

DATE March 18 / 66
SH. 1 OF 14

TMC SPECIFICATION NO. S 10101

COMPILED BY
RCA

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED 

COMPLETE INSTRUCTIONS FOR THE
PRODUCTION TESTING OF THE
MODEL RFE-1

DATE _____
SH. 2 OF 14
COMPILED BY _____

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED

<u>INDEX</u>	<u>PAGE</u>
1. Purpose and Description (See Instruction Book)	
2. Test Equipment Required	3
3. General Instrument Layout	3
4. Test Instructions	4
5. Test Sequence and Procedure	4-11
6. Sample Report Sheet	12

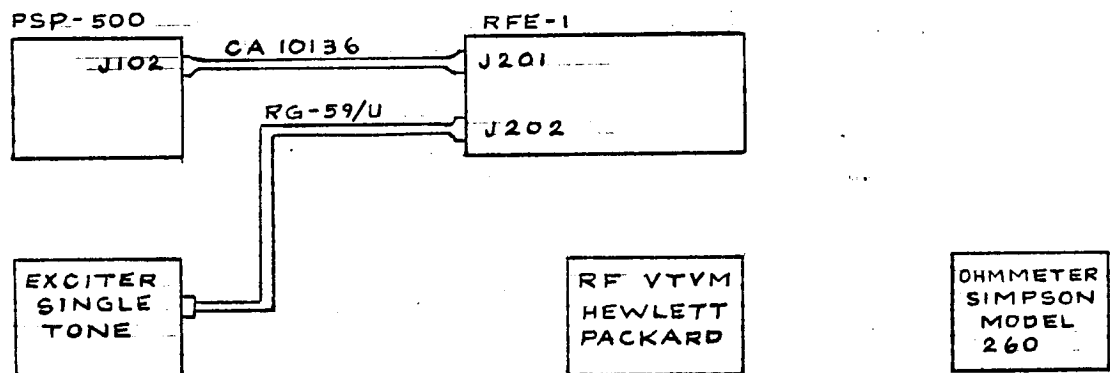
APPROVED

2. TEST EQUIPMENT REQUIRED

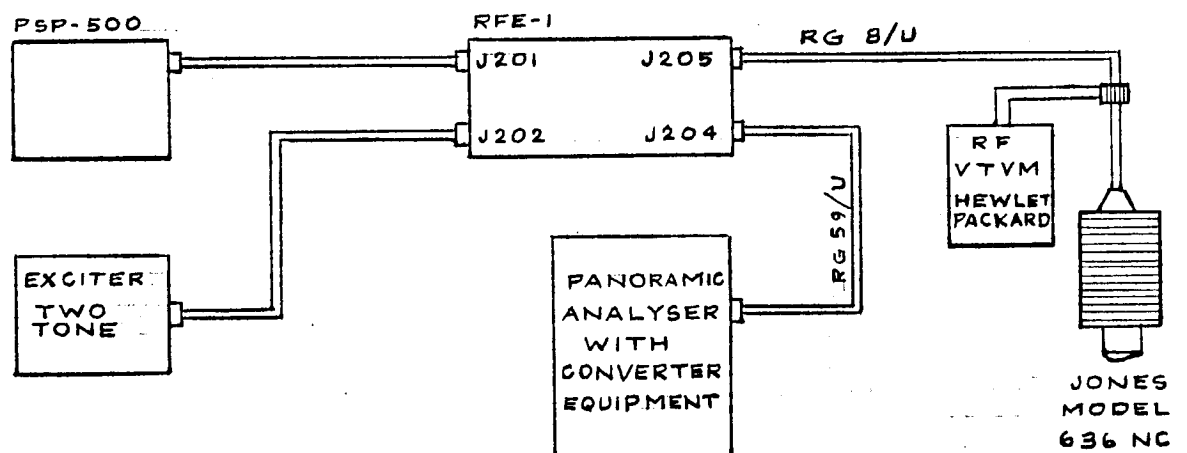
1. PSP-500
2. Vacuum Tube Voltmeter (RF), Hewlett Packard Model 410B
3. RF(Dummy) Load, JONES Model 636 NC
4. Exciter: SBE or Two-Tone Generator
5. Distortion Analyser Panoramic Model PTE or equivalent with converter equipment

3. GENERAL INSTRUMENT LAYOUT

a. Driver stages testing and P.A. Neutralizations:



b. P.A. Performance and Intermodulation Distortion Test:



DATE 4 OF 14
SH. 4 OF 14
COMPILED BY

TMC SPECIFICATION NO. S₁₀₁₀₁

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED

4. TEST INSTRUCTIONS:

- a. Proceed with the test as outlined in Test Sequence and Procedure paragraph 5 to follow.
- b. Fill in blanks on report sheet, rejecting those units which do not meet specifications stated herein.
- c. Sign report sheets and submit them to your supervisor.

5. TEST SEQUENCE AND PROCEDURE:

A. General Inspection

- a. Inspect the unit for obvious mechanical and electrical imperfections.
- b. Inspect all the relative positions of variable capacitors C205, C213 and C276 with respect to dial settings. The dials must read zero when capacitors are fully meshed (extreme counter clockwise position).
- c. Visually inspect the pressurized compartment for "shorts" from components to ground as well as between the component parts.
All RF connections must be as short as physically possible.
NOTE: Do not enclose the pressurized compartment until resistance check has been performed.
- d. Visually inspect the Driver chassis for "shorts" of component parts, and make sure that all RF connections were kept as short as physically possible.
- e. Inspect all the RF wiring of S202, T208, T209, C213, C276 and C273.

B. Blower Wiring

Blower must be wired in accordance with schematic CK-10480. C268 must be 1 mfd. All connections are color coded.

NOTE: If power applied, the improperly wired blower will be damaged.

C. Resistance Check

Warning: Place a bus wire across the meter terminals before measuring resistances with an ohm-meter, otherwise the meter will be permanently damaged.

DATE
SH. 5 OF 14
COMPILED BY

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED

a. J201

Pin	To	Ohms	Remarks
1	- Terminal of M202	Short	S203 in H.V. position
2	pin 7 of J201	3 to 6 ohms	F201 must be inserted
3	Ground	14-16 Meg	S203 In PA SG position
4	Ground	M201 must read	
5	Ground	90K-110K	S206 in SSB position
6	Ground	115K-135K	S206 in SSB position
7	Ground	Open	F201 must be inserted
8	Ground	190K-250K	
9	Ground	Open	
10	Ground	Open	With S204; S205 in closed position
11	To pin 10 Of J201	Short	With S204; S205 in closed position
12	Ground	Short	
A-1	Ground	Open	

b. Pressurized Compartment

WARNING: Do not place ohmeter leads to other points than indicated in the chart below, otherwise the germanium diodes CR204 and CR205 may be damaged.

From	To	R lies between the Values of:	Remarks
Pin 1 of V203	C259	6 to 7 ohms	Be certain that ohmeter leads
Pin 1 of V203	Pin 1 of V204	4 to 6 ohms	are making good contacts.
Pin C of V203	C260	19K to 25K	
Pin C of V203	Pin C of V204	Short to 2K	R213 and R221 set in extreme C.C.W. position.

DATE _____
SH. 6 OF 14
COMPILED BY _____

TMC SPECIFICATION NO. S₁₀₁₀₁

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED

D. Initial Power Check

- a. Connect power supply unit, PSP-500, to unit under test as shown in general instrument layout paragraph 3a. NO NOT apply RF drive.
- b. Be sure that transmitter plates switch and high voltage breaker are off and the interlock switches in their "off position and S206 in SSB position.
- c. Turn the main line breaker to ON position and note if all filaments operate.
- d. Quickly go through all positions of metering switch observing multi-meter. No meter readings should be seen except in filament position.
- e. Meter switch in filament position, reset filament adjust pot, R216, to mark on Multi-meter.
- f. Set bias controls R213 and R221 to full counter clockwise position.
- g. Measure voltage to ground from pin C of V203, must be approximately -50V.
- h. Measure voltage at pin 2 of V201, must be -147 V to -163 V.
- i. Pull out all the interlocks: S204, S205.

E. Voltage Check

- a. Turn on transmitter plates switch, with VTVM check the following voltages:

From	To	Voltages
Plate Cap	Ground	90 to 150 V
Pin 6 of V201	Ground	90 to 150 V
Pin 3 of V202	Ground	50 to 110 V
Pin 4 of V202	Ground	-110 to -130 V
Pin 5 of V202	Ground	-130 to -155 V
Pin 2 of V201	Ground	-145 to -165 V
Pin 1 of V201	Ground	-140 to -155 V

- b. Turn off the power and place cover on the bottom of pressurized compartment.

DATE 7 OF 14
SH. OF
COMPILED BY

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED

F. Alignment of Driver Chassis

- a. Turn on the ; main power.
 - b. Check the P.A. filament voltage (reset if necessary, R216 Fil. Adj.).
 - c. Pull out the cover interlock switches (S204, 205), and turn on transmitter plate switch wait 3 minutes.
 - d. Set the multimeter switch to RF DR position.
 - e. Set all trimmers to their midway capacity.
 - f. Set the driver band switch to 2-4 mcs. position.
 - g. Set driver tuning at point No. 1.
 - h. Apply drive slowly at 2 mcs. (single tone)
 - i. Tune T201 and T204 to the peak indication on the multimeter reducing the drive to maintain 20 V on the multimeter.
 - j. Set driver tuning at point #9 and apply drive slowly at 4 mcs (single tone).
 - k. Tune trimmers C201 and C207 to the peak indication on multimeter, readjust drive to maintain 20 V on multimeter.
- NOTE: Remove drive and if multimeter continues to read readjust C223 and start from step (g).

- l. Repeat steps (g) through (k) several times until no further adjustment of coils and trimmers is necessary.
 - m. Set driver band switch to 4-8 mcs. position.
 - n. Set driver tuning at point No. 1.
 - o. Apply drive slowly at 4 mcs. (single tone)
 - p. Tune T202 and T205 to the peak indication on multimeter.
 - q. Set drive tuning at point no. 9 and apply drive slowly at 8 mcs (single tone).
 - r. Tune trimmers C202 and C208 to the peak indication on the multimeter.
- NOTE: Check for oscillation as in the note after step (k).
- s. Repeat steps (n) through (r) several times until no further adjustment of coils and trimmers is necessary.

DATE _____
SH. 8 OF 14
COMPILED BY _____

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE RFE-1

JOB 028/66

APPROVED

- t. Set driver band switch to 8-16 mcs. position.
- u. Set driver tuning at point No. 1.
- v. Apply drive slowly at 8 mcs. (single tone)
- w. Tune T203 and T206 to the peak indication on multimeter.
- x. Set driver tuning at point No. 9 and apply drive slowly at 16 mcs (single tone).
- y. Tune trimmers C204 and C211 to the peak indication on the multimeter.
NOTE: Check for oscillation as in the note after step (k).
- z. Repeat steps (n) through (y) several times until no further adjustment of coils and trimmers is necessary.
- aa. Set driver switch to 16-32 mcs. position.
- bb. Set driver tuning at point No. 1.
- cc. Apply drive slowly at 16 mcs. (single tone)
- dd. Tune L208 and T207 to the peak indication on multimeter.
- ee. Set driver tuning at point No. 9 and apply drive slowly at 32 mcs. (single tone).
- ff. Tune trimmers C203 and C210 to the peak indication on the multimeter.
NOTE: Check for oscillation as in the note after step (k)
- gg. Repeat steps (aa) through (ff) several times until no further adjustment of coils and trimmers is necessary.
- hh. Lock all coils observing the multimeter.
- ii. Push in Interlock switches (S204, 205). Turn OFF transmitter plates switch.

NOTE: It is of the utmost importance that the driver chassis be aligned with great care. Inadequate gain in these stages will produce an appreciable amount of distortion.

DATE 9 14
SH. OF
COMPILED BY

TMC SPECIFICATION NO. S 10101

TITLE:

JOB 028/66

APPROVED

G. Neutralization of P.A.

WARNING: Be certain that overload breaker stays in OFF position throughout the neutralization process.

- a. Turn ALDC Adj. to extreme counter clockwise position.
- b. Connect VTVM to the plates of power amplifiers.
- c. Connect R.F. load and set P.A. loading at point No. 0.
- d. Disconnect lead from C215 and place a jumper wire across C249.
- e. Pull out Interlock switches (S204, 205), turn on S103.
- f. Apply drive at 32 mcs. (single tone), tuning the driver stages to the peak meter indication in RF DR position. Adjust the drive control to 20 V on multimeter.
- g. Set PA bandswitch to 24-32 position.
- h. Tune P.A. tuning to peak indication on R.F. VTVM.
- i. Adjust P.A. neutralizing capacitor C214 each time retuning P.A. tuning to the peak until the reading on VTVM is approximately 0.9 volts RMS. Tighten locknut on capacitor rotor.
- j. Apply drive at 16mcs and tune the driver stages to the peak indication in RF DR position. Adjust the drive control till 20 V on multimeter is obtained.
- k. Set the P.A. band switch to 16-24 mcs. position.
- l. Tune P.A. tuning to the peak indication on RF VTVM; the reading must not exceed 1 V RMS.
- m. Set up the unit at 2 mcs. The reading on VTVM must not exceed 1 V RMS. If more than 1 V RMS, readjust the neutralizing capacitor C214 and recheck at 32 mcs.
- n. Turn off S103, disconnect VTVM, remove R.F. drive and disconnect jumper wire across C249.
- o. Push in the Interlock switches (S204, 205).
- p. Connect the feedback cable to C215.

DATE
SH. 10 OF 14

COMPILED BY

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED

H. Adjustment of P.A. Bias

- a. Be certain that V203 Bias and V204 Bias control potentiometers are in extreme counter clockwise position, and that mode switch is in SSB position.
- b. Disconnect the exciter from J202.
- c. Turn on the transmitter plates switch and pull out the Interlock switches S204, 205.
- d. Turn on the high voltage breaker.
- e. Turn V203 Bias control potentiometer slowly clockwise until the PA plate current will read 125 ma and lock the potentiometer.
- f. Turn V204 Bias control potentiometer slowly clockwise until the PA plate current will read 220 ma and lock the potentiometer.
- g. Set the multimeter switch to PA HV position; the multimeter must read approximately 2000 VDC.
- h. Turn off the transmitter plates switch.

I. Spurious Test

NOTE: Do not connect driver to the unit for this test; this test.

- a. Turn on the transmitter plates switch and pull out the Interlock switches S204, 205.
- b. Turn on the high voltage breaker.
- c. Tune the driver stages and the PA at approximately 2 mcs., move tuning knobs slightly, observing PA plate current and RF DR.
- d. Continue to rotate driver tuning and PA tuning knobs throughout the band keeping the driver tuning frequency and the PA plate frequency approximately the same. Switch bands and check all frequencies until 32 mcs.

NOTE: If there is a sudden jump in PA plate current and RF DR during the tests in (c) and (d):

1. Determine the parasitic frequency.
2. If it is grid to plate oscillation, then the unit must be reneutralised.

DATE _____
SH. 11 OF 14
COMPILED BY _____

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE, RFE-1

JOB 028/66

APPROVED _____

J. P.A. performance and Intermodulation

Distortion Test

- a. Set up the equipment as described in paragraph 3b.
- b. Set up the unit for all operations, using two tone signal from exciter; set the band switches as per chart below; the voltage across the 50 ohm load must be 160 V as measured with Hewlett Packard VTVM.

The third and fifth order products may not be less than 40 db below fundamental tones.

F	Driver Band	PA Band
2	2 - 4	2.0 - 2.5
2.5	2 - 4	2.5 - 3.0
3.0	2 - 4	3.0 - 4.0
4.0	4 - 8	4.0 - 6.0
6.0	4 - 8	6.0 - 8.0
8.0	8 - 16	8.0 - 12
12	8 - 16	12 - 16
16	16 - 32	16 - 24
24	16 - 32	24 - 32
32	16 - 32	24 - 32

The multimeter reading must be as follows at each frequency:

Sw. Pos.	Value
ISG	-8 to -10 ma
RF DR	8 to 15 V
RF rL	appx. 800 V
RF QUT	appx. 160 V

- c. If the above test is acceptable proceed immediately to the next test.

K. ALDC Adjustment

- a. While the unit is still fully tuned at some frequency, turn slowly clockwise the ALDC adjustment potentiometer until the output will just begin to drop off.
- b. Increase the drive from the exciter, the output must increase only slightly.
- c. Turn off all the power.

Units which have met the specifications above must be prepared for shipment; cover plates, loose items etc.

One copy of report sheet must accompany each Mod 1 RFE-1

DATE SH. <u>12</u> OF <u>14</u>	TMC SPECIFICATION NO. S 10101
COMPILED BY	TITLE: TEST PROCEDURE, RFE-1
JOB 028/66	

APPROVED

Model RFE-1
TEST REPORT SHEET

ACCEPT

- | | |
|---|-------|
| A. GENERAL INSPECTION | _____ |
| B. BLOWER WIRING | _____ |
| C. RESISTANCE CHECK | _____ |
| D. INITIAL POWER CHECK | _____ |
| E. VOLTAGE CHECK | _____ |
| F. ALIGNMENT OF DRIVER CHASSIS | _____ |
| G. NEUTRALIZATION OF P.A. | _____ |
| H. ADJUSTMENT OF P.A. BIAS | _____ |
| I. SPURIOUS TEST | _____ |
| J. P.A. PERFORMANCE AND INTERMODULATION
PERFORMANCE TEST | _____ |
| K. ALDC ADJUSTMENT | _____ |

SERIAL NUMBER _____ MFG. NUMBER 30777-3

4CX350A#

V203, R20L7038

V204, R20L8102

DATE 30 May 73 TESTED BY R. Patterson

DATE
SH. 13 OF 14
COMPILED BY

TMC SPECIFICATION NO. S 10101

TITLE: TEST PROCEDURE RFE-1 JOB 028/66

APPROVED

RFE-1 D.C. VOLTAGE TEST:

A. Pull out Interlocks (S204, S205) turn on transmitter plates switch and measure the following voltages:

B. Pin C of V203 with Mode Switch \uparrow n:

SSB - 51 V. (Approx -50 V)

CW - 25 V. (About -25V)

C. C. Pin 2 of V201 to ground: - 150 V (-147 to -163 V)

FROM	VOLTS	TOLERANCE
Plate Cap V202	120	90 to 150V
Pin 6 of V201	120	90 to 150V
Pin 3 of V202	74	50 to + 110V
Pin 4 of V202	110	-110 to -130V
Pin 5 of V202	150	-130 to -155V
Pin 2 of V201	150	-145 to -165V
Pin 1 of V201	150	-140 to -155V

APPROVED _____

PA Performance and Intermodulation Test

MULTIMETER

Freq mc	Driver Band	PA Band	ISG ma	RF.DR. volts	RF.PL. volts	RF.Out volts	PA Plate current ma	Dist. db*
2	2-4	2-2.5	-9	9	975		390	43
2.5	2-4	2.5-3.0	-9	9	800		375	40
3.0	2-4	3.0-4.0	-10	9	800		380	40
4.0	4-8	4.0-6.0	-10	8	850		360	45
6.0	4-8	6.0-8						
3.0	8-16	8-12	-10	8	825		380	45
12	8-16	12-16	-10	8	750		390	43
16	16-32	16-24						
24	16-32	24-32	-10	8	850		390	42
32	16-32	24-32						

160W / 50 Ohms

* Third and fifth order products down from one tone.

