Software Defined Radio (SDR) Application Review Guide

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Presentation Outline

- What is an SDR application
- Decision tree to determine if a radio can either elect to be or must be a Software Defined Radio (SDR)
- SDR software security description required for filling
- Permissive changes for an SDR
- Permit But Ask Procedure
  - what should be included
- Draft KDB 442812 available for review and comment

Software Defined Radio

- 2.944 requires that SDR applicants:
  - take steps to ensure only approved software operates the radio
  - Any radio were third parties can operate outside of the grant must be an SDR and take steps (a) to ensure approved software operates the radio.
  - A operational description must be provided with the application for certification.
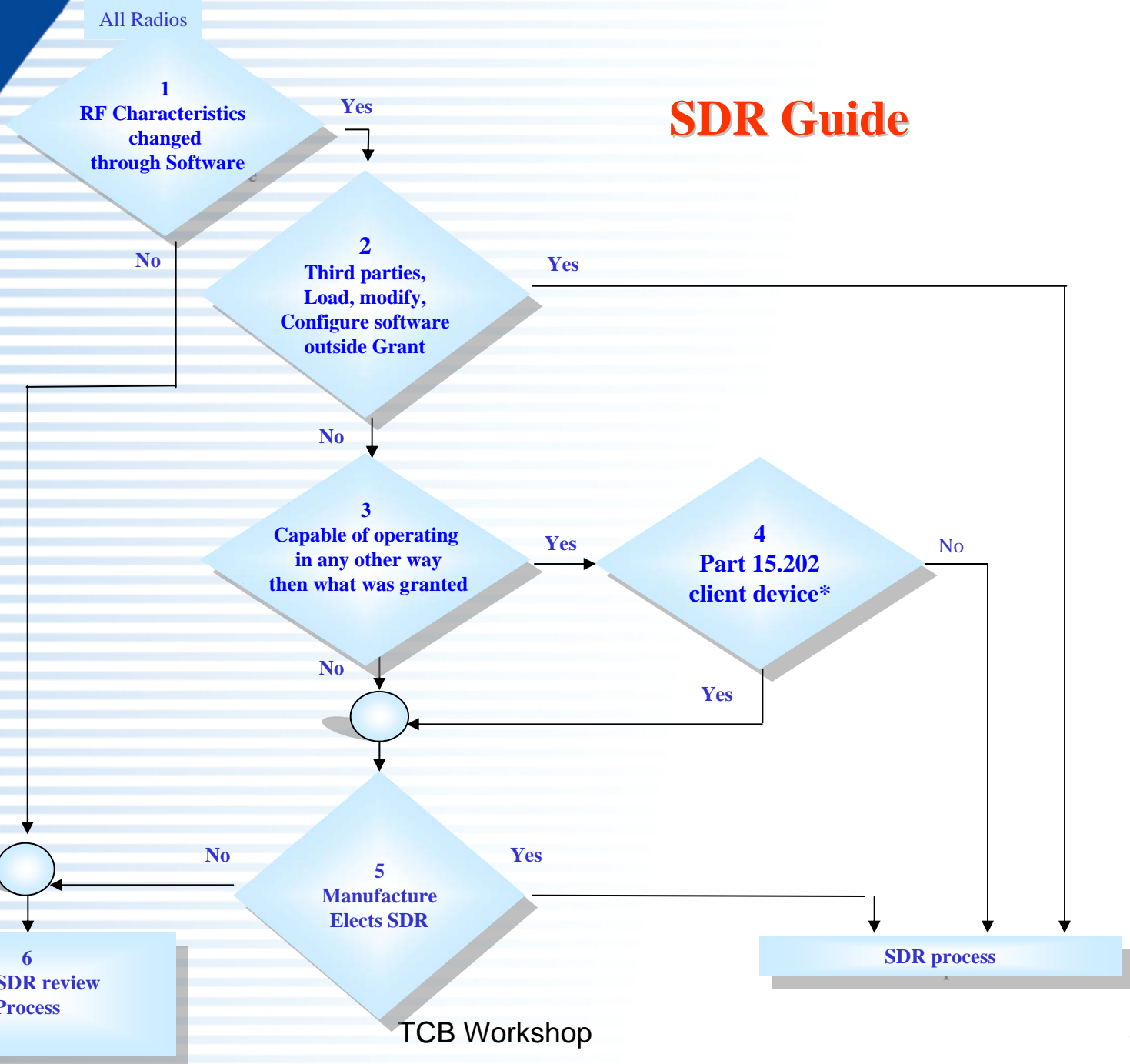
Software Defined Radio

- When transmitter's RF parameters can be modified, by third parties through software to operate in any other bands not permitted by the rules, and not in compliance with the certification as granted it can be granted as an SDR.

- However, radios that only operate as granted may also be granted as an SDR and have the ability to make Class III permissive changes - field upgrades by third parties are permissible.

- The responsible party must maintain an acceptable software security process that ensures regulatory compliance for SDR transmitters when sold and operated in the US.

- A detail description of this security process must be submitted with an SDR filling along with description of the software related items.

All Radios

SDR Guide

1
RF Characteristics changed through Software

Yes

No

2
Third parties, Load, modify, Configure software outside Grant

Yes

No

3
Capable of operating in any other way then what was granted

Yes

No

4
Part 15.202 client device*

No

Yes

5
Manufacture Elects SDR

No

Yes

6
Non SDR review Process

SDR process

Security Description Guide

Category	
Description Software (2.944 [c])	**General software operational description.**
	Describe all the radio frequency parameters that are modified by the software without any hardware changes.
	High level (simplified) block diagram of the software architecture
Labeling	**How is the device to be labeled? Will the device have single label or will it use electronic label as per 2.925 (e)?**
	How can the FCC verify, in the field, that correct version of the software is running in the device? Submit a description of this capability and instructions for the FCC to use in the field to verify that proper software is operating in the device.
	The means by which software version numbers can be related to any future Class III permissive changes.

Security Description Guide

Category	
Security	**What ensures that third parties (Professional installers, qualified personnel, authorized certified technicians, end users, etc – not direct employees) can not operate US sold devices on any other regulatory domain frequencies or in any manner that is in violation of the grant or grant conditions.**
	Explain if any third parties have the capability to operate a US sold device on any other regulatory domain frequencies or in any manner that is in violation with the grant.
	Describe how the software updates are distributed for all regulatory domains and what ensures that product sold in the US can only operate as granted on US frequencies.

Security Description Guide

Category	
Security (continued)	**Is the product as shipped in the US regulatory harden (factory hardware/firmware) and limited so that it can only operate as granted on US frequencies?**
	What stops third parties from loading non US version of software onto products intended for US sale?
	Can third parties make factory level changes to reload non-us domain codes, etc.
Unauthorized changes (hack) to the software (2.944).	**Describe how open source is the operating code for granted RF properties. Describe the difficulty and proprietary nature of the code that controls the RF parameters as granted.**

Permissive Changes

- Class I No different than non-SDR grant.
- Class II Any Class II change (even for adding new antenna types) will prevent the grantee from making future Class III changes.
- Class III As long as there is no host hardware or previous Class II changes, there is no limit to the number of Class III changes permitted. In general there are three categories for Class III changes:

Class III Changes

- Modification to software that effect RF parameters that degrade original reported RF parameters but still meet rules for the original equipment class. – Submit test documentation similar to Class II requirements for non-SDR.

- Adding new technical rule part and/or equipment class. For example, an SDR first granted as a 15.247 DTS device could later add part 15 UNII Subpart E. Submit a complete set of new test documentation for new equipment class similar to procedures for a non-SDR.

- Major changes in software, distribution and security (SDS) that materially changed the descriptions provided on the initial grant will require a Class III permissive change. Do not submit only the changes. A full description is required. The Class III documentations in effect replace the original description in its entirety.

A Class III change should also include

- Identify all version of software that contain the original grant and all other granted Class III permissive changes including the requested Class III change.

- Provide a statement that confirms that this change request does or does not modify the Software, Distribution and Security Documentation. If it does then a Class III type 3 resubmission of SDS security documentation is also required.

Permit But Ask Procedure

The following should be submitted with the PBA request:

- Define if PBA is an initial grant or permissive change to an SDR
    - Permissive changes to a non SDR to SDR are not permitted
    - If Class II permissive change is requested further Class III will not be permitted.
    - If A Class III is requested provide a description as defined in slides (9,10,11) of this presentation.

- Manuals and Operational Descriptions to allow the reviewer to understand the product and its function.

- (Continued on next slide)

Permit But Ask Procedure (cont'd)

- For initial grants a statement to affirm why the grant is a SDR. This is generally a very simple statement :
  - Must be an SDR "World wide Radio with security for managing software as descried below".
  - Elects to be an SDR "To taking advantage of Class III permissive changes.

- Software Defined Radio Security Description
  - Provide a description as outlined in slides (6,7,8)
  - Also refer to draft KDB 442812