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Arab Ham
Radio Club

How To Work FM Satellites

Just The Basics

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What You Need

1. Dual Band Radio (Just about any HT will work).
2. Dual Band Antenna Like the Arrow.
3. A way to track the satellites.
4. Know you Grid Square **EM64ri**

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Optional But Recommended

1. Voice Recorder
2. Compass
3. A helper someone listing on the downlink

How To Setup Your Radio

Doppler Shift

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$$f_o = c / (c + \text{rel_V}) f_r \quad \text{and} \quad f_o = c / (c - \text{rel_V}) f_r$$

f = freq in Hz (400,000,000) 4E6

C = speed of light in m/S (300,000,000) 3E8

v_rel = relative speed of the satellite in m/S (8000m/S) 8E3

If you solve for the formula

$$.999973334 \times 400\text{MHz} - 400\text{MHz} = -10.6\text{kHz}$$

$$1.000026667 \times 400\text{MHz} - 400\text{MHz} = +10.6\text{kHz}$$

440MHz Doppler shift is approx **10kHz**

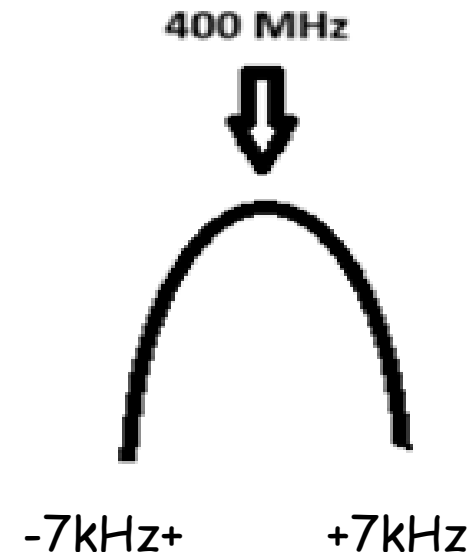
146mHz Doppler shift is approx. 3.9kHz

Why Does It Matter

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It's because your FM radio is designed to RX a ± 5 kHz deviated signal (400.005 MHz to 399.995 MHz) the RX's bandwidth of about 14 kHz. As the satellite is approaching with a Doppler shift of +10 kHz will push the upper side of the TX signal outside of the RX bandpass and the audio will be distorted.



Program Your Radio For ISS

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ISS 437.8 Downlink and 145.990 Uplink with 67Hz tone

1. 437.810 ISS_AP TX 145.990 67Hz tone
2. 437.805 ISS_AN TX 145.990 67Hz tone
3. 437.800 ISS_C TX 145.990 67Hz tone
4. 437.795 ISS_DN TX 145.990 67Hz tone
5. 437.790 ISS_DP TX 145.990 67Hz tone

The Exchange

Your Call and Grid

KB5YXU this is KX4MG EM64

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Questions

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Thank You

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