

GBIPG Summary of the PF1 450 Spectrum - Updated March 24, 2004

As of March 2004, the PF1 450 band, which officially covers 385 - 520 MHz, is relatively free of strong RFI in the 385 - 470 MHz range. This region should typically provide good access to the spectrum for Observers. Though a great deal of known RFI has been mitigated from the band, broadband power line and electric fence RFI continue to be a risk, as is leakage from the local Cable TV¹ distribution system. To keep such risks to a minimum, the RFI group will continue to spend time in the community, finding and suppressing RFI sources. If such interference is encountered, it should be immediately reported to an IPG member. Furthermore, Observers are encouraged to coordinate with the RFI Group in advance, when using this band. If this is done, extra effort can be made to assure relevant community RFI is suppressed for specific observations and requirements.

Since the range of 385 - 400 MHz is a part of the 225 - 400 MHz military band, increased activity in that range should be expected during times of heavy military operations. Note that such events are rare and we do have coordination agreements in place. A narrowband line is consistently seen at 400.1 MHz. This is a CW beacon from Orbcomm or equivalent satellites and is one of the stronger continuous duty lines in the 385 - 470 MHz range. Some fainter lines have been seen in the 399.76 - 399.99 MHz range. Our best guess is that these are old Russian Cosmos satellites which operate at 399.76, 399.84, and 399.92 MHz. Nova satellites which operate at 399.9675 MHz, may also be a possibility. Sporadic transmissions and some propagation beacons may be seen in the 420-450 MHz Amateur band. Normally, the strongest continuous duty signal in the Amateur band is a propagation beacon at 432.305 MHz. This can be shut down upon request by contacting Denise Wirt on extension 2107. Intermittent traffic from Amateur satellites, "OSCARs" may be seen from 435-438 MHz. Note that during times of emergency or contests, activity in this band may increase. For example, the second full weekend in June (2 pm Saturday - 11 pm Sunday) should be avoided as this is the appointed time for a major annual Amateur "QSO VHF Party," at which time many 1.5 KW mountaintop transmitters will be operating heavily. Lesser events occur during the first full weekend in August and in the second full weekend in September. Otherwise, the Amateur band is relatively quiet day and night, but tends to be quieter at night, as is the case with the PF1 450 band in general. A relatively strong digital pager transmitter, which seems to be "on" about 50% of the time during the day, will be seen at 462.875 MHz. This signal originates from Keeney Mountain, outside the NRQZ. Its activity should be minimal from 11.00 pm - 5 am.

The PF1 450 band above 476 MHz is dominated by relatively strong, persistent, RFI from broadcast UHF TV stations located outside the NRQZ. For analog stations, most of the power is in the audio and video carriers, thus Observers have been able to do useful work among these relatively strong signals. We routinely see RFI from stations in all allocations from 470 - 520 MHz, but some are much stronger and more objectionable than others. Since these strong signals are received in GBT sidelobes and / or directly by the PF1 450 feed, GBT pointing tends to have a minimal impact. Channel 15 (Roanoke, VA), which occupies 476 - 482 MHz is the strongest. It is currently a 24 hour analog station and its video and audio carriers are at 477.25 MHz and 481.75 MHz, respectively. Observers also find RFI from UHF channel 19 highly objectionable. It also originates in Roanoke, VA, and is a 24-7 station, but unlike channel 15, it is a digital station. Due to the digital format, it occupies the entire 500-506 MHz allocation.

¹ Please see Figure 1 for channel frequencies.

In addition to the routine maintenance that will be required to keep community RFI suppressed, close tabs need to be kept on the 406.1- 410 MHz shared RA band. Portions of this band are available for hydrological devices on a not-to-interfere basis, but a recent GBT RFI scan detected a strong signal from a continuous duty IFLOWS rain gauge relay station in the band. Though RFI from this particular source has since been mitigated, its existence indicates that it may be up to the Radio Astronomy community to detect and report such interference to maintain the integrity of shared bands.

Finally, it should be noted that no known sources of strong “in-house” RFI currently exist in the band, but continued diligence will be required to maintain this status.

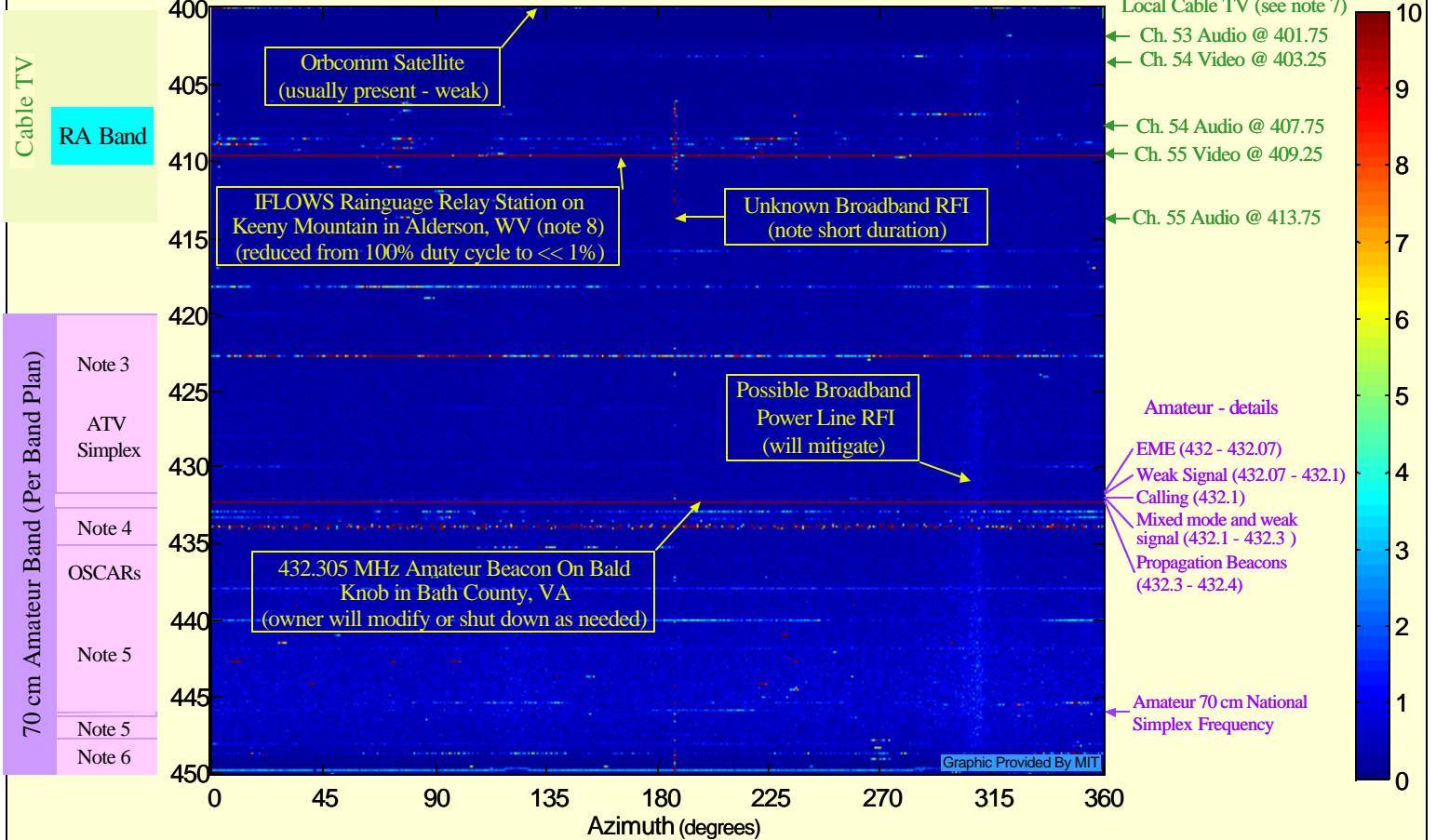
Figure 1 presents some detailed information on the 400 - 450 MHz range. Additional RFI related information and links are provided on the RFI Management website.

Report Prepared by: Jeff Acree



GBT PF1 450 RFI SCAN

("Scan 15" – see notes 1 & 2 for setup)



Notes:

1. Data taken 19 October, 2003, 2:45-3:30 AM using the PF1 450 and Spectrometer with 50 MHz BW, 9 level mode and 2 second integrations.
2. Data is LCP with receiver baseline removed.
3. ATV repeaters or simplex with 421.25 MHz video carrier and control links and experimental.
4. Auxiliary/repeater links.
5. Miscellaneous – please see band plan.
6. Repeater inputs and outputs (local option).
7. Cable TV RFI was not detected in this scan. Data for reference only.
8. IFLOWS = Integrated Flood Observation And Warning System.