

Boomerang TRANSMITTER TUNE UP PROCEDURE PERFORMANCE TEST

The procedure in this chapter allows the verification of the electrical performance of transmitter. These tests do not require access to the interior of the instrument.

Recommended test equipment

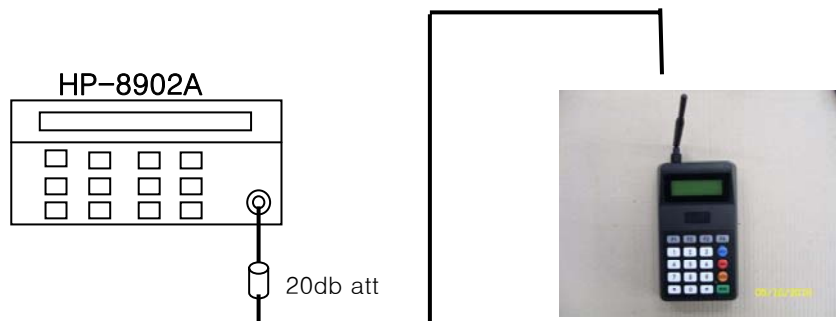
| Description | Minimum specification | Model |
|--------------------|---|---------------|
| Power meter | + / - 0.2dB, - 60 to -20dBm. 100 KHz to 1GHz | HP-436A/8481D |
| Spectrum analyzer | 100KHz to 12GHz, up to -120 dBm | HP-8591E |
| Measuring receiver | 0.2 to 1300MHz, 0 to -125dBm, Freq Counter | HP-8902A |
| Oscilloscope | DC to 100MHz, 5mV to 1V/div, Rise Time capavity | TEK TDS360 |
| Frequency Counter | + / - 0.1ppm, 10Hz ~ 1GHz, 9digit | HP-53181A |
| Attenuator | 10W, 20dB Att, DC to 1GHz | Tescom 99910 |

1. Frequency Accuracy

Frequency : 457.5750MHz

Stability : Same as reference oscillator accuracy. Internal 1ppm 0 to 50degC

1.Test Setup (Connect Boomerang BNC Jack without antenna)



Carrier frequency accuracy test

2. HP-8902A : auto tuning, frequency display

3. Boomerang TRANSMITTER

1) Connect 20dB Attenuators

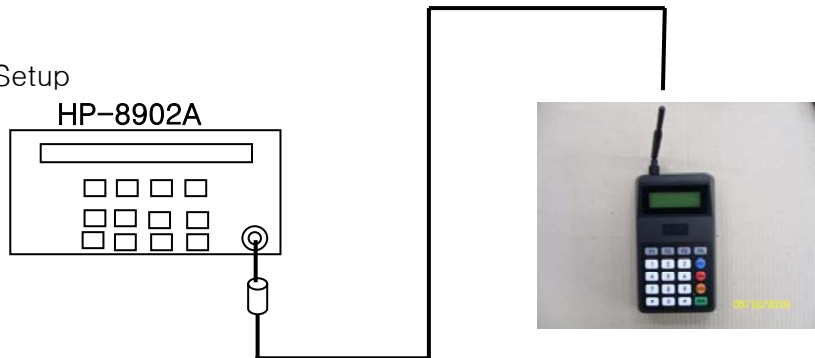
2) Power On

3) Setup key, enter, password 2386 key enter, Use # key to select " SYNC OFF, RF ON

| TC-1950A FREQ | Lower Limit | Actual | Upper Limit | Remarks |
|---------------|-------------|--------|-------------|---------|
| 457.5750MHz | 457.5748 | | 457.5752 | |

2. RF Output Level Accuracy
 RF level : 30dBm
 Accuracy : +/-1dB

1. Test Setup



(Connect Boomerang BNC Jack without antenna)

2. HP-8902A : Auto-tuning, RF Power

3. Boomerang TRANSMITTER

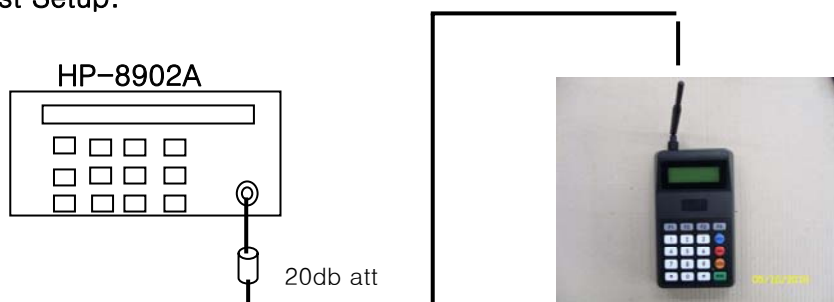
- 1) Connect 20dB Attenuators
- 2) Power On
- 3) Setup key, enter, password 2386 key enter, Use # key to select " SYNC OFF, RF ON

3. Spectral Purity

3.1. Residual FM Noise

RMS Noise : <10Hz Typ, 300Hz ~ 3KHz
 <70Hz Typ, 50Hz ~ 3KHz

1. Test Setup.



(Connect Boomerang BNC Jack without antenna)

2. HP 8902A : FM, RMS, Filter BW 300Hz ~ 3KHz

3. Boomerang TRANSMITTER:

- 1) Connect 20dB Attenuators
- 2) Power On
- 3) Setup key, enter, password 2386 key enter, Use # key to select " SYNC OFF, RF ON

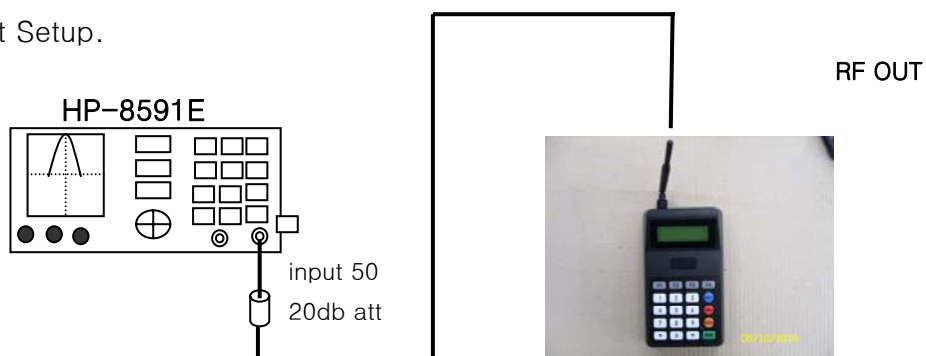
TC-1950A Signal Generator Residual FM

| 8902 Filter BW | | Actual | Limit (Hz) | Remark |
|----------------|------|--------|------------|--------|
| HPF | LPF | | | |
| 300Hz | 3KHz | | 10Hz | |
| 50Hz | 3KHz | | 70Hz | |

3.2. Harmonic Spurious :

Harmonic Level at 2xFOUT : <-60dBc

1. Test Setup.



Harmonice test

(Connect Boomerang BNC Jack without antenna)

2. HP 8591E : Span = 500KHz, RBW = 10KHz, VBW = 30KHz.

3. Boomerang TRANSMITTER:

1) Connect 20dB Attenuators

2) Power On

3) Setup key, enter, password 2386 key enter, Use # key to select " SYNC OFF, RF ON

Boomerang TRANSMITTER Harmonic Spurious

| Fout(MHz) | Spurious(MHz) | Level(dBm) | Fout-2*Fout | Limit | Remark |
|-----------|---------------|------------|-------------|--------|--------|
| 457.575 | 915.15 | | | -60dbc | |

4. Modulation

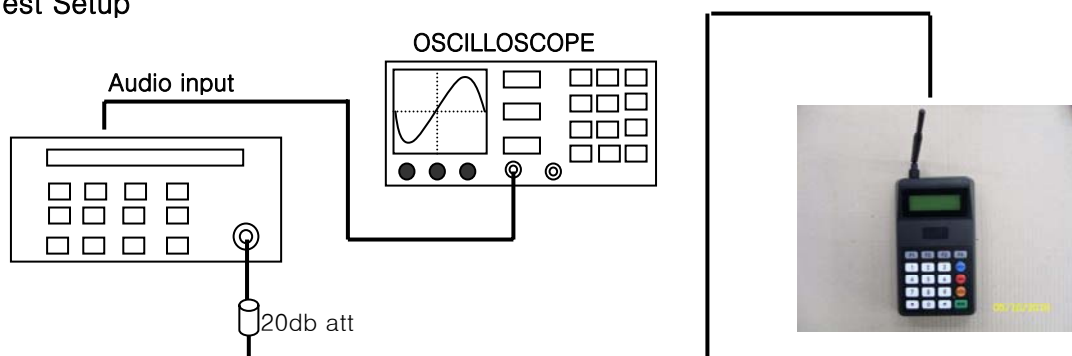
4.1. FM(RECT) (Internal FSK Test Patterns)

Deviation Accuracy

Deviation : 4.5KHz,

Accuracy : +/-5% (4.275 < FM < 4.725)@4.5KHz

1.Test Setup



FSK Deviation and Noise Test

(Connect Boomerang BNC Jack without antenna)

2. Equipment

HP-8902A : FM, AVG, HPF=OFF, LPF=15KHz

TDS360 : 250us/div, 500mV/div Average : 16

3. Boomerang TRANSMITTER:

- 1) Connect 20dB Attenuators
- 2) Power On
- 3) Setup key, enter, password 2386 key enter, Use # key to select " SYNC OFF, RF ON

4. Read FM Deviation in RMS.

DEV(Boomerang)

4.5KHz

Limit

4.5KHz + - 5%

Table : FSK Deviation Accuracy

| Item | Lower | Actual | Upper | Remark |
|-----------------|-------|--------|-------|--------|
| Deviation (AVG) | 4.275 | | 4.725 | |