



## Part-NCC AMC/GM - Amendment 1

<b>Description:</b>	Part-NCC AMC- GM - Amendment 1 (Annex to ED Decision 2014-030-R )
<b>Language:</b>	English
<b>Acceptable Means of Compliance and Guidance Materials group:</b>	Part-NCC
<b>Explanatory Note:</b>	ED Decision 2014-030-R - Explanatory Note
<b>Related ED Decision:</b>	ED Decision 2014/030/R

**Annex to Decision 2014/030/R**  
**‘AMC and GM to Part-NCC – Amendment 1’**

The Annex to Decision 2013/021/R<sup>1</sup> is hereby amended as follows:

The text of the amendment is arranged to show deleted, new or amended text as shown below:

1. deleted text is marked with ~~strike through~~;
2. new or amended text is highlighted in grey; and
3. an ellipsis (...) indicates that the remaining text is unchanged in front of or following the reflected amendment.

AMC1 NCC.GEN.130 is replaced by the following:

**AMC1 NCC.GEN.130 Portable electronic devices**

**TECHNICAL PREREQUISITES FOR THE USE OF PEDS**

**(a) Scope**

This AMC describes the technical prerequisites under which any kind of portable electronic device (PED) may be used on board the aircraft without adversely affecting the performance of the aircraft's systems and equipment.

**(b) Prerequisites concerning the aircraft configuration**

- (1) Before an operator may permit the use of any kind of PED on-board, it should ensure that PEDs have no impact on the safe operation of the aircraft. The operator should demonstrate that PEDs do not interfere with on-board electronic systems and equipment, especially with the aircraft's navigation and communication systems.
- (2) The assessment of PED tolerance may be tailored to the different aircraft zones for which the use of PEDs is considered, i.e. may address separately:
  - (i) the passenger compartment;
  - (ii) the flight crew compartment; and
  - (iii) areas not accessible during the flight.

**(c) Scenarios for permitting the use of PEDs**

- (1) Possible scenarios, under which the operator may permit the use of PEDs, should be as documented in Table 1. The scenarios in Table 1 are listed in a descending order with the least permitting scenario at the bottom.

<sup>1</sup> Decision 2013/021/R of the Executive Director of the Agency of 23 August 2013 on adopting Acceptable Means of Compliance and Guidance Material for non-commercial operations with complex motor-powered aircraft (Part-NCC).

- (2) Restrictions arising from the corresponding aircraft certification, as documented in the aircraft flight manual (AFM) or equivalent document(s), should stay in force. They may be linked to different aircraft zones, or to particular transmitting technologies covered.
- (3) For Scenarios Nos. 3 to 8 in Table 1 the use of C-PEDs and cargo tracking devices may be further expanded, when the EMI assessment has demonstrated that there is no impact on safety as follows:
- (i) for C-PEDs by using the method described in (d)(2); and
  - (ii) for cargo tracking devices by using the method described in (d)(3).

**Table 1 – Scenarios for permitting the use of PEDs by the operator**

No.	Technical condition	Non-intentional transmitters	T-PEDs
1	The aircraft is certified as T-PED tolerant, i.e. it has been demonstrated during the aircraft certification process that front door and back door coupling have no impact on the safe operation of the aircraft	All phases of flight	All phases of flight
2	A complete electromagnetic interference (EMI) assessment for all technologies, using the method described in (d)(1), has been performed and has demonstrated the T-PED tolerance	All phases of flight	All phases of flight
3	The aircraft is certified for the use of T-PEDs using particular technologies (e.g. WLAN or mobile phone)	All phases of flight	All phases of flight, restricted to those particular technologies
4	The EMI assessment, using the method described in (d)(1), has demonstrated that: <ul style="list-style-type: none"> <li>(a) the front door coupling has no impact on safety; and</li> <li>(b) the back door coupling has no impact on safety when using particular technologies (e.g. WLAN or mobile phone)</li> </ul>	All phases of flight	All phases of flight, restricted to those particular technologies
5	The EMI assessment, using the method described in (d)(1)(i), has demonstrated that the front door coupling has no impact on safety caused by non-intentional transmitters	All phases of flight	Not permitted
6	The EMI assessment, using the method described in (d)(1)(ii), has demonstrated that the back door coupling has no impact on safety when using particular technologies (e.g. WLAN or mobile	All phases of flight - except low visibility approach operation	All phases of flight - except low visibility approach operation, restricted to those

No.	Technical condition	Non-intentional transmitters	T-PEDs
	phone)		particular technologies
7	An EMI assessment has not been performed	All phases of flight - except low visibility approach operation	Not permitted
8	Notwithstanding Scenarios Nos. 3 to 7	(a) before taxi-out; (b) during taxi-in after the end of landing roll; and (c) the pilot-in-command may permit the use during prolonged departure delays, provided that sufficient time is available to check the passenger compartment before the flight proceeds	

(d) Demonstration of electromagnetic compatibility

(1) EMI assessment at aircraft level

The means to demonstrate that the radio frequency (RF) emissions (intentional or non-intentional) are tolerated by aircraft systems should be as follows:

(i) to address front door coupling susceptibility for any kind of PEDs:

- (A) RTCA, 'Guidance on allowing transmitting portable, electronic devices (T-PEDs) on aircraft', DO-294C (or later revisions), Appendix 5C; or
- (B) RTCA, 'Aircraft design and certification for portable electronic device (PED) tolerance', DO-307 (including Change 1 or later revisions), Section 4; and

(ii) to address back door coupling susceptibility for T-PEDs:

- (A) EUROCAE, 'Guidance for the use of portable electronic devices (PEDs) on board aircraft', ED-130 (or later revisions), Annex 6;
- (B) RTCA DO-294C (or later revisions), Appendix 6D; or
- (C) RTCA DO-307 (including Change 1 or later revisions), Section 3.

(2) Alternative EMI assessment of C-PEDs

(i) For front door coupling:

(A) C-PEDs should comply with the levels as defined by:

- (a) EUROCAE/RTCA, 'Environmental conditions and test procedures for airborne equipment', ED-14D/DO-160D (or later revisions), Section 21, Category M, for operation in the passenger compartment and the flight crew compartment; and

(b) EUROCAE ED-14E/RTCA DO-160E (or later revisions), Section 21, Category H, for operation in areas not accessible during the flight.

(B) If the C-PEDs are electronic flight bags used in the flight crew compartment, an alternative compliance method described in EASA, 'General acceptable means of compliance for airworthiness of products, part and appliances', AMC-20, AMC 20-25 ('Airworthiness and operational considerations for electronic flight bags'), may be used.

(ii) For back door coupling the EMI assessment described in (1)(ii) should be performed.

(3) Alternative EMI assessment of cargo tracking devices

In case a transmitting function is automatically deactivated in a cargo tracking device (being a T-PED), the unit should be qualified for safe operation on board the aircraft. One of the following methods should be considered acceptable as evidence for safe operation:

(i) A type-specific safety assessment, including failure mode and effects analysis, has been performed at aircraft level. The main purpose of the assessment should be to determine the worst hazards and to demonstrate an adequate design assurance level of the relevant hardware and software components of the cargo tracking device.

(ii) The high intensity radiated field (HIRF) certification of the aircraft has been performed, i.e. the aircraft type has been certified after 1987 and meets the appropriate special condition. In such a case, the operator should observe the following:

(A) The tracking device:

(a) features an automated and prolonged radio suspension in flight using multiple modes of redundancy; and

(b) has been verified in the aircraft environment to ensure deactivation of the transmitting function in flight.

(B) The transmissions of the tracking device are limited per design to short periods of time (less than 1 second per 1 000 seconds) and cannot be continuous.

(C) The tracking devices should comply with the levels as defined by EUROCAE ED-14E/RTCA DO-160E (or later revisions), Section 21, Category H.

(D) In order to provide assurance on the tracking device design and production, the following documents are retained as part of the evaluation package:

(a) operational description, technical specifications, product label and images of the tracking device and any peripheral attachments;

(b) failure mode and effects analysis report of the tracking device and any peripheral attachments;

(c) declaration of stringent design and production controls in place during the tracking device manufacturing;

(d) declaration of conformity and technical documentation showing compliance to the European Norms (EN), regulating the transmitter characteristic of the tracking device or its transmission module; and

(e) an EMI assessment report documenting the emission levels.

(iii) The tracking device interference levels during transmission are below those considered acceptable for the specific aircraft environment.

(e) Operational conditions of C-PEDS and cargo tracking devices

The operator should ensure that C-PEDs and cargo tracking devices are maintained in good and safe condition, having in mind that:

- (1) damage may modify their emissions characteristics; and
- (2) damage to the battery may create a fire hazard.

(f) Batteries in C-PEDs and cargo tracking devices

Lithium-type batteries in C-PEDs and cargo tracking devices should meet:

- (1) United Nations (UN) Transportation Regulations, 'Recommendations on the transport of dangerous goods - manual of tests and criteria', UN ST/SG/AC.10/11; and
- (2) one of the following standards:
  - (i) Underwriters Laboratory, 'Lithium batteries', UL 1642;
  - (ii) Underwriters Laboratory, 'Household and commercial batteries', UL 2054;
  - (iii) Underwriters Laboratory, 'Information technology equipment – safety', UL 60950-1;
  - (iv) International Electrotechnical Commission (IEC), 'Secondary cells and batteries containing alkaline or other non-acid electrolytes - safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications', IEC 62133;
  - (v) RTCA, 'Minimum operational performance standards for rechargeable lithium battery systems', DO-311. RTCA DO-311 may be used to address concerns regarding overcharging, over-discharging, and the flammability of cell components. The standard is intended to test permanently installed equipment; however, these tests are applicable and sufficient to test electronic flight bags rechargeable lithium-type batteries; or
  - (vi) European Technical Standard Order (ETSO), 'Non-rechargeable lithium cells and batteries', ETSO C142a.

A new AMC2 NCC.GEN.130 is inserted as follows:

#### **AMC2 NCC.GEN.130 Portable electronic devices**

##### **PROCEDURES FOR THE USE OF PEDS**

(a) Scope

This AMC describes the procedures under which any kind of portable electronic device (PED) may be used on board the aircraft without adversely affecting the performance of the aircraft's systems and

equipment. This AMC addresses the operation of PEDs in the different aircraft zones — passenger compartment, flight compartment, and areas inaccessible during the flight.

(b) Prerequisites

Before permitting the use of any kind of PEDs the operator should ensure compliance with (c) of AMC1 NCC.GEN.130.

(c) Hazard identification and risk assessment

The operator should identify the safety hazards and manage the associated risks following the management system implemented in accordance with ORO.GEN.200. The risk assessment should include hazards associated with:

- (1) PEDs in different aircraft zones;
- (2) PED use during various phases of flight;
- (3) PED use during turbulence;
- (4) improperly stowed PEDs;
- (5) impeded or slowed evacuations;
- (6) passenger non-compliance, e.g. not deactivating transmitting functions, not switching off PEDs or not stowing PEDs properly;
- (7) disruptive passengers; and
- (8) battery fire.

(d) Use of PEDs in the passenger compartment

(1) Procedures and training

If an operator permits passengers to use PEDs on board its aircraft, procedures should be in place to control their use. These procedures should include provisions for passenger briefing, passenger handling and for the stowage of PEDs. The operator should ensure that all crew members and ground personnel are trained to enforce possible restrictions concerning the use of PEDs, in line with these procedures.

(2) Provisions for use

- (i) The use of PEDs in the passenger compartment may be granted under the responsibility of the operator, i.e. the operator decides which PED may be used during which phases of the flight.
- (ii) Notwithstanding (b), medical equipment necessary to support physiological functions may be used at all times and does not need to be switched-off.

(3) Stowage, passenger information and passenger briefing of PEDs

- (i) In accordance with NCC.OP.135 the operator should establish procedures concerning the stowage of PEDs. The operator should:
  - (A) identify the phases of flight in which PEDs are to be stowed; and

(B) determine suitable stowage locations, taking into account the PEDs' size and weight.

(ii) The operator should provide general information on the use of PEDs to the passengers before the flight. This information should specify at least:

(A) which PEDs can be used during which phases of the flight;

(B) when and where PEDs are to be stowed; and

(C) that the instructions of the crew are to be followed at all times.

(iii) The use of PEDs should be part of the passenger briefings. The operator should remind passengers to pay attention and to avoid distraction during such briefings.

#### (4) In-seat electrical power supplies

Where in-seat electrical power supplies are available for passenger use, the following should apply:

(i) information giving safety instructions should be provided to the passengers;

(ii) PEDs should be disconnected from any in-seat electrical power supply during taxiing, take-off, approach, landing, and during abnormal or emergency conditions; and

(iii) flight crew and cabin crew should be aware of the proper means to switch-off in-seat power supplies used for PEDs.

#### (5) Operator's safety measures during boarding and any phase of flight

(i) Appropriate coordination between flight crew and cabin crew should be established to deal with interference or other safety problems associated with PEDs.

(ii) Suspect equipment should be switched off.

(iii) Particular attention should be given to passenger misuse of equipment.

(iv) Thermal runaways of batteries, in particular lithium batteries, and potential resulting fire, should be handled properly.

(v) The pilot-in-command may, for any reason and during any phase of flight, require deactivation and stowage of PEDs.

(vi) When the operator restricts the use of PEDs, consideration should be given to handle special requests to operate a T-PED during any phase of the flight for specific reasons (e.g. for security measures).

#### (6) Reporting

Occurrences of suspected or confirmed interference should be reported to the competent authority. Where possible, to assist follow-up and technical investigation, reports should describe the suspected device, identify the brand name and model number, its location in the aircraft at the time of the occurrence, interference symptoms, the device user's contact details and the results of actions taken by the crew.

#### (e) Use of PEDs in the flight crew compartment



In the flight crew compartment the operator may permit the use of PEDs, e.g. to assist the flight crew in their duties, when procedures are in place to ensure the following:

- (1) The conditions for the use of PEDs in-flight are specified in the operations manual.
- (2) The PEDs do not pose a loose item risk or other hazard.
- (3) These provisions should not preclude use of a T-PED (specifically a mobile phone) by the flight crew to deal with an emergency. However, reliance should not be predicated on a T-PED for this purpose.

(f) PEDs not accessible during the flight

PEDs should be switched off, when not accessible for deactivation during flight. This should apply especially to PEDs contained in baggage or transported as part of the cargo. The operator may permit deviation for PEDs for which safe operation has been demonstrated in accordance with AMC1 NCC.GEN.130. Other precautions, such as transporting in shielded metal boxes, may also be used to mitigate associated risks.

GM1 NCC.GEN.130 is amended as follows:

## **GM1 NCC.GEN.130 Portable electronic devices**

### **DEFINITIONS**

(a) Definition and categories of PEDs

PEDs are any kind of electronic device, typically but not limited to consumer electronics, brought on board the aircraft by crew members, passengers, or as part of the cargo and that are not included in the approved aircraft configuration. All equipment that is able to consume electrical energy falls under this definition. The electrical energy can be provided from internal sources as batteries (chargeable or non-rechargeable) or the devices may also be connected to specific aircraft power sources.

PEDs ~~fall into three~~ include the following two categories:

- (1) Non-intentional transmitters can non-intentionally radiate RF transmissions, sometimes referred to as spurious emissions. This category includes, but is not limited to, ~~computing equipment~~ calculators, cameras, radio receivers, audio and video ~~reproducers~~ players, electronic games and toys; when these devices are not equipped with a transmitting function. ~~In addition, portable, non-transmitting devices provided to assist crew members in their duties are included in this category. The category is identified as PED.~~
- (2) Intentional transmitters ~~can~~ radiate RF transmissions on specific frequencies as part of their intended function. In addition, they may radiate non-intentional transmissions like any PED. The term 'transmitting PED' (T-PED) is used to identify the transmitting capability of the PED. Intentional transmitters are transmitting devices such as RF-based remote control equipment, which may include some toys, two-way radios (sometimes referred to as private mobile radio), mobile phones of any type, satellite phones, computers with mobile phone data connection, ~~wireless fidelity (WiFi)~~ wireless local area network (WLAN) or Bluetooth capability. After

deactivation of the transmitting capability, e.g. by activating the so-called 'flight mode' or 'flight safety mode', the T-PED remains a PED having non-intentional emissions.

**(3b) Controlled PEDs (C-PEDs)**

A controlled PED (C-PED) is a PED subject to administrative control by the operator using it. This will include, inter alia, tracking the allocation of the devices to specific aircraft or persons and ensuring that no unauthorised changes are made to the hardware, software or databases. ~~A controlled PED will also be subject to procedures to ensure that it is maintained to the latest amendment state.~~ C-PEDs can be assigned to the category of non-intentional transmitters ~~(PEDs)~~ or ~~intentional transmitters (T-PEDs).~~

**(c) Cargo tracking device**

A cargo tracking device is a PED attached to or included in airfreight (e.g. in or on containers, pallets, parcels or baggage). Cargo tracking devices can be assigned to the category of non-intentional transmitters or T-PEDs. If the device is a T-PED, it complies with the European Norms (EN) for transmissions.

**(d) Definition of the switched-off status**

Many PEDs are not completely disconnected from the internal power source when switched off. The switching function may leave some remaining functionality, e.g. data storage, timer, clock, etc. These devices can be considered switched off when in the deactivated status. The same applies for devices having no transmitting capability and are operated by coin cells without further deactivation capability, e.g. wrist watches.

**(e) Electromagnetic interference (EMI)**

The two classes of EMI to be addressed can be described as follows:

- (1) Front door coupling is the possible disturbance to an aircraft system as received by the antenna of the system and mainly in the frequency band used by the system. Any PED internal oscillation has the potential to radiate low level signals in the aviation frequency bands. Through this disturbance especially the instrument landing system (ILS) and the VHF omni range (VOR) navigation system may indicate erroneous information.
- (2) Back door coupling is the possible disturbance of aircraft systems by electromagnetic fields generated by transmitters at a level which could exceed on short distance (i.e. within the aircraft) the electromagnetic field level used for the aircraft system certification. This disturbance may then lead to system malfunction.

GM2 NCC.GEN.130 is replaced by the following:

**GM2 CAT.GEN.MPA.140 Portable electronic devices**

**CREW REST COMPARTMENT, NAVIGATION, TEST ENTITIES AND FIRE CAUSED BY PEDS**

- (a) When the aircraft is equipped with a crew rest compartment, it is considered being part of the passenger compartment.

- (b) Front door coupling may influence the VOR navigation system. Therefore, the flight crew monitors other navigation sensors to detect potential disturbances by PEDs, especially during low visibility departure operation based on VOR guidance.
- (c) Specific equipment, knowledge and experience are required, when the industry standards for evaluating technical prerequisites for the use of PEDs are applied. In order to ensure conformity with the industry standards, the operator is encouraged to cooperate with an appropriately qualified and experienced entity, as necessary. For this entity an aviation background is not required, but is considered to be beneficial.
- (d) Guidance to follow in case of fire caused by PEDs is provided by the International Civil Aviation Organisation, 'Emergency response guidance for aircraft incidents involving dangerous goods', ICAO Doc 9481-AN/928.

GM3 NCC.GEN.130 is replaced by the following:

### **GM3 NCC.GEN.130 Portable electronic devices**

#### **CARGO TRACKING DEVICES EVALUATION**

##### **(a) Safety assessment**

Further guidance on performing a safety assessment can be found in:

- (1) EASA, 'Certification specifications and acceptable means of compliance for large aeroplanes', CS-25, Book 2, AMC-Subpart F, AMC 25.1309;
- (2) EUROCAE/SAE, 'Guidelines for development of civil aircraft and systems', ED-79/ARP 4754 (or later revisions); and
- (3) SAE, 'Guidelines and methods for conducting the safety assessment process on civil airborne systems and equipment', ARP 4761 (or later revisions).

##### **(b) HIRF certification**

The type certificate data sheet (TCDS), available on the EASA website for each aircraft model having EASA certification, lists whether the HIRF certification has been performed through a special condition. The operator may contact the type certification holder to gain the necessary information.

##### **(c) Failure mode and effects analysis**

Further guidance on performing a failure mode and effects analysis can be found in:

- (1) SAE ARP 4761 (or later revisions); and
- (2) U.S. Department of Defense, 'Procedures for performing a failure mode, effects and criticality analysis', Military Standard MIL-STD-1629A (or later revisions).