Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.6 ± 6 %	5.34 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.26 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**72.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.6 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	5.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.1 ± 6 %	5.75 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.78 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.7 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.9 ± 6 %	5.89 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.77 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.7 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.6 ± 6 %	6.17 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.36 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.5 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	46.7 Ω - 9.0 jΩ
Return Loss	- 20.1 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	49.0 Ω - 5.1 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	48.8 Ω - 3.6 jΩ
Return Loss	- 28.4 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	50.7 Ω - 5.0 jΩ
Return Loss	- 26.1 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	52.5 Ω - 6.2 jΩ
Return Loss	- 23.8 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	47.9 Ω - 9.4 jΩ
Return Loss	- 20.2 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	49.4 Ω - 5.4 jΩ
Return Loss	- 25.3 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	48.9 Ω - 2.3 jΩ
Return Loss	- 31.7 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	52.1 Ω - 3.3 jΩ
Return Loss	- 28.5 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	54.0 Ω - 4.7 jΩ
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.189 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

DASY5 Validation Report for Head TSL

Date: 20.06.2022

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1291

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.47 S/m; ε_r = 35; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5300 MHz; σ = 4.57 S/m; ε_r = 34.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 4.77 S/m; ε_r = 34.5; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.87 S/m; ε_r = 34.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 5.07 S/m; ε_r = 34.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.8, 5.8, 5.8) @ 5200 MHz, ConvF(5.49, 5.49, 5.49) @ 5300 MHz, ConvF(5.25, 5.25, 5.25) @ 5500 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 MHz; Calibrated: 08.03.2022
- 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)

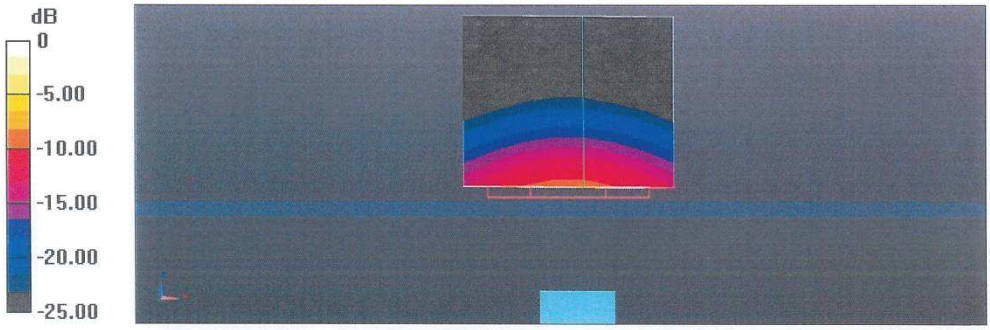
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.31 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 7.69 W/kg; SAR(10 g) = 2.22 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 69.2%
Maximum value of SAR (measured) = 17.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.86 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 8.19 W/kg; SAR(10 g) = 2.34 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 69%
Maximum value of SAR (measured) = 18.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.09 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 8.38 W/kg; SAR(10 g) = 2.38 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.4%
Maximum value of SAR (measured) = 19.7 W/kg

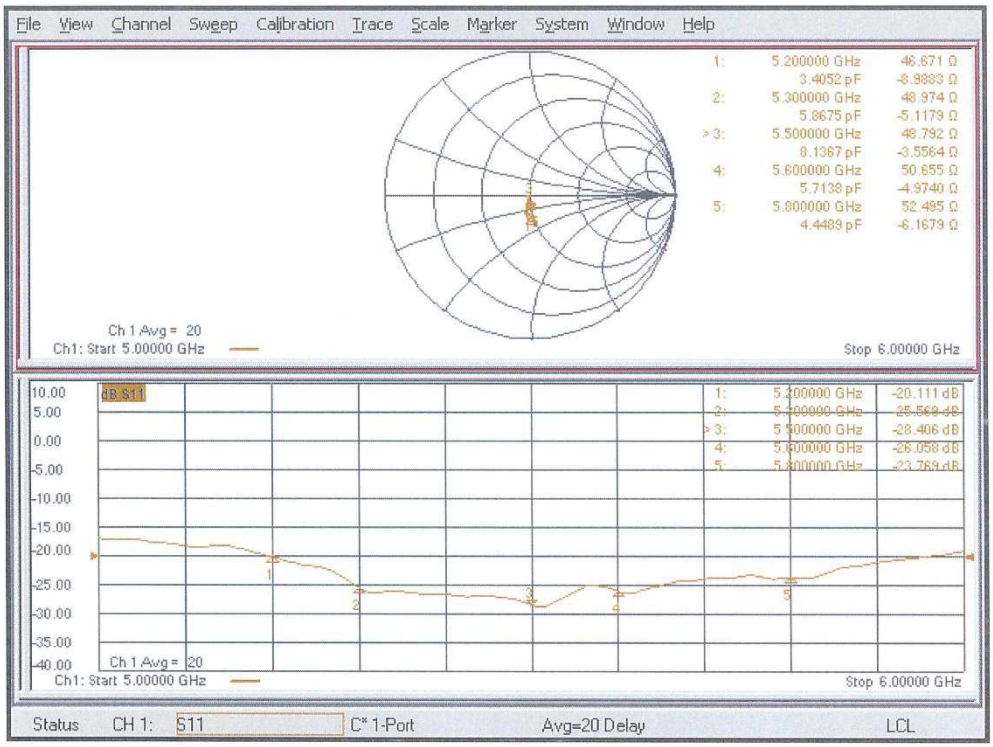
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.38 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.36 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 67.7%
Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.18 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.29 W/kg
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 65.1%
Maximum value of SAR (measured) = 19.1 W/kg



0 dB = 19.7 W/kg = 12.94 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 24.06.2022

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1291

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.34 S/m; ε_r = 48.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5300 MHz; σ = 5.47 S/m; ε_r = 48.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 5.75 S/m; ε_r = 48.1; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.89 S/m; ε_r = 47.9; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 6.17 S/m; ε_r = 47.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.29, 5.29, 5.29) @ 5200 MHz, ConvF(5.23, 5.23, 5.23) @ 5300 MHz, ConvF(4.84, 4.84, 4.84) @ 5500 MHz, ConvF(4.79, 4.79, 4.79) @ 5600 MHz, ConvF(4.62, 4.62, 4.62) @ 5800 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

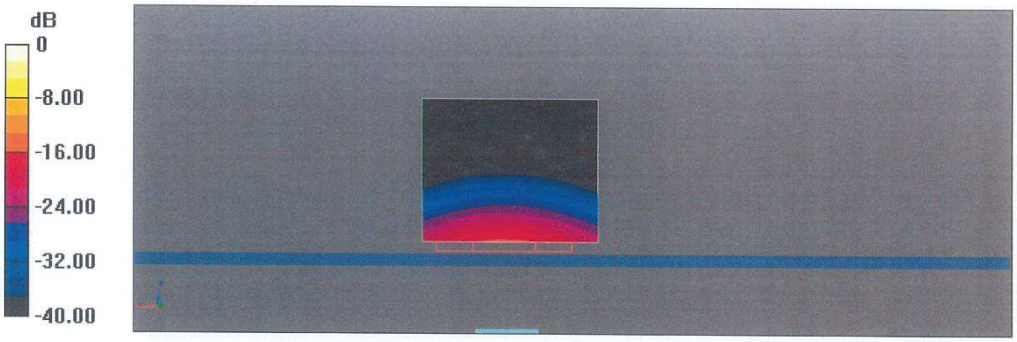
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.40 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 26.0 W/kg
SAR(1 g) = 7.26 W/kg; SAR(10 g) = 2.06 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 68.4%
Maximum value of SAR (measured) = 16.6 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.64 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 7.37 W/kg; SAR(10 g) = 2.09 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 67%
Maximum value of SAR (measured) = 17.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.59 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 7.78 W/kg; SAR(10 g) = 2.17 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.3%
Maximum value of SAR (measured) = 18.4 W/kg

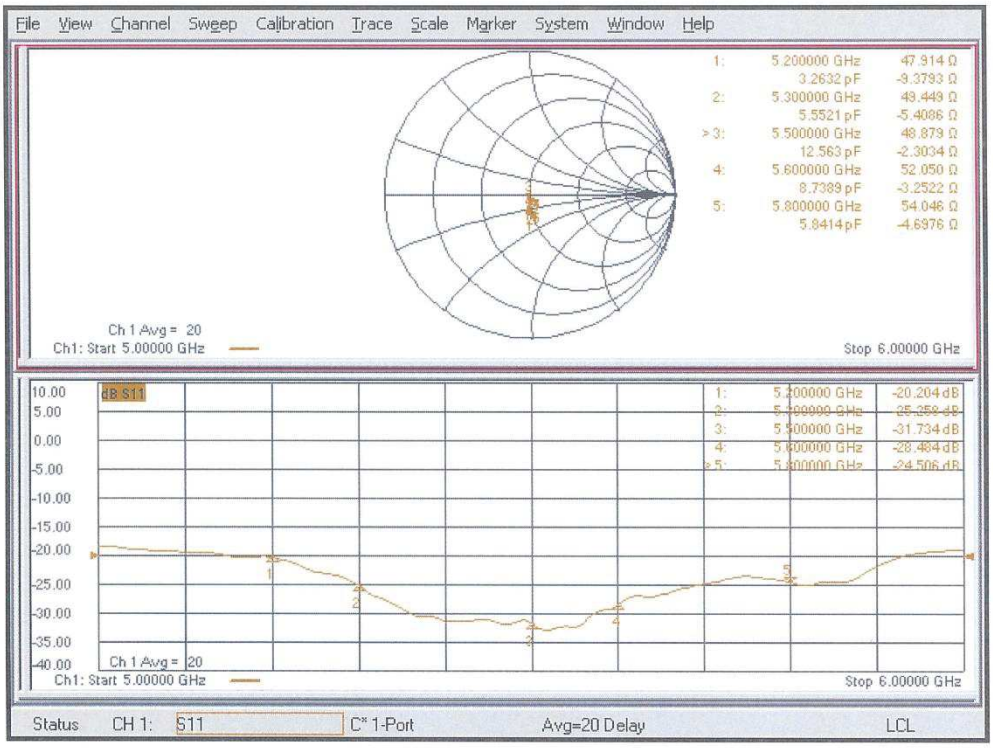
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.84 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 31.8 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.17 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 64.4%
Maximum value of SAR (measured) = 18.6 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.45 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 30.7 W/kg
SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.06 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 63.6%
Maximum value of SAR (measured) = 17.9 W/kg



0 dB = 18.6 W/kg = 12.71 dBW/kg

Impedance Measurement Plot for Body TSL



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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 0108

Client TüV SÜD UK

Certificate No: D6.5GHzV2-1071_Mar22

CALIBRATION CERTIFICATE

Object	D6.5GHzV2 - SN:1071
Calibration procedure(s)	QA CAL-22.v6 Calibration Procedure for SAR Validation Sources between 3-10 GHz
Calibration date:	March 11, 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	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Power sensor R&S NRP33T	SN: 100967	08-Apr-21 (No. 217-03293)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 7405	31-Dec-21 (No. EX3-7405_Dec21)	Dec-22
DAE4	SN: 908	24-Jun-21 (No. DAE4-908_Jun21)	Jun-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator Anapico APSIN20G	SN: 827	18-Dec-18 (in house check Dec-21)	In house check: Dec-23
Network Analyzer Keysight E5063A	SN:MY54504221	31-Oct-19 (in house check Oct-19)	In house check: Oct-22

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

Issued: March 14, 2022

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

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

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.

Additional Documentation:

b) 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.
- *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 absorbed power density (APD):* The absorbed power density is evaluated according to Samaras T, Christ A, Kuster N, "*Compliance assessment of the epithelial or absorbed power density above 6 GHz using SAR measurement systems*", Bioelectromagnetics, 2021 (submitted). The additional evaluation uncertainty of 0.55 dB (rectangular distribution) is considered.

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	DASY6	V16.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	5 mm	with Spacer
Zoom Scan Resolution	dx, dy = 3.4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	6500 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	34.5	6.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.8 ± 6 %	6.10 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	100 mW input power	27.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**277 W/kg ± 24.7 % (k=2)**

SAR averaged over 8 cm³ (8 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**62.3 W/kg ± 24.4 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	5.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.0 W/kg ± 24.4 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.9 Ω + 0.0 jΩ
Return Loss	- 39.2 dB

APD (Absorbed Power Density)

APD averaged over 1 cm²	Condition	
APD measured	100 mW input power	276 W/m²
APD measured	normalized to 1W	**2760 W/m² ± 29.2 % (k=2)**

APD averaged over 4 cm²	condition	
APD measured	100 mW input power	125 W/m²
APD measured	normalized to 1W	**1250 W/m² ± 28.9 % (k=2)**

*The reported APD values have been derived using psSAR8g.

General Antenna Parameters and Design

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

DASY6 Validation Report for Head TSL

Measurement Report for D6.5GHz-1071, UID 0 -, Channel 6500 (6500.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
D6.5GHz	16.0 x 6.0 x 300.0	SN: 1071	-

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz]	Conversion Factor	TSL Cond. [S/m]	TSL Permittivity
Flat, HSL	5.00	Band	CW,	6500	5.75	6.10	33.8

Hardware Setup

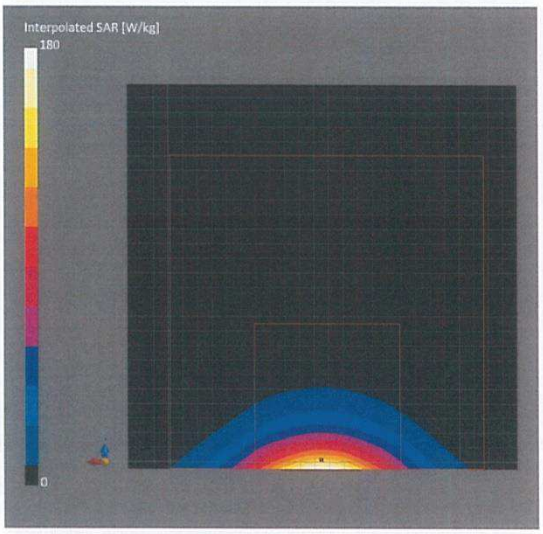
Phantom	TSL	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center - 1182	HBBL600-10000V6	EX3DV4 - SN7405, 2021-12-31	DAE4 Sn908, 2021-06-24

Scan Setup

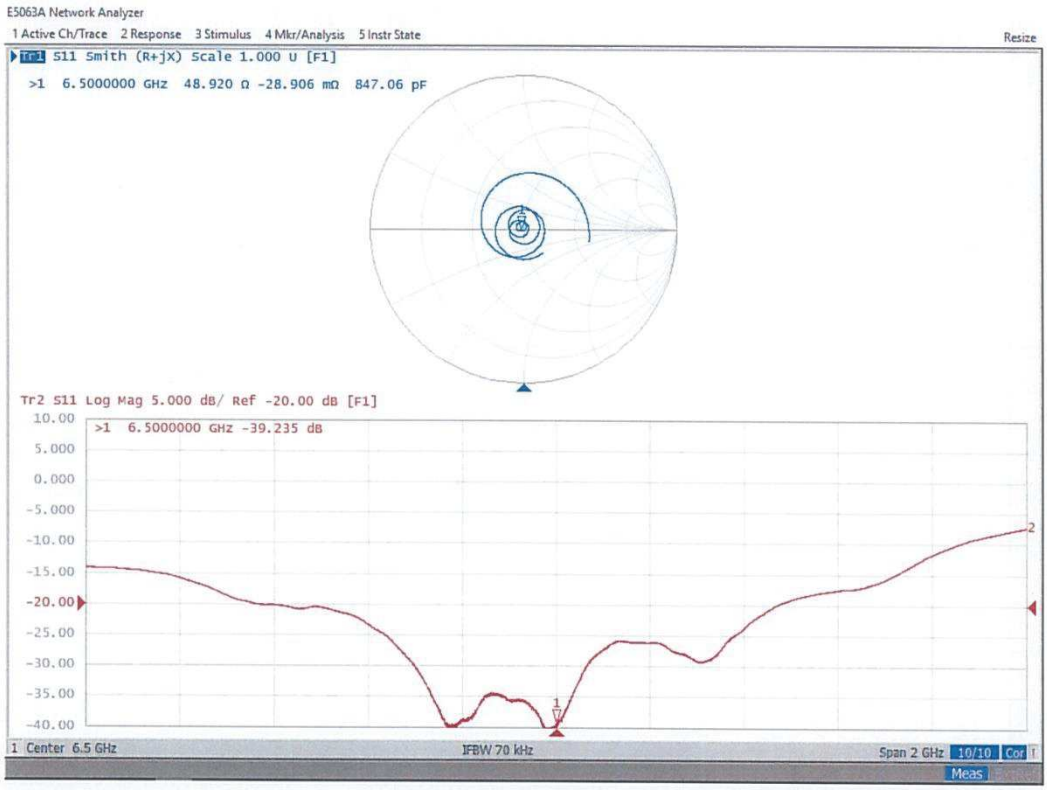
	Zoom Scan
Grid Extents [mm]	22.0 x 22.0 x 22.0
Grid Steps [mm]	3.4 x 3.4 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2022-03-11, 14:15
psSAR1g [W/Kg]	27.8
psSAR8g [W/Kg]	6.26
psSAR10g [W/Kg]	5.13
Power Drift [dB]	0.02
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	No correction
M2/M1 [%]	54.1
Dist 3dB Peak [mm]	4.8



Impedance Measurement Plot for Head TSL



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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 0108

Client **Apple UK**

Certificate No: 5G-Veri10-1037_Nov21

CALIBRATION CERTIFICATE

Object	5G Verification Source 10 GHz - SN: 1037
Calibration procedure(s)	QA CAL-45.v3 Calibration procedure for sources in air above 6 GHz
Calibration date:	November 29, 2021

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
Reference Probe EUmmWV3	SN: 9374	2020-12-30(No. EUmmWV3-9374_Dec20)	Dec-21
DAE4ip	SN: 1602	2021-06-25 (No. DAE4ip-1602_Jun21)	Jun-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: November 29, 2021

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

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

Accreditation No.: SCS 0108

Glossary

CW Continuous wave

Calibration is Performed According to the Following Standards

- Internal procedure QA CAL-45-5Gsources
- IEC TR 63170 ED1, "Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz", January 2018

Methods Applied and Interpretation of Parameters

- *Coordinate System:* z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- *Measurement Conditions: (1) 10 GHz:* The radiated power is the forward power to the horn antenna minus ohmic and mismatch loss. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. *(2) 30, 45, 60 and 90 GHz*: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- *Horn Positioning:* The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUmmW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- *E- field distribution:* E field is measured in two x-y-plane (10mm, 10mm + $\lambda/4$) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm^2 and 4cm^2) power density values at 10mm in front of the horn.
- *Field polarization:* Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

Calibrated Quantity

- Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m^2) averaged over the surface area of 1 cm^2 and 4cm^2 at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

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	cDASY6 Module mmWave	V2.4
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 7.5 mm	
Number of measured planes	2 (10mm, 10mm + λ/4)	
Frequency	10 GHz ± 10 MHz	

Calibration Parameters, 10 GHz

Circular Averaging

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Avg Power Density Avg ($psPDn+$, $psPDtot+$, $psPDmod+$) (W/m^2)		Uncertainty (k = 2)
				1 cm^2	4 cm^2	
10 mm	86.1	**146**	1.27 dB	**53.2**	**49.8**	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Avg Power Density Avg ($psPDn+$, $psPDtot+$, $psPDmod+$) (W/m^2)		Uncertainty (k = 2)
				1 cm^2	4 cm^2	
10 mm	86.1	**146**	1.27 dB	**53.2**	**49.7**	1.28 dB

[1] Assessed ohmic and mismatch loss plus numerical offset: 0.55 dB

DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1037	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

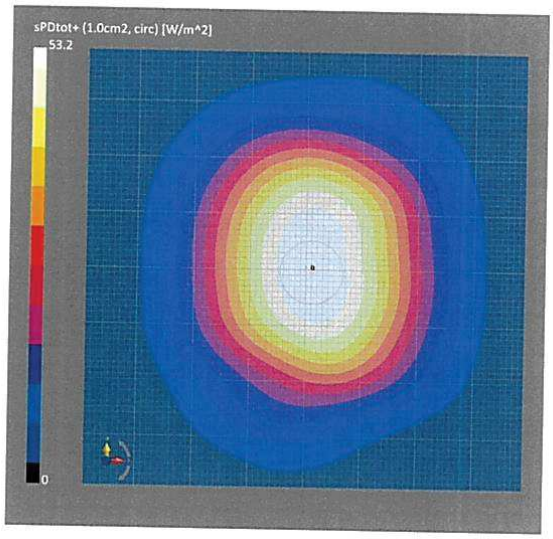
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2021-11-29, 10:22
Avg. Area [cm²]	1.00
psPDn+ [W/m²]	53.0
psPDtot+ [W/m²]	53.2
psPDmod+ [W/m²]	53.4
E_{max} [V/m]	146
Power Drift [dB]	-0.05



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1037	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

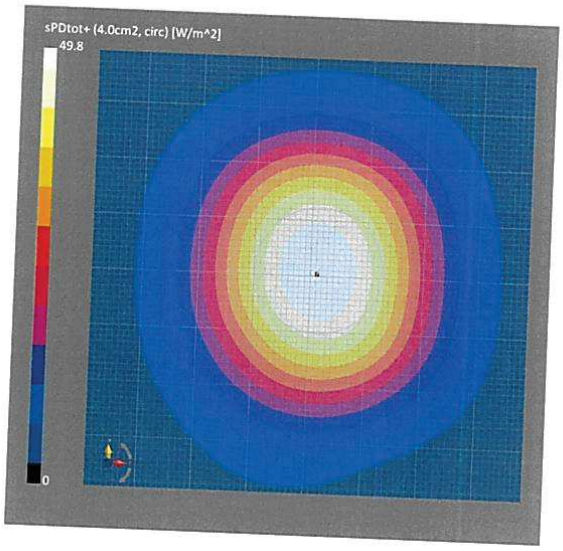
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

Date	5G Scan
	2021-11-29, 10:22
Avg. Area [cm²]	4.00
psPDn+ [W/m²]	49.6
psPDtot+ [W/m²]	49.8
psPDmod+ [W/m²]	49.9
E_{max} [V/m]	146
Power Drift [dB]	-0.05



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1037	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

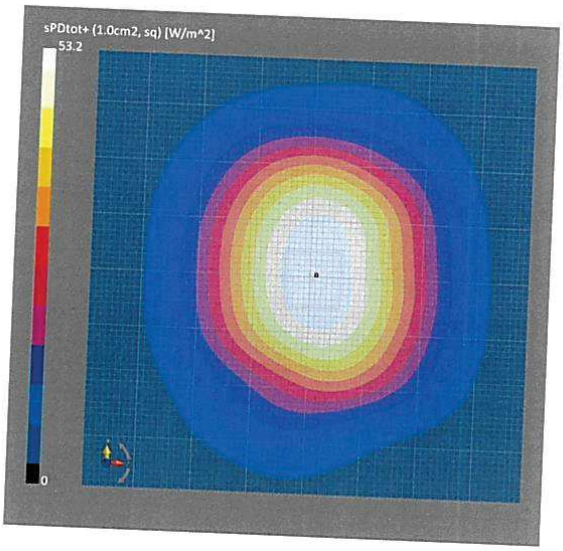
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2021-11-29, 10:22
Avg. Area [cm²]	1.00
psPDn+ [W/m²]	53.1
psPDtot+ [W/m²]	53.2
psPDmod+ [W/m²]	53.4
E_{max} [V/m]	146
Power Drift [dB]	-0.05



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1037	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

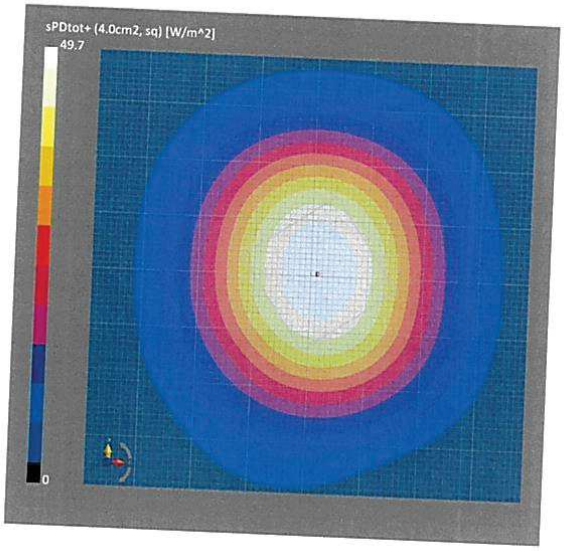
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2021-11-29, 10:22
Avg. Area [cm²]	4.00
psPDn+ [W/m²]	49.5
psPDtot+ [W/m²]	49.7
psPDmod+ [W/m²]	49.8
E_{max} [V/m]	146
Power Drift [dB]	-0.05



ANNEX C

SAR PLOTS

Bluetooth 2450 MHz

Measurement Report for A2779, BACK, ISM 2.4 GHz Band, IEEE 802.15.1 Bluetooth (GFSK, DH5), Channel 39 (2441.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	ISM 2.4 GHz Band	Bluetooth, 10032-CAA	2441.0, 39	7.94	1.71	41.5

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - sn:2057	HBBL-600-6000 Batch 2 DAK 3.5 Head 19 deg.C 2022-Sep-27 - B2.prn, 2022-Sep-28	EX3DV4 - SN7536, 2022-06-17	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-29, 22:55	2022-09-29, 23:03
psSAR1g [W/Kg]	0.289	0.303
psSAR10g [W/Kg]	0.138	0.143
Power Drift [dB]	0.13	0.13
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		70.9
Dist 3dB Peak [mm]		8.9

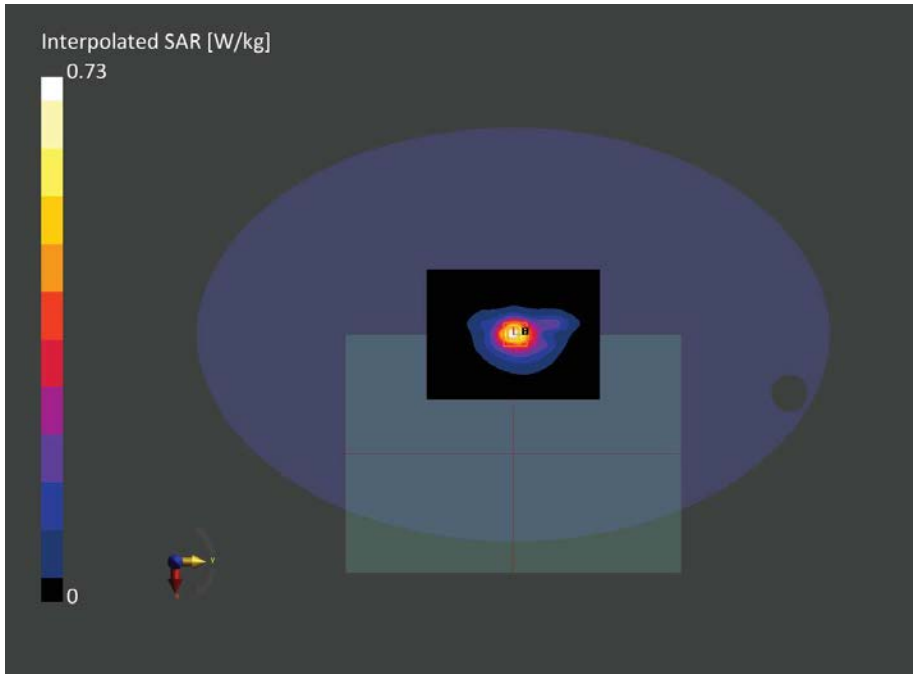


Figure C.1: SAR Body Testing Results for the A2779 at 2441 MHz

Measurement Report for A2779, BACK, ISM 2.4 GHz Band, IEEE 802.15.1 Bluetooth (GFSK, DH5), Channel 78 (2480.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	ISM 2.4 GHz Band	Bluetooth, 10032-CAA	2480.0, 78	7.94	1.74	41.4

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - sn:2057	HBBL-600-6000 Batch 2 DAK 3.5 Head 19 deg.C 2022-Sep-27 - B2.prn, 2022-Sep-28	EX3DV4 - SN7536, 2022-06-17	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-30, 06:03	2022-09-30, 06:12
psSAR1g [W/Kg]	0.238	0.241
psSAR10g [W/Kg]	0.112	0.114
Power Drift [dB]	0.07	-0.07
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		71.9
Dist 3dB Peak [mm]		8.5

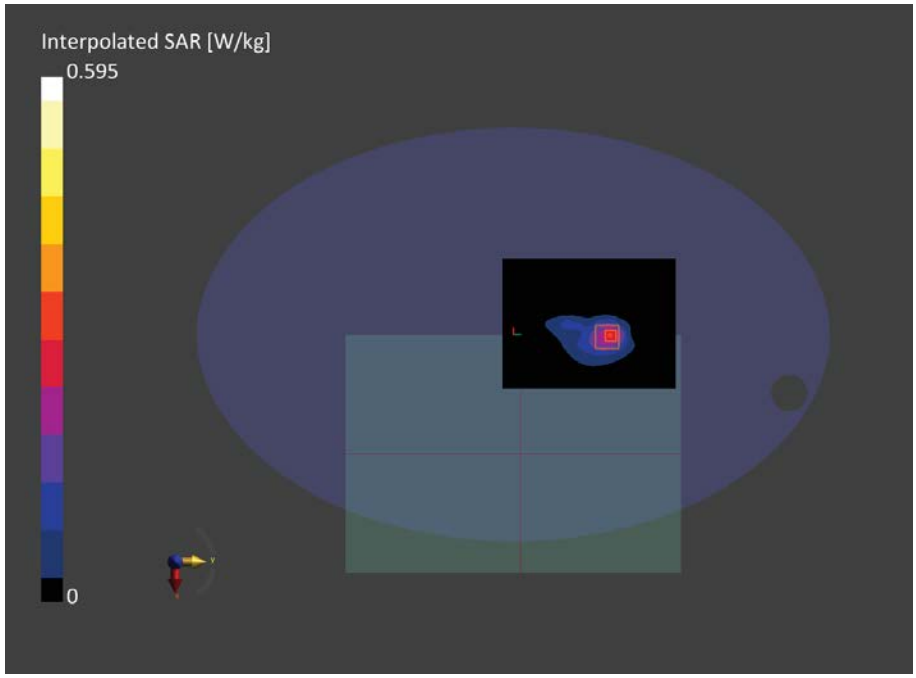


Figure C.2: SAR Body Testing Results for the A2779 at 2480 MHz

TUV SUD

Measurement Report for A2779, BACK, ISM 2.4 GHz Band, IEEE 802.15.1 Bluetooth (GFSK, DH5), Channel 39 (2441.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	ISM 2.4 GHz Band	Bluetooth, 10032-CAA	2441.0, 39	7.94	1.71	41.5

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - sn:2057	HBBL-600-6000 Batch 2 DAK 3.5 Head 19 deg.C 2022-Sep-27 - B2.prn, 2022-Sep-28	EX3DV4 - SN7536, 2022-06-17	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 160.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-30, 07:58	2022-09-30, 08:08
psSAR1g [W/Kg]	0.109	0.107
psSAR10g [W/Kg]	0.053	0.052
Power Drift [dB]	-0.05	-0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		72.3
Dist 3dB Peak [mm]		9.2

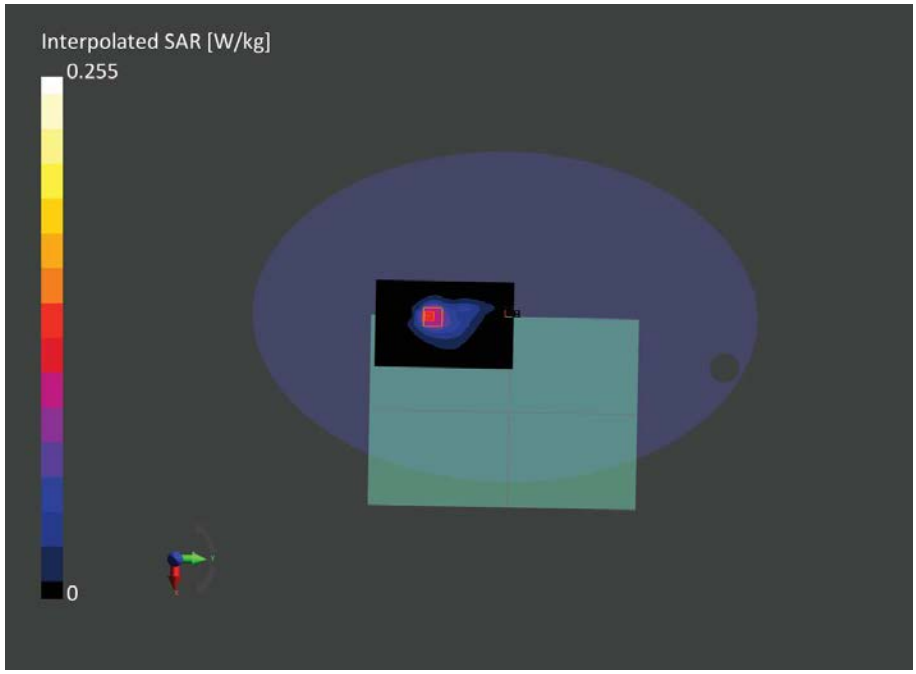


Figure C.3: SAR Body Testing Results for the A2779 at 2441 MHz

TUV SUD

Measurement Report for A2779, BACK, Custom Band, CW, Channel 5250000 (5250.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	Custom Band	CW, 0--	5250.0, 5250000	4.49	4.59	36.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19 deg.C 2022-Sep-27 - B3 6GHz, 2022-Oct-01	EX3DV4 - SN3759, 2020-12-17	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-03, 22:49	2022-10-03, 22:59
psSAR1g [W/Kg]	0.504	0.593
psSAR10g [W/Kg]	0.192	0.195
Power Drift [dB]	-0.04	0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		63.6
Dist 3dB Peak [mm]		7.2

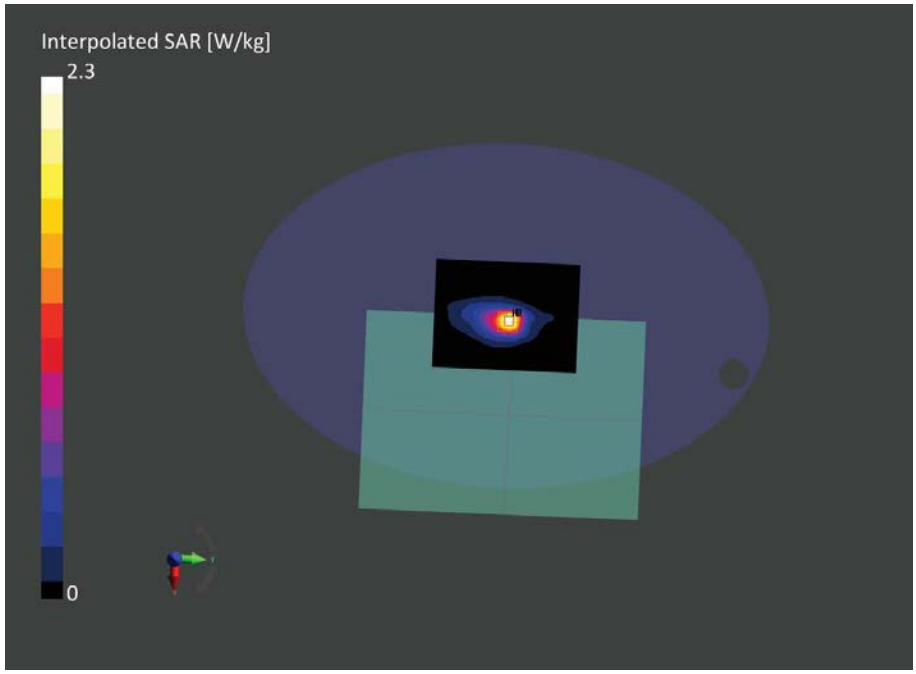


Figure C.4: SAR Body Testing Results for the A2779 at 5250 MHz

Measurement Report for A2779, BACK, Custom Band, CW, Channel 5200000 (5200.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	Custom Band	CW, 0--	5200.0, 5200000	4.57	4.43	36.6

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19.4 deg.C 2022-Oct-03 - B3 5GHz, 2022-Oct-04	EX3DV4 - SN3759, 2020-12-17	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-04, 02:57	2022-10-04, 03:06
psSAR1g [W/Kg]	0.396	0.392
psSAR10g [W/Kg]	0.140	0.128
Power Drift [dB]	0.02	-0.03
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		64.8
Dist 3dB Peak [mm]		8.0

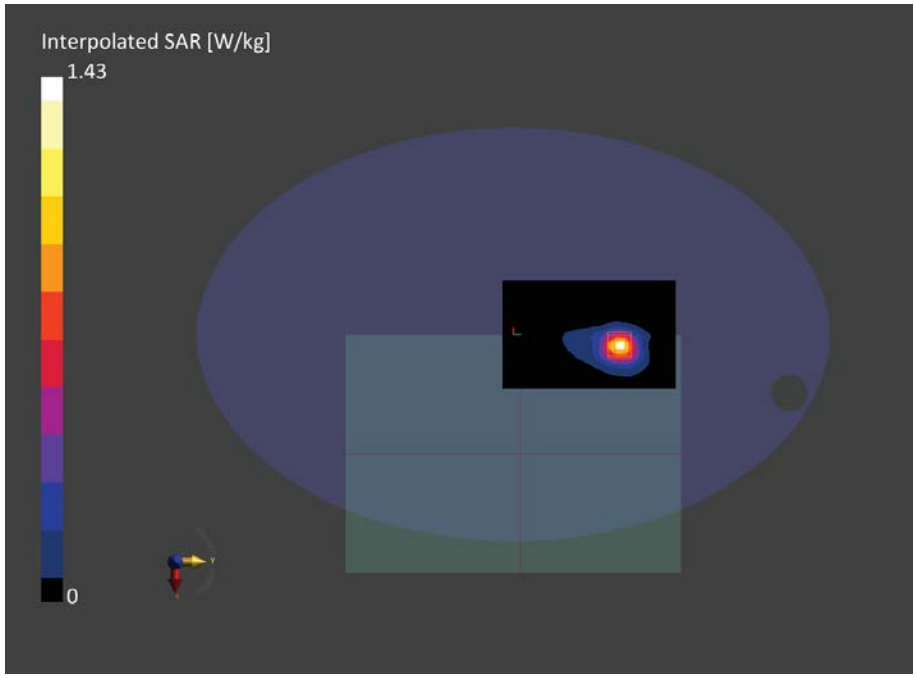


Figure C.5: SAR Body Testing Results for the A2779 at 5200 MHz

TUV SUD

Measurement Report for A2779, BACK, Custom Band, CW, Channel 5850000 (5850.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	Custom Band	CW, 0--	5850.0, 5850000	3.88	5.16	35.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19.4 deg.C 2022-Oct-03 - B3 5GHz, 2022-Oct-04	EX3DV4 - SN3759, 2020-12-17	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-04, 01:18	2022-10-04, 01:28
psSAR1g [W/Kg]	0.822	0.943
psSAR10g [W/Kg]	0.301	0.298
Power Drift [dB]	-0.04	-0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		60.2
Dist 3dB Peak [mm]		7.2

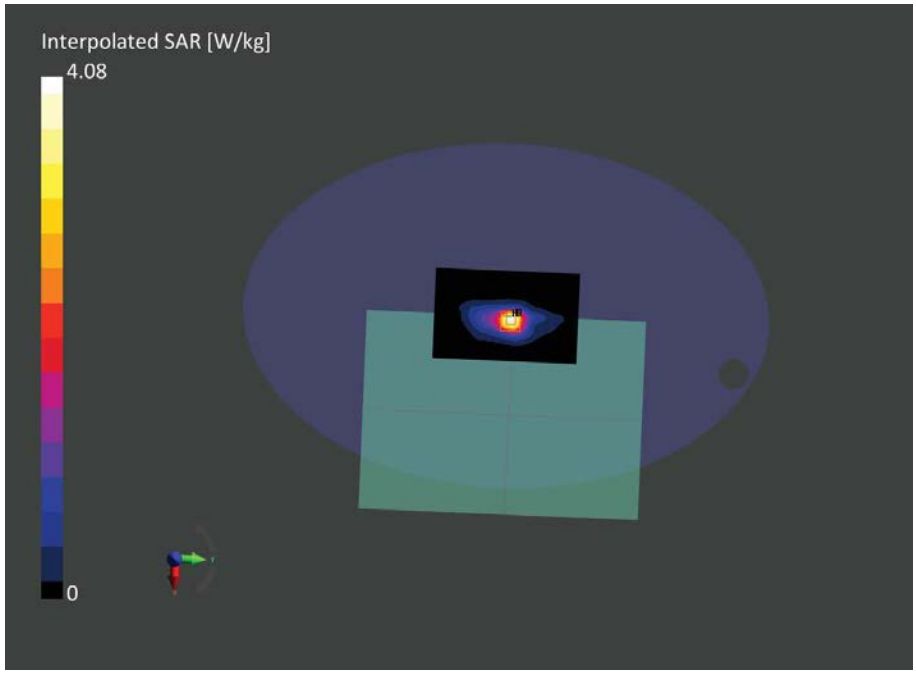


Figure C.6: SAR Body Testing Results for the A2779 at 5850 MHz

TUV SUD

Measurement Report for A2779, BACK, Custom Band, CW, Channel 5725000 (5725.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	Custom Band	CW, 0--	5725.0, 5725000	3.88	5.02	35.5

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19.4 deg.C 2022-Oct-03 - B3 5GHz, 2022-Oct-04	EX3DV4 - SN3759, 2020-12-17	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-04, 03:40	2022-10-04, 03:48
psSAR1g [W/Kg]	1.09	1.10
psSAR10g [W/Kg]	0.388	0.389
Power Drift [dB]	0.02	-0.00
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		61.8
Dist 3dB Peak [mm]		8.0

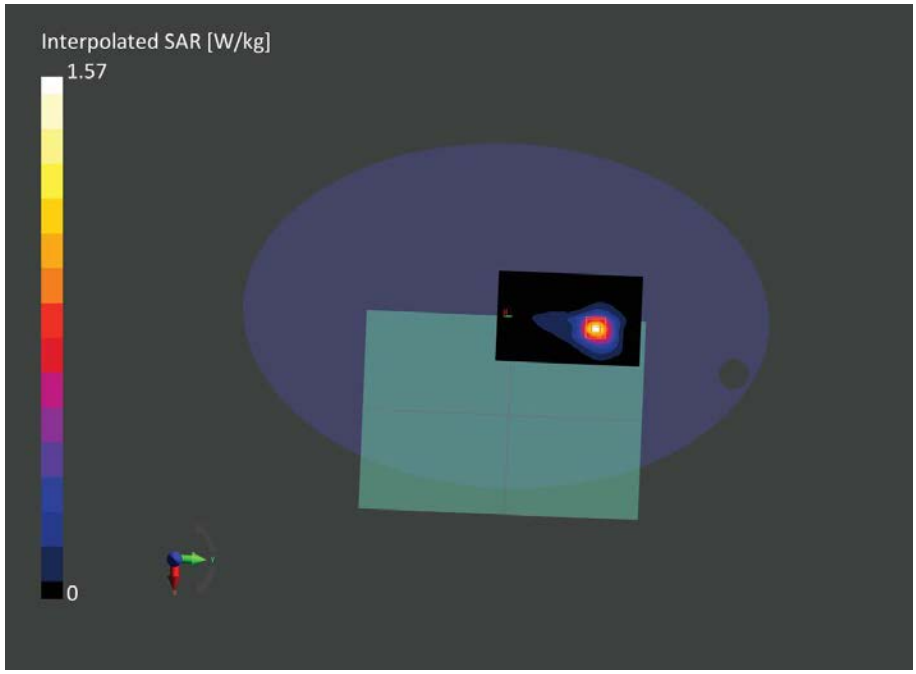


Figure C.7: SAR Body Testing Results for the A2779 at 5725 MHz

Measurement Report for A2779, BACK, Custom Band, CW, Channel 5850000 (5850.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	Custom Band	CW, 0--	5850.0, 5850000	3.88	5.16	35.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19.4 deg.C 2022-Oct-03 - B3 5GHz, 2022-Oct-04	EX3DV4 - SN3759, 2020-12-17	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-04, 02:29	2022-10-04, 02:39
psSAR1g [W/Kg]	0.573	0.659
psSAR10g [W/Kg]	0.210	0.216
Power Drift [dB]	-0.02	-0.00
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		60.4
Dist 3dB Peak [mm]		7.2

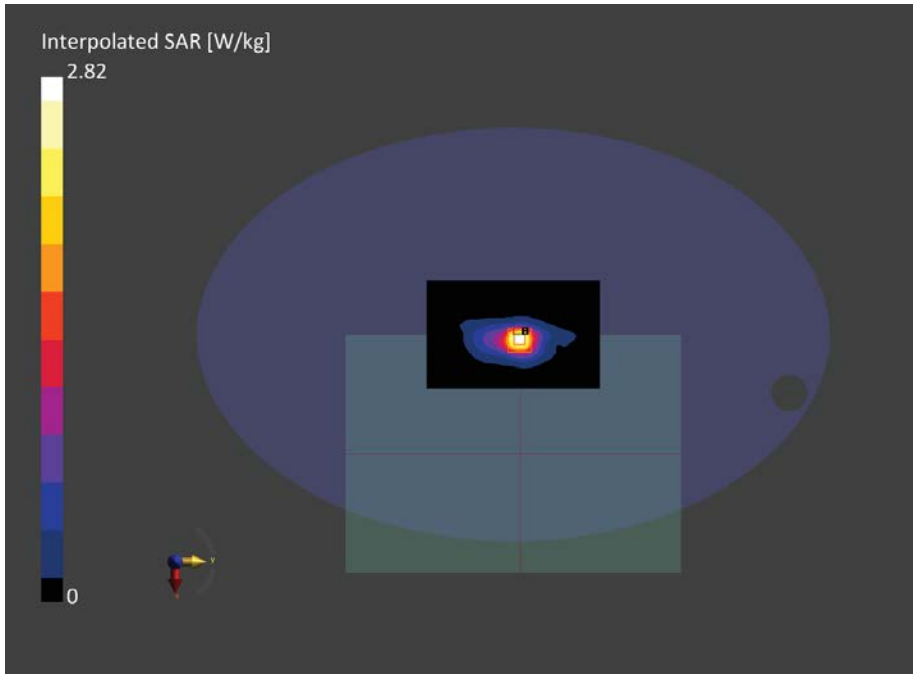


Figure C.8: SAR Body Testing Results for the A2779 at 5850 MHz

TUV SUD

Measurement Report for A2779, BACK, Custom Band, CW, Channel 5725000 (5725.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	Custom Band	CW, 0--	5725.0, 5725000	3.88	5.02	35.5

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19.4 deg.C 2022-Oct-03 - B3 5GHz, 2022-Oct-04	EX3DV4 - SN3759, 2020-12-17	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-04, 07:12	2022-10-04, 07:20
psSAR1g [W/Kg]	0.591	0.662
psSAR10g [W/Kg]	0.221	0.234
Power Drift [dB]	0.05	-0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		62.8
Dist 3dB Peak [mm]		8.0

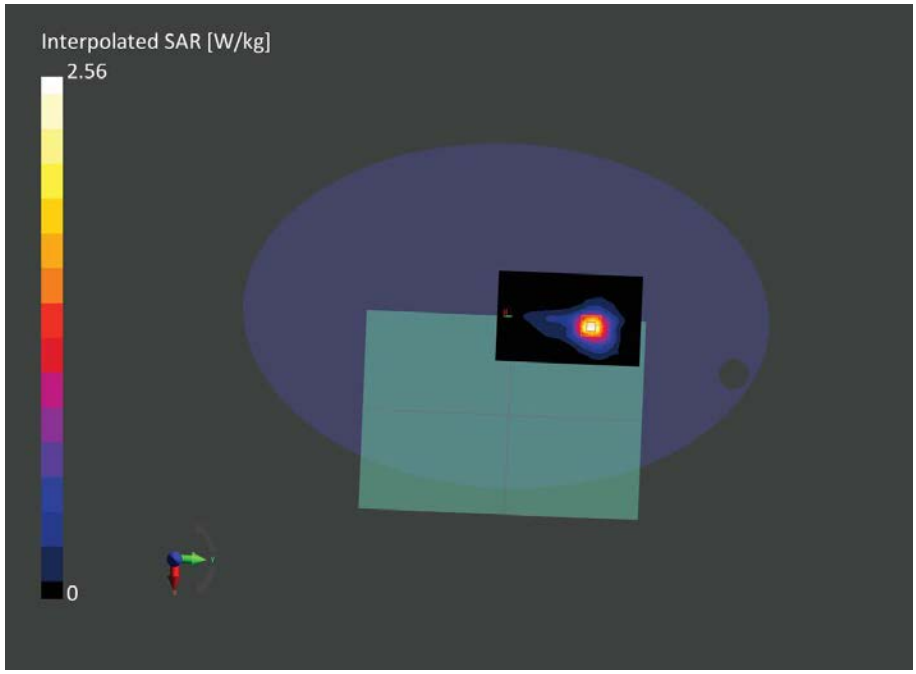


Figure C.9: SAR Body Testing Results for the A2779 at 5725 MHz

WLAN 2450 MHz
TUV SUD

Measurement Report for A2779, BACK, WLAN 2.4GHz, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle), Channel 12 (2467.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 2.4GHz	WLAN, 10415-AAA	2467.0, 12	7.46	1.73	40.8

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 22.3 deg.C 2022-Sep-05 - B1, 2022-Sep-05	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	180.0 x 200.0	28.0 x 28.0 x 28.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-05, 20:50	2022-09-05, 20:59
psSAR1g [W/Kg]	0.599	0.610
psSAR10g [W/Kg]	0.272	0.271
Power Drift [dB]	-0.01	-0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		75.0
Dist 3dB Peak [mm]		8.0

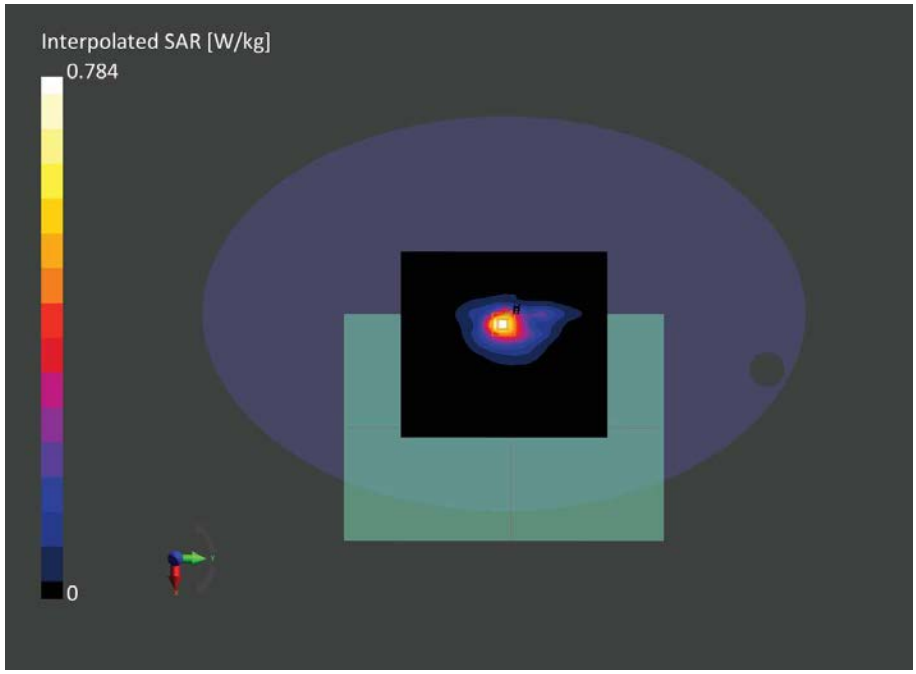


Figure C.10: SAR Body Testing Results for the A2779 at 2467 MHz

WLAN 2450 MHz
TUV SUD

Measurement Report for A2779, BACK, WLAN 2.4GHz, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle), Channel 12 (2467.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 2.4GHz	WLAN, 10415-AAA	2467.0, 12	7.46	1.73	40.8

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 22.3 deg.C 2022-Sep-05 - B1, 2022-Sep-05	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	180.0 x 200.0	28.0 x 28.0 x 28.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-06, 00:00	2022-09-06, 00:10
psSAR1g [W/Kg]	0.476	0.482
psSAR10g [W/Kg]	0.234	0.230
Power Drift [dB]	-0.05	-0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		75.6
Dist 3dB Peak [mm]		8.9

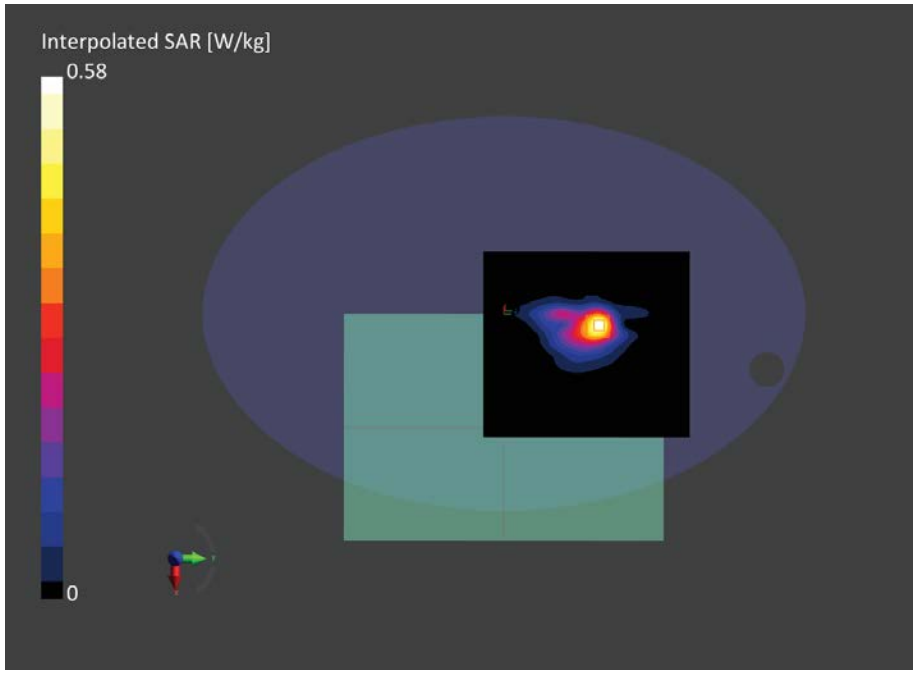


Figure C.11: SAR Body Testing Results for the A2779 at 2467 MHz

WLAN 2450 MHz
TUV SUD

Measurement Report for A2779, BACK, WLAN 2.4GHz, UID 10193 CAD, Channel 10 (2457.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section	Position	Test Distance [mm]	Band	Group	UID	Rev	Frequency [MHz]	Channel Number
Flat HSL	BACK	0.00	WLAN 2.4GHz	WLAN	10193	CAD	2457.000	10

Hardware Setup

Phantom	TSL	Probe	Calibration Date	DAE	Calibration Date
ELI V8.0 (20deg probe tilt)	HBBL-600-10000	EX3DV4 - SN7719	2022-03-11	DAE4 Sn1712	2022-03-09

Scan Setup

Scan Name	Grid Extents [mm]	Grid Steps [mm]	Sensor Surface [mm]	TSL Correction	Meas. Method	Probe Positioning	MAIA
Fast Area Scan	140.0 x 320.0 x 0.0	10.0 x 10.0 x 1.0	4.0	+ only	Measured	N/A	N/A
Area Scan	140.0 x 320.0 x 0.0	10.0 x 10.0 x 1.0	3.0	+ only	Measured	VMS + 6p	N/A
Zoom Scan	28.0 x 28.0 x 28.0	5.0 x 5.0 x 1.5	1.4	+ only	Measured	VMS + 6p	N/A
Zoom Scan	28.0 x 28.0 x 28.0	5.0 x 5.0 x 1.5	1.4	+ only	Measured	VMS + 6p	N/A

SAR Measurement Results

Date	Scan Name	psSAR1g [W/kg]	psSAR10g [W/kg]	Tune-up [dB]	Drift [dB]	M2/M1 [%]	Dist 3dB [mm]
2022-09-06, 20:38	Fast Area Scan	0.576	0.272	0.00	N/A	N/A	N/A
2022-09-06, 20:48	Area Scan	0.597	0.276	0.00	-0.03	N/A	N/A
2022-09-06, 20:56	Zoom Scan	0.612	0.275	0.00	-0.05	74.8	8.6
2022-09-06, 21:05	Zoom Scan	0.488	0.229	0.00	-0.03	71.4	8.1

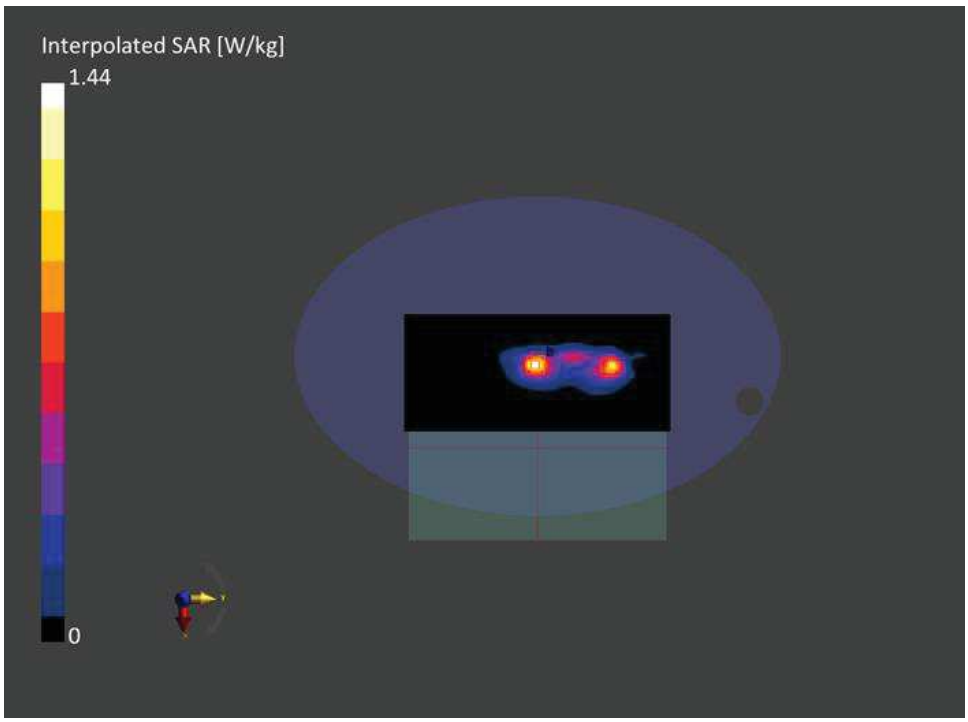


Figure C.12: SAR Body Testing Results for the A2779 at 2457 MHz

WLAN 5500 MHz
TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle), Channel 58 (5290.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 5GHz	WLAN, 10544-AAC	5290.0, 58	4.43	4.66	35.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 19.1 deg.C 2022-Oct-12 - B3 6GHz.prn, 2022-Oct-17	EX3DV4 - SN3759, 2021-12-13	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	100.0 x 100.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-18, 13:24	2022-10-18, 13:34
psSAR1g [W/Kg]	0.518	0.565
psSAR10g [W/Kg]	0.188	0.183
Power Drift [dB]	0.00	-0.09
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		63.6
Dist 3dB Peak [mm]		8.0

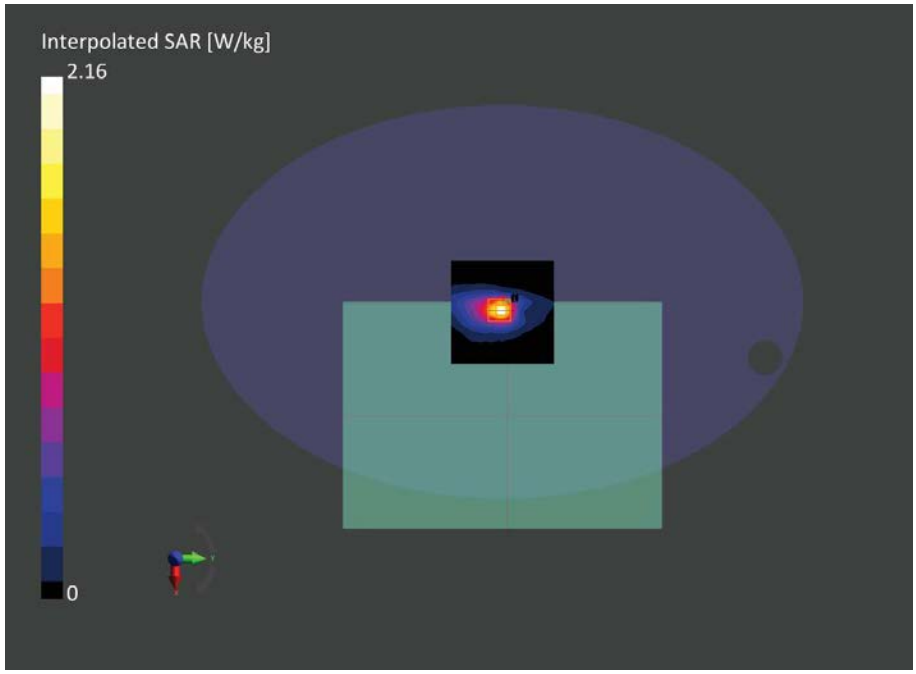


Figure C.13: SAR Body Testing Results for the A2779 at 5290 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle), Channel 42 (5210.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 5GHz	WLAN, 10544-AAC	5210.0, 42	5.32	4.48	37.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 21.5 deg.C 2022-Sep-07 5GHz - B1.prn, 2022-Sep-07	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-09, 07:13	2022-09-09, 07:21
psSAR1g [W/Kg]	0.604	0.617
psSAR10g [W/Kg]	0.218	0.218
Power Drift [dB]	-0.04	-0.06
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		67.2
Dist 3dB Peak [mm]		8.0

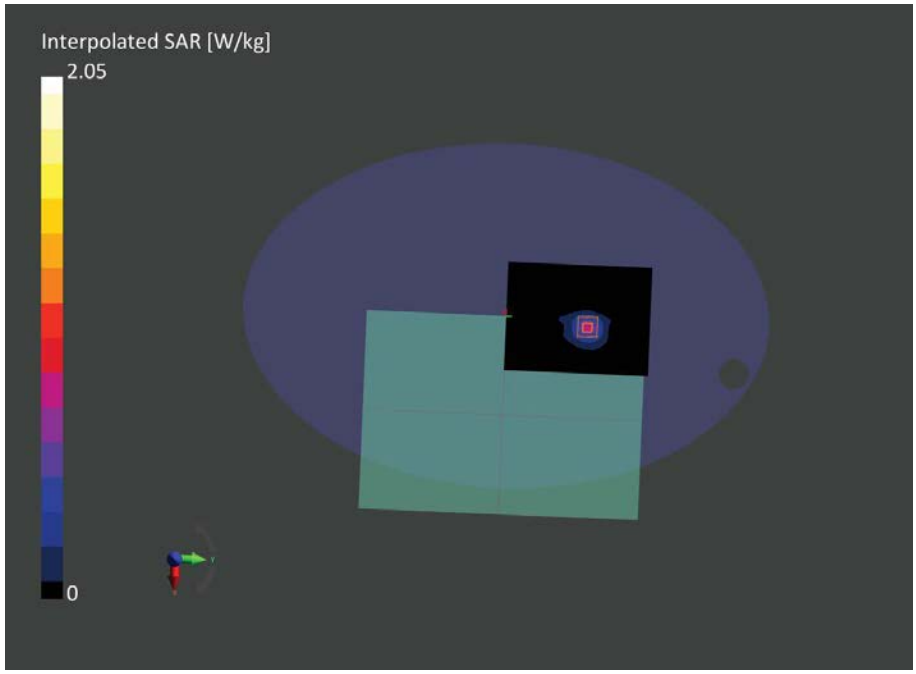


Figure C.14: SAR Body Testing Results for the A2779 at 5210 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, UID 10544 AAC, Channel 42 (5210.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section	Position	Test Distance [mm]	Band	Group	UID	Rev	Frequency [MHz]	Channel Number
Flat HSL	BACK	0.00	WLAN 5GHz	WLAN	10544	AAC	5210.000	42

Hardware Setup

Phantom	TSL	Probe	Calibration Date	DAE	Calibration Date
ELI V8.0 (20deg probe tilt)	HBBL-600-10000	EX3DV4 - SN7719	2022-03-11	DAE4 Sn1712	2022-03-09

Scan Setup

Scan Name	Grid Extents [mm]	Grid Steps [mm]	Sensor Surface [mm]	TSL Correction	Meas. Method	Probe Positioning	MAIA
Fast Area Scan	120.0 x 260.0 x 0.0	10.0 x 10.0 x 1.0	4.0	+ only	Measured	N/A	N/A
Area Scan	120.0 x 260.0 x 0.0	10.0 x 10.0 x 1.0	3.0	+ only	Measured	VMS + 6p	N/A
Zoom Scan	22.0 x 22.0 x 22.0	4.0 x 4.0 x 1.4	1.4	+ only	Measured	VMS + 6p	N/A
Zoom Scan	22.0 x 22.0 x 22.0	4.0 x 4.0 x 1.4	1.4	+ only	Measured	VMS + 6p	N/A

SAR Measurement Results

Date	Scan Name	psSAR1g [W/kg]	psSAR10g [W/kg]	Tune-up [dB]	Drift [dB]	M2/M1 [%]	Dist 3dB [mm]
2022-09-08, 14:15	Fast Area Scan	0.659	0.244	0.00	N/A	N/A	N/A
2022-09-08, 14:22	Area Scan	0.643	0.233	0.00	0.01	N/A	N/A
2022-09-08, 14:32	Zoom Scan	0.680	0.245	0.00	-0.01	67.2	8.1
2022-09-08, 14:41	Zoom Scan	0.672	0.234	0.00	-0.02	66.3	7.9

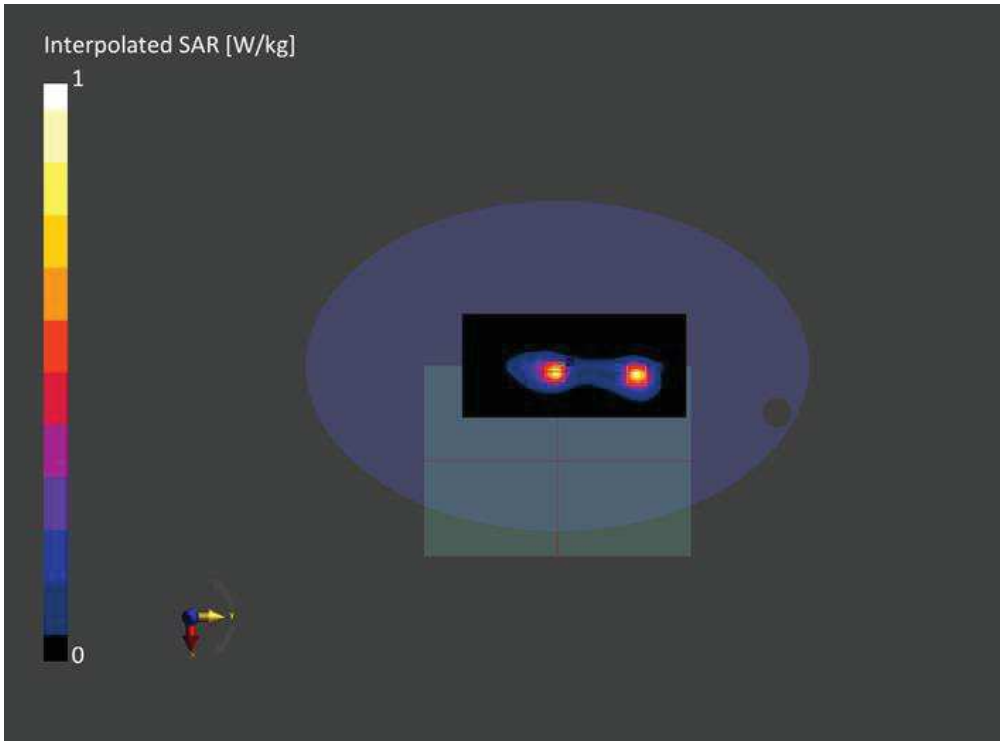


Figure C.15: SAR Body Testing Results for the A2779 at 5210 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle), Channel 138 (5690.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 5GHz	WLAN, 10544-AAC	5690.0, 138	4.66	4.81	36.1

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 22.2 deg.C 2022-Sep-12 5GHz - B1.prn, 2022-Sep-12	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-14, 13:49	2022-09-14, 13:59
psSAR1g [W/Kg]	0.402	0.443
psSAR10g [W/Kg]	0.146	0.145
Power Drift [dB]	-0.10	-0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		62.6
Dist 3dB Peak [mm]		7.2

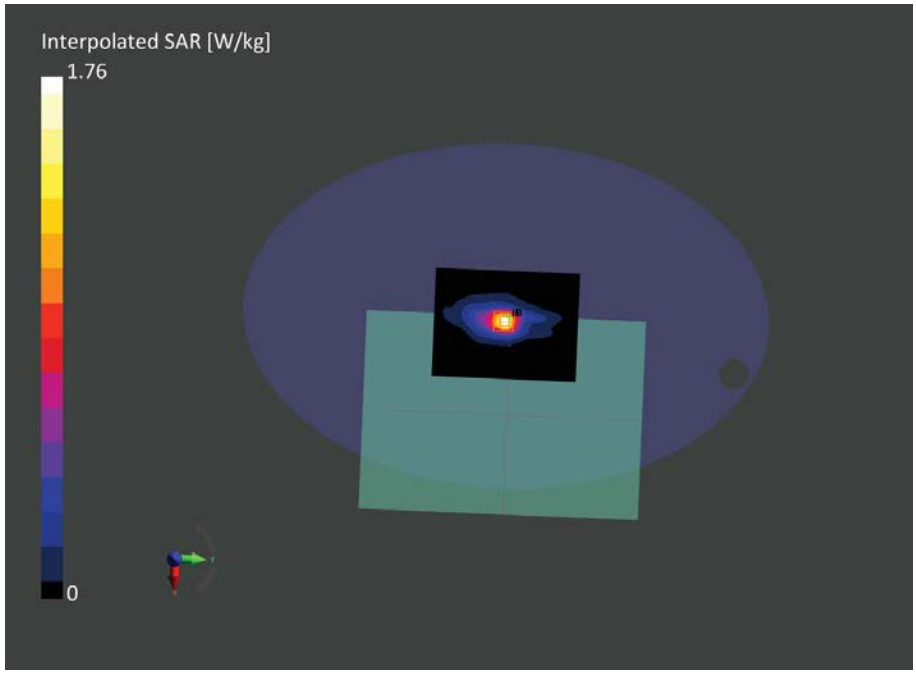


Figure C.16: SAR Body Testing Results for the A2779 at 5690 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle), Channel 138 (5690.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 5GHz	WLAN, 10544-AAC	5690.0, 138	4.66	4.81	36.1

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 22.2 deg.C 2022-Sep-12 5GHz - B1.prn, 2022-Sep-12	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-14, 16:08	2022-09-14, 16:16
psSAR1g [W/Kg]	0.551	0.591
psSAR10g [W/Kg]	0.201	0.214
Power Drift [dB]	-0.02	-0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		62.8
Dist 3dB Peak [mm]		8.0

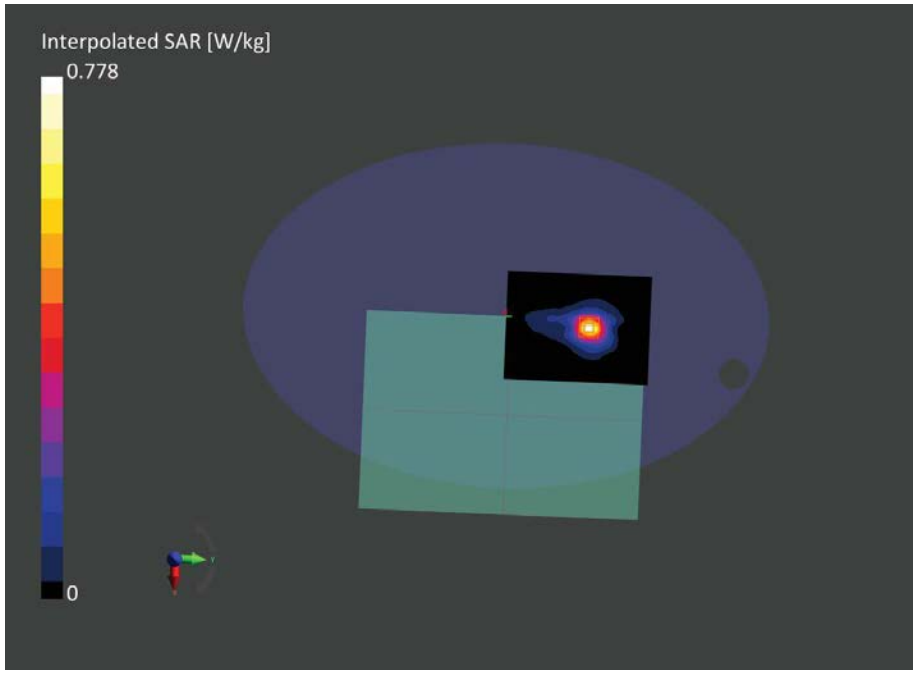


Figure C.17: SAR Body Testing Results for the A2779 at 5690 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, UID 10544 AAC, Channel 122 (5610.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section	Position	Test Distance [mm]	Band	Group	UID	Rev	Frequency [MHz]	Channel Number
Flat HSL	BACK	0.00	WLAN 5GHz	WLAN	10544	AAC	5610.000	122

Hardware Setup

Phantom	TSL	Probe	Calibration Date	DAE	Calibration Date
ELI V8.0 (20deg probe tilt)	HBBL-600-10000	EX3DV4 - SN3759	2021-12-13	DAE4 Sn475	2021-12-06

Scan Setup

Scan Name	Grid Extents [mm]	Grid Steps [mm]	Sensor Surface [mm]	TSL Correction	Meas. Method	Probe Positioning	MAIA
Fast Area Scan	100.0 x 180.0 x 0.0	10.0 x 10.0 x 1.0	4.0	+ only	Measured	N/A	N/A
Area Scan	100.0 x 180.0 x 0.0	10.0 x 10.0 x 1.0	3.0	+ only	Measured	VMS + 6p	N/A
Zoom Scan	22.0 x 22.0 x 22.0	4.0 x 4.0 x 1.4	1.4	+ only	Measured	VMS + 6p	N/A
Zoom Scan	22.0 x 22.0 x 22.0	4.0 x 4.0 x 1.4	1.4	+ only	Measured	VMS + 6p	N/A

SAR Measurement Results

Date	Scan Name	psSAR1g [W/kg]	psSAR10g [W/kg]	Tune-up [dB]	Drift [dB]	M2/M1 [%]	Dist 3dB [mm]
2022-10-17, 14:27	Fast Area Scan	0.570	0.211	0.00	N/A	N/A	N/A
2022-10-17, 14:31	Area Scan	0.556	0.205	0.00	-0.01	N/A	N/A
2022-10-17, 14:41	Zoom Scan	0.594	0.218	0.00	-0.03	63.4	8.7
2022-10-17, 14:50	Zoom Scan	0.356	0.111	0.00	-0.04	62.1	7.3

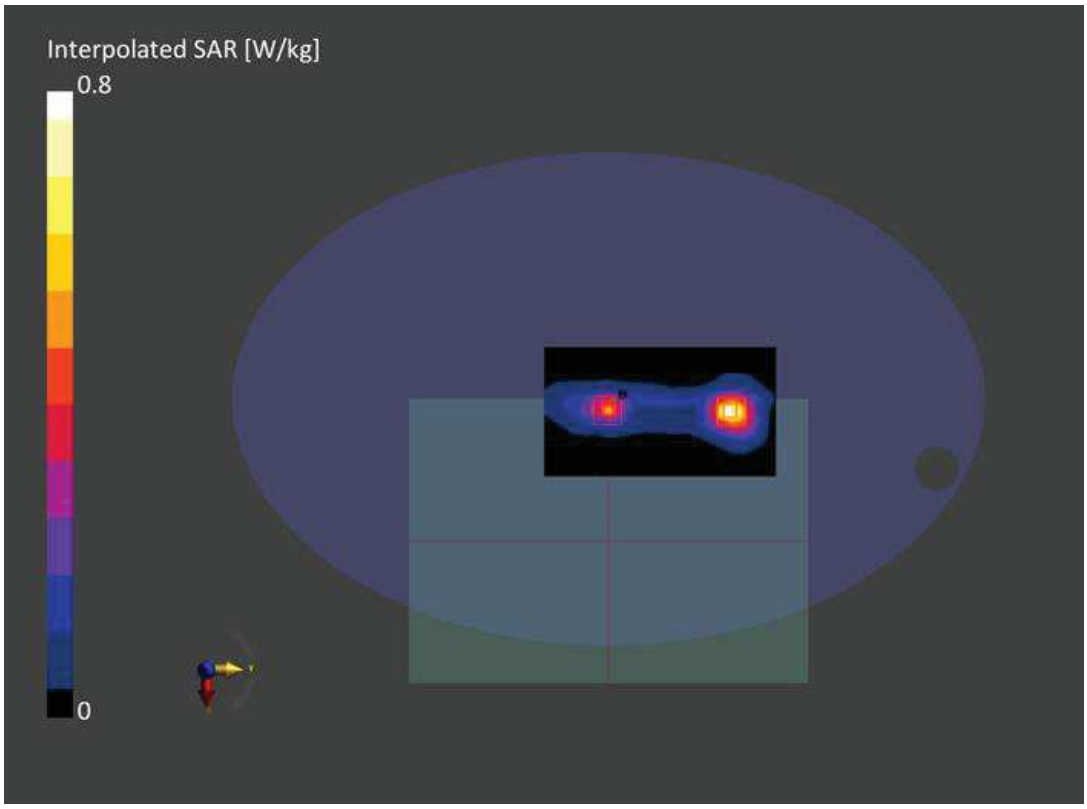


Figure C.18: SAR Body Testing Results for the A2779 at 5610 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle), Channel 155 (5775.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 5GHz	WLAN, 10544-AAC	5775.0, 155	4.65	5.13	36.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 21.5 deg.C 2022-Sep-07 5GHz - B1.prn, 2022-Sep-07	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 200.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-09, 01:54	2022-09-09, 02:04
psSAR1g [W/Kg]	0.437	0.479
psSAR10g [W/Kg]	0.152	0.155
Power Drift [dB]	-0.17	-0.07
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		61.2
Dist 3dB Peak [mm]		7.2

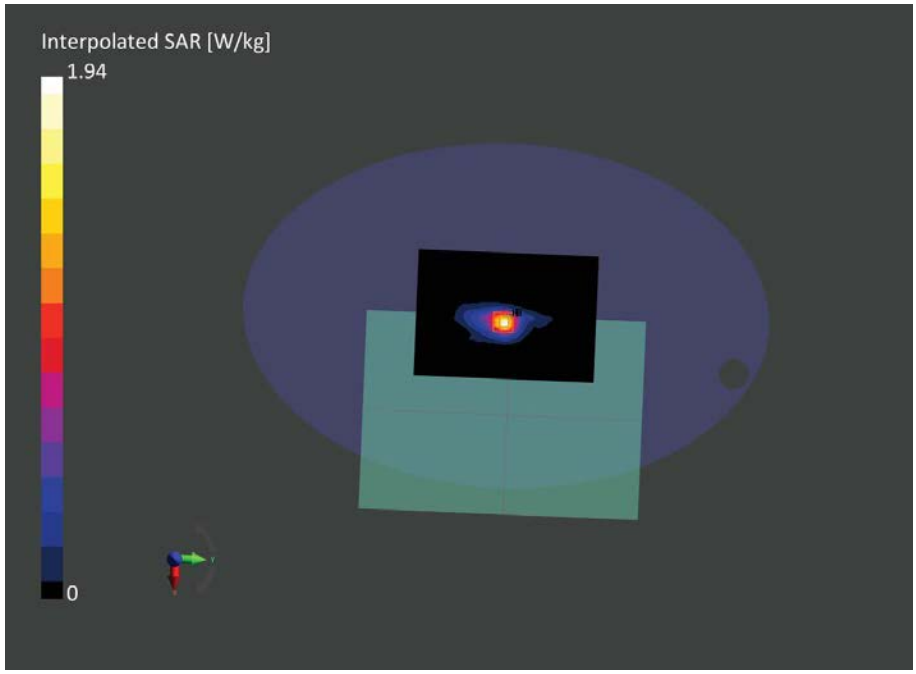


Figure C.19: SAR Body Testing Results for the A2779 at 5775 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle), Channel 155 (5775.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	WLAN 5GHz	WLAN, 10544-AAC	5775.0, 155	4.65	5.13	36.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2102	HBBL-600-10000 DAK 3.5 Head 21.5 deg.C 2022-Sep-07 5GHz - B1.prn, 2022-Sep-07	EX3DV4 - SN7719, 2022-03-11	DAE4 Sn1712, 2022-03-09

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 160.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-09-09, 09:54	2022-09-09, 10:02
psSAR1g [W/Kg]	0.488	0.509
psSAR10g [W/Kg]	0.178	0.174
Power Drift [dB]	-0.02	0.09
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		61.5
Dist 3dB Peak [mm]		7.9

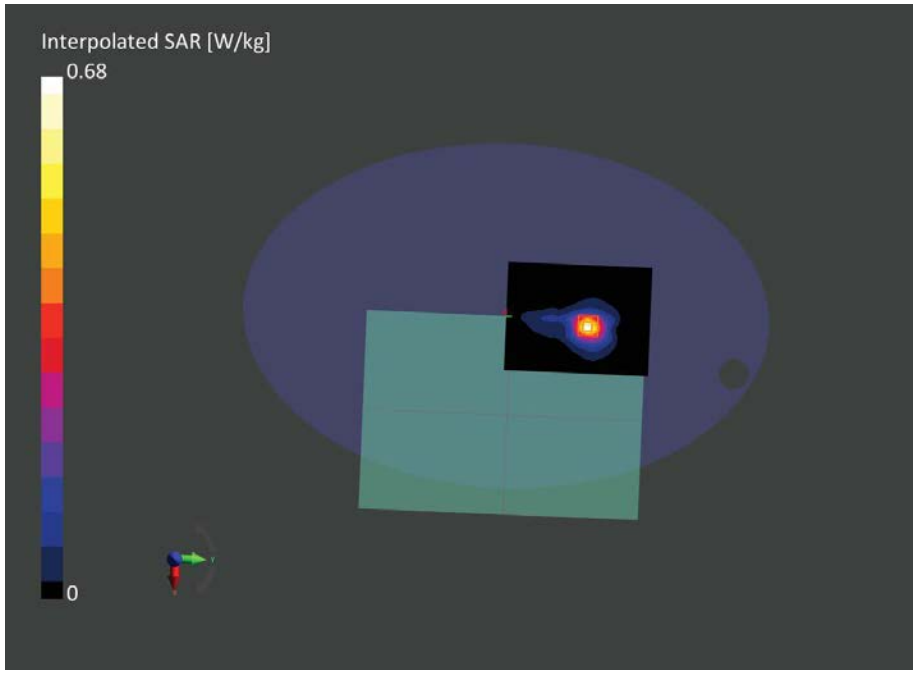


Figure C.20: SAR Body Testing Results for the A2779 at 5775 MHz

TUV SUD

Measurement Report for A2779, BACK, WLAN 5GHz, UID 10544 AAC, Channel 155 (5775.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section	Position	Test Distance [mm]	Band	Group	UID	Rev	Frequency [MHz]	Channel Number
Flat HSL	BACK	0.00	WLAN 5GHz	WLAN	10544	AAC	5775.000	155

Hardware Setup

Phantom	TSL	Probe	Calibration Date	DAE	Calibration Date
ELI V8.0 (20deg probe tilt)	HBBL-600-10000	EX3DV4 - SN3759	2021-12-13	DAE4 Sn475	2021-12-06

Scan Setup

Scan Name	Grid Extents [mm]	Grid Steps [mm]	Sensor Surface [mm]	TSL Correction	Meas. Method	Probe Positioning	MAIA
Fast Area Scan	100.0 x 180.0 x 0.0	10.0 x 10.0 x 1.0	4.0	+ only	Measured	N/A	N/A
Area Scan	100.0 x 180.0 x 0.0	10.0 x 10.0 x 1.0	3.0	+ only	Measured	VMS + 6p	N/A
Zoom Scan	22.0 x 22.0 x 22.0	4.0 x 4.0 x 1.4	1.4	+ only	Measured	VMS + 6p	N/A
Zoom Scan	22.0 x 22.0 x 22.0	4.0 x 4.0 x 1.4	1.4	+ only	Measured	VMS + 6p	N/A

SAR Measurement Results

Date	Scan Name	psSAR1g [W/kg]	psSAR10g [W/kg]	Tune-up [dB]	Drift [dB]	M2/M1 [%]	Dist 3dB [mm]
2022-10-17, 15:00	Fast Area Scan	0.557	0.204	0.00	N/A	N/A	N/A
2022-10-17, 15:04	Area Scan	0.548	0.198	0.00	0.01	N/A	N/A
2022-10-17, 15:14	Zoom Scan	0.574	0.203	0.00	-0.01	62.1	8.1
2022-10-17, 15:22	Zoom Scan	0.472	0.164	0.00	0.01	61.5	7.9

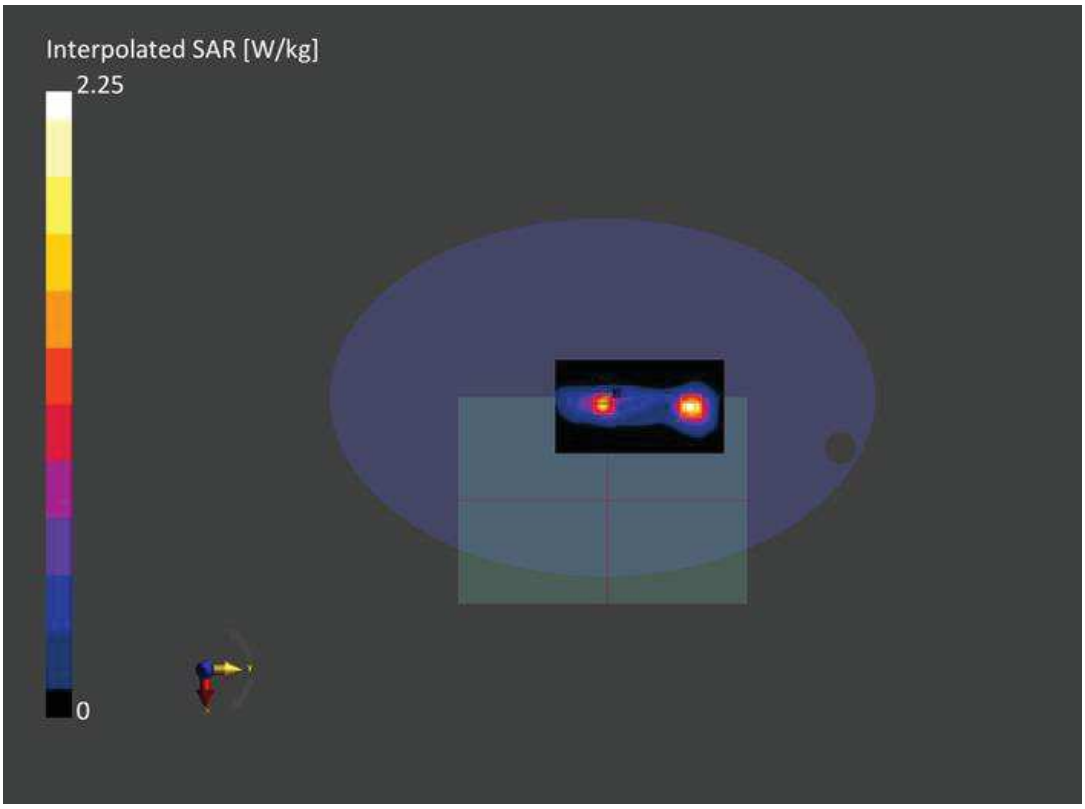


Figure C.21: SAR Body Testing Results for the A2779 at 5775 MHz

WLAN Band 1

Measurement Report for A2779, BACK, U-NII-5, IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle), Channel 79 (6345.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	U-NII-5	WLAN, 10755-AAC	6345.0, 79	5.1	6.02	32.7

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - xxxx	HBBL-600-10000 DAK 3.5 Head 19.1 deg.C 2022-Oct-12 - B3 6GHz.prn, 2022-Oct-12	EX3DV4 - SN3759, 2021-12-13	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	136.0 x 153.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	8.5 x 8.5	3.4 x 3.4 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-17, 17:28	2022-10-17, 17:38
psSAR1g [W/kg]	0.396	0.461
psSAR10g [W/kg]	0.129	0.146
psAPD (1.0cm2, sq) [W/m2]		4.61
psAPD (4.0cm2, sq) [W/m2]		3.36
Power Drift [dB]	-0.10	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		49.0
Dist 3dB Peak [mm]		7.3

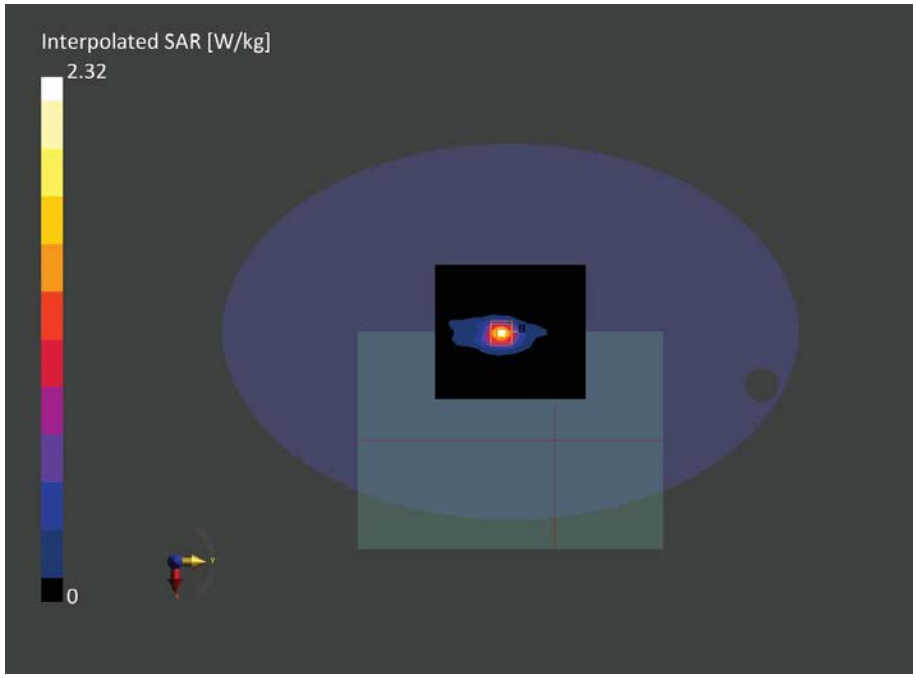


Figure C.22: SAR Body Testing Results for the A2779 at 6345 MHz

Measurement Report for A2779, BACK, U-NII-5, IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle), Channel 15 (6025.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	BACK, 0.00	U-NII-5	WLAN, 10755-AAC	6025.0, 15	5.1	5.55	33.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - xxxx	HBBL-600-10000 DAK 3.5 Head 19.1 deg.C 2022-Oct-12 - B3 6GHz.prn, 2022-Oct-12	EX3DV4 - SN3759, 2021-12-13	DAE4 Sn475, 2021-12-06

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	119.0 x 136.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	8.5 x 8.5	3.4 x 3.4 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-10-17, 19:46	2022-10-17, 19:57
psSAR1g [W/kg]	0.486	0.555
psSAR10g [W/kg]	0.180	0.195
psAPD (1.0cm2, sq) [W/m2]		5.55
psAPD (4.0cm2, sq) [W/m2]		4.41
Power Drift [dB]	-0.01	0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	Positive only	Positive only
M2/M1 [%]		51.8
Dist 3dB Peak [mm]		8.2

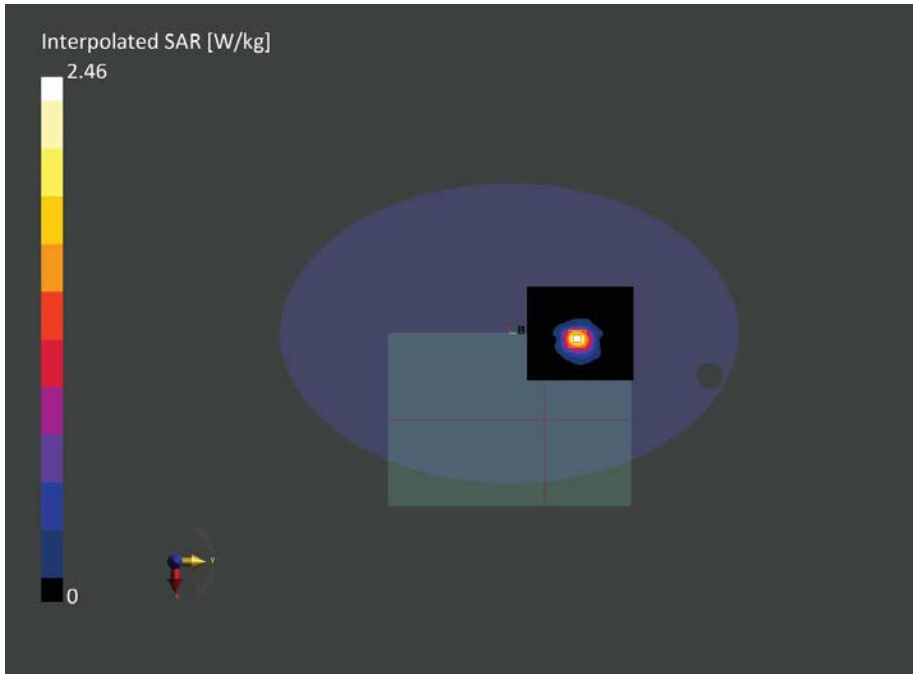


Figure C.23: SAR Body Testing Results for the A2779 at 6025 MHz

Measurement Report for A2779, BACK, U-NII-8, UID 10755 AAC, Channel 207 (6985.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
A2779,	310.0 x 220.0 x 10.0		Laptop

Exposure Conditions

Phantom Section	Position	Test Distance [mm]	Band	Group	UID	Rev	Frequency [MHz]	Channel Number
Flat HSL	BACK	0.00	U-NII-8	WLAN	10755	AAC	6985.000	207

Hardware Setup

Phantom	TSL	Probe	Calibration Date	DAE	Calibration Date
ELI V8.0 (20deg probe tilt)	HBBL-600-10000	EX3DV4 - SN3759	2021-12-13	DAE4 Sn475	2021-12-06

Scan Setup

Scan Name	Grid Extents [mm]	Grid Steps [mm]	Sensor Surface [mm]	TSL Correction	Meas. Method	Probe Positioning	MAIA
Fast Area Scan	102.0 x 204.0 x 0.0	8.5 x 8.5 x 1.0	4.0	+ only	Measured	N/A	N/A
Area Scan	102.0 x 204.0 x 0.0	8.5 x 8.5 x 1.0	3.0	+ only	Measured	VMS + 6p	Y
Zoom Scan	22.0 x 22.0 x 22.0	3.4 x 3.4 x 1.4	1.4	+ only	Measured	VMS + 6p	Y
Zoom Scan	22.0 x 22.0 x 22.0	3.4 x 3.4 x 1.4	1.4	+ only	Measured	VMS + 6p	Y

SAR Measurement Results

Date	Scan Name	psSAR1g [W/kg]	psSAR10g [W/kg]	psAPD (1.0cm2, sq) [W/m2]	psAPD (4.0cm2, sq) [W/m2]	Tune-up [dB]	Drift [dB]	M2/M1 [%]	Dist 3dB [mm]
2022-09-24, 15:21	Fast Area Scan	0.294	0.100	N/A	N/A	0.00	N/A	N/A	N/A
2022-09-24, 15:28	Area Scan	0.281	0.091	N/A	N/A	0.00	-0.08	N/A	N/A
2022-09-24, 15:39	Zoom Scan	0.328	0.103	3.28	2.35	0.00	0.01	45.7	7.5
2022-09-24, 15:49	Zoom Scan	0.143	0.049	1.43	1.10	0.00	-0.00	44.2	7.8

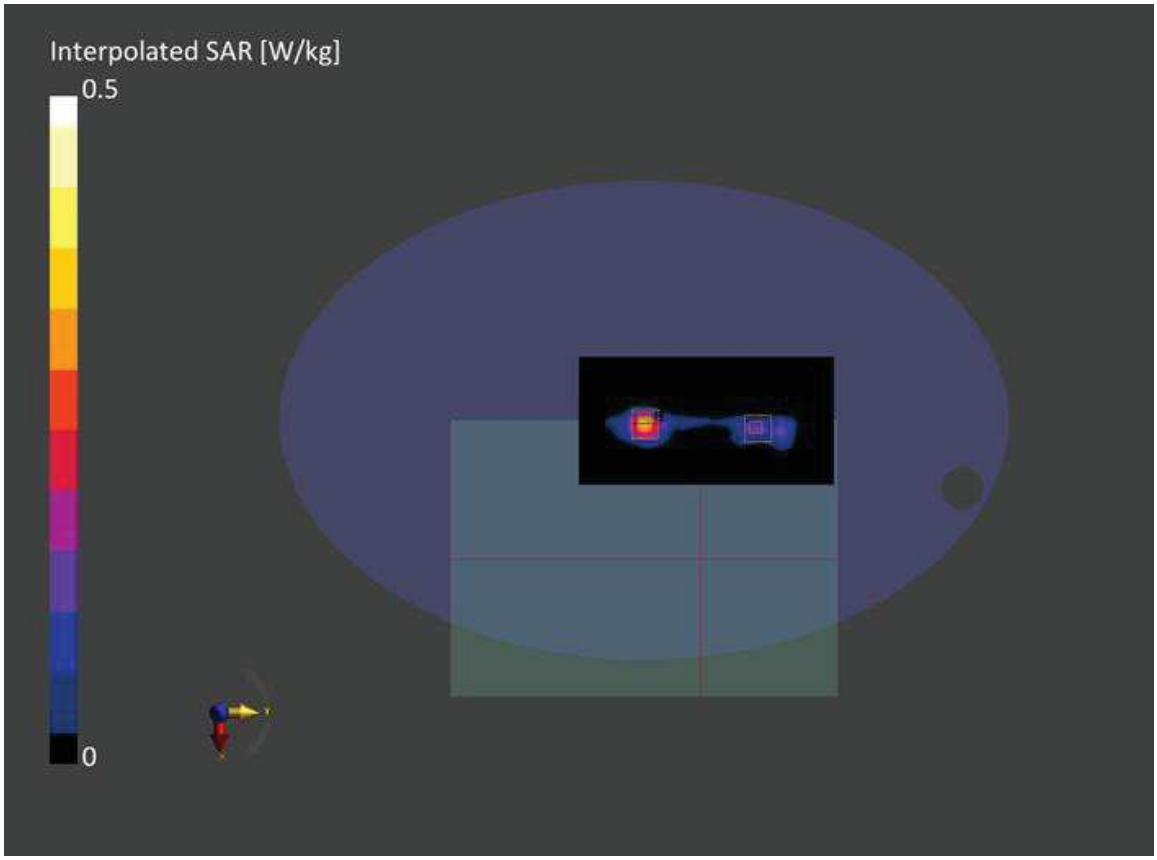


Figure C.24: SAR Body Testing Results for the A2779 at 6985 MHz

Measurement Report for A2779, BACK, U-NII-5, UID 10755 AAC, Channel 15 (6025.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
, A2779	315.0 x 220.0 x 18.0		Laptop

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G Air	BACK, 2.00	U-NII-5	WLAN, 10755-AAC	6025.0, 15	1.0

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave- 1056	---Air	EUmmWV4 - SN9481_F1-55GHz, 2022-02-23	DAE4 Sn475, 2021-12-06

Scan Setup

	5G Scan
Grid Extents [mm]	100.0 x 100.0
Grid Steps [lambda]	0.05 x 0.05
Sensor Surface [mm]	2.0
MAIA	Y

Measurement Results

	5G Scan
Date	2022-11-17, 18:35
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	1.97
psPDtot+ [W/m^2]	3.80
psPDmod+ [W/m^2]	4.93
E_{max} [V/m]	70.6
Power Drift [dB]	-0.14

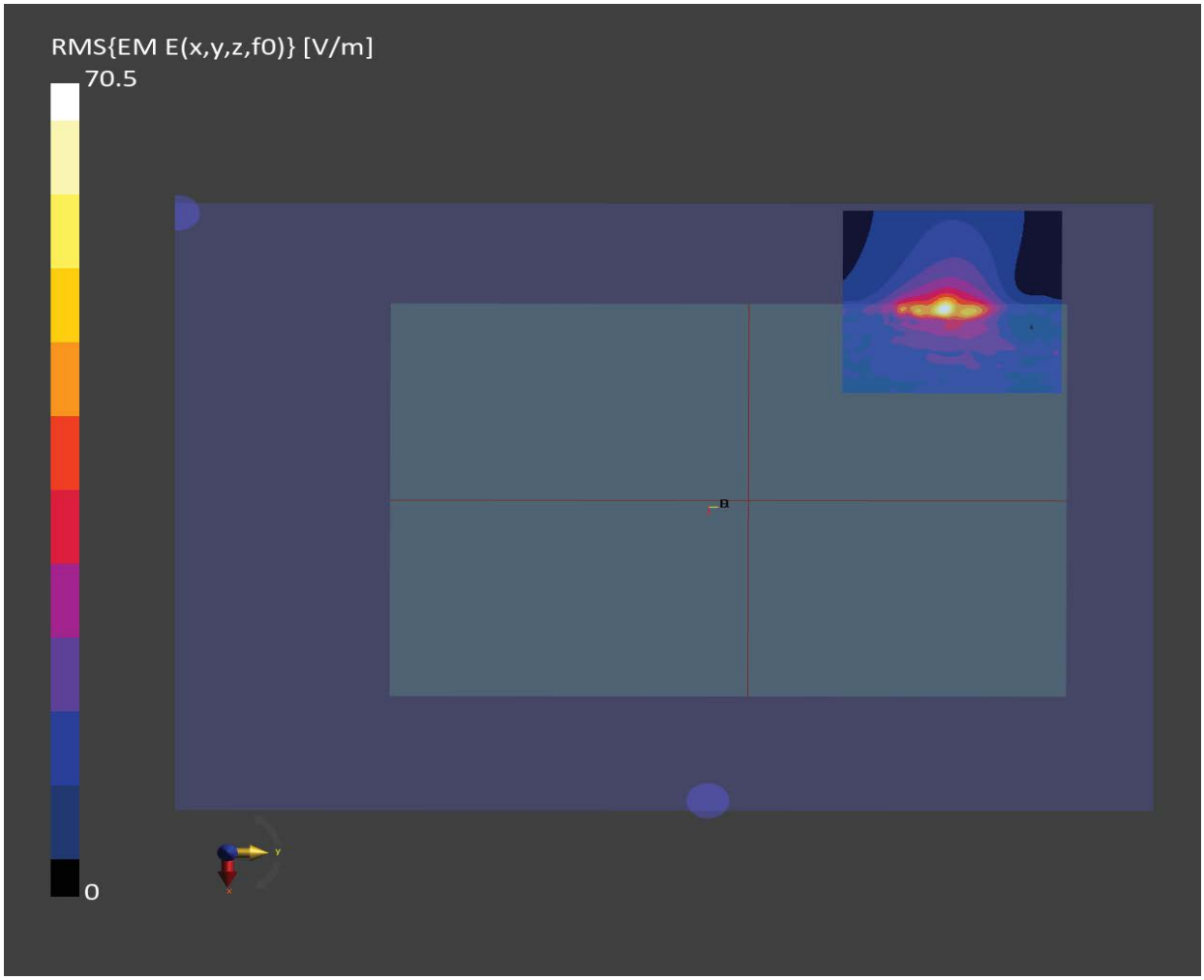


Figure C.25: PD Body Testing Results for the A2779 at 6025 MHz