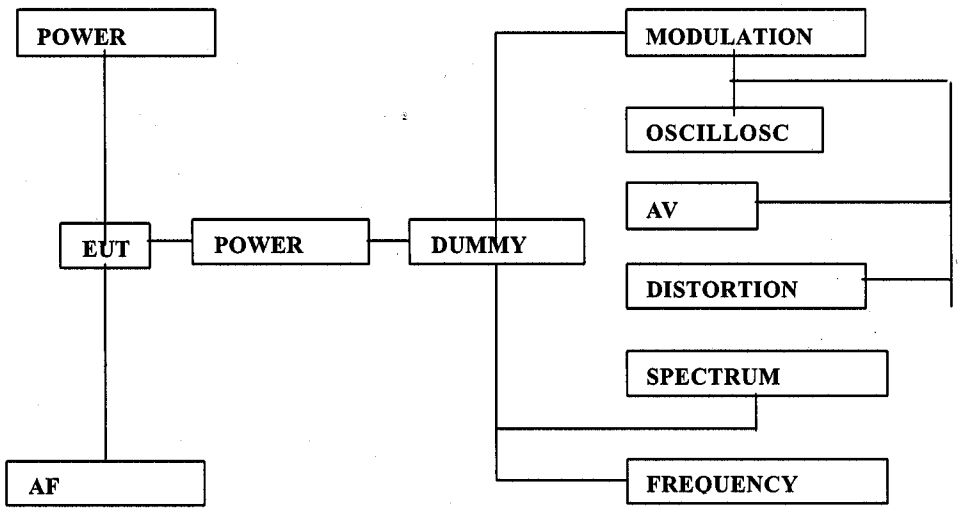
4. ADJUSTMENT

4.1 Frequency synthesizer (PLL)

a) After connecting the power meter and dummy load(50Ω), join the antenna connector of GM1500XTM with above equipment.
b) Check the voltage between TP & GND in digital voltmeter.
c) Then set the low channel of GM1500XTM the lowest frequency.
d) After pressed PTT key of GM1500XTM, trim VC2 for adjusting the lowest frequency of TX channel to DC 1.0V in the voltage of FR.
e) After releasing the PTT key, And then check if the highest frequency of Rx channel is within DC 0.5~3.0V in the voltage of FR.
f) When the FM Radio mode setting, check if the FM frequency channel is DC 2.0 In the voltage of FM.

4.2 TRANSMITTER

a) Connect EUT & measure equipment accordin g to block diagram below.



b) Connect DC 6.0V, voltage preset to EUT.
c) Connect "Power Meter" & "dummy load(50Ω)".
d) Adjust TX frequency according to trimming trimmer VC1.
e) Connect AF oscillator to Mic terminal for conform modulation degree.
f) Adjust the frequency of AF oscillator to 1kHz and adjust AF level should be 60mV.
g) Checking oscilloscope and modulation meter.
Max frequency deviation should be in 7 2.2 KHz.

4.3 TRANSMITTER TEST (GM1500XTM)

a) Output Power Test
Power(6.0V DC) should be Max. 2.0W when POWER AUTO is selected in GMRS channel. Power

should be Max.0.5W when POWER LOW is selected in GMRS channel(1~7, 15~22ch). Power should be Max.0.5W in FRS channel(8~14ch)

b) Audio Response

Connect AF oscillator to Mic terminal and then confirm the audio level that doesn't distortion the wave of oscilloscope in the frequency range, 300Hz 3kHz. Check the audio level for 300Hz 3kHz based on frequency standard, 1kHz.

c) Modulation Degree Test

1) Connect AF oscillator to the Mic terminal and then adjust the level to 60mV.
2) Measure the oscilloscope wave and he point needle of modulation meter after pressing PTT key.
3) Sweep gradually the frequency of AF oscilloscope from 300Hz to 3KHz.
4) At this time, the point needle of modulation meter should be in ±2.5KHz.

d) Spectrum Test

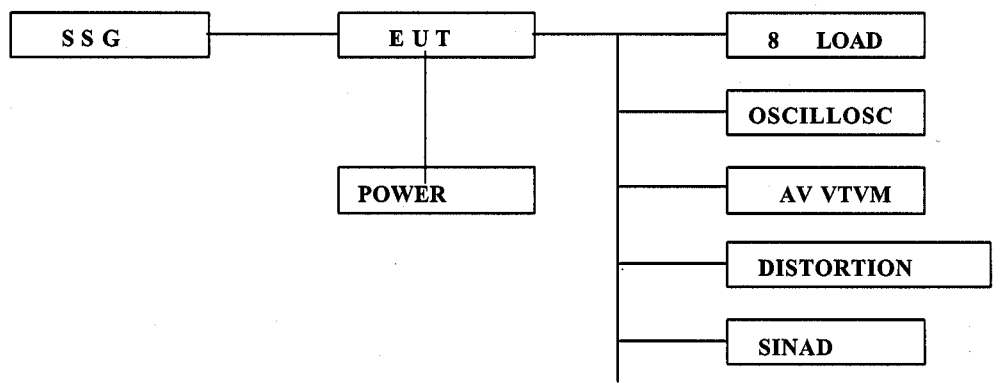
1) Antenna is 50 and attenuator degree should be 20dB more.
2) Observe the spectrum with pressing PTT key. The harmonic should be less than -13dBm(conducted) carrier.

4.4 RECEIVER

a) Preparation

1) Adjust the power supply to DC 6.0V
2) Adjust Voltage level to 0.7Vrms(8 load) after power on.

b) Connection method



c) The Conform of GM1500XTM Rx sensitivity

1) Adjust SSG to channel frequency.
2) Adjust modulation frequency 1kHz to modulation degree 1.5KHz.
3) After adjusting the frequency of SSG to channel frequency, RF level sets To -47dBm.

d) The Conform of GM1500XTM Squelch sensitivity

1) Set the standard channel.
2) In squelch mode, SQ volume VR1 must be turned counterclockwise.
3) After adjusting SSG to channel frequency, the adjusting SSG to level.

(–120dBm set is audio on, -130dBm set is audio off)

e) The Confirm of FM Radio Rx sensitivity

1) Adjust SSG to FM Radio channel frequency.

2) Adjust modulation frequency 1KHz to modulation degree 10KHz.

1) After adjusting the frequency of SSG to Radio channel frequency, RF level Sets to –47dBm.

4.5 RECEIVER TEST (GM1500XTM , FM RADIO)

a) Audio Distortion Test

1) SSG should be adjusted to -47dBm.

2) Adjust to 0.7Vrms(8 load) seeing Audio wave.

3) Read the needle of distortion meter(normal condition would be less than 5% distortion.)

b) Rx sensitivity test

SSG should be adjusted to 12dB of SINAD's point needle seeing wave of oscilloscope as SSG sets in 1kHz with 1.5KHz frequency deviation. At this time, normal RF level is less than –120dBm

c) Squelch Test

After RF level of SSG should be set to the least level, RF level should be gradually increased until speaker makes audio sound. At this point, check RF level(Check Audio on : -120dBm, Audio off : -130dBm)

c) FM Radio Distortion Test

1) SSG should be adjusted to -47dBm.

2) Adjust to 0.7Vrms(8 load) seeing Audio wave.

3) Read the needle of distortion meter(normal condition would be Less than 5% distortion.)

4) FM Radio FM modulation sets to 10KHz.

e) FM Radio sensitivity test

SSG should be adjusted to 20dB of SINAD's point needle seeing wave of Oscilloscope as SSG sets in 1KHz with 10KHz frequency deviation. At this time, normal RF level is less than –110dBm.

4.6 Symptoms, Check point & Correction

a) Diagnose is method

1) Check each switch to work well.

2) Check voltage of battery.

3) Problem develops from transmitter or receiver?

b) Troubleshooting

1) Transmitter

1.Power key is on condition but does not work.

a.Battery could completely discharge.

b.Battery cell twist..

c.Touch problem come between Battery and Radio.

2.Fail to transmit

a.Run out of battery or charge problem.

b.Fault of PTT key.

c. Fault of Q1, Q2, D2.

3.Transmitter works but frequency is unmatched

a.Out of order in frequency synthesizer.

b.Out of order in X-tal(X1).

4.Audio does not sound(Tx power and Tx frequency are normal)

a. Problem of microphone or Mic connector.

b. IC U206A,U206B problem.

5.Tx is set when switch is on.

a. Tx switch problem

2) Receiver (GM1500XTM, FM RADIO)

1. Rx sound does not work

a. Speaker line open problem or connector problem.

b. Receiver power circuit problem.

c. Audio amplifier Base band IC U215 problem.

2. Only noise sound

a. U2 problem.

b. VCO problem.

3. Rx sensitivity is weak

a. Antenna mounting problem.

b. Front-End circuit problem. (with FM Radio Front-End)

c. Local oscillation frequency deviation problem.

d. SF1 saw filter fail.(Only GM1500XTM)

e. VCO problem.

4. Squelch does not work

a. U2 problem.

b. Control logic problem.