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STATION, RADIO, A510

TECHNICAL HANDBOOK - INSPECTION STANDARDS

INTRODUCTION

1. This regulation details the inspection standards to be observed during field inspection and after field or base repair.
2. Departure from these standards will not be permitted unless authorized by War Office or DEME of the overseas theatre concerned.
3. These standards cover the following aspects of inspection:-

- (a) **Field inspection schedule.** This details the tests and test methods to be carried out when inspecting equipment in the hands of troops. The limits and tolerances quoted also will be observed as minimum field repair standards.
- (b) **Field inspection record.** This is for the use of an examiner when inspecting equipment in the hands of troops, or after field repair.
- (c) **Base inspection schedule.** To avoid repetition this schedule has been omitted. Where necessary direct reference to the equipment EMERs is included in the base inspection record.

- (d) **Base inspection record.** This details the standards to be observed during base repair and subsequent inspection of the equipment. The standards will apply to all base workshops, and will be used as a guide by other workshops engaged in repair, and during the inspection of depot stocks.

References

4. TELS A 619 - EMER specification for inspection standards, telecommunications equipment.
- TELS A 760 - Repainting of electronic equipment
- TELS A 779 - General standard for the overhaul of electronic equipment
- TELS F 560-9 - Station, radio, A510

FIELD INSPECTION SCHEDULE

Introduction

5. This part of the regulation is to be used when inspecting equipment in the hands of the troops. The field inspection record gives the condemnation limits beyond which the equipment will not carry out its task efficiently.
6. Using these condemnation limits as the standard, examiners should classify the equipment in accordance with the latest ACI. When the equipment is serviceable but barely satisfies the minimum standards in the field inspection record the symbol 'O' must be used to indicate that the equipment should be kept under observation with facilities available. If the facilities are not available to the unit the equipment may have to be downgraded. In borderline cases, particularly where quantitative measurements are not given, the final assessment must be based on the examiner's experience and judgment using the standard as a guide.

This being a sealed equipment, inspection is restricted to the examination of external components and to those tests which can be applied to input and output connections.

General specification

7. The equipment and all accessories will be inspected for general cleanliness and will be free from moisture and fungoid growth.
8. Paintwork will be free from cracking, chipping or flaking. Where patch painting has been carried out uniformity of colour need not be considered.
9. Panel components and controls will be securely mounted and functional.
10. Accessories and station spares will be complete and serviceable.

11. Outstanding modifications will be recorded.

Z4/6625-99-949-0510 Wattmeter, absorption AF, No 1

**Electrical tests**

Z4/10S/831 Oscilloscope, type 13A

12. The electrical tests are detailed in the field inspection record. Further information regarding method and test conditions is given in Tels F 564.

Z4/6625-99-949-0470 Voltmeter, valve, No 3, equipment

**Test equipment**

\* 60dB attenuator

13. The following test equipment and accessories will be required:-

\* 75Ω dummy load

\* 2kΩ dummy load

ZD/02674 Signal generator, No 12  
ZC/1411 Frequency meter, SCR 211

\* For further details see Tels F 564

**FIELD INSPECTION RECORD**

14. In the following particulars paragraph numbers refer to Tels F 564.

Item	Test	Specification limits			Result
		Min	Max	Unit	
<b>GENERAL</b>					
1	Cleanliness	-	-	-	
2	Paintwork	-	-	-	
3	Components and controls	-	-	-	
4	Accessories and station spares	-	-	-	
5	Modifications	-	-	-	
<b>RECEIVER</b>					
6	<b>R.F.sensitivity (para 52)</b> Connect S.G.12 (X1, 75Ω) to aerial socket and earth; a.f. wattmeter (100Ω) to contacts 4 and 5 of SKT2. Tune S.G.12 to 2Mc/s and receiver for maximum output A.F. output for 5μV input	200	-	μW	
7	<b>Signal-to-noise ratio (para 53)</b> Conditions as for item 6. Adjust input to produce 200μW output switch off modulation Residual noise Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high band)	-	20	μW	
8	<b>Dial calibration (para 51)</b> Conditions as for item 6. Check calibration of frequency dial at each Mc/s point Low band High band	-	50	kc/s	
		-	100	kc/s	
<b>TRANSMITTER</b>					
9	<b>R.F. output - low impedance (para 59 and 60)</b> Check that the crystals are inserted in their respective positions. Connect a 75Ω dummy load and V.V.3 between aerial socket and earth. Set A-B NET to B, CRYSTAL to 1, MATCHING to 0 and control switch to CW. With key depressed tune for maximum output				

Item	Test	Specification limits			Result
		Min	Max	Unit	
10	Output voltage	6.14	-	V	
	Switch to VOICE				
	Output voltage reference c.w. output	43	56	%	
	Repeat at crystal positions 2, 3 and 4				
11	<b>R.F. output - high impedance (para 61)</b>				
	Replace 75Ω load with 2kΩ load. Set A-B-NET to A, CRYSTAL to 1 and control switch to CW. Tune for maximum output on AERIAL TUNE METER				
	Output voltage	32	-	V	
	Switch to VOICE				
12	Output voltage reference c.w. output	45	65	%	
	<b>Modulation sensitivity (para 62)</b>				
	Conditions as in item 10 but with C.R.O. in place of V.V.3. Connect B.F.O. No 8 via attenuator to contacts 1 and 4 of SKT2. On VOICE, adjust B.F.O. No 8 to give approximately 50-80% modulation pattern. Adjust frequency of B.F.O. No 8 to produce maximum depth of modulation				
	Frequency	900	1500	c/s	
13	At this frequency, adjust B.F.O. No 8 output to give 100% modulation				
	B.F.O. output	30	-	V	
	<b>FUNCTIONAL</b>				
	<b>Netting</b>				
14	On receive and net, tune receiver to sender crystal frequency				
	Zero-beat to be heard in phones				
13	Clear audio tone either side of zero				
	<b>Dial lock</b>				
14	Net as in item 12. Operate dial lock four times				
	Netting signal must not be lost				
14	<b>Pilot lamps</b>				
	Illuminate as detailed below				
		Switch positions		Lamp	
		Control	A-B-NET		
		CW	All	Sender	
		R	A & B	Receiver	
		R	Net	Both	
		VOICE	All	Sender	

BASE INSPECTION RECORD

15. The specification figures quoted are based on measurements made using the test equipment detailed in Tels F 564 Tables 1 and 2.

16. In the following particulars paragraph numbers refer to Tels F 564.

Item	Test	Specification limits			Result
		Min	Max	Unit	
	<b>GENERAL</b>				
1	The general condition will be in accordance with Tels A 779				
	<b>RECEIVER</b>				
2	<b>Audio sensitivity (para 46)</b> Connect a.f. wattmeter (100Ω) to contacts 4 and 5 of SKT2; B.F.O. No 8, V.V.3. and 40dB attenuator to pin 3 of V5 via 0.5μF capacitor Input at 1kc/s for output of 200μW	-	0.2	V	
3	<b>Audio response (para 47)</b> Conditions as for item 2 Output at 0.3kc/s Output at 3kc/s Reference input at 1kc/s to produce 200μW	50 63	- -	μW μW	
4	<b>I.F. sensitivity (para 48)</b> Connect S.G.12 (X1, 75Ω) via 0.1μF capacitor to pin 6 of V2; a.f. wattmeter (100Ω) to contacts 4 and 5 of SKT2 Modulated input for 200μW output (Note actual input) Frequency for maximum output	-	50	μW	
5	<b>I.F. selectivity (para 49)</b> Conditions as for item 4. Increase input by 6dB. Tune S.G.12 to each side of resonance where output falls to 200μW Bandwidth Repeat with input increased by 60dB Bandwidth	454 4.95 22.5	456 6.05 27.5	kc/s kc/s kc/s	
6	<b>Heterodyne oscillator (para 50)</b> Conditions as for item 4. Tune S.G.12 for maximum a.f. output, adjust input to give 200μW. Switch off modulation, plug phones into SKT2 and key into SKT3 Beat note	-	1	kc/s	
7	<b>Dial calibration (para 51)</b> For this and following tests, insert receiver into case. Couple frequency meter to aerial socket and check calibration of frequency dial at each Mc/s point Low band High band	- -	50 100	kc/s kc/s	
8	<b>R.F. sensitivity (para 52)</b> Connect S.G.12 (X1, 75Ω) to aerial socket and earth; a.f. wattmeter (100Ω) to contacts 4 and 5 of SKT2. Tune S.G.12 to 2Mc/s and receiver for maximum output A.F. output for 5μV input Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high band)	200	-	μW	

Item	Test	Specification limits			Result
		Min	Max	Unit	
9	<b>Signal-to-noise ratio(para 53)</b> Conditions as for item 8. Adjust input to produce 200 $\mu$ W output Switch off modulation Residual noise Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high band)	-	20	$\mu$ W	
10	<b>Second channel rejection (para 54)</b> Conditions as for item 8. At frequencies below, tune S.G.12 and receiver and adjust input to give 200 $\mu$ W output. Retune S.G.12 to image frequency (+0.91Mc/s), increase input to give 200 $\mu$ W output. Check the image ratio at:- 2Mc/s 4.5Mc/s 5Mc/s 10Mc/s	60 46 46 36	- - - -	dB dB dB dB	
11	<b>I.F. rejection (para 55)</b> Conditions as for item 8. Tune S.G.12 to 2Mc/s, output 5 $\mu$ V. Tune receiver for maximum output, adjust gain control to give 200 $\mu$ W output. Retune S.G.12 to 455kc/s Input required to produce 200 $\mu$ W output	50	-	mV	
12	<b>A.G.C. operation (para 56)</b> Conditions as for item 8. Tune S.G.12 to 10Mc/s, output 5 $\mu$ V. Tune receiver for maximum output. Increase S.G.12 output to 50mV, adjust receiver gain for 200 $\mu$ W output. Reduce S.G.12 output to 10 $\mu$ V. A.F. output	20	-	$\mu$ W	
13	<b>Low voltage operation (para 57)</b> At reduced voltages (h.t. 66V, l.t. 1.1V). Replace a.f. wattmeter by phones. Adjust S.G.12 to 5Mc/s, 10 $\mu$ V, modulation depth 30%. Signal in phones and clear netting on both bands				
	<b>TRANSMITTER</b>				
14	<b>R.F. output - low impedance (para 59 and 60)</b> Insert 2, 4.5, 7.5 and 10Mc/s crystals Connect either 75 $\Omega$ dummy load with V.V.3 or wattmeter, h.f., No 2, (52 $\Omega$ , 1W) between aerial and earth. Set A-B-NET to B, CRYSTAL to 1, MATCHING to 0 and control SW to CW. With key depressed, tune for maximum output Output voltage Output power Switch to VOICE Output voltage reference c.w. output Output power reference c.w. output Repeat at crystal positions 2, 3 and 4	6.14 0.5 43 18	- - 56 32	V W % %	
15	<b>R.F. output - high impedance (para 61)</b> Connect 2k $\Omega$ dummy load with V.V.3 between aerial and earth. Set A-B-NET to A, CRYSTAL to 1 and control SW to CW. Tune for maximum output on the AERIAL TUNE METER Output voltage	32	-	V	

Item	Test	Specification limits			Result
		Min	Max	Unit	
16	Switch to VOICE				
	Output voltage reference c.w. output Repeat at crystal positions 2 and 3	45	65	%	
	<b>Modulation sensitivity (para 62)</b> Conditions as in item 15 but with C.R.O. in place of V.V.3. Connect B.F.O. No 8 via 60dB attenuator to contacts 1 and 4 of SKT2. On VOICE, adjust B.F.O. No 8 to give approximately 50-80% modulation pattern. Adjust frequency of B.F.O. No 8 to produce maximum depth of modulation				
17	Frequency	900	1500	c/s	
	At this frequency, adjust B.F.O. No 8, output to give 100% modulation				
	B.F.O. output	30	-	V	
18	<b>Low voltage operation (para 63)</b> Conditions as for item 13 but with low voltage supply h.t. 66V, l.t. 1.1V)				
	Output voltage (c.w.)	4.75	-	V	
	Output power (c.w.)	0.5	-	W	
18	<b>Seal testing (para 64 and 65)</b> Initial pressure 10 lb/sq.in.				
	Time constant	36	-	hr	

EME8c/835

END