

SAR Test Report

Product Name : Virtual Reality Controller

Model No. : B0-S8A526053-BZ

FCC ID : 2AI3GS8A526053

Applicant : Pico Technology Inc.

Address : 20th Floor, Shining Tower, No.35 Xueyuan Road,
HaiDian District, Beijing, The People' s Republic of
China

Date of Receipt : Jul. 18, 2016

Test Date : Aug. 02, 2016~Aug. 15, 2016

Issued Date : Aug. 23, 2016

Report No. : 1672084R-HP-US-P03V01

Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by CNAS,TAF any agency of the government.

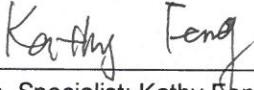
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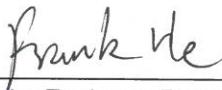
Test Report Certification

Issued Date: Aug. 23, 2016
Report No: 1672084R-HP-US-P03V01



Product Name : Virtual Reality Controller
Applicant : Pico Technology Inc.
Address : 20th Floor, Shining Tower, No.35 Xueyuan Road, HaiDian District, Beijing, The People's Republic of China
Manufacturer : Pico Technology Inc.
Address : 20th Floor, Shining Tower, No.35 Xueyuan Road, HaiDian District, Beijing, The People's Republic of China
FCC ID : 2AI3GS8A526053
Model No. : B0-S8A526053-BZ
EUT Voltage : DC 5V or 9V
Brand Name : 
Applicable Standard : FCC KDB Publication 248227 D01v02r02
FCC KDB Publication 447498 D01v06
FCC KDB Publication 865664 D01v01r04
RSS - 102 Issue 5: 2015
IEEE Std. 1528-2013
IEC 62209-2: 2010
FCC 47CFR §2.1093
ANSI C95.1-2005
Test Result : Max. SAR Measurement (1g)
802.11a: **1.161** W/kg
Performed Location : Suzhou EMC Laboratory
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
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FCC Registration Number: 800392;

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Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	:	BSMI, NCC, TAF
USA	:	FCC
Japan	:	VCCI
China	:	CNAS

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site :<http://www.quietek.com/tw/ctg/cts/accreditations.htm>
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site :
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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1672084R-HP-US-P03V01	V1.0	Initial Issued Report	Aug. 23, 2016

1. General Information

1.1. EUT Description

Product Name	Virtual Reality Controller
Brand Name	 Pico
Model No.	B0-S8A526053-BZ
EUT Voltage	DC 5V or 9V
Frequency Range	<p>For 2.4GHz Band</p> 802.11b/g/n(20MHz): 2412~2462MHz 802.11n(40MHz): 2422~2452MHz <p>For 5GHz Band</p> 802.11a/n/ac(20MHz): 5180MHz~5240MHz; 5260MHz~5320MHz; 5500MHz~5720MHz; 5745~5825MHz 802.11n/ac(40MHz): 5190~5230MHz; 5270MHz~5310MHz ; 5510MHz~5710MHz ; 5750~5790MHz 802.11ac(80MHz): 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5760 MHz
Channel Number	<p>For 2.4GHz Band</p> 802.11b/g/n(20MHz): 11 802.11n(40MHz): 7 <p>For 5GHz Band</p> 802.11a/n/ac(20MHz): 25 802.11n/ac(40MHz): 12 802.11ac(80MHz): 6
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM 802.11a/n/ac: OFDM
Data Rate	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150 Mbps 802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
Channel Control	Auto
Antenna Delivery	1*Tx + 1*Rx
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Working Frequency of Each Channel:

For 2.4GHz Band

802.11b/g/n(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz	04	2427 MHz
05	2432 MHz	06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz	N/A	N/A

802.11n(40MHz) Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz	N/A	N/A

For 5.0GHz Band

802.11a/n(20MHz)/ac(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
52	5260MHz	56	5280 MHz	60	5300 MHz	64	5320 MHz
100	5500MHz	104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580MHz	120	5600 MHz	124	5620 MHz	128	5640 MHz
132	5660 MHz	136	5680 MHz	140	5700 MHz	144	5720 MHz
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825MHz	N/A	N/A	N/A	N/A	N/A	N/A

802.11n(40MHz)/ac(40MHz) Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz	62	5310 MHz
102	5510 MHz	110	5550 MHz	118	5590 MHz	126	5630 MHz
134	5670 MHz	142	5710 MHz	151	5755 MHz	159	5795 MHz

802.11ac(80MHz) Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530MHz	122	5610MHz
138	5690 MHz	155	5775 MHz	N/A	N/A	N/A	N/A

Antenna List

Model No.	AA077					
Antenna manufacturer	Unictron					
Antenna Delivery	<input checked="" type="checkbox"/>	1*TX+1*RX	<input type="checkbox"/>	2*TX+2*RX	<input type="checkbox"/>	3*TX+3*RX
Antenna technology	<input checked="" type="checkbox"/>	SISO				
	<input type="checkbox"/>	MIMO	<input type="checkbox"/>	Basic		
	<input type="checkbox"/>		<input type="checkbox"/>	CDD		
	<input type="checkbox"/>		<input type="checkbox"/>	Beam-forming		
Antenna Type	<input type="checkbox"/>	External	<input type="checkbox"/>	Dipole		
	<input checked="" type="checkbox"/>	Internal	<input type="checkbox"/>	PIFA		
			<input type="checkbox"/>	PCB		
			<input checked="" type="checkbox"/>	Ceramic Chip Antenna		
			<input type="checkbox"/>	Metal plate type F antenna		
Antenna Gain	1.4dBi for 2.4G					
	2.3dBi for 5G					

1.1. Power setting parameter

Test Mode	Test Channel	Power Setting
802.11b	2412	15
	2437	15
	2462	15
802.11g	2412	14
	2437	14.5
	2462	14
802.11n(20MHz)	2412	14
	2437	19
	2462	13
802.11n(40MHz)	2422	11
	2437	13
	2452	9

Test Mode	Test Channel	Power Setting
802.11a	5180	9
	5200	9
	5240	9
	5260	9
	5300	9
	5320	9
	5500	10
	5600	10
	5700	10
	5720	10
	5745	11
	5785	11
802.11n(20MHz)	5825	11
	5180	9
	5200	9
	5240	9
	5260	9
	5300	9
	5320	9
	5500	10
	5600	10
	5700	10
	5720	10

	5745	11
	5785	11
	5825	11
802.11n(40MHz)	5190	9
	5230	9
	5270	9
	5310	9
	5510	10
	5590	10
	5670	10
	5710	10
	5755	10
	5795	10
	5795	10
	5180	9
802.11ac(20MHz)	5200	9
	5240	9
	5260	9
	5300	9
	5320	9
	5500	10
	5600	10
	5700	10
	5720	10
	5745	11
	5785	11
	5825	11
802.11ac(40MHz)	5190	9
	5230	9
	5270	9
	5310	9
	5510	10
	5590	10
	5670	10
	5710	10
	5755	10
	5795	10
802.11ac(80MHz)	5795	10
	5210	9
	5290	9
	5530	10
	5610	10

	5690	10
	5775	10

1.2. Test Environment

Ambient conditions in the laboratory:

Items	Required	Actual
Temperature (°C)	18-25	21.5± 2
Humidity (%RH)	30-70	52

1.3. Power Reduction for SAR

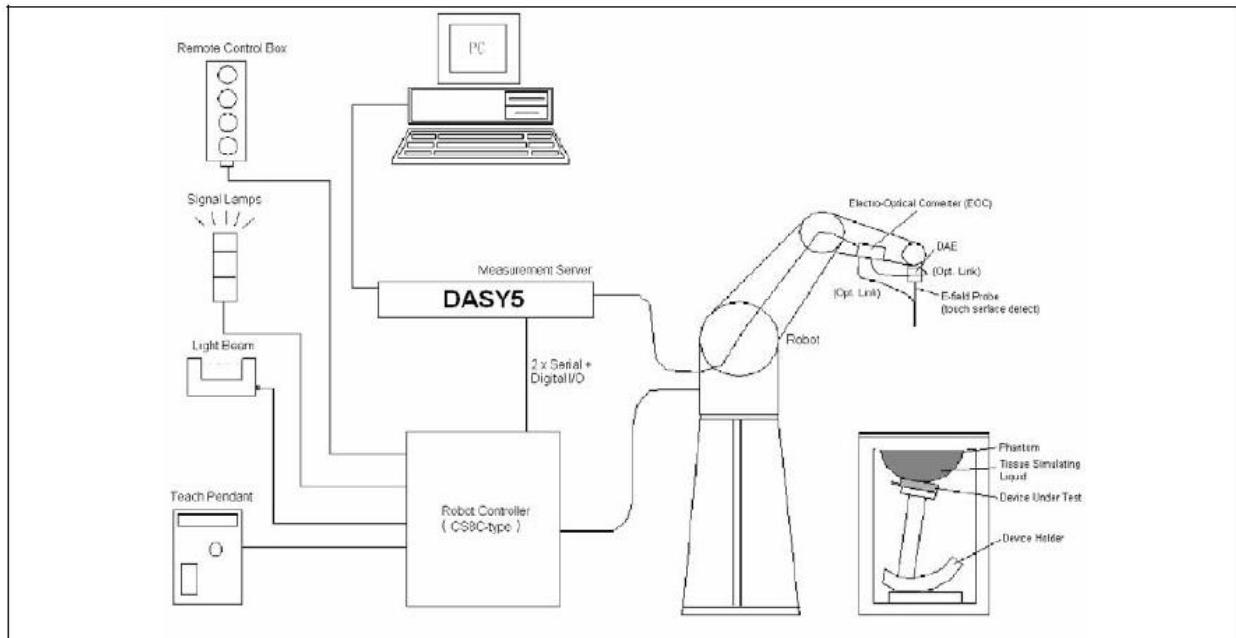
There is no power reduction used for any band mode implemented in this device for SAR purposes.

1.4. Guidance Documents

- 1) FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- 2) FCC KDB Publication 865664 D01v01r04(SAR measurement 100 MHz to 6 GHz)
- 3) FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- 4) RSS 102 Issue5 Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
- 5) IEEE Std. 1528-2013 (IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques)
- 6) IEC 62209-2: 2010 (Human exposure to radio frequency fields from hand- held and bodymounted wireless communication devices — Human models, instrumentation, and procedures)
- 7) FCC 47CFR §2.1093 Radiofrequency radiation exposure evaluation: portable devices
- 8) ANSI C95.1-2005 - IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

2. SAR Measurement System

2.1. DASY5 System Description



The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

2.1.1. Applications

Predefined procedures and evaluations for automated compliance testing with all worldwide standards, e.g., IEEE 1528, OET 65, IEC 62209-1, IEC 62209-2, EN 50360, EN 50383 and others.

2.1.2. Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE 1528-2003, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

2.1.3. Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 7x7x7 (5mmx5mmx5mm) providing a volume of 30mm in the X & Y axis, and 30mm in the Z axis.

2.1.4. Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528. The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x, y, z) = Ae^{-\frac{z}{2a}} \cos^2 \left(\frac{\pi}{2} \frac{\sqrt{x'^2 + y'^2}}{5a} \right)$$

$$f_2(x, y, z) = Ae^{-\frac{z}{a}} \frac{a^2}{a^2 + x'^2} \left(3 - e^{-\frac{2z}{a}} \right) \cos^2 \left(\frac{\pi}{2} \frac{y'}{3a} \right)$$

$$f_3(x, y, z) = A \frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2} \left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a + 2z)^2} \right)$$

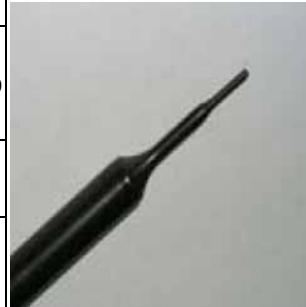
2.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D.

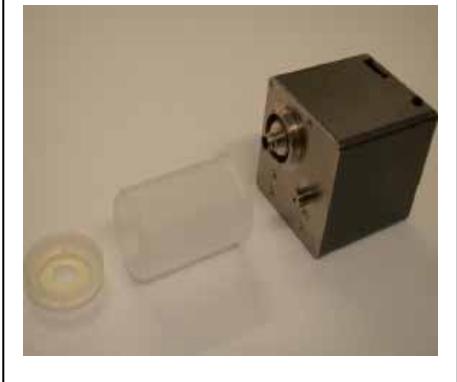
2.2.1. Isotropic E-Field Probe Specification

Model	EX3DV4
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz 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 μ W/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.



2.3. Boundary Detection Unit and Probe Mounting Device

The DASY probes use a precise connector and an additional holder for the probe, consisting of a plastic tube and a flexible silicon ring to center the probe. The connector at the DAE is flexibly mounted and held in the default position with magnets and springs. Two switching systems in the connector mount detect frontal and lateral probe collisions and trigger the necessary software response.

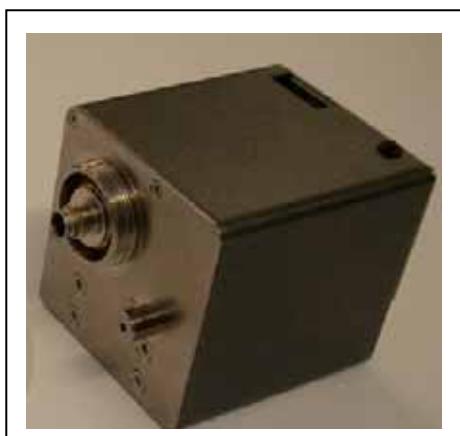


2.4. DATA Acquisition Electronics (DAE) and Measurement Server

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.

Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.



2.5. Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller



2.6. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions.

During probe rotations, the probe tip will keep its actual position.



2.7. Device Holder

The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).

Thus the device needs no repositioning when changing the angles.



The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

2.8. SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom tip, three reference markers are provided to identify the phantom position with respect to the robot.

3. Tissue Simulating Liquid

3.1. The composition of the tissue simulating liquid

INGREDIENT (% Weight)	2450MHz Body	5250MHz Body	5600MHz Body	5750MHz Body
Water	73.2	75.68	75.68	75.68
Salt	0.04	0.43	0.43	0.43
Sugar	0.00	0.00	0.00	0.00
HEC	0.00	0.00	0.00	0.00
Preventol	0.00	0.00	0.00	0.00
DGBE	26.7	4.42	4.42	4.42
Triton X-100	0.00	19.47	19.47	19.47

3.2. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Dielectric Probe Kit and Agilent Vector Network Analyzer E5071C

Body Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
2450MHz	Reference result ± 5% window	52.7 50.07 to 55.34	1.95 1.85 to 2.05	N/A
	08-10-2016	52.19	1.97	21.0
5250MHz	Reference result ± 5% window	49.0 46.55 to 51.45	5.36 5.09 to 5.63	N/A
	08-10-2016	47.42	5.32	21.0
5600MHz	Reference result ± 5% window	48.5 46.10 to 50.90	5.77 5.48 to 6.06	N/A
	08-10-2016	48.47	5.80	21.0
5750MHz	Reference result ± 5% window	48.2 45.79 to 50.61	6.00 5.70 to 6.30	N/A
	08-10-2016	47.63	6.05	21.0

3.3. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

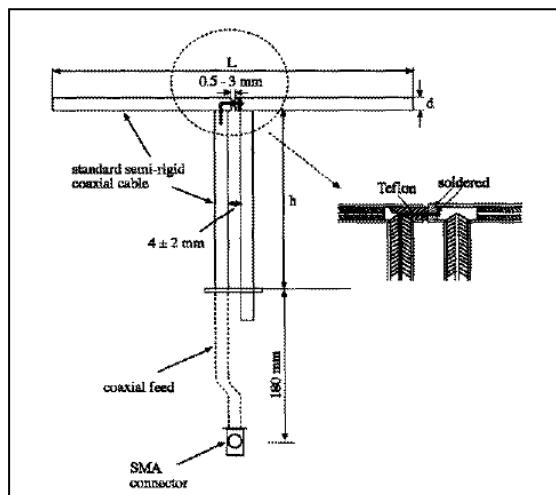
Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5750	35.3	5.27	48.2	6.00

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000$ kg/m³)

4. SAR Measurement Procedure

4.1. SAR System Validation

4.1.1. Validation Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
2450MHz	53.5	30.4	3.6
5250MHz	20.6	14.2	3.6
5600MHz	20.6	14.2	3.6
5750MHz	20.6	14.2	3.6

4.1.2. Validation Result

System Performance Check at 2450MHz for Body				
Validation Dipole: D2450V2, SN: 839				
2450 MHz	Reference result ± 10% window	49.8 44.82 to 54.78	23.3 20.97 to 25.63	N/A
	08-10-2016	46.8	21.2	21.0
Validation Dipole: D5GHzV2, SN: 1203				
5250 MHz	Reference result ± 10% window	73.7 66.33 to 81.07	20.8 18.72 to 22.88	N/A
	08-10-2016	78.7	20.4	21.0
Validation Dipole: D5GHzV2, SN: 1203				
5600 MHz	Reference result ± 10% window	78.8 70.92 to 86.68	22.3 20.07 to 24.53	N/A
	08-10-2016	81.1	21.5	21.0
Validation Dipole: D5GHzV2, SN: 1203				

5750 MHz	Reference result ± 10% window	75.2 67.68 to 82.72	21.1 18.99 to 23.21	N/A
	08-10-2016	75.7	20.9	21.0

Note: All SAR values are normalized to 1W forward power.

4.2. SAR Measurement Procedure

The DASY 5 calculates SAR using the following equation,

$$SAR = \frac{\sigma |E|^2}{\rho}$$

σ : represents the simulated tissue conductivity

ρ : represents the tissue density

The EUT is set to transmit at the required power in line with product specification, at each frequency relating to the LOW, MID, and HIGH channel settings.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR location (interpolated resolution set at 1mm²) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at 1mm³).

4.3. SAR Measurement Conditions for 802.11 Device

4.3.1. Duty Factor Control

Unless it is permitted by specific KDB procedures or continuous transmission is specifically restricted by the device, the reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

4.3.2. Initial Test Position SAR Test Reduction Procedure

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.¹⁶ The initial test position procedure is described in the following:

When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).

a) When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

b) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

5. SAR Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 "Uncontrolled Environments" limits. These limits apply to a location which is deemed as "Uncontrolled Environment" which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for brain or body)	1.60 W/kg
Spatial Average SAR (whole body)	0.08 W/kg
Spatial Peak SAR (10g for hands, feet, ankles and wrist)	4.00 W/kg

6. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Cali. Due Date
Stäubli Robot TX60L	Stäubli	TX60L	F10/5C90A1/A/01	N/A
Controller	Stäubli	SP1	S-0034	N/A
Dipole Validation Kits	Speag	D2450V2	839	2018.02.08
Dipole Validation Kits	Speag	D5GHzV2	1078	2018.02.09
SAM Twin Phantom	Speag	SAM	TP-1561/1562	N/A
Device Holder	Speag	SD 000 H01 HA	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1220	2017.02.08
E-Field Probe	Speag	EX3DV4	3710	2017.02.18
SAR Software	Speag	DASY5	V5.2 Build 162	N/A
Power Amplifier	Mini-Circuit	ZVA-183-S+	N657400950	N/A
Directional Coupler	Agilent	778D	20160	N/A
Universal Radio Communication Tester	R&S	CMU 200	117088	2017.03.10
Vector Network	Agilent	E5071C	MY48367267	2017.03.10
Signal Generator	Agilent	E4438C	MY49070163	2017.03.10
Power Meter	Anritsu	ML2495A	0905006	2016.10.29
Wide Bandwidth Sensor	Anritsu	MA2411B	0846014	2016.10.29

7. Measurement Uncertainty

DASY5 Uncertainty according to IEEE std. 1528-2013								
Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram / 10 gram.								
Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(vi) Veff
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%	∞
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.	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
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%	∞
Phantom and Setup								
Phantom Uncertainty	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Liquid Conductivity (target)	±5.0%	R	$\sqrt{3}$	0.64	0.43	±1.8%	±1.2%	∞
Liquid Conductivity (meas.)	±2.5%	N	1	0.64	0.43	±1.6%	±1.1%	∞
Liquid Permittivity (target)	±5.0%	R	$\sqrt{3}$	0.6	0.49	±1.7%	±1.4%	∞
Liquid Permittivity (meas.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
Combined Std. Uncertainty						±11.0%	±10.8%	387
Expanded STD Uncertainty						±22.0%	±21.5%	

DASY5 Uncertainty according to IEEE std. 1528-2013								
Measurement uncertainty for 3 GHz to 6 GHz averaged over 1 gram / 10 gram.								
Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(vi) veff
Measurement System								
Probe Calibration	±6.55%	N	1	1	1	±6.55%	±6.55%	∞
Axial Isotropy	±4.7%	R	√3	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	√3	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±2.0%	R	√3	1	1	±1.2%	±1.2%	∞
Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	√3	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	√3	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.8%	R	√3	1	1	±0.5%	±0.5%	∞
Probe Positioning	±9.9%	R	√3	1	1	±5.7%	±5.7%	∞
Max. SAR Eval.	±4.0%	R	√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	√3	1	1	±2.9%	±2.9%	∞
Phantom and Setup								
Phantom Uncertainty	±4.0%	R	√3	1	1	±2.3%	±2.3%	∞
Liquid Conductivity (target)	±5.0%	R	√3	0.64	0.43	±1.8%	±1.2%	∞
Liquid Conductivity (meas.)	±2.5%	N	1	0.64	0.43	±1.6%	±1.1%	∞
Liquid Permittivity (target)	±5.0%	R	√3	0.6	0.49	±1.7%	±1.4%	∞
Liquid Permittivity (meas.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
Combined Std. Uncertainty						±12.8%	±12.6%	330
Expanded STD Uncertainty						±25.6%	±25.2%	

DASY5 Uncertainty according to IEC 62209-2/2010

Measurement uncertainty for 30 MHz to 6 GHz averaged over 1 gram / 10 gram.

Error Description	Uncert. Value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(vi) Veff
Measurement System								
Probe Calibration	±6.5%	N	1	1	1	±6.5%	±6.5%	∞
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%	∞
Modulation Response	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%	∞
System Detection Limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
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%	∞
Post-processing	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Test Sample Related								
Test Sample 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	±0.0%	R	$\sqrt{3}$	1	1	±0.0%	±0.0%	∞
Power Scaling	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Phantom and Setup								
Phantom Uncertainty	±7.9%	R	$\sqrt{3}$	1	1	±4.6%	±4.6%	∞
SAR correction	±1.9%	R	$\sqrt{3}$	1	1	±1.1%	±0.9%	∞
Liquid Conductivity (meas.)	±2.5%	N	1	0.78	0.71	±2.0%	±1.8%	∞
Liquid Permittivity (meas.)	±2.5%	N	1	0.26	0.26	±0.6%	±0.7%	∞
Temp. unc. - Conductivity	±5.2%	R	$\sqrt{3}$	0.78	0.71	±2.3%	±2.1%	∞
Temp. unc. - Permittivity	±0.8%	R	$\sqrt{3}$	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty							±12.8%	±12.7%
Expanded STD Uncertainty							±25.6%	±25.4%

8. Conducted Power Measurement

Test Mode	Frequency (MHz)	Avg Power (dBm)	Max. Power (dBm)	Scaling Factor
802.11b	2412	16.84	17.1	1.062
	2437	16.91	17.1	1.045
	2462	17.02	17.1	1.019
802.11g	2412	19.87	20.0	1.030
	2437	19.52	20.0	1.117
	2462	19.59	20.0	1.099
802.11n(20MHz)	2412	19.28	20.0	1.180
	2437	23.82	24.0	1.042
	2462	18.86	19.1	1.057
802.11n(40MHz)	2422	17.43	17.5	1.016
	2437	19.02	19.1	1.019
	2452	15.03	15.1	1.016

Test Mode	Frequency (MHz)	Avg Power (dBm)	Max. Power (dBm)	Scaling Factor
802.11a	5180	8.95	9.0	1.012
	5200	8.97	9.0	1.007
	5240	8.99	9.0	1.002
	5260	8.89	9.0	1.026
	5300	8.83	9.0	1.040
	5320	8.62	9.0	1.091
	5500	9.07	9.2	1.030
	5600	9.15	9.2	1.012
	5700	9.13	9.2	1.016
	5745	10.03	10.2	1.040
	5785	10.11	10.2	1.021
	5825	10.05	10.2	1.035
802.11n(20MHz)	5180	8.83	9.0	1.040
	5200	8.9	9.0	1.023
	5240	8.92	9.0	1.019
	5260	8.67	9.0	1.079
	5300	8.62	9.0	1.091
	5320	8.58	9.0	1.102

	5500	9.13	9.2	1.016
	5600	9.19	9.2	1.002
	5700	9.07	9.2	1.030
	5745	9.98	10.2	1.052
	5785	10.07	10.2	1.030
	5825	10.03	10.2	1.040
802.11n(40MHz)	5190	8.84	9.0	1.038
	5230	8.91	9.0	1.021
	5270	8.86	9.0	1.033
	5310	8.9	9.0	1.023
	5510	9.13	9.2	1.016
	5590	9.17	9.2	1.007
	5670	9.08	9.2	1.028
	5755	9.15	9.2	1.012
	5795	9.1	9.2	1.023
	5180	8.85	9.0	1.035
802.11ac(20MHz)	5200	8.92	9.0	1.019
	5240	8.96	9.0	1.009
	5260	8.63	9.0	1.089
	5300	8.59	9.0	1.099
	5320	8.52	9.0	1.117
	5500	9.15	9.2	1.012
	5600	9.22	9.5	1.067
	5700	9.08	9.2	1.028
	5745	9.98	10.2	1.052
	5785	10.09	10.2	1.026
	5825	10.04	10.2	1.038
	5190	8.87	9.0	1.030
802.11ac(40MHz)	5230	8.91	9.0	1.021
	5270	8.88	9.0	1.028
	5310	8.9	9.0	1.023
	5510	9.13	9.2	1.016
	5590	9.19	9.2	1.002
	5670	9.06	9.2	1.033
	5755	9.14	9.2	1.014
	5795	9.11	9.2	1.021
802.11ac(80MHz)	5210	8.79	9.0	1.050

	5290	8.68	9.0	1.076
	5530	9.15	9.2	1.012
	5610	9.06	9.2	1.033
	5775	9.23	9.5	1.064

9. Test Procedures

9.1. SAR Test Results Summary

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 2412- 2462 MHz														
Test Mode:802.11b														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	11	2462	17.02	0.05	1.05	1.019	1.070	1.6					
Edge*	Fixed	11	2462	17.02	0.16	1.03	1.019	1.050	1.6					
Back	Fixed	11	2462	17.02	0.18	0.87	1.019	0.887	1.6					
Front	Fixed	11	2462	17.02	0.14	0.651	1.019	0.663	1.6					
Edge	Fixed	06	2437	16.91	0.09	0.896	1.045	0.936	1.6					
Back	Fixed	06	2437	16.91	0.11	0.891	1.045	0.931	1.6					
Front	Fixed	06	2437	16.91	-0.09	0.644	1.045	0.673	1.6					
Test Mode:802.11g														
Edge	Fixed	01	2412	19.87	0.20	1.03	1.030	1.061	1.6					
Edge*	Fixed	01	2412	19.87	-0.07	0.991	1.030	1.021	1.6					
Back	Fixed	01	2412	19.87	0.11	0.716	1.030	0.737	1.6					
Front	Fixed	01	2412	19.87	-0.02	0.667	1.030	0.687	1.6					
Edge	Fixed	11	2462	19.59	-0.07	1	1.099	1.099	1.6					
Back	Fixed	11	2462	19.59	0.04	0.809	1.099	0.889	1.6					
Front	Fixed	11	2462	19.59	0.02	0.671	1.099	0.737	1.6					
Test Mode:802.11n(20MHz)														
Edge	Fixed	06	2437	23.82	-0.20	0.940	1.042	0.979	1.6					
Edge*	Fixed	06	2437	23.82	-0.01	0.897	1.042	0.935	1.6					
Back	Fixed	06	2437	23.82	0.17	0.544.	1.042	0.567	1.6					
Front	Fixed	06	2437	23.82	0.10	0.416	1.042	0.433	1.6					
Edge	Fixed	01	2412	19.28	0.08	0.851	1.180	1.004	1.6					
Back	Fixed	01	2412	19.28	-0.11	0.790	1.180	0.932	1.6					

Front	Fixed	01	2412	19.28	-0.10	0.739	1.180	0.872	1.6
Test Mode:802.11n(40MHz)									
Edge	Fixed	06	2437	19.02	-0.19	0.837	1.019	0.853	1.6
Edge*	Fixed	06	2437	19.02	0.07	0.795	1.019	0.810	1.6
Back	Fixed	06	2437	19.02	0.07	0.538	1.019	0.548	1.6
Front	Fixed	06	2437	19.02	-0.10	0.394	1.019	0.401	1.6
Edge	Fixed	03	2422	17.43	-0.10	0.790	1.016	0.803	1.6
Back	Fixed	03	2422	17.43	0.15	0.312	1.016	0.317	1.6

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 2412- 2462 MHz														
Test Mode:802.11b														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Scaled SAR 1g (W/kg)	Duty cycle (%)	Duty factor	Duty Cycle Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	11	2462	17.02	1.070	100	1	1.070	1.6					
Edge*	Fixed	11	2462	17.02	1.050	100	1	1.050	1.6					
Back	Fixed	11	2462	17.02	0.887	100	1	0.887	1.6					
Front	Fixed	11	2462	17.02	0.663	100	1	0.663	1.6					
Edge	Fixed	06	2437	16.91	0.936	100	1	0.936	1.6					
Back	Fixed	06	2437	16.91	0.931	100	1	0.931	1.6					
Front	Fixed	06	2437	16.91	0.673	100	1	0.673	1.6					
Test Mode:802.11g														
Edge	Fixed	01	2412	19.87	1.061	94.70	1.056	1.120	1.6					
Edge*	Fixed	01	2412	19.87	1.021	94.70	1.056	1.078	1.6					
Back	Fixed	01	2412	19.87	0.737	94.70	1.056	0.779	1.6					
Front	Fixed	01	2412	19.87	0.687	94.70	1.056	0.725	1.6					
Edge	Fixed	11	2462	19.59	1.099	94.70	1.056	1.161	1.6					
Back	Fixed	11	2462	19.59	0.889	94.70	1.056	0.939	1.6					
Front	Fixed	11	2462	19.59	0.737	94.70	1.056	0.779	1.6					
Test Mode:802.11n(20MHz)														
Edge	Fixed	06	2437	23.82	0.979	94.10	1.063	1.041	1.6					
Edge*	Fixed	06	2437	23.82	0.935	94.10	1.063	0.994	1.6					
Back	Fixed	06	2437	23.82	0.567	94.10	1.063	0.603	1.6					
Front	Fixed	06	2437	23.82	0.433	94.10	1.063	0.461	1.6					
Edge	Fixed	01	2412	19.28	1.004	94.10	1.063	1.067	1.6					
Back	Fixed	01	2412	19.28	0.932	94.10	1.063	0.991	1.6					
Front	Fixed	01	2412	19.28	0.872	94.10	1.063	0.927	1.6					
Test Mode:802.11n(40MHz)														

Edge	Fixed	06	2437	19.02	0.853	86.79	1.15	0.981	1.6
Edge*	Fixed	06	2437	19.02	0.810	86.79	1.15	0.932	1.6
Back	Fixed	06	2437	19.02	0.548	86.79	1.15	0.630	1.6
Front	Fixed	06	2437	19.02	0.401	86.79	1.15	0.462	1.6
Edge	Fixed	03	2422	17.43	0.803	86.79	1.15	0.923	1.6
Back	Fixed	03	2422	17.43	0.317	86.79	1.15	0.365	1.6

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 5180 - 5240 MHz														
Test Mode:802.11a														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	48	5240	8.99	-0.11	0.906	1.002	0.908	1.6					
Back	Fixed	48	5240	8.99	0.13	0.734	1.002	0.735	1.6					
Front	Fixed	48	5240	8.99	0.14	0.594	1.002	0.595	1.6					
Edge	Fixed	40	5200	8.97	-0.04	1.05	1.007	1.057	1.6					
Edge*	Fixed	40	5200	8.97	0.07	0.99	1.007	0.997	1.6					
Back	Fixed	40	5200	8.97	0.01	0.703	1.007	0.708	1.6					
Front	Fixed	40	5200	8.97	0.16	0.426	1.007	0.429	1.6					

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 5180 - 5240 MHz														
Test Mode:802.11a														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Scaled SAR 1g (W/kg)	Duty cycle (%)	Duty factor	Duty Cycle Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	48	5240	8.99	0.908	94.50	1.058	0.960	1.6					
Back	Fixed	48	5240	8.99	0.735	94.50	1.058	0.778	1.6					
Front	Fixed	48	5240	8.99	0.595	94.50	1.058	0.630	1.6					
Edge	Fixed	40	5200	8.97	1.057	94.50	1.058	1.119	1.6					
Edge*	Fixed	40	5200	8.97	0.997	94.50	1.058	1.055	1.6					
Back	Fixed	40	5200	8.97	0.708	94.50	1.058	0.749	1.6					
Front	Fixed	40	5200	8.97	0.429	94.50	1.058	0.454	1.6					

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 5500 - 5700 MHz														
Test Mode:802.11a														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (± 0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	120	5600	9.15	0.19	0.831	1.012	0.841	1.6					
Back	Fixed	120	5600	9.15	0.14	0.654	1.012	0.662	1.6					
Front	Fixed	120	5600	9.15	0.06	0.529	1.012	0.535	1.6					
Edge	Fixed	140	5700	9.13	0.01	0.884	1.016	0.898	1.6					
Edge*	Fixed	140	5700	9.13	0.04	0.805	1.016	0.818	1.6					
Back	Fixed	140	5700	9.13	-0.01	0.342	1.016	0.347	1.6					

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 5500 - 5700 MHz														
Test Mode:802.11a														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Scaled SAR 1g (W/kg)	Duty cycle (%)	Duty factor	Duty Cycle Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	120	5600	9.15	0.841	94.50	1.058	0.890	1.6					
Back	Fixed	120	5600	9.15	0.662	94.50	1.058	0.700	1.6					
Front	Fixed	120	5600	9.15	0.535	94.50	1.058	0.566	1.6					
Edge	Fixed	140	5700	9.13	0.898	94.50	1.058	0.950	1.6					
Edge*	Fixed	140	5700	9.13	0.818	94.50	1.058	0.865	1.6					
Back	Fixed	140	5700	9.13	0.347	94.50	1.058	0.368	1.6					

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 5785 - 5825 MHz														
Test Mode:802.11a														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	157	5785	10.11	0.06	0.878	1.021	0.896	1.6					
Edge*	Fixed	157	5785	10.11	0.13	0.875	1.021	0.893	1.6					
Back	Fixed	157	5785	10.11	0.11	0.675	1.021	0.689	1.6					
Front	Fixed	157	5785	10.11	0.20	0.464	1.021	0.474	1.6					
Edge	Fixed	165	5825	10.05	0.15	0.845	1.035	0.875	1.6					
Back	Fixed	165	5825	10.05	0.11	0.364	1.035	0.377	1.6					

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

SAR MEASUREMENT														
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52									
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15									
Product: Virtual Reality Controller														
Frequency: 5785 - 5825 MHz														
Test Mode:802.11a														
Test Position Body (0mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Scaled SAR 1g (W/kg)	Duty cycle (%)	Duty factor	Duty Cycle Scaled SAR 1g (W/kg)	Limit (W/kg)					
		Channel	MHz											
Edge	Fixed	157	5785	10.11	0.896	94.50	1.058	0.948	1.6					
Edge*	Fixed	157	5785	10.11	0.893	94.50	1.058	0.945	1.6					
Back	Fixed	157	5785	10.11	0.689	94.50	1.058	0.729	1.6					
Front	Fixed	157	5785	10.11	0.474	94.50	1.058	0.501	1.6					
Edge	Fixed	165	5825	10.05	0.875	94.50	1.058	0.925	1.6					
Back	Fixed	165	5825	10.05	0.377	94.50	1.058	0.399	1.6					

Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

2: * - repeated at the highest measured SAR according to the FCC KDB 865664

3: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

5: Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.

9.2. SAR Test Notes

9.2.1. Test position and configuration

1. Liquid tissue depth was at least 15.0 cm for all frequencies.
2. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
3. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
4. Reported SAR were scaled to the maximum duty factor to demonstrate compliance per FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02.
5. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

WLAN Notes:

When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other default channels is not required.

Appendix A. SAR System Validation Data

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

System Check Body 2450MHz

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

Communication System: UID 0, CW; Communication System Band: D2450(2450MHz); Duty Cycle: 1:1;

Frequency: 2450 MHz; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.97$ S/m; $\epsilon_r = 52.19$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

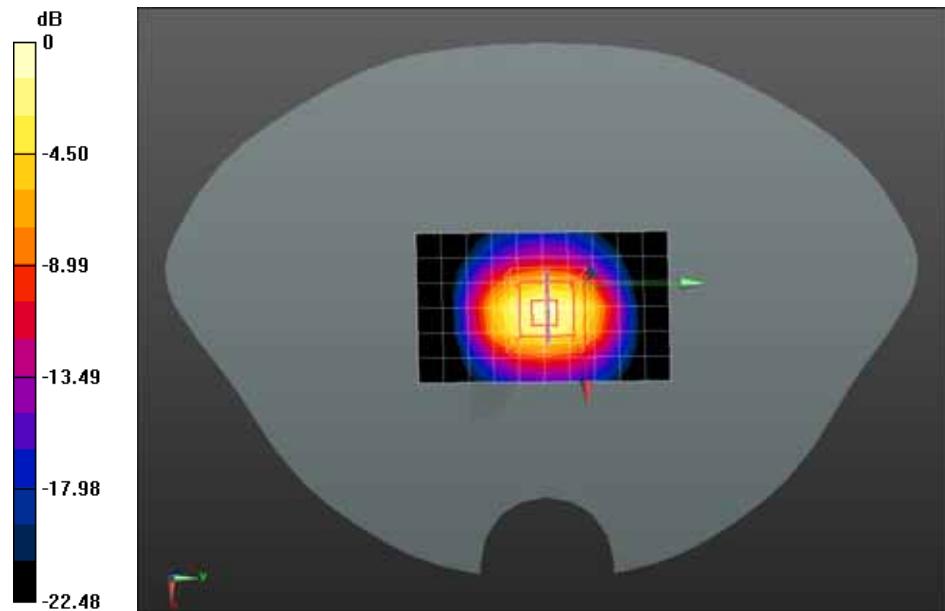
- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/System Check Body 2450MHz/Area Scan (7x11x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 11.9 W/kg

Configuration/System Check Body 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm; Reference Value = 75.15 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 24.8 W/kg

SAR(1 g) = 11.7 W/kg; SAR(10 g) = 5.3 W/kg Maximum value of SAR (measured) = 13.4 W/kg



0 dB = 13.4 W/kg = 11.27 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

System Check Body 5250MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5250 MHz; Medium parameters used: $f = 5250$ MHz; $\sigma = 5.32$ S/m; $\epsilon_r = 49.42$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

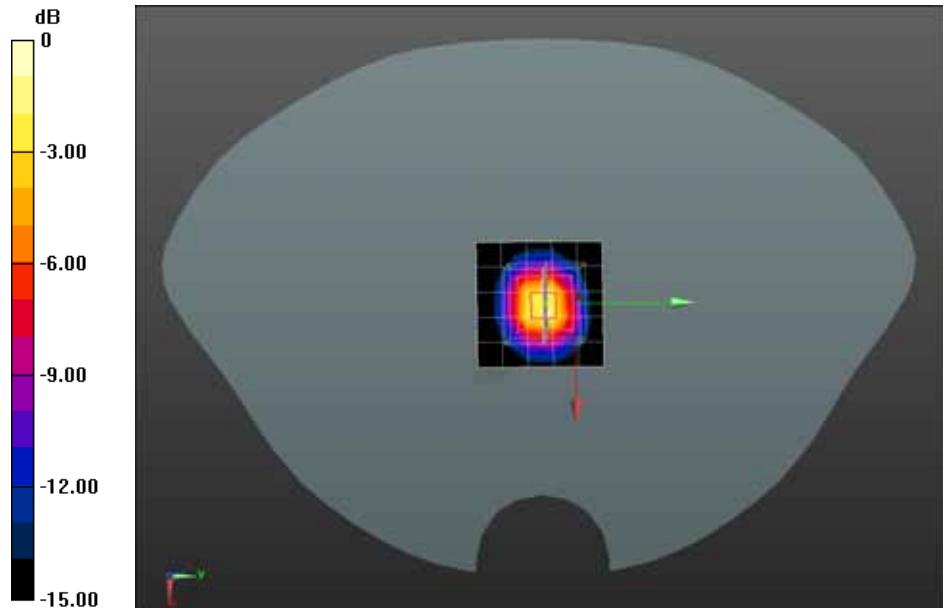
Configuration/Body 5250MHz/Area Scan (6x6x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 6.67 W/kg

Configuration/Body 5250MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm; Reference Value = 44.33 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 46.0 W/kg

SAR(1 g) = 7.87 W/kg; SAR(10 g) = 2.04 W/kg Maximum value of SAR (measured) = 8.83 W/kg



0 dB = 8.83 W/kg = 9.03 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

System Check Body 5600MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5600 MHz; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.8$ S/m; $\epsilon_r = 48.47$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

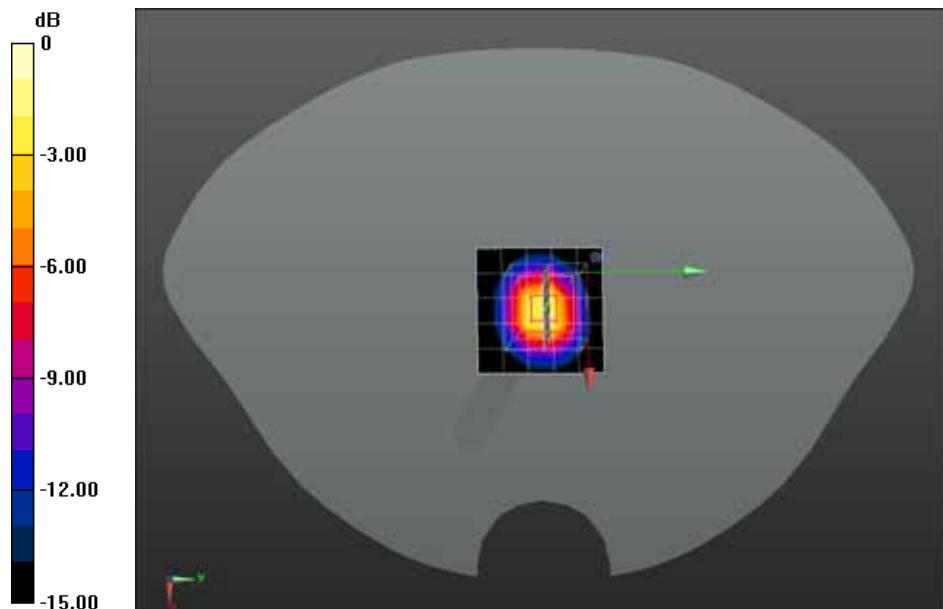
Configuration/Body 5600MHz/Area Scan (6x6x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 7.15 W/kg

Configuration/Body 5600MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm; Reference Value = 44.69 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 62.6 W/kg

SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.15 W/kg Maximum value of SAR (measured) = 8.6 W/kg



0 dB = 8.6 W/kg = 8.25 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuieTek Lab

System Check Body 5750MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5750 MHz; Medium parameters used: $f = 5750$ MHz; $\sigma = 6.05$ S/m; $\epsilon_r = 48.03$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

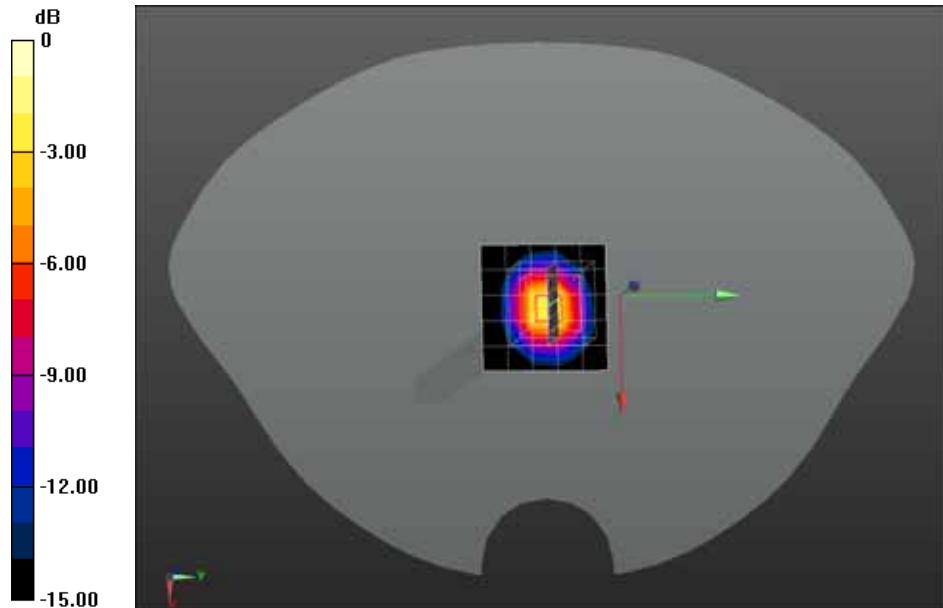
Configuration/Body 5750MHz/Area Scan (6x6x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 8.08 W/kg

Configuration/Body 5750MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm; Reference Value = 46.02 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 31.9 W/kg

SAR(1 g) = 7.57 W/kg; SAR(10 g) = 2.09 W/kg Maximum value of SAR (measured) = 10.2 W/kg



Appendix B. SAR measurement Data

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2437MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

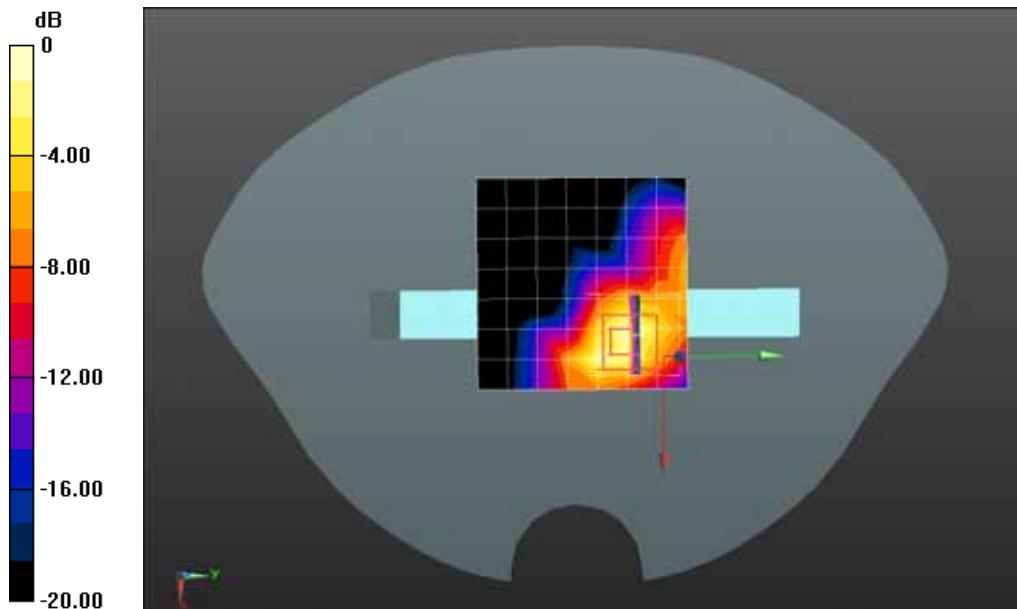
- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11b 2437MHz Body-Edge/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.873 W/kg

Configuration/802.11b 2437MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 3.305 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 2.16 W/kg

SAR(1 g) = 0.896 W/kg; SAR(10 g) = 0.375 W/kg Maximum value of SAR (measured) = 0.958 W/kg



0 dB = 0.958 W/kg = -0.19 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2437MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

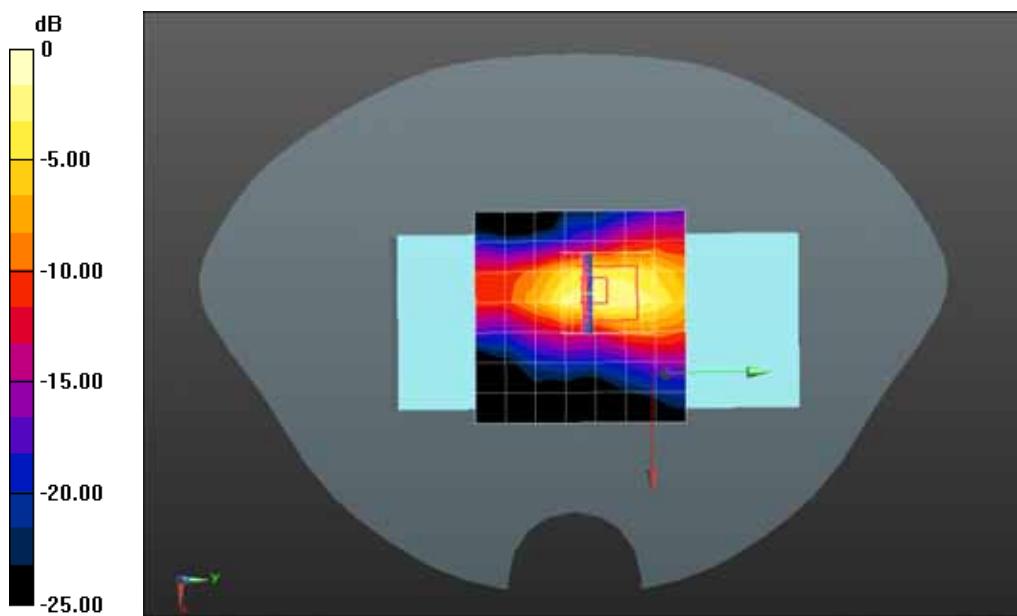
Configuration/802.11b 2437MHz Body-Back/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.799 W/kg

Configuration/802.11b 2437MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 7.309 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 2.30 W/kg

SAR(1 g) = 0.891 W/kg; SAR(10 g) = 0.352 W/kg Maximum value of SAR (measured) = 1.12 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2437MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11b 2437MHz Body-Front/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

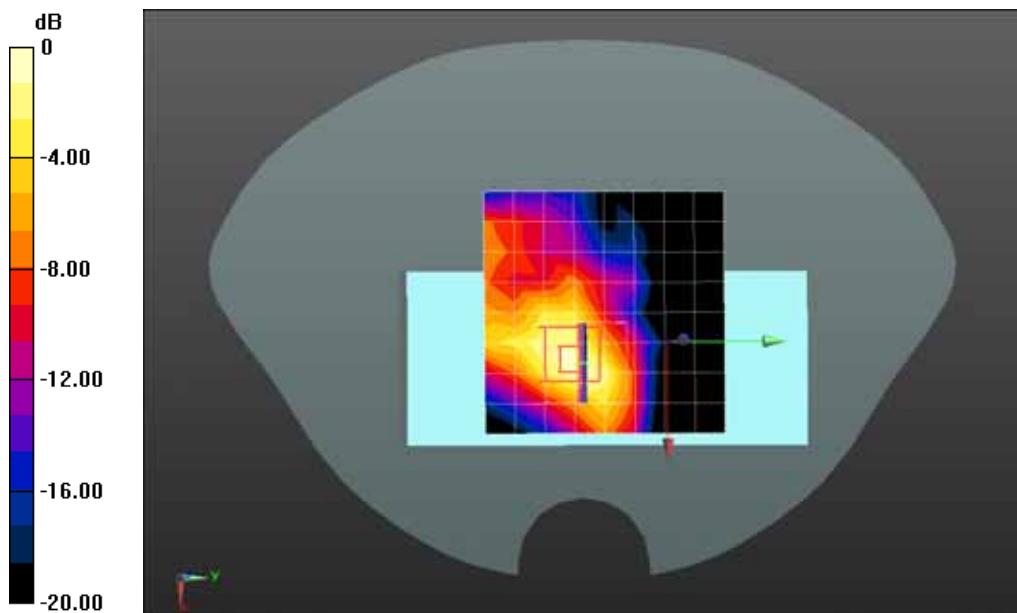
Maximum value of SAR (measured) = 0.660 W/kg

Configuration/802.11b 2437MHz Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 9.856 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.44 W/kg

SAR(1 g) = 0.644 W/kg; SAR(10 g) = 0.297 W/kg

Maximum value of SAR (measured) = 0.751 W/kg



0 dB = 0.751 W/kg = -1.24 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2462MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 2.01$ S/m; $\epsilon_r = 52.21$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11b 2462MHz Body-Edge/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

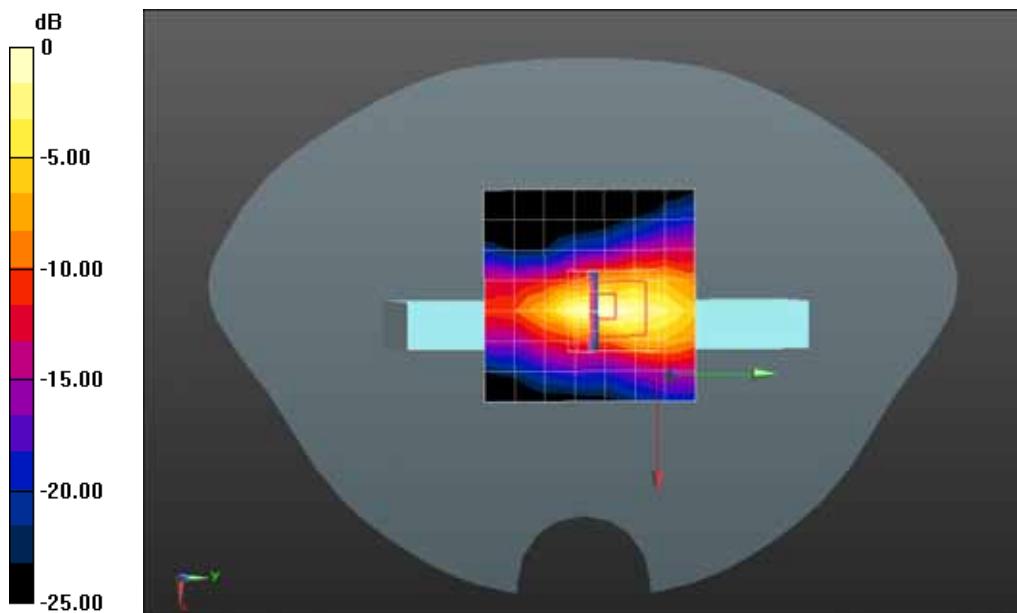
Maximum value of SAR (measured) = 1.51 W/kg

Configuration/802.11b 2462MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 16.16 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.43 W/kg

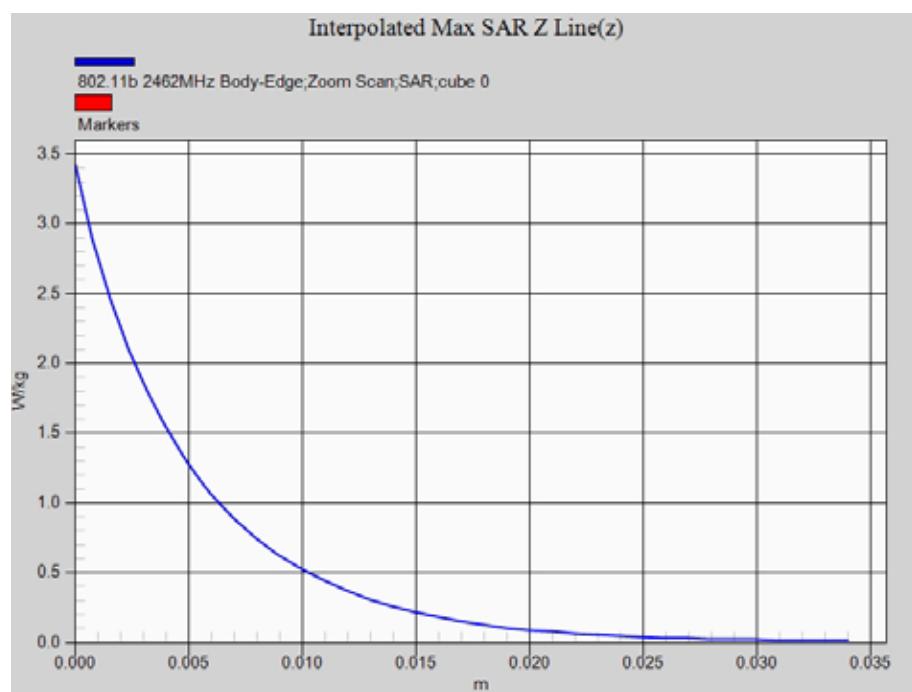
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.483 W/kg

Maximum value of SAR (measured) = 1.48 W/kg



0 dB = 1.48 W/kg = 1.70 dBW/kg

Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2462MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 2.01$ S/m; $\epsilon_r = 52.21$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11b 2462MHz Body-Edge/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

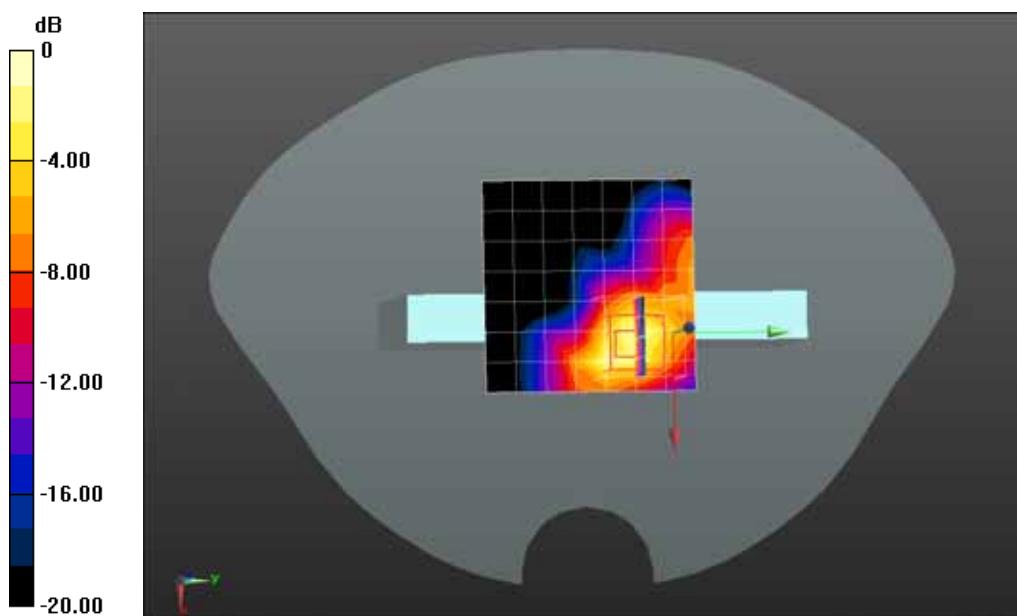
Maximum value of SAR (measured) = 1.01 W/kg

Configuration/802.11b 2462MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 3.248 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 2.50 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.431 W/kg

Maximum value of SAR (measured) = 1.15 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2462MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 2.01$ S/m; $\epsilon_r = 52.21$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11b 2462MHz Body-Back/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

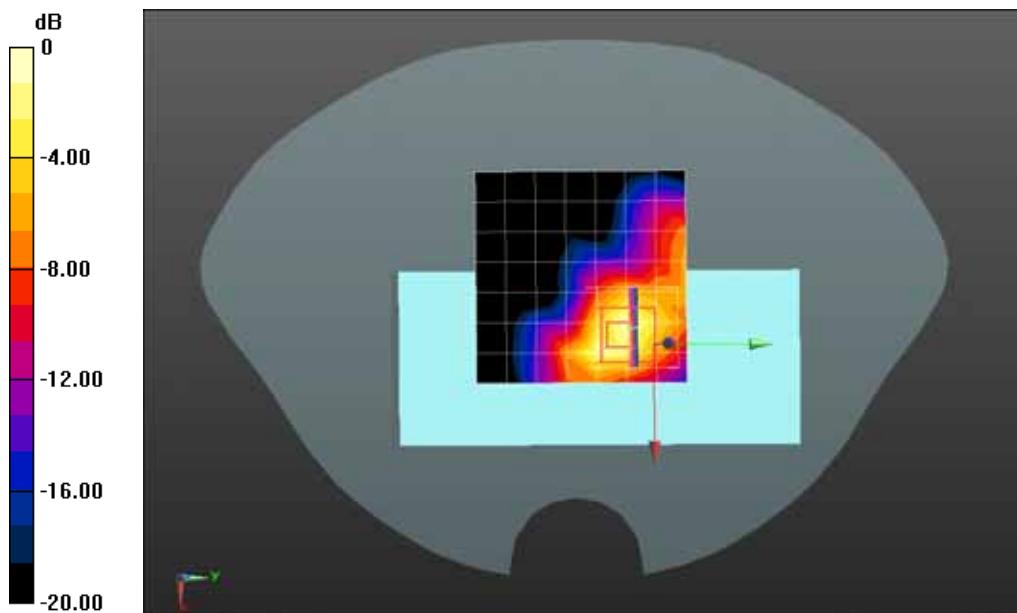
Maximum value of SAR (measured) = 0.856 W/kg

Configuration/802.11b 2462MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 3.199 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 2.13 W/kg

SAR(1 g) = 0.870 W/kg; SAR(10 g) = 0.363 W/kg

Maximum value of SAR (measured) = 0.937 W/kg



0 dB = 0.937 W/kg = -0.28 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11b 2462MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 2.01$ S/m; $\epsilon_r = 52.21$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11b 2462MHz Body-Front/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

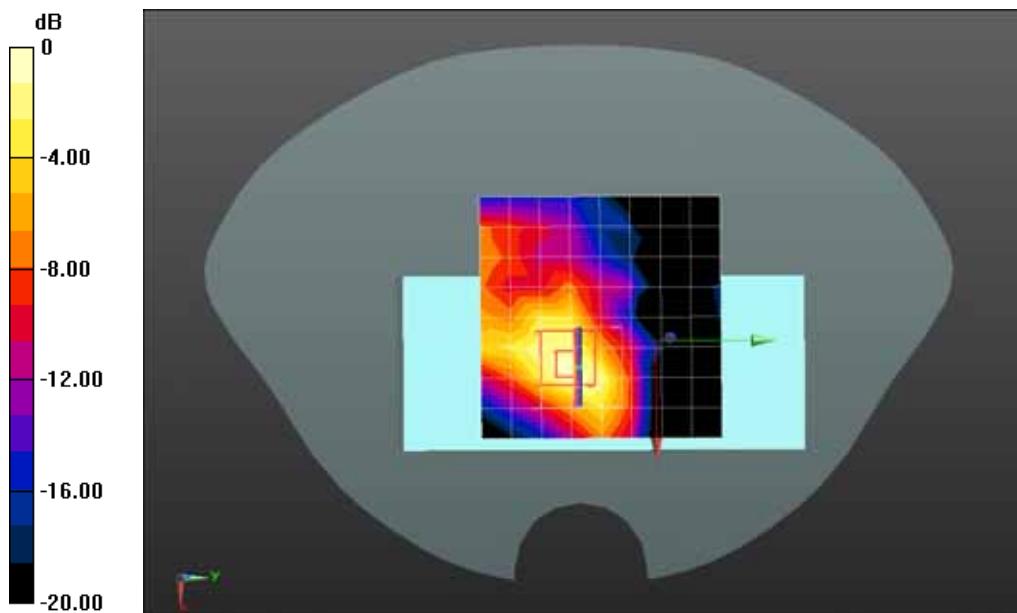
Maximum value of SAR (measured) = 0.662 W/kg

Configuration/802.11b 2462MHz Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 9.405 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.651 W/kg; SAR(10 g) = 0.298 W/kg

Maximum value of SAR (measured) = 0.760 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2412MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11g; Duty Cycle: 1:1.0;

Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ S/m; $\epsilon_r = 52.36$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

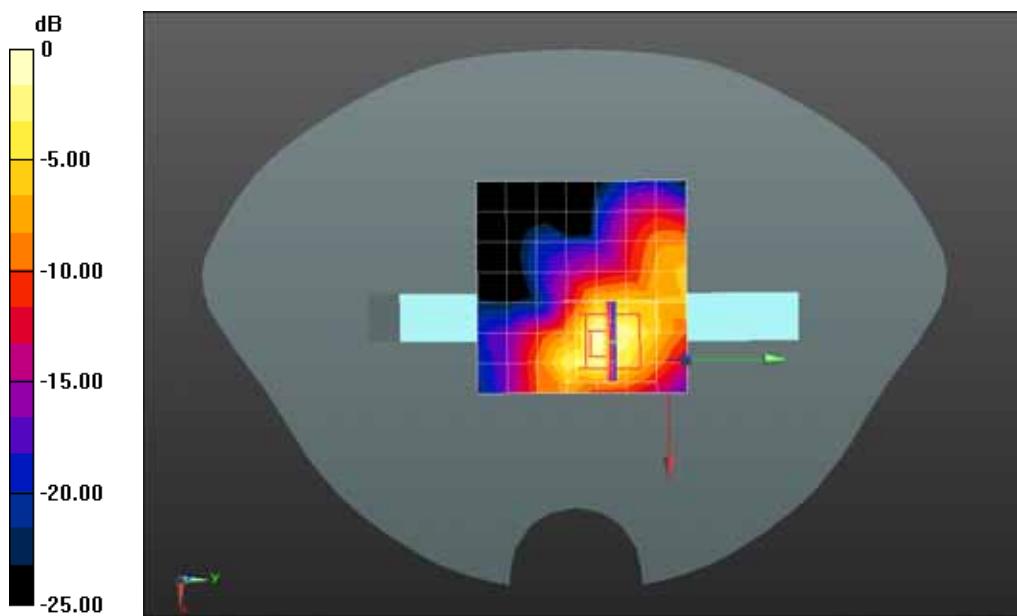
Configuration/802.11g 2412MHz Body-Edge/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.996 W/kg

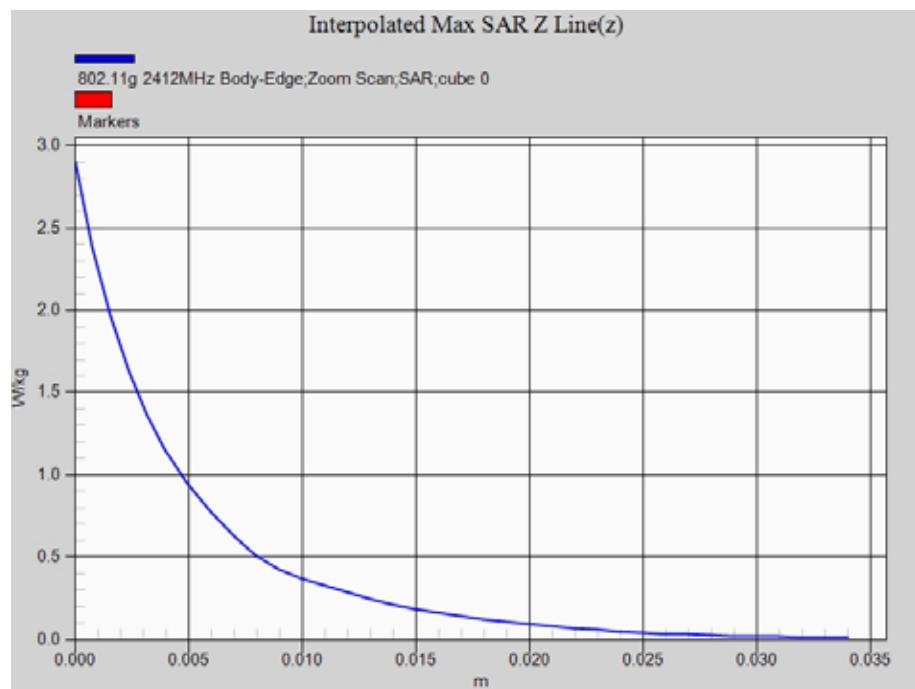
Configuration/802.11g 2412MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 8.563 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 2.91 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.426 W/kg Maximum value of SAR (measured) = 1.18 W/kg



Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2412MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11g; Duty Cycle: 1:1.0;

Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ S/m; $\epsilon_r = 52.36$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11g 2412MHz Body-Edge/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

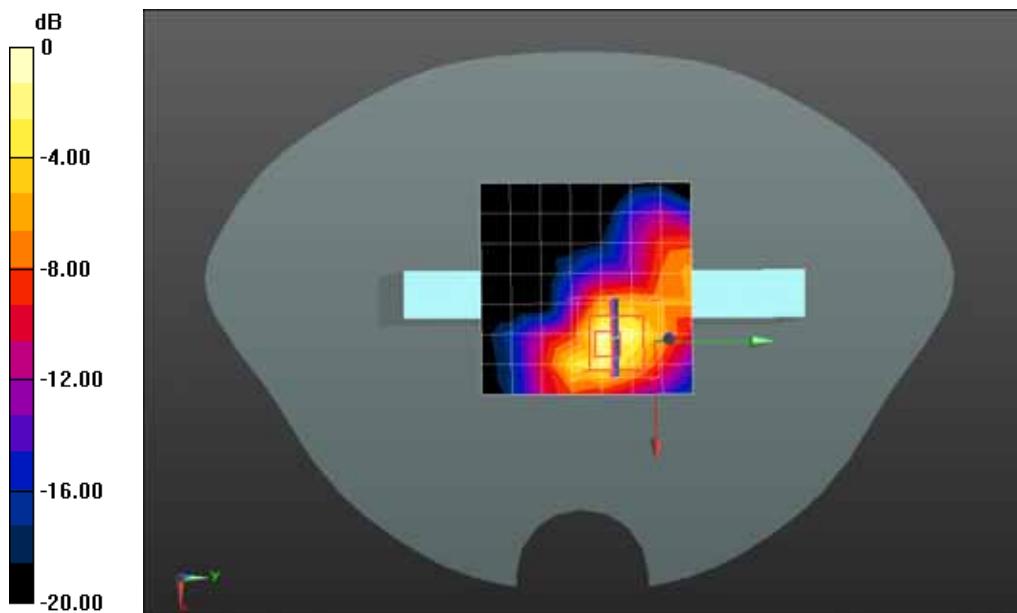
Maximum value of SAR (measured) = 0.947 W/kg

Configuration/802.11g 2412MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 8.621 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 2.49 W/kg

SAR(1 g) = 0.991 W/kg; SAR(10 g) = 0.410 W/kg

Maximum value of SAR (measured) = 1.14 W/kg



0 dB = 1.14 W/kg = 0.57 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2412MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11g; Duty Cycle: 1:1.0;

Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ S/m; $\epsilon_r = 52.36$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

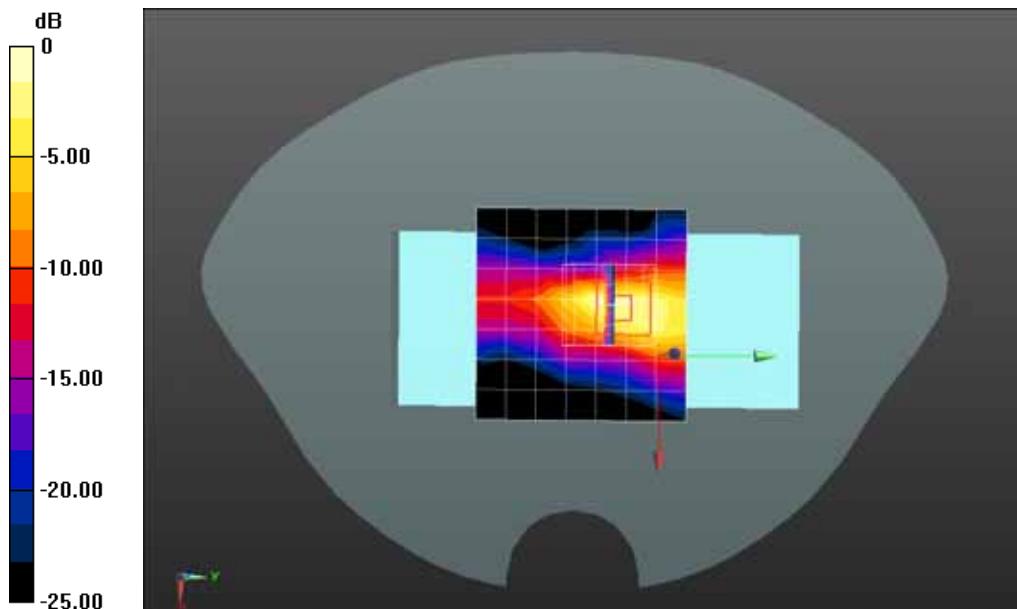
- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11g 2412MHz Body-Back/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.699 W/kg

Configuration/802.11g 2412MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 12.33 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 0.716 W/kg; SAR(10 g) = 0.278 W/kg Maximum value of SAR (measured) = 0.879 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2412MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11g; Duty Cycle: 1:1.0;

Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.92$ S/m; $\epsilon_r = 52.36$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11g 2412MHz Body-Back/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

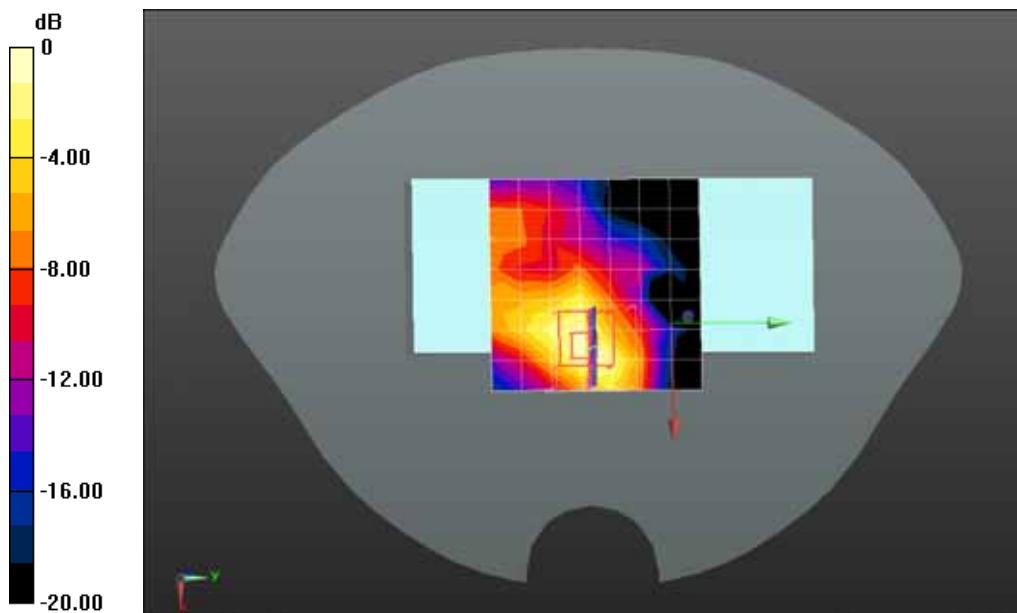
Maximum value of SAR (measured) = 0.625 W/kg

Configuration/802.11g 2412MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 14.30 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.667 W/kg; SAR(10 g) = 0.304 W/kg

Maximum value of SAR (measured) = 0.777 W/kg



0 dB = 0.777 W/kg = -1.10 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2462MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11g; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.10$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11g 2462MHz Body-Edge/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

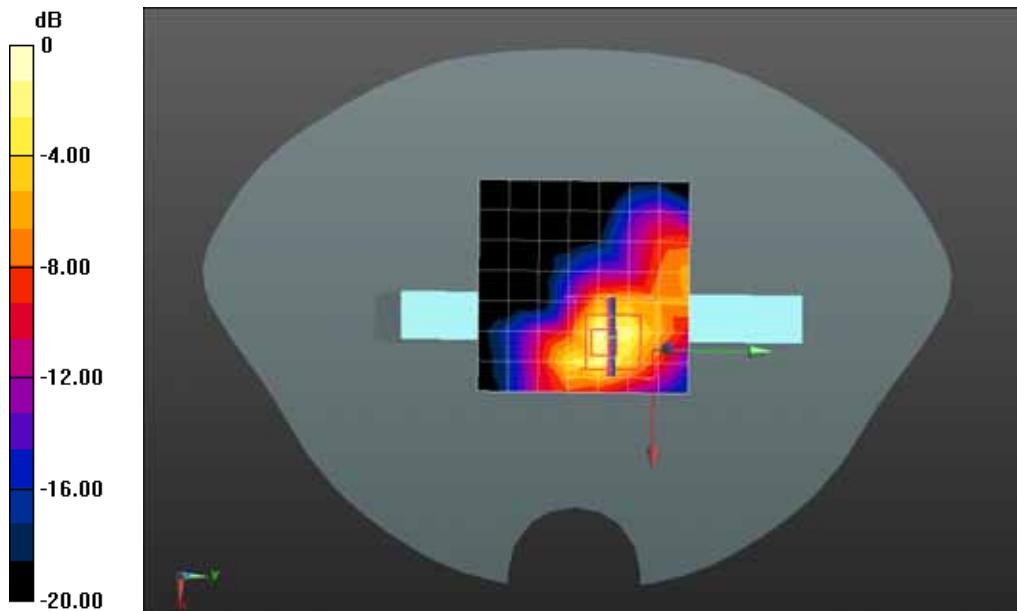
Maximum value of SAR (measured) = 0.957 W/kg

Configuration/802.11g 2462MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 8.621 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 2.51 W/kg

SAR(1 g) = 1 W/kg; SAR(10 g) = 0.415 W/kg

Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg = 0.61 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2462MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11b; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.10$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11g 2462MHz Body-Back/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

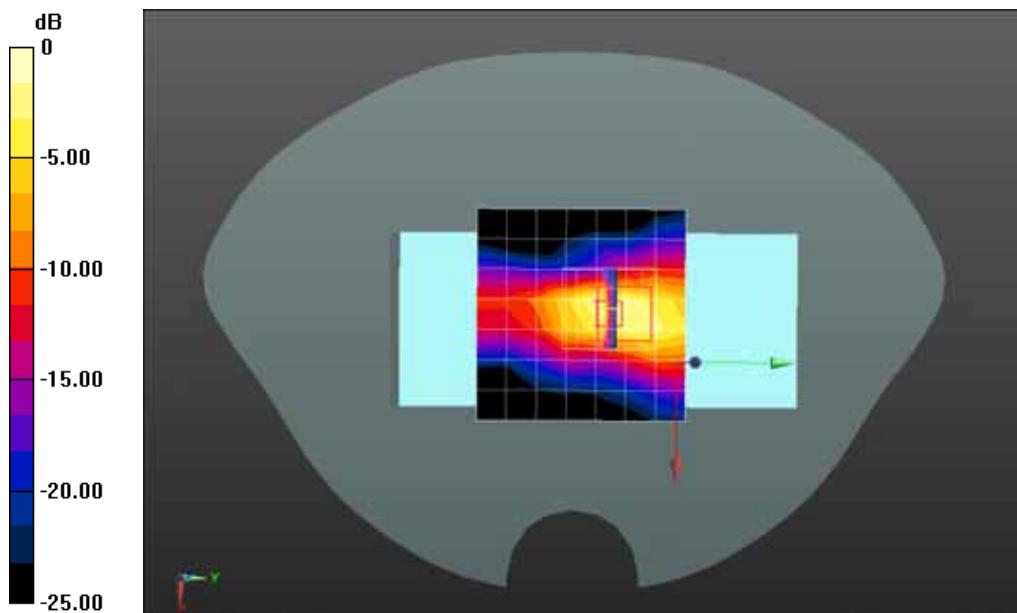
Maximum value of SAR (measured) = 0.679 W/kg

Configuration/802.11g 2462MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 17.25 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 2.19 W/kg

SAR(1 g) = 0.809 W/kg; SAR(10 g) = 0.320 W/kg

Maximum value of SAR (measured) = 1.02 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11g 2462MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11g; Duty Cycle: 1:1.0;

Frequency: 2462 MHz; Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.10$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11g 2462MHz Body-Front/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

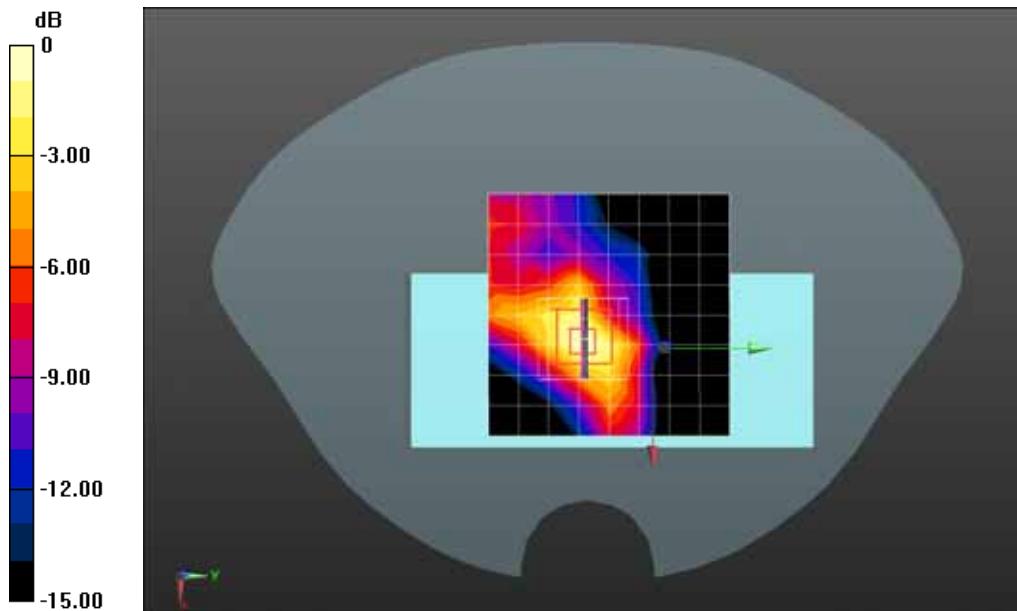
Maximum value of SAR (measured) = 0.768 W/kg

Configuration/802.11g 2462MHz Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 14.27 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.671 W/kg; SAR(10 g) = 0.305 W/kg

Maximum value of SAR (measured) = 0.769 W/kg



0 dB = 0.769 W/kg = -1.14 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n20 2437MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

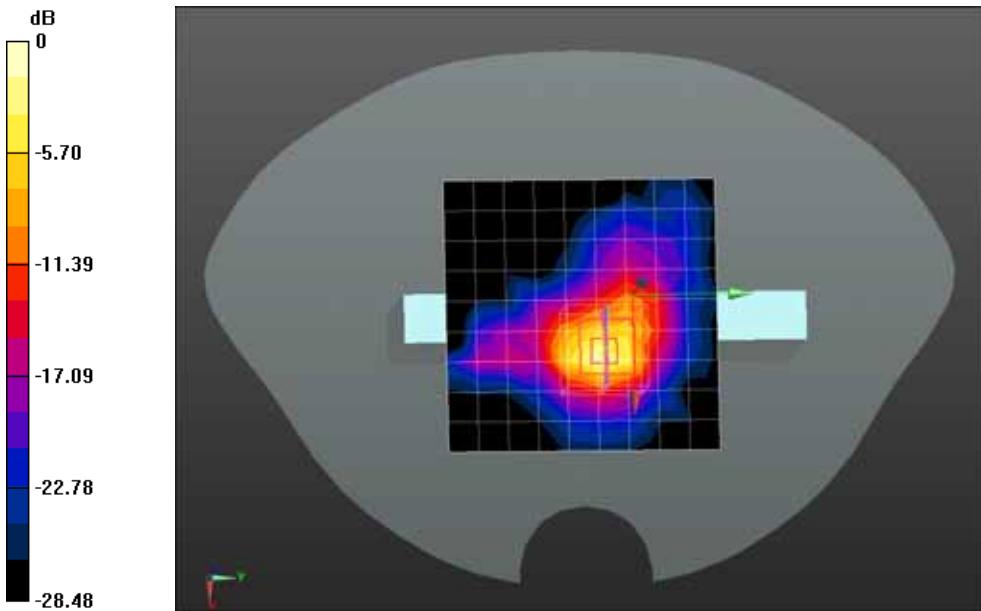
Configuration/802.11n20 2437MHz Body-Edge/Area Scan (10x10x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.937 W/kg

Configuration/802.11n20 2437MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 5.319 V/m; Power Drift = -0.20 dB

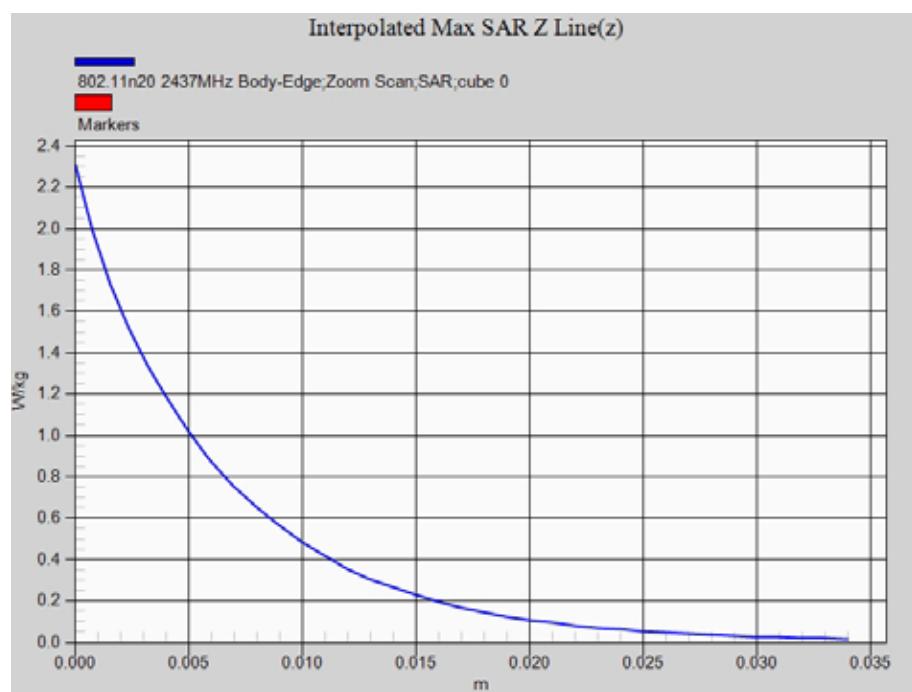
Peak SAR (extrapolated) = 2.31 W/kg

SAR(1 g) = 0.940 W/kg; SAR(10 g) = 0.341 W/kg Maximum value of SAR (measured) = 1.18 W/kg



0 dB = 1.18 W/kg = 0.72 dBW/kg

Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n20 2437MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

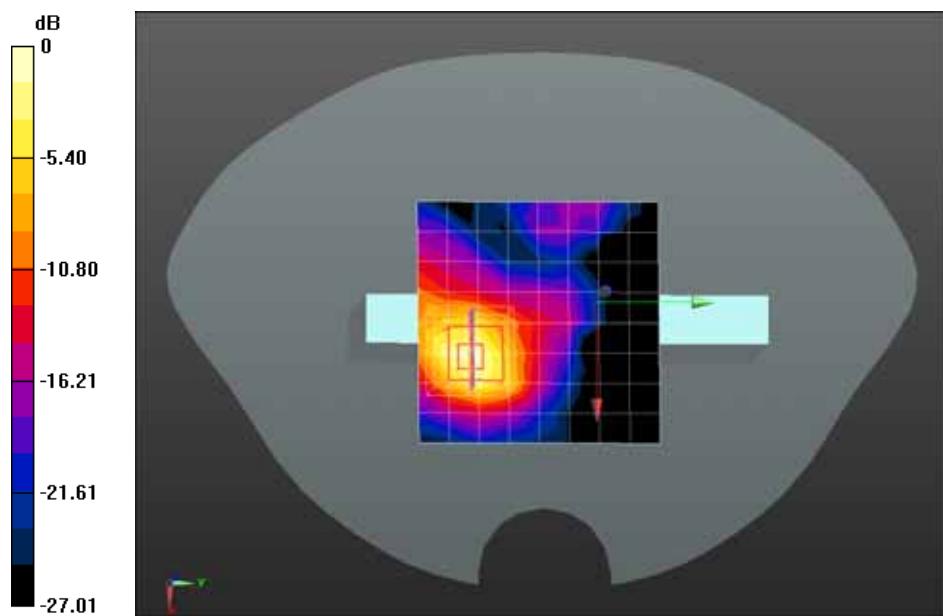
Configuration/802.11n20 2437MHz Body-Edge/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.852 W/kg

Configuration/802.11n20 2437MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 9.142 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.90 W/kg

SAR(1 g) = 0.897 W/kg; SAR(10 g) = 0.397 W/kg Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg = 1.52 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n20 2437MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

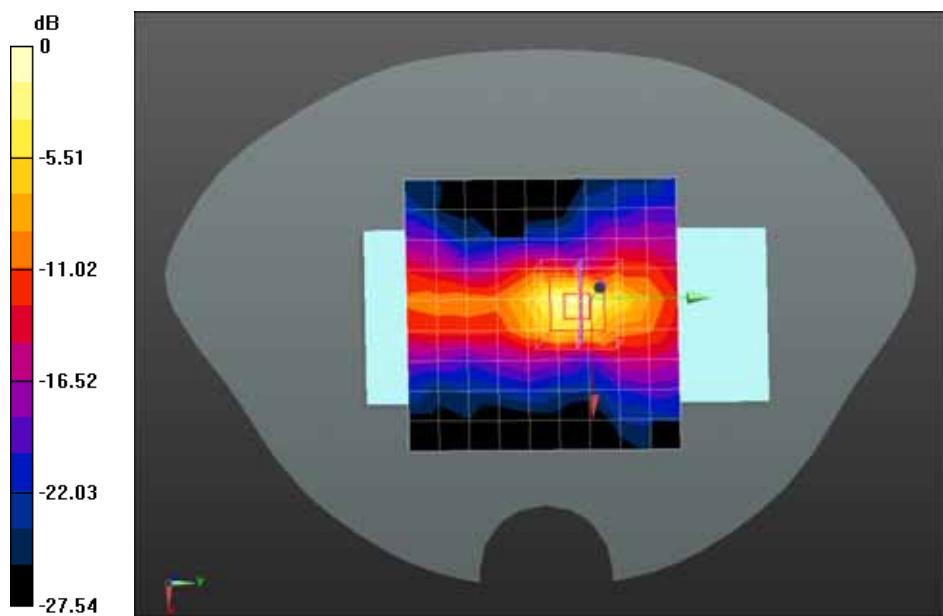
Configuration/802.11n20 2437MHz Body-Back/Area Scan (10x10x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.523 W/kg

Configuration/802.11n20 2437MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 11.87 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.544 W/kg; SAR(10 g) = 0.208 W/kg Maximum value of SAR (measured) = 0.661 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n20 2437MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

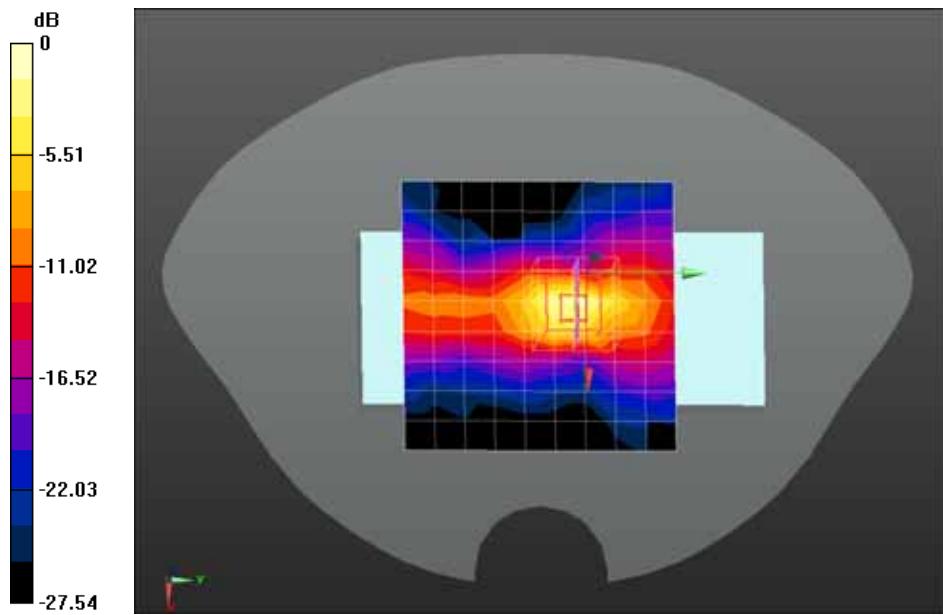
Configuration/802.11n20 2437MHz Body-Front/Area Scan (10x10x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.423 W/kg

Configuration/802.11n20 2437MHz Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 11.87 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.416 W/kg; SAR(10 g) = 0.188 W/kg Maximum value of SAR (measured) = 0.761 W/kg



0 dB = 0.761 W/kg = -2.10 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n20 2412MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.93$ S/m; $\epsilon_r = 53.29$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

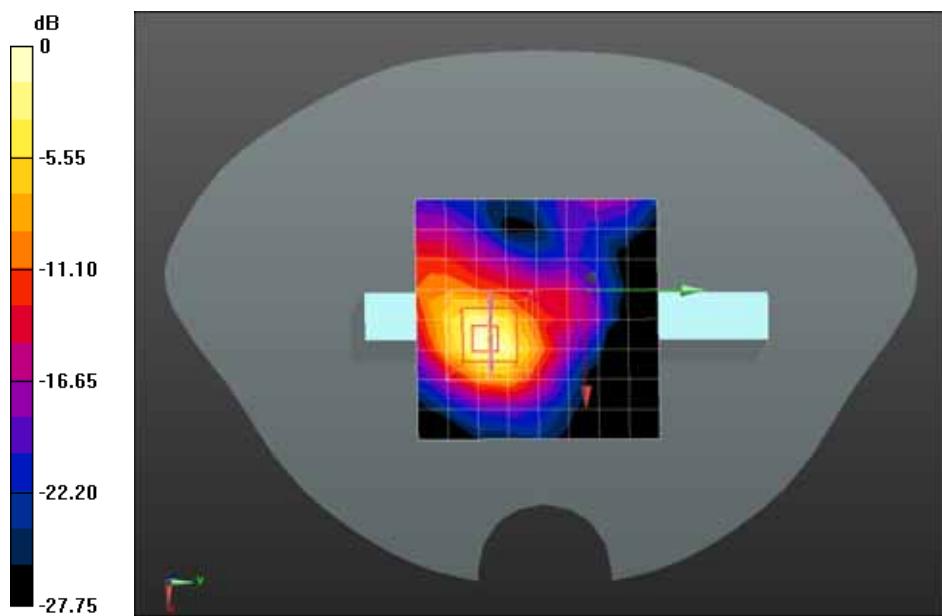
Configuration/802.11n20 2412MHz Body-Edge/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.807 W/kg

Configuration/802.11n20 2412MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 5.292 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 2.02 W/kg

SAR(1 g) = 0.851 W/kg; SAR(10 g) = 0.346 W/kg Maximum value of SAR (measured) = 1.00 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n20 2412MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.93$ S/m; $\epsilon_r = 53.29$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

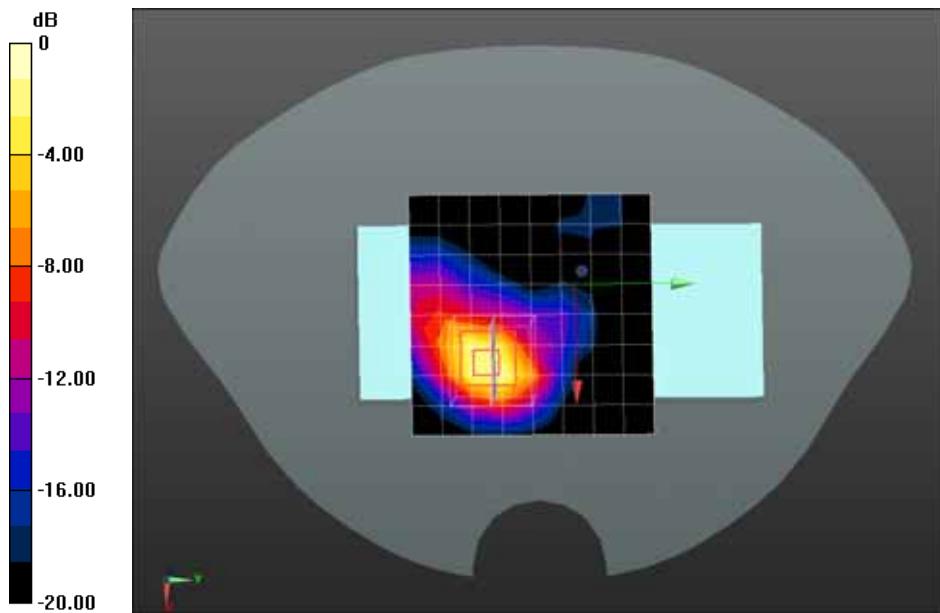
Configuration/802.11n20 2412MHz Body-Back/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.734 W/kg

Configuration/802.11n20 2412MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 4.414 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.87 W/kg

SAR(1 g) = 0.790 W/kg; SAR(10 g) = 0.324 W/kg Maximum value of SAR (measured) = 0.915 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuieTek Lab

802.11n20 2412MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(20MHz); Duty Cycle: 1:1.0; Frequency: 2412 MHz; Medium parameters used: $f = 2412$ MHz; $\sigma = 1.93$ S/m; $\epsilon_r = 53.29$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

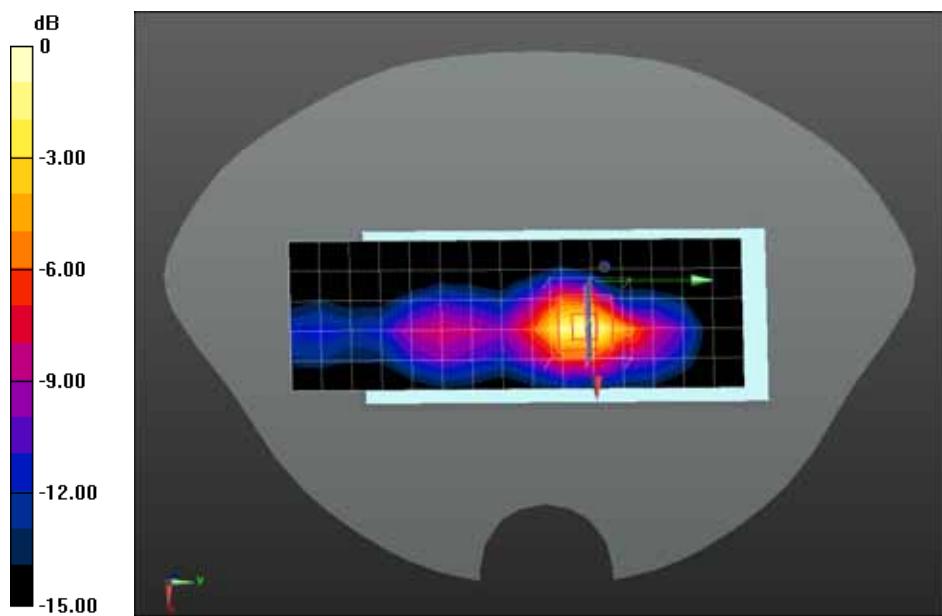
Configuration/802.11n20 2412MHz Body-Front/Area Scan (6x16x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.881 W/kg

Configuration/802.11n20 2412MHz Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 11.25 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.739 W/kg; SAR(10 g) = 0.309 W/kg Maximum value of SAR (measured) = 0.901 W/kg



0 dB = 0.901 W/kg = -0.45 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n40 2437MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(40MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

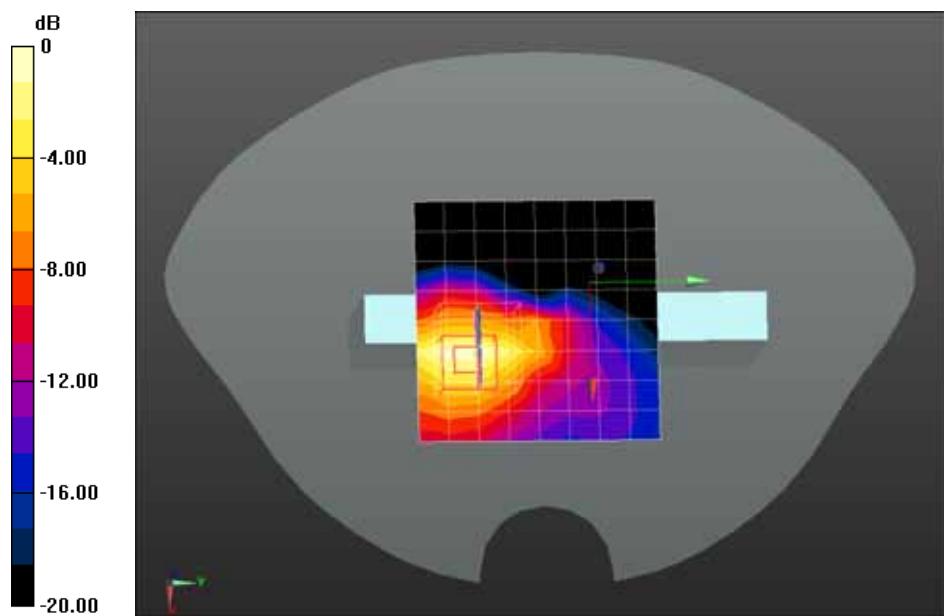
Configuration/802.11n40 2437MHz Body-Edge/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.898 W/kg

Configuration/802.11n40 2437MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 10.25 V/m; Power Drift = -0.19 dB

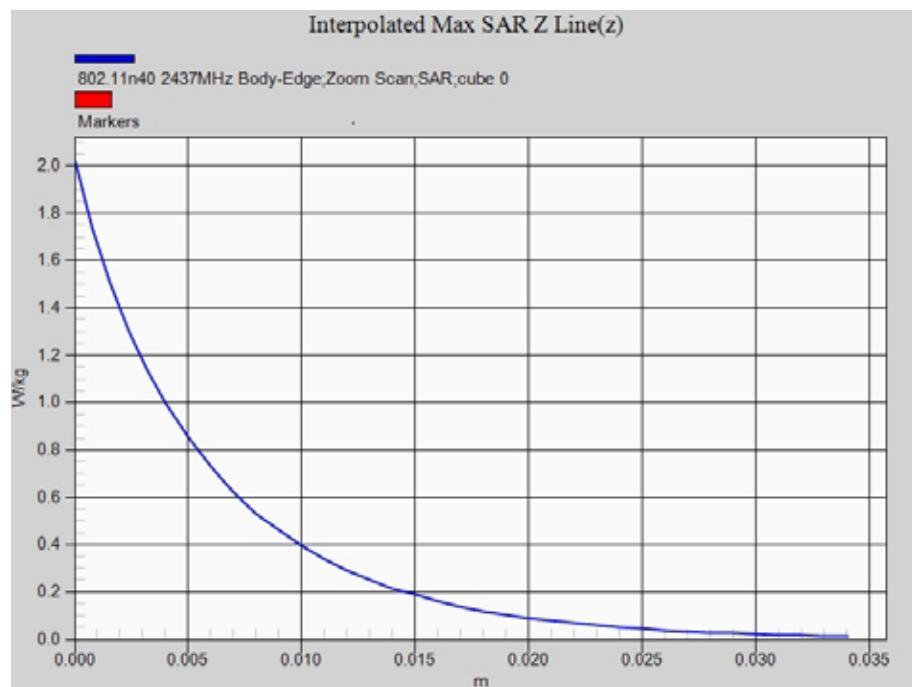
Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.837 W/kg; SAR(10 g) = 0.543 W/kg Maximum value of SAR (measured) = 1.04 W/kg



0 dB = 1.04 W/kg = 1.94 dBW/kg

Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n40 2437MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(40MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.93$ S/m; $\epsilon_r = 52.15$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

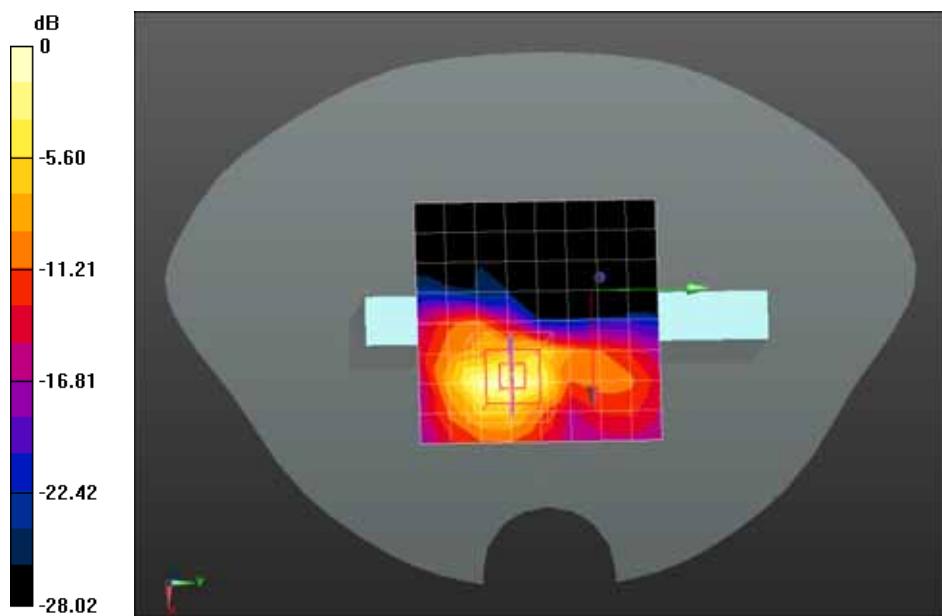
Configuration/802.11n40 2437MHz Body-Edge/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.825 W/kg

Configuration/802.11n40 2437MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 5.063 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.795 W/kg; SAR(10 g) = 0.422 W/kg Maximum value of SAR (measured) = 0.840 W/kg



0 dB = 0.840 W/kg = 0.94 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuieTek Lab

802.11n40 2437MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(40MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

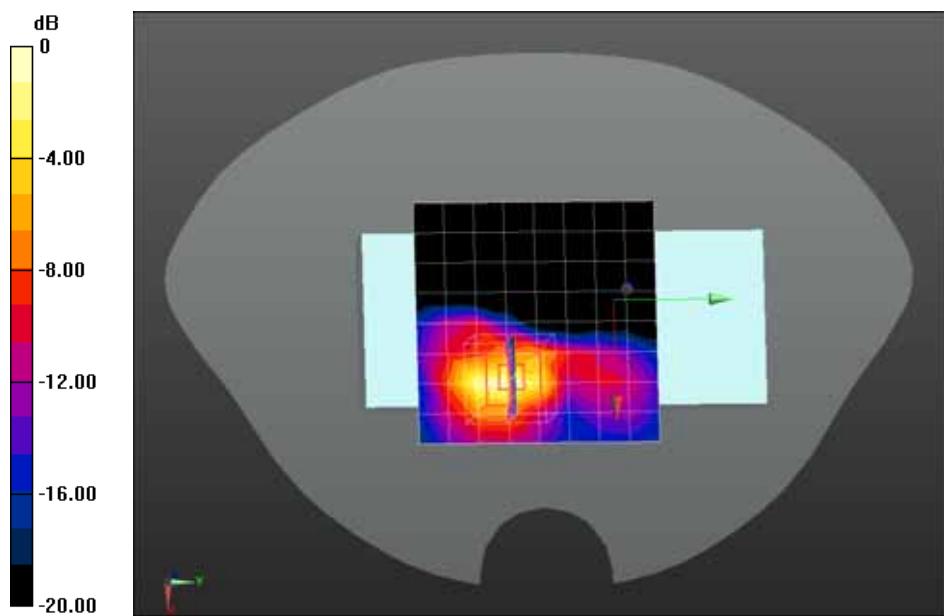
Configuration/802.11n40 2437MHz Body-Back/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.634 W/kg

Configuration/802.11n40 2437MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 1.063 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.538 W/kg; SAR(10 g) = 0.225 W/kg Maximum value of SAR (measured) = 0.650 W/kg



0 dB = 0.650 W/kg = -1.87 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuieTek Lab

802.11n40 2437MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(40MHz); Duty Cycle: 1:1.0; Frequency: 2437 MHz; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.26$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

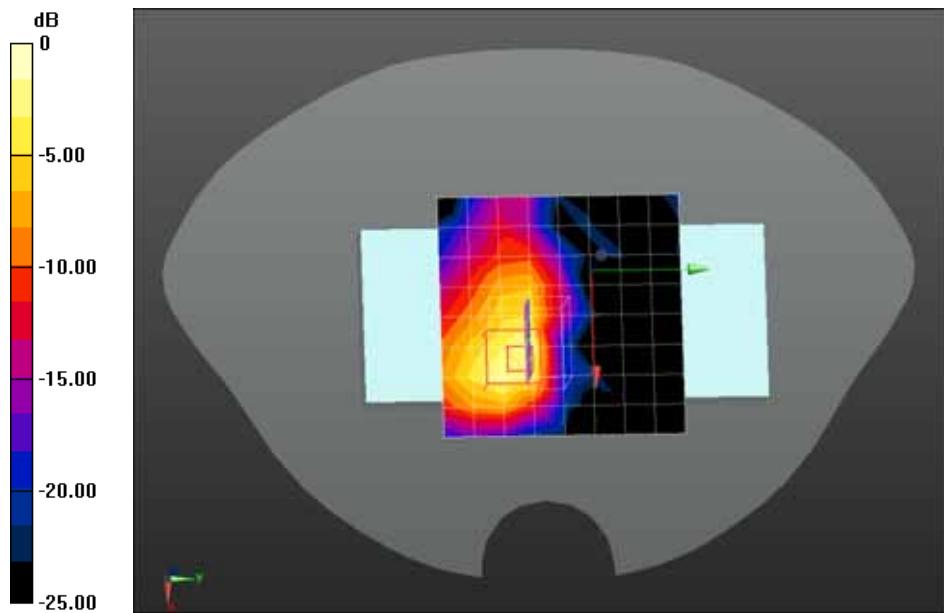
Configuration/802.11n40 2437MHz Body-Front/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.358 W/kg

Configuration/802.11n40 2437MHz Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 5.628 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.394 W/kg; SAR(10 g) = 0.186 W/kg Maximum value of SAR (measured) = 0.439 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n40 2422MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(40MHz); Duty Cycle: 1:1.0; Frequency: 2422 MHz; Medium parameters used: $f = 2422$ MHz; $\sigma = 1.94$ S/m; $\epsilon_r = 52.28$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

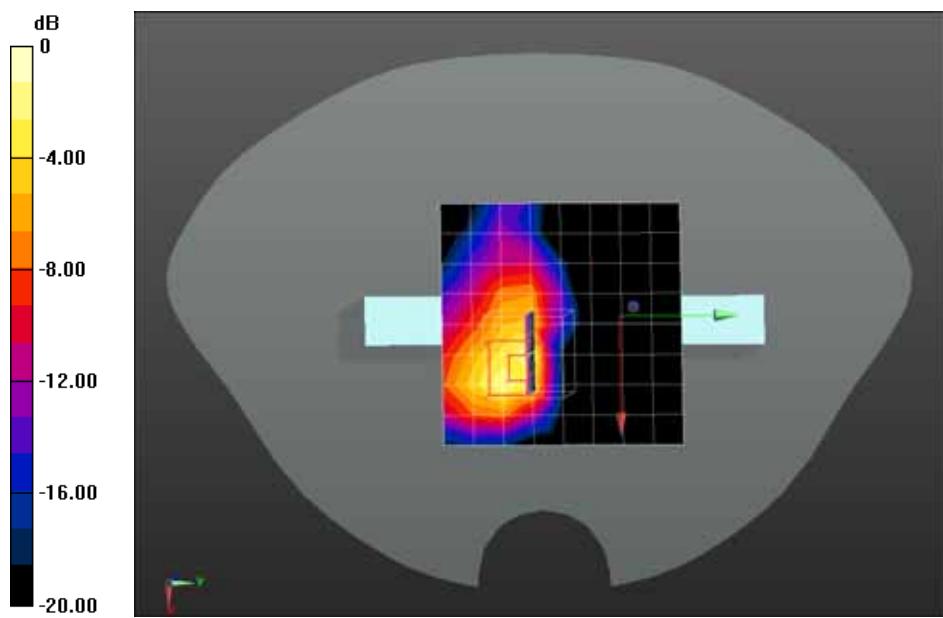
Configuration/802.11n40 2422MHz Body-Edge/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.754 W/kg

Configuration/802.11n40 2422MHz Body-Edge/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 8.614 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 0.790 W/kg; SAR(10 g) = 0.505 W/kg Maximum value of SAR (measured) = 0.834 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11n40 2422MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, Wi-Fi (0); Communication System Band: 802.11n(40MHz); Duty Cycle: 1:1.0; Frequency: 2422 MHz; Medium parameters used: $f = 2422$ MHz; $\sigma = 1.94$ S/m; $\epsilon_r = 52.28$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

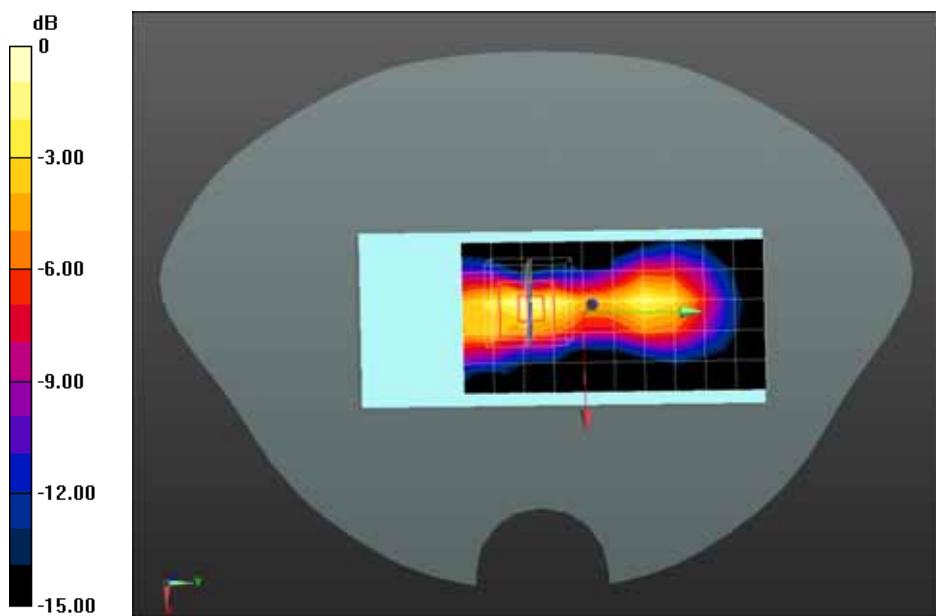
Configuration/802.11n40 2422MHz Body-Back/Area Scan (6x11x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.320 W/kg

Configuration/802.11n40 2422MHz Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 13.26 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.716 W/kg

SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.128 W/kg Maximum value of SAR (measured) = 0.369 W/kg



0 dB = 0.369 W/kg = -4.33 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5200MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5200 MHz; Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5200Hz Body-Edge/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm

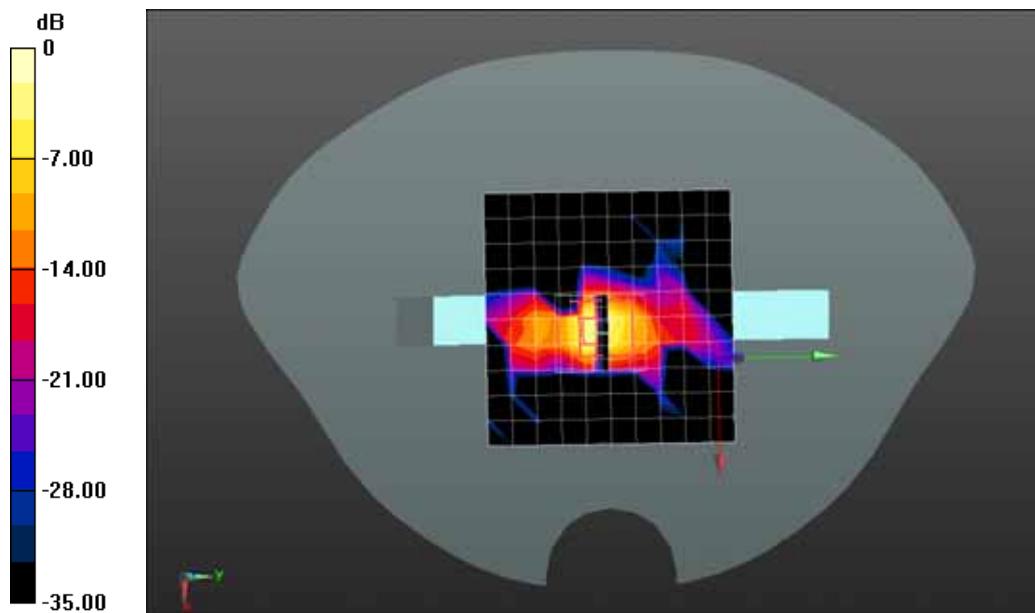
Maximum value of SAR (measured) = 0.787 W/kg

Configuration/802.11a 5200Hz Body-Edge/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 11.13 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.76 W/kg

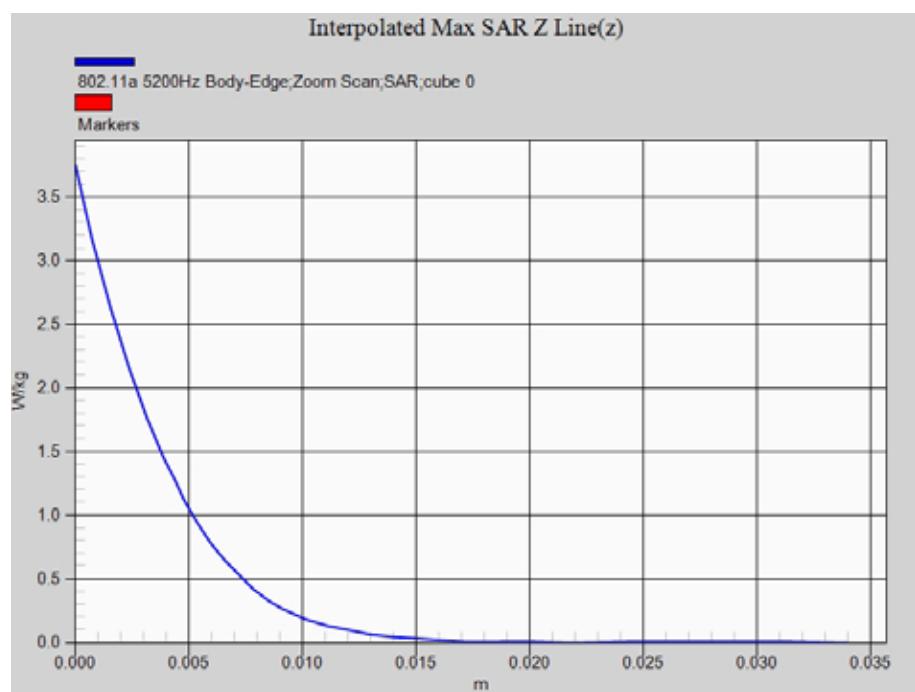
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.265 W/kg

Maximum value of SAR (measured) = 1.41 W/kg



0 dB = 1.41 W/kg = 1.49 dBW/kg

Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5200MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5200 MHz; Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5200MHz Body-Edge/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

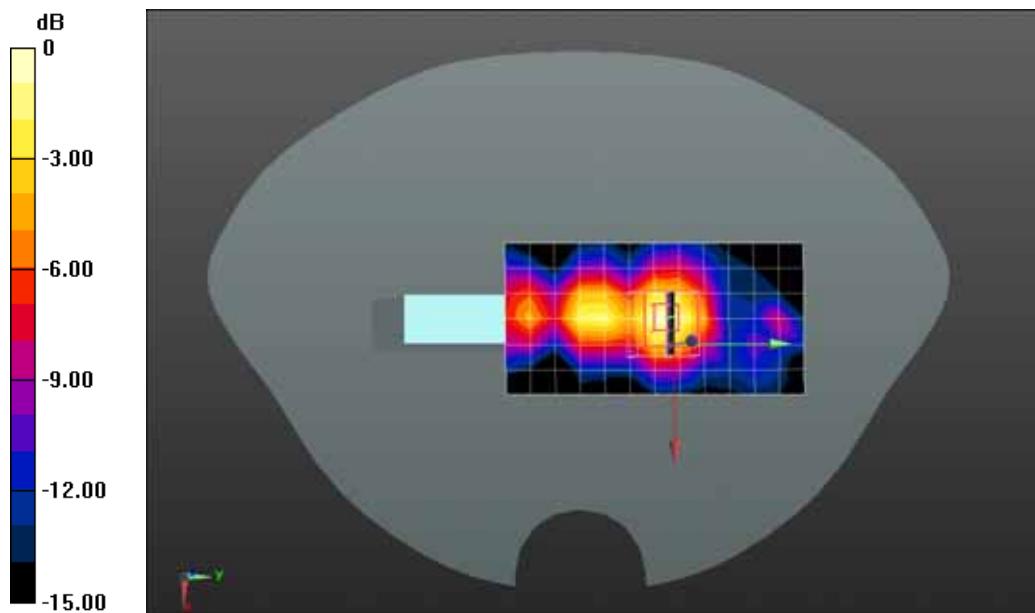
Maximum value of SAR (measured) = 2.15 W/kg

Configuration/802.11a 5200MHz Body-Edge/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 13.26 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 4.00 W/kg

SAR(1 g) = 0.99 W/kg; SAR(10 g) = 0.421 W/kg

Maximum value of SAR (measured) = 2.22 W/kg



0 dB = 2.22 W/kg = 3.46 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5200MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5200 MHz; Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5200MHz Body-Back/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

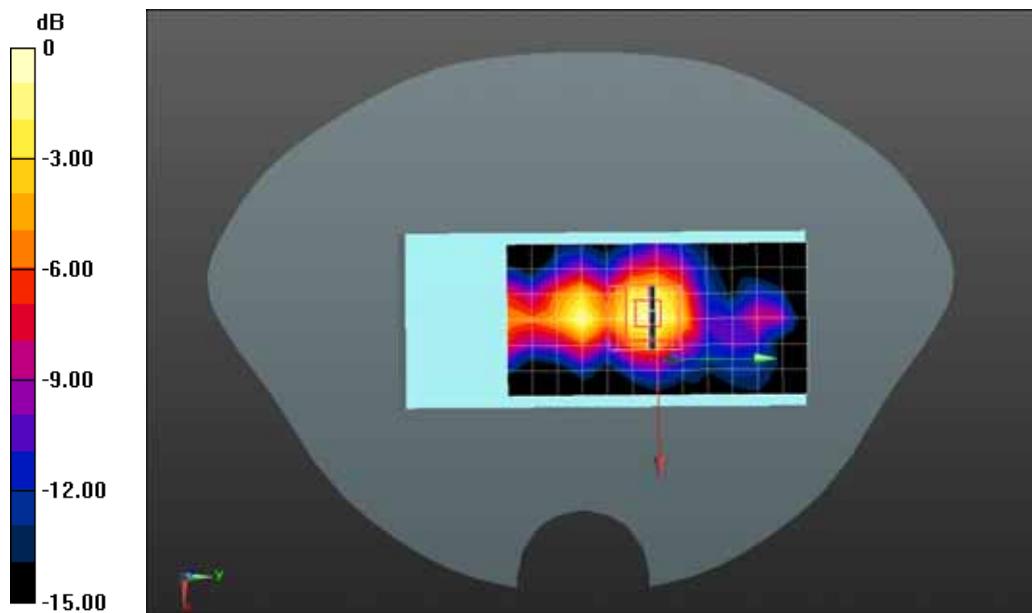
Maximum value of SAR (measured) = 1.70 W/kg

Configuration/802.11a 5200MHz Body-Back/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 13.79 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.41 W/kg

SAR(1 g) = 0.703 W/kg; SAR(10 g) = 0.357 W/kg

Maximum value of SAR (measured) = 1.93 W/kg



0 dB = 1.93 W/kg = 2.86 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5200MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5200 MHz; Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ S/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5200MHz Body-Front/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

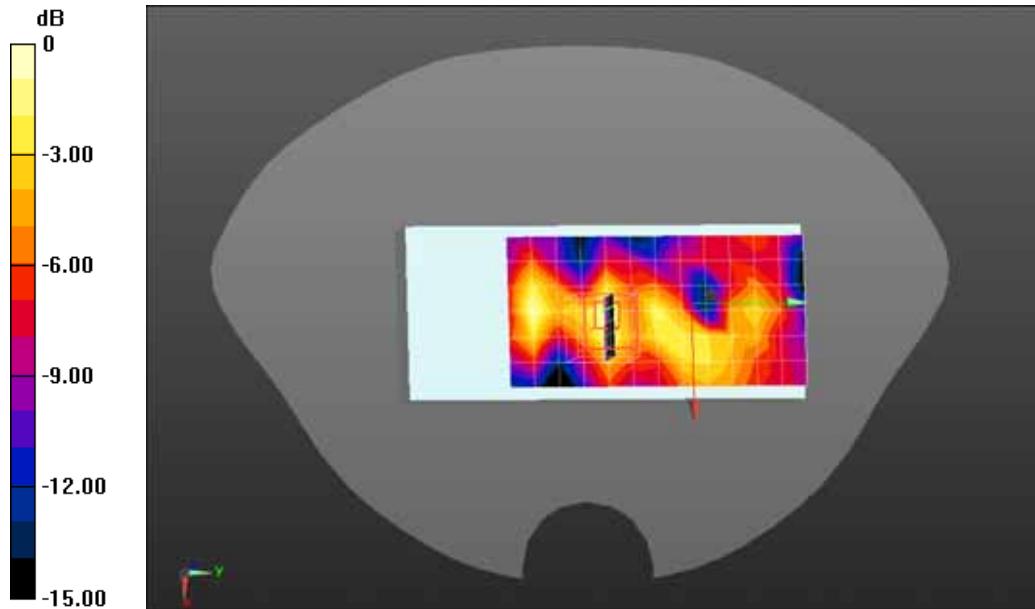
Maximum value of SAR (measured) = 0.613 W/kg

Configuration/802.11a 5200MHz Body-Front/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 3.611 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.390 W/kg

SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.129 W/kg

Maximum value of SAR (measured) = 0.616 W/kg



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5240MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: $f = 5240$ MHz; $\sigma = 5.21$ S/m; $\epsilon_r = 48.84$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5240Hz Body-Edge/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm

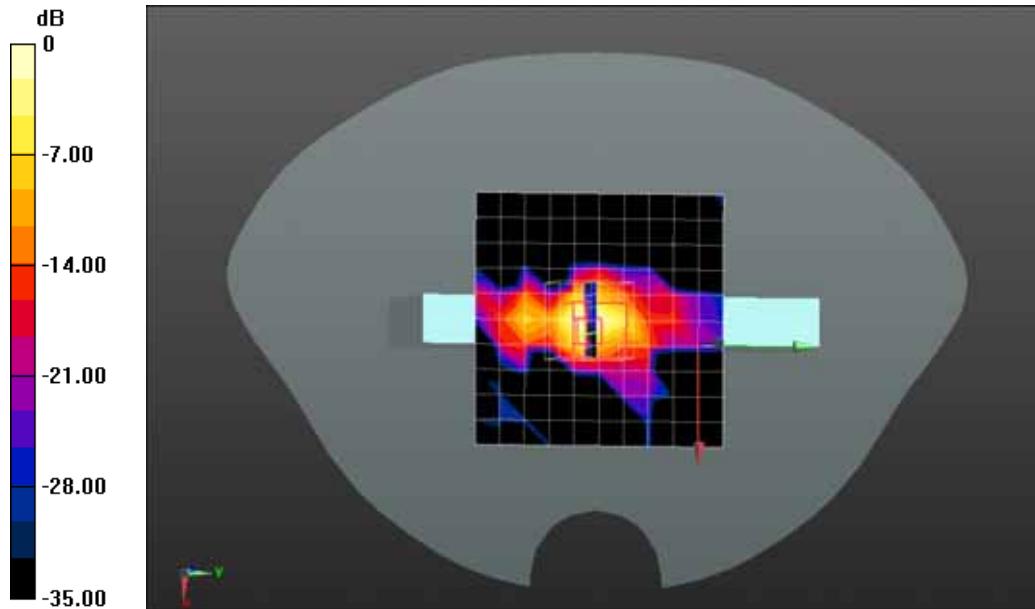
Maximum value of SAR (measured) = 1.20 W/kg

Configuration/802.11a 5240Hz Body-Edge/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 14.88 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 9.26 W/kg

SAR(1 g) = 0.906 W/kg; SAR(10 g) = 0.230 W/kg

Maximum value of SAR (measured) = 1.19 W/kg



0 dB = 1.19 W/kg = 0.76 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5240MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: $f = 5240$ MHz; $\sigma = 5.21$ S/m; $\epsilon_r = 48.84$; $\rho =$

1000 kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5240MHz Body-Back/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

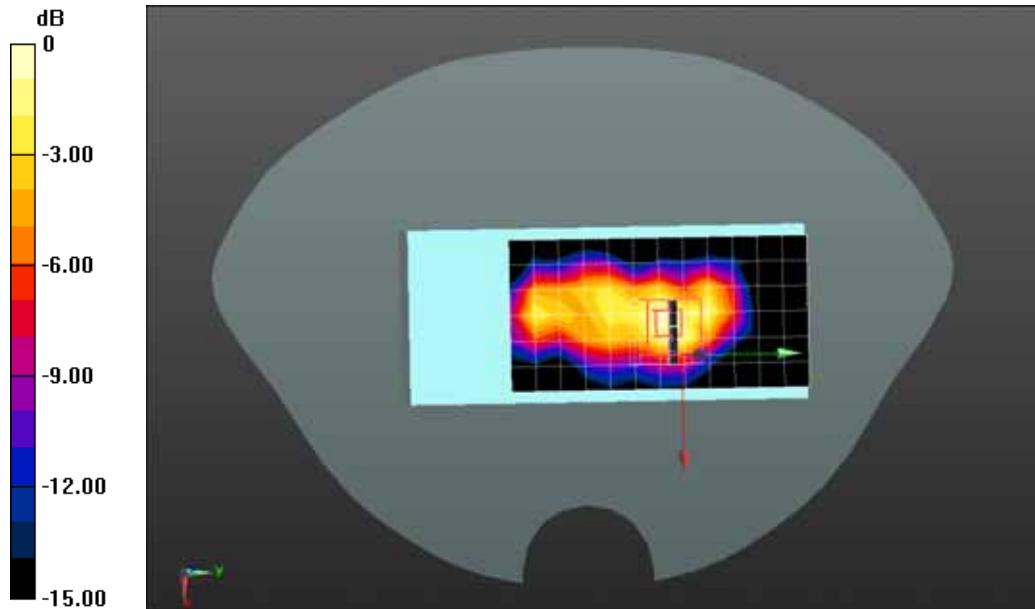
Maximum value of SAR (measured) = 1.22 W/kg

Configuration/802.11a 5240MHz Body-Back/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 7.822 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 2.50 W/kg

SAR(1 g) = 0.734 W/kg; SAR(10 g) = 0.267 W/kg

Maximum value of SAR (measured) = 1.38 W/kg



0 dB = 1.38 W/kg = 1.40 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5240MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: $f = 5240$ MHz; $\sigma = 5.21$ S/m; $\epsilon_r = 48.84$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.35, 4.35, 4.35); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5240MHz Body-Front/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

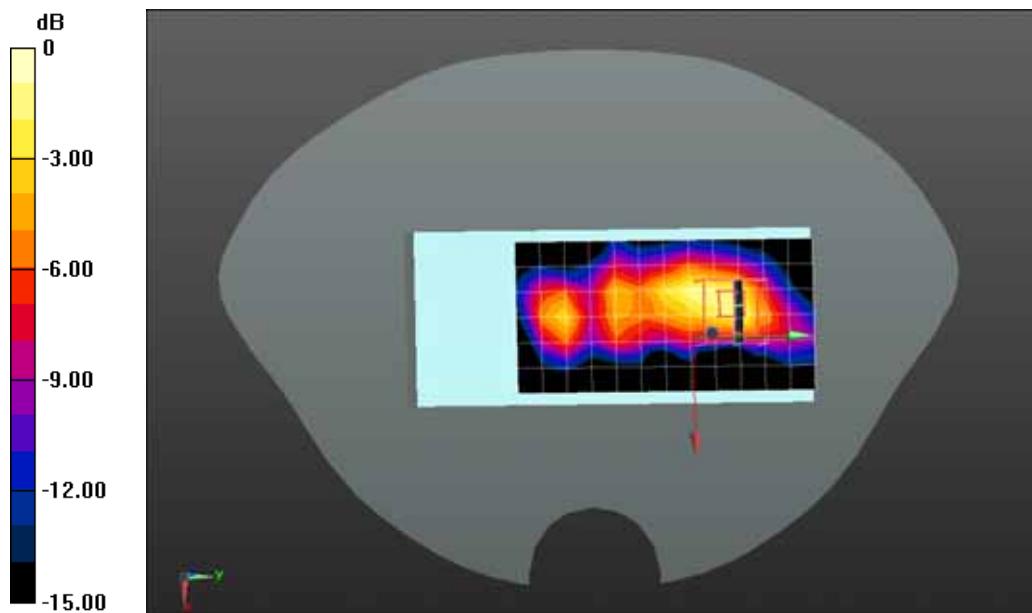
Maximum value of SAR (measured) = 0.936 W/kg

Configuration/802.11a 5240MHz Body-Front/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 4.482 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 2.15 W/kg

SAR(1 g) = 0.594 W/kg; SAR(10 g) = 0.193 W/kg

Maximum value of SAR (measured) = 1.16 W/kg



0 dB = 1.16 W/kg = 0.64 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5600MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5600 MHz; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.8$ S/m; $\epsilon_r = 48.47$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5600Hz Body-Edge/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm

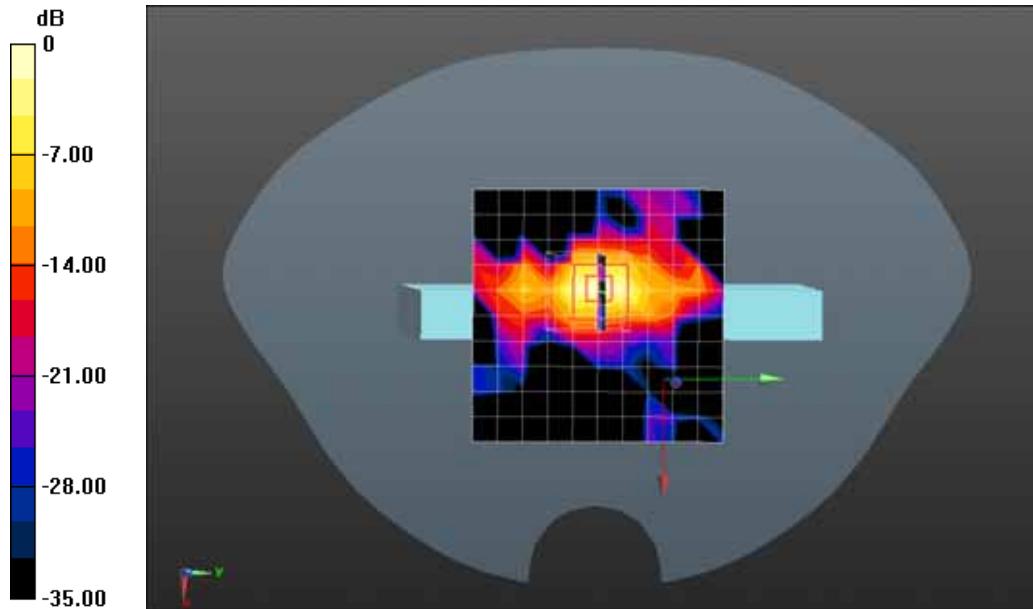
Maximum value of SAR (measured) = 1.02 W/kg

Configuration/802.11a 5600Hz Body-Edge/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 4.638 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 3.00 W/kg

SAR(1 g) = 0.831 W/kg; SAR(10 g) = 0.233 W/kg

Maximum value of SAR (measured) = 1.07 W/kg



0 dB = 1.07 W/kg = 0.29 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5600MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5600 MHz; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.8$ S/m; $\epsilon_r = 48.47$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5600MHz Body-Back/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

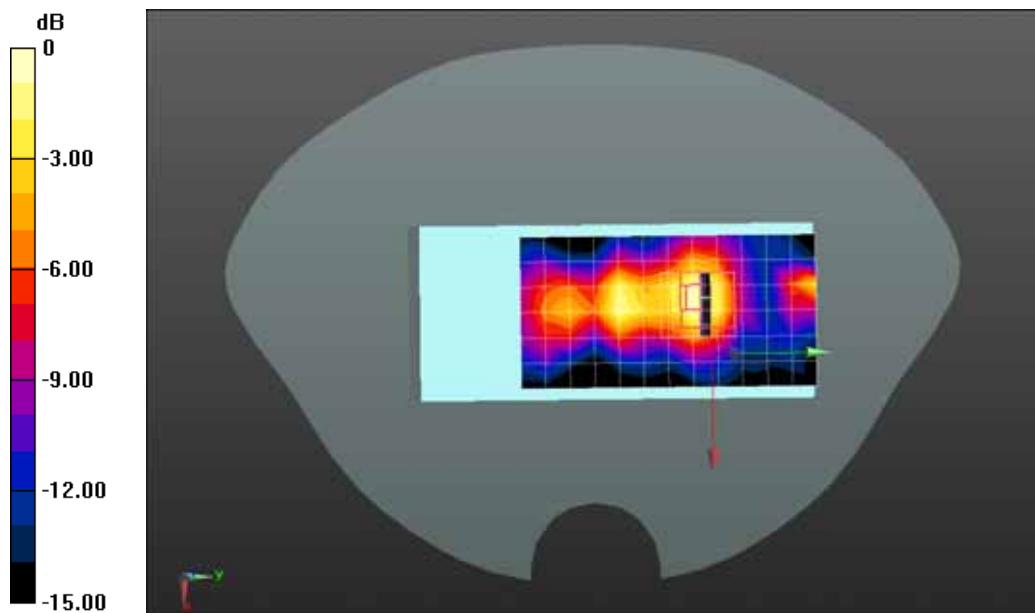
Maximum value of SAR (measured) = 1.09 W/kg

Configuration/802.11a 5600MHz Body-Back/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 5.498 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 2.02 W/kg

SAR(1 g) = 0.654 W/kg; SAR(10 g) = 0.229 W/kg

Maximum value of SAR (measured) = 1.20 W/kg



0 dB = 1.20 W/kg = 0.79 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5600MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5600 MHz; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.8$ S/m; $\epsilon_r = 48.47$; $\rho = 1000$ kg/m³; Phantom section: Flat Section; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5600MHz Body-Front/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

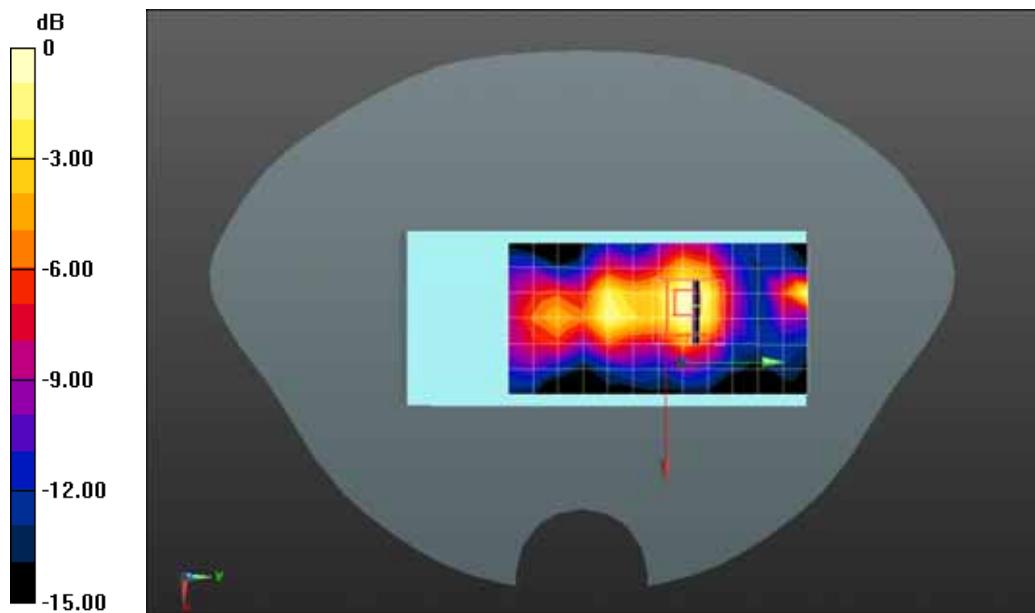
Maximum value of SAR (measured) = 0.892 W/kg

Configuration/802.11a 5600MHz Body-Front/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 5.366 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.67 W/kg

SAR(1 g) = 0.529 W/kg; SAR(10 g) = 0.188 W/kg

Maximum value of SAR (measured) = 0.957 W/kg



0 dB = 0.957 W/kg = -0.19 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5700MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5700 MHz; Medium parameters used: $f = 5700$ MHz; $\sigma = 5.93$ S/m; $\epsilon_r = 48.22$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5700Hz Body-Edge/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm

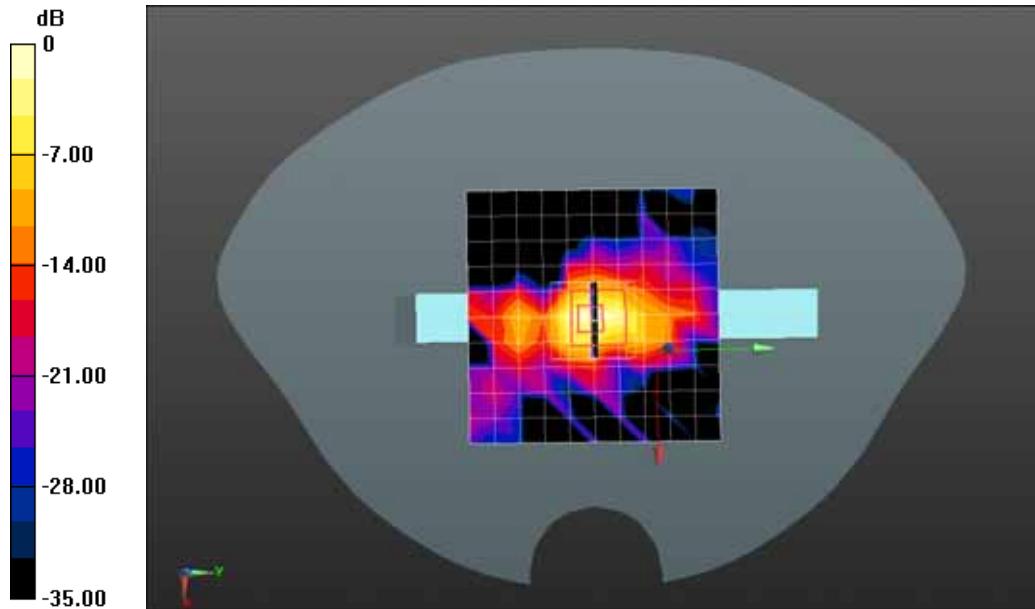
Maximum value of SAR (measured) = 1.08 W/kg

Configuration/802.11a 5700Hz Body-Edge/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 13.99 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.18 W/kg

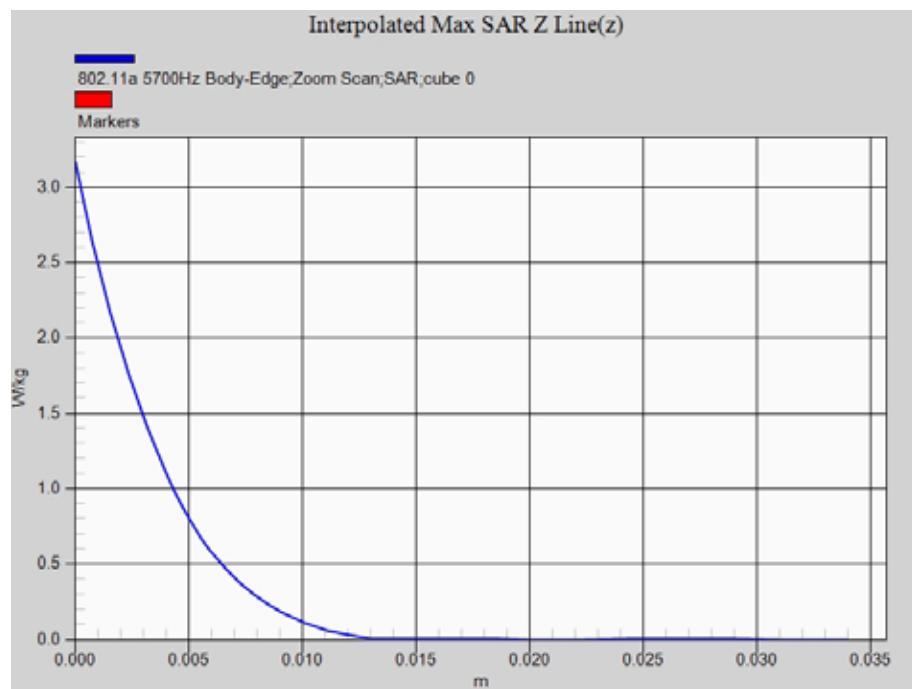
SAR(1 g) = 0.884 W/kg; SAR(10 g) = 0.244 W/kg

Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg

Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5700MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5700 MHz; Medium parameters used: $f = 5700$ MHz; $\sigma = 5.93$ S/m; $\epsilon_r = 48.22$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5700MHz Body-Edge/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

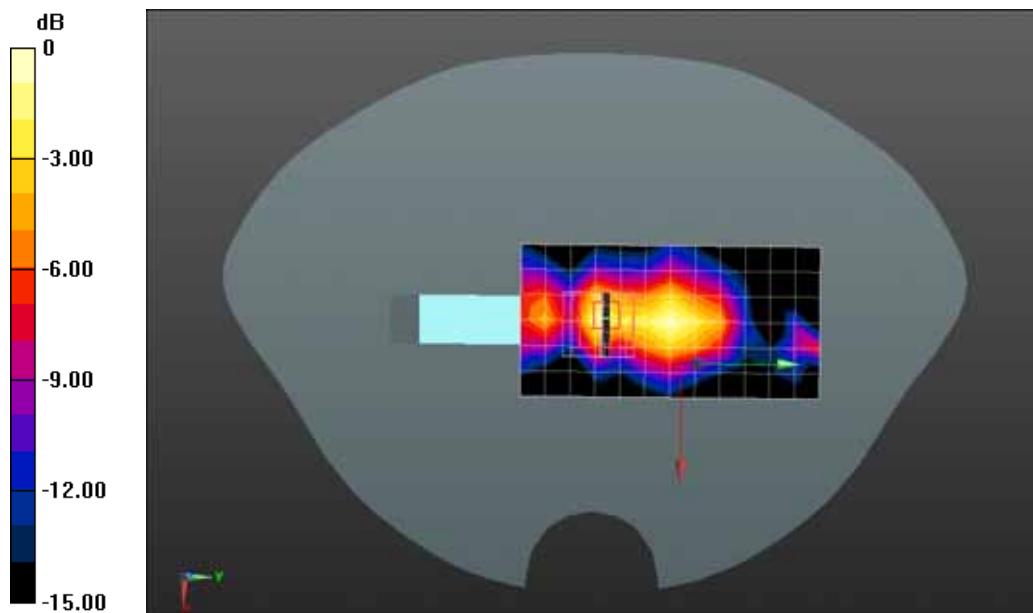
Maximum value of SAR (measured) = 1.93 W/kg

Configuration/802.11a 5700MHz Body-Edge/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 12.62 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 4.19 W/kg

SAR(1 g) = 0.805 W/kg; SAR(10 g) = 0.272 W/kg

Maximum value of SAR (measured) = 2.15 W/kg



0 dB = 2.15 W/kg = 3.32 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5700MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5700 MHz; Medium parameters used: $f = 5700$ MHz; $\sigma = 5.93$ S/m; $\epsilon_r = 48.22$; $\rho =$

1000 kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.67, 3.67, 3.67); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5700MHz Body-Back/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

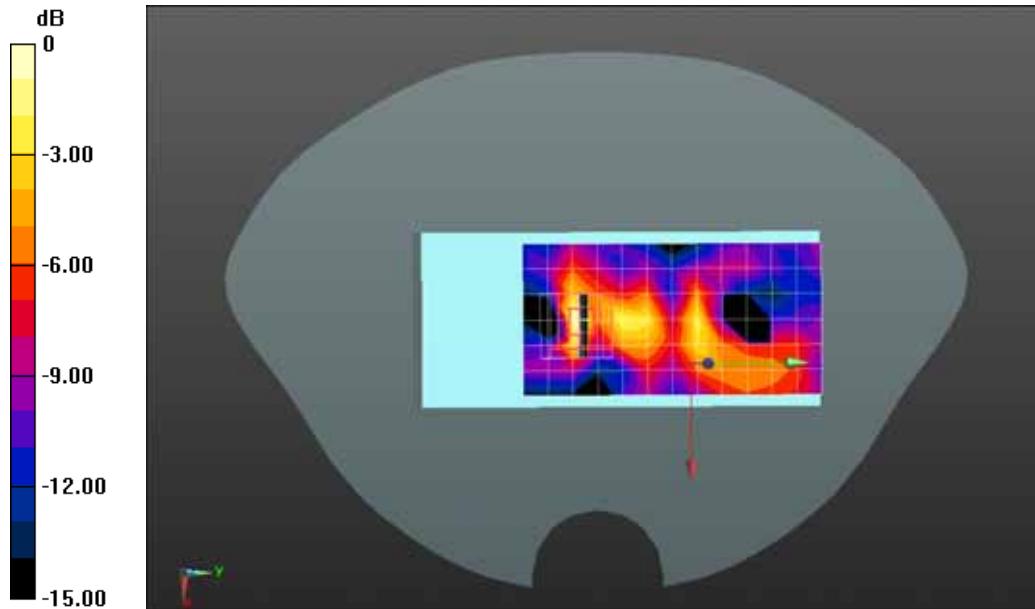
Maximum value of SAR (measured) = 0.504 W/kg

Configuration/802.11a 5700MHz Body-Back/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 3.235 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.629 W/kg

SAR(1 g) = 0.342 W/kg; SAR(10 g) = 0.137 W/kg

Maximum value of SAR (measured) = 0.524 W/kg



0 dB = 0.524 W/kg = -4.89 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5785MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5785 MHz; Medium parameters used: $f = 5785$ MHz; $\sigma = 6.09$ S/m; $\epsilon_r = 47.94$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5785Hz Body-Edge/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm

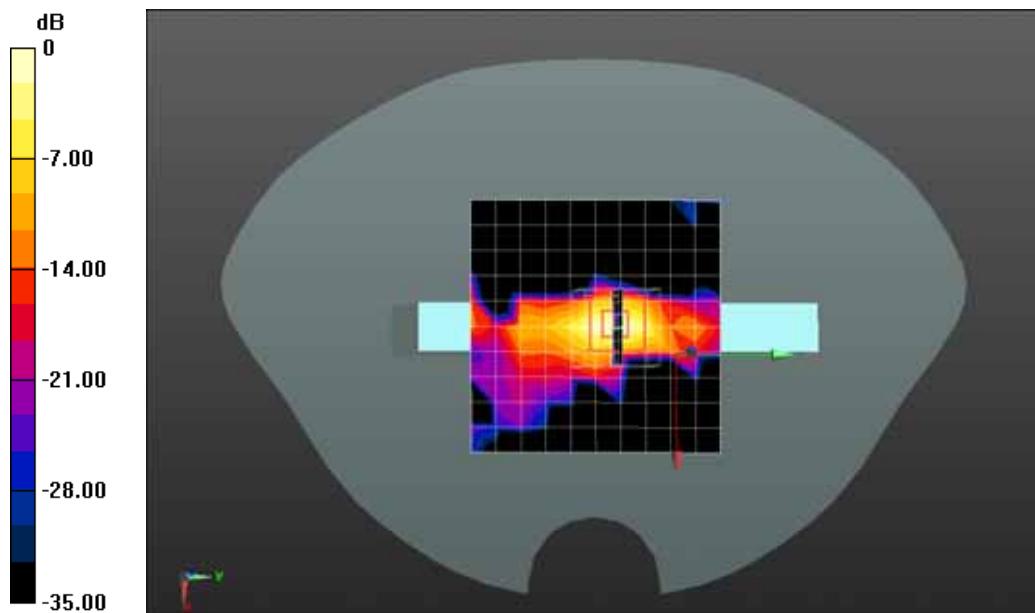
Maximum value of SAR (measured) = 1.07 W/kg

Configuration/802.11a 5785Hz Body-Edge/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 12.49 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 3.37 W/kg

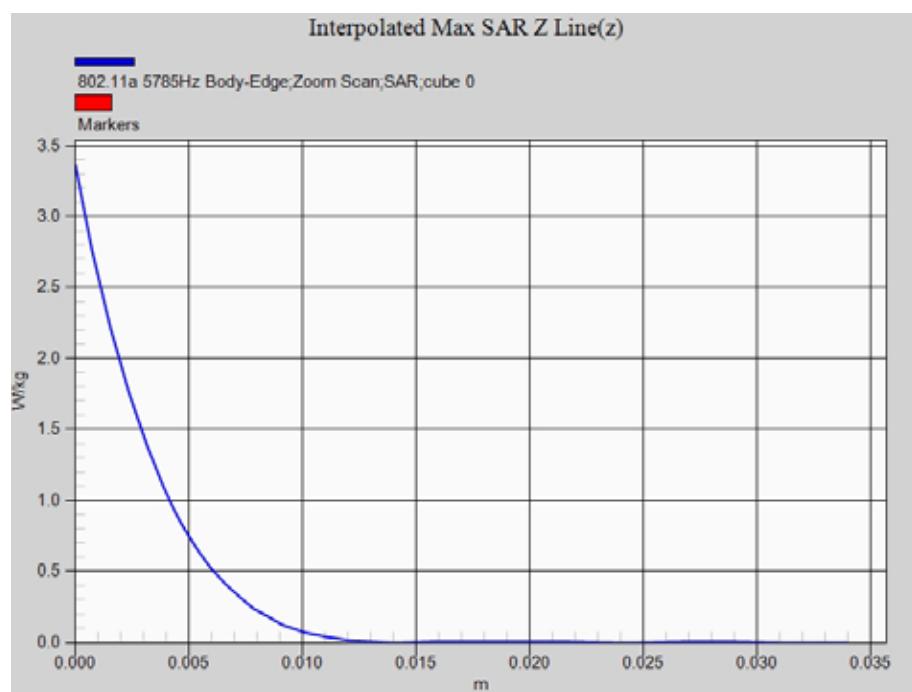
SAR(1 g) = 0.878 W/kg; SAR(10 g) = 0.236 W/kg

Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg = 0.09 dBW/kg

Z-Axis Plot



Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5785MHz Body-Edge-1

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5785 MHz; Medium parameters used: $f = 5785$ MHz; $\sigma = 6.09$ S/m; $\epsilon_r = 47.94$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5785MHz Body-Edge/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

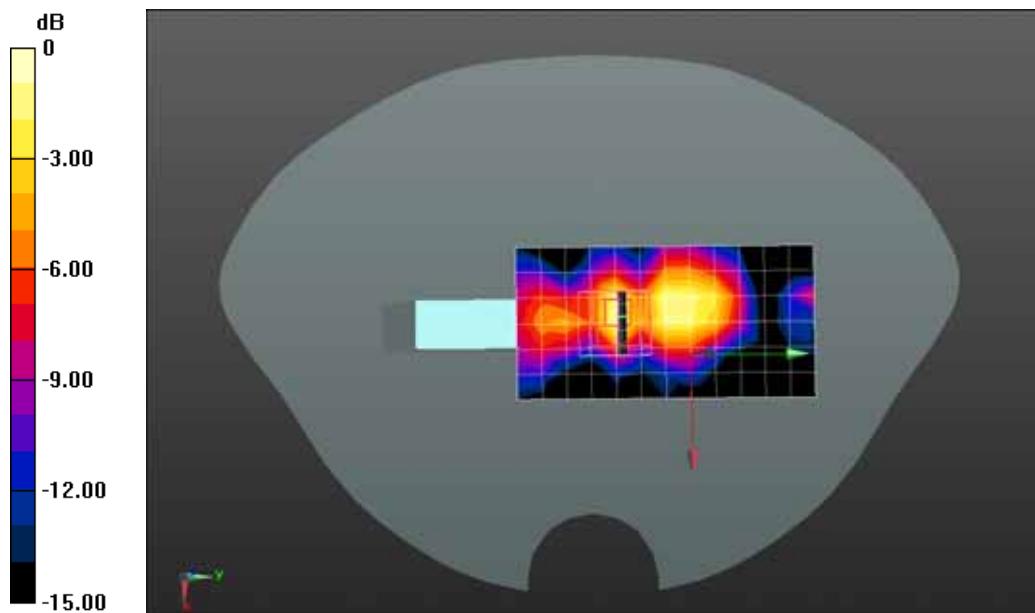
Maximum value of SAR (measured) = 1.65 W/kg

Configuration/802.11a 5785MHz Body-Edge/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 6.763 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 3.46 W/kg

SAR(1 g) = 0.875 W/kg; SAR(10 g) = 0.242 W/kg

Maximum value of SAR (measured) = 1.83 W/kg



0 dB = 1.83 W/kg = 2.62 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5785MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5785 MHz; Medium parameters used: $f = 5785$ MHz; $\sigma = 6.09$ S/m; $\epsilon_r = 47.94$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5785MHz Body-Back/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

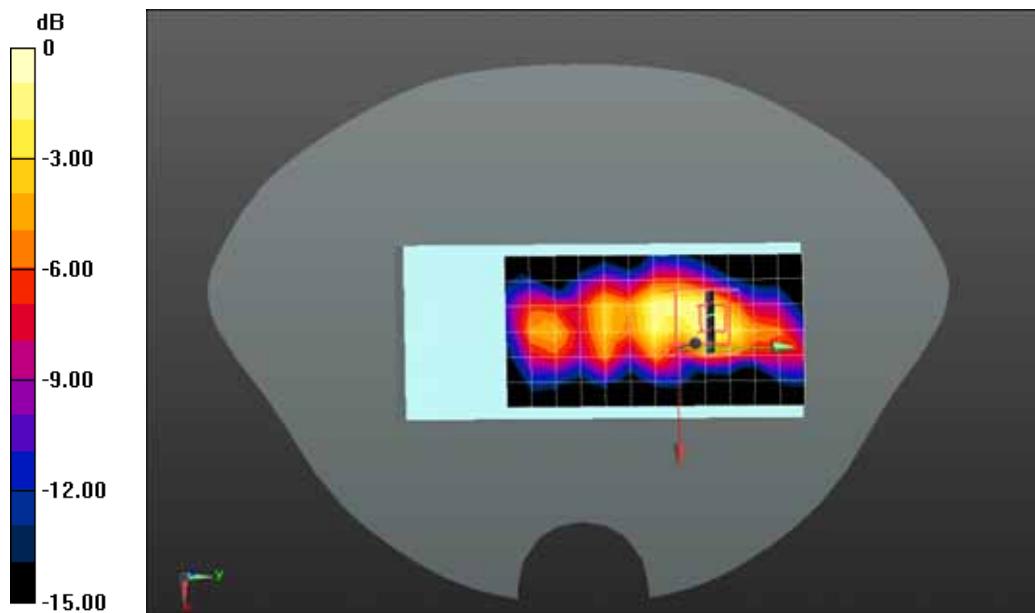
Maximum value of SAR (measured) = 1.10 W/kg

Configuration/802.11a 5785MHz Body-Back/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 4.752 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 2.87 W/kg

SAR(1 g) = 0.675 W/kg; SAR(10 g) = 0.232 W/kg

Maximum value of SAR (measured) = 1.35 W/kg



0 dB = 1.35 W/kg = 1.30 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5785MHz Body-Front

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5785 MHz; Medium parameters used: $f = 5785$ MHz; $\sigma = 6.09$ S/m; $\epsilon_r = 47.94$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5785MHz Body-Front/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

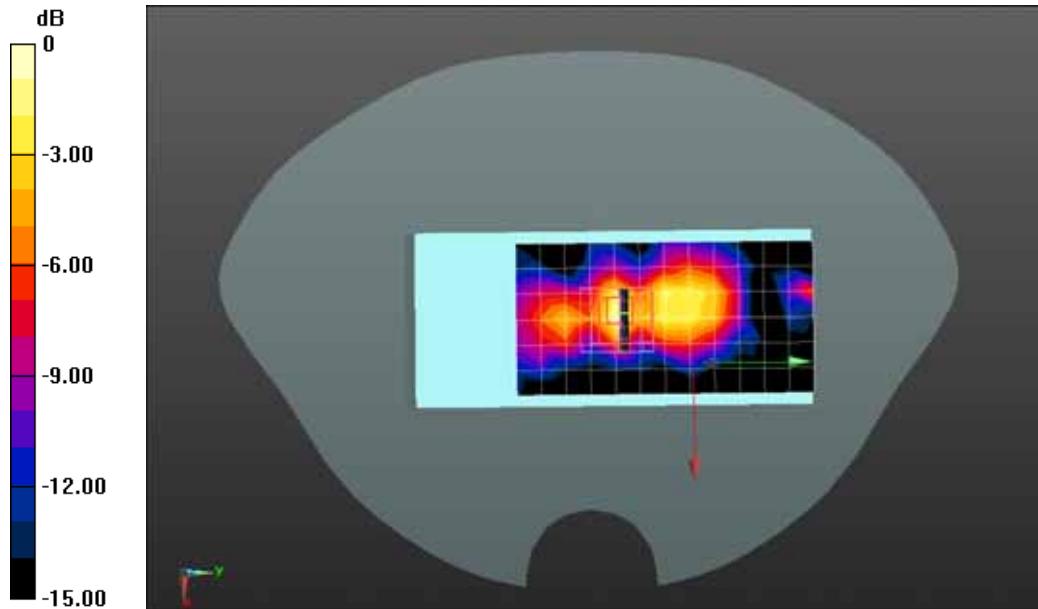
Maximum value of SAR (measured) = 0.913 W/kg

Configuration/802.11a 5785MHz Body-Front/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 4.970 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 1.81 W/kg

SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.125 W/kg

Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg = 0.09 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5825MHz Body-Edge

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5825 MHz; Medium parameters used: $f = 5825$ MHz; $\sigma = 6.13$ S/m; $\epsilon_r = 47.84$; $\rho =$

1000 kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5825Hz Body-Edge/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm

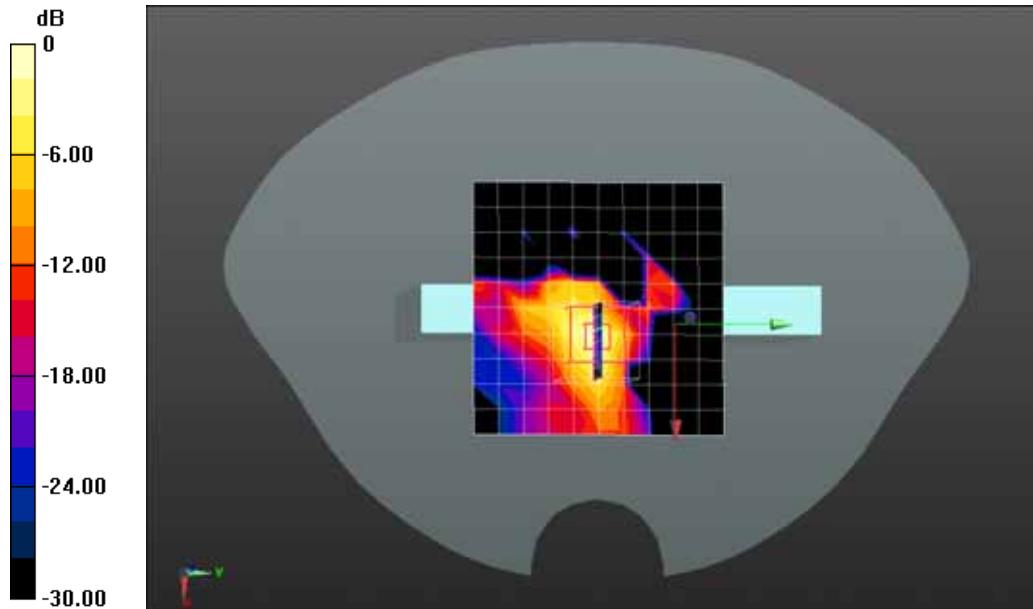
Maximum value of SAR (measured) = 0.977 W/kg

Configuration/802.11a 5825Hz Body-Edge/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 5.200 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 2.87 W/kg

SAR(1 g) = 0.845 W/kg; SAR(10 g) = 0.252 W/kg

Maximum value of SAR (measured) = 0.939 W/kg



0 dB = 0.939 W/kg = -0.27 dBW/kg

Date/Time: 08-10-2016

Test Laboratory: QuiTek Lab

802.11a 5825MHz Body-Back

DUT: Virtual Reality Controller; Type: B0-S8526053-BZ

Communication System: UID 0, CW (0); Communication System Band: 5GHz(5000.0-6000.0MHz); Duty

Cycle: 1:1; Frequency: 5825 MHz; Medium parameters used: $f = 5825$ MHz; $\sigma = 6.13$ S/m; $\epsilon_r = 47.84$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.8, 3.8, 3.8); Calibrated: 19/02/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 09/02/2016
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/802.11a 5825MHz Body-Back/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

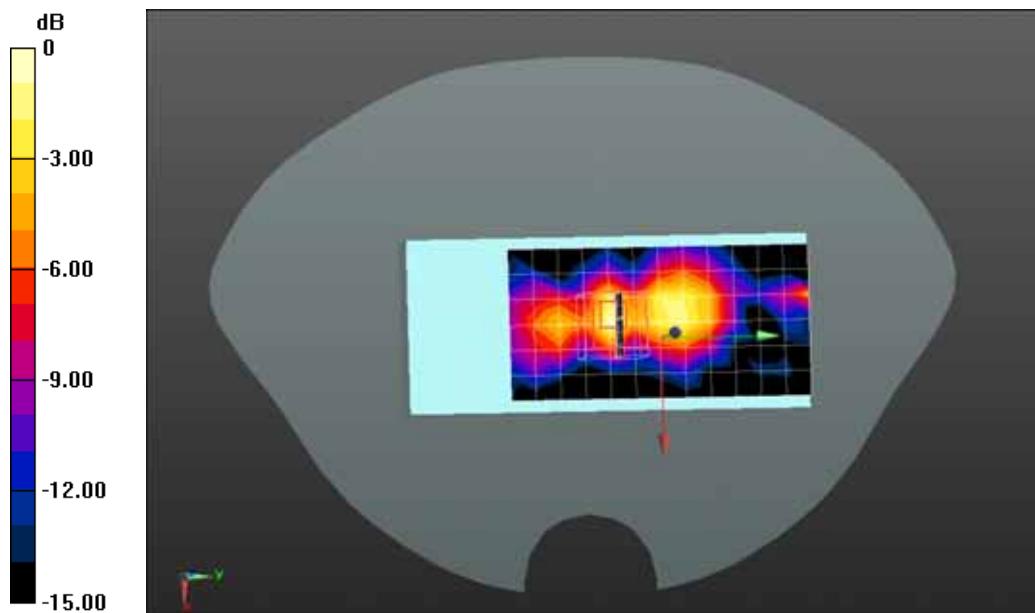
Maximum value of SAR (measured) = 0.765 W/kg

Configuration/802.11a 5825MHz Body-Back/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm; Reference Value = 3.894 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 3.25 W/kg

SAR(1 g) = 0.364 W/kg; SAR(10 g) = 0.099 W/kg

Maximum value of SAR (measured) = 0.810 W/kg



0 dB = 0.810 W/kg = -0.92 dBW/kg

Appendix C. Probe Calibration Data

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



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

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

Accreditation No.: SCS 0108

Client QTK-CN (Auden)

Certificate No: EX3-3710_Feb16

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3710

Calibration procedure(s)
QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5,
QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: February 19, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: February 20, 2016

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

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



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

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

Accreditation No.: SCS 0108

Glossary:

TS	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization ϕ	ϕ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- $NORM_{x,y,z}$: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). $NORM_{x,y,z}$ are only intermediate values, i.e., the uncertainties of $NORM_{x,y,z}$ does not affect the E^2 -field uncertainty inside TSL (see below ConvF).
- $NORM(f)_{x,y,z} = NORM_{x,y,z} * frequency_response$ (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- $DCP_{x,y,z}$: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR : PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- $Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z; A, B, C, D$ are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters:** Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to $NORM_{x,y,z} * ConvF$ whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical Isotropy (3D deviation from isotropy):** in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset:** The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle:** The angle is assessed using the information gained by determining the $NORM_x$ (no uncertainty required).

EX3DV4 – SN:3710

February 19, 2016

Probe EX3DV4

SN:3710

Manufactured: July 21, 2009
Calibrated: February 19, 2016

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

EX3DV4– SN:3710

February 19, 2016

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.40	0.39	0.48	$\pm 10.1\%$
DCP (mV) ^B	102.5	102.6	100.3	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^C (k=2)
0	CW	X	0.0	0.0	1.0	0.00	183.2	$\pm 3.0\%$
		Y	0.0	0.0	1.0		187.9	
		Z	0.0	0.0	1.0		183.9	

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 E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

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

EX3DV4- SN:3710

February 19, 2016

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

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)
450	43.5	0.87	9.92	9.92	9.92	0.20	1.50	± 13.3 %
750	41.9	0.89	9.83	9.83	9.83	0.24	1.30	± 12.0 %
835	41.5	0.90	9.29	9.29	9.29	0.18	1.65	± 12.0 %
900	41.5	0.97	9.11	9.11	9.11	0.26	1.23	± 12.0 %
1810	40.0	1.40	8.09	8.09	8.09	0.45	0.83	± 12.0 %
1900	40.0	1.40	7.94	7.94	7.94	0.39	0.83	± 12.0 %
2450	39.2	1.80	7.24	7.24	7.24	0.47	0.81	± 12.0 %
2600	39.0	1.96	6.95	6.95	6.95	0.43	0.88	± 12.0 %
3500	37.9	2.91	7.05	7.05	7.05	0.38	0.99	± 13.1 %
5250	35.9	4.71	5.10	5.10	5.10	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.57	4.57	4.57	0.45	1.80	± 13.1 %
5750	35.4	5.22	4.59	4.59	4.59	0.50	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. 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.

EX3DV4- SN:3710

February 19, 2016

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

Calibration Parameter Determined in Body 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)
450	56.7	0.94	10.22	10.22	10.22	0.08	1.50	± 13.3 %
750	55.5	0.96	9.49	9.49	9.49	0.35	1.00	± 12.0 %
835	55.2	0.97	9.37	9.37	9.37	0.30	1.10	± 12.0 %
900	55.0	1.05	9.27	9.27	9.27	0.29	1.10	± 12.0 %
1810	53.3	1.52	7.81	7.81	7.81	0.45	0.80	± 12.0 %
1900	53.3	1.52	7.60	7.60	7.60	0.34	0.80	± 12.0 %
2450	52.7	1.95	7.08	7.08	7.08	0.35	0.86	± 12.0 %
2600	52.5	2.16	6.77	6.77	6.77	0.36	0.95	± 12.0 %
3500	51.3	3.31	6.28	6.28	6.28	0.24	1.52	± 13.1 %
5250	48.9	5.36	4.35	4.35	4.35	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.67	3.67	3.67	0.60	1.90	± 13.1 %
5750	48.3	5.94	3.80	3.80	3.80	0.60	1.90	± 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. Above 5 GHz frequency validity can be extended to ± 110 MHz.

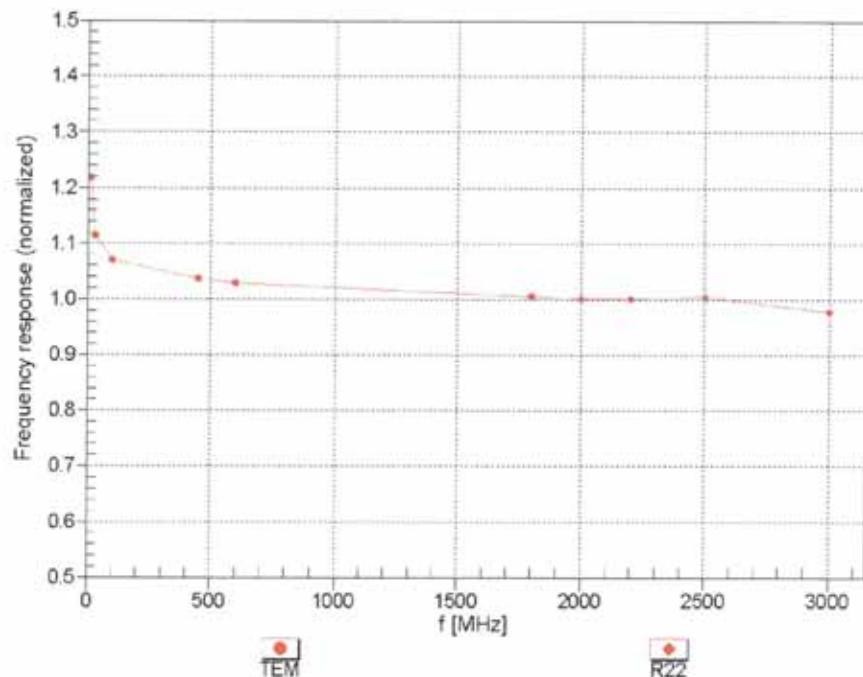
^F At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty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

EX3DV4- SN:3710

February 19, 2016

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)

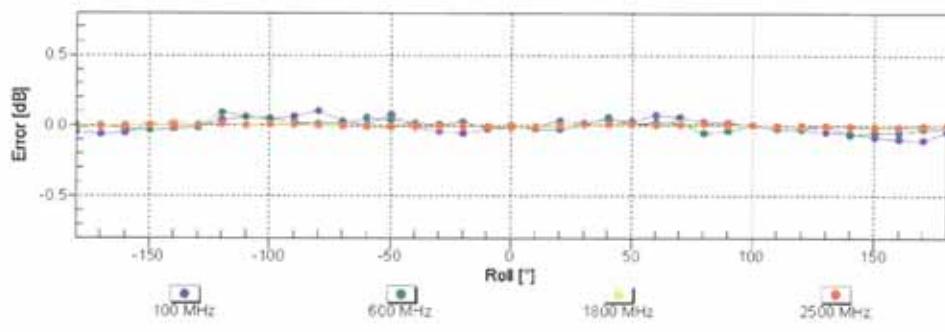
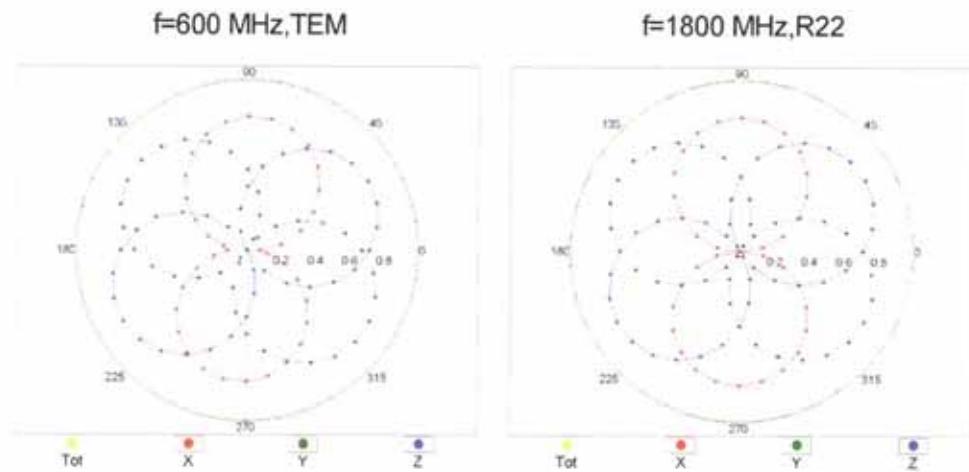


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

EX3DV4-SN:3710

February 19, 2016

Receiving Pattern (ϕ), $\theta = 0^\circ$

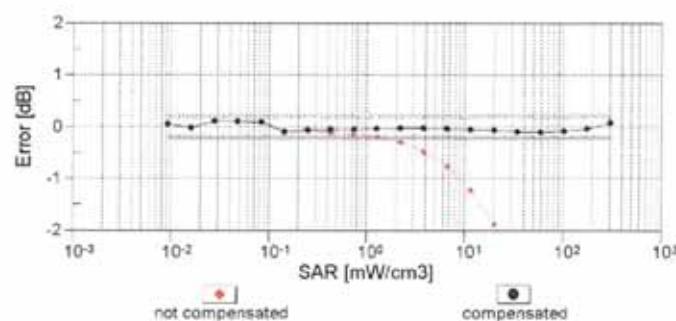
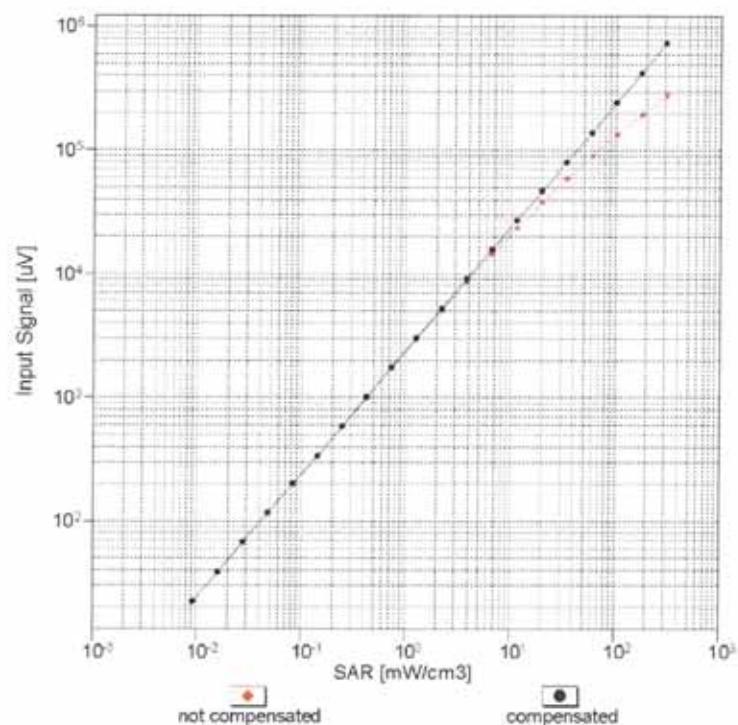


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

EX3DV4– SN:3710

February 19, 2016

Dynamic Range $f(\text{SAR}_{\text{head}})$
(TEM cell, $f_{\text{eval}} = 1900$ MHz)

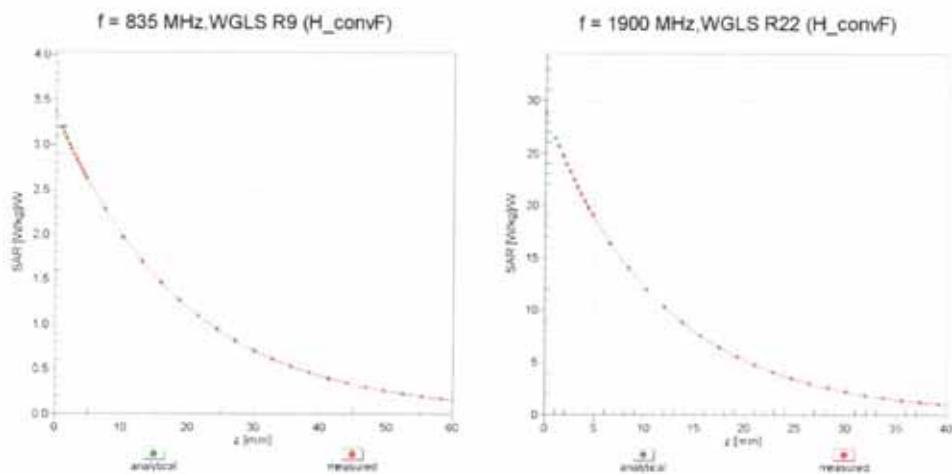


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

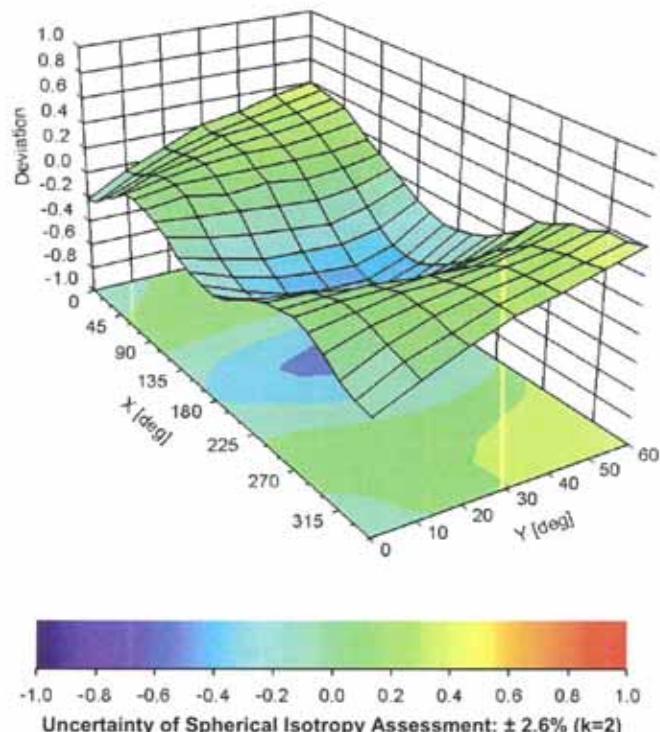
EX3DV4- SN:3710

February 19, 2016

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), $f = 900 \text{ MHz}$



EX3DV4- SN:3710

February 19, 2016

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	80.2
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

Appendix D. Dipole Calibration Data

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



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

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

Accreditation No.: **SCS 0108**

Client **QTK-CN (Auden)**

Certificate No: **D2450V2-839_Feb16**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 839**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **February 09, 2016**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20K)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check; Jun-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check; Oct-16

Calibrated by:	Name Michael Weber	Function Laboratory Technician	Signature
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Approved by:	Katja Pokovic	Technical Manager	
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Issued: February 10, 2016

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.3 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.9 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.6 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	49.8 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.87 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.3 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.4 Ω + 2.0 $j\Omega$
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω + 6.4 $j\Omega$
Return Loss	- 23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.143 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 20, 2009

DASY5 Validation Report for Head TSL

Date: 08.02.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 839

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.84$ S/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.76, 7.76, 7.76); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

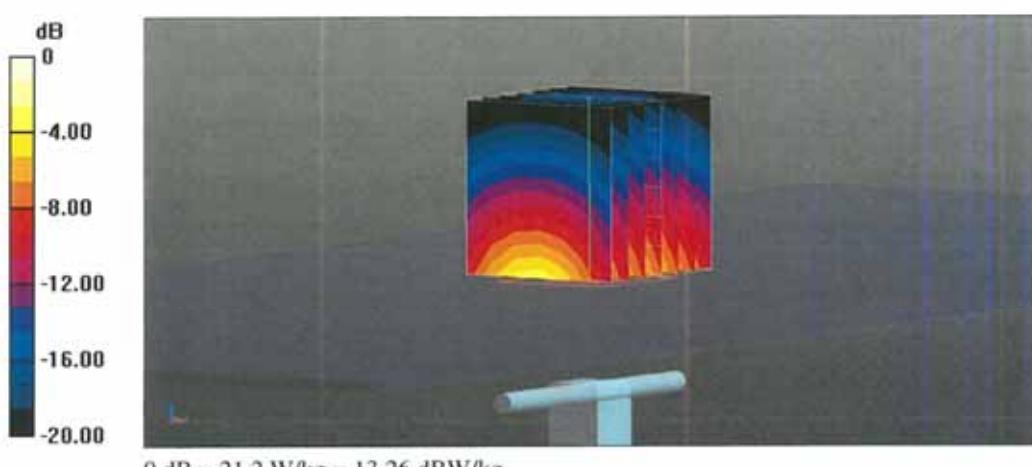
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 113.0 V/m; Power Drift = 0.00 dB

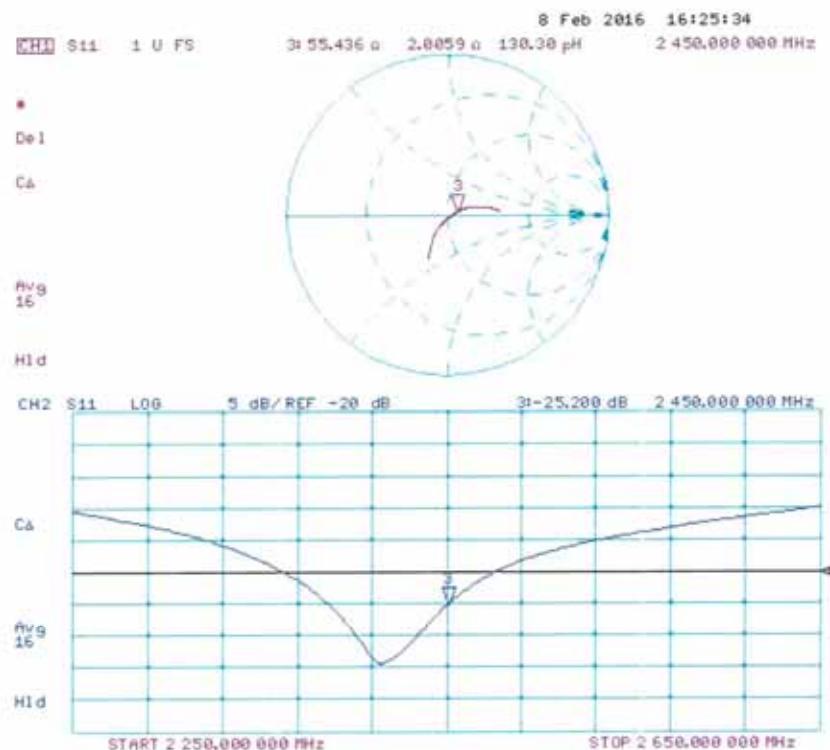
Peak SAR (extrapolated) = 26.2 W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 6.03 W/kg

Maximum value of SAR (measured) = 21.2 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.02.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 839

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2$ S/m; $\epsilon_r = 52.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

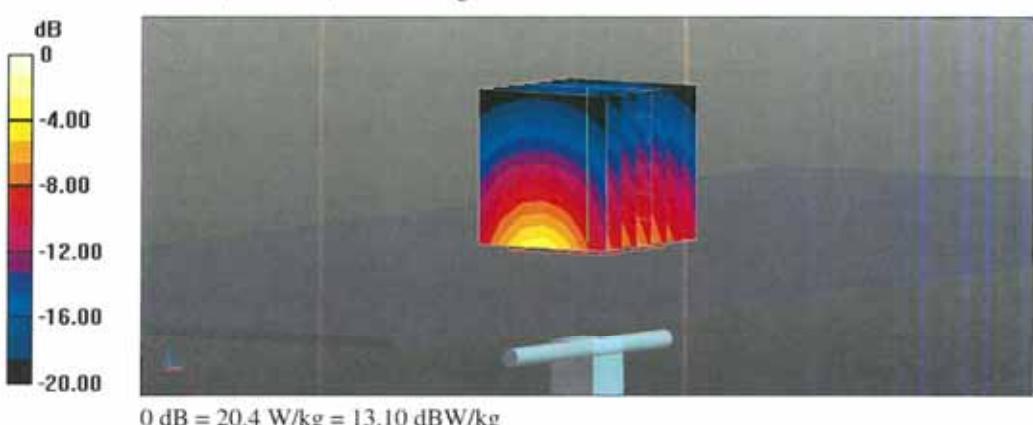
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.1 V/m; Power Drift = 0.02 dB

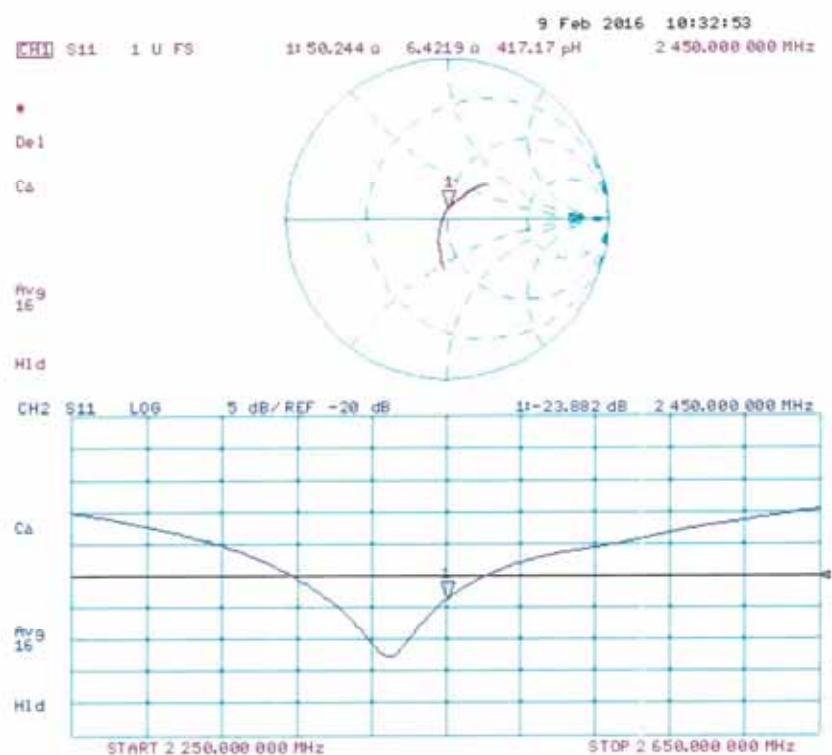
Peak SAR (extrapolated) = 25.0 W/kg

SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.87 W/kg

Maximum value of SAR (measured) = 20.4 W/kg



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **QTK-CN (Auden)**

Certificate No: **D5GHzV2-1078_Feb16**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1078**

Calibration procedure(s) **QA CAL-22.v2**
Calibration procedure for dipole validation kits between 3-6 GHz

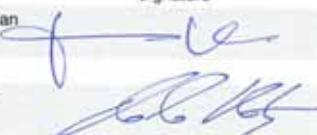
Calibration date: **February 10, 2016**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 3503	31-Dec-15 (No. EX3-3503_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: February 11, 2016

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.55 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	76.7 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.1 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	4.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.6 W / kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	5.05 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	77.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.2 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.1 ± 6 %	5.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	73.7 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.10 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.8 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.4 ± 6 %	5.94 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.94 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	78.8 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	22.3 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	6.15 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	75.2 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.1 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	51.7 Ω - 7.8 $j\Omega$
Return Loss	- 22.2 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	56.9 Ω - 5.9 $j\Omega$
Return Loss	- 21.5 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	55.8 Ω - 1.3 $j\Omega$
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	52.3 Ω - 6.5 $j\Omega$
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.3 Ω - 3.4 $j\Omega$
Return Loss	- 21.6 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	56.2 Ω + 0.4 $j\Omega$
Return Loss	- 24.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 26, 2008

DASY5 Validation Report for Head TSL

Date: 04.02.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1078

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.55 \text{ S/m}$; $\epsilon_r = 35.2$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 4.9 \text{ S/m}$; $\epsilon_r = 34.7$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 5.05 \text{ S/m}$; $\epsilon_r = 34.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.53, 5.53, 5.53); Calibrated: 31.12.2015, ConvF(4.99, 4.99, 4.99); Calibrated: 31.12.2015, ConvF(4.95, 4.95, 4.95); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 72.58 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.23 W/kg

Maximum value of SAR (measured) = 17.5 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 72.43 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 31.4 W/kg

SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.35 W/kg

Maximum value of SAR (measured) = 18.8 W/kg

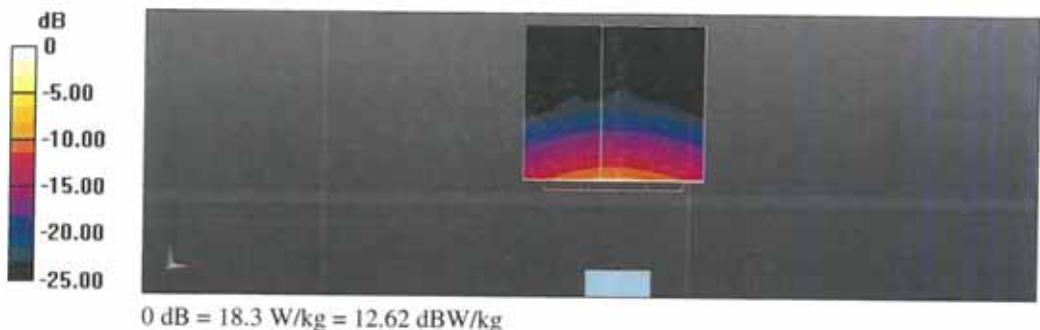
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 70.73 V/m; Power Drift = 0.01 dB

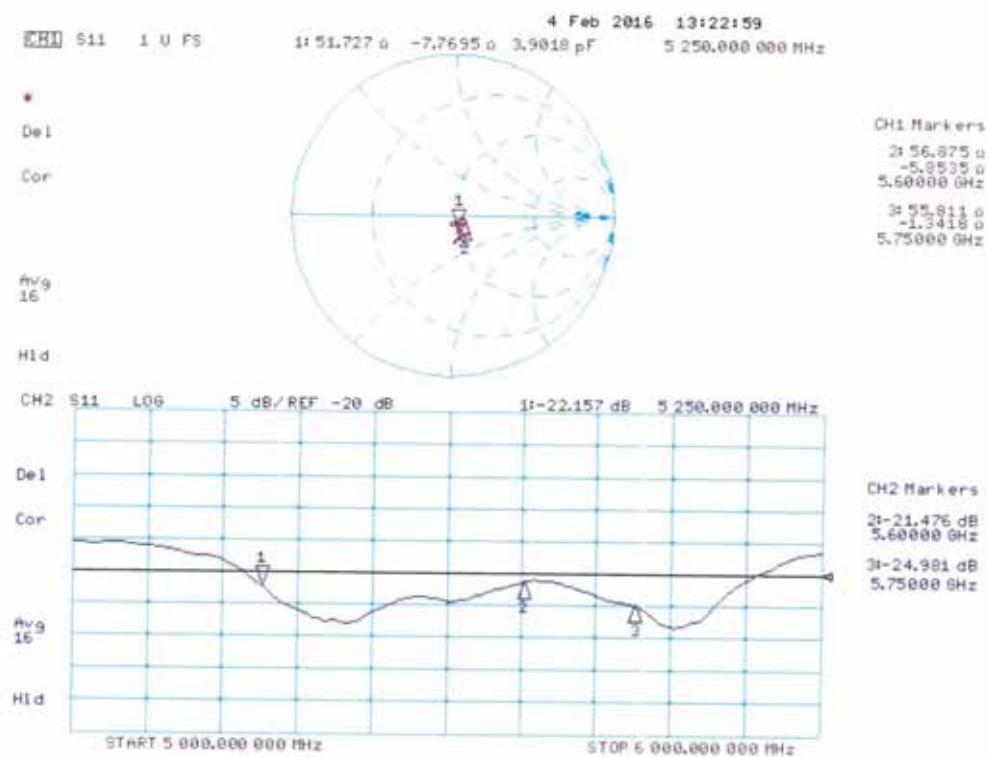
Peak SAR (extrapolated) = 31.4 W/kg

SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.24 W/kg

Maximum value of SAR (measured) = 18.3 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.02.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1078

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 5.46 \text{ S/m}$; $\epsilon_r = 47.1$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.94 \text{ S/m}$; $\epsilon_r = 46.4$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 6.15 \text{ S/m}$; $\epsilon_r = 46.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.85, 4.85, 4.85); Calibrated: 31.12.2015, ConvF(4.35, 4.35, 4.35); Calibrated: 31.12.2015, ConvF(4.3, 4.3, 4.3); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 66.04 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 27.8 W/kg

SAR(1 g) = 7.42 W/kg; SAR(10 g) = 2.1 W/kg

Maximum value of SAR (measured) = 17.0 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 66.76 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 32.7 W/kg

SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.25 W/kg

Maximum value of SAR (measured) = 19.1 W/kg

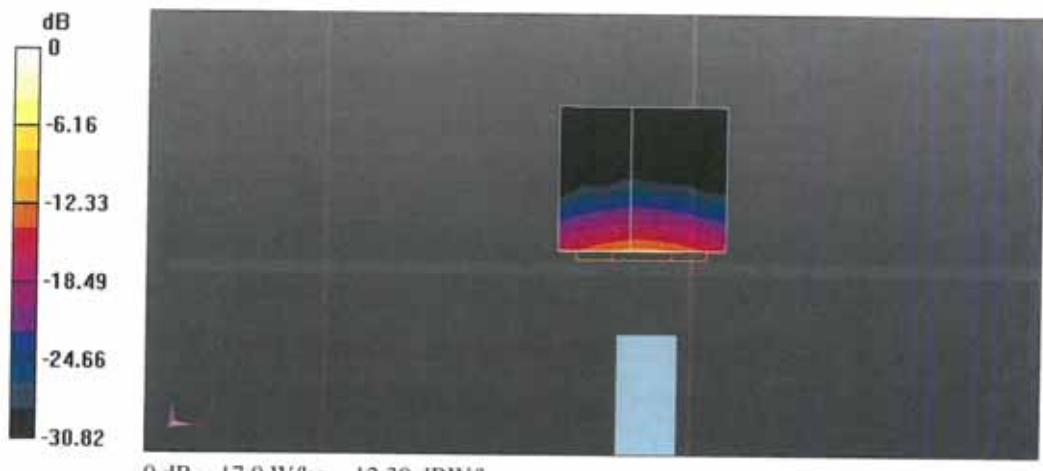
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 64.46 V/m; Power Drift = 0.04 dB

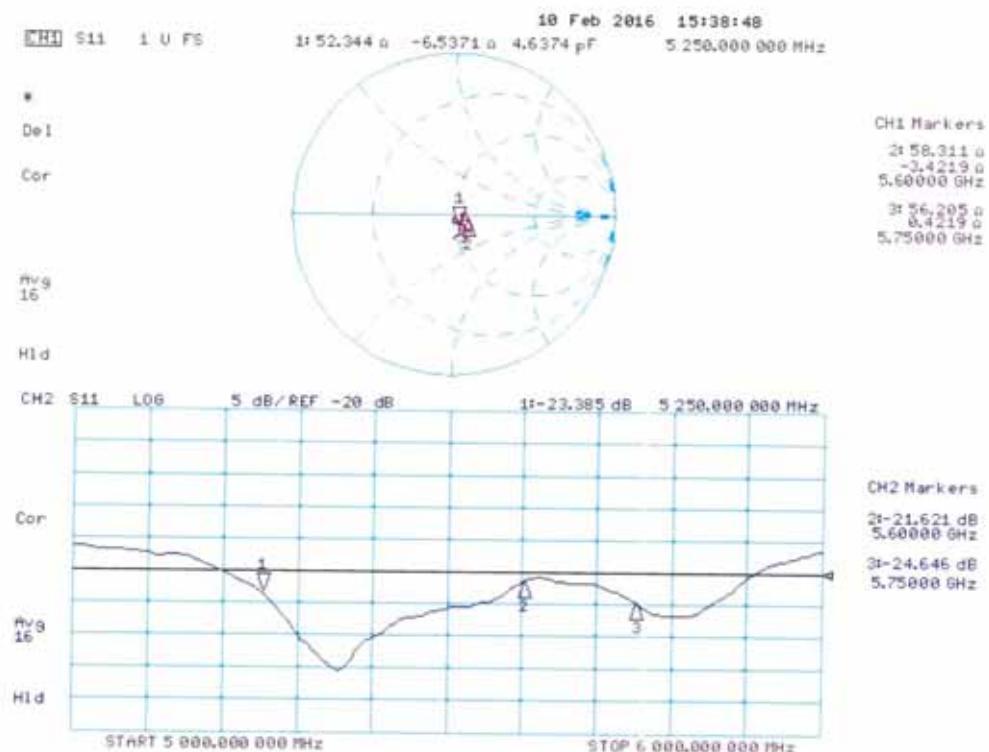
Peak SAR (extrapolated) = 32.4 W/kg

SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.13 W/kg

Maximum value of SAR (measured) = 18.3 W/kg



Impedance Measurement Plot for Body TSL



Appendix E. DAE Calibration Data

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



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

Accreditation No.: **SCS 0108**

Client **QTK (Auden)**

Certificate No: **DAE4-1220_Feb16**

CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BM - SN: 1220**

Calibration procedure(s) **QA CAL-06.v29**
 Calibration procedure for the data acquisition electronics (DAE)

Calibration date: **February 09, 2016**

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
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-15 (No:17153)	Sep-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-16 (in house check)	In house check: Jan-17
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-16 (in house check)	In house check: Jan-17

Calibrated by:	Name Eric Hainfeld	Function Technician	Signature 
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: February 9, 2016

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

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



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Accreditation No.: **SCS 0108**

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - *DC Voltage Measurement Linearity*: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - *Common mode sensitivity*: Influence of a positive or negative common mode voltage on the differential measurement.
 - *Channel separation*: Influence of a voltage on the neighbor channels not subject to an input voltage.
 - *AD Converter Values with inputs shorted*: Values on the internal AD converter corresponding to zero input voltage
 - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
 - *Input Offset Current*: Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - *Input resistance*: Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - *Low Battery Alarm Voltage*: Typical value for information. Below this voltage, a battery alarm signal is generated.
 - *Power consumption*: Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = $6.1\mu\text{V}$, full range = $-100...+300\text{ mV}$

Low Range: 1LSB = 61nV , full range = $-1.....+3\text{mV}$

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	$405.200 \pm 0.02\% \text{ (k=2)}$	$404.917 \pm 0.02\% \text{ (k=2)}$	$404.148 \pm 0.02\% \text{ (k=2)}$
Low Range	$3.97868 \pm 1.50\% \text{ (k=2)}$	$3.99493 \pm 1.50\% \text{ (k=2)}$	$3.98743 \pm 1.50\% \text{ (k=2)}$

Connector Angle

Connector Angle to be used in DASY system	$175.5^\circ \pm 1^\circ$
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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	199992.49	-1.95	-0.00
Channel X + Input	20002.61	1.47	0.01
Channel X - Input	-19998.19	2.75	-0.01
Channel Y + Input	199990.16	-4.79	-0.00
Channel Y + Input	20000.95	-0.12	-0.00
Channel Y - Input	-20000.64	0.07	-0.00
Channel Z + Input	199992.42	-2.65	-0.00
Channel Z + Input	19999.85	-1.16	-0.01
Channel Z - Input	-20001.51	-0.58	0.00

Low Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	2000.70	-0.41	-0.02
Channel X + Input	201.26	-0.07	-0.03
Channel X - Input	-198.71	-0.13	0.07
Channel Y + Input	2000.99	-0.18	-0.01
Channel Y + Input	201.09	-0.36	-0.18
Channel Y - Input	-198.41	0.05	-0.03
Channel Z + Input	2000.72	-0.36	-0.02
Channel Z + Input	200.53	-0.75	-0.37
Channel Z - Input	-199.64	-1.25	0.63

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	9.84	7.96
	-200	-8.01	-9.87
Channel Y	200	-8.25	-8.80
	-200	8.16	7.85
Channel Z	200	11.73	11.96
	-200	-14.95	-14.75

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	-	2.13	-4.30
Channel Y	200	8.06	-	2.34
Channel Z	200	9.87	6.25	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15882	14889
Channel Y	16011	15892
Channel Z	15707	16206

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input $10M\Omega$

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	0.45	-1.43	2.29	0.44
Channel Y	0.15	-1.62	1.28	0.42
Channel Z	-0.81	-1.60	0.84	0.43

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9