TMC SPECIFICATION			NO. S 1214
REV: Ø			
COMPILED: E.R.	CHECKED:	APPD:	SHEET 1 OF 17
TITLE: GPT-10K-LFE			
SECTION 1			

COMPLETE TEST INSTRUCTIONS

FOR

GPT-10K-LFE TRANSMITTER

TEST EQUIPMENT REQUIRED

A. SPECTRUM ANALYZER MODEL LP-1A WITH MODIFIED RACK or equivalent.

B. SIMPSON 260 OHMMETER OR EQUIVALENT

C. ONE RF AMMETER 0-20 RFA

D. TWO TONE GENERATOR MODEL T.T.G.

E. TER-5K 50 UNBALANCED LOAD

F. CX-102-J-103-M CAPACITOR

G. AUDIO OSCILLATOR H.P. 200CD OR EQUIVALENT

A. MECHANICAL INSPECTION:

1. Check all knobs and switches on the PA frame for proper operation.

2. Check load adj. switches, coarse and fine for proper counter reading corresponding to proper switch position. Load adj. coarse counter should read 10 when in the clockwise position. Load adj. fine should read 10 when in a clockwise position.

3. Carefully check the PA compartment and blower box for good mechanical condition, obvious miswiring and loose connections.

4. Check power supply for loose connections and correct value of circuit components.

B. PRELIMINARY ELECTRICAL INSPECTION:

*1. With Main Power switch OFF, check for short circuits to ground:

   a. The 3 power input phases should read not less than 1 megohm.

   b. The positive side of the high voltage circuit should read not less than 100K ohms with the Shorting relay contacts opened with the shorting relay contacts closed. This reading should be ZERO.

*2. The following units must be checked for proper termination of cables:

   a. Relay Panel

   b. Exciter Drawer

   c. IPA Drawer(VLLA)

*3. Check complete unit for correct value of fuses.

4. Check to insure that PA output circuit is correctly connected to unbalanced output.

NOTE: Indicated completion and acceptance of portion(s) of this test prec ded by (") by recording required observed value of by check ( ) mark as required on attached test Data Sheet.

*5. Turn ON MAIN POWER switches and observe following:

a. AC Power light must go on.

b. The PA Blower must turn in the same direction as arrow stamped on the housing.

c. The top fans must turn clockwise when viewed facing the hub.

*6. CIRCUIT FUSING CHECKS:

a. With the Main Power switch OFF, remove any two of the three main blower fuses, the main blower must not run when the Main Power switch is closed. Open Main Power switch and replace the two fuses. Close Main Power switch and continue fusing circuit checks below.

b. Remove Rear Fan fuse, the top fan must stop.

c. Remove the PA Filament fuse, the PA Filament voltage must be removed.

d. Remove the Timer fuse, this must deactivate the Timer.

*7. Set Filament Switch to 210-V.

*8. The PA Bias voltmeters should read between 280 and 400 volts and be adjustable by the PA Bias adjust controls on the relay panel. Set these to MAX. volts.

*9. Set the Driver Biases A & B to approximately 40 volts using the Driver Bias adjustments on the driver panel.

*10. Unlatch the following overload relays and note the corresponding overload light indicator, it must light:

a. PA Plate c. IPA Plate e. SWR

b. PA Screen d. IPA Screen

By pushing Overload Reset switch on the main control panel the overload light indicators must go out and the overload relays must reset.

NOTE: Indicated completion and acceptance of portion(s) of this test preceded by (") by recording required observed value of by check ( ) mark as required on attached test Data Sheet.

*11. The energizing of the Tune Operate lights must correspond to the position of the Tune-Operate switch. Also the Tune-Operate relay must energize and deenergize with this switch.

*12. The Filament Elapse time meter must indicate when the Filaments are ON.

*13. Check the Time Delay relay for proper operation and time interval, between 3 and 5 minutes.

*14. With the Alarm switch ON the alarm must sound.

C. PROTECTIVE INTERLOCK SYSTEM:

1. Before checking the interlock system insure that a jumper is connected from COM to NO (terminals 1 and 2) of E-1015.

The interlock indicator light and switch are connected in such a manner that the indicator will be ON if all interlocks are closed. To find an open interlock always turn the interlock switch to extreme counterclockwise position (IPA TEST SWITCH): rotate in clockwise direction to the position where the indicator light goes out. This is an open interlock. In cases where there is more than one interlock open,the above procedure must be repeated until all interlocks are closed and all individual interlock lights are energized.

*2. With the Main Power switch closed each interlock must be checked individually by manually opening and observing the following:

a. The Shorting relay must release (deenergize).

b. The corresponding indicator light should go out.

D. HIGH VOLTAGE CHECKS:

1. Turn ON the High Voltage switch and check the following:

a. The H.V. contactor should energize.

2. Placing the screen Voltage switch in the OFF position should remove the screen voltage.

NOTE: Indicate completion and acc ptanc of portion(s) of this test preced d by ( ) by recording required observed value or by check ( ) mark as required on attached test Data Sheet.

D. HIGH VOLTAGE CHECKS CONTINUED

*3. The IPA Screen voltage must change from approximately 260 volts to 150 volts as the Tune-Operate switch is moved from the Operate to Tune Position with IPA screen overload adjust pot in extreme counter-clockwise position.

E. IDLING PLATE CURRENT ADJUSTMENT:

1. With transmitter energized, blowers running, HV switch ON, Tune-Operate switch in Operate position, Screen Voltage switch in ON position and S2003 Driver Drawer in normal position, make the following adjustments:

*a. Adjust both PA Bias on the relay panel to a PA Plate current reading of 1.0 ampere each.

*b. Adjust both Driver Bias on the driver drawer for a Driver Plate current of 100 ma. each.

F. CHECK OF PROTECTIVE DEVICES FOR REMOVAL OF HIGH VOLTAGES:

1. With the transmitter energized as in paragraph E above, and with the Alarm Switch in the ON position, mechanically trip Protective Devices as listed below in sequence. Each time a protective device is mechanically tripped, the device must reset electrically, and the HIGH VOLTAGE must be turned ON again, before testing the next PROCECTIVE DEVICE.

*a. PA Plate overload

*b. PA Screen overload

*c. Zener Diode Protect relay

*d. IPA Plate overload

*e. IPA Screen overload

*f. PA Bias relay (by removal of respective fuses)

*g. SWR overload

*h. Turn H.V. OFF

NOTE: Indicate completion and acceptance of portion(s) of this test pr ceded by (*) by recording observed value or by check ( ) mark as required on attached test Data Sheet.

G. OVERLOAD ADJUSTMENTS:

*1. PA Plate overload

a. Turn H.V. breaker ON.

b. Adjust both PA Bias adjusts for individual Plate Currents of 1.4 amps each. Total PA Plate Current should read 2.8 amps.

c. Adjust the PA Plate overload adjust to trip at 2.8 amps.

d. Readjust both PA Bias adjusts for individual Plate currents of 1.0 amps each.

e. Turn H.V. OFF.

*2. PA Screen overload

a. Turn H.V. breaker ON.

b. Drive the transmitter at 500 KC and vary the loading until the PA screen meter reads 60 ma.

c. Adjust the PA Screen overload adjust to trip at 60 ma.

d. Turn H.V. breaker OFF.

*3. IPA PLATE OVERLOAD

a. Turn H.V. switch ON.

b. Adjust both Bias adjusts until Driver Plate Current Meter reads 150 MA for Plate A and Plate B. Position "Plates" should read 300 MA ± 20 MA.

c. Adjust the IPA Plate overload adjust to trip at 300 MA.

d. Readjust both Bias adjusts for a reading of 100 MA for each plate.

e. Turn H.V. switch OFF.

*4. IPA SCREEN OVERLOAD

a. Remove IPA Drawer from load by pulling it out on the slides.

NOTE: Indicate compl tion and acceptance of portion(s) of this test preceded by (*) by r cording required obs rved value or by ch ck ( ) mark as required on attached test DATA SHEET.

IPA SCREEN OVERLOAD CONTINUED

b. Put S-2003 of IPA Drawer in the TEST position.

c. Short to ground PIN 2 of XV-2004 and the IPA Screen Overload should trip out.

d. Adjust the IPA Screen Overload adjust until the relay will latch when reset.

e. Repeat Procedure until relay will latch readily when reset.

f. Readjust both IPA Plate currents for a reading of 100 MA each.

g. Put S-2003 in NORMAL position and put drawer back in the transmitter.

H. OUTPUT METER ADJUSTMENT:

1. Place the SWR switch into the POWER position.

2. Adjust R-1257 Meter Balance which is located in the directional coupler in the PA compartment, until the KW/SWR meter reads ZERO. Lock in Place.

I. TRANSMITTER TUNING GENERAL:

1. Since this transmitter is a fully broadbanded device, the normal tuning devices found on the high frequency transmitters are no longer needed. The only controls that are needed are the Load Adjust Fine and Load Adjust Coarse which adjust the output impedance of the transmitter.

2. The IPA Driver is also fully broadbanded and since it is an intermediate Amplifier there is no tuning, loading or matching of any sort needed.

3. The output of this transmitter is designed for 50 ohms. The Coarse adjust switch adjusts from 20 to 120 ohms. 20 ohms is 10 on the counter and 120 ohms is 60 in the counter. The Fine Adjust Switch adjusts from 50 to 43 ohms. 50 ohms being 20 on the counter and 43 ohms being 10 on the counter.

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I. TRANSMITTER TUNING GENERAL: CONTINUED

4. The majority of the test frequencies will be run at a Coarse Adjust counter reading of 30 which is 50 ohms and a Fine Adjust counter reading of 20 which is 50 ohms. The higher frequencies (400KC and up) may have to have different loading positions depending upon how the impedance of the load varies.

5. Normally during test, the transmitter is tuned with a two tone audio signal connected to one of the two channel inputs. However, it may also be tuned with the carrier or a single audio tone.

6. Set the LFE output to minimum to prevent the IPA screen overload from tripping, and always ascertain that the drive is at minimum before applying high voltage to the transmitter.

7. The PA tubes must not be driven beyond 2.6 amperes total of plate current when attaining full output.

8. The total IPA plate current must not be driven beyond 300 ma. when attaining full output.

9. Turn transmitter ON with High Voltage OFF. Set LFE to minimum.

J. CARRIER TEST:

1. Connect a 50 ohm 5 KW unbalanced load to the output of the transmitter.

2. In the load, insert a 0-20 RF ampere meter in series with and between the input connector and the resistors.

3. Set Load Adj. Coarse for a reading of 30 on the counter and and Load Adj. Fine for a reading of 20 on the counter.

4. Place SWR switch in the Power position.

5. Tune the exciter for an output frequency of 500 KC. with carrier.

6. Turn the H.V. Breaker ON and increase the output of LFE until a reading of 10 amperes is achieved on the RF ampere meter in the load.

NOTE: Indicate completion and acceptance of portion(s) of this test preceded by (*) by recording required observed value or by check ( ) mark as required on attached test Data Sheet.

J. CARRIER TEST: CONTINUED

7. Then adjust R-1258 in the directional coupler until a reading of 5 KW is present on the KW/SWR meter. Lock in place. NOTE: The meter will read the power dissipated at the load or antenna and not the power output of the transmitter. This is very important when looking into high VSWR Ratios.

8. To see if the output has been matched efficiently into the load vary the Load Adj. Coarse one position each way and monitor the amount of Plate and Screen Current drawn against Power Out in each position.Total Plate Current drawn with 5 KW AVG output should not exceed 2.6 amps. Screen Current should not exceed 50 MA. Set the Load Adj. Fine and monitor the same conditions as before. Adjust for maximum Power output with least amount of Plate Current drawn.

9. Repeat the procedure in the previous part 8 for the rest of the frequencies indicated on the report sheet and record.

*K DIRECTIONAL COUPLER CHECK:

1. Turn H.V. Breaker OFF.

2. In the output load insert a .01 4000V capacitor between the meter and resistors.

3. Tune the exciter to a frequency of 350 KCS.

4. Put SWR Switch in the POWER position, turn H.V. breaker ON and turn OVERLOAD adjustment fully clockwise.

5. Drive transmitter until an output of 1 KW is achieved in the KW/SWR meter.

6. Place SWR Switch in the CAL position and adjust CALIBRATE pot. until meter reads CAL.

7. Place SWR Switch in the SWR position and the meter should read between 2.0 and 2.7.

8. Turn the OVERLOAD adjust counter-clockwise until SWR overload trips. Readjust OVERLOAD adjust fully clockwise and repeat procedure.

NOTE: Indicate completion and acceptance of portion(s) of this test preceded by ( ) by recording required observed value or by check ( ) mark as required on attached test Data Sheet.

*K. DIRECTIONAL COUPLER CHECK: CONTINUED

9. Reduce drive and change frequency to 225 KCS. Repeat entire procedure. SWR meter should read between 3.0 and 3.7

*L. TONE TEST & DISTORTION TEST:

1. Turn H.V. Breaker OFF.

2. Remove CARRIER and insert two tones.

3. Remove capacitor from load and hook up with meter only.

4. Tune exciter to 100 KC and repeat procedure as in Part J3.

5. Turn H.V. Breaker ON and repeat procedure as in Part J8.

6. Connect Spectrum Analyzer to the Monitor Output and measure the third order products of the IPA and PA section. Record on test sheet and repeat procedure for other frequencies that appear on Sheet. Third order products must be at least 35 db below two tone test at 10 KW PEP.

*M. ALDC CHECK:

1. With transmitter loaded to full carrier output, 5KWAVG, on any frequency within its range turn on the ALDC. The transmitter output must decrease with an increase in ALDC voltage, (counter-clockwise rotation of ALDC Control).

   a. Set the ALDC control full clockwise, make a distortion check.

   b. Adjust the ALDC to a point where the output commences to decrease and make a distortion check.

REQUIREMENT:

The distortion requirement of 35 db below the two tone test level at full output must not be degraded by application of ALDC in paragraph C above.

NOTE: Indicate completion and acceptance of position(s) of this test preceded by (*) recording required observed value or by check ( ) mark as required on attached test Data Sheet.

N. KEYING TEST:

1. Connect Square Wave Generator to terminals C and D on J-1011. Set Generator frequency at 25 ohms, set + - output to 50 volts.

2. Set MMX Exciter controls as follows: Mode switch in FSK position. Shift Selector (Rear of Unit) to 425 ohms. Voltage Selector (Rear of Unit) at 50 Volts.

3. Tune Transmitter to any frequency at low power.

4. Tune Receiver to Transmitter frequency. A clear FSK signal should be heard.

5. Turn OFF High Voltage.

6. Connect Square Wave Generator to terminals F and G of J-1011. Set Exciter Mode switch to FAX. Turn ON High Voltage.

7. A clear FAX signal should be heard.

8. Turn OFF High Voltage.

9. Remove Generator leads from J-1011. Now connect dry contact key to terminal B and G of J-1011. Set Exciter Mode switch to CW. Turn ON High Voltage and Key.

10. A clear CW signal should be heard.

11. Turn OFF High Voltage and disconnect Key lines.

O. REMOTE TEST:

1. Connect Remote Test J1G to J-1013

2. Remove Jumpers from terminals 1 and 2, 4 and 5 of E-1002. Also remove jumper from terminals 5 and 6 of E-8119

CAUTION: Turn OFF Transmitter Main Power before disconnecting above jumpers.

3. Set Test J1G controls as follows: Gain control full clockwise. All switches OFF.

4. Turn ON Main Power, and HV Breaker to ON position.

5. External interlock indicator should indicate open.

6. Place Test J1G interlock switch in ON position. Interlock indicator should indicate CLOSED.

7. Place Test J1G High Voltage switch in ON position. Tune transmitter to any frequency at full power.

8. Place Test J1G High Voltage ON-OFF switch in OFF position. Transmitter High Voltage should deenergize.

9. Place Test J1G High Voltage ON-OFF switch in ON position. High Voltage should energize and transmitter come up to full power.

10. Turn Test J1G Gain control. CCW transmitter output should drop to zero.

11. Turn OFF High Voltage and Main Power.

12. Reconnect all jumpers removed in Step #2.

PART 1
REPORT SHEET

1. Mechanical Inspection _____
2. Short Circuit Checks _____
3. Cable Termination Checks _____
4. Fuse Checks _____
5. Blower Checks _____
6. Circuit Fusing Checks _____
7. PA Bias A Voltage set at _____ VDC
8. PA Bias B Voltage set at _____ VDC
9. IPA Bias A Voltage set at _____ VDC
10. Filament Adjust set at _____ VAC
11. IPA Bias B Voltage set at _____ VDC
12. Overload Relays Checks _____
13. Tune-Operate Lights and Relay Checks _____
14. PA Screen Switch and Relay Checks _____
15. Time Delay Relay Operation Check _____
16. Alarm Operation Check _____
17. Protective Interlock System Check _____
18. High Voltage Circuits Check _____

    a. IPA Screen Voltage, Operate ____V:Tune _____ V

19. <u>IDLING PLATE CURRENT ADJUSTMENTS</u>

    a. PA Idling Plate Current A Adjusted to _____ AMP.

    b. PA Idling Plate Current B Adjusted to _____ AMP.

    c. IPA Idling Plate Current 1 Adjusted to _____ MA

REPORT SHEET CONTINUED

19. IDLING PLATE CURRENT ADJUSTMENTS

d. IPA Idling Plate Current 2 Adjusted to _____ MA.

20. CHECK FOR PROTECTIVE DEVICES FOR REMOVAL H.V.

a. PA Plate Overload _____

b. PA Screen Overload _____

c. Zener Diode Protect Relay _____

d. IPA Plate Overload _____

e. IPA Screen Overload _____

f. PA Bias Relay _____

g. SWR Overload _____

21. OVERLOAD ADJUSTMENTS

a. PA Plate Overload set to trip at _____ AMP.

b. PA Screen Overload set to trip at _____ MA.

c. IPA Plate Overload set to trip at _____ MA.

d. IPA Screen Overload set to trip (short out to ground) _____ OK

22. OUTPUT METER ADJUSTMENT _____

23. CARRIER TEST

FREQUENCY	OUTPUT
5 KC	_____ KW
100 KC	_____ KW
250 KC	_____ KW
500 KC	_____ KW
540 KC	_____ KW

TMC SPECIFICATION

NO. S 1214

REV: Ø

COMPILED: E.R. | CHECKED: | APPD: | SHEET 16 OF 17

TITLE: GPT 10KLFE

SECTION I

TUNING CHART

GPT 10KLFE

	IPA				PA					
FREQ.	PLATE 1 MA.	PLATE2 MA.	DISTORTION DB.	LOAD FINE	LOAD COARSE	PLATE 1 AMP.	PLATE 2 AMP.	SCREEN MA.	DISTORTION DB.	OUTPUT KW.
30 KC.										
100KC.										
250KC.										
500KC.										
540KC.										

TMC SPECIFICATION			NO. S 1214 C
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24. DIRECTIONAL COUPLER CHECK

a. SWR on 2 to 1 trips out _____

b. SWR on 3 to 1 trips out _____

25. Unbalanced tuning complete and Distortion Check _____

26. ALDC Circuit test made on _____KC

27. Keying Test _____

28. Remote Test _____

TESTED BY _____ MFG. NO. _____

APPROVED BY _____ DATE _____

REMARKS _____

_____

_____

REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S 1214
LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
4-16-68	Ø			ORIGINAL RELEASE FOR PRODUCTION	

TMC FORM MLR-1 2-65—AINS.