

EX3DV4 - SN:7732

June 25, 2025

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10829	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	+9.6
10830	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.83	+9.6
10831	AAE	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	+9.6
10832	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	+9.6
10833	AAE	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	+9.6
10834	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	+9.6
10835	AAE	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	+9.6
10836	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	+9.6
10837	AAE	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	+9.6
10838	AAE	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	+9.6
10840	AAE	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	+9.6
10841	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	+9.6
10843	AAE	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	+9.6
10844	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	+9.6
10846	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10854	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	+9.6
10855	AAE	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.38	+9.6
10856	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	+9.6
10857	AAE	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	+9.6
10858	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.38	+9.6
10859	AAE	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.31	+9.6
10860	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10861	AAE	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	+9.6
10863	AAE	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10864	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	+9.6
10865	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10866	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	+9.6
10868	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	+9.6
10869	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	+9.6
10870	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	+9.6
10871	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	+9.6
10872	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	+9.6
10873	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	+9.6
10874	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	+9.6
10875	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	+9.6
10876	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	+9.6
10877	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
10879	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	9.12	+9.6
10880	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	+9.6
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
10883	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	+9.6
10884	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.63	+9.6
10885	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	+9.6
10886	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	+9.6
10887	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	+9.6
10888	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	+9.6
10889	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	+9.6
10890	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	+9.6
10891	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	+9.6
10892	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	+9.6
10897	AAE	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	+9.6
10899	AAE	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	+9.6
10900	AAE	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	+9.6
10900	AAE	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10901	AAE	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10902	AAE	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10903	AAE	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10904	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10905	AAE	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10906	AAE	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10907	AAE	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	+9.6
10908	AAE	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	+9.6
10909	AAE	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.90	+9.6
10910	AAE	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	+9.6

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10311	AAH	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	+9.5
10312	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.5
10313	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.5
10314	AAC	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	+9.5
10315	AAC	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	+9.5
10316	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	+9.6
10317	AAD	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.5
10318	AAE	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	+9.6
10319	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	+9.6
10320	AAB	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	+9.6
10321	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.6
10322	AAD	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	+9.6
10323	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.6
10324	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.6
10325	AAC	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	+9.6
10326	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	+9.6
10327	AAC	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	+9.6
10328	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	+9.5
10329	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	+9.5
10330	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	+9.5
10331	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	+9.5
10332	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	+9.5
10333	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	+9.5
10334	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	+9.5
10335	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	+9.5
10336	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	+9.5
10337	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	+9.5
10338	AAC	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	+9.5
10339	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	+9.5
10340	AAD	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	+9.5
10341	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	+9.5
10342	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	+9.5
10343	AAC	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	+9.6
10344	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	+9.5
10345	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	+9.5
10346	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	+9.5
10347	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	+9.5
10348	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	+9.6
10349	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	+9.5
10350	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.84	+9.5
10351	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	+9.6
10352	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	+9.6
10353	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	+9.6
10354	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	+9.6
10355	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	+9.6
10356	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	9.14	+9.6
10357	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	9.31	+9.6
10358	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	9.61	+9.6
10359	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	9.33	+9.6
10360	AAE	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	+9.6
10361	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.36	+9.6
10362	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	+9.6
10363	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	+9.6
10364	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	+9.6
10365	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	+9.6
10366	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	+9.6
10367	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	+9.6
10368	AAD	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	+9.6
10372	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	+9.6
10373	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	+9.5
10374	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.20	+9.6
10378	AAA	ULLA BDR	ULLA	1.16	+9.5
10379	AAA	ULLA HDR4	ULLA	9.53	+9.6
10380	AAA	ULLA HDR8	ULLA	10.32	+9.6
10381	AAA	ULLA HDRp4	ULLA	3.19	+9.5
10382	AAA	ULLA HDRp8	ULLA	3.43	+9.5

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10983	AAE	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
10984	AAE	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.42	±9.6
10985	AAE	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.54	±9.6
10986	AAE	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.60	±9.6
10987	AAE	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.63	±9.6
10988	AAE	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.66	±9.6
10989	AAE	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.65	±9.6
10990	AAE	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.62	±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	8.48	±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	8.98	±9.6
11012	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.88	±9.6
11013	AAE	IEEE 802.11be (320 MHz, MCS1, 96pc duty cycle)	WLAN	8.47	±9.6
11014	AAE	IEEE 802.11be (320 MHz, MCS2, 96pc duty cycle)	WLAN	8.45	±9.6
11015	AAE	IEEE 802.11be (320 MHz, MCS3, 96pc duty cycle)	WLAN	8.44	±9.6
11016	AAE	IEEE 802.11be (320 MHz, MCS4, 96pc duty cycle)	WLAN	8.44	±9.6
11017	AAE	IEEE 802.11be (320 MHz, MCS5, 96pc duty cycle)	WLAN	8.41	±9.6
11018	AAE	IEEE 802.11be (320 MHz, MCS6, 96pc duty cycle)	WLAN	8.40	±9.6
11019	AAE	IEEE 802.11be (320 MHz, MCS7, 96pc duty cycle)	WLAN	8.28	±9.6
11020	AAE	IEEE 802.11be (320 MHz, MCS8, 96pc duty cycle)	WLAN	8.27	±9.6
11021	AAE	IEEE 802.11be (320 MHz, MCS9, 96pc duty cycle)	WLAN	8.46	±9.6
11022	AAE	IEEE 802.11be (320 MHz, MCS10, 96pc duty cycle)	WLAN	8.36	±9.6
11023	AAE	IEEE 802.11be (320 MHz, MCS11, 96pc duty cycle)	WLAN	8.08	±9.6
11024	AAE	IEEE 802.11be (320 MHz, MCS12, 96pc duty cycle)	WLAN	8.42	±9.6
11025	AAE	IEEE 802.11be (320 MHz, MCS13, 96pc duty cycle)	WLAN	8.37	±9.6
11026	AAE	IEEE 802.11be (320 MHz, MCS0, 96pc duty cycle)	WLAN	8.39	±9.6

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Appendix G. – Dipole Calibration Data

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



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

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

Accreditation No.: **SCS 0108**

Client: **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **CLA13-1016_Nov25**

CALIBRATION CERTIFICATE

Object: **CLA13 - SN: 1016**

Calibration procedure(s): **QA CAL-15.v12**
 Calibration Procedure for SAR Validation Sources below 700 MHz

Calibration date: **November 13, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
 Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	29-Oct-25 (No. Part of L1407)	Oct-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04283)	Mar-26
OCP DAK-12	SN: 1016	16-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 3877	06-Jan-25 (No. EX3-3877_Jan25)	Jan-26
DAE4ip	SN: 1910	11-Mar-25 (No. DAE4ip-1910_Mar25)	Mar-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-250527)	May-26
Signal Generator R&S SMB100A	SN: 182081	27-May-25 (No. 675-CAL16-S4588-250527)	May-26
Mismatch: SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1336	09-Dec-24 (No. OCP-DAK3.5-1336_Dec24)	Dec-25

	Name	Function	Signature
Calibrated by	Kresimir Franjic	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
Issued: November 13, 2025			
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Certificate No: CLA13-1016_Nov25

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재	김	지	훈			
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Accreditation No.: **SCS 0108**

Glossary

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

Calibration is Performed According to the Following Standards

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- 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%.

CLA13 - SN: 1016

November 13, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	EL18 Flat Phantom	
EUT Positioning	Touch Position	
Zoom Scan Resolution	dx, dy = 6mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	13MHz $\pm$ 1MHz	

HSL parameters at 13 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	55.0	0.75 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	52.6 $\pm$ 6%	0.72 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 13 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	30 dBm input power	0.538 W/kg $\pm$ 18.4% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	30 dBm input power	0.333 W/kg $\pm$ 18.0% (k = 2)

CLA13 - SN: 1016

November 13, 2025

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with HSL at 13 MHz**

Impedance, transformed to feed point	53.1 Ω - 1.1 j Ω
Return Loss	-29.8 dB

Additional EUT Data

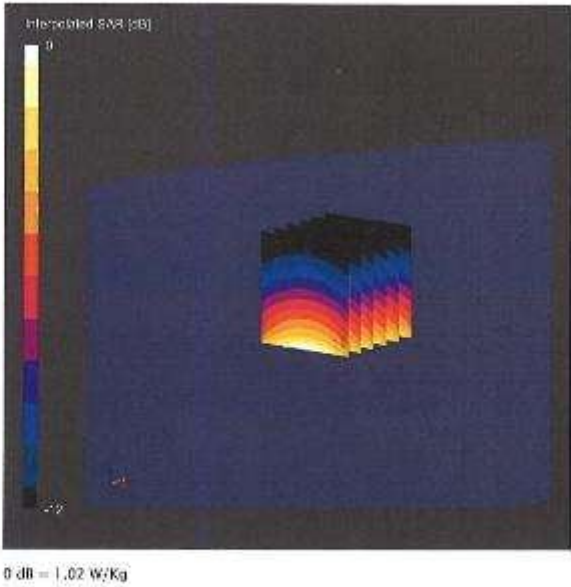
Manufactured by	SPEAG
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CLA13 - SN: 1016

November 13, 2025

System Performance Check Report

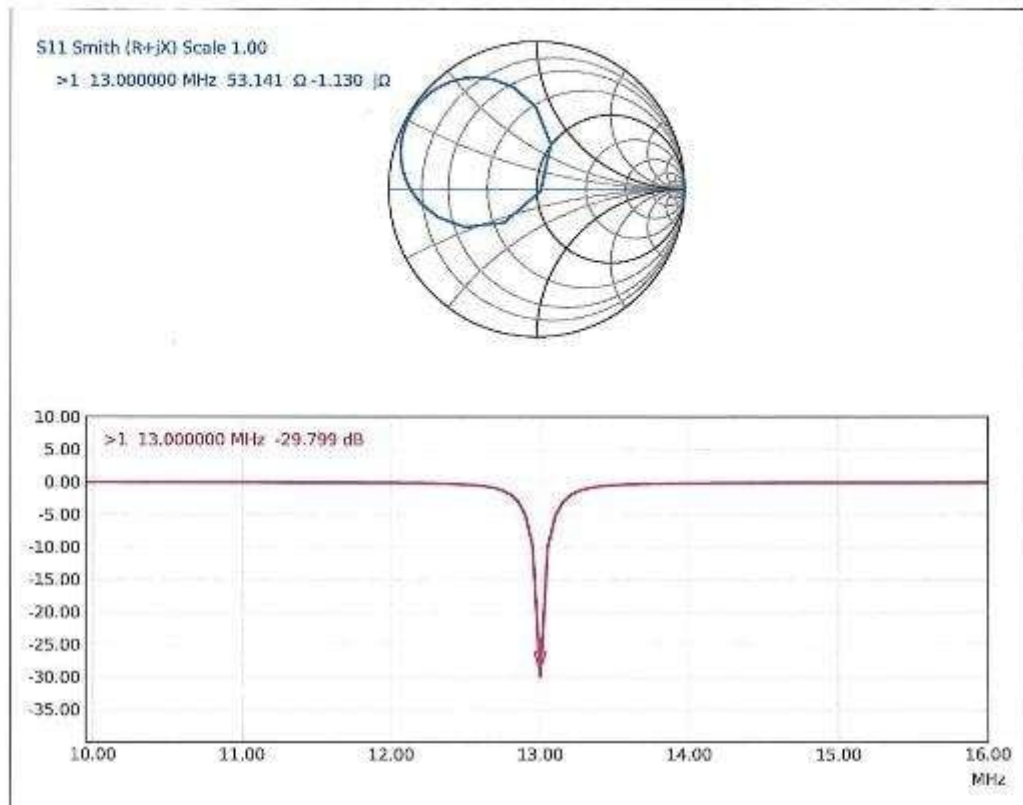
Summary							
Dipole	Frequency [MHz]	TSL	Power [dBm]				
GA11 - SN1016	13	HSL	30				
Exposure Conditions							
Phantom Section, TSL	Test Distance [mm]	Band	Group, IIR	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	0	CW, 0--	13, 0		15.48	0.72	52.6
Hardware Setup							
Phantom	TSL, Measured Date	Probe, Calibration Date	DAF, Calibration Date				
EU V8.0-1	HSL, 2025-11-13	LX3DP6 - SN3877, 2025-01-08	DAF4p Sn1510, 2025-03-11				
Scans Setup				Measurement Results			
Zoom Scan				Zoom Scan			
Grid Distance [mm]	30 x 30 x 30			Date	2025-11-13		
Grid Steps [mm]	6.0 x 6.0 x 1.5			psSAR1 g [W/Kg]	0.158		
Sensor Surface [mm]	1.6			psSAR1 Gg [W/Kg]	0.151		
Graded Grid	Yes			Power Offset [dB]	0.00		
Grading Ratio	1.5			Power Scaling	Disabled		
WMA	N/A			Scaling Factor [dB]			
Surface Detection	VWS + Sp			TSL Correction	Positive / Negative		
Scan Method	Measured						



CLA13 - SN: 1016

November 13, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client **HCT**
Gyeonggi-do, Republic of Korea

Certificate No. **D750V3-1014_May25**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1014**

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

Calibration date **May 20, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009558)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	17-Apr-25 (No. DAE4ip-1836_Apr25)	Apr-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

Calibrated by **Krešimir Franjić** Name **Krešimir Franjić** Function **Laboratory Technician** Signature

Approved by **Sven Kühn** Name **Sven Kühn** Function **Technical Manager** Signature

Issued: May 21, 2025

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Certificate No: D750V3-1014_May25

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결재	담당자	확인자
확인/일	6.5 18.5.25	13.5 18.5.25
일 자	2025 / 05.29	2025 / 05.29

Calibration Laboratory of Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 0108**

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D750V3 - SN: 1014

May 20, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with spacer
Zoom Scan Resolution	dx, dy = 6mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	750MHz $\pm$ 1MHz	

HSL parameters at 750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	41.9	0.890 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2) °C	42.9 $\pm$ 6%	0.910 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 750 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	2.21 W/kg
SAR for nominal HSL parameters	normalized to 1W	8.80 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	1.44 W/kg
SAR for nominal HSL parameters	normalized to 1W	5.73 W/kg $\pm$ 16.5% (k = 2)

D750V3 - SN: 1014

May 20, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 750 MHz

Impedance	51.7 Ω - 0.0 j Ω
Return Loss	-35.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.037 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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D750V3 - SN: 1014

May 20, 2025

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D750V3 - SN1014	750	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz]	Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	15	CM, 0---	750, 0			9.55	0.91	42.9

Hardware Setup

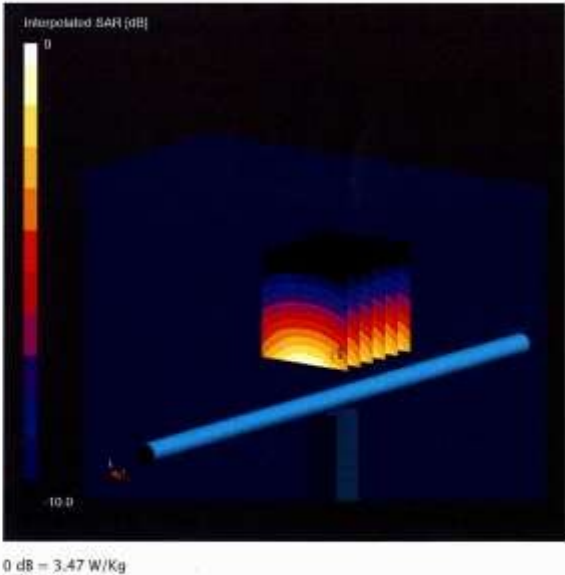
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Flat V4.0 mod	HSL, 2025-05-20	EX3DV4 - SN7340, 2025-01-10	DAE4ip Sn1830, 2025-04-17

Scans Setup

	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	6.0 x 6.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MADA	N/A
Surface Detection	VMS + Gp
Scan Method	Measured

Measurement Results

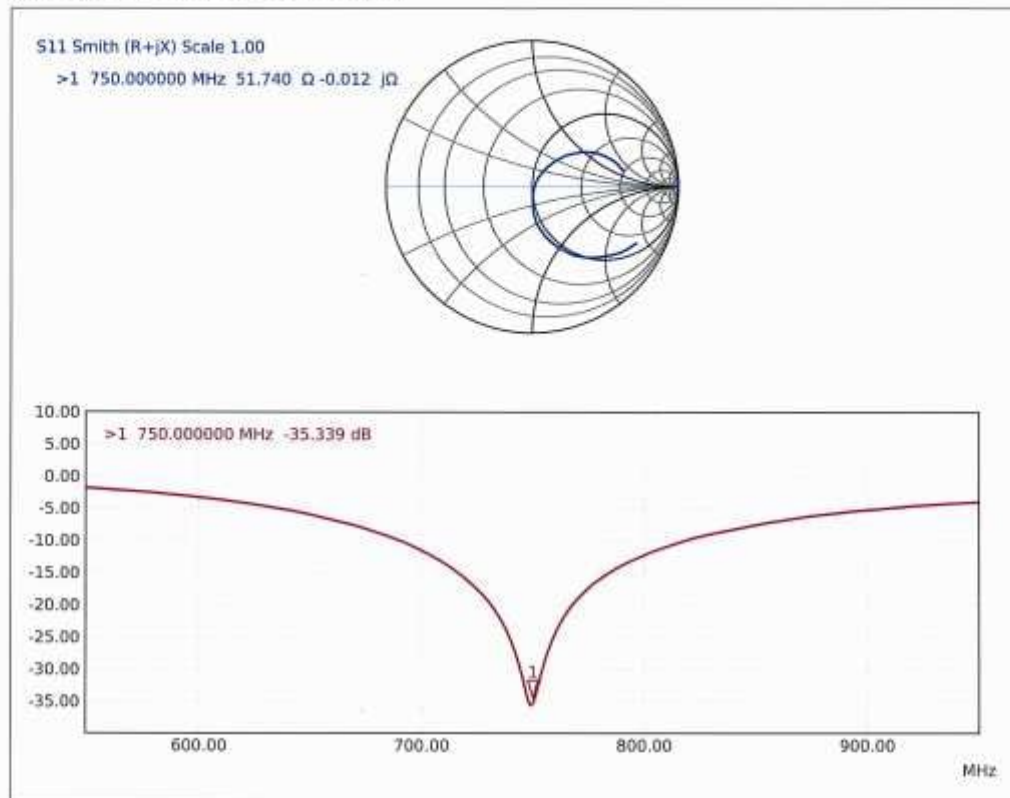
	Zoom Scan
Date	2025-05-20
psSAR1g [W/Kg]	2.21
psSAR10g [W/Kg]	1.44
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



D750V3 - SN: 1014

May 20, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **D835V2-4d165_Apr25**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d165**

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

Calibration date **April 14, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity < 70%.
 Calibration Equipment used (M&TE critical for calibration):

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 40304315009541)	Feb-25
Spectrum Analyzer R&S FSV49	SN: 101832	25-Jan-25 (No. 40304315009558)	Jan-25
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-25
ODP DAK-12	SN: 1016	24-Sept-24 (No. ODP-DAK12-1016_Sep24)	Sep-25
ODP DAK-3.5	SN: 1249	25-Sept-24 (No. ODP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX30V4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-25
DAE4ip	SN: 1830	28-Oct-24 (No. DAE4ip-1830_Oct24)	Oct-25
Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator T&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch: SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

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

Issued: April 14, 2025

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결	난 당 자	하 인 자
재	7/21/25	
서명	8.6.17/25	8.6.17/25
일 자	2025.05.07	2025.05.07

Certificate No: D835V2-4d165_Apr25

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Accreditation No.: SCS 0108

Glossary

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

Calibration Is Performed According to the Following Standards

- IEC/IECC #2209-1528, "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.
- KDB #05064, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D835V2 - SN: 4d165

April 14, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	18.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with spacer
Zoom Scan Resolution	dx, dy = 8mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	835MHz ± 1MHz	

HSL parameters at 835 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	41.5	0.900 mho/m
Measured HSL parameters	(22.0 ± 0.2) °C	42.6 ± 8%	0.930 mho/m ± 8%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 835 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	2.34 W/kg
SAR for nominal HSL parameters	normalized to 1W	9.32 W/kg ± 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	1.51 W/kg
SAR for nominal HSL parameters	normalized to 1W	6.01 W/kg ± 16.5% (k = 2)

D835V2 - SN: 40185

April 14, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 835 MHz

Impedance	50.3 Ω - 5.9 j Ω
Return Loss	-24.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.389 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	SPEAC
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D835V2 - SN: 4d165

April 14, 2025

System Performance Check Report

Summary

Device	Frequency (VW)	TSL	Power (dBm)
D835V2 - SN4d165	ATX	95.0	24

Exposure Conditions

Phantom Location, TSL	Test Distance (mm)	Band	Power, dB	Frequency (MHz)	Channel Number	Conductivity Refractive Index	SL Conductivity (cm)	TSL Penetration (cm)
Flat	75	2W, 9.0	835.0			0.51	0.33	40.8

Hardware Setup

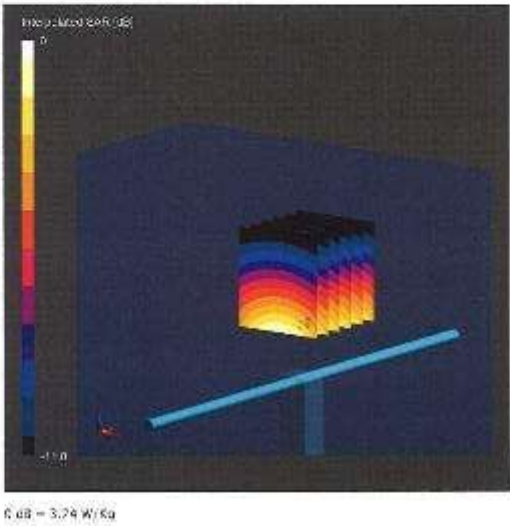
Phantom	TSL, Measured Date	Probe, Calibration Date	IME, Calibration Date
Faris, Aired	95, 2025-04-14	D835V2 - SN7577, 2025-01-10	DAB4431835, 2024-12-28

Scans Setup

	Scans Setup
Grid Dimensions (mm)	30 x 30 x 30
Grid Step (mm)	0.0 x 0.0 x 0.0
Sensor Surface (mm)	1.4
Grided Grid	Yes
Griding Ratio	1.5
RAW	Yes
Surface Detection	Yes - 2g
Scan Method	Measure

Measurement Results

	Measurement Results
DBI	2025-04-14
psdB (W/Kg)	2.34
psdB (W/Kg)	1.91
Power (dB)	0.00
Power (dB)	Disabled
Scaling Factor (dB)	Disabled
TSL Correction	Positive / Negative



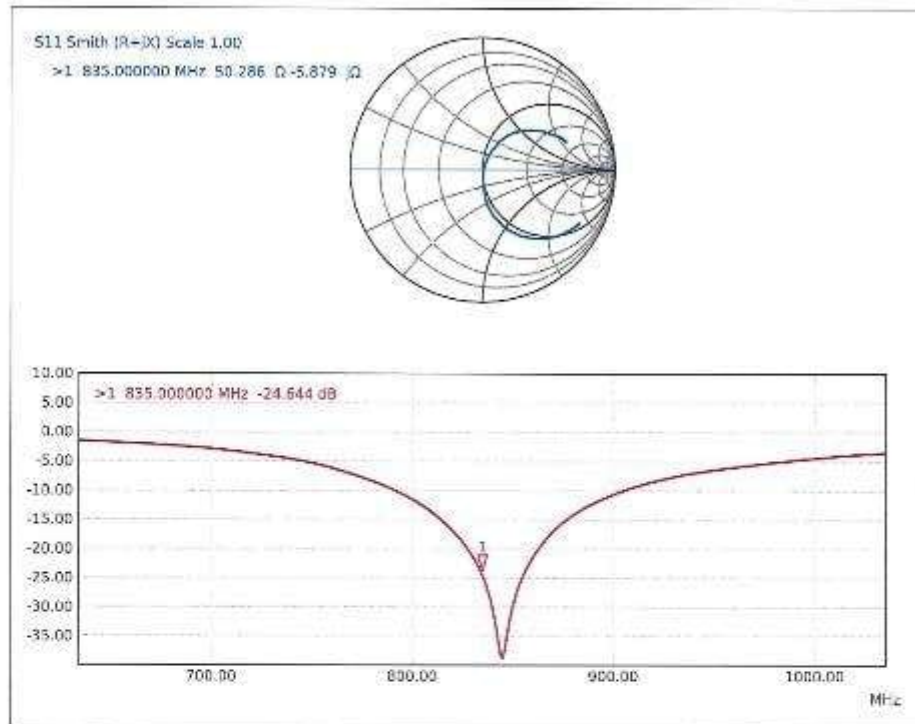
Certificate No: D835V2-4d165_Apr25

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D835V2 - SN: 4d165

April 14, 2025

Impedance Measurement Plot for HSL



Certificate No: D835V2-4d165_Apr25

Page 6 of 6

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



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Accreditation No.: **SCS 0108**

Client
HCT
 Gyeonggi-do, Republic of Korea

Certificate No.
D835V2-441_Mar26

CALIBRATION CERTIFICATE

Object
 D835V2 - SN: 441

Calibration procedure(s)
 QA CAL-05.v13
 Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date
 March 27, 2026

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility, environment temperature (22±3)°C and humidity < 70%.
 Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP40T	SN: 101861	29-Apr-25 (No. 2025-001450)	Apr-26
Power Sensor R&S NRP18AN	SN: 100961	22-Aug-25 (No. 4030A315010971)	Aug-26
Spectrum Analyzer R&S FSV40	SN: 101832	23-Jan-26 (No. 4330A315011635)	Jan-27
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	16-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	29-Jan-25 (No. EX3-7349_Jan25)	Jan-27
DAE4ip	SN: 1836	18-Feb-26 (No. DAE4ip_1836_Feb26)	Feb-27

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-250527)	May-26
Signal Generator R&S SMB100A	SN: 182081	27-May-25 (No. 675-CAL13-S4506-250527)	May-26
Mismatch SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	24-Feb-26 (No. OCP-DAK12-1029_Feb26)	Feb-27
OCP DAK-3.5	SN: 1336	10-Dec-25 (No. OCP-DAK3.5-1336_Dec25)	Dec-26

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	
Issued: March 27, 2026			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: D835V2-441_Mar26

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2026.04.10	2026.04.10	2026.04.10

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Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D835V2 - SN: 441

March 27, 2026

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with spacer
Frequency	835MHz $\pm$ 1MHz	

HSL parameters at 835 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	41.5	0.50 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2) °C	42.4 $\pm$ 6%	0.91 mho/m $\pm$ 8%
HSL temperature change during test	$\leq$ 0.5 °C		

SAR result with HSL at 835 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	2.40 W/kg
SAR for nominal HSL parameters	normalized to 1W	9.55 W/kg $\pm$ 17.0% (k= 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	1.51 W/kg
SAR for nominal HSL parameters	normalized to 1W	6.01 W/kg $\pm$ 15.5% (k= 2)

DB35V2 - SN: 441

March 27, 2026

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 835 MHz

Impedance	50.9 Ω ± 0.4 jΩ
Return Loss	-40.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.374 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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D835V2 - SN: 441

March 27, 2026

System Performance Check Report

Summary

Device	Frequency (GHz)	TSL	Power (dBm)
D835V2 - SN441	825	115	74

Exposure Conditions

Platform Section	TSL	Test Distance (mm)	Scan Group	Group ID	Frequency (MHz)	Channel Number	Correction Factor	TR Conductivity (S/cm)	IS Penetration
Hx	15	CM	0	0	825	0	5.0	0.9	-0.4

Hardware Setup

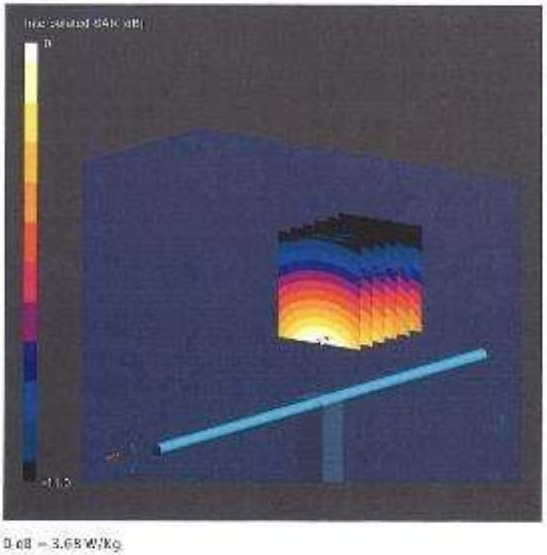
Platform	TSL Measurement Date	Probe Calibration Date	DAC Calibration Date
Hx V3.0 mod	MSL 2025-03-27	D835V4 - SN7549, 2025-01-29	D854b 5V-B35, 2025-02-18

Scans Setup

	Scans Setup
Grid Spacing (mm)	20 x 20 x 20
Grid Steps (mm)	6.0 x 6.0 x 1.5
Sensor Surface (mm)	1.5
Graded Unit	99%
Grading Ratio	1.5
SRM	100%
Surface Detection	YMS + Sp
Scan Method	Repeated

Measurement Results

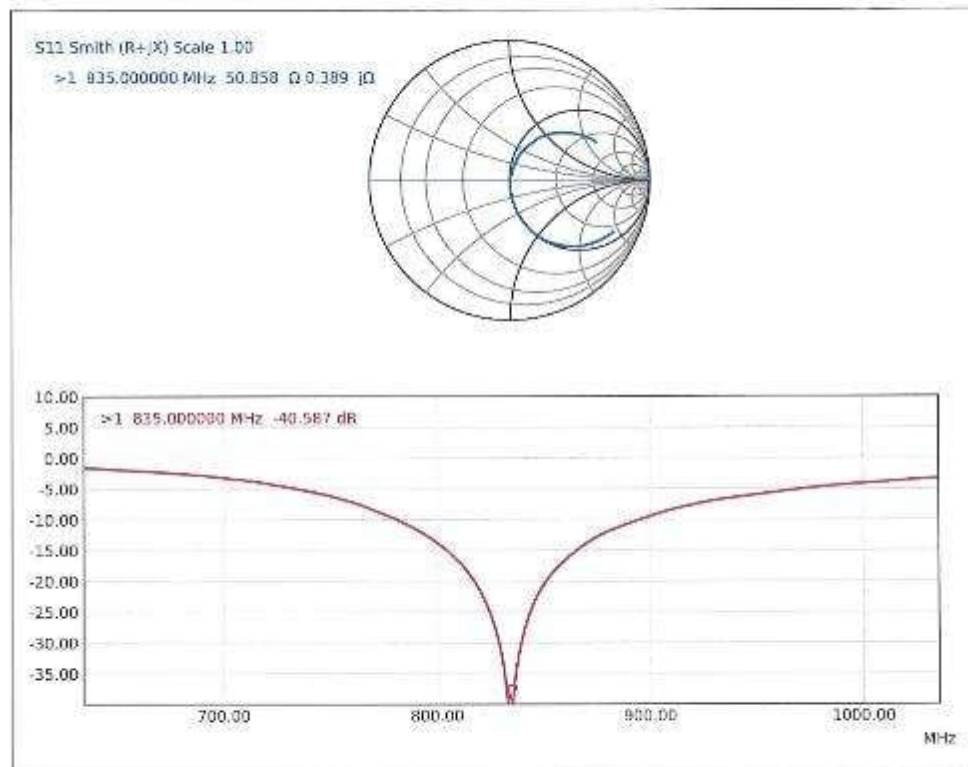
	Measurement Results
Date	2025-03-22
ex5557m (W/Kg)	2.40
ex5557m (W/Kg)	1.0
Power Eff (dB)	-0.05
Power Spillover	Disabled
Scaling Factor (dB)	
SL Collection	Positive / Negative



D835V2 - SN: 441

March 27, 2026

Impedance Measurement Plot for HSL



Certificate No: D835V2-441 Mar26

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Accreditation No.: SCS 0108

Client **HCT**
Gyeonggi-do, Republic of Korea

Certificate No. **D1640V2-345_Jul25**

CALIBRATION CERTIFICATE

Object **D1640V2 - SN: 345**

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

Calibration date **July 7, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100957	28-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sep-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sep-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	17-Apr-25 (No. DAE4ip-1836_Apr25)	Apr-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Sources_Box-250527)	May-26
Signal Generator R&S SMG100A	SN: 162061	27-May-25 (No. 675-CAL16-S4586-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1336	09-Dec-24 (No. OCP-DAK3.5-1336_Dec24)	Dec-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Köhn	Technical Manager	
			Issued: July 8, 2025
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Certificate No: D1640V2-345_Jul25

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Calibration Laboratory of Schmid & Partner Engineering AG

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Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D1640V2 - SN: 345

July 7, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 6mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	1640MHz $\pm$ 1MHz	

HSL parameters at 1640 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	40.2	1.31 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2) °C	41.1 $\pm$ 6%	1.29 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 1640 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	8.49 W/kg
SAR for nominal HSL parameters	normalized to 1W	33.8 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	4.62 W/kg
SAR for nominal HSL parameters	normalized to 1W	18.4 W/kg $\pm$ 16.5% (k = 2)

D1640V2 - SN: 345

July 7, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 1640 MHz

Impedance	48.7 Ω + 6.2 j Ω
Return Loss	-23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.232 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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D1640V2 - SN: 345

July 7, 2025

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D1640V2 - SN145	1640	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10	CW, 0--	1640, 0		7.84	1.29	41.1

Hardware Setup

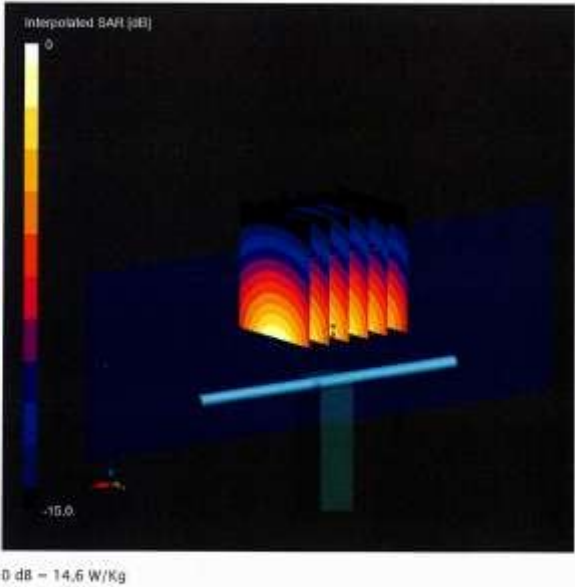
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2025-07-07	EX10V4 - SN7349, 2025-01-10	DAE4ip Sn1836, 2025-04-17

Scans Setup

	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	6.0 x 6.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + Gp
Scan Method	Measured

Measurement Results

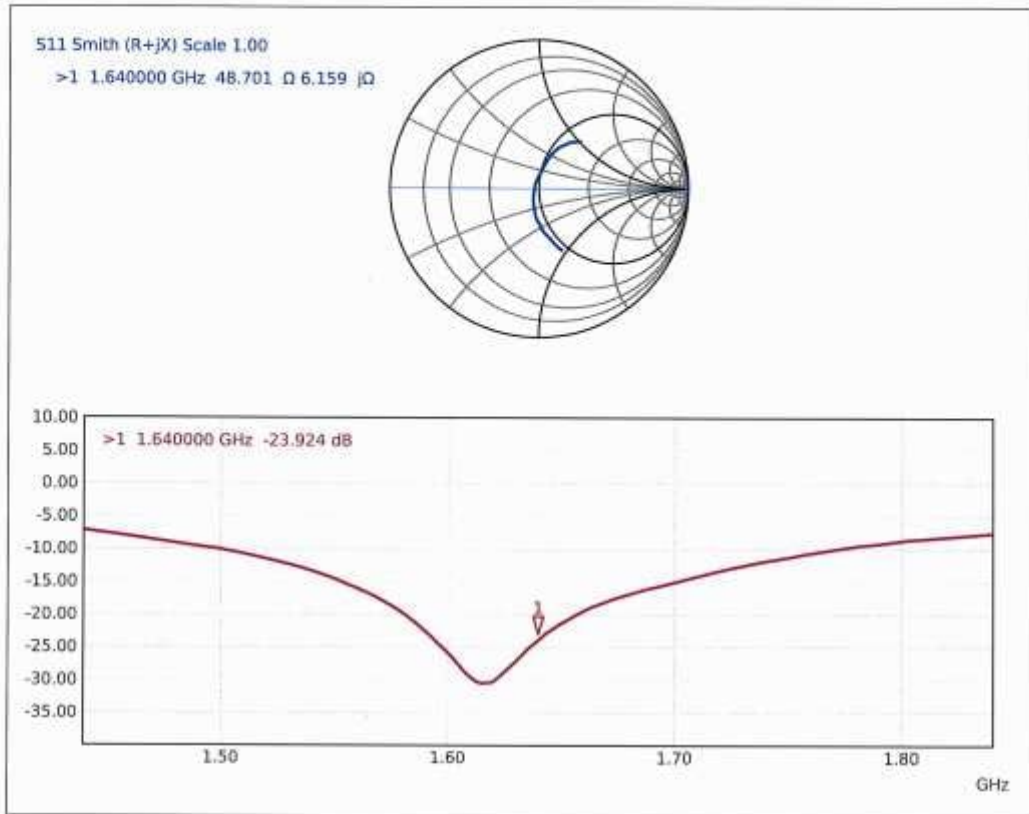
	Zoom Scan
Date	2025-07-07
piSAR1g [W/Kg]	8.49
piSAR10g [W/Kg]	4.62
Power Drift [dB]	0.01
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



D1640V2 - SN: 345

July 7, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **D1800V2-2d015_Apr25**

CALIBRATION CERTIFICATE

Object **D1800V2 - SN: 2d015**

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

Calibration date **April 17, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
 Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX30V4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1662	05-Nov-24 (No. DAE4ip-1662_Nov24)	Nov-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SM5100A	SN: 182061	28-May-24 (No. 675-CAL16-S4568-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Claudio Leubler	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
			Issued: April 22, 2025
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

결	담당자	확인자
제	김기현	
발행일	2025/04/22	2025/04/22
판	2025/05/02	2025/05/02

Certificate No: D1800V2-2d015_Apr25

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Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D1800V2 - SN: 2d015

April 17, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 6mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	1800MHz $\pm$ 1MHz	

HSL parameters at 1800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	40.0	1.40 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	41.3 $\pm$ 6%	1.39 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 1800 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	9.56 W/kg
SAR for nominal HSL parameters	normalized to 1W	38.1 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	5.04 W/kg
SAR for nominal HSL parameters	normalized to 1W	20.1 W/kg $\pm$ 16.5% (k = 2)

D1800V2 - SN: 2d015

April 17, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 1800 MHz

Impedance	46.8 Ω - 4.1 j Ω
Return Loss	-25.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.214 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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D1800V2 - SN: 2d015

April 17, 2025

System Performance Check Report

Summary

Dipole	Frequency (MHz)	TSL	Power (dBm)
D1800V2 - SN:2d015	1800	<95	24

Exposure Conditions

Phantom Section, TSL	Test Distance (mm)	Band	Group, UHF	Frequency (MHz)	Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Permittivity
Flat	10	CW, 0--	1800, 0			7.94	1.38	41.3

Hardware Setup

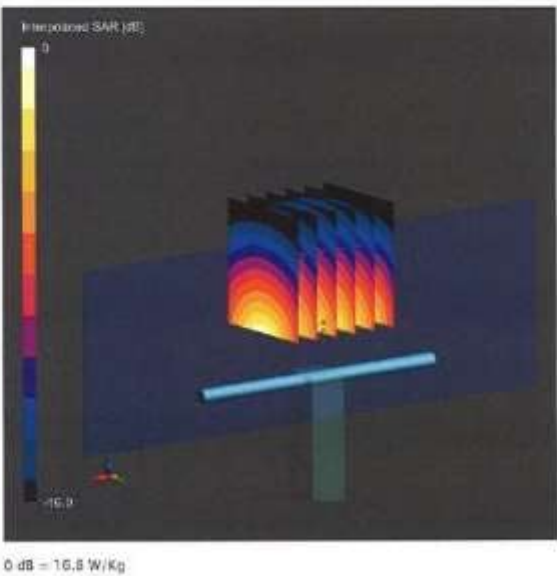
Phantom	TSL Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2025-04-17	EX30V4 - SN7349, 2025-01-10	DAE4(a) SN1882, 2024-11-05

Scans Setup

	Zoom Scan
Grid Extents (mm)	30 x 30 x 30
Grid Steps (mm)	5.0 x 5.0 x 1.5
Sensor Surface (mm)	1.8
Coated Grid	Yes
Coating Ratio	1.5
MARA	N/A
Surface Detection	VMS - Sp
Scan Method	Measured

Measurement Results

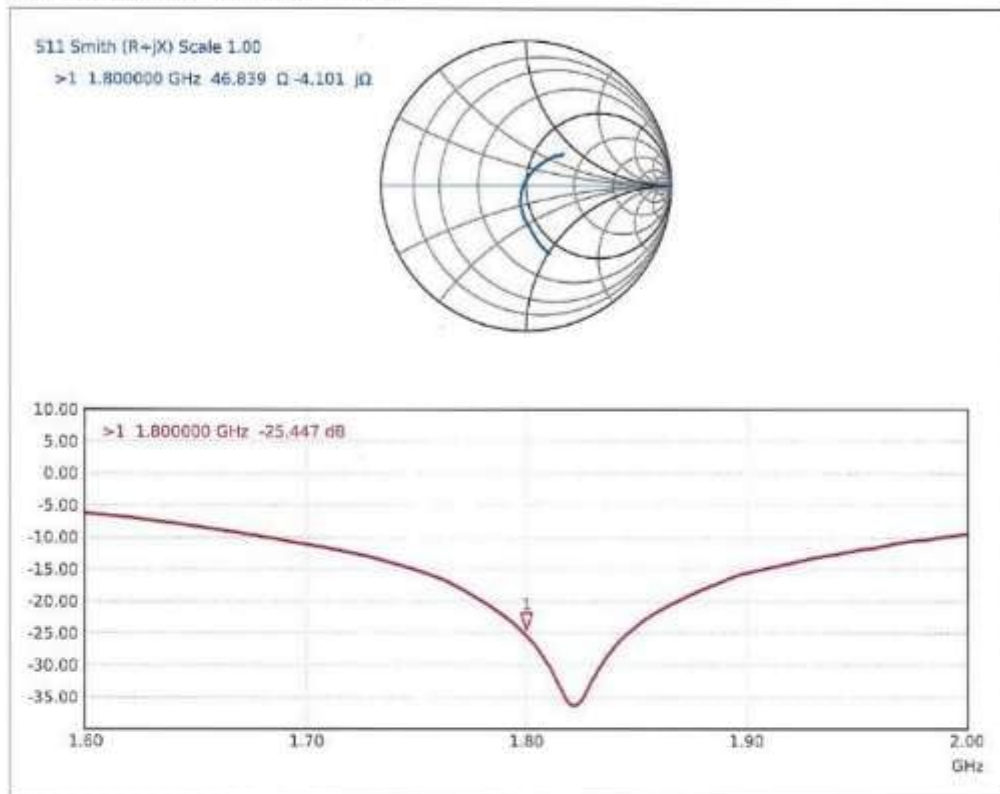
	Zoom Scan
Date	2025-04-17
µSAR1g (W/Kg)	0.56
µSAR10g (W/Kg)	5.04
Power Dx (R) (dB)	0.05
Power Scaling	Disabled
Scaling Factor (dB)	
TSL Correction	Positive / Negative



D1800V2 - SN: 2d015

April 17, 2025

Impedance Measurement Plot for HSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
 Zeughausstrasse 45, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 0108**

Client
HCT
 Gyeonggi-do, Republic of Korea

Certificate No.
D1800V2-2d007_Mar26

CALIBRATION CERTIFICATE

Object
 D1800V2 - SN: 2d007

Calibration procedure(s)
 QA CAL-05.v13
 Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date
 March 12, 2026

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP40T	SN: 101861	29-Apr-25 (No. 2025-001450)	Apr-26
Power Sensor R&S NRP18AN	SN: 100961	22-Aug-25 (No. 4030AS15010971)	Aug-26
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-26 (No. 4030A315011865)	Jan-27
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	16-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	29-Jan-26 (No. EX3-7349_Jan26)	Jan-27
DAE4ip	SN: 1836	18-Feb-26 (No. DAE4ip-1836_Feb26)	Feb-27

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-26 (No. 675-ACAD_Source_Box-F50527)	May-26
Signal Generator R&S SMB100A	SN: 182081	27-May-26 (No. 675-CAL16-S4568-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	24-Feb-26 (No. OCP-DAK12-1029_Feb26)	Feb-27
OCP DAK-3.5	SN: 1836	10-Dec-25 (No. OCP-DAK3.5-1836_Dec25)	Dec-26

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
			Issued: March 13, 2026
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Certificate No: D1800V2-2d007_Mar26

Page 1 of 6

결	단	보	사	파	인	자
제	7월 21일					
직	BL 11120			40 11180		
일	2026.03.26			2026.03.26		

Calibration Laboratory of
Schmid & Partner
Engineering AG
 Zeughausstrasse 48, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 0108**

Glossary

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

Calibration is Performed According to the Following Standards

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D1800V2 - SN: 2d007

March 12, 2026

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Frequency	1800MHz $\pm$ 1MHz	

HSL parameters at 1800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	40.0	1.40 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	39.8 $\pm$ 6%	1.35 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 1800 MHz

SAR averaged over 1 cm ² (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	8.55 W/kg
SAR for nominal HSL parameters	normalized to 1W	38.0 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	5.03 W/kg
SAR for nominal HSL parameters	normalized to 1W	20.0 W/kg $\pm$ 16.5% (k = 2)

D1800V2 - SN: 2d007

March 12, 2026

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 1800 MHz

Impedance	45.4 Ω - 7.7 j Ω
Return Loss	-20.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured. The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------

D1800V2 - SN: 2d007

March 12, 2026

System Performance Check Report

Summary

Dipole	Frequency (MHz)	TSL	Power (dBm)
D1800V2 - SN2d007	1800	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance (mm)	Band	Group, UIC	Frequency (MHz)	Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Permittivity
Flx	10	CW, D		1800, 0		7.95	1.35	30.8

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAS, Calibration Date
MTP V6.0 Center	HSL 2026-03-12	DD10V4 - 997149, 2026-01-29	DAB4p S1836, 2026-02-18

Scans Setup

	Zoom Scan
Grid Distance (mm)	30 x 30 x 30
Grid Steps (mm)	0.0 x 0.0 x 1.5
Sensor Surface Area	1.4
Graded Grid	Yes
Grading Ratio	1.5
Scale	N/A
Surface Detection	WPS + Ep
Scan Method	Measured

Measurement Results

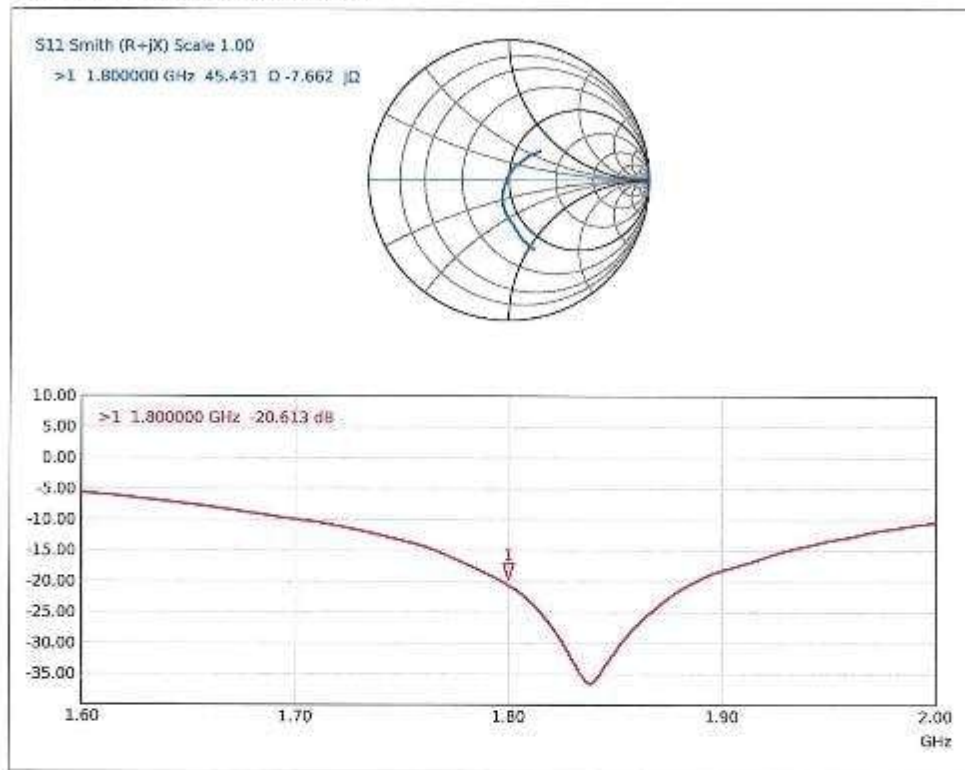
	Zoom Scan
Date	2026-03-12
meSAR _{1g} (W/Kg)	0.55
meSAR _{10g} (W/Kg)	5.03
Power Shift (dB)	0.00
Power Scaling	Corrected
Scaling Factor (dB)	
TSL Correction	Positive / Negative



D1800V2 - SN: 20007

March 12, 2026

Impedance Measurement Plot for HSL



Calibration Laboratory of
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Accreditation No.: **SCS 0108**

Client **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **D1900V2-5d032_Jan26**

CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d032

Calibration procedure(s) QA CAL-05.v13
 Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date January 28, 2026

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
 Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP40T	SN: 101651	29-Apr-25 (No. 2025-001453)	Apr-26
Power Sensor R&S NRP18A	SN: 101659	08-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101632	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	16-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4p	SN: 1836	28-Nov-25 (No. DAE4p-1836_Nov25)	Nov-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-200527)	May-26
Signal Generator R&S SMP100A	SN: 182081	27-May-25 (No. 675-CAL16-S4588-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1336	10-Dec-25 (No. OCP-DAK3.5-1336_Dec25)	Dec-26

	Name	Function	Signature
Calibrated by	Claudio Leubler	Laboratory Technician	
Approved by	Sven Köhn	Technical Manager	
			Issued: January 29, 2026
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: D1900V2-5d032_Jan26

Page 1 of 6

결	김기현	화영자
재	DL 김기현	BS / 682
작성/일	2026.02.05	2026.02.05

Calibration Laboratory of Schmid & Partner Engineering AG

Zaugghausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D1900V2 - SN: 5d032

January 28, 2026

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Frequency	1900MHz $\pm$ 1MHz	

HSL parameters at 1900 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	40.0	1.40 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	41.3 $\pm$ 6%	1.41 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 1900 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	9.96 W/kg
SAR for nominal HSL parameters	normalized to 1W	39.7 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	5.26 W/kg
SAR for nominal HSL parameters	normalized to 1W	20.9 W/kg $\pm$ 16.5% (k = 2)

D1900V2 - SN: 5d032

January 28, 2026

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 1900 MHz

Impedance	53.6 Ω + 6.6 j Ω
Return Loss	-22.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.182 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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D1900V2 - SN: 5d032

January 28, 2026

System Performance Check Report

Summary

Dipole	Frequency (MHz)	TSL	Power (dBm)
D1900V2 - SN5d032	1920	-5SL	24

Exposure Conditions

Phantom Section, TSL	Test Distance (mm)	Kind	Group, LID	Frequency (MHz), Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Perm. Const.
Flat	10	CW, D--	TS02, B	1920, B	7.68	1.41	<1.5

Hardware Setup

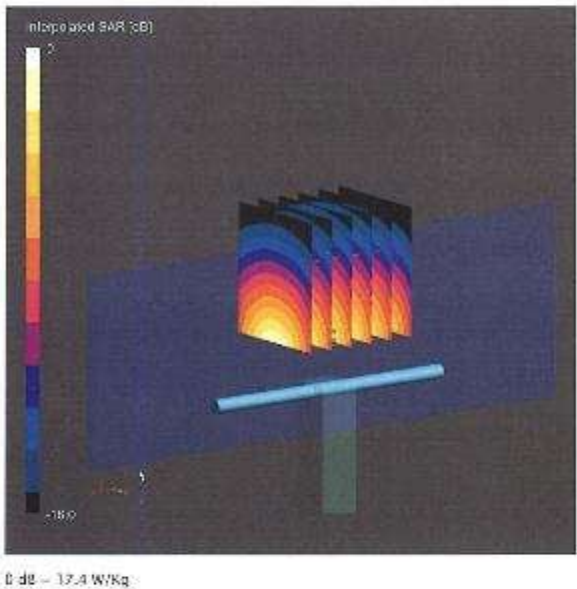
Phantom	TSL Measured Date	Probe, Calibration Date	DAE, Calibration Date
MTP V1.0 Center	USL, 2026-01-28	EX3DVR - SN7340, 2025-01-10	EAR4q-5r1838, 2025-11-26

Scans Setup

	Zoom Scan
Grid Distance (mm)	30 x 30 x 10
Grid Steps (mm)	0.0 x 0.0 x 1.5
Sensor Surface (mm)	1.4
Coated Grid	Yes
Coating Ratio	1.5
MAPS	N/A
Surface Detection	VMS + SS
Scan Method	Measured

Measurement Results

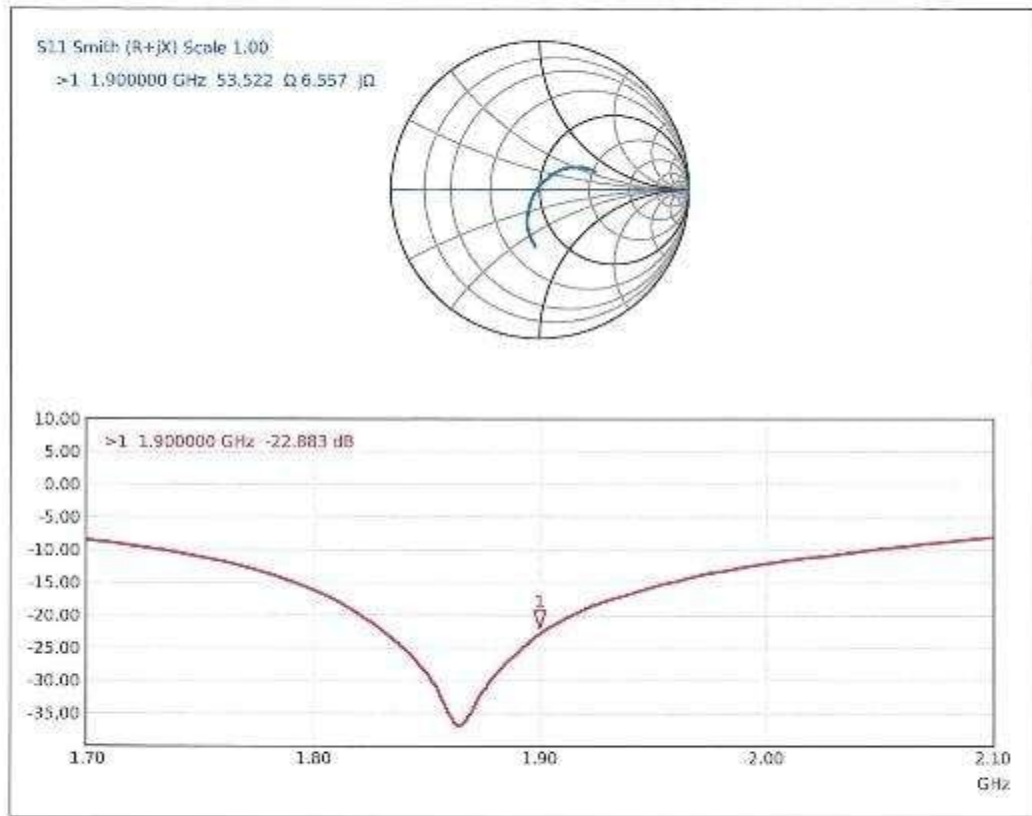
	Zoom Scan
Date	2026-01-28
psSAR1q (W/Kg)	9.36
psSAR10q (W/Kg)	5.26
Power Crft (dB)	0.01
Power Scaling	Disabled
Scaling Factor (dB)	
TSL Correction	Positive / Negative



D1900V2 - SN: 5d032

January 28, 2026

Impedance Measurement Plot for HSL



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Accreditation No.: SCS 0108

Client **HCT**
Gyeonggi-do, Republic of Korea

Certificate No. **D2300V2-1010_May25**

CALIBRATION CERTIFICATE

Object **D2300V2 - SN: 1010**

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

Calibration date **May 19, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	17-Apr-25 (No. DAE4ip-1836_Apr25)	Apr-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

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

Issued: May 19, 2025

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Certificate No: D2300V2-1010_May25

Page 1 of 6

결재	담당자	화인자
확인/발행	63 / 105183	63 / 105183
일 자	2025 / 0529	2025 / 0529

Calibration Laboratory of Schmid & Partner Engineering AG

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Accreditation No.: **SCS 0108**

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D2300V2 - SN: 1010

May 19, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2300MHz $\pm$ 1MHz	

HSL parameters at 2300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	39,5	1.67 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	38.2 $\pm$ 6%	1.69 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 2300 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	12.2 W/kg
SAR for nominal HSL parameters	normalized to 1W	48.6 W/kg $\pm$ 17,0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	5.93 W/kg
SAR for nominal HSL parameters	normalized to 1W	23.6 W/kg $\pm$ 16,5% (k = 2)

D2300V2 - SN: 1010

May 19, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 2300 MHz

Impedance	48.5 Ω – 1.9 j Ω
Return Loss	-32.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.17 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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D2300V2 - SN: 1010

May 19, 2025

System Performance Check Report

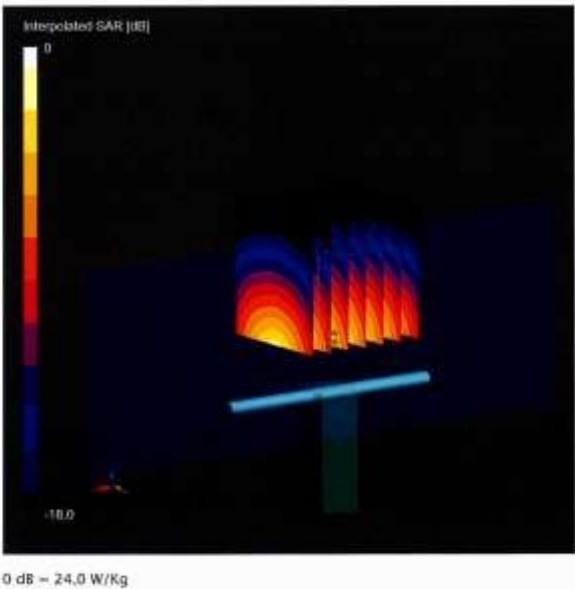
Summary			
Dipole	Frequency [MHz]	TSL	Power [dBm]
D2300V2 - SN1010	2300	HSL	-24

Exposure Conditions							
Phantom Section, TSL	Test Distance [mm]	Sand	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	1.0		CW, 0=	2300.0	7.48	1.69	38.2

Hardware Setup			
Phantom	TSL Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2025-05-19	EX3DV4 - SN7349, 2025-01-10	DAE4g Sn1836, 2025-04-17

Scans Setup	
	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	5.0 x 5.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

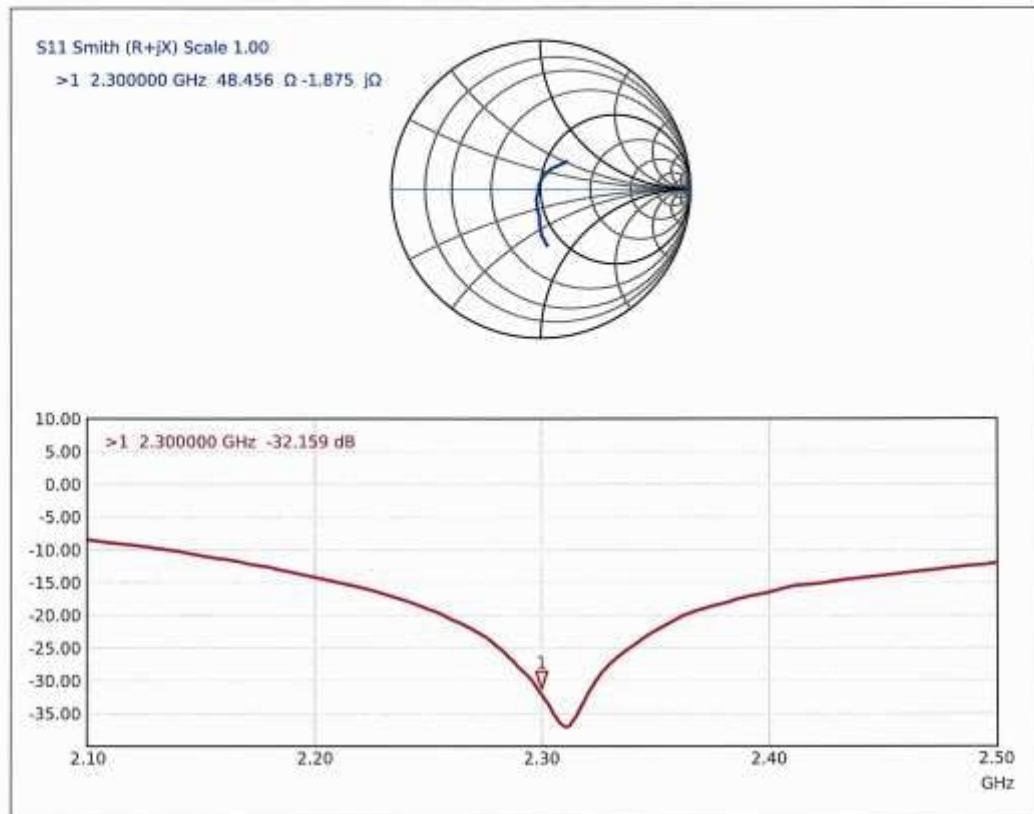
Measurement Results	
	Zoom Scan
Date	2025-05-19
prSAR1g [W/Kg]	12.2
prSAR10g [W/Kg]	5.93
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



D2300V2 - SN: 1010

May 19, 2025

Impedance Measurement Plot for HSL



Calibration Laboratory of Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 0108

Client **HCT**
Gyeonggi-do, Republic of Korea

Certificate No. **D2450V2-743_Feb26**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 743**

Calibration procedure(s) **QA CAL-05.v13**
Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date **February 19, 2026**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.
Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP40T	SN: 101861	25-Apr-25 (No. 2025-001450)	Apr-25
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 403CA315008541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	23-Jan-26 (No. 403CA315011865)	Jan-27
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	18-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	25-Jan-26 (No. EX3-7349_Jan26)	Jan-27
DAE4ip	SN: 1836	16-Feb-26 (No. DAE4ip-1836_Feb26)	Feb-27

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-250527)	May-26
Signal Generator R&S SMB100A	SN: 162081	27-May-25 (No. 675-CAL16-S458A-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK 3.5	SN: 1336	10-Dec-25 (No. OCP-DAK3.5-1336_Dec25)	Dec-26

Calibrated by	Name Krešimir Franjić	Function Laboratory Technician	Signature
Approved by	Name Sven Köhn	Function Technical Manager	Signature
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: D2450V2-743_Feb26

Page 1 of 6

결	판	판	자	하	인	자
재	7/2/25					
확인/생일	PL 7/2/25					
일 자	2026.02.27					

Calibration Laboratory of Schmid & Partner Engineering AG

Zeuhausstrasse 43, 8004 Zurich, Switzerland



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D2450V2 - SN: 743

February 19, 2026

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Frequency	2450MHz $\pm$ 1MHz	

HSL parameters at 2450 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	39.2	1.80 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2) °C	37.6 $\pm$ 6%	1.87 mho/m $\pm$ 6%
HSL temperature change during test	$\leq$ 0.5 °C		

SAR result with HSL at 2450 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	12.8 W/kg
SAR for nominal HSL parameters	normalized to 1W	51.0 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	6.01 W/kg
SAR for nominal HSL parameters	normalized to 1W	23.9 W/kg $\pm$ 16.5% (k = 2)

D2450V2 - SN: 743

February 19, 2026

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 2450 MHz

Impedance	54.0 Ω + 4.0 j Ω
Return Loss	-25,3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured. The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

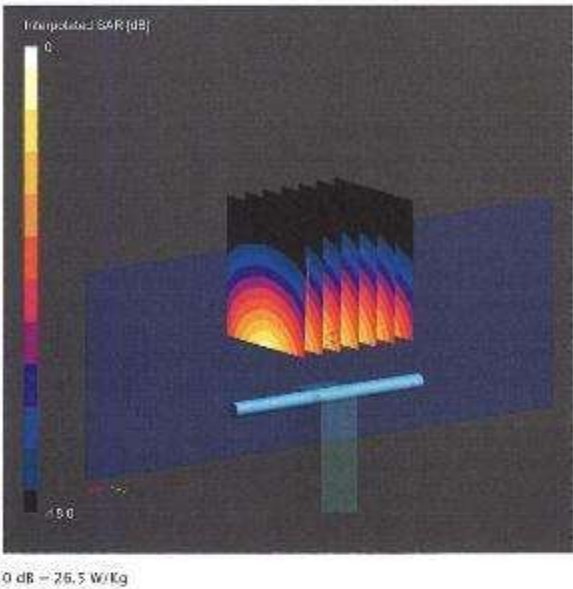
Manufactured by	SPEAG
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D2450V2 - SN: 743

February 19, 2026

System Performance Check Report

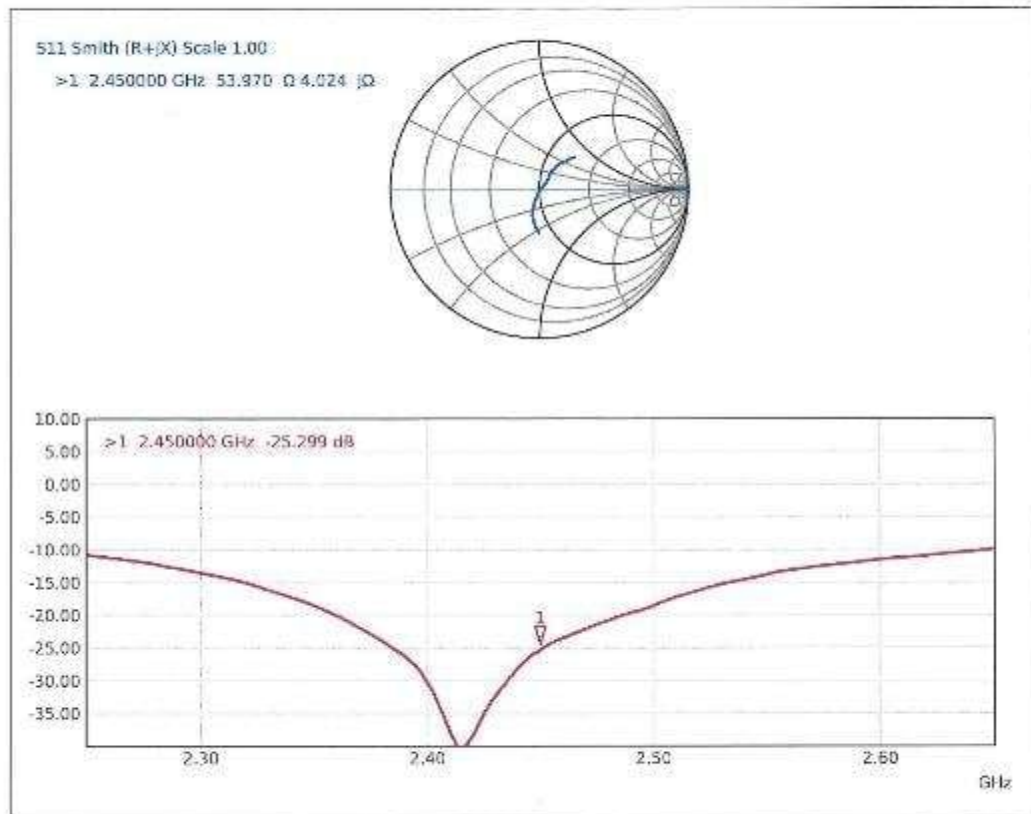
Summary								
Probe		Frequency (MHz)			TSL	Power (dBm)		
D2450V2 - SN743		2450			HSI	25		
Exposure Conditions								
Phantom Section, TSL	Test Distance (mm)	Band	Coup, 3D	Frequency (MHz)	Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Permittivity
For	10		Cal. 0 -	2450, G		7.34	1.87	37.6
Hardware Setup								
Phantom		TSL, Measured Date		Probe, Calibration Date		DA's, Calibration Date		
MFP V3.0, Canon		HSI, 2026-02-19		EX50V4 - SN7349, 2026-01-29		DS-40p Antenna, 2026-02-18		
Scans Setup				Measurement Results				
				Zoom Scan				
Grid Extents (mm)				30 x 30 x 30				
Grid Steps (mm)				5.0 x 5.0 x 1.5				
Sensor Surface (mm²)				1.4				
Graded Grid				Yes				
Grading Ratio				1.5				
WNA				N/A				
Surface Detection				VMS + Gp				
Scan Method				Measured				
				Zoom Scan				
Date				2026-02-19				
psSAR1g (W/Kg)				12.6				
psSAR10g (W/Kg)				0.01				
Power Drift (%/S)				-0.01				
Power Scaling				Disabled				
Scaling Factor (dB)								
TSL Correction				Positive / Negative				



D2450V2 - SN: 743

February 19, 2026

Impedance Measurement Plot for HSL



Appendix: Transfer Calibration at Four Validation Locations on SAM Head¹

Evaluation Condition

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
---------	------------------	-----------------------------

SAR result with SAM Head (Top $\cong$ C0)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	54.4 W/kg $\pm$ 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	25.4 W/kg $\pm$ 16.9 % (k=2)

SAR result with SAM Head (Mouth $\cong$ F90)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	55.5 W/kg $\pm$ 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	26.6 W/kg $\pm$ 16.9 % (k=2)

SAR result with SAM Head (Neck $\cong$ H0)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	52.3 W/kg $\pm$ 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	24.3 W/kg $\pm$ 16.9 % (k=2)

SAR result with SAM Head (Ear $\cong$ D90)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	33.5 W/kg $\pm$ 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	16.9 W/kg $\pm$ 16.9 % (k=2)

¹ Additional assessments outside the current scope of SGS 0108

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Accreditation No.: SCS 0108

Client **HCT**
Gyeonggi-do, Republic of Korea

Certificate No. **D2600V2-1043_May25**

CALIBRATION CERTIFICATE

Object **D2600V2 - SN: 1043**

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

Calibration date **May 22, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009558)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	17-Apr-25 (No. DAE4ip-1836_Apr25)	Apr-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182061	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch: SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
			Issued: May 22, 2025
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

결	담	담	자	화	인	자
재						
직위/성명	GS	10526호		BS	10526호	
일	2025	10529		2025	10529	

Certificate No: D2600V2-1043_May25

Page 1 of 6

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

Accreditation No.: **SCS 0108**

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D2600V2 - SN: 1043

May 22, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2600MHz $\pm$ 1MHz	

HSL parameters at 2600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	39.0	1.96 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	37.1 $\pm$ 6%	2.01 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 2600 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	14.3 W/kg
SAR for nominal HSL parameters	normalized to 1W	56.9 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	6.42 W/kg
SAR for nominal HSL parameters	normalized to 1W	25.6 W/kg $\pm$ 16.5% (k = 2)

D2600V2 - SN: 1043

May 22, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 2600 MHz

Impedance	49.9 Ω – 5.7 j Ω
Return Loss	-24.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 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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D2600V2 - SN: 1043

May 22, 2025

System Performance Check Report

Summary

Display	Frequency (MHz)	TSL	Power (dBm)
D2600V2 - SN1043	2600	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance (mm)	Band	Group, UID	Frequency (MHz)	Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Permittivity
Flat	10	CW, 0		2600, 0		7.26	2.01	37.1

Hardware Setup

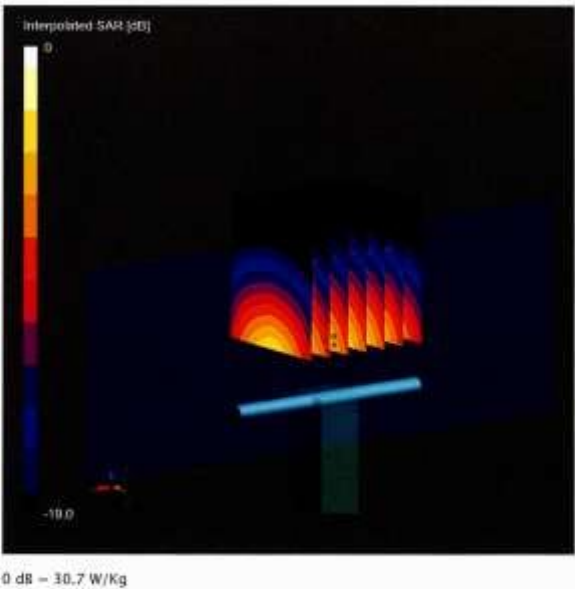
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP VE.0 Center	HSL, 2025-05-22	EX30V4 - SN7349, 2025-01-10	DAE4ip Sn1836, 2025-04-17

Scans Setup

	Zoom Scan
Grid Extents (mm)	30 x 30 x 30
Grid Steps (mm)	5.0 x 5.0 x 1.5
Sensor Surface (mm)	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

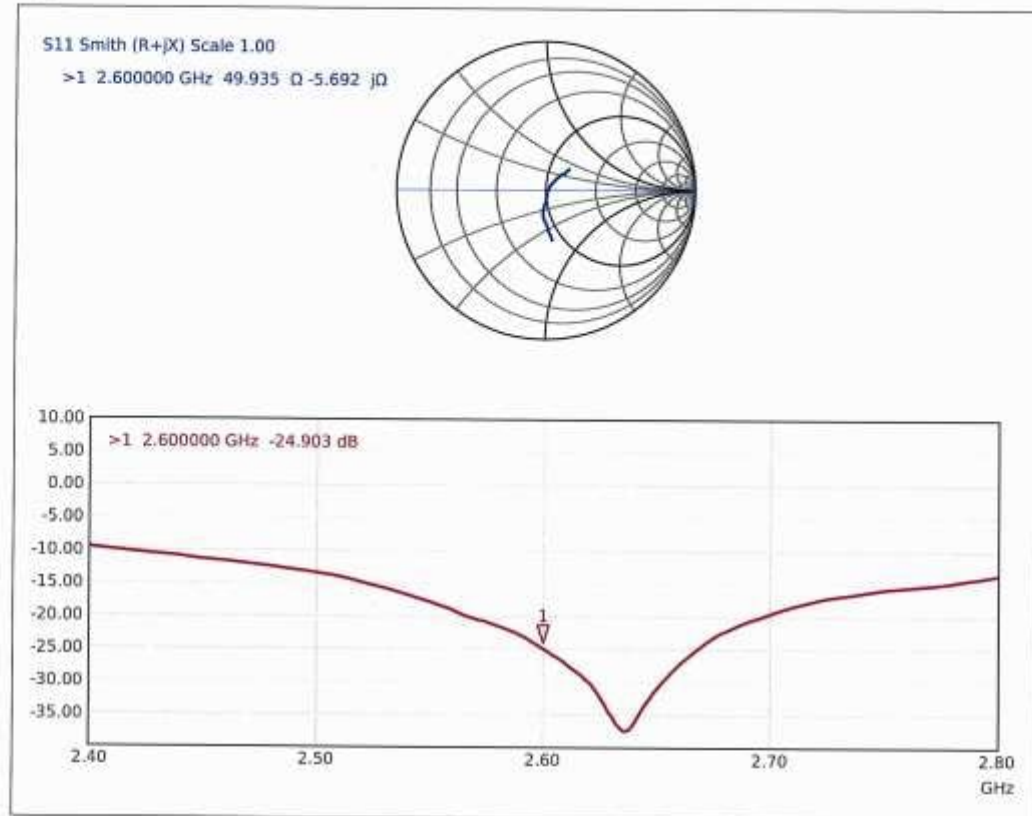
	Zoom Scan
Date	2025-05-22
psSAR1g (W/Kg)	14.3
psSAR10g (W/Kg)	6.42
Power Drift (dB)	0.00
Power Scaling	Disabled
Scaling Factor (dB)	
TSL Correction	Positive / Negative



D2600V2 - SN: 1043

May 22, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client **HCT**
Gyeonggi-do, Republic of Korea

Certificate No. **D3500V2-1132_Jan26**

CALIBRATION CERTIFICATE

Object **D3500V2 - SN: 1132**

Calibration procedure(s) **QA CAL-22.v8**
Calibration Procedure for SAR Validation Sources between 3 - 10 GHz

Calibration date **January 28, 2026**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP40T	SN: 101861	29-Apr-25 (No. 2025-001450)	Apr-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315008541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315008541)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	16-Sep-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sep-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1855	26-Nov-25 (No. DAE4ip-1855_Nov25)	Nov-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-250527)	May-26
Signal Generator R&S SMB100A	SN: 182061	27-May-25 (No. 675-CAL18-S458B-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1336	10-Dec-25 (No. OCP-DAK3.5-1336_Dec25)	Dec-26

	Name	Function	Signature
Calibrated by	Aidonia Georgiadou	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: January 28, 2026

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Certificate No: D3500V2-1132_Jan26

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결	무	시	확	인	자
재	기	기	기	기	기
작성/검	2024.02.05	2024.02.05	2024.02.05	2024.02.05	2024.02.05

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Accreditation No.: **SCS 0108**

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D3500V2 - SN: 1132

January 26, 2026

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Frequency	3500MHz $\pm$ 1MHz	

HSL parameters at 3500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	37.9	2.91 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2) °C	39.6 $\pm$ 6%	2.98 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 3500 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	6.52 W/kg
SAR for nominal HSL parameters	normalized to 1W	65.2 W/kg $\pm$ 19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.48 W/kg
SAR for nominal HSL parameters	normalized to 1W	24.8 W/kg $\pm$ 19.5% (k = 2)

D3500V2 - SN: 1132

January 28, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 3500 MHz

Impedance	51.8 Ω - 5.1 $j\Omega$
Return Loss	-25.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.13 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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D3500V2 - SN: 1132

January 28, 2026

System Performance Check Report

Summary

Device	Frequency [MHz]	TSL	Power [dBm]
D3500V2 - SN1132	5520	HSL	20

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, IED	Frequency [Wife]	Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flu	10	CW, E		3500.0		6.63	2.4R	59.6

Hardware Setup

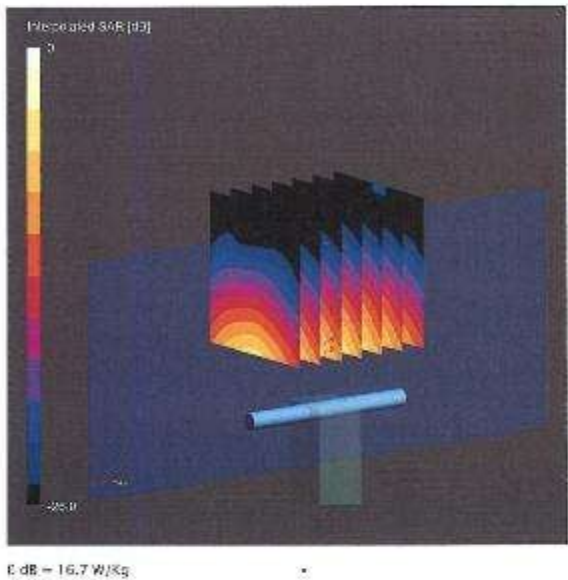
Phantom	TSL Measured Date	Probe Calibration Date	DAS Calibration Date
MPT V6.0 Center	HSL, 2026-01-28	BK3049 - SN7349, 2025-01-10	DA44p Sn 636, 2025-11-26

Scans Setup

	Zoom Scan
Grid Elements [mm]	28 x 28 x 28
Grid Steps [mm]	5.5 x 5.0 x 1.4
Sensor Surface [mm]	1.4
Coated Grid	Yes
Coating Ratio	1.5
MMA	N/A
Surface Detection	NMS + Top
Scan Method	Maximize

Measurement Results

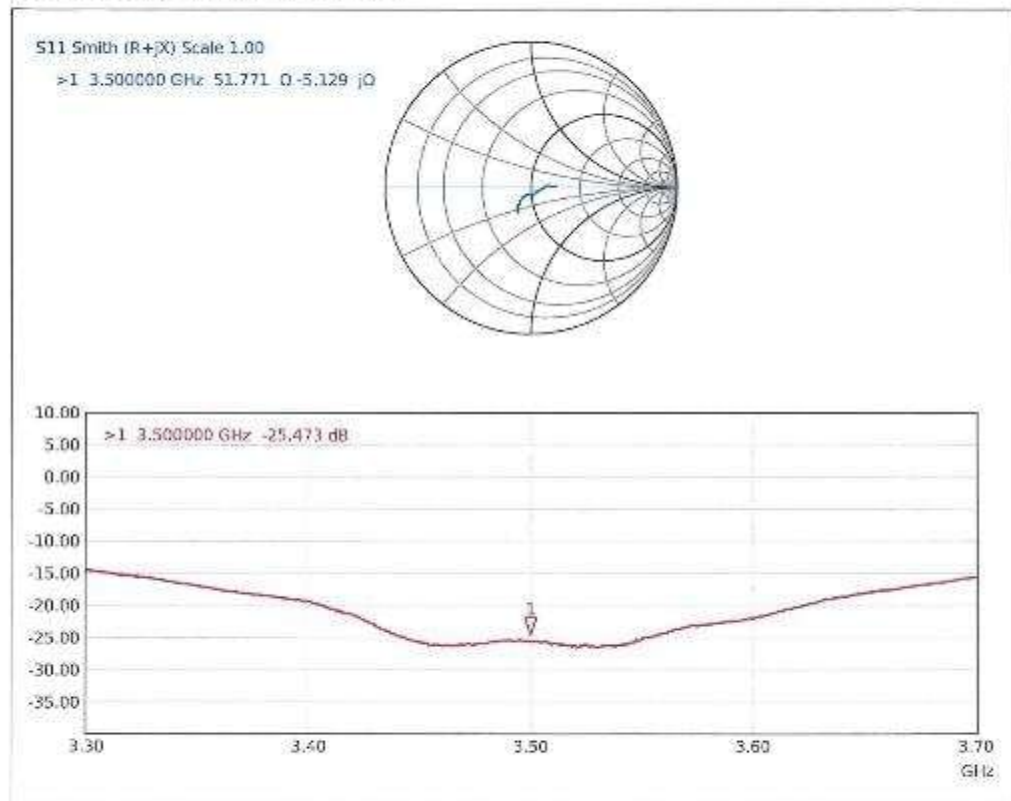
	Zoom Scan
Date	2026-01-28
psSAR1q [W/Kg]	6.52
psSAR10q [W/Kg]	2.15
Power Err R [dB]	-0.01
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



D3500V2 - SN: 1132

January 25, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **D3700V2-1066_Sep25**

CALIBRATION CERTIFICATE

Object **D3700V2 - SN: 1066**

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

Calibration date **September 15, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
 Calibration Equipment used (M&TE critical for calibration):

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	30-Apr-25 (No. 1020-300791769)	Apr-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1162	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	04-Sept-25 (No. DAE4ip-1836_Sep25)	Sep-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-250627)	May-26
Signal Generator R&S SMB100A	SN: 182081	27-May-25 (No. 675-CAL16-S4598-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1336	09-Dec-24 (No. OCP-DAK3.5-1336_Dec24)	Dec-25

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

Issued: September 17, 2025

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Certificate No: D3700V2-1066_Sep25

Page 1 of 6

결	담	담	자	화	인	자
재	김	지	현			
리	위	성	영	2025.09.18	2025.09.18	
일	적	2025.09.18				

Calibration Laboratory of

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 0108**

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D3700V2 - SN: 1066

September 15, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.4mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	3700MHz $\pm$ 1MHz	

HSL parameters at 3700 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	37.7	3.12 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2) °C	39.4 $\pm$ 6%	3.10 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 3700 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	6.77 W/kg
SAR for nominal HSL parameters	normalized to 1W	67.7 W/kg $\pm$ 19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.50 W/kg
SAR for nominal HSL parameters	normalized to 1W	25.0 W/kg $\pm$ 19.5% (k = 2)

D3700V2 - SN: 1066

September 15, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 3700 MHz

Impedance	48.1 Ω + 2.1 j Ω
Return Loss	-30.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.13 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

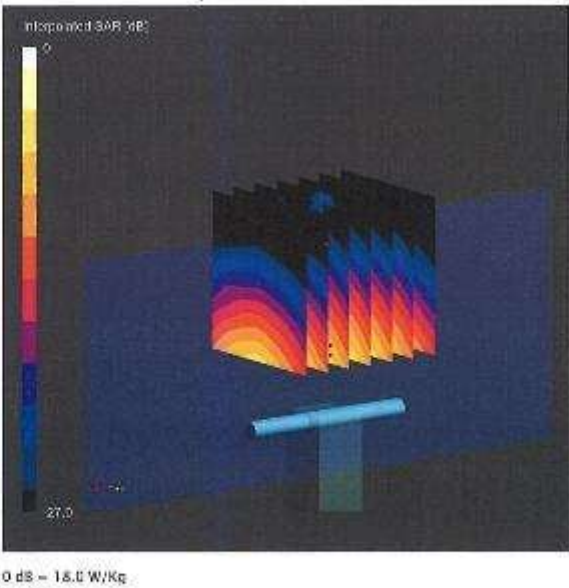
Manufactured by	SPEAG
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D3700V2 - SN: 1066

September 15, 2025

System Performance Check Report

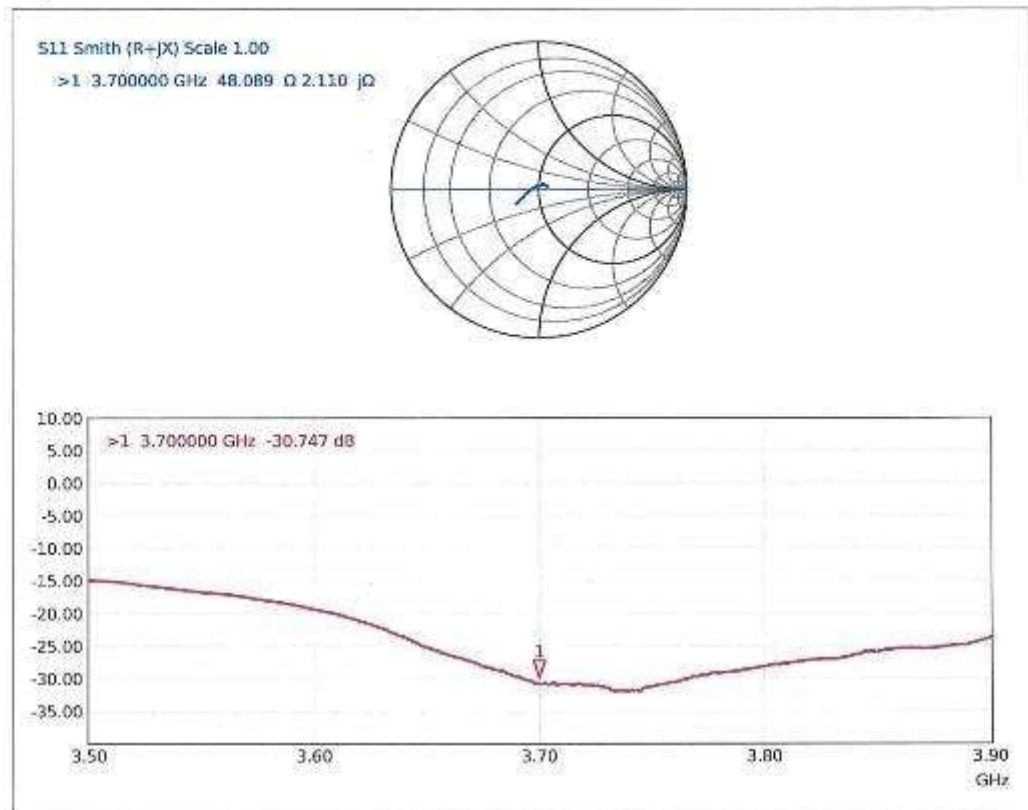
Summary								
Model	Frequency (MHz)			TSL	Power (dBr)			
D3700V2 - SN1066	3700			HSL	20			
Exposure Conditions								
Phantom Section, TSL	Test Distance (mm)	Band	Group, 3D	Frequency (MHz), Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Permittivity	
Flat	10	DM, C-1	DM, C-1	3700, 0	8.45	3.10	39.4	
Hardware Setup								
Phantom	TSL Measured Date			Probe, Calibration Date		DAE, Calibration Date		
MFP V8.0 Center	HSL, 2025-09-15			EK30V4 - SN7349, 2025-01-10		DA51p Sn1836, 2025-09-04		
Scans Setup				Measurement Results				
Zoom Scan				Zoom Scan				
Grid Extents (mm)	28 x 28 x 28			Date				
Grid Steps (mm)	5.0 x 5.0 x 1.4			2025-09-15				
Sensor Surface (mm)	1.4			psSAR1g (W/Kg)				
Graded Grid	Yes			0.77				
Grading Ratio	1.5			psSAR10g (W/Kg)				
MAA	N/A			2.50				
Surface Detection	VME + Go			Power Drift (dB)				
Scan Method	Measured			0.02				
				Power Scaling				
				Disabled				
				Scaling Factor (dB)				
				TSL Correction				
				Positive / Negative				



D3700V2 - SN: 1066

September 15, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: SCS 0108

Client

HCT

Gyeonggi-do, Republic of Korea

Certificate No.

D3900V2-1019_May25

CALIBRATION CERTIFICATE

Object **D3900V2 - SN: 1019**

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

Calibration date **May 21, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.
Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	26-Mar-25 (No. 217-04290)	Mar-26
Power Sensor R&S NRP18A	SN: 101859	06-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04293)	Mar-26
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4ip	SN: 1836	17-Apr-25 (No. DAE4ip-1836_Apr25)	Apr-26

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Setup 1	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

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

Issued: May 21, 2025

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결 재	담당자	확인자
43 14568	95 11828	2025 10529
일	2025 10529	2025 10529

Certificate No: D3900V2-1019_May25

Page 1 of 6

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Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D3900V2 - SN: 1019

May 21, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.4mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	3900MHz $\pm$ 1MHz	

HSL parameters at 3900 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	37.5	3.32 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	38.6 $\pm$ 6%	3.32 mho/m $\pm$ 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 3900 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	7.03 W/kg
SAR for nominal HSL parameters	normalized to 1W	70.3 W/kg $\pm$ 19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.47 W/kg
SAR for nominal HSL parameters	normalized to 1W	24.7 W/kg $\pm$ 19.5% (k = 2)

D3900V2 - SN: 1019

May 21, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 3900 MHz

Impedance	47.5 Ω – 6.3 j Ω
Return Loss	-23.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.103 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured. The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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D3900V2 - SN: 1019

May 21, 2025

System Performance Check Report

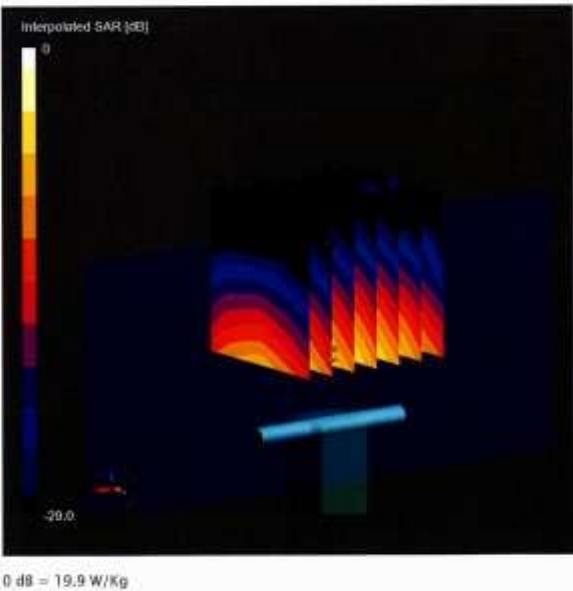
Summary			
Dipole	Frequency [MHz]	TSL	Power [dBm]
D3900V2 - SN1019	3900	HSL	20

Exposure Conditions							
Phantom Section, TSL	Test Distance [mm]	Band	Group, UFD	Frequency [MHz]	Channel Number	Conversion Factor	TSL Conductivity [S/m]
Flat	10	CW, 0--		3900, 0		6.37	3.32

Hardware Setup			
Phantom	TSL Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2025-05-21	EX3DV4 - SN7349, 2025-01-10	DAE4ip Sn1836, 2025-04-17

Scans Setup	
	Zoom Scan
Grid Extends [mm]	28 x 28 x 28
Grid Steps [mm]	5.0 x 5.0 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAGA	N/A
Surface Detection	YMS + 6g
Scan Method	Measured

Measurement Results	
	Zoom Scan
Date	2025-05-21
psSAR1g [W/Kg]	7.03
psSAR10g [W/Kg]	2.47
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



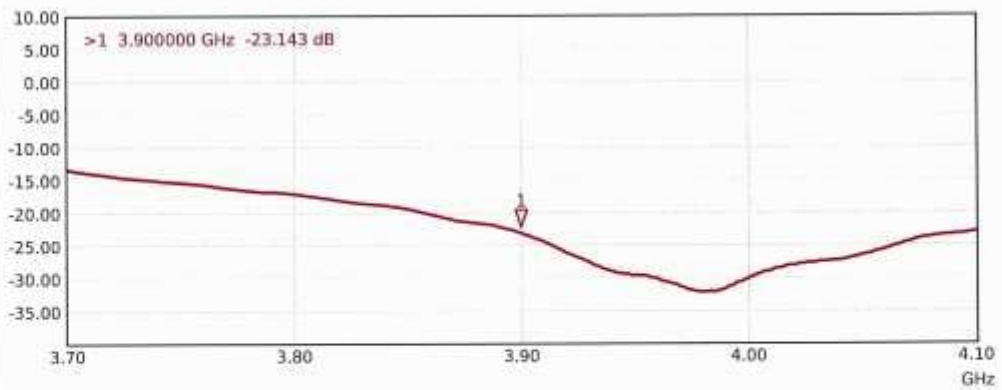
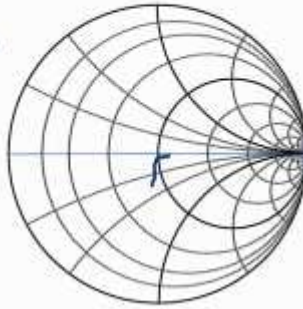
D3900V2 - SN: 1019

May 21, 2025

Impedance Measurement Plot for HSL

S11 Smith (R+jX) Scale 1.00

>1 3.900000 GHz 47.489 Ω -6.323 j Ω



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Accreditation No.: **SCS 0108**

Client **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **D5GHzV2-1253_Sep25**

CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN: 1253**

Calibration procedure(s): **QA CAL-22.v8**
Calibration Procedure for SAR Validation Sources between 3 - 10 GHz

Calibration date: **September 26, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.
 Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP 33T	SN: 105967	30-Apr-25 (No. 1020-300791789)	Apr-26
Power Sensor R&S NRP 16A	SN: 101859	05-Feb-25 (No. 4030A315009541)	Feb-26
Spectrum Analyzer R&S FSV40	SN: 101832	29-Jan-25 (No. 4030A315009658)	Jan-26
3.5mm mismatch combination	SN: 1152	24-Mar-25 (No. 217-04263)	Mar-26
OCP DAK-12	SN: 1013	18-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	18-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4p	SN: 1838	04-Sep-25 (No. DAE4p-1838_Sep25)	Sep-26

Secondary Standards	ID	Check Date (In house)	Scheduled Check
ACAD Setup 1	SN: 1000	27-May-25 (No. 675-ACAD_Source_Box-250527)	May-26
Signal Generator R&S SMB100A	SN: 182061	27-May-25 (No. 675-CAL16-S4588-250527)	May-26
Mismatch; SMA	SN: 1102	24-Apr-25 (No. 675-Mismatch_SMA-250424)	Apr-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1338	09-Dec-24 (No. OCP-DAK3.5-1338_Dec24)	Dec-25

Calibrated by	Name Krešimir Franjic	Function Laboratory Technician	Signature
Approved by	Name Sven Kühn	Function Technical Manager	Signature

Issued: September 29, 2025

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

Certificate No: D5GHzV2-1253_Sep25

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결	담당자	확인자
재	김지훈	
직위/성명	DL / 김지훈	DL / 김지훈
일 자	2025.10.17	2025.10.17

Calibration Laboratory of

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S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

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

Accreditation No.: SCS 0108

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

- 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.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The 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%.

D5GHzV2 - SN: 1253

September 26, 2025

Measurement Conditions

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

DASY Version	DASY8 Module SAR	17.0.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 4mm, dz = 1.4mm	Graded Ratio = 1.4 mm (Z direction)
Frequency	5250MHz $\pm$ 1MHz 5600MHz $\pm$ 1MHz 5750MHz $\pm$ 1MHz 5800MHz $\pm$ 1MHz	

HSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	35.9	4.71 mho/m
Measured HSL parameters	(22.0 $\pm$ 0.2)°C	36.4 $\pm$ 6%	4.62 mho/m $\pm$ 6%
HSL temperature change during test	$\leq$ 0.5 °C		

SAR result with HSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	7.92 W/kg
SAR for nominal HSL parameters	normalized to 1W	79.2 W/kg $\pm$ 19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.26 W/kg
SAR for nominal HSL parameters	normalized to 1W	22.6 W/kg $\pm$ 19.5% (k = 2)

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HSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	35.5	5.07 mho/m
Measured HSL parameters	(22.0 ±0.2)°C	35.8 ±6%	5.02 mho/m ±6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	8.15 W/kg
SAR for nominal HSL parameters	normalized to 1W	81.5 W/kg ±19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.34 W/kg
SAR for nominal HSL parameters	normalized to 1W	23.4 W/kg ±19.5% (k = 2)

HSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	35.4	5.22 mho/m
Measured HSL parameters	(22.0 ±0.2)°C	35.6 ±6%	5.18 mho/m ±6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	8.06 W/kg
SAR for nominal HSL parameters	normalized to 1W	80.6 W/kg ±19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.29 W/kg
SAR for nominal HSL parameters	normalized to 1W	22.9 W/kg ±19.5% (k = 2)

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HSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal HSL parameters	22.0 °C	35.3	5.27 mho/m
Measured HSL parameters	(22.0 ± 0.2) °C	35.5 ± 6%	5.23 mho/m ± 6%
HSL temperature change during test	< 0.5 °C		

SAR result with HSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	8.06 W/kg
SAR for nominal HSL parameters	normalized to 1W	80.6 W/kg ± 19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of HSL	Condition	
SAR for nominal HSL parameters	20 dBm input power	2.29 W/kg
SAR for nominal HSL parameters	normalized to 1W	22.9 W/kg ± 19.5% (k = 2)

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Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 5250 MHz

Impedance	50.4 Ω + 4.2 j Ω
Return Loss	-27.5 dB

Antenna Parameters with HSL at 5600 MHz

Impedance	56.3 Ω - 2.1 j Ω
Return Loss	-24.1 dB

Antenna Parameters with HSL at 5750 MHz

Impedance	56.7 Ω + 0.8 j Ω
Return Loss	-24.0 dB

Antenna Parameters with HSL at 5800 MHz

Impedance	54.3 Ω - 0.6 j Ω
Return Loss	-27.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 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

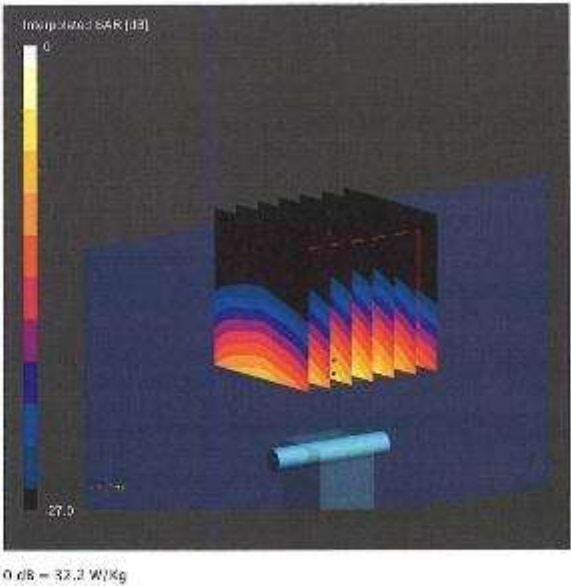
Manufactured by	SPEAG
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D5GHzV2 - SN: 1253

September 26, 2025

System Performance Check Report

Summary							
Device	Frequency (MHz)			TN	Power (dBm)		
D5GHzV2 - SN1253	5250			TS1	20		
Exposure Conditions							
Flatten Sector, TSL	Test Distance (mm)	Board	Group, ID	Frequency (MHz), Channel Number	Conversion Factor	TSL Conductivity (S/m)	TSL Permittivity
Flat	70	CW, C---		5250, 0	5.88	4.62	36.4
Hardware Setup							
Hardware	TSL Measured Date		Probe Calibration Date		DAE Calibration Date		
MFF X3/P Center	JN: 2025-09-20		DA3054 - SN7349, 2025-01-10		DA540p SN:836, 2025-09-04		
Scans Setup				Measurement Results			
				Zoom Scan			
Grid Extents (mm)				22 x 22 x 22			
Grid Steps (mm)				4.0 x 4.0 x 1.4			
Sensor Surface (mm)				1.4			
Coated Grid				Yes			
Coating Ratio				1.6			
N/A				N/A			
Surface Detection				VMS - Ep			
Scan Method				Measured			
				Zoom Scan			
				Date			
				2025-09-26			
				pSAR1g (W/Kg)			
				7.92			
				pSAR10g (W/Kg)			
				2.88			
				Power DLR (dB)			
				0.00			
				Power Scaling			
				Disabled			
				Scaling Factor (dB)			
				TSL Correction			
				Positive / Negative			

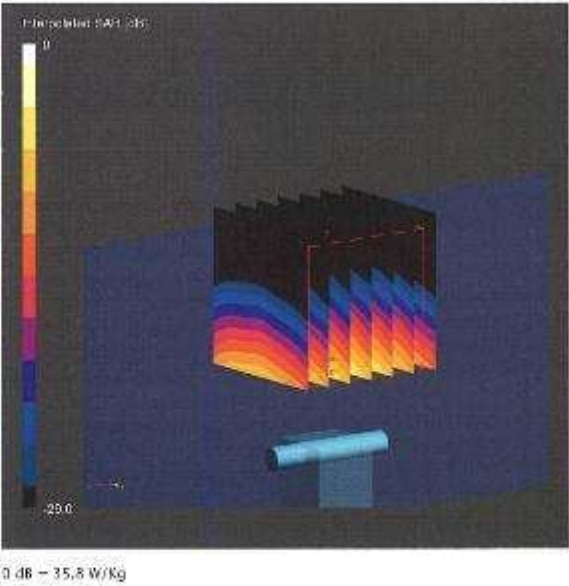


D5GHzV2 - SN: 1253

September 26, 2025

Systems Performance Check Report

Summary								
Dipole	Frequency (MHz)			TSL	Power (dBm)			
D5GHzV2 - SN1253	5600			HS	20			
Exposure Conditions								
Flatten Section, TSL	Test Distance (mm)	Band	Group, dB	Frequency (MHz), Channel Number	Conversion Factor	TSL Conductivity (S/m)	TN	Permittivity
Flat	10	CW, 0		5600, 0	5.21	5.02		15.8
Hardware Setup								
Hardware	TSL, Measured Date		Probe, Calibration Date		DAC, Calibration Date			
MFF v8.0 Center	PSL, 2025-09-26		EX3094 - SN2349, 2025-01-10		DAC4ip SN1036, 2025-04-04			
Scans Setup					Measurement Results			
					Zoom Scan			
Grid Points (mm)	22 x 22 x 22				2025-09-26			
Grid Steps (mm)	4.0 x 4.0 x 1.4				psSAR _{1g} [W/Kg]			
Sensor Surface (mm)	1.4				8.15			
Flashed Grid	Yes				psSAR _{10g} [W/Kg]			
Erasing Ratio	1.4				2.34			
MFA	N/A				Power Ball [dB]			
Surface Detection	VMS 1: 6p				0.01			
Scan Method	Measured				Power Scaling			
					Disabled			
					Scaling Factor [dB]			
					TSL Correction			
					Positive / Negative			

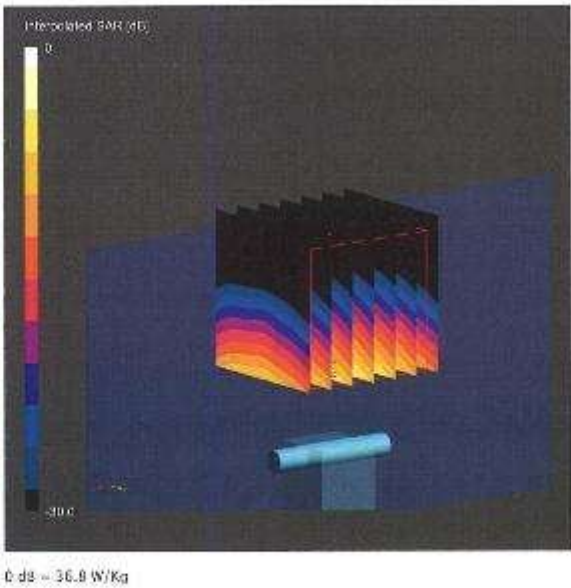


D5GHzV2 - SN: 1253

September 26, 2025

System Performance Check Report

Summary							
Device	Frequency [MHz]			TSL	Power [dBm]		
D5GHzV2 - SK1253	5750			HSL	20		
Exposure Conditions							
Position Sensor, TSL	Test Distance [mm]	Band	Group, U/D	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Yes	10	24G, U--		5750, 0	5.38	5.18	15.0
Hardware Setup							
Platform	TSL Measured Data			Probe, Calibration Date		DAR, Calibration Date	
MHT VML2 Carrier	HSL, 2025-09-26			EX30VM - SK7349, 2025-01-10		DM405 SK1816, 2025-09-04	
Scans Setup				Measurement Results			
				Zoom Scan			
Grid Extents [mm]	22 x 22 x 22			Date			
Grid Steps [mm]	4.0 x 4.0 x 1.4			2025-09-26			
Sensor Surface [mm]	1.4			meSAR1g [W/Kg]			
Graded Grid	Yes			6.06			
Grading Ratio	1:4			meSAR1kg [W/Kg]			
MARK	N/A			2.29			
Surface Detection	WPS + hp			Power Drift [dB]			
Scan Method	Measured			-0.07			
				Power Scaling			
				Disabled			
				Scaling Factor [dB]			
				SL Correction			
				Positive / Negative			

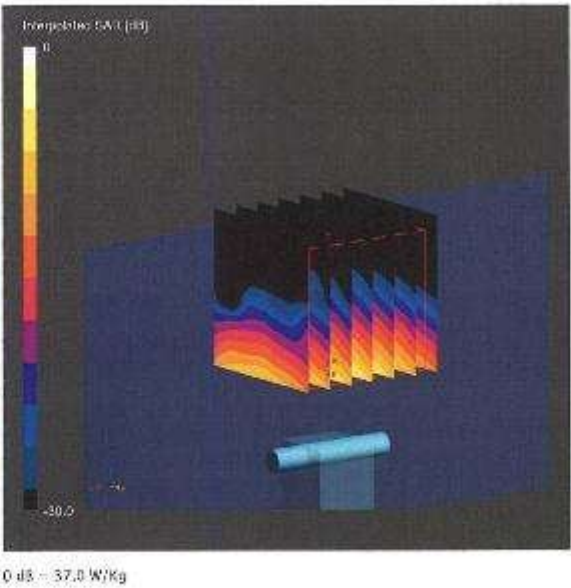


D5GHzV2 - SN: 1253

September 26, 2025

System Performance Check Report

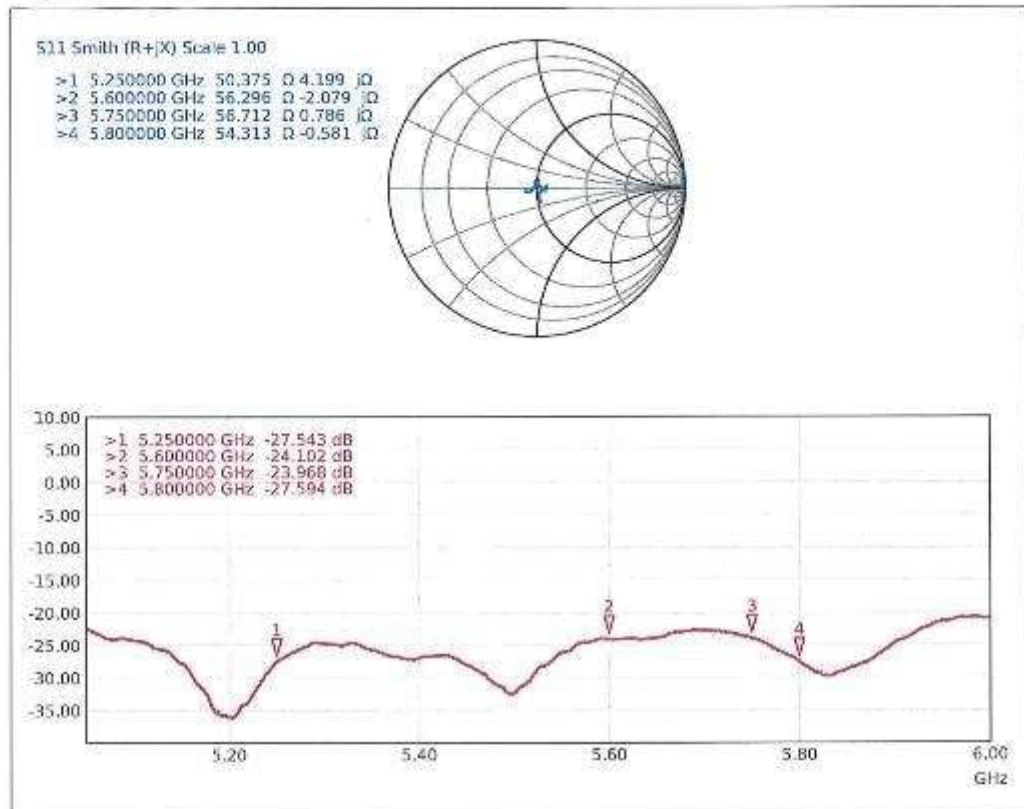
Summary								
Device	Frequency (MHz)			TSL	Power (dBm)			
D5GHzV2 - SN1253	5820			15	20			
Exposure Conditions								
Human Subject, TSL	Test Distance (m)	Band	Group, UIC	Frequency (MHz), Channel Number	Correction Factor	TSL Conductivity (S/m)	TSL Permittivity	
Flat	10		CW, G	5820, 0	5.17	5.23	34.5	
Hardware Setup								
Human	TSL Measured Date		Probe, Calibration Date			DAS, Calibration Date		
MH V&L Canal	FSL 2025-09-26		PX3004 - SN7149, 2025-01-10			DA/4ip Sn: 636, 2025-03-04		
Scans Setup								
				Zoom Scan				
Grid Extents (mm)	72 x 27 x 27							
Grid Steps (mm)	4.0 x 4.0 x 1.4							
Sensor Surface (mm)	1.4							
Cradled Grid	Yes							
Cradling Ratio	-4							
MARK	N/A							
Surface Detection	WBS - 3p							
Scan Method	Measured							
Measurement Results								
				Zoom Scan				
				Date				
				2025-09-26				
				pSAR1G [W/Kg]				
				0.06				
				pSAR10G [W/Kg]				
				2.24				
				Power D.F. [dB]				
				0.01				
				Power Scaling				
				Disabled				
				Scaling Factor [dB]				
				TSL Correction				
				Positive / Negative				



D5GHzV2 - SN: 1253

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Impedance Measurement Plot for HSL



Appendix: Transfer Calibration at Four Validation Locations on SAM Head¹

Evaluation Conditions (f=5250 MHz)

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
---------	------------------	-----------------------------

SAR result with SAM Head (Top)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	84.8 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	24.3 W/kg ± 19.9 % (k=2)

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	84.0 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	23.4 W/kg ± 19.9 % (k=2)

SAR result with SAM Head (Neck)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	82.1 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	23.4 W/kg ± 19.9 % (k=2)

SAR result with SAM Head (Ear)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	53.1 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	17.9 W/kg ± 19.9 % (k=2)

¹ Additional assessments outside the current scope of SCS 0108.

Appendix: Transfer Calibration at Four Validation Locations on SAM Head²

Evaluation Conditions (f=5800 MHz)

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
---------	------------------	-----------------------------

SAR result with SAM Head (Top)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	83.8 W/kg ± 20.3 % (k=2)
SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	23.8 W/kg ± 19.9 % (k=2)

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	90.6 W/kg ± 20.3 % (k=2)
SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	25.8 W/kg ± 19.9 % (k=2)

SAR result with SAM Head (Neck)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	80.8 W/kg ± 20.3 % (k=2)
SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	22.8 W/kg ± 19.9 % (k=2)

SAR result with SAM Head (Ear)

SAR averaged over 1 cm ³ (1 g) of HSL	Condition	
SAR for nominal HSL parameters	normalized to 1W	57.6 W/kg ± 20.3 % (k=2)
SAR averaged over 10 cm ³ (10 g) of HSL	condition	
SAR for nominal HSL parameters	normalized to 1W	19.4 W/kg ± 19.9 % (k=2)

² Additional assessments outside the current scope of SCS D108