

ACB

Radio Equipment Directive

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ACB Europe

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Your Certification Resource

American Certification Body, Inc.

Introduction

- American Certification Body (ACB)
 - Notified Body to the RE Directive
 - Notified Body to the EMC Directive
 - TCB (Certification Body) for FCC (USA)
 - FCB (Certification Body) for ISED (Canada)
 - RCB (Certification Body) for MIC (Japan)
 - CB (Certification Body) for OFCA (Hong Kong)



Introduction

- American Certification Body (ACB)
 - Compliance Management and Support
 - Product Compliance management
 - Identification of testing or regulatory requirements
 - Test planning, writing and checking
 - Compliance update gap analysis
 - International Approvals (GMA)
 - Training courses



Introduction

- American Certification Body (ACB)
 - Worldwide offices
 - England
 - Netherlands
 - Finland
 - USA
 - China
 - Taiwan



Introduction

- Michael Derby
 - Background
 - Manufacturer – Product Test and Development
 - Including EMC Testing
 - Test Lab – Testing and Consultancy
 - EMC, Radio, RF Exposure
 - Europe and USA
 - Industry participation
 - ETSI standards writer / contributor



Introduction

- Michael Derby
 - Now: ACB
 - Senior Regulatory Engineer
 - Director of ACB Europe
 - Certifying Engineer
 - EU, USA, Canada, Hong Kong
 - Research and training



Introduction

- Michael Derby
 - Other Industry Organisations
 - TCB Council USA – Board of Directors
 - Active member of the REDCA and EUANB
 - TCB Council and REDCA Liaison
 - Secretary of the EMC Test Lab Association
 - Member of many Industry Compliance Groups



Agenda

- Déjà vu?
 - We all know the RED very well by now
 - Has anything exciting happened since last year's Rohde & Schwarz Demystifying EMC event?
 - The R&TTED has gone (R.I.P. R&TTED)
 - Who or what is ETSI?
 - Harmonised standards
 - Guidance documents in progress
 - FCC updates



Agenda

- Timing
 - We have 1 hour for this presentation
 - Breaking my bad timing habit!
 - Please ask any questions during the presentation, and also at the end



Reminder...

- Supplying a radio product to EU member states, including EEA, EFTA
 - This is a reminder that if you place a new radio product on the market, or continue to market an existing radio product, or install a radio module into your product which you place on the market, or re-brand someone else's radio product...
...you should be using the RE Directive (RED)



Changes to the Standards

- Radio Equipment Directive
 - As we already know, the transition from the R&TTED to the RED was more than just an alignment with the NLF; such as we saw with the EMCD and LVD
 - New administrative processes
 - Technical changes to the requirements
 - This requires testing changes in most cases



Timeline

- Radio Equipment Directive
 - It's 2017 now, and 2020 is looming
 - The world looks very different to how it did in 1999
 - In an IoT world, radios will be everywhere; meaning a congested radio spectrum
 - Radios must continue to share a finite radio spectrum which is becoming busier by the day
 - Radio Spectrum can be shared in several ways;
 - Frequency, time, modulation, location, etc.



Admin changes

- Admin changes associated with the RED
 - Most changes observed by manufacturers are based around problems observed while using the R&TTED
 - Consistency of “who is responsible”
 - Responsibility of importers
 - Clearer information to users
 - Greater responsibility on product suppliers
 - This feels like a ‘tightening’ of the requirements
 - It is similar to how the R&TTED should have been



Technical changes

- Technical changes for the RED
 - Receiver performance
 - The RED introduces “Efficient use of spectrum”
 - This has resulted in an instruction from the EU to ETSI, to include test cases for spectrum sharing
 - Transmitter co-locations and Receiver performance
 - Co-existence
 - A wireless future with radios everywhere
 - Spectrum sharing test cases
 - Increased requirements for EMC immunity



ETSI

- So, who writes these ETSI standards?
 - It's you and me!
 - People talk about “ETSI Certification”
 - That is wrong on many levels
 - People ask “what are ETSI doing?”
 - ETSI is a standards writing organisation
 - All standards are based on contributor input
 - “They” (ETSI) is actually “us” and “we”
 - You write the standards you want/need to use



ETSI

- How it often works
 - Manufacturers identify a requirement
 - They approach ETSI to create a standard
 - Someone starts a working group within ETSI
 - The working group (WG) writes the standard
 - Made up of manufacturers, regulators, test labs
 - Maybe standard is based on existing band use; or maybe band use is requested after the use case is identified
 - EC Decision becomes issued
 - Standard becomes harmonised



ETSI

- If a standard already exists?
 - Someone identifies a change or update need
 - Usually a manufacturer
 - In the case of RED, it was the EU Commission
 - They approach ETSI to change a standard
 - The WG within ETSI changes the standard
 - Made up of manufacturers, regulators, test labs
 - EC accepts the new standard
 - Standard becomes harmonised



ETSI

- ETSI publishes a standard
 - It is known as ‘harmonised’ when ETSI members vote to issue it
 - EC review the standard for acceptance
 - If accepted, it is listed on the EC’s Official Journal (OJ) of harmonised standards (HS)
 - At that point, if fully applied, it can be used to provide “presumption of conformity” with the applicable part of the Directive



Radio Equipment Directive

- Presumption of Conformity?
 - What's the big deal with using a Harmonised Standard which is listed on the OJ?
 - Legally in the EU; really it's not so important
 - A manufacturer may use any applicable standard
 - We're pragmatic business people though...
 - Be advised that some other global regions choose to use the EU approach as their type approval; and do not realise the finer details of the rules
 - This may require communication and education



Radio Equipment Directive

- Existing products already on the market:
 - Old R&TTED products do not just simply meet the RED by default
 - From a technical point of view:
Products already compliant to the R&TTED using R&TTED test standards; cannot assume to meet the RED based on old tests
 - In many cases, the latest technical requirements (test cases) for meeting the RED are generally tougher than the old R&TTED requirements



Radio Equipment Directive

- Existing products already on the market:
 - “But my product has not changed!”
 - “But we have not had any complaints before!”
 - A significant part of the RED is to prepare for a near-future environment with radios everywhere
 - The radio has not changed, but the environment and ‘state of the art’ is changing
 - I have seen manufacturers cease production on whole radio ranges due to the changes



Radio Equipment Directive

- Standards timeline
 - Standards are constantly in progress
 - As of 10 January 2018; there are 156 standards listed on the RED OJ
 - Some standards are listed with a limitation
 - e.g.; provide presumption of conformity for transmitters only, not including receivers or transceivers; or only for receivers tested to full requirements



Radio Equipment Directive

- Harmonised Standards for testing:
 - Are the new RED standards different to the old R&TTED standards?
 - Yes, in most cases they are
 - Additional receiver tests have been added to many of the existing test standards
 - Spectrum sharing requirements may be included



Radio Equipment Directive

- Harmonised Standards for testing:
 - In addition to the RED changes, some companies have taken this opportunity to get their own updates into the ETSI standards; based on test methods or introducing new technology types
 - ETSI standard writing is by contribution of attendees
 - Also to consider changes to the state of the art
 - If you want to influence the standards or you don't like the progress of the standards, you join ETSI
 - Let's look at some typical examples of changes; and some examples of common standards...



Radio Equipment Directive

- Existing Standards, just being updated
 - Standards which existed for R&TTED devices and have an update for RED
 - Manufacturers of products using these standards are using the same standard as before; but with changes to the test cases, or essential requirements, or limits, etc.
 - In some cases, a preliminary version of the standard was issued and now they're working on the next version
 - Stepped approach
 - In some cases, the standard was accepted but has been found to be insufficient and now needs an update
 - Requires corrections



Radio Equipment Directive

- Existing Standards, just being updated
 - Some common examples:
 - EN 300 328 for Bluetooth, ZigBee, 2.4 GHz WLAN
 - Additional receiver blocking tests for all devices
 - EN 301 893 for 5 GHz WLAN
 - Additional receiver blocking tests for all devices
 - Changes to the existing Adaptivity test cases
 - EN 300 220 – Short Range Devices; 25 MHz to 1 GHz
 - Split now into multiple sections with receiver tests
 - EN 300 440 – Short Range Devices; 1 GHz to 40 GHz
 - See next slide...



Radio Equipment Directive

- Existing Standards, just being updated
 - Some common examples:
 - EN 300 440 – Short Range Devices; 1 GHz to 40 GHz
 - Originally published without many changes, which was a surprise to many of us because it included a ‘receiver category 3’ without any receiver testing
 - It was rejected by the EU Commission as considered insufficient to show compliance with the RED
 - Listed as a harmonised standard on the RED OJ, but only if you apply ‘receiver category 1’ when testing
 - In revision to amend the receiver test section



Radio Equipment Directive

- Further notes on these standards:
 - EN 300 328
 - V2.1.1 was listed on the RED OJ in January 2017
 - V2.2.0 is in progress now
 - Tougher receiver blocking requirements!
 - Scheduled for OJ listing in November 2018
 - EN 300 220-2
 - V3.1.1 was listed on the RED OJ in March 2017
 - V3.2.0 is in progress now
 - Removal of receiver category 3
 - Scheduled for OJ listing in September 2018



Radio Equipment Directive

- Existing Standards, just being updated
 - EN 300 440
 - V2.1.1 was listed on the RED OJ in July 2017
 - Presumption of conformity only when the manufacturer applies Receiver Category 1; or for transmitter-only devices
 - V2.2.0 is in progress now
 - Receiver testing added for receiver category 3
 - Scheduled for OJ listing in October 2018



Radio Equipment Directive

- Existing Standards, just being updated
 - Remember that the manufacturer should keep a close eye on the development of the standards they use for compliance of their devices
 - Changes in the standard could require a re-assessment, or a re-test
 - The DoC to the RED is dynamic and applies to each new product placed on the market on each new day
 - There is no certification, nor 'grandfathering' of authorisation with the RED (or EMCD, LVD)



Radio Equipment Directive

- Change Standard, from one to another
 - Some products will use a new standard under the RED; compared to the R&TTED
 - NFC RFID; GNSS (GPS) Receivers; Wireless Chargers
 - Manufacturers of those products are familiar with some radio test standards; but now use a different standard
 - There are changes in what tests they need to do
 - Typically there will be additional receiver and spectrum sharing tests to do
 - In most cases, as the standard has changed; the test procedures, methods and limits have also changed
 - And the standard is written by different people



Radio Equipment Directive

- Change Standard, from one to another
 - Some common examples:
 - NFC RFID
 - Previously EN 302 291 but now EN 300 330
 - Comparable performance, but different test cases
 - GNSS (GPS) Receivers
 - No dedicated standard before, so used EN 300 440
 - Now have dedicated standard, EN 303 413
 - Completely new test cases for receiver performance
 - Wireless Chargers or Wireless Power Transfer
 - Previously EN 300 330 but now EN 303 417



Radio Equipment Directive

- New Standards, for new product types
 - Some products are now within the scope of the RED but were not in scope of the R&TTED
 - TRx <9 kHz; FM Radio Receivers; Television Receivers
 - Manufacturers of those products used the EMCD and LVD in the past; and did not consider radio performance
 - Now their products come within the scope of the RED
 - All radio performance test cases are new for them
 - EMC test cases assess the radio link operation; in addition to any other function of the product



Radio Equipment Directive

- New Standards, for new product types
 - Some common examples:
 - TRx <9 kHz
 - Short Range Device standard is under development
 - Product Specific (e.g. EN 303 447 Robotic Mowers)
 - Broadcast Sound Receivers
 - New standard, EN 303 345
 - Completely new test cases for receiver
 - Broadcast TV Receivers
 - e.g. EN 303 340 for Digital Terrestrial TV Rx
 - Expected to have problems



Radio Equipment Directive

- Harmonised Standards for testing:
 - Standards not yet listed on the RED OJ?
 - If the 'Radio' test standard is not yet listed on the RED OJ, a Notified Body must be used
 - You cannot state compliance to the Directive without a Notified Body, if you have not used a 'Radio' standard that is listed on the RED OJ
 - You do not 'need' a Notified Body for test reports to non-Harmonised EMC or Safety standards



Radio Equipment Directive

- Use of a Notified Body
 - Notified Bodies have been helpful in bridging the gap when standards were not harmonised
 - Many radio standards now listed on the OJ
 - Notified Bodies are still useful for checking everything has been done correctly
 - Often we are just checking that the manufacturer has really done the correct thing
 - Often asked to check the admin and non-technical aspects as much as the technical



RED Guide

- The RED Guide, by the EU Commission
 - Since last year's Demystifying EMC, the RED Guide has been published
 - As a 'version 1' with some items missing
 - Now there is a draft 'version 2'
 - The Guide does not change the RED
 - It provides guidance, interpretation, clarification
 - We can use it as "latest state of the art"



Technical Guidance Notes

- REDCA Technical Guidance Notes (TGN)
 - Guidance documents on specific topics
 - Created by the REDCA, for the REDCA
 - Guidance only; but good if the RED is not clear
 - The REDCA TGNs are assessed by the EC, who are observers at the REDCA, and therefore the TGNs provide a good level of confidence



Technical Guidance Notes

- REDCA TGNs
 - There are some new TGNs in progress:
 - TGN on modules (we discuss in the next session)
 - TGN on combined equipment
 - TGN on risk assessments
 - TGN on vehicles
 - TGN on radio determination equipment



TGN on modules

- TGN01
 - Assessment of modules to the RED
 - Useful for radio modules
 - Assessment of host products which have a CE Marked radio module installed
 - Useful for products containing radio modules
 - Both topics are covered in that TGN



TGN on combined equipment

- TGN on combining equipment together
 - There are overlaps here to TGN01 on modules
- Deals with co-location and simultaneous operation of multiple radio devices
 - Notice I don't specifically state "transmit"
 - Multiple transmitters operating simultaneously may have interference, RF Exposure issues, etc.
 - Transmitter(s) and receiver(s) operating simultaneously may have operational problems



TGN on combined equipment

- TGN on combining equipment together
 - Multiple transmitters operating simultaneously
 - Radio performance
 - Intermodulation products
 - Combined output power levels
 - Additional effort needed when accepting Article 3.2 test data of the module as compliant at host level
 - RF Exposure issues, etc.
 - Combined levels when assessing SAR or MPE1



TGN on combined equipment

- TGN on combining equipment together
 - One (or more) transmitter and one (or more) receiver operating simultaneously may have operational problems
 - Receiver blocking and receiver performance
 - Interference from within the host device may affect the receiver performance of a radio
 - Additional effort needed when accepting Article 3.2 test data of the module as compliant at host level



TGN on combined equipment

- TGN on combining equipment together
 - Host assessment and radio assessment
 - All of this is a reminder that simply buying a radio module with a CE Mark and installing it into a host product is not enough to demonstrate compliance
 - It is a big topic!



TGN on Risk Assessments

- TGN on risk assessments
 - Applies to the EMCD and RED
 - A reminder that the manufacturer must create a compliance risk assessment for all devices
 - Products advance faster than the standards
 - A time for the manufacturer to check that all aspects of their product have been assessed
 - Does the standard cover full operation of the product; and is the testing sufficient for the RED?



TGN on Risk Assessments

- TGN on risk assessments
 - Examples:
 - Is the frequency range of the standard wide enough to cover the possible emissions or immunity concerns of the product or environment?
 - Is the operating environment of the standard wide enough to cover the intended (or reasonably foreseen) use of the product?
 - A standard may have been applied; but have all the possible standards been applied?
 - e.g. EN 60950-1 and EN 60950-22



TGN on Risk Assessments

- TGN on risk assessments
 - Examples:
 - Real compliance risks not covered in the standard
 - A battery powered transmitter without correctly enabled voltage regulator for the frequency determination at low voltage conditions
 - Environment of the product to be considered
 - Drones used for monitoring high voltage mains cables (overhead power lines) will be exposed to high levels of fields at 50 Hz and therefore 50 Hz immunity tests may become appropriate



TGN on Risk Assessments

- TGN on risk assessments
 - Requirements for manufacturers, test labs and Notified Bodies:
 - Understand the product and standards
 - Check that the test cases performed, and operation modes tested, represent all the possible operations of the product
 - Understand use of the product, which may include reviewing user manual and manufacturer's website



FCC changes

- Some important FCC changes
 - This is primarily a RED presentation
 - ...but you are listening to an FCC TCB...



FCC test lab accreditation

- Testing radio transmitters for certification
 - Until 13th July 2017, it was not mandatory to use an accredited test lab for FCC testing
 - Testing which leads to certification
 - Since 13th July 2017, it is mandatory to use a test lab which is ISO 17025 accredited, and the testing is within the scope of the lab, and the capabilities of the lab are recognised by the FCC and listed on the FCC website



FCC sDoC

- Authorisation routes for FCC
 - A comment about non-transmitter devices
 - “unintentional radiators”, or electronic devices
 - Until 2 November 2017, there were three FCC authorisation routes available:
 - Verification (mostly for low risk non-transmitters)
 - DoC (mostly for higher risk non-transmitters)
 - Certification (mostly for transmitters)
 - Since 2 November 2017, it has changed
 - For the non-transmitter devices, which included general electronic equipment, IT, etc.



FCC sDoC

- Authorisation routes for FCC
 - Verification and DoC have been merged
 - Now there is sDoC (supplier's DoC)
 - Now there are two FCC authorisation routes:
 - sDoC (for all non-transmitters)
 - Certification (for transmitters)
 - (Note, it is possible to certify non-transmitters, instead of using the sDoC route)



FCC sDoC

- Authorisation routes for FCC
 - Significant difference for sDoC?
 - Manufacturer must have (and state) a 'responsible party', in the USA
 - This is a company who the FCC can contact in the event of non-compliance issues or questions
 - Important for non-USA manufacturers
 - Transition period for move to sDoC
 - One year
 - Verification and the old DoC end on 2 November 2018



FCC modules

- Installing an FCC certified radio module
 - FCC taking a much more holistic approach to full compliance of the final system
 - Just like with the EU
 - See you after the break!...



Questions?

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Your Certification Resource

American Certification Body, Inc.