

TELEVISION RECEIVER PERFORMANCE

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Chair of ATSC TG1/S10 on Receivers

Applicable ATSC Documents

- A/74: Stationary Terrestrial Digital Broadcast Receivers
- A/174: Mobile Digital Television Receivers
- Both documents take the same approach: Describe signal conditions (including channel impairments) under which receivers are expected to operate

Signal Conditions

- Dynamic range of *desired* signal at tuner input
 - Implications for receiver sensitivity, noise figure
- Multiple strong *undesired* signals
 - Implications for dynamic range of first amplifier and first mixer
 - Implications for selectivity
 - Trade-offs of selectivity, dynamic range
 - Trade-offs of tuner (analog) selectivity ahead of the receiver's A/D converter vs. digital selectivity after wide-range A/D
 - Applicability of directional antenna, possibly with automatic steering

Signal Conditions (2)

- Multipath
 - Highly important for receiver performance, although perhaps not as relevant for spectrum sharing, *unless*
 - Single-frequency-networks are utilized for broadcast DTV (creates a form of self-generated multipath that receivers must handle)

Determination of Signal Conditions

- Emphasis on realistic conditions actually observed in field, not theoretically possible worst cases
- Emphasis on digital recordings (“captures”) of signals in real-world conditions, especially for multipath
- Leads to competitive, cost-effective receiver design that meets consumer needs

Avoidance of Specific Design Prescriptions

- Encourages, rather than limits, design evolution and use of new technologies
- Encourages exploration of different trade-offs:
 - Double-conversion tuners vs. single-conversion with tracking filters
 - Analog RF selectivity vs. digital selectivity at IF, with associated implications for A/D performance
 - Steerable antenna controls

DTV Receiver Front End (Reference Block Diagram)

