

# Frequency setup for Mixed-Mode observations

Ref: SX Observations using a Broadband Receiver and RDBE:  
Revised frequencies  
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VGOS Memo Series 041.2

[https://www.haystack.mit.edu/haystack-memo-series/  
vgos-memos/memo\\_VGOS\\_041.2.pdf](https://www.haystack.mit.edu/haystack-memo-series/vgos-memos/memo_VGOS_041.2.pdf)

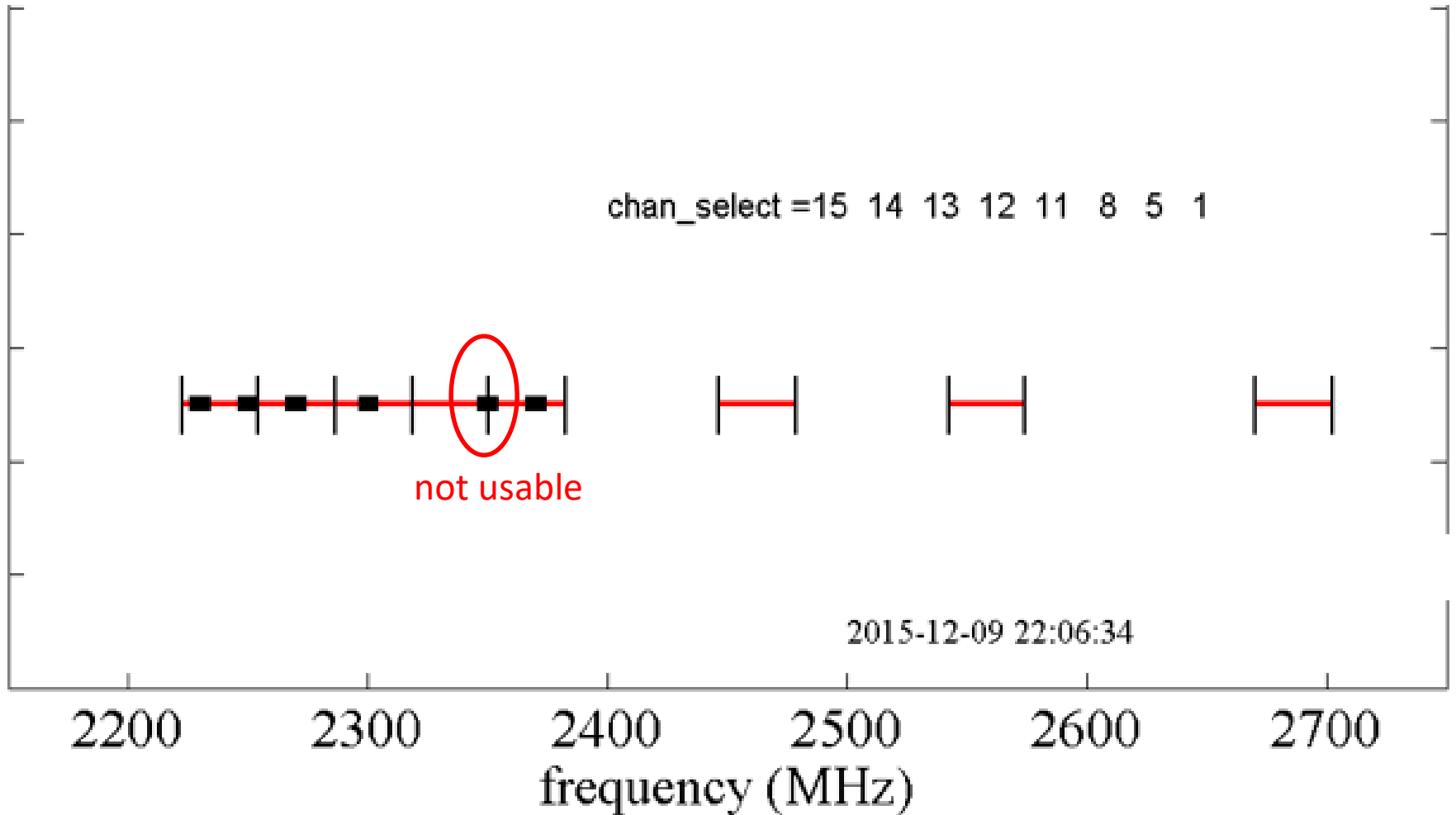
# Frequency selection

- Goal: match the S/X R1 set of frequencies
  - The frequencies are given in the \$CODES section for a recent R1 or for CONT14
- Constraints
  - the Local Oscillators for the four vgos bands must be separated by a multiple of 32 MHz
  - no 8 MHz channel should cross a 32 MHz boundary
- Challenge: aligning 32-MHz VGOS channels and the 8-MHz SX channels

# Add'l constraints/selections

- Assume phasecal tones are at  $k*5$  MHz  
(needed to set phasecal offset in RDBE for extraction)
- Minimum quantization of LO in UDC is 0.4 MHz
  - i.e. can offset phasecal from 0 by  $n*0.4$  MHz
- VGOS – S/X correspondence
  - Band A → cover S-band
  - Bands C and D → cover X-band
  - Band B → set to VGOS Band C frequencies

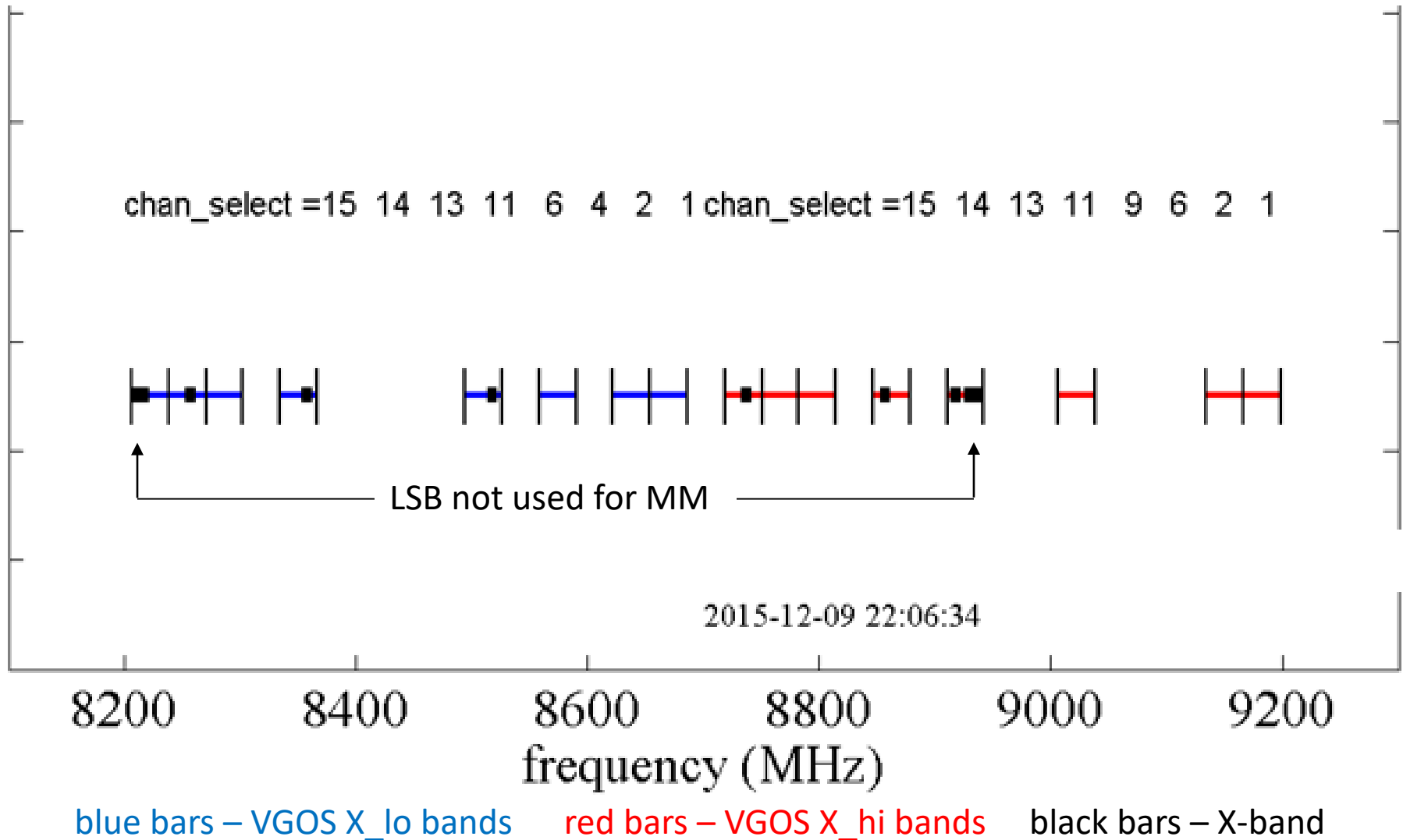
# S-band mixed-mode freqs



red bars – VGOS bands

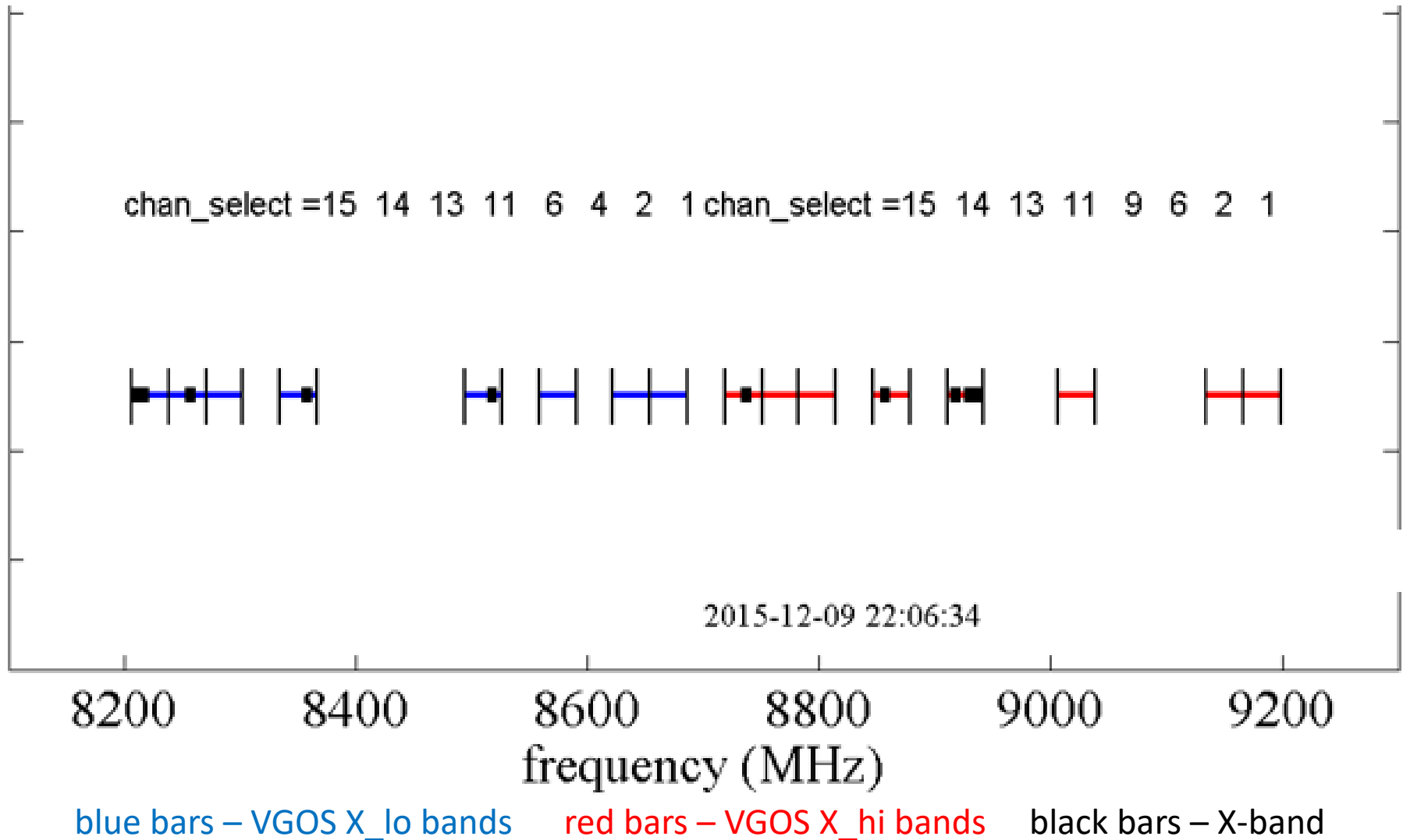
black bars – S-band channels

# X-band mixed-mode freqs



# Questions?

# X-band mixed-mode freqs



# Frequency selection

- Set lowest Band A frequency below S-band
- Adjust to fit S-band channels within Band A channels (as many as possible).
- Set Band C and Band D frequencies to try to fit X-band channels inside Band C and D channels.
- Adjust LOs of C and D to be  $m \cdot 32$  MHz above Band A LO.
- Iteratively adjust Band A LO and the values of  $m$  to include as many S/X channels in VGOS channels as possible.