SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Liquid	Ambient Temp.[°C]	Liquid Temp.[°C]	Probe S/N	Input Power (mW)	1 W Target SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation [%]
E	5200	D5GHzV2, SN: 1103					3930	100	81.1	7.69	76.90	-5.18
E	5300	D5GHzV2, SN: 1103					3930	100	82.5	8.25	82.50	0.00
E	5500	D5GHzV2, SN: 1103	Oct. 10. 2013	Head	22.0	22.5	3930	100	85.3	8.49	84.90	-0.47
E	5600	D5GHzV2, SN: 1103					3930	100	84.5	8.59	85.90	1.66
E	5800	D5GHzV2, SN: 1103					3930	100	80.5	8.56	85.60	6.34
E	5200	D5GHzV2, SN: 1103					3930	100	74.7	7.04	70.40	-5.76
E	5300	D5GHzV2, SN: 1103					3930	100	76.0	7.30	73.00	-3.95
E	5500	D5GHzV2, SN: 1103	Oct. 10. 2013	Body	22.0	22.5	3930	100	80.0	7.89	78.90	-1.38
E	5600	D5GHzV2, SN: 1103					3930	100	81.3	8.59	85.90	5.66
E	5800	D5GHzV2, SN: 1103					3930	100	75.5	7.97	79.70	5.56
E	5200	D5GHzV2, SN: 1103					3930	100	81.1	8.03	80.30	-0.99
E	5300	D5GHzV2, SN: 1103					3930	100	82.5	7.69	76.90	-6.79
E	5500	D5GHzV2, SN: 1103	Oct. 11. 2013	Head	22.3	22.7	3930	100	85.3	8.19	81.90	-3.99
E	5600	D5GHzV2, SN: 1103					3930	100	84.5	8.82	88.20	4.38
E	5800	D5GHzV2, SN: 1103					3930	100	80.5	8.52	85.20	5.84
E	5200	D5GHzV2, SN: 1103					3930	100	74.7	7.04	70.40	-5.76
E	5300	D5GHzV2, SN: 1103					3930	100	76.0	7.91	79.10	4.08
E	5500	D5GHzV2, SN: 1103	Oct. 11. 2013	Body	22.3	22.7	3930	100	80.0	7.53	75.30	-5.88
E	5600	D5GHzV2, SN: 1103					3930	100	81.3	7.68	76.80	-5.54
E	5800	D5GHzV2, SN: 1103					3930	100	75.5	7.51	75.10	-0.53

Note1 : System Verification was measured with input 100 mW, 250 mW and normalized to 1W.

Note2 : To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the same liquid, probe and DAE as the SAR tests in the same time period.

Note3: Full system validation status and results can be found in Attachment 3.

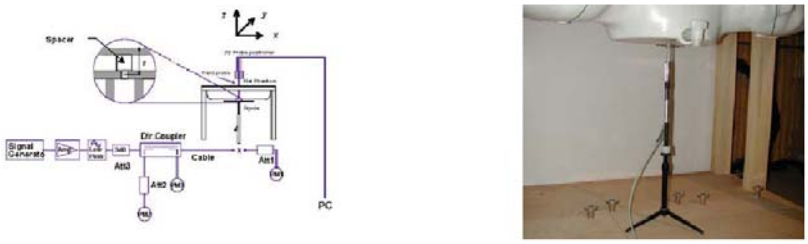


Figure 11.1 Dipole Verification Test Setup

12. SAR TEST RESULTS

12.1 Head SAR Results

Table 12.1 GSM/GPRS 850 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
836.6	190	GSM850	GSM	33.0	33.0	0.090	Left Touch	FCC #1	1	1:8.3	0.154	1.000	**0.154**
836.6	190	GSM850	GSM	33.0	33.0	0.150	Right Touch	FCC #1	1	1:8.3	0.132	1.000	0.132
836.6	190	GSM850	GSM	33.0	33.0	-0.180	Left Tilt	FCC #1	1	1:8.3	0.112	1.000	0.112
836.6	190	GSM850	GSM	33.0	33.0	-0.050	Right Tilt	FCC #1	1	1:8.3	0.116	1.000	0.116
836.6	190	GSM850	GPRS	33.0	33.0	0.160	Left Touch	FCC #1	1	1:8.3	0.190	1.000	0.190
836.6	190	GSM850	GPRS	32.0	31.9	0.120	Left Touch	FCC #1	2	1:4.15	0.289	1.023	0.296
836.6	190	GSM850	GPRS	30.0	30.0	-0.030	Left Touch	FCC #1	3	1:2.77	0.285	1.000	0.285
836.6	190	GSM850	GPRS	29.5	29.4	-0.150	Left Touch	FCC #1	4	1:2.075	0.301	1.023	**0.308**
836.6	190	GSM850	GPRS	29.5	29.4	-0.190	Right Touch	FCC #1	4	1:2.075	0.253	1.023	0.259
836.6	190	GSM850	GPRS	29.5	29.4	0.000	Left Tilt	FCC #1	4	1:2.075	0.193	1.023	0.197
836.6	190	GSM850	GPRS	29.5	29.4	-0.060	Right Tilt	FCC #1	4	1:2.075	0.239	1.023	0.245
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram					

Table 12.2 PCS/GPRS 1900 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
1880.0	661	PCS1900	PCS	30.0	30.0	0.110	Left Touch	FCC #1	1	1:8.3	0.059	1.000	**0.059**
1880.0	661	PCS1900	PCS	30.0	30.0	0.060	Right Touch	FCC #1	1	1:8.3	0.041	1.000	0.041
1880.0	661	PCS1900	PCS	30.0	30.0	0.150	Left Tilt	FCC #1	1	1:8.3	0.021	1.000	0.021
1880.0	661	PCS1900	PCS	30.0	30.0	-0.100	Right Tilt	FCC #1	1	1:8.3	0.015	1.000	0.015
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.170	Left Touch	FCC #1	1	1:8.3	0.066	1.000	0.066
1880.0	661	PCS1900	GPRS	28.7	28.7	0.010	Left Touch	FCC #1	2	1:4.15	0.115	1.000	0.115
1880.0	661	PCS1900	GPRS	27.2	27.1	0.190	Left Touch	FCC #1	3	1:2.77	0.118	1.023	0.121
1880.0	661	PCS1900	GPRS	26.0	26.0	0.160	Left Touch	FCC #1	4	1:2.075	0.121	1.000	**0.121**
1880.0	661	PCS1900	GPRS	26.0	26.0	-0.100	Right Touch	FCC #1	4	1:2.075	0.093	1.000	0.093
1880.0	661	PCS1900	GPRS	26.0	26.0	0.040	Left Tilt	FCC #1	4	1:2.075	0.046	1.000	0.046
1880.0	661	PCS1900	GPRS	26.0	26.0	0.170	Right Tilt	FCC #1	4	1:2.075	0.040	1.000	0.040
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram					

Table 12.3 WCDMA 850 Head SAR

MEASUREMENT RESULTS												
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch											
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.040	Left Touch	FCC #1	1:1	0.123	1.000	0.123
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.060	Right Touch	FCC #1	1:1	0.156	1.000	**0.156**
836.6	4183	WCDMA 850	RMC	22.5	22.50	-0.100	Left Tilt	FCC #1	1:1	0.099	1.000	0.099
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.030	Right Tilt	FCC #1	1:1	0.125	1.000	0.125
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram				

Table 12.4 WCDMA 1900 Head SAR

MEASUREMENT RESULTS												
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch											
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.170	Left Touch	FCC #1	1:1	0.140	1.002	**0.140**
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	0.120	Right Touch	FCC #1	1:1	0.134	1.002	0.134
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.030	Left Tilt	FCC #1	1:1	0.046	1.002	0.046
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	0.120	Right Tilt	FCC #1	1:1	0.044	1.002	0.044
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram				

Table 12.5 DTS Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
2437	6	802.11b	DSSS	17.0	16.93	0.100	Left Touch	FCC #1	1	1:1	0.383	1.016	0.389
2437	6	802.11b	DSSS	17.0	16.93	-0.090	Right Touch	FCC #1	1	1:1	0.438	1.016	0.445
2437	6	802.11b	DSSS	17.0	16.93	0.040	Left Tilt	FCC #1	1	1:1	0.461	1.016	**0.468**
2437	6	802.11b	DSSS	17.0	16.93	0.000	Right Tilt	FCC #1	1	1:1	0.453	1.016	0.460
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram					

Table 12.6 NII Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
5200	40	802.11a	OFDM	14.5	12.26	0.000	Left Touch	FCC #1	6	1:1	0.025	1.675	0.042
5200	40	802.11a	OFDM	14.5	12.26	0.000	Right Touch	FCC #1	6	1:1	0.048	1.675	**0.080**
5210	42	802.11ac	OFDM	11.6	11.29	0.160	Right Touch	FCC #1	29.3	1:1	0.020	1.074	0.021
5200	40	802.11a	OFDM	14.5	12.26	0.000	Left Tilt	FCC #1	6	1:1	0.020	1.675	0.033
5200	40	802.11a	OFDM	14.5	12.26	0.000	Right Tilt	FCC #1	6	1:1	0.020	1.675	0.033
5260	52	802.11a	OFDM	14.5	12.79	0.000	Left Touch	FCC #1	6	1:1	0.062	1.483	0.092
5260	52	802.11a	OFDM	14.5	12.79	-0.040	Right Touch	FCC #1	6	1:1	0.088	1.483	**0.131**
5290	58	802.11ac	OFDM	11.6	11.57	0.040	Right Touch	FCC #1	29.3	1:1	0.056	1.007	0.056
5260	52	802.11a	OFDM	14.5	12.79	-0.030	Left Tilt	FCC #1	6	1:1	0.048	1.483	0.071
5260	52	802.11a	OFDM	14.5	12.79	0.000	Right Tilt	FCC #1	6	1:1	0.015	1.483	0.022
5700	140	802.11a	OFDM	14.5	14.04	0.170	Left Touch	FCC #1	6	1:1	0.169	1.112	0.188
5700	140	802.11a	OFDM	14.5	14.04	-0.160	Right Touch	FCC #1	6	1:1	0.260	1.112	**0.289**
5530	106	802.11ac	OFDM	11.6	11.57	-0.140	Right Touch	FCC #1	29.3	1:1	0.067	1.007	0.067
5700	140	802.11a	OFDM	14.5	14.04	0.060	Left Tilt	FCC #1	6	1:1	0.064	1.112	0.071
5700	140	802.11a	OFDM	14.5	14.04	-0.190	Right Tilt	FCC #1	6	1:1	0.068	1.112	0.076
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram					

12.2 Standalone Body-Worn SAR Results

Table 12.8 GSM/PCS/WCDMA Body-Worn SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
836.6	190	GSM850	GSM	33.0	33.0	-0.150	10 mm [Front]	FCC #1	1	1:8.3	0.233	1.000	0.233
836.6	190	GSM850	GSM	33.0	33.0	0.080	10 mm [Rear]	FCC #1	1	1:8.3	0.606	1.000	**0.606**
836.6	190	GSM 850	GPRS	29.5	29.4	0.100	10 mm [Front]	FCC #1	4	1:2.075	0.424	1.023	0.434
824.2	128	GSM 850	GPRS	29.5	29.4	-0.160	10 mm [Rear]	FCC #1	4	1:2.075	1.110	1.023	**1.136**
836.6	190	GSM 850	GPRS	29.5	29.4	-0.020	10 mm [Rear]	FCC #1	4	1:2.075	1.000	1.023	1.023
848.8	251	GSM 850	GPRS	29.5	29.5	0.110	10 mm [Rear]	FCC #1	4	1:2.075	0.759	1.000	0.759
1880.0	661	PCS1900	PCS	30.0	30.0	0.070	10 mm [Front]	FCC #1	1	1:8.3	0.150	1.000	0.150
1880.0	661	PCS1900	PCS	30.0	30.0	0.150	10 mm [Rear]	FCC #1	1	1:8.3	0.440	1.000	**0.440**
1880.0	661	PCS1900	GPRS	26.0	26.0	-0.080	10 mm [Front]	FCC #1	4	1:2.075	0.184	1.000	0.184
1850.2	512	PCS1900	GPRS	26.0	26.0	0.090	10 mm [Rear]	FCC #1	4	1:2.075	0.811	1.000	0.811
1880.0	661	PCS1900	GPRS	26.0	26.0	0.080	10 mm [Rear]	FCC #1	4	1:2.075	1.070	1.000	1.070
1909.8	810	PCS1900	GPRS	26.0	25.9	0.130	10 mm [Rear]	FCC #1	4	1:2.075	1.200	1.023	**1.228**
836.6	4183	WCDMA 850	RMC	22.5	22.50	-0.190	10 mm [Front]	FCC #1	N/A	1:1	0.224	1.000	0.224
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.150	10 mm [Rear]	FCC #1	N/A	1:1	0.460	1.000	**0.460**
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.160	10 mm [Front]	FCC #1	N/A	1:1	0.197	1.002	0.197
1852.4	9262	WCDMA 1900	RMC	22.5	22.45	-0.070	10 mm [Rear]	FCC #1	N/A	1:1	0.876	1.012	0.886
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.170	10 mm [Rear]	FCC #1	N/A	1:1	1.010	1.002	1.012
1907.6	9538	WCDMA 1900	RMC	22.5	22.41	0.000	10 mm [Rear]	FCC #1	N/A	1:1	1.070	1.021	**1.092**
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

Table 12.9 DTS Body-Worn SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
2437	6	802.11b	DSSS	17.0	16.93	0.070	10 mm [Front]	FCC #1	1	1:1	0.155	1.016	0.158
2437	6	802.11b	DSSS	17.0	16.93	0.040	10 mm [Rear]	FCC #1	1	1:1	0.234	1.016	**0.238**
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

Table 12.10 NII Body-Worn SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
5200	40	802.11a	OFDM	14.5	12.26	0.000	10 mm [Front]	FCC #1	1	1:1	0.00691	1.675	0.012
5200	40	802.11a	OFDM	14.5	12.26	-0.030	10 mm [Rear]	FCC #1	1	1:1	0.040	1.675	**0.067**
5210	42	802.11ac	OFDM	11.6	11.29	0.000	10 mm [Rear]	FCC #1	1	1:1	0.037	1.074	0.040
5260	52	802.11a	OFDM	14.5	12.79	0.000	10 mm [Front]	FCC #1	1	1:1	0.015	1.483	0.022
5260	52	802.11a	OFDM	14.5	12.79	-0.120	10 mm [Rear]	FCC #1	1	1:1	0.083	1.483	**0.123**
5290	58	802.11ac	OFDM	11.6	11.57	0.090	10 mm [Rear]	FCC #1	1	1:1	0.016	1.007	0.016
5700	140	802.11a	OFDM	14.5	14.04	-0.040	10 mm [Front]	FCC #1	1	1:1	0.196	1.112	0.218
5700	140	802.11a	OFDM	14.5	14.04	-0.090	10 mm [Rear]	FCC #1	1	1:1	0.227	1.112	**0.252**
5530	106	802.11ac	OFDM	11.6	11.57	-0.030	10 mm [Rear]	FCC #1	1	1:1	0.163	1.007	0.164
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

12.3 Standalone Wireless router SAR Results

Table 12.11 GPRS/WCDMA Hotspot SAR

MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
836.6	190	GSM 850	GPRS	29.5	29.4	0.060	10 mm [Bottom]	FCC #1	4	1:2.075	0.076	1.023	0.078
836.6	190	GSM 850	GPRS	29.5	29.4	0.100	10 mm [Front]	FCC #1	4	1:2.075	0.424	1.023	0.434
836.6	190	GSM 850	GPRS	33.0	33.0	0.110	10 mm [Rear]	FCC #1	1	1:8.3	0.610	1.000	0.610
824.2	128	GSM 850	GPRS	32.0	31.9	0.040	10 mm [Rear]	FCC #1	2	1:4.15	1.010	1.023	1.034
836.6	190	GSM 850	GPRS	32.0	31.9	0.000	10 mm [Rear]	FCC #1	2	1:4.15	0.968	1.023	0.991
848.8	251	GSM 850	GPRS	32.0	31.8	0.010	10 mm [Rear]	FCC #1	2	1:4.15	0.814	1.047	0.852
824.2	128	GSM 850	GPRS	30.0	30.0	-0.160	10 mm [Rear]	FCC #1	3	1:2.77	1.000	1.000	1.000
836.6	190	GSM 850	GPRS	30.0	30.0	-0.010	10 mm [Rear]	FCC #1	3	1:2.77	0.869	1.000	0.869
848.8	251	GSM 850	GPRS	30.0	29.9	-0.030	10 mm [Rear]	FCC #1	3	1:2.77	0.743	1.023	0.760
824.2	128	GSM 850	GPRS	29.5	29.4	-0.160	10 mm [Rear]	FCC #1	4	1:2.075	1.110	1.023	**1.136**
836.6	190	GSM 850	GPRS	29.5	29.4	-0.020	10 mm [Rear]	FCC #1	4	1:2.075	1.000	1.023	1.023
848.8	251	GSM 850	GPRS	29.5	29.5	0.110	10 mm [Rear]	FCC #1	4	1:2.075	0.759	1.000	0.759
836.6	190	GSM 850	GPRS	29.5	29.4	0.050	10 mm [Right]	FCC #1	4	1:2.075	0.451	1.023	0.462
836.6	190	GSM 850	GPRS	29.5	29.4	-0.120	10 mm [Left]	FCC #1	4	1:2.075	0.573	1.023	0.586
824.2	128	GSM 850	GPRS	29.5	29.4	-0.080	10 mm [Rear]	FCC #1	4	1:2.075	1.080	1.023	1.105
1880.0	661	PCS1900	GPRS	26.0	26.0	0.010	10 mm [Bottom]	FCC #1	4	1:2.075	0.607	1.000	0.607
1880.0	661	PCS1900	GPRS	26.0	26.0	-0.080	10 mm [Front]	FCC #1	4	1:2.075	0.184	1.000	0.184
1880.0	661	PCS1900	GPRS	30.0	30.0	0.150	10 mm [Rear]	FCC #1	1	1:8.3	0.442	1.000	0.442
1850.2	512	PCS1900	GPRS	28.7	28.7	0.190	10 mm [Rear]	FCC #1	2	1:4.15	0.631	1.000	0.631
1880.0	661	PCS1900	GPRS	28.7	28.7	0.000	10 mm [Rear]	FCC #1	2	1:4.15	0.792	1.000	0.792
1909.8	810	PCS1900	GPRS	28.7	28.7	-0.050	10 mm [Rear]	FCC #1	2	1:4.15	1.120	1.000	1.120
1850.2	512	PCS1900	GPRS	27.2	27.2	0.140	10 mm [Rear]	FCC #1	3	1:2.77	0.720	1.000	0.720
1880.0	661	PCS1900	GPRS	27.2	27.1	-0.090	10 mm [Rear]	FCC #1	3	1:2.77	1.050	1.023	1.074
1909.8	810	PCS1900	GPRS	27.2	27.1	0.120	10 mm [Rear]	FCC #1	3	1:2.77	1.140	1.023	1.167
1850.2	512	PCS1900	GPRS	26.0	26.0	0.090	10 mm [Rear]	FCC #1	4	1:2.075	0.811	1.000	0.811
1880.0	661	PCS1900	GPRS	26.0	26.0	0.080	10 mm [Rear]	FCC #1	4	1:2.075	1.070	1.000	1.070
1909.8	810	PCS1900	GPRS	26.0	25.9	0.130	10 mm [Rear]	FCC #1	4	1:2.075	1.200	1.023	**1.228**
1880.0	661	PCS1900	GPRS	26.0	26.0	0.120	10 mm [Right]	FCC #1	4	1:2.075	0.123	1.000	0.123
1880.0	661	PCS1900	GPRS	26.0	26.0	-0.060	10 mm [Left]	FCC #1	4	1:2.075	0.054	1.000	0.054
1909.8	810	PCS1900	GPRS	26.0	25.9	-0.000	10 mm [Rear]	FCC #1	4	1:2.075	1.180	1.023	1.207
1909.8	810	PCS1900	GPRS	26.0	25.9	0.030	10 mm [Rear]	FCC #1	4	1:2.075	1.150	1.023	1.177
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

Note: Yellow entries represent measurements with connected earphone cable. / Blue entries represent repeatability measurements.

Table 12.12 GPRS/WCDMA Hotspot SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.080	10 mm [Bottom]	FCC #1	N/A	1:1	0.040	1.000	0.040
836.6	4183	WCDMA 850	RMC	22.5	22.50	-0.190	10 mm [Front]	FCC #1	N/A	1:1	0.224	1.000	0.224
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.150	10 mm [Rear]	FCC #1	N/A	1:1	0.460	1.000	**0.460**
836.6	4183	WCDMA 850	RMC	22.5	22.50	-0.080	10 mm [Right]	FCC #1	N/A	1:1	0.246	1.000	0.246
836.6	4183	WCDMA 850	RMC	22.5	22.50	0.060	10 mm [Left]	FCC #1	N/A	1:1	0.308	1.000	0.308
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.170	10 mm [Bottom]	FCC #1	N/A	1:1	0.657	1.002	0.659
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.160	10 mm [Front]	FCC #1	N/A	1:1	0.197	1.002	0.197
1852.4	9262	WCDMA 1900	RMC	22.5	22.45	-0.070	10 mm [Rear]	FCC #1	N/A	1:1	0.876	1.012	0.886
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.170	10 mm [Rear]	FCC #1	N/A	1:1	1.010	1.002	1.012
1907.6	9538	WCDMA 1900	RMC	22.5	22.41	0.000	10 mm [Rear]	FCC #1	N/A	1:1	1.070	1.021	**1.092**
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.050	10 mm [Right]	FCC #1	N/A	1:1	0.121	1.002	0.121
1880.0	9400	WCDMA 1900	RMC	22.5	22.49	-0.160	10 mm [Left]	FCC #1	N/A	1:1	0.052	1.002	0.052
1907.6	9538	WCDMA 1900	RMC	22.5	22.41	0.140	10 mm [Rear]	FCC #1	N/A	1:1	1.050	1.021	1.072
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

Note: Blue entries represent repeatability measurements.

Table 12.13 W-LAN Hotspot / WIFI Direct SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
2437	6	802.11b	DSSS	17.0	16.93	0.150	10 mm [Top]	FCC #3	1	1:1	0.228	1.016	0.232
2437	6	802.11b	DSSS	17.0	16.93	0.070	10 mm [Front]	FCC #3	1	1:1	0.155	1.016	0.158
2437	6	802.11b	DSSS	17.0	16.93	0.040	10 mm [Rear]	FCC #3	1	1:1	0.234	1.016	**0.238**
2437	6	802.11b	DSSS	17.0	16.93	-0.080	10 mm [Right]	FCC #3	1	1:1	0.032	1.016	0.033
2437	6	802.11b	DSSS	17.0	16.93	0.130	10 mm [Left]	FCC #3	1	1:1	0.037	1.016	0.038
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

12.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC/OET Bulletin 65, Supplement C [June 2001] and FCC KDB Publication447498 D01v05r01.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. This DUT has NFC operations. The NFC antenna is integrated into the back cover. The SAR tests were performed with the battery cover containing the NFC antenna.
4. Liquid tissue depth was at least 15.0 cm for all frequencies.
5. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units
6. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05r01.
7. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
8. Per FCC KDB Publication 648474 D04v01r01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB 865664 D01v01r01, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 14 for variability analysis.

GSM Notes:

1. This device supports GSM VOIP in the head and body-worn configurations, therefore GPRS was additionally evaluated for head and body-worn compliance.
2. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
3. Per FCC KDB Publication 447498 D01v05r01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

WCDMA Notes:

1. WCDMA mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02r02.
2. Body SAR for HSPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSPA active is less than 0.25 dB higher than that measured without HSPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75% of the SAR limit.
3. Per FCC KDB Publication 447498 D01v05r01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. Per April 2013 TCB Workshop notes, full SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
4. When Hotspot is enabled, all 5 GHz bands are disabled. Therefore no 5 GHz WIFI Wireless Router SAR Data was required.
5. 5 GHz WIFI Direct GO is not supported in the 5 GHz band for this device. WIFI Direct GO is supported in the 2.4 GHz band only. The manufacturer expects 2.4 GHz WIFI Direct GO may be used in a similar manner to wireless router usage. Therefore, 2.4 GHz WIFI Direct GO was evaluated for SAR similarly to wireless router SAR procedures in FCC KDB Publication 941225.
6. WIFI transmission was verified using a spectrum analyzer.
7. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other default channels was not required.

13. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r01 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r01 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r01 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} * \frac{\text{(Max Power of channel, mW)}}{\text{Min. Separation Distance, mm}}$$

Table 13.1 Estimated SAR

Mode	Frequency	Maximum Allowed Power		Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2480	8.0	6	10	0.126

Note : Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05r01, the maximum power of the channel was rounded to the nearest mW before calculation.

13.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v05r01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 13.1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Path 1	Path 2
GSM/GPRS, WCDMA	Bluetooth, WIFI

Figure 13.1 Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05r01 3) procedures.

Table 13.2 Simultaneous Transmission Scenarios

Ref.	Simultaneous Transmit Configurations	Head	Body-Worn Accessory	Hot Spot	Note
		IEEE1528, Supp C	Supple-ment C	FCC KDB 941225 D06 Edges/sides	
1	GSM850 Voice + 2.4 GHz WIFI	Yes	Yes	N/A	
2	PCS1900 Voice + 2.4 GHz WIFI	Yes	Yes	N/A	
3	WCDMA 850 + 2.4 GHz WIFI	Yes	Yes	Yes	
4	WCDMA 1900 + 2.4 GHz WIFI	Yes	Yes	Yes	
5	GSM850 Voice + 5 GHz WIFI	Yes	Yes	N/A	
6	PCS1900 Voice + 5 GHz WIFI	Yes	Yes	N/A	
7	WCDMA 850 + 5 GHz WIFI	Yes	Yes	N/A	
8	WCDMA 1900 + 5 GHz WIFI	Yes	Yes	N/A	
9	GSM850 GPRS + 2.4 GHz WIFI	Yes	Yes	Yes	
10	GPRS1900 GPRS + 2.4 GHz WIFI	Yes	Yes	Yes	
11	GSM850 GPRS + 5 GHz WIFI	Yes	Yes	N/A	
12	GPRS1900 GPRS + 5 GHz WIFI	Yes	Yes	N/A	
13	GSM850 Voice + Bluetooth	N/A	Yes	N/A	
14	PCS1900 Voice + Bluetooth	N/A	Yes	N/A	
15	WCDMA 850 + Bluetooth	N/A	Yes	N/A	
16	WCDMA 1900 + Bluetooth	N/A	Yes	N/A	

Notes:
1. 2.4 GHz WIFI is supported Hotspot and WIFI-Direct.
2. 5 GHz WIFI is not supported Hotspot and not supported WIFI-Direct.
3. WCDMA, GPRS is supported Hotspot.
4. Bluetooth and WIFI cannot transmit simultaneously since they share the same chip.
5. GSM and WCDMA cannot transmit simultaneously since they share the same chip.
6. VoIP is supported in WCDMA, GSM.

Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI Direct are specified above.

13.4 Head SAR Simultaneous Transmission Analysis

Table 13.3 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.154	0.389	0.543	Head SAR	Left Touch	0.059	0.389	0.448
	Right Touch	0.132	0.445	0.577		Right Touch	0.041	0.445	0.486
	Left Tilt	0.112	0.468	0.580		Left Tilt	0.021	0.468	0.489
	Right Tilt	0.116	0.460	0.576		Right Tilt	0.015	0.460	0.475

Table 13.4 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GPRS 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.308	0.389	0.697	Head SAR	Left Touch	0.121	0.389	0.510
	Right Touch	0.259	0.445	0.704		Right Touch	0.093	0.445	0.538
	Left Tilt	0.197	0.468	0.665		Left Tilt	0.046	0.468	0.514
	Right Tilt	0.245	0.460	**0.705**		Right Tilt	0.040	0.460	0.500

Table 13.5 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.123	0.389	0.512	Head SAR	Left Touch	0.140	0.389	0.529
	Right Touch	0.156	0.445	0.601		Right Touch	0.134	0.445	0.579
	Left Tilt	0.099	0.468	0.567		Left Tilt	0.046	0.468	0.514
	Right Tilt	0.125	0.460	0.585		Right Tilt	0.044	0.460	0.504

Table 13.6 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.154	0.042	0.196	Head SAR	Left Touch	0.059	0.042	0.101
	Right Touch	0.132	0.080	0.212		Right Touch	0.041	0.080	0.121
	Left Tilt	0.112	0.033	0.145		Left Tilt	0.021	0.033	0.054
	Right Tilt	0.116	0.033	0.149		Right Tilt	0.015	0.033	0.048

Table 13.7 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GPRS 850 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.308	0.042	0.350	Head SAR	Left Touch	0.121	0.042	0.163
	Right Touch	0.259	0.080	0.339		Right Touch	0.093	0.080	0.173
	Left Tilt	0.197	0.033	0.230		Left Tilt	0.046	0.033	0.079
	Right Tilt	0.245	0.033	0.278		Right Tilt	0.040	0.033	0.073

Table 13.8 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.123	0.042	0.165	Head SAR	Left Touch	0.140	0.042	0.182
	Right Touch	0.156	0.080	0.236		Right Touch	0.134	0.080	0.214
	Left Tilt	0.099	0.033	0.132		Left Tilt	0.046	0.033	0.079
	Right Tilt	0.125	0.033	0.158		Right Tilt	0.044	0.033	0.077

Table 13.9 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.154	0.092	0.246	Head SAR	Left Touch	0.059	0.092	0.151
	Right Touch	0.132	0.131	0.263		Right Touch	0.041	0.131	0.172
	Left Tilt	0.112	0.071	0.183		Left Tilt	0.021	0.071	0.092
	Right Tilt	0.116	0.022	0.138		Right Tilt	0.015	0.022	0.037

Table 13.10 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GPRS 850 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.308	0.092	0.400	Head SAR	Left Touch	0.121	0.092	0.213
	Right Touch	0.259	0.131	0.390		Right Touch	0.093	0.131	0.224
	Left Tilt	0.197	0.071	0.268		Left Tilt	0.046	0.071	0.117
	Right Tilt	0.245	0.022	0.267		Right Tilt	0.040	0.022	0.062

Table 13.11 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.123	0.092	0.215	Head SAR	Left Touch	0.140	0.092	0.232
	Right Touch	0.156	0.131	0.287		Right Touch	0.134	0.131	0.265
	Left Tilt	0.099	0.071	0.170		Left Tilt	0.046	0.071	0.117
	Right Tilt	0.125	0.022	0.147		Right Tilt	0.044	0.022	0.066

Table 13.12 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.154	0.188	0.342	Head SAR	Left Touch	0.059	0.188	0.247
	Right Touch	0.132	0.289	0.421		Right Touch	0.041	0.289	0.330
	Left Tilt	0.112	0.071	0.183		Left Tilt	0.021	0.071	0.092
	Right Tilt	0.116	0.076	0.192		Right Tilt	0.015	0.076	0.091

Table 13.13 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GPRS 850 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.308	0.188	0.496	Head SAR	Left Touch	0.121	0.188	0.309
	Right Touch	0.259	0.289	0.548		Right Touch	0.093	0.289	0.382
	Left Tilt	0.197	0.071	0.268		Left Tilt	0.046	0.071	0.117
	Right Tilt	0.245	0.076	0.321		Right Tilt	0.040	0.076	0.116

Table 13.14 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.123	0.188	0.311	Head SAR	Left Touch	0.059	0.188	0.247
	Right Touch	0.156	0.289	0.445		Right Touch	0.041	0.289	0.330
	Left Tilt	0.099	0.071	0.170		Left Tilt	0.021	0.071	0.092
	Right Tilt	0.125	0.076	0.201		Right Tilt	0.015	0.076	0.091

13.5 Body-Worn Simultaneous Transmission Analysis

Table 13.15 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.233	0.158	0.391
Rear Side	GSM 850	0.606	0.238	0.844
Front Side	GPRS 850	0.434	0.158	0.592
Rear Side	GPRS 850	1.136	0.238	1.374
Front Side	PCS 1900	0.150	0.158	0.308
Rear Side	PCS 1900	0.440	0.238	0.678
Front Side	GPRS 1900	0.184	0.158	0.342
Rear Side	GPRS 1900	1.228	0.238	1.466
Front Side	WCDMA 850	0.224	0.158	0.382
Rear Side	WCDMA 850	0.460	0.238	0.698
Front Side	WCDMA 1900	0.197	0.158	0.355
Rear Side	WCDMA 1900	1.092	0.238	1.330

Table 13.16 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.233	0.012	0.245
Rear Side	GSM 850	0.606	0.067	0.673
Front Side	GPRS 850	0.434	0.012	0.446
Rear Side	GPRS 850	1.136	0.067	1.203
Front Side	PCS 1900	0.150	0.012	0.162
Rear Side	PCS 1900	0.440	0.067	0.507
Front Side	GPRS 1900	0.184	0.012	0.196
Rear Side	GPRS 1900	1.228	0.067	1.295
Front Side	WCDMA 850	0.224	0.012	0.236
Rear Side	WCDMA 850	0.460	0.067	0.527
Front Side	WCDMA 1900	0.197	0.012	0.209
Rear Side	WCDMA 1900	1.092	0.067	1.159

Table 13.17 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.233	0.022	0.255
Rear Side	GSM 850	0.606	0.123	0.729
Front Side	GPRS 850	0.434	0.022	0.456
Rear Side	GPRS 850	1.136	0.123	1.259
Front Side	PCS 1900	0.150	0.022	0.172
Rear Side	PCS 1900	0.440	0.123	0.563
Front Side	GPRS 1900	0.184	0.022	0.206
Rear Side	GPRS 1900	1.228	0.123	1.351
Front Side	WCDMA 850	0.224	0.022	0.246
Rear Side	WCDMA 850	0.460	0.123	0.583
Front Side	WCDMA 1900	0.197	0.022	0.219
Rear Side	WCDMA 1900	1.092	0.123	1.215

Table 13.18 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.233	0.218	0.451
Rear Side	GSM 850	0.606	0.252	0.858
Front Side	GPRS 850	0.434	0.218	0.652
Rear Side	GPRS 850	1.136	0.252	1.388
Front Side	PCS 1900	0.150	0.218	0.368
Rear Side	PCS 1900	0.440	0.252	0.692
Front Side	GPRS 1900	0.184	0.218	0.402
Rear Side	GPRS 1900	1.228	0.252	**1.480**
Front Side	WCDMA 850	0.224	0.218	0.442
Rear Side	WCDMA 850	0.460	0.252	0.712
Front Side	WCDMA 1900	0.197	0.218	0.415
Rear Side	WCDMA 1900	1.092	0.252	1.344

Table 13.19 Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.233	0.126	0.359
Rear Side	GSM 850	0.606	0.126	0.732
Front Side	GPRS 850	0.434	0.126	0.560
Rear Side	GPRS 850	1.136	0.126	1.262
Front Side	PCS 1900	0.150	0.126	0.276
Rear Side	PCS 1900	0.440	0.126	0.566
Front Side	GPRS 1900	0.184	0.126	0.310
Rear Side	GPRS 1900	1.228	0.126	1.354
Front Side	WCDMA 850	0.224	0.126	0.350
Rear Side	WCDMA 850	0.460	0.126	0.586
Front Side	WCDMA 1900	0.197	0.126	0.323
Rear Side	WCDMA 1900	1.092	0.126	1.218

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

13.6 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v01r01, the device edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

Table 13.20 Simultaneous Transmission Scenario (Hotspot at 10 mm)

Simult TX	Configuration	GPRS 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	-	0.232	0.232	Body SAR	Top	-	0.232	0.232
	Bottom	0.078	-	0.078		Bottom	0.607	-	0.607
	Front	0.434	0.158	0.592		Front	0.184	0.158	0.342
	Rear	1.136	0.238	1.374		Rear	1.228	0.238	**1.466**
	Right	0.462	0.033	0.495		Right	0.123	0.033	0.156
	Left	0.586	0.038	0.624		Left	0.054	0.038	0.092

Table 13.21 Simultaneous Transmission Scenario (Hotspot at 10 mm)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	-	0.232	0.232	Body SAR	Top	-	0.232	0.232
	Bottom	0.040	-	0.040		Bottom	0.659	-	0.659
	Front	0.224	0.158	0.382		Front	0.197	0.158	0.355
	Rear	0.460	0.238	0.698		Rear	1.092	0.238	1.330
	Right	0.246	0.033	0.279		Right	0.121	0.033	0.154
	Left	0.308	0.038	0.346		Left	0.052	0.038	0.090

13.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r01.

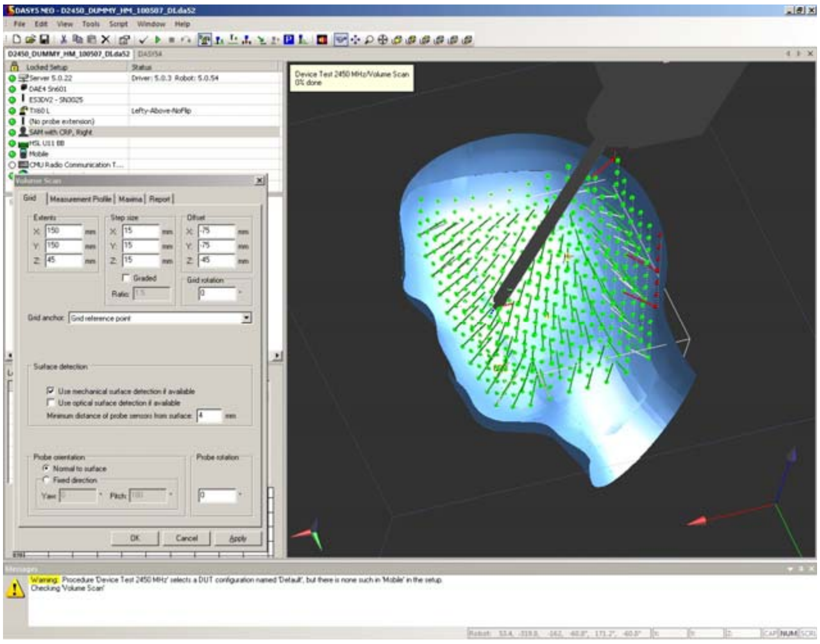
Description of Volume Scan:

In order to determine the EM field distribution in a three-dimensional spatial extension, volume scans are required.
In free space, these assessments can help to gain more information on the performance of the DUT(e.g., to determine the degree of symmetry of the filed radiated from a horn antenna).

For dosimetric application, it is necessary to assess the peak spatial SAR value averaged over a volume. For this purpose, fine resolution volume scans need to be performed at the peak SAR location(s) determined during the Area Scan. In DASY4 software these scans are called Zoom Scan jobs. The default Zoom Scan measures 7 x 7 x 7 points with a step size of 5 mm. Faster evaluations can be achieved with a reduced number of measurement points. For example, a Zoom Scan with a grid step size in x- and y-directions of 7.5 mm (5 x 5 x 7cube configuration) reduces the measurement time to almost half with only 1-2% difference in SAR reading compared to the fine-resolution 7 x 7 x 7 scan.

For SAR evaluations with larger spatial extensions (e.g., within a complete phantom head section)a Volume Scan job should be used.

The Volume Scan job is compatible with DASY4 SAR, PRO and NEO system levels. Volume Scans are used to assess peak SAR and averaged SAR measurement in largely extended 3-dimensionalvolumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location With an Administrator access mode, the grid can be optionally graded in Z-direction, whereby the smallest grid step and the grading ratio can be defined. Chosen grading ratio is automatically adjusted so that the desired extent in Z-direction is fully covered.



Under the Report page, the quantity to be evaluated for an instant report may be selected. This quantity can be: field magnitude, SAR, interpolated SAR or averaged SAR.

SAR Assessment:

Alternative1

- Evaluation Method
  - Maximum summed SAR Value
- Description
  - Easiest and most conservative method to determine the upper limit of multi-band SAR
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Multi-band SAR Value is 0.9 + 1.3 = 2.2

Alternative2

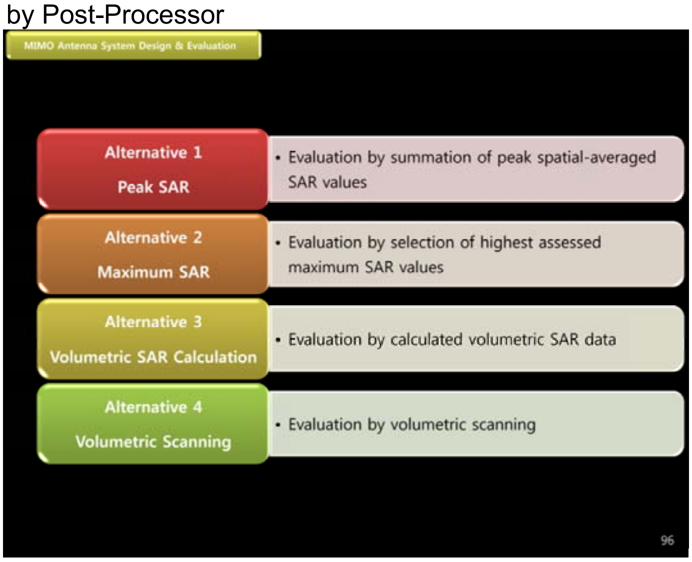
- Evaluation Method
  - Selection of highest assessed maximum SAR Value
- Description
  - Accurate estimate of the multi-band SAR
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Multi-band SAR Value is 1.3

Alternative3

- Evaluation Method
  - Combining existing Area and Zoom Scan results by Post-Processor
- Description
  - Rapid way of obtaining the multi-band SAR. It is always applicable.
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Combining results by Post-Processor

Alternative4

- Evaluation Method
  - Combining existing Area and Zoom Scan results by Post-Processor
- Description
  - The most accurate way of assessing the multi-band SAR and always applicable.
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Combining results by Post-Processor



14. SAR MEASUREMENT VARIABILITY

14.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2. 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).
3. 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.
4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 14.1 Body SAR Measurement Variability Results

Frequency		Mode	Service	# of Time Slots	Spacing [Side]	Measured SAR (1g)	1st Repeated SAR(1g)	Ratio	2nd Repeated SAR(1g)	Ratio	3rd Repeated SAR(1g)	Ratio
MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
824.2	128	GSM 850	GPRS	4	10 mm [Rear]	1.110	1.080	1.03	N/A	N/A	N/A	N/A
1909.8	810	PCS1900	GPRS	4	10 mm [Rear]	1.200	1.150	1.04	N/A	N/A	N/A	N/A
1907.6	9538	WCDMA 1900	RMC	N/A	10 mm [Rear]	1.070	1.050	1.02	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure							**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

14.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664D01v01r01, the standard measurement uncertainty analysis per IEEE 1528-2003 was not required.

15. IEEE P1528 –MEASUREMENT UNCERTAINTIES

835 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.4	Normal	1	0.64	± 4.4 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

835 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.5	Normal	1	0.6	± 4.5 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

1900 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.7	Normal	1	0.6	± 4.7 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

1900 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.64	± 4.1 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
CombinedStandard Uncertainty					**± 12.1 %**	330
Expanded Uncertainty (k=2)					**± 24.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

2450 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.6	Normal	1	0.64	± 4.6 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

2450 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.7	Normal	1	0.64	± 4.7 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5200 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.5	Normal	1	0.64	± 4.5 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5200 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.4	Normal	1	0.6	± 4.4 %	∞
CombinedStandard Uncertainty					**± 12.4 %**	330
Expanded Uncertainty (k=2)					**± 24.8 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5300 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.6	Normal	1	0.64	± 4.6 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5300 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.7	Normal	1	0.64	± 4.7 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5500 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.6	Normal	1	0.64	± 4.6 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5500 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.7	Normal	1	0.64	± 4.7 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.5	Normal	1	0.6	± 4.5 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5600 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.2	Normal	1	0.64	± 4.2 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.4	Normal	1	0.6	± 4.4 %	∞
CombinedStandard Uncertainty					**± 12.4 %**	330
Expanded Uncertainty (k=2)					**± 24.8 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5600 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.4	Normal	1	0.64	± 4.4 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5800 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.9	Normal	1	0.64	± 4.9 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.6 %**	330
Expanded Uncertainty (k=2)					**± 25.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5800 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.7	Normal	1	0.64	± 4.7 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

16.CONCLUSION

Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect toall parameters subject to the test. The test results and statements relate only to the item(s)tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role impossible biological effect are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease).

Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

17. REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.

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Attachment 1. – Probe Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Digital EMC (Dymstec)**

Certificate No: **EX3-3930_Sep13**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3930
Calibration procedure(s)	QA CAL-01.v9, QA CAL-12.v8, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	September 10, 2013

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)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	4-Sep-13 (No. DAE4-660_Sep13)	Apr-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-15
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 10, 2013

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

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.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect 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 with CW signal (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; Dx,y,z; VRx,y,z: A, B, C, D* 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 ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values 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 ± 50 MHz to ± 100 MHz.
- *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.

Probe EX3DV4

SN:3930

Manufactured: July 24, 2013
Calibrated: September 10, 2013

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3930

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.42	0.47	0.43	± 10.1 %
DCP (mV)[B]	104.2	102.4	101.6	

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	147.3	±3.0 %
		Y	0.0	0.0	1.0		160.7	
		Z	0.0	0.0	1.0		150.8	

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3930

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	Depth (mm)	Unct. (k=2)
450	43.5	0.87	11.77	11.77	11.77	0.17	2.04	± 13.4 %
600	42.7	0.88	11.59	11.59	11.59	0.12	1.20	± 13.4 %
750	41.9	0.89	10.43	10.43	10.43	0.35	0.84	± 12.0 %
835	41.5	0.90	10.04	10.04	10.04	0.53	0.68	± 12.0 %
900	41.5	0.97	9.95	9.95	9.95	0.31	0.96	± 12.0 %
1750	40.1	1.37	8.77	8.77	8.77	0.36	0.88	± 12.0 %
1900	40.0	1.40	8.52	8.52	8.52	0.37	0.85	± 12.0 %
2300	39.5	1.67	8.10	8.10	8.10	0.51	0.72	± 12.0 %
2450	39.2	1.80	7.65	7.65	7.65	0.49	0.76	± 12.0 %
2600	39.0	1.96	7.50	7.50	7.50	0.34	0.89	± 12.0 %
3500	37.9	2.91	7.23	7.23	7.23	0.52	0.83	± 13.1 %
5200	36.0	4.66	5.22	5.22	5.22	0.30	1.80	± 13.1 %
5300	35.9	4.76	4.89	4.89	4.89	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.99	4.99	4.99	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.79	4.79	4.79	0.30	1.90	± 13.1 %
5800	35.3	5.27	4.71	4.71	4.71	0.40	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies 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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3930

Calibration Parameter Determined in Body Tissue Simulating Media

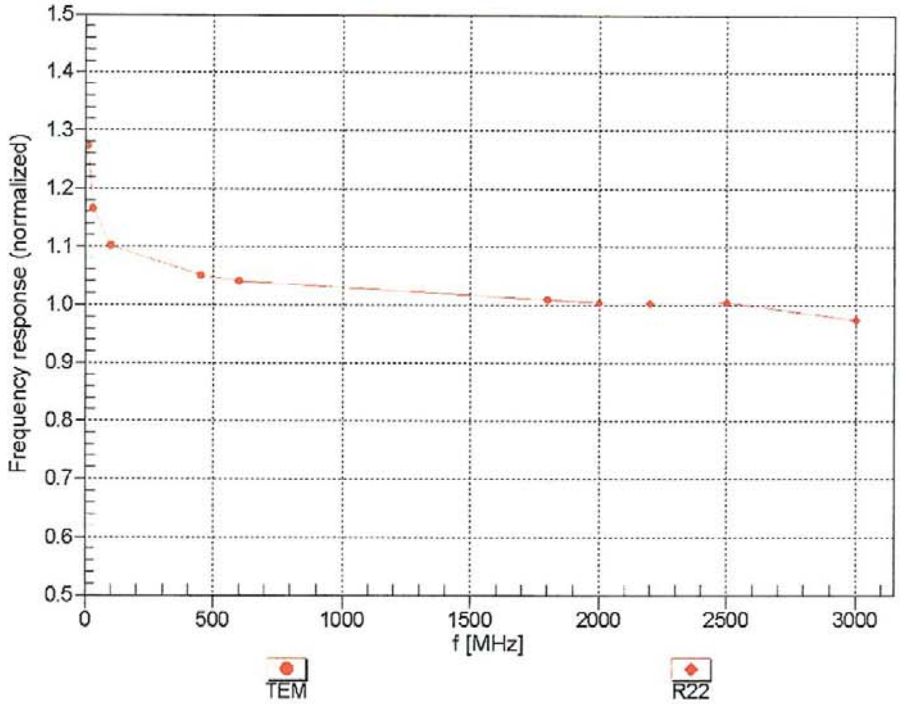
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	11.48	11.48	11.48	0.05	1.80	± 13.4 %
600	56.1	0.95	10.50	10.50	10.50	0.12	1.20	± 13.4 %
750	55.5	0.96	10.02	10.02	10.02	0.42	0.86	± 12.0 %
835	55.2	0.97	10.01	10.01	10.01	0.39	0.89	± 12.0 %
900	55.0	1.05	9.77	9.77	9.77	0.76	0.63	± 12.0 %
1750	53.4	1.49	8.25	8.25	8.25	0.34	0.88	± 12.0 %
1900	53.3	1.52	7.89	7.89	7.89	0.35	0.89	± 12.0 %
2300	52.9	1.81	7.66	7.66	7.66	0.63	0.65	± 12.0 %
2450	52.7	1.95	7.48	7.48	7.48	0.80	0.50	± 12.0 %
2600	52.5	2.16	7.21	7.21	7.21	0.80	0.50	± 12.0 %
3500	51.3	3.31	6.63	6.63	6.63	0.62	0.82	± 13.1 %
5200	49.0	5.30	4.61	4.61	4.61	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.31	4.31	4.31	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.00	4.00	4.00	0.55	1.90	± 13.1 %
5600	48.5	5.77	3.94	3.94	3.94	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.14	4.14	4.14	0.55	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies 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.

EX3DV4– SN:3930 September 10, 2013

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

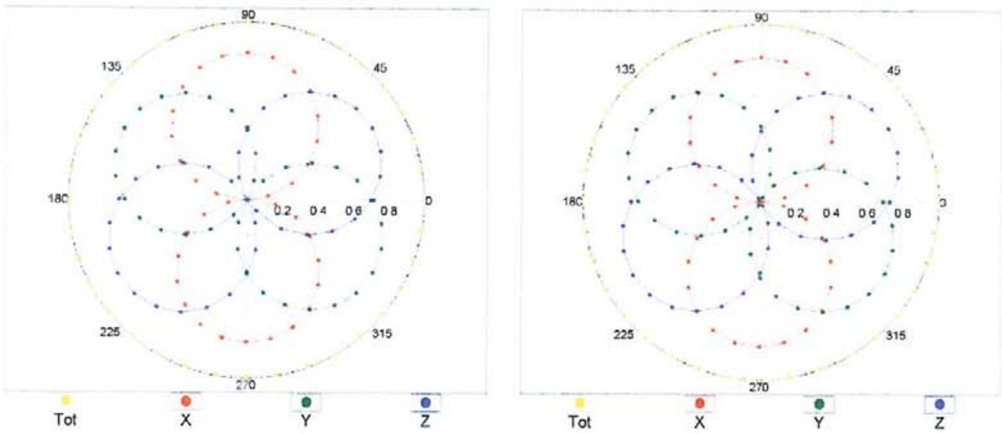


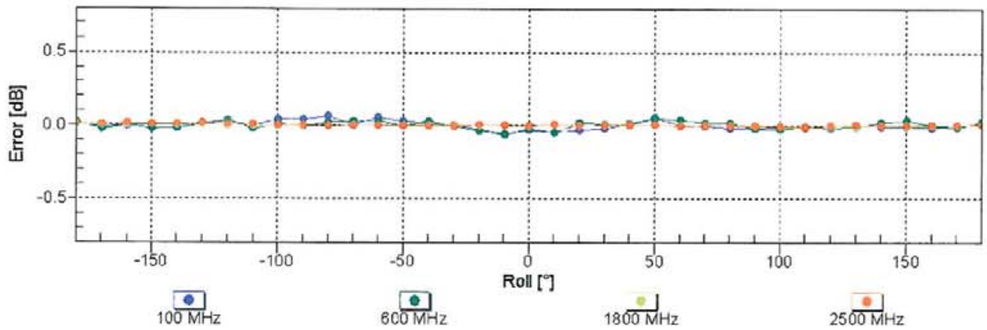
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: EX3-3930_Sep13 Page 7 of 11

Receiving Pattern (ϕ), ϑ = 0°

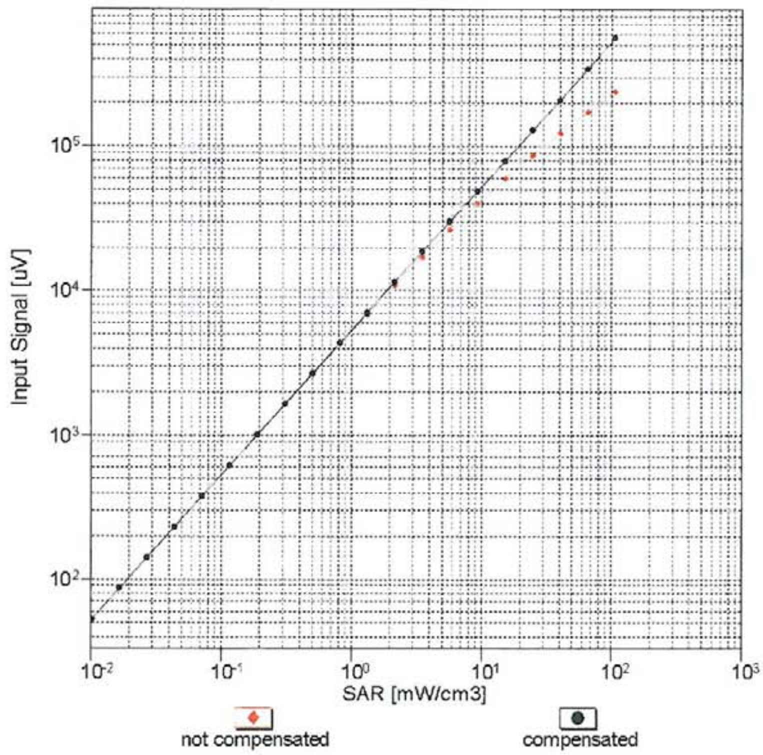
f=600 MHz,TEM f=1800 MHz,R22

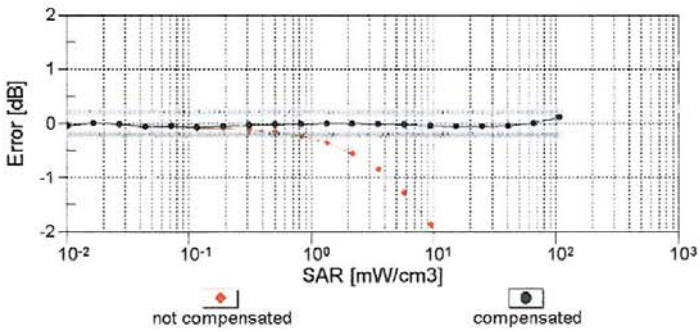




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



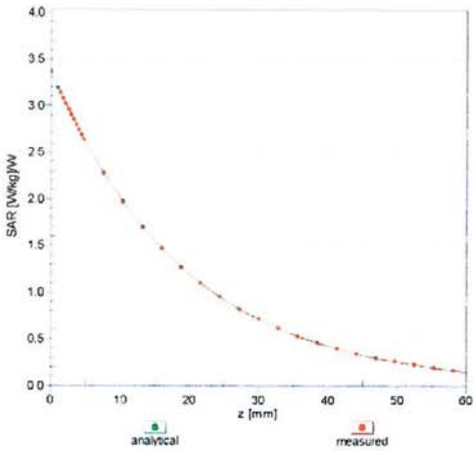


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

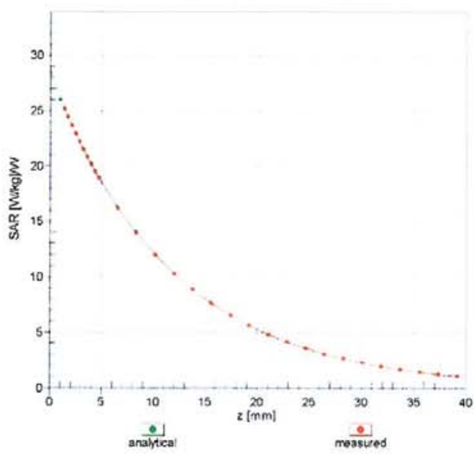
EX3DV4– SN:3930 September 10, 2013

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

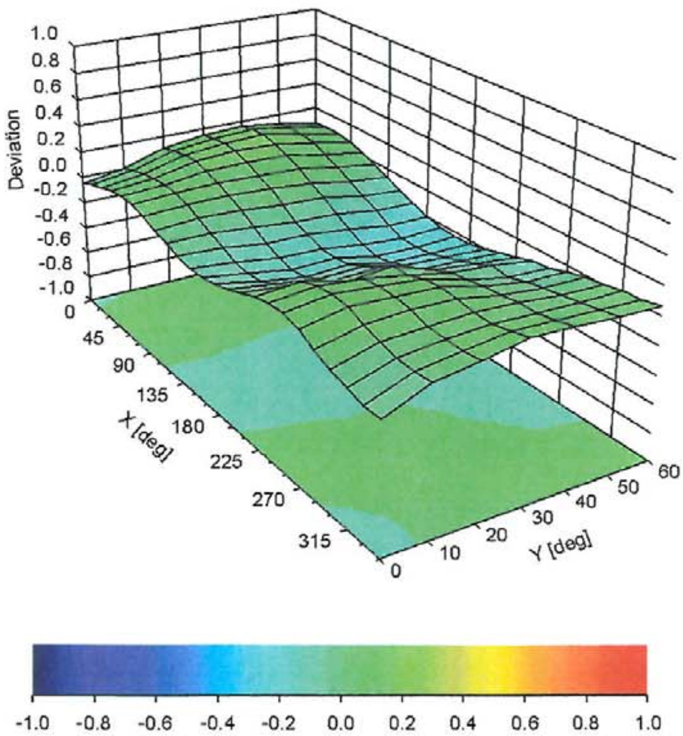


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3930

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-59.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Attachment 2. – Dipole Calibration Data

Calibration Laboratory of
Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Client **Digital EMC (Dymstec)**

Certificate No: **D835V2-464_Mar12**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 464
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 14, 2012

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)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: March 14, 2012

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D835V2-464_Mar12 Page 1 of 8

Calibration Laboratory of
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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.5 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.33 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.40 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.16 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.53 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.32 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω - 2.2 jΩ
Return Loss	- 32.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5 Ω - 4.0 jΩ
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.382 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
Manufactured on	March 27, 2002

DASY5 Validation Report for Head TSL

Date: 14.03.2012

Test Laboratory: SPEAG, Zurich, Switzerland

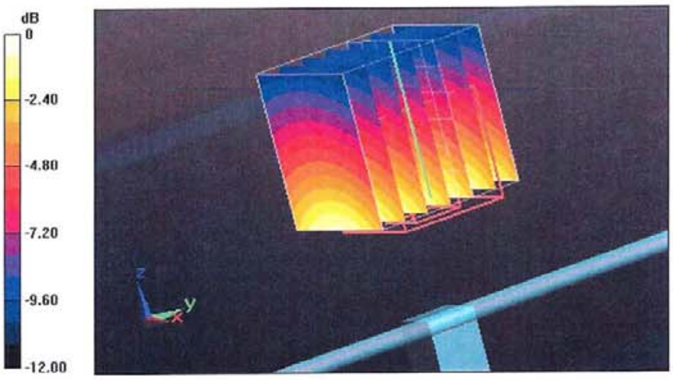
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 464

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

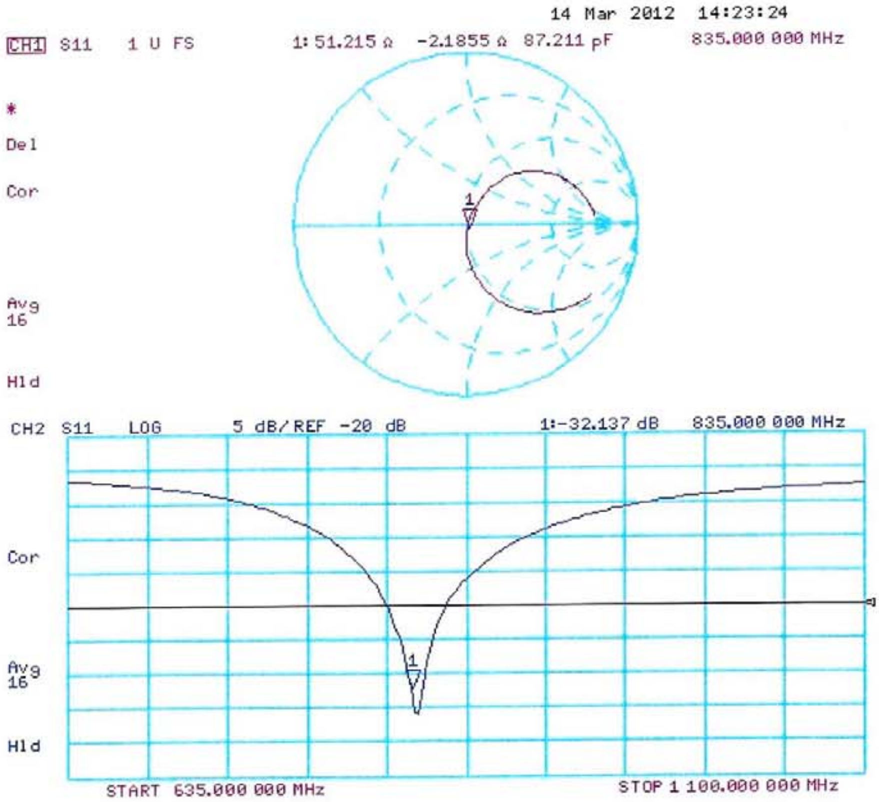
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.936 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 3.4190
SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



0 dB = 2.710mW/g = 8.66 dB mW/g

Certificate No: D835V2-464_Mar12 Page 5 of 8

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-464_Mar12 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 14.03.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 464

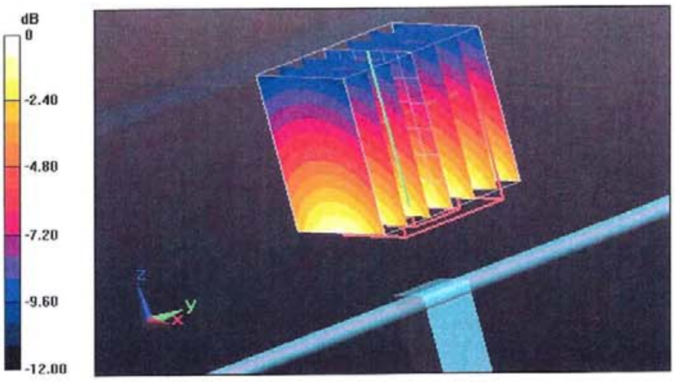
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

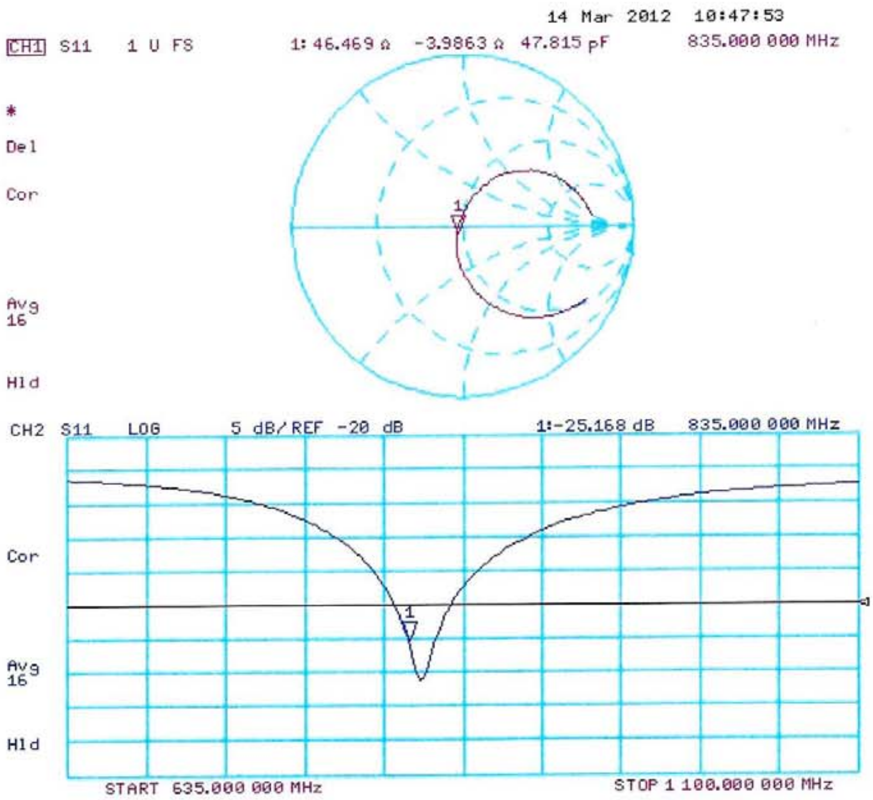
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.242 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.5300
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.61 mW/g
Maximum value of SAR (measured) = 2.840 mW/g



0 dB = 2.840mW/g = 9.07 dB mW/g

Impedance Measurement Plot for Body TSL



Certificate No: D835V2-464_Mar12 Page 8 of 8

Calibration Laboratory of
Schmid & Partner
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Accreditation No.: **SCS 108**

Client **Digital EMC (Dymstec)**

Certificate No: **D1900V2-5d029_Mar12**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d029
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 16, 2012

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)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 16, 2012

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.43 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**38.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.99 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.85 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**39.6 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.22 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 0.6 jΩ
Return Loss	- 30.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.6 Ω - 2.7 jΩ
Return Loss	- 25.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 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
Manufactured on	December 17, 2002