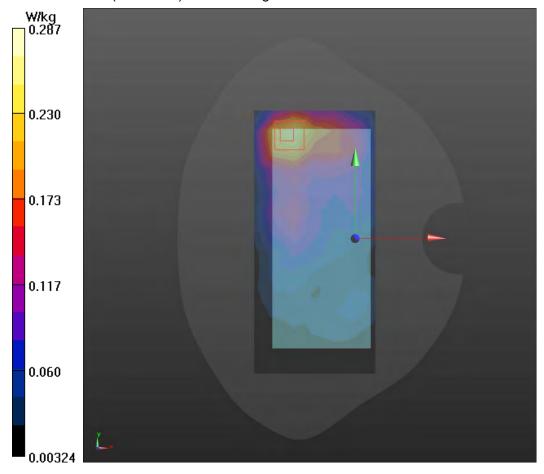


Plot 47 802.11b Back Side Low (Distance 10mm) Date: 2022/6/28 Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1.02 Medium parameters used: f = 2412 MHz; σ = 1.801 S/m; ε_r = 37.737; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat 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)

Back Side Low/Area Scan (10x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.274 W/kg

Back Side Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 6.335 V/m; Power Drift = 0.011 dB Peak SAR (extrapolated) = 0.511 W/kg SAR(1 g) = 0.256 W/kg; SAR(10 g) = 0.125 W/kg Maximum value of SAR (measured) = 0.287 W/kg

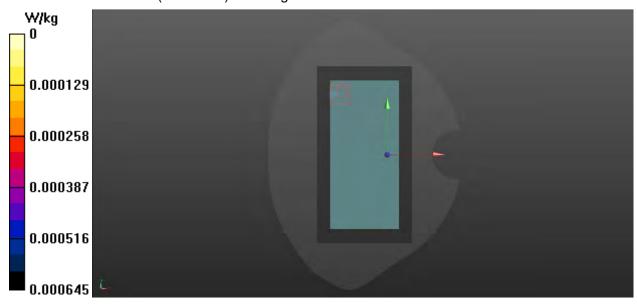


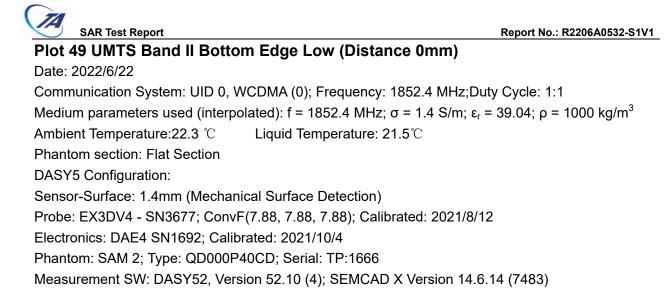


Plot 48 Bluetooth Back Side Low (Distance 10mm) Date: 2022/6/28 Communication System: UID 0, BT (0); Frequency: 2402 MHz;Duty Cycle: 1:1.32 Medium parameters used: f = 2402 MHz; σ = 1.789 S/m; ε_r = 37.77; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section 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 Low/Area Scan (10x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0 W/kg

Back Side Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 1.539 V/m; Power Drift = -0.028 dB Peak SAR (extrapolated) = 0 W/kg SAR(1 g) = 0 W/kg; SAR(10 g) = 0 W/kg Maximum value of SAR (measured) = 0 W/kg

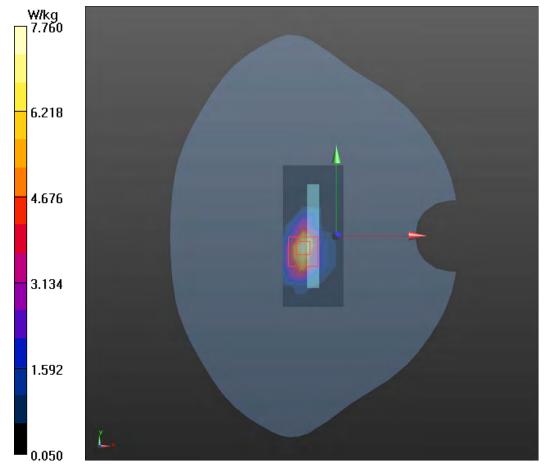


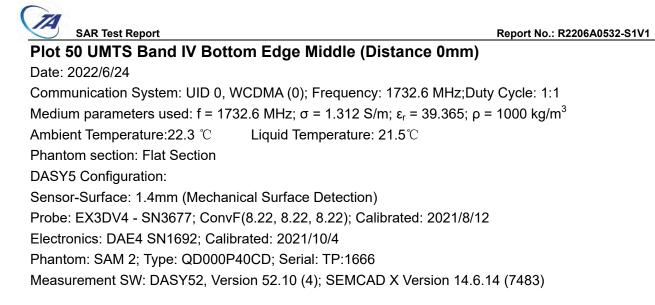


Bottom Edge Low/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 7.99 W/kg

Bottom Edge Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 48.04 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 15.0 W/kg SAR(1 g) = 4.01 W/kg; SAR(10 g) = 1.88 W/kg

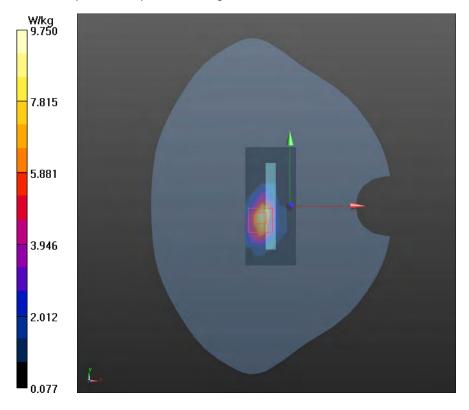
Maximum value of SAR (measured) = 7.76 W/kg





Bottom Edge Middle/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 9.75 W/kg

Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 49.77 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 18.3 W/kg SAR(1 g) = 4.45 W/kg; SAR(10 g) = 2.02 W/kg Maximum value of SAR (measured) = 9.75 W/kg

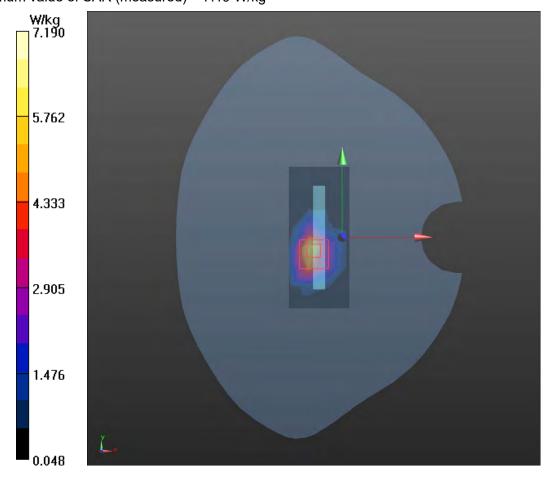




Plot 51 LTE Band 2 1RB Bottom Edge Low (Distance 0mm) Date: 2022/6/22 Communication System: UID 0, LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1860 MHz; σ = 1.407 S/m; ϵ_r = 39.071; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat 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) = 6.28 W/kg

Bottom Edge Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 61.57 V/m; Power Drift = 0.047 dB Peak SAR (extrapolated) = 13.7 W/kg SAR(1 g) = 3.98 W/kg; SAR(10 g) = 1.84 W/kg Maximum value of SAR (measured) = 7.19 W/kg



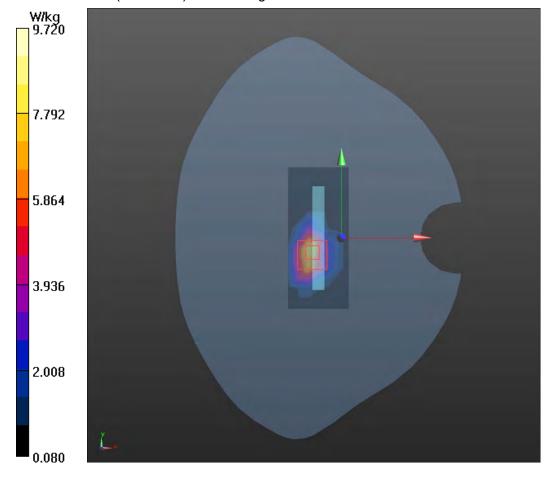


Plot 52 LTE Band 4 1RB Bottom Edge Middle (Distance 0mm) Date: 2022/6/24 Communication System: UID 0, LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1 Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.313 S/m; ϵ_r = 39.384; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °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) = 8.64 W/kg

Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 69.43 V/m; Power Drift = -0.072 dB Peak SAR (extrapolated) = 17.9 W/kg SAR(1 g) = 3.86 W/kg; SAR(10 g) = 1.76 W/kg

Maximum value of SAR (measured) = 9.72 W/kg

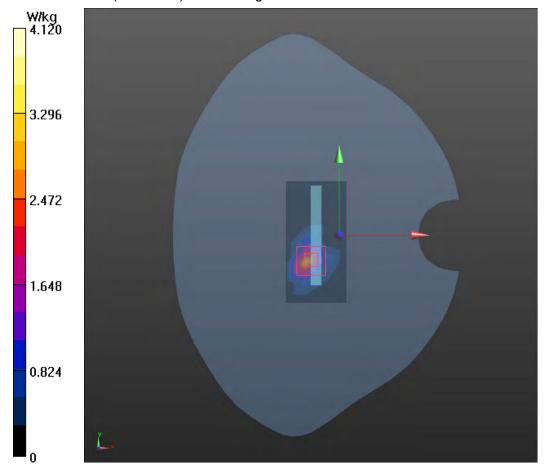




Plot 53 LTE Band 7 1RB Top Edge High (Distance 0mm) Date: 2022/7/4 Communication System: UID 0, LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1 Medium parameters used: f = 2560 MHz; σ = 1.971 S/m; ϵ_r = 37.231; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat 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)

Top Edge High/Area Scan (5x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 3.73 W/kg

Top Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 17.58 V/m; Power Drift = 0.027 dB Peak SAR (extrapolated) = 9.26 W/kg SAR(1 g) = 3.09 W/kg; SAR(10 g) = 1.26 W/kg Maximum value of SAR (measured) = 4.12 W/kg



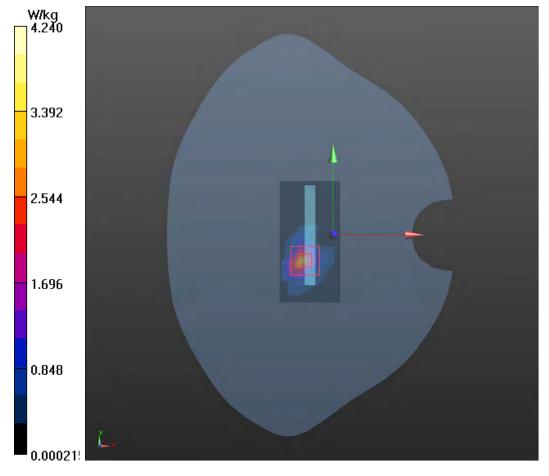


Plot 54 LTE Band 38 1RB Top Edge High (Distance 0mm) Date: 2022/7/4 Communication System: UID 0, LTE (0); Frequency: 2610 MHz;Duty Cycle: 1:1.58 Medium parameters used: f = 2610 MHz; σ = 2.027 S/m; ε_r = 37.056; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat 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)

Top Edge High/Area Scan (5x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 3.25 W/kg

Top Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 17.30 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 9.85 W/kg SAR(1 g) = 3.5 W/kg; SAR(10 g) = 1.2 W/kg

Maximum value of SAR (measured) = 4.24 W/kg

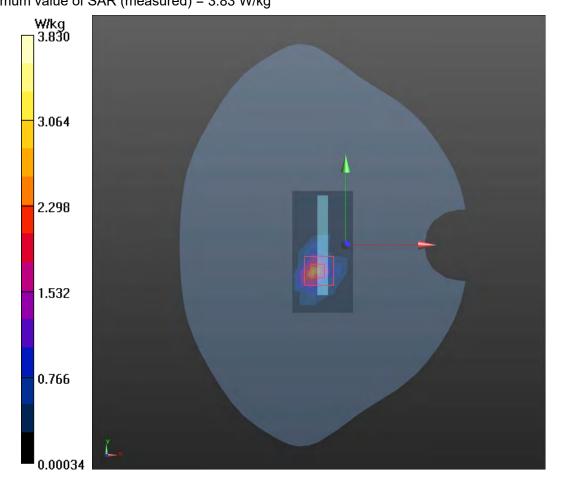


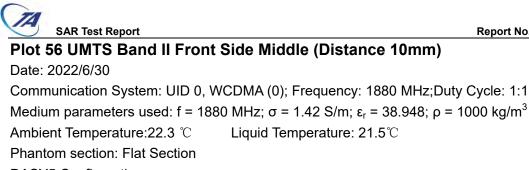


Plot 55 LTE Band 41 1RB Top Edge High (Distance 0mm) Date: 2022/7/3 Communication System: UID 0, LTE (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58 Medium parameters used: f = 2593 MHz; σ = 2.063 S/m; ε_r = 36.918; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25); 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)

Top Edge High/Area Scan (5x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 3.82 W/kg

Top Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 15.57 V/m; Power Drift = 0.193 dB Peak SAR (extrapolated) = 9.49 W/kg SAR(1 g) = 3.72 W/kg; SAR(10 g) = 1.25 W/kg Maximum value of SAR (measured) = 3.83 W/kg

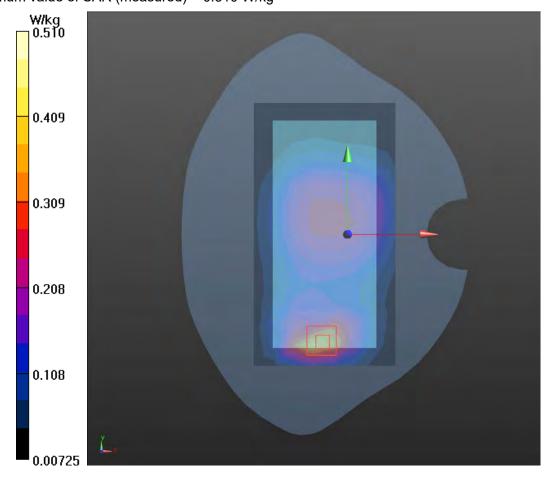


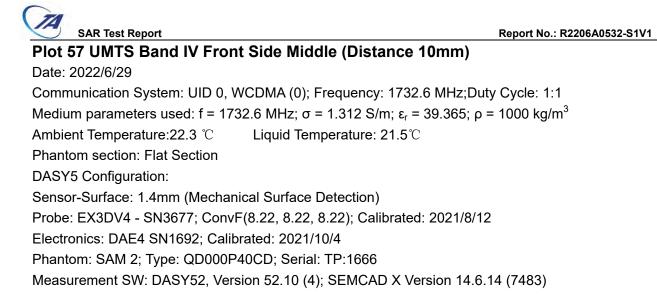


DASY5 Configuration: Sensor-Surface: 1.4mm (Mechanical Surface Detection) Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12 Electronics: DAE4 SN1692; Calibrated: 2021/10/4 Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666 Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Front Side Middle/Area Scan (10x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.486 W/kg

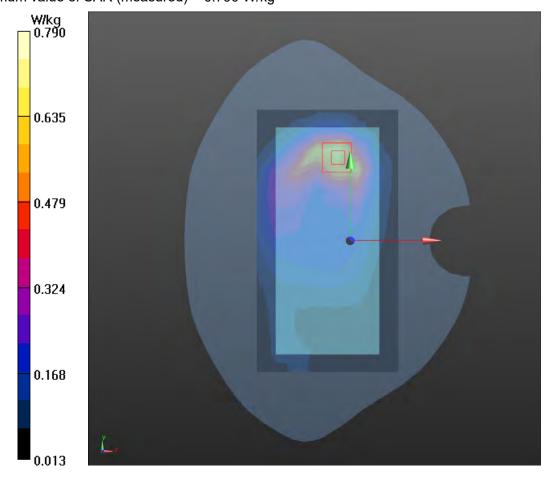
Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 7.596 V/m; Power Drift = 0.043 dB Peak SAR (extrapolated) = 0.711 W/kg SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.279 W/kg Maximum value of SAR (measured) = 0.510 W/kg





Front Side Middle/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.717 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 10.48 V/m; Power Drift = -0.1 dB Peak SAR (extrapolated) = 1.12 W/kg SAR(1 g) = 0.684 W/kg; SAR(10 g) = 0.359 W/kg Maximum value of SAR (measured) = 0.790 W/kg

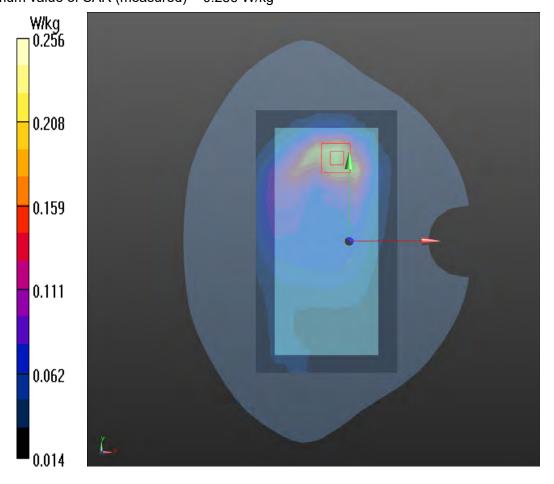




Plot 58 UMTS Band V Front Side Middle (Distance 10mm) Date: 2022/6/25 Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz;Duty Cycle: 1:1 Medium parameters used: f = 836.6 MHz; σ = 0.953 S/m; ϵ_r = 39.762; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: 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)

Front Side Middle/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm dx=10mm, dy=10mm Maximum value of SAR (measured) = 0.201 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 5.884 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.326 W/kg SAR(1 g) = 0.198 W/kg; SAR(10 g) = 0.130 W/kg Maximum value of SAR (measured) = 0.256 W/kg

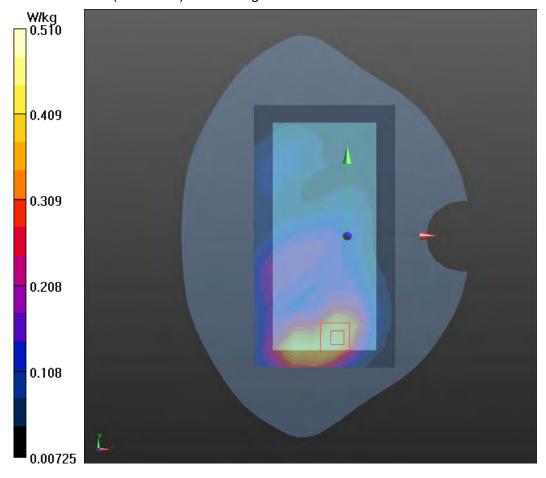




Plot 59 LTE Band 2 1RB Front Side High (Distance 10mm) Date: 2022/6/21 Communication System: UID 0, LTE (0); Frequency: 1900 MHz;Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz; σ = 1.434 S/m; ϵ_r = 38.861; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat 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)

Front Side High/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm dx=10mm, dy=10mm Maximum value of SAR (measured) = 0.51 W/kg

Front Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 11.04 V/m; Power Drift = 0.012 dB Peak SAR (extrapolated) = 0.798 W/kg SAR(1 g) = 0.509 W/kg; SAR(10 g) = 0.299 W/kg Maximum value of SAR (measured) = 0.51W/kg

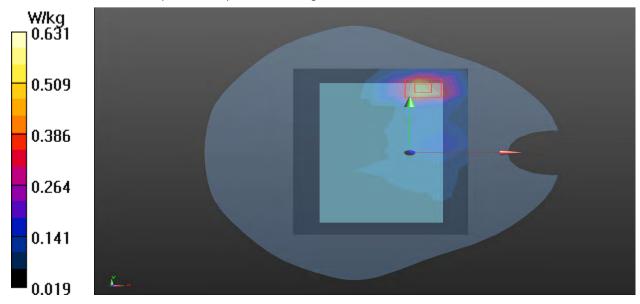


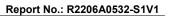


Plot 60 LTE Band 5 1RB Front Side High (Distance 10mm) Date: 2022/6/25 Communication System: UID 0, LTE (0); Frequency: 844 MHz;Duty Cycle: 1:1 Medium parameters used: f = 844 MHz; σ = 0.958 S/m; ε_r = 39.728; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat 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)

Front Side High/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.615 W/kg

Front Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 16.25 V/m; Power Drift = -0.101 dB Peak SAR (extrapolated) = 0.969 W/kg SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.245 W/kg Maximum value of SAR (measured) = 0.631 W/kg







Plot 61 LTE Band 38 1RB Front Side High (Distance 10mm)

Date: 2022/7/1 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)

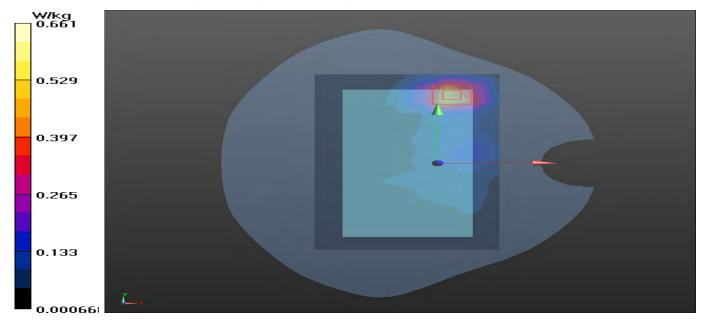
Front Side High/Area Scan (10x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.493 W/kg

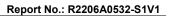
Front Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 3.045 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.490 W/kg; SAR(10 g) = 0.243 W/kg

Maximum value of SAR (measured) = 0.661 W/kg







Plot 62 LTE Band 41 1RB Front Side Middle (Distance 10mm)

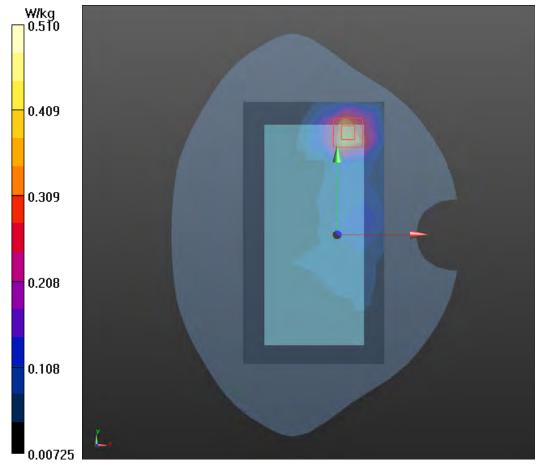
Date: 2022/7/1 Communication System: UID 0, LTE (0); Frequency: 2593MHz;Duty Cycle: 1:1.58 Medium parameters used: f = 2593MHz; σ = 2.063 S/m; ε_r = 36.918; ρ = 1000 kg/m³ Ambient Temperature:22.3 °C Liquid Temperature: 21.5 °C Phantom section: Flat Section DASY5 Configuration: Sensor-Surface: 1.4mm (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)

Front Side Middle/Area Scan (10x18x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.505 W/kg

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 2.360 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.497 W/kg; SAR(10 g) = 0.245 W/kg

Maximum value of SAR (measured) = 0.510 W/kg





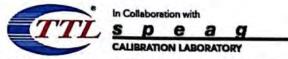
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ANNEX D: Probe Calibration Certificate (SN: 3677)

Add: No.52 HuaYua Tel: +86-10-623046 E-mail: cttl@chinatt				CONTRACTOR OF STREET	
Client TA(Sh	anghai) ERTIFICATE	Cert	tificate No:	Z21-60285	
Object	EX3DV4 - :	SN : 3677			-
Calibration Procedure(s)	FE 744 00				
	FF-Z11-004 Calibration	-02 Procedures for Dosimetric I	F-field Probes		
Calibration date:					
Campration date:	August 12,	2021		-	
pages and are part of the cer	inodic.				
numidity<70%.			environment	temperature(22	t3)℃ and
numidity<70%. Calibration Equipment used (temperature(22	
humidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2	M&TE critical for ca ID # 101919	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21)	ertificate No.) (04466)		alibration
numidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91	M&TE critical for ca ID # 101919 101547	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21)	ertificate No.) (04466) (04466)	Scheduled C	alibration
numidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91	M&TE critical for ca ID # 101919 101547 101548	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21)	ertificate No.) (04466) (04466) (04466)	Scheduled Co Jun-22 Jun-22 Jun-22	alibration 2 2
humidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20)	ertificate No.) (04466) (04466) (04466) (04466) (00525)	Scheduled C Jun-22 Jun-22 Jun-22 Feb-22	alibration 2 2 2 2
Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB	libration) Cal Date(Calibrated by, Ca 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20) 10-Feb-20(CTTL, No.J20)	ertificate No.) (04466) (04466) (04466) (00525) (00525)	Scheduled Co Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 Feb-22	alibration 2 2 2 2 2
humidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20)	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2	Scheduled C Jun-22 Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22	alibration 2 2 2 2 2 2 2
humidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB SN 3617 SN 1556 ID #	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20) 10-Feb-20(CTTL, No.J20) 27-Jan-21(SPEAG, No.EX	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2 (44-1556_Jan	Scheduled C Jun-22 Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22	alibration 2 2 2 2 2 2 2
Aumidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB SN 3617 SN 1556 ID #	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20) 10-Feb-20(CTTL, No.J20) 27-Jan-21(SPEAG, No.DA	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2)	Scheduled Ca Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22 21) Jan-22	alibration 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Aumidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A Network Analyzer E5071C	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB SN 3617 SN 1556 ID # A 6201052605 MY46110673	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20) 27-Jan-21(SPEAG, No.Ex 15-Jan-21(SPEAG, No.DA Cal Date(Calibrated by, Certific 16-Jun-21(CTTL, No.J21) 21-Jan-21(CTTL, No.J20)	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2) (04467)	Scheduled Ca Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22 21) Jan-22 Scheduled Cali Jun-22 Jan-22	alibration 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A Network Analyzer E5071C N	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB SN 3617 SN 1556 ID # A 6201052605 MY46110673 Iame	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J20) 10-Feb-20(CTTL, No.J20) 27-Jan-21(SPEAG, No.EX 15-Jan-21(SPEAG, No.DA Cal Date(Calibrated by, Certifit 16-Jun-21(CTTL, No.J21) 21-Jan-21(CTTL, No.J20) Function	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2) (04467)	Scheduled Ca Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22 21) Jan-22 Scheduled Cali Jun-22	alibration 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Aumidity<70%. Calibration Equipment used (Primary Standards Power Meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A Network Analyzer E5071C N	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB SN 3617 SN 1556 ID # A 6201052605 MY46110673	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 10-Feb-20(CTTL, No.J20) 27-Jan-21(SPEAG, No.Ex 15-Jan-21(SPEAG, No.DA Cal Date(Calibrated by, Certific 16-Jun-21(CTTL, No.J21) 21-Jan-21(CTTL, No.J20)	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2) (04467)	Scheduled Ca Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22 21) Jan-22 Scheduled Cali Jun-22 Jan-22	alibration 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 10dBAttenuator Reference 20dBAttenuator Reference Probe EX3DV4 DAE4 Secondary Standards SignalGenerator MG3700A Network Analyzer E5071C N Calibrated by:	M&TE critical for ca ID # 101919 101547 101548 r 18N50W-10dB r 18N50W-20dB SN 3617 SN 1556 ID # A 6201052605 MY46110673 Iame	libration) Cal Date(Calibrated by, Ce 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J21) 15-Jun-21(CTTL, No.J20) 10-Feb-20(CTTL, No.J20) 27-Jan-21(SPEAG, No.EX 15-Jan-21(SPEAG, No.DA Cal Date(Calibrated by, Certifit 16-Jun-21(CTTL, No.J21) 21-Jan-21(CTTL, No.J20) Function	ertificate No.) (04466) (04466) (04466) (00525) (00526) (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2 (3-3617_Jan2) (04467)	Scheduled Ca Jun-22 Jun-22 Jun-22 Feb-22 Feb-22 1) Jan-22 21) Jan-22 Scheduled Cali Jun-22 Jan-22	alibration 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2

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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_cycle) 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 θ =0 is normal to probe axis

Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system Calibration is Performed According to the Following Standards:

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

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

- Methods Applied and Interpretation of Parameters:
- NORMx, y, z: Assessed for E-field polarization θ=0 (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	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.

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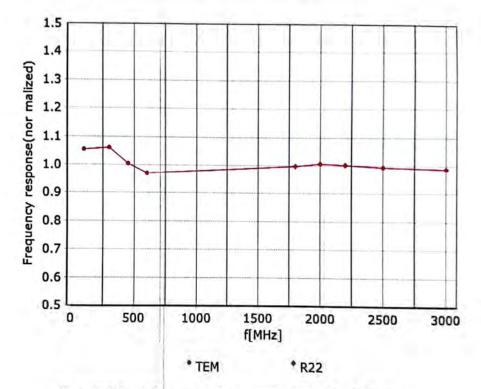




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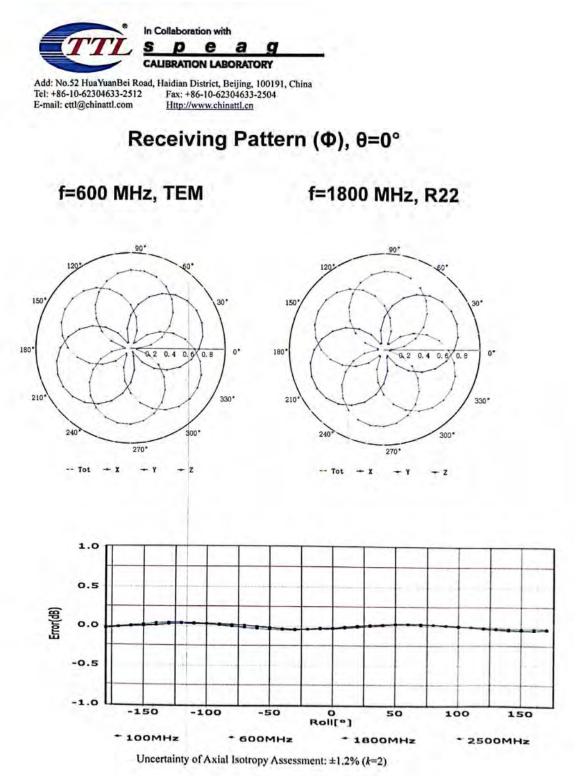
Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



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

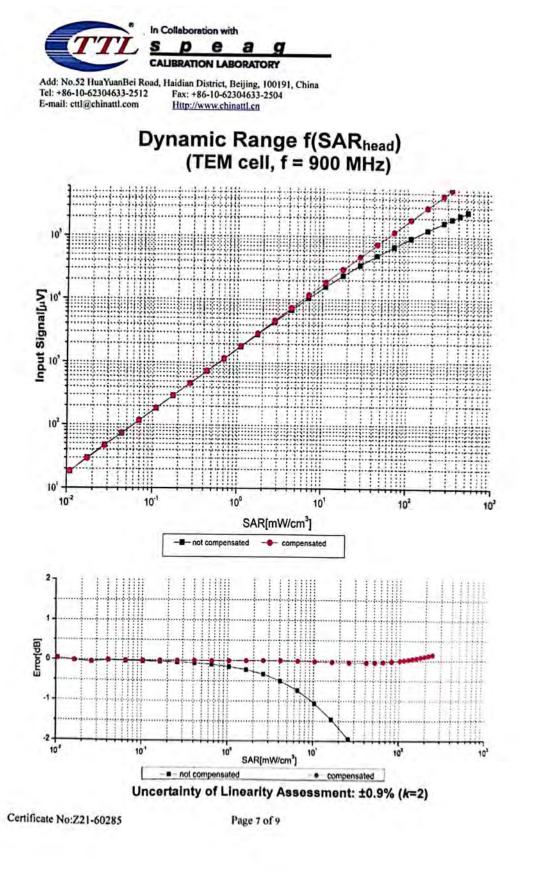
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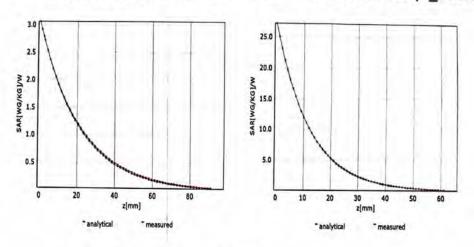




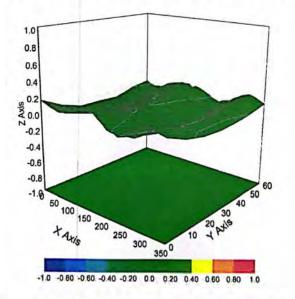
Conversion Factor Assessment

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)

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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

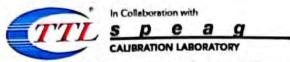
Certificate No:Z21-60285

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ANNEX E: Probe Calibration Certificate (SN: 7543)

anghai)	Certificate No	: Z21-60417
RTIFICATE		
EX3DV4 - S	SN : 7543	
Calibration	Procedures for Dosimetric E-field Probe	es
December :	28, 2021	
surements and the	uncertainties with confidence probability	y are given on the following
tificate.	solution and considence probability	y are given on the following
conducted in the	closed laboratory facility: environmen	t temperature(22±3)℃ and
M&TE critical for ca	libration)	
ID#) Scheduled Calibration
101919		Jun-22
101547	15-Jun-21(CTTL, No.J21X04466)	Jun-22
		Jun-22
	10-Feb-20(CTTL, No.J20X00525)	Feb-22
		Feb-22
SN 3617 SN 1555	27-Jan-21(SPEAG, No.EX3-3617_Jar	121) Jan-22
	20-Aug-21(SPEAG, No.DAE4-1555_A	
514 1355		ug21/2) Aug-22
ID #		
	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
ID #	Cal Date(Calibrated by, Certificate No.) 16-Jun-21(CTTL, No.J21X04467)	Scheduled Calibration Jun-22
ID # 6201052605	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration Jun-22 Jan-22
ID # 6201052605 MY46110673 ame	Cal Date(Calibrated by, Certificate No.) 16-Jun-21(CTTL, No.J21X04467) 21-Jan-21(CTTL, No.J20X00515) Function	Scheduled Calibration Jun-22
ID # 6201052605 MY46110673	Cal Date(Calibrated by, Certificate No.) 16-Jun-21(CTTL, No.J21X04467) 21-Jan-21(CTTL, No.J20X00515)	Scheduled Calibration Jun-22 Jan-22
ID # 6201052605 MY46110673 ame	Cal Date(Calibrated by, Certificate No.) 16-Jun-21(CTTL, No.J21X04467) 21-Jan-21(CTTL, No.J20X00515) Function	Scheduled Calibration Jun-22 Jan-22
ID # 6201052605 MY46110673 lame Yu Zongying Lin Hao	Cal Date(Calibrated by, Certificate No.) 16-Jun-21(CTTL, No.J21X04467) 21-Jan-21(CTTL, No.J20X00515) Function SAR Test Engineer SAR Test Engineer	Scheduled Calibration Jun-22 Jan-22
ID # 6201052605 MY46110673 ame Yu Zongying	Cal Date(Calibrated by, Certificate No.) 16-Jun-21(CTTL, No.J21X04467) 21-Jan-21(CTTL, No.J20X00515) Function SAR Test Engineer	Scheduled Calibration Jun-22 Jan-22
	Calibration December : ocuments the trace surements and the ificate. conducted in the M&TE critical for ca ID # 101919 101547 101548 18N50W-10dB	ID # Cal Date(Calibrated by, Certificate No. 101919 15-Jun-21(CTTL, No.J21X04466) 101547 15-Jun-21(CTTL, No.J21X04466) 101548 15-Jun-21(CTTL, No.J21X04466) 18N50W-10dB 10-Feb-20(CTTL, No.J20X00525) 18N50W-20dB 10-Feb-20(CTTL, No.J20X00526)



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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_cycle) of the RF signal
A.B.C.D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization 0	8 rotation around an axis that is in the plane normal to probe axis (at measurement center).
	θ=0 is normal to probe axis

Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system Calibration is Performed According to the Following Standards:

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

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

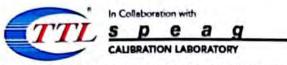
Methods Applied and Interpretation of Parameters:

- NORMx, y, z: Assessed for E-field polarization θ=0 (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).

Certificate No:Z21-60417

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7543

Basic Calibration Parameters

and the second sec	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(µV/(V/m)2) A	0.62	0.69	0.55	±10.0%
DCP(mV) ⁸	100.4	104.2	102.3	-

Modulation Calibration Parameters

UID	Communication System Name	•	A dB	B dBõV	C	D dB	VR mV	Unc ^E (<i>k</i> =2)
0	CW	X	0.0	0.0	1.0	0.00	197.2	±2.7%
	Logy.	Y	0.0	0.0	1.0		206.6	
		Z	0.0	0.0	1.0		180.8	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).

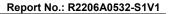
^B Numerical linearization parameter: uncertainty not required.

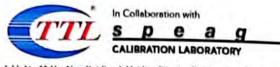
^E Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No:Z21-60417

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7543

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz] ^c	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	10.27	10.27	10.27	0.17	1.26	±12.1%
835	41.5	0.90	9.89	9.89	9.89	0.14	1.62	±12.1%
1750	40.1	1.37	8.42	8.42	8.42	0.28	0.95	±12.1%
1900	40.0	1.40	8.20	8.20	8.20	0.28	1.03	±12.1%
2000	40.0	1.40	8.23	8.23	8.23	0.26	1.08	±12.1%
2300	39.5	1.67	7.68	7.68	7.68	0.62	0.70	±12.1%
2450	39.2	1.80	7.49	7.49	7.49	0.68	0.69	±12.1%
2600	39.0	1.96	7.24	7.24	7.24	0.50	0.81	±12.1%
3300	38.2	2.71	6.94	6.94	6.94	0.41	1.05	±13.3%
3500	37.9	2.91	6.79	6.79	6.79	0.43	1.03	±13.3%
3700	37.7	3.12	6.51	6.51	6.51	0.44	1.01	±13.3%
3900	37.5	3.32	6.40	6.40	6.40	0.35	1.35	±13.3%
4100	37.2	3.53	6.49	6.49	6.49	0.40	1.15	±13.3%
4400	36.9	3.84	6.32	6.32	6.32	0.35	1.35	±13.3%
4600	36.7	4.04	6.22	6.22	6.22	0.45	1.20	±13.3%
4800	36.4	4.25	6.16	6.16	6.16	0.45	1.20	±13.3%
4950	36.3	4.40	5.95	5.95	5.95	0.45	1.25	±13.3%
5250	35.9	4.71	5.44	5.44	5.44	0.45	1.25	±13.3%
5600	35.5	5.07	4.81	4.81	4.81	0.55	1.20	±13.3%
5750	35.4	5.22	4.94	4.94	4.94	0.55	1.25	±13.3%

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

^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters. ^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary

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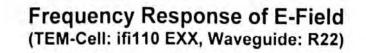
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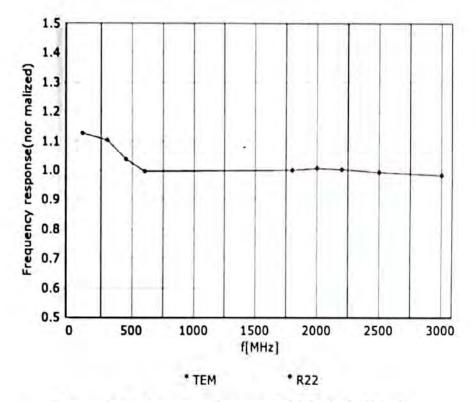




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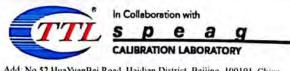


Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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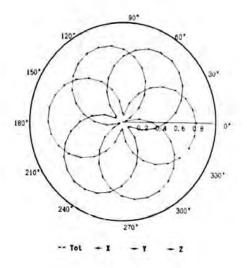
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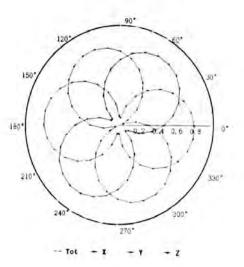
 E-mail: cttl@chinattl.com
 IIttp://www.chinattl.cn

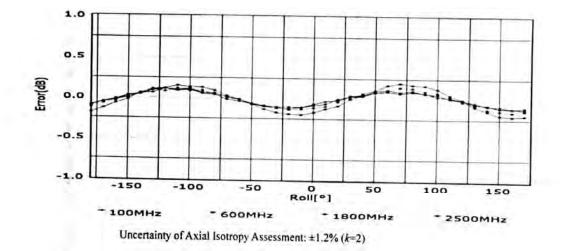
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM

f=1800 MHz, R22

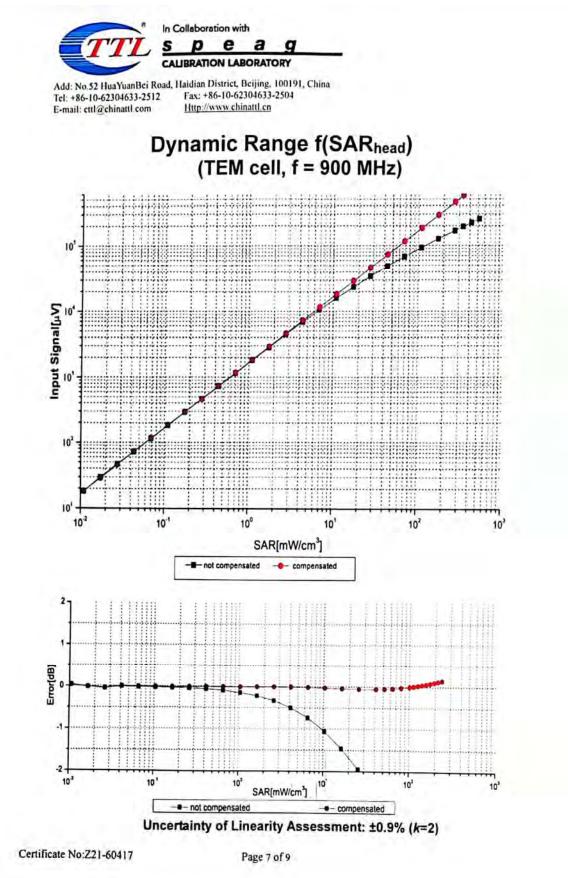




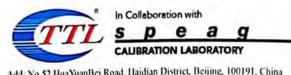


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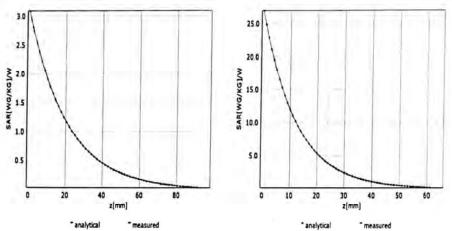


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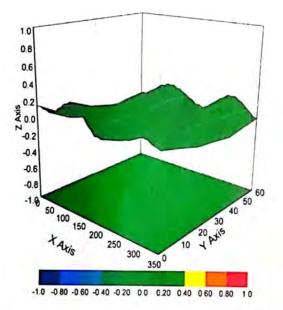
Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF) 3.0 25.0 2.5

f=1750 MHz,WGLS R22(H_convF)



Deviation from Isotropy in Liquid



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

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:7543

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	50.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

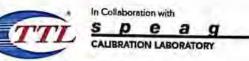
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ANNEX F: D835V2 Dipole Calibration Certificate

Add: No.51 Xueyua Tel: +86-10-623046			"Infutution		CNAS L0570
E-mail: ettl@chinat Client TA(Sh	anghai)	www.chinattl.cn	ertificate No:	Z20-60296	
CALIBRATION CE	RTIFICAT	E			
Dbject	D835V	2 - SN: 4d020			
Calibration Procedure(s)	FF-Z11 Calibra	-003-01 tion Procedures for dip	oole validation kits		
Calibration date:		28, 2020			
Measurements(SI). The me bages and are part of the co All calibrations have been humidity<70%.	ertificate.	the uncertainties with the closed laboratory			
bages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used	ertificate.	the closed laboratory	facility: environm	ent temperature	
bages and are part of the contract of the cont	I conducted in M&TE critical f	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N	facility: environm by, Certificate No.) o.J20X02965)	ent temperature Scheduled Ma	(22±3)°C and Calibration ay-21
bages and are part of the contract of the cont	ertificate. conducted in (M&TE critical for ID # 106276 101369	the closed laboratory or calibration) Cal Date(Calibrated	/ facility: environm by, Certificate No.) 0.J20X02965) 0.J20X02965)	ent temperature Scheduled Mi Mi	(22±3)°C and
Primary Standards Power Meter NRP2 Power sensor NRP6A	ertificate. conducted in (M&TE critical for ID # 106276 101369	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N 12-May-20 (CTTL, N	facility: environm by, Certificate No.) o.J20X02965) lo.J20X02965) lo.EX3-3617_Jan20	ent temperature Scheduled Ma Ma Ja	(22±3)°C and Calibration ay-21 ay-21
Calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	ertificate. conducted in (M&TE critical for 106276 101369 SN 3617 SN 771 ID #	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N 12-May-20 (CTTL, N 30-Jan-20(SPEAG,N 10-Feb-20(CTTL-SP Cal Date(Calibrated I	facility: environm by, Certificate No.) o.J20X02965) o.J20X02965) lo.EX3-3617_Jan20 EAG,No.Z20-60017 by, Certificate No.)	ent temperature Scheduled Mi)) Ja 7) Fe	(22±3)°C and Calibration ay-21 ay-21 an-21
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ertificate. conducted in (M&TE critical for ID # 106276 101369 SN 3617 SN 771	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N 12-May-20 (CTTL, N 30-Jan-20(SPEAG,N 10-Feb-20(CTTL-SP	facility: environm by, Certificate No.) o.J20X02965) o.J20X02965) lo.EX3-3617_Jan20 EAG,No.Z20-60017 by, Certificate No.) o.J20X00516)	ent temperature Scheduled Mi Mi)) Ja 7) Fe Scheduled Fr	(22±3)°C and Calibration ay-21 ay-21 an-21 ab-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	ertificate. conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # ID # ID # MY49071430	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N 12-May-20 (CTTL, N 30-Jan-20(SPEAG,N 10-Feb-20(CTTL-SP Cal Date(Calibrated I 25-Feb-20 (CTTL, No	facility: environm by, Certificate No.) o.J20X02965) o.J20X02965) lo.EX3-3617_Jan20 EAG,No.Z20-60017 by, Certificate No.) o.J20X00516)	ent temperature Scheduled Mi Mi)) Ja 7) Fe Scheduled Fr	(22±3)°C and Calibration ay-21 ay-21 ay-21 eb-21 calibration eb-21 eb-21 eb-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	ertificate. conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N 12-May-20 (CTTL, N 30-Jan-20(SPEAG,N 10-Feb-20(CTTL-SP Cal Date(Calibrated I 25-Feb-20 (CTTL, No 10-Feb-20 (CTTL, No	facility: environm by, Certificate No.) 0.J20X02965) 10.J20X02965) 10.EX3-3617_Jan20 EAG,No.Z20-60017 by, Certificate No.) 0.J20X00516) 0.J20X00515)	ent temperature Scheduled Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma	(22±3)°C and Calibration ay-21 ay-21 ay-21 eb-21 calibration eb-21 eb-21 eb-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	ertificate. conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # MY49071430 MY46110673 Name	the closed laboratory or calibration) Cal Date(Calibrated 12-May-20 (CTTL, N 12-May-20 (CTTL, N 30-Jan-20(SPEAG,N 10-Feb-20(CTTL-SP) Cal Date(Calibrated I 25-Feb-20 (CTTL, No 10-Feb-20 (CTTL, No	r facility: environm by, Certificate No.) o.J20X02965) lo.J20X02965) lo.EX3-3617_Jan20 EAG,No.Z20-60017 by, Certificate No.) o.J20X00516) o.J20X00515)	ent temperature Scheduled Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma Ma	(22±3)°C and Calibration ay-21 ay-21 ay-21 eb-21 calibration eb-21 eb-21 eb-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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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	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	200
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

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL

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Date: 08.28.2020

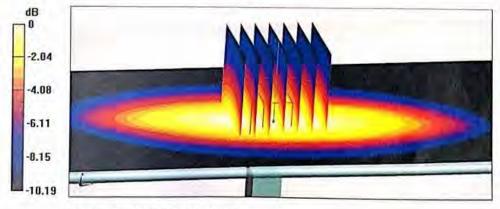
Test Laboratory: CTTL, Beijing, China DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020 Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz; $\sigma = 0.877$ S/m; $\varepsilon_r = 41.23$; $\rho = 1000$ kg/m³ Phantom section: Center Section

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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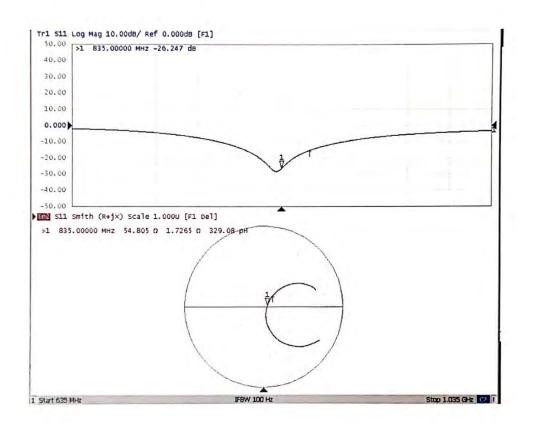
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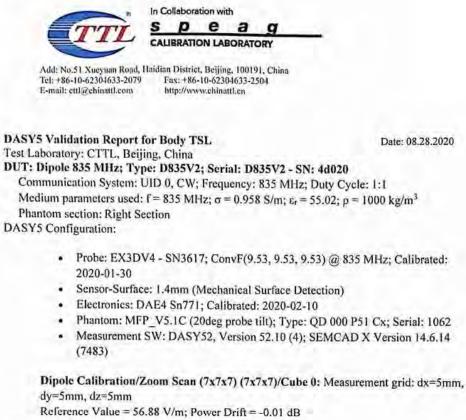
Impedance Measurement Plot for Head TSL

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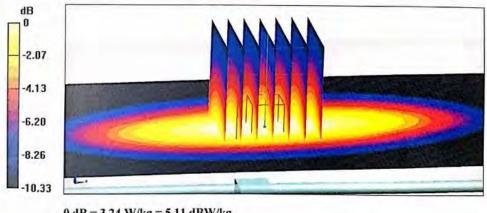


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Reference Value = 56.88 V/m; Power Drift = -0.01 dBPeak SAR (extrapolated) = 3.65 W/kg SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.59 W/kg Smallest distance from peaks to all points 3 dB below = 15.8 mm Ratio of SAR at M2 to SAR at M1 = 66.5% Maximum value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

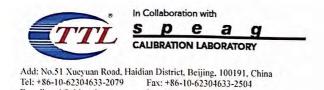


0 dB = 3.24 W/kg = 5.11 dBW/kg

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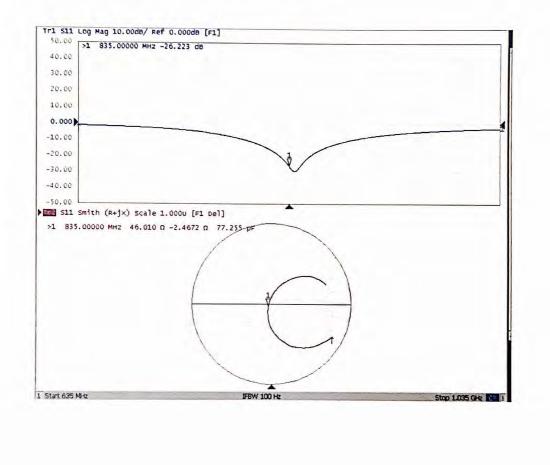




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Impedance Measurement Plot for Body TSL

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ANNEX G: D1750V2 Dipole Calibration Certificate

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· · · · ·			0-60079
10. z	ERTIFICAT	E	
Object	D1750	V2 - SN: 1033	
Calibration Procedure(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	Febura	ry 25, 2020	
	ertificate.		
All calibrations have beer humidity<70%.	n conducted in	the closed laboratory facility: environment or calibration)	t temperature(22±3)℃ and
All calibrations have been numidity<70%. Calibration Equipment used	n conducted in		t temperature(22±3)°C and Scheduled Calibration
All calibrations have been numidity<70%. Calibration Equipment used	n conducted in d (M&TE critical f	or calibration)	
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards	n conducted in d (M&TE critical f	or calibration) Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	n conducted in d (M&TE critical f ID # 106276 101369 4 SN 3846	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)	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	n conducted in d (M&TE critical f ID # 106276 101369	or 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	n conducted in d (M&TE critical f ID # 106276 101369 4 SN 3846	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)	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	n conducted in d (M&TE critical f 106276 101369 4 SN 3846 SN 1555 ID #	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
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 106276 101369 4 SN 3846 SN 1555 1D # MY49071430	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.)	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	n conducted in d (M&TE critical f 106276 101369 4 SN 3846 SN 1555 1D # MY49071430	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)	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 1D # 106276 101369 4 SN 3846 SN 1555 1D # MY49071430 MY46110673	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)	Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration 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	n conducted in d (M&TE critical f 1D # 106276 101369 5 SN 3846 SN 1555 1D # MY49071430 MY46110673 Name	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	Scheduled Calibration Apr-20 Apr-20 Mar-20 Aug-20 Scheduled Calibration Feb-21 Feb-21

Certificate No: Z20-60079

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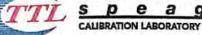


TSL

N/A

ConvF





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Glossary:

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

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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	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		

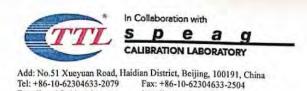
SAR result with Body TSL

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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http://www.chinattl.cn 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

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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



Date: 02.25.2020

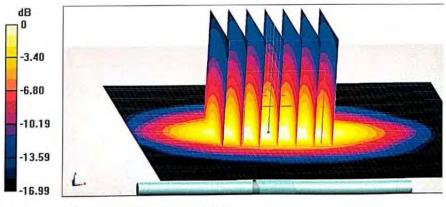
DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033

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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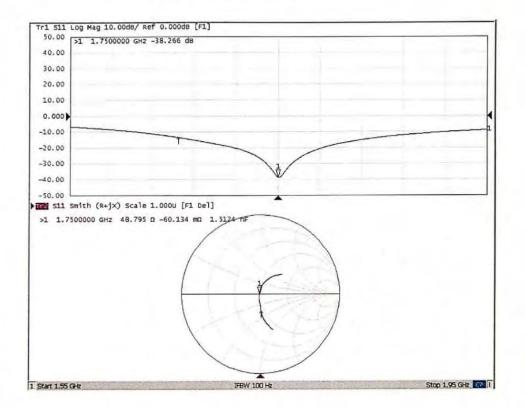
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Impedance Measurement Plot for Head TSL









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

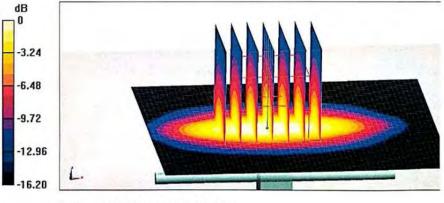
Date: 02.25.2020

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

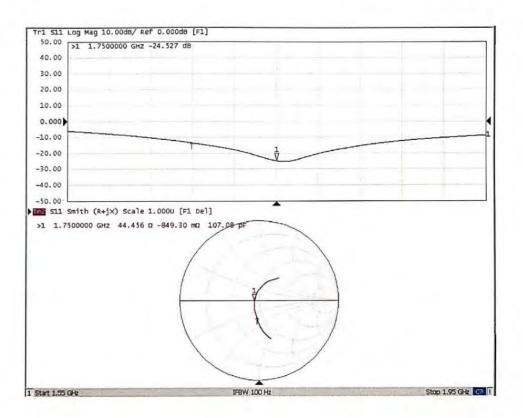
Certificate No: Z20-60079

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Impedance Measurement Plot for Body TSL



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ANNEX H: D1900V2 Dipole Calibration Certificate

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Client TA(S	Shanghai)	Certificate No: Z	20-60297
CALIBRATION CI	ERTIFICAT	E	
Object	D1900	V2 - SN: 5d060	
Calibration Procedure(s)		000.04	
		-003-01 tion Procedures for dipole validation kits	
Calibration date:	August	27, 2020	
pages and are part of the ce All calibrations have been	ertificate.	the uncertainties with confidence probability the closed laboratory facility: environment	
pages and are part of the ce All calibrations have been humidity<70%.	asurements and ertificate.	the closed laboratory facility: environment	
pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used	asurements and ertificate. I conducted in (M&TE critical for ID #	the closed laboratory facility: environment or calibration) Cal Date(Calibrated by, Certificate No.)	temperature(22±3)°C and Scheduled Calibration
bages 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	the 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
bages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	asurements and ertificate. Conducted in (M&TE critical for 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)	temperature(22±3)°C and Scheduled Calibration May-21 May-21
bages 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 101369	the 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
bages and are part of the ce All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	asurements and ertificate. Conducted in (M&TE critical for ID # 106276 101369 SN 3617	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)	scheduled Calibration May-21 May-21 Jan-21
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 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)	temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21
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 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.)	temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration
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	asurements and ertificate. a conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 ID # ID # ID # MY49071430	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)	Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration 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	asurements and ertificate. a conducted in (M&TE critical for 10 # 106276 101369 SN 3617 SN 771 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)	temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21
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	asurements and ertificate. a conducted in a (M&TE critical for 10 # 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	temperature(22±3)°C and Scheduled Calibration May-21 May-21 Jan-21 Feb-21 Scheduled Calibration Feb-21 Feb-21

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TSL	ficano simulatina linuid
ConvF	tissue simulating liquid 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, 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		1

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.5 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.2 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	53.3	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

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.89 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.8 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.6 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	52.5Ω+ 6.58jΩ		
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

Certificate No: 720-60297

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DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China DUT: Dipole 1900 MUL: True D1000V2: Se

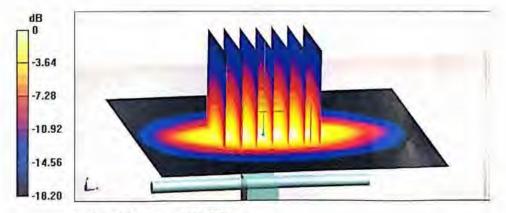
Date: 08.27.2020

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

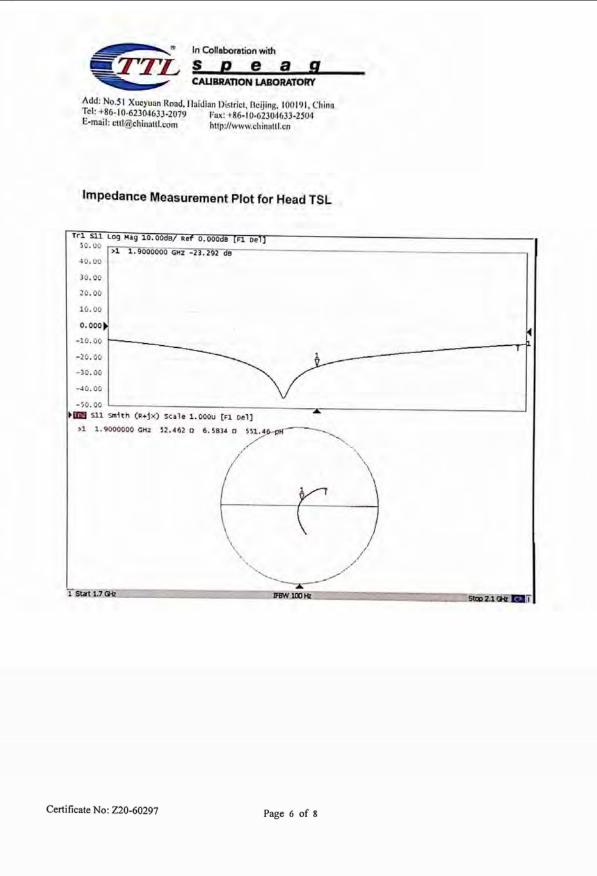


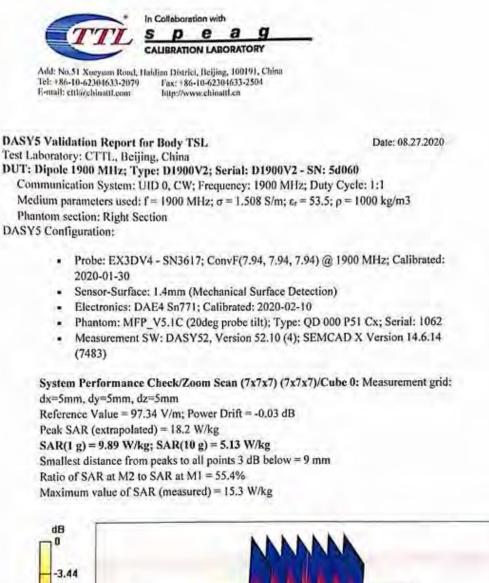
0 dB = 15.6 W/kg = 11.93 dBW/kg

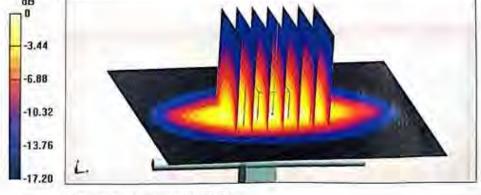
Certificate No: Z20-60297

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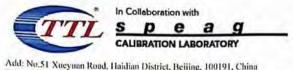


0 dB = 15.3 W/kg = 11.85 dBW/kg

Certificate No: Z20-60297

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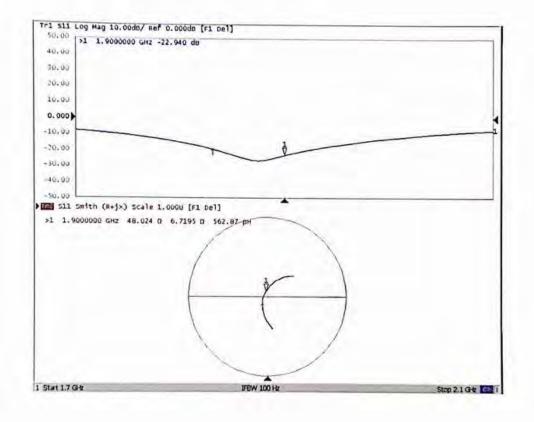


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Impedance Measurement Plot for Body TSL



Certificate No: Z20-60297

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ANNEX I: D2450V2 Dipole Calibration Certificate

Tel: +86-10-62304633-207 E-mail: ettl@chinatt.com Client TA(Shang CALIBRATION CERT Object Calibration Procedure(s) Calibration date: This calibration Certificate docur measurements(SI). The measure pages and are part of the certificat All calibrations have been com humidity<70%.	http://www.chinattl.en ghai) FIFICATE D2450V2 - SN: 786 FF-Z11-003-01 Calibration Procedures for c August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	al standards, which realize th	e physical units of
CALIBRATION CERT Object Calibration Procedure(s) Calibration date: This calibration Certificate docur measurements(SI). The measure pages and are part of the certificat All calibrations have been con-	TIFICATE D2450V2 - SN: 786 FF-Z11-003-01 Calibration Procedures for c August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	lipole validation kits al standards, which realize th	e physical units of
Dbject Calibration Procedure(s) Calibration date: This calibration Certificate docur measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	D2450V2 - SN: 786 FF-Z11-003-01 Calibration Procedures for c August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	al standards, which realize th	
Calibration Procedure(s) Calibration date: This calibration Certificate docur measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	FF-Z11-003-01 Calibration Procedures for c August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	al standards, which realize th	
Calibration date: This calibration Certificate docur measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	Calibration Procedures for a August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	al standards, which realize th	
This calibration Certificate docur measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	Calibration Procedures for a August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	al standards, which realize th	
This calibration Certificate docur measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	August 27, 2020 ments the traceability to nation ements and the uncertainties wit ate.	al standards, which realize th	
This calibration Certificate docur measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	ments the traceability to nation ments and the uncertainties wit ate.		
measurements(SI). The measure pages and are part of the certifica All calibrations have been con-	ements and the uncertainties wit ate.		
Calibration Equipment used (M&	TE critical for calibration)		
Primary Standards ID	# Cal Date(Calibrate	ed by, Certificate No.) Sche	eduled Calibration
Power Meter NRP2 106	6276 12-May-20 (CTTL,	No.J20X02965)	May-21
	1369 12-May-20 (CTTL,		May-21
		No.EX3-3617_Jan20)	Jan-21
DAE4 SN	1771 10-Feb-20(CTTL-S	PEAG,No.Z20-60017)	Feb-21
Secondary Standards ID	# Cal Date(Calibrate	d by, Certificate No.) Sche	eduled Calibration
Secondary Standards	49071430 25-Feb-20 (CTTL,	No.J20X00516)	Feb-21
and a second sec			Eab 21
Signal Generator E4438C MY	46107873 10-Feb-20 (CTTL,	No.J20X00515)	Feb-21
Signal Generator E4438C MY NetworkAnalyzer E5071C MY	46107873 10-Feb-20 (CTTL,	No.J20X00515)	Signature
Signal Generator E4438C MY NetworkAnalyzer E5071C MY			
Signal Generator E4438C MY NetworkAnalyzer E5071C MY Calibrated by: Zha	ame Function	gineer	
Signal Generator E4438C MY NetworkAnalyzer E5071C MY Calibrated by: Zha Reviewed by: Lin I	ame Function to Jing SAR Test En	gineer	

Certificate No: Z20-60298

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In Collaboration with s p e а CALIBRATION 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", 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	2

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	1 Sec.	

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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an District, Beijing, 100191, China Fax: +86-10-62304633-2504 http://www.chinattl.cn

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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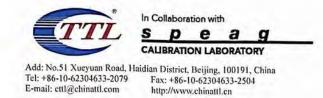


In Collaboration with s р e а CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: 186-10-62304633-2079 Fax: 186-10-62304633-2504 E-mail: ettl@chinattl.com http://www.chinattl.cn DASY5 Validation Report for Head TSL Date: 08.27.2020 Test Laboratory: CTTL, Beijing, 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

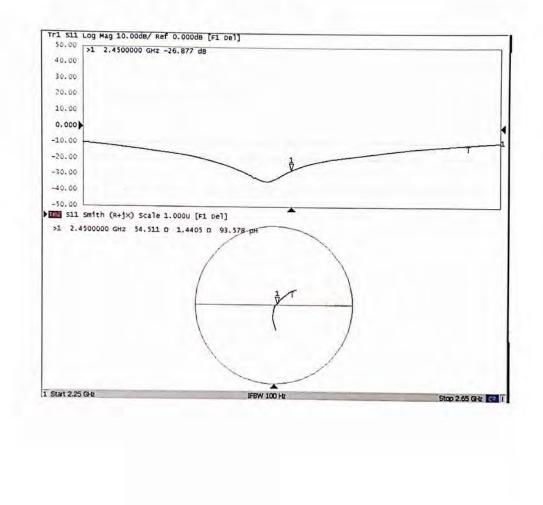
Certificate No: Z20-60298

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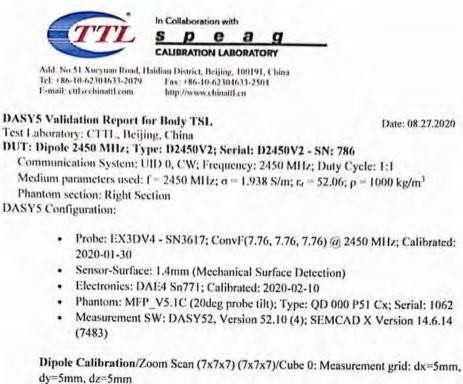
Impedance Measurement Plot for Head TSL



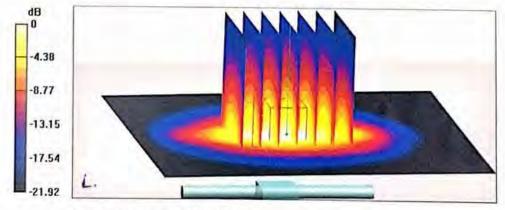
Certificate No: Z20-60298

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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

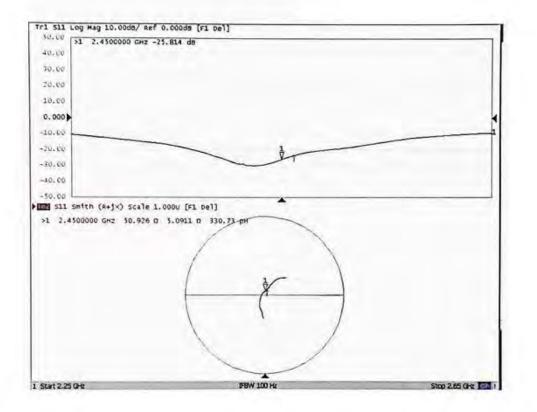
Certificate No: Z20-60298

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Impedance Measurement Plot for Body TSL



Certificate No: Z20-60298

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ANNEX J: D2600V2 Dipole Calibration Certificate

Add: No.52 HuaYua Tel: +86-10-6230463 E-mail: enl@chinatt	33-2079 Fax: +	86-10-62304633-2504	CNAS L057
	hanghai)	www.chinattl.en Certificate No: Z	21-60156
CALIBRATION CE	0 /		
SALIBRATION CE	RIFICAL	-	
Object	D2600\	/2 - SN: 1025	
Calibration Procedure(s)	-		
	FF-Z11		
	Galiora	tion Procedures for dipole validation kits	
Calibration date:	April 23	, 2021	
pages and are part of the ce		the uncertainties with confidence probability	
	ertificate.	he closed laboratory facility: environment	
All calibrations have been humidity<70% Calibration Equipment used	ertificate.	he closed laboratory facility: environment or calibration)	
All calibrations have been numidity<70% Calibration Equipment used	conducted in t	he closed laboratory facility: environment	temperature (22±3)°C ani
All calibrations have been numidity<70% Calibration Equipment used Primary Standards	ID #	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 Power sensor NRP6A Reference Probe EX3DV4	inificate. conducted in t (M&TE critical fr ID # 106276 101369 SN 3617	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
All calibrations have been numidity<70% Calibration 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 calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power Sensor NRP6A Reference Probe EX3DV4 DAE4	inificate. conducted in t (M&TE critical fr ID # 106276 101369 SN 3617	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 numidity<70% Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	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)	temperature (22±3)% 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 Secondary Standards	entificate. conducted in t (M&TE critical for 10 # 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.)	temperature (22±3)°C and Scheduled Calibration May-21 May-21 Jan-22 Jan-22 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	initicate. conducted in t (M&TE critical fr 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 May-21 Jan-22 Jan-22 Scheduled Calibration 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	entificate. conducted in t (M&TE critical for 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 (CTTL, No.J20X02965) 27-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	entificate. conducted in t (M&TE critical for 10 # 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 (CTTL, No.J20X02965) 27-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 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	entificate. conducted in t (M&TE critical for 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 (CTTL, No.J20X02965) 27-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 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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	In Co	ollabora	tion wit	h	
TTL	S	р	е	а	g
-	CAL	BRATIC	ON LAP	ORAT	DRY

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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	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9±6 %	1.94 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	13.9 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)

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No.52 HuaYuanHei Roa	d, Haid	ian Dist	fiel, Beij	ing. 100	191. China
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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	
a fine an enterty	1055.05	

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

SPEAG

Certificate No: Z21-60156

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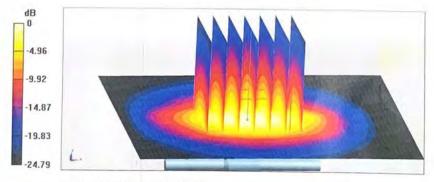


In Collaboration with р e s а CALIBRATION LABORATORY Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 Tel: +86-10-62304633-2079 E-mail: ettl@chinattl.com http://www.chinattl.cn DASY5 Validation Report for Head TSL Date: 04.23.2021 Test Laboratory: CTTL, Beijing, China DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1025 Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2600 MHz; $\sigma = 1.944 \text{ S/m}$; $\epsilon_r = 39.94$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Center Section DASY5 Configuration: Probe: EX3DV4 - SN3617; ConvF(7.55, 7.55, 7.55) @ 2600 MHz; Calibrated: 2021-01-27 Sensor-Surface: 1.4mm (Mechanical Surface Detection) •

- 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 ٠ (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

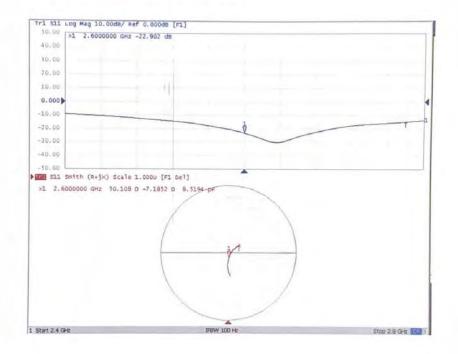
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Impedance Measurement Plot for Head TSL



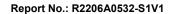
Certificate No: Z21-60156

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ANNEX K: DAE4 Calibration Certificate (SN: 1692)

	ch, Switzerland		C Service suisse d'étalonnage Servizio svizzero di taratura S Swiss Calibration Service
Accredited by the Swiss Accredit The Swiss Accreditation Servic Multilateral Agreement for the r	e is one of the signatories	to the FA	ation No.: SCS 0108
Cilent TA-SH (Auden			e No: DAE4-1692_Oct21
Object	1000 For 0 # 10	04 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		
All calibrations have been conduc	mainties with confidence pro	nal standards, which realize the physical obability are given on the following pages lacility: environment lemperature (22 ±	s and are part of the certificate.
All calibrations have been conduc Calibration Equipment used (M& [*] Primary Standards	mainties with confidence pro	obability are given on the following pages	s and are part of the certificate.
All calibrations have been conduc Calibration Equipment used (M& [*] <u>Primary Standards</u> Keithley Multimeter Type 2001	rtainties with confidence pro cted in the closed laboratory TE critical for calibration)	Dability are given on the following page: Iacility: environment lemperature (22 ± Cal Date (Certificate No.) 31-Aug-21 (No:31368)	s and are part of the certificate. 3)°C and humidity < 70%. Scheduled Calibration Aug-22
All calibrations have been conduc Calibration Equipment used (M& Primary Standards Keithley Multimeter Type 2001 Secondary Standards Auto DAE Calibration Unit	TE critical for calibration) ID # SN: 0810278 ID # SN: 0810278 ID #	bability are given on the following page: Iacility: environment lemperature (22 ± <u>Cal Date (Certificate No.)</u> 31-Aug-21 (No:31368) Check Date (in house)	s and are part of the certificate. 3)°C and humidity < 70%. Scheduled Calibration
All calibrations have been conduc Calibration Equipment used (M& <u>Primary Standards</u> Keithley Multimeter Type 2001 <u>Secondary Standards</u> Auto DAE Calibration Unit Calibrator Box V2.1	TE critical for calibration) ID # SN: 0810278 ID # SN: 0810278 ID #	bability are given on the following pages facility: environment temperature (22 ± <u>Cal Date (Certificate No.)</u> 31-Aug-21 (No:31368) <u>Check Date (in house)</u> 07-Jan-21 (in house check)	s and are part of the certificate. 3)°C and humidity < 70%. Scheduled Calibration Aug-22 Scheduled Check In house check: Jan-22 In house check: Jan-22 Signature
All calibrations have been conduc Calibration Equipment used (M& <u>Primary Standards</u> Keithley Multimeter Type 2001 <u>Secondary Standards</u> Auto DAE Calibration Unit Calibrator Box V2.1	ID # ID # SE UWS 053 AA 1001 SE UWS 006 AA 1002	Cal Date (Certificate No.) Cal Date (Certificate No.) Check Date (in house) O7-Jan-21 (in house check) O7-Jan-21 (in house check) Function	s and are part of the certificate. 3)°C and humidity < 70%. Scheduled Calibration Aug-22 Scheduled Check In house check: Jan-22 In house check: Jan-22 Signature
All calibrations have been conduc Calibration Equipment used (M& <u>Primary Standards</u> Keithley Multimeter Type 2001 <u>Secondary Standards</u> Auto DAE Calibration Unit Calibrator Box V2.1 Calibrated by: Approved by:	Adrian Gehring Sven Kühn	Cal Date (Certificate No.) 31-Aug-21 (No:31368) Check Date (in house) 07-Jan-21 (in house check) 07-Jan-21 (in house check) 07-Jan-21 (in house check)	s and are part of the certificate. 3)°C and humidity < 70%. Scheduled Calibration Aug-22 Scheduled Check In house check: Jan-22 In house check: Jan-22 Signature J. N. S. J. W. U.





Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



Schweizerlacher Kallbrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

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

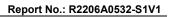
data acquisition electronics information used in DASY system to align probe sensor X to the robot coordinate system.

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.

Certificate No: DAE4-1692_Oct21

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DC Voltage Measurement A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV,	full range =	-100+300 mV
Low Range:	1LSB =	61nV,	full range =	-1+3mV
DASY measurement	parameters: Aut	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)
	3.95023 ± 1.50% (k=2)		

Connector Angle

Connector Angle to be used in DASY system	334.5 ° ± 1 °
---	---------------

Certificate No: DAE4-1692_Oct21

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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)

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

1.5.5	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200		-0.88	-2.39
Channel Y	200	6.27		2.31
Channel Z	200	8.86	3.02	1.00

Certificate No: DAE4-1692_Oct21

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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)
Channel X	15949	15587
Channel Y	15899	16465
Channel Z	15625	15999

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 (μV)
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

Certificate No: DAE4-1692_Oct21

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ANNEX L: DAE4 Calibration Certificate (SN: 1291)

Client : TA	Http://www.chinattl.cn (Shanghai)		No: Z22-60098
CALIBRATION	CERTIFICATE		
Object	DAE4 - 5	SN: 1291	
Calibration Procedure(s)	FF-Z11-0	002-01	
	Calibratio (DAEx)	on Procedure for the Data Acquisit	tion Electronics
Calibration date:	March 24	4, 2022	
All calibrations have be humidity<70%.	e certificate. een conducted in th	e closed laboratory facility: environ	ment temperature(22±3)°C and
humidity<70%. Calibration Equipment u	een conducted in th sed (M&TE critical for		ment temperature(22±3)℃ and Scheduled Calibration
	een conducted in th sed (M&TE critical for ID # Cal E	r calibration)	
humidity<70%. Calibration Equipment u Primary Standards	een conducted in th sed (M&TE critical for ID # Cal E	r calibration) Date(Calibrated by, Certificate No.)	Scheduled Calibration
humidity<70%. Calibration Equipment u Primary Standards Process Calibrator 753	een conducted in th sed (M&TE critical for ID # Cal E 1971018 1	r calibration) Date(Calibrated by, Certificate No.) 5-Jun-21 (CTTL, No.J21X04465)	Scheduled Calibration Jun-22
humidity<70%. Calibration Equipment u Primary Standards	een conducted in th sed (M&TE critical for ID # Cal D 1971018 1: Name	r calibration) Date(Calibrated by, Certificate No.) 5-Jun-21 (CTTL, No.J21X04465) Function	Scheduled Calibration Jun-22
humidity<70%. Calibration Equipment u Primary Standards Process Calibrator 753 Calibrated by:	een conducted in the sed (M&TE critical for ID # Cal E 1971018 19 Name Yu Zongying	r calibration) Date(Calibrated by, Certificate No.) 5-Jun-21 (CTTL, No.J21X04465) Function SAR Test Engineer	Scheduled Calibration Jun-22





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 E-mail: ettl@chinattl.com
 Http://www.chinattl.cn

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

Certificate	No:	Z22-60098	

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 Http://www.chinattl.cn

DC Voltage Measurement

High Range:	1LSB =	6.1µV,	full range =	-100+300 mV
Low Range:	1LSB =	61nV .	full range =	-1+3mV

Calibration Factors	x	Y	z
High Range	402.577 ± 0.15% (k=2)	403.249 ± 0.15% (k=2)	$403.164 \pm 0.15\%$ (k=2)
Low Range	3.97371 ± 0.7% (k=2)	3.97778 ± 0.7% (k=2)	3.97281 ± 0.7% (k=2)

Connector Angle

Connector Angle to b	e used in DASY syste	m		167	° ± 1 °
	10				•
			-		
	- +				
	6,0				
ertificate No: Z22-60098		Page 3 of 3			



ANNEX M: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX N: Test Setup Photos

The Test Setup Photos are submitted separately.