

**TRAFFIC SERVICE POSITION SYSTEM NO. 1/1B**  
**IMPEDANCE BALANCE**  
**ADMINISTRATION AND RECORDS**

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**1. GENERAL**

**1.01** The impedance balance of an office may be affected by changes in office cabling resulting from equipment rearrangements or additions, as well as by changes in the assignment of equipment or facilities. Comprehensive records of the balance measurements in Traffic Service Position System (TSPS)

No. 1, TSPS No. 1B, and Remote Trunk Arrangements (RTA) should be organized, maintained, and administered as an aid to analyzing impedance balance conditions or survey results and initiating corrective action. This section specifies the forms for recording impedance balance measurements and provides a suggested method for organization. These office records should be kept up-to-date as new balance tests are made. Current office records are required for office balance certification.

**1.02** This section is reissued to reflect changes in Forms BS-1695 and BS-1696, Fig. 3 and Fig. 4, respectively. Change arrows are used to indicate significant changes. This reissue does not affect the equipment test list (ETL).

**1.03** The balance records should provide entries for all phases of the balancing processes. They should be in a form that is readily updated whenever existing trunks are rearranged or when new trunks are added. Consolidation of the records into a manageable package will simplify their administration.

**1.04** The initial balancing effort for a given office should include establishment of the office balance record. In those cases where office balance has already been completed and records established, the records should contain all information required in this section. In some cases, it may be worth the effort to reorganize these records to the suggested format.

**2. OFFICE BALANCE RECORDS AND FORMS**

**A. General**

**2.01** The following paragraphs describe a standard arrangement of impedance balance records and the use of Forms E-6001, BS-1695, and BS-1696.

**2.02** Balance records in an office should be organized in binders labeled BALANCE RECORD.

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In addition to containing a complete record of balance test results, the binders should include complete administrative instructions for performing balance work with cross-referencing to all applicable sections of the practices covering the various tests required. A sample binder arrangement is contained in this section as a guide to establishing and maintaining a complete self-contained record of all balance information for a TSPS or RTA system.

**2.03** Balance measurements are performed as part of circuit order work. The test results should be transcribed onto the record forms described in this section and to Form E-2545A (Section 660-450-010) or the Work Order Record and Details (WORD) document from the Trunk Integrated Record Keeping System (TIRKS). See Section 682-400-010.

### B. Purpose of Forms

**2.04 Form E-6001—Index Sheet:** The index sheet lists, in sequence, the procedures used and any related testing information required for balance work. A separate index is required for each section of the balance record binder.

**2.05 Form BS-1695—Measurements Made to Determine Value of Office NBOC:** This form provides a permanent record of sampling tests taken to determine the office network build-out capacitance (NBOC) value. It identifies all paths tested and includes a record of the capacitance value measured for each path. This information is retained for future reference and is used when considering major office rearrangements. This form is required when performing balance work for an office and copies of it should be forwarded to the transmission engineer, per local instruction, for review in the selection of the office NBOC value.

**2.06 Form BS-1696—Record of Impedance Balance Tests:** This form is used when the Wiltron 9041 return loss measuring set (RLMS) or equivalent is used. It provides a permanent record of all balance measurements and build-out capacitor adjustments.

### C. Centralization of Records and Forms

**2.07** The binder arrangement of the balance record forms will ensure that all office balance record forms described above are kept in a central file. This binder should be divided into six sections to be identified as follows:

SECTION I—General Information

SECTION II—Testing Arrangements

SECTION III—NBOC Value

SECTION IV—Incoming Toll Connecting Trunks

SECTION V—TSPS and RTA Trunks

SECTION VI—Position Circuits (Base Unit) or Base-Remote Trunks (RTA).

**2.08** Figure 1 shows a binder outline and illustrates the application of the forms, procedures, and miscellaneous information in the various sections of the binder.

**2.09** Each section covers a certain aspect of balance work and should be complete in itself, having its own index and page numbering sequence.

**2.10** A Form E-6001 index sheet at the beginning of each section should list a description of all items included and assign a subpart letter (A, B, C, etc) and page number, as appropriate.

**2.11** Pages taken from appropriate methods sections showing the balance test procedures may be inserted in each section subpart appearing in the index sheet. Balance test procedures for the TSPS No. 1 and No. 1B base unit are in Section 250-208-506. Balance test procedures for the RTA and position subsystems (PSS) No. 1 and No. 2 are in Section 250-211-503. A Form BS-1695 is prepared when an office is initially balanced. An entry on a Form BS-1696 should also be completed for each access or completing path of each trunk group on initial balance. Entries on those forms will be added to or changed as a result of new balance measurements that are made as part of circuit order work tests or surveys. These pages and forms become a part of the binder section and are given a page number following the procedure for the particular test involved.

### D. Preparation and Use of Forms

#### E-6001—Index Sheet

**2.12** Form E-6001, shown in Fig. 2, is for use in all sections of the balance record binder. A separate form should be prepared for each section of the binder.

**2.13** Each index sheet should list in a logical sequence in the description column the various informative items and procedure steps for the balance work items covered in the section. Each entry in the description column should be assigned a section subpart identity using an alphabetical sequencing. Each page of a section subpart should be sequentially numbered and the total number of pages entered in the pages column of the index sheet.

**BS-1695—Measurements Made to Determine Value of Office NBOC**

**2.14** Form BS-1695, shown in Fig. 3, is for use in Section III of the balance record binder. Form BS-1695 has provision for recording sampling data for two trunks. The form assumes the use of the Wiltron 9041 RLMS and is prepared and completed as follows:

Office Tested—Enter office name.

Trunk Group Number (TGN)—Enter trunk group number.

Member Number (MEM) of Trunk—Enter trunk number.

Date Tested—Enter date.

Name Of Tester—Enter name or initials.

COLUMN A—Enter the sum of the THL dB and TEST MODE switch settings.

COLUMN B—Is preprinted for ease of reference to test results.

COLUMN C—On line 7, enter the sum of the NBOC settings that resulted in the peak indication on the RLMS. Remaining lines are preprinted.

COLUMN D, E, and F—Set RETURN LOSS TEST TYPE switch as directed in test procedure. The results of the ERL, SRL LO, and SRL HI tests are obtained by summing the setting of the ADD dB switch and the RLMS meter indication. These results should be recorded in the appropriate line and column.

REMARKS—Space is provided at the bottom of the form for remarks, notes, reminders, and the final NBOC value.

**BS-1696—Record of Impedance Balance Tests**

**2.15** Form BS-1696 is used when balance tests are made with the Wiltron 9041 RLMS or equivalent (as described in Sections 250-208-506 and 250-211-503). This form, shown in Fig. 4, is for use in Sections IV, V, and VI of the balance record binder. The form is prepared and completed as follows:

Office Tested—Enter office name.

Procedure—Enter test procedure section and issue numbers (ie, Section 250-208-506 for base unit or Section 250-211-503 for RTA and PSS No. 1 and No. 2). Enter detailed level procedure (DLP) number obtained from procedure section.

Requirement—Enter requirement section (660-463-301) issue number. Enter requirement test number (obtained from Section 660-463-301).

COLUMN A—Enter trunk group number (TGN).

COLUMN B—Enter trunk number.

COLUMN C—Enter the sum of the THL dB and TEST MODE switch settings.

COLUMNS D, E, and F—Set RETURN LOSS TEST TYPE switch as directed in the test procedure. The results of the ERL, SRL LO, and SRL HI tests are obtained by summing the setting of the ADD dB switch and the RLMS meter indication. These results should be recorded in the appropriate column.

COLUMNS G and H—Enter the ERL and SRL requirements obtained from Section 660-463-301. (The requirement for SRL LO and SRL HI is the same.)

COLUMN I—Enter the date tested.

COLUMN J—Enter name or initials of tester.

COLUMN K—Space is provided for remarks, notes, and (when required) build-out capacitor value.

**3. ADDITIONAL RECORD INFORMATION**

**3.01** The progressive steps of doing balancing work must follow a logical sequence and must pro-

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duce a permanent record complete enough to be usable for any future testing. In the following paragraphs, some considerations are given as an aid in the preparation of balancing records and in planning and doing balancing work.

**3.02** Information that could be included in Section I of the balance record binder is as follows:

- (a) A schematic of the traffic flow pattern showing the various switching paths through the office
- (b) An inventory by SD number of trunks listing intertoll, toll-connecting, and miscellaneous trunks as related to the traffic flow schematic described in (a) above and including information such as quantity, bay locations, drawing numbers, provision of build-out capacitors, etc
- (c) Any special information applicable to the office involved (such as correspondence regarding office balance).

**3.03** Information in Section II of the balance record binder should include the testing arrangements provided in the office.

**3.04** In the initial construction of the balance record binders, all information should be arranged for future use with logical spacing for trunk group growth and rearrangements, etc. The record should include all exceptions and office peculiarities pertinent to balancing conditions as entries in the general information of Section I or in the "Notes" and "Remarks" spaces provided on the individual forms. As an aid in testing and test analysis, pages

from the methods sections, sketches, and notes on test setups employed may be included as part of the record. If pages from practices are included, care must be taken to ensure that any updates in the practices are reflected in the record. In addition, the overall arrangement should be such that comparison between trunk groups and individual trunks and the measurement information can be readily obtained.

## **4. MAINTENANCE OF THE OFFICE BALANCE RECORD**

**4.01** Maintenance of the balancing records concurrently with balancing work as it is performed should be a primary consideration. Circuit order work test results for new trunks or retest results obtained when trunking is rearranged should be promptly entered in the record from Form E-2545A, the WORD document, or equivalent (per Section 660-450-010). "Date Tested" entries will consequently reflect the current balancing conditions.

## **5. AVAILABILITY OF FORMS**

**5.01** Forms E-6001 and BS-1695 may be obtained from the Western Electric Company in pads of 25, one pad per package. Order in multiples of 25 forms. Form BS-1696 may be obtained from the same source in pads of 50, two pads per package. Order in multiples of 100 forms. The ordering information is as follows:

(Quantity) Form E-6001.

(Quantity) Form BS-1695.

(Quantity) Form BS-1696.

## BALANCE RECORD BINDER

CONTENTS	PAGE
SECTION I — GENERAL INFORMATION	
INDEX .....	
PART A Traffic Schematic and Trunk Inventory .....	
PART B Miscellaneous Information .....	
SECTION II — TESTING ARRANGEMENTS	
INDEX .....	
PART A Testroom Testing Arrangement .....	
PART B Portable Testing Equipment .....	
PART C Balance Test Termination .....	
SECTION III — NBOC VALUES	
INDEX .....	
PART A Procedures .....	
PART B Test Results .....	
SECTION IV — INCOMING TOLL CONNECTING TRUNKS	
INDEX .....	
PART A Procedures .....	
PART B Test Results .....	
SECTION V — TSPS AND RTA TRUNKS	
INDEX .....	
PART A Procedures .....	
PART B Test Results .....	
SECTION VI — POSITION CIRCUIT (BASE UNIT) OR BASE-REMOTE TRUNKS (RTA)	
INDEX .....	
PART A Procedures .....	
PART B Test Results .....	

**Fig. 1—Outline for Balance Record Binder**



## Measurements To Determine Value Of Office NBOC

BS 1695  
(6 83)

Office Tested			Trunk Group Number (TGN)			Office Tested			Trunk Group Number (TGN)		
Member Number (MEM) Of Trunk			Date Tested	Name Of Tester		Member Number (MEM) Of Trunk			Date Tested	Name Of Tester	
Sum Of THL dB And Test Mode Switch Settings	Line No.	Capacitance Setting	Return Loss Test Type Switch Setting, Sum Of Add dB Switch Setting And Meter Indication			Sum Of THL dB And Test Mode Switch Settings	Line No.	Capacitance Setting	Return Loss Test Type Switch Setting, Sum Of Add dB Switch Setting And Meter Indication		
			ERL	SRL Lo	SRL HI				ERL	SRL Lo	SRL HI
A	B	C	D	E	F	A	B	C	D	E	F
dB	1	Peak + .012 $\mu$ F	dB	dB	dB	dB	1	Peak + .012 $\mu$ F	dB	dB	dB
	2	Peak + .010 $\mu$ F	dB	dB	dB		2	Peak + .010 $\mu$ F	dB	dB	dB
	3	Peak + .008 $\mu$ F	dB	dB	dB		3	Peak + .008 $\mu$ F	dB	dB	dB
	4	Peak + .006 $\mu$ F	dB	dB	dB		4	Peak + .006 $\mu$ F	dB	dB	dB
	5	Peak + .004 $\mu$ F	dB	dB	dB		5	Peak + .004 $\mu$ F	dB	dB	dB
	6	Peak + .002 $\mu$ F	dB	dB	dB		6	Peak + .002 $\mu$ F	dB	dB	dB
	* 7	Peak = $\mu$ F	dB	dB	dB		* 7	Peak = $\mu$ F	dB	dB	dB
	8	Peak - .002 $\mu$ F	dB	dB	dB		8	Peak - .002 $\mu$ F	dB	dB	dB
	9	Peak - .004 $\mu$ F	dB	dB	dB		9	Peak - .004 $\mu$ F	dB	dB	dB
	10	Peak - .006 $\mu$ F	dB	dB	dB		10	Peak - .006 $\mu$ F	dB	dB	dB
	11	Peak - .008 $\mu$ F	dB	dB	dB		11	Peak - .008 $\mu$ F	dB	dB	dB
	12	Peak - .010 $\mu$ F	dB	dB	dB		12	Peak - .010 $\mu$ F	dB	dB	dB
	13	Peak - .012 $\mu$ F	dB	dB	dB						
Remarks						Remarks					

\* Return Peak Indication On This Line

FCC Item No. 101

Fig. 3—Form BS-1695—Measurements Made to Determine Value of Office NBOC

