DATE Feb.13/56 SH. 1 OF 3 COMPILED BY WFT	TMC SPECIFICATION NO. S-10015	
	TITLE: AMC 6-2 Noise Measurement	JOB 5
APPROVED		

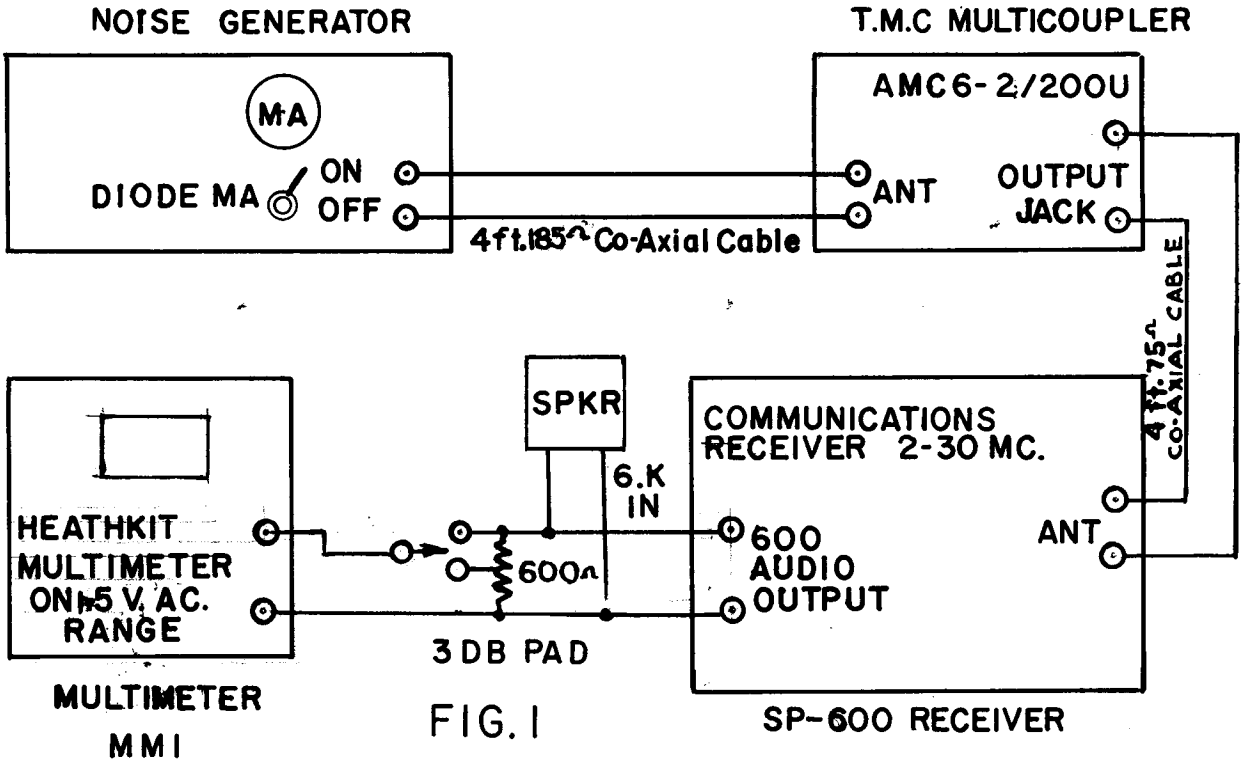

FIG. 1

TEST EQUIPMENT

I Noise Generator

1. Uses Sylvania 5722 noise diode

2. Output impedance for AMC 6-2/200U must be essentially 200 ohms resistive from 2 to 30 megacycles.

3. Diode current is variable and is indicated by a 0 to 10 milliampere meter.

4. Provision for changing the internal impedance of the noise generator is desirable.

TEST EQUIPMENT (cont'd)

II Multicoupler - AMC 6-2/200U or /200B

1. Measurements made with filter switch on the "in" position. A.C. line voltage 115 volts AC.

2. Shielded coaxial cable and fittings are used to connect noise generator, multicoupler and receiver.

III Receiver (2 to 30 megacycles)

A receiver with a good noise factor, i.e. less than 4, is desirable for these measurements. The SP-600 receiver is used by T.M.C.(Canada)

IV A speaker across the output of the receiver is desirable but must be decoupled impedance-wise from the 600 ohm load resistor.

V A resistive 3 DB pad to eliminate relative errors in the output meter is used across the 600 ohm output. This pad is calibrated by introducing a 10 microvolt signal 400 cycle modulated 30%. From a standard signal generator (Measurements Corp. Model 80 or 82), with the audio gain control full up and the output pad switched out of the circuit, the R.F. gain control is adjusted until a reference voltage, such as one volt, is obtained on the output meter. Switch the 3 DB pad into the voltmeter circuit and increase the attenuator setting of the signal generator to 14 microvolts. If the pad is correct, the same one volt reference will be obtained on the output meter.

VI Output Meter

Heathkid Model MM1 is used on the lower part of its 1.5 V.A.C. scale.

TEST PROCEDURE

A. Step 1

Conditions: (See Fig.1)
(a) Noise generator current switch "off"
(b) AMC 6-2 filter switch on the "in" position, primary supply 115 volt, 60 cycle.
(c) Receiver B.F.O. off, R.F. gain on manual, audio gain control full up, selectivity normal.
(d) 3 DB pad out of circuit.

Adjustments:

Increase the receiver RF gain until a reference level of, say, one volt is obtained on the output meter.

TEST PROCEDURE (cont'd)

B. Step 2

Conditions: (a) RF gain control in the same position as in "A".
(b) 3 DB pad switched into the output meter circuit.

Adjustments: Increase the noise diode current until the same reference voltage, in this case one volt, is obtained on the output meter.

C. Step 3

Calculate the combined noise factor of the system.

(a) Use the noise figure formula

$$F = \frac{P_n}{KT} = 20\ I_{d.c.}\ R\ *$$

$I_{d.c.}$ = diode current amp.

R = internal resistance of noise generator.

i.e. If noise current in R = 2 ma and given R = 200 ohm

$$F = 20 \times \frac{2}{1000} \times 200 = 8$$

* Terman and Petit, Electronic Measurements, Page 373.

(b) A correction factor normally small when using recommended receiver may be introduced by using formula $F_{12} = F_1 + \frac{F_2 - 1}{G_1}$

Page 362 of Terman and Petit, Electronic Measurements.

PRECAUTIONS

The overall test set-up from the noise generator to the output meter should be linear when making measurements. This may be checked by making repeated measurements by inserting additional 3 DB pads in the meter circuit while increasing the diode current of the noise generator in steps of twice its previous value. Make noise measurements only in the region where doubling the noise diode current is compensated for by 3DB pad steps in the output meter circuit.