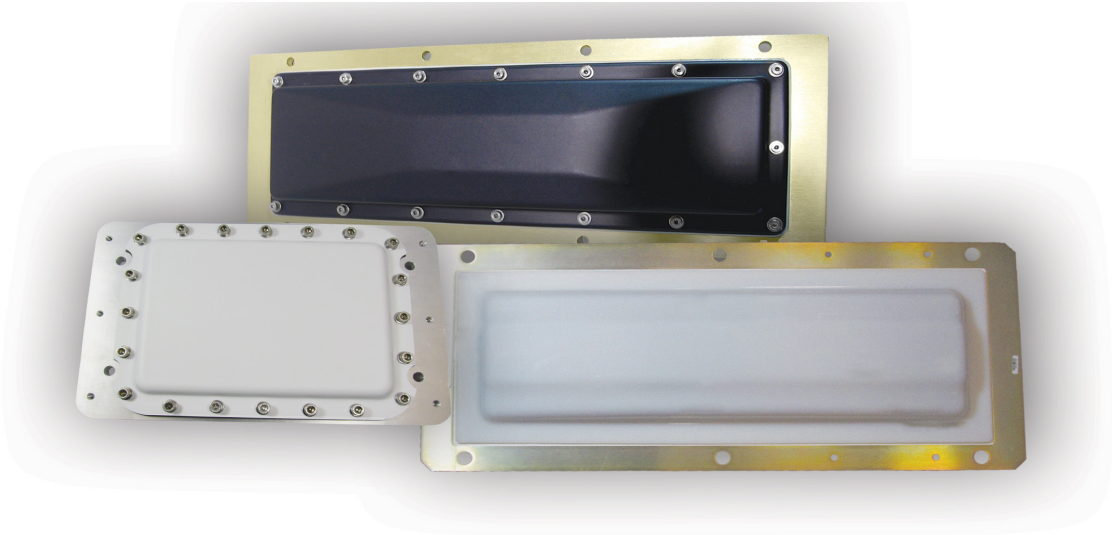
Antenna Mounting Guidelines

For Train Undercarriage

16-0148-001 Rev C 2/2022

This guideline provides general information for developing an installation plan for TransCore's AA3233-004, AA3233-005, AA3234, AA3237, and AA3238 antennas. The structural assembly under train cars or locomotives varies considerably for each train manufacturer. Each installation must be customized. All installation configurations should be thoroughly tested before completing the project.

Note: *Antenna footprints are highly dependent on the install and its environment. The measurements shown in this guideline were taken in a controlled lab without a train and will require adjustment based on the actual installation and equipment.*



Factors that affect margins

All surrounding metal can affect margins, including the metal floor of the train. Close-mounted metal objects can "skew" or misshape the footprint.

A center footprint measurement for each train type should be taken at the start of a project to make sure that the footprint is long enough and the margins high enough for reliable operation.

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Polarization

The long axis of the antenna must be aligned in the same direction as the long axis of the tag. TransCore tags and antennas are linearly polarized in the direction of the long axis of each component. If the tag and antenna are at 90 degrees with this polarization, the system will not function. Tags and antennas should be center-aligned with each other, +/- 7.5 cm (Figure 1).

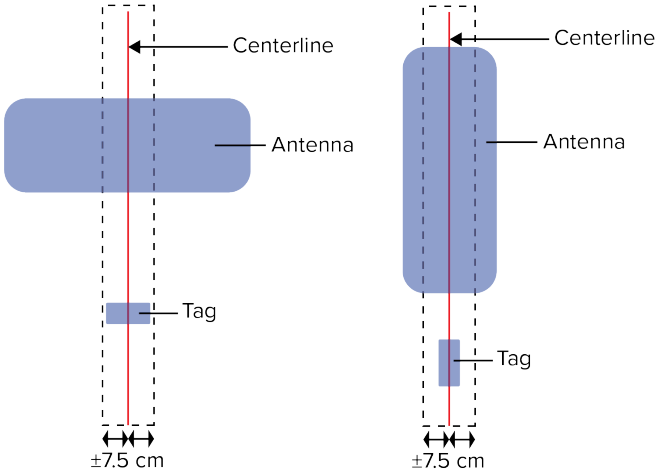

Figure 1 Tag and antenna polarization and alignment

Mounting

The antenna mounting fixture needs to be structurally stable and should be attached to the train car body or the bogie according to the train car manufacturer recommendations.
The coax cable strain relief must be as near to the coax connector as possible. The cable should be immobile to prevent shock, vibration, and cable movement from loosening the coax connector.

Note: *Refer to TransCore document 16-0089-001, Antenna Strain Relief Mount Installation Instructions.*

Metal from the mounting fixture should not extend more than ¼ inch below the antenna back plane surface, radome side, with the exception of the mounting bolt caps.

Metal Free Zone

Metal fixtures from other under-train components that are above the back plane of the antenna will have no effect on system performance. Metal fixtures that are below the back plane of the antenna should not intrude on the radiation cone designated by the angles shown in Figure 2, and additionally should be kept 30 cm from close proximity to the antenna, as also shown in Figure 2.
Metal obstructions that violate these rules have been know to cause distortions in the antenna radiation pattern which could possibly cause serious performance issues.

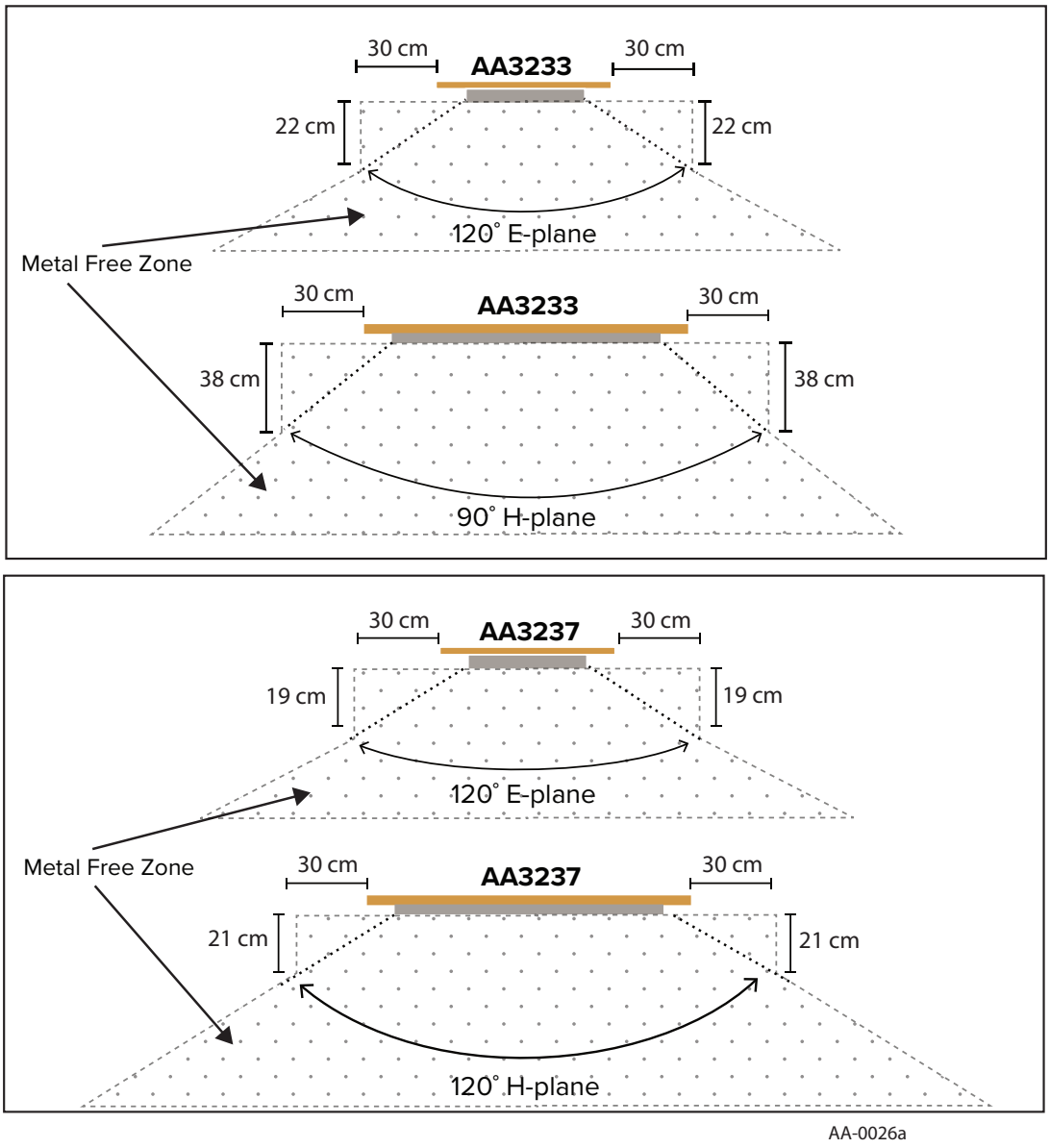

Figure 2 Area below the antenna that must remain clear of metal obstructions

For more information:

Sales Support
800.923.4824

Technical Support
505.856.8007

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