EASA
European Union Aviation Safety Agency

Panel 5 updates (Lithium batteries, EMI, PED tolerance, IFE)

Mayte Iniguez

Electrical Systems Senior Expert

STC WORKSHOP

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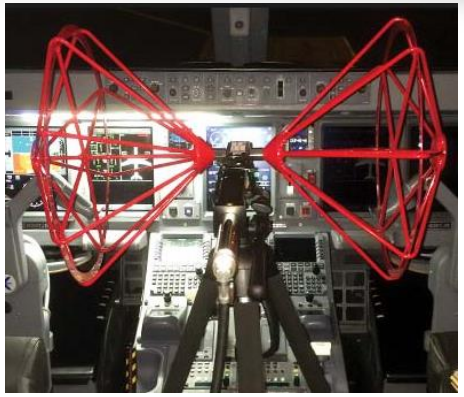
Agenda – Panel 5 updates



- Lithium battery modifications classification
- New standard on EMI testing – EUROCAE ED-248
- PED tolerance
- AMC 20-19 to be published by mid 2019 – replacing TGL 17

Lithium Battery modification classification

All Lithium battery modifications <u>shall be classified Major</u>, because Special Conditions are always applicable and a lithium battery thermal runaway is considered at least as hazardous.

However, in accordance with Part 21 *„When the strict application of the paragraph 3.3 criteria(*).results in a major classification, the applicant may request re-classification, if justified, and Agency could take the responsibility in re-classifying the change."*

EASA may <u>re-classify</u> a Lithium battery modification <u>as minor</u> in some cases.

(*) paragraph 3.3 from **GM 21A.91 Classification of changes to a type Design**

Possible re-classification if:

- Battery with Capacity up to 100Wh AND installed in the cabin in an area where the cabin crew can visually localize it in case of fumes or fire AND no oxygen lines/equipment, water, fuel or any other flammable substances in the same enclosure AND battery qualified at least to DO-311, DO-227 or DO-347.

- Relocation of an already approved installation (where the SCs were applicable) with no impact in the original Safety Assessment AND conditions of installation not worse than the original ones (in terms of separation to oxygen lines/equipment, water, fuel, other flammable substances, heat points)

- Modifications including a Li battery within an equipment with a capacity up to 5Wh AND ETSO 142b AND no other reasons to classify the change as Major.

ED-248 Guide to civil aircraft electromagnetic compatibility

Aircraft EMC compliance for safety and functional performance of installed electrical and electronic systems.

First standard that provides guidance on how to perform EMI tests at aircraft level. Published in January 2018.

Show compliance to 25.1353(a) and 25.1431(d)

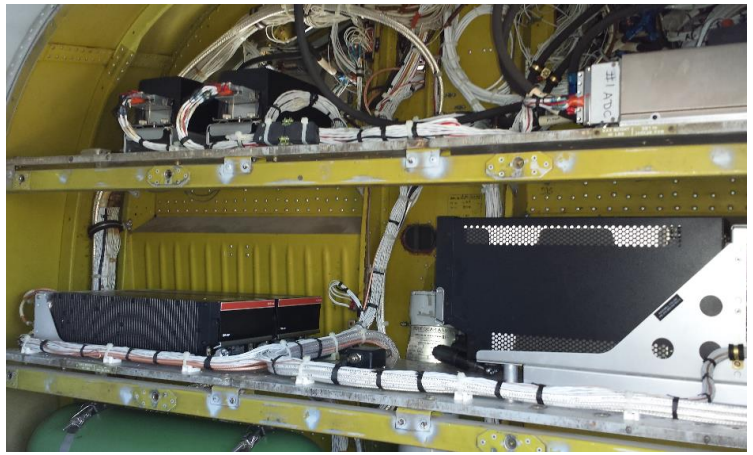
ED-248

Some traditional practices were not efficient - like to operate communications and navigation equipment only at one low, high and mid-band frequencies.

ED-248 provide detail guidance on how to perform efficient Radio Ground Tests (all frequencies should be checked, but the number may be reduced by determining potential EMI freqs from DO-160 section 21 tests plots or antenna scans from instrumented ground tests – using spectrum analyser)

ED-248

Definition of Simple Change to existing aircraft: No need to perform an aircraft ground EMI test.



Demonstration based on qualification to same EMC standards that existing aircraft equipment, new or modified equipment with no CAT, HAZ or Major FCs, and wiring, shields, connectors and interfaces are the same as the existing aircraft installations.

PED tolerance

ED-130A Change 1 (published on April 2019) – to delete the references to Wi-Fi when mentioning the 100mW EIRP for low power emissions/RTCA DO-363 Change 1

EUROCAE ED-239/RTCA DO-307A

Compliance to 25.1309 – PEDs intentional transmitions become the normal EMI environment in the aircraft.

For Portable Electronic Devices: no fixed positions, no DO-160 qualification, uncertainty on the number present in the aircraft.

In-Flight Entertainment System

TGL17 to become obsolete soon – publication of AMC 20-19 mid 2019

No technical differences to TGL17, only a general refresh to cope with new technologies

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End slide

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Back – up slides

- The following slides were presented by Fernando Menendez in the STC Workshop 2018.

Regulation not addressing all Lithium hazards

- Some events leads to discover that regulation in place was not sufficient:
  - Step 1: Authorities need to cover gap regulation: New special conditions raised as per Part 21A.16B
  - Step 2: New guidance material is needed (Minimum Operation Performance Standards):
    - DO-311A for rechargeable Lithium batteries published Dec 2017(RTCA SC-225)
    - DO-227A for non-rechargeable Lithium batteries published Sept 2017 (RTCA SC-235)
  - Step 3:
    - TSO C-142b & C-179b published in March 2018.
    - ETSO C-142b & C-179b to be published in 2019

  - Long term: Requirement 25.1353 & 29.1353 will be updated to be generic. New technologies will be managed by AMC.

Rechargeable Lithium batteries SC

- EASA SC public consultation in 2006.
- EASA implement the SC through a generic Rechargeable Li bat CRI.

- Means of compliance:
  - DO-311A + Risk assessment at A/C level is an acceptable means of compliance with these requirements. Applicable to all sizes of batteries.
- Applicable for A/C types under CS 23, 25, 27 & 29.

- CS-23/27 applies only to “Main batteries”. Further applicability is under discussion. Risk based approach.
- CS-22, VLA, SLA specific SC published in January 2016

https://www.easa.europa.eu/documents/public-consultations/proposed-special-condition-sc-ela2015-01

Rechargeable Lithium batteries ETSO

- ETSO-C179b: Permanently Installed Rechargeable Lithium Cells, Batteries and Battery Systems ➔will reference to DO-311A.

- TSO C-179b published On March 2018
- ETSO C-179b will be published in 2019.

- New ETSO applications will be requested to comply with DO-311A.

- New installations will be requested to comply with the Special Conditions

Non-Rechargeable Lithium batteries SC

- Part 21A 16B: EASA published September 2016 the Special Conditions.

  https://www.easa.europa.eu/system/files/dfu/SC%20F-xx%20Issue%201.pdf

- EASA implement the SC through a generic Non-rechargeable Li bat CRI to CS25 & CS29 products.

- CS-23/27 applicability is under discussion. Risk based approach.

- Previous Means of Compliance: Due to missing a more appropriate standard, **ETSO-C142a** + **Risk assessment at A/C level** is an acceptable MoC to the SC contained in this CRI.
- In parallel FAA created IP (SC & MoC) for this topic.
- FAA MoC TSO 142a + DO 347 "Certification Test Guidance for Small and Medium Sized Rechargeable Lithium Batteries and Battery Systems" (testing)

NRLB: Clarifications to MoC

- **Minimum Operational Performance Standards (MOPS) for Non–Rechargeable Lithium Batteries DO-227A + risk assessment at A/C level (limited to Special Conditions 3, 4, 5 & 6) is an acceptable MoC to the Special Conditions 1 to 6 contained in this CRI.**

- Alternatively Means of Compliance can be proposed by the applicant to show compliance with the SC's included in this CRI and agreed by EASA in a case by case basis.

- Risk assessment at A/C level:
  - Cover the delta between qualification and safe functioning & installation.
  - Internal failures can occur!!! Mitigation means to be presented.
  - Understand the impact on the rest of the A/C, crew & passengers.

Non-Rechargeable Lithium batteries ETSO

- ETSO C-142b will be published in 2019
- TSO C-142b published March 2018

- New ETSO applications will be requested to follow the new material DO-227A.

- Batteries between 2 & 5W.h have an special treatment. TSO-C142b-7 approvals. End item level test.

- New installations will be requested to comply with the Special Conditions

Very small batteries treatment

- For Very Small Lithium Batteries (equal or less than 2 Watt-hour of energy), an acceptable Means of Compliance with this Special Condition is showing these batteries compliant with Underwriters Laboratories UL 1642, UL 2054 (only rechargeable) & IEC 62133 (only rechargeable).

- EASA CRI Rechargeable & Non rechargeable Li bat does not apply to “very small batteries” qualified as per above if qualification is referenced in the Certification Plan.