

ANT 1:

Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH36(5180MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5180$ MHz; $\sigma = 4.896$ S/m; $\epsilon_r = 47.26$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH36(5180MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.36 W/kg

Configuration/CH36(5180MHz Back)/Zoom Scan (7x7x7)/Cube 0:

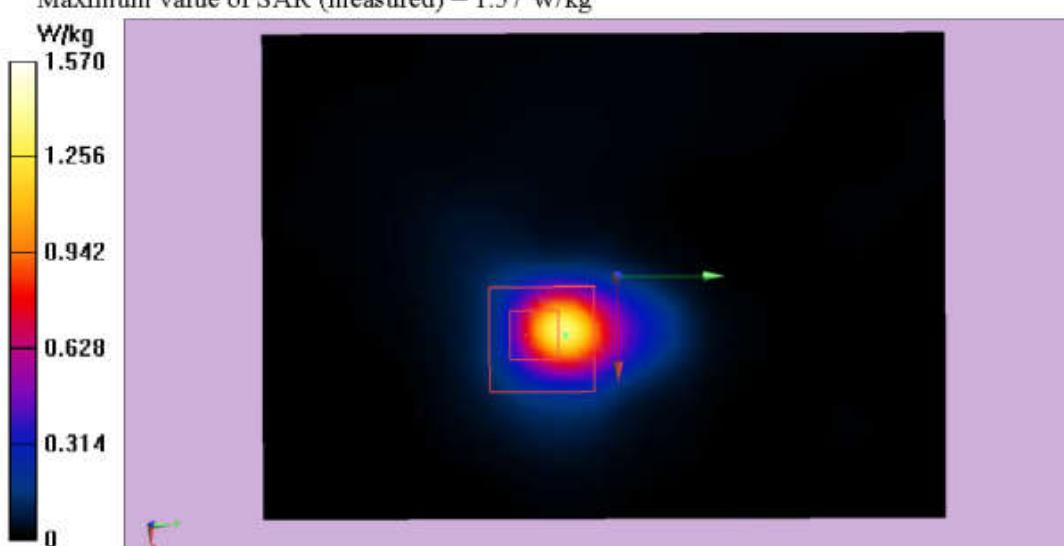
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.596 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 3.34 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.314 W/kg

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



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH40(5200MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.911$ S/m; $\epsilon_r = 47.21$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH40(5200MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.38 W/kg

Configuration/CH40(5200MHz Back)/Zoom Scan (7x7x7)/Cube 0:

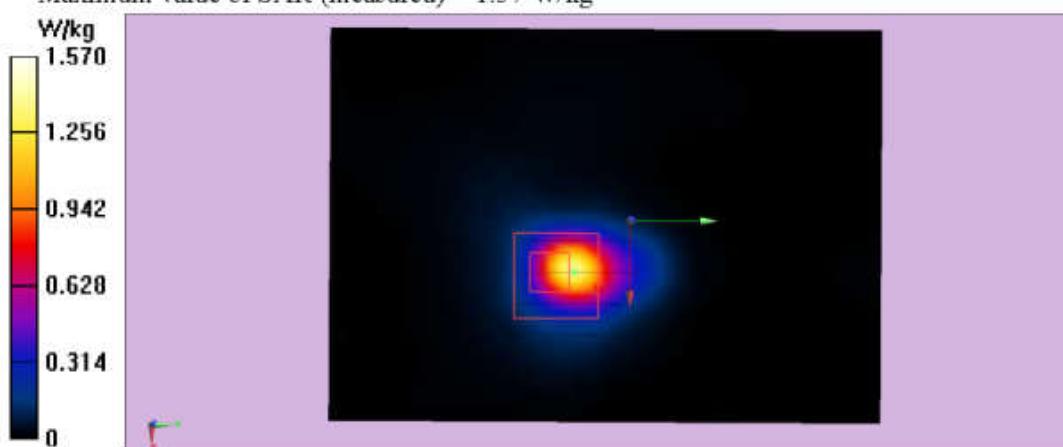
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.558 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 3.37 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.317 W/kg

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



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH40(5200MHz Left)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.911$ S/m; $\epsilon_r = 47.21$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH40(5200MHz Left)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0179 W/kg

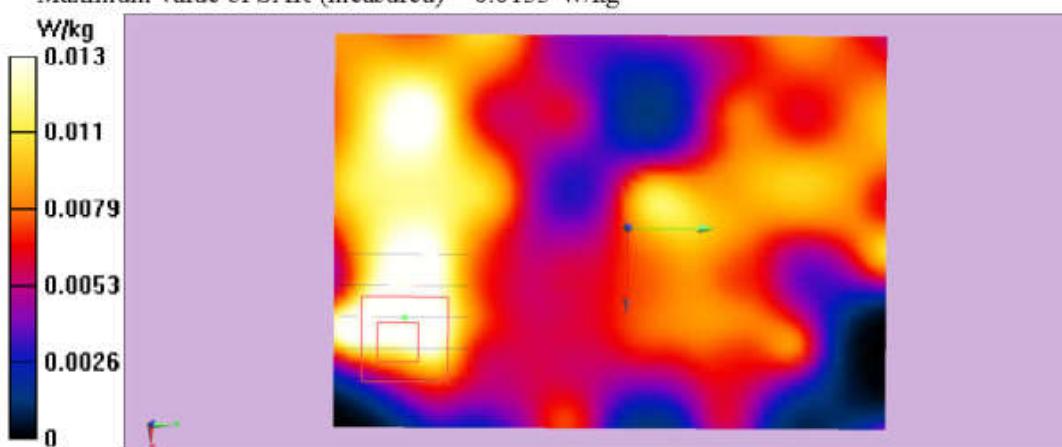
Configuration/CH40(5200MHz Left)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.7930 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.0570 W/kg

SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.00471 W/kg

Maximum value of SAR (measured) = 0.0133 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH40(5200MHz Right)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.911$ S/m; $\epsilon_r = 47.21$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH40(5200MHz Right)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0513 W/kg

Configuration/CH40(5200MHz Right)/Zoom Scan (7x7x7)/Cube 0:

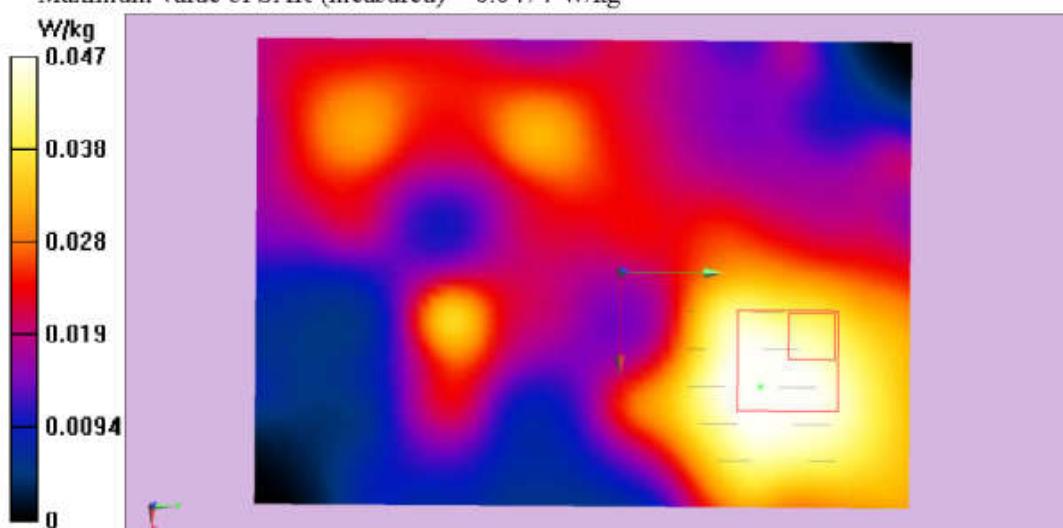
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.488 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.138 W/kg

SAR(1 g) = 0.037 W/kg; SAR(10 g) = 0.018 W/kg

Maximum value of SAR (measured) = 0.0474 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH40(5200MHz Top)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.911$ S/m; $\epsilon_r = 47.21$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH40(5200MHz Top)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0959 W/kg

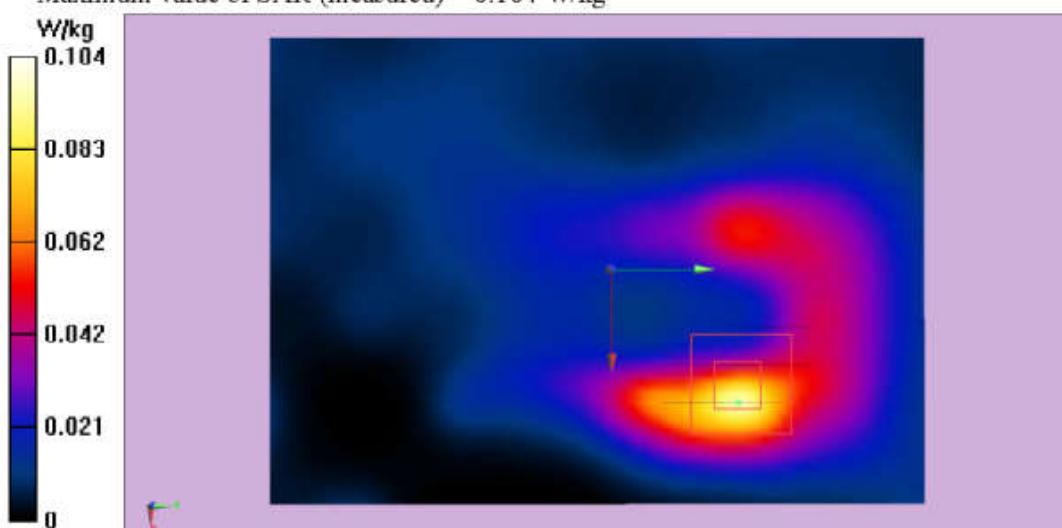
Configuration/CH40(5200MHz Top)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.777 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.284 W/kg

SAR(1 g) = 0.100 W/kg; SAR(10 g) = 0.039 W/kg

Maximum value of SAR (measured) = 0.104 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH48(5240MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 4.958$ S/m; $\epsilon_r = 47.19$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH48(5240MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.37 W/kg

Configuration/CH48(5240MHz Back)/Zoom Scan (7x7x7)/Cube 0:

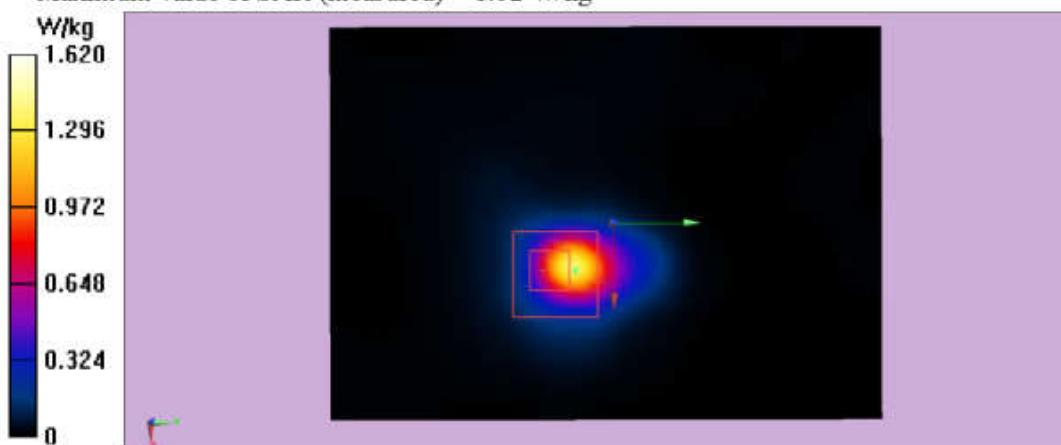
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.693 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 3.46 W/kg

SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.324 W/kg

Maximum value of SAR (measured) = 1.62 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH52(5260MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5260 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 5.3 \text{ S/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH52(5260MHz Back)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.608 W/kg

Configuration/CH52(5260MHz Back)/Zoom Scan (7x7x7)/Cube 0:

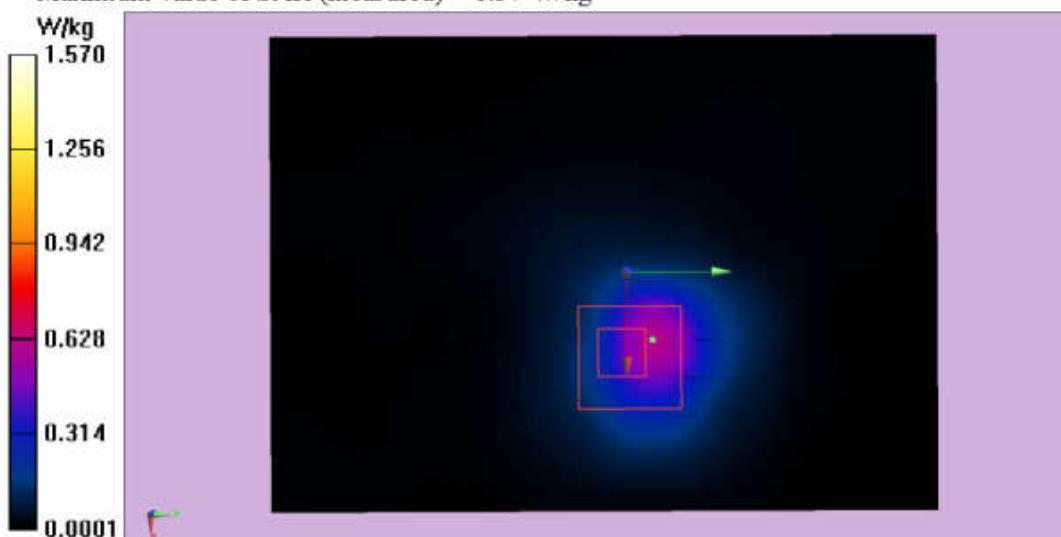
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 3.080 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 3.56 W/kg

SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.344 W/kg

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



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH60(5300MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5300 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5300$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH60(5300MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.619 W/kg

Configuration/CH60(5300MHz Back)/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.057 V/m; Power Drift = -0.12dB

Peak SAR (extrapolated) = 3.69 W/kg

SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.344 W/kg

Maximum value of SAR (measured) = 1.77 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH64(5320MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5320 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5320 \text{ MHz}$; $\sigma = 5.3 \text{ S/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH64(5320MHz Back)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.624 W/kg

Configuration/CH64(5320MHz Back)/Zoom Scan (7x7x7)/Cube 0:

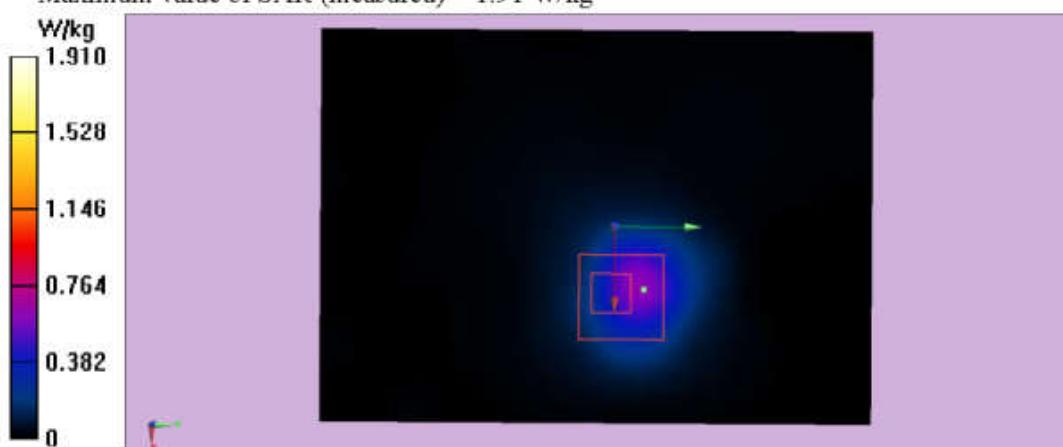
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 2.972 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 3.79 W/kg

SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.342 W/kg

Maximum value of SAR (measured) = 1.91 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH64(5320MHz Left)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5320 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5320 \text{ MHz}$; $\sigma = 5.3 \text{ S/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH64(5320MHz Left)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.0214 W/kg

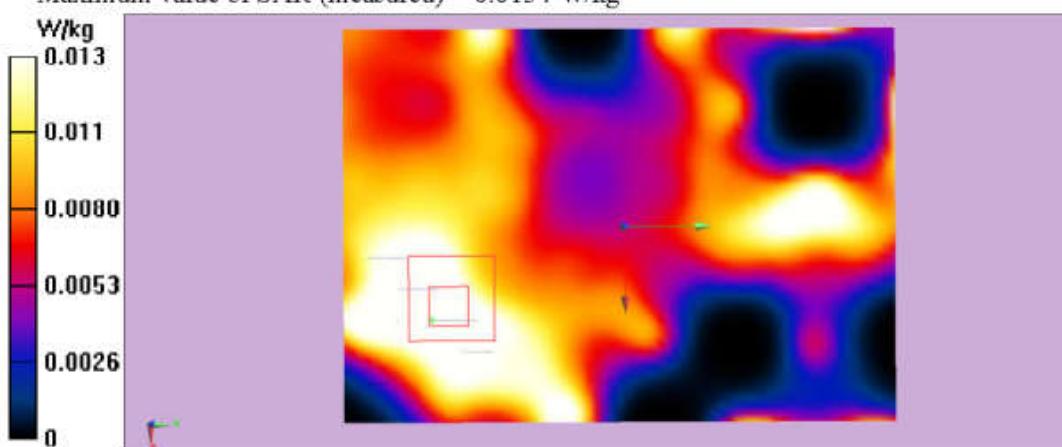
Configuration/CH64(5320MHz Left)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 0.6570 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.0720 W/kg

SAR(1 g) = 0.015 W/kg; SAR(10 g) = 0.00593 W/kg

Maximum value of SAR (measured) = 0.0134 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH64(5320MHz Right)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5320 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5320 \text{ MHz}$; $\sigma = 5.3 \text{ S/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH64(5320MHz Right)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.0668 W/kg

Configuration/CH64(5320MHz Right)/Zoom Scan (7x7x7)/Cube 0:

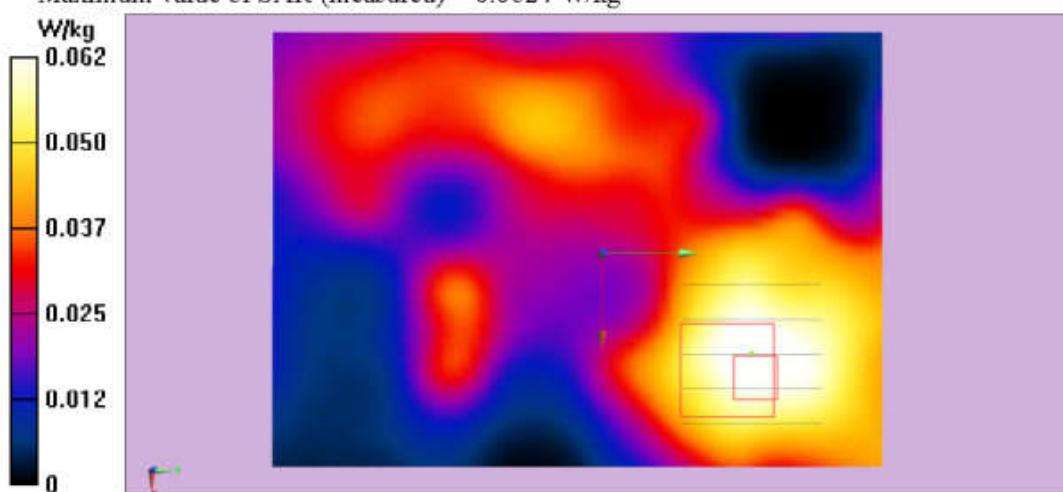
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 1.618 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.282 W/kg

SAR(1 g) = 0.060 W/kg; SAR(10 g) = 0.028 W/kg

Maximum value of SAR (measured) = 0.0624 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH64(5320MHz Top)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5320 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5320 \text{ MHz}$; $\sigma = 5.3 \text{ S/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH64(5320MHz Top)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.0981 W/kg

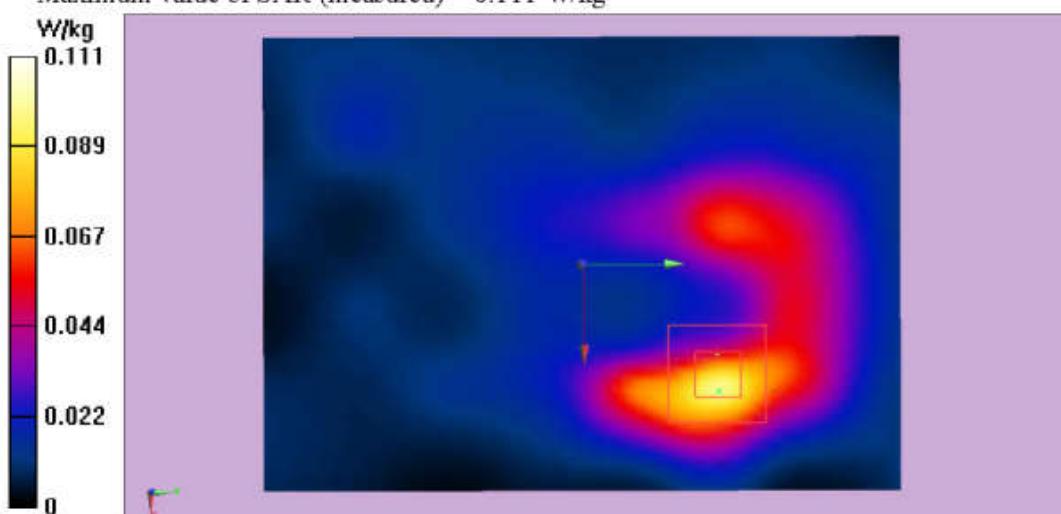
Configuration/CH64(5320MHz Top)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 2.671 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.303 W/kg

SAR(1 g) = 0.105 W/kg; SAR(10 g) = 0.042 W/kg

Maximum value of SAR (measured) = 0.111 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH100(5500MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5500 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.68$ S/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.46, 4.46, 4.46); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH100(5500MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.729 W/kg

Configuration/CH100(5500MHz Back)/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.121 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 4.34 W/kg

SAR(1 g) = 1.22 W/kg; SAR(10 g) = 0.406 W/kg

Maximum value of SAR (measured) = 2.08 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH120(5600MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5600 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5600$ MHz; $\sigma = 6.07$ S/m; $\epsilon_r = 46$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH120(5600MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.775 W/kg

Configuration/CH120(5600MHz Back)/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.090 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 4.66 W/kg

SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.431 W/kg

Maximum value of SAR (measured) = 2.22 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH140(5700MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5700 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5700$ MHz; $\sigma = 5.68$ S/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.37, 4.37, 4.37); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH140(5700MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.748 W/kg

Configuration/CH140(5700MHz Back)/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.129 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 4.53 W/kg

SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.421 W/kg

Maximum value of SAR (measured) = 2.16 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH140(5700MHz Left)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5700 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5700$ MHz; $\sigma = 5.68$ S/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.37, 4.37, 4.37); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH140(5700MHz Left)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0189 W/kg

Configuration/CH140(5700MHz Left)/Zoom Scan (7x7x7)/Cube 0:

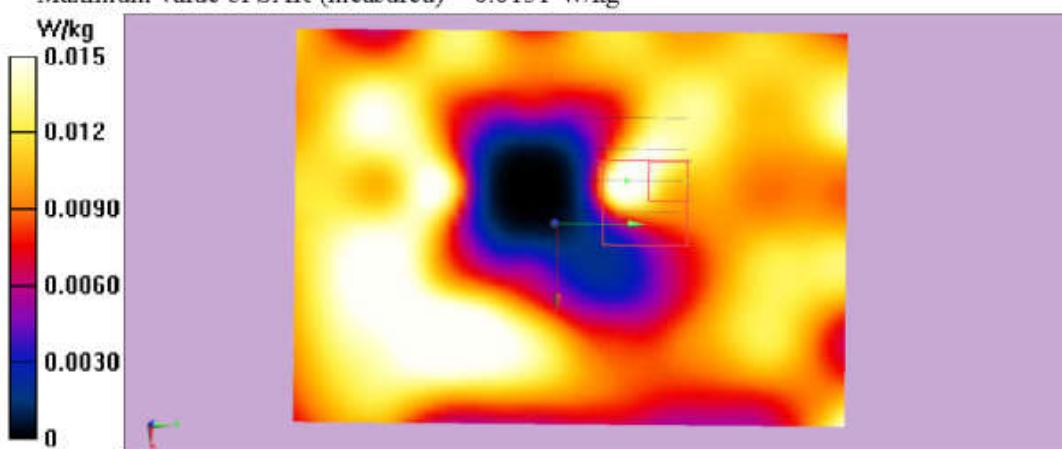
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.6610 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.0460 W/kg

SAR(1 g) = 0.00867 W/kg; SAR(10 g) = 0.00283 W/kg

Maximum value of SAR (measured) = 0.0151 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH140(5700MHz Right)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5700 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5700$ MHz; $\sigma = 5.68$ S/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.37, 4.37, 4.37); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH140(5700MHz Right)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0668 W/kg

Configuration/CH140(5700MHz Right)/Zoom Scan (7x7x7)/Cube 0:

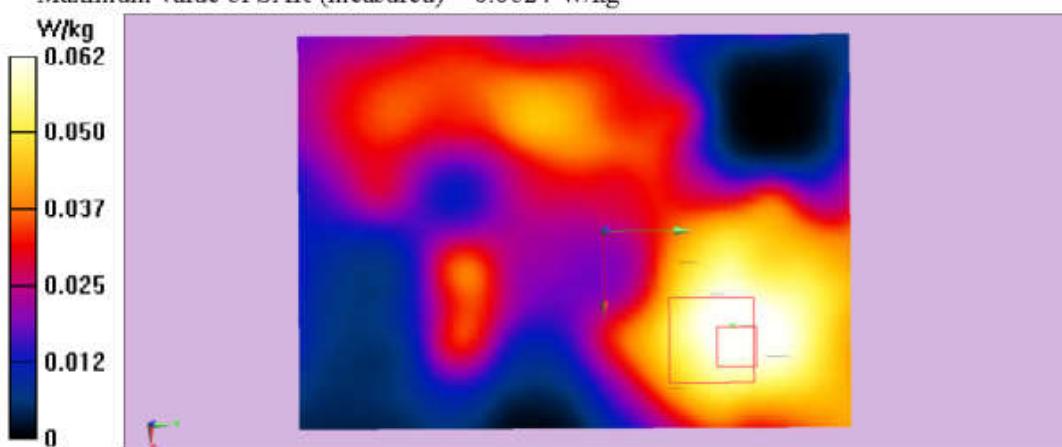
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.618 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.282 W/kg

SAR(1 g) = 0.060 W/kg; SAR(10 g) = 0.028 W/kg

Maximum value of SAR (measured) = 0.0624 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH140(5700MHz Top)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5700 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5700$ MHz; $\sigma = 5.68$ S/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.37, 4.37, 4.37); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH140(5700MHz Top)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.121 W/kg

Configuration/CH140(5700MHz Top)/Zoom Scan (7x7x7)/Cube 0:

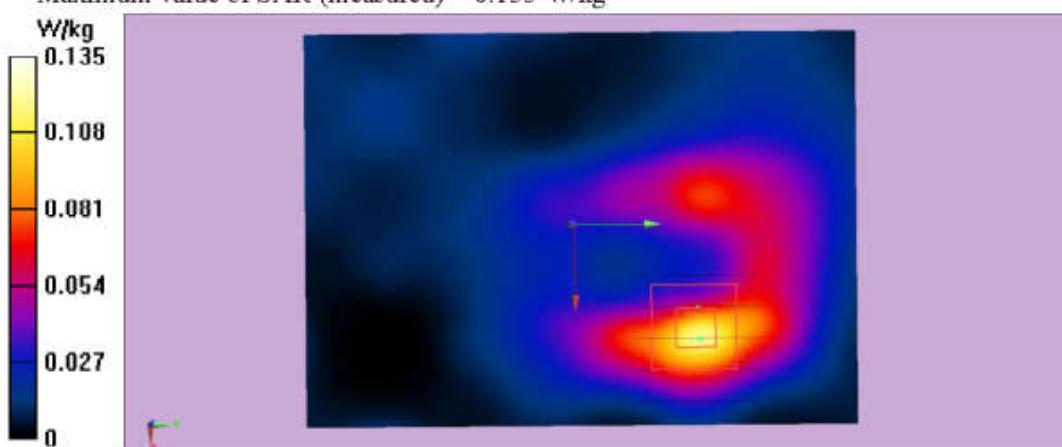
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.922 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.474 W/kg

SAR(1 g) = 0.135 W/kg; SAR(10 g) = 0.051 W/kg

Maximum value of SAR (measured) = 0.135 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH149(5745MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5745 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5745 \text{ MHz}$; $\sigma = 6.07 \text{ S/m}$; $\epsilon_r = 46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH149(5745MHz Back)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.789 W/kg

Configuration/CH149(5745MHz Back)/Zoom Scan (7x7x7)/Cube 0:

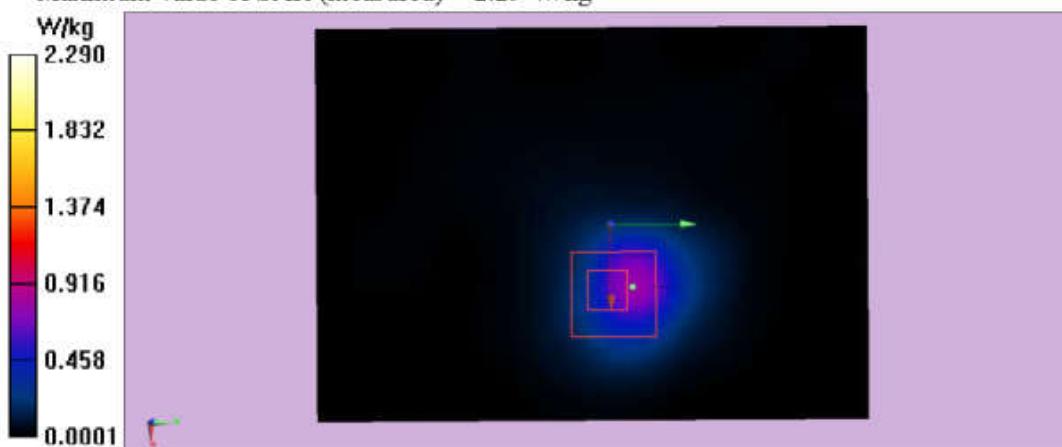
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 3.018 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 4.77 W/kg

SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.440 W/kg

Maximum value of SAR (measured) = 2.29 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH157(5785MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5785 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.07 \text{ S/m}$; $\epsilon_r = 46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH157(5785MHz Back)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.790 W/kg

Configuration/CH157(5785MHz Back)/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 2.924 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 4.83 W/kg

SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.447 W/kg

Maximum value of SAR (measured) = 2.30 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH157(5785MHz Left)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5785 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.07 \text{ S/m}$; $\epsilon_r = 46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH157(5785MHz Left)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.0250 W/kg

Configuration/CH157(5785MHz Left)/Zoom Scan (7x7x7)/Cube 0:

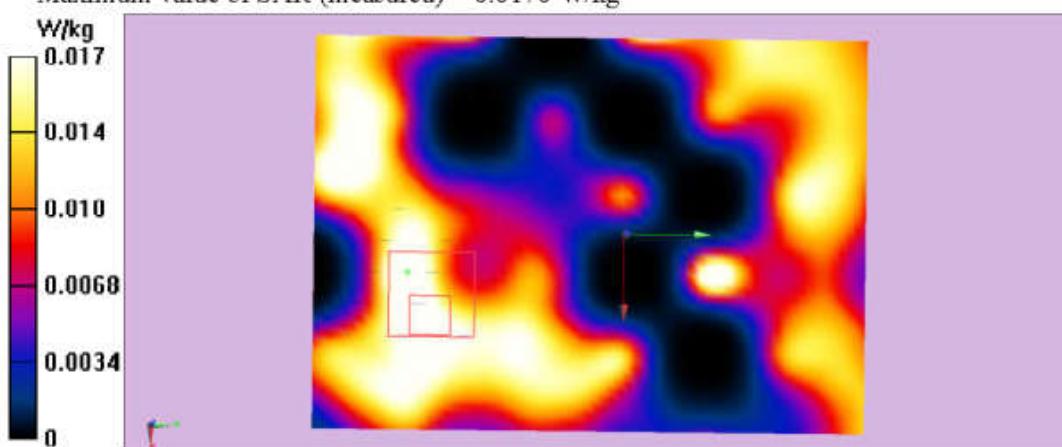
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 0.9770 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.0680 W/kg

SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.00698 W/kg

Maximum value of SAR (measured) = 0.0170 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH157(5785MHz Right)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5785 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.07 \text{ S/m}$; $\epsilon_r = 46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH157(5785MHz Right)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.0682 W/kg

Configuration/CH157(5785MHz Right)/Zoom Scan (7x7x7)/Cube 0:

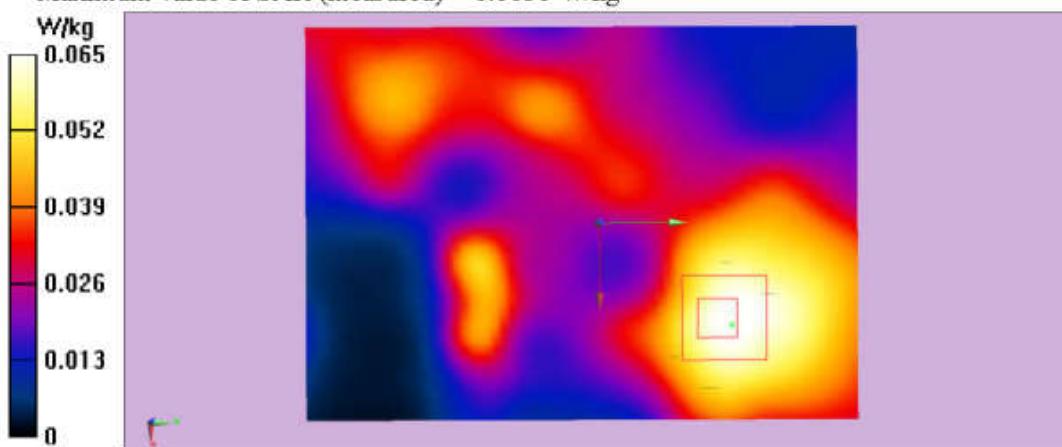
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 1.784 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.249 W/kg

SAR(1 g) = 0.061 W/kg; SAR(10 g) = 0.028 W/kg

Maximum value of SAR (measured) = 0.0650 W/kg



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH157(5785MHz Top)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5785 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.07 \text{ S/m}$; $\epsilon_r = 46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH157(5785MHz Top)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.127 W/kg

Configuration/CH157(5785MHz Top)/Zoom Scan (7x7x7)/Cube 0:

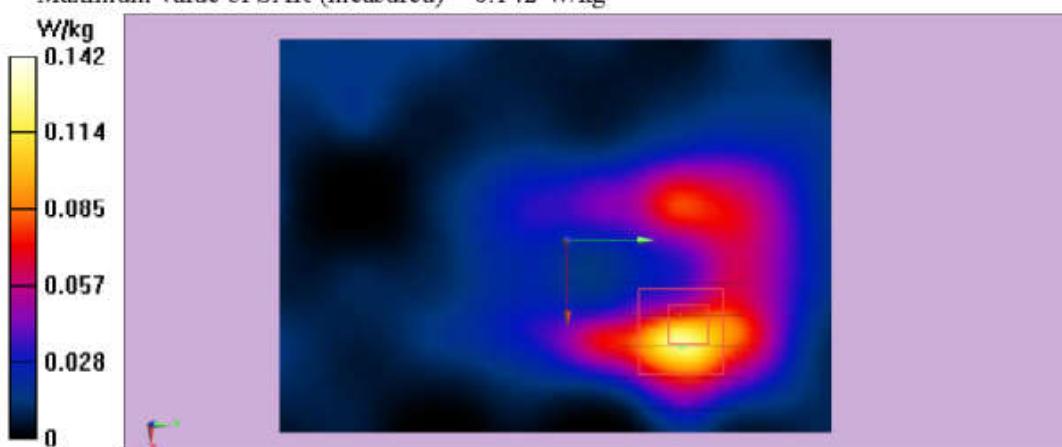
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 2.957 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.386 W/kg

SAR(1 g) = 0.133 W/kg; SAR(10 g) = 0.051 W/kg

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



Test Laboratory: Audix SAR Lab

Date: 27/09/2018

11a CH165(5825MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5825 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5825 \text{ MHz}$; $\sigma = 6.07 \text{ S/m}$; $\epsilon_r = 46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH165(5825MHz Back)/Area Scan (51x71x1): Interpolated grid:

$dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.804 W/kg

Configuration/CH165(5825MHz Back)/Zoom Scan (7x7x7)/Cube 0:

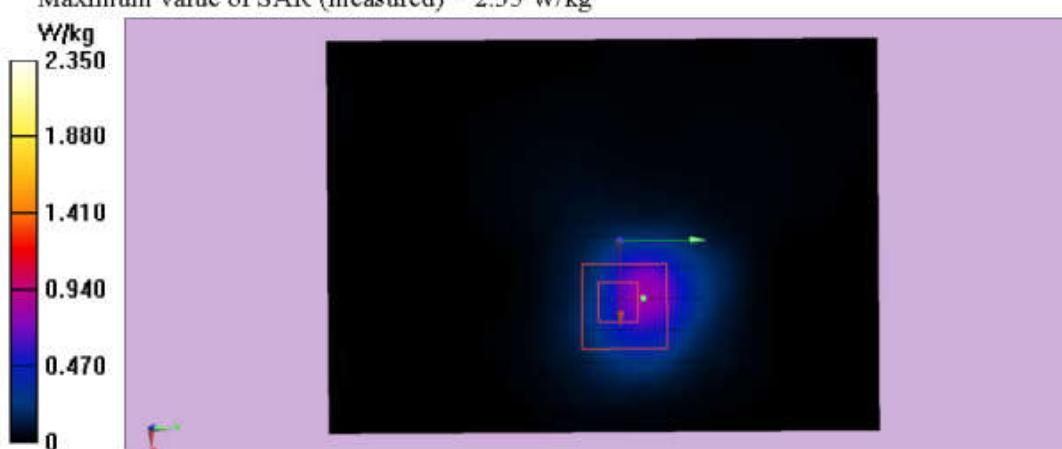
Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 3.114 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 4.92 W/kg

SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.453 W/kg

Maximum value of SAR (measured) = 2.35 W/kg



Test Laboratory: Audix SAR Lab

Date: 18/10/2018

11a CH36(5180MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5180$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH36(5180MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

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

Configuration/CH36(5180MHz Back)/Zoom Scan (7x7x7)/Cube 0:

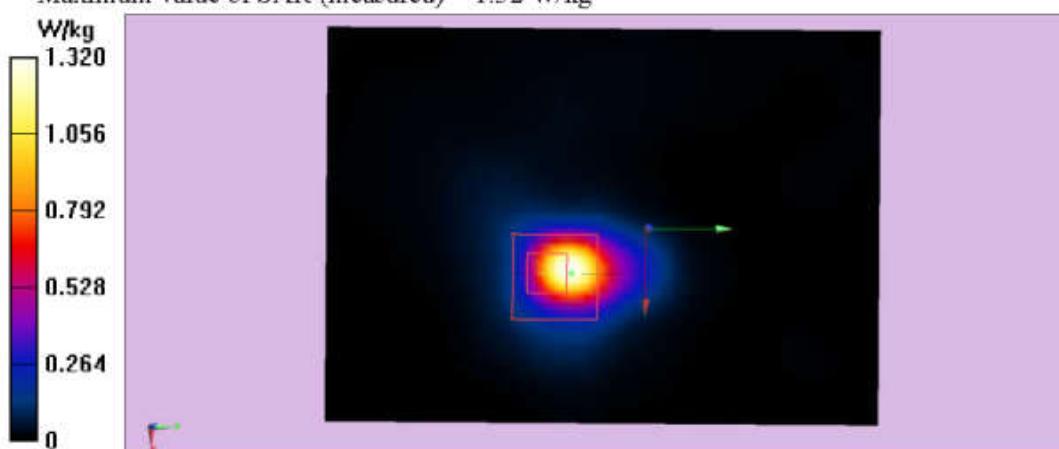
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.554 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 2.13 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.296 W/kg

Maximum value of SAR (measured) = 1.32 W/kg



Test Laboratory: Audix SAR Lab

Date: 18/10/2018

11a CH40(5200MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH40(5200MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.59 W/kg

Configuration/CH40(5200MHz Back)/Zoom Scan (7x7x7)/Cube 0:

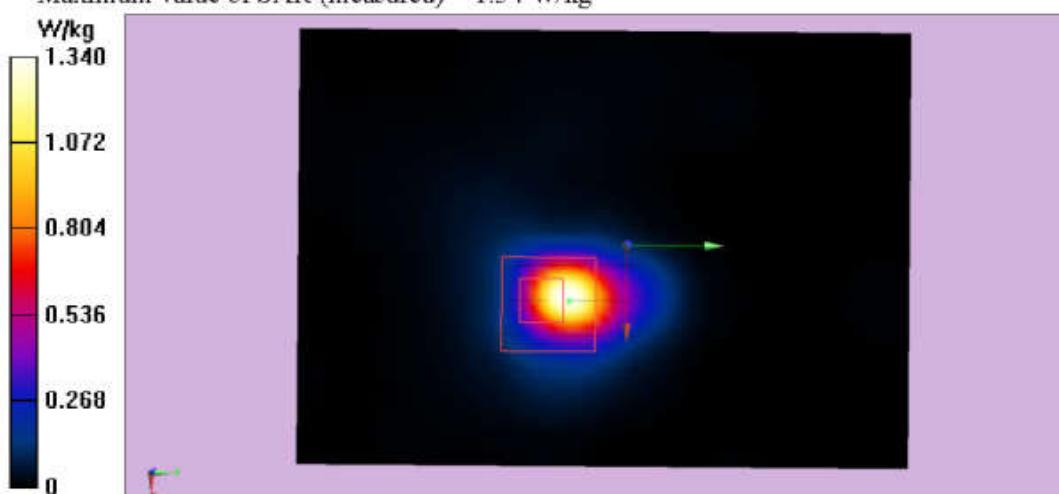
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.538 V/m; Power Drift = 0.04dB

Peak SAR (extrapolated) = 3.37 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.297 W/kg

Maximum value of SAR (measured) = 1.34 W/kg



Test Laboratory: Audix SAR Lab

Date: 18/10/2018

11a CH48(5240MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.26, 5.26, 5.26); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH48(5240MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

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

Configuration/CH48(5240MHz Back)/Zoom Scan (7x7x7)/Cube 0:

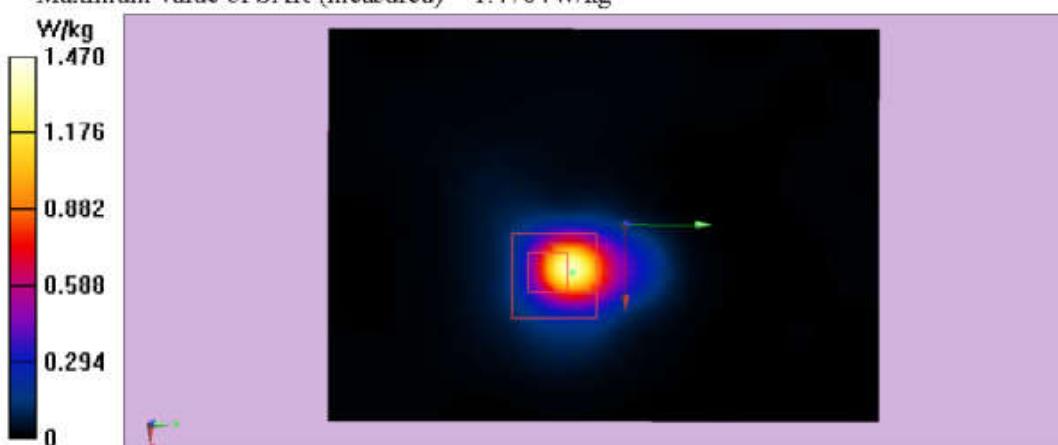
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.647V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 2.64 W/kg

SAR(1 g) = 1.09W/kg; SAR(10 g) = 0.314 W/kg

Maximum value of SAR (measured) = 1.4704W/kg



Test Laboratory: Audix SAR Lab

Date: 18/10/2018

11a CH52(5260MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System

Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5260 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5260$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH52(5260MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.608 W/kg

Configuration/CH52(5260MHz Back)/Zoom Scan (7x7x7)/Cube 0:

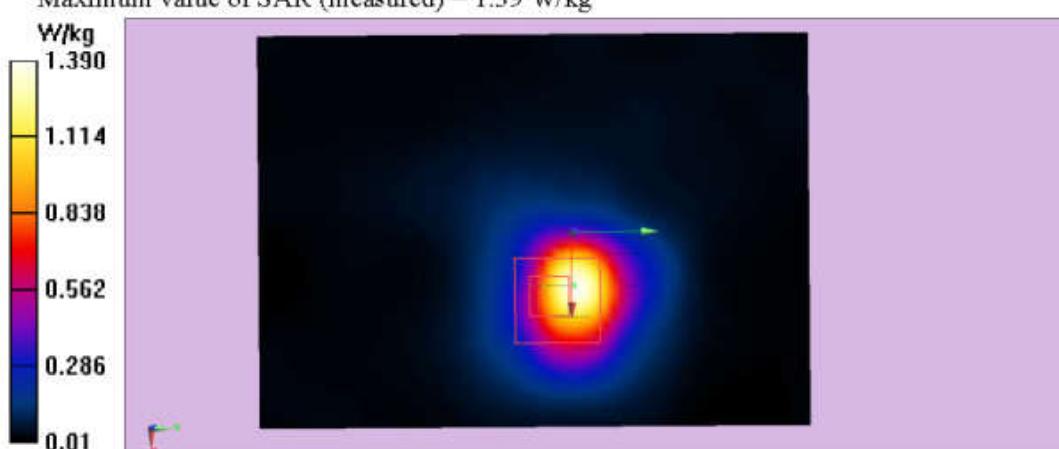
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.027 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 2.67 W/kg

SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.334 W/kg

Maximum value of SAR (measured) = 1.39 W/kg



Test Laboratory: Audix SAR Lab

Date: 18/10/2018

11a CH60(5300MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System

Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5300 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5300$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH60(5300MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.69 W/kg

Configuration/CH60(5300MHz Back)/Zoom Scan (5x5x7)/Cube 0:

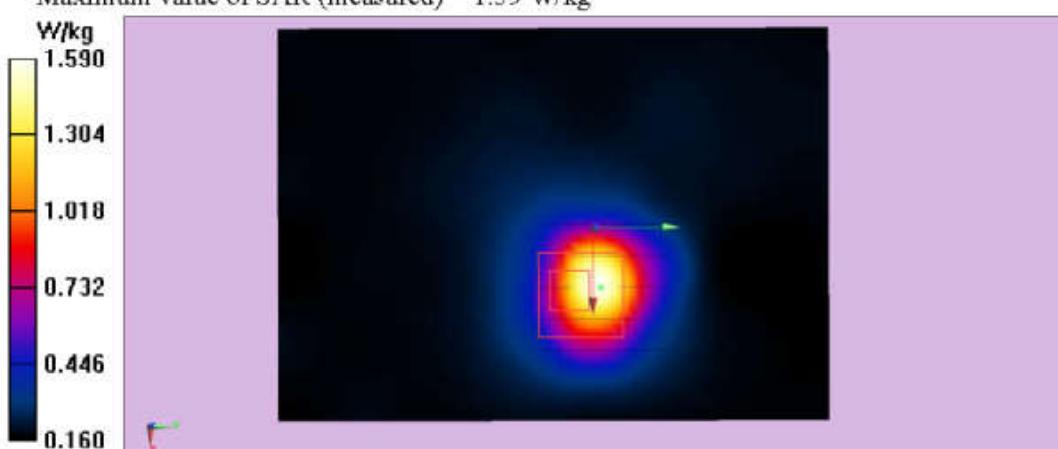
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.84 V/m; Power Drift = -0.02dB

Peak SAR (extrapolated) = 2.84 W/kg

SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.316 W/kg

Maximum value of SAR (measured) = 1.59 W/kg



Test Laboratory: Audix SAR Lab

Date: 18/10/2018

11a CH64(5320MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System

Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5320 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5320$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.98, 4.98, 4.98); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH64(5320MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.69 W/kg

Configuration/CH64(5320MHz Back)/Zoom Scan (7x7x7)/Cube 0:

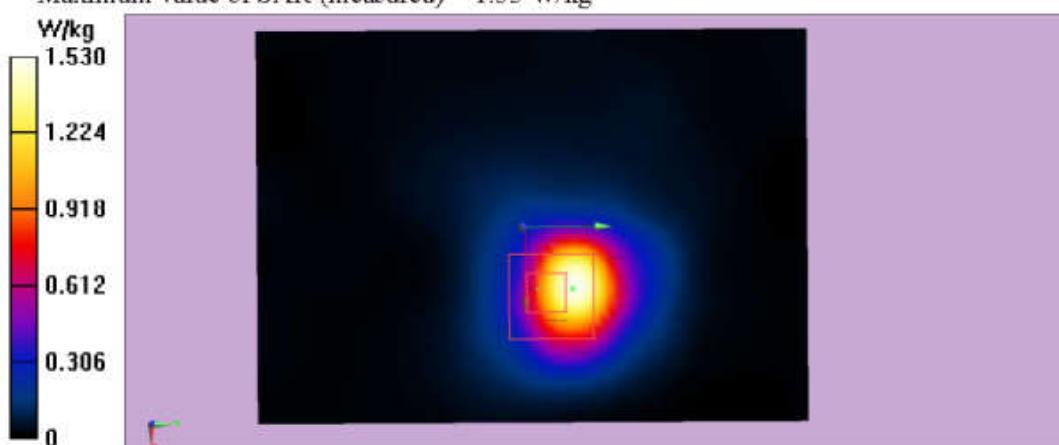
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.004 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.57 W/kg

SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.314 W/kg

Maximum value of SAR (measured) = 1.53 W/kg



Test Laboratory: Audix SAR Lab

Date: 19/10/2018

11a CH100(5500MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5500 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.46, 4.46, 4.46); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/ CH100(5500MHz Back)/Area Scan (51x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.581 W/kg

Configuration/ CH100(5500MHz Back Back)/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.063 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.397 W/kg

Maximum value of SAR (measured) = 1.43 W/kg



Test Laboratory: Audix SAR Lab

Date: 19/10/2018

11a CH120(5600MHz Back)**DUT: POS Terminal M/N:SPD1-01**

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5600 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.37, 4.37, 4.37); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/ CH120(5600MHz Back)/Area Scan (51x71x1): Interpolated grid; dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.79 W/kg

Configuration/ CH120(5600MHz Back)/Zoom Scan (7x7x7)/Cube 0:

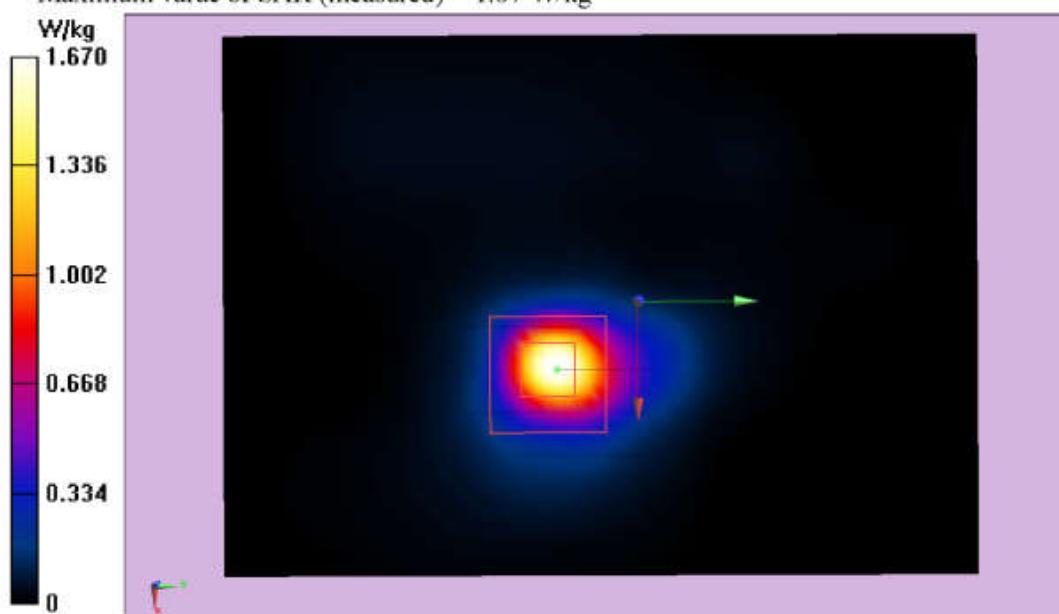
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.014 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.416 W/kg

Maximum value of SAR (measured) = 1.67 W/kg



Test Laboratory: Audix SAR Lab

Date: 19/10/2018

11a CH140(5700MHz Back)**DUT: POS Terminal M/N:SPD1-01**

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5700 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5700$ MHz; $\sigma = 6.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/ CH140(5700MHz Back)/Area Scan (51x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.76 W/kg

Configuration/ CH140(5700MHz Back)/Zoom Scan (7x7x7)/Cube 0:

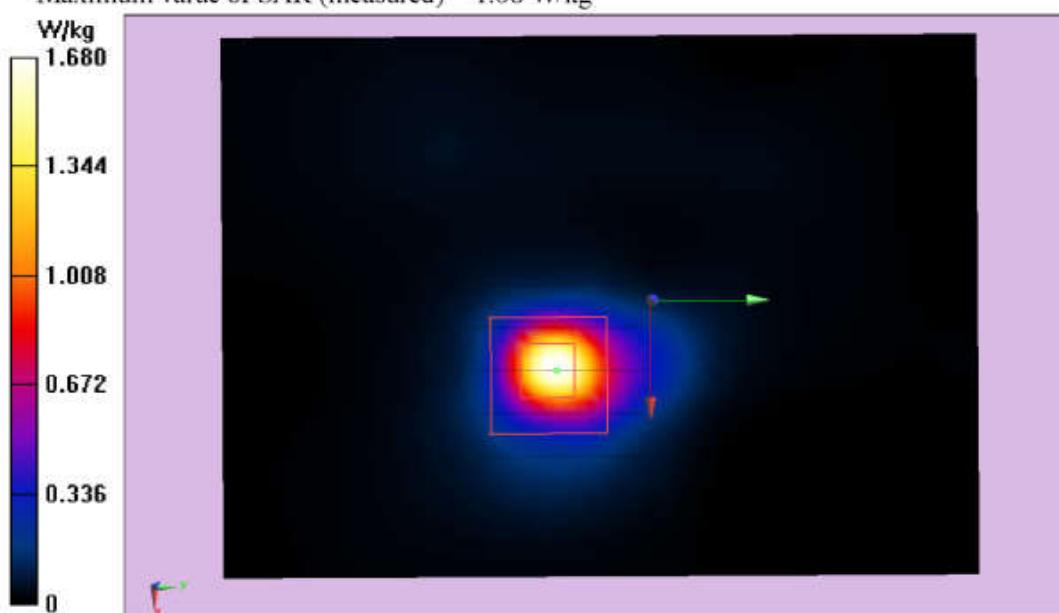
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.247 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.367 W/kg

Maximum value of SAR (measured) = 1.68 W/kg



Test Laboratory: Audix SAR Lab

Date: 19/10/2018

11a CH149(5745MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System

Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5745 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5745$ MHz; $\sigma = 6.07$ S/m; $\epsilon_r = 46$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH149(5745MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.75 W/kg

Configuration/CH149(5745MHz Back)/Zoom Scan (7x7x7)/Cube 0:

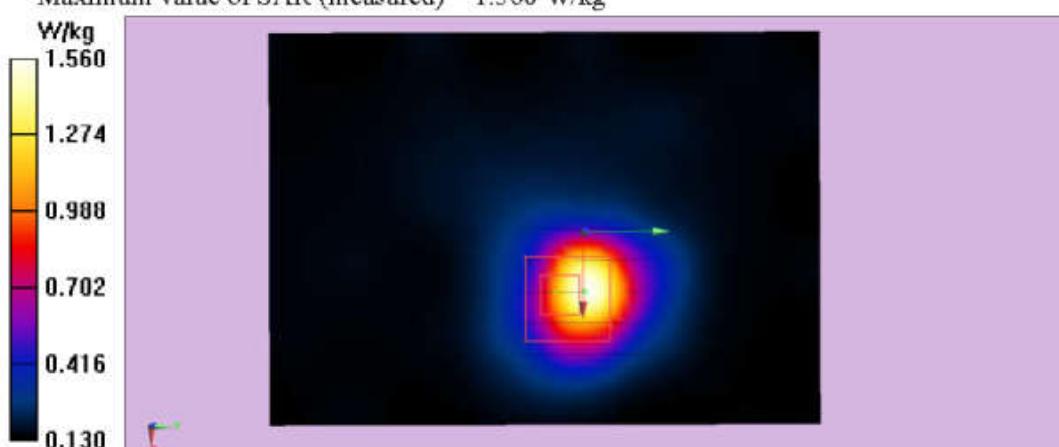
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.003 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.17 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.405 W/kg

Maximum value of SAR (measured) = 1.560 W/kg



Test Laboratory: Audix SAR Lab

Date: 19/10/2018

11a CH157(5785MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System

Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5785 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5785$ MHz; $\sigma = 6.07$ S/m; $\epsilon_r = 46$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH157(5785MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.78 W/kg

Configuration/CH157(5785MHz Back)/Zoom Scan (7x7x7)/Cube 0:

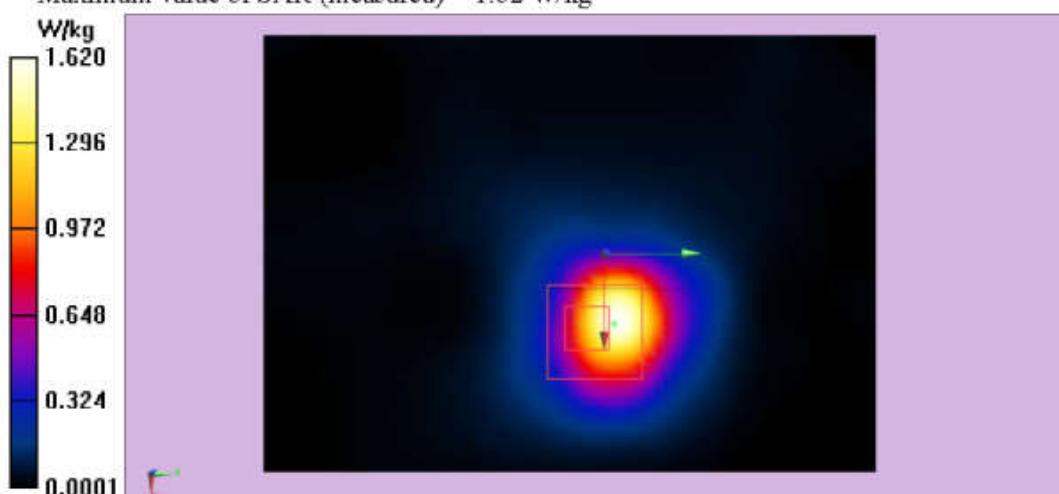
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.832 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 3.24 W/kg

SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.412 W/kg

Maximum value of SAR (measured) = 1.62 W/kg



Test Laboratory: Audix SAR Lab

Date: 19/10/2018

11a CH165(5825MHz Back)

DUT: POS Terminal M/N:SPD1-01

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System

Band: IEEE 802.11a WiFi 5.8GHz ; Frequency: 5825 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5825$ MHz; $\sigma = 6.07$ S/m; $\epsilon_r = 46$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.42, 4.42, 4.42); Calibrated: 07/03/2018;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 08/02/2018
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CH165(5825MHz Back)/Area Scan (51x71x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

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

Configuration/CH165(5825MHz Back)/Zoom Scan (7x7x7)/Cube 0:

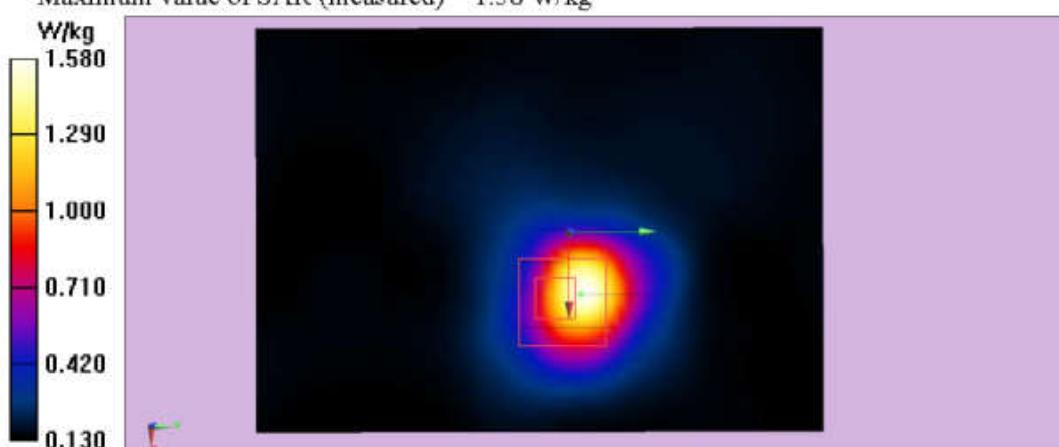
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.01 V/m; Power Drift = -0.08dB

Peak SAR (extrapolated) = 3.87 W/kg

SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.426 W/kg

Maximum value of SAR (measured) = 1.58 W/kg



ANNEX C: DASY CABLIBRATION CERTIFICATE

Schmid & Partner Engineering AG

S p e a g

Zürcherstrasse 43, 8004 Zürich, Switzerland
Phone: +41 44 245 9700, Fax: +41 44 245 9779
info@speag.com, http://www.speag.com

IMPORTANT NOTICE

USAGE OF THE DAE 4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw; over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MΩ is given in the corresponding configuration file.

Important Note:

Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:

Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:

To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Schmid & Partner Engineering

TN_BR040315AD DAE4.doc

11.12.2009



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: ctll@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)



中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client

Audix

Certificate No: Z18-97029

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3767
--------	------------------

Calibration Procedure(s)	FF-Z11-004-01
--------------------------	---------------

Calibration Procedures for Dosimetric E-field Probes
--

Calibration date:	March 07, 2018
-------------------	----------------

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

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

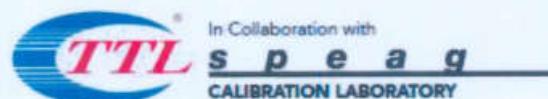
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101547	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101548	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Reference10dBAttenuator	18N50W-10dB	13-Mar-16(CTTL, No.J16X01547)	Mar-18
Reference20dBAttenuator	18N50W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG, No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1524	13-Sep-17(SPEAG, No.DAE4-1524_Sep17)	Sep -18
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	14-Jan-18 (CTTL, No.J18X00561)	Jan -19

	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: March 09, 2018

This calibration certificate shall not be reproduced except in full without written approval of the 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](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 $\theta=0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- **NORMx,y,z:** Assessed for E-field polarization $\theta=0$ (≤ 900 MHz in TEM-cell; $f > 1800$ MHz: 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:** 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 $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to 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 ± 50 MHz to ± 100 MHz.
- **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).



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](http://www.chinattl.cn)

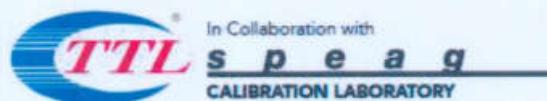
Probe EX3DV4

SN: 3767

Calibrated: March 07, 2018

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)



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](http://www.chinattl.cn)

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3767

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.55	0.57	0.48	$\pm 10.0\%$
DCP(mV) ^B	102.0	102.0	104.0	

Modulation Calibration Parameters

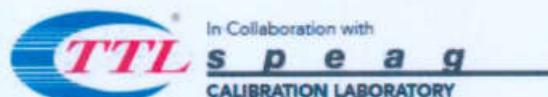
UID	Communication System Name	A dB	B dB- μV	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X 0.0	0.0	1.0	0.00	172.3	$\pm 2.0\%$
		Y 0.0	0.0	1.0		176.3	
		Z 0.0	0.0	1.0		161.6	

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 E²-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.



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](http://www.chinattl.cn)

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3767

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	9.67	9.67	9.67	0.35	0.75	±12.1%
835	41.5	0.90	9.38	9.38	9.38	0.17	1.17	±12.1%
900	41.5	0.97	9.40	9.40	9.40	0.14	1.37	±12.1%
1450	40.5	1.20	8.58	8.58	8.58	0.13	1.27	±12.1%
1750	40.1	1.37	8.30	8.30	8.30	0.23	1.05	±12.1%
1900	40.0	1.40	7.90	7.90	7.90	0.20	1.13	±12.1%
2000	40.0	1.40	7.81	7.81	7.81	0.22	1.04	±12.1%
2450	39.2	1.80	7.47	7.47	7.47	0.49	0.77	±12.1%
2600	39.0	1.96	7.29	7.29	7.29	0.65	0.68	±12.1%
3500	37.9	2.91	7.02	7.02	7.02	0.51	0.90	±13.3%
5200	36.0	4.66	5.63	5.63	5.63	0.35	1.70	±13.3%
5300	35.9	4.76	5.26	5.26	5.26	0.35	1.45	±13.3%
5500	35.6	4.96	4.94	4.94	4.94	0.35	1.75	±13.3%
5600	35.5	5.07	4.81	4.81	4.81	0.40	1.45	±13.3%
5800	35.3	5.27	4.75	4.75	4.75	0.40	1.85	±13.3%

^C Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^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.



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](http://www.chinattl.cn)

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3767

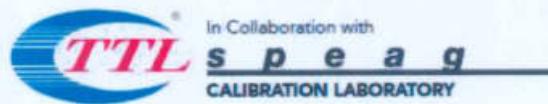
Calibration Parameter Determined in Body Tissue Simulating Media

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	9.93	9.93	9.93	0.40	0.80	±12.1%
835	55.2	0.97	9.60	9.60	9.60	0.15	1.49	±12.1%
900	55.0	1.05	9.51	9.51	9.51	0.19	1.33	±12.1%
1450	54.0	1.30	8.70	8.70	8.70	0.10	1.48	±12.1%
1750	53.4	1.49	8.19	8.19	8.19	0.22	1.13	±12.1%
1900	53.3	1.52	7.83	7.83	7.83	0.20	1.16	±12.1%
2000	53.3	1.52	7.90	7.90	7.90	0.19	1.22	±12.1%
2450	52.7	1.95	7.63	7.63	7.63	0.41	0.99	±12.1%
2600	52.5	2.16	7.47	7.47	7.47	0.45	0.92	±12.1%
3500	51.3	3.31	6.58	6.58	6.58	0.57	0.96	±13.3%
5200	49.0	5.30	5.26	5.26	5.26	0.40	1.80	±13.3%
5300	48.9	5.42	4.98	4.98	4.98	0.40	1.60	±13.3%
5500	48.6	5.65	4.46	4.46	4.46	0.50	1.60	±13.3%
5600	48.5	5.77	4.37	4.37	4.37	0.50	1.35	±13.3%
5800	48.2	6.00	4.42	4.42	4.42	0.50	1.40	±13.3%

^C Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

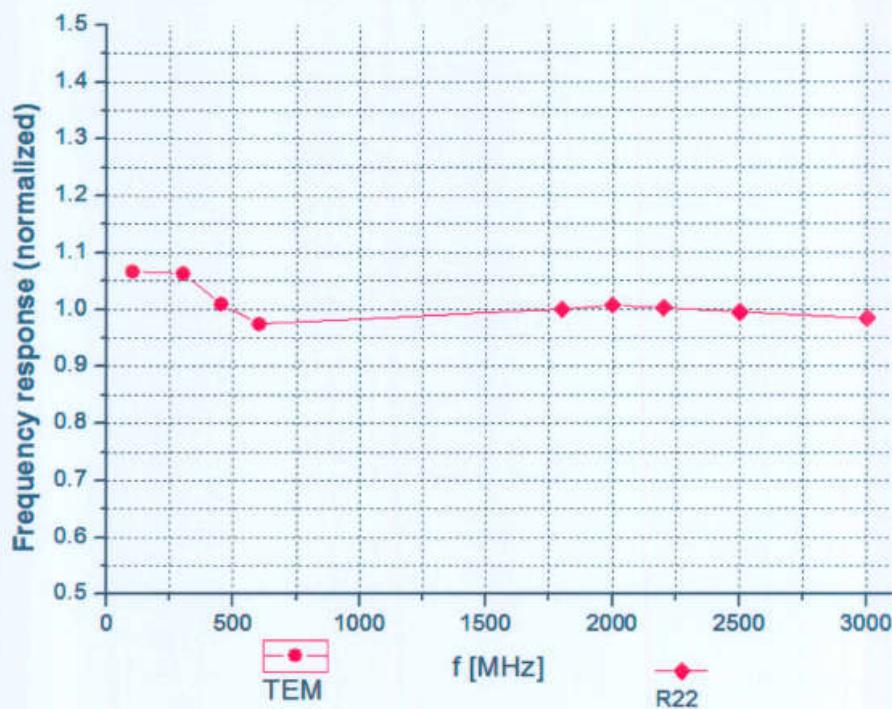
^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty 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.

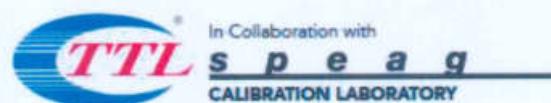


Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctl@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)

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



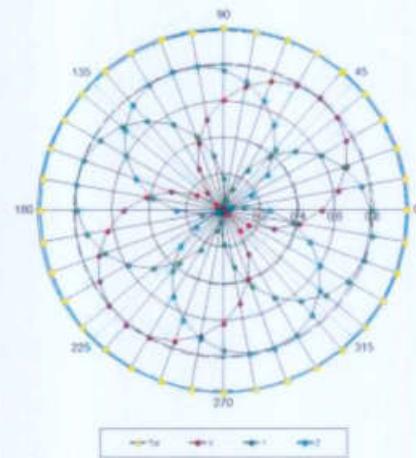
Uncertainty of Frequency Response of E-field: $\pm 7.4\%$ ($k=2$)



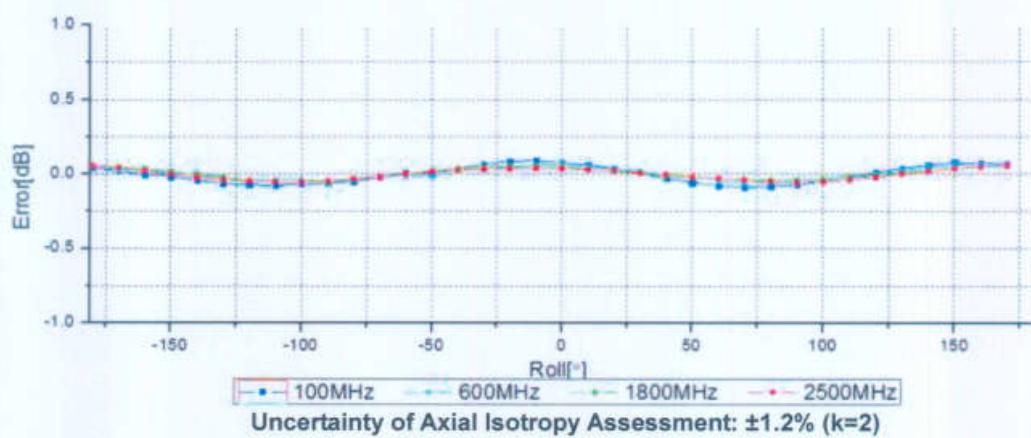
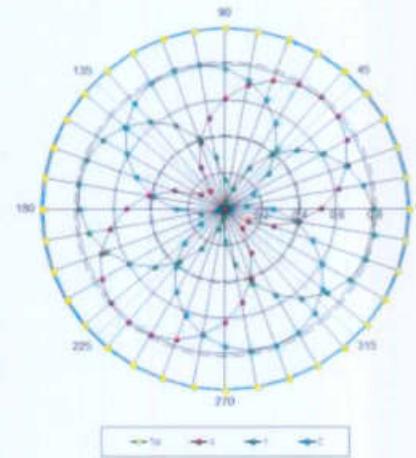
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 FAX: +86-10-62304633-2209
E-mail: cttl@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)

Receiving Pattern (Φ), $\theta=0^\circ$

f=600 MHz, TEM



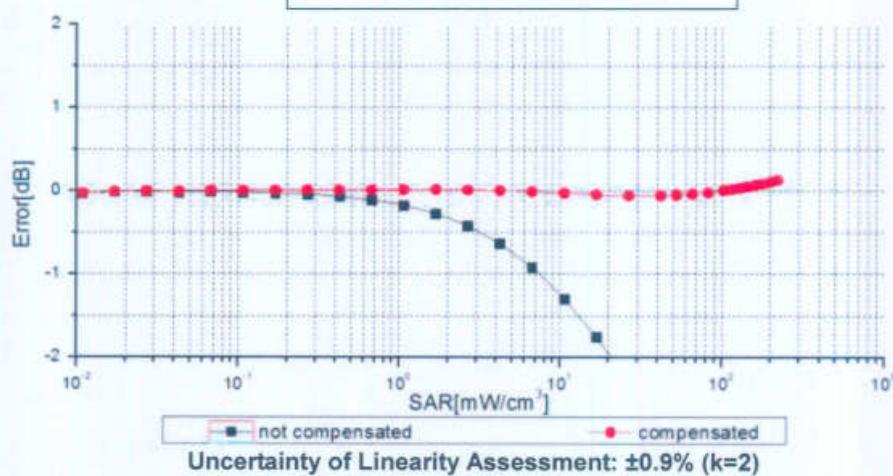
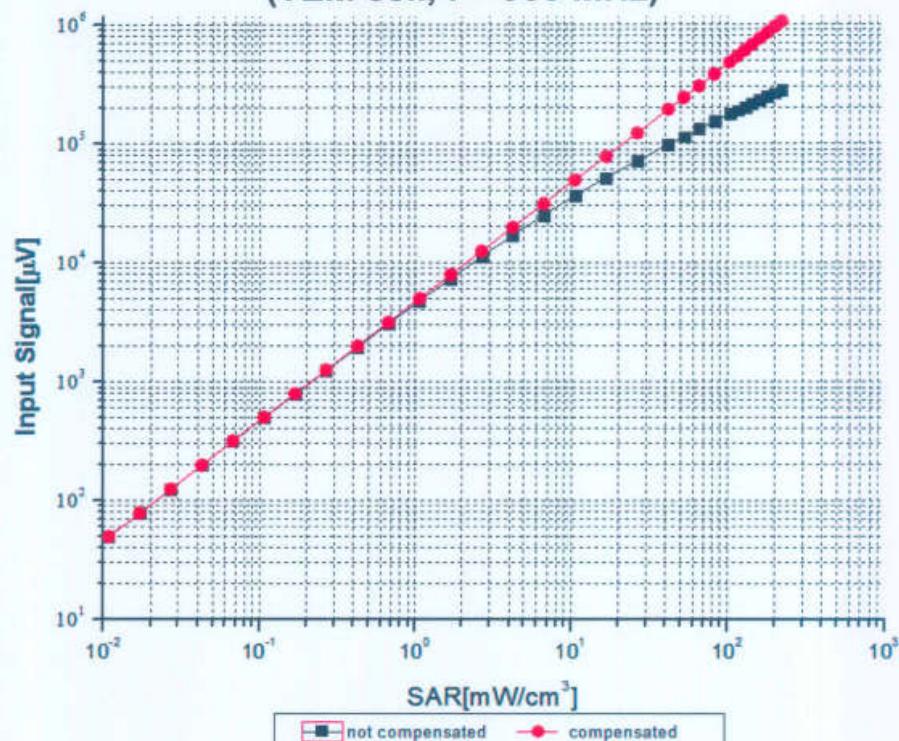
f=1800 MHz, R22



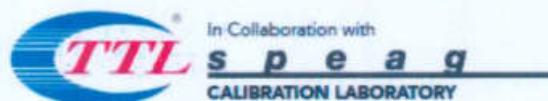


Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctl@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)

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



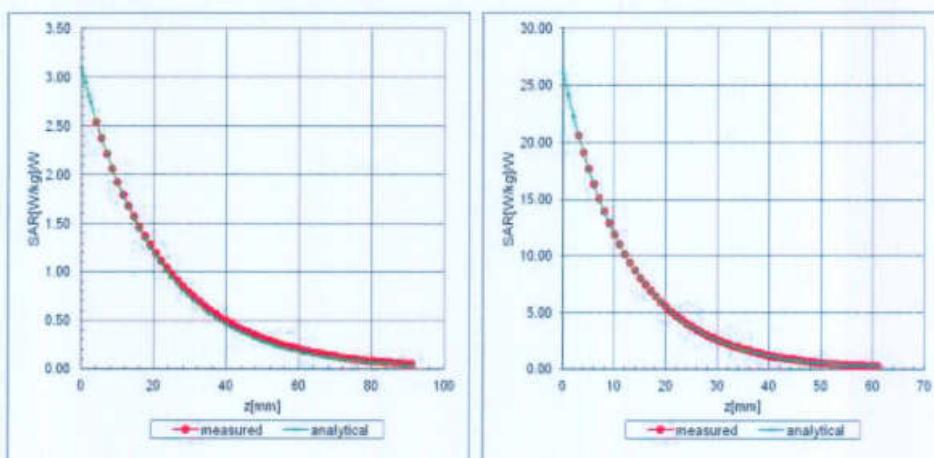
Uncertainty of Linearity Assessment: ±0.9% (k=2)



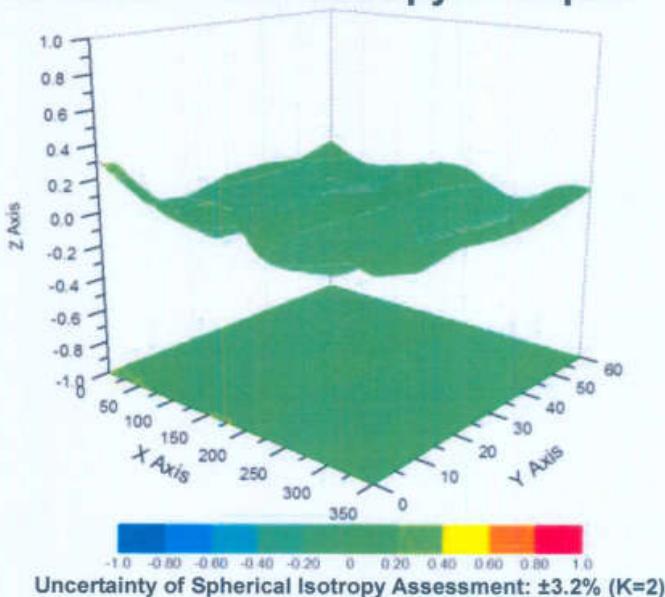
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctl@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)

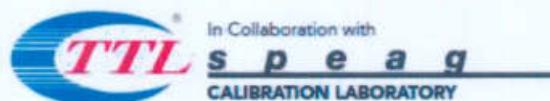
Conversion Factor Assessment

f=750 MHz, WGLS R9(H_convF) f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid





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](http://www.chinattl.cn)

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3767

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	146.6
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
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: ctl@chinattl.com <http://www.chinattl.cn>



中国认可
 国际互认
 校准
 CALIBRATION
 CNAS L0570

Client

Audix

Certificate No: Z17-97065

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 862

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

Calibration date: June 06, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG, No.EX3-3617_Jan17)	Jan-18
DAE4	SN 771	19-Jan-17(CTTL-SPEAG, No.Z17-97016)	Jan-18
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: June 09, 2017

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



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: 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, "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: ttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

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

DASY Version	DASY52	52.10.0.1442
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	39.6 ± 6 %	1.81 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	13.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	52.8 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.13 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.5 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	52.8 ± 6 %	1.96 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	12.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	51.5 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.94 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.7 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: 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	48.6Ω+ 5.14jΩ
Return Loss	- 25.4dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.7Ω+ 4.98jΩ
Return Loss	- 26.0dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.273 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
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: 06.06.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 862

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.809 \text{ S/m}$; $\epsilon_r = 39.63$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.74, 7.74, 7.74); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; 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)

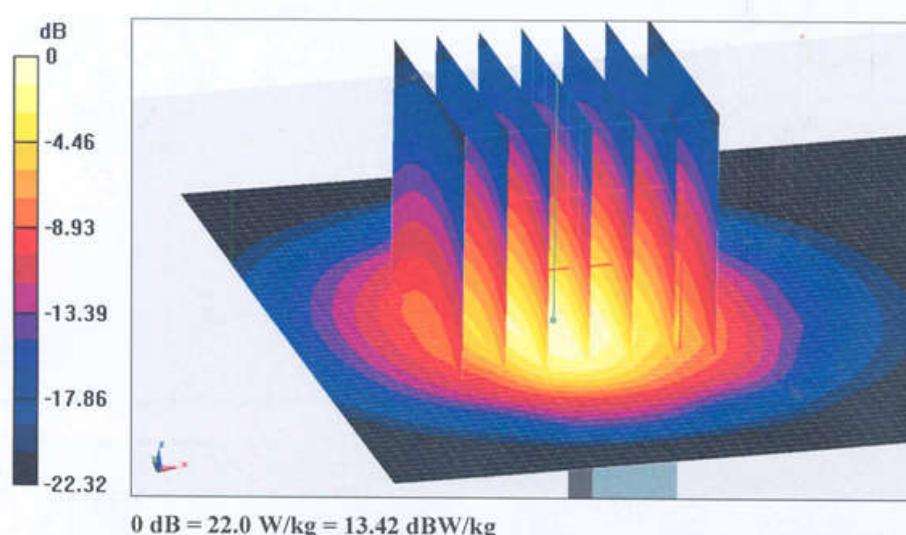
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.85 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 27.4 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.13 W/kg

Maximum value of SAR (measured) = 22.0 W/kg

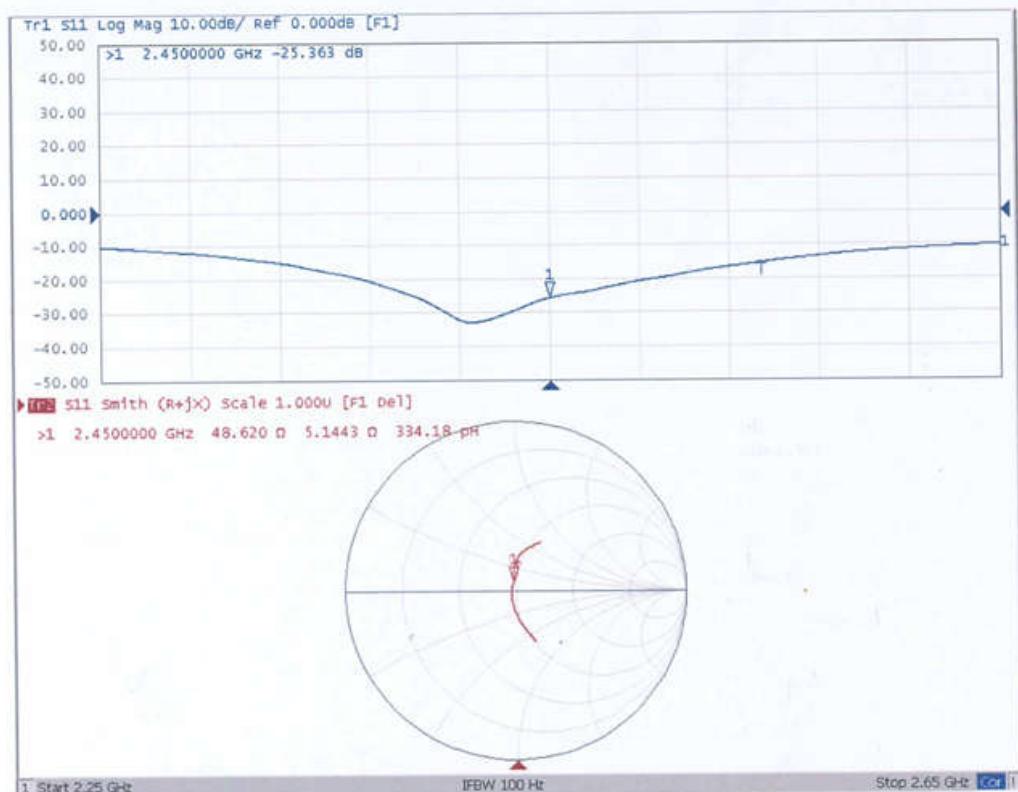




In Collaboration with
s p e a g
CALIBRATION LABORATORY

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

DASY5 Validation Report for Body TSL

Date: 06.06.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 862

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.959 \text{ S/m}$; $\epsilon_r = 52.82$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.8, 7.8, 7.8); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; 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)

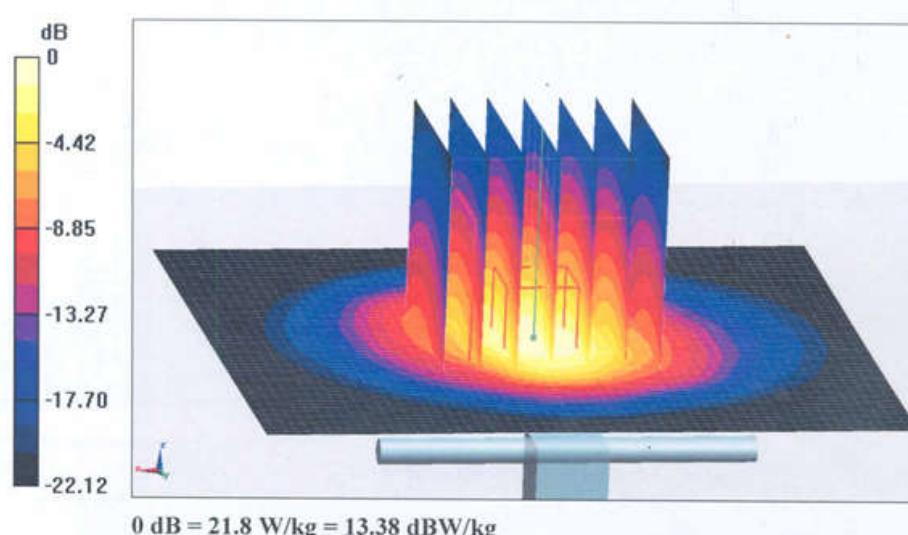
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.72 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 27.0 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.94 W/kg

Maximum value of SAR (measured) = 21.8 W/kg

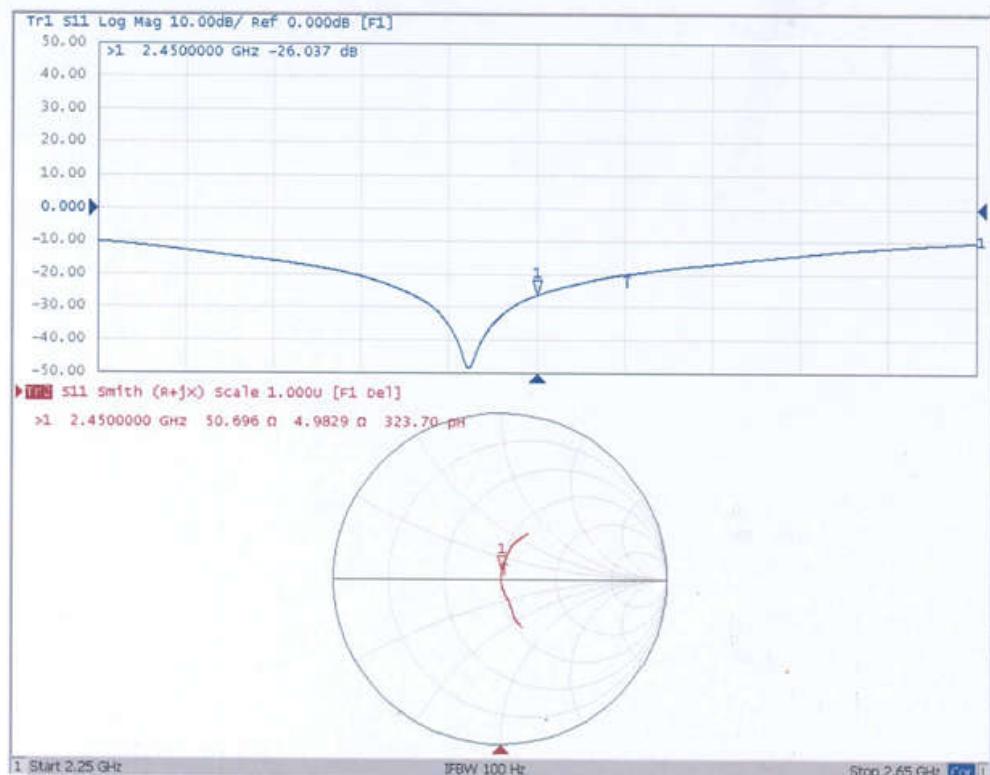




In Collaboration with
s p e a g
CALIBRATION LABORATORY

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

Impedance Measurement Plot for Body 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: ctll@chinattl.com http://www.chinattl.cn



中国认可
 国际互认
 校准
 CALIBRATION
 CNAS L0570

Client

Audix

Certificate No: Z17-97066

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1102

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

Calibration date: May 25, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
ReferenceProbe 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
NetworkAnalyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: May 27, 2017

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



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: ctll@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	52.10.0.1442
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	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.7 ± 6 %	4.61 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	75.2 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.17 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.7 mW / g ± 24.2 % (k=2)



In Collaboration with
s p e a g
 CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: ctth@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	36.1 ± 6 %	4.94 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	8.14 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	2.31 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.2 mW /g ± 24.2 % (k=2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.0 ± 6 %	5.09 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	—	—

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.89 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	79.1 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	22.5 mW /g ± 24.2 % (k=2)



In Collaboration with
s p e a g
 CALIBRATION LABORATORY

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

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.9 ± 6 %	5.45 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.62 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	75.9 mW /g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.15 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.4 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	47.3 ± 6 %	5.80 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	7.97 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	79.3 mW /g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.23 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	22.2 mW /g ± 24.2 % (k=2)



In Collaboration with
s p e a g
CALIBRATION LABORATORY

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

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22,0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 5 %	5.88 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.48 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	74.4 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.11 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.0 mW / g ± 24.2 % (k=2)



In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 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 5250 MHz

Impedance, transformed to feed point	47.0Ω - 4.13jΩ
Return Loss:	- 25.6dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	55.2Ω - 3.97jΩ
Return Loss:	- 24.2dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	51.0Ω - 1.92jΩ
Return Loss:	- 33.4dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	48.2Ω - 2.57jΩ
Return Loss:	- 30.0dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	56.5Ω - 1.31jΩ
Return Loss:	- 24.1dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	52.2Ω - 1.49jΩ
Return Loss:	- 31.7dB



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: ctll@chinattl.com http://www.chinattl.cn

General Antenna Parameters and Design

Electrical Delay (one direction)	1.308 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
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: ctll@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL

Date: 05.25.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1102Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz,
Frequency: 5750 MHz,Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.612 \text{ mho/m}$; $\epsilon_r = 35.73$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 4.938 \text{ mho/m}$; $\epsilon_r = 36.11$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 5.085 \text{ mho/m}$; $\epsilon_r = 36.04$; $\rho = 1000 \text{ kg/m}^3$,

Phantom section: Center Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(5.13,5.13,5.13); Calibrated: 2016/9/26, ConvF(4.59,4.59,4.59); Calibrated: 2016/9/26, ConvF(4.66,4.66,4.66); Calibrated: 2016/9/26,
- 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 (7413)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.47 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 30.3 W/kg

SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 18.4 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 = 71.52 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 35.6 W/kg

SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.31 W/kg

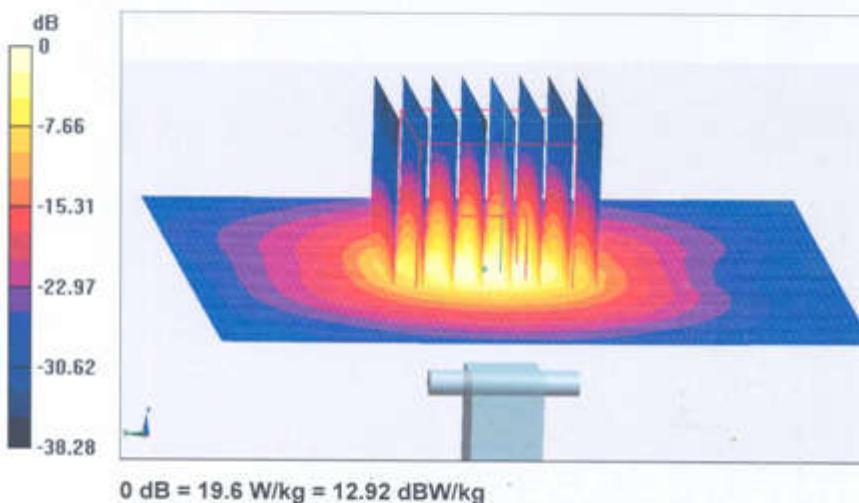
Maximum value of SAR (measured) = 20.5 W/kg



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: ctcl@chinattl.com http://www.chinattl.cn

Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.52 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 19.6 W/kg

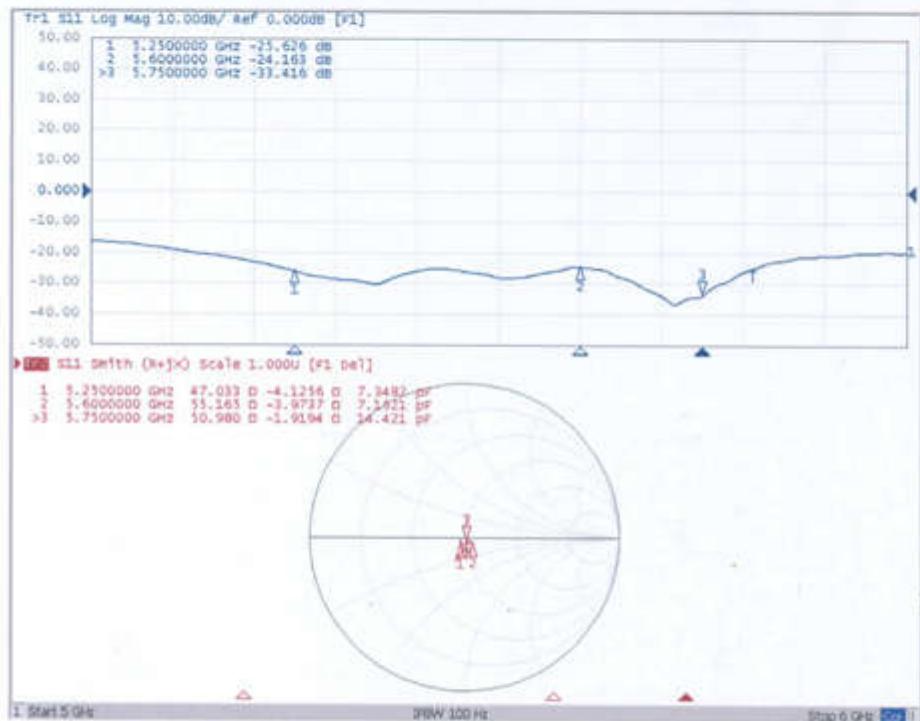




In Collaboration with
s p e a g
CALIBRATION LABORATORY

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

Impedance Measurement Plot for Head TSL



Certificate No: Z17-97066

Page 11 of 14



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: 05.23.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1102

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz,
Frequency: 5750 MHz,Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 5.446 \text{ mho/m}$; $\epsilon_r = 47.88$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.798 \text{ mho/m}$; $\epsilon_r = 47.31$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 5.879 \text{ mho/m}$; $\epsilon_r = 47.23$; $\rho = 1000 \text{ kg/m}^3$,

Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(4.68,4.68,4.68); Calibrated: 2016/9/26, ConvF(3.98,3.98,3.98); Calibrated: 2016/9/26, ConvF(4.35,4.35,4.35); Calibrated: 2016/9/26,
- 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 (7413)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.69 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 29.9 W/kg

SAR(1 g) = 7.62 W/kg; SAR(10 g) = 2.15 W/kg

Maximum value of SAR (measured) = 17.4 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 = 57.31 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 33.5 W/kg

SAR(1 g) = 7.97 W/kg; SAR(10 g) = 2.23 W/kg

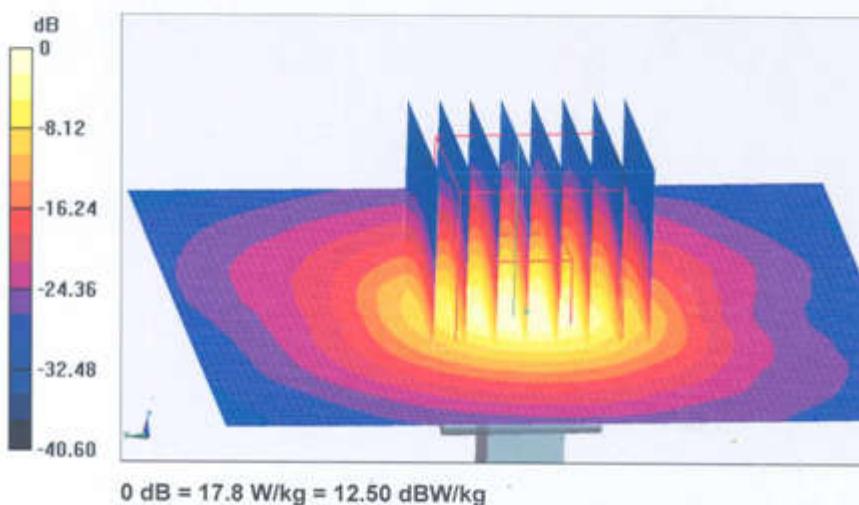
Maximum value of SAR (measured) = 19.7 W/kg



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

Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.96 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.7 W/kg
SAR(1 g) = 7.48 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 17.8 W/kg

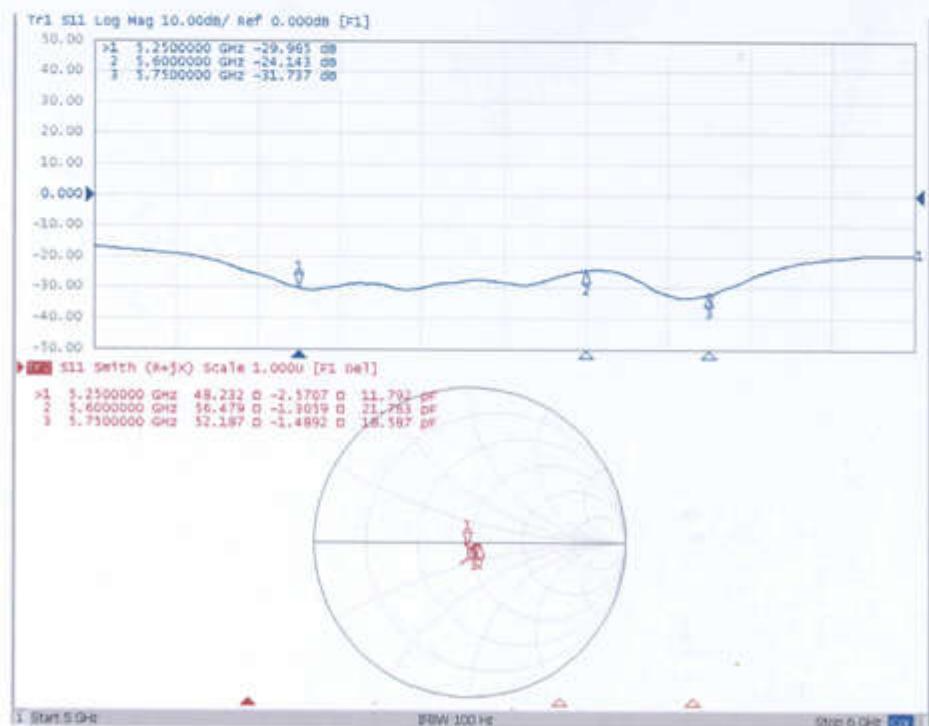




In Collaboration with
s p e a g
CALIBRATION LABORATORY

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



Certificate No: Z17-97066

Page 14 of 14



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](http://www.chinattl.cn)



中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client : **Audix**

Certificate No: Z18-97032

CALIBRATION CERTIFICATE

Object DAE4 - SN: 899

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

Calibration date: February 08, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: February 09, 2018

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



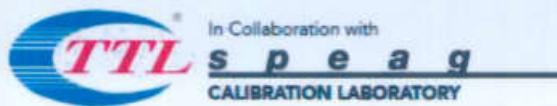
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctll@chinattl.com Http://www.chinattl.cn

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.



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

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = $6.1\mu V$, 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	$402.436 \pm 0.15\% (k=2)$	$403.025 \pm 0.15\% (k=2)$	$403.015 \pm 0.15\% (k=2)$
Low Range	$3.98018 \pm 0.7\% (k=2)$	$3.97653 \pm 0.7\% (k=2)$	$3.98312 \pm 0.7\% (k=2)$

Connector Angle

Connector Angle to be used in DASY system	$351.5^\circ \pm 1^\circ$
---	---------------------------