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1	*Honeywell*	3.1.3, point 2 third bullet	7	ED-14, DO-160 can be used only for non-intentionally transmitting PEDs as they leave out the part of the spectrum of the intentional transmission	Specify that this point does not apply to T-PEDs	Yes	No	Rejected	ED-14/DO-160 section 21 leaves out the intentional transmission, as it is covering the spurious emissions of any kind of PEDs (transmitting or non-transmitting). The frequency spectrum regulation ensures that the intentional transmission licenced frequency bands do not occur in the frequencies bands used for aeronautical purposes. Not change to the text is necessary
2	*Honeywell*	3.1.3 Table on page 7 and 8	7, 8	The table contains certification objectives that are extending significantly the presented scope of the CM	Extend the scope of the CM (if the goal is to include certification of devices being part of the aircraft configuration- AccessPoint, PicoCell, AID)	Yes	No	Rejected	The intent of the CM is to deal only with the PED demonstration in general, also when required in a certification exercise when a Wi-Fi access point or a PicoCell are being installed. The CM is not dealing with the PicoCell or access point installation itself, but with the risks associated to the emissions of the PEDs that will be allowed in the cabin when the installed system is functioning. To consider the several scenarios possible, table in section 2.1.3 provides different approaches depending on the intention of the certification exercise, which are in line with the operational regulation.
3	*Lufthansa Technik - Aircraft Base Maintenance*	general	general	General description is missing the general distinction between HIRF and non-HIRF/partial HIRF aircraft to a far extent. The distinction between HIRF and non-/partial-HIRF comes at a late stage only – and not fully clear.	Emphasize the distinction between HIRF and non-/partial-HIRF early – and state that HIRF is good to satisfy backdoor effects in any way. From then focus on non-/partial HIRF aircraft only	X	X	Rejected	This CM is endorsing the ED-130A and ED-239, which contain very detailed description of the different categories. The intention is not to duplicate the information contained in the documents endorsed.
4	*Sirium Aerotech*	1.1	3	According to the proposed CM: "*Wireless communication standards which are limited to a maximum of 100mW Equivalent Isotropic Radiated Power (EIRP) do not need to be analysed for backdoor coupling (for example Bluetooth, Wi-Fi)*" WiFi is granted as low power technology in a wide sense. Only 2,4GHz band is considered low power technology according to ED-130A.	The paragraph should be replaced by: "*Wireless communication standards which are limited to a maximum of 100mW Equivalent Isotropic Radiated Power (EIRP) do not need to be analysed for backdoor coupling (for example Bluetooth, Wi-Fi **in the 2.4GHz ISM band**)*"	No	Yes	Accepted	Text changed as suggested
5	*Sirium Aerotech*	1.2 Note 1 3.1.3	4, 7	The paragraph "The use of EUROCAE ED-130...)" is repeated.	Consider removal of one of the repeated paragraphs.	Yes	No	Accepted	Notes 1 and 2 deleted in section 1.2. As a consequence, Notes 3, 4 and 5 have been renumbered.
6	*Sirium Aerotech*	N/A	N/A	It may be understood that conducting tests for GSM will enable to use cellulars onboard. As per AC-91-21-1C Par 7 a. this is only possible if any kind of Picocell is already installed.	We suggest that policy regarding installation of picocell for the use of GSM band should be mentioned explicitly.	Yes	No	Rejected	FAA material mentioned in the comment is not applicable in Europe. Refer to Commission Decision (EU) 2016/2317.
7	*Sirium Aerotech*	3.1.4	8	The following paragraph is not clear: "Restrictions arising from the EMI assessment should be documented in the aircraft flight manual (AFM) or equivalent documents"	It should be clarified which documents are equivalent to AFM, and in which situations is required an amendment to AFM or only to equivalent documents.	Yes	No	Accepted	AFM is not existing in all kind of aircraft, other terminologies are used for smaller aircraft. Text changes as follows: "Restrictions arising from the EMI assessment should be documented in the aircraft flight manual (AFM) or Pilot Operating Handbook (OPH)"

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8	*Sirium Aerotech*	N/A	N/A	There is no guidance about major/minor classification for the AFM change. In particular for operational approvals, a stand alone change to AFM may be necessary (see comment 4). It would be useful guidance for such classification.	It should be included guidance for AFM change.	Yes	No		Guidance for classification of an AFM change is included in Part 21. Part 21.A.91 classifies the change of the aircraft operational capabilities as Major.
9	*PMV Engineering*	1.1	3	Indicating WIFI as example of technology that do not need to be analysed is confusing and could lead to wrong interpretation. Some WIFI standards can be limited to 100mW EIRP but this is dependent on countries and technology.	Remove WIFI in the sentence (for example Bluetooth, Wi-Fi).	no	yes	Accepted	See comment 4
10	*PMV Engineering*	1.1	3	"Front door coupling assessment is only needed if it is intended to allow operation of PEDs in low visibility approach operation (e.g. CAT II and III precision approach)." Should be clearer to consider the aircraft capability rather than the airline intention to use or not these capabilities on a specific operational environment.	Replace the statement by : "Front door coupling assessment is only needed if it is intended to allow operation of PEDs during critical flight phases" Or "Front door coupling assessment is only needed if it is intended to allow operation of PEDs during landing phases" assuming take off phase would never be impacted by the use of PED.	No	yes	Partially Accepted	To follow the same terminology as in the operational regulation the mention to "low visibility approach operation" is kept. But for clarity and not to be more restrictive than the operational rules, the mention to CAT II and III is deleted.
11	*PMV Engineering*	2	6	*"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."* While certifying an A/C as T-PED tolerant, emission of T-PED shall be considered (without activating flight mode). This sentence gives the feeling that this CM only addresses PED (non-intentional transmitter). Furthermore, flight safety mode should not prevent the passenger to reactivate the WIFI. In that case, the PED is still a T-PED (with intentional emissions).	Clarify if this memorandum addresses both PED categories (PED and T-PED). Clarify statement about "flight safety" mode.	Yes	no	Partially accepted	Section 2 includes the following: "PEDs fall into two main categories: non-intentional transmitters and intentional transmitters (T-PEDs). " to indicate that the term PED is general and refers to all kind of devices, intentional and non-intentional transmitters. To avoid confusion the following paragraph is deleted: "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"
12	*PMV Engineering*	3.1.2	6	How does DAL D or E (if any) systems required by AIR OPS, for example Cockpit Door Surveillance System (CDSS) or Quick Access Recorder (QAR) are addressed?	Clarify position on these systems.	Yes	no	Noted.	EASA PED tolerance requirements are only for CAT, HAZ. Major systems and CVR and FDR. No change to the CM is needed.

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13	*PMV Engineering*	3.1.2	6	Concerning CVR and FDR, system interfaces shall be considered. For example: - CVR Microphone and Preamplifier, - FDAU. Note that for example CVR microphone is qualified: for 2 V/m (30 MHz to 1.215 GHz) as per ED56A (TSO C123a). or less than 2V/m (32 MHz to 1 GHz) as per TSO-C84.	Clarify FDR and CVR, including system interfaces.	Yes	no	Noted	The proposal is a good engineering practice, however in the frame of the EUROCAE WG-99 / RTCA SC-234 this point was discussed and it was agreed between Authorities and Industry to require to assess only CVR and FDR, as defined and justified in the ED-239 section 3.4: "The RF radiated susceptibility requirement for the cockpit voice recorders and flight data recorders is for the recorders themselves and not the overall recorder systems…" No change to the CM is needed.
14	*PMV Engineering*	3.1.3	7	HIRF vs PED compliance. We concur with the fact that HIRF compliance is sufficient to demonstrate PED compliance for either CRITICAL (DAL A) or ESSENTIAL (DAL B) systems. However, for NON ESSENTIAL REQUIRED (DAL C) systems HIRF compliance qualification level are rather low (DO160 CAT T meaning 5V/m). Field Strength computation have shown that PED can radiate much more than 5V/m, considering MEF and distance. Furthermore, T-PED testing have shown that some equipment (e.g. smoke detectors, audio system-handsets, boomsets) can be susceptible to GSM or WIFI frequencies.	Indicate that HIRF compliance is compatible with PED compliance for CRITICAL or ESSENTIAL systems but that additional demonstration are necessary for NON ESSENTIAL REQUIRED systems.	No	YES	Rejected	It was justified in the frame of the EUROCAE WG-99 and RTCA SC-234 to reduce the requirement for major systems to be in line with HIRF requirements. Refer to ED-239 table 3-1.
15	*PMV Engineering*	3.1.4	8	"Restrictions arising from the EMI assessment should be documented in the aircraft flight manual (AFM) or equivalent documents." May be confusing, what should be an equivalent document of the AFM? This document is EASA approved as such or by delegation/privilege to DOAs.	Remove "or equivalent document".	Yes	No	Accepted	Refer to comment Nr 7

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16	*Panasonic Avionics*	1.1		The following sentence may mislead an applicant or operator into thinking all Wifi systems do not require PED tolerance assessment: "*Wireless communication standards which are limited to a maximum of 100mW Equivalent Isotropic Radiated Power (EIRP) do not need to be analysed for backdoor coupling (for example Bluetooth, **Wi-Fi**), as these low power emissions are not considered a risk to the safe operation of an aircraft*" The ED-130A provides a more detailed definition for low power technologies, see excerpt from Section 6.2.2 below: "*[Low power technologies] include Bluetooth (IEEE 802.15.1), ZigBee (IEEE 802.15.4). 100mW may be conservatively considered representative maximum operating power of normal in-band WLAN (IEEE 802.11) output power level in the 2.4GHz ISM band.*" The distinction is that ED-130A mentions Wifi in the 2.4GHz ISM band. This is because the WLAN 5Ghz technologies typically have output powers on the order of 500mW. I suggest providing more clarification of low power technologies to avoid confusion or misinterpretation.	Suggest changing below. From: Wireless communication standards which are limited to a maximum of 100mW Equivalent Isotropic Radiated Power (EIRP) do not need to be analysed for backdoor coupling (for example Bluetooth, Wi-Fi), as these low power emissions are not considered a risk to the safe operation of an aircraft" To: Wireless communication standards which are limited to a maximum of 100mW Equivalent Isotropic Radiated Power (EIRP) do not need to be analysed for backdoor coupling as these low power emissions are not considered a risk to the safe operation of an aircraft. Example of low power technologies include Bluetooth (IEEE 802.15.1), ZigBee (IEEE 802.15.4), and Wi-Fi (IEEE 802.11) provided the Wi-Fi operates exclusively in the 2.4GHz band".	Yes	No	Partially Accepted	See comment Nr 4
17	*Panasonic Avionics*	2	6	Section 3 in this policy states: *"Back door coupling requirements are in line with HIRF certification requirements.*" It also states: "*The applicant for certification of installed wireless RF systems that communicate with portable wireless RF transmitters and receivers, which will not become part of the aircraft configuration, should provide evidence of approved data that shows the airplane has demonstrated transmitting PED tolerance*." Presumably the applicant would point to the TCDS and the listing of HIRF rule or Special Condition as evidence of approved data. This is the "Full HIRF Aircraft" guidance detailed in ED-130A Section 3.6.6.1. It may help provide guidance in this policy identifying what evidence or other data is expected from applicants when installing wireless RF systems on Full HIRF aircraft.	Suggest adding below paragraphs to Section 2: "Aircraft that comply EASA HIRF rule or EASA CRI/JAA Special Condition at the initial TC release meet the requirements for demonstrating back door PED tolerance. The significance of "initial" is that all the systems and equipment were considered for HIRF certification and not grandfathered from previous TC revisions. These aircraft are termed "Full HIRF Tolerant Aircraft" using the definition from EUROCAE ED-130A. Example aircraft that meet Full HIRF criteria and back door tolerance requirements include A320, A330, A340, A350, A380, B777, B787, CS100, EMB-145, ERJ-170, and ERJ-190 series. The applicant for certification of installed wireless RF systems on Full HIRF Tolerant Aircraft shall document the use of HIRF cert basis in the Certification Plan. The TCDS shall constitute as evidence of approved data that shows the airplane has demonstrated transmitting PED tolerance for back door coupling effects. "	Yes	No	Rejected	This CM is to be used in a certification exercise and therefore the certification basis are to be known by the applicant. The intention of this CM is not to duplicate the information and guidelines that are already included in the endorsed standards.

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18	*Panasonic Avionics*	3.1.3	7	This section requires the applicant preform both back door and front door coupling susceptibility assessments for wireless systems used in all phases of flight. However, Section 2 implies the applicant is only responsible for demonstrating PED tolerance for the intentional transmissions, which only poses a back door coupling threat, see excerpt below: "*The applicant for certification of installed wireless RF systems that communicate with portable wireless RF transmitters and receivers, which will not become part of the aircraft configuration, should provide evidence of approved data that shows the airplane has demonstrated transmitting PED tolerance*." Moreover Section 3.8 in ED-130A states the operator is required to meet front door tolerance, see excerpt below: "*Note that per the current FAA policy statement (at the time of release of this document) and the EASA project specific CRIs, the certification applicant is required to meet aircraft back door tolerance for transmitting PEDs intended for use with the installed wireless system, while the Operator is required to meet front door tolerance*."	See recommended changes below: 1. Update Item No. 2 in table under Front door coupling assessment. Currently it shows "Needed". Change to "See Note 5". 2. Change Note 5 to state: From: A front door coupling susceptibility assessment is necessary when the intention is to allow gate-to-gate operation of the PEDs, i.e. including low visibility approach operation. In all other cases, performing a back door coupling assessment is sufficient To: A front door coupling susceptibility assessment is necessary when the intention is to allow gate-to-gate operation of the PEDs, i.e. including low visibility approach operation. The assessment may be differed to the operator. The rationale behind this comment is that most operators around the world have already demonstrated PED tolerance for gate to gate operations. Not all operators have a wireless RF systems. Introducing a wireless system should not force an applicant into re-certifying the aircraft as front door PED tolerant. Use of non-transmitting PED devices remains an operator requirement regardless if a wireless communication system is installed on the aircraft.	Yes	Yes	Partially accepted	The comments refers to an operational approval of the use of PEDs, however this CM is to be used in a certification project. In a certification project when a Wi-Fi or a Pico cell is being installed and it is intended to be activated and connected to the PEDs during all phases of flight, performing a front door coupling assessment is required to get the certification of the installation. Therefore the recommended change 1 is rejected. To avoid confusion the CM text in section 2 is changed as follows: The applicant for certification of installed wireless RF systems that communicate with portable wireless RF transmitters and receivers, which will not become part of the aircraft configuration, should provide evidence of approved data that shows the airplane has demonstrated transmitting PED tolerance. Recommended change Nr 2 is accepted and the CM is changed accordingly. Note: As a result of other comments Note 5 has been renumbered to Note 3.

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19	*Panasonic Avionics*	3.1.4	8	The 3.1.4 section states: *"Restrictions arising from the EMI assessment should be documented in the aircraft flight manual (AFM) or equivalent documents*". Incorporating the limitation information into an AFM or AFMS may congest or dilute other data contained in the manual. Per FAA AC 25.1581-1 Chg. 1: "*The AFM content should be limited to the smallest practicable amount of material that is appropriate for the intended operation of the airplane*." The FAA Advisory Circular acknowledges the bulk and complexity of the AFM can be kept manageable by locating information and procedures in the Flight Crew Operating Manual (FCOM). Typically STC applicants do not generate FCOM supplements since these are maintained by the airline operator and not included in Part 23/25/27/29 STCs. Today, Panasonic provides limitations associated with its PED compatibility assessments inside the Equipment List containing the assessment results. This complies with recommendations and guidance contained in ED-130A Section 3.8.1.3.	Suggest following changes: 1. Change Section 3.1.4 heading from "Aircraft Flight Manual Limitations" to "PED Assessment Limitations" 2. Change first sentence in section to read: "Restrictions arising from the EMI assessment should be documented in the PED Equipment List or equivalent documents and provided the operator. 3. Replace "AFM" with "PED Equipment List, or equivelant" throughout the section. The rationale for this comment is that he AFM is not the right location to list PED tolerance related information unless it requires specific action by the flight crew. One of the ED-130A drafts had similar guidance suggesting AFM updates for PED limitations. During FRAC, a reviewer provided a non-concur comment and the RTCA SC-234 and WG-99 committees agreed the AFM is not a suitable location to provide this information.	Yes	Yes	Rejected	The AFM is the appropriate document to record the certified status of the aircraft including its operational limitations. The list of PED tolerant or non-PED tolerant P/Ns is not to be recorded in the AFM, but the approved performance and resulting limitations. The ED-130A is not only limited to certification but also for operators, in the operational context updating the AFM makes no sense, however it does in a certification exercise.
20	*Airbus*	All		General Comment: The CM should make clear that HIRF approval is considered as being sufficient to demonstrate back-door coupling PED Tolerance (refer to comments # 5, 7, 8, and 9).	Refer comments #24, 26, 27, and 28 below.	No	Yes	Rejected	Even in a fully HIRF certified aircraft CVR and FDR still need to be assessed to be PED tolerant.
21	*Airbus*	1.2	4	Editorial change: Table on referenced documents. Comment on the element assignment of issues for ED-239 DO-307	Airbus proposes the editorial change to the invert assignment from "A/Initial (note 1)" to Initial(note 1) / A"	Yes	No	Accepted	Text changed as suggested
22	*Airbus*	1.2	4	Editorial change to "Note 2" last line: not ".. that the new " but "… than the new documents"	Airbus suggests to replace the wording ".. that the new " by "… than the new documents"	Yes	No	Accepted	Text changed as suggested
23	*Airbus*	2	6	"This standard EMI test is out of the scope of this CM." Issue: Not clear.	Airbus suggests change to: "EMI demonstration for electrical equipment installation is out of the scope of this CM."	Yes	No	Accepted	Text changed as suggested

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24	*Airbus*	2.1.3	7	"The recommendations in the guidance material to address back door coupling closely follow existing practices for aircraft system “high intensity radiated fields” (HIRF) protection, therefore consideration of the existing HIRF certification of the aircraft is helpful to address the back-door coupling effects." Airbus issue: Unclear for HIRF aircraft. For more clarity Airbus suggests to consider following statement from ED-239, and to adapt accordingly: "No further analysis or testing is required when PED tolerance for back door effects is met through aircraft HIRF certification for the FAA or EASA HIRF regulations or EASA/JAA special conditions. "	For clarity, Airbus suggests to add the following sentence: "*No further analysis or testing is required when PED tolerance for back door effects is met through aircraft is approved to meet EASA regulations and Special Conditions addressing HIRF requirements as part of the type certificate (TC).”*	No	Yes	Rejected	Refer to comment 20
25	*Airbus*	2.1.3	7	Editorial change: Front door susceptibility third bullet. Not “quality” but “qualify”	Airbus suggest to replace “quality” by “qualify”	Yes	No	Accepted	Text changed as proposed
26	*Airbus*	2.1.5	9	ICAs do not have always to be produced (e.g. if aircraft is HIRF approved by TC/STC). Airbus suggest to consider following conclusion by ED-239: For aircraft certified as HIRF compliant with 14 CFR 23.1308, 25.1317, 27.1317, 29.2317, or that are certified to FAA/EASA/JAA HIRF special conditions, as part of the original type certificate (TC), then no further ICA for maintaining back door PED tolerance are required.	Airbus suggest to change first sentence of §3.1.5. to: “*The applicant should maintain ICA documentation in accordance with CS 23.1529, 25.1529, 27.1529 or 29.1529.*”	No	Yes	Accepted	Text changed as proposed
27	*Airbus*	2.1.5	9	"Guidance on sustaining aircraft PED tolerance can be found in EUROCAE ED-130A / RTCA DO-363 section 7." These Standards addressing mainly “retrofit” cases. The Reference to ED-239 section 5.7 should be added, because of it addresses in addition procedures for TC/STC.	Airbus proposes to insert the following reference: "Guidance on sustaining aircraft PED tolerance can be found in EUROCAE ED-130A / RTCA DO-363 section 7 or EUROCAE ED-239 / RTCA DO-307A section 5.7"	No	Yes	Accepted	Text changed as proposed
28	*Airbus*	2.1.6	9	"The applicant should list all of the evaluated aircraft systems and equipment for which PED tolerance has been demonstrated." Issue: For HIRF approved aircraft such a list is not useful (no added value for both, applicants, and authorities).	Airbus proposes to insert the following change: "For non-HIRF or only partially HIRF approved aircraft the applicant should list all of the evaluated aircraft systems and equipment for which PED tolerance has been demonstrated."	No	Yes	Accepted	Text changed as proposed
29	*Airbus*	2.2	9	Typo: Headline should read “Whom this Certification Memorandum Affects”	Airbus proposes to change headline to “Whom this Certification Memorandum Affects”	Yes	No	Rejected	The title comes from the official EASA CM template which is used in all EASA CMs.

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30	*Airbus*	2.1.1	6	The applicant may use a Certification Plan for the entire electromagnetic demonstration (e.g. new TC, new Model) at aircraft level.	Airbus proposes to insert the following sentence: "If an aircraft level Certification Plan will be issued by the applicant, the PED tolerance should be treated within the Electromagnetics Hazards Section of this Certification Plan."	Yes	No	Rejected	EASA does not intend to regulate the format of the applicant's documentation.
31	*The Boeing Company - Boeing Commercial Airplanes*	2.1.2	6	**THE PROPOSED TEXT STATES:** "3.1.2. Safety Objectives … The applicant should demonstrate that the use of PEDs does not adversely affect the correct operation of any "required" aircraft systems or equipment, i.e. those required for type certification, or whose improper functioning would reduce safety; throughout the entire flight envelope, including taxiing to/from the runway, and Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) In other words, equipment and systems that have failure modes that are classified as Major, Hazardous or Catastrophic, and Flight Data Recorder and Cockpit Voice Recorder need to be assessed."	**REQUESTED CHANGE:** Boeing recommends to revise the text as follows: *"3.1.2. Safety Objectives* … *The applicant should demonstrate that the use of PEDs does not adversely affect the correct operation of ~~any "required" aircraft systems or equipment, i.e. those required for type certification, or whose improper functioning would reduce safety; throughout the entire flight envelope, including taxiing to/from the runway, and~~* ***equipment and systems that have failure modes that are classified as Major, Hazardous or Catastrophic, as well as the*** *Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR)* *~~In other words, equipment and systems that have failure modes that are classified as Major, Hazardous or Catastrophic, and Flight Data Recorder and Cockpit Voice Recorder need to be assessed."~~* *JUSTIFICATION:* *The use of the word "required" may cause confusion and evaluation of systems not intended to be evaluated by this CM. The existing wording in the first paragraph above is consistent with the criteria for determining which aircraft equipment/systems require assessment from the initial revision of DO-307, but is not consistent with the revised criteria in DO-307 Revision A. The paragraph immediately following is consistent with the DO-307 Revision A criteria. This discrepancy may lead to a misinterpretation by some applicants that assessment is still mandated for all "required" systems.*			Accepted	Text changed as proposed.
32	*Lufthansa Technik - Office of Airworthiness*	1.1	3	Third paragraph is talking about "guideline to certify an aircraft as PED tolerant". This is not in line with CAT.GEN.MPA.140, requiring the operator to ensure safe operation when PED usage is allowed during flight (scenario 1 to 7). There is no requirement for a technical approval to certify a configuration of an aircraft to be PED tolerant. Configuration found for PED tolerance analysis is already certified in terms of airworthiness.	EASA is requested to adapt intent of CM-ES-003 to "guidance for PED tolerance declaration".	yes	no	Rejected	CAT.GEN.MPA.140 are operational guidelines. This Certification Memorandum is to be used in a certification exercise. It is to be used when an aircraft is to be certified PED tolerant or for the certification of the installation of a Wi-Fi system or a pico-cell system that will connect wirelessly with PEDs.

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33	*Lufthansa Technik - Office of Airworthiness*	3.1.5	9	Production of ICA in accordance with CS23, CS25.1529 etc. is not in line with ED-130A section 7.1.4. The section 7.1.4 of ED-130A is stating that continued airworthiness and PED tolerance are independent. Sustainment of PED tolerance, not related to a change on aircraft, will be ensured within the already certified configuration of the aircraft and no additional airworthiness requirements will be generated. Allowance of the use of PEDs on board aircraft is within the responsibility of the operator. Guidance to keep the aircraft in a PED tolerant configuration has to be defined in accordance with ED-130A section 7 and be followed by the operator. As the decision of the allowance or prohibition of PED during flight (on an PED tolerant aircraft) or keep the aircraft in a PED tolerant configuration or not will be made by the operator, this will not be within the leverage of a DOAH.	Requirement for ICA should be deleted. Compliance with PED tolerant configuration have to be defined in accordance with ED-130A section 7.	no	yes	Rejected	This CM is to be used in a certification exercise, not by the operator to get the operational approval on the use of PEDs onboard. In a certification exercise, PED tolerance is required when a system that will control TPEDs is installed in an aircraft, as a picocell or a WLAN access point, as the intentional transmissions of the PEDs that interact with the install system are considered part of the aircraft environment. Therefore ICAs are required to keep the PED tolerance certification.
34	*Lufthansa Technik - Office of Airworthiness*	3.2	9	CM shall be affective for TC and STC applicants, this is not in line with GM2 CAT.GEN.MPA.140 c). CAT.GEN.MPA.140 c) does not require a DOAH for demonstration of PED tolerance. This represents a disadvantage of Part 21 entities towards “qualified and experienced entity” as stated in CAT.GEN.MPA.140 c).	Adapt audience of this CM to be in line with GM2 CAT.GEN.MPA.140 c).	no	yes	Rejected	Audience is not the same as in GM2 CAT.GEN.MPA.140 c), which is an operational regulation. This CM is a certification document to be used in a certification exercise, and therefore addressed by TC/STC holders.

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35	*Silver Atena Electronic Systems Engineering*	3.1.4 para 1		<u>Question 1: Testing areas. Is testing in the cargo necessary?</u> The first paragraph in **section 3.1.4 Aircraft Flight Manual Limitation** states: […]They may (they=restrictions/limitations) be linked to different aircraft zones where EMI testing has not been successfully conducted and where PED use should be prohibited, or to particular transmission technologies covered. On the other hand, ED-239 states the following **4.8 Aircraft IPL Measurements** […] Determine the worst-case IPL values for each area of the aircraft separately. If these worst-case IPL values for flight deck/cockpit, crew rest and cargo areas can be demonstrated to be independent of the cabin IPL, and these areas are not accessible for the passengers in flight, then different MEF values can be applied. The cabin IPL should meet or exceed the applicable target IPL of Table 4-7 for the aircraft size. For cockpit/flight deck, crew rest and **cargo areas** the target IPL can be used from the next lower cabin size, e.g. medium instead of large aircraft. **B.2 Evaluation of Worst-Case IPL** […] **Aircraft cargo bay IPL measurements:** IPL measurements should also be conducted inside the **cargo bay**. Because of the varying size of the cargo doors, the number of measurements necessary to address the apertures varies with the size of the aircraft. This area should be empty when performing this test, as credit may not be taken for any expected loading given by baggage or cargo. If entering the cargo bay during flight is not allowed and therefore no PEDs are expected in the area. Is still necessary to perform the testing in that area? May an applicant decide not to test in the cargo bay. Does it need to be included in the Aircraft Flight Manual as a limitation? Are there mandatory testing areas and optional testing areas?				Noted	Generally it is expected that the PED tolerance is demonstrated for all aircraft areas, if not this will lead to specific limitations to be included in the AFM.

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36	*Silver Atena Electronic Systems Engineering*			<u>Question 2: Large, medium and small A/C definition.</u> There is some incongruity between the definition of large, medium and small aircraft given by EASA and the one included in ED-239 ED-239 defines: • Small aircraft: Less than 10 PAX • Medium aircraft: form 10 to 19 PAX • Large aircraft: more than 19 PAX EASA divides aircraft size based on take-off mass (CS25/29, CS23A, CS-LSA.5). Is it correct to assume, that ED-239 categories are applicable for T-PED testing, regardless of EASA definition?				Noted	The ED-239 Table 4-6 definition depending on the Nr of passengers is used for the estimation of the front door Multiple Equipment Factor, which is a multiplying factor that accounts for the cumulative effects on the interference level of many PED devices. The number of PED devices that may be operating at the same time is generally defined considering the number of passengers that may be in the aircraft, independently of the aircraft size. Therefore the EASA classification of aircraft depending on its size is totally independent of the classification depending on the number of passengers, which is used exclusively for the MEF estimation.
37	*Silver Atena Electronic Systems Engineering*	1.1		<u>Question 3: Front Door Coupling test applicability clarification needed</u> Section **1.1 Purpose and scope** of the CM states: […] Front door coupling assessment is only needed if it is intended to allow operation of PEDs in low visibility approach operation (e.g. CAT II and III precision approach) Table in section **3.1.3 RF and EMI Assessment at aircraft level**, scenario N°3 states that if the intention is the installation of a wireless communication system to be used in all flight phases except low visibility approach operation, only a backdoor testing is required. Is it then correct to assume that if the applicant wants to allow T-PEDs (with transmission capabilities enabled) during all flight phases except low visibility approach operation, a back-door assessment is sufficient? Assuming the following scenario, is any testing necessary?: • HIRF certified A/C. • Intention is to install a Wi-Fi system (power under 100mW) • PEDs and Wi-Fi System will not be allowed during low visibility approaches					If the applicant wants to allow T-PEDs (with transmission capabilities enabled) during all flight phases except low visibility approach operation, a back-door assessment is sufficient? Yes, but the limitation needs to be recorded in the AFM-S Assuming the following scenario, is any testing necessary? • HIRF certified A/C. CVR and FDR need to be assessed also • Intention is to install a Wi-Fi system (power under 100mW) If 100mW maximum EIRP is demonstrated, then this is considered a low risk technology and no further assessment is needed. • PEDs and Wi-Fi System will not be allowed during low visibility approaches. If Wi-Fi has a demonstrated maximum EIRP limited to 100mW no back door coupling assessment is necessary. As PEDs will not be allowed to be switched on during low visibility approach operation, no front door assessment is needed.

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38	*Silver Atena Electronic Systems Engineering*			Question 4: PED becomes a part of the A/C configuration Section **3.1.3 RF and EMI Assessment at aircraft level**, the third bullet point under section 2 states: In case the PED is becoming part of the A/C configuration, an alternative acceptable means of compliance is to qualify the PED in accordance to EUROCAE ED-14/RTCA DO-160 section 21. What is exactly meant with "an alternative"? Is this an alternative to front-door coupling test? Assuming the answer is yes. A PED with transmission capabilities enabled will certainly fail the radiated emissions test (DO-160 Section 21) at least at the transmitting frequency (e.g. 2.4GHz). What would happen during the low visibility approaches?				Noted	It is recognized that a PED cannot become part of the aircraft configuration, in which case it won't fall under the definition of PED anymore. Therefore the alternative test is removed from section 2.1.3 2)
39	*Silver Atena Electronic Systems Engineering*			Question 5: EASA SIB 2013-21 This SIB recommends but does not require to comply with ED-130 or DO-307 when expanding the use of PEDs on board during low visibility operation. Is this not a contradiction with what is written in this document?				Noted	This CM is a certification document, while the SIB is for operators. EASA SIB 2013-21 is withdrawn and superseded by Annex to EASA ED Decision 2014/029/R.
40	*Silver Atena Electronic Systems Engineering*			Question 6: Parallel work during testing According to the ED-130 and ED-239, no parallel work within the A/C is allowed during testing, how about outside of the A/C? Can work be done (without electrical tools), for instance on the fuselage?				Noted	It is up to the applicant to define and demonstrate that the conditions of the test are appropriate to achieve the certification requirements.
41	*LSA Electromagnetics Limited*	1.1	3	The WG-99 committee did not accept that WiFi would be accepted to be a low power device due to the potential for higher power devices to be brought board (e.g. up to 500 mW). The upper limit on radiated power for WLAN of 100 mW was accepted, but it was not accepted that this was a low power technology. This was a particular issue with the FAA and the wording in the proposed CM does not reflect my understanding of the WG position. The wording in Section 6.2.2. of ED-130A needs to be read very carefully.				Accepted	See comment 4
42	*LSA Electromagnetics Limited*	3.3	7	See comment for 1.1.				Noted.	See reply to comment for 1.1

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43	*Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)*			The document states that front-door coupling assessment is only needed for low-visibility approach operation (e.g. CAT II and CAT III precision approach). On other places, it is said that equipment and systems with failure modes classified as major, hazardous and catastrophic need to be assessed for PED tolerance. In my opinion, these two statements are not entirely equal, since some system functions other than CATII and CATIII may actually fall into major and hazardous classification for front-door coupling (for example, ILS during CAT I, VOR, VHF, ATC, GPS – see pages A-13 to A-22 of ED-130A). One may thus pose the question, to which extent or whether an assessment should be performed for these other systems. Taking a look at the mitigations and controls for these failure modes (also in the Appendix A of ED-130A), some procedures are acceptable for dealing with them. For example, assessing aircraft position during approach, similar to what is written in GM2 CAT.GEN.MPA.140 (b), or the pilot following appropriate procedures in the case of system loss. For most of these failure modes, no additional control measure besides these operator or pilot procedures is required. Accordingly, restricting front-door coupling assessment to low-visibility approach operation is a consequence of that. Therefore, I think mentioning something related to it could avoid any confusion that might arise, perhaps in section 2.1.2.				Accepted	Regarding the requirements for front door coupling, that is only required to be able to allow any kind (transmitting or not transmitting) PEDs in low visibility approach operation, it has been determined that the only possible CAT FC that can be generated by PED interferences to aircraft transmitters is through the ILS in low visibility approach operation, and as we are working in a risk based approach, it has been agreed to request to perform the front door coupling only if PEDs are going to be used in this critical phase of flight. However the requirement (as in the operational rules: https://www.easa.europa.eu/system/files/dfu/Annex%20to%20Decision%202014-029-R.pdf) is that if PEDs want to be allowed in all flight phases, IPL measurements need to be conducted to all radio receivers listed in the ED-130A and ED-239. For clarity purposes, the following sentence has been added in section 2.1.3 just after the requirement to assess all systems with CAT, HAZ and Major FCs: "For front-door coupling, assessment is only needed if PED operation is intended in low-visibility approach."
45	*LHsystems*			In chapter 1.1 the CM states: Wireless communication standards which are limited to a maximum of 100mW Equivalent Isotropic Radiated Power (EIRP) do not need to be analysed for backdoor coupling (for example Bluetooth, Wi-Fi), as these low power emissions are not considered a risk to the safe operation of an aircraft. This is in line with ED-130A, chapter 6.2.2 Low Power technologies. ED-130A calls the same limit and includes as examples Bluetooth and ZigBee. For WLAN (Wi-Fi) ED-130A states: 100mW may be conservatively considered representative maximum operating power of normal in-band WLAN (IEEE 802.11) output power level in the 2.4GHz ISM band.				Noted	Refer to comment Nr 4

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46	*LHSystems*			QUESTION: Does the CM (and ED-130A) include all WLAN bands (2.4 GHz , 5GHz) or is the low power emission statement limited to technologies using the 2.4GHz band? It would be a great advantage if all WLAN frequency bands would fall under the low power emission "rule" as this would not need further distinction of WLAN use allowance (allowance of 2.4GHz use and allowance of 5GHz use) within the Operational Approval process. In other words: An airline that wants to allow the usage of T-PEDs on board - whereas the transmitting functionality is limited to Bluetooth and WLAN functionality ("flight mode with Bluetooth and WLAN enabled") - would not have to demonstrate aircraft backdoor tolerance. This is due to the fact that "transmitting PEDs using these technologies [Low Power technologies] can be considered to present an acceptable level of risk and be treated like non-transmitting PEDs". For Gate-to-Gate including Low Visibility approach front door tolerance is needed, of course.				Noted	Refer to comment Nr 4
47	*Michael Airey*			Having read the proposed CM in more detail, I definitely think that there is a disconnect in the proposed CM wording. Section 6.2.2. of ED-130A does NOT, in my view, accept that WLAN is a low power technology, even though it DOES accept that the test level for WLAN can be limited to 100 mW. This is also based on my participation at the WG meeting where the proposal for WLAN to be considered as low power was rejected. Noting the comment on technologies with EIRP less than 100 mW, there was significant discussion on this at the WG meetings. My understanding from the meetings was the while BT, for example, fell under this category, WLAN did not due to the potential for higher power transmitters embedded in devices.				Accepted	Refer to comment Nr 4