Product Safety and RF Energy Exposure Booklet for Digital Vehicular Repeater Systems (DVRS)

ATTENTION!

Before using this equipment, please read this booklet which contains important operating instructions for safe usage, RF energy control and compliance with exposure limits.

8F083X05 Rev. 2

FUTURECOM SYSTEMS GROUP, ULC

RF Exposure

ATTENTION!

Changes or modifications not expressly approved by Futurecom Systems Group, ULC could void the User's authority to operate the equipment.

ATTENTION!

This radio is intended for use in occupational / controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet IC limits. This radio device is NOT authorized for general population, consumer, or any other use.

It is the responsibility of the Repeater Operator to ensure that Maximum Permissible Exposure (MPE) limits are observed at all times during repeater transmissions. If this vehicular repeater is used in combination with a separate mobile radio transmitter, the Repeater operator must ensure at all times that no person comes within the MPE distance from the vehicle body to ensure compliance with the IC's RF energy exposure limits for the general population.

The minimum lateral distance between all possible personnel and the body of the DVRS equipped vehicle must be as specified in Table 1 (Stand-Alone DVR) and Table 2 (DVR interfaced to a Mobile Radio i.e. DVRS).
Failure to observe the MPE distance exclusion area around the antenna may expose persons within this area to RF energy above the IC exposure limit for bystanders (general population).

DVR MODEL (20W)	Recommended Lateral Distance from Antenna
VHF	82cm (up to 50% Tx duty cycle)
UHF	70cm (up to 50% Tx duty cycle)
700MHz	73cm (up to100% Tx duty cycle)
800MHz	76cm (up to100% Tx duty cycle)

Table 1 Recommended Lateral Distance – Stand-Alone DVR

NOTE:

50% Tx duty cycle is defined as Push To Talk (PTT), 50% Talk - 50% Listen.
100% Tx duty cycle is defined as Push To Talk (PTT), 100% Talk.

Mobile Radio Rated Power (up to 50% Tx duty cycle)	Recommended Lateral Distance from Vehicle Body
DVRS with up to 60 Watt **APX** Mobile Radio	90 cm

Table 2 Recommended Lateral Distance – DVRS (DVR Interfaced to a Mobile Radio)

IMPORTANT

The maximum allowed gain of the λ/4 omni-directional antenna for the Mobexcom P25 DVR Repeater is Unity (0dBd).

Installation Requirements for Compliance with Radio Frequency (RF) Energy Exposure Safety Standards

ATTENTION!

To ensure compliance with RF Energy Safety Standards:

- Install only Futurecom / Motorola approved antennas and accessories and set conducted power into the DVR and Mobile antennas equal to or lower than the approved power levels – refer to **Table 3** (Stand-Alone DVR) or **Table 4** (DVR interfaced to APX Mobile Radio).

- Ensure the antenna installation is consistent with the DVR Antenna Installation instructions described in this document as well as with the Mobile Radio Antenna Installation Instructions published in the applicable Motorola Installation Manual.

- Ensure the **Product & RF Safety Booklets** enclosed with the Mobile Radio and the DVR are available to the end user upon completion of the installation.

	ANTENNA			DVR MODEL				
#	Kit #	Freq. Range [MHz]	Type	700 MHz (20W) (up to 100% Tx duty cycle)	800 MHz (20W) (up to 100% Tx duty cycle)	406-430MHz (20W) (up to 50% Tx duty cycle)	450-470MHz (20W) (up to 50% Tx duty cycle)	VHF (20W) (up to 50% Tx duty cycle)
1	**HAF4016**	764-870	¼ wave	**20W**	**20W**			
2	**HAE6012A**	380-433	¼ wave			**20W**		
3	**HAE4003A**	450-470	¼ wave				**20W**	
5	**HAD4006**	136-144	¼ wave					**20W**
6	**HAD4007**	144-150.8	¼ wave					**20W**
7	**HAD4008**	150.8-162	¼ wave					**20W**
8	**HAD4009**	162-174	¼ wave					**20W**

Table 3 Approved Stand-Alone DVR Combinations

DVR: 800MHz (806 - 824MHz, 851 - 869MHz) DVR IC:2098B-DVRS800
Trunk Mounted Antenna: HAF4016A, ¼ wave, 0dBd
Mobile: Roof Mounted Antenna
Maximum conducted power delivered to antenna: DVR (W) / Mobile (W)

APX6500/ APX7500 VHF (138-174MHz) IC: 109U-92FT3824	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd					
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W					
APX6500/ APX7500 700/800MHz IC: 109U-92FT5858	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd				
Max Power: DVR / Mobile	10W / 42W	10W / 42W	10W / 42W	10W / 42W				
APX6500/ APX7500 UHF R1 (406-470MHz) IC: 109U-92FT4894	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd				
Max Power: DVR / Mobile	10W / 48W	10W / 48W	10W / 48W	10W / 48W				
APX6500/ APX7500 UHF R2 (450-470MHz) IC: 109U-92FT4896	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd				
Max Power: DVR / Mobile	10W / 54W	10W / 54W	10W / 54W	10W / 54W				
APX7500 7/800 MHz 35W - VHF 50W IC: 109U-92FT7037	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	
Max Power: DVR / Mobile	10W / 42W	10W / 42W	10W / 42W	10W / 42W	10W / 60W	10W / 60W	10W / 60W	
APX7500 UHF R1 40W - 7/800 MHz 35W IC: 109U-92FT7043	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd
Max Power: DVR / Mobile	10W / 48W	10W / 48W	10W / 48W	10W / 48W	10W / 42W	10W / 42W	10W / 42W	10W / 42W
APX7500 UHF R2 45W 7/800 MHz 35W IC: 109U-92FT7044	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd
Max Power: DVR / Mobile	10W / 54W	10W / 54W	10W / 54W	10W / 54W	10W / 42W	10W / 42W	10W / 42W	10W / 42W
APX7500 VHF 50W - UHF R1 40W IC: 109U-92FT4895	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W	10W / 48W	10W / 48W	10W / 48W	10W / 48W	
APX7500 VHF 50W - UHF R2 45W IC: 109U-92FT7047	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W	10W / 54W	10W / 54W	10W / 54W	10W / 54W	

Table 4A Approved 800MHz DVRS Configurations – APX6500 / APX7500

DVR: 700MHz (768 - 776MHz, 798 - 806MHz) DVR IC:2098B-DVRS700
Trunk Mounted Antenna: HAF4016A, ¼ wave, 0dBd
Mobile: Roof Mounted Antenna
Maximum conducted power delivered to antenna: DVR (W) / Mobile (W)

APX6500/ APX7500 VHF (138-174MHz) IC: 109U-92FT3824	HAD4008A 1/4 wave, 0dBd	HAD4009A 1/4 wave, 0dBd	HAD4021A 1/4 wave, 0dBd					
Max Power: DVR / Mobile	5W / 60W	5W / 60W	5W / 60W					
APX6500/ APX7500 700/800MHz IC: 109U-92FT5858	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd				
Max Power: DVR / Mobile	5W / 42W	5W / 42W	5W / 42W	5W / 42W				
APX6500/ APX7500 UHF R1 (406-470MHz) IC: 109U-92FT4894	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd				
Max Power: DVR / Mobile	5W / 48W	5W / 48W	5W / 48W	5W / 48W				
APX6500/ APX7500 UHF R2 (450-470MHz) IC: 109U-92FT4896	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd				
Max Power: DVR / Mobile	5W / 54W	5W / 54W	5W / 54W	5W / 54W				
APX7500 7/800 MHz 35W - VHF 50W IC: 109U-92FT7037	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAD4008A 1/4 wave, 0dBd	HAD4009A 1/4 wave, 0dBd	HAD4021A 1/4 wave, 0dBd	
Max Power: DVR / Mobile	5W / 42W	5W / 42W	5W / 42W	5W / 42W	5W / 60W	5W / 60W	5W / 60W	
APX7500 UHF R1 40W - 7/800 MHz 35W IC: 109U-92FT7043	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd
Max Power: DVR / Mobile	5W / 48W	5W / 48W	5W / 48W	5W / 48W	5W / 42W	5W / 42W	5W / 42W	5W / 42W
APX7500 UHF R2 45W 7/800 MHz 35W IC: 109U-92FT7044	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	HAF4013A, 1/4 wave, 3dBd	HAF4014A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd
Max Power: DVR / Mobile	5W / 54W	5W / 54W	5W / 54W	5W / 54W	5W / 42W	5W / 42W	5W / 42W	5W / 42W
APX7500 VHF 50W - UHF R1 40W IC: 109U-92FT4895	HAD4008A 1/4 wave, 0dBd	HAD4009A 1/4 wave, 0dBd	HAD4021A 1/4 wave, 0dBd	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	
Max Power: DVR / Mobile	5W / 60W	5W / 60W	5W / 60W	5W / 48W	5W / 48W	5W / 48W	5W / 48W	
APX7500 VHF 50W - UHF R2 45W IC: 109U-92FT7047	HAD4008A 1/4 wave, 0dBd	HAD4009A 1/4 wave, 0dBd	HAD4021A 1/4 wave, 0dBd	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	
Max Power: DVR / Mobile	5W / 60W	5W / 60W	5W / 60W	5W / 54W	5W / 54W	5W / 54W	5W / 54W	

Table 4B Approved 700MHz DVRS Configurations – APX6500 / APX7500

DVR: VHF (138 - 174MHz) DVR IC:2098B-DVRSVHF
Trunk Mounted Antenna: HAD4006A, ¼ wave, 0dBd, HAD4007A, ¼ wave, 0dBd, HAD4008A, ¼ wave, 0dBd, HAD4009A, ¼ wave, 0dBd
Mobile: Roof Mounted Antenna
Maximum conducted power delivered to antenna: DVR (W) / Mobile (W)

APX6500/ APX7500 VHF (138-174MHz) IC: 109U-92FT3824	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd				
Max Power: DVR / Mobile	6W / 60W	6W / 60W	6W / 60W				
APX6500/ APX7500 700/800MHz IC: 109U-92FT5858	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd				
Max Power: DVR / Mobile	6W / 42W	6W / 42W	6W / 42W				
APX6500/ APX7500 UHF R1 (406-470MHz) IC: 109U-92FT4894	HAE4012A, 1/4 wave, 0dBd	HAE4013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd			
Max Power: DVR / Mobile	6W / 48W	6W / 48W	6W / 48W	6W / 48W			
APX6500/ APX7500 UHF R2 (450-470MHz) IC: 109U-92FT4896	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd			
Max Power: DVR / Mobile	6W / 54W	6W / 54W	6W / 54W	6W / 54W			
APX7500 7/800 MHz 35W - VHF 50W IC: 109U-92FT7037	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	
Max Power: DVR / Mobile	6W / 42W	6W / 42W	6W / 42W	6W / 60W	6W / 60W	6W / 60W	
APX7500 UHF R1 40W - 7/800 MHz 35W IC: 109U-92FT7043	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd
Max Power: DVR / Mobile	6W / 48W	6W / 48W	6W / 48W	6W / 48W	6W / 42W	6W / 42W	6W / 42W
APX7500 UHF R2 45W 7/800 MHz 35W IC: 109U-92FT7044	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd
Max Power: DVR / Mobile	6W / 54W	6W / 54W	6W / 54W	6W / 54W	6W / 42W	6W / 42W	6W / 42W
APX7500 VHF 50W - UHF R1 40W IC: 109U-92FT4895	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd
Max Power: DVR / Mobile	6W / 60W	6W / 60W	6W / 60W	6W / 48W	6W / 48W	6W / 48W	6W / 48W
APX7500 VHF 50W - UHF R2 45W IC: 109U-92FT7047	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd
Max Power: DVR / Mobile	6W / 60W	6W / 60W	6W / 60W	6W / 54W	6W / 54W	6W / 54W	6W / 54W

Table 4C Approved VHF DVRS Configurations – APX6500 / APX7500

DVR: UHF (406.1 - 430MHz) DVR IC:2098B-DVRSUHF
Trunk Mounted Antenna: HAE6012A, ¼ wave, 0dBd
Mobile: Roof Mounted Antenna
Maximum conducted power delivered to antenna: DVR (W) / Mobile (W)

APX6500/ APX7500 VHF (138-174MHz) IC: 109U-92FT3824	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd					
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W					
APX6500/ APX7500 700/800MHz IC: 109U-92FT5858	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAF4014A, ¼ wave, 3dBd				
Max Power: DVR / Mobile	10W / 42W	10W / 42W	10W / 42W	10W / 42W				
APX6500/ APX7500 UHF R1 (406-470MHz) IC: 109U-92FT4894	HAE4012A, 1/4 wave, 0dBd	HAE4013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd				
Max Power: DVR / Mobile	10W / 48W	10W / 48W	10W / 48W	10W / 48W				
APX6500/ APX7500 UHF R2 (450-470MHz) IC: 109U-92FT4896	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd				
Max Power: DVR / Mobile	10W / 54W	10W / 54W	10W / 54W	10W / 54W				
APX7500 7/800 MHz 35W - VHF 50W IC: 109U-92FT7037	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAF4014A, ¼ wave, 3dBd	
Max Power: DVR / Mobile	10W / 42W	10W / 42W	10W / 42W	10W / 60W	10W / 60W	10W / 60W	10W / 42W	
APX7500 UHF R1 40W - 7/800 MHz 35W IC: 109U-92FT7043	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAF4014A, ¼ wave, 3dBd
Max Power: DVR / Mobile	10W / 48W	10W / 48W	10W / 48W	10W / 48W	10W / 42W	10W / 42W	10W / 42W	10W / 42W
APX7500 UHF R2 45W 7/800 MHz 35W IC: 109U-92FT7044	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAF4014A, ¼ wave, 3dBd
Max Power: DVR / Mobile	10W / 54W	10W / 54W	10W / 54W	10W / 54W	10W / 42W	10W / 42W	10W / 42W	10W / 42W
APX7500 VHF 50W - UHF R1 40W IC: 109U-92FT4895	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W	10W / 48W	10W / 48W	10W / 48W	10W / 48W	
APX7500 VHF 50W - UHF R2 45W IC: 109U-92FT7047	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W	10W / 54W	10W / 54W	10W / 54W	10W / 54W	

Table 4D Approved UHF DVRS Configurations – APX6500 / APX7500

DVR: UHF (450 - 470MHz) DVR IC:2098B-DVRSUHF
Trunk Mounted Antenna: HAE4003A, ¼ wave, 0dBd
Mobile: Roof Mounted Antenna
Maximum conducted power delivered to antenna: DVR (W) / Mobile (W)

APX6500/ APX7500 VHF (138-174MHz) IC: 109U-92FT3824	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd					
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W					
APX6500/ APX7500 700/800MHz IC: 109U-92FT5858	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAF4014A, ¼ wave, 3dBd				
Max Power: DVR / Mobile	10W / 42W	10W / 42W	10W / 42W	10W / 42W				
APX6500/ APX7500 UHF R1 (406-470MHz) IC: 109U-92FT4894	HAE4012A, 1/4 wave, 0dBd	HAE4013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd				
Max Power: DVR / Mobile	10W / 48W	10W / 48W	10W / 48W	10W / 48W				
APX6500/ APX7500 UHF R2 (450-470MHz) IC: 109U-92FT4896	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd				
Max Power: DVR / Mobile	10W / 54W	10W / 54W	10W / 54W	10W / 54W				
APX7500 7/800 MHz 35W - VHF 50W IC: 109U-92FT7037	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAF4014A, ¼ wave, 3dBd	
Max Power: DVR / Mobile	10W / 42W	10W / 42W	10W / 42W	10W / 60W	10W / 60W	10W / 60W	10W / 42W	
APX7500 UHF R1 40W - 7/800 MHz 35W IC: 109U-92FT7043	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAF4014A, ¼ wave, 3dBd
Max Power: DVR / Mobile	10W / 48W	10W / 48W	10W / 48W	10W / 48W	10W / 42W	10W / 42W	10W / 42W	10W / 42W
APX7500 UHF R2 45W 7/800 MHz 35W IC: 109U-92FT7044	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	HAF4013A, 1/4 wave, 3dBd	HAF4016A, 1/4 wave, 0dBd	HAF4017A, 1/4 wave, 3dBd	HAF4014A, ¼ wave, 3dBd
Max Power: DVR / Mobile	10W / 54W	10W / 54W	10W / 54W	10W / 54W	10W / 42W	10W / 42W	10W / 42W	10W / 42W
APX7500 VHF 50W - UHF R1 40W IC: 109U-92FT4895	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6012A, 1/4 wave, 0dBd	HAE6013A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W	10W / 48W	10W / 48W	10W / 48W	10W / 48W	
APX7500 VHF 50W - UHF R2 45W IC: 109U-92FT7047	HAD4008A, 1/4 wave, 0dBd	HAD4009A, 1/4 wave, 0dBd	HAD4021A, 1/4 wave, 0dBd	HAE6015A, 1/2 wave, 2dBd	HAE4003A, 1/4 wave, 0dBd	HAE4011A, 1/2 wave, 3.5dBd	HAE4004A, 1/4 wave, 0dBd	
Max Power: DVR / Mobile	10W / 60W	10W / 60W	10W / 60W	10W / 54W	10W / 54W	10W / 54W	10W / 54W	

Table 4E Approved UHF DVRS Configurations – APX6500 / APX7500

Antenna Installation Instructions

IMPORTANT

To assure optimum performance and compliance with Industry Canada RF Energy Safety standards, these antenna installation guidelines and instructions are limited to metal-body vehicles with appropriate ground planes and take into account the potential exposure of back seat passengers and bystanders outside the vehicle.

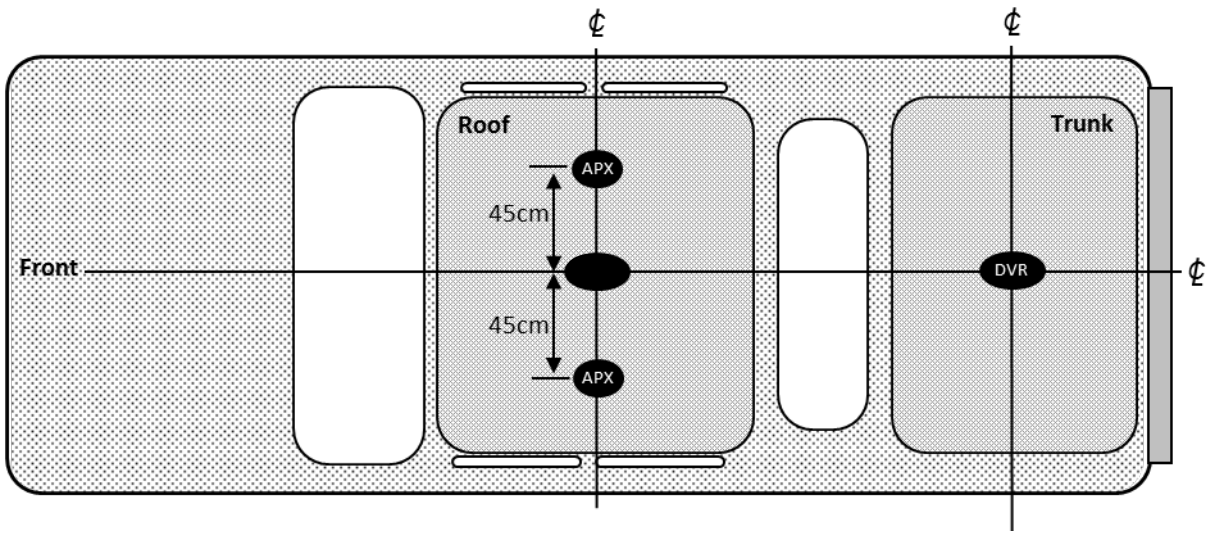
Selecting an Antenna Site/Location on a Metal Body Vehicle

External installation

Check the requirements of the antenna supplier and install the vehicle antenna external to a metal body vehicle in accordance with those requirements.

Roof top

APX mobile radio: For optimum performance and compliance with RF Energy Safety standards, mount the mobile radio antennas (dual and single band) at 45cm from the center as shown in the figure below. NOTE: For single band applications (one antenna), choose either side for the installation (not the center).



Trunk lid
For optimum performance and compliance with RF Energy Safety standards, mount the DVR antenna (DVR) in the center area of the trunk as shown above.

Before installing an antenna on the trunk lid:

- Ensure that the distance from the antenna location on the trunk lid will be at least 85 cm from the front surface of the rear seat-back to assure compliance with RF Energy Safety standards.
- Ensure that the trunk lid is grounded by connecting grounding straps between the trunk lid and the vehicle chassis.
- Ensure that the antenna cable can be easily routed to the radio. Route the antenna cable as far away as possible from any vehicle electronic control units and associated wiring.
- Check the antenna location for any electrical interference.
- Ensure that any other mobile radio antenna on this vehicle is at least 30.5cm away from the DVR and its associated mobile radio antennas.

NOTE:
Any two metal pieces rubbing against each other (such as seat springs, shift levers, trunk and hood lids, exhaust pipes etc.) in close proximity to the antenna can cause severe receiver interference.

Mobile Radio / DVR Antenna separation

To ensure interference-free performance when both the Mobile Radio and the DVR are active, the two antennas must be mounted in such way as to provide 30dB minimum antenna isolation.

Fixed DVRS Site Antennas

Mobile radio equipment is sometimes installed at a fixed location and operated as a control station or as a fixed unit. In such cases the antenna installation must comply with the following requirements in order to assure optimal performance and make sure human exposure to radio frequency electromagnetic energy is within the guidelines set forth in the above standards.

• The antennas must be mounted outside the building.
• Mount the antennas on a tower if at all possible.
• If the antennas are to be mounted on a building then it must be mounted on the roof.
• As with all fixed site antenna installations, it is the responsibility of the licensee to manage the site in accordance with applicable regulatory requirements and may require additional compliance actions such as site survey measurements, signage, and site access restrictions in order to insure that exposure limits are not exceeded.

Temporary-Fixed Site

Futurecom requires the P25 Transportable DVRS (TDVRS) operator to ensure FCC/IC Requirements for Radio Frequency Exposure are met. It is the responsibility of the Licensee to ensure that the appropriate separation distances between the antennas and bystanders are established and followed to meet the FCC and IC Maximum Permissible Exposure (MPE) Requirements in any particular Temporary-Fixed location. In situations where a site assessment is not practical, it is recommended that the antennas be located **at least 9 feet from bystanders**. This should ensure MPE compliance in any Temporary-Fixed application and is likely to be a much greater separation distance than is necessary in most cases. Failure to observe the MPE distance exclusion area around the antenna may expose persons within this area to RF energy above the FCC/IC exposure limits for bystanders (general population).

Approved Antennas and Maximum output power (W) for combination DVR and APX mobiles for Temporary-Fixed Site

NOTE:
APX mobile RF conducted antenna power in the tables below denotes up to 50% Tx duty cycle.
DVR RF conducted antenna power in the tables below denotes up to 100% Tx duty cycle.

DVR

Band	Antenna	Power (W)
VHF (138-174MHz)	DDN9014	6
UHF1 (406-430MHz)	DDN9015	10
UHF2 (450-470MHz)	DDN9015	10
700 (768-806MHz)	DDN9016	5
800 (806-869MHz)	DDN9016	10

APX

Band	Antenna	Power (W)
VHF (138-174MHz)	DDN9014	60
UHF1 (406-470MHz)	DDN9015	48
700/800 (768-870MHz)	DDN9016	42

Max Power (W) for combination DVR and APX

		APX		
	DVR/APX	**VHF**	**UHFR1**	**700/800MHz**
DVR	**VHF**	6/60	6/48	6/42
	UHFR1	10/60	10/48	10/42
	UHFR2	10/60	10/48	10/42
	700MHz	5/60	5/48	5/42
	800MHz	10/60	10/48	10/42