

Indiana Repeater Council

Coordination Policy

Version 0.1

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With thanks and appreciation to the officers and staff of:

Illinois Repeater Association, Inc.

Wisconsin Association of Repeaters, Inc.

Michigan Area Repeater Council, Inc.

Ohio Area Repeater Council, Inc.

SouthEastern Repeater Association, Inc.

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1. Introduction

The Indiana Repeater Council, Inc. (IRC), is an Indiana Domestic Nonprofit Corporation comprised as defined in the Bylaws of the Corporation. The IRC's purpose is to provide frequency recommendations as related to the coordination of amateur radio repeater and auxiliary stations. That is, the IRC serves as a Frequency Coordinator.

The function and purpose of a Frequency Coordinator is defined in the U.S. Code of Federal Regulations (CFR) Title 47 Part 97.3 (a) (22) as:

“An entity, recognized in a local or regional area by amateur operators whose stations are eligible to be auxiliary or repeater stations, that recommends transmit/receive channels and associated operating and technical parameters for such stations in order to avoid or minimize potential interference.”

The organizational goal of the IRC is to:

- make frequency coordination recommendations that will reduce interference between coordinated systems;
- make frequency coordination recommendations on a first-come, first-served basis, without bias;
- maintain a database of all coordinated systems;
- require periodic updates from the coordinated system owners/trustees; and
- assist the Federal Communications System (FCC) by providing information about coordinated systems as the FCC requests.

Changes to this policy must be approved by the members of the organization as specified in the Bylaws.

If any party does not agree with this policy or the interpretation of this policy by the Frequency Coordinator, they must submit, in writing, a request that IRC appoint and convene a Board of Appeals to review the decision.

2. Definitions

Active Repeater and/or Auxiliary Station – An active repeater and/or auxiliary station must have all of the following characteristics:

- available for use by the general amateur public or, in the case of a closed system, by club members only, on its coordinated frequencies for at least 305 days per year, excepting the first year of operation;
- the repeater and/or auxiliary station's Primary Contact or Holder of Coordination must respond to requests for periodic updates;
- the repeater and/or auxiliary station must be operated consistent with the coordination recommendation.

Closed Repeater – A system that does not allow public access.

DV – A digital voice mode.

Frequency Coordinator – The Frequency Coordinator, appointed by the Indiana Repeater Council, Inc., is the recognized Frequency Coordinator in the State of Indiana and will be responsible for the final approval on all matters of frequency coordination in the State of Indiana. The Frequency Coordinator may appoint assistant coordinators for specific areas, bands or modes.

Holder of Coordination – The individual or entity (club, organization, etc.) responsible for ensuring the station operation is consistent with the coordination recommendation.

Inactive Repeater and/or Auxiliary Station – Any repeater and/or auxiliary station that does not meet the definition of an active repeater and/or auxiliary station will be considered in-active.

Interference – defined as an undesired co- or adjacent-channel signal which causes distortion or blocking of a desired input, output, link, or control signal of a coordinated system. Hearing other on-channel users may be a nuisance, but is not interference. Abnormal short-term enhanced propagation is also not considered interference.

Open Repeater – A system whose use by all appropriately-licensed operators is welcomed and encouraged.

Periodic Update – A periodic update is a requirement for maintaining a coordination. The frequency coordination document and periodic updates from IRC will be sent to the Holder of Coordinator and/or Primary Contact.

Primary Contact – The name and contact information for the person with whom IRC will correspond.

Selective Access – A tone, code, or other method used to control access to a systems receiver.

Significant Change – A significant change is defined as any change of:

- station location
- selective access
- emission designator / mode of operation
- antenna height
- effective radiated power (ERP)
- any other parameter affecting system service area

Sponsor – The individual or entity (club, organization, etc.) sponsoring the station.

Trustee – See Holder of Coordination.

3. Frequency Coordination and Recommendations

3.1. Frequency Coordination Requirements

3.1.1. Application for frequency assignments is made through the use of the Coordination Form. This form and instructions may be downloaded from the IRC web site or may be filled out on-line at the IRC web site. All applications must contain the requested information necessary to complete the Coordination Form.

3.1.2. Once a coordination recommendation is issued, the system should be constructed as recommended to minimize interference with other coordinated stations.

3.1.3. Once the system is in service, the Frequency Coordinator must be notified.

3.2. Time Limit for Construction of New Systems

3.2.1. The system must be placed into operation within six (6) months of the recommendation being issued.

- 3.2.2. Alternatively, the Holder of Coordination and/or Primary Contact may request of the Frequency Coordinator an implementation extension of up to six (6) additional consecutive months. Substantive justification for the delay should be included with the request.
- 3.2.3. A system not operational at the end of the six (6) months, or the extension period, is considered to be abandoned and the recommendation will be withdrawn.

3.3. Time Limits for Existing and Continuing Stations

- 3.3.1. Frequency coordination recommendations for all repeater and/or auxiliary stations are subject to periodic update. The time interval for this periodic update shall be two (2) years.
- 3.3.2. Once a periodic update request is issued, the Holder of Coordination or Primary Contact must reply within sixty (60) days.

3.4. Frequency Coordination Procedural Guidelines

- 3.4.1. Coordination requests are handled/processed in the order they are received as first-come first-served.
- 3.4.2. Coordinated recommendations must comply with FCC Part 97 rules and regulations and with IRC policies at all times.
- 3.4.3. Coordination recommendations are based on IRC's published band plan.
- 3.4.4. Coordination recommendations are based on established minimum distance and/or software modeling techniques.
- 3.4.5. All Part 97 licensees have an equal right to make use of spectrum under this service and a coordination recommendation does not convey the exclusive, nor indefinite, use of the frequencies described in the recommendation.
- 3.4.6. A coordination recommendation may be revised at any time as may be required to resolve an interference problem, to improve spectrum utilization, or to implement a policy change.

3.5. Notification of Extended Maintenance of a System

If the repeater or auxiliary station is removed from service for maintenance, and is expected to be off air beyond sixty (60) consecutive days, the Holder of Coordination or Primary Contact must notify the Frequency Coordinator.

3.6. Transfer of Coordination

In order to make an administrative transfer of a coordination:

- The current Holder of Coordination must first relinquish the coordination and then specify the new Holder of Coordination. This can be accomplished in writing or by email to the Frequency Coordinator.
- The new Holder of Coordination must then provide all required administrative information. This can be accomplished in writing or by email to the Frequency Coordinator.

4. Frequency De-Coordination

4.1. Conditions for De-coordination:

- 4.1.1. If the coordination recommendation is invalidated due to a significant change.
- 4.1.2. If the repeater or auxiliary station is removed from service permanently.
- 4.1.3. If a system is ordered permanently shut down by the FCC for any reason.
- 4.1.4. If a system has been found to be in-active.
- 4.1.5. If the Holder of Coordination fails to reply to a periodic update within sixty (60) days.
- 4.1.6. If the system is found to bear primary responsibility in a case of interference.
- 4.1.7. If the Holder of Coordination exhibits lack of candor regarding the periodic update, such as reporting a system is active when in fact upon submitted observations it is not.

5. Frequency Interference

5.1. Input Frequency Interference Consequences

- 5.1.1. Frequency recommendations shall be made with as much, if not more, weight given to the consequences of the transmissions of fixed and mobile stations on the input frequency, as compared to the consequences of the output signal of the coordinated station itself.

5.2. Interference to a Coordinated Repeater and/or Auxiliary Station

- 5.2.1. In cases of interference between repeater and/or auxiliary stations, the coordination status of the stations determines where the primary responsibility lies for resolving the interference. Refer to CFR Title 47 Part 97.205 (c):

“Where the transmissions of a repeater cause harmful interference to another repeater, the two station licensees are equally and fully responsible for resolving the interference unless the operation of one station is recommended by a frequency coordinator and the operation of the other station is not. In that case, the licensee of the non-coordinated repeater has primary responsibility to resolve the interference.”

- 5.2.2. In cases where a system in Indiana is involved in interference with a system operated outside Indiana, the Frequency Coordinator, when called upon, will cooperate with the Frequency Coordinator from the other state and will adhere to the guidelines listed above when dealing with the out-of-state repeater and their Frequency Coordinator.

5.3. Interference Resolution Procedures

- 5.3.1. Repeater and/or auxiliary system owners receiving harmful interference from another system or its users should document times, conditions, call signs and describe the type of interference.
- 5.3.2. Band conditions should be observed in all cases, abnormal band conditions shall not be considered the basis for complaining about interference.

- 5.3.3. The Holder of Coordination of the system receiving the interference should contact the Holder of Coordination of the interfering system, outlining the problems and include documentation and should attempt to solve the interference issue.
- 5.3.4. If the interference problem cannot be solved with the owner of the interfering system, the Holder of Coordination of the station being interfered with should contact the Frequency Coordinator outlining the problem and providing whatever documentation is available. Attempts to contact the interfering system owner and/or user should also be explained in detail.
- 5.3.5. If the Frequency Coordinator is unable to resolve the interference through re-coordination of one or both systems, either party may contact the FCC for resolution. The Frequency Coordinator will cooperate with the FCC in providing whatever information the FCC required.

6. Band Plans

6.1. General Policies

- 6.1.1. IRC will coordinate FM, DV, and ATV repeaters and auxiliary links on frequencies appropriate for the type of operation according to a set of band plans. These are based on the recommended ARRL Band Plans, but do not follow them completely.
- 6.1.2. Our goal is to implement band plans that satisfy the needs of repeater owners within the State of Indiana while also protecting the interests and operation of coordinated systems in adjacent states, weak signal modes, digital (packet) communications, FM simplex, and satellite uplinks and downlinks.
- 6.1.3. Any changes made to the band plans only affect pending and future coordination applications. Existing coordinated systems are considered grandfathered and shall be protected as they always have been. No existing coordinated operation is at risk due to the adoption of band plan changes.
- 6.1.4. The band plan shows typical channel width and repeater offsets. Non-standard offsets will be considered upon request, *e.g.* offsets other than 25 MHz in the 902 MHz band to accommodate local Part 15 interference issues.
- 6.1.5. In cases where a repeater sub-band overlaps a simplex sub-band, preference will be made to the simplex usage where ever possible.
- 6.1.6. Shared, non-protected pairs are intended for low-profile, portable, or temporary repeaters. They may be used without coordination, though operators of these repeaters are asked to advise the Frequency Coordinator that they are being used. Shared, non-protected pairs must use some form of selective access.

6.2. Sub-bands

- 6.2.1. The sub-bands appearing in this document in **bold typeface** are sub-bands in which IRC issues coordinations. Those sub-bands in normal typeface are for non-coordinated amateur radio activities.

6.2.2. In this document, each sub-band is identified. The start and end frequencies specified for each band and sub-band are the absolute band edges. The carrier frequency for channelized modes may be shifted away from the absolute band edge so that the total emitted spectrum is within the band or sub-band. For example, although the 2m band ends at 148.000 MHz, the highest channel available on the band is 147.990 MHz, an FM repeater input.

6.3. 10 meters, 28.000 – 29.700 MHz

28.000 – 29.510	Various weak signal and non-repeater modes
29.520 – 29.580	Repeater Inputs (20 kHz channels, 100 kHz offset)
29.600	National FM Simplex Calling Channel
29.620 – 29.700	Repeater Outputs (20 kHz channels, 100 kHz offset)

6.4. 6 meters, 50.000 – 54.000 MHz

50.000 – 51.110	Various weak signal and non-repeater modes
51.110 – 51.500	Repeater Inputs (20 kHz channels, 500 kHz offset)
51.500 – 51.600	FM Simplex
51.610 – 52.000	Repeater Outputs (20 kHz channels, 500 kHz offset)
52.000 – 52.500	Repeater Inputs (20 kHz channels, 1.00 MHz offset)
52.525	National Calling Frequency
52.550 – 53.000	Repeater Inputs (20 kHz channels, 1.00 MHz offset)
53.000 – 53.500	Repeater Outputs (20 kHz channels, 1.00 MHz offset)
53.500 – 53.550	FM Simplex
53.550 – 54.000	Repeater Inputs (20 kHz channels, 1.00 MHz offset)

6.5. 2 meters, 144.000 – 148.000 MHz

144.000 – 144.500	Various weak signal and non-repeater modes
144.390	APRS Nationwide (Packet)
144.500 – 144.900	Repeater Inputs (10 kHz channels, 600 kHz offset)
144.900 – 145.100	Packet (20 kHz channels)
145.100 – 145.500	Repeater Outputs (10 kHz channels, 600 kHz offset)
145.500 – 145.800	Miscellaneous and experimental modes
145.800 – 146.000	Satellite Sub-Band
146.000 – 146.400	Repeater Inputs (15 kHz channels, 600 kHz offset)
146.400 – 146.600	FM Voice Simplex (15 kHz channels)
146.520	FM National Calling Frequency
146.600 – 147.400	Repeater Outputs (15 kHz channels, 600 kHz offset)
147.400 – 147.600	FM Voice Simplex (15 kHz channels)
147.600 – 148.000	Repeater Inputs (15 kHz channels, 600 kHz offset)

6.6. 1.25 meters, 222.000 – 225.000 MHz

222.000 – 222.150	Various weak signal and non-repeater modes
222.150 – 222.250	Links and Control (20 kHz channels)
222.250 – 223.400	Repeater Inputs (20 kHz channels, 1.60 MHz offset)
223.400 – 223.600	FM Simplex, Packet (20 kHz channels)
223.500	National Calling Frequency
223.600 – 223.850	Links and Control (20 kHz channels)
223.850 – 225.000	Repeater Outputs (20 kHz channels, 1.60 MHz offset)

6.7. 70 centimeters, 420.000 – 450.000 MHz

420.000 – 426.000	ATV (6.00 MHz channel, 421.250 MHz V, 425.750 MHz A)
426.000 – 432.000	ATV (6.00 MHz channel, 427.250 MHz V, 431.750 MHz A)
431.000 – 433.000	Various weak signal and non-repeater modes
433.000 – 435.000	FM/DV Auxiliary Links (25 kHz channels)
435.000 – 438.000	Satellite only
438.000 – 441.500	FM/DV Auxiliary Links (25 kHz channels)
440.500	FM Repeater Output (shared, non-protected pair)
441.500	FM Repeater Output (shared, non-protected pair)
441.525 – 442.000	DV Repeater Outputs (6.25 kHz channels, 5.00 MHz offset)
442.000 – 445.000	FM Repeater Outputs (25 kHz channels, 5.00 MHz offset)
445.000 – 445.500	FM Simplex, Links, Packet (25 kHz channels)
445.500	FM Repeater Input (shared, non-protected pair)
445.500 – 446.500	FM Simplex, Links, Packet (25 kHz channels)
446.000	National FM Simplex Calling Frequency
446.500	FM Repeater Input (shared, non-protected pair)
446.525 – 447.000	DV Repeater Inputs (6.25 kHz channels, 5.00 MHz offset)
447.000 – 450.000	FM Repeater Inputs (25 kHz channels, 5.00 MHz offset)

6.8. 33 centimeters, 902.000 – 928.000 MHz

902.000 – 902.075	FM/DV Repeater Inputs (12.5 kHz channels, 25 MHz offset)
902.075 – 902.125	Various weak signal and non-repeater modes
902.125 – 903.000	FM/DV Repeater Inputs (12.5 kHz channels, 25 MHz offset)
903.000 – 903.400	Various weak signal and non-repeater modes
903.400 – 909.000	Mixed use, including links and control
909.000 – 927.000	Mixed broadband use, ATV, data
927.000 – 927.075	FM/DV Repeater Outputs (12.5 kHz channels, 25 MHz offset)
927.075 – 927.125	Simplex (FM and digital)
927.125 – 928.000	FM/DV Repeater Outputs (12.5 kHz channels, 25 MHz offset)

6.9. 23 centimeters, 1200.000 – 1300.000 MHz

1240.000 – 1246.000	ATV (6.00 MHz channel, 1241.250 MHz V, 1245.750 MHz A)
1246.000 – 1248.000	Point-to-point links paired with 1258.000 – 1260.000
1248.000 – 1252.000	Miscellaneous and experimental modes
1252.000 – 1258.000	ATV (6.00 MHz channel, 1253.250 MHz V, 1257.750 MHz A)
1258.000 – 1260.000	Point-to-point links paired with 1246.000 – 1248.000
1260.000 – 1270.000	Miscellaneous and experimental modes
1270.000 – 1274.000	FM/DV Repeater Inputs (25 kHz channels, 20.00 MHz offset)
1274.000 – 1276.000	Miscellaneous and experimental modes
1276.000 – 1282.000	ATV (6.00 MHz channel, 1277.250 MHz V, 1281.750 MHz A)
1282.000 – 1290.000	Miscellaneous and experimental modes
1290.000 – 1294.000	FM/DV Repeater Outputs (25 kHz channels, 20.00 MHz offset)
1294.000 – 1295.000	FM Simplex
1294.500	National FM Simplex Calling Frequency
1295.000 – 1300.000	Various weak signal and non-repeater modes

7. Geographical Repeater Separation

7.1. General Policies

- 7.1.1. Coordinated systems will be geographically spaced from each other to provide a minimum separation, depending on frequency spacing, to reduce interference. At this time, straight-line distance is the determining factor for this spacing.
- 7.1.2. Minimum spacing based on terrain and signal strength models may be used in the future.
- 7.1.3. Any changes made to the geographical separation policies only affect pending and future coordination applications. Existing coordinated systems are considered grandfathered and shall be protected as they always have been. No existing coordinated operation is at risk due to the adoption of geographical separation policy changes.

Frequency Band	Co-channel separation	Adjacent channels	Adjacent channel separation
52 MHz	120 miles	20 kHz	20 miles
144 MHz	120 miles	10 kHz	50 miles
		15 kHz	40 miles
		20 kHz	25 miles
		30 kHz	20 miles
222 MHz	120 miles	20 kHz	25 miles
		40 kHz	5 miles
440 MHz	120 miles	25 kHz or less	5 miles
		50 kHz	1 mile
902 MHz	120 miles	25 kHz or less	5 miles
		50 kHz	1 mile
1296 MHz	120 miles	25 kHz or less	5 miles
		50 kHz	1 mile

8. Technical Standards

8.1. Bandwidth

- 8.1.1. Spectral purity requirements for FM voice repeater and auxiliary link operations will be comparable to modern land-mobile requirements and to FCC requirements for the band in question, whichever is more stringent. The occupied bandwidth shall not exceed 15 kHz on channels spaced every 10 or 15 kHz, 16 kHz on channels spaced every 20 kHz, and 18 kHz on channels spaced every 25 kHz. Additional adjacent-channel protection is required for 2m repeaters operating on 10 or 15 kHz channels due to the increased possibility of interference to adjacent channels and is considered in the coordination review of those repeater pairs. Occupied bandwidth of repeaters on the 902 MHz band shall not exceed 12.5 kHz.

8.2. Selective Access

- 8.2.1. The IRC will publish a selective access map which indicates the assigned CTCSS (aka PL), CDCSS (aka DCS), DMR Color Code, P25 NAC, NXDN RAN, and System Fusion DSQ for various regions around the state. The map currently published on the IRC web site includes CTCSS tones and will be developed to include the other selective access methods.
- 8.2.2. All new coordination recommendations, inclusive of any significant change in coordinated parameters, shall include a CTCSS, CDCSS, or equivalent means of selective access, as part of the coordination.
- 8.2.3. All existing coordinations that lack a stated selective access method or which are using a method that does not conform to the stated policy may continue to use their coordinated means of selective access. The IRC urges holders of these coordinations to move towards the recommended means of selective access for their region.
- 8.2.4. To the extent permitted by the conditional access method, the tone or code selection process shall exclude the tones and codes used in any areas within approximately 150 miles. Regions which regularly experience periods of enhanced propagation, such as across of the Great Lakes, should use methods that look beyond the minimum recommended distance.
- 8.2.5. The tone or code selection shall be from the region where the transmitter is located. If interference issues exist in the actual system coverage area, the selective access method for the region(s) included in the coverage area may be recommended.
- 8.2.6. The published plans should be periodically reviewed by the affected parties to identify areas where alternate choices are occurring, or as new digital modes are deployed, and propose additions or changes to the plan as appropriate.
- 8.2.7. Digital mode systems shall not be assigned "default" or "all access" codes such as DMR Color Code 1, P25 \$293, \$F7E, \$F7F, NXDN RAN 0, System Fusion DSQ 0.

8.3. ATV

- 8.3.1. AM ATV sub-bands are shown as a 6 MHz segment. AM ATV operations must use VSB filtering of the lower sideband and be NTSC compliant. The visual carrier frequency must be 1.25 MHz above the lower limit of the specified sub-band edge specified and aural carrier frequency 4.5 MHz above the visual carrier. FM ATV operations on 23cm must use the center of the channel as the carrier frequency.