



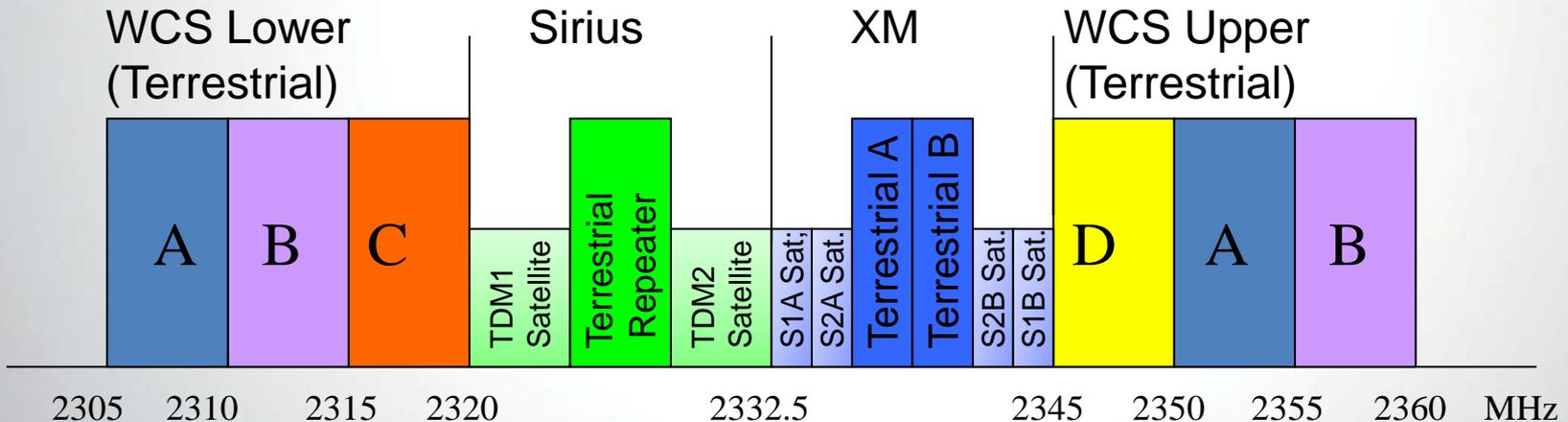
FCC Workshop
Receiver Ecosystem

March 12, 2012

Outline

- Spectrum and Service Overview
- Challenges
- SDARS Ecosystem
- Receiver Type Acceptance

Spectrum and Service Overview

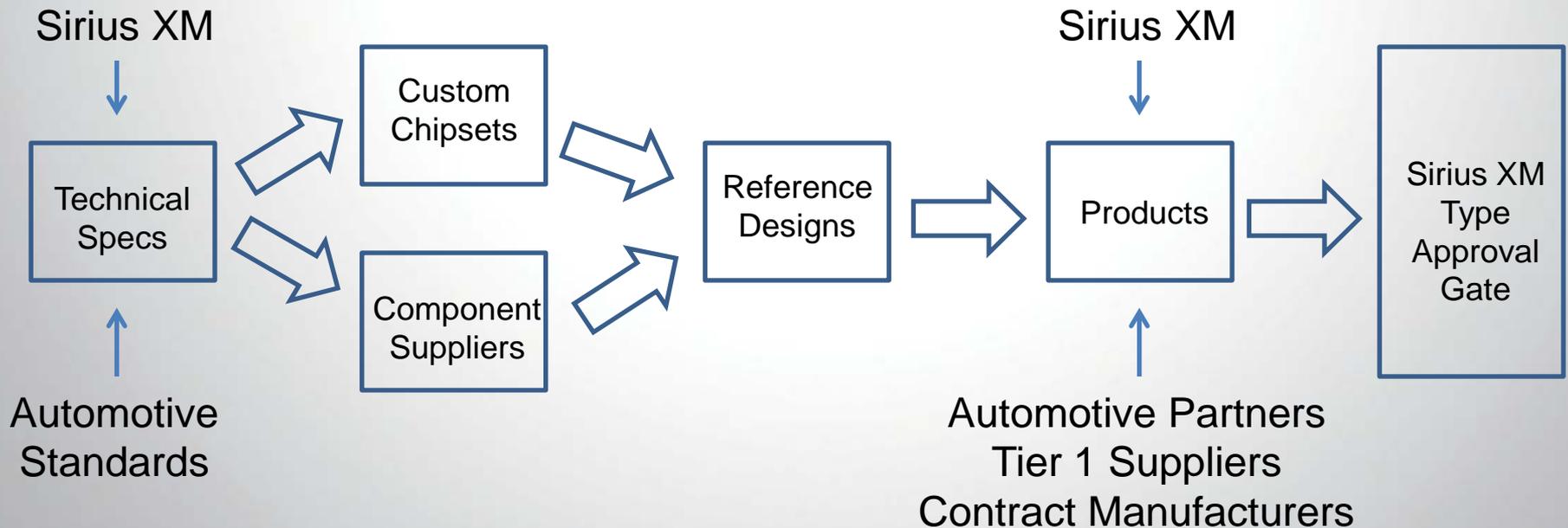


- Broadcast subscription service to mobile receivers – primarily automotive
 - Nationwide
 - High availability
 - Ubiquitous coverage
- Quality of service dictates diverse signal delivery using multiple satellites and terrestrial repeaters to address blockages
- Proprietary Waveforms tuned for delivery of digital services in mobile environment
- Sirius XM plays the role of network, service & chipset provider as well as some aspects of product design

Challenges

- Nationwide, ubiquitous broadcast system to mobile, automotive receivers
- Service Availability expectations of >99%
- Reliance on Satellite delivery
 - Terrestrial coverage less than 1% of CONUS
- Significant dynamic range requirements
 - very weak satellite signals to very strong terrestrial repeaters
- Life cycles of technology introduction and obsolescence in automotive industry
- Sound Cost/Performance tradeoffs

SDARS Ecosystem



Sirius XM Internal Receiver Type Approval

- Sirius XM employs an internal process for Type Approval to ensure Sirius XM capable products meet minimum RF performance and User Interface standards prior to shipment
- RF Sensitivity
 - Measured individually on each satellite and terrestrial path
 - Dynamic range tests for varying levels of terrestrial signal
 - Dual Satellite Combining
 - Satellite/Terrestrial Combining
- Rejection
 - Rejection of adjacent channels (SDARS and WCS)
 - Co-Channel rejection (Satellite vs Terrestrial)
 - Spurious OOB transmissions (+/- 500MHz from center of band)
- Antenna Performance.
 - Pattern, NF etc...
- Fading and Multipath – multiple scenarios
- Dropouts - Ability to provide error free audio through temporary signal interruptions (foliage, overpass)
- Handover – seamless transitions between Satellite and Terrestrial reception