



MOTOROLA SOLUTIONS

Spectrum Efficiency and Receiver Performance Workshop

Session 3

A Brief Introduction...



- Motorola Solutions supplies a wide variety of communications systems and services:
 - **Two-way radio systems**
 - Public Safety Radio systems / networks
 - Professional and Commercial Radio systems / networks
 - Integrated Command and Control
 - Accessories
 - **Broadband Radio systems**
 - Public Safety BB radio systems / networks
 - **Enterprise systems**
 - WLAN radio systems / networks
 - RFID systems
 - Mobile Computing Devices
 - Advanced Data Capture Systems
- Wide-ranging experience with cellular systems, two-way radio, consumer radios (e.g., WLANs, etc.), RFID systems

Radio Specification Development



- Typically, *baseline* radio performance specs are Standards-driven:
 - IEEE (e.g., 802.xx standards)
 - TIA (e.g., TIA 102.xxxx P25 standards)
 - ETSI (e.g., EN300-394-1 Tetra, TS 102 361-1 DMR, etc.)
 - 3GPP/3GPP2 (e.g., LTE, WCDMA, etc.)
- Standards process is typically industry and customer-driven
 - Typically, a very complex and involved process (many parties)...
- Performance enhancements are typically customer-focused
 - In many cases, it pays to exceed standard radio requirements...
 - Tends to increase system reliability...
 - For example, improved SRR or IMR performance may help reduce interference
 - Enhancements usually come with increased unit cost or power consumption...

Wide Range of Radio Requirements



- There is a very wide range of performance requirements across all of these different systems:
 - **802.11g WLAN Systems (extremely popular)**
 - 16 dB adjacent channel rejection (for r=1/2 BPSK, -1 dB for r=3/4 64-QAM)
 - 32 dB alternate channel rejection (for r=1/2 BPSK, 15 dB for r=3/4 64-QAM)
 - ~ -25 dBr OOBE levels
 - **P25 Digital Public Safety Radio Systems (mission critical – base site)**
 - 60 dB adjacent channel rejection
 - 80 dB intermodulation rejection
 - 90 dB spurious response rejection
 - 100 dB blocker rejection
 - ~ -67 dBr OOBE levels
 - ~ 97% coverage reliability
- Largely driven by industry/customer needs, economic considerations, power and size issues... (i.e., very complex trade-offs...)
 - Cost issues are a major consideration (especially for consumer markets)...
 - Different systems also have vastly different coverage / reliability expectations and product life-cycles...



- Standards development typically drives radio specifications...
 - Long-standing tradition and developmental rules...
 - Drives baseline performance requirements
 - An involved process, with much industry and customer input
- Industry often exceeds baseline performance requirements
 - Allows for product differentiation...
 - Allows special customer needs to be addressed...
- Wide range of systems and radio requirements in the field
 - Depends on numerous factors, ranging from cost, power, and size to specific customer applications
 - Different systems / bands have vastly different product life-cycles (and legacy equipment issues)
 - Professional and Mission Critical systems have special / extensive coverage and reliability needs (typically coverage-driven)...
 - Very difficult to anticipate the vast range of applied systems, and the mix of systems in any particular band...