To : The Contracting Group.

From : The Laboratory.

Date : August 26, 1981.

Subject: Transmitter test box.

1. The so-called transmitter test box for checking out subcarrier-modulated transmitters was returned to the laboratory in order to investigate problems when measuring 40 kHz subcarrier equipment. These problems could be confirmed in subsequent laboratory tests.

2. The main difficulty was related to the fact that a 40 kHz subcarrier transmitter has a much wider baseband noise spectrum than a 20 kHz subcarrier transmitter. The filter means in the test box, allthough adequate for the 20 kHz case, failed to remove all the baseband noise in a 40 kHz system. The unsuppressed noise in the latter case triggered the subcarrier demodulator irregularly such that the subcarrier frequency indication became incorrect and such that the recovered audio contained strong noise spikes.

3. The cure for the problem described in sec. 2 was to install a front-panel switch which adapts the subcarrier filtering to either a 20 kHz or a 40 kHz system. This switch will be indispensible in any possible follow-up equipment of this kind.

4. While investigating the problem as described in sec. 2 it was found that an available SRT-93 transmitter showed a baseband noise excursion which was far in excess of its specification. The noise waveform itself exhibited a fair constant amplitude during most of the time, but also frequent peaks which exceeded the normal amplitude by a factor of 2,5 or 3.
   It is not known if this is a normal behaviour of this transmitter type, or that the available item is malfunctioning.
   From a technical point of view this behaviour should be considered as inefficient in either masking effect or receiver bandwidth utilization.

5. The pehnomenon described in sec 4 showed up prominently in the transmitter test box where all excursions are measured as true peak values. A different way of measuring excursions by using average-responding detectors and a fixed translation factor based upon simusoïdal signals would certainly not be so dependent on peak disturbances.
   It has been noticed that several different transmitter manufacturers prescribe different measuring procedures for checking excursions. These comprise average-responding measurements, c.r.o. measurements of only the main body of the noise trace, spectrum measurements of the video composite, etc.
   It is to be expected that the different procedures will not yield the same final numerical results.
   A question could be which method can be considered representative and useful as a basis of comparison.

6. The same inconsistency, allthough to a lesser extent, exists when measuring the actual subcarrier excursion. The subcarrier waveforms differ in shape.
   For a SRT-153 the waveform is a rounded symmetrical squarewave of approximately 20 kHz. For a SRT-93 it is something between triangular and sinusoïdal, whilst for a SRT-105 it mostly resembles a differentiated squarewave.
   Excursion read-outs vary in dependence whether peaks, r.m.s. values or averages are measured.

7. The laboratory did up to now consider a true peak excursion measurement as the correct procedure. Based upon the previous observations the laboratory recognizes that a large incosistency may result when anyone compares the true peak excursion figures with those obtained previously or with a different test procedure.
   The laboratory has therefore revised the excursion detection circuit such that it now responds to the average excursion, and indicates 1.57 times as much as peak excursion. This factor is only accuratly true for a sinusoïdal modulation signal.

8. The laboratory herewith submits its transistor test box which is revised as follows:
   a) An extra frontpanel tumbler switch optimizes the tester for either a 20 kHz or a 40 kHz subcarrier frequency level.
   b) The excursion indication is now based upon the average level of excursion plus a constant translation factor.

   The laboratory would like to receive the Contracting Group's comments or preference on this technical matter.

August, 25th 1981.