

# Measurement Description

Cellular systems require increasingly higher data rates which can be achieved using large bandwidths on the order of GHz. The frequencies below 6~GHz are highly occupied, which makes frequencies at millimeter-wave~(mmWave) bands attractive due to the vast amount of unused spectrum. Deploying wireless systems relies on accurate characterization of the statistical channel propagation in the deployment band. Channel models for sub-6~GHz cellular systems are the result of extensive channel measurement campaigns performed with channel sounders, where the measurement data are used to characterize the wireless channel and to derive the statistical channel model. The characterization of the wireless channel is different at different frequencies, so the statistical models derived for sub-6~GHz bands may not be accurate for mmWave bands. Therefore, channel sounders operating at mmWave bands are required to characterize the nature of radio propagation at these frequencies.

We will be conducting channel sounding measurements using channel sounder from National Instruments at 28 GHz, 39GHz, 120, and 144 GHz. We are requesting 2 GHz bandwidth for these bands as this is the bandwidth of the sounding signal that we transmit.

Our channel sounding setup is shown in Fig. 1 below. We will mostly be conducting our measurements inside the lab in Engineering building 2 of NCSU. We have two separate radio heads from NI for 28 GHz and 39 GHz. We have a separate radio head from VDI that can operate at two separate bands at 120 GHz and 144 GHz.

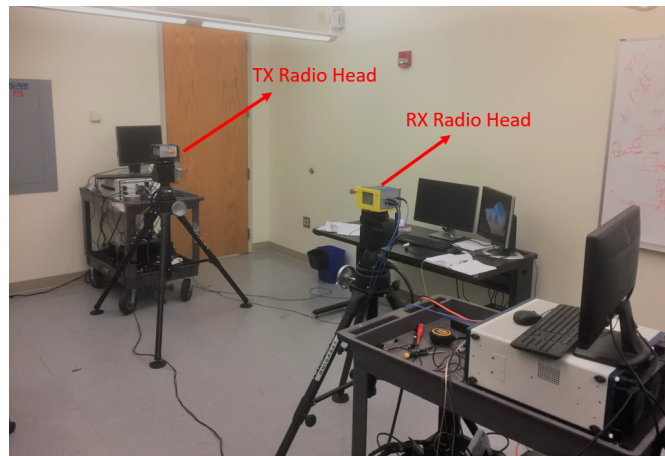


Fig 1: The channel sounder hardware

The following diagram shows the components used in our sounder.

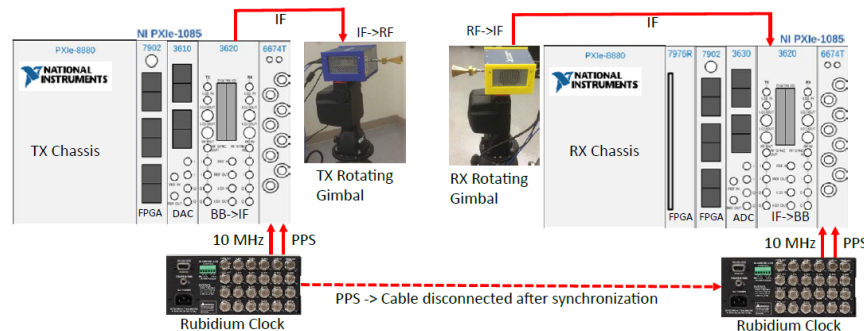


Fig 2: Components of the Channel sounder