Alignment Procedure

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Due to the high accuracy of the I/O, the modulation, transmit voice, DTlMF, SAT and data deviations are all preset in the DSP software and are not normally set in production and /or field. These procedures give the test method to verify the phone has proper deviations.

1.0 RADIO TUNE/TEST INSTRUCTIONS

1.1 800 MHz and 1900 MHz FlLTERING SAW and fixed ceramic elements, therefore no tuning is required at 800 MHz or 1900 MHz.

1.2 REFERENCE FREQUENCY ADJUSTMENT

CHECK/SET RF FREQUENCY (VCTCXO)TEST SETUP

Testing of the VCTCXO circuit is temperature dependent and should be carried out at an ambient room temperature of +23C to +27C. Any frequency adjustments should be made 24 hours after reflow soldering to allow for relaxation of thermal stress. Additionally, the adjustment accuracy depends on having the transceiver completely closed up in the case. If this is not possible at board level with some kind of fixture of the fixture is suspect, this test me redone(checked) at final test.

Terminate ANT(TP1) into a frequency counter with a 50 ohm input impedance.

Enter test mode and issue a suspend
.
Enter the following test commands:
*** The same channel should be used for all parts of this test***
@80 (initialize the transceiver-carrier off and audio muted)
@6502 (AFC offl @El 14OlFF (center DAC3)
@3Czzxxxx (select a MID-CHANNEL CELLULAR BAND)
@8407 (set the transmitter power level)
@8l (turn the transmitter on)

TEST RESULTS

Wait until output is stable (< +/- 42Hz variation in frequency). Log output frequency and calculate error in ppm. Verity that the transmitter frequency is < +/- 100 Hz of the channel frequency.

Adjust DAC3 with the commands @E1140xxx where xxx is 000 to 3FF(each step is approx. 17Hz.) to achieve a transmitter frequency that is <+/- l00 Hz of the channel frequency.

END OF TEST

@80 (carrier off and audio muted)

1.3 SET TRANSMIT RF POWER

TEST SETUP

Before testing, provide the antenna (TPl) with a 50 ohm load capable of dissipating 1 W (average power).

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Enter the following test commands:

@6502 (set DCTXO control voltage)
@3C383 (tune to MID-CHANNEL CELLULAR BAND, CHAN 383)
@81 (turn on carrier output)

For each level, 0 through 10, repeat the following setup and check each under test results below:
@840x (x is power level to be set, 0 to A(A=pl 10))
@3900yy (yy is hex setting corresponding to power level as follows:)

Each hex setting is approx. 0.5 dB for power levels 0,1,2,3,4 and approx. l.0 dB for 5,6,7,8,9,10.
@222D (store new power levels)
NOTE: Levels 0,1,2 are set when level 0 is set.

TEST RESULTS:

Verify that the power levels for each of the setup settings is within the tolerance shown below:

Power Level	Power Output	Measurement Middle	Measurement Band Edge
0	+26.0dBm	+1.0/-0.5dB	+1.0/-1.5
1	+26.0dBm	+1.0/-0.5dB	+1.0/-1.5
2	+26.0dBm	+1.0/-0.5dB	+1.0/-1.5
3	+22.5dBm	+/- 1.5dB	+/-2.0dB/-4.0dB
4	+19.0dBm	+/- 1.5dB	+/-2.0dB/-4.0dB
5	+15.5dBm	+/- 1.5dB	+/-2.0dB/-4.0dB
6	+l2.0dBm	+/- 1.5dB	+/-2.0dB/-4.0dB
7	+8.5dBm	+/- 1.5dB	+/-2.0dB/-4.0dB
8	+5.0dBm	+/- 1.5dB	+/-3.0dB
9	+l.5dBm	+/- 3.0dB	+/-6.0
10	-2.0dBm	+/- 5.0dB	+/-9.0

END OF TEST
@82 (turn carrier oft).
Repeat the above @3c step for MID-CHANNEL 800 Mhz Amps, 011000

TRANSMIT DEVIATION

TEST SETUP
Set the modulation test equipment to have 50Hz high-pass and 15khz low-pass filtering. Inject a 1004Hz signal into the system connector audio input(X500-2, ATMS and X500-4, AGND). Adjust the level of the input signal to 45 mvRMS.

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Enter the following test commands:

@6502	(AFC off)
@3Czzxxx	(Tune to MID-CHANNEL CELLULAR BAND)
@8400	(set attenuation to power level 0)
@8l	(turn the carrier on)
@88	(unmute the transmit path)
@AC	(turn on the cornpander)
@2C0001	(disable auto-writes to Patti addr. 40,48, & 88)
@2C482C	(TX PGA=-2.5dB, Rx PGA=+2.5dB)
@2C4005	(audio to system connector)

Record the deviation level at the test equipment.

TEST RESULTS

The transmit deviation should be 2.9kH.z +/-500Hz

.

END OF TEST

@80	(reset transceiver)

DTMF DEVIATION AND HIGH FREQUENCY

TEST SETUP

Set modulation analyzer for 50Hz HP and 15kHz LP.

Enter the following test commands:

@3Czzxxx	(Tune to MID-CHANNEL CELLULAR BAND)
@88	(open transmit audio)
@8400	(set attenuation to power level 0)
@8l	(turn the carrier on)
@AA0D	(turn on DTMF high tone)

Turn off injected audio signal to radio.

TEST RESULTS

Verify that the mobile transmitted tone is 1143Hz +/- 1.5% and the peak radian deviation (fdev/ftone) is 4.5+/-10%

END OF TEST

@AB	(turn DTMF ofI)
@80	(initialize transceiver)

Alignment Procedure

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SAT DEVIATION

TEST SETUP
Set modulation analyzer for 50Hz HP and 15kHz LP.

Enter the following test commands:

@3Czzxxx	(Tune to MID-CHANNEL CELLULAR BAND)
@6502	(lock the VCTCXO)
@8400	(power level 0)
@81	(turn on transmitter)
@A002	(turn SAT on (6030Hz))
@85	(mute receive audio)
@87	(mute transmit audio)

Using an on-channel carrier, inject a valid SAT tone of 6030Hz at 1.8kHz deviation into the mobile unit.

TEST RESULTS
Verify that the mobile transmitted frequency is 6030Hz +/- Hz and the peak frequency deviation is: 2000Hz +/- 10% with above filtering excluding residual FM.

END OF TEST

@80	(initialize transceiver)

DATA (SIGNALING TONE) DEVIATION

TEST SETUP
Set modulation analyzer for 50Hz HP and 15kHz LP.

Enter the following test commands:

@3Czzxx	(Tune to MID-CHANNEL CELLULAR BAND)
@6502	(lock the VCTCXO)
@8400	(power level 0)
@8I	(turn on transmitter)
@8F	(turn on 10kHz data tone)

TEST RESULTS
Verify that the transmit deviation level is 8.0kHz +/- 10%.

END OF TEST
@80 (initialize transceiver)

Alignment Procedure

RECEIVER ALIGNMENT

NO ALIGNMENT REQUIRED

DESCRIPTION OF ACTIVE DEVICES

TRANSMITTER

Component Designation	Function of Devices
Z111	1900 MHz Circulator
N113	GAAS FET RF Switch
N147	800 MHz Duplex Filter
N100	GAAS FET Rf Switch
Z150	800 MHz Transmit SAW Filter
Z151	SAW Filter
N150	Amplifier and Mixer IC
Z152	1900 MHz Saw Filter
V101	Switching Transistor
V110	Switching Transistor
NII0	Dual Band Power Amplifier
V111	Detector Diode
V113	Detector Diode
Z110	Isolator, 800 MHz
N116	Diplexer

RECEIVER

Component Designation	Function of Device
N310	1900 MHz Ceramic Filter
N377	1900 MHz LNA and Mixer IC
Z364	1900 SAW Filte
V310,V311, V373	Switching Transistor
Z325	800 MHz SAW Filter
N308	GAAS FET Switch
N325	800 MHz LNA & Mixer IC
N303	Crystal Filter
V400	Tuning Diode
N400	Receiver IF IC
Z400	Filter, 600 kHz
Z401	Filter, 600 kHz

DESCRIPTION OF ACTIVE DEVICES

SYNTHESIZER

Component Designation	Function of Device
N200	Synthesizer/ Modulator IC
N201	VCO Module
V204, V205	FET Amplifier
V201, V203	Tuning Diode
Z200	Crystal
V210	Transistor Oscillator