3GPP RAN4
UMTS UE Receiver Blocking

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US Regulatory Climate

- More spectrum available for commercial wireless
  - PCS “G” and “H” Blocks approved for commercial service
    - G Block 1910-1915/1990-1995 MHz
    - H Block 1915-1920/1995-2000 MHz
    - Separation of UL and DL reduced to only 10 MHz
  - Report and Order (FCC 04-219)
  - Notice of Proposed Rulemaking (FCC 04-218)
- Increasing pressure to open more spectrum
- Increasing reliance on industry standards
  - Notice of Inquiry on Radio Rx Standards (FCC 03-54)
- <u>Need specs that represent actual products</u>

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UMTS Performance Specs

- 3GPP 25.101
- Specs originally defined for Band 1
  - 1920-1980, 2110-2170 MHz (Europe)
- Other bands for North America added later
  - Band 2: 1850-1910, 1930-1990 MHz (US PCS)
  - Band 4: 1710-1755, 2110-2155 MHz (US AWS)
  - Band 5: 824-849, 869-894 MHz (US Cellular)

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UMTS UE Blocking Specs

- Specs for UMTS Band 2 (1900 MHz) are basically the same as Band 1; however, duplex spacing is smaller (80 MHz) and the separation of downlink and uplink bands is very small (20 MHz)
  - Separation is even smaller (10 MHz) since G-Block and H-Block have been approved by FCC
- Actual blocking levels for current UMTS mobiles are approx. the same as GSM (PCS-1900)
  - UE receiver must be able to work when transmitter is at full power
  - Approx. -25 to -15 dBm for out-of-band CW blocker

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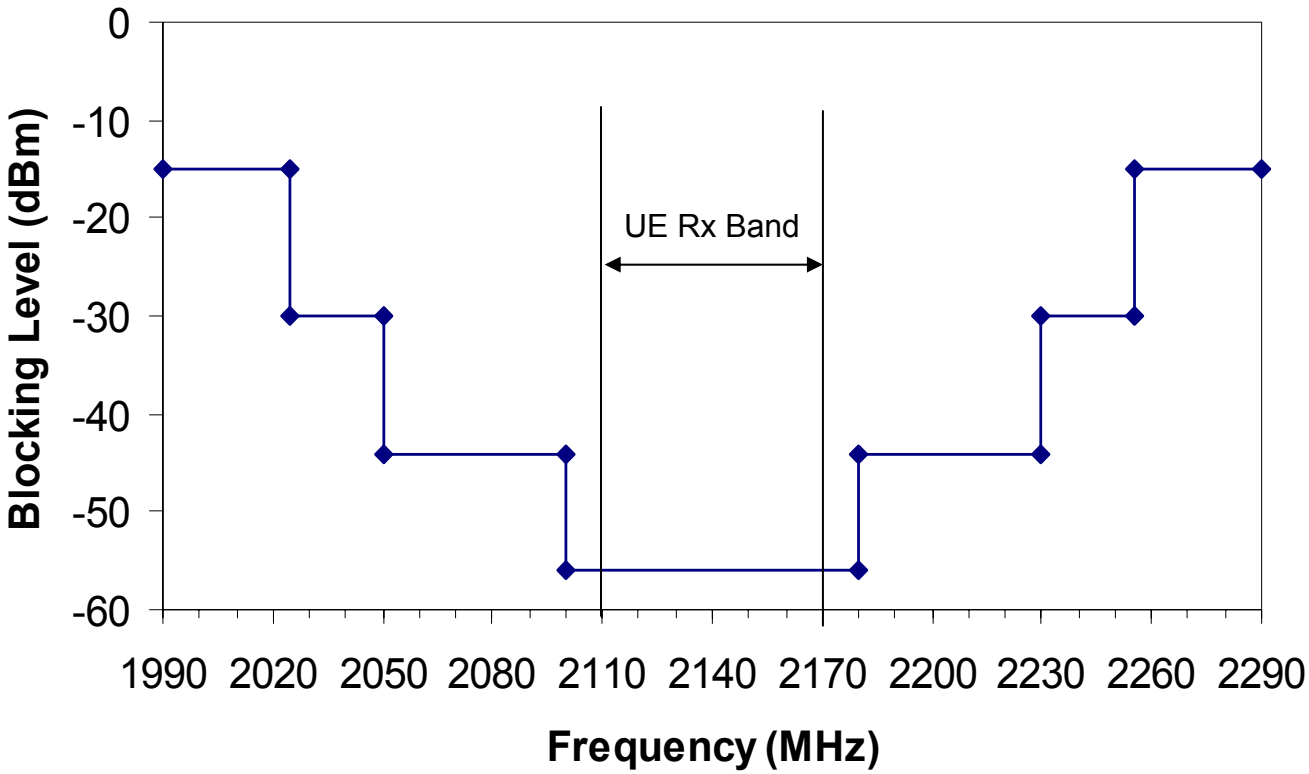
UMTS Band 1

- Current blocking levels



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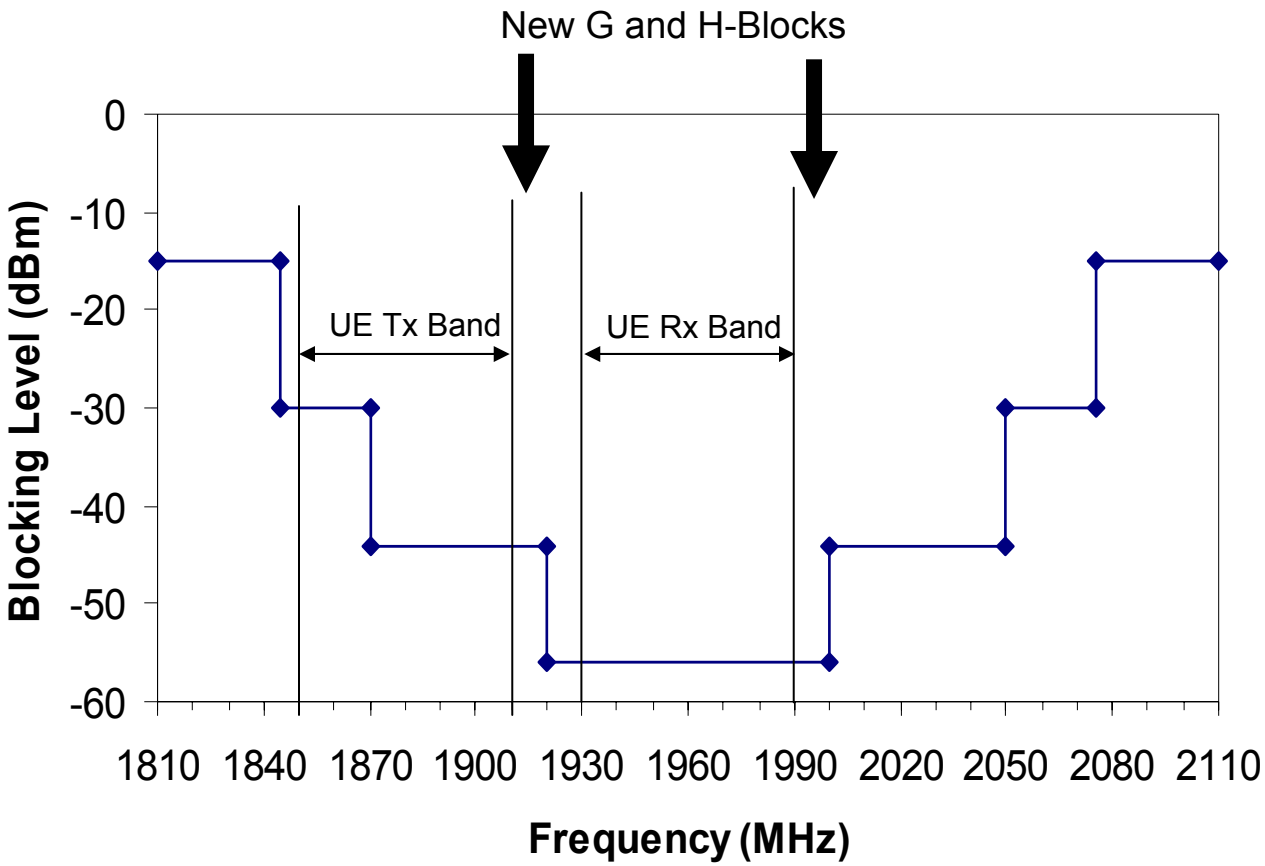
UMTS Band 2

- Current blocking levels



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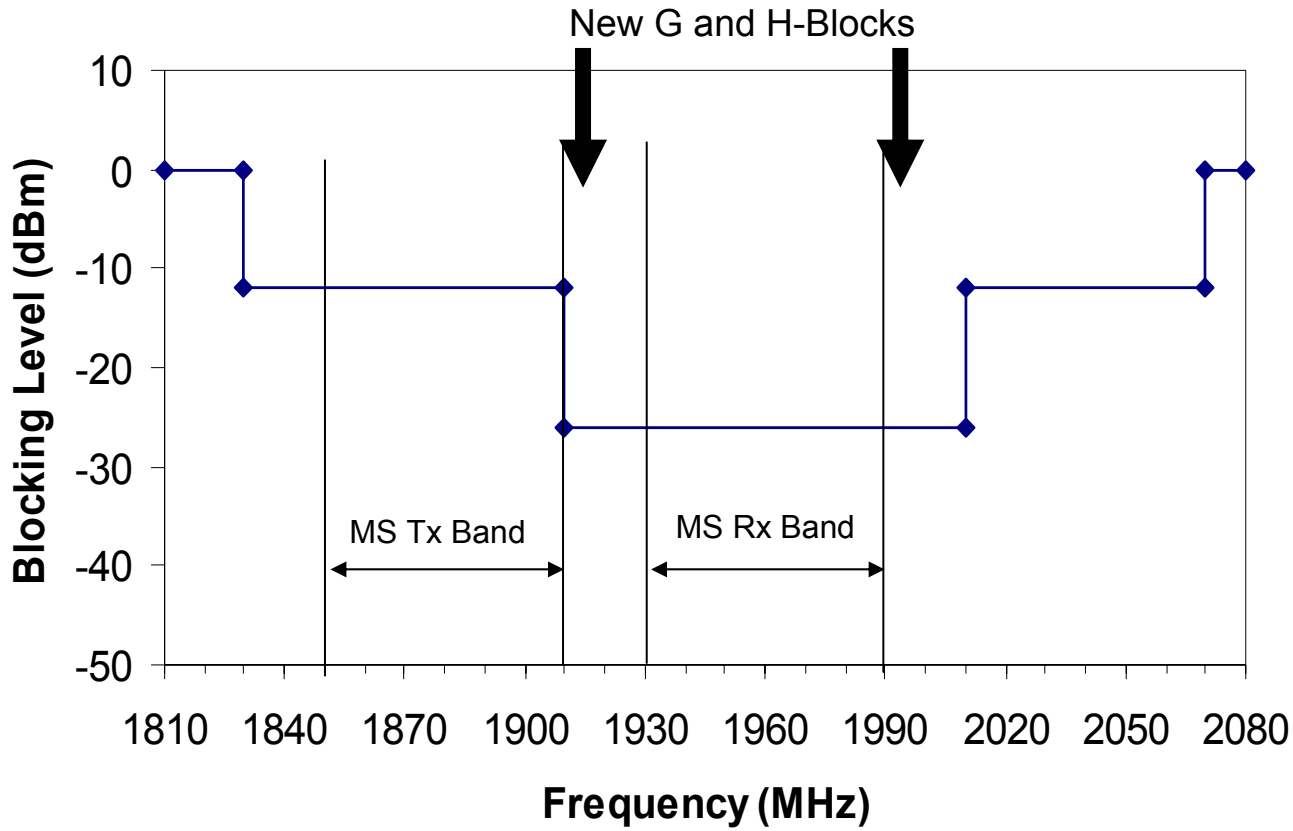
GSM – PCS1900

- Compare current blocking levels for GSM



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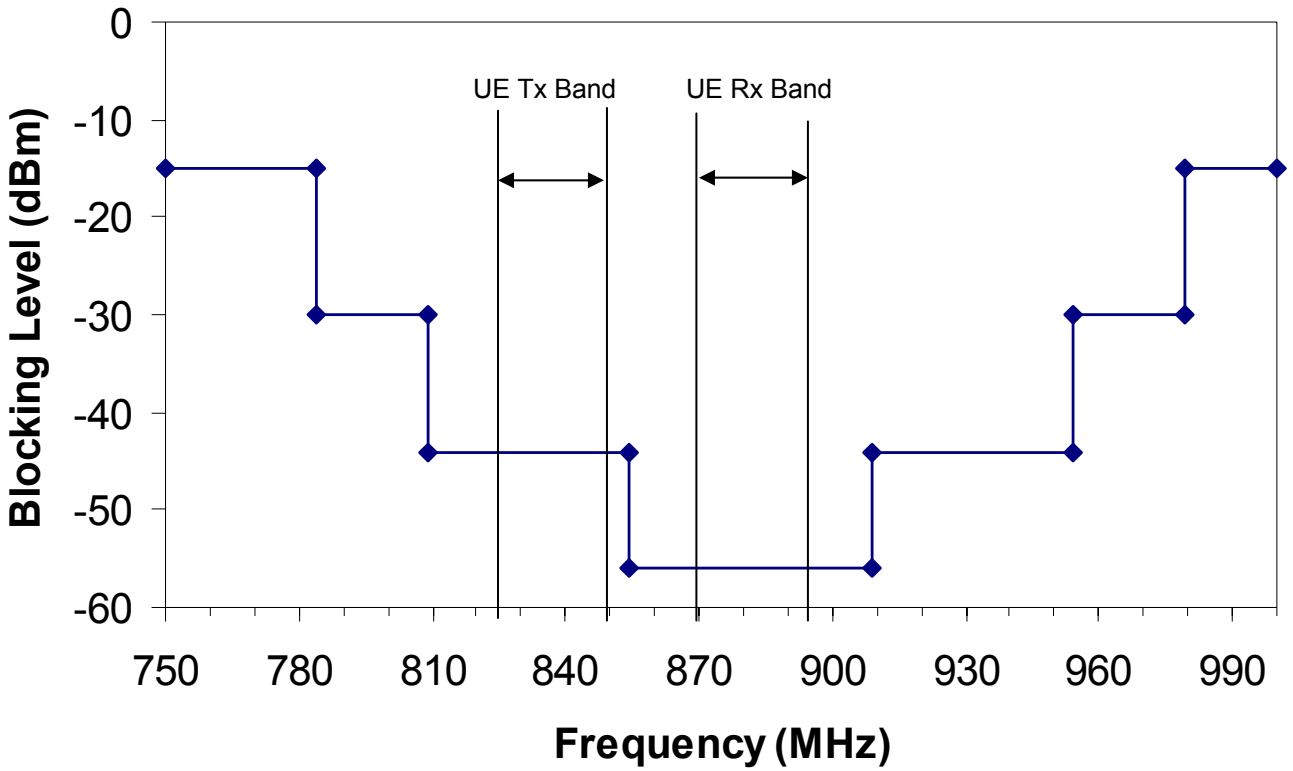
UMTS Band 5

- Current blocking levels



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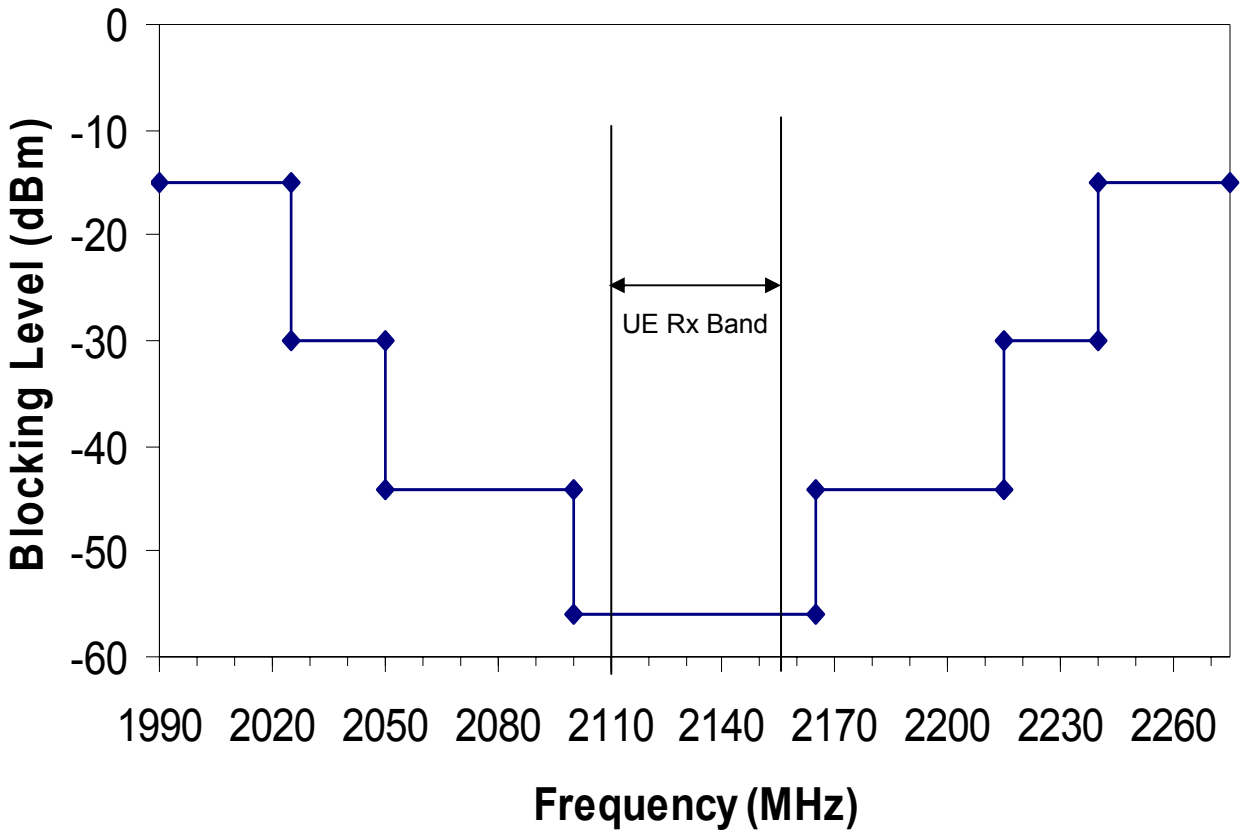
UMTS Band 4

- Current blocking levels



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Proposal

- The specifications should (must) accurately reflect the actual expected performance of products in use
- This is extremely important when discussing allowable levels with the FCC (transmit power, out of band emissions, etc.)
  - GSM specs are much closer to actual performance
  - Also needed for UMTS
- Blocking specs for Band 2 and Band 5 should be updated with actual levels (also maybe Band 4)
  - Based on actual performance of typical UE receivers
  - Also ensures that performance does not degrade over time

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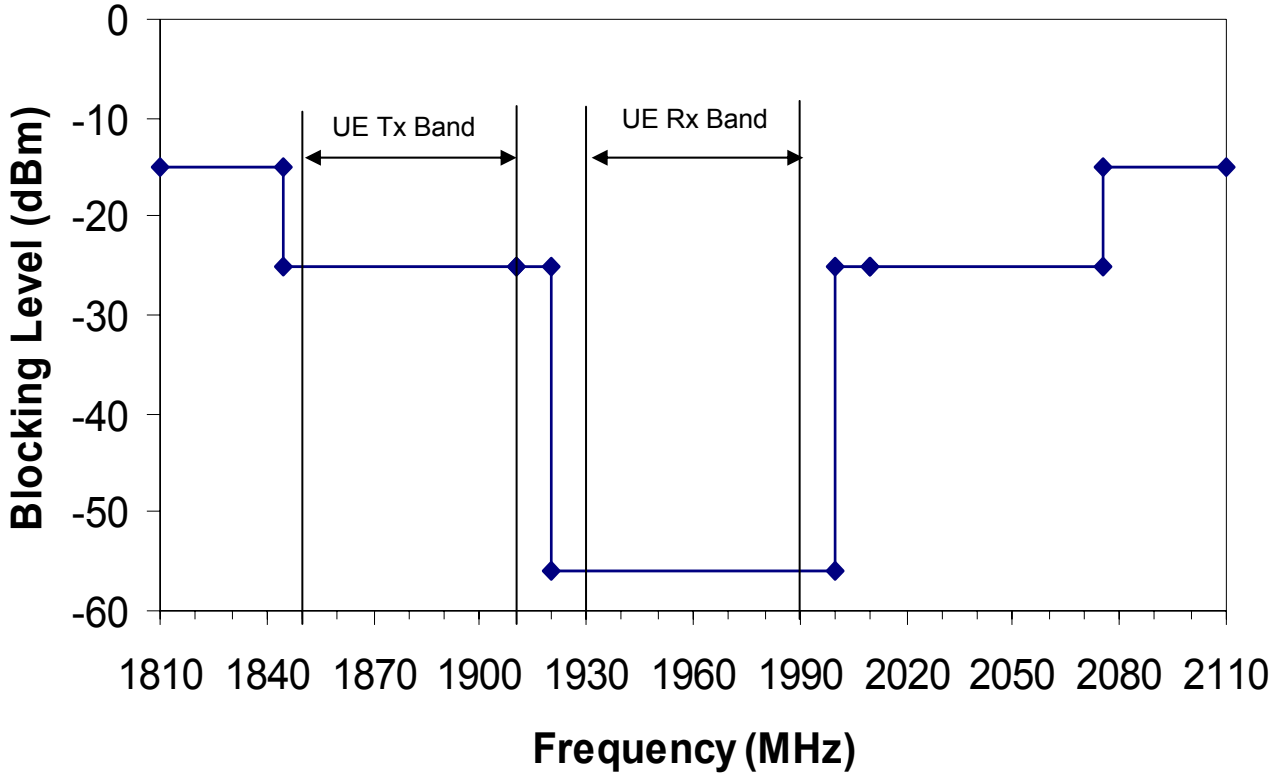
Proposal – Band 2

- Proposed Blocking levels - PCS



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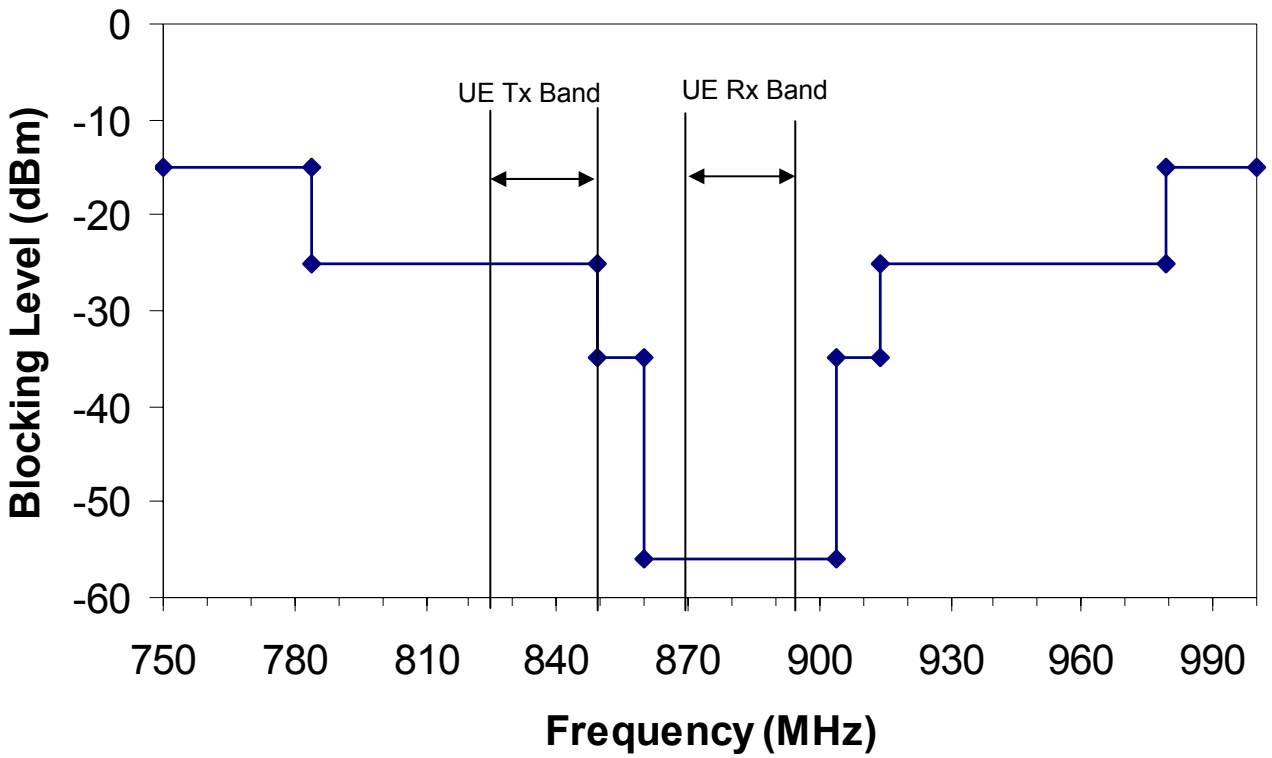
Proposal – Band 5

- Proposed Blocking levels - Cellular



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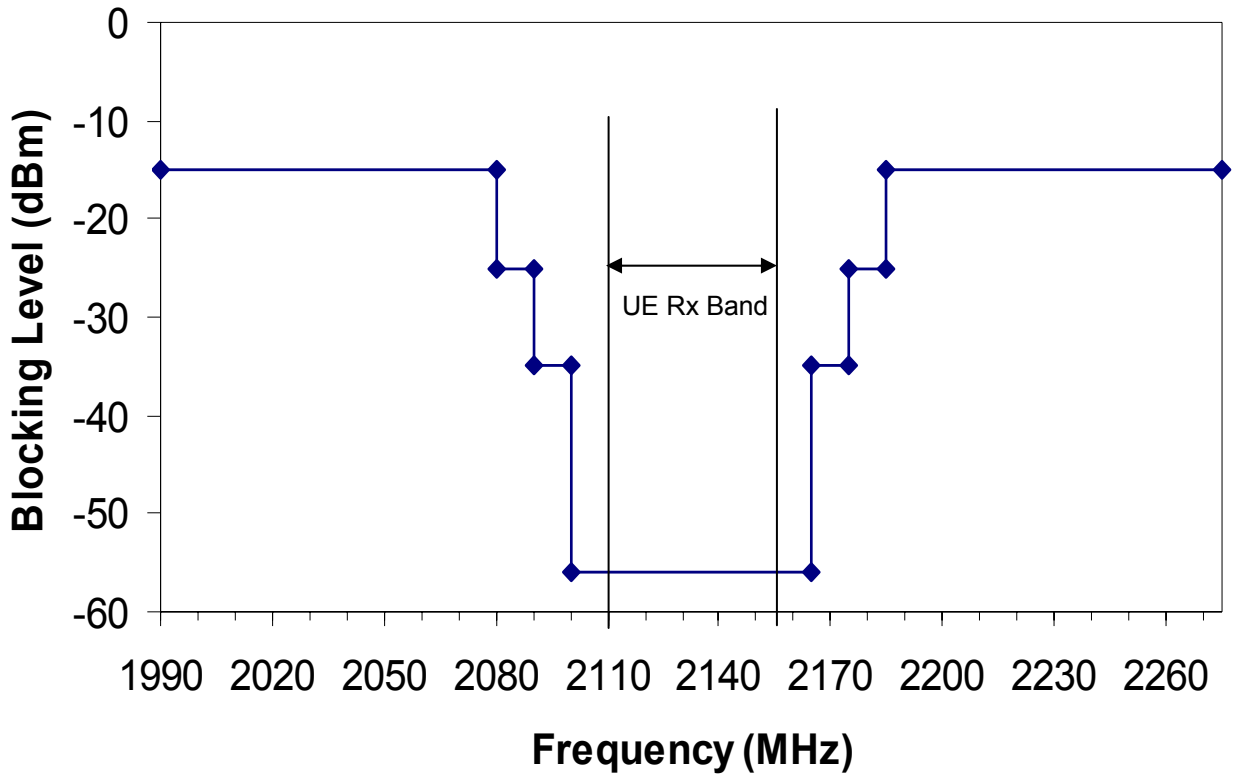
Proposal – Band 4

- Proposed Blocking levels – 1710/2110 MHz



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Conclusions

- Increasing pressure to allow more spectrum for commercial services
- Increased reliance on accepted industry standards
- Regulators are getting smarter
- For meaningful and successful discussions with regulators, specifications must accurately represent actual performance
- GSM specs are closer to actual performance, this should also be the case for UMTS
  - Specs based on performance of current UE

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