

## NO. 5 CROSSBAR OFFICES

### TERMINAL BALANCE REQUIREMENTS

#### 1. GENERAL

**1.01** Table A provides terminal balance measurement requirements of the various intertoll terminating connection paths in class 4 and higher No. 5 crossbar switching offices. Both the echo return loss (ERL) and singing point or singing return loss (SP/SRL) requirements must be met.

**1.02** This section is reissued to include changes and/or additions to Table A, Test Nos. 1, 2, 3, 6, 8, 9, and 11. Due to the extensive revision, arrows normally used to indicate change have been omitted.

**1.03** Measurement results are to be recorded on Form E-6005 or E-6006 as shown in Section 660-472-010. The form to be used is dependent on the type of test equipment used in obtaining the measurements. The available test equipment and specific methods for performing the measurements are covered in Section 660-472-504. The procedures for establishing the test conditions and making adjustments are covered in Section 660-472-502. General information on balance testing is covered in Section 660-472-100.

#### 2. APPLICATIONS

**2.01** To ensure that an office will meet balance objectives and can be certified by the responsible transmission engineer, the requirements for the terminal balance objectives should be applied on a test condition basis. This means that 50 percent of all measurements for each test condition in Table A must be equal to or greater than the

median requirement given in Table A. Similarly, not more than two percent of the measurements for each test condition may be below the minimum requirements. Certification of an office as meeting terminal balance objectives can generally be obtained if the test conditions given in this section (and in Section 660-472-300 for class 3 and higher ranking offices) meet the requirements.

**2.02** The certification of an office as meeting terminal balance objectives is the responsibility of a transmission engineer. The requirements for office certification are given in Section 853-500-110 and apply the requirements of this section to specific trunk categories (primary intertoll, secondary intertoll, intrabuilding toll connecting, 2-wire interbuilding toll connecting, and 4-wire interbuilding toll connecting). The measurements as recorded by plant maintenance personnel for the various test conditions must be summarized by the transmission engineer to determine if the office can be certified. Certification is based on trunks rather than measurements; therefore, trunks with more than one mode of operation will not be considered as balanced unless all modes meet requirements. In addition, all 4-wire terminating sets in the toll office end of toll-connecting trunks must meet the requirements shown in Table A.

**2.03** All trunks with a test condition measuring below minimum should be investigated and corrective action taken. No trunks should have a test condition that measures equal to or below the turndown limit. The turndown limit indicates severe balance irregularities.

#### NOTICE

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TABLE A  
CLASS 4 AND HIGHER RANKING NO 5 CROSSBAR OFFICE  
TERMINAL BALANCING TEST CONDITIONS AND REQUIREMENTS

TEST NO.	TEST AND CIRCUIT CLASSIFICATION	ERL AND SP/SRL TEST CONDITIONS (BALANCE TEST CIRCUIT AND TEST EQUIPMENT ARE SPECIFIED IN SECTION 660-472-504. PROCEDURES TO OBTAIN TEST CONDITIONS ARE SPECIFIED IN SECTION 660-472-502.)	REQUIREMENTS (NOTE 2)					
			ERL IN DB			SP/SRL IN DB		
			MEDIAN	MINIMUM	TURNDOWN LIMIT	MEDIAN	MINIMUM	TURNDOWN LIMIT
1	OPERATOR ASSISTANCE (OA) TRUNKS: 121, TX, WH, ETC.		22	16	13	14	8	5
2	A OPR TOLL JUNCTOR B DIRECT SWITCHBOARD ACCESS TO OUTGOING IT TRUNK		22	16		14	8	
3	INCOMING INTERTOLL MACHINE PATHS: TOLL COMPLETING (TC) 2W OPERATOR OFFICE (OO) INTERMARKER GROUP (IM) (TRK TO SUB) LOCAL TANDEM		18	13	10.5	10	6	4
4	INCOMING INTERTOLL VIA TOLL SWITCHBOARD: TOLL SWITCHING (TS) 2W OPERATOR OFFICE (OO)		22	16		15	11	
			22	18		14	10	
			18	13	10	6		

Table A (Sheet 1 of 3)

TABLE A (CONT)

TEST NO.	TEST AND CIRCUIT CLASSIFICATION	CLASS 4 AND HIGHER RANKING NO 5 CROSSBAR OFFICE TERMINAL BALANCING TEST CONDITIONS AND REQUIREMENTS	REQUIREMENTS (NOTE 2)						
			ERL IN DB			SP/SRL IN DB			
			MEDIAN	MINIMUM	TURNDOWN LIMIT	MEDIAN	MINIMUM	TURNDOWN LIMIT	
5	OUTGOING INTERTOLL MACHINE PATHS: AMA CAMA LAMA TSPS INTERMARKER GROUP (IM) (TRK TO TRK)		2-WIRE FACILITIES	18	13	10.5	10	6	4
			4-WIRE FACILITIES (NOTE 1)	22	16		15	11	
			2-WIRE IN SAME BLDG CONTAINING 2-DB PAD (NOTE 6)	22	16		14	10	
6	OUTGOING INTERTOLL VIA TOLL SWITCHBOARD: RECORDING COMPLETING (RC) 2W OPERATOR OFFICE (OO)		2-WIRE FACILITIES	18	13	10.5	10	6	4
			4-WIRE FACILITIES (NOTE 1)	22	16		15	11	
			2-WIRE IN SAME BLDG CONTAINING 2-DB PAD	22	18		14	10	
7	INCOMING OR OUTGOING TOLL COMPLETING ON MACHINE PATHS OR VIA TOLL SWITCHBOARD PATHS: MOBILE RADIO SERVICE COASTAL HARBOR SERVICE TOLL SUBSCRIBER LINES, ETC.			15	9	6	10	6	4
8	TOLL INFORMATION AND SERVICE TRUNKS AND POSITION TELEPHONE CIRCUITS TOLL INFO TRUNKS TO TOLL SWBD TOLL INFO DESK TOLL TST BD POSITION TELEPHONE CIRCUITS TERMINATED WITH OPERATOR HEADSET		TOLL SWITCHBOARD OR TESTBOARD	11	7	5	8	4	2
			INFORMATION DESK (NOTE 3)	15	11	9	12	8	6
9	<b>A, A'</b> INCOMING MACHINE PATHS: INCOMING INTERTOLL (INC IT) (CLASS 4 OFFICE ONLY)  <b>B</b> OUTGOING MACHINE PATHS: OUTGOING INTERTOLL (OG IT) (CLASS 4 OFFICE ONLY)  <b>B'</b> OUTGOING MACHINE PATHS: OUTGOING INTERTOLL (OG IT) (CLASS 3 AND CLASS 4 OFFICES)		<b>A &amp; B'</b>	27	21	18	20	14	11
			<b>A' &amp; B</b>	22	18	10.5	14	10	4

Table A (Sheet 2 of 3)

TABLE A (CONT)

		CLASS 4 AND HIGHER RANKING NO 5 CROSSBAR OFFICE TERMINAL BALANCING TEST CONDITIONS AND REQUIREMENTS				REQUIREMENTS (NOTE 2)								
TEST NO.	TEST AND CIRCUIT CLASSIFICATION	ERL AND SP/SRL TEST CONDITIONS (BALANCE TEST CIRCUIT AND TEST EQUIPMENT ARE SPECIFIED IN SECTION 660-472-504. PROCEDURES TO OBTAIN TEST CONDITIONS ARE SPECIFIED IN SECTION 660-472-502.)				ERL IN DB			SP/SRL IN DB					
		TRUNK MEASURED		BAL TST CKT		MEDIAN	MINIMUM	TURNDOWN LIMIT	MEDIAN	MINIMUM	TURNDOWN LIMIT			
		IN	OUT	IN	OUT									
10	4WTS OF INCOMING TC PATHS FROM CLASS 5 OFFICE: AMA CAMA LAMA TSPS													
11	4WTS OF OUTGOING TC MACHINE PATHS TO CLASS 5 OFFICE: TOLL COMPLETING AND TOLL SWITCHING COMBINED (TM) 2W OPERATOR OFFICE (OO)						14	14				6		
12	4WTS OF INCOMING OR OUTGOING SWITCHBOARD PATHS TO CLASS 5 OFFICE TOLL SWITCHING (TS) 2W OPERATOR OFFICE (OO) RECORDING COMPLETING (RC)										6			
13	INCOMING OR OUTGOING SPECIAL SERVICES WATS LD DID DOD					15	9	6	10			4		

NOTES:

- REQUIREMENTS ARE SAME AS FOR 2-WIRE FACILITIES IF TRUNK CONTAINS E-TYPE SIGNALING UNITS WITH BUILT-IN 4WTS AND FIXED NBO CAPACITOR.
- VALUES GIVEN ARE ACTUAL MEASUREMENTS MINUS TRANS-HYBRID LOSS. SEE SECTIONS 660-471-100 AND -504.
- WHEN TOLL OFFICE TO INFORMATION SYSTEM IS 4-WIRE FACILITY, 4WTS MUST MEET REQUIREMENTS OF TEST 11.
- MEASUREMENT IS MADE TO VERIFY COMP NET. AND NBO CAPACITOR WIRING. ALL TRUNKS MEASURED SHOULD EQUAL OR EXCEED THE INDICATED REQUIREMENTS.
- WHEN PBX IS EQUIPPED WITH A TEST TERMINATION FOR BALANCE TESTING (600 OR 900 OHM PLUS 2.16UF, DEPENDING ON THE NOMINAL IMPEDANCE OF PBX) THE TEST CONDITION IS SIMILAR TO A CLASS 5 OFFICE. IN THESE PBX'S THE REQUIREMENTS OF EITHER TEST 3 OR 5 APPLY.
- FOR INTRABUILDING 2-WIRE TC TRUNKS WITH TSPS/RTA ACCESS, THE MEDIAN ERL REQUIREMENT IS 20dB. ALL OTHER REQUIREMENTS IN TEST 5 REMAIN THE SAME.
- BAL TST 2 CIRCUIT SHOULD ONLY BE USED FOR CLASS 3 AND HIGHER RANKING OFFICES. BAL TST 3 CIRCUIT SHOULD ONLY BE USED FOR CLASS 4 OFFICES.

Table A (Sheet 3 of 3)