LINE INSULATION TEST FRAMES
MODIFIED TO MEASURE NOISE ON SUBSCRIBER LINES
NO. 1 CROSSBAR SWITCHING SYSTEMS
(GA6123)

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1. GENERAL

1.01 This appendix provides measurement procedures for
 locating noise on subscriber lines using the modified
 (per GA 6123) line insulation test frame (LIT) and a noise
 measuring set (NMS).

1.02 The noise measuring set used is the 3A NMS or the
 Northeast Electronics TTS-37B or -37C test set.

1.03 The noise measuring set converts subscriber line
 noise to a dc voltage. The sensitivity of the noise
 measuring set can be adjusted to detect noise above any
 desired level. The lines with excessive noise are printed on
 the LIT teletypewriter and are identified by equipment
 location.

Caution: Do not use this procedure to derive noise
 measurements for the noise component of the
 Subscriber Plant Transmission Index.

2. CALIBRATION – 3A NMS

2.01 Set the function switch on the 3A NMS at NM 900
 and the DBRN switch at 70. The filter should be C
 message weighting.

2.02 Supply 1000 Hz at the O-dB level through a 5A
 attenuator to the input jack of the 3A NMS. The
 3A NMS should read 10 dBm with a 10-dB loss cut in on
 the 5A attenuator.

2.03 Patch the 3A MON DC jack to the MON DC jack on
 the LIT frame. Use the cord described in the note
 below. The 3A meter will not show a reading when a plug
 is in the MON DC jack.

Caution: The cord that plugs into the MON DC jack
 on the LIT frame is equipped with a 310 plug on
 one end and a 347A, 347B, or Mallory No. 75 plug
 on the other end. This cord must be made locally
 by connecting the tip of the 310 plug to the tip of
 the 347 or Mallory No. 75 plug. The ring of the 310
 plug is attached to the sleeve of the 347 or Mallory
 plug.

2.04 Start the LIT frame using Test 9. The tubes take
 about one minute to warm up before the frame will
 start testing subscriber lines.

2.05 Insert a phenol plug into the IN jack on the LIT
 frame. This removes subscriber lines while
 calibrating.

(a) Adjust the sensitivity potentiometer of the
 LIT frame until the TT tube fires (TT relay
 operates) on each line and the LIT teletype
 prints out the office code, 922 and the line
 identification.

(b) Set the loss in the 5A attenuator at 11 dB.

(c) Remove the plug momentarily from the MON
 DC jack on the 3A NMS. The 3A NMS meter
 should read 9 dBrnc.

Caution: To prevent damage to the NMS meter
 needle, do not pull the MON DC plug out of the
 jack until the DBRN switch is set to a higher
 reading.

(d) Replace the plug in the MON DC jack. The
 LIT frame should not stop.

(e) Set the loss in the 5A attenuator at 10 dB, 9
 dB, 8 dB, 7 dB etc. At each setting check that
 the LIT frame stops and prints the office
 code, a nine-hundred number, (922 to 900)
 and the line equipment number. Record the
 setting and the nine-hundred number
 (900-922). Repeat for each setting. Save this
 information for decoding noise printouts.

2.06 Remove the phenol plug.

2.07 Operate the LIT frame RN key.

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3. **OPERATION — 3A NMS**

3.01 Connect the 3A IN jack to the LIT frame IN jack using a 3P17B cord.

3.02 Set the DBRN switch on the 3A NMS, 10 dBrn lower than the level of noise to be detected. For example, set the switch to 10 when noise levels of 20 dBrn or higher are to be detected.

3.03 Restart the LIT frame using Test 9.

3.04 Ground start PBX lines will read as noisy lines if the LIT frame is not arranged to bypass them.

3.05 Complete the LIT test cycle.

(a) The LIT teletypewriter printout is decoded by using the information obtained in 2.06 (e).

4. **CALIBRATION — TTS-378 or C**

4.01 Patch the MW (milliwatt) jack into the LINE jack of the TTS-37B or C test set.

4.02 Turn the switches on the TTS-37B or C to a 900 ohm termination and C message weighting.

4.03 Check that the MW level is 90 dBrn.

4.04 Set the controls on the TTS-37B or C to 90 dBrn on the right switch and 10 dBrn on the left switch using dBm scales (blue).

4.05 Patch the MON DC jack of the TTS-37B or C to the MON DC jack of the LIT frame using a straight cord equipped with 310 plugs.

Note: Disregard the meter readings when the cord is plugged into the MON DC jack.

4.06 Start the LIT frame on Test 9.

4.07 Insert a phenol plug into the IN jack on the LIT frame.

4.08 Adjust the sensitivity pot on the LIT frame so the teletypewriter will print out at 90 dBrn and 9 dBrn but not at 90 dBrn and 10 dBrn.

4.09 Check the calibration of the LIT frame.

**EXAMPLE:**

\[90 + 10 = \text{No LIT teletypewriter printout}\]

\[90 + 9,8,7,6 \text{ or } 5 = 922\]

\[90 + 4,3,2 \text{ or } 1 = 912\]

\[80 + 10, 9,8,7,6 \text{ or } 5 = 911\]

\[80 + 4,3,2 \text{ or } 1 = 901\]

Note: These values are not the same on all LIT frames.

4.10 During the calibration check, record the LIT teletypewriter test entries in the calibration printout column in Table A. These figures are used for decoding information during an actual test and are valid only for the LIT frame that was calibrated.

4.11 Remove the cord connected to the MW jack and the LINE jack of the TTS-37B or C.

4.12 Remove the phenol plug from the IN jack on the LIT frame.

5. **OPERATION — TTS-37B or C**

5.01 Leave the switches on the TTS-37B or C set at the 900-ohm termination and C message weighting.

5.02 To select the range of noise readings desired on the teletypewriter printout, set the left and right switches on the TTS 37B or C in one of the following combinations: 10 and 9, 20 and 9, 30 and 4 or 30 and 9. See Table A for the actual noise range determined by the TTS-37B or C setting. For example, the setting 20 and 9 gives an actual noise range of 20 to 38 dBrn.

5.03 Start the LIT frame using Test 9 and complete the test cycle.

5.04 To decode the teletypewriter printout information, see Table A and proceed as follows:

(a) Locate the printout test number in the calibration printout column. (See 4.10.)

(b) Then, reading across, locate the TTS-37B or C switch setting column. This gives the actual noise in dBrn for the printout number.

6. **VERIFICATION OF NOISY LINES**

**Plant Service Center**

6.01 Measure suspected noisy lines from the local test desk (if equipped for noise measuring).

**Crossbar Offices**

6.02 Manually operate the line hold magnet of the line to be tested. Take a reading of the line. If the reading is out of limits proceed to the MDF.
6.03 Remove the heat coils from the cable pair to isolate the noise.

6.04 Take corrective measures.

Step-By-Step Offices

6.05 Manually operate the cutoff relay of the line to test. Take a reading of the line. If the reading is out of limits proceed to the MDF.

6.06 Remove the heat coils of the cable pair to isolate the noise outside or inside of the office.

6.07 Take corrective measures.
# TABLE A

**NOISE MEASUREMENTS MADE WITH THE MODIFIED LIT FRAME AND TTS-37B OR C TEST SET**

<table>
<thead>
<tr>
<th>CALIBRATION</th>
<th>TTS-37B SETTING</th>
<th>PRINTOUT</th>
<th>ACTUAL NOISE IN dBm</th>
<th>SWITCH SETTING TTS-37B or C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 + 9</td>
<td>20 + 9</td>
</tr>
<tr>
<td>10 dBrn</td>
<td>20 dBrn</td>
<td>25 dBrn</td>
<td>30 dBrn</td>
<td></td>
</tr>
<tr>
<td>90 + 9</td>
<td>922</td>
<td>10 dBrn</td>
<td>20 dBrn</td>
<td>25 dBrn</td>
</tr>
<tr>
<td>90 + 8</td>
<td>11</td>
<td>21</td>
<td>26</td>
<td>31</td>
</tr>
<tr>
<td>90 + 7</td>
<td>12</td>
<td>22</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>90 + 6</td>
<td>13</td>
<td>23</td>
<td>28</td>
<td>33</td>
</tr>
<tr>
<td>90 + 5</td>
<td>14</td>
<td>24</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>90 + 4</td>
<td>15</td>
<td>25</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>90 + 3</td>
<td>16</td>
<td>26</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>90 + 2</td>
<td>17</td>
<td>27</td>
<td>32</td>
<td>37</td>
</tr>
<tr>
<td>90 + 1</td>
<td>18</td>
<td>28</td>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td>80 + 10</td>
<td>19</td>
<td>29</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td>80 + 9</td>
<td>20</td>
<td>30</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>80 + 8</td>
<td>21</td>
<td>31</td>
<td>36</td>
<td>41</td>
</tr>
<tr>
<td>80 + 7</td>
<td>22</td>
<td>32</td>
<td>37</td>
<td>42</td>
</tr>
<tr>
<td>80 + 6</td>
<td>23</td>
<td>33</td>
<td>38</td>
<td>43</td>
</tr>
<tr>
<td>80 + 5</td>
<td>24</td>
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<td>80 + 4</td>
<td>25</td>
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<td>80 + 3</td>
<td>26</td>
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<td>41</td>
<td>46</td>
</tr>
<tr>
<td>80 + 2</td>
<td>27</td>
<td>37</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>80 + 1</td>
<td>900</td>
<td>28+</td>
<td>38+</td>
<td>43+</td>
</tr>
</tbody>
</table>

**NOTE:** The teletypewriter printout numbers recorded during the calibration test correspond to the actual noise in the TTS-37B or C switch setting column (10 + 9, 20 + 9, etc.).