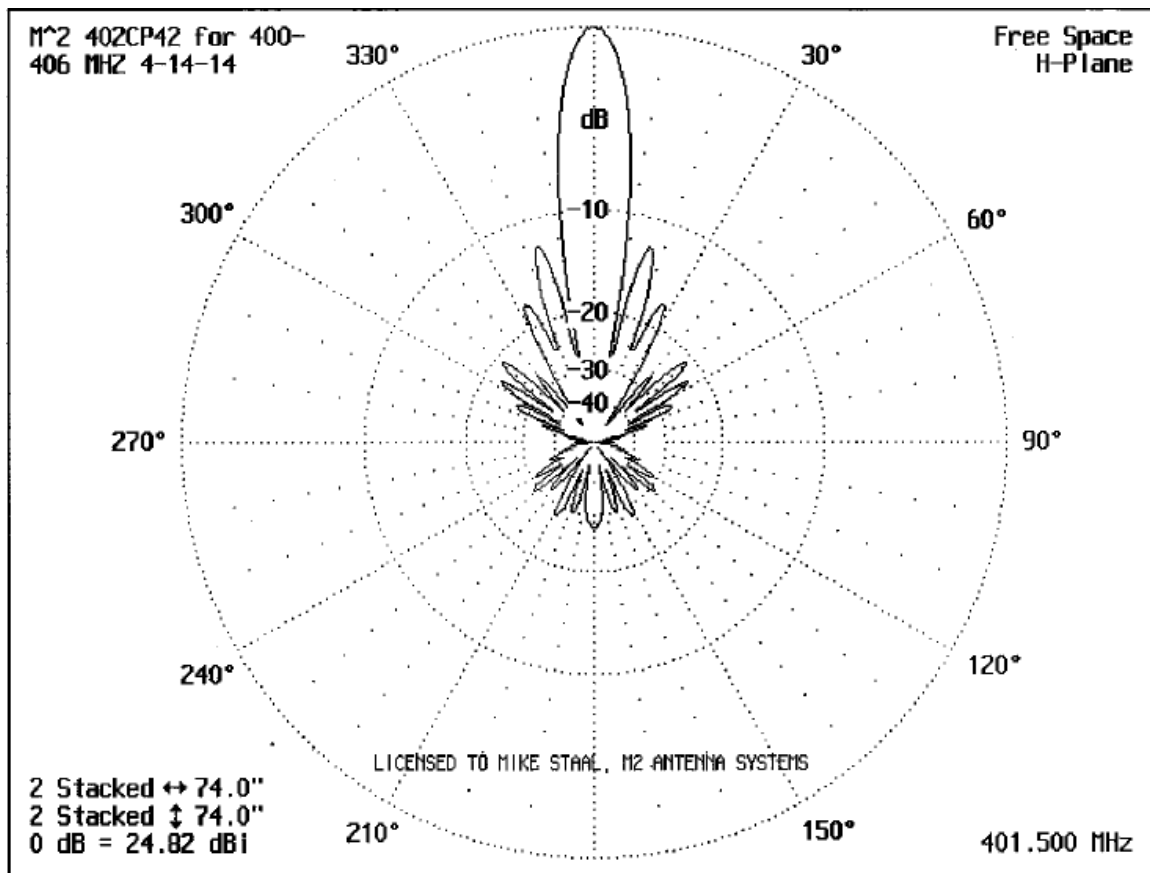


ATTACHMENT A: CORVUS-BC-1 & -BC2 UHF Command System Summary

System RF Characteristics:

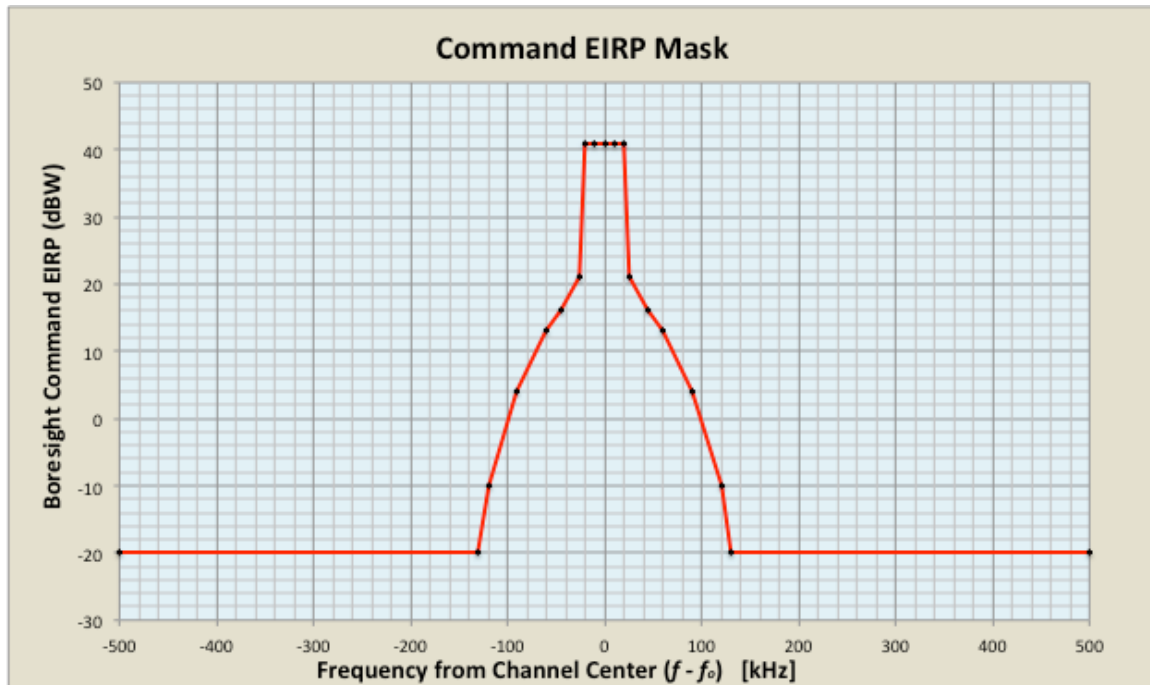
- 1) Command Uplink Polarization: RHCP
- 2) Command G.S. Uplink Antenna Type: 4 X 18.7 dBi gain Yagis (21 elements per plane X 2 planes)
- 3) Command Antenna Boresight Gain at 402.6 MHz: +24.0 dBiC
- 4) Command Maximum Uplink EIRP: 41.0 dBW
- 5) Antenna Beamwidth: 10 degrees (see azimuth plot)



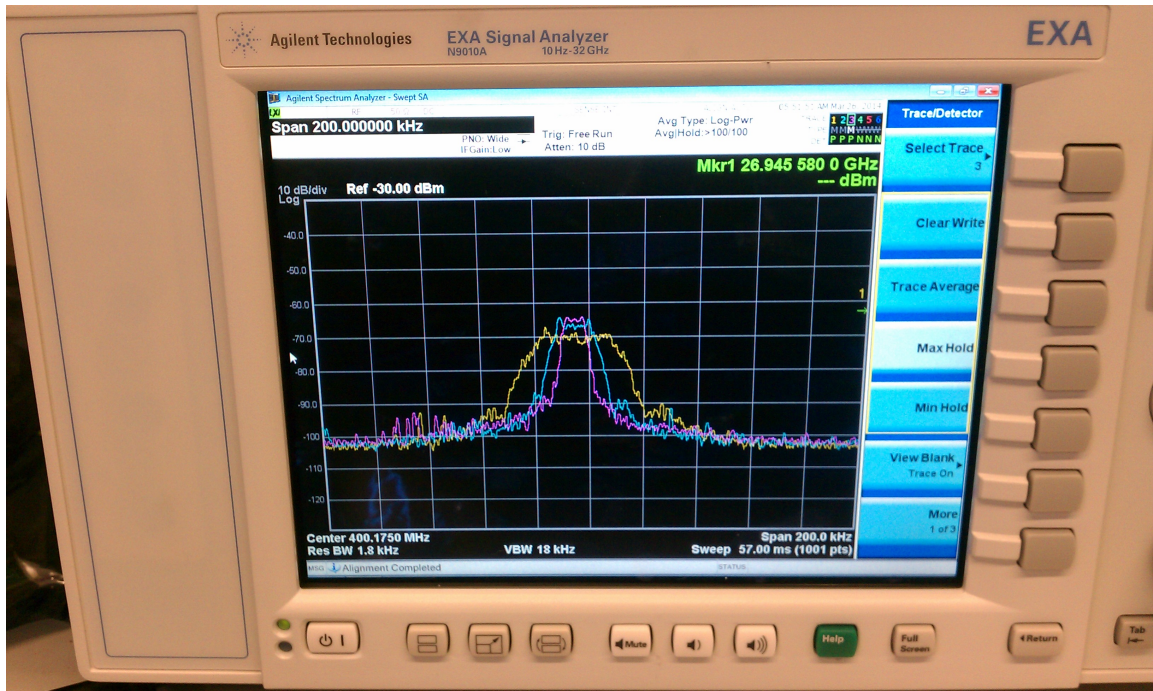
- 6) Emission -3 dB BW: 40 kHz
- 7) Emission Designator: 40M0F1D (GFSK @ 38.4 kbps)

8) Command Receiver Sensitivity Threshold: -104 dBm for 10E-6 BER

9) Emission Mask:



10) Emission Spectrum Characteristics: The same transceiver is used on the spacecraft as in the ground station. The two transceivers communicate with each other in 1/2-duplex mode. We use three data rates. The purple trace is 9600 bps, the blue trace is 19,200 bps and the yellow trace is 38,400 bps. We will be predominantly using the 38,400 bps as our standard data rate in the future. [BTW, Ignore the green marker data at the top of the screen. That should have been turned off]. The key point here is that the FIR filters of the transceiver have the same sort of roll-off characteristic on TX and RX at both frequencies and we do not see any spurs generated from our equipment adding to this. We will send you a new spectrum plot centered at 402.6 MHz and in a Span of 3 MHz as soon as we can make it available. The image we will send you is FROM our active command station at Ames, which is running at full 40+ dBW EIRP and has been for 3 years now. Here is the downlink spectrum from one of these radios. The emission at 402.6 MHz looks the same as this emission on the downlink except for the existence of the intermodulation shoulders generated by the command transmitter HPA.



Using our Part 5 license, we will command our two Corvus-BC-1 & -BC-2 spacecraft every day, starting in mid-July, and you can feel free to “look and see” if you can detect us commanding from Ames at your GS location. We can supply TLEs or pass data if you wish to perform a test with us. It is pretty likely that you’ll be able to see some level of our emission if your station is anywhere in the bay area and if we direct our antenna in your direction. Circumstances would be such that your antenna and ours would not be tracking the same objects and they would very infrequently cross each other at the same point in the sky. BTW, NASA Ames RC has set a minimum elevation angle of 5 degrees on our system so we can’t radiate directly at the horizon in any direction. This also helps isolate us.