

DATE 1/27/61
SH. 1 OF 8
COMPILED BY

TMC SPECIFICATION NO. S 531

A

TITLE: TEST PROCEDURE SBT-1KF, H

JOB

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NOTE: This spec. is applicable to the SBT-1KF and SBT-1KH, the only difference being the SBT-1KF uses the CBE-1 and the SBT-1KH uses the CBE-2.

A. INTRODUCTION

The SBT-1KF is a general purpose radio transmitter providing SSB, ISB, DSB, Am, FS and CW operation throughout a frequency range of 2 to 32 megacycles in 100 CPS steps (320,000 channels) with a stability of 1 part in 10^8 per day. The complete system is housed in two separate racks.

B. MAIN COMPONENTS

The SBT-1KF consists of 16 separate units integrated to form the system. These units are:

1) Rack Ass'y.	RAK-11	} SBG SECTION
2) Sideband Exciter	CBE-1 or 2	
3) Controlled Harmonic Generator	CHG-1	
4) Controlled Master Oscillator	CMO-1	
5) Low Frequency Loop	CLL-1	
6) High Frequency Loop	CHL-1	
7) Frequency Standard	CSS-1	
8) Power Supply	CPP-5	
9) Power Supply	CPP-2	
10) Rack Ass'y.	RAK-17B	} PA SECTION
11) Antenna Tuning System	ATS-2	
12) Linear Power Amplifier	RFD-1	
13) Auxiliary Power Panel	APP-4	
14) Low voltage Power Supply	P.S.-4	
15) High voltage Power Supply	P.S.-5	
16) Tone Intelligence System	TIS-3	

Modification Kit KIT-1 may also be supplied as required by the particular installation.

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C. TEST PROCEDURE

The test procedure for the SBT-1KF system is outlined on the following pages. Before the system can be tested correctly, all components except the RAK-17 rack assembly must be tested and passed by the test department as per the specific test requirements for each unit.

I. EQUIPMENT REQUIRED

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-1KF (S531 page 8 (size Dw'g.)).
10. Voltmeter, Simpson 260 or equivalent.
11. Modification kit KIT-1 (if not supplied with system).
12. Square Wave Generator, Boonton Model 71.
13. Two, (2) conductor shielded cables.
14. Test Receiver (GPR-90 or equivalent).

II. PROCEDURE

1. Install Modification Kit, KIT-101 to interconnect the SBG (exciter) rack to the power amplifier rack.
2. Install AC input power cables from the rear of the RAK-11 and RAK-17B to the AC line.

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PROCEDURE CONT'D.

3. Apply power to the SBG section and allow unit to warm up as per the test specifications for the SBG-1 (S-527). Make sure RF output controls on CHG are at zero.
4. Connect fanning strips of test cable assembly to E501 and E502 on rear of APP-4 chassis. Remove all jumpers from rear of APP-4 and CMO chassis; these jumpers will be replaced upon completion of this test procedure.
5. Connect shielded lead from the output of the TTG mounted in test equipment rack PTE to CHANNEL 1 and CHANNEL 2 input terminals (balanced) on test cable assembly. Set exciter switches CHANNEL 1 and CHANNEL 2 on TIS-3 to the line positions.
6. Connect RF output cable from J609 jack of AX-198 assembly to RF input terminal of TU-2 antenna tuner.
7. Connect coaxial cable from RF output terminal of TU-2 unit to the dummy load.
8. Connect dummy load MONITOR OUTPUT to SIGNAL INPUT jack of PTE analyzer.
9. Connect a jumper between terminals 5 and 8 on the test cable assembly terminal board T601. This completes the EXTERNAL INTERLOCKS circuit within the rack.
10. Connect a jumper from terminal 21, T602 to terminal 22. This completes the KEY LINE circuit to the CMO.
11. Set MAIN POWER switch on APP-4 to ON position. The red MAIN POWER indicator lamp should light.
12. Set MAIN POWER switch on PS-4 to ON position. The green MAIN POWER indicator lamp should light and RFD-1 blower and PS-5 fan should start running. NOTE: PS-4 TRANSMITTER VOLTAGES switch should be in STANDBY position; FINAL VOLTAGES switch on OFF position and OVERLOAD breakers in ON position. Adjust line voltage to 115 volts, rack fan should start running.
13. After a warm-up time of approximately 5 minutes, set the TRANSMITTER VOLTAGES switch to ON position. The red indicator lamp should light.

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PROCEDURE CONT'D.

14. Set the FINAL VOLTAGES switch to ON position. The red indicator should light and approximately 200 MA of plate current should appear on the PA PLATE CURRENT meter on the RFD.
15. Place voltmeter across terminals 3 and 4 of T601 on test cable. Meter should read 115 volts A.C. This is transmitter antenna relay voltage, and may vary $\pm 10\%$.
16. With voltmeter connected as in (15) above, set XMTR VOLTAGES switch on PS-4 to STANDBY POSITION.
 - a. Voltmeter should read zero volts.
 - b. FINAL VOLTAGES and TRANSMITTER VOLTAGES indicators on P.S.-4 should go out. Remove meter.
17. Place a jumper across terminals 1 and 2 on T601. TRANSMITTER VOLTAGES and FINAL VOLTAGES indicator should light. Remove jumper. This checks the REMOTE XMTR PLATE circuit to the P.S.-4.
18. Place an ohmmeter across terminals 24 and 25 T602. The ohmmeter should read 10 ohm $\pm 10\%$ between 24 and 25 and ∞ between 23 and 24.
19. Place a jumper across terminals 1 and 2 to key the unit. An ohmmeter connected between 23 and 24 should read 10 ohm $\pm 20\%$; between 24 and 25 should read ∞ . Remove jumper and meter.
20. Using the TTG supplied with the PTE test rack, adjust the SBG section for two tone test at required frequency. See test chart on last page and refer to SBG test procedure S-527. Reduce CHG output to zero.
21. Set TRANSMITTER VOLTAGES switch on PS-4 to On position. The TRANSMITTER VOLTAGES and FINAL VOLTAGES indicators should light.
22. Adjust for 1KW, PEP, at the test frequency. 1KW PEP is 225 VRMS across 52 ohm load when measured with HP410B.
23. Adjust system for 40 DB third order distortion at test frequency. See chart.
24. Adjust system for 1KW, CW at test frequency. (225 VRMS @ 52 ohm).
25. Adjust CHG output to zero.

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PROCEDURE CONT'D.

26. Turn the LEVEL ADJ. knob on the TIS-3 maximum clockwise.
27. Set the SHIFT CPS indicator to 850.
28. Turn the FUNCTION selector switch to the CW position.
29. Turn the CENTER FREQUENCY CPS selector switch to the 2000 position.
30. Turn the TEST selector switch to the LINE position.
31. Turn the KEY MODE selector switch to the 50V position.
32. Set the MULTIPLY BY frequency selector on the SQUARE WAVE GENERATOR to 1 position.
33. Turn the CYCLES frequency selector maximum counterclockwise and observe fluctuating meter reading.
34. Turn the control knob under the PEAK VOLTS meter maximum counterclockwise.
35. Set the small OUTPUT selector switch to the 50 position.
36. 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.
37. Set the B+ switch on TIS-3 to the ON position. The red B+ indicator should light.
38. Set the EXCITER switches CHANNEL 1 and CHANNEL 2 to the FSK FAX CW position.
39. Increase the LEVEL ADJ. knob for a fluctuating meter indication approximately one third full scale reading.
40. Adjust the LSB section of the CBE for an indication of a fluctuating input on both CHANNEL 1 and CHANNEL 2. Turn LSB section OFF.

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PROCEDURE CONT'D.

41. Adjust the USB section of the CBE for an indication of a fluctuating input on both CHANNEL 1 and CHANNEL 2. Adjust USB GAIN control for approximately 1/3 scale deflection.
42. Set up test receiver to receive test frequency. BFO on.
43. Adjust SBT-1K system for approximately 500 watts CW at test frequency using USB, CHANNEL 1 or CHANNEL 2.
44. A keyed 1KC tone should be heard on the receiver.
45. Reduce transmitter output to zero.
46. Turn FUNCTION selector switch on TIS-3 to the FSK position.
47. Increase transmitter output to 1000 watts. A varying tone above and below the center frequency should be heard.
48. Vary the CENTER FREQ. CPS selector between 2550 and 1900 and listen for changes in pitch of varying tone. Set switch back to 2000.
49. Vary the SHIFT CPS indicator to a lower value and note a narrower shift above and below the center frequency.
50. Reduce transmitter output to zero.
51. Change the small OUTPUT selector on the SQUARE WAVE GENERATOR to the 10 position.
52. 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.
53. Set the FUNCTION selector switch on the TIS-3 to the FAX position.
54. Increase transmitter output to 1000 watts. A varying tone should be heard.
55. Reverse the output leads at the SQUARE WAVE GENERATOR and note a change in frequency of output tone of receiver.
56. Reduce transmitter output to zero.

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PROCEDURE CONT'D.

- 57. Turn off all power switches and reduce all gain controls to zero. Remove AC connections to line.
- 58. Remove Modification Kit, KIT-101, all test equipment and cables. This completes operational testing of system SBT-1KF.
- 59. Check cables, hardware and slides for ease of movement. Units should tilt without obstruction.
- 60. This completes testing of system SBT-1KF.

