| TMC SPECIFICATION | | | NO. S 1189 |
|---|---|---|---|
| REV: Ø 1 | | | |
| COMPILED: BN | CHECKED: BM | APPD: 5/10/67 | SHEET 1 OF 11 |
| TITLE: | | | |
| 5/10/67 /jb | | | |

TEST PROCEDURE

SBT-1KF5

## I. INTRODUCTION

THE SBT-1KF5 is a general purpose transmitter providing SSB, ISB, DSB, AM, CW and FS operation throughout a frequency range of 2 to 32 Mcs, in 100 Cps steps, with a stability of 1 part in $10^8$ per day.

## II. 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-2 | |
| 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 | |

III. TEST EQUIPMENT

1. Dummy Load, 1KW, 50 ohms
2. Spectrum Analyzer, PTE
3. VTVM, HP Model 410B or equivalent
4. Voltmeter, Simpson Model 260 or equivalent
5. Square Wave Generator, Boonton Model 71
6. Test Receiver, TMC Model GPR-90 or equivalent

IV. TEST 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. All power switches to OFF or STANDBY.
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 a shielded lead from the output of the TTG mounted in the PTE to Channel 1 or Channel 2 inputs on the APP-4 (13, 14, 15 or 18, 19, 20). Both channels to be tested. Set exciter switches, CHANNEL 1 and CHANNEL 2 on the TIS to LINE.
5. Connect RF output cable from J609 jack of AX-198 assembly to RF input terminal of TU-2 antenna tuner.

6. Connect coaxial cable from RF output terminal of TU-2 unit to the dummy load.
7. Connect dummy load MONITOR OUTPUT to SIGNAL INPUT jack of PTE analyzer.
8. Connect jumpers between TERM. 5 and 6, 7 and 8, on the APP-4. This completes the EXT. INTLKS.
9. Connect a jumper from terminal 21,APP-4 to terminal 22. This completes the KEY LINE circuit to the CMO.
10. Set S100 on the PS-4 to NORMAL, TRANSMITTER VOLTAGES to STANDBY, FINAL VOLTAGES to OFF, OVERLOAD breakers to ON.
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. 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.
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 on APP-4. 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 APP-4. 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, APP-4. The ohmmeter should read 10 ohm $\pm$ 10% between 24 and 25 and $\infty$ 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 $\infty$ . 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.
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 APP-4 so that the

upper S.W. output terminal is connected to terminal 27 on APP-4 and the other S.W. output terminal connected to terminal 29 on APP-4.

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.

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 one third 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 valve 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 APP-4 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.
57. Set the TRANSMITTER VOLTAGES switch to STANDBY.
58. Set up the Transmitter as in Steps 26 thru 41.
59. Set S100 on the PS-4B to CW position.
60. On the CHG, set the B+ switch to OFF. The CHG will stay ON.
61. Turn on the TRANSMITTER VOLTAGES switch. Adjust the transmitter for 1KW output.
62. By shutting off the SQUARE WAVE GENERATOR, the transmitter Plate Current should fall to 0 and the CHG output should fall to 0. Turning on the generator should result in full output.

63. Set the TRANSMITTER VOLTAGES to STANDBY.

64. Turn S100 to PTT. Connect a jumper across Terminals 10 and 11 of E701 on the PS-4B.

65. Set the TRANSMITTER VOLTAGES to ON. The transmitter should be at full output with the Square Wave Generator on. Disconnecting the jumper on Terminals 10 and 11 should result in the PA Plate Current falling to 0, and the CHG output will fall to 0.

66. Reconnect the jumper. On the CSS-1C move the coaxial jumper cable from INT. STD IN to EXT. STD. IN. The transmitter should still operate. Replace the coaxial jumper to INT. STD. Remove the jumper from TERM. 10 and 11 of the PS-4.

67. Turn off all power switches and reduce all gain controls to zero. Remove AC connections to line.

68. Check cables, hardware and slides for ease of movement. Units should tilt without obstruction.

69. This completes testing of system SBT-1KF5.

TMC SPECIFICATION

NO. S 1189 | SHEET 10 OF 11 | APPD: | CHECKED: | COMPILED: BN | REV: | TITLE: TEST PROCEDURE SBT-1KF5

SER. NOS: CBE, CHG, CMO, CLL, CHL; CSS, CPP-5, CPP-2, TIS-3, RFD-1; PS 4, PS 5, APP-4, ATS-2, SBT-1KF5

DATE:

TEST BY:

1 KW, PEP, SSB

| FREQ. MC | VOX SETTING | SBE BAND | DRIVER BAND | 1st. AMP TUNE | PA GRID TUNE | PA TUNING | PA LOADING | PA LOAD SW. | MA, PA PLATE CURRENT | MA, PA SCREEN CURRENT | 3rd ORD. DIST. -DB |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

1 KW, CW

| FREQ. MC | MA, PA PLATE CURRENT | MA, PA SCREEN CURRENT | FORWARD POWER WATTS | REFLECTED POWER WATTS | ACTUAL POWER WATTS | REMARKS |
|---|---|---|---|---|---|---|
| 2 | | | | | | |
| 5 | | | | | | |
| 10 | | | | | | |
| 20 | | | | | | |
| 30 | | | | | | |

NOTE:
1. 1 KW, PEP IS 225 VRMS ACROSS 52 LOAD.
2. 1 KW, CW IS 225 VRMS ACROSS 52 LOAD.
3. 3rd ORDER DISTORTION REQUIRED AT 30 MCS IS 35 DB.

TMC FORM SPEC 1

1M-8-64-AINS.

# TMC SPECIFICATION

NO. S 1189

REV:

COMPILED: BN | CHECKED: | APPD: | SHEET 11 OF 11

TITLE: TEST PROCEDURE SBT-1KF5

| | TEST | PARA. | ACCEPT |
|---|---|---|---|
| 1. | SBG Operation | 3 | |
| 2. | Main Power APP-4 | 11 | |
| 3. | Main Power PS-4 | 12 | |
| 4. | Main Power TIS | 37 | |
| 5. | Main Power ATS | | |
| 6. | Interlocks | | |
| 7. | Transmitter Voltages Test | 13 | |
| 8. | Final Voltages | 14 | |
| 9. | Antenna Relay | 15-16 | |
| 10. | Remote Transmitter Voltage | 17 | |
| 11. | Receiver Muting | 18-19 | |
| 12. | TIS CW Test | 26-44 | |
| 13. | TIS FSK Test | 46-49 | |
| 14. | TIS FAX Test | 51-55 | |
| 15. | PS-4B CW Test | 58-62 | |
| 16. | PS-4B PTT Test | 64-65 | |
| 17. | Ext. 1MC Test | 66 | |
| 18. | Slide Operation | 68 | |

APPROVED

TESTER

# REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S 1189
LIST NO.

| DATE | REV. | SHEET | EMN # | DESCRIPTION | APP. |
|---|---|---|---|---|---|
| 5/11/67 | Ø | | | ORIGINAL RELEASE FOR PRODUCTION | |

TMC FORM MLR-1 2-65—AINS.