



Accredited by the Swiss Accreditation Service (SAS)

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "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 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

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

DASY Version	DASY52	
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 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	38.8 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.49 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.9 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 Ω - 2.6 $j\Omega$
Return Loss	- 31.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.212 ns
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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

Date: 30.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d210

Communication System: UID 0 - CW; Frequency: 1800 MHz

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.37$ S/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.63, 8.63, 8.63) @ 1800 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; 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 = 108.6 V/m; Power Drift = -0.02 dB

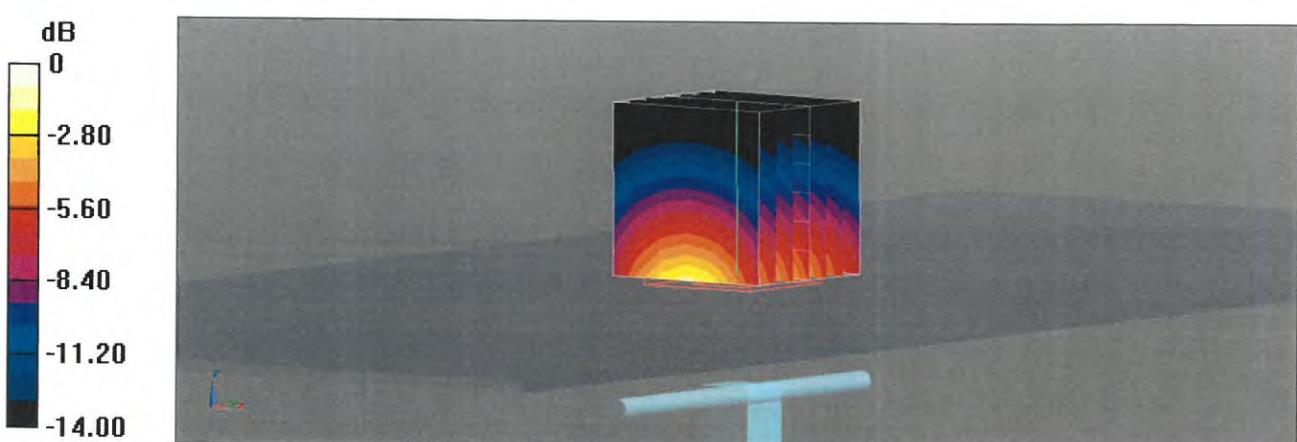
Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.49 W/kg; SAR(10 g) = 4.95 W/kg

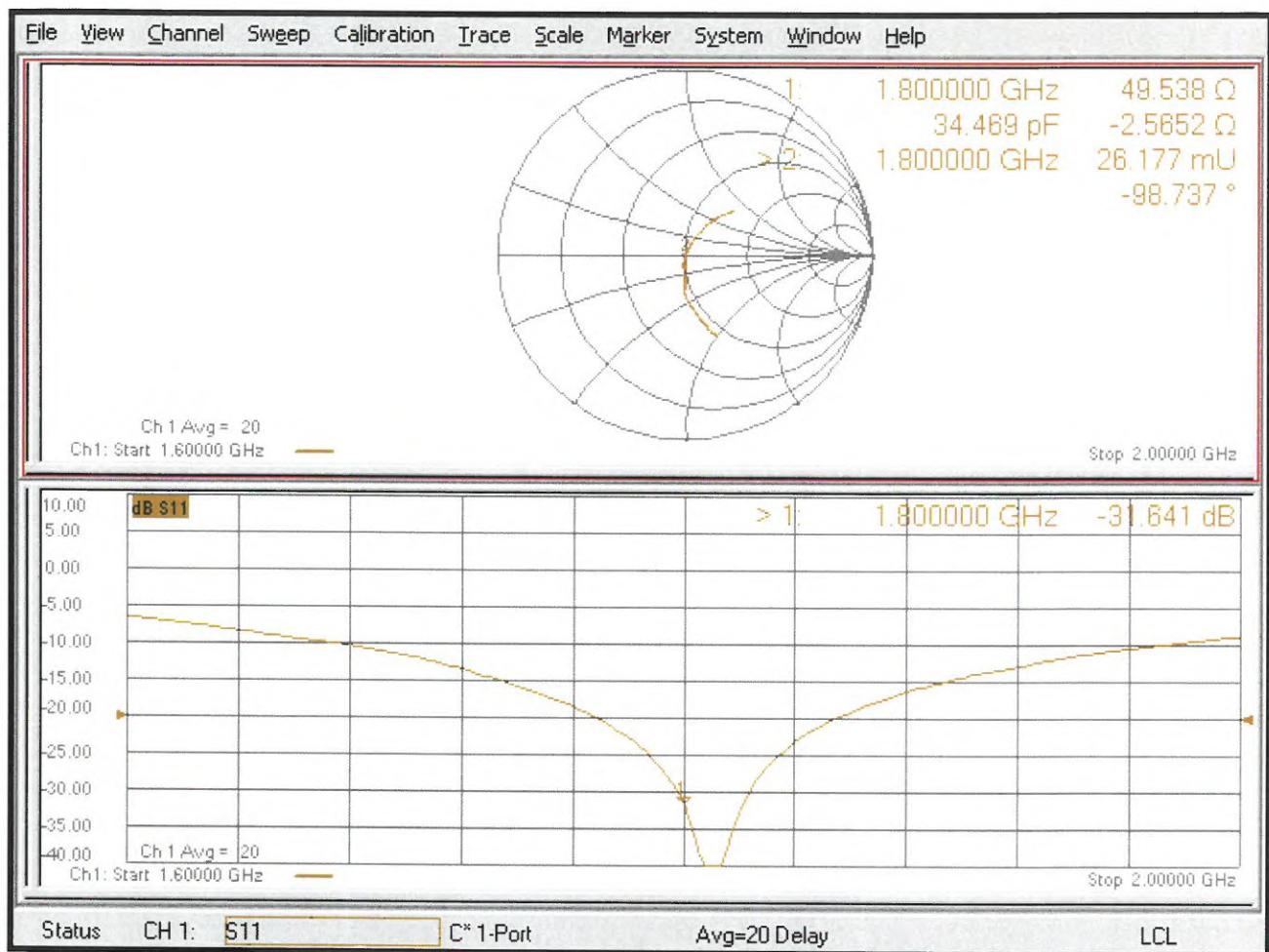
Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 53.5%

Maximum value of SAR (measured) = 14.9 W/kg



Impedance Measurement Plot for Head TSL





Dipole Internal Calibration Record

Asset No. :	E-533	Model No. :	D1800MHzV2	Serial No. :	2d210
Environmental	22.8°C, 46 %	Original Cal. Date :	May 30, 2022	Next Cal. Date :	May 30, 2025

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiion Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, 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

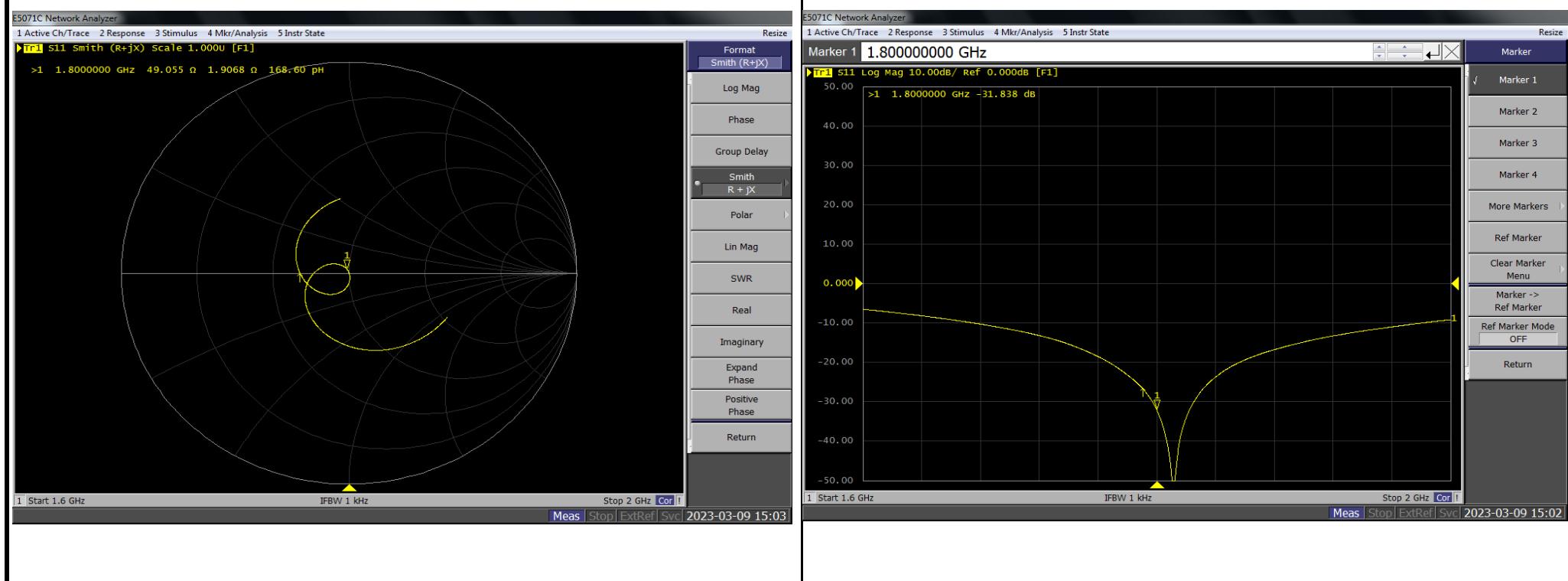
Model No

For Head Tissue

D1800V2	Item	Original Cal. Result	Verified on 2023/03/09	Deviation	Result
	Impedance, transformed to feed point	49.5Ω-2.6jΩ	49.1Ω+1.9jΩ	<5Ω	Pass
	Return Loss(dB)	-31.6	-31.8	-0.6%	Pass
	SAR Value for 1g(mW/g)	9.49	9.30	-2.0%	Pass
	SAR Value for 10g(mW/g)	4.95	4.76	-3.8%	Pass

Impedance Test-Head

Return Loss-Head



Validation Report for Head TSL

Test Laboratory: BTL

Date: 2023/3/9

System Check_H1800

Frequency: 1800 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $\sigma = 1.416 \text{ S/m}$; $\epsilon_r = 41.386$; $\rho = 1000 \text{ kg/m}^3$

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012 W/kg
- Electronics: DAE4 Sn1486; Calibrated: 2022/5/31
- Probe: EX3DV4 - SN7369; ConvF(8.67, 8.67, 8.67) @ 1800 MHz; Calibrated: 2022/5/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=250mW /Area Scan (8x8x1):

Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Configuration/Pin=250mW /Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 97.00 V/m; Power Drift = 0.00 dB

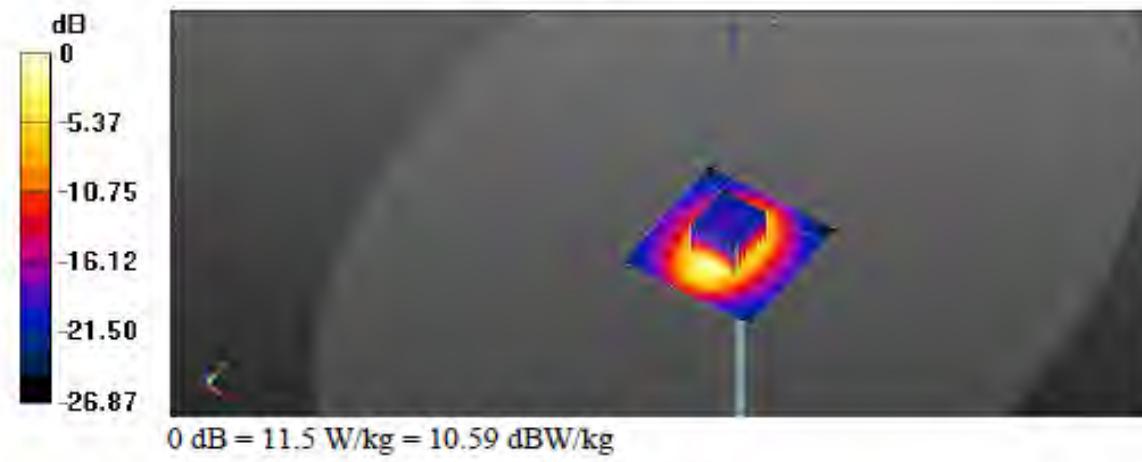
Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 9.3 W/kg; SAR(10 g) = 4.76 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 52.6%

Maximum value of SAR (measured) = 14.7 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen



Dipole Internal Calibration Record

Asset No. :	E-533	Model No. :	D1800MHzV2	Serial No. :	2d210
Environmental	23.1°C, 48 %	Original Cal. Date :	May 30, 2022	Next Cal. Date :	May 30, 2025

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiion Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, 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	ML2495A	1128008	N/A	May 12, 2023
Power Sensor	Anritsu	MA2411B	1126001	N/A	May 12, 2023
Directional Coupler	Woken	TS-PCC0M-05	107090019	N/A	N/A
Signal Generator	R & S	SMB100A	113244	N/A	June 13, 2023
ENA Network Analyzer	Agilent	E5071C	MY46524658	N/A	March 17, 2023

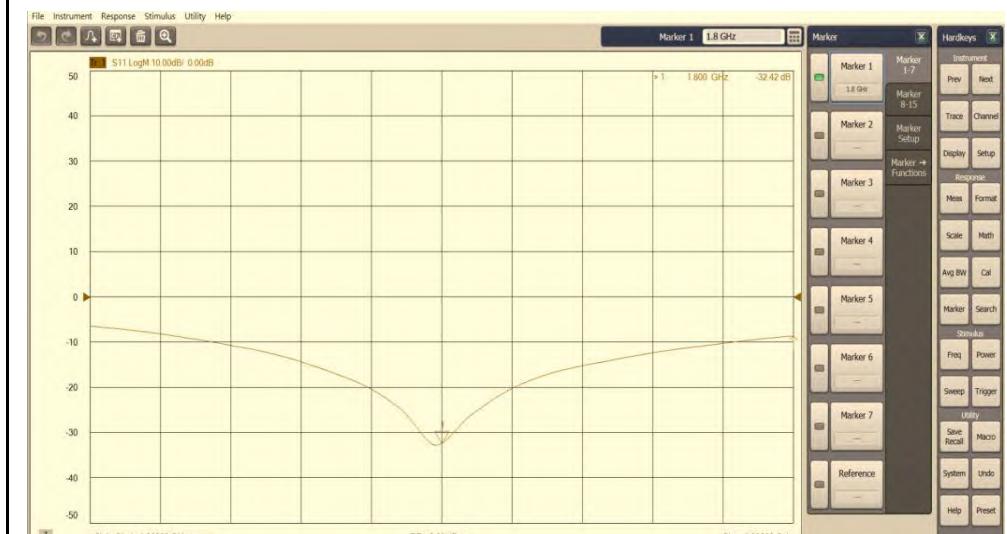
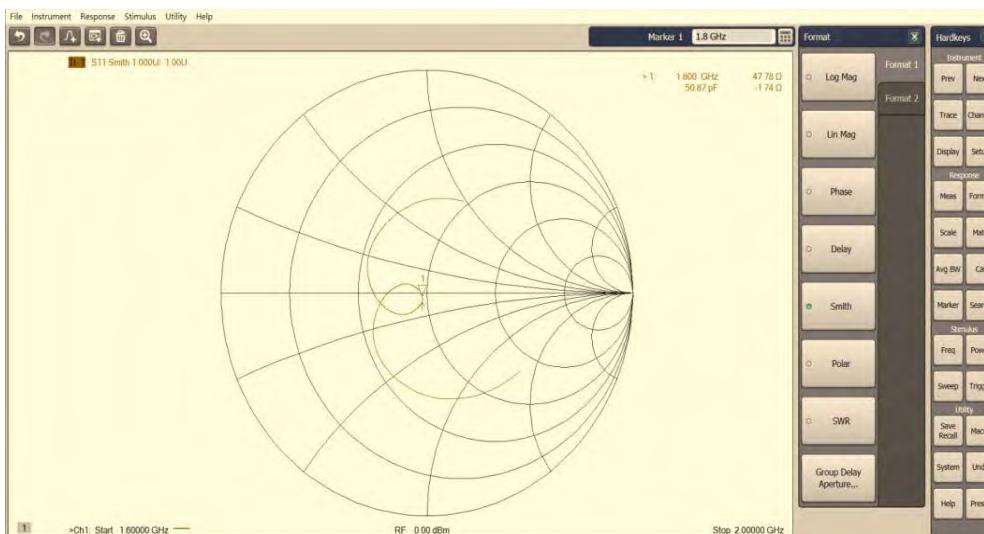
Model No

For Head Tissue

	Item	Original Cal. Result	Verified on 2024/03/07	Deviation	Result
	Impedance, transformed to feed point	49.5Ω-2.6jΩ	47.8Ω-1.7jΩ	<5Ω	Pass
D1800V2	Return Loss(dB)	-31.6	-32.4	-2.5%	Pass
	SAR Value for 1g(mW/g)	9.49	9.89	4.2%	Pass
	SAR Value for 10g(mW/g)	4.95	5.07	2.4%	Pass

Impedance Test-Head

Return Loss-Head



Test Laboratory: BTL

Date: 2024/3/7

System Check_H1800

Frequency: 1800 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.408$ S/m; $\epsilon_r = 41.711$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012 W/kg
- Electronics: DAE4 Sn1486; Calibrated: 2023/6/16
- Probe: EX3DV4 - SN7369; ConvF(8.59, 8.59, 8.59) @ 1800 MHz; Calibrated: 2023/5/22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=250mW/Area Scan (8x8x1):

Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 12.1 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.5 V/m; Power Drift = -0.01 dB

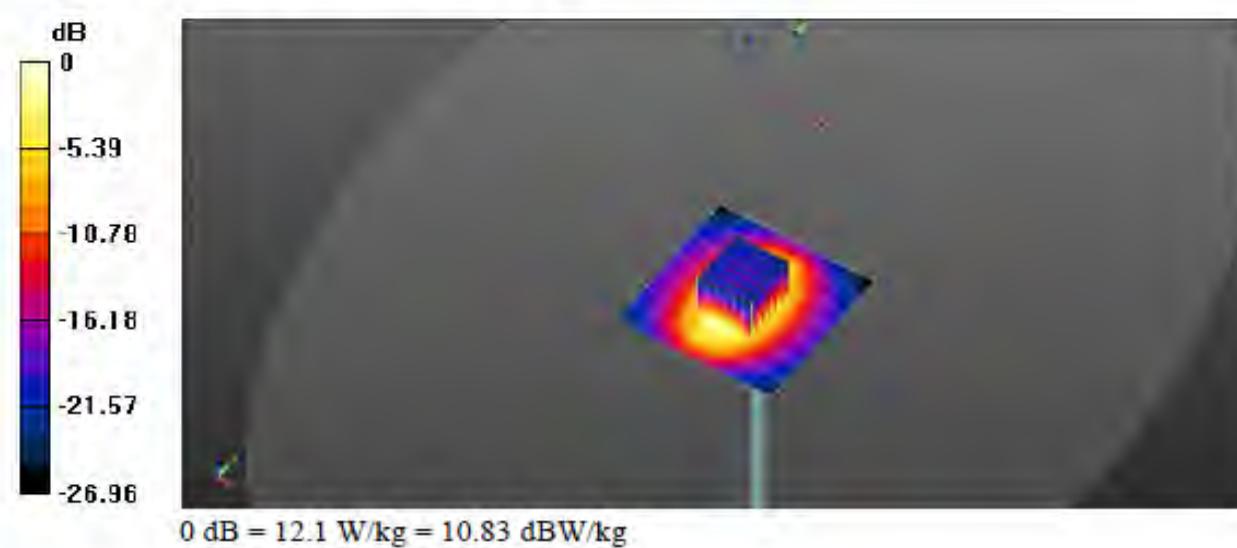
Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 9.89 W/kg; SAR(10 g) = 5.07 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 53%

Maximum value of SAR (measured) = 15.6 W/kg



Calibrator:

Approver:



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Accreditation No.: **SCS 0108**

Client **BTL**

Certificate No: **D1900V2-5d208_May22**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN:5d208**

Calibration procedure(s) **QA CAL-05.v11**
 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 23, 2022**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: Name **Michael Weber** Function **Laboratory Technician**

Signature

Approved by: Name **Sven Kühn** Function **Technical Manager**

Signature

Issued: May 30, 2022

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "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 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz \pm 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 \pm 0.2) °C	39.0 \pm 6 %	1.40 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.8 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.4 Ω + 4.6 $j\Omega$
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns
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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

Date: 23.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d208

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1900 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; 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 = 110.4 V/m; Power Drift = 0.08 dB

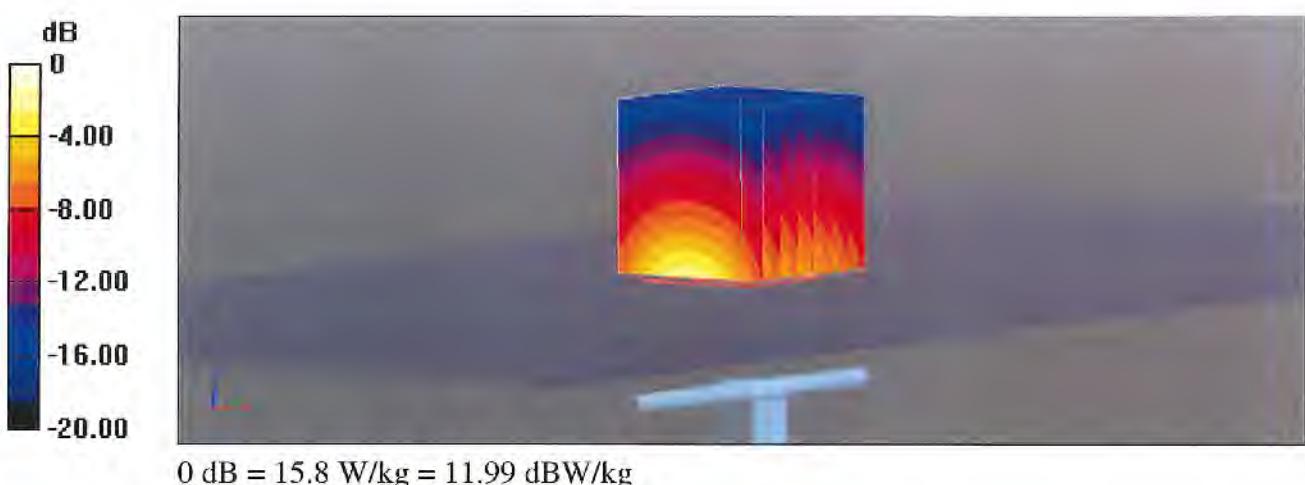
Peak SAR (extrapolated) = 19.0 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.23 W/kg

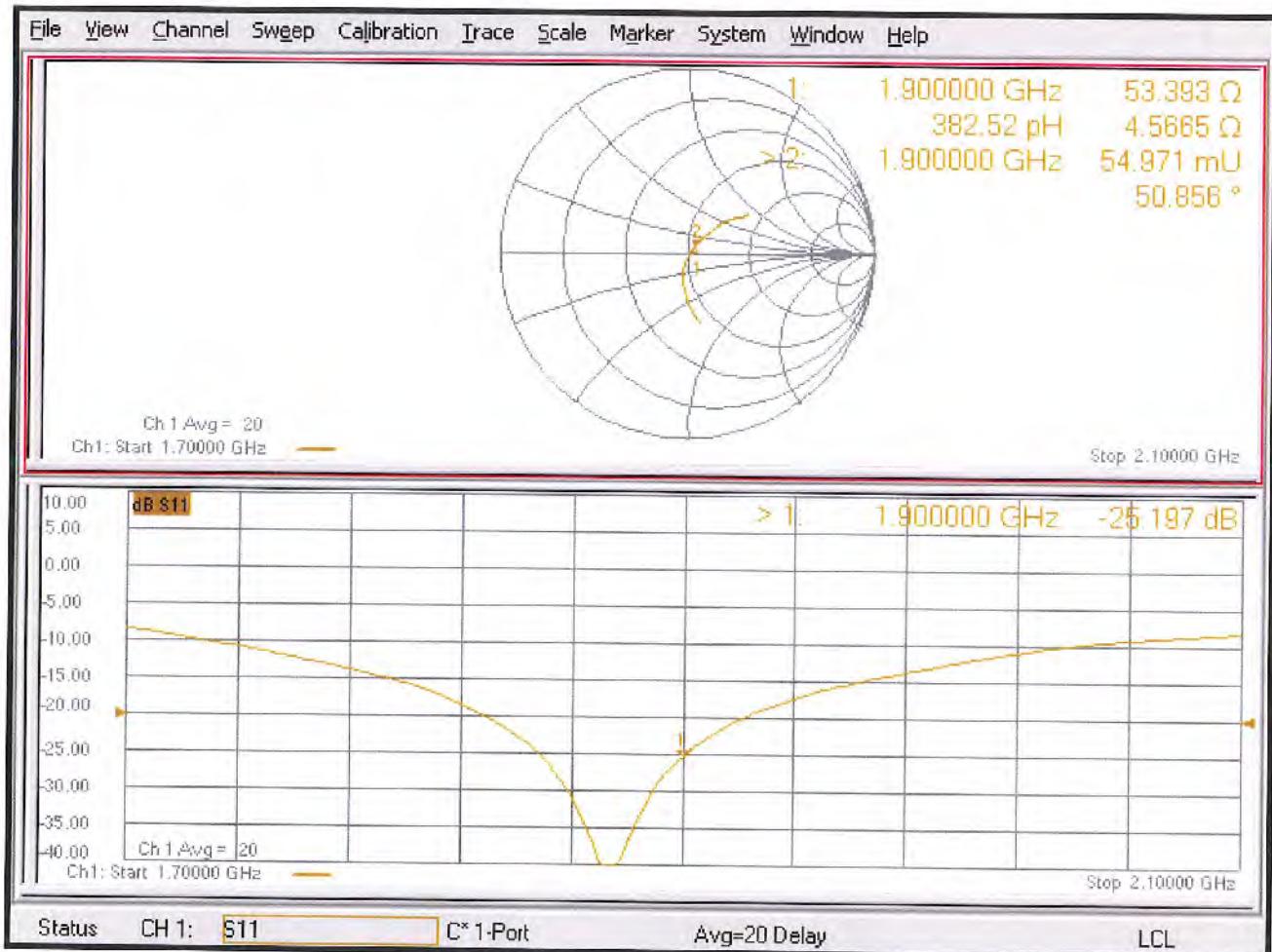
Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 53.7%

Maximum value of SAR (measured) = 15.8 W/kg



Impedance Measurement Plot for Head TSL





Dipole Internal Calibration Record

Asset No. :	E-535	Model No. :	D1900MHzV2	Serial No. :	5d208
Environmental	23.9°C, 53 %	Original Cal. Date :	May 23, 2022	Next Cal. Date :	May 23, 2025

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiion Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, 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

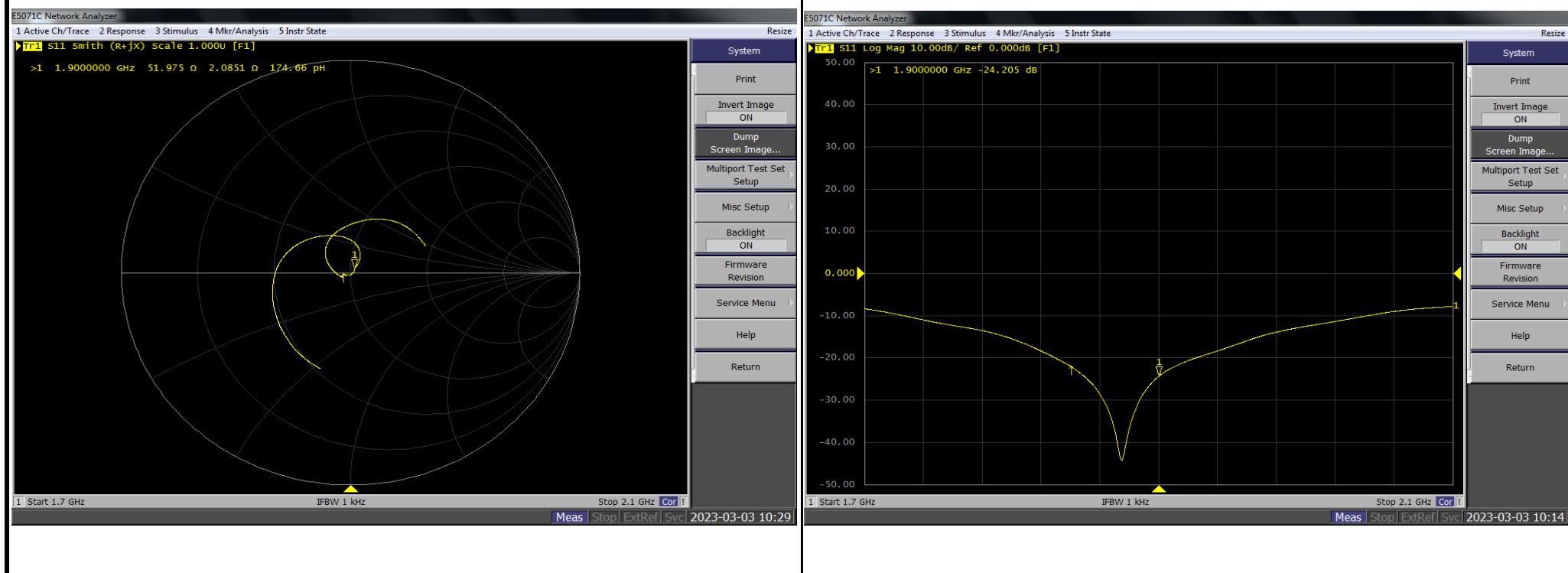
Model No

For Head Tissue

D1900V2	Item	Original Cal. Result	Verified on 2023/03/03	Deviation	Result
	Impedance, transformed to feed point	53.4Ω+4.6jΩ	52.0Ω+2.1jΩ	<5Ω	Pass
	Return Loss(dB)	-25.2	-24.2	4.0%	Pass
	SAR Value for 1g(mW/g)	10.1	10.1	0.0%	Pass
	SAR Value for 10g(mW/g)	5.23	5.33	1.9%	Pass

Impedance Test-Head

Return Loss-Head



Validation Report for Head TSL

Test Laboratory: BTL

Date: 2023/3/3

System Check_H1900

Frequency: 1900 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.412$ S/m; $\epsilon = 41.054$; $\rho = 1000$ 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(8.3, 8.3, 8.3) @ 1900 MHz; Calibrated: 2022/5/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=250mW /Area Scan (7x7x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 14.9 W/kg

Configuration/Pin=250mW /Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 100.7 V/m; Power Drift = 0.01 dB

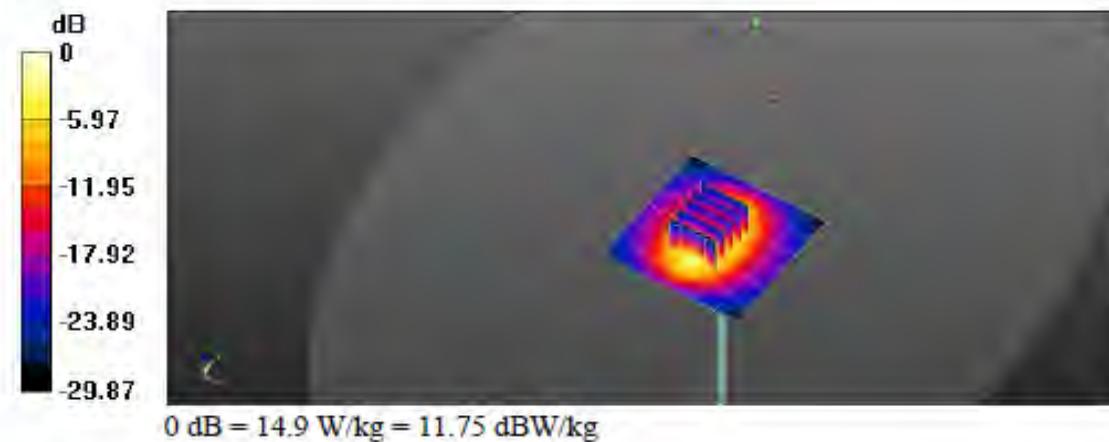
Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.33 W/kg

Smallest distance from peaks to all points 3 dB below = 10.1 mm

Ratio of SAR at M2 to SAR at M1 = 55.5%

Maximum value of SAR (measured) = 15.4 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen



Dipole Internal Calibration Record

Asset No. :	E-535	Model No. :	D1900MHzV2	Serial No. :	5d208
Environmental	23.4°C, 49 %	Original Cal. Date :	May 23, 2022	Next Cal. Date :	May 23, 2025

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiton Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, 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	ML2495A	1128008	N/A	May 12, 2023
Power Sensor	Anritsu	MA2411B	1126001	N/A	May 12, 2023
Directional Coupler	Woken	TS-PCC0M-05	107090019	N/A	N/A
Signal Generator	R & S	SMB100A	113244	N/A	June 13, 2023
ENA Network Analyzer	Agilent	E5071C	MY46524658	N/A	March 17, 2023

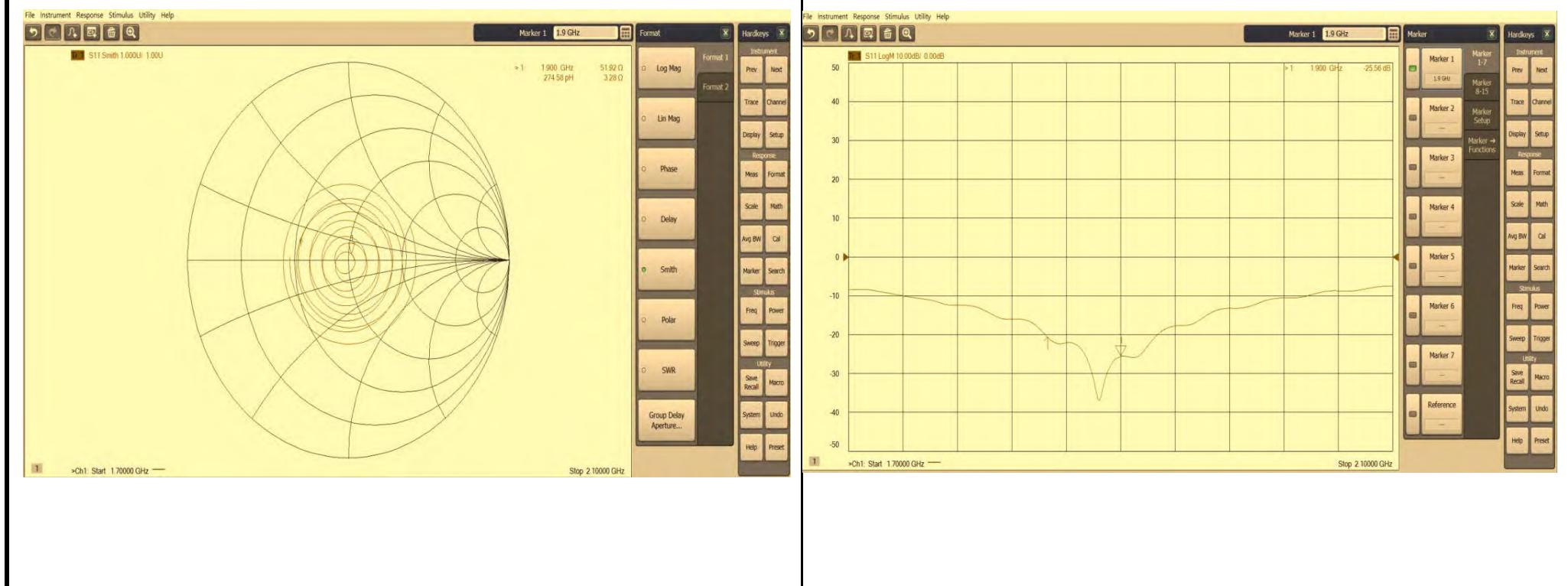
Model No

For Head Tissue

	Item	Original Cal. Result	Verified on 2024/03/01	Deviation	Result
	Impedance, transformed to feed point	53.4Ω+4.6jΩ	51.9Ω+3.3jΩ	<5Ω	Pass
D1900V2	Return Loss(dB)	-25.2	-25.6	-1.6%	Pass
	SAR Value for 1g(mW/g)	10.1	9.8	-3.0%	Pass
	SAR Value for 10g(mW/g)	5.23	5.45	4.2%	Pass

Impedance Test-Head

Return Loss-Head



Validation Report for Head TSL

Test Laboratory: BTL

Date: 2024/3/1

System Check_H1900

Frequency: 1900 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.414$ S/m; $\epsilon_r = 41.293$; $\rho = 1000$ 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: 2023/6/16
- Probe: EX3DV4 - SN7369; ConvF(8.26, 8.26, 8.26) @ 1900 MHz; Calibrated: 2023/5/22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=250mW/Area Scan (7x7x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 14.1 W/kg

Configuration/Pin=250mW/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 98.30 V/m; Power Drift = -0.09 dB

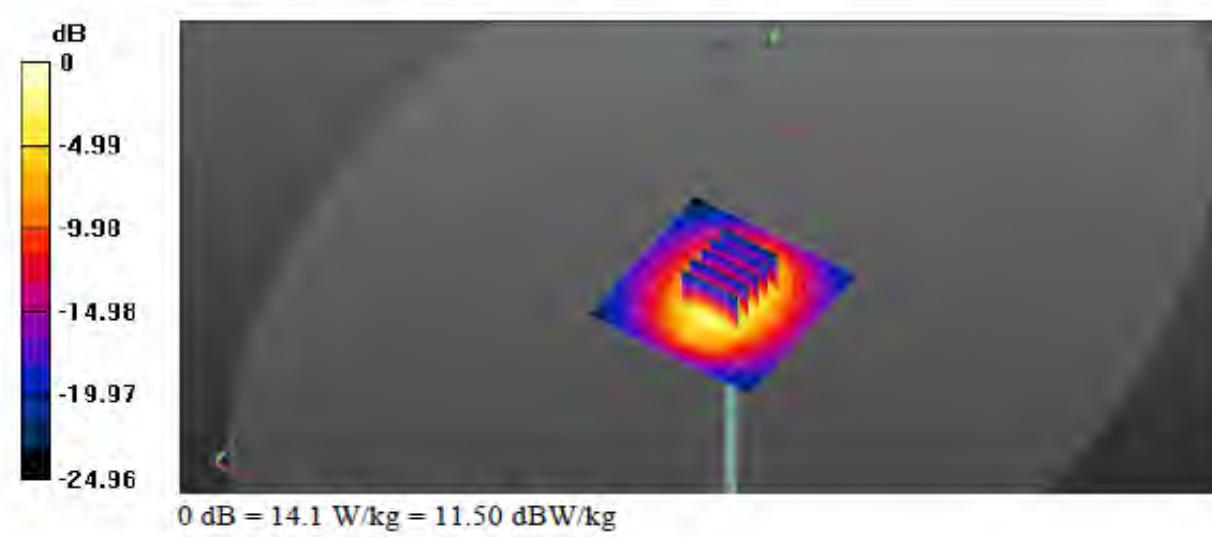
Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.45 W/kg

Smallest distance from peaks to all points 3 dB below = 12.8 mm

Ratio of SAR at M2 to SAR at M1 = 58.2%

Maximum value of SAR (measured) = 14.4 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen



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The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Client **BTL**

Accreditation No.: **SCS 0108**

Certificate No: **D2300V2-1054_May22**

CALIBRATION CERTIFICATE

Object **D2300V2 - SN:1054**

Calibration procedure(s) **QA CAL-05.v11**
 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 25, 2022**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by:	Name	Function	Signature
	Aldonia Georgiadou	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: May 30, 2022

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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "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 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.69 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	48.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.1 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.1 Ω - 5.6 $j\Omega$
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.170 ns
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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

Date: 25.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1054

Communication System: UID 0 - CW; Frequency: 2300 MHz

Medium parameters used: $f = 2300$ MHz; $\sigma = 1.69$ S/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.98, 7.98, 7.98) @ 2300 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; 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 = 114.6 V/m; Power Drift = 0.02 dB

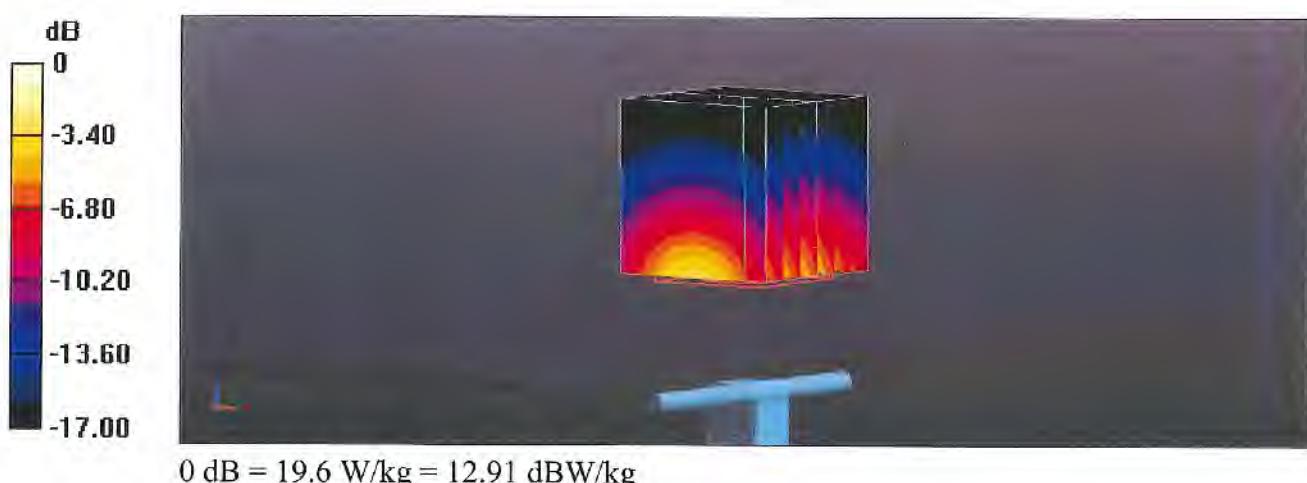
Peak SAR (extrapolated) = 22.8 W/kg

SAR(1 g) = 12.2 W/kg; SAR(10 g) = 5.80 W/kg

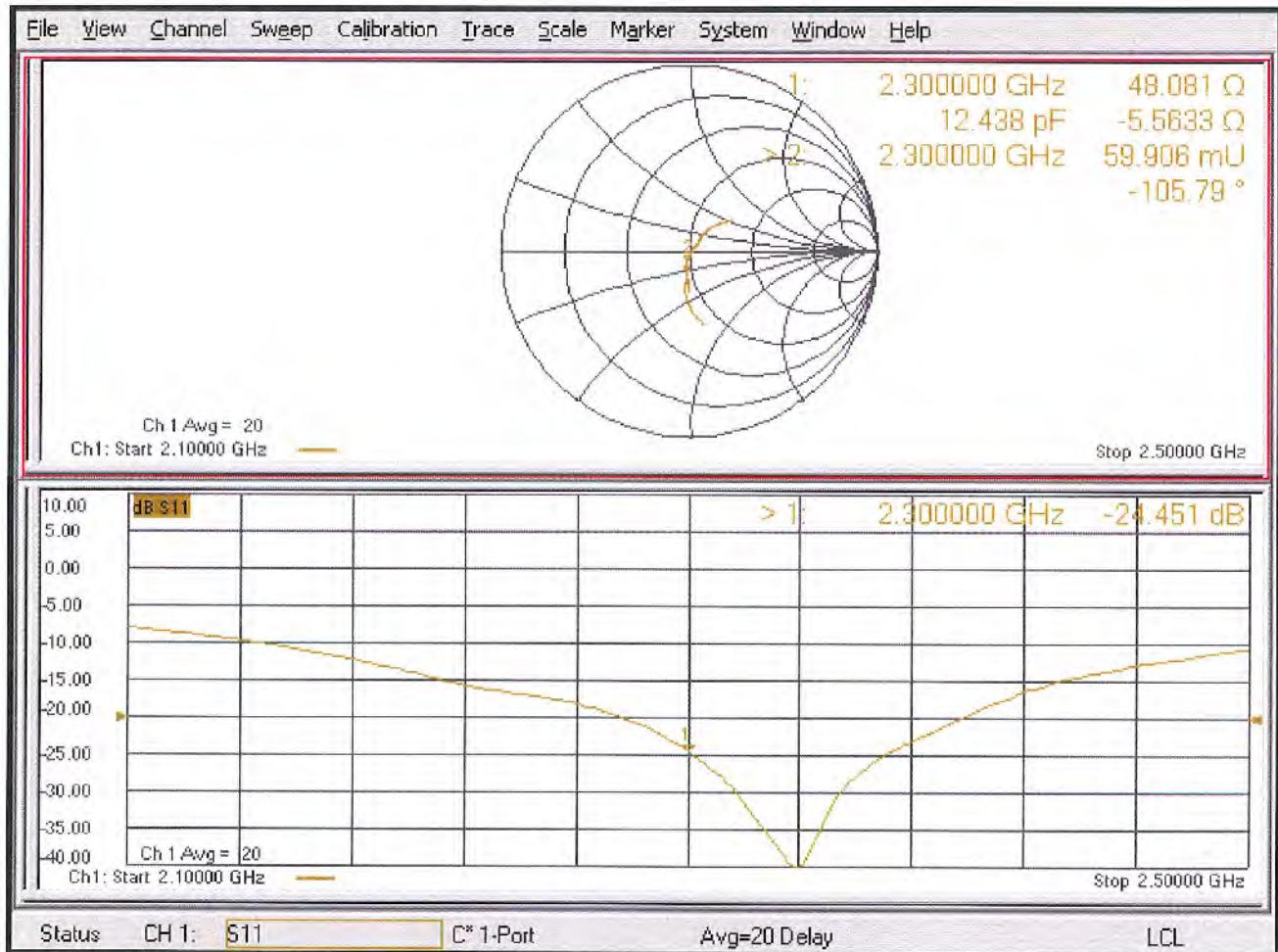
Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 53.3%

Maximum value of SAR (measured) = 19.6 W/kg



Impedance Measurement Plot for Head TSL





Dipole Internal Calibration Record

Asset No. :	E-536	Model No. :	D2300MHzV2	Serial No. :	1064
Environmental	23.7°C, 51 %	Original Cal. Date :	May 25, 2022	Next Cal. Date :	May 25, 2025

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiion Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, 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

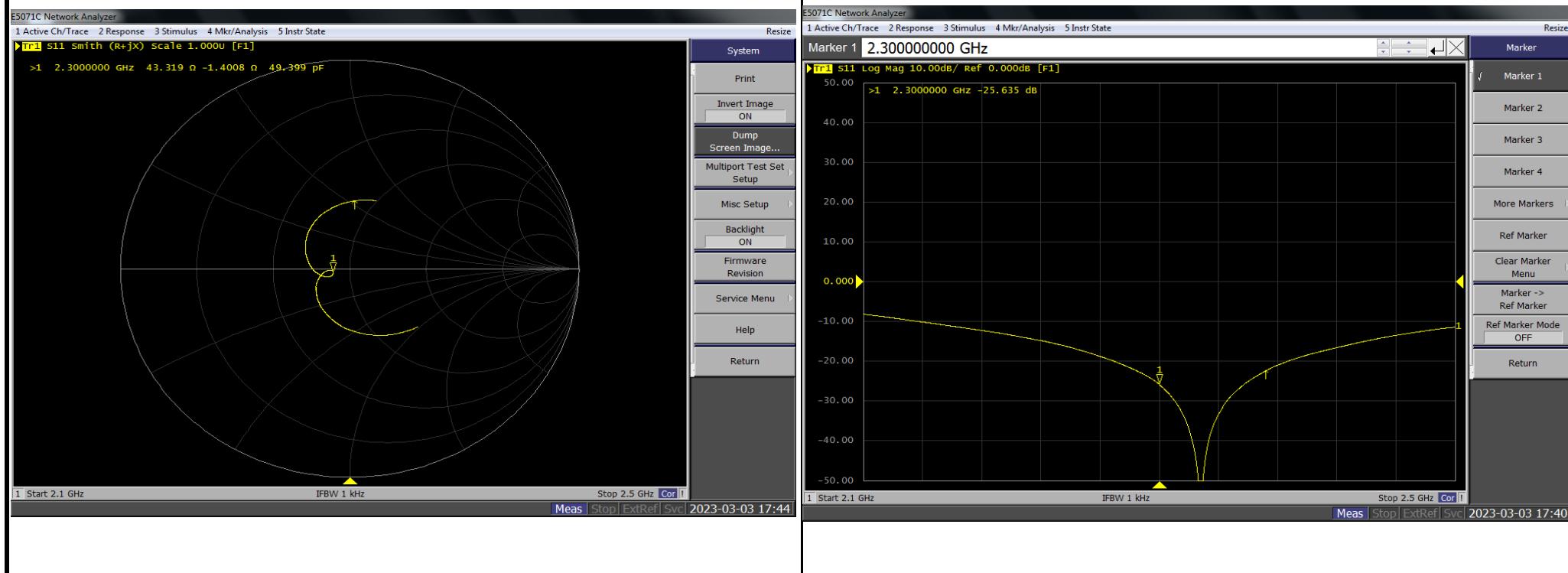
Model No

For Head Tissue

D2300V2	Item	Original Cal. Result	Verified on 2023/03/03	Deviation	Result
	Impedance, transformed to feed point	48.1Ω-5.6jΩ	43.3Ω-1.4jΩ	<5Ω	Pass
	Return Loss(dB)	-24.5	-25.6	-4.5%	Pass
	SAR Value for 1g(mW/g)	12.2	12.8	4.9%	Pass
	SAR Value for 10g(mW/g)	5.80	6.17	6.4%	Pass

Impedance Test-Head

Return Loss-Head



Test Laboratory: BTL

Date: 2023/3/3

System Check_H2300

Frequency: 2300 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 2300$ MHz; $\sigma = 1.646$ S/m; $\epsilon_r = 38.477$; $\rho = 1000$ 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(7.93, 7.93, 7.93) @ 2300 MHz; Calibrated: 2022/5/28
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=250mW /Area Scan (9x9x1):

Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 18.0 W/kg

Configuration/Pin=250mW /Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.6 V/m; Power Drift = 0.04 dB

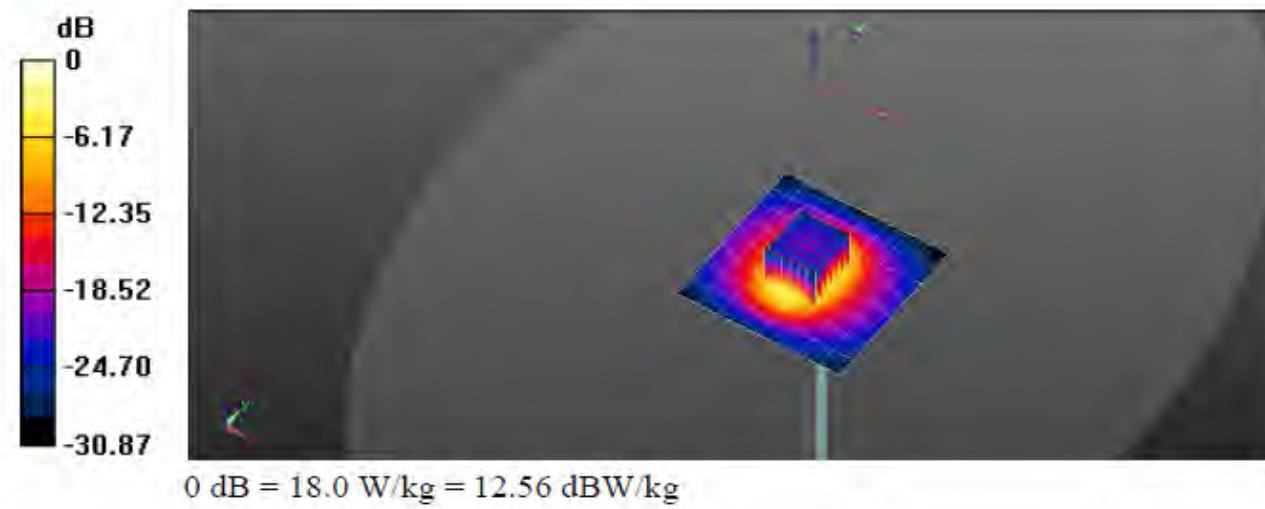
Peak SAR (extrapolated) = 25.1 W/kg

SAR(1 g) = 12.8 W/kg; SAR(10 g) = 6.17 W/kg

Smallest distance from peaks to all points 3 dB below = 9.2 mm

Ratio of SAR at M2 to SAR at M1 = 51.5%

Maximum value of SAR (measured) = 19.1 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen



Dipole Internal Calibration Record

Asset No. :	E-536	Model No. :	D2300MHzV2	Serial No. :	1064
Environmental	23.1°C, 48 %	Original Cal. Date :	May 25, 2022	Next Cal. Date :	May 25, 2025

Standard List

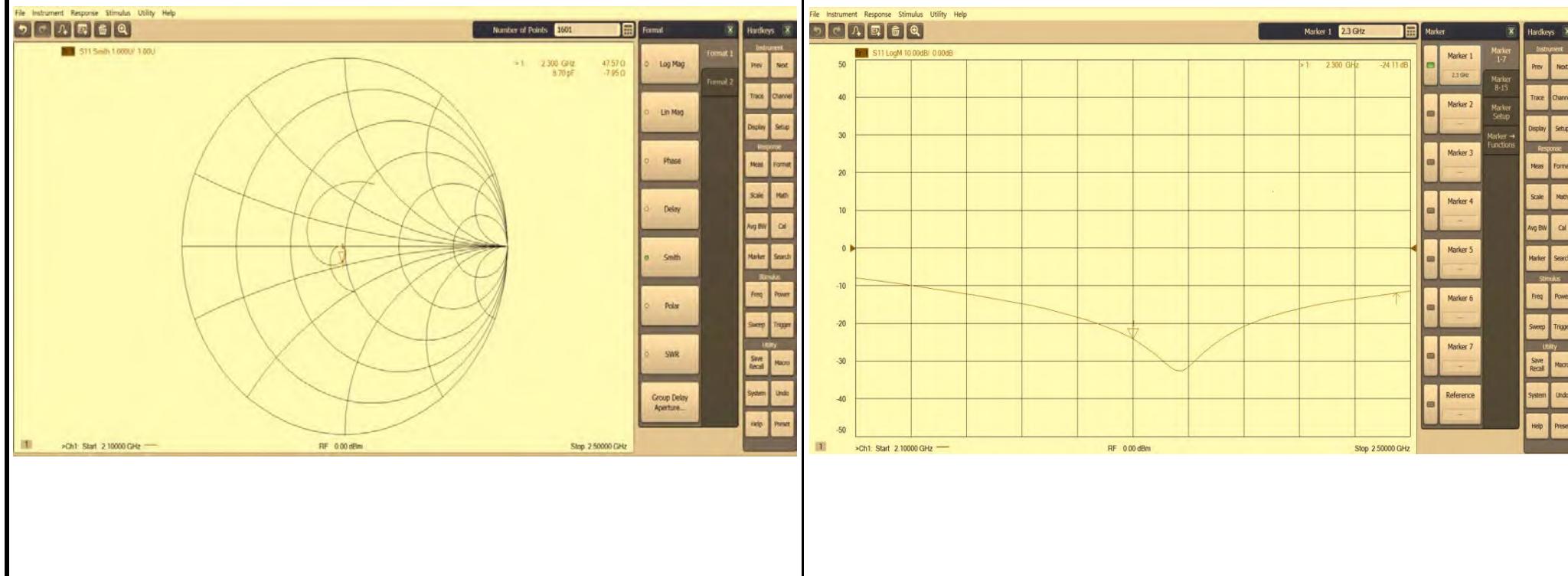
1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiton Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, June 2013
2	IEC 62209-2	Procedure to determine the Specific Absorption Rate (SAR) for wireless communication 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.Orgnization :	Cal. Date :
Power Amplifier	EMCI	EMC053035	980869	N/A	N/A
Power Meter	Anritsu	ML2495A	1128008	N/A	May 12, 2023
Power Sensor	Anritsu	MA2411B	1126001	N/A	May 12, 2023
Directional Coupler	Woken	TS-PCC0M-05	107090019	N/A	N/A
Signal Generator	R & S	SMB100A	113244	N/A	June 13, 2023
ENA Network Analyzer	Agilent	E5071C	MY46524658	N/A	March 17, 2023

Model No	For Head Tissue				
	Item	Original Cal. Result	Verified on 2024/02/27	Deviation	Result
D2300V2	Impedance, transformed to feed point	48.1Ω-5.6jΩ	47.8Ω-8.0jΩ	<5Ω	Pass
	Return Loss(dB)	-24.5	-24.1	1.6%	Pass
	SAR Value for 1g(mW/g)	12.2	12.0	-1.6%	Pass
	SAR Value for 10g(mW/g)	5.80	5.72	-1.4%	Pass

Impedance Test-Head



Test Laboratory: BTL

Date: 2024/2/27

System Check_H2300

Frequency: 2300 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 2300$ MHz; $\sigma = 1.704$ S/m; $\epsilon_r = 40.344$; $\rho = 1000$ 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: 2023/6/16
- Probe: EX3DV4 - SNT369; ConvF(7.89, 7.89, 7.89) @ 2300 MHz; Calibrated: 2023/5/22
- Sensor-Surface: 2mm (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

Configuration/Pin=250mW/Area Scan (9x9x1):

Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 17.4 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.3 V/m; Power Drift = -0.00 dB

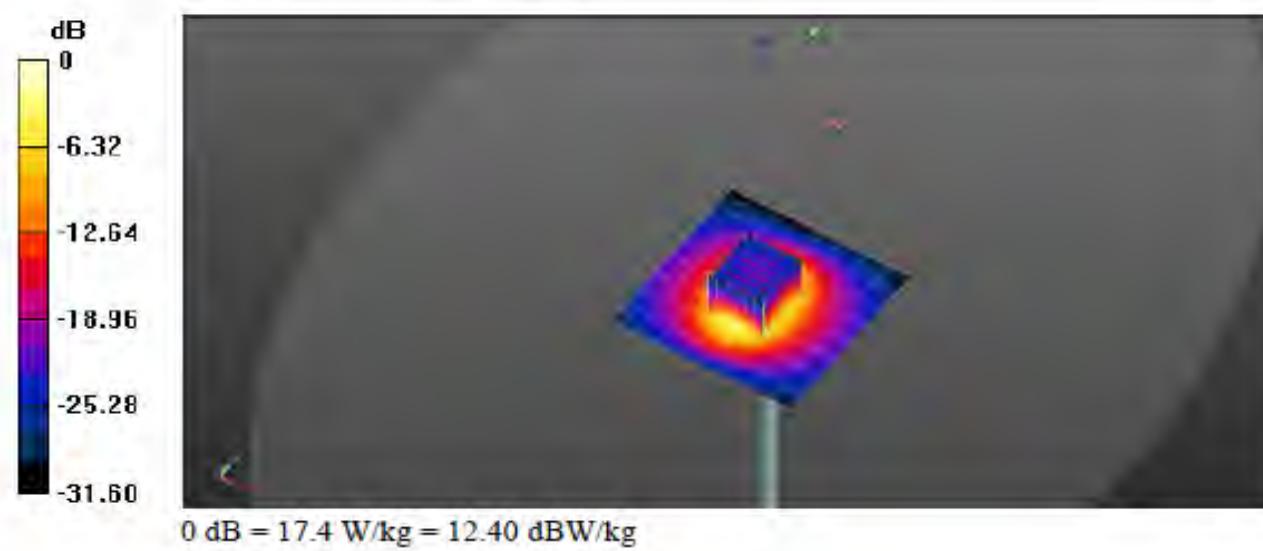
Peak SAR (extrapolated) = 24.0 W/kg

SAR(1 g) = 12 W/kg; SAR(10 g) = 5.72 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 50.2%

Maximum value of SAR (measured) = 18.0 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen



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Accreditation No.: **SCS 0108**

Client

Auden
Taoyuan City

Certificate No.

D2600V2-1077_Apr25

CALIBRATION CERTIFICATE

Object **D2600V2 - SN: 1077**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date **April 15, 2025**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	28-Oct-24 (No. DAE4ip-1836_Oct24)	Oct-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

Calibrated by	Name	Function	Signature
Calibrated by	Leif Klysner	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: April 15, 2025

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Accreditation No.: **SCS 0108**

Glossary

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

Calibration is Performed According to the Following Standards

- IEC/IEEE 62209-1528, "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 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY 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%.

Measurement Conditions

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

DASY Version	DASY8 Module SAR		16.4.0
Extrapolation	Advanced Extrapolation		
Phantom	Modular Flat Phantom		
Distance Dipole Center - TSL	10 mm		with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.5mm		Graded Ratio = 1.5 mm (Z direction)
Frequency	2600MHz \pm 1MHz		

HSL parameters at 2600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	39.0	1.96 mho/m
Measured HSL parameters	(22.0 \pm 0.2)°C	37.3 \pm 6%	2.02 mho/m \pm 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 2600 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	14.1 W/kg
SAR for nominal HSL parameters	normalized to 1W	56.1 W/kg \pm 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	6.29 W/kg
SAR for nominal HSL parameters	normalized to 1W	25.0 W/kg \pm 16.5% (k = 2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with HSL at 2600 MHz**

Impedance	50.0 Ω – 5.3 $j\Omega$
Return Loss	-25.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns
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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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System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D2600V2 – SN1077	2600	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10	CW, 0--		2600, 0	7.26	2.02	37.3

Hardware Setup

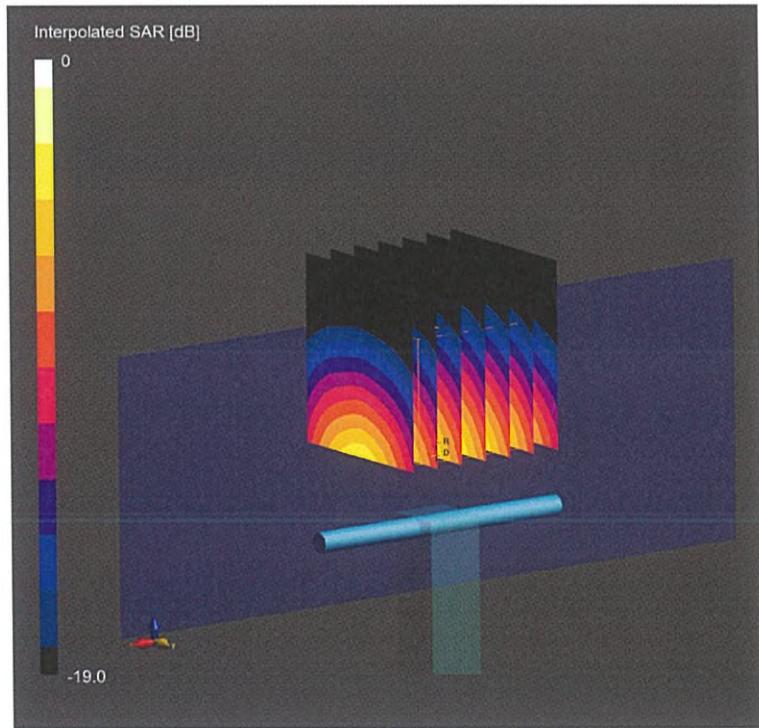
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2025-04-15	EX3DV4 – SN7349, 2025-01-10	DAE4ip Sn1836, 2024-10-28

Scans Setup

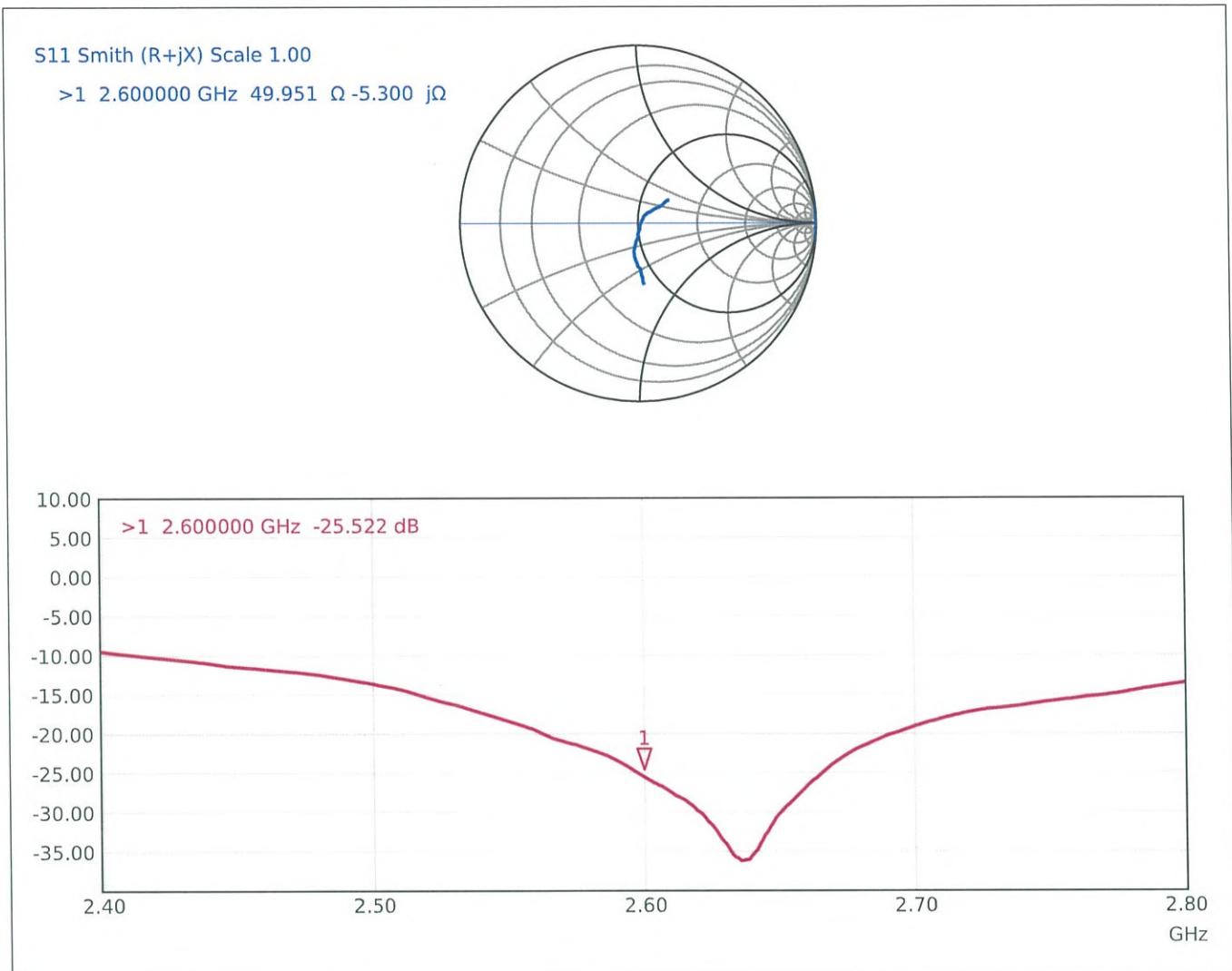
	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	5.0 x 5.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2025-04-15
psSAR1g [W/Kg]	14.1
psSAR10g [W/Kg]	6.29
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



Impedance Measurement Plot for HSL





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Multilateral Agreement for the recognition of calibration certificates

Client **BTL**

New Taipei City

Accreditation No.: **SCS 0108**

Certificate No. **D3500V2-1096_Aug23**

CALIBRATION CERTIFICATE

Object **D3500V2 - SN:1096**

Calibration procedure(s) **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **August 15, 2023**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3503	07-Mar-23 (No. EX3-3503_Mar23)	Mar-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: Name **Michael Weber** Function **Laboratory Technician**

Signature

Approved by: Name **Sven Kühn** Function **Technical Manager**

Signature

Issued: August 22, 2023

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "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 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

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

DASY Version	DASY52	
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	$dx, dy = 4.0 \text{ mm}, dz = 1.4 \text{ mm}$	Graded Ratio = 1.4 (Z direction)
Frequency	$3400 \text{ MHz} \pm 1 \text{ MHz}$ $3500 \text{ MHz} \pm 1 \text{ MHz}$	

Head TSL parameters at 3400 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	38.0	2.81 mho/m
Measured Head TSL parameters	$(22.0 \pm 0.2) \text{ °C}$	$36.8 \pm 6 \text{ %}$	$2.86 \text{ mho/m} \pm 6 \text{ %}$
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 3400 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.73 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	66.5 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.2 W/kg ± 19.5 % (k=2)

Head TSL parameters at 3500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.9	2.91 mho/m
Measured Head TSL parameters	$(22.0 \pm 0.2) \text{ °C}$	$36.7 \pm 6 \text{ %}$	$2.93 \text{ mho/m} \pm 6 \text{ %}$
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 3500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	66.5 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.9 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 3400 MHz

Impedance, transformed to feed point	43.7 Ω - 1.8 $j\Omega$
Return Loss	- 23.1 dB

Antenna Parameters with Head TSL at 3500 MHz

Impedance, transformed to feed point	47.7 Ω + 3.6 $j\Omega$
Return Loss	- 27.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.135 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

Date: 15.08.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1096

Communication System: UID 0 - CW; Frequency: 3500 MHz, Frequency: 3400 MHz

Medium parameters used: $f = 3500 \text{ MHz}$; $\sigma = 2.93 \text{ S/m}$; $\epsilon_r = 36.7$; $\rho = 1000 \text{ kg/m}^3$,

Medium parameters used: $f = 3400 \text{ MHz}$; $\sigma = 2.86 \text{ S/m}$; $\epsilon_r = 36.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.91, 7.91, 7.91) @ 3500 MHz, ConvF(7.91, 7.91, 7.91) @ 3400 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- 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=100 mW, d=10mm, f=3500MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0:

Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 68.95 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 18.2 W/kg

SAR(1 g) = 6.71 W/kg; SAR(10 g) = 2.51 W/kg

Smallest distance from peaks to all points 3 dB below = 8 mm

Ratio of SAR at M2 to SAR at M1 = 75.1%

Maximum value of SAR (measured) = 12.7 W/kg

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3400MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0:

Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 69.98 V/m; Power Drift = 0.06 dB

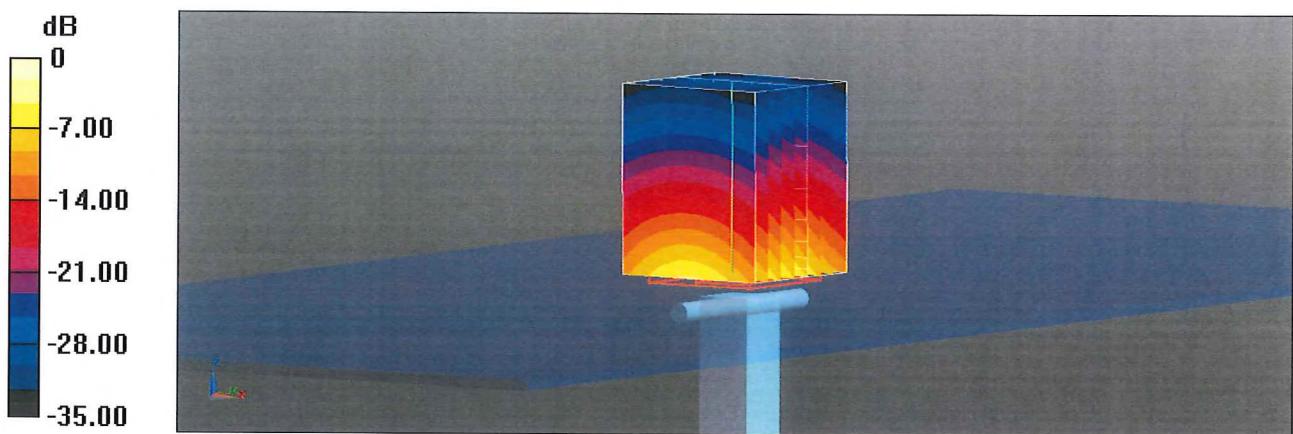
Peak SAR (extrapolated) = 18 W/kg

SAR(1 g) = 6.73 W/kg; SAR(10 g) = 2.54 W/kg

Smallest distance from peaks to all points 3 dB below = 8 mm

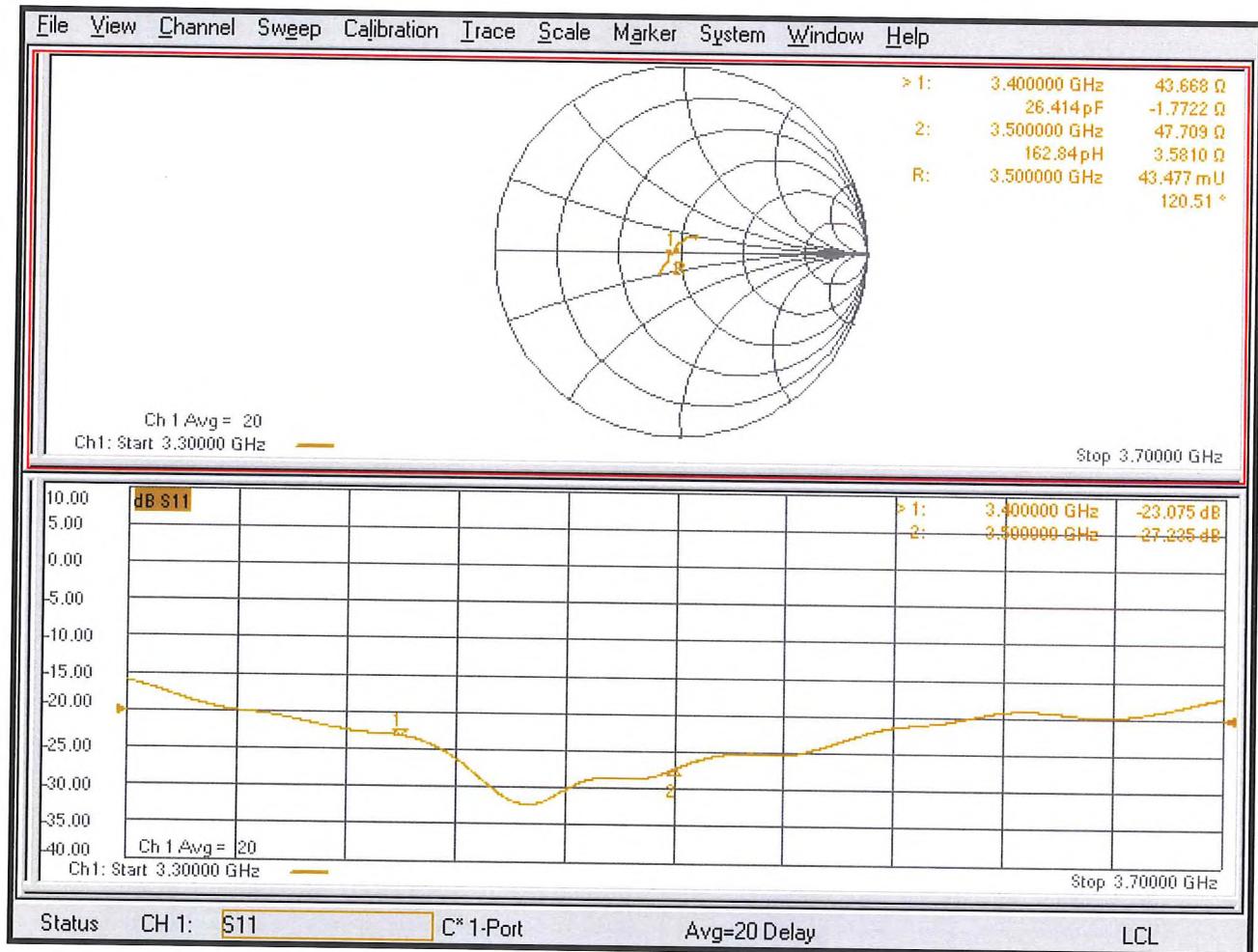
Ratio of SAR at M2 to SAR at M1 = 75.8%

Maximum value of SAR (measured) = 12.5 W/kg



$$0 \text{ dB} = 12.5 \text{ W/kg} = 10.97 \text{ dBW/kg}$$

Impedance Measurement Plot for Head TSL





Dipole Internal Calibration Record

Asset No. :	E-982	Model No. :	D3500MHzV2	Serial No. :	1096
Environmental	23.3°C, 45 %	Original Cal. Date :	August 13, 2024	Next Cal. Date :	August 13, 2025

Standard List

1	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorptiton Rate(SAR) in the Human Head from Wireless Communication Devices: Measurement Texhniques, 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

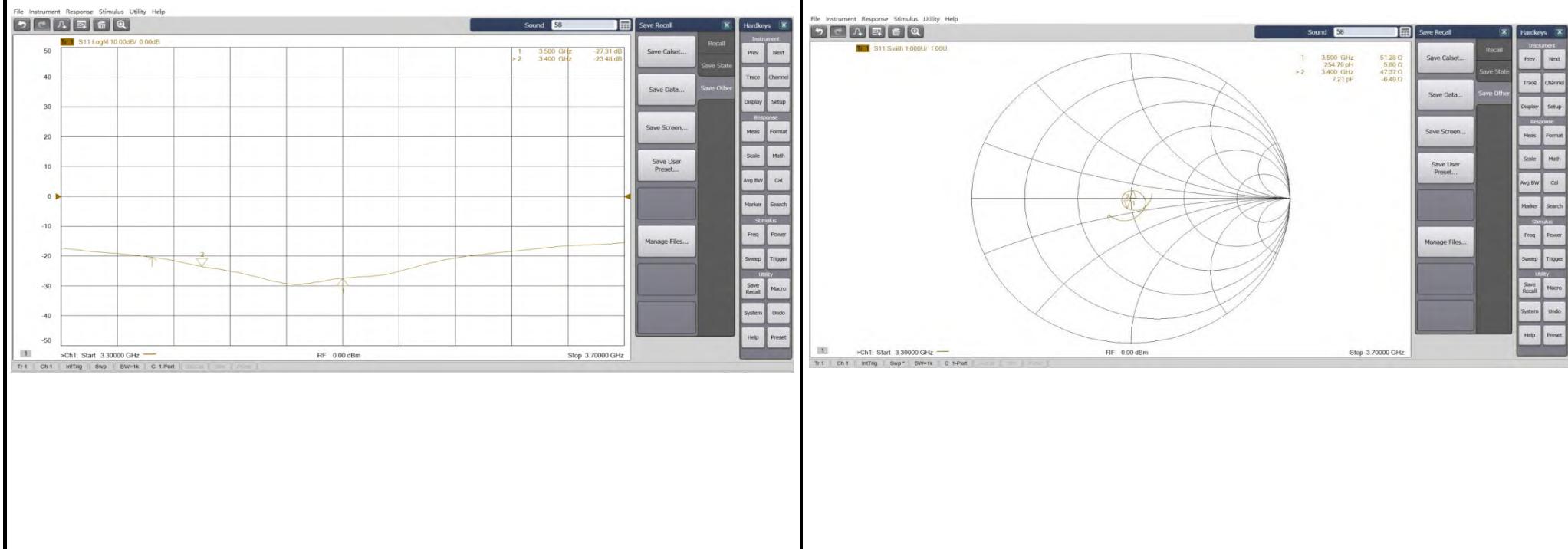
Equipment :	Manufacturer :	Model No. :	Serial No. :	Cal.Organization :	Cal. Date :
Power Amplifier	EMCI	EMC053035	980869	N/A	N/A
Power Meter	Anritsu	ML2495A	1128008	N/A	May 11, 2024
Power Sensor	Anritsu	MA2411B	1126001	N/A	May 11, 2024
Directional Coupler	Woken	TS-PCC0M-05	107090019	N/A	N/A
Signal Generator	R & S	SMB100A	113244	N/A	June 18, 2024
Vector network analyzer	Keysight	P5002A	MY58301034	N/A	March 6, 2024

For Head Tissue

Frequency	Item	Original Cal. Result	Verified on 2024/08/13	Deviation	Result
3400MHz	Impedance, transformed to feed point	43.7Ω-1.8jΩ	47.4Ω-6.5jΩ	<5Ω	Pass
	Return Loss(dB)	-23.1	-23.48	-1.6%	Pass
	SAR Value for 1g(mW/g)	6.73	6.73	0.0%	Pass
	SAR Value for 10g(mW/g)	2.54	2.47	-2.8%	Pass
3500MHz	Impedance, transformed to feed point	47.7Ω+3.6jΩ	51.3Ω+5.8jΩ	<5Ω	Pass
	Return Loss(dB)	-27.2	-27.31	-0.4%	Pass
	SAR Value for 1g(mW/g)	6.71	7.24	7.9%	Pass
	SAR Value for 10g(mW/g)	2.51	2.66	6.0%	Pass

Impedance Test-Head

Return Loss-Head



Test Laboratory: BTL

Date: 2024/8/13

System Check_H3400

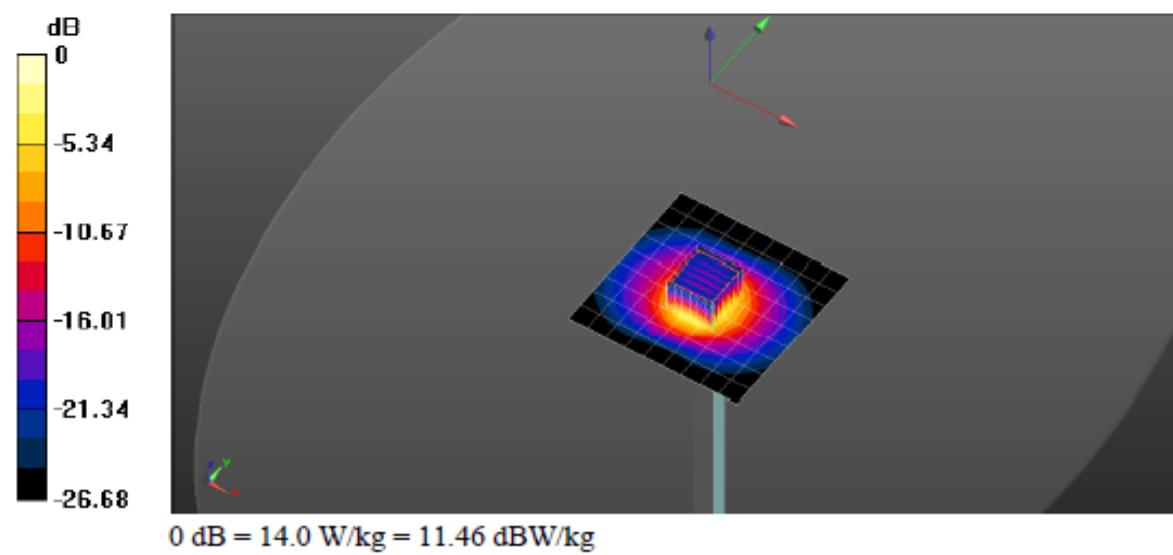
Frequency: 3400 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C
Medium parameters used: $f = 3400$ MHz; $\sigma = 2.803$ S/m; $\epsilon_r = 38.282$; $\rho = 1000$ kg/m³
DASY5 Configuration:
- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012 W/kg
- Electronics: DAE4 Sn1486; Calibrated: 2024/5/16
- Probe: EX3DV4 - SN7369; ConvF(6.9, 6.96, 6.48) @ 3400 MHz; Calibrated: 2024/6/3
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=100mW/Area Scan (10x10x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 11.0 W/kg

Configuration/Pin=100mW 1/Zoom Scan (7x7x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 66.54 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 19.4 W/kg
SAR(1 g) = 6.73 W/kg; SAR(10 g) = 2.47 W/kg
Smallest distance from peaks to all points 3 dB below = 8.6 mm
Ratio of SAR at M2 to SAR at M1 = 63%
Maximum value of SAR (measured) = 14.0 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen

Test Laboratory: BTL

Date: 2024/8/13

System Check_H3500

Frequency: 3500 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 23.0°C; Liquid Temperature: 22.0°C

Medium parameters used: $f = 3500$ MHz; $\sigma = 2.919$ S/m; $\epsilon_r = 37.951$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012 W/kg
- Electronics: DAE4 Sn1486; Calibrated: 2024/5/16
- Probe: EX3DV4 - SN7369; ConvF(6.87, 6.96, 6.44) @ 3500 MHz; Calibrated: 2024/6/3
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 AA; Serial: 1240

Configuration/Pin=100mW/Area Scan (10x10x1):

Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 11.8 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0:

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

Reference Value = 67.63 V/m; Power Drift = -0.04 dB

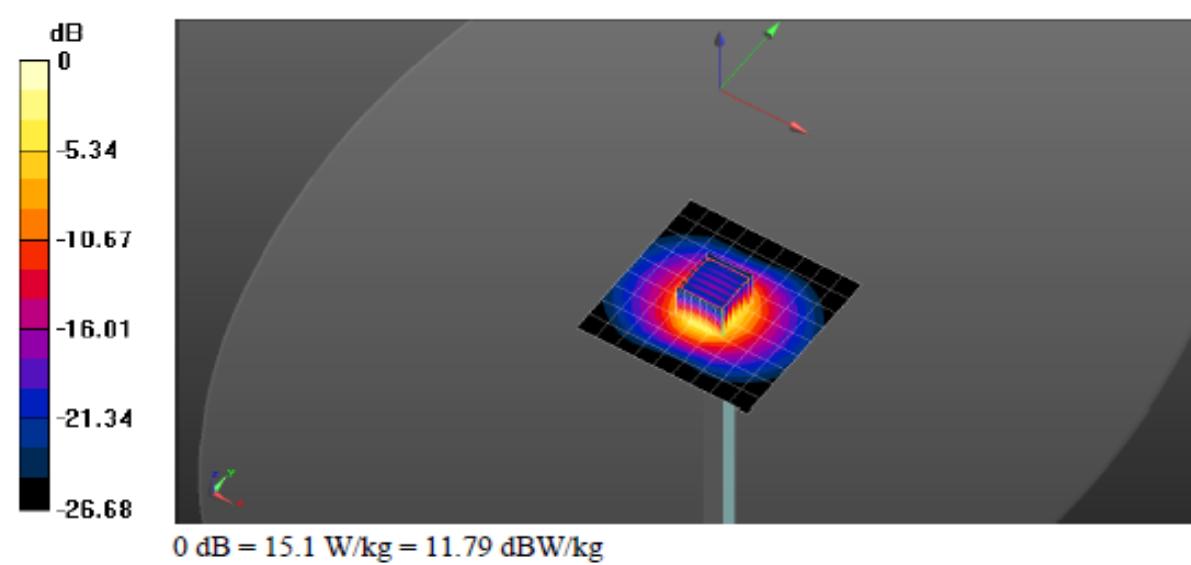
Peak SAR (extrapolated) = 20.9 W/kg

SAR(1 g) = 7.24 W/kg; SAR(10 g) = 2.66 W/kg

Smallest distance from peaks to all points 3 dB below = 8.6 mm

Ratio of SAR at M2 to SAR at M1 = 63%

Maximum value of SAR (measured) = 15.1 W/kg



Calibrator:

Jerry Chang

Approver:

Peter Chen



Accredited by the Swiss Accreditation Service (SAS)

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 Multilateral Agreement for the recognition of calibration certificates

Client **BTL**

Certificate No. **D3700V2-1065_Aug23**

New Taipei City

CALIBRATION CERTIFICATE

Object **D3700V2 - SN:1065**

Calibration procedure(s) **QA CAL-22.v7**
 Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **August 15, 2023**

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

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Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
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Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3503	07-Mar-23 (No. EX3-3503_Mar23)	Mar-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: Name **Michael Weber** Function **Laboratory Technician**

Signature

Approved by: Name **Sven Kühn** Function **Technical Manager**

Issued: August 22, 2023

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



Accredited by the Swiss Accreditation Service (SAS)

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Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "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 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	$dx, dy = 4 \text{ mm}, dz = 1.4 \text{ mm}$	Graded Ratio = 1.4 (Z direction)
Frequency	$3700 \text{ MHz} \pm 1 \text{ MHz}$	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.7	3.12 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	36.5 \pm 6 %	3.08 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	67.7 W/kg \pm 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.5 W/kg \pm 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.0 Ω - 0.7 $j\Omega$
Return Loss	- 29.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.139 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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