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TEST REPORT

Report Number: 102459792LEX-001
Project Number: G102459792

Evaluation of the: Companion Microphone

Tested to the SAR Criteria in

FCC Part 2.1093. Rss-102 Issue 5, per KDB447498 D01 v06

For

Starkey Laboratories Inc.

Test Performed by:	Test Authorized by:
Intertek 731 Enterprise Drive Lexington, KY 40510	Starkey Laboratories Inc. 6700 Washington Ave S Eden Prairie, MN 55344-3405

Prepared By: Carmen Davis **Date:** 5/3/2016

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Approved By: Bryan C. Taylor **Date:** 5/3/2016

Bryan Taylor, Team Lead-Engineering

TABLE OF CONTENTS

1.0 DOCUMENT HISTORY

Revision/ Project Number	Writer Initials	Date	Change
1.0 /G102459792	BT	3/15/2016	Original document

2.0 INTRODUCTION

At the request of Starkey Laboraties, the Companion Microphone was evaluated for SAR in accordance with the requirements for FCC Part 2.1093 and RSS-102. Testing was performed in accordance with IEEE Std 1528, IEC62209-2, and the Office of Engineering and Technology KDB 447498. Testing was performed at the Intertek facility in Lexington, Kentucky.

For the evaluation, the dosimetric assessment system DASY52 was used. The total uncertainty for the evaluation of the spatial peak SAR values averaged over a cube of 1g tissue mass had been assessed for this system to be ±21.4%.

The Companion Microphone was tested at the maximum output power measured by Intertek. Maximum output power measurements are tabulated under Section 9.0 Test Results.

The maximum spatial peak SAR value for the sample device averaged over 1g was found to be:

Mode	Channels	Frequency (MHz)	Conducted Output Power (dBm)	Reported SAR_{1g} – Body Mode (W/kg)	Limit (W/kg)
Left Transmitter Front Side	388	913.256	17.3	0.179	1.6
Right Transmitter Front Side	389	913.56	17.12	0.280	1.6
Left and Right Transmitters Front Side	388/389	913.256 and 913.56	21.73	0.2267	1.6

Table 1: Maximum Measured SAR

Based on the worst-case data presented above, the Companion Microphone was found to be **compliant** with the 1.6 W/kg requirements for general population / uncontrolled exposure.

Modifications made to test sample

Intertek implemented no modifications.

3.0 TEST SITE DESCRIPTION

The SAR test site located at 731 Enterprise Drive, Lexington KY 40510 is comprised of the SPEAG model DASY 5.2 automated near-field scanning system, which is a package, optimized for dosimetric evaluation of mobile radios [3]. This system is installed in an ambient-free shielded chamber. The ambient temperature is controlled to 22.0 $\pm 2^{O}$C. During the SAR evaluations, the RF ambient conditions are monitored continuously for signals that might interfere with the test results. The tissue simulating liquid is also stored in this area in order to keep it at the same constant ambient temperature as the room.

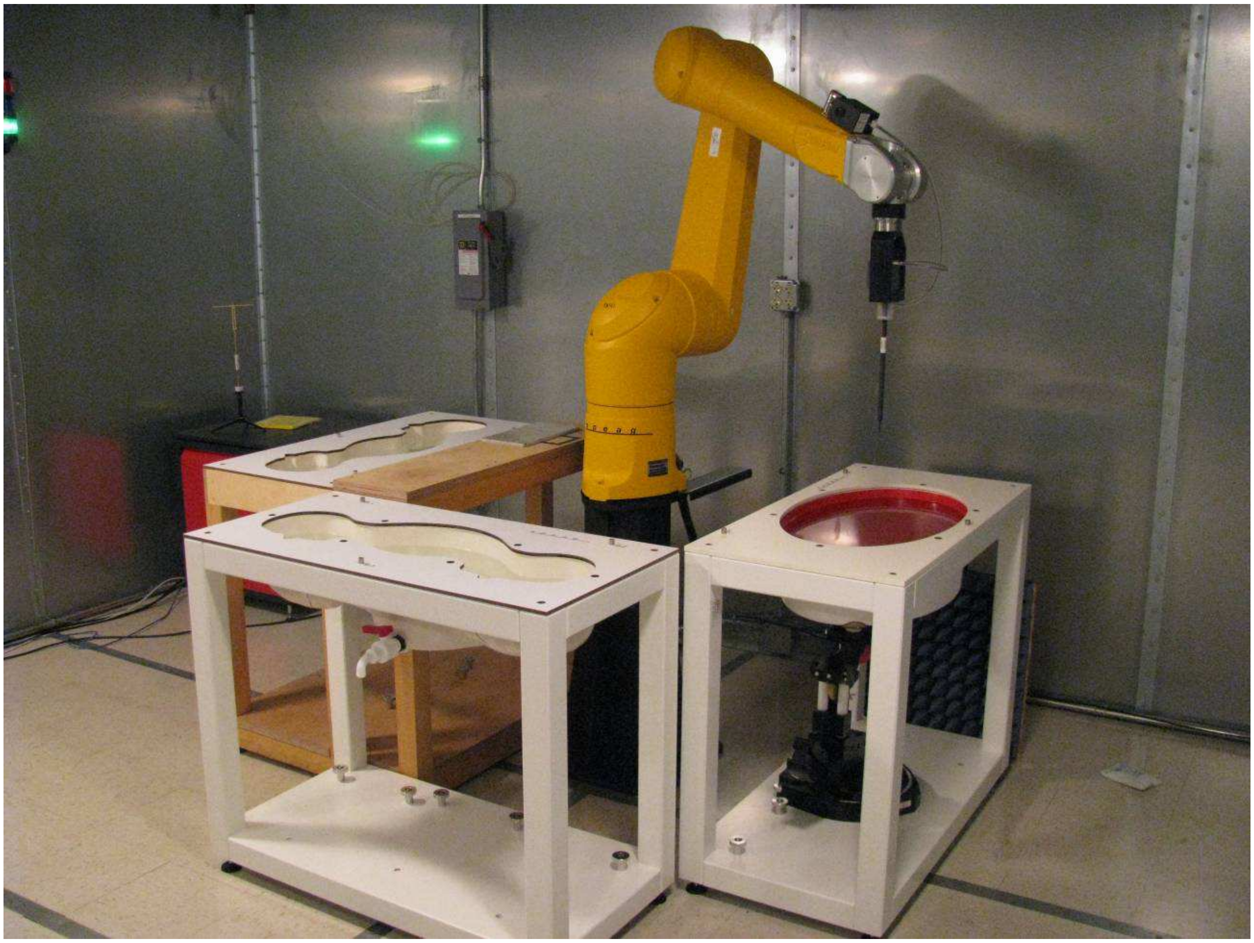

Figure 1: Intertek SAR Test Site

Measurement Equipment

The following major equipment/components were used for the SAR evaluation:

Description	Serial Number	Manufacture	Model	Cal. Date	Cal. Due	Eq. Used
SAR Probe	3516	Speag	EXDV3	12/16/2015	12/16/2016	☒
System Verification Dipole	13	Speag	D900V2	12/9/2015	12/9/2016	☒
DAE	358	Speag	DAE4	9/16/2015	9/16/2016	☒
Vector Signal Generator	257708	Rohde & Schwarz	SMBV100A	9/18/2015	9/18/2016	☒
Network Analyzer	US39173983	Agilent	8753ES	3/18/15	3/18/2016	☒
USB Power Sensor	100155	Rohde & Schwarz	NRP-Z81	9/20/2015	9/20/2016	☒
USB Power Sensor	100705	Rohde & Schwarz	NRP-Z51	9/20/2015	9/20/2016	☒
Dielectric Probe Kit	1111	Speag	DAK-3.5	NCR	NCR	☒
SAM Twin Phantom	1663	Speag	QD 000 P40 C	NCR	NCR	☒
Oval Flat Phantom ELI 5.0	1108	Speag	QD OVA 002 A	NCR	NCR	☒
6-axis robot	F11/5H1Y A/A/01	Staubli	RX-90	NCR	NCR	☒

NCR – No Calibration Required

Table 2: Test Equipment Used for SAR Evaluation

Measurement Uncertainty

The Table below includes the uncertainty budget suggested by the IEEE Std 1528-2003 and determined by SPEAG for the DASY5 measurement System.

Error Description	Uncertainty Value	Prob. Dist.	Div.	c_i (1g)	c_i (10g)	Std.Unc. (1g)	Std.Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±5.5%	N	1	1	1	±5.5%	±5.5%	∞
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 Effect	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
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	±0.4%	R	√3	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	√3	1	1	±1.7%	±1.7%	∞
Max. SAR Eval.	±1.0%	R	√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	√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 Standard Uncertainty						±10.7%	±10.5%	387
Expanded STD Uncertainty						**±21.4%**	**±21.0%**	

Notes.

1. Worst Case uncertainty budget for DASY5 assessed according to IEEE 1528-2003. The budget is valid for the frequency range 300 MHz – 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerably smaller.

Error Description	Uncertainty Value	Prob. Dist.	Div.	c_i (1g)	c_i (10g)	Std.Unc. (1g)	Std.Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55%	N	1	1	1	±6.55%	±6.55%	∞
Axial Isotropy	±4.7%	R	√3	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	√3	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effect	±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 Standard Uncertainty						±12.8%	±12.8%	330
Expanded STD Uncertainty						**±25.6%**	**±25.2%**	

Notes.

Worst Case uncertainty budget for DASY5 assessed according to IEEE 1528-2003. The budget is valid for the frequency range 3 GHz – 6 GHz and represents a worst-case analysis. Probe calibration error reflects uncertainty of the EX3D probe. For specific tests and configurations, the uncertainty could be considerably smaller.

4.0 JOB DESCRIPTION

At the request of Starkey Laboratories Inc., SAR testing was performed on the Companion Microphone.

Test sample	
Manufacturer	Starkey Laboratories Inc.
Model Number	Companion Microphone
Serial Number	160118284
Receive Date	2/22/2016
Device Received Condition	Good
Device Category	Portable
RF Exposure Category	General Population/Uncontrolled Environment
Antenna Type	Internal
Test sample Accessories	
Power Supply	Battery Powered

Table 3: Product Information

Channels	Frequency Range (MHz)	Duty Cycle
369	907.492	100%
370	907.795	100%
388	913.256	100%
389	913.56	100%
409	919.628	100%
410	919.93	100%

Table 4: Operating Bands

Figure 2: Test Sample (Front)

Figure 3: Test Sample (Back)

5.0 SYSTEM VERIFICATION

System Validation

Prior to the assessment, the system was verified to be within ±10% of the specifications by using the system validation kit. The system validation procedure tests the system against reference SAR values and the performance of probe, readout electronics and software. The test setup utilizes a phantom and reference dipole. The results from the system verifications with a dipole are shown in *Table 5*.

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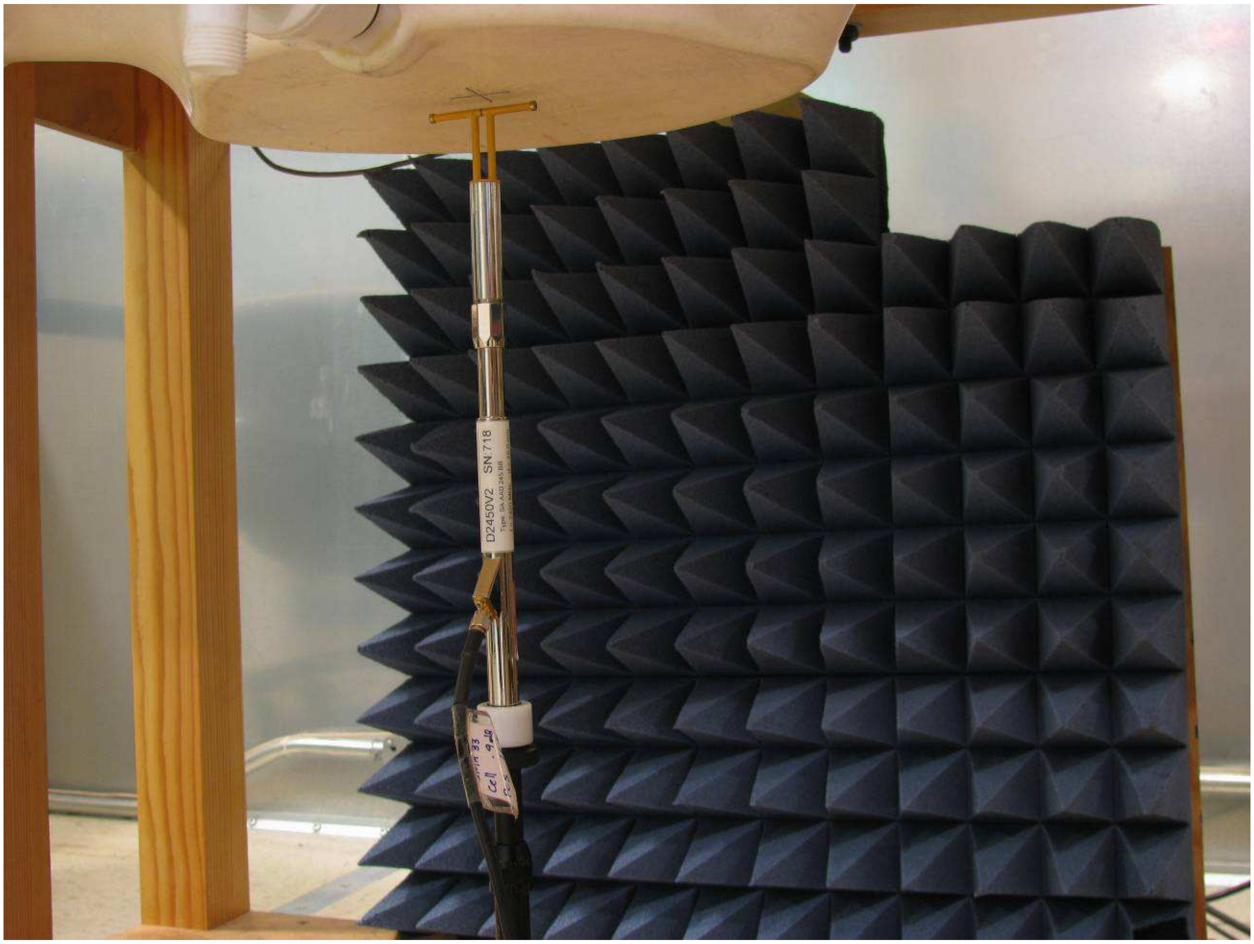


Figure 4: System Verification Setup

Reference Dipole Validation									
Ambient Temp (°C)	Fluid Temp (°C)	Frequency (MHz)	Dipole	Fluid Type	Dipole Power Input	Cal. Lab SAR (1g)	Measured SAR (1g)	% Error SAR (1g)	Date
23.2C	22.8C	900MHz	D900V2	MSL900	1W	11.4	12	5.26	2/23/2016
22.9	22.7	900MHz	D900V2	MSL900	1W	11.4	10.5	7.89	4/6/2016

Table 5: Dipole Validation

Measurement Uncertainty for System Validation

Source of Uncertainty	Value(dB)	Probability Distribution	Divisor	c_i	$u_i(y)$	$(u_i(y))$^2
Measurement System						
Probe Calibration	5.50	n1	1	1	5.50	30.250
Axial Isotropy	4.70	r	1.732	0.7	2.71	7.364
Hemispherical Isotropy	9.60	r	1.732	0.7	5.54	30.722
Boundary Effect	1.00	r	1.732	1	0.58	0.333
Linearity	4.70	r	1.732	1	2.71	7.364
System Detection Limits	1.00	r	1.732	1	0.58	0.333
Readout Electronics	0.30	n1	1	1	0.30	0.090
Response Time	0.80	r	1.732	1	0.46	0.213
Integration Time	2.60	r	1.732	1	1.50	2.253
RF Ambient Noise	3.00	r	1.732	1	1.73	3.000
RF Ambient Reflections	3.00	r	1.732	1	1.73	3.000
Probe Positioner	0.40	r	1.732	1	0.23	0.053
Probe Positioning	2.90	r	1.732	1	1.67	2.803
Max. SAR Eval.	1.00	r	1.732	1	0.58	0.333
Dipole / Generator / Power Meter Related						
Dipole positioning	2.90	n1	1	1	2.90	8.410
Dipole Calibration Uncertainty	0.68	r	1.732	1	0.39	0.154
Power Meter 1 Uncertainty (+20C to +25C)	0.13	n1	1	2	0.13	0.017
Power Meter 2 Uncertainty (+20C to +25C)	0.04	n1	1	3	0.04	0.002
Sig Gen VSWR Mismatch Error	1.80	n1	1	5	1.80	3.240
Sig Gen Resolution Error	0.01	n1	1	6	0.01	0.000
Sig Gen Level Error	0.90	n1	1	1	0.90	0.810
Phantom and Setup						
Phantom Uncertainty	4.00	r	1.732	1	2.31	5.334
Liquid Conductivity (target)	5.00	r	1.732	0.43	2.89	8.334
Liquid Conductivity (meas.)	2.50	n1	1	0.43	2.50	6.250
Liquid Permittivity (target)	5.00	r	1.732	0.49	2.89	8.334
Liquid Permittivity (meas.)	2.50	n1	1	0.49	2.50	6.250
Combined Standard Uncertainty		N1	1	1	11.63	135.247
Expanded Uncertainty		Normal k=	2		**23.26**	
Expanded Uncertainty	**is**	**23.3**	**for**	**Nor mal**	**k=**	**2**

Tissue Simulating Liquid Description and Validation

The dielectric parameters were verified to be within 5% of the target values prior to assessment. The dielectric parameters (ε_r, σ) are shown in Table 6: Dielectric Parameter Validation.

Measured Tissue Properties									
Tissue Type	Frequency Measure (MHz)	Dielectric Constant Target	Conductivity Target	Dielectric Constant Measure	Imaginary Part	Conductivity Measure	Dielectric % Deviation	Conductivity % Deviation	Date
	900	56.8	1.07	57.98	20.37	1.02	2.08	4.74	
	913	56.8	1.07	57.89	20.3	1.03	1.92	3.70	2/23/2016
MSL900	915	56.8	1.07	57.87	20.37	1.04	1.88	3.16	

Measured Tissue Properties									
Tissue Type	Frequency Measure (MHz)	Dielectric Constant Target	Conductivity Target	Dielectric Constant Measure	Imaginary Part	Conductivity Measure	Dielectric % Deviation	Conductivity % Deviation	Date
	900	56.8	1.07	58.01	20.41	1.02	2.13	4.56	
	913	56.8	1.07	57.91	20.26	1.03	1.95	3.89	4/6/2016
MSL900	915	56.8	1.07	57.88	20.22	1.03	1.90	3.87	

Table 6: Dielectric Parameter Validation

Table 7: Tissue Simulating Fluid Recipe

TYPICAL COMPOSITION OF INGREDIENTS FOR LIQUID TISSUE PHANTOMS. (450MHz to 2450 MHz data only)												
Ingredient (% by weight)	f (MHz)											
	450		835		915		1900		2450		5500	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56	54.9	70.45	62.7	68.64	65.53	78.67
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.36	0.5	0	0	0
Sugar	56.32	46.78	56	45	56.5	41.76	0	0	0	0	0	0
HEC	0.98	0.52	1	1	1	1.21	0	0	0	0	0	0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0	0	0	0	0	0
Triton X-100	0	0	0	0	0	0	0	0	36.8	0	17.235	10.665
DGBE	0	0	0	0	0	0	44.92	29.18	0	31.37	0	0
DGHE	0	0	0	0	0	0	0	0	0	0	17.235	10.665
Dielectric Constant	43.42	58	42.54	56.1	42	56.8	39.9	53.3	39.8	52.7		
Conductivity (S/m)	0.85	0.83	0.91	0.95	1	1.07	1.42	1.52	1.88	1.95		

Tissue Simulating Liquid for 5GHz, MBBL3500-5800V5 Manufactured by SPEAG (proprietary mixture)

Ingredients	**(% by weight)**
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

6.0 EVALUATION PROCEDURES

Prior to any testing, the appropriate fluid was used to fill the phantom to a depth of 15 cm ±0.2cm. The fluid parameters were verified and the dipole validation was performed as described in the previous sections.

Test Positions:

The Device was positioned against the SAM and flat phantom using the exact procedure described in IEEE Std 1528, IEC62209-2, and the Office of Engineering and Technology KDB 447498.

Reference Power Measurement:

The measurement probe was positioned at a fixed location above the reference point. A power measurement was made with the probe above this reference position so it could used for the assessing the power drift later in the test procedure.

Area Scan:

A coarse area scan was performed in order to find the approximate location of the peak SAR value. This scan was performed with the measurement probe at a constant height in the simulating fluid. A two dimensional spline interpolation algorithm was then used to determine the peaks and gradients within the scanned area. The area scan resolution conformed to the requirements of KDB 865664 as shown in Table 8.

Zoom Scan:

A zoom scan was performed around the approximate location of the peak SAR as determined from the area scan. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure. The zoom scan resolution conformed to the requirements of KDB 865664 as shown in Table 8.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

Table 8: SAR Area and Zoom Scan Resolutions

Interpolation, Extrapolation and Detection of Maxima:

The probe is calibrated at the center of the dipole sensors which is located 1 to 2.7 mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASY5, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and extrapolation routines. The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard's method.

Thereby, the interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation. The DASY5 routines construct a once-continuously differentiable function that interpolates the measurement values as follows:

- For each measurement point a trivariate (3-D) / bivariate (2-D) quadratic is computed. It interpolates the measurement values at the data point and forms a least-square fit to neighboring measurement values.
- The spatial location of the quadratic with respect to the measurement values is attenuated by an inverse distance weighting. This is performed since the calculated quadratic will fit measurement values at nearby points more accurate than at points located further away.
- After the quadratics are calculated for at all measurement points, the interpolating function is calculated as a weighted average of the quadratics.

There are two control parameters that govern the behavior of the interpolation method. One specifies the number of measurement points to be used in computing the least-square fits for the local quadratics. These measurement points are the ones nearest the input point for which the quadratic is being computed. The second parameter specifies the number of measurement points that will be used in calculating the weights for the quadratics to produce the final function. The input data points used there are the ones nearest the point at which the interpolation is desired. Appropriate defaults are chosen for each of the control parameters.

The trivariate quadratics that have been previously computed for the 3-D interpolation and whose input data are at the closest distance from the phantom surface, are used in order to extrapolate the fields to the surface of the phantom.

In order to determine all the field maxima in 2-D (Area Scan) and 3-D (Zoom Scan), the measurement grid is refined by a default factor of 10 and the interpolation function is used to evaluate all field values between corresponding measurement points. Subsequently, a linear search is applied to find all the candidate maxima. In a last step, non-physical maxima are removed and only those maxima which are within 2 dB of the global maximum value are retained.

Averaging and Determination of Spatial Peak SAR

The interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretizing the entire measured volume. The resolution of this spatial grid used to calculate the averaged SAR is 1mm or about 42875 interpolated points. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are centered at the location. The location is defined as the center of the incremental volume.

The spatial-peak SAR must be evaluated in cubical volumes containing a mass that is within 5% of the required mass. The cubical volume centered at each location, as defined above, should be expanded in all directions until the desired value for the mass is reached, with no surface boundaries of the averaging volume extending beyond the outermost surface of the considered region. In addition, the cubical volume should not consist of more than 10% of air. If these conditions are not satisfied then the center of the averaging volume is moved to the next location. Otherwise, the exact size of the final sampling cube is found using an inverse polynomial approximation algorithm, leading to results with improved accuracy. If one boundary of the averaging volume reaches the boundary of the measured volume during its expansion, it will not be evaluated at all. Reference is kept of all locations used and those not used for averaging the SAR. All average SAR values are finally assigned to the centered location in each valid averaging volume.

All locations included in an averaging volume are marked to indicate that they have been used at least once. If a location has been marked as used, but has never been assigned to the center of a cube, the highest averaged SAR value of all other cubical volumes which have used this location for averaging is assigned to this location. Only those locations that are not part of any valid averaging volume should be marked as unused. For the case of an unused location, a new averaging volume must be constructed which will have the unused location centered at one surface of the cube. The remaining five surfaces are expanded evenly in all directions until the required mass is enclosed, regardless of the amount of included air. Of the six possible cubes with one surface centered on the unused location, the smallest cube is used, which still contains the required mass.

If the final cube containing the highest averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the post processing engine.

Power Drift Measurement:

The probe was positioned at precisely the same reference point and the reference power measurement was repeated. The difference between the initial reference power and the final one is referred to as the power drift. The power drift measurement was used to assess the output power stability of the test sample throughout the SAR scan.

RF Ambient Activity:

During the entire SAR evaluation, the RF ambient activity was monitored using a spectrum analyzer with an antenna connected to it. The spectrum analyzer was tuned to the frequency of measurement and with one trace set to max hold mode. In this way, it was possible to determine if at any point during the SAR measurement there was an interfering ambient signal. If an ambient signal was detected, then the SAR measurement was repeated.

7.0 CRITERIA

The following FCC limits for SAR apply to portable devices operating in the General Population/Uncontrolled Exposure environment:

Exposure (General Population/Uncontrolled Exposure environment)	SAR (W/kg)
Average over the whole body	0.08
Spatial Peak (1g)	1.60
Spatial Peak for hands, wrists, feet and ankles (10g)	4.00

8.0 TEST CONFIGURATION

For the purpose of this evaluation, the Companion Microphone was considered to be a device that could be operated against the body. The device is a "clip on" device which is typically worn on a belt or pocket with the clip side against the body. Therefore SAR scans were performed on both front and clip sides of the device while in direct contact with the phantom surface.

The test channels and operating modes were selected using software based test commands that enabled transmission at 100% duty cycle in each modulation mode. All SAR scans were performed with a freshly charged battery installed. SAR scans were performed on the middle channel with the "left", "right", and with the "left and right" transmitters operating.

Figure 5: Front Test Position

Figure 6: Clip Side Test Position

9.0 TEST RESULTS

The results on the following page(s) were obtained when the device was transmitting at maximum output power. Detailed measurement data and plots, which reveal information about the location of the maximum SAR with respect to the device, are referenced are shown in separate exhibits presented with this application. The measured conducted output power was compared to the power declared by the manufacturer and used for scaling the measured SAR values.

The device was evaluated according to the specific requirements found in FCC KDB 447498[9]. The worst case 1-g SAR value for the transmitter was less than the 1.6mW/g limit. Repeatability measurements were not required since the Reported SAR was <0.8W/kg.

Conducted Output Power Measurements:

Table 9: Conducted Power Measurements

Right Transmitter Conducted Power Measurements				
Date	**Channel**	**Frequency**	**Peak (dBm)**	**Average (dBm)**
4/6/2016	370 (Low)	907.795	17.01	15.91
	389 (Mid)	913.56	17.12	16.98
	410 (High)	919.931	17.08	16.95

Left Transmitter Conducted Power Measurements				
Date	**Channel**	**Frequency**	**Peak (dBm)**	**Average (dBm)**
4/6/2016	369 (Low)	907.492	17.24	16.81
	388 (Mid)	913.256	17.30	17.12
	409 (High)	919.628	17.28	17.11

Both Transmitters Conducted Power Measurements				
Date	**Channels**	**Frequencies**	**Peak (dBm)**	**Average (dBm)**
2/23/2016	369/370 (Low)	907.492/ 907.795	21.73	18.33
	388/389 (Mid)	913.256/ 913.56	21.73	19.18
	409/410 (High)	919.628/ 919.931	21.62	19.04

Standalone SAR Measurements:

Table 10: Left Radio Front Side and Clip Side SAR Results

Body Mode SAR Results Using 900MHz MSL. Clip Side of Sample Contacting Phantom								
Left Channel	**Position**	**Frequency (Mhz)**	**Power Drift (dB)**	**Measured SAR 1g (W/kg)**	**Measured SAR 10g (W/kg)**	**Reported SAR 1g (W/kg)**	**Reported SAR 10g (W/kg)**	**Measured Conducted Output Power (dBm)**
388	Front Side	913.256	0.18	0.1210	0.1020	**0.1790**	**0.1509**	17.30
	Clip Side	913.256	-0.28	0.0898	0.0722	**0.1328**	**0.1068**	17.30
1g SAR Limit (Head & Body) = 1.6W/kg, 10g SAR Limit (Extremities) = 4.0								

Table 11: Right Radio Front Side and Clip Side SAR Results

Body Mode SAR Results Using 900MHz MSL. Front Side of Sample Contacting Phantom								
Right Channel	**Position**	**Frequency**	**Power Drift (dB)**	**Measured SAR 1g (W/kg)**	**Measured SAR 10g (W/kg)**	**Reported SAR 1g (W/kg)**	**Reported SAR 10g (W/kg)**	**Measured Conducted Output Power (dBm)**
389	Front Side	913.56	0.05	0.1820	0.1520	**0.2806**	**0.2343**	17.12
	Clip Side	913.56	0.20	0.1160	0.0777	**0.1788**	**0.1198**	17.12
1g SAR Limit (Head & Body) = 1.6W/kg, 10g SAR Limit (Extremities) = 4.0								

Table 12: Both Radios Front Side and Clip Side SAR Results

Body Mode SAR Results Using 900MHz MSL. Front Side of Sample Contacting Phantom								
Both Channels	**Position**	**Frequency**	**Power Drift (dB)**	**Measured SAR 1g (W/kg)**	**Measured SAR 10g (W/kg)**	**Reported SAR 1g (W/kg)**	**Reported SAR 10g (W/kg)**	**Measured Conducted Output Power (dBm)**
388/389	Front Side	913.256/913.56	-0.01	0.2130	0.1240	**0.2267**	**0.1320**	21.73
	Clip Side	913.256/913.56	-0.07	0.1430	0.0840	**0.1522**	**0.0894**	21.73
1g SAR Limit (Head & Body) = 1.6W/kg, 10g SAR Limit (Extremities) = 4.0								

Simultaneous Transmission Calculations

Worst case simultaneous TX 1-g SAR = 0.1136W/kg

10.0 REFERENCES

[1] ANSI, *ANSI/IEEE C95.1-1991: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz*, The Institute of electrical and Electronics Engineers, Inc., New York, NY 10017, 1992

[2] Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01), FCC, Washington, D.C. 20554, 1997

[3] Thomas Schmid, Oliver Egger, and Niels Kuster, "Automated E-field scanning system for dosimetric assessments", *IEEE Transaction on Microwave Theory and Techniques*, vol. 44, pp. 105-113, Jan. 1996.

[4] Niels Kuster, Ralph Kastle, and Thomas Schmid, "Dosimetic evaluation of mobile communications equipment with know precision", IEICE Transactions on Communications, vol. E80-B, no. 5, pp.645-652, May 1997.

[5] NIS81, NAMAS, "The treatment of uncertainty in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddinton, Middlesex, England, 1994.

[6] Barry N. Tayor and Chris E. Kuyatt, "Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994.

[7] Federal Communications Commission, KDG 248227 - "SAR Measurement Procedures for 802.11 a/b/g Transmitters"

[8] Federal Communications Commission, KDB 648474 – "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas".

[9] Federal Communications Commission, KDB 447498 – "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies".

[10] Federal Communications Commission, KDB 616217 – "SAR Evaluation Considerations for Laptop Computers with Antennas Built-in on Display Screens".

[11] Federal Communications Commission, KDB 450824 – "SAR Probe Calibration and System Verification Considerations for Measurements at 150MHz – 3GHz".

[12] Federal Communications Commission, KDB 865664 – "SAR Measurement Requirements for 3-6GHz".

[13] Federal Communications Commission, KDB 941225 – "SAR Measurement Procedures for 3G Devices".

[14] ANSI, ANSI/IEEE C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.

11.0 APPENDIX – SAR PLOTS

Date/Time: 4/6/2016 11:53:38 AM

Test Laboratory: Intertek

913.256MHz Clip Side

Procedure Notes:

DUT: Starkey; Serial:

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

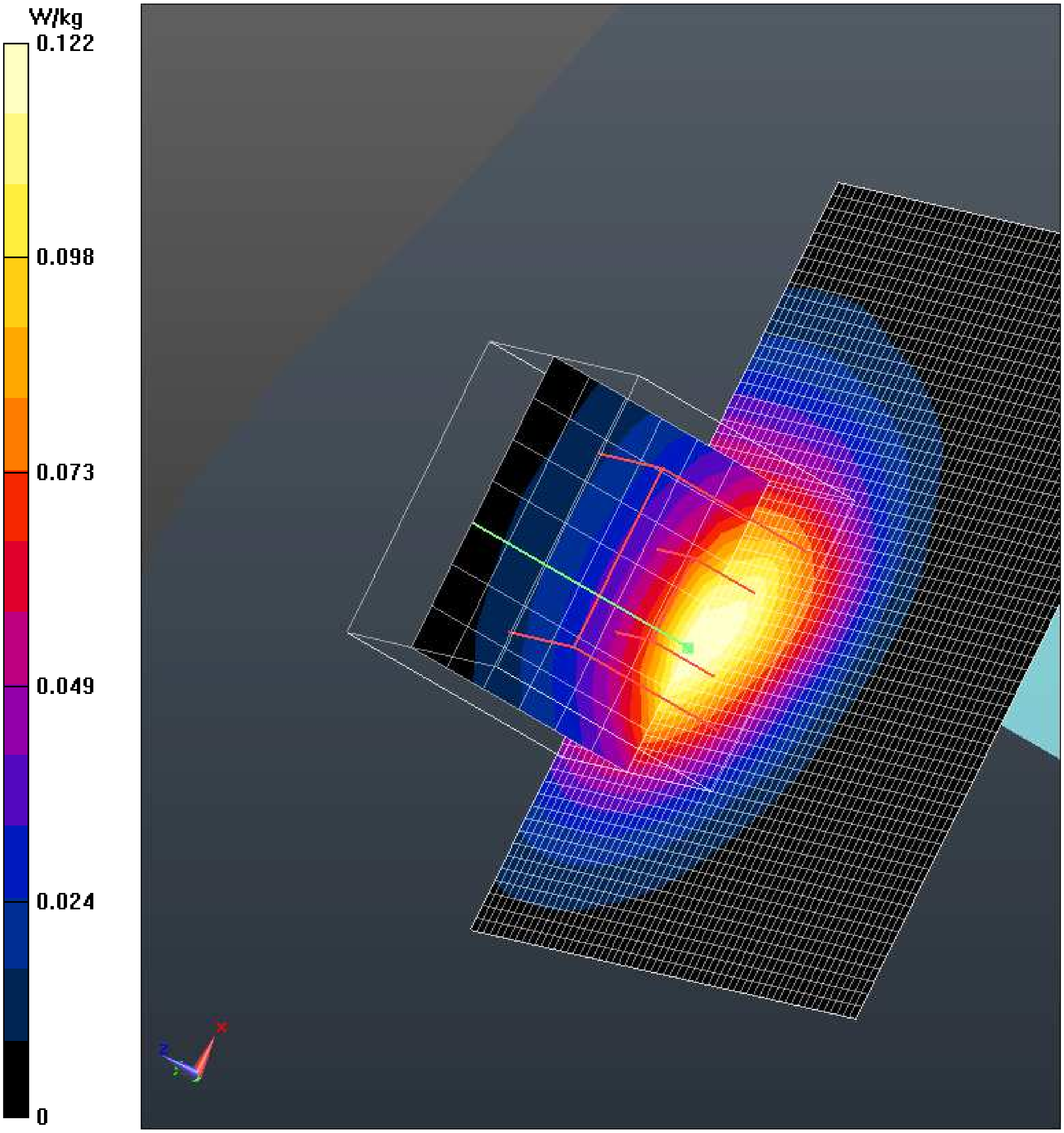
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

WWAN Flat-Section MSL Testing/Left Transmitter 913.256MHz Clip Side/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.122 W/kg

WWAN Flat-Section MSL Testing/Left Transmitter 913.256MHz Clip Side/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.181 V/m; Power Drift = -0.28 dB
Peak SAR (extrapolated) = 0.147 W/kg
SAR(1 g) = 0.089 W/kg; SAR(10 g) = 0.054 W/kg
Maximum value of SAR (measured) = 0.125 W/kg


W/kg
0.122
0.098
0.073
0.049
0.024
0

Date/Time: 4/6/2016 12:20:56 PM

Test Laboratory: Intertek

913.56MHz Clip Side

Procedure Notes:

DUT: Starkey; Serial:

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 900 MHz; $\sigma = 1.02$ S/m; $\varepsilon_r = 57.98$; $\rho = 1000$ kg/m^3

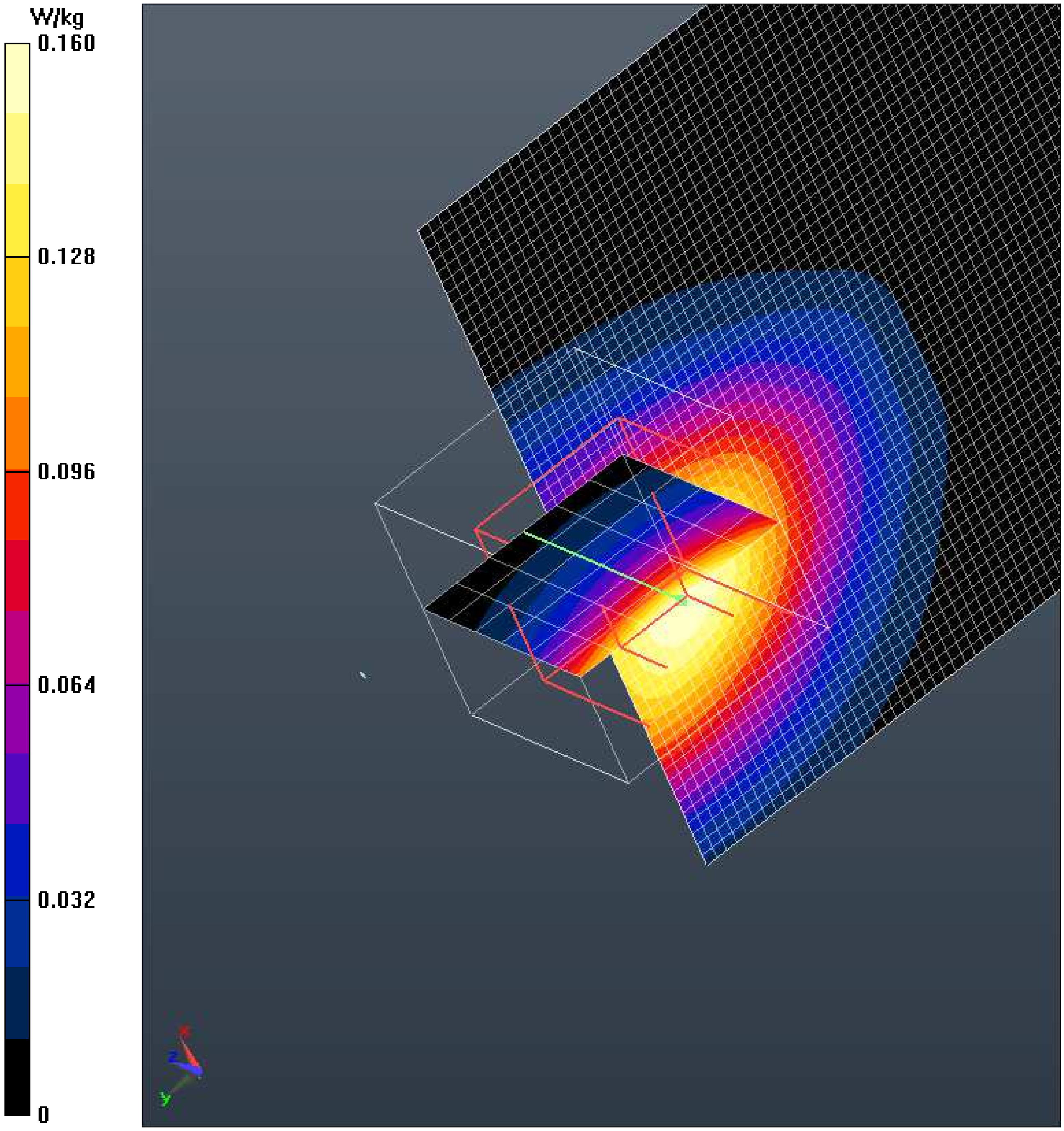
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

WWAN Flat-Section MSL Testing/Right Transmitter 913.56MHz Clip Side/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.160 W/kg

WWAN Flat-Section MSL Testing/Right Transmitter 913.56MHz Clip Side/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.449 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.188 W/kg
SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.069 W/kg
Maximum value of SAR (measured) = 0.162 W/kg


W/kg
0.160
0.128
0.096
0.064
0.032
0

Date/Time: 4/6/2016 3:34:39 PM

Test Laboratory: Intertek

913.256MHz Front Side

Procedure Notes:

DUT: Starkey; Serial:

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3 , Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

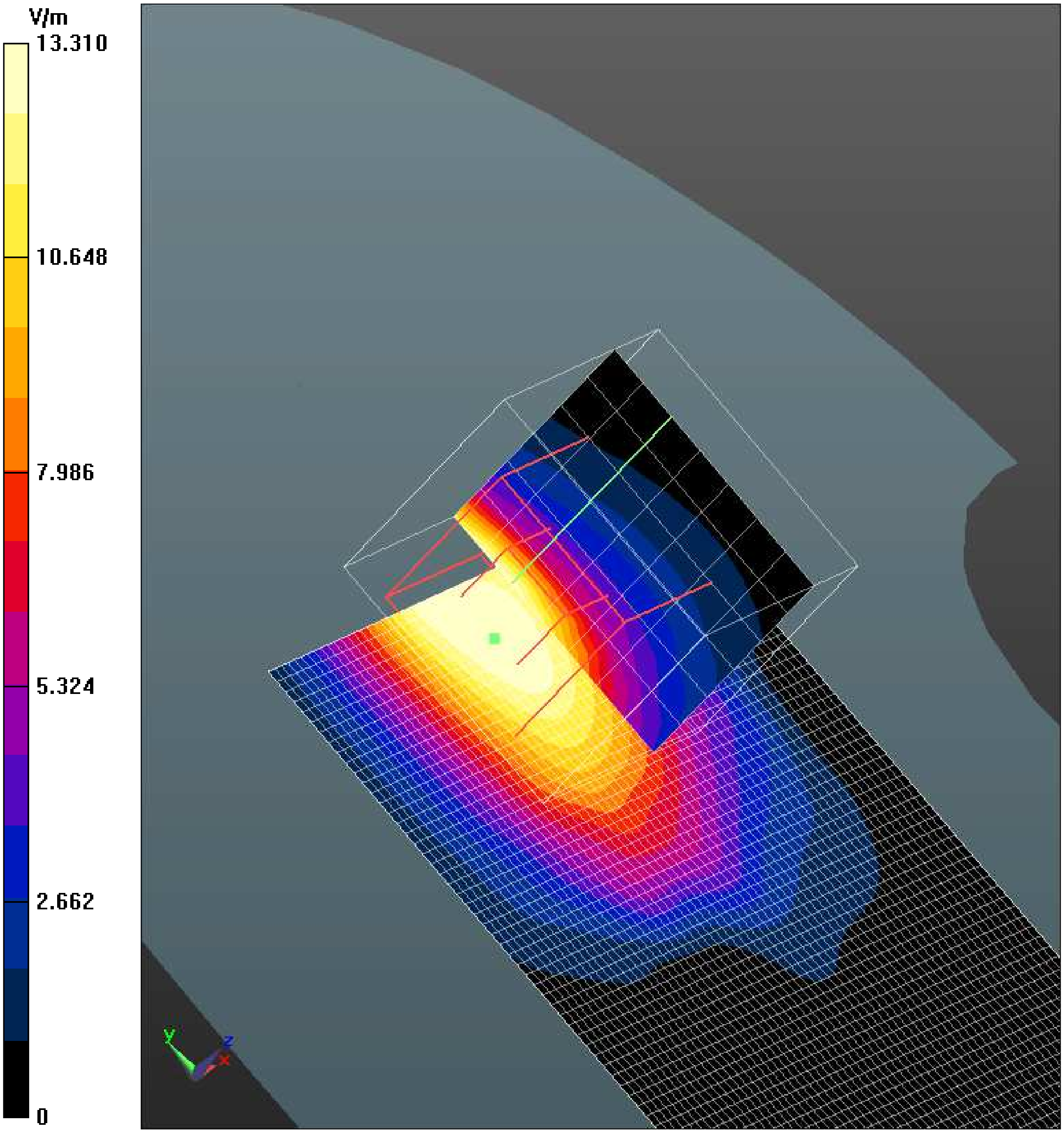
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

WWAN Flat-Section MSL Testing/Left Transmitter 913.256MHz Front Side/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of Total (interpolated) = 13.31 V/m

WWAN Flat-Section MSL Testing/Left Transmitter 913.256MHz Front Side/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.264 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.239 W/kg
SAR(1 g) = 0.121 W/kg; SAR(10 g) = 0.072 W/kg
Maximum value of SAR (measured) = 0.186 W/kg


V/m
13.310
10.648
7.986
5.324
2.662
0
y
z
x

Date/Time: 4/6/2016 4:14:37 PM

Test Laboratory: Intertek

913.56MHz Front Side

Procedure Notes:

DUT: Starkey; Serial:

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

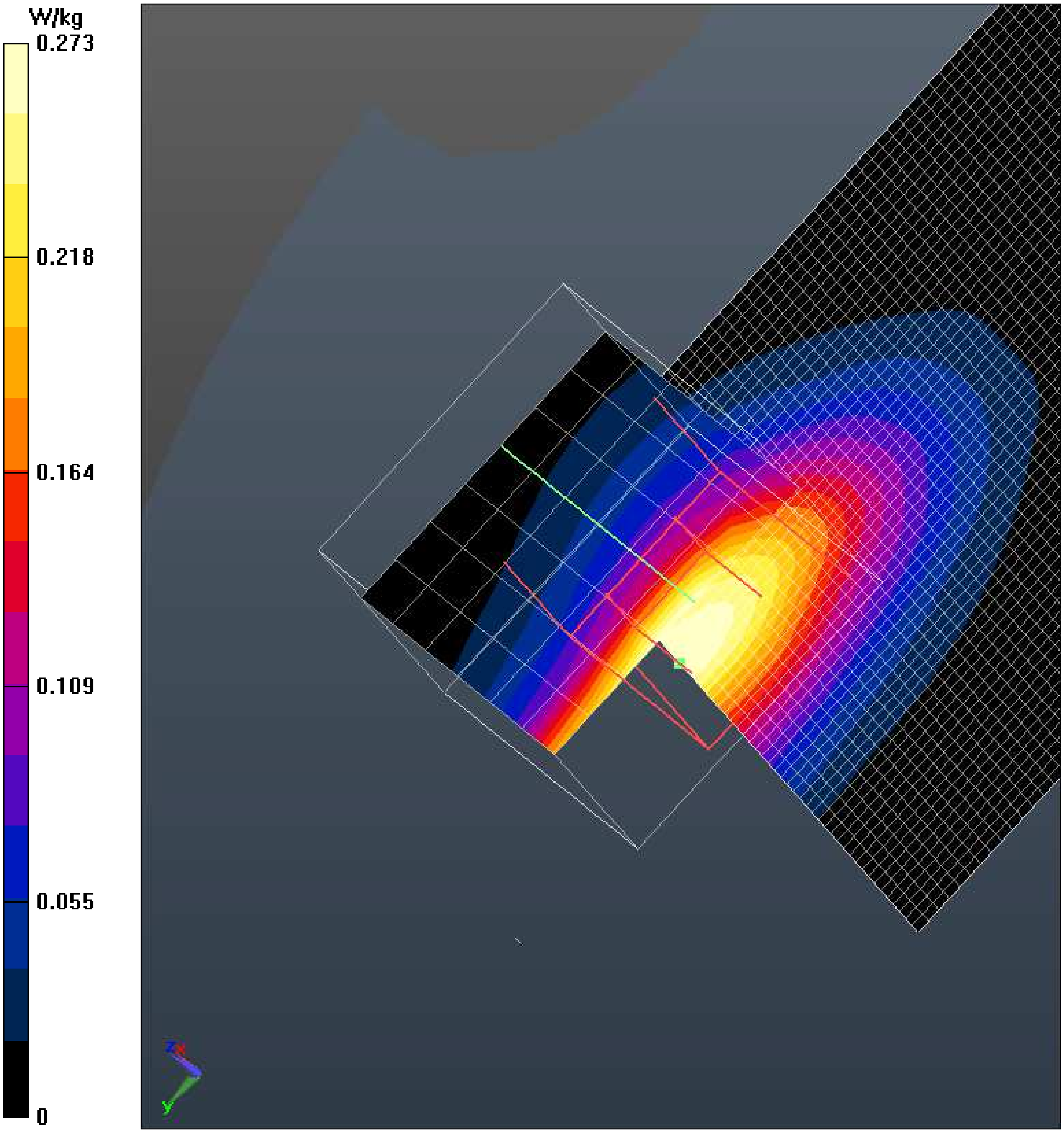
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

WWAN Flat-Section MSL Testing/Right Transmitter 913.56MHz Front Side/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.273 W/kg

WWAN Flat-Section MSL Testing/Right Transmitter 913.56MHz Front Side/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.108 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.359 W/kg
SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 0.283 W/kg


W/kg
0.273
0.218
0.164
0.109
0.055
0

Date/Time: 2/23/2016 7:37:31 PM

Test Laboratory: Intertek
File Name: 913MHz SAR Scans with Dual Transmission_Recalculated with Correct Factors.da52:4

913MHz SAR Scans with Dual Transmission_Recalculated with Correct Factors

Procedure Notes:

DUT: Starkey; Serial:

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

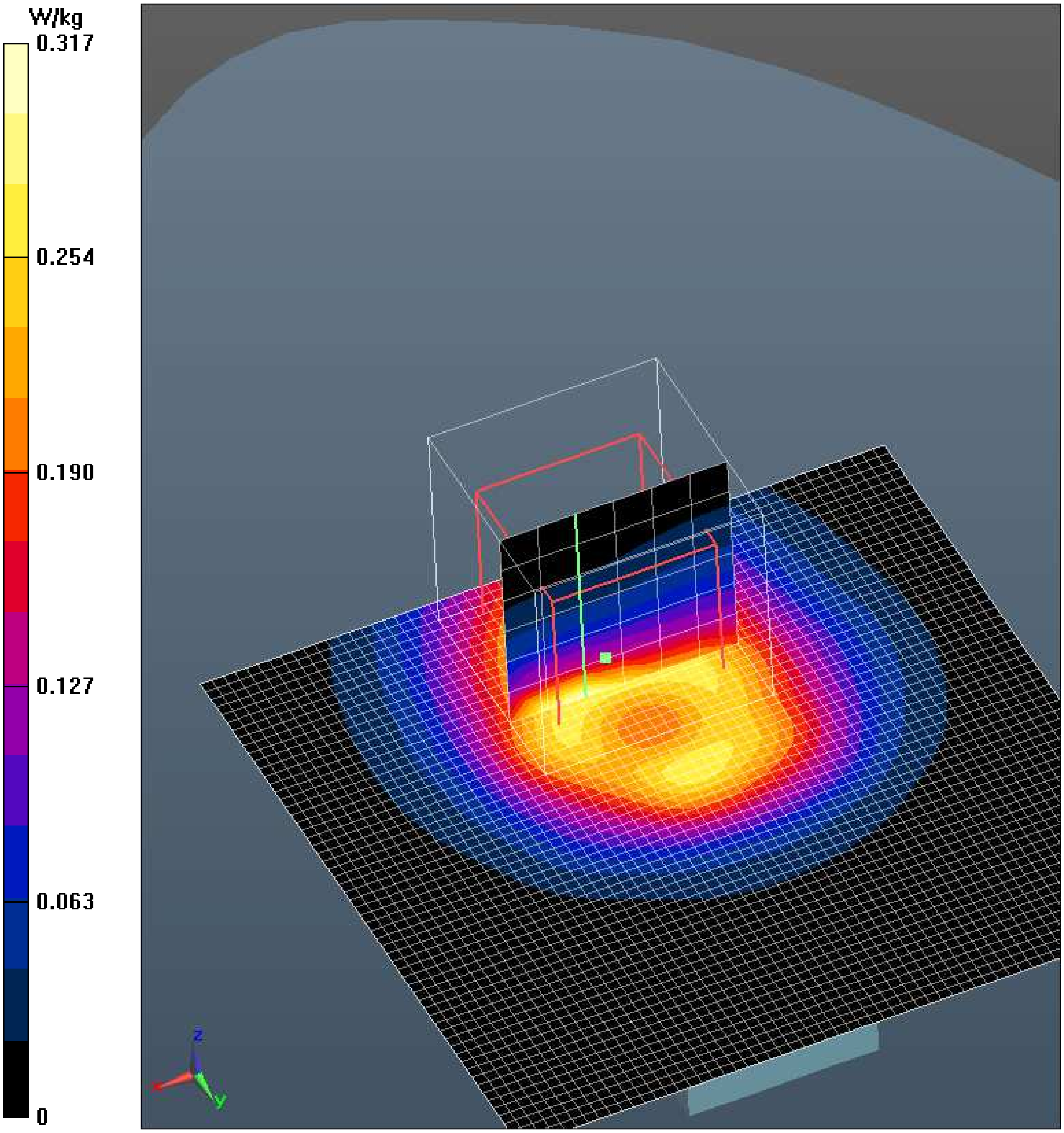
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

WWAN Flat-Section MSL Testing/Both Transmitters 913Mhz Front Side/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.317 W/kg

WWAN Flat-Section MSL Testing/Both Transmitters 913Mhz Front Side/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.466 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.426 W/kg
SAR(1 g) = 0.213 W/kg; SAR(10 g) = 0.124 W/kg
Maximum value of SAR (measured) = 0.332 W/kg


W/kg
0.317
0.254
0.190
0.127
0.063
0

Date/Time: 2/23/2016 9:43:14 PM

Test Laboratory: Intertek
File Name: 913MHz SAR Scans with Dual Transmission_Recalculated with Correct Factors.da52:4

913MHz SAR Scans with Dual Transmission_Recalculated with Correct Factors

Procedure Notes:

DUT: Starkey; Serial:

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

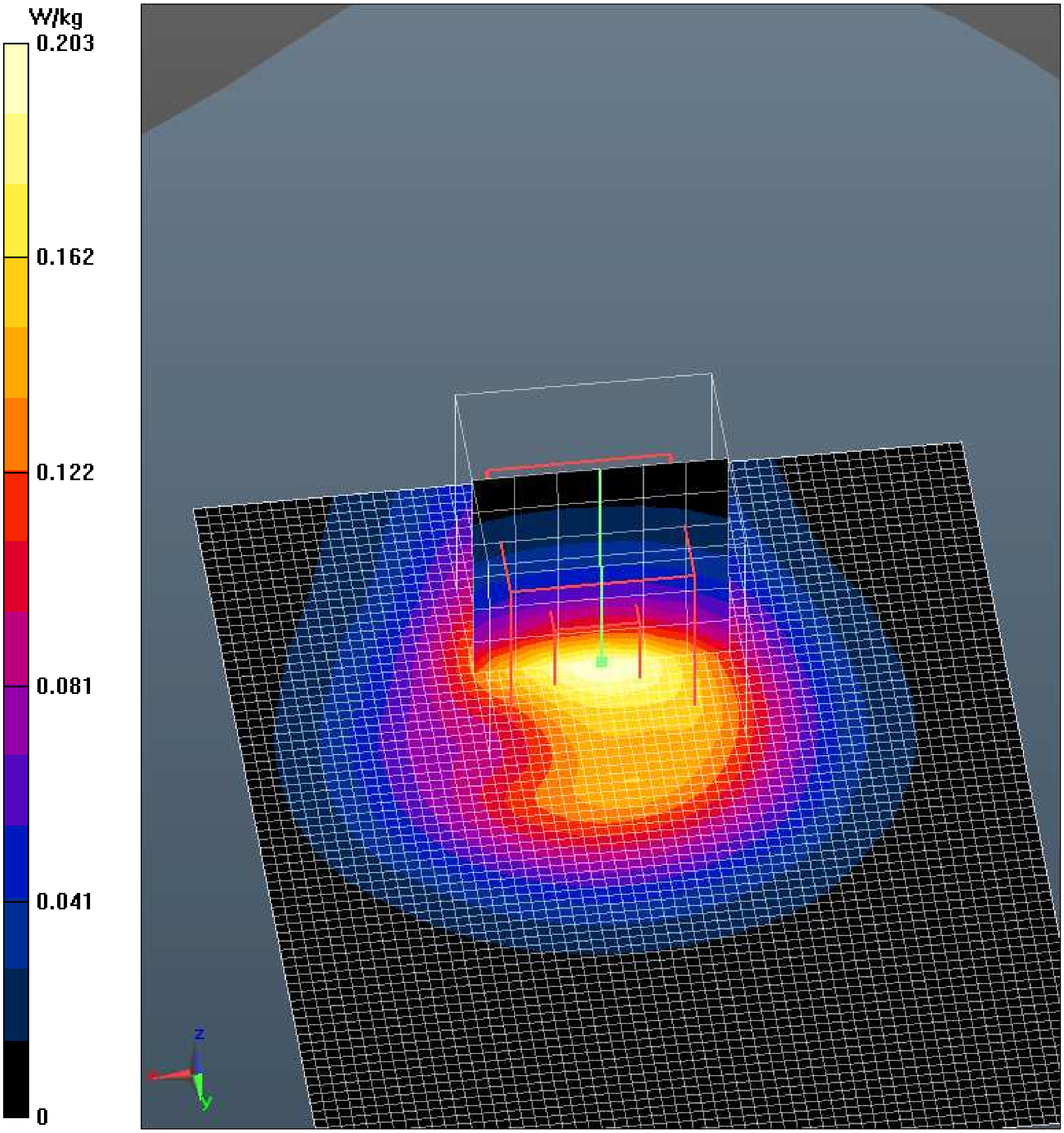
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

WWAN Flat-Section MSL Testing/Both Transmitters 913Mhz Clip Side/Area Scan (61x81x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.203 W/kg

WWAN Flat-Section MSL Testing/Both Transmitters 913Mhz Clip Side/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.324 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.241 W/kg
SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.084 W/kg
Maximum value of SAR (measured) = 0.206 W/kg


W/kg
0.203
0.162
0.122
0.081
0.041
0

Date/Time: 2/23/2016 1:45:34 PM

Test Laboratory: Intertek
File Name: 900MHz Dipole Validation.da52:0

1.1.1 900MHz Dipole Validation

Procedure Notes: Ambient Temp: 22.8C, Fluid Temp: 22.2C

DUT: Dipole 900 MHz D900V2; Serial: D900V2 - SN:xxx

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3 , Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

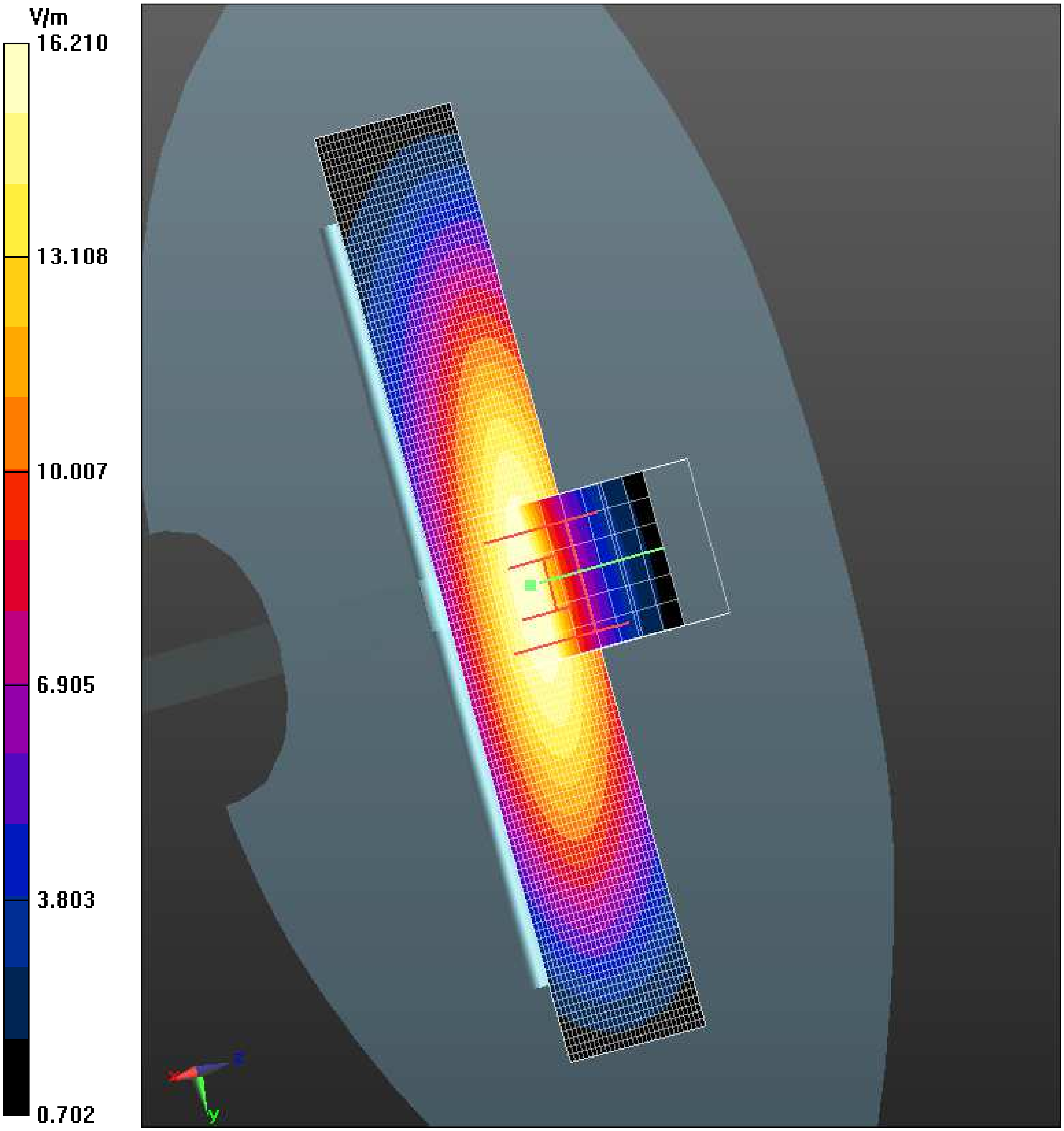
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequencies below 1 GHz/d=15mm, Pin=100 mW, dist=2.0mm (EX-Probe)/Area Scan (31x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of Total (interpolated) = 16.21 V/m

System Performance Check at Frequencies below 1 GHz/d=15mm, Pin=100 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.910 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 12 W/kg; SAR(10 g) = 7.83 W/kg
Normalized to target power = 1 W and actual power = 0.017 W
Maximum value of SAR (measured) = 13.0 W/kg


V/m
16.210
13.108
10.007
6.905
3.803
0.702
z
y

Date/Time: 4/6/2016 2:31:29 PM

Test Laboratory: Intertek
File Name: 900MHz Dipole Validation.da52:0

1.1.2 900MHz Dipole Validation

Procedure Notes: Ambient Temp: 22.8C, Fluid Temp: 22.2C

DUT: Dipole 900 MHz D900V2; Serial: D900V2 - SN:xxx

Communication System: UID 0, CW (0); Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 57.98; ρ = 1000 kg/m^3

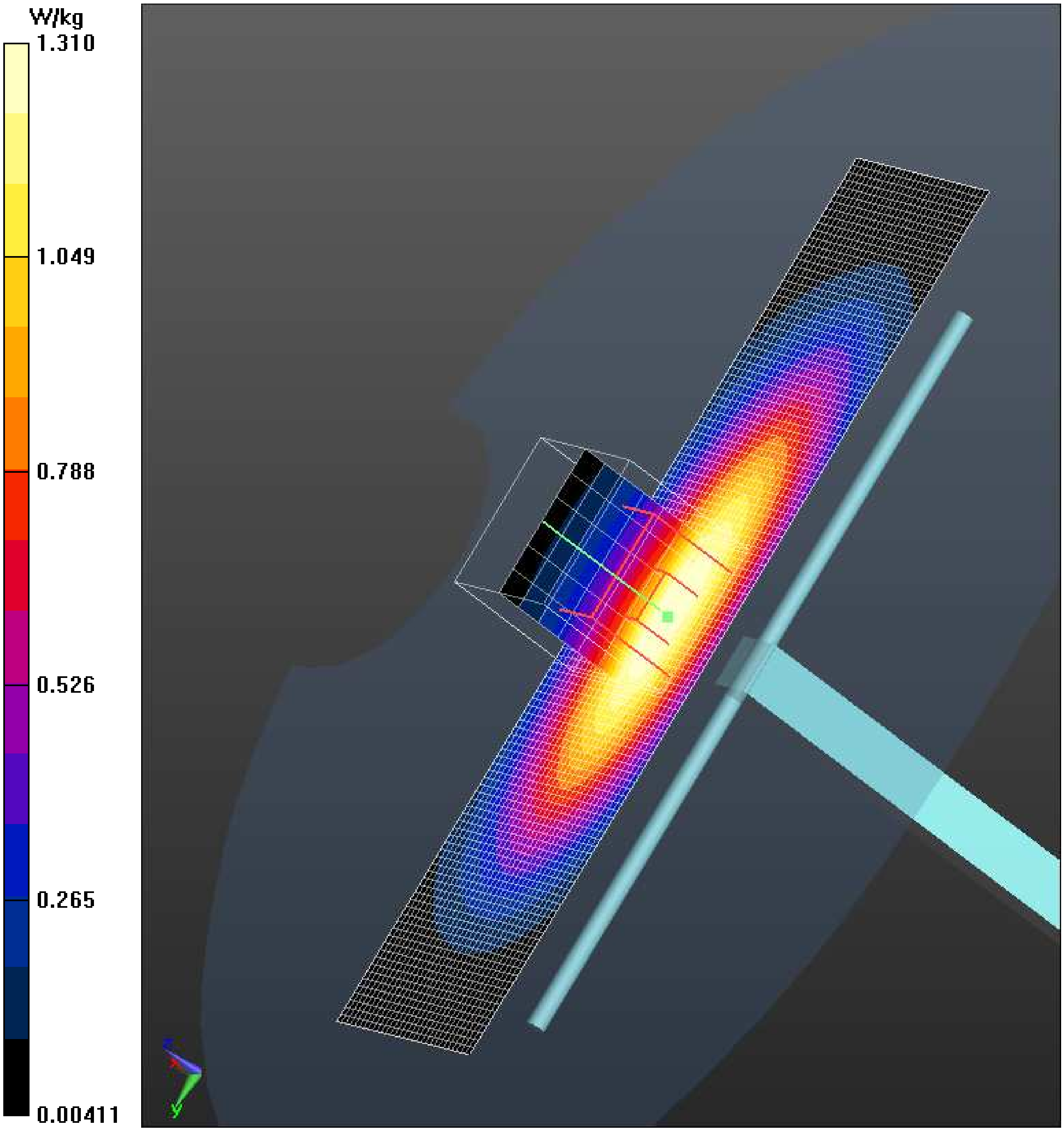
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV3 - SN3516; ConvF(10.61, 10.61, 10.61); Calibrated: 12/16/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn358; Calibrated: 9/16/2015
- Phantom: SAM 2 with CRP v5.0; Type: QD000P40CD; Serial: TP:1663
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequencies below 1 GHz/d=15mm, Pin=100 mW, dist=2.0mm (EX-Probe) 2/Area Scan (31x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.31 W/kg

System Performance Check at Frequencies below 1 GHz/d=15mm, Pin=100 mW, dist=2.0mm (EX-Probe) 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 36.805 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 10.5 W/kg; SAR(10 g) = 6.85 W/kg
Normalized to target power = 1 W and actual power = 0.1 W
Maximum value of SAR (measured) = 11.4 W/kg


W/kg
1.310
1.049
0.788
0.526
0.265
0.00411

APPENDIX – DESCRIPTION OF THE FLAT PHANTOM USED FOR TESTING

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Certificate of Conformity / First Article Inspection

Item	Oval Flat Phantom ELI 5.0
Type No	QD OVA 002 A
Series No	1108 and higher
Manufacturer	Untersee Composites Knebelstrasse 8, CH-8268 Mannenbach, Switzerland

Tests
Complete tests were made on the prototype units QD OVA 001 A, pre-series units QD OVA 001 B as well as on some series units QD OVA 001 B. Some tests are made on all series units QD OVA 002 A.

Test	Requirement	Details	Units tested
Shape	Internal dimensions, depth and sagging are compatible with standards	Bottom elliptical 600 x 400 mm, Depth 190 mm, dimension compliant with [1] for f > 375 MHz	Prototypes
Material thickness	Bottom: 2.0mm +/- 0.2mm	dimension compliant with [3] for f > 800 MHz	all
Material parameters	rel. permittivity 2 – 5, loss tangent ≤ 0.05, at f ≤ 6 GHz	rel. permittivity 3.5 +/- 0.5 loss tangent ≤ 0.05	Material samples
Material resistivity	Compatibility with tissue simulating liquids .	Compatible with SPEAG liquids. **	Phantoms, Material sample
Sagging	Sagging of the flat section in tolerance when filled with tissue simulating liquid.	within tolerance for filling height up to 155 mm	Prototypes, samples

** Note: Compatibility restrictions apply certain liquid components mentioned in the standard, containing e.g. DGBE, DGMHE or Triton X-100. Observe technical note on material compatibility.

Standards

[1] OET Bulletin 65, Supplement C, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 01-01
[2] IEEE 1528-2003, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques, December 2003
[3] IEC 62209–1 ed1.0, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", 2005-02-18
[4] IEC 62209–2 ed1.0, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 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)", 2010-03-30

Conformity
Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of **body-worn** SAR measurements and system performance checks as specified in [1 – 4] and further standards.

Date 25.7.2011

Signature / Stamp

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APPENDIX – SYSTEM VALIDATION SUMMARY

				Probe Calibration Point		Dielectric Properties		CW Validation			Modulation Validation		
Frequency (MHz)	Date	Probe (SN#)	Probe (Model #)	Frequency (MHz)	Fluid Type	σ	ϵ_r	Sensitivity	Probe Linearity	Probe Isotropy	Mod. Type	Duty Factor	PAR
835	12/20/2015	3516	EX3DV3	835	Body	54.2	0.98	Pass	Pass	Pass	GMSK	Pass	N/A
900	12/20/2015	3516	EX3DV3	900	Body	54	1.02	Pass	Pass	Pass	GMSK	Pass	N/A
1750	12/20/2015	3516	EX3DV3	1800	Body	52.9	1.41	Pass	Pass	Pass	GMSK	Pass	N/A
1900	12/20/2015	3516	EX3DV3	1900	Body	52.7	1.48	Pass	Pass	Pass	GMSK	Pass	N/A