Standard Operating Procedure

Title / Subject

Radio Equipment Requirements & Approved Equipment List

References/Updates:
Updated: 10/13/2025

Table of Change

1.	Add Intro/Purpose, Definitions, Modifications to 3a, 3e,	Page 1
2.	Add F v., G, J xi, and Modifications to J ix.	Page 2
3.	Add K ii 11.	Page 3
4.	Updated section numbers and added a new section 4.	Page 4

1. **Introduction/Purpose**
   This policy relates to the addition of any radio equipment into the West Virginia Statewide Interoperable Radio Network (WV SIRN) and spells out the requirements for all radio manufacturers to have their equipment approved. This policy will also categorize radios into various levels according to the radios feature set and capabilities.

2. **Definitions**
   All definitions are located in the "Definitions" document located on the SIRN Website at www.sirn.wv.gov.

3. **Radio Equipment Requirements**
   - **a.** No equipment shall be programmed or attempted to be used with the SIRN that is not listed on the SIRN Approved Equipment List (SIRN AEL), as set forth by the SIEC.
   - **b.** The SIRN AEL shall be based on criteria to establish minimum operating standards and not based on a specific manufacturer(s).
   - **c.** The SWIC shall publish an updated SIRN AEL on the SIRN website as soon as reasonably possible after changes have been made.
   - **d.** No radio activations, unless approved by the SIEC Technical Committee for official testing, shall be made for equipment not approved.
   - **e.** Per FCC Licensing, mobile unit output power is limited to no more than 50 watts.

f. Link Layer Authentication is mandatory in a radio purchased after June 30, 2025. It is encouraged that any future radio purchases be equipped with Link Layer Authentication.

g. The approved radios will be broken down in the following format utilizing 5 Levels

i. Level 1; Radios in this section shall meet or exceed ALL of the below criteria

1. At least 3000 Channels
2. Mixing Conventional and Trunking Channels in the Same Zone
3. Scanning Conventional and Trunking in the Same Scan List
4. TDMA (Phase 2) Enabled
5. Capable of AES Encryption with Multi-Key
6. Display capable of at least 14 characters

ii. Level 2; Radios in this section shall meet or exceed ALL of the below criteria

1. At least 1000 Channels
2. Mixing Conventional and Trunking Channels in the Same Zone
3. Scanning Conventional and Trunking in the Same Scan List
4. TDMA (Phase 2) Enabled
5. Capable of AES Encryption with Multi-Key
6. Display capable of at least 12 characters.

iii. Level 3; Radios in this section will meet 1 or more of the below criteria

1. NOT Capable of AES Encryption with Multi-Key
2. At least 512 Channels
3. TDMA (Phase 2) Enabled
4. NOT Capable of Mixing Conventional and Trunking Channels in the Same Zone
5. NOT Capable of Scanning Conventional and Trunking in the Same Scan List

iv. Level 4; End of Life but working properly (i.e. Motorola XTS & XTL, or APX 7000). Radios that are End of Life from their manufacturer, yet still function properly. They do not have the same functionality or available features of newer radios. **CAUTION WHEN PURCHASING USED RADIOS. Be sure to confirm Firmware and software versions, and radio feature sets. Feature sets must include 9600 baud (P-25 trunking). In addition, they should include P-25 CAI. If encryption is desired it should be AES and multikey is preferred if an option. Early versions of radios may not function properly on the SIRN system, even though they may *appear* to function properly. If a radio is determined to not function properly and causes any issues, it may be "turned off" to prevent system issues. Radio's that do not function properly may be turned off in the system if their use causes users to perceive a negative perception of the capabilities of the SIRN.**

v. Level 5 – Pending Manufacturer Actions – These radios have been reported to the manufacturer with a noted performance issue that is awaiting a fix. The fix will be tested and confirmed as acceptable prior to that model of product being put back on the approved list for purchase.

vi. Level 99 – No longer recommended for use (End of life or NOT working properly). The radio listings in Level 99 are no longer being supported by the manufacturer or have identified operational issues when used on SIRN. While the device may still work to some level of usability on SIRN, the radio has noted significant issues. The radio is NOT RECOMMENDED for use or purchase by the SIEC.

h. Site equipment (such as new sites or related equipment) will be evaluated on a case-by-case basis. Please refer to the Standard Operation Procedure for "**Adding Astro Site Repeater Sites**". Parties interested in purchasing a new site shall contact the SWIC to begin the process.

i. Testing of radio equipment (new or currently approved equipment) or testing of parameter changes shall only be conducted with prior approval of the SIEC Technical Committee.

j. No vendor shall conduct radio testing of parameters or equipment that is not approved by the SIEC Technical Committee.

k. In order for radio equipment to be properly categorized and accepted for use on the system the following testing process has been established:

i. A vendor shall submit a request to the SWIC to have a device tested.

ii. A vendor shall appoint a single point of contact representing the vendor and the appointed tester.

iii. The SWIC or designee will coordinate with the Chair of the SIEC Technical Committee to assign the initial testing of the device to the most appropriate person. All equipment submissions must include the radio and accessories needed to operate the unit, non-expiring programming software that does not require an internet cloud or internet connect to install and function, and cables if requested and any needed technical support to program and test the radios.

iv. The SIEC will test the radios to demonstrate proper operation and notify the vendor of any issues and make reasonable attempts to resolve minor issues.

v. After acceptance, the SIEC Technical Committee will determine the appropriate Level of Acceptance and suggest to the SIEC the Approval of the equipment.

vi. After SIEC approval of the radios it will be added to the SIRN AEL. If not approved, the reason(s) will be conveyed to the vendor who has the opportunity to correct the issues and resubmit for testing.

vii. Any vendor who desires to have their approved product placed on the SIRN AEL must provide 4 each of the following:

i. Radios for inclusion in the Approved Equipment List
ii. Belt Clips/Holsters
iii. Remote speaker microphones
iv. Chargers
v. Programming Cables
vi. Encryption cables for use with the Motorola KVL
vii. Programming software that does not expire
viii. Software system key
ix. Provide master hardware key if available with 4 daughter keys)
x. Portal address with 4 user names and passwords for programming software and firmware updates (One credential shared amongst four users is acceptable)

viii. Said radios will be usable as well as non-expiring programming software for the duration of that radio's life span or for the length of time said radio is on the approved equipment list. All equipment must be tested for no less than 30 days and will only be approved at a regularly scheduled meeting of the SIEC.

ix. Vendors knowingly selling equipment that is not approved will be reported to the appropriate officials for investigation. The SIEC reserves the right to remove manufacturers from the SIRN AEL that have vendors routinely selling equipment not meeting the specifications for use on SIRN.

x. The SIEC will only test and approve radios based on the data available from the vendors and the configuration of the radio sent for testing. Please submit properly equipped radios and proper documentation with the radios for testing. Radio features (ie. Encryption, TDMA, etc.) that are not included in the radio cannot be tested, and will not be able to be approved at the level the option is required.

xi. It is recommended that radios be equipped with any and all options available for the radio model. A 4000-channel radio that is provided with 2000 channels will be a Level 2 radio as it was not tested with the requirement for Level 1. Include absolutely anything you want tested now and in the future. Updating options released later will potentially require testing prior to release of that option being available for sale. No feature shall be approved without prior recommended approval of the Technical Committee to the SIEC.

xii. The SIRN AEL and testing process is based on properly equipped radios.

xiii. Radio programming shall not necessitate a connection to the internet by the radio or the programming computer. All programming shall be possible via a programming cable using a computer that is not connected to the internet. Programming only via an internet cloud site is not acceptable. WIFI connectivity and programming is desirable.

l. In order to establish proper operation with the existing system and user equipment the following criteria has been established

i. Required – All equipment must meet these criteria for approval. If at any time the equipment is found to not meet these requirements it will be immediately removed.

1. Adjustable time-out timer – Programmer must be able to enter values from 30 seconds to 120 seconds.

2. Busy Channel – The radio must alert the user that they are attempting a PTT on a busy channel; the radio must give audible warning to the user as long as the PTT button is pressed.

3. Busy Queuing and Call Back – The radio will notify the user (Both Visual and Audible) that the system is busy and when a talk channel is available the radio will notify the user they can now transmit.

4. Capable of operation at least from 400-470 MHz – Wider operation is acceptable; this is due to the SIRN implementing sites in the 400-410 range.

5. Conventional Radio Channels – Must be able to populate the radio with conventional channels as well as trunking.

6. Dynamic Regroup capability – Must be able to dedicate a channel and place that channel in a zone/group on any channel spot.

7. Full Spectrum Control Channel Scan – Must automatically search for available control channels.

8. Multi-Zone Roaming – The radio must allow operation on a multizone controlled system.

9. Out of Range Indication – The radio must alert the user (visually and audible) that the radio is out of system range. Audible and/or visual indication should be selectable by the programmer.

10. Radio inhibit capability – The radio must be able to be rendered nonoperational by the inhibit command from the Astro platform. This feature must be enabled based on the loading of the WV SIRN system key and locked in a manner that it cannot be disabled by a programmer with the radio programming software.

11. Return to affiliation after conventional channel activity – The radio must be able to be changed from trunking to conventional and back to trunking and reaffiliate without any user interaction other than channel changes.

12. Return to affiliation after Out of Range – The radio must return to system operation after it has gone out of system range without user interaction.

13. Site Trunking Notification – The radio must give the programmer the option to set audible, visual or both alerts to the user when the radio senses a Site Trunking situation.

14. Site Trunking Roaming to Wide Area Sites – The radio shall, without user interaction, search for and roam to wide area sites, if available, when a Site Trunking situation is indicated.

15. Talkgroup Call – The radio must be able to transmit and receive on the programmed talkgroups.

16. Operational TDMA (APCO P-25 Phase II)

ii. Optional Features – These features will be tested if present and the results noted, but they are not required for approval. Users should check with the vendor to ensure the radio they are purchasing has the Optional Features they desire.

1. Ability to software program a radio for single site operation
2. Ability to mute all or select Alert Tones
3. Call Alert (Encode and Decode), Both Trunking and Conventional
4. Emergency Alarm (Encode and Decode)
5. Operator Programmable Scan List
6. Operator Programmable Zone List
7. P-25 CAI Operation
8. PTT Unit ID/Alias Display
9. RSSI Indication
10. Secure Operation (Other than AES) & Multi-key Operation

iii. *Scanning* – The capability of scanning is handled differently between vendors and subscriber units and not all makes/models handle scanning the same. The utilization of scan in any radio has the potential for a responder to miss received audio. If the scan feature is deemed necessary by a user or agency, the following are possible scan configurations and noted issues with each.

1. *Non-mixed mode scan* – Trunked talkgroups and conventional channels can NOT be combined into the same scan list.
2. *Mixed mode type scan* – It is possible to combine a trunked talkgroup and a conventional channel into the same scan list, but there is no priority given to any list member.
3. *Priority Mixed Mode Scan* - it is possible to combine trunked talkgroups and conventional channels into the same scan list and be able to assign a priority to a member of that list.
4. *Priority Scan* - Scan that involves EITHER talkgroups or conventional channels, but not a mix of both. This type of scan is normally available in most manufacturers.

m. Requirements of Manufacturers – The following are general requirements of the manufacturer for their radios to be considered for the Approved Equipment List. This policy section became effective January 1, 2018.

i. Firmware updates

1. The manufacturer must provide field installable firmware as needed to address functional issues with the radio. This must be provided free of charge and may not require the use of an external USB/Key type device.

2. The manufacturer must provide an online portal for firmware downloading, as updates are released. Access to this portal and downloads will start at time of testing and continue until the radio is no longer on the SIRN AEL for all radios of that type on the system.

ii. Software updates

1. The manufacturer must provide field upgradable software as needed to keep software updated to the current version.

2. The manufacturer must provide an online portal for software downloading, as updates are released. Registration and login requirements are acceptable.

iii. A reasonable fee for software licensing is acceptable. Software must be provided at no cost for testing purposes of equipment.

Note: Most radio manufactures have options when ordering equipment. The tested and approved equipment should be reviewed and the purchaser should ensure that a radio is properly configured before purchasing. Proper Make and Model numbers do not always indicate proper configuration. Purchaser should not completely rely solely on vendor suggestions.

4. Connected applications and services

The West Virginia SIEC also takes notice of the new forms of technology that supplement or augment the traditional Land Mobile Radio (LMR) system. These forms of technology come in many forms with interconnectivity ranging from directly connected infrastructure, broadband, and donor radios just to name a few. As new technology opportunities are made available to the SIEC, each will be tested, and results will be reported. No connected app or service is considered to be a life safety initiative that fully replaces a traditional LMR radio subscriber unit. The list of connected apps and services listed in Section 6 are the only ones that have been tested and approved for use on or in conjunction with the traditional SIRN LMR system.

5. SIRN Approved Equipment List

Type	Level	Make	Model	Programming Software	!!! NOTE !!! ALL RADIOS MUST BE UHF 400-470 MHz
LEVEL 1					
Portables					
	1	Bendix King	KNG2-P400	RES	
	1	EF Johnson	VP600	Armada	
	1	EF Johnson	VP8000	Armada	
	1	Harris	XL200P	Harris RPM	
	1	Kenwood	NX-5300	D1N	
	1	Kenwood	TK-5330	D1N	
	1	Kenwood	VP-5330	Armada	
	1	Kenwood	VP-6330	Armada	
	1	Motorola	APX-6000	APX CPS	
	1	Motorola	APX-7000	APX CPS	
	1	Motorola	APX-8000	APX CPS	
	1	Motorola	APX-Next	CPS & Online	
	1	BK Technologies	BKR 9000	RES	
Mobiles					
	1	Harris	XL200M	Harris RPM	
	1	Kenwood	VM7000	Armada	
	1	Kenwood	NX-5800	D1N	
	1	Kenwood	TK-5830	D1N	
	1	Kenwood	VM-5830	Armada	
	1	Kenwood	VM-6830	Armada	
	1	Kenwood	VM-8000	Armada	
	1	Motorola	APX-6500	APX CPS	
	1	Motorola	APX-7500	APX CPS	
	1	Motorola	APX-8500	APX CPS	
LEVEL 2					
Portables					
	2	Bendix-King	KNG-P400	RES	
	2	Harris	XG-25P	Harris RPM	
	2	Harris	XG-75P	Harris RPM	
	2	Harris	Unity XG-100	Harris RPM	

Type	Level	Make	Model	Programming Software	!!! NOTE !!! ALL RADIOS MUST BE UHF 400-470 MHz
	2	Harris	P7300	Harris RPM	
	2	Motorola	APX-4000	APX CPS	
	2	Motorola	N50	APX CPS	
Mobiles	2	Bendix-King	KNG400M	RES	
	2	Harris	XG-25M	Harris RPM	
	2	Harris	Unity XG-100M	Harris RPM	
	2	Harris	M7300	Harris RPM	
	2	Motorola	APX-4500	APX CPS	
LEVEL 3					
Portables	3	ICOM	IC-F9021	ICOM Software	Cannot Scan Conventional and Trunking in the same list. Not capable of operator programmable scan list
	3	Harris	P3300	Harris RPM	No Encryption
	3	Kenwood	TK-5320	KPG-112	Will Not mix Conventional and Trunking in the same Zone. Cannot Scan Conventional and Trunking in the same list
	3	Motorola	APX-900	APX CPS	Only 512 Channels No AES Encryption

Type	Level	Make	Model	Programming Software	!!! NOTE !!! ALL RADIOS MUST BE UHF 400-470 MHz
	3	Motorola	APX-1000	APX CPS	Only 512 Channels No AES Encryption
Mobiles	3	Harris	M3300	Harris RPM	No Encryption
	3	ICOM	IC-9521	ICOM Software	Cannot Scan Conventional and Trunking in the same list
	3	Kenwood	TK-5820	KPG-112	Will not mix Conventional and Trunking in the same Zone. Cannot Scan Conventional and Trunking in the same scan list
	3	Motorola	APX-1500	APX CPS	Not capable of multi-key encryption

LEVEL 4 - Level 4; End of Life but working properly (i.e. Motorola XTS & XTL, or APX 7000). Radios that are End of Life from their manufacturer, yet still function properly. They do not have the same functionality or available features of newer radios. Note specific comments above in Section 3.f.iv.

Type	Level	Make	Model	Programming Software	!!! NOTE !!! ALL RADIOS MUST BE UHF 400-470 MHz
Portables					
	4	Kenwood	10 Series V3	KPG-95DGN	
	4	EF Johnson	51xx Series	PC Configure	

	4	Harris	P5400	Harris RPM	Effective 04/12/16 Frequency range is 450-470
	4	Harris	CG15P	Harris RPM	Effective 04/12/16 Frequency range is 450-470
	4	Motorola	XTS-1500	XTS CPS	
	4	Motorola	XTS-2500	XTS CPS	
	4	Motorola	XTS-5000	XTS CPS	
	4	Tait	TP91xx	Tait Software	
Mobiles					
	4	Kenwood	10 Series V3	KPG-95DGN	
	4	EF Johnson	53xx Series	PC Configure	
	4	Motorola	XTL-1500	XTL CPS	
	4	Motorola	XTL-2500	XTL CPS	
	4	Motorola	XTL-5000	XTL CPS	
	4	Tait	TM91xx	Tait Software	

LEVEL 5 – Condition requiring manufacturers actions before any other radios will be allowed to be connected to the system.

Type	Level	Make	Model	Programming Software	!!! NOTE !!! ALL RADIOS MUST BE UHF 400-470 MHz

LEVEL 99 – No longer recommended for use (End of life and not working properly). The radio listings in Level 99 are radios that are no longer being supported by the manufacturer. While the device may still work to some level of usability on SIRN, the radio has noted significant issues. The radio is NOT RECOMMENDED for use or purchase by the SIEC. Equipment with currently assigned Radio ID's and active on the SIRN may continue to be operated on the SIRN. Equipment listed in this section is no longer authorized to be newly activated on the SIRN.					
Portables	99	Kenwood	10 Series V2	KPG-95DGN	Limited support from the manufacturer. Poor roaming ability. No future firmware updates beyond what is currently available.
Mobiles	99	Kenwood	10 Series V2	KPG-95DGN	Limited support from the manufacturer. Poor roaming ability. No future firmware updates beyond what is currently available.

Tested Connected apps and services

App or Service	Brand/Vendor	Status	Usage Notations
Inter Subsystem Interface (ISSI)	Motorola Solutions	Operational	Allows a foreign radio system to be integrated into the SIRN Astro System. *Significant ongoing costs to all parties involved.*
Critical Connect	Motorola Solutions	Operational	Allows for other radio technologies to interface into a radio LMR system.
Wave	Motorola Solutions	Operational	Push-To-Talk application for smart devices; Carrier agnostic; Allows for broadband-only and LMR talkgroup integration directly into Astro systems; Easy management by LRM administrators; Small recurring cost to end users.