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ADDITIONAL VALIDATION OF THE COMPUTATIONAL MODEL USED IN THE ASSESSMENT OF EXPOSURE FROM VEHICLE-MOUNT ANTENNAS USING FDTD SIMULATIONS

(Supplement to SAR simulations report provided for DVR VHF mobile radio)

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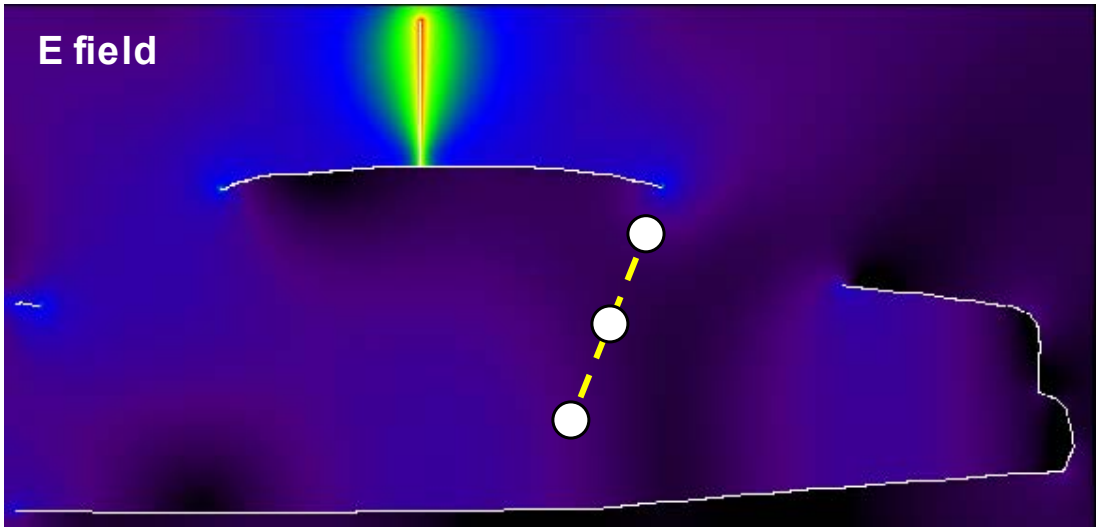
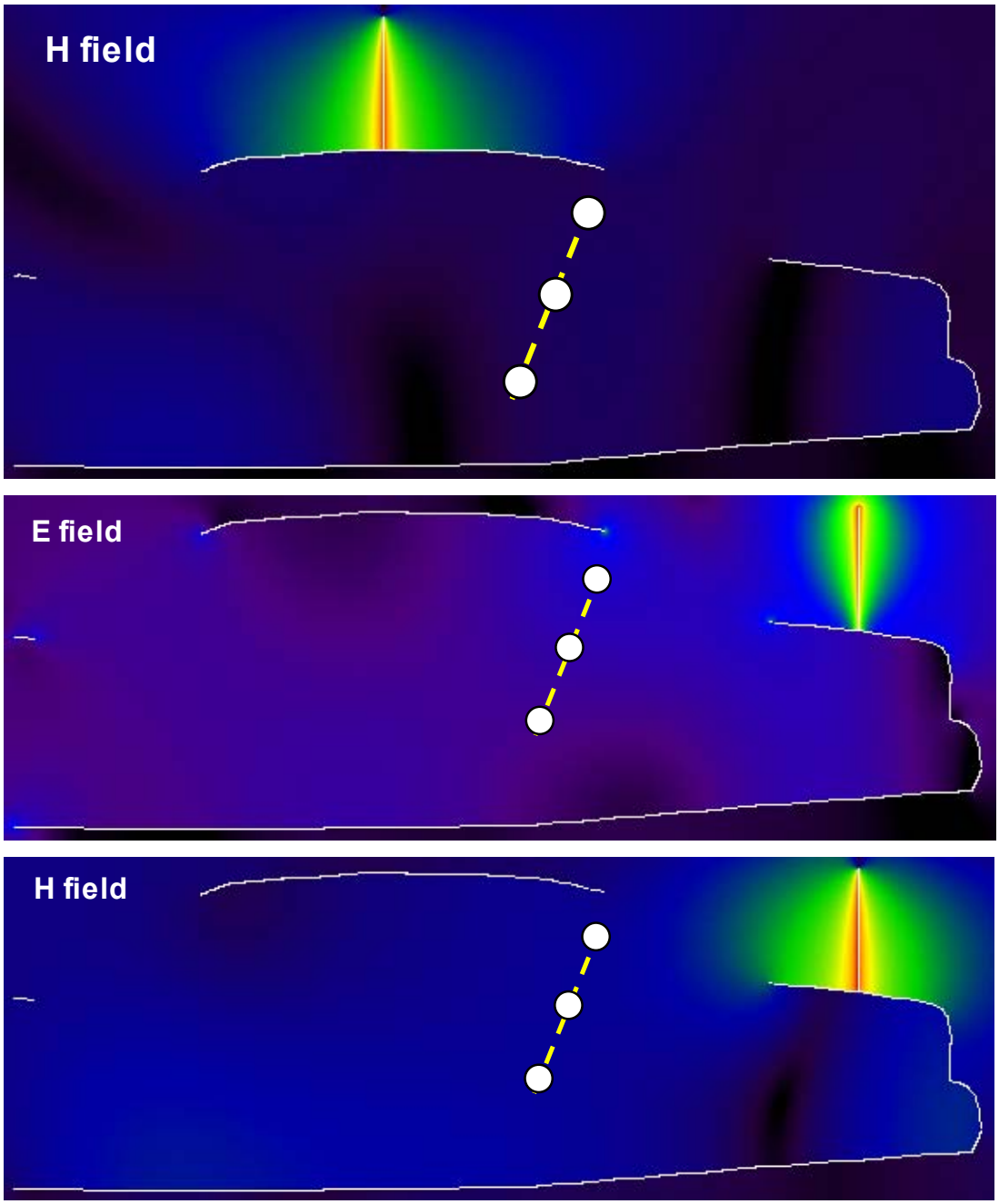
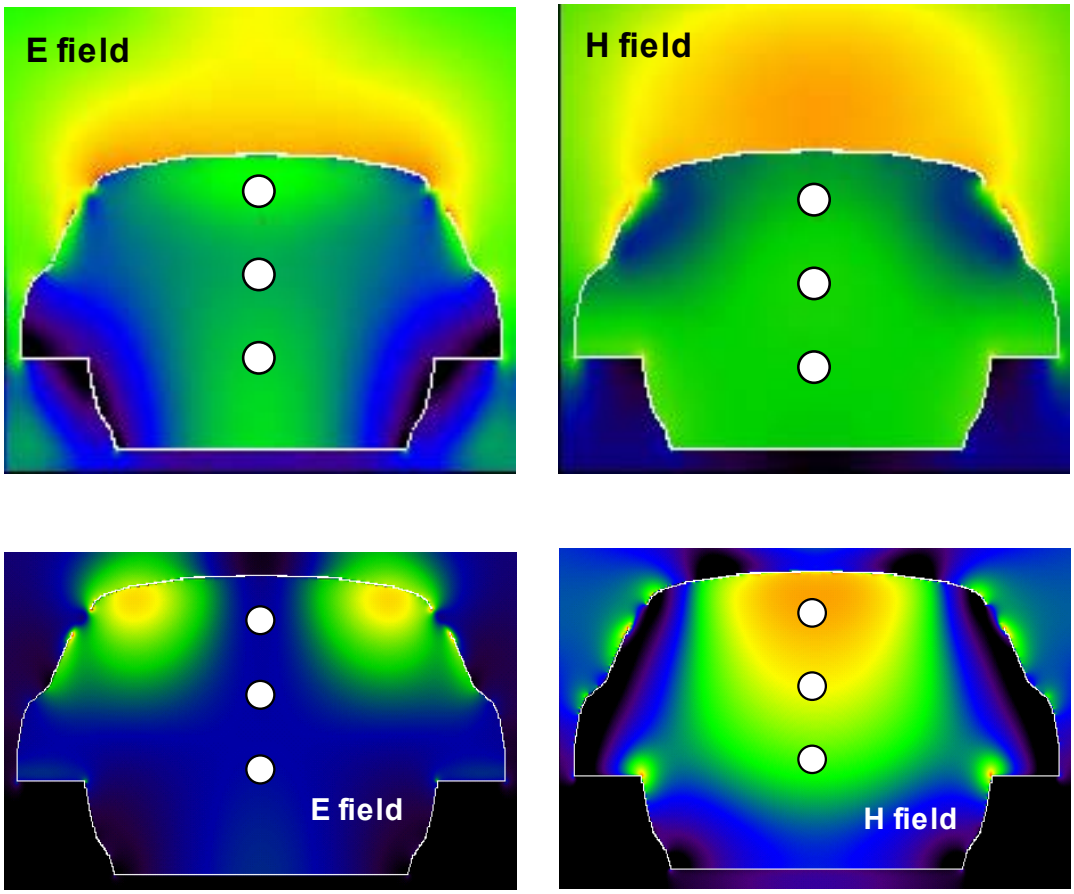
The present report describes the additional validation results for the computational model used to assess passenger exposure from vehicle mount antennas which operate in the VHF frequency range. This validation has been performed in addition to several other validation studies reported in the Appendix to the SAR report provided for DVR VHF mobile radio product. Specifically the present validation was done for the particular exposure condition that produced the highest SAR (the same condition produced both the highest 1-g average and Whole Body Average SAR values) with the aim to compare simulated and measured *equivalent power densities* (EPD) inside the car at the location of the exposed human model. Since this particular exposure condition encompasses simultaneous transmission from the VHF mobile radio antenna mounted on the roof and VHF DVR antenna mounted on the trunk, two separate simulations have been performed for each of those antennas to calculate E and H field based EPD's (symbols S_E and S_H, respectively) and compare them with the measured data.

S_E and S_H were computed and measured in the center of the back seat at three positions corresponding to the locations of the passenger's head, chest and lower trunk. The dashed line in the E- and H-field snapshots below shows approximate locations of those points. The first two snapshots refer to the case of the mobile radio roof mount antenna; the last two refer to the case of the DVR trunk mount antenna.





The other four pictures below additionally show the qualitative E and H filed distributions in a vertical plane across the width of the car, crossing the center of the passenger's head. Also in this case, the first two pictures correspond to the roof-mount antenna configuration, while the last two pictures correspond to the trunk-mount antenna configuration.



The comparison between simulated and measured EPD's is shown in the tables and charts below. The first two tables below represent the configuration with roof-mount antenna (results are normalized to the 55.6 W maximum radiated power used for the VHF mobile radio):

ROOF	XFDTD at 55.6 W	Meas. at 55.6 W	Difference
Position	S_E mW/cm^2	S_E mW/cm^2	%
Head	6.17E-01	4.97E-01	24%
Chest	2.74E-01	1.82E-01	51%
Lower trunk	2.39E-01	5.90E-02	305%
Average	3.77E-01	2.46E-01	53%

E-field based EPD measured and simulated results for the roof-mount antenna

ROOF	XFDTD at 55.6 W	Meas. at 55.6 W	Difference
Position	S_H mW/cm^2	S_H mW/cm^2	%
Head	2.49E-01	2.30E-02	981%
Chest	2.74E-01	3.00E-02	815%
Lower trunk	2.01E-01	6.30E-02	219%
Average	2.41E-01	3.87E-02	524%

H-field based EPD measured and simulated results for the roof-mount antenna

The next two tables represent the configuration with trunk-mount antenna (results are normalized to the 5.96 W maximum radiated power used for the VHF DVR):

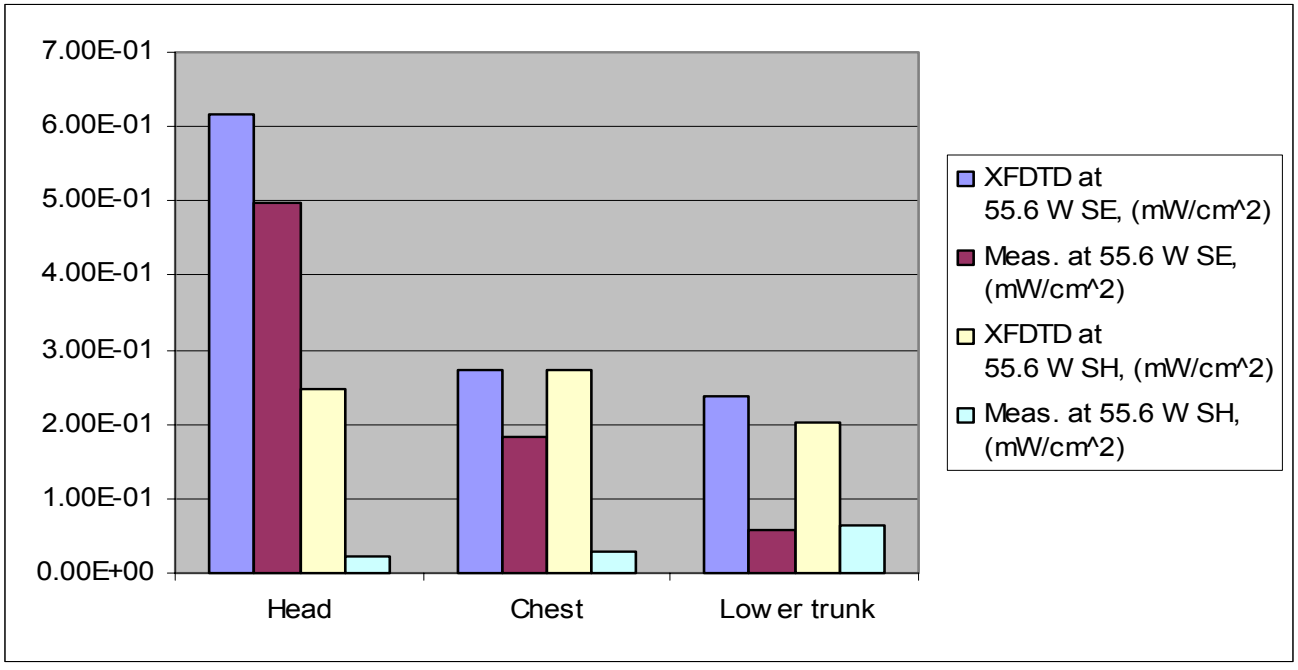
TRUNK	XFDTD at 5.96 W	Meas. at 5.96 W	Difference
Position	S_E mW/cm^2	S_E mW/cm^2	%
Head	3.47E-01	1.36E-01	155%
Chest	1.38E-01	6.60E-02	109%
Lower trunk	7.67E-02	3.70E-02	107%
Average	1.87E-01	7.97E-02	135%

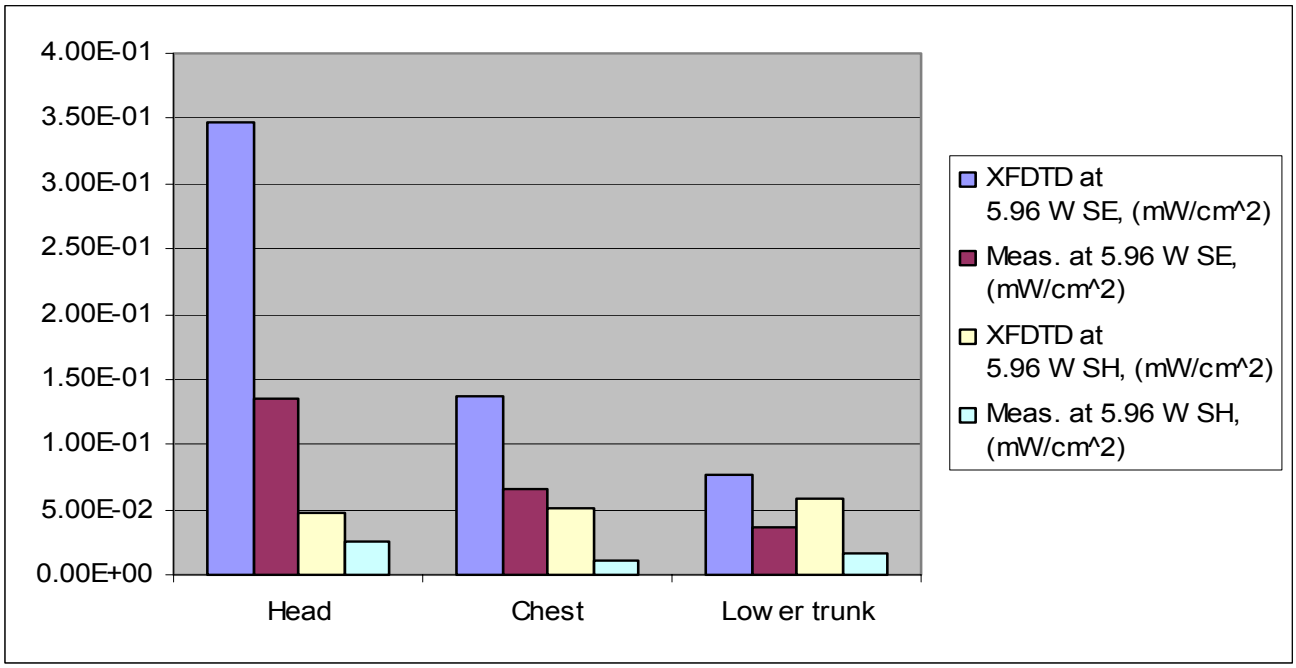
E-field based EPD measured and simulated results for the trunk-mount antenna

TRUNK	XFDTD at 5.96 W	Meas. at 5.96 W	Differenc e
Position	S_H mW/cm^2	S_H mW/cm^2	%
Head	4.66E-02	2.60E-02	79%
Chest	5.04E-02	1.10E-02	358%
Lower trunk	5.84E-02	1.70E-02	244%
Average	5.18E-02	1.80E-02	188%

H-field based EPD measured and simulated results for the trunk-mount antenna

The following charts summarize the result for trunk and roof mounted antennas respectively.





In summary, the aggregated data presented in this analysis show that the simulation model employed in the SAR compliance assessment relative to the in-vehicle exposure is consistently conservative.