Body SAR Test Result

System & Position								DUT Configuration			SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	RB#	RB offset	Antenna Manufacturer	Ant Status	Power Reduction	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 41	QPSK20M	Bottom of Laptop	17	40620	1	0	Speed	Ant 1	w/o	-	1.00	24.00	23.40	1.15	0.18	0.386	0.44
	LTE 41	QPSK20M	Bottom of Laptop	17	40620	50	0	Speed	Ant 1	w/o	-	1.00	23.00	22.44	1.14	0.15	0.291	0.33
12	LTE 41	QPSK20M	Bottom of Laptop	0	40620	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.92	1.02	0.04	0.678	0.69
	LTE 41	QPSK20M	Bottom of Laptop	0	40620	50	0	Speed	Ant 1	w/	-	1.00	17.00	16.82	1.04	0.1	0.49	0.51
	LTE 41	QPSK20M	Bottom of Laptop	0	39790	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.49	1.12	-0.09	0.59	0.66
	LTE 41	QPSK20M	Bottom of Laptop	0	39750	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.31	1.17	0.12	0.578	0.68
	LTE 41	QPSK20M	Bottom of Laptop	0	40185	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.57	1.10	0.13	0.612	0.67
	LTE 41	QPSK20M	Bottom of Laptop	0	41055	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.79	1.05	-0.18	0.581	0.61
	LTE 41	QPSK20M	Bottom of Laptop	0	41490	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.71	1.07	-0.18	0.573	0.61
	LTE 41	QPSK20M	Bottom of Laptop	0	40620	1	0	WNC	Ant 1	w/	-	1.00	18.00	17.92	1.02	0.19	0.389	0.40
	LTE 41	QPSK20M	Bottom of Laptop	0	40620	1	0	Auden	Ant 1	w/	-	1.00	18.00	17.92	1.02	0.12	0.466	0.48
	LTE 41 - HPUE	QPSK20M	Bottom of Laptop	17	40620	1	0	Speed	Ant 1	w/o	-	1.00	27.00	26.48	1.13	-0.07	0.343	0.39
	LTE 42	QPSK20M	Bottom of Laptop	17	43340	1	0	Speed	Ant 1	w/o	-	1.00	24.00	23.77	1.05	-0.03	0.451	0.47
	LTE 42	QPSK20M	Bottom of Laptop	17	43340	50	0	Speed	Ant 1	w/o	-	1.00	23.00	22.74	1.06	-0.18	0.426	0.45
42	LTE 42	QPSK20M	Bottom of Laptop	0	43340	1	0	Speed	Ant 1	w/	-	1.00	21.00	20.93	1.02	0.12	0.549	0.56
	LTE 42	QPSK20M	Bottom of Laptop	0	43340	50	0	Speed	Ant 1	w/	-	1.00	20.00	19.85	1.04	0.14	0.393	0.41
	LTE 42	QPSK20M	Bottom of Laptop	0	43190	1	0	Speed	Ant 1	w/	-	1.00	21.00	20.82	1.04	0.03	0.482	0.50
	LTE 42	QPSK20M	Bottom of Laptop	0	43490	1	0	Speed	Ant 1	w/	-	1.00	21.00	20.76	1.06	0.11	0.453	0.48
	LTE 42	QPSK20M	Bottom of Laptop	0	43340	1	0	WNC	Ant 1	w/	-	1.00	21.00	20.93	1.02	-0.13	0.516	0.53
	LTE 42	QPSK20M	Bottom of Laptop	0	43340	1	0	Auden	Ant 1	w/	-	1.00	21.00	20.93	1.02	-0.05	0.531	0.54
	LTE 43	QPSK20M	Bottom of Laptop	17	44215	1	0	Speed	Ant 1	w/o	-	1.00	24.00	23.45	1.14	-0.05	0.442	0.50
	LTE 43	QPSK20M	Bottom of Laptop	17	44215	50	0	Speed	Ant 1	w/o	-	1.00	23.00	22.42	1.14	-0.08	0.376	0.43
43	LTE 43	QPSK20M	Bottom of Laptop	0	44215	1	0	Speed	Ant 1	w/	-	1.00	21.00	20.74	1.06	0.09	0.522	0.55
	LTE 43	QPSK20M	Bottom of Laptop	0	44215	50	0	Speed	Ant 1	w/	-	1.00	20.00	19.81	1.04	0.03	0.371	0.39
	LTE 43	QPSK20M	Bottom of Laptop	0	44190	1	0	Speed	Ant 1	w/	-	1.00	21.00	20.66	1.08	0.16	0.461	0.50
	LTE 43	QPSK20M	Bottom of Laptop	0	44240	1	0	Speed	Ant 1	w/	-	1.00	21.00	20.61	1.09	0.02	0.463	0.50
	LTE 43	QPSK20M	Bottom of Laptop	0	44215	1	0	WNC	Ant 1	w/	-	1.00	21.00	20.74	1.06	0.03	0.471	0.50
	LTE 43	QPSK20M	Bottom of Laptop	0	44215	1	0	Auden	Ant 1	w/	-	1.00	21.00	20.74	1.06	-0.12	0.497	0.53
	LTE 48	QPSK20M	Bottom of Laptop	17	55780	1	0	Speed	Ant 1	w/o	-	1.00	22.00	21.45	1.14	-0.11	0.151	0.17
	LTE 48	QPSK20M	Bottom of Laptop	17	55780	50	0	Speed	Ant 1	w/o	-	1.00	21.00	20.49	1.12	0.09	0.125	0.14
	LTE 48	QPSK20M	Bottom of Laptop	0	55780	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.58	1.10	-0.16	0.388	0.43
	LTE 48	QPSK20M	Bottom of Laptop	0	55780	50	0	Speed	Ant 1	w/	-	1.00	17.00	16.55	1.11	0.03	0.328	0.36
	LTE 48	QPSK20M	Bottom of Laptop	0	55340	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.53	1.11	0.15	0.345	0.38
13	LTE 48	QPSK20M	Bottom of Laptop	0	56210	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.50	1.12	0.14	0.417	0.47
	LTE 48	QPSK20M	Bottom of Laptop	0	56640	1	0	Speed	Ant 1	w/	-	1.00	18.00	17.27	1.18	0.16	0.355	0.42
	LTE 48	QPSK20M	Bottom of Laptop	0	56210	1	0	WNC	Ant 1	w/	-	1.00	18.00	17.50	1.12	-0.03	0.236	0.26
	LTE 48	QPSK20M	Bottom of Laptop	0	56210	1	0	Auden	Ant 1	w/	-	1.00	18.00	17.50	1.12	-0.01	0.394	0.44

Body SAR Test Result

System & Position								DUT Configuration			SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	RB#	RB offset	Antenna Manufacturer	Ant Status	Power Reduction	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	17	518598	1	1	Speed	Ant 1	w/o	-	1.00	24.00	22.94	1.28	0.08	0.187	0.24
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	17	518598	135	69	Speed	Ant 1	w/o	-	1.00	24.00	22.87	1.30	-0.08	0.181	0.24
34	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	518598	1	1	Speed	Ant 1	w/	-	1.00	17.50	17.28	1.05	0.02	0.656	0.69
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	518598	135	69	Speed	Ant 1	w/	-	1.00	17.50	17.04	1.11	0.15	0.21	0.23
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	509202	1	1	Speed	Ant 1	w/	-	1.00	17.50	17.26	1.06	-0.19	0.24	0.25
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	513900	1	1	Speed	Ant 1	w/	-	1.00	17.50	17.08	1.10	0.07	0.543	0.60
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	523302	1	1	Speed	Ant 1	w/	-	1.00	17.50	17.15	1.08	0.1	0.561	0.61
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	528000	1	1	Speed	Ant 1	w/	-	1.00	17.50	17.21	1.07	0.02	0.528	0.56
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	518598	1	1	WNC	Ant 1	w/	-	1.00	17.50	17.28	1.05	-0.01	0.513	0.54
	5GNR-n41	DFT-s QPSK100M	Bottom of Laptop	0	518598	1	1	Auden	Ant 1	w/	-	1.00	17.50	17.28	1.05	-0.11	0.374	0.39
	5GNR-n41 - HPUE	DFT-s QPSK100M	Bottom of Laptop	17	518598	1	1	Speed	Ant 1	w/o	-	1.00	27.00	26.07	1.24	-0.19	0.156	0.19

Body SAR Test Result

System & Position								DUT Configuration			SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	RB#	RB offset	Antenna Manufacturer	Ant Status	Power Reduction	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	17	642888	1	1	Speed	Ant 1	w/o	-	1.00	22.00	21.98	1.00	0.16	0.168	0.17
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	17	642888	50	28	Speed	Ant 1	w/o	-	1.00	22.00	21.80	1.05	-0.07	0.185	0.19
35	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	642888	1	1	Speed	Ant 1	w/	-	1.00	20.00	19.49	1.12	0.03	0.623	0.70
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	642888	50	28	Speed	Ant 1	w/	-	1.00	20.00	19.48	1.13	-0.04	0.492	0.56
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	638000	1	1	Speed	Ant 1	w/	-	1.00	20.00	19.38	1.15	-0.16	0.474	0.55
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	640444	1	1	Speed	Ant 1	w/	-	1.00	20.00	19.42	1.14	0.12	0.571	0.65
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	645332	1	1	Speed	Ant 1	w/	-	1.00	20.00	19.44	1.14	-0.02	0.501	0.57
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	642888	1	1	WNC	Ant 1	w/	-	1.00	20.00	19.49	1.12	-0.06	0.564	0.63
	5GNR-n48	DFT-s QPSK40M	Bottom of Laptop	0	642888	1	1	Auden	Ant 1	w/	-	1.00	20.00	19.49	1.12	0.05	0.618	0.69
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	17	650000	1	1	Speed	Ant 1	w/o	-	1.00	27.00	26.29	1.18	0.07	0.168	0.20
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	17	650000	135	69	Speed	Ant 1	w/o	-	1.00	27.00	25.98	1.26	0.12	0.152	0.19
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	650000	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.49	1.00	0.09	0.491	0.49
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	650000	135	69	Speed	Ant 1	w/	-	1.00	19.50	19.20	1.07	0.15	0.468	0.50
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	633332	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.28	1.05	-0.13	0.623	0.65
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	640000	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.08	1.10	0.07	0.585	0.64
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	641666	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.03	1.11	0.04	0.58	0.64
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	643332	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.26	1.06	-0.18	0.511	0.54
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	653000	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.25	1.06	-0.14	0.611	0.65
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	656000	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.29	1.05	0.13	0.569	0.60
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	659000	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.19	1.07	0.07	0.5	0.54
39	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	662000	1	1	Speed	Ant 1	w/	-	1.00	19.50	19.45	1.01	0.07	0.657	0.66
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	662000	1	1	WNC	Ant 1	w/	-	1.00	19.50	19.45	1.01	0.04	0.562	0.57
	5GNR-n77	DFT-s QPSK100M	Bottom of Laptop	0	662000	1	1	Auden	Ant 1	w/	-	1.00	19.50	19.45	1.01	-0.02	0.594	0.60
											-	1.00	-	-	1		-	-
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	17	650000	1	1	Speed	Ant 1	w/o	-	1.00	27.00	26.45	1.14	-0.14	0.21	0.24
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	17	650000	135	69	Speed	Ant 1	w/o	-	1.00	27.00	26.12	1.22	0.12	0.167	0.20
40	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	650000	1	1	Speed	Ant 1	w/	-	1.00	19.00	18.94	1.01	-0.07	0.678	0.68
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	650000	135	69	Speed	Ant 1	w/	-	1.00	19.00	18.70	1.07	0.12	0.628	0.67
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	633332	1	1	Speed	Ant 1	w/	-	1.00	19.00	18.77	1.05	0.18	0.634	0.67
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	640000	1	1	Speed	Ant 1	w/	-	1.00	19.00	18.78	1.05	-0.14	0.626	0.66
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	641666	1	1	Speed	Ant 1	w/	-	1.00	19.00	18.84	1.04	-0.02	0.637	0.66
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	643332	1	1	Speed	Ant 1	w/	-	1.00	19.00	18.79	1.05	0.12	0.641	0.67
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	650000	1	1	WNC	Ant 1	w/	-	1.00	19.00	18.94	1.01	-0.14	0.622	0.63
	5GNR-n78	DFT-s QPSK100M	Bottom of Laptop	0	650000	1	1	Auden	Ant 1	w/	-	1.00	19.00	18.94	1.01	-0.09	0.587	0.59

Body SAR Test Result

System & Position								DUT Configuration			SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	RB#	RB offset	Antenna Manufacturer	Ant Status	Power Reduction	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WLAN2.4G	802.11b	Bottom of Laptop	0	6			Speed	Ant 0	-	99.17	1.01	14.00	13.99	1.00	0.09	0.293	0.30
	WLAN2.4G	802.11b	Bottom of Laptop	0	6			Speed	Ant 1	-	99.17	1.01	14.00	13.98	1.00	0.15	0.475	0.48
	WLAN2.4G	802.11n HT40	Bottom of Laptop	0	6			Speed	Ant 0+1	-	97.89	1.02	17.00	16.97	1.01	-0.13	0.453	0.47
	WLAN2.4G	802.11b	Bottom of Laptop	0	1			Speed	Ant 1	-	99.17	1.01	14.00	13.97	1.01	0.07	0.402	0.41
	WLAN2.4G	802.11b	Bottom of Laptop	0	11			Speed	Ant 1	-	99.17	1.01	14.00	13.96	1.01	0.04	0.538	0.55
	WLAN2.4G	802.11b	Bottom of Laptop	0	12			Speed	Ant 1	-	99.17	1.01	14.00	13.92	1.02	-0.18	0.561	0.58
20	WLAN2.4G	802.11b	Bottom of Laptop	0	13			Speed	Ant 1	-	99.17	1.01	14.00	13.91	1.02	-0.01	0.614	0.63
	WLAN2.4G	802.11b	Bottom of Laptop	0	13			HB	Ant 1	-	99.17	1.01	14.00	13.91	1.02	-0.11	0.571	0.59
	WLAN2.4G	802.11b	Bottom of Laptop	0	13			Auden	Ant 1	-	99.17	1.01	14.00	13.91	1.02	0.02	0.606	0.62
	WLAN5.3G	802.11ac VHT160	Bottom of Laptop	0	50			Speed	Ant 0	-	96.56	1.04	11.50	11.47	1.01	0.18	0.624	0.66
	WLAN5.3G	802.11ac VHT160	Bottom of Laptop	0	50			Speed	Ant 1	-	97.80	1.02	12.00	11.97	1.01	-0.14	0.632	0.65
21	WLAN5.3G	802.11ac VHT160	Bottom of Laptop	0	50			Speed	Ant 0+1	-	96.89	1.03	14.80	14.73	1.02	-0.02	0.643	0.68
	WLAN5.3G	802.11ac VHT160	Bottom of Laptop	0	50			HB	Ant 0+1	-	96.89	1.03	14.80	14.73	1.02	0.12	0.517	0.54
	WLAN5.3G	802.11ac VHT160	Bottom of Laptop	0	50			Auden	Ant 0+1	-	96.89	1.03	14.80	14.73	1.02	0.07	0.635	0.67
	WLAN5.6G	802.11ac VHT160	Bottom of Laptop	0	**114**			Speed	Ant 0	-	96.56	1.04	11.50	11.46	1.01	-0.03	0.376	0.39
	WLAN5.6G	802.11ac VHT160	Bottom of Laptop	0	**114**			Speed	Ant 1	-	97.80	1.02	13.00	12.97	1.01	0.02	0.548	0.56
22	WLAN5.6G	802.11ac VHT160	Bottom of Laptop	0	**114**			Speed	Ant 0+1	-	96.89	1.03	15.30	15.29	1.00	-0.05	0.587	0.60
	WLAN5.6G	802.11ac VHT160	Bottom of Laptop	0	**114**			HB	Ant 0+1	-	96.89	1.03	15.30	15.29	1.00	0.16	0.453	0.47
	WLAN5.6G	802.11ac VHT160	Bottom of Laptop	0	**114**			Auden	Ant 0+1	-	96.89	1.03	15.30	15.29	1.00	0.04	0.542	0.56
	WLAN5.8G	802.11ac VHT80	Bottom of Laptop	0	155			Speed	Ant 0	-	96.32	1.04	12.00	11.97	1.01	0.05	0.621	0.65
	WLAN5.8G	802.11ac VHT80	Bottom of Laptop	0	155			Speed	Ant 1	-	96.05	1.04	12.00	11.98	1.00	-0.04	0.573	0.60
23	WLAN5.8G	802.11ac VHT80	Bottom of Laptop	0	155			Speed	Ant 0+1	-	97.32	1.03	15.00	14.96	1.01	-0.17	0.633	0.66
	WLAN5.8G	802.11ac VHT80	Bottom of Laptop	0	155			HB	Ant 0+1	-	97.32	1.03	15.00	14.96	1.01	0.12	0.615	0.64
	WLAN5.8G	802.11ac VHT80	Bottom of Laptop	0	155			Auden	Ant 0+1	-	97.32	1.03	15.00	14.96	1.01	0.07	0.594	0.62
	WLAN5.9G	802.11ac VHT160	Bottom of Laptop	0	163			Speed	Ant 0	-	96.56	1.04	12.00	11.97	1.01	0.07	0.602	0.63
	WLAN5.9G	802.11ac VHT160	Bottom of Laptop	0	163			Speed	Ant 1	-	97.80	1.02	12.00	11.98	1.00	-0.06	0.424	0.43
24	WLAN5.9G	802.11ac VHT160	Bottom of Laptop	0	163			Speed	Ant 0+1	-	96.89	1.03	15.00	14.97	1.01	0.01	0.614	0.64
	WLAN5.9G	802.11ac VHT160	Bottom of Laptop	0	163			HB	Ant 0+1	-	96.89	1.03	15.00	14.97	1.01	0.15	0.579	0.60
	WLAN5.9G	802.11ac VHT160	Bottom of Laptop	0	163			Auden	Ant 0+1	-	96.89	1.03	15.00	14.97	1.01	0.13	0.567	0.59
	BT	BR/EDR	Bottom of Laptop	0	0			Speed	Ant 1	-	76.35	1.31	11.00	10.95	1.01	0.07	0.045	0.06
	BT	BR/EDR	Bottom of Laptop	0	39			Speed	Ant 1	-	76.35	1.31	11.00	10.89	1.03	-0.11	0.054	0.07
25	BT	BR/EDR	Bottom of Laptop	0	78			Speed	Ant 1	-	76.35	1.31	11.00	10.86	1.03	0.01	0.062	0.08
	BT	BR/EDR	Bottom of Laptop	0	78			HB	Ant 1	-	76.35	1.31	11.00	10.86	1.03	0.15	0.053	0.07
	BT	BR/EDR	Bottom of Laptop	0	78			Auden	Ant 1	-	76.35	1.31	11.00	10.86	1.03	-0.18	0.054	0.07

Body SAR Test Result																			
System & Position								DUT Configuration			SAR								
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	RB#	RB offset	Antenna Manufacturer	Ant Status	Power Reduction	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
27	RFID	ASK	Bottom of Laptop	0	13.56			Speed	-	-	-	1.00	-	-	1.00	0	<0.001	0.00
	RFID	ASK	Bottom of Laptop	0	13.56			HB	-	-	-	1.00	-	-	1.00	0	<0.001	0.00

SAR and Power Density Test Result

System & Position						DUT Configuration			SAR										Power Density								
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	Antenna Manufacturer	Ant Status	Power Status	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Measured APD W/m^2 (4cm^2)	Scaled APD W/m^2 (4cm^2)	Grid Step [λ]	iPD [W/m2]	Scaling Factor for Measurement Uncertainty	Averaging Area [cm2]	Power Drift [dB]	Normal psPD [W/m2]	Scaled Normal psPD [W/m2]	Total psPD [W/m2]	Scaled Total psPD [W/m2]
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Speed	Ant 0	w/o	97.08	1.03	12.00	11.99	1.00	0.16	0.614	0.63	5.69	5.86									
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Speed	Ant 1	w/o	98.31	1.02	14.00	13.95	1.01	-0.19	0.631	0.65	5.85	6.03	0.0509	33.24	1.545	4.00	-0.07	1.79	2.82	2.59	4.12
26	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Speed	Ant 0+1	w/o	96.70	1.03	16.1	16.07	1.01	0.05	0.653	0.68	6.06	6.3	0.0509	33.37	1.545	4.00	-0.01	1.86	2.96	2.69	4.32
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Speed	Ant 0	LPI	97.08	1.03	12.00	11.99	1.00	-0.08	0.612	0.63	5.67	5.84									
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Speed	Ant 1	LPI	98.31	1.02	14.00	13.95	1.01	0.19	0.617	0.64	5.81	5.99									
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Speed	Ant 0+1	LPI	96.70	1.03	16.10	16.07	1.01	0.11	0.64	0.67	5.93	6.17	0.0509	32.65	1.545	4.00	-0.03	1.81	2.88	2.61	4.19
	UNII-5	802.11be HE320	Bottom of Laptop	0	63	Speed	Ant 0+1	w/o	96.70	1.03	15.00	14.88	1.03	-0.16	0.588	0.62	5.45	5.78									
	UNII-5	802.11be HE320	Bottom of Laptop	0	95	Speed	Ant 0+1	w/o	96.70	1.03	15.00	14.82	1.04	-0.01	0.601	0.64	5.63	6.03									
	UNII-6	802.11be HE160	Bottom of Laptop	0	111	Speed	Ant 0+1	w/o	96.70	1.03	15.00	14.96	1.01	0.03	0.467	0.49	4.33	4.5									
	UNII-7	802.11be HE320	Bottom of Laptop	0	127	Speed	Ant 0+1	w/o	96.70	1.03	15.00	14.95	1.01	0.01	0.219	0.23	2.03	2.11									
	UNII-7	802.11be HE320	Bottom of Laptop	0	159	Speed	Ant 0+1	w/o	96.70	1.03	15.00	14.81	1.04	0.05	0.319	0.34	2.96	3.17									
	UNII-8	802.11be HE320	Bottom of Laptop	0	191	Speed	Ant 0+1	w/o	96.70	1.03	15.00	14.92	1.02	0.07	0.266	0.28	2.46	2.58									
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	WNC	Ant 0+1	w/o	96.70	1.03	16.10	16.07	1.01	0.12	0.648	0.67	6.01	6.25	0.0509	33.11	1.545	4.00	-0.18	1.84	2.93	2.64	4.24
	UNII-5	802.11be HE320	Bottom of Laptop	0	31	Auden	Ant 0+1	w/o	96.70	1.03	16.10	16.07	1.01	-0.11	0.645	0.67	5.98	6.22	0.0509	32.96	1.545	4.00	0.01	1.83	2.91	2.6	4.18

Appendix H. Analysis of Simultaneous Transmission.

The analysis of simultaneous transmission SAR are shown as below.

<Possibilities of Simultaneous Transmission>

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Body Exposure Condition
A	WWAN + WLAN 2.4G + BT + RFID	Yes
B	WWAN + WLAN 5G + BT + RFID	Yes
C	WWAN + WLAN 6G + BT + RFID	Yes

Notes

1. The WLAN 2.4G, 5G and 6G cannot transmit simultaneously.
2. The transmitter of WWAN Ant 1 is more than 20 cm from Bottom of Laptop, there is no requirement for that posotion to evaluate simultaneous transmission.

Simultaneous Transmission SAR Evaluation										
Band	Position	1	2	3	4	5	6	A(1+2+5+6)	B(1+3+5+6)	C(1+4+5+6)
		Max WWAN	Max WLAN 2.4GHz	Max WLAN 5GHz	Max WLAN 6GHz	Max BT	Max RFID	Summimg result 1g SAR W/kg	Summimg result 1g SAR W/kg	Summimg result 1g SAR W/kg
		1g SAR W/kg	1g SAR W/kg	1g SAR W/kg	1g SAR W/kg	1g SAR W/kg	1g SAR W/kg			
LTE 41	Bottom of Laptop	0.69	0.63	0.68	0.68	0.08	0.00	1.40	1.45	1.45
LTE 42	Bottom of Laptop	0.56	0.63	0.68	0.68	0.08	0.00	1.27	1.32	1.32
LTE 43	Bottom of Laptop	0.55	0.63	0.68	0.68	0.08	0.00	1.26	1.31	1.31
LTE 48	Bottom of Laptop	0.47	0.63	0.68	0.68	0.08	0.00	1.18	1.23	1.23
5GNR-n41	Bottom of Laptop	0.69	0.63	0.68	0.68	0.08	0.00	1.40	1.45	1.45
5GNR-n48	Bottom of Laptop	0.70	0.63	0.68	0.68	0.08	0.00	1.41	1.46	1.46
5GNR-n77	Bottom of Laptop	0.66	0.63	0.68	0.68	0.08	0.00	1.37	1.42	1.42
5GNR-n78	Bottom of Laptop	0.68	0.63	0.68	0.68	0.08	0.00	1.39	1.44	1.44

Total Exposure Ratio						
Band	Position	1	4	5	6	C(1+4+5+6)
		Max WWAN	Max WLAN 6GHz	Max BT Ant 1	Max RFID	Total Exposure Ratio
		1g SAR W/kg	4cm^2 W/m^2	1g SAR W/kg	1g SAR W/kg	
LTE 41	Bottom of Laptop	0.69	4.32	0.08	0.00	0.91
LTE 42	Bottom of Laptop	0.56	4.32	0.08	0.00	0.83
LTE 43	Bottom of Laptop	0.55	4.32	0.08	0.00	0.83
LTE 48	Bottom of Laptop	0.34	4.32	0.08	0.00	0.69
5GNR-n41	Bottom of Laptop	0.69	4.32	0.08	0.00	0.91
5GNR-n48	Bottom of Laptop	0.70	4.32	0.08	0.00	0.70
5GNR-n77	Bottom of Laptop	0.66	4.32	0.08	0.00	0.68
5GNR-n78	Bottom of Laptop	0.68	4.32	0.08	0.00	0.69

Appendix J. Calibration of Test Equipment List

Calibration of Test Equipment List are shown as below.

Equipment for SAR Test					
Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	CLA13	1018	Mar. 20, 2023	1 Year
System Validation Dipole	SPEAG	D2450V2	737	Feb. 20, 2023	1 Year
System Validation Dipole	SPEAG	D2600V2	1020	Aug. 18, 2023	1 Year
System Validation Dipole	SPEAG	D3500V2	1007	Jan. 22, 2023	1 Year
System Validation Dipole	SPEAG	D3700V2	1017	Feb. 23, 2023	1 Year
System Validation Dipole	SPEAG	D3900V2	1020	Feb. 23, 2023	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1019	Feb. 22, 2023	1 Year
System Validation Dipole	SPEAG	D6.5GHzV2	1008	Sep. 21, 2023	1 Year
System Verification Source	SPEAG	5G Verification Source 10 GHz	1025	Jan. 19, 2023	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7472	Oct. 23, 2023	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7555	Jul. 19, 2023	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7696	Jan. 25, 2023	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7720	Mar. 23, 2023	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7797	Dec. 12, 2023	1 Year
E-Field Probe	SPEAG	EUmmWV4	9615	Jul. 10, 2023	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1585	Jul. 14, 2023	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1590	Sep. 14, 2023	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1698	Nov. 17, 2023	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1589	May. 24, 2023	1 Year
Universal Radio Communication Tester	Anritsu	MT8821C	6201381727	Aug. 09, 2023	1 Year
Universal Radio Communication Tester	Anritsu	MT8000A	6272278610	Aug. 16, 2023	1 Year
Analong Signal Generator	R&S	SMA100B	104417	Oct. 23, 2023	1 Year
Mini-Circuits Wideband Amplifier	Mini-Circuits	ZVA-183-S+	434502031A	Jul. 07, 2023	1 Year
Power Meter	Anritsu	ML2495A	1218009	Jul. 03, 2023	1 Year
Power Sensor	Anritsu	MA2411B	1207252	Jul. 03, 2023	1 Year
Thermometer	YFE	YF-160A	120702365	Sep. 11, 2023	1 Year
Dielectric Assessment Kit	SPEAG	DAKS-3.5	1092	May. 23, 2023	1 Year
Dielectric Assessment Kit	SPEAG	DAKS_VNA R140	0010917	May. 22, 2023	1 Year
Powersource1	SPEAG	SE_UMS_160 BA	1052	Jul. 13, 2023	1 Year

Appendix Z. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

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)
Accreditation No.: SCS 0108

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client B.V. ADT
Taoyuan City, Taiwan

Certificate No. CLA13-1018_Mar23

CALIBRATION CERTIFICATE

Object: CLA13 - SN: 1018

Calibration procedure(s): QA CAL-15.v10
Calibration Procedure for SAR Validation Sources below 700 MHz

Calibration date: March 20, 2023

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: CC2552 (20x)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3877	06-Jan-23 (No. EX3-3877_Jan23)	Jan-24
DAE4	SN: 654	27-Jan-23 (No. DAE4-654_Jan23)	Jan-24

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter NRP2	SN: 107193	08-Nov-21 (in house check Dec-22)	In house check: Dec-24
Power sensor NRP-Z91	SN: 100922	15-Dec-09 (in house check Dec-22)	In house check: Dec-24
Power sensor NRP-Z91	SN: 100418	01-Jan-04 (in house check Dec-22)	In house check: Dec-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: March 21, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: 2 ± 0.2 mm
EUT Positioning	Touch Position	
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	13 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	55.0	0.75 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	54.1 ± 6 %	0.74 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	1 W input power	0.534 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**0.538 W/kg ± 18.4 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	1 W input power	0.335 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**0.337 W/kg ± 18.0 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω + 2.8 jΩ
Return Loss	- 29.4 dB

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 20.03.2023

Test Laboratory: SPEAG, Zurich, Switzerland

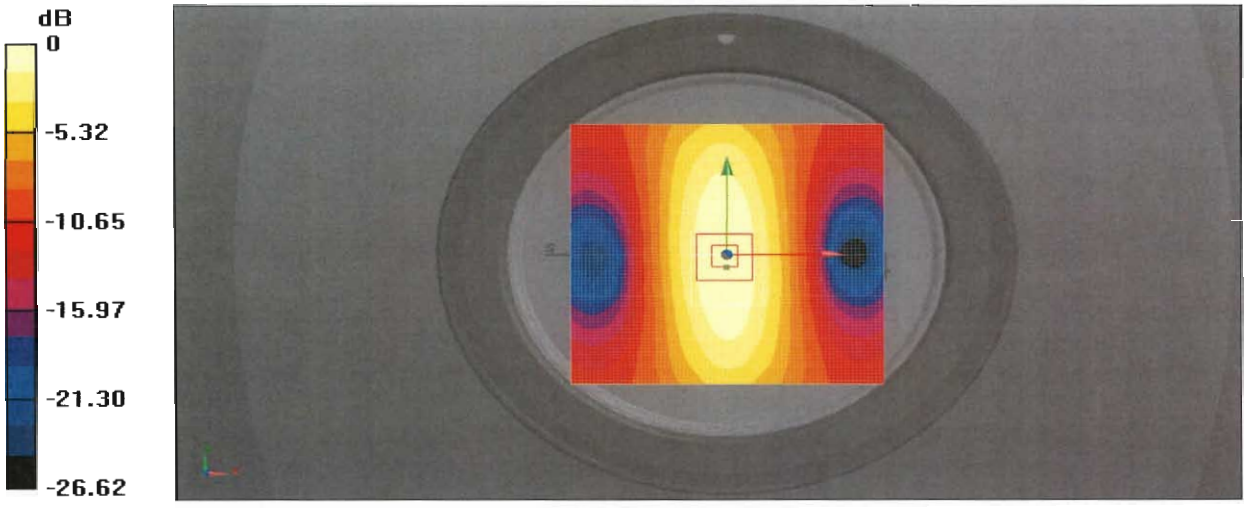
DUT: CLA13; Type: CLA13; Serial: CLA13 - SN: 1018

Communication System: UID 0 - CW; Frequency: 13 MHz
Medium parameters used: f = 13 MHz; σ = 0.74 S/m; εr = 54.1; ρ = 1000 kg/m3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

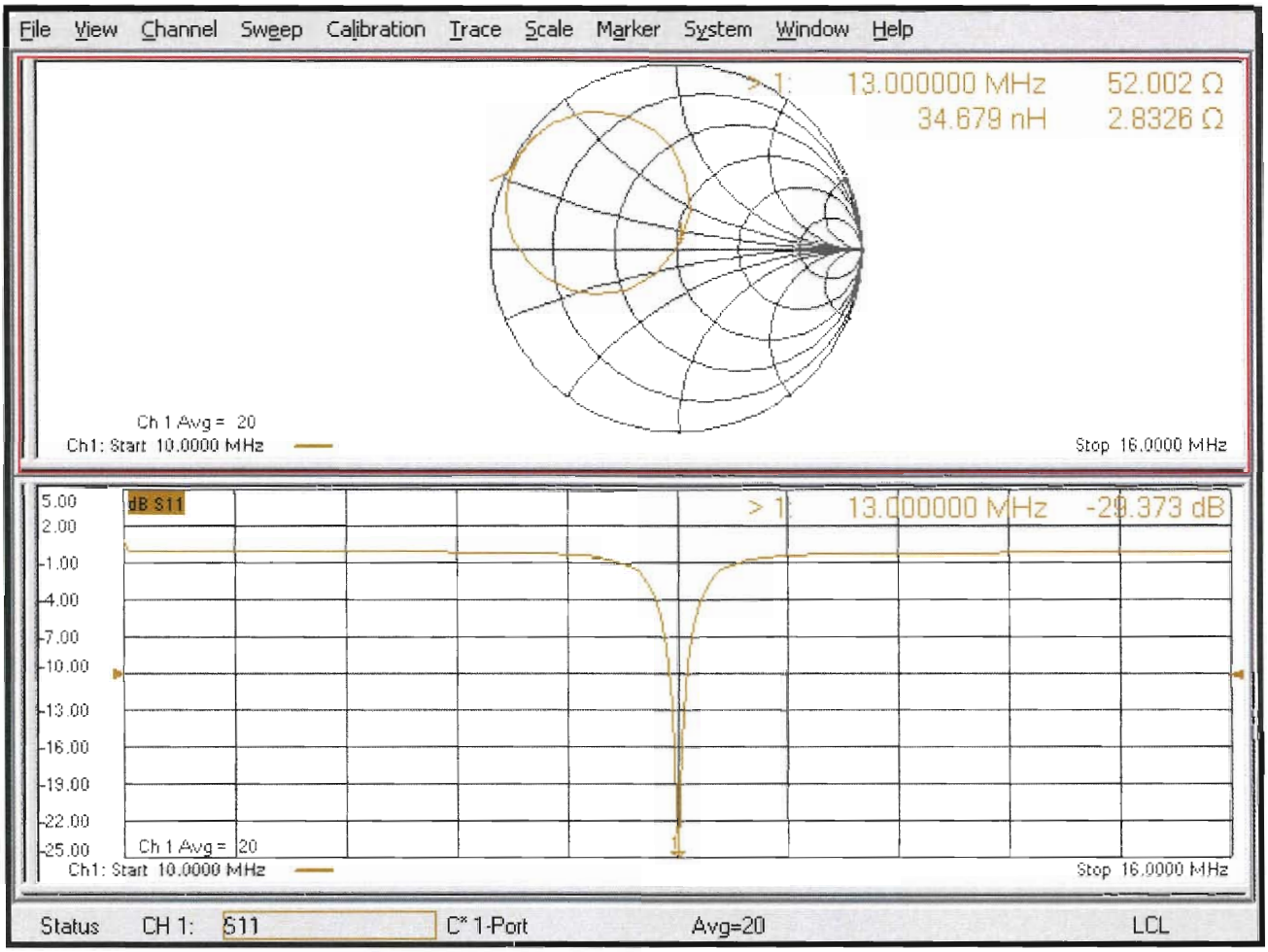
- Probe: EX3DV4 - SN3877; ConvF(15.33, 15.33, 15.33) @ 13 MHz; Calibrated: 06.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 27.01.2023
- Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2034
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

CLA Calibration for HSL-LF Tissue/CLA-13, touch configuration, Pin=1W/Zoom Scan, dist=1.4mm (8x10x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 32.07 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.534 W/kg; SAR(10 g) = 0.335 W/kg
Smallest distance from peaks to all points 3 dB below = 18.4 mm
Ratio of SAR at M2 to SAR at M1 = 79.5%
Maximum value of SAR (measured) = 0.782 W/kg



0 dB = 0.782 W/kg = -1.07 dBW/kg

Impedance Measurement Plot for Head TSL



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 0108

Client B.V. ADT

Certificate No: D2450V2-737_Feb23

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:737
Calibration procedure(s)	QA CAL-05.v12 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	February 20, 2023

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	10-Jan-23 (No. EX3-7349_Jan23)	Jan-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 20, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.3 ± 6 %	1.85 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	12.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**50.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.97 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.8 Ω + 4.9 jΩ
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 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

DASY5 Validation Report for Head TSL

Date: 20.02.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:737

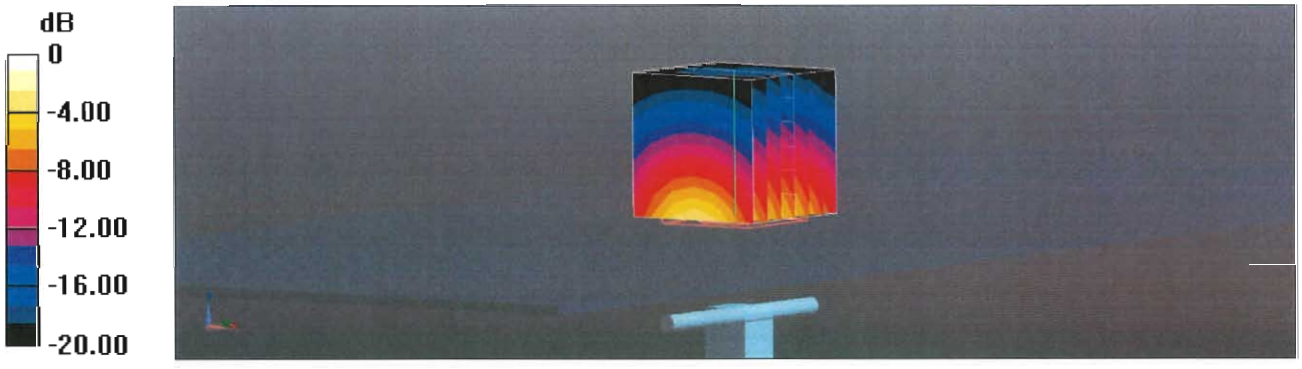
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 S/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

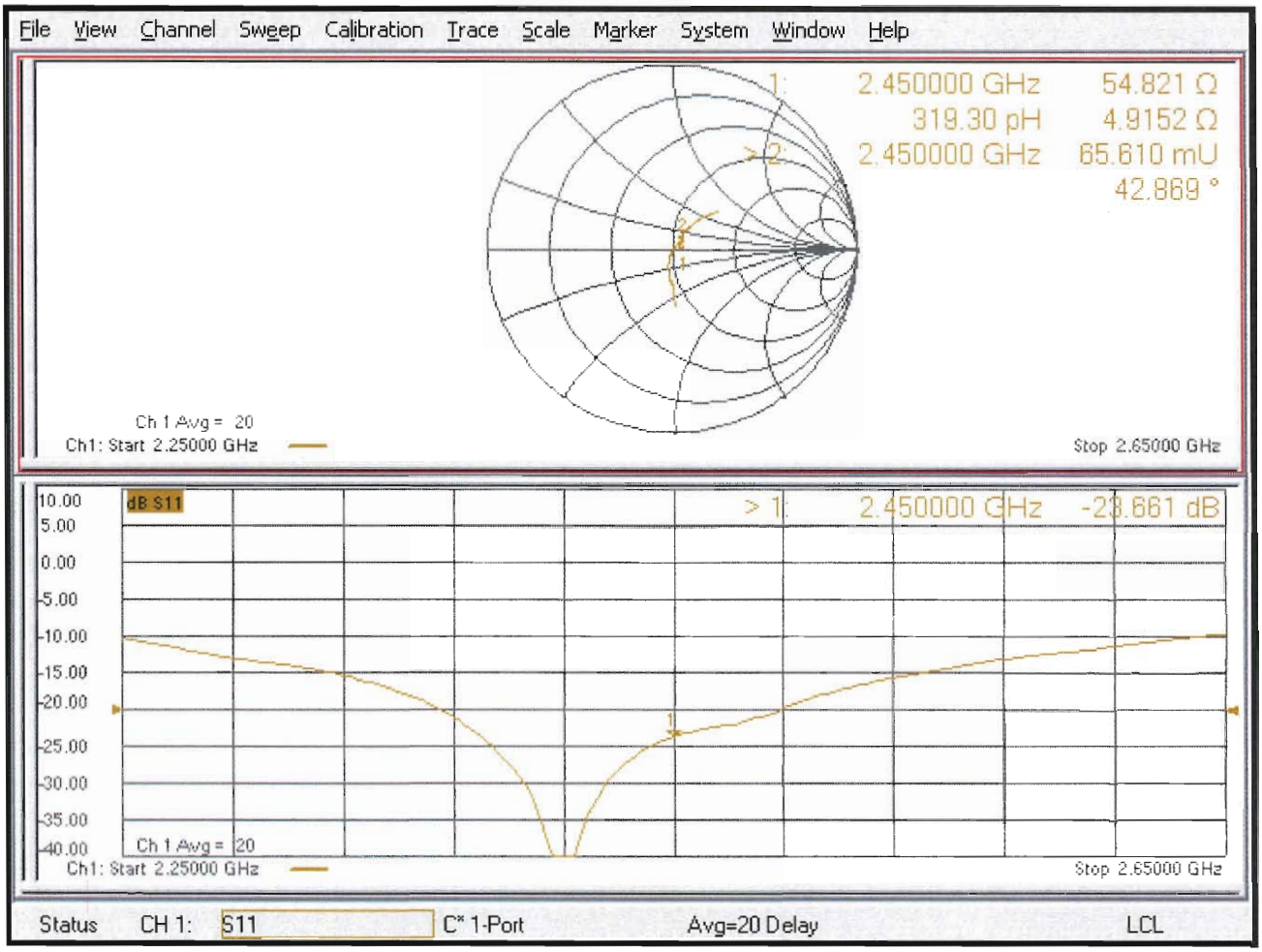
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.6 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 25.0 W/kg
SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.97 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 50.9%
Maximum value of SAR (measured) = 20.9 W/kg



0 dB = 20.9 W/kg = 13.20 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client B.V. ADT
Taoyuan City

Certificate No. D2600V2-1020_Aug23

CALIBRATION CERTIFICATE

Object: D2600V2 - SN:1020

Calibration procedure(s): QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: August 18, 2023

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 NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 7349	10-Jan-23 (No. EX3-7349_Jan23)	Jan-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: August 22, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.6 ± 6 %	1.99 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**55.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.9 Ω - 4.8 jΩ
Return Loss	- 24.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 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

Date: 18.08.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1020

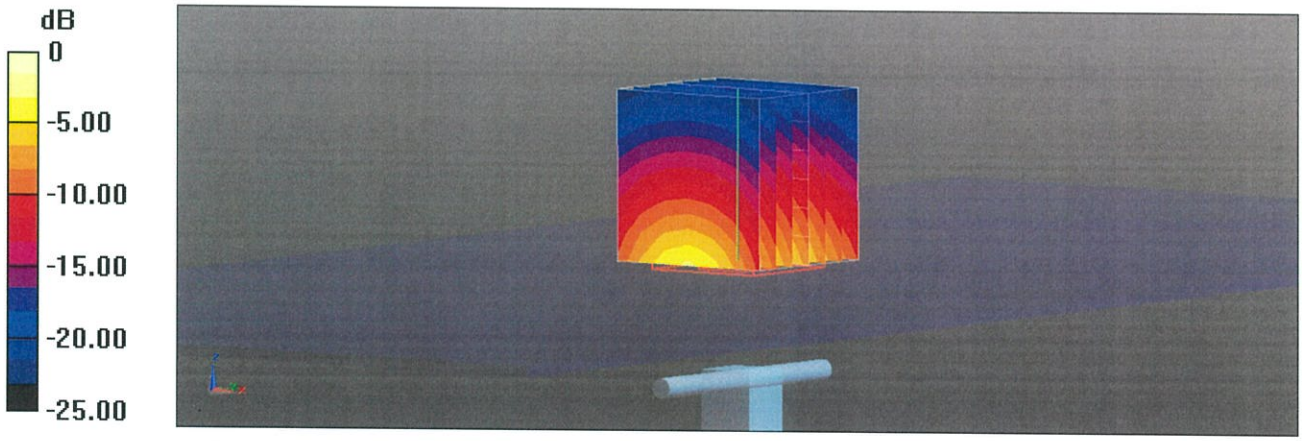
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.99 S/m; ε_r = 37.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.84, 7.84, 7.84) @ 2600 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

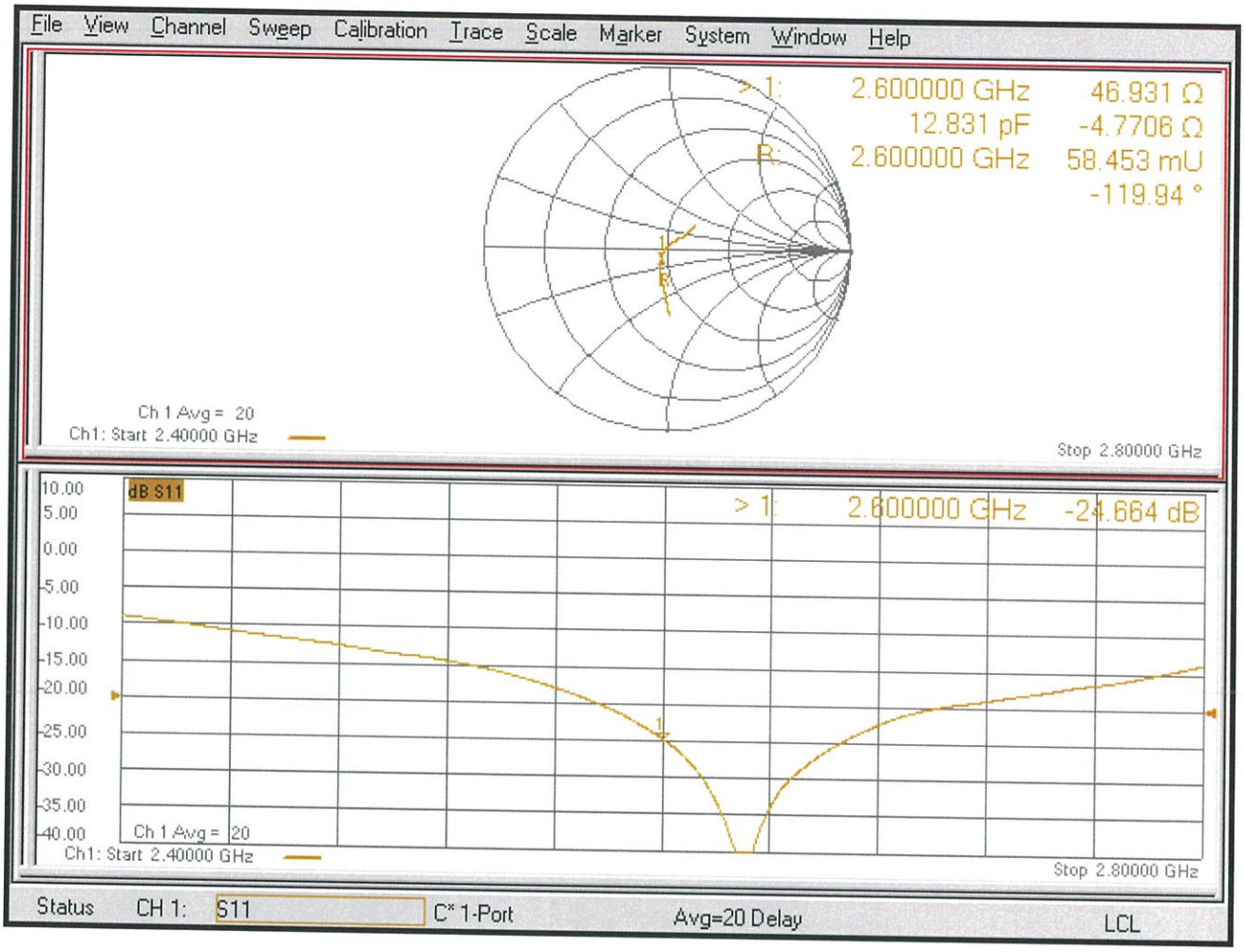
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 119.3 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.43 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 51.3%
Maximum value of SAR (measured) = 23.5 W/kg



0 dB = 23.5 W/kg = 13.71 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client B.V. ADT (Auden)

Certificate No: D3500V2-1007_Jan23

CALIBRATION CERTIFICATE

Object: D3500V2 - SN:1007

Calibration procedure(s): QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: January 22, 2023

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: January 23, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3500 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.9	2.91 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.1 ± 6 %	2.93 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	100 mW input power	6.69 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**66.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.1 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω - 3.9 jΩ
Return Loss	- 27.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.137 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

DASY5 Validation Report for Head TSL

Date: 22.01.2023

Test Laboratory: SPEAG, Zurich, Switzerland

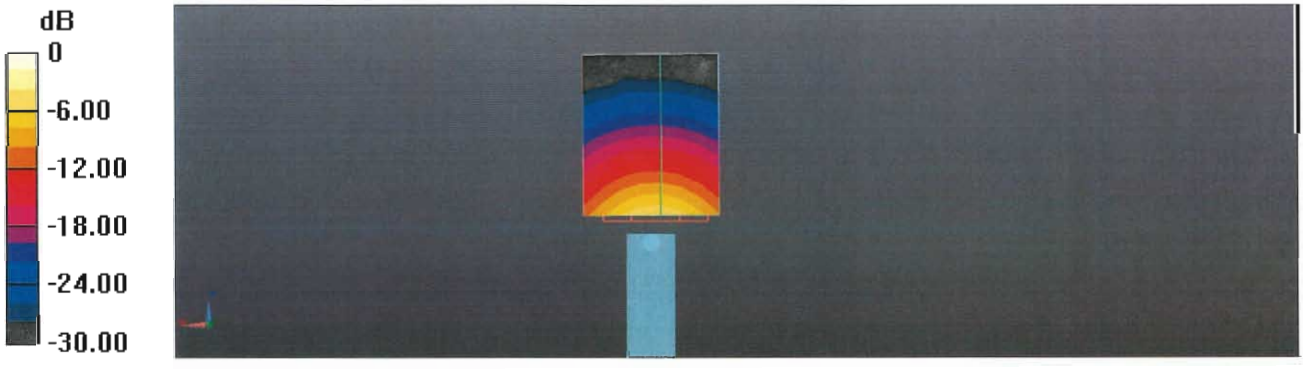
DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1007

Communication System: UID 0 - CW; Frequency: 3500 MHz
Medium parameters used: f = 3500 MHz; σ = 2.93 S/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

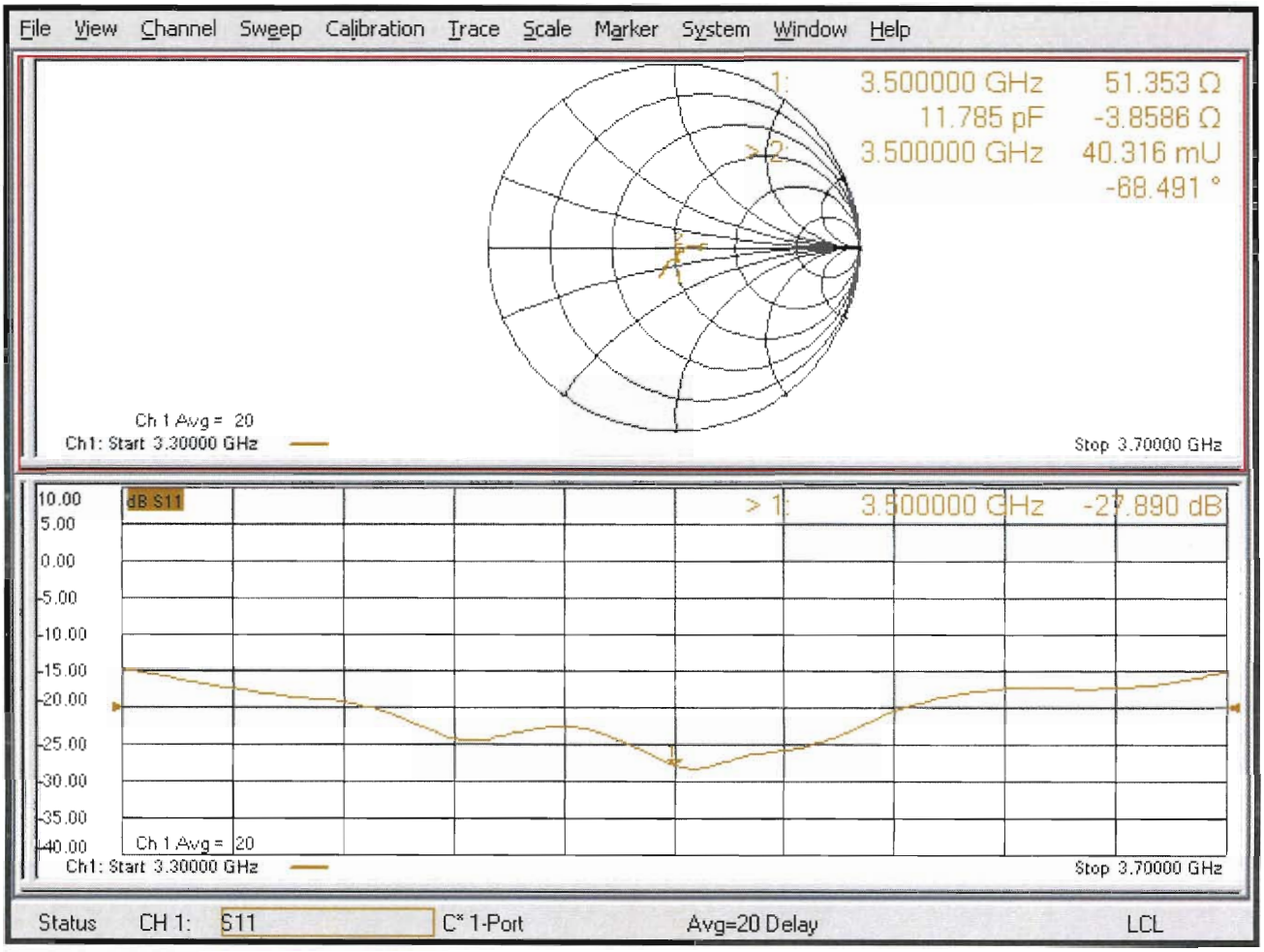
- Probe: EX3DV4 - SN3503; ConvF(7.91, 7.91, 7.91) @ 3500 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3500MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.99 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 6.69 W/kg; SAR(10 g) = 2.50 W/kg
Smallest distance from peaks to all points 3 dB below = 8.2 mm
Ratio of SAR at M2 to SAR at M1 = 75.4%
Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 12.7 W/kg = 11.05 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client B.V. ADT

Certificate No: D3700V2-1017_Feb23

CALIBRATION CERTIFICATE

Object: D3700V2 - SN:1017

Calibration procedure(s): QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: February 23, 2023

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 24, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3700 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.7	3.12 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.2 ± 6 %	3.09 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	100 mW input power	6.48 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**65.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω - 9.0 jΩ
Return Loss	- 20.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.136 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

DASY5 Validation Report for Head TSL

Date: 23.02.2023

Test Laboratory: SPEAG, Zurich, Switzerland

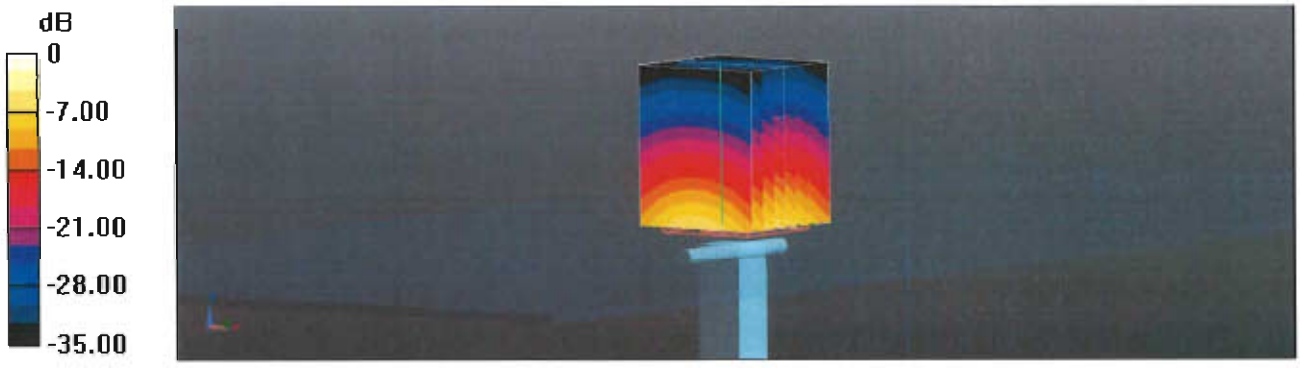
DUT: Dipole 3700 MHz; Type: D3700V2; Serial: D3700V2 - SN:1017

Communication System: UID 0 - CW; Frequency: 3700 MHz
Medium parameters used: f = 3700 MHz; σ = 3.09 S/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

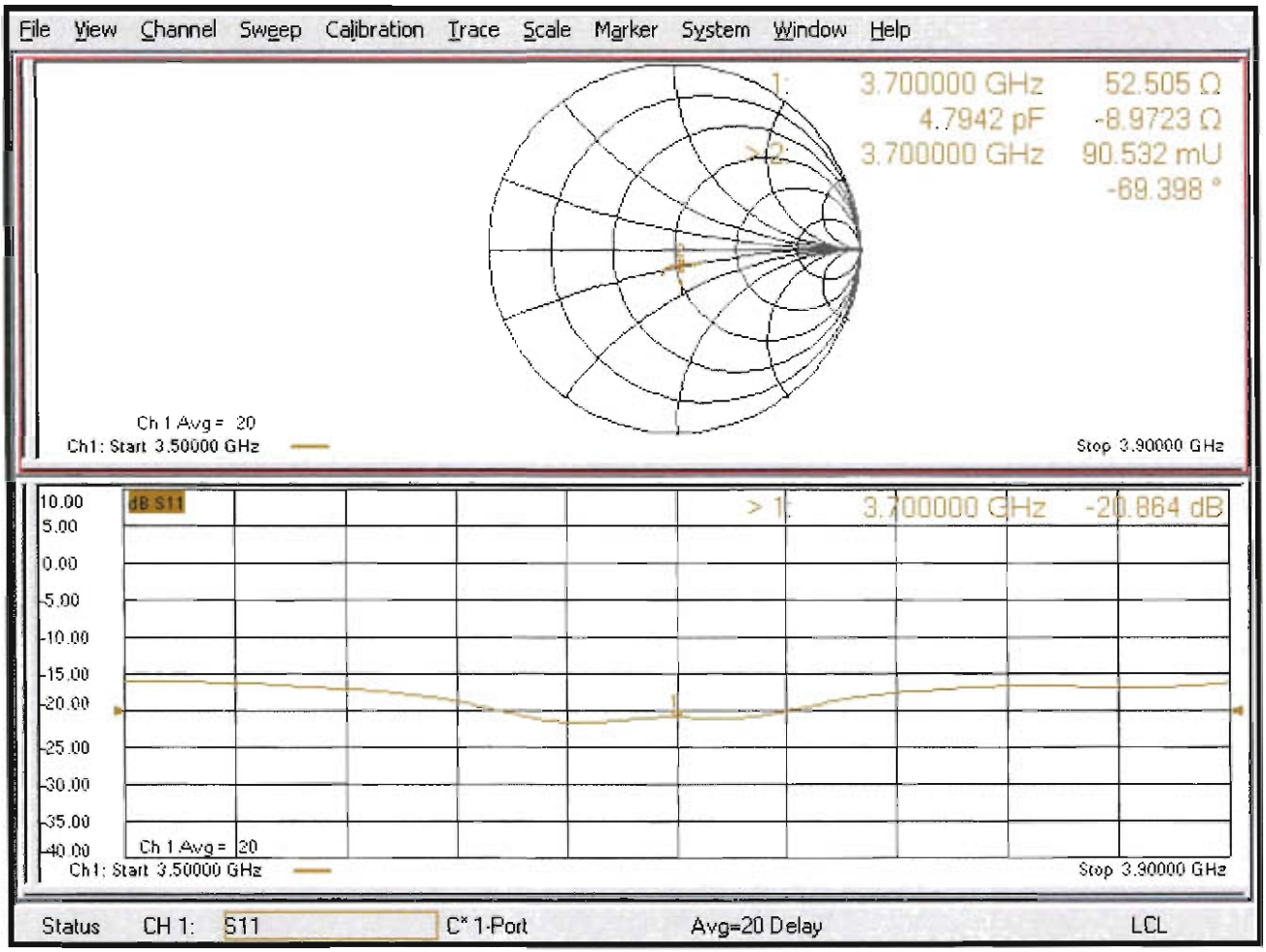
- Probe: EX3DV4 - SN3503; ConvF(7.73, 7.73, 7.73) @ 3700 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3700MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.33 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 6.48 W/kg; SAR(10 g) = 2.37 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 74.3%
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg = 10.97 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client B.V. ADT

Certificate No: D3900V2-1020_Feb23

CALIBRATION CERTIFICATE

Object: D3900V2 - SN:1020

Calibration procedure(s): QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: February 23, 2023

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Meis Kuster	Quality Manager	

Issued: February 24, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3900 MHz ± 1 MHz 4100 MHz ± 1 MHz	

Head TSL parameters at 3900 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.5	3.32 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.0 ± 6 %	3.26 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 3900 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**70.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 4100 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.2	3.53 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	3.45 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 4100 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**68.4 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 3900 MHz

Impedance, transformed to feed point	47.7 Ω - 2.3 jΩ
Return Loss	- 29.5 dB

Antenna Parameters with Head TSL at 4100 MHz

Impedance, transformed to feed point	54.9 Ω - 1.3 jΩ
Return Loss	- 26.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.103 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

DASY5 Validation Report for Head TSL

Date: 23.02.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN:1020

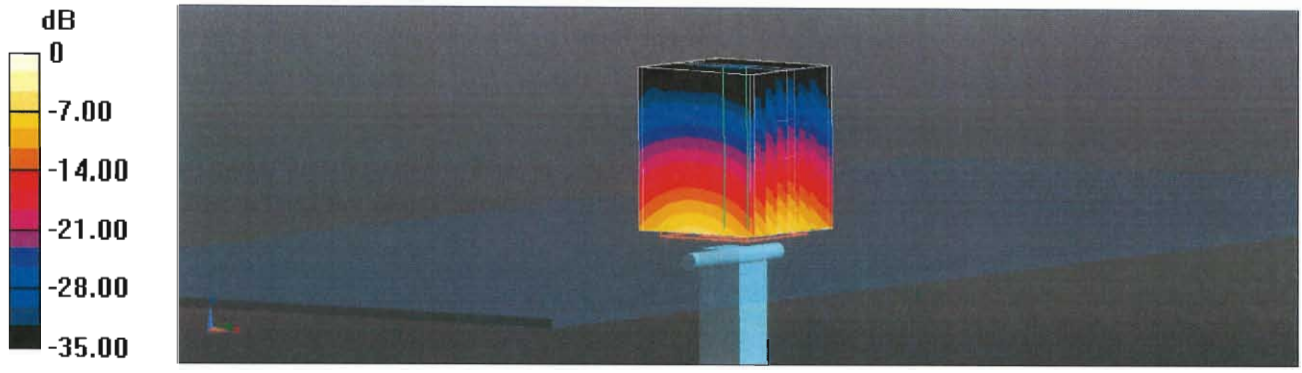
Communication System: UID 0 - CW; Frequency: 3900 MHz, Frequency: 4100 MHz
Medium parameters used: f = 3900 MHz; σ = 3.26 S/m; ε_r = 38; ρ = 1000 kg/m^3
Medium parameters used: f = 4100 MHz; σ = 3.45 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.39, 7.39, 7.39) @ 3900 MHz, ConvF(7.26, 7.26, 7.26) @ 4100 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

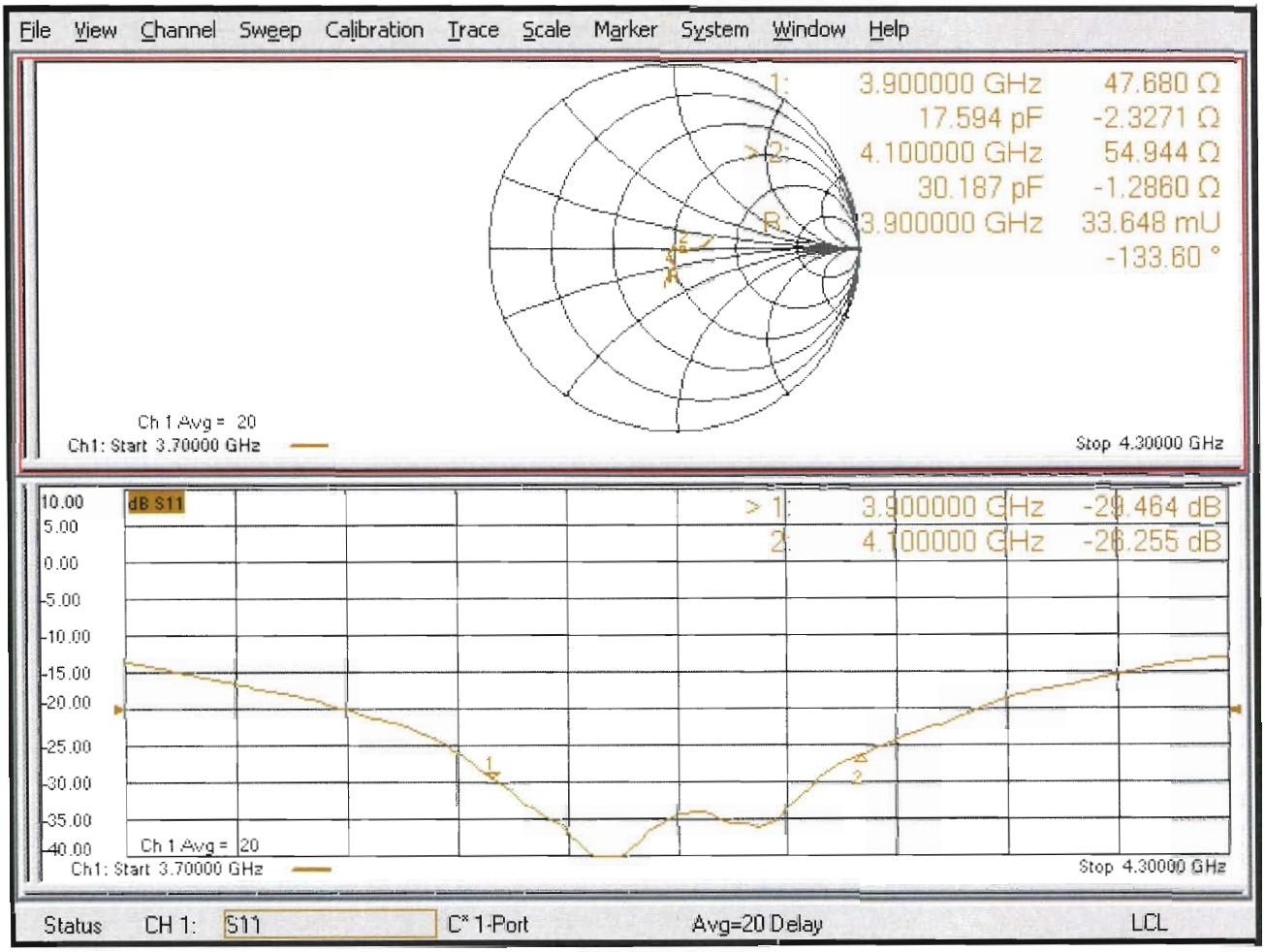
Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3900MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.22 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 19.9 W/kg
SAR(1 g) = 7.01 W/kg; SAR(10 g) = 2.44 W/kg
Smallest distance from peaks to all points 3 dB below = 7.9 mm
Ratio of SAR at M2 to SAR at M1 = 73.7%
Maximum value of SAR (measured) = 13.7 W/kg

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=4100MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.05 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 19.0 W/kg
SAR(1 g) = 6.79 W/kg; SAR(10 g) = 2.35 W/kg
Smallest distance from peaks to all points 3 dB below = 7.9 mm
Ratio of SAR at M2 to SAR at M1 = 74.7%
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg = 11.35 dBW/kg

Impedance Measurement Plot for Head TSL



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

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Accreditation No.: SCS 0108

Client B.V. ADT

Certificate No: D5GHzV2-1019_Feb23

CALIBRATION CERTIFICATE

Object: D5GHzV2 - SN:1019

Calibration procedure(s): QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: February 22, 2023

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 23, 2023

Report No.: SFBEDW-WTW-P23090599

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.0 ± 6 %	4.67 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.9 ± 6 %	5.06 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.6 ± 6 %	5.21 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.5 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	52.6 Ω - 3.4 jΩ
Return Loss	- 27.5 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	57.8 Ω + 0.1 jΩ
Return Loss	- 22.9 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.2 Ω + 4.7 jΩ
Return Loss	- 23.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 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

DASY5 Validation Report for Head TSL

Date: 22.02.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1019

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5250 MHz; σ = 4.67 S/m; ε_r = 36; ρ = 1000 kg/m^3
Medium parameters used: f = 5600 MHz; σ = 5.06 S/m; ε_r = 35.9; ρ = 1000 kg/m^3
Medium parameters used: f = 5800 MHz; σ = 5.21 S/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

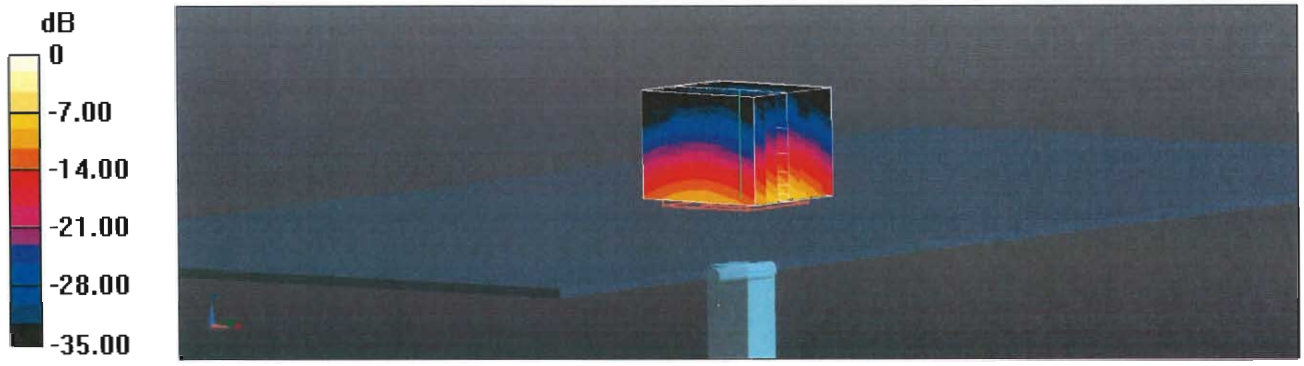
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.93 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 27.2 W/kg
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.29 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 71%
Maximum value of SAR (measured) = 17.9 W/kg

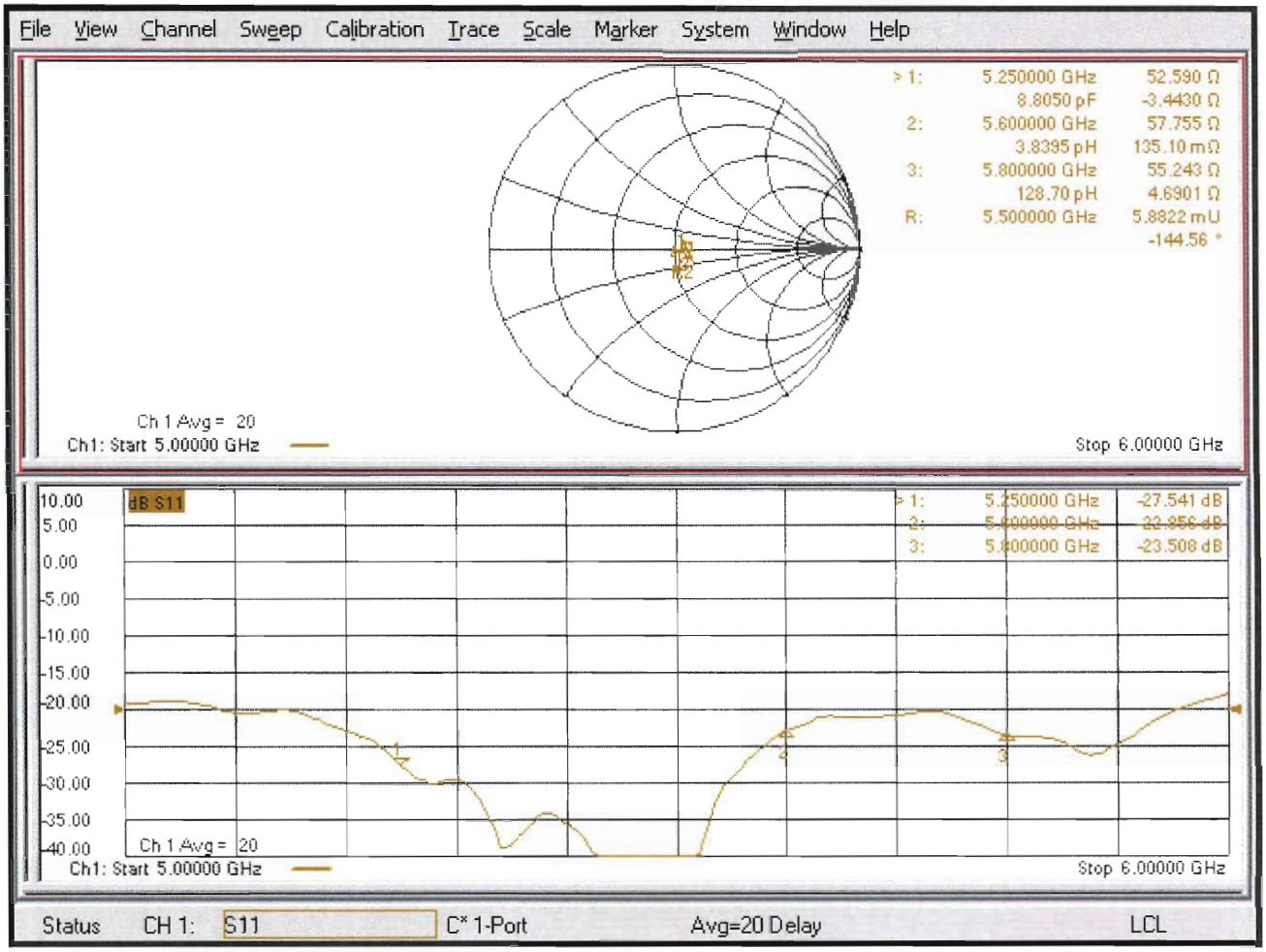
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.03 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.36 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 68.4%
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.20 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 31.5 W/kg
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.25 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.3%
Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 19.1 W/kg = 12.81 dBW/kg

Impedance Measurement Plot for Head TSL



Calibration Laboratory of
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Engineering AG
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Accreditation No.: SCS 0108

Client B.V. ADT
Taoyuan City

Certificate No. D6.5GHzV2-1008_Sep23

CALIBRATION CERTIFICATE

Object: D6.5GHzV2 - SN:1008

Calibration procedure(s): QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: September 21, 2023

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 sensor R&S NRP33T	SN: 100967	03-Apr-23 (No. 217-03806)	Apr-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Mismatch combination	SN: 84224 / 360D	03-Apr-23 (No. 217-03812)	Apr-24
Reference Probe EX3DV4	SN: 7405	12-Jun-23 (No. EX3-7405_Jun23)	Jun-24
DAE4	SN: 908	03-Jul-23 (No. DAE4-908_Jul23)	Jul-24

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator Anapico APSIN20G	SN: 827	18-Dec-18 (in house check Dec-21)	In house check: Dec-23
Power sensor NRP-Z23	SN: 100169	10-Jan-19 (in house check Nov-22)	In house check: Nov-23
Power sensor NRP-18T	SN: 100950	28-Sep-22 (in house check Nov-22)	In house check: Nov-23
Network Analyzer Keysight E5063A	SN:MY54504221	31-Oct-19 (in house check Oct-22)	In house check: Oct-25

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: September 21, 2023

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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range Of 4 MHz To 10 GHz)", October 2020.

Additional Documentation:

b) DASY 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 Return Loss ensures low reflected power. 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 absorbed power density (APD):* The absorbed power density is evaluated according to Samaras T, Christ A, Kuster N, "*Compliance assessment of the epithelial or absorbed power density above 6 GHz using SAR measurement systems*", Bioelectromagnetics, 2021 (submitted). The additional evaluation uncertainty of 0.55 dB (rectangular distribution) is considered.

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	DASY6	V16.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	5 mm	with Spacer
Zoom Scan Resolution	dx, dy = 3.4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	6500 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	34.5	6.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.3 ± 6 %	6.09 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	100 mW input power	29.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**292 W/kg ± 24.7 % (k=2)**

SAR averaged over 8 cm^3 (8 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.65 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**65.9 W/kg ± 24.4 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	5.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.9 W/kg ± 24.4 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.2 Ω - 6.9 jΩ
Return Loss	- 23.0 dB

APD (Absorbed Power Density)

APD averaged over 1 cm²	Condition	
APD measured	100 mW input power	291 W/m²
APD measured	normalized to 1W	**2910 W/m² ± 29.2 % (k=2)**

APD averaged over 4 cm²	condition	
APD measured	100 mW input power	133 W/m²
APD measured	normalized to 1W	**1330 W/m² ± 28.9 % (k=2)**

*The reported APD values have been derived using the psSAR1g and psSAR8g.

General Antenna Parameters and Design

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

DASY6 Validation Report for Head TSL

Measurement Report for D6.5GHz-1008, UID 0 -, Channel 6500 (6500.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
D6.5GHz	10.0 x 10.0 x 10.0	SN: 1008	-

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz]	Conversion Factor	TSL Cond. [S/m]	TSL Permittivity
Flat, HSL	5.00	Band	CW,	6500	5.50	6.09	33.3

Hardware Setup

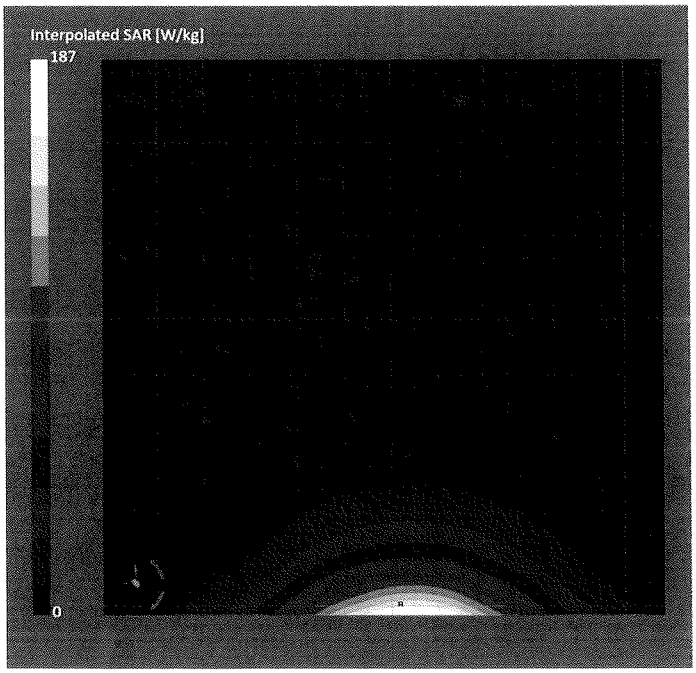
Phantom	TSL	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center - 1182	HBBL600-10000V6	EX3DV4 - SN7405, 2023-06-12	DAE4 Sn908, 2023-07-03

Scan Setup

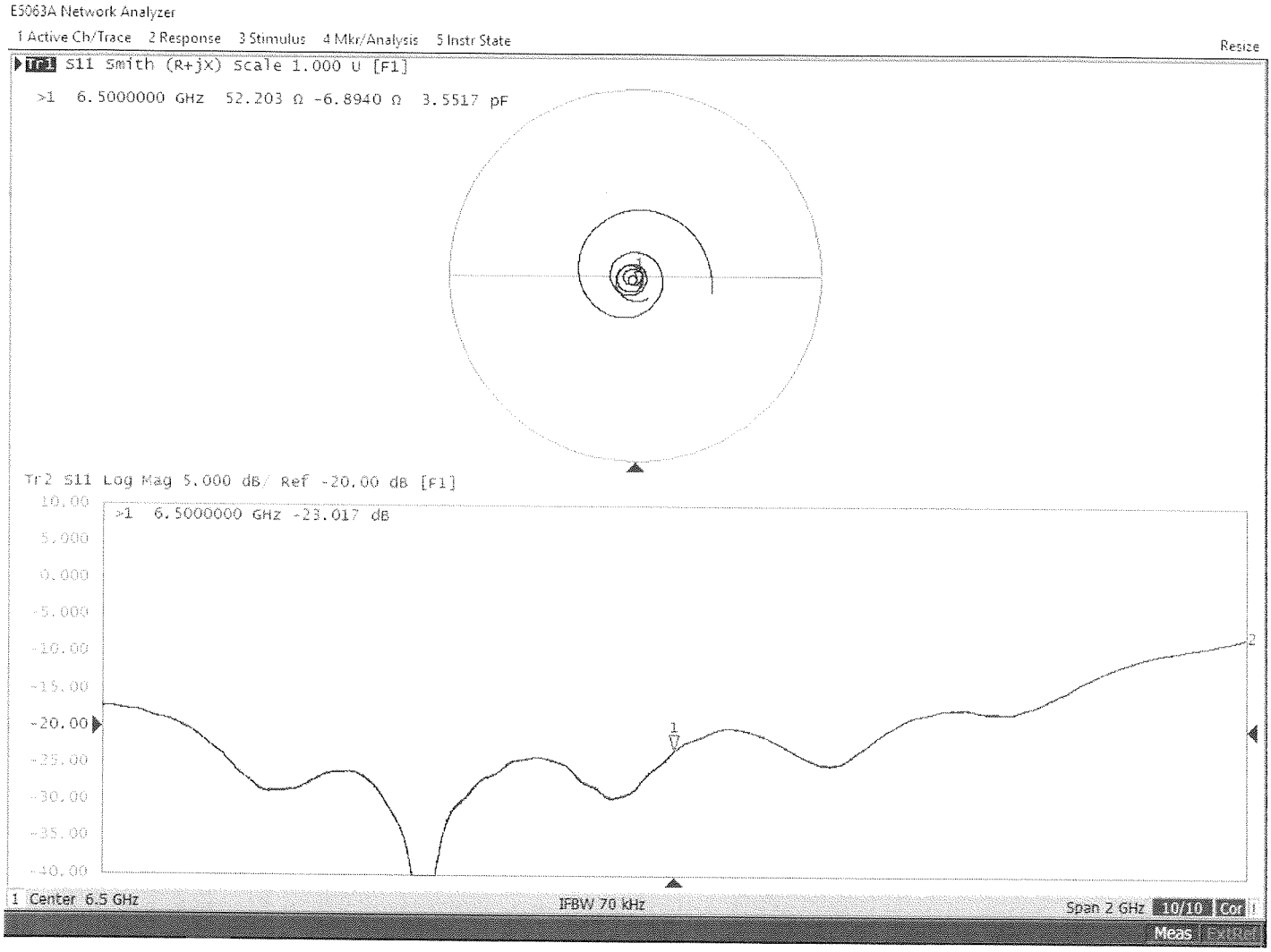
	Zoom Scan
Grid Extents [mm]	22.0 x 22.0 x 22.0
Grid Steps [mm]	3.4 x 3.4 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2023-09-21, 12:35
psSAR1g [W/Kg]	29.4
psSAR8g [W/Kg]	6.65
psSAR10g [W/Kg]	5.44
Power Drift [dB]	0.02
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	No correction
M2/M1 [%]	50.7
Dist 3dB Peak [mm]	4.6



Impedance Measurement Plot for Head TSL



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 0108

Client **B.V. ADT (Auden)**

Certificate No: 5G-Veri10-1025_Jan23

CALIBRATION CERTIFICATE

Object	5G Verification Source 10 GHz - SN: 1025
Calibration procedure(s)	QA CAL-45.v4 Calibration procedure for sources in air above 6 GHz
Calibration date:	January 19, 2023

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
Reference Probe EUmmWV3	SN: 9374	2023-01-03(No. EUmmWV3-9374_Jan23)	Jan-24
DAE4ip	SN: 1602	2022-06-27 (No. DAE4ip-1602_Jun22)	Jun-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMF100A	SN: 100184	19-May-22 (in house check Nov-22)	In house check: Nov-23
Power sensor R&S NRP18S-10	SN: 101258	31-May-22 (in house check Nov-22)	In house check: Nov-23

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: February 8, 2023

Glossary

CW Continuous wave

Calibration is Performed According to the Following Standards

- Internal procedure QA CAL-45, Calibration procedure for sources in air above 6 GHz.
- IEC/IEEE 63195-1, "Assessment of power density of human exposure to radio frequency fields from wireless devices in close proximity to the head and body (frequency range of 6 GHz to 300 GHz)", May 2022

Methods Applied and Interpretation of Parameters

- *Coordinate System:* z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- *Measurement Conditions: (1) 10 GHz:* The radiated power is the forward power to the horn antenna minus ohmic and mismatch loss. The forward power is measured prior and after the measurement with a power sensor. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. *(2) 30, 45, 60 and 90 GHz*: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- *Horn Positioning:* The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUmmW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- *E- field distribution:* E field is measured in two x-y-plane (10mm, 10mm + λ/4) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm^2 and 4cm^2) power density values at 10mm in front of the horn.
- *Field polarization:* Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

Calibrated Quantity

- Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m^2) averaged over the surface area of 1 cm^2 and 4cm^2 at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

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	DASY8 Module mmWave	V3.2
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 7.5 mm	
Number of measured planes	2 (10mm, 10mm + λ/4)	
Frequency	10 GHz ± 10 MHz	

Calibration Parameters, 10 GHz

Circular Averaging

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm²	**4** cm²	
10 mm	86.1	**154**	1.27 dB	**57.6**	**53.6**	1.28 dB

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Power Density psPDn+, psPDtot+, psPDmod+ (W/m²)		Uncertainty (k = 2)
				1 cm²	**4** cm²	
10 mm	86.1	**154**	1.27 dB	**55.7, 58.5, 58.7**	**51.7, 54.4, 54.7**	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm²	**4** cm²	
10 mm	86.1	**154**	1.27 dB	**57.6**	**53.5**	1.28 dB

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Power Density psPDn+, psPDtot+, psPDmod+ (W/m²)		Uncertainty (k = 2)
				1 cm²	**4** cm²	
10 mm	86.1	**154**	1.27 dB	**55.6, 58.5, 58.7**	**51.6, 54.3, 54.6**	1.28 dB

Max Power Density

Distance Horn Aperture to Measured Plane	***Prad*[1] *(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Max Power Density Sn, Stot, |Stot| (W/m²)	Uncertainty (k = 2)
10 mm	86.1	**154**	1.27 dB	**57.2, 60.3, 60.4**	1.28 dB

[1] Assessed ohmic and mismatch loss plus numerical offset: 0.55 dB

DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1025	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

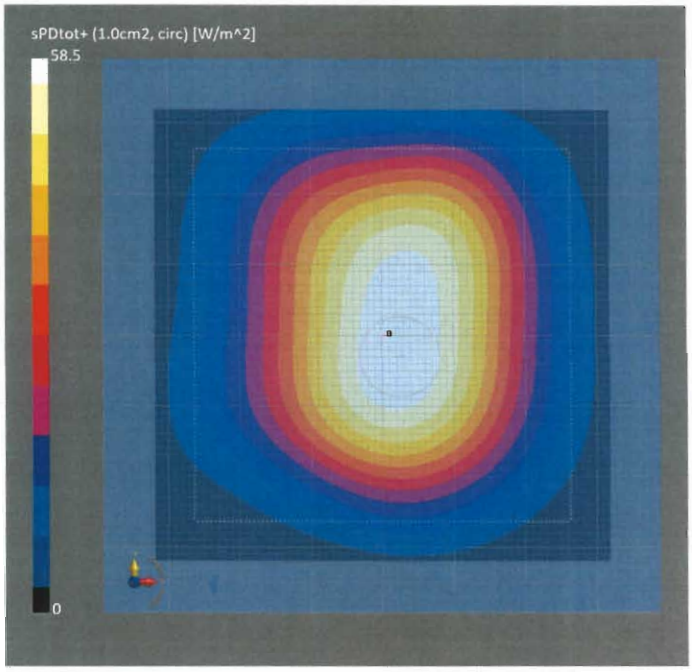
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-01-03	DAE4ip Sn1602, 2022-06-27

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-01-19, 13:57
Avg. Area [cm^2]	1.00
Avg. Type	Circular Averaging
psPDn+ [W/m^2]	55.7
psPDtot+ [W/m^2]	58.5
psPDmod+ [W/m^2]	58.7
Max(Sn) [W/m^2]	57.2
Max(Stot) [W/m^2]	60.3
Max(|Stot|) [W/m^2]	60.4
E_{max} [V/m]	154
Power Drift [dB]	0.00



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1025	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

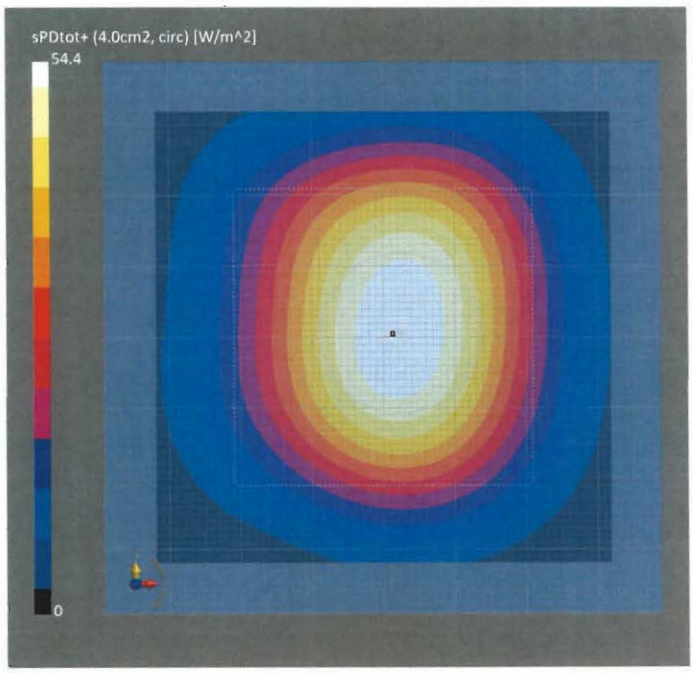
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-01-03	DAE4ip Sn1602, 2022-06-27

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-01-19, 13:57
Avg. Area [cm²]	4.00
Avg. Type	Circular Averaging
psPDn+ [W/m²]	51.7
psPDtot+ [W/m²]	54.4
psPDmod+ [W/m²]	54.7
Max(Sn) [W/m²]	57.2
Max(Stot) [W/m²]	60.3
Max(|Stot|) [W/m²]	60.4
E_{max} [V/m]	154
Power Drift [dB]	0.00



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1025	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

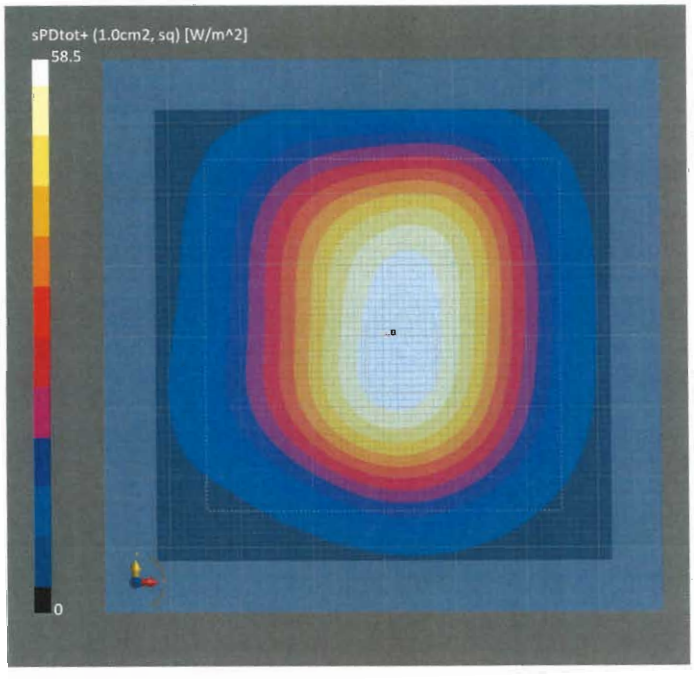
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-01-03	DAE4ip Sn1602, 2022-06-27

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-01-19, 13:57
Avg. Area [cm²]	1.00
Avg. Type	Square Averaging
psPDn+ [W/m²]	55.6
psPDtot+ [W/m²]	58.5
psPDmod+ [W/m²]	58.7
Max(Sn) [W/m²]	57.2
Max(Stot) [W/m²]	60.3
Max(|Stot|) [W/m²]	60.4
E_{max} [V/m]	154
Power Drift [dB]	0.00



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1025	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

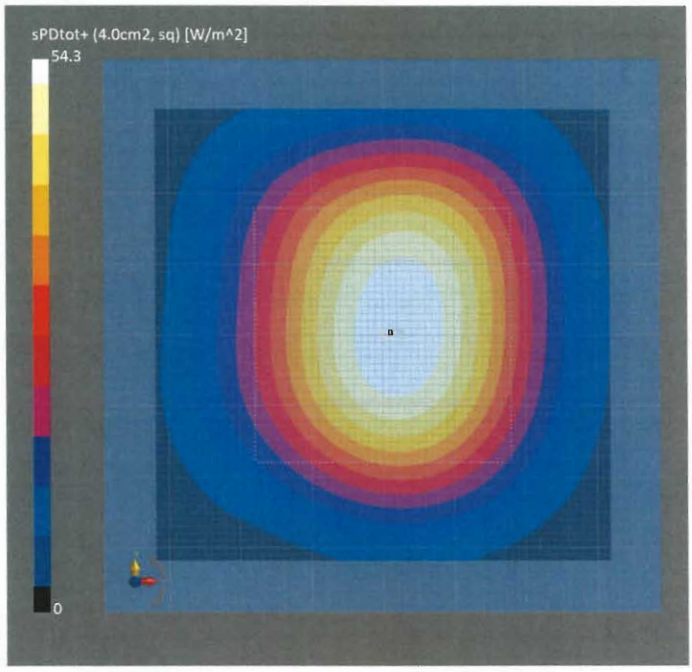
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-01-03	DAE4ip Sn1602, 2022-06-27

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-01-19, 13:57
Avg. Area [cm²]	4.00
Avg. Type	Square Averaging
psPDn+ [W/m²]	51.6
psPDtot+ [W/m²]	54.3
psPDmod+ [W/m²]	54.6
Max(Sn) [W/m²]	57.2
Max(Stot) [W/m²]	60.3
Max(|Stot|) [W/m²]	60.4
E_{max} [V/m]	154
Power Drift [dB]	0.00



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

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S 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 0108

Client	**B.V. ADT** **Taoyuan City**	Certificate No.	**EX-7472_Oct23**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7472
Calibration procedure(s)	QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6, QA CAL-25.v8 Calibration procedure for dosimetric E-field probes
Calibration date	October 23, 2023

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 NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	05-Oct-23 (OCP-DAK3.5-1249_Oct23)	Oct-24
OCP DAK-12	SN: 1016	05-Oct-23 (OCP-DAK12-1016_Oct23)	Oct-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe ES3DV2	SN: 3013	06-Jan-23 (No. ES3-3013_Jan23)	Jan-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Jeton Kastrati	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: October 23, 2023

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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ 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. 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 $f \leq 800$ 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.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Parameters of Probe: EX3DV4 - SN:7472

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu V/(V/m)^2$) [A]	0.59	0.48	0.42	±10.1%
DCP (mV) [B]	99.6	99.6	100.2	±4.7%

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B $dB\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc[E] $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	176.3	±3.5%	±4.7%
		Y	0.00	0.00	1.00		184.9		
		Z	0.00	0.00	1.00		190.5		
10352	Pulse Waveform (200Hz, 10%)	X	20.00	88.79	18.92	10.00	60.0	±3.3%	±9.6%
		Y	1.46	60.58	6.72		60.0		
		Z	2.27	64.91	9.56		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	20.00	91.18	18.95	6.99	80.0	±2.3%	±9.6%
		Y	0.84	60.00	5.44		80.0		
		Z	1.03	62.21	7.30		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	20.00	99.86	21.71	3.98	95.0	±1.5%	±9.6%
		Y	4.00	68.00	7.00		95.0		
		Z	0.38	60.00	4.92		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	20.00	138.84	37.51	2.22	120.0	±2.0%	±9.6%
		Y	11.53	156.07	5.46		120.0		
		Z	8.66	159.67	15.32		120.0		
10387	QPSK Waveform, 1 MHz	X	2.12	71.77	18.07	1.00	150.0	±3.6%	±9.6%
		Y	1.45	66.38	14.45		150.0		
		Z	1.26	64.93	13.25		150.0		
10388	QPSK Waveform, 10 MHz	X	2.82	73.06	18.56	0.00	150.0	±1.2%	±9.6%
		Y	1.93	66.74	15.15		150.0		
		Z	1.76	65.59	14.33		150.0		
10396	64-QAM Waveform, 100 kHz	X	3.27	73.66	21.00	3.01	150.0	±1.1%	±9.6%
		Y	2.04	65.70	16.67		150.0		
		Z	1.97	65.18	16.28		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.75	68.79	16.97	0.00	150.0	±2.3%	±9.6%
		Y	3.29	66.43	15.44		150.0		
		Z	3.31	66.68	15.42		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.98	66.44	16.24	0.00	150.0	±4.1%	±9.6%
		Y	4.55	65.27	15.35		150.0		
		Z	4.62	65.70	15.49		150.0		

Note: For details on UID parameters see Appendix

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

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Linearization parameter uncertainty for maximum specified field strength.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EX3DV4 - SN:7472

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms\,V^{-2}$	T2 $ms\,V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	42.9	324.96	36.75	10.65	0.00	5.08	0.53	0.36	1.01
y	31.1	233.63	35.81	6.22	0.00	4.93	0.22	0.20	1.00
z	29.6	223.83	36.12	3.43	0.00	5.03	0.00	0.24	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-96.3°
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	1.4 mm

Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.