ANNEX B: Product Change Description

QUECTEL®
Build a Smarter World

BG96 R1.1 & BG96 R1.2
Differences Statement

LTE Module Series

PCB Rev.: R1.2

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Based on BG96 R1.1, BG96 R1.2 has enabled VDD_QFPROM_PRG hardware interface, which is connected to ground directly in BG96 R1.1, so as to support secure boot feature.

Some points are highlighted as below:

- BG96 R1.1 and R1.2 versions share the same hardware architecture and key components.
- BG96 R1.1 and R1.2 versions share the same pinout placements.
- Secure boot is enabled through a set of hardware fuses in BG96 R1.2. For the code to be executed, it must be signed by the trusted entity identified in the hardware fuses, so we have to enable VDD_QFPROM_PRG hardware interface.
- The new hardware will be used with the new software baseline TX3.0, and the software version is R04Axx.

The details are illustrated as below:

1. What's Secure Boot

Secure boot refers to the bootup sequence that establishes a trusted platform for secure applications. It starts as an immutable sequence that validates the origin of the code using cryptographic authentication so only authorized software can be executed. The bootup sequence places the device in a known security state and protects against binary manipulation of software and reflashing attacks.

A secure boot system adds cryptographic checks to each stage of the boot up process. This process asserts the authenticity of all secure software images that are executed by the device. This additional check prevents any unauthorized or maliciously modified software from running on the device. Secure boot is enabled through a set of hardware fuses. For the code to be executed, it must be signed by the trusted entity identified in the hardware fuses.

In simple terms, secure boot ensures running of signed/authorized software on the module, and unsigned/unauthorized software will not be allowed to run.

2. Enabled VDD_QFPROM_PRG Hardware Interface

A. BG96 R1.1 does not support secure boot function

The VDD_QFPROM_PRG (N19) pin of baseband chip is for secure boot function. In BG96 R1.1, this pin is connected to ground directly, which means secure boot function is disabled.

B. BG96 R1.2 supports secure boot function

According to Qualcomm's suggestion and our customers' requirements, the VDD_QFPROM_PRG pin is connected to VREG_L3_1P8(1.8V) in BG96 R1.2 so as to enable secure boot function.

The following pictures show the schematic and PCB designs of BG96 R1.1 and R1.2.

BG96 R1.1 BG96 R1.2

Figure 1: Schematic Designs of BG96 R1.1 and R1.2

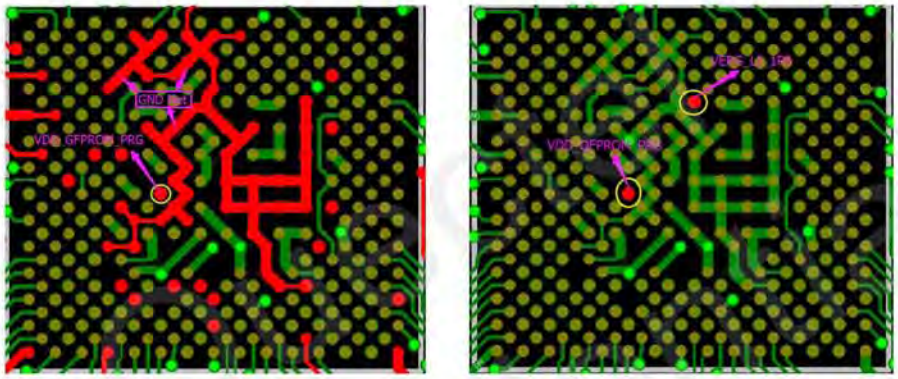

Figure 2: PCB Designs of BG96 R1.1 and R1.2

3. TX2.0 vs TX3.0

The biggest difference of TX3.0 as compared with TX2.0 lies in the adding of VoLTE and handover features. Since VoLTE environment has not been built so maturely yet, the main concern of customers is the handover function.

For TX2.0, re-selection is supported, while handover is not supported.

BG96 supports re-selection mechanism, which means when disconnection happens during cell handover, the module will reconnect automatically. This process lasts for about 1 (or 2) seconds, and the data transmitted (may happen by coincidence) will be buffered and resent once the reconnection established. So, the disconnection is generally imperceptible to customers.

- If the data transmission occurs at the moment that cell handover occurs coincidently, the connection is kept with handover function; the connection is broken and re-connection established in about 1 (or 2) seconds with re-selection. This causes nearly no difference for data telematics because users even cannot feel this disconnection, whereas VoLTE might be affected because of the short time disconnection.

- If the data transmission occurs in the period that no cell alternates, then no any influence will be caused.