



# Software Defined Radios

## Key Issues



# Software-Defined Radios

- SDR for the purposes of the new regulation are:
  - Radios whose operating parameters (frequency range, modulation type or maximum output power), or the circumstances under which the transmitter operates in accordance with Commission rules, can be changed, at least in part, through software changes alone



# FCC Rules for SDRs

- If the manufacture maintains complete control of the software, the device does not have to be declared SDR
- If 3<sup>rd</sup> party or end-user can modify the operation or download software that controls the RF parameters:
  - Device **must** be declared SDR
  - TCBs are not permitted to authorize such radios
  - Professional installers or Qualified Personnel are considered 3<sup>rd</sup> parties
  - Part 15 client devices operating under control of a master are exempted under certain circumstances



# SDRs in Master – Client devices

- Master Devices – (capable of transmitting without receiving an enabling signal)
  - Must operate in U.S. solely in Part 15 frequencies and power limits
  - If software used to configure country of operation by 3<sup>rd</sup> party, must certify as SDR
- Client Devices – capable of transmitting only under control of master device that limits to Part 15 frequencies do not need to be certified as SDR
  - However, if 3<sup>rd</sup> party software changes can be made to power or other operating parameters, must certify as SDR
- Applies to various Wi-Fi devices, Cordless phones (UPCS), other similar systems



# SDR Applications – Additional Requirements

- Software Description
  - The way different software versions are put into service.
  - The security procedures used to ensure only authorized changes are made to the software that controls RF parameters
  - Statement on how open source is the development system, etc
  
- Description of the security procedures used to distribute the different software versions to third parties.
  - Security method used: licensing procedures; encrypted key authentication procedures; embedded hardware based authentication, virtual private networks, etc.
  
- Description of the repair process by authorized third parties that can also load or re- load the different software versions



# SDR or not SDR?

- Review the Operations Manual and Users Manual to determine if the SDR rules apply
- If not sure, question the Grantee
  - Do not assume
- If in doubt, ask the FCC prior to issuing a grant
  - Do not interpret



# FCC Rules and WiMax Devices



# FCC Rules

- FCC does not have specific rules for WiMax Devices
- WiMax has defined several profiles based on IEEE 802.16 standard
- Each of the profile operate in different band and FCC rules for that band apply to operation for that profile





# WiMax Profiles

- 3 common profiles are for operation in:
  - 2496 – 2690 MHz band
    - Part 27 Rules (BRS) for licensed Service apply
  - 3650 -3700 MHz
    - Part 90 Rules apply(\*)
  - 5.8 GHz
    - Part 15 Rules apply
- (\*) Currently there are several petitions for reconsideration for this rule part, and equipment authorization depends on resolution of some of these issues;
  - TCBs cannot authorize equipment in 3650 MHz band