SAR Compliance Test Report

Date of Report	3/02/2020	**Client's Contact person:**	Tony Vahtera
Number of pages:	67	**Responsible Test engineer:**	Kirsi Kyllönen
Testing laboratory:	**Verkotan Oy** Elektroniikkatie 17 90590 Oulu Finland	**Client:**	**AINA Wireless Finland Oy** Joensuunkatu 7G 24100 Salo Finland
Tested device	**Aina Kepler**		
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** **RSS-102** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) **IEEE 1528 - 2013** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique		
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:

For the contents:

03.02.2020

Miia Nurkkala

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Date: 2020.02.03 15:50:44 +02'00'

Laboratory Manager

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Device under Test (DUT):

Product:	Aina Kepler
Manufacturer:	AINA Wireless Finland Oy
IMEI Number:	864839040215330, 864839040199050
FCC ID Number:	2AH78-AKEPLER
IC ID Number:	21419-AKEPLER
Model:	AKepler-0000-001
DUT Number:	22655, 22656
Battery Type used in testing:	Varta Li-Polymer battery, EZPak XL
Portable/ Mobile device	Portable
State of the Sample	Production sample

Testing information:

Testing Performed:	22.10.201 – 4.11.2019
Notes:	This report replaces FCC SAR report Ainawireless ID3517c 29112019
Document ID:	FCC SAR report Ainawireless ID3517c 03022020.docx
Temperature °C	22±2 / Controlled
Humidity RH%	20±20 / Controlled
Measurement performed by:	Kirsi Kyllönen

1.2 Maximum Results

The maximum reported* SAR values for in Front-of-the-Face and for Body-worn configuration 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 Health Canada's RF exposure guideline, Safety Code 6 and in FCC 47 CFR part 2 (2.1093) is SAR1g 1.6 W/kg.

System	Highest Reported* SAR_{1g}(W/kg) in Front-of-Face Condition, 25mm separation	Result
WCDMA II	**0.09**	**PASS**
WCDMA IV	**0.05**	**PASS**
WCDMA V	**0.07**	**PASS**
LTE 2	**0.10**	**PASS**
LTE 4	**0.05**	**PASS**
LTE 5	**0.06**	**PASS**
LTE 12	**0.05**	**PASS**
LTE 13	**0.06**	**PASS**

LTE 14	**0.06**	**PASS**
LTE 66	**0.05**	**PASS**
LTE 71	**0.04**	**PASS**
2.4 ISM	**0.10**	**PASS**

System	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm separation distance	Result
WCDMA II	**0.57**	**PASS**
WCDMA IV	**0.46**	**PASS**
WCDMA V	**0.25**	**PASS**
LTE 2	**0.54**	**PASS**
LTE 4	**0.39**	**PASS**
LTE 5	**0.21**	**PASS**
LTE 12	**0.22**	**PASS**
LTE 13	**0.23**	**PASS**
LTE 14	**0.23**	**PASS**
LTE 66	**0.50**	**PASS**
LTE 71	**0.24**	**PASS**
2.4 ISM	**0.10**	**PASS**

* Reported SAR Values are scaled to maximum theoretical output power.

1.2.1 Simultaneous Transmission SAR

Highest Simultaneous Transmission SAR	Highest Reported* SAR1g(W/kg) in Front-of-Face Condition, 25mm separation	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm separation distance	Result
Cellular Technology +ISM	**0.20**	**0.67**	**PASS**

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

1.2.2 Maximum Drift

Maximum Drift During Measurements	-0.48 dB*

*Drifts >5% have been considered in the scaling factor

1.2.3 Measurement Uncertainty

Expanded Uncertainty (k=2) 95 %	±23.4%

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The DUT Push-to-Talk (PTT) device that is a half-duplex communication technology allowing instant voice messaging on the push of a button.

Device Category	Portable
Exposure Environment	Uncontrolled

2.1 Supported Frequency Bands and Operational Modes

	Modes of Operation	Transmitter Frequency Range (MHz)
TX Frequency bands	WCDMA 2	1850-1910
	WCDMA 4	1710-1755
	WCDMA 5	824-849
	LTE 2	1850-1910
	LTE 4	1710-1755
	LTE 5	824-849
	LTE 12	699-716
	LTE 13	777-787
	LTE 14	788-798
	LTE 66	1710-1780
	LTE 71	663-698
	2.4 ISM	2413-2470

2.2 Simultaneous transmission

ISM and one cellular technology can be operated simultaneously.

2.3 Test exclusions

Time averaged ISM transmissions power is 1mW thus standalone ISM SAR can be excluded from testing.

2.4 Calculated SAR of the ISM transmitter

For simultaneous transmission evaluation the ISM standalone SAR value is estimated according to the following equation:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)/x] W/kg, where x = 7.5 for 1-g SAR.

Maximum output power of the DUT's transmitter is 19.8 dBm i.e. 95.5 mW.
ISM is transmitting 0.1ms during 10ms period thus the duty cycle for ISM transmission is 0.1ms/10ms=0.01.
Thus, the maximum output power of the ISM transmission is 95.5mW*0.01 =0.955 mW

ISM SAR_{1g}= (0.955 mW /1)*((2.47GHz)$^{1/2}$/7.5)=0.20 W/kg

1mm minimum separation distance was used for calculation.

For PTT device the duty factor of 50% is applied hence for this device

ISM SAR_{1g}=0.10 W/kg

3. OUTPUT POWER

3.1.1 Maximum Output Power

From a Customer, maximum defined output power, including tune-up tolerance;

LTE M1/NB-IoT	Max Output Power [dBm]
WCDMA 2	25
WCDMA 4	25
WCDMA 5	25
LTE 2	25
LTE 4	25
LTE 5	25
LTE 12	25
LTE 13	25
LTE 14	25
LTE 66	25
LTE 71	25

ISM 2.4 GHz	
	Max Output Power [dBm]
ISM 2.4 GHz	19.8

3.2 Tested conducted power

Measured conducted output power.

Mode/ Reference Channel	WCDMA Band V			WCDMA Band IV			WCDMA Band II		
	CH 4132 826.4 MHz	CH 4182 836.4 MHz	CH 4233 846.6 MHz	CH 1312 1712.4 MHz	CH 1413 1732.6 MHz	CH 1513 1752.6 MHz	CH 9262 1852.4 MHz	CH 9400 1880.0 MHz	CH 9538 1907.6 MHz
RMC 12.2K	23.02	23.06	22.85	22.78	23.0	23.05	23.1	23.25	23.49
HSDPA Subtest-1	21.97	22.1	22.14	21.69	21.95	22.05	21.9	22.27	22.38
HSDPA Subtest-2	21.99	22.11	22.18	21.73	21.98	22.0	21.98	22.18	22.33
HSDPA Subtest-3	21.52	21.65	21.41	21.22	21.5	21.52	21.51	21.72	21.93
HSDPA Subtest-4	21.48	21.63	21.43	21.39	21.56	21.6	21.52	21.71	21.93
HSUPA Subtest-1	21.97	22.1	22.17	21.86	21.88	22.03	22.03	22.13	22.27
HSUPA Subtest-2	21.51	21.64	21.61	21.4	21.54	21.58	21.48	21.65	21.88
HSUPA Subtest-3	21.98	22.14	22.12	21.7	21.99	22.04	21.91	22.29	22.41
HSUPA Subtest-4	22.14	22.14	22.21	21.87	22.15	22.17	22.06	22.23	22.41
HSUPA Subtest-5	22.05	22.16	22.1	21.81	21.99	22.05	21.97	22.19	22.3

LTE Band / BW	RB Size RBs	RB Offset 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	23.0	23.37	23.31	0	22.48	22.74	22.83	1
	1	2	23.16	23.41	23.45	0	22.6	22.81	22.97	1
	1	5	23.15	23.32	23.28	0	22.44	22.64	22.85	1
	3	0	23.2	23.43	23.57	0	22.25	22.79	22.87	1
	3	1	23.25	23.45	23.64	0	22.29	22.81	22.51	1
	3	3	23.2	23.41	23.48	0	22.26	22.82	22.62	1
	6	0	22.26	22.55	22.54	1	21.27	21.39	21.52	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.24	23.59	23.56	0	22.36	22.57	22.65	1
	1	7	23.41	23.62	23.73	0	22.86	22.81	22.85	1
	1	14	23.33	23.58	23.77	0	22.3	22.48	22.8	1
	8	0	22.32	22.49	22.6	1	21.3	21.47	21.53	2
	8	3	22.36	22.5	22.58	1	21.23	21.38	21.35	2
	8	7	22.22	22.43	22.54	1	21.21	21.47	21.51	2
	15	0	22.22	22.46	22.51	1	21.27	21.52	21.36	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.03	23.37	23.59	0	22.31	22.43	22.67	1
	1	12	23.02	23.59	23.64	0	22.64	22.71	22.93	1
	1	24	23.2	23.37	23.48	0	22.41	22.77	23.01	1
	12	0	22.08	22.37	22.53	1	20.92	21.24	21.37	2
	12	6	22.1	22.43	22.53	1	21.04	21.23	21.47	2
	12	13	22.26	22.43	22.33	1	21.15	21.11	21.27	2
	25	0	22.12	22.4	22.4	1	21.06	21.28	21.3	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.1	23.42	23.23	0	22.39	22.63	22.46	1
	1	24	23.4	23.56	23.66	0	22.99	23.04	23.08	1
	1	49	23.17	23.22	23.4	0	22.66	22.42	22.83	1
	25	0	22.03	22.39	22.44	1	21.19	21.26	21.35	2
	25	12	22.27	22.3	22.48	1	21.26	21.3	21.39	2
	25	25	22.21	22.24	22.43	1	21.16	21.22	21.36	2
	50	0	22.12	22.36	22.35	1	21.04	21.22	21.43	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.89	23.45	23.04	0	22.29	22.5	22.22	1
	1	37	23.38	23.37	23.59	0	22.77	22.62	22.8	1
	1	74	22.99	23.11	23.15	0	22.55	22.28	22.4	1
	36	0	22.07	22.35	22.1	1	20.91	21.12	21.18	2
	36	19	22.08	22.25	22.3	1	20.95	21.11	21.28	2
	36	39	22.13	22.19	22.35	1	20.97	21.08	21.24	2
	75	0	22.01	22.29	22.26	1	20.97	21.25	21.33	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.0	23.12	23.02	0	22.61	22.23	22.24	1
	1	50	23.22	23.34	23.29	0	22.61	22.37	22.69	1
	1	99	23.03	22.93	22.94	0	22.6	22.14	22.58	1
	50	0	21.94	22.25	21.98	1	20.88	21.21	20.96	2
	50	25	22.1	22.24	22.29	1	20.98	21.23	21.17	2
	50	50	22.05	21.99	22.23	1	20.92	21.05	21.21	2
	100	0	21.96	22.18	22.11	1	20.82	21.14	21.11	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.89	22.88	22.71	0	22.08	22.19	22.12	1
	1	2	23.04	23.04	22.98	0	22.24	22.32	22.14	1
	1	5	22.92	23.0	22.85	0	22.17	22.15	22.02	1
	3	0	22.95	23.02	22.91	0	22.14	21.74	21.87	1
	3	1	23.01	23.07	23.01	0	22.22	21.81	21.76	1
	3	3	22.89	23.17	22.98	0	21.68	21.66	21.66	1
	6	0	22.01	21.94	21.92	1	20.73	20.98	20.87	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.05	23.02	22.9	0	22.27	22.16	21.99	1
	1	7	23.11	23.13	22.92	0	22.16	22.58	22.04	1
	1	14	22.94	23.02	22.87	0	22.17	22.15	21.94	1
	8	0	22.03	22.02	21.94	1	21.06	21.04	20.99	2
	8	3	22.03	22.07	21.84	1	21.03	21.02	20.97	2
	8	7	21.94	21.97	21.83	1	20.95	21.0	21.07	2
	15	0	21.9	21.95	21.88	1	21.08	21.06	21.0	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.86	22.87	23.18	0	22.08	22.07	22.73	1
	1	12	22.83	22.89	22.95	0	22.05	22.23	22.4	1
	1	24	22.84	22.95	22.83	0	21.98	22.01	22.02	1
	12	0	21.94	21.86	21.89	1	20.84	20.77	21.32	2
	12	6	21.98	21.97	21.97	1	20.82	20.82	21.05	2
	12	13	21.81	21.96	21.9	1	20.93	20.99	20.96	2
	25	0	21.88	21.91	21.99	1	20.79	20.91	21.04	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.95	22.95	23.16	0	22.06	22.18	22.42	1
	1	24	22.93	23.02	23.13	0	22.16	22.75	22.3	1
	1	49	22.82	23.04	22.96	0	22.15	22.52	22.2	1
	25	0	21.84	21.89	22.08	1	20.94	20.99	21.21	2
	25	12	21.88	21.92	22.05	1	20.8	20.94	21.19	2
	25	25	21.96	21.97	21.96	1	20.96	21.07	20.98	2
	50	0	21.84	21.88	22.11	1	20.83	20.97	21.03	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.84	22.92	23.32	0	22.23	22.28	22.66	1
	1	37	22.93	23.28	23.22	0	22.61	22.65	22.68	1
	1	74	22.82	23.08	22.84	0	22.23	22.74	22.19	1
	36	0	21.88	21.95	22.24	1	20.97	20.95	21.29	2
	36	19	21.9	22.02	22.1	1	20.98	21.03	21.2	2
	36	39	21.88	22.02	21.93	1	21.04	21.1	21.12	2
	75	0	21.87	21.9	22.09	1	21.03	20.89	21.17	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.91	23.04	23.1	0	22.18	22.34	22.34	1
	1	50	23.17	23.24	23.34	0	22.29	22.4	22.71	1
	1	99	22.96	23.11	22.87	0	22.09	22.25	22.13	1
	50	0	22.02	21.98	22.26	1	21.0	20.99	21.24	2
	50	25	21.93	21.98	22.3	1	21.0	20.97	21.26	2
	50	50	22.01	22.02	22.02	1	21.01	21.01	21.03	2
	100	0	21.89	21.96	22.16	1	20.96	20.95	21.15	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.54	23.56	23.68	0	23.07	22.94	22.87	1
	1	2	23.69	23.75	23.92	0	23.25	23.11	23.15	1
	1	5	23.53	23.64	23.7	0	23.0	22.87	23.03	1
	3	0	23.67	23.76	23.7	0	22.94	22.75	22.75	1
	3	1	23.67	23.71	23.76	0	22.93	22.36	22.85	1
	3	3	23.55	23.59	23.76	0	22.92	22.6	22.77	1
	6	0	22.74	22.67	22.71	1	21.64	21.7	21.61	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.65	23.61	23.69	0	22.89	22.75	22.83	1
	1	7	23.64	23.89	23.73	0	23.12	23.06	23.38	1
	1	14	23.72	23.89	23.93	0	23.03	22.97	22.93	1
	8	0	22.8	22.74	22.74	1	21.76	21.59	21.58	2
	8	3	22.75	22.68	22.76	1	21.62	21.55	21.66	2
	8	7	22.69	22.72	22.77	1	21.61	21.6	21.61	2
	15	0	22.67	22.63	22.76	1	21.73	21.68	21.79	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.52	23.82	23.7	0	22.85	22.89	22.92	1
	1	12	23.74	23.85	24.06	0	23.14	23.37	23.14	1
	1	24	23.56	23.66	23.63	0	22.78	22.77	22.89	1
	12	0	22.65	22.64	22.71	1	21.48	21.47	21.61	2
	12	6	22.62	22.67	22.68	1	21.55	21.52	21.69	2
	12	13	22.61	22.68	22.74	1	21.54	21.41	21.62	2
	25	0	22.59	22.71	22.68	1	21.58	21.64	21.67	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.79	23.6	23.7	0	22.92	22.81	23.05	1
	1	24	24.1	23.59	23.81	0	23.06	23.02	23.2	1
	1	49	23.79	23.64	23.95	0	23.04	22.97	22.98	1
	25	0	22.67	22.69	22.73	1	21.59	21.64	21.69	2
	25	12	22.72	22.76	22.73	1	21.64	21.68	21.73	2
	25	25	22.7	22.67	22.74	1	21.81	21.71	21.72	2
	50	0	22.74	22.64	22.75	1	21.75	21.66	21.65	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.26	23.07	23.12	0	22.5	22.76	22.72	1
	1	2	23.27	23.24	23.35	0	22.55	23.02	22.83	1
	1	5	23.28	23.22	23.39	0	22.53	22.92	22.69	1
	3	0	23.12	23.3	23.36	0	22.07	22.32	22.09	1
	3	1	23.4	23.35	23.42	0	22.06	22.32	22.14	1
	3	3	23.3	23.43	23.2	0	22.04	22.1	22.33	1
	6	0	22.32	22.37	22.34	1	21.04	21.27	21.39	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.19	23.32	23.31	0	22.73	22.38	22.6	1
	1	7	23.28	23.26	23.38	0	22.91	22.56	22.6	1
	1	14	23.22	23.22	23.32	0	22.48	22.79	22.77	1
	8	0	22.33	22.22	22.33	1	21.5	21.22	21.3	2
	8	3	22.49	22.28	22.35	1	21.31	21.29	21.35	2
	8	7	22.36	22.27	22.5	1	21.15	21.25	21.4	2
	15	0	22.26	22.21	22.39	1	21.34	21.26	21.38	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.07	23.29	23.36	0	22.62	22.59	22.38	1
	1	12	23.36	23.13	23.51	0	22.63	22.59	22.57	1
	1	24	23.1	23.13	23.32	0	22.31	22.68	22.69	1
	12	0	22.24	22.13	22.29	1	21.58	21.3	21.18	2
	12	6	22.3	22.28	22.29	1	21.59	21.19	21.27	2
	12	13	22.17	22.28	22.32	1	21.16	21.26	21.2	2
	25	0	22.29	22.16	22.21	1	21.37	21.22	21.36	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.16	23.11	23.24	0	22.41	22.39	22.45	1
	1	24	23.09	23.31	23.46	0	22.43	22.52	23.08	1
	1	49	23.15	23.17	23.2	0	22.58	22.52	23.13	1
	25	0	22.17	22.18	22.21	1	21.29	21.17	21.36	2
	25	12	22.14	22.24	22.38	1	21.26	21.34	21.34	2
	25	25	22.16	22.31	22.42	1	21.23	21.38	21.39	2
	50	0	22.26	22.18	22.27	1	21.22	21.13	21.31	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.48	23.74	23.57	0	22.79	23.01	22.9	1
	1	12	23.87	23.86	23.72	0	23.29	23.14	23.49	1
	1	24	23.62	23.86	23.72	0	22.98	23.13	22.95	1
	12	0	22.62	22.59	22.75	1	21.66	21.51	21.61	2
	12	6	22.76	22.7	22.74	1	21.71	21.59	21.59	2
	12	13	22.6	22.84	22.77	1	21.64	21.61	21.64	2
	25	0	22.76	22.68	22.77	1	21.6	21.67	21.76	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			NA	CH 23230 782.0 MHz	NA	3GPP MPR [dB]	NA	CH 23230 782.0 MHz	NA	3GPP MPR [dB]
13 / 10M	1	0		23.6		0		22.84		1
	1	24		23.7		0		23.04		1
	1	49		23.59		0		23.55		1
	25	0		22.68		1		21.61		2
	25	12		22.66		1		21.69		2
	25	25		22.75		1		21.79		2
	50	0		22.62		1		21.56		2

LTE Band / BW	RB Size RBs	RB Offset 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	23.45	23.54	23.86	0	22.81	23.3	23.27	1
	1	12	23.63	23.59	23.61	0	23.14	23.35	23.05	1
	1	24	23.61	23.93	23.63	0	23.29	22.9	22.76	1
	12	0	22.67	22.62	22.64	1	21.59	21.57	21.43	2
	12	6	22.66	22.68	22.65	1	21.52	21.45	21.53	2
	12	13	22.64	22.6	22.78	1	21.48	21.46	21.56	2
	25	0	22.66	22.66	22.62	1	21.66	21.62	21.58	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			NA	CH 23330 793.0 MHz	NA	3GPP MPR [dB]	NA	CH 23330 793.0	NA	3GPP MPR [dB]
14 / 10M	1	0		23.75		0	23.24	23.24	23.24	1
	1	24		23.73		0	23.05	23.05	23.05	1
	1	49		23.86		0	23.35	23.35	23.35	1
	25	0		22.64		1	21.7	21.7	21.7	2
	25	12		22.61		1	21.57	21.57	21.57	2
	25	25		22.62		1	21.53	21.53	21.53	2
	50	0		22.65		1	21.47	21.47	21.47	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.87	23.21	23.24	0	22.3	22.8	22.74	1
	1	2	23.19	23.1	23.37	0	22.42	23.09	22.75	1
	1	5	22.92	23.09	23.2	0	22.28	22.92	22.7	1
	3	0	22.98	23.19	23.35	0	22.35	22.09	22.69	1
	3	1	23.05	23.34	23.44	0	22.34	22.03	22.63	1
	3	3	23.07	23.25	23.26	0	22.32	21.98	22.47	1
	6	0	22.1	22.27	22.32	1	21.12	21.04	21.46	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.19	23.31	23.32	0	22.41	22.52	22.62	1
	1	7	23.15	23.3	23.71	0	22.52	22.61	22.79	1
	1	14	23.17	23.11	23.43	0	22.5	22.52	22.64	1
	8	0	22.27	22.43	22.49	1	21.35	21.43	21.61	2
	8	3	22.2	22.42	22.43	1	21.17	21.31	21.45	2
	8	7	22.25	22.34	22.43	1	21.22	21.24	21.46	2
	15	0	22.16	22.38	22.45	1	21.23	21.35	21.44	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.02	23.44	23.24	0	22.34	23.07	22.84	1
	1	12	23.3	23.59	23.35	0	22.57	23.0	22.66	1
	1	24	23.19	23.29	23.29	0	22.38	22.89	22.56	1
	12	0	22.21	22.52	22.47	1	21.08	21.41	21.35	2
	12	6	22.33	22.39	22.44	1	21.23	21.25	21.35	2
	12	13	22.15	22.31	22.44	1	21.22	21.18	21.2	2
	25	0	22.27	22.32	22.46	1	21.34	21.41	21.28	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.11	23.47	23.04	0	22.31	22.68	22.37	1
	1	24	23.44	23.53	23.46	0	23.1	23.09	23.09	1
	1	49	23.17	23.17	23.17	0	22.39	22.39	22.65	1
	25	0	22.24	22.44	22.36	1	21.31	21.51	21.36	2
	25	12	22.29	22.33	22.33	1	21.21	21.42	21.41	2
	25	25	22.17	22.22	22.24	1	21.16	21.3	21.26	2
	50	0	22.25	22.37	22.26	1	21.22	21.44	21.22	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.11	23.32	23.29	0	22.51	22.65	22.61	1
	1	37	23.39	23.49	23.45	0	22.8	22.92	22.81	1
	1	74	23.06	22.99	23.16	0	22.46	22.39	22.59	1
	36	0	22.37	22.46	22.28	1	21.27	21.45	21.18	2
	36	19	22.25	22.48	22.42	1	21.13	21.38	21.32	2
	36	39	22.17	22.28	22.32	1	21.24	21.35	21.26	2
	75	0	22.25	22.42	22.18	1	21.4	21.5	21.18	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.07	23.31	23.16	0	22.26	22.53	22.52	1
	1	50	23.26	23.58	23.35	0	22.38	23.03	22.85	1
	1	99	23.02	23.11	23.12	0	22.44	22.48	22.55	1
	50	0	22.21	22.5	22.17	1	21.28	21.38	21.18	2
	50	25	22.18	22.53	22.21	1	21.16	21.4	21.19	2
	50	50	22.22	22.25	22.27	1	21.08	21.25	21.17	2
	100	0	22.27	22.36	22.05	1	21.15	21.27	21.04	2

LTE Band / BW	RB Size RBs	RB Offset 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	22.98	22.76	22.72	0	21.76	21.53	21.49	1
	1	12	23.78	23.13	23.05	0	21.79	21.87	22.0	1
	1	24	22.86	22.84	22.96	0	21.8	21.48	22.02	1
	12	0	21.95	21.86	21.89	1	20.8	20.56	20.72	2
	12	6	22.15	22.01	21.88	1	21.21	20.7	20.73	2
	12	13	22.11	22.01	21.88	1	21.25	20.89	20.74	2
	25	0	22.01	21.81	21.81	1	21.08	20.8	20.72	2

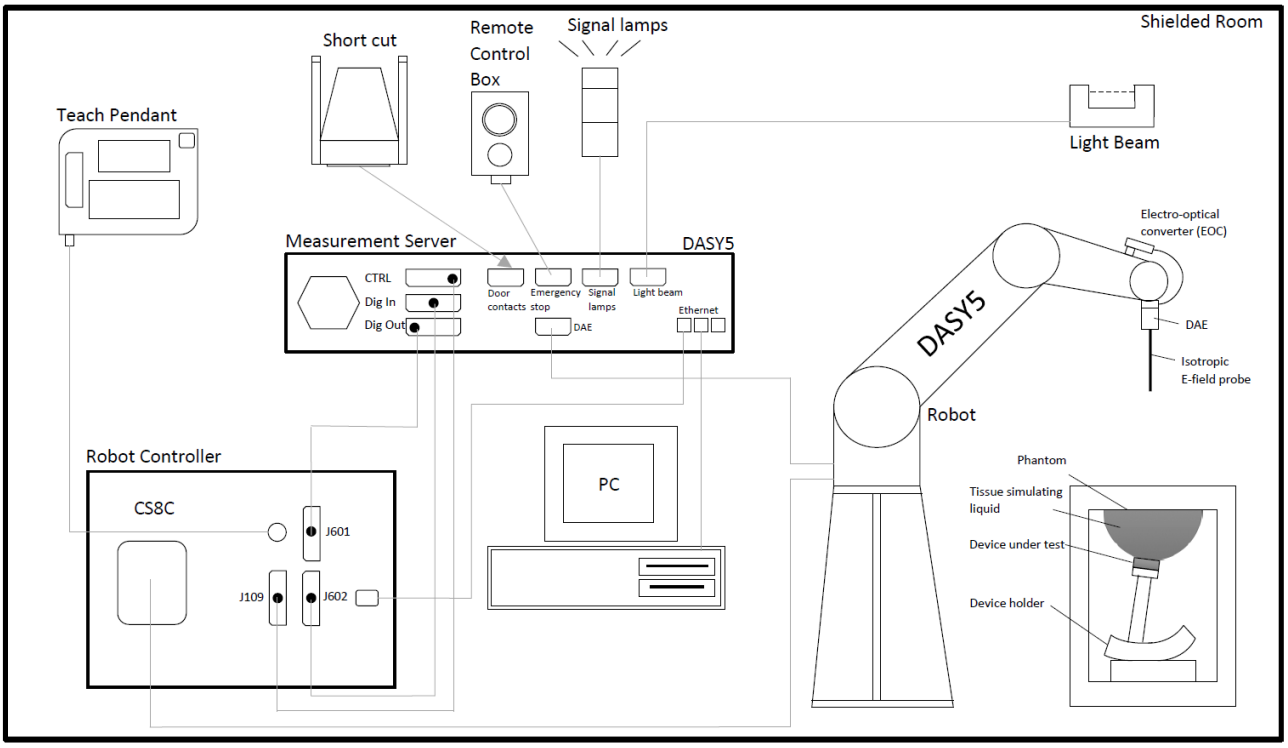
LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 133172 668.0 MHz	CH 133297 680.5 MHz	CH 133422 693.0 MHz	3GPP MPR [dB]	CH 133172 668.0 MHz	CH 133297 680.5 MHz	CH 133422 693.0 MHz	3GPP MPR [dB]
71 / 10M	1	0	22.92	22.9	22.69	0	21.43	21.45	21.95	1
	1	24	22.93	23.08	23.09	0	21.66	22.17	22.24	1
	1	49	23.09	22.87	22.93	0	20.77	21.86	22.13	1
	25	0	22.08	22.03	21.98	1	21.17	20.87	20.98	2
	25	12	22.08	21.96	21.97	1	21.05	20.87	20.95	2
	25	25	22.03	22.08	22.07	1	21.02	20.9	20.89	2
	50	0	22.13	21.99	21.89	1	20.99	20.95	20.76	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.02	22.83	22.81	0	21.62	21.89	21.51	1
	1	37	23.28	23.22	23.02	0	21.61	22.2	21.39	1
	1	74	22.8	22.84	22.69	0	21.13	21.67	21.58	1
	36	0	22.22	21.94	21.76	1	20.96	20.75	20.72	2
	36	19	22.01	21.98	21.85	1	20.86	20.86	20.74	2
	36	39	22.12	22.03	21.89	1	20.9	20.9	20.8	2
	75	0	22.1	21.99	21.86	1	20.91	20.96	20.83	2

LTE Band / BW	RB Size RBs	RB Offset 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	23.18	22.59	22.82	0	21.82	21.32	21.89	1
	1	50	23.42	23.0	23.13	0	22.48	21.96	22.25	1
	1	99	22.74	22.61	22.86	0	21.97	21.31	21.89	1
	50	0	22.1	21.84	21.94	1	20.94	20.86	20.87	2
	50	25	22.14	21.98	21.87	1	20.93	20.94	20.8	2
	50	50	22.11	22.02	21.93	1	20.8	20.82	20.73	2
	100	0	22.1	21.88	21.94	1	20.94	20.95	20.76	2

4. TEST EQUIPMENT

Dasy52 near field scanning systems, manufactured by SPEAG were 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 1 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
DAE	DAE4	705	04.2019
Probe	EX3DV4	3892	04.2019
Dipole	D750V3	DIP 0G750-454	03.2018
Dipole	D835V2	DIP 0G835-473	12.2018
Dipole	D1800V2	2D075	06.2017
Dipole	D1900V2	5D004	06.2017
DASY5 Software	52.8.8.1258	-	NA
Communication tester	Anritsu MT8820C	6200951734	11.2018
Communication tester	Anritsu MT8820C	6200930942	10.2019
Signal generator	R&S SMIQ 06B	1125.5555.06	NA

Amplifier	AR	10S1G4A	NA
Power Sensor	NRP-Z11	100265	12.2018
Power Reflection Meter	NRT	835065/049	02.2019
Directional Power Sensor	NRT-Z44	835374/021	02.2019

Dipole calibration period supporting data:

		Measured on 08/2019			Calibrated		
Dipole and serial number	**Frequency (MHz)**	**Return loss (dB)**	**Impedance (Ω)**		**Return loss (dB)**	**Impedance (Ω)**	
DIP 0G750-454 42/17	750	-22.42	56.05	-5.29	-27.8	52.5	-3.3
DIP 0G835-473 51/18	835	-28.88	49.34	3.52	-30.0	51.7	2.6
D1800V2 2D075	1800	-29.51	46.78	-0.30	-25.4	46.0	3.3
D1900V2 5D004	1900	-26.52	45.93	1.99	-29.9	48.5	-2.7

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 Tip diameter: 2.5 mm Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The Triple Modular Phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. It is used for compliance testing of small wireless devices in body-worn configurations. The phantom conforms to the requirements of IEEE 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 IEEE 1528 and FCC published RF Exposure KDB Procedures. The dielectric parameters of the used tissue simulants were within ±10% of the recommended values in all frequencies used. A liquid compensation algorithm was used in DASY5 with which measured peak average SAR values were corrected for the deviation of used liquid. Depth of the tissue simulant was at least 15.0 cm from the inner surface of the flat phantom.

Head 600-3000 MHz tissue simulant liquid Ingredients
Deionized Water, tween, salt

4.4 System Validation Status

Frequency [MHz]	Dipole Type / SN	Probe Type / SN	Calibrated Signal Type	DAE Unit / SN	Dielectric Constant [ε] Head tissue simulant	Conductivity σ [S/m] Head tissue simulant	Validation Done
							Head tissue simulant
750	D750V3 - SN: 42/17	EX3DV4 - SN: 3892	CW	DAE 4 / 705	40.84	0.93	05.2019
835	D835V2 - SN: 455	EX3DV4 - SN: 3892	CW/GMSK	DAE 4 / 705	42.29	0.98	05.2019
1800	D1800V2 - SN: 2D075	EX3DV4 - SN: 3892	CW	DAE 4 / 705	40.29	1.46	05.2019
1900	D1900V2 - SN: 5D004	EX3DV4 - SN: 3892	CW/GMSK	DAE 4 / 705	40.10	1.50	05.2019

4.5 System Check

Date	Tissue Type	Tissue Temp. [°C]	Frequency [MHz]	Input Power [mW]	Measured SAR1g [W/kg]	1 W Target SAR1g [W/kg]	1 W Normalized SAR1g [W/kg]	Deviation 1g [%]	Plot #
23.10.2019	WB HEAD	22±2	1900	250mW	9.24	39.74	36.96	-7.0	1
23.10.2019	WB HEAD	22±2	1800	250mW	9.18	38.01	36.72	-3.4	2
24.10.2019	WB HEAD	22±2	835	250mW	2.3	9.63	9.2	-4.5	3
24.10.2019	WB HEAD	22±2	1800	250mW	9.18	38.01	36.72	-3.4	4
29.10.2019	WB HEAD	22±2	835	250mW	2.18	9.63	8.72	-9.5	5
30.10.2019	WB HEAD	22±2	750	250mW	1.97	8.52	7.88	-7.5	6

4.5.1 Tissue Simulant Verification

				Target		Measured		Deviation	
Date	Tissue Type	Tissue Temp [°C]	Frequency [MHz]	Dielectric Constant [ε]	Conductivity. σ [S/m]	Dielectric Constant [ε]	Conductivity σ [S/m]	ε (%)	σ (%)
23.10.2019	**WB Head**	22	1712.4	40.1	1.35	39.3	1.25	-2.1	-7.4
23.10.2019	**WB Head**	22	1732.6	40.1	1.36	39.3	1.26	-2.0	-7.4
23.10.2019	**WB Head**	22	1752.6	40.1	1.37	39.3	1.27	-2.0	-7.4
23.10.2019	**WB Head**	22	1800	40.0	1.40	39.2	1.30	-2.1	-7.4
23.10.2019	**WB Head**	22	1852.5	40.0	1.40	39.1	1.32	-2.4	-5.4
23.10.2019	**WB Head**	22	1860	40.0	1.40	39.0	1.33	-2.6	-4.7
23.10.2019	**WB Head**	22	1880	40.0	1.40	38.9	1.34	-2.7	-4.1
23.10.2019	**WB Head**	22	1900	40.0	1.40	38.9	1.35	-2.7	-3.9
23.10.2019	**WB Head**	22	1907.6	40.0	1.40	38.9	1.35	-2.7	-3.3
24.10.2019	**WB Head**	22	829	41.5	0.90	41.7	0.88	0.5	-2.4
24.10.2019	**WB Head**	22	835	41.5	0.90	41.7	0.88	0.5	-2.2
24.10.2019	**WB Head**	22	836.5	41.5	0.90	41.7	0.88	0.5	-2.3
24.10.2019	**WB Head**	22	844	41.5	0.91	41.7	0.88	0.4	-2.9
24.10.2019	**WB Head**	22	1720	40.1	1.35	39.3	1.26	-2.1	-7.0
24.10.2019	**WB Head**	22	1732.5	40.1	1.37	39.2	1.27	-2.1	-7.0
24.10.2019	**WB Head**	22	1745	40.0	1.38	39.2	1.28	-2.1	-7.1
24.10.2019	**WB Head**	22	1770	40.0	1.40	39.2	1.30	-2.1	-7.0
24.10.2019	**WB Head**	22	1800	41.7	0.90	41.9	0.87	0.5	-3.5
29.10.2019	**WB Head**	22	826.4	41.5	0.90	41.5	0.85	-0.2	-5.6
29.10.2019	**WB Head**	22	835	41.5	0.90	41.4	0.85	-0.1	-5.3
29.10.2019	**WB Head**	22	836.6	41.5	0.90	41.4	0.85	-0.2	-5.4
29.10.2019	**WB Head**	22	846.6	41.5	0.91	41.4	0.86	-0.3	-6.1
30.10.2019	**WB Head**	22	673	42.3	0.89	41.9	0.84	-1.1	-5.7
30.10.2019	**WB Head**	22	680.5	42.3	0.89	41.8	0.84	-1.1	-5.6
30.10.2019	**WB Head**	22	688	42.3	0.89	41.8	0.84	-1.1	-5.3
30.10.2019	**WB Head**	22	704	42.2	0.89	41.7	0.85	-1.2	-4.8
30.10.2019	**WB Head**	22	707.5	42.2	0.89	41.6	0.85	-1.2	-4.7
30.10.2019	**WB Head**	22	711	42.1	0.89	41.6	0.85	-1.3	-4.5
30.10.2019	**WB Head**	22	750	41.9	0.89	41.4	0.86	-1.3	-3.4
30.10.2019	**WB Head**	22	779.5	41.8	0.90	41.3	0.87	-1.2	-2.5
30.10.2019	**WB Head**	22	782	41.8	0.90	41.3	0.87	-1.2	-2.4
30.10.2019	**WB Head**	22	784.5	41.8	0.90	41.2	0.87	-1.2	-2.3
30.10.2019	**WB Head**	22	790.5	41.7	0.90	41.2	0.88	-1.3	-2.1
30.10.2019	**WB Head**	22	793	41.7	0.90	41.2	0.88	-1.3	-2.0
30.10.2019	**WB Head**	22	795.5	41.7	0.90	41.2	0.88	-1.3	-1.9

5. TEST PROCEDURE

Testing was carried out in accordance with FCC KDB Publication 447498 D01 and RSS-102. KDB 941225 D05 was used to select LTE test modes for testing. Low, mid and high frequency channels for the configuration with the highest SAR value were tested as per ISED notice 2016-DRS001.

5.1 Test Positions

Appendix A presents photos of the test positions.

5.1.1 Front-of-Face Configuration

Measurements were made with 25mm separation between the flat phantom and the device, device front side facing the phantom.

5.1.2 Body-worn, 0mm separation distance

The device was placed in the SPEAG holder and placed below the flat phantom, back side of the device and the clip in contact with flat phantom.

5.2 Scan Procedures

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

5.3 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

Uncertainty Budget
IEEE 1528-2013

Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.0 %	N	1	1	1	±6.0 %	±6.0 %	∞
Axial Isotropy	±4.7 %	R		0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	1.73	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	1.73	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	1.73	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	1.73	1	1	±0.6 %	±0.6 %	∞
Modulation Response^m	±2.4 %	R	1.73	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	1.73	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	1.73	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	1.73	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	1.73	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	1.73	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	1.73	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±2.0 %	R	1.73	1	1	±1.2 %	±1.2 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	1.73	1	1	±2.9 %	±2.9 %	∞
Power Scaling	±6 %	R	1.73	1	1	±3.5 %	± 3.5%	∞
Phantom and Setup								
Phantom Uncertainty	±6.1 %	R	1.73	1	1	±3.5 %	±3.5 %	∞
SAR correction	±1.9 %	R	1.73	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.)	±2.5 %	R	1.73	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.)	±2.5 %	R	1.73	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity	±3.4 %	R	1.73	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity	±0.4 %	R	1.73	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±11.7 %	±11.6 %	361
Expanded STD Uncertainty						**±23.4 %**	**±23.3 %**	

7. TEST RESULTS

7.1 SAR Results for Front-of -Face Exposure, 25 mm separation distance and Body-worn Condition, 0 mm separation distance

Tested device is push-to talk, PTT, device hence the duty factor of 0.5 is applied.

Band	Channel	Freq [MHz]	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Duty Cycle	Measured SAR_{10g} [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR_{1g} [mW/g]	Plot #
WCDMA II	9400	1880	25	23.25	Front	1:1	0.117	-0.26*	1.59	50	0.09	7
WCDMA II	9400	1880	25	23.25	Back	1:1	0.76	0.14	1.50	50	0.57	8
WCDMA II	9262	1852.5	25	23.1	Back	1:1	0.708	0.06	1.55	50	0.55	
WCDMA II	9538	1907.6	25	23.49	Back	1:1	0.777	0.06	1.42	50	0.55	

*Larger than 5% drifts included to scaling factor

Band	Channel	Freq [MHz]	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Duty Cycle	Measured SAR_{10g} [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR_{1g} [mW/g]	Plot #
WCDMA IV	1412	1732.6	25	23.0	Front	1:1	0.062	-0.21	1.58	50	0.05	9
WCDMA IV	1412	1732.6	25	23.0	Back	1:1	0.549	-0.04	1.58	50	0.44	
WCDMA IV	1312	1712.4	25	22.78	Back	1:1	0.465	-0.05	1.67	50	0.39	
WCDMA IV	1512	1752.6	25	23.05	Back	1:1	0.586	0.04	1.57	50	0.46	10

Band	Channel	Freq [MHz]	Maximum Power [dBm]	Conducted Power [dBm]	Test position	Duty Cycle	Measured SAR_{10g} [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR_{1g} [mW/g]	Plot #
WCDMA V	4183	836.6	25	23.06	Front	1:1	0.086	0.11	1.56	50	0.07	11
WCDMA V	4183	836.6	25	23.06	Back	1:1	0.294	-0.09	1.56	50	0.23	
WCDMA V	4132	826.4	25	23.02	Back	1:1	0.315	0.0	1.58	50	0.25	12
WCDMA V	4233	846.6	25	22.85	Back	1:1	0.27	-0.12	1.64	50	0.22	

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 2	18900	1880	QPSK/20	1	50	25	23.34	Front	1:1	0.109	-0.40*	1.61	50	0.09	
LTE 2	19100	1900	QPSK/20	50	25	25	22.29	Front	1:1	0.0924	-0.48*	2.08	50	0.10	13
LTE 2	18900	1880	QPSK/20	1	50	25	23.34	Back	1:1	0.685	-0.35*	1.59	50	0.54	14
LTE 2	19100	1900	QPSK/20	50	25	25	22.29	Back	1:1	0.506	-0.4	2.05	50	0.52	
LTE 2	18700	1860	QPSK/20	1	50	25	23.22	Back	1:1	0.631	-0.10	1.51	50	0.48	

LTE 2	19100	1900	QPSK/20	1	50	25	23.29	Back	1:1	0.628	0.02	1.48	50	0.47	

*Larger than 5% drifts included to scaling factor

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 4	20300	1745	QPSK/20	1	50	25	23.34	Front	1:1	0.067	-0.09	1.47	50	0.05	15
LTE 4	20300	1745	QPSK/20	50	25	25	22.3	Front	1:1	0.052	-0.27*	1.98	50	0.05	
LTE 4	20300	1745	QPSK/20	1	50	25	23.34	Back	1:1	0.533	0.15	1.47	50	0.39	16
LTE 4	20300	1745	QPSK/20	50	25	25	22.3	Back	1:1	0.417	0.08	1.86	50	0.39	
LTE 4	20050	1720	QPSK/20	1	50	25	23.14	Back	1:1	0.444	-0.16	1.53	50	0.34	
LTE 4	20175	1732.5	QPSK/20	1	50	25	23.24	Back	1:1	0.493	0.11	1.50	50	0.37	

*Larger than 5% drifts included to scaling factor

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 5	20450	829	QPSK/10	1	24	25	24.1	Front	1:1	0.094	-0.05	1.23	50	0.06	17
LTE 5	20525	836.5	QPSK/10	25	12	25	22.76	Front	1:1	0.070	-0.12	1.67	50	0.06	
LTE 5	20450	829	QPSK/10	1	24	25	24.1	Back	1:1	0.318	-0.11	1.23	50	0.20	
LTE 5	20525	836.5	QPSK/10	25	12	25	22.76	Back	1:1	0.249	-0.08	1.67	50	0.21	
LTE 5	20525	836.5	QPSK/10	1	49	25	23.64	Back	1:1	0.302	-0.16	1.37	50	0.21	18
LTE 5	20600	844	QPSK/10	1	49	25	23.95	Back	1:1	0.258	-0.44*	1.41	50	0.18	

*Larger than 5% drifts included to scaling factor

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 12	23130	711.0	QPSK/10	1	24	25	23.46	Front	1:1	0.070	-0.32*	1.43	50	0.05	19
LTE 12	23130	711.0	QPSK/10	25	25	25	22.42	Front	1:1	0.052	-0.14	1.81	50	0.05	
LTE 12	23130	711.0	QPSK/10	1	24	25	23.46	Back	1:1	0.284	-0.03	1.43	50	0.20	
LTE 12	23130	711.0	QPSK/10	25	25	25	22.42	Back	1:1	0.214	-0.43*	2.00	50	0.21	
LTE 12	23060	704	QPSK/10	1	0	25	23.16	Back	1:1	0.269	-0.24*	1.61	50	0.22	
LTE 12	23095	707.5	QPSK/10	1	24	25	23.31	Back	1:1	0.296	-0.08	1.48	50	0.22	20

*Larger than 5% drifts included to scaling factor

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 13	23230	782.0	QPSK/10	1	24	25	23.7	Front	1:1	0.079	0.25*	1.43	50	0.06	21
LTE 13	23230	782.0	QPSK/10	25	25	25	22.75	Front	1:1	0.061	-0.08	1.68	50	0.05	
LTE 13	23230	782.0	QPSK/10	1	24	25	23.7	Back	1:1	0.318	-0.08	1.35	50	0.21	
LTE 13	23230	782.0	QPSK/10	25	25	25	22.75	Back	1:1	0.251	-0.04	1.68	50	0.21	
LTE 13	23205	779.5	QPSK/5	1	12	25	23.87	Back	1:1	0.331	0.23*	1.37	50	0.23	22
LTE 13	23255	784.5	QPSK/5	1	12	25	23.72	Back	1:1	0.328	0.26*	1.43	50	0.23	

*Larger than 5% drifts included to scaling factor

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 14	23330	793	QPSK/10	1	49	25	23.86	Front	1:1	0.085	-0.17	1.30	50	0.06	23
LTE 14	23330	793	QPSK/10	25	0	25	22.64	Front	1:1	0.065	-0.18	1.72	50	0.06	
LTE 14	23330	793	QPSK/10	1	49	25	23.86	Back	1:1	0.321	-0.07	1.30	50	0.21	
LTE 14	23330	793	QPSK/10	25	0	25	22.64	Back	1:1	0.244	-0.21	1.72	50	0.21	
LTE 14	23305	790.5	QPSK/5	1	12	25	23.63	Back	1:1	0.334	0.08	1.37	50	0.23	24
LTE 14	23355	795.5	QPSK/5	1	0	25	23.86	Back	1:1	0.32	-0.07	1.30	50	0.21	

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 66	132322	1745	QPSK/20	1	50	25	23.58	Front	1:1	0.0756	-0.15	1.39	50	0.05	25
LTE 66	132322	1745	QPSK/20	50	25	25	22.53	Front	1:1	0.0593	-0.18	1.77	50	0.05	
LTE 66	132322	1745	QPSK/20	1	50	25	23.58	Back	1:1	0.606	0.28*	1.48	50	0.45	
LTE 66	132322	1745	QPSK/20	50	25	25	22.53	Back	1:1	0.469	0.16	1.77	50	0.41	
LTE 66	132072	1720	QPSK/20	1	50	25	23.26	Back	1:1	0.482	0.14	1.49	50	0.36	
LTE 66	132572	1770	QPSK/20	1	50	25	23.35	Back	1:1	0.681	0.07	1.46	50	0.50	26

*Larger than 5% drifts included to scaling factor

Band	Channel	Frequency [MHz]	Modulation/ BW [MHz]	RB Size	RB Offset	Maximum Power [dBm]	Conducted Power [dBm]	Test Position	Duty Cycle	Measured SAR1g [mW/g]	Power Drift [dB]	Scaling Factor	Normal Duty Cycle [%]	Reported SAR 1g [mW/g]	Plot #
LTE 71	1333222	673.0	QPDK/20	1	50	25	23.42	Front	1:1	0.058	0.19	1.44	50	0.04	
LTE 71	1333222	673.0	QPDK/20	50	25	25	22.14	Front	1:1	0.045	-0.43	2.13*	50	0.05	27
LTE 71	1333222	673.0	QPDK/20	1	50	25	23.42	Back	1:1	0.282	-0.13	1.44	50	0.20	
LTE 71	1333222	673.0	QPDK/20	50	25	25	22.14	Back	1:1	0.223	-0.17	1.93	50	0.22	
LTE 71	133297	680.5	QPDK/20	1	50	25	23.0	Back	1:1	0.307	0.11	1.58	50	0.24	
LTE 71	133372	688.0	QPDK/20	1	50	25	23.13	Back	1:1	0.312	-0.20	1.54	50	0.24	28

*Larger than 5% drifts included to scaling factor

The pictures of the test positions are presented in appendix A.

7.2 Simultaneous Transmission Analysis

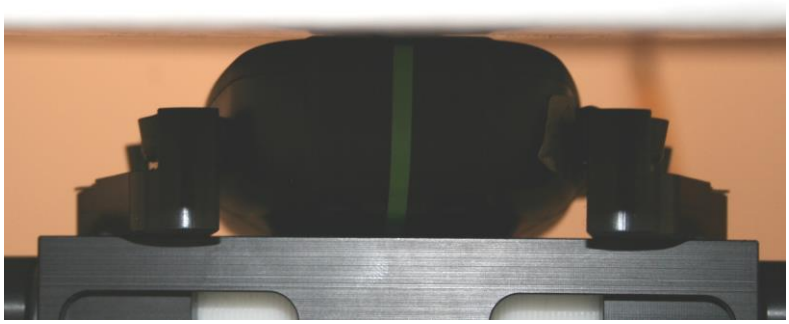
Simultaneous transmission analysis for maximum cellular SAR and maximum ISM SAR is in a table below. Direct summation of SAR results was performed.

	Exposure Condition	Body SAR_{1g} [mW/g]	Front-of Face SAR_{1g} [mW/g]
		Back	Front
Cellular	WCDMA II	0.57	0.09
	WCDMA IV	0.46	0.05
	WCDMA V	0.25	0.07
	LTE 2	0.54	0.10
	LTE 4	0.39	0.05
	LTE 5	0.21	0.06
	LTE 12	0.22	0.05
	LTE 13	0.23	0.06
	LTE 14	0.23	0.06
	LTE 66	0.50	0.05
	LTE 71	0.24	0.04
Maximum Cellular SAR		0.57	0.10
Maximum ISM SAR		0.10	0.10
SAR Summation		0.67	0.20

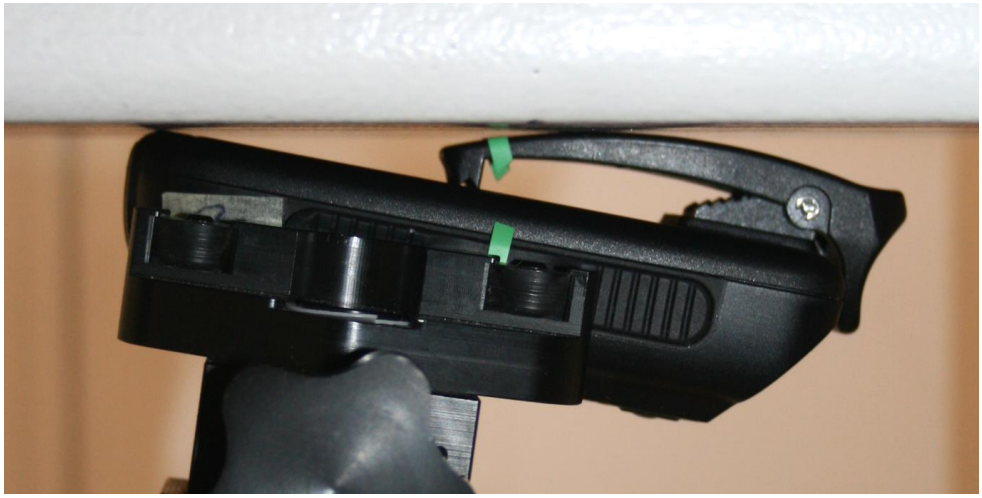
APPENDIX A: PHOTOS OF THE DUT

Size of the DUT is: 77.7 x 111.8 (124.8 with clip) x 29.7 (44.6 with clip) mm

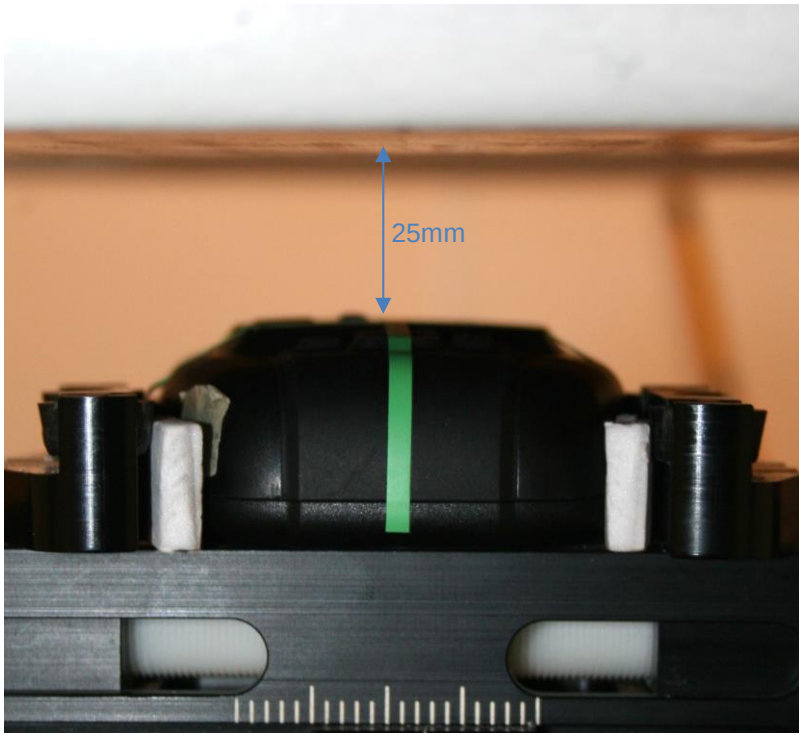
DUT front, back and side view.



Test position “Back”.DUT with back side towards the phantom with 0mm separation



Test position “Back”.DUT with back side towards the phantom with 0mm separation



Test position “Front”. DUT with front side towards the phantom with 25mm separation

Test position “Front”. DUT with front side towards the phantom with 25mm separation

APPENDIX B: SYSTEM CHECK SCAN

Plot 1

Date/Time: 23.10.2019 8:25:46

Test Laboratory: Verkotan Oy

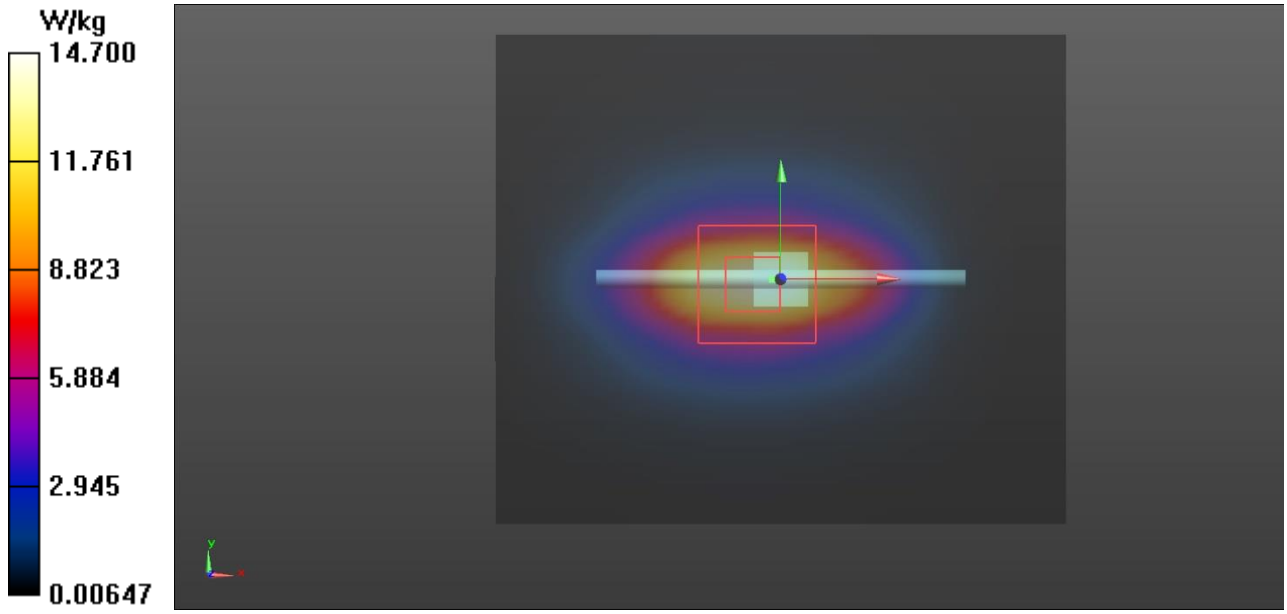
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN: 5D004

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.342 S/m; ε_r = 38.937; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.46, 8.46, 8.46); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/system check/Area Scan (71x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.7 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 106.3 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.24 W/kg; SAR(10 g) = 4.83 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 13.7 W/kg



Plot 2

Date/Time: 23.10.2019 8:49:12

Test Laboratory: Verkotan Oy

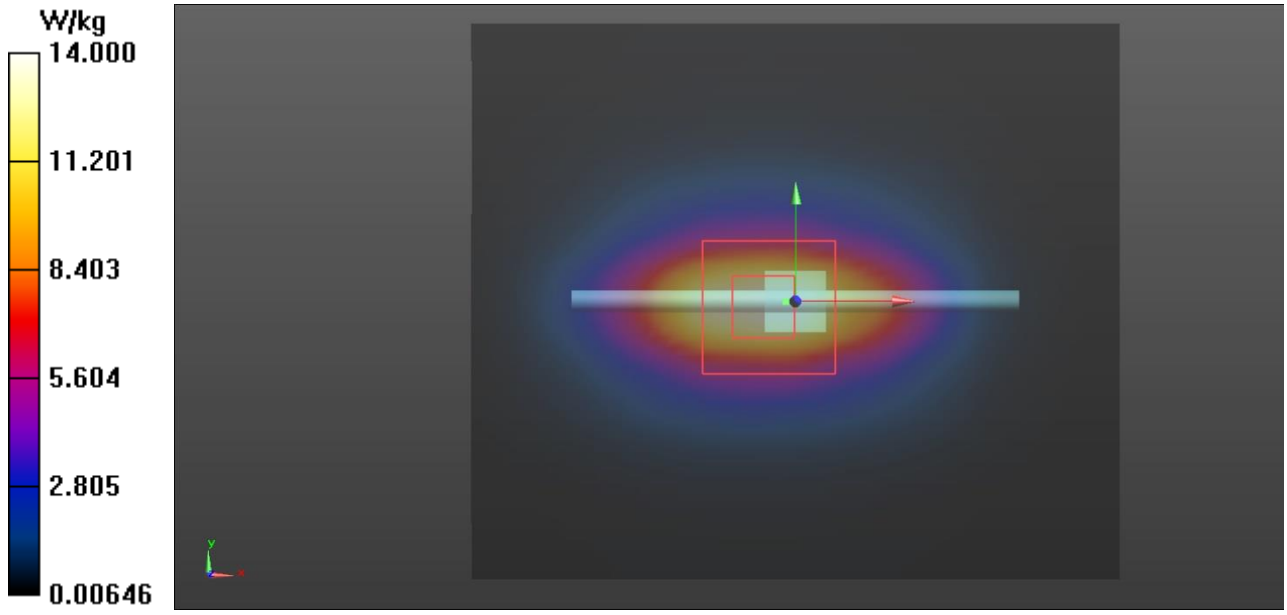
DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN: 2D075

Communication System: UID 0, CW (0); Communication System Band: D1800 (1800.0 MHz); Frequency: 1800 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1800 MHz; σ = 1.296 S/m; ε_r = 39.161; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/system check/Area Scan (71x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.0 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 104.6 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.18 W/kg; SAR(10 g) = 4.8 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 13.3 W/kg



Plot 3

Date/Time: 24.10.2019 8:12:36

Test Laboratory: Verkotan Oy

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN: 473

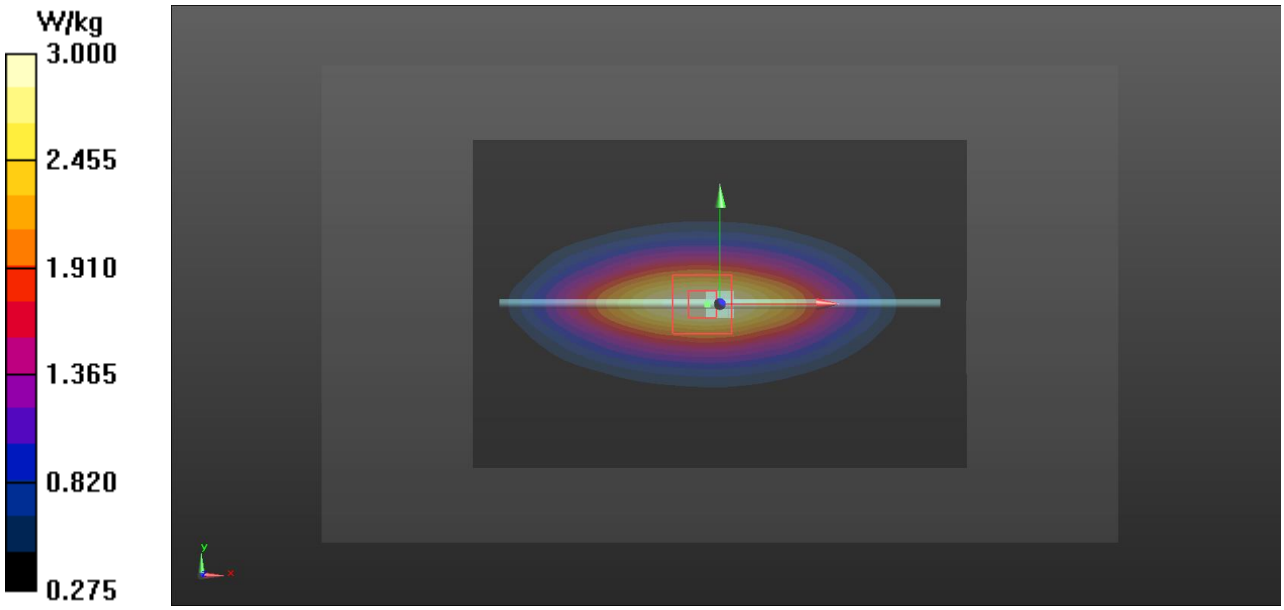
Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 835 MHz; σ = 0.88 S/m; ε_r = 41.716; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/system check/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.03 W/kg

Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 62.34 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 3.34 W/kg
SAR(1 g) = 2.3 W/kg; SAR(10 g) = 1.51 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 3.00 W/kg



Date/Time: 28.10.2019 9:45:50

Date/Time: 24.10.2019 7:43:38

Test Laboratory: Verkotan Oy

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN: 2D075

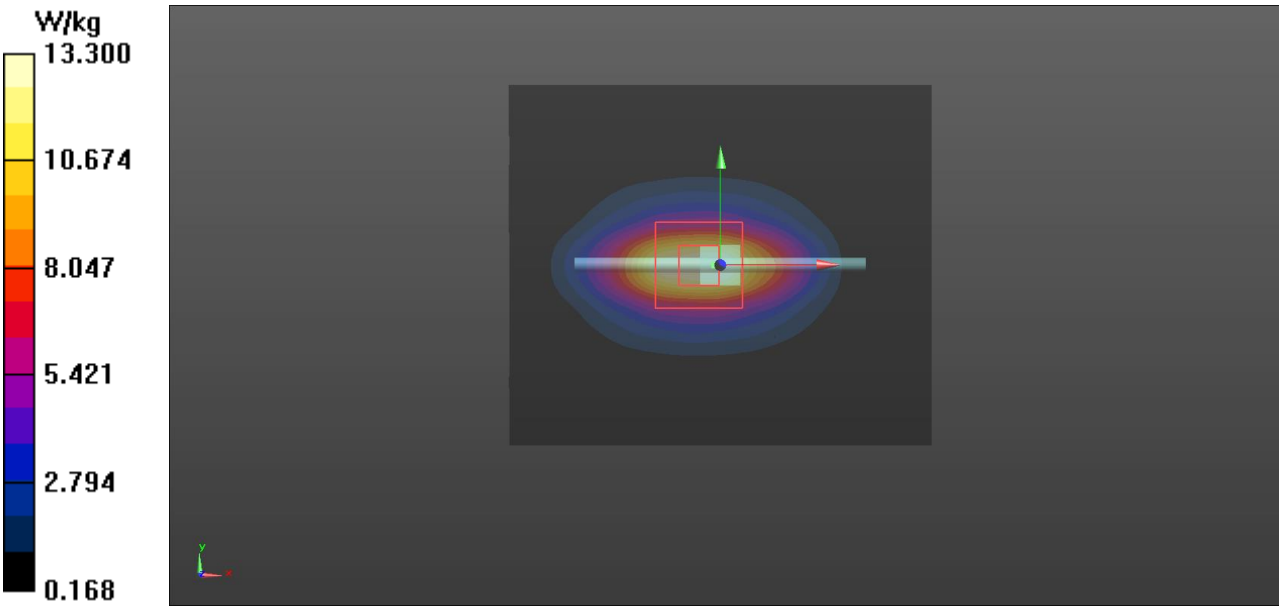
Communication System: UID 0, CW (0); Communication System Band: D1800 (1800.0 MHz); Frequency: 1800 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1800 MHz; σ = 1.302 S/m; ε_r = 39.16; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/system check/Area Scan (71x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.8 W/kg

Configuration/system check/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 104.2 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.18 W/kg; SAR(10 g) = 4.81 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 13.3 W/kg



Date/Time: 29.10.2019 10:12:56

Test Laboratory: Verkotan Oy

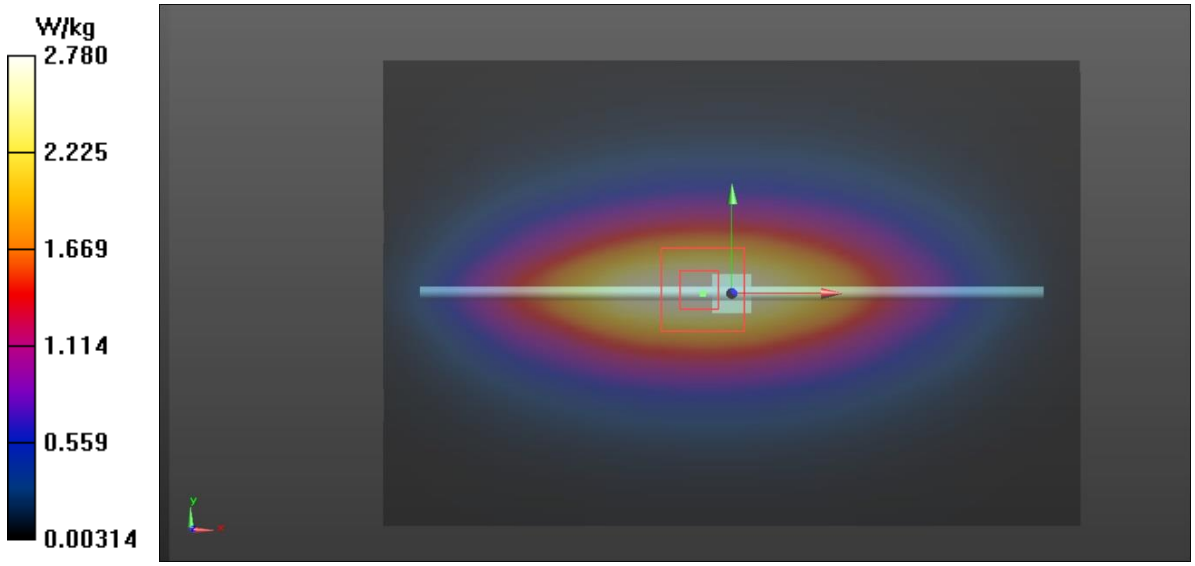
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN: 473

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 835 MHz; σ = 0.852 S/m; ε_r = 41.438; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/system check/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.78 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 61.36 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 3.11 W/kg
SAR(1 g) = 2.18 W/kg; SAR(10 g) = 1.41 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 2.79 W/kg



Plot 6

Date/Time: 30.10.2019 11:36:04

Test Laboratory: Verkotan Oy

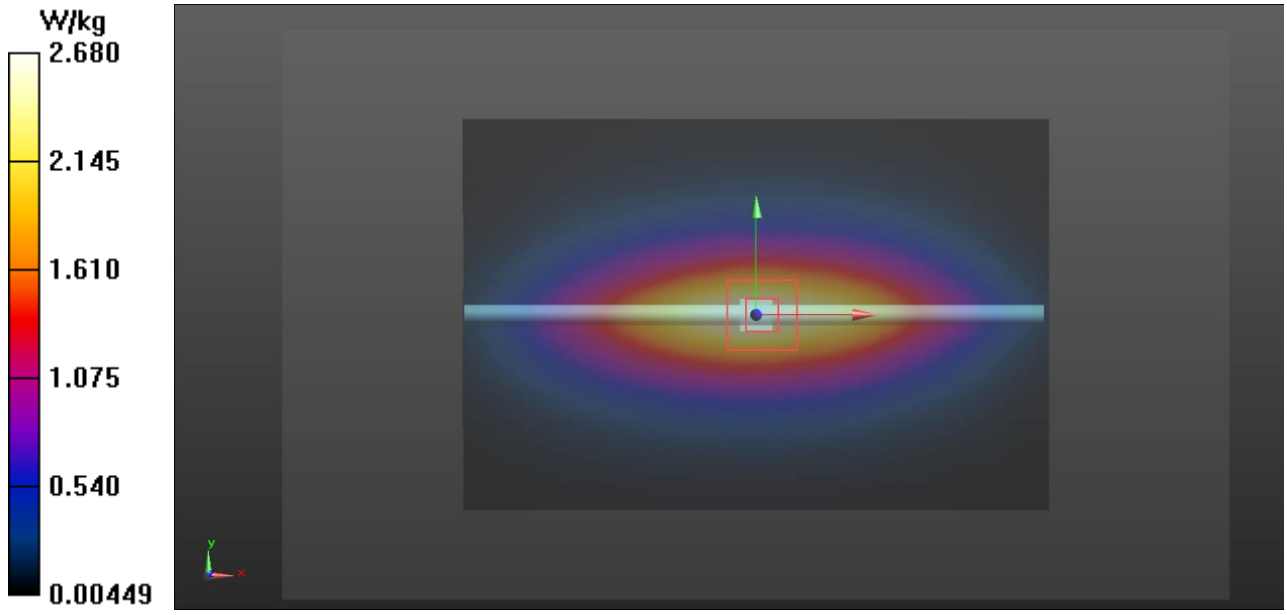
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN: 454

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 835 MHz; σ = 0.895 S/m; ε_r = 40.946; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/system check/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.68 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 57.93 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 2.93 W/kg
SAR(1 g) = 1.97 W/kg; SAR(10 g) = 1.29 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 2.64 W/kg



APPENDIX C: MEASUREMENT SCAN

Plot 7

Date/Time: 23.10.2019 23:53:54

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

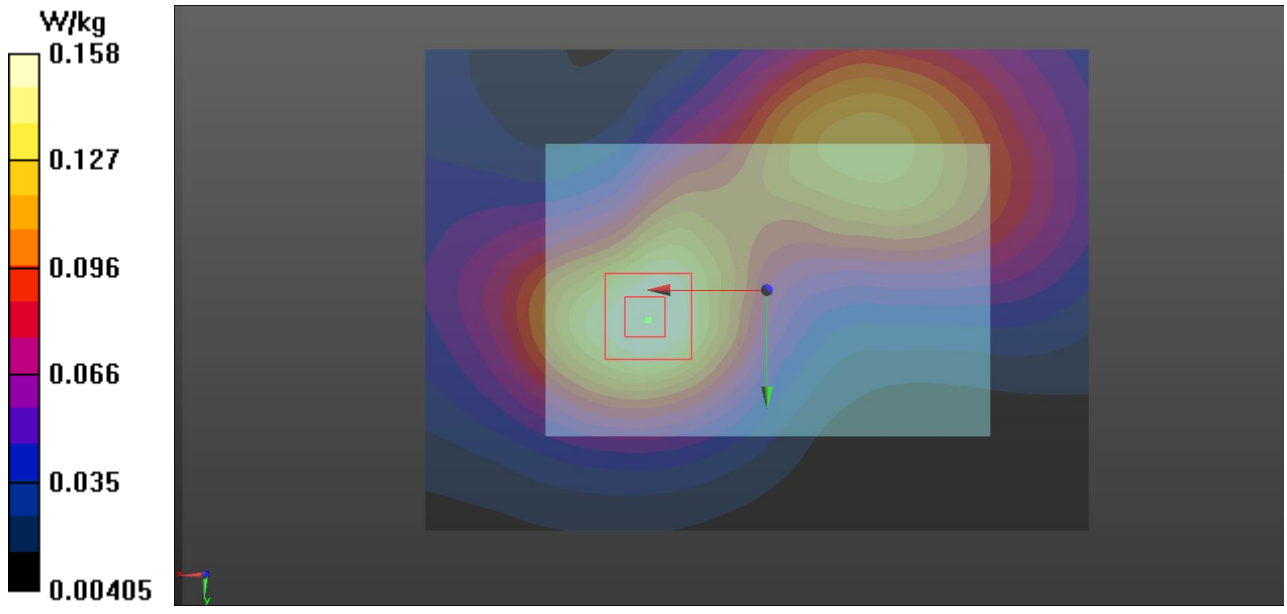
Communication System: UID 0, WCDMA (0); Communication System Band: Band 2; Frequency: 1880 MHz;Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 1880 MHz; σ = 1.335 S/m; ε_r = 38.978; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.46, 8.46, 8.46); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

WCDMA 2 front/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.165 W/kg

WCDMA 2 front/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 8.117 V/m; Power Drift = -0.26 dB
Peak SAR (extrapolated) = 0.181 W/kg
SAR(1 g) = 0.117 W/kg; SAR(10 g) = 0.073 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.158 W/kg



Plot 8

Date/Time: 23.10.2019 19:09:39

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

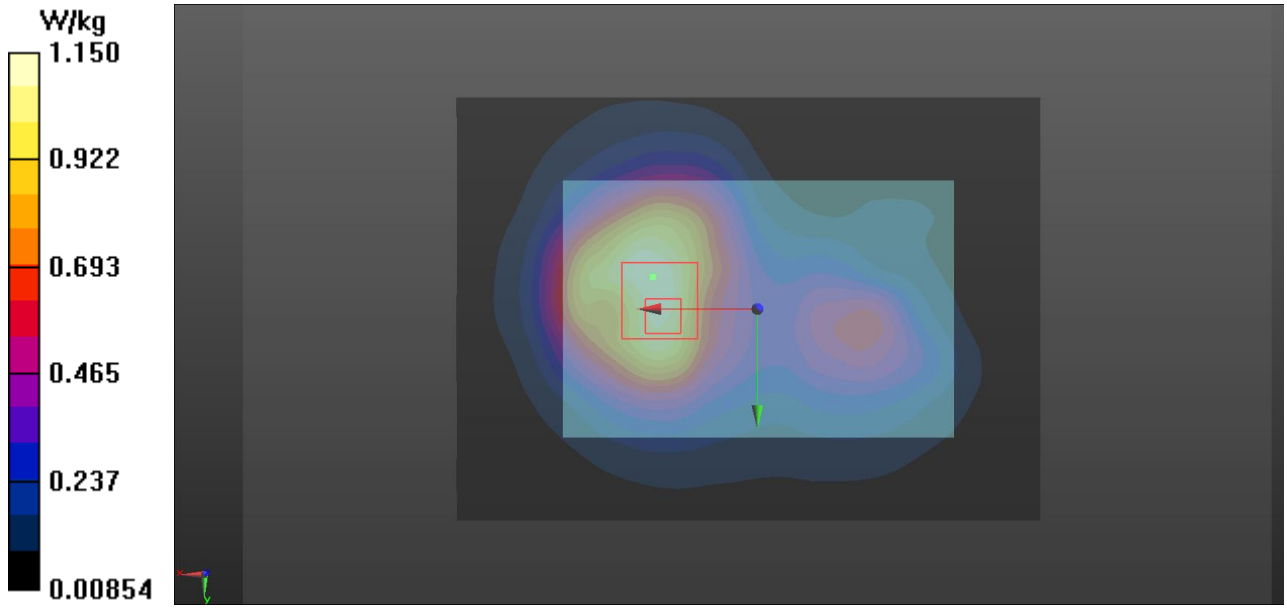
Communication System: UID 0, WCDMA (0); Communication System Band: Band 2; Frequency: 1880 MHz;Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 1880 MHz; σ = 1.335 S/m; ε_r = 38.978; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.46, 8.46, 8.46); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

WCDMA 2 0mm back/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.60 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.760 W/kg; SAR(10 g) = 0.469 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.01 W/kg

WCDMA 2 0mm back/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.15 W/kg



Plot 9

Date/Time: 24.10.2019 0:13:59

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

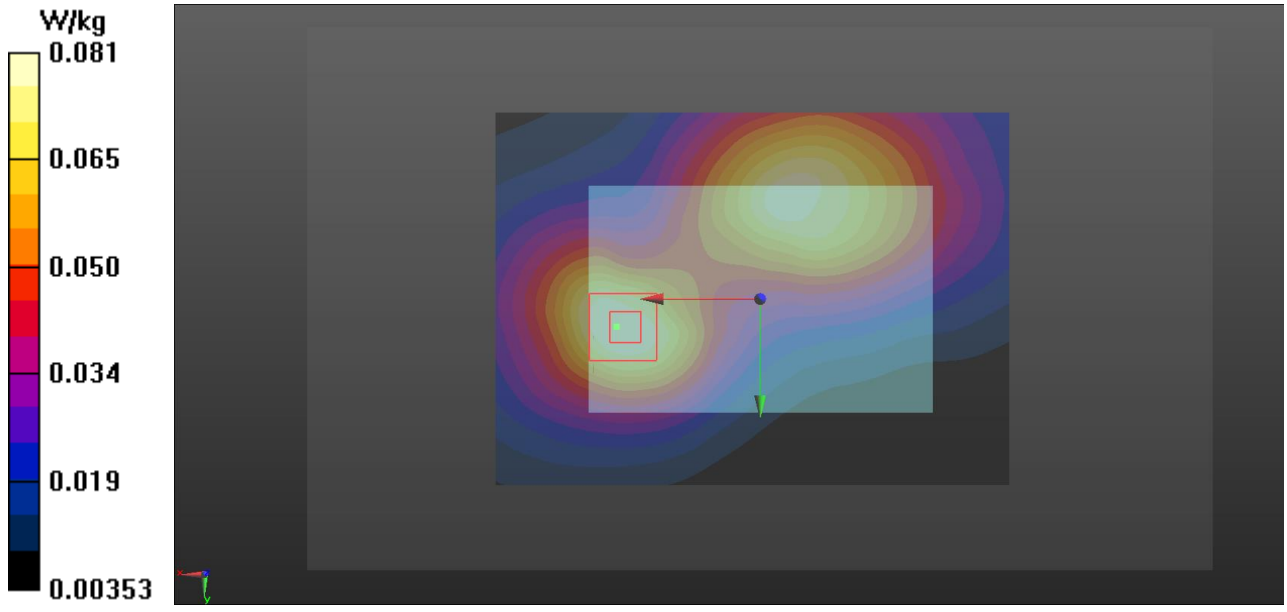
Communication System: UID 0, WCDMA (0); Communication System Band: Band 4; Frequency: 1732.6 MHz;Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 1733 MHz; σ = 1.261 S/m; ε_r = 39.272; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

WCDMA 4 front/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0835 W/kg

WCDMA 4 front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.694 V/m; Power Drift = -0.21 dB
Peak SAR (extrapolated) = 0.0930 W/kg
SAR(1 g) = 0.062 W/kg; SAR(10 g) = 0.039 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0806 W/kg



Plot 10

Date/Time: 23.10.2019 20:46:40

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

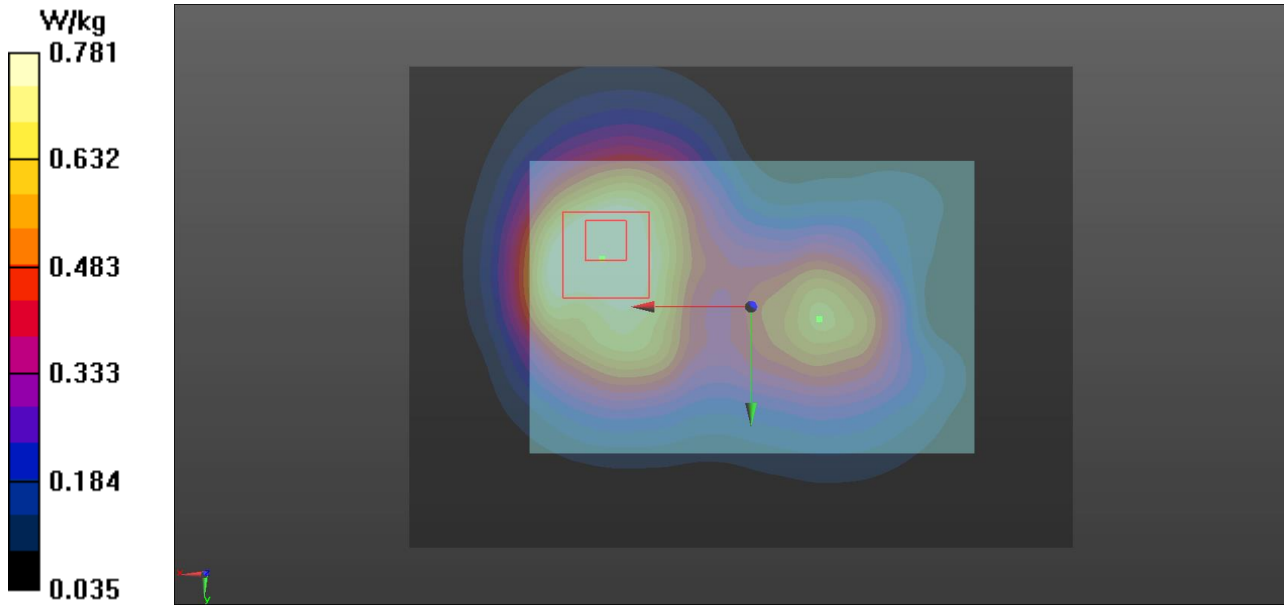
Communication System: UID 0, WCDMA (0); Communication System Band: Band 4; Frequency: 1752.6 MHz;Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 1753 MHz; σ = 1.271 S/m; ε_r = 39.265; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

WCDMA 4 0mm back/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.892 W/kg

WCDMA 4 0mm back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.61 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.930 W/kg
SAR(1 g) = 0.586 W/kg; SAR(10 g) = 0.361 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.781 W/kg



Plot 11

Date/Time: 29.10.2019 17:12:08

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

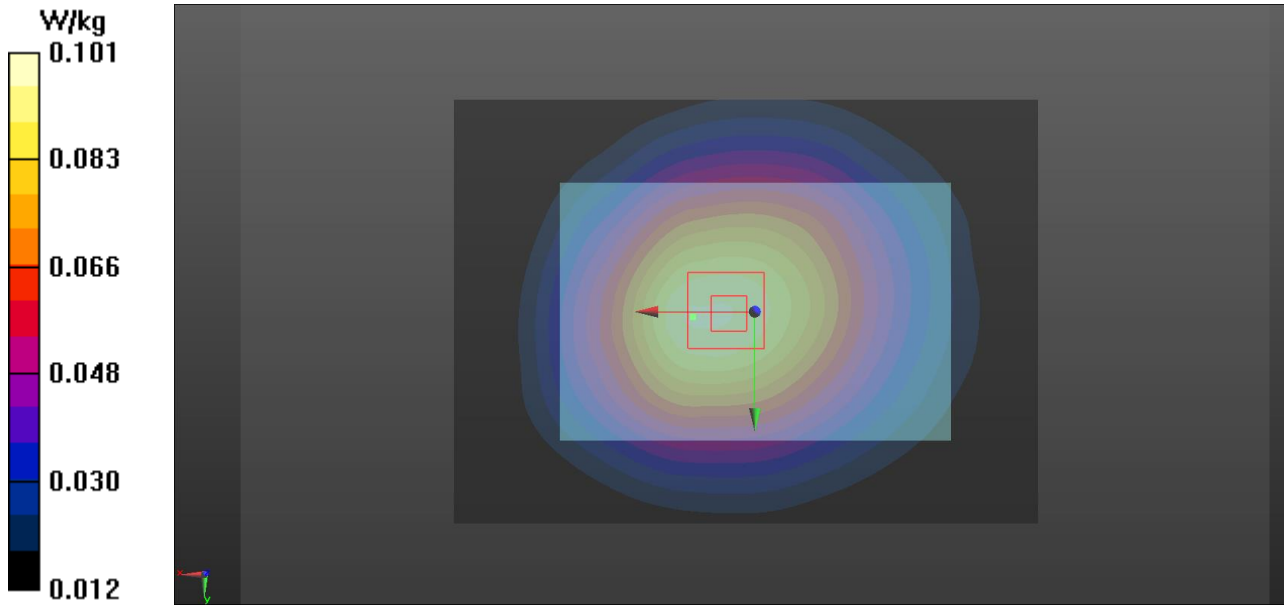
Communication System: UID 0, WCDMA (0); Communication System Band: Band 5; Frequency: 836.6 MHz;Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 837 MHz; σ = 0.853 S/m; ε_r = 41.432; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

WCDMA 5 front/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0957 W/kg

WCDMA 5 front/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.16 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.110 W/kg
SAR(1 g) = 0.086 W/kg; SAR(10 g) = 0.063 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.101 W/kg



Plot 12

Date/Time: 29.10.2019 16:24:52

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

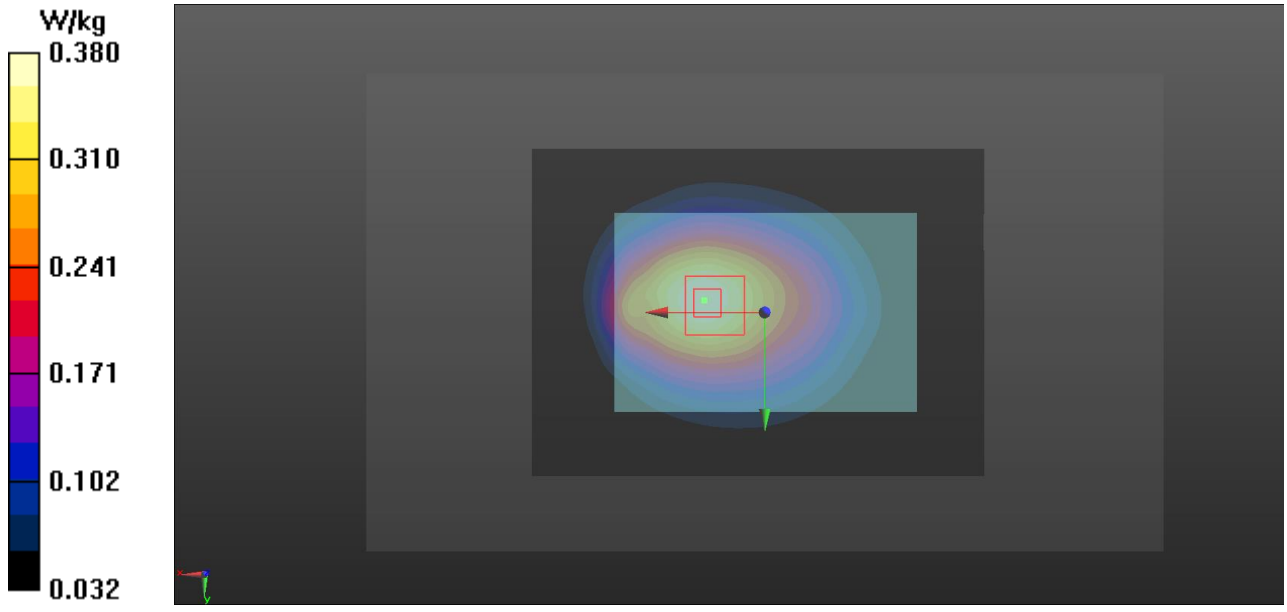
Communication System: UID 0, WCDMA (0); Communication System Band: Band 5; Frequency: 826.4 MHz;Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.849 S/m; ε_r = 41.476; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

WCDMA 5 back 2 2 3/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.385 W/kg

FCC WCDMA 5 back 2 2 3/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.06 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.414 W/kg
SAR(1 g) = 0.315 W/kg; SAR(10 g) = 0.220 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.380 W/kg



Plot 13

Date/Time: 23.10.2019 23:31:22

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

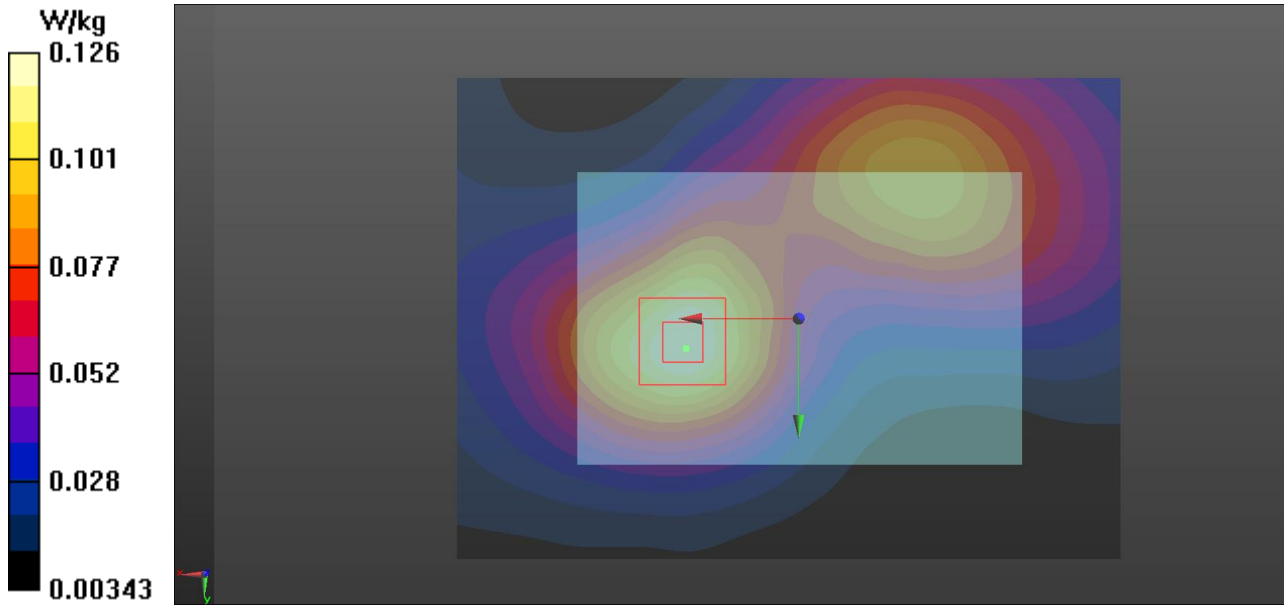
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 2, E-UTRA/FDD (1850.0 - 1910.0 MHz); Frequency: 1900 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.342 S/m; ε_r = 38.937; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.46, 8.46, 8.46); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

FCC LTE 2, front Bw20 RB50 start25/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.127 W/kg

FCC LTE 2, front Bw20 RB50 start25/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.304 V/m; Power Drift = -0.48 dB
Peak SAR (extrapolated) = 0.145 W/kg
SAR(1 g) = 0.092 W/kg; SAR(10 g) = 0.058 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.126 W/kg



Plot 14

Date/Time: 23.10.2019 13:50:02

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

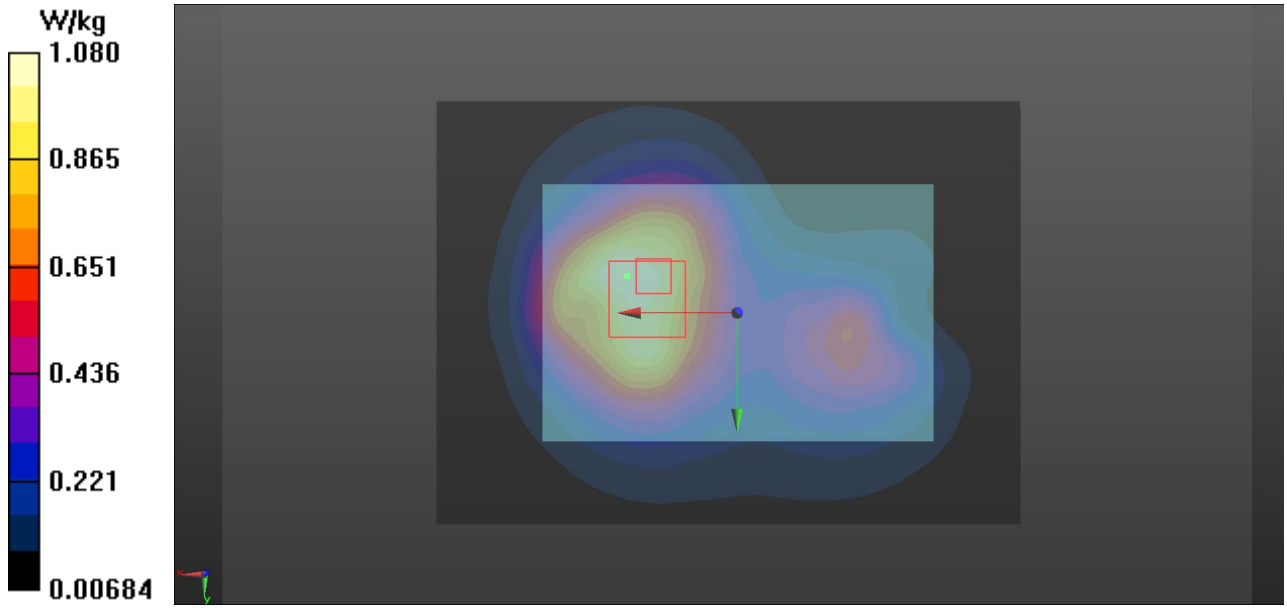
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 2, E-UTRA/FDD (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.335 S/m; ε_r = 38.978; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.46, 8.46, 8.46); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

FCC LTE 2, back Bw20 RB1 start50 0mm/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.29 V/m; Power Drift = -0.35 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.685 W/kg; SAR(10 g) = 0.424 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.956 W/kg

FCC LTE 2, back Bw20 RB1 start50 0mm/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.08 W/kg



Plot 15

Date/Time: 24.10.2019 19:56:28

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

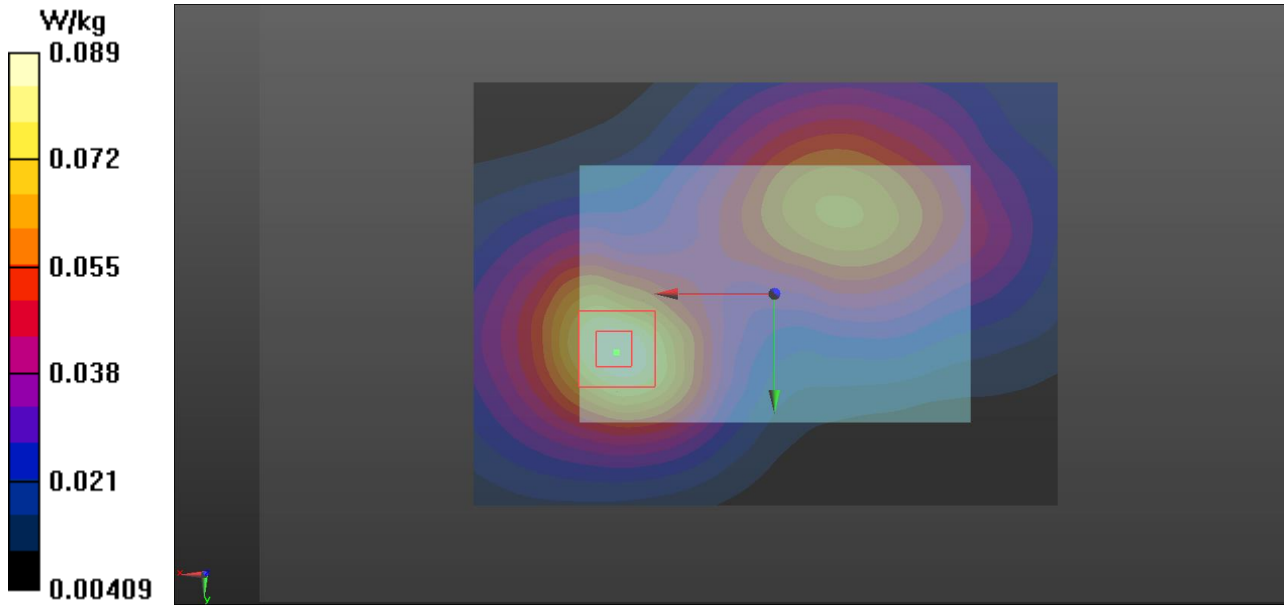
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 4, E-UTRA/FDD (1710.0 - 1755.0 MHz); Frequency: 1745 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1745 MHz; σ = 1.272 S/m; ε_r = 39.243; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 4, front Bw20 RB1 start50 0mm 3 2/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0890 W/kg

LTE 4, front Bw20 RB1 start50 0mm 3 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.768 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.102 W/kg
SAR(1 g) = 0.067 W/kg; SAR(10 g) = 0.042 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0887 W/kg



Date/Time: 24.10.2019 12:12:57

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

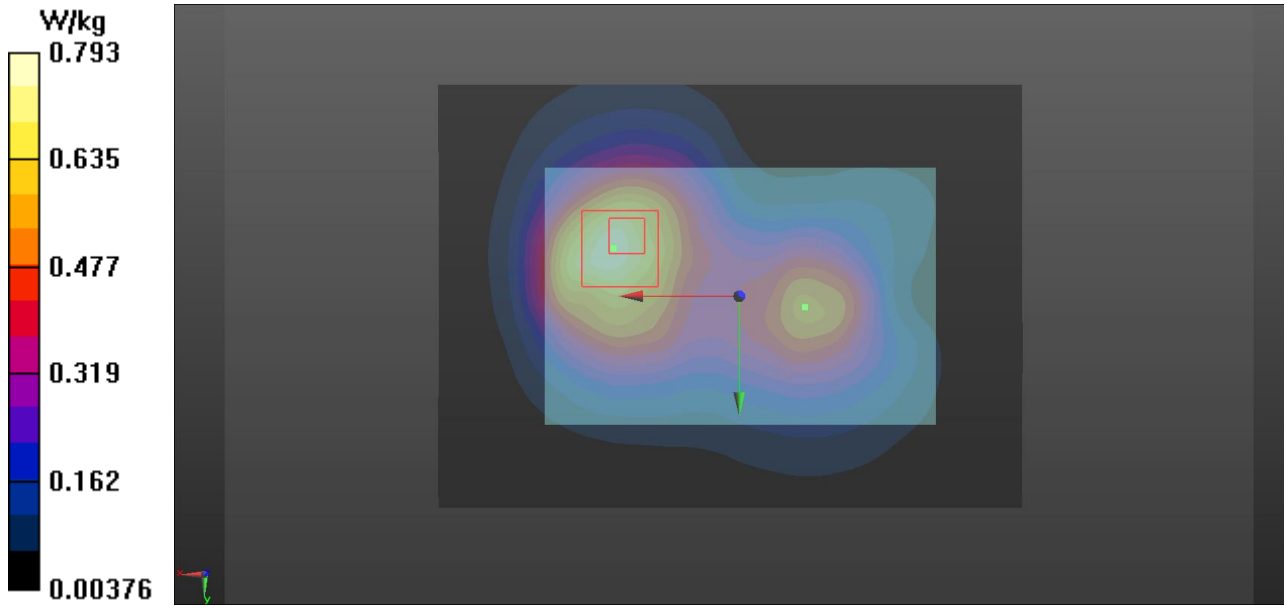
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 4, E-UTRA/FDD (1710.0 - 1755.0 MHz); Frequency: 1745 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1745 MHz; σ = 1.272 S/m; ε_r = 39.243; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 4, back Bw20 RB1 start50 0mm 3/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.14 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.831 W/kg
SAR(1 g) = 0.533 W/kg; SAR(10 g) = 0.329 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.702 W/kg

LTE 4, back Bw20 RB1 start50 0mm 3/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.793 W/kg



Plot 17

Date/Time: 24.10.2019 19:01:02

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

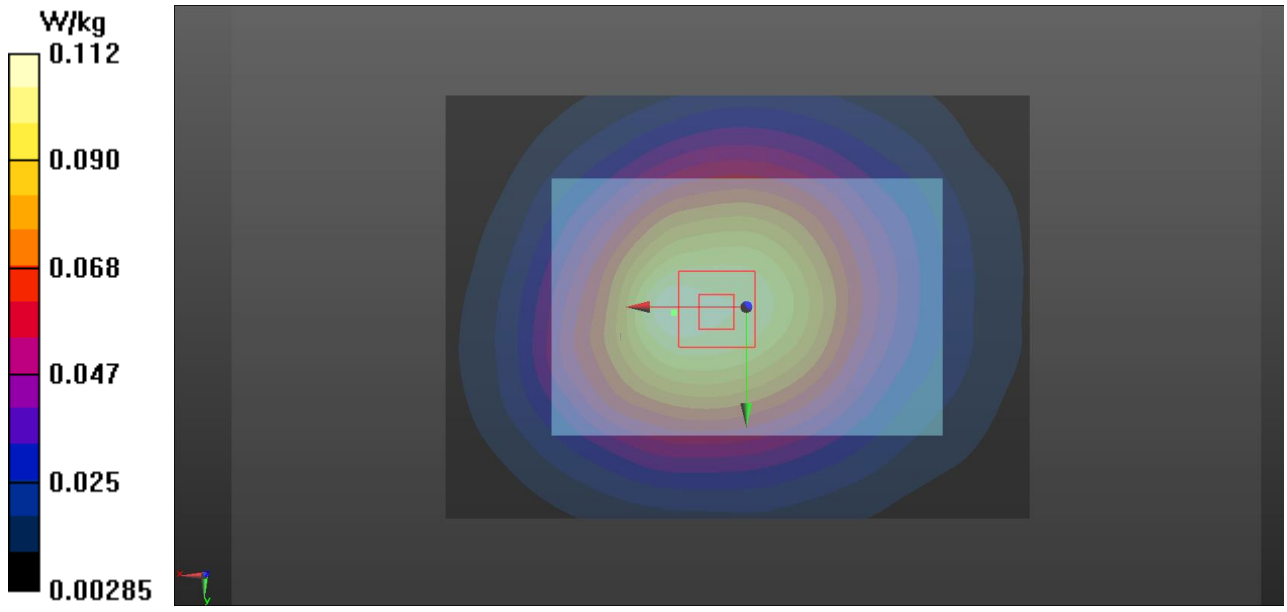
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 5, E-UTRA/FDD (824.0 - 849.0 MHz); Frequency: 829 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 829 MHz; σ = 0.878 S/m; ε_r = 41.741; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 5, front Bw10 RB1 start24 0mm 3/Zoom Scan (7x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.124 W/kg
SAR(1 g) = 0.094 W/kg; SAR(10 g) = 0.070 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.113 W/kg

LTE 5, front Bw10 RB1 start24 0mm 3/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.112 W/kg



Plot 18

Date/Time: 24.10.2019 16:40:20

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

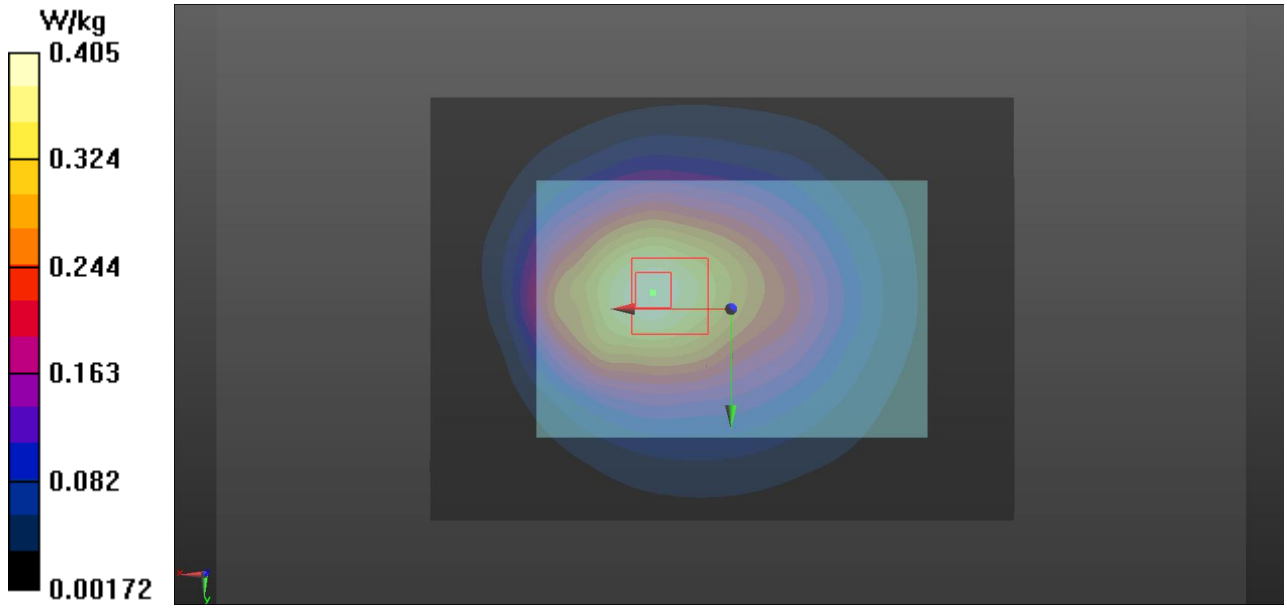
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 5, E-UTRA/FDD (824.0 - 849.0 MHz); Frequency: 836.5 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.881 S/m; ε_r = 41.705; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(9.98, 9.98, 9.98); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

FCC LTE 5, back Bw10 RB1 start49 0mm 2/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.48 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.408 W/kg
SAR(1 g) = 0.302 W/kg; SAR(10 g) = 0.219 W/kg (SAR corrected for target medium).
Maximum value of SAR (measured) = 0.369 W/kg

FCC LTE 5, back Bw10 RB1 start49 0mm 2/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.405 W/kg



Plot 19

Date/Time: 30.10.2019 13:16:37

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

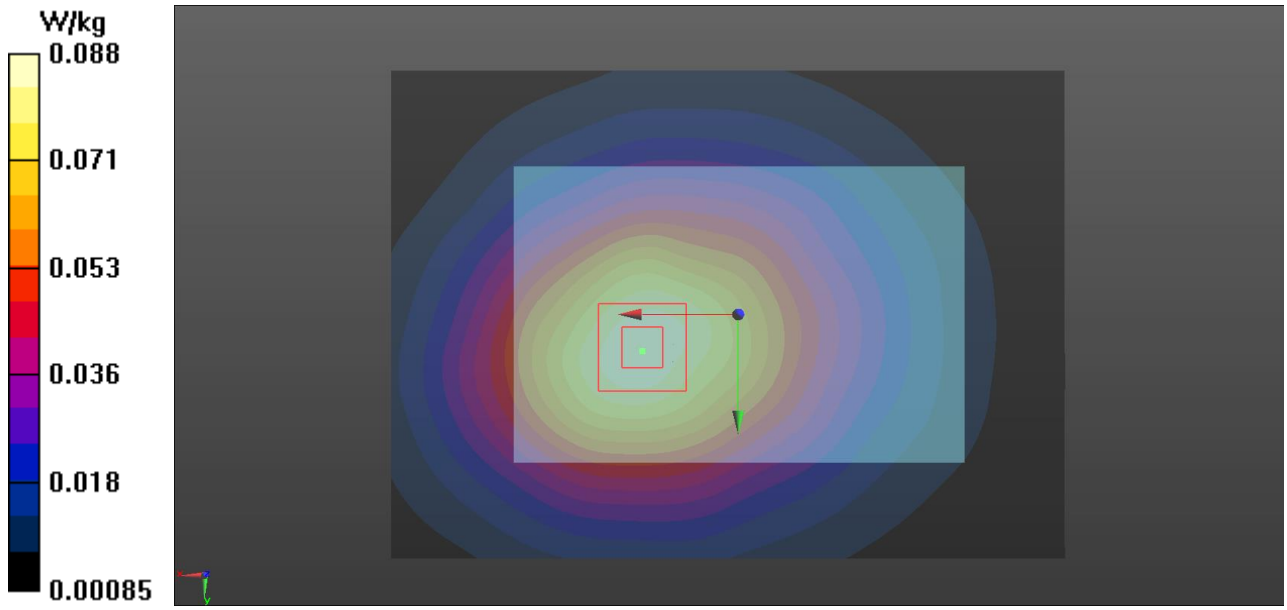
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 12, E-UTRA/FDD (698.0 - 716.0 MHz); Frequency: 711 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 711 MHz; σ = 0.85 S/m; ε_r = 41.606; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
- Electronics: DAE4 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 12, Front Bw10 RB1 start24/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.331 V/m; Power Drift = -0.32 dB
Peak SAR (extrapolated) = 0.0930 W/kg
SAR(1 g) = 0.070 W/kg; SAR(10 g) = 0.050 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0851 W/kg

LTE 12, Front Bw10 RB1 start24/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0883 W/kg



Plot 20

Date/Time: 30.10.2019 18:48:45

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

Communication System: UID 0, Generic LTE (0); Communication System Band: Band 12, E-UTRA/FDD (698.0 - 716.0 MHz); Frequency: 707.5 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.848 S/m; ε_r = 41.634; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

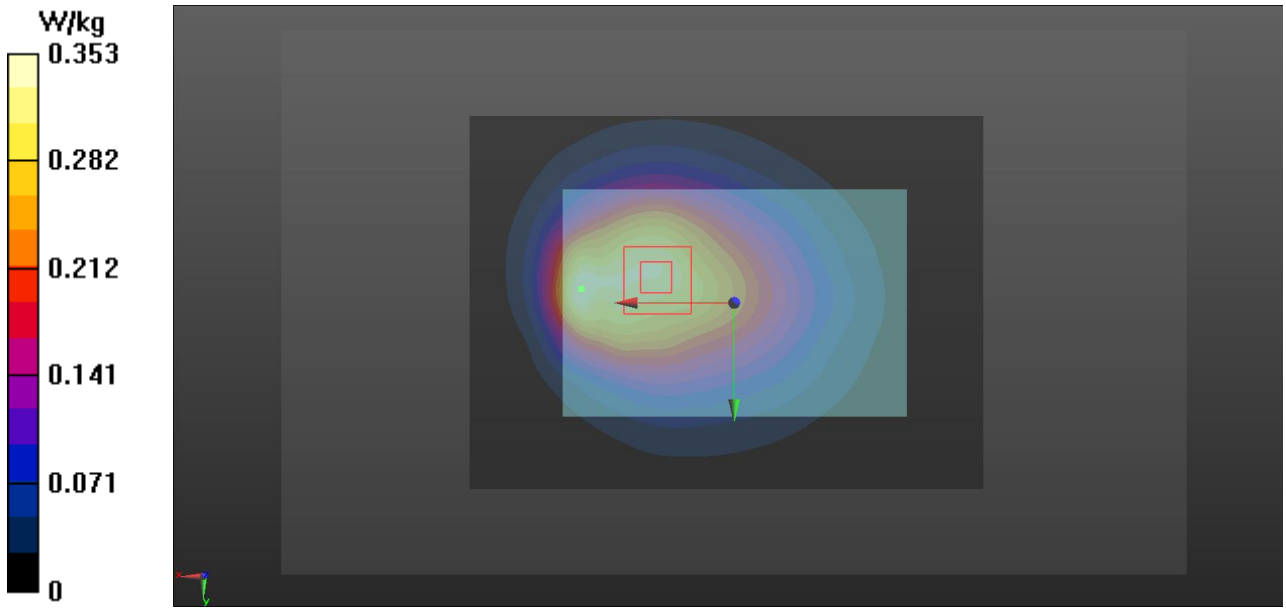
DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Back/LTE 12, Back Bw10 RB1 start24 2/Zoom Scan (8x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.07 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.467 W/kg
SAR(1 g) = 0.296 W/kg; SAR(10 g) = 0.205 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.367 W/kg

Back/LTE 12, Back Bw10 RB1 start24 2/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm.
Maximum value of SAR (interpolated) = 0.353 W/kg



Plot 21

Date/Time: 30.10.2019 13:54:57

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

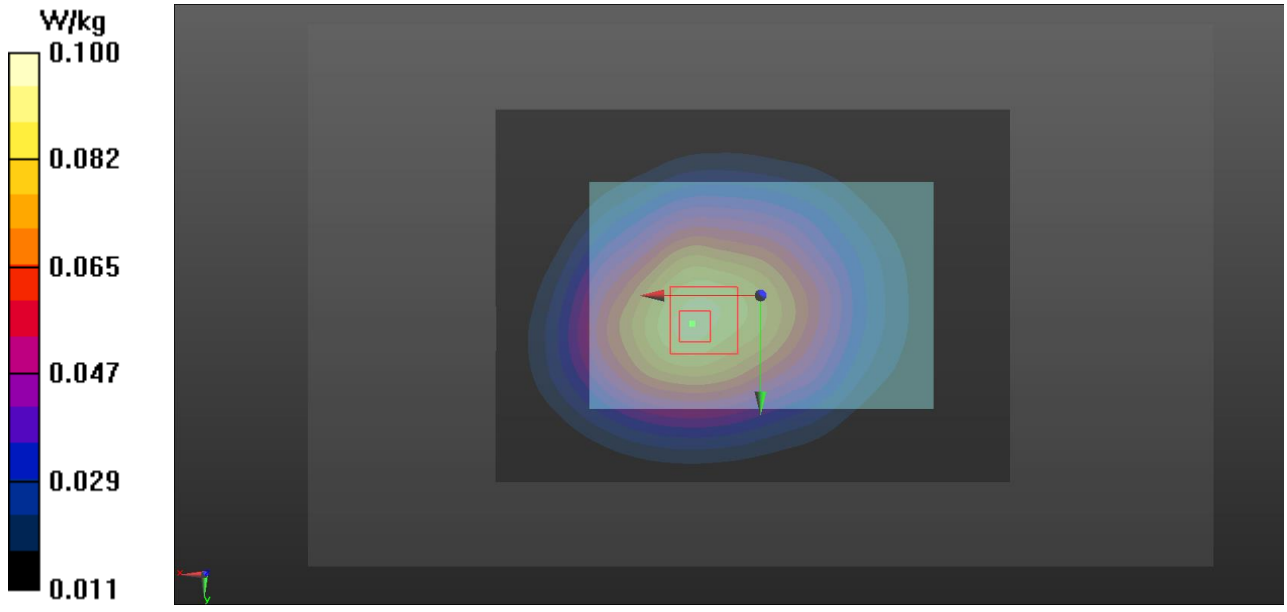
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 13, E-UTRA/FDD (777.0 - 787.0 MHz); Frequency: 782 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 782 MHz; σ = 0.874 S/m; ε_r = 41.257; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 13, Front Bw10 RB1 start24/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0913 W/kg

LTE 13, Front Bw10 RB1 start24/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.826 V/m; Power Drift = 0.25 dB
Peak SAR (extrapolated) = 0.110 W/kg
SAR(1 g) = 0.079 W/kg; SAR(10 g) = 0.056 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.100 W/kg



Plot 22

Date/Time: 30.10.2019 19:43:18

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

Communication System: UID 0, Generic LTE (0); Communication System Band: Band 13, E-UTRA/FDD (777.0 - 787.0 MHz); Frequency: 779.5 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 779.5 MHz; σ = 0.873 S/m; ε_r = 41.273; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

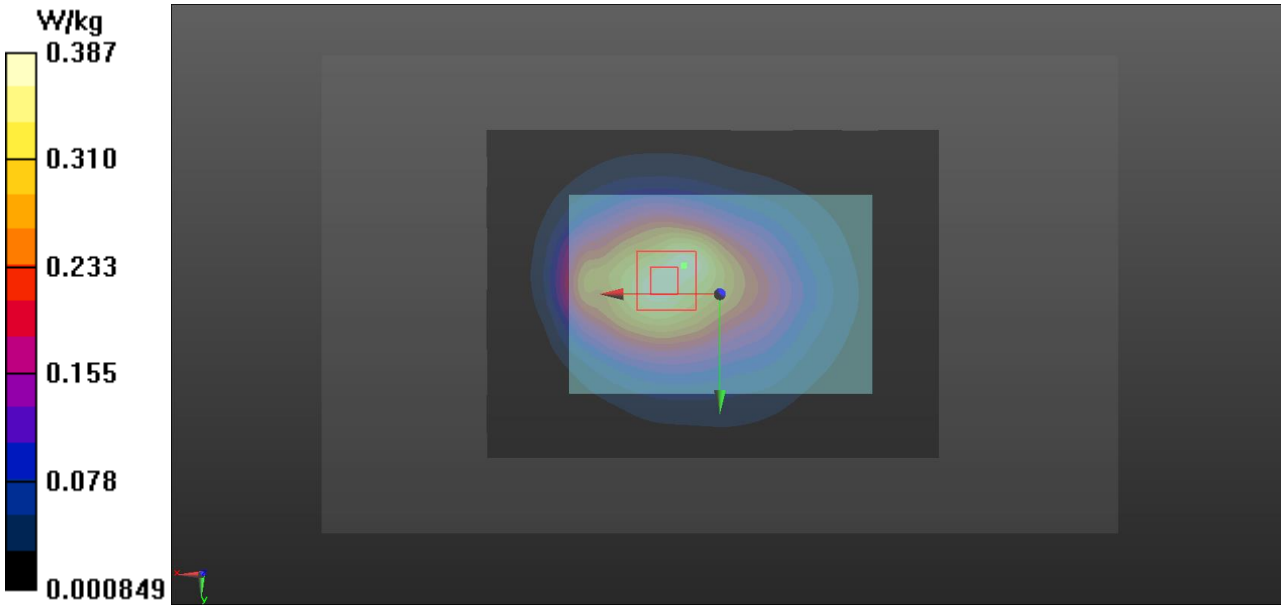
DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 13, Back Bw5 RB1 start12/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.79 V/m; Power Drift = 0.30 dB
Peak SAR (extrapolated) = 0.420 W/kg
SAR(1 g) = 0.331 W/kg; SAR(10 g) = 0.230 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.398 W/kg

LTE 13, Back Bw5 RB1 start12/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.387 W/kg



Plot 23

Date/Time: 30.10.2019 14:09:09

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

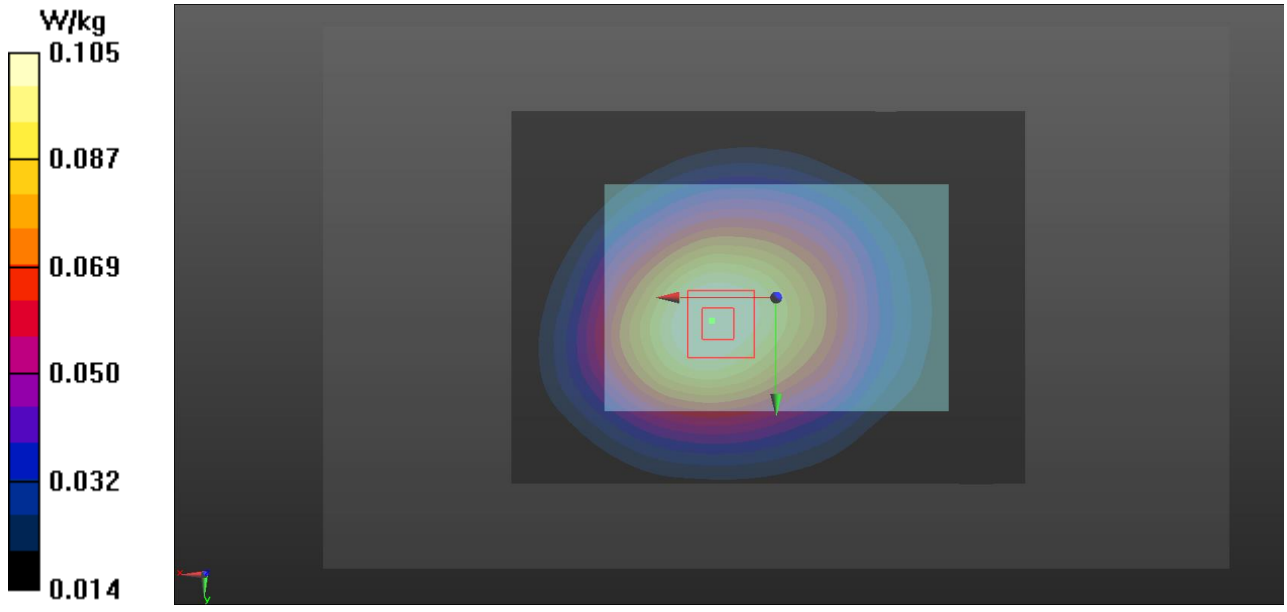
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 14, E-UTRA/FDD (788.0 - 798.0 MHz); Frequency: 793 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 793 MHz; σ = 0.878 S/m; ε_r = 41.184; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 14, Front Bw10 RB1 start49/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.110 W/kg

Configuration/LTE 14, Front Bw10 RB1 start49/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.57 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.115 W/kg
SAR(1 g) = 0.085 W/kg; SAR(10 g) = 0.062 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.105 W/kg



Plot 24

Date/Time: 31.10.2019 10:35:21

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

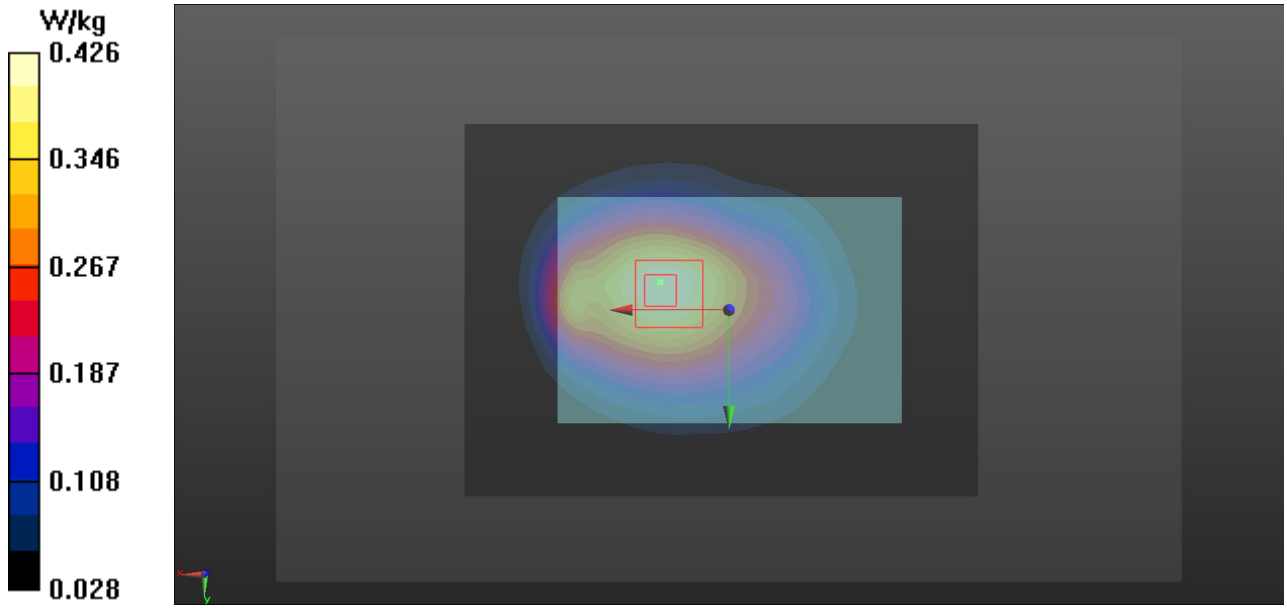
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 14, E-UTRA/FDD (788.0 - 798.0 MHz); Frequency: 790.5 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 790.5 MHz; σ = 0.877 S/m; ε_r = 41.205; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 14, Back Bw5 RB1 start12/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.427 W/kg

LTE 14, Back Bw5 RB1 start12/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.27 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.480 W/kg
SAR(1 g) = 0.334 W/kg; SAR(10 g) = 0.230 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.426 W/kg



Plot 25

Date/Time: 24.10.2019 19:25:35

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

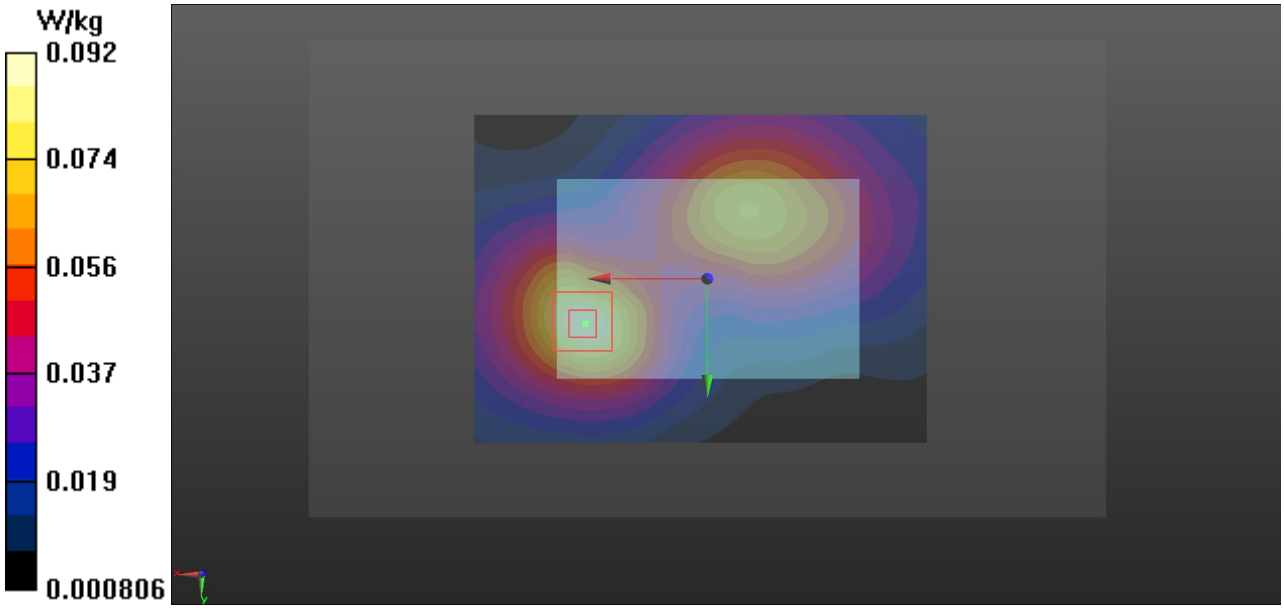
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 66; Frequency: 1745 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1745 MHz; σ = 1.272 S/m; ε_r = 39.243; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

FCC LTE 66, front Bw20 RB1 start50 0mm 3/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 5.926 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.115 W/kg
SAR(1 g) = 0.076 W/kg; SAR(10 g) = 0.047 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0998 W/kg

FCC LTE 66, front Bw20 RB1 start50 0mm 3/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0920 W/kg



Plot 26

Date/Time: 24.10.2019 15:23:10

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

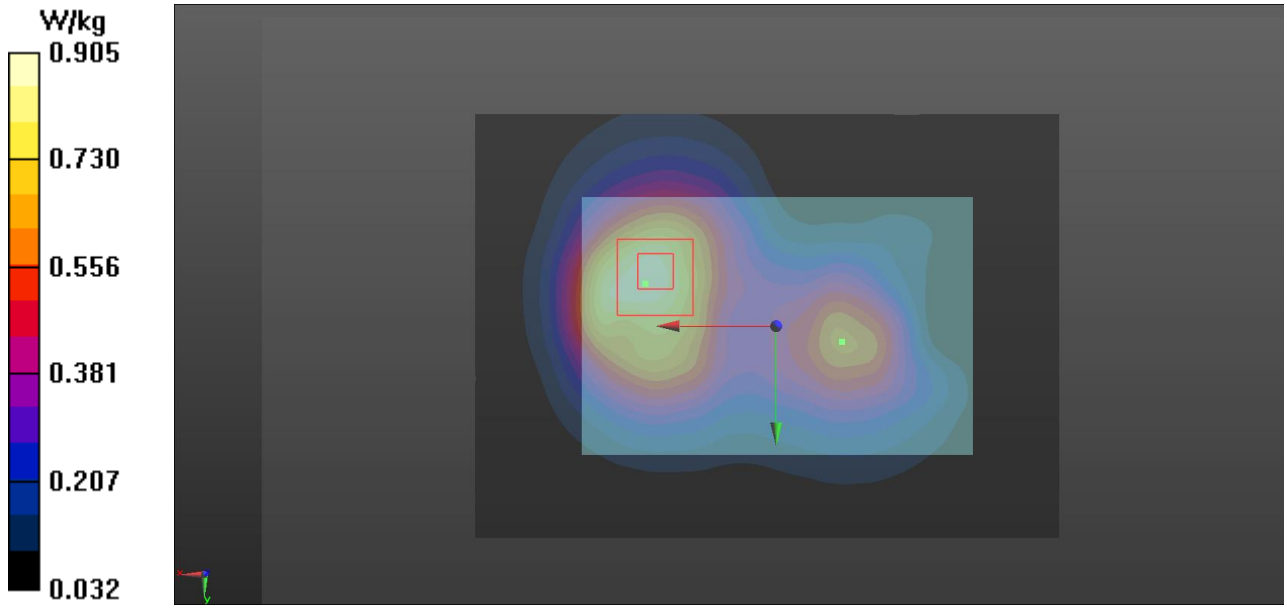
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 66; Frequency: 1770 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1770 MHz; σ = 1.285 S/m; ε_r = 39.217; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(8.69, 8.69, 8.69); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 66, back Bw20 RB1 start50 0mm 2 2/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.919 W/kg

LTE 66, back Bw20 RB1 start50 0mm 2 2/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.03 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.681 W/kg; SAR(10 g) = 0.415 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.905 W/kg



Plot 27

Date/Time: 30.10.2019 15:20:58

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

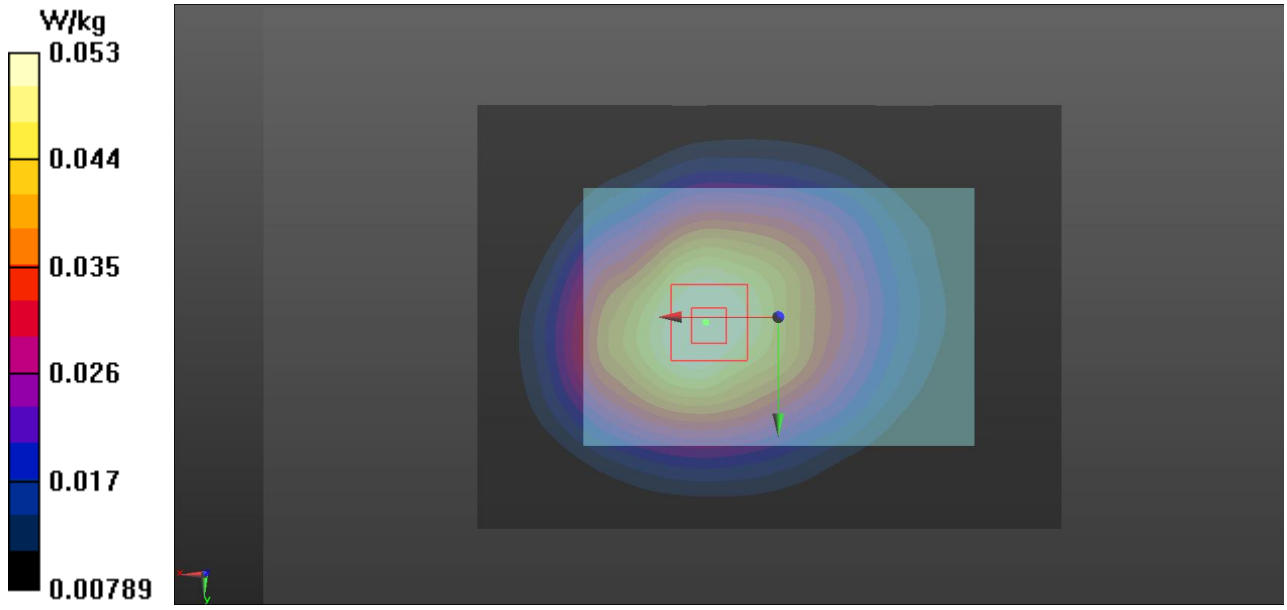
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 71; Frequency: 673 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 673 MHz; σ = 0.837 S/m; ε_r = 41.89; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 71, Front Bw20 RB50 start25 2/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0539 W/kg

LTE 71, Front Bw20 RB50 start25 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.677 V/m; Power Drift = -0.43 dB
Peak SAR (extrapolated) = 0.0580 W/kg
SAR(1 g) = 0.045 W/kg; SAR(10 g) = 0.033 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0526 W/kg



Plot 28

Date/Time: 30.10.2019 17:02:31

Test Laboratory: Verkotan Oy

DUT: Aina Kepler; Model: AKepler-0000-001 ; IMEI: 864839040215330

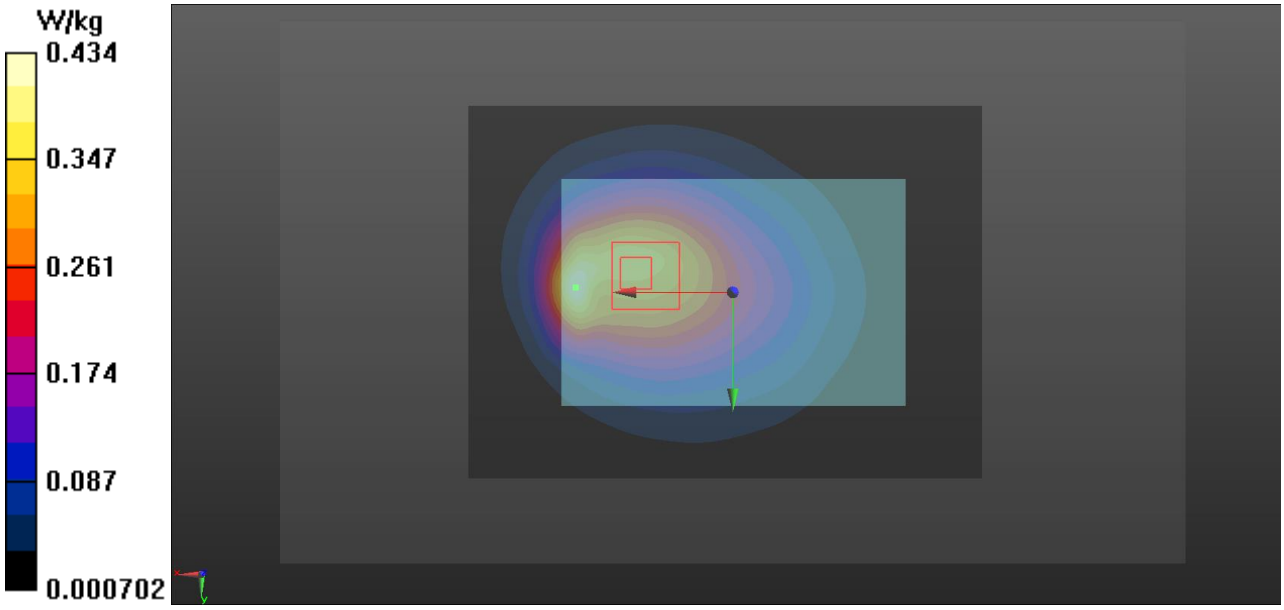
Communication System: UID 0, Generic LTE (0); Communication System Band: Band 71; Frequency: 688 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 688 MHz; σ = 0.841 S/m; ε_r = 41.786; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(10.63, 10.63, 10.63); Calibrated: 23.4.2019;
- 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 Sn705; Calibrated: 15.4.2019
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

LTE 71, Back Bw20 RB1 start50 2 2/Zoom Scan (8x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.84 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 0.553 W/kg
SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.217 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.418 W/kg

LTE 71, Back Bw20 RB1 start50 2 2/Area Scan (111x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.434 W/kg



APPENDIX D: RELEVANT PAGES FROM PROBE CALIBRATION

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: EX3-3892_Apr19

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3892
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v7 Calibration procedure for dosimetric E-field probes
Calibration date:	April 23, 2019

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	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-10)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 25, 2019

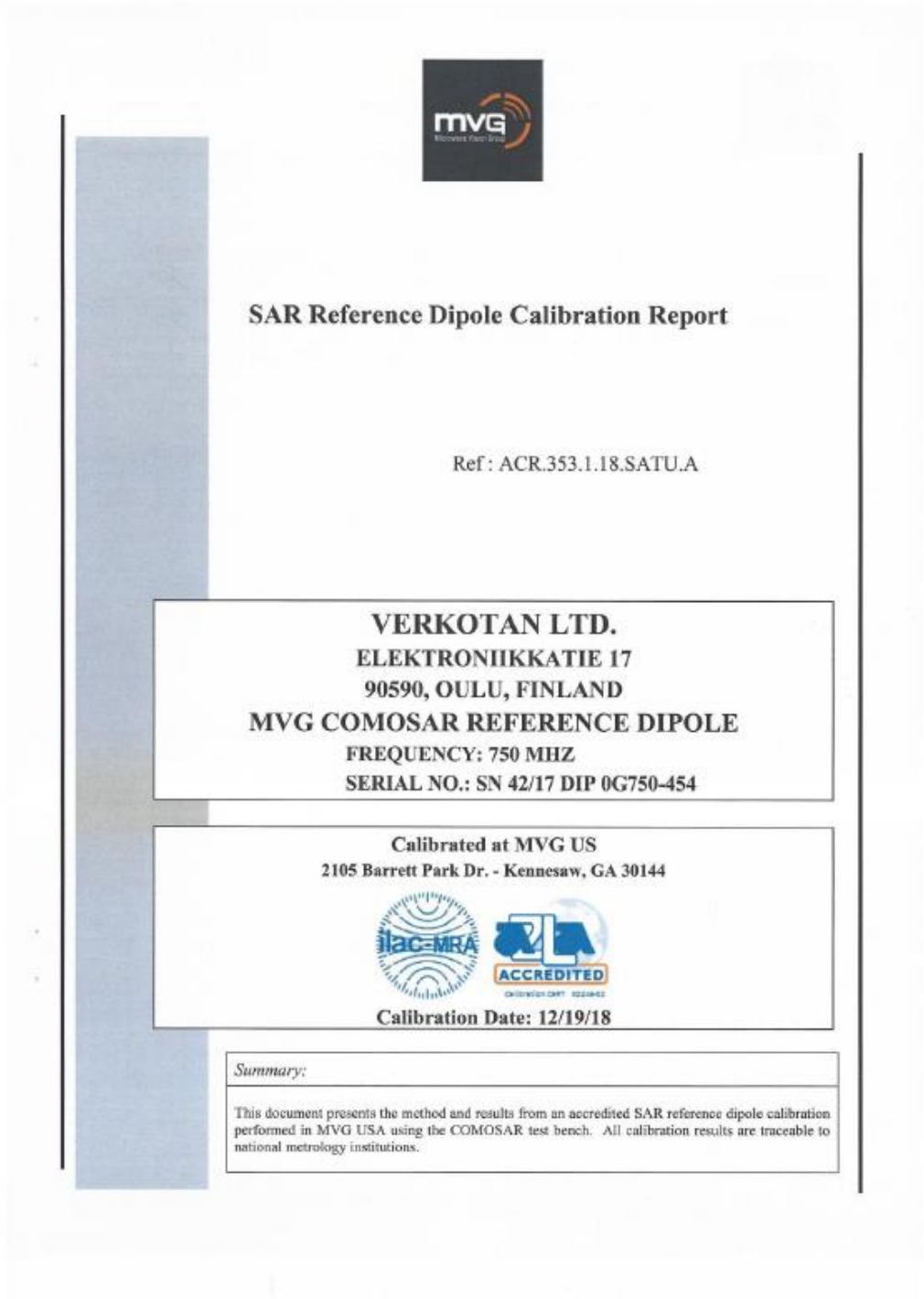
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3892

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.63	10.63	10.63	0.49	0.80	± 12.0 %
900	41.5	0.97	9.98	9.98	9.98	0.51	0.85	± 12.0 %
1750	40.1	1.37	8.69	8.69	8.69	0.39	0.80	± 12.0 %
1900	40.0	1.40	8.46	8.46	8.46	0.41	0.84	± 12.0 %
2450	39.2	1.80	7.56	7.56	7.56	0.41	0.85	± 12.0 %
2600	39.0	1.96	7.51	7.51	7.51	0.35	0.91	± 12.0 %

[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] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[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



mvg

SAR Reference Dipole Calibration Report

Ref : ACR.353.1.18.SATU.A

VERKOTAN LTD.
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 750 MHZ
SERIAL NO.: SN 42/17 DIP 0G750-454

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

ilac-MRA A2LA ACCREDITED

Calibration Date: 12/19/18

Summary:

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

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 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.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 40.0 sigma : 0.93
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	750 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49	8.52 (0.85)	5.55	5.62 (0.56)
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

SAR Reference Dipole Calibration Report

Ref : ACR.353.2.18.SATU.A

VERKOTAN LTD.
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 835 MHZ
SERIAL NO.: SN 51/18 DIP 0G835-473

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED

Calibration Date: 12/19/18

Summary:

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

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 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.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 40.0 sigma : 0.90
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	835 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56	9.63 (0.96)	6.22	6.19 (0.62)
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

SAR Reference Dipole Calibration Report

Ref : ACR.165.30.17.SATU.A

VERKOTAN LTD.
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
SAR REFERENCE DIPOLE
FREQUENCY: 1800 MHZ
SERIAL NO.: D1800V2-2D075

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

Calibration Date: 06/14/17

Summary:

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

1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 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.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 41.7 sigma : 1.46
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	1800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4	38.01 (3.80)	20.1	20.02 (2.00)
1900	39.7		20.5	
1950	40.5		20.9	

SAR Reference Dipole Calibration Report

Ref : ACR.165.31.17.SATU.A

VERKOTAN LTD.
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
SAR REFERENCE DIPOLE
FREQUENCY: 1900 MHZ
SERIAL NO.: D1900V2-5D004

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

Calibration Date: 06/14/17

Summary:

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

1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 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.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 38.5 sigma : 1.45
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	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	
1900	39.7	39.74 (3.97)	20.5	20.44 (2.04)
1950	40.5		20.9	