

## 1600- OR 2000-CYCLE SINGLE FREQUENCY SIGNALING SYSTEM

### SUPPLY CIRCUIT SD-56239-01

#### TESTS

##### 1. GENERAL

1.01 This section describes a method for testing 1600 or 2000 cycle supply circuits SD-56239-01 (J68602CK).

1.02 The tests and the features tested are:

- (A) Output Power - Using No. 13A Transmission Measuring Set
- (B) Output Power - Using No. 40B Transmission Measuring System
- (C) Output Frequency - Using No. 72A Frequency Meter
- (D) Output Frequency - Using Beat Frequency Method
- (E) Alarm

1.03 The beat frequency method of test (D) may be used instead of the No. 72A frequency meter of test (C), for checking the output frequency if another supply is available. The supply used for comparison in test (D) should have the same power and nominal frequency as the supply being checked and should be within  $\pm 2$  cycles of its nominal frequency. The limitation of  $\pm 2$  cycles from nominal frequency includes any frequency shift which may occur if a carrier channel is used for transmitting the power from another building. A supply adjusted by the beat frequency method should not be used for checking another supply.

1.04 If, in test (D), a supply in a distant building is used for checking the frequency, an assistant is required.

1.05 Lettered Steps: The letters a, b, c, etc., are added to a step number to indicate that the step covers an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of steps should be made are given in the ACTION column, and all steps governed by the same condition are designated by the same letter. Where a condition does not apply, the associated steps should be omitted.

##### 2. APPARATUS

2.01 The apparatus needed for each test is shown in the following list. The details for each item are covered in the indicated paragraphs.

Apparatus	Number Required for Tests				
	(A)	(B)	(C)	(D)	(E)
TMS (2.02)	1	-	-	-	-
Patching cord (2.03)	1	2	1	4*	-
Testing cord 2.04)	1	-	-	-	-
Thermometer (2.05)	1	1	-	-	-
Frequency meter (2.06)	-	-	1	-	-
Watch (2.07)	-	-	-	1	-
Head telephone set (2.08)	-	-	-	1	-
Testing cord (2.09)	-	-	-	-	1
2.02 No. 13A transmission measuring set or No. 40B transmission measuring system.					
2.03 Patching cord - P2AA cord, 6 feet long, equipped with two No. 241A plugs (2P13B cord). *Four cords required when connecting to a supply in same building. Only 3 required when supply is in distant building.					
2.04 Testing cord - W2CA cord, 5 feet 6 inches long, equipped with one No. 327A plug (2W36A cord). (To connect No. 13A TMS to 1600~ SEND or 2000~ SEND jack).					
2.05 Line thermometer (Spec. No. 6639N), or equivalent for measuring the room temperature in degrees F.					
2.06 No. 72A frequency meter (J64072A).					
2.07 Stop watch, KS-3008, or equivalent watch with second hand.					
2.08 No. 52A, head telephone set or equivalent.					
2.09 Testing cord - No. 893A cord, 3 feet long, equipped with 2 No. 360A tools (1W13A cord) and 2 No. 411A tools. (To short-circuit P relay winding).					

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**3. METHOD**

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
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(A) Output Power - Using No. 13A Transmission Measuring Set

At Signaling Power Supply Bay

- 1 Connect cord of TMS to 105-125 volt d-c or a-c supply
- 2 Operate dial switch of TMS to black 10
- 3 Operate toggle switch of TMS to ON and wait 5 minutes for set to warm
- 4 Calibrate TMS as in Section 103-213-100
- 5 Patch 1600~ SEND or 2000~ SEND jack to TMS
- 6 Patch OSC TST jack of supply circuit to 51 Ω RES jack

Reading of TMS agrees with Table A in dbm ± 0.4db. Use ambient temperature value in table nearest to that read on thermometer. Ambient temperature is air temperature near equipment.

TABLE A

Ambient Temp. in Degrees F	Transmission Level at which the Associated Signaling Circuit Connects	
	<u>-13</u>	<u>-16</u>
	(dbm)	(dbm)
61	-11.3	-14.4
68	-11.4	-14.5
75	-11.5	-14.6
82	-11.6	-14.7
89	-11.7	-14.8
96	-11.8	-14.9
103	-11.9	-15.0
110	-12.0	-15.1

- 7 If requirement in step 6 is met - Proceed to step 10
- 8 If requirement in step 6 is not met - Change the strapping at the E, F, or G resistors, the Z lead at the A retardation coil, or both as required, to meet the requirement in Table A to ±0.3 db  
  

Note: A change in strapping at the E, F, and G resistors provides a small change, while a transfer of the Z lead provides a larger change. Leave at least 116,500 ohms resistance in circuit.
- 9 If strapping was changed - Check output frequency per test (C) or (D)

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
10	To test other supply circuits, disconnect cord from 1600~ SEND or 2000~ SEND jack and proceed as in steps 5 through 9	
11	When this test is completed, remove all patches and restore all keys	

(B) Output Power - Using No. 40B Transmission Measuring System

At Toll Testboard

- 1 Patch TMS to REC jack of testing trunk which terminates near supply circuit. Operate keys, as required, for connection to proper scale

At Signaling Power Supply Bay

- 2 Patch 1600~ SEND or 2000~ SEND jack to MISC REC jack of testing trunk used in step 1
- 3 Patch OSC TST jack of supply circuit to 51  $\Omega$  RES jack Same as step 6 of test (A)
- 4 If requirement in step 3 is met -  
Proceed to step 7
- 5 If requirement in step 3 is not met -  
Change the strapping at the E, F, or G resistors, the Z lead at the A retardation coil, or both, as required, to meet the requirement in Table A of test (A) to  $\pm 0.3$  db  
  
Note: A change in strapping at the E, F, and G resistors, provides a small change, while a transfer of the Z lead provides a larger change. Leave at least 116,500 ohms resistance in circuit.
- 6 If strapping was changed -  
Check output frequency per test (C) or (D)
- 7 To test other supply circuits disconnect cord from 1600~ SEND or 2000~ SEND jack and proceed as in steps 2 through 6
- 8 When test is completed, remove all patches and restore all keys

(C) Output Frequency - Using No. 72A Frequency Meter

At Signaling Power Supply Bay

- 1 Prepare and calibrate meter as in Section 103-425-100
- 2 Operate CAL-MEAS-SEARCH switch to MEAS
- 3 Operate FREQUENCY CPS control to 1600 or 2000 cycles, as required
- 4 Patch 1600~ SEND or 2000~ SEND jack to 600  $\Omega$  IN jack of frequency meter
- 5 Adjust frequency control of meter to give stationary 1/1 pattern (loop or line on meter screen as in Fig. 11 of Section 103-425-100) Frequency is within  $\pm 2$  cycles of 1600 or 2000 cycles, as required

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<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
6	If requirement in step 5 is met - Proceed as in steps 9 through 11	
7	If requirement in step 5 is not met - Change strapping on capacitors F3 to F9 to obtain nominal frequency $\pm 1/2$ cycle	
8	If strapping on capacitors F3 to F9 was changed - Check output power per test (A) or (B)	
9	To test other supply circuits disconnect cord from 1600~ SEND or 2000~ SEND jack and proceed as in steps 4 through 8	
10	When this test is completed, remove patching cord and restore switch and control on meter	

(D) Output Frequency - Using Beat Frequency Method

- 1 If an intertoll trunk is used for comparing frequency with that of supply in another building, remove intertoll trunk from service

At Signaling Power Supply Bay

- 2 Patch 1600~ SEND or 2000~ SEND jack  
ATTEN IN jack
- 3 Patch ATTEN OUT jack to MIX A jack
- 4 Connect head telephone set to MIX C jack
- 5a When checking with another supply in same building -  
Patch MIX B jack to PAD IN A or PAD IN B jack, as required  
Patch 8 db OUT or 14 db OUT jack to 1600~ SEND or 2000~ SEND jack, as required
- 6a When checking with a supply in a distant building -  
Patch MIX B jack to jack (usually designated SEND) for connection to toll test-board  
Have toll testboard man complete connection to supply in distant building
- 7 Compare volume of tone (in receiver) from the two sources, as follows -  
Disconnect patching cord from MIX A jack and listen, then reinsert patching cord  
Repeat procedure at MIX B jack

Tone volume approximately same from each source

- 8 If volume of tone from two sources is not approximately same -  
Turn 2 DB ATTEN control until tones are approximately same volume
- 9 Listen in receiver for beats
- 10 If requirement in step 9 is met -  
Proceed as in steps 13 and 14

Beat frequency not over two per second

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
11	If requirement in step 9 is not met - Change strapping on capacitors F3 to F9 until requirement of step 9 is met	
12	If strapping on capacitors F3 to F9 was changed - Check output power per test (A) or (B)	
13	To test other supply circuits, disconnect cord from 1600~ SEND or 2000~ SEND jack and proceed as in step 2 and steps 7 through 12	
14	When test is completed, remove patching cords and head telephone set	
<u>(E) Alarm</u>		
1	Short circuit P relay winding	Red alarm lamp lighted and alarm sounds
2	Disconnect short circuit from P relay	Red lamp extinguished and alarm silenced