Within the EU, the applicable directive to allow for “CE” marking of radio equipment is the Radio and Telecommunications Terminal Equipment Directive 1999/5/EC, more commonly known as the R&TTE Directive.

In order to demonstrate compliance with the essential requirements of the directive, there are 3 articles to be met:

Article 3.1(a) - “health and safety of the user and others”
Article 3.1(b) - “EMC”
Article 3.2 - “effective use of the radio spectrum”

Once compliance with the above 3 articles has been met, for radio equipments, manufacturer’s can then follow one of 3 routes to compliance, Annex III, Annex IV or Annex V.

Integration of modules

Usually, there are 2 possible scenarios:

1. integration of a radio module that has had no testing performed.
2. integration of a radio module that is in itself, fully or partially compliant with the R&TTE Directive.

For scenario 1, full testing of the host device is required in order to meet the 3 articles of the R&TTE Directive.

For scenario 2, limited testing is required as the radio module is usually deemed compliant with Article 3.2.

We assume that we are dealing with scenario 2 and the radio module is compliant with the R&TTE Directive.

GSM/GPRS M2M modules

GSM/GPRS M2M modules are usually supplied fully compliant with the R&TTE Directive. The module integrator then has to demonstrate that the host device is compliant in its own right. In general, the applicable tests will be as follows:

**Article 3.2:**

Limited testing is required in order to demonstrate continued compliance with Article 3.2.

- ETSI EN 301 511 (version number is usually the latest listed in the OJ)
- Clause 4.2.16 - Radiated spurious emissions (allocated) (Clause no. 12.2.1 in TS 151 010-1)
- Clause 4.2.17 - Radiated spurious emissions (idle) (Clause no. 12.2.2 in TS 151 010-1)

These tests are to ensure that:

a. there are no spurious emissions outside the GSM limits specified from the host.
b. the host equipment has not modified the module behaviour.
c. the host antenna is matched to the module.
Article 3.1(b):
This article invokes the requirements of the EMC directive (2004/108/EC). Full testing to the appropriate EMC standard is required. The harmonised test standards are as follows:

- EN 301 489-7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)
- EN 301 489-1: EMC standard for radio equipment and services: Part 1 Common technical requirements.

Appropriate tests should be selected from tables 2 (emission) and 3 (immunity) in EN 301 489-1, depending on the type of product (portable use, vehicular use or fixed use). Clause 8.2 (radiated emission) is not applicable as this will be addressed by the Article 3.2 tests.

Article 3.1(a):
This article invokes the Low Voltage Directive (LVD) 2006/95/EC (but with no lower voltage limit applying) and also requires that RF exposure is taken into consideration.

For LVD compliance EN60950-1 (safety of IT Equipment) is usually the applicable standard, although other more appropriate standards could be chosen by the manufacturer.

Electrical Safety testing involves testing such as general construction, battery safety, heating tests, fault conditions, mechanical considerations, enclosures, and selection of safety critical components and materials.

RF exposure can be addressed by a number of appropriate standards. For devices held against the head, SAR testing may be required to EN50360 / EN 62209-1. Other devices may demonstrate compliance by calculation.

Integration of other radio modules (as well as GSM/GPRS)
It is now common to see two or more radio modules integrated into one host device (for example, a GPRS module, a GPS module, a WLAN module, an RFID module, an FM transmitter module etc.). Similar rules to those described above apply, but the test standards will vary according to the device.

Technical Construction File (TCF):
The Technical Construction File (TCF) is described in Annex II of the R&TTE Directive. It is usually supplied to a notified body in unalterable electronic form. Contents may vary but should contain the following:

- Index (Either a structured contents list or Index to the information within the TCF)
- Overview purpose of apparatus including
- Description, any Variants and any naming/revision differences within the TCF
- Identification of Equipment including Model Numbers, brandnames and manufacturer details
- Block Diagram with all points of connection (including Earthing) and Key Functions
- Where not self evident details of interactions at ports
- Circuit Diagrams
- PCB Layout Diagrams
- Parts List(s)
- Data sheets for any Network/Radio/Safety critical components
- Software / Firmware Versions
- Photographs / Illustrations showing external features
- Declaration of Conformity

The TCF should be held for a period of 10 years after the last product has been manufactured. The TCF can be modified as appropriate by the manufacturer.

Where the manufacturer integrating the compliant module does not have access to the technical documentation pertaining to the module, he should make clear to the module manufacturer that documentation must be retained and supplied upon request to the relevant authorities in EU member states.

Notified Bodies
There are a number of R&TTE Notified Bodies within the EU and abroad. Use of a Notified Body in the compliance process reduces the risk to the manufacturer while demonstrating to the user or for example, a surveillance authority that an independent third party has been involved.

TÜV SÜD BABT (NB number “0168”) is the certification body of TÜV SÜD Product Service and is wholly independent.

Disclaimer
This guide has been produced to assist radio module integrators to understand the regulatory requirements of the EU. It is not definitive, nor does it cover all possible scenarios. It is based on our interpretation of various directives, rules and regulations. As such TÜV SÜD accepts no responsibility for errors contained within.

© TÜV SÜD | UK: MIG Guide to Wireless M2M Module Integration en-UK