



Coherence test

We injected a 215.2 GHz tone into receiver on one antenna, derived from a separate synthesizer (HP 8662), locked to a separate 5 MHz output from the maser. We used a tone in the receiver's lower sideband because the harmonic generator seemed to work best at that frequency - to test coherence, the sideband shouldn't matter. The tone appeared at 650 MHz on output of CARMA downconverter. We mixed this down to 10 MHz in another mixer, using a 660 MHz LO from another synthesizer, again locked separately to one of the 5 MHz maser outputs. We examined this on a scope that was triggered off the 10 MHz output of the final synthesizer. A block diagram of the setup is shown below.

Shaded blocks indicate hardware associated with the test tone. Note that the tone is independent of the CARMA LO system, apart from the 10 MHz offset needed for the tone's Xband phaselock in the antenna - this was taken from the regular antenna 10 MHz distribution.

CoherenceCheck.png

A photo of the harmonic generator mounted in front of the beamsplitter and dewar window:

[DSC00596.JPG](#)

Test tone examined with 1 Hz resolution on a spectrum analyzer (500 Hz span):

[DSC00394.JPG](#)

Here is a video of the tone - we change the scope averaging from 1 to 2 to 8 to 64 during the course of the recording. There is a small amplitude glitch about every 1 sec - not clear what this is due to, but should not have big impact on vlbi.

[TestTone.mp4](#)

test