

Appendix A

Detailed System Check Results

1. System Performance Check
System Performance Check 835 MHz Head
System Performance Check 1750 MHz Head
System Performance Check 1900 MHz Head
System Performance Check 2450 MHz Head
System Performance Check 2600 MHz Head
System Performance Check 5250 MHz Head
System Performance Check 5600 MHz Head
System Performance Check 5750 MHz Head

Test Laboratory: SGS-SAR Lab

System Performance Check 835 MHz Head

DUT: D835V2; Type: D835V2; Serial: 4d105

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

Medium: HSL835; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.888 \text{ S/m}$; $\epsilon_r = 43.127$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3748; ConvF(8.76, 8.76, 8.76); Calibrated: 2019-06-19
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1267; Calibrated: 2019-12-17
- Phantom: SAM 7; Type: SAM; Serial: 1027
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=15mm, Pin=250mW/Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (measured) = 2.94 W/kg

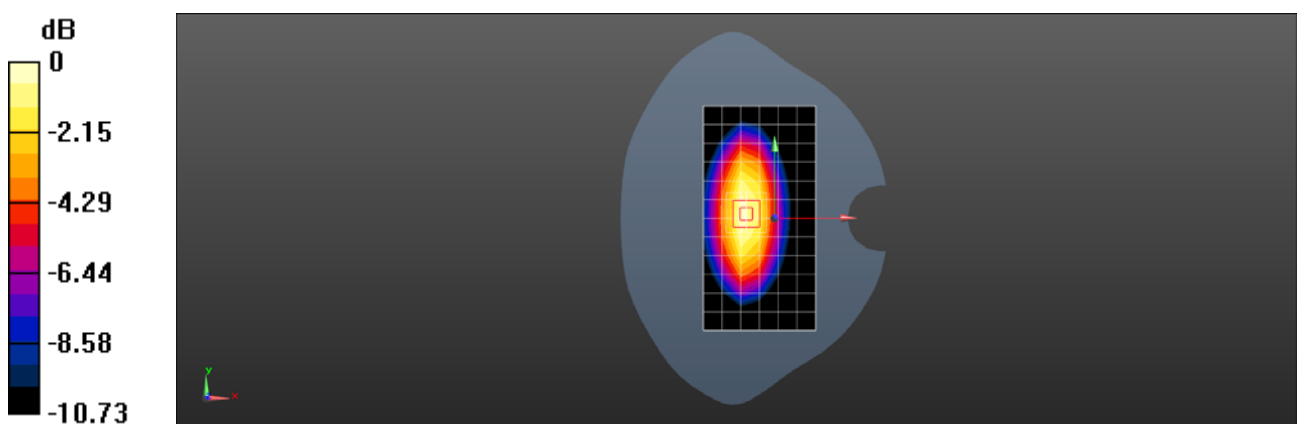
Body/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.11 V/m ; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.43 W/kg ; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 3.11 W/kg



0 dB = 3.11 W/kg = 4.93 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 835 MHz Head

DUT: D835V2; Type: D835V2; Serial: 4d105

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

Medium: HSL835; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.886 \text{ S/m}$; $\epsilon_r = 40.849$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3748; ConvF(8.76, 8.76, 8.76); Calibrated: 2019-06-19
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1267; Calibrated: 2019-12-17
- Phantom: SAM 7; Type: SAM; Serial: 1027
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=15mm, Pin=250mW/Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (measured) = 2.99 W/kg

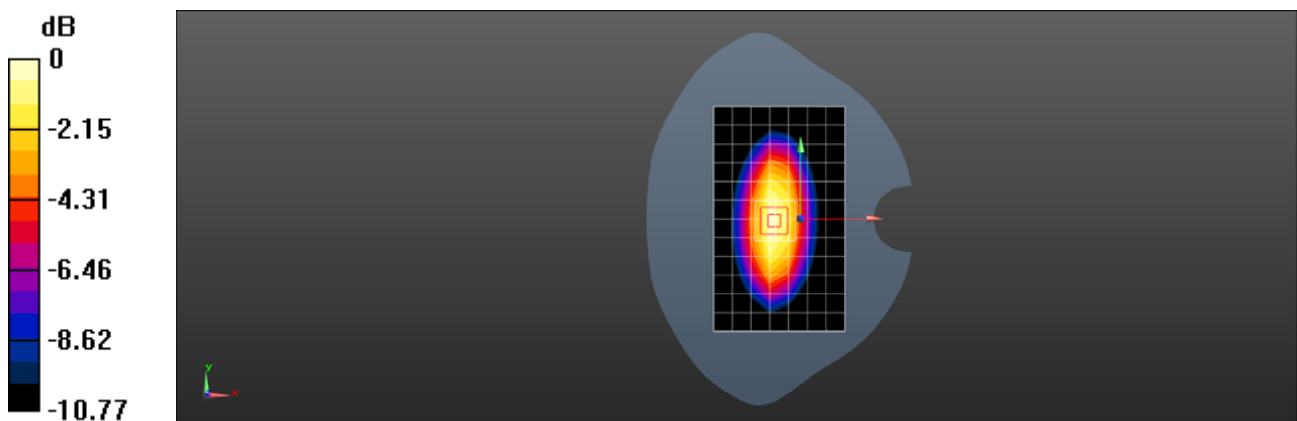
Body/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.85 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.78 W/kg

SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.62 W/kg

Maximum value of SAR (measured) = 3.15 W/kg



0 dB = 3.15 W/kg = 4.98 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 1750 MHz Head

DUT: D1750V2; Type: D1750V2; Serial: 1149

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

Medium: HSL1750; Medium parameters used: $f = 1750$ MHz; $\sigma = 1.347$ S/m; $\epsilon_r = 40.949$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3982; ConvF(8.8, 8.8, 8.8); Calibrated: 2019-09-11
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1428; Calibrated: 2020-03-03
- Phantom: SAM 3; Type: SAM; Serial: 1912
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=10mm, Pin=250mW/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.4 W/kg

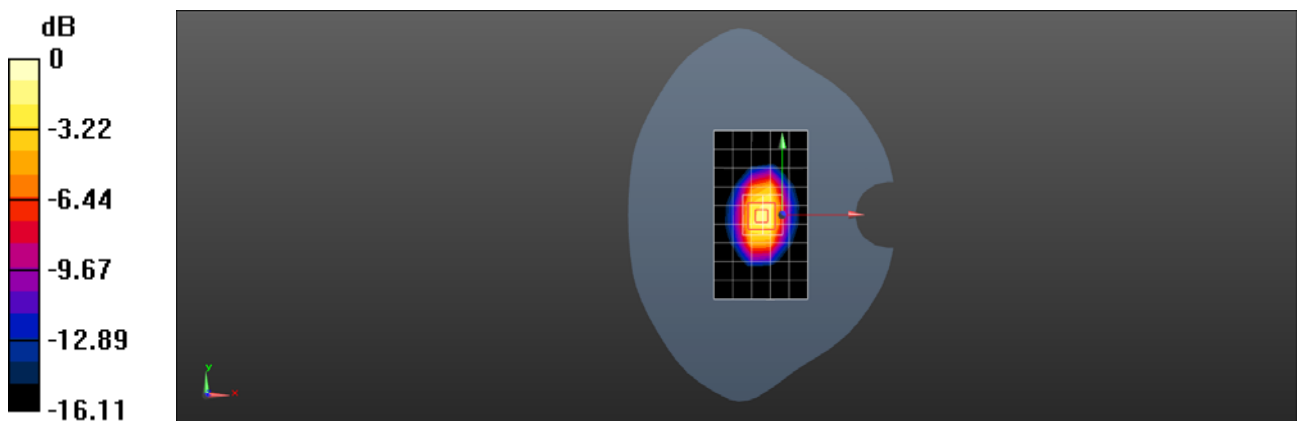
Body/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 89.65 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 9.71 W/kg; SAR(10 g) = 5.08 W/kg

Maximum value of SAR (measured) = 14.6 W/kg



0 dB = 14.6 W/kg = 11.64 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 1900 MHz Head

DUT: D1900V2; Type: D1900V2; Serial: 5d028

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

Medium: HSL1900; Medium parameters used: $f = 1900$ MHz; $\sigma = 1.431$ S/m; $\epsilon_r = 39.92$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3982; ConvF(8.48, 8.48, 8.48); Calibrated: 2019-09-11
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 3; Type: SAM; Serial: 1912
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=10mm, Pin=250mW/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.98 W/kg

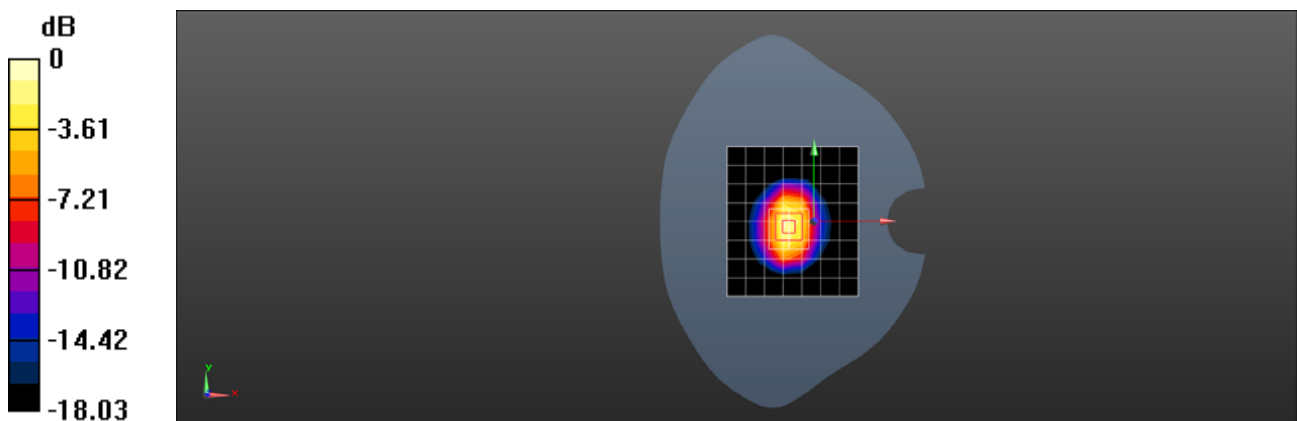
Body/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 88.89 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 19.6 W/kg

SAR(1 g) = 10.57 W/kg; SAR(10 g) = 5.47 W/kg

Maximum value of SAR (measured) = 11.9 W/kg



0 dB = 11.9 W/kg = 10.76 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 2450MHz Head

DUT: D2450V2; Type: D2450V2; Serial: 733

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

Medium: HSL2450; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.803$ S/m; $\epsilon_r = 40.177$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.87, 7.87, 7.87); Calibrated: 2019-10-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 2; Type: SAM; Serial: 1913
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=10mm, Pin=250mW/Area Scan (9x10x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 15.7 W/kg

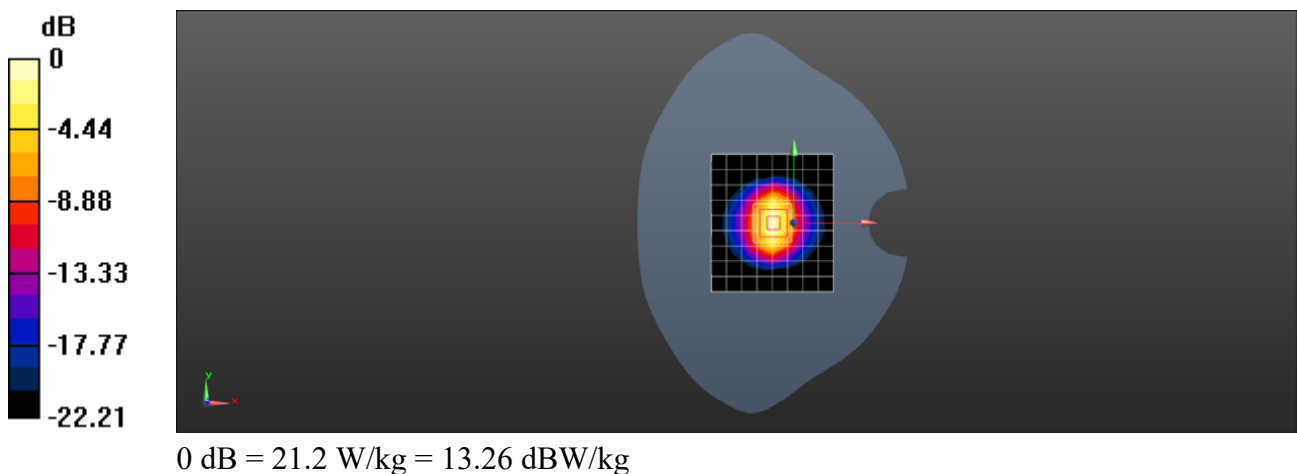
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.5 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 25.6 W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 6.08 W/kg

Maximum value of SAR (measured) = 21.2 W/kg



Test Laboratory: SGS-SAR Lab

System Performance Check 2600MHz Head

DUT: D2600V2; Type: D2600V2; Serial: 1125

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

Medium: HSL2600; Medium parameters used: $f = 2600$ MHz; $\sigma = 1.98$ S/m; $\epsilon_r = 40.375$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.74, 7.74, 7.74); Calibrated: 2019-10-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 2; Type: SAM; Serial: 1913
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=10mm, Pin=250mW/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 14.4 W/kg

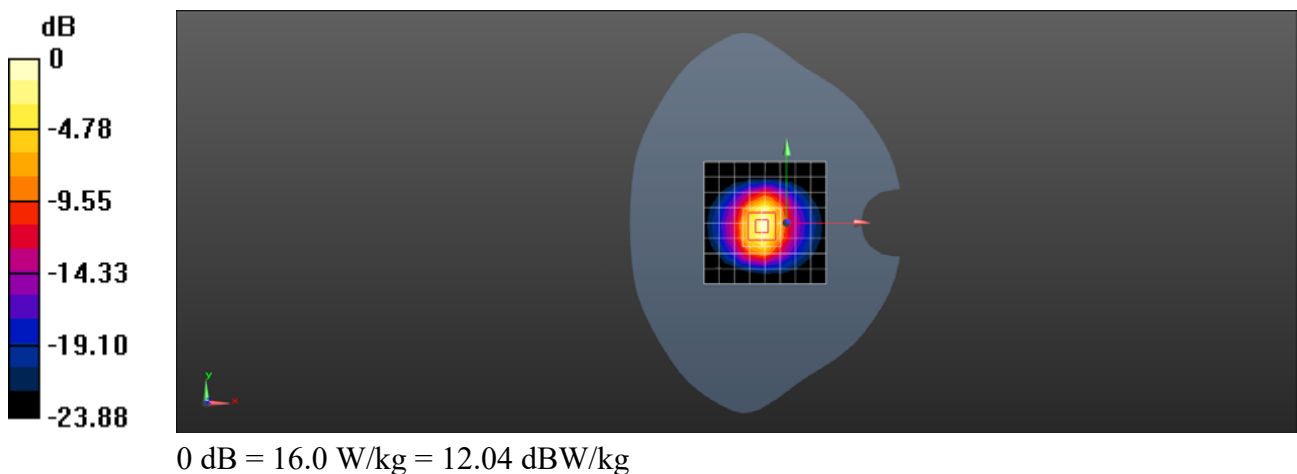
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.53 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 31.6 W/kg

SAR(1 g) = 14 W/kg; SAR(10 g) = 6.19 W/kg

Maximum value of SAR (measured) = 16.0 W/kg



Test Laboratory: SGS-SAR Lab

System Performance Check 2600MHz Head

DUT: D2600V2; Type: D2600V2; Serial: 1125

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

Medium: HSL2600; Medium parameters used: $f = 2600$ MHz; $\sigma = 1.993$ S/m; $\epsilon_r = 39.389$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.74, 7.74, 7.74); Calibrated: 2019-10-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 2; Type: SAM; Serial: 1913
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/d=10mm, Pin=250mW/Area Scan (9x10x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 17.2 W/kg

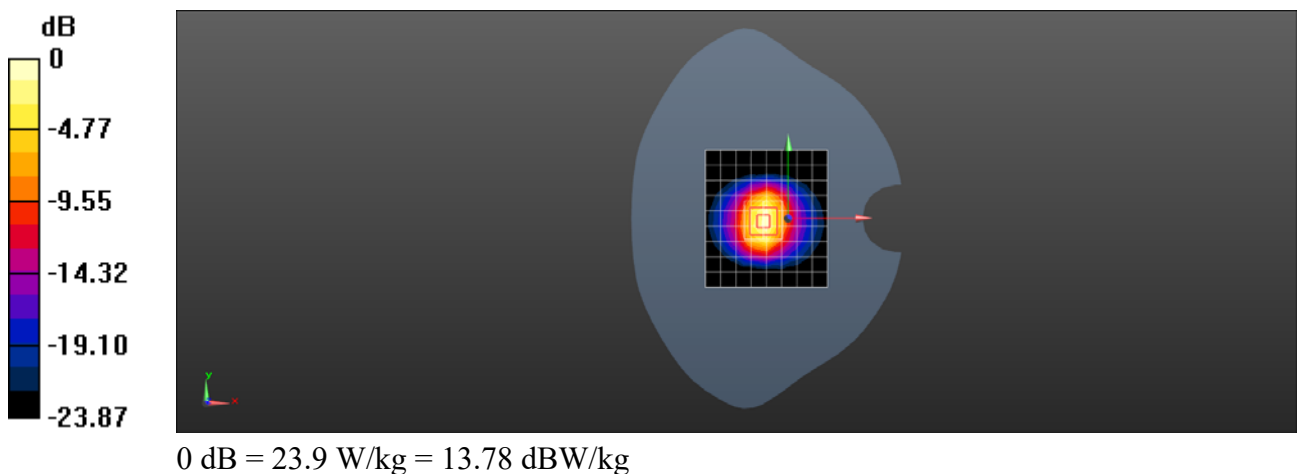
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.93 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 29.3 W/kg

SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.28 W/kg

Maximum value of SAR (measured) = 23.9 W/kg



Test Laboratory: SGS-SAR Lab

System Performance Check 5.25GHz Head

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1165

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

Medium: HSL5G; Medium parameters used: $f = 5250$ MHz; $\sigma = 4.716$ S/m; $\epsilon_r = 35.725$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(5.34, 5.34, 5.34); Calibrated: 2019-10-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 1; Type: SAM; Serial: 1640
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

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

dx=10mm, dy=10mm

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

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

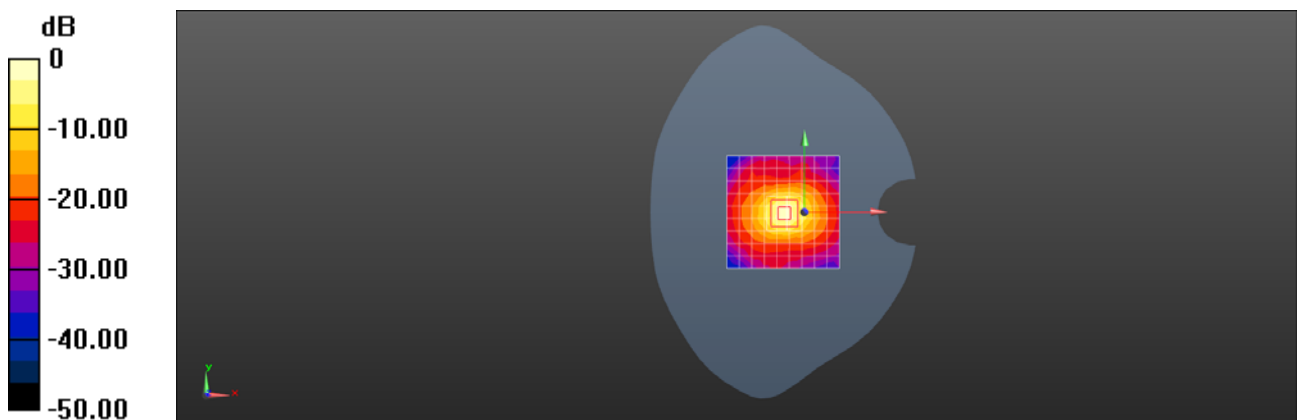
grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 66.10 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 27.4 W/kg

SAR(1 g) = 6.88 W/kg; SAR(10 g) = 2.01 W/kg

Maximum value of SAR (measured) = 15.7 W/kg



0 dB = 15.7 W/kg = 11.96 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 5.6GHz Head

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1165

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

Medium: HSL5G; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.099$ S/m; $\epsilon_r = 34.858$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(4.9, 4.9, 4.9); Calibrated: 2019-10-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 1; Type: SAM; Serial: 1640
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

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

dx=10mm, dy=10mm

Maximum value of SAR (measured) = 16.2 W/kg

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

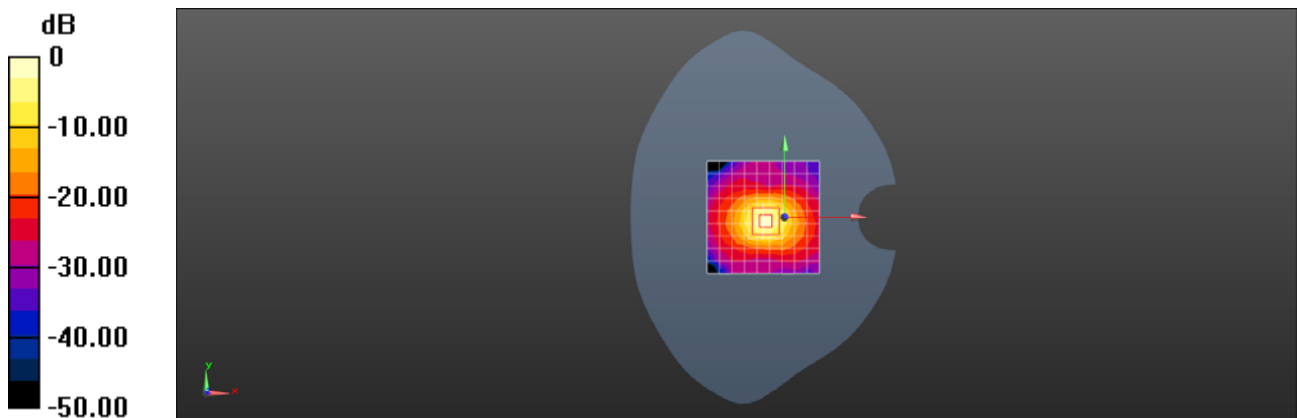
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.20 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 34.5 W/kg

SAR(1 g) = 7.51 W/kg; SAR(10 g) = 2.12 W/kg

Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 5.75GHz Head

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1165

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

Medium: HSL5G; Medium parameters used: $f = 5750$ MHz; $\sigma = 5.293$ S/m; $\epsilon_r = 34.677$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(4.83, 4.83, 4.83); Calibrated: 2019-10-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2019-09-18
- Phantom: SAM 1; Type: SAM; Serial: 1640
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

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

dx=10mm, dy=10mm

Maximum value of SAR (measured) = 17.6 W/kg

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

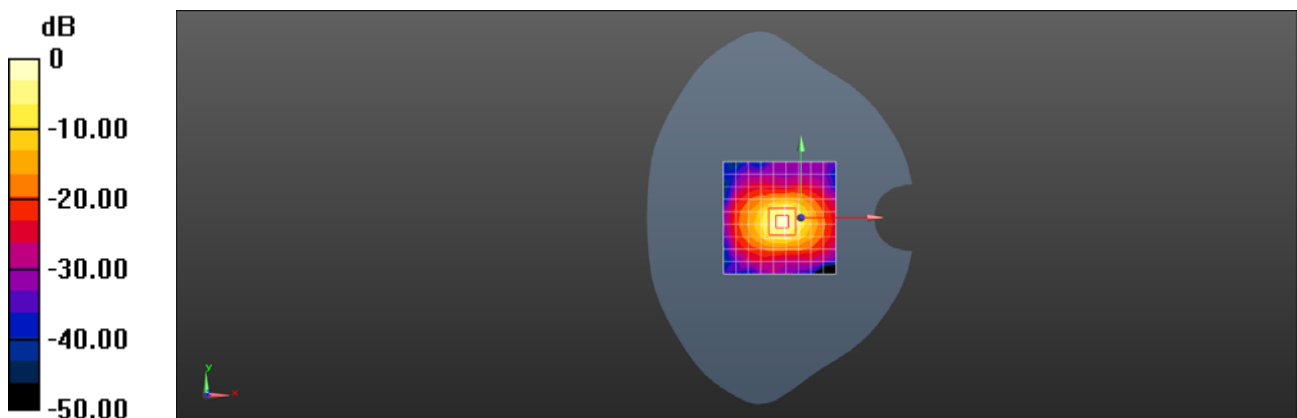
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.99 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 34.6 W/kg

SAR(1 g) = 7.74 W/kg; SAR(10 g) = 2.21 W/kg

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



0 dB = 18.8 W/kg = 12.74 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 (ϵ_r)	COND (σ)	CW Validation			MOD.Validation		
							Sensitivity	Probe Linearity	Probe Isotropy	Modulation	Duty. Factore	PAR
750	2019/10/09	3982	EX3DV4	750 Head	42.116	0.857	PASS	PASS	PASS	N/A	N/A	N/A
835	2019/10/09	3982	EX3DV4	835 Head	42.233	0.904	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2019/10/09	3982	EX3DV4	1750 Head	40.251	1.375	PASS	PASS	PASS	N/A	N/A	N/A
1900	2019/10/09	3982	EX3DV4	1900 Head	40.284	1.389	PASS	PASS	PASS	GMSK	PASS	N/A
3300	2019/10/09	3982	EX3DV4	3300 Head	38.739	2.639	PASS	PASS	PASS	TDD	PASS	N/A
3500	2019/10/09	3982	EX3DV4	3500 Head	38.305	3.020	PASS	PASS	PASS	TDD	PASS	N/A
3700	2019/10/09	3982	EX3DV4	3700 Head	37.686	3.256	PASS	PASS	PASS	TDD	PASS	N/A
3900	2019/10/09	3982	EX3DV4	3900 Head	37.075	3.485	PASS	PASS	PASS	TDD	PASS	N/A
4100	2019/10/09	3982	EX3DV4	4100 Head	35.944	3.467	PASS	PASS	PASS	TDD	PASS	N/A
4400	2019/10/09	3982	EX3DV4	4400 Head	35.247	3.740	PASS	PASS	PASS	TDD	PASS	N/A
4600	2019/10/09	3982	EX3DV4	4600 Head	38.343	3.847	PASS	PASS	PASS	TDD	PASS	N/A
4800	2019/10/09	3982	EX3DV4	4800 Head	38.252	4.182	PASS	PASS	PASS	TDD	PASS	N/A
4950	2019/10/09	3982	EX3DV4	4950 Head	37.973	4.216	PASS	PASS	PASS	TDD	PASS	N/A
Frequency (MHz)	Date	Probe SN	Probe Type	Probe CAL Point	PERM (ϵ_r)	COND (σ)	CW Validation			MOD.Validation		
							Sensitivity	Probe Linearity	Probe Isotropy	Modulation	Duty. Factore	PAR
750	2019/10/28	3923	EX3DV4	750 Head	43.278	0.910	PASS	PASS	PASS	N/A	N/A	N/A
835	2019/10/28	3923	EX3DV4	835 Head	40.769	0.906	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2019/10/28	3923	EX3DV4	1750 Head	40.524	1.336	PASS	PASS	PASS	N/A	N/A	N/A
1900	2019/10/28	3923	EX3DV4	1900 Head	41.235	1.418	PASS	PASS	PASS	GMSK	PASS	N/A
2000	2019/10/28	3923	EX3DV4	2000 Head	41.105	1.398	PASS	PASS	PASS	N/A	N/A	N/A
2450	2019/10/28	3923	EX3DV4	2450 Head	39.345	1.785	PASS	PASS	PASS	OFDM	PASS	N/A
2600	2019/10/28	3923	EX3DV4	2600 Head	38.713	1.996	PASS	PASS	PASS	TDD	PASS	N/A
5250	2019/10/28	3923	EX3DV4	5250 Head	36.570	4.625	PASS	PASS	PASS	OFDM	PASS	N/A
5600	2019/10/28	3923	EX3DV4	5600 Head	35.748	5.159	PASS	PASS	PASS	OFDM	PASS	N/A
5750	2019/10/28	3923	EX3DV4	5750 Head	35.384	5.309	PASS	PASS	PASS	OFDM	PASS	N/A
Frequency (MHz)	Date	Probe SN	Probe Type	Probe CAL Point	PERM (ϵ_r)	COND (σ)	CW Validation			MOD.Validation		
							Sensitivity	Probe Linearity	Probe Isotropy	Modulation	Duty. Factore	PAR
750	2019/06/28	3748	EX3DV4	750 Head	42.653	0.898	PASS	PASS	PASS	N/A	N/A	N/A
835	2019/06/28	3748	EX3DV4	835 Head	41.876	0.903	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2019/06/28	3748	EX3DV4	1750 Head	40.832	1.379	PASS	PASS	PASS	N/A	N/A	N/A
1900	2019/06/28	3748	EX3DV4	1900 Head	41.287	1.415	PASS	PASS	PASS	GMSK	PASS	N/A
2450	2019/06/28	3748	EX3DV4	2450 Head	39.591	1.807	PASS	PASS	PASS	OFDM	PASS	N/A
2600	2019/06/28	3748	EX3DV4	2600 Head	39.374	1.993	PASS	PASS	PASS	TDD	PASS	N/A
5250	2019/06/28	3748	EX3DV4	5250 Head	36.480	4.751	PASS	PASS	PASS	OFDM	PASS	N/A
5600	2019/06/28	3748	EX3DV4	5600 Head	35.375	5.194	PASS	PASS	PASS	OFDM	PASS	N/A
5750	2019/06/28	3748	EX3DV4	5750 Head	35.081	5.316	PASS	PASS	PASS	OFDM	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.