Description of Operation and Purpose:

Purpose: New product beta-testing is conducted concurrently with FCC certification to prove the suitability of the Channelized Booster for deployment, introduce it to major customers and/or integrators, familiarize and train Applications Engineering personnel in system design so that the product will be ready to offer for sale upon receipt of certification.

This operation on the Progressive Insurance real-world system will give us a controlled environment in which to take detailed measurements of signal, interference and noise and verify the signal booster's ability to discern individual channels while rejecting other in-band channels emanating from the Mayfield Village donor site.

The following is the detailed test plan:

Channelized Booster Test Plan – Progressive Causality Insurance Company, Mayfield Village, OH

A. The Channel Plan provided by Progressive for this system is:

12.5 kHz channels on the frequencies designated below [Rx Frequencies +5 MHz.]:

1 - 452.4375
2 - 452.4625
3 - 452.7375
.

B. Testing

1. The initial testing will be done with personnel at both the booster site and the donor site.
2. The following procedure will be followed:
    i. Attach a Spectrum Analyzer to the donor antenna and look for signals within the downlink passbands. If strong out-of-band signals affect the spectrum analyzer, temporarily connect to the downlink output of the window filter(s) in the booster.
    ii. Look for and note the level of signals on the desired channels from the donor site, keying them up locally, if required.
    iii. Look for and note the level and frequency of other signals within the passband that are higher than the desired signals or above -50 dBm.
    iv. Connect a spectrum analyzer centered to one of the conventional channels noted above to an output of the receiver multicoupler system at the donor site. Set the analyzer to 50 kHz span, 1 kHz resolution bandwidth and 300 Hz video bandwidth (Signal Hawk). Note the noise floor level. (Depending upon channel activity, it may be necessary to find a lesser-used channel for this test.)
    v. Connect a signal generator to the output of the signal booster. Use a service monitor capable of duplex operation (that can take power while generating a

signal) or use a directional coupler and dummy load to protect the signal generator from any downlink power that may be present.

vi. Input an unmodulated signal on-channel starting with a level of -120dBm. Slowly increase the signal level until the channel module uplink keys. Note this level and the signal measured at the donor site (if any). Continue to increase the signal generator output until a -100 dBm signal is measured at the donor site, or the uplink goes into AGC, whichever comes first. Note this level.

vii. If the signal was not yet into AGC on the previous step, increase the signal generator level until AGC action occurs and note the signal level on both ends.

viii. Look for and note any noise elevation on adjacent channels with the spectrum analyzer.

ix. Modulate the signal generator with a 1 kHz tone at +/- 3 kHz deviation and connect SINAD measuring equipment to the receiver at the donor site.

x. Reduce the signal level to the 12 dB SINAD point and note the signal level into the booster.

xi. Measure the receiver SINAD at the donor site both coupled into the antenna port of the receiver multicoupler system and at the receiver itself.

xii. Repeat the above steps on the other 3 conventional channels.

xiii. Key the transmitters at the donor site and note that each downlink channel keys. Note the power output from each channel.

xiv. This ends testing at the Donor Site.

3. Measure the isolation between the donor and coverage antenna system.
    i. Generate a signal into the coverage antenna system and look for this signal on the donor antenna.
    ii. Subtract the signal received from the signal generated. This is the isolation. It should be 100 dB or greater.

C. Operational Testing

1. Connect the signal booster to its coverage antenna system and talk to the personnel returning from the donor site on one or more of the channels. Make note of any transmission quality issues.
2. Conduct radio checks with personnel outside the building, verifying that system operation is correct.
3. Find a coverage overlap area between the outside system and the signal booster and note how it affects system operation.