DASY5 Validation Report for Head TSL

Date: 22.04.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:919

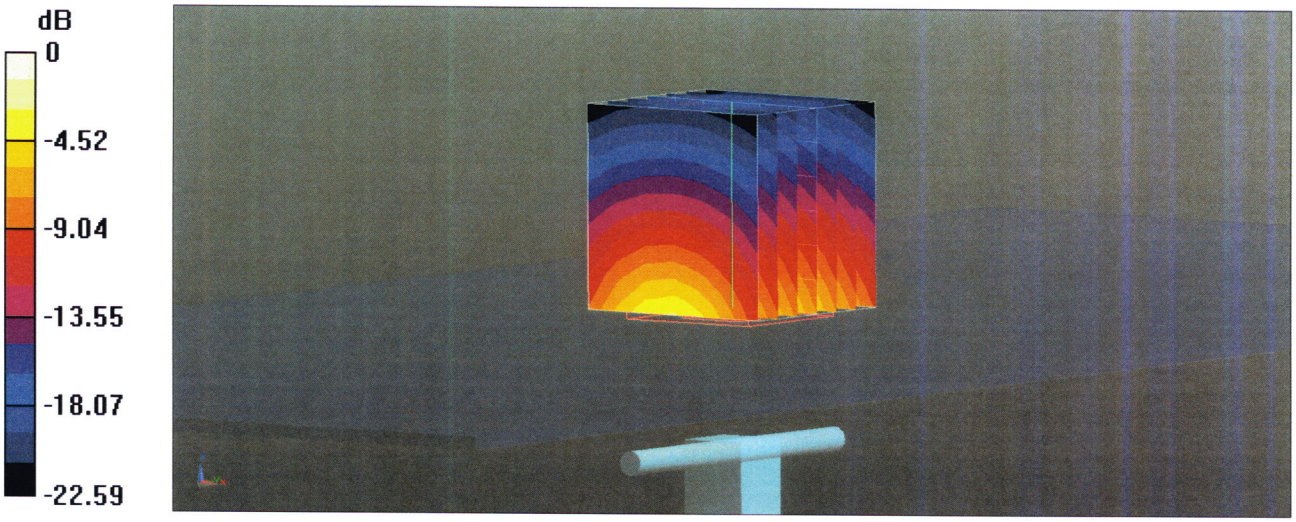
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.87 S/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

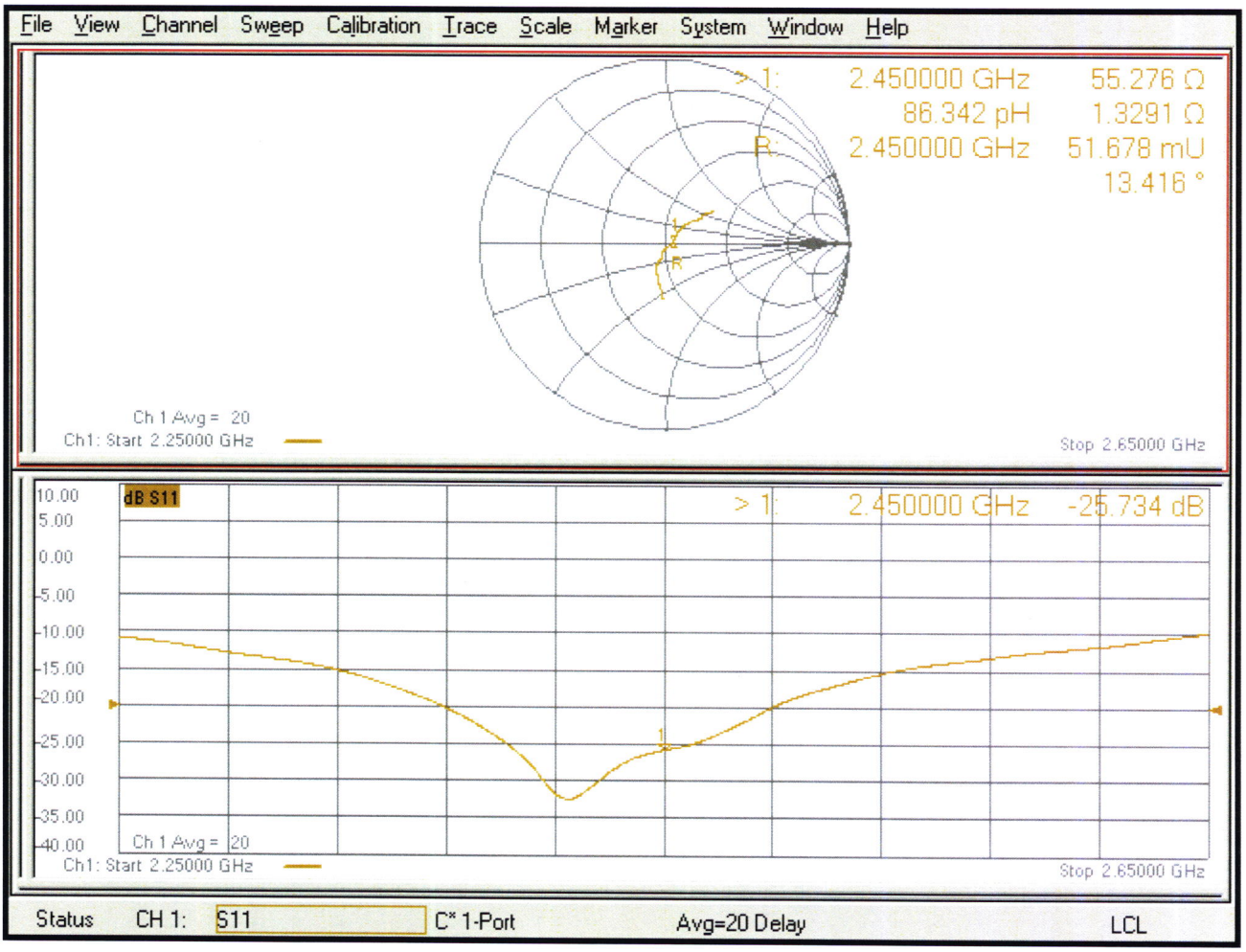
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 119.3 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 27.2 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.3 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 50.1%
Maximum value of SAR (measured) = 22.4 W/kg



0 dB = 22.4 W/kg = 13.51 dBW/kg

Impedance Measurement Plot for Head TSL



Dipole Internal Calibration Record

Asset No. :	E-434	Model No. :	D2450V2	Serial No. :	919
Environmental	22.5℃, 57 %	Original Cal.Date :	April 22, 2024	Next Cal. Date :	April 22, 2027

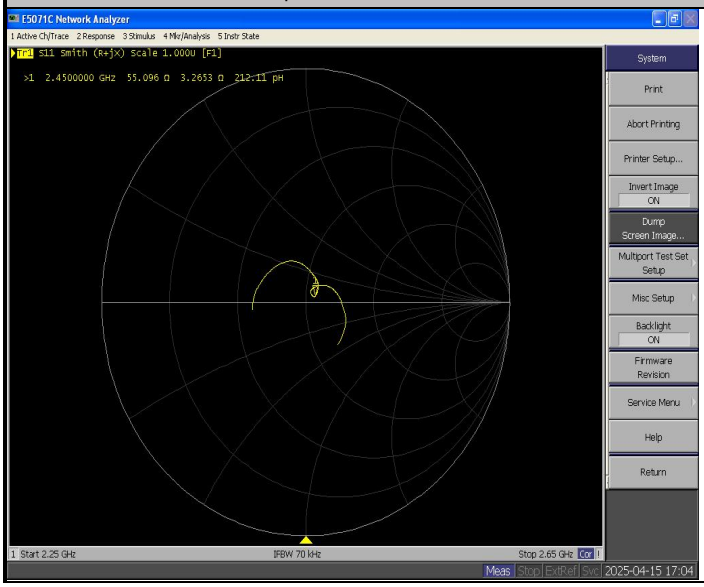
Standard List		
1	IEC/IEEE 62209-1528:2020	Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528:Human Models,Instrumentation And Procedures(Frequency Range of 4 MHz to 10GHz)
2	KDB865664	SAR Measurement Requirements for 100 MHz to 6 GHz

Equipment Information

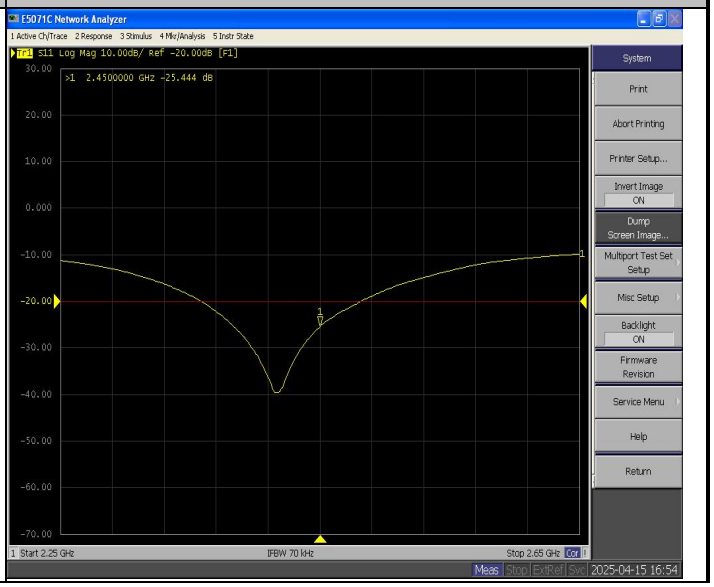
Equipment :	Manufacturer :	Model No. :	Serial No. :	Cal.Organization :	Cal. Date :
Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	N/A	June 29, 2024
DC Source metter	Iteck	IT6154	006104126768201001	N/A	June 29, 2024
Vector Network Analyze	Agilent	E5071C	MY46102965	N/A	January 11, 2025
Signal Generator	Agilent	N5172B	MY53050758	N/A	January 11, 2025
Smart Power Sensor	R&S	NRP18S	101333	N/A	June 1, 2024
Dielectric Assessment	Speag	DAK-3.5	1226	N/A	January 20, 2025
Directional Coupler	Woken	TS-PCC0M-05	0107090019	N/A	January 11, 2025
Coupler	Woken	0110A05601O-10	COM5BNW1A2	N/A	January 12, 2025
Liquid Thermometer	Nscing Es	YZ6021S	/	N/A	November 24, 2024

Model No	For Head Tissue				
	Item	Original Cal. Result	Verified on 2025/4/15	Deviation	Result
D2450V2	Impedance, transformed to feed point	55.3Ω+1.3jΩ	55.09Ω+3.27Ω	<5Ω	Pass
	Return Loss(dB)	-25.7	-25.444	-1.0%	Pass
	SAR Value for 1g(mW/g)	13.6	12.7	-6.6%	Pass
	SAR Value for 10g(mW/g)	6.3	5.97	-5.2%	Pass

Impedance Test-Head



Return Loss-Head



Test Laboratory: BTL Inc. Date: 2025/4/15

System Check_H2450_0415

DUT: Dipole 2450 MHz D2450V2;SN:919;

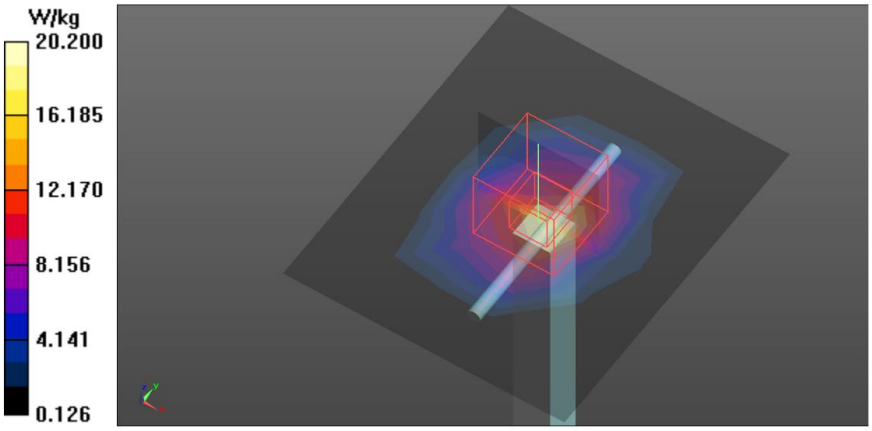
Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.836 S/m; ε_r = 39.639; ρ = 1000 kg/m^3
Ambient Temperature：22.5℃; Liquid Temperature：22.1℃

DASY Configuration:

- Probe: EX3DV4 - SN3809; ConvF(7.59, 6.97, 6.79)@2450 MHz;Calibrated: 2025/1/24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 2024/11/14
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1222
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Area Scan (6x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 15.6 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 111.4 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 23.9 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.97 W/kg
Smallest distance from peaks to all points 3 dB below = 10.7 mm
Ratio of SAR at M2 to SAR at M1 = 53.1%
Maximum value of SAR (measured) = 20.2 W/kg



Calibrator: Justin Huang Approver: Herbert Liu

Dipole Internal Calibration Record

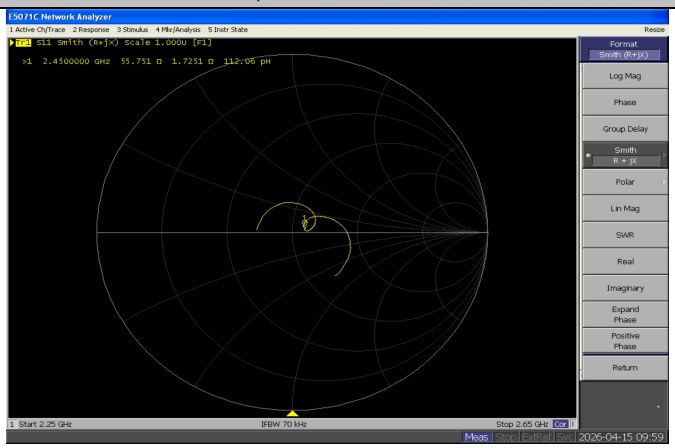
Asset No. :	E-434	Model No. :	D2450V2	Serial No. :	919
Environmental	22.8℃, 55 %	Original Cal.Date :	April 22, 2024	Next Cal. Date :	April 22, 2027

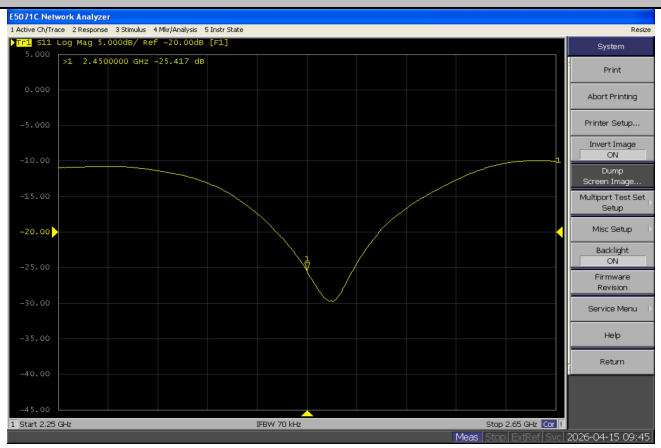
Standard List		
1	IEC/IEEE 62209-1528:2020	Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528:Human Models,Instrumentation And Procedures(Frequency Range of 4 MHz to 10GHz)
2	KDB865664	SAR Measurement Requirements for 100 MHz to 6 GHz

Equipment Information					
Equipment :	Manufacturer :	Model No. :	Serial No. :	Cal.Organization :	Cal. Date :
Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	N/A	May 29, 2025
DC Source metter	Iteck	IT6154	006104126768201001	N/A	May 29, 2025
Vector Network Analyze	Agilent	E5071C	MY46102965	N/A	December 20, 2025
Signal Generator	Agilent	N5172B	MY53050758	N/A	December 20, 2025
Smart Power Sensor	R&S	NRP18S	101333	N/A	May 29, 2025
Dielectric Assessment	Speag	DAK-3.5	1226	N/A	February 19, 2026
Directional Coupler	Woken	TS-PCC0M-05	0107090019	N/A	December 20, 2025
Coupler	Woken	0110A05601O-10	COM5BNW1A2	N/A	December 20, 2025
Liquid Thermometer	Nscing Es	YZ6021S	/	N/A	November 13, 2025

Model No	For Head Tissue				
	Item	Original Cal. Result	Verified on 2026/4/15	Deviation	Result
D2450V2	Impedance, transformed to feed point	55.3Ω+1.3jΩ	55.8Ω+1.7jΩ	<5Ω	Pass
	Return Loss(dB)	-25.7	-25.4	-1.2%	Pass
	SAR Value for 1g(mW/g)	13.6	12.9	-5.1%	Pass
	SAR Value for 10g(mW/g)	6.3	5.87	-6.8%	Pass

Impedance Test-Head	Return Loss-Head





Validation Report for Head TSL

Test Laboratory: BTL Inc. Date: 2026/4/15

System Check_H2450_0415

DUT: Dipole 2450 MHz D2450V2;SN:919;

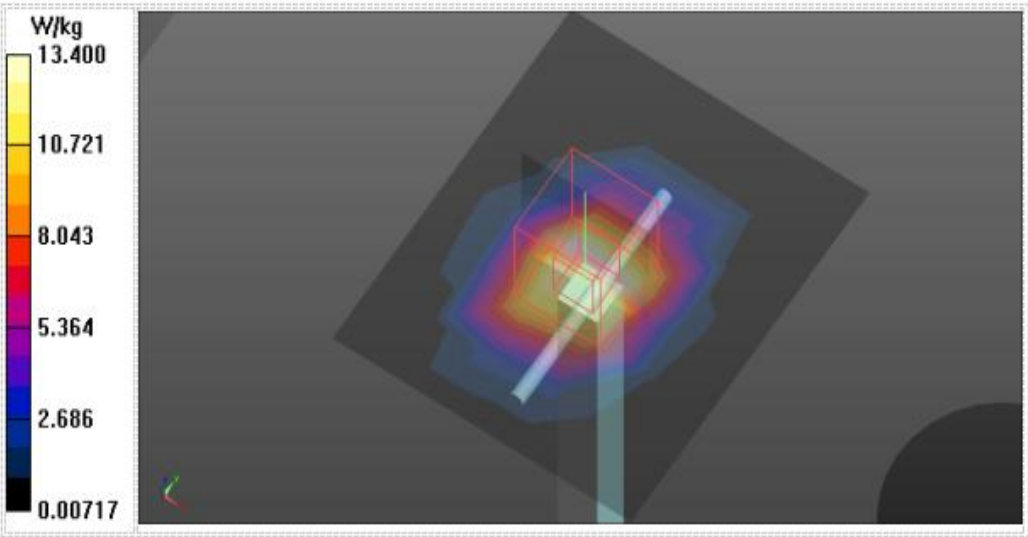
Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.824 S/m; ε_r = 38.36; ρ = 1000 kg/m^3
Ambient Temperature：22.8 ℃; Liquid Temperature：22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3809; ConvF(7.46, 7.46, 7.46) @ 2450 MHz; Calibrated: 2026/3/20
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 2025/11/19
- Phantom: Twin-SAM V5.0 (30deg probe tilt); Type: QD000P40CB; Serial: TP:1469
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Area Scan (6x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 13.4 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 111.9 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.87 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 47%
Maximum value of SAR (measured) = 21.8 W/kg



Calibrator: Dana Chen Approver: Herbert Liu