Table 14: LTE Band 4

Test Position	Cover Type	RB allocation	RB offset	Channel/ Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of 10gSAR 4 W/kg (mW/g)					Plot No.
							Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	1	50	20300/1745	23.00	22.50	1.220	2.530	-0.018	1.12	1.369	/
Front Side	standard	1	50	20300/1745	23.00	22.50	0.897	1.750	0.022	1.12	1.006	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	1	50	20050/1720	23.00	22.45	1.470	3.190	-0.180	1.14	1.668	/
	standard	1	50	20175/1732.5	23.00	22.45	1.480	3.140	0.130	1.14	1.680	15
	standard	1	50	20300/1745	23.00	22.50	1.350	2.880	0.062	1.12	1.515	/
Top Edge	standard	1	50	20300/1745	23.00	22.50	0.149	0.372	0.012	1.12	0.167	/
Bottom Edge	standard	1	50	20300/1745	23.00	22.50	0.091	0.205	-0.011	1.12	0.102	/
Back Side	standard	50%	0	20300/1745	22.00	21.53	1.280	2.640	0.050	1.11	1.426	/
Front Side	standard	50%	0	20300/1745	22.00	21.53	0.617	1.240	-0.037	1.11	0.688	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	50%	0	20300/1745	22.00	21.53	1.050	2.230	0.033	1.11	1.170	/
Top Edge	standard	50%	0	20300/1745	22.00	21.53	0.124	0.258	0.100	1.11	0.138	/
Bottom Edge	standard	50%	0	20300/1745	22.00	21.53	0.073	0.182	-0.013	1.11	0.081	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 50% limit(10g).

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Table 15: LTE Band 5

Test Position	Cover Type	RB allocation	RB offset	Channel/ Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of 10gSAR 4 W/kg (mW/g)					Plot No.
							Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	1	25	20450/829	25.00	23.88	0.481	0.820	0.020	1.29	0.623	16
	standard	1	25	20525/836.5	25.00	23.79	0.373	0.580	0.000	1.32	0.493	/
	standard	1	25	20600/844	25.00	24.34	0.375	0.587	-0.010	1.16	0.437	/
Front Side	standard	1	25	20600/844	25.00	24.34	0.212	0.365	-0.099	1.16	0.247	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	1	25	20600/844	25.00	24.34	0.184	0.301	0.053	1.16	0.214	/
Top Edge	standard	1	25	20600/844	25.00	24.34	0.115	0.192	-0.064	1.16	0.134	/
Bottom Edge	standard	1	25	20600/844	25.00	24.34	0.042	0.073	0.128	1.16	0.049	/
Back Side	standard	50%	25	20450/829	24.00	23.01	0.266	0.415	0.039	1.26	0.334	/
Front Side	standard	50%	25	20450/829	24.00	23.01	0.182	0.251	-0.011	1.26	0.229	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	50%	25	20450/829	24.00	23.01	0.223	0.364	-0.027	1.26	0.280	/
Top Edge	standard	50%	25	20450/829	24.00	23.01	0.072	0.119	0.050	1.26	0.090	/
Bottom Edge	standard	50%	25	20450/829	24.00	23.01	0.035	0.061	0.000	1.26	0.044	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 50% limit(10g).

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Table 16: LTE Band 7

Test Position	Cover Type	RB allocation	RB offset	Channel/ Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of 10gSAR 4 W/kg (mW/g)					Plot No.
							Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	1	50	20850/2510	23.00	22.58	1.460	3.410	-0.15	1.10	1.608	/
Front Side	standard	1	50	20850/2510	23.00	22.58	0.857	0.193	-0.012	1.10	0.944	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	1	50	20850/2510	23.00	22.58	1.890	3.770	0.034	1.10	2.082	/
	standard	1	50	21100/2535	23.00	22.50	2.020	4.940	0.14	1.12	2.266	/
	standard	1	50	21350/2560	23.00	22.39	2.440	5.910	0.023	1.15	2.808	17
Top Edge	standard	1	50	20850/2510	23.00	22.58	0.206	0.430	0.047	1.10	0.227	/
Bottom Edge	standard	1	50	20850/2510	23.00	22.58	0.076	0.143	-0.055	1.10	0.083	/
Back Side	standard	50%	50	20850/2510	22.00	21.49	1.250	2.960	0.11	1.12	1.406	/
Front Side	standard	50%	50	20850/2510	22.00	21.49	0.736	1.820	0.021	1.12	0.828	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	50%	50	20850/2510	22.00	21.49	1.120	2.770	0.038	1.12	1.260	/
Top Edge	standard	50%	50	20850/2510	22.00	21.49	0.160	0.337	0.04	1.12	0.180	/
Bottom Edge	standard	50%	50	20850/2510	22.00	21.49	0.059	0.110	-0.0267	1.12	0.066	/
Right Edge	Standard	100%	0	20850/2510	22.00	21.39	1.380	3.340	0	1.15	1.588	/
Right Edge	Repeated	1	50	21350/2560	23.00	22.39	2.250	5.640	0.02	1.15	2.589	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 50% limit(10g).

Measurement Variability				
Test Position	**Channel/ Frequency(MHz)**	**MAX Measured SAR_{10g} (W/kg)**	**1st Repeated SAR_{10g} (W/kg)**	**Ratio**
Right Edge	21350/2560	2.440	2.250	1.08

Note: 1) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

2) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

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Table 17: LTE Band 12

Test Position	Cover Type	RB allocation	RB offset	Channel/ Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of 10gSAR 4 W/kg (mW/g)					Plot No.
							Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	1	25	23060/704	23.50	22.78	0.547	0.102	-0.010	1.18	0.646	/
	standard	1	25	23095/707.5	23.50	22.68	0.943	1.620	0.050	1.21	1.139	18
	standard	1	25	23130/711	23.50	22.84	0.896	1.560	0.014	1.16	1.043	/
Front Side	standard	1	25	23130/711	23.50	22.84	0.425	0.715	0.023	1.16	0.495	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	1	25	23130/711	23.50	22.84	0.496	0.862	-0.034	1.16	0.577	/
Top Edge	standard	1	25	23130/711	23.50	22.84	0.108	0.189	0.052	1.16	0.126	/
Bottom Edge	standard	1	25	23130/711	23.50	22.84	0.084	0.156	0.011	1.16	0.098	/
Back Side	standard	50%	13	23130/711	22.50	22.09	0.641	1.190	0.099	1.10	0.704	/
Front Side	standard	50%	13	23130/711	22.50	22.09	0.367	0.585	0.142	1.10	0.403	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	50%	13	23130/711	22.50	22.09	0.456	0.822	0.017	1.10	0.501	/
Top Edge	standard	50%	13	23130/711	22.50	22.09	0.101	0.163	0.022	1.10	0.111	/
Bottom Edge	standard	50%	13	23130/711	22.50	22.09	0.092	0.178	0.130	1.10	0.101	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 50% limit(10g).

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Table 18: LTE Band 13

Test Position	Cover Type	RB allocation	RB offset	Channel/ Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of 10gSAR 4 W/kg (mW/g)					Plot No.
							Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	1	25	23230/782	24.00	23.63	0.607	1.040	0.109	1.09	0.661	19
	standard	1	25	23790/710	24.00	23.45	0.542	0.926	0.022	1.14	0.615	/
	standard	1	25	23800/711	24.00	23.47	0.583	0.974	-0.080	1.13	0.659	/
Front Side	standard	1	25	23230/782	24.00	23.63	0.315	0.552	0.030	1.09	0.343	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	1	25	23230/782	24.00	23.63	0.302	0.527	0.140	1.09	0.329	/
Top Edge	standard	1	25	23230/782	24.00	23.63	0.095	0.185	0.016	1.09	0.103	/
Bottom Edge	standard	1	25	23230/782	24.00	23.63	0.064	0.117	-0.028	1.09	0.070	/
Back Side	standard	50%	0	23230/782	23.00	22.80	0.423	0.762	0.019	1.05	0.443	/
Front Side	standard	50%	0	23230/782	23.00	22.80	0.258	0.401	0.021	1.05	0.270	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	50%	0	23230/782	23.00	22.80	0.273	0.464	0.020	1.05	0.286	/
Top Edge	standard	50%	0	23230/782	23.00	22.80	0.248	0.433	-0.150	1.05	0.260	/
Bottom Edge	standard	50%	0	23230/782	23.00	22.80	0.052	0.098	0.011	1.05	0.054	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 50% limit(10g).

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Table 19: LTE Band 17

Test Position	Cover Type	RB allocation	RB offset	Channel/ Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of 10gSAR 4 W/kg (mW/g)					Plot No.
							MeasuredSAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	1	25	23780/709	24.00	23.49	0.745	1.250	-0.021	1.12	0.838	/
	standard	1	25	23790/710	24.00	23.45	0.826	1.330	0.025	1.14	0.938	20
	standard	1	25	23800/711	24.00	23.47	0.782	1.280	0.040	1.13	0.884	/
Front Side	standard	1	25	23780/709	24.00	23.49	0.324	0.484	0.038	1.12	0.364	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	1	25	23780/709	24.00	23.49	0.359	0.602	-0.011	1.12	0.404	/
Top Edge	standard	1	25	23780/709	24.00	23.49	0.097	0.158	0.100	1.12	0.109	/
Bottom Edge	standard	1	25	23780/709	24.00	23.49	0.082	0.134	0.120	1.12	0.092	/
Back Side	standard	50%	13	23800/711	23.00	22.44	0.517	0.872	0.064	1.14	0.588	/
Front Side	standard	50%	13	23800/711	23.00	22.44	0.237	0.365	-0.092	1.14	0.270	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	standard	50%	13	23800/711	23.00	22.44	0.268	0.452	0.081	1.14	0.305	/
Top Edge	standard	50%	13	23800/711	23.00	22.44	0.072	0.113	0.014	1.14	0.082	/
Bottom Edge	standard	50%	13	23800/711	23.00	22.44	0.069	0.102	-0.028	1.14	0.078	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 50% limit(10g).

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Table 20: Wi-Fi (2.4G)

Test Position	Cover Type	Mode 802.11b	Duty Cycle	Channel/ Frequency (MHz)	Tune-up dBm)	Measured power (dBm)	Limit of SAR 4 W/kg (mW/g)					Plot No.
							Area Scan SAR 10g	Zoom Scan SAR 10g	Power Drift (dB)	Scaling Factor	Report SAR 10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	DSSS	100.0%	1/2412	18.00	17.04	0.078	0.082	0.188	1.25	0.102	/
	standard	DSSS	100.0%	6/2437	18.00	17.47	0.120	0.118	-0.079	1.13	0.133	21
	standard	DSSS	100.0%	11/2462	18.00	17.21	0.069	0.074	-0.090	1.20	0.089	/
Front Side	standard	DSSS	100.0%	6/2437	18.00	17.47	0.095	0.096	0.120	1.13	0.108	/
Left Edge	standard	DSSS	100.0%	6/2437	18.00	17.47	0.021	0.017	0.046	1.13	0.019	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	standard	DSSS	100.0%	6/2437	18.00	17.47	0.105	0.102	0.030	1.13	0.115	/
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Note: 1. The value with blue color is the maximum SAR Value of each test band.												

MAX Adjusted SAR							
Mode	Test Position	Channel/ Frequency (MHz)	MAX Reported SAR_{10g} (W/kg)	802.11b Tune-up limit (dBm)	Tune-up limit (dBm)	Scaling Factor	Adjusted SAR_{10g} (W/kg)
802.11g	Back Side	6/2437	0.133	18.00	18.00	1.00	0.133
802.11n HT20	Back Side	6/2437	0.133	18.00	18.00	1.00	0.133
802.11n HT40	Back Side	6/2437	0.133	18.00	19.00	1.26	0.167
Note: SAR is not required for OFDM when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.							

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Table 21: Wi-Fi (5G, U-NII-1)

Test Position	Cover Type	Mode 802.11n HT40	Duty Cycle	Channel/ Frequency (MHz)	Tune-up dBm)	Measured power (dBm)	Limit of SAR 4 W/kg (mW/g)					Plot No.
							Area Scan SAR 10g	Zoom Scan SAR 10g	Power Drift (dB)	Scaling Factor	Report SAR 10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	OFDM	100.0%	38/5190	13.50	13.18	0.083	0.096	-0.025	1.08	0.103	/
	standard	OFDM	100.0%	46/5230	13.50	13.08	0.119	0.161	-0.090	1.10	0.177	22
Front Side	standard	OFDM	100.0%	38/5190	13.50	13.18	0.034	0.055	-0.074	1.08	0.059	/
Left Edge	standard	OFDM	100.0%	38/5190	13.50	13.18	0.028	0.032	-0.080	1.08	0.034	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	standard	OFDM	100.0%	38/5190	13.50	13.18	0.090	0.096	-0.037	1.08	0.103	/
Bottom Edge	standard	OFDM	100.0%	38/5190	13.50	13.18	0.026	0.021	-0.096	1.08	0.023	N/A

Note: 1. The value with blue color is the maximum SAR Value of each test band.

the highest reported SAR for a test configuration is > 1.2 W/kg, SAR is required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

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Table 22: Wi-Fi (5G, U-NII-3)

Test Position	Cover Type	Mode 802.11n HT40	Duty Cycle	Channel/ Frequency (MHz)	Tune-up dBm)	Measured power (dBm)	Limit of SAR 4 W/kg (mW/g)					Plot No.
							Area Scan SAR 10g	Zoom Scan SAR 10g	Power Drift (dB)	Scaling Factor	Report SAR 10g	
Product Specific 10-g SAR (Distance 0mm)												
Back Side	standard	OFDM	100.0%	159/5795	12.50	12.05	0.031	0.040	-0.025	1.11	0.044	23
	standard	OFDM	100.0%	151/5755	12.50	11.78	0.048	0.039	-0.090	1.18	0.045	/
Front Side	standard	OFDM	100.0%	159/5795	12.50	12.05	0.024	0.016	-0.074	1.11	0.018	/
Left Edge	standard	OFDM	100.0%	159/5795	12.50	12.05	0.024	0.011	-0.080	1.11	0.012	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	standard	OFDM	100.0%	159/5795	12.50	12.05	0.025	0.013	-0.037	1.11	0.014	/
Bottom Edge	standard	OFDM	100.0%	159/5795	12.50	12.05	0.021	0.026	-0.096	1.11	0.029	N/A

Note: 1. The value with blue color is the maximum SAR Value of each test band.

the highest reported SAR for a test configuration is > 1.2 W/kg, SAR is required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

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Table 23: BT

Band	Configuration	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (mm)	Estimated SAR (W/kg)
Bluetooth	Product Specific 10-g SAR	2480	9.00	0	0.133
For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01 based on the formula below. (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.					

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10.4 Simultaneous Transmission Analysis

Simultaneous Transmission Configurations	Product Specific 10-g SAR
GSM + Bluetooth	Yes
WCDMA + Bluetooth	Yes
LTE + Bluetooth	Yes
GSM + Wi-Fi-2.4GHz	Yes
WCDMA + Wi-Fi-2.4GHz	Yes
LTE + Wi-Fi-2.4GHz	Yes
GSM + Wi-Fi-5GHz	Yes
WCDMA + Wi-Fi-5GHz	Yes
LTE + Wi-Fi-5GHz	Yes
Wi-Fi-2.4GHz + Bluetooth	N/A
Wi-Fi-5GHz + Bluetooth	N/A
Wi-Fi-2.4GHz + Wi-Fi-5GHz	N/A

General Note:

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. Per KDB 447498 D01, simultaneous transmission SAR is compliant if,

i) Scalar SAR summation < 1.6W/kg, simultaneously transmission SAR measurement is not necessary.

ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.

iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

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The maximum SAR_{10g} Value for Main- Antenna

SAR_{10g}(W/kg) / Test Position		GSM 850	GSM 1900	WCDMA Band II	WCDMA Band IV	WCDMA Band V	LTE FDD 2	LTE FDD 4	LTE FDD 5	LTE FDD 7	LTE FDD 12	LTE FDD 13	LTE FDD 17	MAX. SAR_{10g}
Product Specific 10-g SAR	Back Side	1.012	0.539	0.185	0.576	0.618	0.388	1.426	0.623	1.608	1.139	0.661	0.938	1.608
	Front Side	0.481	0.185	0.464	0.701	0.064	0.347	1.006	0.247	0.944	0.495	0.343	0.364	1.006
	Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.000
	Right Edge	0.378	0.813	0.346	2.236	0.127	0.319	1.680	0.280	2.808	0.577	0.329	0.404	2.808
	Top Edge	0.084	0.028	0.059	0.068	0.048	0.049	0.167	0.134	0.227	0.126	0.260	0.109	0.260
	Bottom Edge	0.044	0.014	0.029	0.114	0.017	0.041	0.102	0.049	0.083	0.101	0.070	0.092	0.114

About BT and Main- Antenna

SAR_{10g}(W/kg) / Test Position	Main-antenna	BT	MAX. ΣSAR_{10g}
Back Side	1.608	0.133	1.741
Front Side	1.006	0.133	1.139
Left Edge	0.000	0.133	0.133
Right Edge	2.808	0.133	2.941
Top Edge	0.260	0.133	0.393
Bottom Edge	0.114	0.133	0.247

Note: 1.The value with blue color is the maximum ΣSAR_{10g} Value.
2. MAX. ΣSAR_{10g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. ΣSAR_{10g} = 2.941W/kg <4 W/kg, so the Simultaneous transimition SAR with volum scan are not required for BT and Main-Antenna.

About Wi-Fi and Main- Antenna

SAR_{10g}(W/kg) / Test Position	Main-antenna	Wi-Fi 2.4G	Wi-Fi5G (U-NII-1)	Wi-Fi5G (U-NII-3)	MAX. ΣSAR_{10g}
Back Side	1.608	0.133	**0.177**	0.044	1.785
Front Side	1.006	**0.108**	0.059	0.018	1.114
Left Edge	0.000	0.019	**0.034**	0.012	0.034
Right Edge	2.808	0.000	0.000	0.000	2.808
Top Edge	0.260	**0.115**	0.103	0.014	0.375
Bottom Edge	0.114	0.000	0.023	**0.029**	0.143

Note: 1.The value with blue color is the maximum ΣSAR_{10g} Value.
2. MAX. ΣSAR_{10g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. ΣSAR_{10g} = 2.808W/kg <4W/kg, so the Simultaneous transimition SAR with volum scan are not required for Wi-Fi and Main-Antenna.

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11 Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528- 2013 is not required in SAR reports submitted for equipment approval.

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ANNEX A: Test Layout

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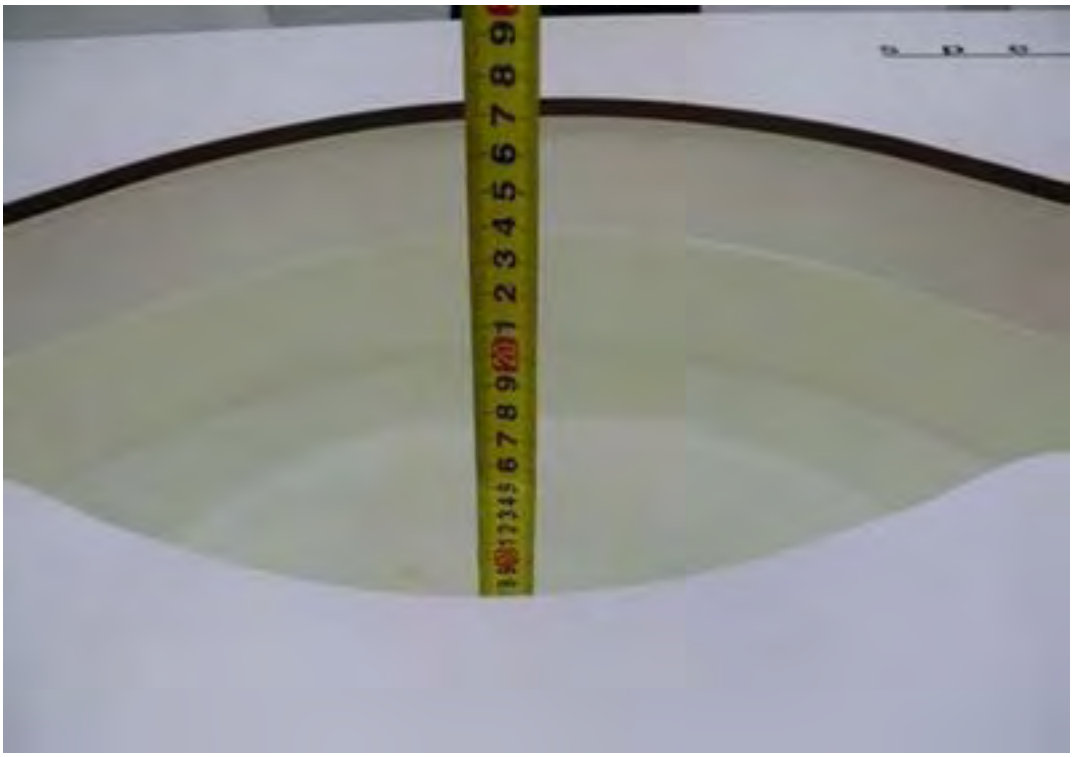
Tissue Simulating Liquids

For the measurement of the field distribution inside the flat phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For Head and Body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Picture 3.



Picture 3: Liquid depth in the flat Phantom

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ANNEX B: System Check Results

Plot 1 System Performance Check at 750 MHz TSL

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3

Date: 1/7/2020

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

Medium parameters used: f = 750 MHz; σ = 0.88 S/m; ε_r = 42.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=15mm,Pin=250mW/Area Scan (41x121x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.29 W/kg

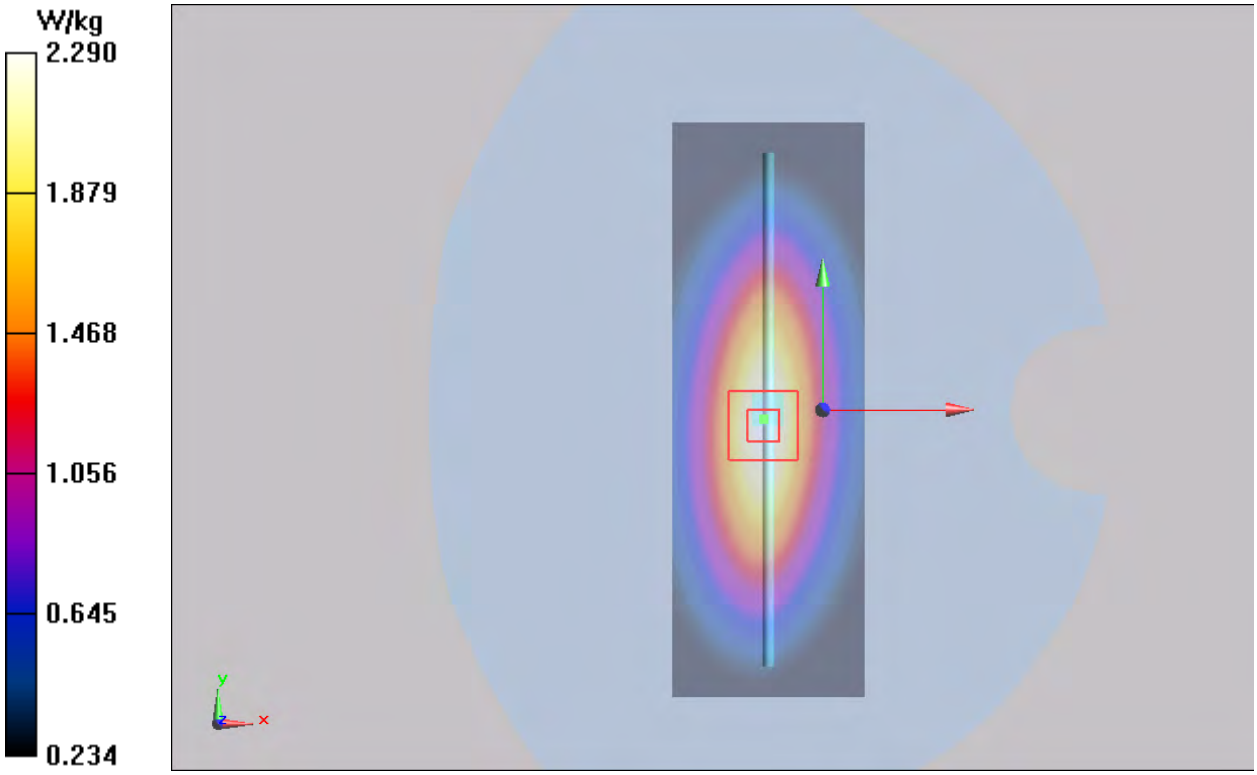
d=15mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.653 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.16 W/kg

SAR(1 g) = 2.13 W/kg; SAR(10 g) = 1.41 W/kg

Maximum value of SAR (measured) = 2.29 W/kg



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Plot 2 System Performance Check at 835 MHz TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2

Date: 1/11/2020

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.88 S/m; ε_r = 41.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.20, 9.20, 9.20); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.64 mW/g

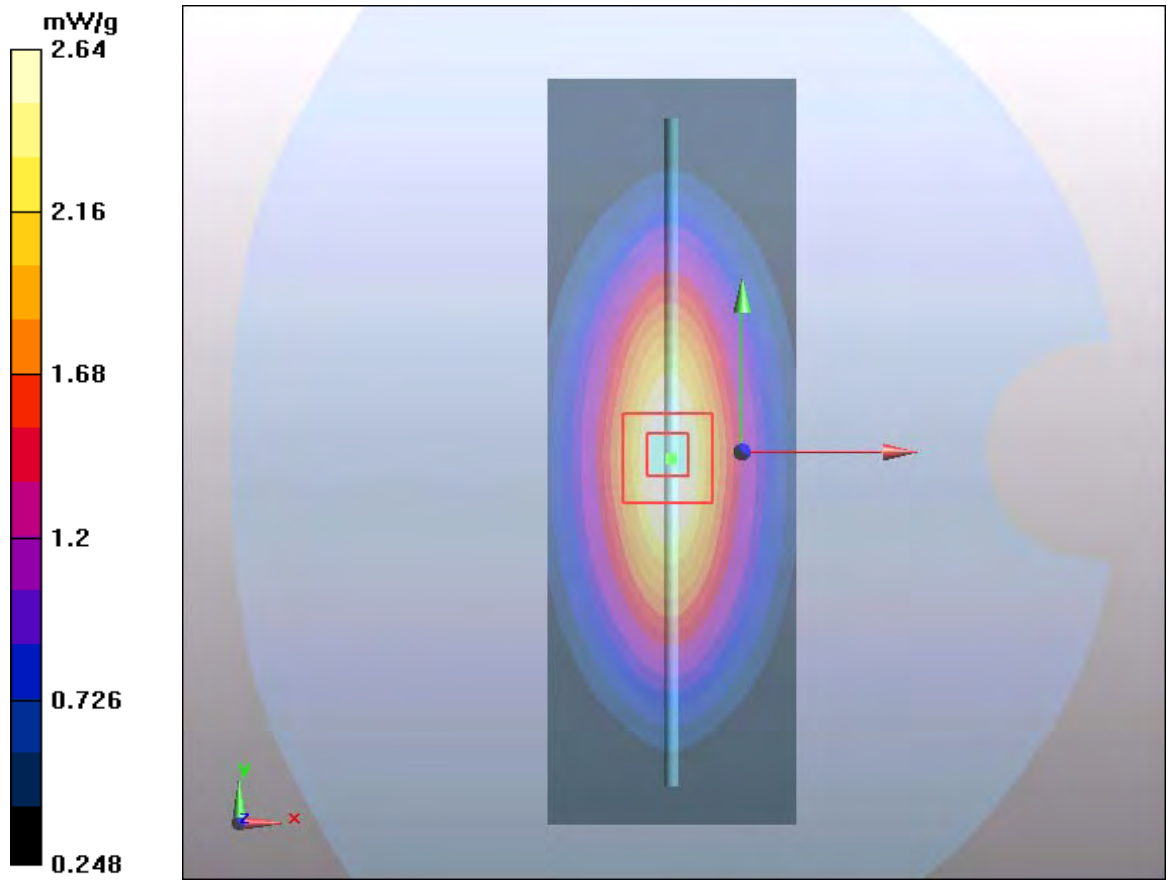
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.64 mW/g



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Plot 3 System Performance Check at 1750 MHz TSL

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2

Date: 1/8/2020

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.34 S/m; ε_r = 40.2; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.21, 8.21, 8.21); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=10mm, Pin=250mW/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 9.78 mW/g

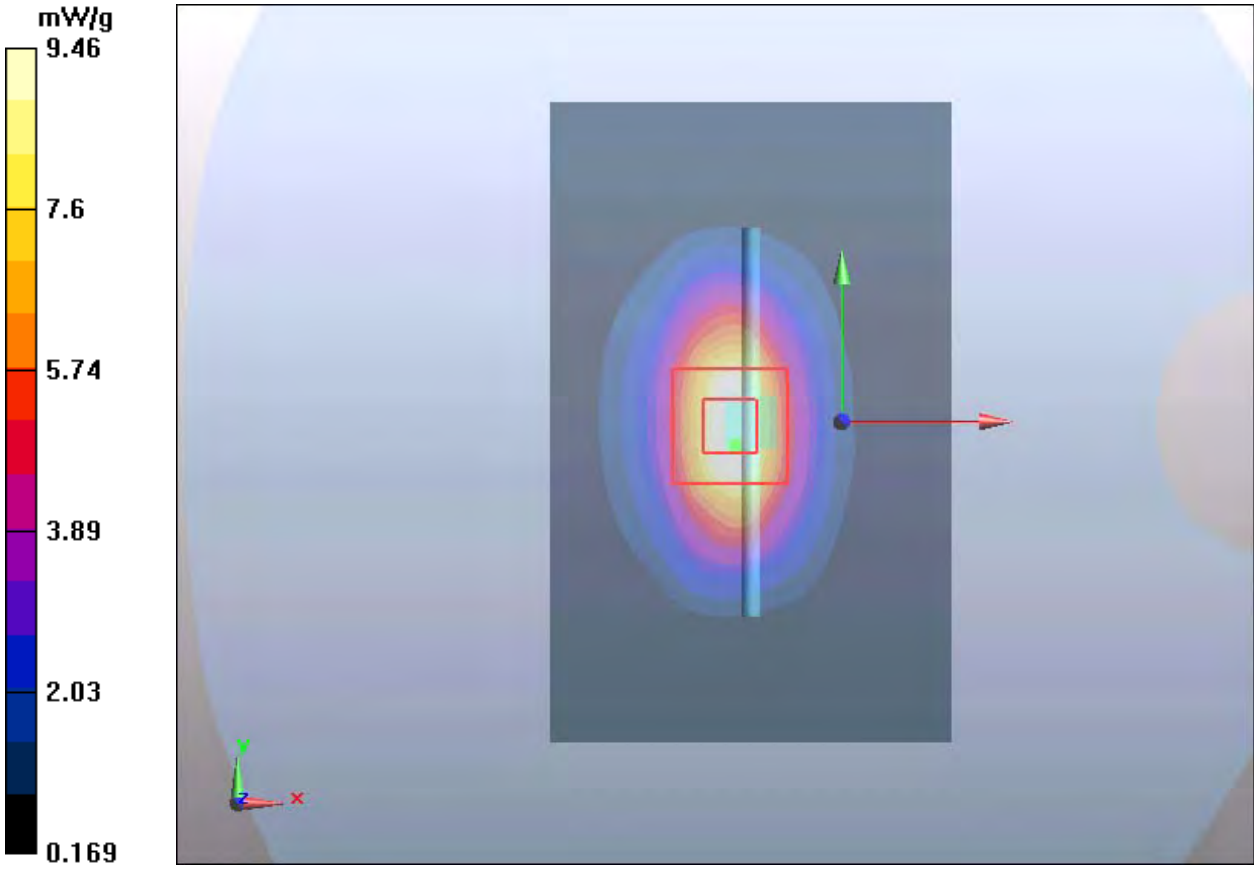
d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 15.5 W/kg

SAR(1 g) = 8.95 mW/g; SAR(10 g) = 4.5 mW/g

Maximum value of SAR (measured) = 9.46 mW/g



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Plot 4 System Performance Check at 1900 MHz TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2

Date: 1/9/2020

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.41 S/m; ε_r = 40.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.79, 7.79, 7.79); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.3 mW/g

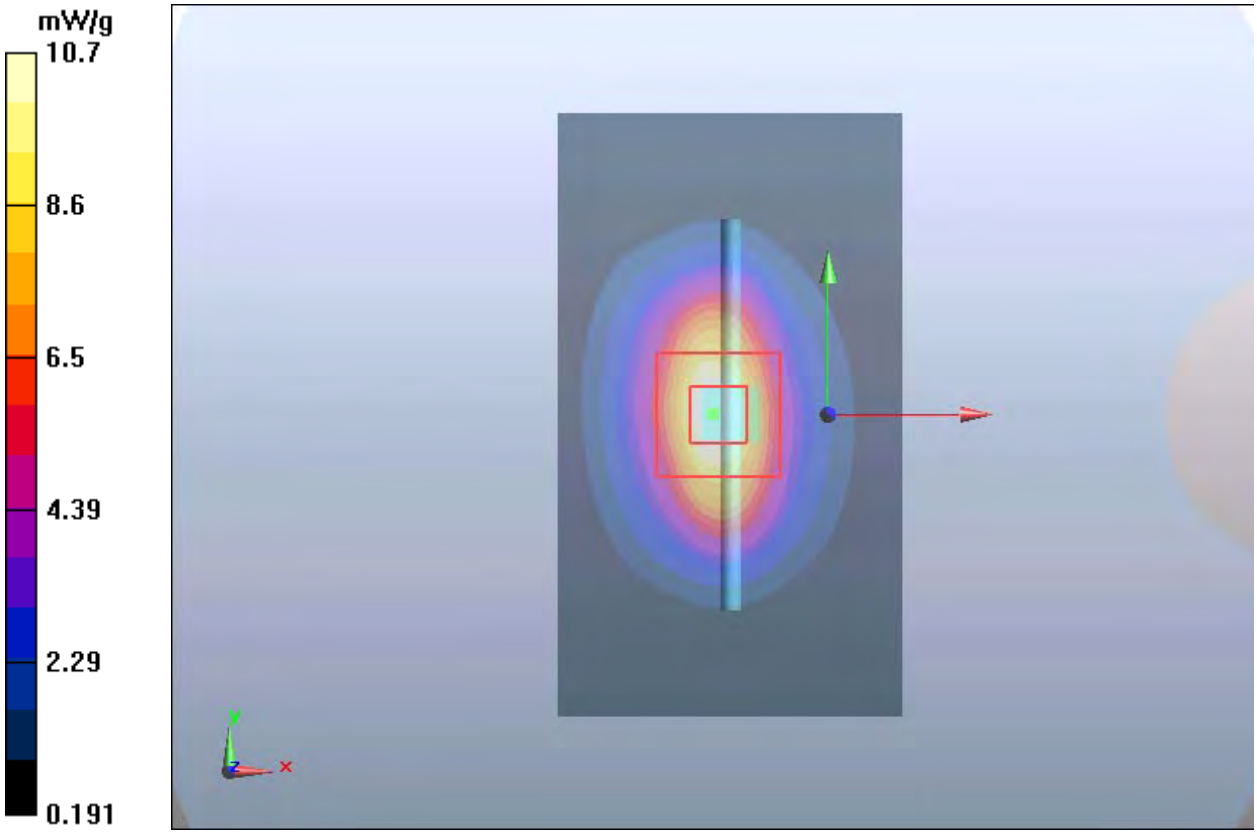
d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.88 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.7 mW/g



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Plot 5 System Performance Check at 2450 MHz TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2

Date: 1/10/2020

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.81 S/m; ε_r = 38.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 18.2 mW/g

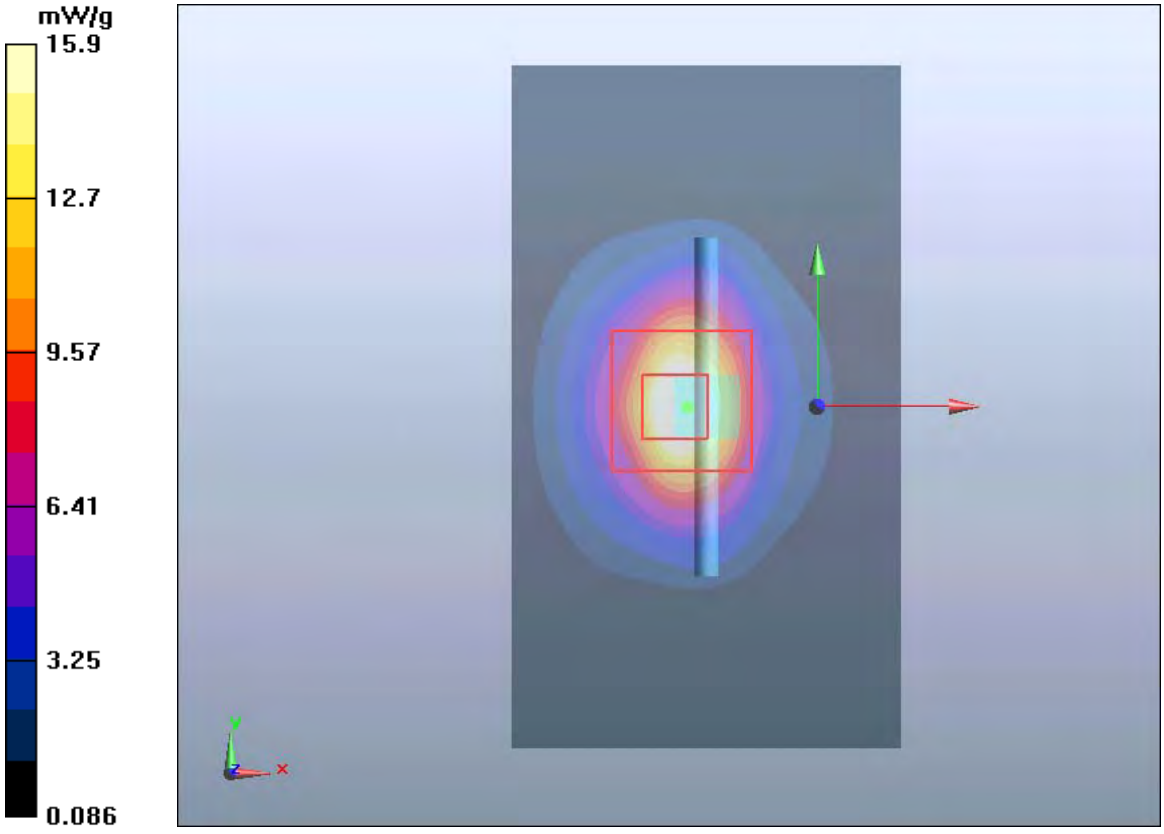
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g

Maximum value of SAR (measured) = 15.9 mW/g



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Plot 6 System Performance Check at 2600 MHz TSL

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2

Date: 1/10/2020

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz; σ = 2.01 S/m; ε_r = 38.2; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.20, 7.20, 7.20); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid:dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 17.439 mW/g

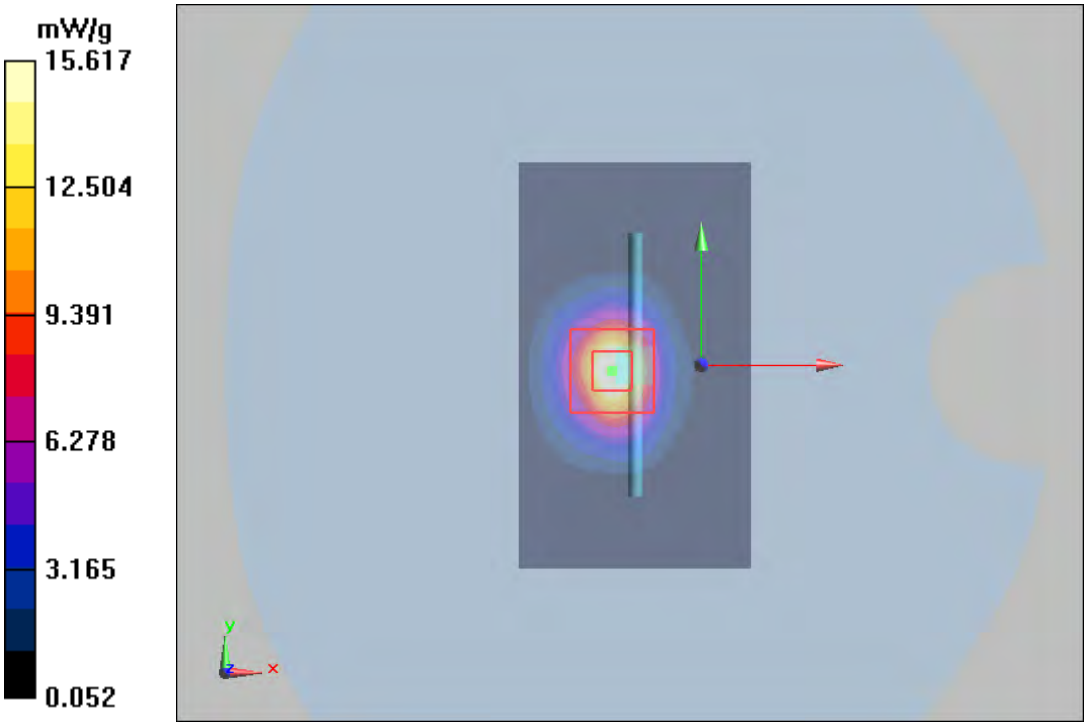
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.998 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.858 W/kg

SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.07 mW/g

Maximum value of SAR (measured) = 15.617 mW/g



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Plot 7 System Performance Check at 5250 MHz TSL

DUT: Dipole 5250 MHz; Type: D5GHzV2; Serial: D5GHzV2

Date: 1/10/2020

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5250 MHz; σ = 4.80 S/m; ε_r = 35.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.56, 5.56, 5.56); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 9.14 mW/g

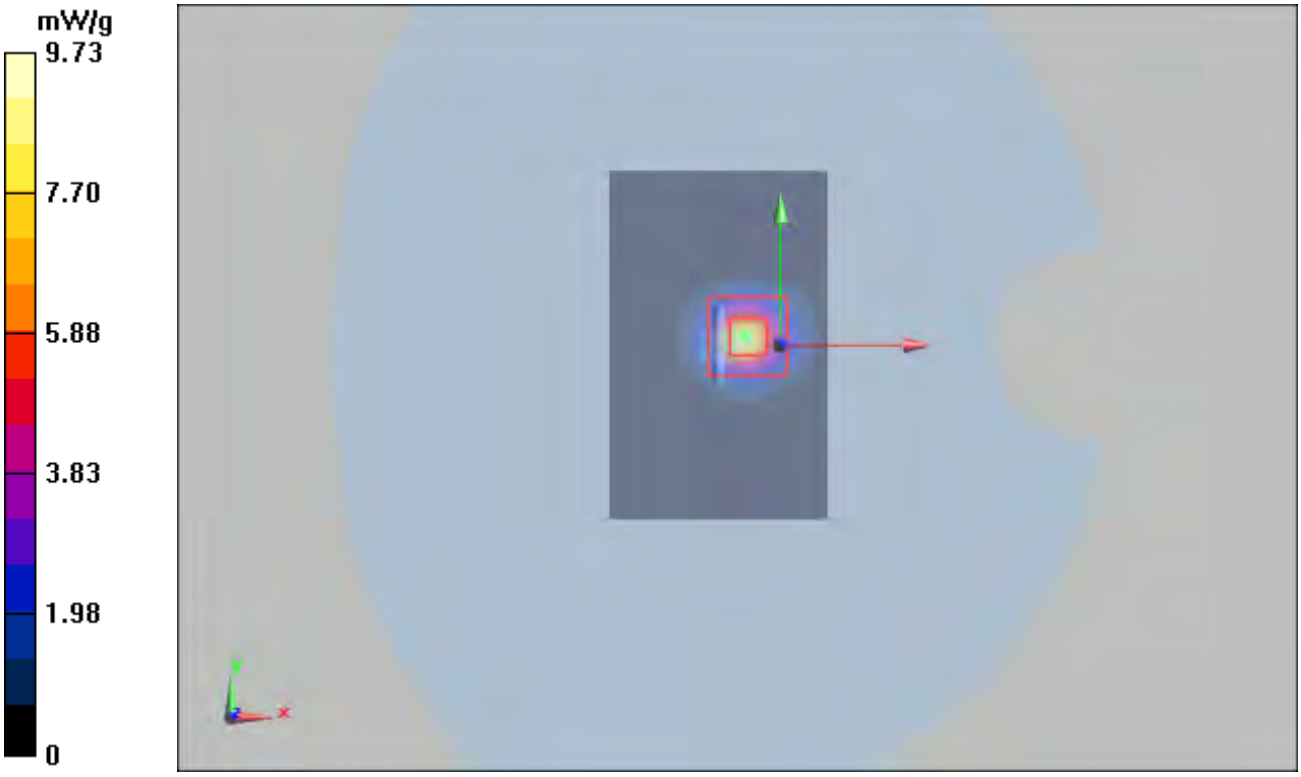
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 33.6 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 52.2 W/kg

SAR(1 g) = 7.87 mW/g; SAR(10 g) = 2.25 mW/g

Maximum value of SAR (measured) = 9.73 mW/g



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Plot 8 System Performance Check at 5750 MHz TSL

DUT: Dipole 5750 MHz; Type: D5GHzV2; Serial: D5GHzV2

Date: 1/10/2020

Communication System: CW; Frequency: 5750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5750 MHz; σ = 5.21 S/m; ε_r = 34.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.99, 4.99, 4.99); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 8.31 mW/g

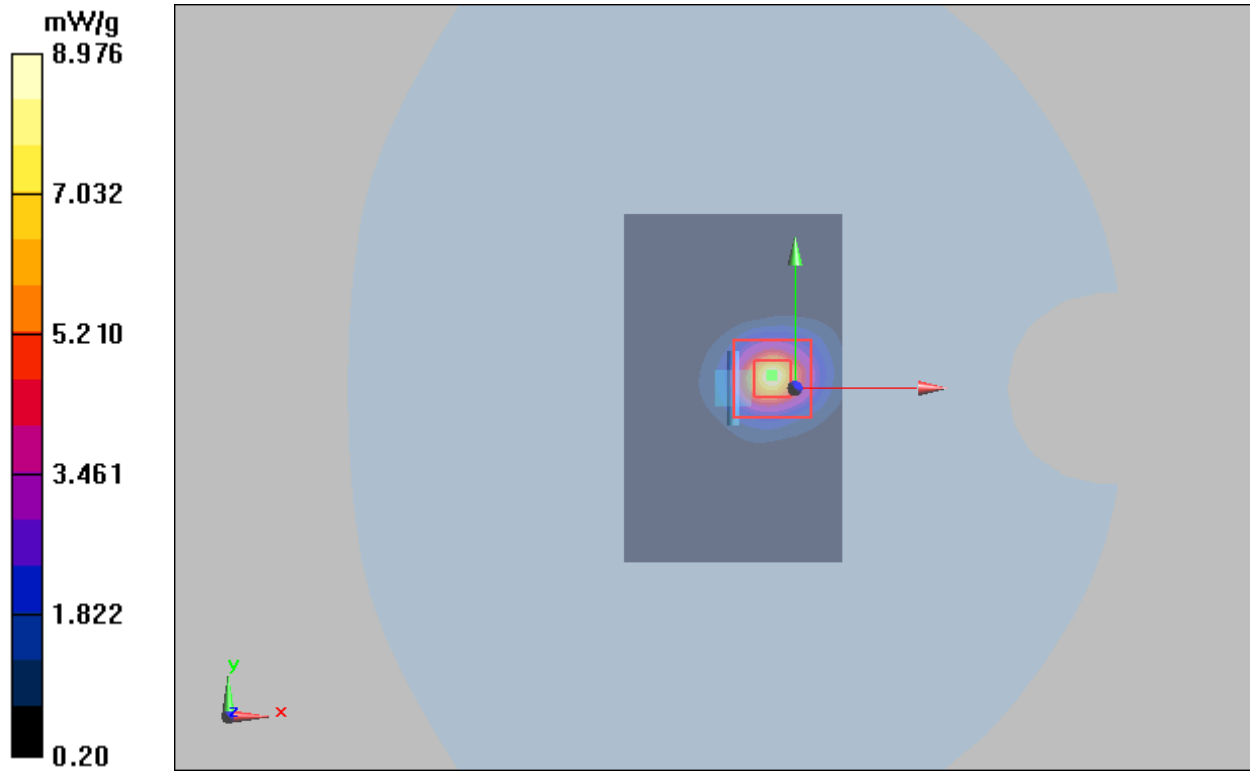
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 23.1 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 23.4 W/kg

SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.27 mW/g

Maximum value of SAR (measured) = 8.976 mW/g



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ANNEX C: Highest Graph Results

Plot 9 GSM 850 GPRS (4Txslots) Back Side Low

Date: 1/11/2020

Communication System: UID 0, GPRS 4TX (0); Frequency: 824.2 MHz;Duty Cycle: 1:2.07491

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.914 S/m; ε_r = 42.162; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.20, 9.20, 9.20); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Low/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.62 W/kg

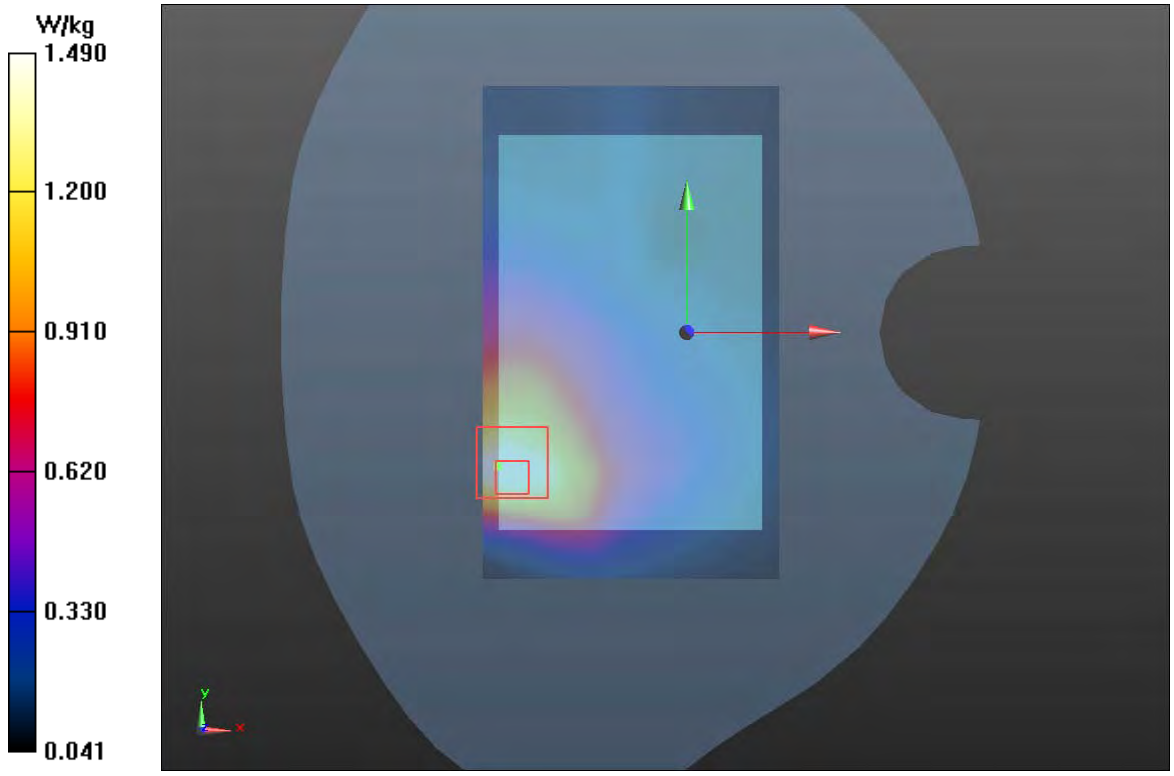
Back Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.82 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.64 W/kg

SAR(1 g) = 1.390 W/kg; SAR(10 g) = 0.834 W/kg

Maximum value of SAR (measured) = 1.490 W/kg



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Plot 10 GSM 1900 GPRS (4Txslots) Right Edge Low

Date: 1/9/2020

Communication System: UID 0, GPRS 4TX (0); Frequency: 1850.2 MHz;Duty Cycle: 1:2.07491

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.398 S/m; ε_r = 39.043; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.79, 7.79, 7.79); Calibrated: 6/19/2019;

Electronics: DAE4 SN1317; Calibrated: 10/23/2019

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Right Edge Low/Area Scan(51x111x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.76 W/kg

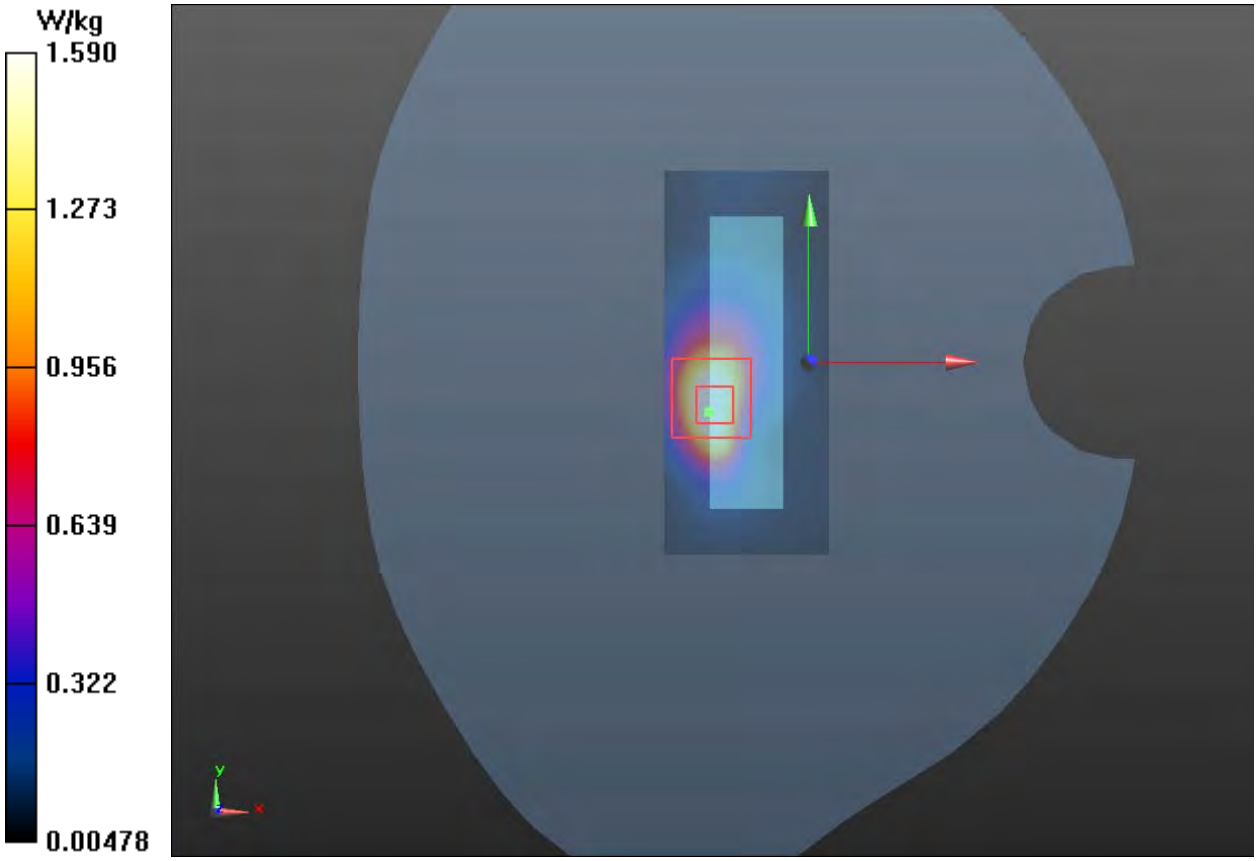
Right Edge Low/Zoom Scan(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.22 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 2.89 W/kg

SAR(1 g) = 1.440 W/kg; SAR(10 g) = 0.679 W/kg

Maximum value of SAR (measured) = 1.590 W/kg



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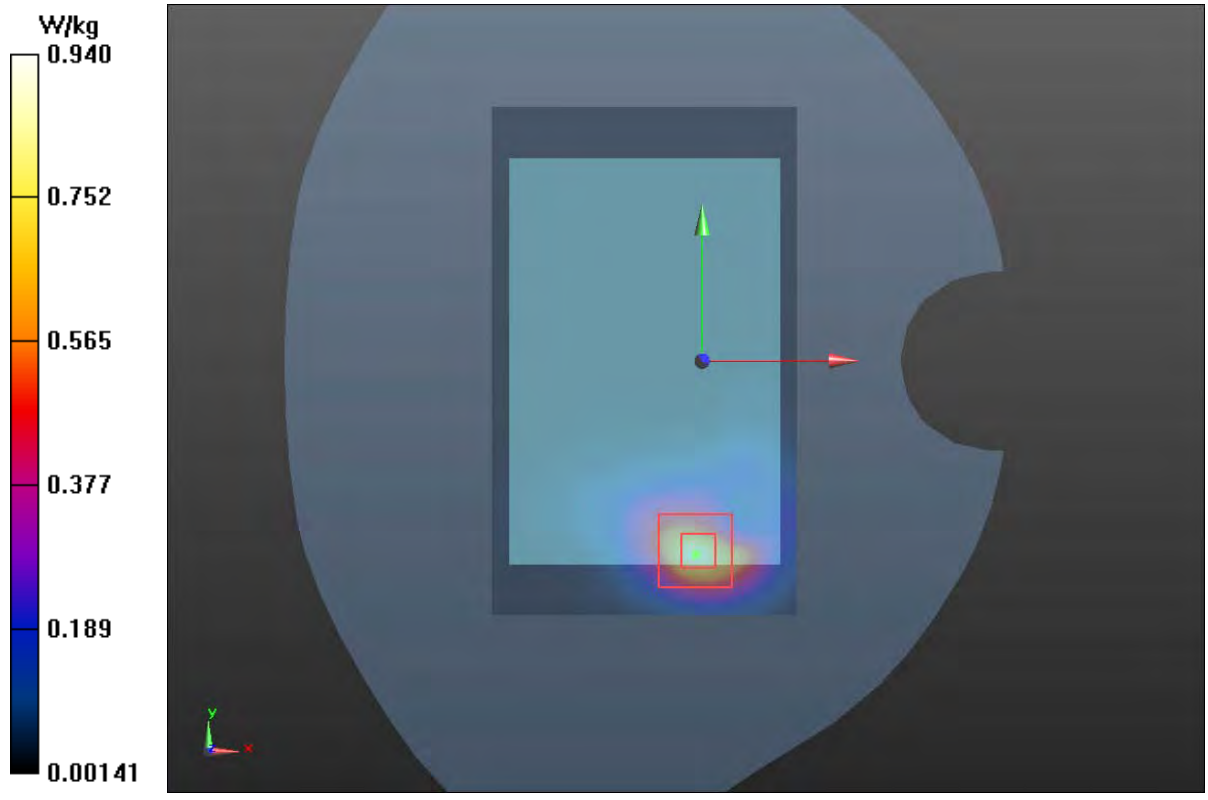
Plot 11 UMTS Band II Front Side Middle

Date: 1/9/2020
Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.42 S/m; ε_r = 38.948; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.79, 7.79, 7.79); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Front Side Middle/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.885 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.008 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 0.814 W/kg; SAR(10 g) = 0.364 W/kg

Maximum value of SAR (measured) = 0.940 W/kg



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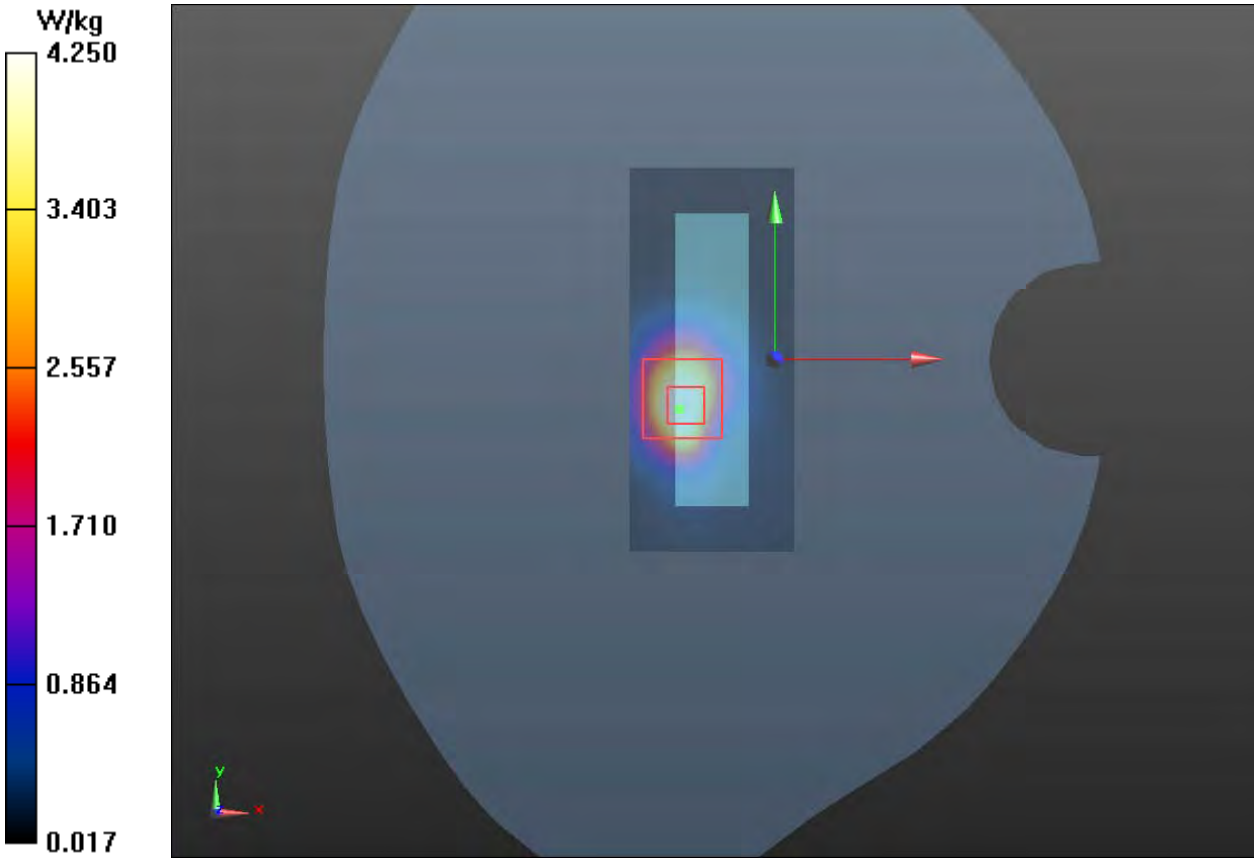
Plot 12 UMTS Band IV Right Edge Low

Date: 1/8/2020
Communication System: UID 0, WCDMA (0); Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1712.4 MHz; σ = 1.298 S/m; ε_r = 39.443; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.21, 8.21, 8.21); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Right Edge Low/Area Scan (51x111x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 4.750 W/kg

Right Edge Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 40.23 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 7.820 W/kg
SAR(1 g) = 3.890 W/kg; SAR(10 g) = 1.830 W/kg

Maximum value of SAR (measured) = 4.250 W/kg



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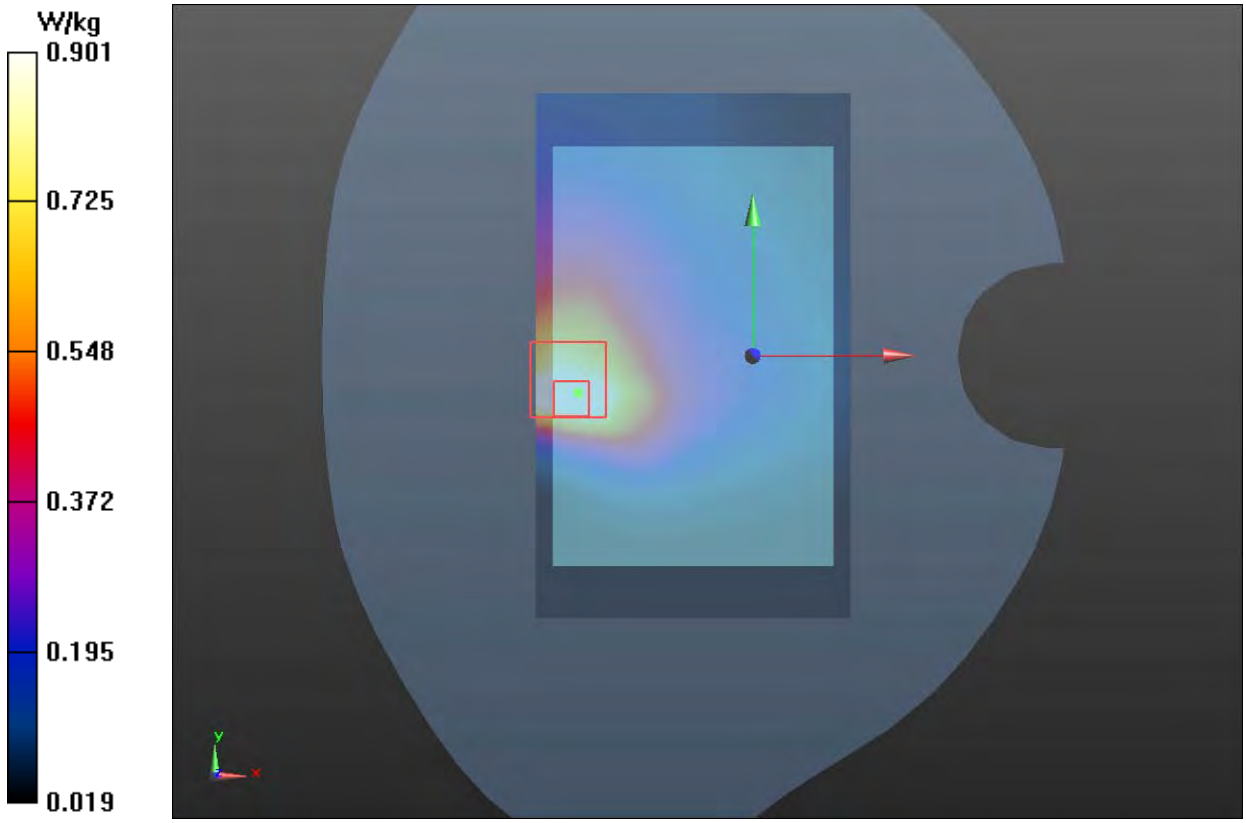
Plot 13 UMTS Band V Back Side Low

Date: 1/11/2020
Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.917 S/m; ε_r = 42.224; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.20, 9.20, 9.20); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Low /Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.090 W/kg

Back Side Low /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.05 V/m; Power Drift = 0.100 dB
Peak SAR (extrapolated) = 1.980 W/kg
SAR(1 g) = 0.878 W/kg; SAR(10 g) = 0.501 W/kg

Maximum value of SAR (measured) = 0.901 W/kg



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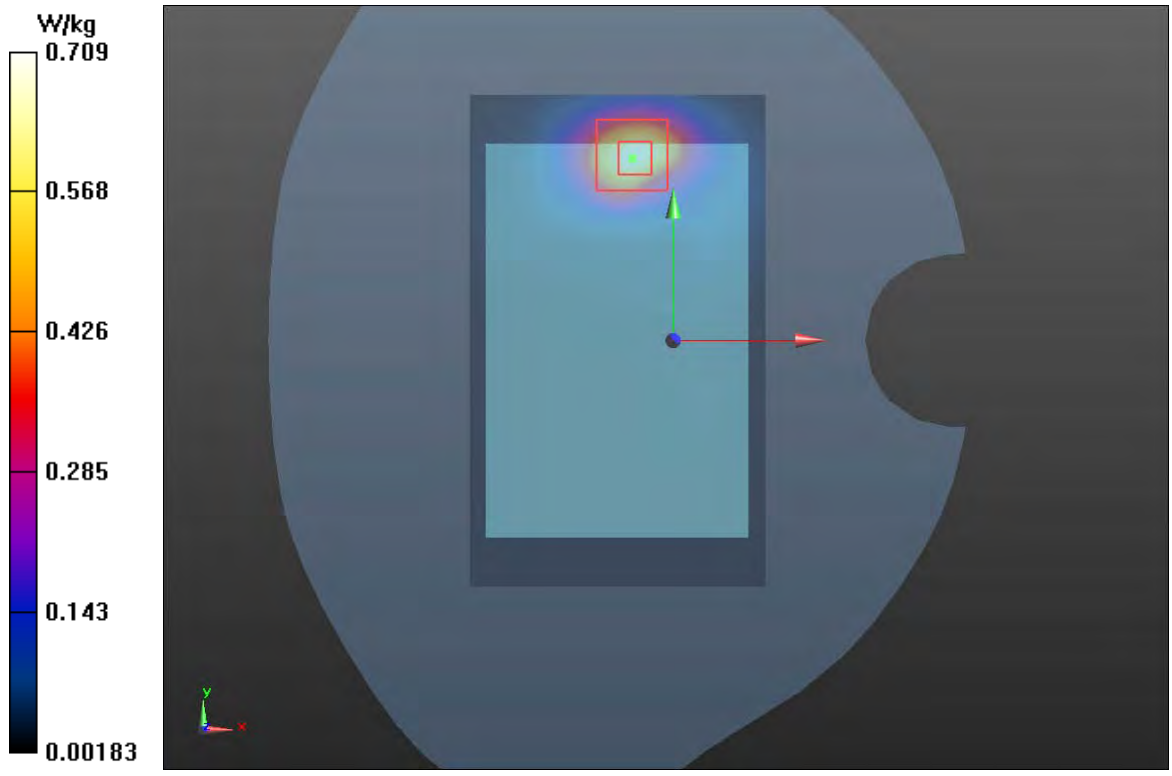
Plot 14 LTE Band 2 1RB Back Side High

Date: 1/9/2020
Communication System: UID 0, LTE (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.434 S/m; ε_r = 38.861; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.79, 7.79, 7.79); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side High/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.703 W/kg

Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.413 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.635 W/kg; SAR(10 g) = 0.318 W/kg

Maximum value of SAR (measured) = 0.709 W/kg



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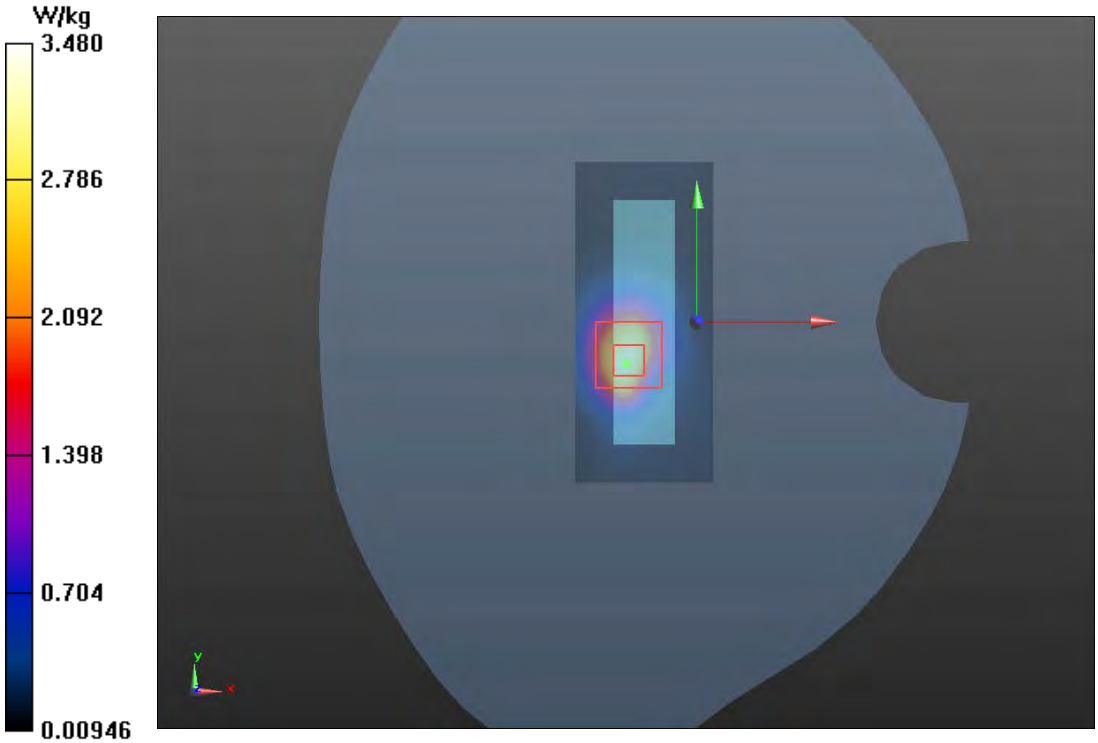
Plot 15 LTE Band 4 1RB Right Edge Middle

Date: 1/8/2020
Communication System: UID 0, LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1745 MHz; σ = 1.323 S/m; ε_r = 39.378; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.21, 8.21, 8.21); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Right Edge Middle/Area Scan(51x111x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 3.460 W/kg

Right Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 36.38 V/m; Power Drift = 0.130 dB
Peak SAR (extrapolated) = 5.77 W/kg
SAR(1 g) = 3.140 W/kg; SAR(10 g) = 1.480 W/kg

Maximum value of SAR (measured) = 3.480 W/kg



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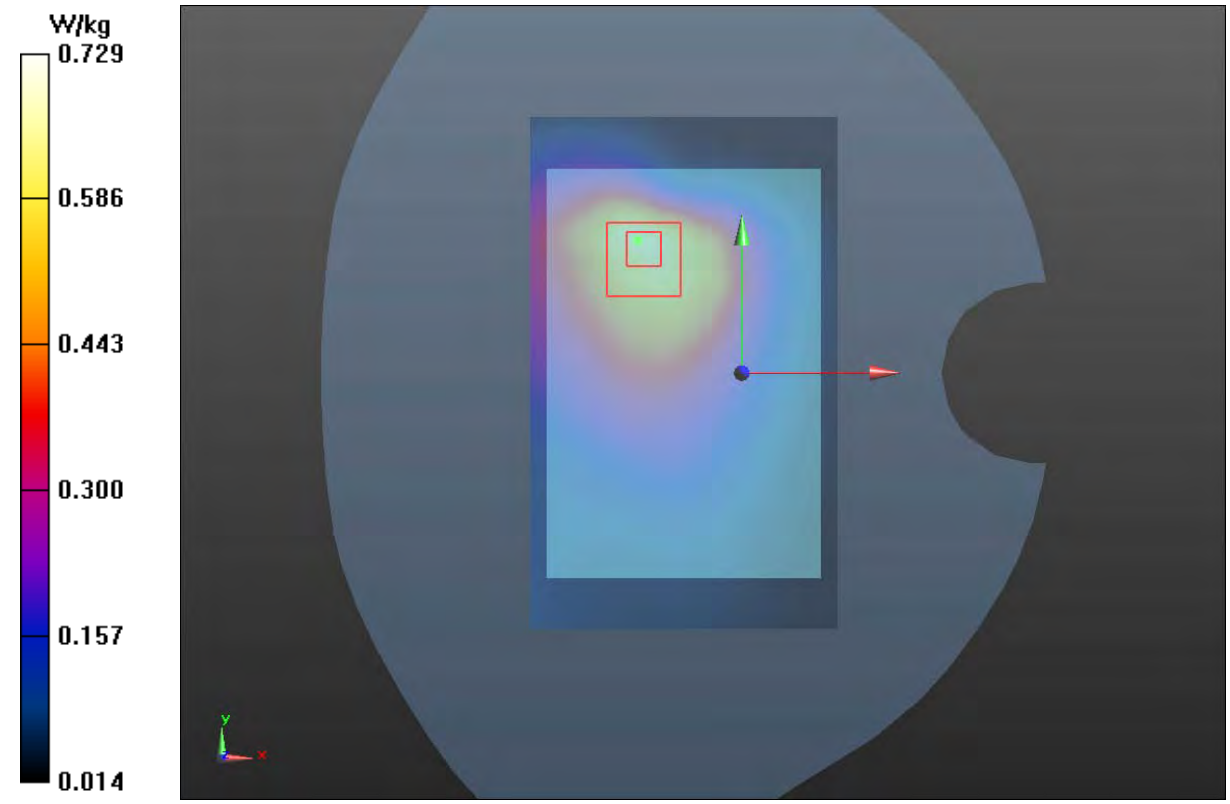
Plot 16 LTE Band 5 1RB Back Side Low

Date: 1/11/2020
Communication System: UID 0, LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.923 S/m; ε_r = 42.199; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.20, 9.20, 9.20); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Low /Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.733 W/kg

Back Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.98 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 1.210 W/kg
SAR(1 g) = 0.820 W/kg; SAR(10 g) = 0.481 W/kg

Maximum value of SAR (measured) = 0.729 W/kg



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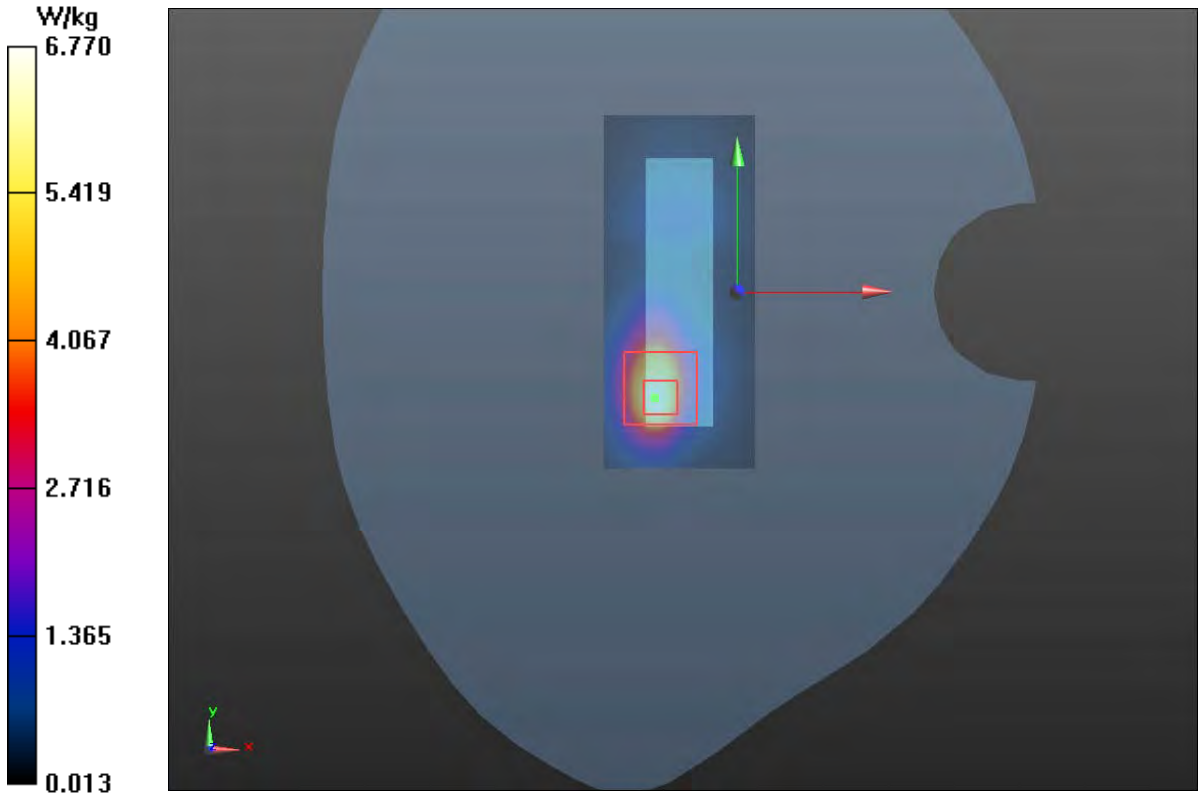
Plot 17 LTE Band 7 1RB Right Edge High

Date: 1/10/2020
Communication System: UID 0, LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2560 MHz; σ = 1.997 S/m; ε_r = 40.391; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.20, 7.20, 7.20); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Right Edge High/Area Scan (51x111x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 7.030 W/kg

Right Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.67 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 5.910 W/kg; SAR(10 g) = 2.440 W/kg

Maximum value of SAR (measured) = 6.770 W/kg



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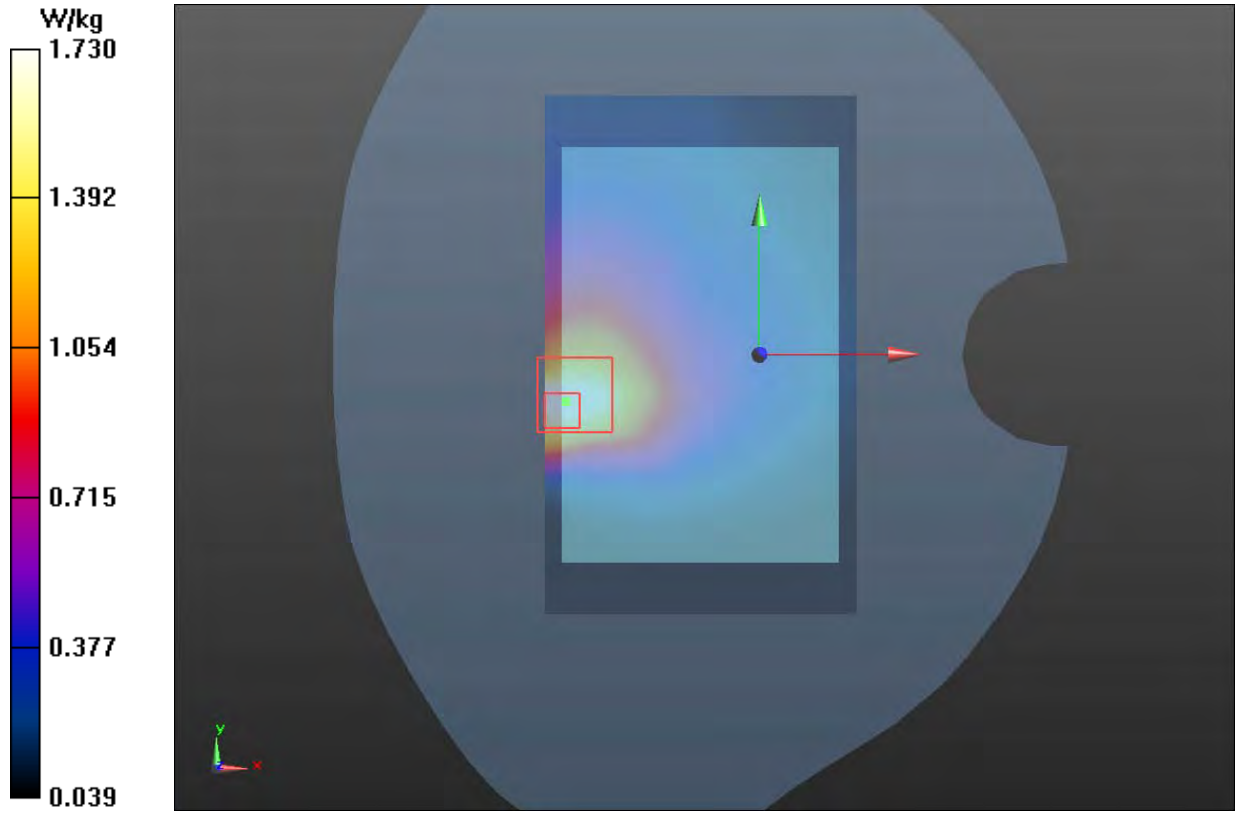
Plot 18 LTE Band 12 1RB Back Side Middle

Date: 1/7/2020
Communication System: UID 0, LTE (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.848 S/m; ε_r = 42.763; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Middle/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.82 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.46 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.23 W/kg
SAR(1 g) = 1.62 W/kg; SAR(10 g) = 0.943 W/kg

Maximum value of SAR (measured) = 1.730 W/kg



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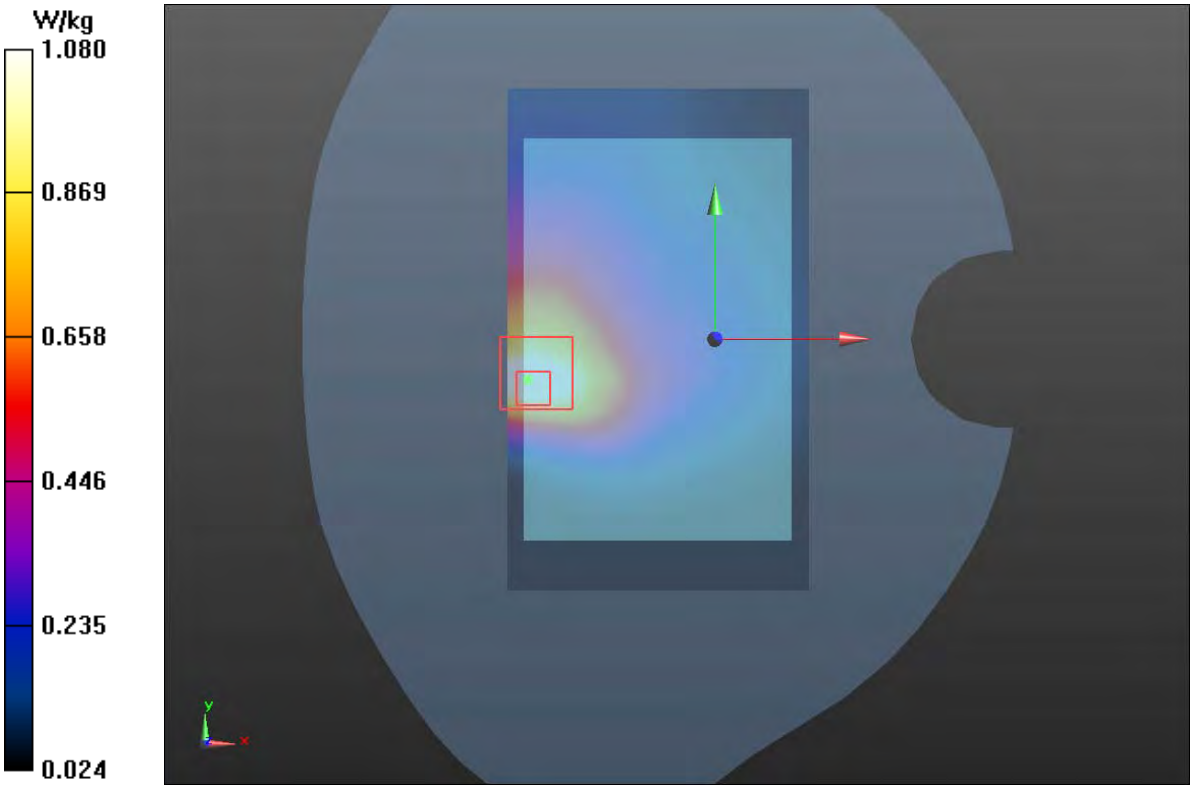
Plot 19 LTE Band 13 1RB Back Side Middle

Date: 1/7/2020
Communication System: UID 0, LTE (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used: f = 782 MHz; σ = 0.887 S/m; ε_r = 42.079; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Middle /Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.23 W/kg

Back Side Middle /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.40 V/m; Power Drift = 0.109 dB
Peak SAR (extrapolated) = 2.15 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.607 W/kg

Maximum value of SAR (measured) = 1.080 W/kg



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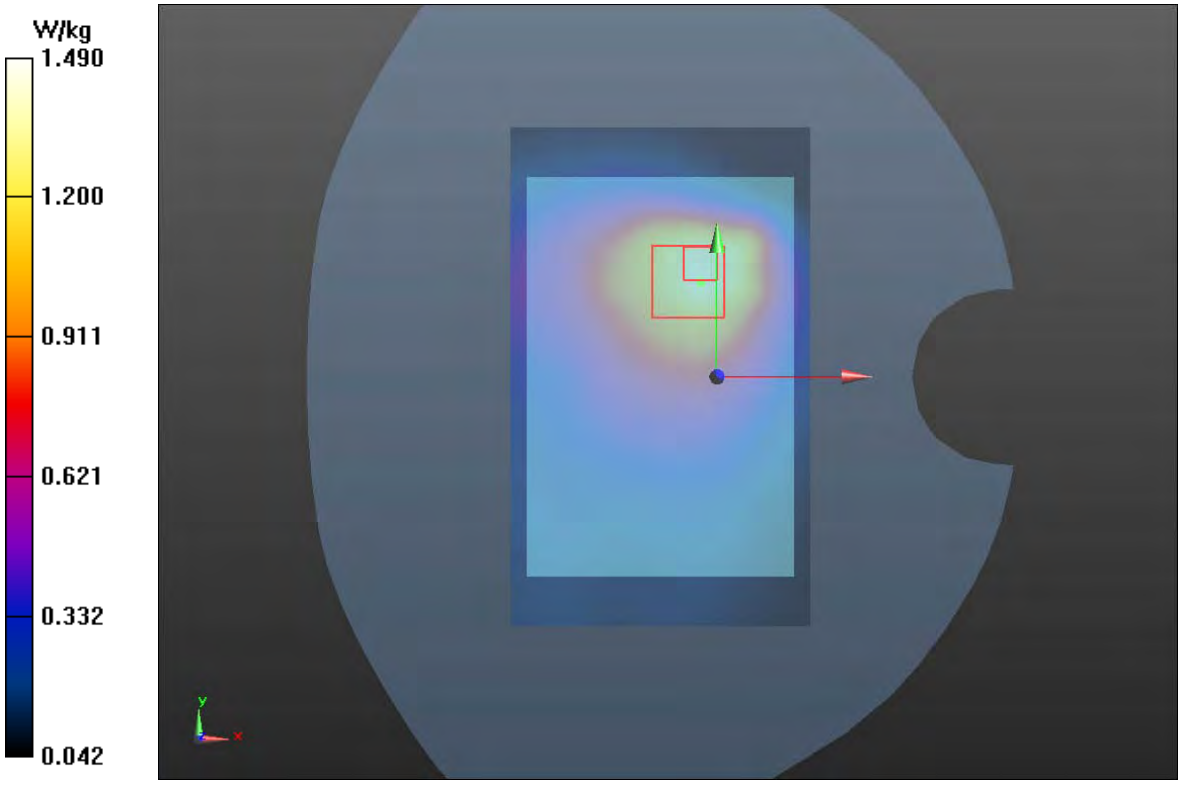
Plot 20 LTE Band 17 1RB Back Side Middle

Date: 1/7/2020
Communication System: UID 0, LTE (0); Frequency: 710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 710 MHz; σ = 0.85 S/m; ε_r = 42.757; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.54, 9.54, 9.54); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Middle /Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.410 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.92 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 2.44 W/kg
SAR(1 g) = 1.330 W/kg; SAR(10 g) = 0.826 W/kg

Maximum value of SAR (measured) = 1.490 W/kg



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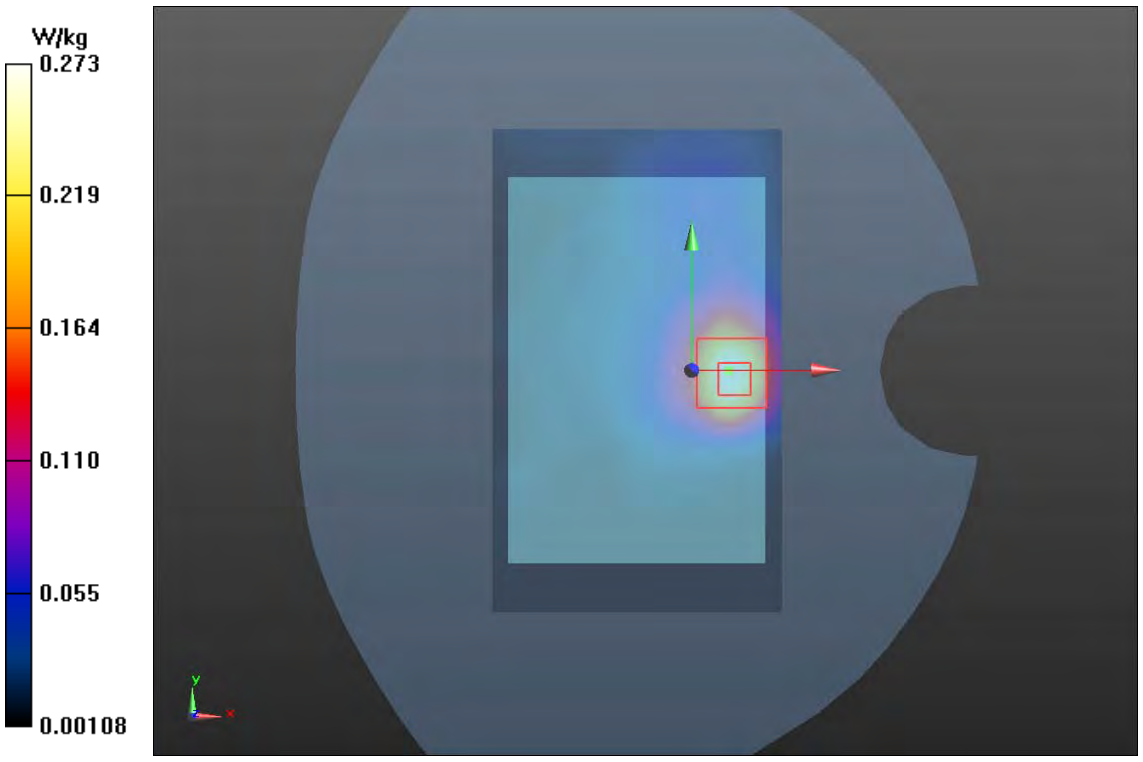
Wi-Fi-Antenna
Plot 21 802.11b Back Side Middle

Date: 1/10/2020
Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.856 S/m; ε_r = 40.836; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side Middle/Area Scan (81x131x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.282 W/kg

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.146 V/m; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 0.547 W/kg
SAR(1 g) = 0.251 W/kg; SAR(10 g) = 0.118 W/kg

Maximum value of SAR (measured) = 0.273 W/kg



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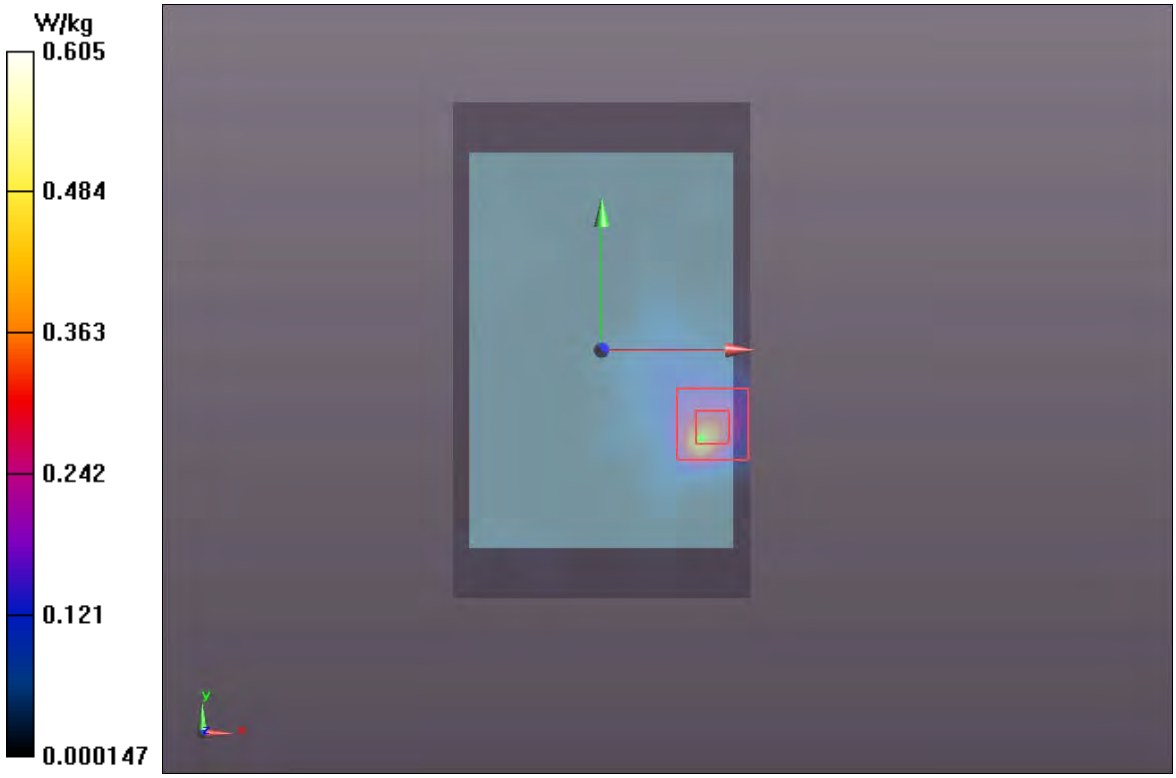
Plot 22 802.11nHT40 U-NII-1 Back Side CH46

Date: 1/10/2020
Communication System: UID 0, 802.11n HT40 (0); Frequency: 5230 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5230 MHz; σ = 4.726 S/m; ε_r = 36.022; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(5.56, 5.56, 5.56); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side CH46/Area Scan (91x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.472 W/kg

Back Side CH46/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.044 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.532 W/kg; SAR(10 g) = 0.161 W/kg

Maximum value of SAR (measured) = 0.605 W/kg



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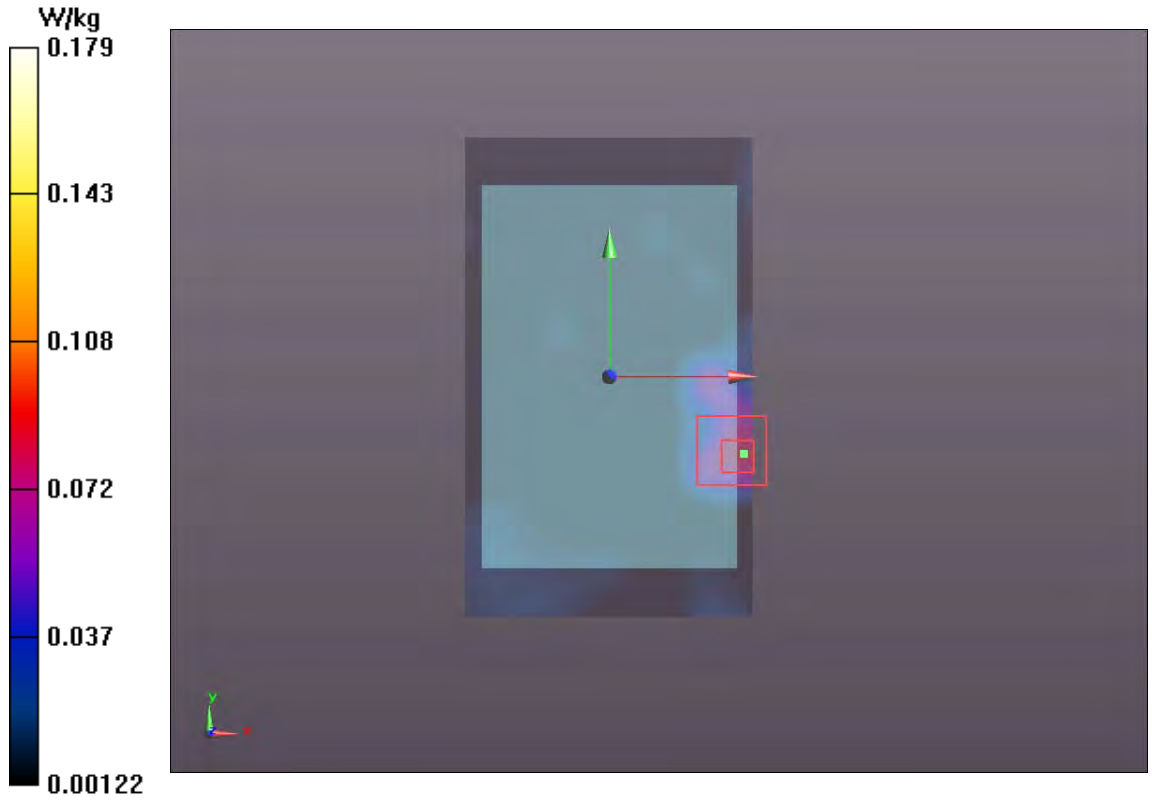
Plot 23 802.11nHT40 U-NII-3 Back Side CH159

Date: 1/10/2020
Communication System: UID 0, 802.11n HT40 (0); Frequency: 5795 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5795 MHz; σ = 5.462 S/m; ε_r = 34.604; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(4.99, 4.99, 4.99); Calibrated: 6/19/2019;
Electronics: DAE4 SN1317; Calibrated: 10/23/2019
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.12 (7470)

Back Side CH159/Area Scan(91x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.085 W/kg

Back Side CH159/Zoom Scan(7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.014 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 0.377 W/kg
SAR(1 g) = 0.121 W/kg; SAR(10 g) = 0.040 W/kg

Maximum value of SAR (measured) = 0.179 W/kg



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ANNEX D: Probe Calibration Certificate

In Collaboration with speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

中国认可 国际互认 校准 CALIBRATION CNAS L0570

Client TA(Shanghai) Certificate No: Z19-60169

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3677
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	June 19, 2019

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Power sensor NRP-Z91	101547	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Power sensor NRP-Z91	101548	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Reference10dBAttenuator	18N50W-10dB	09-Feb-18(CTTL, No.J18X01133)	Feb-20
Reference20dBAttenuator	18N50W-20dB	09-Feb-18(CTTL, No.J18X01132)	Feb-20
Reference Probe EX3DV4	SN 3617	31-Jan-19(SPEAG,No.EX3-3617_Jan19)	Jan-20
DAE4	SN 1331	06-Feb-19(SPEAG, No.DAE4-1331_Feb19)	Feb -20
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGeneratorMG3700A	6201052605	21-Jun-18 (CTTL, No.J18X05033)	Jun-19
Network Analyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan -20

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: June 20, 2019

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Certificate No: Z19-60169 Page 1 of 11

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In Collaboration with
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CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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E-mail: cttl@chinattl.com Http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z:* A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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Probe EX3DV4

SN: 3677

Calibrated: June 19, 2019

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	0.41	0.46	0.40	±10.0%
DCP(mV)[B]	101.1	102.9	101.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	152.0	±2.6%
		Y	0.0	0.0	1.0		170.1	
		Z	0.0	0.0	1.0		147.7	

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	9.54	9.54	9.54	0.11	1.56	±12.1%
835	41.5	0.90	9.20	9.20	9.20	0.11	1.61	±12.1%
1750	40.1	1.37	8.21	8.21	8.21	0.22	1.11	±12.1%
1900	40.0	1.40	7.79	7.79	7.79	0.22	1.04	±12.1%
2300	39.5	1.67	7.66	7.66	7.66	0.57	0.72	±12.1%
2450	39.2	1.80	7.50	7.50	7.50	0.59	0.71	±12.1%
2600	39.0	1.96	7.20	7.20	7.20	0.65	0.68	±12.1%
5250	35.9	4.71	5.56	5.56	5.56	0.40	1.40	±13.3%
5600	35.5	5.07	4.90	4.90	4.90	0.45	1.40	±13.3%
5750	35.4	5.22	4.99	4.99	4.99	0.50	1.35	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	0.96	9.75	9.75	9.75	0.40	0.75	±12.1%
835	55.2	0.97	9.40	9.40	9.40	0.18	1.38	±12.1%
1750	53.4	1.49	7.86	7.86	7.86	0.23	1.09	±12.1%
1900	53.3	1.52	7.62	7.62	7.62	0.22	1.15	±12.1%
2300	52.9	1.81	7.67	7.67	7.67	0.55	0.81	±12.1%
2450	52.7	1.95	7.57	7.57	7.57	0.59	0.75	±12.1%
2600	52.5	2.16	7.33	7.33	7.33	0.74	0.65	±12.1%
5250	48.9	5.36	4.93	4.93	4.93	0.45	1.55	±13.3%
5600	48.5	5.77	4.24	4.24	4.24	0.50	1.45	±13.3%
5750	48.3	5.94	4.35	4.35	4.35	0.50	1.50	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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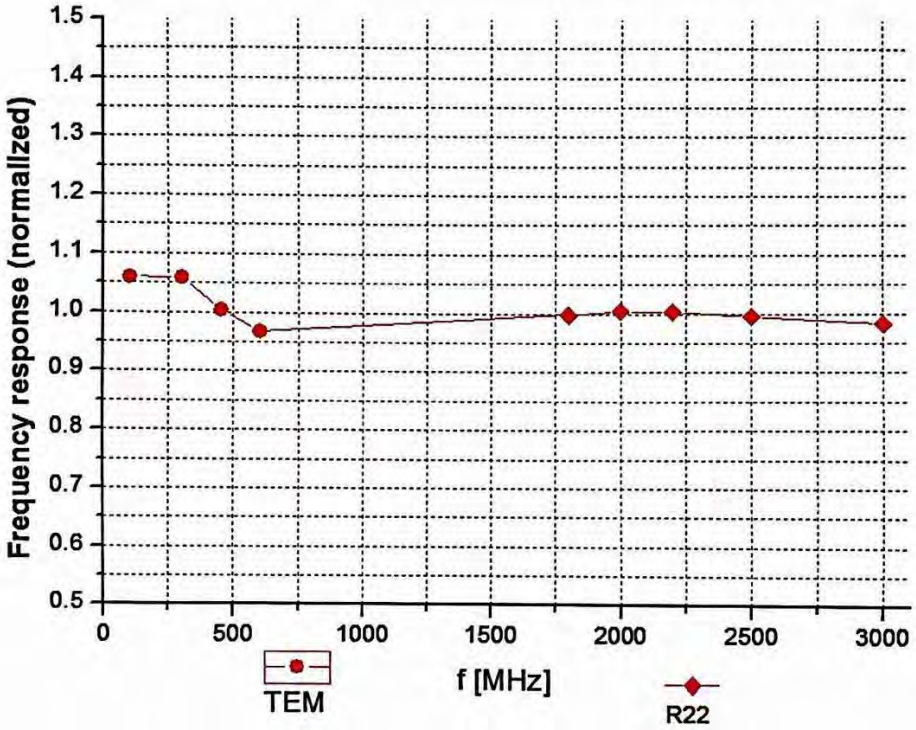
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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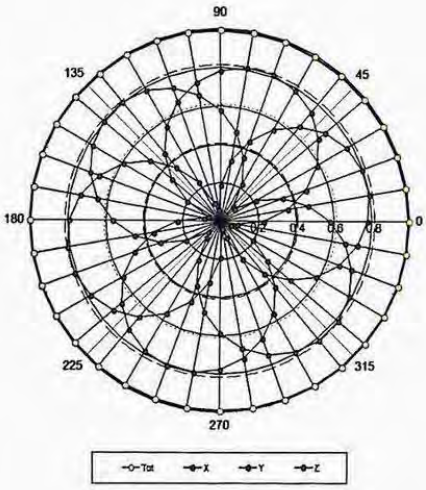
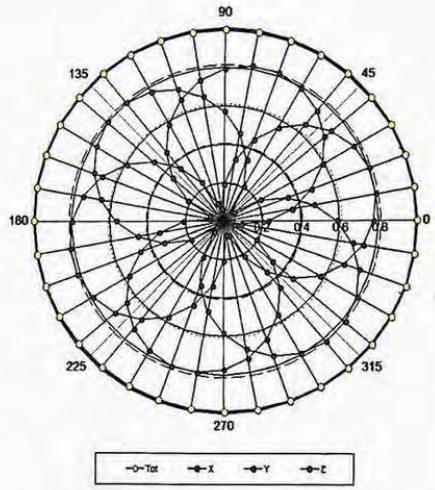
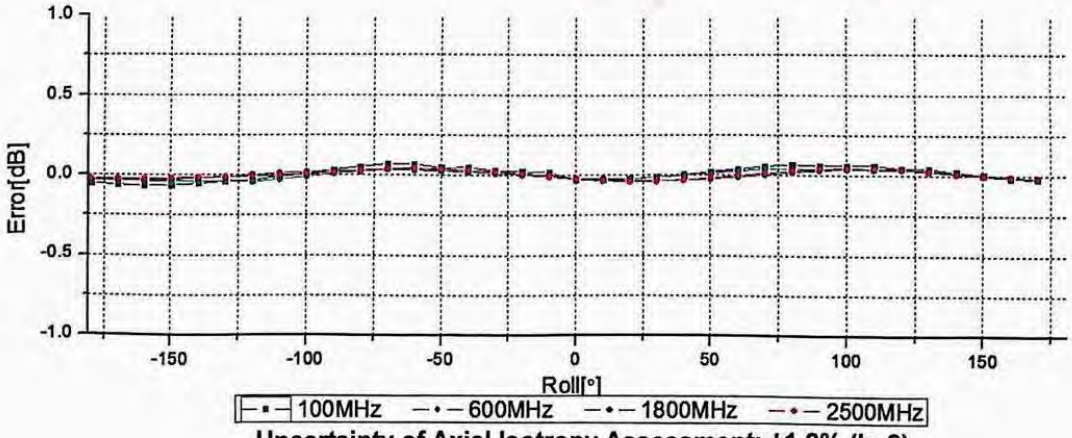
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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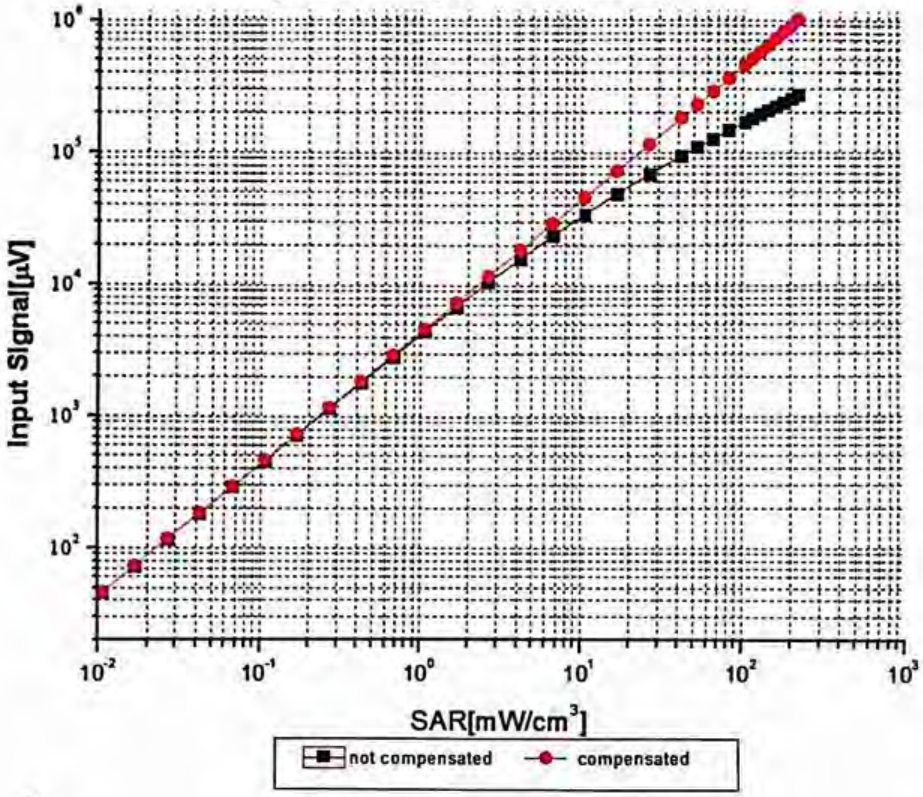
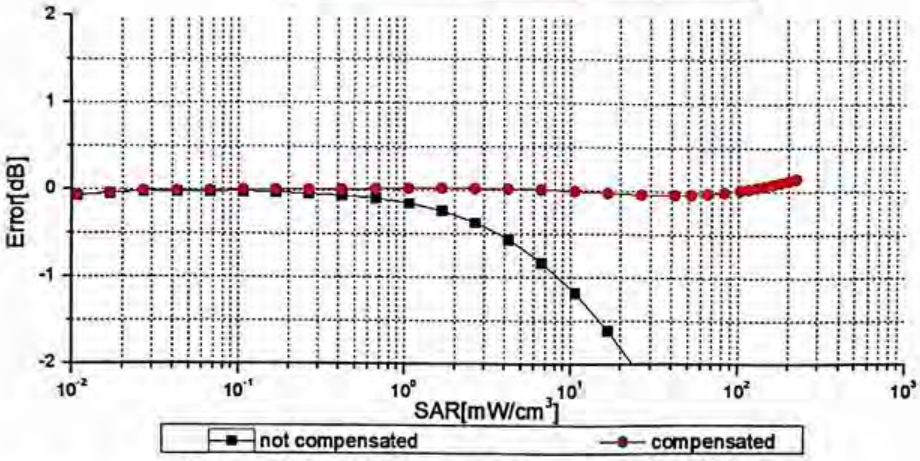
Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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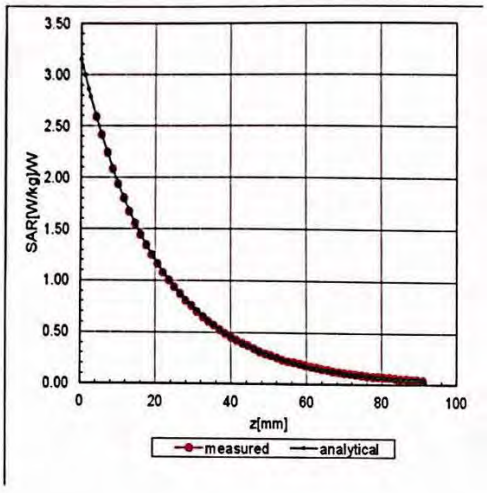
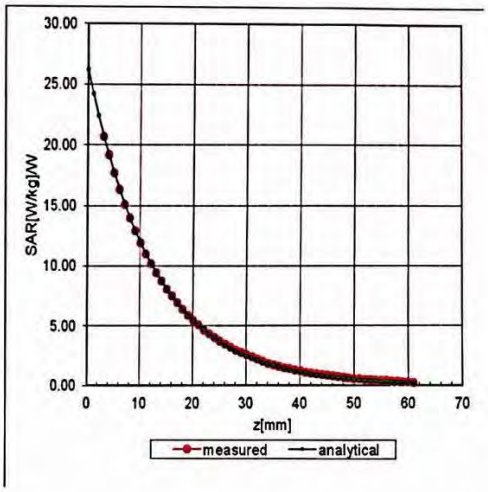
Conversion Factor Assessment

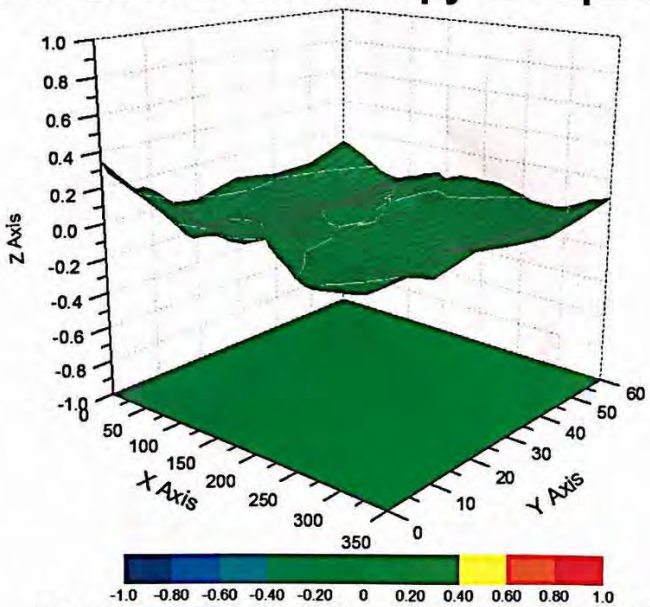
f=750 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3677

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	117.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

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ANNEX E: D750V3 Dipole Calibration Certificate

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中国认可 国际互认 校准 CALIBRATION CNAS L0570

Client TA(Shanghai) Certificate No: Z17-97113

CALIBRATION CERTIFICATE

Object	D750V3 - SN: 1045
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	August 27, 2017

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102083	22-Sep-16 (CTTL, No.J16X06809)	Sep-17
Power sensor NRV-Z5	100595	22-Sep-16 (CTTL, No.J16X06809)	Sep-17
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG,No.EX3-3617_Jan17)	Jan-18
DAE4	SN 1331	19-Jan-17(CTTL-SPEAG,No.Z17-97015)	Jan-18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: August 30, 2017

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Certificate No: Z17-97113 Page 1 of 8

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.7 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.34 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.36 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.45 mW /g ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.7 ± 6 %	0.95 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.78 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.46 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.87 mW /g ±18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5Ω- 2.95jΩ
Return Loss	- 28.5dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5Ω- 5.53jΩ
Return Loss	- 24.2dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.140 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 08.27.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1045

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

Medium parameters used: f = 750 MHz; σ = 0.886 S/m; ε_r = 41.66; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(10.05, 10.05, 10.05); Calibrated: 1/23/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

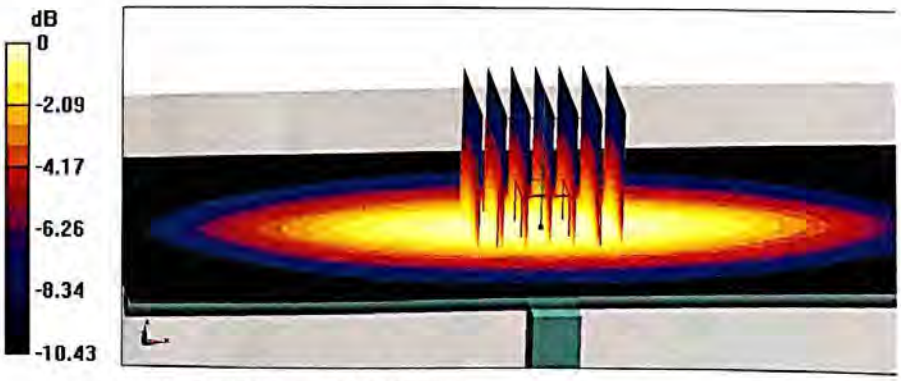
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.59 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.20 W/kg

SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.36 W/kg

Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

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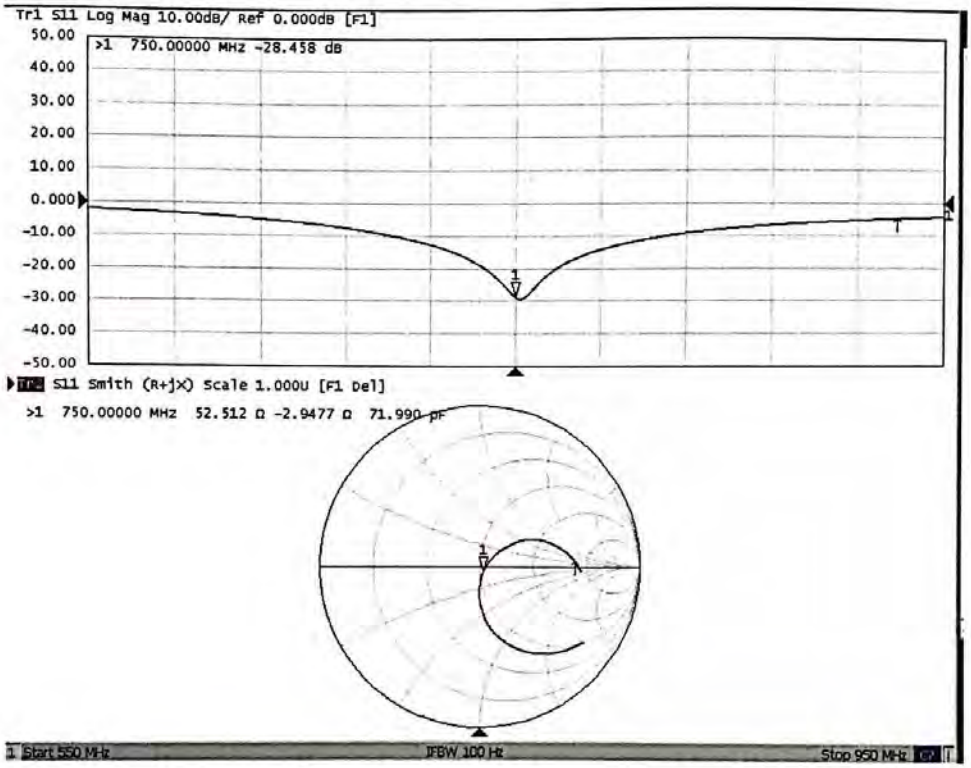
Impedance Measurement Plot for Head TSL



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