ARIZONA 70CM BANDPLAN

440.00000 MHz – 450.00000 MHz Revision
2023-03-15 ARCA

Introduction

Arizona adopted the ARRL UHF band plan with a few minor changes and additions as shown under Arizona Option and Narrowband Allocation. The band plan is designed to maximize the available pairs and increase frequency re-use and will supersede any, and all, prior 70 cm band plans in the state of Arizona.

NOTE: Repeater pairs with a valid coordination certified prior to March 1, 2023, will be grandfathered on their current allocation as long as it remains in good standing. All new coordination will follow this band plan.

Emission Designators

Every Coordination Application must contain the appropriate Emission Designator for the transmissions permitted on the repeater being coordinated. Improper declaration of the Emission types, or changing the Emissions without re-coordinating, will invalidate the coordination and, if not corrected, can lead to decoordination.

Table of Common Emission Designators

Emission Designator	Allocation	Common Usage
7K60FXD	Narrowband (<12.5KHz)	2-slot DMR TDMA Data (MOTOTURBO)
7K60FXE	Narrowband (<12.5KHz)	2-slot DMR TDMA Voice (MOTOTURBO)
7K60FXW	Narrowband (<12.5KHz)	2-slot DMR TDMA Data + Voice (MOTOTURBO)
8K10F1D	Narrowband (<12.5KHz)	P25 Phase I C4FM Data
8K10F1E	Narrowband (<12.5KHz)	P25 Phase I C4FM Voice
8K10F1W	Narrowband (<12.5KHz)	P25 Phase I C4FM Data + Voice
16K0F1D	Wideband (<25KHz)	Yaesu Fusion Analog Data
16K0F2D	Wideband (<25KHz)	Yaesu Fusion Analog Data
16K0F3E	Wideband (<25KHz)	Yaesu Fusion Analog Voice
12K5F7W	Narrowband (<12.5KHz)	Yaesu Fusion Digital Data + Voice
11K2F3E	Narrowband (<12.5KHz)	Frequency modulated (FM) 2.5 kHz deviation analog voice

20K0F3E	Wideband (<25KHz)	Frequency modulated (FM) analog voice, 5 kHz deviation

Allocation Types

The Band Plan accommodates several types of allocations within the band.

Repeater (TX/RX)
Repeater allocations are granted as a Narrowband or Wideband allocation. Narrowband allocations are allocated for all emissions of 12.5 KHz or less and will be granted a Narrowband allocation. Narrowband allocations are channelized every 12.5 KHz

Wideband allocations are for transmissions greater than 12.5 KHz and 25 KHz or less and will be granted a Wideband allocation. Wideband allocations are channelized every 25 KHz.

No allocation will be made for emissions greater than 25 KHz.

CTSS tones on analog repeaters are required and are specified by the owner on their application. Closed repeaters will not have their CTSS published. Each repeater will be assigned a frequency with a 5 MHz offset in accordance with the band plan. Frequency pairs are not permitted to deviate from the coordination and must adhere to the transmit and receive frequencies in the band plan and coordination.

The repeater test pair is only low level and is coordinate by the coordinator for temporary repeater tests. The test pair is a shared frequency and owners will need to communicate with each other.

Low Level Repeaters (TX/RX)
Low Level Repeaters are intended for shared, local and portable operations. Some overlap is expected. Repeater owners agree to accept co-channel occupation and act to prevent inadvertent access by cochannel users.

The use of some type of CTSS or input protection is mandatory on these pairs. Owners are responsible for CTSS or access coordination and need to advise the coordinator of their choice.

Owners agree not to operate on these pairs in “beacon” mode, intertie to other frequencies, internet or otherwise monopolize the “channel”

Transmitter power is limited to a max of 10 watts power output and 50 watts ERP on these pairs with an antenna not to exceed 50ft AGL or HAAT (whichever is less).

Simplex Operation (SX)
Simplex Frequencies are allocated in this band plan but are not formally coordinated. Simplex is intended for shared, local and portable operations. Some overlap is expected. Users agree to accept cochannel occupation and act to prevent inadvertent access by other co-channel users.

446.0000S is designated by the ARRL as the National simplex frequency. As such, this simplex channel should be used for making contact, or short QSOs only. Extended QSOs should QSY to another Simplex or Repeater frequency.

Simplex frequencies are not for use on a repeater.

Hot Spot Operation (SX (HS))
Hot Spots are a special designation of Simplex Frequencies allocated for local proximity use and should only be used with low power hot spots. As these frequencies are highly re-used, the hot spot, and its users, should not radiate more than ¼ mile from the hot spot. The TX Power for the hot spot and its users should not exceed 1-watt Effective Radiated Power (ERP) with an antenna with 0 db gain or less. The top of the antenna shall not be higher than 10 feet AGL.

Control Operations (Control)
Control Operations are designated in the band plan. These are Simplex shared frequencies for intermittent control of repeater or remote base. As a shared frequency, minimum power and antenna should be used to prevent interference with co-channel users.

Effective Radiated Power (ERP)
Effective Radiated Power (ERP) is an IEEE standardized definition of directional radio frequency (RF) power, such as that emitted by a radio transmitter. This includes the entire repeater system, including the power out from the transmitter or power amp, insertion loss of the duplexer, filtering, transmission line and antenna.

System gain, and loss, are measured in dBd (reference to a dipole). This is often confused with the gain measurements on some antennas which are measured in dBi (reference to a theoretical isotropic antenna). These are not the same measurement. For reference, 0 dBd = dBi-2.15 (6 dBi = (6-2.15 (3.85)) dBd. On the Coordination application, only list your antenna/system gain in dBd.

To calculate you need to include system losses for the duplexer, transmission line, lightning protection, connectors, and other filters. In most of the cases this is around -3dBd. To keep this simple, the application can assume a -3dBd loss. Express the Antenna Gain in dBd

Antenna Gain (dBd) no change

Convert isotropic gain (dBi) to dipole gain (dBd)

Antenna Gain (dBd) = Antenna Gain (dBi) – 2.15

Based on these assumptions, you can use this formula

System Gain (dBd) = Antenna Gain (dBd) – Duplexer (dBd) – Other Filters (dBd) – Transmission Line (dBd) This can be simplified to:

System Gain (dBd) = Antenna Gain (dBd) – 3dBd

To convert the Power Output from the Radio, or Power Amplifier, to ERP to be included on the application.

$$ERP\ (Watts) = P_{out}\ (Watts) * 10^{(System\ Gain(dBd)\ /\ 10)}$$

There are ERP calculators on the internet which can be used in place of these equations.

Arizona Band Plan for 440-450 MHz

NOTE: Transmit (TX) denotes the Repeater Transmitter (Output) frequency with the Receiver (RX) representing the Repeater Receive (Input) frequency.

NOTE: Frequency are channelized on Wideband every 25KHz and Narrowband every 12.5 KHz.

Low Level Wideband Repeater (Transmit High)

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
445.9000	440.9000	TX/RX	Wideband (<25KHz) (Test Pair)
446.1000-446.2000	441.1000-441.2000	TX/RX	Wideband (<25KHz) (Low Level)

Wideband Repeater (Transmit Low)

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
442.5000-444.4750	447.5000-449.4750	TX/RX	Wideband (<25KHz) (Wide Area)

Wideband Repeater (Transmit High)

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
446.2250-446.4500	441.2250-441.4500	TX/RX	Wideband (<25KHz) (Low Level)
446.5250-447.4750	441.5250-442.4750	TX/RX	Wideband (<25KHz) (Wide Area)

Low Level Narrowband Repeater (Transmit High)

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
445.6500-445.8875	440.6500-440.8875	TX/RX	Narrowband (<12.5KHz) (Low Level)

Narrowband Repeater (Transmit Low)

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
444.5000-444.9875	449.5000-449.9875	TX/RX	Narrowband (<12.5KHz) (Wide Area)

Narrowband Repeater (Transmit High)

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation

445.0250-445.6375	440.0250-440.6375	TX/RX	Narrowband (<12.5KHz) (Wide Area)

Wideband Simplex

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
441.0250-441.0750	441.0250-441.0750	SX	Wideband (<25KHz) Simplex
446.0000-446.0750	446.0000-446.0750	SX	Wideband (<25KHz) Simplex
446.5000-446.5000	446.5000-446.5000	SX	Wideband (<25KHz) Simplex

Narrowband Simplex

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
440.0000-440.0125	440.0000-440.0125	SX	Narrowband (<12.5KHz) Simplex
440.9250-440.9375	440.9250-440.9375	SX	Narrowband (<12.5KHz) Simplex

Hotspot

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
440.9500-440.9875	440.9500-440.9875	SX (HS)	Narrowband (<12.5KHz) (Hot Spot)
445.0000-445.0125	445.0000-445.0125	SX (HS)	Narrowband (<12.5KHz) (Hot Spot)
445.9500-445.9875	445.9500-445.9875	SX (HS)	Narrowband (<12.5KHz) (Hot Spot)

Packet

Transmit Frequency	Receive Frequency	TX/RX/SX	Allocation
446.4750	441.4750	TX/RX	Wideband (<25KHz) (Packet)
445.9250	445.9250	SX	Wideband (<25KHz) (APRS)

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Allocation Category	TX	RX	SX
Wideband TX Low	442.500000	447.500000	
Wideband TX Low	442.525000	447.525000	
Wideband TX Low	442.550000	447.550000	
Wideband TX Low	442.575000	447.575000	
Wideband TX Low	442.600000	447.600000	
Wideband TX Low	442.625000	447.625000	
Wideband TX Low	442.650000	447.650000	
Wideband TX Low	442.675000	447.675000	
Wideband TX Low	442.700000	447.700000	
Wideband TX Low	442.725000	447.725000	
Wideband TX Low	442.750000	447.750000	
Wideband TX Low	442.775000	447.775000	
Wideband TX Low	442.800000	447.800000	
Wideband TX Low	442.825000	447.825000	
Wideband TX Low	442.850000	447.850000	
Wideband TX Low	442.875000	447.875000	
Wideband TX Low	442.900000	447.900000	
Wideband TX Low	442.925000	447.925000	
Wideband TX Low	442.950000	447.950000	
Wideband TX Low	442.975000	447.975000	
Wideband TX Low	443.000000	448.000000	
Wideband TX Low	443.025000	448.025000	
Wideband TX Low	443.050000	448.050000	

Allocation Category	TX	RX	SX
Wideband TX Low	443.075000	448.075000	
Wideband TX Low	443.100000	448.100000	
Wideband TX Low	443.125000	448.125000	
Wideband TX Low	443.150000	448.150000	
Wideband TX Low	443.175000	448.175000	
Wideband TX Low	443.200000	448.200000	
Wideband TX Low	443.225000	448.225000	
Wideband TX Low	443.250000	448.250000	
Wideband TX Low	443.275000	448.275000	
Wideband TX Low	443.300000	448.300000	
Wideband TX Low	443.325000	448.325000	
Wideband TX Low	443.350000	448.350000	
Wideband TX Low	443.375000	448.375000	
Wideband TX Low	443.400000	448.400000	
Wideband TX Low	443.425000	448.425000	
Wideband TX Low	443.450000	448.450000	
Wideband TX Low	443.475000	448.475000	
Wideband TX Low	443.500000	448.500000	
Wideband TX Low	443.525000	448.525000	
Wideband TX Low	443.550000	448.550000	
Wideband TX Low	443.575000	448.575000	
Wideband TX Low	443.600000	448.600000	
Wideband TX Low	443.625000	448.625000	

Allocation Category	TX	RX	SX
Wideband TX Low	443.650000	448.650000	
Wideband TX Low	443.675000	448.675000	
Wideband TX Low	443.700000	448.700000	
Wideband TX Low	443.725000	448.725000	
Wideband TX Low	443.750000	448.750000	
Wideband TX Low	443.775000	448.775000	
Wideband TX Low	443.800000	448.800000	
Wideband TX Low	443.825000	448.825000	
Wideband TX Low	443.850000	448.850000	
Wideband TX Low	443.875000	448.875000	
Wideband TX Low	443.900000	448.900000	
Wideband TX Low	443.925000	448.925000	
Wideband TX Low	443.950000	448.950000	
Wideband TX Low	443.975000	448.975000	
Wideband TX Low	444.000000	449.000000	
Wideband TX Low	444.025000	449.025000	
Wideband TX Low	444.050000	449.050000	
Wideband TX Low	444.075000	449.075000	
Wideband TX Low	444.100000	449.100000	
Wideband TX Low	444.125000	449.125000	
Wideband TX Low	444.150000	449.150000	
Wideband TX Low	444.175000	449.175000	
Wideband TX Low	444.200000	449.200000	

Allocation Category	TX	RX	SX
Wideband TX Low	444.225000	449.225000	
Wideband TX Low	444.250000	449.250000	
Wideband TX Low	444.275000	449.275000	
Wideband TX Low	444.300000	449.300000	
Wideband TX Low	444.325000	449.325000	
Wideband TX Low	444.350000	449.350000	
Wideband TX Low	444.375000	449.375000	
Wideband TX Low	444.400000	449.400000	
Wideband TX Low	444.425000	449.425000	
Wideband TX Low	444.450000	449.450000	
Wideband TX Low	444.475000	449.475000	
Wideband TX High	446.225000	441.225000	
Wideband TX High	446.250000	441.250000	
Wideband TX High	446.275000	441.275000	
Wideband TX High	446.300000	441.300000	
Wideband TX High	446.325000	441.325000	
Wideband TX High	446.350000	441.350000	
Wideband TX High	446.375000	441.375000	
Wideband TX High	446.400000	441.400000	
Wideband TX High	446.425000	441.425000	
Wideband TX High	446.450000	441.450000	
Wideband TX High	446.525000	441.525000	
Wideband TX High	446.550000	441.550000	

Allocation Category	TX	RX	SX
Wideband TX High	446.575000	441.575000	
Wideband TX High	446.600000	441.600000	
Wideband TX High	446.625000	441.625000	
Wideband TX High	446.650000	441.650000	
Wideband TX High	446.675000	441.675000	
Wideband TX High	446.700000	441.700000	
Wideband TX High	446.725000	441.725000	
Wideband TX High	446.750000	441.750000	
Wideband TX High	446.775000	441.775000	
Wideband TX High	446.800000	441.800000	
Wideband TX High	446.825000	441.825000	
Wideband TX High	446.850000	441.850000	
Wideband TX High	446.875000	441.875000	
Wideband TX High	446.900000	441.900000	
Wideband TX High	446.925000	441.925000	
Wideband TX High	446.950000	441.950000	
Wideband TX High	446.975000	441.975000	
Wideband TX High	447.000000	442.000000	
Wideband TX High	447.025000	442.025000	
Wideband TX High	447.050000	442.050000	
Wideband TX High	447.075000	442.075000	
Wideband TX High	447.100000	442.100000	
Wideband TX High	447.125000	442.125000	

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Allocation Category	TX	RX	SX
Wideband TX High	447.150000	442.150000	
Wideband TX High	447.175000	442.175000	
Wideband TX High	447.200000	442.200000	
Wideband TX High	447.225000	442.225000	
Wideband TX High	447.250000	442.250000	
Wideband TX High	447.275000	442.275000	
Wideband TX High	447.300000	442.300000	
Wideband TX High	447.325000	442.325000	
Wideband TX High	447.350000	442.350000	
Wideband TX High	447.375000	442.375000	
Wideband TX High	447.400000	442.400000	
Wideband TX High	447.425000	442.425000	
Wideband TX High	447.450000	442.450000	
Wideband TX High	447.475000	442.475000	
Narrowband TX Low	444.500000	449.500000	
Narrowband TX Low	444.512500	449.512500	
Narrowband TX Low	444.525000	449.525000	
Narrowband TX Low	444.537500	449.537500	
Narrowband TX Low	444.550000	449.550000	
Narrowband TX Low	444.562500	449.562500	
Narrowband TX Low	444.575000	449.575000	
Narrowband TX Low	444.587500	449.587500	
Narrowband TX Low	444.600000	449.600000	
Narrowband TX Low	444.612500	449.612500	
Narrowband TX Low	444.625000	449.625000	
Narrowband TX Low	444.637500	449.637500	
Narrowband TX Low	444.650000	449.650000	
Narrowband TX Low	444.662500	449.662500	
Narrowband TX Low	444.675000	449.675000	
Narrowband TX Low	444.687500	449.687500	
Narrowband TX Low	444.700000	449.700000	
Narrowband TX Low	444.712500	449.712500	

Allocation Category	TX	RX	SX
Narrowband TX Low	444.725000	449.725000	
Narrowband TX Low	444.737500	449.737500	
Narrowband TX Low	444.750000	449.750000	
Narrowband TX Low	444.762500	449.762500	
Narrowband TX Low	444.775000	449.775000	
Narrowband TX Low	444.787500	449.787500	
Narrowband TX Low	444.800000	449.800000	
Narrowband TX Low	444.812500	449.812500	
Narrowband TX Low	444.825000	449.825000	
Narrowband TX Low	444.837500	449.837500	
Narrowband TX Low	444.850000	449.850000	
Narrowband TX Low	444.862500	449.862500	
Narrowband TX Low	444.875000	449.875000	
Narrowband TX Low	444.887500	449.887500	
Narrowband TX Low	444.900000	449.900000	
Narrowband TX Low	444.912500	449.912500	
Narrowband TX Low	444.925000	449.925000	
Narrowband TX Low	444.937500	449.937500	
Narrowband TX Low	444.950000	449.950000	
Narrowband TX Low	444.962500	449.962500	
Narrowband TX Low	444.975000	449.975000	
Narrowband TX Low	444.987500	449.987500	
Narrowband TX High	445.025000	440.025000	
Narrowband TX High	445.037500	440.037500	
Narrowband TX High	445.050000	440.050000	
Narrowband TX High	445.062500	440.062500	
Narrowband TX High	445.075000	440.075000	
Narrowband TX High	445.087500	440.087500	
Narrowband TX High	445.100000	440.100000	
Narrowband TX High	445.112500	440.112500	
Narrowband TX High	445.125000	440.125000	
Narrowband TX High	445.137500	440.137500	
Narrowband TX High	445.150000	440.150000	
Narrowband TX High	445.162500	440.162500	
Narrowband TX High	445.175000	440.175000	
Narrowband TX High	445.187500	440.187500	
Narrowband TX High	445.200000	440.200000	
Narrowband TX High	445.212500	440.212500	
Narrowband TX High	445.225000	440.225000	
Narrowband TX High	445.237500	440.237500	
Narrowband TX High	445.250000	440.250000	
Narrowband TX High	445.262500	440.262500	
Narrowband TX High	445.275000	440.275000	
Narrowband TX High	445.287500	440.287500	
Narrowband TX High	445.300000	440.300000	
Narrowband TX High	445.312500	440.312500	

Allocation Category	TX	RX	SX
Narrowband TX High	445.325000	440.325000	
Narrowband TX High	445.337500	440.337500	
Narrowband TX High	445.350000	440.350000	
Narrowband TX High	445.362500	440.362500	
Narrowband TX High	445.375000	440.375000	
Narrowband TX High	445.387500	440.387500	
Narrowband TX High	445.400000	440.400000	
Narrowband TX High	445.412500	440.412500	
Narrowband TX High	445.425000	440.425000	
Narrowband TX High	445.437500	440.437500	
Narrowband TX High	445.450000	440.450000	
Narrowband TX High	445.462500	440.462500	
Narrowband TX High	445.475000	440.475000	
Narrowband TX High	445.487500	440.487500	
Narrowband TX High	445.500000	440.500000	
Narrowband TX High	445.512500	440.512500	
Narrowband TX High	445.525000	440.525000	
Narrowband TX High	445.537500	440.537500	
Narrowband TX High	445.550000	440.550000	
Narrowband TX High	445.562500	440.562500	
Narrowband TX High	445.575000	440.575000	
Narrowband TX High	445.587500	440.587500	
Narrowband TX High	445.600000	440.600000	
Narrowband TX High	445.612500	440.612500	
Narrowband TX High	445.625000	440.625000	
Narrowband TX High	445.637500	440.637500	
Narrowband TX High	445.650000	440.650000	
Narrowband TX High	445.662500	440.662500	
Narrowband TX High	445.675000	440.675000	
Narrowband TX High	445.687500	440.687500	
Narrowband TX High	445.700000	440.700000	
Narrowband TX High	445.712500	440.712500	
Narrowband TX High	445.725000	440.725000	
Narrowband TX High	445.737500	440.737500	
Narrowband TX High	445.750000	440.750000	
Narrowband TX High	445.762500	440.762500	
Low Level Wideband TX High	446.100000	441.100000	
Low Level Wideband TX High	446.125000	441.125000	
Low Level Wideband TX High	446.150000	441.150000	
Low Level Wideband TX High	446.175000	441.175000	
Low Level Wideband TX High	446.200000	441.200000	

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Allocation Category	TX	RX	SX
Low Level Narrowband TX High	445.775000	440.775000	
Low Level Narrowband TX High	445.787500	440.787500	
Low Level Narrowband TX High	445.800000	440.800000	
Low Level Narrowband TX High	445.812500	440.812500	
Low Level Narrowband TX High	445.825000	440.825000	
Low Level Narrowband TX High	445.837500	440.837500	
Low Level Narrowband TX High	445.850000	440.850000	
Low Level Narrowband TX High	445.862500	440.862500	
Low Level Narrowband TX High	445.875000	440.875000	
Low Level Narrowband TX High	445.887500	440.887500	
Wideband SX			441.025000
Wideband SX			441.050000
Wideband SX			441.075000
Wideband SX			446.000000
Wideband SX			446.025000
Wideband SX			446.050000
Wideband SX			446.075000
Wideband SX			446.500000
Narrowband SX			440.000000
Narrowband SX			440.012500
Narrowband SX			440.925000
Narrowband SX (HS)			440.937500
Narrowband SX (HS)			440.950000
Narrowband SX (HS)			440.962500
Narrowband SX (HS)			440.975000
Narrowband SX (HS)			440.987500
Narrowband SX (HS)			445.000000
Narrowband SX (HS)			445.012500
Narrowband SX (HS)			445.950000
Narrowband SX (HS)			445.962500
Narrowband SX (HS)			445.975000
Narrowband SX (HS)			445.987500
Test Pair Wideband TX High	445.900000	440.900000	
Packet Wideband TX High	446.475000	441.475000	
Wideband APRS Sx			445.925000