

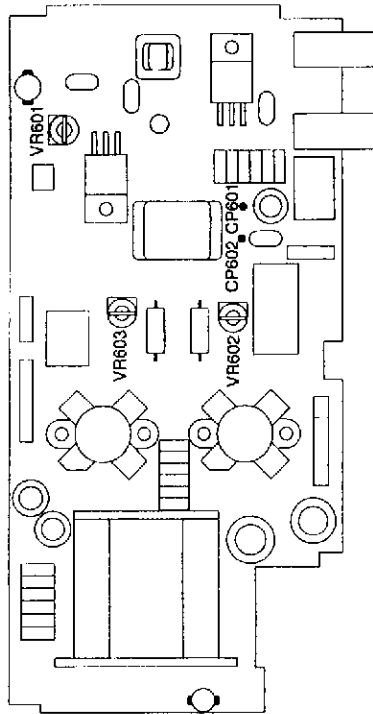
ADJUSTMENT

1) PA unit Adjustment

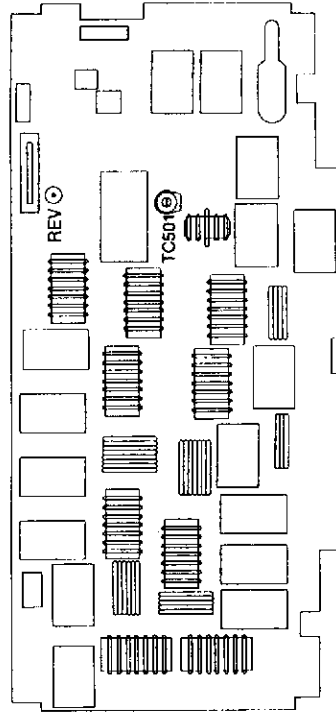
Required Test Equipment

1. Digital voltage meter
2. DC current meter 300-500mA
3. DC regulated power supply 13.80V 25A or more (should be equipped with 20-25A current limit and current meter)
4. Power meter 100W (1.9-60MHz)
5. Linear detector
6. SG or RF generator 1.9-60MHz, -10-+10dBm

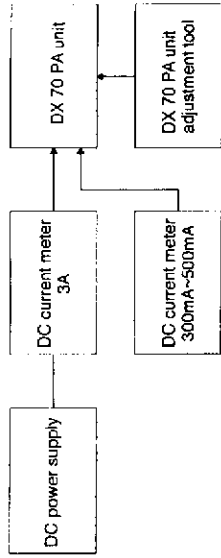
PA Unit Adjustment Points



Filter Unit Adjustment Points

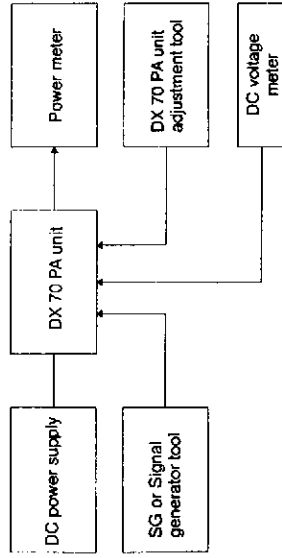


Idle Current Adjustment Setting



Adjustment the idle current without input signal.

SWR Adjustment Setting



Adjust SWR at approximately 50W.

PA Adjustment

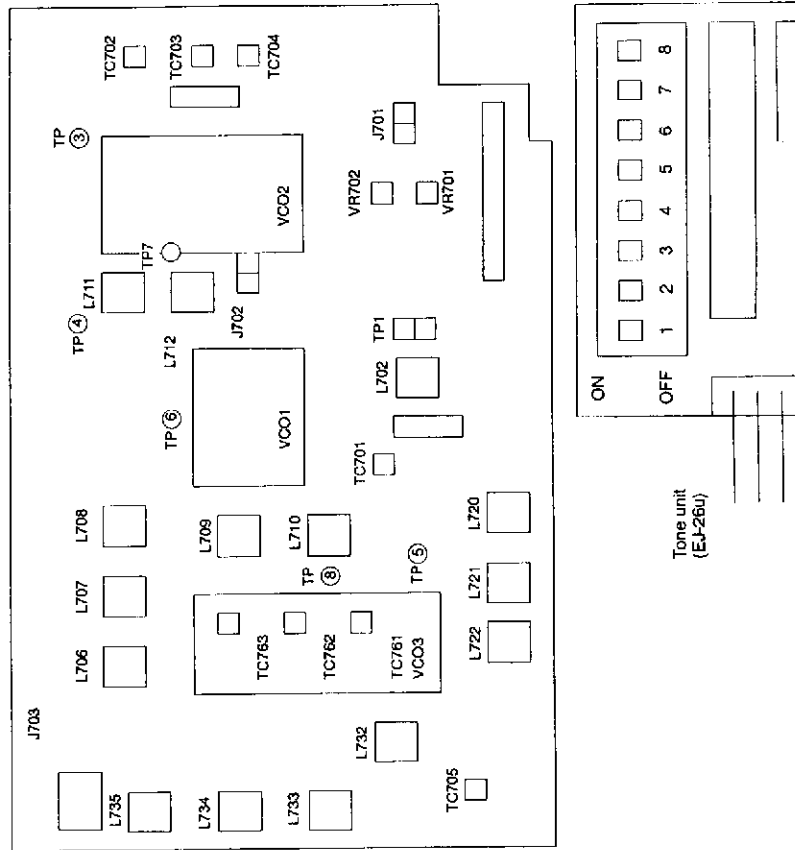
| Item | Condition | Measurement | | Adjustment | | |
|---|--|----------------------------|--------------------------------|----------------|-------|---|
| | | Equipment | Terminal | Unit | Parts | Method |
| Idling current 2SC1972 x 2 | SSG: OFF Mode: USB VR601, 602, 603: min. | Current Meter 300-500mA | CP601 ⊖ | PA | VR601 | Connect the current meter between CP601 and CP602, then adjust VR601 to 100mA. |
| | | | CP602 ⊕ | | | |
| Idling current MRF255 x 2 | SSG: OFF Mode: USB | Current Meter 3A | CN605 unit total current | VR602 VR603 | | Turn VR602 and VR603 counterclockwise fully, check the total current in transmission mode. Turn VR602 clockwise slowly so that the total current increases 400mA. Then turn VR603 clockwise slowly so that the total current increases 400mA. As a result, the total current increases 800mA. |
| | | | | | | |
| Connect TP1 and TP2 by soldering after adjusting. | | | | | | |
| SWR detection | f=1.9MHz SG >>PA unit | Voltage Meter | REV | Filter | TC501 | Adjust the output power to 50W, then adjust the TC501 so that REV voltage is min. |
| | | | | | | |
| When you adjust the finished goods, set the mode to SSB, adjust the input level of microphone, and set the output power to about 50W. | | | | | | |

2) PLL Adjustment

Required Test Equipment

1. Digital voltage meter
2. DC regulated power supply 13.80V 5A or more
3. Frequency counter 500MHz or more
4. Spectrum Analyzer 1GHz or more
5. Oscilloscope 100MHz or more

PLL Unit Adjustment Points



| Item | Condition | Measurement | | | Adjustment | | |
|---|--------------|----------------|------|----------|----------------|-------|---|
| | | Equipment | Unit | Terminal | Unit | Parts | Method |
| VCO1 Frequency | PD1=1.2V | Freq. Counter | VCO1 | CN90 1-3 | | | 175MHz or above |
| | PD1=4.3V | | | | | | 155MHz or below |
| | PD1=1.5-4V | Freq. Counter | VCO2 | CN90 2-4 | | | VCO2 freq.: 71MHz |
| Attach the VCO to PLL, then adjust the unit after installing the PLL to the unit. | | | | | | | |
| VCO2 Lock range | f=7.100MHz | Digital tester | PLL | TP7 | Check | | 1.5V-4V |
| VCO1 Lock range | f=7.0999MHz | | | TP6 | | | 1V-3V |
| | f=7.1000MHz | | | | | | 3V-4.3V |
| VCO3 Lock range | f=0.1500MHz | | | TP8 | TC961 | | 2.5V |
| | f=10.4999MHz | | | | | | When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V-7.0V) |
| | f=10.5000MHz | | | | TC962 | | 2.5V |
| | f=21.4999MHz | | | | TC962 | | When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V-7.0V) |
| | f=21.5000MHz | | | | TC963 | | 2.5V |
| 2nd LO Level | f=7.100MHz | Oscilloscope | | TP4 | Check | | 6.5V or below |
| 1st LO Level | f=7.100MHz | | | TP5 | L711 L712 | PLL | Turn the coils to the max. repeatedly. |
| | f=7.100MHz | | | | L709 L710 | | Turn the coils to the max. repeatedly. |
| | f=7.100MHz | | | | L706 L707 L708 | | Turn the coils to the max. repeatedly. |

3) Tone Unit Adjustment

- 1 Attach EJ26U to DX70.
- 2 When the subaudible Tone is ON in FM mode, adjust the unit according to following table.
- 3 When the subaudible Tone is OFF in FM mode, the tone should not be emitted.

| Item | Condition | Measurement | | | Adjustment | | | | | | | | |
|----------------|---------------------------------------|---------------|-----------|-------------|------------|------|---------------|------------|-----------|-------------|--|--|---------------|
| | | Equipment | Unit | Terminal | Parts | Unit | Method | | | | | | |
| Tone Frequency | 250.3Hz 1 2 3 4 5 6 7 8 * * * * | Freq. Counter | EJ26 U | CN99 1-1 | | | 249.6~251.0Hz | | | | | | |
| | | | | | | | | Tone Level | EJ26 U | CN99 1-1 | | | 156.2~157.2Hz |
| | | | | | | | | | | | | | |
| Tone Level | 156.3Hz 1 2 3 4 5 6 7 8 * * * * | Oscilloscope | EJ26 U | CN99 1-1 | | | 2.8~3.8V p-p | | | | | | |
| | | | | | | | | Tone Level | EJ26 U | CN99 1-1 | | | 3.8~4.8V p-p |
| | | | | | | | | | | | | | |
| Final Setting | 88.5Hz 1 2 3 4 5 6 7 8 * * * * | | | | | | | | | | | | |

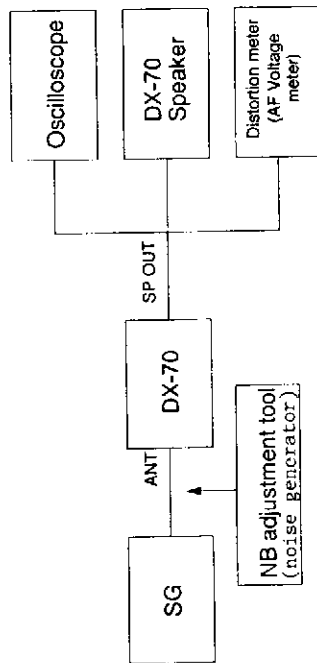
* indicates the number is ON.

| Item | Condition | Measurement | | | Adjustment | | |
|----------------------|---|-------------------|------|----------|------------------------------|--|------------------------|
| | | Equipment | Unit | Terminal | Parts | Unit | Method |
| Frequency (Mode) | RX LSB | Freq. Counter | PLL | TP3 | TC702 | PLL | 9873.60kHz +/- 0.02kHz |
| | RX USB | | | | TC704 | | 9876.40kHz +/- 0.02kHz |
| | RX AM and FM | | | | TC703 | | 9875.00kHz +/- 0.02kHz |
| | RX CWU | | | | Check | | 9875.80kHz +/- 0.3kHz |
| | RX CWL | | | | | | 9874.20kHz +/- 0.3kHz |
| Frequency (IF Shift) | RX LSB | Spectrum Analyzer | PLL | J701 | VR702 | | 453.60kHz +/- 0.1kHz |
| | TX LSB | | | | VR701 | | 453.60kHz +/- 0.01kHz |
| | RX LT, (IF Shift center) | | | | Check | | 453.30kHz +/- 0.2kHz |
| | TX LT, (IF Shift center) | | | | | | 453.50kHz +/- 0.2kHz |
| | RX UT, (IF Shift center) | | | | | | 456.70kHz +/- 0.2kHz |
| | TX UT, (IF Shift center) | | | | | | 456.50kHz +/- 0.2kHz |
| | | | | | | | 78850.00kHz |
| Frequency | f=7.1000MHz, FM | | | J703 | TC701 L702 | Adjust TC701 at first, then L702 when TC701 can not be adjusted. | |
| Level | f=7.100MHz, USB | | | J701 | Check | -6~-0dBm f=456.4kHz | |
| Level | f=7.100MHz, USB | | | J702 | | 1~-6dBm f=71.295MHz | |
| Level | f=53.9999MHz | | | J703 | L720 L721 L722 | Turn the coils to the max. repeatedly. f=123.75MHz | |
| Level | f=53.9999MHz | | | | L732 L733 L734 L745 | Turn the coils to the max. repeatedly f=123.75MHz 1~-6dBm | |
| Spurious | f=53.9999MHz | | | | TC705 | Spurious min. (60dB or more) | |
| Level | f=150k-Hz f=10.400MHz f=10.500MHz f=21.400MHz f=21.500MHz f=29.9999MHz | | | | Check | Level: 2~-6dBm +/-2dB | |

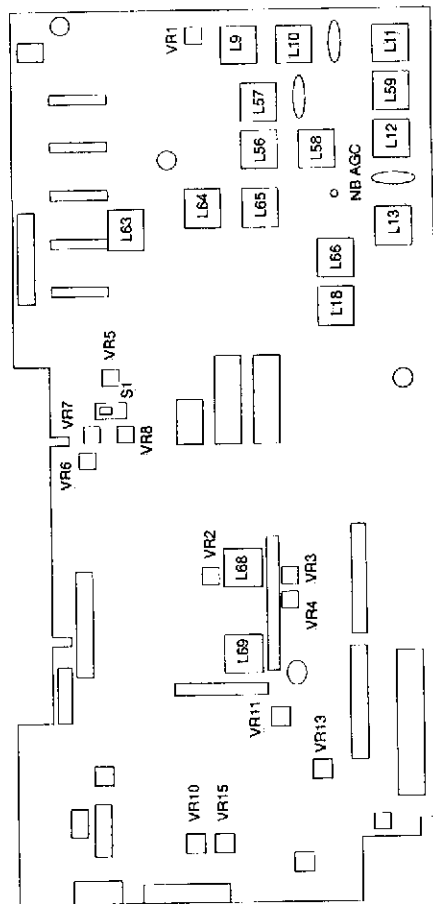
Required Test Equipment

1. Digital voltage meter
2. DC regulated power supply 13.80V 3A or more about 200MHz
3. SG
4. Distortion meter, AF voltage meter
5. 8Ω speaker
6. Oscilloscope
7. (NB adjustment tool (noise generator))

Main Unit Adjustment Setting



Main Unit Adjustment Points



TX Adjustment

4) Sensitivity Adjustment

SG Output Frequency: 14.1000MHz
 Frequency: 14.0993MHz
 RF Gain: +10dB
 Filter: Wide

Connect to HF Antenna Terminal.
 RIT: OFF
 Mode: USB
 ΔIF: Center

AGC: FAST
 NB: OFF

Squelch VR: Turn the knob counterclockwise fully.

| Item | Condition | Measurement | | | Adjustment | |
|--------|---|------------------|----------|------|---|--|
| | | Equipment | Terminal | Unit | Parts | Method |
| Tuning | SG output: 0dBμ Mod: OFF AF output: 300mV | Audio Voltmeter | SP | Main | L56 L57 L58 L59 L12 L13 L66 L68 L69 | Adjust every following group repeatedly to obtain the maximum receiving signal: L56, 57, 58 L59, 12, 13 L66 L68, L69 |
| | Mode: FM f=14.1000MHz SG output: 0dBμ Mod: 1kHz, 3.5kHzDEV | Distortion Meter | | | L59 L12 L13 | Adjust repeatedly to obtain the maximum SINAD. SINAD should be 13dB or more. |
| | SG output: 60dBμ 1kHz, 3.5kHzDEV | | | | Check | SINAD should be 30dB or more. If SINAD is below 30dB, adjust L59, L12 and L13 again. |
| | SG output: -6dBμ Mod: OFF Mode: USB f=14.0993MHz AF output: 300mV | Audio Voltmeter | | | Check | Make sure that S/N is 10.5dB or more by turning ON/OFF SG output. |
| | SG output: 10dBμ Mod: 1kHz, 30% Mode: AM f=14.1000MHz | Audio Voltmeter | | | Check | Make sure S/N is 10dB or more by turning ON/OFF SG modulation. |

5) Noise Blanker Adjustment

SG Output Frequency: 14.1000MHz
 Frequency: 14.0993MHz
 RF Gain: +10dB
 Filter: Wide

Connect to HF Antenna Terminal.
 RIT: OFF
 Mode: USB
 AGC: FAST
 Squelch VR: Turn the knob counterclockwise fully.

NB: OFF
 AGC: FAST
 Center

| Item | Condition | Measurement | | | Adjustment | | |
|--------|---|--------------|---------------|------|-------------------|--|--|
| | | Equipment | Terminal | Unit | Parts | Method | |
| Tuning | SG output: 0dB μ Mod: OFF Mode: USB f=14.0993MHz NB: ON RF Gain: +10dB | Oscilloscope | NB AGC (MAIN) | Main | L63 L64 L65 | Adjust the coils, and set DC voltage of the terminal to the minimum with the oscilloscope. | |

6) S Meter Adjustment

| Item | Condition | Measurement | | | Adjustment | | |
|---------------|--|--------------|-------------------------------|------|--------------|---|--|
| | | Equipment | Terminal | Unit | Parts | Method | |
| RX Total Gain | SG output: 40dB μ Mod: OFF Mode: USB f=14.0993MHz RF Gain: 0dB | AF Voltmeter | SP | Main | VR2 | Adjust SP output by setting the AF gain to about 1V. The output level should be 0dB. Adjust only the noise output to -28dB by turning OFF SG output. | |
| S Meter | SG output: 20dB μ Mod: OFF SG output: 40dB μ | S Meter | S Meter | | VR10 VR15 | The indicator between first and second digits is turned ON. The 9th digit starts flashing. Adjust VR10 and VR15 repeatedly. | |
| | SG: OFF | | | | Check | S Meter is not turned ON. | |
| Squelch | SG: OFF | | BUSY RX LED (Green) AF output | | Check | Turn the Squelch VR to make sure that the squelch closes at about 10 o'clock. | |

7) Receiving Function Adjustment

SG Output Frequency: 14.1000MHz
 Frequency: 14.0993MHz
 RF Gain: +10dB
 Filter: Wide

Connect to HF Antenna Terminal.
 RIT: OFF
 Mode: USB
 AGC: FAST
 Squelch VR: Turn the knob counterclockwise fully.

NB: OFF
 AGC: FAST
 Center

| Item | Condition | Measurement | | | Adjustment | | |
|-------------------|--|------------------|----------|------|------------|--------|---|
| | | Equipment | Terminal | Unit | Parts | Method | |
| AGC | SG output: 40dB μ Output: ON/OFF Mod: OFF | | S Meter | | | Check | Switch AGC. When SG is turned OFF, the meter moves slowly in SLOW, and fast in FAST. |
| RF GAIN | SG output: 40dB μ | | S Meter | | | Check | Switch the RF GAIN from +10dB orderly, the meter swings shorter and shorter. |
| FILTER Switching | Output: OFF Mode: USB, AM, CW | | | | | Check | Switch the FILTER in every mode (except FM), the noise sound should be changed. |
| Band Sensitivity | SG output: -6dB μ f=1.9000MHz f=3.6000MHz f=7.0000MHz f=10.1000MHz f=21.1000MHz f=28.1000MHz Mode: USB or LSB | Audio Voltmeter | | | | Check | In USB mode, SG frequency is -700Hz. In LSB mode, SG frequency is +700Hz. Make sure that S/N is 10dB or more. |
| 50MHz Sensitivity | Connect SG to 50MHz antenna terminal. SG output: -10dB μ SG freq.: 52.1000MHz Mode: USB f=52.0993MHz | | | | | Check | S/N is 10.5dB or more when turning ON/OFF SG output. |
| | SG output: -4dB μ Mod: 1KHz, 3.5kHz Dev Mode: FM f=52.0000MHz | Distortion Meter | | | | Check | SINAD: 13dB or more |

Required Test Equipment

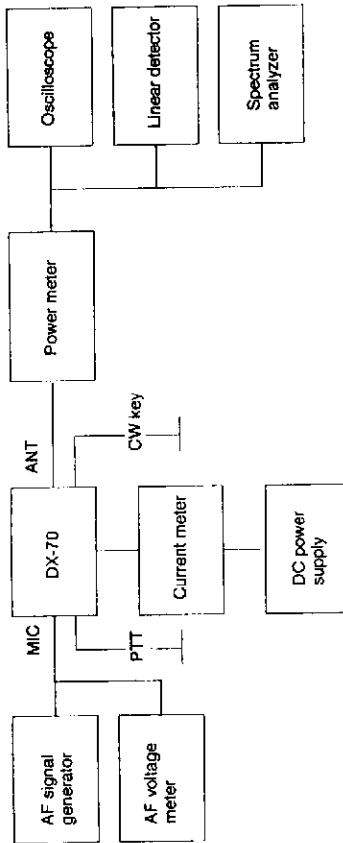
1. Digital voltage meter
2. DC current meter
3. DC regulated power supply (should be equipped with 25-30A current limit)
4. Power meter
5. Linear detector
6. AF generator (600Ω)
7. AF voltage meter
8. Oscilloscope
9. Electronic keyer (CW telegraphy key)
10. TUNE operation tool

20-30A
13.80V 25A or more

8) Transmission Adjustment

Connect the power meter to HF antenna terminal.
 Frequency: 7.1000MHz Mode: USB Power: High
 Speech Compressor (SET mode): OFF FM-TONE: OFF

TX Adjustment Setting



| Item | Condition | Measurement | | Adjustment | |
|------------------------|---|-----------------|------------------------|-------------------------|---|
| | | Equipment | Terminal | Parts | Method |
| Tuning | Slide S1 to rear panel side. AG output: -50dBm | Power Meter | HF Antenna Terminal | L18 L11 L10 L9 | Adjust to the maximum power. (Adjust the AG input level so that the power becomes the maximum at about 50W.) |
| | | | Power Supply Terminal | VR6 | |
| Current Limit | AG output: OFF Mode: FM Set VR7 to 9 o'clock. Set VR6 to 3 o'clock. | Current Meter | HF Antenna Terminal | VR7 | Turn VR7 clockwise to decrease the power, then adjust to 100W. |
| | | | Power Meter | VR5 | Turn VR5 to obtain the power of 50W. |
| Power | Mode: FM Slide S1 to front panel side. | Power Meter | HF Antenna Terminal | VR8 | Turn VR8 to obtain the power of 10W. |
| | | | | Check | Check |
| FM Frequency Deviation | AG output: -30dBm f: 52.0000MHz Mode: FM AG output: -30dBm f: 52.0000MHz Mode: FM FM-TONE: ON (only the unit equipped with TONE) | Linear Detector | 50MHz Antenna Terminal | VR13 | Adjust the maximum frequency deviation to 4.3kHz. |
| | | | Filter | Check | The frequency deviation is increased. (Approx. 5kHz) |

9) Spurious Adjustment

Connect the power meter to HF or 50MHz antenna terminal.
 Frequency: 52.000MHz Mode: FM Power: High
 Speech Compressor (SET mode): OFF FM-TONE: OFF

| Item | Condition | Measurement | | Adjustment | | |
|------------------|--|-------------------------|------------------------|------------|-----------------|---|
| | | Equipment | Terminal | Parts | Method | |
| Spurious Balance | AG output: OFF Mode: FM FM-TONE: OFF f: 52.0000MHz | ATT + spectrum Analyzer | 50MHz Antenna Terminal | Main | VR1 | Balance the spurious to obtain the minimum value. -60dB or below |
| | AG output: OFF Mode: FM Band (MHz): 1.9, 3.5, 10, 14, 18, 21, 24, 28 | | HF Antenna Terminal | | Check | -52dB or below (-47dB or below in 10MHz band only) |
| Carrier Balance | AG output: OFF Mode: LSB/USB | | | | L9 | Adjust so that the value is within the regulation. (Adjust L9 when the spurious is not -52dB or below in 24/28MHz band.) |
| Modulation | Mode: CW Keying: OFF f: 53.99MHz | | | | Check (VR3 VR4) | -50dB or below (Adjust VR3 and VR4 when the carrier suppression is not -50dB or below.) |
| | Mode: FM, AM, USB/LSB Connect the microphone. | Monitor Transceiver | | | Check | 60dB or below Make sure the modulation sound in every mode. |

Connect the power meter to 50MHz antenna terminal.
 Frequency: 52.000MHz Mode: USB Power: High
 Speech Compressor (SET mode): OFF FM-TONE: OFF

| Item | Condition | Measurement | | Adjustment | |
|-----------------|--|--------------------------------|------------------------|------------------|--|
| | | Equipment | Terminal | Parts | Method |
| Filter Tuning | AG output: -30dBm Mode: FM FM-TONE: OFF | Oscilloscope (Linear Detector) | 50MHz Antenna Terminal | L11 L10 L9 | Set the AM modulation factor to the minimum. It should be 5% or below. |
| Carrier Balance | AG output: OFF f: 7.1000MHz Mode: LSB/USB | Oscilloscope | HF Antenna Terminal | VR3 VR4 | Adjust VR3 and VR4 so that the carrier suppression is 50dB (1/300) or below at 100W. The carrier suppression should be decreased in both USB and LSB. |
| CW Wave Form | Mode: CW-L/CW-U Electronic-keyer (dot): approx. 20ms | | | VR11 Check | Make sure of the wave form. The wave form of rise and fall should be symmetry. (The inclination is approx. 3ms.) The side tone of CW is should be heard from speaker. |
| Low Power | Mode: FM Power: Low | Power Meter | | Check | Within 10-20W |
| AM Power | AG output: OFF Mode: AM Power: High | | | Check | 35-50W |
| Band Power | Mode: FM Band (MHz): 1.9, 3.5, 10, 14, 18, 21, 24, 28, 50 | | | Check | Make sure that the power is 80-110W. |