Federal Communications Commission
Office of Engineering and Technology
Laboratory Division Public Draft Review

Laboratory Division Draft Presentation

Title: Considerations of "Soft" Configurations or Configurations of "non-Software Defined Radios"

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Presented: TCB Workshop April 2013 Baltimore Maryland

Purpose of Draft Presentation:
This presentation was made to invite comments prior to any additional action related to this publication. We invite comments:

- On the proposed clarifications.
- Areas that need to be further addressed.
- Additional questions or concerns.
- Other comments related to this subject.

Additional action may include modification to the current publication or first posting a detailed draft prior to a modification of the current publication.

Subject of Draft Presentation:
This presentation was made with the intent to modify KDB Publication: 594280 (Software Configuration Control) to provide further clarification on Configuration Control.

Considerations of "Soft" Configurations or Configurations of "non-Software Defined Radios"

TCB Workshop April 2013

RF Control Configurations

- "Hard" Configurations:
  - All frequency determining circuits including power, modulation, tuning etc. fixed in the hardware design without user configuration control (limited control to adjust power for installation and gain)
- "Soft" Configurations:
  - Some frequency determining parameters configured through non-hardware means; such parameters may include power tables, antenna calibration, frequency options based on location, sensor based control, country of operation based configurations, etc.

“Soft” Configuration – Why?

- Permit design flexibility for a range of products
- Allow same base design to be used in multiple configurations
  - Adjust for variation of different regulatory requirements
  - Permit product evolution
- Adjust for product manufacturing process and component variations

“Soft” Configurations – How?

- Many different approaches are possible, for example some combinations of the following may be used:
  - ROM based configurations
  - EEPROM (with or without field programmability) with or without unique hardware tokens for specific categories
  - Sensor based (proximity, location, etc.)
  - Boot-load and / or BIOS based configuration
  - Software Driver based (authenticated or system controlled)
  - Network or system management based (local or through network connection)
  - External Database
  - Over-the-air software uploads
  - Service provider based
  - User interface based

Compliance Considerations

- Grantee is required to ensure compliance of the approved device under all operating conditions and modes
- Many rule parts place special conditions on user access to operating parameters, for example:
  - Part 15 restrictions on user programming and access (§ 15.15)
  - Part 15 restrictions on master and client devices (§ 15.202)
  - Part 90 front panel programming restrictions (§§ 90.203(g) and 90.427 (b))
  - Part 95 restrictions (§§ 95.645 and 95.655)

Compliance Approaches

- Grantee maintains complete control of how the parameters are configured and does not allow third party (users, installers, integrators, service centers, etc.) access to set or adjust parameters
  - *Operational description must be clear if such configurations are part of the design and how control is maintained* (TCB must ask for this and review it)
  - No user controllable or configurable software or network based software is provided
  - Alternative is to consider Software defined radio approvals

Modular Certifications

- Grantee must ensure all the configurations that determine compliance are part of the module and the operation description makes it clear in the filing
- If the grantee (or through licensed third party) uses software or other host based means to configure the module for compliance:
  - This must be clearly described in the operational description
  - Modules cannot be programmed through country code or other control settings unless approved by FCC (by PBA)
  - Software to control duty cycle for compliance must be clearly described and approved – with very specific OEM instructions and approval; duty cycle range must be fixed in the software to ensure compliance
  - The Host integrator shares responsibilities in compliance
  - OEM integration documentation must make the information clear
  - Host may require its own approval

"Soft" Configurations - Alternatives

- Software Defined Radio (SDR) Approach
  - It may be appropriate to get approval as SDR to demonstrate compliance using different configuration approaches
- Split-Module with or without Limited conditions
  - For modules, where functions are shared between modules and host, it may be possible to split certain control functions
  - Appropriate authentication and validation approaches must be approved by FCC

Non-SDR Special Cases

- Under certain circumstances grantee may be permitted to perform “over-the-air” software upgrades or allow approved parties to perform the functions (KDB 178919)
- Other special arrangements may be considered on a case-by-case basis
- TCB must ensure that any special cases are pre-approved by FCC

Part 15 – Special Cases

- Certain Part 15 devices may have the ability to operate outside the authorized band:
  - This is only permitted for client devices as described in § 15.202.
  - Clients must be truly passive and must wait for an "enabling" signal which permits transmission on that frequency.
    - This is not a "country code" setting
  - Master must not transmit on non-US frequency
    - Operational description must include how the master is prohibited from transmitting in such frequencies
  - For devices that act as "master" in some bands and "client" in other bands the description must explain how this is achieved and managed

Compliance for other modes

- In some cases compliance may be achieved under the guidance of authorized master:
  - Devices may support Wi-Fi Direct in bands where an authorized master (for example with DFS and radar detection capability in the UNII band) is operating.
    - In this case the devices must operate on the same frequency as the master and must move when the master initiates a move

Compliance for other modes

- Indoor operation compliance
  - In the bands requiring indoor operation, the device must be programmed to detect indoor operation, or
    - Device must be connected to AC Power(*), or
    - Device must be under the control of a local master that is acting as an access point and is connected to AC Power(*)
      - Normal “hot spot” in portable devices are not acceptable
      - Remote connection over to network service provider are not acceptable
      - (*) AC Power means “mains” and not through portable DC inverters

Device Configurations through Country Code

- Device Configurations through Country Code are not permitted for compliance purposes when codes are not directly programmed in the hardware,
- Following configurations generally not permitted for non-SDR without prior approval
  - Modular transmitters programmed through host interface for country code compliance unless Host is also certified for compliance
  - Mobile Country Codes (MCC) or Mobile Network Codes (MNC) are not acceptable for programming host compliance
  - Country codes entered through other interfaces provided to users, network, device driver etc must not be used to rely on compliance

Extended Frequency Operation

- Devices with “extended frequency” operation approved on grant listing must not rely on user configurations
  - Operation description must clearly show how the control is maintained in US for compliance
- Where frequency operation is permitted under multiple rule parts with software configuration
  - Operational description must explain how control is maintained and compliance assured for each rule part

User Control Restrictions

- Devices subject to user programming restrictions like front panel programming or frequency programming and using software for configuration:
  - Operation description and user manual instructions must be included to show how compliance is assured
  - Any software or service center control capabilities must be described

Comments on Proposal

- Propose to modify KDB Publication:
  - KDB 594280 (Software Configuration Control)
  - Include some of the discussions in this presentation and plan for further guidance
- Draft KDB publications will be created to invite comments prior to modification of the current versions. We invite comments on:
  - Proposed clarifications
  - Areas that need to be further addressed
  - Questions or concerns on the proposals
  - Other comments

Questions and Answers

Thanks!