



**COMPUTATIONAL EME COMPLIANCE ASSESSMENT OF THE APX SERIES
MODEL M25QSS9PW1BN (PMUE5620A) MOBILE RADIO AND COMPANION
DEVICE, DIGITAL VEHICULAR REPEATER (DVR VHF), MOBEXCOM DVRS VHF
(DQPMDVR3000P)**

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Goh Jue Yie, Giorgi Bit-Babik, Ph.D., and Antonio Faraone, Ph.D.
Motorola Solutions EME Research Lab, Plantation, Florida

Introduction

This report summarizes the computational [numerical modeling] analysis performed to document compliance of the APX Series Model Number M25QSS9PW1BN (PMUE5620A) Mobile Radio interfaced with, and transmitting simultaneously with DVR VHF, model # MOBEXCOM DVRS VHF (DQPMDVR3000P) and vehicle-mounted antennas with the US 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	UHF R1	406.1-470
	DVR	VHF	150.8-173.4
ISED Canada	Mobile APX6500	UHF R1	406.1-430, 450-470
	DVR	VHF	138-174

This computational analysis supplements the measurements conducted to evaluate the compliance of the exposure from this mobile radio and companion device DVR VHF with respect to applicable *reference levels* [1] [2], which in the following will be referred to as

maximum permissible exposure (MPE) limits.¹ A total of 341 test conditions that did not conform with applicable 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 and Health Canada guidelines [1][2].

Employing SAR simulation reduction considerations², a total 22 configurations (requiring a total of 44 numerical simulations) have been performed, all of them addressing the exposure of the back seat passenger to the DVR VHF repeater featuring trunk-mounted antennas and the APX6500 mobile radio featuring roof-mounted 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 are provided in conjunction with this report.

¹ 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.

² 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.

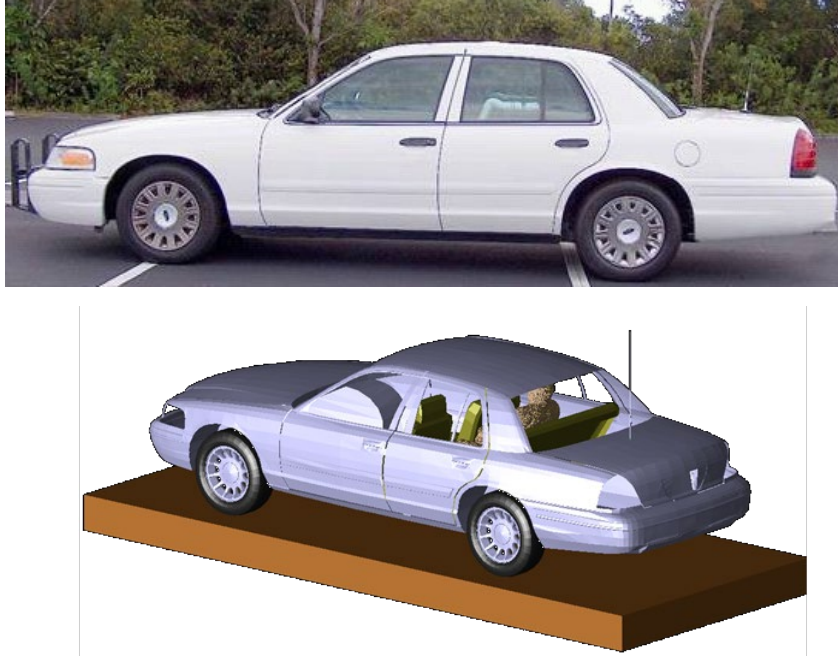


Figure 1: Picture of the vehicle and corresponding CAD model used in XFDTD™ simulations

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 shows the XFDTD™ computational models used for passenger exposure to trunk mounted 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.

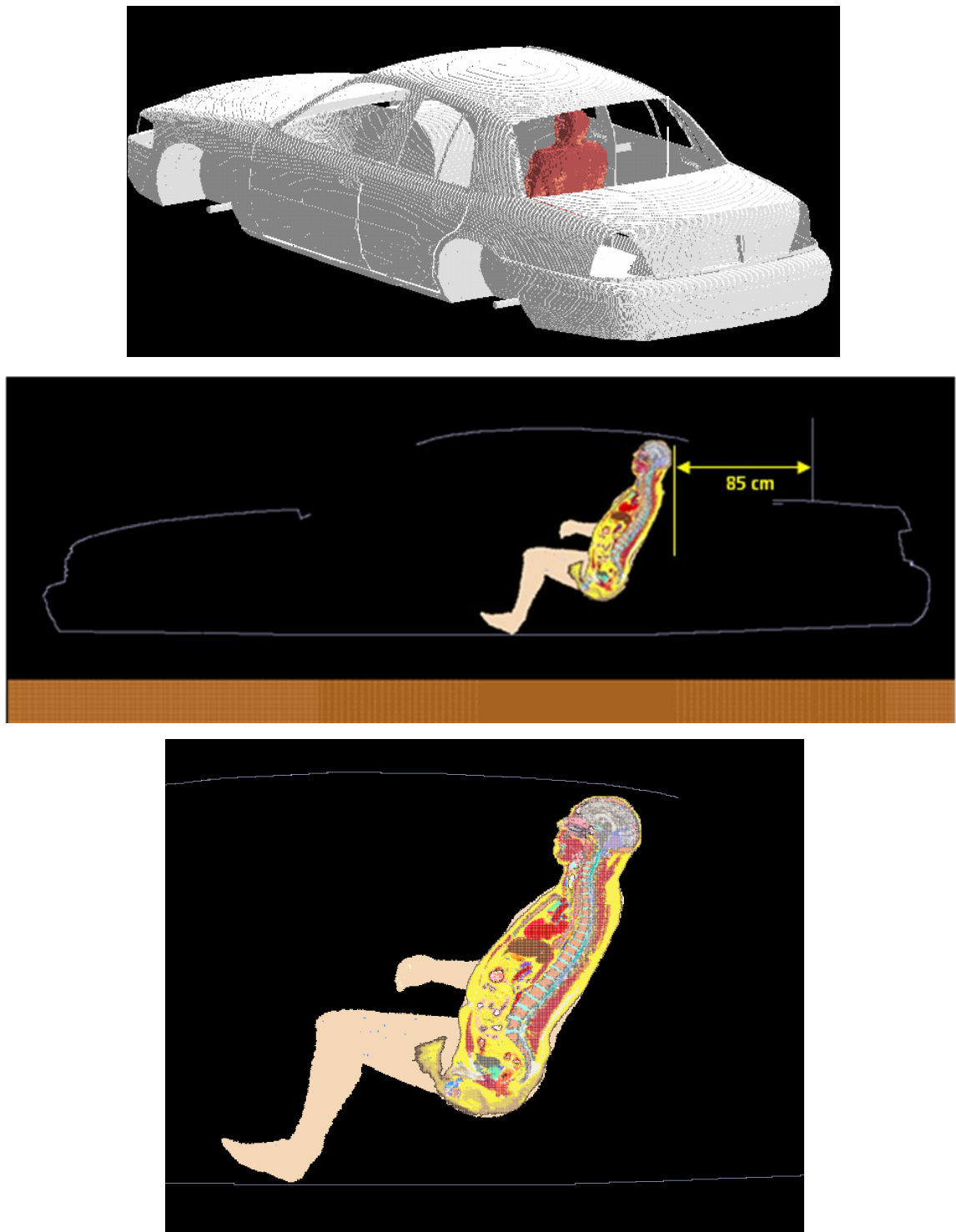


Figure 2: Passenger (back seat) model exposed to a trunk-mount antenna: XFDTD™ geometry. The antenna is installed at 85 cm from the passenger located in the center of the back seat.

The maximum average output power from mobile radio antenna is 48W (380-470 MHz), while it is 6 W from the DVR VHF repeater antenna (136-174 MHz). 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 push-to-talk operation) for the APX6500 mobile radio and (100% talk time) for DVR VHF were employed, all computational results are normalized to half of the APX6500 mobile radio maximum average net output power, i.e., 24W (380-470 MHz) and to full average net output power of the companion DVR VHF repeater, i.e., 6W (136-174 MHz); 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 VHF, 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 VHF). 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 back seat passenger exposure for APX6500 mobile radio
(Configurations exceeding FCC MPE limits)

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm ²)	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Roof	HAE4003A, 1/4 Wave, (450-470MHz)	17.8	450.0125	0.05	Back Center	0.03	0.002	2.60	1.80	0.08	0.003
					Back Side	0.06	0.002	1.70	2.90	0.10	0.006
Roof	HAE4011A, 1/2 Wave, (450-470MHz)	75.0	450.0125	0.01	Back Center	0.01	0.001	2.60	1.80	0.03	0.001
					Back Side	0.03	0.001	1.70	2.90	0.04	0.001
Roof	HAE6010A, 1/2 Wave, (380-433MHz)	65.3	406.5000	0.04	Back Center Fig. 3 & 4	0.13	0.005	2.41	1.81	0.32	0.008
					Back Side	0.14	0.004	1.60	2.83	0.22	0.010
Roof	HAE6010A, 1/2 Wave, (380-433MHz)	65.3	419.5000	0.04	Back Center	0.08	0.002	2.47	1.81	0.21	0.004
					Back Side	0.10	0.003	1.63	2.85	0.15	0.007
Roof	HAE6011A, 5/8 Wave, (380-433MHz)	92.8	406.5000	0.01	Back Center	0.06	0.002	2.41	1.81	0.14	0.003
					Back Side	0.04	0.001	1.60	2.83	0.07	0.004
Roof	HAE6012A, 1/4 Wave, (380-433MHz)	20.0	406.5000	0.04	Back Center	0.13	0.004	2.41	1.81	0.30	0.008
					Back Side	0.11	0.003	1.60	2.83	0.18	0.009
Roof	HAE6012A, 1/4 Wave, (380-433MHz)	20.0	419.5000	0.04	Back Center	0.10	0.002	2.47	1.81	0.24	0.004
					Back Side	0.09	0.002	1.63	2.85	0.14	0.007
Roof	HAE6013A, 1/2 Wave, (380-470MHz)	30.8	450.0125	0.05	Back Center	0.03	0.002	2.60	1.80	0.09	0.004
					Back Side	0.07	0.002	1.70	2.90	0.12	0.006
Roof	HAE6015A, 1/2 Wave, (450-520MHz)	28.0	450.0125	0.05	Back Center	0.03	0.002	2.60	1.80	0.09	0.004
					Back Side	0.07	0.002	1.70	2.90	0.12	0.006

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

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

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm ²)	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Roof	HAE6016A, 1/4 Wave, (450-512MHz)	10.1	450.0125	0.03	Back Center	0.03	0.002	2.60	1.80	0.07	0.003
					Back Side	0.05	0.002	1.70	2.90	0.09	0.005
Roof	HAE6031A, 1/2 Wave, (380-520MHz)	29.8	450.0125	0.04	Back Center	0.03	0.002	2.60	1.80	0.09	0.004
					Back Side	0.07	0.002	1.70	2.90	0.12	0.006
Roof	RAE4014ARB, 5/8 Wave, (445-470MHz)	90.8	469.9875	0.01	Back Center	0.01	0.001	2.61	1.85	0.03	0.001
					Back Side	0.01	0.001	1.69	2.85	0.02	0.002
Roof	RAE4014ARB, 5/8 Wave, (445-470MHz)	94.5	450.0125	0.01	Back Center	0.01	0.0004	2.60	1.80	0.02	0.001
					Back Side	0.01	0.001	1.70	2.90	0.02	0.002
Roof	RAE4014ARB, 5/8 Wave, (445-470MHz)	92.3	460.0000	0.01	Back Center	0.01	0.001	2.60	1.83	0.03	0.001
					Back Side	0.02	0.001	1.70	2.88	0.03	0.002

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

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm ²)	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Roof	HAE4003A, 1/4 Wave, (450-470MHz)	17.8	#450.0125	0.05	Back Center	0.03	0.002	2.60	1.80	0.08	0.003
					Back Side	0.06	0.002	1.70	2.90	0.10	0.006
Roof	HAE4011A, 1/2 Wave, (450-470MHz)	75.0	#450.0125	0.01	Back Center	0.01	0.001	2.60	1.80	0.03	0.001
					Back Side	0.03	0.001	1.70	2.90	0.04	0.001
Roof	HAE6010A, 1/2 Wave, (380-433MHz)	65.3	#406.5000	0.04	Back Center	0.13	0.005	2.41	1.81	0.32	0.008
					Back Side	0.14	0.004	1.60	2.83	0.22	0.010
Roof	HAE6010A, 1/2 Wave, (380-433MHz)	65.3	#419.5000	0.04	Back Center	0.08	0.002	2.47	1.81	0.21	0.004
					Back Side	0.10	0.003	1.63	2.85	0.15	0.007
Roof	HAE6011A, 5/8 Wave, (380-433MHz)	92.8	#406.5000	0.01	Back Center	0.06	0.002	2.41	1.81	0.14	0.003
					Back Side	0.04	0.001	1.60	2.83	0.07	0.004
Roof	HAE6012A, 1/4 Wave, (380-433MHz)	20.0	#406.5000	0.04	Back Center	0.13	0.004	2.41	1.81	0.30	0.008
					Back Side	0.11	0.003	1.60	2.83	0.18	0.009
Roof	HAE6012A, 1/4 Wave, (380-433MHz)	20.0	#419.5000	0.04	Back Center	0.10	0.002	2.47	1.81	0.24	0.004
					Back Side	0.09	0.002	1.63	2.85	0.14	0.007
Roof	HAE6013A, 1/2 Wave, (450-470MHz)	30.8	#450.0125	0.05	Back Center	0.03	0.002	2.60	1.80	0.09	0.004
					Back Side	0.07	0.002	1.70	2.90	0.12	0.006
Roof	HAE6015A, 1/2 Wave, (450-520MHz)	28.0	#450.0125	0.05	Back Center	0.03	0.002	2.60	1.80	0.09	0.004
					Back Side	0.07	0.002	1.70	2.90	0.12	0.006
Roof	HAE6016A, 1/4 Wave, (450-512MHz)	10.1	#450.0125	0.03	Back Center	0.03	0.002	2.60	1.80	0.07	0.003
					Back Side	0.05	0.002	1.70	2.90	0.09	0.005
Roof	HAE6031A, 1/2 Wave, (380-520MHz)	29.8	#450.0125	0.04	Back Center	0.03	0.002	2.60	1.80	0.09	0.004
					Back Side	0.07	0.002	1.70	2.90	0.12	0.006

Note:
Blue – the highest adjusted SAR results for the respective frequency band.
 Note: # Same SAR simulation configuration as FCC US.

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

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm ²)	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Roof	RAE4014ARB, 5/8 Wave, (445-470MHz)	90.8	#469.9875	0.01	Back Center	0.01	0.001	2.61	1.85	0.03	0.001
					Back Side	0.01	0.001	1.69	2.85	0.02	0.002
Roof	RAE4014ARB, 5/8 Wave, (445-470MHz)	94.5	#450.0125	0.01	Back Center	0.01	0.0004	2.60	1.80	0.02	0.001
					Back Side	0.01	0.001	1.70	2.90	0.02	0.002
Roof	RAE4014ARB, 5/8 Wave, (445-470MHz)	92.3	#460.0000	0.01	Back Center	0.01	0.001	2.60	1.83	0.03	0.001
					Back Side	0.02	0.001	1.70	2.88	0.03	0.002

Note:
Note: # Same SAR simulation configuration as FCC US.

Table 2a: Computed and adjusted SAR results for back seat passenger exposure for DVR VHF
(Configurations exceeding FCC MPE limits)

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm ²)	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Trunk	HAD4008A, 1/4 Wave (150.8-162MHz)	47.3	162.0000	0.23	Back Center	0.16	0.007	1.92	2.42	0.31	0.018
					Back Side Fig. 5 & 6	0.16	0.006	4.11	2.98	0.67	0.019
Trunk	HAD4009A, 1/4 Wave (162-174MHz)	44.8	173.4000	0.19	Back Center	0.10	0.005	1.94	2.43	0.19	0.013
					Back Side	0.13	0.005	4.03	2.97	0.52	0.015

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

**Table 2b: Computed and adjusted SAR results for back seat passenger exposure for
DVR VHF
(Configurations exceeding ISED MPE limits)**

Mount Location	Antenna Kit#	Antenna Length (cm)	Freq (MHz)	P.D. (mW/cm ²)	Exposure Location	Computed SAR (W/kg)		Interpolated Adjustment Factors		Adjusted SAR Results (W/kg)	
						1 g	WB	1 g	WB	1 g	WB
Trunk	HAD4006A, 1/4 Wave (136-144MHz)	53.8	140.0000	0.20	Back Center	0.07	0.003	1.77	2.26	0.12	0.007
					Back Side	0.05	0.003	3.74	2.71	0.20	0.008
Trunk	HAD4006A, 1/4 Wave (136-144MHz)	53.8	144.0000	0.17	Back Center	0.18	0.008	1.82	2.31	0.34	0.018
					Back Side	0.07	0.005	3.93	2.83	0.27	0.014
Trunk	HAD4007A, 1/4 Wave (144-150.8MHz)	50.8	144.0000	0.15	Back Center	0.18	0.008	1.82	2.31	0.34	0.018
					Back Side	0.07	0.005	3.93	2.83	0.27	0.014
Trunk	HAD4008A, 1/4 Wave (150.8-162MHz)	47.3	#162.0000	0.23	Back Center	0.16	0.007	1.92	2.42	0.31	0.018
					Back Side	0.16	0.006	4.11	2.98	0.67	0.019
Trunk	HAD4008A, 1/4 Wave (150.8-162MHz)	47.3	156.4000	0.14	Back Center	0.12	0.007	1.91	2.41	0.23	0.017
					Back Side	0.15	0.006	4.15	2.99	0.63	0.018
Trunk	HAD4009A, 1/4 Wave (162-174MHz)	44.8	#173.4000	0.19	Back Center	0.10	0.005	1.94	2.43	0.19	0.013
					Back Side	0.13	0.005	4.03	2.97	0.52	0.015
Trunk	HAD4009A, 1/4 Wave (162-174MHz)	44.8	162.0000	0.17	Back Center	0.16	0.008	1.92	2.42	0.31	0.018
					Back Side	0.17	0.007	4.11	2.98	0.68	0.020
Trunk	HAD4009A, 1/4 Wave (162-174MHz)	44.8	167.7000	0.16	Back Center	0.13	0.006	1.93	2.42	0.25	0.015
					Back Side Fig. 7 & 8	0.17	0.005	4.07	2.98	0.70	0.016

Note:
Bold Blue – the highest adjusted SAR results for the respective frequency band.
 Note: # Same SAR simulation configuration as FCC US.

The SAR distribution in the passenger exposure condition that gave highest adjusted 1-g SAR for the APX6500 UHF R1 (FCC US and ISED Canada) is reported in Figure 3. (406.5000 MHz, passenger on the center of the back seat, HAE6010A antenna installed on the roof).

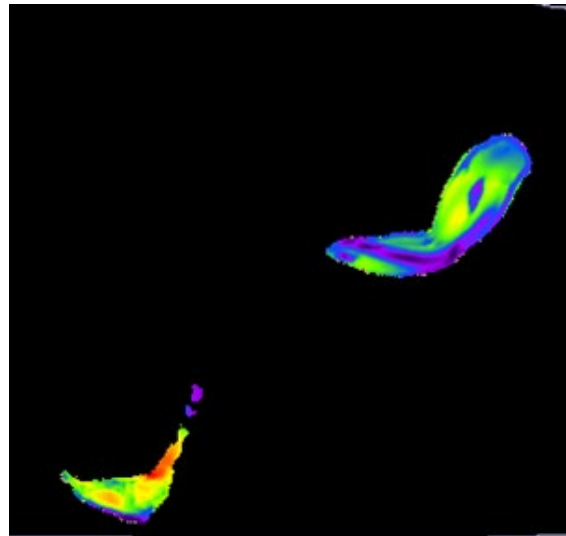
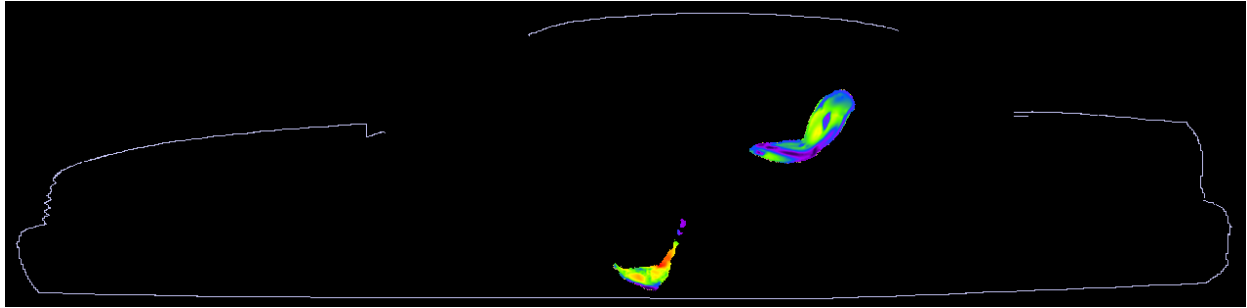
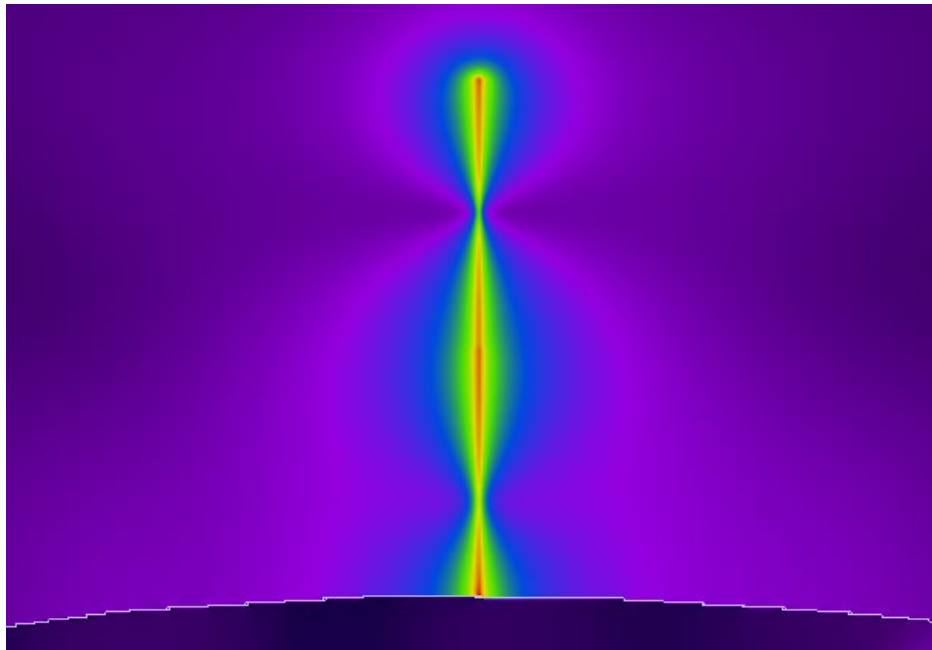
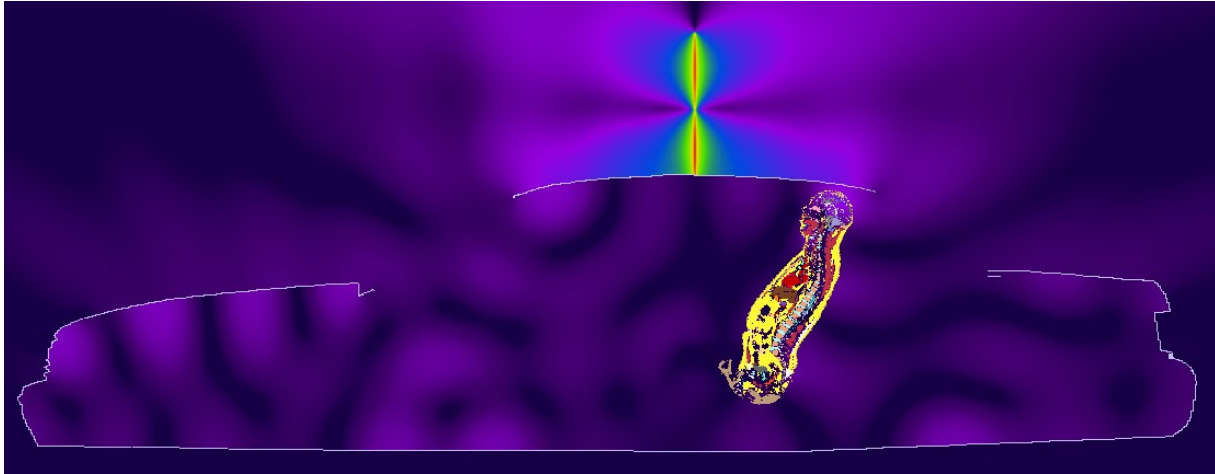
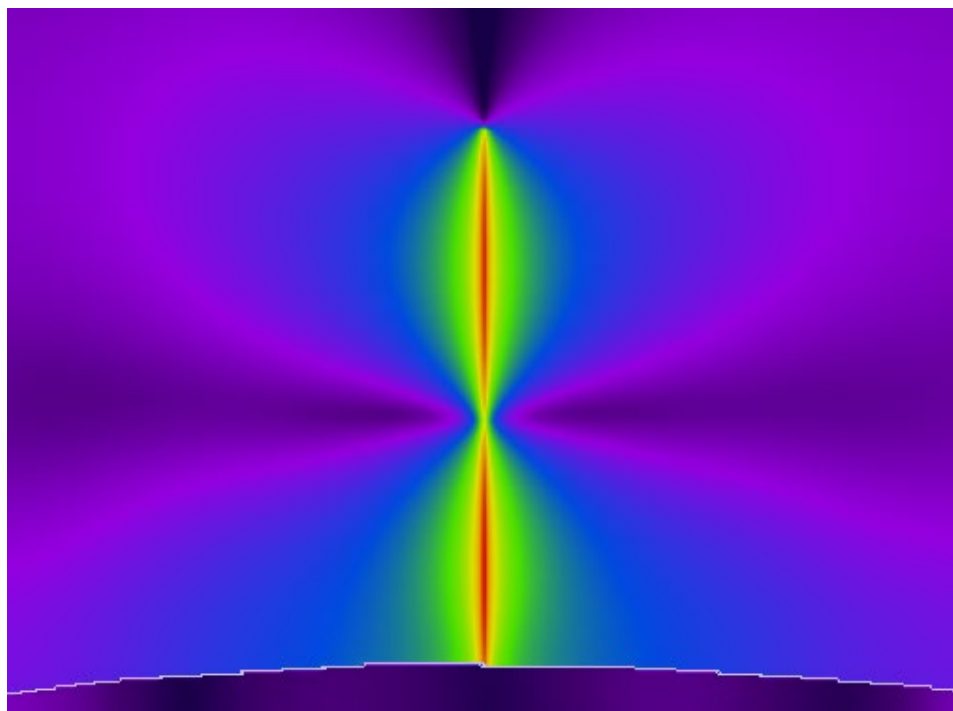
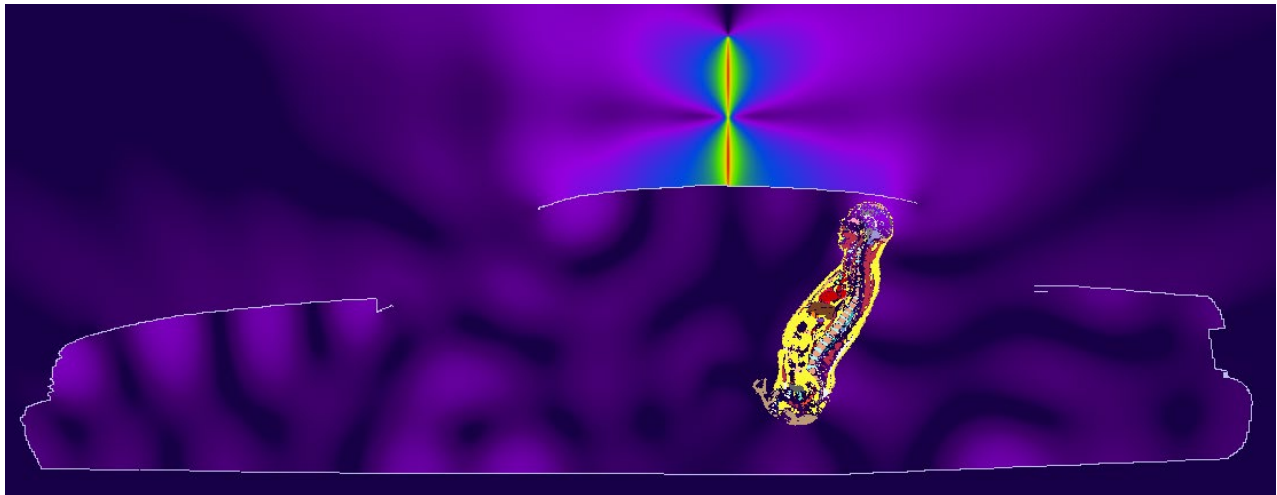


Figure 3. SAR distribution at 406.5000 MHz in the passenger model located at the center of the back seat, produced by the roof-mount HAE6010A antenna. The SAR distribution plot is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.

The plots in Figure 4 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 3.



a)



b)

Figure 4. (a) E-field magnitude distribution corresponding to exposure condition of Figure 3, and (b) H-field magnitude distribution corresponding to exposure condition of Figure 3.

The SAR distribution in the passenger exposure condition that produced the highest adjusted 1-g SAR for the Companion Device DVR VHF (FCC US) is reported in Figure 5. (162.0000 MHz, passenger on the side of the back seat, HAD4008A antenna).

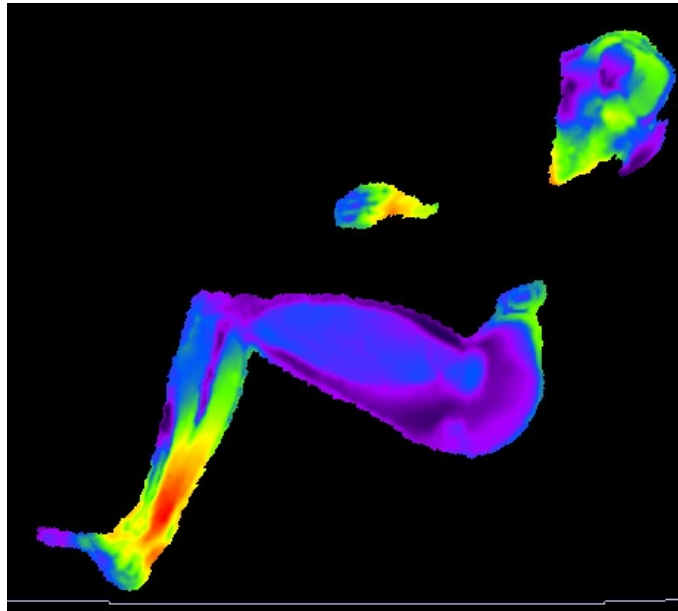
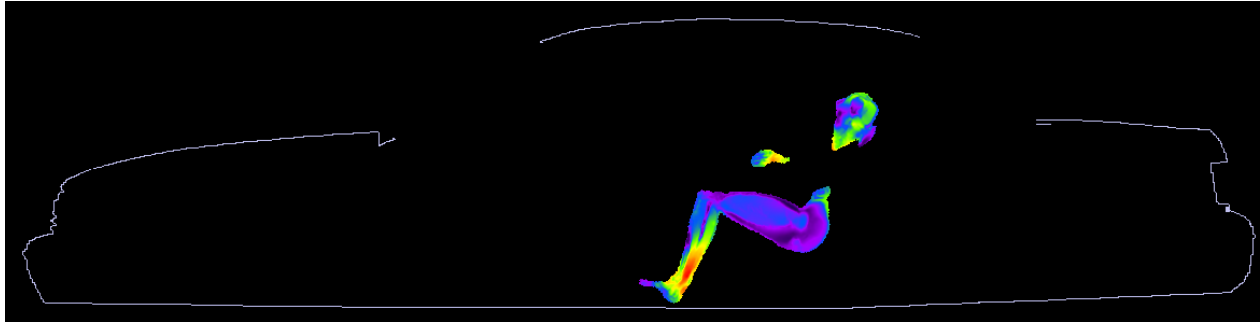
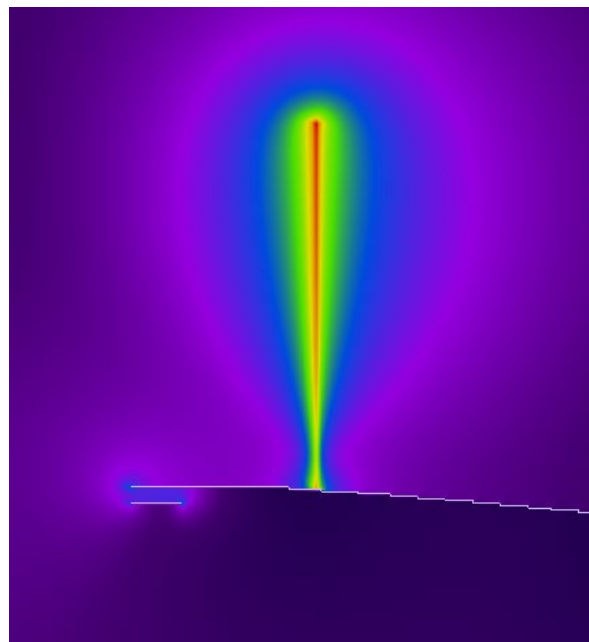
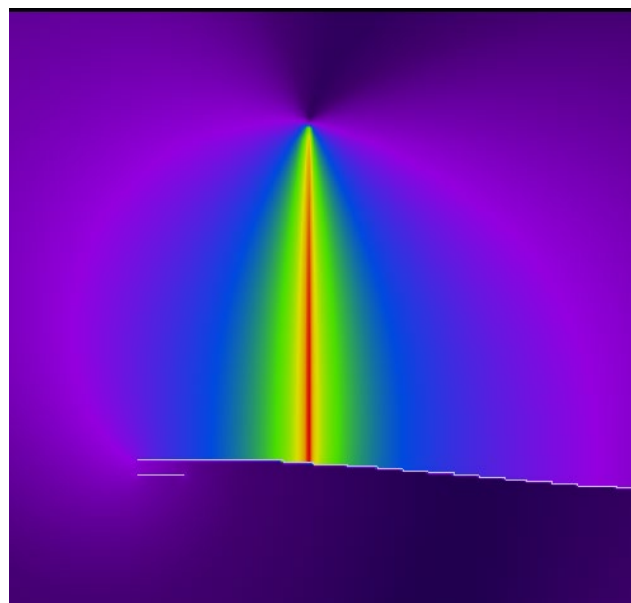
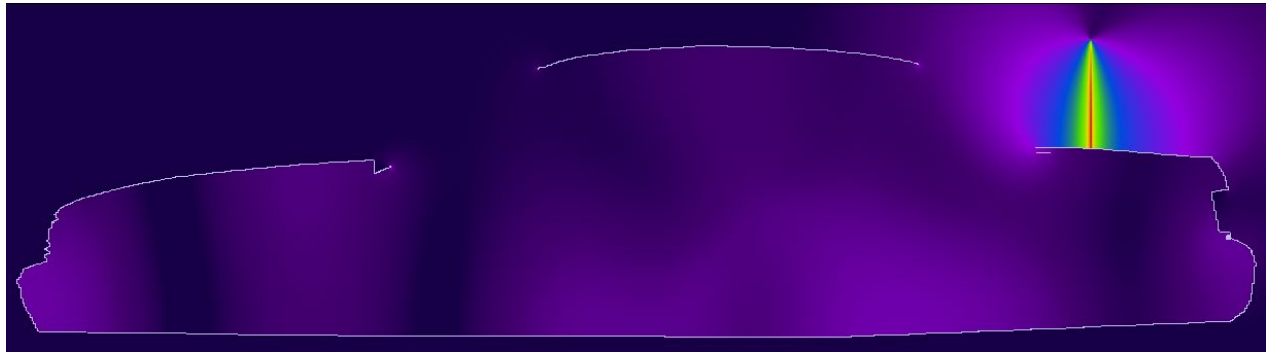


Figure 5. SAR distribution at 162.0000 MHz in the passenger model located on the side of the back seat, produced by the trunk-mount HAD4008A antenna. The SAR distribution plot is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.

The plots in Figure 6 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 5.



a)



b)

Figure 6. (a) E-field magnitude distribution corresponding to exposure condition of Figure 5, and (b) H-field magnitude distribution corresponding to exposure condition of Figure 5.

The SAR distribution in the passenger exposure condition that produced the highest adjusted 1-g SAR for Companion Device DVR VHF (ISED Canada) is reported in Figure 7. (167.7000 MHz, passenger on the side of the back seat, HAD4009A antenna).

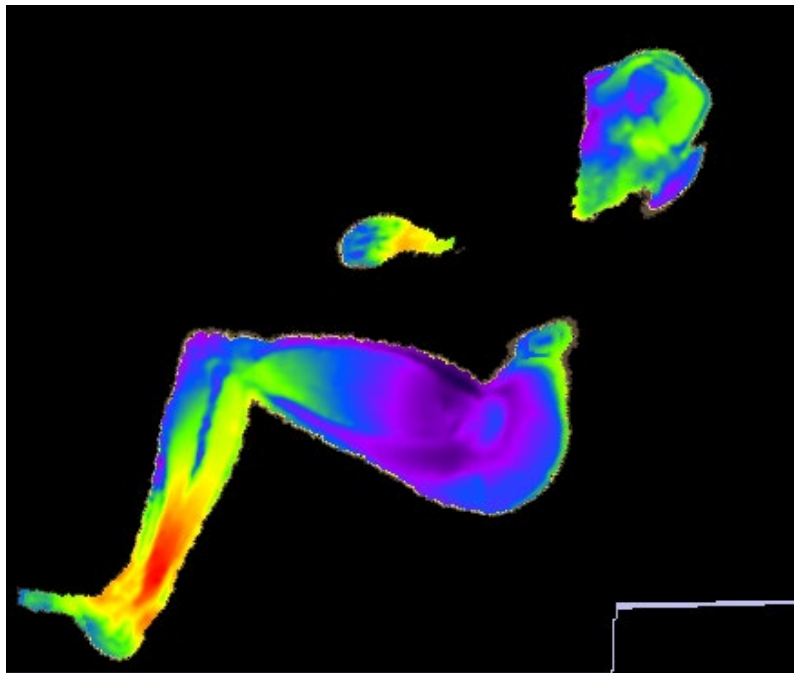
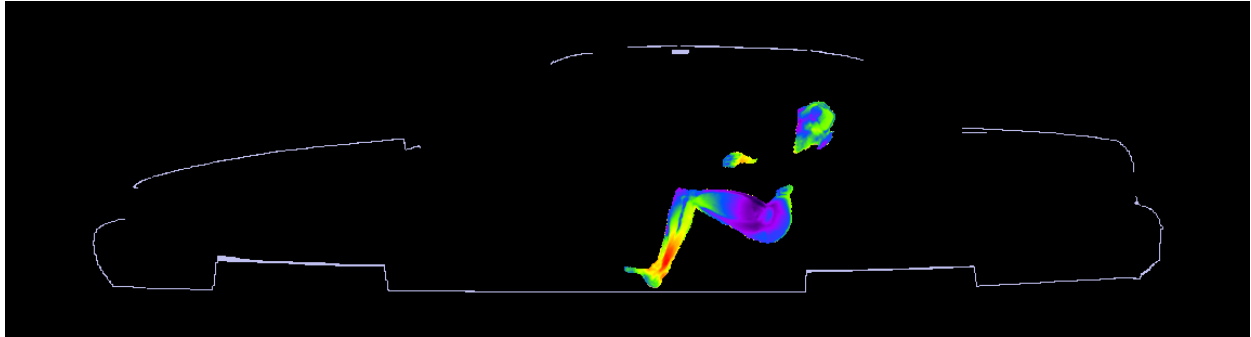
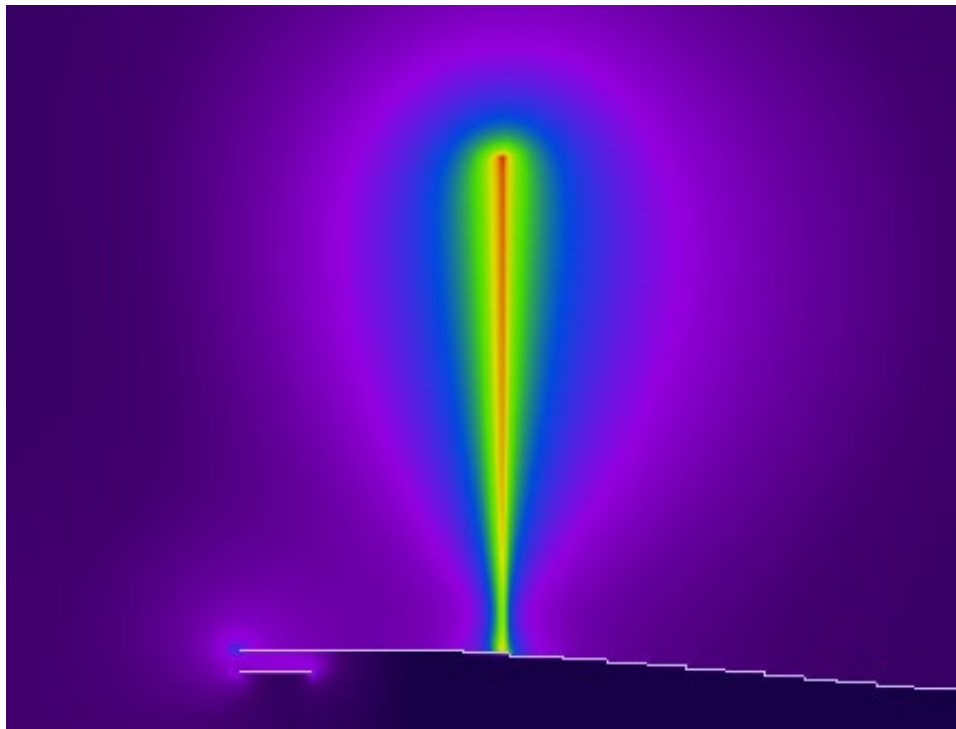
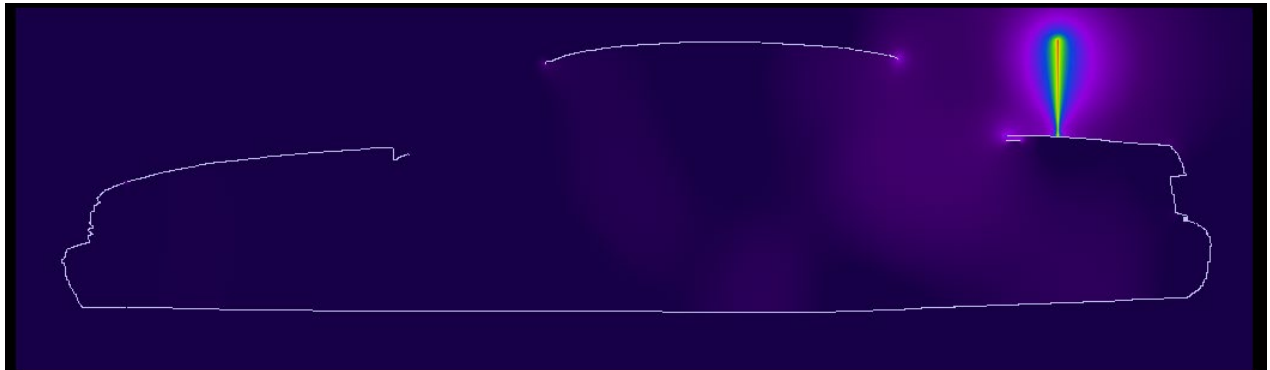
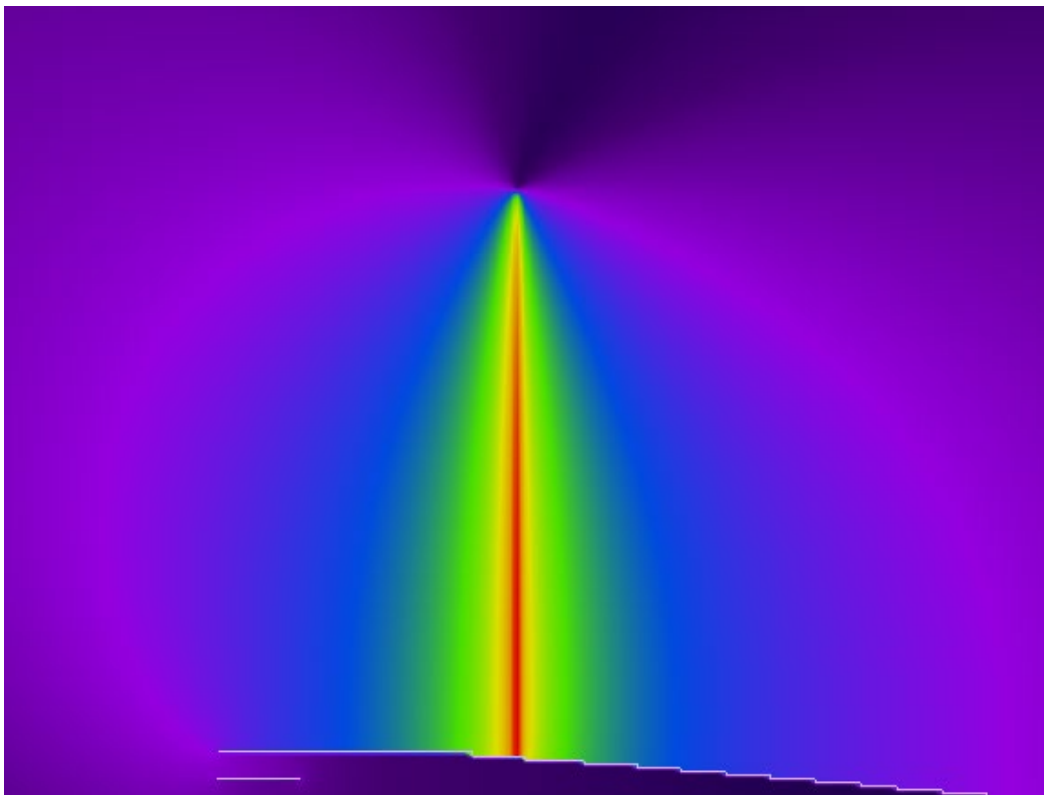
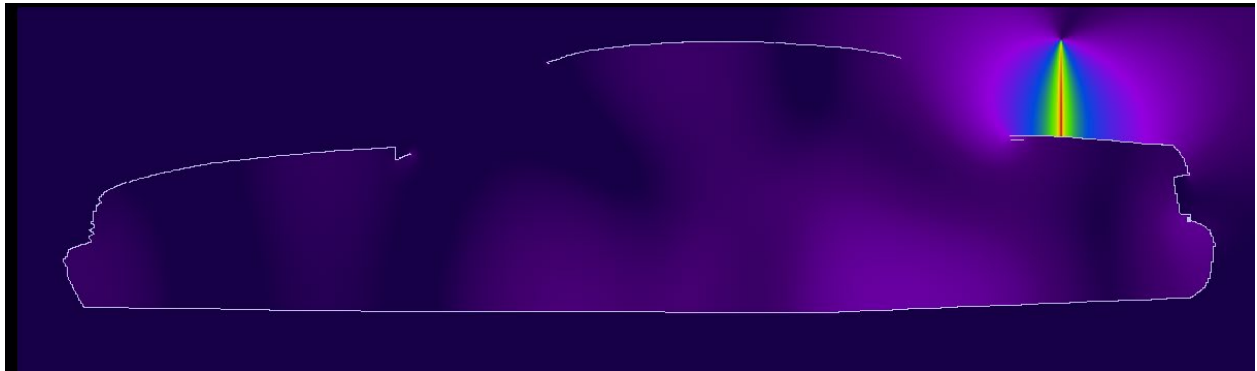


Figure 7. SAR distribution at 167.7000 MHz in the passenger model located on the side of the back seat, produced by the trunk-mount HAD4009A antenna. The SAR distribution plot is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.

The plots in Figure 8 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 7.



a)



b)

Figure 8. (a) E-field magnitude distribution corresponding to exposure condition of Figure 7, and (b) H-field magnitude distribution corresponding to exposure condition of Figure 7.

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 US)

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE4003A	450.0125	HAD4008A	162.0000	132.17	Back Center Back Side	0.08 0.10	0.003 0.006	0.31 0.67	0.018 0.019	0.39 0.77	0.021 0.025	
HAE4003A	460.0000	HAD4008A	162.0000	126.77								The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4003A	469.9875	HAD4008A	162.0000	126.47								
HAE4011A	450.0125	HAD4008A	162.0000	119.97	Back Center Back Side	0.03 0.04	0.001 0.001	0.31 0.67	0.018 0.019	0.34 0.71	0.019 0.020	
HAE4011A	460.0000	HAD4008A	162.0000	118.97								The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4011A	469.9875	HAD4008A	162.0000	118.97								
HAE6010A	406.5000	HAD4008A	162.0000	131.87	Back Center Back Side	0.32 0.22	0.008 0.010	0.31 0.67	0.018 0.019	0.63 0.89	0.026 0.029	
HAE6010A	419.5000	HAD4008A	162.0000	129.37	Back Center Back Side	0.21 0.15	0.004 0.007	0.31 0.67	0.018 0.019	0.52 0.82	0.022 0.026	
HAE6010A	432.9875	HAD4008A	162.0000	126.77								The 3rd highest MPE configuration has SAR below 75% of the limit
HAE6011A	406.5000	HAD4008A	162.0000	120.17	Back Center Back Side	0.14 0.07	0.003 0.004	0.31 0.67	0.018 0.019	0.45 0.74	0.021 0.023	
HAE6011A	419.5000	HAD4008A	162.0000	119.17								The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6011A	432.9875	HAD4008A	162.0000	117.67								
HAE6012A	406.5000	HAD4008A	162.0000	131.87	Back Center Back Side	0.30 0.18	0.008 0.009	0.31 0.67	0.018 0.019	0.61 0.85	0.026 0.028	
HAE6012A	419.5000	HAD4008A	162.0000	127.07	Back Center Back Side	0.24 0.14	0.004 0.007	0.31 0.67	0.018 0.019	0.55 0.81	0.022 0.026	
HAE6012A	432.9875	HAD4008A	162.0000	124.97								The 3rd highest MPE configuration has SAR below 75% of the limit

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE6013A	450.0125	HAD4008A	162.0000	133.67	Back Center Back Side	0.09 0.12	0.004 0.006	0.31 0.67	0.018 0.019	0.40 0.79	0.022 0.025	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6013A	406.5000	HAD4008A	162.0000	133.47								
HAE6013A	450.0125	HAD4008A	162.0000	133.67								
HAE6013A	438.0125	HAD4008A	162.0000	128.77								
HAE6013A	469.9875	HAD4008A	162.0000	127.97								
HAE6013A	422.0125	HAD4008A	162.0000	125.37								
HAE6015A	450.0125	HAD4008A	162.0000	133.17	Back Center Back Side	0.09 0.12	0.004 0.006	0.31 0.67	0.018 0.019	0.40 0.79	0.022 0.025	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6015A	460.0000	HAD4008A	162.0000	129.87								
HAE6015A	469.9875	HAD4008A	162.0000	126.57								
HAE6016A	450.0125	HAD4008A	162.0000	128.07	Back Center Back Side	0.07 0.09	0.003 0.005	0.31 0.67	0.018 0.019	0.38 0.76	0.021 0.024	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6016A	460.0000	HAD4008A	162.0000	127.17								
HAE6016A	469.9875	HAD4008A	162.0000	124.57								
HAE6031A	450.0125	HAD4008A	162.0000	130.67	Back Center Back Side	0.09 0.12	0.004 0.006	0.31 0.67	0.018 0.019	0.40 0.79	0.022 0.025	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6031A	406.5000	HAD4008A	162.0000	130.47								
HAE6031A	422.0125	HAD4008A	162.0000	127.37								
HAE6031A	438.0125	HAD4008A	162.0000	127.17								
HAE6031A	469.9875	HAD4008A	162.0000	126.27								
*RAE4014ARB	469.9875	HAD4008A	162.0000	118.77	Back Center Back Side	0.03 0.02	0.001 0.002	0.31 0.67	0.018 0.019	0.34 0.69	0.019 0.021	
*RAE4014ARB	450.0125	HAD4008A	162.0000	118.67	Back Center Back Side	0.02 0.02	0.001 0.002	0.31 0.67	0.018 0.019	0.33 0.69	0.019 0.021	
*RAE4014ARB	460.0000	HAD4008A	162.0000	118.37	Back Center Back Side	0.03 0.03	0.001 0.002	0.31 0.67	0.018 0.019	0.34 0.70	0.019 0.021	
HAE4003A	450.0125	HAD4009A	173.4000	109.67	Back Center Back Side	0.08 0.10	0.003 0.006	0.19 0.52	0.013 0.015	0.27 0.62	0.02 0.02	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4003A	460.0000	HAD4009A	173.4000	104.27								
HAE4003A	469.9875	HAD4009A	173.4000	103.97								
HAE4003A	450.0125	HAD4009A	162.0000	103.57								
HAE6010A	406.5000	HAD4009A	173.4000	109.37	Back Center Back Side	0.32 0.22	0.008 0.010	0.19 0.52	0.013 0.015	0.51 0.74	0.02 0.03	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6010A	419.5000	HAD4009A	173.4000	106.87								
HAE6010A	432.9875	HAD4009A	173.4000	104.27								
HAE6010A	406.5000	HAD4009A	162.0000	103.27								
HAE6010A	419.5000	HAD4009A	162.0000	100.77								
HAE6012A	406.5000	HAD4009A	173.4000	109.37	Back Center Back Side	0.30 0.18	0.008 0.009	0.19 0.52	0.013 0.015	0.49 0.70	0.02 0.02	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6012A	419.5000	HAD4009A	173.4000	104.57								
HAE6012A	406.5000	HAD4009A	162.0000	103.27								
HAE6012A	432.9875	HAD4009A	173.4000	102.47								
HAE6013A	450.0125	HAD4009A	173.4000	111.17	Back Center Back Side	0.09 0.12	0.004 0.006	0.19 0.52	0.013 0.015	0.28 0.64	0.02 0.02	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6013A	406.5000	HAD4009A	173.4000	110.97								
HAE6013A	438.0125	HAD4009A	173.4000	106.27								
HAE6013A	469.9875	HAD4009A	173.4000	105.47								
HAE6013A	450.0125	HAD4009A	162.0000	105.07								
HAE6013A	406.5000	HAD4009A	162.0000	104.87								
HAE6013A	422.0125	HAD4009A	173.4000	102.87								
HAE6013A	438.0125	HAD4009A	162.0000	100.17								

* Antenna length trimmed to frequency.

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE6015A	450.0125	HAD4009A	173.4000	110.67	Back Center Back Side	0.09 0.12	0.004 0.006	0.19 0.52	0.013 0.015	0.28 0.64	0.02 0.02	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6015A	460.0000	HAD4009A	173.4000	107.37								
HAE6015A	450.0125	HAD4009A	162.0000	104.57								
HAE6015A	469.9875	HAD4009A	173.4000	104.07								
HAE6015A	460.0000	HAD4009A	162.0000	101.27								
HAE6016A	450.0125	HAD4009A	173.4000	105.57	Back Center Back Side	0.07 0.09	0.003 0.005	0.19 0.52	0.013 0.015	0.26 0.61	0.02 0.02	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6016A	460.0000	HAD4009A	173.4000	104.67								
HAE6016A	469.9875	HAD4009A	173.4000	102.07								
HAE6031A	450.0125	HAD4009A	173.4000	108.17	Back Center Back Side	0.09 0.12	0.004 0.006	0.19 0.52	0.013 0.015	0.28 0.64	0.02 0.02	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6031A	406.5000	HAD4009A	173.4000	107.97								
HAE6031A	422.0125	HAD4009A	173.4000	104.87								
HAE6031A	438.0125	HAD4009A	173.4000	104.67								
HAE6031A	469.9875	HAD4009A	173.4000	103.77								
HAE6031A	450.0125	HAD4009A	162.0000	102.07								
HAE6031A	406.5000	HAD4009A	162.0000	101.87								

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE4003A	450.0125	HAD4006A	140.0000	182.20	Back Center Back Side	0.08 0.10	0.003 0.006	0.12 0.20	0.007 0.008	0.20 0.30	0.010 0.014	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4003A	460.0000	HAD4006A	140.0000	172.90								
HAE4003A	469.9875	HAD4006A	140.0000	172.50								
HAE4003A	450.0125	HAD4006A	144.0000	160.50								
HAE4003A	460.0000	HAD4006A	144.0000	151.20								
HAE4003A	469.9875	HAD4006A	144.0000	150.80								
HAE4011A	450.0125	HAD4006A	140.0000	160.70	Back Center Back Side	0.03 0.04	0.001 0.001	0.12 0.20	0.007 0.008	0.15 0.24	0.008 0.009	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4011A	460.0000	HAD4006A	140.0000	159.00								
HAE4011A	469.9875	HAD4006A	140.0000	159.00								
HAE4011A	450.0125	HAD4006A	144.0000	139.00								
HAE4011A	460.0000	HAD4006A	144.0000	137.30								
HAE4011A	469.9875	HAD4006A	144.0000	137.30								
HAE6010A	406.5000	HAD4006A	140.0000	180.90	Back Center Back Side	0.32 0.22	0.008 0.010	0.12 0.20	0.007 0.008	0.44 0.42	0.015 0.018	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6010A	419.5000	HAD4006A	140.0000	176.80								
HAE6010A	406.5000	HAD4006A	144.0000	159.20								
HAE6010A	419.5000	HAD4006A	144.0000	155.10								

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE6011A	406.5000	HAD4006A	140.0000	161.00	Back Center Back Side	0.14 0.07	0.003 0.004	0.12 0.20	0.007 0.008	0.26 0.27	0.010 0.012	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6011A	419.5000	HAD4006A	140.0000	159.40								
HAE6011A	406.5000	HAD4006A	144.0000	139.30								
HAE6011A	419.5000	HAD4006A	144.0000	137.70								
HAE6012A	406.5000	HAD4006A	140.0000	180.90	Back Center Back Side	0.30 0.18	0.008 0.009	0.12 0.20	0.007 0.008	0.42 0.38	0.015 0.017	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6012A	419.5000	HAD4006A	140.0000	172.80								
HAE6012A	406.5000	HAD4006A	144.0000	159.20								
HAE6012A	419.5000	HAD4006A	144.0000	151.10								
HAE6013A	450.0125	HAD4006A	140.0000	185.00	Back Center Back Side	0.09 0.12	0.004 0.006	0.12 0.20	0.007 0.008	0.21 0.32	0.011 0.014	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6013A	406.5000	HAD4006A	140.0000	183.60								
HAE6013A	469.9875	HAD4006A	140.0000	175.10								
HAE6013A	422.0125	HAD4006A	140.0000	170.10								
HAE6013A	450.0125	HAD4006A	144.0000	163.30								
HAE6013A	406.5000	HAD4006A	144.0000	161.90								
HAE6013A	469.9875	HAD4006A	144.0000	153.40								
HAE6013A	422.0125	HAD4006A	144.0000	148.40								
HAE6015A	450.0125	HAD4006A	140.0000	184.10	Back Center Back Side	0.09 0.12	0.004 0.006	0.12 0.20	0.007 0.008	0.21 0.32	0.011 0.014	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6015A	460.0000	HAD4006A	140.0000	178.30								
HAE6015A	469.9875	HAD4006A	140.0000	172.70								
HAE6015A	450.0125	HAD4006A	144.0000	162.40								
HAE6015A	460.0000	HAD4006A	144.0000	156.60								
HAE6015A	469.9875	HAD4006A	144.0000	151.00								
HAE6016A	450.0125	HAD4006A	140.0000	175.00	Back Center Back Side	0.07 0.09	0.003 0.005	0.12 0.20	0.007 0.008	0.19 0.29	0.010 0.013	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6016A	460.0000	HAD4006A	140.0000	173.60								
HAE6016A	469.9875	HAD4006A	140.0000	169.10								
HAE6016A	450.0125	HAD4006A	144.0000	153.30								
HAE6016A	460.0000	HAD4006A	144.0000	151.90								
HAE6016A	469.9875	HAD4006A	144.0000	147.40								
HAE6031A	450.0125	HAD4006A	140.0000	179.70	Back Center Back Side	0.09 0.12	0.004 0.006	0.12 0.20	0.007 0.008	0.21 0.32	0.011 0.014	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6031A	406.5000	HAD4006A	140.0000	178.50								
HAE6031A	422.0125	HAD4006A	140.0000	173.40								
HAE6031A	469.9875	HAD4006A	140.0000	172.20								
HAE6031A	450.0125	HAD4006A	144.0000	158.00								
HAE6031A	406.5000	HAD4006A	144.0000	156.80								
HAE6031A	422.0125	HAD4006A	144.0000	151.70								
HAE6031A	469.9875	HAD4006A	144.0000	150.50								
*RAE4014ARB	469.9875	HAD4006A	140.0000	158.70	Back Center Back Side	0.03 0.02	0.001 0.002	0.12 0.20	0.007 0.008	0.15 0.22	0.008 0.010	
*RAE4014ARB	450.0125	HAD4006A	140.0000	158.50	Back Center Back Side	0.02 0.02	0.001 0.002	0.12 0.20	0.007 0.008	0.14 0.22	0.008 0.010	
*RAE4014ARB	460.0000	HAD4006A	140.0000	158.10	Back Center Back Side	0.03 0.03	0.001 0.002	0.12 0.20	0.007 0.008	0.15 0.23	0.008 0.010	
*RAE4014ARB	469.9875	HAD4006A	144.0000	137.00	Back Center Back Side	0.03 0.02	0.001 0.002	0.34 0.27	0.018 0.014	0.37 0.29	0.019 0.016	
*RAE4014ARB	450.0125	HAD4006A	144.0000	136.80	Back Center Back Side	0.02 0.02	0.001 0.002	0.34 0.27	0.018 0.014	0.36 0.29	0.019 0.016	
*RAE4014ARB	460.0000	HAD4006A	144.0000	136.40	Back Center Back Side	0.03 0.03	0.001 0.002	0.34 0.27	0.018 0.014	0.37 0.30	0.019 0.016	

* Antenna length trimmed to frequency.

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE4003A	450.0125	HAD4007A	144.0000	143.70	Back Center Back Side	0.08 0.10	0.003 0.006	0.34 0.27	0.018 0.014	0.42 0.37	0.021 0.020	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4003A	460.0000	HAD4007A	144.0000	134.40								
HAE4003A	469.9875	HAD4007A	144.0000	134.00								
HAE4003A	450.0125	HAD4007A	150.8000	110.40								
HAE4003A	460.0000	HAD4007A	150.8000	101.10								
HAE4003A	469.9875	HAD4007A	150.8000	100.70								
HAE4011A	450.0125	HAD4007A	144.0000	122.20	Back Center Back Side	0.03 0.04	0.001 0.001	0.34 0.27	0.018 0.014	0.37 0.31	0.019 0.015	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4011A	460.0000	HAD4007A	144.0000	120.50								
HAE4011A	469.9875	HAD4007A	144.0000	120.50								
HAE6010A	406.5000	HAD4007A	144.0000	142.40	Back Center Back Side	0.32 0.22	0.008 0.010	0.34 0.27	0.018 0.014	0.66 0.49	0.026 0.024	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6010A	419.5000	HAD4007A	144.0000	138.30								
HAE6010A	406.5000	HAD4007A	150.8000	109.10								
HAE6010A	419.5000	HAD4007A	150.8000	105.00								
HAE6011A	406.5000	HAD4007A	144.0000	122.50	Back Center Back Side	0.14 0.07	0.003 0.004	0.34 0.27	0.018 0.014	0.48 0.34	0.021 0.018	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6011A	419.5000	HAD4007A	144.0000	120.90								
HAE6012A	406.5000	HAD4007A	144.0000	142.40	Back Center Back Side	0.30 0.18	0.008 0.009	0.34 0.27	0.018 0.014	0.64 0.45	0.026 0.023	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6012A	419.5000	HAD4007A	144.0000	134.30								
HAE6012A	406.5000	HAD4007A	150.8000	109.10								
HAE6012A	419.5000	HAD4007A	150.8000	101.00								
HAE6013A	450.0125	HAD4007A	144.0000	146.50	Back Center Back Side	0.09 0.12	0.004 0.006	0.34 0.27	0.018 0.014	0.43 0.39	0.022 0.020	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6013A	406.5000	HAD4007A	144.0000	145.10								
HAE6013A	469.9875	HAD4007A	144.0000	136.60								
HAE6013A	422.0125	HAD4007A	144.0000	131.60								
HAE6013A	450.0125	HAD4007A	150.8000	113.20								
HAE6013A	406.5000	HAD4007A	150.8000	111.80								
HAE6013A	469.9875	HAD4007A	150.8000	103.30								
HAE6015A	450.0125	HAD4007A	144.0000	145.60	Back Center Back Side	0.09 0.12	0.004 0.006	0.34 0.27	0.018 0.014	0.43 0.39	0.022 0.020	
HAE6015A	460.0000	HAD4007A	144.0000	139.80								
HAE6015A	469.9875	HAD4007A	144.0000	134.20								
HAE6015A	450.0125	HAD4007A	150.8000	112.30								
HAE6015A	460.0000	HAD4007A	150.8000	106.50								
HAE6015A	469.9875	HAD4007A	150.8000	100.90								
HAE6016A	450.0125	HAD4007A	144.0000	136.50	Back Center Back Side	0.07 0.09	0.003 0.005	0.34 0.27	0.018 0.014	0.41 0.36	0.021 0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6016A	460.0000	HAD4007A	144.0000	135.10								
HAE6016A	469.9875	HAD4007A	144.0000	130.60								
HAE6016A	450.0125	HAD4007A	150.8000	103.20								
HAE6016A	460.0000	HAD4007A	150.8000	101.80								
HAE6031A	450.0125	HAD4007A	144.0000	141.20	Back Center Back Side	0.09 0.12	0.004 0.006	0.34 0.27	0.018 0.014	0.43 0.39	0.022 0.020	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6031A	406.5000	HAD4007A	144.0000	140.00								
HAE6031A	422.0125	HAD4007A	144.0000	134.90								
HAE6031A	469.9875	HAD4007A	144.0000	133.70								
HAE6031A	450.0125	HAD4007A	150.8000	107.90								
HAE6031A	406.5000	HAD4007A	150.8000	106.70								
HAE6031A	422.0125	HAD4007A	150.8000	101.60								
HAE6031A	469.9875	HAD4007A	150.8000	100.40								
*RAE4014ARB	469.9875	HAD4007A	144.0000	120.20	Back Center Back Side	0.03 0.02	0.001 0.002	0.34 0.27	0.018 0.014	0.37 0.29	0.019 0.016	
*RAE4014ARB	450.0125	HAD4007A	144.0000	120.00	Back Center Back Side	0.02 0.02	0.001 0.002	0.34 0.27	0.018 0.014	0.36 0.29	0.019 0.016	
*RAE4014ARB	460.0000	HAD4007A	144.0000	119.60	Back Center Back Side	0.03 0.03	0.001 0.002	0.34 0.27	0.018 0.014	0.37 0.30	0.019 0.016	

* Antenna length trimmed to frequency.

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE4003A	450.0125	HAD4008A	162.0000	208.60	Back Center	0.08	0.003	0.31	0.018	0.39	0.021	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4003A	460.0000	HAD4008A	162.0000	199.30	Back Side	0.10	0.006	0.67	0.019	0.77	0.025	
HAE4003A	469.9875	HAD4008A	162.0000	198.90								
HAE4003A	450.0125	HAD4008A	156.4000	141.00								
HAE4003A	460.0000	HAD4008A	156.4000	131.70								
HAE4003A	469.9875	HAD4008A	156.4000	131.30								
HAE4003A	450.0125	HAD4008A	150.8000	106.60								
HAE4011A	450.0125	HAD4008A	162.0000	187.10	Back Center	0.03	0.001	0.31	0.018	0.34	0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4011A	460.0000	HAD4008A	162.0000	185.40	Back Side	0.04	0.001	0.67	0.019	0.71	0.020	
HAE4011A	469.9875	HAD4008A	162.0000	185.40								
HAE4011A	450.0125	HAD4008A	156.4000	119.50								
HAE4011A	460.0000	HAD4008A	156.4000	117.80								
HAE4011A	469.9875	HAD4008A	156.4000	117.80								
HAE6010A	406.5000	HAD4008A	162.0000	207.30	Back Center	0.32	0.008	0.31	0.018	0.63	0.026	The 3rd highest MPE configuration has SAR below 75% of the limit
HAE6010A	419.5000	HAD4008A	162.0000	203.20	Back Side	0.22	0.010	0.67	0.019	0.89	0.029	
HAE6010A	419.5000	HAD4008A	162.0000	203.20	Back Center	0.21	0.004	0.31	0.018	0.52	0.022	
HAE6010A	419.5000	HAD4008A	162.0000	203.20	Back Side	0.15	0.007	0.67	0.019	0.82	0.026	
HAE6010A	406.5000	HAD4008A	156.4000	139.70								
HAE6010A	419.5000	HAD4008A	156.4000	135.60								
HAE6010A	406.5000	HAD4008A	150.8000	105.30								
HAE6010A	419.5000	HAD4008A	150.8000	101.20								
HAE6011A	406.5000	HAD4008A	162.0000	187.40	Back Center	0.14	0.003	0.31	0.018	0.45	0.021	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6011A	419.5000	HAD4008A	162.0000	185.80	Back Side	0.07	0.004	0.67	0.019	0.74	0.023	
HAE6011A	406.5000	HAD4008A	156.4000	119.80								
HAE6011A	419.5000	HAD4008A	156.4000	118.20								
HAE6012A	406.5000	HAD4008A	162.0000	207.30	Back Center	0.30	0.008	0.31	0.018	0.61	0.026	
HAE6012A	419.5000	HAD4008A	162.0000	199.20	Back Side	0.18	0.009	0.67	0.019	0.85	0.028	
HAE6012A	419.5000	HAD4008A	162.0000	199.20	Back Center	0.24	0.004	0.31	0.018	0.55	0.022	
HAE6012A	419.5000	HAD4008A	162.0000	199.20	Back Side	0.14	0.007	0.67	0.019	0.81	0.026	
HAE6012A	406.5000	HAD4008A	156.4000	139.70								
HAE6012A	419.5000	HAD4008A	156.4000	131.60								
HAE6012A	406.5000	HAD4008A	150.8000	105.30								
HAE6013A	450.0125	HAD4008A	162.0000	211.40	Back Center	0.09	0.004	0.31	0.018	0.40	0.022	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6013A	460.0000	HAD4008A	162.0000	210.00	Back Side	0.12	0.006	0.67	0.019	0.79	0.025	
HAE6013A	469.9875	HAD4008A	162.0000	201.50								
HAE6013A	422.0125	HAD4008A	162.0000	196.50								
HAE6013A	450.0125	HAD4008A	156.4000	143.80								
HAE6013A	406.5000	HAD4008A	156.4000	142.40								
HAE6013A	469.9875	HAD4008A	156.4000	133.90								
HAE6013A	422.0125	HAD4008A	156.4000	128.90								
HAE6013A	450.0125	HAD4008A	150.8000	109.40								
HAE6013A	406.5000	HAD4008A	150.8000	108.00								
HAE6015A	450.0125	HAD4008A	162.0000	210.50	Back Center	0.09	0.004	0.31	0.018	0.40	0.022	
HAE6015A	460.0000	HAD4008A	162.0000	204.70	Back Side	0.12	0.006	0.67	0.019	0.79	0.025	
HAE6015A	469.9875	HAD4008A	162.0000	199.10								
HAE6015A	450.0125	HAD4008A	156.4000	142.90								
HAE6015A	460.0000	HAD4008A	156.4000	137.10								
HAE6015A	469.9875	HAD4008A	156.4000	131.50								
HAE6015A	450.0125	HAD4008A	150.8000	108.50								
HAE6015A	460.0000	HAD4008A	150.8000	102.70								
HAE6016A	450.0125	HAD4008A	162.0000	201.40	Back Center	0.07	0.003	0.31	0.018	0.38	0.021	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6016A	460.0000	HAD4008A	162.0000	200.00	Back Side	0.09	0.005	0.67	0.019	0.76	0.024	
HAE6016A	469.9875	HAD4008A	162.0000	195.50								
HAE6016A	450.0125	HAD4008A	156.4000	133.80								
HAE6016A	460.0000	HAD4008A	156.4000	132.40								
HAE6016A	469.9875	HAD4008A	156.4000	127.90								
HAE6031A	450.0125	HAD4008A	162.0000	206.10	Back Center	0.09	0.004	0.31	0.018	0.40	0.022	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6031A	460.0000	HAD4008A	162.0000	204.90	Back Side	0.12	0.006	0.67	0.019	0.79	0.025	
HAE6031A	469.9875	HAD4008A	162.0000	199.80								
HAE6031A	422.0125	HAD4008A	162.0000	199.80								
HAE6031A	469.9875	HAD4008A	162.0000	198.60								
HAE6031A	450.0125	HAD4008A	156.4000	138.50								
HAE6031A	406.5000	HAD4008A	156.4000	137.30								
HAE6031A	422.0125	HAD4008A	156.4000	132.20								
HAE6031A	469.9875	HAD4008A	156.4000	131.00								
HAE6031A	450.0125	HAD4008A	150.8000	104.10								
HAE6031A	406.5000	HAD4008A	150.8000	102.90								
*RAE4014ARB	469.9875	HAD4008A	162.0000	185.10	Back Center	0.03	0.001	0.31	0.018	0.34	0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	450.0125	HAD4008A	162.0000	184.90	Back Side	0.02	0.002	0.67	0.019	0.69	0.021	
*RAE4014ARB	460.0000	HAD4008A	162.0000	184.50	Back Center	0.02	0.001	0.31	0.018	0.33	0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	469.9875	HAD4008A	156.4000	113.20	Back Side	0.02	0.002	0.67	0.019	0.69	0.021	
*RAE4014ARB	469.9875	HAD4008A	156.4000	113.20	Back Center	0.03	0.001	0.31	0.018	0.34	0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	450.0125	HAD4008A	156.4000	113.00	Back Side	0.03	0.002	0.67	0.019	0.70	0.021	
*RAE4014ARB	469.9875	HAD4008A	156.4000	113.00	Back Center	0.03	0.001	0.31	0.018	0.34	0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	450.0125	HAD4008A	156.4000	113.00	Back Side	0.03	0.002	0.67	0.019	0.70	0.021	
*RAE4014ARB	469.9875	HAD4008A	156.4000	113.00	Back Center	0.02	0.001	0.31	0.017	0.25	0.018	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	450.0125	HAD4008A	156.4000	113.00	Back Side	0.02	0.002	0.63	0.018	0.65	0.020	
*RAE4014ARB	469.9875	HAD4008A	156.4000	113.00	Back Center	0.03	0.001	0.31	0.017	0.26	0.018	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	450.0125	HAD4008A	156.4000	113.00	Back Side	0.03	0.002	0.63	0.018	0.66	0.020	
*RAE4014ARB	469.9875	HAD4008A	156.4000	113.00	Back Center	0.03	0.001	0.31	0.017	0.26	0.018	The 2nd highest MPE configuration has SAR below 50% of the limit
*RAE4014ARB	450.0125	HAD4008A	156.4000	113.00	Back Side	0.03	0.002	0.63	0.018	0.66	0.020	

* Antenna length trimmed to frequency.

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE4003A	450.0125	HAD4009A	173.4000	173.70	Back Center Back Side	0.08 0.10	0.003 0.006	0.19 0.52	0.013 0.015	0.27 0.62	0.016 0.021	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4003A	460.0000	HAD4009A	173.4000	164.40								
HAE4003A	450.0125	HAD4009A	162.0000	164.30								
HAE4003A	469.9875	HAD4009A	173.4000	164.00								
HAE4003A	450.0125	HAD4009A	167.7000	155.10								
HAE4003A	460.0000	HAD4009A	162.0000	155.00								
HAE4003A	469.9875	HAD4009A	162.0000	154.60								
HAE4003A	460.0000	HAD4009A	167.7000	145.80								
HAE4003A	469.9875	HAD4009A	167.7000	145.40								
HAE4011A	450.0125	HAD4009A	173.4000	152.20	Back Center Back Side	0.03 0.04	0.001 0.001	0.19 0.52	0.013 0.015	0.22 0.56	0.014 0.016	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE4011A	460.0000	HAD4009A	173.4000	150.50								
HAE4011A	469.9875	HAD4009A	173.4000	150.50								
HAE4011A	450.0125	HAD4009A	162.0000	142.80								
HAE4011A	460.0000	HAD4009A	162.0000	141.10								
HAE4011A	469.9875	HAD4009A	162.0000	141.10								
HAE4011A	450.0125	HAD4009A	167.7000	133.60								
HAE4011A	460.0000	HAD4009A	167.7000	131.90								
HAE4011A	469.9875	HAD4009A	167.7000	131.90								
HAE6010A	406.5000	HAD4009A	173.4000	172.40	Back Center Back Side	0.32 0.22	0.008 0.010	0.19 0.52	0.013 0.015	0.51 0.74	0.021 0.025	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6010A	419.5000	HAD4009A	173.4000	168.30								
HAE6010A	406.5000	HAD4009A	162.0000	163.00								
HAE6010A	419.5000	HAD4009A	162.0000	158.90								
HAE6010A	406.5000	HAD4009A	167.7000	153.80								
HAE6010A	419.5000	HAD4009A	167.7000	149.70								
HAE6011A	406.5000	HAD4009A	173.4000	152.50	Back Center Back Side	0.14 0.07	0.003 0.004	0.19 0.52	0.013 0.015	0.33 0.59	0.016 0.019	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6011A	419.5000	HAD4009A	173.4000	150.90								
HAE6011A	406.5000	HAD4009A	162.0000	143.10								
HAE6011A	419.5000	HAD4009A	162.0000	141.50								
HAE6011A	406.5000	HAD4009A	167.7000	133.90								
HAE6011A	419.5000	HAD4009A	167.7000	132.30								
HAE6012A	406.5000	HAD4009A	173.4000	172.40	Back Center Back Side	0.30 0.18	0.008 0.009	0.19 0.52	0.013 0.015	0.49 0.70	0.021 0.024	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6012A	419.5000	HAD4009A	173.4000	164.30								
HAE6012A	406.5000	HAD4009A	162.0000	163.00								
HAE6012A	419.5000	HAD4009A	162.0000	154.90								
HAE6012A	406.5000	HAD4009A	167.7000	153.80								
HAE6012A	419.5000	HAD4009A	167.7000	145.70								
HAE6013A	450.0125	HAD4009A	173.4000	176.50	Back Center Back Side	0.09 0.12	0.004 0.006	0.19 0.52	0.013 0.015	0.28 0.64	0.017 0.021	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6013A	406.5000	HAD4009A	173.4000	175.10								
HAE6013A	450.0125	HAD4009A	162.0000	167.10								
HAE6013A	469.9875	HAD4009A	173.4000	166.60								
HAE6013A	406.5000	HAD4009A	162.0000	165.70								
HAE6013A	422.0125	HAD4009A	173.4000	161.60								
HAE6013A	450.0125	HAD4009A	167.7000	157.90								
HAE6013A	469.9875	HAD4009A	162.0000	157.20								
HAE6013A	406.5000	HAD4009A	167.7000	156.50								
HAE6013A	422.0125	HAD4009A	162.0000	152.20								
HAE6013A	469.9875	HAD4009A	167.7000	148.00								
HAE6013A	422.0125	HAD4009A	167.7000	143.00								
HAE6015A	450.0125	HAD4009A	173.4000	175.60	Back Center Back Side	0.09 0.12	0.004 0.006	0.19 0.52	0.013 0.015	0.28 0.64	0.017 0.021	
HAE6015A	460.0000	HAD4009A	173.4000	169.80								
HAE6015A	450.0125	HAD4009A	162.0000	166.20								
HAE6015A	469.9875	HAD4009A	173.4000	164.20								
HAE6015A	460.0000	HAD4009A	162.0000	160.40								
HAE6015A	450.0125	HAD4009A	167.7000	157.00								
HAE6015A	469.9875	HAD4009A	162.0000	154.80								
HAE6015A	460.0000	HAD4009A	167.7000	151.20								
HAE6015A	469.9875	HAD4009A	167.7000	145.60								
HAE6016A	450.0125	HAD4009A	173.4000	166.50	Back Center Back Side	0.07 0.09	0.003 0.005	0.19 0.52	0.013 0.015	0.26 0.61	0.016 0.020	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6016A	460.0000	HAD4009A	173.4000	165.10								
HAE6016A	469.9875	HAD4009A	173.4000	160.60								
HAE6016A	450.0125	HAD4009A	162.0000	157.10								
HAE6016A	460.0000	HAD4009A	162.0000	155.70								
HAE6016A	469.9875	HAD4009A	162.0000	151.20								
HAE6016A	450.0125	HAD4009A	167.7000	147.90								
HAE6016A	460.0000	HAD4009A	167.7000	146.50								
HAE6016A	469.9875	HAD4009A	167.7000	142.00								

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

APX 6500 UHF R1		DVRS VHF		Combine MPE (%)	Exposure Location	APX 6500 UHF R1 Adjusted SAR Results (W/kg)		DVRS 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	
HAE6031A	450.0125	HAD4009A	173.4000	171.20	Back Center Back Side	0.09 0.12	0.004 0.006	0.19 0.52	0.013 0.015	0.28 0.64	0.017 0.021	The 2nd highest MPE configuration has SAR below 50% of the limit
HAE6031A	406.5000	HAD4009A	173.4000	170.00								
HAE6031A	422.0125	HAD4009A	173.4000	164.90								
HAE6031A	469.9875	HAD4009A	173.4000	163.70								
HAE6031A	450.0125	HAD4009A	162.0000	161.80								
HAE6031A	406.5000	HAD4009A	162.0000	160.60								
HAE6031A	422.0125	HAD4009A	162.0000	155.50								
HAE6031A	469.9875	HAD4009A	162.0000	154.30								
HAE6031A	450.0125	HAD4009A	167.7000	152.60								
HAE6031A	406.5000	HAD4009A	167.7000	151.40								
HAE6031A	422.0125	HAD4009A	167.7000	146.30								
HAE6031A	469.9875	HAD4009A	167.7000	145.10								
*RAE4014ARB	469.9875	HAD4009A	173.4000	150.20	Back Center Back Side	0.03 0.02	0.001 0.002	0.19 0.52	0.013 0.015	0.22 0.54	0.014 0.017	
*RAE4014ARB	450.0125	HAD4009A	173.4000	150.00	Back Center Back Side	0.02 0.02	0.001 0.002	0.19 0.52	0.013 0.015	0.21 0.54	0.014 0.017	
*RAE4014ARB	460.0000	HAD4009A	173.4000	149.60	Back Center Back Side	0.03 0.03	0.001 0.002	0.19 0.52	0.013 0.015	0.22 0.55	0.014 0.017	
*RAE4014ARB	469.9875	HAD4009A	162.0000	140.80	Back Center Back Side	0.03 0.02	0.001 0.002	0.31 0.68	0.018 0.020	0.34 0.70	0.019 0.022	
*RAE4014ARB	450.0125	HAD4009A	162.0000	140.60	Back Center Back Side	0.02 0.02	0.001 0.002	0.31 0.68	0.018 0.020	0.33 0.70	0.019 0.022	
*RAE4014ARB	460.0000	HAD4009A	162.0000	140.20	Back Center Back Side	0.03 0.03	0.001 0.002	0.31 0.68	0.018 0.020	0.34 0.71	0.019 0.022	
*RAE4014ARB	469.9875	HAD4009A	167.7000	131.60	Back Center Back Side	0.03 0.02	0.001 0.002	0.25 0.70	0.015 0.016	0.28 0.72	0.016 0.018	
*RAE4014ARB	450.0125	HAD4009A	167.7000	131.40	Back Center Back Side	0.02 0.02	0.001 0.002	0.25 0.70	0.015 0.016	0.27 0.72	0.016 0.018	
*RAE4014ARB	460.0000	HAD4009A	167.7000	131.00	Back Center Back Side	0.03 0.03	0.001 0.002	0.25 0.70	0.015 0.016	0.28 0.73	0.016 0.018	
*RAE4014ARB	469.9875	HAD4009A	162.0000	140.80								
*RAE4014ARB	450.0125	HAD4009A	162.0000	140.60								
*RAE4014ARB	460.0000	HAD4009A	162.0000	140.20								
*RAE4014ARB	469.9875	HAD4009A	167.7000	131.60								
*RAE4014ARB	450.0125	HAD4009A	167.7000	131.40								
*RAE4014ARB	460.0000	HAD4009A	167.7000	131.00								

* Antenna length trimmed to frequency.

Results of SAR Computations for combined exposure

From all simulated results, the highest peak 1-g SAR values were identified for both DVR VHF and APX6500 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 VHF [W/kg]	Mobile APX6500 [W/kg]	Total 1-g SAR [W/kg]
FCC US	Back Center	0.31	0.32	0.63
	Back Side	0.67	0.22	0.89
ISED Canada	Back Center	0.34	0.32	0.66
	Back Side	0.70	0.22	0.92

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 VHF [W/kg]	Mobile APX6500 [W/kg]	Total WB SAR [W/kg]
FCC US	Back Center	0.018	0.008	0.026
	Back Side	0.019	0.010	0.029
ISED Canada	Back Center	0.018	0.008	0.026
	Back Side	0.020	0.010	0.030

In summary, the maximum combined peak 1-g SAR is 0.92 W/kg, less than the 1.6 W/kg limit, while the maximum combined whole-body average SAR is 0.030 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 this mobile radio product, the present analysis shows that the computed SAR values are compliant with the FCC US and ISED Canada general public 1-g and whole body 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] IEEE Standard C95.1-1999. *IEEE Standard for Safety Levels with Respect to Human Exposure to RF Electromagnetic Fields, 3 kHz to 300 GHz.*
- [3] 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) .