Synchronized Clock Transmitter and Receiver

Question 3

Test and Alignment Procedure V1.0

prepared for

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Equipment List:

1. DVM (Remote Controlled for automation)

2. Power supply 3V @ 35mA

3. Power supply 9V @ 350mA

4. Agilent Arbitrary Waveform Generator 33250A or 33120A

5. HP8920B with the following options:
001 high stability time base
007 low Level Power measurements
102 spectrum analyzer with tracking generator

Quartex Synchronized Clock Transmitter

Production Test and Alignment Procedure

1. LCD Display Contrast Adjustment

A. Apply 9VDC to the transmitter board via the power jack.
B. Adjust VR1 for good display contrast OR measure the resistance from pin 3 on J5 and adjust VR1 for a reading of 985 Ohms.
C. Activate the GPS simulator and verify communication with the transmitter.

2. Deviation, Frequency Stablilty, and Output Power.

A. Set up the HP8920B in the following way, either remotely or from the front panel.
   a. Go to the AF analyzer screen and set the AF anl in to FM Demod.
   b. Set the Detector to Pk+-/2.
   c. Go back to the RF analyzer screen.
   d. Set the power units to dBm
B. Set up the Transmitter board in the following way:
   a. Switch the transmitter to Channel 8 (position 7 on the rotary switch S1).
   b. Apply 9 VDC to the board via the power jack.
   c. Activate the GPS simulator on the GPS 9 pin connector.
   d. Connect the Transmitter J1 to the HP8920B.

I. Peak Frequency Deviation Test

A. Read Peak Frequency deviation
B. PASS if greater than 2.5kHz and less than 3.2kHz

II. Transmitter Frequency Test

A. Read the Frequency in MHz
B. PASS if frequency is 72.24MHz +/- 250Hz

III. Power Output Test

A. Read the Power in dBm
B. Calculate actual power in dBm = Power read + cable losses
C. PASS if actual power in dBm is less than 29.5dBm and greater than 26.9dBm

3. Second Harmonic Level Test (leave the Transmitter board set up as in step 2).

A. Measure level of the fundamental (Menu and screens apply to the HP8920B)
   a. Go to Spectrum Analyzer screen
   b. Set Center Freq=72.24MHz, Ref Level=30dBm, Span=0.1MHz
   c. Set Controls to Auxiliary, and to Peak Hold. Allow 5 seconds to peak hold.
   d. Set Controls to Marker, and Marker to Peak.
   e. Record the level.

B Measure the level of the Second Harmonic(Menu and screens apply to the HP8920B)
   a. Go to Spectrum Analyzer screen
   b. Set Center Freq=144.48MHz, Ref Level=30dBm, Span=0.1MHz
   c. Set Controls to Auxiliary, and to Peak Hold. Allow 5 seconds to peak hold.
   d. Set Controls to Marker, and Marker to Peak.
   e. Record the level.

C. Calculate the difference
   a. The level taken in step A – the level taken in step B
   b. PASS if the difference is greater than 43dB.

5. Check Tuning Voltage (leave the Transmitter board set up as in step 2).

A. Probe TP1 TUNING with a DVM and measure the voltage
B. PASS if the voltage is greater than 0.5Volts and less than 4.5Volts

6. Measure Transmitter Current Drain (leave the Transmitter board set up as in step 2).

A. Measure the current draw from the 9 Volt Supply with a DVM
B. PASS if the current measured is greater than 280mA and less than 350mA at 9Volts

4. 20 MHz Clock Oscillator Alignment

A. Remove power from the Transmitter board.
B. Deactivate the GPS simulator to stop the board from transmitting.
C. Reapply the 9 VDC supply to the Transmitter board.
B. Bring High impedance “sniffer probe” connected to an RF Frequency counter close to the 20 MHz crystal oscillator.
C. Adjust VC1 with a ceramic tuning tool for a frequency of 20MHz +/- 100Hz