

EX3DV4 - SN:7683

July 03, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>E</sup> k =
0609	AAD	IEEE 802.11ac WiFI (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.57	±9.6
0610	AAD	IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.78	±9.6
0611	AAD	IEEE 802 11ac WIFI (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6
0612	AAD	IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
0613	AAD	IEEE 802.11ac WIFI (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.94	±9.6
0614	AAD	IEEE 802.11ac WIFI (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.59	±9.6
0615	AAD	IEEE 802.11ac WIFI (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6
0616	AAD	IEEE 802.11ac WiFi (40 MHz, MCS0, 90pc duty cycle)	WLAN	8.82	±9.6
0617	AAD	IEEE 802.11ac WIFI (40 MHz, MCS1, 90pc duty cycle)	WLAN	8.81	±9.6
0618	AAD	IEEE 802.11ac WIFI (40 MHz, MCS2, 90pc duty cycle)	WLAN	8.58	±9.6
0619	AAD	IEEE 802.11ac WiFi (40 MHz, MCS3, 90pc duty cycle)	WLAN	8.86	±9.6
0620	AAD	IEEE 802.11ac WiFi (40 MHz, MCS4, 90pc duty cycle)	WLAN	8.87	±9.6
0620	AAD	IEEE 802.11ac WIFI (40 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
	AAD	IEEE 802.11ac WIFI (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.68	±9.6
0622	AAD	IEEE 802.11ac WiFI (40 MHz, MCS7, 90pc duty cycle)	WLAN	8.82	±9.6
	and the second second	I an announce and an an an announce and a second and a second and a second second second second second second s	WLAN	8.96	±9.6
0624	AAD	IEEE 802.11ac WiFi (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.96	±9.6
0625	AAD	IEEE 802.11ac WIFI (40 MHz, MCS9, 90pc duty cycle)	WLAN	8.83	±9.6
0626	AAD	IEEE 802.11ac WIFI (80 MHz, MCS0, 90pc duty cycle)	WLAN	8.88	±9.6
0627	AAD	IEEE 802.11ac WIFI (80 MHz, MCS1, 90pc duty cycle)		8.71	±9.6
0628	AAD	IEEE 802.11ac WIFI (80 MHz, MCS2, 90pc duty cycle)	WLAN	8.85	19.6
0629	AAD	IEEE 802.11ac WIFI (80 MHz, MCS3, 90pc duty cycle)	WLAN		1.000
0630	AAD	IEEE 802.11ac WiFi (80 MHz, MCS4, 90pc duty cycle)	WLAN	8.72	±9.6
0631	AAD	IEEE 802.11ac WiFi (80 MHz, MCS5, 90pc duty cycle)	WLAN	8.81	±9.6
0632	AAD	IEEE 802.11ac WIFI (80 MHz, MCS6, 90pc duty cycle)	WLAN	8.74	±9.6
0633	AAD	IEEE 802.11ac WiFi (80 MHz, MCS7, 90pc duty cycle)	WLAN	8,83	±9.6
10634	AAD	IEEE 802.11ac WiFi (80 MHz, MCS8, 90pc duty cycle)	WLAN	8.80	±9.6
0635	AAD	IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.81	±9.6
0636	AAE	IEEE 802.11ac WiFi (160 MHz, MCS0, 90pc duty cycle)	WLAN	8.83	±9.6
0637	AAE	IEEE 802.11ac WiFi (160 MHz, MCS1, 90pc duty cycle)	WLAN	8.79	±9.6
0638	AAE	IEEE 802.11ac WiFi (160 MHz, MCS2, 90pc duty cycle)	WLAN	8.86	±9.6
0639	AAE	IEEE 802.11ac WiFi (160 MHz, MCS3, 90pc duty cycle)	WLAN	8.85	±9.6
0640	AAE	IEEE 802.11ac WiFi (160 MHz, MCS4, 90pc duty cycle)	WLAN	8.98	±9.6
0641	AAE	IEEE 802.11ac WiFi (160 MHz, MCS5, 90pc duty cycle)	WLAN	9.06	±9.6
0642	AAE	IEEE 802.11ac WIFI (160 MHz, MCS6, 90pc duty cycle)	WLAN	9.06	±9.6
0643	AAE	IEEE 802.11ac WiFi (160 MHz, MCS7, 90pc duty cycle)	WLAN	8.89	±9.6
0644	AAE	IEEE 802.11 ac WIFI (160 MHz, MCS8, 90pc duty cycle)	WLAN	9.05	±9.6
0645	AAE	IEEE 802.11ac WIFI (160 MHz, MCS9, 90pc duty cycle)	WLAN	9.11	±9.6
0646	AAH	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.95	±9.6
0647	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TOD	11,95	±9.6
0648	AAA	CDMA2000 (1x Advanced)	CDMA2000	3.45	±9.6
0652	AAF	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Glipping 44%)	LTE-TOD	6.91	±9.6
0653	AAF	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	±9.6
0654	AAE	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	±9.6
0655	AAF	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	±9.6
0658	AAB	Pulse Waveform (200Hz, 10%)	Test	10.00	±9.6
0659	AAB	Pulse Waveform (200Hz, 20%)	Test	6.99	±9,6
0660	AAB	Pulse Waveform (200Hz, 40%)	Test	3.98	19.6
10661	AAB	Pulse Waveform (200Hz, 60%)	Test	2.22	±9.6
0662	AAB	Pulse Waveform (200Hz, 80%)	Test	0.97	±9.0
0670	AAA	Bluetooth Low Energy	Bluetooth	2,19	±9.6
0671	AAC	IEEE 802.11ax (20 MHz, MCS0, 90pc duty cycle)	WLAN	9.09	±9.6
0672	AAC	IEEE 802.11ax (20 MHz, MCS1, 90pc duty cycle)	WLAN	8.57	±9.6
0673	AAC	IEEE 802.11ax (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.78	±9.6
	AAG	IEEE 802.11ax (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±9.
0674	AAC	IEEE 802.11ax (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.90	±9.1
in sector sectors	and the second second	IEEE 802.11ax (20 MHz, MCS4, sope day cycle)	WLAN	8.77	±9.6
0675	AAC	terms and the line in all meases only of each	WLAN	8.73	±9.0
0675	AAC	LIFEE 802 11ax (20 MHz, MCS6, 90nc duty ownle)			
10675 10676 10677	AAC	IEEE 802.11ax (20 MHz, MCS6, 90pc duty cycle)	WI AN	9.79	
10675 10676 10677 10678	AAC AAC	JEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle)	WLAN WLAN	8.78	±9.0
10675 10676 10677 10678 10679	AAC AAC AAC	JEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.89	±9.6
10675 10676 10677 10678 10679 10680	AAC AAC AAC AAC	JEEE 802,11ax (20 MHz, MCS7, 90pc duty cycle) IEEE 802,11ax (20 MHz, MCS8, 90pc duty cycle) IEEE 802,11ax (20 MHz, MCS9, 90pc duty cycle)	WLAN WLAN	8.89 8.80	±9.6 ±9.0
10675 10676 10677 10678 10679 10680 10681	AAC AAC AAC AAC AAC	JEEE 802,11ax (20 MHz, MCS7, 90pc duty cycle) IEEE 802,11ax (20 MHz, MCS8, 90pc duty cycle) IEEE 802,11ax (20 MHz, MCS9, 90pc duty cycle) IEEE 802,11ax (20 MHz, MCS10, 90pc duty cycle)	WLAN WLAN WLAN	8.89 8.80 8.62	±9.0 ±9.0 ±9.0
10675 10676 10677 10678 10679 10680 10681 10682	AAC AAC AAC AAC AAC AAC	JEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)	WLAN WLAN WLAN WLAN	8.89 8.80 8.62 8.83	±9.0 ±9.0 ±9.0 ±9.0
10675 10676 10677 10678 10679 10680 10681 10682 10683	AAC AAC AAC AAC AAC AAC AAC AAC	IEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS0, 99pc duty cycle)	WLAN WLAN WLAN WLAN WLAN	8.89 8.80 8.62 8.83 8.42	±9.0 ±9.0 ±9.0 ±9.0 ±9.0
10674 10675 10676 10677 10678 10679 10680 10681 10682 10683 10683 10684 10685	AAC AAC AAC AAC AAC AAC	JEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle) IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)	WLAN WLAN WLAN WLAN	8.89 8.80 8.62 8.83	±9.0 ±9.0 ±9.0 ±9.0

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0687	AAC	IEEE 802.11ax (20 MHz, MCS4, 99pc duty cycle)	WLAN	8.45	±9.6
0688	AAG	IEEE 802.11ax (20 MHz, MCS5, 99pc duty cycle)	WLAN	8.29	±9.6
0689	AAC	IEEE 802.11ax (20 MHz, MCS6, 99pc duty cycle)	WLAN	8.55	±9.6
0690	AAC	IEEE 802.11ax (20 MHz, MCS7, 99pc duty cycle)	WLAN	8,29	±9.6
0691	AAC	IEEE 802.11ax (20 MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6
0692	AAC	IEEE 802.11ax (20 MHz, MCS9, 99pc duty cycle)	WLAN	8.29	±9.6
0693	AAC	IEEE 802.11ax (20 MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6
0694	AAC	IEEE 802.11ax (20 MHz, MCS11, 99pc duty cycle)	WLAN	8.57	±9.6
0695	AAC	IEEE 802.11ax (40 MHz, MCS0, 90pc duty cycle)	WLAN	8.78	±9.6
0696	AAC	IEEE 802.11ax (40 MHz, MCS1, 90pc duty cycle)	WLAN	8.91	±9.6
0697	AAC	IEEE 802.11ax (40 MHz, MCS2, 90pc duty cycle)	WLAN	8.61	±9.6
0698	AAC	IEEE 802.11ax (40 MHz, MCS3, 90pc duty cycle)	WLAN	8.89	±9.6
0699	AAC	IEEE 802.11ax (40 MHz, MCS4, 90pc duty cycle)	WLAN	8.82	±9.6
0700	AAC	IEEE 802.11ax (40 MHz, MCS5, 90pc duty cycle)	WLAN	8.73	±9.6
0701	AAC	IEEE 802.11ax (40 MHz, MCS6, 90pc duty cycle)	WLAN	8.86	±9.6
	AAC	IEEE 802.11ax (40 MHz, MCS0, 90pc duty cycle)	WLAN	8.70	±9.6
0702	11.000	and the second se	WLAN	8.82	±9.6
0703	AAC	IEEE 802.11ax (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.56	±9.6
0704	AAC	IEEE 802.11ax (40 MHz, MCS9, 90pc duty cycle)	WLAN	8.69	19.6
0705	AAC	IEEE 802.11ax (40 MHz, MCS10, 90pc duty cycle)	WLAN	8.66	±9.6
0706	AAC	IEEE 802.11ax (40 MHz, MCS11, 90pc duty cycle)	WLAN	8.32	±9.6
0707	AAC	IEEE 802.11ax (40 MHz, MCS0, 99pc duty cycle)	WLAN	8.55	±9.6
0708	AAC	IEEE 802.11ax (40 MHz, MCS1, 99pc duty cycle)	WLAN	8.33	±9.6
0709	AAC	IEEE 802.11ax (40 MHz, MCS2, 99pc duty cycle)		8.29	±9.6
0710	AAC	IEEE 802.11ax (40 MHz, MCS3, 99pc duty cycle)	WLAN		
0711	AAC	IEEE 802.11ax (40 MHz, MCS4, 99pc duty cycle)	WLAN	8.39	±9.6
0712	AAC	IEEE 802.11ax (40 MHz, MCS5, 99pc duty cycle)	WLAN	8.67	±9.6
0713	AAC	IEEE 802.11ax (40 MHz, MCS6, 99pc duty cycle)	WLAN	8.33	±9.6
0714	AAC	IEEE 802.11ax (40 MHz, MCS7, 99pc duty cycle)	WLAN	8.26	±9.6
0715	AAC	IEEE 802.11ax (40 MHz, MCS8, 99pc duty cycle)	WLAN	8.45	±9.6
0716	AAC	IEEE 802.11ax (40 MHz, MCS9, 99pc duty cycle)	WLAN	8.30	±9.6
10717	AAC	IEEE 802.11ax (40 MHz, MCS10, 99pc duty cycle)	WLAN	8.48	±9.6
0718	AAC	IEEE 802.11ax (40 MHz, MCS11, 99pc duty cycle)	WLAN	8.24	±9.6
0719	AAC	IEEE 802.11ax (80 MHz, MCS0, 90pc duty cycle)	WLAN	8,81	±9.6
10720	AAC	IEEE 802.11ax (80 MHz, MCS1, 90pc duty cycle)	WLAN	8.87	±9.6
0721	AAG	IEEE 802.11ax (80 MHz, MCS2, 90pc duty cycle)	WLAN	8.76	±9.6
10722	AAC	IEEE 802.11ax (80 MHz, MCS3, 90pc duty cycle)	WLAN	8.55	±9.8
10723	AAC	IEEE 802.11ax (80 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	#9.6
10724	AAC	IEEE 802.11ax (80 MHz, MCS5, 90pc duty cycle)	WLAN	8.90	±9.6
10725	AAC	IEEE 802.11ax (80 MHz, MCS6, 90pc duty cycle)	WLAN	8.74	±9.6
10726	AAC	IEEE 802.11ax (80 MHz, MCS7, 90pc duty cycle)	WLAN	8.72	±9.6
10727	AAC	IEEE 802.11ax (80 MHz, MCS8, 90pc duty cycle)	WLAN	8.66	±9.6
10728	AAC	IEEE 802.11ax (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.65	±9.6
10729	AAC	IEEE 802.11ax (80 MHz, MCS10, 90pc duty cycle)	WLAN	8.64	±9.6
10730	AAC	IEEE 802.11ax (80 MHz, MCS11, 90pc duty cycle)	WLAN	8.67	±9.6
10731	AAC	IEEE 802.11ax (80 MHz, MCS0, 99pc duty cycle)	WLAN	8.42	±9.6
10732	AAC	IEEE 802.11ax (80 MHz, MCS1, 99pc duty cycle)	WLAN	8.46	±9.6
10733	AAC	IEEE 802.11ax (80 MHz, MCS2, 99pc duty cycle)	WLAN	8.40	±9.6
10734	AAC	IEEE 802.11ax (80 MHz, MCS3, 99pc duty cycle)	WLAN	8.25	±9,6
0735	AAC	IEEE 802.11ax (80 MHz, MCS4, 99pc duty cycle)	WLAN	8.33	±9.
10736	AAC	IEEE 802.11ax (80 MHz, MCS5, 99pc duty cycle)	WLAN	8.27	±9,6
10737	AAC	IEEE 802.11ax (80 MHz, MCS6, 99pc duty cycle)	WLAN	8.36	±9.0
10738	AAC	IEEE 802.11ax (80 MHz, MCS7, 99pc duty cycle)	WLAN	8.42	±9.1
10739	AAC	IEEE 802.11ax (80 MHz, MCS8, 99pc duty cycle)	WLAN	8.29	±9.6
10740	AAC	IEEE 802.11ax (80 MHz, MCS9, 99pc duty cycle)	WLAN	8.48	±9.
10741	AAC	IEEE 802.11ax (80 MHz, MCS10, 99pc duty cycle)	WLAN	8.40	±9.
10742	AAC	IEEE 802.11ax (80 MHz, MCS11, 99pc duty cycle)	WLAN	8.43	±9.
10743	and the second s	IEEE 802.11ax (160 MHz, MCS0, 90pc duty cycle)	WLAN	8.94	±9.
10744		IEEE 802.11ax (160 MHz, MCS1, 90pc duty cycle)	WLAN	9.16	±9.1
10745		IEEE 802.11ax (160 MHz, MCS2, 90pc duty cycle)	WLAN	8.93	19.0
10746		IEEE 802.11ax (160 MHz, MCS3, 90pc duty cycle)	WLAN	9.11	±9,
10740	AAC	IEEE 802.11ax (160 MHz, MCS3, 50pc duty cycle)	WLAN	9.04	±9,
10748	the second s	IEEE 802.11ax (160 MHz, MCS4, solutional solution of the solut	WLAN	8.93	±9.0
10748	and the second sec	IEEE 802.11ax (160 MHz, MCS5, 90pc duty cycle)	WLAN	8.90	±9,0
	AAC		WLAN	8.79	±9.
10.750		IEEE 802.11ax (160 MHz, MCS7, 90pc duty cycle)	VYL-PNN		
10750	AAC	IEEE 802.11ax (160 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.

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UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>E</sup> k =
0753	AAC	IEEE 802.11ax (160 MHz, MCS10, 90pc duty cycle)	WLAN	9.00	±9.6
0754	AAC	IEEE 802.11ax (160 MHz, MCS11, 90pc duty cycle)	WEAN	8.94	±9.6
0755	AAC	IEEE 802.11ax (160 MHz, MCS0, 99pc duty cycle)	WLAN	8.64	±9.6
0756	AAC	IEEE 802.11ax (160 MHz, MCS1, 99pc duty cycle)	WLAN	8.77	±9.6
0757	AAC	IEEE 802.11ax (180 MHz, MCS2, 99pc duty cycle)	WLAN	8.77	±9.6
0758	AAC	IEEE 802.11ax (160 MHz, MCS3, 99pc duty cycle)	WLAN	8.69	±9.6
0759	AAC	IEEE 802.11ax (160 MHz, MCS4, 99pc duty cycle)	WLAN	8.58	±9.6
0760	AAC	IEEE 802.11ax (160 MHz, MCS5, 99pc duty cycle)	WLAN	8.49	±9.6
0761	AAC	IEEE 802.11ax (160 MHz, MCS6, 99pc duty cycle)	WLAN	8.58	±9.6
0762	AAC	IEEE 802,11ax (160 MHz, MCS7, 99pc duty cycle)	WLAN	8.49	±9.6
0763	AAC	IEEE 802,11ax (160 MHz, MCS8, 99pc duty cycle)	WLAN	8.53	±9.5
0764	AAC	IEEE 802.11ax (160 MHz, MCS9, 99pc duty cycle)	WLAN	8.54	±9.6
0765	AAC	IEEE 802.11ax (160 MHz, MCS9, sale duty cycle)	WLAN	8,54	±9.6
0766	AAC	IEEE 802.11ax (160 MHz, MCS10, 390c duty cycle)	WLAN	8.51	±9.6
And the second second	AAG	5G NR (CP-OFDM, 1 RB, 5MHz, QPSK, 15kHz)	5G NR FR1 TDD	7.99	19.6
0767	AAE		5G NB FR1 TOD	8.01	19.6
0768		5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15kHz)	5G NR FR1 TDD	8.01	±9.6
0769	AAD	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 15kHz)	5G NR FR1 TDD	8.02	±9.6
0770	AAE	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 15kHz)	5G NR FR1 TDD	8.02	19.6
0771	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±9.6
0772	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)		8.03	±9.6
0773	AAF	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	
0774	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	and the second se	±9.6
0775	AAF	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
0776	AAE	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6
0777	AAC	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6
0778	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±9.6
0779	AAC	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	±9.6
0780	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
0781	AAF	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
0782	AAE	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.6
0783	AAG	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
0784	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	±9,6
0785	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	±9.6
0788	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	±9.6
10787	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, OPSK, 15 kHz)	5G NR FR1 TDD	8,44	±9.6
10788	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.6
0789	AAF	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	±9.6
10790	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.6
0791	AAG	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	±9.6
0792	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±9.6
10793	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	±9.6
0794	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.6
10795	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	±9.6
0796	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.6
0797	AAF	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	±9.6
0798	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
0799	AAF	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.6
0801	AAF	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
0802	AAE	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	±9.6
0803	AAF	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.6
0805	AAE	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10806	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	±9,1
0809	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.
0810	AAF	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
0812	AAF	5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.
0817	AAG	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.0
0818	-	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.
0819	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	±9.6
0820	and the second second	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	±9.6
0820	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 KHz)	5G NR FR1 TDD	8.41	±9.
	-		5G NR FR1 TDD	8.41	±9.6
0822	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	
	AAF	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	and the second se		±9,1
10823		5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TOD	8.39	±9.
0824	AAE	<ul> <li>A second s Second second s Second second se</li></ul>	FOR MER PERS TO D	0.44	0.0 A
10823 10824 10825 10827	AAF	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz) 5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	8.41 8.42	±9. ±9.1

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10829	AAF	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	±9.6
a had been a second	Contraction of the second	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	19.6
0830	AAE		5G NR FR1 TDD	7.73	±9.6
0831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	±9.6
0832	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)		7.70	±9.6
0833	AAD	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 60 kHz)	5G NR FR1 TDD		
0834	AAE	5G NR (CP-OFDM, 1 HB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7,75	±9,6
0835	AAF	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6
0836	AAE	5G NR (CP-DFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	±9.6
0837	AAF	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	±9.6
0839	AAF	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6
0840	AAE	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	±9.6
0841	AAF	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	±9.6
			5G NR FR1 TDD	8.49	±9.6
0843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
0844	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, OPSK, 60 kHz)		8.41	19.6
0846	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD		
0854	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
0855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	SG NR FR1 TDD	8.36	±9.6
0856	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6
0857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TOD	8.35	19.6
0858	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	±9.6
Concession in	AAE	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
0859			5G NR FR1 TDD	8.41	±9.6
0860	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)		8.41	±9.6 ±9.6
0861	AAF	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD		
0863	AAF	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
0864	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6
0865	AAF	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
0866	AAF	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
0868	AAF	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	±9.6
0869	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
and the same			5G NR FR2 TDD	5.86	±9.6
0870	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
0871	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)		and the second se	
0872	<ol> <li>11.22 COLUMN</li> </ol>	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	±9.6
0873	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.6
0874	AAE	5G NR (DFT-8-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.6
0875	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.6
0876	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	±9.6
0877	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	±9.6
10878	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.6
	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	±9.6
10879			5G NR FR2 TDD	8.38	±9.6
10880	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	and the second s		
10881	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10882	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	±9.6
0883	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	±9.6
0884	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	±9.6
10885	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6,61	±9.6
0886	AAE	5G NR (DFT-8-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TOD	6.65	±9.6
0887	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.6
		and the second of the second se	5G NR FR2 TDD	8.35	±9.6
0888	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	The second se		±9.6
0889	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	
10890	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	±9.6
0891	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	±9.6
0892	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.0
0897	AAE	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TOD	5.66	±9.6
0898	AAC	5G NR (DFTs-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.8
0899	AAB	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
0900	in the second second	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
			5G NR FR1 TDD	5.68	+9.6
0901	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	and the second se	5.68	±9.0
10902		5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD		
10903		5G NR (DFT:s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10904	AAC	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9,6
10905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TOD	5.68	±9.6
10906		5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NH FR1 TOD	5.68	±9.0
10907		5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	±9.6
10908	ing a subscription of	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.0
Palitic and the same		5G NR (DFTs-OFDM, 50% RB, 15 MHz, QPSK, 30 KHz)	5G NR FR1 TDD	5.96	±9.6
10909			00 MB CB1 100	1 3.89	20.0

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0911	AAB	5G NR (DFT-s OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9,6
0912	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
0913	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
0914	AAC	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5,85	±9.6
0915	AAD	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6
0916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, OPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6
0917	AAD	5G NR (DFT=-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
	AAE	5G NR (DFT-s-OFDM, 100% RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6
0918	1010147	5G NR (DFT-5-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6
0919	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6
0920	and the second second		5G NR FR1 TDD	5.84	±9.6
0921	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.6
0922	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, OPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
0923	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
0924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.95	±9.6
0925	AAC	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
0926	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
0927	AAD	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)		5.52	
0928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD		±9.6
0929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±9.6
0930	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±9.6
0931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
0932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
0933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
0934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
0935	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5,51	±9.6
0936	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.6
0937	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5,77	±9.6
0938	AAC	5G NR (DFTs-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.6
0939	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.6
0940	AAC	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	±9.6
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.6
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.6
0943	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	±9.6
10944	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.81	±9.6
10945	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.6
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5,83	±9.6
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.6
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.6
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.6
0950	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.6
10951	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	±9.8
10952	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	±9.6
0953	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	±9.6
10954	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	19.
10955	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 54-QAM, 15 kHz)	5G NR FR1 FDD	8.42	±9.6
10956	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	±9.6
10957	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	±9.6
10958	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	±9.6
10959	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 54-QAM, 30 kHz)	5G NR FR1 FDD	8.33	±9.6
10959	AAE	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 30 KHz)	5G NR FR1 TDD	9.32	±9.6
and the second sec	and second second		5G NR FR1 TDD	9.36	±9.6
10961	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64 QAM, 15 kHz)	5G NR FR1 TDD	9.40	±9.
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.65	±9.
10963	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15kHz)	and the second	9.29	
0964	AAE	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 30kHz)	5G NR FR1 TDD 5G NR FR1 TDD	9.29	±9. ±9.
10965	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	±9.
0966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.00	±9.0
10967	AAG	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)			
10968	AAD	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	±9.
10972	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	±9.
10973	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	±9.6
10974	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	±9.
10978	AAA	ULLA BDR	ULLA	1.16	±9,
10979	AAA	ULLA HDR4	ULLA	8.58	±9.
10980	AAA	ULLA HDRB	ULLA	10.32	±9.
10981	AAA	ULLA HDRp4	ULLA	3.19	±9.
10982	AAA	ULLA HDRp8	ULLA	3.43	±9.

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10983	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9,31	±9.6
10984	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	±9.6
10985	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 54-QAM, 30 kHz)	5G NR FR1 TDD	9.54	±9.6
10986	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	±9.6
10987	AAC	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	±9.6
10988	AAB	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.38	±9.6
10989	AAC	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	±9.6
10990	AAB	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	±9.6
11003	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	10.24	±9.6
11004	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	10.73	±9.6
11005	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.70	±9.6
11006	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.55	±9.6
11007	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.46	±9.6
11008	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.51	±9.6
11009	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.76	±9.6
11010	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.95	±9.6
11011	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.96	±9.6
11012	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.68	±9.6
11013	AAB	IEEE 802 11be (320 MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6
11014	AAB	IEEE 802.11be (320 MHz, MCS2, 99pc duty cycle)	WLAN	8.45	±9.6
11015	AAB	IEEE 802.11be (320 MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±9.6
11016	AAB	IEEE 802.11be (320 MHz, MCS4, 99pc duty cycle)	WLAN	8.44	±9.6
11017	AAB	IEEE 802.11be (320 MHz, MCS5, 99pc duty cycle)	WLAN	8.41	±9.6
11018	AAB	IEEE 802.11be (320 MHz, MCS6, 99pc duty cycle)	WLAN	8.40	±9.6
11019	AAB	IEEE 802.11be (320 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.6
11020	AAB	IEEE 802.11be (320 MHz, MCS8, 99pc duty cycle)	WLAN	8.27	±9.6
11021	AAB	IEEE 802.11be (320 MHz, MCS9, 99pc duty cycle)	WLAN	8.46	±9.6
11022	AAB	IEEE 802.11be (320 MHz, MCS10, 99pc duty cycle)	WLAN	8.36	±9.6
11023	AAB	IEEE 802.11be (320 MHz, MCS11, 99pc duty cycle)	WLAN	8.09	±9.6
11024	AAB	IEEE 802.11be (320 MHz, MCS12, 99pc duty cycle)	WLAN	8.42	±9.6
11025	AAB	IEEE 802.11be (320 MHz, MCS13, 99pc duty cycle)	WLAN	8.37	±9.6
11026	AAB	IEEE 802.11be (320 MHz, MCS0, 99pc duty cycle)	WLAN	8.39	±9.6

<sup>E</sup> Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: EX-7683\_Jul24

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# **ANNEX I: Dipole Calibration Certificate**

### 750MHz Dipole

Add: No.52 Hua YuanBei Road, Haidian District, Beijing, 100191       CNAS L0570         Tol: +86-10-62304633-2117       http://www.caict.ac.cn         Client       SAICT       Certificate No: Z22-60333         CALIBRATION CERTIFICATE       D750V3 - SN: 1163         Object       D750V3 - SN: 1163         Calibration Procedure(s)       FF-Z11-003-01 Calibration Procedures for dipole validation kits         Calibration date:       August 22, 2022         This calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the folio pages and are part of the certificate.
CALIBRATION CERTIFICATE         Object       D750V3 - SN: 1163         Calibration Procedure(s)       FF-Z11-003-01 Calibration Procedures for dipole validation kits         Calibration date:       August 22, 2022         This calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follow
Object       D750V3 - SN: 1163         Calibration Procedure(s)       FF-Z11-003-01 Calibration Procedures for dipole validation kits         Calibration date:       August 22, 2022         This calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follow
Calibration Procedure(s)       FF-Z11-003-01 Calibration Procedures for dipole validation kits         Calibration date:       August 22, 2022         This calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follow
Calibration Procedures for dipole validation kits Calibration date: Calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follo
Calibration Procedures for dipole validation kits Calibration date: Calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follo
Calibration date: August 22, 2022 This calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follo
This calibration Certificate documents the traceability to national standards, which realize the physical un measurements (SI). The measurements and the uncertainties with confidence probability are given on the follo
neasurements (SI). The measurements and the uncertainties with confidence probability are given on the follo
neasurements (SI). The measurements and the uncertainties with confidence probability are given on the follo
Calibration Equipment used (M&TE critical for calibration)
Primary Standards ID # Cal Date (Calibrated by, Certificate No.) Scheduled Calibrated
Power Meter NRP2 106277 24-Sep-21 (CTTL, No.J21X08326) Sep-22
Power sensor         NRP8S         104291         24-Sep-21 (CTTL, No.J21X08326)         Sep-22
Power sensor         NRP8S         104291         24-Sep-21 (CTTL, No.J21X08326)         Sep-22           Reference Probe EX3DV4         SN 7464         26-Jan-22(SPEAG,No.EX3-7464_Jan22)         Jan-23
Power sensor         NRP8S         104291         24-Sep-21 (CTTL, No.J21X08326)         Sep-22
Power sensor         NRP8S         104291         24-Sep-21 (CTTL, No.J21X08326)         Sep-22           Reference Probe EX3DV4         SN 7464         26-Jan-22(SPEAG,No.EX3-7464_Jan22)         Jan-23
Power sensor         NRP8S         104291         24-Sep-21 (CTTL, No.J21X08326)         Sep-22           Reference         Probe         EX3DV4         SN 7464         26-Jan-22(SPEAG,No.EX3-7464_Jan22)         Jan-23           DAE4         SN 1556         12-Jan-22(CTTL-SPEAG,No.Z22-60007)         Jan-23
Power sensor     NRP8S     104291     24-Sep-21 (CTTL, No.J21X08326)     Sep-22       Reference     Probe     EX3DV4     SN 7464     26-Jan-22(SPEAG,No.EX3-7464_Jan22)     Jan-23       DAE4     SN 1556     12-Jan-22(CTTL-SPEAG,No.Z22-60007)     Jan-23       Secondary Standards     ID #     Cal Date (Calibrated by, Certificate No.)     Scheduled Calibrated
Power sensorNRP8S10429124-Sep-21 (CTTL, No.J21X08326)Sep-22ReferenceProbeEX3DV4SN 746426-Jan-22(SPEAG,No.EX3-7464_Jan22)Jan-23DAE4SN 155612-Jan-22(CTTL-SPEAG,No.Z22-60007)Jan-23Secondary StandardsID #Cal Date (Calibrated by, Certificate No.)Scheduled CalibraSignal Generator E4438CMY4907143013-Jan-22 (CTTL, No.J22X00409)Jan-23Network Analyzer E5071CMY4611067314-Jan-22 (CTTL, No.J22X00406)Jan-23
Power sensor     NRP8S     104291     24-Sep-21 (CTTL, No.J21X08326)     Sep-22       Reference Probe EX3DV4     SN 7464     26-Jan-22(SPEAG,No.EX3-7464_Jan22)     Jan-23       DAE4     SN 1556     12-Jan-22(CTTL-SPEAG,No.Z22-60007)     Jan-23       Secondary Standards     ID #     Cal Date (Calibrated by, Certificate No.)     Scheduled Calibra       Signal Generator E4438C     MY49071430     13-Jan-22 (CTTL, No.J22X00409)     Jan-23       Network Analyzer E5071C     MY46110673     14-Jan-22 (CTTL, No.J22X00406)     Jan-23
Power sensorNRP8S10429124-Sep-21 (CTTL, No.J21X08326)Sep-22ReferenceProbeEX3DV4SN 746426-Jan-22 (SPEAG, No.EX3-7464_Jan22)Jan-23DAE4SN 155612-Jan-22 (CTTL-SPEAG, No.Z22-60007)Jan-23Secondary StandardsID #Cal Date (Calibrated by, Certificate No.)Scheduled CalibraSignal Generator E4438CMY4907143013-Jan-22 (CTTL, No.J22X00409)Jan-23Network Analyzer E5071CMY4611067314-Jan-22 (CTTL, No.J22X00406)Jan-23NameFunctionSignature
Power sensorNRP8S10429124-Sep-21 (CTTL, No.J21X08326)Sep-22ReferenceProbeEX3DV4SN746426-Jan-22(SPEAG,No.EX3-7464_Jan22)Jan-23DAE4SN155612-Jan-22(CTTL-SPEAG,No.Z22-60007)Jan-23Secondary StandardsID #Cal Date (Calibrated by, Certificate No.)Scheduled CalibraSignal GeneratorE4438CMY4907143013-Jan-22 (CTTL, No.J22X00409)Jan-23Network AnalyzerE5071CMY4611067314-Jan-22 (CTTL, No.J22X00406)Jan-23

Certificate No: Z22-60333

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### Glossary:

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

#### Calibration is Performed According to the Following Standards:

- a) 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-mounted 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) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

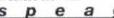
The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

Certificate No: Z22-60333

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#### **Measurement Conditions**

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ±1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	42.0	0.90 mho/m
Measured Head TSL parameters	(22.0 ±0.2) °C	41.3 ±6 %	0.90 mho/m ±6 %
Head TSL temperature change during test	<1.0 °C	-	

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.48 W/kg ± 18.8 % (k=2)
SAR averaged over 10 $cm^3$ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.62 W/kg ±18.7 % (k=2)

Certificate No: Z22-60333

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#### Appendix (Additional assessments outside the scope of CNAS L0570)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.0Ω- 4.06jΩ	
Return Loss	- 27.8dB	

#### General Antenna Parameters and Design

0.941 ns	
	0.941 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 feed-point may be damaged.

Manufactured by		SPEAG
ificate No: Z22-60333	Page 4 of 6	







### DASY5 Validation Report for Head TSL

Date: 2022-08-22

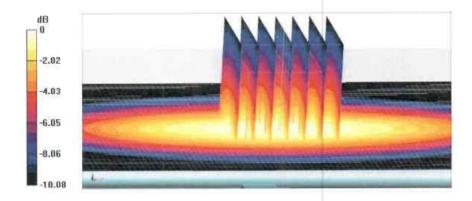
Test Laboratory: CTTL, Beijing, China **DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1163** Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz;  $\sigma = 0.902$  S/m;  $\varepsilon_r = 41.26$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN7464; ConvF(10.26, 10.26, 10.26) @ 750 MHz; Calibrated: 2022-01-26
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

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

Reference Value = 55.49 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 3.17 W/kg SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.42 W/kg Smallest distance from peaks to all points 3 dB below = 21.2 mm Ratio of SAR at M2 to SAR at M1 = 67.5% Maximum value of SAR (measured) = 2.84 W/kg

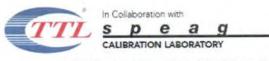


0 dB = 2.84 W/kg = 4.53 dBW/kg

Certificate No: Z22-60333

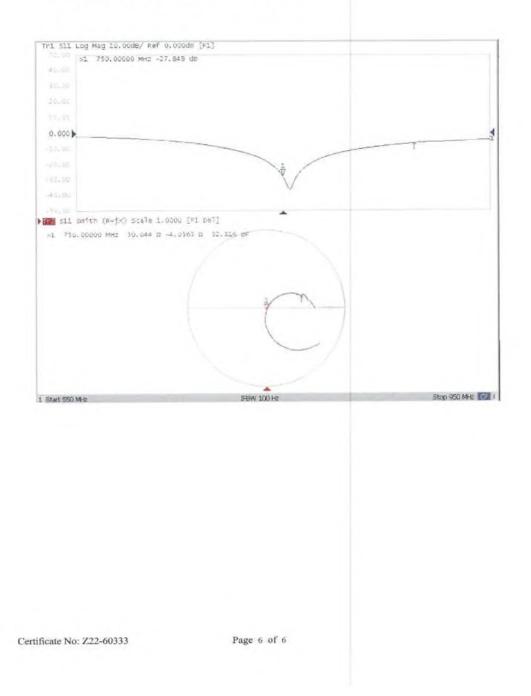
Page 5 of 6







### Impedance Measurement Plot for Head TSL





### 835MHz Dipole

Add: No.52 HuaYu Tel: +86-10-623046 E-mail: ettl & chinat Client SAICT CALIBRATION CI	33-2079 Fax: - tl.com http:/// <b>Г</b>		CALIBRATION CNAS L0570 1-60355
Client SAICT	г	Certificate No: Z2	1-60355
CALIBRATION CI	and the second labor		
Dbject			
object	DOOD /		
	D835V	2 - SN: 4d057	
Calibration Procedure(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	Octobe	r 18, 2021	
bages and are part of the ce All calibrations have been numidity<70%. Calibration Equipment used	conducted in t	he closed laboratory facility: environment t	emperature (22±3)°C and
		ar collibration)	
			Scheduled Calibration
	ID #	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22
Primary Standards	ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Sep-22 Sep-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	ID # 106277 104291 SN 7517	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG.No.Z21-60001)	Sep-22 Sep-22 Feb-22
Primary Standards Power Meter NRP2 Power sensor NRP8S	ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Sep-22 Sep-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	ID # 106277 104291 SN 7517	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG.No.Z21-60001)	Sep-22 Sep-22 Feb-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	ID # 106277 104291 SN 7517 SN 1556	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Sep-22 Feb-22 Jan-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593)	Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593)	Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG.No.Z21-60001) 15-Jan-21(SPEAG.No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232)	Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG.No.Z21-60001) 15-Jan-21(SPEAG.No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function	Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer	Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature

Certificate No: Z21-60355 Page 1 of 6





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#### Glossary:

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

#### Calibration is Performed According to the Following Standards:

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

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Certificate No: Z21-60355

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#### Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.64 W/kg ± 18.8 % (k=2)
SAR averaged over 10 $cm^3$ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.29 W/kg ± 18.7 % (k=2)

Certificate No: Z21-60355

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 http://www.chinattl.cn

#### Appendix (Additional assessments outside the scope of CNAS L0570)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8Ω- 4.19jΩ	
Return Loss	- 27.5dB	

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.301 ns
----------------------------------	----------

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

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

### Additional EUT Data

Manufactured by	SPEAG
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Certificate No: Z21-60355

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#### DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 10.18.2021

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d057** Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma = 0.886$  S/m;  $\epsilon_r = 40.9$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Right Section

DASY5 Configuration:

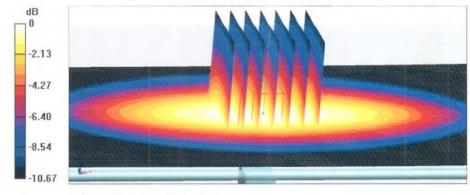
- Probe: EX3DV4 SN7517; ConvF(9.81, 9.81, 9.81) @ 835 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4): SEMCAD X Version 14.6.14 (7501)

**Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 58.86 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.68 W/kgSAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.56 W/kgSmallest distance from peaks to all points 3 dB below = 18 mm

Ratio of SAR at M2 to SAR at M1 = 64.9%

Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

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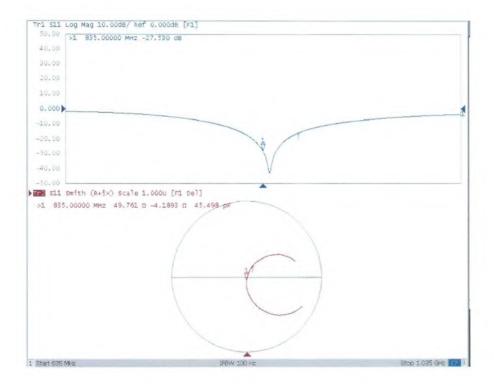
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Impedance Measurement Plot for Head TSL



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### 1750MHz Dipole

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Tel: +86-10-62304633-2117 E-mail: emf@caiet.ac.cn	http://www.eaic	and the second	
Client SAIC			22-60335
CALIBRATION CI	ERTIFICAT	Е	
Object	D1750	/2 - SN: 1152	
Calibration Procedure(s)			
		-003-01 tion Procedures for dipole validation kits	
Calibration date:		22, 2022	
THE SECOND PROPERTY AND A CONTRACT OF A CONTRA	August	22, 2022	
270370	asurements and	the uncertainties with confidence probability	are given on the following
pages and are part of the ce			
	conducted in t	he closed laboratory facility: environment or calibration)	temperature (22±3)°C and
All calibrations have been humidity<70%. Calibration Equipment used	conducted in t		
All calibrations have been humidity<70%. Calibration Equipment used	conducted in t (M&TE critical for	or calibration)	
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S	conducted in t (M&TE critical for ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22 Sep-22
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	Conducted in t (M&TE critical for ID # 106277 104291 SN 7464	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22)	Scheduled Calibration Sep-22 Sep-22 Jan-23
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S	conducted in t (M&TE critical for ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22 Sep-22
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	Conducted in t (M&TE critical for ID # 106277 104291 SN 7464	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22)	Scheduled Calibration Sep-22 Sep-22 Jan-23
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	conducted in t (M&TE critical fo ID # 106277 104291 SN 7464 SN 1556	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007)	Scheduled Calibration Sep-22 Sep-22 Jan-23 Jan-23
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards	conducted in t (M&TE critical fo ID # 106277 104291 SN 7464 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration Sep-22 Sep-22 Jan-23 Jan-23 Scheduled Calibration
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	conducted in t (M&TE critical for 106277 104291 SN 7464 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406)	Scheduled Calibration Sep-22 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	conducted in t (M&TE critical fo 1D # 106277 104291 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function	Scheduled Calibration Sep-22 Sep-22 Jan-23 Jan-23 Scheduled Calibration Jan-23
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	conducted in t (M&TE critical for 106277 104291 SN 7464 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406)	Scheduled Calibration Sep-22 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	conducted in t (M&TE critical fo 1D # 106277 104291 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function	Scheduled Calibration Sep-22 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23

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### Glossary:

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

#### Calibration is Performed According to the Following Standards:

- a) 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-mounted 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) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

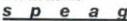
The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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#### Measurement Conditions

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

DASY Version	DASY52	52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ±6 %	1.41 mho/m ±6 %
Head TSL temperature change during test	<1.0 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.3 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.6 W/kg ±18.7 % (k=2)

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#### Appendix (Additional assessments outside the scope of CNAS L0570)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.9Ω- 0.71jΩ
Return Loss	- 32.8dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.120 ns	
----------------------------------	----------	--

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 feed-point may be damaged.







#### DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 2022-08-22

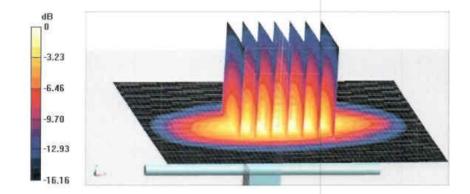
**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1152** Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz;  $\sigma = 1.408$  S/m;  $\epsilon_r = 41.28$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN7464; ConvF(8.52, 8.52, 8.52) @ 1750 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

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

```
Reference Value = 91.44 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.18 W/kg; SAR(10 g) = 4.94 W/kg
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 56.3%
Maximum value of SAR (measured) = 14.0 W/kg
```

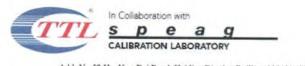


0 dB = 14.0 W/kg = 11.46 dBW/kg

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#### Impedance Measurement Plot for Head TSL

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797.020 1550	Neg 10.00de/ Ref 0.000de [r1] 1.7500000 GHz -32.785 de		
40.00	1.7500000 642 -32.785 88		
20.00			
10.00			
0.000			
19,00			
30,00		N.	
-20.00			
- 502, 000	(0+jx) Scale 1.0000 [F1 Del]	*	

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### 1900MHz Dipole

	CALIBRA	TION LABORATORY	NAS 按准
Add: No.52 HuaYu Tel: +86-10-623046 E-mail: ettl @chinat	633-2079 Fax: -	District, Beljing, 100191, Chi *86-10-62304633-2504 www.chinattl.en	CALIBRATIO CNAS L0570
Client SAI	СТ	Certificate No: Z	21-60357
CALIBRATION C	ERTIFICAT	E	Mar Road
Object	D1900	V2 - SN: 5d088	
Calibration Procedure(s)	EE 714	-003-01	
		tion Procedures for dipole validation kits	
Calibration date:			
Janualuu uale.	Octobe	r 18, 2021	
All calibrations have been humidity<70%. Calibration Equipment used		he closed laboratory facility: environment or calibration)	temperature $(22\pm3)^{\rm eC}$ and
numidity<70%. Calibration Equipment used		or calibration)	
numidity<70%. Calibration Equipment used	(M&TE critical fo		
numidity<70%. Calibration Equipment used Primary Standards	(M&TE critical fo	or calibration) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Dumidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	(M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22
umidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S	(M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22 Sep-22 Feb-22
Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	(M&TE critical fo ID # 106277 104291 SN 7517	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG,No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21)	Scheduled Calibration Sep-22 Sep-22 Feb-22
Dumidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Scheduled Calibration Sep-22 Sep-22 Feb-22 ) Jan-22
Primary Standards Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards	(M&TE critical fo 1D # 106277 104291 SN 7517 SN 1556 ID #	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG,No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration
Primary Standards Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	(M&TE critical fe ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG,No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22
Primary Standards Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.)         24-Sep-21 (CTTL, No.J21X08326)         24-Sep-21 (CTTL, No.J21X08326)         03-Feb-21 (CTTL-SPEAG, No.Z21-60001)         15-Jan-21 (SPEAG, No.DAE4-1556_Jan21)         Cal Date (Calibrated by, Certificate No.)         01-Feb-21 (CTTL, No.J21X00593)         14-Jan-21 (CTTL, No.J21X00232)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22

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lossary:

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

#### Calibration is Performed According to the Following Standards:

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

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.39 mho/m ± 6 %.
Head TSL temperature change during test	<1.0 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.5 W/kg ± 18.7 % (k=2)

Certificate No: Z21-60357

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#### Appendix (Additional assessments outside the scope of CNAS L0570)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7Ω+ 6.80jΩ
Return Loss	- 22.6dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.110 ns	
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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

Certificate No: Z21-60357

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#### DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 10.18.2021

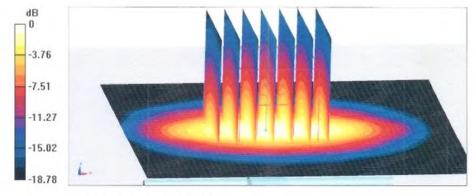
#### **DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d088** Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz; $\sigma = 1.387$ S/m; $\varepsilon_t = 39.88$ ; $\rho = 1000$ kg/m<sup>3</sup> Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN7517; ConvF(7.81, 7.81, 7.81) @ 1900 MHz; Calibrated: 2021-02-03
- · Sensor-Surface: 1,4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 103.6 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 19.2 W/kg

SAR(1 g) = 10 W/kg; SAR(10 g) = 5.1 W/kg Smallest distance from peaks to all points 3 dB below = 10 mm Ratio of SAR at M2 to SAR at M1 = 52.1% Maximum value of SAR (measured) = 15.8 W/kg



0 dB = 15.8 W/kg = 11.99 dBW/kg

Certificate No: Z21-60357

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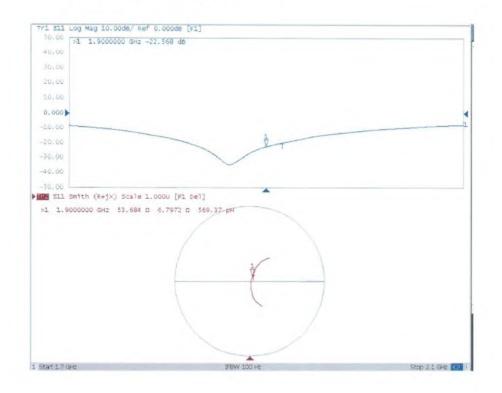


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Impedance Measurement Plot for Head TSL



Certificate No: Z21-60357

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### 2450MHz Dipole

	CALIBRA	TION LABORATORY	NAS 肉际互认
Add: No.52 HuaYu Tel: +86-10-623046		District, Beijing, 100191, Chi 86-10-62304633-2504	CALIBRATIO
E-mail: ettl@chinat	tl.com http://	www.chinattl.en	a management
Client SAIC	Т	Certificate No: Z2	1-60358
CALIBRATION CI	ERTIFICAT	E	and the second
Object	D2450	V2 - SN: 873	
Calibration Procedure(s)	EE 744	-003-01	
		tion Procedures for dipole validation kits	
Colibration date:			
Calibration date:	Octobe	or 21, 2021	
pages and are part of the ce	ertificate.		
	conducted in t	he closed laboratory facility; environment t or calibration)	emperature (22±3)°C and
All calibrations have been humidity<70%. Calibration Equipment used	conducted in t (M&TE critical for	or calibration)	
All calibrations have been numidity<70%. Calibration Equipment used	conducted in t		emperature (22±3)°C and Scheduled Calibration Sep-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards	Conducted in t (M&TE critical for ID #	or calibration) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	conducted in t (M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S	conducted in t (M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22 Sep-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	conducted in t (M&TE critical fo ID # 106277 104291 SN 7517 SN 1556	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards	conducted in t (M&TE critical fe ID # 106277 104291 SN 7517	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG.No.Z21-60001) 15-Jan-21(SPEAG.No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration Sep-22 Sep-22 Feb-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	conducted in t (M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID #	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	conducted in t (M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG.No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	conducted in t (M&TE critical fr 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	conducted in t (M&TE critical for ID# 106277 104291 SN 7517 SN 1556 ID# MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.)         24-Sep-21 (CTTL, No.J21X08326)         24-Sep-21 (CTTL, No.J21X08326)         03-Feb-21 (CTTL-SPEAG.No.Z21-60001)         15-Jan-21 (SPEAG.No.DAE4-1556_Jan21)         Cal Date (Calibrated by, Certificate No.)         01-Feb-21 (CTTL, No.J21X00593)         14-Jan-21 (CTTL, No.J21X00232)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	conducted in t (M&TE critical for 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG.No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22

Certificate No: Z21-60358

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#### Glossary:

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

#### Calibration is Performed According to the Following Standards:

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

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
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	39.5 ± 6 %	1.81 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

#### SAR result with Head TSL

SAR averaged over 1 $cm^3$ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.2 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg ± 18.7 % (k=2)

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### Appendix (Additional assessments outside the scope of CNAS L0570)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6Ω+ 1.26jΩ
Return Loss	- 28.8dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.066 ns
----------------------------------	----------

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

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

#### Additional EUT Data

Manufactured by	SPEAG
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Certificate No: Z21-60358

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#### DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 10.21.2021

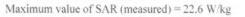
**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873** Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz;  $\sigma = 1.809$  S/m;  $\epsilon_r = 39.51$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Right Section

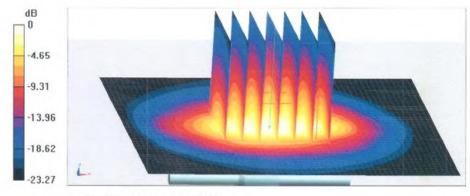
DASY5 Configuration:

- Probe: EX3DV4 SN7517; ConvF(7.34, 7.34, 7.34) @ 2450 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP\_V5.1C (20deg probe tilt): Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW; DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

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

```
Reference Value = 108.0 \text{ V/m}; Power Drift = -0.03 \text{ dB}
Peak SAR (extrapolated) = 28.0 \text{ W/kg}
SAR(1 g) = 13.3 \text{ W/kg}; SAR(10 g) = 6.05 \text{ W/kg}
Smallest distance from peaks to all points 3 dB below = 9.2 \text{ mm}
Ratio of SAR at M2 to SAR at M1 = 46.9\%
```





0 dB = 22.6 W/kg = 13.54 dBW/kg

Certificate No: Z21-60358

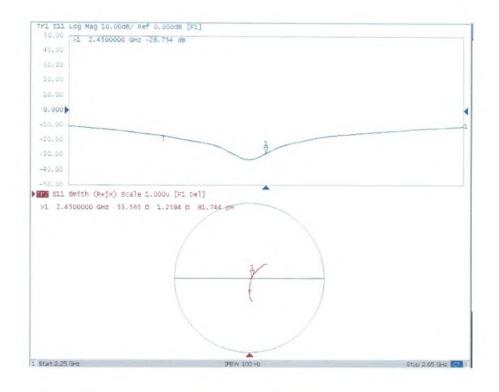
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Impedance Measurement Plot for Head TSL



Certificate No: Z21-60358

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## 2550MHz Dipole

	, Switzerland	Hac MBA	S Schweizerischer Kalibrierdienst C Service suisse d'étalonnage Servizio svizzero di taratura S wiss Calibration Service
ccredited by the Swiss Accreditation he Swiss Accreditation Service luitilateral Agreement for the rec	is one of the signatorie		Accreditation No.: SCS 0108
lient SAICT Shenzhen		Certificate No	D2550V2-1010_Apr24
CALIBRATION C	ERTIFICAT		Range Ral
Dbject	D2550V2 - SN:10	010	
Calibration procedure(s)	QA CAL-05.v12 Calibration Proce	dure for SAR Validation Source	s between 0.7-3 GHz
Calibration date:	April 23, 2024		
The measurements and the uncertain	ainties with confidence pr	robability are given on the following pages a y facility: environment temperature $(22 \pm 3)$	ind are part of the certificate.
he measurements and the uncerta II calibrations have been conducte Calibration Equipment used (M&TE	ainties with confidence pr ad in the closed laborator E critical for calibration)	robability are given on the following pages a y facility: environment temperature $(22 \pm 3)$	ind are part of the certificate. *C and humidity < 70%,
he measurements and the uncerta Il calibrations have been conducte alibration Equipment used (M&TE rimary Standards	ainties with confidence pr ad in the closed laborator E critical for calibration)	robability are given on the following pages a y facility: environment temperature (22 ± 3) Cal Date (Certificate No.)	ind are part of the certificate. *C and humidity < 70%, Scheduled Calibration
he measurements and the uncerta Il calibrations have been conducte alibration Equipment used (M&TE rimary Standards jower meter NRP2	ainties with confidence pr ad in the closed laborator E critical for calibration)	robability are given on the following pages a y facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 26-Mar-24 (No. 217-04036/04037)	Ind are part of the certificate. "C and humidity < 70%. Scheduled Calibration Mar-25
he measurements and the uncerta all calibrations have been conducte calibration Equipment used (M&TE trimary Standards tower meter NRP2 tower sensor NRP-Z91	ainties with confidence pr ad in the closed laborator E critical for calibration)	robability are given on the following pages a y facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 26-Mar-24 (No. 217-04036/04037) 26-Mar-24 (No. 217-04036)	ind are part of the certificate. *C and humidity < 70%, Scheduled Calibration
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he measurements and the uncerta all calibrations have been conducte calibration Equipment used (M&TE trimary Standards tower meter NRP2 tower sensor NRP-Z91 tower sensor NRP-Z91 teference 20 dB Attenuator	ainties with confidence pr ed in the closed laborator E critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: BH9394 (20k)	Cal Date (Certificate No.)           26-Mar-24 (No. 217-04036/04037)           26-Mar-24 (No. 217-04036)	Ind are part of the certificate. *C and humidity < 70%. Scheduled Calibration Mar-25 Mar-25 Mar-25 Mar-25 Mar-25 Mar-25
The measurements and the uncertain All calibrations have been conducted Calibration Equipment used (M&TE Primary Standards Prower sensor NRP-291 Yower sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination	ainties with confidence pr ad in the closed laborator E critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245	Cal Date (Certificate No.)           26-Mar-24 (No. 217-04036/04037)           26-Mar-24 (No. 217-04036)           26-Mar-24 (No. 217-04036)           26-Mar-24 (No. 217-04036)           26-Mar-24 (No. 217-04037)           26-Mar-24 (No. 217-04037)           26-Mar-24 (No. 217-04047)	Ind are part of the certificate. "C and humidity < 70%. Scheduled Calibration Mar-25 Mar-25 Mar-25 Mar-25
he measurements and the uncerta all calibrations have been conducte calibration Equipment used (M&TE trimary Standards tower meter NRP2 tower sensor NRP-Z91 tower sensor NRP-Z91 teference 20 dB Attenuator ype-N mismatch combination teference Probe EX3DV4	ainties with confidence pr ed in the closed laborator E critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327	Cal Date (Certificate No.)           26-Mar-24 (No. 217-04036/04037)           26-Mar-24 (No. 217-04036)	Ind are part of the certificate. *C and humidity < 70%. Scheduled Calibration Mar-25 Mar-25 Mar-25 Mar-25 Mar-25 Mar-25 Mar-25 Mar-25
he measurements and the uncerta all calibrations have been conducte calibration Equipment used (M&TE trimary Standards rower meter NRP2 rower sensor NRP-291 lever sensor NRP-291 teference 20 dB Attenuator type-N mismatch combination teference Probe EX3DV4 0AE4 secondary Standards	ainties with confidence pr ad in the closed laborator critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID #	robability are given on the following pages a ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 26-Mar-24 (No. 217-04036/04037) 26-Mar-24 (No. 217-04036) 26-Mar-24 (No. 217-04037) 26-Mar-24 (No. 217-04046) 26-Mar-24 (No. 217-04047) 03-Nov-23 (No. EX3-7349_Nov23) 30-Jan-24 (No. DAE4-601_Jan24) Check Date (in house)	Ind are part of the certificate. *C and humidity < 70%. Scheduled Calibration Mar-25 Mar-25 Mar-25 Mar-25 Mar-25 Mov-24 Jan-25 Scheduled Check
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#### Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



 S
 Schweizerischer Kalibrierdienst

 C
 Service suisse d'étalonnage

 Servizio svizzero di taratura
 Swiss Calibration Service

Accreditation No.: SCS 0108

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

### 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%.

Certificate No: D2550V2-1010\_Apr24

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## Measurement Conditions

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

DASY Version	DASY52	
Extrapolation	and the second se	V52.10.4
Phantom	Advanced Extrapolation	
Distance Director	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	with Spacer
Frequency		
	2550 MHz ± 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

Nominal Head TSL parameters	Temperature	Permittivity	Conductivity
	22.0 °C	39.1	
Measured Head TSL parameters	(22.0 ± 0.2) °C		1.91 mho/m
Head TSL temperature change during test		37.6±6%	1.98 mho/m ± 6 %
result with Head TSI	< 0.5 °C		

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	and the second s	
	250 mW input power	14.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	
		55.0 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	AND CONSTRUCTION OF THE	
SAR for nominal Head To:	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.0 W/kg ± 16.5 % (k=2)

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# Appendix (Additional assessments outside the scope of SCS 0108)

## Antenna Parameters with Head TSL

Impedance, transformed to feed point	
Return Loss	53.3 Ω - 2.9 jΩ
Total and the second se	- 27.4 dB

## General Antenna Parameters and Design

Electrical Delay (one direction)	
	1.153 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

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the

## Additional EUT Data

F

Manufactured by SPEAG

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## DASY5 Validation Report for Head TSL

Test Laboratory: SPEAG, Zurich, Switzerland

Date: 23.04.2024

# DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1010

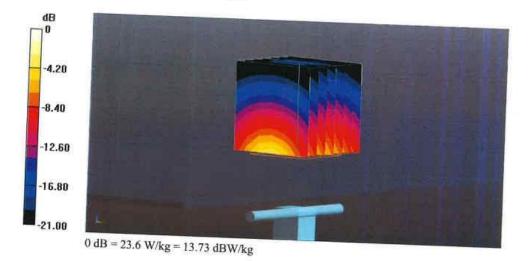
Communication System: UID 0 - CW; Frequency: 2550 MHz Medium parameters used: f = 2550 MHz;  $\sigma = 1.98$  S/m;  $\epsilon_r = 37.6$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.85, 7.85, 7.85) @ 2550 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; 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=5mmReference Value = 118.6 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 29.0 W/kg SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.35 W/kg Smallest distance from peaks to all points 3 dB below = 9 mm Ratio of SAR at M2 to SAR at M1 = 48.4% Maximum value of SAR (measured) = 23.6 W/kg

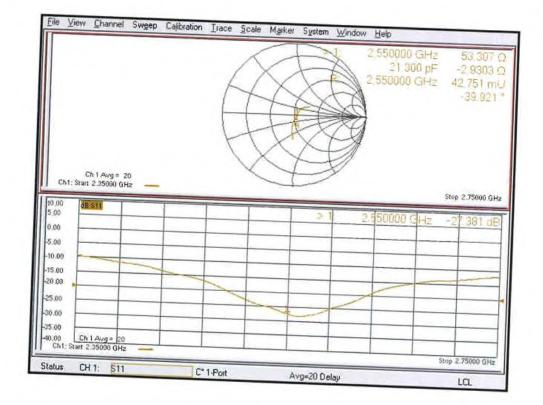


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Impedance Measurement Plot for Head TSL



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## **5GHz Dipole**

Add: No.52 HuaYuanBei Ro Tel: +86-10-62304633-2117 E-mail: emf@caict.ac.en	http://www.caic	17185	
		ac cn	
Client SAIC	100-0		22-60336
CALIBRATION CI	ERTIFICAT	E	
Object	D5GHz	2V2 - SN: 1238	
Calibration Procedure(s)			
odibiddon i rooddaro(3)		-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	August	17, 2022	
the second se			
bages and are part of the ca All calibrations have been humidity<70%. Calibration Equipment used	ertificate. conducted in t	the uncertainties with confidence probability he closed laboratory facility: environment or calibration) Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326)	
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All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	ID # 106277 104291	he closed laboratory facility: environment or calibration) Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326)	temperature (22±3)℃ and Scheduled Calibration Sep-22
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bages and are part of the ca All calibrations have been humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	ertificate. conducted in t (M&TE critical fe ID # 106277 104291 SN 7464 SN 1556 ID # MY49071430 MY46110673	he closed laboratory facility: environment or calibration) Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No. J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function	temperature (22±3)℃ and Scheduled Calibration Sep-22 Sep-22 Jan-23 Jan-23 Scheduled Calibration Jan-23
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Certificate No: Z22-60336

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### Glossary:

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

### Calibration is Performed According to the Following Standards:

- a) 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-mounted 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) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Certificate No: Z22-60336

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#### Measurement Conditions

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

DASY Version	DASY52	52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
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 5750 MHz ± 1 MHz	

#### Head TSL parameters at 5250MHz

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	36.3 ±6 %	4.64 mho/m ±6 %
Head TSL temperature change during test	<1.0 °C		

### SAR result with Head TSL at 5250MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.7 W/kg ±24.4 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.8 W/kg ±24.2 % (k=2)

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### Head TSL parameters at 5600MHz

	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	35.2 ±6 %	5.01 mho/m ±6 %
Head TSL temperature change during test	<1.0 °C	-	-

#### SAR result with Head TSL at 5600MHz

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	82.6 W/kg ±24.4 % (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	23.6 W/kg ±24.2 % (k=2)

#### Head TSL parameters at 5750MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ±0.2) °C	35.0 ±6 %	5.18 mho/m ±6 %
Head TSL temperature change during test	<1.0 °C	-	-

### SAR result with Head TSL at 5750MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.87 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	78.5 W/kg ±24.4 % (k=2)
SAR averaged over 10 $cm^3$ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.1 W/kg ±24.2 % (k=2)

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#### Appendix (Additional assessments outside the scope of CNAS L0570)

#### Antenna Parameters with Head TSL at 5250MHz

Impedance, transformed to feed point	48.4Ω- 3.36jΩ	
Return Loss	- 28.5dB	

#### Antenna Parameters with Head TSL at 5600MHz

Impedance, transformed to feed point	50.8Ω+ 2.69jΩ
Return Loss	- 31.1dB

#### Antenna Parameters with Head TSL at 5750MHz

Impedance, transformed to feed point	53.5Ω+ 2.34jΩ	
Return Loss	- 27.9dB	

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.098 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 feed-point may be damaged.

#### Additional EUT Data

	SPEAG	
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	Page 5 of 8	







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#### DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 2022-08-17

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1238** Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz Duty Cycle: 1:1 Medium parameters used: f = 5250 MHz;  $\sigma$  = 4.643 S/m;  $\epsilon_r$  = 36.34;  $\rho$  = 1000 kg/m<sup>3</sup> Medium parameters used: f = 5600 MHz;  $\sigma$  = 5.006 S/m;  $\epsilon_r$  = 35.17;  $\rho$  = 1000 kg/m<sup>3</sup> Medium parameters used: f = 5750 MHz;  $\sigma$  = 5.18 S/m;  $\epsilon_r$  = 34.96;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

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

- Probe: EX3DV4 SN7464; ConvF(5.43, 5.43, 5.43) @ 5250 MHz; ConvF(4.91, 4.91, 4.91) @ 5600 MHz; ConvF(4.85, 4.85, 4.85) @ 5750 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 67.66 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 31.9 W/kg SAR(1 g) = 7.95 W/kg; SAR(10 g) = 2.27 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 65.1%

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

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 68.44 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 35.2 W/kg SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.37 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 63.5% Maximum value of SAR (measured) = 20.1 W/kg

Certificate No: Z22-60336

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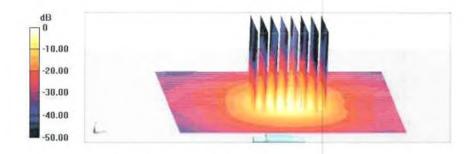






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Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.17 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 35.8 W/kg SAR(1 g) = 7.87 W/kg; SAR(10 g) = 2.22 W/kg Smallest distance from peaks to all points 3 dB below = 7.4 mm Ratio of SAR at M2 to SAR at M1 = 61.3% Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg = 12.88 dBW/kg

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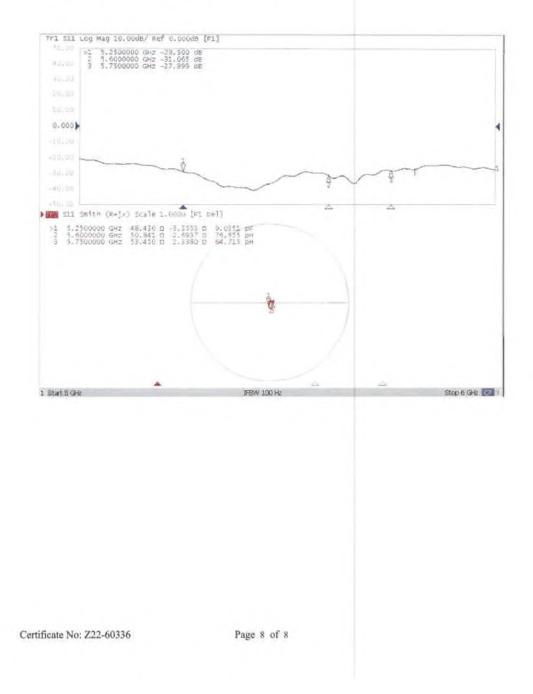






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Impedance Measurement Plot for Head TSL





## **CLA13 Dipole**

ghausstrasse 43, 8004 Zurich, S	iwitzerland		Servizio svizzero di taratura Swiss Calibration Service
credited by the Swiss Accreditation e Swiss Accreditation Service is ultilateral Agreement for the reco	s one of the signatories		Accreditation No.: SCS 0108
ient SAICT Shenzhen	a la thair	Certificate No	CLA13-1039_Aug23
CALIBRATION CE	RTIFICATE		
Dbject	CLA13 - SN: 1039	1	
	QA CAL-15.v10 Calibration Procee	dure for SAR Validation Source	es below 700 MHz
Calibration date:	August 18, 2023		
All calibrations have been conducted	d in the closed laboratory	y facility: environment temperature (22 $\pm$ 3)	
NI calibrations have been conducter Calibration Equipment used (M&TE	d in the closed laboratory		
NI calibrations have been conducter Calibration Equipment used (M&TE Primary Standards	d in the closed laboratory critical for calibration)	y facility: environment temperature (22 $\pm$ 3)	°C and humidity < 70%.
NI calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2	d in the closed laboratory critical for calibration) ID #	y facility: environment temperature (22 ± 3) Cal Date (Certificate No.)	°C and humidity < 70%. Scheduled Calibration
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91	d in the closed laboratory critical for calibration) ID # SN: 104778	y facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 30-Mar-23 (No. 217-03804/03805)	°C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x)	Cal Date (Certificate No.) 30-Mar-23 (No. 217-03804/03805) 30-Mar-23 (No. 217-03804) 30-Mar-23 (No. 217-03805) 30-Mar-23 (No. 217-03805) 30-Mar-23 (No. 217-03809)	°C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Mar-24
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327	Cal Date (Certificate No.) 30-Mar-23 (No. 217-03804/03805) 30-Mar-23 (No. 217-03804) 30-Mar-23 (No. 217-03805) 30-Mar-23 (No. 217-03805) 30-Mar-23 (No. 217-03809) 30-Mar-23 (No. 217-03810)	°C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Mar-24 Mar-24
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x)	Cal Date (Certificate No.) 30-Mar-23 (No. 217-03804/03805) 30-Mar-23 (No. 217-03804) 30-Mar-23 (No. 217-03805) 30-Mar-23 (No. 217-03805) 30-Mar-23 (No. 217-03809)	°C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Mar-24
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327 SN: 3877	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         20-Mar-23 (No. 217-03809)         20-Mar-23 (No. 217-03809)         20-Mar-23 (No. 217-03809)         20-Mar-23 (No. 217-03810)         06-Jan-23 (No. DAE4-654_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)	°C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Scheduled Check
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327 SN: 3654 ID # SN: 107193	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03810)         06-Jan-23 (No. EX3-3877_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)         08-Nov-21 (in house check Dec-22)	*C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24
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All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter NRP2 Power sensor NRP-291 Power sensor NRP-291	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327 SN: 3877 SN: 654 ID # SN: 107193 SN: 100922 SN: 100418	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03810)         06-Jan-23 (No. 217-03810)         06-Jan-23 (No. EX3-3877_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)         08-Nov-21 (in house check Dec-22)         15-Dec-09 (in house check Dec-22)         01-Jan-04 (in house check Dec-22)	*C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 Jan-24 In house check: Dec-24 In house check: Dec-24 In house check: Dec-24 In house check: Dec-24
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Prower meter NRP2 Prower sensor NRP-Z91 Prower sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Prower meter NRP2 Prower meter NRP2 Prower sensor NRP-Z91 Prower sensor NRP-Z91 RF generator HP 8648C	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327 SN: 3877 SN: 654 ID # SN: 107193 SN: 100922 SN: 100922 SN: 100418 SN: US3642U01700	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03810)         06-Jan-23 (No. 217-03810)         06-Jan-23 (No. EX3-3877_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)         08-Nov-21 (in house check Dec-22)         15-Dec-09 (in house check Dec-22)         01-Jan-04 (in house check Jun-22)         04-Aug-99 (in house check Jun-22)	*C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Scheduled Check In house check: Dec-24 In house check: Dec-24 In house check: Dec-24 In house check: Jun-24
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All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Power sensor NRP-Z91 RF generator HP 8648C Network Analyzer Agilent E8358A	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327 SN: 3877 SN: 654 ID # SN: 107193 SN: 100922 SN: 100922 SN: 100418 SN: US3642U01700 SN: US41080477 Name	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03810)         06-Jan-23 (No. EX3-3877_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)         08-Nov-21 (in house check Dec-22)         15-Dec-09 (in house check Dec-22)         01-Jan-04 (in house check Dec-22)         04-Aug-99 (in house check Oct-22)         31-Mar-14 (in house check Oct-22)	*C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Scheduled Check In house check: Dec-24 In house check: Dec-24 In house check: Dec-24 In house check: Jun-24
All calibrations have been conducter Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 RF generator HP 8648C	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: 0C2552 (20x) SN: 310982 / 06327 SN: 3877 SN: 654 ID # SN: 107193 SN: 100922 SN: 100418 SN: US3642U01700 SN: US41080477	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03810)         06-Jan-23 (No. 217-03810)         06-Jan-23 (No. EX3-3877_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)         08-Nov-21 (in house check Dec-22)         15-Dec-09 (in house check Dec-22)         01-Jan-04 (in house check Dec-22)         04-Aug-99 (in house check Jun-22)         31-Mar-14 (in house check Oct-22)	*C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Scheduled Check In house check: Dec-24 In house check: Dec-24 In house check: Jun-24 In house check: Jun-24 In house check: Oct-24
Calibration Equipment used (M&TE Primary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter NRP2 Power sensor NRP-Z91 Power sensor NRP-Z91 Power sensor NRP-Z91 RF generator HP 8448C Network Analyzer Agilent E8358A	d in the closed laboratory critical for calibration) ID # SN: 104778 SN: 103244 SN: 103245 SN: CC2552 (20x) SN: 310982 / 06327 SN: 3877 SN: 654 ID # SN: 107193 SN: 100922 SN: 100922 SN: 100418 SN: US3642U01700 SN: US41080477 Name	Cal Date (Certificate No.)         30-Mar-23 (No. 217-03804/03805)         30-Mar-23 (No. 217-03804)         30-Mar-23 (No. 217-03805)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03809)         30-Mar-23 (No. 217-03810)         06-Jan-23 (No. EX3-3877_Jan23)         27-Jan-23 (No. DAE4-654_Jan23)         Check Date (in house)         08-Nov-21 (in house check Dec-22)         15-Dec-09 (in house check Dec-22)         01-Jan-04 (in house check Dec-22)         04-Aug-99 (in house check Oct-22)         31-Mar-14 (in house check Oct-22)	*C and humidity < 70%. Scheduled Calibration Mar-24 Mar-24 Mar-24 Mar-24 Jan-24 Jan-24 Jan-24 Scheduled Check In house check: Dec-24 In house check: Dec-24 In house check: Jun-24 In house check: Jun-24 In house check: Oct-24

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



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

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C

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Accreditation No.: SCS 0108

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

### Glossary:

TSLtissue simulating liquidConvFsensitivity in TSL / NORM x,y,zN/Anot 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%.

Certificate No: CLA13-1039\_Aug23

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### **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	53.3 ± 6 %	0.71 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	1 W input power	0.449 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	0.466 W/kg ± 18.4 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 1 W input power	0.277 W/kg

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## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	44.2 Ω - 0.4 jΩ	
Return Loss	- 24.1 dB	

### Additional EUT Data

Manufactured by	SPEAG

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#### DASY5 Validation Report for Head TSL

Date: 18.08.2023

Test Laboratory: SPEAG, Zurich, Switzerland

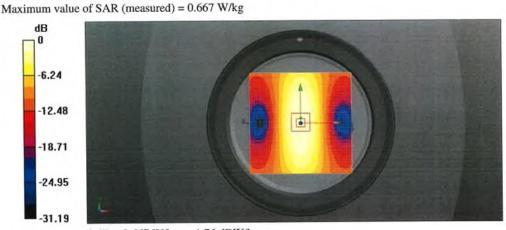
#### DUT: CLA13; Type: CLA13; Serial: CLA13 - SN: 1039

Communication System: UID 0 - CW; Frequency: 13 MHz Medium parameters used: f = 13 MHz;  $\sigma$  = 0.71 S/m;  $\epsilon$ r = 53.3;  $\rho$  = 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 = 29.61 V/m; Power Drift = -0.05 dB Peak SAR (extrapolated) = 0.925 W/kg SAR(1 g) = 0.449 W/kg; SAR(10 g) = 0.277 W/kg Smallest distance from peaks to all points 3 dB below = 20.9 mm Ratio of SAR at M2 to SAR at M1 = 78%



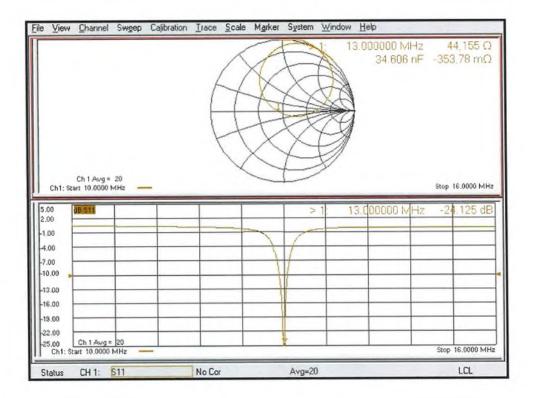
0 dB = 0.667 W/kg = -1.76 dBW/kg

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### Impedance Measurement Plot for Head TSL



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## **ANNEX J: Extended Calibration SAR Dipole**

Referring to KDB865664 D01, if dipoles are verified in return loss (<-20dBm, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

	Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)	
2022/8/22	-27.8	/	50.0	/	-4.06	/	
2023/8/22	-27.0	2.9	51.3	1.3	-3.83	0.23	
2024/8/22	-26.5	4.7	51.6	1.6	-3.67	0.39	

Justification of Extended Calibration SAR Dipole D750V3 - SN: 1163

Justification of Extended Calibration SAR Dipole D835V2 - SN: 4d057

	Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)	
2021/10/18	-27.5	/	49.8	/	-4.19	/	
2022/10/18	-26.8	2.5	51.4	1.6	-3.97	0.22	
2023/10/18	-25.5	7.3	52.6	2.8	-3.61	0.58	

Justification of Extended Calibration SAR Dipole D1750V2 - SN: 1152

	Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)	
2022/8/22	-32.8	/	47.9	/	-0.71	/	
2023/8/22	-33.7	2.7	49.6	1.7	-0.55	0.16	
2024/8/22	-34.3	4.6	50.4	2.5	-0.42	0.29	

Justification of Extended Calibration SAR Dipole D1900V2 - SN: 5d088

	Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)	
2021/10/18	-22.6	/	53.7	/	6.80	/	
2022/10/18	-22.2	1.8	54.6	0.9	6.93	0.13	
2023/10/18	-21.1	6.6	55.9	2.2	7.17	0.37	



Justification of Extended Calibration SAR Dipole D2450V2 - SN: 873							
Head							
Date of Return	-Loss	Dolta (%)	Real	Delta	Imaginary		

Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2021/10/21	-28.8	/	53.6	/	1.26	/
2022/10/20	-28.1	2.4	54.9	1.3	1.43	0.17
2023/10/20	-27.4	4.9	55.8	2.2	1.52	0.26

Justification of Extended Calibration SAR Dipole D5GHzV2– serial no.1238

	Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)	
			5250MHz				
2022/8/17	-28.5	/	48.4	/	-3.36	/	
2023/8/17	-27.6	3.2	49.5	1.1	-3.18	0.18	
2024/8/17	-26.9	5.6	50.1	1.7	-2.94	0.42	
			5600MHz				
2022/8/17	-31.1	/	50.8	/	2.69	/	
2023/8/17	-30.3	2.6	52.2	1.4	2.88	0.19	
2024/8/17	-29.5	5.1	53.6	2.8	3.03	0.34	
			5750MHz				
2022/8/17	-27.9	/	53.5	/	2.34	/	
2023/8/17	-27.1	2.9	55.1	1.6	2.45	0.11	
2024/8/17	-26.2	6.1	56.8	3.3	2.69	0.35	

Justification of Extended Calibration SAR Dipole CLA13 - SN: 1039

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2023/8/18	-24.1	/	44.2	/	-0.40	/
2024/8/18	-23.3	3.3	45.8	1.6	-0.25	0.15

The Return-Loss is <-20dB, and within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the value result should support extended cabration.



## ANNEX K: LTE Band 41 Power Class 2 and Power Class 3 Linearity

This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per May 2017 TCB Workshop Notes based on the device behavior, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the highest power and available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR for each exposure condition. The linearity between the Power Class 2 and Power Class 3 SAR results and the respective frame averaged powers was calculated to determine that the results were linear. When ULCA is active, the linearity between the Power Class 2 with ULCA active and Power Class 3 with ULCA active SAR results and the respective frame averaged powers was calculated to determine that the results were linear. Per May 2017 TCB Workshop, no additional SAR measurements were required since the linearity between power classes was < 10% and all reported SAR values were < 1.4 W/kg for 1g and < 3.5 W/kg for 10g.

LTE Band 41 SAR testing with power class 2 at the highest power and available duty factor was additionally performed for the power class 3 configuration with the highest SAR for each exposure condition.



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1	LTE Band 41	LTE Band 41				
7	(Power Class 3)	(Power Class 2)				
Maximum Tune up Power (dBm)	24.00	26.50				
Reported 1g SAR (W/kg)	0.15	0.17				
Duty Cycle	63.30%	43.30%				
Frame Averaged (mW)	159.00	193.41				
Linearity SAR (W/kg)	0.182	/				
% deviation from expected linearity	/	-6.83%				

## Table L.1: Ant.2 - LTE Band 41 Head Power Level A1/A2 Linearity Data

## Table L.2: Ant.2 - LTE Band 41 Hotspot Power Level B1/B2 Linearity Data

	LTE Band 41	LTE Band 41
1	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	24.00	26.50
Reported 1g SAR (W/kg)	0.29	0.36
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	159.00	193.41
Linearity SAR (W/kg)	0.353	/
% deviation from expected linearity	/	2.05%

## Table L.2: Ant.2 - LTE Band 41 Body-Worn Power Level B1/B2 Linearity Data

	-	-
1	LTE Band 41	LTE Band 41
1	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	24.00	26.50
Reported 1g SAR (W/kg)	0.17	0.19
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	159.00	193.41
Linearity SAR (W/kg)	0.207	/
% deviation from expected linearity	/	-8.12%



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1	LTE Band 41	LTE Band 41
7	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	21.00	21.00
Reported 1g SAR (W/kg)	1.11	0.73
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	79.69	54.51
Linearity SAR (W/kg)	0.759	/
% deviation from expected linearity	/	-3.86%

## Table L.4: Ant.4- LTE Band 41 Head Power Level A1/A2 Linearity Data

## Table L.5: Ant.4 - LTE Band 41 Hotspot Power Level B1/B2 Linearity Data

,	LTE Band 41	LTE Band 41
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	23.90	23.90
Reported 1g SAR (W/kg)	0.47	0.30
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	155.38	106.29
Linearity SAR (W/kg)	0.322	/
% deviation from expected linearity	/	-6.69%

## Table L.6: Ant.4 - LTE Band 41 Body-Worn Power Level B1/B2 Linearity Data

	-	
1	LTE Band 41	LTE Band 41
1	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	23.90	23.90
Reported 1g SAR (W/kg)	0.21	0.14
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	155.38	106.29
Linearity SAR (W/kg)	0.144	/
% deviation from expected linearity	/	-2.54%



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1	LTE Band 41	LTE Band 41
7	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	16.00	16.00
Reported 1g SAR (W/kg)	0.44	0.31
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	25.20	17.24
Linearity SAR (W/kg)	0.301	/
% deviation from expected linearity	/	3.00%

## Table L.7: Ant.5- LTE Band 41 Head Power Level A1/A2 Linearity Data

## Table L.8: Ant.5 - LTE Band 41 Hotspot Power Level B1/B2 Linearity Data

	LTE Band 41	LTE Band 41
7	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	22.30	22.30
Reported 1g SAR (W/kg)	0.85	0.54
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	107.50	73.53
Linearity SAR (W/kg)	0.581	/
% deviation from expected linearity	/	-7.13%

## Table L.9: Ant.5 - LTE Band 41 Body-Worn Power Level B1/B2 Linearity Data

	-	-
1	LTE Band 41	LTE Band 41
1	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	22.30	22.30
Reported 1g SAR (W/kg)	0.28	0.18
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	107.50	73.53
Linearity SAR (W/kg)	0.192	/
% deviation from expected linearity	/	-6.02%



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/	LTE Band 41	LTE Band 41
7	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	23.00	23.00
Reported 1g SAR (W/kg)	1.14	0.73
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	126.30	86.39
Linearity SAR (W/kg)	0.780	/
% deviation from expected linearity	/	-6.39%

## Table L.10: Ant.6- LTE Band 41 Head Power Level A1/A2 Linearity Data

## Table L.11: Ant.6 - LTE Band 41 Hotspot Power Level B1/B2 Linearity Data

	-	-
	LTE Band 41	LTE Band 41
/	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	23.20	23.20
Reported 1g SAR (W/kg)	0.46	0.33
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	132.25	90.47
Linearity SAR (W/kg)	0.315	/
% deviation from expected linearity	/	4.87%

## Table L.12: Ant.6 - LTE Band 41 Body-Worn Power Level B1/B2 Linearity Data

/	LTE Band 41 (Power Class 3)	LTE Band 41 (Power Class 2)
Maximum Tune up Power (dBm)	23.20	23.20
Reported 1g SAR (W/kg)	0.20	0.14
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	132.25	90.47
Linearity SAR (W/kg)	0.137	/
% deviation from expected linearity	/	2.33%

## \*\*\*END OF REPORT\*\*\*