Errata EM250 and EM260

The document describes issues that pertain to the EM250 and EM260, and is divided into two sections:

- Outstanding
- Resolved

This Errata refers to the following releases of the chip datasheets

- 120-0082-000_EM250 revision L

- 120-1003-000_EM260 revision K

Outstanding issues   The EM250 and EM260 chips have the following issue:

1.   Slightly degraded receive sensitivity on some chips

The auto gain control algorithm makes the wrong decision for some EM250 and EM260 chips on gain setting for packets near the sensitivity level. This may result in a degraded sensitivity (parameters "Sensitivity (boost mode)" and "Sensitivity" in Table 7 of the datasheet) on those chips of up to 3dB.

In this case, the average sensitivity on affected chips is -98dBm at band centre or -99dBm for boost mode.

"Typical" sensitivity as defined in the datasheet is -97dBm, or -98dBm for boost mode.

Note that the datasheet defines "Typical" as the average seen on the reference design at 2440MHz plus one standard deviation to add some margin.

Affected Conditions

This issue is present for all software releases prior to EmberZnet 3.0.1.

Workaround

There is no workaround for this issue. In subsequent releases (3.0.1 onwards), settings relating to AGC will be updated to resolve this problem. Note that earlier versions of the datasheet (EM250 rev "K", EM260 rev "J" and prior) listed a value for receive sensitivity matching the reduced value here.

Resolved issues   The following issues in earlier releases are now resolved:

1.   Packet loss on isolated channels

On some builds of the EM250 radio communication module (RCM) shipped with development kits, higher rates of packet loss can be experienced on several channels across the band. All boards being shipped have been screened to ensure that this problem does not exist while a solution is being developed.

Affected Conditions

This issue only occurred on the "A0" version of the EM250 module design. (Part number 710-0452-000).

This issue does not affect any version of the EM250 and EM260 reference designs.

Resolution

This problem no longer occurs on reference design versions B0 and onwards. Use the latest version of the EM250 reference in any hardware design. If you are using an older hardware design and this problem occurs, select an alternate channel for use.

2.   Packet loss at high input power

At input powers higher than –25dBm, there is some compression in the receive chain where the gain is not properly adjusted. In the worst case, this has resulted in packet loss of up to 0.1%. This packet loss can be seen in range testing measurements when nodes are closely positioned and transmitting at high power or when receiving from test equipment. There is no damage to the EM250 from this problem.

Affected conditions

This issue is present for all chip and software versions.

Resolution

This is not an issue that requires any silicon modification. The mechanism is well understood, and will rarely occur in the field. If nodes are close enough for it to occur in the field, the MAC and networking software treat the packet as not having been received and therefore the MAC level and network level retries resolve the problem without the upper level application being notified.

In order to get an input level of -25dBm, nodes with 0dB gain antennas would need to be around 0.25m apart.

3.   Low power and high voltage sleep current

A small percentage of EM250 and EM260 chips had a sleep current higher than 1 uA under limited conditions. This has only been seen in test conditions operating higher than 3.3 Volts input voltage and at operating temperatures less than 0 degrees Celsius. This does not impact devices operating at less than 3.3 Volts or devices operating in environments greater than 0 degrees Celsius.

Affected Conditions

The issue is occurs with EM250 and EM260 silicon revisions A and B operating an 3.3V input voltage ("Regulator input voltage (VDD_PADS)" in Table 5 of the datasheet) and operating at less than 0 degrees Celsius.

Resolution

This problem has been fixed with a silicon design change implemented on Revision C of the EM250 and EM260.

After reading this document

If you have questions or require assistance with the procedures described in this document, contact Customer Support at www.silabs.com/zigbee-support.

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