Process owner:	**Design Services Manager - EMEA** Fabio Deperini	
Process owner:	**Design Services Manager - APAC** Hyunsoo Jang	
Process owner:	**Design Services Manager - MEA** Moshe Weisrose	
Approval:	**Global Application Engineering Manager** Paolomaria Schiratti	

Rev	Date	Modifications	Author
0	2010-07-10	First issue	P. Schiratti
1	2012-11-22	Clarification in chapter 6.1	P. Schiratti
2	2013-11-06	Updated company logo	P. Schiratti
3	2015-08-07	Updated company logo	P. Schiratti
4	2015-09-21	Updated chapter 6.1	P. Schiratti
5	2016-05-10	Updated chapter 6.1 Added DS manager MEA	F. Deperini

Contents

1. Scope

Aim of this document is to describe the service specification and the procedure to manage the Design Review request.

2. Applicability

This service can be applied in all the cases where the customer requests a Design Review activity of its application. The Design Review service is executed by dedicated Telit personnel that are part of Application Engineering or R&D departments.

3. Terms and acronyms

AE   Application Engineering
RF   Radio Frequency
IT   Information Technology
DRS   Design Review Service
PCB   Printed Circuit Board
BOM   Bill of Material

4. References

Telit Modem Integration Design Guide.pdf

Mod_0363_AE_Design_Review_request_form.doc

5. Design Review Service specification

M2M integrators require reliable modules and specific and professional support. The applications that use wireless technology are numerous, varied and technically demanding. For this reason Telit Wireless Solution provides different phase support.

The DRS can benefit all customers. During a design review, AE and R&D experts work together to make a complete design review of the application thus assisting customers in facilitating their design phase, avoiding common pitfalls and errors. This service ensures optimal stability and performance for the customer's application and reduces overall time-to-market.

The service includes:

- **Schematics review:** a complete review of application's schematics made by AE and R&D experts to avoid deployment errors that can create issues that lead to delays and added expenses in order to solve them. The review is mainly focused on parts of the customer application that interact with the module i.e. SIM holder, serial ports, GPIOs, power supply, modem interconnection, voltage levels, other RF components, etc.

- **PCB layout review:** in this phase a complete layout review is performed to check the most critical part in application PCB, such as RF path, audio path, power supply lines and digital bus. Telit experts help the customer to define the best component placement and PCB layout to avoid possible interference on audio, digital and RF components.

- **Component placement advice:** it is part of the PCB layout review. In this phase the best position for critical components placement is analysed and suggested to the customer.

- **Component selection advice (to earn space and/or to reduce the BOM):** AE and R&D experts can advice different solutions and options in component selection, mainly to help the customer earning space if necessary and/or reducing the total BOM of the application getting the required performances.

- **Measurement and characterization of integrated antenna:** AE and R&D experts can characterize and measure customer integrated antennas, to verify and suggest antenna matching, design and RF interaction with application box.

- **System architecture advice:** AE and R&D experts can advise different system architecture solutions and options, mainly to help the customer to define, in the early stages of a project, the feasibility and the most suited application system architecture to fulfil the required performances. Also constraint can be analysed, such as antenna position, type and clearance to provide the customer with information on the restrictions that will then apply to the design.

6. Design Review Service procedure

6.1. Service request procedure

All the request of DRS should be forwarded to Technical Support team. It is responsibility of AE team to verify and manage the request in order to define a schedule for each review. To perform a full review it is mandatory to receive from the customer the following information:

Design Review request form:
- The Design Review request form filled in with detailed information on customer, application type, environmental conditions and requirements

General documentation:
- Basic description of the functionalities and purpose of the customer's product.
- Placement indication of the antennas positions on the system.
- Coexistence of different transmitters/receivers in the system with indication of either the technology (Wi-Fi, BT, ZigBee…) or the frequency range used and RF power output.
- Assembly drawing and/or product photos of the whole application, not only the modem board. This will allow us to see overall arrangement, particularly antennas with respect to cables, noise sources, etc.
- Antenna and connector's datasheets or link from where to download. Any further relevant information (like shielding, exposure to high voltage in the vicinity, and to extreme temperature, etc.)

Schematic files:
- PDF with searchable names of components and signals.
- Complete RF section which connect to the module.
- The complete power supply; in particular we need to see the relationship between all the supply voltages to evaluate overall sequencing and dimensioning.
- The sources and terminations of all the digital signals of the module.
- Part name and vendor description and/or BOM file so that we can easily find their datasheet. If some are hard to find customer should enclose them.
- Clock frequencies, transmit and receive frequencies, transmit power levels etc. if other CPUs and/or radios are used in the application.

CAD files:
- Gerber files in format RS247X or Gerber X2 (PDF gerber pictures are not suited)
- Drill files in Excellon with preferable separate files for plated and non-plated
- Netlist file in IPC-356A format and the component layout in pdf searchable
- PCB stack up description with gerber filename correspondences organized from top to bottom by fulfilling the Table 1 (available also as Excel file)

In alternative:
- The full ODB++ package files zipped.

If possible, customer should check the correct visualization of the gerbers in ZofzPCB, a 3D Gerber Viewer freely available.

PCB LAYUP				
LAYER	**FILENAME**	**MATERIAL**	**DIELECTRIC CONSTANT**	**THICKNESS [units]**
SILKSCREEN TOP			-	
PASTE MASK TOP			-	
SOLDER MASK TOP			-	
LAYER 1 (TOP)			-	
DIELECTRIC				
LAYER 2			-	
DIELECTRIC				
......	...	...	...	...
DIELECTRIC				
LAYER N-1			-	
DIELECTRIC				
LAYER N (BOTTOM)			-	
SOLDER MASK BOTTOM			-	
PASTE MASK BOTTOM			-	
SILKSCREEN BOTTOM			-	

Table 1 - PCB layup description

Extra documentations (helpful in shortening the timings):
- Number of Support Center ID and/or Bugzilla ID customer if this project was or is still under any Telit support. Subsequent design review revisions request shall come with the list of changes applied to the previous design.

All these information and documentation should be properly coded by the customer and sent directly to our Technical Support email boxes in the different regions: ts-emea@telit.com, ts-americas@telit.com, ts-apac@telit.com.

6.2. Times and notifications

Technical Support should get the request of DRS at least one week before starting the activity in order to schedule the internal resources. After that, the customer should provide the requested documentation (see Chapter 6.1).

When the Design Review is completed, the Technical Support sends a report to the customer containing Telit suggestion and corrections of the design. Usually a complete DR requires five working days, from the receiving of the complete documentations.

If any additional investigation is required, Technical Support will contact the customer and will update him about the outgoing activity.

7.   Personnel and their responsibility

Design Service Manager - EMEA: Fabio Deperini
Telephone Contact: +39 040 4192 111

Design Service Manager - APAC: Hyunsoo Jang
Telephone Contact: +82 2 368 9631

Design Service Manager - MEA: Moshe Weisrose
Telephone Contact: +972 722 5971 05