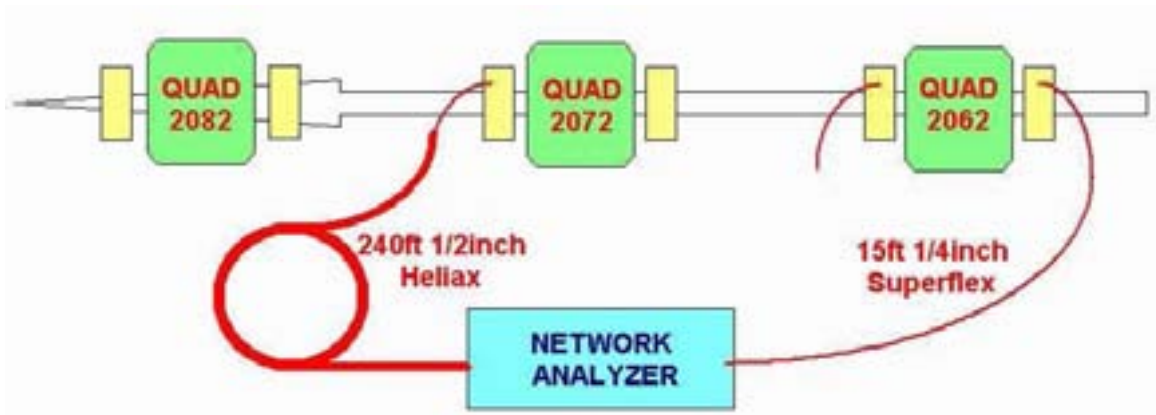


E-Cloud LER Beam Pipe Measurements

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A network analyzer was used to measure characteristics of the beam pipe through BPM buttons.

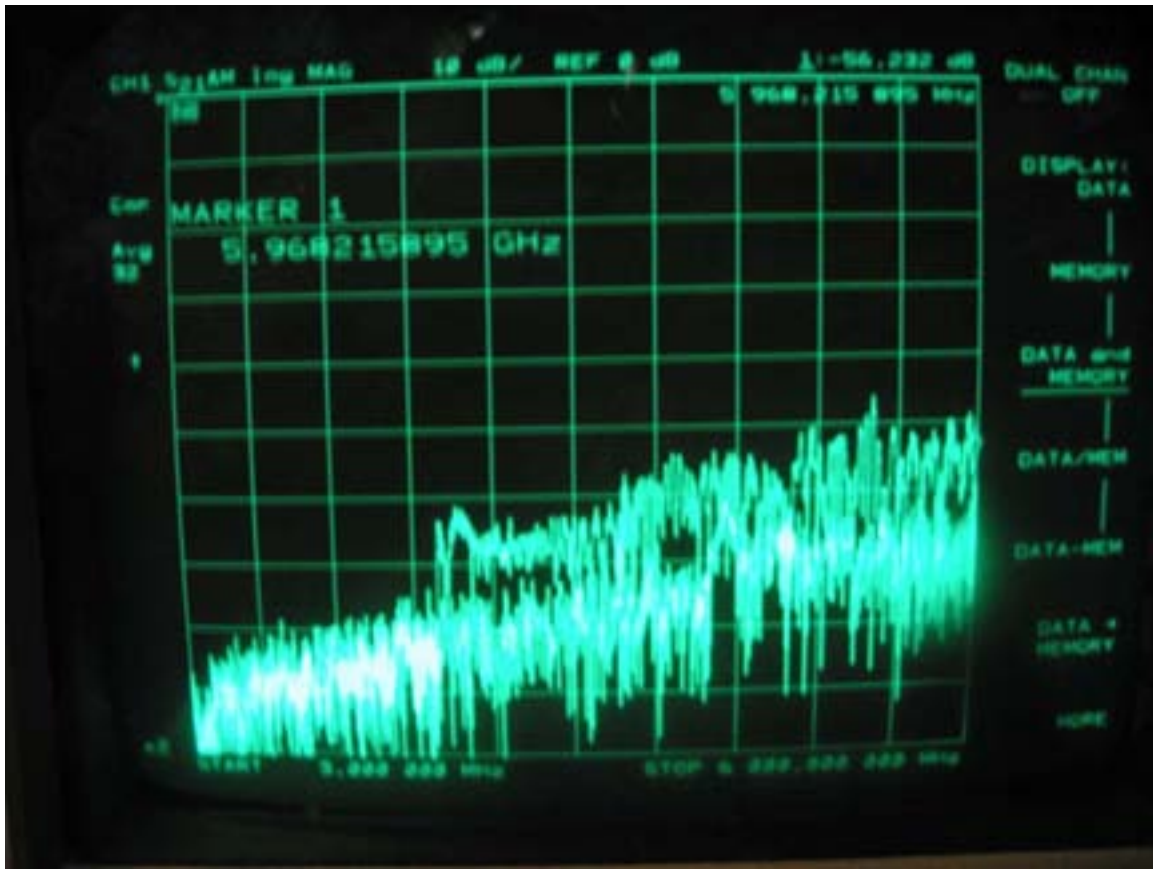


The data shown below is taken from the above 3 BPMs with cables shown attached.



Scales 5MHz to 6GHz linear, 600MHz/div 1dB/div reference (0dB) at 5th division

S11 looking into RED button on BPM 2062. Analyzer was calibrated to the end of a 1/4 inch Superflex cable. The N to SMA adapter, not taken out in the calibration, was connected directly to the BPM button SMA connector. Coupling into button has a local max at 2.7GHz as shown in figure. At this frequency the insertion loss is about 0.5dB, 10% of power is transmitted into the beam pipe.

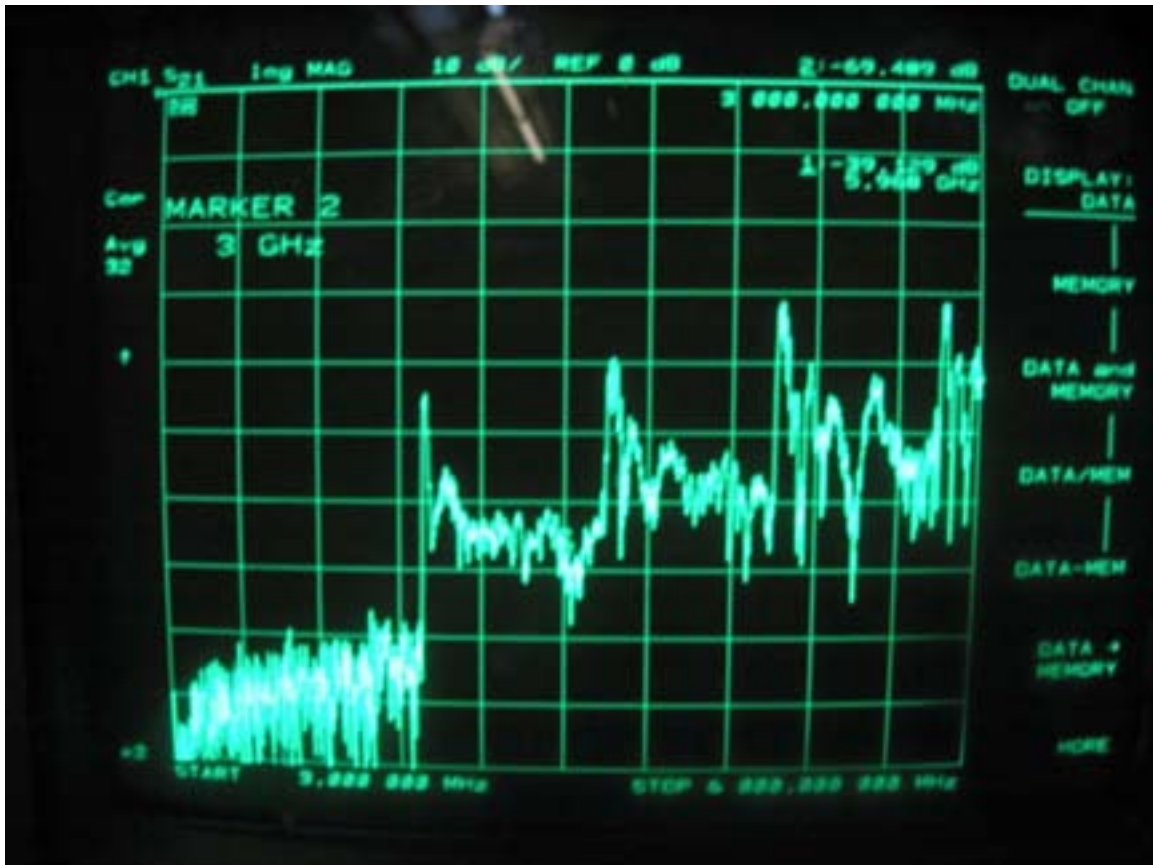


Scales 5MHz to 6GHz linear, 600MHz/div 10dB/div reference (0dB) at top

The network analyzer was calibrated with a through calibration using about 240ft of 1/2 inch heliax and about 15ft of 1/4 inch superflex. The other end of the 15ft cable was connected to the RED button of BPM 2062.

For the bottom trace the other end of the 240ft cable was connected to the RED button of BPM 3052 (~240ft away). The bottom trace of the above plot looked the same if the cable was disconnected, it seems to be the noise floor of the measurement system.

The top trace was taken with the 240ft cable connected to the RED button cable of the BPM next to the next upstream quad. The beam pipe cutoff is seen at about 2GHz. The signal between 2GHz and 3GHz is attenuated 60dB to 70dB.



Scales 5MHz to 6GHz linear, 600MHz/div 10dB/div reference (0dB) at top

The network analyzer was calibrated with a through calibration using about 240ft of 1/2 inch heliax and about 15ft of 1/4 inch superflex. The other end of the 15ft cable was connected to the RED button of BPM 2062.

The 240ft cable was connected to the button on the other side of the quad, about 1m upstream.

Opinionated Comments Section:

Further evaluation of the 2.0GHz to 2.7GHz region using lower noise floor systems should be done.