Subject: Technicians Guidelines

Functional Area: Communications

Category: Guideline

Approved By: MABAS Executive Board

Purpose:

To provide a source for radio technicians, both independent radio shops and in-house radio programmers, so that mobile and portable radios will contain proper features to adequately function within the guidelines of the various MABAS Radio Advocacy Statements and MABAS Policies.

Responsibility:

This information can be utilized by all fire departments and their respective radio technicians.

Accountability:

Enforcement of this specific guideline rests initially with the Co-Chairs of the MABAS Telecommunications, Communications, and Dispatch Centers committee, then the MABAS CEO, followed by the MABAS President, 1st Vice President and 2nd Vice President. Ultimately, however, ultimate authority regarding the enforcement of radio operations and licensing rests with the Federal Communications Commission (FCC).

Reporting Requirement:

There is no routine reporting requirement for this guideline.

Background

The MABAS Radio Committee has fielded questions from radio shops and fire agencies which are looking for guidance on programming features, channel designators, and other radio parameters that are necessary to attain interoperability with all MABAS agencies.

Guideline

The MABAS Telecommunications, Communications and Dispatch Committee hereby establishes the following guideline:

1. **CHANNEL SPECIFICATIONS AND NOMENCLATURE:**

   CTCSS is found only on the transmitter of the radio for portables and mobiles on wideband frequencies. If a command van is used, or a base-station is used for regional reception, CTCSS for the receiver may be considered for those radios found in communications vans or base stations only to reduce interference.

   ▪ Note 1: The radio's LCD display may also contain channel number as space allows, i.e. "4 IFERN".

   ▪ Note 2: (N) Means Narrow-Band Only. Not all radios are capable for Narrow-Band based on age and FCC Type Acceptance.

   ▪ Note 3: Until the FCC makes a final decision on narrow-band, MABAS recommends that "transmit only" CTCSS be implemented on portables and mobiles for the wideband channels.

- Note 4: MABAS recommends that "full TX/RX" CTCSS be implemented on portables and mobiles for the narrowband channels.

Freq: TX/RX	CTCSS Tone	Name	Suggested Display or Abbreviation
154.2650	210.7 (M2) (Note 3)	Interagency Fire Emergency Radio Network	IFERN
154.3025 (N)	67.0 (XZ) (Note 4)	Interagency Fire Emergency Radio Network 2	IFERN2
153.8300	69.3 (WZ) (Note 3)	RED Fireground	FG-RED
154.2800	74.4 (WA) (Note 3)	WHITE Fireground	FG-WHITE
154.2950	85.4 (YA) (Note 3)	BLUE Fireground	FG-BLUE
153.8375 (N)	91.5 (ZZ) (Note 4)	GOLD Fireground	FG-GOLD
154.2725 (N)	94.8 (ZA) (Note 4)	BLACK Fireground	FG-BLACK
154.2875 (N)	136.5 (4Z) (Note 4)	GRAY Fireground	FG-GRAY

2. **CHANNELIZATION:**

The MABAS Radio Committee **has not adopted a standardized channel layout** for radios, however, it is noted that many agencies are standardizing with the following format **AS AN EXAMPLE ONLY**. This is NOT to be considered a "MABAS Standard" but simply an example of how many fire agencies have programmed their radios.

- The normal VHF dispatch channel (non-MABAS listed channel) should be found at Channel 1 so that the gloved operator in the field can rotate the channel selector fully counter-clockwise to find the normal fire dispatch channel for routine local (non-MABAS) dispatch.

- The RED Fireground frequency should be found at the last channel, usually Channel 16, so that rotating the channel selector fully clockwise will find the most commonly used Fireground channel. Subsequent "clicks" counterclockwise will allow the operator to quickly switch to White and Blue, etc. if alternate Fireground channels are used.

EXAMPLE CHANNEL LAYOUT:

Position	Channel Name	Position	Channel Name
F1	Primary VHF Dispatch Frequency	F9	Other VHF Frequency
F2	IFERN	F10	Other VHF Frequency
F3	Other VHF Frequency	F11	GRAY Fireground
F4	Other VHF Frequency	F12	BLACK Fireground
F5	Other VHF Frequency	F13	GOLD Fireground
F6	Other VHF Frequency	F14	BLUE Fireground
F7	Other VHF Frequency	F15	WHITE Fireground
F8	Other VHF Frequency	F16	RED Fireground

3. **SCAN FEATURES:**

The MABAS Communications Committee has fielded questions on popular scan configurations in programmable mobile and portable radios. Configurations should include:

3.1 **Scan List:** A list of channels should be limited to tactical channels or essential channels for the command function. Scan lists should be limited to IFERN, Fireground channels, and main dispatch channel. This is a local decision based on local policy, however, lower-priority channels or seldom used channels should probably not be included in a scan list when in a tactical mode.

3.2 **Deletion of "talk-back" scan:** This feature moves the transmit frequency to the channel where last activity occurred. In this scan mode, the operator may actually transmit on an undesired channel because the radio sensed activity on a non-primary channel

3.3 **Use of "Priority Scan":** Radios should be configured so that the scanner's priority follows the selected channel. Regardless of how many channels are in a given scan list, priority is given to the channel that is selected by the channel selector. Activity on the selected channel will be given priority over activity on any other channel in the scan list.

4. **CHANNEL GUIDE:**

Because most popular radios are multi-channel, it is recommended that a channel guide be available to the operators. A laminated card, label, or engraved plate should be available on the front of the radio case, or on the radio's holster. Mobile radios should have a similar channel guide in plain view near the radio.

Mobile and portable radios with alpha-numeric displays my not require any type of placard, card, or label unless special instructions are desired.

5. **PORTABLE RADIO SPEAKER MICROPHONE & PUBLIC-SAFETY MICROPHONE:**

There are many options for speaker-microphones and accessories. Recommendations:

5.1 **Speaker Mic:** Speaker microphones (coiled cord with microphone containing a push-to-talk switch, and speaker), when used, still allows the portable-radio antenna to be away from the operator's body, per manufacturer's guidelines.

5.2 **Public-Safety Mic:** Public-safety microphones (straight or nearly straight cord with speaker, microphone, push-to-talk switch, and remote antenna). The installation must strictly adhere to manufacturers guidelines and must remain unmodified. The mic-mounted remote antenna must remain in place since the portable-mounted antenna is automatically disconnected once the public-safety microphone is attached to the radio. The proper band antenna needs to be used. Even though a UHF antenna may be shorter and "more convenient", it does not perform properly on a VHF radio. It can cause damage to the radio, and it will degrade performance.

6. **MOBILE RADIO ANTENNAS:**

6.1 **Glass-mounted Antennas:** There are various manufacturers who make on-the-glass antennas for VHF. Many do not perform to public-safety-grade standards. This leads to poor reception, decreased transmit power, interference to other mobile radios, poor ground, and other problems. These antennas, if used at all, should be used with a high degree of caution.

6.2 **Mounting Positions of Permanent Antennas:** Antennas mounted on the body of a vehicle should be as high as possible, and as centered as possible for best performance.

6.3 Mobiles that require more than one radio antenna should consider antenna spacing based on 1/8-wavelength null. This helps to reduce in-band and cross-band interference between radios.

7. MOBILE RADIO POWER SETTINGS:

7.1 It is recommended that mobile radios be programmed or adjusted with power setting not to exceed 10 watts on all Fireground channels. High power settings (over 25W) could be used on IFERN, IFERN2, or as needed for authorized frequencies other than the identified Fireground frequencies.

7.2 It is recognized that some legacy mobile radios only have one power setting, often at 100 Watts. As mobile radios are replaced, MABAS encourages compliance with the low-power guidelines for fireground channels.

7.3 Power should be programmed or adjusted using good engineering practices with trained personnel using professional-grade test equipment such as dummy loads, service monitors and watt meters.

Conclusion

This guideline should be useful for radio technicians, or those who are competent in the use of radio programming software, in properly setting up mobile and portable radios to ensure MABAS interoperability. It is hoped that technicians can use this guideline to counsel the users so that optimal radio performance is achieved.

Approved by the MABAS Executive Board on August 5, 2004.