June 29, 2009

Si4431 Errata (Rev. A0)

Errata Status Summary

Errata #	Title	Impact	Status
1	TX Current Consumption.	Major	Increased current consumption at +13 dBm; other power levels unaffected.
2	Some non-standard frequencies are not supported.	Major	Will be fixed in the next revision.
3	Radio does not return to the low power state when in Low Duty Cycle Mode.	Minor	Will be fixed in the next revision.
4	Radio does not return to the low power state when in Auto TX mode.	Minor	Will be fixed in the next revision.
5	Additional tuning steps required for proper RX mode operation.	Minor	Will be fixed in the next revision.
6	Potential modem failure with default settings.	Minor	Will be fixed in the next revision.
7	Default register settings for optimal current consumption.	Minor	Will be fixed in the next revision.
8	Register modification required for TX data-rates greater than 100 kbps.	Informational	Will update data sheet to reflect operation.
9	Wake Up Timer and Low Duty Cycle mode not functional.	Minor	Use the micro or 32 kHz option for these functions. Will be fixed in the next revision.
10	False preamble detection issue.	Minor	Software work around available.
11	Antenna switch control in TX mode.	Minor	Software work around available.

Impact Definition: Each erratum is marked with an impact, as defined below:
- Minor: Workaround exists.
- Major: Errata that do not conform to the data sheet or standard.
- Information: The device behavior is acceptable the data sheet will be changed to match the device behavior.

Errata Details

1. **Description**: The TX current consumption at +13 dBm does not meet specification; lower power settings are within specification.

   Impact: May impact battery life. The +13 dBm current consumption is at 34 mA versus the data sheet specification of 28 mA.

   Workaround: No workaround exists in the current silicon for +13 dBm: lower power levels are unaffected.

   Resolution: Will be fixed in the next revision.

2. **Description**: Some non-standard frequencies are not supported.

   Impacts: Operation in frequencies between 240-280 MHz and 480-560 MHz should be avoided.

   Workaround: These are non-standard bands and should result in no customer impact; no workaround at this time.

   Resolution: Will be fixed in the next revision.

3. **Description**: Radio does not return to the low power state when in Low Duty Cycle mode.

   Impacts: When using the Low Duty Cycle mode, the radio will not automatically return to the low power state.

   Workaround: The radio mode control can be implemented on the external MCU for controlling the RX power state.

   Resolution: Will be fixed in the next revision.

4. **Description**: Radio does not return to the low power state when in Auto TX mode.

   Impacts: When using Auto TX mode, the radio will not return to the low power state when the TX FIFO reaches the empty state.

   Workaround: The FIFO underflow interrupt can be enabled allowing the external MCU to wake up when the TX FIFO is empty and put the radio into the low power state: *Program register 05h bit 7(enfferr = 1).*

   Resolution: Will be fixed in the next revision.

5. **Description**: Additional tuning steps are required for proper RX mode operation.

   Impacts: Tuning can fail if additional steps are not implemented in customer firmware.

   Workaround: The following steps should be followed to ensure proper operation:

   1. Program desired RX frequency minus 937.5kHz: *Program registers 75h, 76h, and 77h*
   2. Program tune mode: *Program register 07h bit 1 (pllon = 1)*
   3. Disable VCO calibration: *Program register 55h bit 0 (skipvco = 1)*
   4. Program desired RX frequency: *Program registers 75h, 76h, and 77h*
   5. Program RX mode: *Program register 07h bit 2 (rxon = 1)*
   6. Implement normal operation

   Resolution: Will be fixed in the next revision.

6. **Description**: Potential modem failure in receive mode with default settings.

   Impacts: Under strong blocker conditions, the modem can fail unless the listed workaround is followed.

   Workaround: Operate the radio with AFC enabled: *Program register 56h to C1h.*

   Resolution: Will be fixed in the next revision.

7. **Description**: Default register settings for optimal current consumption.

   Impacts: Current consumption.

   Workaround: Program register 57h bits 2:0 (cdcurr[2:0] = 001), register 59 bit 6 (fbdivhc = 0), register 5Ah bits 1:0 (vcocur[1:0] = 01).

   Resolution: Will be fixed in the next revision.

8. **Description**: Register modification required for TX data-rates greater than 100 kbps.

   Impacts: Eye closure and phase noise.

   Workaround: Program register 58h bits 7:6 (cpcurr[1:0] = 11).

   Resolution: Will update datasheet to reflect operation.

9. **Description**: Wake-up Timer and Low Duty Cycle Modes not functional.

   Impacts: These features are not supported.

   Workaround: Use the external microcontroller or the 32 kHz XTAL option on the Si4432 to implement these functions.

   Resolution: Will be fixed in the next revision.

10. **Description**: If a false preamble is detected the chip will remain in the sync detection state indefinitely or until a valid sync word is detected.

   Impacts: RX link performance and battery life.

   Workaround: Extend the preamble detection threshold to prevent false preamble detection or implement a software work around and perform the sync timeout on the microcontroller.

   Resolution: Will be fixed in the next revision.

11. **Description**: In antenna diversity mode the antenna selected for the RX packet may not be the same as the subsequent TX. The TX antenna selection will toggle between both antennas.

   Impacts: Might not effect link performance depending on conditions.

   Workaround: If random selection of the TX antenna is not desired then a single antenna may be manually selected by using the antdiv[2:0] register in 08h.

   Resolution: Will be fixed in the next revision.