



Appendix A. System Check Plots

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System Performance Check

Place of testing: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D2450-EX

DUT: Dipole; Type: D2450V2; Serial: 860

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

Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.82$ S/m; $\epsilon_r = 37.648$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- 1 Probe: EX3DV4 - SN7350; ConvF(7.72, 7.72, 7.72) @ 2450 MHz; Calibrated: 2020-12-21
- 1 Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- 1 Electronics: DAE4 Sn1531; Calibrated: 2021-02-24
- 1 Phantom: SAM7; Type: SAM; Serial: 1594
- 1 DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/d=10mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: $dx=12$ mm, $dy=12$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 16.3 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 64.01 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 26.2 W/kg

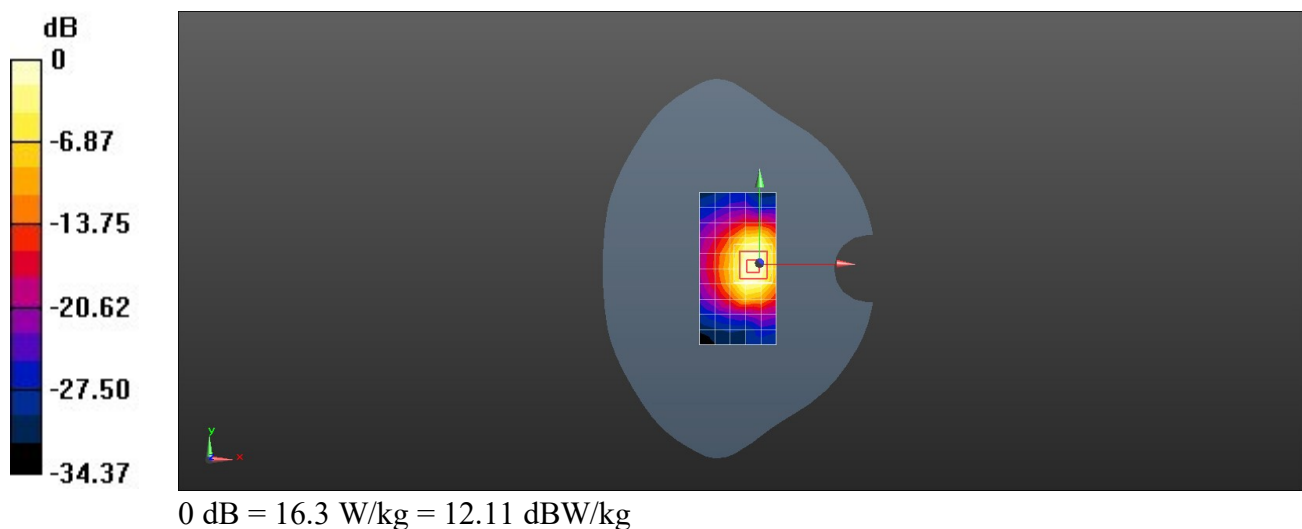
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 6 W/kg

Smallest distance from peaks to all points 3 dB below = 8.9 mm

Ratio of SAR at M2 to SAR at M1 = 49.6%

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 21.1 W/kg



Place of testing: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D2450-EX

DUT: Dipole; Type: D2450V2; Serial: 860

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

Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.819$ S/m; $\epsilon_r = 37.601$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- 1 Probe: EX3DV4 - SN7350; ConvF(7.72, 7.72, 7.72) @ 2450 MHz; Calibrated: 2020-12-21
- 1 Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- 1 Electronics: DAE4 Sn1531; Calibrated: 2021-02-24
- 1 Phantom: SAM7; Type: SAM; Serial: 1594
- 1 DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/d=10mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: $dx=12$ mm, $dy=12$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 19.7 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 59.23 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 27.9 W/kg

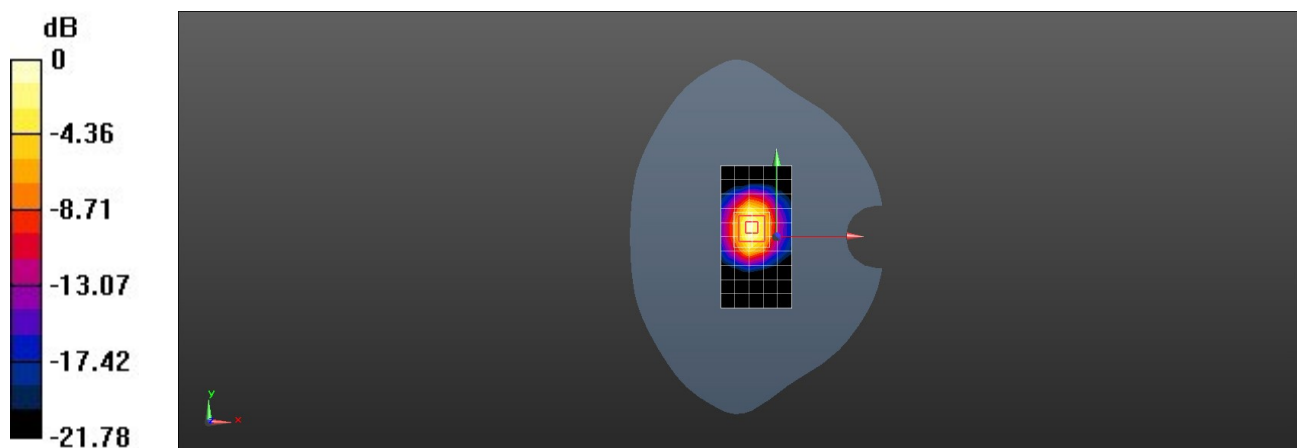
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.28 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 49%

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 22.4 W/kg



0 dB = 22.4 W/kg = 13.51 dBW/kg

Place of testing: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D2450-EX

DUT: Dipole; Type: D2450V2; Serial: 860

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

Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.766$ S/m; $\epsilon_r = 38.302$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY Configuration:

- 1 Probe: EX3DV4 - SN3744; ConvF(7.37, 7.37, 7.37) @ 2450 MHz; Calibrated: 2021-07-28
- 1 Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- 1 Electronics: DAE4 Sn1492; Calibrated: 2021-07-28
- 1 Phantom: SAM1; Type: SAM; Serial: 1475
- 1 DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/d=10mm, Pin=250mW, f=2450 MHz/Area Scan (7x9x1): Measurement grid:
 $dx=12$ mm, $dy=12$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 19.8 W/kg

Configuration/d=10mm, Pin=250mW, f=2450 MHz/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 59.30 V/m; Power Drift = -0.24 dB

Peak SAR (extrapolated) = 25.4 W/kg

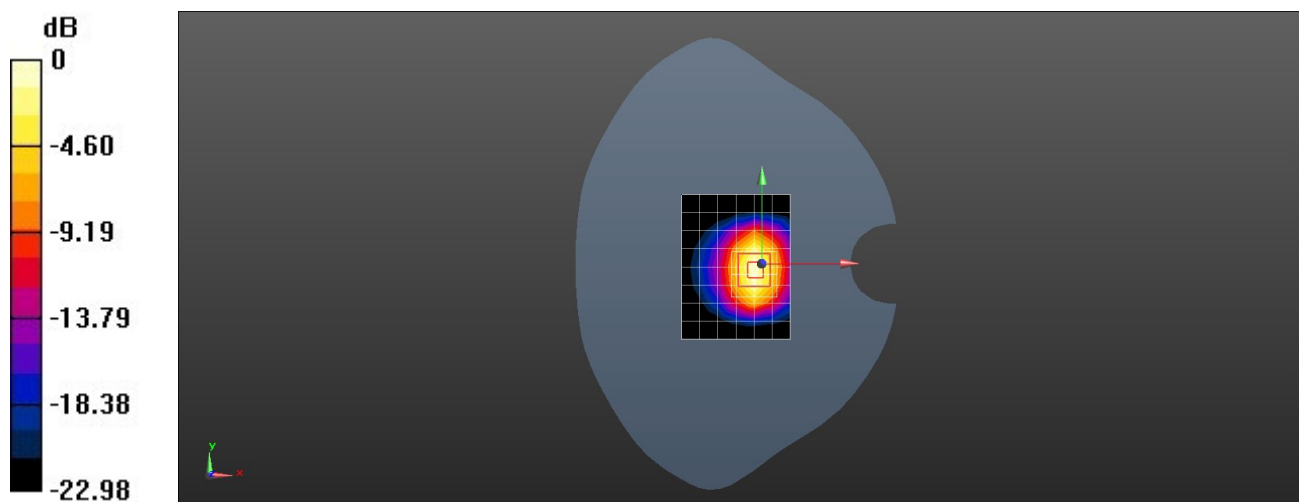
SAR(1 g) = 12.2 W/kg; SAR(10 g) = 5.67 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 48.2%

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 20.2 W/kg



0 dB = 20.2 W/kg = 13.05 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.

FREQ.	DATE	PROBE SN	PROBE TYPE	PROBE CAL POINT		PERM	COND	CW VALIDATION			MOD.VALIDATION		
[Mhz]						(ϵ_r)	(σ)	SENSI- TIVITY	PROBE LINARITY	PROBE ISOTROPY	MOD. TYPE	DUTY. FACTORE	PAR
750	2020-3-4	7350	EX3DV4	750	Head	41.26	0.868	PASS	PASS	PASS	N/A	N/A	N/A
835	2020-3-4	7350	EX3DV4	835	Head	41.03	0.898	PASS	PASS	PASS	GMSK	PASS	N/A
900	2020-3-4	7350	EX3DV4	900	Head	40.87	0.930	PASS	PASS	PASS	NA	NA	N/A
1450	2020-3-4	7350	EX3DV4	1450	Head	39.84	1.156	PASS	PASS	PASS	NA	NA	N/A
1750	2020-3-4	7350	EX3DV4	1750	Head	39.49	1.323	PASS	PASS	PASS	NA	NA	N/A
1900	2020-3-4	7350	EX3DV4	1900	Head	39.16	1.385	PASS	PASS	PASS	GMSK	PASS	N/A
2000	2020-3-4	7350	EX3DV4	2100	Head	39.12	1.436	PASS	PASS	PASS	N/A	N/A	N/A
2300	2020-3-4	7350	EX3DV4	2300	Head	38.73	1.642	PASS	PASS	PASS	TDD	PASS	N/A
2450	2020-3-4	7350	EX3DV4	2450	Head	38.51	1.740	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
2600	2020-3-4	7350	EX3DV4	2600	Head	38.30	1.885	PASS	PASS	PASS	TDD	PASS	N/A
3300	2020-3-3	7350	EX3DV4	3300	Head	37.27	2.642	PASS	PASS	PASS	TDD	PASS	N/A
3500	2020-3-3	7350	EX3DV4	3500	Head	36.96	2.816	PASS	PASS	PASS	TDD	PASS	N/A
3700	2020-3-3	7350	EX3DV4	3700	Head	36.68	2.999	PASS	PASS	PASS	TDD	PASS	N/A
3900	2020-3-3	7350	EX3DV4	3900	Head	36.39	3.189	PASS	PASS	PASS	TDD	PASS	N/A
4100	2020-3-3	7350	EX3DV4	4100	Head	36.11	3.389	PASS	PASS	PASS	TDD	PASS	N/A
4500	2020-3-3	7350	EX3DV4	4400	Head	35.52	3.812	PASS	PASS	PASS	TDD	PASS	N/A
4700	2020-3-3	7350	EX3DV4	4600	Head	35.19	4.032	PASS	PASS	PASS	TDD	PASS	N/A
4900	2020-3-3	7350	EX3DV4	4950	Head	34.86	4.251	PASS	PASS	PASS	TDD	PASS	N/A
5250	2020-3-3	7350	EX3DV4	5250	Head	34.65	4.613	PASS	PASS	PASS	OFDM/TDD	PASS	N/A
5600	2020-3-3	7350	EX3DV4	5600	Head	34.09	4.998	PASS	PASS	PASS	OFDM/TDD	PASS	N/A
5750	2020-3-3	7350	EX3DV4	5750	Head	33.85	5.168	PASS	PASS	PASS	OFDM/TDD	PASS	N/A

Table of SAR System validation summary:

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 ($>5\text{dB}$), such as OFDM according to KDB 865664.

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.

FREQ.	DATE	PROBE SN	PROBE TYPE	PROBE CAL POINT		PERM	COND	CW VALIDATION			MOD.VALIDATION		
[Mhz]						(ϵ_r)	(σ)	SENSI- TIVITY	PROBE LINARITY	PROBE ISOTROPY	MOD. TYPE	DUTY. FACTORE	PAR
750	2020-08-25	3744	EX3DV4	750	Head	1.91%	2.72%	PASS	PASS	PASS	N/A	N/A	N/A
835	2020-08-25	3744	EX3DV4	850	Head	2.48%	3.08%	PASS	PASS	PASS	GMSK	PASS	N/A
900	2020-08-25	3744	EX3DV4	850	Head	1.93%	4.54%	PASS	PASS	PASS	NA	NA	N/A
1750	2020-08-25	3744	EX3DV4	1750	Head	1.00%	4.74%	PASS	PASS	PASS	NA	NA	N/A
1900	2020-08-25	3744	EX3DV4	1900	Head	1.25%	3.29%	PASS	PASS	PASS	GMSK	PASS	N/A
2000	2020-08-25	3744	EX3DV4	2000	Head	-3.90%	1.86%	PASS	PASS	PASS	N/A	N/A	N/A
2300	2020-08-25	3744	EX3DV4	2300	Head	-3.52%	1.38%	PASS	PASS	PASS	TDD	PASS	N/A
2450	2020-08-25	3744	EX3DV4	2450	Head	-3.44%	0.61%	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
2600	2020-08-25	3744	EX3DV4	2600	Head	-3.59%	1.58%	PASS	PASS	PASS	TDD	PASS	N/A
3300	2020-08-25	3744	EX3DV4	3300	Head	-2.65%	-2.37%	PASS	PASS	PASS	TDD	PASS	N/A
3500	2020-08-25	3744	EX3DV4	3500	Head	-3.14%	-3.26%	PASS	PASS	PASS	TDD	PASS	N/A
3700	2020-08-25	3744	EX3DV4	3700	Head	-3.45%	-3.88%	PASS	PASS	PASS	TDD	PASS	N/A
3900	2020-08-25	3744	EX3DV4	3900	Head	-3.84%	-4.11%	PASS	PASS	PASS	TDD	PASS	N/A
4100	2020-08-25	3744	EX3DV4	4100	Head	-3.92%	-3.88%	PASS	PASS	PASS	TDD	PASS	N/A
4500	2020-08-25	3744	EX3DV4	4400	Head	-0.95%	-0.61%	PASS	PASS	PASS	TDD	PASS	N/A
4700	2020-08-25	3744	EX3DV4	4600	Head	-1.28%	2.42%	PASS	PASS	PASS	TDD	PASS	N/A
4900	2020-08-25	3744	EX3DV4	4950	Head	-1.68%	0.34%	PASS	PASS	PASS	TDD	PASS	N/A
5250	2020-08-25	3744	EX3DV4	5250	Head	-2.42%	1.95%	PASS	PASS	PASS	OFDM/TDD	PASS	N/A
5600	2020-08-25	3744	EX3DV4	5600	Head	-3.72%	2.23%	PASS	PASS	PASS	OFDM/TDD	PASS	N/A
5750	2020-08-25	3744	EX3DV4	5750	Head	-3.45%	2.87%	PASS	PASS	PASS	OFDM/TDD	PASS	N/A

Table of SAR System validation summary:

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 ($>5\text{dB}$), such as OFDM according to KDB 865664.