



**COMPUTATIONAL EME COMPLIANCE ASSESSMENT OF THE APX SERIES  
MODEL M25KSS9PW1BN (PMUD3490A) MOBILE RADIO AND COMPANION  
DEVICE, DIGITAL VEHICULAR REPEATER (DVR 800), MOBEXCOM DVRS 800  
(DQPMDVR8000P)**

**April 20, 2020**

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**Introduction**

This report summarizes the computational [numerical modeling] analysis performed to document compliance of the APX Series Model Number M25KSS9PW1BN (PMUD3490A) Mobile Radio interfaced with, and transmitting simultaneously with DVR 800, model # MOBEXCOM DVRS 800 (DQPMDVR8000P) and vehicle-mounted antennas with the United States Federal Communications Commission (FCC) and Innovation, Science and Economic Development (ISED) Canada guidelines for human exposure to radio frequency (RF) emissions. The devices operate in the following frequency bands:

Regions	Device	Bands	Frequency Band (MHz)
FCC US	Mobile APX6500	VHF Band	150.8 – 173.4
	DVR	800	806-824; 851-869
ISED Canada	Mobile APX6500	VHF Band	138 -174
	DVR	800	806-824; 851-869

This computational analysis supplements the measurements conducted to evaluate the compliance of the exposure from this mobile radio and companion device DVR 800 with respect to applicable *reference levels*, which in the following will be referred to as *maximum permissible*

*exposure* (MPE) limits.<sup>1</sup> A total of 63 test conditions that did not conform with FCC MPE limit and 143 test conditions did not conform with ISED MPE limits were considered to determine whether those conditions complied with the *specific absorption rate* (SAR) limits for general public exposure (1.6 W/kg averaged over 1 gram of tissue and 0.08 W/kg averaged over the whole body) set forth in FCC guidelines [2] and Health Canada guidelines [1].

Employing SAR simulation reduction considerations<sup>2</sup>, a total 8 configurations (requiring a total of 16 numerical simulations) have been performed, all of them addressing the exposure of the back seat passenger to the DVR 800 repeater featuring trunk-mount antennas and the APX6500 mobile radio featuring roof-mount antennas.

For all simulations a commercial code (XFDTD™ v7.6.0, by Remcom Inc, State College, PA, USA) based on the Finite-Difference-Time-Domain (FDTD) methodology was employed to carry out the computational analysis. It is well established and recognized within the scientific community that SAR represents the *basic restriction* for RF energy exposure up to 6 GHz and that MPE limits are in fact derived from SAR limits. Accordingly, the SAR computations provide a scientifically valid and more relevant estimate of RF energy exposures.

## Method

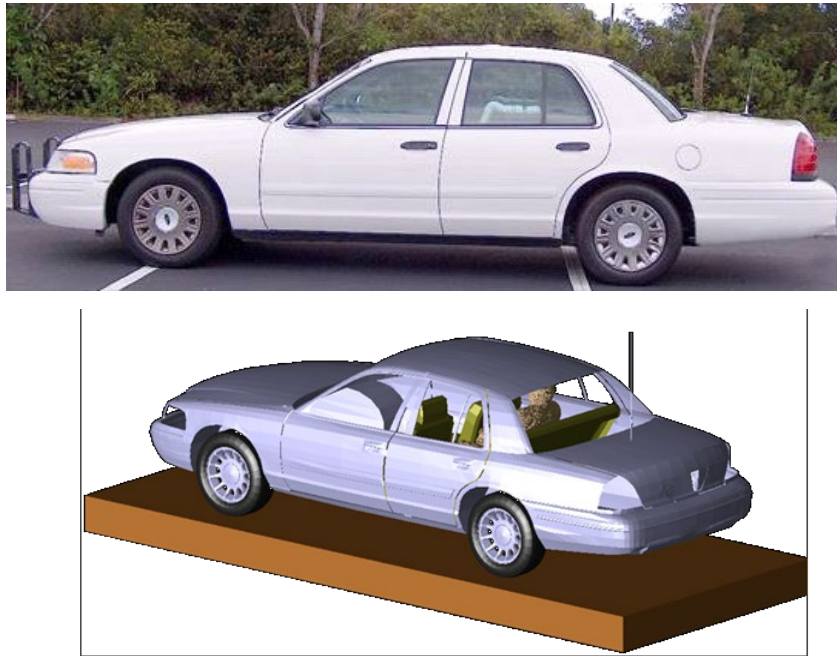
The XFDTD™ v7.6.0 computational suite enable simulating the heterogeneous full human body model defined according to the IEC/IEEE 62704-2:2017 standard and derived from the so-called Visible Human [3], discretized in 3 mm cubic-edge voxels. The IEC/IEEE 62704-2:2017 dielectric properties for 39 body tissues are automatically assigned by XFDTD™ at the specific simulation frequency. The “seated” man model representing the passenger was obtained from the standing model by modifying the articulation angles at the hips and the knees. Details of the computational method and model are provided in the Appendix A to this report. The evaluation of the computational uncertainties and results of the benchmark validations are provided in the Appendix B attached to this report. The XFDTD code validation performed by Remcom Inc. according to the IEEE/IEC 62704-2:2017 standard requirements is provided in conjunction with this report.

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<sup>1</sup> This choice is made for process efficiency, since “MPE” is used in the United States. In this way, chances of making editorial mistakes that may then require extended interactions with the report examiner are reduced.

<sup>2</sup> SAR simulation reduction is described in the SAR Simulations Reduction Considerations section of this report.

The car model has been imported into XFDTD™ from the CAD file of the sedan vehicle defined in the IEEE/IEC 62704-2:2017 standard, having dimensions 4.98 m (L) x 1.85 m (W) x 1.18 m (H), and discretized with the minimum resolution of 3 mm and the maximum resolution of 8 mm. Figure 1 below shows both the vehicle CAD model and a picture of the actual vehicle.

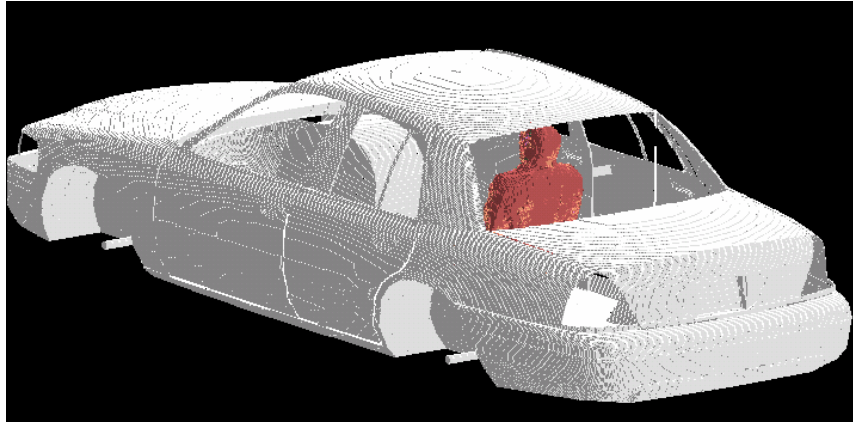


**Figure 1: Picture of the vehicle and corresponding CAD model used in XFDTD™ simulations**

For back seat passenger exposures, the antenna is positioned on the trunk at 85 cm distance from the passenger model head when the passenger model is located in the center of the back seat, replicating the experimental conditions used in MPE measurements. Figure 2 and Figure 3 shows the XFDTD™ computational models used for passenger exposure to trunk and roof mount antennas.

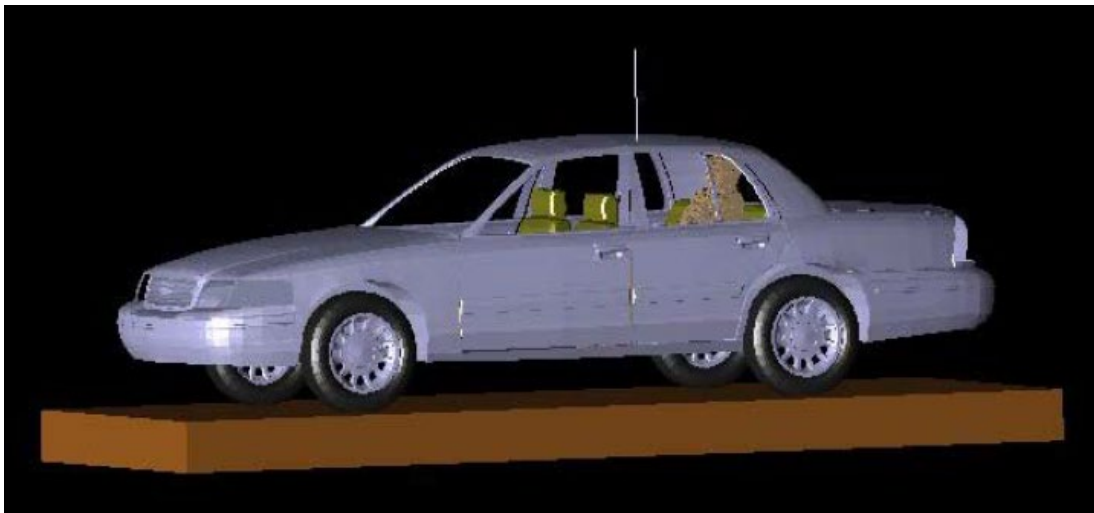
According to the IEC/IEEE 62704-2:2017 standard a lossy dielectric slab featuring 30 cm thickness, relative dielectric constant 8 and conductivity 0.01 S/m has been introduced in the computational model to properly account for the effect of the ground (pavement) on exposure.

The computational code employs a time-harmonic field excitation to produce a steady-state electromagnetic field in the exposed body model. Subsequently, the corresponding SAR distribution is automatically processed in order to determine the whole-body SAR and peak spatial average SAR distribution.





**Figure 2: Passenger (back seat) model exposed to a trunk-mount antenna: XFDTD™ geometry.**  
The antenna is installed at 85 cm from the passenger located in the center of the back seat.



**Figure 3: Passenger (back seat) model exposed to a roof-mount antenna: XFDTD™ geometry.**

The maximum average output power from mobile radio antenna is 60W (VHF band), while it is 10 W from the DVR 800 repeater antenna (800 MHz band). Since the ohmic losses in the vehicle materials, as well as the mismatch losses at the antenna feed-point are neglected, while source-

based time averaging (50% talk time for to push-to-talk operation) for the APX6500 mobile radio and (100% talk time) for DVR 800 were employed, all computational results are normalized to half of the APX6500 mobile radio maximum average net output power, i.e., 30W (VHF band) and a full average net output power of the companion DVR 800 repeater, i.e., 10W (800 MHz band); minus the corresponding minimum insertion loss in excess of 0.5 dB of the feed cables supplied with the antennas, in accordance with the IEC/IEEE 62704-2:2017 standard provisions.

### **Results of SAR computations for car passengers**

The test conditions requiring SAR computations are summarized in Table 1 (APX6500 mobile radio, 50% talk time) and Table 2 (DVR 800, 100% talk time), together with the antenna data, the SAR results, and power density (P.D.) as obtained from the MPE measurements in the corresponding test conditions. The conditions are for antennas mounted on the center of the roof (APX6500 mobile radio) and the center of the trunk (DVR 800). The antenna length listed in the tables includes the height of the 1.8 cm magnetic mount base used in MPE measurements to position the antenna on the vehicle. The same length was then used in the corresponding simulation model.

The passenger is located in the center or on the side of the rear seat corresponding to the respective configurations defined in the IEC/IEEE 62704-2-2017 standard.

All the transmit frequency, antenna length, and passenger location combinations reported in Tables 1 and 2 have been simulated individually. These tables also include the interpolated adjustment factor and corresponding scaled SAR values following the requirements of the IEC/IEEE 62704-2:2017 standard.

**Table 1a: Computed and adjusted SAR results for passenger exposure for APX6500 mobile radio**  
 (Configurations exceeding FCC MPE limits)

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm <sup>2</sup> )	Exposure Location	Computations SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Roof	HAD4007A, 1/4 Wave (144-150.8 MHz)	50.8	150.8000	0.22	Back Center	0.111	0.004	1.303	1.900	0.144	0.007
					Back Side (Fig. 4 & 5)	0.217	0.004	1.002	2.401	<b>0.218</b>	<b>0.010</b>
Roof	HAD4008A, 1/4 Wave (150.8-162 MHz)	47.3	162.0000	0.23	Back Center	0.028	0.001	1.352	1.896	0.038	0.003
					Back Side	0.055	0.002	1.028	2.420	0.056	0.004
Roof	HAD4009A, 1/4 Wave (162-174 MHz)	44.8	162.0000	0.21	Back Center	0.028	0.001	1.352	1.896	0.038	0.003
					Back Side	0.055	0.002	1.028	2.420	0.056	0.004
Roof	HAD4016A, 1/4 Wave (136-162 MHz)	53.1	150.8000	0.20	Back Center	0.111	0.004	1.303	1.900	0.145	0.007
					Back Side	0.216	0.004	1.002	2.401	0.217	0.010
Roof	HAD4017A, 1/4 Wave (146-174 MHz)	48.0	165.0125	0.22	Back Center	0.018	0.001	1.365	1.895	0.025	0.002
					Back Side	0.051	0.001	1.035	2.425	0.053	0.003
Roof	HAD4021A, 1/4 Wave (136-174MHz)	53.5	165.0125	0.18	Back Center	0.018	0.001	1.365	1.895	0.025	0.002
					Back Side	0.051	0.001	1.035	2.425	0.053	0.003

Note:  
**Blue** – the highest adjusted SAR results for the respective frequency band.

**Table 1b: Computed and adjusted SAR results for passenger exposure for APX6500 mobile radio**  
 (Configurations exceeding ISED MPE limits)

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm <sup>2</sup> )	Exposure Location	Computations SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Roof	HAD4006A, 1/4 Wave (136-144 MHz)	53.8	140.0000	0.22	Back Center (Fig. 6 & 7)	0.252	0.006	1.257	1.771	<b>0.316</b>	0.010
					Back Side	0.252	0.006	1.043	2.243	0.263	<b>0.014</b>
Roof	HAD4007A, 1/4 Wave (144-150.8 MHz)	50.8	#150.8000	0.22	Back Center	0.111	0.004	1.303	1.900	0.144	0.007
					Back Side	0.217	0.004	1.002	2.401	0.218	0.010
Roof	HAD4008A, 1/4 Wave (150.8-162 MHz)	47.3	#162.0000	0.23	Back Center	0.028	0.001	1.352	1.896	0.038	0.003
					Back Side	0.055	0.002	1.028	2.420	0.056	0.004
Roof	HAD4009A, 1/4 Wave (162-174 MHz)	44.8	#162.0000	0.21	Back Center	0.028	0.001	1.352	1.896	0.038	0.003
					Back Side	0.055	0.002	1.028	2.420	0.056	0.004
Roof	HAD4016A, 1/4 Wave (136-162 MHz)	53.1	#150.8000	0.20	Back Center	0.111	0.004	1.303	1.900	0.145	0.007
					Back Side	0.216	0.004	1.002	2.401	0.217	0.010
Roof	HAD4017A, 1/4 Wave (146-174 MHz)	48.0	#165.0125	0.22	Back Center	0.018	0.001	1.365	1.895	0.025	0.002
					Back Side	0.051	0.001	1.035	2.425	0.053	0.003
Roof	HAD4021A, 1/4 Wave (136-174MHz)	53.5	#165.0125	0.18	Back Center	0.018	0.001	1.365	1.895	0.025	0.002
					Back Side	0.051	0.001	1.035	2.425	0.053	0.003

Notes:  
**Bold Blue** – the highest adjusted SAR results for the respective frequency band.  
 # - Same SAR simulation configuration as Table 1a



**Table 2a: Computed and adjusted SAR results for passenger exposure for Companion Device DVR800**

(Configurations exceeding FCC MPE limits)

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm <sup>2</sup> )	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Trunk	HAF4016A, 1/4 Wave (764-870MHz)	10.8	815.0000	0.06	Back Center	0.090	0.003	1.023	2.178	0.092	<b>0.007</b>
					Back Side (Fig. 8 & 9)	0.100	0.003	1.370	1.885	<b>0.137</b>	0.005

Note:  
**Blue** – the highest adjusted SAR results for the respective frequency band.

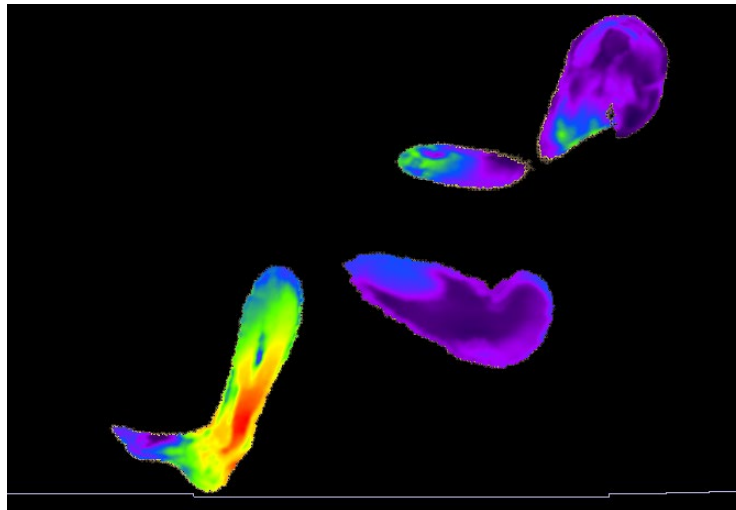
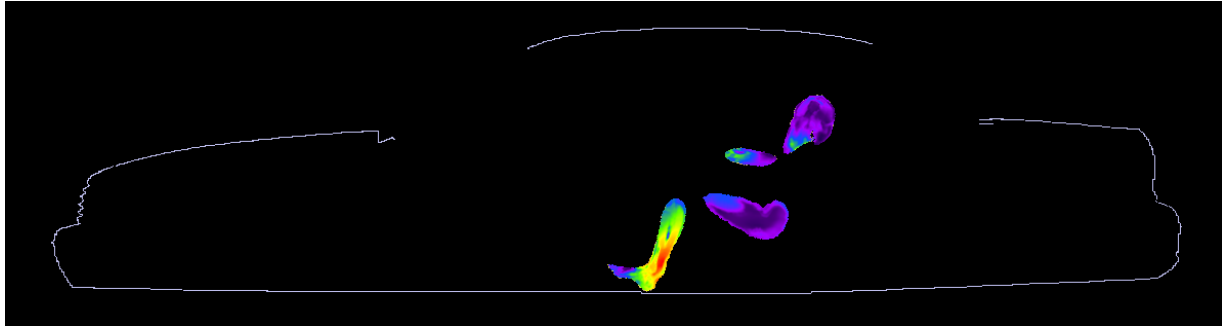
**Table 2b: Computed and adjusted SAR results for passenger exposure for Companion Device DVR800**

(Configurations exceeding ISED MPE limits)

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm <sup>2</sup> )	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Trunk	HAF4016A, 1/4 Wave (764-870MHz)	10.8	#815.0000	0.06	Back Center	0.090	0.003	1.023	2.178	0.092	<b>0.007</b>
					Back Side (Fig. 8 & 9)	0.100	0.003	1.370	1.885	<b>0.137</b>	0.005

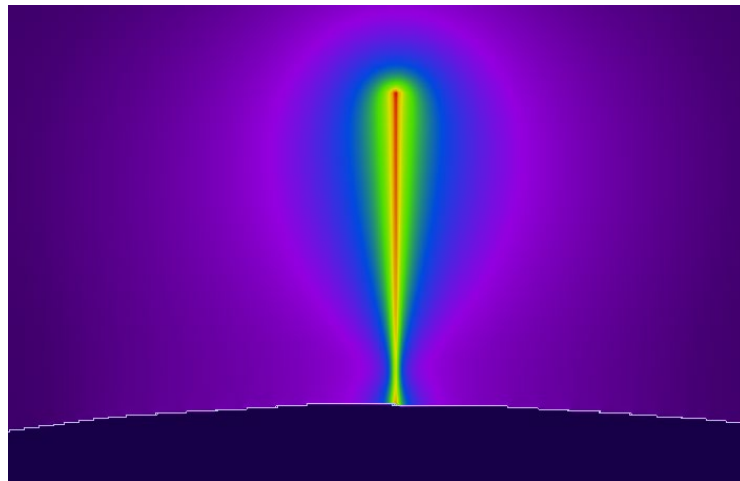
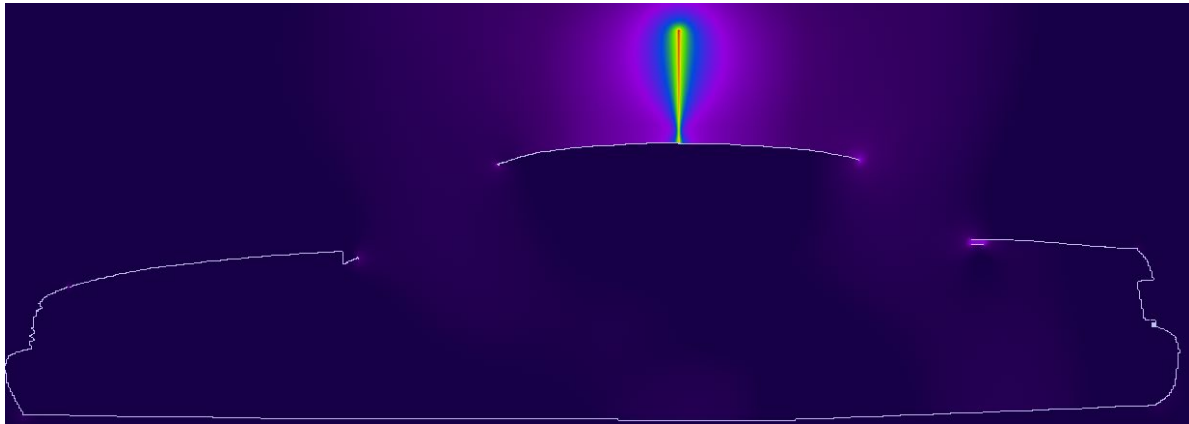
Note:  
**Blue** – the highest adjusted SAR results for the respective frequency band.  
 # - Same SAR simulation configuration as Table 2a.

The SAR distribution in the passenger exposure condition that gave highest adjusted 1-g SAR for the APX6500 mobile radio (FCC US) is reported in Figure 4. (150.8000 MHz, passenger on the side of the back seat, HAD4007A antenna installed on the roof).

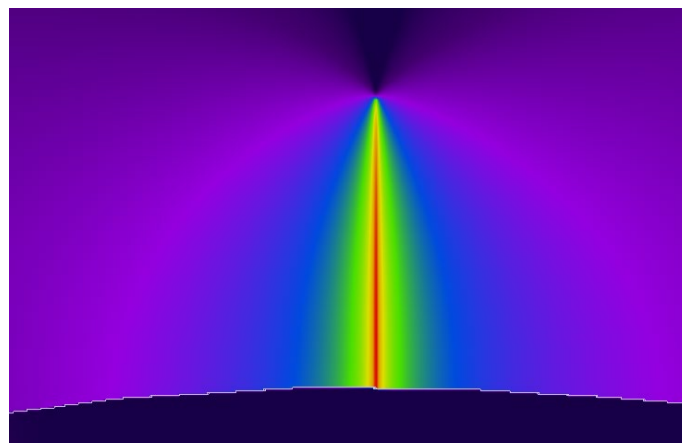
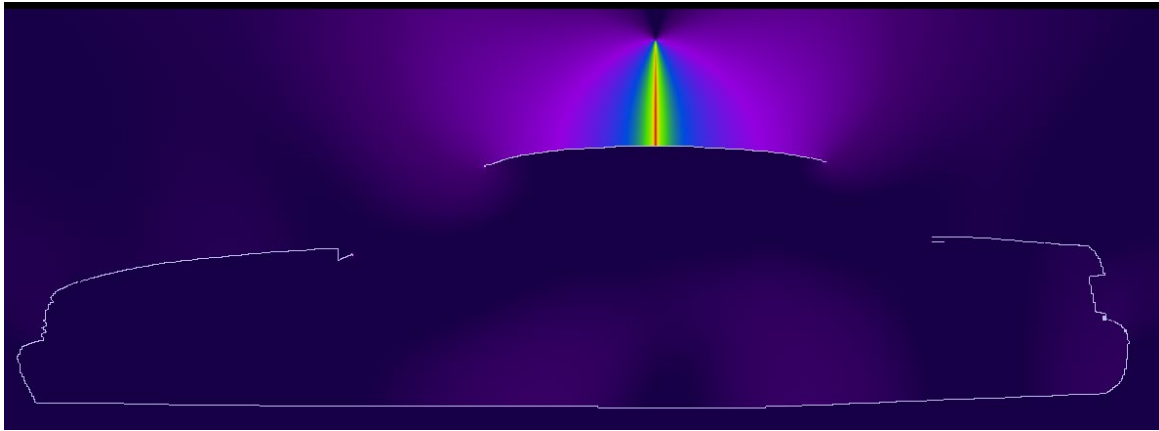


**Figure 4. SAR distribution at 150.8000 MHz in the passenger model located on the side of the back seat, produced by the roof-mount HAD4007A antenna. The SAR distribution plot is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.**

The plots in Figure 5 illustrate the E and H field distributions in the plane of the antenna corresponding to the exposure condition resulting in the SAR distribution in Figure 4.



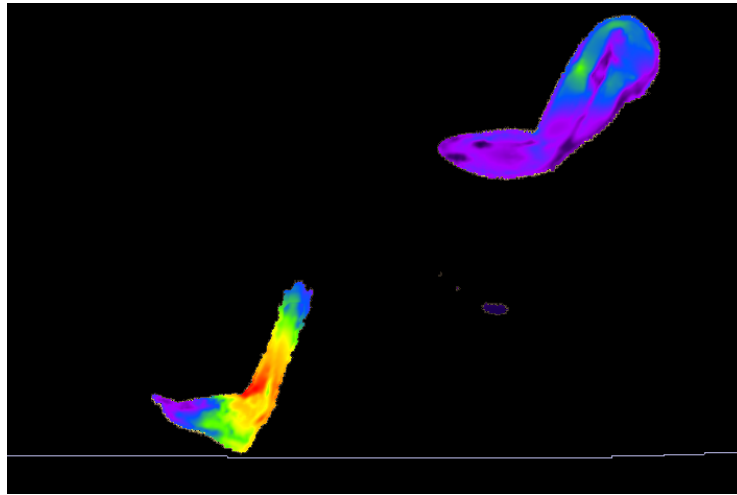
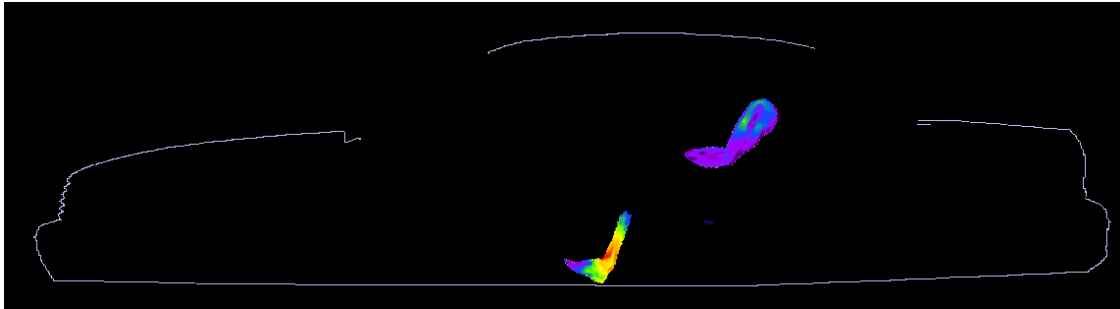
a)



b)

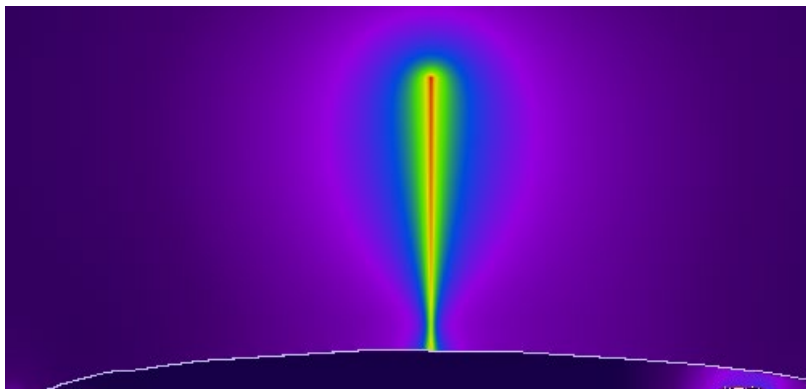
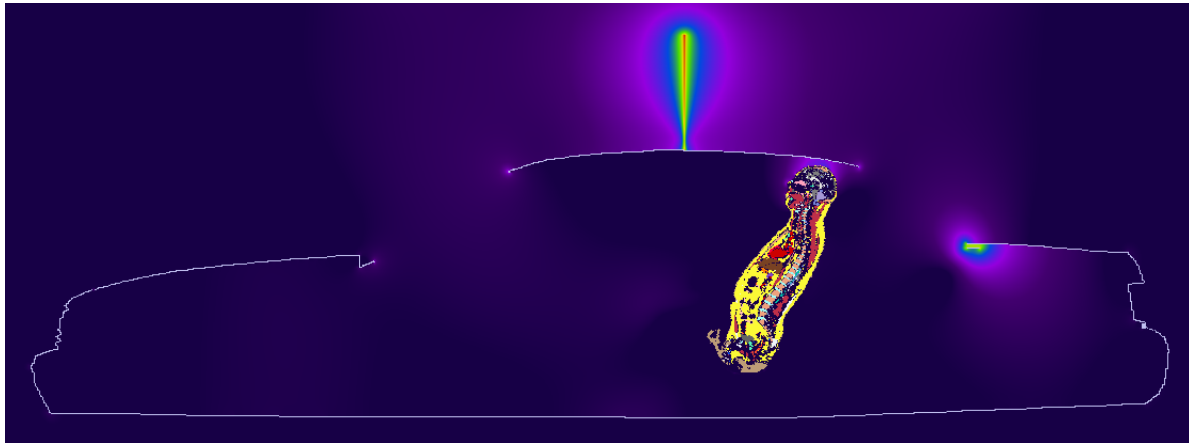
**Figure 5. (a) E-field magnitude distribution corresponding to exposure condition of Figure 4, and (b) H-field magnitude distribution corresponding to exposure condition of Figure 4.**

The SAR distribution in the passenger exposure condition that gave highest adjusted 1-g SAR for the APX6500 mobile radio (ISED Canada) is reported in Figure 6. (140.0000 MHz, passenger on the center of the back seat, HAD4006A antenna installed on the roof).

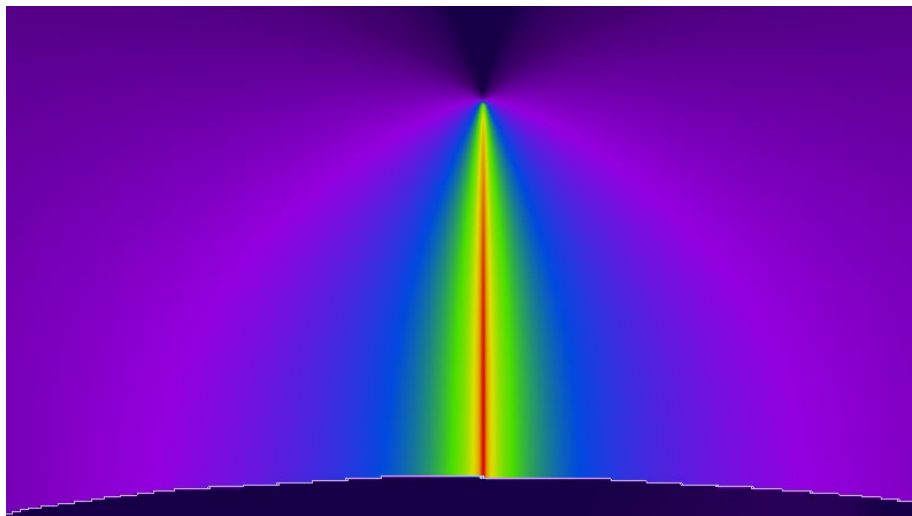
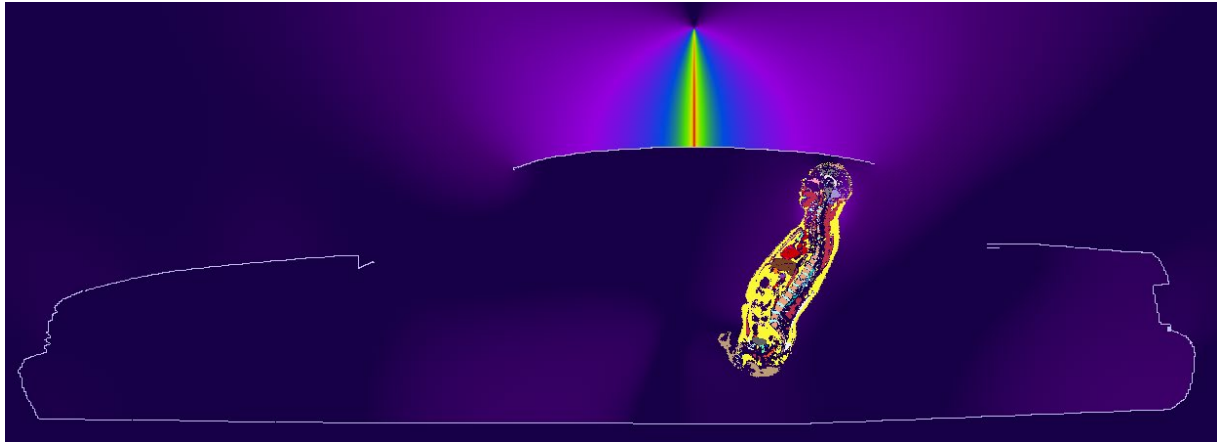


**Figure 6. SAR distribution at 140.0000 MHz in the passenger model located on the center of the back seat, produced by the roof-mount HAD4006A antenna. The SAR distribution plot is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.**

The plots in Figure 7 illustrate the E and H field distributions in the plane of the antenna corresponding to the exposure condition resulting in the SAR distribution in Figure 6.



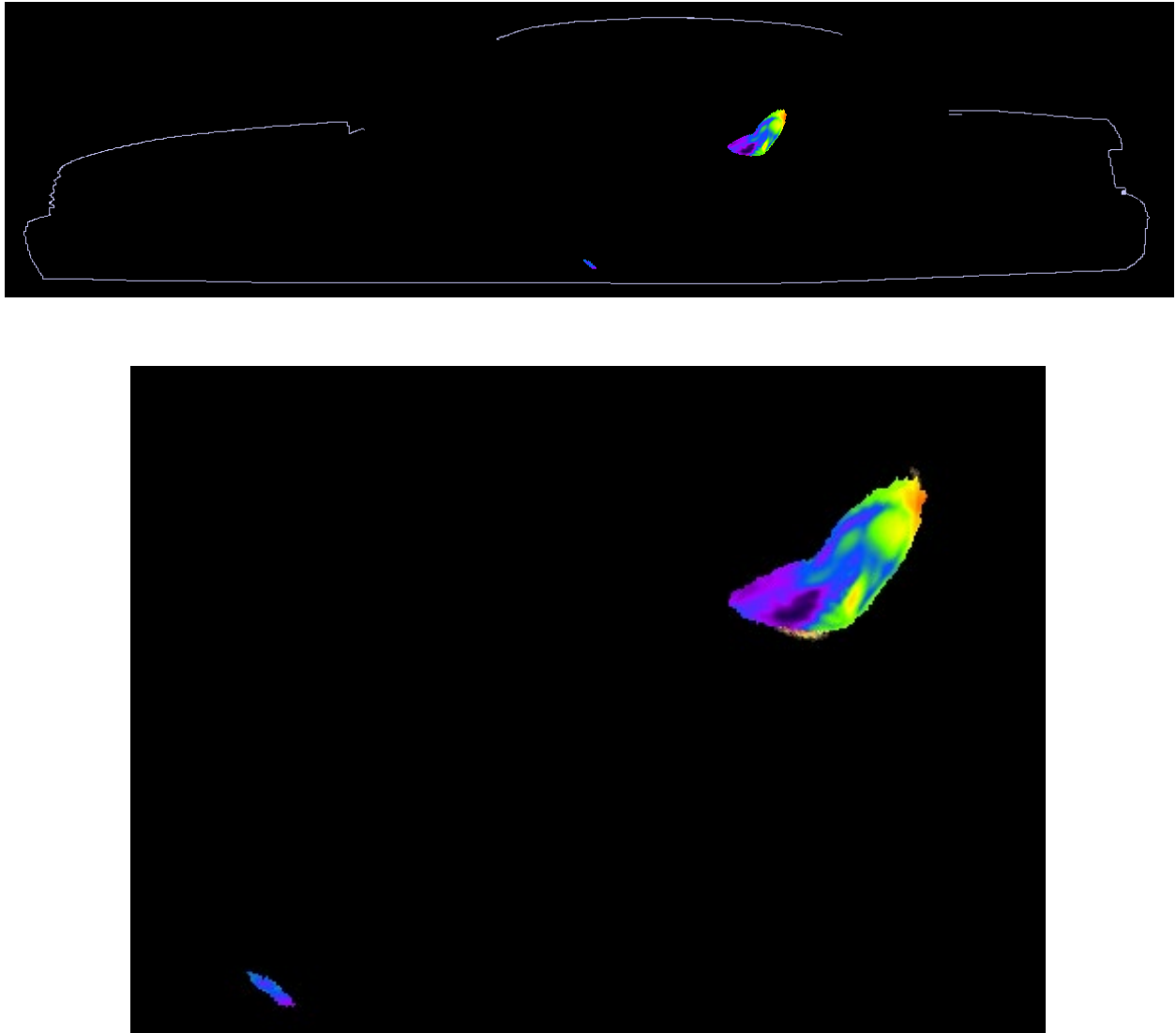
a)



b)

**Figure 7. (a) E-field magnitude distribution corresponding to exposure condition of Figure 6, and (b) H-field magnitude distribution corresponding to exposure condition of Figure 6.**

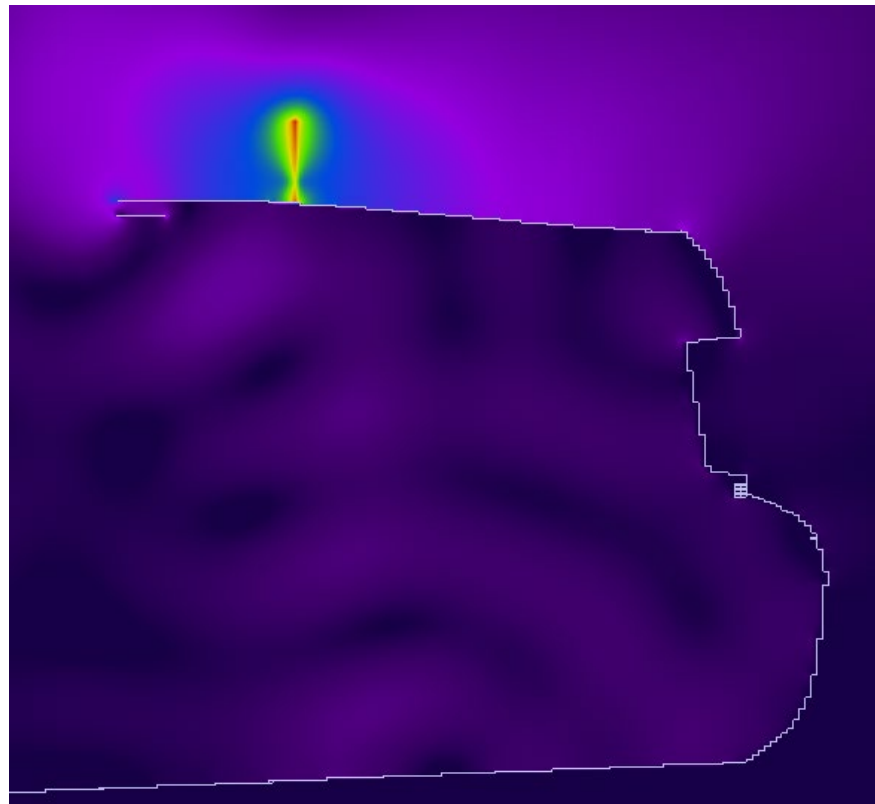
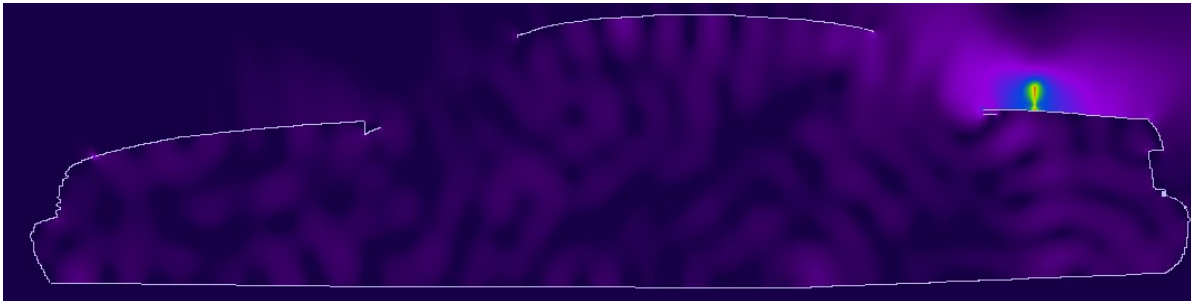
The SAR distribution in the passenger exposure condition that produced the highest adjusted 1-g SAR for the DVR 800 is reported in Figure 8 (815.0000 MHz, passenger on the side of the back seat, HAF4016A antenna installed on the trunk).



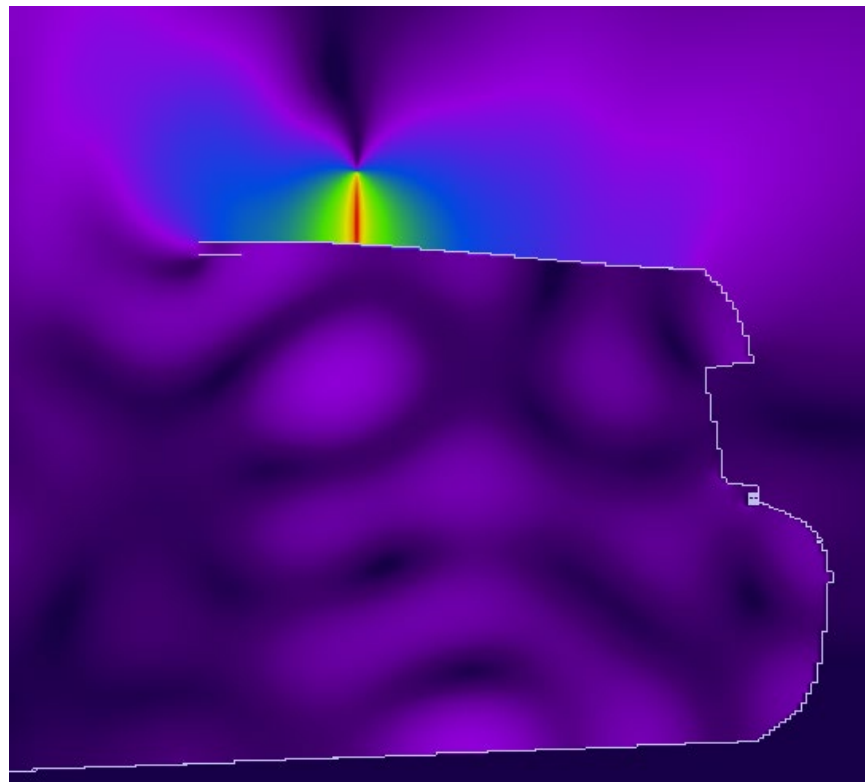
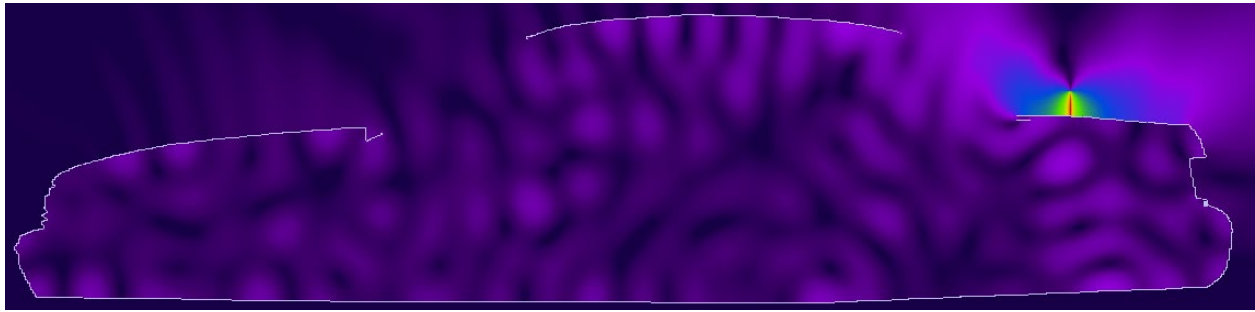
**Figure 8. SAR distribution at 815.0000 MHz in the passenger model located on the side of the back seat, produced by the trunk-mount HAF4016A antenna. The SAR distribution plot is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.**



The plots in Figure 9 illustrate the E and H field distributions in the plane of the antenna corresponding to the exposure condition resulting in the SAR distribution in Figure 8.



a)



b)

**Figure 9. (a) E-field magnitude distribution corresponding to exposure condition of Figure 8, and (b) H-field magnitude distribution corresponding to exposure condition of Figure 8.**

**SAR Simulation Reduction Considerations**

Per the Response to Inquiry to FCC Tracking Number 528198, for a particular antenna that has more than one configuration which exceeds the MPE limit, SAR evaluations shall begin with the highest MPE configuration (mount location and frequency channel). If the SAR value is less than 50% of the SAR limit, no further SAR evaluation is needed for that antenna.

If the highest MPE configuration SAR value is above 50% of the SAR limit, a subsequent SAR simulation shall be performed on the subsequent highest MPE configuration (ranked in descending percentage of the MPE limit). If the subsequent adjusted SAR value is below 75% of the limit, no further SAR evaluation is needed for that antenna, otherwise further SAR simulations for the remaining antenna configurations shall continue until the adjusted SAR value is below 75% of the SAR limit.

Table 3 and 4 below lists all the configurations that did not conform to applicable MPE limits (ranked in descending percentage of the MPE limit), to which the aforementioned SAR simulation reduction considerations were applied.

**Table 3: SAR Simulation Reduction Considerations for Back Seat Passenger (FCC)**

DVR 800		APX6500 G1 VHF		Combine MPE (%)	Exposure Location	DVR 800 Adjusted SAR Results (W/kg)		APX6500 G1 VHF Adjusted SAR Results (W/kg)		Combine Adjusted SAR Results (W/kg)		SAR Simulation Reduction	
Antenna Kit#	Freq (MHz)	Antenna Kit#	Freq (MHz)			1g	WB	1g	WB	1g	WB		
HAF4016A	815.0000	HAD4007A	150.8000	121.8	Back Center	0.092	0.007	0.144	0.007	0.236	0.014	The highest MPE configuration has SAR below 50% of the limit.	
					Back Side	0.137	0.005	0.218	0.010	0.355	0.016		
HAF4016A	806.0000	HAD4007A	150.8000	121.1									
HAF4016A	824.0000	HAD4007A	150.8000	119.4									
HAF4016A	851.0000	HAD4007A	150.8000	118.6									
HAF4016A	860.0000	HAD4007A	150.8000	117.5									
HAF4016A	869.0000	HAD4007A	150.8000	114.7									
HAF4016A	815.0000	HAD4008A	162.0000	127.5	Back Center	0.092	0.007	0.038	0.003	0.130	0.010		The highest MPE configuration has SAR below 50% of the limit.
					Back Side	0.137	0.005	0.056	0.004	0.193	0.009		
HAF4016A	806.0000	HAD4008A	162.0000	126.8									
HAF4016A	824.0000	HAD4008A	162.0000	125.1									
HAF4016A	851.0000	HAD4008A	162.0000	124.3									
HAF4016A	860.0000	HAD4008A	162.0000	123.2									
HAF4016A	815.0000	HAD4008A	156.4000	122.0									
HAF4016A	806.0000	HAD4008A	156.4000	121.3									
HAF4016A	869.0000	HAD4008A	162.0000	120.4									
HAF4016A	824.0000	HAD4008A	156.4000	119.6									
HAF4016A	851.0000	HAD4008A	156.4000	118.8									
HAF4016A	860.0000	HAD4008A	156.4000	117.7									
HAF4016A	869.0000	HAD4008A	156.4000	114.9									
HAF4016A	815.0000	HAD4008A	150.8000	106.4									
HAF4016A	806.0000	HAD4008A	150.8000	105.7									
HAF4016A	824.0000	HAD4008A	150.8000	104.0									
HAF4016A	851.0000	HAD4008A	150.8000	103.2									
HAF4016A	860.0000	HAD4008A	150.8000	102.1									
HAF4016A	815.0000	HAD4009A	162.0000	119.5	Back Center	0.092	0.007	0.038	0.003	0.130	0.010	The highest MPE configuration has SAR below 50% of the limit.	
					Back Side	0.137	0.005	0.056	0.004	0.193	0.009		
HAF4016A	806.0000	HAD4009A	162.0000	118.8									
HAF4016A	824.0000	HAD4009A	162.0000	117.1									
HAF4016A	851.0000	HAD4009A	165.0125	116.3									
HAF4016A	860.0000	HAD4009A	162.0000	116.3									
HAF4016A	869.0000	HAD4009A	165.0125	115.6									
HAF4016A	815.0000	HAD4009A	162.0000	115.2									
HAF4016A	806.0000	HAD4009A	165.0125	113.9									
HAF4016A	824.0000	HAD4009A	165.0125	113.1									
HAF4016A	851.0000	HAD4009A	162.0000	112.4									
HAF4016A	860.0000	HAD4009A	165.0125	112.0									
HAF4016A	869.0000	HAD4009A	165.0125	109.2									

**Table 3 (continued): SAR Simulation Reduction Considerations for Back Seat Passenger (FCC)**

DVR 800		APX6500 G1 VHF		Combine MPE (%)	Exposure Location	DVR 800 Adjusted SAR Results (W/kg)		APX6500 G1 VHF Adjusted SAR Results (W/kg)		Combine Adjusted SAR Results (W/kg)		SAR Simulation Reduction	
Antenna Kit#	Freq (MHz)	Antenna Kit#	Freq (MHz)			1g	WB	1g	WB	1g	WB		
HAF4016A	815.0000	HAD4016A	150.8000	110.5	Back Center	0.092	0.007	0.145	0.007	0.237	0.014	The highest MPE configuration has SAR below 50% of the limit.	
					Back Side	0.137	0.005	0.217	0.010	0.354	0.016		
HAF4016A	806.0000	HAD4016A	150.8000	109.8									
HAF4016A	824.0000	HAD4016A	150.8000	108.1									
HAF4016A	851.0000	HAD4016A	150.8000	107.3									
HAF4016A	860.0000	HAD4016A	150.8000	106.2									
HAF4016A	815.0000	HAD4016A	156.4000	104.6									
HAF4016A	806.0000	HAD4016A	156.4000	103.9									
HAF4016A	869.0000	HAD4016A	150.8000	103.4									
HAF4016A	824.0000	HAD4016A	156.4000	102.2									
HAF4016A	815.0000	HAD4016A	162.0000	101.5									
HAF4016A	851.0000	HAD4016A	156.4000	101.4									
HAF4016A	806.0000	HAD4016A	162.0000	100.8									
HAF4016A	860.0000	HAD4016A	156.4000	100.3									
HAF4016A	815.0000	HAD4017A	165.0125	122.7	Back Center	0.092	0.007	0.025	0.002	0.117	0.009	The highest MPE configuration has SAR below 50% of the limit.	
					Back Side	0.137	0.005	0.053	0.003	0.190	0.009		
HAF4016A	806.0000	HAD4017A	165.0125	122.0									
HAF4016A	824.0000	HAD4017A	165.0125	120.3									
HAF4016A	851.0000	HAD4017A	165.0125	119.5									
HAF4016A	860.0000	HAD4017A	165.0125	118.4									
HAF4016A	815.0000	HAD4017A	165.0125	115.6									
HAF4016A	806.0000	HAD4017A	158.0125	113.3									
HAF4016A	869.0000	HAD4017A	158.0125	112.6									
HAF4016A	824.0000	HAD4017A	158.0125	110.9									
HAF4016A	851.0000	HAD4017A	158.0125	110.1									
HAF4016A	860.0000	HAD4017A	158.0125	109.0									
HAF4016A	869.0000	HAD4017A	158.0125	106.2									
HAF4016A	815.0000	HAD4021A	165.0125	101.8	Back Center	0.092	0.007	0.025	0.002	0.117	0.009	The highest MPE configuration has SAR below 50% of the limit.	
					Back Side	0.137	0.005	0.053	0.003	0.190	0.009		
HAF4016A	806.0000	HAD4021A	165.0125	101.1									
HAF4016A	815.0000	HAD4021A	158.0125	100.5									

**Table 4: SAR Simulation Reduction Considerations for Back Seat Passenger (ISED Canada)**

DVR 800		APX6500 G1 VHF		Combine MPE (%)	Exposure Location	DVR 800 Adjusted SAR Results (W/kg)		APX6500 G1 VHF Adjusted SAR Results (W/kg)		Combine Adjusted SAR Results (W/kg)		SAR Simulation Reduction									
Antenna Kit#	Fre q (MHz)	Antenna Kit#	Fre q (MHz)			1g	WB	1g	WB	1g	WB										
HAF4016A	815.0000	HAD4006A	140.0000	198.2	Back Center	0.092	0.007	0.316	0.010	0.408	0.017	The highest MPE configuration has SAR below 50% of the limit.									
					Back Side	0.137	0.005	0.263	0.014	0.400	0.020										
HAF4016A	806.0000	HAD4006A	140.0000	196.6																	
HAF4016A	824.0000	HAD4006A	140.0000	193.3																	
HAF4016A	851.0000	HAD4006A	140.0000	191.7																	
HAF4016A	860.0000	HAD4006A	140.0000	189.4																	
HAF4016A	869.0000	HAD4006A	140.0000	185.8																	
HAF4016A	815.0000	HAD4006A	144.0000	184.2																	
HAF4016A	806.0000	HAD4006A	144.0000	183.4																	
HAF4016A	824.0000	HAD4006A	144.0000	180.9																	
HAF4016A	851.0000	HAD4006A	144.0000	179.3																	
HAF4016A	860.0000	HAD4006A	144.0000	177.0																	
HAF4016A	869.0000	HAD4006A	144.0000	171.0																	
HAF4016A	815.0000	HAD4007A	150.8000	195.5	Back Center	0.092	0.007	0.144	0.007	0.236	0.014			The highest MPE configuration has SAR below 50% of the limit.							
					Back Side	0.137	0.005	0.218	0.010	0.355	0.016										
HAF4016A	806.0000	HAD4007A	150.8000	193.9																	
HAF4016A	824.0000	HAD4007A	150.8000	190.6																	
HAF4016A	851.0000	HAD4007A	150.8000	189.0																	
HAF4016A	860.0000	HAD4007A	150.8000	186.7																	
HAF4016A	869.0000	HAD4007A	150.8000	180.7																	
HAF4016A	815.0000	HAD4007A	144.0000	174.4																	
HAF4016A	806.0000	HAD4007A	144.0000	172.8																	
HAF4016A	824.0000	HAD4007A	144.0000	169.5																	
HAF4016A	851.0000	HAD4007A	144.0000	167.9																	
HAF4016A	860.0000	HAD4007A	144.0000	165.6																	
HAF4016A	869.0000	HAD4007A	144.0000	159.6																	
HAF4016A	815.0000	HAD4008A	162.0000	204.4	Back Center	0.092	0.007	0.038	0.003	0.130	0.010					The highest MPE configuration has SAR below 50% of the limit.					
					Back Side	0.137	0.005	0.056	0.004	0.193	0.009										
HAF4016A	806.0000	HAD4008A	162.0000	202.8																	
HAF4016A	824.0000	HAD4008A	162.0000	199.5																	
HAF4016A	851.0000	HAD4008A	162.0000	197.9																	
HAF4016A	815.0000	HAD4008A	156.4000	195.8																	
HAF4016A	860.0000	HAD4008A	162.0000	195.6																	
HAF4016A	806.0000	HAD4008A	156.4000	194.2																	
HAF4016A	824.0000	HAD4008A	156.4000	190.9																	
HAF4016A	869.0000	HAD4008A	162.0000	189.6																	
HAF4016A	851.0000	HAD4008A	156.4000	189.3																	
HAF4016A	860.0000	HAD4008A	156.4000	187.0																	
HAF4016A	869.0000	HAD4008A	156.4000	181.0																	
HAF4016A	815.0000	HAD4008A	150.8000	171.7																	
HAF4016A	806.0000	HAD4008A	150.8000	170.1																	
HAF4016A	824.0000	HAD4008A	150.8000	166.8																	
HAF4016A	851.0000	HAD4008A	150.8000	165.2																	
HAF4016A	860.0000	HAD4008A	150.8000	162.9																	
HAF4016A	869.0000	HAD4008A	150.8000	156.9																	

**Table 4 (continued): SAR Simulation Reduction Considerations for Back Seat Passenger (ISED Canada)**

DVR 800		APX6500 G1 VHF		Combine MPE (%)	Exposure Location	DVR 800 Adjusted SAR Results (W/kg)		APX6500 G1 VHF Adjusted SAR Results (W/kg)		Combine Adjusted SAR Results (W/kg)		SAR Simulation Reduction	
Antenna Kit#	Freq (MHz)	Antenna Kit#	Freq (MHz)			1g	WB	1g	WB	1g	WB		
HAF4016A	815.0000	HAD4009A	162.0000	191.9	Back Center	0.092	0.007	0.038	0.003	0.130	0.010	The highest MPE configuration has SAR below 50% of the limit.	
					Back Side	0.137	0.005	0.056	0.004	0.193	0.009		
HAF4016A	806.0000	HAD4009A	162.0000	190.3									
HAF4016A	824.0000	HAD4009A	162.0000	187.0									
HAF4016A	815.0000	HAD4009A	165.0125	186.9									
HAF4016A	851.0000	HAD4009A	162.0000	185.4									
HAF4016A	806.0000	HAD4009A	165.0125	185.3									
HAF4016A	860.0000	HAD4009A	162.0000	183.1									
HAF4016A	824.0000	HAD4009A	165.0125	182.0									
HAF4016A	851.0000	HAD4009A	165.0125	180.4									
HAF4016A	860.0000	HAD4009A	165.0125	178.1									
HAF4016A	869.0000	HAD4009A	162.0000	177.1									
HAF4016A	869.0000	HAD4009A	165.0125	172.1									
HAF4016A	815.0000	HAD4009A	173.0125	128.9									
HAF4016A	806.0000	HAD4009A	173.0125	127.3									
HAF4016A	824.0000	HAD4009A	173.0125	124.0									
HAF4016A	851.0000	HAD4009A	173.0125	122.4									
HAF4016A	860.0000	HAD4009A	173.0125	120.1									
HAF4016A	869.0000	HAD4009A	173.0125	114.1									
HAF4016A	815.0000	HAD4016A	150.8000	178.0	Back Center	0.092	0.007	0.145	0.007	0.237	0.014		The highest MPE configuration has SAR below 50% of the limit.
					Back Side	0.137	0.005	0.217	0.010	0.354	0.016		
HAF4016A	806.0000	HAD4016A	150.8000	176.4									
HAF4016A	815.0000	HAD4016A	144.0000	173.2									
HAF4016A	824.0000	HAD4016A	150.8000	173.1									
HAF4016A	806.0000	HAD4016A	144.0000	171.6									
HAF4016A	851.0000	HAD4016A	150.8000	171.5									
HAF4016A	860.0000	HAD4016A	150.8000	169.2									
HAF4016A	815.0000	HAD4016A	156.4000	168.9									
HAF4016A	824.0000	HAD4016A	144.0000	168.3									
HAF4016A	806.0000	HAD4016A	156.4000	167.3									
HAF4016A	851.0000	HAD4016A	144.0000	166.7									
HAF4016A	860.0000	HAD4016A	144.0000	164.4									
HAF4016A	815.0000	HAD4016A	162.0000	164.1									
HAF4016A	824.0000	HAD4016A	156.4000	164.0									
HAF4016A	869.0000	HAD4016A	150.8000	163.2									
HAF4016A	806.0000	HAD4016A	162.0000	162.5									
HAF4016A	851.0000	HAD4016A	156.4000	162.4									
HAF4016A	860.0000	HAD4016A	156.4000	160.1									
HAF4016A	824.0000	HAD4016A	162.0000	159.2									
HAF4016A	869.0000	HAD4016A	144.0000	158.4									
HAF4016A	851.0000	HAD4016A	162.0000	157.6									
HAF4016A	860.0000	HAD4016A	162.0000	155.3									
HAF4016A	869.0000	HAD4016A	156.4000	154.1									
HAF4016A	869.0000	HAD4016A	162.0000	149.3									

**Table 4 (continued): SAR Simulation Reduction Considerations for Back Seat Passenger (ISED Canada)**

DVR 800		APX6500 G1 VHF		Combine MPE (%)	Exposure Location	DVR 800 Adjusted SAR Results (W/kg)		APX6500 G1 VHF Adjusted SAR Results (W/kg)		Combine Adjusted SAR Results (W/kg)		SAR Simulation Reduction
Antenna Kit#	Fre q (MHz)	Antenna Kit#	Fre q (MHz)			1g	WB	1g	WB	1g	WB	
HAF4016A	815.0000	HAD4017A	165.0125	196.9	Back Center	0.092	0.007	0.025	0.002	0.117	0.009	The highest MPE configuration has SAR below 50% of the limit.
					Back Side	0.137	0.005	0.053	0.003	0.190	0.009	
HAF4016A	806.0000	HAD4017A	165.0125	195.3								
HAF4016A	824.0000	HAD4017A	165.0125	192.0								
HAF4016A	851.0000	HAD4017A	165.0125	190.4								
HAF4016A	860.0000	HAD4017A	165.0125	188.1								
HAF4016A	815.0000	HAD4017A	158.0125	182.4								
HAF4016A	869.0000	HAD4017A	165.0125	182.1								
HAF4016A	806.0000	HAD4017A	158.0125	180.8								
HAF4016A	824.0000	HAD4017A	158.0125	177.5								
HAF4016A	851.0000	HAD4017A	158.0125	175.9								
HAF4016A	860.0000	HAD4017A	158.0125	173.6								
HAF4016A	869.0000	HAD4017A	158.0125	167.6								
HAF4016A	815.0000	HAD4017A	150.8000	156.8								
HAF4016A	806.0000	HAD4017A	150.8000	155.2								
HAF4016A	824.0000	HAD4017A	150.8000	151.9								
HAF4016A	851.0000	HAD4017A	150.8000	150.3								
HAF4016A	860.0000	HAD4017A	150.8000	148.0								
HAF4016A	869.0000	HAD4017A	150.8000	142.0								
HAF4016A	815.0000	HAD4017A	173.0125	124.2								
HAF4016A	806.0000	HAD4017A	173.0125	122.6								
HAF4016A	824.0000	HAD4017A	173.0125	119.3								
HAF4016A	851.0000	HAD4017A	173.0125	117.7								
HAF4016A	815.0000	HAD4017A	146.0000	116.5								
HAF4016A	860.0000	HAD4017A	173.0125	115.4								
HAF4016A	806.0000	HAD4017A	146.0000	114.9								
HAF4016A	824.0000	HAD4017A	146.0000	111.6								
HAF4016A	851.0000	HAD4017A	146.0000	110.0								
HAF4016A	869.0000	HAD4017A	173.0125	109.4								
HAF4016A	860.0000	HAD4017A	146.0000	107.7								
HAF4016A	869.0000	HAD4017A	146.0000	101.7								



**Table 4 (continued): SAR Simulation Reduction Considerations for Back Seat Passenger (ISED Canada)**

DVR 800		APX6500 G1 VHF		Combine MPE (%)	Exposure Location	DVR 800 Adjusted SAR Results (W/kg)		APX6500 G1 VHF Adjusted SAR Results (W/kg)		Combine Adjusted SAR Results (W/kg)		SAR Simulation Reduction
Antenna Kit#	Freq (MHz)	Antenna Kit#	Freq (MHz)			1g	WB	1g	WB	1g	WB	
HAF4016A	815.0000	HAD4021A	165.0125	164.5	Back Center	0.092	0.007	0.025	0.002	0.117	0.009	The highest MPE configuration has SAR below 50% of the limit.
					Back Side	0.137	0.005	0.053	0.003	0.190	0.009	
HAF4016A	806.0000	HAD4021A	165.0125	162.9								
HAF4016A	815.0000	HAD4021A	158.0125	162.5								
HAF4016A	806.0000	HAD4021A	158.0125	160.9								
HAF4016A	824.0000	HAD4021A	165.0125	159.6								
HAF4016A	851.0000	HAD4021A	165.0125	158.0								
HAF4016A	824.0000	HAD4021A	158.0125	157.6								
HAF4016A	815.0000	HAD4021A	150.8000	156.3								
HAF4016A	815.0000	HAD4021A	144.0000	156.1								
HAF4016A	851.0000	HAD4021A	158.0125	156.0								
HAF4016A	860.0000	HAD4021A	165.0125	155.7								
HAF4016A	806.0000	HAD4021A	150.8000	154.7								
HAF4016A	806.0000	HAD4021A	144.0000	154.5								
HAF4016A	860.0000	HAD4021A	158.0125	153.7								
HAF4016A	824.0000	HAD4021A	150.8000	151.4								
HAF4016A	824.0000	HAD4021A	144.0000	151.2								
HAF4016A	851.0000	HAD4021A	150.8000	149.8								
HAF4016A	869.0000	HAD4021A	165.0125	149.7								
HAF4016A	851.0000	HAD4021A	144.0000	149.6								
HAF4016A	869.0000	HAD4021A	158.0125	147.7								
HAF4016A	860.0000	HAD4021A	150.8000	147.5								
HAF4016A	860.0000	HAD4021A	144.0000	147.3								
HAF4016A	869.0000	HAD4021A	150.8000	141.5								
HAF4016A	869.0000	HAD4021A	144.0000	141.3								
HAF4016A	815.0000	HAD4021A	173.0125	110.9								
HAF4016A	806.0000	HAD4021A	173.0125	109.3								
HAF4016A	824.0000	HAD4021A	173.0125	106.0								
HAF4016A	851.0000	HAD4021A	173.0125	104.4								
HAF4016A	860.0000	HAD4021A	173.0125	102.1								

### Results of SAR Computations for combined exposure

From all simulated results, the highest peak 1-g SAR values were identified for both DVR 800 and APX6500 VHF mobile radio exposures and then summed up to produce the composite combined peak SAR value for corresponding locations of the human body model. Tables 5 and 6 present the highest combined peak 1-g and whole-body SAR values, respectively.

**Table 5: Worst case peak 1-g average SAR for passenger exposure conditions and combined 1-g average SAR from simultaneous exposure.**

	Passenger location	DVR 800 [W/kg]	Mobile APX6500 [W/kg]	Total 1-g SAR [W/kg]
FCC	Back Center	0.092	0.145	0.237
	Back Side	0.137	0.218	0.355
ISED Canada	Back Center	0.092	0.316	0.408
	Back Side	0.137	0.263	0.400

**Table 6: Worst case peak whole body average SAR for passenger exposure conditions and combined whole body average SAR from simultaneous exposure.**

	Passenger location	DVR 800 [W/kg]	Mobile APX6500 [W/kg]	Total WB SAR [W/kg]
FCC	Back Center	0.007	0.007	0.014
	Back Side	0.005	0.010	0.015
ISED Canada	Back Center	0.007	0.010	0.017
	Back Side	0.005	0.014	0.019

In summary, the maximum combined peak 1-g SAR is 0.408 W/kg, less than the 1.6 W/kg limit, while the maximum combined whole-body average SAR is 0.019 W/kg, less than the 0.08 W/kg limit.

### Conclusions

Under the test conditions described for evaluating passenger exposure to the RF electromagnetic fields emitted by vehicle-mounted antennas used in conjunction with these products, the present analysis shows that the computed SAR values are compliant with the FCC and ISED Canada general public SAR limits.

## References

- [1] Health Canada Safety Code 6 (2015). Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz.
- [2] United States Federal Communication Commission, “Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields,” OET Bulletin 65 (Ed. 97-01), August 1997.
- [3] [http://www.nlm.nih.gov/research/visible/visible\\_human.html](http://www.nlm.nih.gov/research/visible/visible_human.html)
- [4] ICNIRP (International Commission on Non-Ionising Radiation Protection) 1998. *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)*. Health Phys. 74:494–522.
- [5] IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz. IEEE Std C95.1-2019 (Revision of IEEE Std C95.1-2005/ Incorporates IEEE Std C95.1-2019/Cor 1-2019) .