

PBAR Note 641
Dimensions and Measurements of Debuncher Band 3 and 4 Waveguide-
Coax Launchers

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This note is a document about dimensions and measurement results of waveguide-coax launchers (Band 3 and 4) installed on the arrays in debuncher cooling upgrade.

Shown in Figure 1 and 5 are schematic drawings of launchers (pick-up) in the cross section along the longitudinal direction (beam direction) of the arrays. The unit in these drawings is inch. Note: although there are upper band and lower band for pickup arrays, the launchers are the same to avoid possible confusion during installation.

Launchers for band 3 and 4 kickers were made by Penn-engineering Inc., therefore no schematic drawings are presented in this note.

RF Measurements were made on all launchers (port) and printed in hard copies for future reference. Since the measurement results are similar to each other, only a few plots for each type of launcher/band are presented in this document.

There are two types of measured S11 parameters. One is the measurement made at the end of design/tuning stage using a launcher and a straight section of band 3 or 4 waveguide terminated with a cone of absorber. I use "Original" to denote this kind of measurement. As shown in Figure 2, 6, 9 and 12, the original S11 of all launchers are below or around -20 db over the full band 3 or 4.

The other type of measurement is the one made after these launchers were installed onto the array including several type N feedthrough or connectors, elbows, waveguide bends (kicker) and magic Ts (kicker) etc. The kicker arrays were terminated with wedges of absorber. During all measurements (pickup array or kicker array) when one launcher was being measured, all other launchers were terminated with 50 ohm terminator. As shown in Figure 3, 4, 7, 8, 10, 11, 13 and 14 these "final" S11s are around -15 db.

Note: the rule for denoting the port number on pick-up tanks is as follows. From the upper stream to the down stream of the tank, the port number on one side of the tank (for example on the wall side) is 1, 3, 5 and 7 while on the other side of the tank (for example on the aisle side) is 2, 4, 6 and 8.

Note: the rule for denoting the port number on band 3 and 4 kicker tanks is as follows. From the upper stream to the down stream of the tank, the port number is 1, 2, 3, 4, 5, 6, 7, and 8. The odd number is SUM mode port (Type N connectors face the beam line.) The even number is Differential mode port (Type N connectors face the wall or aisle side.)

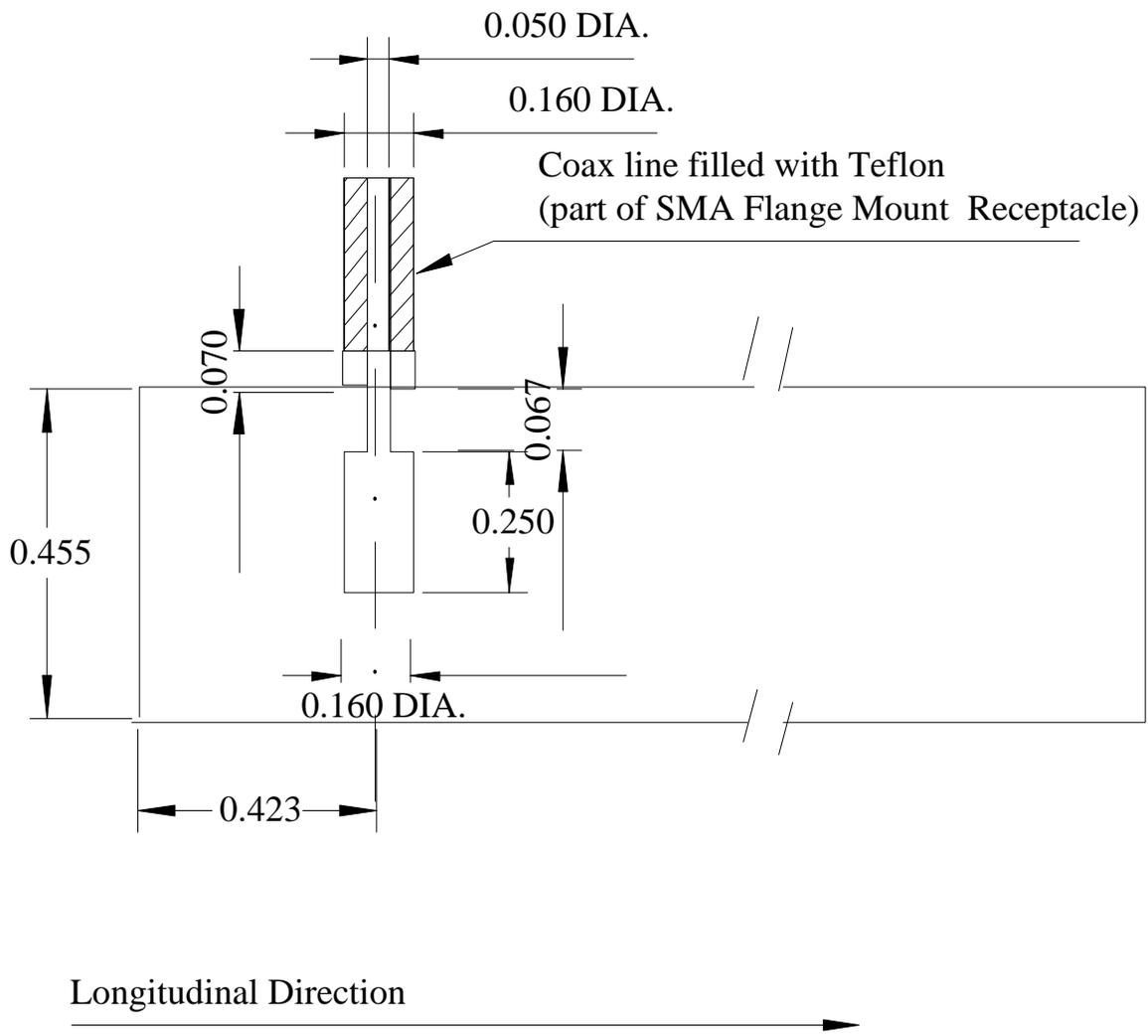


Figure 1. Dimension of WG-Coax Launcher (Band 3 Pickup)
(dimension unit is inch)

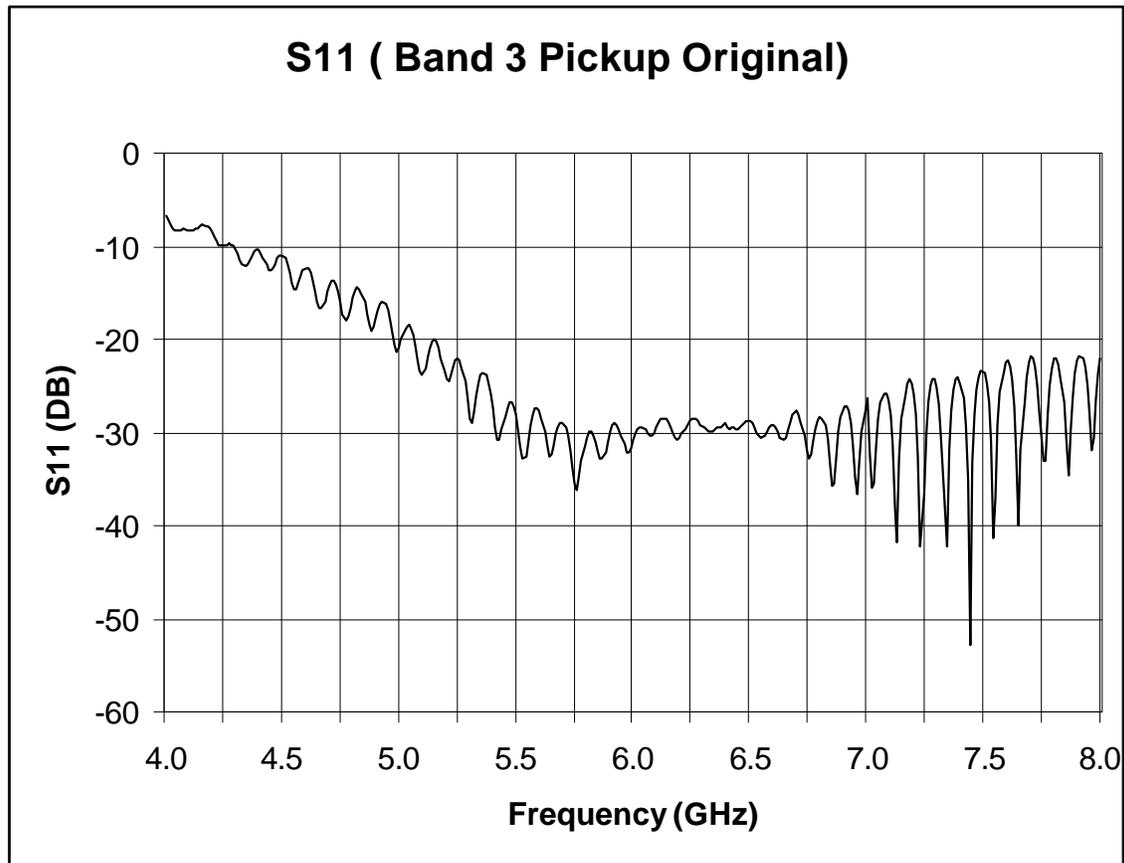


Figure 2. S11 of WG-Coax Launcher (Band 3, Pickup, measured using test setup– a straight section of waveguide)

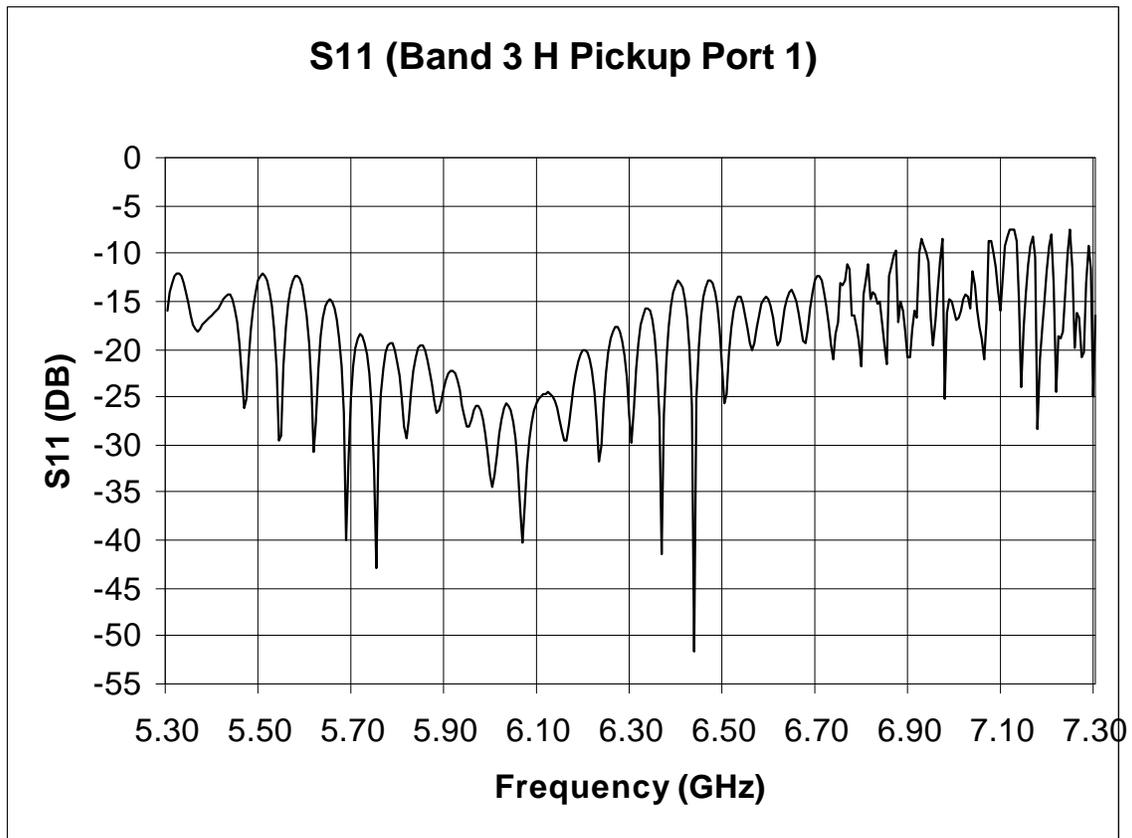


Figure 3. S_{11} of WG-Coax Launcher (Band 3, Horizontal Pickup Tank, Port 1, upper stream, measured after being installed onto array)

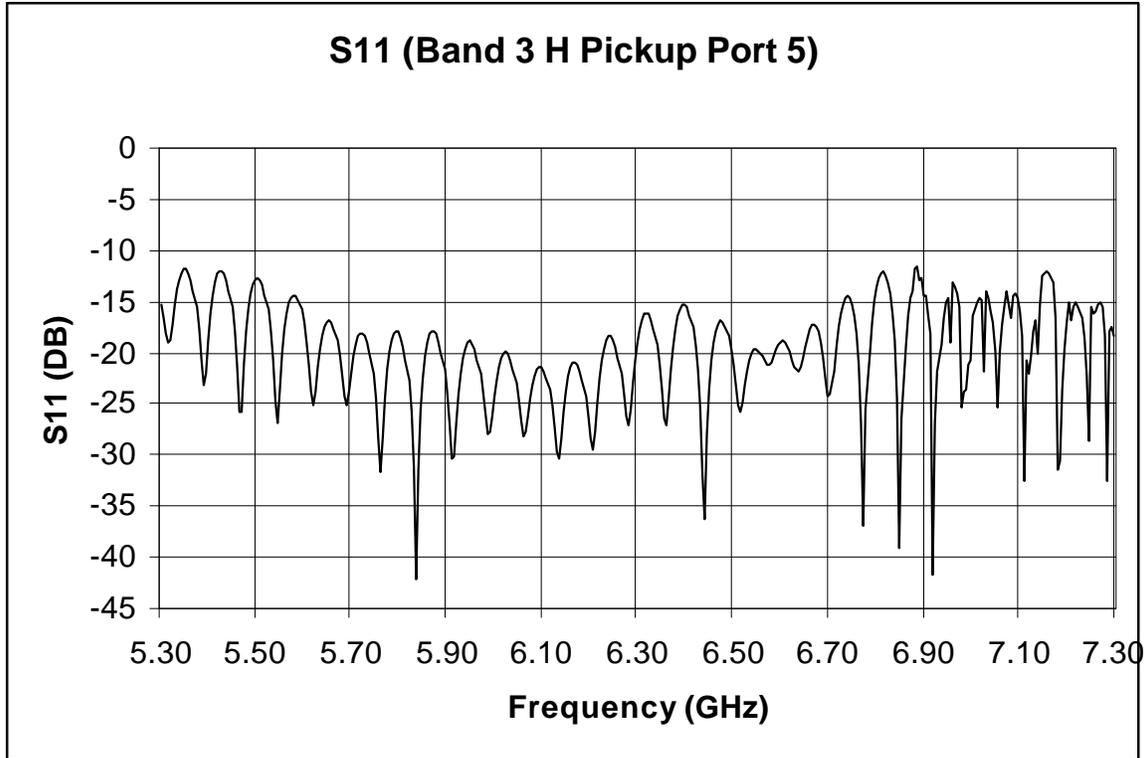


Figure 4. S11 of WG-Coax Launcher (Band 3, Horizontal Pickup Tank, Port 5, down stream, measured after being installed onto array)

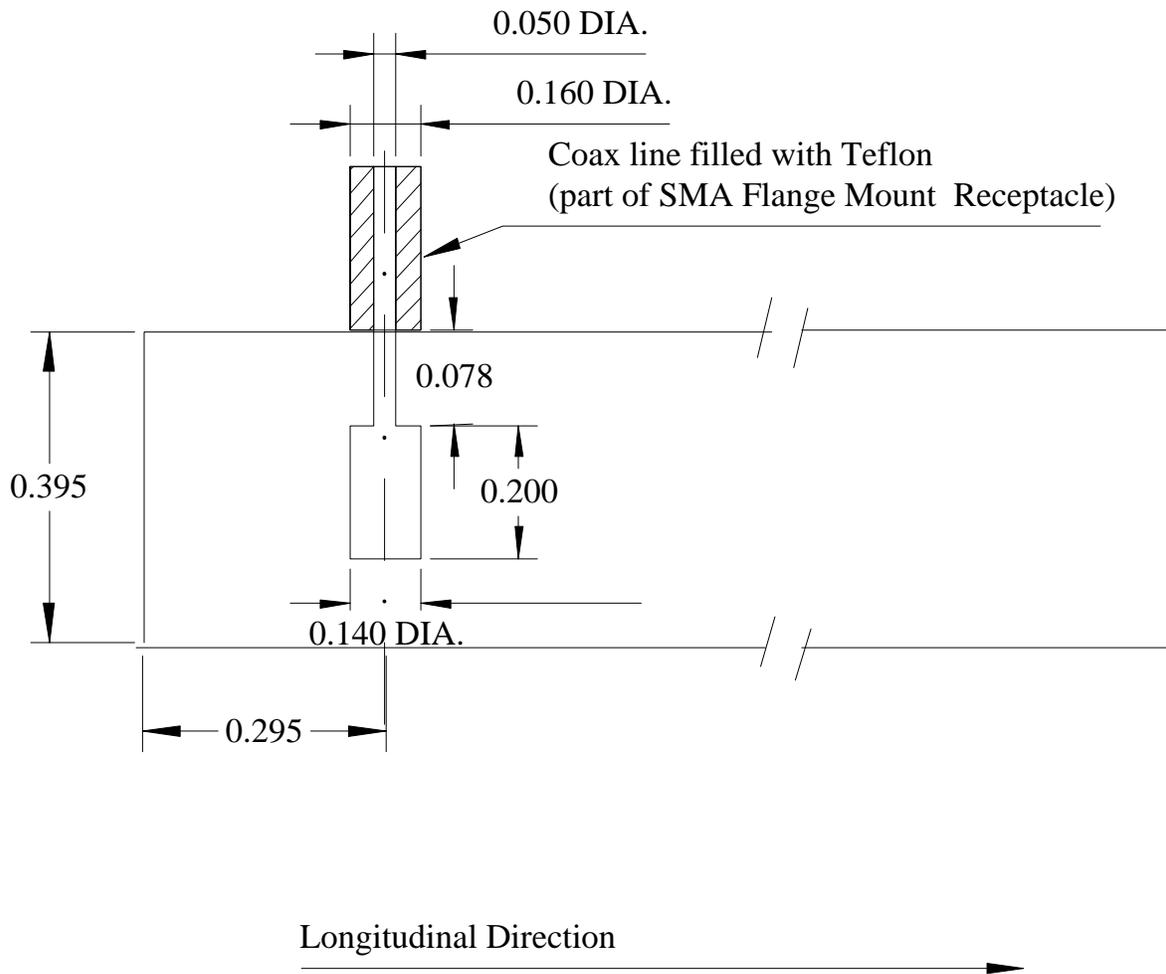


Figure 5. Dimension of WG-Coax Launcher (Band 4 Pickup)
(dimension unit is inch)

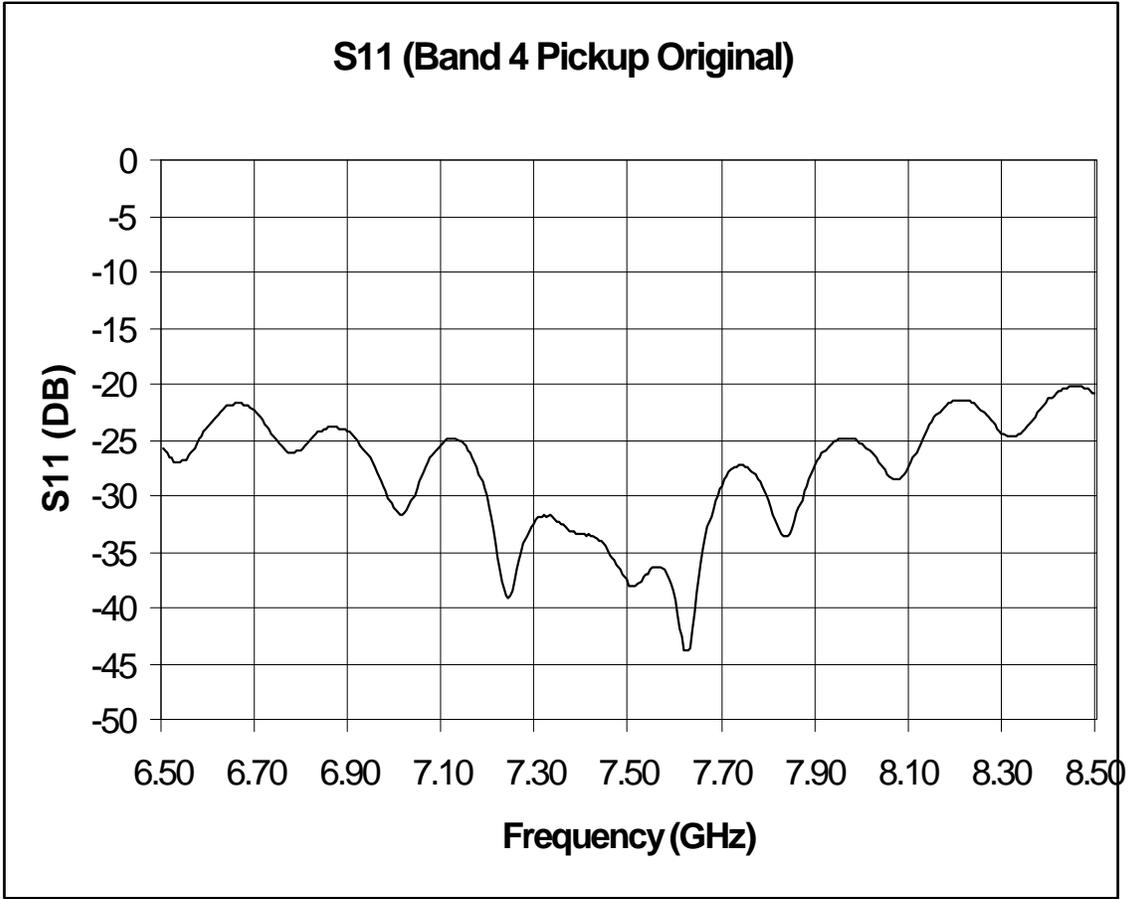


Figure 6. S11 of WG-Coax Launcher (Band 4, Pickup, measured using test setup– a straight section of waveguide)

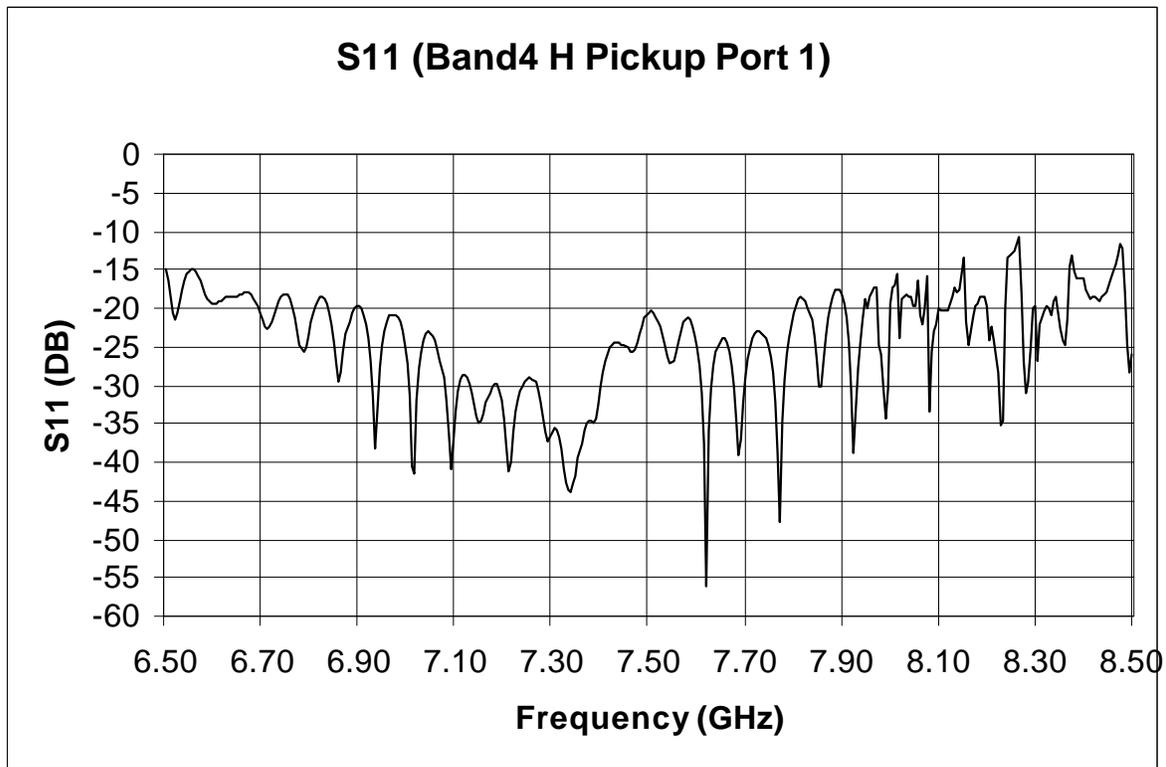


Figure 7. S11 of WG-Coax Launcher (Band 4, Horizontal Pickup Tank, Port 1, upper stream, measured after being installed onto array)

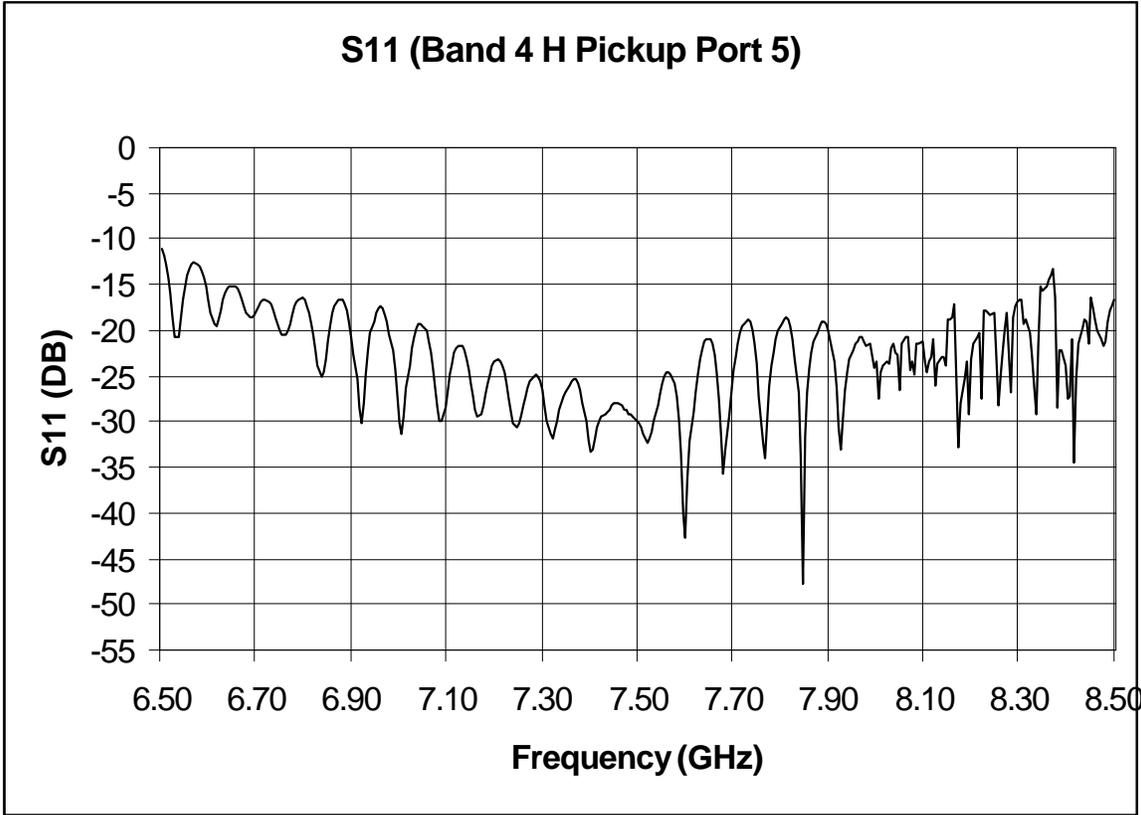


Figure 8. S11 of WG-Coax Launcher (Band 4, Horizontal Pickup Tank, Port 5, down stream, measured after being installed onto array)

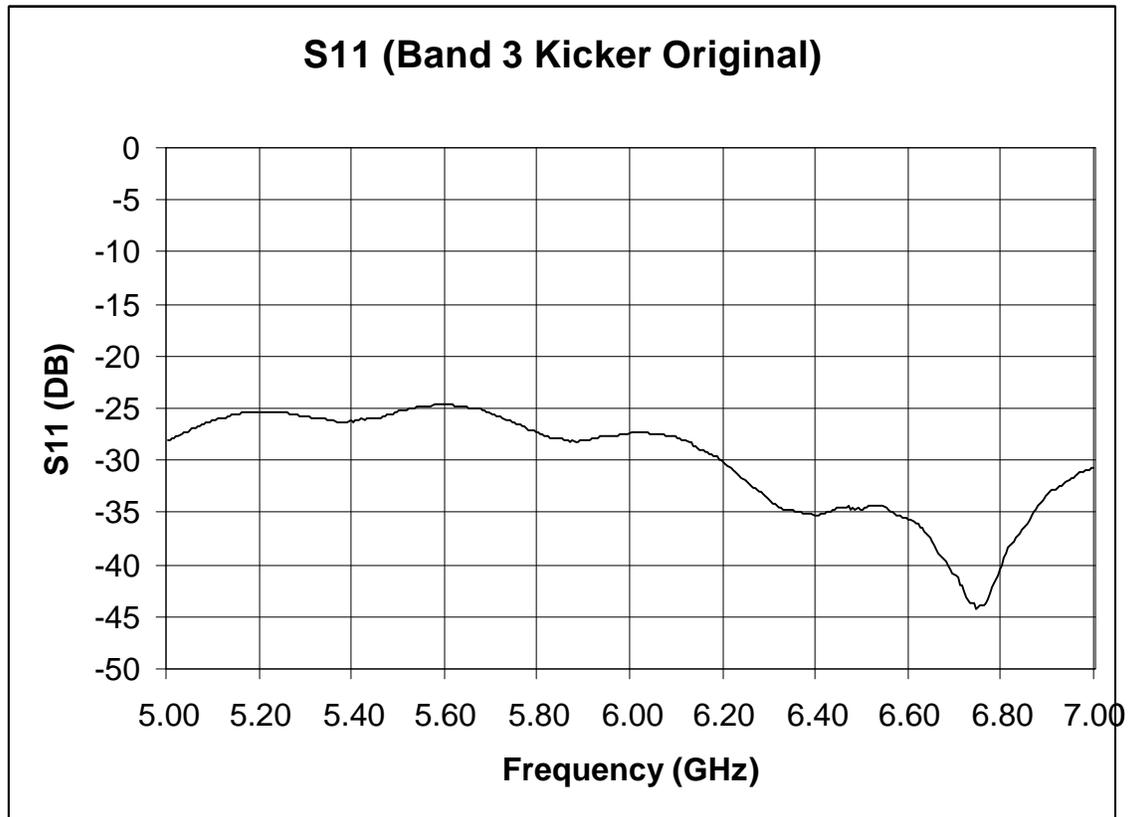


Figure 9. S11 of WG-Coax Launcher (Band 3, Kicker, Commercial WR 159 from Penn-Engineering Inc., measured using a test setup – a straight section of waveguide)

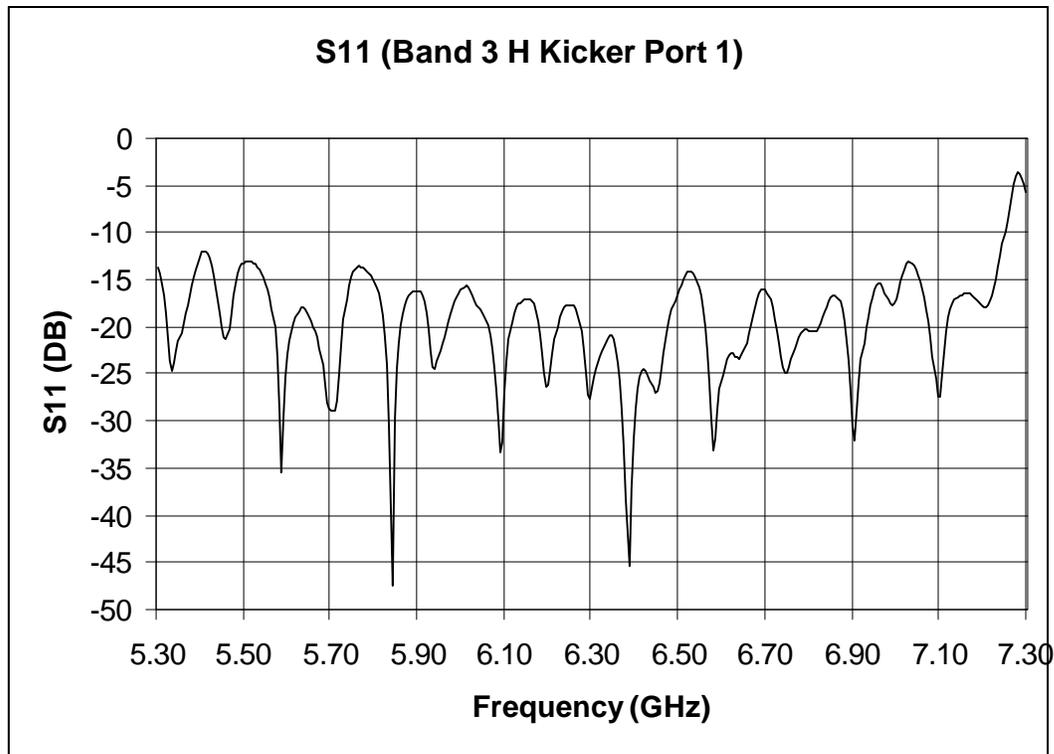


Figure 10. S11 of WG-Coax Launcher (Band 3, Horizontal Kicker Tank, Port 1, measured after being installed onto array with Magic T and Bends. Note: Port 1 is a SUM mode port.)

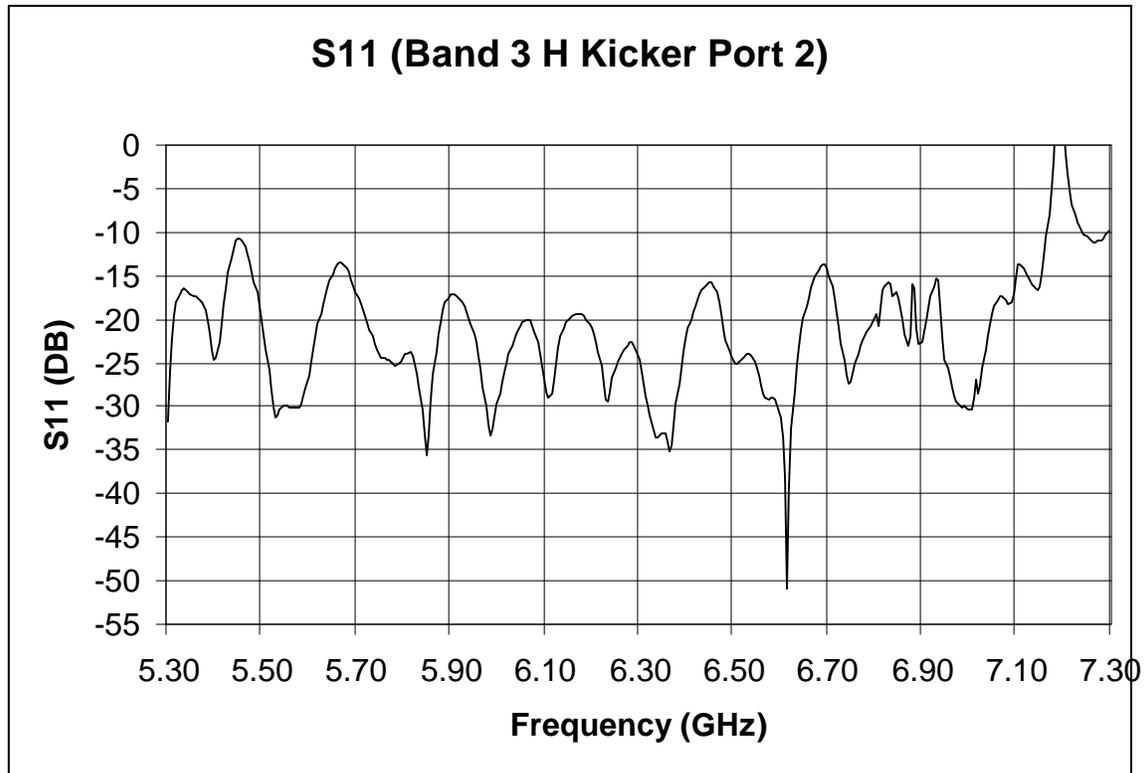


Figure 11. S11 of WG-Coax Launcher (Band 3, Horizontal Kicker Tank, Port 2, measured after being installed onto array with Magic T and Bends. Note: Port 2 is a DIFFERENTIAL mode port.)

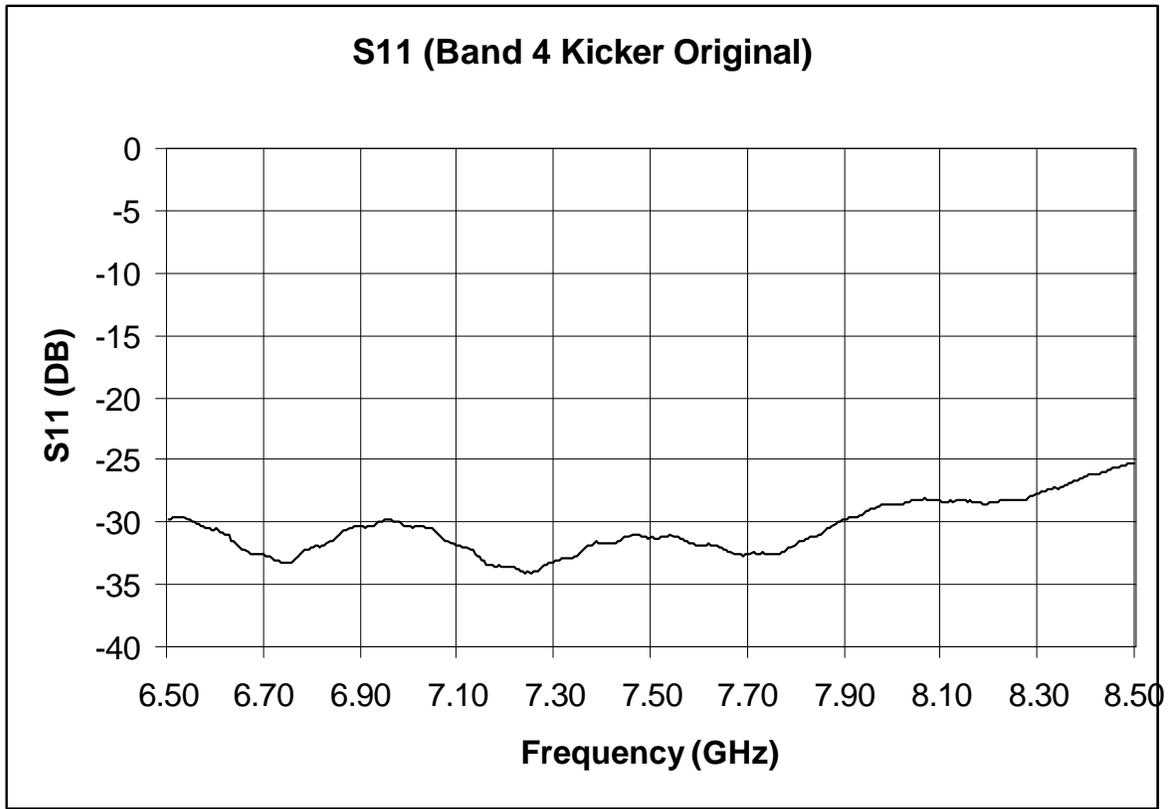


Figure 12. S11 of WG-Coax Launcher (Band 4, Kicker, Commercial WR 137 from Penn-Engineering Inc., measured using a test setup – a straight section of waveguide)

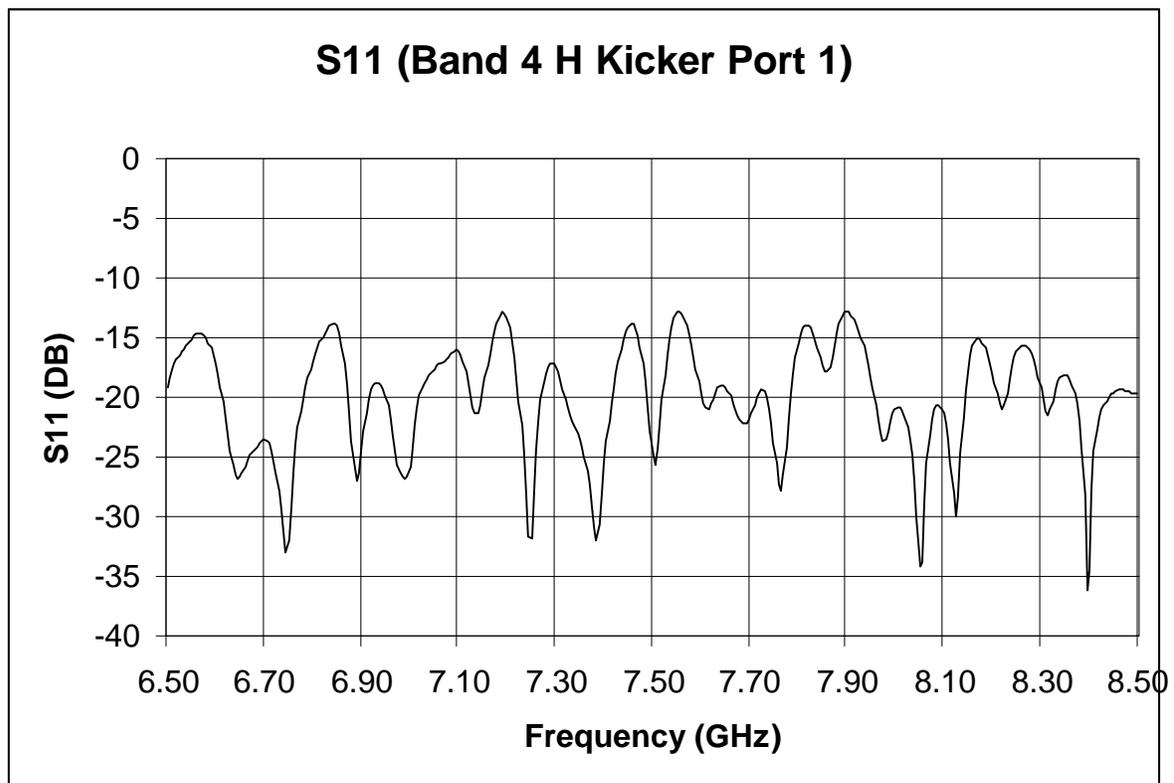


Figure 13. S11 of WG-Coax Launcher (Band 4, Horizontal Kicker Tank, Port 1, measured after being installed onto array with Magic T and Bends. Note: Port 1 is a SUM mode port.)

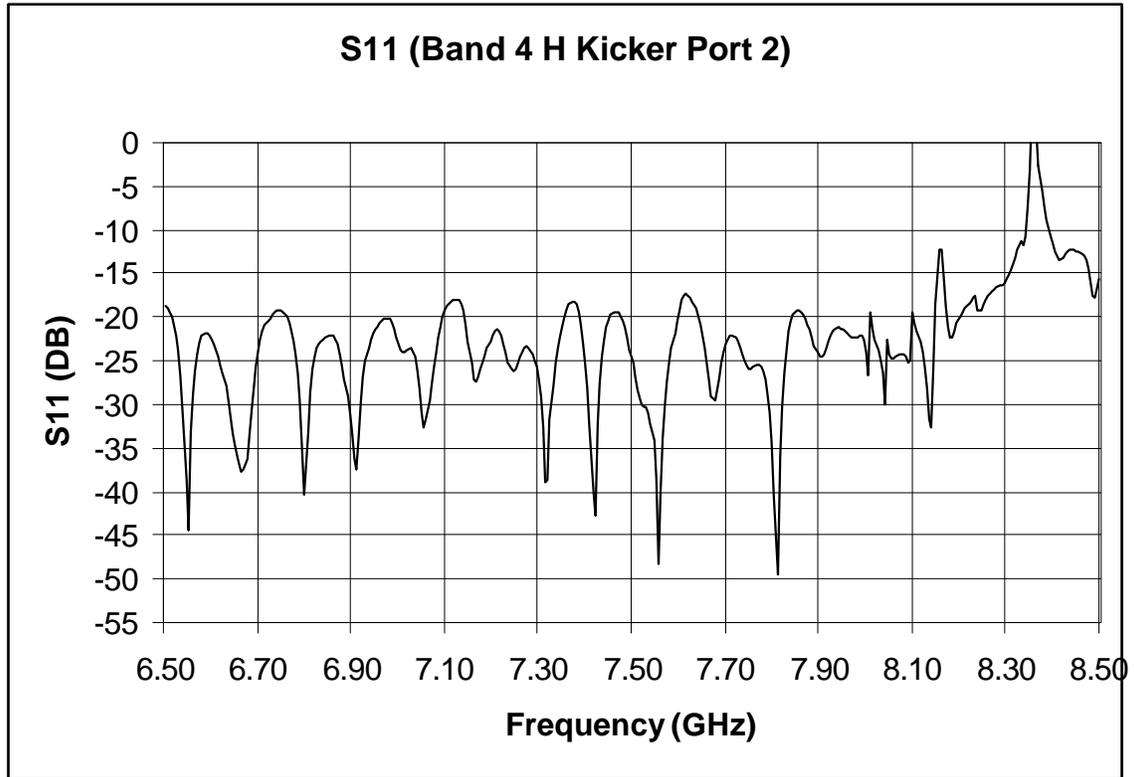


Figure 14. S11 of WG-Coax Launcher (Band 4, Horizontal Kicker Tank, Port 2, measured after being installed onto array with Magic T and Bends. Note: Port 2 is a DIFFERENTIAL mode port.)