

DATE		TMC SPECIFICATION NO. S-612	
SHEET	1 OF 6		
RK COMPILED	RK CHECKED	TITLE:	
<i>Ron Kohn</i> APPROVED			

TEST PROCEDURE, SBT-1KS

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## A. INTRODUCTION

The SBT-1KS is a general purpose radio transmitter providing AM, CW, FS, SSB and DSB operation throughout a frequency range of 2 to 32 MC. The transmitter provides 1KW output for AM, CW and FS operation and 1KW PEP for sideband service.

## B. MAIN COMPONENTS

The SBT-1KS consists of nine separate units integrated to form the transmitter system. These components are:

1. Rack Assembly, RAK-9G
2. Auxiliary Power Panel, APP-4
3. High Voltage Power Supply, PS-5
4. Mid and Low Voltage Power Supply, PS-4A
5. Linear Power Amplifier, RFD-1A
6. Mode Selector, SBE-3.
7. Variable Frequency Oscillator, VOX-5.
8. Tone Intelligence System, TIS-3.
9. Antenna Tuning System, ATS-2.

## C. TEST PROCEDURE

The test procedure for the SBT-1KS system is outlined on the following pages. Before the system can be tested correctly, all components except the RAK-9G rack assembly must be tested and passed by the test department as per the specific test requirements for each unit.

1. 52 ohm load, 1KW dissipation.
2. AC power cables.
3. Test equipment rack TMC model PTE.
4. RF output cable. RG-8/U.
5. MWC24(7)S3, cable insulated shielded, 5 ft.
6. CA-409 cable assembly, jumper, 6 in.
7. H.P. VTVM, Model 410B, or equivalent.
8. Test cable assembly #106.
9. Test chart, SBT-1KS (S-612) (2 size Dw'g).
10. Voltmeter, Simpson 260 or equivalent.
11. Square Wave Generator, Boonton Model 71.
12. Two, (2) conductor shielded cables.
13. Test Receiver (GPR-90 or equivalent).

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1. Install AC input power cable from J601 of RAK-9 to AC line.
2. Connect Fanning strips of test cables assembly to E501 and E502 on rear of APP-4 chassis.
3. Connect shielded lead from output of TTG mounted in test equipment rack PTE to CHANNEL 1 and CHANNEL 2 input terminals on test cable assembly.
4. Connect dummy load MONITOR OUTPUT to SIGNAL INPUT jack of PTE analyzer.
5. Connect cable from J609 jack of AX-198 to RF input of TU-2 and from RF output of TU-2 to dummy load.
6. Connect jumper from terminal 5 on test cable terminal board T601 to terminal 8. This completes external interlock circuit.
7. Connect a jumper from terminal 21, T602 to terminal 22. This completes the KBY LINE to the SBE.
8. Set MAIN POWER switch on APP-4 to ON position. The red MAIN POWER indicator lamp should light.
9. Set MAIN POWER switch on PS-4A to ON position. The green MAIN POWER indicator lamp should light and RFD-1A blower and PS-5 fan should start running.

## NOTE:

PS-4A TRANSMITTER VOLTAGES switch should be in STANDBY position; FINAL VOLTAGES switch in OFF position and OVERLOAD breakers in ON position. Adjust line voltage to 115 volts, rack fan should start running.

10. Turn on POWER switch on SBE. The red lamp on power supply and OVEN lamp should light.
11. Turn on POWER switch on VOX. The red MAIN POWER lamp and INNER OVEN and OUTER OVEN lamps should light.
12. Set the exciter switches CHANNEL 1 and CHANNEL 2 on the TIS-3 to LINE.
13. After a warm-up time of approximately 5 minutes, set the TRANSMITTER VOLTAGES switch to ON position. The red indicator lamp should light. Set TRANSMITTER VOLTAGES switch to STANDBY position.
14. Set XMTR switch on SBE to ON position. The TRANSMITTER VOLTAGES red indicator lamp on PS-4 should light.
15. Turn VOX METER switch to HFO position.
16. Set VOX HFO switch to ON position.
17. Set VOX MASTER OSCILLATOR FREQUENCY. (see chart, P.5)
18. With SBE, MF, XTAL, SW, in the VMO position, adjust the SBE for two tone test at req. output frequency using the TTG supplied with the PTE test equipment rack.
19. Set SBE OUTPUT control to zero.
20. Set FINAL VOLTAGES switch on PS-4 to ON position. Red indicator should light.

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21. Using the tuning chart, adjust the RFD-1 for 1KW PEP at required frequency (225 VRMS across 52 ohms). The ATS-2 should be adjusted for minimum standing wave ratios at test frequencies.
22. Adjust RFD-1 to obtain 40 db third order distortion at 1KW PEP.
23. Adjust RFD-1 to obtain 1KW CW. (225 VRMS @ 52 ohms.)
24. Place voltmeter across terminals 3 and 4 of T601 to test cable. Meter should read 115 volts A.C. This is transmitter antenna relay voltage, and may vary  $\pm 10\%$ .
25. With voltmeter connected as in (23) above, set XMTR switch and EXCITER switch on SBE to OFF position.
  - a. Voltmeter should read zero volts.
  - b. FINAL VOLTAGE and TRANSMITTER VOLTAGE indicators on P.S.-4 should go out.
26. Place a jumper across terminals 1 and 2 on T601. TRANSMITTER VOLTAGES indicator should light. Remove jumper.
27. Place a jumper across terminals 9 and 10 on T601. TRANSMITTER VOLTAGES, FINAL VOLTAGES and EXCITER ON indicators should light. Remove jumper.
28. Place an ohmmeter across terminals 24 and 25 on T602. The ohmmeter should read  $10\Omega \pm 20\%$  between 24 and 25,  $\infty$  between 23 and 24.  
  
Place a jumper across terminals 9 and 10 to key the unit. An ohmmeter connected between 23 and 24 should read  $10\Omega \pm 20\%$  between 24 and 25 should read  $\infty$ .
29. Turn the LEVEL ADJ. knob on the TIS-3 maximum clockwise.
30. Set the SHIFT CPS indicator to 850.
31. Turn the FUNCTION selector switch to the CW position.
32. Turn the CENTER FREQUENCY CPS selector switch to the 2000 position.
33. Turn the TEST selector switch to the LINE position.
34. Turn the KEY MODE selector switch to the 50V position.
35. Set the MULTIPLY by frequency selector on the SQUARE WAVE GENERATOR to 1 position.
36. Turn the CYCLES frequency selector maximum counter-clockwise and observe fluctuating meter reading.
37. Turn the control knob under the PEAK VOLTS meter maximum counter-clockwise.
38. Set the small OUTPUT selector switch to the 50 position.
39. Connect a piece of 2 conductor shielded cable from the two uppermost S.W. output terminals on the SQUARE WAVE GENERATOR to the test cable assembly terminal board T602 so that the upper S.W. output terminal is connected to terminal 27 on T602 and the other S.W. output terminal connected to terminal 29 on T602.
40. Set th B+ switch on TIS-3 to the ON position. The red B+ indicator should light.



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41. Set the EXCITER switches CHANNEL 1 and CHANNEL 2 to the FSK FAX CW position.
42. Increase the LEVEL ADJ. knob for a fluctuating meter indication approximately one third full scale reading.
43. Adjust the LSB section of the SBE for an indication of a fluctuating input on both CHANNEL 1 and CHANNEL 2. Turn LSB section OFF.
44. Adjust the USB section of the SBE for an indication of a fluctuating input on both CHANNEL 1 and CHANNEL 2. Adjust USB GAIN control for approximately 1/3 scale deflection.
45. Set up test receiver to receive test frequency BFO on.
46. Adjust SBT-1K system for approximately 500 watts CW at test frequency using USB, CHANNEL 1 or CHANNEL 2.
47. A keyed 1KC tone should be heard on the receiver.
48. Reduce transmitter output to zero.
49. Turn FUNCTION selector switch on TIS-3 to the FSK position.
50. Increase transmitter output to 1000 watts. A varying tone above and below the center frequency should be heard.
51. Vary the CENTER FREQ. CPS selector between 2550 and 1900 and listen for changes in pitch of varying tone. Set switch back to 2000.
52. Vary the SHIFT CPS indicator to a lower value and note a narrower shift above and below the center frequency.
53. Reduce transmitter output to zero.
54. Change the small OUTPUT selector on the SQUARE WAVE GENERATOR to the 10 position.
55. Disconnect the wires from terminals 27 and 29 of test cable assembly and connect to terminals 31 and 32. This connects the generator to the FAX input.
56. Set the FUNCTION selector switch on the TIS-3 to the FAX position.
57. Increase transmitter output to 1000 watts. A varying tone should be heard.
58. Reverse the output leads at the SQUARE WAVE GENERATOR and note a change in frequency of output tone of receiver.
59. Reduce transmitter output to zero.
60. Turn off all power switches and reduce all gain controls to zero. Remove AC connections to line.
61. Check cables, hardware and slides for ease of movement. Units should tilt without obstruction.
62. This completes testing of system SBT-1KS.



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TEST CHART SBT-1KS or S1

DATE  
TEST BY

SBT-1KS ser. no.  
TIS-3 ser. no.  
ATS-2 ser. no.

RFD ser. no.  
VOX-5 ser. no.  
SBE-3, ser. no.

1KW PEP, SSB											1KW, CW				REMARKS		
FREQ. MC	VOX SETTING	SBE BAND	DRIVER BAND	1st. AMPL. TUNE	PA GRID TUNE	PA TUNING	PA LOADING	PA LOADING SWITCH	MA, PA PLATE CURRENT	MA, PA SCREEN CURRENT	3rd ORDER DISTORTION -DB	MA, PA PLATE CURRENT	MA, PA SCREEN CURRENT	FORWARD POWER WATTS		REFLECTED POWER WATTS	ACTUAL POWER WATTS
2																	
5																	
10																	
20																	
30																	

- NOTE:
- 1KW, PEP, IS 225 VRMS ACROSS 52  $\Omega$  LOAD.
  - 1KW, CW IS 225 VRMS ACROSS 52  $\Omega$  LOAD.
  - 3rd ORDER DISTORTION REQUIRED AR 30 MCS IS 35DB.

ITEMS	ACCEPT	REJECT
1. A.C. POWER TO APP 4	_____	_____
2. A.C. POWER TO PS-4A	_____	_____
3. A.C. POWER TO SBE-3	_____	_____
4. A.C. POWER TO VOX- 5	_____	_____
5. AC POWER TO TIS-3	_____	_____
6. INTERLOCK CIRCUITS	_____	_____
7. KEY LINE CIRCUIT	_____	_____
8. CHANNEL 1 CIRCUIT	_____	_____
9. CHANNEL 2 CIRCUIT	_____	_____
10. REMOTE XMTR PLATE CONTROL	_____	_____
11. PUSH TO TALK CIRCUIT	_____	_____
12. RECEIVER MUTING	_____	_____
13. 115V ANTENNA RELAY	_____	_____

SYM	DESCRIPTION	DATE	CH. NO.	DRAFTS	CHECKER	ENG. APP.
UNLESS OTHERWISE SPECIFIED:		SCALE:				
DIMENSIONS ARE IN INCHES		MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND ANY DEVIATIONS WILL BE CAUSE FOR REJECTION. REMOVE ALL BURRS AND SHARP EDGES				
TOLERANCES ON FRACTIONS $\pm 1/64$ DECIMALS $\pm .05$ ANGLES $\pm 1/20^\circ$		REQ. PER UNIT				

REQ. PER UNIT	MODEL	SECTION	ASS'Y. NO.	DATE
USED ON				

REQ. ITEM	PART NO.	DESCRIPTION	SYMBOL
		THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK	
STOCK SIZE		S-612	
MATERIAL		TEST PROCEDURE CHART, SBT1KS	
		RK	RK
TYPE & TEMPER	HEAT TREAT. SPEC.	DRAWN	CHECKER
		RK	RK
FINISH & SPEC. NO.		FINAL APPROVAL	
		S-612	
		ELEC. DES. APP.	MECH. DES. APP.