



Cellular Terminal Receiver Design Specifications

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Requirement Specifications Flow

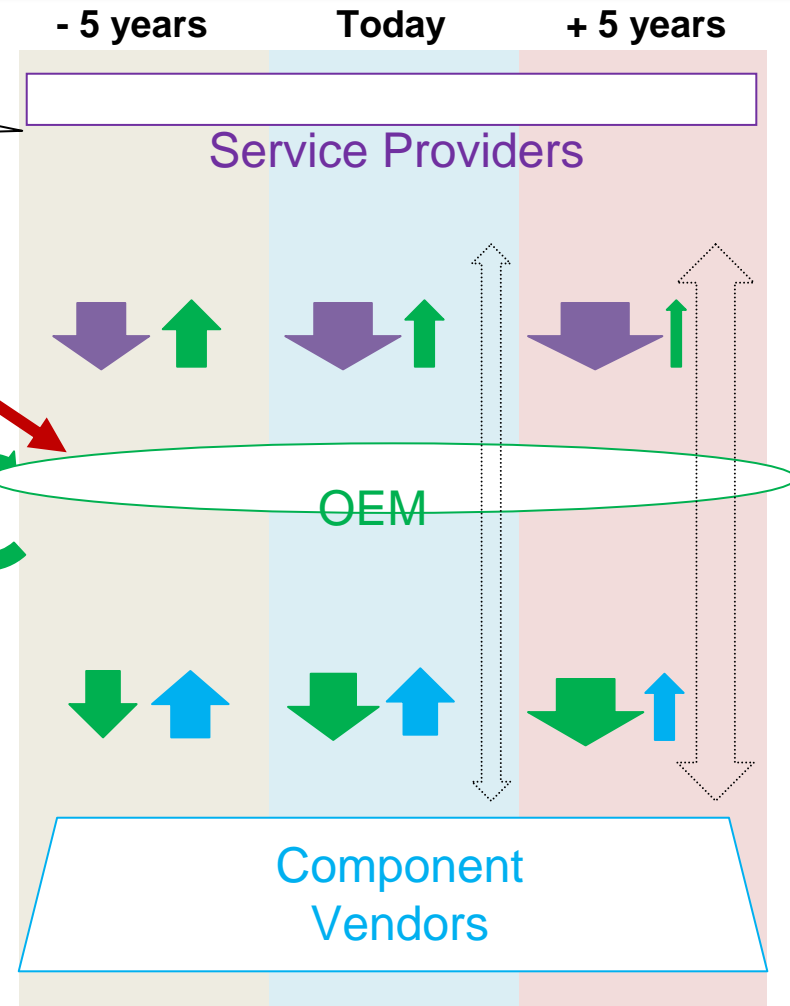
Requirements Sources for Receiver

- ❑ Operators Requirements
 - RFI/RFP/RFQ

Bands, Modes, RF, Features,
Co-exists, Form Factor,...
- ❑ 3GPP/3GPP2 Standards radio specifications
 - TS36.101, TS25.101, IS-98,...
- ❑ Production Team
 - Test limits, production margins, ...
- ❑ Projections
 - Upcoming entrants/deployments
- ❑ Component Vendors
 - Datasheets, evaluation data, availability....

Sources of Compromise

- Costs
- Power consumption
- PCB area
- Mechanicals
- Design cycle



Receiver Interference & Tradeoffs

Key interferer effects on receiver

- Compression: Receiver saturates/overload by strong interferer
- 2nd Order distortion: Beat frequency of interferer/s
- 3rd Order distortion: Intermodulation & cross-modulation of interferers

Long pole cases for receiver design

- 3rd order distortion by close-in interferer & TX
- Strong adjacent interferer

Silicon solution

- Reconfigurable architecture
- Dynamic range
- Programmable on-chip filtering
- Linearity

Mechanical solution

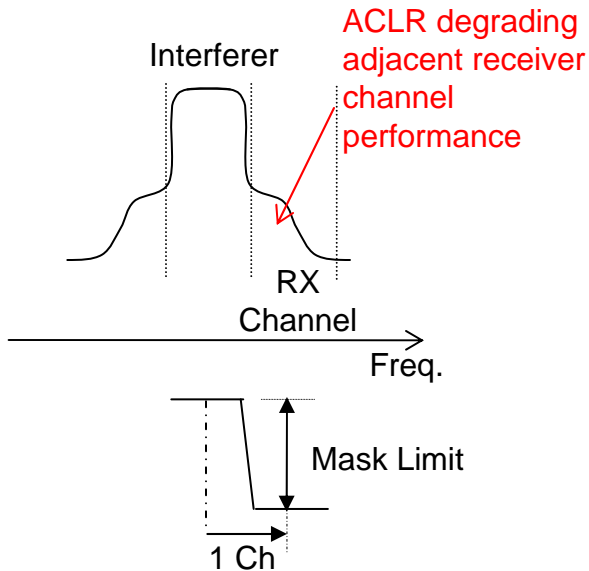
- RF SAW/BAW duplexers & filters
- Antenna isolation



RX Requirements	Silicon	Mechanical	Tradeoffs*
TX - Full Duplex	No	Yes	Costs, Area, Rigid
Adjacent interferers	Yes	No	Power
In-band interferers	Yes	No	Power
Out-of-Band interferers	Yes	Yes	None except TDD

* The larger the requirements overhead, the steeper the tradeoffs

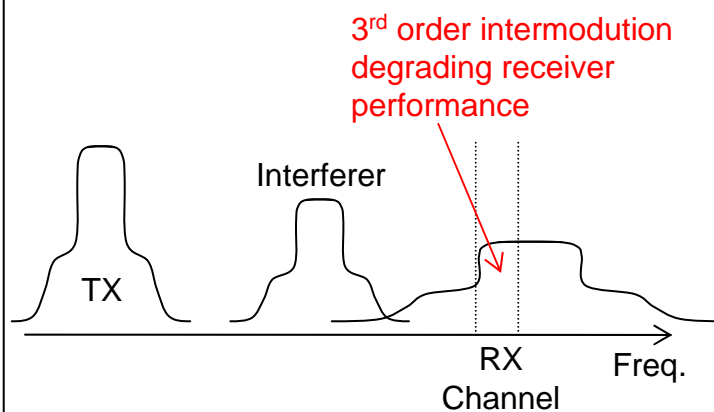
Issue 1: ACLR (3rd order spurious)



Network Solution

- Isolate interferer transmitting source
 - Larger keep out to reduce level at victim receiver

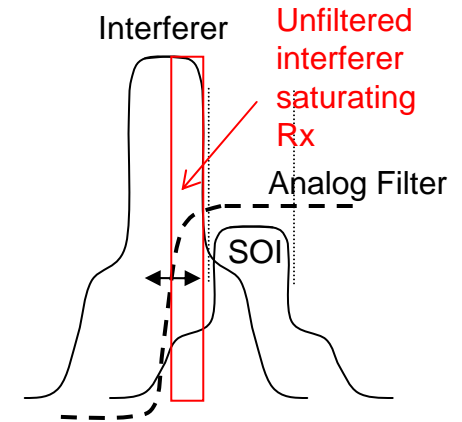
Issue 2: TX+Interferer (3rd order distortion)



RX Tradeoffs

- Very high linearity RF receiver
 - Power
- Receiver performance

Issue 3: Blocking



RX Tradeoffs

- High order analog filter
 - Power & Si Area
- High dynamic range ADC
 - Power

END