Approval:	**Global AE Manager** *Massimiliano Lonzar*
Approval:	**Design Services Manager** *Fabio Deperini*
Author:	**Technical Support Engineer** *Marino J. Marson*

DISCLAIMER

The contents are confidential and any disclosure to persons other than the officers, employees, agents or subcontractors of the owner or licensee of this document, without the prior written consent of Telit, is strictly prohibited. Telit makes every effort to ensure the quality of the information it makes available. Notwithstanding the foregoing, Telit does not make any warranty as to the information contained herein, and does not accept any liability for any injury, loss or damage of any kind incurred by use of or reliance upon the information. Telit disclaims all responsibility for the application of the devices characterized in this document, and notes that the application of the device must comply with the safety standards of the applicable country, and where applicable, with the relevant wiring rules.

Contents

1. Scope

Aim of this document is to describe suggestions and corrections that Telit advises to improve **Ovoo Electronics *"B106AA(V2)"*** application that integrates Telit module **GE910-QUAD V3**.

2. Design review

Design review is based on the following received documentation:

- Schematic files: *"Ovoo Electronics"*
- Gerber file:
- Other: *"Telit Design Review R01 (Schematic).pdf"*

Summary Tables:

Schematic Review	P	F	I	MI	N/A
Power Supply	√				
SIM Pins	√				
Digital Pins		√			
Audio					√
RF	√		√		

PCB Layout Review	P	F	I	MI	N/A
General Placement					√
Antenna Waveguide					√
RF Aspects					√
Audio Aspects					√

P: Pass; F: Fail; I: Improvements possible; MI: Missing Information; N/A: Not Applicable

The following symbols will be used throughout the Design Review to indicate:

√ OK: No design changes are required.

Tip: information or possible improvement, not mandatory but recommended.

Warning: if you don't follow the recommendation there's a risk of malfunctioning or issues during the homologation phase, strongly recommended.

Error: it's mandatory to follow the recommendation otherwise the module could be damaged or could not work properly or there's high probability of facing issues during the homologation phase.

? Missing Information: some relevant information is missing therefore the DR cannot be accurate on this item.

2.1. Schematic review

2.1.1. Power supply

- OK

2.1.2. SIM pins

- OK

2.1.3. Digital pins

- LEDs D6, D3, D4 must be placed on collector otherwise forward voltage is limited to 1.2V (nominal 2.9V) when the base in controlled by 1.8V digital lines. We suggest same the configuration also for LEDs controlled by 3.3V digital lines.

- Bidirectional voltage level translators with auto-direction sensing, like TXB0104, are not recommended: the auto-direction feature requires current pulses that cellular module might not be able to guarantee while adding worthless complexity to the design (this feature is necessary only for bi-directional GPIOs, not for lines like UART which have fixed direction). Use them only if strictly necessary.
  We strongly suggest components with direction control input like SN74AVC2T245 or similar.

- When using level shifters we suggest not connecting output enable pins directly to power nets (GND or VCC depending on level shifter used) but through a resistor (e.g. 10K resistor): this could be useful for testing in that it makes possible to put level-shifters IC in 3-state giving so access to every level-shifted signal from external.

2.1.4. Audio pins

N/A

2.1.5. RF aspects

- To avoid harmonics we suggest making provision for, on modem board and any other board connected or close to it, 33pF capacitor to GND, placed very close to component and on its same path and layer, in the following cases only if those components are not shielded:
  - Power Sources and signals on I/O connectors **(J1, …)**
  - On power supply input PADs
  - On power supply output PADs **(VAUX/PWRMON, …)**

- Diodes in forward conduction, like LEDs, on anode and/or cathodes if not directly tied to a power net **(D6, D3, D4, …)**

We suggest predisposing 33pF capacitors because in general this is a value where SMD 0603/0402, 25V/50V COG capacitors have their self-resonant frequency at about 1GHz.

2.2. PCB Layout review

2.2.1. General placement

N/A

2.2.2. RF aspects

N/A

2.2.3. Audio aspects

N/A

2.3. General comments

Review is related to received application information and the supposed use of it.

3. Quality record

This design review is registered internally in Bugzilla with ID#**32846**.
The customer request is registered internally in Salesforce with ID#**00157856**.