Review of TCB PAG Submissions

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Note: The views expressed in this presentation are those of the authors and may not necessarily represent the views of the Federal Communications Commission.

Overview

- The FCC still has an extensive amount of PAG applications to process in addition to the normal KDB inquiry workload.
- The fewer errors and omissions an application has, the fewer requests for technical information will be issued by the FCC.
- The issuance of a request for technical information can lead to significant delays in the approval of a PAG application.
- This session we will be looking mainly at issues associated with the PAG item MODLIM.

MODLIM

- Pre-Approval Guidance – LMA
  - These are the five items which will trigger a PAG.

From KDB 996369 D01

- §15.212(a) (1)(i): No RF shielding
- §15.212 (a) (1& 2) (ii)): No buffered modulation/data inputs.
- §15.212(a) (1&2) (iii): No voltage regulation.
- §15.212(a) (1 & 2) (iv), When the host requires professional antenna installation.
- §15.212(a)(1)(v). The module cannot be tested in a stand-alone configuration.

MODLIM

- Modular Approval Cover Letter
  - Though there is not an exacting format required for the Modular Approval Cover Letter, there are at least three elements the letter should possess.
    - The requirements from § 15.212 (a)(1)
    - A simple **Yes** or **No** as to whether the requirement is met.
    - A general comment as to why or why not the requirement has been met.
  - In the case of a LMA, please DO NOT go into an elaborate description as to how the limitation is addressed.
  - This information should be saved for the test plan, Grant Comments, user manual, etc.

MODLIM

- Modular Approval Cover Letter Examples
  - A brief and succinct description of the requirement, whether it is met, and how that requirement is either met or not met.

Item	§ 15.212 Requirement	Y/N	Comments
1	The radio elements of the modular transmitter must have their own shielding.	No	The EUT module does not contain its own RF shield.
2	The modular transmitter must have buffered modulation/data inputs.	Yes	The module's transmitter chip utilizes buffered data inputs.
3	The modular transmitter must have its own power supply regulation.	Yes	The module contains its own power supply regulator chip.

MODLIM

- Cover Letter Common Mistakes

Item	§ 15.212 Requirement	Y/N	Comments
1	The radio elements of the modular transmitter must have their own shielding.	Yes	The host device shall serve as the shield for the module.

- No. Installing the module into a metal box is not a substitute for the module having its own shield.
- In actuality, the biggest concern for modules without shields is ingress and not egress.
- Putting an unshielded module into a "metal box" would only potentially mitigate RF emissions.
- Also, the comment "No shield is required since the module passed emissions stand alone" is also not appropriate. This does not account for ingress.

MODLIM

- Cover Letter Common Mistakes – Cont'd

Item	§ 15.212 Requirement	Y/N	Comments
2	The modular transmitter must have buffered modulation/data inputs.	No	The WPT module does not have buffered data inputs.

- Not all Part 15 devices have data inputs.
- § 15.212(a)(1)(ii) The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with part 15 requirements under conditions of excessive data rates or over-modulation.
- If your module does not have data inputs, then mark the requirement as met (Yes) and explain in the comment section.

MODLIM

- Cover Letter Common Mistakes – Cont'd

Item	§ 15.212 Requirement	Comments
4	The modular transmitter must comply with the antenna and transmission system requirements of §§ 15.203, 15.204(b) and 15.204(c).	Please refer to the Operational Description.

- The FCC reviewer, or the TCB reviewer, or even the casual observer should not have to search through additional documents in order to understand whether a requirement is met or not.
- Additionally, the Operational Description is a document held Long Term Confidential.
- Again, it should be clear in the cover letter alone whether a requirement is met or not and how.

MODLIM

- Cover Letter Common Mistakes – Cont'd

Item	§ 15.212 Requirement	Y/N	Comments
6	The modular transmitter must be equipped with either a permanently affixed label or must be capable of electronically displaying its FCC identification number.	Yes	The module has a permanently affixed label. Please see exhibits Label and Label Location.

- It's not completely wrong to reference an exhibit.
- With that being said, there should be an adequate narrative describing how the requirement is met.
- The reference to another exhibit should only be for supporting data.

MODLIM

- Grant Comments
  - The Grant Comments are used to help emphasize that the integrator may have additional responsibilities with regards to the modular limitations.

From KDB 996369 D01

1. "This Module is limited, requiring the host integrator to perform additional testing as provided by the manufacturer's integration instructions for: <provided reason>."

Or.

2. "This Module is limited, requiring the host integrator to file a Class II or Class III permissive change for each specific host per the test plan defined in the module integration instructions."

MODLIM

- Grant Comments – Con't
  - Issues we have seen with the Grant Comments.
    - No comments at all concerning the module integration.
    - No direction towards either a test plan or manufacturer's integration instruction used to show continued compliance after host integration.
    - Recommendation 2. from KDB 996369 just copied-and – paste. Rarely would a module require BOTH a Class II and Class III Permissive Change. Please only choose the one which fits your particular module.

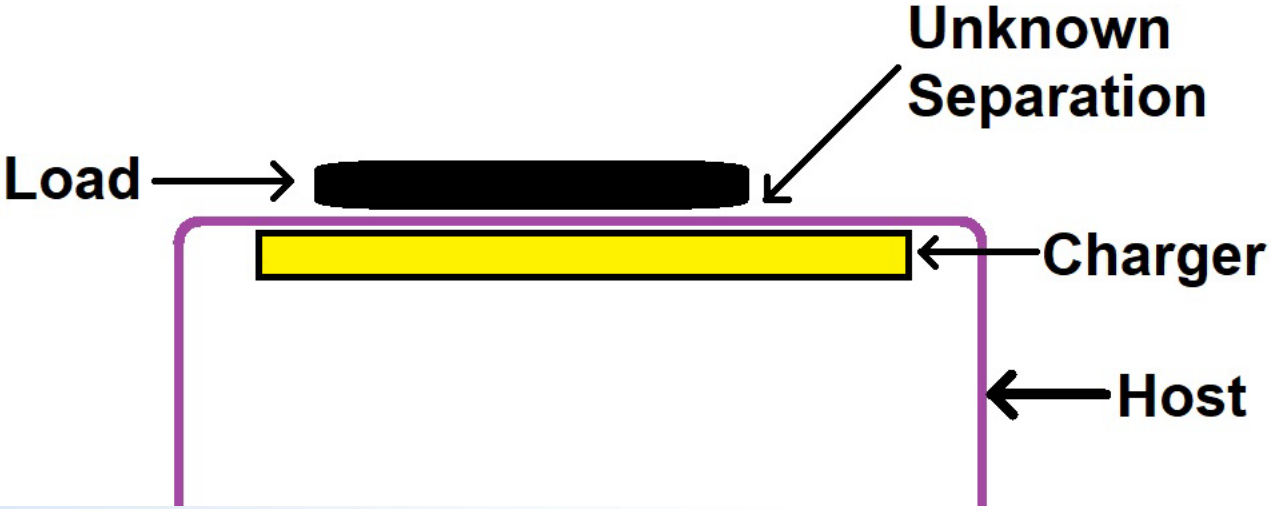
MODLIM

- WPT Modules
  - KDB 680106 gives guidance on how to perform measurements on WPT devices.
  - Many applications come in where the WPT module is tested stand alone with the load at a 0 mm distance from the charger.

  - At this separation distance, one would expect the maximum power transfer with the least amount of leakage.

MODLIM

- WPT Modules - Cont'd
  - However, in practice, once this module is installed into a host, there is no telling the actual separation between the WPT and the load.



  - In this condition, the leakage could actually be higher than when originally evaluated stand alone.

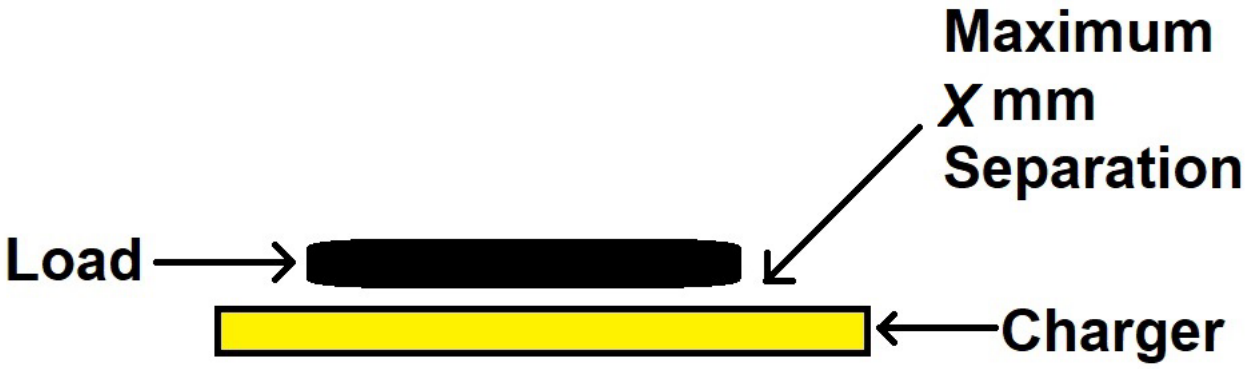
MODLIM

- WPT Modules - Cont'd
  - The module manufacturer could, in their test plan, recommend that retesting RFx in each host specific condition be repeated.
  - This should also be emphasized in the grant comments.
  - Alternately, the host manufacturer could test the module in a "worst case" condition. This would have to be clearly documented in the test report.
  - The user manual would also have to have specific installation instructions.

MODLIM

- WPT Modules - Cont'd

Example



- For this example, let us assume that the charger is incapable of charging at a distance greater than *X* mm. The sensing circuits do not detect the load and therefore go into low power standby mode.

MODLIM

- WPT Modules - Cont'd
  - Test report demonstrates testing at *X* mm separation with "investigation" of steps between 0 mm and *X* mm. This should be clearly documented in the test report.
  - Installation instructions should be clear that any physical separation between the charger and the load caused by the host greater than *X* mm will result in the charger not properly operating.
  - It should also be noted that the area of the host designated for the charger should be constructed of a material which would likely not cause magnetic perturbation and potentially invalidate the testing.
  - The leakage could actually be higher than when originally evaluated stand alone.

MODLIM

- User Manual – Test Plan
  - KDB 996369 D01 Appendix C discusses possible scenarios for testing modules without a shield. (Which seems to be the most prevalent LMA item.)
  - Testing section should make reference to the actual FCC rule part for which the module was certified. (e.g., Don't just say, "radiated spurious based upon original report")
  - If the test plan appears in the user manual, please make it obvious that this section is for, indeed, the LMA test plan. Some applications "squeeze" the test plan in and amongst the information required by KDB 996369 D03.
  - All LMA which trigger a PAG under MODLIM require a test plan even if the module is by a manufacturer who only plans to integrate the module into their own equipment.
  - If the grantee does not want to define a test plan with test reduction, they can just state full testing is required.

MODLIM

- Miscellaneous
  - After a PAG approval for MODLIM, it is not necessary to file another MODLIM PAG for each successive host integration.
  - The only exception would be is if the filing is for a rule part which requires a PAG.
  - For instance, a Limited Module files a PAG under MODLIM which is certified to Part 15F Ultra-wideband.
  - Each installation of the module would then require a PAG under UWB15F.

UN6GHZ

- AFC DUT Test Reports – Additional Information
  - Include appropriate AFC response in a table in the test report for successful test cases.
    - EIRP limit for channel inquiry to AFC
    - EIRP PSD limit for frequency inquiry to AFC
  - If DUT is capable of inquiring by channel and frequency, then both must be tested.

AFC.RSA – Inquired Channel

Channel	BW	Ant Gain	Power	EIRP (dBm)	AFC Limit EIRP (dBm)

AFC.RSA – Inquired Frequency

Center Frequency	BW	Ant Gain	Power	EIRP PSD (dBm/Mhz)	AFC Limit EIRP PSD (dbm/Mhz)

Questions?

Thank You!