frequency, with standard FM, and the AM varied in modulation depth.

6.17.3 *Presentation.* The AM suppression ratio should be measured versus input level for at least the standard test. The ratio at 45 dBf input is the rated AM suppression ratio. The supplementary test data may be tabulated or curves may be drawn for each frequency.

6.18 Frequency Drift. This test is intended to show the variation of the tuned frequency of the receiver. The tests are normally performed with the receiver tuned to the standard mean carrier frequency and the controls set to their normal settings. The AFC is first turned off or set to minimum. The variation of frequency is observed by adjusting the frequency of the signal generator so that the receiver remains correctly tuned and the frequency is measured by a frequency counter. The local-oscillator frequency is also monitored (Section 3.5) for exact measurements.

The test should cover the following causes of frequency drift and the results should describe the operating conditions.

(1) The frequency varies with time during the warm-up period of the receiver. A curve of frequency drift with time is plotted with time in minutes as the abscissa on a logarithmic scale and frequency drift in kilohertz as the ordinate on a linear scale. Time is measured from switching the tuner "on," with observations started immediately. The warm-up drift in kilohertz shall be stated as the maximum drift observed during a 2 hour period. If the receiver is intended for different types of installations, these tests should be repeated for the corresponding thermal environmental conditions.

(2) The frequency varies with ambient temperature. The receiver is tested in an environmental test chamber over the range which it is expected to operate. The drift is recorded for each temperature setting, starting with standard ambient as the reference. Sufficient time must be allowed for the receiver to reach thermal equilibrium.

(3) The frequency may vary with power supply voltage. The line voltage shall be varied from 105 to 130 and the resultant frequency drift shall be observed 1 minute after the voltage change has occurred. The amount of frequency drift for a line voltage change from 105 to 130 V is noted.

(4) If the receiver has AGC (automatic gain control), the variation of signal input may affect the oscillator frequency indirectly by way of the control circuit. The frequency drift with variation of signal input voltage should be observed after the receiver has been in operation a sufficient length of time to reach temperature stability. The maximum frequency drift when the input signal level is changed from the monophonic usable sensitivity level to 100 dBf is observed.

The rated frequency drift is the maximum frequency drift value obtained at the standard mean carrier frequency in any of the tests described above. The setting of the AFC must be stated.

6.19 Automatic Frequency Control. Many FM receivers employ AFC, using dc voltage or current from the output of the frequency-sensitive FM detector to regulate the frequency of the local oscillator. This negative feedback improves the centering of the heterodyned signal within the passband of the IF amplifier and FM detector. AFC reduces the care required in tuning and compensates for local-oscillator drift.

6.19.1 *AFC Characteristic.* The local oscillator frequency is monitored for AFC measurements. The receiver is set to 98 MHz with the volume control at minimum, 45 dBf input signal, and the signal unmodulated. The other controls are set for standard test conditions.

To plot the AFC characteristic, the generator is tuned to 99 MHz and slowly returned toward 98 MHz in small increments, recording the generator and local-oscillator frequencies at each step. The generator change is continued until 97 MHz is reached, then reversed toward 98 MHz again and continued until 99 MHz is reached, recording the two frequencies at each step.

The tuning error (generator frequency − oscillator frequency) is plotted against the generator detuning as shown in Fig 11. Note that the arrows show the tuning direction, and some readings at those frequencies may have to be repeated since the action is abrupt. The "AFC pull-in range" and the "AFC hold-in range" are shown. The various ratings are determined at an input of 45 dBf and should be correlated with other tuning characteristics (Section 6.11.5).

6.19.2 *AFC Correction Factor.* With the AFC off, the receiver is detuned by ± 75 kHz. The AFC is switched on and the tuning error is noted. The AFC correction factor is the ratio of the tuning error with AFC off to the tuning error with AFC on.

The rated AFC correction factor is measured at 98 MHz with a 45 dBf input signal.

6.19.3 *AFC Offset Error.* If the AFC can be switched off, the receiver is tuned for minimum distortion with the AFC off, and the local oscillator frequency is noted. The AFC is then switched on and the change in oscillator frequency is recorded as the AFC offset error.

The rated AFC offset error is measured at 98 MHz with a 45 dBf input signal.

6.19.4 *Repetition of Tests with AFC On.* AFC markedly affects many characteristics of the radio receiver. Earlier tests have been made with AFC off. Some of these measurements should be repeated with AFC active to determine if the AFC action affects the results.

6.20 Antenna Input Impedance. The specified source impedance for which a receiver has been designed is not to be confused with the actual input impedance of the receiver as measured at the antenna terminals. Receiver input impedance is measured using a VHF (very high frequency) impedance bridge or a vector impedance meter. The receiver is connected to the measuring instrument which may obtain the test signal from an FM generator. A 65 dBf input at 98 MHz is normally used, with the receiver tuned as given in Section 5.4. The impedance varies with both frequency and signal level so the test should be repeated to derive a family of curves, or at least repeated at 90 and 106 MHz and at several input levels, including usable sensitivity level. The results of the above tests may be converted into VSWR (voltage standing wave ratio), or a VSWR measuring system may be used.

6.21 Antenna Unbalance Ratio. Many receivers are provided with a balanced input circuit to reduce interference entering in an unbalanced or asymmetrical mode. The efficiency of the balanced input is determined by the unbalance ratio, usually expressed in dB and defined as the ratio between balanced and unbalanced input signals that produce the same output, with the receiver operating in a linear mode (below limiting). A large ratio indicates good balance.

The effect of reversing the antenna terminal connections will indicate unbalance by a change in the output, but a lack of change does not necessarily indicate a balanced system. The unbalance ratio may be measured using first a balanced dummy antenna (Section 3.6(1)) and then an unbalanced dummy antenna (Fig 2), with inputs well below the limiting action of the receiver and a 1 kHz bandpass filter to allow a more accurate indication by reducing the noise output.

6.22 Regeneration. Regeneration occurs when a signal generated within a receiver is coupled back to the input terminals in an amount sufficient to affect the receiver performance. If the reciprocal of the coupling exceeds the loop gain, oscillation is maintained. A desired carrier and the ninth or tenth harmonic of the IF may give two slightly different intermediate frequencies, beating to give an audio-frequency output, called tweet.

Regeneration may occur at certain frequencies, with different control settings, with or without an RF input signal, without an antenna, or with a particular antenna configuration. Such regeneration may be detected as increased distortion or modified signal-to-noise ratio.

Most receiver designs have enough gain to detect regeneration with no input signal. The set is tested in a well-shielded room with an audio voltmeter and a monitor speaker connected to the output. The dial is scanned slowly, watching for a change in the noise character or amount, particularly around 96.3 and 107 MHz. Local transmitters may cause a change in noise even if the room attenuation prevents usable reception. The receiver should be tested with various combinations of control settings, with a terminating resistor across the antenna terminals, with open terminals, with an unbalanced pick up (open wire lead), and with its built-in antenna. If regeneration is detected, a loosely coupled input signal may help in determining the exact frequency and in locating the feedback path. Plotting the noise level versus tuning frequency may help locate gradual changes.

6.23 Radiation and Power Line Conduction. Radiation of the oscillator and power line conduction shall be measured in accordance with the IEEE Std 187-1951, Open Field Method of Measurement of Spurious Radiation from Frequency Modulation and Television Broadcast Receivers, and IEEE Std 213-1961, Methods of Measurement of Radio Interference: Conducted Interference Output to the Power Line from FM and Television Broadcast Receivers in the Range of 300 kHz to 25 MHz.

6.24 Acoustic Feedback. Acoustic feedback occurs when the acoustic and mechanical vibrations produced by the receiver's loudspeaker system cause variation in the response of the receiver and consequently in the audio output. The receiver, plus any separate speakers, is placed in normal operating position. The receiver is tuned to at least an 80 dBf signal modulated 10 percent at 1 kHz. The volume control is adjusted to rated output or maximum setting. The modulation is removed and the output is examined for possible howl, ringing, and other outputs not associated with the input signal.

7. Stereophonic Performance Tests

Because of the nature of the stereophonic composite signal and the additional circuitry incorporated in a stereophonic receiver (generally referred to as the multiplex circuitry), a number of the measurements described in Section 6 must be repeated using stereophonic modulation, as described below. Many of the same parameters are measured and stereophonic ratings are determined. In addition, certain measurements specifically relating to stereophonic performance must be made in order to adequately describe the performance of a receiver capable of receiving both stereophonic and monophonic broadcasts.

Note that the filter described in Section 3.8 is to be connected between the receiver output and the audio voltmeter in all stereophonic measurements and tests unless otherwise specified.

7.1 Stereophonic Usable Sensitivity. Signal-to-noise ratios measured in the receiver when it is operating in the stereo mode will differ from those measured with the receiver in the monophonic mode. Stereophonic usable sensitivity is measured in the same manner as monophonic usable sensitivity (Section 6.2), except that standard stereophonic test modulation (L = −R mode) is used and a 19 kHz ± 2 Hz pilot-signal frequency modulates the RF carrier 9 percent (±6.75 kHz). The peaks of the modulating signal, including pilot, modulate the carrier 100 percent (±75 kHz). Signal output of the generator is reduced to the least value which will produce a 30 dB drop in indicated output when the output is measured through a 1000 Hz null filter.

The result, expressed in dBf, is the rated stereophonic usable sensitivity.

If the receiver under test is equipped with automatic switching facilities for altering the mode of operation from monophonic to stereophonic, and if those facilities are non-defeatable by the user, the stereophonic usable sensitivity shall be equal to the stereo threshold rating (Section 7.4), providing that stereo threshold rating, expressed in dBf results in at least a 30 dB drop in indicated output when measured through the 1000 Hz null filter, as previously discussed. Any stereo threshold range control available for external adjustment by the user shall be placed in its most sensitive setting (least input required to effect monophonic to stereophonic switching) for this test.

7.2 Stereophonic 50 dB Quieting Sensitivity. This test is performed at 98 MHz, using a procedure similar to the monophonic measurement (Section 6.4), except that standard stereophonic test modulation is used, the receiver is operated in the stereophonic mode, and the generator is modulated by the pilot only when the tone modulation (L = −R) is removed. The signal input is reduced until the output with standard modulation is 50 dB above the output with pilot modulation only. The result, expressed in dBf, is the rated stereophonic 50 dB quieting sensitivity.

In the event that the filter inserted between the receiver output and the audio voltmeter is insufficiently sharp to eliminate residual pilot products (19 kHz) from the resultant reading, the distortion analyzer (Section 3.11) may be inserted between the receiver output and the output meter and tuned for a null at 19 kHz for this test as well as for the tests of Sections 7.3, 7.6, and 7.7. The smaller number of dB observed for left or right output shall be used in these ratings.

7.3 Stereophonic Signal-to-Noise Ratio at 65 dBf. This test is performed at 98 MHz with an input signal level of 65 dBf under standard conditions, with standard stereophonic modulation and the receiver in the stereophonic mode. The output obtained with pilot modulation only is measured and the resulting rated signal-to-noise ratio is expressed in dB. This test is a measure of the signal-to-noise ratio attained for relatively strong input signals.

Alternatively, a graph may be presented, in which signal input intensity in dBf is plotted along the horizontal axis, and output with pilot only, measured in dB, is plotted along the vertical axis. Increasing signal shall be plotted from left to right and increasing signal-to-noise ratios shall be plotted from top to bottom. Such a presentation shall include signal inputs from 0 dBf (or from stereo threshold level described in Section 7.4) to at least 65 dBf.

7.4 Muting-Stereo Threshold. In most stereophonic receivers, the subcarrier detection may be defeated during monophonic reception with a manual override switch, thus reducing noise and potential crosstalk from subcarriers. In some receivers, the subcarrier detection is defeated automatically under poor stereo reception conditions. In such receivers setting the selector switch to stereo may not insure stereo operation unless the automatic switch is also activated by sensing a 19 kHz pilot signal. The input signal level and the pilot level usually determine the automatic switching action so that the subcarrier channel is made inoperative under poor stereo reception conditions.

With the receiver tuned to mean carrier frequency, input signal level at 65 dBf, and with its mode switch set to stereo (or automatic stereo), apply standard stereophonic test modulation (L = −R mode) at 100 percent deviation. The signal input is decreased until the output drops sharply and this signal value is recorded in dBf. The signal input is then increased until the output is restored and this level, in dBf, is also recorded. The two input levels are a measure of the stereo switching sensitivity and the hysteresis of each. The rated stereo threshold is the mean of the two signal levels observed above and is stated in dBf. If the receiver is equipped with a variable stereo threshold control, the tests should be repeated for each extreme setting of the control and the minimum and maximum stereo threshold values shall be stated in dBf.

The automatic stereo switch response to pilot level changes is measured by maintaining 65 dBf signal input and reducing the pilot level until the output drops sharply. Record the pilot modulation at this point in percent. This determines switch performance in the presence of some types of multipath effects.

The automatic stereo switch vulnerability to harmonics of the modulation frequency is determined by maintaining 65 dBf signal input with standard (L = −R) modulation at 100 percent with no pilot signal. The modulation frequency is varied around 6333 and 9500 Hz. Any increases indicate switch operation. The threshold may be determined by finding the minimum signal deviation for switch operation at the most effective modulation frequency.

7.5 Stereophonic Frequency Response. The stereophonic frequency response tests are performed in a manner similar to those described in Section 6.9 except that the generator is modulated with standard stereophonic test modulation and with L-only and R-only signals at modulation frequencies from 30 to 15 000 Hz. Outputs are recorded from each channel and compared to the response of the standard de-emphasis network (unless preemphasis is used, Section 3.2). Results are expressed in dB with reference to a 1000 Hz output obtained with standard stereophonic test modulation in L-only or R-only mode. The rated frequency response shall be stated as: From 30 to 15 000 Hz ± X dB.

7.6 Distortion

7.6.1 ***Distortion at 50 dB Quieting Sensitivity.*** The rated distortion at stereophonic 50 dB quieting sensitivity is the percentage of distortion measured with the signal generator modulated 100 percent in the L = −R mode at 100 Hz, 1 kHz, and 6 kHz. The receiver is tuned to standard mean carrier frequency and the input is set at 50 dB quieting sensitivity level (Section 7.2). The greater percentage observed from either the right or left output shall be used in this rating.

7.6.2 *Distortion at 65 dBf.* The rated stereophonic distortion at 65 dBf input is the percentage of distortion measured with the signal generator modulated 100 percent in the L = −R mode at 100 Hz, 1 kHz, and 6 kHz. The receiver is tuned to standard mean carrier frequency and the input is set at 65 dBf. The greater percentage observed from either the right or left channel output shall be the rated distortion at 65 dBf.

7.6.3 *Intermodulation Distortion.* Stereophonic intermodulation distortion is measured at 98 MHz with an input signal level of 65 dBf and standard (L = −R) stereophonic modulation. The 1 kHz product from intermodulation of the 19 kHz pilot with the second harmonic of 9 or 10 kHz modulation at 100 percent is measured using a 200 to 1500 Hz bandpass filter. It is expressed as a percentage of the output from 100 percent modulation at 1 kHz. Products from other modulation frequencies at subharmonics of 18 kHz may also be determined.

7.7 Stereo Separation. Separation measurements are often affected by other parameters, so it is suggested that the RF and audio tests be completed first, for better evaluation of separation test results.

A 65 dBf signal, at mean carrier frequency is applied to the receiver. Standard stereophonic test modulation (L-only or R-only mode) is used at 100 percent total modulation. An L-only signal is applied at a frequency of 1000 Hz and the L-output level is recorded as a reference. Next, the output from the right-channel is recorded and the difference between the two readings is recorded. This value, expressed in dB is the left separation at 1 kHz.

This procedure is repeated, this time with R-only modulation applied, and the difference between the R output and the L output is recorded in dB. The smaller of the two readings obtained is the rated separation at 1 kHz.

Tests are repeated at other modulating frequencies from 30 Hz to 15 kHz and the results may be plotted with audio frequency plotted logarithmically along the abscissa and dB plotted linearly along the ordinate. If a complete graphic plot is not presented, published separation ratings must include separation values at least at audio frequencies of 100 Hz, 1000 Hz, and 10 000 Hz.

For more complete measurements, separation should be measured as a function of pilot level.

Some receivers are equipped with cross-blending circuits that reduce residual noise in the stereophonic listening mode when activated. Such circuits tend to reduce separation at mid and high frequencies as well. Whenever mention is made of such a feature in a published specification, that mention shall include a statement as to realizable separation at 1 kHz and 5 kHz when the switch is activated.

7.8 Identicality. The term *identicality* is used as a measure of symmetry in the two channels. It is expressed in dB as the ratio of the mean scalar output voltage of the two channels to one-half the vector sum of the output voltage of the two channels, when L = −R modulation is applied. For identical channels, the scalar output voltage = |L| = |R| and the vector output voltage L + R = 0.

Identicality factor is defined in this way for stereo receivers to make it consistent with usage for stereo amplifiers. However, the unbalance is referred to the mean scalar output voltage, rather than to the voltage at the junction of the two equal resistors when L = R modulation is applied, so that the identicality factor will reflect any abnormal behavior of the subcarrier channel in the receiver.

7.8.1 *Measurements.* Two equal resistors are connected in series across the two channel outputs, and the voltmeter is connected to the junction of the resistors so that it reads one-half the vector sum of the output from each of the two channels. When measuring normal loudspeaker outputs, 1000 Ω resistors are used, and 1 MΩ resistors are used when measuring tuner outputs.

With a 65 dBf input and L = −R modulation, the controls are adjusted for normal reception and standard output. The balance control is set for minimum output indication. The control settings are not changed while the modulation frequency is varied from 300 to 10 000 Hz in suitable increments. For each frequency, the output of each channel is measured and the average noted as the (|L| + |R|)/2. The vector unbalance (L + R)/2 at the junction of the two equal resistors is also noted. The corresponding identicality factor is the ratio of $\frac{1}{2}$ (|L| + |R|)/$\frac{1}{2}$ (L + R), expressed in dB. Note that the voltage measured at the junction of the two resistors is one-half the vector sum so that no additional factor need be applied.

The factor may be measured at various control settings to check on the tracking, or a quick evaluation may be made by listening while varying each control at several frequencies.

If noise or hum affect the readings, a bandpass filter may be used at each frequency.

7.8.2 *Presentation.* The identicality factor in dB is plotted linearly versus modulating frequency as a logarithmic abscissa. The control tracking is plotted in dB error versus dB change from normal settings or maximum settings.

7.9 Subcarrier Product Rejection. With the signal generator connected as usual and tuned to mean standard carrier frequency, standard stereophonic test modulation (L = −R) is applied at 100 percent system modulation. Output level is recorded, using either the left or the right channel output connection. The filter (Section 3.8) is changed to a 200 Hz highpass filter. Next, all modulation except the 19 kHz pilot signal is removed and the output level is once more recorded. The rated subcarrier product rejection is the difference between the two output readings taken above, expressed in dB.

7.10 SCA Rejection. SCA interference is caused by intermodulation with the effectively reinserted 38 kHz subcarrier which is always present. SCA interference is most objectionable during quiet parts of a program, and it is desirable to test for SCA interference with a composite signal with pilot only.

A study of possible subcarrier spectra and the receiver's de-emphasis characteristics indicates that an SCA subcarrier modulated by a 2.5 kHz sine wave will generate more interference than any other possible modulation. Accordingly, a 67 kHz subcarrier with a ± 6 kHz deviation at 2.5 kHz is used (Section 3.4). The SCA generator should be filtered to meet FCC specifications for out-of-band energy.

The signal generator, tuned to mean standard carrier frequency and at an output level of 65 dBf is connected under standard test conditions. Modulation is stereophonic, with only the 19 kHz pilot applied to provide 9 percent modulation. The SCA generator is adjusted to add a 67 kHz subcarrier with ± 6 kHz modulation at 2.5 kHz, and its output level is adjusted for 10 percent modulation of the main carrier. SCA interference is measured in the left and right channel outputs using the standard output filter (Section 3.8). Results are expressed in dB below the output obtained with standard stereophonic test modulation (L = −R mode) adjusted for 90 percent of maximum total deviation. Rated SCA rejection shall be the smaller reading obtained from either the left or the right channel outputs in the above tests.

8. Performance Evaluation

To facilitate the evaluation of receiver performance, specifications should include the rated characteristics given in Table 3.

9. Standard Data Format

In addition to the performance ratings listed in Section 8, receiver test records often require curves and tables for analysis of several parameters. This section covers standard forms for this presentation, the necessary test steps, and some secondary function tests needed for the records. The relationship to the rating tests is indicated by section references.

The test report headings should include a description of the receiver sample, the output load used, the standard test output chosen, and any variation from standard procedure.

9.1 Monophonic Measurements

9.1.1 *Sensitivity Curves.* See Fig 3. Curves are obtained by making the following measurements:

(1) S + D + N: Signal plus distortion plus noise output with standard modulation

(2) D + N: Distortion plus noise measured with distortion meter, with standard modulation

(3) N: Noise output without modulation

(4) Muting (dashed curves): With muting active

Table 3
Receiver Performance Evaluation

Specification Ratings		Monophonic	Stereophonic
Usable sensitivity	dBf	(Section 6.2)	(Section 7.1)
50 dB quieting sensitivity	dBf	(Section 6.4)	(Section 7.2)
Signal-to-noise ratio at 65 dBf	dB	(Section 6.5)	(Section 7.3)
Hum and noise at 65 dBf	dB	(Section 6.6)	—
Minimum volume hum and noise	dB	(Section 6.7)	—
Muting threshold	dBf	(Section 6.8)	(Section 7.4)
Frequency response 30 Hz to 15 kHz	±dB	(Section 6.9)	(Section 7.5)
Distortion at 50 dB quieting	percent	(Section 6.10.1)	(Section 7.6.1)
Distortion at 65 dBf	percent	(Section 6.10.2)	(Section 7.6.2)
Intermodulation distortion	percent	(Section 6.12)	(Section 7.6.3)
Capture ratio	dB	(Section 6.13)	—
Adjacent channel selectivity	dB	(Section 6.14)	—
Alternate channel selectivity	dB	(Section 6.14)	—
Spurious response ratio	dB	(Section 6.15.1)	—
Image response ratio	dB	(Section 6.15.2)	—
IF response ratio (balanced)	dB	(Section 6.15.3)	—
IF response ratio (unbalanced)	dB	(Section 6.15.3)	—
RF intermodulation	dB	(Section 6.16)	—
AM suppression ratio	dB	(Section 6.17.3)	—
Frequency drift	kHz	(Section 6.18)	—
AFC correction factor	—	(Section 6.19.2)	—
AFC offset error	±kHz	(Section 6.19.3)	—
Stereo separation	dB	—	(Section 7.7)
Subcarrier product ratio	dB	—	(Section 7.9)
SCA rejection ratio	dB	—	(Section 7.10)

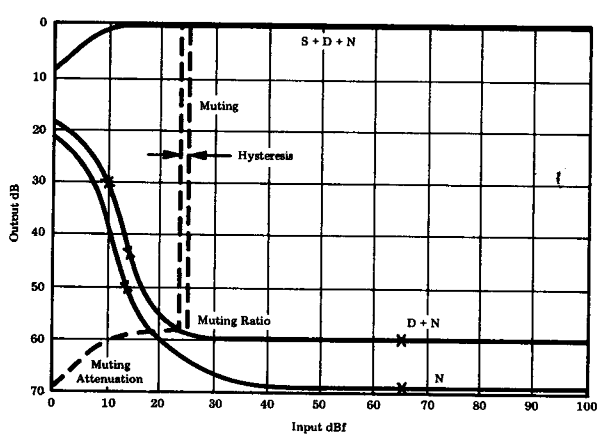

Fig 3
Monophonic Sensitivity Curves

Significant points obtained from the curves are:

(1) Usable sensitivity (measured at 90, 98, and 108 MHz): Input where (S + D + N) − (D + N) = 30 dB (Section 6.2)

(2) Volume sensitivity: Input where (S + D + N) = −20 dB (Section 6.3)

(3) 50 dB quieting sensitivity: Input where (S + D + N) − (N) = 50 dB (Section 6.4)

(4) Distortion at 50 dB quieting: (S + D + N) − (D + N) at above input (Section 6.10.1)

(5) Distortion at 65 dBf: (S + D + N) − (D + N) at 65 dBf input (Section 6.10.2)

(6) Signal-to-noise ratio at 65 dBf: (S + D + N) − (N) at 65 dBf input (Section 6.5)

(7) Hum and noise at 65 dBf: Signal-to-noise ratio with low-pass filter instead of bandpass filter (Section 6.6)

(8) Minimum volume hum and noise: Measurement at 65 dBf with volume control at minimum (Section 6.7)

(9) Muting ratio: Reduction in (S + D + N) at muting, stated in dB (Section 6.8)

(10) Muting threshold: Mean of two input levels for hysteresis as shown on curve, stated in dBf. (Section 6.8)

(11) Muting hysteresis: Difference in input levels for switching hysteresis as shown on curve, stated in dBf (Section 6.8)

(12) Muting attenuation: Reduction in (S + D + N) at zero input, stated in dB (Section 6.8)

(13) For reference in the test report, other curve points may be identified as "20 dB quieting," "1 dB limiting," etc

Supplementary tests that can be made are:

(1) Tuning meter threshold, minimum in-

Table 4
Input Level Table

Input Level (dBf)	Capture Ratio (dB)	AM Suppression (dB)	Selectivity in dB Channels from Desired Signal −2	−1	+1	+2
Usable sensitivity	3.8	22	78	−6	−5	78
50 dB quieting sensitivity	3.3	28	72	−5	−4	72
25	2.2	41	75	−4	1	61
35	2.0	43	58	−3	−1	57
45	1.7*	43*	48*	−3*	0*	47*
55	1.6	43	38	−3	0	37
65	1.6*	43	28	−3	−1	27
80	1.6	42	—	—	—	—
100	1.7	37	—	—	—	—

*Values used for ratings.
NOTE: The AM suppression at 20 Hz AM should also be recorded at 45 dBf input.

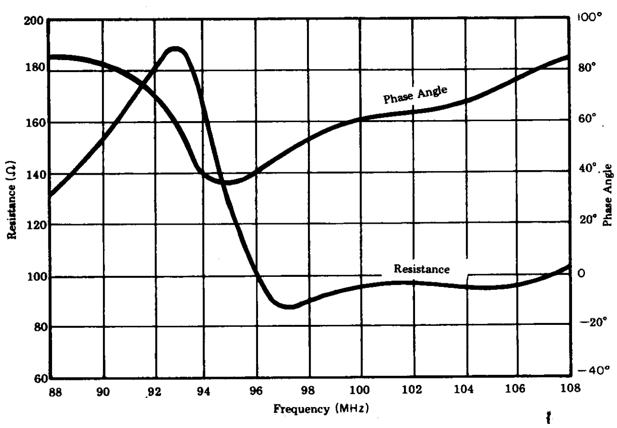

Fig 4
Input Impedance

put in dBf for useful indication, may be different inputs for peak and zero center types

(2) Gain reserve: At 65 dBf input, advance volume to maximum setting, reducing modulation to maintain standard output; record modulation reduction in dB as the gain reserve.

9.1.2 *Input Impedance and Unbalance (Sections 6.20 and 6.21).* See Fig 4. Alternatively, the impedance may be stated in ohms at the three principal frequencies (Section 6.20). The unbalance is stated in dB (Section 6.21).

9.1.3 *Input Level Table.* The capture ratio (Section 6.13), AM suppression (Section 6.17.3), and selectivity (Section 6.14) may be tabulated versus input on a single form, as shown in Table 4.

9.1.4 *Spurious Responses (Section 6.15).* Spurious responses should be tabulated, including those listed and any others found:

IF, unbalanced	10.7 MHz	Section 6.15.3
IF, balanced	10.7 MHz	Section 6.15.3
Signal + (1/2) IF	103.35 MHz	Section 6.15.4
Signal + (2/3) IF	105.13 MHz	Section 6.15.4
Image	119.4 MHz	Section 6.15.2
2 × signal + IF	206.7 MHz	Section 6.15.4

The rated spurious response ratio is the poorest of those measured under Sections 6.15.4 and 6.16 or found by scanning the frequencies listed in Section 6.15.1.

9.1.5 *RF Intermodulation (Section 6.16).* The first response listed is used for rating, the others are for more complete tests:

$2f_1 - f_2$ = signal, 2 × 98.8 − 99.6 = 98.0 MHz
$f_2 - f_1$ = signal, 198 − 100 = 98.0 MHz
$f_1 + f_2$ = signal, 0.8 + 97.2 = 98.0 MHz
$f_2 - f_1$ = IF, 110.7 − 100 = 10.7 MHz
$f_1 + f_2$ = image, 59 + 60.4 = 119.4 MHz

9.1.6 *Frequency Response (Section 6.9).* See Fig 5. Measurements for curves *A* through *E* are made as follows:

(1) For curve *A* measurements are made at full volume with reduced modulation for standard output

(2) For curve *D* measurements are made with the same modulation and volume control lowered to reduce 1 kHz 30 dB

(3) For curve *C* measurements are made with loudness compensation turned on