RF EXPOSURE EVALUATION DOCUMENT

For SPEN WPT Charging

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-S918B/DS, SM-S918B
FCC ID	:	A3LSMS918B
EUT Description	:	GSM/WCDMA/LTE5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB

Date Of Issue:
2022-11-07

Prepared by:
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Suwon Test Site: UL Korea, LTD. Suwon Laboratory
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1. TEST PROCEDURE

Per FCC Guidance, WPT function was evaluated for portable exposure condition.

2. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Shield Room

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

3. INFORMATION OF EQUIPMENT UNDER TEST

Information	
Operating frequency [MHz]	0.562
Maximum output power [mW]	50
Charging type	Inductive wireless power transfer
Operating duty factor	0.3833

4. TEST EQUIPMENT

Test equipment (Measurement probe)				
Description	**Manufacturer**	**Model**	**S/N**	**Cal due.**
E-H Field Analyzer	**Narda**	**EHP-200AC**	**170WX91008**	**8-23-2023**

5. MEASUREMENT RESULT

5.1. H-field measurement results of EUT's 6 sides

Distance	H-field measurement [A/m]					
	Rear	Front	Edge.1	Edge.2	Edge.3	Edge.4
0cm	**0.7568**	0.1950	0.0370	0.0269	0.0167	0.3451

(0mm distance means that the probe's surface are touched at DUT's surface.)

5.2. H-field measurement results for 0cm to 10cm at Rear side.

Distance [cm]	H-field meas. [A/m]	H-field x (duty factor) [A/m]	FCC Limit [A/m]
0	**0.7568**	**0.2939**	1.63
1	0.3615	0.1404	
2	0.1993	0.0774	
3	0.1159	0.0450	
4	0.0722	0.0280	
5	0.0479	0.0186	
6	0.0320	0.0124	
7	0.0221	0.0086	
8	0.0162	0.0063	
9	0.0120	0.0047	
10	0.0087	0.0034	

(Distance means that the probe's surface are touched at DUT's surface.)

5.3. Corrected H-field measurement

Operating duty factor is based on Averaging time of §1.1310 table 1.

- 0.7568 A/m * 0.3883 = 0.2939 A/m

6. Assessment of impact on SAR when the S-pen is inserted or removed from the charging slot

2-D scans were made for the upper antennas (Sub1, Sub2, Sub3, Sub4, Sub5 and Sub7 antennas) to verify that the S-pen has no significant influence on the SAR values and SAR distribution. These antennas are closet to the S-pen slot and associated charging circuitry (within about 6cm from the charging circuit). The table on the following page demonstrates that the pen has no significant impact on the measured values or hotspot location. Most values have less than a 10% change in SAR values. Some cases exceed 10%, but the SAR values were low. The cellular antennas are located at distances of more than 5cm from the charging circuitry and based on the minimal impact of the S-pen on the SAR values and distribution. The SAR date in the document, obtained with the pen installed, supports compliance without need for additional testing with the pen removed.

Test Results;

For SAR distributions of each RF exposure and each antennas, Please refer to SAR distribution's plots.

Spot-check configurations				DUT with Spen during charging					DUT without Spen					Change in SAR (%)		Figure
				Area based 1-g SAR (W/kg)	Peak point SAR (W/kg)	Peak SAR location (mm)			Area based 1-g SAR (W/kg)	Peak point SAR (W/kg)	Peak SAR location (mm)					
Band	Ant	RF exposure Conditions	Worst case position			X-axis	Y-axis	Z-axis			X-axis	Y-axis	Z-axis	Area	Peak	
DTS	Ant.2	Head	Left touch	0.171	0.265	0.0553	0.314	-0.176	0.174	0.276	0.0553	0.314	-0.176	1.8%	4.2%	1
	MIMO	Head	Left touch	0.164	0.282	0.0553	0.314	-0.176	0.159	0.272	0.0553	0.314	-0.176	-3.0%	-3.5%	2
		Body-worn	Rear-15mm	0.122	0.186	0.011	0.054	-0.207	0.123	0.185	0.011	0.054	-0.207	0.8%	-0.5%	3
		Hotspot	Edge4-10mm	0.305	0.438	-0.024	0.0535	-0.207	0.306	0.445	-0.024	0.0535	-0.207	0.3%	1.6%	4
BT	Ant.1	Head	Right touch	0.179	0.274	0.0526	-0.324	-0.174	0.186	0.285	0.0526	-0.324	-0.174	3.9%	4.0%	5
	Ant.2	Head	Left touch	0.122	0.178	0.0533	0.325	-0.173	0.116	0.163	0.0533	0.325	-0.173	-4.9%	-8.4%	6
	MIMO	Head	Right touch	0.408	0.691	0.0447	-0.334	-0.174	0.415	0.702	0.0447	-0.334	-0.174	1.7%	1.6%	7
		Hotspot	Rear-10mm	0.0981	0.147	0.011	0.052	-0.206	0.0969	0.149	0.011	0.052	-0.206	-1.2%	1.4%	8
UNII (below 6GHz)	MIMO	Head (UNII 2C)	Right touch	0.149	0.378	0.0103	-0.306	-0.174	0.158	0.41	0.0103	-0.306	-0.174	6.0%	8.5%	9
		Body-worn (UNII 2A)	Rear-15mm	0.197	0.405	-0.025	0.08	-0.208	0.207	0.431	-0.025	0.08	-0.208	5.1%	6.4%	10
		Hotspot (UNII 3)	Rear-10mm	0.207	0.457	0.01	0.08	-0.207	0.202	0.469	0.01	0.07	-0.207	-2.4%	2.6%	11
		Product Specific 10-g (UNII 4)	Edge4-0mm	0.793	11	-0.03	0.07	-0.207	0.782	10.9	-0.03	0.07	-0.207	-1.4%	-0.9%	12
UNII (above 6GHz)	MIMO	Head	Right touch	0.069	0.4241	0.026697	-0.33062	-0.1747	0.069	0.4116	0.027815	-0.33019	-0.17476	0.0%	-2.9%	13
		Body-worn	Rear-15mm	0.118	0.1498	0.00985	0.07565	-0.20398	0.106	0.1292	0.0073	0.07055	-0.20398	-10.2%	-13.8%	14
		Product Specific 10-g	Edge 4-0mm	0.169	0.9078	-0.02585	0.07735	-0.20399	0.173	0.9119	-0.02585	0.07735	-0.20399	2.4%	0.5%	15
UWB	Ant.1	Product Specific 10-g	Rear-0mm / Ch9	0.008	0.1819	-0.06704	0.077504	-0.19942	0.004	0.1584	-0.02002	0.072246	-0.19941	-50.0%	-12.9%	16
	Ant.2	Product Specific 10-g	Front-0mm / Ch9	0.002	0.02206	-0.032	-0.0916	-0.20699	0.002	0.02041	-0.1014	-0.00815	-0.207	0.0%	-7.5%	17
NFC	NFC Ant.	Product Specific 10-g	Rear-0mm / (B/106)	0.092	0.1174	8.74E-11	-0.03	-0.17401	0.093	0.1172	8.74E-11	-0.03	-0.17401	1.1%	-0.2%	18
LTE Band 4	Sub.2	Head	Right tilt	0.614	0.841	0.0146	-0.334	-0.174	0.584	0.781	0.0146	-0.334	-0.174	-4.9%	-7.1%	19
		Body-worn	Rear-15mm	0.126	0.172	-0.01	0.075	-0.207	0.133	0.181	-0.01	0.075	-0.207	5.6%	5.2%	20
		Hotspot	Edge1-10mm	0.468	0.639	-0.017	-0.0075	-0.207	0.47	0.64	-0.017	-0.0075	-0.207	0.4%	0.2%	21
NR Bn66	Sub.2	Head	Right tilt	0.631	0.889	0.00836	-0.333	-0.173	0.657	0.851	0.00836	-0.333	-0.173	4.1%	-4.3%	22
NR Band n41-SRS0	Sub.2	Head	Right tilt	0.844	1.03	0.0109	-0.323	-0.174	0.864	1.06	0.0109	-0.323	-0.174	2.4%	2.9%	23
		Body-worn	Rear-15mm	0.122	0.177	-0.006	0.073	-0.207	0.127	0.188	-0.006	0.073	-0.207	4.1%	6.2%	24
		Hotspot	Edge1-10mm	0.166	0.218	-0.025	-0.0225	-0.207	0.166	0.222	-0.025	-0.0225	-0.207	0.0%	1.8%	25
NR Band n41-SRS2	Sub.1	Head	Left touth	0.176	0.287	0.0112	0.32	-0.174	0.186	0.303	0.0112	0.32	-0.174	5.7%	5.6%	26
		Hotspot	Rear-10mm	0.0283	0.0442	-0.035	0.078	-0.207	0.0289	0.0434	-0.035	0.078	-0.207	2.1%	-1.8%	27
NR Band n77-SRS0	Sub.3	Head	Right touch	0.726	1.25	0.0231	-0.341	-0.174	0.78	1.35	0.0231	-0.341	-0.174	7.4%	8.0%	28
		Body-worn	Rear-15mm	0.144	0.224	0.013	0.066	-0.206	0.139	0.215	0.001	0.066	-0.207	-3.5%	-4.0%	29
		Hotspot	Edge4-10mm	0.141	0.26	-0.031	0.068	-0.206	0.153	0.281	-0.031	0.068	-0.207	8.5%	8.1%	30
NR Band n77-SRS2	Sub.5	Head	Left touch	0.261	0.456	0.0383	0.251	-0.174	0.247	0.434	0.0383	0.251	-0.174	-5.4%	-4.8%	31
		Hotspot	Rear-10mm	0.135	0.216	-0.011	0.018	-0.207	0.131	0.22	-0.011	0.018	-0.207	-3.0%	1.9%	32

Figure 1

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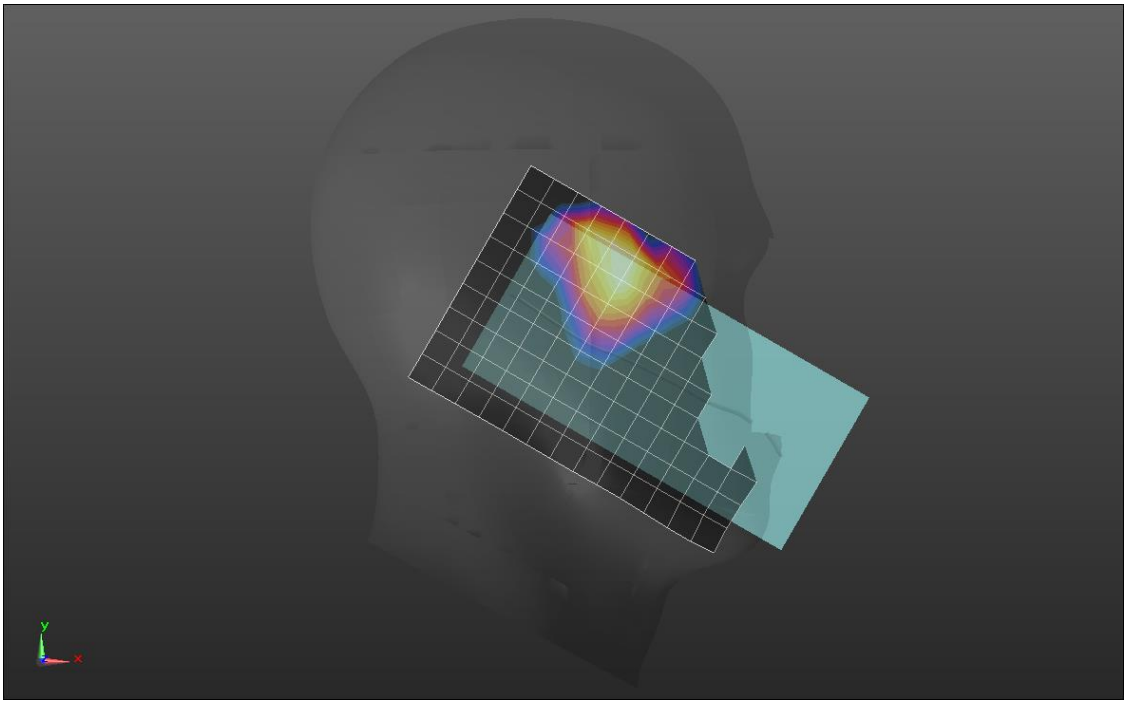

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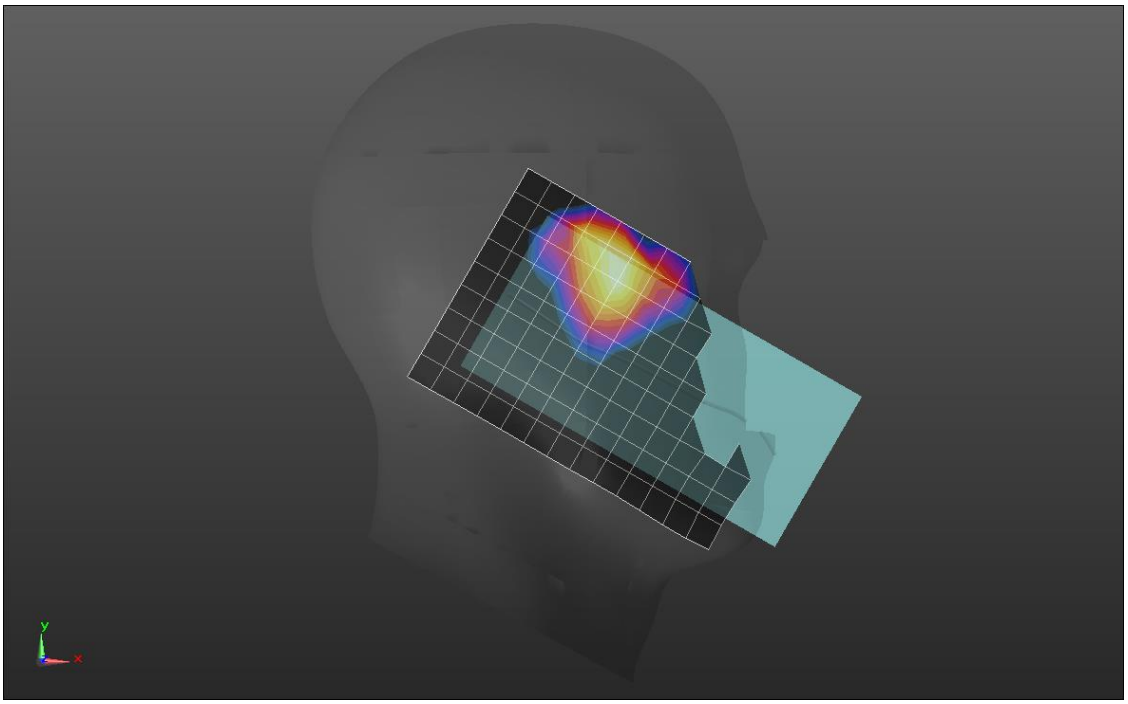

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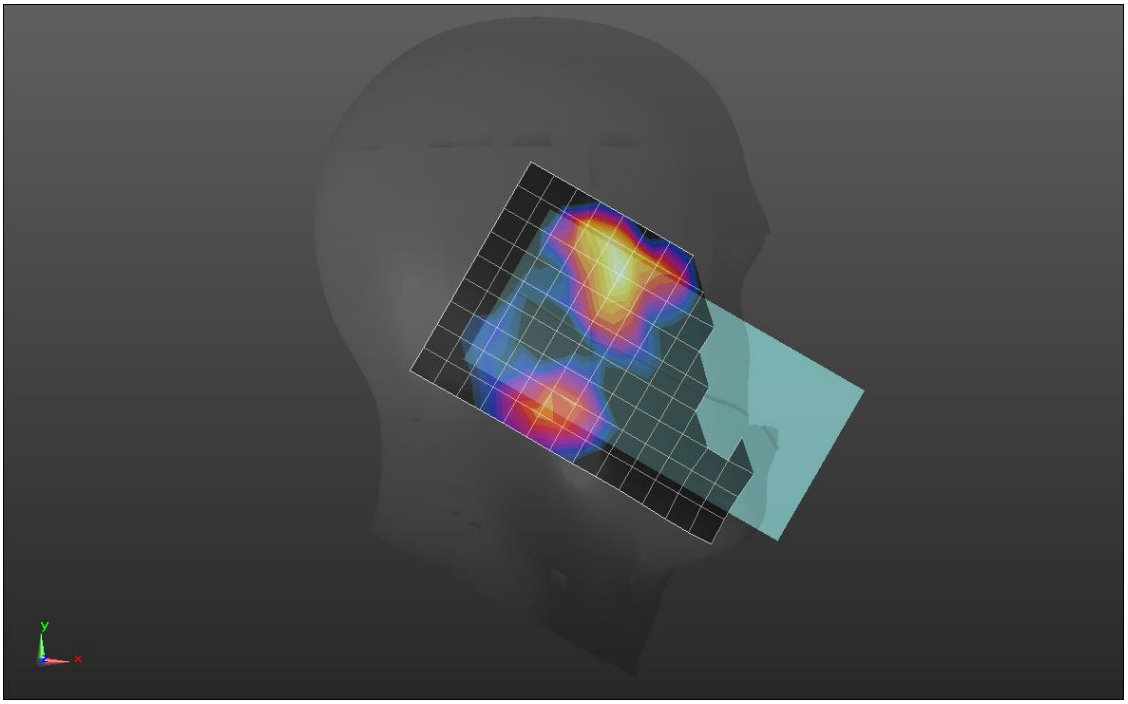

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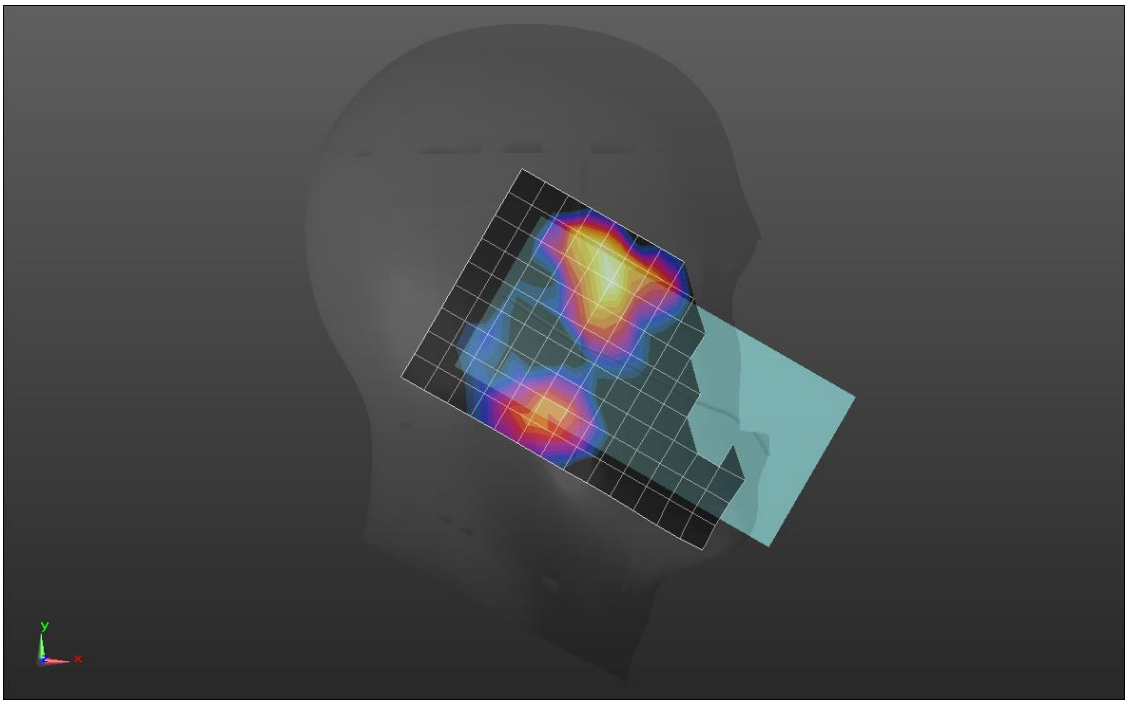

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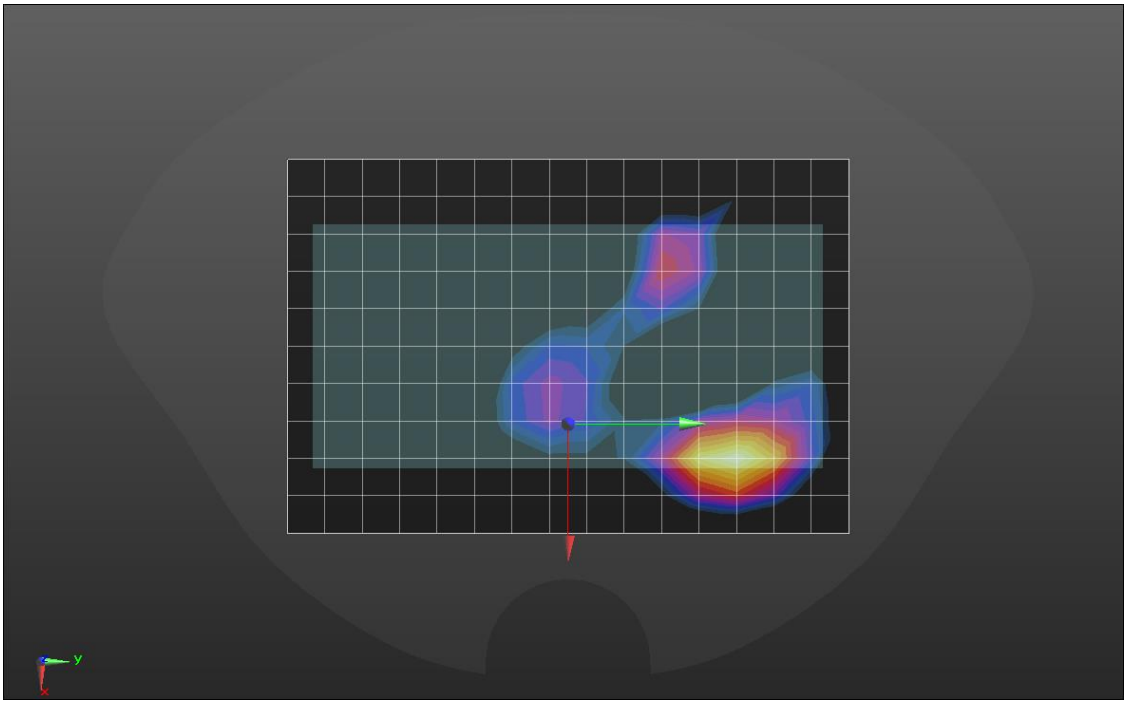

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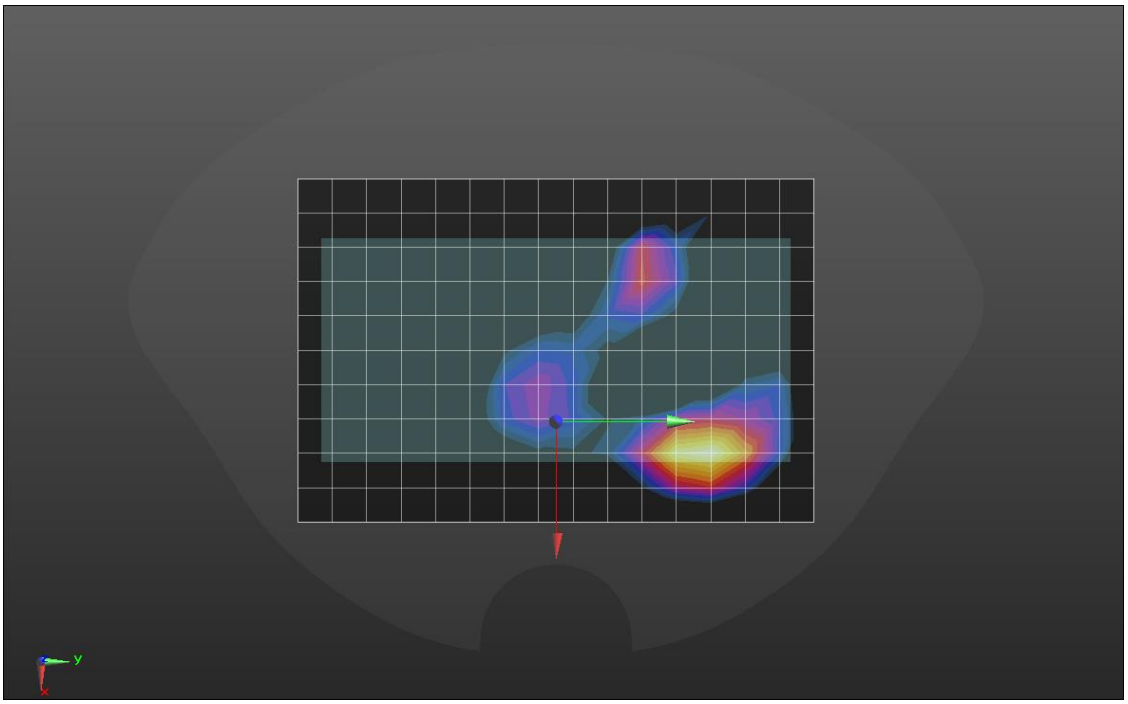

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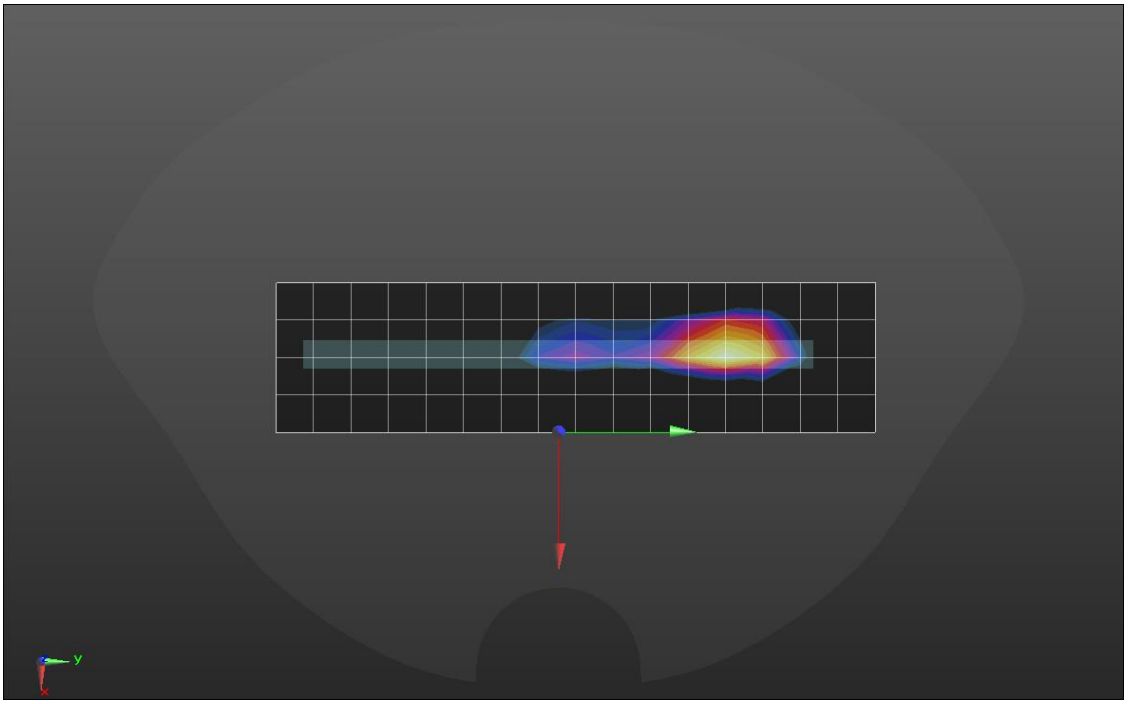

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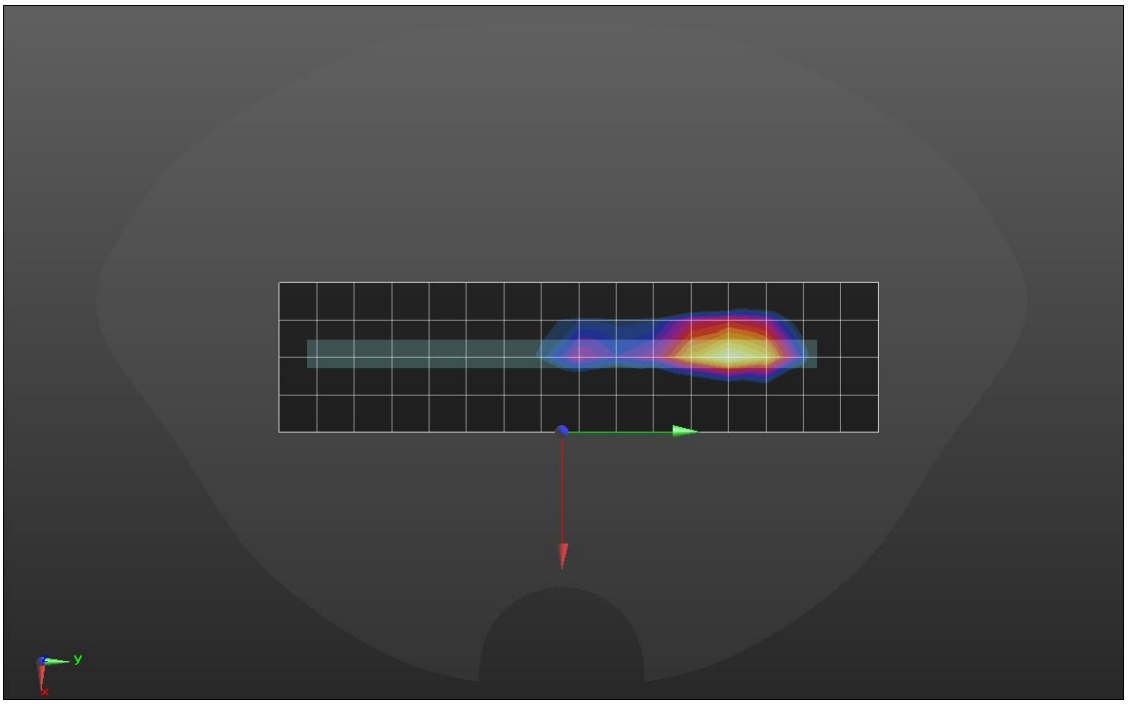

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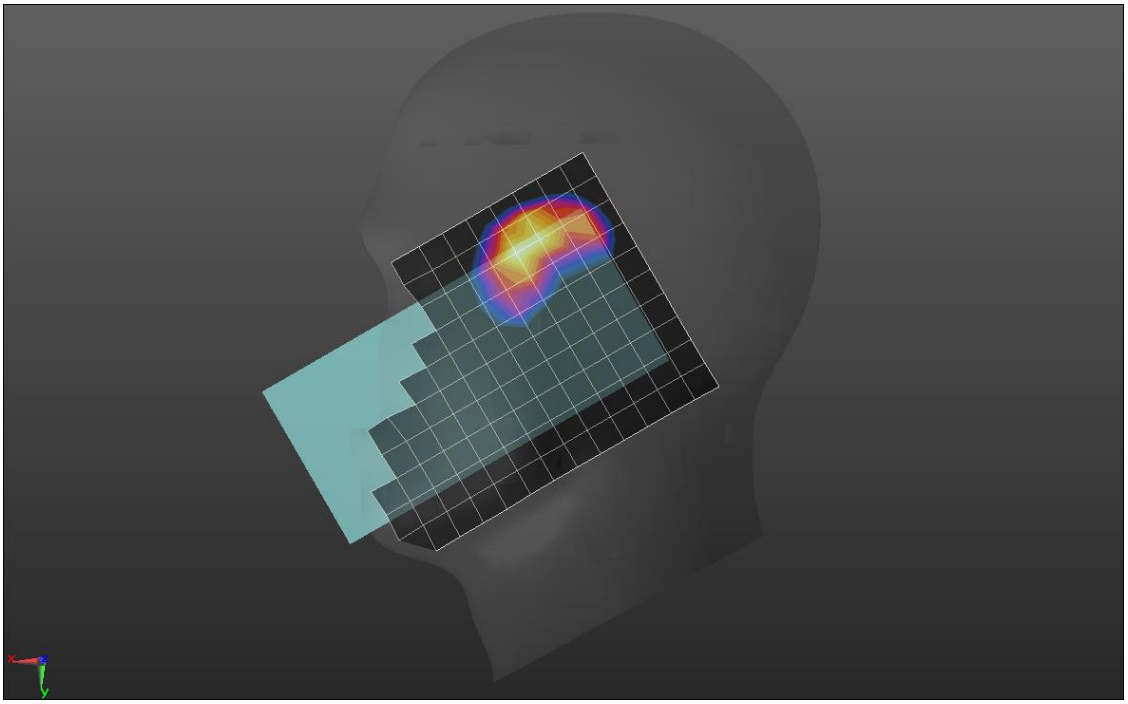

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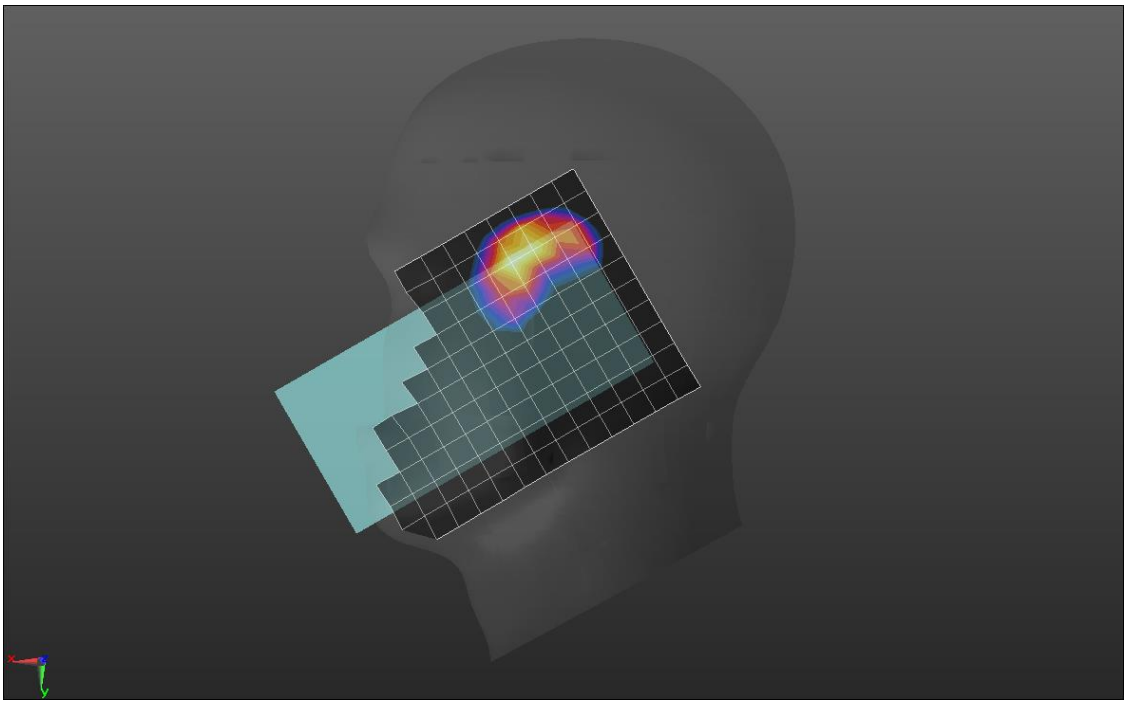

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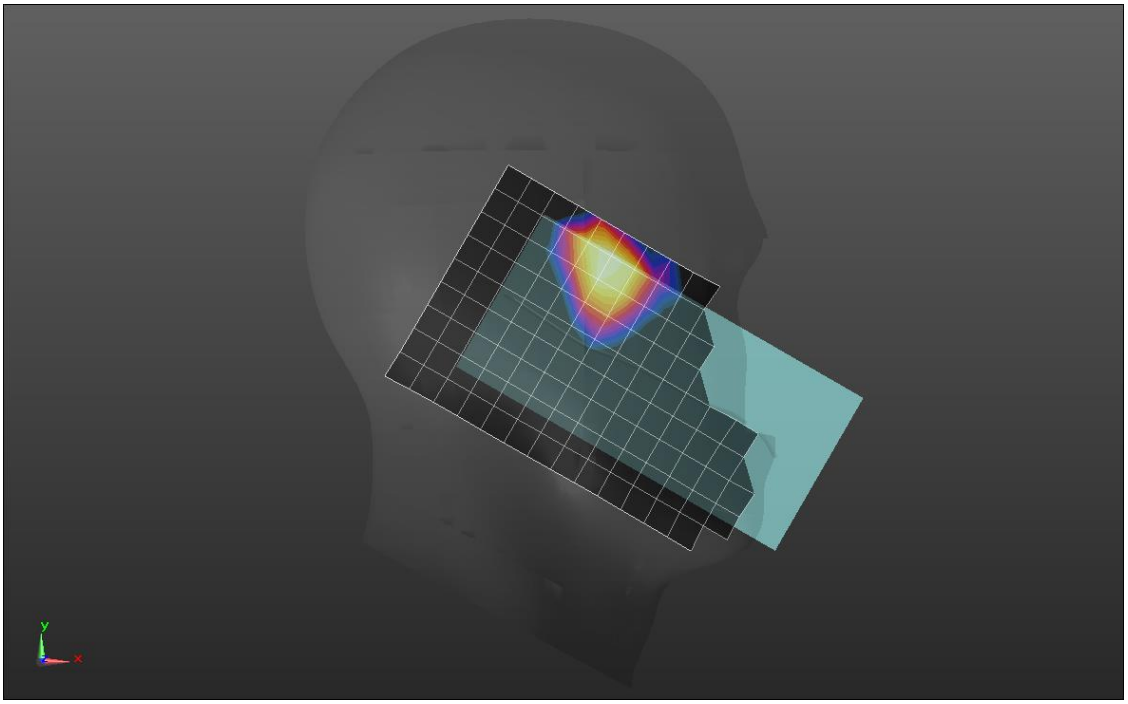

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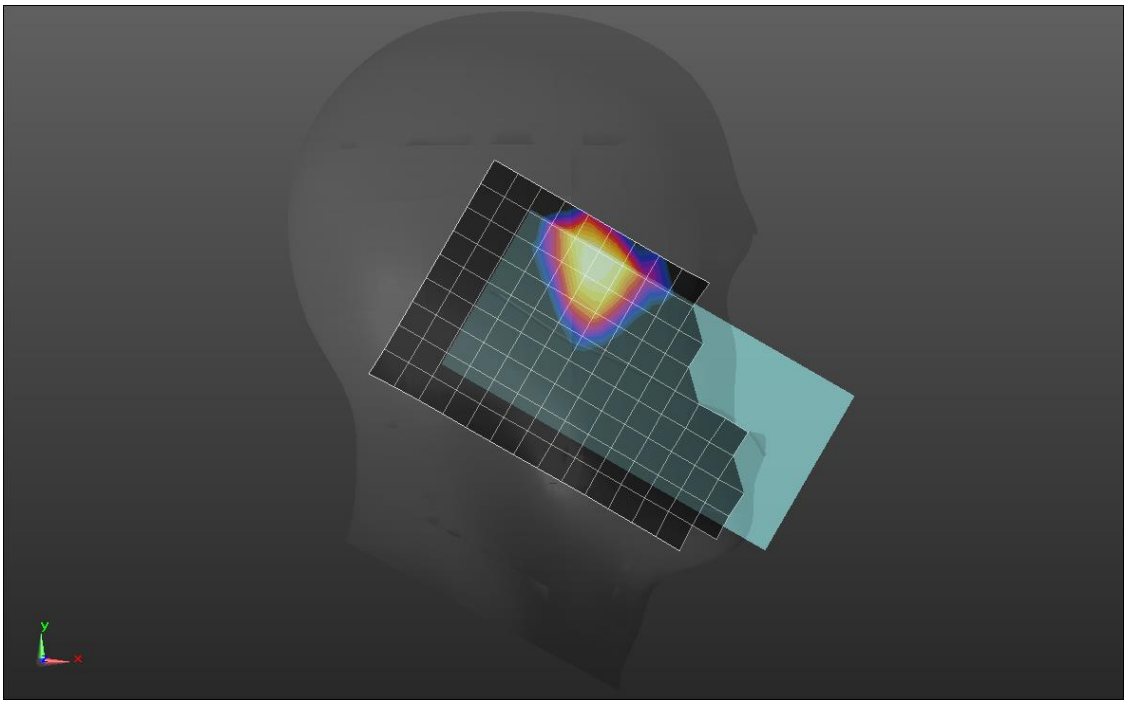

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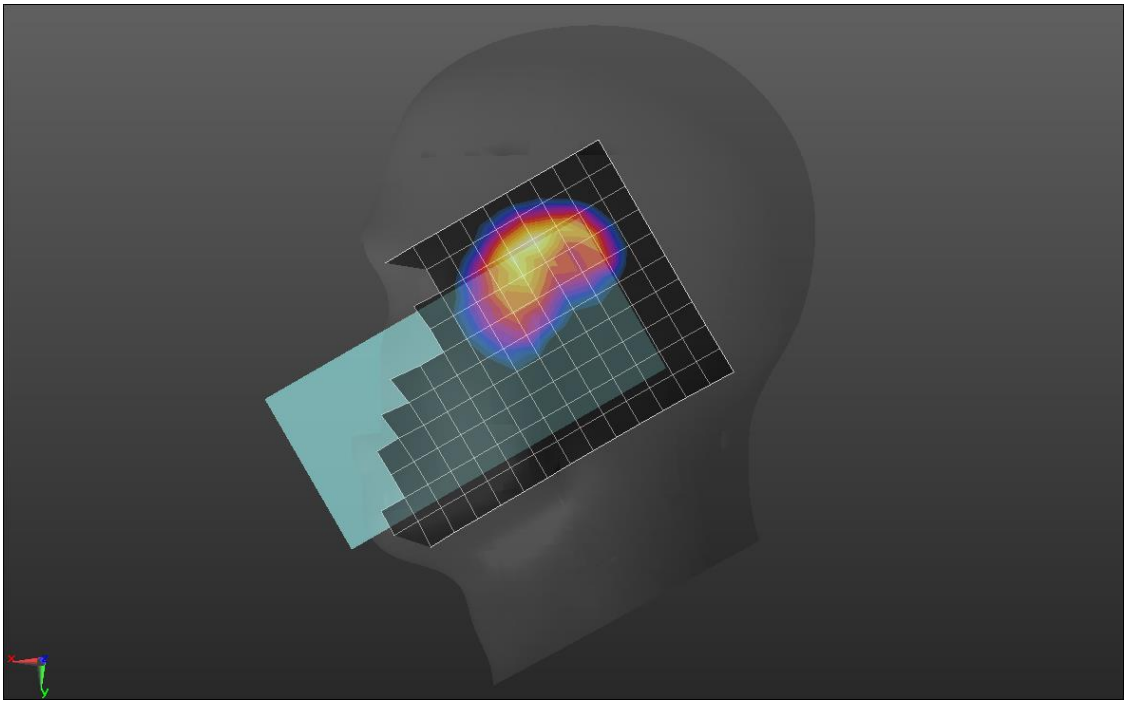

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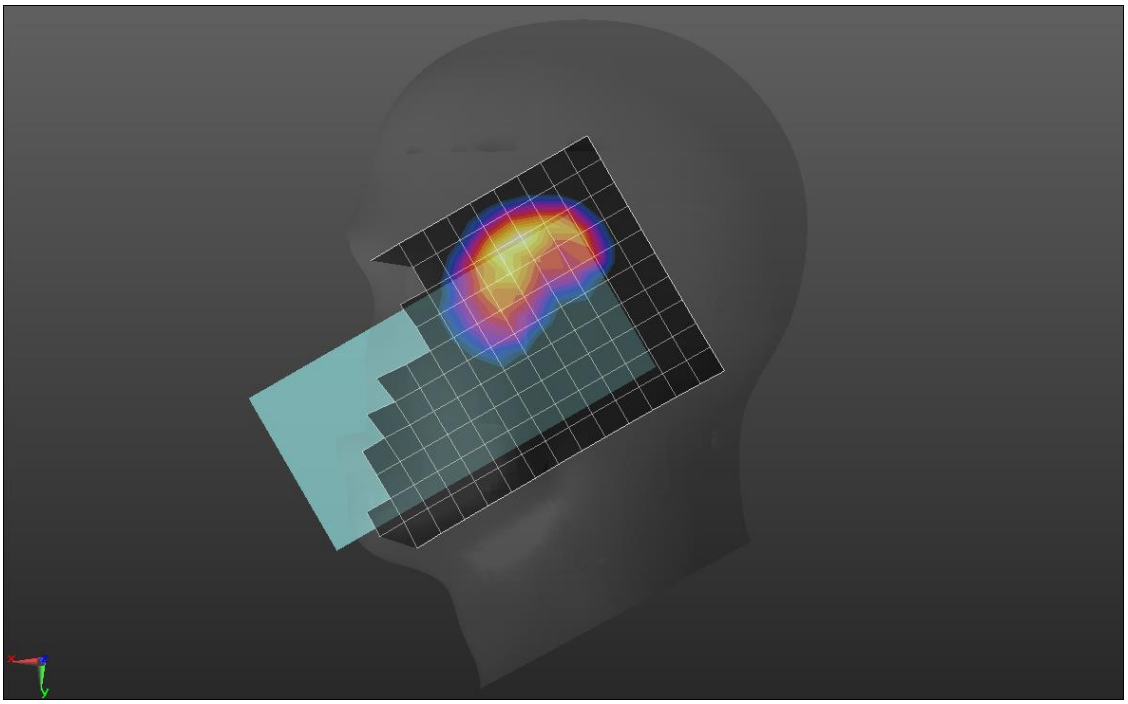

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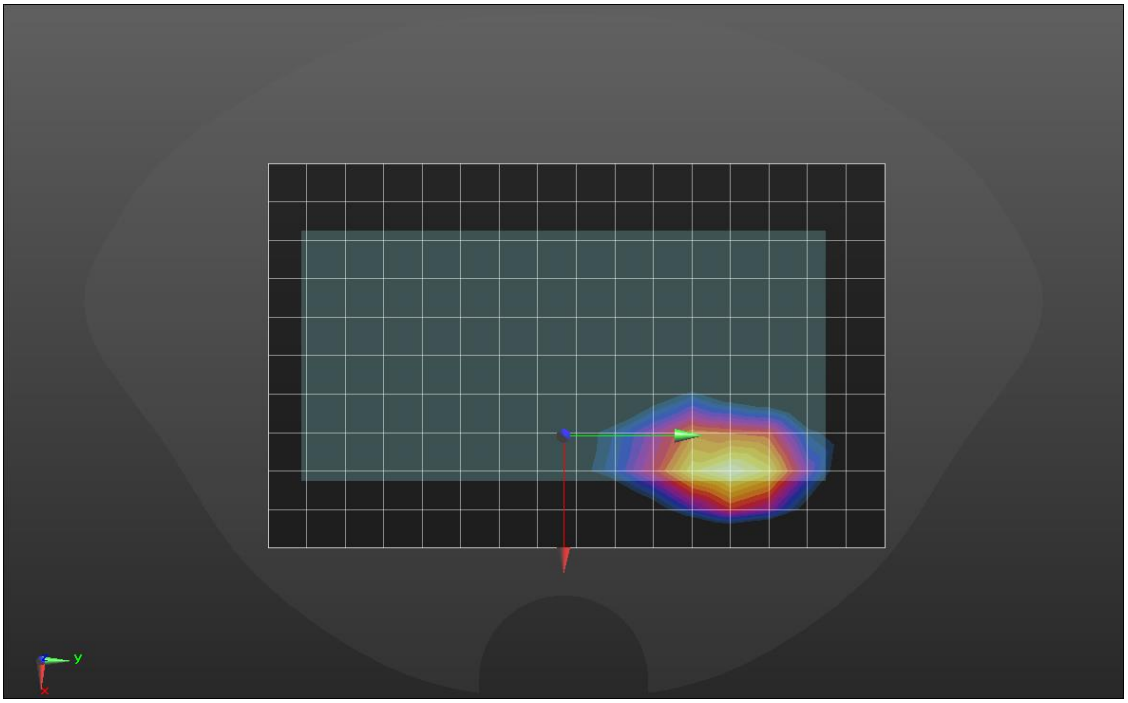

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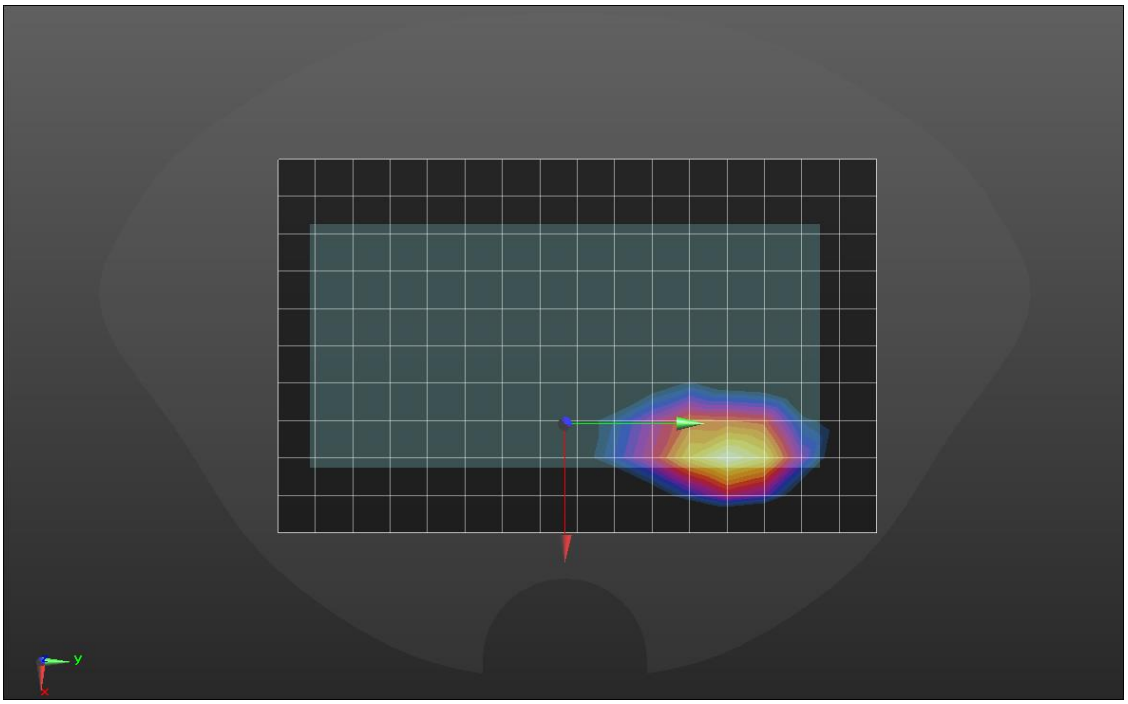

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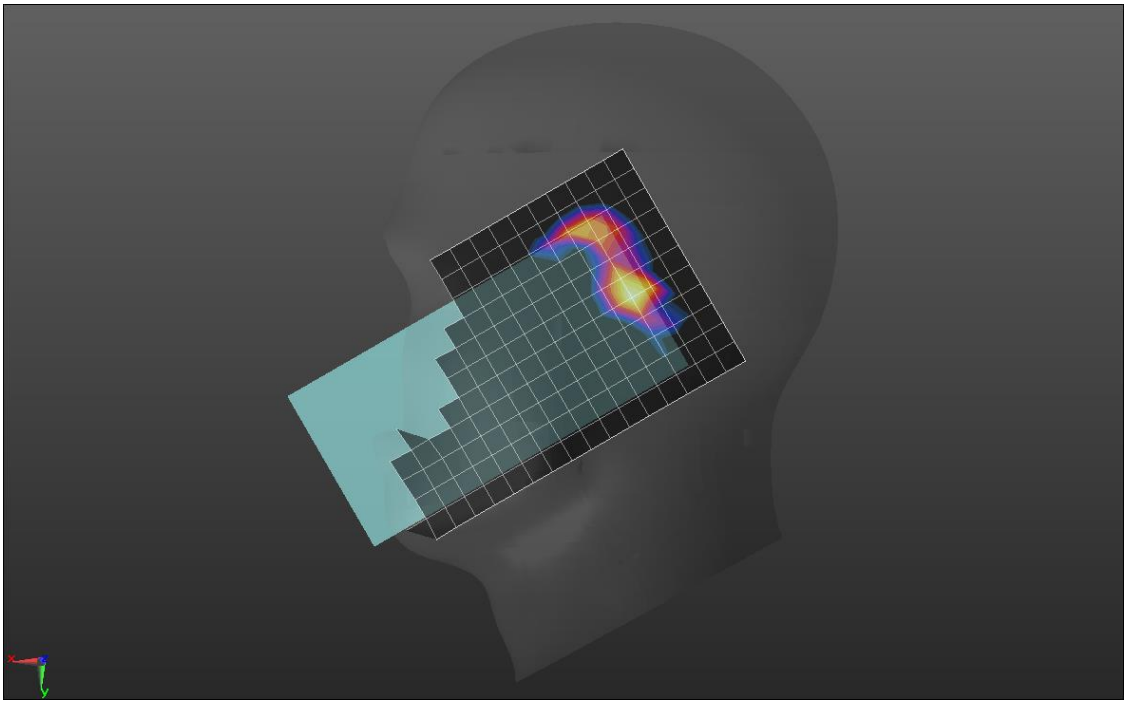

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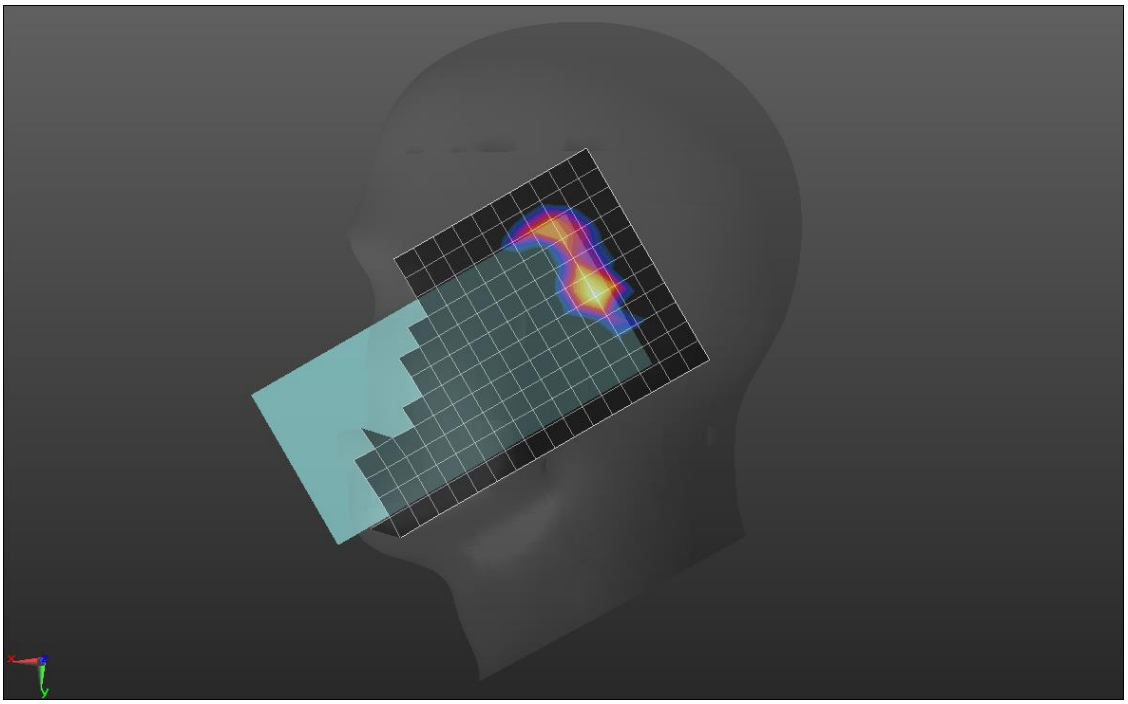

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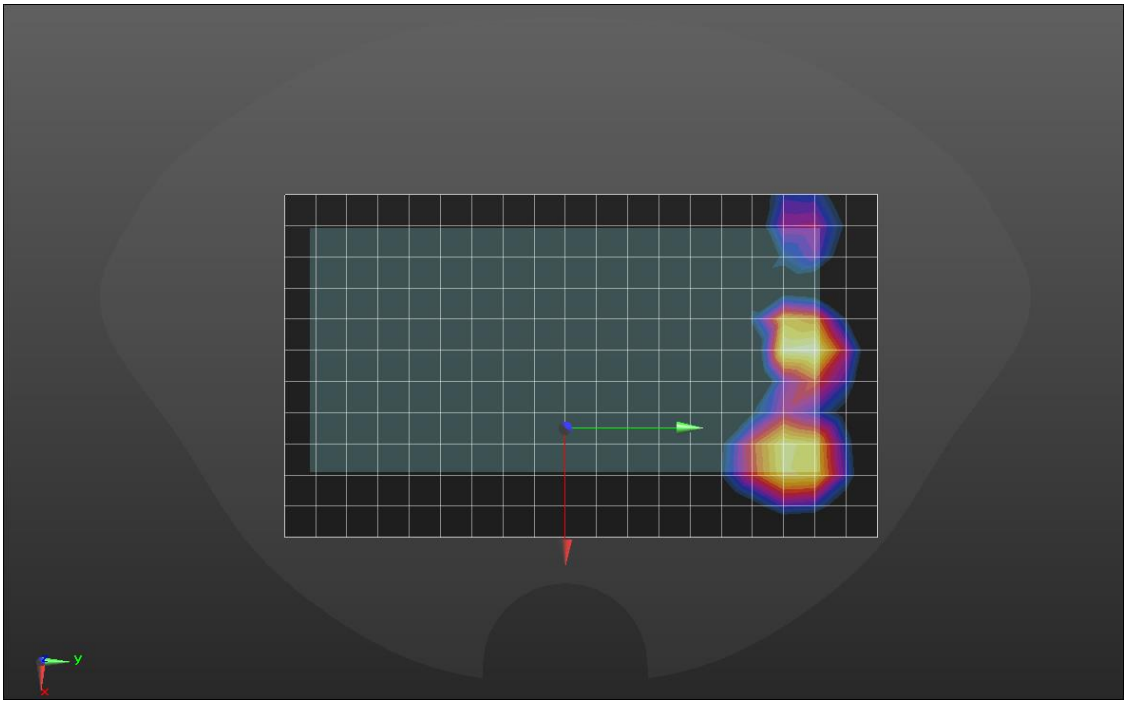

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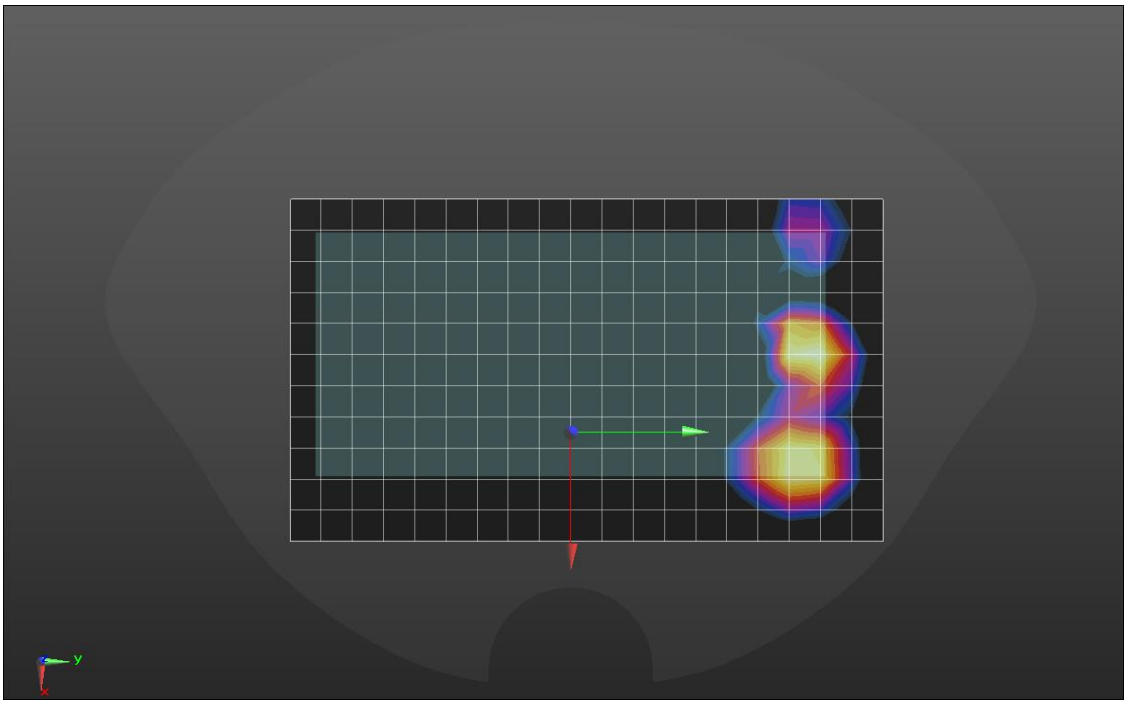

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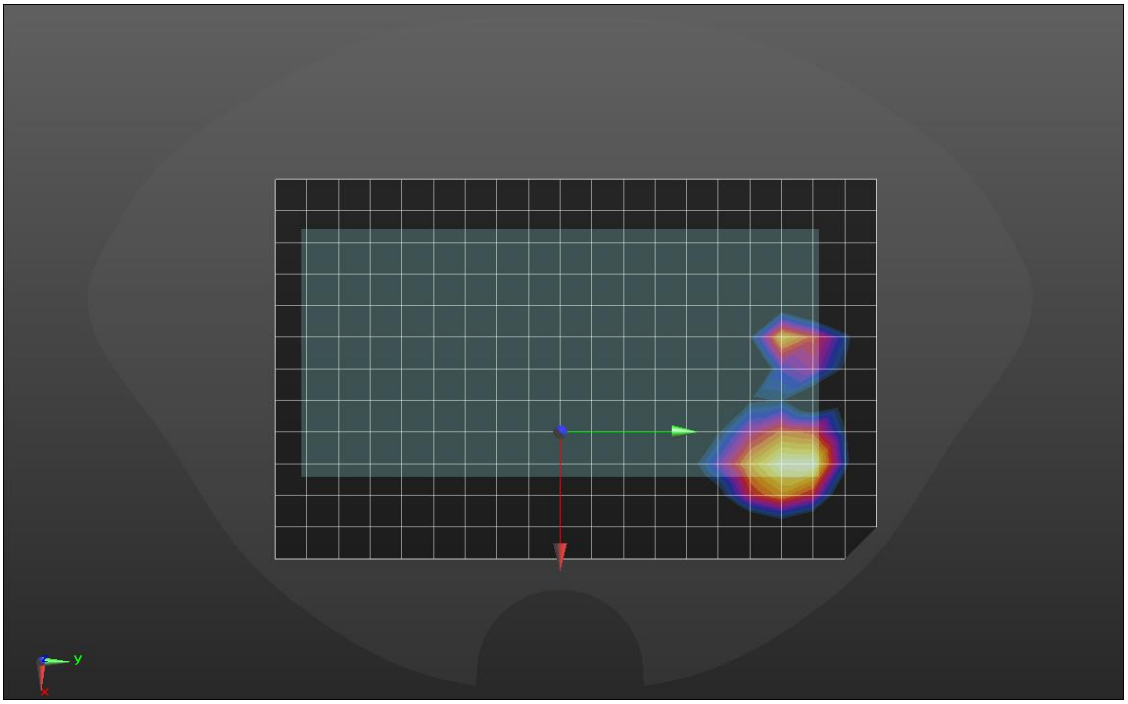

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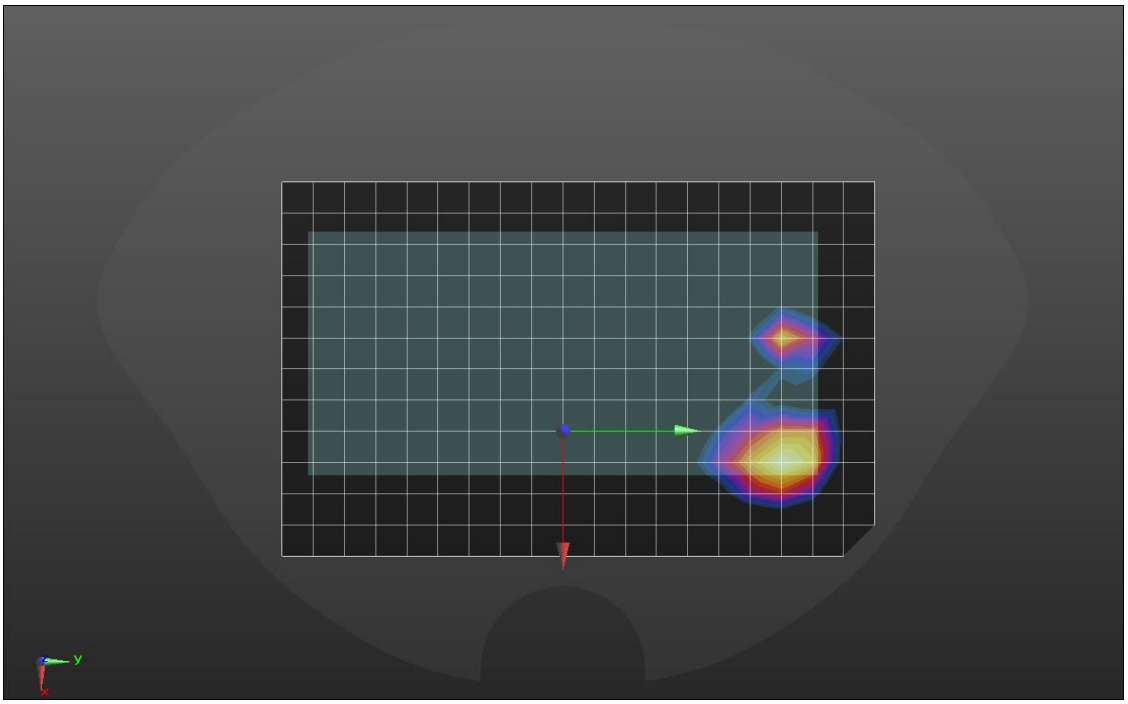

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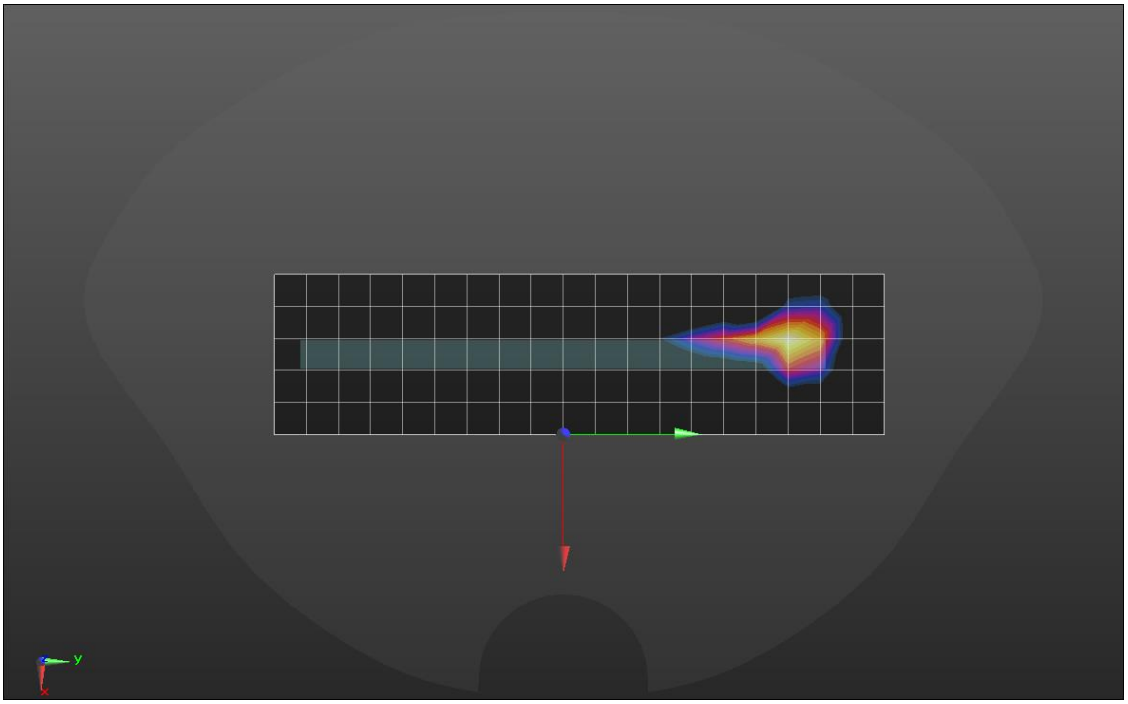

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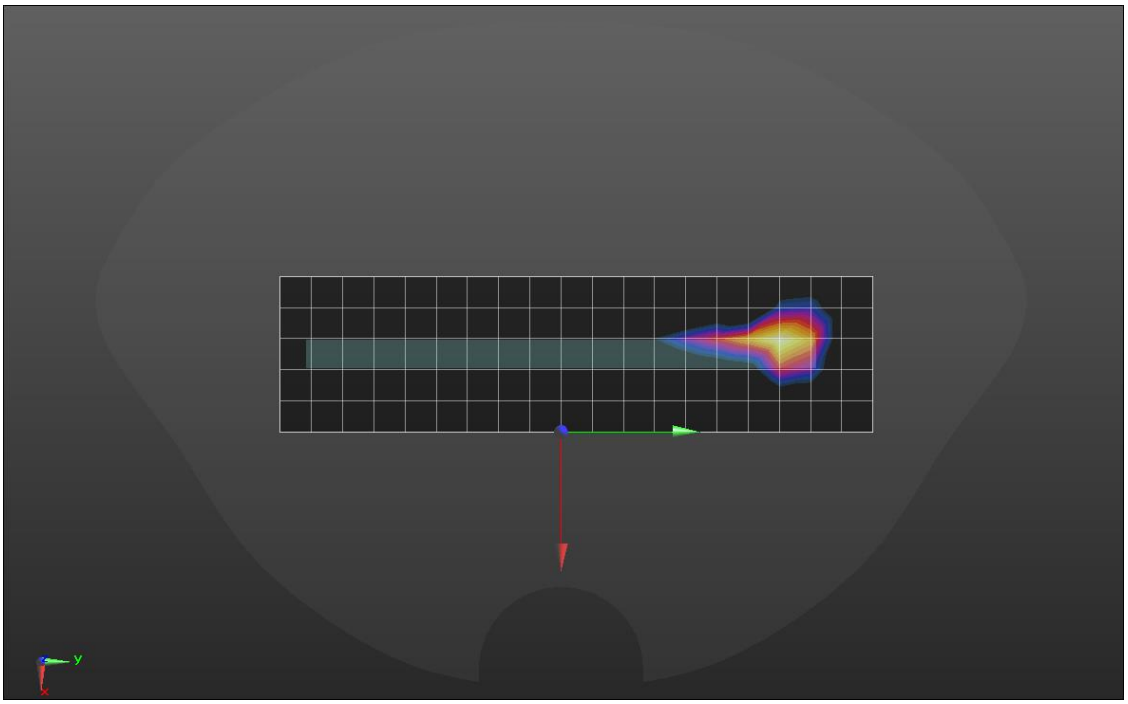

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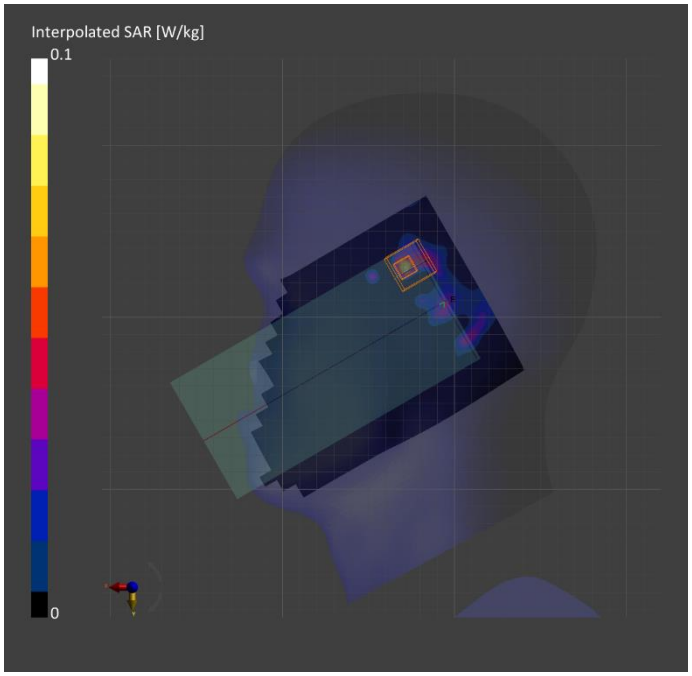

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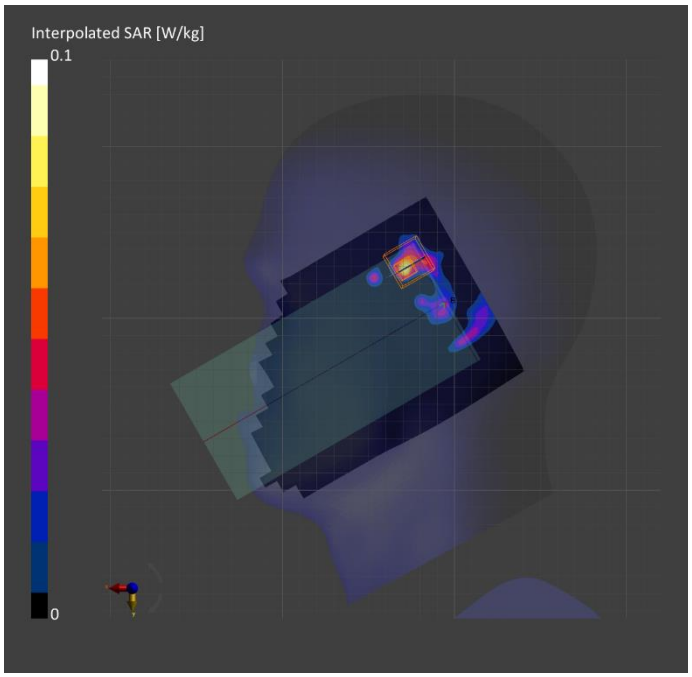

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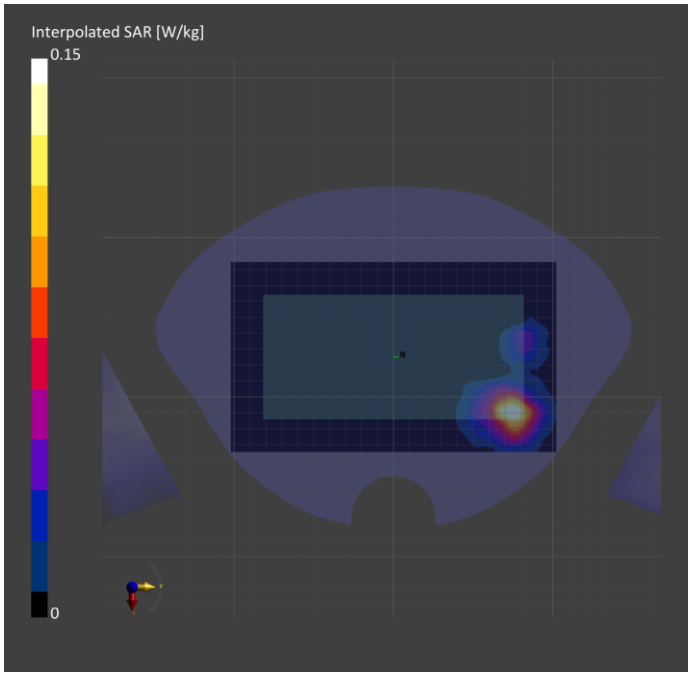

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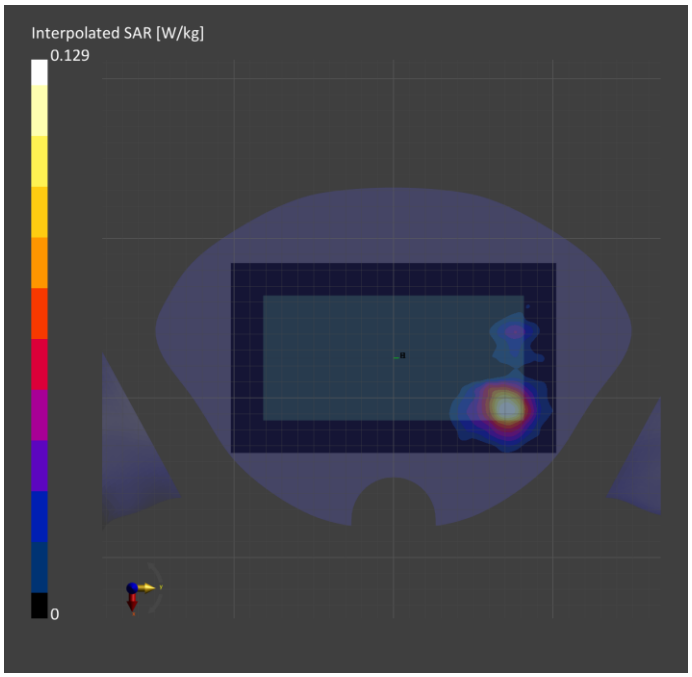

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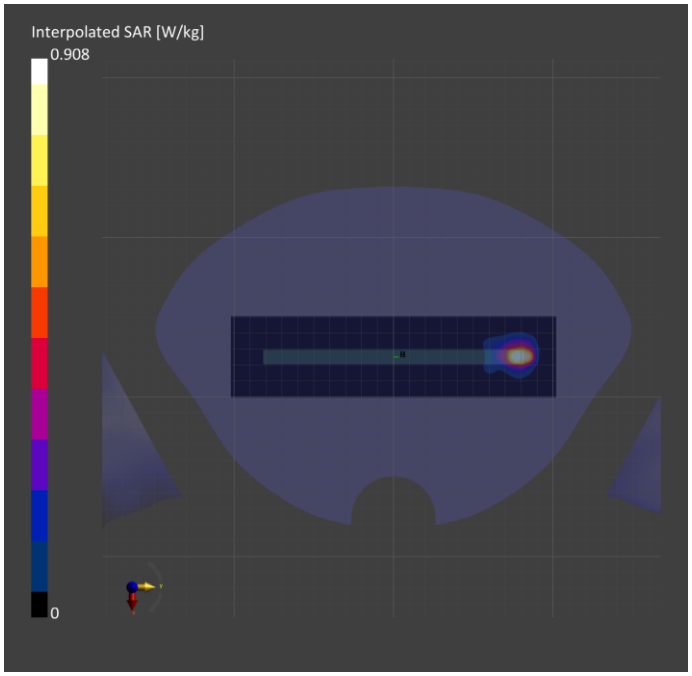

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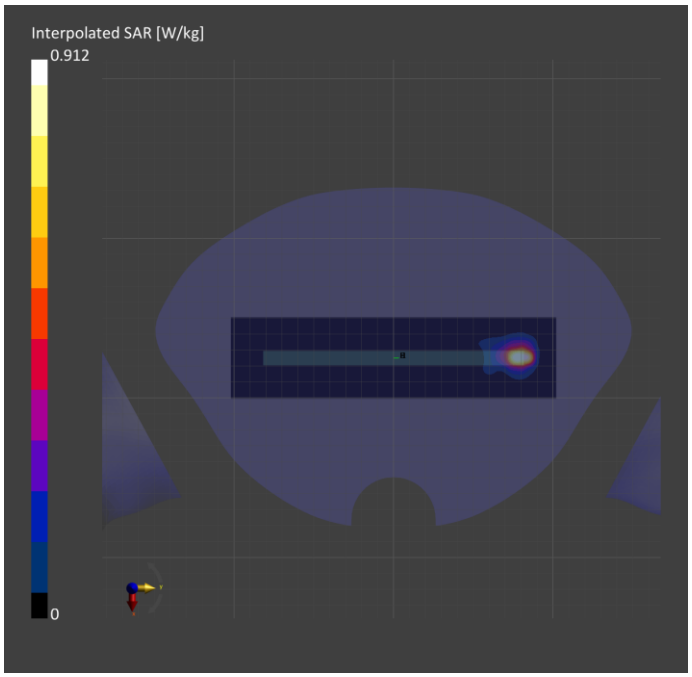

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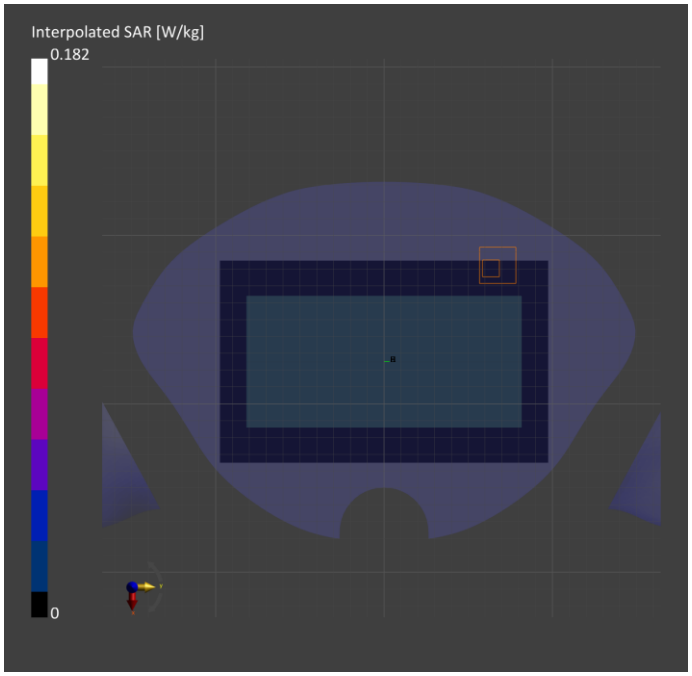

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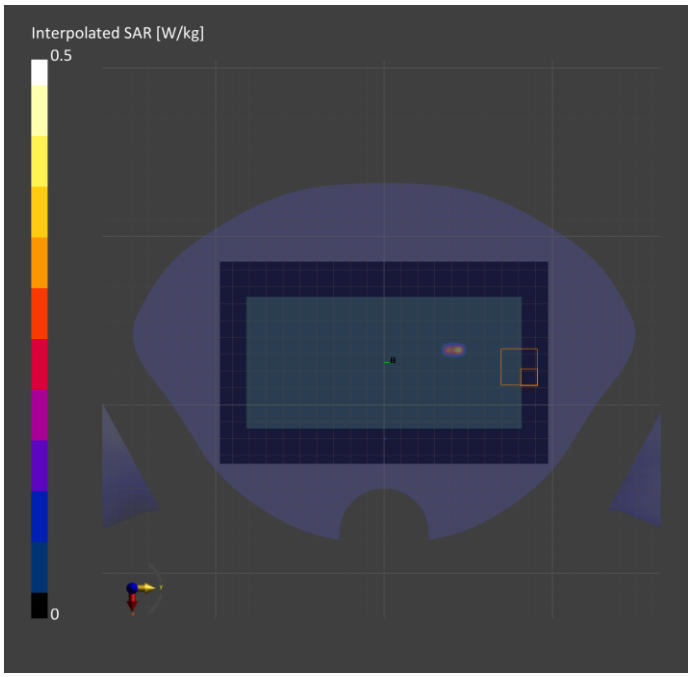

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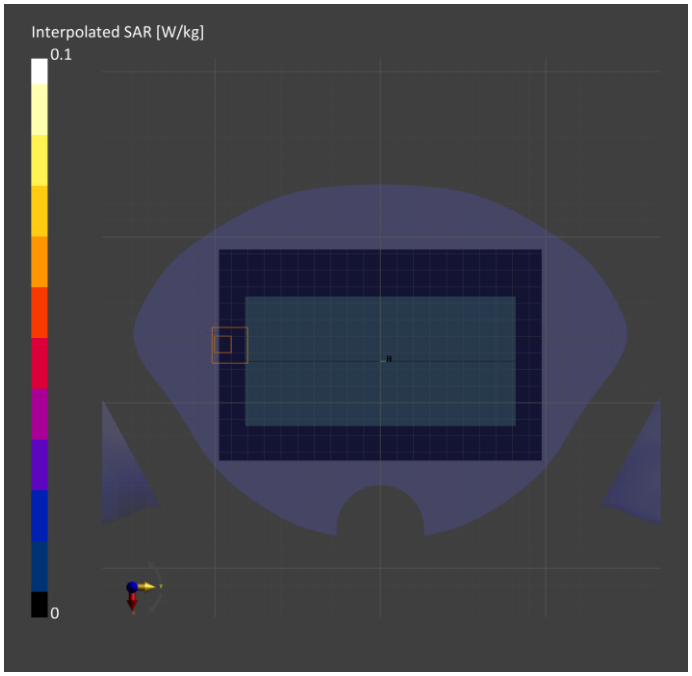

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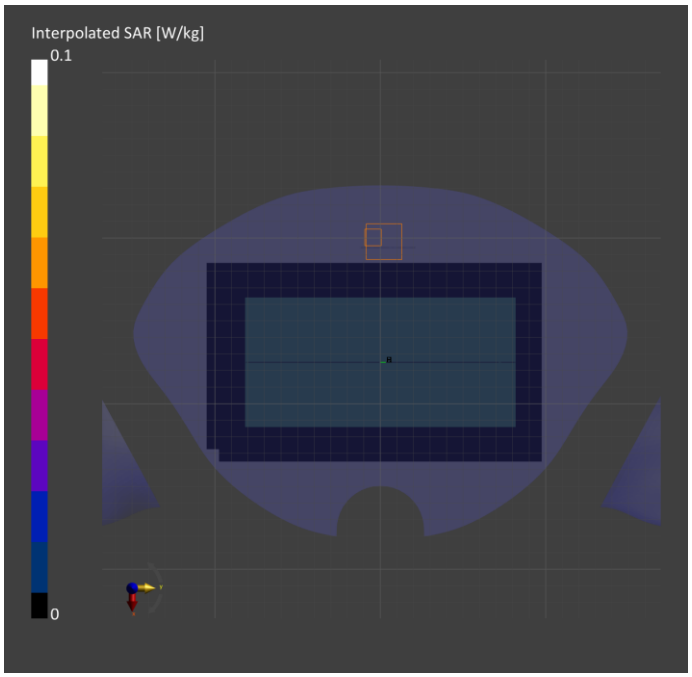

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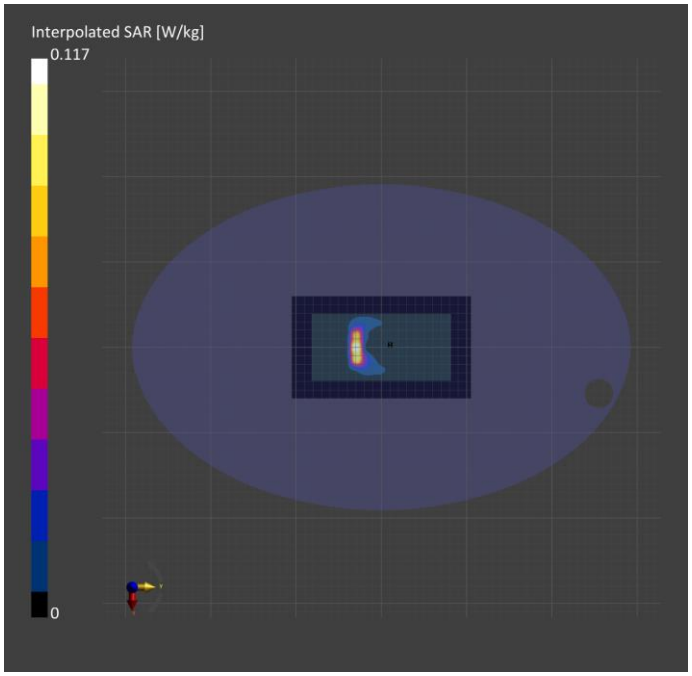

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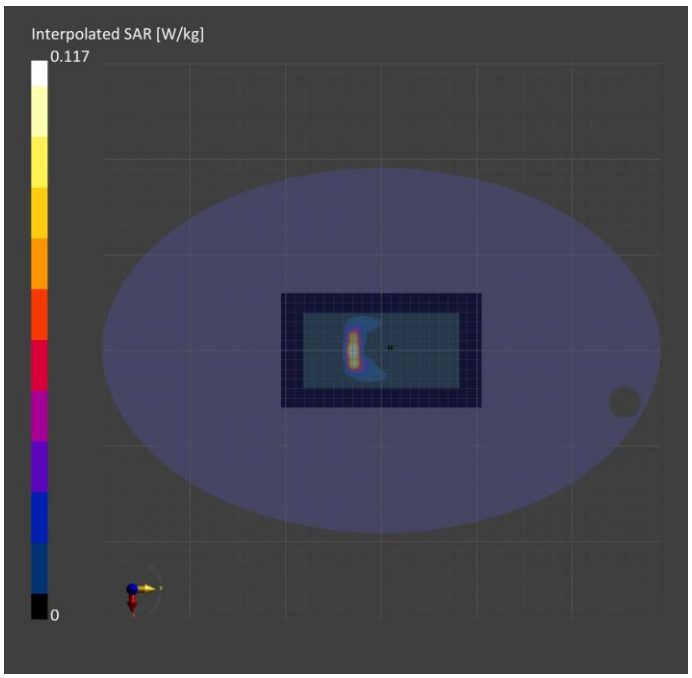

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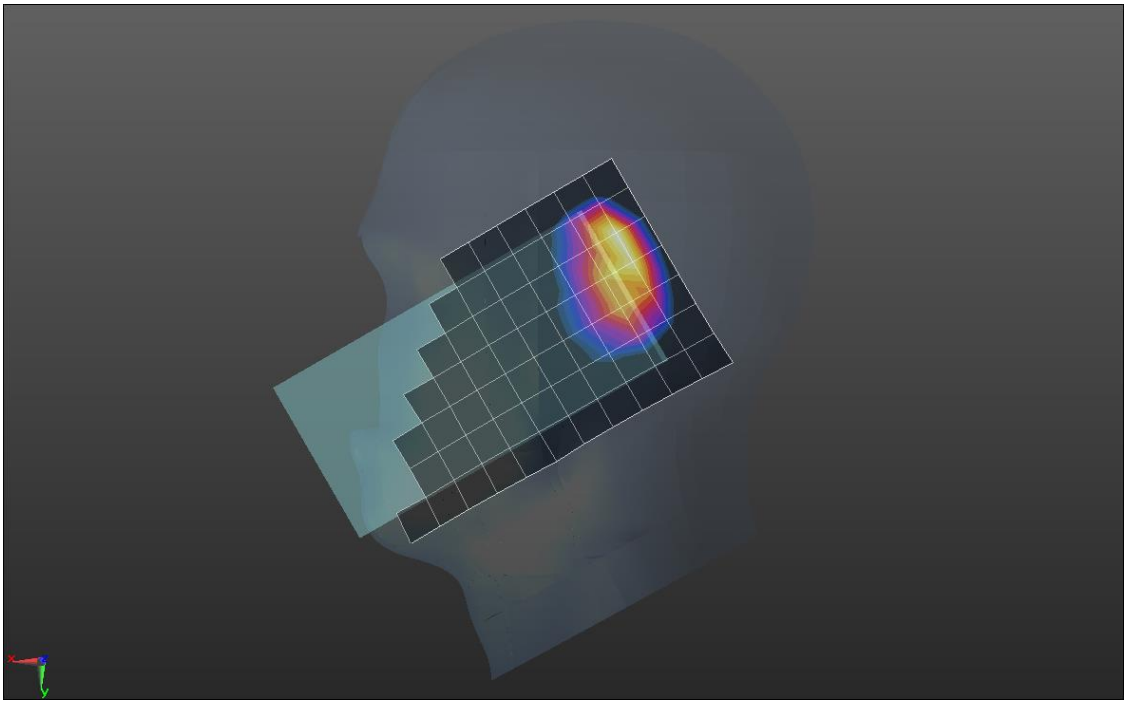

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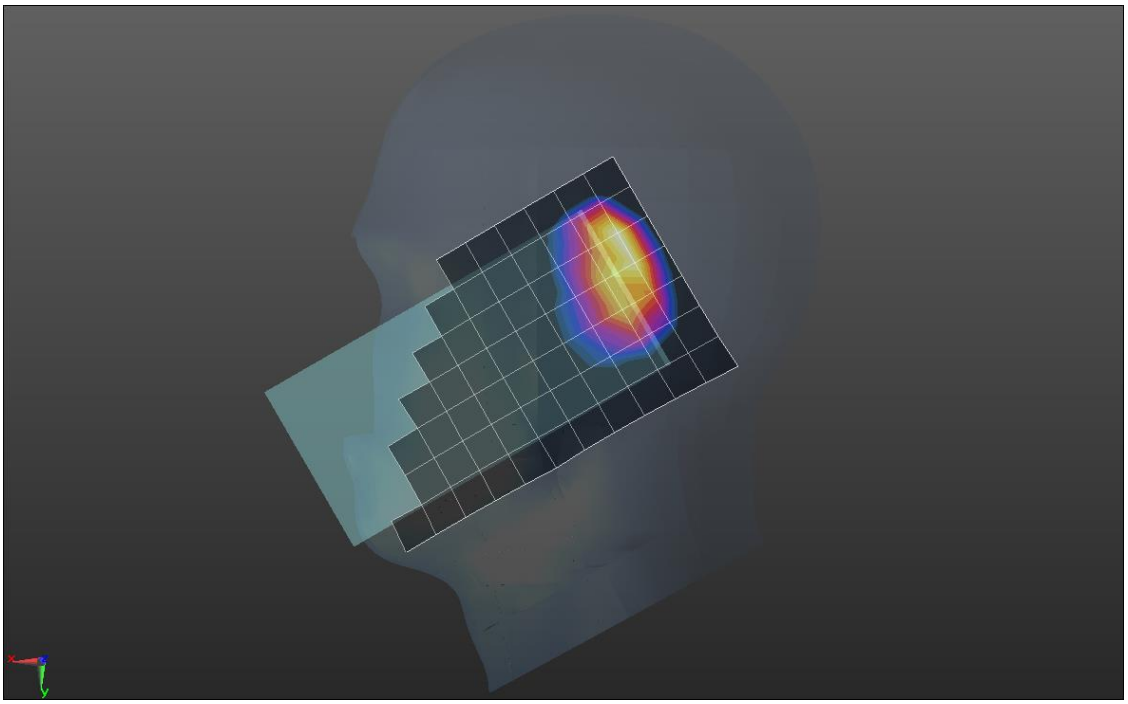

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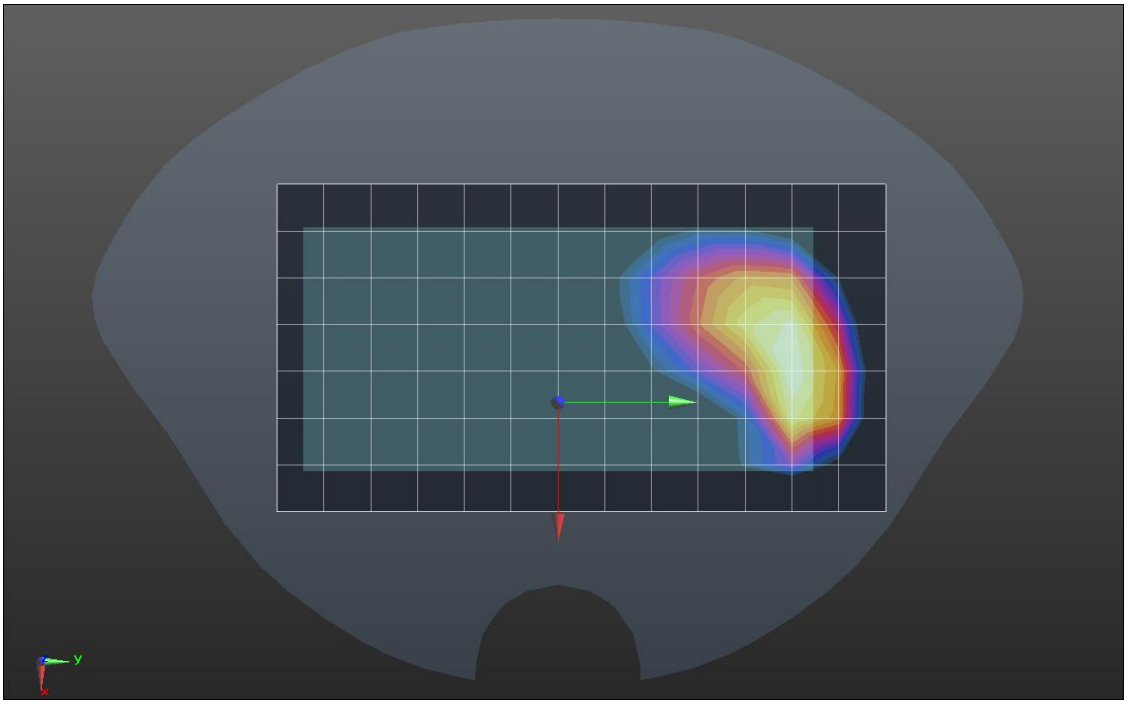

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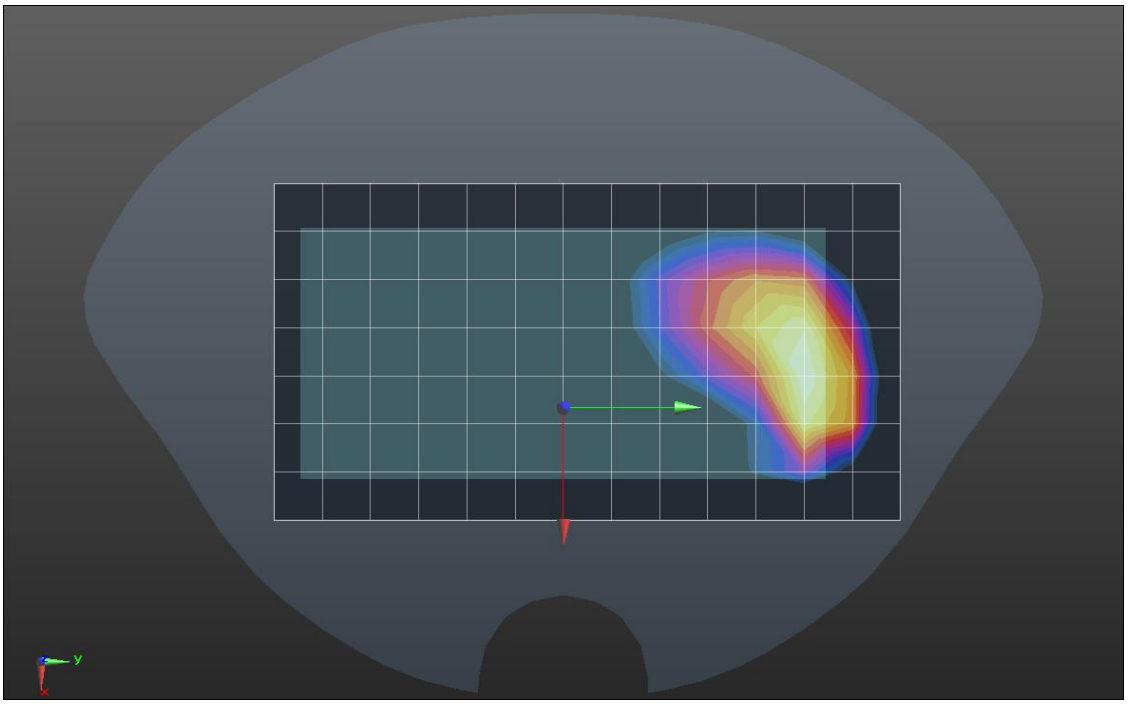

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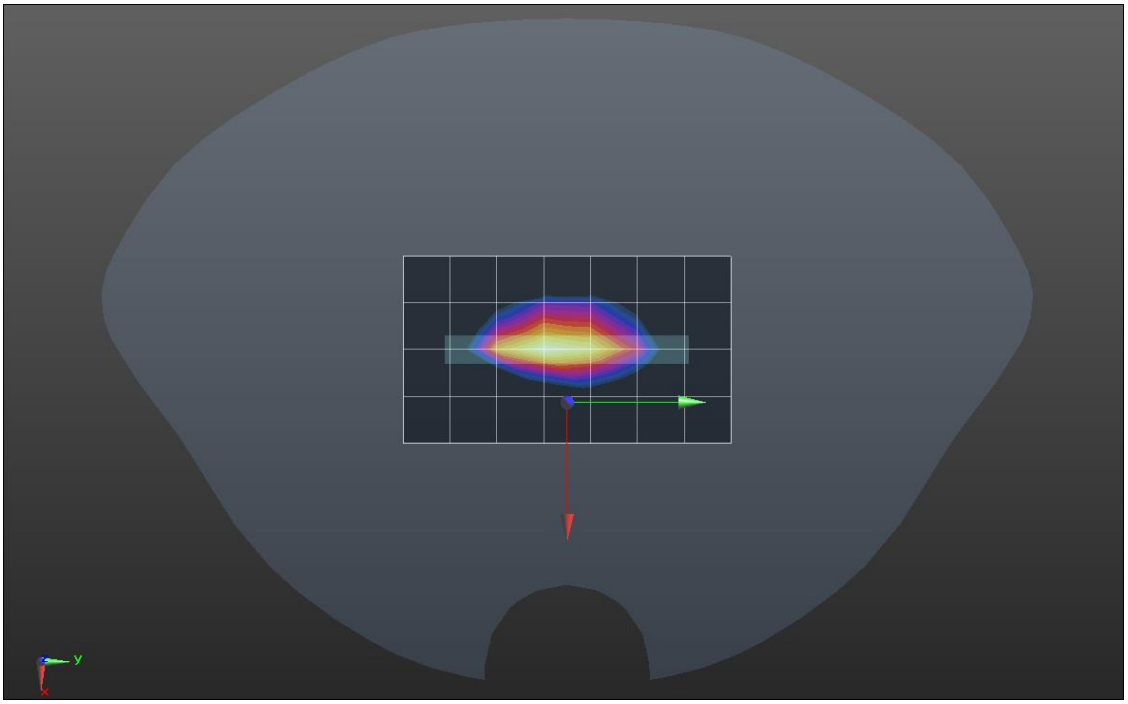

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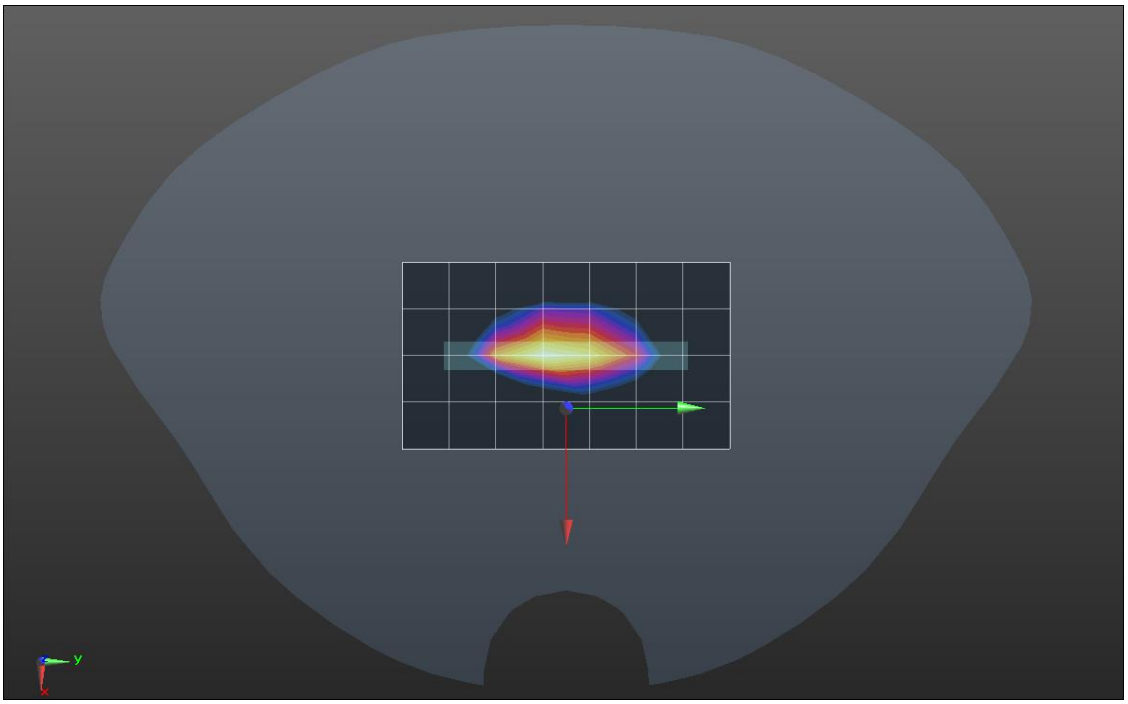

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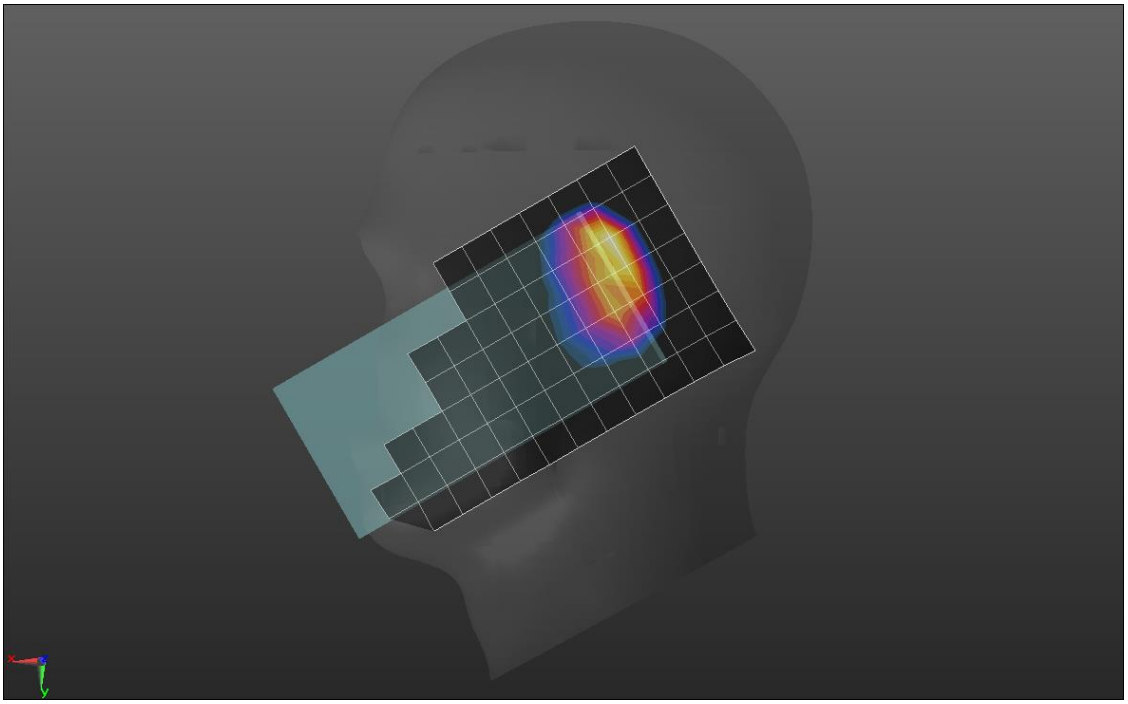

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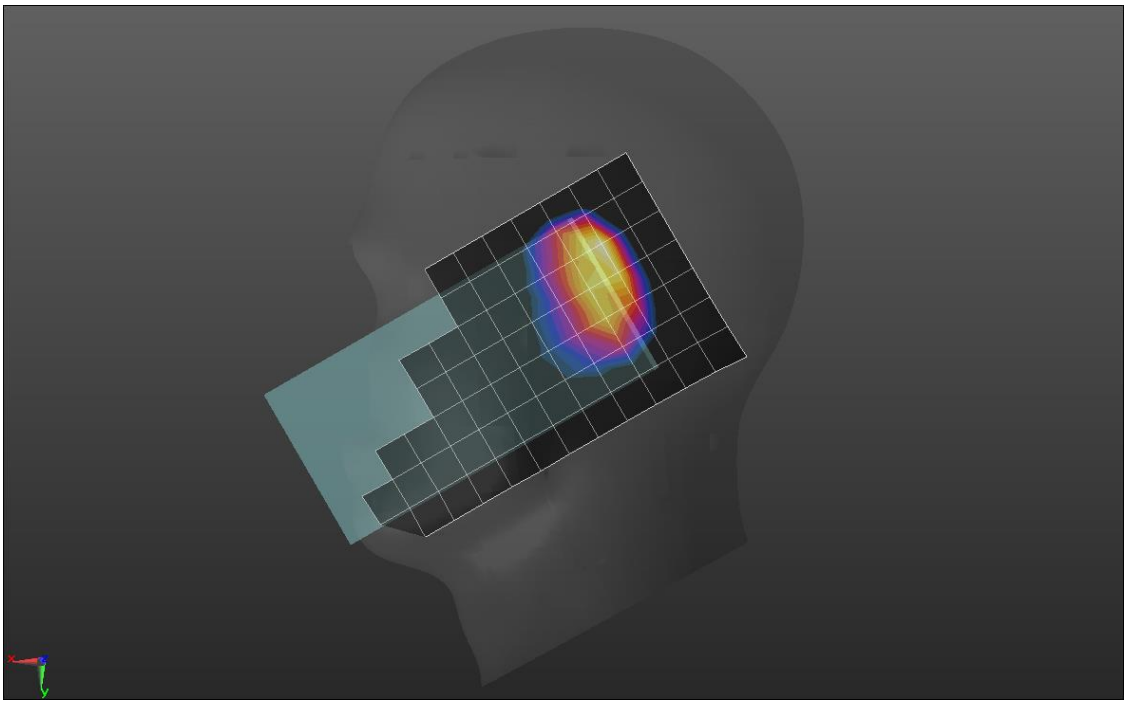

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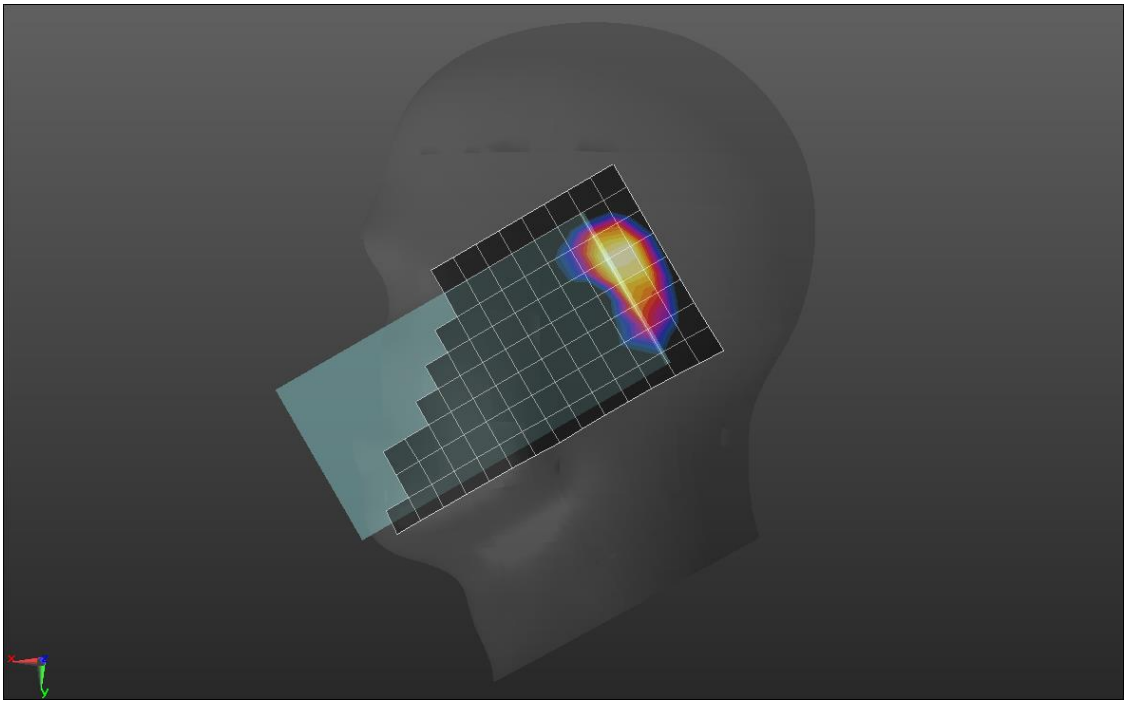

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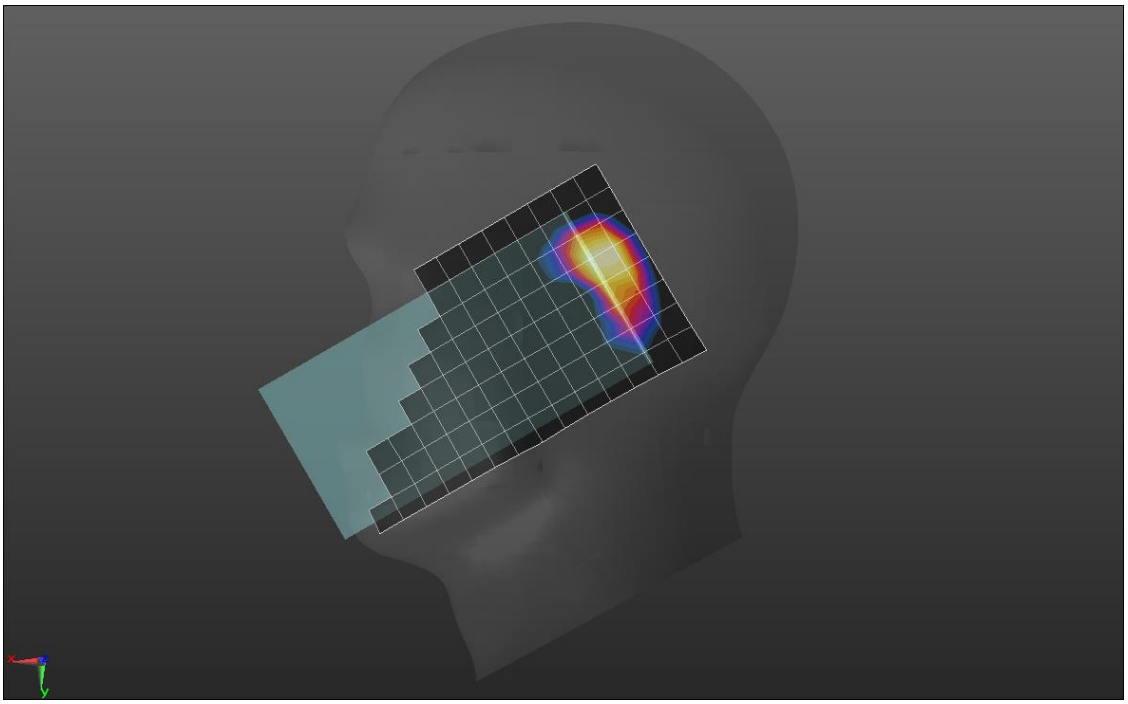

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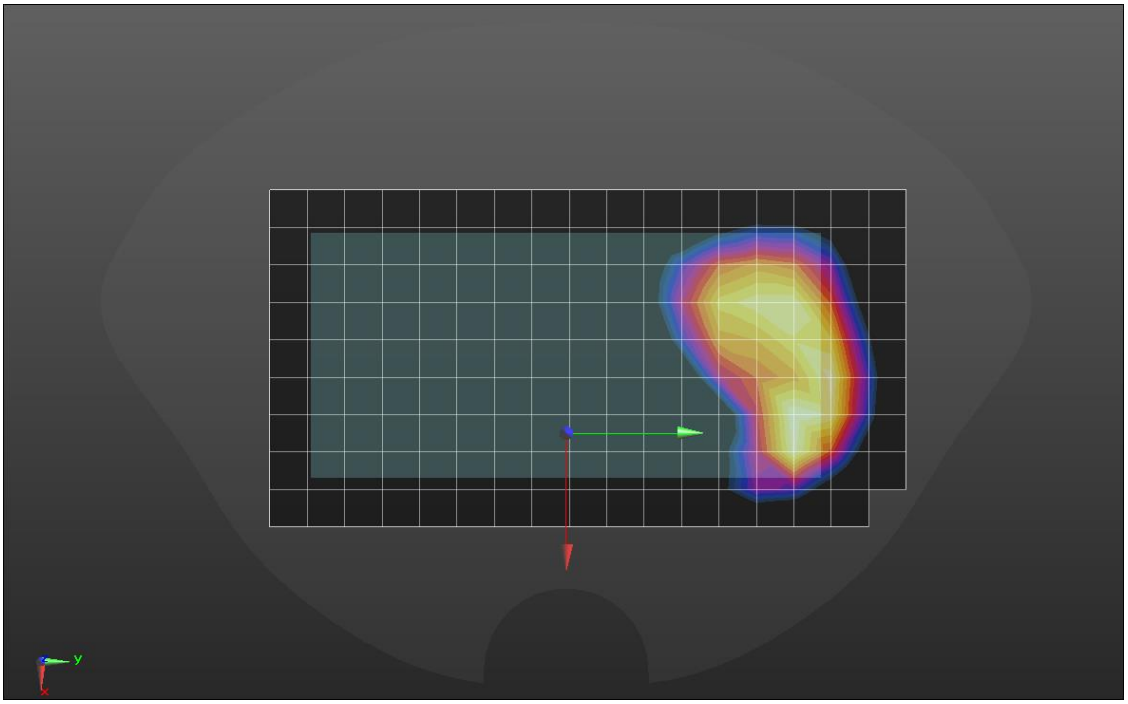

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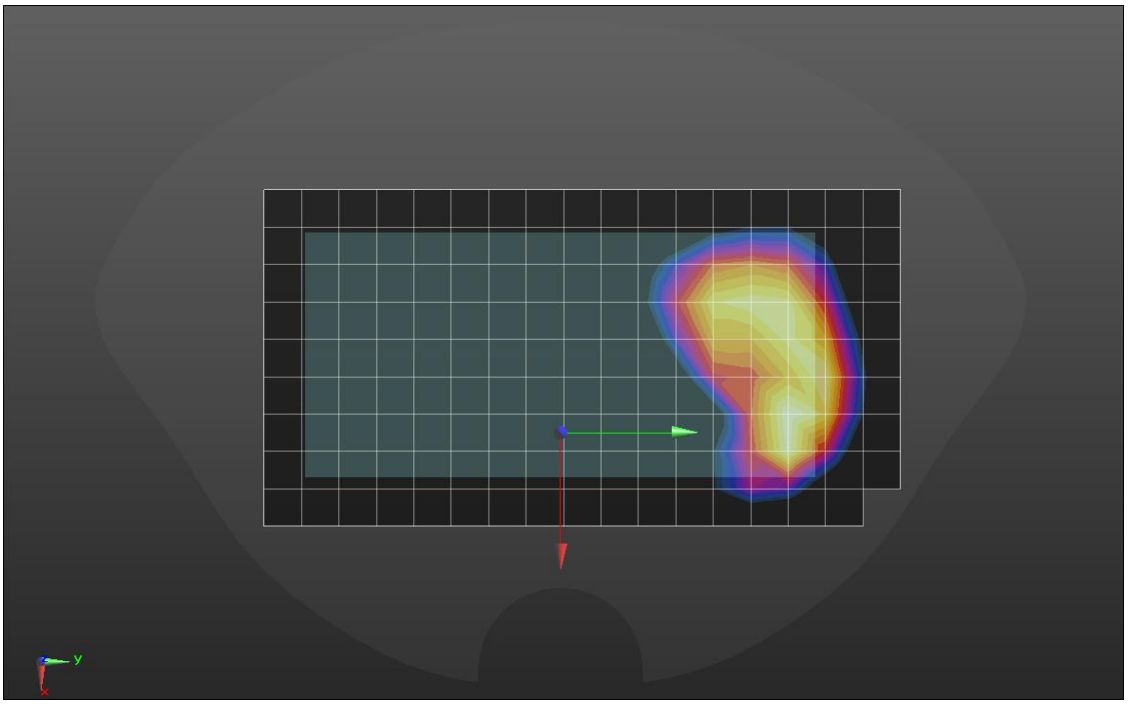

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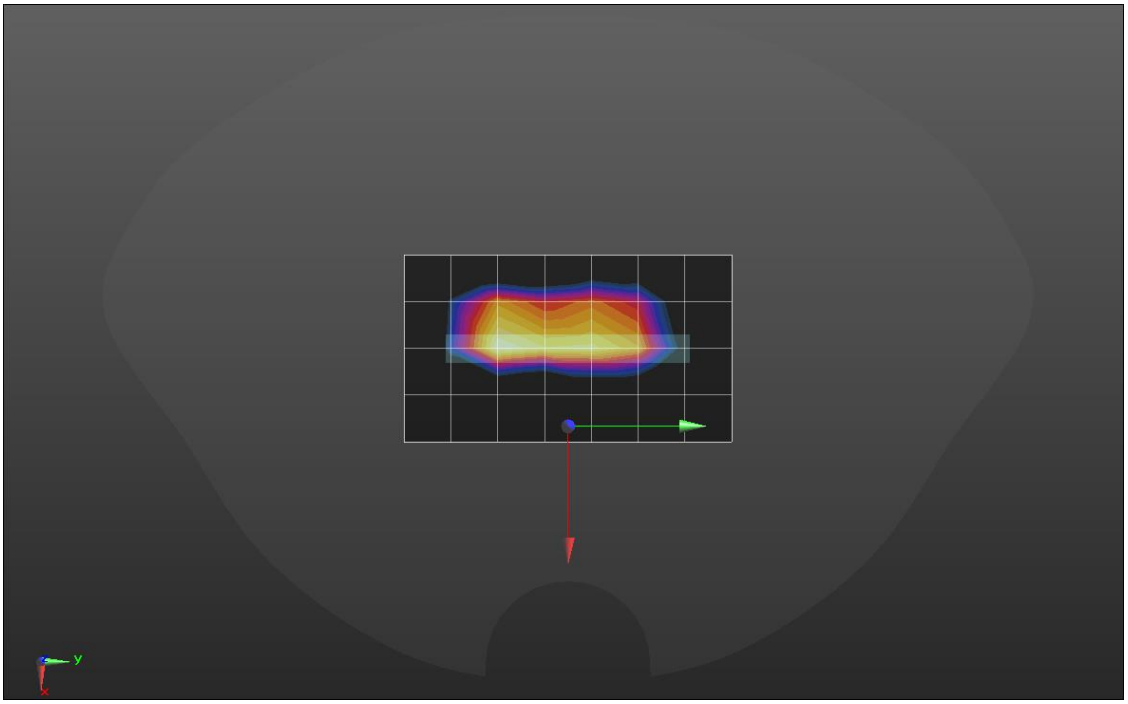

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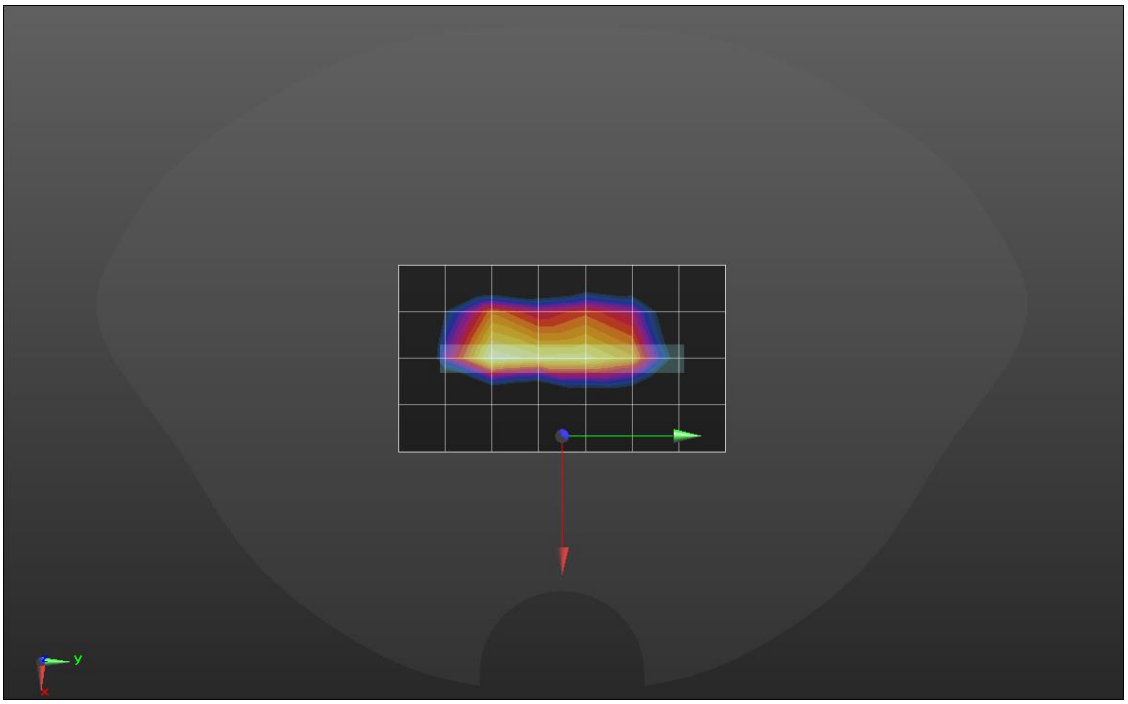

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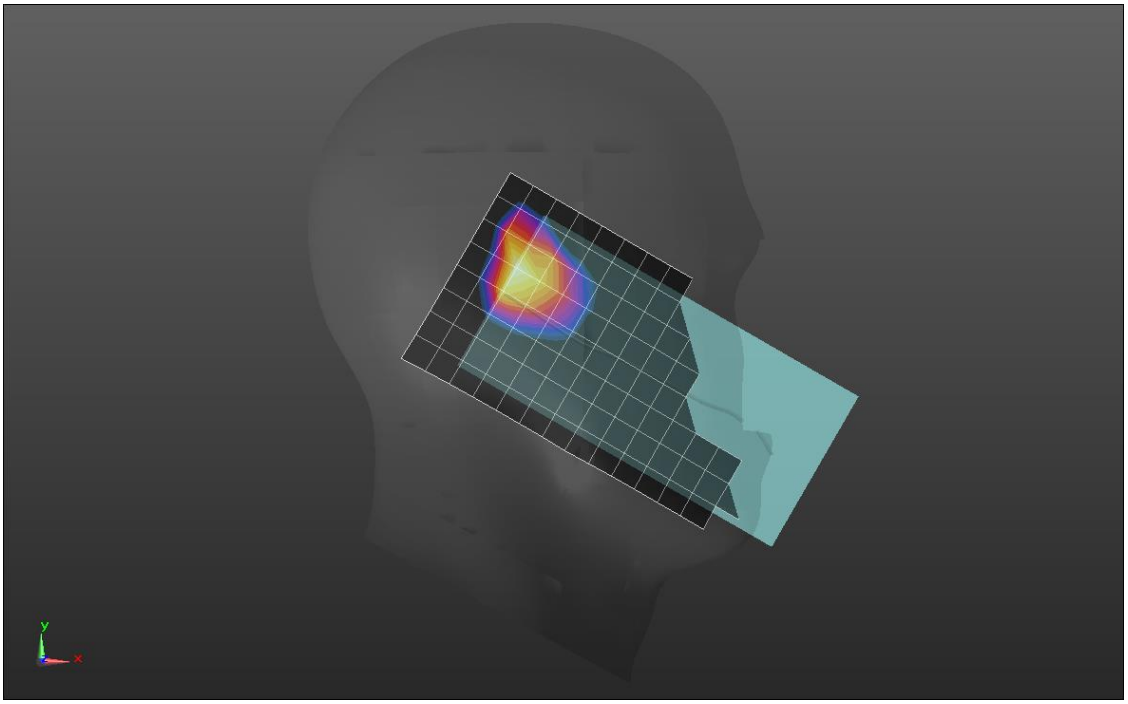

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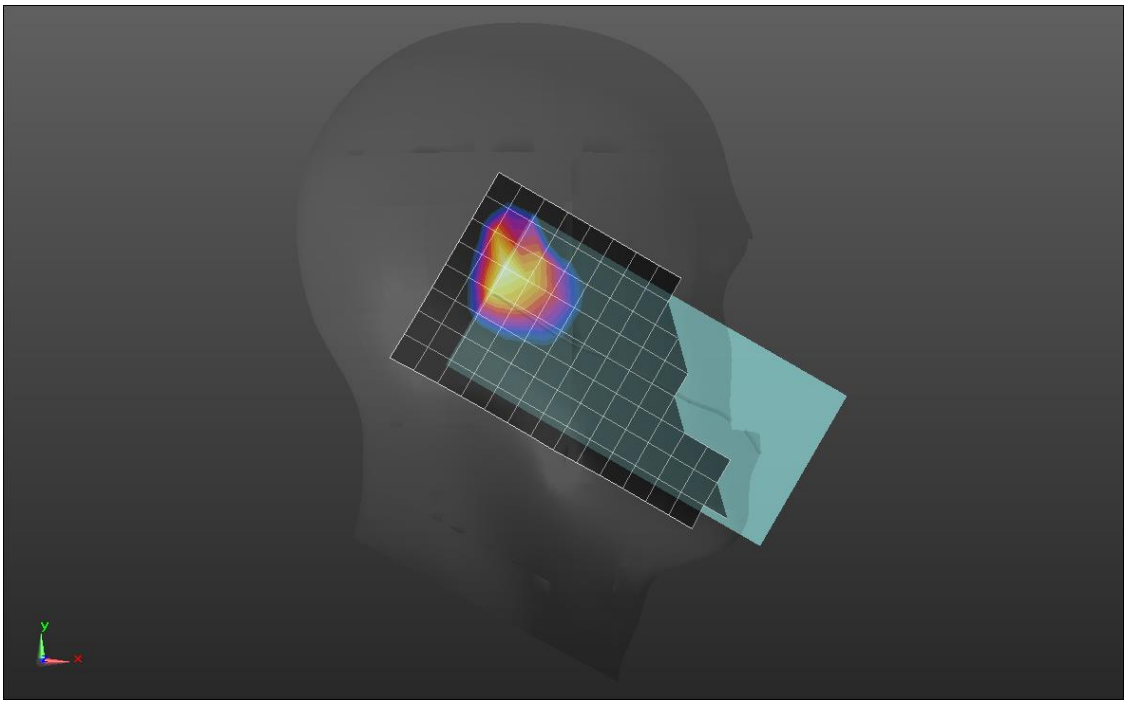

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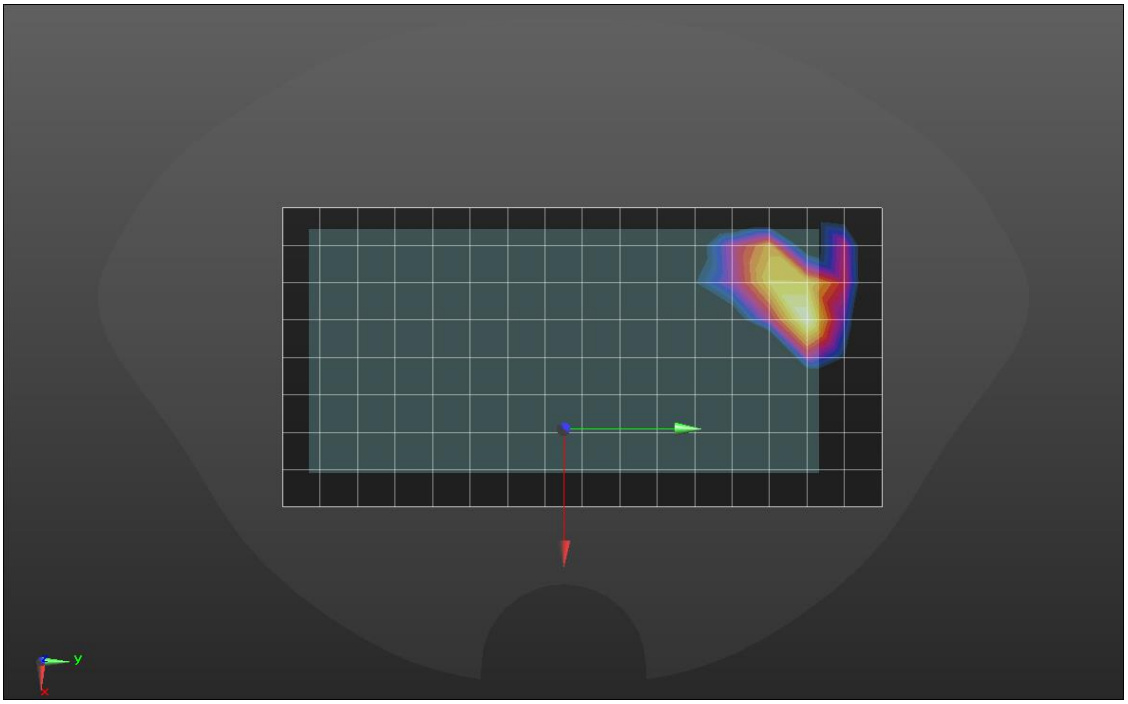

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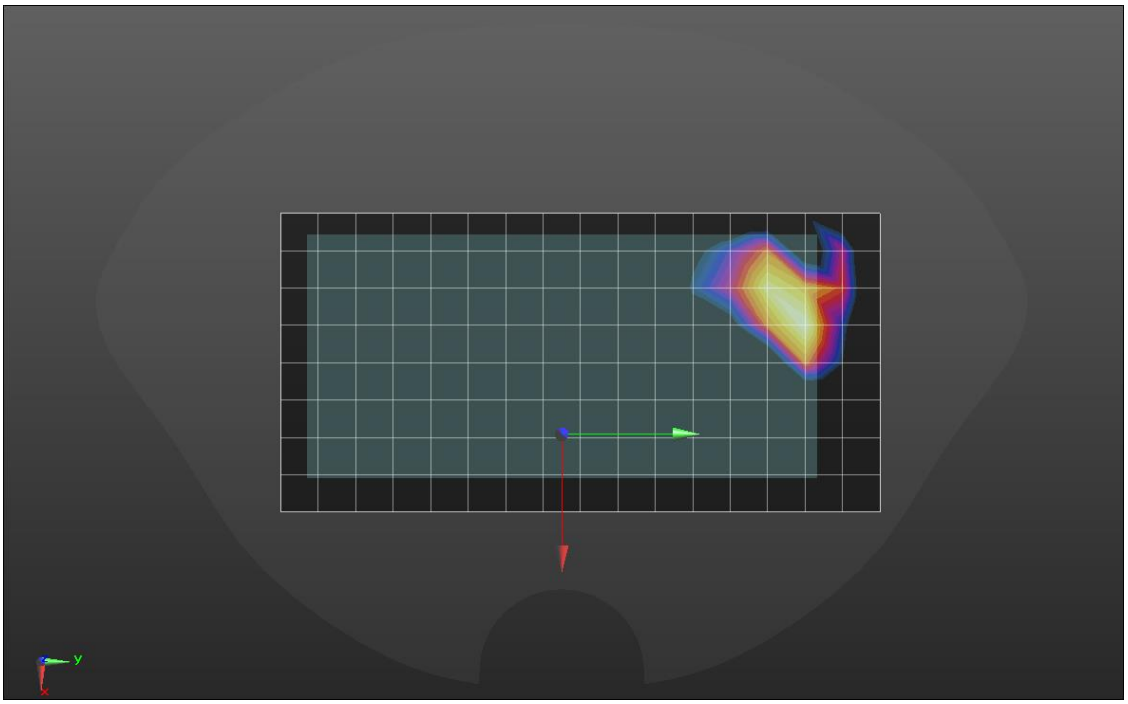

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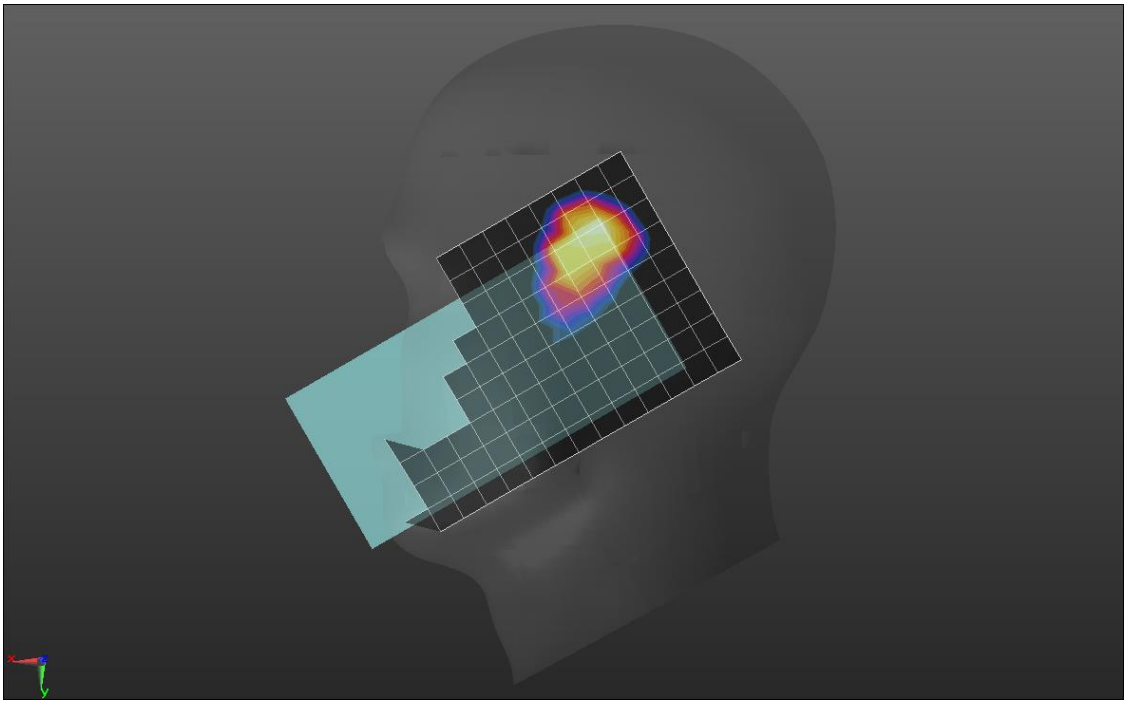

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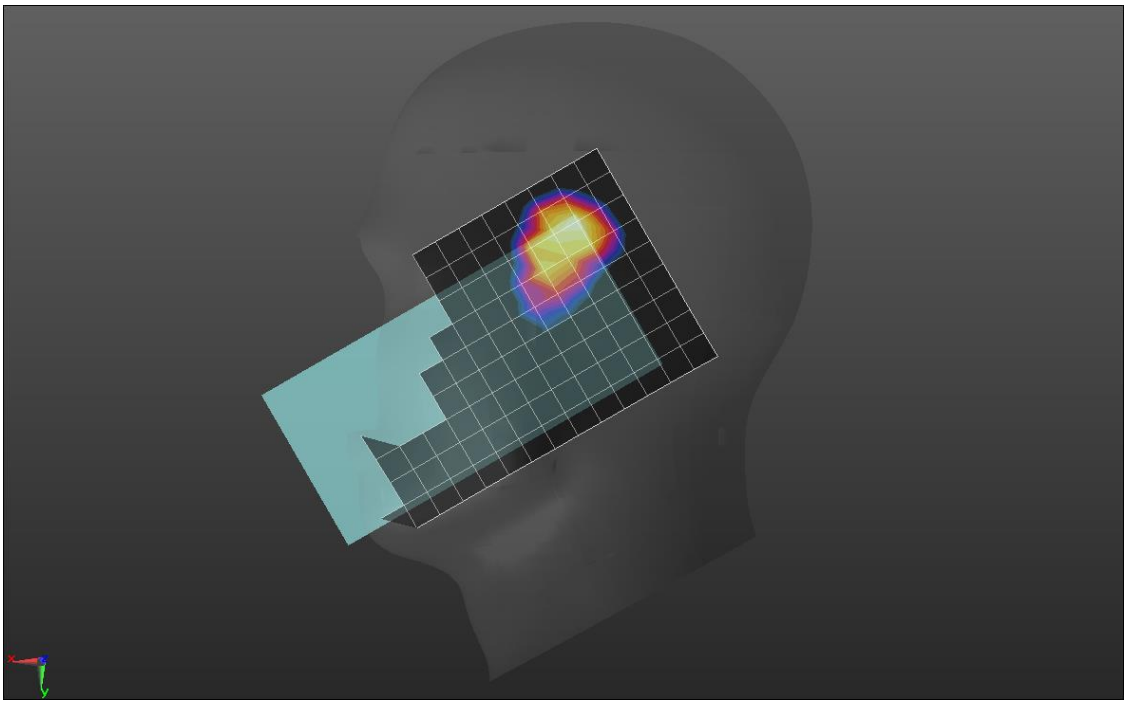

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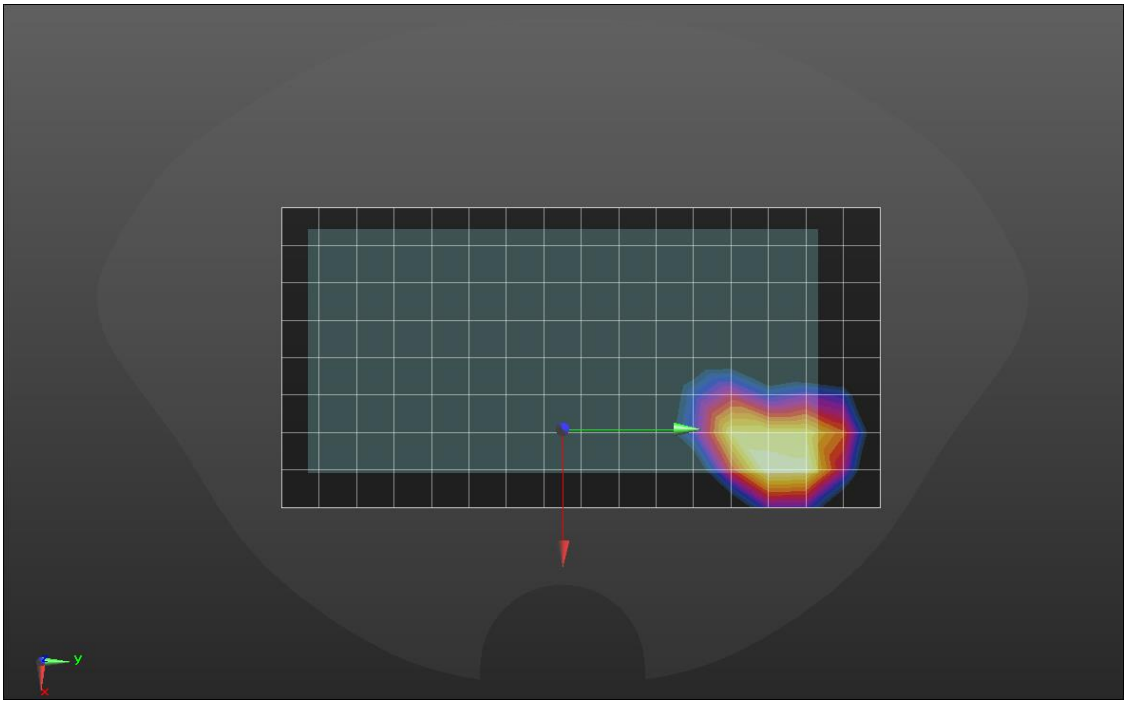

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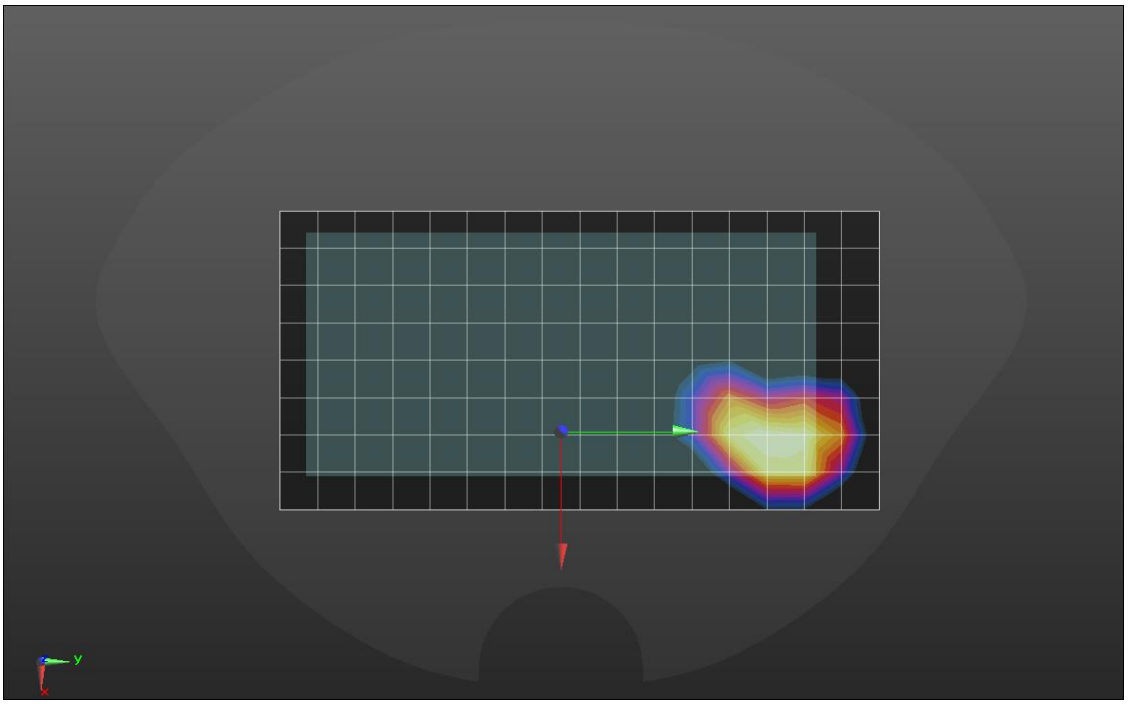

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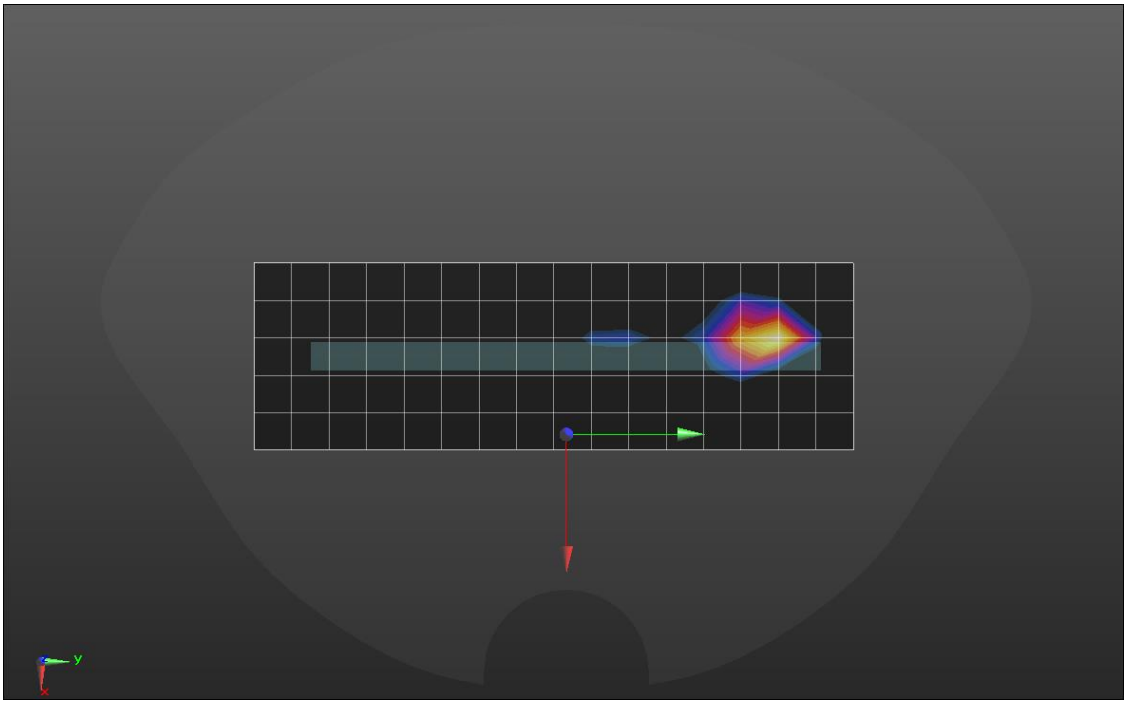

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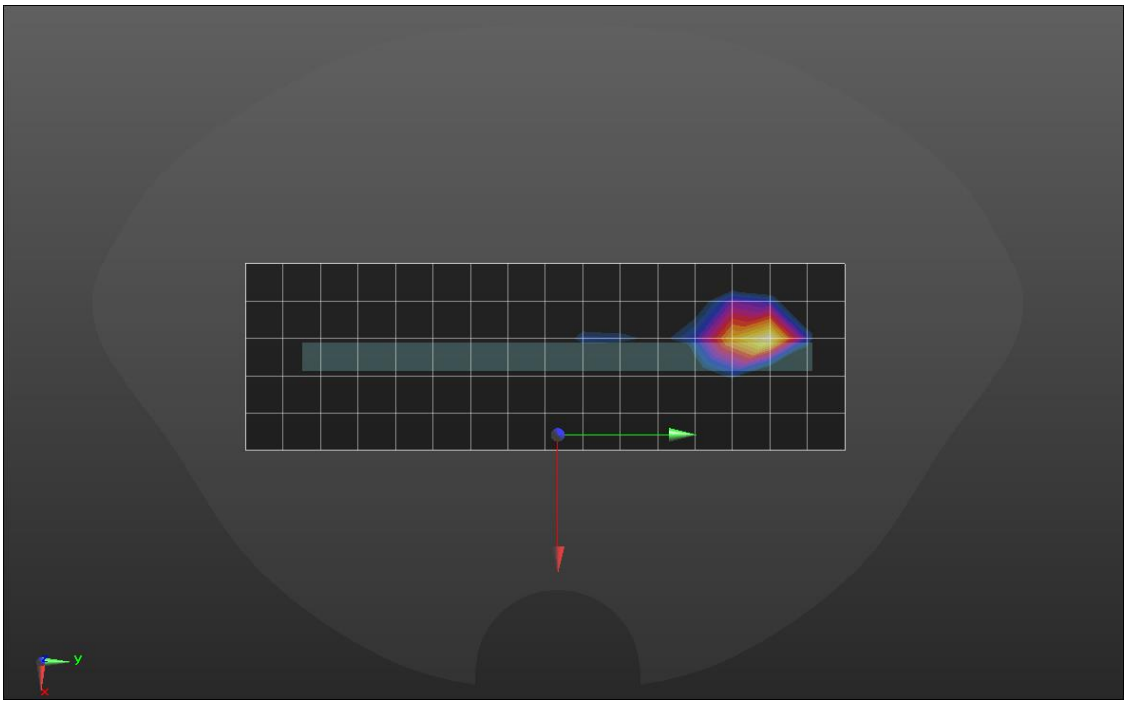

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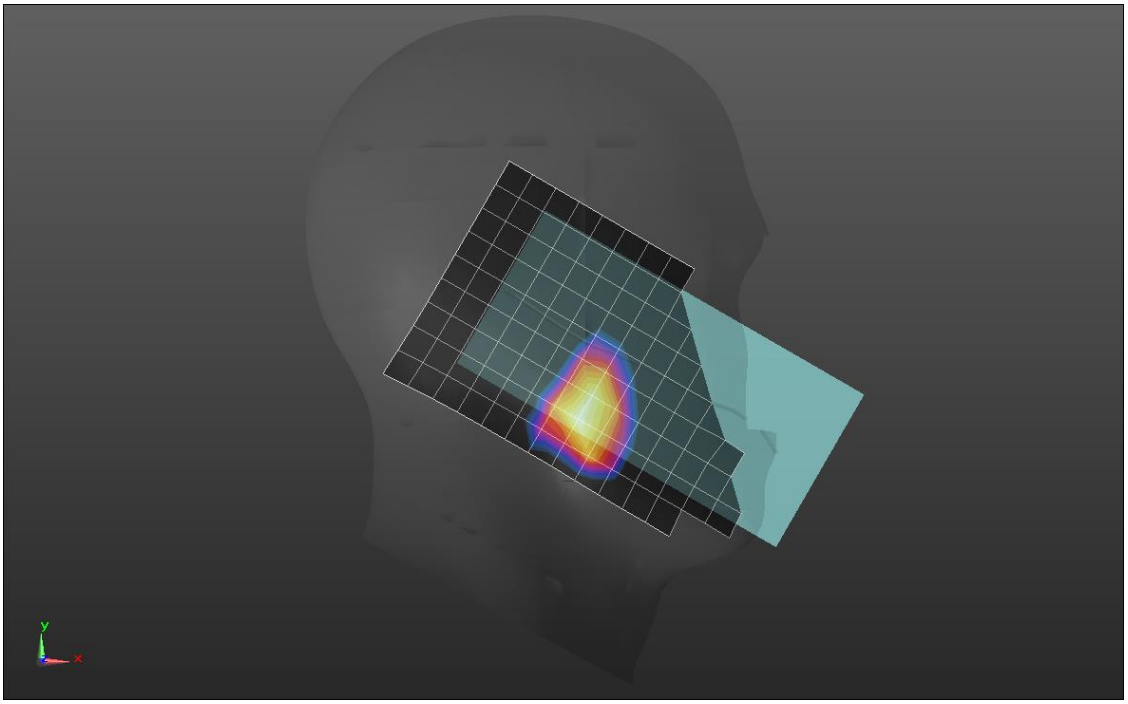

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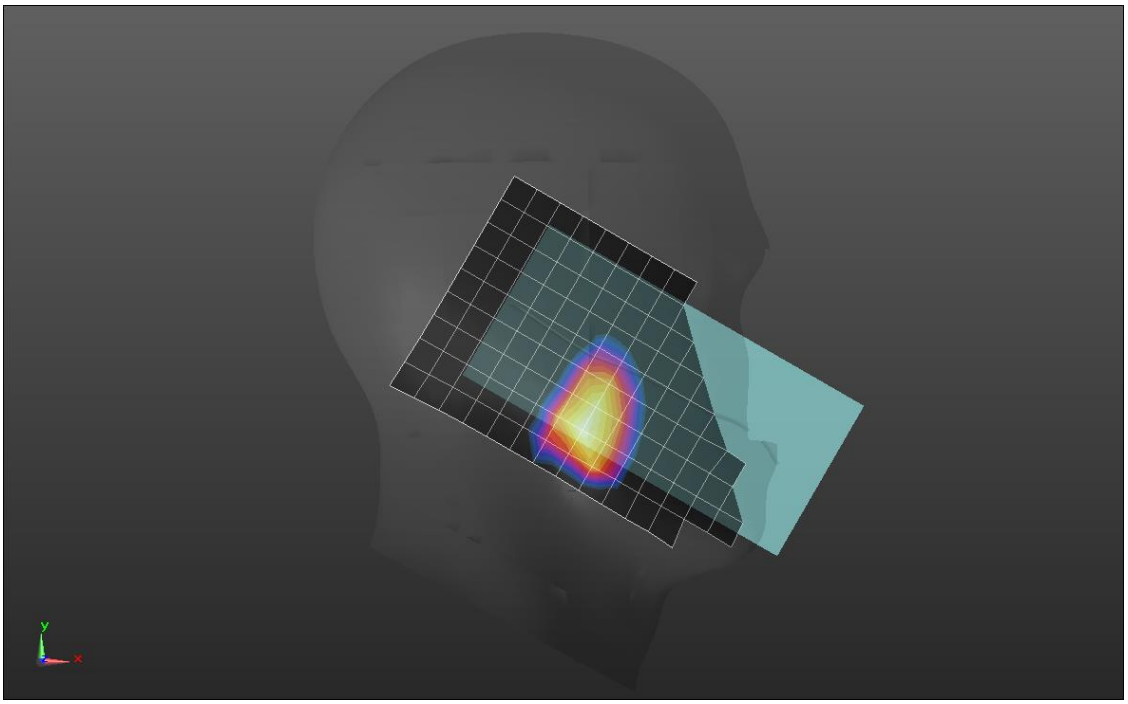

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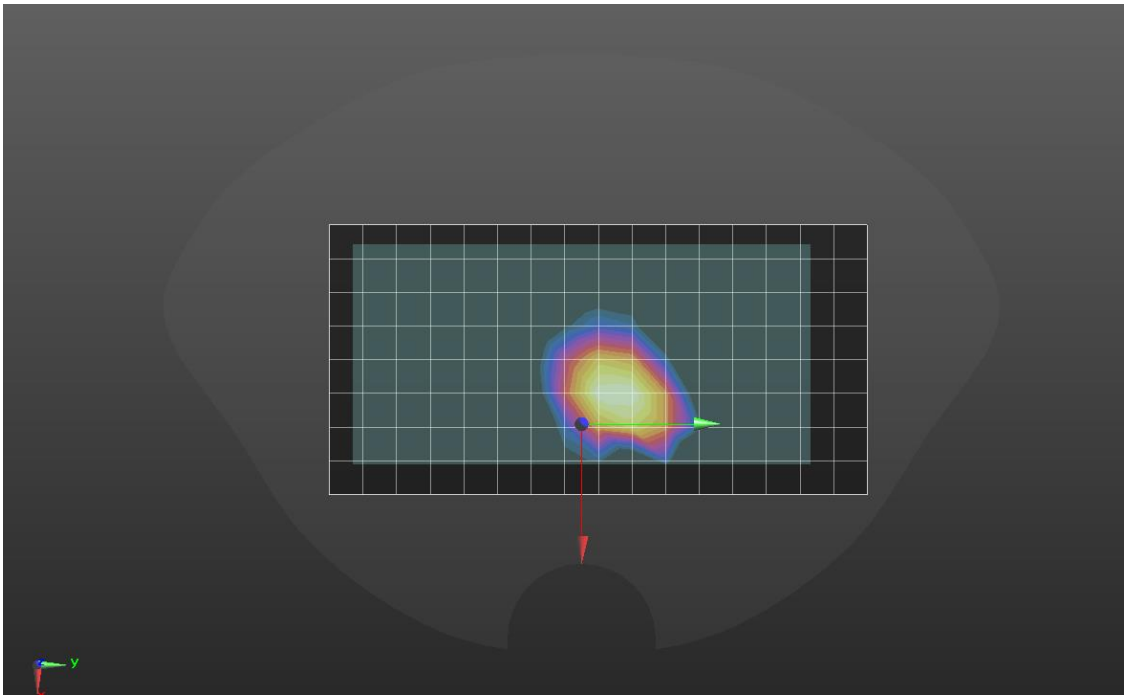

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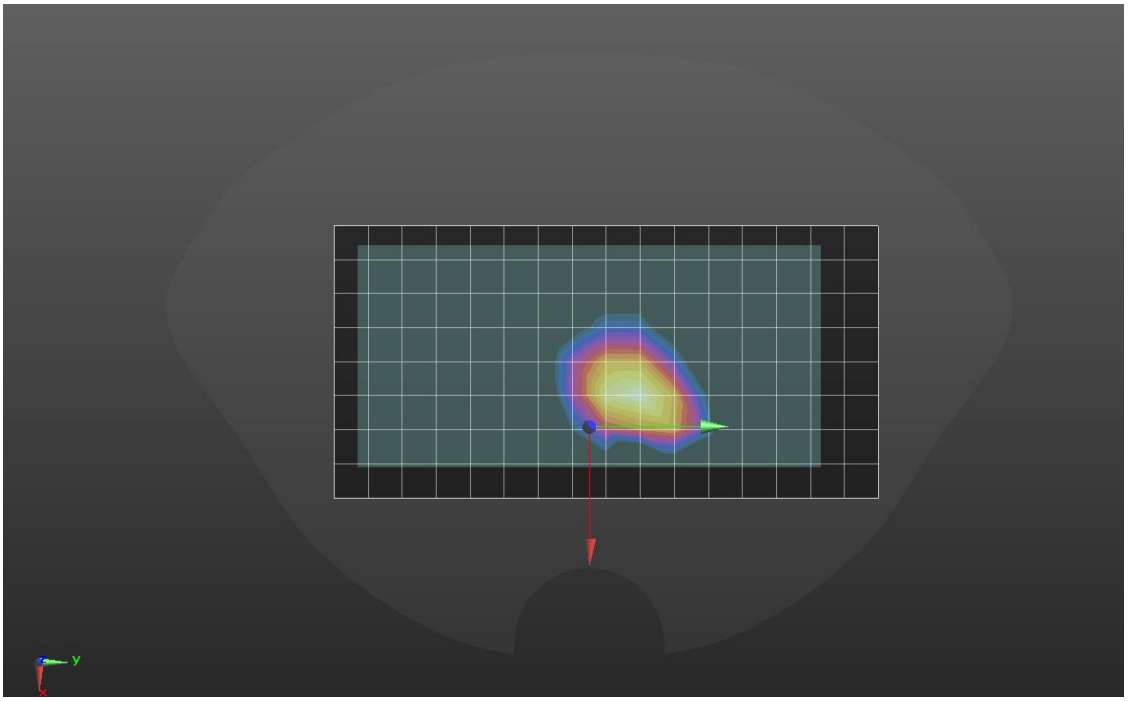

END OF EVALUATION DOCUMENT