

DASY5 Validation Report for Head TSL

Date: 08.02.2021

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:973

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ S/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

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: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 121.4 V/m; Power Drift = -0.06 dB

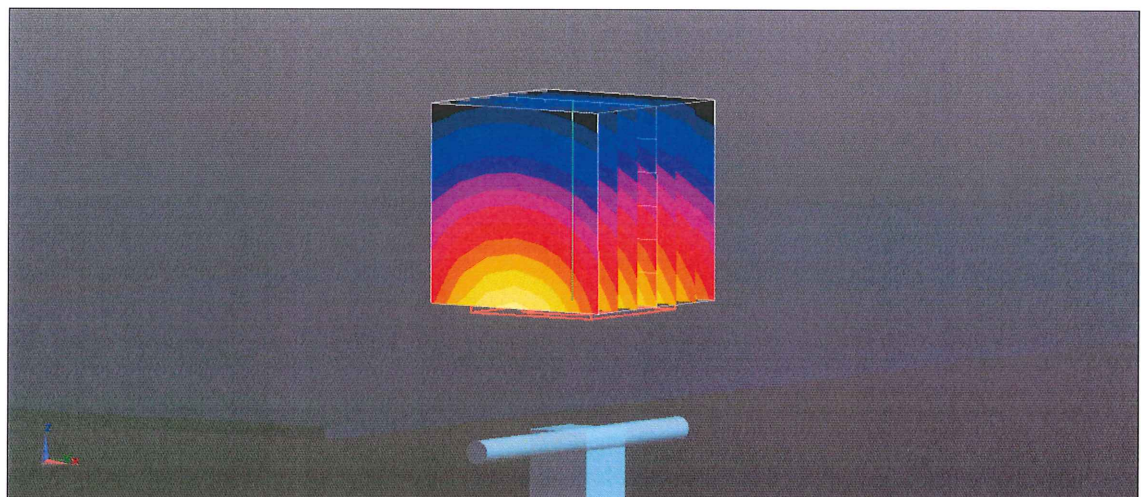
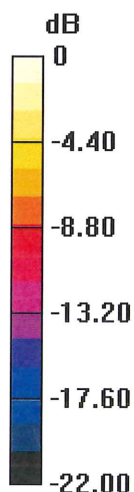
Peak SAR (extrapolated) = 27.0 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.18 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

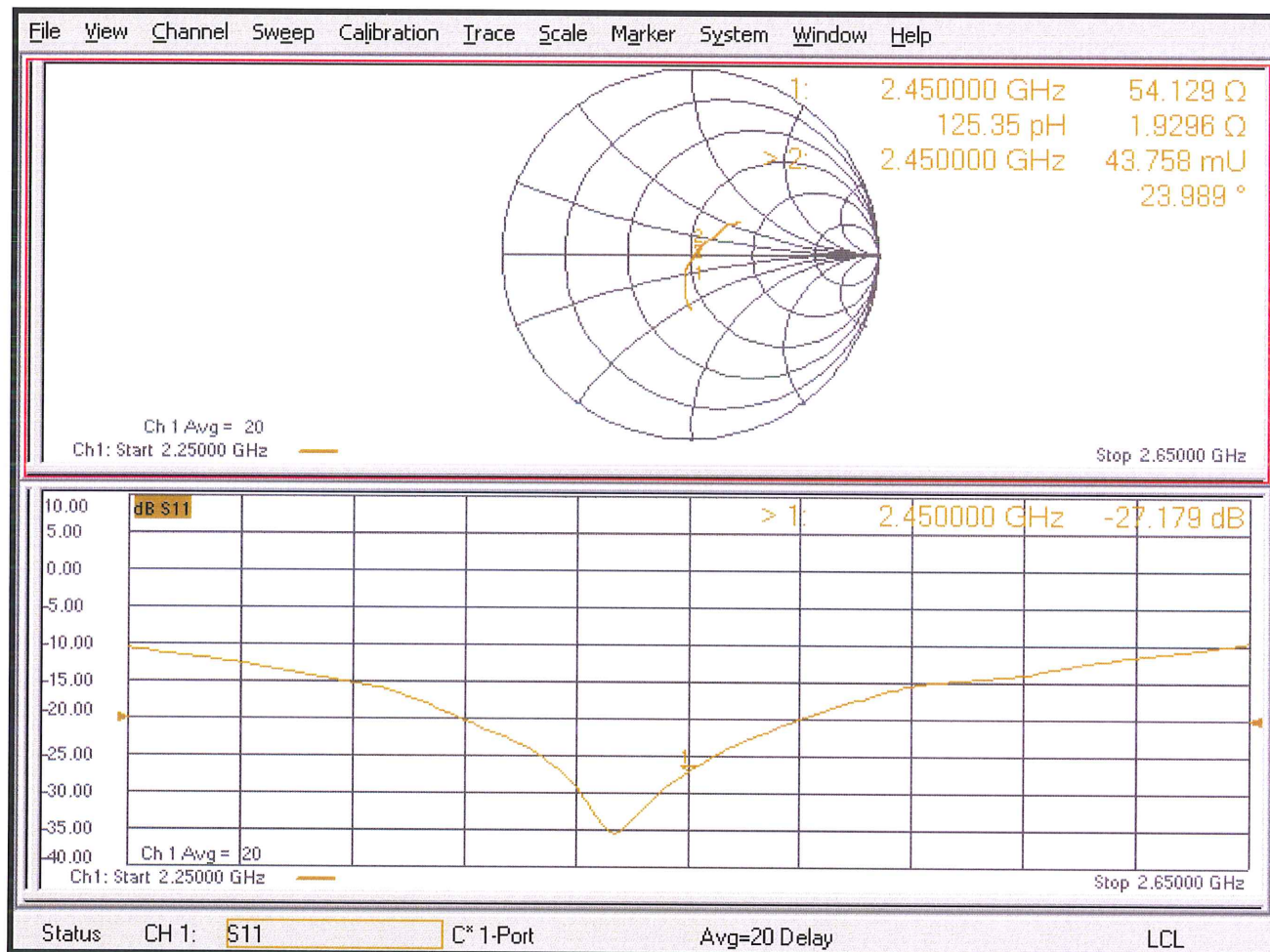
Ratio of SAR at M2 to SAR at M1 = 49.5%

Maximum value of SAR (measured) = 22.3 W/kg



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

Impedance Measurement Plot for Head TSL





Dipole Internal Calibration Record

Asset No. :	E-537	Model No. :	D2450V2	Serial No. :	973
Environmental	22.9°C, 52 %	Original Cal. Date :	February 8, 2021	Next Cal. Date :	February 7, 2024

Standard List

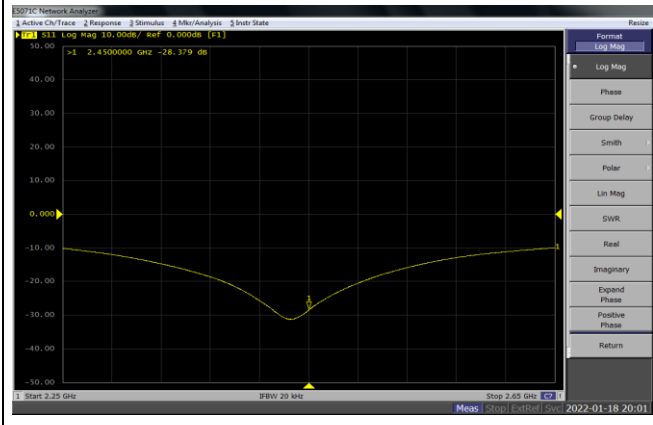
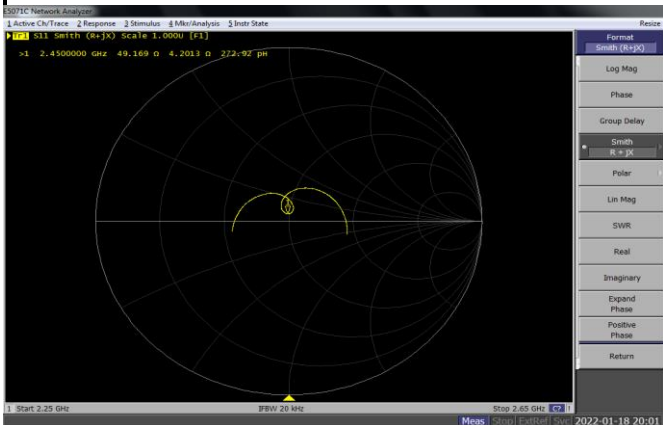
1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques, June 2013
2	IEC 62209-2	Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body(frequency range of 30 MHz to 6 GHz),
3	KDB865664	SAR Measurement Requirements for 100 MHz to 6 GHz

Equipment Information

Equipment :	Manufacturer :	Model No. :	Serial No. :	Cal.OrganiZation :	Cal. Date :
Power Amplifier	EMCI	EMC053035	980869	N/A	N/A
Power Meter	Anritsu	MA2487A	6K00004714	N/A	August 15, 2021
Power Sensor	Anritsu	MA2491A	34138	N/A	August 15, 2021
Directional Coupler	Woken	TS-PCCOM-05	107090019	N/A	N/A
Signal Generator	R & S	SMB100A	113244	N/A	August 2, 2021
ENA Network Analyzer	Agilent	E5071C	MY46524658	N/A	March 22, 2021

Model No	For Head Tissue				
	Item	Original Cal. Result	Verified on 2022/1/18	Deviation	Result
D2450V2	Impedance, transformed to feed	54.1Ω+1.9jΩ	49.2Ω+4.2jΩ	<5Ω	Pass
	Return Loss(dB)	-27.2	-28.379	-4.3%	Pass
	SAR Value for 1g(mW/g)	13.4	14.1	5.2%	Pass
	SAR Value for 10g(mW/g)	6.18	6.5	5.2%	Pass

Impedance Test-Head	Return Loss-Head
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Test Laboratory: BTL

Date: 2022/1/18

System Check_H2450

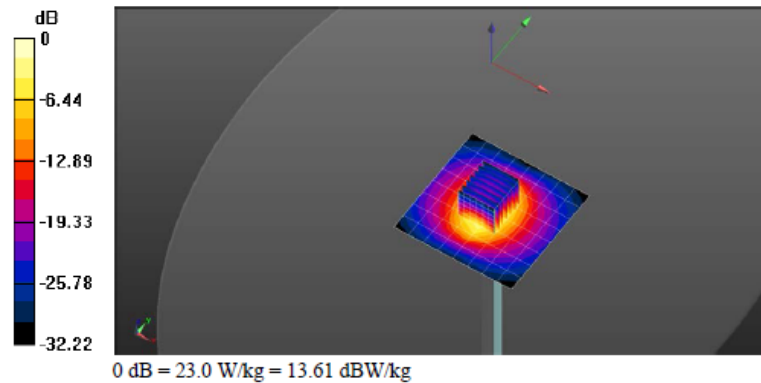
Frequency: 2450 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.862$ S/m; $\epsilon_r = 40.655$; $\rho = 1000$ kg/m³
DASY5 Configuration:
- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1486; Calibrated: 2021/6/1
- Probe: EX3DV4 - SN7369; ConvF(7.62, 7.62, 7.62) @ 2450 MHz; Calibrated: 2021/6/3
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

System Performance Check at Frequencies above 1

GHz/Pin=250mW 4/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm.
Maximum value of SAR (measured) = 23.0 W/kg

System Performance Check at Frequencies above 1

GHz/Pin=250mW 4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 114.1 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.5 W/kg
Smallest distance from peaks to all points 3 dB below = 9.2 mm
Ratio of SAR at M2 to SAR at M1 = 46.7%
Maximum value of SAR (measured) = 24.1 W/kg



Calibrator:

Jemy Chang

Approver:

Peter Chen



Dipole Internal Calibration Record

Asset No. :	E-537	Model No. :	D2450MHzV2	Serial No. :	973
Environmental	24.3°C, 57 %	Original Cal. Date :	February 8, 2021	Next Cal. Date :	February 7, 2024

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques, June 2013
2	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
3	KDB865664	SAR Measurement Requirements for 100 MHz to 6 GHz

Equipment Information

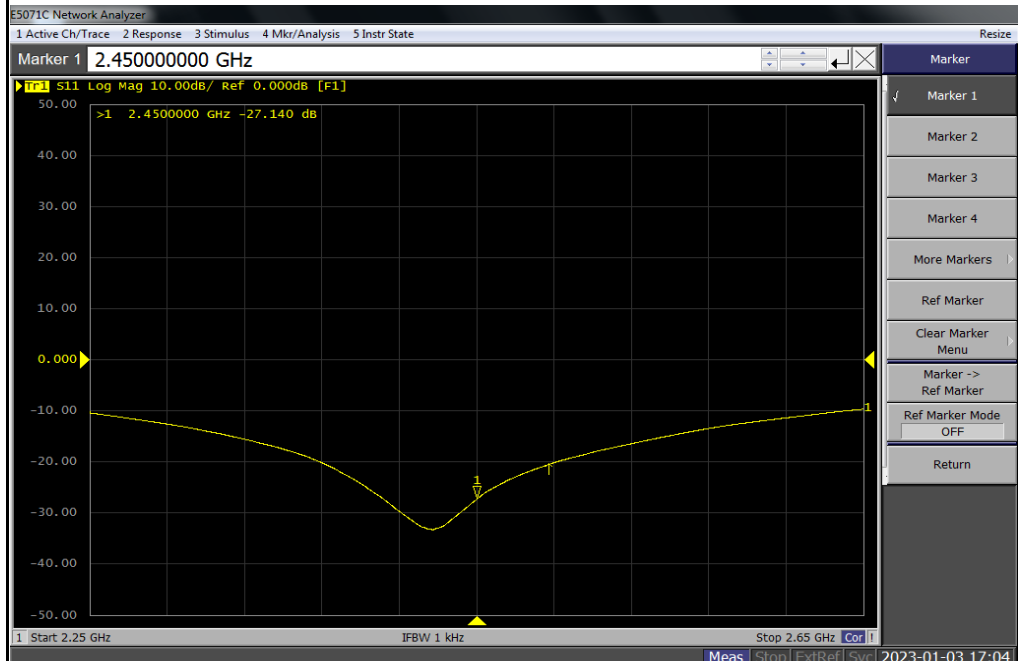
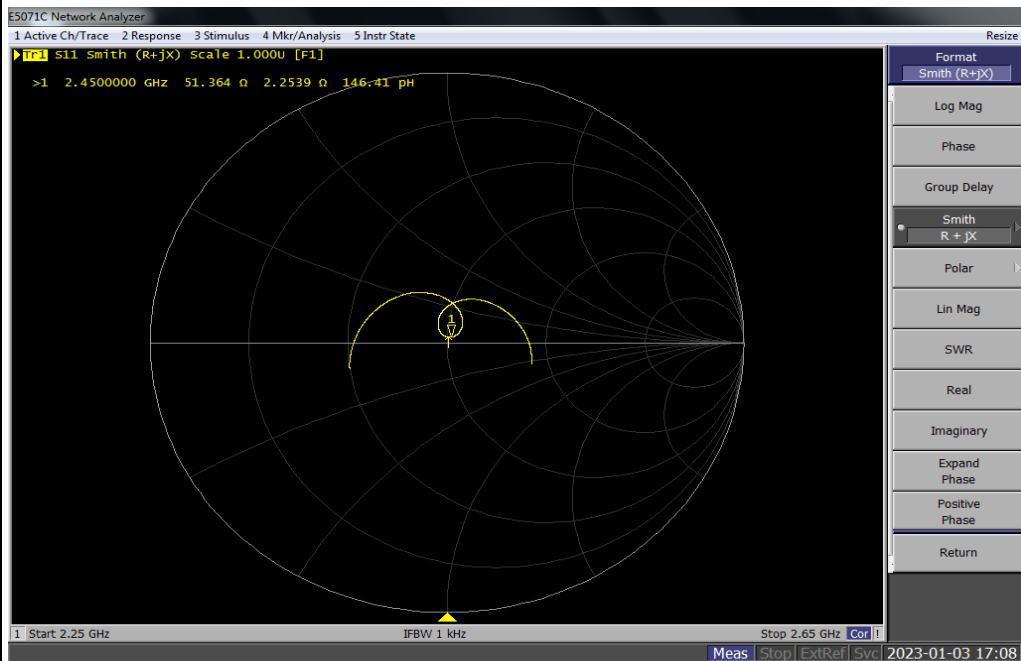
Equipment :	Manufacturer :	Model No. :	Serial No. :	Cal.Organization :	Cal. Date :
Power Amplifier	EMCI	EMC053035	980869	N/A	N/A
Power Meter	Anritsu	MA2495A	1128008	N/A	June 1, 2022
Power Sensor	Anritsu	MA2411B	1126001	N/A	June 1, 2022
Directional Coupler	Woken	TS-PCC0M-05	107090019	N/A	N/A
Signal Generator	R & S	SMB100A	113244	N/A	July 29, 2022
ENA Network Analyzer	Agilent	E5071C	MY46524658	N/A	March 21, 2022

Model No For Head Tissue

	Item	Original Cal. Result	Verified on 2023/01/03	Deviation	Result
D2450V2	Impedance, transformed to feed point	54.1Ω+1.9jΩ	51.4Ω+2.3jΩ	<5Ω	Pass
	Return Loss(dB)	-27.2	-27.1	0.4%	Pass
	SAR Value for 1g(mW/g)	13.4	14.0	4.5%	Pass
	SAR Value for 10g(mW/g)	6.18	6.60	6.8%	Pass

Impedance Test-Head

Return Loss-Head



Test Laboratory: BTL

Date: 2023/1/3

System Check_H2450

Frequency: 2450 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
 Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.877$ S/m; $\epsilon_r = 40.815$; $\rho = 1000$ kg/m³

DASY5 Configuration:

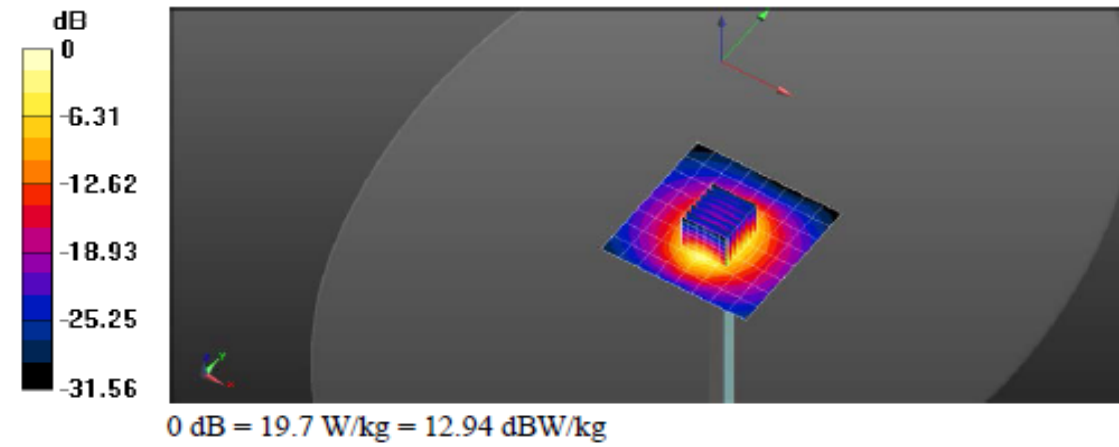
- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1486; Calibrated: 2022/5/31
- Probe: EX3DV4 - SN7369; ConvF(7.61, 7.61, 7.61) @ 2450 MHz; Calibrated: 2022/5/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)),
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

System Performance Check at Frequencies above 1 GHz/Pin=250mW /Area Scan (9x9x1):

Measurement grid: dx=12mm, dy=12mm
 Maximum value of SAR (measured) = 19.7 W/kg

System Performance Check at Frequencies above 1 GHz/Pin=250mW /Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 106.9 V/m; Power Drift = -0.13 dB
 Peak SAR (extrapolated) = 28.4 W/kg
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.6 W/kg
 Smallest distance from peaks to all points 3 dB below = 9.2 mm
 Ratio of SAR at M2 to SAR at M1 = 49.4%
 Maximum value of SAR (measured) = 23.2 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen