Updates to
Mobile and Portable Device RF Exposure Equipment Authorization Procedures

Tim Harrington
Electronics Engineer
Equipment Authorization Branch

Laboratory Division
Office of Engineering and Technology
Federal Communications Commission

Overview

- Review and approval policies to accompany available multi-transmitter laptop and handset SAR evaluation procedures
- KDB 447498 update in preparation to include items:
  - Companion review & approval procedures and policies for KDB multi-transmitter laptop and handset RF exposure evaluation procedures
  - General module SAR procedure
  - General collocation issues

KDB 447498 *Mobile and Portable Device RF Exposure Equipment Authorization Procedures*

KDB 616217 Multi-Tx Laptop

- Laptop and module review & approval items (from Dec. 2007 FCC-TCB conference-call notes):
- New FCC ID applications:
  - Must be in accordance with KDB 616217, with approvals based on transmitter configurations as documented in a filing
  - KDB 616217 is used to determine whether or not SAR evaluation is required
- New FCC ID applications requesting capability for third parties such as installers, integrators or end users to assemble other laptop transmitter system configurations must contain installation instructions to obviate need for additional RF exposure evaluations

KDB 616217 *SAR Evaluation Considerations for Laptop Computers with Antennas Built-in on Display Screens*

KDB 616217 Multi-Tx Laptop

- New FCC ID applications:
  - Grant remarks items:
    - Device is approved for use in transmitter system configurations as described in the filing.
    - Additional equipment authorization is not required when the transmitter is installed and used according to conditions evaluated and determined in accordance with appropriate procedures.
    - Changes not subject to additional testing per appropriate procedures are permitted; otherwise, additional testing and equipment authorization filings are required.
  - OEM installers of modules must follow KDB laptop procedures and grantee-furnished installation instructions and requirements for simultaneous transmission configurations with respect to other transmitters in the laptop computer display screen to determine SAR evaluation requirements

KDB 616217 Multi-Tx Laptop

- Laptop transmitter configuration changes (adding, removing, changing locations of transmitters within laptop) is permitted without re-testing if:
  - SAR evaluation not required according to conditions in laptop procedures KDB
  - All transmitters have Certification – adding a new transmitter requires a new evaluation and authorization
  - Transmitter configuration changes must consider permissive change policies of KDB 178919

KDB 178919 *Permissive Change Policies*

KDB 616217 Multi-Tx Laptop

- Modular devices certified per KDB 616217 can be installed in laptops without further testing if
  - Configuration does not require SAR evaluation
  - Installation must be in accordance with grantee's instructions
- For installation instructions that restrict collocation, integrator must coordinate with grantee to establish configuration where SAR evaluation not required, or get separate approvals

KDB 616217 Multi-Tx Laptop

- When module installation requires SAR evaluation per KDB 616217, integrators must either file for separate FCC ID(s), or coordinate with grantee(s) to modify appropriate associated FCC ID(s)
- Module integrators must be aware that other grant conditions or operating instructions may necessitate additional equipment authorizations, where applicable:
  - Example – module without shielding limited for use in a specific host must adhere to relevant grant condition
  - Other conditions may include radio parameters, EMC, etc.

KDB 616217 Multi-Tx Laptop

- Simultaneous-transmitting EMC evaluation is required if:
  - The transmitters share a common antenna, or
  - The transmitters coordinate transmissions
- Grantees for multiple transmitter system configurations share responsibility for compliance of the final product
- Two-way authentication requirements remain applicable for user-installed modules with antennas integrated within a host product

KDB 648474 Multi-Tx Handset

- Handset review & approval – to accompany new evaluation procedures:
- New FCC ID applications and subsequent configuration changes shall be in accordance with KDB 648474
  - Approvals are based on transmitter configurations as documented in a filing
  - KDB 648474 is used to determine whether or not SAR evaluation is required
  - Subsequent configuration changes also apply KDB 178919
- TCB filings may apply KDB 648474
  - When associated devices are not otherwise excluded per KDB 628591
  - When SAR evaluation is not required for co-transmission in different frequency bands

KDB 648474 *SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas*
KDB 178919 *Permissive Change Policies*
KDB 628591 *TCB Exclusion List*

General Module SAR Procedure

- Updated TCB Exclusion List has provision based on output power and SAR for host-independent transmitter modules to be used in standalone portable final products that do not allow simultaneous transmission
- To determine whether device qualifies, SAR shall be evaluated with antenna(s) and radiating structures positioned at minimal separation distance away from the phantom for all expected operations

General Module SAR Procedure

- Unless a module and its antenna(s) have certain built-in mechanisms to provide a minimum separation distance, a spacing is not used in the SAR evaluation
- Optimal energy coupling conditions with respect to separation distance must be evaluated to ensure SAR is not higher than at minimal separation
- Testing for optimal coupling conditions is required only for highest SAR configuration according to RF channel, operating mode, and device and antenna positions as determined during initial minimum-separation distance testing

General Module SAR Procedure

- Optimal energy coupling evaluation
  - Position device sequentially at 5 mm intervals away from the phantom and perform single-point SAR measurements at the highest SAR location determined in the minimal separation configuration
  - Measurements start at approximately one half of the probe tip diameter away from the liquid / phantom boundary and back-off test device until SAR is reduced by more than 50% from the minimal separation condition
  - Additional SAR evaluation for the optimal energy coupling condition is required when any point SAR is more than 25% higher than at the minimal separation condition

Present Collocation Policies

- An FCC Certification (FCC ID) is valid for whatever representations and test data are on file, which historically and typically was a single transmitter system configuration per FCC ID
- The usual no-collocation grant remark essentially means that some configurations may be subject to separate Equipment Authorization, e.g. multi-transmitter products, composite system configurations
- Authorized collocations are as documented within an FCC ID record, or per exceptions or conditions established by FCC where appropriate

Present Collocation Policies

- Grant note used where specific procedures have not been established
- Specific collocation guidance provided includes:
  - KDB 616217 multi-transmitter laptops
  - KDB 648474 multi-transmitter handsets
  - KDB 447498 multi-transmitter mobile device (WLAN gateway product)
- Policies and procedures going forward aim to avoid use of collocation conditions

Wrap-up

- Updated KDB RF Exposure document to be released soon for use in conjunction with other recent OET SAR procedures
- TCBs continue to use RF exposure practices and procedures based on preceding info-meeting notes and other documents, e.g., for RF exposure grant notes
- For best consistency, before completing device reviews and approvals, please review recent or applicable previous grants for similar devices
- Please ask for guidance from OET/Lab whenever anything whatsoever is unclear