

**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.

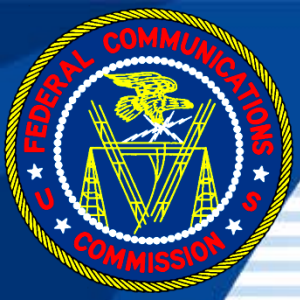
We invite comments:

- 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



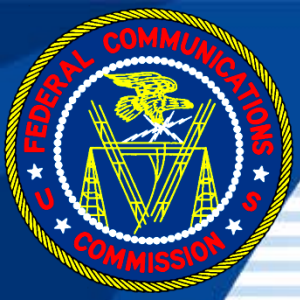
User Control Restrictions

- 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!