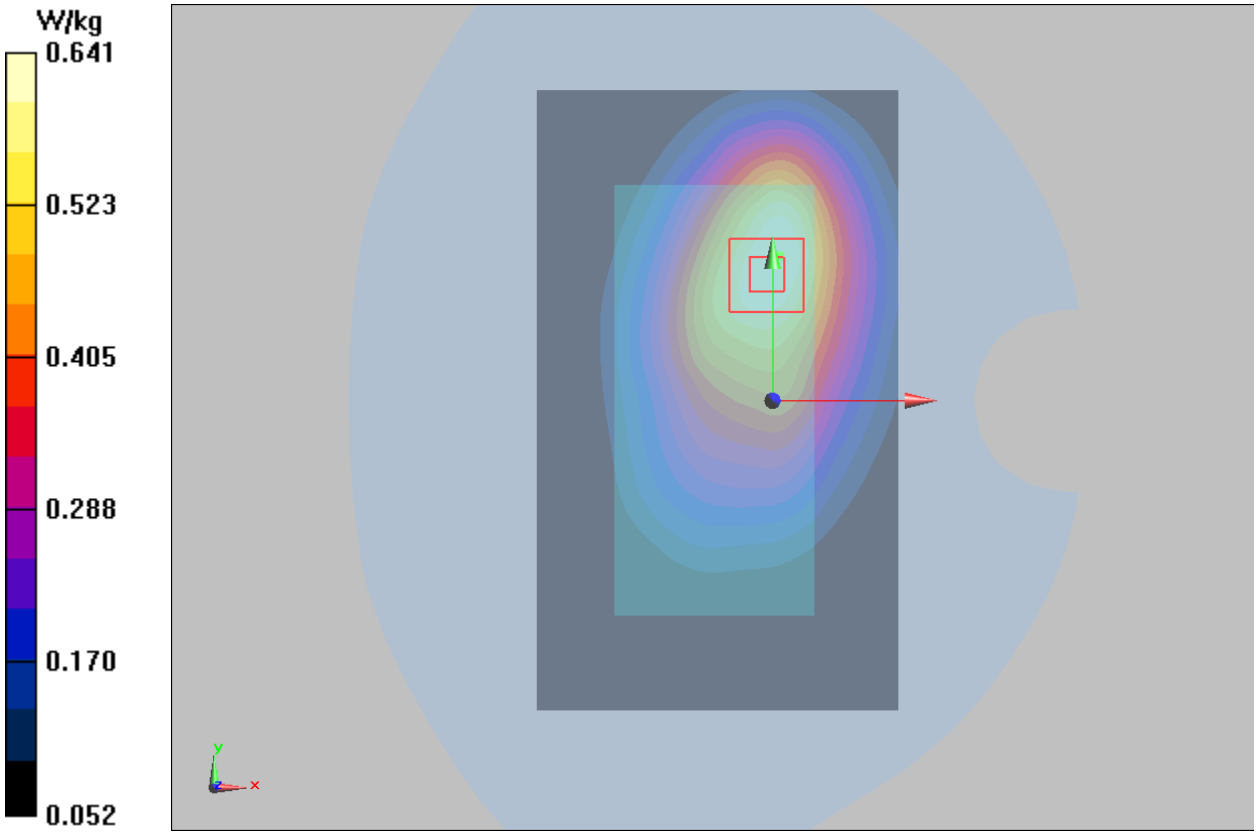
Plot 48 LTE Band 12 1RB Front Side Middle (Distance 10mm)

Date: 5/25/2020
Communication System: UID 0, LTE (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.848 S/m; εr = 42.763; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (7x12x1): Measurement grid: dx=15 mm, dy=15 mm
Maximum value of SAR (measured) = 0.655 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.07 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 0.830 W/kg
SAR(1 g) = 0.610 W/kg; SAR(10 g) = 0.435 W/kg
Maximum value of SAR (measured) = 0.641 W/kg



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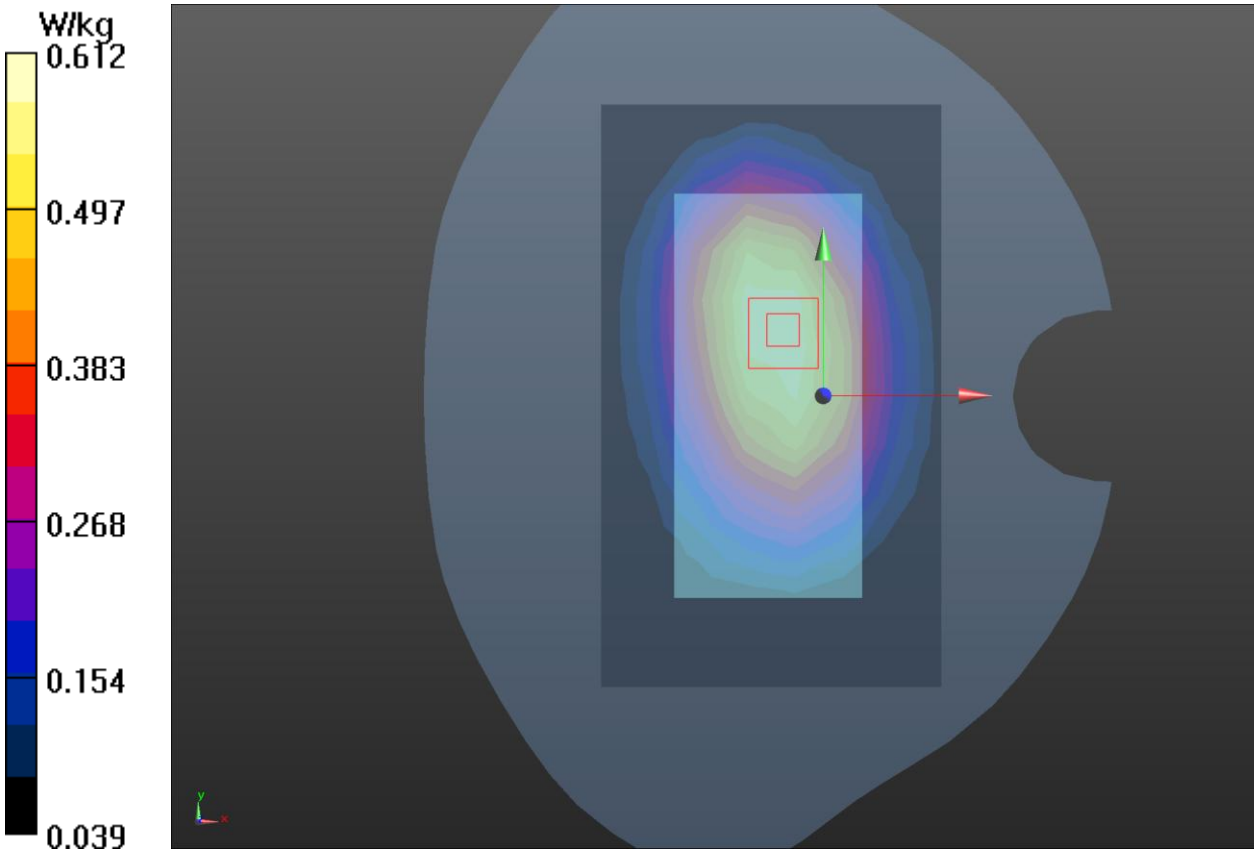
Plot 49 LTE Band 12 1RB Back Side Middle (Distance 0mm)

Date: 6/28/2020
Communication System: UID 0, LTE (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.848 S/m; εr = 42.763; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN7515; ConvF(9.88, 9.88, 9.88); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.486 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.83 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.725 W/kg
SAR(1 g) = 0.588 W/kg; SAR(10 g) = 0.407 W/kg
Maximum value of SAR (measured) = 0.612 W/kg



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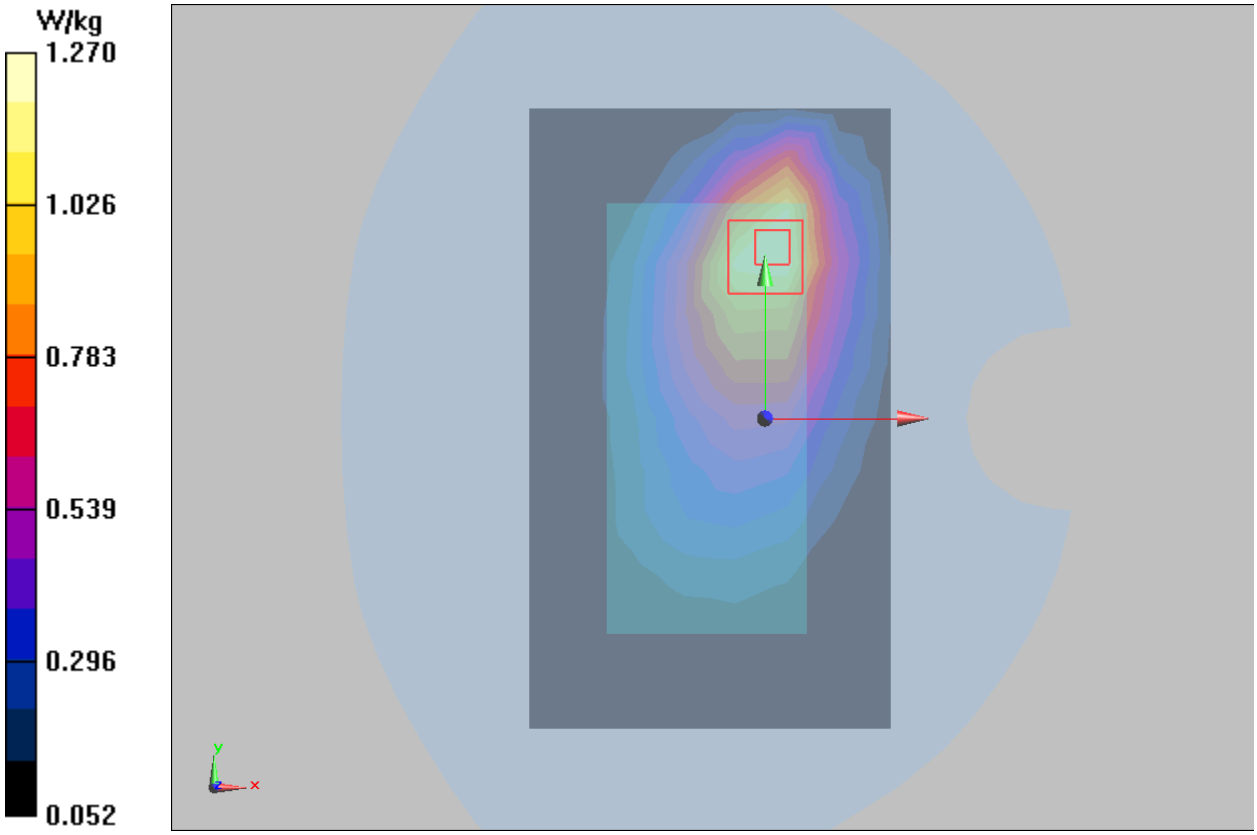
Plot 50 LTE Band 12 1RB Front Side Middle (Distance 0mm)

Date: 5/25/2020
Communication System: UID 0, LTE (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.848 S/m; εr = 42.763; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.17 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.87 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.761 W/kg
Maximum value of SAR (measured) = 1.27 W/kg



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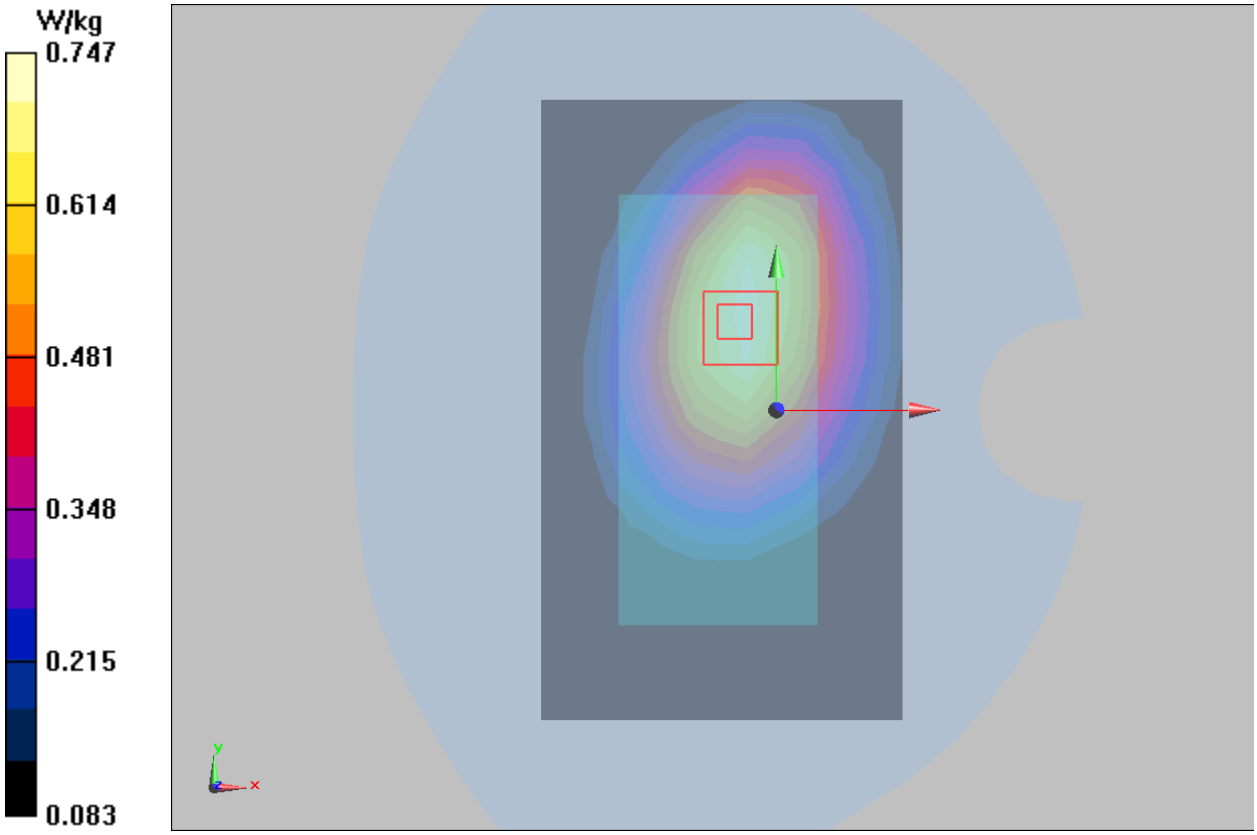
Plot 51 LTE Band 13 1RB Front Side Middle (Distance 10mm)

Date: 5/25/2020
Communication System: UID 0, LTE-FDD (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used: f = 782 MHz; σ = 0.887 S/m; εr = 42.079; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.735 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.15 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.922 W/kg
SAR(1 g) = 0.717 W/kg; SAR(10 g) = 0.530 W/kg
Maximum value of SAR (measured) = 0.747 W/kg



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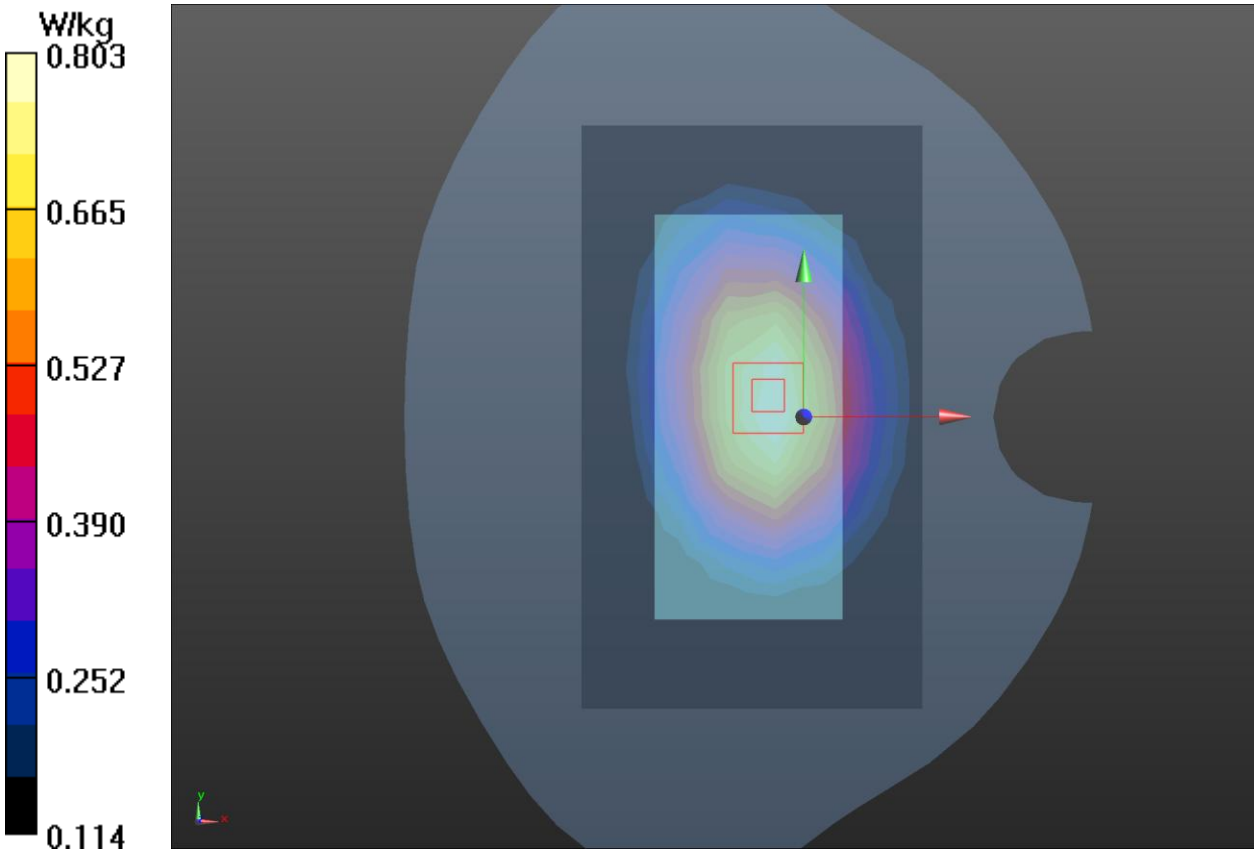
Plot 52 LTE Band 13 1RB Back Side Middle (Distance 0mm)

Date: 6/28/2020
Communication System: UID 0, LTE (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used: f = 782 MHz; σ = 0.887 S/m; εr = 42.079; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN7515; ConvF(9.88, 9.88, 9.88); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.821 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.02 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.952 W/kg
SAR(1 g) = 0.761 W/kg; SAR(10 g) = 0.559 W/kg
Maximum value of SAR (measured) = 0.803 W/kg



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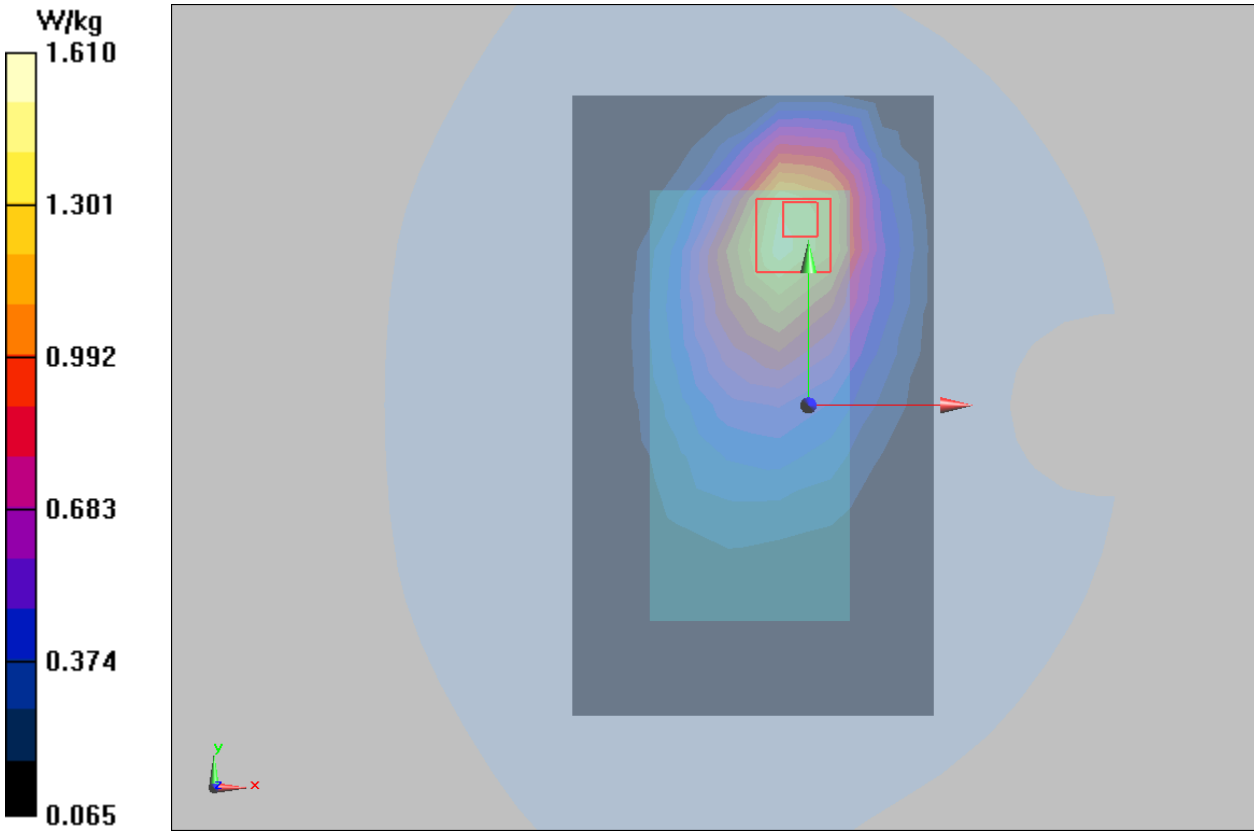
Plot 53 LTE Band 13 1RB Front Side Middle (Distance 0mm)

Date: 5/25/2020
Communication System: UID 0, LTE-FDD (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used: f = 782 MHz; σ = 0.887 S/m; εr = 42.079; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.47 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.89 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 2.34 W/kg
SAR(1 g) = 1.47 W/kg; SAR(10 g) = 0.941 W/kg
Maximum value of SAR (measured) = 1.610 W/kg



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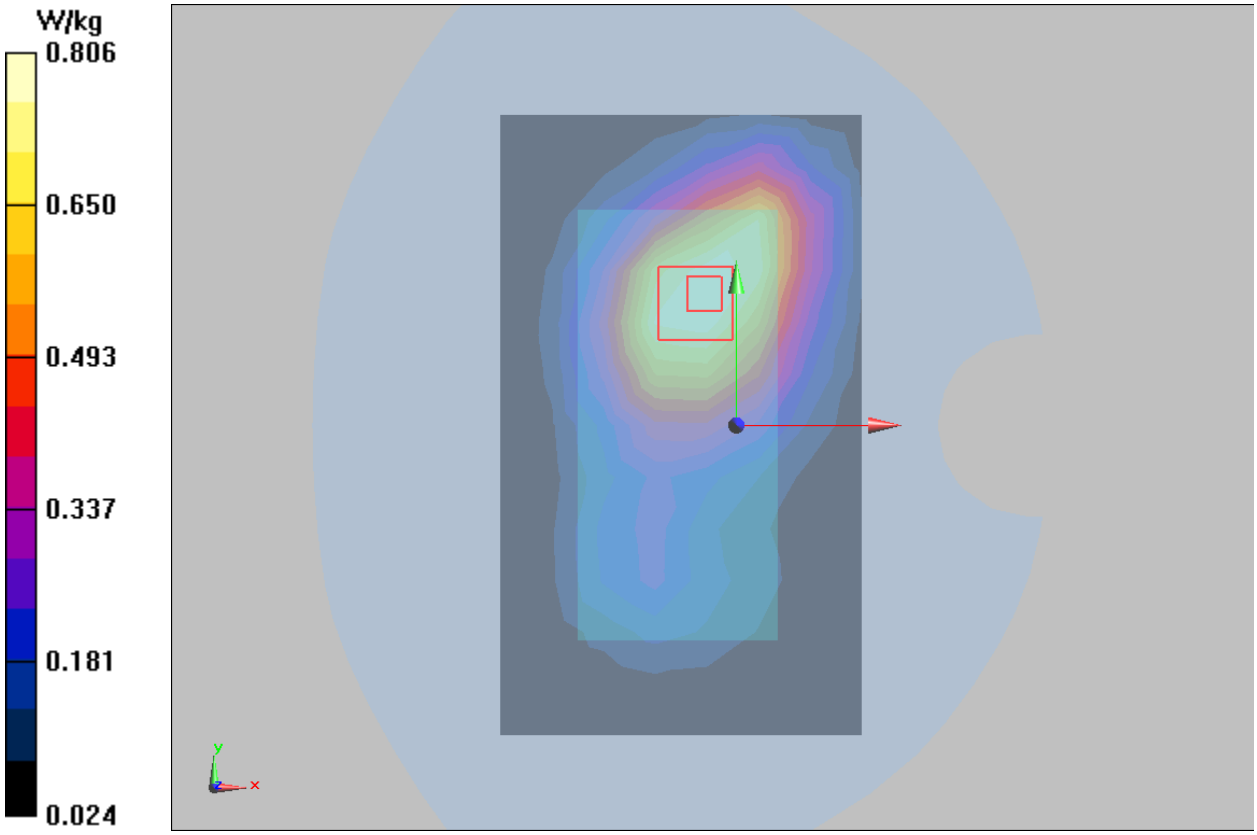
Plot 54 LTE Band 25 1RB Front Side Low (Distance 10mm)

Date: 5/22/2020
Communication System: UID 0, LTE-FDD (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.407 S/m; εr = 39.071; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.79, 7.79, 7.79); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Low/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.791 W/kg

Front Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.51 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.758 W/kg; SAR(10 g) = 0.478 W/kg
Maximum value of SAR (measured) = 0.806 W/kg



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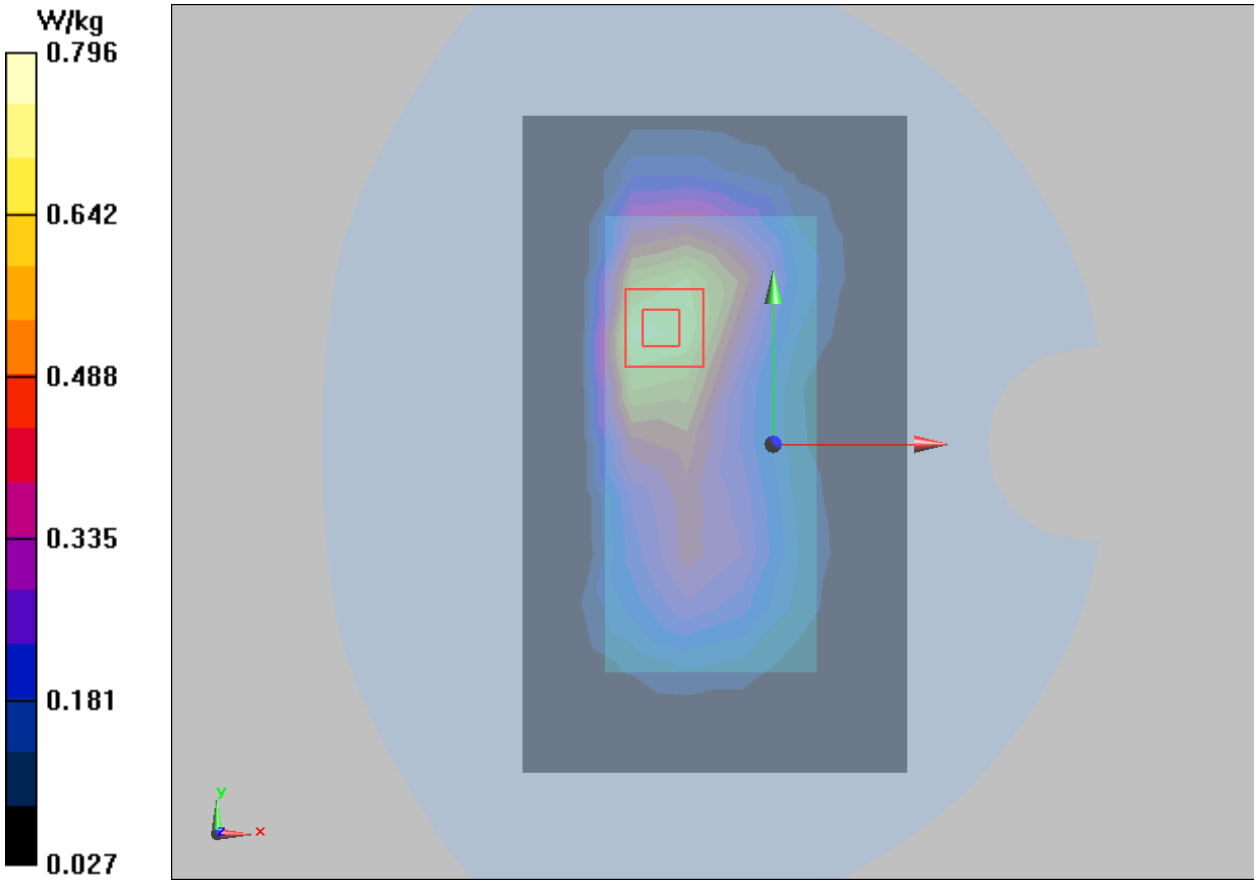
Plot 55 LTE Band 25 1RB Back Side Low (Distance 0mm)

Date: 6/28/2020
Communication System: UID 0, LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.379 S/m; εr = 38.4; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(8.18, 8.18, 8.18); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Low/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.711 W/kg

Back Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.58 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.739 W/kg; SAR(10 g) = 0.457 W/kg
Maximum value of SAR (measured) = 0.796 W/kg



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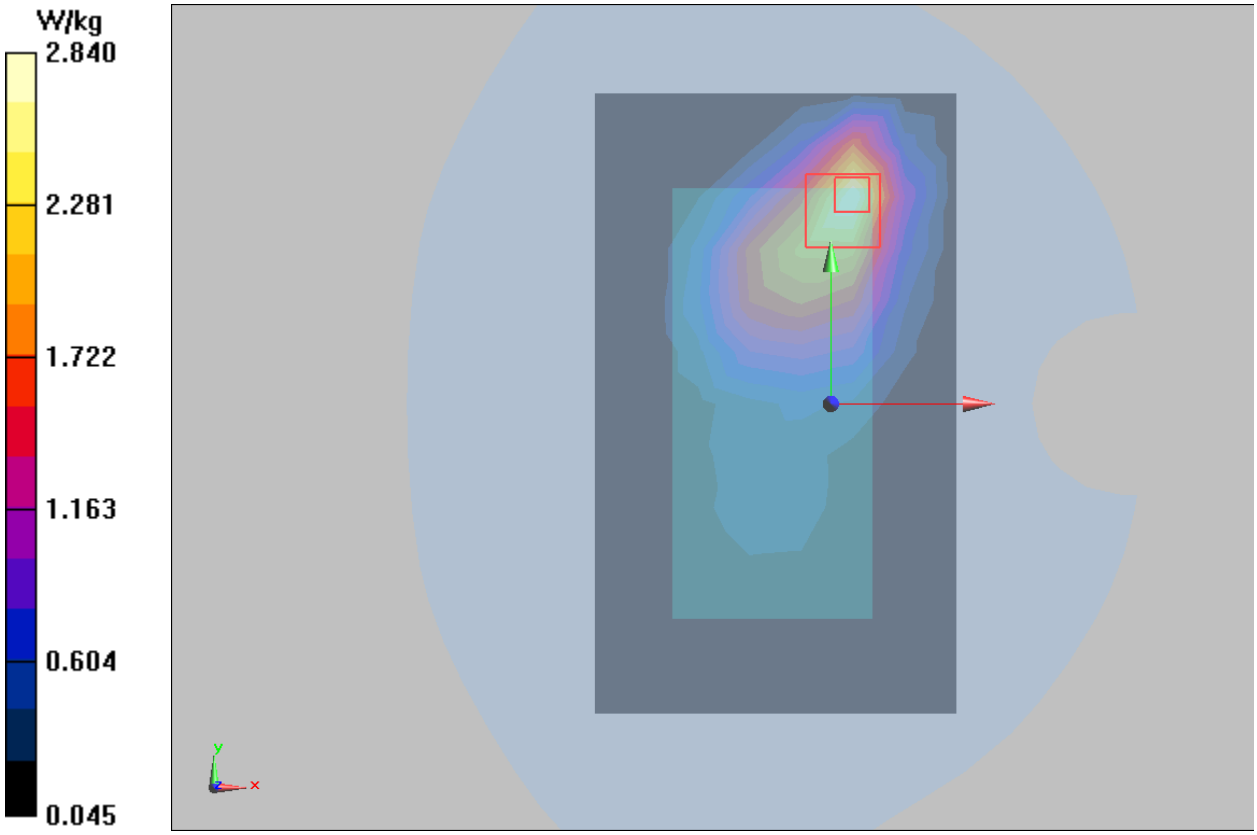
Plot 56 LTE Band 25 1RB Front Side Low (Distance 0mm)

Date: 5/22/2020
Communication System: UID 0, LTE-FDD (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.407 S/m; εr = 39.071; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.79, 7.79, 7.79); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Low/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.92 W/kg

Front Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.40 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 5.27 W/kg
SAR(1 g) = 2.71 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 2.840 W/kg



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Plot 57 LTE Band 26 1RB Front Side High (Distance 10mm)

Date: 5/23/2020

Communication System: UID 0, LTE-FDD (0); Frequency: 831.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 841.5 MHz; σ = 0.919 S/m; εr = 42.185; ρ = 1000 kg/m3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.20, 9.20, 9.20); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side High/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.641 W/kg

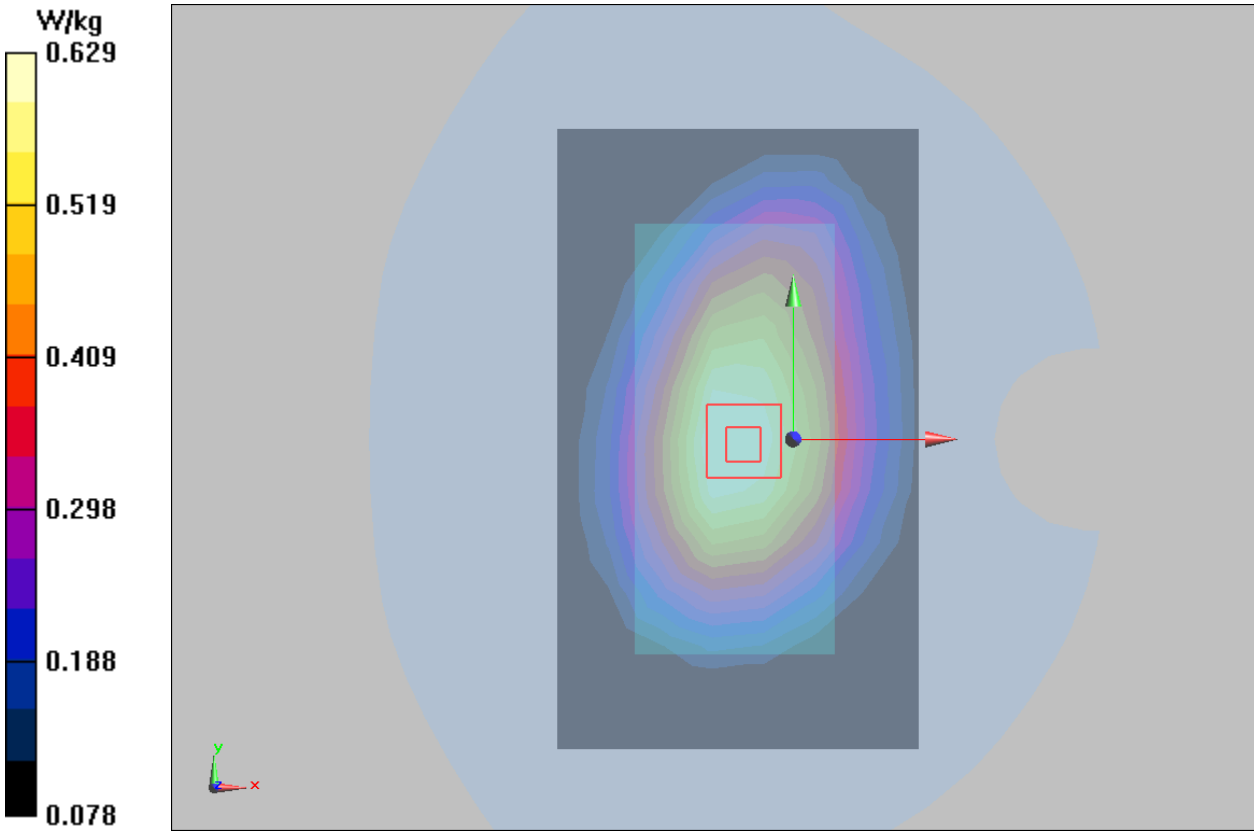
Front Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.82 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.777 W/kg

SAR(1 g) = 0.602 W/kg; SAR(10 g) = 0.444 W/kg

Maximum value of SAR (measured) = 0.629 W/kg



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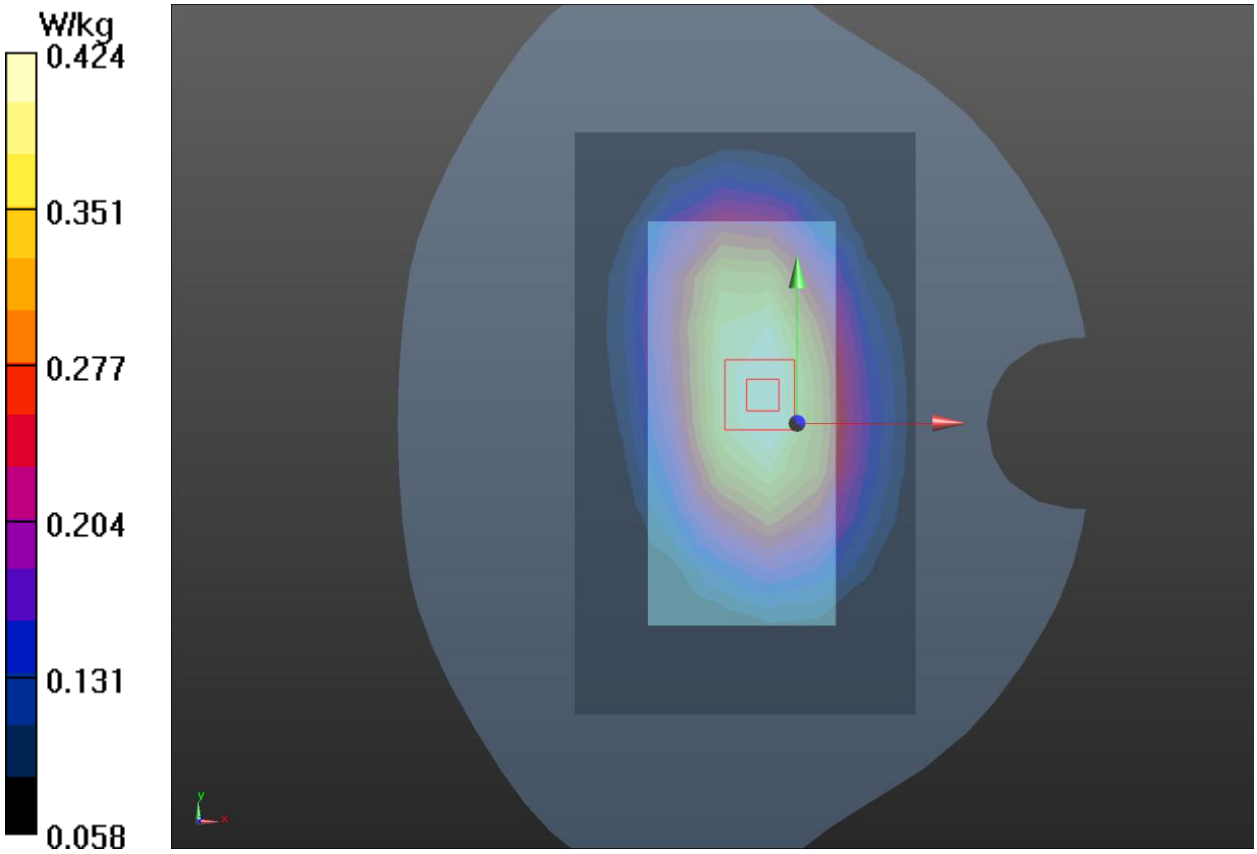
Plot 58 LTE Band 26 1RB Back Side Middle (Distance 0mm)

Date: 6/28/2020
Communication System: UID 0, LTE (0); Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 831.5 MHz; σ = 0.919 S/m; εr = 42.185; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(9.60, 9.60, 9.60); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.441 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.27 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.525 W/kg
SAR(1 g) = 0.402 W/kg; SAR(10 g) = 0.295 W/kg
Maximum value of SAR (measured) = 0.424 W/kg



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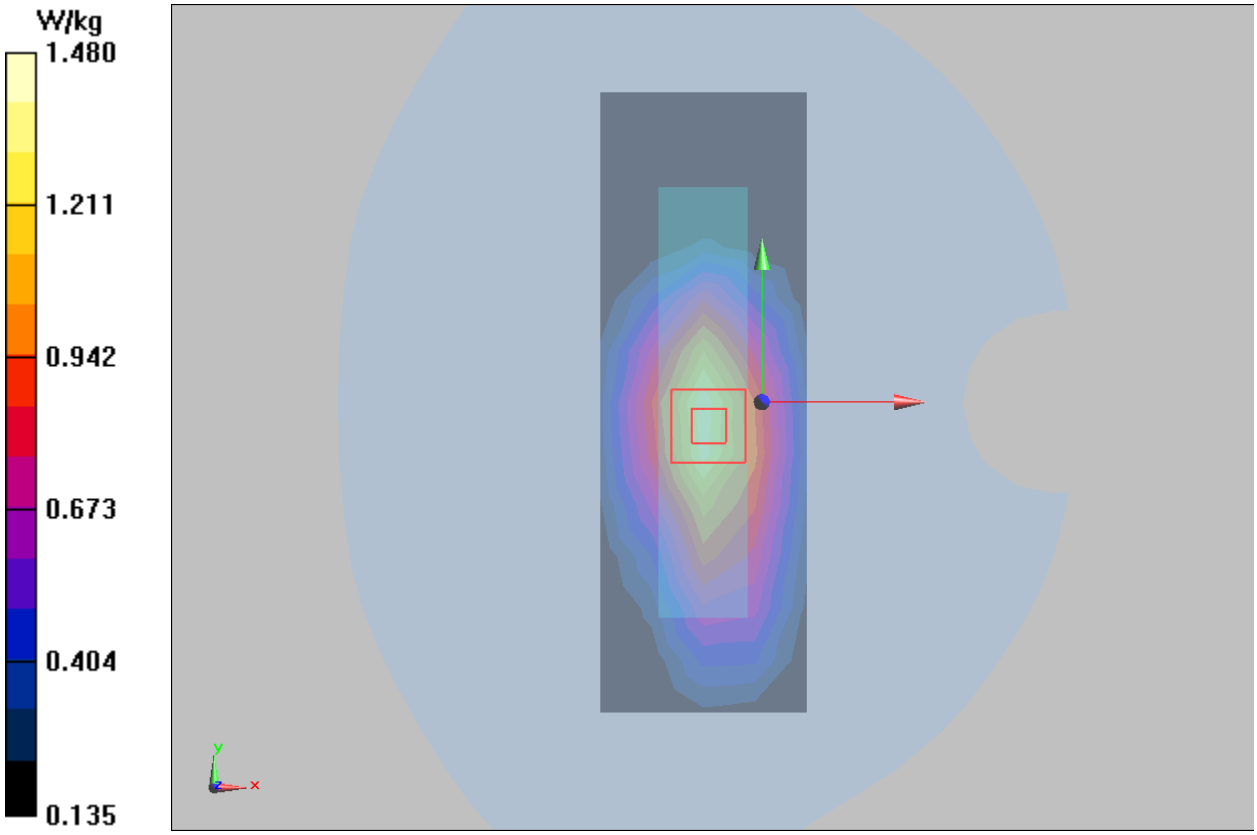
Plot 59 LTE Band 26 1RB Right Edge Middle (Distance 0mm)

Date: 5/23/2020
Communication System: UID 0, LTE-FDD (0); Frequency: 831 MHz;Duty Cycle: 1:1
Medium parameters used: f = 831.5 MHz; σ = 0.919 S/m; εr = 42.186; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.20, 9.20, 9.20); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Right Edge Middle/Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.38 W/kg

Right Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.05 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 1.36 W/kg; SAR(10 g) = 0.898 W/kg
Maximum value of SAR (measured) = 1.480 W/kg



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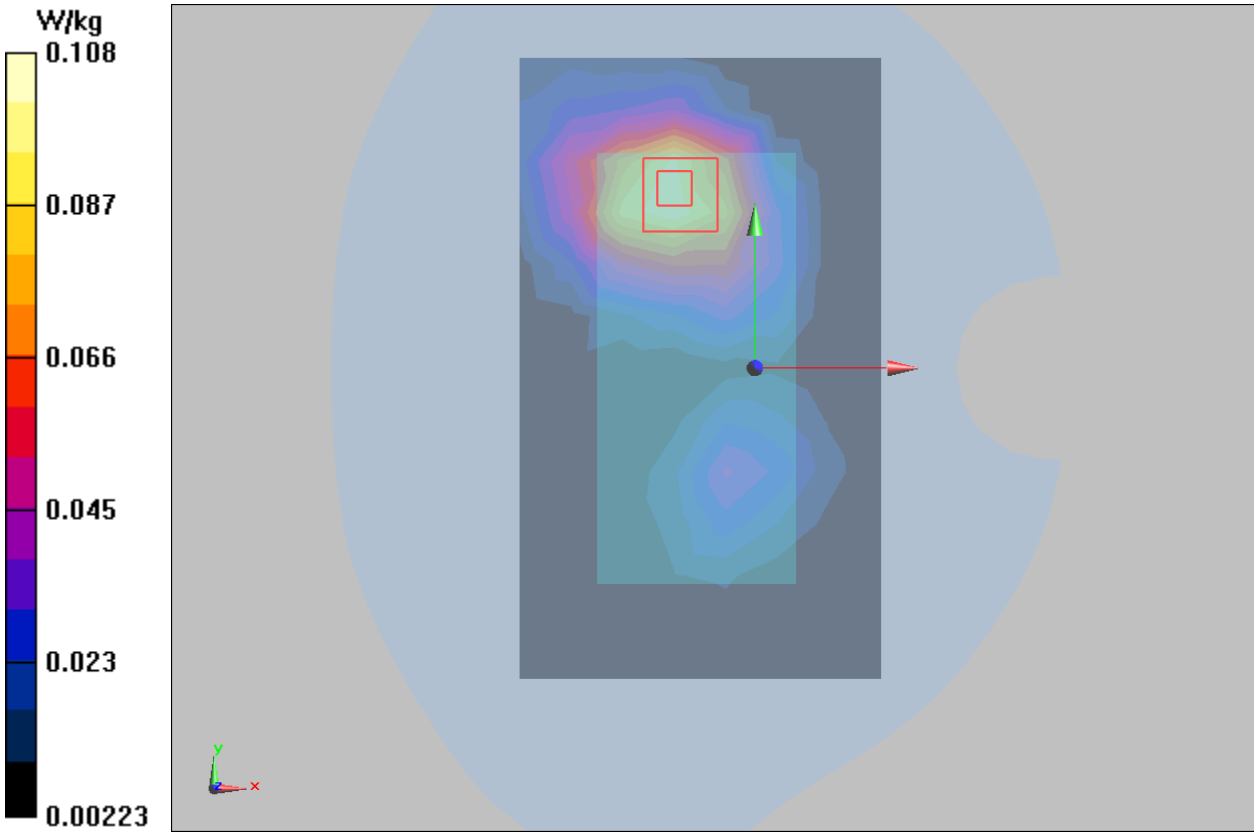
Wi-Fi-Antenna
Plot 60 802.11b Front Side Middle (Distance 10mm)

Date: 5/24/2020
Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.797 S/m; εr = 38.629; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0998 W/kg

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.630 V/m; Power Drift = 0.148 dB
Peak SAR (extrapolated) = 0.191 W/kg
SAR(1 g) = 0.101 W/kg; SAR(10 g) = 0.057 W/kg
Maximum value of SAR (measured) = 0.108 W/kg



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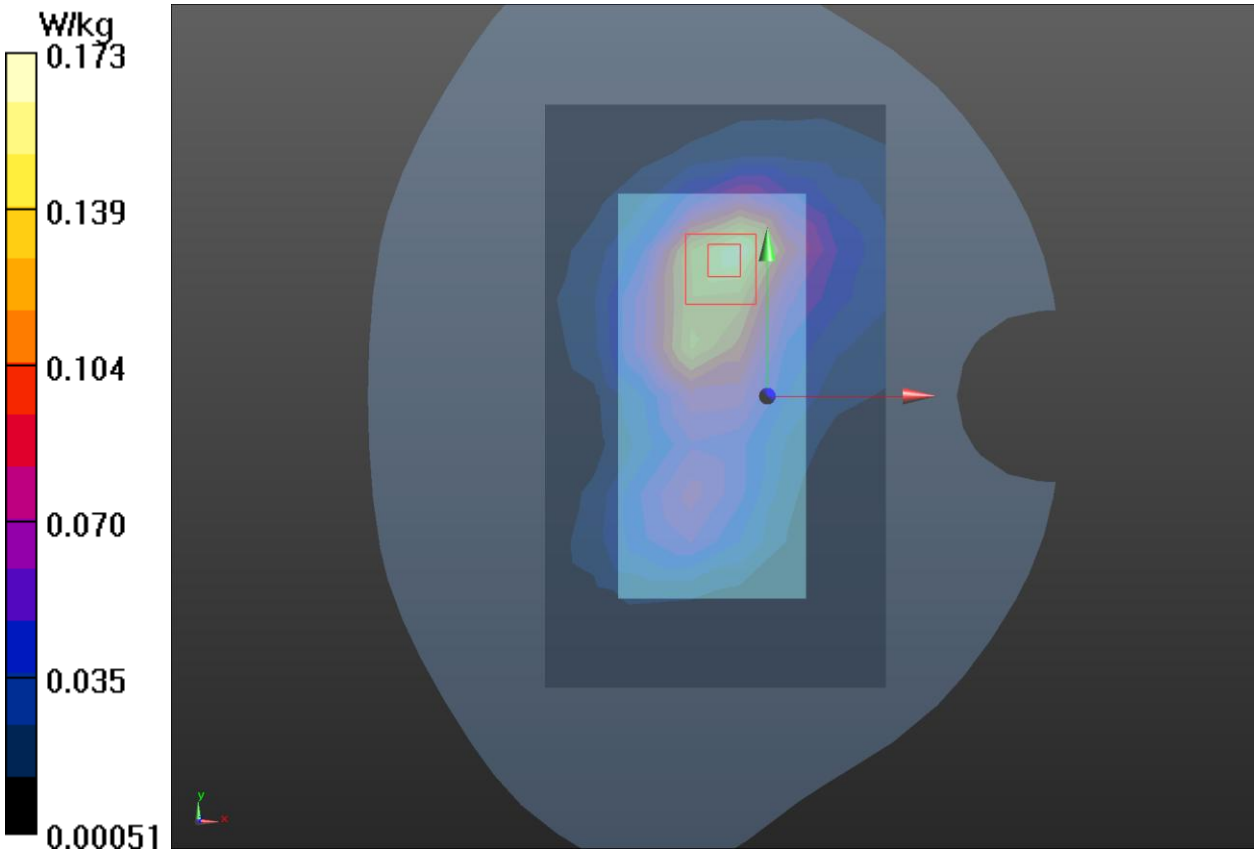
Plot 61 802.11b Back Side Middle (Distance 0mm)

Date: 6/28/2020
Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.791 S/m; εr = 39.401; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(7.45, 7.45,7.45); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.164 W/kg

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.088 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.301 W/kg
SAR(1 g) = 0.157 W/kg; SAR(10 g) = 0.083 W/kg
Maximum value of SAR (measured) = 0.173 W/kg



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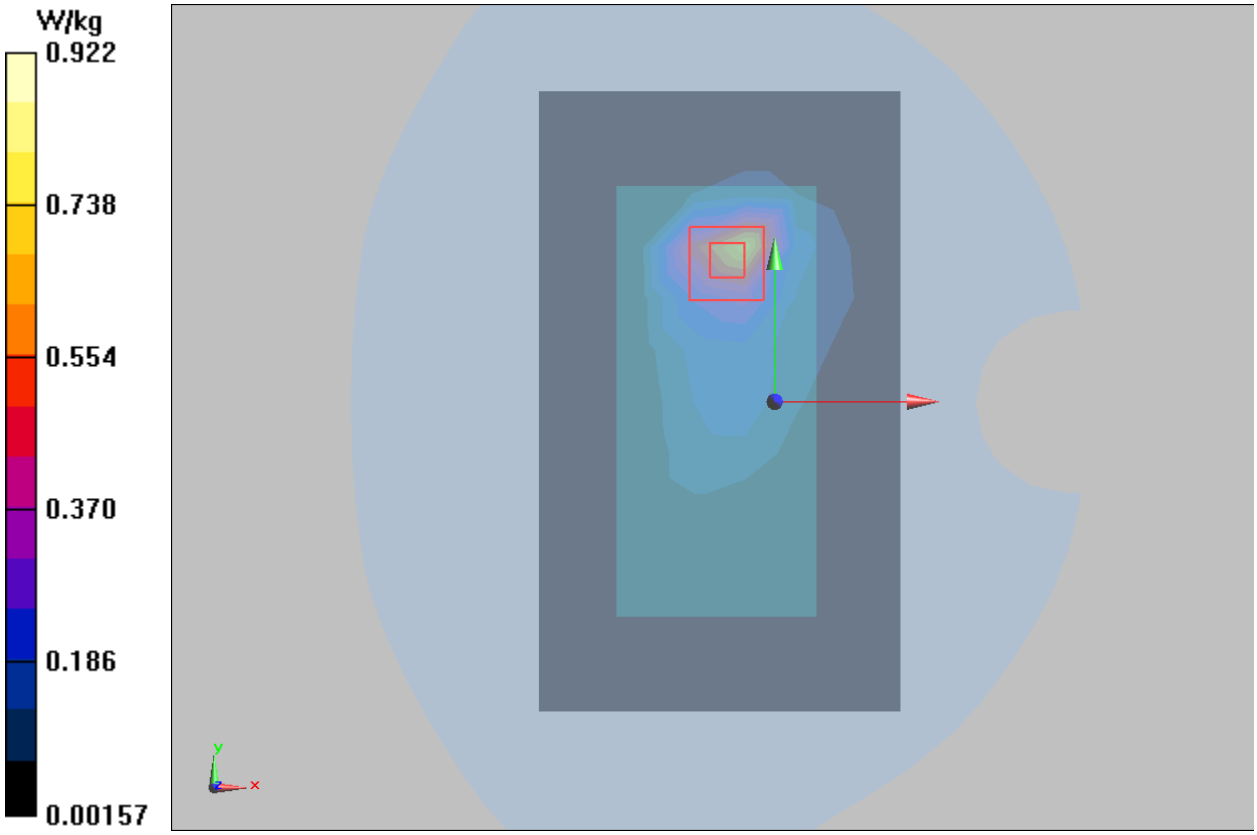
Plot 62 802.11b Back Side Middle (Distance 0mm)

Date: 5/24/2020
Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.791 S/m; εr = 39.401; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.730 W/kg

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.872 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.776 W/kg; SAR(10 g) = 0.326 W/kg
Maximum value of SAR (measured) = 0.922 W/kg



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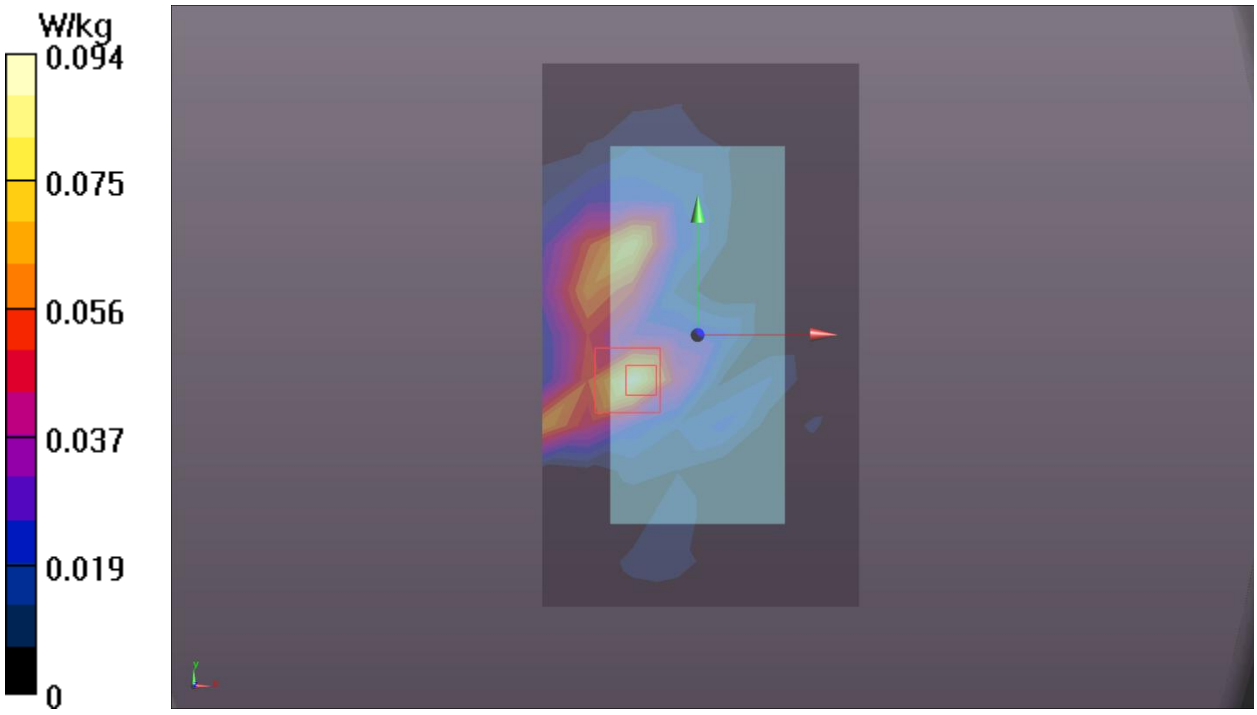
Plot 63 802.11a U-NII-1 Front Side Middle (Distance 10mm)

Date: 5/26/2020
Communication System: UID 0, 802.11a (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.823 S/m; εr = 36.7; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(5.56, 5.56, 5.56); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0924 W/kg

Front Side Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.813 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.291 W/kg
SAR(1 g) = 0.080 W/kg; SAR(10 g) = 0.031 W/kg
Maximum value of SAR (measured) = 0.094 W/kg



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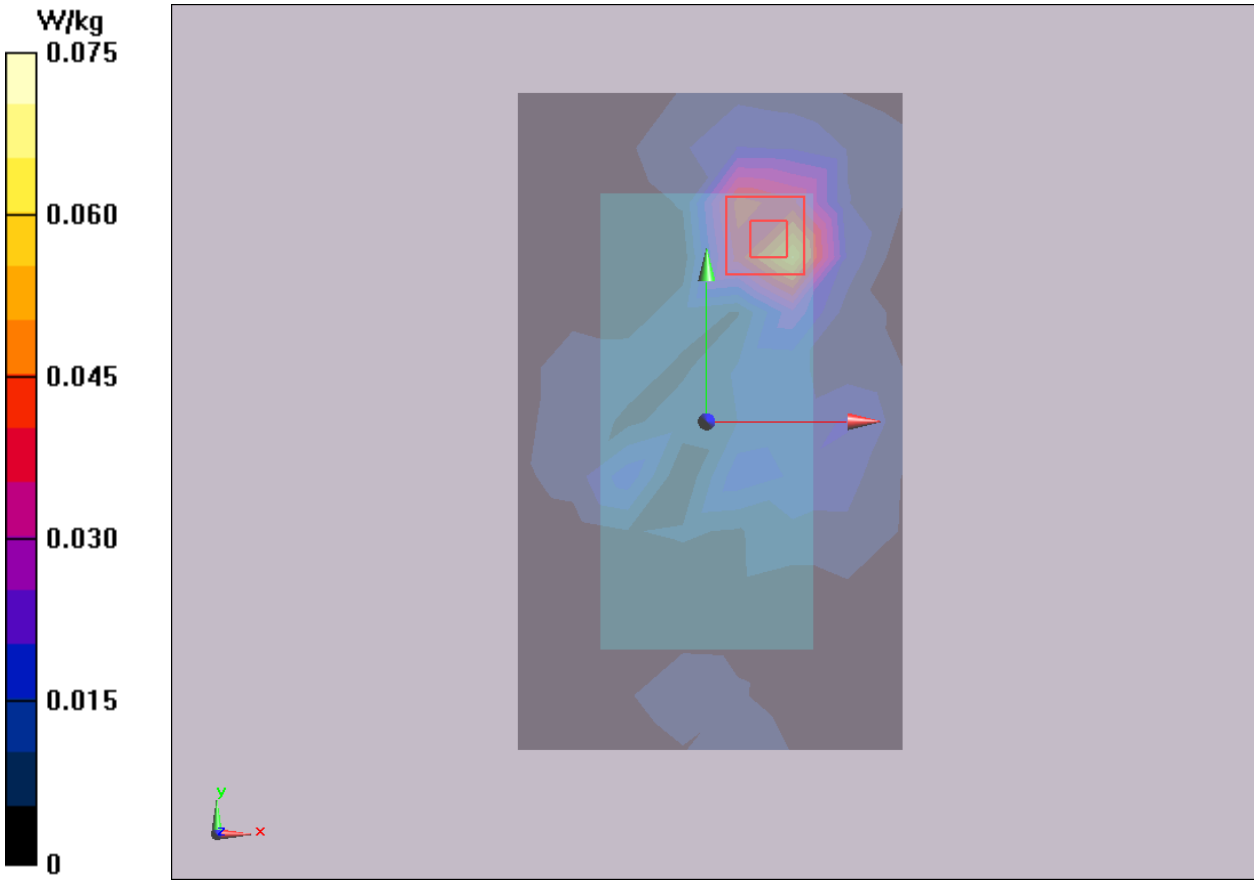
Plot 64 802.11a U-NII-1 Back Side Middle (Distance 0mm)

Date: 6/29/2020
Communication System: UID 0, 802.11a (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.823 S/m; εr = 36.7; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(5.38, 5.38,5.38); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0605 W/kg

Back Side Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.575 V/m; Power Drift = 0.057 dB
Peak SAR (extrapolated) = 0.245 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.024 W/kg
Maximum value of SAR (measured) = 0.075 W/kg



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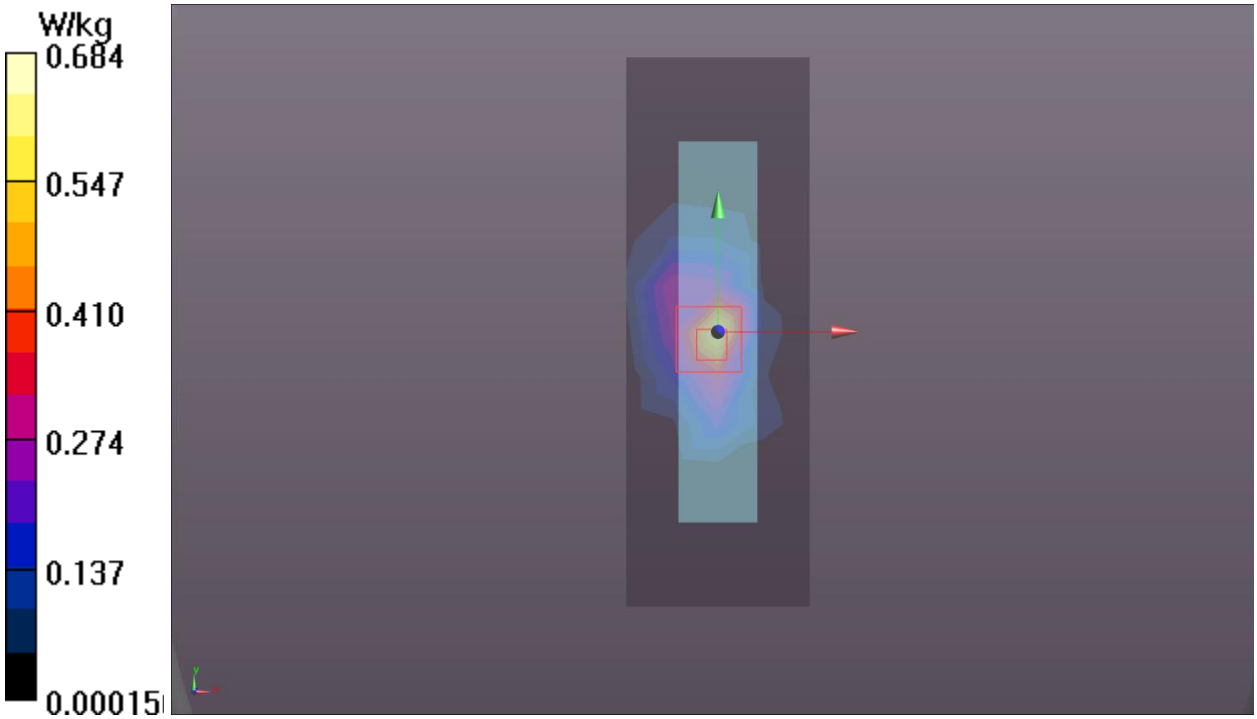
Plot 65 802.11a U-NII-1 Left Edge Middle (Distance 0mm)

Date: 5/26/2020
Communication System: UID 0, 802.11a (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.823 S/m; εr = 36.7; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(5.56, 5.56, 5.56); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Left Edge Middle/Area Scan (8x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.602 W/kg

Left Edge Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.31 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 2.30 W/kg
SAR(1 g) = 0.651 W/kg; SAR(10 g) = 0.216 W/kg
Maximum value of SAR (measured) = 0.684 W/kg



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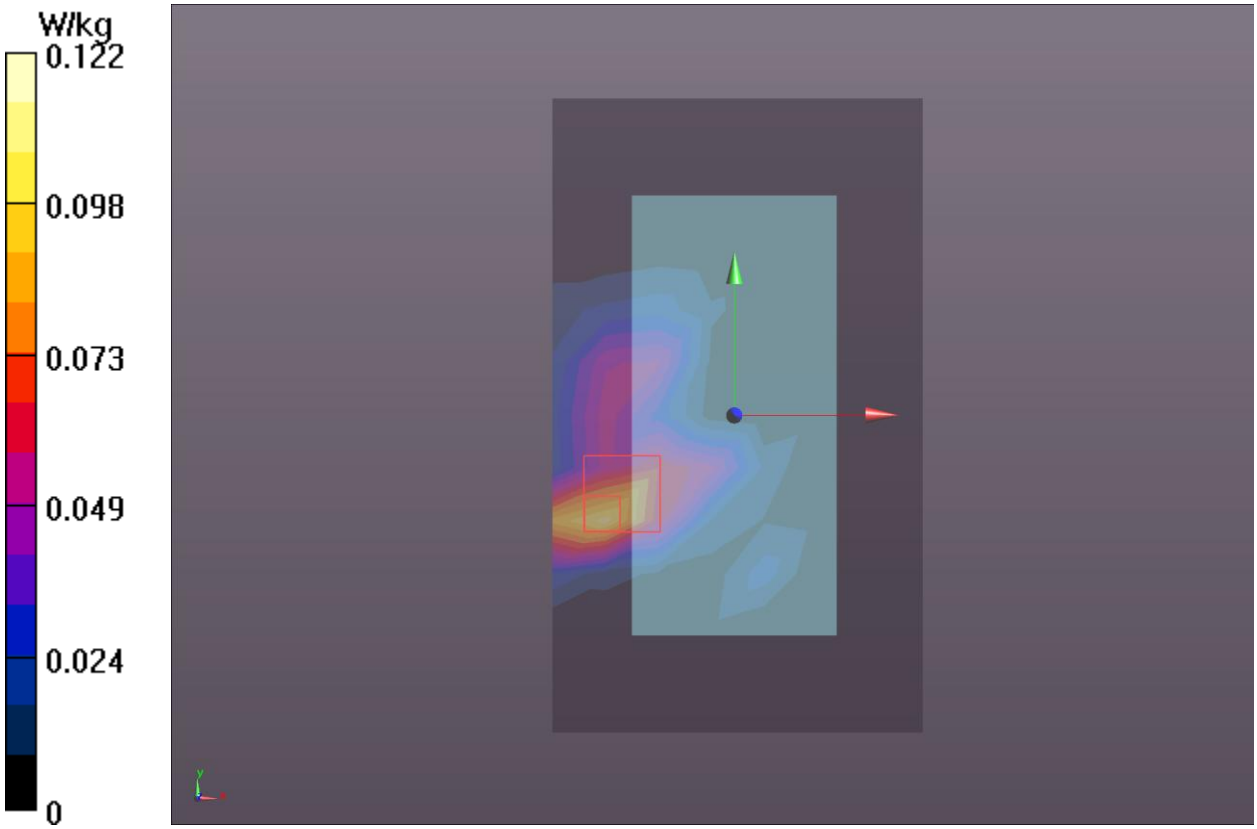
Plot 66 802.11a U-NII-2A Front Side Low (Distance 10mm)

Date: 5/26/2020
Communication System: UID 0, 802.11a (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 4.808 S/m; εr = 36.877; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(5.56, 5.56, 5.56); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Low/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.110 W/kg

Front Side Low/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.099 dB
Peak SAR (extrapolated) = 0.287 W/kg
SAR(1 g) = 0.099 W/kg; SAR(10 g) = 0.038 W/kg
Maximum value of SAR (measured) = 0.122 W/kg



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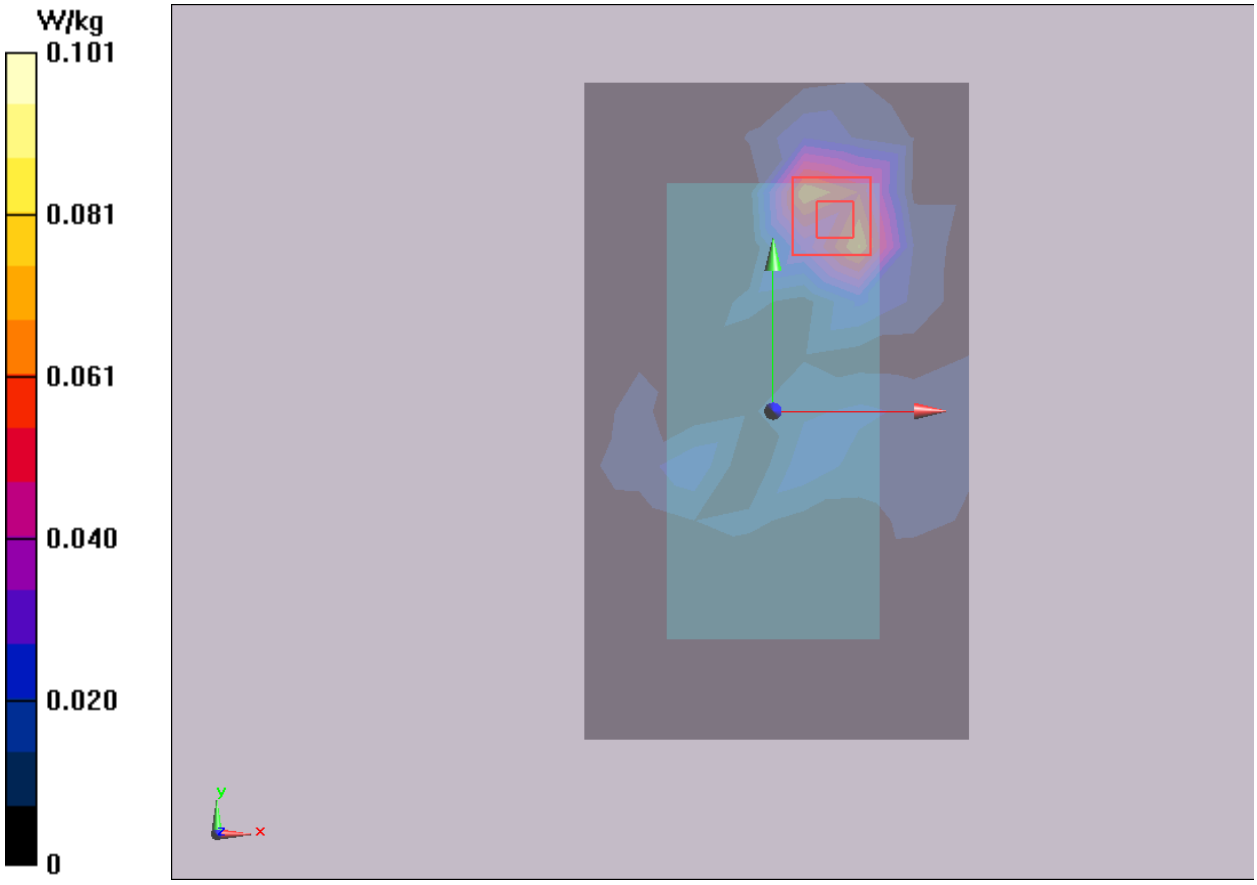
Plot 67 802.11a U-NII-2A Back Side Low (Distance 0mm)

Date: 6/29/2020
Communication System: UID 0, 802.11a (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 4.808 S/m; εr = 36.877; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(5.38, 5.38,5.38); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Low/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0686 W/kg

Back Side Low/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.539 V/m; Power Drift = 0.081 dB
Peak SAR (extrapolated) = 0.290 W/kg
SAR(1 g) = 0.090 W/kg; SAR(10 g) = 0.031 W/kg
Maximum value of SAR (measured) = 0.101 W/kg



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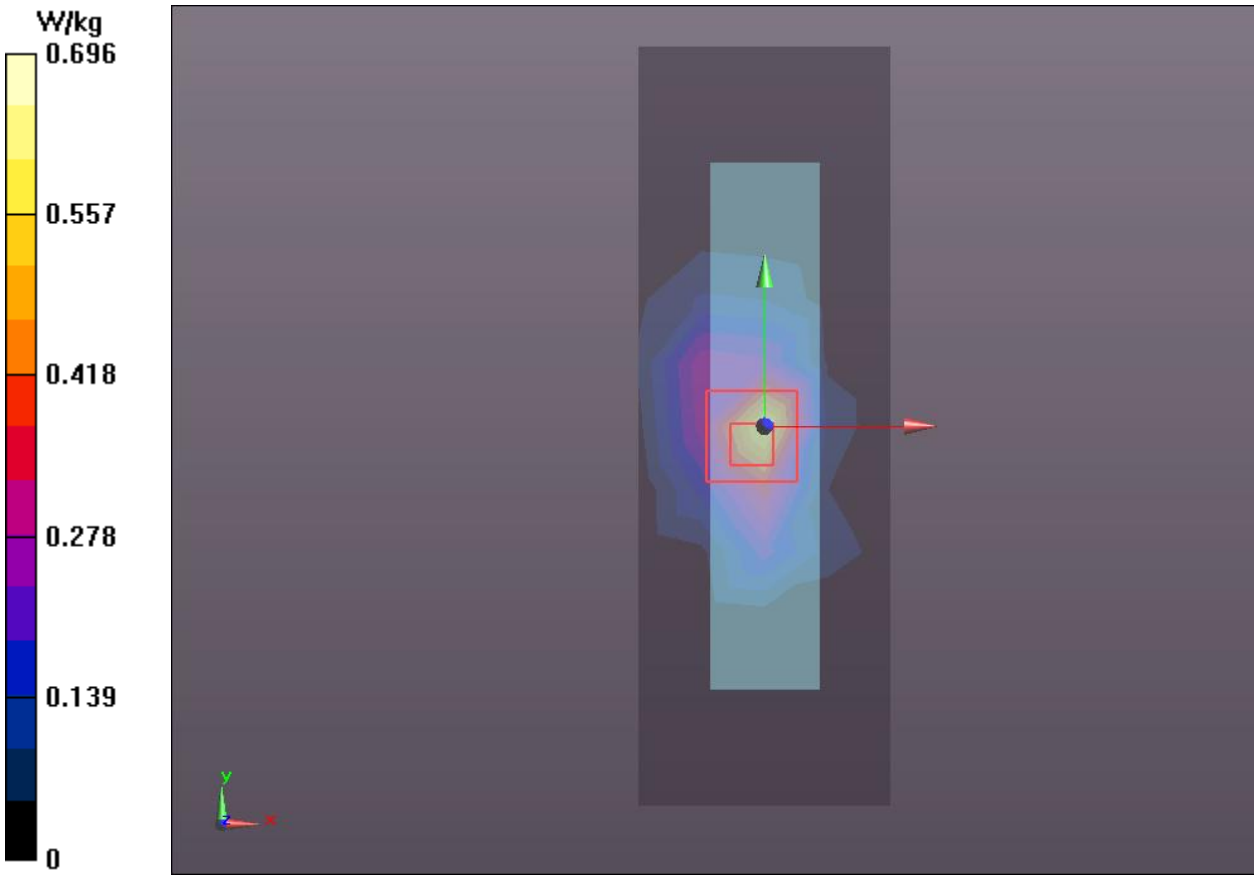
Plot 68 802.11a U-NII-2A Left Edge Low (Distance 0mm)

Date: 5/26/2020
Communication System: UID 0, 802.11a (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 4.808 S/m; εr = 36.877; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(5.56, 5.56, 5.56); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Left Edge Low/Area Scan (8x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.605 W/kg

Left Edge Low /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.40 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 2.57 W/kg
SAR(1 g) = 0.689 W/kg; SAR(10 g) = 0.227 W/kg
Maximum value of SAR (measured) = 0.696 W/kg



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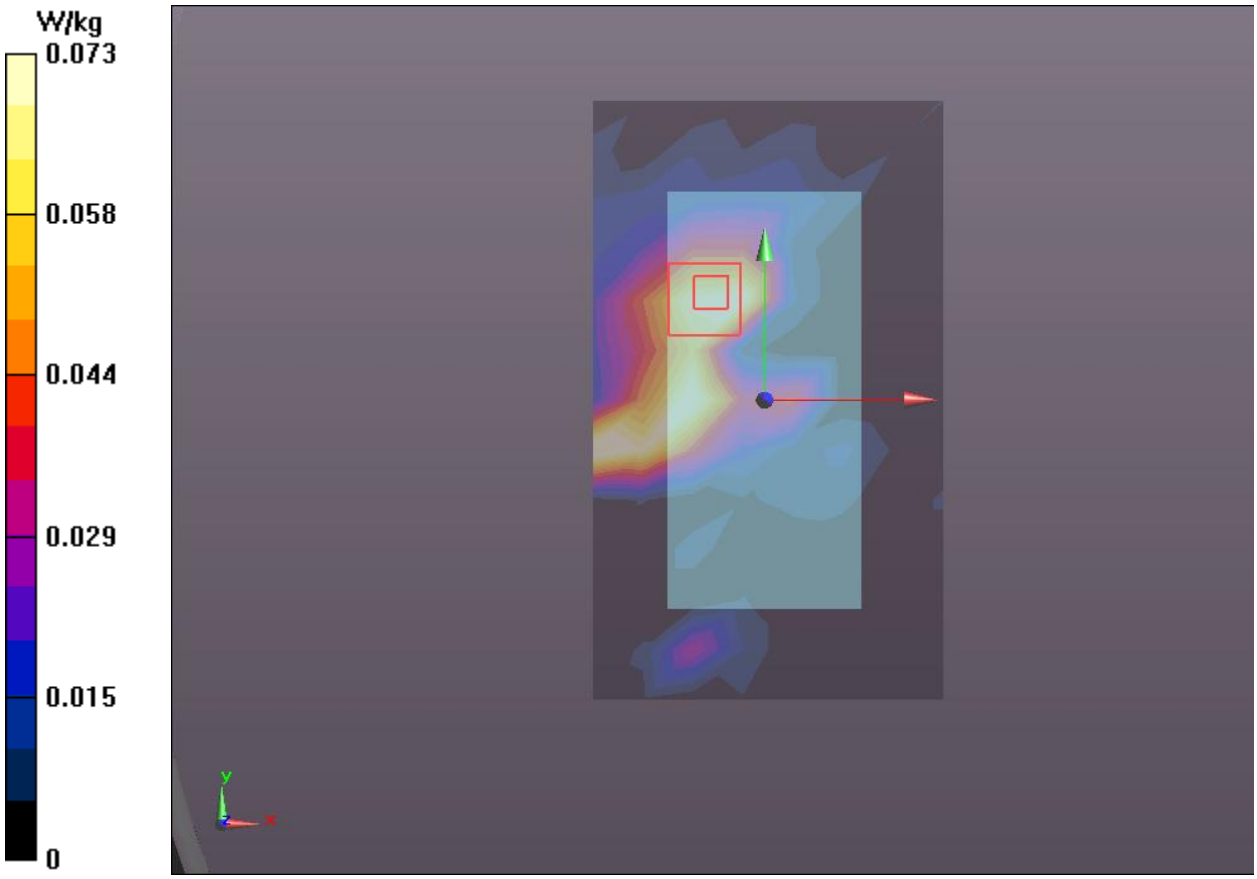
Plot 69 802.11a U-NII-2C Front Side Middle (Distance 10mm)

Date: 5/27/2020
Communication System: UID 0, 802.11a (0); Frequency: 5580 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5580 MHz; σ = 5.258 S/m; εr = 35.664; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(4.90, 4.90, 4.90); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0813 W/kg

Front Side Middle /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.845 V/m; Power Drift = 0.139 dB
Peak SAR (extrapolated) = 0.379 W/kg
SAR(1 g) = 0.088 W/kg; SAR(10 g) = 0.037 W/kg
Maximum value of SAR (measured) = 0.073 W/kg



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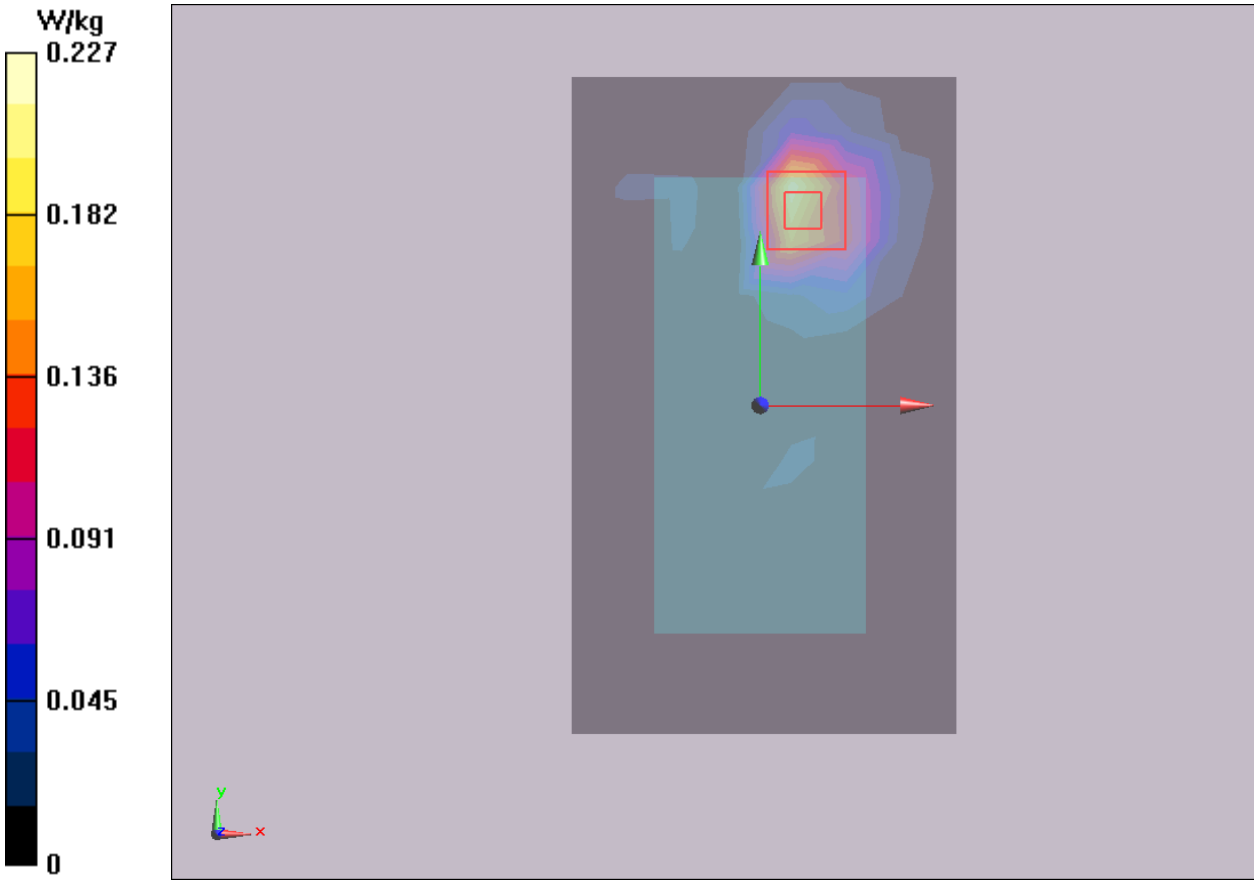
Plot 70 802.11a U-NII-2C Back Side Middle (Distance 0mm)

Date: 6/29/2020
Communication System: UID 0, 802.11a (0); Frequency: 5580 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5580 MHz; σ = 5.258 S/m; εr = 35.664; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(4.77, 4.77,4.77); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.210 W/kg

Back Side Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.119 V/m; Power Drift = 0.189 dB
Peak SAR (extrapolated) = 0.617 W/kg
SAR(1 g) = 0.208 W/kg; SAR(10 g) = 0.078 W/kg
Maximum value of SAR (measured) = 0.227 W/kg



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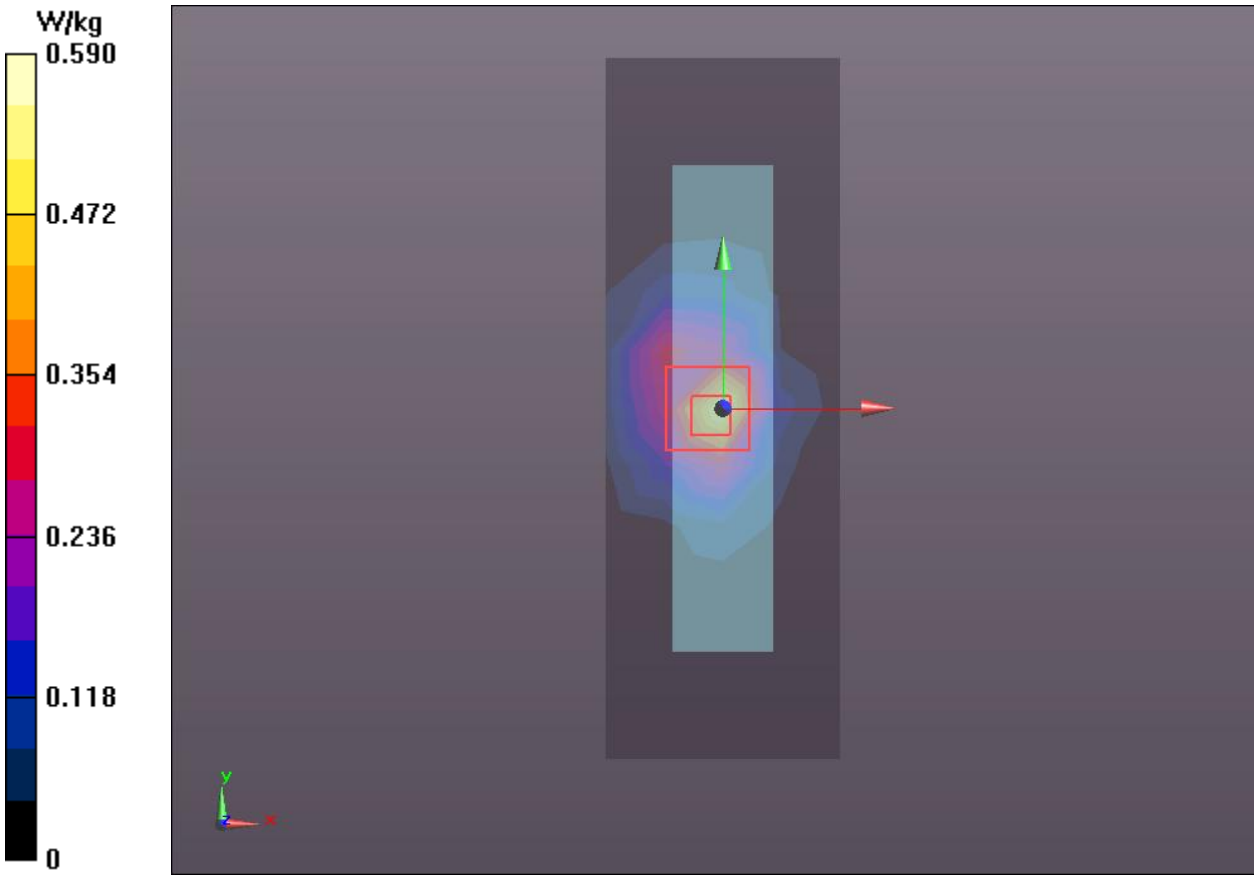
Plot 71 802.11a U-NII-2C Left Edge Middle (Distance 0mm)

Date: 5/27/2020
Communication System: UID 0, 802.11a (0); Frequency: 5580 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5580 MHz; σ = 5.258 S/m; εr = 35.664; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(4.90, 4.90, 4.90); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Left Edge Middle/Area Scan (8x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.545 W/kg

Left Edge Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.38 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.489 W/kg; SAR(10 g) = 0.184 W/kg
Maximum value of SAR (measured) = 0.590 W/kg



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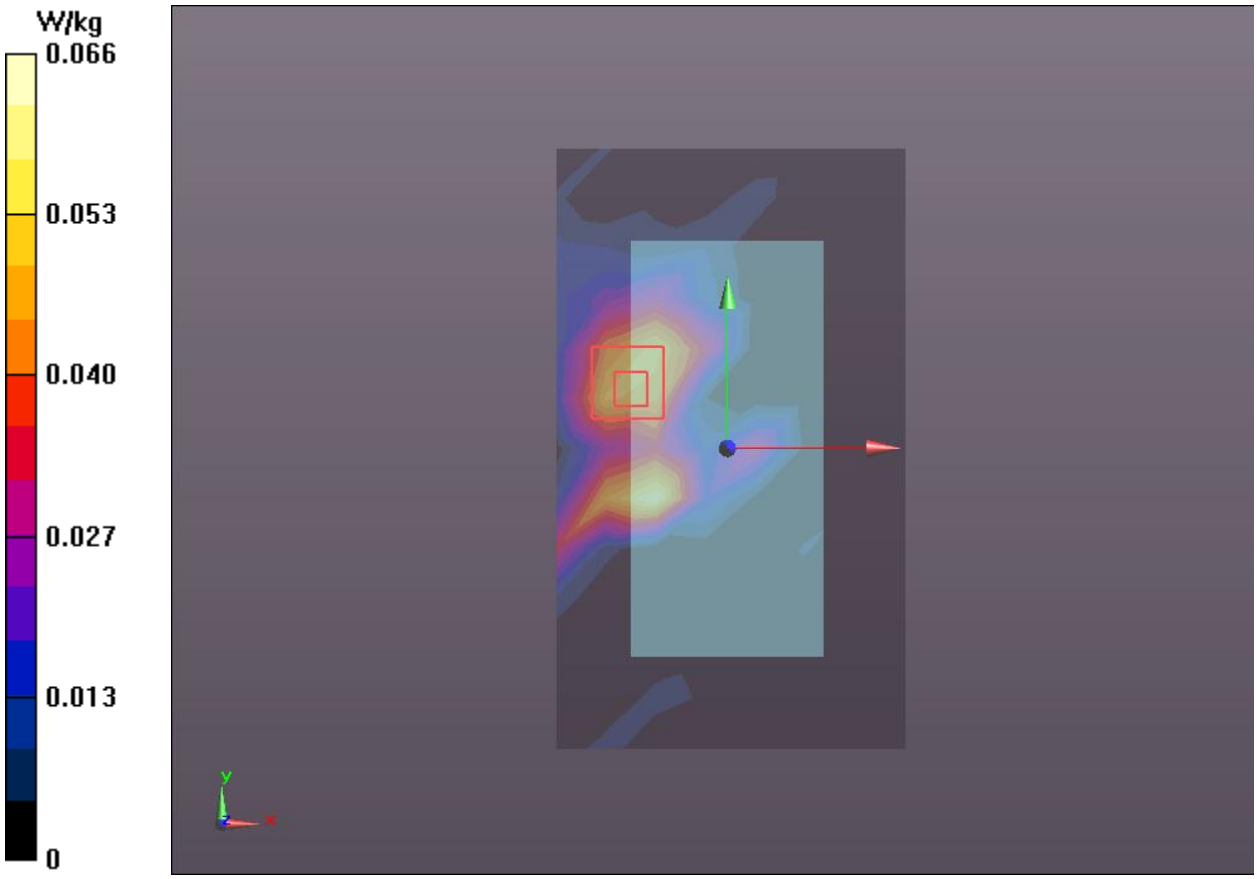
Plot 72 802.11a U-NII-3 Left Front Side Middle (Distance 10mm)

Date: 5/27/2020
Communication System: UID 0, 802.11a (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 5.47 S/m; εr = 35.343; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(4.99, 4.99, 4.99); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Front Side Middle/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0632 W/kg

Front Side Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.445 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.387 W/kg
SAR(1 g) = 0.083 W/kg; SAR(10 g) = 0.033 W/kg
Maximum value of SAR (measured) = 0.066 W/kg



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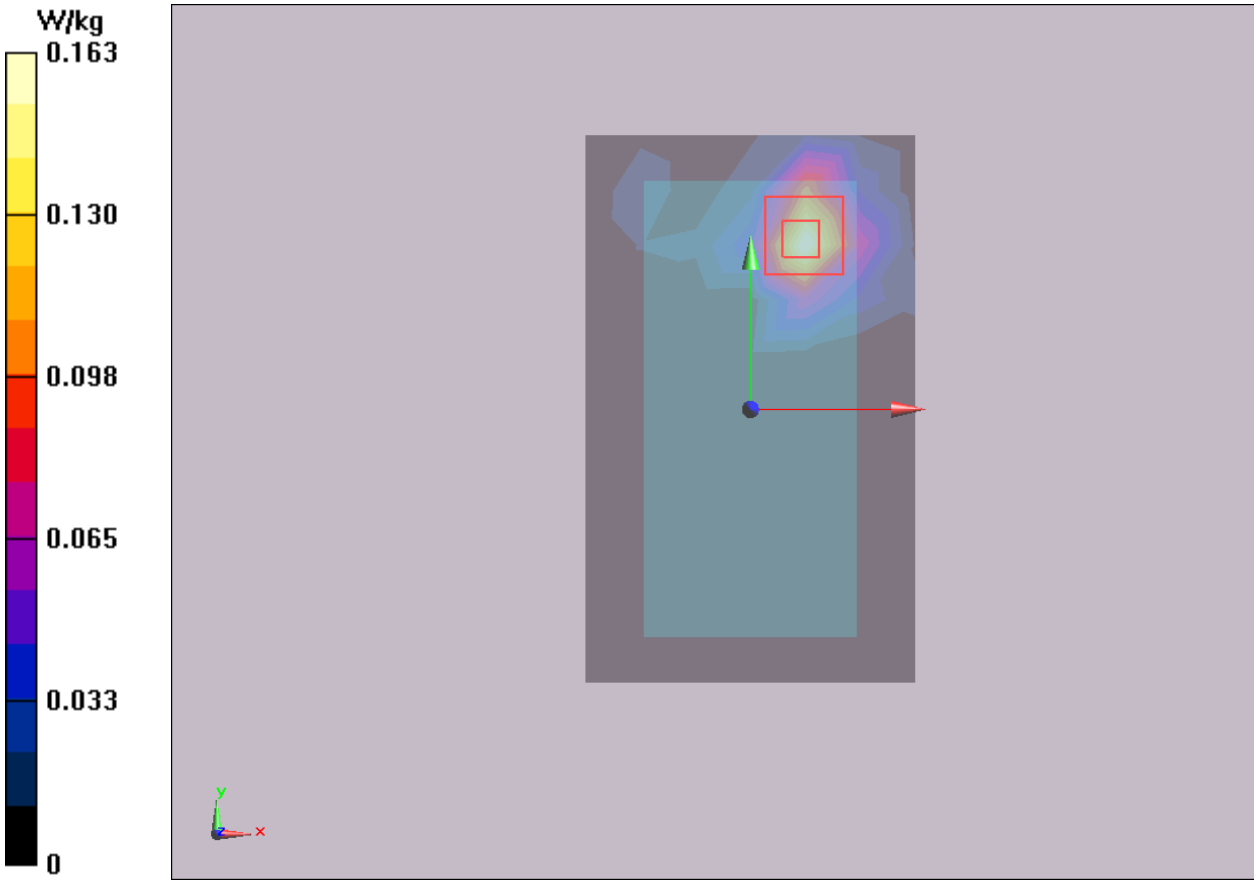
Plot 73 802.11a U-NII-3 Left Back Side Middle (Distance 0mm)

Date: 6/29/2020
Communication System: UID 0, 802.11a (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 5.47 S/m; εr = 35.343; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(4.94, 4.94,4.94); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (11x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.170 W/kg

Back Side Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.100dB
Peak SAR (extrapolated) = 0.500 W/kg
SAR(1 g) = 0.159 W/kg; SAR(10 g) = 0.060 W/kg
Maximum value of SAR (measured) = 0.163 W/kg



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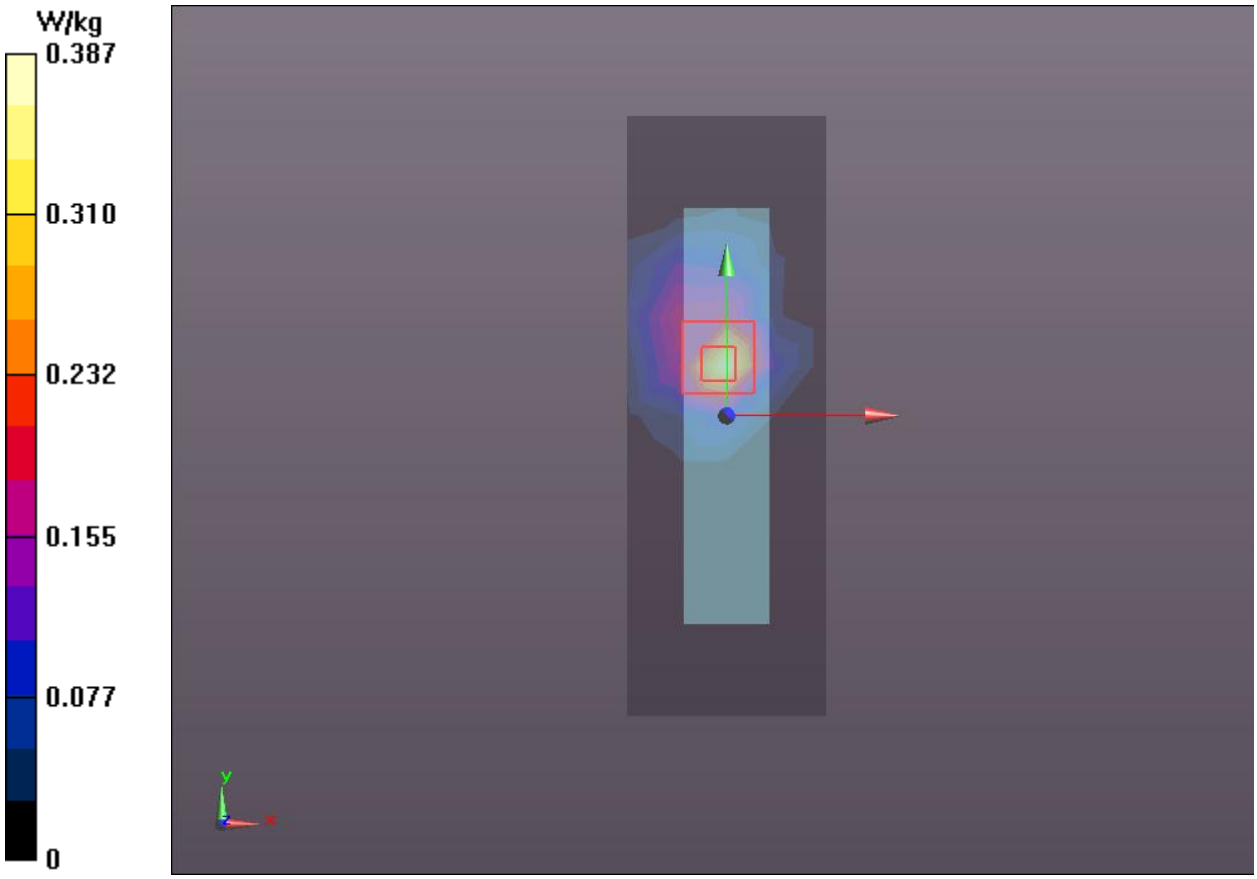
Plot 74 802.11a U-NII-3 Left Edge Middle (Distance 0mm)

Date: 5/27/2020
Communication System: UID 0, 802.11a (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 5.47 S/m; εr = 35.343; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(4.99, 4.99, 4.99); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Left Edge Middle/Area Scan (8x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.377 W/kg

Left Edge Middle/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.468 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.934 W/kg
SAR(1 g) = 0.320 W/kg; SAR(10 g) = 0.118 W/kg
Maximum value of SAR (measured) = 0.387 W/kg



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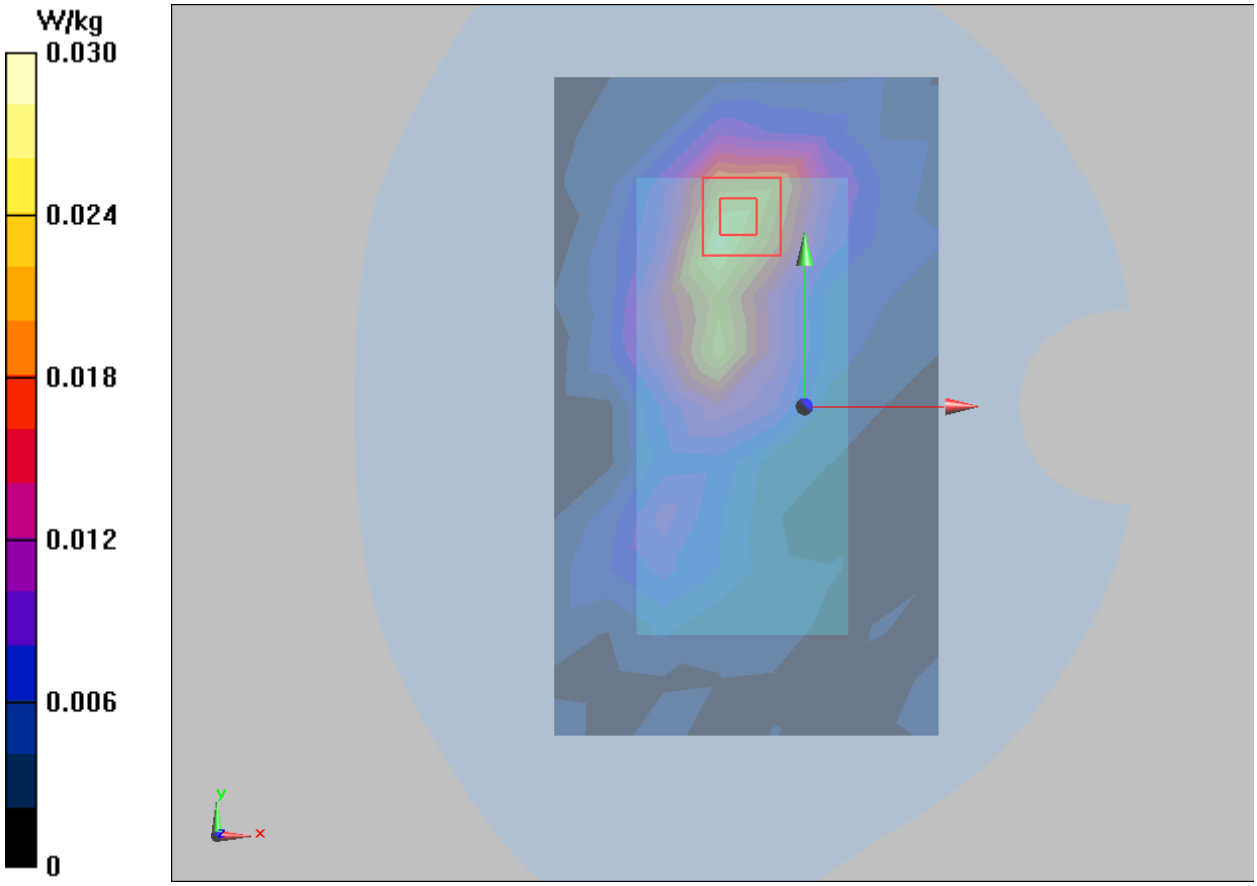
Plot 75 BT Back Side Middle (Distance 0mm)

Date: 6/28/2020
Communication System: UID 0, BT (0); Frequency: 2441 MHz;Duty Cycle: 1:1.32
Medium parameters used: f = 2441 MHz; σ = 1.801 S/m; εr = 38.617; ρ = 1000 kg/m3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 -SN7515; ConvF(7.45, 7.45,7.45); Calibrated: 10/22/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Back Side Middle/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0270 W/kg

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.802 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.053 W/kg
SAR(1 g) = 0.027 W/kg; SAR(10 g) = 0.013 W/kg
Maximum value of SAR (measured) = 0.030 W/kg



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ANNEX D: Probe Calibration Certificate(3677)

In Collaboration with
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CALIBRATION LABORATORY
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中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client TA(Shanghai) Certificate No: Z19-60169

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3677
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	June 19, 2019

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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Power sensor NRP-Z91	101547	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Power sensor NRP-Z91	101548	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Reference10dBAttenuator	18N50W-10dB	09-Feb-18(CTTL, No.J18X01133)	Feb-20
Reference20dBAttenuator	18N50W-20dB	09-Feb-18(CTTL, No.J18X01132)	Feb-20
Reference Probe EX3DV4	SN 3617	31-Jan-19(SPEAG,No.EX3-3617_Jan19)	Jan-20
DAE4	SN 1331	06-Feb-19(SPEAG, No.DAE4-1331_Feb19)	Feb -20
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGeneratorMG3700A	6201052605	21-Jun-18 (CTTL, No.J18X05033)	Jun-19
Network Analyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan -20

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: June 20, 2019

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Certificate No: Z19-60169 Page 1 of 11

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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Probe EX3DV4

SN: 3677

Calibrated: June 19, 2019

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	0.41	0.46	0.40	±10.0%
DCP(mV)[B]	101.1	102.9	101.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	152.0	±2.6%
		Y	0.0	0.0	1.0		170.1	
		Z	0.0	0.0	1.0		147.7	

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%.

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	9.54	9.54	9.54	0.11	1.56	±12.1%
835	41.5	0.90	9.20	9.20	9.20	0.11	1.61	±12.1%
1750	40.1	1.37	8.21	8.21	8.21	0.22	1.11	±12.1%
1900	40.0	1.40	7.79	7.79	7.79	0.22	1.04	±12.1%
2300	39.5	1.67	7.66	7.66	7.66	0.57	0.72	±12.1%
2450	39.2	1.80	7.50	7.50	7.50	0.59	0.71	±12.1%
2600	39.0	1.96	7.20	7.20	7.20	0.65	0.68	±12.1%
5250	35.9	4.71	5.56	5.56	5.56	0.40	1.40	±13.3%
5600	35.5	5.07	4.90	4.90	4.90	0.45	1.40	±13.3%
5750	35.4	5.22	4.99	4.99	4.99	0.50	1.35	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	0.96	9.75	9.75	9.75	0.40	0.75	±12.1%
835	55.2	0.97	9.40	9.40	9.40	0.18	1.38	±12.1%
1750	53.4	1.49	7.86	7.86	7.86	0.23	1.09	±12.1%
1900	53.3	1.52	7.62	7.62	7.62	0.22	1.15	±12.1%
2300	52.9	1.81	7.67	7.67	7.67	0.55	0.81	±12.1%
2450	52.7	1.95	7.57	7.57	7.57	0.59	0.75	±12.1%
2600	52.5	2.16	7.33	7.33	7.33	0.74	0.65	±12.1%
5250	48.9	5.36	4.93	4.93	4.93	0.45	1.55	±13.3%
5600	48.5	5.77	4.24	4.24	4.24	0.50	1.45	±13.3%
5750	48.3	5.94	4.35	4.35	4.35	0.50	1.50	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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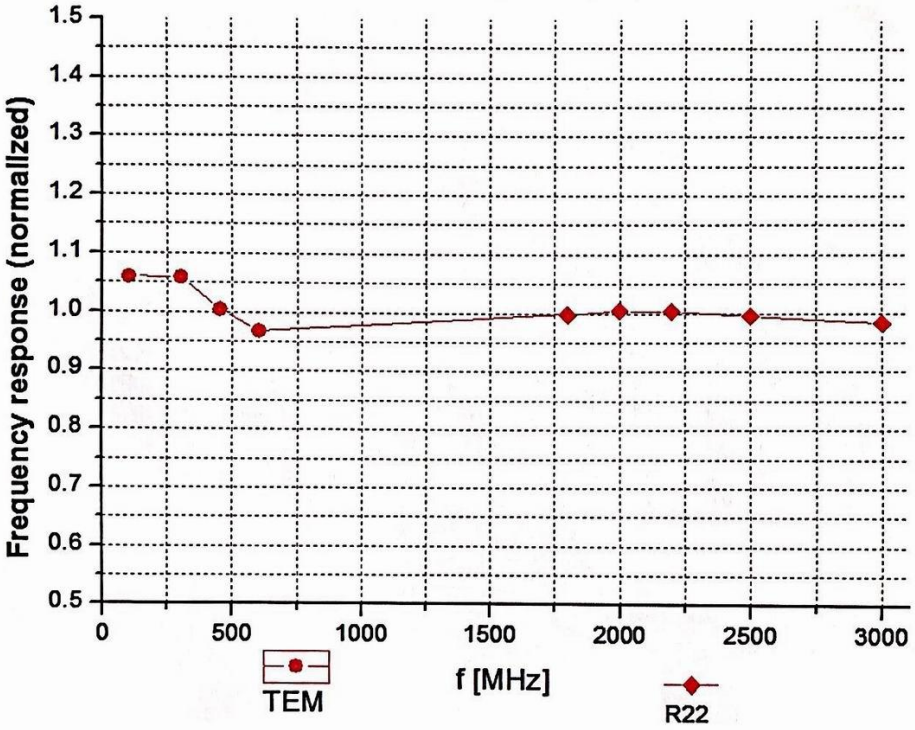
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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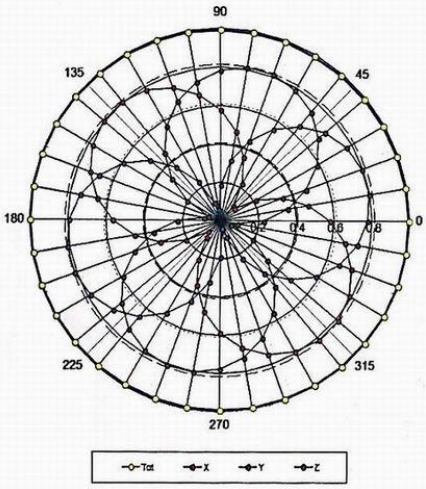
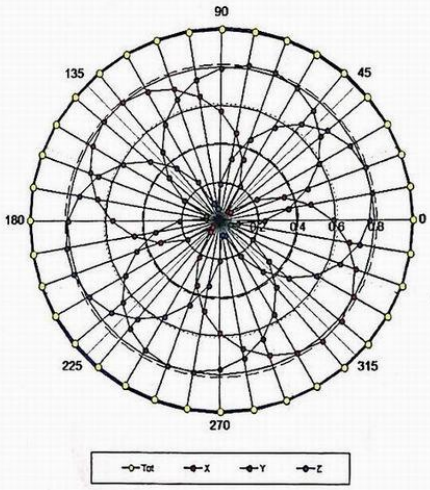
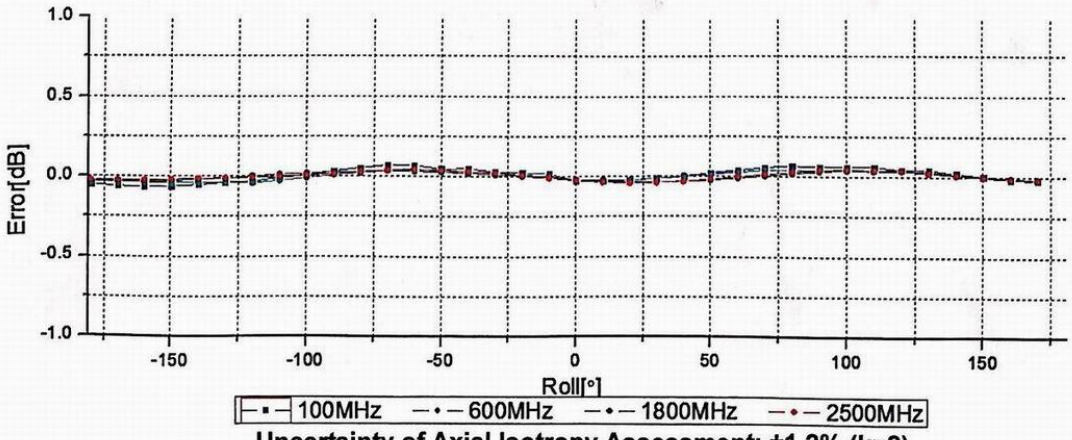
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

Certificate No: Z19-60169 Page 8 of 11

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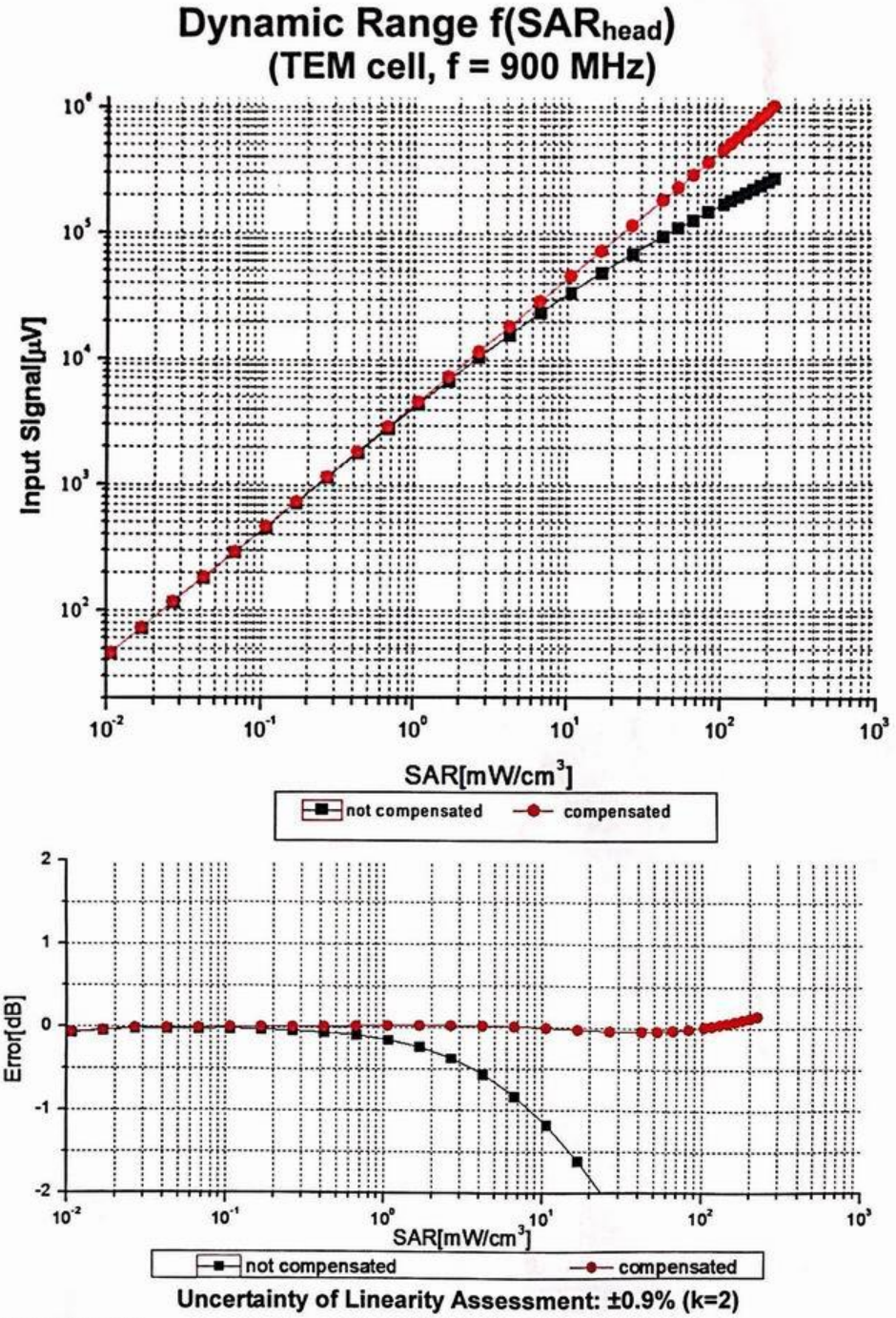

Certificate No: Z19-60169 Page 9 of 11

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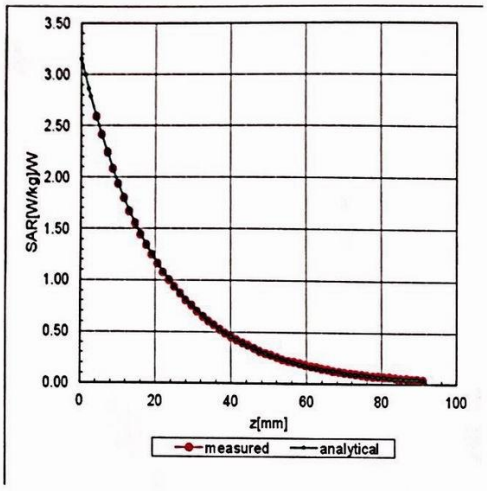
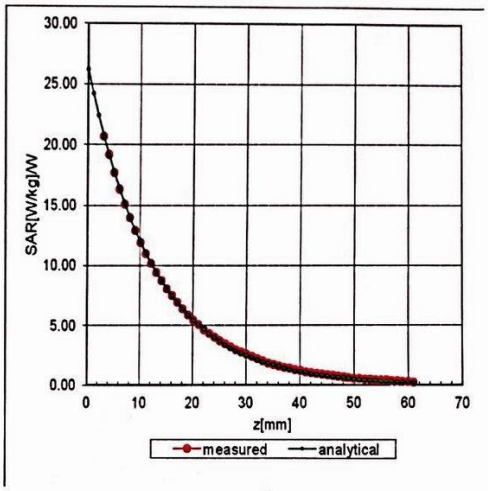
Conversion Factor Assessment

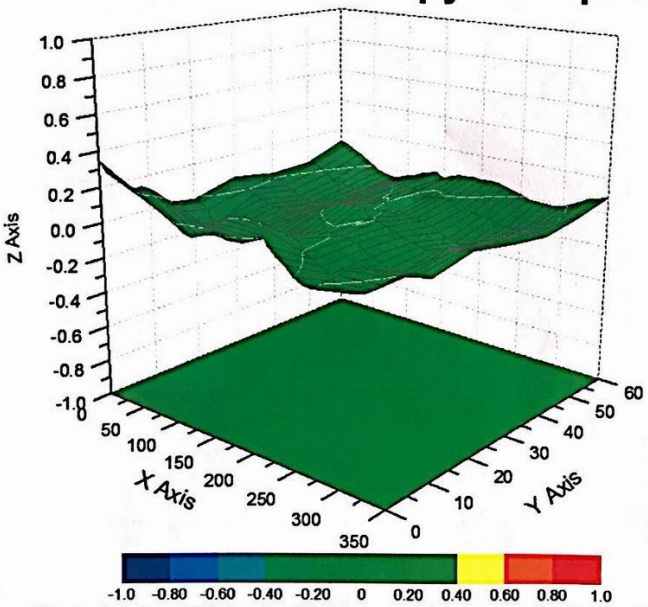
f=750 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	117.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

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ANNEX E: Probe Calibration Certificate(7515)

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

Client Auden

Certificate No: EX3-7515_Oct19

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7515

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: October 22, 2019

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	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	07-Oct-19 (No. DAE4-660_Oct19)	Oct-20
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2019

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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) **Accreditation No.: SCS 0108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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EX3DV4 – SN:7515 October 22, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7515

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.42	0.51	0.45	± 10.1 %
DCP (mV)[B]	94.8	98.3	95.0	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	141.0	±2.2 %	± 4.7 %
		Y	0.0	0.0	1.0		158.5		
		Z	0.0	0.0	1.0		145.1		

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%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 5).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:7515

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-5.4
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:7515

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	9.88	9.88	9.88	0.48	0.91	± 12.0 %
835	41.5	0.90	9.60	9.60	9.60	0.54	0.80	± 12.0 %
900	41.5	0.97	9.45	9.45	9.45	0.38	0.97	± 12.0 %
1750	40.1	1.37	8.55	8.55	8.55	0.35	0.87	± 12.0 %
1900	40.0	1.40	8.18	8.18	8.18	0.40	0.87	± 12.0 %
2000	40.0	1.40	8.10	8.10	8.10	0.35	0.90	± 12.0 %
2300	39.5	1.67	7.73	7.73	7.73	0.36	0.90	± 12.0 %
2450	39.2	1.80	7.45	7.45	7.45	0.32	0.98	± 12.0 %
2600	39.0	1.96	7.30	7.30	7.30	0.32	1.02	± 12.0 %
5250	35.9	4.71	5.38	5.38	5.38	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.77	4.77	4.77	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.94	4.94	4.94	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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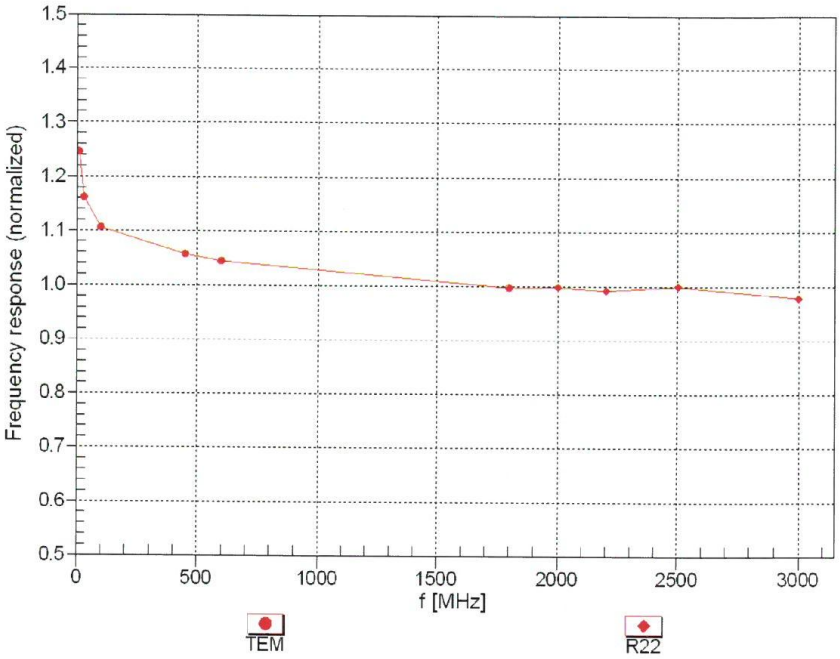
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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