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

S Schweizerischer Kalibrierdienst
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Accreditation No.: **SCS 0108**

Client **TüV SÜD UK**

Certificate No: **D5GHzV2-1100_Dec20**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1100
Calibration procedure(s)	QA CAL-22.v5 Calibration Procedure for SAR Validation Sources between 3-10 GHz
Calibration date:	December 17, 2020

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	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: BH9394 (20k)	31-Mar-20 (No. 217-03106)	Apr-21
Type-N mismatch combination	SN: 310982 / 06327	31-Mar-20 (No. 217-03104)	Apr-21
Reference Probe EX3DV4	SN: 3503	31-Dec-19 (No. EX3-3503_Dec19)	Dec-20
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

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: MY41092317	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-21

	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: December 17, 2020

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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) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 10.0 mm, dz = 10.0 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.3 ± 6 %	4.49 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.96 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.5 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.59 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.2 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.8 ± 6 %	4.79 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.66 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**86.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	4.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.10 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.6 W/kg ± 19.5 % (k=2)**

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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	47.4 ± 6 %	5.31 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.54 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 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	47.2 ± 6 %	5.44 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.71 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.4 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	46.9 ± 6 %	5.72 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**81.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.6 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	46.7 ± 6 %	5.86 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.01 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 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	46.4 ± 6 %	6.14 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 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	51.5 Ω - 10.0 jΩ
Return Loss	- 20.1 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	49.5 Ω - 4.0 jΩ
Return Loss	- 27.8 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	47.5 Ω - 4.3 jΩ
Return Loss	- 25.7 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.2 Ω - 3.9 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	51.7 Ω - 0.1 jΩ
Return Loss	- 35.7 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	50.6 Ω - 9.1 jΩ
Return Loss	- 20.9 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	49.3 Ω - 2.1 jΩ
Return Loss	- 32.9 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	48.7 Ω - 3.3 jΩ
Return Loss	- 28.8 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	54.1 Ω - 2.7 jΩ
Return Loss	- 26.5 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	51.5 Ω + 0.7 jΩ
Return Loss	- 36.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.205 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: 17.12.2020

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1100

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 = 4.49 S/m; ε_r = 35.3; ρ = 1000 kg/m^3
Medium parameters used: f = 5300 MHz; σ = 4.59 S/m; ε_r = 35.1; ρ = 1000 kg/m^3
Medium parameters used: f = 5500 MHz; σ = 4.79 S/m; ε_r = 34.8; ρ = 1000 kg/m^3
Medium parameters used: f = 5600 MHz; σ = 4.9 S/m; ε_r = 34.7; ρ = 1000 kg/m^3
Medium parameters used: f = 5800 MHz; σ = 5.1 S/m; ε_r = 34.4; 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: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

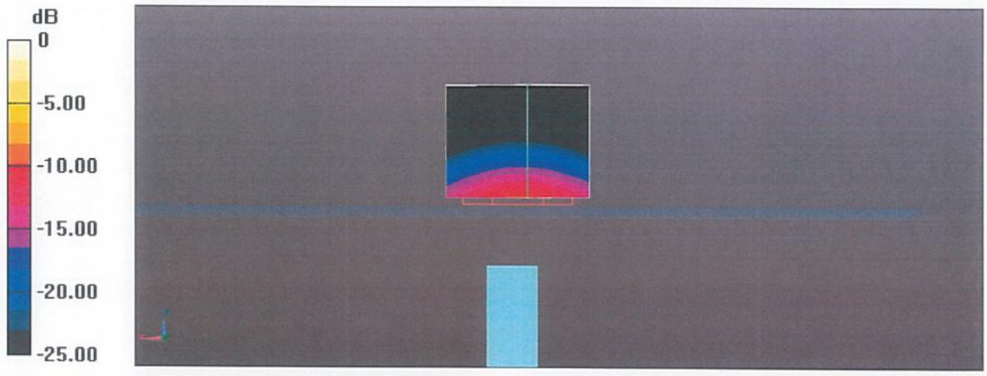
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.35 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.27 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 69.2%
Maximum value of SAR (measured) = 17.9 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 = 77.90 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 8.26 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 = 69.1%
Maximum value of SAR (measured) = 18.8 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 = 78.49 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 33.6 W/kg
SAR(1 g) = 8.66 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.5%
Maximum value of SAR (measured) = 20.3 W/kg

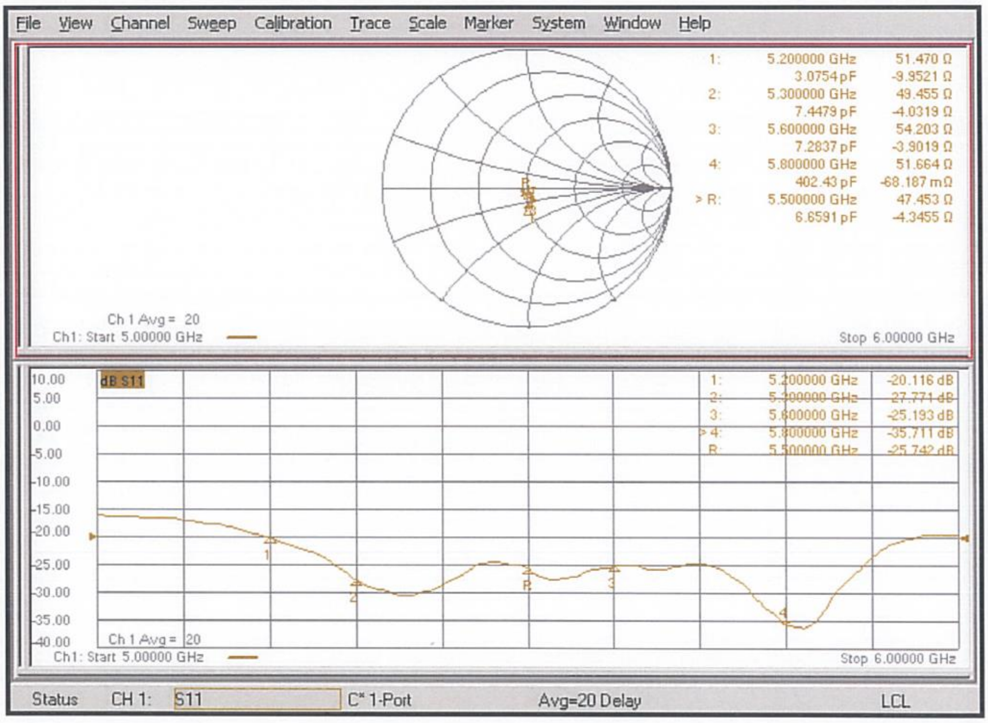
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.74 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.5 W/kg
SAR(1 g) = 8.44 W/kg; SAR(10 g) = 2.39 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 67.2%
Maximum value of SAR (measured) = 19.6 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 = 75.50 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.28 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.2%
Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg = 12.88 dBW/kg

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 17.12.2020

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1100

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 = 5.31 S/m; ε_r = 47.4; ρ = 1000 kg/m^3
Medium parameters used: f = 5300 MHz; σ = 5.44 S/m; ε_r = 47.2; ρ = 1000 kg/m^3
Medium parameters used: f = 5500 MHz; σ = 5.72 S/m; ε_r = 46.9; ρ = 1000 kg/m^3
Medium parameters used: f = 5600 MHz; σ = 5.86 S/m; ε_r = 46.7; ρ = 1000 kg/m^3
Medium parameters used: f = 5800 MHz; σ = 6.14 S/m; ε_r = 46.4; 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: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

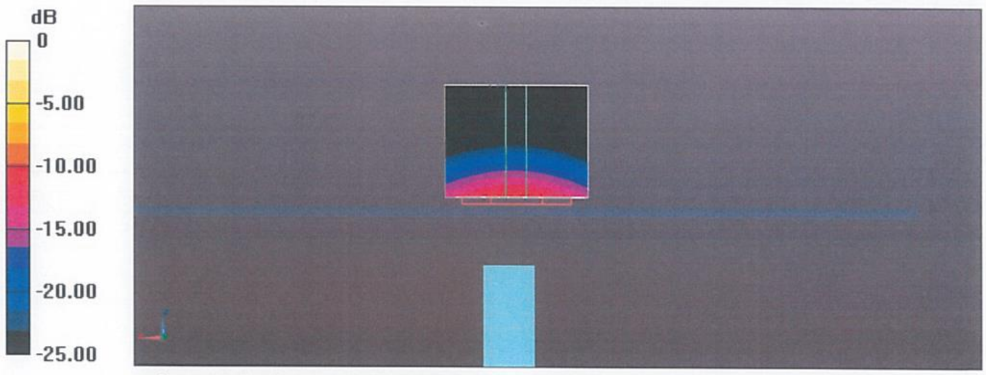
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.60 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 7.54 W/kg; SAR(10 g) = 2.12 W/kg
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 70%
Maximum value of SAR (measured) = 16.9 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 = 69.86 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.16 W/kg
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 68.5%
Maximum value of SAR (measured) = 17.5 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 = 70.73 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.28 W/kg
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 67%
Maximum value of SAR (measured) = 19.1 W/kg

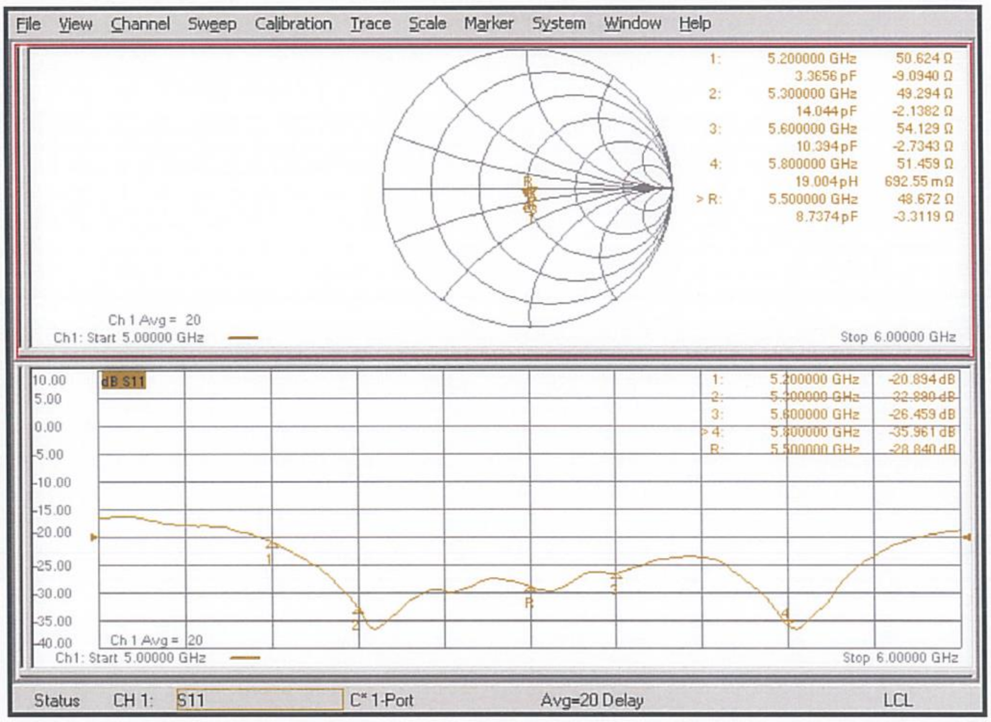
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.77 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 32.1 W/kg
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.22 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.6%
Maximum value of SAR (measured) = 18.8 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 = 67.99 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 31.7 W/kg
SAR(1 g) = 7.75 W/kg; SAR(10 g) = 2.14 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.1%
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 18.5 W/kg = 12.68 dBW/kg

Impedance Measurement Plot for Body TSL



Certificate No: D5GHzV2-1100_Dec20 Page 16 of 16

ANNEX C

TEST RESULTS

Bluetooth 2450 MHz

Date/Time: 05/09/2021 08:50:11

Test Laboratory: TUV SUD

Bluetooth FCC-ISEDda53

DUT: A2485

Communication System: UID 10035 - CAA, IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5); Communication System Band: ISM 2.4 GHz Band (2400.0 - 2483.5 MHz); Frequency: 2480 MHz;Communication System PAR: 3.826 dB; PMF: 1.14815
Medium parameters used (interpolated): f = 2480 MHz; σ = 1.899 S/m; ε_r = 40.265; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2480 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10035 - CAA, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

BT Core 0/Core 0 - Bottom -BT-EDR- 3-dh5 -ePA -Power Command 0,9/Area Scan (101x111x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.514 W/kg

BT Core 0/Core 0 - Bottom -BT-EDR- 3-dh5 -ePA -Power Command 0,9/Zoom Scan (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.85 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.803 W/kg
SAR(1 g) = 0.322 W/kg; SAR(10 g) = 0.149 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.592 W/kg

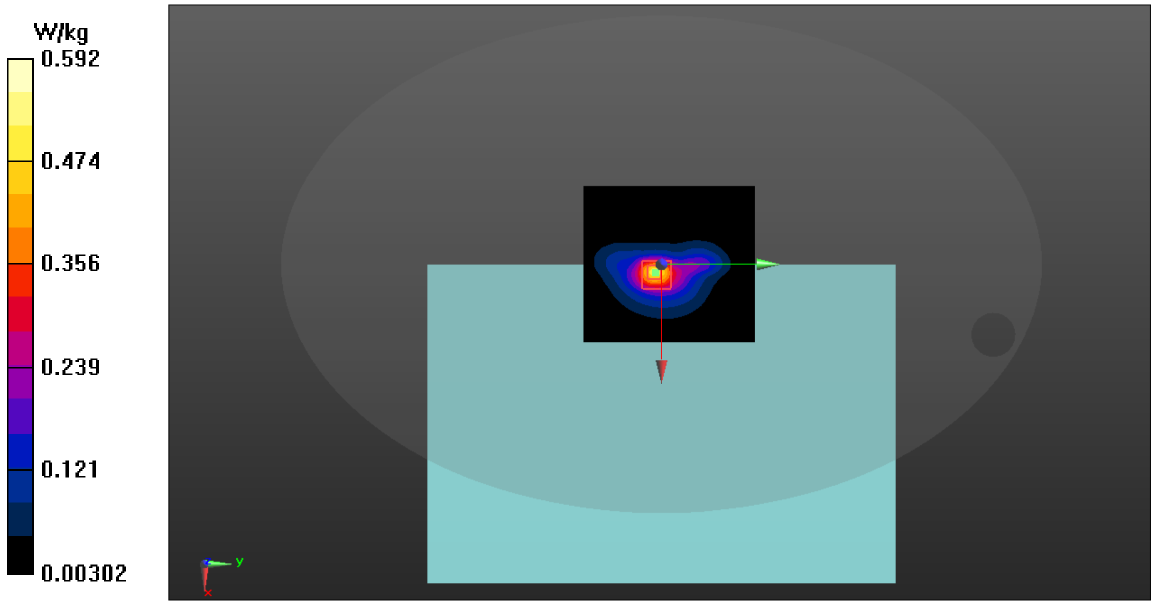


Figure C.1: SAR Body Testing Results for the A2485 at 2480 MHz

Date/Time: 05/09/2021 09:14:30

Test Laboratory: TUV SUD

Bluetooth FCC-ISEDda53

DUT: A2485

Communication System: UID 10035 - CAA, IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5); Communication System Band: ISM 2.4 GHz Band (2400.0 - 2483.5 MHz); Frequency: 2402 MHz;Communication System PAR: 3.826 dB; PMF: 1.14815
Medium parameters used (interpolated): f = 2402 MHz; σ = 1.838 S/m; ε_r = 40.394; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2402 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10035 - CAA, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

BT Core 1/Core 1 - Bottom -BT-EDR- 3-dh5 -ePA -Power Command 0,9/Area scan (101x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.336 W/kg

BT Core 1/Core 1 - Bottom -BT-EDR- 3-dh5 -ePA -Power Command 0,9/Zoom Scan (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.94 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.522 W/kg
SAR(1 g) = 0.194 W/kg; SAR(10 g) = 0.083 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.372 W/kg

COMMERCIAL-IN-CONFIDENCE

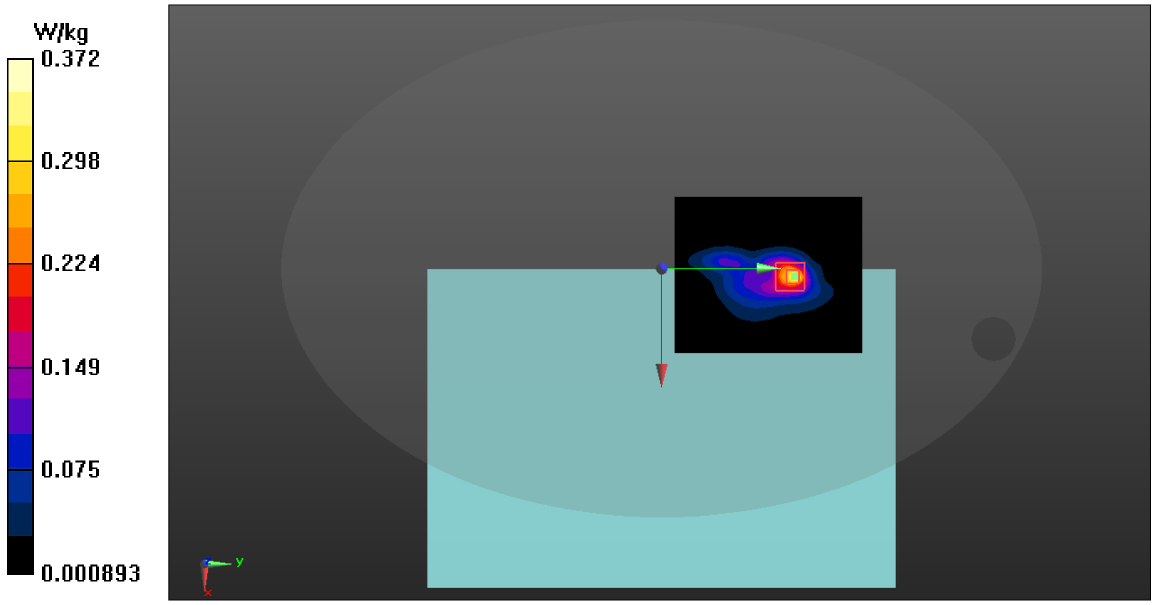


Figure C.2: SAR Body Testing Results for the A2485 at 2402 MHz

Date/Time: 05/09/2021 09:46:23

Test Laboratory: TUV SUD

Bluetooth FCC-ISEDda53

DUT: A2485

Communication System: UID 10032 - CAA, IEEE 802.15.1 Bluetooth (GFSK, DH5); Communication System Band: ISM 2.4 GHz Band (2400.0 - 2483.5 MHz); Frequency: 2441 MHz;Communication System PAR: 1.158 dB; PMF: 1.14288
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.868 S/m; ε_r = 40.331; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2441 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10032 - CAA, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

BT Core 2/Core 2 - Bottom-BT-BDR-dh5 -IPA -Power Command 1,4/Area scan (101x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.177 W/kg

BT Core 2/Core 2 - Bottom-BT-BDR-dh5 -IPA -Power Command 1,4/Zoom Scan (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.07 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.280 W/kg
SAR(1 g) = 0.106 W/kg; SAR(10 g) = 0.046 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.194 W/kg

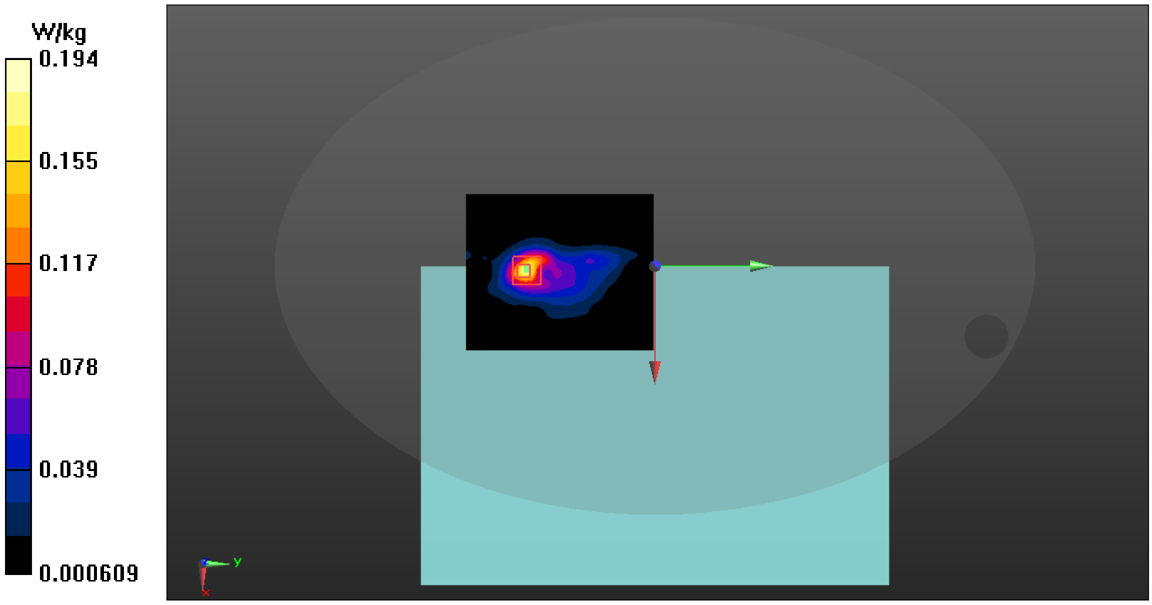


Figure C.3: SAR Body Testing Results for the A2485 at 2441 MHz

Date/Time: 04/09/2021 13:54:30

Test Laboratory: TUV SUD

Bluetooth FCC-ISED (5GHz ON)da53

DUT: A2485

Communication System: UID 10035 - CAA, IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5); Communication System Band: ISM 2.4 GHz Band (2400.0 - 2483.5 MHz); Frequency: 2404 MHz;Communication System PAR: 3.826 dB; PMF: 1.14815
Medium parameters used (interpolated): f = 2404 MHz; σ = 1.84 S/m; ε_r = 40.391; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2404 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10035 - CAA, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

BT Core 0 -wifi on/Core 0 - Bottom-BT-BDR-dh5 -IPA -Power Command 1,3/Area Scan (101x111x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.184 W/kg

BT Core 0 -wifi on/Core 0 - Bottom-BT-BDR-dh5 -IPA -Power Command 1,3/Zoom Scan (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.342 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.286 W/kg
SAR(1 g) = 0.114 W/kg; SAR(10 g) = 0.052 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.212 W/kg

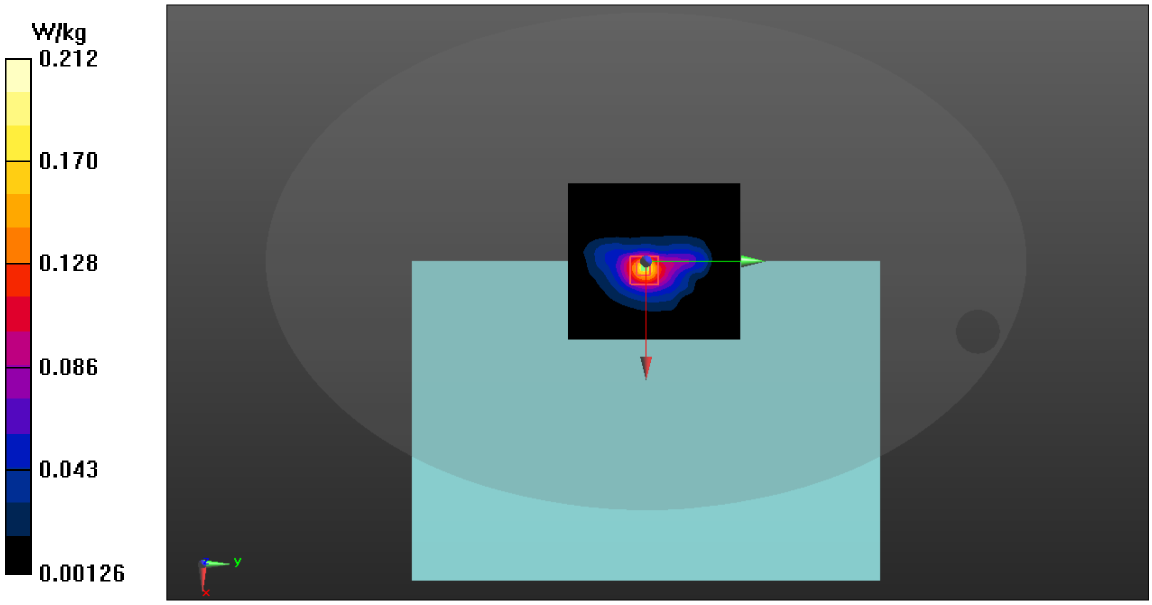


Figure C.4: SAR Body Testing Results for the A2485 at 2404 MHz

Date/Time: 04/09/2021 16:07:41

Test Laboratory: TUV SUD

Bluetooth FCC-ISED (5GHz ON)da53

DUT: A2485

Communication System: UID 10032 - CAA, IEEE 802.15.1 Bluetooth (GFSK, DH5); Communication System Band: ISM 2.4 GHz Band (2400.0 - 2483.5 MHz); Frequency: 2480 MHz;Communication System PAR: 1.158 dB; PMF: 1.14288
Medium parameters used (interpolated): f = 2480 MHz; σ = 1.899 S/m; ε_r = 40.265; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2480 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10032 - CAA, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

BT Core 1 -wifi on/Core 1 - Bottom -BT-BDR-dh5 -ePA -Power Command 1,4/Area scan (101x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.170 W/kg

BT Core 1 -wifi on/Core 1 - Bottom -BT-BDR-dh5 -ePA -Power Command 1,4/Zoom Scan (10x8x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.090 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.229 W/kg
SAR(1 g) = 0.085 W/kg; SAR(10 g) = 0.035 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.166 W/kg

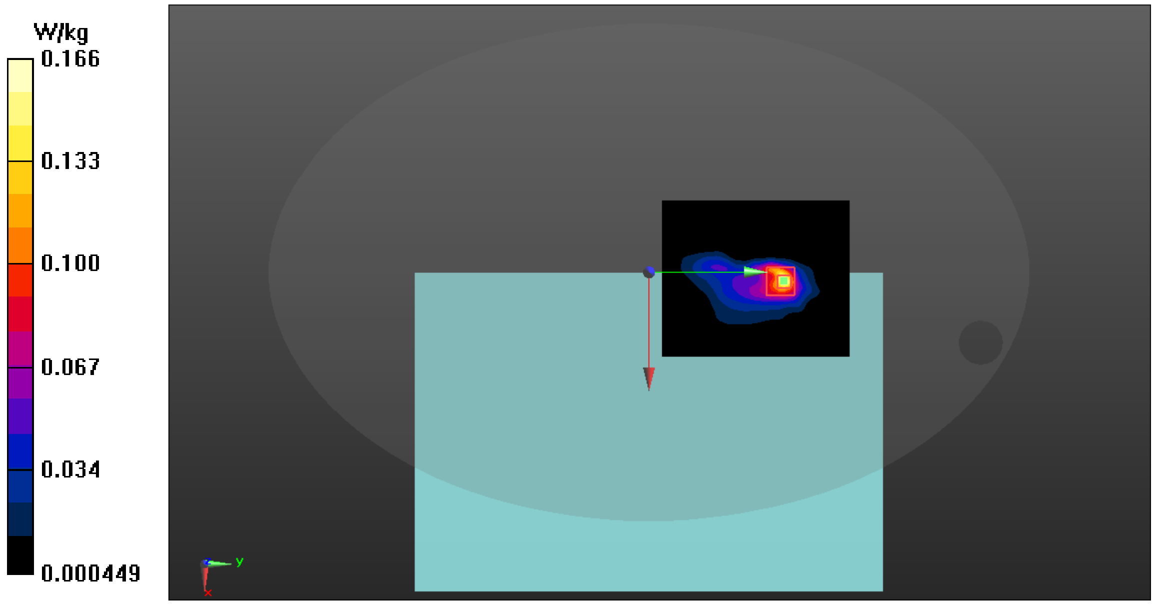


Figure C.5: SAR Body Testing Results for the A2485 at 2480 MHz

Date/Time: 04/09/2021 17:14:08

Test Laboratory: TUV SUD

Bluetooth FCC-ISED (5GHz ON)da53

DUT: A2485

Communication System: UID 10032 - CAA, IEEE 802.15.1 Bluetooth (GFSK, DH5); Communication System Band: ISM 2.4 GHz Band (2400.0 - 2483.5 MHz); Frequency: 2441 MHz;Communication System PAR: 1.158 dB; PMF: 1.14288
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.868 S/m; ε_r = 40.331; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2441 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10032 - CAA, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

BT Core 2 - wifi on/Core 2 - Bottom-BT-BDR-dh5 -IPA -Power Command 1,4/Area scan (101x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.152 W/kg

BT Core 2 - wifi on/Core 2 - Bottom-BT-BDR-dh5 -IPA -Power Command 1,4/Zoom Scan (7x8x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.691 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.227 W/kg
SAR(1 g) = 0.084 W/kg; SAR(10 g) = 0.035 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.160 W/kg

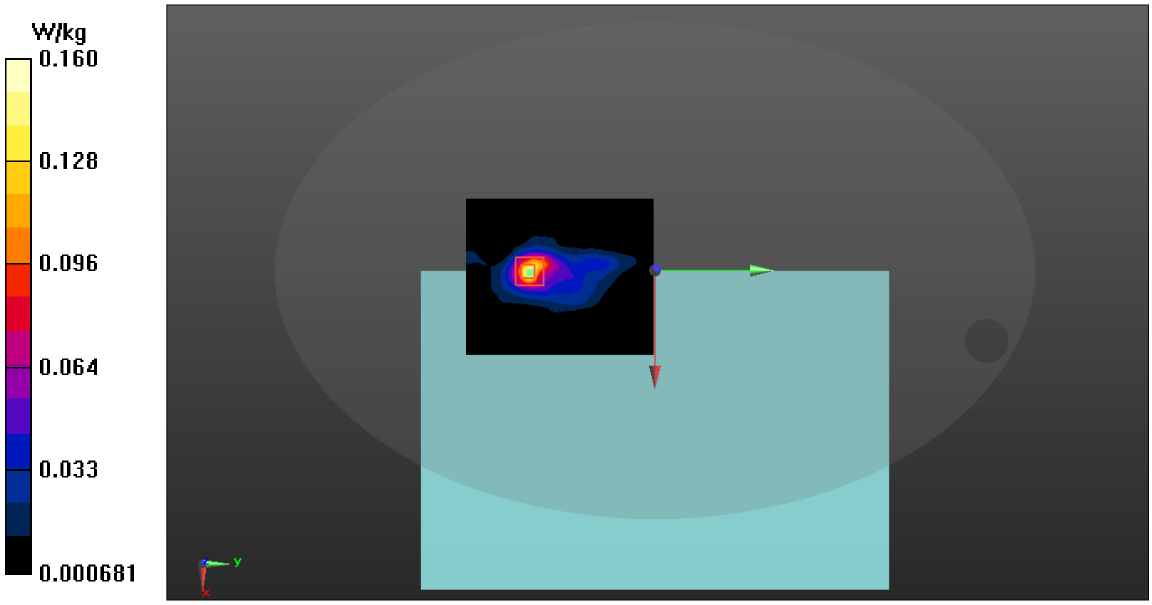


Figure C.6: SAR Body Testing Results for the A2485 at 2441 MHz

WLAN 2450 MHz

Date/Time: 23/08/2021 12:15:46

Test Laboratory: TUV SUD

WIFI 2.4Ghz Core 0 Bottom CH1- 23 08 21

DUT: A2485

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Communication System Band: WLAN 2.4GHz (2412.0 - 2484.0 MHz); Frequency: 2412 MHz;Communication System PAR: 1.872 dB; PMF: 1.04833
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.829 S/m; ε_r = 39.917; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2412 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10012 - CAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

2.4GHz Core 0 -Bottom of EUT/001 Core 0 - CH1 q71/Area Scan (101x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.673 W/kg

2.4GHz Core 0 -Bottom of EUT/001 Core 0 - CH1 q71/Zoom Scan (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.27 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.442 W/kg; SAR(10 g) = 0.200 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.801 W/kg

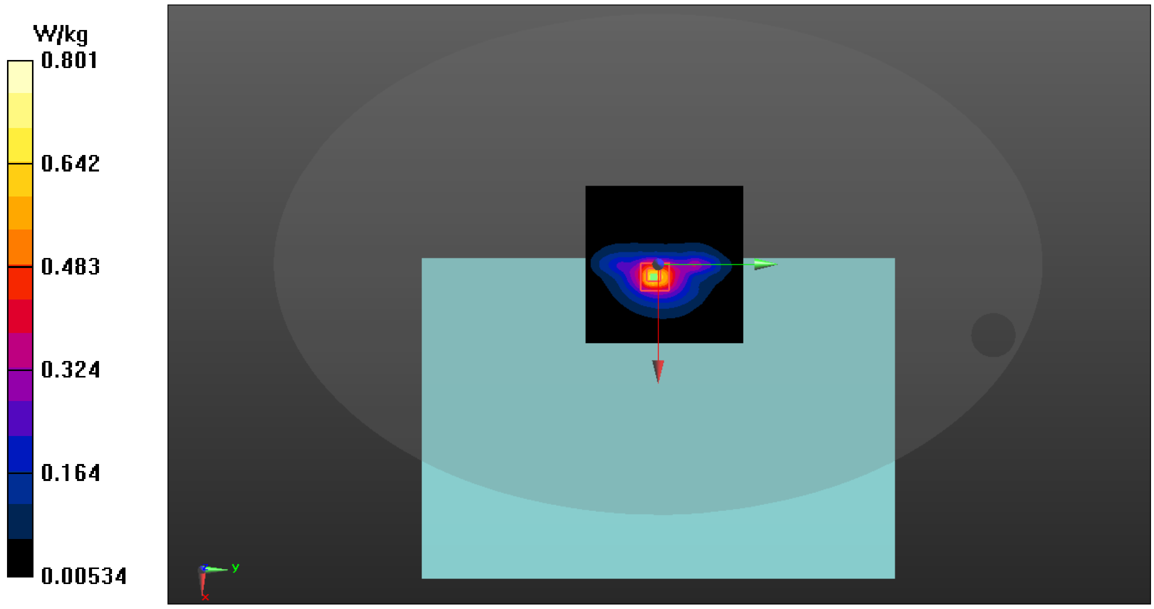


Figure C.7: SAR Body Testing Results for the A2485 at 2412 MHz

Date/Time: 23/08/2021 12:43:57

Test Laboratory: TUV SUD

WIFI 2.4Ghz Core 1 Bottom Ch1 - 23 08 21

DUT: A2485

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Communication System Band: WLAN 2.4GHz (2412.0 - 2484.0 MHz); Frequency: 2412 MHz;Communication System PAR: 1.872 dB; PMF: 1.04833
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.829 S/m; ε_r = 39.917; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2412 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10012 - CAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

2.4GHz Core 1 -Bottom of EUT/Core 1 - CH1 q71/Area Scan (101x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.430 W/kg

2.4GHz Core 1 -Bottom of EUT/Core 1 - CH1 q71/Zoom Scan (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.93 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.758 W/kg
SAR(1 g) = 0.282 W/kg; SAR(10 g) = 0.118 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.533 W/kg

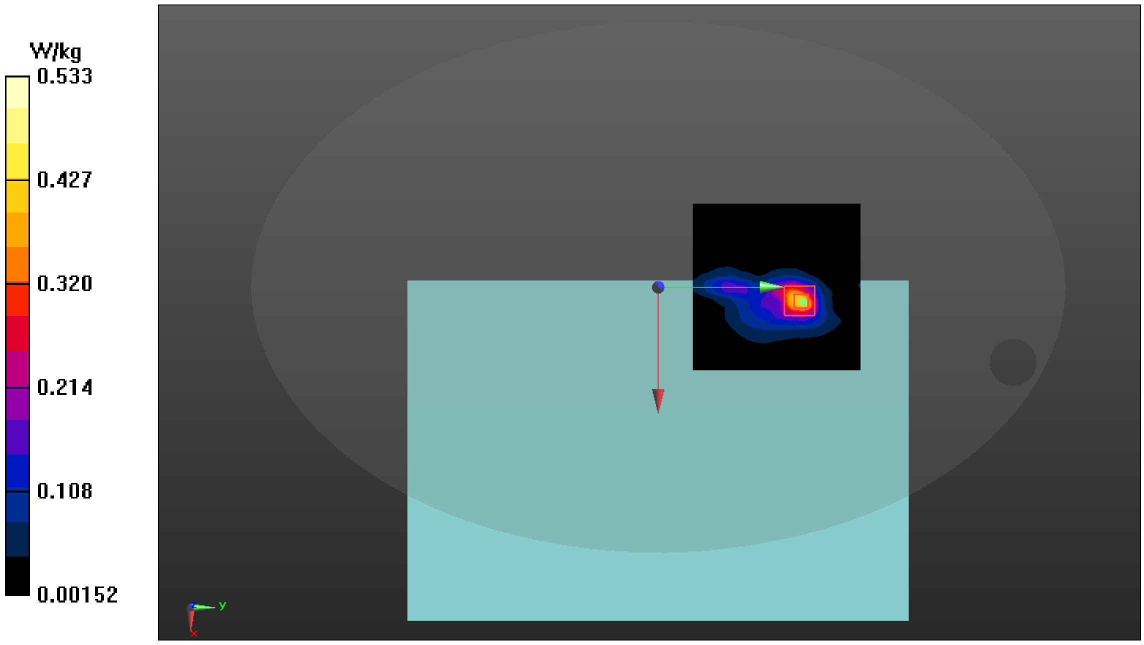


Figure C.8: SAR Body Testing Results for the A2485 at 2412 MHz

Date/Time: 23/08/2021 13:07:37

Test Laboratory: TUV SUD

WIFI 2.4Ghz MIMO Core 0 + Core 1 CH7 - 23 08 21

DUT: A2485

Communication System: UID 10193 - CAC, IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK); Communication System Band: WLAN 2.4GHz (2412.0 - 2484.0 MHz); Frequency: 2442 MHz;Communication System PAR: 8.092 dB; PMF: 1.01742
Medium parameters used (interpolated): f = 2442 MHz; σ = 1.851 S/m; ε_r = 39.868; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(7.82, 7.82, 7.82) @ 2442 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10193 - CAC, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 31.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

2.4GHz MIMO/Core 0&1 - CH7 q73/Area Scan (71x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.787 W/kg

2.4GHz MIMO/Core 0&1 - CH7 q73/Zoom Scan (7x8x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.51 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.486 W/kg; SAR(10 g) = 0.220 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.920 W/kg

2.4GHz MIMO/Core 0&1 - CH7 q73/Zoom Scan 2 (7x7x4)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.51 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.389 W/kg; SAR(10 g) = 0.166 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.745 W/kg

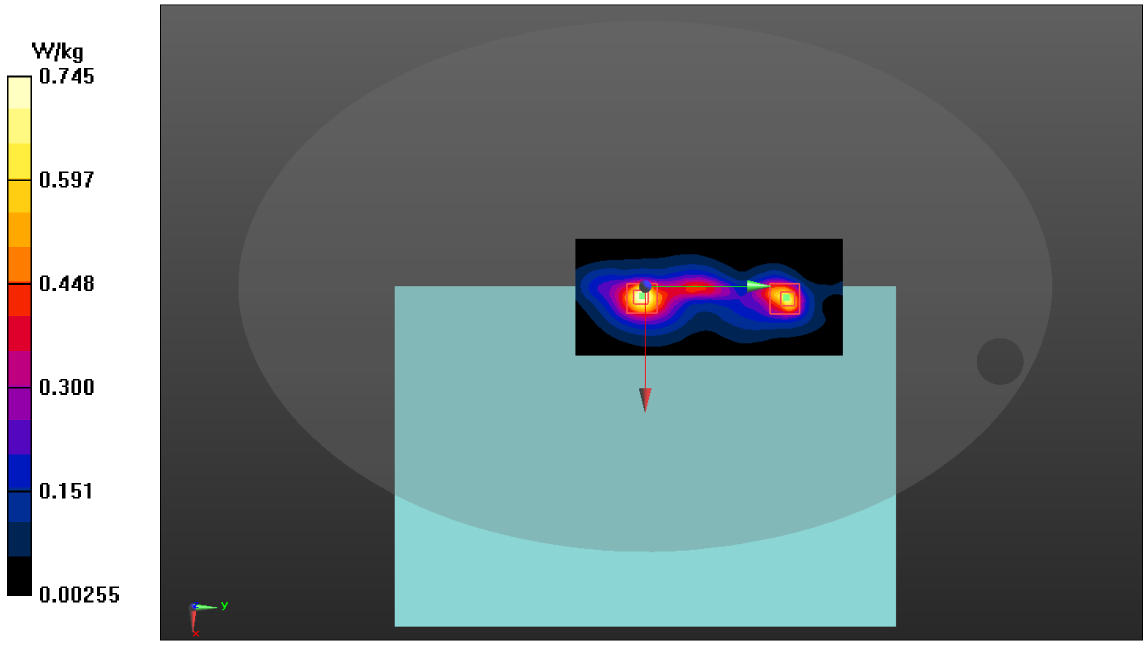


Figure C.9: SAR Body Testing Results for the A2485 at 2442 MHz

Date/Time: 20/08/2021 08:46:43

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC Core 0 Bottom- 20 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-1, U-NII-2A (5170 - 5330 MHz); Frequency: 5210 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5210 MHz; σ = 4.552 S/m; ε_r = 34.854; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(5.48, 5.48, 5.48) @ 5210 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz Core 0 -Bottom of EUT/Core 0 - Bottom- ch42 q53/Area Scan (91x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.62 W/kg

5GHz Core 0 -Bottom of EUT/Core 0 - Bottom- ch42 q53/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 22.50 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.19 W/kg
SAR(1 g) = 0.734 W/kg; SAR(10 g) = 0.243 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.71 W/kg

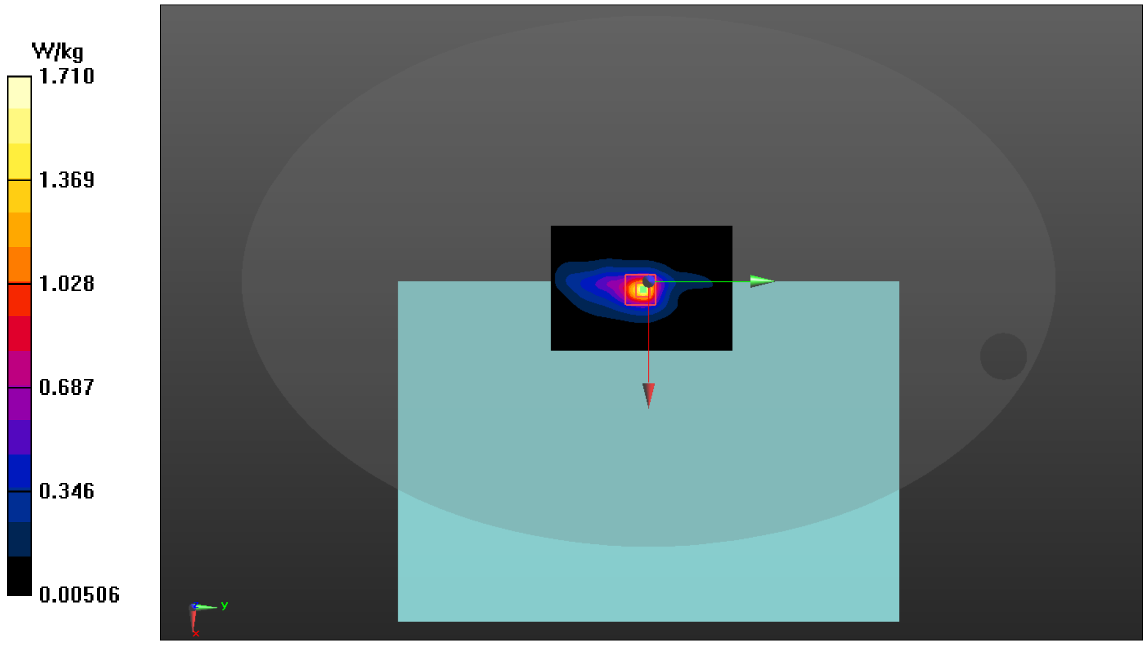


Figure C.10: SAR Body Testing Results for the A2485 at 5210 MHz

Date/Time: 20/08/2021 09:17:46

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC Core 1 Bottom- 20 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-1, U-NII-2A (5170 - 5330 MHz); Frequency: 5210 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5210 MHz; σ = 4.552 S/m; ε_r = 34.854; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(5.48, 5.48, 5.48) @ 5210 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz Core 1 -Bottom of EUT/Core 1 - Bottom- ch42 q54/Area Scan (91x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.07 W/kg

5GHz Core 1 -Bottom of EUT/Core 1 - Bottom- ch42 q54/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm 2 (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 17.77 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 0.482 W/kg; SAR(10 g) = 0.171 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.14 W/kg

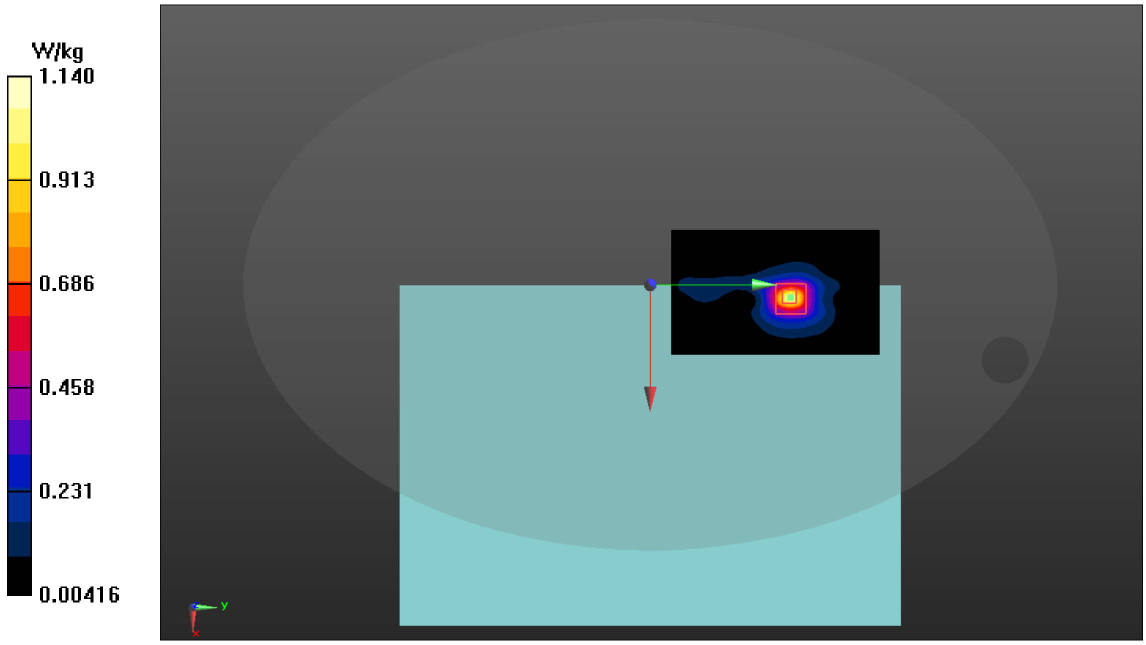


Figure C.11: SAR Body Testing Results for the A2485 at 5210 MHz

Date/Time: 25/08/2021 10:32:52

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC MIMO Core 0 + Core 1 Back- 25 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-1, U-NII-2A (5170 - 5330 MHz); Frequency: 5210 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5210 MHz; $\sigma = 4.557$ S/m; $\varepsilon_r = 34.742$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(5.48, 5.48, 5.48) @ 5210 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz MIMO-Bottom/FCC SDM Core 0 + Core 1 - ch42 q56/Area Scan (91x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.54 W/kg

5GHz MIMO-Bottom/FCC SDM Core 0 + Core 1 - ch42 q56/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 16.07 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 0.688 W/kg; SAR(10 g) = 0.232 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.60 W/kg

5GHz MIMO-Bottom/FCC SDM Core 0 + Core 1 - ch42 q56/Zoom Scan 2(4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 16.07 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.153 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.01 W/kg

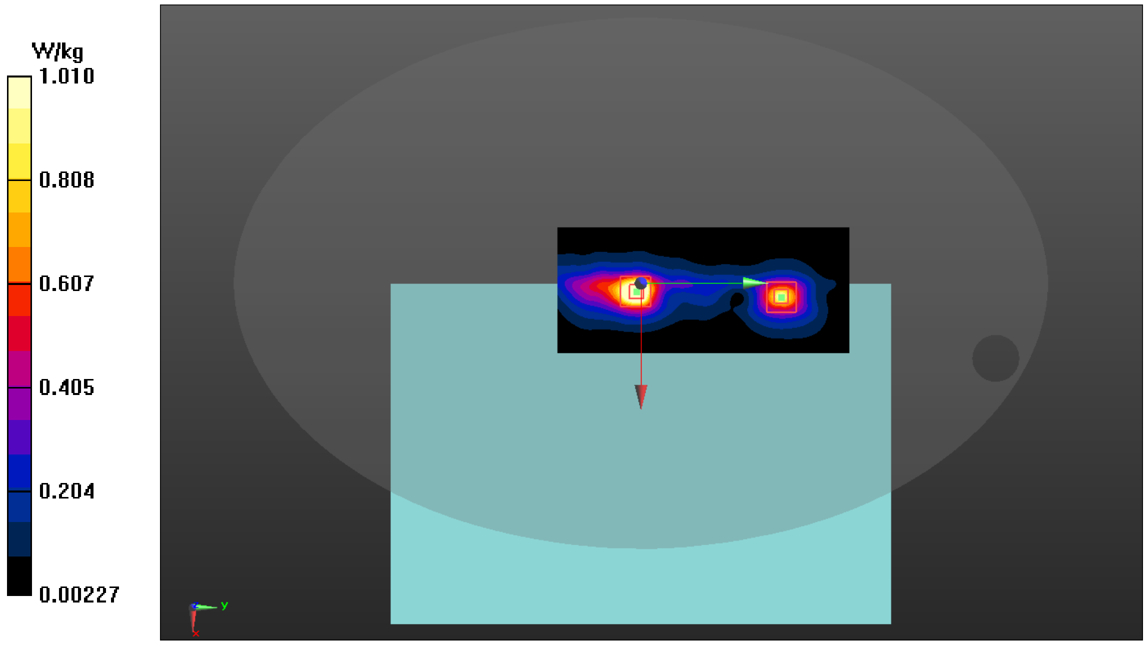


Figure C.12.A: SAR Body Testing Results for the A2485 at 5210 MHz

Date/Time: 25/08/21 09:13:48

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC MIMO Core 0 + Core 1 Back- 25 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-1, U-NII-2A (5170 - 5330 MHz); Frequency: 5290 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5290 MHz; σ = 4.642 S/m; ε_r = 34.583; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(5.37, 5.37, 5.37) @ 5290 MHz; Calibrated: 18/06/21

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/21

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/21

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz MIMO-Bottom/Core 0 +Core 1 - ch58 q50/Area Scan (91x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.14 W/kg

5GHz MIMO-Bottom/Core 0 +Core 1 - ch58 q50/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 18.60 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 0.510 W/kg; SAR(10 g) = 0.171 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.20 W/kg

5GHz MIMO-Bottom/Core 0 +Core 1 - ch58 q50/Zoom Scan 2(4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 18.60 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.395 W/kg; SAR(10 g) = 0.140 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.936 W/kg

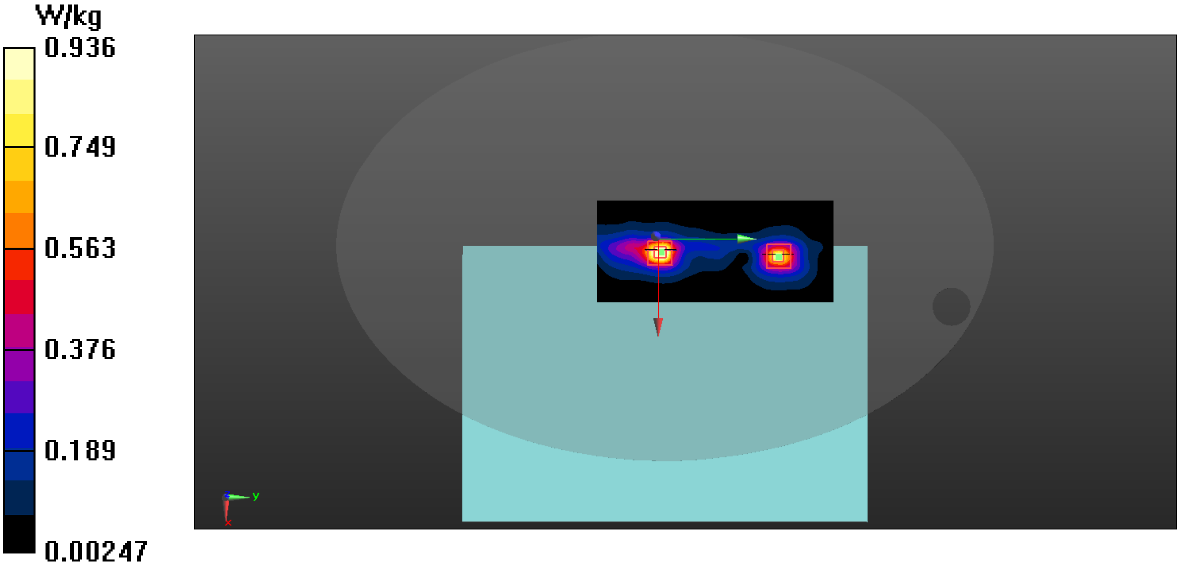


Figure C.12.B: SAR Body Testing Results for the A2485 at 5290 MHz

WLAN 5500 MHz

Date/Time: 20/08/2021 11:02:19

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC Core 0 Bottom- 20 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-2C Standalone (5490 - 5710 MHz); Frequency: 5610 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5610 MHz; σ = 4.994 S/m; ε_r = 34.113; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(4.85, 4.85, 4.85) @ 5610 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz Core 0 -Bottom of EUT/Core 0 - Bottom- ch122 q53/Area Scan (91x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.20 W/kg

5GHz Core 0 -Bottom of EUT/Core 0 - Bottom- ch122 q53/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 18.56 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 2.62 W/kg
SAR(1 g) = 0.538 W/kg; SAR(10 g) = 0.177 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.33 W/kg

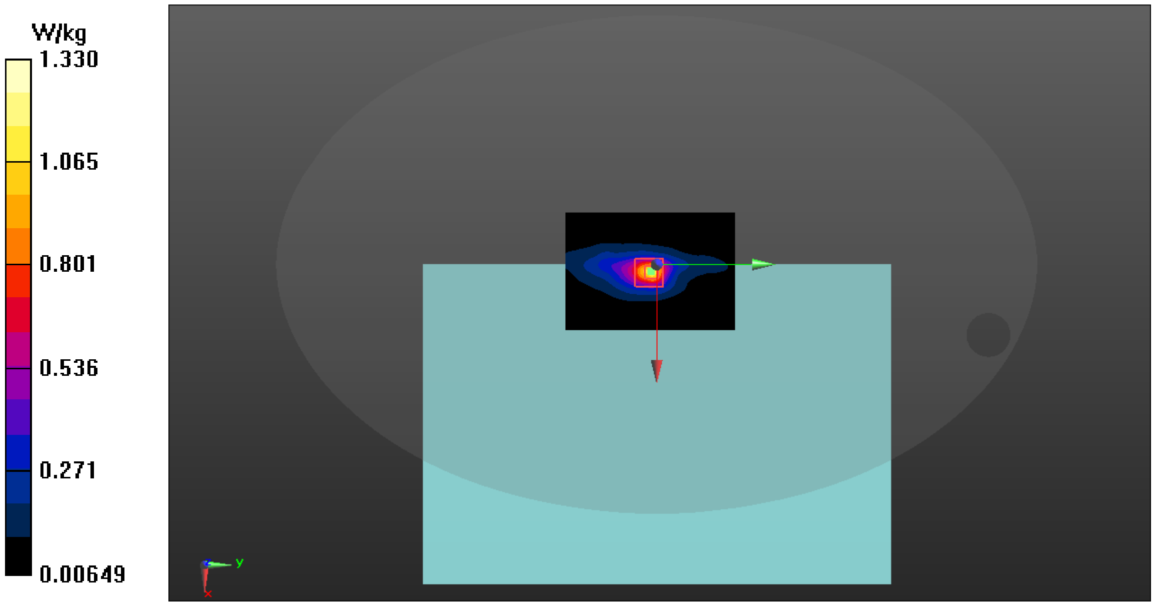


Figure C.13: SAR Body Testing Results for the A2485 at 5610 MHz

Date/Time: 20/08/2021 13:29:31

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC Core 1 Bottom- 20 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-2C Standalone (5490 - 5710 MHz); Frequency: 5530 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5530 MHz; σ = 4.903 S/m; ε_r = 34.252; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(4.9, 4.9, 4.9) @ 5530 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz Core 1 -Bottom of EUT/Core 1 - Bottom- ch106 q50/Area Scan (91x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.877 W/kg

5GHz Core 1 -Bottom of EUT/Core 1 - Bottom- ch106 q50/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.76 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 0.400 W/kg; SAR(10 g) = 0.143 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.979 W/kg

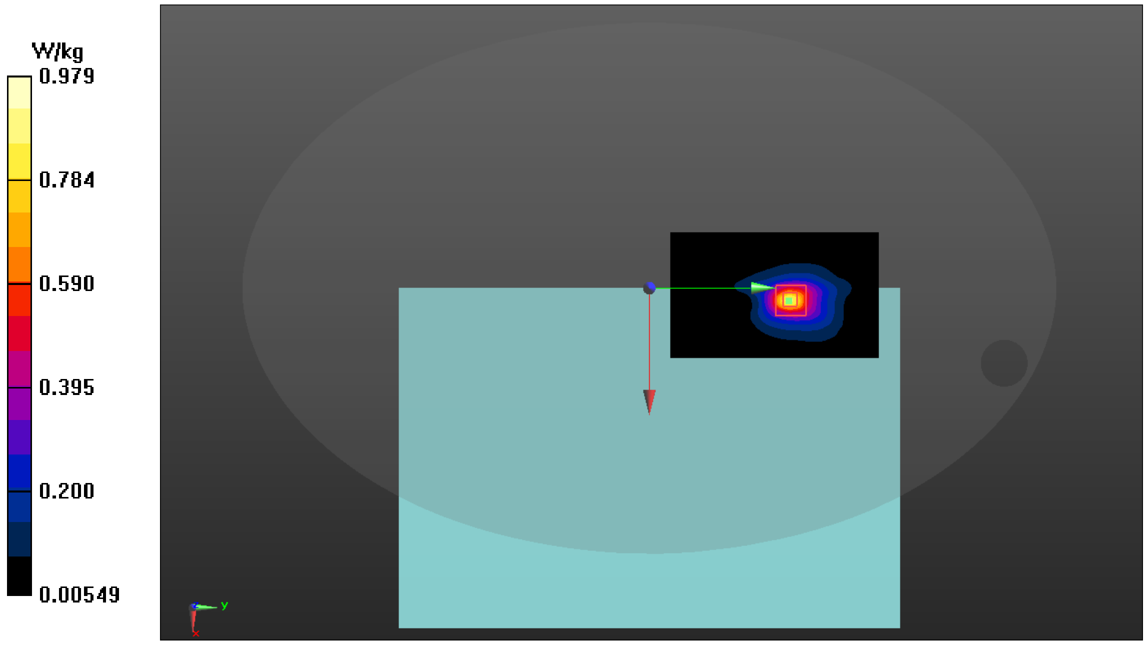


Figure C.14: SAR Body Testing Results for the A2485 at 5530 MHz

Date/Time: 25/08/2021 11:31:58

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC MIMO Core 0 + Core 1 Back- 25 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-2C Standalone (5490 - 5710 MHz); Frequency: 5530 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5530 MHz; σ = 4.898 S/m; ε_r = 34.13; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(4.9, 4.9, 4.9) @ 5530 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz MIMO-Bottom/Core 0 + Core 1 - Bottom- ch106 q50/Area Scan (91x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.964 W/kg

5GHz MIMO-Bottom/Core 0 + Core 1 - Bottom- ch106 q50/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 14.10 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 0.429 W/kg; SAR(10 g) = 0.144 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.05 W/kg

5GHz MIMO-Bottom/Core 0 + Core 1 - Bottom- ch106 q50/Zoom Scan 2(4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 14.10 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.349 W/kg; SAR(10 g) = 0.124 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.868 W/kg

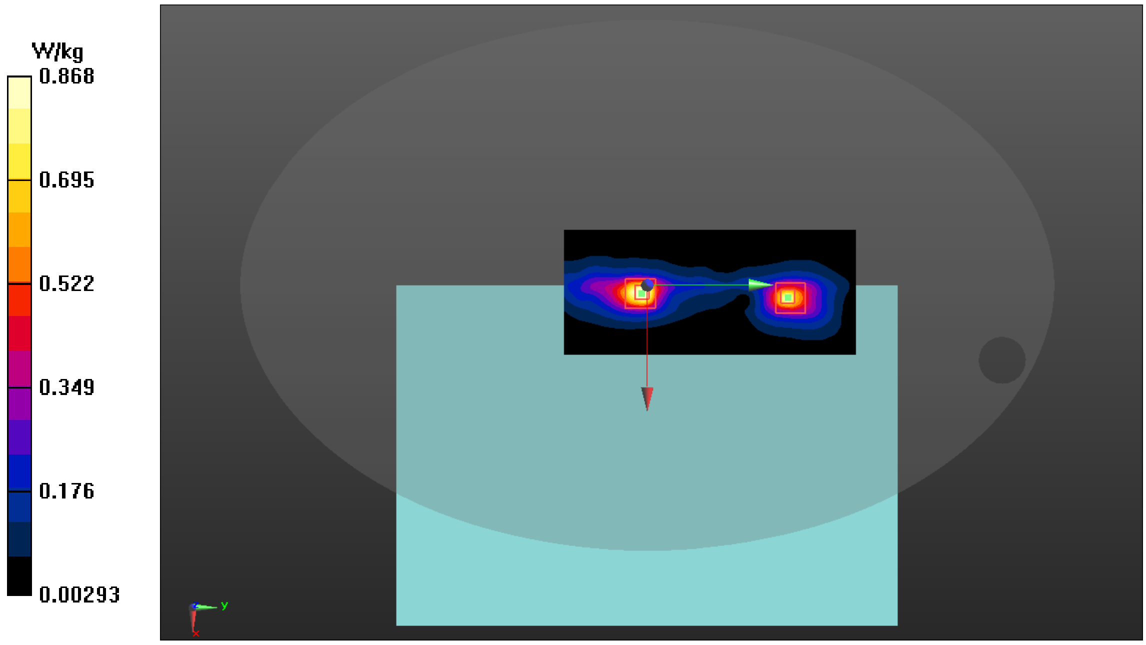


Figure C.15: SAR Body Testing Results for the A2485 at 5530 MHz

Date/Time: 20/08/2021 12:02:38

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC Core 0 Bottom- 20 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-3 Standalone (5735 - 5835 MHz); Frequency: 5775 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5775 MHz; σ = 5.183 S/m; ε_r = 33.829; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(4.8, 4.8, 4.8) @ 5775 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz Core 0 -Bottom of EUT/Core 0 - Bottom- ch155 q55/Area Scan (91x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.05 W/kg

5GHz Core 0 -Bottom of EUT/Core 0 - Bottom- ch155 q55/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 17.17 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 2.39 W/kg
SAR(1 g) = 0.469 W/kg; SAR(10 g) = 0.153 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.16 W/kg

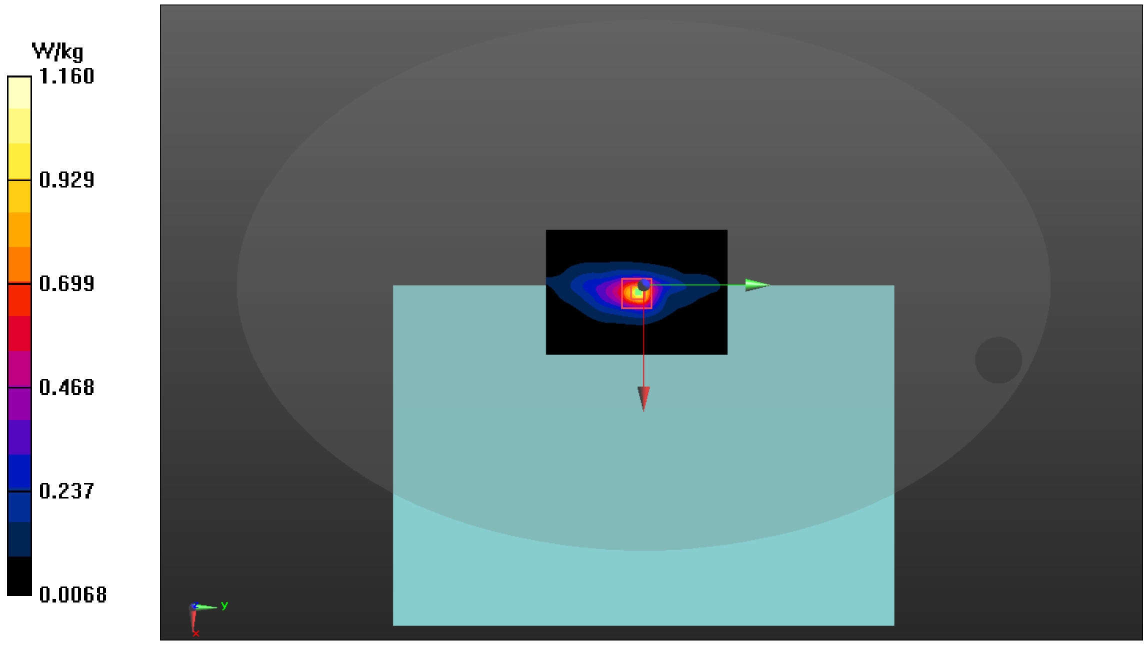


Figure C.16: SAR Body Testing Results for the A2485 at 5775 MHz

Date/Time: 20/08/2021 15:19:14

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC Core 1 Bottom- 20 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-3 Standalone (5735 - 5835 MHz); Frequency: 5775 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5775 MHz; σ = 5.183 S/m; ε_r = 33.829; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(4.8, 4.8, 4.8) @ 5775 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz Core 1 -Bottom of EUT/Core 1 - Bottom- ch155 q54/Area Scan (91x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.897 W/kg

5GHz Core 1 -Bottom of EUT/Core 1 - Bottom- ch155 q54/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (9x9x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.06 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 0.380 W/kg; SAR(10 g) = 0.133 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.972 W/kg

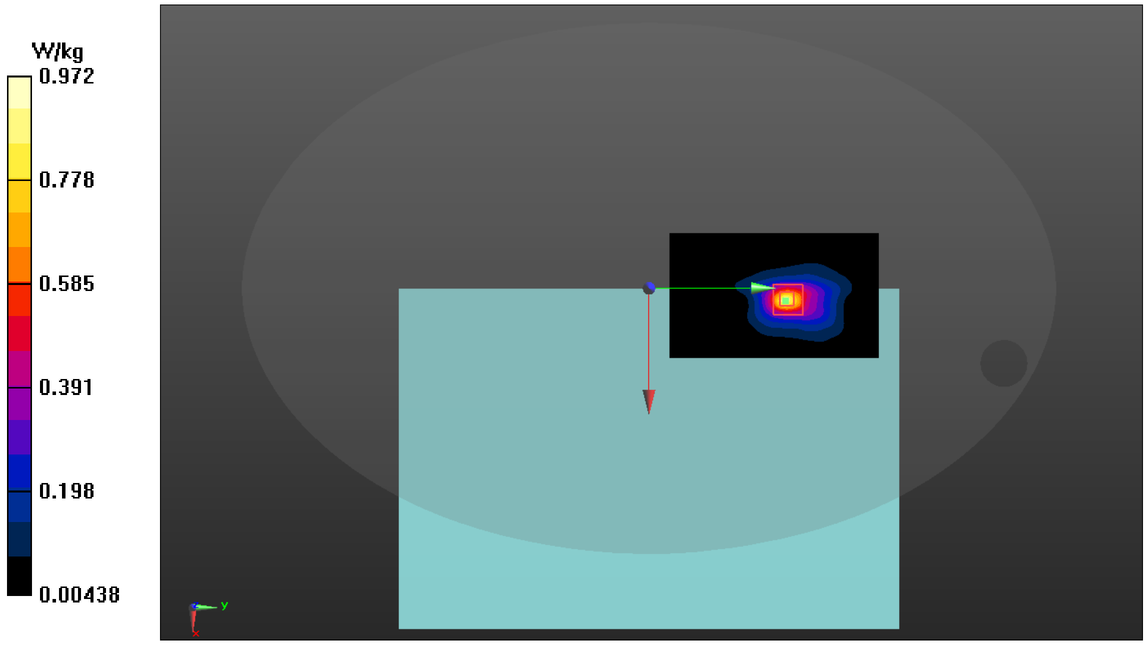


Figure C.17: SAR Body Testing Results for the A2485 at 5775 MHz

Date/Time: 25/08/2021 12:21:48

Test Laboratory: TUV SUD

WIFI 5Ghz ISEDC MIMO Core 0 + Core 1 Back- 25 08 21

DUT: A2485

Communication System: UID 10544 - AAB, IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle); Communication System Band: U-NII-3 Standalone (5735 - 5835 MHz); Frequency: 5775 MHz;Communication System PAR: 8.467 dB; PMF: 1.01391
Medium parameters used (interpolated): f = 5775 MHz; σ = 5.168 S/m; ε_r = 33.705; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

Probe: EX3DV4 - SN7536; ConvF(4.8, 4.8, 4.8) @ 5775 MHz; Calibrated: 18/06/2021

Modulation Compensation: PMR for UID 10544 - AAB, Calibrated: 18/06/2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -14.0, 25.0

Electronics: DAE4 Sn1584; Calibrated: 09/06/2021

Phantom: ELI V8.0 (REAR); Type: QD OVA 004 Ax; Serial: 2102

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

5GHz MIMO-Bottom/Core 0 + Core 1 - Bottom- ch155 q54/Area Scan (91x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.803 W/kg

5GHz MIMO-Bottom/Core 0 + Core 1 - Bottom- ch155 q54/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 14.37 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.323 W/kg; SAR(10 g) = 0.113 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.804 W/kg

5GHz MIMO-Bottom/Core 0 + Core 1 - Bottom- ch155 q54/Zoom Scan 2(4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 14.37 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.335 W/kg; SAR(10 g) = 0.109 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.858 W/kg

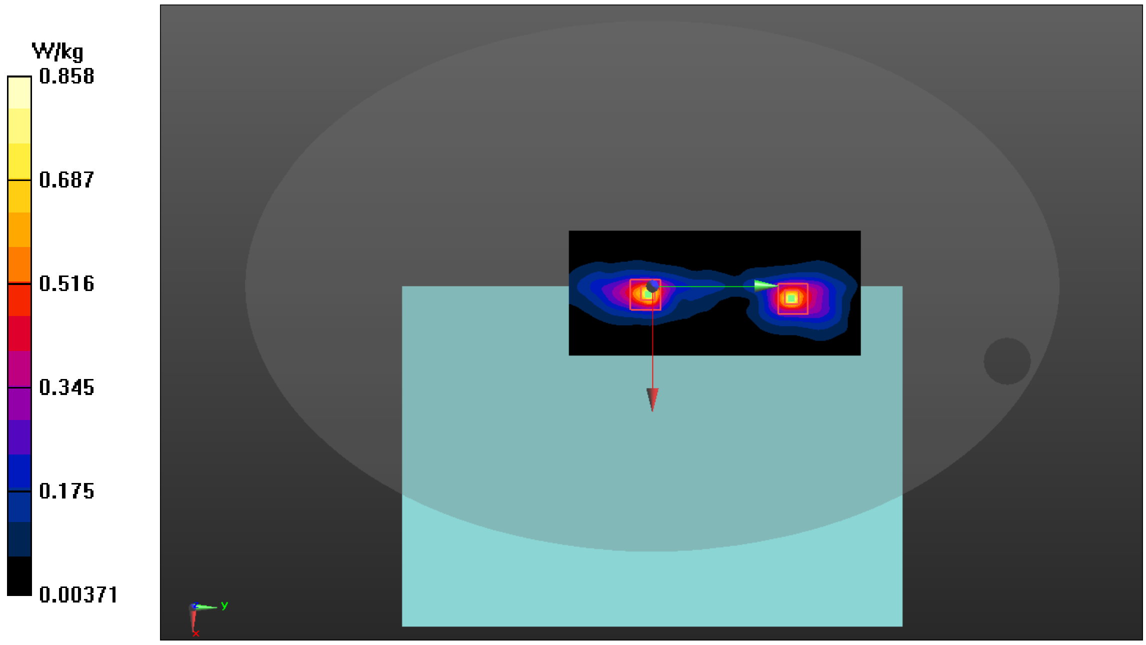
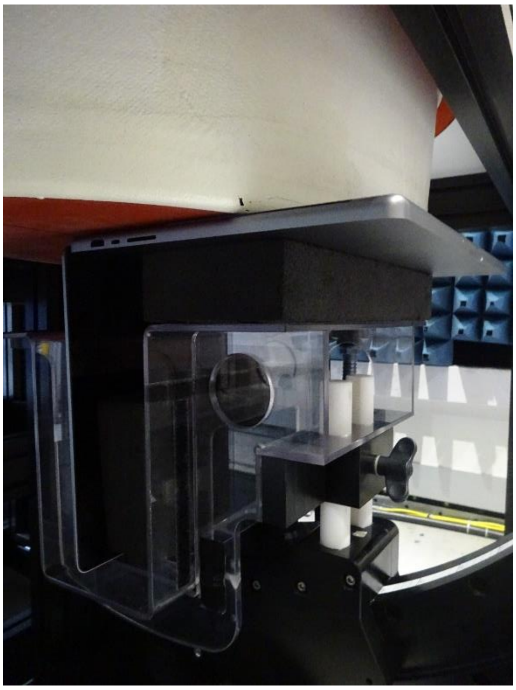


Figure C.18: SAR Body Testing Results for the A2485 at 5775 MHz

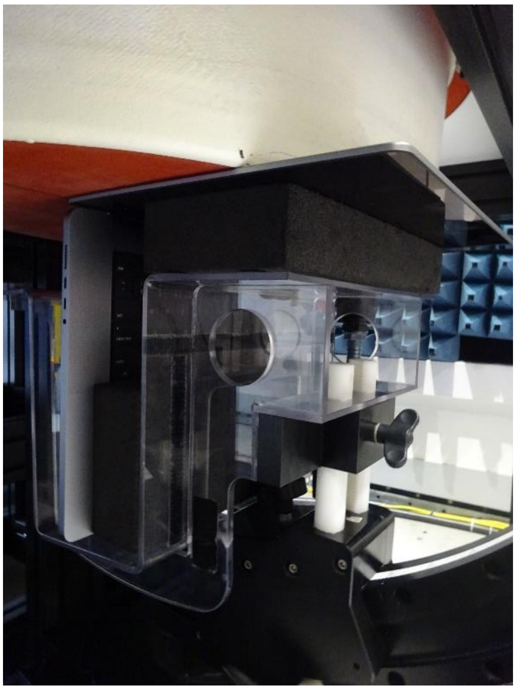
ANNEX D

PHOTOGRAPHS

TEST POSITIONAL PHOTOGRAPHS



Bottom – 0 mm separation distance.



Rear of Display – 0 mm separation distance.

PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Top

Bottom

- **ANNEX E**

- **TIME AVERAGED SAR VERIFICATION**

Time Average SAR Verification – ISED

1.0 Introduction

The following verification was completed at the client's site in the UK, using the clients own test equipment and verification procedures.

1.1 Time-Averaged SAR Verification Summary

This device supports the manufacturer's time-averaged SAR (TAS) mechanism for WLAN operations. The output power is controlled in real-time so that the power averaged over any 60 second window does not exceed the 1gm power level tested for SAR in this report. The time-averaged SAR algorithm tracks the energy contribution relative to the available energy budget for each transmitter, defined as the "utilization ratio". Once the utilization ratios for each of the individual WLAN transmitters are calculated, they are summed to derive the overall WLAN system power utilization ratio. This metric is used by the WLAN chipset to manage power levels over time and ensure that SAR limits are never exceeded.

As per ISED Algorithm acceptance letter, the following test scenarios were defined to validate the TAS mechanism. The specific scenarios are constructed to validate the operation of the algorithm in all operational states, including transitions between states/antennas:

• Change in Antenna

• Change in Band (includes connection drop scenario)

Predefined transmit profiles for each test scenario are provided by the manufacturer's test automation software to control the operation of the DUT while synchronized operational data was recorded from internal firmware and external power monitors. The data was plotted over time relative to the utilization limit to demonstrate that the maximum time-averaged power is never exceeded. "Reported" values were output and captured directly from DUT firmware, while "Measured" results were obtained from external power meter. The uncertainty budget applied to the WLAN power control functions for this device is 1.5 dB. In all test cases, WLAN radios were configured to operate at 100% duty cycle.

Table 1-1
Test Configurations for Time-Averaged SAR Verification

Mode	Antenna	Channel	Plim (dBm)	Plim (mW)
802.11b	Core 0 – WF2	6	17.25	53.1
802.11b	Core 1 – WF1	6	17.25	53.1
802.11a	Core 0 – WF2	149	12.75	18.8
802.11a	Core 1 – WF1	149	12.75	18.8

Plim is the maximum time-averaged output power evaluated for SAR compliance

1.2 Verification Summary

Scenario 1: Change in Antenna from Core 0 to Core 1

For this test, the effect on the time-averaging algorithm from a change in the active transmit antenna was evaluated. Figures F-1 and F-2 show a switch of 2.4 GHz transmissions from Core 0(WF2) to Core 1(WF1) at Time = 120 s. The test automation is controlling the WLAN radios to operate at 100% duty cycle. The utilization ratio never exceeds 100% and the average transmit power never exceeds the Plim of each respective antenna.

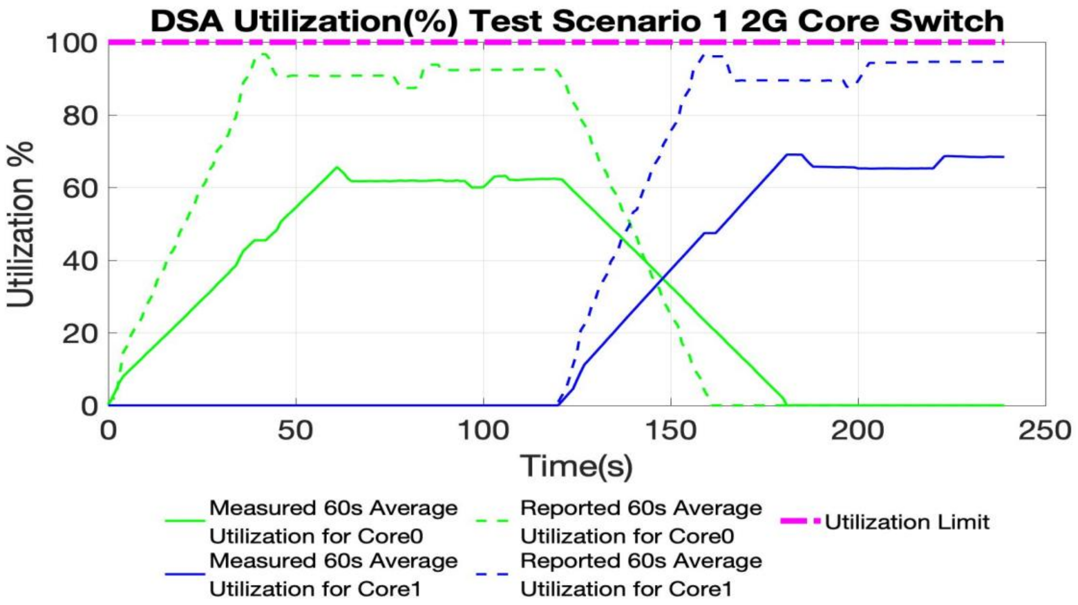


Figure F - 1
60 Sec Average SAR Utilization vs. Time, 2.4 GHz

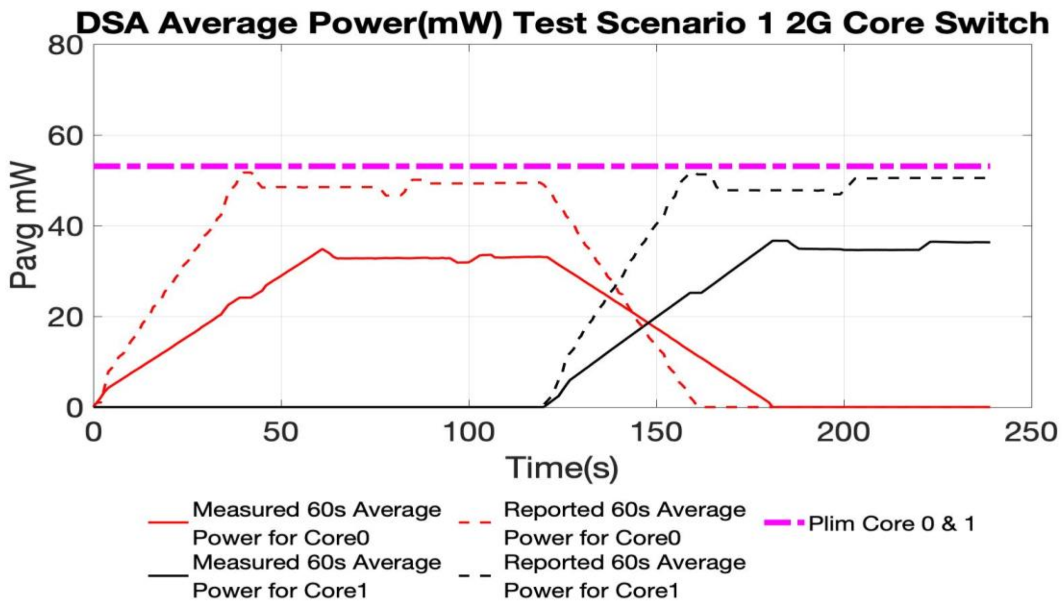


Figure F - 2
60 Sec Average Power vs. Time, 2.4 GHz

For this test, the effect on the time-averaging algorithm from a change in the active transmit antenna was evaluated. Figures F-3 and F-4 show a switch of 5 GHz transmissions from Core 0(WF2) to Core 1(WF1) at Time = 120 s. The test automation is controlling the WLAN radios to operate at 100% duty cycle. The utilization ratio never exceeds 100% and the average transmit power never exceeds the Plim of each respective antenna.

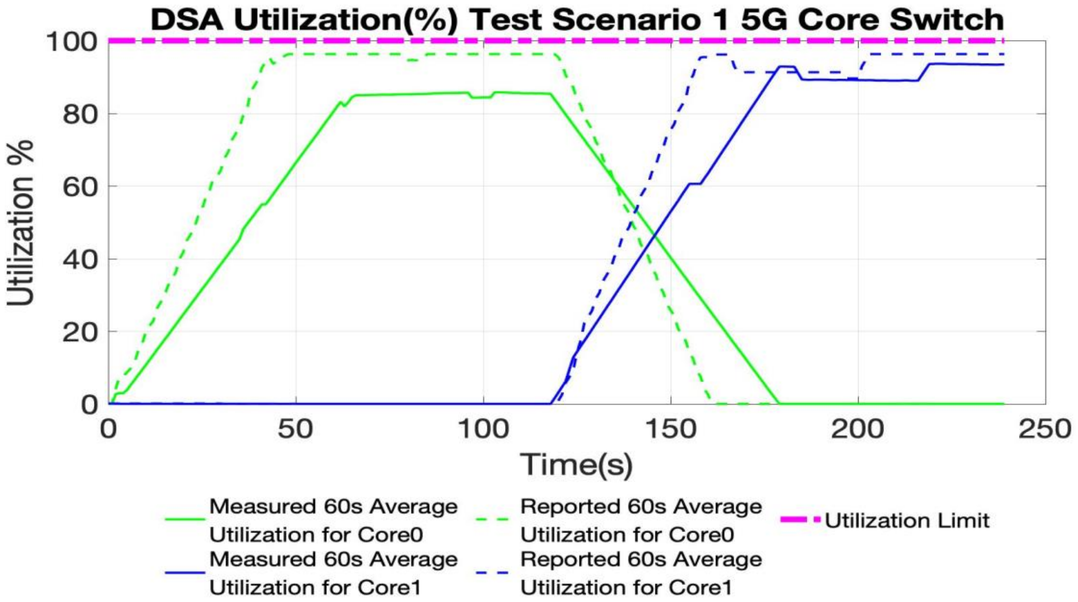


Figure F - 3
60 Sec Average SAR Utilization vs. Time, 5 GHz

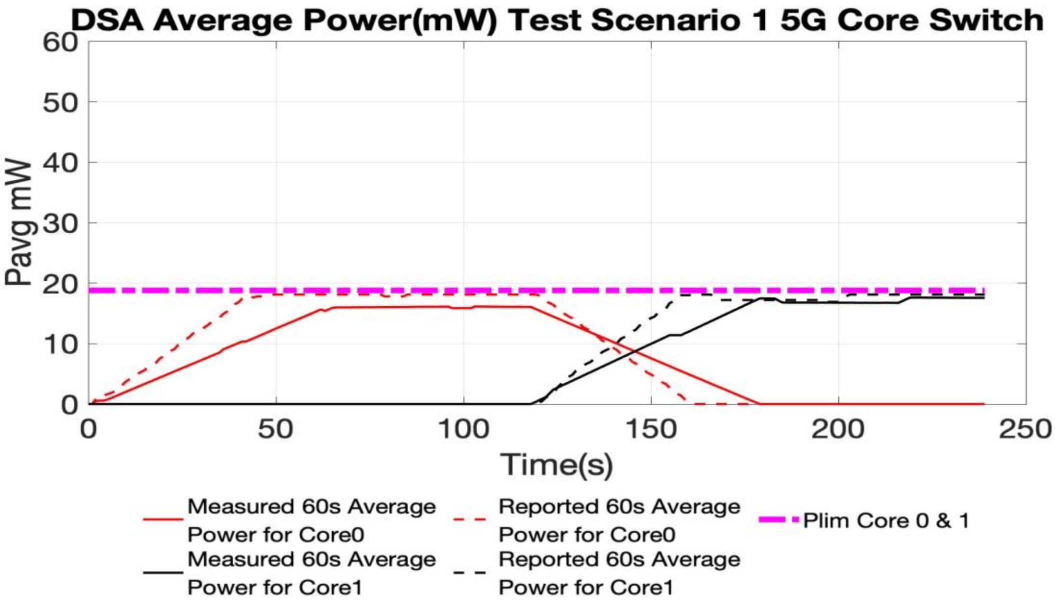


Figure F - 4
60 Sec Average Power vs. Time, 5 GHz

Scenario 2: Change in Band Test Case on the same Antenna

This test demonstrates the efficacy of the time-averaged SAR algorithm while switching between 2.4 GHz and 5 GHz WLAN bands. In addition, it shows that the algorithm tracks time-averaged power and system utilization when the active transmitter is disabled and then reconnects.

The 2.4 GHz (Core 0 - WF2) transmitter is active at 100% duty cycle until Time = 120 s. When 2.4 GHz transmissions cease, the 5 GHz (Core 0 - WF2) transmitter is activated and begins to negotiate a new connection. The connection is established and the increase in average transmit power and utilization can clearly be seen. In this case the utilization ratio never exceeds 100% and the average transmit power never exceeds the Plim of each respective antenna. Figures G-5/6 show a switch from 2.4 GHz to 5 GHz transmissions on Core 0 -WF2.

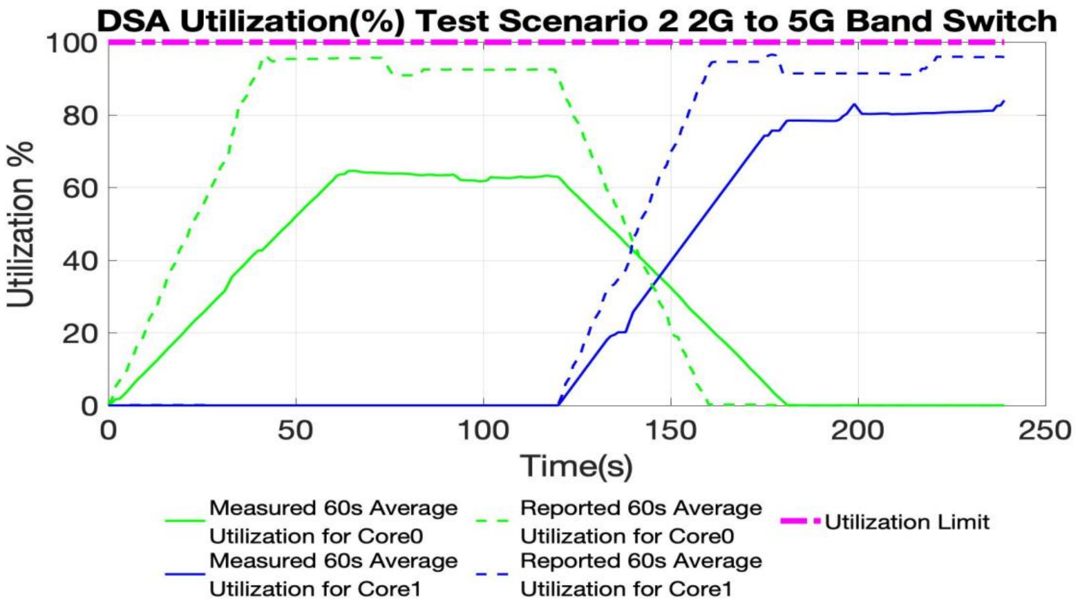


Figure F - 5
60 Sec Average SAR Utilization vs. Time during Band Switch

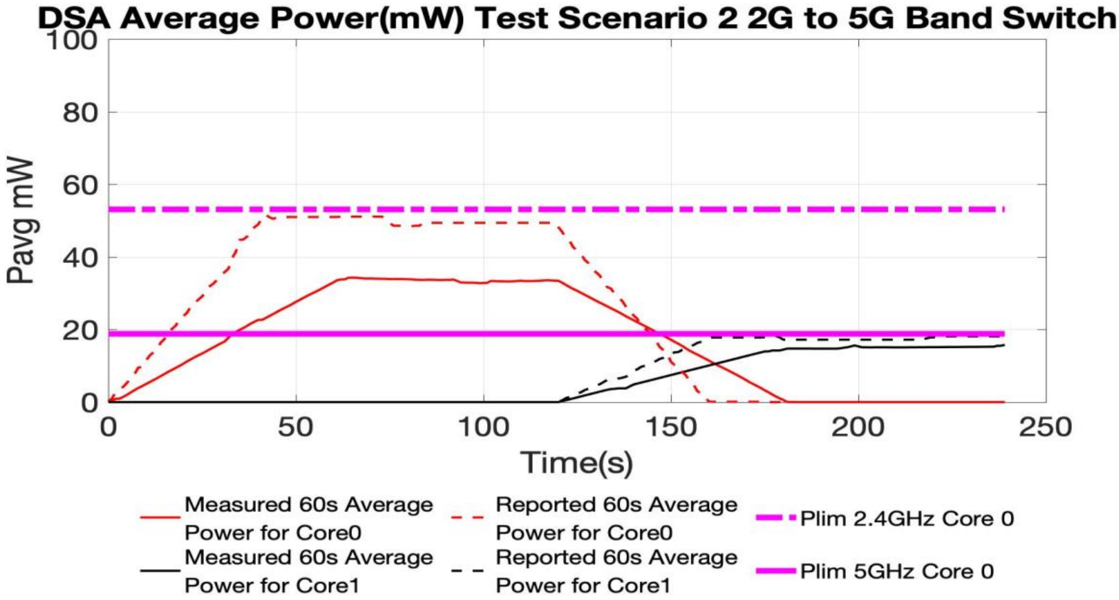


Figure F - 6
60 Sec Average Power vs. Time during Band Switch

Time Average SAR Verification - FCC

1.0 Introduction

The following verification was completed at the client’s site in the UK, using the clients own test equipment and verification procedures.

1.1 Time-Averaged SAR Verification Summary

This device supports the manufacturer’s time-averaged SAR (TAS) mechanism for WLAN operations. The output power is controlled in real-time so that the power averaged over any 60 second window does not exceed the 1gm power level tested for SAR in this report. The time-averaged SAR algorithm tracks the energy contribution relative to the available energy budget for each transmitter, defined as the “utilization ratio”. Once the utilization ratios for each of the individual WLAN transmitters are calculated, they are summed to derive the overall WLAN system power utilization ratio. This metric is used by the WLAN chipset to manage power levels over time and ensure that SAR limits are never exceeded.

As per FCC guidance, the following test scenarios were defined to validate the TAS mechanism. The specific scenarios are constructed to validate the operation of the algorithm in all operational states, including transitions between states/antennas:

• Change in Antenna

• Change in Band (includes connection drop scenario)

Predefined transmit profiles for each test scenario are provided by the manufacturer’s test automation software to control the operation of the DUT while synchronized operational data was recorded from internal firmware and external power monitors. The data was plotted over time relative to the utilization limit to demonstrate that the maximum time-averaged power is never exceeded. “Reported” values were output and captured directly from DUT firmware, while “Measured” results were obtained from external power meter. The uncertainty budget applied to the WLAN power control functions for this device is 1.5 dB. In all test cases, WLAN radios were configured to operate at 100% duty cycle.

Table 1-1
Test Configurations for Time-Averaged SAR Verification

Mode	Antenna	Channel	Plim (dBm)	Plim (mW)
802.11b	Core 0 – WF2	6	18.0	63.1
802.11b	Core 1 – WF1	6	18.0	63.1
802.11a	Core 0 – WF2	149	13.5	22.4
802.11a	Core 1 – WF1	149	13.5	22.4

Plim is the maximum time-averaged output power evaluated for SAR compliance

1.2 Verification Summary

Scenario 1: Change in Antenna from Core 0 to Core 1

For this test, the effect on the time-averaging algorithm from a change in the active transmit antenna was evaluated. Figures F-1 and F-2 show a switch of 2.4 GHz transmissions from Core 0(WF2) to Core 1(WF1) at Time = 120 s. The test automation is controlling the WLAN radios to operate at 100% duty cycle. The utilization ratio never exceeds 100% and the average transmit power never exceeds the Plim of each respective antenna.

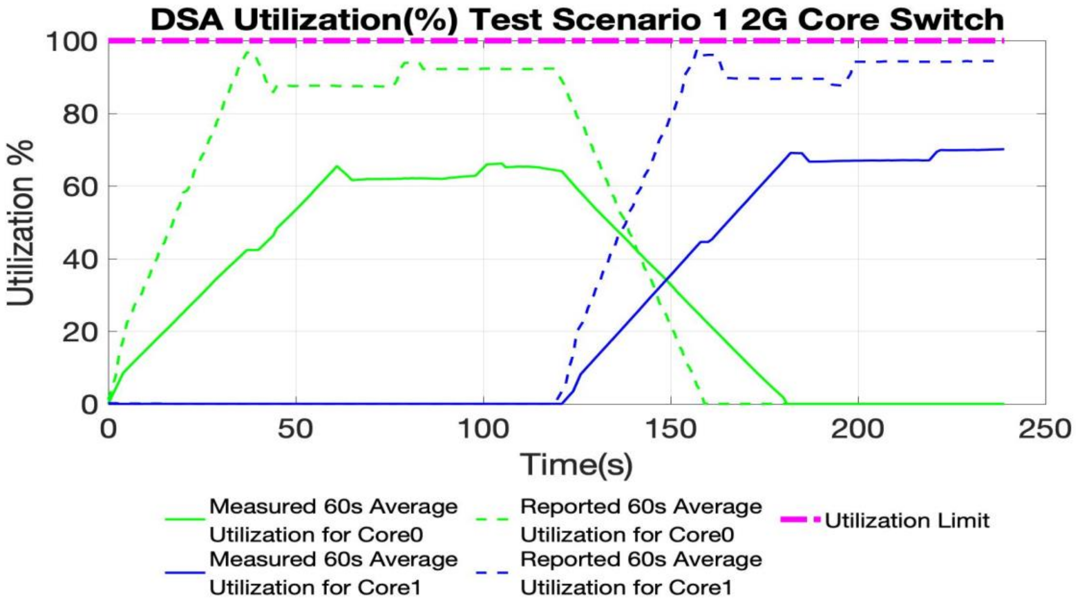


Figure F - 1
60 Sec Average SAR Utilization vs. Time, 2.4 GHz

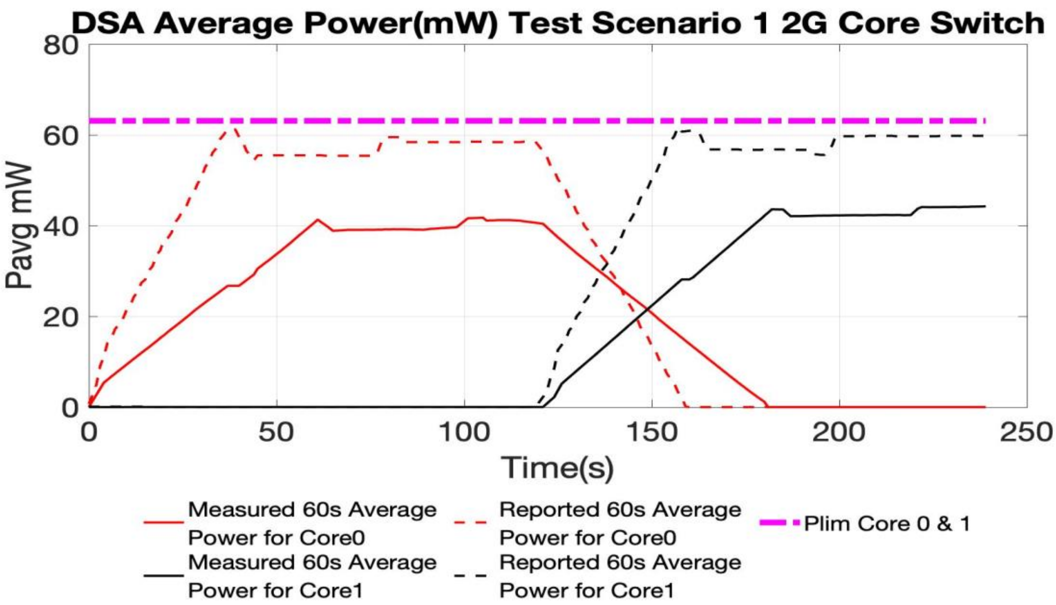


Figure F - 2
60 Sec Average Power vs. Time, 2.4 GHz

For this test, the effect on the time-averaging algorithm from a change in the active transmit antenna was evaluated. Figures F-3 and F-4 show a switch of 5 GHz transmissions from Core 0(WF2) to Core 1(WF1) at Time = 120 s. The test automation is controlling the WLAN radios to operate at 100% duty cycle. The utilization ratio never exceeds 100% and the average transmit power never exceeds the Plim of each respective antenna.

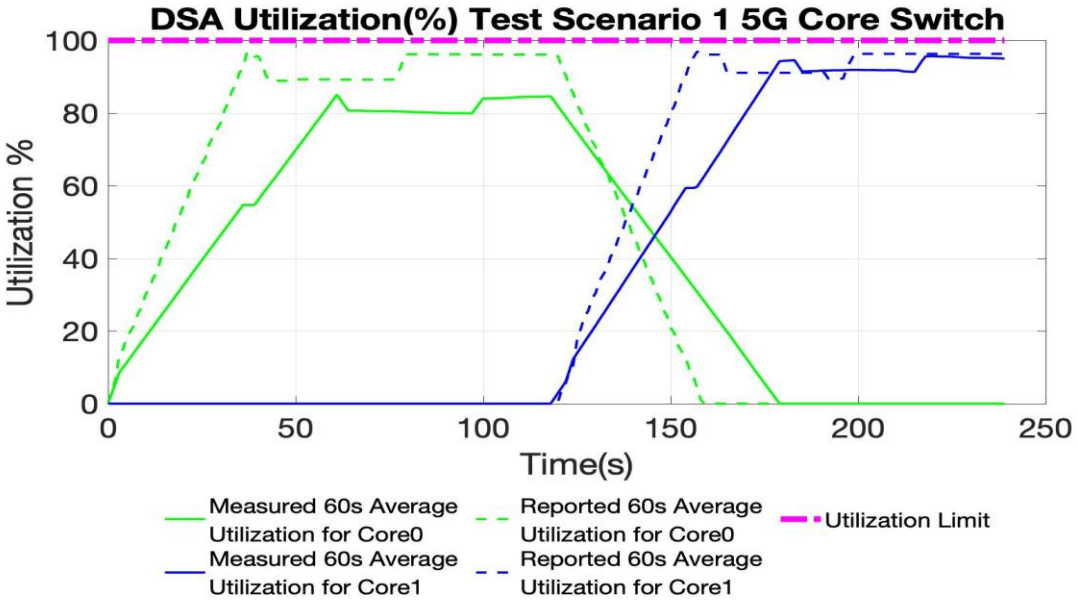


Figure F - 3
60 Sec Average SAR Utilization vs. Time, 5 GHz

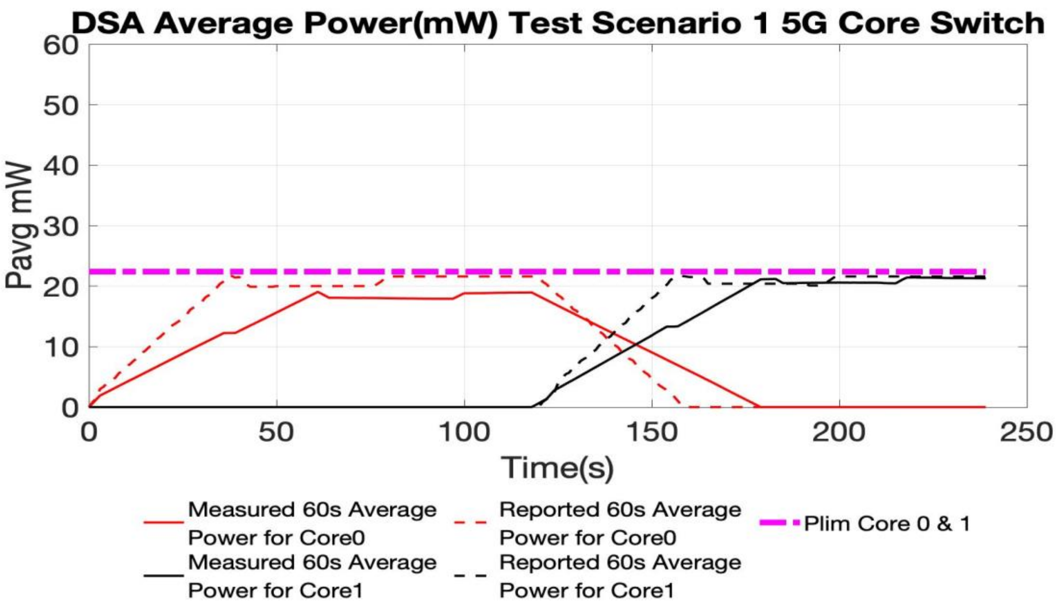


Figure F - 4
60 Sec Average Power vs. Time, 5 GHz

Scenario 2: Change in Band Test Case on the same Antenna

This test demonstrates the efficacy of the time-averaged SAR algorithm while switching between 2.4 GHz and 5 GHz WLAN bands. In addition, it shows that the algorithm tracks time-averaged power and system utilization when the active transmitter is disabled and then reconnects.

The 2.4 GHz (Core 0 - WF2) transmitter is active at 100% duty cycle until Time = 120 s. When 2.4 GHz transmissions cease, the 5 GHz (Core 0 - WF2) transmitter is activated and begins to negotiate a new connection. The connection is established and the increase in average transmit power and utilization can clearly be seen. In this case the utilization ratio never exceeds 100% and the average transmit power never exceeds the Plim of each respective antenna. Figures G-5/6 show a switch from 2.4 GHz to 5 GHz transmissions on Core 0 -WF2.

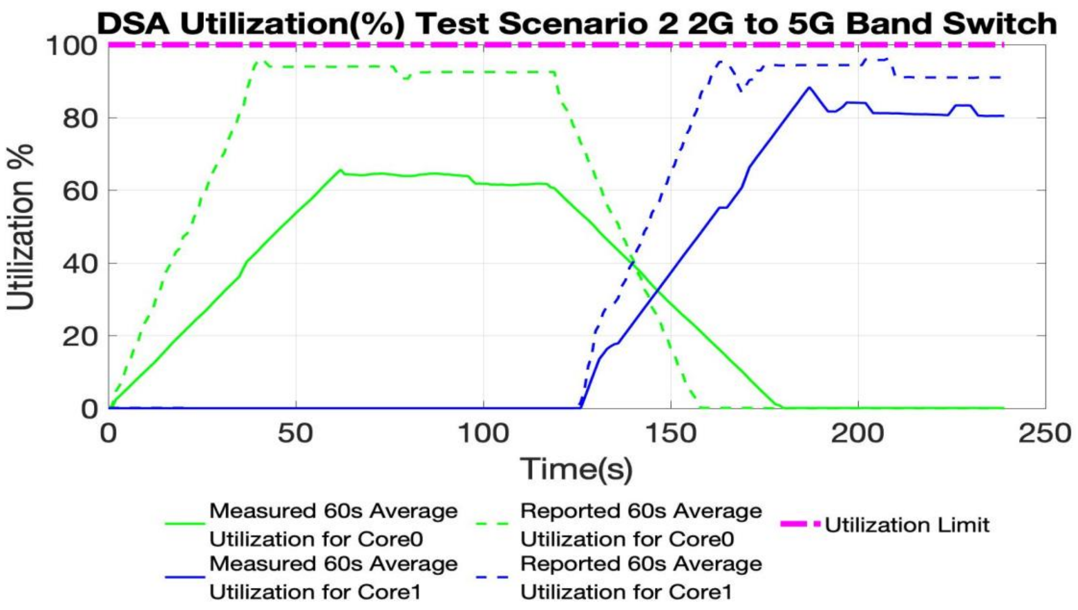


Figure F - 5
60 Sec Average SAR Utilization vs. Time during Band Switch

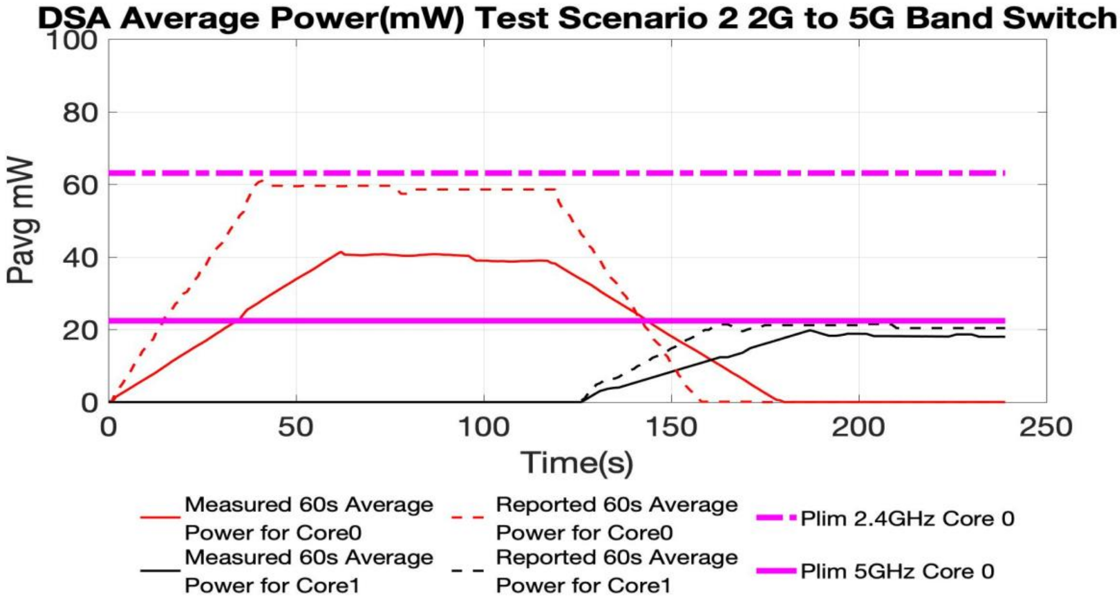


Figure F - 6
60 Sec Average Power vs. Time during Band Switch