

**DATA SYSTEMS—DATAPHONE® SERVICE AND  
DATA ACCESS ARRANGEMENTS ON DIRECT  
DISTANCE DIALING NETWORK—METHODS OF  
INVESTIGATING TROUBLE REPORTS  
AND/OR TARIFF COMPLIANCE WHEN USING  
ACOUSTICALLY OR INDUCTIVELY COUPLED DEVICES**

**1. GENERAL**

**1.01** This section describes the maintenance considerations and procedures used to locate a trouble condition involving customer-provided equipment (CPE) that is acoustically or inductively coupled to the switched telecommunications network. Although the acoustically and/or inductively coupled station is considered a voice arrangement, it is normally used to transmit to/from a DATAPHONE Service or Data Access Arrangement at the remote end; therefore, the local loop and the telephone set is one element of the customer's overall service. Individual responsibility of both the customer and the telephone company (telco) is defined. Appropriate material concerning this subject is contained in Section 660-101-317.

**1.02** Whenever this section is reissued, the reason for reissue will be included in this paragraph.

***Acoustic Coupling***

**1.03** Acoustic coupling is considered to be the transfer of energy acoustically between external CPE and the transmitter of a telephone handset, and/or between the receiver of a telephone handset and external (CPE) receiving equipment. A signal acoustically coupled to the direct distance dialing (DDD) network is influenced by the acoustic interface between the acoustic device and the telephone set. In addition, the electrical and acoustic properties of the telephone set and the characteristics of the transmission facilities affect acoustic coupling. The T-type carbon transmitter (which is used in most 500-type, Princess®, and Trimline® telephone sets) is sensitive to certain factors such as handset position, vibration, and packing of the carbon granules in the transmitter.

***Inductive Coupling***

**1.04** Since a telephone set contains components with magnetic fields associated with them, inductive coupling of data or voice signals is possible. One means of inductively transmitting by magnetic coupling is through a U-type receiver found in most 500-type telephone sets. TRIMLINE and some 500-type telephone sets equipped with LA- or LB-type receivers produce weak magnetic fields, making inductive coupling impractical.

***Tariff Compliance***

**1.05** The applicable tariff requires that the signal power within the bandwidth of 300-3200 Hz must not exceed -9 dBm at the input to the local loop when averaged over a 3-second interval. Local tariffs may authorize a higher input signal power level on a fixed longer-than-average local loop in order for the power level input at the central office (CO) to be approximately -12 dBm or less (3-second interval average). Tariff compliance can be checked using the F-58654 test set. If such measurements indicate possible tariff violation, additional more precise measurements should be made. See 3.01. For information concerning the operation of this test set, refer to the following Bell System Practices:

SECTION	TITLE
107-305-100	F-58654 Portable Test Set for Acoustic and Inductive Couplers—Description and Operation
107-305-500	Testing Acoustically and Inductively Coupled Devices Using the F-58654 Test Set—Test Procedures.

***Customer Responsibility***

**1.06** In order to comply with the tariff, the manufacturer or the customer must assure that the acoustically or inductively coupled device inputs a signal power level to the local loop in compliance with 1.05. The telco can assure tariff compliance by methods as stated in 1.05 or by bridged CO measurements. See 3.01.

***Telco Responsibility***

**1.07** As in Dataphone service where the Bell System assumes maintenance responsibility for the service up to the baseband digital interface of the data set, voice service is maintained up to and including the telephone set. Where Bell System data access arrangements (DAAs) are provided, Bell System maintenance responsibility ends at the Electronic Industries Association (EIA) interface between the DAA and the CPE. Similarly, with acoustically or inductively coupled CPE, Bell System maintenance responsibility consists of providing voice service up to the acoustic or inductive interface.

**1.08** Since most acoustically or inductively coupled CPE is portable and may be coupled to various local loops, transmission characteristics of the local loop and telephone set will vary. Local telephone loops are designed only for voice communications and are not conditioned for data transmission as are some Dataphone loops. Local telephone loops which are designed for Dataphone service are conditioned so that satisfactory data transmission is guaranteed. No guarantee of satisfactory service can be offered when acoustically or inductively coupled CPE is used on nonconditioned local loops.

**1.09** The telco is under no obligation to condition local loops for data transmission unless specific compensation (via special assemblies or local tariffs) is received by the company for the additional effort required to condition a specified local loop. In many instances, conditioning will not be required for proper operation of acoustic or inductive CPE. In the event that conditioning becomes necessary, suitable compensation should be expected by the telco for effort expended beyond that required to ascertain that the local loop and telephone set in question perform for voice communication.

**2. ANALYSIS PROCEDURES**

**2.01** This part outlines the analysis procedures to be used by local test and the craft forces in isolating and clearing troubles involving acoustically or inductively coupled CPE. This practice should be used in conjunction with Section 660-101-317.

**2.02** Procedures for clearing trouble are normally initiated by receipt of a trouble report by the Repair Service Bureau. Normal local test procedures (DC tests, etc) will be followed. Telephone sets that perform satisfactorily for voice communication may not always permit coupling of acoustic or inductive CPE. Refer to 1.07.

**2.03** The customer should be asked if present voice communication is being transmitted by the telephone set in question. If not, a return call should be placed to that telephone set. If a subjective evaluation of voice performance (together with 14-type local test desk [LTD] tests given in Section 662-400-500) indicate that voice performance is satisfactory, the customer should be informed. The customer should be advised to check CPE with his vendor or if the customer still insists on the dispatch of a repairman, notification must be given that a maintenance of service charge will apply if the repairman verifies that voice performance is satisfactory.

**2.04** The dispatched repairman should repeat the subjective voice tests from the telephone set in question with the 14-type LTD. If satisfactory voice communication is obtained, the customer must be informed and no components (transmitter or receiver) of the telephone set are to be changed and maintenance of service charge applied.

**2.05** If the subjective voice tests from the telephone set in question indicate that the station equipment may be defective, the telephone set or suspected defective components must be replaced and satisfactory voice performance verified. Station equipment changes must be recorded on the line card for future reference. Maintenance charges *are not* applicable when defective station equipment is replaced.

**2.06** If a customer is unable to couple inductively because L-type receivers are used, the customer should be informed that the CPE is not compatible with all types of Bell System station equipment. In the future, only L-type receivers

may be used and should *not* be replaced with a U-type receiver to improve the performance of inductively coupled CPEs.

**2.07** If subjective voice tests indicate that the local voice service is within requirements and the customer is still not satisfied, the Local Test Foreman should be notified of the results. The Foreman should then notify the DATEC (Section 010-521-100) or equivalent force for action. The customer report will be "referred out" under the normal procedure.

**2.08** The DATEC or equivalent person will contact the customer and discuss the communication system for indication of possible problems at the far end or other points in the system. He may elect to visit the premises for level tests with the F-58654 test set for indications of high or low output levels. When a maintenance visit is made, the customer must be advised that telco measurements at the CO indicated that the CPE may be transmitting an excessively strong signal. The customer should be requested to operate the acoustically or inductively coupled equipment into the F-58654 test set so that direct measurements can be made. See 1.05. If the customer refuses to cooperate, he must be informed that transmitting excessively strong signals is sufficient reason to disconnect service. If he still refuses to cooperate, the telco Commercial Department should be advised according to local procedures. Tests may be required on the far end or verification required of circuit designs if FX service is involved. No conditioning action should be taken if service meets normal voice design requirements.

**2.09** If the problem is identified as due to conditions not affecting voice service (ie, bridge taps), the customer should be so advised per 1.08 and 1.09.

**2.10** Local test should be notified to "close out" the report and advised of action taken.

### **3. TELCO SUSPECTED TARIFF VIOLATION BY CUSTOMER**

**3.01** Where carrier systems are involved in FX service, a tariff power level violation may be brought to our attention. Under the Power Criteria Surveillance process, CPE installations which are suspected of exceeding tariff limitations can be monitored to confirm the violation. Bridged CO measurements of signal power levels can be

performed at the serving central office with a 6F type noise measuring set. Refer to Section 103-626-100 for operation of the 6F test set. The power level should be no greater than 81DBRNC (power no greater than -9 dBm since telephone can be near office). If the results of the tests show that the transmitted signal power level is within requirements, the customer should be thanked for his cooperation.

**3.02** Signal power levels exceeding -9 dBm input to the CO must be investigated to determine the cause of the problem. A DATEC or equivalent person should be notified to investigate the customer's service. If an excessively strong signal is being transmitted, the customer must be informed that he is in violation of the tariff and service will be suspended unless the violation is corrected. The telco employee may use the F-58654 test set to assist the customer in adjusting the signal power level to meet requirements. A maintenance or service charge, as discussed in Section 660-101-312, is applicable when a tariff violation is determined and the telco Commercial Department must be notified of the tariff violation. During the ten days that the tariff allows for the customer to correct a violation, CO measurements of the transmitted signal power level should again be made. If corrective action is not taken by the customer during the allotted period, service termination procedures should be implemented by again notifying the Commercial Department.

**3.03** In violation of the tariffs, the T1 transmitters of Bell System telephone sets have been illegally replaced with electromagnetic transmitters (nonstandard components) in an attempt to improve data transmission. These customer-provided devices may have a higher output level and thus may cause signal power level violations. Since the tariff compliance test using the F-58654 test set does not utilize the telephone set, a visual inspection of the set must be made to determine if nonstandard components have been added. If components have been substituted, illegal parts must be removed and the telephone set returned to normal with a report forwarded to the telco Commercial Department. In repeated cases, the transmitter cover should be glued on as is done with coin telephone sets.

### **4. REFERENCES**

**4.01** Documents listed in this section contain additional information for analyzing problems involving acoustically or inductively coupled CPE.

**SECTION 314-205-301**

<b>SECTION</b>	<b>TITLE</b>	<b>SECTION</b>	<b>TITLE</b>
010-521-100	Data Technical (DATEC) Support	660-101-312	Maintenance of Service Charge on Services with Customer-Provided Equipment (CPE)
103-626-100	6F and 6FR Voiceband Noise Measuring Sets (J94006F and J94006FR)—Description, Operation and Maintenance	660-101-317	Handling Trouble Reports When Acoustically or Inductively Coupled Devices are Used for Data Transmission
107-305-100	F-58654 Portable Test Set for Acoustic and Inductive Couplers—Description and Operation	662-400-500	Local Test Desk—14 Type Operation and Test Procedure
107-305-500	Testing Acoustically and Inductively Coupled Devices Using the F-58654 Test Set—Test Procedures	Tech. Ref. PUB 41803	Acoustic and Inductive Coupling for Data and Voice Transmission