



-	T7	<u>Tspeag</u>		CA	IC.
		CALIBRATION LABORATORY			
	Add	: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China			
	Tel:	+86-10-62304633-2117			
	E-m	ail: emf@caict.ac.cn http://www.caict.ac.cn			
0899	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %
0900	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
0901	AAD	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz) 5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	5.68 5.68	± 9.6 %
0902	AAD	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 KHz)	5G NR FR1 TDD	5.68	± 9.6 %
0904	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
0905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
0906	AAD	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
0907	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz) 5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	5.78 5.93	± 9.6 %
0909	AAD	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 KHz)	5G NR FR1 TDD	5.96	± 9.6 %
0910	AAD	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
0911	AAD	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
0912	AAD	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
0913 0914	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz) 5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	5.84 5.85	± 9.6 %
0914	AAD	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 KHz)	5G NR FR1 TDD	5.83	± 9.6 %
0916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
0917	AAD	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
0918	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
0919	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz) 5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	5.86	± 9.6 %
0920	AAD	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87 5.84	± 9.6 %
0922	AAD	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	± 9.6 %
0923	AAD	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
0924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
0925	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.95	± 9.6 %
0926	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz) 5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	5.84 5.94	± 9.6 %
0928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
0929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
0930	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
0931	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
0932	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz) 5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD 5G NR FR1 FDD	5.51 5.51	± 9.6 % ± 9.6 %
0934	AAA	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
0935	AAA	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
0936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
0937 0938	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	± 9.6 %
0938	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz) 5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD 5G NR FR1 FDD	5.90 5.82	± 9.6 % ± 9.6 %
0940	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 KHz)	5G NR FR1 FDD	5.89	± 9.6 %
0941	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
0942	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
0943 0944	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	± 9.6 %
0944	AAB	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz) 5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD 5G NR FR1 FDD	5.81 5.85	± 9.6 % ± 9.6 %
0946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
0947	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
0948	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
0949	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
0950	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz) 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD 5G NR FR1 FDD	5.94 5.92	± 9.6 %
0952	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 KHz)	5G NR FR1 FDD	8.25	± 9.6 %
0953	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	± 9.6 %
0954	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	± 9.6 %
0955	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	± 9.6 %
0956 0957	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz) 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD 5G NR FR1 FDD	8.14 8.31	± 9.6 %





4	-	In Collaboration with		-	
	ΓΊ	<u>speag</u>		CA	IC
		CALIBRATION LABORATORY			
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		: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China +86-10-62304633-2117			
		ail: emf@caict.ac.cn http://www.caict.ac.cn			
0958	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	± 9.6 %
0959	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	± 9.6 %
0960	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	± 9.6 %
0961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.36	± 9.6 %
0962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	± 9.6 %
0964	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz) 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD 5G NR FR1 TDD	9.55	± 9.6 %
0965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	± 9.6 %
0966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
0967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
0968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	± 9.6 %
0972	AAB	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	± 9.6 %
0973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	± 9.6 %
0974	AAB	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	± 9.6 %
0978	AAA	ULLABDR	ULLA	1.16	± 9.6 %
0979 0980	AAA	ULLA HDR4	ULLA	8.58	± 9.6 %
0981	AAA	ULLA HDR8 ULLA HDRp4	ULLA	10.32	± 9.6 %
0982	AAA	ULLA HDRp8	ULLA	3.19	± 9.6 %
0983	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	3.43 9.31	± 9.6 %
0984	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
0985	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.54	± 9.6 %
0986	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	± 9.6 %
0987	AAC	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	± 9.6 %
0988	AAB	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.38	± 9.6 %
0989	AAC	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	± 9.6 %
0990	AAB	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	± 9.6 %
1003	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	10.24	± 9.6 %
1004	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	10.73	± 9.6 %
1005	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.70	± 9.6 %
1006	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.55	± 9.6 %
1007	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz) 5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD 5G NR FR1 FDD	8.46 8.51	± 9.6 %
1009	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.76	± 9.6 % ± 9.6 %
1010	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.95	± 9.6 %
1011	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.96	± 9.6 %
1012	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.68	± 9.6 %
1013	AAA	IEEE 802.11be (320MHz, MCS1, 99pc duty cycle)	WLAN	8.47	± 9.6 %
1014	AAA	IEEE 802.11be (320MHz, MCS2, 99pc duty cycle)	WLAN	8.45	± 9.6 %
1015	AAA	IEEE 802.11be (320MHz, MCS3, 99pc duty cycle)	WLAN	8.44	± 9.6 %
		IEEE 802.11be (320MHz, MCS4, 99pc duty cycle)	WLAN	8.44	± 9.6 %
1017	AAA	IEEE 802.11be (320MHz, MCS5, 99pc duty cycle)	WLAN	8.41	± 9.6 %
1018 1019	AAA	IEEE 802.11be (320MHz, MCS6, 99pc duty cycle)	WLAN	8.40	± 9.6 %
1020	AAA	IEEE 802.11be (320MHz, MCS7, 99pc duty cycle) IEEE 802.11be (320MHz, MCS8, 99pc duty cycle)	WLAN	8.29	± 9.6 %
1020	AAA	IEEE 802.11be (320MHz, MCS8, 99pc duty cycle)	WLAN WLAN	8.27 8.46	± 9.6 %
1022	AAA	IEEE 802.11be (320MHz, MCS3, 95pc duty cycle)	WLAN	8.36	± 9.6 % ± 9.6 %
1023	AAA	IEEE 802.11be (320MHz, MCS11, 99pc duty cycle)	WLAN	8.09	± 9.6 %
1024	AAA	IEEE 802.11be (320MHz, MCS12, 99pc duty cycle)	WLAN	8.42	± 9.6 %
1025	AAA	IEEE 802.11be (320MHz, MCS13, 99pc duty cycle)	WLAN	8.37	± 9.6 %
1026	AAA	IEEE 802.11be (320MHz, MCS0, 99pc 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.

Certificate No:J23Z60393

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ANNEX H Dipole Calibration Certificate

750 MHz Dipole Calibration Certificate

ichmid & Partner ingineering AG eughausstrasse 43, 8004 Zuri ccredited by the Swiss Accredite he Swiss Accreditation Ser luitilateral Agreement for th	ditation Service (vice is one of th	to the EA rtificates	C Service suisse d'elabridage Servizio svizzero di taratura S Swiss Calibration Service Accreditation No.: SCS 0108	
lient CTTL Beijing			Certificate No.	D750V3-1017_Jul24
CALIBRATION C	ERTIFICAT	ſE		
Object	D750V3	- SN: 1017		
Calibration procedure(s)	QA CAL Calibrati		re for SAR Validation Sou	rces between 0.7 - 3 GHz
Calibration date	July 9, 2	024		
This calibration certificate do The measurements and the	ocuments the trac uncertainties with onducted in the cle	eability to nation a confidence pro osed laboratory		hysical units of measurements (SI). pages and are part of the certificate. $(22 \pm 3)^{\circ}$ C and humidity < 70%.
This calibration certificate do The measurements and the All calibrations have been co	ocuments the trac uncertainties with onducted in the cle	eability to nation a confidence pro osed laboratory	bability are given on the following	pages and are part of the certificate.
This calibration certificate do The measurements and the All calibrations have been co Calibration Equipment used Primary Standards Power Sensor R&S NRP-33T	ocuments the trac uncertainties with anducted in the cli (M&TE critical for	eability to nation a confidence pro osed laboratory r calibration)	bability are given on the following facility: environment temperature	pages and are part of the certificate. (22±3)°C and humidity < 70%.
This calibration certificate do The measurements and the in All calibrations have been co Calibration Equipment used Primary Standards Power Sensor R&S NRP-33T Power Sensor R&S NRP18A	ocuments the trac uncertainties with anducted in the cl (M&TE critical for	eability to nation oconfidence pro osed laboratory calibration) ID SN: 100967 SN: 101859	Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A3150078	pages and are part of the certificate. (22 ± 3)°C and humidity < 70%. Scheduled Cal Mar-25 01) Mar-25
This calibration certificate do The measurements and the i All calibrations have been co Calibration Equipment used Primary Standards Power Sensor R&S NRP-33T Power Sensor R&S NRP18A Spectrum Analyzer R&S FSV	ocuments the trac uncertainties with onducted in the cl (M&TE critical for	eability to nation confidence pro osed laboratory calibration) ID SN: 100967 SN: 101859 SN: 101832	Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A31500785 25-Jan-24 (No. 4030-31500785	pages and are part of the certificate. (22 ± 3)°C and humidity < 70%. Scheduled Cal Mar-25 01) Mar-25
This calibration certificate do The measurements and the I All calibrations have been co Calibration Equipment used Primary Standards Power Sensor R&S NRP18A Spectrum Analyzer R&S FSV Mismatch; Short [S4188] Atte	ocuments the trac uncertainties with onducted in the cl (M&TE critical for	eability to nation confidence pro osed laboratory calibration) ID SN: 100967 SN: 101832 SN: 101832 SN: 1152	Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A3150078 25-Jan-24 (No. 4030-31500755 28-Mar-24 (No. 217-04050)	pages and are part of the certificate. (22±3)°C and humidity < 70%. Scheduled Cal Mar-25 01) Mar-25 1) Jan-25 Mar-25
This calibration certificate do The measurements and the in All calibrations have been co Calibration Equipment used Primary Standards Power Sensor R&S NRP-33T Power Sensor R&S NRP-18A Spectrum Analyzer R&S FSV Mismatch; Short [S4188] Atte OCP DAK-12	ocuments the trac uncertainties with onducted in the cl (M&TE critical for	ID ID SN: 100967 SN: 101859 SN: 101859 SN: 101859 SN: 101832 SN: 101832	Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 217-04038) 25-Jan-24 (No. 4030-31500755 25-Jan-24 (No. 4030-31500755 28-Mar-24 (No. 217-04050) 05-Oct-23 (No. OCP-DAK12-10	pages and are part of the certificate. (22±3)°C and humidity < 70%.
This calibration certificate do The measurements and the I All calibrations have been co Calibration Equipment used Primary Standards Power Sensor R&S NRP18A Spectrum Analyzer R&S FSV Mismatch; Short [S4188] Atte	ocuments the trac uncertainties with onducted in the cl (M&TE critical for	eability to nation confidence pro osed laboratory calibration) ID SN: 100967 SN: 101832 SN: 101832 SN: 1152	Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A3150078 25-Jan-24 (No. 4030-31500755 28-Mar-24 (No. 217-04050)	scheduled Cal Mar-25 1) Jar-25 10 Mar-25 11 Jar-25 16_Oct23) Oct-24

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 SMB100A	SN: 182081	28-May-24 (No. 0001-300719404)	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	tante
Approved by	Sven Kühn	Technical Manager	Sila
This calibration certificate s	shall not be reproduced except	in full without written approval of the labo	Issued: July 9, 2024 pratory.

Certificate No: D750V3-1017_Jul24

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

Schweizerischer Kalibrierdienst Service suisse d'étalonnage С Servizio svizzero di taratura

Swiss Calibration Service

S

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Accreditation No.: SCS 0108

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

Glossary

TSL tissue simulating liquid sensitivity in TSL / NORM x,y,z ConvF

not applicable or not measured N/A

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%.

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July 9, 2024

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 ±1MHz	

Head TSL parameters at 750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.890 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	42.5 ±6%	0.910 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 750 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	2.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.52 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	1.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.53 W/kg ±16.5% (k = 2)

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Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 750 MHz

Impedance	53.2 Ω – 0.7 jΩ	
Return Loss	-30.1 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 ns

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

Additional EUT Data

Manufactured by	SPEAG
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Certificate No: D750V3-1017_Jul24

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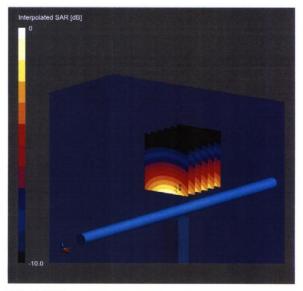




July 9, 2024

System Performance Check Report

Dipole		Fre	equency [MHz]		TSL	Power [dBm]		
D750V3 - SN1017	750			HSL	24			
Exposure Condition	s							
Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz]	, Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	15		CW, 0	750, 0		9.9	0.91	42.5
Hardware Setup								
Phantom	TSL, Measured Dat	e	Pro	be, Calibration Dat	e	DAE,	Calibration Date	
Flat V4.9 mod	HSL, 2024-07-09		EX3	DV4 - SN7349, 20	24-06-03	DAE4	p Sn1836, 2024-01-10	
Scans Setup					Measuremer	t Results		
				Zoom Scan	-			Zoom Scar
Grid Extents [mm]				30 x 30 x 30	Date	-		2024-07-09
Grid Steps [mm]			6.	0 x 6.0 x 1.5	psSAR1g [W/K	g]		2.14
Sensor Surface (mm)				1.4	psSAR10g [W/	Kg]		1.39
Graded Grid				Yes	Power Drift [d	B]		0.00
Grading Ratio				1.5	Power Scaling			Disabled
MAIA				N/A	Scaling Factor	[dB]		
Surface Detection				VMS + 6p	TSL Correction	1		Positive / Negative



0 dB = 3.48 W/Kg

Certificate No: D750V3-1017_Jul24

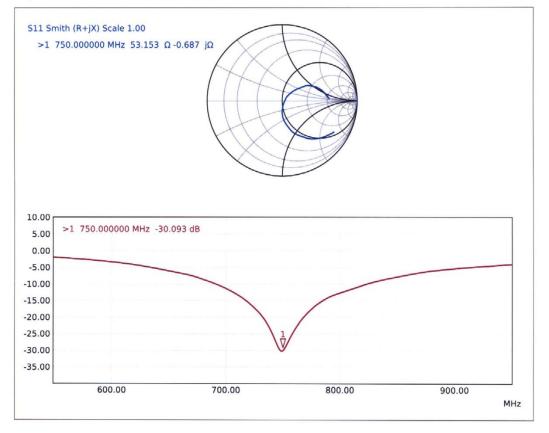
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July 9, 2024

Impedance Measurement Plot for Head TSL



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835 MHz Dipole Calibration Certificate

ent	CTTL			Certificate No.	335V2-4d	069 Jul24
	Beljing					
CAL	IBRATION C	ERTIFICAT	ſE			
Object		D835V2	- SN: 4d069)		
Calibra	ation procedure(s)	QA CAL Calibrati		re for SAR Validation Sources	between 0).7 - 3 GHz
Calibra	ation date	July 9, 2	024			
Power	y Standards Sensor R&S NRP-33		ID SN: 100967	Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038)		Scheduled Cal Mar-25
Power	Sensor R&S NRP-33 Sensor R&S NRP18A	1	SN: 100967 SN: 101859	28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A315007801)		
Power Spectru	Sensor R&S NRP-33	V40	SN: 100967	28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A315007801) 25-Jan-24 (No. 4030-315007551) 28-Mar-24 (No. 217-04050)		Mar-25 Mar-25 Jan-25 Mar-25
Power Spectru Nismat	Sensor R&S NRP-33 Sensor R&S NRP18A um Analyzer R&S FS tch; Short [S4188] Att 0AK-12	V40	SN: 100967 SN: 101859 SN: 101832 SN: 1152 SN: 1152 SN: 1016	28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A315007801) 25-Jan-24 (No. 4030-315007551) 28-Mar-24 (No. 217-04050) 05-Oct-23 (No. OCP-DAK12-1016_Oc		Mar-25 Mar-25 Jan-25 Mar-25 Oct-24
Power S Power S Spectru Mismat OCP D OCP D	Sensor R&S NRP-33 Sensor R&S NRP18A um Analyzer R&S FS tch; Short [S4188] Att 0AK-12 0AK-3.5	V40	SN: 100967 SN: 101859 SN: 101832 SN: 1152 SN: 116 SN: 1249	28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A315007801) 25-Jan-24 (No. 4030-315007551) 28-Mar-24 (No. 217-04050) 05-Oct-23 (No. OCP-DAK12-1016_Oc 05-Oct-23 (No. OCP-DAK3.5-1249_Oc		Mar-25 Mar-25 Jan-25 Mar-25 Oct-24 Oct-24
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Power S Power S Spectru Mismat DCP D DCP D Referen DAE4ip Second ACAD	Sensor R&S NRP-33 Sensor R&S NRP18A um Analyzer R&S FS1 tch; Short [S4188] Att bAK-3.5 nce Probe EX3DV4 p dary Standards Source Box	V40 enuator [S4423]	SN: 100967 SN: 101859 SN: 101832 SN: 1152 SN: 1016 SN: 1249 SN: 7349 SN: 1836 ID SN: 1000	28-Mar-24 (No. 217-04038) 21-Mar-24 (No. 4030A315007801) 25-Jan-24 (No. 4030-315007551) 28-Mar-24 (No. 217-04050) 05-Oct-23 (No. OCP-DAK12-1016_Oc 05-Oct-23 (No. OCP-DAK3.5-1249_Oc 03-Jun-24 (No. EX3-7349_Jun24) 10-Jan-24 (No. DAE4ip-1836_Jan24) Check Date (in house) 28-May-24 (No. 675-ACAD_Source_B	:t23)	Mar-25 Mar-25 Jan-25 Mar-25 Oct-24 Oct-24 Jun-25 Jan-25 Scheduled Chec May-25
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst Service suisse d'étalonnage

C Service suisse d'étalonnage Servizio svizzero di taratura

S Swiss Calibration Service

Accreditation No.: SCS 0108

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

Glossary

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

Calibration is Performed According to the Following Standards

- 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%.

Certificate No: D835V2-4d069_Jul24

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July 9, 2024

D835V2 - SN: 4d069

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	835MHz ±1MHz	

Head TSL parameters at 835 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.900 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	42.3 ±6%	0.930 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 835 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.47 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.09 W/kg ±16.5% (k = 2)

Certificate No: D835V2-4d069_Jul24

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D835V2 - SN: 4d069

July 9, 2024

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 835 MHz

Impedance	51.1 Ω – 4.5 jΩ
Return Loss	-26.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.393 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

Certificate No: D835V2-4d069_Jul24

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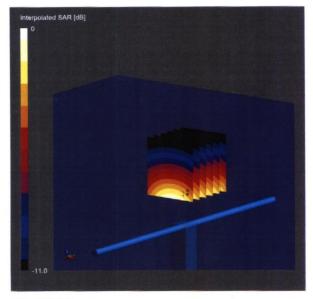


D835V2 - SN: 4d069

July 9, 2024

System Performance Check Report

Dipole		Frequency [MH	Iz]	TSL	Power [dBm]		
D835V2 - SN4d069	835		HSL	24			
Exposure Condition	s						
Phantom Section, TSL	Test Distance [mm]	and Group, UID	Frequency [MHz]	Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	15	CW, 0	835, 0		9.61	0.93	42.3
Hardware Setup							
Phantom	TSL, Measured Date	Pro	be, Calibration Date	e	DAE,	Calibration Date	
Flat V4.9 mod	HSL, 2024-07-09	EX3	3DV4 - SN7349, 20	24-06-03	DAE4	ip Sn1836, 2024-01-10	
Scans Setup				Measureme	nt Results		
			Zoom Scan				Zoom Scar
Grid Extents (mm)			30 x 30 x 30	Date			2024-07-09
Grid Steps [mm]		6	.0 x 6.0 x 1.5	psSAR1g [W/Kg]		2.38	
Sensor Surface (mm)			1.4	psSAR10g [W	/Kg]		1.53
Graded Grid			Yes	Power Drift [dB]			0.00
Grading Ratio			1.5	Power Scaling			Disable
MAIA			N/A	Scaling Facto	r [d8]		
Surface Detection			VMS + 6p	TSL Correctio	n		Positive / Negative
Scan Method			Measured				



 $0 \, dB = 3.85 \, W/Kg$

Certificate No: D835V2-4d069_Jul24

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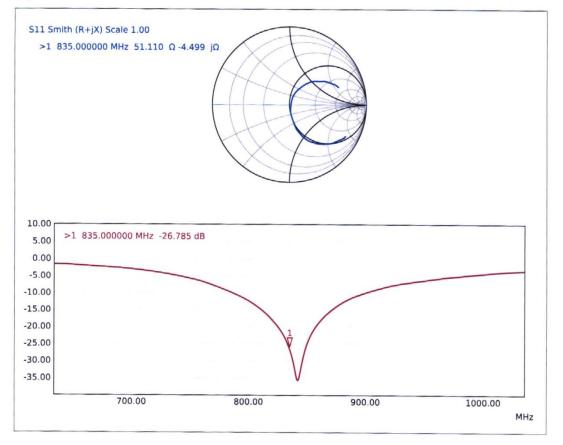




D835V2 - SN: 4d069

July 9, 2024





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15

1800 MHz Dipole Calibration Certificate

e Swis	sstrasse 43, 8004 Zuri d by the Swiss Accred s Accreditation Serval Agreement for th	ditation Service vice is one of t	(SAS) he signatories	to the EA	ibration Service
ient	CTTL Beijing			Certificate No. D1800V2-2	2d145_Jul24
CAL	IBRATION CI	ERTIFICA	TE		
Object		D1800V	2 - SN: 2d1	45	- 1970
Calibrati	ion procedure(s)		05.v12 ion Procedu	re for SAR Validation Sources between	0.7 - 3 GHz
Calibrati	ion date	July 11,	2024		
The mea All calibr	asurements and the u	ncertainties with nducted in the cl	osed laboratory	nal standards, which realize the physical units of measobability are given on the following pages and are part facility: environment temperature $(22\pm3)^\circ$ C and hum	of the certificate.
The mea All calibr Calibrati	asurements and the u rations have been cor ion Equipment used (I Standards	ncertainties with nducted in the cl	n confidence pro osed laboratory r calibration)	bability are given on the following pages and are part facility: environment temperature (22±3)°C and hum Cal Date (Certificate No.)	of the certificate. hidity < 70%.
The mea All calibr Calibrati Calibrati	asurements and the u rations have been cor ion Equipment used (I Standards ensor R&S NRP-33T	ncertainties with nducted in the cl	ID ID ID ID ID ID ID ID	bability are given on the following pages and are part facility: environment temperature (22±3)°C and hum Cal Date (Certificate No.) 28-Mar-24 (No. 217-04038)	of the certificate. hidity < 70%.
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Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland ac mra

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Swiss Calibration Service

Accreditation No.: SCS 0108

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

Glossary

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

Calibration is Performed According to the Following Standards

- 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%.

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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 ±1MHz	

Head TSL parameters at 1800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	40.5 ±6%	1.38 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 1800 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition			
SAR for nominal Head TSL parameters	24 dBm input power	9.83 W/kg		
SAR for nominal Head TSL parameters	normalized to 1W	39.1 W/kg ±17.0% (k = 2)		

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	5.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.6 W/kg ±16.5% (k = 2)

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Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 1800 MHz

Impedance	46.9 Ω – 2.4 jΩ		
Return Loss	-27.7 dB		

General Antenna Parameters and Design

Electrical Delay (one direction)	1.213 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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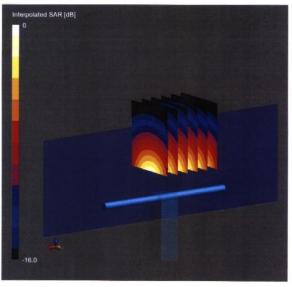




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System Performance Check Report

Summary								
Dipole			Frequency [MHz]	TSL	Power [dBm]		
D1800V2 - SN2d145			1800		HSL	24		
Exposure Condition	\$				_			
Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MH	Iz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10		CW, 0	1800, 0		7.95	1.38	40.5
Hardware Setup								
Phantom	TSL, Measured Dat	te	Probe, Calibration Date		DAE, Calibration Date			
MFP V8.0 Right	HSL, 2024-07-11 EX3DV4 - \$N7349, 2024-06-03		DAE4ip Sn1836, 2024-01-10					
Scans Setup					Measuremen	nt Results		
				Zoom Scan				Zoom Scan
Grid Extents [mm]	30 x		30 x 30 x 30	Date			2024-07-11	
Grid Steps [mm]	6.0 x 6.0 x 1.5		0 x 6.0 x 1.5	psSAR1g [W/Kg]			9.83	
Sensor Surface [mm]	1.4		1.4	psSAR10g [W/Kg]		5.17		
Graded Grid	Yes		Yes	Power Drift [dB]		0.01		
Grading Ratio	1.5		Power Scaling		Disabled			
MAIA				N/A	Scaling Factor	[dB]		
Surface Detection				All points	TSL Correction	n		Positive / Negative
Scan Method				Measured				



0 dB = 17.6 W/Kg

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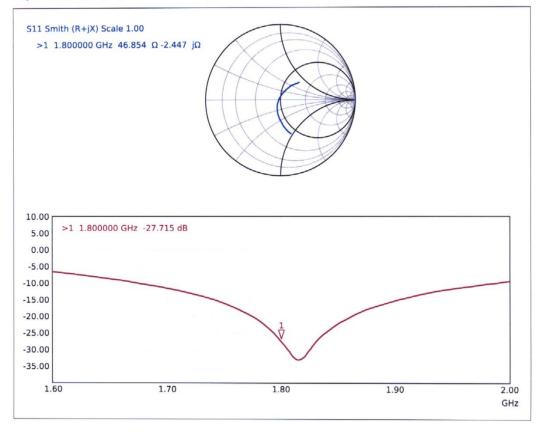
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Impedance Measurement Plot for Head TSL



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