SAR Compliance Test Report

Date of Report	10/06/2022	**Client's Contact person:**	Timo Hakala
Number of pages:	77	**Responsible Test engineer:**	Jesper Varis
Testing laboratory:	**Verkotan Oy** Elektroniikkatie 17 90590 Oulu Finland	**Client:**	**GE Healthcare** Kuortaneenkatu 2 00510 Helsinki Finland
Tested device	Portrait Mobile Patient Monitor (HUB01) and Portrait Sensor Battery (SBT01)		
Related reports:	FCC SAR report Hub and Sensor Battery ID4539 28092021		
Testing has been carried out in accordance with:	**47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **FCC published RF exposure KDB procedures** **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:

10.06.2022

Miia Nurkkala

Digitaalinen allekirjoittaja: Miia Nurkkala
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Laboratory Manager

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Equipment under Test (DUT):

Product:	HUB
Manufacturer:	GE Healthcare
Model:	HUB01 (Portrait Mobile Patient Monitor)
Serial Number:	SRW20440017SP, SRW20440005SP, SRW20440004SP
FCC ID Number:	2AO8L-HUB01
DUT Number:	22118, 22119, 22120
Battery Type used in testing:	Li-ion battery
State of the Sample	Production sample

Product:	Sensor Battery
Manufacturer:	GE Healthcare
Model:	SBT01 (Portrait Sensor Battery)
Serial Number:	SRX20460073SP, SRX20460074S, SRX20480076SP
FCC ID Number:	2AO8L-SBT01
DUT Number:	22125, 22126, 22127
Battery Type used in testing:	Li-ion battery
State of the Sample	Production sample

Testing information:

Testing performed:	3.12.2020 – 15.12.2020, 04.01.2021, 3.6.2022
Notes:	-
Document ID:	FCC SAR report Hub and Sensor Battery ID4539 ID5194 06062022.docx
Document History/Changes	Initial version
Temperature °C	22±2 / Controlled
Humidity RH%	30±20 / Controlled
FCC Test Firm Designation Number	FI00005
Measurement performed by:	Jesper Varis

1.2 Maximum Results

The maximum reported* SAR values 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 FCC 47 CFR part 2 (2.1093) for Body is SAR_{1g} of 1.6 W/kg.

1.2.1 Standalone SAR

HUB

System	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm/5mm separation distance	Result
MBAN	**0.43**	**PASS**
WLAN 2.4 GHz	**0.64**	**PASS**
WLAN 5 GHz	**1.17**	**PASS**
Bluetooth Low Energy	**0.03**	**PASS**

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

Sensor Battery

System	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm separation distance	Result
MBAN	**0.91**	**PASS**

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

1.2.2 Simultaneous Transmission for HUB

Highest Simultaneous Transmission SAR	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm separation distance	Result
WLAN 5 GHz Bottom antenna + MBAN Top antenna +NFC	**1.42**	**PASS**

1.2.3 Maximum Drift

Maximum Drift During Measurements	0.5dB*

*Larger than 5% drifts included to scaling factors

1.2.4 Measurement Uncertainty

0.3 - 3 GHz frequency range

Expanded Uncertainty (k=2) 95 %	±22.2 %

3 - 6 GHz frequency range

Expanded Uncertainty (k=2) 95 %	±24.5 %

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The DUT is a wireless patient monitor system manufactured by GE Healthcare. It contains two devices to be tested: HUB and Sensor Battery. The HUB supports WLAN at 2.4GHz and 5GHz frequencies, MBAN at 2.4GHz frequency, Bluetooth Low Energy and NFC at 13.56MHz. Sensor Battery supports MBAN at 2.4GHz frequency.

WLAN, MBAN and NFC have been fully SAR tested in 2020 and reported in document FCC SAR report Hub and Sensor Battery ID4539 28092021. Bluetooth Low Energy was enabled to the DUT afterwards. The purpose of this test report is to show RF exposure compliance of the DUT with this change. The test results of WLAN, MBAN and NFC tested in 2020 are being reused in this report.

The HUB collects data from the Sensor Battery by using MBAN and transmit data to hospital servers by using WLAN.

Device Category	Portable
Exposure Environment	General population uncontrolled

2.1 Supported Frequency Bands and Operational Modes

TX Frequency bands	**Modes of Operation**	**Transmitter Frequency Range (MHz)**
	MBAN	2362-2498
	2.4 GHz WLAN	2412-2462
	5 GHz WLAN	5180-5580, 5660-5825
	NFC	13.56
	Bluetooth Low Energy	2400 – 2483.5

2.2 NFC SAR Test Exclusion

Operation mode	**Output power [mW]***	**Duty cycle [%]**	**Time-averaged output power [mW]**
NFC	500	0.2	1

*Max total power dissipation of the NFC IC

According to appendix C of 447498D01, equation 4.3.1 c 2, the SAR test exclusion power threshold for 13.56MHz is 443mW at <50mm separation distance. The maximum time-averaged output power of the NFC transmitter is 1mW thus it is below the test exclusion threshold.

2.3 Simultaneous Transmission

The HUB has two WLAN antennas and two MBAN antennas. WLAN 2.4GHz can transmit only with top WLAN antenna. Bluetooth Low Energy can transmit with WLAN top antenna thus it can only transmit simultaneously with MBAN and NFC. WLAN 5GHz can transmit either with top or bottom antenna. Only one of WLAN and one MBAN antenna can transmit at the same time. NFC can be operating simultaneously with WLAN and MBAN.

Possible simultaneous transmissions are:

MBAN Top antenna + NFC
MBAN Bottom antenna + NFC
MBAN Top antenna + Bluetooth Low Energy
MBAN Bottom antenna + Bluetooth Low Energy
NFC + Bluetooth Low Energy
WLAN 2.4 GHz Top antenna + NFC
WLAN 2.4 GHz Top antenna + MBAN Top antenna
WLAN 2.4 GHz Top antenna + MBAN Bottom antenna
WLAN 5 GHz Top antenna + NFC
WLAN 5 GHz Bottom antenna + NFC
WLAN 5 GHz Top antenna + MBAN Top antenna
WLAN 5 GHz Top antenna + MBAN Bottom antenna
WLAN 5 GHz Bottom antenna + MBAN Top antenna
WLAN 5 GHz Bottom antenna + MBAN Bottom antenna
WLAN 2.4 GHz Top antenna + MBAN Top antenna + NFC
WLAN 2.4 GHz Top antenna + MBAN Bottom antenna + NFC
WLAN 5 GHz Top antenna + MBAN Top antenna + NFC
WLAN 5 GHz Top antenna + MBAN Bottom antenna + NFC
WLAN 5 GHz Bottom antenna + MBAN Top antenna + NFC
WLAN 5 GHz Bottom antenna + MBAN Bottom antenna + NFC
Bluetooth Low Energy + MBAN Top Antenna + NFC
Bluetooth Low Energy + MBAN Bottom Antenna + NFC

3. OUTPUT POWER

3.1 Maximum specified conducted output power [dBm]

From the customer, based on the module manufacturer statement.

HUB:

MBAN	Max Output Power [dBm]*
MBAN Top Antenna	12.3
MBAN Bottom Antenna	11.8

*Max output power is from the antenna input

WLAN 2.4 GHz	Max Output Power [dBm]*
802.11b	16.5

*Max output power is from the WLAN module output

WLAN 5 GHz	Channel	Frequency [MHz]	Max Output Power [dBm]*
802.11a	36-48	5180-5240	17.5
	52-64	5260-5320	14.5
	100	5500	16.5
	104-136	5520-5680	18
	140	5700	14.5
	149	5745	12.9
	153-161	5765-5825	18
	165	5825	16.5

*Max output power is from the WLAN module output

Bluetooth Low Energy	Max Output Power [dBm]*
BLE	3

*Max output power is from the BLE module output

Sensor Battery:

MBAN	Max Output Power [dBm]*
MBAN	12
MBAN	12

*Max output power is from the antenna input

3.2 Tested conducted output power

HUB

MBAN conducted power measured from the antenna input:

Band	Channel	Frequency [MHz]	Antenna	Output power [dBm]
MBAN	0	2362	TOP	10.42
MBAN	13	2395.5	TOP	10.42
MBAN	26	2430.5	TOP	10.29
MBAN	39	2463.2	TOP	10.11
MBAN	52	2498	TOP	9.82
MBAN	0	2362	BOTTOM	11.12
MBAN	13	2395.5	BOTTOM	10.83
MBAN	26	2430.5	BOTTOM	10.37
MBAN	39	2463.2	BOTTOM	9.83
MBAN	52	2498	BOTTOM	9.27

2.4 GHz WLAN conducted power measured from the WLAN module output:

Standard	Transmission mode	Data rate [Mbps]	Antenna	Output power [dBm]		
				CH 1 2412 MHz	CH 6 2437 MHz	CH 11 2462 MHz
802.11b	DSSS	1	TOP	14.84	14.59	14.1

5 GHz WLAN conducted power measured from the WLAN module output:

Standard	Channel	Frequency [MHz]	Transmission mode	Data rate [Mbps]	Antenna	Output power [dBm]
802.11a	36	5180	OFDM	6	TOP	12.26
802.11a	40	5200				12.86
802.11a	44	5220				13.12
802.11a	48	5240				13.38
802.11a	52	5260				11.21
802.11a	56	5280				10.91
802.11a	60	5300				10.53
802.11a	64	5320				10.62
802.11a	100	5500				13.19
802.11a	108	5540				15.27
802.11a	116	5580				15.51
802.11a	132	5660				15.09
802.11a	149	5745				12.56
802.11a	157	5785				17.62
802.11a	165	5825				13.52

Standard	Channel	Frequency [MHz]	Transmission mode	Data rate [Mbps]	Antenna	Output power [dBm]
802.11a	36	5180	OFDM	6	BOTTOM	14.15
802.11a	40	5200				14.12
802.11a	44	5220				14.07
802.11a	48	5240				14.04
802.11a	52	5260				10.72
802.11a	56	5280				10.64
802.11a	60	5300				10.61
802.11a	64	5320				10.68
802.11a	100	5500				11.92
802.11a	108	5540				13.36
802.11a	116	5580				13.4
802.11a	132	5660				13.82
802.11a	149	5745				11.02
802.11a	157	5785				16.13
802.11a	165	5825				12.85

BLE conducted power measured from the module output:

Band	Channel	Frequency [MHz]	Output power [dBm]
BLE	0	2402	-0.14
BLE	20	2440	0.65
BLE	39	2480	1.94

Sensor Battery

MBAN conducted power measured from the antenna input:

Band	Channel	Frequency [MHz]	Output power [dBm]
MBAN	0	2362	11.7
MBAN	13	2395.5	11.81
MBAN	26	2430.5	11.85
MBAN	39	2463.2	11.86
MBAN	52	2498	11.8

4. TEST EQUIPMENT

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

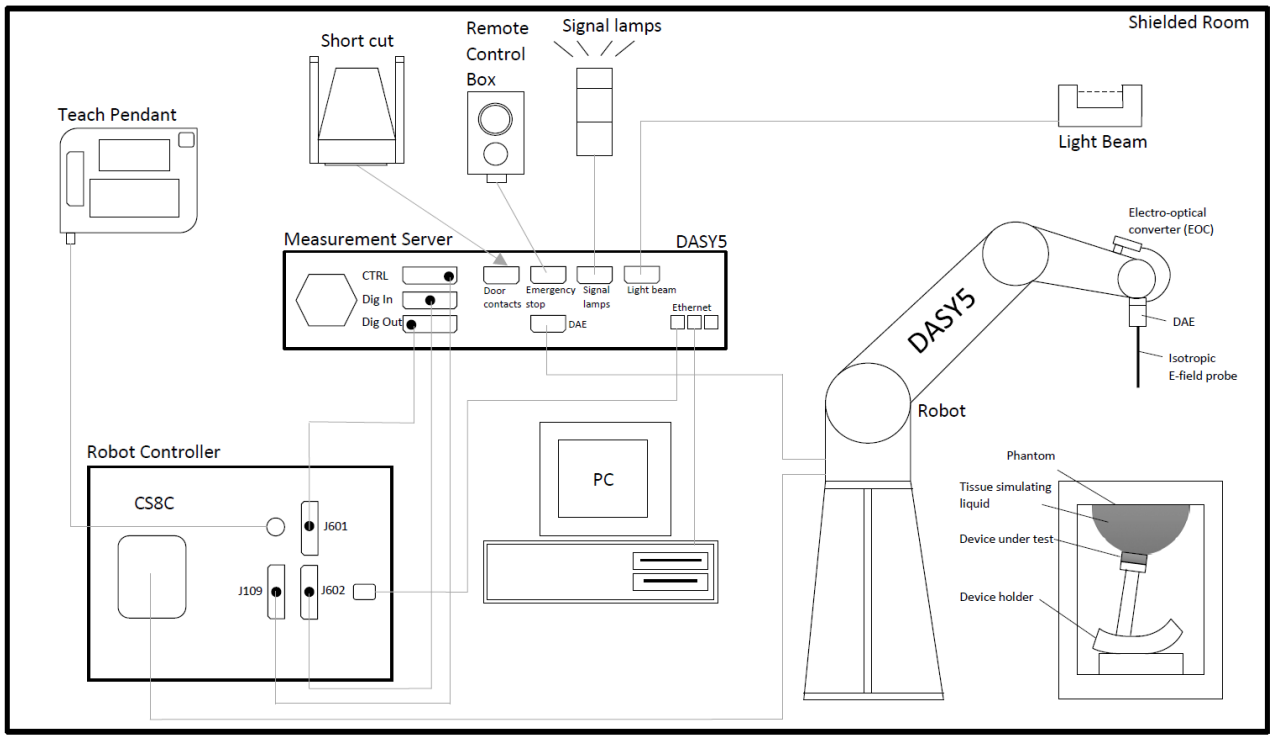


Figure 1 Schematic Laboratory Picture

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.

Used in testing during 3.12.2020 – 10.12.2020, 4.1.2021

Test Equipment	Model	Serial Number	Calibration Date
DAE	DAE4	756	03.2020
Probe	EX3DV4	3892	04.2020
Probe	EX3DV4	7447	03.2020
Dipole	D2450V2	758	03.2020
Dipole	D5GHZV2	1014	03.2020
DASY5 Software	52.8.8.1258	-	NA
Signal Generator	R&S SMIQ06B	8349681023	NA
Amplifier	AR 10S1G4A	320421	NA
Amplifier	5GHz	NA	NA
Power meter	R&S NRT	835065/049	02.2020
Directional Power Sensor	NRT-Z44	835374/021	02.2020
Power Sensor	NRP-Z11	100265	12.2019
Power Sensor	NRP-Z11	100265	12.2020
Power Sensor	NRP-Z81	100792	06.2020

Used in testing during 03.06.2022

Test Equipment	Model	Serial Number	Calibration Date
DAE	DAE4	1332	02.2022
Probe	EX3DV4	7447	02.2022
Dipole	D2450V2	758	03.2020
DASY5 Software	52.8.8.1258	-	NA
Signal Generator	Anritsu MG3710	6261911026	02.2022
Amplifier	AR 10S1G4A	320421	NA
Inline Peak Power Sensor	Anritsu MA24105A	2102058	11.2021

Dipole calibration period supporting data:

		Measured on 09/2021			Calibrated		
Dipole and serial number	Frequency (MHz)	Return loss (dB)	Impedance (Ω)		Return loss (dB)	Impedance (Ω)	
D2450V2 - SN: 758	2450	-28.7	46.7	-1.3	-35	49.9	-0.5

4.1.1 Isotropic E-field Probe Type EX3DV4

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

4.2 Phantoms

Modular flat phantom:

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. The shell thickness of the bottom plate is 2±0.2mm. The dimensions are 308x192x182mm and filling volume is 9.2 liters giving a filling height of 155mm.

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 at 2.4GHz and ±5% at 5GHz frequency area. 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 – 6000 MHz tissue simulant liquid Ingredients
Deionized Water, oil, salt, emulsifiers

4.4 System Validation Status

Frequency [MHz]	Dipole Type / SN	Probe Type / SN	Calibrated Signal Type	DAE Unit / SN	Dielectric Constant ε	Conductivity, σ [S/m]	Validation Done
							Head tissue simulant
2450	D2450V2 / 729	EX3DV4 / 3892	CW/DSSS	DAE 4 / 705	39.3	1.84	05/2020
2450	D2450V2 / 729	EX3DV4 / 7447	CW	DAE 4 / 756	39.5	1.9	04/2020
5250	D5GHzV2 - 1045	EX3DV4 - 7447	CW	DAE 4 / 756	34.862	4.649	04/2020
5600	D5GHzV2 - 1045	EX3DV4 - 7447	CW	DAE 4 / 756	34.195	5.043	04/2020
5750	D5GHzV2 - 1045	EX3DV4 - 7447	CW	DAE 4 / 756	33.92	5.22	04/2020
2450	D2450V2 - SN: 758	EX3DV4 - SN: 77	CW/DSSS	DAE 4 / 1332	37.82	1.79	04/2022

4.5 System Check

Date	Tissue Type	Tissue Temp. [°C]	Frequency [MHz]	Input Power [mW]	Measured SAR_{1g} [W/kg]	1 W Target SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation (%)	Plot #
1.12.2020	WB Head	22	2450	250	13.1	55.34	52.4	-5.3	1
2.12.2020	WB Head	22	2450	250	13	55.34	52	-6.0	2
3.12.2020	WB Head	22	2450	250	12.9	55.34	51.6	-6.8	3
7.12.2020	WB Head	22	2450	250	13.4	55.34	53.6	-3.1	4
8.12.2020	WB Head	22	2450	250	13.2	55.34	52.8	-4.6	5
8.12.2020	WB Head	22	5250	100	7.97	77.65	79.7	2.6	6
9.12.2020	WB Head	22	5250	100	8.2	77.65	82	5.6	7
10.12.2020	WB Head	22	5600	100	7.99	83.31	79.9	-4.1	8
14.12.2020	WB Head	22	5600	100	8.26	83.31	82.6	-0.9	9
14.12.2020	WB Head	22	5750	100	7.61	75.18	76.1	1.2	10
4.1.2021	WB Head	22	5750	100	6.92	75.18	69.2	-7.95	11
3.6.2022	WB Head	22	2450	250	12.7	55.34	50.8	-8.20	12

4.5.1 Tissue Simulant Verification

				Target		Measured		Deviation	
Date	Tissue Type	Tissue Temp [°C]	Frequency [MHz]	Dielectric Constant [ε] Target	Conductivity σ [S/m] Target	Dielectric Constant [ε]	Conductivity σ [S/m]	ε (%)	σ (%)
01.12.2020	WB Head	22	2362	39.36	1.72	38	1.81	-3.4	4.9
01.12.2020	WB Head	22	2395.4	39.3	1.75	37.95	1.83	-3.4	4.5
01.12.2020	WB Head	22	2430.5	39.23	1.78	37.89	1.86	-3.4	4.1
01.12.2020	WB Head	22	2450	39.2	1.8	37.86	1.87	-3.4	4.0
01.12.2020	WB Head	22	2463.2	39.18	1.81	37.84	1.88	-3.4	3.7
01.12.2020	WB Head	22	2498	39.14	1.85	37.79	1.91	-3.5	2.9
02.12.2020	WB Head	22	2362	39.36	1.72	37.43	1.79	-4.9	4.1
02.12.2020	WB Head	22	2395.4	39.3	1.75	37.38	1.82	-4.9	3.7
02.12.2020	WB Head	22	2430.5	39.23	1.78	37.32	1.84	-4.9	3.3
02.12.2020	WB Head	22	2442	39.21	1.79	37.3	1.85	-4.9	3.2
02.12.2020	WB Head	22	2450	39.2	1.8	37.28	1.86	-4.9	3.1
02.12.2020	WB Head	22	2463.2	39.18	1.81	37.26	1.87	-4.9	2.9
02.12.2020	WB Head	22	2498	39.14	1.85	37.22	1.89	-4.9	2.2
03.12.2020	WB Head	22	2412	39.27	1.77	37.22	1.76	-5.2	-0.5
03.12.2020	WB Head	22	2437	39.22	1.79	37.18	1.78	-5.2	-0.7
03.12.2020	WB Head	22	2442	39.21	1.79	37.17	1.78	-5.2	-0.7
03.12.2020	WB Head	22	2450	39.2	1.8	37.15	1.79	-5.2	-0.8
03.12.2020	WB Head	22	2462	39.18	1.81	37.15	1.8	-5.2	-1.0

03.12.2020	WB Head	22	2472	39.17	1.82	37.13	1.8	-5.2	-1.2
07.12.2020	WB Head	22	2362	39.36	1.72	37.36	1.79	-5.1	3.7
07.12.2020	WB Head	22	2395.4	39.3	1.75	37.32	1.81	-5.0	3.3
07.12.2020	WB Head	22	2430.5	39.23	1.78	37.26	1.84	-5.0	3.1
07.12.2020	WB Head	22	2450	39.2	1.8	37.22	1.85	-5.0	2.9
07.12.2020	WB Head	22	2463.2	39.18	1.81	37.2	1.86	-5.1	2.7
07.12.2020	WB Head	22	2498	39.14	1.85	37.15	1.89	-5.1	2.0
08.12.2020	WB Head	22	2412	39.27	1.77	38.7	1.81	-1.4	2.6
08.12.2020	WB Head	22	2450	39.2	1.8	38.64	1.84	-1.4	2.3
08.12.2020	WB Head	22	5180	36.01	4.63	34.39	4.44	-4.5	-4.2
08.12.2020	WB Head	22	5240	35.94	4.7	34.3	4.5	-4.6	-4.1
08.12.2020	WB Head	22	5250	35.93	4.71	34.28	4.52	-4.6	-4.0
09.12.2020	WB Head	22	5180	36.01	4.63	34.74	4.55	-3.5	-1.9
09.12.2020	WB Head	22	5200	35.99	4.65	34.71	4.57	-3.5	-1.8
09.12.2020	WB Head	22	5220	35.96	4.68	34.68	4.59	-3.6	-1.8
09.12.2020	WB Head	22	5240	35.94	4.7	34.64	4.61	-3.6	-1.7
09.12.2020	WB Head	22	5250	35.93	4.71	34.62	4.62	-3.6	-1.7
10.12.2020	WB Head	22	5500	35.64	4.96	34.53	4.88	-3.1	-1.7
10.12.2020	WB Head	22	5540	35.6	5.0	34.47	4.92	-3.2	-1.7
10.12.2020	WB Head	22	5580	35.55	5.04	34.38	4.97	-3.3	-1.5
14.12.2020	WB Head	22	5500	35.64	4.96	34.57	4.91	-3.0	-1.1
14.12.2020	WB Head	22	5540	35.6	5.0	34.5	4.96	-3.1	-0.9
14.12.2020	WB Head	22	5580	35.55	5.04	34.41	5.0	-3.2	-0.8
14.12.2020	WB Head	22	5660	35.46	5.13	34.25	5.1	-3.4	-0.5
14.12.2020	WB Head	22	5745	35.36	5.21	34.12	5.2	-3.5	-0.3
14.12.2020	WB Head	22	5750	35.36	5.22	34.11	5.2	-3.5	-0.3
14.12.2020	WB Head	22	5785	35.32	5.25	34.05	5.25	-3.6	-0.2
14.12.2020	WB Head	22	5825	35.27	5.3	33.98	5.29	-3.7	-0.1
04.01.2021	WB Head	22	5750	35.36	5.22	33.72	5.26	-4.6	0.7
04.01.2021	WB Head	22	5785	35.32	5.25	33.63	5.29	-4.8	0.7
03.06.2022	WB Head	22	2402	39.28	1.76	40.65	1.86	3.5	5.7
03.06.2022	WB Head	22	2440	39.22	1.79	40.6	1.89	3.5	5.4
03.06.2022	WB Head	22	2450	39.2	1.8	40.59	1.9	3.5	5.3
03.06.2022	WB Head	22	2480	39.16	1.83	40.53	1.92	3.5	4.7

5. TEST PROCEDURE

HUB device is used mainly off-body, next to the user or carried by the user. The device has a touch screen for configurating the device.

The hub is placed in silicon pouch while carried by the user. The form factor of the hub is like a bulky cell phone. Due to the shape of the device the hub is inherently oriented the flat edge of the device, display or battery, is towards user's body. Thus, 0mm test separation was use for testing those sides. Other sides were tested with 5mm separation.

A control software was used to set the DUT to transmit at maximum power.

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

At WLAN 5GHz, the Hub supports channels 36-116 and 132-165.

For U-NII-1 and U-NII-2A bands, the specified maximum output power was higher for U-NII-1 band, thus testing was done for U-NII-1 band. The highest reported SAR for the tested configuration, adjusted with ratio of lower to higher specified maximum output power for the two bands, SAR was≤ 1.2 W/kg, thus U-NII-2A was not tested.

At 5GHz WLAN, the device was known to have maximum conducted output power between channels 153 and 161 thus channel 157 was chosen to be tested in addition to low, mid and high channels of the U-NII-3 band.

Sensor device is used in contact with the body. The sensor consists of the sensor and the transmitting device part. The testing for sensor was done with 0mm separation

A control software was used to set the DUT to transmit at maximum power.

5.1 Device Holder

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

Device holder supplied by SPEAG

5.2 Test Positions

5.2.1 Body-worn Configuration, 0mm and 5 mm separation distance

The HUB was placed the on SPEAG holder and placed below the flat phantom. Front and back side of the HUB was tested with 0mm separation. Left, right, top and bottom sides of the HUB was tested with 5mm separation.

The Sensor Battery was placed on the SPEAG holder and lifted towards the phantom until the distance between the phantom and the device was 0mm.

All sides of the Sensor Battery were tested with 0mm separation.

Photos of the test positions are presented in Appendix A.

5.3 Scan Procedures

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

5.4 SAR Averaging Methods

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

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

6. MEASUREMENT UNCERTAINTY

Uncertainty Budget
According to IEEE 1528-2013 and IEC 62209-1/201x (0.3 - 3 GHz range)

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	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response^{m}	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±2.0 %	R	$\sqrt{3}$	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	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling^{p}	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.1 %	R	$\sqrt{3}$	1	1	±3.5 %	±3.5 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.)^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±11.2 %	±11.1 %	361
Expanded STD Uncertainty						**±22.3 %**	**±22.2 %**	

Uncertainty Budget

According to IEEE 1528-2013 and IEC 62209-1/2016 (3 - 6 GHz range)

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	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response^{m}	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	1	±3.9 %	±3.9 %	∞
Max. SAR Eval.	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
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	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling^{p}	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.6 %	R	$\sqrt{3}$	1	1	±3.8 %	±3.8 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.)^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±12.3 %	±12.2 %	748
Expanded STD Uncertainty						**±24.6 %**	**±24.5 %**	

7. TEST RESULTS

7.1 SAR Results for Body-Worn Condition with 0mm and 5mm separation

HUB

MBAN:

Mode	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
MBAN	2430.5	26	Top	Front	0	12.3	10.29	0.268	-0.02	1.59	1:1	0.43	
MBAN	2430.5	26	Top	Back	0	12.3	10.29	0.145	0.22*	1.67	1:1	0.24	
MBAN	2430.5	26	Top	Left	5	12.3	10.29	0.080	0.04	1.59	1:1	0.13	
MBAN	2430.5	26	Top	Right	5	12.3	10.29	0.026	0.17	1.59	1:1	0.04	
MBAN	2430.5	26	Top	Top	5	12.3	10.29	0.083	0.02	1.59	1:1	0.13	
MBAN	2430.5	26	Top	Bottom	5	12.3	10.29	0.002	-0.07	1.59	1:1	0.003	
MBAN	2362	0	Top	Front	0	12.3	10.42	0.251	0.4	1.69	1:1	0.42	
MBAN	2395.4	13	Top	Front	0	12.3	10.42	0.277	0.04	1.54	1:1	0.43	13
MBAN	2463.2	39	Top	Front	0	12.3	10.11	0.241	0.03	1.66	1:1	0.40	
MBAN	2498	52	Top	Front	0	12.3	9.82	0.200	0.19	1.77	1:1	0.35	

*Larger than 5% drifts included to scaling factors

Mode	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
MBAN	2430.5	26	Bottom	Front	0	11.8	10.37	0.160	0.22*	1.46	1:1	0.23	
MBAN	2430.5	26	Bottom	Back	0	11.8	10.37	0.143	-0.01	1.39	1:1	0.20	
MBAN	2430.5	26	Bottom	Left	5	11.8	10.37	0.011	0.15	1.39	1:1	0.01	
MBAN	2430.5	26	Bottom	Right	5	11.8	10.37	0.098	-0.11	1.39	1:1	0.14	
MBAN	2430.5	26	Bottom	Top	5	11.8	10.37	0.007	0.37*	1.51	1:1	0.01	
MBAN	2430.5	26	Bottom	Bottom	5	11.8	10.37	0.086	0.22*	1.46	1:1	0.13	
MBAN	2362	0	Bottom	Front	0	11.8	11.12	0.213	0.14	1.17	1:1	0.25	14
MBAN	2395.4	13	Bottom	Front	0	11.8	10.83	0.192	0.03	1.25	1:1	0.24	
MBAN	2463.2	39	Bottom	Front	0	11.8	9.83	0.121	0.1	1.57	1:1	0.19	
MBAN	2498	52	Bottom	Front	0	11.8	9.27	0.079	0.11	1.79	1:1	0.14	

*Larger than 5% drifts included to scaling factors

2.4 GHz WLAN:

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11b	1	2412	1	Top	Front	0	16.5	14.84	0.428	0.09	1.47	1:1	0.63	
802.11b	1	2412	1	Top	Back	0	16.5	14.84	0.361	0.12	1.47	1:1	0.53	
802.11b	1	2412	1	Top	Left	5	16.5	14.84	0.019	-0.04	1.47	1:1	0.03	
802.11b	1	2412	1	Top	Right	5	16.5	14.84	0.147	0.1	1.47	1:1	0.22	
802.11b	1	2412	1	Top	Top	5	16.5	14.84	0.088	0.13	1.47	1:1	0.13	
802.11b	1	2412	1	Top	Bottom	5	16.5	14.84	0.008	-0.07	1.47	1:1	0.01	
802.11b	1	2437	6	Top	Front	0	16.5	14.59	0.393	0.12	1.55	1:1	0.61	
802.11b	1	2462	11	Top	Front	0	16.5	14.1	0.370	0.05	1.74	1:1	0.64	15

5 GHz WLAN:

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11a	6	5240	48	Top	Front	0	17.5	13.38	0.187	0.49*	2.89	1:1	0.54	
802.11a	6	5240	48	Top	Back	0	17.5	13.38	0.141	-0.31*	2.77	1:1	0.39	
802.11a	6	5240	48	Top	Left	5	17.5	13.38	0.031	0.17	2.58	1:1	0.08	
802.11a	6	5240	48	Top	Right	5	17.5	13.38	0.214	-0.06	2.58	1:1	0.55	
802.11a	6	5240	48	Top	Top	5	17.5	13.38	0.0446	0.02	2.58	1:1	0.12	
802.11a	6	5240	48	Top	Bottom	5	17.5	13.38	0.008	NA**	2.58	1:1	0.02	
802.11a	6	5180	36	Top	Right	5	17.5	12.26	0.219	0.22*	3.52	1:1	0.77	16
802.11a	6	5220	44	Top	Right	5	17.5	13.12	0.2240	-0.1	2.74	1:1	0.61	

*Larger than 5% drifts included to scaling factors
** Due to low E-field generated by DUT at the location of the drift measurement, the Power Drift is not applicable

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11a	6	5180	36	Bottom	Front	0	17.5	14.15	0.274	0.06	2.16	1:1	0.59	
802.11a	6	5180	36	Bottom	Back	0	17.5	14.15	0.294	0.21	2.16	1:1	0.64	
802.11a	6	5180	36	Bottom	Left	5	17.5	14.15	0.117	0.04	2.16	1:1	0.25	
802.11a	6	5180	36	Bottom	Right	5	17.5	14.15	0.026	-0.17	2.16	1:1	0.06	
802.11a	6	5180	36	Bottom	Top	5	17.5	14.15	0.0003	NA**	2.16	1:1	0	
802.11a	6	5180	36	Bottom	Bottom	5	17.5	14.15	0.140	0.12	2.16	1:1	0.30	
802.11a	6	5200	40	Bottom	Back	0	17.5	14.12	0.260	0.17	2.18	1:1	0.57	
802.11a	6	5240	48	Bottom	Back	0	17.5	14.04	0.293	-0.04	2.22	1:1	0.65	17

** Measured results was very low, measurement system could not do zoom scan
** Due to low E-field generated by DUT at the location of the drift measurement, the Power Drift is not applicable

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]*	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11a	6	5580	116	Top	Front	0	18	15.51	0.524	0.16	1.77	1:1	0.93	
802.11a	6	5580	116	Top	Back	0	18	15.51	0.4110	0.19	1.77	1:1	0.73	
802.11a	6	5580	116	Top	Left	5	18	15.51	0.022	0.38*	1.94	1:1	0.04	
802.11a	6	5580	116	Top	Right	5	18	15.51	0.661	-0.02	1.77	1:1	1.17	18
802.11a	6	5580	116	Top	Top	5	18	15.51	0.0887	-0.08	1.77	1:1	0.16	
802.11a	6	5580	116	Top	Bottom	5	18	15.51	0.031	0.49*	1.99	1:1	0.06	
802.11a	6	5500	100	Top	Right	5	16.5	13.19	0.329	0.13	2.14	1:1	0.71	
802.11a	6	5540	108	Top	Right	5	18	15.27	0.5380	0.06	1.87	1:1	1.01	

*Larger than 5% drifts included to scaling factors

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11a	6	5540	108	Bottom	Front	0	18	13.36	0.339	0.15	2.91	1:1	0.99	
802.11a	6	5540	108	Bottom	Back	0	18	13.36	0.3800	0.04	2.91	1:1	1.11	
802.11a	6	5540	108	Bottom	Left	5	18	13.36	0.266	0.02	2.91	1:1	0.77	
802.11a	6	5540	108	Bottom	Right	5	18	13.36	0.023	-0.46*	3.24	1:1	0.07	
802.11a	6	5540	108	Bottom	Top	5	18	13.36	0.0095	-0.48*	3.25	1:1	0.03	
802.11a	6	5540	108	Bottom	Bottom	5	18	13.36	0.206	0.14	2.91	1:1	0.60	
802.11a	6	5500	100	Bottom	Back	0	16.5	11.92	0.239	-0.09	2.87	1:1	0.69	
802.11a	6	5580	116	Bottom	Back	0	18	13.4	0.3870	0.05	2.88	1:1	1.12	19

*Larger than 5% drifts included to scaling factors

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11a	6	5785	157	Top	Front	0	18	17.62	0.674	-0.18	1.09	1:1	0.74	
802.11a	6	5785	157	Top	Back	0	18	17.62	0.6270	0.03	1.09	1:1	0.68	
802.11a	6	5785	157	Top	Left	5	18	17.62	0.043	-0.08	1.09	1:1	0.05	
802.11a	6	5785	157	Top	Right	5	18	17.62	0.905	0.06	1.09	1:1	0.99	
802.11a	6	5785	157	Top	Top	5	18	17.62	0.1140	0.21	1.09	1:1	0.12	
802.11a	6	5785	157	Top	Bottom	5	18	17.62	0.062	0.12	1.09	1:1	0.07	
802.11a	6	5660	132	Top	Right	5	18	15.09	0.586	-0.14	1.95	1:1	1.15	20
802.11a	6	5745	149	Top	Right	5	12.9	12.56	0.272	0.21	1.08	1:1	0.29	
802.11a	6	5825	165	Top	Right	5	16.5	13.52	0.4090	0.11	1.99	1:1	0.81	
802.11a	6	5785	157	Top	Right/ Repeat	5	18	17.62	0.925	0.20	1.09	1:1	1.01	

Mode	Data Rate [Mbps]	Freq [MHz]	Channel	Antenna	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
802.11a	6	5785	157	Bottom	Front	0	18	16.13	0.539	0.22*	1.62	1:1	0.87	
802.11a	6	5785	157	Bottom	Back	0	18	16.13	0.5250	0.15	1.54	1:1	0.81	
802.11a	6	5785	157	Bottom	Left	5	18	16.13	0.559	0.1	1.54	1:1	0.86	
802.11a	6	5785	157	Bottom	Right	5	18	16.13	0.019	-0.24*	1.63	1:1	0.03	
802.11a	6	5785	157	Bottom	Top	5	18	16.13	0.0220	-0.32*	1.66	1:1	0.04	
802.11a	6	5785	157	Bottom	Bottom	5	18	16.13	0.208	-0.08	1.54	1:1	0.32	
802.11a	6	5660	132	Bottom	Front	0	18	13.82	0.377	0.21	2.62	1:1	0.99	21
802.11a	6	5745	149	Bottom	Front	0	12.9	11.02	0.141	0.24*	1.63	1:1	0.23	
802.11a	6	5825	165	Bottom	Front	0	16.5	12.85	0.1730	-0.01	2.32	1:1	0.4	

*Larger than 5% drifts included to scaling factors

Bluetooth Low energy:

Mode	Freq [MHz]	Channel	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
BLE	2480	39	Front	0	3	1.94	0.024	0.13	1.28	1:1	0.03	22
BLE	2480	39	Back	0	3	1.94	0.014	-0.06	1.28	1:1	0.0008	
BLE	2480	39	Left	5	3	1.94	0**	N/A***	1.28	1:1	0**	
BLE	2480	39	Right	5	3	1.94	0.0071	0.1	1.28	1:1	0.001	
BLE	2480	39	Top	5	3	1.94	0.0041	0.5*	1.43	1:1	0.002	
BLE	2480	39	Bottom	5	3	1.94	0**	N/A***	1.28	1:1	0**	
BLE	2402	0	Front	0	3	-0.14	0.0104	-0.05	2.06	1:1	0.0005	
BLE	2440	20	Front	0	3	0.65	0.0173	0.2	1.72	1:1	0.003	

*Larger than 5% drifts included to scaling factors
** Measured result was very low, measurement system could not do zoom scan
*** Due to low E-field generated by DUT at the location of the drift measurement, the Power Drift is not applicable

Sensor Battery

Mode	Freq [MHz]	Channel	Test position	Test Separation [mm]	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Power Drift [dB]	Scaling Factor	Duty Cycle	Reported SAR1g [W/kg]	Plot #
MBAN	2430.5	26	Front	0	12	11.85	0.183	-0.14	1.04	1:1	0.19	
MBAN	2430.5	26	Back	0	12	11.85	0.103	-0.07	1.04	1:1	0.11	
MBAN	2430.5	26	Left	0	12	11.85	0.096	0.02	1.04	1:1	0.10	
MBAN	2430.5	26	Right	0	12	11.85	0.082	0.21	1.04	1:1	0.09	
MBAN	2430.5	26	Top	0	12	11.85	0.345	0.04	1.04	1:1	0.36	
MBAN	2362	0	Top	0	12	11.7	0.837	0.03	1.07	1:1	0.90	
MBAN	2395.4	13	Top	0	12	11.81	0.606	0	1.04	1:1	0.63	
MBAN	2463.2	39	Top	0	12	11.86	0.228	0.01	1.03	1:1	0.24	
MBAN	2498	52	Top	0	12	11.8	0.168	-0.03	1.05	1:1	0.18	
MBAN	2362	0	Top/Repeat	0	12	11.7	0.845	-0.01	1.07	1:1	0.91	23

7.2 Calculated NFC SAR Results

For simultaneous transmission evaluation the NFC 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.

The minimum separation distance between the user and the device is ≤5mm.

NFC SAR_{1g}= (1mW/5mm)*$(0.01356GHz)_{1/2}$/7.5=0.003 W/kg

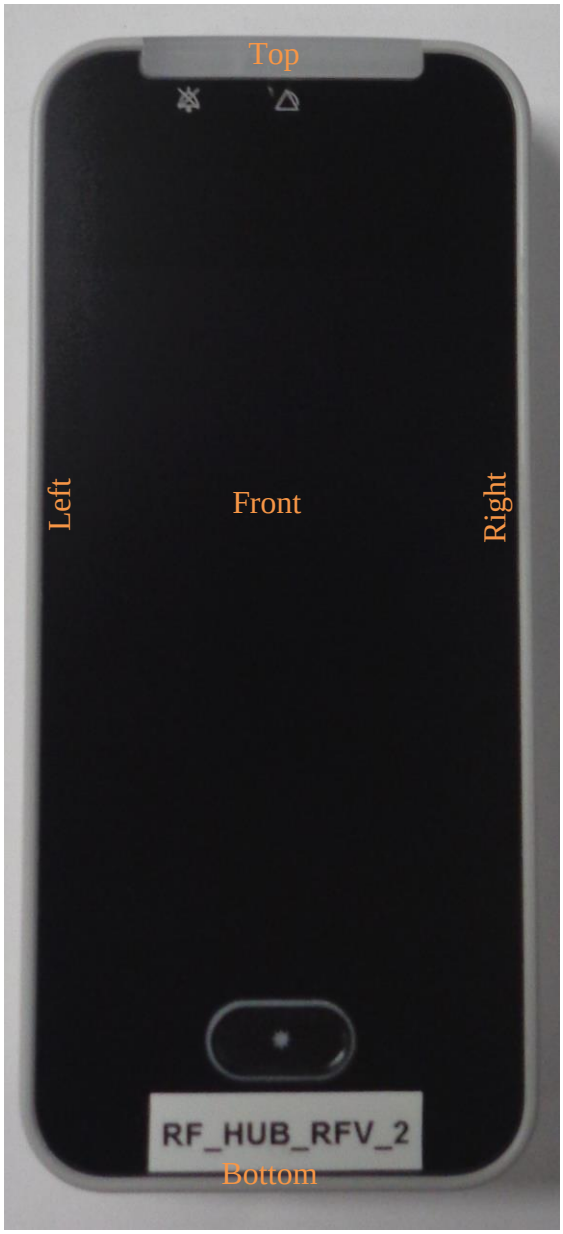
7.3 Simultaneous Transmission Analysis

Simultaneous transmission analysis for the maximum WLAN, maximum MBAN and maximum NFC is in the table below. Direct summation of SAR results was performed. Bluetooth Low Energy is using only WLAN top antenna thus it cannot be operated simultaneously with WLAN.

	Exposure Condition	Maximum Body SAR_{1g} [W/kg]					
	Test Position	**Front**	**Back**	**Left**	**Right**	**Top**	**Bottom**
WLAN	**WLAN 2.4 GHz:**	0.64	0.53	0.03	0.22	0.13	0.01
	WLAN 5 GHz Top Antenna:	0.93	0.73	0.08	1.17	0.16	0.07
	WLAN 5 GHz Bottom Antenna:	0.99	1.12	0.86	0.07	0.04	0.6
	Bluetooth Low Energy	0.03	0.0008	0	0.001	0.002	0
Maximum WLAN/BLE SAR:		0.99	1.12	0.86	1.17	0.16	0.6
MBAN	**MBAN Top Antenna:**	0.43	0.24	0.13	0.04	0.13	0.003
	MBAN Bottom Antenna:	0.25	0.2	0.01	0.14	0.01	0.13
Maximum MBAN SAR:		0.43	0.24	0.13	0.14	0.13	0.13
Maximum NFC SAR:		0.003	0.003	0.003	0.003	0.003	0.003
SAR Summation:		1.42	1.36	0.99	1.31	0.29	0.73

APPENDIX A: PHOTOS OF THE DUT

Size of the DUT is - HUB 63 × 141 × 21 mm, Sensor Battery: 35 x 55 x 20 mm



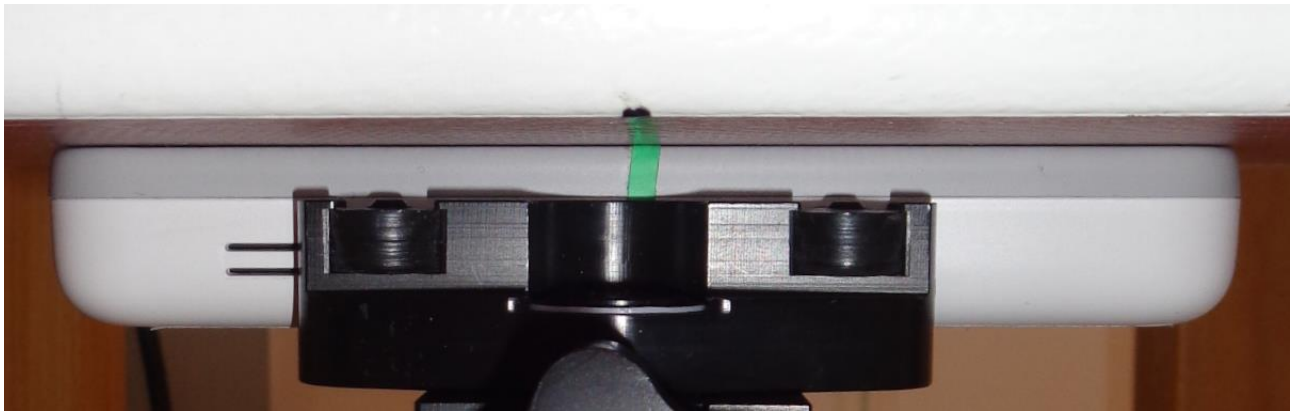
Front side of the HUB

Back side of the HUB and antenna locations

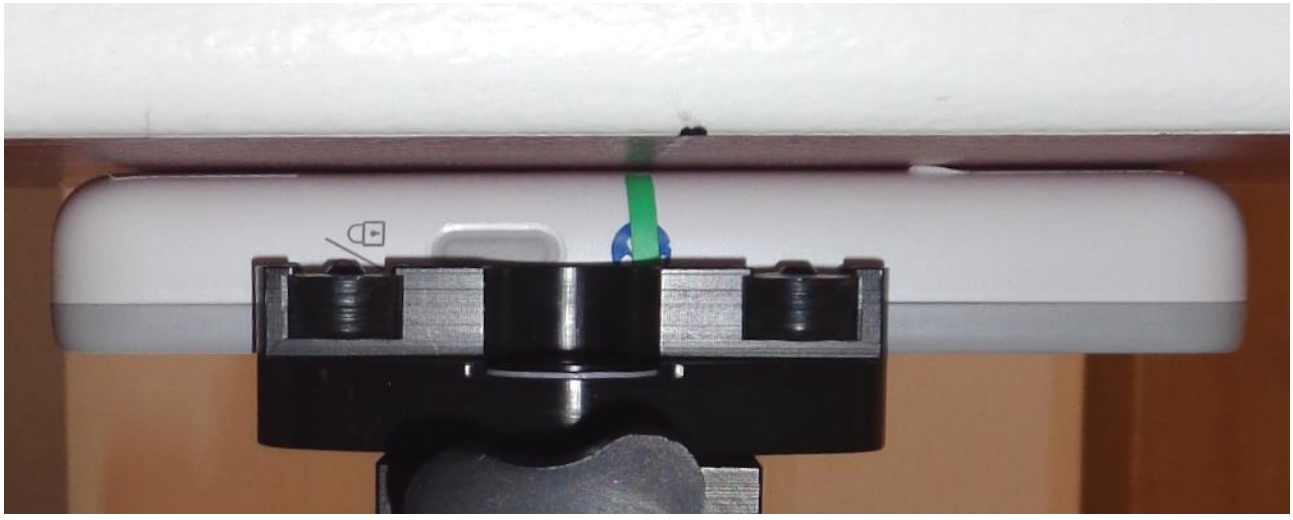
Front side of the Sensor Battery

Back side of the Sensor Battery

Sensor Battery with sensor



Front side of the HUB against the phantom, 0mm separation distance



Back side of the HUB against the phantom, 0mm separation distance

Left side of the HUB against the phantom, 5mm separation distance

Right side of the HUB against the phantom, 5mm separation distance

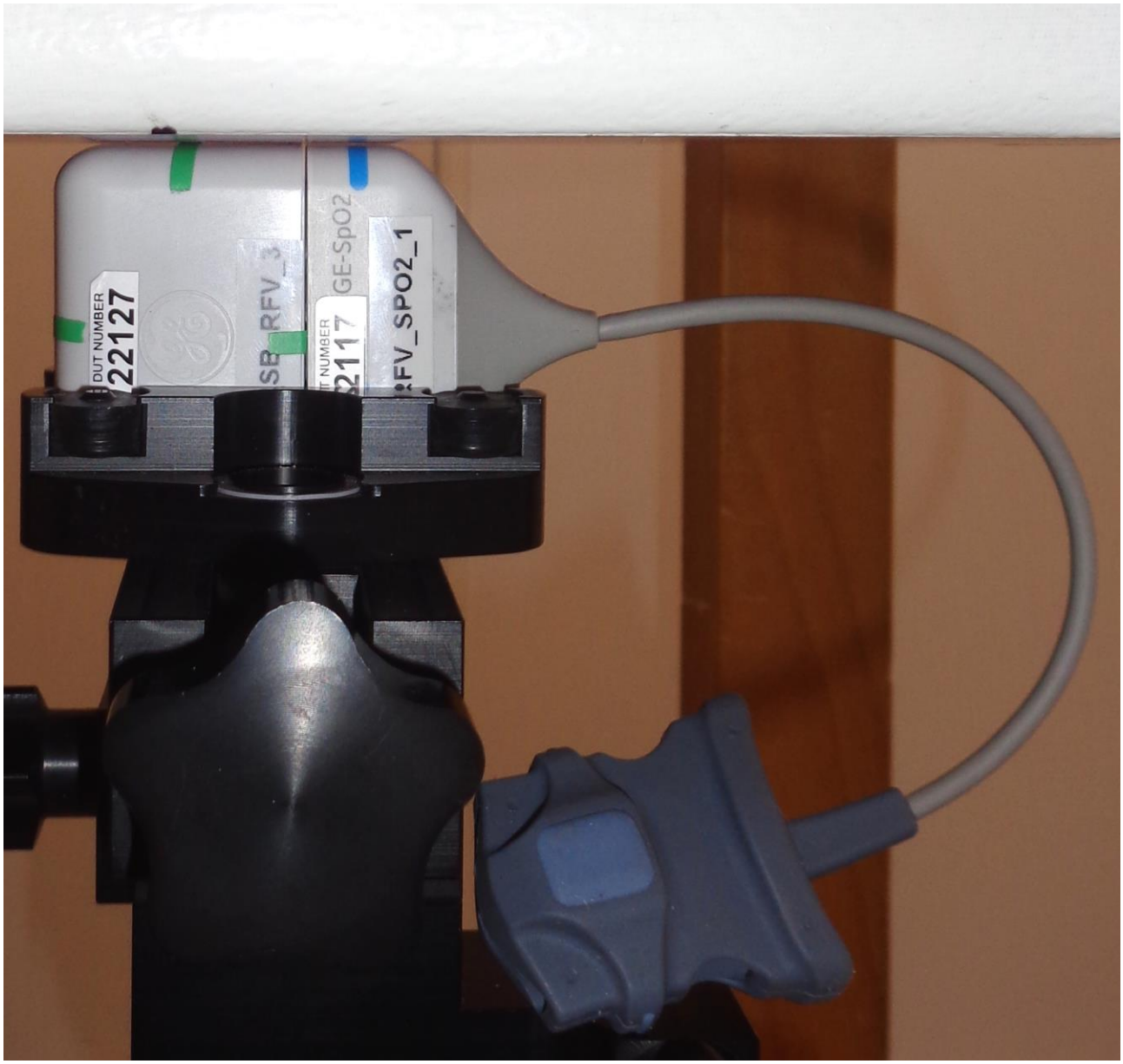
Top side of the HUB against the phantom, 5mm separation distance

Bottom side of the HUB against the phantom, 5mm separation distance

Front side of the Sensor Battery against the phantom, 0mm separation distance

Back side of the Sensor Battery against the phantom, 0mm separation distance

Left side of the Sensor Battery against the phantom, 0mm separation distance



Right side of the Sensor Battery against the phantom, 0mm separation distance

Top side of the Sensor Battery against the phantom, 0mm separation distance

APPENDIX B: SYSTEM CHECK SCAN

Plot 1

Date/Time: 01/12/2020 14.45.30

Test Laboratory: Verkotan Oy

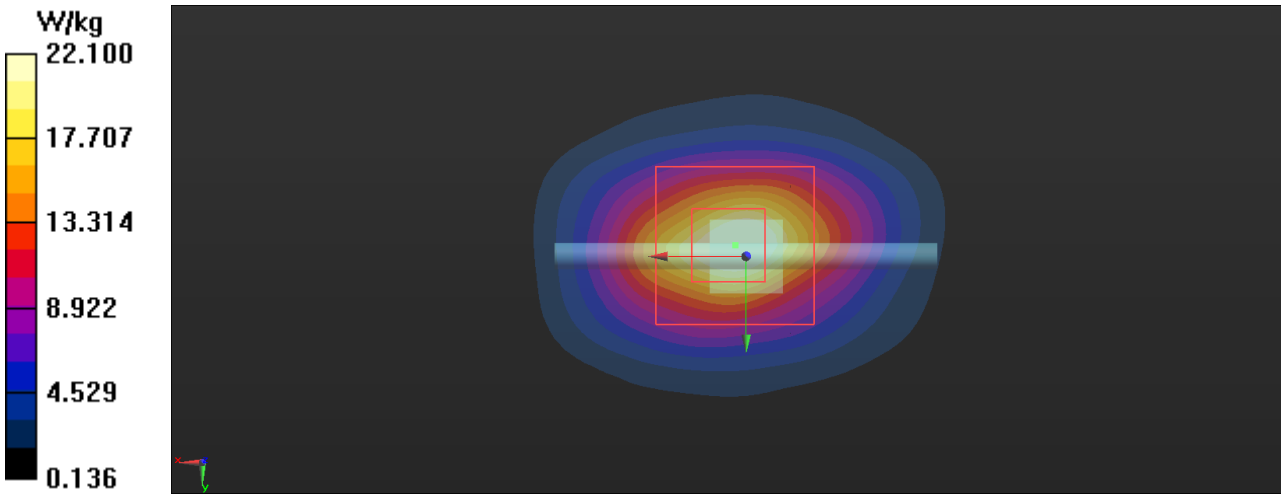
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:758

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.872 S/m; ε_r = 37.86; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2450 MHz; Calibrated: 28/04/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Area Scan (111x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 23.8 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 111.4 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.07 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 48.4%
Maximum value of SAR (measured) = 22.1 W/kg



Plot 2

Date/Time: 02/12/2020 15.01.47

Test Laboratory: Verkotan Oy

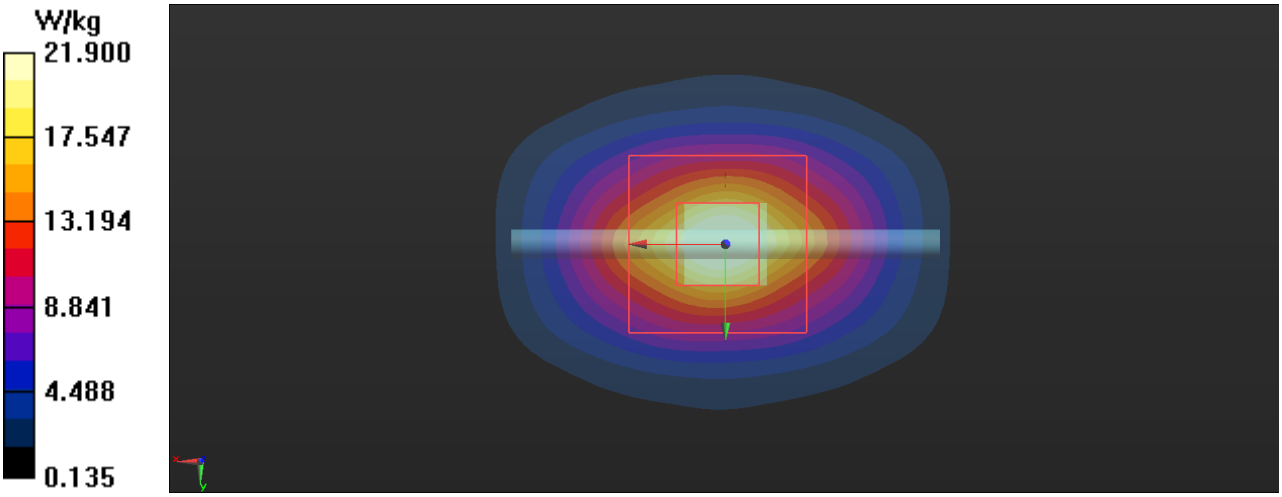
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:758

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.857 S/m; ε_r = 37.279; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2450 MHz; Calibrated: 28/04/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Area Scan (111x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 23.2 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 112.6 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 48.4%
Maximum value of SAR (measured) = 21.9 W/kg



Plot 3

Date/Time: 03/12/2020 16.08.28

Test Laboratory: Verkotan Oy

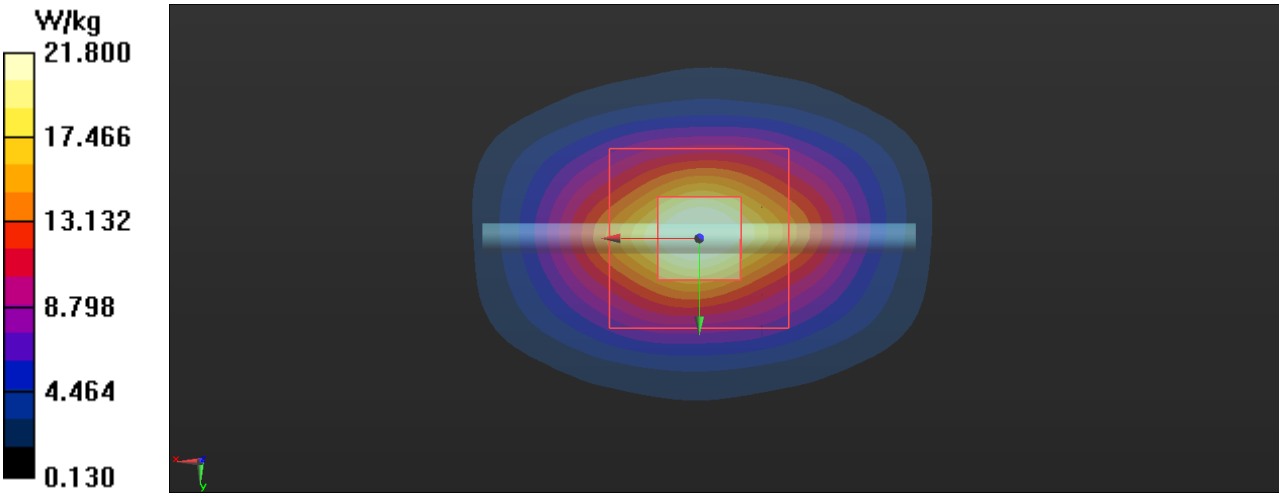
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:758

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.786 S/m; ε_r = 37.152; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2450 MHz; Calibrated: 28/04/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Area Scan (111x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 23.0 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 114.9 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.96 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 48%
Maximum value of SAR (measured) = 21.8 W/kg



Plot 4

Date/Time: 07/12/2020 8.34.15

Test Laboratory: Verkotan Oy

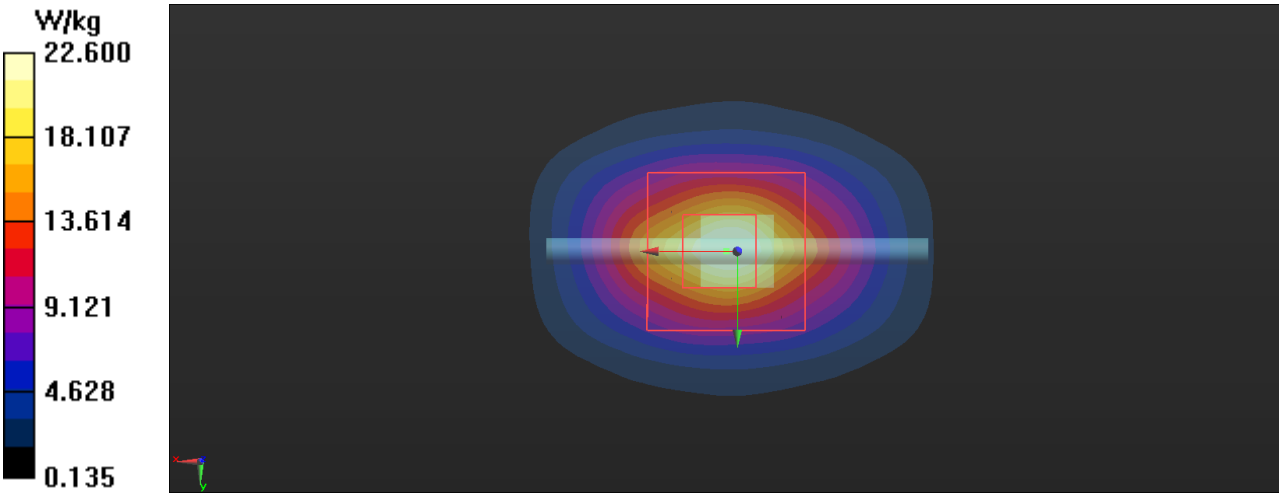
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:758

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.853 S/m; ε_r = 37.221; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2450 MHz; Calibrated: 28/04/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Area Scan (111x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 23.4 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 115.2 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.18 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 48.2%
Maximum value of SAR (measured) = 22.6 W/kg



Plot 5

Date/Time: 08/12/2020 8.28.19

Test Laboratory: Verkotan Oy

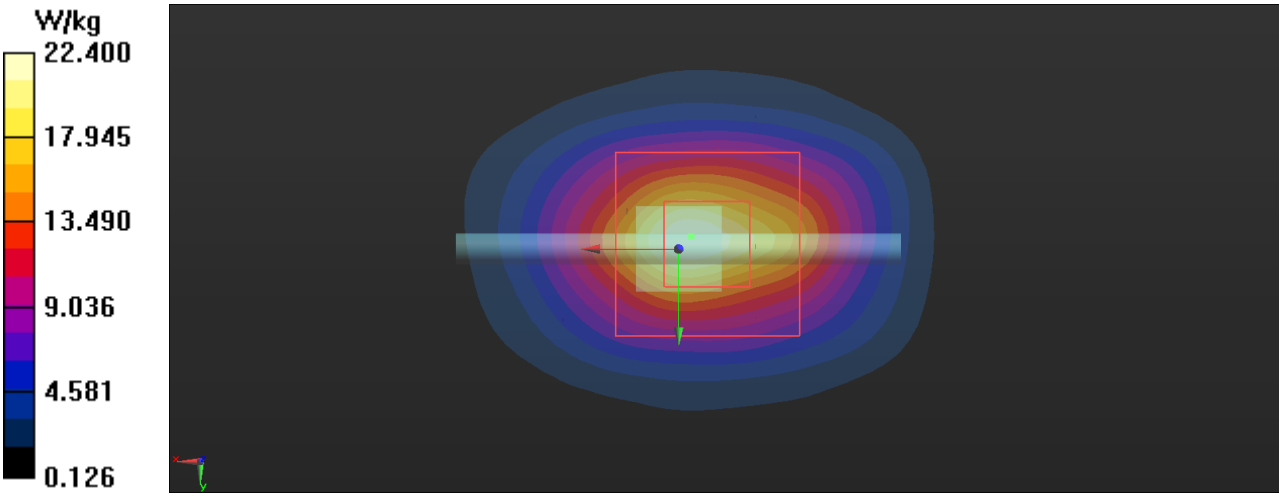
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.841 S/m; ε_r = 38.64; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2450 MHz; Calibrated: 28/04/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Area Scan (111x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 22.5 W/kg
Configuration/system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 112.3 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.13 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 48.2%
Maximum value of SAR (measured) = 22.4 W/kg



Plot 6

Date/Time: 08/12/2020 14.17.10

Test Laboratory: Verkotan Oy

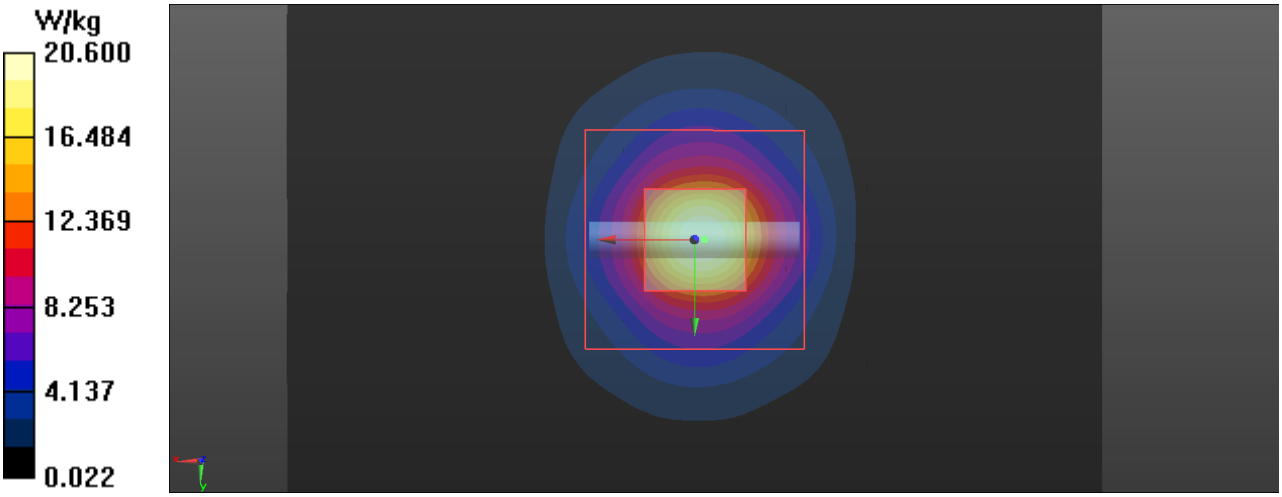
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.518 S/m; ε_r = 34.278; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 5.18, 5.18) @ 5250 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 74.20 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 7.97 W/kg; SAR(10 g) = 2.26 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 6.9 mm
Ratio of SAR at M2 to SAR at M1 = 65.7%
Maximum value of SAR (measured) = 20.3 W/kg
Configuration/system check/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.6 W/kg



Plot 7

Date/Time: 09/12/2020 15.04.07

Test Laboratory: Verkotan Oy

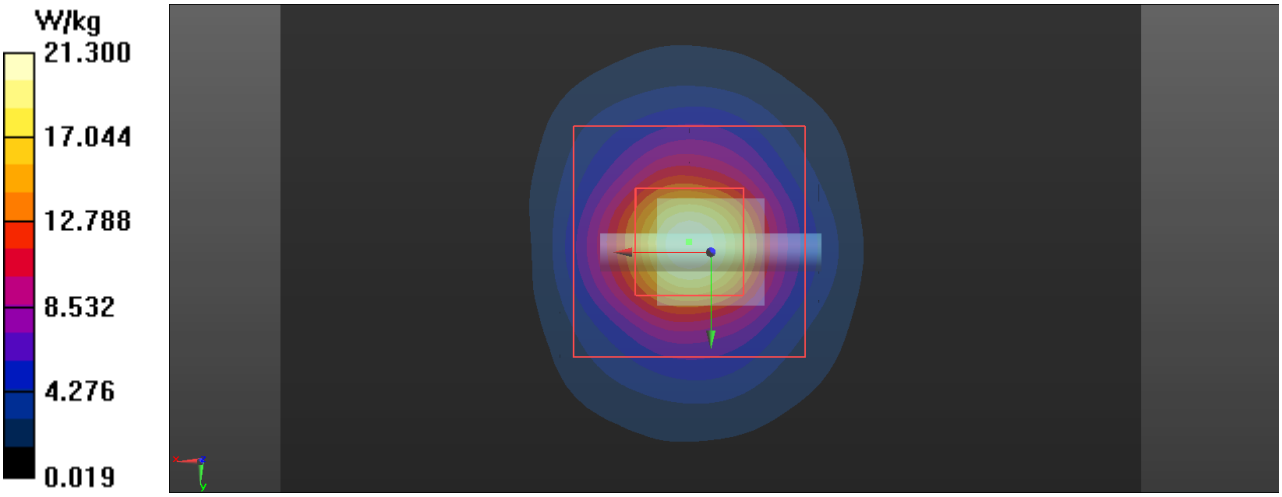
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.624 S/m; ε_r = 34.622; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 5.18, 5.18) @ 5250 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.70 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 8.2 W/kg; SAR(10 g) = 2.34 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.4%
Maximum value of SAR (measured) = 20.8 W/kg
Configuration/system check/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 21.3 W/kg



Plot 8

Date/Time: 10/12/2020 12.45.47

Test Laboratory: Verkotan Oy

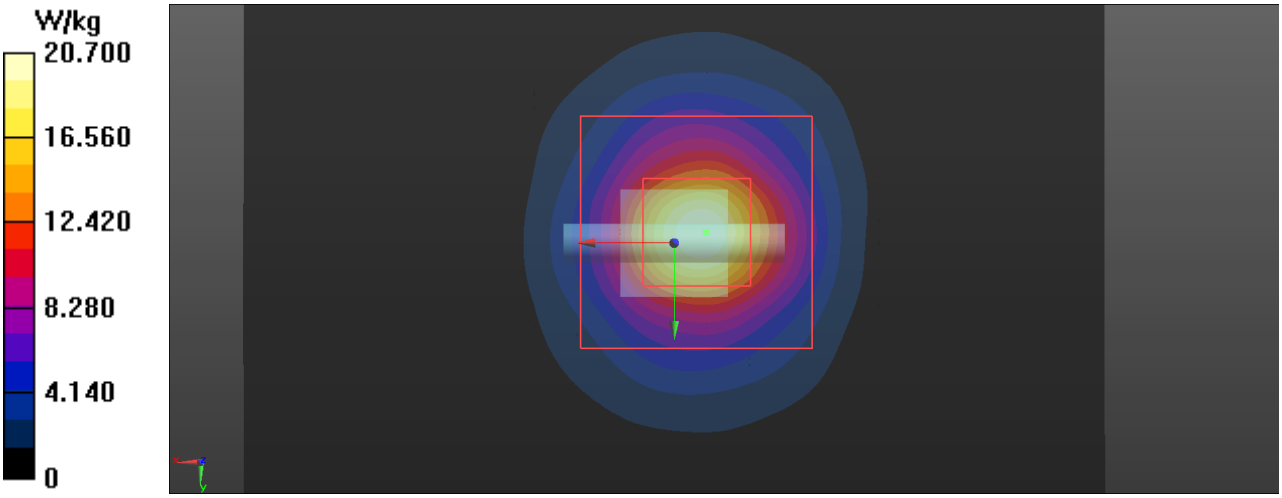
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5600 MHz; σ = 4.996 S/m; ε_r = 34.349; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.56, 4.56, 4.56) @ 5600 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.80 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 34.6 W/kg
SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.27 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 63%
Maximum value of SAR (measured) = 20.8 W/kg
Configuration/system check/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.7 W/kg



Plot 9

Date/Time: 14/12/2020 8.13.55

Test Laboratory: Verkotan Oy

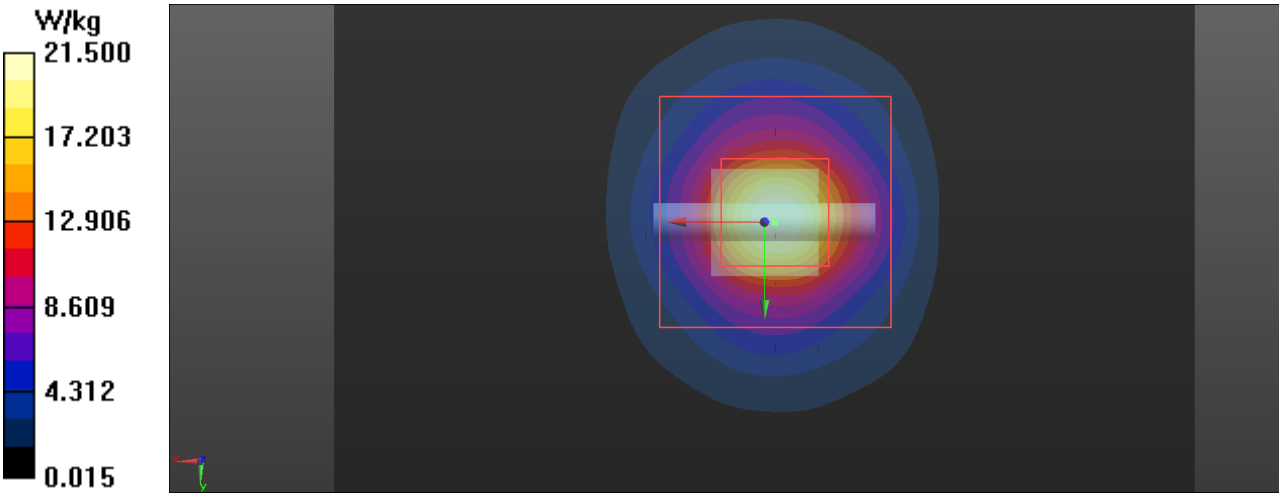
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5600 MHz; σ = 5.026 S/m; ε_r = 34.373; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.56, 4.56, 4.56) @ 5600 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.94 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 35.6 W/kg
SAR(1 g) = 8.26 W/kg; SAR(10 g) = 2.32 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.1 mm
Ratio of SAR at M2 to SAR at M1 = 63.7%
Maximum value of SAR (measured) = 21.5 W/kg
Configuration/system check/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 21.5 W/kg



Plot 10

Date/Time: 14/12/2020 12.59.50

Test Laboratory: Verkotan Oy

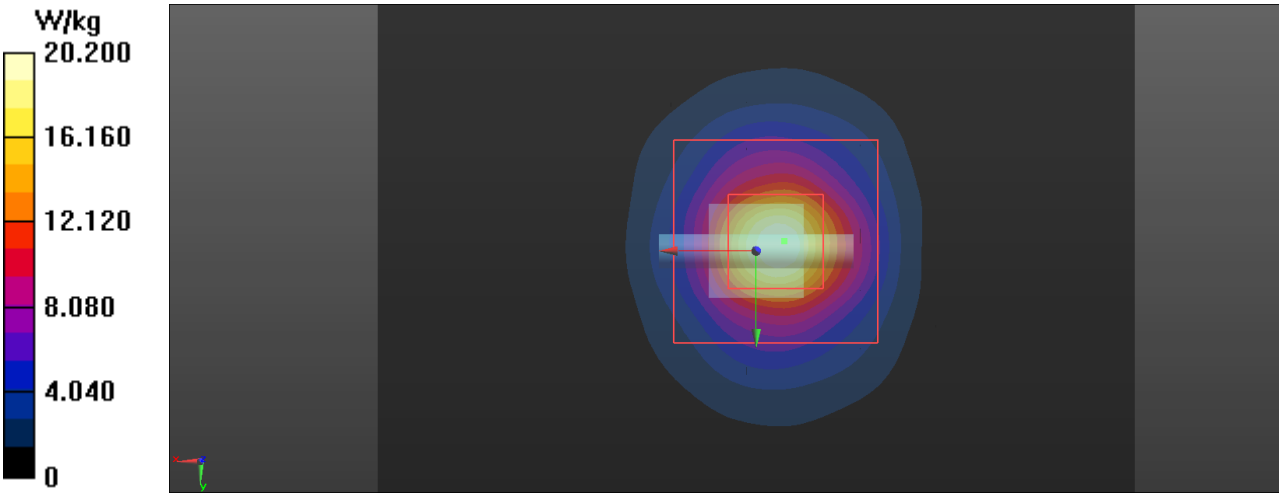
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5750 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5750 MHz; σ = 5.204 S/m; ε_r = 34.106; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.7, 4.7, 4.7) @ 5750 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.18 V/m; Power Drift = 0.26 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 7.61 W/kg; SAR(10 g) = 2.15 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 61.5%
Maximum value of SAR (measured) = 20.0 W/kg
Configuration/system check/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.2 W/kg



Plot 11

Date/Time: 04/01/2021 12.57.53

Test Laboratory: Verkotan Oy

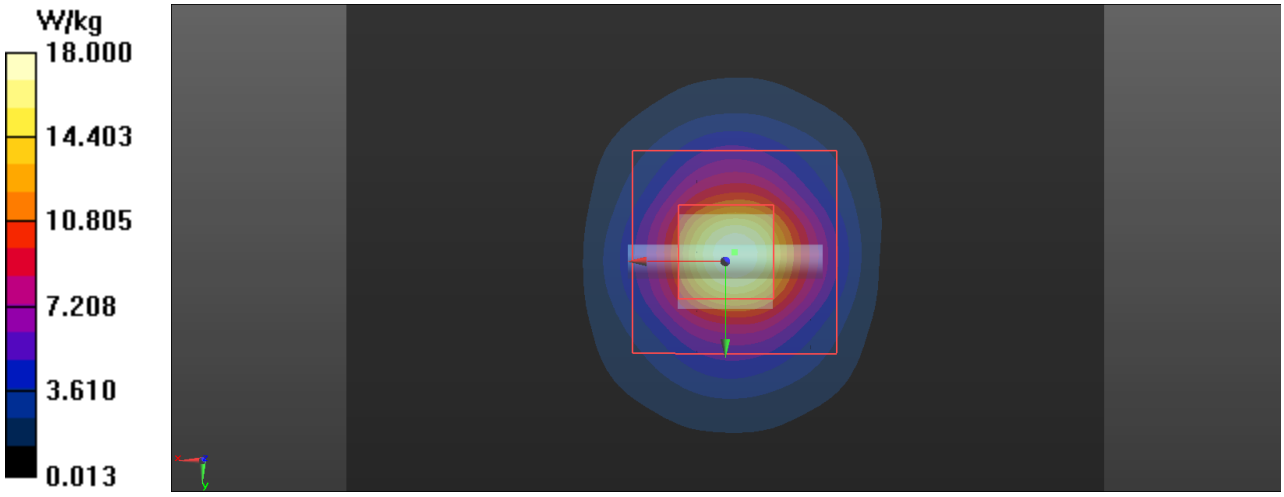
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1014

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5750 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5750 MHz; σ = 5.256 S/m; ε_r = 33.723; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.7, 4.7, 4.7) @ 5750 MHz; Calibrated: 25/03/2020
  -
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: xxxx
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/system check/Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.25 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 34.8 W/kg
SAR(1 g) = 6.92 W/kg; SAR(10 g) = 1.96 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 6.4 mm
Ratio of SAR at M2 to SAR at M1 = 61.2%
Maximum value of SAR (measured) = 18.5 W/kg
Configuration/system check/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.0 W/kg



Plot 12

Date/Time: 03.06.2022 9.25.30

Test Laboratory: Verkotan Oy

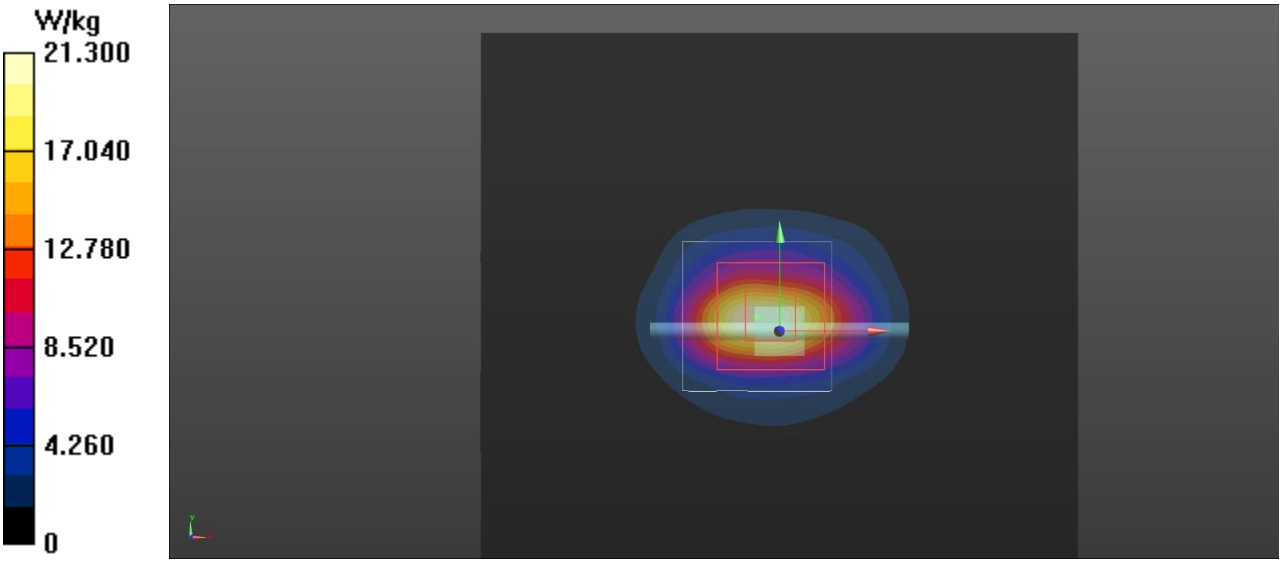
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:758

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.896 S/m; ε_r = 40.585; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(7.77, 7.77, 7.77) @ 2450 MHz; Calibrated: 28.02.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
- Electronics: DAE4 Sn1332; Calibrated: 23.02.2022
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: xxxx
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/System check 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.83 V/m; Power Drift = -0.25 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.86 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 47%
Maximum value of SAR (measured) = 21.8 W/kg
Configuration/System check 2450MHz/Area Scan (81x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 21.3 W/kg



APPENDIX C: MEASUREMENT SCANS

Plot 13

Date/Time: 02/12/2020 14.31.11

Test Laboratory: Verkotan Oy

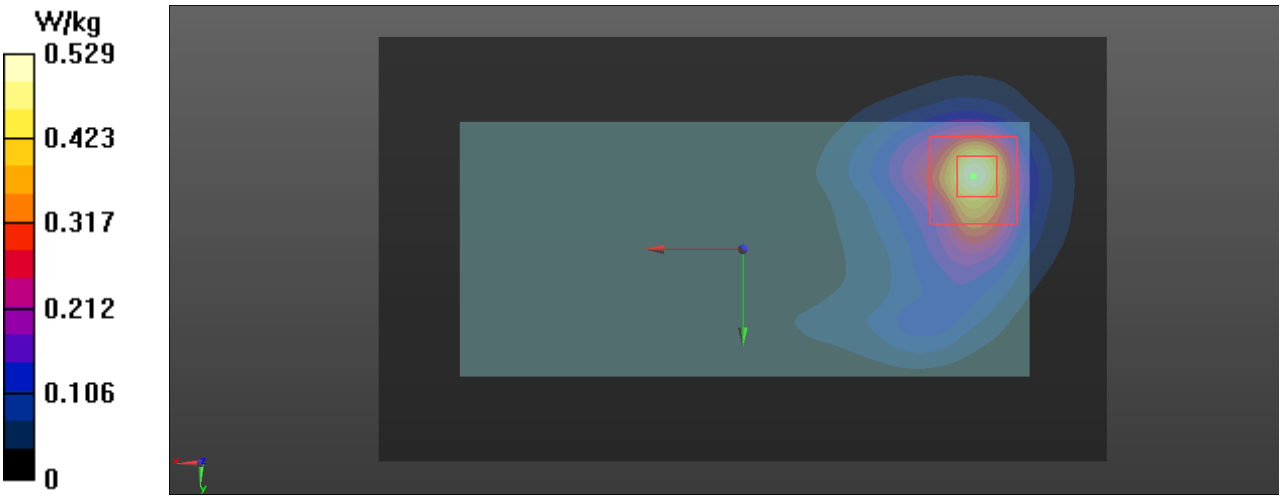
DUT: GE Healthcare HUB

Communication System: UID 0, MBAN (0); Communication System Band: MBAN; Frequency: 2395.4 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2395.4 MHz; σ = 1.831 S/m; ε_r = 37.947; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2395.4 MHz; Calibrated: 28/04/2020
- 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 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

HUB Top Antenna/Hub MBAN Top Antenna Front CH 13 LOW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.60 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.606 W/kg
SAR(1 g) = 0.277 W/kg; SAR(10 g) = 0.128 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 45.6%
Maximum value of SAR (measured) = 0.466 W/kg
HUB Top Antenna/Hub MBAN Top Antenna Front CH 13 LOW/Area Scan (121x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.529 W/kg



Plot 14

Date/Time: 03/12/2020 13.09.57

Test Laboratory: Verkotan Oy

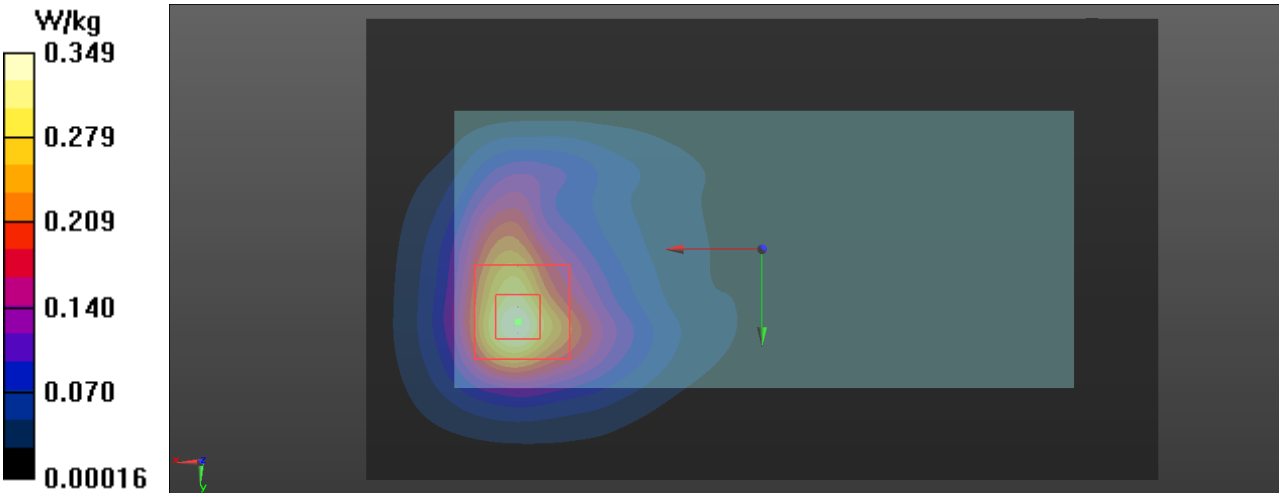
DUT: GE Healthcare HUB

Communication System: UID 0, MBAN (0); Communication System Band: MBAN; Frequency: 2362 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2362 MHz; σ = 1.793 S/m; ε_r = 37.429; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2362 MHz; Calibrated: 28/04/2020
- 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 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

MBAN_WLAN Hub/Hub MBAN Bottom Antenna Front CH 0 LOW/Area Scan (121x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.349 W/kg
MBAN_WLAN Hub/Hub MBAN Bottom Antenna Front CH 0 LOW/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.18 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.427 W/kg
SAR(1 g) = 0.213 W/kg; SAR(10 g) = 0.105 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 12 mm
Ratio of SAR at M2 to SAR at M1 = 49.9%
Maximum value of SAR (measured) = 0.349 W/kg



Plot 15

Date/Time: 04/12/2020 14.05.01

Test Laboratory: Verkotan Oy

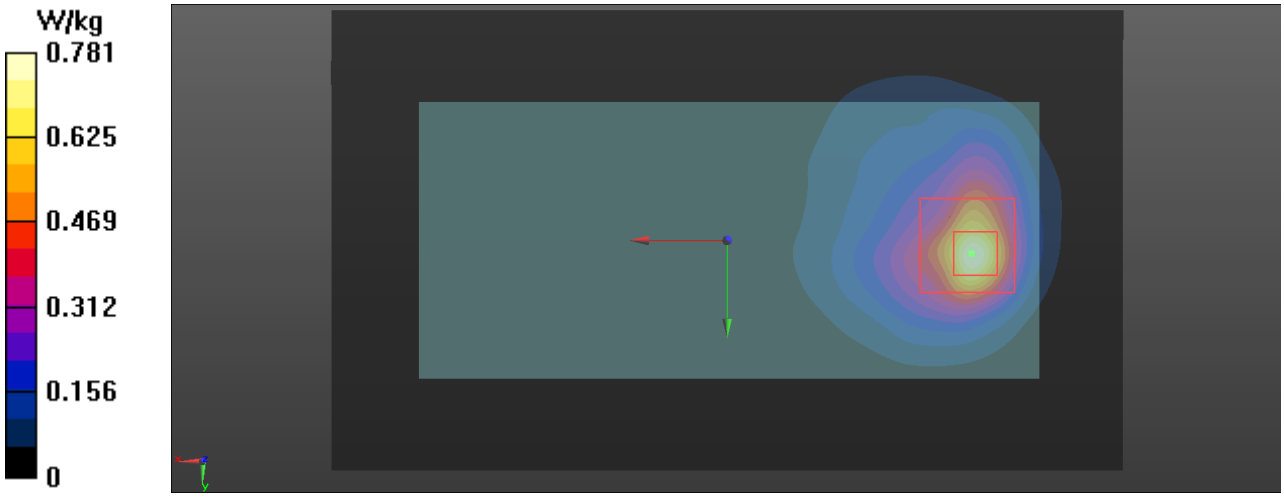
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN 2.4 (0); Communication System Band: WLAN2.4GHz; Frequency: 2462 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 2462 MHz; σ = 1.795 S/m; ε_r = 37.147; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2462 MHz; Calibrated: 28/04/2020
- 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 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub WLAN 2.4 Front 0mm high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.13 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.799 W/kg
SAR(1 g) = 0.370 W/kg; SAR(10 g) = 0.177 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 8.2 mm
Ratio of SAR at M2 to SAR at M1 = 46.3%
Maximum value of SAR (measured) = 0.608 W/kg
Hub WLAN 2.4 Front 0mm high/Area Scan (121x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.781 W/kg



Plot 16

Date/Time: 09/12/2020 9.37.30

Test Laboratory: Verkotan Oy

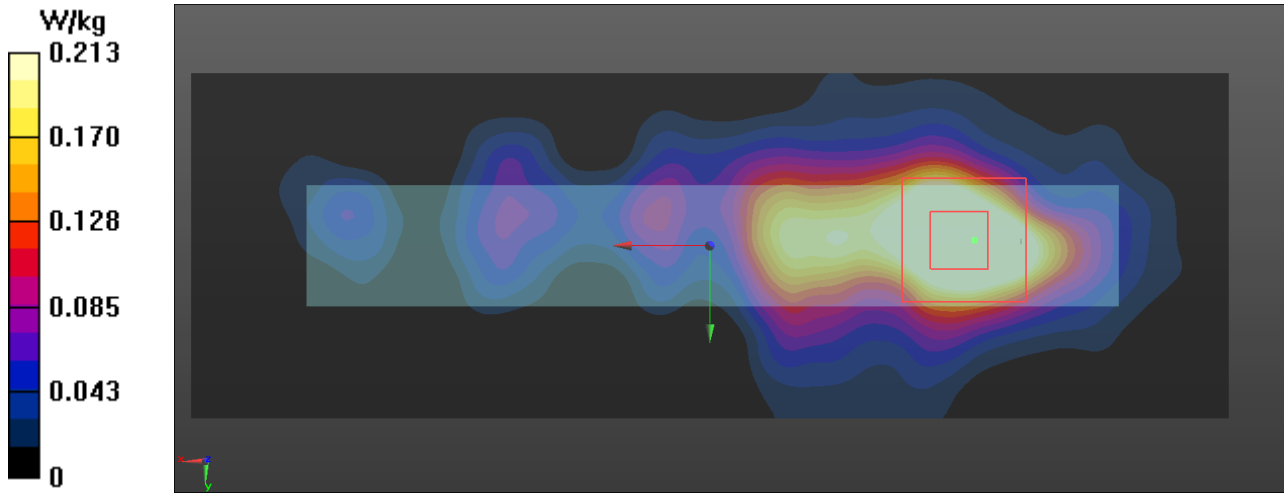
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5180 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5180 MHz; σ = 4.438 S/m; ε_r = 34.392; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 5.18, 5.18) @ 5180 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub 5WLAN Right Side top antenna LOW/Zoom Scan 2 (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.976 V/m; Power Drift = 0.22 dB
Peak SAR (extrapolated) = 0.779 W/kg
SAR(1 g) = 0.219 W/kg; SAR(10 g) = 0.073 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 8.2 mm
Ratio of SAR at M2 to SAR at M1 = 66%
Maximum value of SAR (measured) = 0.500 W/kg
Hub 5WLAN Right Side top antenna LOW/Area Scan (181x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.414 W/kg



Plot 17

Date/Time: 10/12/2020 11.46.52

Test Laboratory: Verkotan Oy

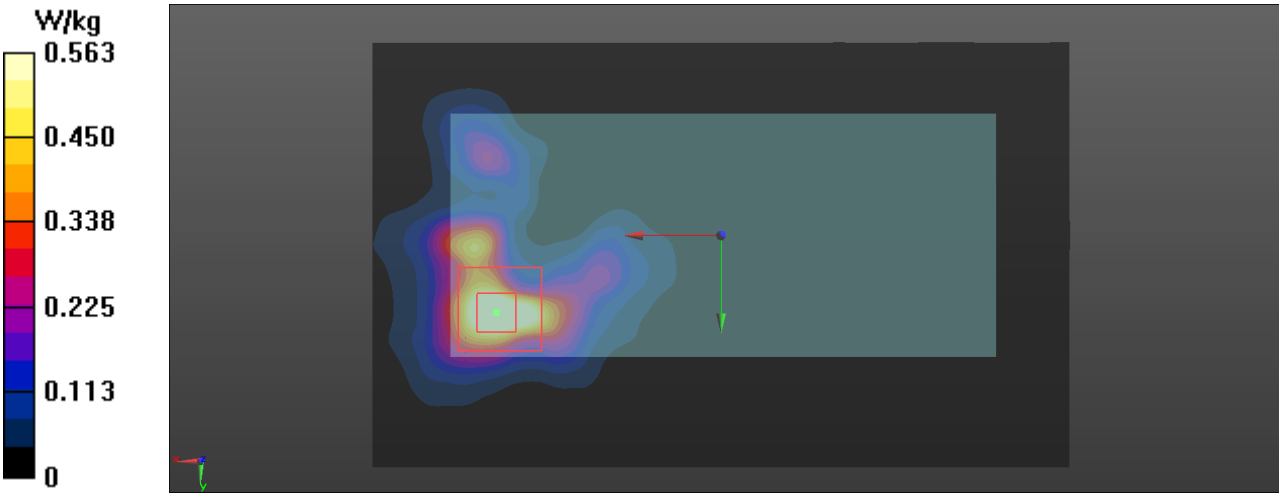
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5240 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5240 MHz; σ = 4.614 S/m; ε_r = 34.643; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(5.18, 5.18, 5.18) @ 5240 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 25.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub WLAN5 Back Bottom antenna HIGH/Area Scan (181x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.718 W/kg
Hub WLAN5 Back Bottom antenna HIGH/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 6.092 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.293 W/kg; SAR(10 g) = 0.095 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.5 mm
Ratio of SAR at M2 to SAR at M1 = 65.6%
Maximum value of SAR (measured) = 0.693 W/kg



Plot 18

Date/Time: 11/12/2020 14.12.12

Test Laboratory: Verkotan Oy

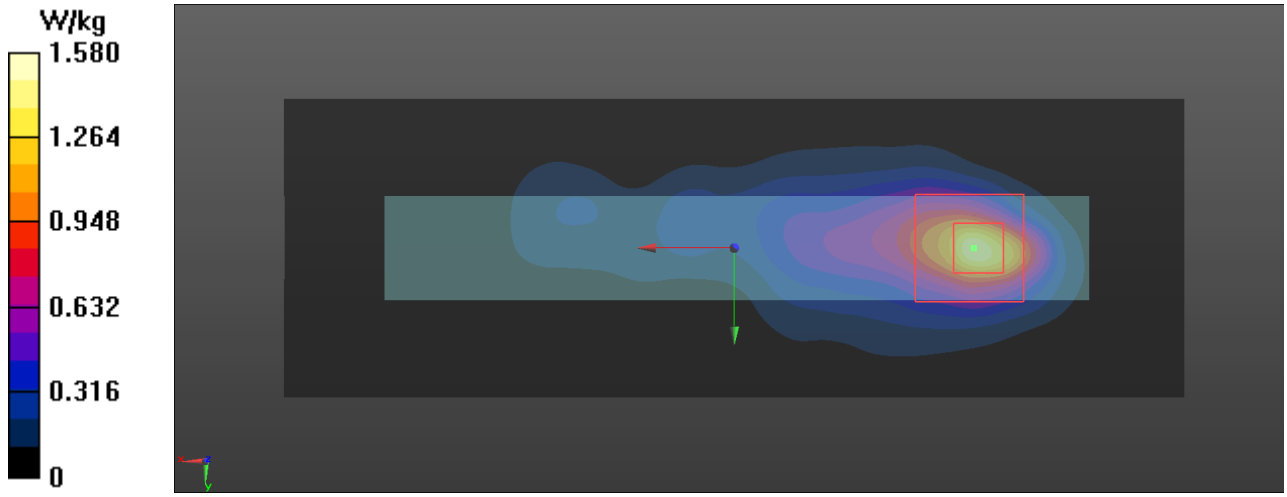
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5580 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5580 MHz; σ = 4.971 S/m; ε_r = 34.38; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.56, 4.56, 4.56) @ 5580 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 25.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub 5WLAN Right Side TOP antenna/Area Scan (181x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.47 W/kg
Hub 5WLAN Right Side TOP antenna/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 11.61 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.59 W/kg
SAR(1 g) = 0.661 W/kg; SAR(10 g) = 0.223 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.5 mm
Ratio of SAR at M2 to SAR at M1 = 62.9%
Maximum value of SAR (measured) = 1.58 W/kg



Plot 19

Date/Time: 14/12/2020 12.15.47

Test Laboratory: Verkotan Oy

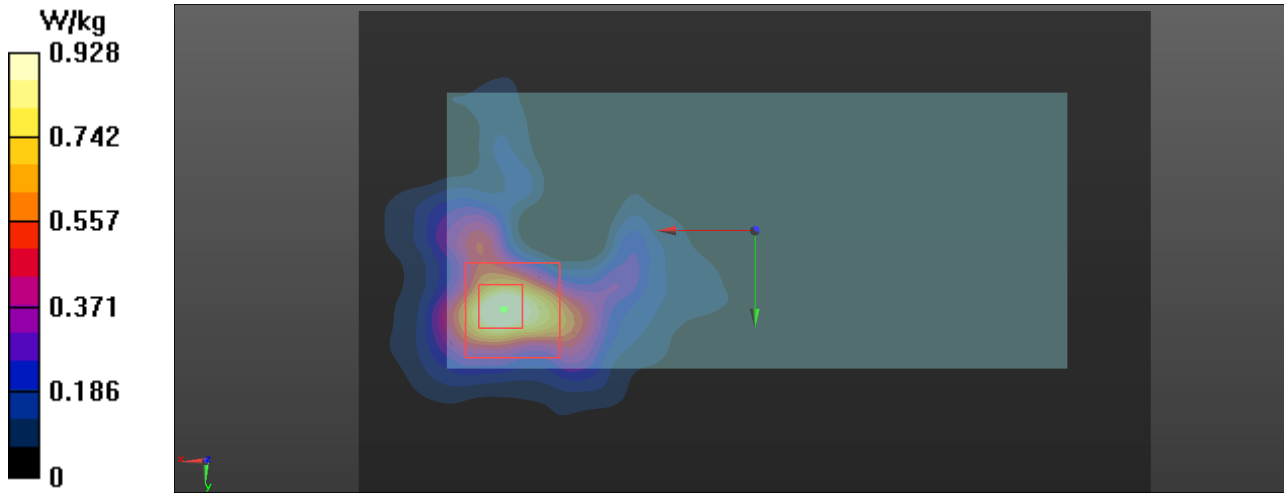
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5580 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5580 MHz; σ = 5.002 S/m; ε_r = 34.408; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.56, 4.56, 4.56) @ 5580 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 25.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub WLAN5 Back Bottom antenna HIGH/Area Scan (181x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.03 W/kg
Hub WLAN5 Back Bottom antenna HIGH/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 5.738 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.387 W/kg; SAR(10 g) = 0.127 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.6 mm
Ratio of SAR at M2 to SAR at M1 = 62.4%
Maximum value of SAR (measured) = 0.928 W/kg



Plot 20

Date/Time: 15/12/2020 12.41.08

Test Laboratory: Verkotan Oy

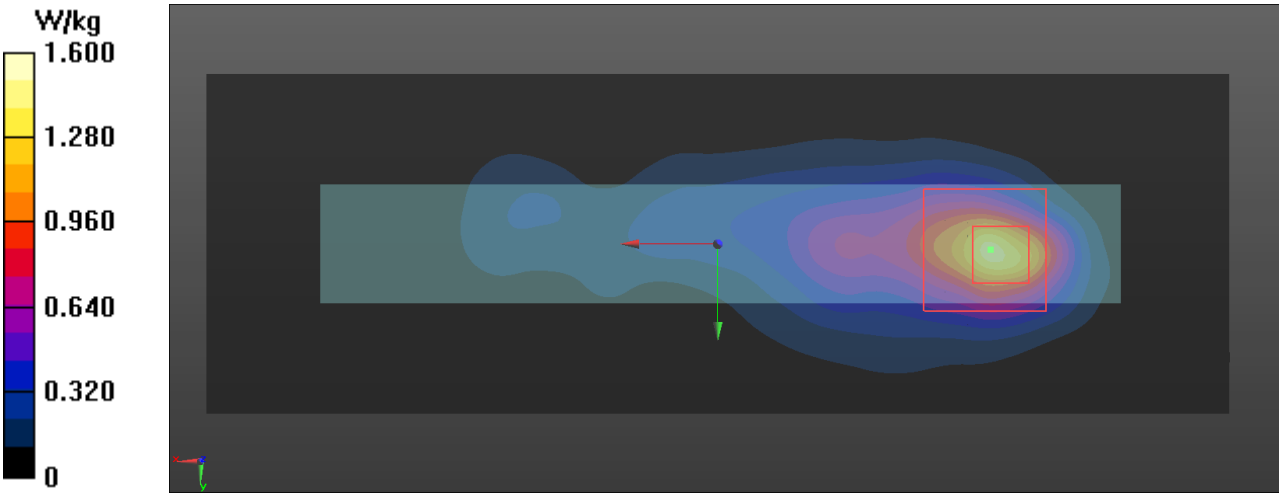
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5660 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5660 MHz; σ = 5.1 S/m; ε_r = 34.251; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.56, 4.56, 4.56) @ 5660 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub 5WLAN Right Side Top antenna low/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 10.99 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 2.35 W/kg
SAR(1 g) = 0.586 W/kg; SAR(10 g) = 0.195 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.6 mm
Ratio of SAR at M2 to SAR at M1 = 62.6%
Maximum value of SAR (measured) = 1.43 W/kg
Hub 5WLAN Right Side Top antenna low/Area Scan (181x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.44 W/kg



Plot 21

Date/Time: 14/12/2020 18.44.23

Test Laboratory: Verkotan Oy

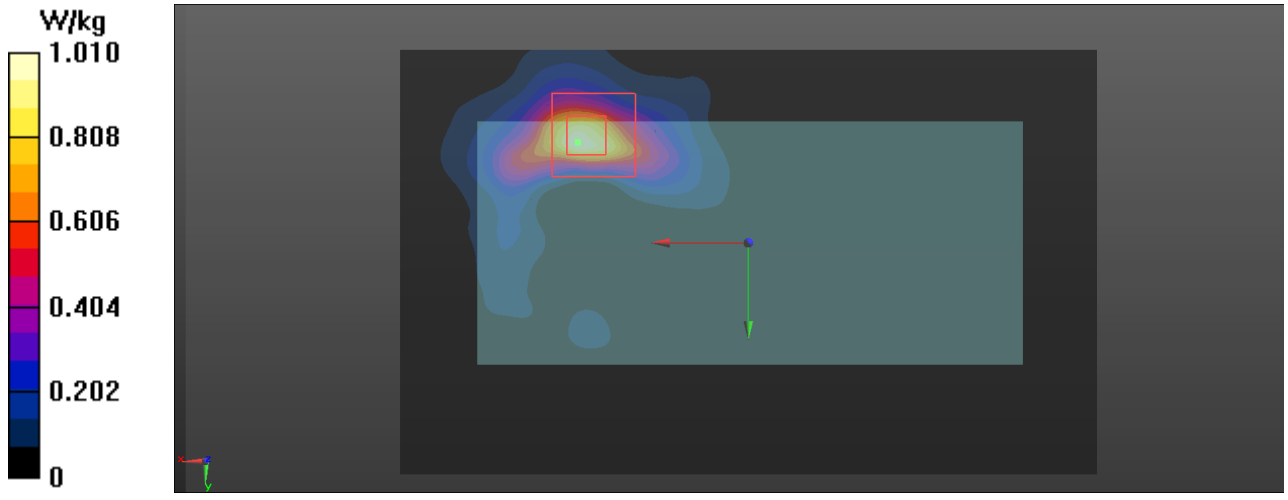
DUT: GE Healthcare HUB

Communication System: UID 0, WLAN5GHz (0); Communication System Band: 5GHz; Frequency: 5660 MHz;Communication System PAR: 0 dB;
Medium parameters used: f = 5660 MHz; σ = 5.1 S/m; ε_r = 34.251; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(4.56, 4.56, 4.56) @ 5660 MHz; Calibrated: 25/03/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), z = 25.0, -4.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Hub WLAN5 Front Bottom antenna/Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 6.636 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.377 W/kg; SAR(10 g) = 0.120 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 60.6%
Maximum value of SAR (measured) = 0.921 W/kg
Hub WLAN5 Front Bottom antenna/Area Scan (181x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.01 W/kg



Plot 22

Date/Time: 03.06.2022 10.55.48

Test Laboratory: Verkotan Oy

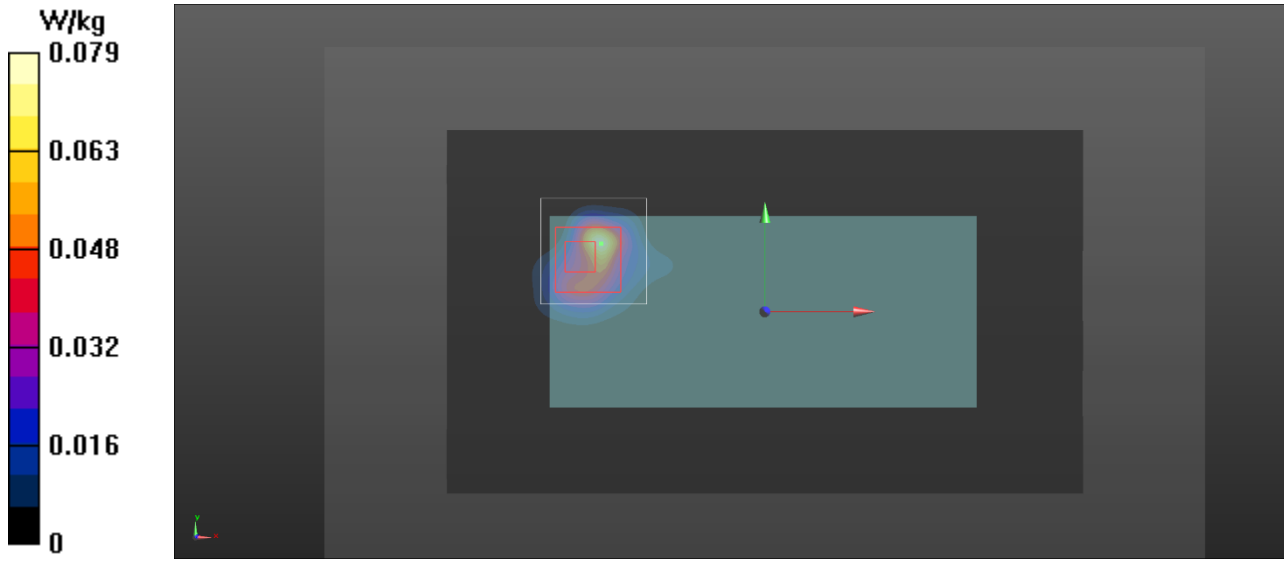
DUT: GE Healthcare HUB

Communication System: UID 0, Bluetooth (0); Communication System Band: Bluetooth; Frequency: 2480 MHz;Communication System PAR: 4.771 dB; PMF: 1
Medium parameters used: f = 2480 MHz; σ = 1.919 S/m; ε_r = 40.532; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN7447; ConvF(7.77, 7.77, 7.77) @ 2480 MHz; Calibrated: 28.02.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 31.0, -4.0
- Electronics: DAE4 Sn1332; Calibrated: 23.02.2022
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: xxxx
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Configuration/Hub Bluetooth High, Front 0mm/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.134 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.0570 W/kg
SAR(1 g) = 0.024 W/kg; SAR(10 g) = 0.00987 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 37%
Maximum value of SAR (measured) = 0.0432 W/kg
Configuration/Hub Bluetooth High, Front 0mm/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0792 W/kg



Plot 23

Date/Time: 07/12/2020 14.44.35

Test Laboratory: Verkotan Oy

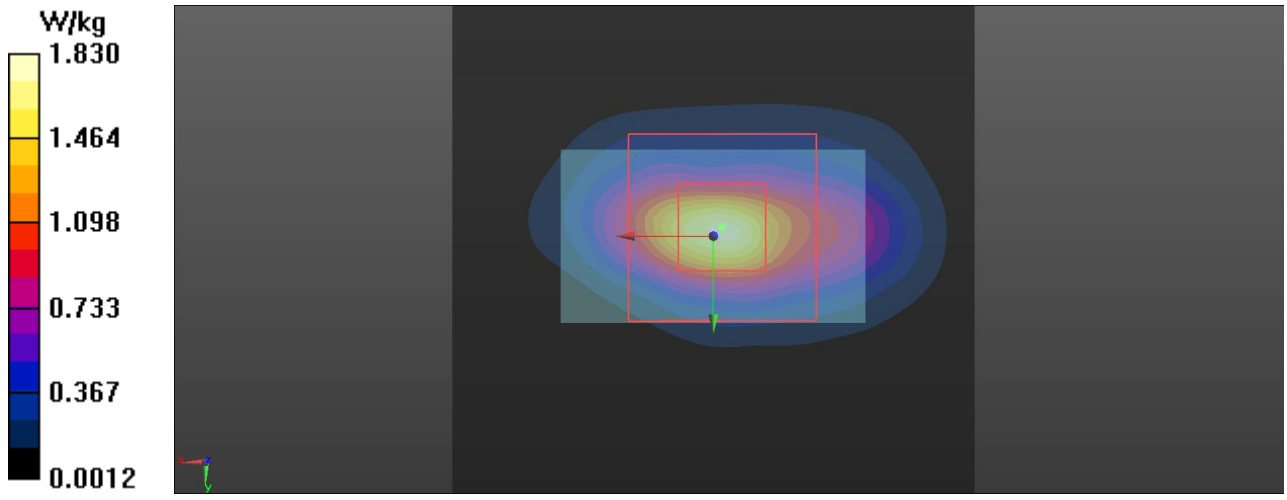
DUT: GE Healthcare Sensor Battery

Communication System: UID 0, MBAN (0); Communication System Band: MBAN; Frequency: 2362 MHz;Communication System PAR: 0 dB;
Medium parameters used (interpolated): f = 2362 MHz; σ = 1.785 S/m; ε_r = 37.363; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY Configuration:

- Probe: EX3DV4 - SN3892; ConvF(7.48, 7.48, 7.48) @ 2362 MHz; Calibrated: 28/04/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn756; Calibrated: 17/03/2020
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx;
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Sensor MBAN Top 0mm LOW Repeat/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.75 W/kg
Sensor MBAN Top 0mm LOW Repeat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.63 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.47 W/kg
SAR(1 g) = 0.845 W/kg; SAR(10 g) = 0.310 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 5 mm
Ratio of SAR at M2 to SAR at M1 = 34.5%
Maximum value of SAR (measured) = 1.83 W/kg



APPENDIX D: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

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

S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 0108

Client Verkotan **Certificate No: EX3-3892_Apr20**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3892
Calibration procedure(s)	QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7 Calibration procedure for dosimetric E-field probes
Calibration date:	April 28, 2020

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	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: CC2552 (20x)	31-Mar-20 (No. 217-03106)	Apr-21
DAE4	SN: 660	27-Dec-19 (No. DAE4-660_Dec19)	Dec-20
Reference Probe ES3DV2	SN: 3013	31-Dec-19 (No. ES3-3013_Dec19)	Dec-20
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-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-19)	In house check: Oct-20

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

Issued: April 28, 2020

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)
600	42.7	0.88	10.46	10.46	10.46	0.10	1.20	± 13.3 %
750	41.9	0.89	10.21	10.21	10.21	0.39	0.96	± 12.0 %
900	41.5	0.97	9.95	9.95	9.95	0.38	0.92	± 12.0 %
1750	40.1	1.37	8.52	8.52	8.52	0.28	0.80	± 12.0 %
1900	40.0	1.40	8.26	8.26	8.26	0.36	0.80	± 12.0 %
2450	39.2	1.80	7.48	7.48	7.48	0.33	0.90	± 12.0 %
2600	39.0	1.96	7.33	7.33	7.33	0.34	0.90	± 12.0 %
4400	36.9	3.84	5.98	5.98	5.98	0.40	1.60	± 13.1 %
4600	36.7	4.04	5.77	5.77	5.77	0.35	1.80	± 13.1 %
4800	36.4	4.25	5.51	5.51	5.51	0.40	1.80	± 13.1 %

[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.

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SWISS ACCREDITATION sas.admin.ch SCS 0108

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Accreditation No.: SCS 0108

Client Verkotan

Certificate No: EX3-7447_Mar20

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7447

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: March 25, 2020

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	27-Dec-19 (No. DAE4-660_Dec19)	Dec-20
Reference Probe ES3DV2	SN: 3013	31-Dec-19 (No. ES3-3013_Dec19)	Dec-20
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-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-19)	In house check: Oct-20

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 27, 2020

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7447

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.41	0.42	0.42	± 10.1 %
DCP (mV)[B]	98.5	91.0	100.2	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	197.2	± 2.7 %	± 4.7 %
		Y	0.0	0.0	1.0		185.8		
		Z	0.0	0.0	1.0		172.3		

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7447

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	10.38	10.38	10.38	0.52	0.88	± 12.0 %
900	41.5	0.97	9.97	9.97	9.97	0.31	1.05	± 12.0 %
1750	40.1	1.37	8.65	8.65	8.65	0.29	0.88	± 12.0 %
1950	40.0	1.40	8.29	8.29	8.29	0.23	0.98	± 12.0 %
2150	39.7	1.53	8.21	8.21	8.21	0.29	0.88	± 12.0 %
2300	39.5	1.67	8.05	8.05	8.05	0.30	1.00	± 12.0 %
2450	39.2	1.80	7.83	7.83	7.83	0.29	1.00	± 12.0 %
2600	39.0	1.96	7.64	7.64	7.64	0.19	1.20	± 12.0 %
3300	38.2	2.71	7.00	7.00	7.00	0.30	1.30	± 13.1 %
5250	35.9	4.71	5.18	5.18	5.18	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.56	4.56	4.56	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.70	4.70	4.70	0.40	1.80	± 13.1 %

[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.

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Accreditation No.: SCS 0108

Client Verkotan

Certificate No: EX3-7447_Feb22

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7447

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: February 28, 2022

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	13-Oct-21 (No. DAE4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

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

Issued: March 1, 2022

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7447

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.40	0.43	0.44	± 10.1 %
DCP (mV)[B]	93.5	95.0	96.2	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	155.9	±2.5 %	± 4.7 %
		Y	0.0	0.0	1.0		167.3		
		Z	0.0	0.0	1.0		159.8		

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7447

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-138
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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

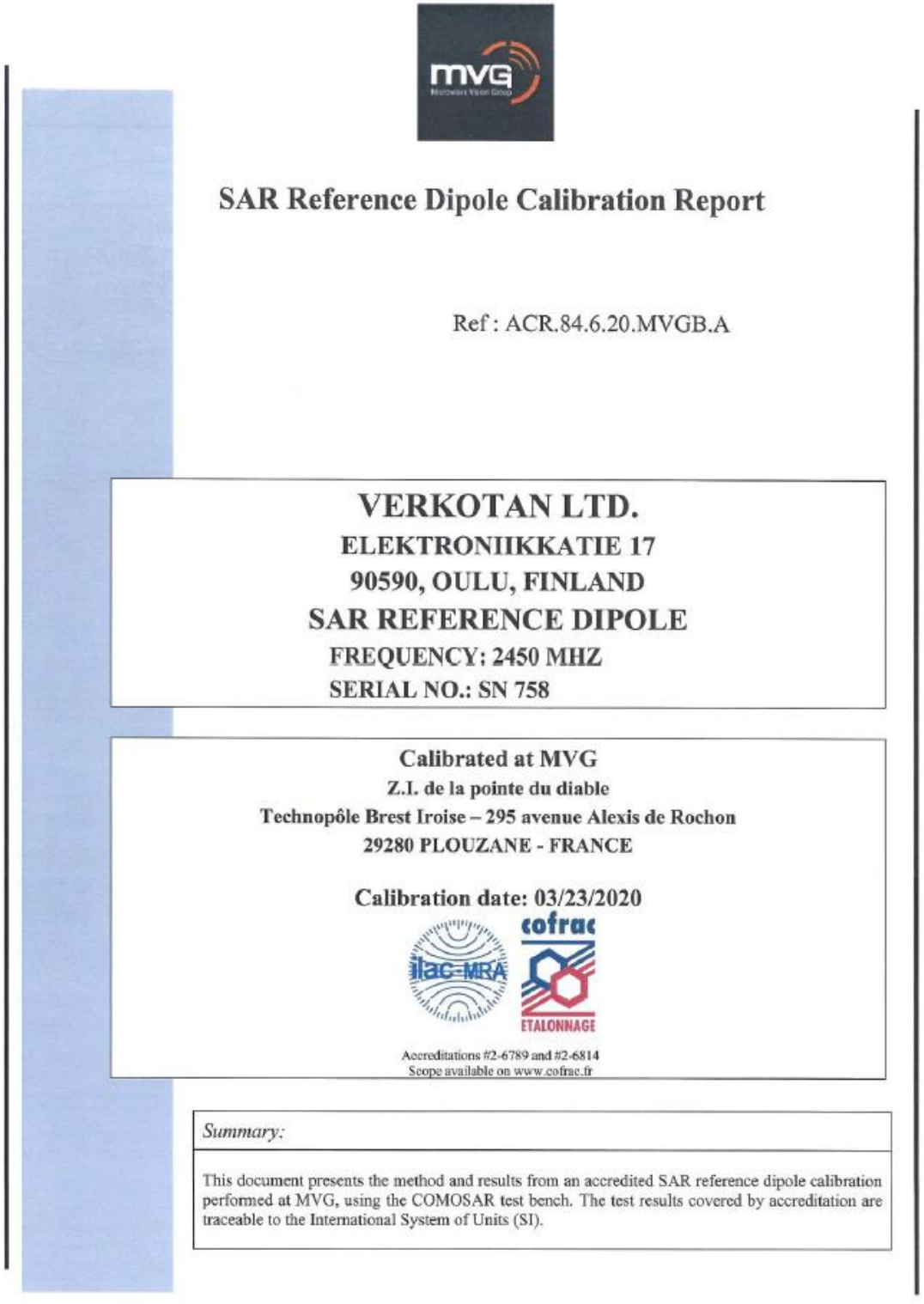
DASY/EASY - Parameters of Probe: EX3DV4 - SN:7447

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)
13	55.0	0.75	15.43	15.43	15.43	0.00	1.00	± 13.3 %
750	41.9	0.89	10.39	10.39	10.39	0.42	0.80	± 12.0 %
900	41.5	0.97	9.90	9.90	9.90	0.45	0.80	± 12.0 %
1750	40.1	1.37	8.42	8.42	8.42	0.28	0.85	± 12.0 %
1950	40.0	1.40	8.13	8.13	8.13	0.26	0.85	± 12.0 %
2150	39.7	1.53	8.14	8.14	8.14	0.25	0.85	± 12.0 %
2300	39.5	1.67	8.09	8.09	8.09	0.21	0.90	± 12.0 %
2450	39.2	1.80	7.77	7.77	7.77	0.15	0.90	± 12.0 %
2600	39.0	1.96	7.61	7.61	7.61	0.24	0.90	± 12.0 %
3300	38.2	2.71	6.85	6.85	6.85	0.30	1.30	± 13.1 %
5250	35.9	4.71	5.20	5.20	5.20	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.50	4.50	4.50	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.60	4.60	4.60	0.40	1.80	± 13.1 %

[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
Microwave Vision Group

SAR Reference Dipole Calibration Report

Ref : ACR.84.6.20.MVGB.A

VERKOTAN LTD.
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
SAR REFERENCE DIPOLE
FREQUENCY: 2450 MHZ
SERIAL NO.: SN 758

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

Calibration date: 03/23/2020

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

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed at MVG, using the COMOSAR test bench. The test results covered by accreditation are traceable to the International System of Units (SI).

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.84.6.20.MVGB.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Technical Manager	3/24/2020	
Checked by :	Jérôme LUC	Technical Manager	3/24/2020	
Approved by :	Yann Toutain	Laboratory Director	3/24/2020	

	Customer Name
Distribution :	Verkotan Ltd.

Issue	Name	Date	Modifications
A	Jérôme LUC	3/24/2020	Initial release

3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	

7 VALIDATION MEASUREMENT

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

7.1 MEASUREMENT CONDITION

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	SN 41/18 EPGO333
Liquid	Head Liquid Values: eps' : 37.5 sigma : 1.80
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2450 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-80 %

7.2 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε_r')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±10 %		0.87 ±10 %	
450	43.5 ±10 %		0.87 ±10 %	
750	41.9 ±10 %		0.89 ±10 %	
835	41.5 ±10 %		0.90 ±10 %	
900	41.5 ±10 %		0.97 ±10 %	
1450	40.5 ±10 %		1.20 ±10 %	
1500	40.4 ±10 %		1.23 ±10 %	
1640	40.2 ±10 %		1.31 ±10 %	
1750	40.1 ±10 %		1.37 ±10 %	
1800	40.0 ±10 %		1.40 ±10 %	
1900	40.0 ±10 %		1.40 ±10 %	
1950	40.0 ±10 %		1.40 ±10 %	
2000	40.0 ±10 %		1.40 ±10 %	
2100	39.8 ±10 %		1.49 ±10 %	

2300	39.5 ±10 %		1.67 ±10 %	
2450	39.2 ±10 %	37.5	1.80 ±10 %	1.80
2600	39.0 ±10 %		1.96 ±10 %	
3000	38.5 ±10 %		2.40 ±10 %	
3500	37.9 ±10 %		2.91 ±10 %	

7.3 MEASUREMENT RESULT

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.

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		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4	55.34 (5.53)	24	24.43 (2.44)
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	

SAR Reference Dipole Calibration Report

Ref : ACR.84.7.20.MVGB.A

VERKOTAN LTD.
ELEKTRONIIKKATIE 17
90590, OULU, FINLAND
SAR REFERENCE DIPOLE
FREQUENCY: 5000 MHZ
SERIAL NO.: SN 1014

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

Calibration date: 03/23/2020

ilac-MRA cofrac ETALONNAGE

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

0.0Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed at MVG, using the COMOSAR test bench. The test results covered by accreditation are traceable to the International System of Units (SI).

SAR REFERENCE DIPOLE CALIBRATION REPORT Ref: ACR.84.7.20.MVGB.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Technical Manager	3/24/2020	
Checked by :	Jérôme LUC	Technical Manager	3/24/2020	
Approved by :	Yann Toutain	Laboratory Director	3/24/2020	

	Customer Name
Distribution :	Verkotan Ltd.

Issue	Name	Date	Modifications
A	Jérôme LUC	3/24/2020	Initial release

1900	40.0 ±10 %		1.40 ±10 %	
1950	40.0 ±10 %		1.40 ±10 %	
2000	40.0 ±10 %		1.40 ±10 %	
2100	39.8 ±10 %		1.49 ±10 %	
2300	39.5 ±10 %		1.67 ±10 %	
2450	39.2 ±10 %		1.80 ±10 %	
2600	39.0 ±10 %		1.96 ±10 %	
3000	38.5 ±10 %		2.40 ±10 %	
3500	37.9 ±10 %		2.91 ±10 %	
5000	36.2 ±10 %		4.45 ±10 %	
5100	36.1 ±10 %		4.56 ±10 %	
5200	36.0 ±10 %		4.66 ±10 %	
5300	35.9 ±10 %		4.76 ±10 %	
5400	35.8 ±10 %		4.86 ±10 %	
5500	35.6 ±10 %		4.97 ±10 %	
5600	35.5 ±10 %	36.66	5.07 ±10 %	5.17
5700	35.4 ±10 %		5.17 ±10 %	
5800	35.3 ±10 %		5.27 ±10 %	
5900	35.2 ±10 %		5.38 ±10 %	
6000	35.1 ±10 %		5.48 ±10 %	

7.3 MEASUREMENT RESULT

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.

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
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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		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	
5200	76.5		21.6	
5250	-	77.65 (7.77)	-	22.22 (2.22)
5500	83.3		23.4	
5600	-	83.31 (8.33)	-	24.02 (2.40)
5750	-	75.18 (7.52)	-	21.96 (2.20)
5800	78.0		21.9	