Requirements Technical Note: Integration of wireless chargers into seats

AC APPLICABILITY	A320 Family, A330 Family, A350, A380
ATA APPLICABILITY	25-21 Passenger Compartment Seats
LEADING TEAM ORGANIZATION	ECG5M

SUMMARY:

This document is an addition to the specification for the electrical integration of in-seat systems X2521PTSI09010 (Issue 04) defining the requirements for integration of wireless chargers into seats.

Please take note that this RTN is only valid in conjunction with the above mentioned Specification.

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RECORD OF REVISIONS

Issue	Date	(Old) Section number	New section number	Description
01	29.05.2019			- Initial Release

LIST OF DISTRIBUTION

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RELATED SPECIFICATIONS LIST

Following specifications are related to the content of this RTN and shall always be respected in latest issues.

No	Reference	Title	Issue	Date
[1]	X2521PTSI09010	Specification for the electrical integration of In-Seat Systems	04	17 Jul 2018

LIST of APPLICABLE DOCUMENTS

No	Reference	Title	Issue	Date
[2]	X4422ME1829415	Requirements for Wireless Charger QI Standard installed in Cabin	1	13 Dec 2018
[3]	CRI F19	A350 Guidance Material regarding the Installation of In-Flight Entertainment Systems including in-Seat Power Supply Systems Aspects	3	-
[4]	X390RP1901584	TN EMC requirements for wireless chargers (Qi standard) in the cabin	1	22 Jan 2019

1 General Requirements

1.1 Document Applicability

This RTN is a cross program document applicable for A320 Family, A330 Family, A380 and A350. It is applicable for integration of wireless chargers into A/C cabin seats.

1.2 Document purpose

This RTN defines requirements for integration of wireless chargers into seats. These requirements are an add-on to the specification for the electrical integration of in-seat systems X2521PTSI09010 (Issue 04) to provide requirements for a wireless charger in regard to design, installation and integration.

1.3 Effectivity

This RTN stays valid as long as no update of the Airbus seat electrical integration specification has been released.

1.4 Terms and Definitions

All requirements from the Airbus seat electrical integration specification that are not explicitly identified as non-applicable requirements within this RTN remain valid for the integration of wireless chargers.

In accordance with an EASA request, the requirements are categorized in four groups. The Requirement Group Letter (A, B, C or D) is attached in the first position of each Requirement Number.

Specification Keyword	Requirement Keyword	Requirement Group	Source Document	Effect
Must	Regulatory	Group A	Airworthiness Regulations (CS25, CRI, IP…)	Deviations are not permitted
Shall	AIRBUS Mandatory	Group B	Guidance Material (AMC, AC, AS, ARP…)	Guidance materials provide established and accepted means of compliance to regulations. Deviations require approval by the Office of Airworthiness.
		Group C	AIRBUS Requirements and other means of compliance (ABD, RTN, RTCA DO…)	Deviations don't violate regulations and guidance materials. Deviations can be agreed on by AIRBUS and Supplier (and customer). Approval by the Office of Airworthiness is not required.
Should	Supporting good design	Group D	Any	Deviations can be agreed on by AIRBUS and Supplier (and customer).

Table 1: Requirements Categories

Further terms:

- The word *WILL* in the text denotes a provision or service or an intention in connection with a requirement of this Requirements Technical Note.
- The word *MAY* in the text denotes a permissible practice or action. It does not express a requirement.

1.5 Abbreviations

The table explains the abbreviations used within this document:

Abbreviation	Definition	Category
ABD	Airbus Directives	document
CRI	Certification Review Item	document
CVE	Compliance Verification Engineer	technical
EMC	Electro Magnetic Compatibility	technical
IP	Interpretative Material	airworthiness
MoC	Means of Compliance	technical
PED	Personal Electronic Device	seat-related
PPUI	PED Power In-Use Indicator	seat-related
RTN	Requirements Technical Note	document
SPB	Seat Power Box	seat-related
WC	Wireless Charger	seat-related

Table 2: Abbreviations

1.6 Means of Compliance

Compliance task	***Means of Compliance***	***Associated Airworthiness Documents***
Engineering Evaluation	MC0: Compliance statement, definitions, election of methods, factors, etc.	Type Design definition, Recorded Statements
	MC1: Design Review	Description, Drawings
	MC2: Calculation/Analysis	Substantiation Reports, e.g. AP2176, AP5340.
	MC3: Safety Assessment	System Safety Analysis, e.g. ABD0062/ABD0200.1.3
Tests	MC4: Laboratory Tests MC5: Ground Tests on A/C MC6: Flight Tests MC8: Simulation	Test Programs, Test Reports, Test Interpretations (e.g. AP5006 for structure tests) See Note 3
Inspection	MC7: Inspection (on Mock-up, A/C, etc.)	Reports of Inspection Visits
Equipment qualification	MC9: Equipment Qualification	See Notes 1 and 2

Note 1: Equipment Qualification is a process, which may include all previous Means of Compliance.

Note 2: ETSO (or TSO) equipment is typically qualified against the requirements of ETSO or TSO. The Declaration of Design and Performance is endorsed by the Airbus CoCs, including limitations, or deviations from the Airbus specification if acceptable (Reasons justifying the acceptance of the deviations need to be appended to the DDP). The APU is qualified either against ETSO or CS-APU. Any deviation impacting ETSO or TSO approval (when needed) should be approved by the Relevant Authority.

Note 3: Tests are to be carried out in accordance with PART 21A.33. Test equipment and all measuring equipment used for tests are to be adequate for the test and appropriately calibrated.

Note 4: In case of MoC 6 is intended to be used, agreement from Development Flight Tests department is mandatory prior any commitment to AAs.

Note 5: If a document addresses several MoC, select "S" for the MoC code.

2 Product Design and Process Requirements

The Wireless Charger System which will be installed in standard commercial aircrafts in the Airbus product family uses an electromagnetic field to transfer energy between two objects through electromagnetic induction refer to Figure 1.

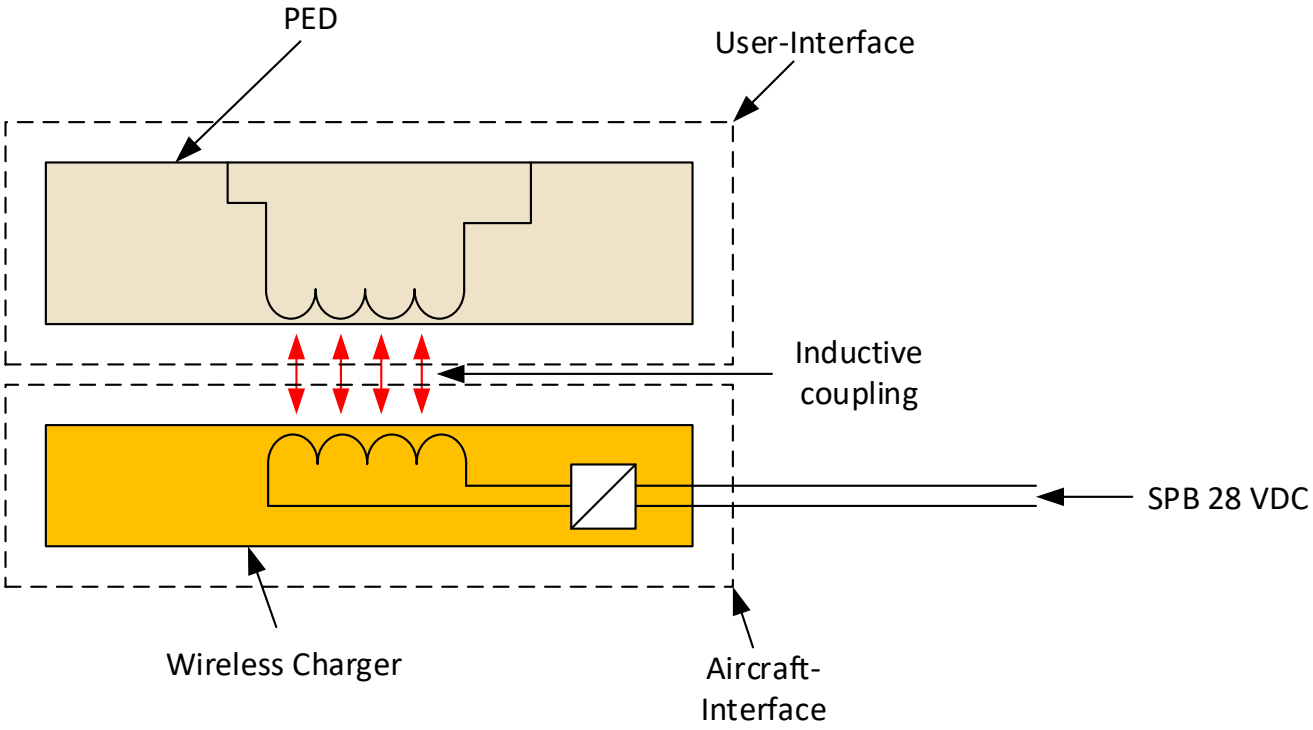

Figure 1: Wireless charging example

The electrical energy is sent through an inductive coupling to a PED. The WC uses an induction coil to create an alternating electromagnetic field from within a charging base, and a second induction coil in the PED takes power from the electromagnetic field and converts it back into electric current to charge the battery. The two induction coils in proximity combine to form an electrical transformer.

Figure 2: WC-device user interface example

2.1 Non-Applicable Requirements

The following table shows requirements from the Airbus seat electrical integration specification [1] which are not applicable for wireless chargers. Since the function of a wireless charger is similar to classical PED power supplies with power outlets, the following non-applicability just refers to wireless chargers but not to classical PED power supplies.

Table 1: Non-Applicable seat electrical integration specification requirements for wireless chargers

Requirement	Requirement Text
Integration-1115	The PED power outlet unit must be mounted so that the axis of the mated pair is approximately horizontal or downward-oriented in order to hinder the ingress of fluids.
Integration-1108	The PED power outlet units shall be positioned either: • at upper/lower backrest of the seat in front of the passenger • under rear of armrest • under seat cushion • in the center console

Table 3: Non-Applicable Requirements

2.2 Additional Requirements

Integration-2700
Category: C
The integrator shall define together with the WC supplier how to handle the WC in terms of locations, position etc.
MoC: 1
Rationale: The integrator together with the supplier of the wireless charger are responsible for the position and locations in a seat

Integration-2701
Category: C
The integrator shall fulfill all requirements that are defined in the installation requirement document of the wireless charger supplier.
MoC: 0
Rationale: The integrator together with the supplier of the wireless charger are responsible for its installation

Integration-2702
Category: B
The integrator shall check and ensure together with the WC supplier that WC are labelled to identify the correct charging position and to indicate the wireless charging by using the international standard sign.
MoC: 7
Rationale: To identify correct loading position for passengers

Integration-2703
Category: A
The integrator shall provide a label for a Wireless Charger indicating that PEDs have to be removed during Taxi, Take-Off and Landing.
MoC: 7
Rationale: EASA requirement

Integration-2704
Category: C
One PPUI-Light per seat shall be installed on seats with wireless chargers installed when the power output of the WC is more than 10VA.
Additional Information: The PPUI-Light location and safety requirements of [1] chapter 4.4.2 are also applicable for wireless chargers.
MoC: 7
Rationale: EASA requirement.

Integration-2705
Category: B
The electrical wiring between in-seat power supply and wireless charger shall be protected against damages to protect against the hazards of electrical shocks.
MoC: 7
Rationale: to reduce the risk of electrical shocks to passengers