



Plot 45 Bluetooth Back Side Middle (Distance 15mm)

Date: 2022/3/4 Communication System: UID 0, BT (0); Frequency: 2433 MHz;Duty Cycle: 1:1.30 Medium parameters used: f = 2433 MHz; σ = 1.827 S/m; ϵ_r = 37.673; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side Middle/Area Scan (10x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.038 W/kg

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 1.827 V/m; Power Drift = -0.18 dB Peak SAR (extrapolated) = 0.083 W/kg SAR(1 g) = 0.037 W/kg; SAR(10 g) = 0.019 W/kg

Maximum value of SAR (measured) = 0.040 W/kg





Plot 46 GSM 850 GPRS (4Txslots) Back Side Middle (Distance 10mm)

Date: 2022/2/23 Communication System: UID 0, GPRS 4TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:2.07 Medium parameters used: f = 836.6 MHz; σ = 0.953 S/m; ε_r = 39.762; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side Middle/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.273 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 9.948 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 0.355 W/kg

SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.120 W/kg Maximum value of SAR (measured) = 0.292 W/kg





Plot 47 GSM 1900 GPRS (1Txslot) Bottom Edge Middle (Distance 10mm)

Date: 2022/2/28 Communication System: UID 0, GPRS 1TX (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30 Medium parameters used: f = 1880 MHz; σ = 1.393 S/m; ϵ_r = 38.344; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Middle/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.315 W/kg

Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 12.85 V/m; Power Drift = -0.046 dB Peak SAR (extrapolated) = 0.395 W/kg

SAR(1 g) = 0.243 W/kg; SAR(10 g) = 0.130 W/kg

Maximum value of SAR (measured) = 0.322 W/kg







Plot 48 UMTS Band II Bottom Edge Low (Distance 10mm)

Date: 2022/3/1 Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1880 MHz; σ = 1.393 S/m; ϵ_r = 38.344; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Middle/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.771 W/kg

Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 20.06 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.947 W/kg

SAR(1 g) = 0.511 W/kg; SAR(10 g) = 0.271 W/kg Maximum value of SAR (measured) = 0.781 W/kg







Plot 49 UMTS Band IV Bottom Edge Middle (Distance 10mm)

Date: 2022/2/27 Communication System: UID 0, WCDMA (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1732.6 MHz; σ = 1.293 S/m; ϵ_r = 38.782; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Middle/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.799 W/kg

Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 21.20 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.994 W/kg

SAR(1 g) = 0.538 W/kg; SAR(10 g) = 0.292 W/kg

Maximum value of SAR (measured) = 0.822 W/kg







Plot 50 UMTS Band V Back Side Middle (Distance 10mm)

Date: 2022/2/23 Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz;Duty Cycle: 1:1 Medium parameters used: f = 836.6 MHz; σ = 0.953 S/m; ϵ_r = 39.762; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side Middle/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.756 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 16.65 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.615 W/kg; SAR(10 g) = 0.384 W/kg Maximum value of SAR (measured) = 0.894 W/kg







Plot 51 LTE Band 2 50% RB Bottom Edge Low (Distance 10mm)

Date: 2022/3/1 Communication System: UID 0, LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1860 MHz; σ = 1.379 S/m; ε_r = 38.4; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Low/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.877 W/kg

Bottom Edge Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 20.94 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.576 W/kg; SAR(10 g) = 0.305 W/kg Maximum value of SAR (measured) = 0.894 W/kg







Plot 52 LTE Band 4 50% RB Bottom Edge High (Distance 10mm)

Date: 2022/3/2 Communication System: UID 0, LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1745 MHz; σ = 1.301 S/m; ϵ_r = 38.753; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge High/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.780 W/kg

Bottom Edge High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 19.77 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 0.951 W/kg

SAR(1 g) = 0.514 W/kg; SAR(10 g) = 0.277 W/kg

Maximum value of SAR (measured) = 0.784 W/kg







Plot 53 LTE Band 5 1RB Back Side High (Distance 10mm)

Date: 2022/2/23 Communication System: UID 0, LTE (0); Frequency: 844 MHz;Duty Cycle: 1:1 Medium parameters used: f = 844 MHz; σ = 0.958 S/m; ε_r = 39.728; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side High/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.865 W/kg

Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 12.66 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.665 W/kg; SAR(10 g) = 0.396 W/kg Maximum value of SAR (measured) = 0.926 W/kg







Plot 54 LTE Band 7 1RB Bottom Edge Middle (Distance 10mm)

Date: 2022/3/10 Communication System: UID 0, LTE (0); Frequency: 2535 MHz;Duty Cycle: 1:1 Medium parameters used: f = 2535 MHz; σ = 1.91 S/m; ϵ_r = 37.398; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Middle/Area Scan (5x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 1.63 W/kg

Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 19.66 V/m; Power Drift = -0.024 dB Peak SAR (extrapolated) = 2.09 W/kg SAR(1 g) = 0.633 W/kg; SAR(10 g) = 0.291 W/kg

Maximum value of SAR (measured) = 1.65 W/kg







Plot 55 LTE Band 13 1RB Back Side Middle (Distance 10mm)

Date: 2022/2/25 Communication System: UID 0, LTE (0); Frequency: 782 MHz;Duty Cycle: 1:1 Medium parameters used: f = 782 MHz; σ = 0.917 S/m; ε_r = 40.132; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated:2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side Middle/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.529 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 12.66 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 0.755 W/kg

SAR(1 g) = 0.413 W/kg; SAR(10 g) = 0.237 W/kg Maximum value of SAR (measured) = 0.608 W/kg







Plot 56 LTE Band 26 1RB Back Side High (Distance 10mm)

Date: 2022/2/23 Communication System: UID 0, LTE (0); Frequency: 841.5 MHz;Duty Cycle: 1:1 Medium parameters used (interpolated): f = 841.5 MHz; σ = 0.957 S/m; ϵ_r = 39.746; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side High/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.992 W/kg

Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 15.59 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.640 W/kg; SAR(10 g) = 0.410 W/kg Maximum value of SAR (measured) = 1.07 W/kg







Plot 57 LTE Band 38 1RB Bottom Edge High (Distance 10mm)

Date: 2022/3/11 Communication System: UID 0, LTE (0); Frequency: 2610 MHz;Duty Cycle: 1:1.58 Medium parameters used: f = 2610 MHz; σ = 2.027 S/m; ϵ_r = 37.056; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge High/Area Scan (5x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.781 W/kg

Bottom Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 10.39 V/m; Power Drift = 0.125 dB Peak SAR (extrapolated) = 1.88 W/kg

SAR(1 g) = 0.688 W/kg; SAR(10 g) = 0.311 W/kg Maximum value of SAR (measured) = 1.45 W/kg







Plot 58 LTE Band 66 1RB Bottom Edge Low (Distance 10mm)

Date: 2022/3/2 Communication System: UID 0, LTE (0); Frequency: 1720 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1720 MHz; σ = 1.263 S/m; ϵ_r = 40.387; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Low/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.979 W/kg

Bottom Edge Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 18.51 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.649 W/kg; SAR(10 g) = 0.353 W/kg Maximum value of SAR (measured) = 0.989 W/kg







Plot 59 802.11b Right Edge Middle (Distance 10mm)

Date: 2022/3/4 Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1.02 Medium parameters used: f = 2412 MHz; σ = 1.801 S/m; ϵ_r = 37.737; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Right Edge Middle/Area Scan (5x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.199 W/kg

Right Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 3.161 V/m; Power Drift = 0.011 dB Peak SAR (extrapolated) = 0.257 W/kg

SAR(1 g) = 0.164 W/kg; SAR(10 g) = 0.081 W/kg Maximum value of SAR (measured) = 0.206 W/kg





Plot 60 802.11ac VHT80 U-NII-2C Right Edge Low (Distance 10mm)

Date: 2022/3/14 Communication System: UID 0, 802.11ac-VHT80 (0); Frequency: 5775 MHz;Duty Cycle: 1:1.09 Medium parameters used: f = 5775 MHz; σ = 5.428 S/m; ε_r = 34.617; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(5.04, 5.04, 5.04); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Right Edge Middle/Area Scan (6x21x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 1.11 W/kg

Right Edge Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm Reference Value = 3.812 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 2.02 W/kg

SAR(1 g) = 0.448 W/kg; SAR(10 g) = 0.164 W/kg Maximum value of SAR (measured) = 1.11 W/kg







Plot 61 Bluetooth Right Edge Middle (Distance 10mm)

Date: 2022/3/4 Communication System: UID 0, BT (0); Frequency: 2433 MHz;Duty Cycle: 1:1.30 Medium parameters used: f = 2433 MHz; σ = 1.827 S/m; ϵ_r = 37.673; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Right Edge Middle/Area Scan (5x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.203 W/kg

Right Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 3.172 V/m; Power Drift = 0.125 dB

Peak SAR (extrapolated) = 0.262 W/kg

SAR(1 g) = 0.114 W/kg; SAR(10 g) = 0.049 W/kg Maximum value of SAR (measured) = 0.211 W/kg







Plot 62 UMTS Band IV Bottom Edge Middle (Distance 0mm)

Date: 2022/3/2 Communication System: UID 0, WCDMA (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1732.6 MHz; σ = 1.293 S/m; ϵ_r = 38.782; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Middle/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 7.11 W/kg

Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 57.79 V/m; Power Drift = -0.027 dB Peak SAR (extrapolated) = 14.3 W/kg

Peak SAR (exitapolated) = 14.3 W/kg

SAR(1 g) = 4.24 W/kg; SAR(10 g) = 1.75 W/kg Maximum value of SAR (measured) = 9.95 W/kg







Plot 63 LTE Band 2 1RB Bottom Edge Low (Distance 0mm)

Date: 2022/3/1 Communication System: UID 0, LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1860 MHz; σ = 1.379 S/m; ε_r = 38.4; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Low/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 8.61 W/kg

Bottom Edge Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 59.38 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 17.0 W/kg

SAR(1 g) = 4.39 W/kg; SAR(10 g) = 1.81 W/kg

Maximum value of SAR (measured) = 11.5 W/kg







Plot 64 LTE Band 7 1RB Bottom Edge Low (Distance 0mm)

Date: 2022/3/10 Communication System: UID 0, LTE (0); Frequency: 2510 MHz;Duty Cycle: 1:1 Medium parameters used: f = 2510 MHz; σ = 1.91 S/m; ε_r = 37.398; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge Low/Area Scan (5x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 4.04 W/kg

Bottom Edge Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 15.38 V/m; Power Drift = 0.071 dB Peak SAR (extrapolated) = 6.30 W/kg

SAR(1 g) = 3.33 W/kg; SAR(10 g) = 1.24 W/kg

Maximum value of SAR (measured) = 4.05 W/kg







Plot 65 LTE Band 66 1RB Bottom Edge High (Distance 0mm)

Date: 2022/3/2 Communication System: UID 0, LTE (0); Frequency: 1770 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1770 MHz; σ = 1.319 S/m; ϵ_r = 38.665; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Bottom Edge High/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 8.96 W/kg

Bottom Edge High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 60.56 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 4.7 W/kg; SAR(10 g) = 1.94 W/kg

Maximum value of SAR (measured) = 11.6 W/kg







Plot 66 802.11a U-NII-1 Right Edge Middle (Distance 0mm)

Date: 2022/3/14 Communication System: UID 0, 802.11a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.01 Medium parameters used: f = 5580 MHz; σ = 5.175 S/m; ϵ_r = 35.112; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(5.00, 5.00, 5.00); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Right Edge Middle/Area Scan (6x21x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 3.46 W/kg

Right Edge Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm Reference Value = 10.87 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 5.5 W/kg

SAR(1 g) = 3.45 W/kg; SAR(10 g) = 0.956 W/kg Maximum value of SAR (measured) = 3.5 W/kg





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ANNEX D: Probe Calibration Certificate

Client TA(Sha	anghai)	v.chinattl.cn Certifica	te No: Z2	1-60285
CALIBRATION CE	RTIFICATE			
Object	EX3DV4 - S	SN : 3677		
Calibration Procedure(s)	FF-Z11-004 Calibration	I-02 Procedures for Dosimetric E-field	d Probes	
Calibration date:	August 12,	2021		
neasurements(SI) The measurements	the second se			
ages and are part of the certi Il calibrations have been o umidity<70%. alibration Equipment used (N rimary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91	Internet and the second of the	uncertainties with confidence pro closed laboratory facility: enviro libration) Cal Date(Calibrated by, Certifica 15-Jun-21(CTTL, No.J21X0446 15-Jun-21(CTTL, No.J21X0446 15-Jun-21(CTTL, No.J21X0446	onment temp ate No.) Sc 36) 36)	ven on the following erature(22±3)℃ and heduled Calibration Jun-22 Jun-22
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ages and are part of the certi Il calibrations have been c umidity<70%. alibration Equipment used (M rimary Standards Power Sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A	urements and the ficate. conducted in the M&TE critical for ca ID # 101919 101547 101548 18N50W-10dB 18N50W-20dB SN 3617 SN 1556 ID # 6201052605	uncertainties with confidence pro closed laboratory facility: enviro libration) Cal Date(Calibrated by, Certifica 15-Jun-21(CTTL, No.J21X0446 15-Jun-21(CTTL, No.J21X0446 10-Feb-20(CTTL, No.J20X0052 10-Feb-20(CTTL, No.J20X0052 27-Jan-21(SPEAG, No.EX3-36 15-Jan-21(SPEAG, No.DAE4-1 Cal Date(Calibrated by, Certificate N 16-Jun-21(CTTL, No.J21X0446	ate No.) Sc 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 36) 37) Schutzen	ven on the following erature(22±3)°C and heduled Calibration Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 Jan-22 Jan-22 Jan-22
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ages and are part of the certi all calibrations have been of umidity<70%. Calibration Equipment used (M rimary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A Network Analyzer E5071C Na alibrated by: Yi eviewed by: Li	urements and the ficate. conducted in the A&TE critical for ca ID # 101919 101547 101548 18N50W-10dB 18N50W-20dB SN 3617 SN 1556 ID # 6201052605 MY46110673 Ime U Zongying n Hao	uncertainties with confidence pro closed laboratory facility: enviro libration) Cal Date(Calibrated by, Certifica 15-Jun-21(CTTL, No.J21X0446 15-Jun-21(CTTL, No.J21X0446 10-Feb-20(CTTL, No.J21X0446 10-Feb-20(CTTL, No.J20X0052 27-Jan-21(SPEAG, No.EX3-36 15-Jan-21(SPEAG, No.DAE4-1 Cal Date(Calibrated by, Certificate N 16-Jun-21(CTTL, No.J21X0446 21-Jan-21(CTTL, No.J21X0446 21-Jan-21(CTTL, No.J20X0051 Function SAR Test Engineer SAR Test Engineer	onment temp ate No.) Sc ate No	ven on the following erature(22±3)°C and heduled Calibration Jun-22 Jun-22 Jeb-22 Feb-22 Feb-22 Jan-22 Jan-22 Jan-22 ignature

Certificate No: Z21-60285

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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_cvcle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization 0	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 θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx, y,z are only intermediate values, i.e., the uncertainties of NORMx, y,z does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z* frequency_response (see Frequency Response Chart). This
 linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the
 frequency response is included in the stated uncertainty of ConvF.
- DCPx, y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z:A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f<800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- Spherical isotropy (3D deviation from isotropy): In a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the
 probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3677

Basic Calibration Parameters

·	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(µV/(V/m) ²) ^A	0.41	0.46	0.40	±10.0%
DCP(mV) ^B	99.3	101.9	101.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dBõV	C	D dB	VR mV	Unc ^E (k=2)
0 CW	x	0.0	0.0	1.0	0.00	158.2	±2.0%	
		Y	0.0	0.0	1.0	1 1	170.4	
		Z	0.0	0.0	1.0		156.9	1

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

^A The uncertainties of Norm X, Y, Z do not affect the E²-field uncertainty inside TSL (see Page 4).

^B Numerical linearization parameter: uncertainty not required.

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

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3677

Relative Conductivity DepthG Unct. f [MHz]^C ConvF X ConvF Y ConvF Z Alpha^G Permittivity F (S/m) F (mm) (k=2) 750 9.64 9.64 0.40 0.80 41.9 0.89 $\pm 12.1\%$ 9.64 835 41.5 0.90 9.30 9.30 0.16 1.29 ±12.1% 9.30 1750 1.37 0.24 1.00 ±12.1% 40.1 8.22 8.22 8.22 0.24 1.10 1900 40.0 1.40 7.88 7.88 7.88 $\pm 12.1\%$ 2000 40.0 1.40 7.96 7.96 7.96 0.21 1.17 ±12.1% 2300 39.5 1.67 7.67 7.67 7.67 0.66 0.68 ±12.1% 0.70 2450 7.50 0.66 ±12.1% 39.2 1.80 7.50 7.50 2600 39.0 1.96 7.25 0.62 0.73 ±12.1% 7.25 7.25 3300 2.71 7.00 7.00 7.00 0.45 0.94 ±13.3% 38.2 3500 37.9 2.91 6.92 6.92 0.45 0.98 6.92 ±13.3% 3700 1.04 37.7 3.12 6.71 6.71 6.71 0.45 ±13.3% 3900 37.5 3.32 6.62 6.62 6.62 0.40 1.25 ±13.3% 4100 6.66 37.2 3.53 6.66 6.66 0.30 1.38 $\pm 13.3\%$ 6.43 6.43 6.43 4400 3.84 0.35 1.35 36.9 ±13.3% 4600 36.7 4.04 6.35 6.35 6.35 0.50 1.13 ±13.3% 6.30 4800 36.4 4.25 6.30 6.30 0.45 1.25 ±13.3% 4.40 6.13 6.13 6.13 4950 36.3 0.45 1.25 ±13.3% 4.71 5.45 5.45 5.45 5250 35.9 0.50 1.30 ±13.3% 5.00 5.00 5600 35.5 5.07 5.00 0.60 1.15 ±13.3% 5750 35.4 5.22 5.04 5.04 5.04 0.55 1.26 ±13.3%

Calibration Parameter Determined in Head Tissue Simulating Media

^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.

Certificate No:Z21-60285

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



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

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Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF)

f=1750 MHz,WGLS R22(H_convF)



Deviation from Isotropy in Liquid



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

Certificate No:Z21-60285

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:3677

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	117.4
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

Certificate No:Z21-60285

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ANNEX E: D750V3 Dipole Calibration Certificate

Client TA(theom http://	www.chmaltl.cn	
	Shanghai)	Certificate No: Z	20-60299
CALIBRATION CI	ERTIFICAT	E	
Object	D750V	3 - SN: 1045	
Calibration Procedure(s)			
	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	August	28, 2020	
All calibrations have been	n conducted in	the closed laboratory facility: environment	t temperature(22±3)°C an
All calibrations have beer humidity<70%. Calibration Equipment used	n conducted in I (M&TE critical fo	the closed laboratory facility: environment	t temperature(22±3)°C an
All calibrations have beer humidity<70%. Calibration Equipment used Primary Standards	I Conducted in	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.)	t temperature(22±3)°C an Scheduled Calibration
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	ID #	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965)	t temperature(22±3)°C ar Scheduled Calibration May-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	ID # 106276 101369	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965)	t temperature(22±3)°C an Scheduled Calibration May-21 May-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 3617 SN 771	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG No.Z20-60017)	t temperature(22±3)°C an Scheduled Calibration May-21 May-21 Jan-21 Feb-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 3617 SN 771	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017)	t temperature(22±3)°C an Scheduled Calibration May-21 May-21 Jan-21 Feb-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	a conducted in d (M&TE critical for 1D # 106276 101369 SN 3617 SN 771 ID #	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.)	t temperature(22±3)°C an Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	n conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # ID # MY49071430 MY46110673	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	t temperature(22±3)°C an Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	a conducted in (M&TE critical for 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function	t temperature(22±3)°C an Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	A conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name Zhao Jing	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer	t temperature(22±3)°C an Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C Calibrated by: Reviewed by:	a conducted in (M&TE critical for 1D # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY49071430 MY46110673 Name Zhao Jing Lin Hao	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer	Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21

Certificate No: Z20-60299

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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%.

Certificate No: Z20-60299

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In Collaboration with



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Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.87 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	-	

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.37 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.57 W/kg ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.4 ± 6 %	0.94 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C		

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.58 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.70 W/kg ±18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.3Ω- 2.29jΩ
Return Loss	- 26.6dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7Ω- 4.58jΩ	
Return Loss	- 25.6dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	0.900 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by SPEAG	
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DASY5 Validation Report for Head TSL

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Date: 08.28.2020

Test Laboratory: CTTL, Beijing, China DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1045 Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz; $\sigma = 0.873 \text{ S/m}$; $\varepsilon_r = 41.28$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Right Section **DASY5** Configuration:

- Probe: EX3DV4 SN3617; ConvF(10.07, 10.07, 10.07) @ 750 MHz; Calibrated: ٠ 2020-01-30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2020-02-10
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 54.97 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.00 W/kg SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.38 W/kg Smallest distance from peaks to all points 3 dB below: Larger than measurement grid Ratio of SAR at M2 to SAR at M1 = 68.7% Maximum value of SAR (measured) = 2.71 W/kg



0 dB = 2.71 W/kg = 4.33 dBW/kg

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Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 08.28.2020 Test Laboratory: CTTL, Beijing, China DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1045 Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz; $\sigma = 0.94 \text{ S/m}$; $\varepsilon_r = 54.36$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Center Section **DASY5** Configuration: Probe: EX3DV4 - SN3617; ConvF(9.8, 9.8, 9.8) @ 750 MHz; Calibrated: . 2020-01-30 Sensor-Surface: 1.4mm (Mechanical Surface Detection) . Electronics: DAE4 Sn771; Calibrated: 2020-02-10 Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483) Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 53.84 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 3.14 W/kg

SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.41 W/kg Smallest distance from peaks to all points 3 dB below = 18.4 mm Ratio of SAR at M2 to SAR at M1 = 67.9% Maximum value of SAR (measured) = 2.80 W/kg



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

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Impedance Measurement Plot for Body TSL



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ANNEX F: D835V2 Dipole Calibration Certificate

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Client TA(Sh	anghai)	Certificate No: Z	20-60296
CALIBRATION CE	RTIFICAT	E	
Dbject	D835V2	2 - SN: 4d020	
Calibration Procedure(s)	FF-Z11 Calibra	-003-01 tion Procedures for dipole validation kits	
Calibration date:	August	28, 2020	
pages and are part of the ce	ertificate.	the uncertainties with confidence probability	are given on the following
All calibrations have been numidity<70%.	conducted in (M&TE critical fr	the closed laboratory facility: environmen or calibration)	t temperature(22±3)°C and
VII calibrations have been umidity<70%. Calibration Equipment used	conducted in (M&TE critical fr	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.)	t temperature(22±3)°C and
Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 3617 SN 771	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017)	t temperature(22±3)℃ an Scheduled Calibration May-21 May-21 Jan-21 Feb-21
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	ID # ID 3000000000000000000000000000000000000	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.)	t temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	Conducted in (M&TE critical for (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	t temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	Assurements and entificate. conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function	scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21 Feb-21
ages and are part of the ce ages and are part of the ce unidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	Assurements and entificate. conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name Zhao Jing	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer	Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21
Primary Standards Power Meter NRP2 Power Sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	Assurements and entificate. conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao	the closed laboratory facility: environmen or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer	Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21



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Glossary: tissue simulating liquid TSL 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%.

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.65 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.37 W/kg ± 18.7 % (k=2)

Body TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	اسب	

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.76 W /kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	1000
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.40 W/kg ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.8Ω+ 1.73jΩ	
Return Loss	- 26.2dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.0Ω- 2.47jΩ	
Return Loss	- 26.2dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.258 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

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DASY5 Validation Report for Head TSL

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Date: 08.28.2020

Test Laboratory: CTTL, Beijing, China DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020 Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz; $\sigma = 0.877$ S/m; $\epsilon_r = 41.23$; $\rho = 1000$ kg/m³ Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 SN3617; ConvF(9.66, 9.66, 9.66) @ 835 MHz; Calibrated: 2020-01-30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2020-02-10
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062 .
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 58.09 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.46 W/kg SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.57 W/kg Smallest distance from peaks to all points 3 dB below = 16.6 mm Ratio of SAR at M2 to SAR at M1 = 68.1% Maximum value of SAR (measured) = 3.12 W/kg



0 dB = 3.12 W/kg = 4.94 dBW/kg

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Impedance Measurement Plot for Head TSL

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Reference Value = 56.88 V/m; Power Drift = -0.01 dB = Peak SAR (extrapolated) = 3.65 W/kgSAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.59 W/kgSmallest distance from peaks to all points 3 dB below = 15.8 mmRatio of SAR at M2 to SAR at M1 = 66.5%Maximum value of SAR (measured) = 3.24 W/kg



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Impedance Measurement Plot for Body TSL

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ANNEX G: D1750V2 Dipole Calibration Certificate

Client TA(SI	nanghai) ERTIFICAT	Certificate No: Z20	0-60079
CALIBRATION C	ERTIFICAT	E	
Object			and the second second
the second second second	D1750	V2 - SN: 1033	
Calibration Procedure(s)	FF 744	002.04	
Calibration Procedures for dipole validation kits			
Calibration date:	Febura	ary 25, 2020	
	, obuild	., 10, 1010	
All calibrations have beer humidity<70%. Calibration Equipment used	n conducted in I (M&TE critical f	the closed laboratory facility: environment	t temperature(22±3)℃ and
All calibrations have beer humidity<70%. Calibration Equipment used Primary Standards	n conducted in d (M&TE critical f ID #	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.)	t temperature(22±3)°C and
All calibrations have beer humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	ID # 106276	the closed laboratory facility: environment for calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605)	t temperature(22±3)°C and Scheduled Calibration Apr-20
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	n conducted in d (M&TE critical f ID # 106276 101369	the closed laboratory facility: environment for calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605)	scheduled Calibration Apr-20 Apr-20
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	ID # 106276 101369 SN 3846	the closed laboratory facility: environment for calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064)	temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 3846 SN 1555	the closed laboratory facility: environment for calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295)	Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	n conducted in d (M&TE critical f ID # 106276 101369 6 SN 3846 SN 1555 ID #	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.)	t temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	ID # 106276 101369 SN 3846 SN 1555 ID # MY49071430	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516)	t temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration Feb-21
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	n conducted in d (M&TE critical f 10 # 106276 101369 SN 3846 SN 1555 ID # MY49071430 MY46110673	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	n conducted in (M&TE critical f ID # 106276 101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function	temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Feb-21
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	n conducted in (M&TE critical f ID # 106276 101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name Zhao Jing	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer	temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Signature
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C Calibrated by: Reviewed by:	n conducted in (M&TE critical f ID # 106276 101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 11-Apr-19 (CTTL, No.J19X02605) 25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer	temperature(22±3)°C and Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Signature

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Glossary:

TSL

N/A

ConvF





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tissue simulating liquid sensitivity in TSL / NORMx,y,z not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

CO NUMBER OF COMPANY		
DASY Version	DASY52	V52.10.4
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	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.35 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	8.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	35.9 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	18.9 W/kg ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.4 ± 6 %	1.48 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C		

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	36.9 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.8 W/kg ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.8Ω- 0.06 jΩ	
Return Loss	- 38.3 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.5Ω- 0.85 jΩ	
Return Loss	- 24.5 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.085 ns	
----------------------------------	----------	--

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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SAR Test Report



DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 02.25.2020

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033 Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz; $\sigma = 1.349$ S/m; $\varepsilon_r = 39.06$; $\rho = 1000$ kg/m3 Phantom section: Right Section DASY5 Configuration:

- Probe: EX3DV4 SN3846; ConvF(8.2, 8.2, 8.2) @ 1750 MHz; Calibrated: 2019-03-25
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 2019-08-22
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 98.26 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 16.9 W/kg SAR(1 g) = 8.93 W/kg; SAR(10 g) = 4.71 W/kg Smallest distance from peaks to all points 3 dB below = 10 mm Ratio of SAR at M2 to SAR at M1 = 53.5% Maximum value of SAR (measured) = 13.9 W/kg



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

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Impedance Measurement Plot for Head TSL









DASY5 Validation Report for Body TSL Test Laboratory: CTTL, Beijing, China

Date: 02.25.2020

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033 Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz; $\sigma = 1.482$ S/m; $\varepsilon_r = 52.35$; $\rho = 1000$ kg/m3 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 SN3846; ConvF(7.8, 7.8, 7.8) @ 1750 MHz; Calibrated: 2019-03-25
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 2019-08-22
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 94.32 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 16.9 W/kg SAR(1 g) = 9.24 W/kg; SAR(10 g) = 4.95 W/kg Smallest distance from peaks to all points 3 dB below = 9.2 mm Ratio of SAR at M2 to SAR at M1 = 56% Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

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Impedance Measurement Plot for Body TSL



Certificate No: Z20-60079

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ANNEX H: D1900V2 Dipole Calibration Certificate

n-mail: ettlacchinat	it.com http://	www.chinatti.cu	
Client TA(Shanghai)	Certificate No: Z	20-60297
CALIBRATION CI	ERTIFICAT	Е	
Object	D1900	V2 - SN: 5d060	
Calibration Procedure(s)	FF 744	000.04	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	August	27 2020	
	August	27, 2020	
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%.	asurements and ertificate. n conducted in	the uncertainties with confidence probability the closed laboratory facility: environment	are given on the following
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used	asurements and ertificate. n conducted in I (M&TE critical fi	the uncertainties with confidence probability the closed laboratory facility: environment or calibration)	are given on the following
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards	asurements and ertificate. In conducted in I (M&TE critical for ID #	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.)	are given on the following temperature(22±3)°C and Scheduled Calibration
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	asurements and ertificate. conducted in (M&TE critical for ID # 106276 101250	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965)	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 May: 21
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe FX3DV4	asurements and ertificate. a conducted in (M&TE critical for ID # 106276 101369 SN 3617	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG No EX3-3617, Jan20)	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	asurements and ertificate. Conducted in (M&TE critical for ID # 106276 101369 SN 3617 SN 771	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017)	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	asurements and ertificate. Conducted in (M&TE critical for ID # 106276 101369 SN 3617 SN 771 ID #	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.)	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration
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measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power Sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	asurements and ertificate. a conducted in (M&TE critical for 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	asurements and ertificate. a conducted in (M&TE critical for 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Signature
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	asurements and ertificate. a conducted in (M&TE critical for 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name Zhao Jing	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 Jan-21 Jeb-21 Scheduled Calibration Feb-21 Feb-21 Feb-21
measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power Sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C Calibrated by: Reviewed by:	asurements and ertificate. a conducted in a (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao	the uncertainties with confidence probability the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Jan-20(SPEAG,No.EX3-3617_Jan20) 10-Feb-20(CTTL-SPEAG,No.Z20-60017) Cal Date(Calibrated by, Certificate No.) 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer	are given on the following temperature(22±3)°C and Scheduled Calibration May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21 Signature

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lossary:	
TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx.v.z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	V52.10.4
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	1900 MHz ± 1 MHz	

Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	-	

SAR result with Head TSL

SAR for nominal Head TSL parameters	normalized to 1W	20.2 W/kg ± 18.7 % (k=2)
SAR measured	250 mW input power	5.04 W/kg
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	39.5 W/kg ± 18.8 % (k=2)
SAR measured	250 mW input power	9.82 W/kg
SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	

Body TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.5 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C		-

SAR result with Body TSL

9.89 W/ka
erne ennig
39.8 W/kg ± 18.8 % (k=2)
5.13 W/kg
20.6 W/kg ± 18.7 % (k=2)

Certificate No: Z20-60297

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5Q+ 6.58jQ		
Return Loss	- 23.3dB		

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0Ω+ 6.72jΩ		
Return Loss	- 22.9dB		

General Antenna Parameters and Design

Electrical Delay (one direction)	1.061 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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TTT.	S	p	e	a	g
	CAL	BRATIC	ON LAP	ORAT	DRY

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DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China DUT: Dipole 1990 MUL: True D10001/2: Sec

Date: 08.27.2020

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060 Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz; $\sigma = 1.404$ S/m; $\varepsilon_r = 41.12$; $\rho = 1000$ kg/m3 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 SN3617; ConvF(8.14, 8.14, 8.14) @ 1900 MHz; Calibrated: 2020-01-30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2020-02-10
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 100.3 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 19.0 W/kg SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.04 W/kg Smallest distance from peaks to all points 3 dB below = 10 mm Ratio of SAR at M2 to SAR at M1 = 51.9% Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

Certificate No: Z20-60297

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dB -3.44 -6.88 -10.32 -13.76 -17.20

0 dB = 15.3 W/kg = 11.85 dBW/kg

Certificate No: Z20-60297

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 http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



Certificate No: Z20-60297

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ANNEX I: D2450V2 Dipole Calibration Certificate

	In Collabo	ration with	中国认可
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Add: No 51 Xueyua	n Road. Haidian Dist	rict. Beijing. 100191. China	CALIBRATION
Tel: +86-10-623046. E-mail: cttl@chinatt	33-2079 Fax: +	86-10-62304633-2504	CNAS L0570
Client TA(SI	nanghai)	Certificate No:	Z20-60298
CALIBRATION CE	RTIFICAT	E	
Object	D2450	/2 - SN: 786	
Calibration Procedura(s)			
Calibration Flocedule(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	August	27, 2020	
This collibration Codificate	desumants the	transphility to policical standards, which t	colize the physical units of
masurements(SI) The mai	documents the	the uncertainties with confidence probabili	ealize the physical units of
Dages and are part of the ce	asurements and	the uncertainties with confidence probabili	ly are given on the following
r-ges and are part of the of	in the date.		
All calibrations have been	conducted in	the closed laboratory facility: environme	nt temperature(22±3)°C and
humidity<70%.			
Colibration Equipment used	MRTE oritical f	ar calibration)	
Calibration Equipment used		Si calibration)	
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106276	12-May-20 (CTTL, No.J20X02965)	May-21
Power sensor NRP6A	101369	12-May-20 (CTTL, No.J20X02965)	May-21
Reference Probe EX3DV4	SN 3617	30-Jan-20(SPEAG,No.EX3-3617_Jan20)	Jan-21
DAE4	SN 771	10-Feb-20(CTTL-SPEAG,No.Z20-60017)	Feb-21
Secondary Standards	ID#	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	25-Feb-20 (CTTL, No.J20X00516)	Feb-21
NetworkAnalyzer E5071C	MY46107873	10-Feb-20 (CTTL, No.J20X00515)	Feb-21
		1.000	1. Secondaria
2.00.0000	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	AN BELLIN US
Reviewed by:	Lin Hao	SAR Test Engineer	林花
Approved by:	Qi Dianyuan	SAR Project Leader	1772
		Name and	
This collibration codificate at	all not be reason	Issued: Se	ptember 2, 2020
This calibration certificate si	ian not be reprot	need except in this without whiten approve	a or the laboratory.

Certificate No: Z20-60298

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In Collaboration with s p e а CALIBRATION LABORATORY

Tel: +86-10-62304633-2079 E-mail: cttl@chinattl.com

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Fax: +86-10-62304633-2504 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", September 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%.

Certificate No: Z20-60298

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Measurement Conditions

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

DASY Version	DASY52	V52.10.4
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	a second second

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	39.5 ± 6 %	1.79 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	-	(****)

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.3 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.99 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.0 W/kg ± 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	52.1 ± 6 %	1.94 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	10-e-	

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	52.4 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.3 W/kg ± 18.7 % (k=2)

Certificate No: Z20-60298

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.5Ω+ 1.44 jΩ	
Return Loss	- 26.9dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.9Ω+ 5.09 jΩ	
Return Loss	- 25.8dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.018 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

Certificate No: Z20-60298

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In Collaboration with s р e а CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: 186-10-62304633-2079 Fax: 186-10-62304633-2504 E-mail: ettl@chinattl.com http://www.chinattl.cn DASY5 Validation Report for Head TSL Date: 08.27.2020 Test Laboratory: CTTL, Beijing, China DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786 Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz; $\sigma = 1.787 \text{ S/m}$; $\epsilon_r = 39.53$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Center Section **DASY5** Configuration: Probe: EX3DV4 - SN3617; ConvF(7.65, 7.65, 7.65) @ 2450 MHz; Calibrated: 2020-01-30 Sensor-Surface: 1.4mm (Mechanical Surface Detection) Electronics: DAE4 Sn771; Calibrated: 2020-02-10 Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483) Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 102.7 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 27.7 W/kg SAR(1 g) = 13 W/kg; SAR(10 g) = 5.99 W/kg Smallest distance from peaks to all points 3 dB below = 8.9 mm Ratio of SAR at M2 to SAR at M1 = 47% Maximum value of SAR (measured) = 22.0 W/kg dB 0 -4.66 -9.31 -13.97 -18.62 -23.28 0 dB = 22.0 W/kg = 13.42 dBW/kg

Certificate No: Z20-60298

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Impedance Measurement Plot for Head TSL



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Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 102.9 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 26.9 W/kg SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.08 W/kg Smallest distance from peaks to all points 3 dB below = 8.5 mm Ratio of SAR at M2 to SAR at M1 = 49.9% Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

Certificate No: Z20-60298

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Impedance Measurement Plot for Body TSL



Certificate No: Z20-60298

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ANNEX J: D2600V2 Dipole Calibration Certificate

Tel: +86-10-623046	nBei Road, Haidian 1 33-2079 Fax: +	District, Beijing, 100191, Chi 300, Chi	CALIBRATIO CNAS L057
E-mail: ent@chinatt	Leom http://w	www.chinattl.en	21-60156
Client IAG	DTICIOAT	Certificate No. 2	21-00150
SALIBRATION CE	RIFICAL	E	
Object	D2600\	/2 - SN: 1025	
Calibration Procedure(s)	FE-211	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	April 23	3, 2021	
All calibrations have been humidity<70% Calibration Equipment used	conducted in t	he closed laboratory facility: environment	temperature (22±3) $^{6}\!C$ and
All calibrations have been numidity<70% Calibration Equipment used Primary Standards	I (M&TE critical fo	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.)	temperature (22±3)°C and Scheduled Calibration
All calibrations have been numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2	I (M&TE critical fo	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965)	temperature (22±3)°C and Scheduled Calibration May-21
All callbrations have been humidity<70% Callbration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	ID # 106276 101369	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965)	temperature (22±3)°C and Scheduled Calibration May-21 May-21
All callbrations have been numidity<70% Callbration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	ID # 106276 101369 ID 803617	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21(SPEAG,No.EX3-3617_Jan21)	temperature (22±3)°C and Scheduled Calibration May-21 May-21 Jan-22
All calibrations have been numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 3617 SN 777	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21(SPEAG,No.EX3-3617_Jan21) 08-Jan-21(CTTL-SPEAG,No.Z21-60003)	temperature (22±3)°C and Scheduled Calibration May-21 May-21 Jan-22 Jan-22
All calibrations have been humidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	I (M&TE critical fo I (M&TE critical fo 106276 101369 SN 3617 SN 777 ID #	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (CTTL, No.J20X02965) 27-Jan-21 (CTTL-SPEAG, No.Z21-60003) Cal Date(Calibrated by, Certificate No.)	temperature (22±3)°C and Scheduled Calibration May-21 May-21 Jan-22 Jan-22 Scheduled Calibration
All calibrations have been humidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	conducted in t I (M&TE critical fe ID # 106276 101369 SN 3617 SN 777 ID # MY49071430	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG, No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG, No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593)	temperature (22±3)°C and Scheduled Calibration May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22
All calibrations have been humidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	conducted in t I (M&TE critical fe ID # 106276 101369 SN 3617 SN 777 ID # MY49071430 MY46110673	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG,No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG,No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232)	temperature (22±3)°C and Scheduled Calibration May-21 May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
All Calibrations have been humidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	Conducted in t (M&TE critical fo 10 # 106276 101369 SN 3617 SN 777 ID # MY49071430 MY46110673 Name	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG,No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG,No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function	temperature (22±3)°C and Scheduled Calibration May-21 May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Jan-22
All Calibrations have been numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	conducted in t (M&TE critical fo 10 # 106276 101369 SN 3617 SN 777 ID# MY49071430 MY46110673 Name Zhao Jing	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG,No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG,No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAB Test Engineer	temperature (22±3)°C and Scheduled Calibration May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature
All calibrations have been numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	Conducted in t (M&TE critical for 106276 101359 SN 3617 SN 777 ID# MY49071430 MY46110673 Name Zhao Jing	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG,No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG,No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer	temperature (22±3)℃ and Scheduled Calibration May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature 文文
All Calibrations have been numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C Calibrated by: Reviewed by:	Conducted in t (M&TE critical for 10.05276 10.1369 SN 3617 SN 777 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG,No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG,No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer SAR Test Engineer	temperature (22±3)℃ and Scheduled Calibration May-21 May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature 试道
All Calibrations have been numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C Calibrated by: Reviewed by: Approved by:	Conducted in t (M&TE critical for 10 # 106276 101369 SN 3617 SN 777 ID # MY49071430 MY49071430 MY46110673 Name Zhao Jing Lin Hao Qi Dianyuan	he closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 27-Jan-21 (SPEAG, No.EX3-3617_Jan21) 08-Jan-21 (CTTL-SPEAG, No.Z21-60003) Cal Date(Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer SAR Test Engineer SAR Project Leader	temperature (22±3)℃ and Scheduled Calibration May-21 Jan-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Jan-22

Certificate No: Z21-60156

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E-mail: ctil a chinatth.com

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%.

Certificate No: Z21-60156

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Measurement Conditions

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

DASY Version	DASY52	V52 10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5 1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	$dx_{s} dy_{s} dz = 5 mm$	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied

	1 criticovity	Conductivity
22.0 °C	39.0	1.96 mho/m
2.0 ± 0.2) °C	39.9±6%	1.94 mho/m ± 6 %
<1.0 °C		_
	22.0 °C 22.0 ± 0.2) °C <1.0 °C	22.0 °C 39.0 22.0 ± 0.2) °C 39.9 ± 6 % <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	13.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	56.1 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.5 W/kg ± 18.7 % (k=2)

Certificate No: Z21-60156

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Appendix(Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1Ω- 7.19)Ω	
Return Loss	- 22 9dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1 055 ns
	1.000010

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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- Electronics: DAE4 Sn777; Calibrated: 2021-01-08
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 101.1 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 31.5 W/kg SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.1 W/kg Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 44%

Maximum value of SAR (measured) = 24.4 W/kg



0 dB = 24.4 W/kg = 13.87 dBW/kg

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Impedance Measurement Plot for Head TSL



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ANNEX K: D5GHzV2 Dipole Calibration Certificate

E-mail: cttl@chinatt	33-2512 Fax: + tl.com http://	86-10-62304633-2504	CNAS L057
Client TA(S	Shanghai)	Certificate No: Z2	0-60080
CALIBRATION CE	ERTIFICAT	E. A.	
Object	D5GHz	V2 - SN: 1151	
Calibration Procedure(s)			
	FF-Z11 Calibra	-003-01 tion Procedures for dipole validation kits	
Calibration date:	Febura	ry 27, 2020	
humidity<70%. Calibration Equipment used	(M&TE critical f	or calibration)	
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106276	11-Apr-19 (CTTL, No.J19X02605)	Apr-20
December 100001		11-Apr-19 (CTTL, No.J19X02605)	Apr-20
Power sensor NRP6A ReferenceProbe FX3DV4	101369 SN 3846	25-Mar-10/CTTL SPEAC No 710 COORAN	11 00
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4	101369 SN 3846 SN 1555	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295)	Mar-20 Aug-20
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards	101369 SN 3846 SN 1555 ID #	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.)	Mar-20 Aug-20 Scheduled Calibration
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	101369 SN 3846 SN 1555 ID # MY49071430	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516)	Mar-20 Aug-20 Scheduled Calibration Feb-21
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzerE5071C	101369 SN 3846 SN 1555 ID # MY49071430 MY46110673	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzerE5071C	101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function	Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Signature
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzerE5071C	101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name Zhao Jing	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer	Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzerE5071C Calibrated by: Reviewed by:	101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer	Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Signature
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzerE5071C Calibrated by: Reviewed by: Approved by:	101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao Qi Dianyuan	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer SAR Project Leader	Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Signature
Power sensor NRP6A ReferenceProbe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzerE5071C Calibrated by: Reviewed by: Approved by: This calibration certificate set	101369 SN 3846 SN 1555 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao Qi Dianyuan hall not be repro	25-Mar-19(CTTL-SPEAG,No.Z19-60064) 22-Aug-19(CTTL-SPEAG,No.Z19-60295) Cal Date(Calibrated by, Certificate No.) 10-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer SAR Project Leader Issued: Febu duced except in full without written approval of	Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21 Signature Signature rary 29, 2019 of the laboratory.



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Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	V52.10.4
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	36.9±6%	4.59 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	7.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	78.0 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.3 W/kg ± 24.2 % (k=2)

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E-mail: cttl@chinattl.com http://www.china	04633-2504 attl.cn			
d TSL parameters at 5600 MHz ne following parameters and calculations were a	applied.			4.53
	Temperature	Permitt	ivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5		5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.3 ±	6 %	4.96 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C			
Head TSL temperature change during test R result with Head TSL at 5600 MHz	<1.0 °C			
Head TSL temperature change during test <u>R result with Head TSL at 5600 MHz</u> SAR averaged over 1 cm ³ (1 g) of Head TSL	<1.0 °C	tion		
Head TSL temperature change during test R result with Head TSL at 5600 MHz SAR averaged over 1 cm ³ (1 g) of Head TSL SAR measured	<1.0 °C	tion put power		8.02 W/kg
Head TSL temperature change during test R result with Head TSL at 5600 MHz SAR averaged over 1 cm ³ (1 g) of Head TSL SAR measured SAR for nominal Head TSL parameters	<1.0 °C Condit 100 mW in normalize	tion put power d to 1W	80.5 \	8.02 W/kg W/kg ± 24.4 % (k=2)
Head TSL temperature change during test R result with Head TSL at 5600 MHz SAR averaged over 1 cm ³ (1 g) of Head TSL SAR measured SAR for nominal Head TSL parameters SAR averaged over 10 cm ³ (10 g) of Head TSL	<1.0 °C Condit 100 mW in normalize SL Condit	tion put power ed to 1W	80.5	8.02 W/kg W/kg ± 24.4 % (k=2)
Head TSL temperature change during test R result with Head TSL at 5600 MHz SAR averaged over 1 cm ³ (1 g) of Head TSL SAR measured SAR for nominal Head TSL parameters SAR averaged over 10 cm ³ (10 g) of Head TS SAR measured	<1.0 °C Condit 100 mW in normalize SL Condit 100 mW in	tion put power d to 1W tion put power	80.5 \	8.02 W/kg W/kg ± 24.4 % (k=2) 2.29 W/kg

	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	36.1 ± 6 %	5.12 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	7.72 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	77.4 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.9 W/kg ± 24.2 % (k=2)

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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	48.1 ± 6 %	5.27 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	7.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	73.4 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.8 W/kg ± 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	47.4 ± 6 %	5.74 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	en en ser	

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	7.78 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	77.4 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	22.0 W/kg ± 24.2 % (k=2)

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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	47.1 ± 6 %	5.96 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	7.38 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	73.5 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.6 W/kg ± 24.2 % (k=2)

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Appendix (Additional assessments outside	the scope of CNAS L0570)
Antenna Parameters with Head TSL at 5250	MHz
Impedance, transformed to feed point	52.4Ω - 6.47jΩ
Return Loss	- 23.4dB
Antenna Parameters with Head TSL at 5600	MHz
Impedance, transformed to feed point	57.0Ω - 3.86jΩ
Return Loss	- 22.6dB
Antenna Parameters with Head TSL at 5750	MHz
Impedance, transformed to feed point	55.9Ω + 0.16jΩ
Return Loss	- 25.0dB
Antenna Parameters with Body TSL at 5250	MHz
Return Loss	51.6Ω - 5.33jΩ
Intenna Parameters with Body TSL at 5600	MHz
Impedance, transformed to feed point	57.6Ω - 2.15jΩ
Return Loss	- 22.7dB
Intenna Parameters with Body TSL at 5750	MHz
Impedance, transformed to feed point	55.4Ω + 1.94jΩ
Return Loss	- 25.2dB
Noturn 2000	
North E000	

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Electrical Delay (one direction)	and Design	1.066 ns	
After long term use with 100W radiate be measured.	ed power, only a slight wa	rming of the dipole near the	feedpoint can
connected to the second arm of the d of the dipoles, small end caps are add according to the position as explained affected by this change. The overall of No excessive force must be applied to connections near the feedpoint may be Additional EUT Data	lipole. The antenna is ther ded to the dipole arms in d d in the "Measurement Co dipole length is still accord o the dipole arms, becaus be damaged.	efore short-circuited for DC- order to improve matching w nditions" paragraph. The SA ing to the Standard. e they might bend or the sol	signals. On some hen loaded R data are not dered
Manufactured by		SPEAG	











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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 = 62.00 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 33.5 W/kg SAR(1 g) = 7.38 W/kg; SAR(10 g) = 2.07 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 61.1% Maximum value of SAR (measured) = 17.8 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg

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ANNEX L: DAE4 Calibration Certificate

	cn, Switzerland	Hadadadadada	S Swiss Calibration Service
Accredited by the Swiss Accredit The Swiss Accreditation Servic Multilateral Agreement for the	alion Service (SAS) ce is one of the signatories recognition of calibration of	a to the EA certificates	ation No.: SCS 0108
Cilent TA-SH (Auden	1)	Certifica	te No: DAE4-1692_Oct21
CALIBRATION	CERTIFICATE		
Object	DAE4 - SD 000 D	004 BO - SN: 1692	
Calibration procedure(s)	QA CAL-06.v30 Calibration proces	dure for the data acquisition e	electronics (DAE)
Calibration date:	October 04, 2021		
This calibration certificate docum The measurements and the unce All calibrations have been condu Calibration Equipment used (M&	ents the traceability to natio ertainties with confidence pro cled in the closed laboratory TE critical for calibration)	nal standards, which realize the physics obability are given on the following page / facility: environment temperature (22 ±	al units of measurements (SI), is and are part of the certificate, 3)°C and humidity < 70%.
This calibration certificate docum The measurements and the unce All calibrations have been condu Calibration Equipment used (M& Primary Standards Keithley Multimeter Type 2001	ents the traceability to natio ertainties with confidence pro cled in the closed laboratory TE critical for calibration) ID # SN: 0810278	nal standards, which realize the physica obability are given on the following page facility: environment temperature (22 ± Cal Date (Cértificate No.) 31-Aug-21 (No:31368)	al units of measurements (SI), is and are part of the certificate, 3)°C and humidity < 70%. Scheduled Calibration
This calibration certificate docum The measurements and the unce All calibrations have been condu Calibration Equipment used (M& Primary Standards Keithley Multimeter Type 2001 Secondary Standards	ents the traceability to natio entainties with confidence pro- cted in the closed laboratory TE critical for calibration) ID # SN: 0810278	nal standards, which realize the physice obability are given on the following page (facility: environment temperature (22 ± <u>Cal Date (Certificate No.)</u> 31-Aug-21 (No:31368) Check Date (in house)	al units of measurements (SI), is and are part of the certificate, 3)°C and humidity < 70%. Scheduled Calibration Aug-22
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Accreditation No.: SCS 0108

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Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary

DAE Connector angle

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

Methods Applied and Interpretation of Parameters

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

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DC Voltage Measurement A/D - Converter Resolution nominal

High Range:	1LSB =	6.1uV	full range -	100 1200 mV
Low Range:	1LSB =	61nV .	full range =	-1+3mV
DASY measurement	parameters: Au	to Zero Time: 3	sec; Measuring	time: 3 sec

Calibration Factors	x	Y	z
High Range	404.451 ± 0.02% (k=2)	404.531 ± 0.02% (k=2)	404.388 ± 0.02% (k=2)
Low Range	3.95023 ± 1.50% (k=2)	4.00333 ± 1.50% (k=2)	3.97913 ± 1.50% (k=2)

Connector Angle

connector Angle to be used in DASY system	334.5°±1°
Somector Angle to be used in DASY system	334.5 ° ± 1

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High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	199998.31	2.10	0.00
Channel X + Input	20004.35	2.07	0.01
Channel X - Input	-19997,45	4.22	-0.02
Channel Y + Input	199996.63	0.87	0.00
Channel Y + Input	20001.14	-1.08	-0.01
Channel Y - Input	-20002.28	-0.47	0.00
Channel Z + Input	199998.12	1.98	0.00
Channel Z + Input	20002.54	0.26	0.00
Channel Z - Input	-20001.19	0.53	-0.00

Appendix (Additional assessments outside the scope of SCS0108) 1. DC Voltage Linearity

Low Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	2001.64	0.32	0.02
Channel X	+ Input	202.20	0.58	0.29
Channel X	- Input	-197.54	0.78	-0.39
Channel Y	+ Input	1999.35	-1.87	-0.09
Channel Y	+ Input	200.36	-1.25	-0.62
Channel Y	- Input	-199.29	-0.98	0.49
Channel Z	+ Input	2000.89	-0.32	-0.02
Channel Z	+ Input	200.91	-0.59	-0.29
Channel Z	- Input	-199.57	-1.16	0.58

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (µV)
Channel X	200	15.85	13.56
	- 200	-12.16	-14.19
Channel Y	200	21.51	20.97
	- 200	-24.04	-24.35
Channel Z	200	-6.87	-7.13
	- 200	6.28	5.75

3. Channel separation

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

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	1	-0.88	-2.39
Channel Y	200	6.27		2.31
Channel Z	200	8.86	3.02	

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4. AD-Converter Values with Inputs shorted

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

High Range (LSB)	Low Range (LSB)
15949	15587
15899	18485
15625	15900
	High Range (LSB) 15949 15899 15625

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec Input $10M\Omega$

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation
Channel X	1.24	-0.39	2.50	0.44
Channel Y	-0.70	-1.86	0.77	0.48
Channel Z	-0.23	-1.42	0.54	0.37

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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ANNEX M: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX N: Test Setup Photos

The Test Setup Photos are submitted separately.