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A. *Our editions are **not** identical to the original document. You will find that full advantage has been taken of electronic publishing facilities, so pages are cleaned up where possible (rendering them better than originals in some cases!), and large diagrams are prepared for both on-screen viewing and for easy printing at A4 format.*

Q. Why do you not just give your manuals away, as so many do via the internet these days?

A. *We do make all our manuals available free of charge (in soft copy) to VMARS members. These members have already covered the costs of running the archive via their subscriptions. The only time members are charged for copies is when they request them on paper, in which case charges are restricted to the cost of paper, ink and postage.*

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Despite the above, we will be making copies of essential technical information (circuit diagram, parts list, layout) freely available to all via our website from late 2004 onwards. This will be done to try and encourage and enable the maintenance of our remaining stock of vintage electronic equipment.

Guidance on using this electronic document

Acrobat Reader version

You need to view this document with Acrobat Reader **version 5.0** or later. It is possible that the document might open with an earlier version of the Acrobat Reader (thus allowing you to get this far!), but is also likely that some pages will not be shown correctly. You can upgrade your Acrobat Reader by direct download from the internet at http://www.adobe.com/products/acrobat/readermain.html or going to http://www.adobe.com/ and navigating from there.

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You should note first that virtually all original documents are in double-sided format, i.e. printed on both sides of the paper. Accordingly, our copies are similarly double-sided., and the best results are obtained if the document is printed double-sided. You can print out on one side only, but you will find that you get a number of blank sheets (which can just be removed and reused), and where margins vary in width between left-hand and right-hand pages, there is a danger of the text disappearing into the binding of your printed copy.

This document is of fairly simple format in that it can be made to print out using an A4 format printer (this is the common paper size available in UK and Europe, which measures 29.7cm by 21.0cm). By "simple" I mean that there are no large diagrams on fold out sheets, which will require multiple A4 pages to print out at full size.

Original document sizes do vary a lot – from the small manuals, which approximate to A5 size (21.0 x 14.8 cm) up to the now obsolete foolscap size (21.6 x 33.0 cm). US documents tend to use their "letter" size paper (21.6 x 27.9 cm). All these sizes can be printed on A4 paper by simply getting Acrobat to shrink or enlarge the pages as necessary. This is done as follows:

1. Select "File – Print" or click on the printer icon. This will bring up the print dialog box.
2. Select the correct printer if necessary.
3. Select the pages you want to print – even if you want to print all of the document, you will probably not want to print this notice and help page, so start the printing at page 3.
4. In the "Page Handling" area, next to "Page Scaling", select "Fit to paper". The press "OK"

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Any other problems?

Please get in touch with me at archivist@vmarsmanuals.co.uk.

Richard Hankins, VMARS Archivist, Summer 2004

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.

Electrical tests

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

Test equipment

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

ZD/02674	Signal generator, No 12
ZC/1411	Frequency meter, SCR 211
Z4/6625-99-949-0510	Wattmeter, absorption AF, No 1
Z4/108/831	Oscilloscope, type 13A
Z4/6625-99-949-0470	Voltmeter, valve, No 3, equipment
*	60dB attenuator
*	75Ω dummy load
*	2kΩ dummy load

* 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*	
	GENERAL				
1	Cleanliness	-	-	-	
2	Paintwork	-	-	-	
3	Components and controls	-	-	-	
4	Accessories and station spares	-	-	-	
5	Modifications	-	-	-	
	RECEIVER				
6	**R.F.sensitivity - (para 52)**				
	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	
	Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high hand)				
7	**Signal-to-noise ratio (para 53)**				
	Conditions as for item 6. Adjust input to produce 200μW output switch off modulation				
	Residual noise	-	20	μW	
	Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high band)				
8	**Dial calibration (para 51)**				
	Conditions as for item 6. Check calibration of frequency dial at each Mc/s point				
	Low band	-	50	kc/s	
	High band	-	100	kc/s	
	TRANSMITTER				
9	**R.F. output - low impedance (para 59 and 60)**				
	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 Min	Max	Unit	Result
	Output voltage	6.14	-	V	
	Switch to VOICE				
	Output voltage reference c.w. output	43	56	%	
	Repeat at crystal positions 2, 3 and 4				
10	**R.F. output - high impedance (para 61)**				
	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				
	Output voltage reference c.w. output	45	65	%	
11	**Modulation sensitivity (para 62)**				
	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	
	At this frequency, adjust B.F.O. No 8 output to give 100% modulation				
	B.F.O. output	30	-	V	
	FUNCTIONAL				
12	**Netting**				
	On receive and net, tune receiver to sender crystal frequency				
	Zero-beat to be heard in phones				
	Clear audio tone either side of zero				
13	**Dial lock**				
	Net as in item 12. Operate dial lock four times				
	Netting signal must not be lost				
14	**Pilot lamps**				
	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*	
	GENERAL				
1	The general condition will be in accordance with Tels A 779				
	RECEIVER				
2	**Audio sensitivity (para 46)**				
	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	**Audio response (para 47)**				
	Conditions as for item 2				
	Output at 0.3kc/s	50	–	μW	
	Output at 3kc/s	63	–	μW	
	Reference input at 1kc/s to produce 200μW				
4	**I.F. sensitivity (para 48)**				
	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	–	50	μV	
	(Note actual input)				
	Frequency for maximum output	454	456	kc/s	
5	**I.F. selectivity (para 49)**				
	Conditions as for item 4. Increase input by 6dB. Tune S.G.12 to each side of resonance where output falls to 200μW				
	Bandwidth	4.95	6.05	kc/s	
	Repeat with input increased by 60dB				
	Bandwidth	22.5	27.5	kc/s	
6	**Heterodyne oscillator (para 50)**				
	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	**Dial calibration (para 51)**				
	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	–	50	kc/s	
	High band	–	100	kc/s	
8	**R.F. sensitivity (para 52)**				
	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	
	Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high band)				

Item	Test	Specification limits Min	Max	Unit	Result
9	**Signal-to-noise ratio(para 53)**				
	Conditions as for item 8. Adjust input to produce 200μW output Switch off modulation				
	Residual noise	-	20	μW	
	Repeat at 4.5Mc/s (low band) and at 5Mc/s and 10Mc/s (high band)				
10	**Second channel rejection (para 54)**				
	Conditions as for item 8. At frequencies below, tune S.G.12 and receiver and adjust input to give 200μW output. Retune S.G.12 to image frequency (+0.91Mc/s), increase input to give 200μW output. Check the image ratio at:-				
	2Mc/s	60	-	dB	
	4.5Mc/s	46	-	dB	
	5Mc/s	46	-	dB	
	10Mc/s	36	-	dB	
11	**I.F. rejection (para 55)**				
	Conditions as for item 8. Tune S.G.12 to 2Mc/s, output 5μV. Tune receiver for maximum output, adjust gain control to give 200μW output. Retune S.G.12 to 455kc/s				
	Input required to produce 200μW output	50	-	mV	
12	**A.G.C. operation (para 56)**				
	Conditions as for item 8. Tune S.G.12 to 10Mc/s, output 5μV. Tune receiver for maximum output. Increase S.G.12 output to 50mV, adjust receiver gain for 200μW output. Reduce S.G.12 output to 10μV.				
	A.F. output	20	-	μW	
13	**Low voltage operation (para 57)**				
	At reduced voltages (h.t. 66V, l.t. 1.1V). Replace a.f. wattmeter by phones. Adjust S.G.12 to 5Mc/s, 10μV, modulation depth 30%.				
	Signal in phones and clear netting on both bands				
	TRANSMITTER				
14	**R.F. output - low impedance (para 59 and 60)**				
	Insert 2, 4.5, 7.5 and 10Mc/s crystals				
	Connect either 75Ω dummy load with V.V.3 or wattmeter, h.f., No 2, (52Ω, 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	6.14	-	V	
	Output power	0.5	-	W	
	Switch to VOICE				
	Output voltage reference c.w. output	43	56	%	
	Output power reference c.w. output	18	32	%	
	Repeat at crystal positions 2, 3 and 4				
15	**R.F. output - high impedance (para 61)**				
	Connect 2kΩ 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*	
	Switch to VOICE				
	Output voltage reference c.w. output	45	65	%	
	Repeat at crystal positions 2 and 3				
16	**Modulation sensitivity (para 62)**				
	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				
	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	
17	**Low voltage operation (para 63)**				
	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	**Seal testing (para 64 and 65)**				
	Initial pressure 10 lb/sq.in.				
	Time constant	36	-	hr	

EME8c/835

END