

## **SECTION 1. TEST METHOD**

### **1.1 HANDSET**

#### **1. Instrument for Test**

- 1) MULTIMETER
- 2) AC VOLT METER (ACVM)
- 3) AUDIO FREQUENCY GENERATOR (600ohm OUTPUT)
- 4) STORAGE OSCILLOSCOPE
- 5) TELEPHONE ANALYZER  
or 20Hz RING GENERATOR with ADJUSTABLE OUTPUT LEVEL
- 6) FREQUENCY COUNTER
- 7) DISTORTION METER
- 8) RF STANDARD SIGNAL GENERATOR (SSG)
- 9) RF VOLT METER
- 10) MODULATION METER
- 11) SINAD METER
- 12) SPECTRUM ANALYZER

## 2. Standard Test Condition

### 1) STANDARD VOLTAGE

(1) BASESET UNIT .....AC 220V  $\pm$  10%, 50Hz

(2) HANDSET UNIT .....DC 3.9  $\pm$  0.1V

2) TEMPERATURE .....25  $\pm$  5°C

### 3) TX FREQUENCY

<u>CHANNEL</u>	<u>BASESET TX</u>	<u>HANDSET TX</u>
1 / 21	904.0125 / 904.5125 MHz	814.0125 / 814.5125 MHz
2 / 22	904.0375 / 904.5375 "	814.0375 / 814.5375 "
3 / 23	904.0625 / 904.5625 "	814.0625 / 814.5625 "
4 / 24	904.0875 / 904.5875 "	814.0875 / 814.5825 "
5 / 25	904.1125 / 904.6125 "	814.1125 / 814.6125 "
6 / 26	904.1375 / 904.6375 "	814.1375 / 814.6375 "
7 / 27	904.1625 / 904.6625 "	814.1625 / 814.6625 "
8 / 28	904.1875 / 904.6875 "	814.1875 / 814.6875 "
9 / 29	904.2125 / 904.7125 "	814.2125 / 814.7125 "
10 / 30	904.2375 / 904.7375 "	814.2375 / 814.7375 "
11 / 31	904.2625 / 904.7625 "	814.2625 / 814.7625 "
12 / 32	904.2875 / 904.7875 "	814.2875 / 814.7875 "
13 / 33	904.3125 / 904.8125 "	814.3125 / 814.8125 "
14 / 34	904.3375 / 904.8375 "	814.3375 / 814.8325 "
15 / 35	904.3625 / 904.8625 "	814.3625 / 814.8625 "
16 / 36	904.3775 / 904.8875 "	814.3775 / 814.8875 "
17 / 37	904.4125 / 904.9125 "	814.4125 / 814.9125 "
18 / 38	904.4375 / 904.9375 "	814.4375 / 814.9375 "
19 / 39	904.4625 / 904.9625 "	814.4625 / 814.9625 "
20 / 40	904.4875 / 904.9875 "	814.4875 / 814.9875 "

4) STANDARD MODULATION ..... 1KHz,  $\pm$  2KHz DEVIATION

5) STANDARD RF INPUT ..... 60dBuV

6) STANDARD AUDIO FREQUENCY ..... 1KHz

7) TELEPHONE LINE IMPEDANCE ..... 600 $\Omega$

8) STANDARD LPF ..... 15KHz

### 3. Entering TEST MODE

#### 1) Handset

##### (1) Entering TEST MODE

A. When the power is off.

- Press dial button [3],[9] and turn the power on simultaneously.  
(BEEP tone is heard)

##### (2) Function and Operation Mode

A. TEST MODE 1 : Talk mode + CH

- TEST MODE → [1] → [TALK] → Channel No.(2 digits)
- [0] BTN : RX MUTE ON/OFF

B. TEST MODE 2 : DATA receiving mode

- TEST MODE → [2] → [TALK] → Channel No.(2 digits)

C. TEST MODE 3 : ID No. confirmation mode

- TEST MODE → [3]

D. TEST MODE 4 : DATA transmitting mode

- TEST MODE → [4] → [TALK] → Channel No.(2 digits)

E. TEST MODE 5 : ID No. entering mode

- TEST MODE → [5] → ID No.(6 digits)

## 2) Base

### (1) Entering TEST MODE

A. When the power is on.

- Connect the keypad jig and PCB of base and press TEST button.  
(BEEP tone is heard and the LEDs of jig is on)

### (2) Function and Operation Mode

A. TEST MODE 1 : Talk mode

- TEST MODE → [1] → [CHAN] → Channel No.(2 digits)
- [0] BTN : RX MUTE ON/OFF

B. TEST MODE 2 : DATA receiving mode

- TEST MODE → [2] → [CHAN] → Channel No.(2 digits)

C. TEST MODE 3 : ID No. confirmation mode

- TEST MODE → [3]
- Display the ID No. on the LCD of jig.

D. TEST MODE 4 : DATA transmitting mode

- TEST MODE → [4] → [CHAN] → Channel No.(2 digits)

E. TEST MODE 5 : ID No. entering mode

- TEST MODE → [5] → ID No.(6 digits)  
(After enter the ID No, attach label of ID No. on the PCB.  
When it's final assemble, refer to attached the label)

\* [RDL] button : Test mode is initialized.

## 4. Test for Handset

### 1) Preparation

- (1) Adjust the voltage of power supply to DC 3.9V.
- (2) Press dial button [3],[9] and turn the power on simultaneously.  
Or,  
Power switch is on and test switch is on.
- (3) Press dial button [1] → [TALK] → [2] → [1] to set channel 21 in test mode 1.  
\* Disassemble the antenna.

### 2) Not adjust Tx and Rx VCO.

### 3) Adjustment of Tx Frequency

- (1) Connect 50 $\Omega$  coaxial cable to antenna part of RF board.
- (2) Connect the coaxial cable to Freq. Counter and adjust the VC501(RF module) to within 814.5125MHz $\pm$  1KHz.

### 4) Adjustment of Tx Power

- (1) Connect the coaxial cable to RF Power Meter.
- (2) Adjust VR1401(RF module) that power is 7 $\pm$  1mW.

### 5) Check SPURIOUS

- (1) Set the spectrum analyzer to REF. LEVEL = +15dBm, START = 100MHz, STOP = 2GHz, RESOLUTION BANDWIDTH = 30KHz.
- (2) Connect coaxial cable to spectrum analyzer and check the spurious is above 53dBc.

### 6) Adjustment of Tx Voice Deviation

- (1) Set the channel 21.
- (2) Adjust the power of Audio Freq. Generator to 1KHz, 10mVrms.
- (3) Connect Audio Freq. Generator to Test pad through 100uF Elec. capacitor and adjust RV1 that the freq.deviation is 2.0 $\pm$  0.15KHz and check the distortion factor is below 5%.(The Mic. Path is mute.)

### 7) Test for Tx Data Deviation

- (1) Remove Freq. Generator and press [REDIAL] → [4] → [TALK] → Channel No. (2 digits) to transmit data.
- (2) Check the data deviation is 2~5KHz.

## 8) Adjustment of Rx Sensitivity

- (1) Press [1] button to return Test Mode.
- (2) Press [TALK] → [2] → [1] to set the channel 21 in Test Mode.
- (3) Set the RF output power is 60dBuV, the frequency is 904.5125MHz, audio frequency is 1KHz, and FM modulation is 2KHz of SSG.
- (4) Connect to coaxial cable at SSG.
- (5) Connect the Level Meter to pin #3 of U4 and GND of K/P board and check level and distortion factor. Adjust the RV2 of K/P board that level of each receiver part is  $150 \pm 5$  mVrms. In this time, check the distortion factor is below 5.
- (6) Decrease the output power of SSG to confirm that 12dB SINAD point is below -107dBm.

## 9) Adjustment of Carrier Detect

- (1) Adjust VR1301 of RF module that pin #60 of CPU port is low when the output of SSG is up +3dBm.(It can check the led of [TALK].)
- (2) Check that the LED of Talk is off when the output of SSG is decreased to -2dBm and it is on when the output of SSG is increased +2dBm.

## 10) You need not adjust Dx Alarm.

## 11) Entering ID No.

- (1) set the Test Mode 5.
- (2) Beep tone is heard when pressing ID No.(6 digits).

## 12) Test for Low Battery

- (1) Turn the power supply switch off/on.
- (2) Decrease the voltage to check that the point which Beep tone is heard below DC  $3.4 \pm 0.1$  V .

## 5. Test for Base

### 1) Preparation

- (1) Connect the test JIG to sample and then press the 'TEST' button to enter the test mode.
- (2) Press dial button [1] → [CHAN] → [2] → [1] to set channel 21 in Test Mode.
  - \* Disassemble the Antenna terminal.

### 2) Adjustment of Tx and Rx VCO.

#### (1) Tx VCO

Contact the oscilloscope probe to pin3 of U13, and then adjust CV2 to DC  $1.7V \pm 0.1V$ .

#### (2) Rx VCO

Contact the oscilloscope probe to pin3 of U13, and then adjust CV3 to DC  $1.7V \pm 0.1V$ .

### 3) Adjustment of Tx Frequency

- (1) Connect  $50\Omega$  coaxial cable to antenna part of RF board.
- (2) Connect the coaxial cable to Freq. Counter and adjust CV1 to  $904.5125MHz \pm 1KHz$ .

### 4) Adjustment of Tx power

- (1) Connect coaxial cable to RF Power Meter.
- (2) Adjust RV3 that power is  $7 \pm 1mW$ .

### 5) Check Spurious

- (1) Set the Spectrum Analyzer to REF LEVEL = +15dBm, START = 100MHz, STOP = 2GHz, RESOLUTION BANDWIDTH = 30KHz.
- (2) Connect coaxial cable to Spectrum Analyzer and check the spurious is above 53dBc.

### 6) Adjustment of Tx Voice Deviation

- (1) Press dial button [0] for Rx mute on.
- (2) Feed DC 48V to tel. line.
- (3) Adjust output of Audio Freq. Generator to 1KHz, 312mVrms when it is not loaded to tel. line and connect it. Adjust RV2 that the freq. deviation is  $2.2 \pm 0.2kHz$  (@ 30mA Loop Current) and check the distortion factor is below 5%.

### 7) Test for Tx data Deviation

- (1) After testing 4, on the Rx mute state, press [RDL] → [4] → [CHAN] → Channel No.(2 digits) to transmit data.
- (2) Check the data deviation is 2 ~ 5KHz.

## 8) Adjustment of Rx Sensitivity

- (1) Set the output power is 60dBuV, the frequency is 814.5125MHz, audio frequency is 1KHz and FM modulation is 2KHz of SSG.
- (2) After connecting 600 $\Omega$  dummy to each part of Tel line, connect Level Meter and adjust T1 to be the maximum level.
- (3) adjust RV1 of main board that AC level is  $500 \pm 30$ mVrms. In this time, check the distortion factor is below 5% and check the Rx sensitivity is below -107dBm.(12dB SINAD)

## 9) Adjustment of Carrier Detect ( You don't need to adjust it, just check it)

- (1) Check that the LED of [TALK] is on when the output of SSG is up 6dB (than 12dB SINAD point).
- (2) Check that the LED of [TALK] is off when the output of SSG is decreased to -1dB (than 12dB SINAD point)

## 10) You need not adjust Dx Alarm.

## 11) Entering ID No.

- (1) Press the [5] button for set the Test Mode 5.
- (2) Confirmation tone(BEEP) is heard when pressing ID No.(6 digits)

## 12) Test for Ring

- (1) Set the normal mode by entering power to base and handset.
- (2) Adjust ring output Telephone Analyzer to 20Hz, 70Vrms and connect base to tel. line.
- (3) Check the ring is occurred in Ringer of handset when the output of ring is started in Telephone Analyzer.

## 13) Entering Flash Time

- (1) Press [7] button at test mode state.(Display the Flash Time on the LCD of jig.)
- (2) Press each dial button for set desire the Flash Time.
  - . [1] : 100ms, [2] : 200ms, [3] : 300ms, [4] : 400ms, [5] : 500ms
  - [6] : 600ms, [7] : 700ms, [8] : 800ms, [9] : 900ms, [0] : 1000ms