

CHAPTER 3
SCHEDULED TESTS AND SERVICING

3-1. INTRODUCTION.

This chapter contains scheduled tests and servicing information necessary to ensure optimum performance and reliability of Antenna Coupler Group AN/SRA-22.

Section 3-2 contains a maintenance requirement index that schedules the procedure for regular periods (daily, weekly, and such). In addition to scheduling the procedures, the maintenance requirement index specifies the rate and time expected to perform the procedures, as well as any related procedures pertaining to other equipment that should be performed at the same time.

Section 3-3 contains the scheduled tests and servicing procedures. These procedures include the following:

- a. A list of special tools, test equipment, and materials necessary.
- b. Preliminary procedures or initial set-up of equipment, associated equipment, and test equipment.
- c. A step-by-step test procedure containing maintenance standard test indications that represent optimum performance.
- d. Corrective measures to be taken when the maintenance standard test requirements cannot be fulfilled.

Note

This equipment should not be energized daily for the sole purpose of making daily checks. The equipment should, however, be energized at least twice a week and at least two days before getting underway.

3-2. MAINTENANCE REQUIREMENT INDEX.

Table 3-1 is a maintenance requirement index that schedules maintenance procedures for regular periods.

TABLE 3-1. MAINTENANCE REQUIREMENT INDEX

FREQ CODE	MAINTENANCE REQUIREMENT	CARD NO.	RATE REQ'D	MAN HRS	RELATED MAINT.
*D-1	(1) Measure forward power, reflected power, and VSWR for frequency in use.		RM3	0.05	
W-1	(1) Check Antenna Coupler CU-714/SRA-22 pressurization. (2) Inspect cables and hardware.		RMSN	0.05	
**W-2	(1) Record forward power, reflected power, and VSWR over frequency range.		RM3	0.02	C-25, Q1
M-1	(1) Record input voltage to Antenna Coupler Control C-2698/SRA-22.		ET3	0.1	
M-2	(1) Clean and inspect interior and exterior of Antenna Coupler Control C-2698/SRA-22.		RMSN	0.01	C-25, M9

* Requires operation of associated transmitter.

** Readings obtained will be used in AN/XXX check C-25, Q1.

TABLE 3-1. (Continued)

FREQ CODE	MAINTENANCE REQUIREMENT	CARD NO.	RATE REQ'D	MAN HR'S	RELATED MAINT.
Q-1	(1) Record control voltages at terminal board TB-5.		ET3	0.2	
*A-1	(1) Verify calibration of forward and reflected power indication of r-f power meter.		ET3	0.1	
A-2	(1) Lubricate gear assembly of Antenna Coupler CU-714/SRA-22. (2) Clean and inspect Antenna Coupler Cu-714/SRA-22.		ET3	1.0	

* Requires operation of associated transmitter.

3-3. MAINTENANCE REQUIREMENT DESCRIPTION.

SYSTEM	COMPONENT	M. R. NUMBER
Communications	AN/SRA-22	C-26 D-1
SUB-SYSTEM	RELATED M. R.	RATE
Radio		RM3
MAINTENANCE REQUIREMENT:	TIME(HR)	
Measure forward and reflected power for frequency in use.	0.05	

PRELIMINARY:

1. Energize the associated transmitter in order to apply power to Antenna Coupler Group AN/SRA-22.
2. Place LOAD-ANT switch in the LOAD position and tune the associated transmitter to the designated frequency.
3. Unkey the transmitter. Turn the EXCITER GAIN control to minimum (CCW) position. Turn the LOAD-ANT switch to the ANT position.

TEST PROCEDURE:

1. Pre-set the AN/SRA-22 COIL and TAP dials, the CAPACITOR 12-position switch, and the SERIES-SHUNT switch to the values previously determined to be correct for the frequency in use.
2. Hold the TUNE-OPERATE switch in the TUNE position until the CAPACITOR RUN light goes out.
3. Holding the TUNE-OPERATE switch in the TUNE position, operate the COIL and TAP levers to zero the position meters.
4. Place the FORWARD-REFLECTED switch in the FORWARD 1000 position. Place the transmitter in CW (or AM with no modulation). Key the transmitter and advance the EXCITER GAIN control to produce an indication of 500 watts on the r-f power meter.
5. Operate the FORWARD-REFLECTED power switch to the REFLECTED position (first 1000, then 100) and record the reflected power.
6. Determine the VSWR from the chart, figure 3-1. VSWR should not exceed 1.3 to 1.

CORRECTIVE MEASURES:

1. If FORWARD power does not reach 500 watts*, trouble is indicated in the transmitter.
2. If the VSWR is more than 1.3 to 1, the AN/SRA-22 should be retuned, and new tuning chart values entered. The change may be related to difference of position of objects in proximity to the antenna.
3. If the VSWR cannot be reduced below 1.3 to 1, or the VSWR protective device trips repeatedly, check for open or shorted leads to the coupler and antenna, grounded antenna, or inadequate ground on the coupler case. Otherwise trouble is indicated inside the coupler or coupler control.

*When used with AN/XXX transmitter or similar.

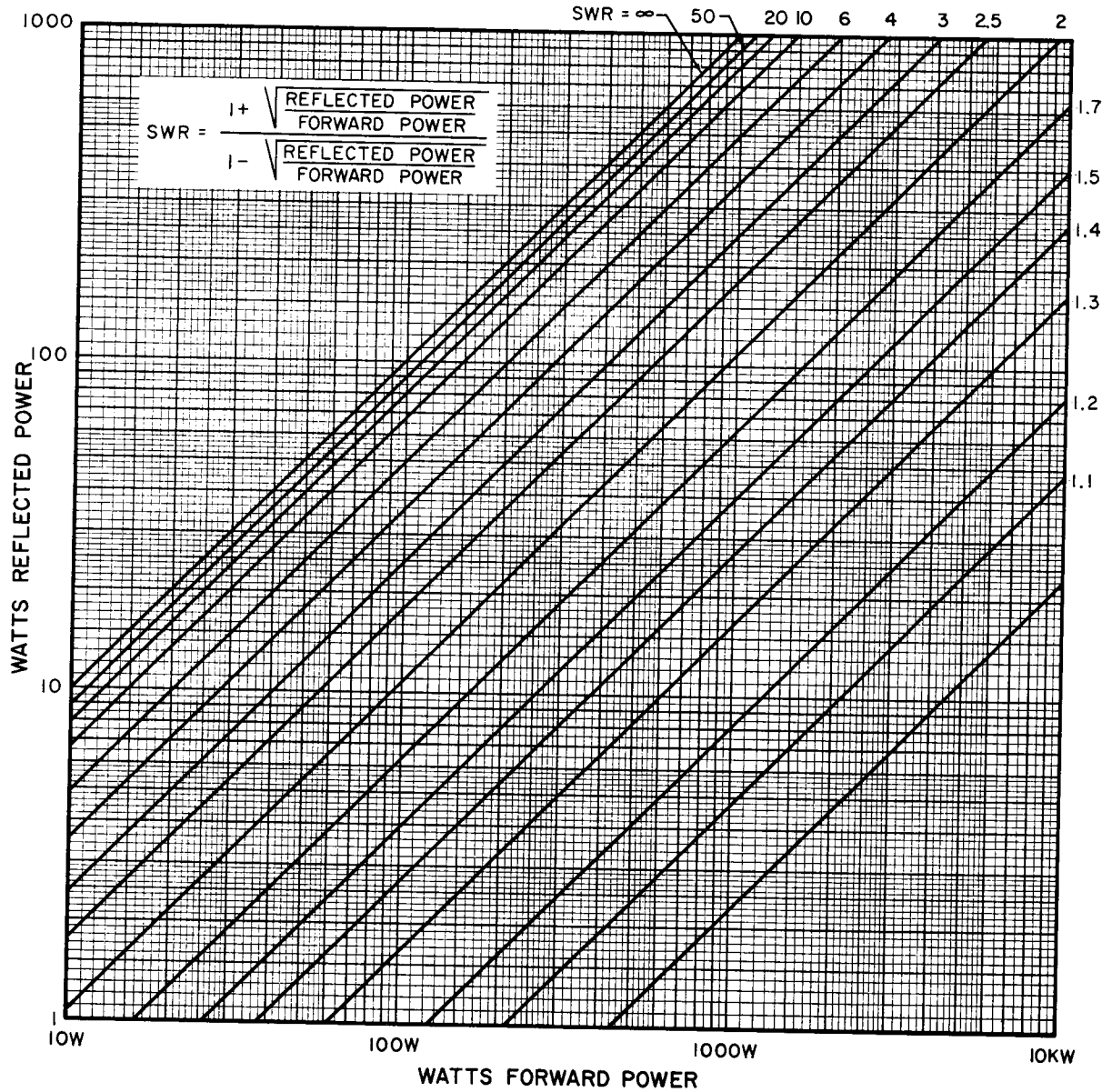


Figure 3-1. Relationship of SWR to Incident and Reflected Power

SYSTEM	COMPONENT		M. R. NUMBER	
Communications	AN/SRA-22		C-26	W-1
SUB-SYSTEM	RELATED M. R.	RATE	TIME (HR)	
Radio		RMSN	0.05	
MAINTENANCE REQUIREMENT:				
Clean and inspect Antenna Coupler CU-714/SRA-22.				

PRELIMINARY:

De-energize and tag associated transmitter before performing work on the antenna coupler group.

TEST PROCEDURE:

1. Check pressure gauge on front of Antenna Coupler CU-714/SRA-22. Gauge should indicate approximately 10 pounds per square inch gauge pressure.
2. Inspect cables and plugs on front of CU-714/SRA-22 for visible signs of breaks or damage. Check gaskets for evidence of damage.
3. Inspect bowl insulator for cracks, paint, or dirt. Clean bowl insulator with a detergent and water solution, exercising care to avoid damaging glazed surface.
4. Check that ground strap on case is properly installed and not loose or broken (see figure 7-5).

CORRECTIVE MEASURES:

If corrective measures other than cleaning are needed, notify the appropriate electronic repair force.

SYSTEM	COMPONENT		M. R. NUMBER	
Communications	AN/SRA-22		C-26	W-2
SUB-SYSTEM	RELATED M. R.	RATE	TIME (HR)	
Radio			0.1	
MAINTENANCE REQUIREMENT.				
Over operating frequency range: (1) record forward power; (2) record reflected power.				
TOOLS, TEST EQUIPMENT, MATERIALS:				
DA-91A/U Dummy Load.				

PRELIMINARY:

1. Energize the associated transmitter to apply power to Antenna Coupler Group AN/SRA-22.
2. Place LOAD-ANT switch in LOAD position and tune the associated transmitter in accordance with Technical Manual to designated frequency.
 - Test 1. Approximately 2.0 megacycles.
 - Test 2. Approximately 4.3 megacycles.
 - Test 3. Approximately 8.9 megacycles.
 - Test 4. Approximately 18.1 megacycles.
3. Unkey transmitter and turn EXCITER GAIN on transmitter to minimum (CCW) position.

CAUTION

To protect transmitter and coupler against damage, do not key transmitter again until loading is approximately correct.

TEST PROCEDURE:

1. Set C-2698/SRA-22 controls to the following initial positions:
 - a. LOAD-ANT switch to ANT.
 - b. CAPACITOR SERIES-SHUNT switch to SHUNT.
 - c. CAPACITOR 12-position switch to 1.
 - d. R-f power meter switch to 1000 REFLECTED.
 - e. TUNE-OPERATE switch to TUNE.
 - f. COIL and TAP dial at 100.
 - g. Operate COIL and TAP TUNE levers to center meters.

- Set COIL dial to proper limiting value for frequency range:

FREQUENCY	COIL DIAL SETTING
2 to 6 megacycles	500
6 to 12 megacycles	350
12 to 16 megacycles	250
16 to 32 megacycles	200

3. Key transmitter and slowly advance EXCITER GAIN control on transmitter to obtain an r-f power meter reading. Meter switch may be reduced to 100 REFLECTED for more sensitive reading. KEEP TRANSMITTER POWER LOW: DO NOT EXCEED 125 WATTS FORWARD POWER.

4. Operate the COIL COARSE TUNE-FINE TUNE lever in the direction required to obtain a dip in reflected power as indicated by the r-f power meter. DO NOT GO ABOVE CENTER ZERO ON COIL METER. If no dip is found before the coil meter reaches zero, adjust the coil tuning to 130 on COIL dial and proceed to the next step.

5. Advance the 12 position CAPACITOR switch one position at a time, waiting for the CAPACITOR run lamp to go out before keying the transmitter. Watch for a dip in reflected power. If no dip is detected by the time position 12 is reached, operate the CAPACITOR SERIES-SHUNT switch to SERIES, and reduce the CAPACITOR switch one position at a time, watching the reflected power for a dip.

6. When a dip is noticed, switch the r-f power meter to FORWARD and verify that forward power is still good. Return the r-f power meter switch to REFLECTED.

7. Once the dip is found, operate the COIL and TAP TUNE switches to reduce the reflected power to less than 100 watts (100 REFLECTED position).

8. Place the TUNE-OPERATE switch in OPERATE, r-f power meter switch to 1000 FORWARD. Advance EXCITER GAIN control on the transmitter to produce a reading of 500 watts*.

9. Operate the r-f power meter switch to the REFLECTED position. Observe and record the reflected power and refer to chart (figure 3-1) to determine VSWR.

10. Repeat steps 1 through 9 for each frequency range.

CORRECTIVE MEASURES:

1. If FORWARD power does not reach an indicated 500 watts* on advancing the transmitter EXCITER GAIN, verify that r-f power meter calibration is correct (see M. R. C. Step A-1). Otherwise, trouble is indicated in the transmitter*.

2. If VSWR cannot be reduced below 1.3 to 1, or protective device trips out, trouble is indicated in the antenna, antenna lead, CU-714 coupler, or coupler ground connection.

SYSTEM	COMPONENT	M. R. NUMBER
Communications	AN/SRA-22	C-26 M-1
SUB-SYSTEM	RELATED M. R.	RATE
Radio		ET3
		TIME (HR)
		0.1

MAINTENANCE REQUIREMENT:

Record input voltage to Antenna Coupler Control C-2698/SRA-22.

TOOLS, TEST EQUIPMENT, MATERIALS:

AN/PSM-4 or equivalent.

PRELIMINARY:

Remove screws which secure the cover of terminal board TB-5.

TEST PROCEDURE:

- Set multimeter to the 200-volt (or equivalent) scale, ac function.
- Turn on transmitter low voltage power supply and allow 40 seconds warm-up.

CAUTION

Do not let hand come in contact with terminals on TB-5 or bare test equipment leads test.

*When AN/SRA-22 is used with AN/XXX transmitter. Other values may apply when used with other equipments.

3. Measure voltage between terminals 13 and 24 of terminal board TB-5. Voltage should be 115 volts ac \pm 12 volts.

CORRECTIVE MEASURES:

If voltage is not present, check fuse 2F1, plug 2P6, and transmitter fuses and ac supply.

SYSTEM	COMPONENT		M. R. NUMBER	
	RELATED M. R.	RATE	C-26	M-2
Communications	AN/SRA-22			
SUB-SYSTEM			TIME (HR)	
Radio	C-25	M-9	RMSN	
			0.1	

MAINTENANCE REQUIREMENT:

Clean and inspect interior and exterior of Antenna Coupler Control C-2698/SRA-22.

TOOLS, TEST EQUIPMENT, MATERIALS:

1. Vacuum cleaner
2. Duster brush
3. Wiping cloth
4. Cleaning solvent

PRELIMINARY:

1. De-energize and tag associated transmitter to remove power before performing work on antenna coupler control.
2. Remove the two screws which mount the right side of the coupler control to the transmitter rack. Swing coupler control out.

CAUTION

Exercise care to avoid damaging cables attached to rear of coupler control. Cables may be disconnected temporarily to facilitate servicing.

3. Remove dust cover from coupler control by releasing Dzus fasteners on each side and lifting cover clear.

PROCEDURE:

1. Inspect for dust or lint accumulation. Loosen dirt with duster brush and remove with vacuum cleaner, being careful to avoid damaging wires and components.
2. Inspect interior of coupler for loose or frayed insulation, damaged components, and wear caused by operation or vibration.
3. Wipe panel clean with a soft cloth moistened with detergent and water.

CAUTION

Do not let cleaning solution wash dirt into switch contacts and insulation.

4. Inspect panel knobs and switches for looseness or improper indexing. Check panel meters for broken glass, damaged pointers, or movements.
5. On completion, replace dust cover, latch Dzus fasteners. Secure coupler control to transmitter rack.

CORRECTIVE MEASURES:

For any action required other than cleaning or tightening loose knobs and hardware, notify the appropriate repair personnel.

SYSTEM Communications	COMPONENT AN/SRA-22		M. R. NUMBER	
	SUB-SYSTEM Radio	RELATED M. R.	RATE ET3	TIME (HR) 0.2

MAINTENANCE REQUIREMENT:

Record control voltages at terminal board TB-5 of Antenna Coupler Group AN/SRA-22.

TOOLS, TEST EQUIPMENT, MATERIALS:

AN/PSM-4 or equivalent.

PRELIMINARY:

1. Remove the two screws which mount the right side of Antenna Coupler Control C-2698/SRA-22 to the transmitter rack; swing antenna coupler out.
2. Remove cover from terminal board TB-5.

TEST PROCEDURE:

1. Energize the transmitter low voltage power supply; allow 40 seconds for warm-up.
2. Operate the capacitor 12-position switch to each position. Hold the TUNE-OPERATE switch in the TUNE position and measure the control voltage between terminal 24 (ac common) and each of the TB-5 terminals indicated. Voltage should measure 115 volts ac \pm 12 volts.

SWITCH POSITION	TERMINALS
1	2, 3
2	1, 2
3	1, 4
4	3
5	2
6	1
7	4
8	3, 4
9	2, 3, 4
10	1, 2, 3
11	1, 2, 4
12	1, 3, 4

3. Operate the CAPACITOR SERIES-SHUNT switch and measure the control voltage at TB-5 between terminal 24 (ac common) and the terminals indicated. Voltage should be 115 volts ac \pm 12 volts. Hold TUNE-OPERATE switch in TUNE.

SWITCH POSITION	TERMINALS
SHUNT	6
SERIES	7

4. Operate the COIL and TAP control levers and measure the control voltage at TB-5 between terminal 24 and the terminals indicated. Voltage should measure 115 volts ac \pm 12 volts. Hold TUNE-OPERATE switch in TUNE.

SWITCH POSITION	TERMINALS
COIL (MAX OR MIN)	22, 23
TAP (MAX OR MIN)	20, 21

5. Set the multimeter to the 50-volt dc scale and measure the voltage between terminals 12 (ground) and 5 (+24 volts) of TB-5. Voltage should measure 24 volts dc \pm 4 volts.
6. Set the multimeter to the 25-volt dc scale and measure the voltage between terminal 12 (ground) and terminal 9 (+ 12 volts) of TB-5. Voltage should measure 12 volts dc \pm 3 volts.

CORRECTIVE MEASURES:

1. If ac values are absent, check fuse 2F1, TUNE-OPERATE switch, and transmitter fuses.
2. If ac values are absent only on some pins, check associated control switches.
3. If dc values are absent (or read ac), check 2CR1, 2CR2, and related power supply circuitry.

SYSTEM	COMPONENT		M. R. NUMBER	
	RELATED M. R.	RATE	C-26	A-1
Communications	AN/SRA-22			
SUB-SYSTEM			TIME (HR)	
Radio		ET3	0.1	

MAINTENANCE REQUIREMENT:

Verify calibration of FORWARD and REFLECTED power indication of R-F WATTMETER.

TOOLS, TEST EQUIPMENT, MATERIALS:

1. Dummy Load DA-91A/U or DA-88A/U.
2. Electronic Voltmeter AN/USM-143 or Hewlett-Packard 400H.

PRELIMINARY:

1. Connect antenna coupler control to dummy load through coaxial T-connector.
2. Energize electronic voltmeter.

TEST PROCEDURE:

1. Operate LOAD-ANT switch 2S1 to LOAD position. Energize and tune transmitter into dummy load according to standard tuning procedure.
2. Operate FORWARD-REFLECTED power switch 2S7 to 1000 FORWARD. Key transmitter and note power reading.
3. Operate electronic voltmeter to AC VOLTS position. Key transmitter and measure r-f voltage on open branch of coaxial T-connector. Calculate power using formula $P = \frac{E^2}{51.5}$ and compare with reading of r-f power meter 2M3.
4. Unkey the transmitter and interchange input connector 2P1 with output connector 2P2. Operate FORWARD-REFLECTED power switch 2S7 to the REFLECTED position.
5. Key transmitter and note power reading. The r-f power meter should read the same as in step 2.
6. Unkey the transmitter and restore input and output connections to proper jacks; remove T-connector from the output cable.

CORRECTIVE MEASURES:

1. If the r-f power meter reading obtained in step 5 does not agree with the reading obtained in step 2, check diodes 2CR-1, 2CR-2; metering resistors 2R-4 and 2R-5; and switch 2S-5. Otherwise 2C-1 and 2C-2 may be out of adjustment and require laboratory calibration.
2. If the power readings obtained in steps 2 and 5 above do not agree with the calculated value of step 3, check switch 2S-1, relay 2K-3, coaxial cables, and connectors.

SYSTEM	COMPONENT		M. R. NUMBER	
	RELATED M. R.	RATE	C-26	A-2
Communications	AN/SRA-22			
SUB-SYSTEM			TIME (HR)	
Radio		ET3	1.0	

MAINTENANCE REQUIREMENT:

1. Clean and inspect Antenna Coupler CU-714/SRA-22.
2. Lubricate gear assembly of Antenna Coupler CU-714/SRA-22.

TOOLS, TEST EQUIPMENT, MATERIALS:

1. Cleaning solvent.
2. Lubricating oil, MIL-L-7870a.

PRELIMINARY:

1. De-energize and tag associated transmitter before performing work on Antenna Coupler CU-714/SRA-22.
2. Remove plug 1P7 and coaxial plug 1P8 from connections on antenna coupler unit.
3. Free the 12 captive screws holding the antenna coupler in the case. Pull the unit out of the case and remove it to a suitable work location.

PROCEDURE:

1. Make a visual check for loose, worn, or broken hardware; heat damage; and corrosion.
2. Check electrical connections to 1J7 and 1J8 on front, and 1P10 at rear of coupler unit for evidence of damage. Clean as necessary.
3. Apply two drops of MIL-I.-7870a oil to the oil wick (373) (see figure 6-1) in small hole on planetary gear assembly of potentiometer R6.

Note

Only the gears and bearings lubricated by the oil wick require lubrication.

4. On completion of cleaning and lubricating:
 - a. Return the antenna coupler unit to the case, making sure that 1P9 and 1P10 line up properly and cable to blower motor section is dressed clear of coupler unit.
 - b. Secure unit to the case with the 12 captive screws, making sure that gasket seats properly.
 - c. Replace 1P7 and 1P8 in their connections and seal securely against moisture.
 - d. Pressurize the coupler unit and check for leaks (refer to Section 7-4).

CORRECTIVE MEASURES:

1. If inspection indicates need for replacement of a part, refer to appropriate sections of instruction book for procedure.
2. If leaks exist on checking pressurization, gaskets may be sealed with Adhesive Sealant RTV-102 (FSN KE 8040-225-4548) or replaced with 1/8-inch gasket material (KZ 5330-244-9277). See figure 7-7.