

## INTERNATIONAL SERVICES

### RESPONSIBILITIES AND TROUBLE LOCATING PROCEDURES FOR VOICEBAND CIRCUITS AT GROUP AND SUPERGROUP FREQUENCIES

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**1. GENERAL**

**1.01** This section describes responsibilities and procedures for testing a voiceband circuit which appears at a satellite earth station or submarine cable station (Telephone Company offices) at group or supergroup and above frequencies and group, supergroup, etc, connector points. Most of the techniques for actual tests are neither new nor innovative, but rather represent the consolidation of standard recognized methods into a single section for the convenience of central offices.

**1.02** These procedures are not intended to preclude the use of other methods which may be necessary under the specific circumstances of a given case. Nor are they intended to restrict the applications of new techniques, methods, or equipment that may become available in the future.

**1.03** Reduced costs, improved transmission, and enhanced restoration capability support the elimination of channel bank equipments at satellite earth stations and perhaps at submarine cable stations in the future. These advantages override the benefits of more convenient testing and of easily defined demarcation points where International

Record Carrier (IRC) services are concerned and therefore will require testing at carrier frequencies.

**1.04** Figure 1A displays a voice-frequency connection using back-to-back channel banks and may be compared to Fig. 1B showing a group connection arrangement.

**2. DEFINITIONS**

**2.01 *Serving Test Center/International Transmission Maintenance Center (STC/ITMC):*** The central office to which a customer or an IRC reports troubles. Subsequent references in this section to "STC" are intended to include ITMC if the circuit in question is, in fact, handled by an ITMC. A more detailed definition of an ITMC may be found in Section 660-630-301.

**2.02 *Circuit Testing:*** Action(s) taken by an STC or ITMC to sectionalize a fault reported by a customer or an IRC.

**2.03 *Facility Testing:*** Action(s) taken by a US carrier office, either a control or subcontrol of the international facility, in sectionalizing a reported fault between the voice-frequency channel banks, US and foreign.

**2.04 *CO Circuit:*** Applies only to the circuit section supplied to an International Record Carrier by the Telephone Company. More detailed explanations may be found in Section 660-630-311.

**2.05 *North American Network:*** The integrated public telephone network which includes the 50 states of the United States, Canada, Bermuda, and the Caribbean, except for Cuba and the Netherlands Antilles. Although Mexico is not part of the NA Network, it is included as part of the group of countries in the network only for the purpose of this section.

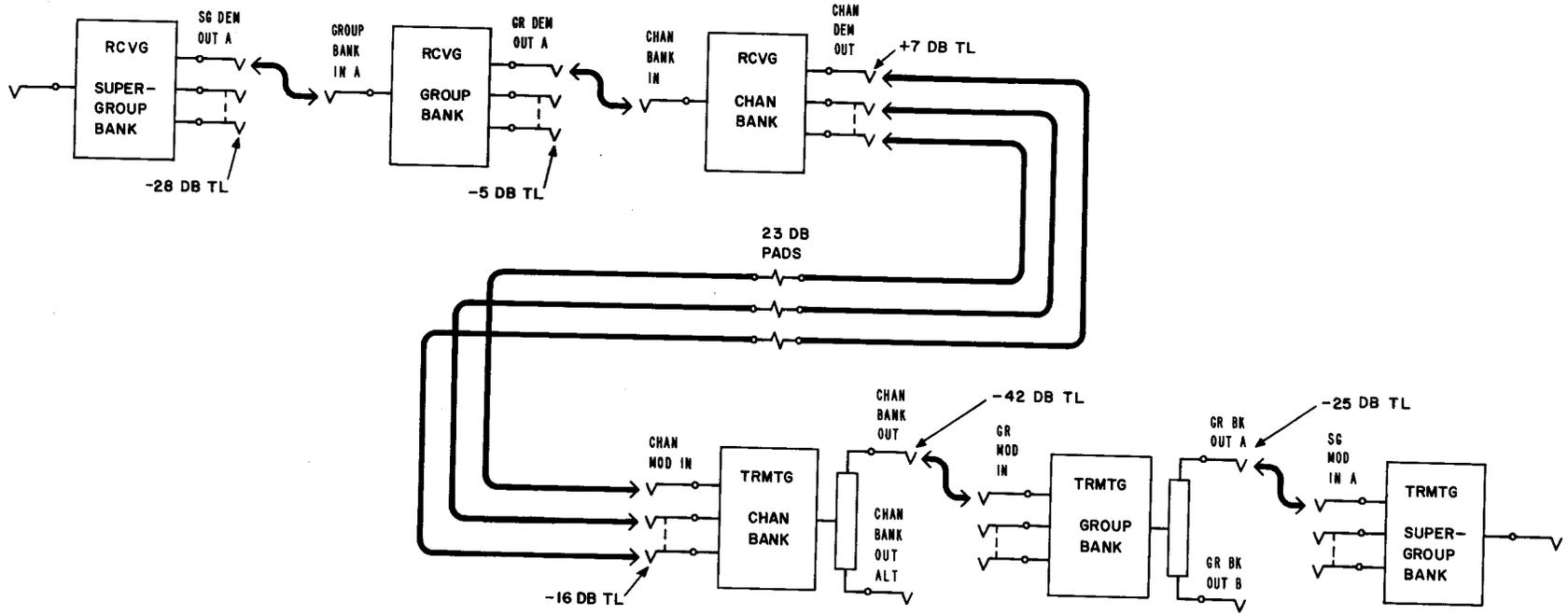


FIG. 1A -- BACK-TO-BACK CHANNEL BANK ARRANGEMENT

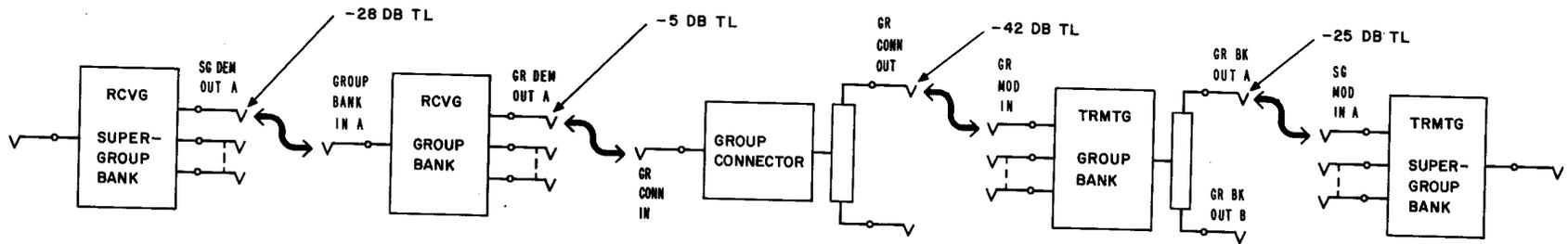


FIG 1B -- GROUP CONNECTOR ARRANGEMENT

Fig. 1

### 3. TESTING RESPONSIBILITIES

**3.01** This section addresses the configuration of facilities whereby the actual demarcation between Bell System and non-Bell System (ie, COMSAT) facilities occurs at carrier frequency as compared to voice frequency, or back-to-back channel banks, interface. Testing at these high-frequency (carrier) points increases the hazard of affecting other working services, and special precautions should be exercised to avoid any impairments. In addition, testing at these "carrier" frequencies should not be initiated until normal voice-frequency tests have been made up to the US channel bank of the international channel group and found to be inadequate for the case at hand.

**3.02** In those cases where the Bell System has the end-to-end circuit responsibility for a service within the North American Network (see 2.05), trouble sectionalization is accomplished on a circuit basis. The STC should encounter no special difficulty in contacting an appropriate office in the foreign location. This foreign office should function as a subcontrol and assist in sectionalization efforts. Difficulty in establishing a contact or in securing assistance from the foreign location should be referred through line of organization.

**3.03** In cases where the Bell System has end-to-end responsibility for a service outside of the North American Network, the circuit routing should be through an ITMC; and Section 660-630-310 will apply regardless of the interface between the Bell System and, for example, COMSAT.

**3.04** Other services involving this high-frequency configuration are those provided for International Record Carriers. Further discussion will be addressed to the IRC cases; however, these procedures are to be applied should other non-Bell System entities provide a similar service configuration wherein we provide facilities.

**3.05** For circuit sections which the Telephone Company provides to any of the IRCs in reaching a departure point from the US, the IRC in question is or acts as the ITMC for the complete circuit to the foreign location. The circuit section provided by the Telephone Company (designated as "CO") ends at the satellite earth station or at the submarine cable terminal. In spite of what the service order (USSO) for the CO section states, the actual normal (or voice frequency) testing point

for an STC remains at the US voice-frequency channel bank terminal of the international facility. Tests beyond this VF point become facility type tests as covered later in this section. However, because of the added testing complexity and the fact that the Telephone Company does have, at least potentially, a testing responsibility beyond actual Telephone Company physical facilities, COLR cards will be issued defining the "CO" circuit terminal at the foreign point at which the channel bank locates.

**3.06** According to Section 660-630-311, the Telephone Company is to assume testing responsibilities on facilities which pass a departure point from the US (generally a satellite earth station) without a voice-frequency interface between the domestic and international segments (via group or supergroup, etc, connectors). The overall control location for the total service (the IRC) must make sufficient tests on the foreign segments to offer a reasonable probability that the fault is either in the international facility between the US and foreign channel banks or between the US channel bank and the overall control office location (the CO segment or circuit).

**3.07** Assuming that the control location's operating personnel have in fact sectionalized a trouble as we expect, a report to the STC would be handled in a normal way in verifying circuit conditions up to the point of connection to the US channel bank nearest the international circuit section. Action on any deficiencies in the segment would be an STC responsibility. Trouble clearance information must be returned to the control point (the IRC) in question so that the IRC may fulfill his overall obligations to the user.

**3.08** Should the STC tests indicate a fault in the international circuit section, the STC would secure the efforts of the US carrier office in such tests of the international channel bank section as are necessary to prove or disprove the existence of a trouble. Whether this carrier or facility type testing is done immediately with the STC in contact with the US carrier office, or at a later time, is dependent upon specific conditions at the time; however, the US carrier office must promptly advise the STC of the results of any tests once such tests are completed.

**3.09** Once a fault is indicated to be in the international facility section, the US carrier

office must assume responsibility for subsequent trouble determination and clearance efforts as appropriate. This assumes that the carrier office is operating under directional control criteria and is control in its receiving direction. If the tests made at a high-frequency point indicate that the fault is in the direction transmitting from the US, the US carrier office should notify the foreign carrier control office, and then advise the STC of this action. The STC must in turn advise the IRC, if applicable.

**3.10** Testing to determine a fault (or the absence of a fault) and its probable location may be done by bridged high-frequency tests at the Telco earth station (or cable station) office. Part 4 of this section offers some methods for these tests. However, this coordination should be directed by the carrier office. Corrective action is dependent upon the source of the trouble and this responsibility rests with whoever provides the segment in question.

**3.11** Some deficiencies may not be evident by tests at a (high frequency) midpoint. These could relate to the frequency response or envelope delay. These types of faults would normally be a function of the entire group or might be a defective modem at one channel bank terminal or the other. To clearly determine this may well require tests between the two respective carrier offices, US and foreign. Should the US location need assistance in contacting the proper foreign technical personnel, assistance may be requested of a US ITMC with a regular working relationship with the country in question.

**3.12** Any testing limits (objectives) applied to a facility section should be those stated in applicable BSP sections for the type of equipment in service, and not on any conditioning parameters, ie, C2 overseas per Section 314-410-103. Facility testing should not include equipment added to meet a service order conditioning requirement.

#### **4. TESTING PROCEDURES**

**4.01** It is not considered necessary to include procedures for voice-frequency testing in this section and the following paragraphs will apply only on a high-frequency or channel bank terminal basis. As some circumstances might require a Telco earth station (or other office) to engage in tests using a channel bank connected to a group connector output hybrid so as to present a circuit

at voice frequency, a spare channel bank would be required. Each office which might be faced with such testing requirements should arrange for a dedicated spare channel bank reserved for testing and not available for service assignment.

**4.02** No procedure is suggested for applying a 1000-Hz test signal from a carrier-frequency point with working services on other channels, groups, supergroups, or mastergroups. *The application of test signals of 0 dBm0, -10 dBm0, or -16 dBm0 level at a carrier frequency point incurs an unacceptable service hazard.* A 1000-Hz test tone must be applied ONLY at a voice-frequency testing point of the circuit. When testing internationally, this test tone should be -10 dBm0.

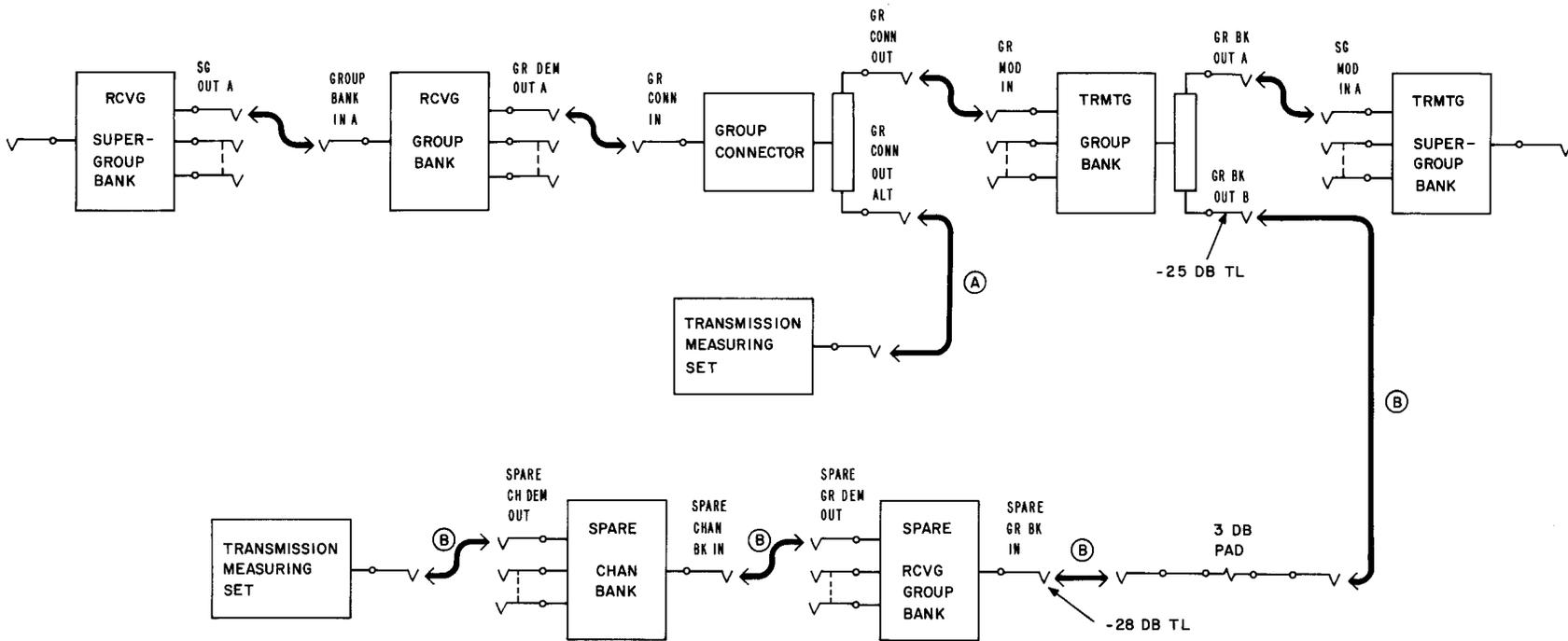
**4.03** Figures 1 and 2 display various arrangements for either the direct connection of measuring equipment or the connection of spare equipment to provide voice-frequency testing access.

**4.04** Testing at a carrier point receiving to the US may occur with a signal, probably 800 Hz, applied by a foreign location. The application (and/or removal) of the test signal must be arranged for by the STC for services controlled by the US, or through the STC serving the control office for noncontrolled circuits in the US. In this latter case, the overall control office (IRCs, for example) must deal with the foreign location to apply and remove test signals.

**4.05** Various types of tests may be required on circuits using specialized customer equipment or on IRC services used for data transmission. Such tests relate to impulse noise, harmonic distortion, phase jitter, etc. Methods, equipment necessary, and limits to be met are found in sections in the 314-410 layers.

#### **5. EQUALIZATION OF INTERNATIONAL RECORD CARRIER SERVICES**

**5.01** When ordered by a service order, equalization may be applied to an IRC service as indicated in Section 314-410-103. Where IRC services are furnished using a channel bank which does not appear at voice frequency at the departure point from the US, the section to be equalized ENDS at the US channel bank of the international facility (not to include the channel bank itself). Although the Telco responsibility does carry up to a (high



- (A) ARRANGEMENTS FOR DIRECT MEASUREMENTS OF VOICEBAND CIRCUITS AT CARRIER FREQUENCIES
- (B) ARRANGEMENTS FOR MEASUREMENTS AT VOICEBAND USING SPARE RECEIVING GROUP AND CHANNEL BANK EQUIPMENTS

Fig. 2—Measurements at a Group Connector Point

**SECTION 660-630-312**

frequency) midpoint interface such as with COMSAT at the earth station, equalizing and testing equalized parameters to this high-frequency midpoint is not considered practical.

made at voice or carrier frequency, and an example (not necessarily all inclusive) of test equipment acceptable for the measurement.

**6. TEST EQUIPMENT LIST**

**6.01** The following table shows types of measurements required in trouble sectionalization, whether

MEASUREMENT	FREQUENCY BAND	TEST EQUIPMENT
Equivalent 1000 Hz loss (foreign points may use 800 Hz)	Carrier	Siemens D2006 or equivalent
C Message Noise	Carrier	7A Carrier Frequency Noise Measuring Set (7A CFNMS)
Channel Gain Frequency Characteristic	Voice	25B Gain and Delay Set
Envelope Delay Distortion	Voice	25B Gain and Delay Set
C Message Noise	Voice	6F Noise Measuring Set
Impulse Noise	Voice	6F Noise Measuring Set
Phase Jitter	Carrier	Siemens D2006 and Bradley 75LA or equivalent
Harmonic Distortion	Carrier	Siemens D2006 or equivalent
Single-Frequency Interference	Carrier	Siemens D2006 or equivalent
Frequency Shift	Voice	Wandel & Golterman FVM-1 Frequency-Shift Meter

**7. FIGURES**

Fig. 1b—Group Connector Arrangement

**7.01** The following figures display various connecting and testing arrangements and test level points as appropriate:

Fig. 2—Measurements at a Group Connector Point

Fig. 1a—Back-to-Back Channel Bank Test Arrangement