

JIS

JAPANESE INDUSTRIAL STANDARD

**Methods of Measurement on
Receivers for Amplitude Modulated
Sound-Broadcasting Emissions**

JIS C 6102—1988

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Methods of Measurement on Receivers for
Amplitude Modulated Sound-
Broadcasting Emissions

C 6102-1988

1. Scope

This Japanese Industrial Standard specifies standard test methods for the comparison and evaluation of radio receivers for receiving amplitude modulated sound-broadcasting emission in a frequency range from 531 kHz to 26.1 MHz, hereinafter referred to as "receivers". The test items may be selected as needed at the time of test.

2. General Specification for Test

2.1 Values of Voltage and Current The values shall be expressed in r.m.s. value unless otherwise specified.

2.2 Expression of Level When the power, voltage and electric field strength are expressed in decibel (dB), Table 1 shall be followed.

Table 1

Kind of level	Value to be employed as 0 dB	Symbol	Remark
Power	1 mW	dB (mW)	Used mainly for low-frequency power level.
	1 fW	dB (fW)	Used mainly for high-frequency power level.
Voltage	1 V	dB (V)	Used mainly for low-frequency voltage level.
	1 μ V	dB (μ V)	Used mainly for high-frequency voltage level.
Electric field strength	1 μ V/m	dB (μ V/m)	

2.3 Test Site As a rule the tests shall be carried out in a place not disturbed by external unnecessary waves. For this purpose it is desired to carry out the tests in a shielded room which sufficiently shields external electric field.

2.4 Atmospheric Conditions for Testing The tests shall, as a rule, be carried out in the atmosphere of ordinary temperature and ordinary humidity specified in JIS Z 8703.

2.5 Adjustment of Receiver

2.5.1 Tuning Control The tuning control shall be carried out as specified in (1) or (2) below, but if the level of input signal is small it shall be carried out as specified in (3).

Applicable Standard, Corresponding International Standards and Reference Standard: See page 58.

- (1) Receiving state obtained according to the indication or by the operation of the frequency indicator or automatic tuner, if provided.
- (2) State of minimum distortion.

A signal with modulation frequency 1 kHz (or 400 Hz) and modulation factor 80 % (may be 30 % for a receiver the distortion of which extremely increases when the modulation factor increases) is applied to the receiver and the tuning is made so that the output becomes the maximum.

Then the modulation frequency is increased, with the modulation factor maintained constant, to a modulation frequency at which the attenuation of the output is about 10 to 14 dB, and the tuner is so adjusted that the distortion of output becomes the minimum.

- (3) State of maximum output.

Remark: In the test which is carried out by changing the input signal level, the tuning may be readjusted at each level if it is not in contradiction to the test purpose (e.g. two signal selectivity, sensitivity suppressing characteristic).

2.5.2 Sound Volume Control Unless otherwise specified, the (sound) volume control shall be adjusted to a position at which the standard test output is obtained.

Remark: When the position of the volume control is changed for the purpose of test, balance control should be carried out at the position of the volume control if necessary.

2.5.3 Balance Control Unless otherwise specified, the balance shall be so adjusted that the outputs of right and left channels are identical when the standard test signal is applied.

2.5.4 Tone Control The tone control shall be adjusted to a position at which the electric characteristic in audio frequency band becomes most flat. When the test is carried out with this control adjusted to another position due to construction of the receiver or the contents of the test, such fact shall be additionally recorded in the measurement report.

2.5.5 Sensitivity Control (Change-over) When a receiver with sensitivity control (change-over) function is tested, the control shall be adjusted (change-over) to the high sensitivity side. If necessary the test should be carried out with this control changed over according to the test input level for each test item and such fact shall be additionally recorded in the measurement report.

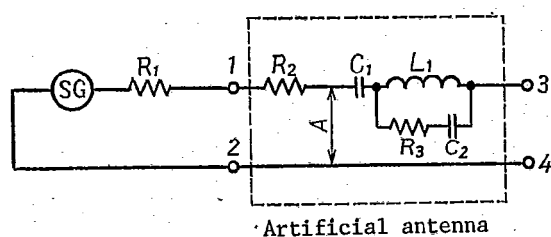
3. Standard Artificial Antenna and Test Electric Field Generating Coil

3.1 Standard Artificial Antenna In the test of a receiver which uses an open-circuit antenna, adequate one shall be selected from the standard artificial antennas given below for use in this test. Two kinds of standard

artificial antenna i.e. for single signal and for two signals are shown for each type of antenna. The standard artificial antenna for two signals is used when the test is carried out with two signals applied. Figures 1, 3, 5, 7 and 9 show standard artificial antennas for single signal and Figures 2, 4, 6, 8 and 10 show standard artificial antennas for two signals. The input signal level (refer to 4.2.2) when each standard artificial antenna is used is such that the level is equal to the open terminal voltage of the signal generator when a standard artificial antenna for single signal is used, and the level is lower than the open terminal voltage of the signal generator by 6 dB (μV) when a standard artificial antenna for two signals is used.

- (1) When the test is carried out at 531 kHz or more up to and including 26.1 MHz by simulating an antenna of about 10 m in length.

Fig. 1



SG : Signal generator

$$C_1 = 125 \text{ pF}$$

$$C_2 = 400 \text{ pF}$$

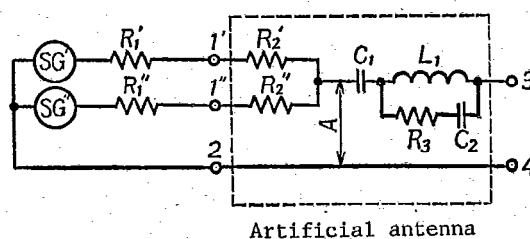
$$L_1 = 20 \text{ } \mu\text{H}$$

 R_1 : Resistance of SG

$$R_1 + R_2 = 80 \text{ } \Omega$$

$$R_3 = 320 \text{ } \Omega$$

Fig. 2



SG' and SG'' : Signal generators

$$C_1 = 125 \text{ pF}$$

$$C_2 = 400 \text{ pF}$$

$$L_1 = 20 \text{ } \mu\text{H}$$

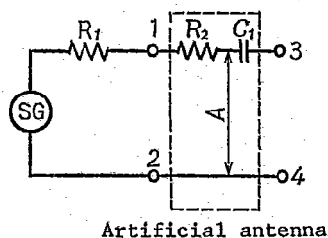
 R_1' and R_1'' : Resistances of SG' and SG''

$$R_1' + R_2' = R_1'' + R_2'' = 160 \text{ } \Omega$$

$$R_3 = 320 \text{ } \Omega$$

- (2) When the test is carried out at 531 kHz or more up to and including 1.6 MHz by simulating a room antenna of about 5 m in length.

Fig. 3

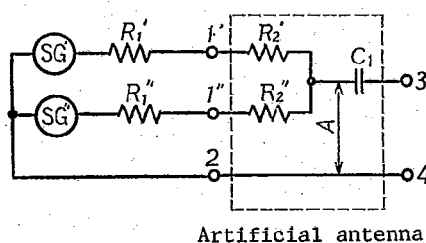


SG : Signal generator

$$R_1 + R_2 = 80 \text{ } \Omega$$

$$C_1 = 75 \text{ pF}$$

Fig. 4



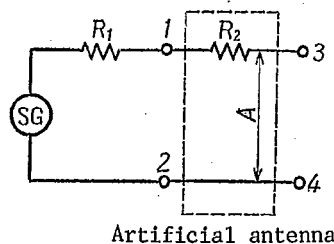
SG' and SG'' : Signal generators

$$C_1 = 75 \text{ pF}$$

$$R_1' + R_2' = R_1'' + R_2'' = 160 \text{ } \Omega$$

- (3) When the test is carried out at 6 MHz or more up to and including 26.1 MHz by simulating a room antenna of about 5 m in length.

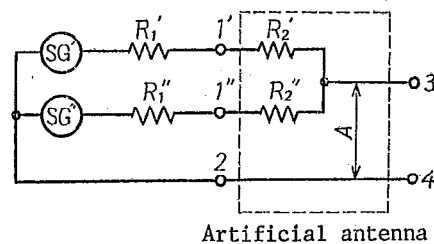
Fig. 5



SG : Signal generator

$$R_1 + R_2 = 200 \, \Omega$$

Fig. 6

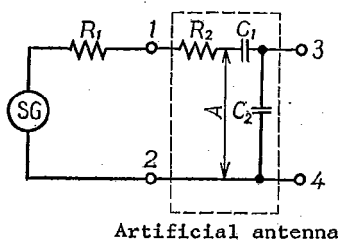


SG' and SG'' : Signal generators

$$R_1' + R_2' = R_1'' + R_2'' = 400 \, \Omega$$

- (4) When the test is carried out at 531 kHz or more up to and including 26.1 MHz by simulating a rod antenna for automobile.

Fig. 7



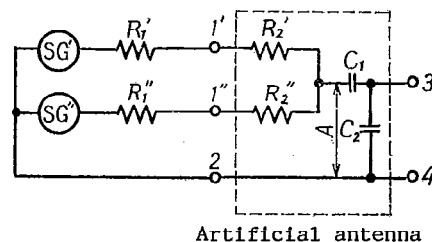
SG : Signal generator

$$R_1 + R_2 = 80 \, \Omega$$

$$C_1 = 15 \, \text{pF}$$

$$C_2 = 60 \, \text{pF}$$

Fig. 8



SG' and SG'' : Signal generators

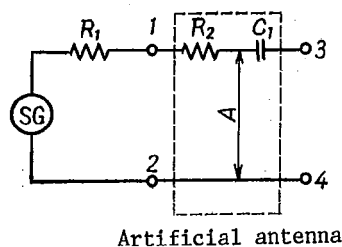
$$R_1' + R_2' = R_1'' + R_2'' = 160 \, \Omega$$

$$C_1 = 15 \, \text{pF}$$

$$C_2 = 60 \, \text{pF}$$

- (5) When the test is carried out at 531 kHz or more up to and including 26.1 MHz by simulating a portable rod antenna of about 1 m long.

Fig. 9

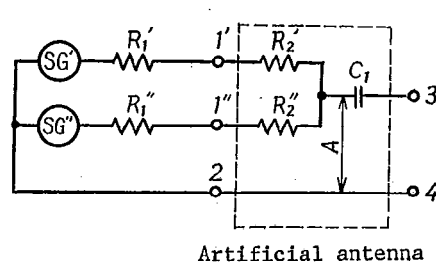


SG : Signal generator

$$R_1 + R_2 = 80 \, \Omega$$

$$C_1 = 10 \, \text{pF}$$

Fig. 10



SG' and SG'' : Signal generators

$$C_1 = 10 \, \text{pF}$$

$$R_1' + R_2' = R_1'' + R_2'' = 160 \, \Omega$$

Remark: A receiver which uses open-wire antenna shall be tested in such a way that the antenna is considered as a part of the receiver, and an adequate artificial antenna which simulates the signal source impedance of the antenna is inserted between the signal generator and the input terminals of the receiver. The standard simulation networks for the said artificial antenna are shown in Figs. 1 to 10 as the standard artificial antennas. However, if it is obvious that use of the standard artificial antenna is inadequate, an artificial antenna of an impedance more close to the signal source impedance of the antenna appropriate to the receiver shall be used.

The value of C_2 of the standard artificial antenna representing rod antennas for automobile (Figs. 7 and 8) is the value representing the capacitance of antenna cable, and varies according to the kind and length of the attached cable. There are many receivers which are designed based on $C_2=65\text{ pF}$ taking the antenna actually used into consideration, in recent receivers; therefore an artificial antenna of $C_2=65\text{ pF}$ is used sometimes.

Some of automobile receivers are so designed that the value of C_2 forms a part of the tuning circuit. Therefore it is desired to readjust the receiver, as far as possible, when the test is carried out by using a standard artificial antenna.

The portable rod antenna is accommodated in a receiver in many cases, and has variety in length. Therefore, monistic determination of the standard artificial antenna is more difficult than the case of automobile receivers. However, rod antennas are widely used in small portable short-wave receivers, so the standard artificial antennas are determined with the conditions on the length. Since the value of C_1 in Figs. 9 and 10 should have a different value according to the length of the rod antenna accommodated in the receiver, the size of receiver, the measuring frequency, etc., an artificial antenna with a different value of C_1 is used sometimes as needed.

In many cases the receiver is so designed that the value of C_1 forms a part of the tuning circuit. Therefore it is desired to readjust the receiver as far as possible, when the test is carried out by using a standard artificial antenna.

3.2 Test Electric Field Generating Coil The measurement of receivers employing frame antennas is carried out by use of a test electric field generating coil.

- (1) **Construction and Various Parameters of Test Electric Field Generating Coil** The test electric field generating coil shall be completely shielded electrostatically as shown in Fig. 11.

A copper tube of 10 to 12 mm in diameter is bent into circular form of average diameter 0.25 m and used as the shielding body, only one end of which is earthed and the other end is insulated not to form a short circuited coil. An insulated single-core conductor is introduced into the above copper tube and used as the coil. The value of the series impedance which is used to make the electric field strength ($\mu\text{V}/\text{m}$) at a position 0.6 m distant from the coil equal to $\frac{1}{10}$ of the reading (μV) of the signal generator (in the case of Fig. 12) or equal to $\frac{1}{20}$ of the reading (in the case of Fig. 13) is obtained from the equation in Remark of (2) and shown in Table 2. A resistor accommodated in a small box provided on the support of the shielding body is connected to the non-earthed end of the coil and the live line side of the shielded cable. The value of this resistance shall be so determined that the series impedance shows the appropriate value in Table 2 and then corrected by calibration.

It is necessary that the parallel capacitance of the shielded cable is small so that no trouble occurs within the range of test frequencies to be used.

Fig. 11

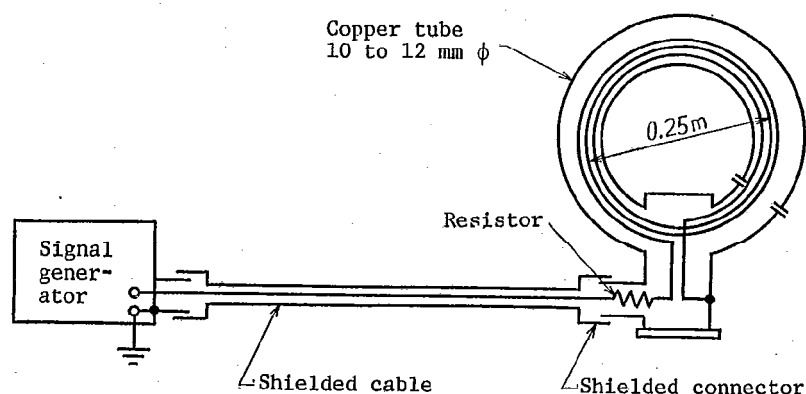


Table 2

Number of turns	Series impedance	Test frequency range
3	409 Ω	531 kHz to 10 MHz
1	136 Ω	531 kHz to 26.1 MHz

Remark: The series impedance is composed of the internal resistance of signal generator, the impedances of shielded cable and coil, and the resistance of series resistor.

- (2) **Relative Positions of Test Electric Field Generating Coil and Receiver**
The arrangement shall be as illustrated in Fig. 12, when the frame antenna of the receiver to be tested has air core, and as illustrated in Fig. 13 when the antenna has a magnetic core.

Fig. 12

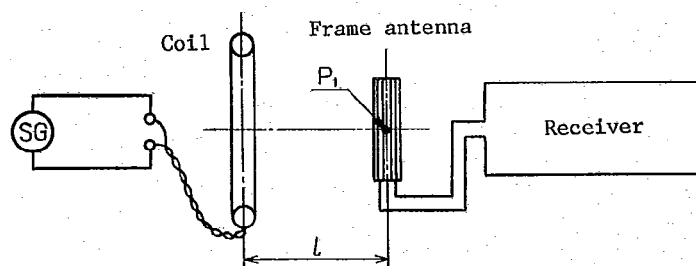
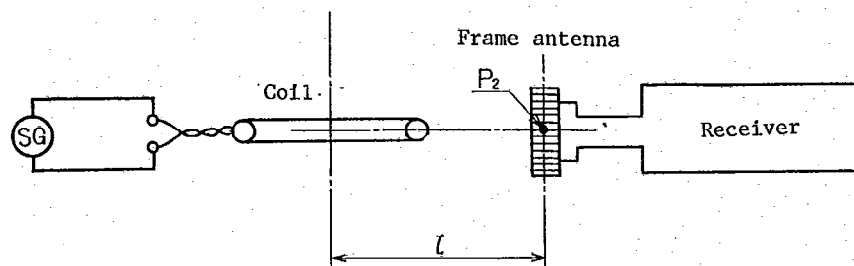


Fig. 13



In this procedure the distance l between the coil and the frame antenna shall be larger than twice the maximum dimension in the coil and frame antenna and far smaller than the signal wavelength. The distance from surrounding substance e.g. the wall of shielded room shall be at least twice l . The l means the distance between the centre of the coil and the centre of the frame antenna in the case of Fig. 12, and it means the distance between the centre of the coil and the centre line of the magnetic core of the frame antenna in the case of Fig. 13.

Remark: The value of equivalent field strength E ($\mu\text{V/m}$) at the position where the frame antenna is located i.e. P_1 in Fig. 12 and P_2 in Fig. 13, is calculated from the following formulae:

$$\text{In the case of Fig. 12} \quad E = \frac{60 \pi N A^2 I}{l^3} \times 10^6 \text{ } [\mu\text{V/m}]$$

$$\text{In the case of Fig. 13} \quad E = \frac{30 \pi N A^2 I}{l^3} \times 10^6 \text{ } [\mu\text{V/m}]$$

where N : number of turns of coil

A : radius of coil (m)

I : current flowing through coil (A)

l : distance between centre of coil and frame antenna (m)

The above equivalent field strength is not the average equivalent field strength for the frame antenna.

- (3) Calibration In the case of testing a receiver employing a frame antenna of good sensitivity, errors due to the leakage in the signal generator may sometimes take place.

Also when the space surrounding the coil and the frame antenna is small i.e. the distance from the metallic wall of shielded room is short, errors may occur. For compensating these errors, it is desired to investigate the formulae in Remark of (2) and introduce the correction term if necessary. For this correction, a calibration antenna identical to the frame antenna in size is prepared, this antenna is turned with a variable capacitor, and the terminal voltage of this capacitor V and Q of the circuit are measured. The voltage e (μV) induced in the calibration antenna is calculated from the following formula:

$$e = \frac{V}{Q}$$

where V : terminal voltage of variable capacitor (μV)

Q : Q of calibration circuit

The relation between induced voltage e and equivalent field strength E_0 ($\mu V/m$)

$$e = N_0 S_0 \frac{2\pi}{\lambda} E_0$$

where N_0 : number of turns of calibration frame antenna (T)

S_0 : area of calibration frame antenna (m^2)

λ : wavelength (m)

E_0 : measured value of field strength at the position of calibration frame antenna ($\mu V/m$)

Therefore, E_0 can be obtained from the following formula:

$$E_0 = \frac{\lambda V}{2\pi Q N_0 S_0} \quad [\mu V/m]$$

The value of this E_0 can be used to investigate the value calculated by the formulae in Remark of (2).

- (4) Test by Two Signals This test shall be carried out with each signal coil arranged in each side of the frame antenna of the receiver.

4. Standard Conditions for Testing

4.1 Power Supply A power supply adequate for the receiver to be tested (specimen) shall be used and it shall, unless otherwise specified, comply with the following requirements:

- (1) Receiver Employing Commercial Power Supply A power supply equal to the rated voltage and rated frequency of the receiver shall be used, if there are more than one rating one of them shall be chosen and then used. The fluctuation of the power supply voltage shall be not more than $\pm 2\%$ during the test, and the waveform distortion is desired to be small so that it will not affect the test results.
- (2) Receiver Employing Battery Power Supply A stabilize d.c. power supply by which a voltage equal to the rated voltage of the receiver is available shall be used. When a battery is used, a battery of the kind assigned to the specimen shall be used.

4.2 Test Input Signal

4.2.1 Standard Test Frequency The standard test frequencies shall be as given in Table 3.

The frequency may be added further if necessary.

If the tuning at any of these frequencies is impossible due to construction of the receiver, a frequency nearest to the said frequency at which the tuning is possible shall be used.

Table 3

19 Frequencies	8 Frequencies	3 Frequencies
531 kHz		
603 kHz	603 kHz	
801 kHz		
999 kHz	999 kHz	999 kHz
1.197 MHz		
1.404 MHz	1.404 MHz	
1.602 MHz		
2.4 MHz		
3.3 MHz		
3.9 MHz	3.9 MHz	
4.9 MHz		
6.1 MHz		
7.2 MHz	7.2 MHz	7.2 MHz
9.6 MHz		
11.8 MHz	11.8 MHz	11.8 MHz
15.3 MHz		
17.8 MHz	17.8 MHz	
21.6 MHz		
25.8 MHz	25.8 MHz	

4.2.2 Input Signal Level The input signal level of a receiver using a open-circuit antenna means the open terminal voltage at point A, when the network of receiver side from the position of point A is removed in artificial antennas shown in Figs. 1 to 10, and that of a receiver using a frame antenna means the equivalent field strength at the position of the antenna.

- (1) **Input Signal Level for Receiver Using Open-circuit Antenna** The input signal level for a receiver using an open-circuit antenna shall be selected from the levels shown in Table 4. The standard input signal level is 5 mV [74 dB (μ V)].

Table 4

Input signal level (voltage)	Input signal level (decibel)	Remark
50 μ V	34 dB (μ V)	Standard value
500 μ V	54 dB (μ V)	
5 mV	74 dB (μ V)	
50 mV	94 dB (μ V)	

- (2) **Input Signal Level for Receiver Using Frame Antenna** The input signal level for a receiver using a frame antenna shall be selected from the levels shown in Fig. 5. The standard input signal level is 5 mV/m [74 dB (μ V/m)].

Table 5

Input signal level (field strength)	Input signal level (decibel)	Remark
50 μ V/m	34 dB (μ V/m)	Standard value
500 μ V/m	54 dB (μ V/m)	
5 mV/m	74 dB (μ V/m)	
50 mV/m	94 dB (μ V/m)	

4.2.3 Standard Test Modulation The standard modulation frequency and modulation factor of the test input signal shall be as follows:

Modulation frequency 1 kHz (or 400 Hz)
Modulation factor 30 %

4.2.4 Standard Test Signal The standard test signal means a signal of standard test modulation and standard input signal level.

4.3 Standard Artificial Load The standard artificial load means a resistance of a value equal to the nominal impedance of the speaker attached to the receiver or specified one, or the impedance at 1 kHz (or 400 Hz) of the said speaker. The tolerances shall be ± 5 %.

For a receiver which has no speaker or no speaker terminals like a tuner, it means a resistance of a value equal to the impedance at the terminals provided for supplying power to other apparatus (excluding speakers), and the value is assigned by the manufacturer.

4.4 Standard Test Output

- (1) This means the output of a receiver equipped with a speaker or terminals for connection with a speaker at the time of carrying out the measurements, and shall be selected from the outputs shown in Table 6.

The standard value is 50 mW [17 dB (mW)].

Table 6

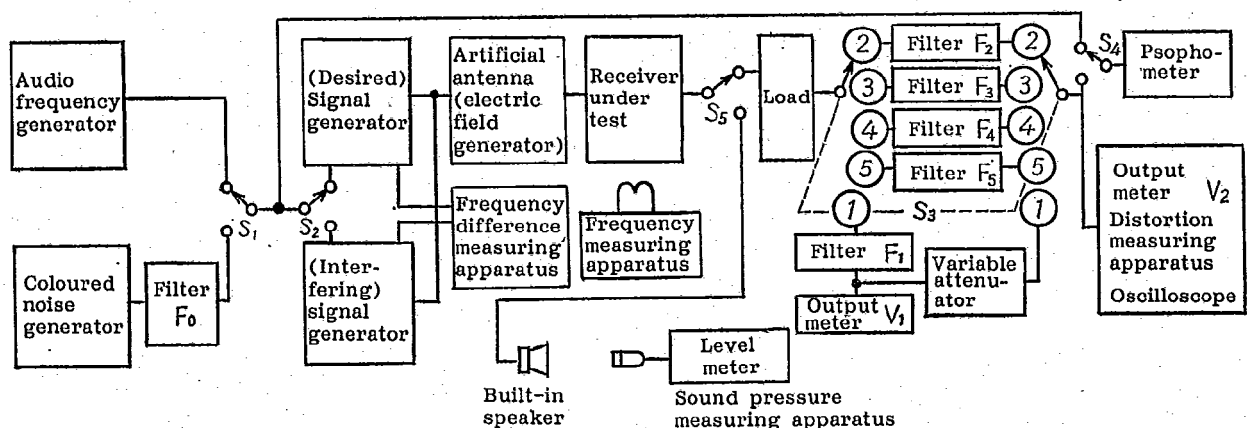
Output level (power)	Output level (decibel)	Remark
1 mW	0 dB (mW)	Standard value
5 mW	7 dB (mW)	
50 mW	17 dB (mW)	
500 mW	27 dB (mW)	
1 W	30 dB (mW)	

- (2) It means the output shown by the manufacturer for a receiver not equipped with a speaker nor terminals for connection with a speaker (tuner or the like).

5. Configuration of Measuring Circuit

The basic configuration of measuring circuit shall be as illustrated in Fig. 14, unless otherwise especially specified. The measurement shall be carried out for the measurement items not especially noted with the positions of contacts of switches S_1 , S_2 , S_3 , S_4 and S_5 as shown in the figure. In the case of measurements of a receiver employing a frame antenna, the test field generating coil shall be used instead of the artificial antenna in accordance with 3.2 (2).

Fig. 14



- (1) Coloured Noise In this test, the coloured noise means the artificial aural signal which is obtained by passing of white noise through the filter having the frequency characteristics shown in Fig. 15.

- (2) Psophometer In this test, the psophometer means an apparatus consisting of the combination of the noise evaluation filter shown in Fig. 16 and a r.m.s. value voltmeter of time constant 200 ms. The internal circuit of the psophometer shall not saturate up to a peak input voltage 20 dB larger than the maximum indication of the meter at the range in service covering all the ranges.
- (3) Output Meter An output meter which indicates mean square value is desirable. Such meter is especially necessary for measurement of an output composed of more than two frequency components like a noise or a noise and a signal.

When a filter is located between the load and the output meter, it is necessary to carry out the calibration by taking the attenuation in the filter at the measuring frequency into consideration.

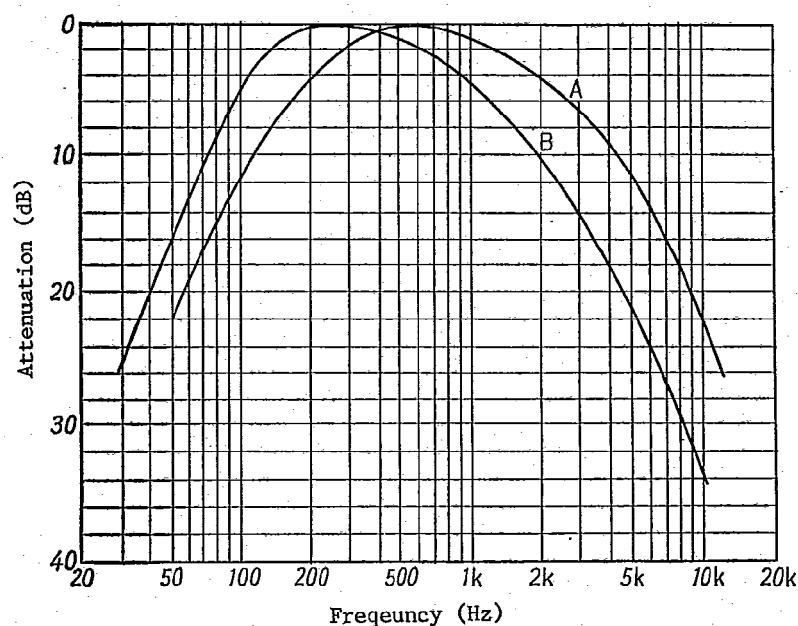
- (4) Filter The filters shall be changed over to meet with the purpose of the measurement. The specifications of these filters are given in Table 7.

Table 7

Filter	Specification	Description
F 0	4.5 kHz L.P.F	L.P.F Low filter
F 1	1 kHz (or 400 Hz) B.P.F	B.P.F Band-pass filter
F 2	224 Hz to 15 kHz B.P.F	Mainly used for measurement in which hum is removed.
F 3	Audibility weighting curve A	The characteristics are shown in Fig. 17 and Table 8.
F 4	22.4 Hz to 22.4 kHz B.P.F	The characteristics are shown in Fig. 18.
F 5	125 Hz B.P.F	

- (5) Load The load shall be so selected that the load impedance viewed from the receiver has a correct value at any position of switch S_3 .

Fig. 15. Circuit and Frequency Characteristic of Coloured Noise Filter



Remarks A: Frequency characteristic of coloured noise (measured with $\frac{1}{3}$ octave filter)

B: Frequency characteristic of filter circuit

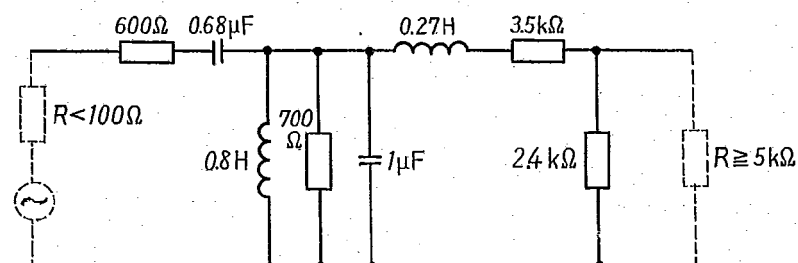
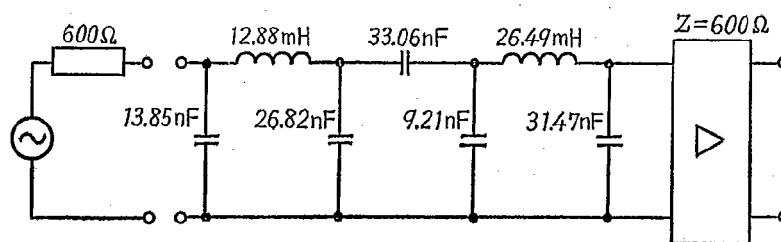
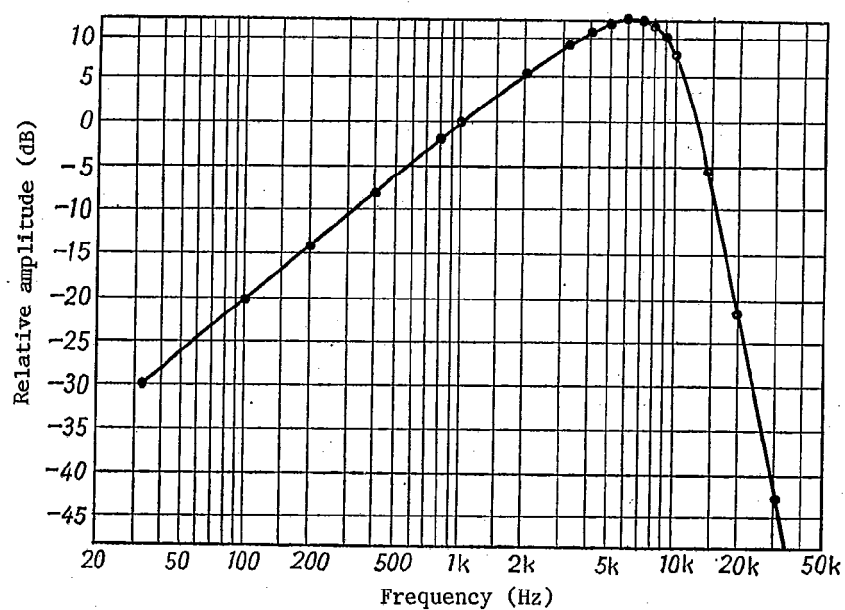


Fig. 16

(a) Circuit of Noise Evaluation Filter



(b) Charactersitic of Noise Evaluation Filter



Frequency (Hz)	Response dB	Tolerance dB
31.5	-29.9	±2.0
63	-23.9	±1.4
100	-19.8	±1.0
200	-13.8	±0.85
400	-7.8	±0.7
800	-1.9	±0.55
1 k	0	±0.5
2 k	+ 5.6	±0.5
3.15k	+ 9.0	±0.5
4 k	+10.5	±0.5
5 k	+11.7	±0.5
6.3k	+12.2	0
7.1k	+12.0	±0.2
8 k	+11.4	±0.4
9 k	+10.1	±0.6
10 k	+ 8.1	±0.8
12.5k	0	±1.2
14 k	- 5.3	±1.4
16 k	-11.7	±1.6
20 k	-22.2	±2.0
31.5k	-42.7	+2.8, -∞

Table 8. Frequency Characteristic of Audibility Weighting Curve A and Tolerance

Frequency (Hz)	Response dB	Tolerance dB	Frequency Hz	Response dB	Tolerance dB
10	-70.4	+3.0, $-\infty$	500	-3.2	± 1.0
12.5	-63.4	+3.0, $-\infty$	630	-1.9	± 1.0
16	-56.7	+3.0, $-\infty$	800	-0.8	± 1.0
20	-50.5	± 3.0	1 k	0	± 1.0
25	-44.7	± 2.0	1.25k	+0.6	± 1.0
31.5	-39.4	± 1.5	1.6 k	+1.0	± 1.0
40	-34.6	± 1.5	2 k	+1.2	± 1.0
50	-30.2	± 1.5	2.5 k	+1.3	± 1.0
63	-26.2	± 1.5	3.15k	+1.2	± 1.0
80	-22.5	± 1.5	4 k	+1.0	± 1.0
100	-19.1	± 1.0	5 k	+0.5	± 1.5
125	-16.1	± 1.0	6.3 k	-0.1	+1.5, -2.0
160	-13.4	± 1.0	8 k	-1.1	+1.5, -3.0
200	-10.9	± 1.0	10 k	-2.5	+2.0, -4.0
250	-8.6	± 1.0	12.5 k	-4.3	+3.0, -6.0
315	-6.6	± 1.0	16 k	-6.6	+3.0, $-\infty$
400	-4.8	± 1.0	20 k	-9.3	+3.0, $-\infty$

Fig. 17. Audibility Weighting Curve A

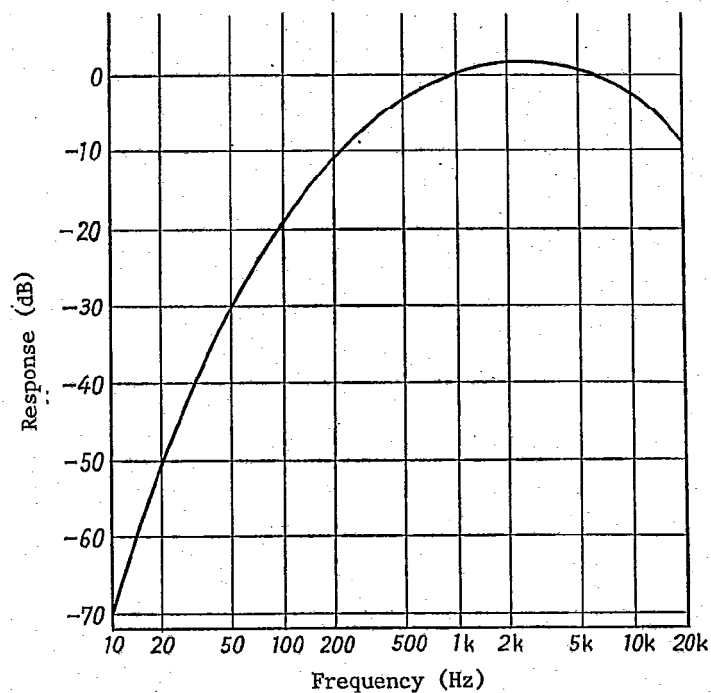
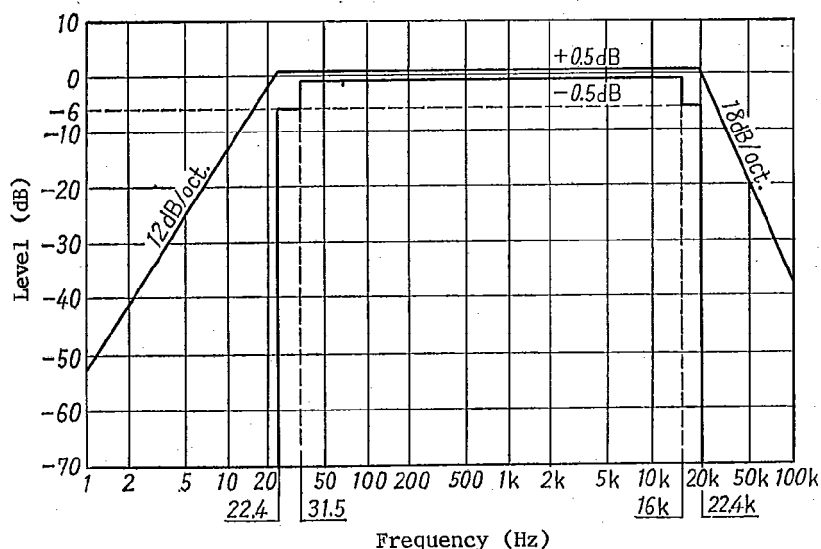


Fig. 18. Characteristics of Wide Band-pass Filter



6. Inspection of General Operating Conditions

6.1 Inspection in General Carry out the inspection of the receiver on the items given below prior to various performance tests, to check whether the operating conditions of the receiver is enough to endure various test or not.

If the operation of a specimen is not enough, as the decision of this inspection, subject the specimen to the tests after readjustment or modification.

6.2 Mechanical Construction Examine whether there is any abnormality on each control device or on the general operation or not.

6.3 Unwanted Oscillation Operate the receiver under the test conditions specified in 2.3, 2.4 and 4.1, and examine whether unwanted self-oscillation, acoustic feedback, etc. appears or not under each of the following conditions:

- (1) When the signal generator, antenna, external loudspeaker, etc. are connected.
- (2) When each control is adjusted to certain positions.
- (3) When the input signal level is changed.

6.4 Receiving Frequency Band Operate the receiver under the test conditions specified in 2.3, 2.4 and 4.1, and then examine the receivable frequency band by operating the tuning control.

6.5 Power or Current Consumption Carry out the power consumption test by using the power supply specified in 4.1, with no signal applied. Measure the power consumption for receivers employing commercial power supply and the current consumption for receivers employing battery power supply. If the receiver is intended for use on a.c. and d.c., measure the a.c. power consumption and the d.c. current consumption.

For a receiver having a power amplifier in its output circuit, measure the power consumption at its maximum useful output.

6.6 Insulation Operate a receiver of commercial power supply under the standard conditions for testing specified in 4. for 1 h, and then examine the insulation resistance and dielectric strength on the parts given below.

- (1) Between the power supply terminals, and the antenna and earth terminals connected together.
- (2) Between the power supply terminals and the + B wiring or equivalent wiring (receivers without transformer are excluded).

Measure the insulation resistance with a d.c. 500 V insulation resistance tester, and test the dielectric strength by applying an a.c. voltage of 1 kV at 50 Hz or 60 Hz for 1 min. However, if the no-load voltage of winding B of the power supply transformer exceeds 500 V, carry out the test at a voltage equal to twice the above no-load voltage.

6.7 continuous Operation Apply the standard test signal of the test frequency chosen in accordance with 4.2.1 to a receiver, operate the receiver under the standard conditions for testing specified in 2.3, 2.4 and 4.1 continuously for 6 h and then check existence on non-existence of abnormalities at various parts.

7. Methods of Measurement ⁽¹⁾

Note ⁽¹⁾ Carry out the measurement on receiver under the standard conditions for testing specified in 2. and 4., except the measurements especially specified.

7.1 Characteristics of Sensitivity, SN Ratio and Automatic Gain Control

7.1.1 SN Ratio and Audibility Weighted SN Ratio The SN ratio means the ratio of the signal output to the random noise output which is generated by the receiver. The audibility weighted SN ratio means the ratio of the signal output to the random noise output which is generated by the receiver and corrected with audibility weighting curve A. Carry out the measurement according to Fig. 14, as follows:

- (1) **SN Ratio** Apply the standard test signal of the test frequency chosen from those of 4.2.1 to the receiver, tune the receiver according to 2.5.1, turn switch S_3 to ①, and then adjust the volume control so that the indication of output meter V_1 shows the standard test output of 4.4.

For a receiver without loudspeaker terminals, read the output level of the receiver corresponding to the input signal level, if the receiver has no volume control.

But, if a receiver without loudspeaker terminals has a sound volume control, adjust the volume control so that the standard test output of 4.4 (2) is attained.