# Appendix A. System Check Plots

| Table of Contents |
| --- |
| System Performance Check |
| System validation |

Date: 2021-10-13

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; $\sigma$ = 1.746 S/m; $\varepsilon_r$ = 39.046; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

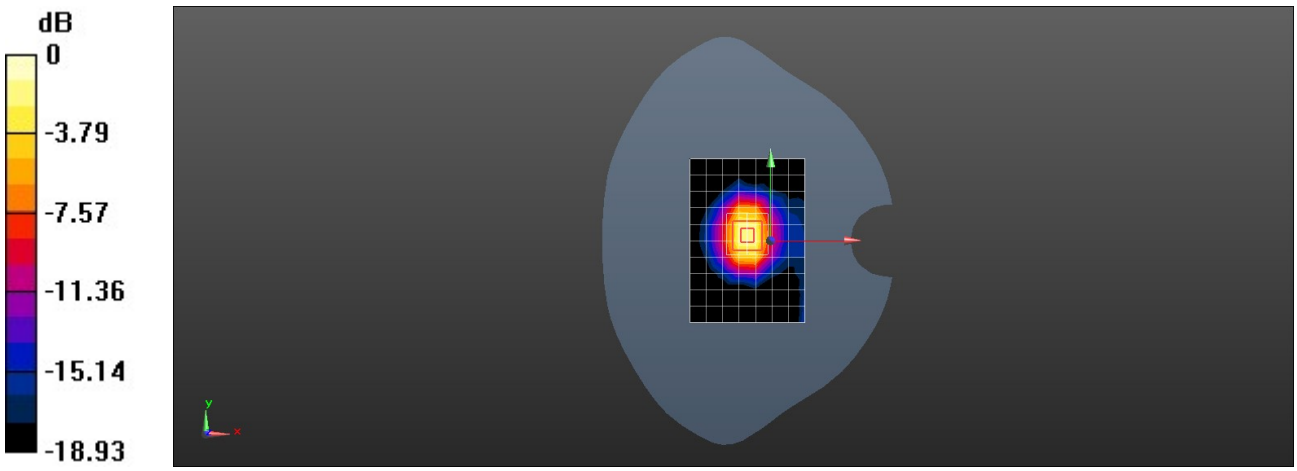
- Probe: EX3DV4 - SN7381; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 2020-11-30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1531; Calibrated: 2021-02-24
- Phantom: SAM7; Type: SAM; Serial: 1594
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Configuration/d=10mm, Pin=250mW/Area Scan (8x11x1):** Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 13.8 W/kg

**Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.9 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 24.1 W/kg
**SAR(1 g) = 12.4 W/kg; SAR(10 g) = 6.03 W/kg**
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 52.6%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 20.0 W/kg




0 dB = 20.0 W/kg = 13.01 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. [Mhz] | DATE | PROBE SN | PROBE TYPE | PROBE CAL POINT | | PERM (εr) | COND (σ) | CW VALIDATION | | | MOD.VALIDATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | SENSI-TIVITY | PROBE LINARITY | PROBE ISOTROPY | MOD. TYPE | DUTY. FACTORE | PAR |
| 750 | 2021-01-06 | 7381 | EX3DV4 | 750 | Head | 43.34 | 0.903 | PASS | PASS | PASS | N/A | N/A | N/A |
| 835 | 2021-01-06 | 7381 | EX3DV4 | 850 | Head | 43.08 | 0.933 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 1750 | 2021-01-06 | 7381 | EX3DV4 | 1750 | Head | 42.90 | 0.956 | PASS | PASS | PASS | NA | NA | N/A |
| 1800 | 2021-01-06 | 7381 | EX3DV4 | 1750 | Head | 42.07 | 1.367 | PASS | PASS | PASS | NA | NA | N/A |
| 1900 | 2021-01-06 | 7381 | EX3DV4 | 1900 | Head | 41.97 | 1.401 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 2000 | 2021-01-06 | 7381 | EX3DV4 | 2000 | Head | 41.76 | 1.455 | PASS | PASS | PASS | N/A | N/A | N/A |
| 2300 | 2021-01-06 | 7381 | EX3DV4 | 2300 | Head | 39.46 | 1.463 | PASS | PASS | PASS | TDD | PASS | N/A |
| 2450 | 2021-01-06 | 7381 | EX3DV4 | 2450 | Head | 39.14 | 1.619 | PASS | PASS | PASS | OFDM/TDD | PASS | PASS |
| 2600 | 2021-01-06 | 7381 | EX3DV4 | 2600 | Head | 40.37 | 1.829 | PASS | PASS | PASS | TDD | PASS | N/A |
| 3300 | 2021-01-07 | 7381 | EX3DV4 | 3300 | Head | 38.42 | 1.974 | PASS | PASS | PASS | TDD | PASS | N/A |
| 3500 | 2021-01-07 | 7381 | EX3DV4 | 3500 | Head | 38.94 | 2.716 | PASS | PASS | PASS | TDD | PASS | N/A |
| 3700 | 2021-01-07 | 7381 | EX3DV4 | 3700 | Head | 38.49 | 2.888 | PASS | PASS | PASS | TDD | PASS | N/A |
| 3900 | 2021-01-07 | 7381 | EX3DV4 | 3900 | Head | 38.12 | 3.067 | PASS | PASS | PASS | TDD | PASS | N/A |
| 4100 | 2021-01-07 | 7381 | EX3DV4 | 4100 | Head | 37.79 | 3.261 | PASS | PASS | PASS | TDD | PASS | N/A |
| 4500 | 2021-01-07 | 7381 | EX3DV4 | 4400 | Head | 37.38 | 3.445 | PASS | PASS | PASS | TDD | PASS | N/A |
| 4700 | 2021-01-07 | 7381 | EX3DV4 | 4600 | Head | 36.62 | 3.845 | PASS | PASS | PASS | TDD | PASS | N/A |
| 4900 | 2021-01-07 | 7381 | EX3DV4 | 4950 | Head | 36.21 | 4.037 | PASS | PASS | PASS | TDD | PASS | N/A |
| 5250 | 2021-01-07 | 7381 | EX3DV4 | 5250 | Head | 35.83 | 4.237 | PASS | PASS | PASS | OFDM/TDD | PASS | N/A |
| 5600 | 2021-01-07 | 7381 | EX3DV4 | 5600 | Head | 35.13 | 4.629 | PASS | PASS | PASS | OFDM/TDD | PASS | N/A |
| 5750 | 2021-01-07 | 7381 | EX3DV4 | 5750 | Head | 34.26 | 4.996 | 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 (>5dB), such as OFDM according to KDB 865664.