



## Appendix A. System Check Plots

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Test Laboratory: HUAWEI SAR/HAC Lab

## SystemPerformanceCheck-D2450-EX-Body

**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;  $\sigma = 2.003$  S/m;  $\epsilon_r = 53.023$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7505; ConvF(7.28, 7.28, 7.28) @ 2450 MHz; Calibrated: 2018-6-12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = 1.0, 31.0$
- Electronics: DAE4 Sn1492; Calibrated: 2018-11-14
- Phantom: ELI v5.0; Type: ELI; Serial: 1038
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**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) = 15.0 W/kg

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

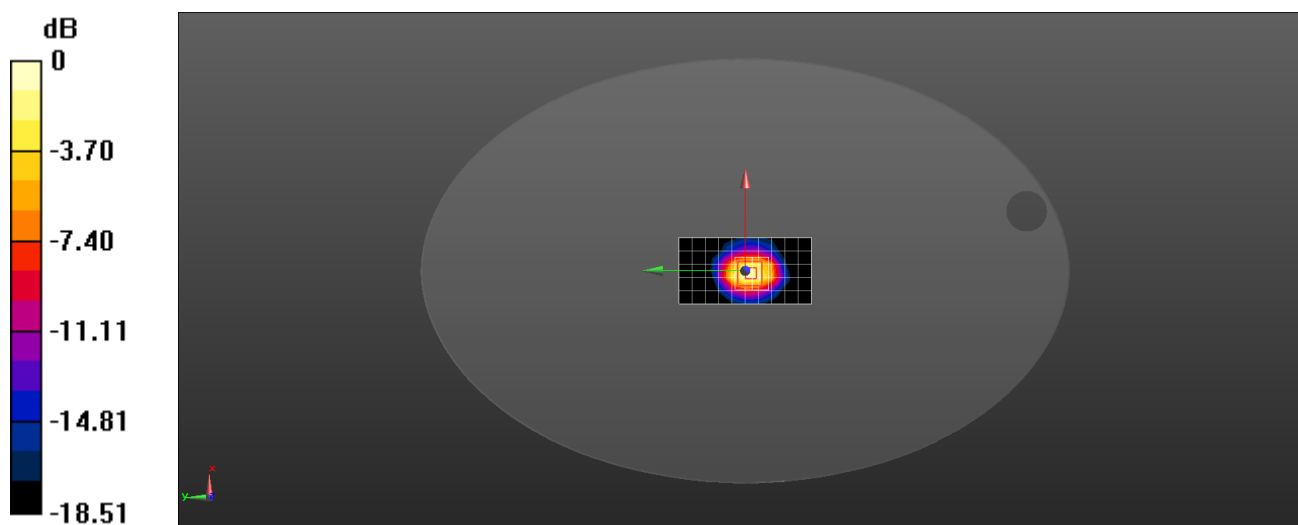
Reference Value = 94.72 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 20.8 W/kg

**SAR(1 g) = 11.9 W/kg; SAR(10 g) = 5.99 W/kg**

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

Maximum value of SAR (measured) = 18.1 W/kg



0 dB = 18.1 W/kg = 12.58 dBW/kg

Test Laboratory: HUAWEI SAR/HAC Lab

## SystemPerformanceCheck-D2450-EX-Body

**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;  $\sigma = 1.954$  S/m;  $\epsilon_r = 50.334$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3736; ConvF(7.02, 7.02, 7.02) @ 2450 MHz; Calibrated: 2018-4-27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = 1.0, 31.0$
- Electronics: DAE4 Sn851; Calibrated: 2018-7-18
- Phantom: ELI V8.0; Type: ELI; Serial: 2090
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**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) = 18.5 W/kg

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

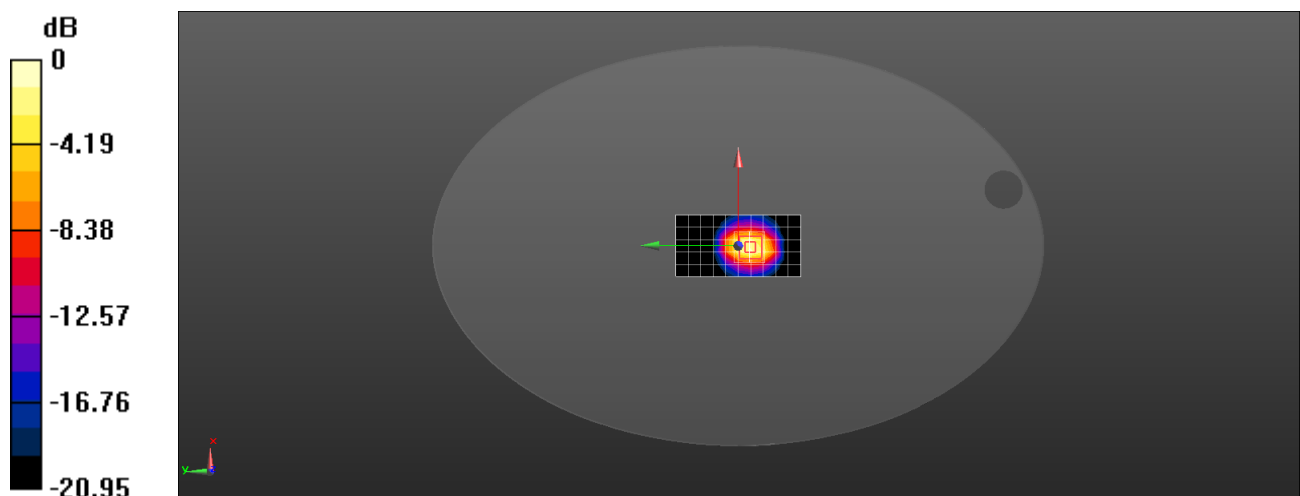
Reference Value = 99.29 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 24.5 W/kg

**SAR(1 g) = 12.4 W/kg; SAR(10 g) = 5.89 W/kg**

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

Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 19.9 W/kg = 12.99 dBW/kg

Test Laboratory: HUAWEI SAR/HAC Lab

## SystemPerformanceCheck-D5250-EX-Body

**DUT: Dipole; Type: D5GHzV2; Serial: 1155**

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

Medium parameters used (interpolated):  $f = 5250$  MHz;  $\sigma = 5.257$  S/m;  $\epsilon_r = 49.803$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3736; ConvF(4.01, 4.01, 4.01) @ 5250 MHz; Calibrated: 2018-4-27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = 1.0, 25.0$
- Electronics: DAE4 Sn851; Calibrated: 2018-7-18
- Phantom: ELI V8.0; Type: ELI; Serial: 2090
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**Configuration/d=10mm, Pin=100mW/Area Scan (7x10x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm

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

Maximum value of SAR (measured) = 14.1 W/kg

**Configuration/d=10mm, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=1.4$ mm

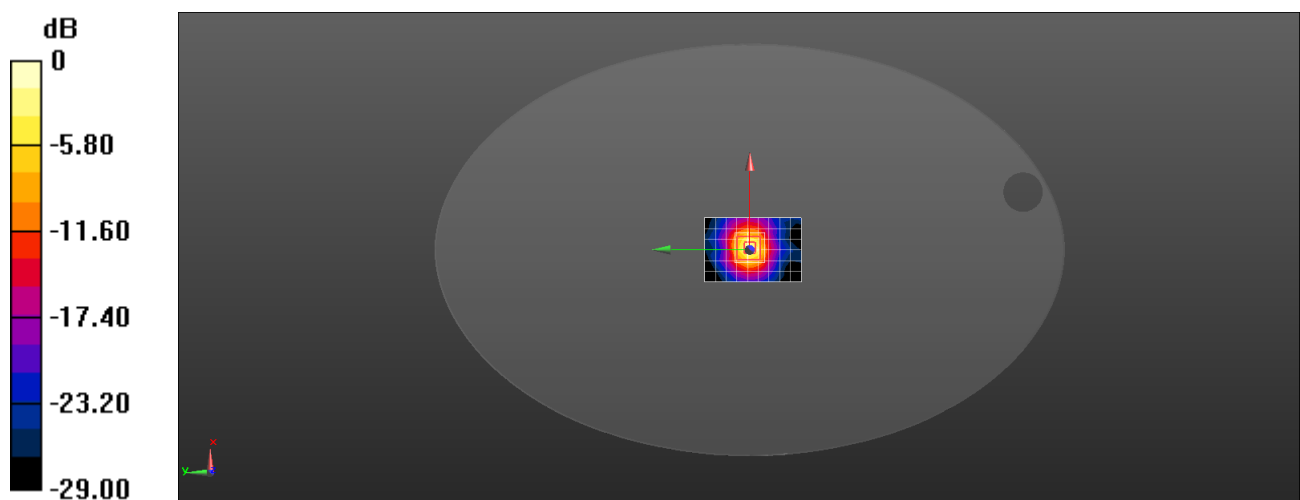
Reference Value = 64.94 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 27.9 W/kg

**SAR(1 g) = 7.63 W/kg; SAR(10 g) = 2.19 W/kg**

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

Maximum value of SAR (measured) = 17.3 W/kg



0 dB = 17.3 W/kg = 12.38 dBW/kg

Test Laboratory: HUAWEI SAR/HAC Lab

## SystemPerformanceCheck-D5600-EX-Body

**DUT: Dipole; Type: D5GHzV2; Serial: 1155**

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

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.682$  S/m;  $\epsilon_r = 49.488$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3736; ConvF(3.58, 3.58, 3.58) @ 5600 MHz; Calibrated: 2018-4-27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = 1.0, 25.0$
- Electronics: DAE4 Sn851; Calibrated: 2018-7-18
- Phantom: ELI V8.0; Type: ELI; Serial: 2090
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**Configuration/d=10mm, Pin=100mW/Area Scan (7x10x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (measured) = 17.1 W/kg

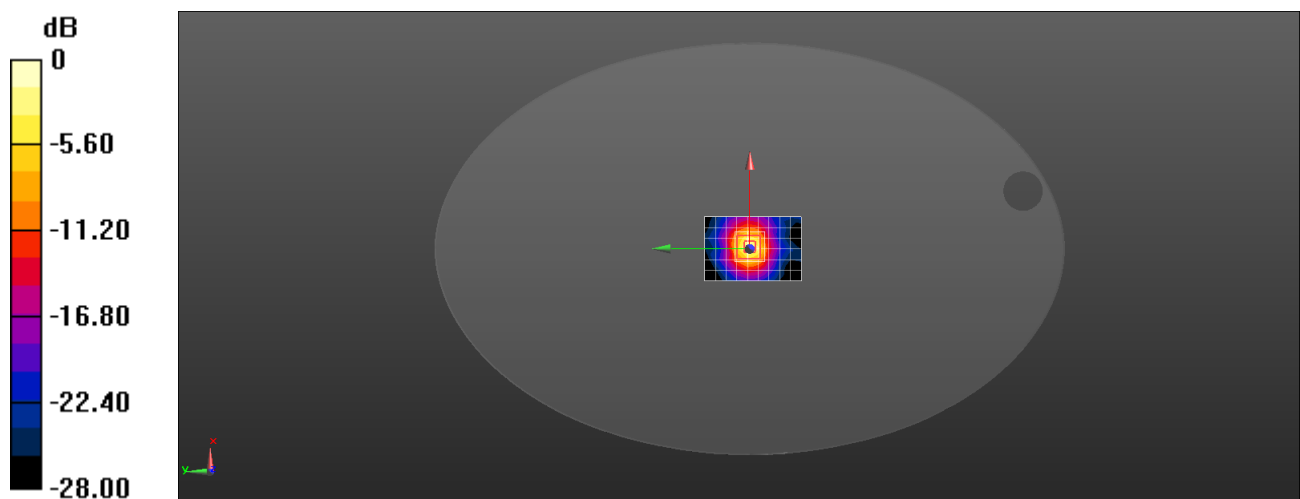
**Configuration/d=10mm, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=1.4$ mm

Reference Value = 67.83 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 32.4 W/kg

**SAR(1 g) = 8.19 W/kg; SAR(10 g) = 2.34 W/kg**

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



0 dB = 18.8 W/kg = 12.74 dBW/kg

Test Laboratory: HUAWEI SAR/HAC Lab

## SystemPerformanceCheck-D5750-EX-Body

**DUT: Dipole; Type: D5GHzV2; Serial: 1155**

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

Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.967$  S/m;  $\epsilon_r = 49.255$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3736; ConvF(3.93, 3.93, 3.93) @ 5750 MHz; Calibrated: 2018-4-27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = 1.0, 25.0$
- Electronics: DAE4 Sn851; Calibrated: 2018-7-18
- Phantom: ELI V8.0; Type: ELI; Serial: 2090
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**Configuration/d=10mm, Pin=100mW/Area Scan (7x10x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm

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

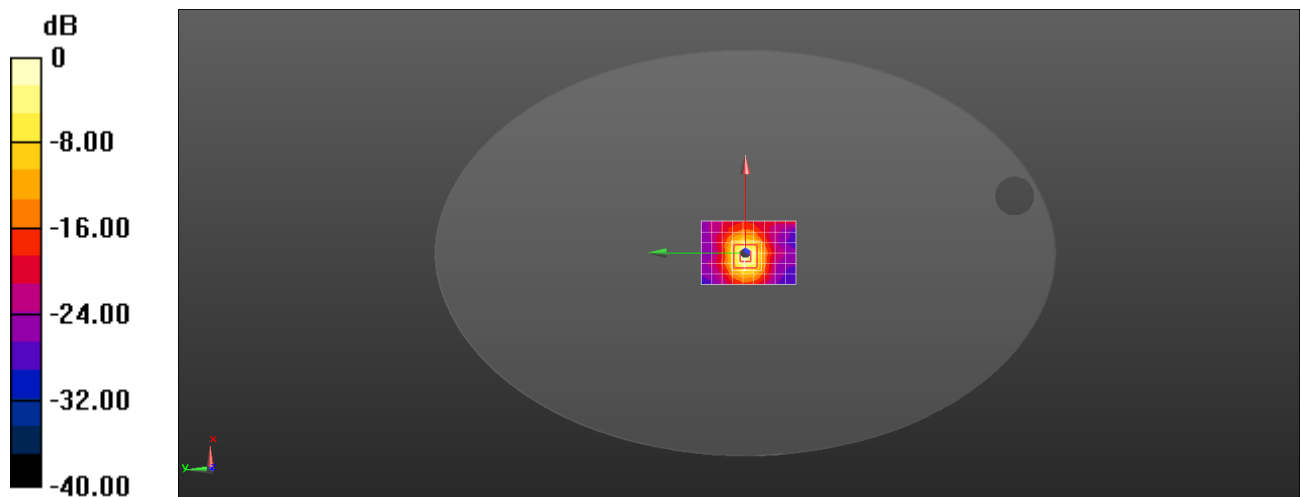
**Configuration/d=10mm, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=1.4$ mm

Reference Value = 64.01 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 30.9 W/kg

**SAR(1 g) = 7.45 W/kg; SAR(10 g) = 2.12 W/kg**

Maximum value of SAR (measured) = 17.8 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg

## **System Validation**

Per FCC KDB 865664 D02v01, 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:

FREQ. [Mhz]	DATE	PROBE SN	PROBE TYPE	PROBE CAL POINT		PERM	COND	CW VALIDATION			MOD.VALIDATION		
						( $\epsilon_r$ )	( $\sigma$ )	SENSI- TIVITY	PROBE LINARITY	PROBE ISOTROPY	MOD. TYPE	DUTY. FACTORE	PAR
835	2018/10/10	3736	EX3DV4	835	Head	41.02	0.927	PASS	PASS	PASS	GMSK	PASS	N/A
1900	2018/11/6	3736	EX3DV4	1900	Head	39.52	1.339	PASS	PASS	PASS	GMSK	PASS	N/A
5250	2018/9/10	3736	EX3DV4	5250	Head	35.11	4.650	PASS	PASS	PASS	OFDM	N/A	PASS
5600	2018/9/10	3736	EX3DV4	5600	Head	36.06	5.025	PASS	PASS	PASS	OFDM	N/A	PASS
5750	2018/9/10	3736	EX3DV4	5750	Head	35.23	5.052	PASS	PASS	PASS	OFDM	N/A	PASS
835	2018/8/23	3736	EX3DV4	835	Body	53.71	0.994	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2018/10/17	3736	EX3DV4	1750	Body	52.03	1.471	PASS	PASS	PASS	N/A	N/A	N/A
1900	2018/10/17	3736	EX3DV4	1900	Body	51.57	1.578	PASS	PASS	PASS	GMSK	PASS	N/A
2450	2018/10/17	3736	EX3DV4	2450	Body	52.19	2.044	PASS	PASS	PASS	OFDM	PASS	PASS
2600	2017/12/7	3736	EX3DV4	2600	Body	51.94	2.190	PASS	PASS	PASS	TDD	PASS	N/A
5250	2018/9/10	3736	EX3DV4	5250	Body	48.53	5.598	PASS	PASS	PASS	OFDM	N/A	PASS
5600	2018/9/10	3736	EX3DV4	5600	Body	48.72	5.999	PASS	PASS	PASS	OFDM	N/A	PASS
5750	2018/9/10	3736	EX3DV4	5750	Body	48.00	6.207	PASS	PASS	PASS	OFDM	N/A	PASS





FREQ. [Mhz]	DATE	PROBE SN	PROBE TYPE	PROBE CAL POINT		PERM	COND	CW VALIDATION			MOD.VALIDATION		
						( $\epsilon_r$ )	( $\sigma$ )	SENSI-TIVITY	PROBE LINARITY	PROBE ISOTROPY	MOD. TYPE	DUTY. FACTORE	PAR
750	2018/7/11	7505	EX3DV4	750	Head	43.58	0.915	PASS	PASS	PASS	N/A	N/A	N/A
835	2018/7/11	7505	EX3DV4	835	Head	43.36	0.945	PASS	PASS	PASS	GMSK	PASS	N/A
900	2018/7/11	7505	EX3DV4	900	Head	43.19	0.970	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2018/7/11	7505	EX3DV4	1750	Head	41.51	1.374	PASS	PASS	PASS	NA	NA	N/A
1900	2018/7/11	7505	EX3DV4	1900	Head	41.28	1.464	PASS	PASS	PASS	GMSK	PASS	N/A
2000	2018/7/11	7505	EX3DV4	2000	Head	41.11	1.517	PASS	PASS	PASS	N/A	N/A	N/A
2300	2018/7/11	7505	EX3DV4	2300	Head	40.75	1.732	PASS	PASS	PASS	N/A	N/A	N/A
2450	2018/7/11	7505	EX3DV4	2450	Head	40.49	1.843	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
2600	2018/7/11	7505	EX3DV4	2600	Head	40.33	1.954	PASS	PASS	PASS	TDD	PASS	N/A
5250	2018/7/11	7505	EX3DV4	5250	Head	35.98	4.529	PASS	PASS	PASS	OFDM	PASS	N/A
5600	2018/7/11	7505	EX3DV4	5600	Head	35.29	4.941	PASS	PASS	PASS	OFDM	PASS	N/A
5750	2018/7/11	7505	EX3DV4	5750	Head	35.08	5.117	PASS	PASS	PASS	OFDM	PASS	N/A
750	2018/7/11	7505	EX3DV4	750	Body	54.84	0.957	PASS	PASS	PASS	N/A	N/A	N/A
835	2018/7/11	7505	EX3DV4	835	Body	54.68	0.991	PASS	PASS	PASS	GMSK	PASS	N/A
1750	2018/7/11	7505	EX3DV4	1750	Body	53.15	1.469	PASS	PASS	PASS	N/A	N/A	N/A
1900	2018/7/11	7505	EX3DV4	1900	Body	53.02	1.577	PASS	PASS	PASS	GMSK	PASS	N/A
2300	2018/7/11	7505	EX3DV4	2300	Body	52.53	1.880	PASS	PASS	PASS	N/A	N/A	N/A
2450	2018/7/11	7505	EX3DV4	2450	Body	52.32	2.025	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
2600	2018/7/11	7505	EX3DV4	2600	Body	52.04	2.165	PASS	PASS	PASS	TDD	PASS	N/A
5250	2018/7/11	7505	EX3DV4	5250	Body	47.23	5.434	PASS	PASS	PASS	OFDM	PASS	N/A
5600	2018/7/11	7505	EX3DV4	5600	Body	46.60	5.922	PASS	PASS	PASS	OFDM	PASS	N/A
5750	2018/7/11	7505	EX3DV4	5750	Body	46.27	6.144	PASS	PASS	PASS	OFDM	PASS	N/A



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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 865664D01v01 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.