

MESSAGE CIRCUIT NOISE AND IMPULSE NOISE MEASUREMENTS

MESSAGE CIRCUIT TRUNKS

TEST CLASSIFICATIONS AND INTERVALS

1. GENERAL

1.01 This section discusses the circumstances under which message circuit noise and impulse noise measurements are to be made on all message trunks which make up the direct distance, extended area, and local dialing networks. The types of trunks covered by this section are the same as those listed in Section 660-402-300. This section also establishes test intervals for routine message circuit noise and impulse noise measurements.

1.02 This section is reissued to delete information about routine tests for impulse noise.

1.03 Message circuit noise requirements for trunks are specified in Section 660-403-500 along with the methods of making overall noise measurements. If, as discussed below, the noise limits given in Section 660-403-500 are exceeded, procedures for sectionalizing and trouble clearing, as covered in other sections, should be followed.

1.04 Impulse noise requirements are specified in Section 331-200-100 along with methods of making measurements (including sampling techniques).

1.05 There are four types of message circuit noise measurement tests made on trunks:

- (a) Circuit or trunk order tests,
- (b) Trouble tests,
- (c) Routine tests, and
- (d) Supplementary tests.

Each of these classifications is treated separately below and summarized in Table A.

1.06 Impulse noise measurements are *not* required in connection with establishing trunks by circuit order. These measurements are made on trunk transmission facilities during initial lineup

and are made as a result of trouble investigation and as supplementary tests on trunk facilities. The logic flow process for impulse noise tests is shown in Chart 1.

1.07 Message circuit noise measurements made in connection with circuit order tests, investigation of noise complaint, or supplementary noise tests should be made during the periods designated as the office busy hours. The "circuit order and maintenance limits" and the "immediate action limits" outlined in Tables A and B of Section 660-403-500 were designed to be met under these conditions.

1.08 Impulse noise measurements made in connection with a noise complaint or supplementary tests should be made during the periods designated as the office busy hours. Refer to Section 331-200-100 for requirements and methods of measurement.

1.09 For most purposes, routine message circuit measurements may be made at any time because the widespread application of single-frequency signaling equipment tends to load the network with the power associated with inband signaling tones. These tones are present on all idle trunks equipped with inband single-frequency signaling, and contribute about the same amount of power as the corresponding message signal when the trunk is in use. Also, with the development of many automatic single-circuit testing systems, such as ATMS and CAROT, it is expected that the greatest use of these improved testing techniques will occur during the evening and night hours when activity is at a minimum.

1.10 In certain cases, the noise may not be relatively constant throughout a 24-hour period, as described above, but may increase during the office busy hours. Trunks arranged for loop, simplex, or composite signaling may exhibit this characteristic. Since the quantity of such trunks continues to decrease and since automatic testing during the non-busy hours is expected to increase,

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no special arrangement need be made to perform routine tests on these trunks during the busy hour. Supplementary tests on voice-frequency trunks during the busy period may be preferred for critical evaluation of noise. In any event, when external disturbers are suspected as the principal noise contributors which result in customer complaints, measurements should be made during the periods when the suspected disturbers are most active.

2. CIRCUIT ORDER TESTS

A. Tests

2.01 Message circuit type noise measurements are required for all newly established trunks and on all changed or rearranged trunks. Where the change consists merely of renumbering a trunk, however, noise measurements are not required.

B. Requirements

2.02 A trunk should not be turned up for service if it does not meet the "circuit order and maintenance limits" given in Section 660-403-500 for message circuit noise. *Exceptions to this policy are made only upon the specific authorization of Area Plant or Engineering as prescribed in Company instructions.*

2.03 When corrective action is necessary to meet the "circuit order and maintenance limits" for message circuit noise, every effort should be made to bring the noise down to the lowest possible value, *not just under the limit*, before the trunk is turned up for service.

2.04 Impulse noise measurements are *not* required for circuit order tests.

3. TROUBLE TESTS

3.01 Message circuit type noise measurements should be made on trunks on which any type of corrective action has been taken before they are restored to service. If the measured noise is under "circuit order and maintenance limits," the trunk should be restored to service, and no additional noise measurement in connection with the trouble test is required. If the measured noise is above the "circuit order and maintenance limits" but below the "immediate action limit," the trunk may be restored to service but action should be scheduled to correct the problem. In

this case, the trouble ticket is not considered as closed until repeat measurement has been made and the limits specified in Section 660-403-500 have been met. *Exceptions to this policy are made only upon specific authorization of Area Plant or Engineering as prescribed in Company instructions.*

3.02 Impulse noise measurements need not be made on trunks on which corrective action has been taken unless the trunk was specifically removed from service because of impulse noise problems. In this case, the trunk should not be returned to service unless the measured impulse noise is less than 15 counts in 15 minutes, using the threshold level specified in Section 331-200-100.

4. ROUTINE TESTS

A. Tests

4.01 All trunks, except intrabuilding trunks without gain devices, should be measured for message circuit type noise at least once each year. A noise measurement made as a result of circuit order rearrangements or changes of existing trunks during this period fulfills this requirement. The noise check made with the automatic transmission test control frame (ATTC) to the code 104 test line is a comparison of the measured noise with a general preset noise level. While it does not fulfill the above requirement, it should be used, where already available, to provide data as a guide for the need for supplementary tests (see 5.01).

4.02 In many instances, it is expedient for each terminal of a 2-way trunk to make routine noise measurements without assistance at the distant terminal. Where this can be accomplished, the measurements should be made during the period scheduled by the control office. Each terminal office should measure the loss and noise of the trunk in its receiving direction by establishing test connections to the distant test line circuits which provide the 1-milliwatt, 1000-Hz testing power and the balance test termination for the respective measurements.

4.03 Impulse noise measurements, using the sampling techniques specified in Section 331-200-100, should be made on a trunk group when there are trouble reports indicating possible high-impulse noise.◆

B. Requirements

4.04 If the message circuit noise on a trunk exceeds the "immediate action limit" in Section 660-403-500, the trunk should be removed from service promptly and kept out of service until corrective action has reduced the noise below the "circuit order and maintenance limits." The trouble ticket is not considered closed until repeat measurements confirm that the limits specified in Section 660-403-500 have been met. *Exceptions to this policy are made only upon specific authorization of Area Plant or Engineering as prescribed in Company instructions.*

4.05 On a routine test where the "circuit order and maintenance limits" are exceeded but the noise is below the "immediate action limit," the trunk may be left in service, but corrective action should be initiated as soon as possible. If the cause of excessive noise cannot be removed by maintenance action, the matter should be forwarded promptly via lines of organization.

4.06 If impulse noise measurements are made on individual trunks, the requirement is not more than 15 counts in 15 minutes, using the threshold level specified in Section 331-200-100.

4.07 If a trunk group or an individual trunk fails to meet the requirements specified in Section 331-200-100, the trunk or trunks may be left in service but corrective action must be planned to investigate the cause of excessive noise. However, if the impulse noise on any individual trunk is not within the "immediate action limit" (100 counts in 5 minutes), the message circuit noise should be measured immediately. If the message circuit noise exceeds the "immediate action limit" given in Section 660-403-500 the trunk should be removed from service. Otherwise, an impulse noise measurement should be repeated. If the count is still above 100 counts in 5 minutes, the trunk should be removed from service until corrective action can be taken. If the impulse noise is below the "immediate action limit" on the second measurement, the trunk may be returned to service, but corrective action should be scheduled if the measured noise exceeds the requirements specified in Section 331-200-100.

4.08 Results of noise measurements should be analyzed to determine whether or not the source of excessive noise is common to groups of trunks. For example, if several trunks in a particular channel group have excessive noise, it indicates possible trouble in the carrier system identified with the channel group in question.

5. SUPPLEMENTARY TESTS

5.01 Message circuit type noise measurements should be made on individual trunks, or groups of trunks, which have been identified (from analysis of reports or other information) as possible sources of excessive noise on calls using the direct distance, extended area, and local dialing networks. Indicators of such noise would include subscriber reports, operator reports, service observations, ATTC noise indications, listening tests or observations by testboard or other plant personnel, etc. The requirements specified above under routine tests apply also to supplementary tests.

6. RECORDS AND REPORTS

6.01 The measurements at *both* ends of each trunk should be recorded. However, in the case of 2-wire trunks (with or without either E-type repeaters or gain devices), the noise at the distant end may be estimated by the appropriate method described in Part 5 of Section 660-403-500. The control office will be responsible for obtaining and recording the results of noise measurements made at the distant terminals of all trunks which it controls. These records should be retained until the trunk to which they apply is discontinued or rearranged.

6.02 Summaries and reports of results of noise measurements made during circuit or trunk order, routine, and supplementary tests on all types of message trunks should be forwarded via lines of organization as indicated in Section 660-403-010. Notations should be made of unusual noise conditions.

6.03 No formal procedures have yet been established for the recording of impulse noise measurement results.

TABLE A
TRUNK MESSAGE CIRCUIT NOISE TESTS

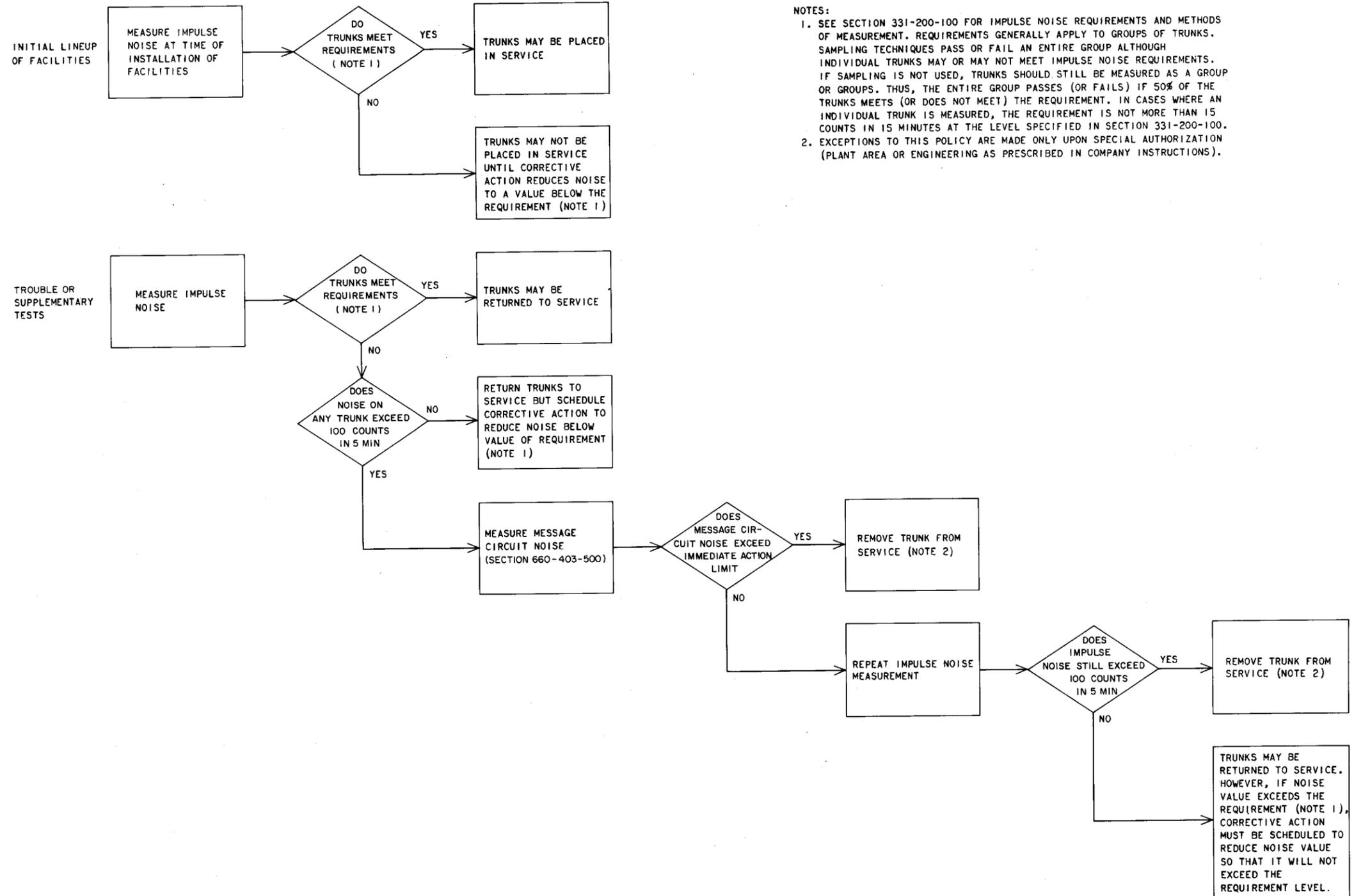
TEST CLASSIFICATION	TEST INTERVAL	DISPOSITION AFTER MEASUREMENT (NOTE 1)
Circuit or trunk order	All new, changed, or re-arranged trunks.	Trunks meeting "circuit order and maintenance limits" may be placed in service.
Trouble	Any trunk which has received any type of corrective action.	Trunks not meeting "circuit order and maintenance limits" should <i>not</i> be placed in service until corrective action has reduced the noise to a value below the "circuit order and maintenance limits" (Note 2).
Routine	All trunks, except intra-building trunks without gain devices, at least once a year.	Trunks meeting "circuit order and maintenance limits" may be returned to service. Trunks not meeting "circuit order and maintenance limits" but which meet "immediate action limit" may be returned to service. However, corrective action should be initiated as soon as possible to reduce the noise below "circuit order and maintenance limits" (Note 3).
Supplementary	Any trunk or group of trunks when identified through analysis of reports and records as a possible source of excessive noise.	Trunks not meeting "immediate action limit" should be <i>removed</i> from service until corrective action has reduced the noise below "circuit order and maintenance limits."

Note 1: See BSP Section 660-403-500 for noise requirements.

Note 2: *Exceptions to this policy are made only upon specific authorization of Area Plant or Engineering as prescribed in Company instructions.*

Note 3: If the cause of excessive noise cannot be removed by maintenance action, the matter should be forwarded promptly via lines of organization.

CHART I
TRUNK IMPULSE NOISE TESTS



NOTES:
 1. SEE SECTION 331-200-100 FOR IMPULSE NOISE REQUIREMENTS AND METHODS OF MEASUREMENT. REQUIREMENTS GENERALLY APPLY TO GROUPS OF TRUNKS. SAMPLING TECHNIQUES PASS OR FAIL AN ENTIRE GROUP ALTHOUGH INDIVIDUAL TRUNKS MAY OR MAY NOT MEET IMPULSE NOISE REQUIREMENTS. IF SAMPLING IS NOT USED, TRUNKS SHOULD STILL BE MEASURED AS A GROUP OR GROUPS. THUS, THE ENTIRE GROUP PASSES (OR FAILS) IF 50% OF THE TRUNKS MEETS (OR DOES NOT MEET) THE REQUIREMENT. IN CASES WHERE AN INDIVIDUAL TRUNK IS MEASURED, THE REQUIREMENT IS NOT MORE THAN 15 COUNTS IN 15 MINUTES AT THE LEVEL SPECIFIED IN SECTION 331-200-100.
 2. EXCEPTIONS TO THIS POLICY ARE MADE ONLY UPON SPECIAL AUTHORIZATION (PLANT AREA OR ENGINEERING AS PRESCRIBED IN COMPANY INSTRUCTIONS).