Document Title:

Tuning and Aligning Base Station

RELEASED

1.0 PURPOSE

1.1 The purpose of this Work Instruction is to provide the Operator instruction on the Tuning and Aligning on the Base Station, models B-150, B-450 & B-800.

2.0 SCOPE

2.1 This instruction applies to all Base Stations tested under 509-000XX-10-WI.

3.0 REFERENCES

3.1 IPMN p/n: 516-80468 Quality Manual, Section 10
3.2 509-000XX-10-WI Standard Base Station Test Procedure.

4.0 PROCEDURE

4.1 Base Station Setup

4.1.1 On the Exciter board place the following jumpers;

B-150	jmp1	pins 2 & 3 for 193 synthesiser, pins 1 & 2 for all others
	jp1	N/A
B-450	jmp1	pins 1 & 2 for Murata, 2 & 3 all others
	jp1	pins 2 & 3 for 193 synthesiser, pins 1 & 2 for all others
B-800	jmp1	pins 1 & 2 for Murata device, pins 2 & 3 for all others
	jp1	N/A

4.1.2 On Injection board place the following jumpers;

B-150	pins 2 & 3 for 193, pins 1 & 2 for 190 or 191
B-450	pins 2 & 3 for 193, pins 1 & 2 for 190 or 191
B-800	N/A

4.1.3 Turn off power, hold S1 and turn on power, continue to hold S1 for 5 sec.

4.1.4 Flash to 168 processor using the Hitex program, and 167 processor in DOS mode.

4.1.5 Hard boot the base by cycling the power, the TX LED should illuminate for approximately 3 sec.

4.1.6 Enter the EEPROM parameters, see Appendix A

4.2 Receiver Distortion and SINAD Level

4.2.1 Place RF Probe on the amplifier located on the Injection board, Set the variable resistor for center and adjust Inductor for the least amount of error (±100Hz).
B-150 amplifier U6 Variable resistor R10
B-450 amplifier U7 Variable resistor R23
B-800 amplifier U4 Variable resistor R7

4.2.2 Remove inserts from L11 inductors on 3 receiver board

4.2.3 Connect probe from Audio IN HI on 8920 to TP6 on system controller board.

4.2.4 Remove yellow wire from TB1 on receiver boards not being tuned.

4.2.5 Inject an on frequency signal in the receiver under test (1kHz test tone @ 5.0 kHz deviation), while monitoring the voltage on TB1 tune for maximum voltage,
B-150 In order; C4 then C5 …C9…C8…
B450 C22
B800 C30

4.2.6 Then tune for the lowest distortion reading on the 8920, Record the DC voltage from TB1 and the distortion level from the 8920, on the Test Data Sheet.
B-150 CV1
B-450 C5
B-800 C22

4.2.7 Set 8920 to measure SINAD and adjust RF level for 12 dB, monitoring the voltage at TP1 adjust for 0.745 VDC. (Receiver 1 R12, receiver 2 R10, receiver 3 R33)

4.2.8 Add 50 dB to the RF level and monitor TP 1, Adjust for 2.75 VDC
(Receiver 1 R12, receiver 2 R10, receiver 3 R33)

4.2.9 Repeat steps 4.2.7 & 4.2.8 to eliminate any interaction between these adjustments.

4.3 Receiver AC and DC Levels

4.3.1 Connect the Audio IN HI to TP 6, inject an on frequency signal @ -80 dBm adjust the AC level to 350 mVDC and the DC to 2.5 VDC. Record voltages on Test Data Sheet.
(rec 1 AC-R72 / DC-R57, rec 2 AC-R71 / DC-R58, rec 3 AC-R53 / DC-R59)

4.4 RSSI Calibration

4.4.1 Set input signal level to as follows then, in HyperTerminal type in "calibrate rssi =" and the corresponding level

-120 dBm - calibrate rssi = -120
-110 dBm - calibrate rssi = -110
–100 dBm - calibrate rssi = -100
–90 dBm - calibrate rssi = -90
–80 dBm - calibrate rssi = -80
–70 dBm - calibrate rssi = -70
–60 dBm - calibrate rssi = -60
–50 dBm - calibrate rssi = -50
–40 dBm - calibrate rssi = -40
–30 dBm - calibrate rssi = -30

4.4.2 Repeat 4.4.1 for the other 2 receivers.

4.5 Exciter

4.5.1 Connect the output of the base station to the RF-IN port of the communications test set.

4.5.2 Using the X=1400,19 command, generate data messages so the transmit power and frequency can be checked

4.5.3 While the base station is transmitting the data messages, adjust the one of the following for a level just below 5.0 kHz deviation. Record deviation on the test data sheet.
B-150 RV1
B-450 R42
B-800 R11

4.5.4 While monitoring the transmit signal at the C276 pin 2 with the HF probe, adjust one of the following for minimum reference spurs at the +/- 25 kHz offset frequency from the carrier frequency. Use the 200 kHz span of the spectrum analyzer for the best view of the reference spurs.
B-150 RV1
B-450 RV1
B-800 R4

4.5.5 Using X=1400,19 command, adjust one of the following for minimum frequency error. Record error on the test data sheet.
B-150 R186
B-450 R30
B-800 R14

4.5.6 Note the power level and then on the power amplifier circuit board adjust the potentiometer (R3) fully counterclockwise (this will enable low power transmit operation).

4.5.7 Connect the base stations' transmit port to the HP communication test set.

4.5.8 While transmitting data messages using the X=1400,19 command, adjust the following:
- TCXO Y1 for minimum frequency error
- R42 for ±5 KHz deviation

4.5.9 Connect the base station to the IPNC.

5.0 Power Amplifier

5.1 Connect the base station's transmit port to the communication test set.

5.2 Using the X=1400,19 command, generate data messages.

5.3 Adjusting RV2 on the exciter PCB, slowly increase the base station output power to the specified level, to increase power turn the control potentiometer clockwise.
B-150 60 watts
B-450 40 watts
B-800 20 watts

6.0 Adjusting Data Quality

6.1 Using a calibrated mobile radio operating on the base station's channel, adjust on of the following for consistent data quality readings of 248 (as observed on the mobile radio's attached PC *IP*Message window).
B-150 R30
B-450 RV1
B-800 R4

ATTACHMENT A: Base Station Test Data Sheet

Date: _____

Serial Number: _____

Tester: _____

Firmware Rev. _____

	Receiver 1	Receiver 2	Receiver 3	
TB1 Voltage-				VDC
Distortion with 1.0 kHz test tone @ 3.0 kHz deviation				%
SINAD with 1.0 kHz test tone @ 5.0 kHz deviation				dBm
Receiver AC Level				MV rms
Receiver DC Level				VDC

TX deviation		kHz
TX Frequency error		Hz
TX Power		Watts