Memorandum

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Subject: Mutual Interference Measurements Between Band 6 Mixer and Cartridge Test Systems

1. Summary

Limited measurements show no interference between the Mixer Test System (MTS) and Cartridge Test System (CTS) caused by their sideband source. Although only two frequencies were measured, no detectable interference was observed when either system was transmitting while the other received at the transmit frequency.

2. Procedure

First, sources and spectrum analyzers for both systems were phase locked to the same 10 MHz reference generated by the HP 83732B synthesizer in the CTS. That synthesizer provides the reference to the cartridge LO *via* the 30 MHz source to the Warm Cartridge Assembly. The 10 MHz reference distribution for the CTS is shown in the block diagram in Figure 1 and the reference distribution for the MTS is in Figure 2. It's interesting to note that neither the LO nor sideband source in the MTS had been previously phased locked to a reference.

Next, each test system was checked to confirm it was tuned to the proper frequency by injecting signals from the sideband source in each system and observing the signal on the spectrum analyzers.

The following frequencies were used with each test system:

LO: 243 GHz
IF: 8 GHz
RF: 235 GHz (LSB) and 251 GHz (USB)

The sideband source in the MTS was turned off and the CTS sideband source was tuned to the requisite RF as confirmed by the spectrum analyzer in the CTS. The spectrum analyzer in each system was tuned to 8 GHz with span widths varying from 100 MHz to 10 GHz. The spectrum analyzer input attenuators were set to 5 dB and we also confirmed the mixer was dominating the spectrum analyzer's the noise floor by checking for Y-Factors on both spectrum analyzers. The variance in the spectrum analyzer displays was reduced by averaging 100 traces.

The procedure was repeated with the MTS transmitting and the CTS receiving. In both cases, no signals were observed on either spectrum analyzer.

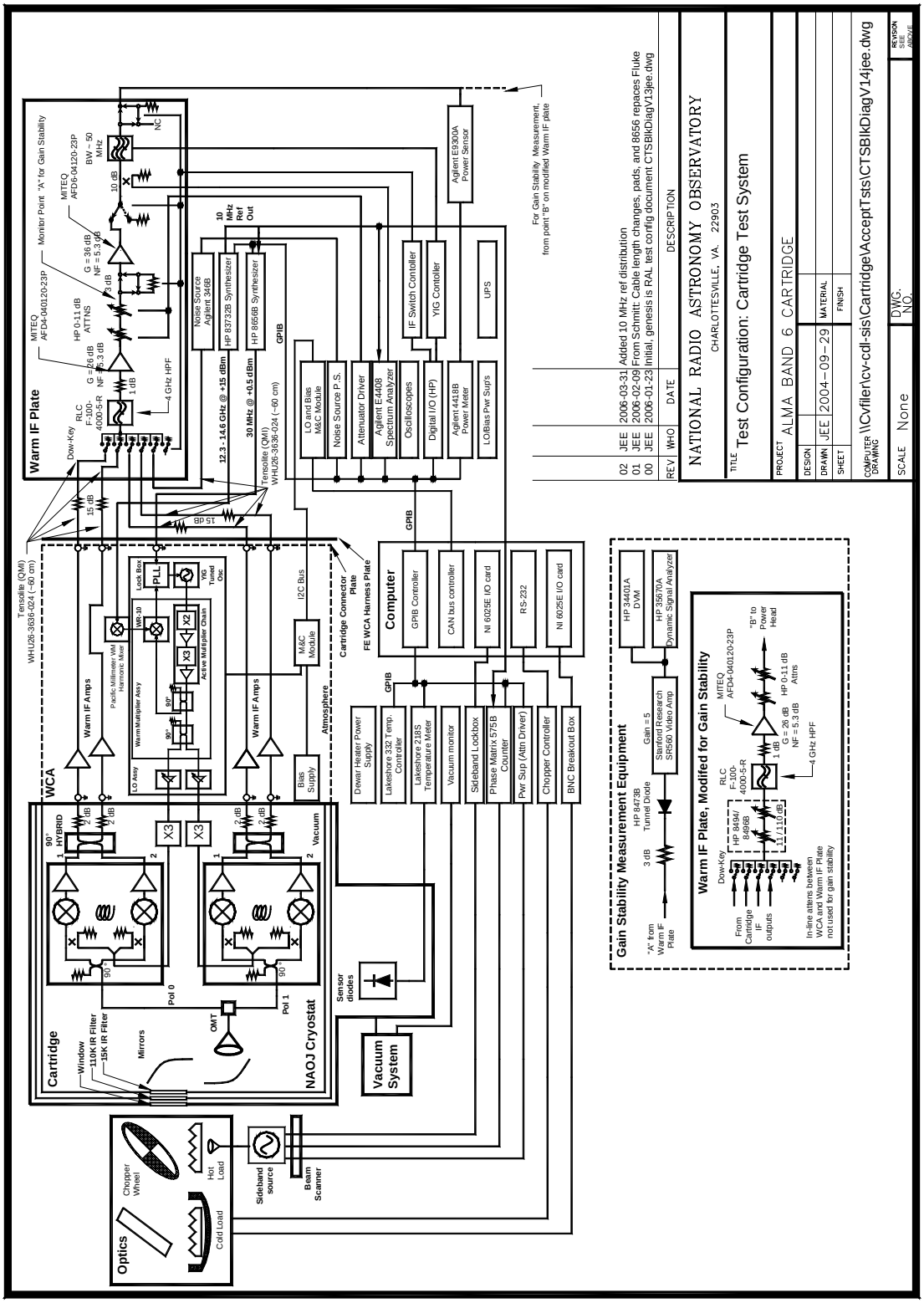

Figure 1: Cartridge Test System Block Diagram

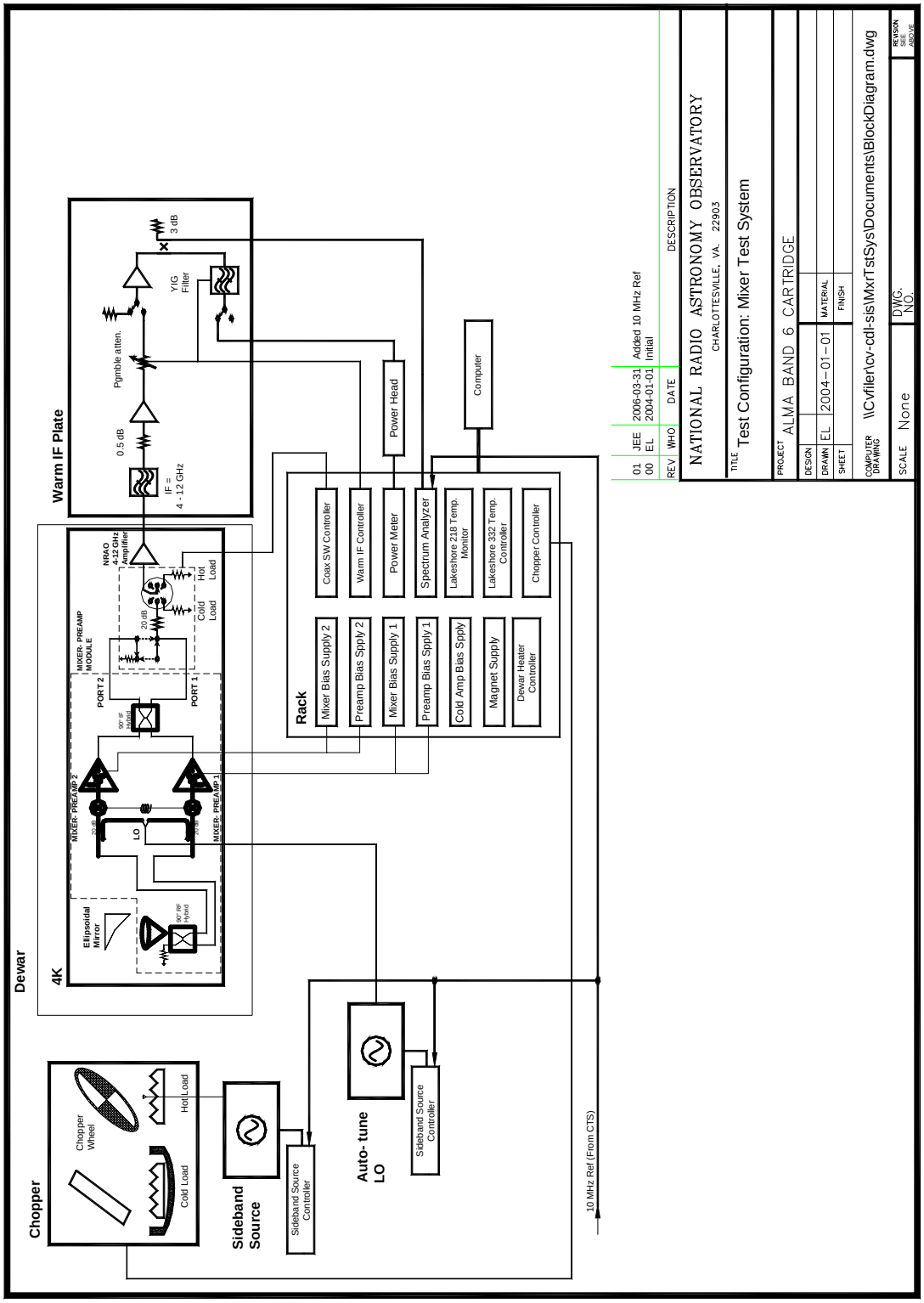

Figure 2: Mixer Test System