MULTISTATION PRIVATE LINE TELEPHONE CIRCUITS FOR THE FEDERAL AVIATION AGENCY SERVICE MAINTENANCE

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1. GENERAL

1.01 This section outlines the circuit order and routine tests required on circuits provided for the Federal Aviation Agency (FAA). The interval for routine tests is also included.

1.02 Included in this section are the administrative features of the FAA private line telephone system and a brief outline of the FAA organization.

1.03 It is expected that the normal administrative procedures, line-up, maintenance, and restoration practices will be followed in so far as they pertain to multistation private line circuits furnished the FAA. This section supplements the existing practices and covers procedures peculiar to these special multistation circuits. Also, because of the special nature of these circuits it apears that the work of Plant people might be facilitated by including in this series of practices (310-410-100, 310-410-300 and 310-410-500) considerations applying to administration, circuit line-up, maintenance and restoration, together with some background information describing the circuits and their use.

1.04 These sections have been reviewed by representatives of the Federal Aviation Agency and the special procedures covering the relations between the testboards and the Air Route Traffic Control Centers have been approved by the FAA as desirable from their standpoint. However, it is recognized that because of the many unusual situations and changes such sections can not cover all of the conditions and desirable administrative practices and it is anticipated that in some cases further supplementary locally prepared information may be used.

1.05 The multistation private lines covered by this section are referred to by the FAA as "Nonconference Interphone" or "Service F Facilities," and are used for messages relating to airway traffic control. Since these circuits are normally required for continuous operation it is desirable that releases for routine tests and trouble investigations be coordinated with the customer's requirements for the facilities. Procedures for this purpose are discussed under "Administrative Features."

1.06 At least one terminal of each interphone circuit appears on one or more key equipments at an Air Route Traffic Control Center (ARTCC) of which there are currently 28 in the

continental United States. In the typical case a circuit extends from such a center to stations at one or more airports along an airway within the zone controlled by that center. Direct circuits are also required between two ARTCC's.

1.07 Certain of the circuits radiating from adjacent ARTCC's have stations at an airport in the vicinity of the common boundary of the two zones. Such circuits may be arranged for interconnection to provide communication when required between the adjacent ARTCC's. The switching is usually done at the nearest toll office under remote control of the airport station, upon the request of either ARTCC. In the switched condition a loop to the controlling airway station remains on the connection for monitoring purposes. Both circuits are restored to their terminal condition upon completion of each message and at the request of the ARTCC.

1.08 To a large extent, interphone circuits are established on a 4-wire basis.

1.09 Signaling from an ARTCC to the airways stations, (and between airways stations for the limited amount of this traffic) is accomplished by loud-speaker paging. Signaling from the airways stations to the ARTCC is on an equivalent ringdown basis being accomplished by various combinations of standard dc and ac signaling arrangements. Signaling between ARTCC's on direct circuits may also involve other arrangements such as two-tone selective signaling.

2. ADMINISTRATIVE FEATURES

(A) General

2.01 The usual administrative procedures applying to private lines should, of course, be followed, supplemented by the special procedures discussed in this section to cover the peculiar conditions applying to the FAA facilities.

2.02 The FAA representative, who may be the Chief Air Route Traffic Controller or Chief Aircraft Communicator, and the Telephone Company representative at the Serving Test Center (STC) will be the normal contacts for matters pertaining to the service maintenance and restoration of the interphone circuits. The representative at the STC will, in turn, report to the Telephone Company representative at the test room designated as the Circuit Control Office.

2.03 When a service situation presents a condition outside of the range of responsibility of the above respective representatives, it is understood that the FAA representative will refer the matter to his regional office, and the control office will refer it to the Division Plant Supervisor's office, or other designated point, via the line of organization. When it becomes necessary for either organization to so refer a case to a next higher organization level, the organization contemplating such action will advise the other organization so that it may take similar action.

2.04 In addition to the FAA station personnel there are Regional and Washington Office representatives who periodically visit the FAA stations for inspection purposes and any installation or service irregularities observed will be referred in the same manner as for the station personnel as outlined in Section D.

(B) Circuit Control — Telephone Company

2.05 Unless otherwise designated the toll office on each multistation toll private telephone line from which the loop to the ARTCC is routed will function as the over-all circuit control office. In the case of direct circuits between ARTCC's the toll office to be designated as the over-all circuit control office will be dependent upon the normal telephone company operating procedures unless such a designation conflicts with the local FAA operating requirements.

2.06 The control of toll private telephone lines includes the responsibility for the loop and station performance as well as for that of the toll facility portions as covered in the Section entitled "Toll Telephone Facility Maintenance — Office Responsibilities," consequently close coordination and cooperation is required with the local test forces responsible for the circuit order and maintenance work at the station locations.

2.07 The circuit control may assign section or subcontrol offices where it is considered desirable for maintenance reasons and should notify all concerned.

2.08 When a new circuit is placed in service the circuit control shall be certain that each station on the private line as well as the station at the ARTCC has been notified of the scheduled time for the start of service. The circuit control shall maintain a record of the individual notified at each customer's station.

2.09 When a new station is added to an existing circuit, the control office should notify that station and the ARTCC of the scheduled time for start of service.

2.10 The circuit control shall be responsible for obtaining a release of the circuit from service for any routine or special test or for any other occasions such as those necessary to permit plant or other work to be done. No work or testing of any kind other than that necessary to restore service in case of an interruption shall be done on these circuits or the associated station equipment (except loud-speaker equipment as covered in 310-410-500) without the direction or approval of the Circuit Control Office.

2.11 Section or subcontrol offices shall be responsible for notifying the intermediate repeater points involved of the necessary service protective measures to be applied in connection with the work or testing to be performed.

2.12 Each office shall keep a complete log of all action taken by the office in connection with service of tests on these circuits.

(C) Circuit Control — FAA

2.13 At the Air Route Traffic Control Center (ARTCC) locations, the Chief Air Route Traffic Controller is the Telephone Company's normal contact in day-to-day service matters.

2.14 Interstate Airway Communications Stations (INSAC), other than those at Air Route Traffic Control Center locations, will coordinate with their respective STC's concerning service irregularities noted by them or reported to them by other stations in their vicinity.

2.15 Further information on the regional organization of the FAA responsible for control of the land line services is covered in Part 3 of this section.

(D) Trouble Reporting Procedures

2.16 Service failures or irregularities on the interphone circuits will be reported as follows by the senior FAA representative on duty:

(a) ARTCC's will notify the Circuit Control Office concerning any irregularity or apparent failure brought to their attention.

(b) INSAC's, other than those at ARTCC locations, will notify their STC concerning any irregularity apparent to them or brought to their attention, and immediately thereafter will notify the ARTCC. If communication with the ARTCC has been disrupted, the INSAC will so notify the STC. The STC will notify the control office who will advise the ARTCC of the condition.

(c) Other stations (weather, air lines, etc) will notify the nearest INSAC of any irregularity using any available facility. If the nearest INSAC is not within local telephone range, they will notify their respective STC's and upon resumption of normal service will notify the ARTCC.

2.17 Unless the trouble is definitely known, the FAA personnel will make brief tests by calling other stations on the circuit before reporting trouble. Results of these tests, when reported to the test room, will be helpful in localizing the trouble.

2.18 The types of trouble that will be reported are generally as follows:

(a) Circuit failures and interruptions.

(b) Failure to signal into ARTCC.

(c) Failure to raise a station from the ARTCC.

(d) Failure of control circuit, or incorrect operation of switching bridge.

(e) Transmission poorer than that normally obtained over the circuit.

(f) Any other irregularities that affect service such as power interruptions or equipment trouble at a station.

2.19 To facilitate prompt reporting the telephone number of the STC (or other office designated by the STC) should be posted conspicuously at each station on the interphone. Usually it is advisable to post one or more alternate phone numbers to call if there is much chance of the station encountering a "busy" testboard phone. In some cases different reporting procedures will be in effect depending on the time of day or night, day of week, etc.

2.20 Reports concerning Telephone Company services or equipments not associated with the interphone circuits will be reported in the normal manner to the local repair service desks or other locations.

(E) Releases for Tests and Other Work

2.21 An interphone circuit will not be taken out of service for any purpose without first obtaining a release from the ARTCC. When a release is obtained for any purpose the work on the circuit should be performed in such a manner that the circuit can be promptly restored and returned to service on request of the ARTCC. This is essential as there may be unscheduled or emergency flights, or other unexpected conditions may arise.

2.22 The circuit control should make arrangements for releases for routine tests with the FAA representative at the ARTCC. Scheduled releases should be short in length and in many cases will have to be scheduled between 2 and 5 A.M. The release periods will depend on the flight schedules and in some cases may be obtained at other times of the day.

2.23 Scheduled releases for routine tests will frequently be canceled if bad or threatening weather exists along the airway controlled. If the weather forecasts indicate the possibility of adverse conditions during the scheduled test period, it may be possible to determine far enough in advance whether the release will be canceled and thus avoid special coverage which would be required in some offices.

2.24 When it is necessary to make annual or other tests on carrier systems or other portions of the circuit which would result in a circuit interruption, or when outside plant or other maintenance work might cause interference or service interruptions, a release should be obtained and the circuit should be made good using other similar facilities in the section to be tested.

2.25 When only a branch or loop is to be removed for testing purposes, the STC must obtain a release from the ARTCC. This may be obtained where practicable through the INSAC at the location where testing is desired. The Circuit Control Office should be notified in all cases.

(F) Monthly Reports

2.26 Monthly reports summarizing the interruptions on each interphone circuit shall be prepared by the circuit control and forwarded via line of organization as required by local Company instructions.

2.27 The outages included in the reports should be checked with the ARTCC. If there are differences they should be noted in the report and explained if practicable.

3. RESTORATION PROCEDURES

3.01 The FAA multistation private line telephone circuits should be restored in accordance with existing priority instructions and in accordance with the usual practices for private lines as supplemented here to cover special considerations applying to FAA circuits.

3.02 In order that these circuits may be restored promptly in case of trouble each control office should plan in advance various ways of making good the part of the circuit controlled by that office. Where possible, facilities similar to the regular layout should be used in order to minimize the number of line-up tests and to simplify the adjustments required in connection with the restoration.

3.03 The grade of transmission on the temporary layout will depend on the extent and nature of the resoration work involved and on the urgency of the customer's need for the circuit. When an emergency condition has been indicated to exist, the temporary layout, as soon as established in a talkable condition, should be turned over to the customer for such use as can

be made pending later complete transmission line-up, or substitution of more adequate facilities. When the customer's immediate requirement for the facility is less urgent than indicated above, the transmission on the emergency layout should be as near to the normal value as practical within the permissible time allowance indicated by the customer.

3.04 As long as at least one of the airways stations on the circuit can signal the ARTCC, lack of signaling arrangements from one or more of the other stations should not delay turning up the emergency layout to the customer as discussed in the previous paragraph. The ARTCC should be notified of the signaling limitations and the suggestion made that it arrange with the stations affected to call one of the stations not affected over the loud-speaker system and have this latter point signal the ARTCC.

3.05 When the talking circuit has been re-established, but some delay may be encountered in completing the signaling arrangements, the ARTCC should be notified of the situation. The service should be offered on the basis that the ARTCC may desire to make immediate use of the circuit by having an attendant monitor for incoming calls until the signaling is restored.

3.06 Where there is more than one branch into a location from the same or different multistation lines and one of these branches is out of service with delayed restoration, the ARTCC should be consulted, as the immediate or imminent air operations may make it more desirable to use the working facility to make good the one which has failed.

3.07 In case there is a failure of loop or line facilities involving more than one multistation line and one or more of the circuits, but not all may be made good, the condition shall be referred to the ARTCC for decision as to which circuit or circuits should be made good initially.

3.08 If trouble develops on a circuit and the section in trouble can not be made good, arrangements should be made to cut the line at the section terminal office and to have the circuit restored by reroutes around the bad section. If this is not possible restore the circuit by connecting the two portions at some other location. If neither is possible continue service on the two portions as if they were individual circuits. Notify the ARTCC center of the action taken.

3.09 When there is a serious shortage of facilities due to severe storms, etc, advantage should be taken of any possibility of using a 2-wire facility to restore temporarily an interrupted 4-wire section. Terminating sets, or 2-wire-4-wire repeaters, with the 2-wire side toward the temporary line will be required at each end of the temporary section. The application of this method will be limited as it depends on obtaining good balances and consequently may not work when there are other 2-wire sections normally in the circuit.

4. TROUBLE INVESTIGATING PROCEDURES

4.01 Reports of service interruptions from the customer shall be investigated promptly and if not closed within 24 hours the details of the report should be forwarded via the line of organization as required by local company instructions.

4.02 Circuit troubles should in general be investigated in the standard manner which requires that the circuit be released by the customer and removed from service. However, if a branch of a circuit develops trouble affecting transmission over the remainder of the circuit, the branch should be disconnected promptly without delay while waiting for a release. The test room making the disconnection will notify the circuit control office which in turn will notify the ARTCC. When the branch is subsequently restored to the circuit the Communications Station served by that branch shall notify the ARTCC in the regular manner over the interphone circuit.

4.03 As soon as the facilities in trouble have been sectionalized, and the nature of the trouble is not immediately known or has been determined to require some delay in clearance, the circuit should be promptly restored on a patch basis, if possible, while the trouble is being investigated and cleared on the regular facilities.

4.04 In extreme cases where the circuit is distant but usable to one or more points, but the circuit can not be released, a transmission testing procedure given in 310-410-500 may be

used with the customer's consent during idle intervals on the circuit.

5. FAA ORGANIZATION

(A) General Organization

5.01 The headquarters office of the Federal Aviation Agency, United States Department of Commerce, is located in Washington, D. C. The field organization of the FAA in the continental United States is divided into four regions.

5.02 Fig. 1 shows the geographic boundaries of the four regions in the United States, and the location of each regional office.

(B) Regional Organization

5.04 The Regional Administrator is the official in charge of each region. Reporting to him are the heads of a number of main groups, one of whom is the Chief of the Airways Operation Division.

5.05 The Chief, Airways Operation Division, is responsible for the operation of the Air Route Traffic Control Centers (ARTCC's), Airport Traffic Control Towers, Airways Communication Stations and associated communication systems within the regional boundaries.

5.06 The Chief, Technical Services and Planning Branch, working under the Chief, Airways Operation Division is the Telephone Company's normal contact in general service matters pertaining to the region.

5.07 With regard to installation details and day-to-day service matters concerning the three main types of FAA operating points, the Telephone Company's normal contacts are as follows:

Type of Installation	
Air Route Traffic Control Centers	Chief Air Route Traffic Controller
Airport Traffic Control Towers	Chief Airport Traffic Controller
Airways Communication Stations	Chief Aircraft Communicator

5.08 Airport Traffic Control Towers and Airways Communication Stations are located at many airports throughout the United States. A complete list of these would be voluminous and of doubtful utility in view of the changing air traffic situation. The location of the Air Route Traffic Control Centers, however, is relatively stable and these are listed below by regions.

1st Region (Regional Office—New York)

Boston, Mass. (East Boston)
New York, N. Y. (LaGuardia)
Washington, D. C. (Arlington)
Pittsburgh, Pa. (McKeesport)
Cincinnati, Ohio
Cleveland, Ohio

2nd Region (Regional Office—Fort Worth)

Atlanta, Ga.
Jacksonville, Fla.
Miami, Fla.
Memphis, Tenn.
Fort Worth, Texas
San Antonio, Texas
New Orleans, La.
El Paso, Texas

3rd Region (Regional Office—Kansas City)

Detroit, Mich. (Wayne)
Chicago, Ill.
Minneapolis, Minn.
St. Louis, Mo.
Kansas City, Mo.
Indianapolis, Ind.

4th Region (Regional Office—Los Angeles)

Albuquerque, N. Mex.
Denver, Colo.
Salt Lake City, Utah
Oakland, Cal.
Los Angeles, Cal. (Inglewood)
Great Falls, Mont.
Seattle, Wash.
Phoenix, Ariz. (Being established)

REGIONAL BOUNDARIES AND LOCATION OF REGIONAL OFFICES AND OTHER MAJOR FIELD ORGANIZATIONS

FEDERAL AVIATION AGENCY
DEPARTMENT OF COMMERCE

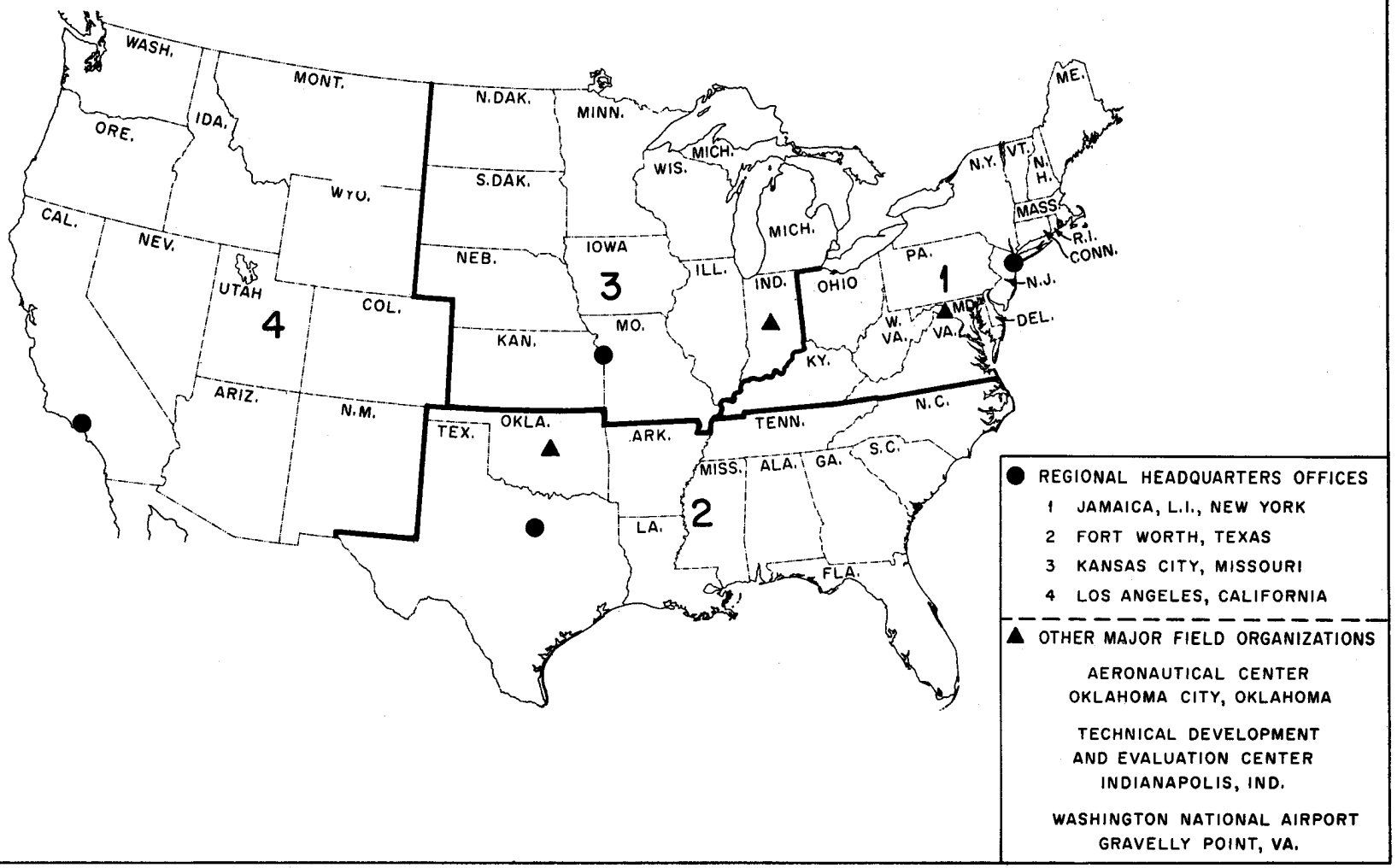

Fig. 1

5.09 To facilitate work with the FAA, each Serving Test Center should tabulate for ready reference the FAA installations and proper personnel to contact in its service area.

6. CIRCUIT ORDER AND ROUTINE TESTS

6.01 Tables 1 and 2 list the required circuit order and routine tests.

TABLE 1

CIRCUIT ORDER TESTS

Equipment or Section	310-410-500 Reference	Office Responsible
Branches and Loops	Part 3(B)	STC for the Station
Interbridge Sections	Part 3(C)	Control Office—Note 2
Central Office Tests	Part 3(A)	Individual Offices
Overall Circuit	Part 3(D)	Control Office—Note 2

TABLE 2

ROUTINE TESTS

Tests	Interval	310-410-500 Reference	Office Responsible
Station Inspections and Routines	3M	Part 4(A)	STC for the Station
Transmission Tests—Backbone Section	M	Part 4(B)	Control Office—Note 2
Transmission Tests—Other than Backbone Section	Note 1	Part 4(B)	Control Office—Note 2
Repeaters	Note 3	Part 4(C)	Individual Offices

Note 1: Make tests at intervals listed in the Section entitled "Single Frequency Net Loss Measurements" for facilities of corresponding length and make-up.

Note 2: The control office is responsible for these tests, but in some cases it may be desirable to appoint another office to act as subcontrol for the actual tests, records, etc.

Note 3: Standard intervals for the routine of repeaters shall be followed, except that repeaters not included in the monthly transmission tests should be routined at least once every four months.