Equipment List

The following table lists the equipment required to perform the M64450G25 Mobile Radio Factory Test Procedure:

TABLE 9: EQUIPMENT REQUIRED TO PEREFORM FACTORY TEST PROCEDURE

QTY	DESCRIPTION	MANUFACTURER	MODEL
2	PC's One for Mobile One for Base	Windows 9X w/ *IP*Message AVR	
1	Service Monitor – Communication Test Set	HP	HP8920B or equivalent
1	Digital multimeter	Tektronix Fluke	77 or equivalent
1	DC power supply w/ ammeter, 13.8V, 20 Amps or more	Astron	RM35A
1	4-Channel Scope	Tektronix	TDS 460A
1	IPSeries High Speed Mobile Radio		M64450G25
1	Calibrated IPSeries High Speed Base Station		B64450G25
1	Internet Protocol Network Controller (IPNC)		
1	100 watt dummy load/attenuator	Pasternack	PE7021-40 or equivalent
2	UHF Antennae (generic mag mount)		
1	Serial cable DB9M-DB9F connectors		IPMN p/n: 156-0245-020
1	IP power cable		IPMN p/n: 502-82017-52
1	3-foot RF jumper cable with type N connectors (generic)		
1	High Frequency Probe		
1	Ceramic tuning tool		IPMN p/n: 44010006
1 ea	#0, #1, and #2 Phillips screwdrivers (generic)		

Programming and Configuring Mobile Radio

Once the appropriate equipment for performing the factory test are gathered, perform the following steps to program and configure an M64450G25 Mobile Radio:

Step 1 Enter the mobile radio serial number, date test being performed, and tester's name on the ***Test Data Sheet (see Appendix B)***.

Step 2 Program the radio to the current Firmware revision using the AVR programming utility.

Step 3 Connect a PC to the radio and launch the *IP*Message program. In the *IP*Message window, type **`factory default`**, press **[ENTER]**, and the radio displays the radio's default values.

Step 4 Enter the appropriate values for the radio's frequency band. The following values were used for a 450-506 MHz mobile radio:

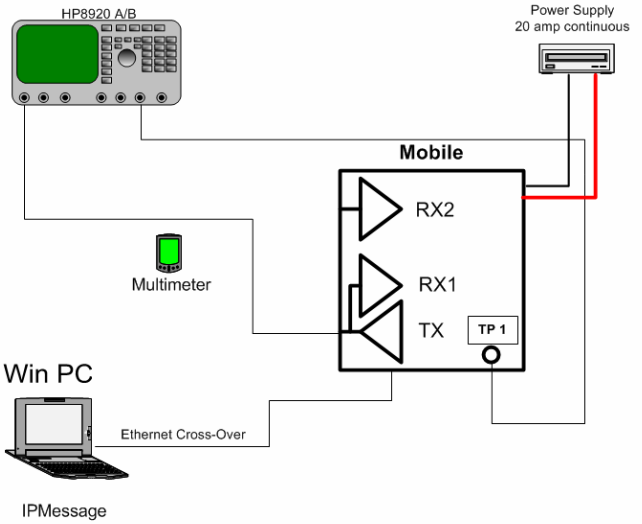
```
[From: 172.16.22.10] Host serial = 115200,N,8,1, timeout=200
[From: 172.16.22.10] Model = HS800
[From: 172.16.22.10] Host framing = Ethernet, no status messages
[From: 172.16.22.10] Channel = 0
[From: 172.16.22.10]        Channel      Tx freq          Rx freq          Inj freq
[From: 172.16.22.10] Frequency= 0, 450.000000, 463.000000, 418.000000
[From: 172.16.22.10] IP Address = 172.16.22.10, Netmask = 255.255.255.0 (VIU = 0.0.0.0, PC = 172.16.20.10)
[From: 172.16.22.10] IPNC = 255.255.255.255
[From: 172.16.22.10] PC netmask = 255.255.255.0
[From: 172.16.22.10] Radio MAC Address = 00:08:ce:00:00:00
[From: 172.16.22.10] Injection = LOW SIDE,   45.0000 MHz
[From: 172.16.22.10] Serial number: undefined
[From: 172.16.22.10] TX Power = 150
[From: 172.16.22.10] TX quiet time = 5
[From: 172.16.22.10] TX sync time = 12 milliseconds
[From: 172.16.22.10] TX tail time = 5
[From: 172.16.22.10] Tx delay = 2 slots
[From: 172.16.22.10] Radio data rate = 32000
[From: 172.16.22.10] PLL load to txkey delay = 2 milliseconds
[From: 172.16.22.10] Carrier detect delay time = 7 milliseconds
[From: 172.16.22.10] roam status time = 1800 seconds, type = 1
[From: 172.16.22.10] roam lost time = 60 seconds
[From: 172.16.22.10] Polarity = TX-, RX-
[From: 172.16.22.10] RSSI step = 12   (=234mV)
[From: 172.16.22.10] num timeslots = 24
[From: 172.16.22.10] timeslot period = 984ms
[From: 172.16.22.10] timeslots per voice packet = 4
[From: 172.16.22.10] noise = -117dBm, -117dBm
[From: 172.16.22.10] receiver = auto
[From: 172.16.22.10] Receiver Hysteresis = 0
[From: 172.16.22.10] diversity speed = 4
[From: 172.16.22.10] 12dB SINAD = -117dBm (63 on RX0)
[From: 172.16.22.10] 12dB SINAD = -117dBm (9 on RX1)
[From: 172.16.22.10] 30dB S/N = -106dBm (96 on RX0)
[From: 172.16.22.10] 30dB S/N = -102dBm (93 on RX1)
[From: 172.16.22.10] 40dB S/N = -100dBm (110 on RX0)
[From: 172.16.22.10] 40dB S/N = -94dBm (128 on RX1)
[From: 172.16.22.10] -40dBm = (225 on RX0)
[From: 172.16.22.10] -40dBm = (227 on RX1)
[From: 172.16.22.10] Modem FEC = on
[From: 172.16.22.10] Suspend Tx = 90 seconds
[From: 172.16.22.10] DHCP Client disabled
[From: 172.16.22.10] DHCP Server enabled
[From: 172.16.22.10] diag message level = 2
[From: 172.16.22.10] TFTP options = 256 (block size), 3 (interval)
[From: 172.16.22.10] Reference Frequency =   16.800000 MHz
[From: 172.16.22.10] MTU = 1480
[From: 172.16.22.10] 06 Feb 2036 22:28:30 (PST), calibration=-236
[From: 172.16.22.10] uptime = 0h:00m:14s
[From: 172.16.22.10] Radio Firmware Rev. 35-01.000.003, Sep  7 2004 - 17:33:10
[From: 172.16.22.10] Temp period = 2s
[From: 172.16.22.10] Temp Maximum = 80C
[From: 172.16.22.10] Comparison Frequency = 400000 Hz
[From: 172.16.22.10] Reflected power limit = 20
```

Test Connections

Test Equipment Setup

The test equipment should be configured as shown in the figure below:

Figure 1. Standard Bench Test Setup for Mobile



Mobile Radio Connections

Perform the following steps to connect the mobile radio properly:

Step 1 Connect the GPS antenna.

Step 2 Connect a serial cable and launch IPMessage.

Step 3 Connect a load to the transmitter antenna port.

Step 4 Connect the power cable to a voltage source of 13.8 VDC able to deliver 25 amps of continuous current.

Step 5 Apply power to the mobile radio.

Step 6 Verify the IPMessage connection by entering the **"?"** in the IPMessage command field and pressing **[ENTER]**.

Receiver Alignments and Tests

TCXO Operation

Perform the following steps to check the operation of the TCXO:

Step 1 In IPMessage, type "**status = pps, cal**" in the command field and press **[ENTER]**.

Step 2 Read the reported error values for the TCXOs.

Step 3 Continue using the "status = pps, cal" command, until GPS is acquired.

Step 4 Repeat the command observing the error values.

Step 5 Observe that the TCXO "error ppb" continues to adjust until it settles at +/-200.

Step 6 Enter the "error ppb" data onto the Tune and Align Data Sheet.

Receiver Injection

Perform the following steps to make sure the receiver injection is locked on frequency:

Step 1 Connect a coaxial cable from the Service Monitor "RF Input" port to the "RX2" port on the mobile radio.

Step 2 Place the Service Monitor in the "Tx" mode.

Step 3 Set the Service Monitor to the base station's Receiver Injection frequency.

Step 4 Adjust the squelch on the Service Monitor until the frequency error is displayed.

Step 5 When the injection frequency stabilizes record the frequency error on the Tune and Align Data Sheet.

✎ At this time the Operator is able to proceed with the other adjustments and alignments.

45 MHz Filters Waveform

Perform the following steps to set the Waveform for the 45 MHz filters:

Step 1 Set the Service Monitor with the following selections:

- Select the spectrum analyzer function
- Set the center frequency for 45 MHz
- Set the amplitude to -20 dBm
- Set the Span to 100 kHz
- Choose "Controls…RF Gen"
- Set to "Track" to enable the tracking generator
- Set the "RF Gen Freq" to equal the radio receive frequency minus 45 MHz
- Set "Amplitude" to -30 dBm
- Set the "Output Port" to "DUPL" to select the duplex out port

Step 2 Connect a High Frequency Probe to "Ant In" port on the Service Monitor.

Step 3 Adjust Receiver 1 filters.

- Connect an RF cable from the “Duplex Out” port to Receiver 1
- Probe U64 pin 1 with the High Frequency Probe
- Adjust CV12, CV5, and CV8 for the correct waveform as shown in the figure below

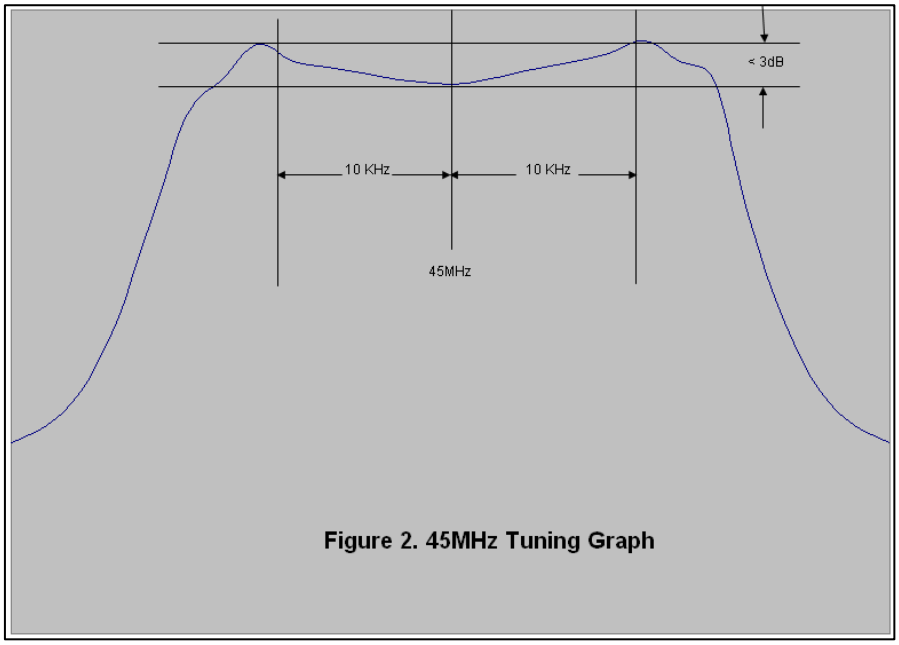


Figure 2. 45MHz Tuning Graph

Step 4 Adjust Receiver 2 filters.

- Connect an RF cable from the “Duplex Out” port to Receiver 2
- Probe U48 pin 1 with the High Frequency Probe
- Adjust CV9, CV2, and CV7 for the correct waveform as shown in the figure above

Reciever 12 dB SINAD

Perform the following steps to adjust Receiver 12 dB SINAD:

Step 1 Set the Service Monitor, as follows:

- Select the “RX” function
- Set “RF Gen Freq” to the receive frequency of the mobile radio under test
- Set the Service Monitor to display SINAD readings
- Set other values as follows:

Amplitude: *Varies*	AFGen1 Freq: 1.000 kHz	AFGen2 Freq: 1.000 kHz
Atten Hold: Off	AFGen to: FM 5 KHz	AFGen2 to: Off
Output Port: RF Out		Ext Load R: 600 ohm
Filter 1: 300 Hz HPF		
Filter 2: 3 kHz LPF		

Step 2 Test Receiver 1, as follows:

- Connect an RF cable from the Service Monitor's "RF Out" port to the antenna port of Receiver 1
- At the Service Monitor, reduce the "Amplitude" until the SINAD meter indicates 12 dB SINAD

The amplitude must be -115 dBm or less. If necessary, adjust CV12 slightly to improve 12 dB SINAD reading.

Step 3 Test Receiver 2, as follows:

- Connect an RF cable from the Service Monitor's "RF Out" port to the antenna port of Receiver 2
- At the Service Monitor, reduce the "amplitude" until the SINAD meter indicates 12 dB SINAD

The amplitude must be -115 dBm or less. If necessary, adjust CV9 slightly to improve 12 dB SINAD reading.

Receivers Minimum Distortion

Perform the following steps to adjust the receivers for minimum distortion:

Step 1 Set the Service Monitor, as follows:

- Select the "RX" function
- Set the "RF Gen Freq" to the receive frequency of the mobile radio under test
- Set the Service Monitor to display distortion readings
- Set other values as follows:

Amplitude: -80 dBm	AFGen1 Freq: 1.000 kHz	AFGen2 Freq: 1.000 kHz
Atten Hold: Off	AFGen to: FM 5 KHz	AFGen2 to: Off
Output Port: RF Out		Ext Load R: 600 ohm
Filter 1: 300 Hz HPF		
Filter 2: 3 kHz LPF		

Step 2 Adjust Receiver 1, as follows:

- Connect an RF cable from the Service Monitor's "RF Out" port to the antenna port of Receiver 1
- Observe the Service Monitor while adjusting CV4 for minimum distortion – Distortion must read 3.0% or less
- Record the distortion on the Tune and Align Data Sheet

Step 3 Adjust Receiver 2, as follows:

- Connect an RF cable from the Service Monitor's "RF Out" port to the antenna port of Receiver 2
- Observe the Service Monitor while adjusting CV1 for minimum distortion – Distortion must read 3.0% or less
- Record the distortion on the Tune and Align Data Sheet

Data Quality and Message Success Rate

Perform the following steps to adjust receiver data quality and Message Success Rate (MSR):

Step 1 Connect the base station to an IPNC via SLIP cable (an Ethernet connection will be used during Message Success Rate Testing).

Step 2 Connect a mobile radio with known good transmitter data quality in the test set up. Allow the mobile radio to connect to the base station.

Step 3 Run IPLinkView or ping the mobile radio from the IPNC.

Step 4 Set the uplink RSSI at -93 +/- 3dBm.

Step 5 Connect the mobile test setup receive cable to each of the two (2) receivers in turn.

Step 6 On each receiver, run a minimum of 50 packets in IPLinkView or 50 pings.

✎ The Data Quality of each receiver must average at least 220 over 50 contiguous samples.

Step 7 For Receiver 1, if necessary adjust CV8 slightly to improve Data Quality.

Step 8 For Receiver 2, if necessary adjust CV7 slightly to improve Data Quality.

Step 9 Calculate the Message Success Rate (MSR) over the 50 consecutive packets on each of the receivers.

✎ The MSR shall be greater than 94%. If MSR does not meet 94% proceed with Hardware Time Verification for trouble shooting.

Step 10 Record the Data Quality and the MSR on the Tune and Align Data Sheet.

Audio AC and DC Voltages and Balances

Perform the following steps to adjust the Receiver Audio AC and DC voltages and balance:

Step 1 Set the Service Monitor, as follows:

- Select the "RX" function
- Set "RF Gen Freq" to the receive frequency of the mobile radio under test
- Set the Service Monitor to display DC volts and AC Volts
- Connect an oscilloscope 1x probe from TP1 on the base station control board to the “audio in” connector on the Service Monitor
- Set other values as follows:

Amplitude: -80 dBm	AFGen1 Freq: 1.000 kHz	AFGen2 Freq: 1.000 kHz
Atten Hold: Off	AFGen to: FM 5 KHz	AFGen2 to: Off
Output Port: RF Out		Ext Load R: 600 ohm
Filter 1: 300 Hz HPF		
Filter 2: 3 kHz LPF		

Step 2 Adjust Receiver 1, as follows:

- Connect an RF cable from the Service Monitor's RF Out port to the antenna port of Receiver 1
- In IPMessage, type the command “receiver = 1” and observe that Receiver 1 is selected
- At TP1, measure AC and DC volts
- Adjust RV5 for an AC reading of 400 mVAC +/- 1mVAC
- Adjust RV6 for a DC reading of 2.500 mVDC +/- 1mVDC
- Record AC and DC levels on the Tune and Align Data Sheet

Step 3 Adjust Receiver 2, as follows:

- Connect an RF cable from the Service Monitor's RF Out port to the antenna port of Receiver 2
- In IPMessage, type the command “receiver = 2” and observe that Receiver 2 is selected
- At TP1, measure AC and DC volts
- Adjust RV3 for an AC reading of 400 mVAC +/- 1mVAC
- Adjust RV4 for a DC reading of 2.500 mVDC +/- 1mVDC
- Record AC and DC levels on the Tune and Align Data Sheet

Receiver Calibration

Each receiver must be calibrated at four (4) points to ensure the proper operation of Intelligent Diversity Reception and to provide the IPNC with correct information about the signal strength of received mobile data.

Step 1 Connect a coaxial cable from the Service Monitor “RF Input” port to a receiver port on the base station

Step 2 Set the Service Monitor

Step 3 Select the "RX" function

Step 4 Set the "RF Gen Freq" to the receive frequency of the mobile radio under test

Step 5 Connect an oscilloscope 1x probe from TP1 on the base station control board to the “audio in” connector on the Service Monitor

Step 6 Set other values as follows:

Amplitude: *varies*	AFGen1 Freq: 1.000 kHz	AFGen2 Freq: 1.000 kHz
Atten Hold: Off	AFGen to: FM 5 KHz	AFGen2 to: Off
Output Port: RF Out		Ext Load R: 600 ohm
Filter 1: 300 Hz HPF		
Filter 2: 3 kHz LPF		

Step 7 Calibrate Receiver 1, as follows:

- Connect an RF cable from the Service Monitor's RF Out port to the antenna port of Receiver 1
- In IPMessage, type the command “receiver = 1” and observe that Receiver 1 is selected
- Set the Service Monitor to measure 12db SINAD
- Reduce signal amplitude on the Service Monitor until 12dB SINAD is reached. Record this value
- In IPMessage, type the command “12DB SINAD = “ and the recorded value
- Set the Service Monitor to measure SNR
- Increase signal amplitude until reaching a level of 30dB SNR
- Record the amplitude
- In IPMessage, type the command “30DB S/N = “ and the recorded value
- Increase signal amplitude until reaching 40dB SNR
- Record the amplitude
- In IPMessage, type the command “40DB S/N = “ and the recorded value
- Set the signal amplitude to -40dBm
- In IPMessage, type the command “-40DBM = -40“

Step 8 Calibrate Receiver 2, as follows:

- Connect an RF cable from the Service Monitor's RF Out port to the antenna port of Receiver 2
- In IPMessage, type the command “receiver = 2” and observe that Receiver 2 is selected
- Set the Service Monitor to measure 12db SINAD
- Reduce signal amplitude on the Service Monitor until 12dB SINAD is reached
- Record the value
- In IPMessage, type the command “12DB SINAD = “ and the recorded value
- Set the Service Monitor to measure SNR
- Increase signal amplitude until reaching a level of 30dB SNR.
- Record the amplitude
- In IPMessage, type the command “30DB S/N = “ and the recorded value
- Increase signal amplitude until reaching 40dB SNR
- Record the amplitude
- In IPMessage, type the command “40DB S/N = “ and the recorded value
- Set the signal amplitude to -40dBm
- In IPMessage, type the command “-40DBM = -40“

Step 9 Test Receiver Calibration, as follows:

- Inject a signal with an amplitude of -95dBm into the Receiver 1 antenna port
- In IPMessage, type the command “noise”. The result must -95 dBM +/- 2.
- Next, inject -105dBM into the receiver and type “noise”. The result must be -95 dBM +/- 2.

  ✎ Result must be within 2dBm. If the noise figure is not within 2dBm of the injected signal level, return to receiver calibration and recalibrate the receivers.

- Repeat the tests for the other Receiver
- Record the noise readings on the Tune and Align Data Sheet

Transmitter Alignment Tests

Transmitter Output

Step 1 Set the Service Monitor to measure the transmitter frequency of the base station.

Step 2 Set the Service Monitor filters to "<20 Hz HPF" and "15 kHz HPF".

✎ Ensure the Service Monitor can handle the full power transmission of the base station otherwise attach an attenuator to the output of the base station transmitter antenna port before transmitting into the Service Monitor.

Step 3 Connect a coaxial cable from the output of the base station (or connected attenuator) to the Service Monitor's RF In port.

Step 4 In IPMessage, type the command "symbol sync time = 5000".

✎ This will provide a steady modulated tone from which frequency error can be measured.

Step 5 When ready to transmit, in IPMessage, type the command "X = 1" - The transmitter frequency will be modulated with a 3.9 kHz tone.

Step 6 On the Service Monitor read the frequency error.

Step 7 Record the transmit frequency error on the Tune and Align Data Sheet - Transmitter frequency error is controlled by the processor and cannot be adjusted manually.

Transmitter Modulation

Step 1 Set the Service Monitor to measure the transmitter frequency of the base station.

Step 2 Set the Service Monitor filters to "<20 Hz HPF" and "15 kHz HPF"

✎ Ensure the Service Monitor can handle the full power transmission of the base station otherwise attach an attenuator to the output of the base station transmitter antenna port before transmitting into the Service Monitor.

Step 3 Connect a coaxial cable from the output of the base station (or connected attenuator) to the Service Monitor's RF In port.

Step 4 In IPMessage, type the command "symbol sync time = 5000". This will provide a steady modulated tone from which frequency error can be measured.

Step 5 When ready to transmit, in IPMessage, type the command "X = 1". The transmitter frequency will be modulated with a 3.9 kHz tone.

Step 6 On the Service Monitor read the deviation. Use RV2 to set the deviation between 4.7 and 4.9 kHz.

Step 7 Record the Transmit Deviation on the Tune and Align Data Sheet.

Transmitter Power

Step 1 Set the Service Monitor to measure the transmitter frequency of the base station.

Step 2 Set the Service Monitor filters to "<20 Hz HPF" and "15 kHz HPF".

✎ Ensure the Service Monitor can handle the full power transmission of the base station otherwise attach an attenuator to the output of the base station transmitter antenna port before transmitting into the Service Monitor.

Step 3 Connect a coaxial cable from the output of the base station (or connected attenuator) to the Service Monitor's RF In port.

Step 4 In IPMessage, type the command "X = 1400,20". The base station will transmit 20 packets of 1400 bytes each. This continuous transmission will last approximately 10 seconds.

Step 5 On the Service Monitor note the transmitter power at the beginning of the transmission and observe whether the transmitter power drops over the course of the transmission.

Step 6 Transmitter Power Output must begin at a level between 20 and 35 watts and must not drop by more then 5 watts over the course of the "X = 1400,20" command.

Step 7 To change the transmitter output power use "TXpower" command in IPMessage.

Step 8 Record the Transmit Power on the Tune and Align Data Sheet.

Transmitter Data Quality and Message Success Rate

Step 1 Connect a base station to an IPNC via SLIP cable or Ethernet.

Step 2 Connect the mobile radio under test in the test set up.

Step 3 Allow the mobile radio to connect to the base station.

Step 4 Run IPLinkView or ping the mobile from the IPNC.

Step 5 Set the downlink and uplink RSSI to -90 +/- 2dBm.

Step 6 Observe the data quality reported by the base station on the uplink.

Step 7 Adjust RV1 in the mobile for the maximum data quality on the uplink.

Step 8 Data Quality must average 220 or better over the course of 50 consecutive packets or pings.

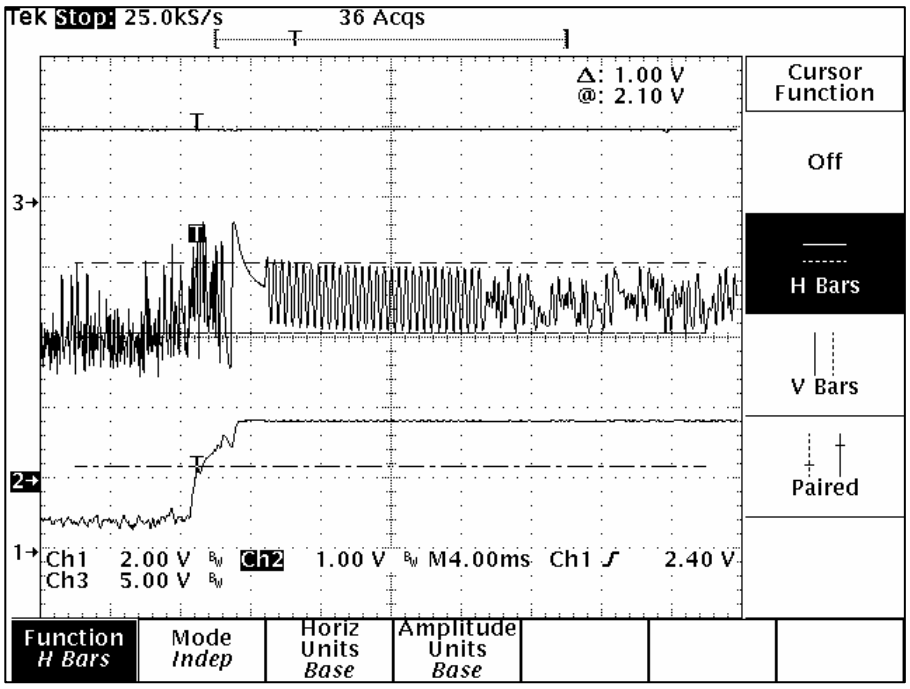
Step 9 Calculate the Message Success Rate over the 50 Consecutive packets. The MSR shall be greater that 94%.

Step 10 Record the Data Quality and the MSR on the Tune and Align Data Sheet. If MSR does not meet 94% proceed with Hardware Time Verification for trouble shooting.

Step 11 After completion of Data Quality and MSR tuning, record Firmware Settings. File the Tune and Align Data Sheet with the Firmware setting in the IPMN Network.

Hardware Timing Troubleshooting

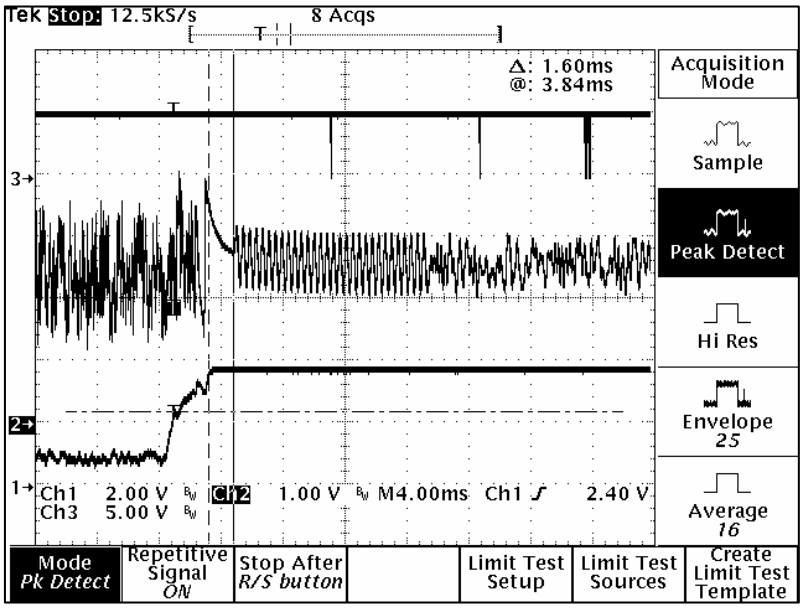
For trouble shooting data quality and MSR failures hardware timing can be verified as follows. The figure below is an oscilloscope plot of a down-link data message from the base station to the mobile. Channel 1 is connected to the mobile's RSSI test point, Channel 2 is connected to the mobile's recovered modulation (TP1), and Channel 3 is connected to the mobile's modem chip select line. The scope's acquisition mode is high-resolution.



As can be seen from this plot, the base station's transmit carrier has ramped up to full power (Channel 1) in just a few milliseconds. The recovered modulation (Channel 2) is stable by this time. There follows a few milliseconds of quiet time followed by 12 milliseconds of symbol sync time.

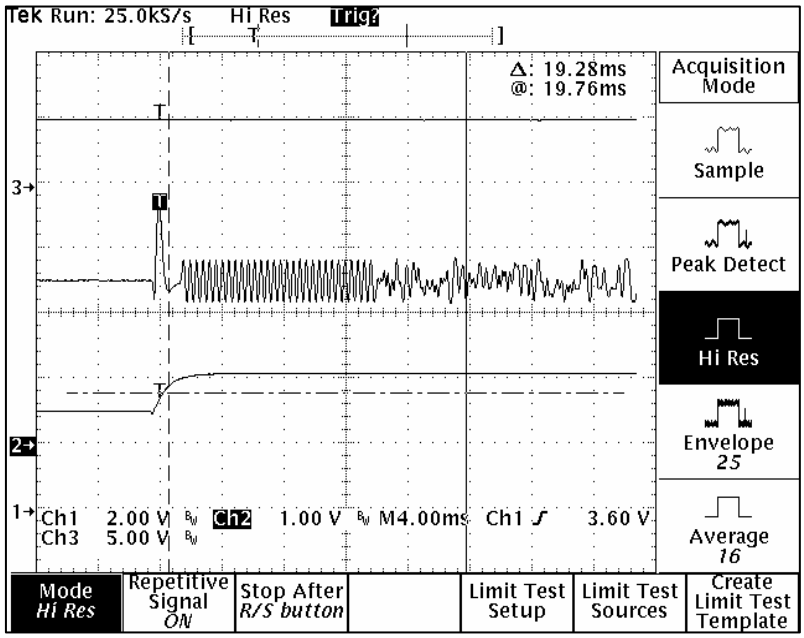
The recovered modulation from a base station should look similar to this plot. The recovered modulation signal should be approximately 1.0 Volts peak-to-peak and should be centered at approximately 2.5 VDC as is indicated in the figure above.

Below is another oscilloscope plot of an up-link data message from the mobile radio to the base station. As in the last plot, Channel 1 is connected to the mobile's RSSI test point, Channel 2 is connected to the mobile's recovered modulation test point (TP1), and Channel 3 is connected to the mobile's modem chip select line. The scope's acquisition mode is now in the peak detect mode. This enables the mobile's modem CS (Chip Select) line to be viewed.

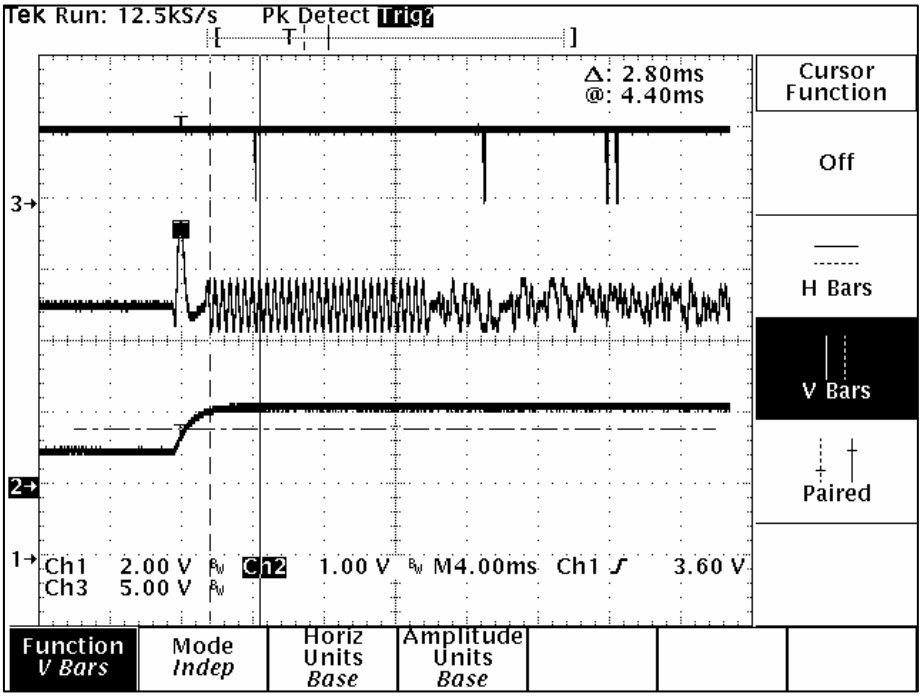


The mobile radio's microcontroller, upon detecting a step response in the RSSI (caused by the base station's transmitter coming up to power), waits a period of time equal to the programmed value of the mobile's carrier detect delay time. The microcontroller then instructs the modem to search for the modem synchronization preamble. When the base station instructs the modem to look for sync tones the modem's CS line transitions low. This can be seen in the above plot. Approximately 10 milliseconds after the base station's transmitter causes a step increase in the mobile's RSSI, the CS signal goes low momentarily. As can be seen, the sync tones are stable by this time and the modem quickly establishes synchronization.

The figure below is a plot of the down-link timing characteristics. Channel 1 is connected to RSSI, Channel 2 is connected to recovered audio, and Channel 3 is connected to the modem CS pin. The scope is in the high resolution acquisition mode. Note there is a very short period of quiet time (no modulation) followed by approximately 12 milliseconds of modem synchronization time (sync time).



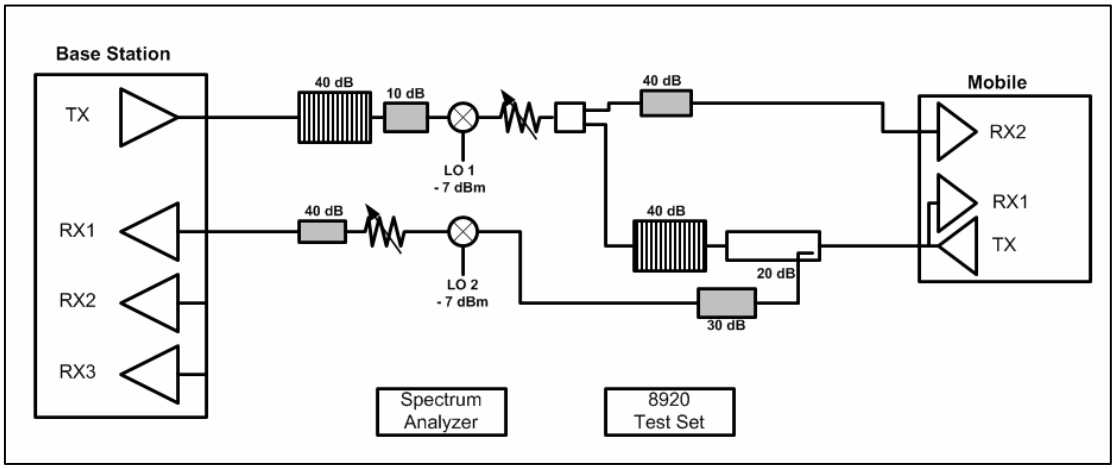
The next plot is the same as before but now the scope is in the peak detect acquisition mode. After the mobile radio detects a step response in the RSSI (caused by a down-link transmission), the mobile radio's microcontroller waits an amount of time equal to the programmed value of the "carrier detect delay time" then instructs the modem to look for frame sync. When the microcontroller instructs the modem to look for frame sync, it asserts the modem's CS line (active low). In this plot, the modem's CS line can be seen to transition low approximately 3 milliseconds after the base station's transmitter has come up to full power.



The recovered modulation should be centered at approximately 2.5 VDC and should have the amplitude of approximately 800 mV peal-to-peak as indicated in the plot above.

Message Success Rate Testing and Burn-In

After completion of the alignment and testing, the base station shall undergo Burn In and Final Testing. Install the mobile radio in the MSR screen room as shown in the figure below.



Sequence Tests

Step 1 In IPMessage, verify latest version of the mobile radio firmware by entering the 'version' command.

Step 2 Verify the serial number and MAC I.D. – match the label on the unit by typing 'serial number' and 'radio mac address'.

Step 3 Modify firmware settings as needed and run IPLinkView on the mobile radio on the highest and lowest frequencies programmed in the mobile radio.

Step 4 Run IPLinkView until a GPS connection is established.

Step 5 Run 'firmware check' for the specific Customer.

Final Inspection

The final inspection of the mobile radio is a critical step that translates directly into confidence in the product. Several areas must be checked on every base station before it can be shipped:

- Screws- every screw hole must have the proper screw tightened the proper amount. The screws must be new and cannot have rounded shoulders. Screw heads must be flush to the case.
- Connectors- all screws must be tight and the internal portions of each connector must not be damaged.
- Covers and panels must not be dented or unduly scratched.
- Initial traveler after completion of Final Inspection.

SECTION 4: FACTORY TEST PROCEDURE