



**Federal Communications Commission
Office of Engineering and Technology
Laboratory Division**

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**EVALUATION AND APPROVAL CONSIDERATIONS FOR HANDSETS WITH
SPECIFIC WIRELESS CHARGING BATTERY COVERS**

This document identifies the test and approval considerations for certain handsets with provisions to use inductive wireless charging capabilities through an optional battery cover. In particular, the procedures described may apply to implementations based on the Qi, PMA, and A4WP wireless power transfer protocols, according to the operating frequencies, receiving coil designs, and communication requirements defined in such industry standards.¹ The charging hardware must be incorporated as an integral part of the battery cover, which is supplied by the handset manufacturer or can be acquired as an optional accessory for a specific handset model from the handset manufacturer. A KDB inquiry is required to confirm the test requirements when the exact protocol defined by these industry standards is not followed. When handsets are tested according to the procedures described in this document, a PAG is not required for equipment approval. General guidance for low power consumer wireless chargers implemented according to closely coupled inductive power transfer techniques is described in KDB Publication 680106 D01.

EQUIPMENT AUTHORIZATION

We require an accessory battery cover that allows a handset to charge its battery wirelessly according to the specific wireless power transfer protocols to be tested and approved as an integral part of the handset, under the FCC ID of the handset.² Once authorized as an integral part of the handset, the wireless charging battery cover may also be sold separately as an accessory for the handset. We do not permit a separate FCC ID for wireless battery charging covers implemented according to these protocols or similar wireless power transfer standards.

If a wireless charging battery cover is designed for use with different handset models with unique FCC ID numbers, it must be tested independently with each handset model during equipment certification. For purposes of equipment authorization, the handset must be separately tested with and without the wireless charging battery cover attached for EMC, SAR, and HAC evaluation to ensure the handset is compliant. Manufacturers must ensure that wireless charging battery covers and all other accessories are identified in appropriate filings of the handset and permissive change requirements are applied to modifications made to the wireless charging battery covers.

The application for equipment authorization must clearly identify the specific protocol and configurations implemented according to the wireless power transfer standards documents. The test reports must clearly identify if passive or active communication mechanism required by the wireless power transfer standards has been fully satisfied. For passive communication, the data message packets must be conveyed from the wireless charging battery cover to the charger (transmitter) by perturbing the magnetic field and load conditions sensed by the charger. According to the WPC protocol, this type of limited power management is used to ensure safe charging operations and is accomplished through defined capacitive or

¹ Qi, PMA and A4WP are supported by the Wireless Power Consortium, Power Matters Alliance, and Alliance for Wireless Power.

² The wireless charger requires a separate equipment authorization approval (see KDB Publication 680106 D01).

resistive switching mechanisms. The process is often called “load modulation.” We have noted that terms such as load modulation, impedance modulation, load switching or amplitude modulation etc. have been used to describe this type of wireless charging power management and other wireless charging communication protocols. However, we require wireless charging battery covers to implement active or passive communication according to the specific protocols defined by the wireless power transfer standards to apply the following procedures. We have determined that when passive communication is used and it is limited to wireless charging power management, the wireless charging battery cover can be tested as an integral part of a handset to satisfy Part 15 unintentional radiator requirements. When active communication is used by means of a separate transmitter or the passive communication is not limited to charging power management, equipment certification according to Part 15 intentional radiator requirements is necessary. A KDB inquiry may be necessary to determine test requirements for certain conditions; for example, the communication is accomplished by modulating the wireless charging frequency signal.

Detailed descriptions and photos of the hardware incorporated in the wireless charging battery cover, including magnets, shields, coil locations and dimensions and other components intended for functions other than wireless charging must be included in the “Operational Description” exhibit for equipment authorization. The information on conditions that initiate, terminate, abort or establish a charging session to ensure chargers are not left unattended in undetermined operating conditions should also be included. Some description of the wireless charging function implemented by the handset is required in the test reports to support the test configurations and results.

SAR

Initially, the handset must be tested according to all applicable SAR test procedures using the normal battery cover (without the wireless charging hardware). The highest SAR *reported* for each wireless technology (1xRTT, EVDO, WCDMA, GSM, Wi-Fi etc.), frequency band, operating mode (different modes/configurations within each wireless technology) and exposure condition (head, body-worn accessory, hotspot mode, etc.) must be repeated using the wireless charging battery cover.³ In addition, for test cases where the measured SAR for a handset with normal battery cover is greater than 1.2 W/kg, these tests should be repeated with the wireless charging battery cover. If there are noticeable changes in SAR distribution between the normal and wireless charging covers, explanations for such changes should be included in the SAR report to support the test results.

EMC

The EMC test report for a handset must include transmitter spurious emissions measurement data, as required by Part 22, 24, 27, etc., with the normal battery cover and also with the wireless charging battery cover. For purposes of performing spurious emission measurements, the handset should be placed on a representative charging pad supporting the specific wireless power transfer protocol under normal charging conditions and in simulated call configurations; for example, through a Bluetooth connection, if applicable to the specific handset.

HAC

If the specific handset model (with a wireless charging battery cover supplied with the handset or sold separately as an accessory for the handset) is rated as Hearing-aid-compatible (HAC) in accordance with Section 20.19 of the FCC rules, then the handset must be evaluated with both the normal and wireless charging battery covers to determine the worst case HAC rating. Further guidance for initial applications and permissive changes for adding wireless charging battery operation can be found in KDB Publication 285076 D01.

³ Left, right, touch, and tilt positions are grouped as a single exposure condition.

Change Notice:

5/28/2013: 648474 D03 Wireless Chargers Battery Cover v01r02 replaces 648474 D03 Handset Wireless Battery Chargers v01r01: relevant comments for 04/05/2013 draft have been taken into consideration.

10/23/2015: 648474 D03 Wireless Chargers Battery Cover v01r03 replaces 648474 D03 Handset Wireless Battery Chargers v01r02: updated PBA to PAG and modified text to include Qi, PMA and A4WP protocols.

12/16/2015: 648474 D03 Wireless Chargers Battery Cover v01r04 replaces 648474 D03 Handset Wireless Battery Chargers v01r03: Updated inconsistency in SAR section from “measured” to “*reported*” to align with KDB Publication 648474 D04.