

# Appendix A

## Detailed System Check Results

1. System Performance Check
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Test Laboratory: SGS-SAR Lab

## System Performance Check 750 MHz Head

**DUT: D750V3; Type: Dipole; Serial: 1210**

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL750; Medium parameters used:  $f = 750$  MHz;  $\sigma = 0.9$  S/m;  $\epsilon_r = 41.458$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.9, 8.9, 8.9); Calibrated: 2021-08-12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn414; Calibrated: 2020-12-30
- Phantom: SAM6; Type: SAM; Serial: 1824
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=15mm, Pin=250mW/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 3.20 W/kg

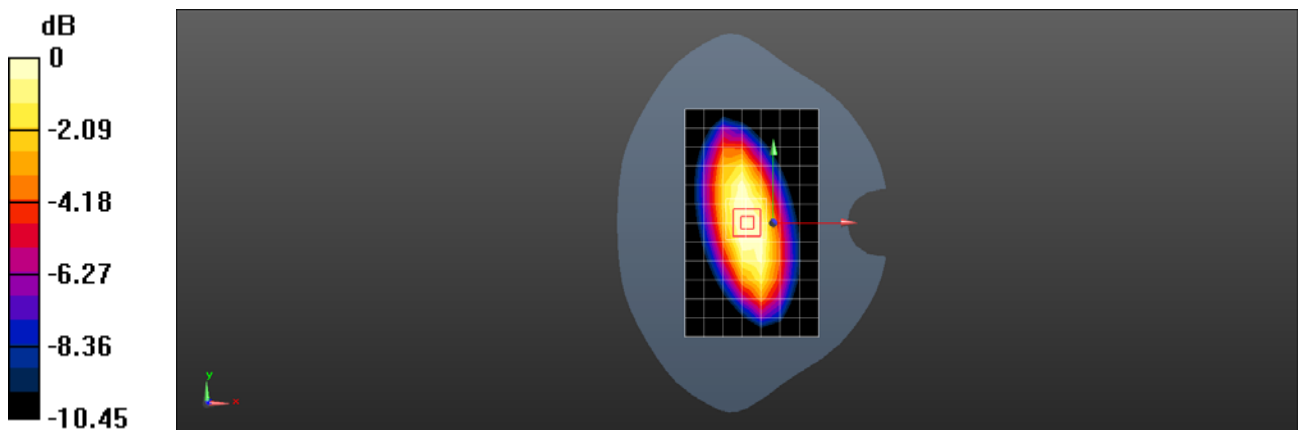
**Body/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.31 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.22 W/kg

**SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.36 W/kg**

Maximum value of SAR (measured) = 2.78 W/kg



Test Laboratory: SGS-SAR Lab

## System Performance Check 835 MHz Head

**DUT: D835V2; Type: Dipole; Serial: 4d256**

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL835; Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.907 \text{ S/m}$ ;  $\epsilon_r = 41.765$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.54, 8.54, 8.54); Calibrated: 2021-08-12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn414; Calibrated: 2020-12-30
- Phantom: SAM6; Type: SAM; Serial: 1824
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=15mm, Pin=250mW/Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (measured) =  $3.79 \text{ W/kg}$

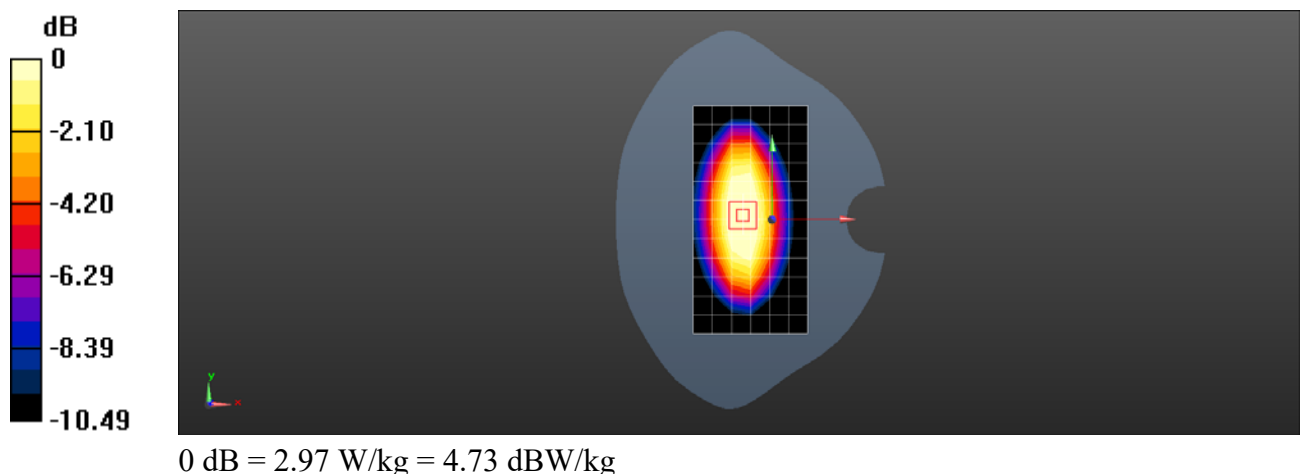
**Body/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $60.38 \text{ V/m}$ ; Power Drift =  $-0.04 \text{ dB}$

Peak SAR (extrapolated) =  $3.50 \text{ W/kg}$

**SAR(1 g) =  $2.34 \text{ W/kg}$ ; SAR(10 g) =  $1.54 \text{ W/kg}$**

Maximum value of SAR (measured) =  $2.97 \text{ W/kg}$



Test Laboratory: SGS-SAR Lab

## System Performance Check 1750 MHz Head

**DUT: D1750V2; Type: Dipole; Serial: 1105**

Communication System: UID 0, CW (0); Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: HSL1750; Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.305$  S/m;  $\epsilon_r = 40.304$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN7620; ConvF(8.97, 8.97, 8.97); Calibrated: 2021-08-24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 2021-11-05
- Phantom: SAM5; Type: SAM; Serial: 1481
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=250mW/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 13.7 W/kg

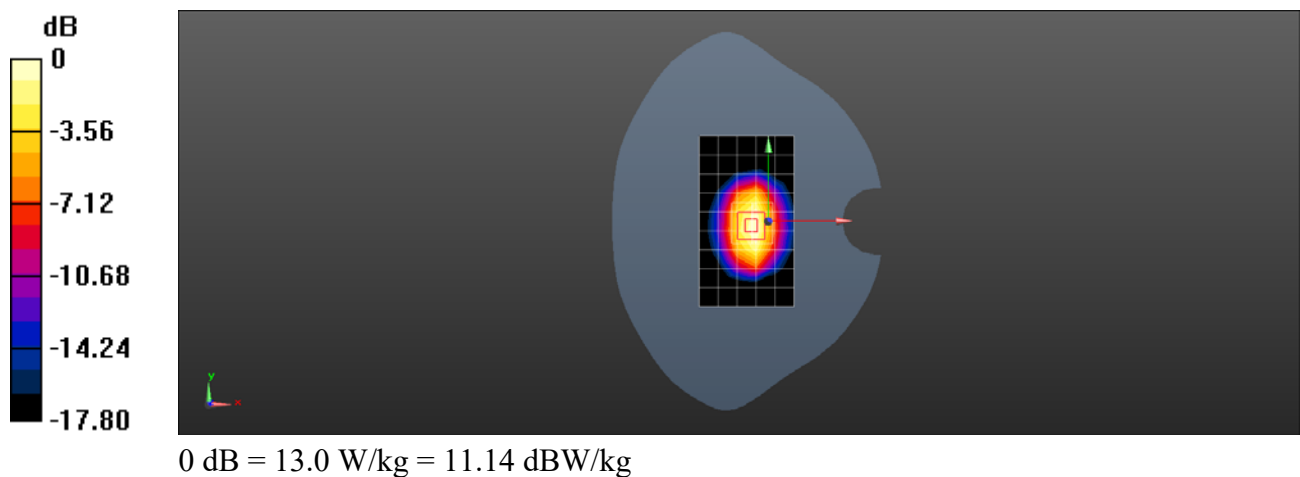
**Body/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.43 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 15.5 W/kg

**SAR(1 g) = 8.43 W/kg; SAR(10 g) = 4.47 W/kg**

Maximum value of SAR (measured) = 13.0 W/kg



Test Laboratory: SGS-SAR Lab

## System Performance Check 1900 MHz Head

**DUT: D1900V3; Type: Dipole; Serial: 5d114**

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.404$  S/m;  $\epsilon_r = 40.118$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN7620; ConvF(8.67, 8.67, 8.67); Calibrated: 2021-08-24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 2021-11-05
- Phantom: SAM5; Type: SAM; Serial: 1481
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=250mW/Area Scan (7x7x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 14.5 W/kg

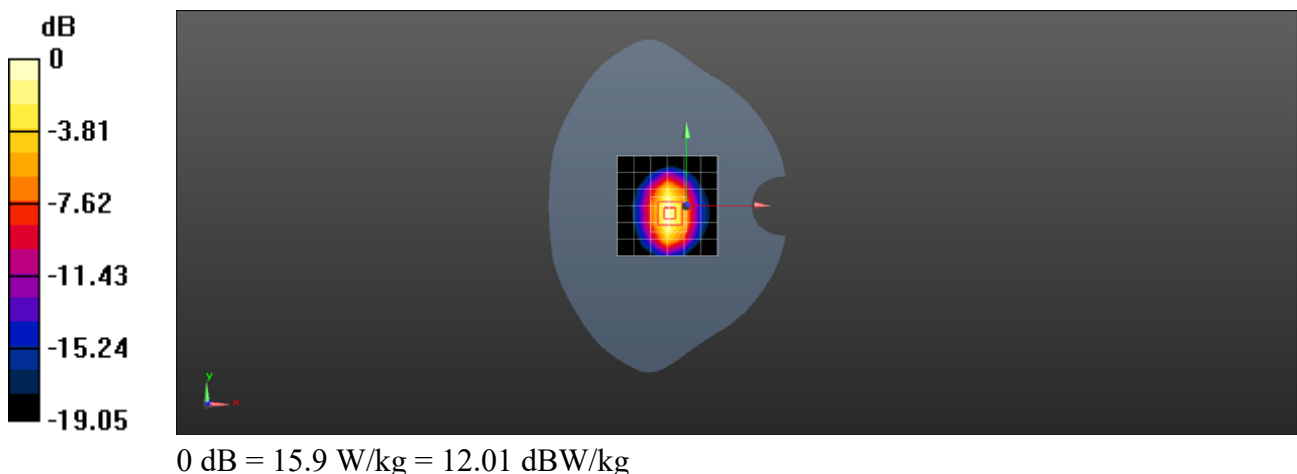
**Body/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.63 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 18.9 W/kg

**SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.14 W/kg**

Maximum value of SAR (measured) = 15.9 W/kg



Test Laboratory: SGS-SAR Lab

## System Performance Check 2450MHz Head

**DUT: D2450V2; Type: Dipole; Serial: 1038**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL2450; Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.782$  S/m;  $\epsilon_r = 40.284$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(6.88, 6.88, 6.88); Calibrated: 2021-08-12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn414; Calibrated: 2020-12-30
- Phantom: SAM6; Type: SAM; Serial: 1824
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=250mW/Area Scan (6x8x1):** Measurement grid: dx=12mm, dy=12mm  
Maximum value of SAR (measured) = 17.0 W/kg

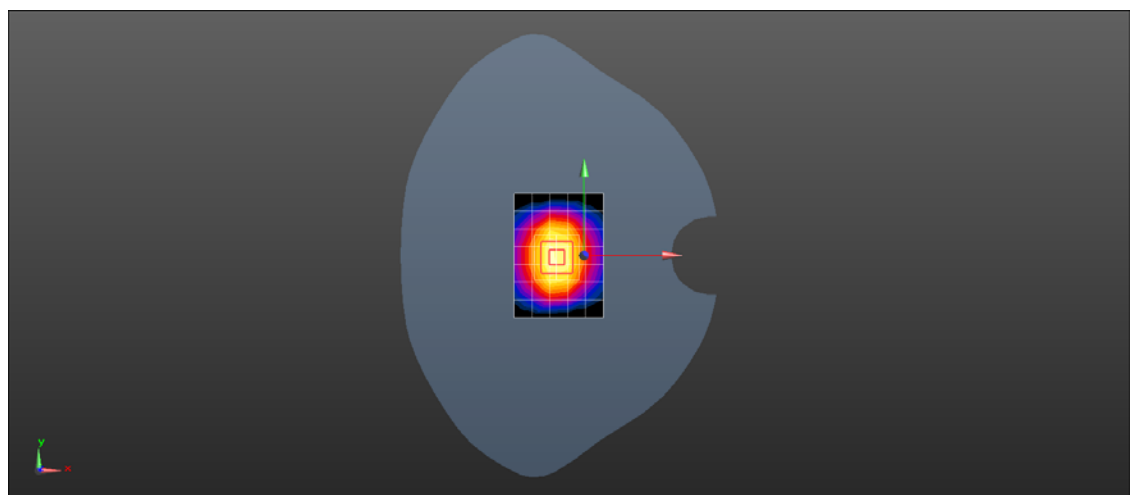
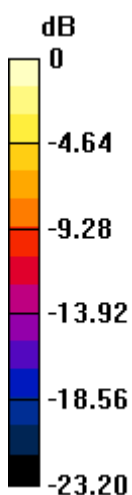
**Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.87 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 27.2 W/kg

**SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.8 W/kg**

Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

Test Laboratory: SGS-SAR Lab

## System Performance Check 2600MHz Head

**DUT: D2600V2; Type: Dipole; Serial: 1125**

Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: HSL2600; Medium parameters used:  $f = 2600$  MHz;  $\sigma = 1.991$  S/m;  $\epsilon_r = 38.724$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(7.43, 7.43, 7.43); Calibrated: 2021-04-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1324; Calibrated: 2021-06-22
- Phantom: SAM2; Type: SAM; Serial: 1563
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=250mW/Area Scan (9x10x1):** Measurement grid: dx=12mm, dy=12mm  
Maximum value of SAR (measured) = 22.0 W/kg

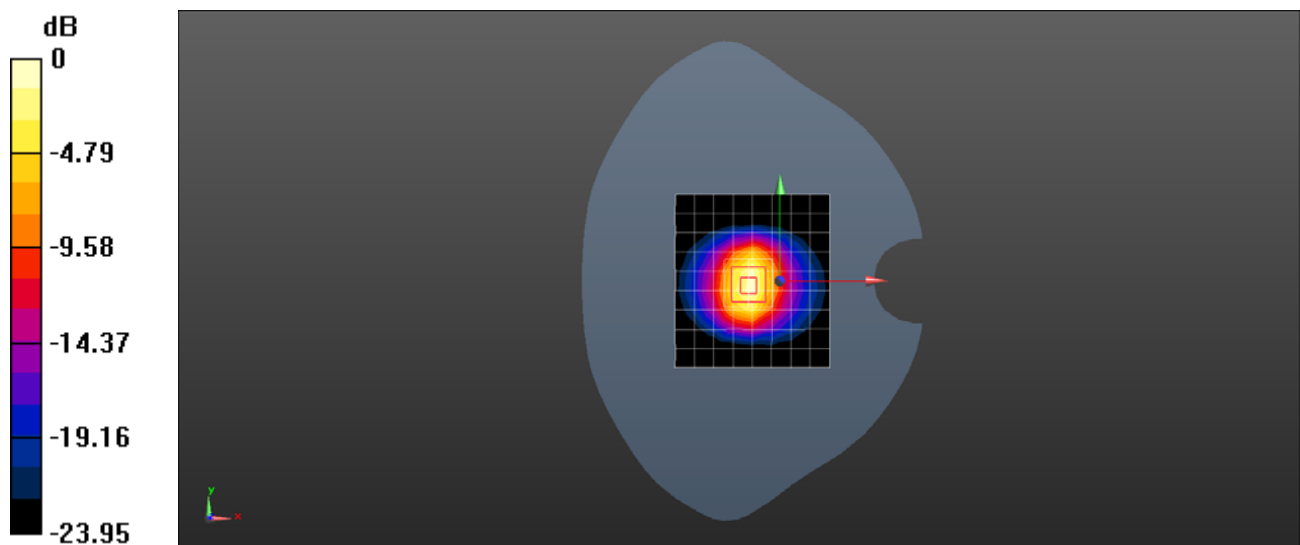
**Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.62 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 30.4 W/kg

**SAR(1 g) = 14 W/kg; SAR(10 g) = 6.25 W/kg**

Maximum value of SAR (measured) = 24.2 W/kg



0 dB = 24.2 W/kg = 13.84 dBW/kg

Test Laboratory: SGS-SAR Lab

## System Performance Check 5.25GHz Head

**DUT: D5GHzV2; Type: Dipole; Serial: 1174**

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: HSL5G; Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.674$  S/m;  $\epsilon_r = 35.725$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.51, 4.51, 4.51); Calibrated: 2021-04-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1324; Calibrated: 2021-06-22
- Phantom: SAM2; Type: SAM; Serial: 1563
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=100mW, f=5250 MHz/Area Scan (10x10x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (measured) = 12.4 W/kg

**Body/d=10mm, Pin=100mW, f=5250 MHz/Zoom Scan (8x8x7)/Cube 0:** Measurement

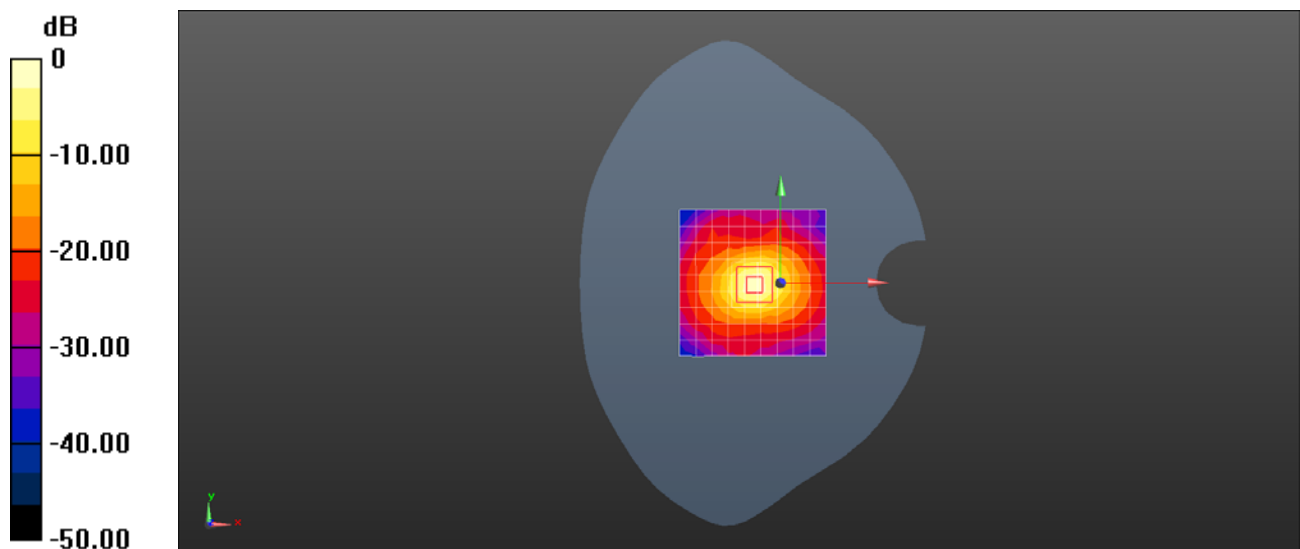
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 67.68 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 29.5 W/kg

**SAR(1 g) = 7.2 W/kg; SAR(10 g) = 2.04 W/kg**

Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg



Test Laboratory: SGS-SAR Lab

## System Performance Check 5.6GHz Head

**DUT: D5GHzV2; Type: Dipole; Serial: 1174**

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: HSL5G; Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.055$  S/m;  $\epsilon_r = 34.857$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.81, 4.81, 4.81); Calibrated: 2021-04-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1324; Calibrated: 2021-06-22
- Phantom: SAM2; Type: SAM; Serial: 1563
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=100mW, f=5600 MHz/Area Scan (10x10x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (measured) = 16.7 W/kg

**Body/d=10mm, Pin=100mW, f=5600 MHz/Zoom Scan (8x8x7)/Cube 0:** Measurement

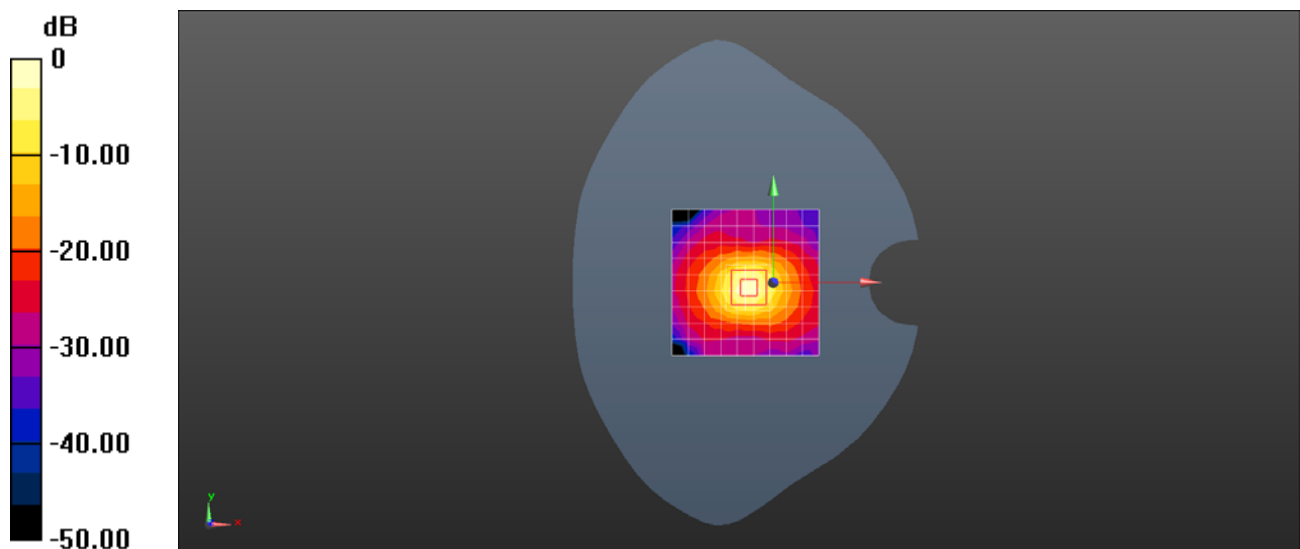
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.83 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 34.9 W/kg

**SAR(1 g) = 7.82 W/kg; SAR(10 g) = 2.2 W/kg**

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



Test Laboratory: SGS-SAR Lab

## System Performance Check 5.75GHz Head

**DUT: D5GHzV2; Type: Dipole; Serial: 1174**

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: HSL5G; Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.246$  S/m;  $\epsilon_r = 34.676$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.90, 4.90, 4.90); Calibrated: 2021-04-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1324; Calibrated: 2021-06-22
- Phantom: SAM2; Type: SAM; Serial: 1563
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Body/d=10mm, Pin=100mW, f=5750 MHz/Area Scan (10x10x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (measured) = 18.8 W/kg

**Body/d=10mm, Pin=100mW, f=5750 MHz/Zoom Scan (8x8x7)/Cube 0:** Measurement

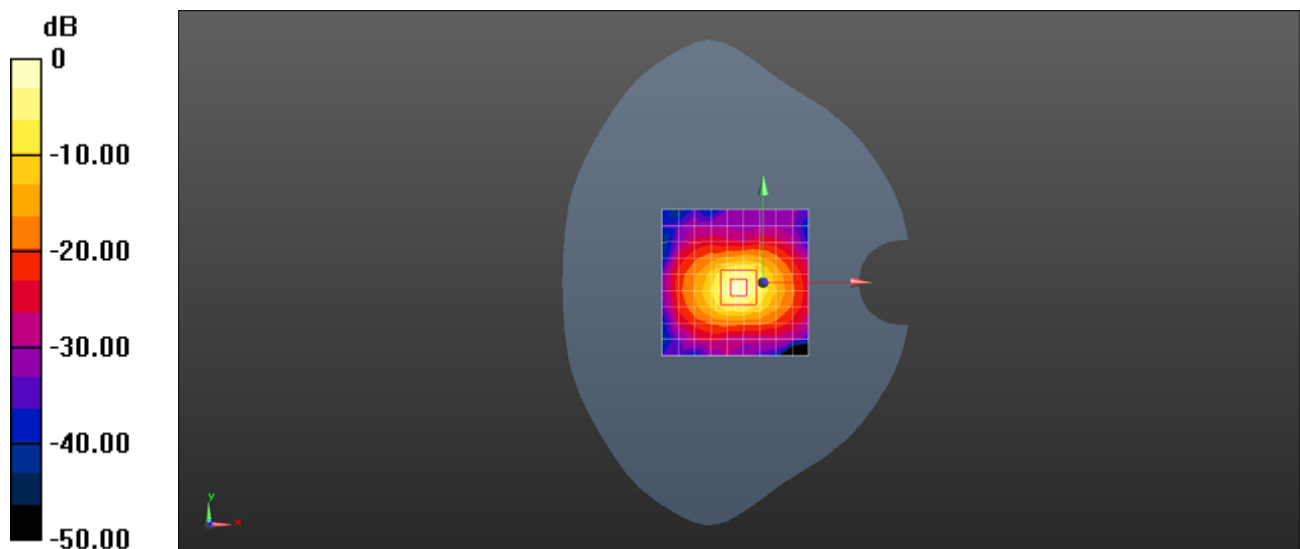
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.81 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 37.1 W/kg

**SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.34 W/kg**

Maximum value of SAR (measured) = 20.1 W/kg



0 dB = 20.1 W/kg = 13.03 dBW/kg

## System Validation

Per FCC KDB 865664 D02, SAR system verification is required to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles are used with the required tissue-equivalent media for system validation, according to the procedures outlined in FCC KDB 865664 D01 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point must be validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

a tabulated summary of the system validation status, measurement frequencies, SAR probes, calibrated signal type(s) and tissue dielectric parameters has been included.

**Table of SAR System validation summary:**

Frequency (MHz)	Date	Probe SN	Probe Type	Probe CAL POINT		PERM ( $\epsilon_r$ )	COND ( $\sigma$ )	CW Validation			MOD.VALIDATION		
								Sensitivity	Probe LINEARITY	Probe ISOTROPY	Modulation	DUTY. FACTORE	PAR
750	2021/5/27	3962	EX3DV4	750	Head	42.980	0.901	PASS	PASS	PASS	N/A	N/A	N/A
835	2021/5/27	3962	EX3DV4	835	Head	42.430	0.909	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2021/5/27	3962	EX3DV4	1750	Head	40.620	1.353	PASS	PASS	PASS	N/A	N/A	N/A
1900	2021/5/27	3962	EX3DV4	1900	Head	41.090	1.393	PASS	PASS	PASS	GMSK	PASS	N/A
2300	2021/5/27	3962	EX3DV4	2300	Head	40.370	1.635	PASS	PASS	PASS	TDD	PASS	N/A
2450	2021/5/27	3962	EX3DV4	2450	Head	39.790	1.816	PASS	PASS	PASS	OFDM	PASS	N/A
2600	2021/5/27	3962	EX3DV4	2600	Head	39.210	1.980	PASS	PASS	PASS	TDD	PASS	N/A
5250	2021/5/27	3962	EX3DV4	5250	Head	35.850	4.737	PASS	PASS	PASS	OFDM	PASS	N/A
5600	2021/5/27	3962	EX3DV4	5600	Head	34.920	5.137	PASS	PASS	PASS	OFDM	PASS	N/A
5750	2021/5/27	3962	EX3DV4	5750	Head	34.500	5.319	PASS	PASS	PASS	OFDM	PASS	N/A
Frequency (MHz)	Date	Probe SN	Probe Type	Probe CAL POINT		PERM ( $\epsilon_r$ )	COND ( $\sigma$ )	CW Validation			MOD.VALIDATION		
								Sensitivity	Probe LINEARITY	Probe ISOTROPY	Modulation	DUTY. FACTORE	PAR
750	2021/9/13	3789	EX3DV4	750	Head	42.781	0.879	PASS	PASS	PASS	N/A	N/A	N/A
835	2021/9/13	3789	EX3DV4	835	Head	41.251	0.890	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2021/9/13	3789	EX3DV4	1750	Head	40.413	1.348	PASS	PASS	PASS	N/A	N/A	N/A
1900	2021/9/13	3789	EX3DV4	1900	Head	40.982	1.414	PASS	PASS	PASS	GMSK	PASS	N/A
2300	2021/9/13	3789	EX3DV4	2300	Head	39.903	1.624	PASS	PASS	PASS	TDD	PASS	N/A
2450	2021/9/13	3789	EX3DV4	2450	Head	39.903	1.825	PASS	PASS	PASS	OFDM	PASS	N/A
2600	2021/9/13	3789	EX3DV4	2600	Head	38.589	1.977	PASS	PASS	PASS	TDD	PASS	N/A
Frequency (MHz)	Date	Probe SN	Probe Type	Probe CAL POINT		PERM ( $\epsilon_r$ )	COND ( $\sigma$ )	CW Validation			MOD.VALIDATION		
								Sensitivity	Probe LINEARITY	Probe ISOTROPY	Modulation	DUTY. FACTORE	PAR
750	2021/9/27	7620	EX3DV4	750	Head	42.114	0.896	PASS	PASS	PASS	N/A	N/A	N/A
835	2021/9/27	7620	EX3DV4	835	Head	42.219	0.906	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2021/9/27	7620	EX3DV4	1750	Head	40.257	1.352	PASS	PASS	PASS	N/A	N/A	N/A
1900	2021/9/27	7620	EX3DV4	1900	Head	40.341	1.387	PASS	PASS	PASS	GMSK	PASS	N/A
2300	2021/9/27	7620	EX3DV4	2300	Head	39.748	1.631	PASS	PASS	PASS	TDD	PASS	N/A
2450	2021/9/27	7620	EX3DV4	2450	Head	39.927	1.816	PASS	PASS	PASS	OFDM	PASS	N/A
2600	2021/9/27	7620	EX3DV4	2600	Head	38.793	1.977	PASS	PASS	PASS	TDD	PASS	N/A

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664D01 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5dB), such as OFDM according to KDB 865664.