SAR Compliance Test Report

Date of Report	14/02/2024	**Client's Contact person:**	Daniel Nydemark
Number of pages:	78		
		Responsible Test engineer:	Ilari Kinnunen
Testing laboratory:	**Verkotan Oy** Elektroniikkatie 17 90590 Oulu Finland	**Client:**	**Axis Communications AB** Gränden 1 SE-223 69 Lund Sweden
Tested device	**AXIS W120**		
Related reports:	-		
Testing has been carried out in accordance with:	**47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **FCC published RF exposure KDB procedures** **IEC/IEEE 62209-1528, 2020** Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices **RSS-102, Issue 5, 2015** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory		
Test Results:	**The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document		
Date and signatures:	14.02.2024 **Laboratory Manager** Miia Nurkkala		

TABLE OF CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Equipment under Test (DUT):

Product:	AXIS W120
Manufacturer:	Axis Communications AB
Model:	W120
Serial Number:	B8A44F8E68D3, B8A44F8E54DB
FCC ID Number:	PNBAXISW120 Contains FCC ID: PNB-RC76B Contains FCC ID: PNB-LB1ZM
ISED ID Number:	Contains IC: 3919A-RC76B Contains IC: 3919A-LB1ZM
DUT Number:	21096, 21095
Battery Type used in testing:	Li-Ion Battery
State of the Sample:	Production sample

Testing information:

Testing performed:	20-26.7.2023
Notes:	-
Document history:	This report replaces test report FCC SAR report_Axis W120 ID4543b_13022024.docxx. ISED ID updated.
Document ID:	FCC SAR report_Axis W120 ID4543b_14022024.docx
Temperature °C	22±2 / Controlled
Humidity RH%	30±20 / Controlled
Measurement performed by:	Ilari Kinnunen/Miia Nurkkala
FCC Test Firm Designation Number:	FI0005
ISED Company Number:	22218

1.2 Maximum Results

The maximum reported* SAR values for Body-worn for transmitting systems are shown in a table below. The device conforms to the requirements of the standards when the maximum reported SAR value is less than or equal to the limit. The SAR limit specified in FCC 47 CFR part 2 (2.1093) and Health Canada's RF exposure guideline, Safety Code 6 for Head/Body SAR_{1g} is 1.6 W/kg.

1.2.1 Standalone SAR

System	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Exposure Condition, 0 mm separation	Result
LTE 12	0.46	PASS
LTE 13	0.36	PASS
LTE 14	0.38	PASS
LTE 25	0.76	PASS
LTE 26	0.54	PASS
LTE 66	1.43	PASS
LTE 71	0.32	PASS
2.4 GHz WLAN	0.05	PASS
5 GHz WLAN	0.003	PASS
BT/BLE	0	PASS

* Reported SAR Values are scaled to upper limit of power tuning tolerance.

1.2.2 Simultaneous Transmission SAR

Highest Simultaneous Transmission SAR	SAR_{1g}(W/kg) in Body-Worn Exposure Condition
LTE 66 + WLAN 2.4 GHz	1.48

1.2.3 Maximum Drift

Maximum Drift During Measurements	-2.22dB*

*Larger than 5% drifts included to scaling factors

1.2.4 Measurement Uncertainty

SAR 1g: 0.3 – 3 GHz:

Expanded Uncertainty (k=2) 95 %	±22.1 %

SAR 1g: 3 – 6 GHz:

Expanded Uncertainty (k=2) 95 %	±24.0 %

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The DUT is a body-worn camera. It is used to document actions and capture evidence as it records incidents as they appeared to the camera wearer. The DUT supports LTE, 2.4GHz & 5GHz WLAN technologies and Bluetooth Classic & Bluetooth Low Energy.

Figure 1 Photos of the DUT

Device Category	Portable
Exposure Environment	General population uncontrolled

2.1 Supported Frequency Bands and Operational Modes

	Modes of Operation	Transmitter Frequency Range [MHz]
TX Frequency bands	LTE 2	1850 – 1910
	LTE 4	1710 – 1755
	LTE 5	824 – 849
	LTE 12	698 – 716
	LTE 13	777 – 787
	LTE 14	788 – 798
	LTE 25	1850 – 1915
	LTE 26	814 – 849
	LTE 66	1710 – 1780
	LTE 71	663 – 698
	WLAN 2.4 GHz	2412 – 2462
	WLAN 5 GHz	5180 – 5825
	Bluetooth/ BLE	2402 – 2480

2.2 Test Exemptions

2.2.1 Excluded Bands from Testing

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands when the specified maximum output power, including tune-up tolerance, is less or same for the smaller band as for the larger band.
The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.

For this product:

- LTE 2 band, 1850-1910 MHz, is excluded from the testing as it is fully covered by LTE 25 band, 1850-1915 MHz
- LTE 4 band, 1710-1755 MHz, is excluded from the testing as it is fully covered by LTE 66 band, 1710-1780 MHz
- LTE 5 band, 824-849 MHz is excluded as it is fully covered by LTE 26 band, 814-849 MHz

2.3 Simultaneous transmission

Cellular and WLAN can be operated simultaneously.

Possible simultaneous transmissions are:
LTE & WLAN 2.4GHz
LTE & WLAN 5GHz
LTE & Bluetooth/BLE

3. OUTPUT POWER

3.1 Maximum specified conducted output power

From the customer, including tune-up tolerances;

LTE	Max Output Power [dBm]
LTE 2	24
LTE 4	24
LTE 5	24
LTE 12	24
LTE 13	24
LTE 14	24
LTE 25	24
LTE 26	24
LTE 66	24
LTE 71	24

WLAN 2.4GHz	Max Output Power [dBm]
802.11b	19
802.11g	19
802.11n	18

BT/BLE	Max Output Power [dBm]
all channels	6

WLAN 5GHz	Output power [dBm]	
	CH 40-60, 104-144, 149-165	CH 36, 64, 100
802.11a	17	16
802.11n/ac	16	15

3.2 Tested conducted power

Measured conducted output power at transmitting antenna connector;

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 18607 1850.7 MHz	CH 18900 1880.0 MHz	CH 19193 1909.3 MHz	3GPP MPR [dB]	CH 18607 1850.7 MHz	CH 18900 1880.0 MHz	CH 19193 1909.3 MHz	3GPP MPR [dB]
2 / 1.4M	1	0	22.43	22.45	22.4	0	21.33	21.26	21.39	1
	1	2	22.59	22.48	22.5	0	21.59	21.26	21.32	1
	1	5	22.44	22.45	22.24	0	21.69	21.2	21.06	1
	3	0	22.56	22.55	22.45	0	21.53	21.48	21.49	1
	3	1	22.58	22.67	22.38	0	21.68	21.63	21.54	1
	3	3	22.49	22.6	22.34	0	21.58	21.56	21.44	1
	6	0	21.52	21.59	21.44	1	20.71	20.59	20.6	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 18615 1851.5 MHz	CH 18900 1880.0 MHz	CH 19185 1918.5 MHz	3GPP MPR [dB]	CH 18615 1851.5 MHz	CH 18900 1880.0 MHz	CH 19185 1918.5 MHz	3GPP MPR [dB]
2 / 3M	1	0	22.57	22.47	22.58	0	21.43	21.26	21.41	1
	1	7	22.8	22.48	22.5	0	21.67	21.3	21.36	1
	1	14	22.69	22.34	22.51	0	21.58	21.31	21.05	1
	8	0	21.63	21.65	21.7	1	20.49	20.69	20.66	2
	8	3	21.66	21.57	21.6	1	20.54	20.54	20.5	2
	8	7	21.68	21.47	21.6	1	20.5	20.56	20.47	2
	15	0	21.52	21.6	21.45	1	20.66	20.57	20.6	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 18625 1852.5 MHz	CH 18900 1880.0 MHz	CH 19175 1907.5 MHz	3GPP MPR [dB]	CH 18625 1852.5 MHz	CH 18900 1880.0 MHz	CH 19175 1907.5 MHz	3GPP MPR [dB]
2 / 5M	1	0	22.52	22.59	22.66	0	21.32	21.51	21.33	1
	1	12	22.77	22.51	22.49	0	21.49	21.55	21.39	1
	1	24	22.42	22.37	22.42	0	21.41	21.47	20.83	1
	12	0	21.55	21.71	21.85	1	20.39	20.7	20.78	2
	12	6	21.57	21.55	21.72	1	20.56	20.63	20.68	2
	12	13	21.74	21.49	21.46	1	20.46	20.66	20.53	2
	25	0	21.6	21.49	21.6	1	20.52	20.57	20.66	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 18650 1855 MHz	CH 18900 1880.0	CH 19150 1905 MHz	3GPP MPR [dB]	CH 18650 1855 MHz	CH 18900 1880.0 MHz	CH 19150 1905 MHz	3GPP MPR [dB]
2 / 10M	1	0	22.3	22.49	22.43	0	20.99	21.3	21.19	1
	1	24	22.86	22.6	22.75	0	21.27	21.29	21.08	1
	1	49	22.37	22.46	22.46	0	21.4	20.54	20.84	1
	25	0	21.77	21.54	21.71	1	20.67	20.54	20.7	2
	25	12	21.8	21.51	21.65	1	20.62	20.52	20.64	2
	25	25	21.62	21.52	21.36	1	20.55	20.53	20.51	2
	50	0	21.66	21.64	21.6	1	20.58	20.62	20.7	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 18675 1857.5 MHz	CH 18900 1880.0	CH 19125 1902.5 MHz	3GPP MPR [dB]	CH 18675 1857.5 MHz	CH 18900 1880.0 MHz	CH 19125 1902.5 MHz	3GPP MPR [dB]
2 / 15M	1	0	22.37	22.58	22.64	0	21.36	21.34	21.17	1
	1	37	22.93	22.58	22.77	0	21.44	21.35	21.38	1
	1	74	22.42	22.41	22.51	0	21.29	20.37	20.4	1
	36	0	21.84	21.65	21.53	1	20.8	20.63	20.64	2
	36	19	21.72	21.56	21.67	1	20.69	20.62	20.66	2
	36	39	21.55	21.55	21.49	1	20.53	20.51	20.49	2
	75	0	21.62	21.55	21.56	1	20.6	20.61	20.54	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 18700 1860.0 MHz	CH 18900 1880.0	CH 19100 1900.0 MHz	3GPP MPR [dB]	CH 18700 1860.0 MHz	CH 18900 1880.0	CH 19100 1900.0 MHz	3GPP MPR [dB]
2 / 20M	1	0	22.65	22.56	22.61	0	21.1	21.25	20.89	1
	1	50	22.8	22.52	22.8	0	21.3	21.63	21.48	1
	1	99	22.54	22.46	22.42	0	20.98	20.74	20.49	1
	50	0	21.71	21.66	21.62	1	20.66	20.69	20.55	2
	50	25	21.7	21.59	21.74	1	20.86	20.63	20.73	2
	50	50	21.69	21.47	21.62	1	20.87	20.52	20.69	2
	100	0	21.76	21.65	21.52	1	20.75	20.47	20.53	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 19957 1710.7 MHz	CH 20175 1732.5 MHz	CH 20393 1754.3 MHz	3GPP MPR [dB]	CH 19957 1710.7 MHz	CH 20175 1732.5 MHz	CH 20393 1754.3 MHz	3GPP MPR [dB]
4 / 1.4M	1	0	22.51	22.62	22.68	0	21.4	21.45	21.3	1
	1	2	22.58	22.61	22.8	0	21.51	21.68	21.11	1
	1	5	22.65	22.58	22.69	0	21.4	21.42	21.02	1
	3	0	22.66	22.75	22.76	0	21.6	21.92	21.67	1
	3	1	22.7	22.81	22.79	0	21.76	21.95	21.67	1
	3	3	22.66	22.81	22.72	0	21.73	21.83	21.68	1
	6	0	21.68	21.91	21.72	1	20.9	21.01	20.85	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 19965 1711.5 MHz	CH 20175 1732.5 MHz	CH 20385 1753.5 MHz	3GPP MPR [dB]	CH 19965 1711.5 MHz	CH 20175 1732.5 MHz	CH 20385 1753.5 MHz	3GPP MPR [dB]
4 / 3M	1	0	22.84	22.8	22.45	0	21.34	21.3	20.98	1
	1	7	22.85	22.68	22.5	0	21.46	21.57	21.25	1
	1	14	22.67	22.62	22.81	0	21.35	21.35	21.17	1
	8	0	21.9	21.84	21.63	1	20.59	20.81	20.59	2
	8	3	21.85	21.83	21.61	1	20.64	20.79	20.7	2
	8	7	21.81	21.87	21.7	1	20.39	20.84	20.71	2
	15	0	21.78	21.8	21.65	1	20.58	20.85	20.63	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 19975 1711.5 MHz	CH 20175 1732.5 MHz	CH 20375 1753.5 MHz	3GPP MPR [dB]	CH 19975 1711.5 MHz	CH 20175 1732.5 MHz	CH 20375 1753.5 MHz	3GPP MPR [dB]
4 / 5M	1	0	22.64	22.8	22.51	0	21.3	21.83	21.51	1
	1	12	22.98	22.62	22.7	0	21.52	21.88	21.47	1
	1	24	22.6	22.5	22.67	0	21.23	21.55	21.46	1
	12	0	21.63	21.84	21.57	1	20.46	20.86	20.52	2
	12	6	21.82	21.89	21.6	1	20.62	20.92	20.63	2
	12	13	21.78	21.87	21.75	1	20.58	20.85	20.61	2
	25	0	21.77	21.87	21.77	1	20.81	20.9	20.73	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20000 1715.0 MHz	CH 20175 1732.5 MHz	CH 20350 1750.0 MHz	3GPP MPR [dB]	CH 20000 1715.0 MHz	CH 20175 1732.5 MHz	CH 20350 1750.0 MHz	3GPP MPR [dB]
4 / 10M	1	0	22.6	22.65	22.87	0	21.26	21.03	21.19	1
	1	24	22.76	22.91	22.8	0	21.4	21.4	21.26	1
	1	49	22.44	22.7	22.62	0	20.64	20.98	21.08	1
	25	0	21.83	21.91	21.73	1	20.78	20.78	20.7	2
	25	12	21.75	21.84	21.59	1	20.8	20.97	20.66	2
	25	25	21.54	21.71	21.62	1	20.66	20.74	20.61	2
	50	0	21.71	21.81	21.63	1	20.76	20.83	20.79	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20025 1717.0 MHz	CH 20175 1732.5 MHz	CH 20325 1747.5 MHz	3GPP MPR [dB]	CH 20025 1717.0 MHz	CH 20175 1732.5 MHz	CH 20325 1747.5 MHz	3GPP MPR [dB]
4 / 15M	1	0	22.8	22.88	22.84	0	21.5	21.17	21.38	1
	1	37	23.0	22.83	22.92	0	21.51	21.69	21.53	1
	1	74	22.74	22.59	22.73	0	21.0	20.99	21.1	1
	36	0	21.65	21.93	21.74	1	20.61	20.73	20.89	2
	36	19	21.73	21.9	21.71	1	20.64	20.79	20.88	2
	36	39	21.54	21.73	21.49	1	20.64	20.81	20.72	2
	75	0	21.56	21.85	21.67	1	20.69	20.75	20.7	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20050 1720.0 MHz	CH 20175 1732.5 MHz	CH 20300 1745.0 MHz	3GPP MPR [dB]	CH 20050 1720.0 MHz	CH 20175 1732.5 MHz	CH 20300 1745.0 MHz	3GPP MPR [dB]
4 / 20M	1	0	22.79	22.73	22.99	0	21.45	21.32	21.45	1
	1	50	23.07	22.9	22.76	0	21.74	21.8	21.8	1
	1	99	22.82	22.67	22.7	0	21.08	20.94	20.96	1
	50	0	21.87	22.07	22.0	1	20.79	20.81	20.97	2
	50	25	21.9	21.9	21.77	1	20.93	20.94	20.85	2
	50	50	21.88	21.87	21.6	1	20.78	20.81	20.57	2
	100	0	21.84	21.92	21.66	1	20.79	20.89	20.65	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20407 824.7 MHz	CH 20525 836.5 MHz	CH 20643 848.3 MHz	3GPP MPR [dB]	CH 20407 824.7 MHz	CH 20525 836.5 MHz	CH 20643 848.3 MHz	3GPP MPR [dB]
5 / 1.4M	1	0	22.76	22.87	22.77	0	21.7	21.67	21.66	1
	1	2	22.96	22.82	22.86	0	21.75	21.57	21.31	1
	1	5	22.72	22.68	22.71	0	21.65	21.54	21.21	1
	3	0	22.9	22.82	22.87	0	21.77	21.87	21.91	1
	3	1	23.08	22.82	22.89	0	21.85	22.03	21.91	1
	3	3	23.0	22.79	22.88	0	21.85	21.93	21.76	1
	6	0	21.81	21.77	21.9	1	20.93	20.81	20.97	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20415 825.5 MHz	CH 20525 836.5 MHz	CH 20635 847.5 MHz	3GPP MPR [dB]	CH 20415 825.5 MHz	CH 20525 836.5 MHz	CH 20635 847.5 MHz	3GPP MPR [dB]
5 / 3M	1	0	22.99	22.86	22.93	0	21.63	21.55	21.56	1
	1	7	22.75	22.82	22.99	0	21.64	21.72	21.72	1
	1	14	22.67	22.91	22.79	0	21.57	21.58	21.71	1
	8	0	21.85	21.87	21.85	1	20.75	20.95	20.79	2
	8	3	21.79	21.86	21.8	1	20.79	20.91	20.83	2
	8	7	21.8	21.86	21.88	1	20.83	20.81	21.02	2
	15	0	21.79	21.82	21.9	1	20.74	20.86	21.08	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20425 826.5 MHz	CH 20525 836.5 MHz	CH 20625 846.5 MHz	3GPP MPR [dB]	CH 20425 826.5 MHz	CH 20525 836.5 MHz	CH 20625 846.5 MHz	3GPP MPR [dB]
5 / 5M	1	0	22.94	22.76	22.8	0	21.52	21.74	21.53	1
	1	12	22.75	22.78	22.94	0	21.66	21.65	21.62	1
	1	24	22.61	22.94	22.8	0	21.38	21.37	21.55	1
	12	0	21.92	21.78	21.98	1	20.53	20.68	21.04	2
	12	6	21.89	21.87	21.86	1	20.64	20.84	21.02	2
	12	13	21.79	21.89	21.78	1	20.63	20.85	20.96	2
	25	0	21.82	21.84	21.88	1	20.73	20.81	20.79	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 20450 829.0 MHz	CH 20525 836.5 MHz	CH 20600 844 MHz	3GPP MPR [dB]	CH 20450 829.0 MHz	CH 20525 836.5 MHz	CH 20600 844 MHz	3GPP MPR [dB]
5 / 10M	1	0	22.95	22.58	22.87	0	21.69	21.71	21.73	1
	1	24	22.92	22.99	22.98	0	21.54	21.64	21.65	1
	1	49	22.76	22.9	22.85	0	21.81	21.57	21.62	1
	25	0	21.9	21.92	22.04	1	20.88	20.83	20.89	2
	25	12	21.9	21.87	22.04	1	20.79	20.84	20.89	2
	25	25	21.84	21.83	21.81	1	20.84	20.81	20.79	2
	50	0	21.97	21.94	21.83	1	20.98	21.08	20.94	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 23017 699.7 MHz	CH 23095 707.5 MHz	CH 23173 715.3 MHz	3GPP MPR [dB]	CH 23017 699.7 MHz	CH 23095 707.5 MHz	CH 23173 715.3 MHz	3GPP MPR [dB]
12 / 1.4M	1	0	22.86	22.92	22.96	0	21.71	21.86	21.78	1
	1	2	23.13	22.98	23.04	0	21.87	21.86	21.74	1
	1	5	23.07	22.74	22.73	0	21.89	21.68	21.71	1
	3	0	23.08	23.03	22.94	0	21.9	22.15	22.05	1
	3	1	23.15	22.98	22.96	0	22.16	22.2	22.16	1
	3	3	23.01	22.85	22.91	0	22.07	22.14	22.02	1
	6	0	22.0	22.04	22.02	1	21.15	21.08	21.17	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 23025 700.5 MHz	CH 23095 707.5 MHz	CH 23165 714.5 MHz	3GPP MPR [dB]	CH 23025 700.5 MHz	CH 23095 707.5 MHz	CH 23165 714.5 MHz	3GPP MPR [dB]
12 / 3M	1	0	22.97	22.72	22.96	0	21.62	21.73	21.55	1
	1	7	23.23	22.98	23.14	0	22.04	22.03	21.77	1
	1	14	22.91	22.73	22.8	0	21.62	21.6	21.84	1
	8	0	22.1	22.1	22.04	1	21.09	21.09	21.05	2
	8	3	22.08	22.07	21.89	1	21.04	21.14	20.89	2
	8	7	22.12	22.09	21.96	1	21.08	20.97	20.89	2
	15	0	22.22	22.02	21.96	1	21.12	21.16	21.02	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 23035 701.5 MHz	CH 23095 707.5 MHz	CH 23155 713.5 MHz	3GPP MPR [dB]	CH 23035 701.5 MHz	CH 23095 707.5 MHz	CH 23155 713.5 MHz	3GPP MPR [dB]
12 / 5M	1	0	22.88	22.64	22.83	0	21.67	21.39	21.49	1
	1	12	23.19	22.94	23.15	0	21.91	22.02	21.65	1
	1	24	22.93	22.61	22.7	0	21.22	21.58	21.52	1
	12	0	22.16	21.94	21.99	1	20.8	20.88	20.87	2
	12	6	22.12	22.09	22.0	1	20.79	21.23	20.97	2
	12	13	21.9	21.98	21.84	1	20.55	20.94	20.84	2
	25	0	21.95	22.04	21.94	1	20.94	21.13	20.92	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 23060 704.0 MHz	CH 23095 707.5 MHz	CH 23130 711.0 MHz	3GPP MPR [dB]	CH 23060 704.0 MHz	CH 23095 707.5 MHz	CH 23130 711.0 MHz	3GPP MPR [dB]
12 / 10M	1	0	22.86	22.42	22.93	0	21.7	21.06	21.2	1
	1	24	22.96	23.01	22.98	0	21.57	22.25	21.69	1
	1	49	22.66	22.77	22.84	0	21.44	22.0	21.58	1
	25	0	21.95	21.79	21.91	1	20.97	20.82	20.97	2
	25	12	21.76	21.99	22.04	1	20.85	21.06	20.95	2
	25	25	21.96	21.91	21.94	1	20.9	20.94	20.93	2
	50	0	22.01	21.88	21.81	1	20.98	20.9	20.9	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 23205 779.5 MHz	CH 23230 782.0 MHz	CH 23255 784.5 MHz	3GPP MPR [dB]	CH 23205 779.5 MHz	CH 23230 782.0 MHz	CH 23255 784.5 MHz	3GPP MPR [dB]
13 / 5M	1	0	22.7	22.75	22.69	0	21.46	21.41	21.48	1
	1	12	22.74	22.87	22.74	0	21.58	21.67	21.75	1
	1	24	22.6	22.59	22.65	0	21.49	21.45	21.46	1
	12	0	21.8	21.6	21.61	1	20.67	20.7	20.68	2
	12	6	21.79	21.77	21.74	1	20.81	20.91	21.0	2
	12	13	21.73	21.66	21.74	1	20.67	20.89	20.74	2
	25	0	21.74	21.8	21.77	1	20.72	20.75	20.85	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			N/A	CH 23230 782.0 MHz	N/A	3GPP MPR [dB]	N/A	CH 23230 782.0 MHz	N/A	3GPP MPR [dB]
13 / 10M	1	0	N/A	22.68	N/A	0	N/A	21.47	N/A	1
	1	24	N/A	23.04	N/A	0	N/A	21.74	N/A	1
	1	49	N/A	22.96	N/A	0	N/A	20.94	N/A	1
	25	0	N/A	21.9	N/A	1	N/A	20.8	N/A	2
	25	12	N/A	21.87	N/A	1	N/A	20.82	N/A	2
	25	25	N/A	21.67	N/A	1	N/A	20.76	N/A	2
	50	0	N/A	21.79	N/A	1	N/A	20.73	N/A	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 23305 790.5 MHz	CH 23330 793.0 MHz	CH 23355 795.5 MHz	3GPP MPR [dB]	CH 23305 790.5 MHz	CH 23330 793.0 MHz	CH 23355 795.5 MHz	3GPP MPR [dB]
14 / 5M	1	0	22.55	22.9	22.81	0	21.63	21.87	21.74	1
	1	12	23.07	22.8	22.8	0	21.98	21.77	21.45	1
	1	24	22.44	22.54	22.75	0	21.65	21.21	21.1	1
	12	0	21.87	21.88	21.76	1	20.76	20.86	20.79	2
	12	6	22.01	21.89	21.75	1	20.99	20.78	20.61	2
	12	13	21.88	21.72	21.63	1	20.76	20.73	20.45	2
	25	0	21.86	21.85	21.78	1	20.83	20.87	21.04	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			N/A	CH 23330 793.0 MHz	N/A	3GPP MPR [dB]	N/A	CH 23330 793.0	N/A	3GPP MPR [dB]
14 / 10M	1	0	N/A	22.13	N/A	0	N/A	21.38	N/A	1
	1	24	N/A	22.75	N/A	0	N/A	21.64	N/A	1
	1	49	N/A	22.62	N/A	0	N/A	21.21	N/A	1
	25	0	N/A	21.97	N/A	1	N/A	20.86	N/A	2
	25	12	N/A	21.87	N/A	1	N/A	20.88	N/A	2
	25	25	N/A	21.65	N/A	1	N/A	20.71	N/A	2
	50	0	N/A	21.76	N/A	1	N/A	20.86	N/A	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26047 1850.7 MHz	CH 26365 1882.5	CH 26683 1914.3 MHz	3GPP MPR [dB]	CH 26047 1850.7 MHz	CH 26365 1882.5	CH 26683 1914.3 MHz	3GPP MPR [dB]
25 / 1.4M	1	0	22.81	22.65	22.88	0	22.07	21.73	21.16	1
	1	2	22.87	22.82	23.1	0	22.09	21.69	21.29	1
	1	5	22.73	22.75	23.05	0	21.71	21.69	21.55	1
	3	0	22.86	22.87	22.8	0	21.76	21.84	21.94	1
	3	1	22.98	22.88	23.06	0	22.03	21.86	22.11	1
	3	3	22.98	22.79	22.97	0	21.95	21.76	22.18	1
	6	0	21.91	21.8	21.87	1	21.03	20.86	20.74	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26055 1851.5 MHz	CH 26365 1882.5	CH 26675 1913.5 MHz	3GPP MPR [dB]	CH 26055 1851.5 MHz	CH 26365 1882.5	CH 26675 1913.5 MHz	3GPP MPR [dB]
25 / 3M	1	0	22.52	22.28	22.28	0	21.12	20.86	20.81	1
	1	7	22.6	22.28	22.5	0	21.18	20.87	21.45	1
	1	14	22.48	22.06	22.65	0	21.04	21.07	21.07	1
	8	0	21.51	21.26	21.29	1	20.59	20.37	20.3	2
	8	3	21.46	21.23	21.45	1	20.54	20.15	20.53	2
	8	7	21.41	21.25	21.53	1	20.41	20.27	20.68	2
	15	0	21.51	21.35	21.3	1	20.57	20.36	20.37	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26065 1852.5 MHz	CH 26365 1882.5	CH 26665 1912.5 MHz	3GPP MPR [dB]	CH 26065 1852.5 MHz	CH 26365 1882.5	CH 26665 1912.5 MHz	3GPP MPR [dB]
25 / 5M	1	0	22.3	22.39	22.29	0	21.06	20.61	20.72	1
	1	12	22.49	22.28	22.62	0	21.08	21.02	21.27	1
	1	24	22.22	22.11	22.6	0	20.97	21.2	21.0	1
	12	0	21.36	21.33	21.28	1	20.31	20.5	20.01	2
	12	6	21.39	21.21	21.26	1	20.37	20.4	20.15	2
	12	13	21.39	21.23	21.42	1	20.27	20.41	20.46	2
	25	0	21.42	21.26	21.24	1	20.43	20.25	20.23	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26090 1855.0 MHz	CH 26365 1882.5	CH 26640 1910.0 MHz	3GPP MPR [dB]	CH 26090 1855.0 MHz	CH 26365 1882.5	CH 26640 1910.0 MHz	3GPP MPR [dB]
25 / 10M	1	0	22.22	22.2	22.2	0	21.17	21.06	21.47	1
	1	24	22.25	22.4	22.27	0	21.11	21.03	20.98	1
	1	49	22.41	22.06	22.34	0	20.6	20.42	21.15	1
	25	0	21.38	21.23	21.28	1	20.39	20.33	20.26	2
	25	12	21.44	21.19	21.21	1	20.43	20.19	20.2	2
	25	25	21.43	21.09	21.24	1	20.36	20.1	20.21	2
	50	0	21.29	21.18	21.3	1	20.4	20.45	20.28	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26115 1857.5 MHz	CH 26365 1882.5	CH 26615 1907.5 MHz	3GPP MPR [dB]	CH 26115 1857.5 MHz	CH 26365 1882.5	CH 26615 1907.5 MHz	3GPP MPR [dB]
25 / 15M	1	0	22.52	22.19	22.65	0	21.18	21.1	21.55	1
	1	37	22.79	22.32	22.44	0	21.1	21.13	21.18	1
	1	74	22.4	22.21	22.35	0	20.9	20.51	21.16	1
	36	0	21.36	21.27	21.27	1	20.43	20.26	20.56	2
	36	19	21.59	21.23	21.21	1	20.59	20.23	20.33	2
	36	39	21.44	21.12	21.14	1	20.45	20.15	20.26	2
	75	0	21.41	21.13	21.33	1	20.39	20.4	20.45	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26140 1860.0 MHz	CH 26365 1882.5	CH 26590 1905.0 MHz	3GPP MPR [dB]	CH 26140 1860.0 MHz	CH 26365 1882.5	CH 26590 1905.0 MHz	3GPP MPR [dB]
25 / 20M	1	0	22.48	22.19	22.13	0	20.88	20.98	20.66	1
	1	50	22.69	22.2	22.45	0	21.08	21.26	21.31	1
	1	99	22.37	22.15	22.11	0	20.62	20.07	20.73	1
	50	0	21.51	21.26	21.3	1	20.54	20.29	20.4	2
	50	25	21.69	21.18	21.34	1	20.65	20.23	20.42	2
	50	50	21.6	21.2	21.1	1	20.66	20.19	20.22	2
	100	0	21.55	21.26	21.29	1	20.53	20.22	20.41	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26697 814.7 MHz	CH 26865 831.5 MHz	CH 27033 848.3 MHz	3GPP MPR [dB]	CH 26697 814.7 MHz	CH 26865 831.5 MHz	CH 27033 848.3 MHz	3GPP MPR [dB]
26 / 1.4M	1	0	22.86	22.74	22.55	0	21.77	21.66	21.06	1
	1	2	22.92	22.85	22.66	0	21.41	21.62	21.29	1
	1	5	22.98	22.72	22.62	0	21.35	21.63	21.02	1
	3	0	22.83	22.83	22.64	0	21.97	21.86	21.59	1
	3	1	22.93	22.84	22.65	0	22.07	21.97	21.75	1
	3	3	22.89	22.82	22.6	0	22.03	21.91	21.6	1
	6	0	21.83	21.93	21.51	1	21.01	21.15	20.59	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26705 815.5 MHz	CH 26865 831.5 MHz	CH 27025 847.5 MHz	3GPP MPR [dB]	CH 26705 815.5 MHz	CH 26865 831.5 MHz	CH 27025 847.5 MHz	3GPP MPR [dB]
26 / 3M	1	0	22.94	22.79	22.72	0	21.38	21.72	21.85	1
	1	7	23.12	22.75	22.57	0	21.82	21.76	21.43	1
	1	14	23.03	22.67	22.52	0	21.84	21.7	20.92	1
	8	0	21.97	21.91	21.66	1	21.01	20.87	20.84	2
	8	3	22.13	21.9	21.68	1	21.08	21.11	20.71	2
	8	7	22.02	21.84	21.57	1	20.91	21.0	20.52	2
	15	0	21.91	21.96	21.74	1	20.92	20.97	20.83	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26715 816.5 MHz	CH 26865 831.5 MHz	CH 27015 846.5 MHz	3GPP MPR [dB]	CH 26715 816.5 MHz	CH 26865 831.5 MHz	CH 27015 846.5 MHz	3GPP MPR [dB]
26 / 5M	1	0	22.91	22.69	22.75	0	21.66	21.54	21.55	1
	1	12	23.08	22.9	22.64	0	21.89	21.78	21.62	1
	1	24	22.92	22.68	22.54	0	21.54	21.35	20.88	1
	12	0	21.96	21.94	21.96	1	20.82	20.82	20.91	2
	12	6	22.05	21.91	21.76	1	20.85	21.12	20.66	2
	12	13	21.93	21.88	21.64	1	20.82	21.01	20.42	2
	25	0	21.92	21.92	21.77	1	20.88	20.97	20.94	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26740 819 MHz	CH 26865 831.5 MHz	CH 26990 844 MHz	3GPP MPR [dB]	CH 26740 819 MHz	CH 26865 831.5 MHz	CH 26990 844 MHz	3GPP MPR [dB]
26 / 10M	1	0	22.7	22.82	23.03	0	21.77	22.08	21.82	1
	1	24	23.0	22.94	22.75	0	21.34	22.15	21.66	1
	1	49	22.8	22.59	22.79	0	21.83	21.67	21.25	1
	25	0	22.0	22.05	22.21	1	21.12	21.07	20.99	2
	25	12	22.01	21.95	22.01	1	20.98	20.99	21.05	2
	25	25	21.82	21.81	21.71	1	20.96	20.87	20.86	2
	50	0	22.01	21.93	21.86	1	21.12	20.96	20.89	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 26765 821.5 MHz	CH 26865 831.5 MHz	CH 26965 841.5 MHz	3GPP MPR [dB]	CH 26765 821.5 MHz	CH 26865 831.5 MHz	CH 26965 841.5 MHz	3GPP MPR [dB]
26 / 15M	1	0	22.8	22.75	22.71	0	22.0	22.06	21.85	1
	1	37	23.21	22.94	23.14	0	22.01	21.97	21.95	1
	1	74	22.97	22.78	22.63	0	21.92	21.77	20.84	1
	36	0	21.89	22.01	21.81	1	21.0	21.1	20.84	2
	36	19	22.06	22.01	22.0	1	21.17	21.02	21.12	2
	36	39	22.09	21.81	21.86	1	21.07	20.94	20.89	2
	75	0	22.04	21.99	21.88	1	21.13	21.02	20.91	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 131979 1710.7 MHz	CH 132322 1745.0 MHz	CH 132665 1779.3 MHz	3GPP MPR [dB]	CH 131979 1710.7 MHz	CH 132322 1745.0 MHz	CH 132665 1779.3 MHz	3GPP MPR [dB]
66 / 1.4M	1	0	22.62	22.62	22.42	0	21.41	21.41	21.33	1
	1	2	22.68	22.81	22.4	0	21.3	21.44	21.22	1
	1	5	22.54	22.52	22.26	0	21.27	21.49	21.08	1
	3	0	22.64	22.78	22.53	0	21.73	21.67	21.33	1
	3	1	22.68	22.82	22.62	0	21.9	21.77	21.53	1
	3	3	22.57	22.75	22.53	0	21.77	21.69	21.44	1
	6	0	21.67	21.71	21.62	1	20.85	21.0	21.0	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 131987 1711.5 MHz	CH 132322 1745.0 MHz	CH 132657 1778.5 MHz	3GPP MPR [dB]	CH 131987 1711.5 MHz	CH 132322 1745.0 MHz	CH 132657 1778.5 MHz	3GPP MPR [dB]
66 / 3M	1	0	22.63	22.86	22.72	0	21.28	21.52	21.44	1
	1	7	22.74	22.64	22.74	0	21.36	21.55	21.44	1
	1	14	22.69	22.62	22.42	0	21.27	21.47	21.18	1
	8	0	21.83	21.8	21.48	1	20.69	20.78	20.66	2
	8	3	21.78	21.78	21.4	1	20.75	20.76	20.57	2
	8	7	21.76	21.69	21.72	1	20.74	20.77	20.41	2
	15	0	21.74	21.74	21.62	1	20.69	20.8	20.56	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 131997 1712.5 MHz	CH 132322 1745.0 MHz	CH 132647 1777.5 MHz	3GPP MPR [dB]	CH 131997 1712.5 MHz	CH 132322 1745.0 MHz	CH 132647 1777.5 MHz	3GPP MPR [dB]
66 / 5M	1	0	22.63	22.82	22.78	0	21.73	21.53	20.98	1
	1	12	22.46	22.7	22.97	0	22.11	21.4	21.54	1
	1	24	22.28	22.64	22.57	0	21.17	21.3	21.11	1
	12	0	21.76	21.84	21.59	1	20.62	20.7	20.56	2
	12	6	21.82	21.79	21.6	1	20.77	20.55	20.42	2
	12	13	21.67	21.76	21.57	1	20.73	20.53	20.49	2
	25	0	21.77	21.77	21.44	1	20.74	20.84	20.62	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 132022 1715.0 MHz	CH 132322 1745.0 MHz	CH 132622 1775.0 MHz	3GPP MPR [dB]	CH 132022 1715.0 MHz	CH 132322 1745.0 MHz	CH 132622 1775.0 MHz	3GPP MPR [dB]
66 / 10M	1	0	22.84	23.11	22.69	0	21.11	21.33	21.07	1
	1	24	22.77	22.89	22.75	0	21.41	21.76	21.34	1
	1	49	22.76	22.53	22.2	0	21.37	21.04	21.08	1
	25	0	21.72	21.86	21.64	1	20.79	20.88	20.64	2
	25	12	21.85	21.8	21.69	1	20.72	20.9	20.69	2
	25	25	21.7	21.61	21.52	1	20.78	20.71	20.56	2
	50	0	21.71	21.69	21.47	1	20.77	20.82	20.73	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 132047 1717.5 MHz	CH 132322 1745.0 MHz	CH 132597 1772.5 MHz	3GPP MPR [dB]	CH 132047 1717.5 MHz	CH 132322 1745.0 MHz	CH 132597 1772.5 MHz	3GPP MPR [dB]
66 / 15M	1	0	22.72	22.98	22.43	0	21.27	21.97	21.2	1
	1	37	22.74	22.85	23.01	0	21.75	21.62	21.55	1
	1	74	22.8	22.65	22.15	0	21.2	21.04	21.2	1
	36	0	21.72	22.04	21.61	1	20.77	20.83	20.8	2
	36	19	21.77	21.81	21.63	1	20.81	20.78	20.88	2
	36	39	21.77	21.6	21.43	1	20.82	20.55	20.57	2
	75	0	21.72	21.79	21.47	1	20.66	20.95	20.58	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 132072 1720.0 MHz	CH 132322 1745.0 MHz	CH 132572 1770.0 MHz	3GPP MPR [dB]	CH 132072 1720.0 MHz	CH 132322 1745.0 MHz	CH 132572 1770.0 MHz	3GPP MPR [dB]
66 / 20M	1	0	22.8	22.97	22.35	0	21.06	21.42	21.07	1
	1	50	22.93	22.64	22.81	0	21.71	21.78	21.72	1
	1	99	22.65	22.77	22.5	0	21.38	21.08	20.81	1
	50	0	21.74	22.09	21.75	1	20.75	21.03	20.87	2
	50	25	21.9	21.81	21.74	1	20.92	20.84	20.92	2
	50	50	21.86	21.61	21.4	1	20.88	20.75	20.51	2
	100	0	21.75	21.72	21.6	1	20.79	20.78	20.61	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 133147 665.5 MHz	CH 133297 680.5 MHz	CH 133447 695.5 MHz	3GPP MPR [dB]	CH 133147 665.5 MHz	CH 133297 680.5 MHz	CH 133447 695.5 MHz	3GPP MPR [dB]
71 / 5M	1	0	22.25	22.45	22.26	0	21.24	21.61	21.17	1
	1	12	22.82	22.72	22.77	0	22.12	22.37	21.69	1
	1	24	22.26	22.6	22.32	0	21.42	21.77	21.11	1
	12	0	21.55	21.7	21.48	1	20.46	20.76	20.5	2
	12	6	21.64	21.73	21.58	1	20.56	20.71	20.58	2
	12	13	21.53	21.6	21.56	1	20.57	20.57	20.55	2
	25	0	21.4	21.7	21.48	1	20.47	20.66	20.59	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 133172 668.0 MHz	CH 133297 680.5 MHz	CH 133422 693.0 MHz	3GPP MPR [dB]	CH 133172 668.0 MHz	CH 133297 680.5 MHz	CH 133422 693.0 MHz	3GPP MPR [dB]
71 / 10M	1	0	22.49	22.43	22.48	0	21.68	21.37	21.85	1
	1	24	22.71	22.7	22.69	0	22.68	22.05	22.56	1
	1	49	22.48	22.73	22.56	0	21.87	21.35	22.65	1
	25	0	21.57	21.62	21.53	1	20.78	20.8	20.67	2
	25	12	21.56	21.66	21.67	1	20.75	20.82	20.72	2
	25	25	21.59	21.55	21.59	1	20.67	20.7	20.73	2
	50	0	21.64	21.65	21.62	1	20.74	20.67	20.55	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 133197 670.5 MHz	CH 133297 680.5 MHz	CH 133397 690.5 MHz	3GPP MPR [dB]	CH 133197 670.5 MHz	CH 133297 680.5 MHz	CH 133397 690.5 MHz	3GPP MPR [dB]
71 / 15M	1	0	22.39	22.47	22.52	0	21.79	21.57	21.31	1
	1	37	22.83	22.65	22.69	0	22.9	21.83	22.04	1
	1	74	22.48	22.32	22.66	0	22.86	21.21	22.6	1
	36	0	21.44	21.6	21.5	1	20.52	20.57	20.53	2
	36	19	21.7	21.7	21.71	1	20.53	20.61	20.64	2
	36	39	21.6	21.58	21.66	1	20.52	20.53	20.59	2
	75	0	21.62	21.69	21.49	1	20.73	20.63	20.6	2

LTE Band / BW	RBs	RB Start	QPSK				16QAM			
			CH 133222 673.0 MHz	CH 133297 680.5 MHz	CH 133372 688.0 MHz	3GPP MPR [dB]	CH 133222 673.0 MHz	CH 133297 680.5 MHz	CH 133372 688.0 MHz	3GPP MPR [dB]
71 / 20M	1	0	22.45	22.21	22.55	0	22.11	21.55	21.37	1
	1	50	22.84	22.86	22.79	0	23.2	22.36	21.74	1
	1	99	22.39	22.27	22.51	0	23.05	21.9	21.36	1
	50	0	21.57	21.61	21.48	1	20.59	20.66	20.54	2
	50	25	21.66	21.65	21.65	1	20.68	20.77	20.61	2
	50	50	21.57	21.47	21.52	1	20.57	20.61	20.58	2
	100	0	21.61	21.51	21.4	1	20.64	20.58	20.47	2

WLAN 2.4 GHz:

Standard	Transmission mode	Data rate [Mbps]	Output power [dBm]		
			CH 1 2412 MHz	CH 6 2437 MHz	CH 11 2462 MHz
802.11b	DSSS	1	18.90	18.87	18.83

Standard	Output power [dBm]		
	CH 1 2402 MHz	CH 19 2440 MHz	CH 39 2480 MHz
BLE	2.59	2.5	2.68

5GHz WLAN:

Standard	Channel	Frequency [MHz]	Transmission mode	Data Rate [Mbps]	Output power [dBm]
802.11a	52	5260	OFDM	6	16.5
802.11a	56	5280	OFDM	6	16.47
802.11a	60	5300	OFDM	6	16.25
802.11a	64	5320	OFDM	6	15.18
802.11a	100	5500	OFDM	6	15.11
802.11a	112	5560	OFDM	6	15.78
802.11a	116	5580	OFDM	6	15.75
802.11a	128	5640	OFDM	6	15.51
802.11a	132	5660	OFDM	6	15.43
802.11a	149	5745	OFDM	6	15.96
802.11a	165	5825	OFDM	6	14.71

4. TEST EQUIPMENT

Dasy52 near field scanning system, manufactured by SPEAG was used for SAR testing. The test system consists of high precision robotics system (Staubli), robot controller, computer, near-field probe, probe alignment sensor, and a phantom containing the tissue equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location of maximum electromagnetic field.

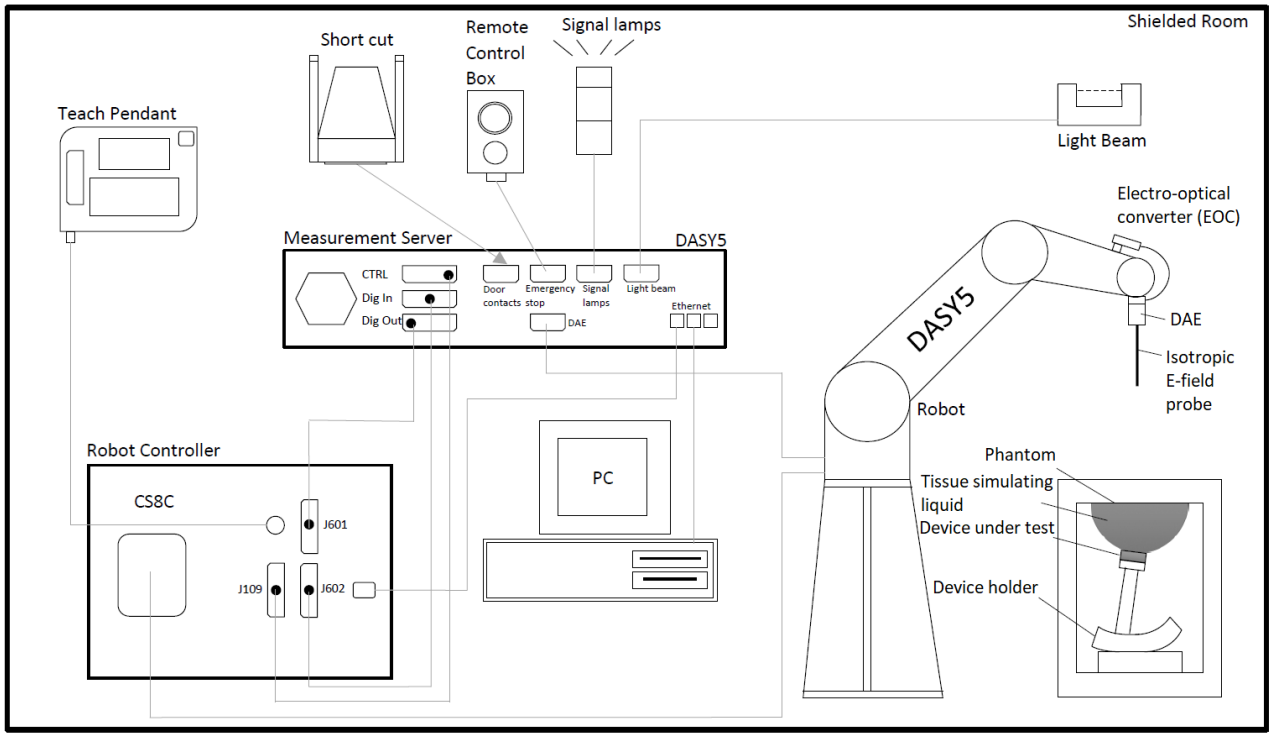


Figure 2 Schematic Laboratory Picture

4.1 Test Equipment List

Main used test system components are listed below. For full equipment list and calibration intervals, please contact the testing laboratory.

Test Equipment	Model	Serial Number	Calibration Date	Interval [years]
DASY5 Software	52.8.8.1258	-	NA	NA
Amplifier, 800MHz-4200MHz, 10W	10S1G4A	320421	NA	NA
Amplifier 500-8000MHz	ZX60-83LN12+	NA	NA	NA
DAE4, converter	DAE4	710	10/2022	1
DAE4, converter	DAE4	1332	2/2023	1
Inline Peak Power Sensor	MA24105A	2102058	11/2022	1
Isotropic DOS probe	EX3DV4	3892	04/2023	1
Isotropic DOS probe	EX3DV4	7447	02/2023	1
Network Analyzer	E5071C	MY46102812	05/2023	1
Power Sensor	NRP8S	1419.0006K02-108509-Zh	08/2021	2
Radio Communication Analyzer	MT8820C	6200951734	12/2022	1
System validation dipole	D2450V2	729	07/2022	3
System validation dipole	D5GHzV2	1045	03/2023	3
System validation dipole	D750V3	1154	07/2022	3
System validation dipole	D1800V2	249	07/2022	3
System validation dipole	D1900V2	511	03/2023	3
Vector Signal Generator	MG3710E	6262028676	NA	NA
Wideband Radio Communication Tester	CMW500	1201.0002K50-159661-pb	02/2023	1

4.1.1 Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix D
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g, Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 10 mm Body diameter: 12 mm
Application	General dosimetry up to 6 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

Eli Phantom:

The phantom used in SAR tests was an ELI phantom, manufactured by SPEAG. ELI phantom is used for compliance testing of handheld and body-mounted wireless devices in the frequency range of 4 MHz to 6 GHz. The phantom conforms to the requirements of IEC/IEEE 62209-1528 and FCC published RF Exposure KDB Procedures.

4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEC/IEEE 62209-1528 and FCC published RF Exposure KDB Procedures. The dielectric parameters of the used tissue simulants were within ±10% of the recommended values at frequencies under 3GHz and ±5% at frequencies above 3GHz. A liquid compensation algorithm was used in DASY5 with which measured peak average SAR values were corrected for the deviation of used liquid. The depth of the tissue simulant was at least 15.0 cm from the inner surface of the flat phantom.

Tissue simulant liquid Ingredients
Deionized Water, oil, salt, emulsifiers

4.4 System Validation Status

Frequency [MHz]	Dipole Type / SN	Probe Type / SN	Calibrated Signal Type	DAE Unit / SN	Dielectric Constant [ε']	Conductivity σ [S/m]	Date
1800	D1800V2-SN:2D075	EX3DV4 - SN: 3892	CW	DAE 4 / 705	40.07	1.3	05/2023
1900	D1900V2-SN:511	EX3DV4 - SN: 3892	CW	DAE 4 / 705	40.65	1.36	05/2023
2450	D2450V2 - SN: 758	EX3DV4 - SN: 3892	CW	DAE 4 / 705	39.82	1.68	05/2023
750	D750V3 - SN: 635	EX3DV4 - SN: 7447	CW	DAE 4 / 1332	45.44	0.86	03/2023
5250	D5GHzV2 - SN: 1045	EX3DV4 - SN: 7447	CW	DAE 4 / 1332	34.53	4.77	03/2023
5600	D5GHzV2 - SN: 1045	EX3DV4 - SN: 7447	CW	DAE 4 / 1332	34.06	5.07	03/2023
5750	D5GHzV2 - SN: 1014	EX3DV4 - SN: 7447	CW	DAE 4 / 1332	35.02	4.98	03/2023

4.5 System Check

Date	Tissue Type	Tissue Temp. [°C]	Frequency [MHz]	Input Power [mW]	Measured SAR_{1g} [W/kg]	1 W Target SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation [%]	Plot #
20.7.2023	WB Head	22	750	250	2.05	8.54	8.2	-3.98%	1
21.7.2023	WB Head	22	1900	250	9.68	38.02	38.72	1.8 %	2
24.7.2023	WB Head	22	1800	250	9.2	38.9	36.8	-5.4 %	3
24.7.2023	WB Head	22	2450	250	13.4	52.3	53.6	2.49%	4
31.7.2023	WB Head	22	5250	250	7.45	73.09	74.5	1.93%	5
31.7.2023	WB Head	22	5600	250	6.81	72.92	68.1	-6.61%	6
31.7.2023	WB Head	22	5750	250	7.53	69.05	75.3	9.05%	7

4.5.1 Tissue Simulant Verification

				Target		Measured		Deviation	
Date	**Tissue Type**	**Tissue Temp [°C]**	**Frequency [MHz]**	**Dielectric Constant [ε] Target**	**Conductivity σ [S/m] Target**	**Dielectric Constant [ε]**	**Conductivity σ [S/m]**	**ε (%)**	**σ (%)**
20.07.2023	WB Head	22	673	42.31	0.88	40.47	0.83	-4.4	-6.5
20.07.2023	WB Head	22	680.5	42.27	0.89	40.44	0.83	-4.3	-6.4
20.07.2023	WB Head	22	688	42.23	0.89	40.48	0.83	-4.2	-6.3
20.07.2023	WB Head	22	704	42.15	0.89	40.52	0.83	-3.9	-5.9
20.07.2023	WB Head	22	707.5	42.13	0.89	40.55	0.83	-3.7	-5.9
20.07.2023	WB Head	22	711	42.11	0.89	40.58	0.84	-3.6	-5.9
20.07.2023	WB Head	22	750	41.9	0.89	40.55	0.85	-3.2	-5.0
20.07.2023	WB Head	22	779.5	41.76	0.89	40.46	0.85	-3.1	-4.4
20.07.2023	WB Head	22	782	41.75	0.89	40.45	0.86	-3.1	-4.3
20.07.2023	WB Head	22	784.5	41.74	0.89	40.44	0.86	-3.1	-4.2
20.07.2023	WB Head	22	790.5	41.71	0.89	40.42	0.86	-3.1	-4.1
20.07.2023	WB Head	22	793	41.7	0.9	40.41	0.86	-3.1	-4.0
20.07.2023	WB Head	22	795.5	41.69	0.9	40.4	0.86	-3.1	-3.9
20.07.2023	WB Head	22	821.5	41.56	0.9	40.28	0.87	-3.1	-3.2
20.07.2023	WB Head	22	831.5	41.52	0.9	40.21	0.87	-3.2	-2.9
20.07.2023	WB Head	22	841.5	41.5	0.91	40.11	0.88	-3.3	-3.2
21.07.2023	WB Head	22	1860	40	1.4	38.02	1.32	-5.0	-5.8
21.07.2023	WB Head	22	1882.5	40	1.4	38.0	1.33	-5.0	-4.9
21.07.2023	WB Head	22	1900	40	1.4	37.99	1.34	-5.0	-4.3
21.07.2023	WB Head	22	1905	40	1.4	37.98	1.34	-5.0	-4.2
24.07.2023	WB Head	22	1720	40.11	1.35	38.48	1.23	-4.1	-9.3
24.07.2023	WB Head	22	1745	40.08	1.37	38.44	1.24	-4.1	-9.2
24.07.2023	WB Head	22	1770	40.04	1.38	38.4	1.26	-4.1	-9.2
24.07.2023	WB Head	22	1800	40	1.4	38.37	1.27	-4.1	-9.1
24.07.2023	WB Head	22	2402	39.28	1.76	37.53	1.64	-4.5	-6.8
24.07.2023	WB Head	22	2412	39.27	1.77	37.52	1.65	-4.4	-6.8
24.07.2023	WB Head	22	2437	39.22	1.79	37.48	1.66	-4.5	-7.1
24.07.2023	WB Head	22	2440	39.22	1.79	37.47	1.66	-4.4	-7.1
24.07.2023	WB Head	22	2450	39.2	1.8	37.46	1.67	-4.4	-7.1
24.07.2023	WB Head	22	2462	39.18	1.81	37.44	1.68	-4.4	-7.4
24.07.2023	WB Head	22	2480	39.16	1.83	37.42	1.69	-4.4	-7.7
31.7.2023	WB Head	22	5250	35.95	4.71	34.46	4.81	-4.13	2.0
31.7.2023	WB Head	22	5260	35.94	4.72	34.45	4.82	-4.14	2.0
31.7.2023	WB Head	22	5280	35.92	4.74	34.44	4.83	-4.11	1.9
31.7.2023	WB Head	22	5320	35.88	4.78	34.37	4.89	-4.20	1.66
31.7.2023	WB Head	22	5500	35.65	4.96	34.14	5.01	-4.25	0.94
31.7.2023	WB Head	22	5560	35.56	5.03	34.05	5.07	-4.24	0.86
31.7.2023	WB Head	22	5600	35.5	5.07	34.00	5.10	-4.21	0.66
31.7.2023	WB Head	22	5660	35.44	5.13	33.93	5.16	-4.27	0.55
31.7.2023	WB Head	22	5745	35.35	5.22	33.81	5.23	-4.36	0.27
31.7.2023	WB Head	22	5750	35.35	5.22	33.80	5.23	-4.36	0.28
31.7.2023	WB Head	22	5825	35.27	5.3	33.71	5.30	-4.14	0

5. TEST PROCEDURE

Testing was carried out in accordance with FCC KDB Publications 447498 D04 Interim General RF Exposure Guidance v01, 248227 D01 802.11 Wi-Fi SAR and RSS-102, Issue 5.

Low, mid and high frequency channels for the configuration with the highest SAR value were tested as per ISED notice 2016-DRS001.

For the cellular technologies, the device was set to transmit using maximum power with a communication tester.

A control software for WLAN & BLE was used to set the DUT to transmit at maximum power.

Since Bluetooth Classic and Bluetooth Low Energy have the same maximum specified output power, only BLE was measured.

The WLAN transmission modes for testing were selected according to largest channel bandwidth configuration, lowest order modulation and lowest data rate.
WLAN 2.4GHz was tested with 802.11b standard with data rate of 1Mbit/s and WLAN 5GHz was tested with 802.11a standard with data rate of 6Mbit/s.

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

5.2 Test Positions

5.2.1 Body-worn Configuration, 0mm separation distance

Body SAR was tested from the back side of the device as the DUT is body worn by using a clip so that the back side of the DUT faces the user. For a conservative SAR evaluation, the clip was removed for the SAR testing. The maximum measured SAR value was tested with the clip as well. The device was placed in the SPEAG holder and lifted towards the phantom until the distance between the phantom and the device was 0mm.

Photos of the test positions are presented in appendix A

5.3 Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy52 are all based on the modified Quadratic Shepard's method (Robert J. Renka," Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).
The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighboring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

6. MEASUREMENT UNCERTAINTY

DASY5 Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 3GHz - 6GHz range)								
Symbol	Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System Errors								
CF	Probe Calibration	±14.0%	N	√2	1	1	±7.0%	±7.0%
CF_{drift}	Probe Calibration Drift	±1.7%	N	√3	1	1	±1.0%	±1.0%
LIN	Probe Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%
BBS	Broadband Signal	±2.6%	R	√3	1	1	±1.5%	±1.5%
ISO	Probe Isotropy	±7.6%	R	3	1	1	±4.4%	±4.4%
DAE	Data Acquisition	±0.3%	N	1	1	1	±0.3%	±0.3%
AMB	RF Ambient	±1.8%	N	1	1	1	±1.8%	±1.8%
Δ_{sys}	Probe Positioning	±3.9%	N	1	0.33	0.33	±1.3%	±1.3%
DAT	Data Processing	±2.3%	N	1	1	1	±2.3%	±2.3%
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)^{DAK}	±2.5%	N	√1	0.78	0.71	±2.0%	±1.8%
LIQ(T_σ)	Conductivity (temp.)^{SS}	±3.4%	R	√3	0.78	0.71	±1.5%	±1.4%
EPS	Phantom Permittivity	±14.0%	R	3	0.25	0.25	±2.0%	±2.0%
DIS	Distance DUT - TSL	±2.0%	N	1	2	2	±4.0%	±4.0%
D_{xyz}	Device Positioning (±0.5mm)	±1.0%	N	1	1	1	±1.0%	±1.0%
H	Device Holder	±3.6%	N	√1	1	1	±3.6%	±3.6%
MOD	DUT Modulation^{m}	±2.4%	R	√3	1	1	±1.4%	±1.4%
TAS	Time-average SAR	±2.6%	R	3	1	1	±1.5%	±1.5%
RF_{drift}	DUT drift	±2.5%	N	1	1	1	±2.5%	±2.5%
VAL	Val Antenna Unc.^{val}	±0.0%	N	1	1	1	±0%	±0%
RF_{in}	Unc. Input Power^{val}	±0.0%	N	1	1	1	±0%	±0%
Correction to the SAR results								
C(ε, σ)	Deviation to Target	±1.9%	N	√1	1	0.84	±1.9%	±1.6%
C(R)	SAR scaling^{p}	±0%	R	3	1	1	±0%	±0%
u(ΔSAR)	Combined Uncertainty						±12.0%	±11.9%
U	**Expanded Uncertainty**						±24.0%	±23.8%

DASY5 Uncertainty Budget

According to IEC/IEEE 62209-1528

(Frequency band: 300MHz - 3GHz range)

Symbol	Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System Errors								
CF	Probe Calibration	±12.0%	N	√2	1	1	±6.0%	±6.0%
CF_{drift}	Probe Calibration Drift	±1.7%	R	√3	1	1	±1.0%	±1.0%
LIN	Probe Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%
BBS	Broadband Signal	±3.0%	R	√3	1	1	±1.7%	±1.7%
ISO	Probe Isotropy	±7.6%	R	3	1	1	±4.4%	±4.4%
DAE	Data Acquisition	±0.3%	N	1	1	1	±0.3%	±0.3%
AMB	RF Ambient	±1.8%	N	1	1	1	±1.8%	±1.8%
Δ_{sys}	Probe Positioning	±3.9%	N	1	0.14	0.14	±0.5%	±0.5%
DAT	Data Processing	±1.2%	N	1	1	1	±1.2%	±1.2%
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)^{DAK}	±2.5%	N	√1	0.78	0.71	±2.0%	±1.8%
$LIQ(T_\sigma)$	Conductivity (temp.)^{BB}	±3.3%	R	√3	0.78	0.71	±1.5%	±1.4%
EPS	Phantom Permittivity	±14.0%	R	3	0	0	±0%	±0%
DIS	Distance DUT - TSL	±2.0%	N	1	2	2	±4.0%	±4.0%
D_{xyz}	Device Positioning (±0.5mm)	±1.0%	N	1	1	1	±1.0%	±1.0%
H	Device Holder	±3.6%	N	√1	1	1	±3.6%	±3.6%
MOD	DUT Modulation^{m}	±2.4%	R	√3	1	1	±1.4%	±1.4%
TAS	Time-average SAR	±2.6%	R	3	1	1	±1.5%	±1.5%
RF_{drift}	DUT drift	±2.5%	N	1	1	1	±2.5%	±2.5%
VAL	Val Antenna Unc.^{val}	±0.0%	N	1	1	1	±0%	±0%
RF_{in}	Unc. Input Power^{val}	±0.0%	N	1	1	1	±0%	±0%
Correction to the SAR results								
C(ε, σ)	Deviation to Target	±1.9%	N	√1	1	0.84	±1.9%	±1.6%
C(R)	SAR scaling^{p}	±0%	R	3	1	1	±0%	±0%
u(ΔSAR)	Combined Uncertainty						±11.0%	±10.9%
U	**Expanded Uncertainty**						±22.1%	±21.9%

7. TEST RESULTS

7.1 SAR Results for Body Exposure Condition with 0mm separation

LTE:

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift** [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 12	23095	707.5	QPSK / 10	1	24	24	23.01	back	0.339	0.03	1:1	1.26	0.43	
LTE 12	23095	707.5	QPSK / 10	25	12	24	21.99	back	0.269	0.05	1:1	1.59	0.43	
LTE 12	23060	704	QPSK / 10	1	24	24	22.96	back	0.361	0.01	1:1	1.27	0.46	8
LTE 12	23130	711	QPSK / 10	1	24	24	22.98	back	0.313	-0.17	1:1	1.26	0.40	

*Larger than 5% drifts included to scaling factors

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift* [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 13	23230	782	QPSK / 10	1	24	24	23.04	back	0.258	-0.18	1:1	1.25	0.32	
LTE 13	23230	782	QPSK / 10	25	0	24	21.9	back	0.205	-0.1	1:1	1.62	0.33	
LTE 13	23205	779.5	QPSK / 5	1	12	24	22.74	back	0.236	-0.17	1:1	1.34	0.32	
LTE 13	23255	784.5	QPSK / 5	1	12	24	22.74	back	0.251	0.25	1:1	1.42	0.36	9

*Larger than 5% drifts included to scaling factors

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift* [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 14	23330	793	QPSK / 10	1	24	24	22.75	back	0.286	-0.02	1:1	1.33	0.38	10
LTE 14	23330	793	QPSK / 10	25	0	24	21.97	back	0.22	-0.06	1:1	1.60	0.35	
LTE 14	23305	790.5	QPSK / 5	1	12	24	23.07	back	0.254	0	1:1	1.24	0.31	
LTE 14	23355	795.5	QPSK / 5	1	0	24	22.81	back	0.244	-0.02	1:1	1.32	0.32	

*Larger than 5% drifts included to scaling factors

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift* [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 25	26140	1860	QPSK / 20	1	50	24	22.96	back	0.485	-0.54	1:1	1.44	0.70	
LTE 25	26140	1860	QPSK / 20	50	25	24	21.69	back	0.365	-0.33	1:1	1.84	0.67	
LTE 25	26365	1882.5	QPSK / 20	1	50	24	22.15	back	0.388	0.24	1:1	1.62	0.63	
LTE 25	26590	1905	QPSK / 20	1	50	24	22.45	back	0.529	0.14	1:1	1.43	0.76	11

*Larger than 5% drifts included to scaling factors

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift* [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 26	26765	821.5	QPSK / 15	1	37	24	23.21	back	0.45	0.16	1:1	1.20	0.54	
LTE 26	26765	821.5	QPSK / 15	36	39	24	22.09	back	0.329	0	1:1	1.55	0.51	
LTE 26	26865	831.5	QPSK / 15	1	37	24	22.94	back	0.4	0.01	1:1	1.28	0.51	
LTE 26	26965	841.5	QPSK / 15	1	37	24	23.14	back	0.343	-0.33	1:1	1.32	0.45	12

*Larger than 5% drifts included to scaling factors

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift** [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 66	132322	1745	QPSK / 20	1	0	24	22.97	back	0.994	-0.5	1:1	1.42	1.41	
LTE 66	132322	1745	QPSK / 20	50	0	24	22.09	back	0.736	0.09	1:1	1.55	1.14	
LTE 66	132322	1745	QPSK / 20	100	0	24	21.72	back	0.695	-0.04	1:1	1.69	1.17	
LTE 66	132072	1720	QPSK / 20	1	50	24	22.93	back	0.886	0.02	1:1	1.28	1.13	
LTE 66	132072	1720	QPSK / 20	50	25	24	21.9	back	0.88	0.11	1:1	1.62	1.43	13
LTE 66	132072	1720	QPSK / 20	100	0	24	21.75	back	0.54	0.18	1:1	1.68	0.91	
LTE 66	132572	1770	QPSK / 20	1	50	24	22.81	back	0.694	-0.58	1:1	1.50	1.04	
LTE 66	132572	1770	QPSK / 20	50	0	24	21.75	back	0.502	0.51	1:1	1.89	0.95	
LTE 66	132572	1770	QPSK / 20	100	0	24	21.6	back	0.501	0.05	1:1	1.74	0.87	
LTE 66	132322	1745	QPSK / 20	1	0	24	22.97	back	0.899	0.04	1:1	1.27	1.14	
LTE 66	132322	1745	QPSK / 20	1	0	24	22.97	back with clip	0.358	0.11	1:1	1.27	0.45	

*Larger than 5% drifts included to scaling factors

Band	Channel	Frequency [MHz]	Modulation / BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Measure SAR_{1g} [W/kg]	Power Drift* [dB]	Duty Cycle	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot #
LTE 71	133297	680.5	QPSK / 20	**1**	50	24	22.86	back	0.247	0.18	1:1	1.30	0.32	14
LTE 71	133297	680.5	QPSK / 20	**50**	25	24	21.65	back	0.175	0.07	1:1	1.72	0.30	
LTE 71	133222	673	QPSK / 20	**1**	50	24	22.84	back	0.188	-0.34	1:1	1.41	0.27	
LTE 71	133372	688	QPSK / 20	**1**	50	24	22.79	back	0.193	0.22	1:1	1.39	0.27	

*Larger than 5% drifts included to scaling factors

2.4GHz WLAN:

Mode	Data Rate [Mbps]	Frequency [MHz]	Channel	Test position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift*[dB]	Scaling Factor	Duty Cycle	Reported SAR_{1g} [W/kg]	Plot #
802.11b	1	2412	1	back	19	18.9	0.026	0	1.02	1:1	0.03	
802.11b	1	2437	6	back	19	18.87	0.046	0	1.03	1:1	0.05	
802.11b	1	2462	11	back	19	18.83	0.048	0	1.04	1:1	0.05	15

*Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable.

Mode	Frequency [MHz]	Channel	Test position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift**[dB]	Scaling Factor	Duty Cycle (%)	Reported SAR_{1g} [W/kg]	Plot #
BLE	2402	0	back	6	2.59	0	NA	2.19	84.00	0.00*	
BLE	2440	19	back	6	2.5	0	NA	2.24	84.00	0.00*	
BLE	2480	39	back	6	2.68	0	NA	2.15	84.00	0.00*	16

*SAR below the dynamic range of the test system
**Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable

5GHz WLAN:

Mode	Data Rate [Mbps]	Frequency [MHz]	Channel	Test position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift[dB]	Scaling Factor	Duty Cycle	Reported SAR_{1g} [W/kg]	Plot #
802.11a	6	5260	52	back	17	16.5	0*	0	1.12	1:1	0.00	
802.11a	6	5280	56	back	17	16.47	0*	0	1.13	1:1	0.00	17
802.11a	6	5320	64	back	16	15.8	0*	0	1.05	1:1	0.00	
802.11a	6	5500	100	back	16	15.11	0.002**	0	1.23	1:1	0.00	
802.11a	6	5560	112	back	17	15.78	0.002**	0	1.32	1:1	0.00	18
802.11a	6	5640	128	back	17	15.51	0.0001**	0	1.41	1:1	0.00	
802.11a	6	5660	132	back	17	15.43	0.003**	0	1.44	1:1	0.00	19
802.11a	6	5745	149	back	17	15.96	0.003**	0	1.27	1:1	0.00	
802.11a	6	5825	165	back	17	14.71	0.00*	0	1.69	1:1	0.00	

*SAR below the dynamic range of the test system
**test results are based on area scan measurement. Zoom scan measurements failed due to the low e-fied generated by the DUT.

7.2 IEC 62209-2 AMD1:2019

According to IEC 62209-2 AMD1:2019, the zoom scan complies if the peak spatial-average SAR is below 0.1 W/kg, or if the following criteria is met:

1. The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak is larger than the horizontal grid step.

2. Ratio of SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum is at least 30%.

Zoom scan compliance according to IEC 62209-2 AMD1:2019 is automatically verified by DASY5 software and all zoom scans in this test report do pass the criteria. The smallest horizontal distance and Ratio between measurement points M2 and M1 of the highest SAR results is available in Appendix C.

7.3 Simultaneous Transmission Analysis

Simultaneous transmission analysis for the maximum Cellular SAR and the maximum WLAN SAR is in the table below. Direct summation of SAR results was performed.

Body SAR:

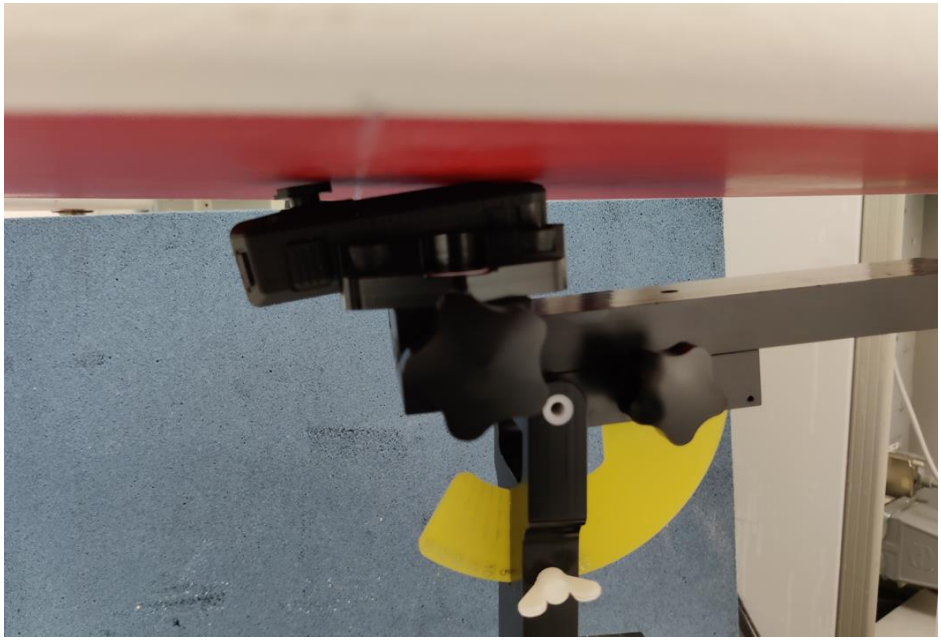
	Exposure Condition	Body SAR_{1g} [W/kg]
	Test Position	**Back**
Cellular	**LTE 12**	0.46
	LTE 13	0.36
	LTE 14	0.38
	LTE 25	0.76
	LTE 26	0.54
	LTE 66	1.43
	LTE 71	0.32
Maximum Cellular SAR		**1.43**
WLAN/BLE	**2.4GHz WLAN**	0.05
	2.4GHz BLE	0
	5GHz WLAN	0.003
Maximum WLAN/BLE SAR		0.05
SAR Summation:		**1.48**

APPENDIX A: PHOTOS OF THE DUT

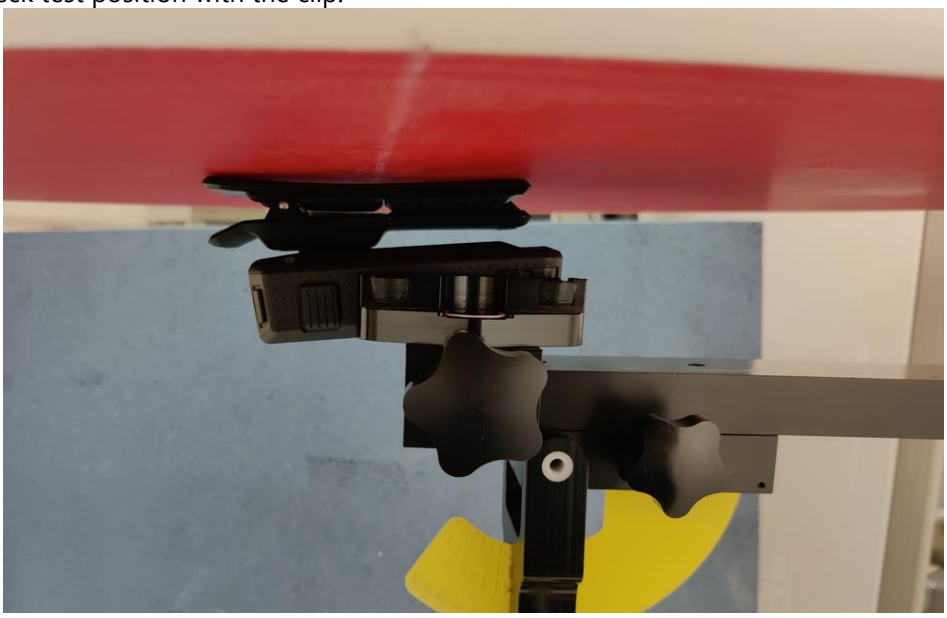
Size of the DUT is: 9.9 x 6.7 x 2.8 cm

DUT and the clip

Test position back 0 mm:



Worst case check test position with the clip:



APPENDIX B: SYSTEM CHECK SCAN

Plot 1

Date/Time: 20.7.2023 10.19.22

Test Laboratory: Verkotan Oy

DUT: D750V3 - SN1154

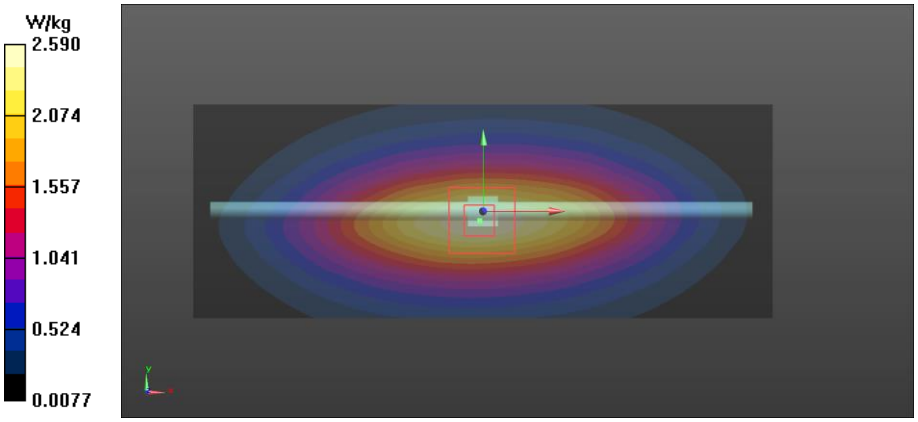
Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 750 MHz; σ = 0.846 S/m; ε_r = 40.555; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(9.91, 8.74, 9.52) @ 750 MHz; Calibrated: 17.2.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 750Mhz/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.23 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.89 W/kg
SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.36 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 24.2 mm
Ratio of SAR at M2 to SAR at M1 = 68.3%
Maximum value of SAR (measured) = 2.61 W/kg

Configuration/system check 750Mhz/Area Scan (191x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.59 W/kg



Plot 2

Date/Time: 21.7.2023 12.57.21

Test Laboratory: Verkotan Oy

DUT: D1900V2 - SN511;

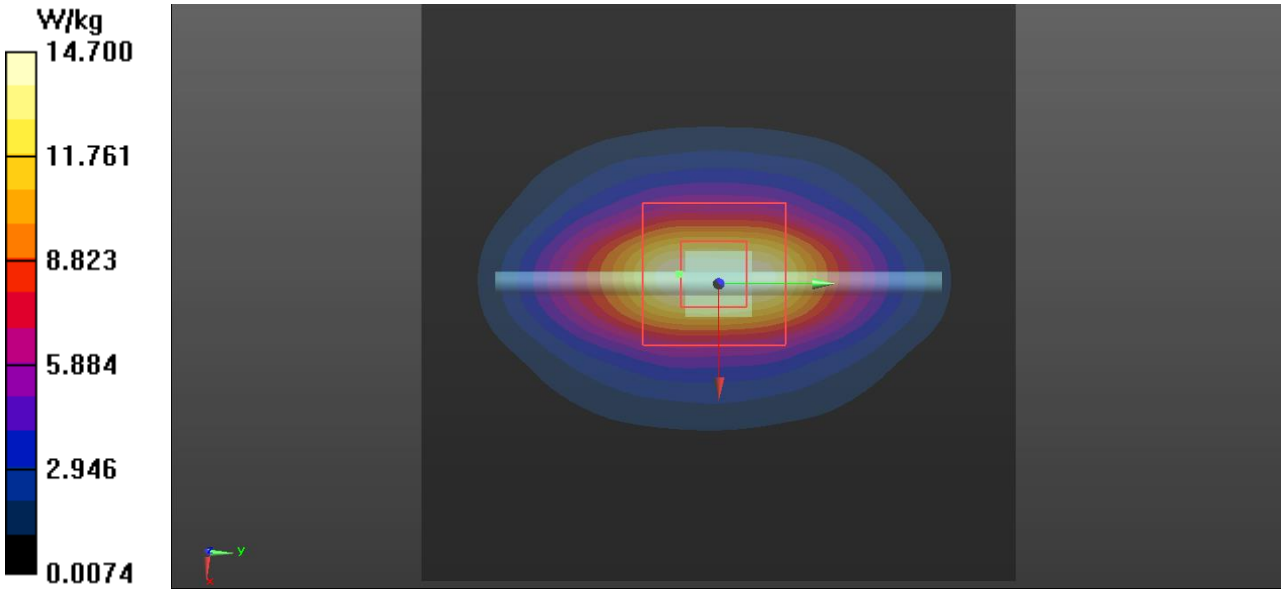
Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 1900 MHz; σ = 1.339 S/m; ε_r = 37.992; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.94, 8.14, 7.8) @ 1900 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 250mW/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.8 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 9.68 W/kg; SAR(10 g) = 5.09 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 56.5%
Maximum value of SAR (measured) = 14.6 W/kg

Configuration/system check 250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.7 W/kg



Plot 3

Date/Time: 24.7.2023 8.50.10

Test Laboratory: Verkotan Oy

DUT: D1800V2 - SN249; Type: D1800V2; Serial: SN249

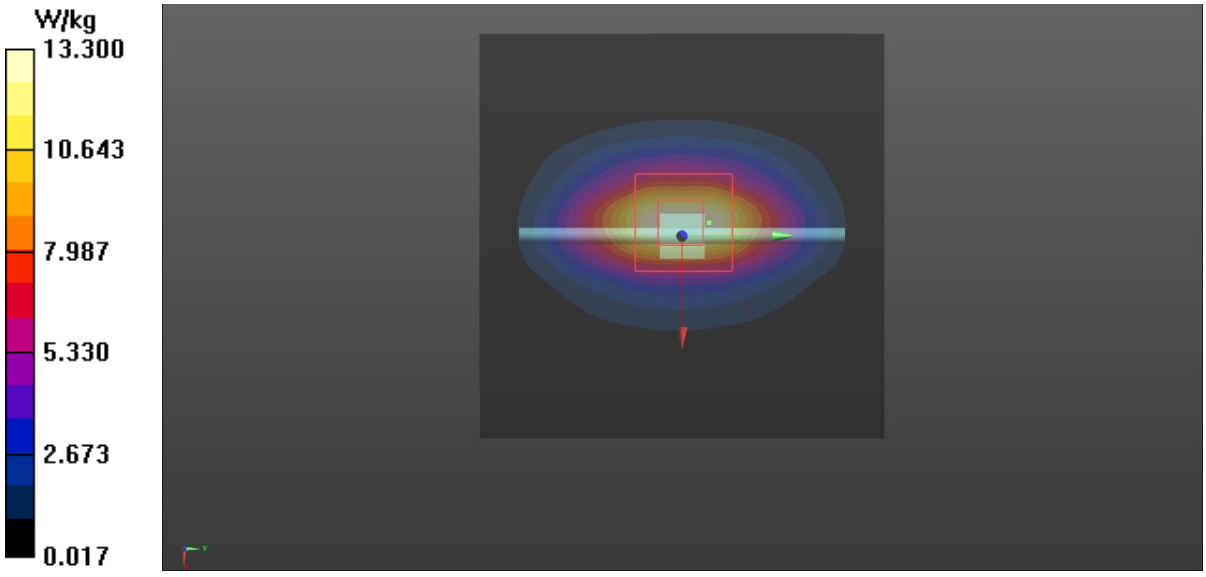
Communication System: UID 0, CW (0); Communication System Band: D1800 (1800.0 MHz); Frequency: 1800 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 1800 MHz; σ = 1.272 S/m; ε_r = 38.367; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.12, 8.3, 8.01) @ 1800 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 250mW/Zoom Scan (7x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.3 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 15.6 W/kg
SAR(1 g) = 9.2 W/kg; SAR(10 g) = 4.85 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 56.5%
Maximum value of SAR (measured) = 13.2 W/kg

Configuration/system check 250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.3 W/kg



Plot 4

Date/Time: 24.7.2023 9.18.04

Test Laboratory: Verkotan Oy

DUT: Dipole 2450 MHz D2450V2; Serial 729

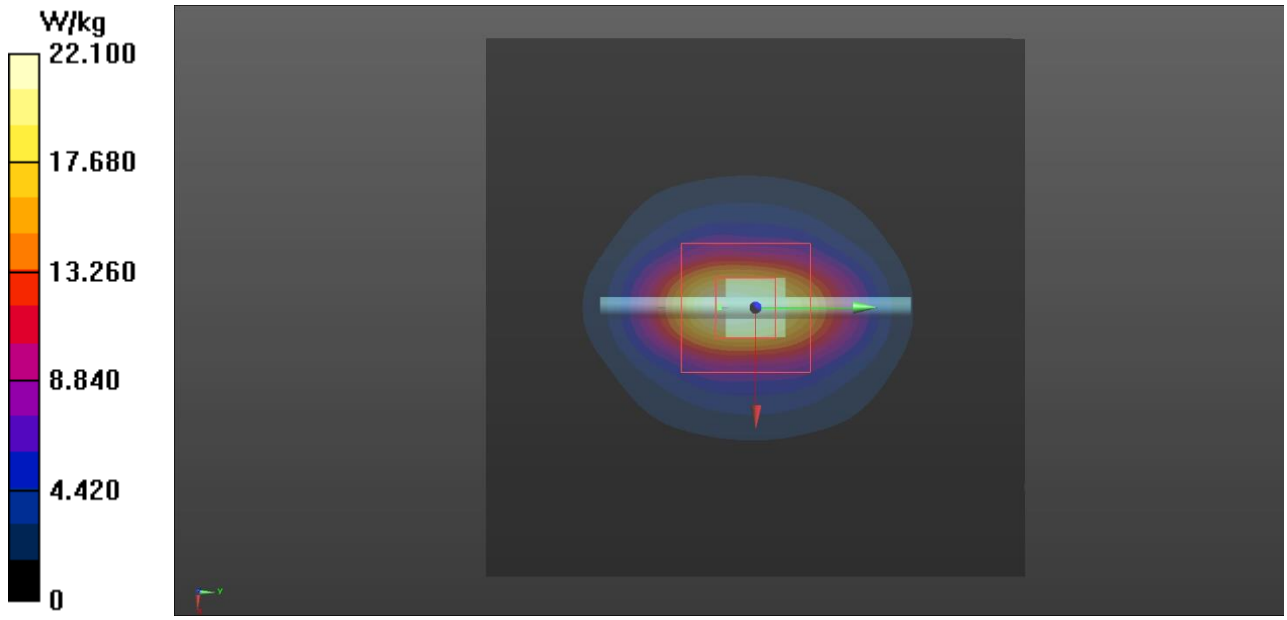
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.671 S/m; ε_r = 37.464; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.09, 7.31, 6.98) @ 2450 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 250mW/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 116.6 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 25.7 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.33 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 51.8%
Maximum value of SAR (measured) = 21.3 W/kg

Configuration/system check 250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 22.1 W/kg



Plot 5

Date/Time: 31/07/2023 09:07:32

Test Laboratory: Verkotan Oy

DUT: D5GHzV2 - SN1045

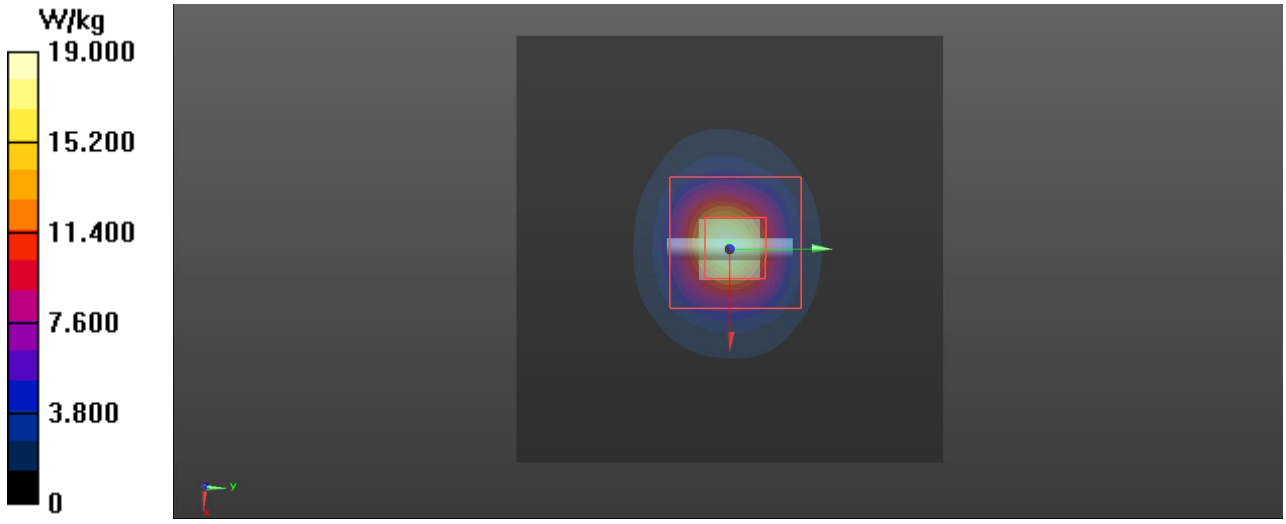
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.806 S/m; ε_r = 34.464; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 4.99, 5.17) @ 5250 MHz; Calibrated: 17/02/2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 25.0
  - Electronics: DAE4 Sn1332; Calibrated: 15/02/2023
  - Phantom: SAR2_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 5250MHz/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.9 W/kg

Configuration/system check 5250MHz/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.86 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 7.45 W/kg; SAR(10 g) = 2.09 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 5.4 mm
Ratio of SAR at M2 to SAR at M1 = 64%
Maximum value of SAR (measured) = 19.0 W/kg



Plot 6

Date/Time: 31/07/2023 09:07:32

Test Laboratory: Verkotan Oy

DUT: D5GHzV2 - SN1045

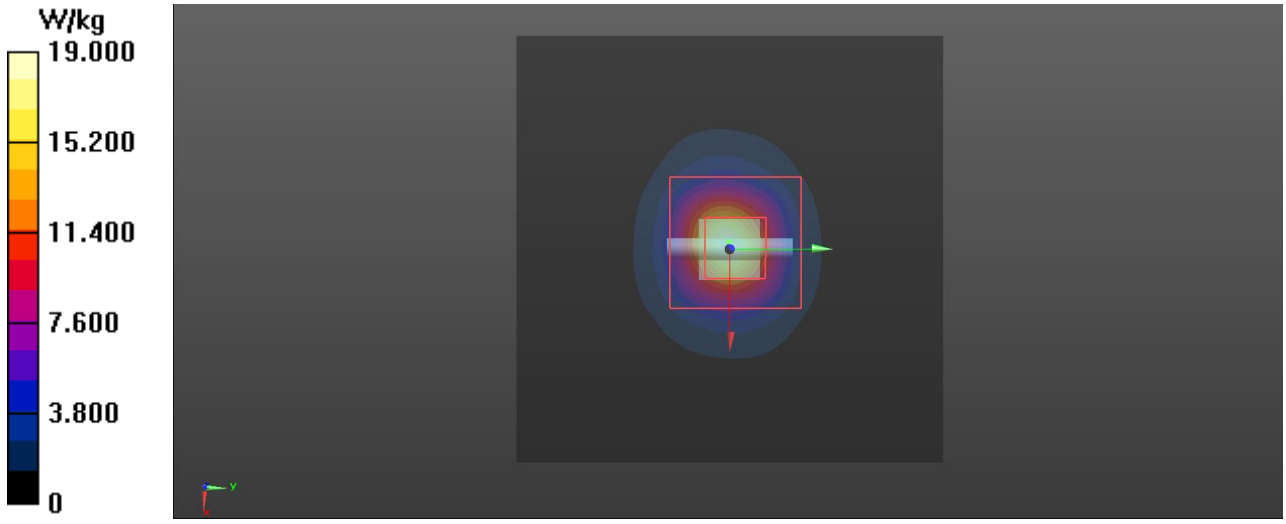
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.806 S/m; ε_r = 34.464; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 4.99, 5.17) @ 5250 MHz; Calibrated: 17/02/2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 25.0
  - Electronics: DAE4 Sn1332; Calibrated: 15/02/2023
  - Phantom: SAR2_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 5250MHz/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.9 W/kg

Configuration/system check 5250MHz/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.86 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 7.45 W/kg; SAR(10 g) = 2.09 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 5.4 mm
Ratio of SAR at M2 to SAR at M1 = 64%
Maximum value of SAR (measured) = 19.0 W/kg



Plot 7

Date/Time: 31/07/2023 09:07:32

Test Laboratory: Verkotan Oy

DUT: D5GHzV2 - SN1045

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.806 S/m; ε_r = 34.464; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

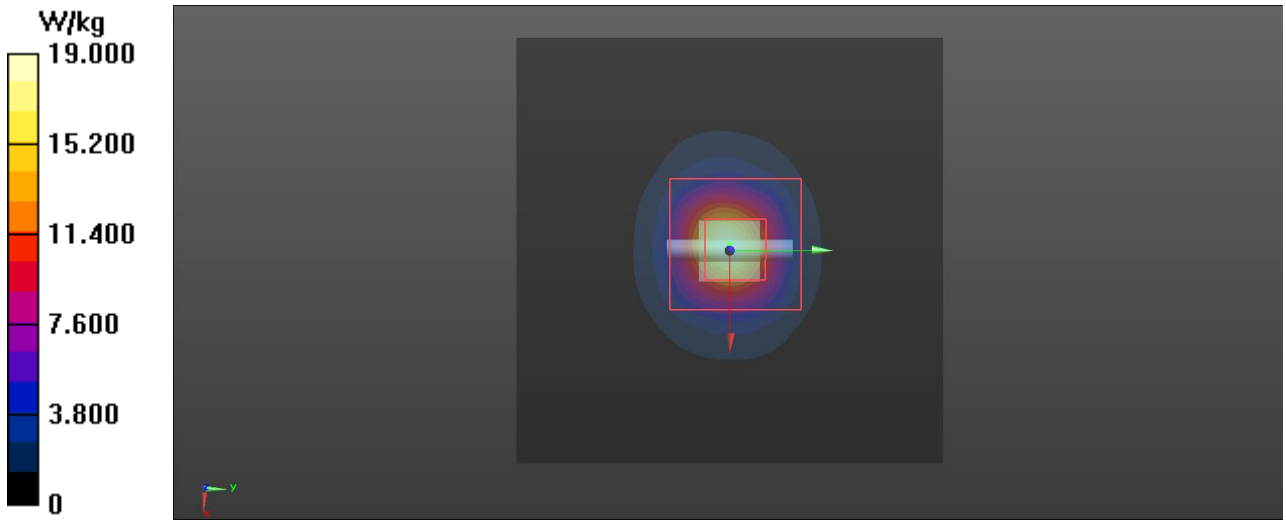
DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 4.99, 5.17) @ 5250 MHz; Calibrated: 17/02/2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 25.0
  - Electronics: DAE4 Sn1332; Calibrated: 15/02/2023
  - Phantom: SAR2_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check 5250MHz/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.9 W/kg

Configuration/system check 5250MHz/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.86 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 7.45 W/kg; SAR(10 g) = 2.09 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 5.4 mm
Ratio of SAR at M2 to SAR at M1 = 64%

Maximum value of SAR (measured) = 19.0 W/kg



APPENDIX C: MEASUREMENT SCANS

Plot 8

Date/Time: 20.7.2023 13.45.22

Test Laboratory: Verkotan Oy

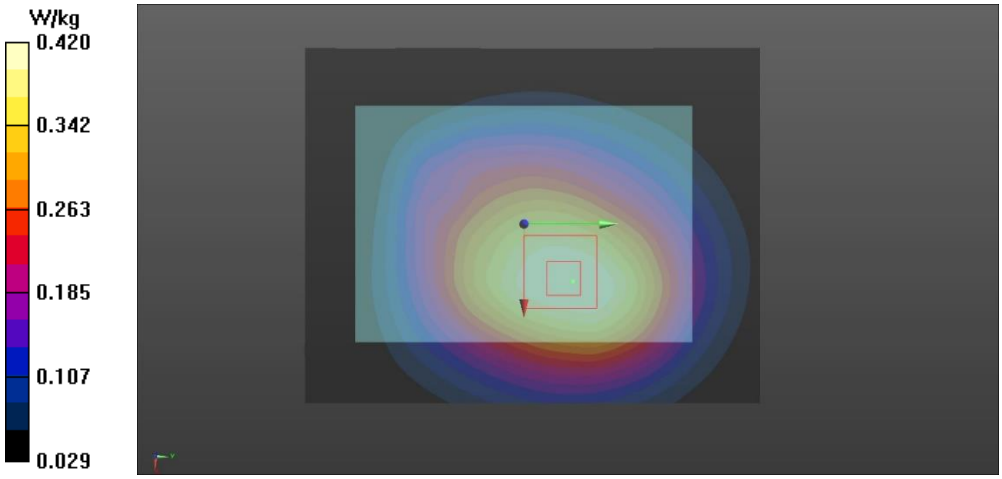
DUT: Axis W120;

Communication System: UID 0, Generic LTE (0); Communication System Band: Band 12, E-UTRA/FDD (698.0 - 716.0 MHz); Frequency: 704 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 704 MHz; σ = 0.834 S/m; ε_r = 40.521; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(9.91, 8.74, 9.52) @ 704 MHz; Calibrated: 17.2.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/LTE 12 CH23060 QPSK 10, RB 1 Offset 24, Back 0mm/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.430 W/kg
Configuration/LTE 12 CH23060 QPSK 10, RB 1 Offset 24, Back 0mm/Zoom Scan (7x7x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 21.35 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.454 W/kg
SAR(1 g) = 0.361 W/kg; SAR(10 g) = 0.264 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 24.8 mm
Ratio of SAR at M2 to SAR at M1 = 66.4%
Maximum value of SAR (measured) = 0.420 W/kg



Plot 9

Date/Time: 20.7.2023 15.33.20

Test Laboratory: Verkotan Oy

DUT: Axis W120;

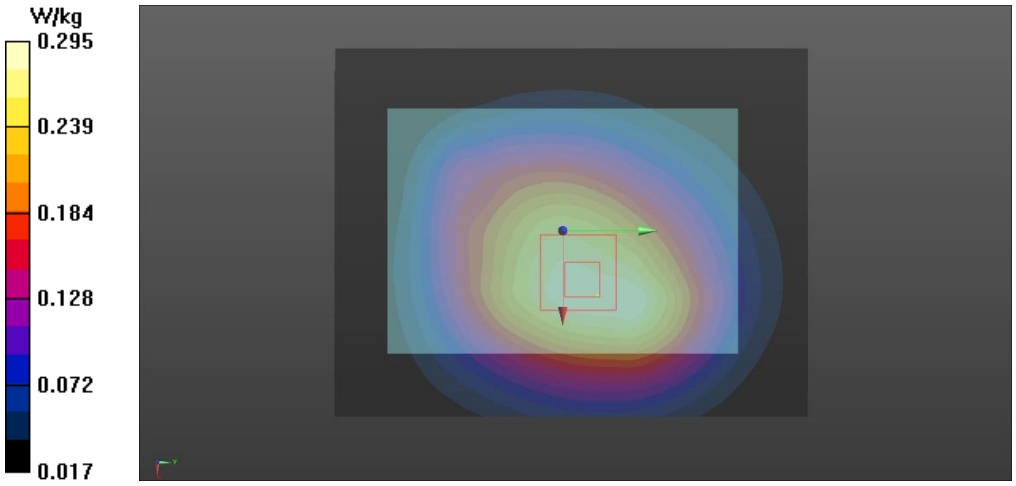
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 13, E-UTRA/FDD (777.0 - 787.0 MHz); Frequency: 784.5 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 784.5 MHz; σ = 0.856 S/m; ε_r = 40.439; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(9.91, 8.74, 9.52) @ 784.5 MHz; Calibrated: 17.2.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/LTE 13 CH23255 QPSK 5, RB 1 Offset 12, Back 0mm/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.294 W/kg

Configuration 2/LTE 13 CH23255 QPSK 5, RB 1 Offset 12, Back 0mm/Zoom Scan (7x7x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 17.86 V/m; Power Drift = 0.25 dB
Peak SAR (extrapolated) = 0.323 W/kg
SAR(1 g) = 0.251 W/kg; SAR(10 g) = 0.182 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 25.5 mm
Ratio of SAR at M2 to SAR at M1 = 64.6%
Maximum value of SAR (measured) = 0.295 W/kg



Plot 10

Date/Time: 21.7.2023 8.28.29

Test Laboratory: Verkotan Oy

DUT: Axis W120;

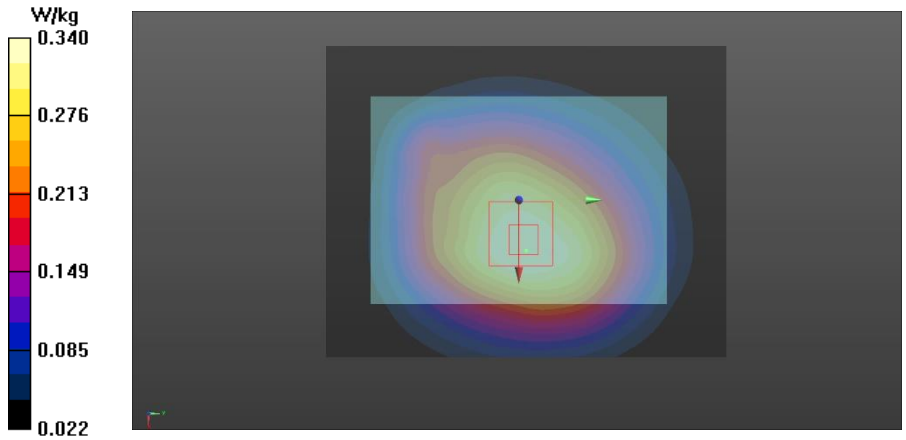
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 14, E-UTRA/FDD (788.0 - 798.0 MHz); Frequency: 793 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 793 MHz; σ = 0.859 S/m; ε_r = 40.406; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(9.91, 8.74, 9.52) @ 793 MHz; Calibrated: 17.2.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 3/LTE 14 CH23330 QPSK 10, RB 1 Offset 24, Back 0mm 2 2/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.348 W/kg

Configuration 3/LTE 14 CH23330 QPSK 10, RB 1 Offset 24, Back 0mm 2 2/Zoom Scan (7x7x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 19.80 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.369 W/kg
SAR(1 g) = 0.286 W/kg; SAR(10 g) = 0.210 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 24.7 mm
Ratio of SAR at M2 to SAR at M1 = 64.6%
Maximum value of SAR (measured) = 0.340 W/kg



Plot 11

Date/Time: 21.7.2023 14.49.09

Test Laboratory: Verkotan Oy

DUT: Axis W120;

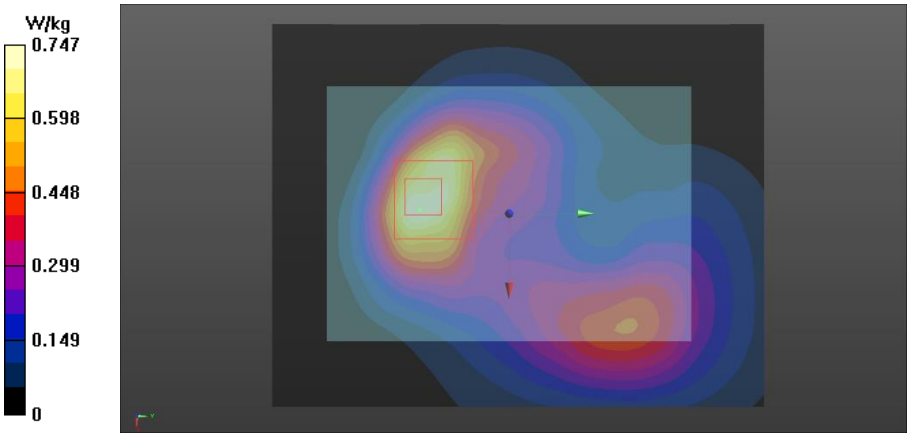
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 25, E-UTRA/FDD (1850.0 - 1915.0 MHz); Frequency: 1905 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 1905 MHz; σ = 1.342 S/m; ε_r = 37.983; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.94, 8.14, 7.8) @ 1905 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/LTE 25 CH26590 QPSK 20, RB 1 Offset 50, Back 0mm/Zoom Scan (7x7x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 15.16 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.855 W/kg
SAR(1 g) = 0.529 W/kg; SAR(10 g) = 0.304 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 10.6 mm
Ratio of SAR at M2 to SAR at M1 = 49%
Maximum value of SAR (measured) = 0.728 W/kg

Configuration 2/LTE 25 CH26590 QPSK 20, RB 1 Offset 50, Back 0mm/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.747 W/kg



Plot 12

Date/Time: 21.7.2023 10.26.30

Test Laboratory: Verkotan Oy

DUT: Axis W120;

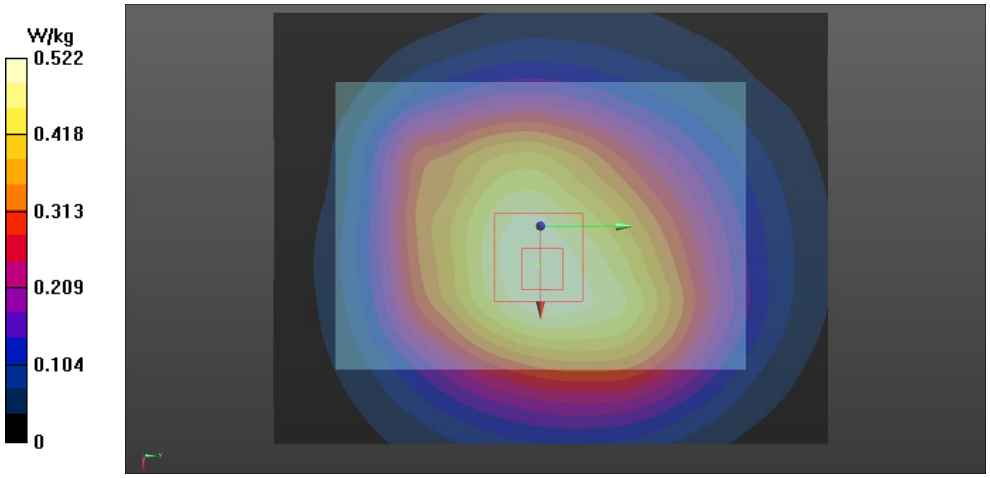
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 26; Frequency: 821.5 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 821.5 MHz; σ = 0.87 S/m; ε_r = 40.275; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(9.37, 8.45, 8.89) @ 821.5 MHz; Calibrated: 17.2.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 3/LTE 26 CH26765 QPSK 15, RB 1 Offset 37, Back 0mm 2/Zoom Scan (7x7x5)/Cube 0: Measurement grid:
dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 24.96 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.571 W/kg
SAR(1 g) = 0.450 W/kg; SAR(10 g) = 0.332 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 29.7 mm
Ratio of SAR at M2 to SAR at M1 = 68.7%
Maximum value of SAR (measured) = 0.530 W/kg

Configuration 3/LTE 26 CH26765 QPSK 15, RB 1 Offset 37, Back 0mm 2/Area Scan (71x91x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.522 W/kg



Plot 13

Date/Time: 24.7.2023 11.37.24

Test Laboratory: Verkotan Oy

DUT: Axis W120;

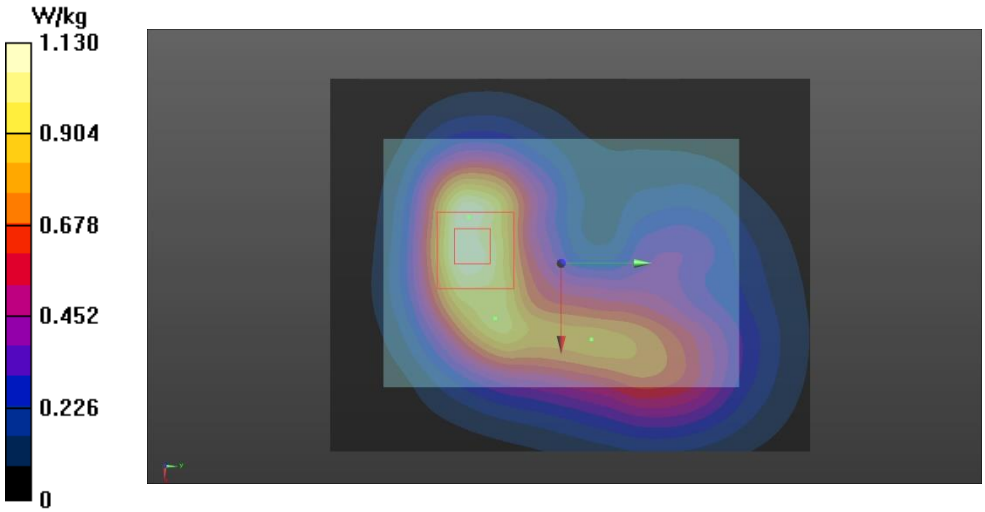
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 66; Frequency: 1720 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 1720 MHz; σ = 1.229 S/m; ε_r = 38.48; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.12, 8.3, 8.01) @ 1720 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/LTE 66 CH132072 QPSK 20, RB 50 Offset 25, Back 0mm 2 2/Zoom Scan (7x7x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 17.19 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.880 W/kg; SAR(10 g) = 0.555 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 15 mm
Ratio of SAR at M2 to SAR at M1 = 58.4%
Maximum value of SAR (measured) = 1.09 W/kg

Configuration 2/LTE 66 CH132072 QPSK 20, RB 50 Offset 25, Back 0mm 2 2/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.13 W/kg



Plot 14

Date/Time: 20.7.2023 11.06.32

Test Laboratory: Verkotan Oy

DUT: Axis W120;

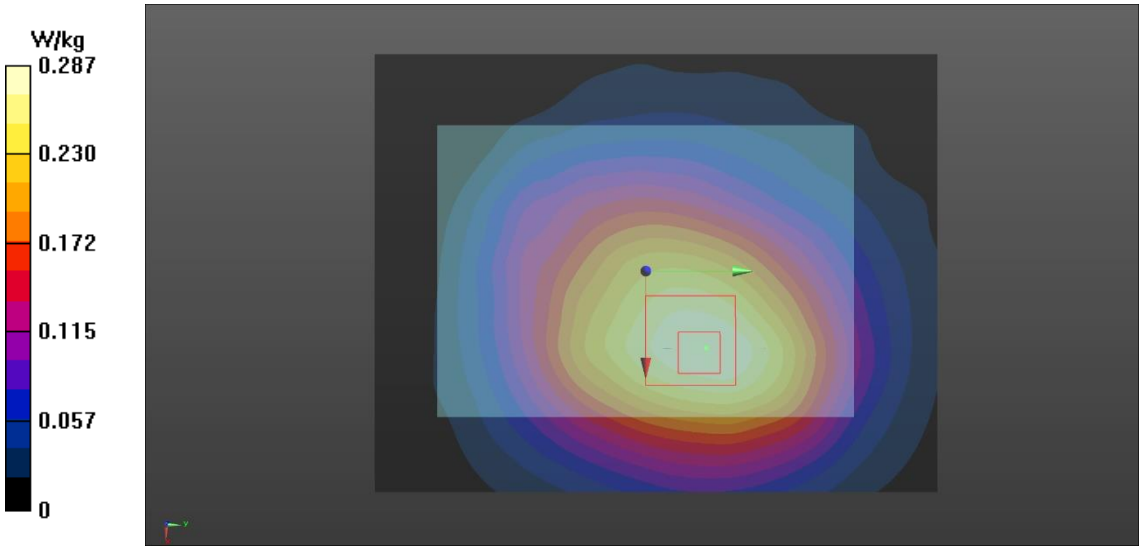
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 71; Frequency: 680.5 MHz;
Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 680.5 MHz; σ = 0.829 S/m; ε_r = 40.443; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(9.91, 8.74, 9.52) @ 680.5 MHz; Calibrated: 17.2.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/LTE 71 CH133297, QPSK 20, RBs 1 Offset 50, Back 0mm/Zoom Scan (6x6x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 17.32 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.320 W/kg
SAR(1 g) = 0.247 W/kg; SAR(10 g) = 0.179 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 19.5 mm
Ratio of SAR at M2 to SAR at M1 = 64.5%
Maximum value of SAR (measured) = 0.289 W/kg

Configuration/LTE 71 CH133297, QPSK 20, RBs 1 Offset 50, Back 0mm/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.287 W/kg



Plot 15

Date/Time: 25.7.2023 10.32.10

Test Laboratory: Verkotan Oy

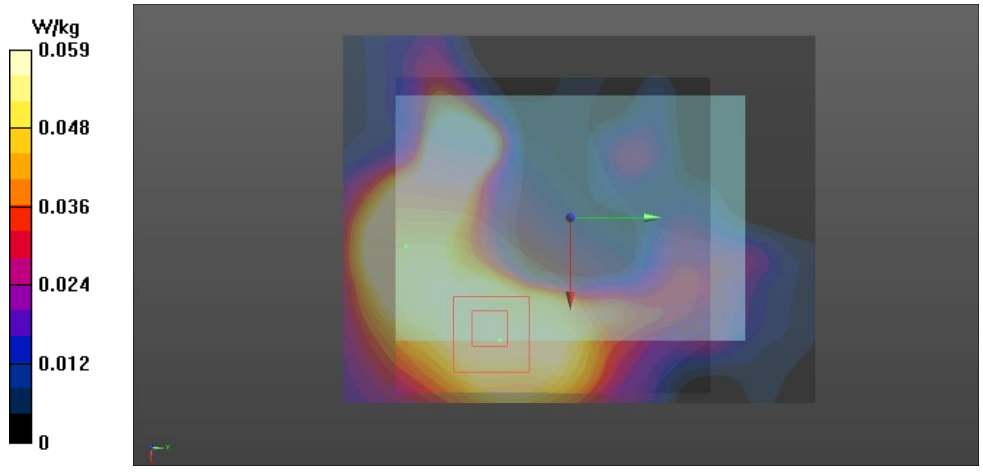
DUT: Axis W120; Type;

Communication System: UID 0, WLAN 2.4 (0); Communication System Band: WLAN2.4GHz; Frequency: 2462 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 2462 MHz; σ = 1.679 S/m; ε_r = 37.441; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.09, 7.31, 6.98) @ 2462 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = -4.0, 31.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/wlan Back 0mm 2 2 2/Zoom Scan (11x10x5)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=7.5mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.103 W/kg
SAR(1 g) = 0.048 W/kg; SAR(10 g) = 0.023 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 39.3%
Maximum value of SAR (measured) = 0.0809 W/kg



Plot 16

Date/Time: 25.7.2023 12.52.56

Test Laboratory: Verkotan Oy

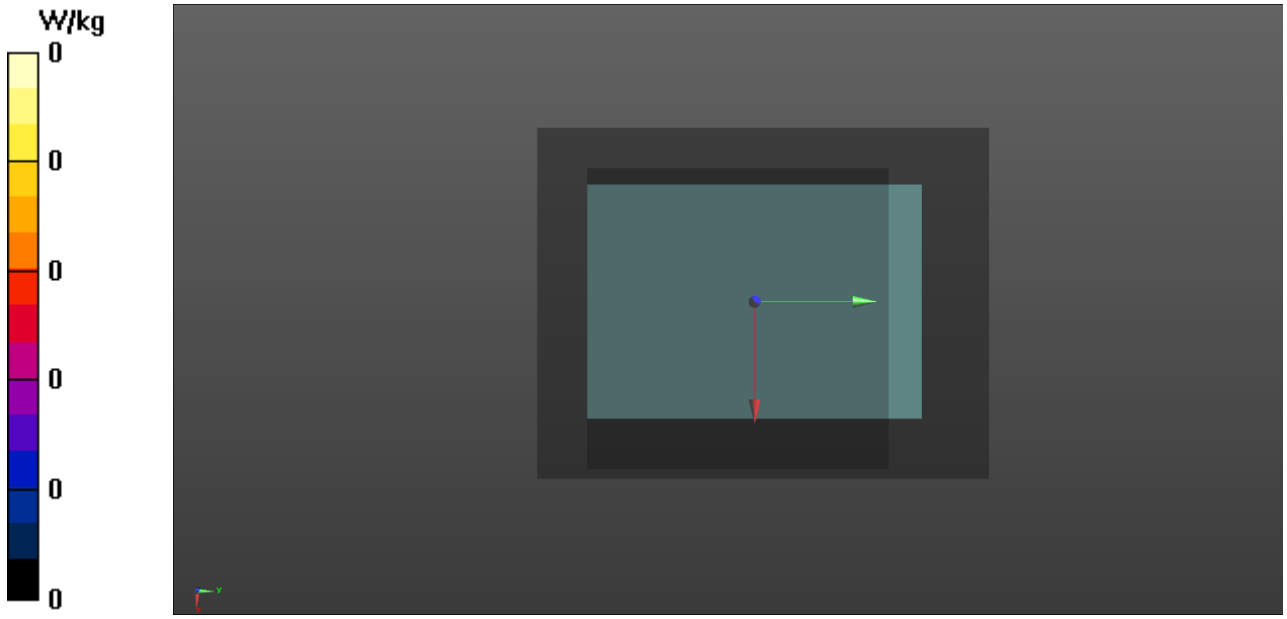
DUT: Axis W120;

Communication System: UID 0, Bluetooth (0); Communication System Band: Bluetooth; Frequency: 2480 MHz;
Communication System PAR: 3.98 dB;
Medium parameters used: f = 2480 MHz; σ = 1.691 S/m; ε_r = 37.42; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.09, 7.31, 6.98) @ 2480 MHz; Calibrated: 20.4.2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = -4.0
  - Electronics: DAE4 Sn710; Calibrated: 19.10.2022
  - Phantom: SAR1_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/BLE Back 0mm 2 2/Area Scan (71x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0 W/kg



Plot 17

Date/Time: 31/07/2023 11:06:34

Test Laboratory: Verkotan Oy

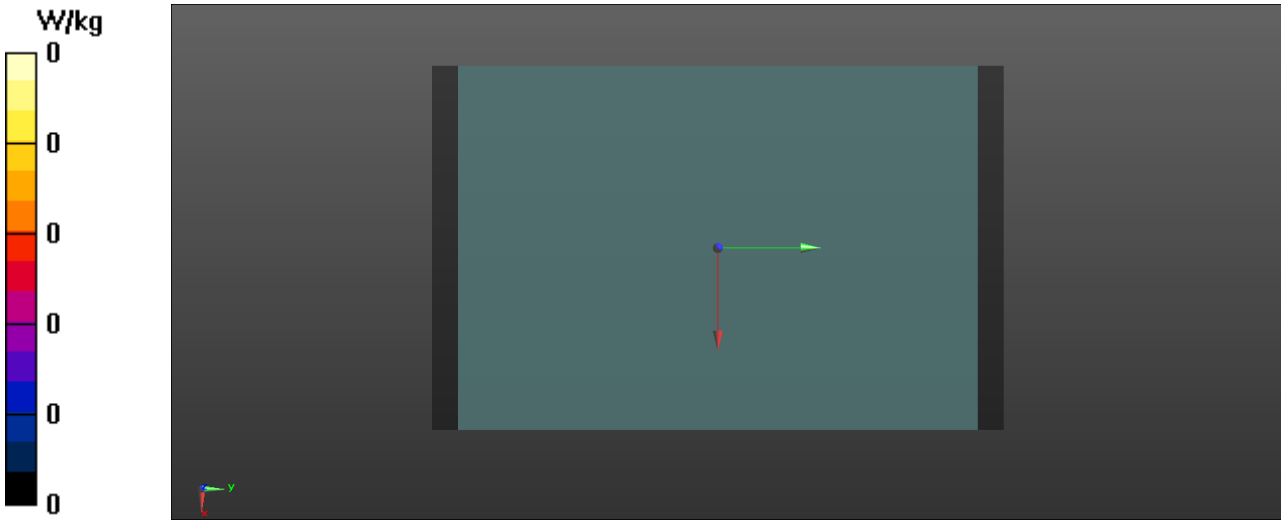
DUT: Axis W120;

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5280 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 5280 MHz; σ = 4.829 S/m; ε_r = 34.442; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 4.99, 5.17) @ 5280 MHz; Calibrated: 17/02/2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -29.0
  - Electronics: DAE4 Sn1332; Calibrated: 15/02/2023
  - Phantom: SAR2_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/WLAN 5GHz, Back 0mm 2/Area Scan (71x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0 W/kg



Plot 18

Date/Time: 31/07/2023 12:09:31

Test Laboratory: Verkotan Oy

DUT: Axis W120;

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5560 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 5560 MHz; σ = 5.071 S/m; ε_r = 34.053; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

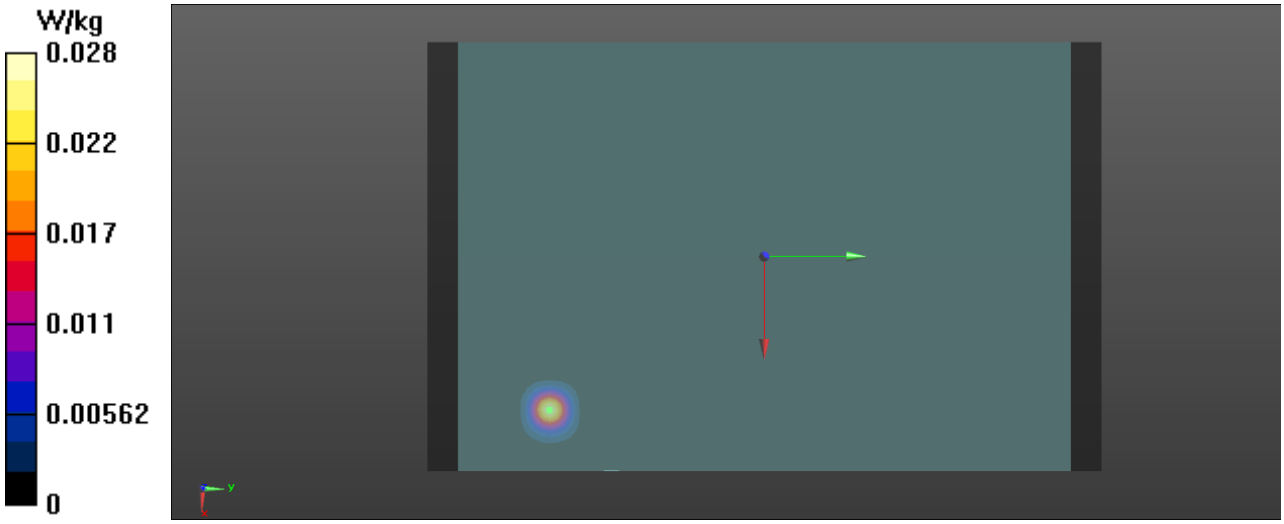
DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.4, 4.29, 4.43) @ 5560 MHz; Calibrated: 17/02/2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = 25.0, -29.0
  - Electronics: DAE4 Sn1332; Calibrated: 15/02/2023
  - Phantom: SAR2_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/WLAN 5GHz, Back 0mm /Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0 W/kg
SAR(1 g) = n.a. ; SAR(10 g) = n.a. (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 0%

Maximum value of SAR (measured) = 0.0194 W/kg

Configuration 2/WLAN 5GHz, Back 0mm 2 2 2 2/Area Scan (71x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0281 W/kg



Plot 19

Date/Time: 31/07/2023 13:10:33

Test Laboratory: Verkotan Oy

DUT: Axis W120;

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5660 MHz;
Communication System PAR: 0 dB;
Medium parameters used: f = 5660 MHz; σ = 5.158 S/m; ε_r = 33.927; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

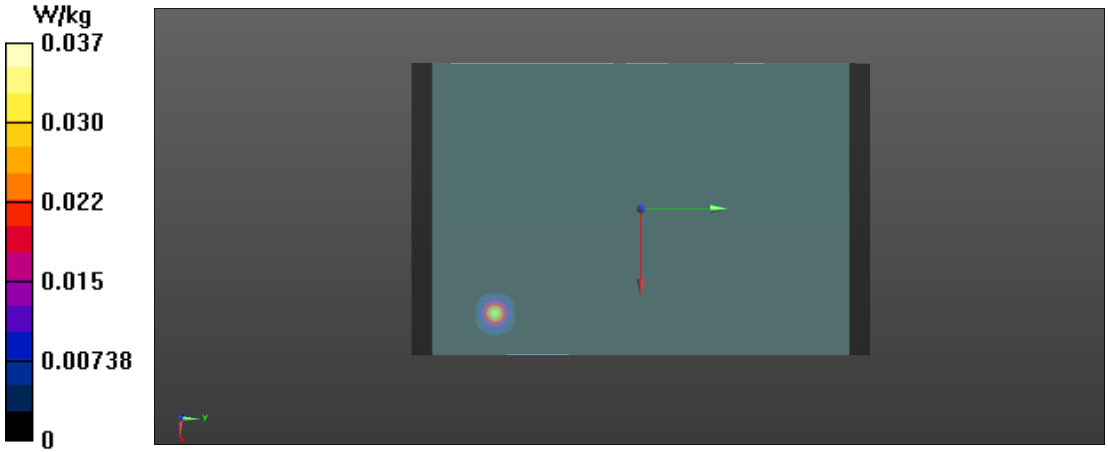
DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.4, 4.29, 4.43) @ 5660 MHz; Calibrated: 17/02/2023
  - Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = 25.0, -29.0
  - Electronics: DAE4 Sn1332; Calibrated: 15/02/2023
  - Phantom: SAR2_Phantom1_ELI; Type: QD OVA 002 AA;
  - DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration 2/WLAN 5GHz, Back 0mm/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0 W/kg
SAR(1 g) = n.a. ; SAR(10 g) = n.a. (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 26.8%

Maximum value of SAR (measured) = 0.0233 W/kg

Configuration 2/WLAN 5GHz, Back 0mm /Area Scan (71x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0369 W/kg



APPENDIX D: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

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

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

Accreditation No.: **SCS 0108**

Client	Verkotan Oulu, Finland	Certificate No.	EX-3892_Apr23

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3892
Calibration procedure(s)	QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6, QA CAL-25.v8 Calibration procedure for dosimetric E-field probes
Calibration date	April 20, 2023

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3) °C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	20-Oct-22 (OCP-DAK3.5-1249_Oct22)	Oct-23
OCP DAK-12	SN: 1016	20-Oct-22 (OCP-DAK12-1016_Oct22)	Oct-23
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe ES3DV2	SN: 3013	06-Jan-23 (No. ES3-3013_Jan23)	Jan-24

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

	Name	Function	Signature
Calibrated by	Jeffrey Katzman	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: April 22, 2023

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

Certificate No: EX-3892_Apr23 Page 1 of 9

Parameters of Probe: EX3DV4 - SN:3892

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu V/(V/m)^2$) [A]	0.47	0.39	0.49	±10.1%
DCP (mV) [B]	102.4	105.3	102.6	±4.7%

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc[E] $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	120.0	±1.1%	±4.7%
		Y	0.00	0.00	1.00		141.8		
		Z	0.00	0.00	1.00		123.2		

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

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

Parameters of Probe: EX3DV4 - SN:3892

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	29.4°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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

Parameters of Probe: EX3DV4 - SN:3892

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz)[C]	Relative Permittivity[F]	Conductivity[F] (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unc ($k = 2$)
450	43.5	0.87	10.79	10.79	10.79	0.16	1.30	±13.3%
600	42.7	0.88	10.21	10.21	10.21	0.10	1.25	±13.3%
750	41.9	0.89	9.64	9.72	9.33	0.37	1.27	±12.0%
900	41.5	0.97	9.30	9.64	8.99	0.35	1.27	±12.0%
1750	40.1	1.37	8.12	8.30	8.01	0.24	1.27	±12.0%
1900	40.0	1.40	7.94	8.14	7.80	0.28	1.27	±12.0%
2450	39.2	1.80	7.09	7.31	6.98	0.26	1.27	±12.0%
2600	39.0	1.96	7.18	7.37	7.04	0.26	1.27	±12.0%
4400	36.9	3.84	6.14	6.32	6.02	0.36	1.27	±14.0%
4800	36.4	4.25	5.96	6.13	5.83	0.36	1.27	±14.0%

[C] Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–8 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

[F] The probes are calibrated using tissue simulating liquids (TSL) that deviate for ε and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10%. If TSL with deviations from the target of less than ±5% are used, the calibration uncertainties are 11.1% for 0.7 - 3 GHz and 13.1% for 3 - 6 GHz.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

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

ilac-MRA

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

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

Accreditation No.: SCS 0108

Client Verkotan **Certificate No** EX-7447_Feb23

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7447

Calibration procedure(s) QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6, QA CAL-25.v8
Calibration procedure for dosimetric E-field probes

Calibration date February 17, 2023

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
OCP DAK-3.5 (weighted)	SN: 1249	20-Oct-22 (OCP-DAK3.5-1249_Oct22)	Oct-23
OCP DAK-12	SN: 1016	20-Oct-22 (OCP-DAK12-1016_Oct22)	Oct-23
Reference 20 dB Attenuator	SN: CC2552 (20x)	04-Apr-22 (No. 217-03527)	Apr-23
DAE4	SN: 660	10-Oct-22 (No. DAE4-660_Oct22)	Oct-23
Reference Probe ES3DV2	SN: 3013	06-Jan-23 (No. ES3-3013_Jan23)	Jan-24

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

	Name	Function	Signature
Calibrated by	Joanna Lleshaj	Laboratory Technician	
Approved by	Niels Kuster	Quality Manager	

Issued: February 21, 2023

Parameters of Probe: EX3DV4 - SN:7447

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu V/(V/m)^2$) [A]	0.43	0.43	0.43	±10.1%
DCP (mV) [B]	90.0	91.0	96.0	±4.7%

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc[E] $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	130.7	±2.3%	±4.7%
		Y	0.00	0.00	1.00		130.1		
		Z	0.00	0.00	1.00		134.6		

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

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

Parameters of Probe: EX3DV4 - SN:7447

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-139.3°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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

EX3DV4 - SN:7447

February 17, 2023

Parameters of Probe: EX3DV4 - SN:7447

Calibration Parameter Determined in Head Tissue Simulating Media

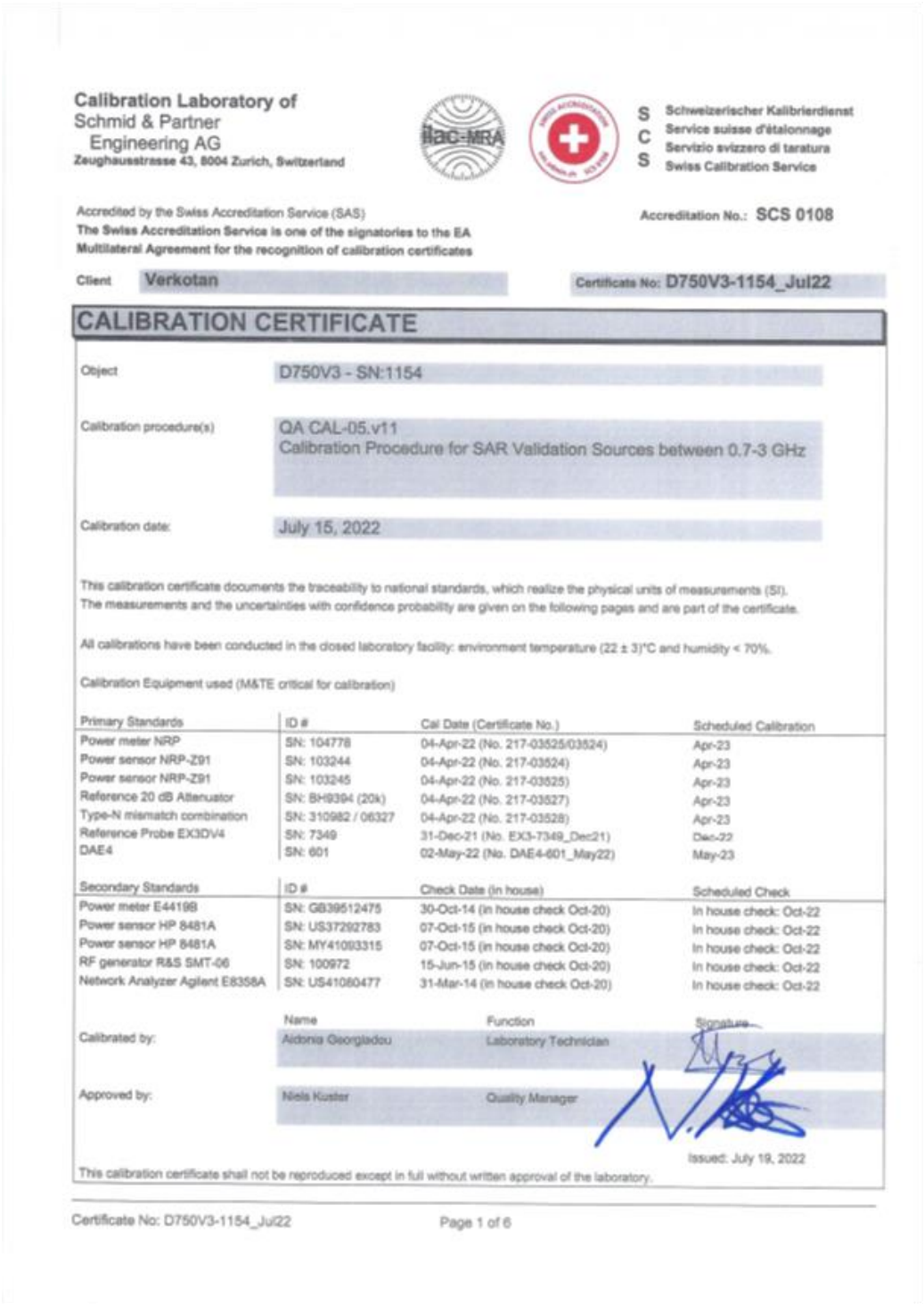
f (MHz)[C]	Relative Permittivity[F]	Conductivity[F] (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unc ($k = 2$)
13	55.0	0.75	17.42	17.42	17.42	0.00	1.25	±13.3%
750	41.9	0.89	9.91	8.74	9.52	0.31	1.27	±12.0%
900	41.5	0.97	9.37	8.45	8.89	0.32	1.27	±12.0%
1750	40.1	1.37	8.45	7.97	8.40	0.25	1.27	±12.0%
1950	40.0	1.40	8.05	7.59	7.97	0.29	1.27	±12.0%
2150	39.7	1.53	8.01	7.58	7.90	0.28	1.27	±12.0%
2300	39.5	1.67	7.85	7.46	7.80	0.28	1.27	±12.0%
2450	39.2	1.80	7.70	7.50	7.63	0.28	1.27	±12.0%
2600	39.0	1.96	7.55	7.37	7.73	0.28	1.27	±12.0%
3300	38.2	2.71	7.02	6.71	7.02	0.34	1.27	±14.0%
5250	35.9	4.71	5.18	4.99	5.17	0.39	1.53	±14.0%
5600	35.5	5.07	4.40	4.29	4.43	0.38	1.77	±14.0%
5750	35.4	5.22	4.47	4.33	4.53	0.38	1.85	±14.0%

[C] Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

[F] The probes are calibrated using tissue simulating liquids (TSL) that deviate for ε and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10%. If TSL with deviations from the target of less than ±5% are used, the calibration uncertainties are 11.1% for 0.7 - 3 GHz and 13.1% for 3 - 6 GHz.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

APPENDIX E: RELEVANT PAGES FROM DIPOLE CALIBRATION REPORTS



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

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

Accreditation No.: SCS 0108

Client: Verkotan

Certificate No: D750V3-1154_Jul22

CALIBRATION CERTIFICATE

Object: D750V3 - SN:1154

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: July 15, 2022

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Aidonia Georgiadou	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: July 19, 2022

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

Certificate No: D750V3-1154_Jul22 Page 1 of 6

Measurement Conditions

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

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

Head TSL parameters

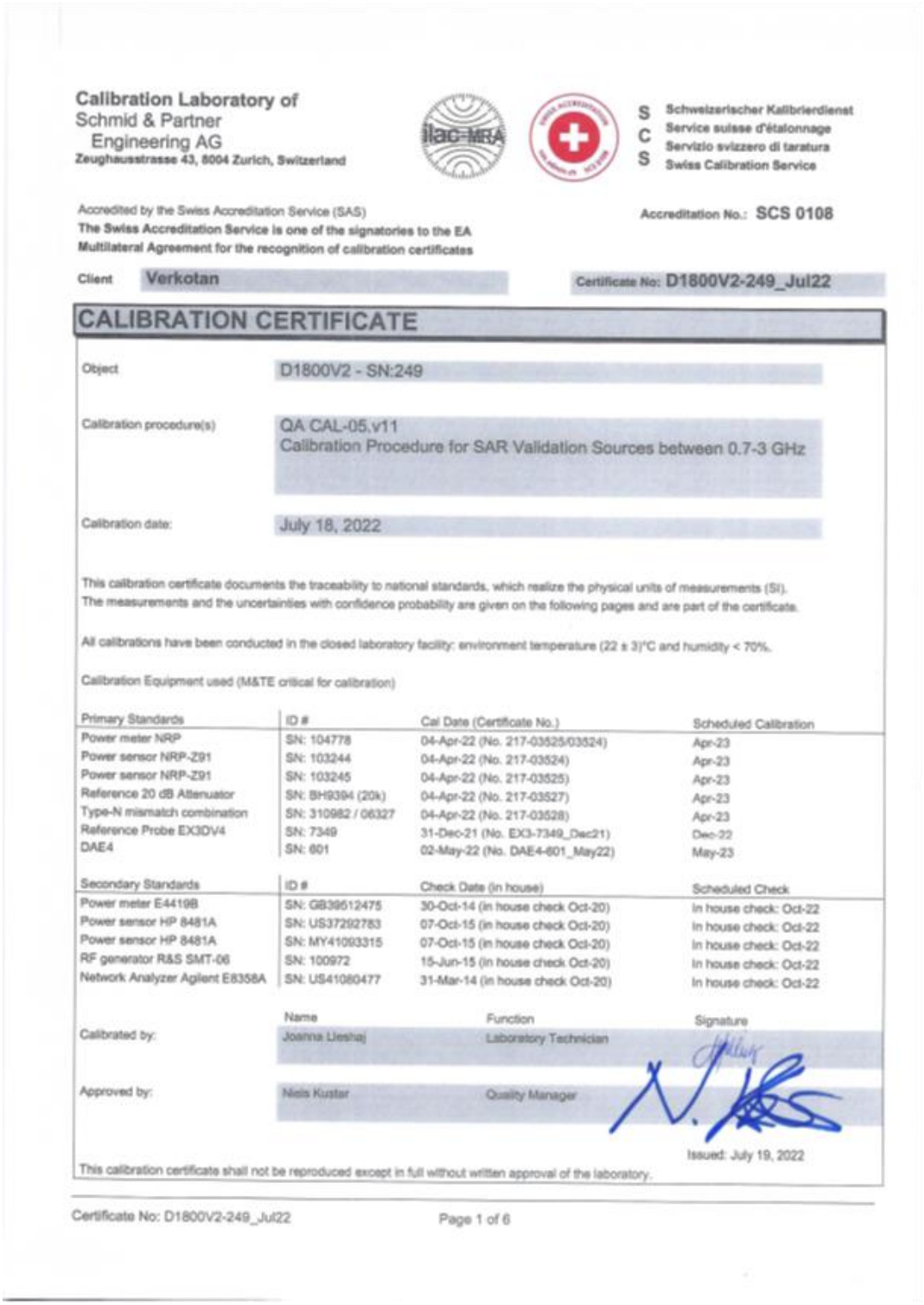
The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.5 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.54 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.57 W/kg ± 16.5 % (k=2)**



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

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

Accreditation No.: SCS 0108

Client: Verkotan

Certificate No: D1800V2-249_Jul22

CALIBRATION CERTIFICATE

Object: D1800V2 - SN:249

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: July 18, 2022

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Joanna Lleshaj	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: July 19, 2022

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

Certificate No: D1800V2-249_Jul22 Page 1 of 6

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.74 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.3 W/kg ± 16.5 % (k=2)**

SAR Reference Dipole Calibration Report

Ref : ACR.68.5.23.BES.A

VERKOTAN OY
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
SAR REFERENCE DIPOLE
FREQUENCY: 1900 MHZ
SERIAL NO.: 511

Calibrated at MVG
Z.I. de la pointe du diable
Technopôle Brest Iroise – 295 avenue Alexis de Rochon
29280 PLOUZANE - FRANCE

Calibration date: 03/09/2023

Accreditations #2-6789 and #2-6814
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

mvg

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.68.5.23.BES.A

	Name	Function	Date	Signature
Prepared by :	Cyrille ONNEE	Measurement Responsible	3/9/2023	
Checked & approved by:	Jérôme Luc	Technical Manager	3/9/2023	
Authorized by:	Yann Toutain	Laboratory Director	3/9/2023	

Yann Toutain ID
Signature numérique de Yann Toutain ID
Date : 2023.03.09 15:01:12 +01'00'

	Customer Name
Distribution :	Verkotan Oy

Issue	Name	Date	Modifications
A	Cyrille ONNEE	3/9/2023	Initial release

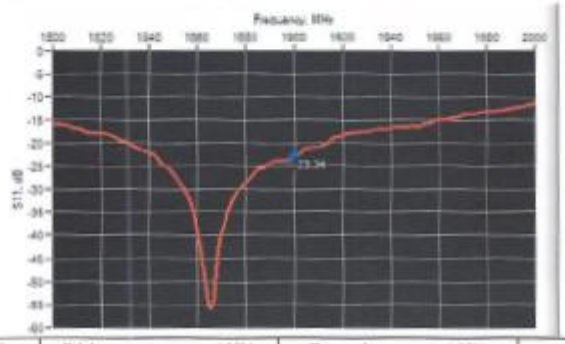
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	Required	Measured	Required	Measured	Required
-	68.00 +/- 2%	-	39.50 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
1900	-23.34	-20	48.5Ω - 6.6jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

6.3.1 SAR with Head Liquid

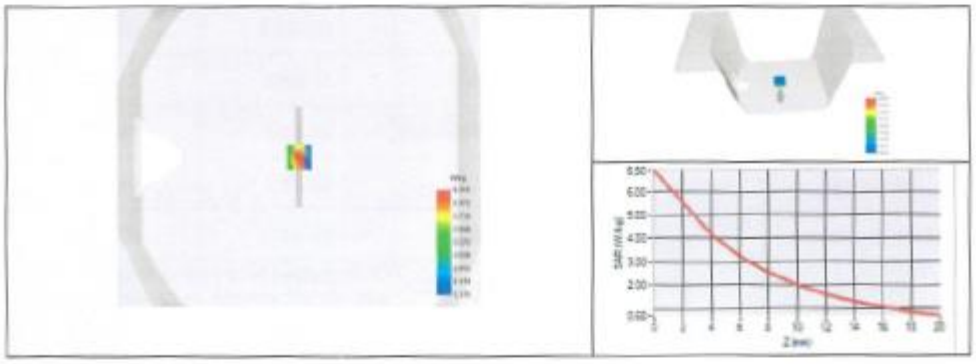
The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.68.5.23.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	SN 41/18 EPGO333
Liquid	Head Liquid Values: eps' : 40.4 sigma : 1.40
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	1900 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
1900 MHz	3.80	38.02	39.70	1.94	19.41	20.50



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

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

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

Accreditation No.: SCS 0108

Client: Verkotan

Certificate No: D2450V2-729_Jul22

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:729

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: July 15, 2022

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Aldonia Georgiadou	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: July 19, 2022

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.9 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 W/kg ± 16.5 % (k=2)**

SAR Reference Dipole Calibration Report

Ref : ACR.68.8.23.BES.A

VERKOTAN OY
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
SAR REFERENCE DIPOLE
FREQUENCY: 5200-5800 MHZ
SERIAL NO.: 1045

Calibrated at MVG
Z.I. de la pointe du diable
Technopôle Brest Iroise – 295 avenue Alexis de Rochon
29280 PLOUZANE - FRANCE

Calibration date: 03/09/2023

Accreditations #2-6789 and #2-6814
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

mvg

SAR REFERENCE DIPOLE CALIBRATION REPORT Ref: ACR.60.8.23.BES.A

	Name	Function	Date	Signature
Prepared by :	Cyrille ONNEE	Measurement Responsible	3/9/2023	
Checked & approved by:	Jérôme Luc	Technical Manager	3/9/2023	
Authorized by:	Yann Toutain	Laboratory Director	3/9/2023	

Yann Toutain ID
Signature numérique de Yann Toutain ID
Date : 2023.03.09 15:05:03 +01'00'

	Customer Name
Distribution :	Verkotan Oy

Issue	Name	Date	Modifications
A	Cyrille ONNEE	3/9/2023	Initial release

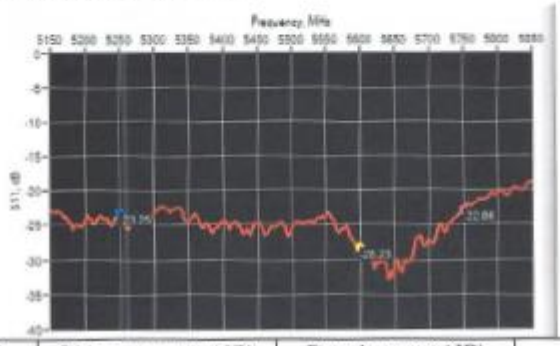
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	Required	Measured	Required	Measured	Required
-	20.60 +/- 2%	-	40.30 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
5250	-23.25	-20	47.8Ω + 6.4jΩ
5600	-28.23	-20	48.5Ω - 3.5jΩ
5750	-22.86	-20	46.7Ω + 6.1jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.68.8.23.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	SN 41/18 EPGO333
Liquid	Head Liquid Values @ 5250 MHz: eps' : 34.3 sigma : 4.67 Head Liquid Values @ 5600 MHz: eps' : 33.6 sigma : 5.05 Head Liquid Values @ 5750 MHz: eps' : 32.9 sigma : 5.46
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=4mm/dy=4mm/dz=2mm
Frequency	5250 MHz 5600 MHz 5750 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
5250 MHz	7.31	73.09	-	2.11	21.12	-
5600 MHz	7.29	72.92	78.30	2.13	21.29	23.20
5750 MHz	6.91	69.05	-	2.03	20.27	-

SAR MEASUREMENT PLOTS @ 5250 MHz