1. INTRODUCTION

In establishing the requirements for the Telecommunications Certification Body (TCB) program, the Commission stated that while it intended to allow TCBs to certify a broad range of equipment, certain functions should continue to be performed by the Commission.

To certify certain types of equipment for which the Commission has not yet established specific guidelines, where a new technology or new rule part is integral, where there is an obligation by the Commission to approve an authorization, or where there is a need to provide case-by-case guidance, the Commission has adopted the Pre-Approval Guidance (PAG) procedure described in KDB Publication 388624 D01.

In general, a TCB needs to follow the PAG procedure when the required test procedures, test equipment, or requirements necessary to configure, support or test a device have not been established.1 This may be the case in the following circumstances:

- the available test procedures do not readily support the modulation or radio parameters of a device, such as for multiple transmissions or wideband waveforms;
- the required test procedures need modification for testing a device;
- an alternative measurement procedure is proposed.

This document provides guidance indicating which types of devices are subject to PAG requirements. There are three classes of applications for equipment authorization subject to a PAG review, prior to approval by a TCB:

- Devices subject to special conditions where the authorization procedures to be used must be approved by the FCC;
- Devices for which a sample must be submitted to the FCC for pre-approval testing;2
- Devices for which there are operation or installation issues which are subject to FCC review.

In each class there are several items, with a unique six-character code identifier that mnemonically relates to the topic of each specific item in the PAG list.

---

1 Specified items on the PAG list may be approved using the PAG Reuse procedures outlined in KDB Publication 388624 D01 when applicable. PAG list items authorized to use the PAG Reuse procedures include DFS, HAC, and dynamic antenna tuning related applications; see Section 5 herein.

2 Test samples are not to be submitted until requested via the FCC Equipment Authorization System (EAS). For any individual application, the FCC may waive sample submittal at its discretion.
2. DEVICES REQUIRING APPROVAL FOR AUTHORIZATION PROCEDURES

**RFXLIM**
RF exposure limits are not fully established, or when the FCC has determined that Sections 1.1307 (c) or (d) applies.

**MOBPOR**
When Section 2.1091(d)(4) of the FCC rules applies and SAR or MPE (above 6 GHz) evaluation is required, except when related to a Class II permissive change in U-NII bands 5.925-7.125 GHz for an already certified module addressing RF exposure conditions for a specific host(s).

**NUMSIM**
RF exposure evaluations using numerical simulations or computational modeling techniques.

**POR100**
Transmitters operating at frequencies below 100 MHz for which SAR evaluation is required per KDB Publication 447498.

**OVER6G**
Portable transmitters operating at frequencies above 6 GHz for which routine RF exposure evaluation is required. An exception for this PAG submittal requirement may be granted via KDB inquiry when for each band SAR is limited to 0.8 W/kg, and the SAR total algebraic summation from transmitters that can be active at the same time is limited to 1.45 W/kg.

**SAREXC**
Portable transmitters operating with source-based, time-averaged maximum output power according to wireless network or infrastructure requirements and separation distance requirements exceeding the “SAR Exclusion Threshold” in KDB Publication 447498 by either: (a) 8 times or more, for compliance with general population exposure requirements; or (b) 20 times or more, for compliance with occupational exposure requirements.

**NOTSAR**
When procedures for SAR evaluation are not covered in KDB Publication 447498 and other KDB publications referenced therein, or if the SAR data required to support compliance is not provided.

**PWRDYN**
Mobile and portable devices incorporating mechanisms to actively control the output power, transmission intervals, transmission durations, transmission duty factors or other relevant parameters in a dynamic or non-systematic manner to mitigate the potential of RF exposure according to time-averaging considerations to determine RF exposure compliance.
3. **DEVICES REQUIRING A SAMPLE SUBMISSION FOR PRE-APPROVAL TESTING**

**UNIDFS**

Unlicensed National Information Infrastructure (U-NII) devices with Dynamic Frequency Selection (DFS) capability (Part 15, Subpart E), including client devices operating in the DFS bands that have radar detection capability.

4. **DEVICES WITH OPERATION OR INSTALLATION ISSUES**

4.1 **RF Exposure Evaluation**

**SIMULT**

When simultaneous transmission SAR measurement is required (see enlarged zoom scan measurement and volume scan post-processing in KDB Publication 865664 D01). Regardless of SAR test exclusion or measurement requirements, when the simultaneously transmitted signals are coherent.4

**FACTOR**

When KDB Publication 447498 and other KDB publications referenced therein do not establishing procedures that readily support the form factor, design or implementation of a product or exposure condition, or when non-standard phantom configurations or test procedures are used for SAR testing.

**PHANTM**

Devices requiring, or tested with, a phantom or test configurations that are not specified in KDB Publication 447498 and other KDB publications referenced therein. For example, when a flat phantom is not used for testing extremity SAR in hands, wrists, feet or ankles or when the SAM phantom or other specific phantoms (described in IEC/IEEE SAR measurement standards) is used for testing other exposure conditions, such as wrist-worn, head-worn devices or other use conditions that may require field reconstruction techniques or non-standard post-processing procedures to determine the 1-g SAR.

**OCCPRTT**

When SAR test reduction is applied not in accordance with KDB Publication 643646 to occupational handheld push-to-talk (PTT) radios, or when KDB Publication 643646 is applied and the highest reported SAR is > 6.0 W/kg.

---

3 Test samples are not to be submitted until requested via the FCC Equipment Authorization System (EAS). For any individual application, the FCC may waive sample submittal at its discretion.

4 See KDB Publication 865664 D01 and KDB Publication 447498 D01 for additional information on coherent signal conditions.
UPMIMO

When KDB Publication 662911, KDB Publication 447498 and other publications referenced therein, do not provide procedures applicable for testing uplink MIMO or antenna diversity transmit configurations, including all 3G/4G/5G technologies.

ANTTUN

When dynamic antenna tuning is applied to optimize transmission efficiency for wide range frequency operations or other operating requirements.5

PWRRED

When a power reduction feature is used to reduce the transmit power; except: when the power reduction is implemented using a single fixed level of reduction through static table look-up for all exposure test configurations in a single wireless operating mode of a frequency band and it is triggered by a single event or operation; or when simultaneous transmission requires power reduction and it is not implemented for satisfying SAR compliance requirements, where simultaneous transmission SAR test exclusion is applied according to the reported standalone SAR tested at the maximum output power level without any power reduction.

PWRINC

When power increase feature is applied to selectively boost the maximum conducted output power in specific wireless modes, or operating configurations without exceeding the maximum output (e.g., radiated output, allowed by the equipment certification).

TXSENS

PAG guidance for TXSENS is provided in Appendix A below.

LODUTY

When a low duty factor analysis report is required to qualify for SAR test exclusion or reduction without a prior KDB inquiry confirming acceptance of the analysis.

AGGREG

PAG guidance for AGGREG is provided in Appendix B below.

SARWID

Technologies operating with wide channel bandwidths or transmission bands where the SAR probe calibration and tissue-equivalent dielectric medium may not fully support such wide band measurements, or when specific procedures in KDB Publication 248227 are not applicable.6

SARRAY

When sensor-array and vector measurement-based SAR systems are used for testing wireless technologies, products, exposure configurations.

---

5 A PAG is not required, provided it is fully explained in the SAR report, when the antenna tuning and operating parameters are implemented using a fixed table look-up mechanism that is fully contained within the approved transmitter; therefore, antenna tuning is static and remains unchanged for the same device operating configurations. The same set of parameters and components must be active for each condition regardless of when and how the device is used. When antenna tuning conditions may change for the same operating conditions and exposure conditions, a PAG is required to determine SAR test requirements according to the individual implementations.

6 See KDB Publication 865664 D01 for SAR probe calibration and tissue dielectric parameter requirements.
Wireless power transfer (WPT) applications, except for those applications that meet the established criteria in KDB Publication 680106 D01.

4.2 EMC and Transmission Radio Parameters

DRGAIN
Where directional gain of antenna systems is measured in lieu of calculations. Directional antenna gain measurement procedure and measurement test results should be provided as described in publication 662911 D03.

4.3 Administrative Issues

CONFID
Requests for permanent confidentiality under exceptional circumstances for exhibits that are not typically held confidential. Requests for keeping external photos, or other exhibits which are normally not eligible for “Long Term Confidentiality” as noted in KDB Publication 726920 D03, require a submission of PAG.7

SOFTDR
Devices requesting approval or Class III permissive change for Software Defined Radio (SDR) subject to Section 2.944 (KDB Publication 442812).8

SWC2PC
Class II permissive changes for devices that have not been approved as Software Defined Radio (SDR), but the grantee intends either under their control or to authorize certain approved third parties to change the circumstances under which the transmitter operates by distribution of the software to field deployed devices (KDB Publications 178919 and 594280).9

TXSPLIT
Split modular transmitters authorized under Section 15.212 (KDB Publication 996369).

ENFORC
Devices restricted to use by only State, Local, or Federal law enforcement agencies.

WAIVER
Grants issued under an FCC Waiver. TCB procedures are as follows; see also KDB Publication 502150: (1) the 731 form associated waiver questions must be checked yes; (2) support

---

7 As discussed in KDB Publication 726920, if a non-disclosure agreement (NDA) or some similar arrangements are required between the user and the grantee, and a sample NDA is included in the application, such applications are not subject to PAG.

8 SDR applications are automatically defined by EAS as a PAG and therefore PAG reuse cannot be used. However, when SOFTDR is applicable as a PAG or an item in a MPAG, the TCBs should reference previously approved application by FCC ID, TC # and inquiry number to help expedite the review for this item.

9 Certain devices may be approved under the PAG Reuse procedure if the software control mechanisms are identical to previously approved PAG for the same Grantee.
information must be uploaded; (3) the waiver must be submitted as part of the filing in the cover letter or attestation exhibit type; (4) a letter from the grantee indicating how the waiver is applicable and indicating the that waiver conditions are met; (5) enter grant comments on Form 731 that identifies the waiver by the waiver order and operational restrictions; (6) manuals must include information on the waiver conditions.

**C2PCPX**

C2PC applications on a case-by-case guidance related to accommodate non-pin-to-pin compatible parts modifications under procedures provided in Publication 178919 as attachment: Notification 202109-001.

### 4.4 Rule Part-specific Devices

**SLOWRA**

Transmitters operating under the special provisions of spectral efficiency specified in Section 90.203(j)(8) for slower data rate where case-by-case consideration is necessary (KDB Publication 579009).

**MEDIMP**

Implanted transmitters with maximum total available output power > 1.0 mW, except Part 95 MedRadio devices.

**MEDRAD**

*MedRadio* transmitters designed to operate in 413-419 MHz, 426-432 MHz, 438-444 MHz, 451-457 MHz, and 2360-2400 MHz bands (Part 95 Subpart I).

**UWB15F**

Ultra-wideband devices operating under Part 15 Subpart F.

**UMFLEX**

Devices certified under Part 30 Upper Microwave Flexible Use Service.

**UN6GHZ**

U-NII devices authorized in U-NII bands 5.925-7.125 GHz under guidance of KDB Publication 987594, except for the C2PC case specified in RF exposure, item code MOBPOR of this document.

**UN5GHZ**


**RDR255**

Field disturbance sensors\(^{10}\) and/or radar devices under Section 15.255. The Operational Description exhibit submitted with the equipment authorization application shall include a

---

\(^{10}\) § 15.255(a) Operation under the provisions of this section [§ 15.255] is not permitted for (2) Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation, or
detailed explanation of how the fixed operation requirement of Section 15.255(a)(2) is satisfied. If certification is being requested for non-fixed operation as a Short-Range Interactive Motion Sensor (SRIMS), then a comprehensive justification shall be provided in the Operational Description exhibit.

**WSD15H**

White Space Devices (WSD) operating under Part 15 Subpart H.

### 4.5 Hearing Aid Compatible (HAC) mobile handsets subject to Section 20.19

**HAC5GS**

Demonstrating T-coil compliance when interim procedures as defined in KDB Publication 285076 D03 HAC FAQ Question 9 are used for testing VoLTE calls for 5G sub-6 bands when call boxes do not support 5G calling.
5. PAG REUSE LIST

The following items from the PAG list (Section 2, Section 3, and Section 4 of this document) may be approved using the PAG Reuse procedures outlined in KDB Publication 388624 D01; PAG Reuse is allowed only for the following PAG list items:

- **UNIDFS**: DFS reuse will be allowed only if the device has the same DFS sensing hardware and software of a previously approved DFS PAG.

- **HAC5GS**: HAC PAG list of Section 4.5. For reuse approval, use a PAG formatted in accordance with KDB Publication 285076 D03 HAC FAQ Question 9.

- **ANTTUN**: Dynamic antenna tuning.

- **TXSENS**: Reuse is permitted only for Power reduction for convertible laptops utilizing Hall effect or G-sensors, under PAG item TXSENS.\(^\text{11}\)

\(^{11}\)Reuse is only applicable for convertible laptops whose screen rotates around 1 axis, from 0 degrees to 360 degrees, in a clamshell style, from closed mode, to open mode, to tent mode, and finally to tablet mode. Actual screen lid angles where power reduction triggering occurs, and amount of power reduction may differ in later applications but the same sensor mechanism hardware as the original PAG must be used.
CHANGE NOTICE

04/20/2021: 388624 D02 Pre-Approval Guidance List v17 replaces 388624 D02 Pre-Approval Guidance List v16r12. Added identification of PAG items using a 6-digit item Identifier, Clarification on 15.255 (RDR255), Clarification in 6GHz (MOBPOR) for exception to C2PC for RF exposure, added new PAG reuse item TXSENS, and added a PAG item WAIVER. Removed from (v16r12) the PAG list II C II C 2 a (i): Using massive MIMO techniques, II C 2 m: White Space Devices and II C 2 f (i): OTT HAC.

04/28/2021: 388624 D02 Pre-Approval Guidance List v17r01 replaces 388624 D02 Pre-Approval Guidance List V17 for corrections. II C 2 m: White Space Devices was incorrectly removed from the PAG list and is now added back as WSD15H. Also, correction made to 5.PAG REUSE LIST, HAC5GS reference to KDB Publication 285076 D03 HAC FAQ Question 8 reference was removed since 285076 D03 HAC FAQ Question 8 is no longer a PAG.

06/16/2021: 388624 D02 Pre-Approval Guidance List v17r02 replaces 388624 D02 Pre-Approval Guidance List v17r01 for corrections. Code ANTTUN is the correct one for the antenna tuning item in the reuse list, it replaces the incorrect cross reference to UPMIMO. Removed extraneous wording in OVER6G item. Removed the SARTDD item. Reworded TXSENS, Note 6, Note 7, AGGREG, and Note 8, SARRAY and removed former Note 10. Introduced specific cross-references to KDB publications also in SARWID, NOTSAR, FACTOR, PHANTM, and UPMIMO.

07/02/2021: 388624 D02 Pre-Approval Guidance List v17r03 replaces 388624 D02 Pre-Approval Guidance List v17r02 to add item UN5GHZ to the PAG list.

09/21/2021: 388624 D02 Pre-Approval Guidance List v17r04 replaces 388624 D02 Pre-Approval Guidance List v17r03 to add item C2PCPX to the PAG list in section 4.3 Administrative Issues. Modified PAG item WAIVER to reference new KDB Publication 502150

12/03/2021: 388624 D02 Pre-Approval Guidance List v17r05 replaces 388624 D02 Pre-Approval Guidance List v17r04 to modify for clarification PAG items TXSENS and AGGREG. Current guidance on TXSENS and AGGREG are provided in Appendix A and B respectively in v17r05 of this document. Also Note 11 above was modified to provide clarification for PAG item SOFTDR. Pag item PWRDIN identification code was changed to PWRDYN, for DYN to refer to DYNAMIC.
Appendix A

TXSENS

When proximity, device tilt, movement detection, or other sensors for external conditions are used to reduce the transmit power, with the exception of devices that implement capacitive proximity sensors for power reduction, and apply the guidance found in KDB Publication 616217 for sensor verification and testing. Thus, for instance, devices that use Hall effect or gravity sensors will still require a PAG. Other device features that control the power based on the mode of operation of the device transmitters (e.g. switching on “hotspot mode”, etc.) are not subject to PAG.

The following additional guidance applies only to convertible laptops whose screen rotates around one axis, from 0 degrees to 360 degrees, in a clamshell style, i.e., from closed mode, to open mode, to “tent” mode, and finally to tablet mode. This process must be followed to determine the lid angle where a power reduction occurs, by taking power measurements at each step, as indicated in the steps listed here below:

i. From the lid in closed mode (0 degrees), open the screen in 10 degree steps until laptop mode is obtained
ii. Lower the screen by 5 degrees increments to verify that the “closed mode” is triggered
iii. From the position of the previous step, open the screen in 1 degree increments until laptop mode is triggered again
iv. Continue opening the screen in 1 degree increments until at least 5 degrees past where “laptop mode” was obtained, then continue opening the screen in 10 degree steps until the device switches to tablet mode
v. Reverse the previous procedure to go from tablet mode back down to closed mode

Checklist for the PAG review
1. Description of the sensor technology
2. Demonstration of sensor trigger conditions, showing response to changing conditions, such as proximity detection for target going in/out of range due to motions near the detection distance threshold. Possible hysteresis effects should be also described.
3. Compliance data in the full range of conditions for which the sensors are designed to operate (e.g., closest/furthest distance, etc.)
4. Failsafe scenarios, as applicable
5. (For convertible laptop only) Verification of the impact of lid orientation, per procedure illustrated above.
Appendix B

AGGREG

Mobile and portable devices designed to transmit using carrier aggregation techniques involving at least two non-contiguous channels. The PAG is not required when carrier aggregation occurs only contiguous channels. This PAG requirement is also waived for devices using carrier aggregation techniques in accordance with KDB Publication 248227.

Checklist for the PAG review

1. Show that SAR evaluation needs to be referring to a uniform channel distribution according to the provisions in KDB 447498-D01 (Sect. 3.1.6 on “Determination of the Frequencies for SAR Testing”), in each non-contiguous frequency interval that contains contiguous channels (regardless of being formally defined as “band”).

2. Provide a sketch of the carrier aggregation scheme, similar to the example shown below. In this case it is shown that there are two contiguous channels “ch1” and “ch2” from frequency f1 to f2, plus two non-contiguous channels “ch3” and “ch4” in a higher frequency band, the first from frequency f3 to f4, and the second from frequency f5 to f6.

3. Show the frequencies selected for the RF exposure evaluation according to the KDB Pub. 447498-D01. In the example shown above, the frequencies for the RF exposure evaluation shall be computed separately for the three frequency intervals [f1, f2], [f3,f4] and [f5,f6].