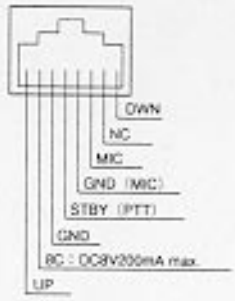
ADJUSTMENT

Measuring Equipment for Adjustment

1. **Digital voltmeter (D.V.M)**
   Input impedance: High
2. **RF valve voltmeter (RF V.M)**
   Input impedance: 1MΩ or more, 2pF or less
   Voltage range: Full scale = 10mV to 300V
   Measurable frequency range: up to 450MHz
3. **Frequency counter (f.counter)**
   Input sensitivity: About 50mV
   Measurable frequency: 450MHz or more
4. **DC power supply**
   Voltage: Variable in the range 10 to 17V
   Current: 13A or more
5. **Power meter**
   Measurement power: 60W, 30W, 10W
   Impedance: 50Ω
   Measurable frequency: 450MHz
6. **AF valve voltmeter (AF V.M)**
   Input impedance: 1MΩ or more
   Voltage range: Full scale = 1mV to 30V
   Measurable frequency range: 50Hz to 10kHz
7. **AF generator (AG)**
   Output frequency: 100Hz to 10kHz
   Output voltage:0.5mV to 1V
8. **Linear detector**
   Measurable frequency: 450MHz
9. **Spectrum analyzer**
   Measurable frequency: 450MHz
10. **Directional coupler**
11. **Oscilloscope**
    High sensitivity with horizontal input terminal
12. **Standard signal genertor (SSG)**
    The standard signal generator must be able to generate the 1GHz band frequencies and vary the amplitude and frequency.
    Output: -133dBm to greater than - 13dBm
13. **Dummy load (for AF)**
    8Ω, about 5W
14. **Distortion meter**
15. **Adjustment jig**

Preparation

●Microphone connector

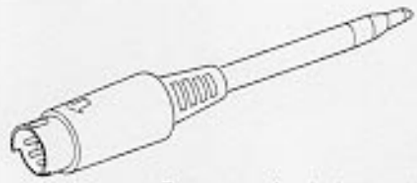


Microphone socket
(as viewed from the front of the set)

- Use an insulated rod, such as a plastic rod, for adjustment (especially for trimmers, coils, etc.).
- To protect the signal generator, never connect the microphone to the microphone socket when the receiver section is adjusted.
- Before the power cord is connected, make sure the power switch is off.
- Without specification of SSG, standard modulation is applied (MOD : 1kHz, DEV : ±3kHz, AF output : 0.63V/8Ω)
- See the instruction manual for transmit and receive operations.
- Use service jigs as necessary.
- It is good to copy critical data with clone operations before making adjustments. For details on clone operations, see "Reference" on Page 39.

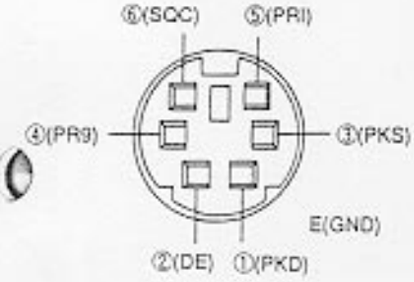
ADJUSTMENT

Adjustment Service Jig

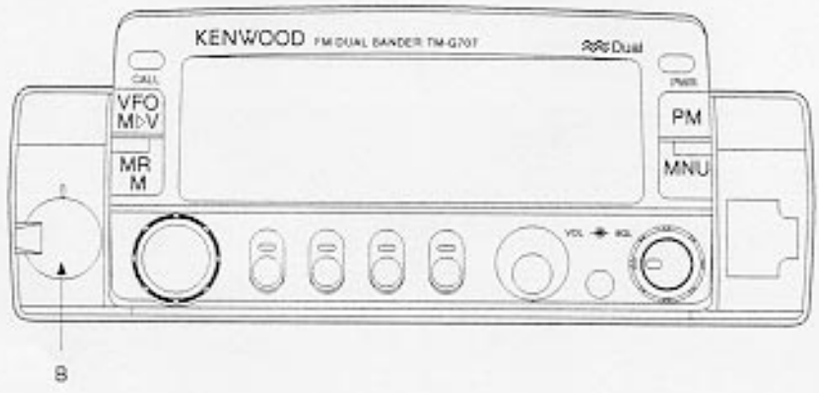


Data terminal short plug (W05-0611-00)

●Service jigs usage



Pin assignment seen from direction B



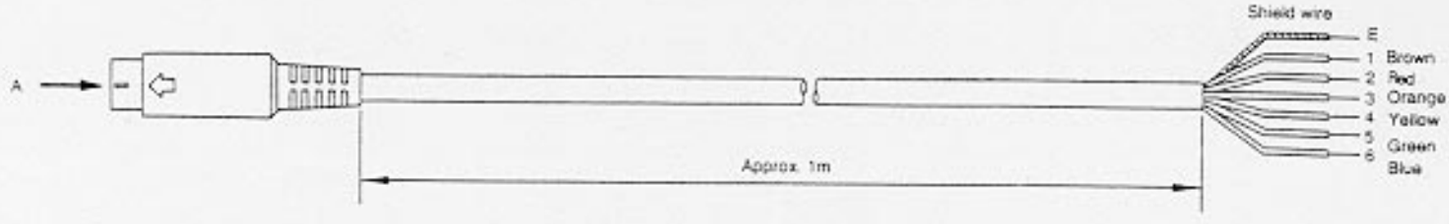
Short plug

Terminals ③ and ⑥ are short circuited.

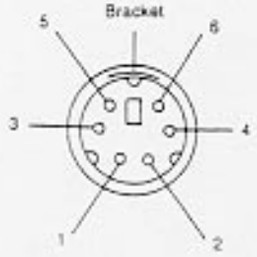
[Reference] ③ PKS (SEND switch for DATA terminal)
Connect PTT output. If PKS is set to "L", data are sent and the microphone will be mute.
⑥ SQC (Squelch control output)
This outputs squelch control output.

●Service jigs specification

Plug cable with 6P mini-DIN : Model PG-5A (cable parts No. : E30-3202-05) processed like under fig.



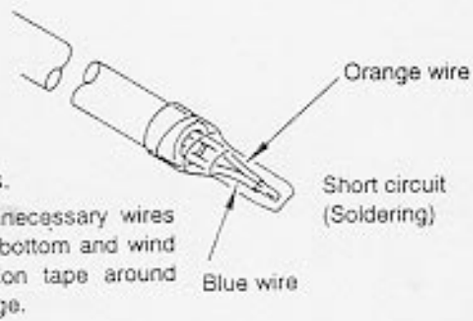
(Cut the cable at suitable length.)



Pin assignment seen from direction A

DIN pin No.	Color
1	Brown
2	Red
(3)	Orange
4	Yellow
5	Green
(6)	Blue
Bracket	Shield

Join these DIN pins.

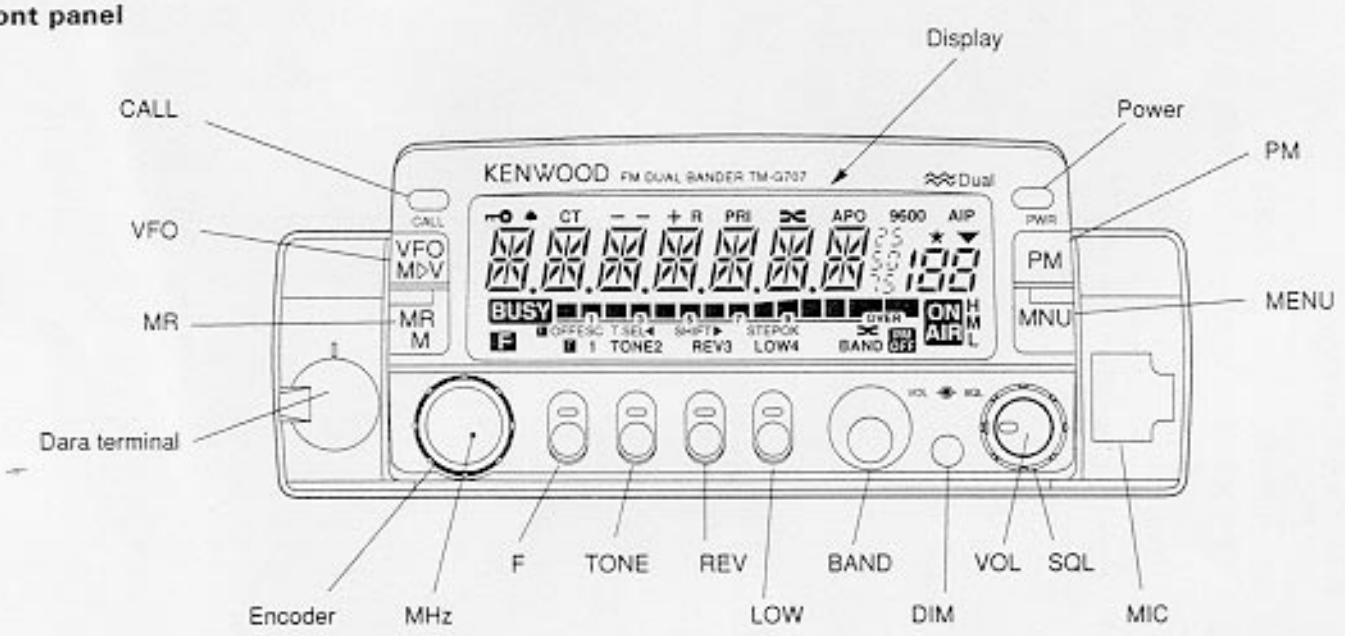


Cut unnecessary wires at the bottom and wind insulation tape around top edge.

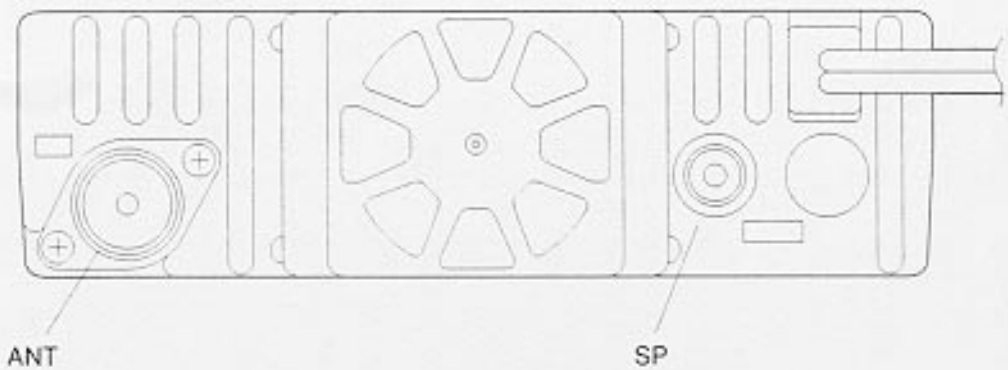
ADJUSTMENT

Parts layout

Front panel



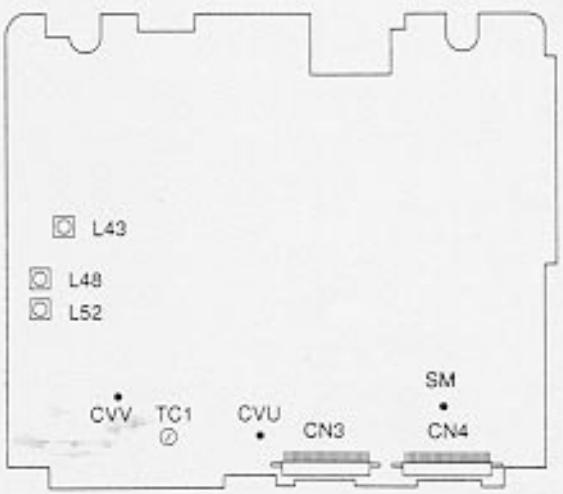
Rear panel



Adjustment parts layout

- TX-RX UNIT
  (Unit under)

- Adjustment parts No.
  TC1 : Transmission frequency (UHF)
  L43 : BPF(VHF)
  L48 : BPF(VHF)
  L52 : BPF(VHF)
- Test point
  CVV : VCO lock voltage (VHF)
  CVU : VCO lock voltage (UHF)
  SM : BPF



ADJUSTMENT

Adjustment mode

- This is the adjustment mode for making adjustments or setting levels.
- The following items can be adjusted or set.
  - A Squelch release sensitivity (SQL.)
  - B S meter light-up start level (S.-1.)
  - C S meter all light-up level (S.ALL.)
  - D Transmission output (TX.POW.)
  - E Transmission modulation factor (DEVI.)
  - F VHF BPF (B.P.F.1, B.P.F.2, B.P.F.3, B.P.F.4)

Adjustment mode startup method

1. Switch OFF (PWR) and insert the adjustment plug at the set data terminal.
2. Switch ON (PWR) while pressing the (F) key and the (TONE) key at the same time.
3. When the set goes into adjustment mode, the "T."mark is displayed at the head of the frequency display.
   See the figure below.

Adjustment mode display

4. In adjustment mode, the desired band and frequency can be selected with **[VFO]**, **[MR]**, **[ENCODER]**, **[MHZ]** and **[BAND]**. You can also switch the transmission output with the **[LOW]** key.
5. When you press the **[MNU]** key, the set goes into adjustment enabled mode.
6. Pressing the **[◄]** or **[►]** key switches the adjustment item to the previous item or the next item among the six adjustment items A-F (9 adjustments).

A. Squelch release sensitivity adjustment (values set independently for 144 MHz and 430 MHz)

① When **[SQL]** is displayed with the **[◄]** or **[►]** key, the value currently input for the squelch level is displayed and the squelch level can be adjusted. (See the figure below.)

② In adjustment enabled mode, the **[VFO]** and **[MR]** keys function as the Up and Down keys, increasing/decreasing the frequency for VFO mode or the memory channel for MR mode.

③ When you apply the prescribed SSG input from the ANT terminal and press the **[OK]** key, the adjustment value is set and the adjustment mode moves to the next item. If you press the **[ESC]** key, the adjustment value is not set.

B. S meter light-up start level (value set for each band)

① When you display **[S-1]** with the **[◄]** or **[►]** key, the value currently input for the S meter is displayed and the value can be adjusted. (See the figure below.)

② When you apply the prescribed SSG input from the ANT terminal and press the **[OK]** key, the adjustment value is set.

C. S meter all light-up level (value set for each band)

① When you display "S.ALL." with the **[◄]** or **[►]** key, the value currently input for the S meter is displayed and the value can be adjusted. (See the figure below.)

② When you apply the prescribed SSG input from the ANT terminal and press the **[OK]** key, the adjustment value is set and the adjustment mode moves to the next item.

D. Transmission output (values set independently for 144 MHz and 430 MHz)

① After setting the frequency, switch to the desired output range with the **[LOW]** key.

② When you display "TX.POW." with the **[◄]** or **[►]** key, the current setting for the output is displayed blinking. (See the figure below.)

③ Connect the power meter to the ANT terminal, then press the mic PTT switch to transmit.
Turn the **[ENCODER]** knob to adjust the power meter reading to the prescribed output.

④ When the prescribed output is reached, switch the PTT switch off and press the **[OK]** key to set the adjustment value.

E. Transmission modulation factor (values set independently for 144 MHz and 430 MHz)

① When you display "DEVI." with the **[◄]** or **[►]** key, the current setting is displayed blinking. (See the figure below.)

② Connect the direct wave detector and power meter to the ANT terminal, apply the prescribed A.G. input from the MIC input terminal, and transmit.
Turn the **[ENCODER]** knob to adjust the direct wave detector reading to the prescribed value.

③ When the prescribed value is reached, stop trasmission and press the **[OK]** key to set the adjustment value.

F. VHF BPF adjustments (4 points: near 120MHz, 132 MHz, 160 MHz, and 170 MHz)

① When you display any of "B.P.F.1." through "B.P.F.4" with the **[◄]** or **[►]** key, the setting is displayed blinking. (See the figure below.)

② Connect the signal generator to the ANT terminal and the digital voltmeter to the TX-RX unit (solder side) SM terminal.

③ Apply a signal of the prescribed output with the specified frequency from the signal generator.
Turn the **[ENCODER]** knob and adjust to maximize the voltage at the SM terminal.

④ When the maximum value is reached, press the **[OK]** key to set the adjusted value.
Set "B.P.F.2", "B.P.F.3", and "B.P.F.4" in the same manner.

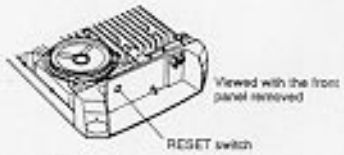
Note:

- The **[ENCODER]** knob only works in frequency display and for trasmission power, modulation foctor, and BPF adjustments.
- When you press the **[OK]** key, the adjusted value is set and adjustment mode moves to the next item, but if you press the **[ESC]** key, the adjusted value is not set.
- To end adjustment mode, switch off the power.

TM-G707A/E

ADJUSTMENT

Common sction

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Power voltage:13.8V 2) VOL, SQL knob:MIN							
2. Reset	**■ Partial Reset (VFO)** Use to initialize all settings except the memory channels, the Call channel, the PM channels, and Memory Channel Lockout. 1 Press [VFO]+ POWER ON. • A confirmation message appears.  • To quit resetting, press any key other than *[OK]*. 2 Press *[OK]*.	**■ Full Reset (Memory)** Use to initialize all settings that you have customized. 1 Press [MR]+ POWER ON. • A confirmation message appears.  • To quit resetting, press any key other than *[OK]*. 2 Press *[OK]*.			**■ Hard Reset** You can also use the RESET switch to initialize settings. Push the switch momentarily to do Partial Reset or press it for 1 second or longer to do Full Reset. No confirmation message appears. Use this switch when the microcomputer and/or the memory chip malfunction becaouse of ambient factors.  			
3. Lock voltage check	1) VHF band FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E	D.V.M	TX-RX (A/3)	CVV (TP6)	Check			about 2.5V
	2) UHF band FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E			CVU (TP7)				about 4.0V
	3) UHF band FREQ.:443.980MHz:K FREQ.:434.980MHz:M,E transmission	Power Meter D.V.M	Rear panel TX-RX (A/3)	ANT CVU (TP7)				about 3.0V
	4) VHF band FREQ.:145.980MHz:K,M FREQ.:144.980MHz:E transmission			CVV (TP6)				about 2.0V
4. BPF Adjust	1) FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:-93dBm	SSG D.V.M	Rear panel TX-RX (A/3)	ANT SM	TX-RX (A/3)	L43 L48 L52	Voltage max	2.5V or more
5. BPF Write	Switch to adjustment mode and carry out the operations for Item F. SSG:-93dBm				Display	Encoder [OK] key	UP/DOWN write	Voltage max

ADJUSTMENT

Receiver section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. High level input S/N and distortion check	1) VHF band FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:— 53dBm AF output:2.83V/8 Ω	SSG Oscilloscope AFV.M Distortion meter	Rear panel	ANT EXT.SP			Check	S/N 42dB or more Distortion rate:4% or less
	2) UHF band FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:— 53dBm AF output:2.83V/8 Ω							
2. Sensitivity check	1) VHF band FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E FREQ.:144.050MHz FREQ.:147.925MHz:K,M FREQ.:145.925MHz:E SSG:— 122dBm:M,E SSG:— 119dBm:K AF output:0.63V/8 Ω	SSG Distortion meter Oscilloscope AFV.M	Rear panel	ANT EXT.SP			Check	SINAD 12dB or more
	2) UHF band FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E FREQ.:438.050MHz:K FREQ.:430.050MHz:M,E FREQ.:449.975MHz:K FREQ.:439.925MHz:M,E SSG:— 122dBm AF output:0.63V/8 Ω							
3. Squelch write	Switch to adjustment mode and carry out the operations for Item A. 1) VHF band FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:— 130dBm:M,E SSG:— 127dBm:K	SSG	Rear panel	ANT EXP.SP	Display	[CK] key	Write	
	2) UHF band FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:— 130dBm							
4. Squelch check	1) VHF band FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:OFF Set to the point where noise will be erased by turning the squelch knob.	SSG Oscilloscope	Rear panel	ANT EXP.SP	Display		Check	Knob position: 8:00 ~ 11:00 Busy lights off.
	2) SSG:— 126dBm:M,E SSG:— 125dBm:K							Squelch open. BUSY lights on.
	3) Squelch knob: clockwise MAX							AF output disappear. BUSY lights off.
	4) UHF band FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E Set to the point where noise will be erased by turning the squelch knob.							Knob position: 8:00 ~ 11:00 Busy lights off.
	5) SSG:— 126dBm							Squelch open. BUSY lights on.
	6) Squelch knob: clockwise MAX							AF output disappear. BUSY lights off.

ADJUSTMENT

Receiver section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. S-meter write	Switch to adjustment mode and carry out the operations for ItemB,C. 1) 144MHz band (S-1) FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:— 118dBm	SSG	Rear panel	ANT	Display	[CK] key	Write	S-meter one segment (S1) lights on.
	2) 144MHz band (S.ALL) SSG:— 96dBm							S-meter all segment (ALL) lights on.
	3) 430MHz band (S-1) FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:— 118dBm							S-meter one segment (S1) lights on.
	4) 430MHz band (S.ALL) SSG:— 96dBm							S-meter all segment (ALL) lights on.
	5) 118MHz band (S-1) FREQ.:130.050MHz SSG:— 100dBm							S-meter one segment (S1) lights on.
	6) 118MHz band (S.ALL) SSG:— 83Bm							S-meter all segment (ALL) lights on.
	7) 300MHz band (S-1) FREQ.:370.100MHz SSG:— 110dBm							S-meter one segment (S1) lights on.
	8) 300MHz band (S.ALL) SSG:— 90dBm							S-meter all segment (ALL) lights on.
	9) 800MHz band (S-1) FREQ.:865.975MHz:K FREQ.:870.100MHz:M,E SSG:— 105dBm							S-meter one segment (S1) lights on.
	10) 800MHz band (S.ALL) SSG:— 85Bm							S-meter all segment (ALL) lights on.
6. S-meter check	1) FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:— 114 ~— 124dBm	SSG	Rear panel	ANT	Display	S-meter	Check	S-meter one segment (S1) lights on.
	2) FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:— 90 ~— 102dBm							S-meter all segment (ALL) lights on.

ADJUSTMENT

Transmission section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmission frequency Adjust	1) UHF band FREQ.:444.000MHz:K FREQ.:435.000MHz:M,E	f.counter Dummy	Rear panel	ANT	TX-RX (A/3)	TC1	444.000MHz:K 435.000MHz:M,E	Not warm up the set. ± 500Hz
2-1. POWER VHF band write or check	For 1), 2) and 4), switch to adjustment mode and carry out the operations for Item D. 1) POWER:LOW FREQ.:146.000MHz:K,M FREQ.:144.975MHz:E Transmission.	Power meter Ammeter	Rear panel	ANT	Display	Encode [OK] key	UP/DOWN write	5.0W ± 0.5W
	2) POWER:MID Transmission.							12W ± 1.0W
	3) POWER:MAX Transmission.						Check	46W or more
	4) POWER:HI Transmission.				Display	Encode [OK] key	UP/DOWN write	M4:22.5W ± 1.0W K,E,M2:MAX Power 52W or more. 50.0W ± 1.0W MAX Power 48W or more. (MAX Power − 2W)± 1.0W
	5) FREQ.:144.000MHz FREQ.:147.975MHz (K,M) FREQ.:145.975MHz (E) POWER:HI Transmission.						Check	K,E,M2:44 ~ 60W M4:20 ~ 25W
	6) POWER:MID Transmission.							10 ~ 14W
	7) POWER:LOW Transmission.							3 ~ 10W
2-2. POWER UHF band write or check	For 1), 2) and 4), switch to adjustment mode and carry out the operations for Item D. 1) POWER:LOW FREQ.:444.000MHz:K FREQ.:435.000MHz:M,E Transmission.	Power meter	Rear panel	ANT	Display	Encode [OK] key	UP/DOWN write	5.0W ± 0.5W
	2) POWER:MID FREQ.:438.000MHz:K FREQ.:430.000MHz:M,E Transmission.							12.0W ± 1.0W
	3) POWER:MAX FREQ.:449.975MHz:K FREQ.:439.975MHz:M,E Transmission.						Check	33W or more
	4) POWER:HI FREQ.:449.975MHz:K FREQ.:439.975MHz:M,E Transmission.				Display	Encode [OK] key	UP/DOWN write	M4:22.5W ± 1.0W K,E,M2:MAX Power 37W or more. 35.0W ± 1.0W MAX Power 33W or more. (MAX Power − 2W) ± 1.0W
	5) FREQ.:438.000MHz:K FREQ.:430.000MHz:M,E FREQ.:449.975MHz:K FREQ.:439.975MHz:M,E POWER:HI Transmission.						Check	K,E,M2:28 ~ 42W M4:20 ~ 25W
	6) POWER:MID Transmission.							10 ~ 14W
	7) POWER:LOW Transmission.							3 ~ 10W

ADJUSTMENT

Transmission section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. DEV write or check	For 1) and 3), switch to adjustment mode and carry out the operations for Item E. 1) VHF band FREQ.:146.000MHz:K,M FREQ.:144.975MHz:E AG:1kHz25mV:E AG:1kHz50mV:K,M Transmission	Power meter Linear detector Oscilloscope	Rear panel	ANT	Display	Encode [OK] key	UP/DOWN Write	± 4.2kHz ± 0.2kHz
	2) Down AG output from the above state by 20dB (1kHz/2.5mV):E 20dB (1kHz/5.0mV):K,M Transmission	AG AF V.M		MIC			Check	± 2.3 ~ 4.2kHz:E ± 2.4 ~ 4.1kHz:K,M
	3) UHF band FREQ.:444.000MHz:K FREQ.:435.000MHz:M,E AG:1kHz25mV:E AG:1kHz50mV:K,M Transmission				Display	Encode [OK] key	UP/DOWN write	± 4.2kHz ± 0.2kHz
	4) Down AG output from the above state by 20dB (1kHz/2.5mV):E 20dB (1kHz/5.0mV):K,M Transmission						Check	± 2.3 ~ 4.2kHz:E ± 2.4 ~ 4.1kHz:K,M
4. TONE DEV check	1) VHF band FREQ.:145.100MHz TONE:88.5Hz Transmission	Power meter Linear detector Oscilloscope	Rear panel	ANT			Check	± 0.5 ~ 1.3kHz
	2) UHF band FREQ.:445.100MHz:K FREQ.:435.100MHz:M,E TONE:88.5Hz Transmission							
5. Protection check	1) VHF band FREQ.:146.000MHz:K,M FREQ.:144.975MHz:E Power:HI ANT:short circuit and open Transmission	Ammeter					Check	12.0A or less
	2) UHF band FREQ.:444.000MHz:K FREQ.:435.000MHz:M,E Power:Hi ANT:short circuit and open Transmission							12.0A or less