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OFFICE COMMUNICATION

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Report of Laboratory Inspection & Test of RCA Model A UHF Converter

Description of Equipment - The Model A UHF converter built by the RCA Princeton Laboratory is designed to make possible reception by a modern commercial television receiver of television transmissions in the 480 to 800 Mc band. The unit operates from a 300 ohm balanced transmission line and feeds the low-band receiver signals on channel 3 through a similar line.

An acorn-type triode oscillator and a crystal converter feed a two-stage amplifier operating on channel 3. Variable length transmission lines are used in both the oscillator and converter. The two-stage IF amplifier employs a neutralized high  $E_m$  miniature pentode and a grounded grid high  $E_m$  miniature triode. Double tuned IF coupling circuits are used throughout. The power supply is self-contained.

*Triode Connected  
A. B.*

Results of Measurements -

1. Sensitivity - The unit was set up with an RCA 621 receiver. The receiver sensitivity was adjusted for an average operating value of 1300 microvolts (-3 volts IF bias). Using a constant output of -1 volt at the detector output of the receiver and a cw input signal to the converter, the gain of the converter was found to reach a maximum of 5.4 at 510 Mc. Minimum points were found at 480 Mc, 615 Mc, and 665 Mc where the converter actually introduced a loss of 2 to 1 or more.

In an attempt to improve the above situation, additional oscillator coupling to the converter was added by lengthening the IF input coupling lead slightly so that it could be dressed very near the oscillator tube. This brought the crystal current up from 25 microamperes to between 100 and 250 microamperes. In addition the tracking between the oscillator and converter tuned lines was adjusted to provide a more constant sensitivity over the whole band.

With these changes a gain varying between 4 and 10 was obtained over the band 470 Mc to 750 Mc.

As the converter was received the test pattern from WABD's UHF transmitter (25 watts) was practically unreadable. With the above changes a very good picture, reasonably free of shot noise, was received. The bandwidth was satisfactory.

2. Signal-to-Noise Ratio - Because of the lack of a shielded room, this noise pickup was found to be too great to allow any measurement of noise above thermal. According to RCA and CBS ER&D Lab, however, this type of circuit should operate with a noise level as low as 10 db from thermal. (RCA production STS30 receivers run from 14 to 16 db).

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3. Input Circuit Balance - This particular unit was less than 10% unbalanced.

4. Spurious Responses - Numerous spurious responses were received as a result of the double conversion system. The amplitude of these responses varied depending upon the local oscillator excitation.

5. Image Response - As the unit was received the image response on the low frequency end of the band was 4 to 1. On the high end of the band the image was greater than the desired signal.

As modified the ratio varied from 3.3. to 1 at the low end to 6 to 1 at the high end of the band.

2 curves enclosed

KBB

