

## NO. 1/1A ESS OFFICES WITH HILO 4-WIRE SWITCHING THROUGH BALANCE REQUIREMENTS

### 1. GENERAL

**1.01** The through balance requirements for a toll switching office are specified in terms of the echo return loss (ERL) and the singing return loss (SRL). Table A gives the through balance measurement requirements for the various through balance connection paths in class 3 and higher No. 1/1A Electronic Switching System (ESS) offices with the HILO 4-wire switching feature. The diagrams in Table A show the simplified connections for which the requirements apply.

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

**1.03** General information on through and terminal balance is given in Section 660-470-100. The through balance verification procedures are described in Section 660-470-501, and information concerning the test equipment and test terminations used in balancing a No. 1/1A ESS office with the HILO 4-wire switching feature is given in Section 660-470-504. The results from the through balance verification procedures should be recorded on the forms specified in Section 660-470-010.

### 2. APPLICATIONS

**2.01** Through balance requirements are applied to an office on the basis of trunk type. For each type of trunk, the following rules apply:

(a) At least 50 percent of all the measurements for each trunk category must be equal to or greater than the median requirement given in Table A.

(b) Not more than 2 percent of the measurements for each category may be below the minimum requirement. Any trunk with a measurement below minimum should be investigated, and corrective action should be taken.

(c) No measurement may be equal to or less than the turndown limit specified in Table A. When this is the case, the trunk should be turned down until corrective action is taken.

**2.02** The ERL and the SRL measurements for all trunks that require through balance should be recorded by plant maintenance personnel. When this process is completed, the results are given to the transmission engineer, who has the responsibility for office certification. (The requirements for certification are given in Section 853-500-110.) If all of the trunks that require balance meet the requirements given in this section and/or Section 660-470-301, certification can be obtained.

**Note:** A trunk should not be considered as balanced unless all modes meet the requirements.

### 3. INTERPRETING REQUIREMENTS

**3.01** In the No. 1/1A ESS office with HILO 4-wire switching, the balance testing is performed at either TP2 (2-dB test pad) or TP0 (no test pad). The TP value is an office parameter and can be defined by trunk groups. When a toll connecting (TC) trunk is tested at TP2, 2-dB pads are included in the TAT 1 and TAT 2 test trunk circuits. If, at an operating company option, TP0 is defined, these pads are automatically removed from the TAT 1 and TAT 2 test circuits.

### NOTICE

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TEST NO.	TRUNK CLASSIFICATION	ERL AND SRL TEST CONDITIONS (BALANCE TEST CIRCUIT AND TEST EQUIPMENT ARE SPECIFIED IN SECTION 660-470-504. PROCEDURES TO OBTAIN TEST CONDITIONS ARE SPECIFIED IN SECTION 660-470-500 AND -501.)	ERL (DB) (NOTE 1)			SRL (DB) (NOTE 1)		
			MEDIAN	MINIMUM	TURNDOWN LIMIT	MEDIAN	MINIMUM	TURNDOWN LIMIT
1	SI TRUNK - INCOMING FROM INTERTOLL OR OUTGOING TO INTERTOLL 121, LH, OPR TDM, OPR JCTR.		31 (27)	25 (21)	22 (18)	24 (20)	18 (14)	15 (11)
2	TOLL CONFERENCE SERVICE MULTIPORT CONFERENCE BRIDGE TEST		27	21	18	20	14	11
3	INCOMING SI TRUNK TO OUTGOING SI TRUNK VIA TOLL SWITCHBOARD		31 (27)	25 (21)	22 (18)	24 (20)	18 (14)	15 (11)
4	OUTGOING SI TRUNK TO INCOMING SI TRUNK VIA TOLL SWITCHBOARD		31 (27)	25 (21)	22 (18)	24 (20)	18 (14)	15 (11)

NOTES:  
 1. VALUES IN PARENTHESES ARE FOR TPO TESTING WHEN THE TP2 PADS IN THE TAT 1 AND TAT 2 TEST CIRCUITS ARE SWITCHED OUT OF THE CIRCUIT (SEE 3.01).  
 2. INCOMING AND OUTGOING SI TRUNK CONNECTIONS VIA THE SWITCHBOARD MUST BE MEASURED IN BOTH DIRECTIONS THROUGH THE OFFICE.

ABBREVIATIONS

- BAL NET. - BALANCING NETWORK
- BAL TEST TERM. - BALANCE TEST TERMINATION
- IDF - INTERMEDIATE DISTRIBUTING FRAME
- IT - INTERTOLL
- JGF - JUNCTURE GROUPING FRAME
- LW - LEAVE WORD
- OPR JCTR - OPERATOR JUNCTURE
- OPR TDM - OPERATOR TANDEM
- RCV - RECEIVE
- RLMS - RETURN LOSS MEASURING SET
- SI - SECONDARY INTERTOLL
- SWBD - SWITCHBOARD
- SWBD BAL TERM. - SWITCHBOARD BALANCE TERMINATION
- TP - TEST PAD
- TAT 1 OR TAT 2 TST CKT - NETWORK TEST ACCESS CIRCUIT
- TLN - TRUNK LINK NETWORK
- TRK CKT - TRUNK CIRCUIT
- TRMT - TRANSMIT
- VFPB - VOICE-FREQUENCY PATCH BAY
- WH - WILL HOLD
- HIL0 4-WIRE TRK CKT - 4-WIRE TRUNKS (e.g., SD-1A362-01)

Table A—Class 3 And Higher No. 1/1A ESS Offices With HIL0 4-Wire Switching—Through Balance Requirements