ELARC

EAST LEINSTER AMATEUR RADIO CLUB

Emergency Communications Field Manual

Rev 1.0 January 2022

FOREWORD

The original version of this Emergency Communications (EmComm) Field Manual was developed by the IARU and then modified by the East Leinster Amateur Radio Club (ELARC) to localise it and focus more on the specific mission of ELARC or any Amateur Radio Club in Ireland which may need to provide Auxiliary or EmComm support to their local community or region in the event of an emergency or communications breakdown, or just to support a community event.

This Manual will provide ELARC members or any Radio Amateur with training material and provide guidance to Radio Amateurs who may find themselves participating in an emergency event or simply when supporting community activities.

It is also designed to provide guidance to the individual amateur radio operator who has little or no experience in handling Emergency Communications (EmComm) but seeks to enhance their ability to participate in such events or to simply have a better understanding of the process.

This Manual can also be used in conjunction with other training materials by leaders within the EmComm community to train radio operators in the basic theory and practice of handling EmComm traffic.

East Leinster Amateur Radio Club. (ELARC) www.ei0el.com

The East Leinster Amateur Radio Club (ELARC) (Callsign: EI0EL) was established during the 2020 Covid 19 Lockdown in Ireland by a group of friends interested in all things radio. Their aims are to further the art of amateur radio, assist their community when possible and have some fun in the process.

We hope that you find this field manual useful, use it for training or to help in organising Field Days. Maybe just place it in your club library and distribute to your club members, you never know you might find it useful if your community needs your Amateur Radio skills to assist in a time of need. Following the procedures and forms set out in this manual will maintain a common standard in Emergency Communications across counties, regions and internationally, vital when you need to get the message through.

73 and keep experimenting.

Frank. EI8HIB.
Chairman ELARC
January 2022

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SECTION 1
INTRODUCTION TO EMERGENCY COMMUNICATIONS

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1.1 What is a Communication Emergency?

A communication emergency exists when a critical communication system failure prevents urgent and possible lifesaving messages getting to the intended recipient/audience in a timely and accurate manner and thus may reduce the public from risk.. As used in this guide, emergency telecommunications may also be referred to emergency communications or "EmComm"

A variety of circumstances can overload or damage critical day-to-day communication systems. It could be a storm that knocks down telephone lines or radio towers, a massive increase in the use of a communication system that causes it to become overloaded, or the failure of a key component in a system that has widespread consequences. Examples are easily found. Violent storms and earthquakes can knock out communication facilities. Critical facilities can also be damaged in "normal" circumstances: underground cables are dug up, fires occur in telephone equipment buildings, or a car crash knocks down a key telephone pole. Hospital telephone systems can fail. Even when no equipment fails, a large-scale emergency such as a chemical or nuclear accident can result in more message traffic than the system was designed to handle. Some emergency operations occur in areas without any existing communication systems, such as with forest fires.

Most Mobile phone networks are designed to handle only about 6-10% of their subscribers at any one time. This works well in normal situations and is economical for the company. But when a crisis happens, they quickly become overloaded as everyone (the other 90%) tries to talk at once.

1.2 What Makes A Good Volunteer?

Emergency telecommunication volunteers come from a wide variety of backgrounds and with a range of skills and experience. The common attributes that all effective volunteers share is a desire to help others without personal gain of any kind, the ability to work as a member of a team, and to take direction from others. EmComm volunteers need to be able to think and act quickly, under the stress and pressure of an emergency.

You cannot help others when you are worried about those you love. Your own family should always be your first priority. Adequate personal and family preparation will enable you to get your own situation under control more quickly so that you are in a position to be of service to others.

1.3 Where Do You Fit In?

Amateur Radio operators have been a communication resource in emergency situations ever since there has been radio. To the agencies they serve, amateurs are their immediately available communication experts. Amateurs have the equipment, the skills, and the frequencies necessary to create expedient and efficient emergency communication networks under poor conditions. They are licensed and pre-authorized for national and international communication. And all of this comes at no cost to the Served Agency, whether that is an arm of government or a disaster relief and mitigation organization such as the International Red Cross.

Amateur Radio Operators have the ability to rapidly enlarge their communication capacity to meet the growing needs in an emergency, something commercial and public safety systems cannot normally do. Many of the skills are the same ones that are used in everyday Amateur Radio activities. However, just having radios, frequencies, and basic radio skills is not enough. Certain EmComm skills are very different from those you use in your daily Amateur Radio life. Field Manual's like this one help fulfil that need, as do local training programs and regular emergency exercises. Without specific EmComm skills, you can easily become part of the problem rather than part of the solution.

As you might expect, technical and operating skills are critical. Just as important, though, is your ability to function as a team player within your own group/club, and the organization you are serving. Those critical skills will also be covered in this Field Manual.

1.4 The Missions

The job you are asked to do will vary with the specific agency you serve. If that agency is a branch of the Red Cross, you will likely be providing the communications needed to maintain a system of shelters and other relief efforts. If it is a national or local government emergency management agency, you could be handling interagency communications or serving as the eyes and ears of the emergency managers. When a hospital's telephone system fails, you might be handling the "mechanics" of communicating so that doctors and nurses can concentrate on patients. In a large forest fire or a search and rescue operation, you might be handling messages from firefighters or rescuers to local community's or assisting with logistical communications to ensure that food, supplies, personnel and materials arrive when and where they're needed. In any widespread disaster, Amateur Radio operators could be assisting all the agencies listed above, and more.

1.5 Communicating – Job #1

While you may be proud of your skill as a radio operator, and the impressive equipment and systems you have in place, it is important to remember that your job is "communicating." If a Served Agency asks you to deliver a long shelter supply list to headquarters, you should be prepared to use any means required – including the fax machine if it is still working. Our job is to get the message through, even if it means using smoke signals. Do not think about how to

use amateur radio to send the message – just think about the best and fastest way to send it. If that means using amateur radio, so much the better. If an agency asks you to use their radio system, do it. You're operating and technical skills are just as important as your amateur radio resources.

SECTION 2
PREPARATION

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2.1 Organisation

Groups may be involved in the routine training of their own members or supporting a Served Agency in an event or exercise which may be arranged some time in advance. Sometimes, this pre-planning period can be very short, especially where the event organisers only realise their need for support very late on in their planning sequence.

Groups/Clubs will need to carefully consider their work-load and the availability and willingness of members to support a particular event before committing themselves to accepting any duty.

It is all too easy for members' enthusiasm and desire to serve to lead the Group/Club into accepting duties which later prove difficult to cover, and may result in a less than professional standard of service.

Groups/Clubs should also always be aware of the work load of adjacent Groups within their county or region. For particularly onerous duties other Groups or clubs can often assist with additional human resources or equipment, subject to their own commitments.

The activities of other Groups/Clubs always need to be taken into account when deciding on the operational frequencies to be used for a duty.

2.2 Planning an Operation

Where activities are being undertaken as part of the routine training of the members, it is important that the operating procedures adopted by the Group are rehearsed at every opportunity. Members of the Group should also be adequately briefed as to the time of the activity, the rendezvous or assembly point, the equipment needed, frequencies to be used and the likely duration of the event.

The need for any protective clothing or food to be carried should be considered and advised to members. Clothing appropriate to the duty should be worn but as a minimum, they should look smart and professional. Members should always carry their identification cards with them whilst on duty.

Where the activity is part of a pre-planned event, then in addition to these routines, members will need to be prepared with details of their points of duty, arrangements for feeding, and accommodation arrangements where overnight duty is involved.

Particular attention must always be paid to the health and safety aspects of any operation, and members are asked to become familiar with the recommendations contained in the applicable Health and Safety guidelines. These may include the use of Personal Protective Equipment (PPE) which could include high visibility jackets or vests, helmets, safety glasses or safety footwear.

Where operations are undertaken on or near roads the use of HSA approved double striped reflective wear is recommended.

Controllers/Leaders should always have in mind the skills of individual members when planning their allocation to duty. Where physical demands are likely to be placed upon members of the team, their physical fitness and capabilities should always be taken into account. Controllers should consider the role of the younger members, and skills and experience of individual members in the Group/Club.

If members are expected to be supplying any equipment for general use such as talk-though units or masts and antenna this should be clearly indicated in the briefing.

2.3 Before an Operation

Before reporting for duty, members should prepare by allowing adequate time for assembling items for use, charging batteries (remembering that batteries may take some time to charge), putting together supplies, food and clothing etc. They should ensure that they can provide adequate equipment on the frequencies specified for their duty. Where battery powered equipment is used, the batteries carried should be adequate for the length of duty.

Where mobile equipment is to be installed in a Served Agency's vehicle, the proper arrangements must be made for connecting to antennas and vehicle power supply.

Members should ensure that they have access to the appropriate equipment for an operation, they should advise their family where they are going, when they expect to return, and what emergency arrangements there are for contact whilst they are away from home.

2.4 During the Operation

Members should arrive in plenty of time for their duty, allowing additional time for journeys in unfamiliar territory or inclement weather, and for locating duty points not previously assessed.

Contact should be made with other organisations or Served Agency's at the point of duty, paying particular attention to explaining your role and communications capability. Each duty presents an opportunity to spread the word about the communication volunteers' role, and of enhancing your Group/Club's reputation.

The procedures detailed in any briefing notes should be followed, particularly regarding checking into the net, and passing the messages or comms traffic which is required for your point of duty. Members must not leave their post without contacting the net controller.

In particular, members should always remember to observe normal standards of courtesy related to the use of frequencies, and to observe the requirements of their radio licence at all times, especially with regard to station identification at appropriate intervals. Control operators must keep a detailed log of the operation for any future enquiry.

In general, where Served Agencies are on duty, members should not be involved in generating comms traffic, but only passing them. In practice, members may find themselves in a situation which requires the generation of message content. If this is the case, careful thought should be given to the content of the message before transmitting, and the consequences of misleading or inaccurate content.

Where members are requested to use radios on commercial frequencies operated by other organisations, protocols and procedures relating to that organisation must be observed.

Any messages handled should be clear, precise and should be concisely written to minimise the use of air-time. The use of the message procedures detailed elsewhere in this Field Manual will help get the message through.

Members should be careful not to fall into the trap of long descriptive transmissions unless they are required to make them, and should always be aware that the transmission is almost certainly being monitored by others who will judge your group/club's relevance to the event and their contribution to the event by what they hear.

When operating in conjunction with medical services it is essential that members do not transmit details of an injury or treatment accompanied by data which would permit identification of the casualty by a casual listener. The only exception to this is if specifically instructed to do so by the Served Agency.

2.5 Closing a Station Down

Except in exceptional circumstances, such as an immediate threat to their safety, operators must not close down a station without first seeking permission to do so from the net controller. If members/operators are told by Served Agency personnel that they are no longer required, they must advise net control and await instructions to stand down or to re-deploy.

When a station is closed ensure that all equipment is properly dismantled and taken away upon departure, together with any rubbish. Proper arrangements should be made for the return of any loaned equipment.

2.6 Visiting Control

The control location should only be visited with permission of net control; remember that the personnel at that location are still working and need a quiet working environment to continue their duty.

On large operations, separate arrangements are usually made for rest and refreshment areas, so that members can unwind without disturbing others. Such provision will also be most useful for the essential debriefing which should follow every operation, however small and routine.

SECTION 3
RELATIONSHIP WITH SERVED AGENCIES

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3.1 What does my attitude have to do with Emergency Communications?

In a word, everything! In situations where a professional and helpful attitude is maintained, Served Agencies point with pride to Amateur Radio's efforts and accomplishments. The opposite situation is clearly illustrated in the words of one emergency management official who said, "Working with amateur radio operators is like herding cats—get them the heck out of here!" This man was clearly frustrated with the attitude of his volunteers.

Although our name says that we are "Amateurs," its real reference is to the fact that we are not paid for our efforts. It need not imply that our efforts or demeanour will be anything less than professional. "Professionalism" means getting the job done efficiently—with a minimum of fuss.

3.2 Who Works For Whom?

The relationship between the volunteer communicator and served agency will vary from situation to situation, but the fact is that you work for them. It doesn't matter whether you are part of a separate group of amateur radio EmComm operators, or part of the agency's regular volunteer force. You still work for them.

Your job is to meet the communication needs of the Served Agency. It is often said that volunteers don't have to take orders. This is true. However, when you volunteer your services to an organization, you implicitly agree to accept and comply with reasonable orders and requests from your "employer." If you do not feel comfortable doing this, do not volunteer.

There may be times that you find yourself unwilling or unable to comply with a Served Agency's demands. The reasons may be personal or related to safety or health, or it may be that you do not consider yourself qualified or capable of meeting a particular demand. On rare occasions, it may be that you are asked to do something not permitted by the amateur radio rules applicable to your country. Regardless of the reason, respectfully explain the situation, and work with the Served Agency or your fellow EmComm volunteers in your communication group to come up with an alternative solution. If the discussion with the Served Agency becomes difficult or uncomfortable, you can always politely pass the discussion up to your immediate EmComm superiors so that they can handle it instead.

SECTION 4
EMERGENCY TELECOMMUNICATION SKILLS

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4.1 Introduction

Our objective should always be to get the message to its intended recipient quickly and accurately, with the minimum of fuss. A number of factors can affect your ability to do this, including your own skill as an emergency communicator, the communication method used, the skills of the receiving party, the cooperation of others, and having adequate resources.

Life–and-death communications are not part of our daily experience. Most of what we say and do each day does not have the potential to severely impact the lives and property of hundreds or thousands of people. In an emergency, any given message can have huge and often unintended consequences. An unclear message, or one that is modified, delayed, misdelivered or never delivered at all can have disastrous results.

4.2 Listening

Listening is at least 50% of communication. Discipline yourself to focus on your job and "tune out" distractions. If your attention drifts at the wrong time, you could miss a critical message. Listening also means avoiding unnecessary transmissions. A wise person once said, "A man has two ears and one mouth. Therefore, he should listen twice as much as he talks." While you are asking, "When will the beds arrive?" for the fourth time that hour, someone else with a life and death emergency might be prevented from calling for help.

Sometimes the job of listening is complicated by noise. You might be operating from a noisy location, the signal might be weak or other stations may be causing interference. In each of these cases, it helps to have headphones to minimize local noise and help you concentrate on the radio signal.

4.3 Microphone Techniques

Speak in a **normal, clear, calm** voice. Raising your voice or shouting can result in over-modulation and distortion, and will not increase volume at the receiving end. Speak at a normal pace. Rushing your words can result in slurred and unintelligible speech.

4.4 Brevity & Clarity

Each communication should consist of only the information necessary to get the message across clearly and accurately. Irrelevant information can distract the recipient and lead to misinterpretation and confusion. If you are the message's author and can leave a word out without changing the meaning of a message, leave it out. If the description of an item will not add to the understanding of the subject of the message, leave it out.

Communicate one complete subject at a time. Mixing different subjects into one message can cause misunderstandings and confusion. If you are sending a list of additional food supplies needed, keep it separate from a message asking for more sandbags.

4.5 Plain Language

All messages and communications during an emergency should be in plain language. "Q" signals (except in CW communication or where required for international communications where there is a language barrier), "10" codes and similar jargon should be avoided. The one exception to this is the list of standard "pro-words" Appendix 7, (often called pro-signs) used in Amateur traffic nets, such as "clear", "say again all after" and so on.

Avoid words or phrases that carry strong emotions. Most emergency situations are emotionally charged already, and you do not need to add to the problem. For instance, instead of saying, "horrific damage and people torn to bits," you might say "significant physical damage and serious personal injuries."

4.6 Phonetics

Certain words in a message may not be immediately understood. To reduce requests to repeat words, use phonetics anytime a word has an unusual or difficult spelling, or may be easily misunderstood.

For the Phonetic Alphabet see Appendix 4 Phonetic Alphabet.

4.7 Pro-words

Pro-words, called "pro-signs" when sent in Morse or digital modes, are procedural terms with specific meanings. ("Pro" is short for "procedural.") They are used to save time and ensure that everyone understands precisely what is being said. See the Appendix 7 Pro-Words.

SECTION 5
EMERGENCY NET OPERATIONS

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5.1 Emergency Net

The purpose of any net is to provide a means for orderly communication within a group of stations. An "emergency" net is a group of stations who provide communication to one or more served agencies, or to the general public, in a communications emergency. An emergency net may be formal or informal, depending on the number of participants and volume of messages.

5.2 Net Formats -- Directed (formal) Nets

In a directed net, a "Net Control Station" (NCS) organizes and controls all activity. One station wishing to call or send a message to another in the net must first receive permission from the NCS. This is done so that messages with a higher priority will be handled first, and that all messages will be handled in an orderly fashion. Directed nets are the best format when there are a large number of member stations.

5.3 Net Formats -- Open (informal) Nets

In an open net, the NCS is optional. Stations may call each other directly. When an NCS is used at all, they usually exert minimal control over the net. The NCS may step in when the message volume increases for short periods, or to solve problems and keep the net operating smoothly. Open nets are most often used when there are only a few stations and little traffic.

5.4 Types of Emergency Nets

Emergency nets may have different purposes, and a given emergency may require one or more of each type of net. During a small operation, all functions may be combined into one net.

5.5 Traffic Nets

A traffic net handles formatted written messages between Served Agency locations or between other nets. In emergency operations, these nets may handle the majority of message originations and deliveries. Messages to or from outside the immediate area may be transferred to and handled by a different net specifically set up to traffic or messages outside the immediate area. Even if you expect to handle traffic primarily on VHF/UHF repeaters, understanding how these layers of nets operate will help you to optimize your use of the system. HF traffic

nets can provide you additional practice and expose a new emergency telecommunication volunteer to traffic handling that you might not encounter on VHF/UHF. During an emergency, nets handling local traffic and nets handling traffic outside the immediate area work together, so it's a good idea to understand emergency traffic from the net operator's perspective.

5.6 Tactical Nets

In general, the tactical net(s) handle the primary on-site emergency communication. Their mission may be handling communications for a Served Agency, weather monitoring and reporting, river level gauging, or a variety of other tasks that do not require a formal written message. Often a tactical net may be set up as a "sub net" to handle specific types of traffic during high volume emergency situations. In such cases an additional NCS may be assigned for the sub net.

5.7 Information Net

An information net is usually an open net used to collect or share information on a developing situation, without overly restricting the use of the frequency by others. Net members send updated local information as needed, and official bulletins from the Served Agency may be sent by the NCS (if the net has one). The NCS and many of the participants monitor the frequency, but a "roll call" is seldom taken and stations may not be expected to check in and out of the net. The operation of an information net also serves as notice to all stations that a more formal net may be activated at any moment if conditions warrant.

5.8 Health and Welfare (H&W) Nets

Where third party messaging for the general public is allowed, these nets usually handle messages between concerned friends, families and persons within and outside of the disaster area. Most H&W nets will be on HF bands, but local VHF or UHF "feeder" nets may be needed within a disaster area. Band conditions, operator license constraints and specific use needs will most always determine which mode may be the best choice for determining the mode of certain net operations.

5.9 Checking Into an Emergency Net

There are two situations where you will need to "check in" to a net:
1. When you first join the net, and
2. When you have messages, questions or information to send.

If you are part of the organization operating the net, simply follow the instructions for checking into directed and open nets as discussed below.

To become part of a **directed net,** listen for the NCS to ask for "check-ins" and listen to any specific instructions, such as "check-ins with emergency traffic only." At the appropriate time, give only your call sign. If you have a message to pass, you can add, "with traffic." If it is an emergency message, say "with emergency traffic." The same is true for stations with priority traffic. Wait for a response before offering more information. Checking into a directed net when the NCS has not asked for check-ins is usually considered a bad practice.
However, if a long period passes with no request, you might wait for a pause in the net's activity and briefly call the NCS like this: "Net control, EI0EL, with traffic."

To check in to an **open net** for the first time, briefly call the net control station as above. If there appears to be no NCS, call anyone on the net to find out if anyone is "in charge" and contact them. If you are already part of the net and have a message to send, simply wait for the frequency to be clear before calling another station.
If you are not part of the organization operating the net, do not just check in and offer to assist. Listen for a while. Be sure you have something specific to offer before checking in, (such as the ability to deliver a message close to your location when none of the regular net members can). If they really do seem to need help that you feel you can provide, you might check in briefly to ask if they have a "resource" net in operation, then switch to that frequency. If not, make a brief offer of assistance to the NCS.

5.10 Passing Messages

If you told the NCS you have traffic to send when you checked in, he will probably ask you to "list your traffic" with its destination and priority. After you send your list, the NCS will direct you to pass each message to the appropriate station in the net, either on the net frequency, or another frequency to avoid tying up the net. When moving to another frequency to pass the message, always check to see if the frequency is in use before beginning.
When you are asked by the NCS to send your message, the standard procedure is for the NCS to tell the receiving station to call the sending station.

5.11 "Breaking" the Net

If the net is in progress, and you have emergency traffic/messages to send, you may need to **"Break"** into the net. Procedures for doing this vary from net to net, but the most common method is to wait for a pause between transmissions and simply say, "Break Break, EI5ABC." The NCS will say, "Go ahead EI5ABC," and you respond, "EI5ABC with emergency traffic."

5.12 Checking Out of an Emergency Net

Always let the NCS know when you are leaving the net, even if it is only for a few minutes. If the NCS believes you are still in the net, they may become concerned about your unexplained absence. This could result in someone being unnecessarily dispatched to check on your well-being.

There are two special situations to be aware of: If someone in authority asks you, such as a law enforcement officer, to move your station, then move immediately and without argument. Notify the NCS of the situation at the first appropriate opportunity. If you are requested by someone in authority to turn off your radio, or to refrain from transmitting, do so immediately and without question. Do not notify Net Control until you have permission to transmit again, and can do so safely. There is usually a good reason for such a request. It may be an issue of security, or it may be a potential hazard, such as an explosive device that could be triggered by RF energy.

SECTION 6
BASIC MESSAGE HANDLING

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6.1 Introduction

Formal messages and informal messages are handled differently in various parts of the world. Operators should inquire of experienced local and regional EmComm volunteers or Co-Ordinators what the practice and procedures are for handling messages in their region or area. The following discussion is very general and is intended to simply introduce the subject of message handling.

6.2 Formal vs. Informal Messages

Both formal (written in a specific format) and informal (oral or written but not in a specific format) messages have their place in emergency communication. In general, informal messages are best used for non-critical and simple messages, or messages that require immediate action, they are delivered directly from the author to the recipient.

Formal messages are more appropriate when two or more people will handle them before reaching the recipient, or where the contents are critical or contain important details.

6.3 Informal Oral Messages

Some emergency messages are best sent informally in the interest of saving precious seconds. If you need an ambulance for a severely bleeding victim, you do not have time to compose and send a formal message. The resulting delay could cause the patient's death. Other messages do not require a formal written message because they have little value beyond the moment. Letting the net control station know where you are or when you will arrive need not be formal. The message is going directly to its recipient, is simple and clear, and has little detail. Many of the messages handled on a tactical net fit this description.

6.4 Formal Written Message Formats

Standardised written message formats are used so that everyone knows what to expect. This increases the speed and accuracy with which you can handle messages. Many volunteer EmComm organizations use a standard format used for passing messages on various nets. Regular practice with creating and sending messages in any standard format is recommended.

6.5 Components of a Standardized Message Format

The following components will be found in most types or versions of a standardized message:

The "**preamble**" sometimes referred to as "the header," consists of administrative data such as the message number, originating station, message precedence (importance) and date and time of origination. The combination of the message number and the originating station serves as a unique message identifier, which can be traced if necessary.

The "**address**" includes the name, address or post office box, town, county and Eircode/Post Code of the recipient. The address should also include the telephone number with area code since many long-distance Radiograms are ultimately delivered with a local phone call.

The "**text**" of the message should be brief and to the point, limited to 25 words or less when possible. The text should be written in lines of five words (ten if using a keyboard) to make it easier and faster to count them for the "check." Care should be taken to avoid word contractions, as the apostrophe is not used in CW. If a word is sent without the apostrophe, its meaning could be lost or changed. The contraction for "I will" (I'll) has a very different meaning when sent without the apostrophe! Contractions are also more difficult to understand when sent by phone, especially in poor conditions. Commas and other punctuation are also not used in formal messages.

The "**signature**" can be a single name, a name and call sign, a full name and a title, "Mom and Dad," and occasionally a return address and phone number – whatever is needed to ensure that the recipient can identify the sender and that a reply message can be sent if necessary.

6.6 Sending a Message with Voice

When the receiving station is ready to copy, read the message at a pace that will allow the receiving station to write it down. Once you are done, if the receiving station has missed any portion of the message they will say, "say again all after____," "say all before," or "say again all between____ and ____."

In some nets, the practice is to say "break" and then unkey between sections of the message so that a station can ask for missing words to be repeated before going on (these repeated words are also known as "fills"). In many nets the entire message is read first before any fills are requested, to save time. Again, refer to your local practice for handling messages for guidance.

All numbers in groups are spoken individually, as in "three two one five," not "thirty-two fifteen," or "three thousand two hundred and fifteen."

6.7 Time Savers

What NOT to say: When passing formal traffic, do not add unnecessary words. Since the parts of the header are always sent in the same order, there is no need to identify each of them. The only exception is the word "number" at the beginning of the header.

6.8 Message Handling Rules

Do not speculate on anything relating to an emergency! There may be hundreds of people listening to what you say (other Amateurs, and the media and general public using scanners) and any incorrect information could cause serious problems for the Served Agency or others. You do not want to be the source of any rumour. If your Served Agency requests an estimate, you can provide that information as long as you make it very clear that it is only an estimate when you send it. For example, saying "The estimated number of homes damaged is twelve" would be acceptable.

Pass messages exactly as written or spoken. Even more important than speed, your job as a communicator is to deliver each message as accurately as possible. Therefore, you must not change any message as you handle it. If it is longer than you would like, you must send it anyway. Apparently misspelled words or confusing text must be sent exactly as received. Only the original author may make changes.

Should you return a message to the author before first sending it if it seems incorrect or confusing? This is a judgment call. If the apparent error will affect the meaning of the message and the author is easily contacted, it is probably a good idea. Whenever possible, it is a good practice to read each message carefully in the presence of the author before accepting it. This way, potential errors or misunderstandings can be corrected before the message is sent.

Be aware that during any incident, operators should not pass any information to the media or members of the public. The information you have about the incident is confidential. Any information released to the press / media / public will be channelled through the site leadership team. Do not upload or share any information related to the incident to Social Media. This will seriously discredit you and your group/club.

Pro Words are contained in Appendix 7.

SECTION 7
NET MESSAGES

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

7.1 Callsigns / Idents

The use of TACTICAL IDENTS for the duration of ALL exercises or actual emergencies is STRONGLY RECOMMENDED. A tactical ident is a callsign, which identifies the User Service unit (or perhaps its location) for which an AREN station is providing communication at the time, rather than the identity of the AREN operator A tactical ident will not change if there is a change of operator. Some typical AREN tactical idents collocated with User Services in a major exercise might be, for example:

User Service	AREN Station with User Service Control Point	AREN Station with User Service Outstations
Garda	Golf Control	Golf One; Golf Two
Fire	Foxtrot Control	Foxtrot One; Foxtrot Two
National Ambulance	November Alpha Control	November Alpha One; November Alpha Two
Coast Guard	Charlie Control	Charlie One; Charlie Two
St Johns Ambulance	Juliet Alpha Control	Juliet Alpha One; Juliet Alpha Two
Red Cross	Romeo Alpha Control	Romeo Alpha One; Romeo Alpha Two
Mountain Rescue	Mike Romeo Control	Mike Romeo One Mike Romeo Two
RNLI Lifeboat	Lima Control	Lima One Lima Two
Military / Defence Forces	Delta Control	Delta One Delta Two

Military Ambulance	Delta Alpha Control	Delta Alpha One Delta Alpha Two

There are no firm rules about the selection of tactical idents but the Senior Controller of a major exercise or actual emergency should ensure they logically identify the User Service and its deployed units. Careful consideration should be given whether or not to duplicate a User Service's own callsign or ident, and the benefit or confusion that might result. For a simple one-net exercise, for example, a local cycle ride for which AREN might cover several checkpoints on behalf of a User Service, idents might be:

Control; Checkpoint One; Checkpoint Two; etc

Licence regulations stipulate that personal callsigns should be given at short intervals during an exchange of transmissions, including on a net. The Net Controller could cover this in several ways, one being to request a Radio Check by all stations at appropriate intervals, replies to include both Tactical ident and Personal callsign; another method could be for each operator to include their personal callsign once at the beginning, or end, of an exchange of transmissions if they have not given it during the previous 15 minutes. **Net Controllers must use their discretion to ensure that rigid adherence to this regulation is not allowed to jeopardise operations**.

It is ESSENTIAL that net Controllers keep an accurate log of the personal callsign of each operator and their tactical ident, and that the times of operator change-over are logged.
At appropriate intervals, net Controllers should broadcast their own (or ARENS's) callsign, state their location, briefly explain the purpose of the AREN exercise, and politely ask for the frequency to be kept clear for the duration

7.2 Establishing The Net

The net Controller, or Senior Controller for a major event, will hold a briefing meeting during which AREN's objectives will be explained. Each AREN operator will be allocated a location and tactical ident. Net frequencies will be assigned.

After operators have been deployed to their locations, each will report his arrival and state of readiness to the net Controller using his personal callsign followed by his tactical ident. The net Controller will make the appropriate log entry. Radio Checks will be made and the net is ready for operation when all operators have established communication.

It might be important that outstations should be able to communicate directly with each other; if so, the net Controller will initiate the necessary Radio Checks at this stage.

It is essential for all stations to keep a listening watch so that they are aware of other activity on the net which may affect them as well as being able to provide a relay service if necessary.

7.3 Message Precedence

The great majority of messages will have ROUTINE precedence. ROUTINE messages do not need to have the precedence stated.

ROUTINE	A message which has only the normal degree of urgency.
PRIORITY	A message which has more than the normal degree of urgency.
EMERGENCY	A message which is extremely urgent – e.g. LIFE IS AT RISK.

7.4 Method of use

For PRIORITY and EMERGENCY messages, the precedence should be stated TWICE at the start of the transmission offering the message.

If appropriate, Net Controllers should consider imposing a state or radio silence for all lower priority messages to avoid interruptions.

7.5 Formal Message Procedures

AREN's aim is to pass messages with 100% accuracy and in a timely manner. For some scenarios, User Services may require messages to be handled in a written format similar to a telegram. To ensure these messages are passed accurately and with sufficient information to allow them to be routed to their destination some discipline is required in formatting the message for transmission.

Communication is most efficient if a message reaches its destination written down exactly as it left the originator. An originator should write down his message (telegram style) with an adequate address and normally an adequate signature. User Services and Local Authorities may have their own message forms for this purpose, but where such forms are not available the AREN standard form should be used.

7.6 Preamble

The station that originates the AREN message composes the preamble. The preamble contains the following information in the specified order.

NUMBER	The number is a serial number assigned to the message by the originating station. It may start at '1' for each event, month or year depending on the volume of messages generated.
PRECEDENCE	The precedence may be: IMMEDIATE OR EMERGENCY PRIORITY ROUTINE
STATION OF ORIGIN	This is the callsign or tactical ident of the station which first transmitted the radio message.
CHECK	The number of words in the main text i.e. Excluding the addressee and the signature. A word is simply a group of characters with a space either side as follows; Main Street - Two Words 12B - One Word HQ - One Word J R Smith - Three Words 087 111 2222 - Three Words "X" or "X-ray" may be used internationally in place of a full stop and is counted in the check as is the word 'STOP' so that this piece of punctuation is not lost in transmission. If absolutely necessary other punctuation should be spoken in full (e.g. 'Comma') and included in the count.
PLACE OF ORIGIN	Place of origin is the place (city, town, village,) from where the originator sends his message.
FILING TIME	Time in UTC when the message was originated.
FILING DATE	Date when the message was originated in the format MMM-DD (JAN-15)

7.7 Example of a formal message:

Golf Control from Juliet Alpha Control, Priority, Priority, over.
Juliet Alpha Control from Golf Control, EI2ABC, pass your message, over.
Golf Control from Juliet Alpha Control, MESSAGE BEGINS
*Number two six, Priority, EI3AAA, Community Center, SomeTown, 2215, Jan 15 **
*TO Casualty Bureau **
Please send us information about following persons stop
*smith jane harbour road 4 stop**
*doe james and family main street 16 stop **
FROM D Jones Red Cross
MESSAGE ENDS
from Juliet Alpha Control, over.
Juliet Alpha Control from Golf Control ROGER, out.

Consider checking that the receiving station has received all "so far". Not all operators can write quickly.

Pauses, or briefly stopping to listen, in order to allow the receiving operator time to write is a much better technique than sending words twice during long or complex messages. Very little is added to the message transmission time and it does permit obtaining corrections in mid-message rather than waiting until the end. A log should be kept of all formal messages originated or relayed and should show the message number, Station of origin, the Station the message was sent from or to along with the date and time. This will allow tracing of messages later if required

7.8 Abbreviated Operating Procedures

The efficiency of a net can be measured by the accuracy and speed with which messages are passed and understood. As time progresses and the operators become more experienced it will be found that some procedural words and phrases can be omitted, thus increasing speed without losing accuracy or understanding. This ABBREVIATED PROCEDURE may involve the selective omission of CALLSIGNS/IDENTS, "OVER", "OUT", "ROGER", "WILCO". For example, in good conditions cessation of transmission can imply an intentional substitute for "OVER" or "OUT"; or the READ BACK of a received message can imply "ROGER" or "WILCO" and has the added advantage of confirming accuracy of receipt.

N.B. The ABBREVIATED PROCEDURE should be used ONLY by experienced operators under virtually perfect communication conditions. If conditions are difficult, either due to weak radio signals or acoustically noisy conditions locally, or some operators are not yet fully experienced, the Net Controller should adopt the FULL PROCEDURE.

FULL PROCEDURE	ABBREVIATED PROCEDURE
"November Alpha 2 from Alpha Control, message,over." *"November Alpha Control from Alpha 2, EI3ABC pass your message, over."* *"November Alpha 2 from Alpha Control, request your ambulance moves now to First Aid Post 4, over."* *"November Alpha Control from Alpha 2, WILCO, out."*	*"November Alpha 2 from Control."* *"November Alpha 2"* *"November Alpha 2, request your ambulance moves now to First Aid Post 4."* "*First Aid Post 4.November Alpha 2."*
"All stations from November Alpha Control, Radio Check with Callsigns. To November Alpha 1, over" *"November Alpha Control from November Alpha 1. Good. EI3ABC out"* *"November Alpha Control to November Alpha 2, over"* *"November Alpha Control from Alpha 2. Readable with difficulty. EI2DEF out"*	*"All November Alpha stations from November Alpha Control, Radio Check with Callsigns. To November Alpha 1, over"* *November Alpha 1. Good. EI3ABC out".* *"To November Alpha 2, over".* *"Alpha 2. Readable with difficulty.EI2DEF out*
"November Alpha Control from Alpha 3, request DIRECT CONTACT with Alpha 4, over". *"November Alpha 3 from November Alpha Control, DIRECT CONTACT with November Alpha 4 is APPROVED,out".* *"November Alpha 4 from Alpha 3, message, over*". *"November Alpha 3 from November Alpha 4, pass your message, over".* *"November Alpha 4 from Alpha 3, how many paramedics at your site? Over".* *"November Alpha 3 from November Alpha 4, seven paramedics, I say again, seven, over".* *"November Alpha 4 from Alpha 3, ROGER, out".* *"November Alpha Control OUT"*	*"Control from November Alpha 3, request DIRECT CONTACT with November Alpha 4, over".* *"November Alpha 3, APPROVED"* **(If November Alpha 4 heard both transmissions):** *"November Alpha 3, SEND. November Alpha 4"* *"How many paramedics at your site? November Alpha 3".* *"Seven, I say again, seven. November Alpha 4".* *"ROGER. November Alpha 3".* *"Control OUT".*
"Juliet Alpha 2 from Juliet Alpha Control, report your location, over" *"PRIORITY PRIORITY. Juliet Alpha Control from Juliet Alpha 5, over*" *"Juliet Alpha 2 WAIT. BREAK. Juliet Alpha 5 from Juliet Alpha Control send your message, over"*	*Juliet Alpha 2 from Control, report location."* *"PRIORITY PRIORITY. Control from Juliet Alpha 5"* *"Juliet Alpha 2 WAIT. BREAK. Juliet Alpha 5 send"* *"Ambulance required at First Aid Post 3*

"Juliet Alpha Control from Juliet Alpha 5, ambulance required at First Aid Post 3, over" *"Juliet Alpha 5, ROGER. WAIT..... Juliet Alpha 5, Ambulance on way, over"* *"Juliet Alpha 5 to Juliet Alpha Control, ROGER, out"* (Control then starts again with Juliet Alpha 2)	*Juliet Alpha 5* *"Juliet Alpha 5, ROGER. WAIT..... Juliet Alpha 5, Ambulance on way"* *"ROGER. Juliet Alpha 5"* (Control then starts again with Juliet Alpha 2)

7.9 Conclusion

Some Group Controllers and Net Controllers will, with justification, want local variations of the recommended Procedure and its examples above. There can be no objection to minor variations but it is STRONGLY ADVISED there should be NO DEVIATION from the PHONETIC ALPHABET; also, ALL THE RECOMMENDED LIST of PROWORDS and PHRASES SHOULD BE USED, but others may be **added** to suit local wishes provided their meaning would be obvious to other Groups.

If you do want to make variations take care not to lose sight of the principal aims of a Standard AREN Procedures, which are to enable different Groups, perhaps from different regions, to work together at short notice without further training, in a disaster scenario, and exchange messages quickly with complete accuracy and lack of ambiguity.

Use BLOCK CAPITALS for addresses. If your writing is anything less than good, it is best to use block capitals throughout.

Write full stops as STOP or X to avoid their getting lost in the text.

Figure 0, spoken zero is written as Ø. Write fractions, mathematical and other signs in words e.g. 2.5 as two point five, ⅞ as seven eights. Or for time, always use four figures on the 24 hours system e.g. 0830 hrs; 1530hrs.

7.10 Ident Station Log

DATE	FROM TIME	IDENT	CALLSIGN
JAN-15	1315hrs	November Alpha Control	EI3ABC
JAN-15	1315hrs	November Alpha One	EI2DEF
JAN-15	1430hrs	November Alpha Control	EI4QWE

SECTION 8
SETTING UP, OPERATIONS AND SHUTTING DOWN

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

8.1 Responding After the Activation

If you already have your assignment, confirm that it is being activated by monitoring and checking into the local activation net. If you do not have a standing assignment, you should check into an activation net and make yourself available for an assignment. It might be a "resource" logistics net if one is active, or the general "tactical" command activation net. (Since local procedures vary widely, you should get to know your group's specific plans and procedures well in advance.)

After you have gathered your equipment and supplies, filled the petrol tank in the car and are ready to respond, you may need to do several things, depending on local plans and the nature of the emergency. You may be asked to check in to a specific net to let them know you are en route, and then periodically to report your progress, particularly if travel is hazardous. In some cases, you may be asked to proceed to a "staging" or "volunteer intake" area to wait for an assignment. This could take some time, especially if the situation is very confused. Often, the development of the response to the emergency is unclear and it will take some time to develop a cohesive and uniform response plan for that incident. You should expect the situation to be fluid as each incident is unique and to respond accordingly. Be prepared to wait patiently for a determination to be made and an assignment to be given. In other cases, such as the immediate aftermath of a snow-storm or flood, you may be forced to make expedient arrangements as you go. Travel may be difficult or impossible, so you may need to do what you can, where you can. Nets may be established on an ad-hoc basis using whatever means are available.

8.2 Who Is In Charge?

At each station, the EmComm manager should appoint one member of the EmComm group to take a leadership role as "station manager," with full responsibility for all operations at that site. This person serves as a point of contact, information and decisions for the team with the incident commander and with other groups aiding in the response. This helps avoid confusion and arguments.

When you accept a position as an EmComm volunteer, you do so knowing that you will often need to follow the directions of another person. Cooperation and good teamwork are key elements that result in an efficient and effective EmComm operation. As the situation arises,

you may have to step into a role of a leader to keep the operation moving forward. Expect to work with others. Expect that there are times you are the follower and at other times, you may be the leader.

8.3 Arriving at the Site

If you are assigned to a facility operated by a Served Agency, such as a shelter, introduce yourself to the person in charge as an "emergency communicator" assigned to serve that location. They will be busy, so get right to the point:

- Identify yourself as an EmComm Operator and explain that you have been assigned to set up a communication station for that location, and by whom.
- Inform them that you would like to set up your equipment and get on the air.
- Ask if another Operator has already arrived.
- Ask if they have a preference for the station's location and explain your needs.
- If you are the first Operator to arrive, be prepared to suggest an appropriate location that can serve as both an operating and message desk, has feed line access to a suitable antenna location, access to power and telephone, and is just isolated enough from the command centre to avoid disturbing each other.
- Ask if there are any hazards or considerations in the immediate area that you should be aware of, or cause you to relocate later.
- If no building or other suitable shelter is available, you may need to set up your own tent, or work from your car.
- Choose a location that provides shelter from wind, precipitation and other hazards, and is close enough to the Served Agency's operations to be convenient but not in each other's way.

8.3 Being a Good Guest

In many cases, you will be occupying a space that is normally used by someone else for another purpose. Respect and protect their belongings and equipment in every way possible. For instance, if you are in a school and will be using a teacher's desk, find a way to remove all the items from its surface to a safe place for the duration of operations.

A cardboard box, sealed and placed under the desk usually works well. Do not use their office supplies or equipment, or enter desk drawers or other storage areas without specific permission from a representative of the building's owners. Some served agencies will seal all filing cabinets, drawers and doors to certain rooms with tamper-evident tape upon arrival to protect the host's property and records.

When installing antennas, equipment and cables, take care not to damage anything. For instance, avoid using "duct" tape to fasten cables to walls or ceilings, since its removal will usually damage the surface. If damage is caused for any reason, make note of it in your log and report it to the appropriate person as soon as possible.

8.4 Initial Set Up and Information Gathering

In most cases, your first priority will be to set up a basic station to establish contact with the net. Pack your radio equipment in your vehicle last so that you can get to it first. If you arrive as a team of two or more, station setup can begin while others carry in the remaining equipment.

Set up and test the antenna for proper SWR, and then check into the net. Test to find the lowest power setting that facilitates reliable communication, especially if you are operating with battery or generator power, to conserve power for extended operations. High power should also be avoided whenever lower power will work just as well to prevent interference with other radio systems, telephones and electronic equipment.

Once your basic station is on the air, you can begin to work on other needs. Some of these things may already be known by the EmComm managers if they have a working relationship with this particular Served Agency.

- Check for working telephones, faxes, Internet and other means of communications
- Learn about the Served Agency's operations and immediate needs at that site
- Install additional stations or support equipment
- Make a list of stations within simplex range
- Identify possible alternative message paths
- Find restroom facilities
- Determine water and food sources, eating arrangements
- Review overall conditions at the site, and how they will affect your operations
- Find a place to get some occasional rest
- As soon as possible, ask a member of the Served Agency's staff to spend a few moments to discuss the agency's operational needs -What are the most critical needs?
- Whom do they need to communicate with, and what sort of information will need to be transmitted?
- Will most messages be short and tactical in nature, or consist of long lists?
- Will any messages be too confidential for radio?
- Are phones and fax still working?
- What will traffic needs be at different times of day?
- How long is the site anticipated to be open?
- Will there be periodic changes in key agency staff?
- You may also need to provide agency staff with some basic information on how to create a message, show them how to use message forms, and instruct them on basic procedures to follow.
- Be sure to let them know that their communications will not be private and "secure" if sent by Amateur Radio and discuss possible alternatives.

8.5 Ending Operations

EmComm operations may end all at once, or be phased out over time.
Several factors may affect which operations end, and when:

- Damaged communication systems are restored and returned to service
- Traffic loads are reduced and can be handled with normal systems
- Shelters and other locations are closed

How you are notified to end operations will depend on the policies of your EmComm group and the Served Agency, and the specific situation. For instance, even though a shelter manager has been told to shut down by the Served Agency, your orders may normally come from a different person who may not be immediately aware of the shelter's closing. In this case, you might need to check with the appropriate EmComm manager before closing your station. Once the decision to close your station has been received and verified, be sure that the person in charge of the location is aware that you are doing so, and if necessary, why.

File and package all messages, logs and other paperwork for travel. Return any borrowed equipment or materials. Carefully remove all antennas and equipment, taking care to package and store it correctly and safely. Avoid the temptation to toss everything into a box with the intention to "sort it out later," unless you are under pressure to leave in a hurry. In the event you are re-deployed quickly, this will save time in the end.

8.6 Departure

Several actions may be necessary when leaving. First, be sure to leave the space you used in as good a condition as possible. Clean up any messes, remove trash and put any furniture or equipment back where it was when you arrived. If you sealed desktop items in a box for safekeeping, simply place the box on the cleaned desk. Do not unpack the items and attempt to replace them on the desk. This will provide proof to the desk's owner that you took steps to protect their belongings, and helps keep them secure until their owner takes possession again. Do not remove tamper evident tape or similar seals placed by others unless told to do so by the appropriate person, or in accordance with the agency's policy.

Thank all those who worked with you. Even a simple "thanks" goes a long way, compared to hearing not a single word.

8.7 The Debriefing

After each operation, your EmComm group, and perhaps even the Served Agency, will probably want to hold a meeting to review the effectiveness of the operation. There may be issues that occurred during operations that you will want to discuss at this meeting. Events may have occurred within the Served Agency that involved communications you handled. If you try to rely entirely on your memory or logbooks, you will probably forget key details or even forget certain events altogether.

To prevent this from happening, keep a separate "de-briefing" diary, specifically for use during this meeting. Some entries might only refer briefly to specific times and dates in the station operating log, or they may contain details of an issue that are not appropriate in the station log. If you will be required to turn over your station logs immediately at the end of operations, your de-briefing diary will need to contain full details of all events and issues for discussion.

SECTION 9
SAFETY AND SURVIVAL

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

9.1 Introduction

Disaster relief volunteers sometimes become so involved with helping others that they forget to take care of their own families and themselves. The needs of disaster victims seem so large when compared with their own that volunteers can feel guilty taking even a moment for their own basic personal needs. However, if you are to continue to assist others, you need to keep yourself in good condition. If you do not, you risk becoming part of the problem. If your family is not safe and all their needs are not taken care of, worrying about them may prevent you from concentrating on your job.

9.2 Home and Family First

Before leaving on an assignment, be sure you have made all necessary arrangements for the security, safety and general wellbeing of your home and family. Family members, and perhaps friends or neighbours, should know where you are going, when you plan to return, and a way to get a message to you in an emergency. If you live in the disaster area or in the potential path of a storm, consider moving your family to a safe location before beginning your volunteer duties. Take whatever steps you can to protect your own property from damage or looting, and let neighbour or even local police know where you are going, when you plan to return, and how to reach you or your family members in an emergency.

In addition to your emergency telecommunication deployment checklists, you might want to create a home and family checklist. It should cover all their needs while you are gone. Here are some ideas to get you started:

9.3 House Checklist

- Board up windows if you are in a storm's path
- Put lawn furniture and loose objects indoors if high winds are likely
- Move valuables to upper levels if flooding is possible
- Heating fuel tanks should be filled
- Drain pipes if below-freezing temperatures and power loss are possible
- Shut off power and gas if practical and if structural damage is possible
- If you live in earthquake country, have an automatic shutoff valve on the gas line

9.4 Family Checklist

- Designate a safe place to stay if needed, preferably with friends or relatives
- Reliable transportation, with fuel tank filled
- Adequate cash money for regular needs and emergencies (not ATM or credit cards)
- House, auto, life and health insurance information to take along if evacuated
- Access to important legal documents such as wills, property deeds, etc.
- Emergency food and water supply. AM/FM radio and extra batteries
- Flashlight and extra batteries, bulbs
- Generator, fuel and safe operating knowledge
- Adequate supply of prescription medications on hand
- List of emergency phone numbers
- Pet supplies and arrangements (shelters will not take pets)
- List of people to call for assistance
- Maps and emergency escape routes
- A way to contact each other
- A plan for reuniting later.

9.5 Should You Leave at All?

There are times when your family may need you as much or more than your EmComm group. Obviously, this is a decision that only you and your family can make. If a family member is ill, your spouse is unsure of their ability to cope without you, if evacuation will be difficult, or any similar concern arises, staying with them may be a better choice. **If there is ever any doubt, your decision must be to stay with your family.** This is also something you should discuss, and come to an agreement with your spouse about well before any disaster, in order to avoid any last-minute problems. You can still lend assistance by assisting with net control functions even while staying with your family.

9.6 You First. The Mission Second

Once you are working with your EmComm group, you will need to continue to take care of yourself. If you become over-tired, ill or weak, you cannot do your job properly. If you do not take care of personal cleanliness, you could become unpleasant to be around. Whenever possible, each station should have at least two operators on duty so that one can take a break for sleep, food and personal hygiene. If that is not possible, work out a schedule with the emergency telecommunication managers or your NCS to take periodic off-duty breaks.

9.7 Food

Most people need at least 2000 calories a day to function well. In a stressful situation, or one with a great deal of physical activity you may need even more. Experienced emergency telecommunication managers and Served Agency personnel will usually be aware of this issue and take steps to see that their volunteer's needs are met. If you are at a regular shelter, at least some of your food needs may be taken care of. In other situations, you may be on your own, at least for a while. High calorie and high protein snacks will help keep you going, but you will also need food that is more substantial. You may need to bring along some freeze-dried

camping food, a small pot, and a camp stove with fuel, or some self-heating military style "Meal, Ready to Eat" (MRE) packages.

9.8 Water

Safe water supplies can be difficult to find during and after many disasters. You will probably use 13-22 litres of water each day just for drinking, cooking and sanitation. In extremely hot or cold conditions, or with increased physical activity, your needs will increase significantly. Most disaster preparedness checklists suggest at least one gallon per person, per day.

Many camping supply stores offer a range of water filters and purification tablets that can help make local water supplies safer. However, they all have limitations you should be aware of. Filters may or may not remove all potentially harmful organisms or discoloration, depending on the type. Those with smaller filter pores (.3 microns is a very tight filter) will remove more foreign matter, but will also clog more quickly. Iodine- saturated filters will kill or remove most harmful germs and bacteria, but are more expensive and impart a faint taste of iodine to the water. Most filters will remove Giardia cysts. All water filters require care in their use to avoid cross- contamination of purified water with dirty water.

Purification tablets, such as Halazone, have a limited shelf life that varies with the type, and give the water an unpleasant taste. The tablets will do nothing for particulate (dirt) or discoloration in the water. Be sure to read and understand the information that comes with any water purification device or tablet before purchasing or using it.

You may be able to use unscented household chlorine bleach. After filtering out any particulates by pouring the water through several layers of densely woven cloth, put 1/8 teaspoon of bleach in a gallon of water, mix well, and allow it to sit for thirty minutes. If it still smells slightly of bleach, you can still use it.

If you have no other means, boiling for at least five minutes will kill any bacteria and other organisms, but will not remove any particulate matter or discoloration. Boiling will leave water with a "flat" taste that can be improved by pouring it back and forth between two containers several times to reintroduce some oxygen.

9.9 Sleep

Try to get at least six continuous hours of sleep in every twenty-four-hour period, or four continuous hours and several shorter naps. Bring fresh soft foam earplugs and a black eye mask to ensure that light and noise around you are not a problem. An appropriate sleeping bag, closed-cell foam pad or air mattress, and your own pillow will help give you the best chance of getting adequate rest. If caffeine keeps you awake, try to stop drinking coffee, tea, or other beverages containing caffeine at least four hours before going to bed. Allowing yourself to become over-tired can also make falling asleep difficult.

9.10 Personal Hygiene

If you pack only a few personal items, be sure they include toothpaste and toothbrush, a comb, and deodorant. If possible, bring a bar of soap or waterless hand cleaner, a small towel and washcloth, and a few extra shirts. Waterless shampoo is available from many camping stores.

After two or three days without bathing, you can become rather unpleasant to be around—think of others and make an attempt to stay as clean and well-groomed as you can under the circumstances.

9.11 Safety in an Unsafe Situation

Many disaster assignments are in unsafe places. Natural disasters can bring flying or falling debris, high or fast-moving water, fire, explosions, building collapse, polluted water, disease, toxic chemicals, and a variety of other dangers. While you may focus on the job assigned you, never lose "situational awareness." You should always be aware of your surroundings and the dangers they hold. Never place yourself in a position where you might be trapped, injured or killed. Try to anticipate what might happen and plan ahead. Always have an escape plan ready in the event that conditions suddenly become dangerous. Do not allow yourself to become "cornered" always have more than one escape route from buildings and hazardous areas.

Wear appropriate clothing. Depending on the weather, your gear might include a hard hat, rain gear, warm non-cotton layers, work gloves and waterproof boots. In sunny climates, include a shade hat, long sleeved shirt, long pants and sunscreen. Always bring several pairs of non-cotton socks and change them often to keep your feet clean and dry.

Create seasonal clothing lists suitable for your climate and the types of disasters you might encounter. As a volunteer communicator, you will not generally be expected to enter environments that require specialized protective clothing or equipment. Do not worry about purchasing these items unless required by your Served Agency.

Avoid potentially dangerous areas. Industrial buildings or facilities may contain toxic chemicals, which can be released in a disaster. Dams can break, bridges can wash out and buildings can collapse. Areas can become inaccessible due to flooding, landslides, collapsed structures, advancing fires or storm surges. If you can avoid being in harm's way, you can also prevent yourself from becoming part of the problem rather than part of the solution.

Be prepared to help others find or rescue you should you become trapped or isolated. Carry a police or signal whistle and a chemical light stick or small flashlight in your pocket. Let others know where you are going if you must travel anywhere, even within a "safe" building. Try not to travel alone in dangerous conditions, bring a "buddy."

9.12 Shelter

In most cases, you will not need your own shelter for operating or sleeping. You may be able to stay or work in the command centre, evacuation shelter or even your own vehicle. However, in some cases a tent, camp trailer, motor home or other suitable shelter may be necessary. Your choice will depend on your needs and resources.

Tents should be rated for high winds, and should be designed to be waterproof in heavy weather. Most inexpensive family camping tents will not survive difficult conditions. Dome tents will shed wind well, but look for published "wind survival" ratings since not all dome designs are equal. Your tent should have a full-coverage rain fly rather than a single waterproof fabric. The tent's bottom should be waterproof, extending up the sidewalls at least six inches

in a “bath-tub” design, but bring an extra sheet of plastic to line the inside just in case. (Placing a plastic ground cloth under a tent will allow rain to quickly run under and through a leaky tent floor.) Bring extra nylon cord and long ground stakes to help secure the tent in windy conditions. If you are not an experienced foul weather camper, consider consulting a reputable local outfitter or camping club for advice on selecting and using a tent.

9.13 Medical Considerations

If you have a medical condition that could potentially interfere with your ability to do your job, it is a good idea to discuss this with your physician ahead of time. For instance, if you are a diabetic, you will need to avoid going for long periods without proper food or medication, and stress may affect your blood sugar level. Persons with heart problems may need to avoid stressful situations. Even if your doctor says you can participate safely, be sure you have an adequate supply of appropriate medications on hand, and a copy of any prescriptions. Let your emergency telecommunication manager and any work partners know of your condition so that they can take appropriate actions if something goes wrong. Wear any medical ID jewellery you have.

Always keep a copy of any special medical information and emergency phone numbers in your wallet. We know you want to help, but your emergency telecommunication manager needs to know and then can make an appropriate assignment.

9.14 Protect Your Eyes and Sight

If you wear eyeglasses or contact lenses, bring at least one spare pair. If you use disposable contact lenses, bring more than enough changes to avoid running out. Some contact lens wearers may want to switch to glasses to avoid having to deal with lens removal and cleaning under field conditions. If you have any doubts, consult your eye doctor ahead of time. Bringing a copy of your lens prescription along may also be a good idea, especially if you are likely to be some distance from home for a while.

Sunglasses may be a necessity in some situations and should always be carried in sunny climates. Working without them in bright sun can cause fatigue, and possibly eye damage. If you are in an area with large expanses of snow or white sand, prolonged periods of exposure can cause the retina to be burned, a very painful condition commonly known as “snow blindness.” Since no painkiller will help with retinal burns, it is best to use good quality UV blocking sunglasses at all times, and avoid prolonged exposure. If you do not normally wear eyeglasses, consider a pair of industrial safety glasses or goggles to protect your eyes from smoke and ash, wind-blown water, dust and debris. Keep all spare eyeglasses or safety glasses/goggles in a felt-lined hard-shell storage case to prevent scratching and breakage.

SECTION 10
PUBLIC RELATIONS

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

10.1 Public Relations

Most AREN operations will attract many listeners, some of whom will be anxious to criticise and to deride our efforts to serve. Some amateurs' seeing Groups on duty at public events will also look critically at all aspects of our operations. Members should always be aware of this and should present a professional appearance and attitude to their duty at all times.

Dress should always be seen to be smart, and where a Group has standardised upon a particular style all members should observe this wherever possible.

Equipment must be properly installed and set up.

Please ensure that the installations in your vehicle are not excessive, as nothing looks worse to the average amateur than a car festooned with stickers and antennas

Ensure that your on-air procedures are slick, avoiding unnecessary chatter, and take care to observe the requirements of the amateur licence.

Do not drink alcohol whilst on duty.

Answer any questions from the public about AREN in a very positive way.

10.2 Approaches from Potential New Members

Any approaches by potential members should be thoughtfully dealt with. Tell them about AREN's aims and activities, make a note of their name and contact details and pass these on to your Controller or Group Registrations Officer. Tell them who your Group Controller is, and their contact details. Advise them of the ARENS’s website.

10.3 Contact with the Media

Members should never communicate with the media about AREN's activities no matter how great the temptation. At non-emergency exercises or events, direct any media enquiries to your Group or County/Area Controller.

When involved in live incidents it is important that all media enquiries are ALWAYS directed to the Press Officer of the lead User Service involved. (This will usually be the Gardai).

10.4 Exercises

If you are involved with any organisations which you feel might benefit from AREN's assistance, pass the details on to your Group Controller.

If you are involved with a duty for any other Group, please let your Controller know as soon as you can. Please also let them know if you are leaving your Group's area for any length of time.

APPENDIX 1: ELARC / IARU MESSAGE FORM

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

ELARC		**RADIO MESSAGE** (For Radio Operator Use Only)			**IARU**	
NUMBER	PRECEDENCE ☐ Routine ☐ Priority ☐ Emergency	STATION OF ORIGIN	PLACE OF ORIGIN	WORD COUNT (CHECK)	FILING TIME	FILING DATE
To: (Block Caps)			From: (Block Caps)			
RECEIVED FROM:	DATE:	TIME:	SENT TO:		DATE:	TIME:

APPENDIX 2: EMERGENCY FREQUENCIES

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

2.1 "WILDERNESS PROTOCOL" TIMES.

Listen for traffic for the first 5 minutes of the hour. A listening watch should be kept on as many of the listed emergency frequencies as possible between 0700 and 2200 Local to the emergency activation.

Stations with Emergency or Urgent traffic only, should transmit at this time.

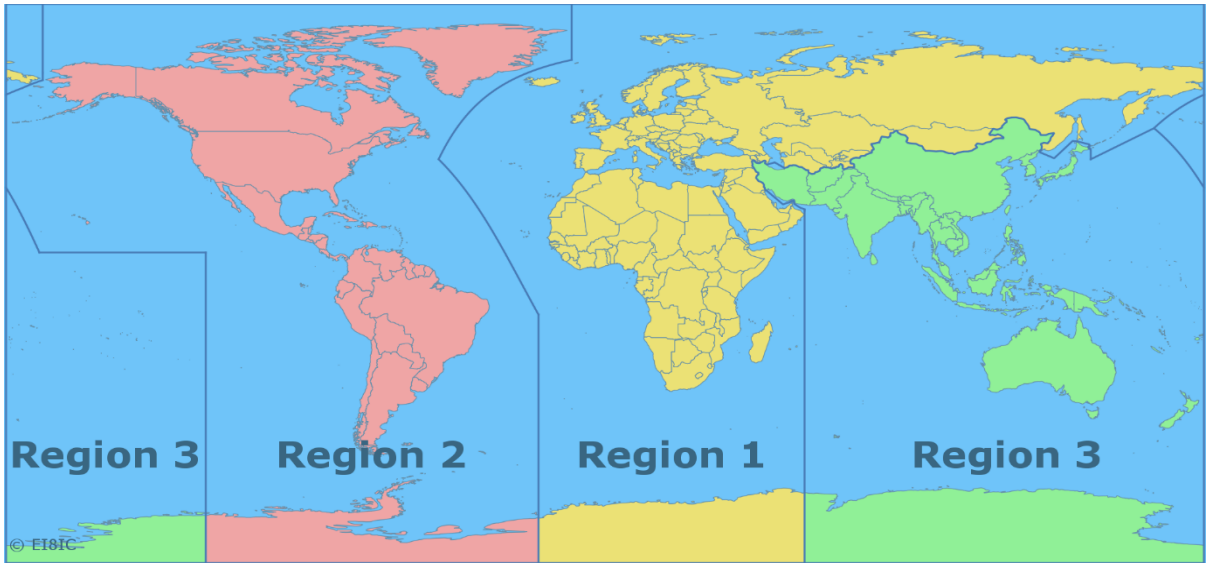
2.3 HF EMERGENCY FREQUENCIES ACROSS ALL REGIONS:

BAND (M)	Region 1 Frequency MHz	Region 2 Frequency MHz	Region 3 Frequency MHz
80m	3.7600	3.7500	3.6000
80m	3.7600	3.8950	3.6000
40m	7.1100	7.0600	7.1100
40m	7.1100	7.2400	7.1100
40m	7.1100	7.2900	7.1100
20m	14.3000	14.3000	14.3000
17m	18.1600	18.1600	18.1600
15m	21.3600	21.3600	21.3600

2.4 VHF / UHF EMERGENCY FREQUENCIES:

BAND (M)	Frequency MHz	Mode
4m	70.3250	Packet Radio (AX.25) & Winlink
4m	70.3500	FM Voice (Simplex)
2m	145.5250	FM voice (Simplex)
2m	145.5000	Calling Frequency
2m	145.4000	Calling Frequency (Local)
70cm	430.4000	Packet Radio (AX.25)
70cm	433.7750	FM voice (Simplex)

2.5 IARU REGIONS:



APPENDIX 3: VOICE REPEATERS IRELAND

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Repeater Name	Repeater Output	Repeater Input	Channel Type	CTCSS Encode	Location
EI0IPG	29.6800	29.5800	Analog	67.0	Carndonagh Donegal IO65JG
EI4SMR	70.3750	70.3750	Analog	Off	Seefin Mountain Cork IO52MA
EI2TGR	145.6000	145.0000	Analog	77.0	Kiltimagh Co. Mayo IO53LU
EI2TRR	145.6000	145.0000	Analog	88.5	Three Rock Co. Dublin IO63VF
GB3LY	145.6000	145.0000	Analog	110.9	Limavady Co. Derry IO65NC
EI2DBR	145.6500	145.0500	Analog	103.5	Devil's Bit Co. Tipperary IO62BU
GB3PK	145.6625	145.0625	Analog	110.9	Ballycastle Co. Antrim IO65WE
EI2CCR	145.6750	145.0750	Analog	110.9	Clermont Cairn Co. Louth IO64UB
EI2HHR	145.6750	145.0750	Analog	Off	Helvick Head Co. Waterford IO62EC
EI2IPG	145.7125	145.1125	Analog	67.0	Carndonagh Donegal IO65JG
GB3NI	145.7250	145.1250	Analog	110.9	Belfast Co. Antrim IO74CO
GB3CP	145.7375	145.1375	Analog	110.9	Co. Fermanagh IO64IG
EI2MGR	145.7500	145.1500	Analog	Off	Mullaghanish Co. Cork IO51KX
EI2KPR	145.7625	145.1625	Analog	88.5	Kippure Co. Dublin IO63UE
GB3WT	145.7750	145.1750	Analog	110.9	Omagh Co. Tyrone IO64JQ
EI2LLX	145.7875	145.1875	Analog	88.5	Laughan Lea Co. Cavan IO63MV
EI7HXR	430.8500	438.4500	Analog	103.5	Clonmel, Co. Tipperary IO62EH
EI7MHR	430.8750	438.4750	Analog	103.5	Mullaghanish, Co. Cork IO51KX
EI7FXR	430.9000	438.5000	Analog	103.5	Farmer's Cross Cork City IO51SU
GB3MT	430.9000	438.5000	Analog	110.9	Magherafelt Co. Derry IO64QS
EI7SMR	430.9250	438.5250	Analog	103.5	Seefin Mountain Cork IO52MA
EI7MLR	430.9500	438.5500	Analog	156.7	Mt. Leinster Co. Carlow IO62OO
GB3OM	430.9500	438.5500	Analog	110.9	Omagh Co. Tyrone IO64JQ
EI1LLR	430.9750	438.5750	Analog	88.5	Laughan Lea Co. Cavan IO63MV
EI7MGR	430.9750	438.5750	Analog	103.5	Mullaghanish Kerry IO51KX
GB3KK	430.9750	438.5750	Analog	88.5	Ballycastle Co. Antrim IO65WC
EI7HAR	433.0000	434.6000	Analog	88.5	Hill of Allen Co. Kildare IO63NF

Repeater Name	Repeater Output	Repeater Input	Channel Type	CTCSS Encode	Location
EI7CCR	433.0250	434.6250	Analog	88.5	Clermont Cairn Co. Louth IO64UB
GB3UL	433.0500	434.6500	Analog	110.9	Belfast Co. Antrim IO74CO
EI7LLR	433.0750	434.6750	Analog	88.5	Laughan Lea Co. Cavan IO63MV
EI7WHR	433.1250	434.7250	Analog	103.5	Woodcock Hill Co. Clare IO52PR
EI7TRR	433.2250	434.8250	Analog	88.5	Three Rock Co. Dublin IO63VF
EI7SHR	433.2500	434.8500	Analog	Off	Spur Hill, Cork City IO51RU
EI7WDR	433.2750	434.8750	Analog	Off	Carrickphierish Waterford IO62KF
GB3DX	433.3000	434.9000	Analog	110.9	Co. Derry IO65HA
EI7TBR	433.3500	434.9500	Analog	Off	Tonabrucky Co. Galway IO53KG
EI7DNR	438.6000	431.0000	Analog	88.5	Dublin City IO63WJ
EI7DKD	439.5625	430.5625	Analog	110.9	Hill Of Faughart Dundalk IO64TB
EI7MLD	430.3000	439.3000	Digital	Off	Mt. Leinster Co. Carlow IO62OO
EI7AKR	430.8250	438.4250	Digital	Off	Knockroe Galway IO53PK
EI7RHD	439.4500	430.4500	Digital	Off	Letteragh Galway IO53KG
EJ7IBD	439.4750	430.4750	Digital	Off	Inishbofin Island IO43WO
EI7LRD	439.5000	430.5000	Digital	Off	Loughrea Galway IO53PK
EI7CDD	439.6500	430.6500	Digital	Off	Carronadavderg Waterford IO62DA
EI7WCD	439.6750	430.6750	Digital	Off	Carrickphierish, Waterford IO62KG

APPENDIX 4: PHONETIC ALPHABET

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Letter	Phonetic Code	Respelling
A	Alpha	AL-FAH
B	Bravo	BRAH-VOH
C	Charlie	CHAR-LEE
D	Delta	DELL-TAH
E	Echo	ECK-OH
F	Foxtrot	FOKS-TROT
G	Golf	GOLF
H	Hotel	HOH-TEL
I	India	IN-DEE-AH
J	Juliet	JEW-LEE-ETT
K	Kilo	KEY-LOH
L	Lima	LEE-MAH
M	Mike	MIKE
N	November	NO-VEM-BER
O	Oscar	OSS-CAH
P	Papa	PAH-PAH
Q	Quebec	KEY-BECK
R	Romeo	ROW-ME-OH
S	Sierra	SEE-AIR-RAH
T	Tango	TANG-GO
U	Uniform	YOU-NEE-FORM
V	Victor	VIK-TAH
W	Whiskey	WISS-KEY
X	X Ray	ECKS-RAY
Y	Yankee	YANG-KEY
Z	Zulu	ZOO-LOO

Letter	Phonetic Code	Respelling
1	One	WUN
2	Two	TOO
3	Three	TREE
4	Four	FOW-ER
5	Five	FIFE
6	Six	SIX
7	Seven	SEV-EN
8	Eight	AIT
9	Nine	NIN-ER
0	Zero	ZEE-RO

APPENDIX 5: INTERNET GATEWAYS, IRELAND

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Gateway Call Sign	Receive	Transmit	Access Tone / Code	System	Location
EI0IPG	29.8600	29.7600	67 Hz	EchoLink	Carndonagh, Co. Donegal
MB7ICA	50.5200	50.5200	77 Hz	EchoLink	Dromara, Co. Down
MI0RTX	70.3500	70.3500	110.9 Hz	EchoLink	Dromara, Co. Down
EI4FMG-L	70.3500	70.3500	88.5 Hz	EchoLink	Fieldstown, Co. Louth
EI4GCG	70.4250	70.4250	77 Hz	Echolink/IRLP	Galway City
EI2SHD	144.8125	144.8125	n/a	Wires-X	Salthill, Galway
EI2GCD	144.8500	144.8500	DMR CC1	MMDVM	Galway City
MB7ICM-L	144.9625	144.9625	110.9 Hz	EchoLink	Enniskillen, Co. Fermanagh
EI2MOG	145.2125	145.2125	88.5 Hz	EchoLink	Mount Oriel, Co. Louth
EI2AIR	145.2875	145.2875	Carrier	EchoLink	Dunshaughlin, Co. Meath
MB7IAF-L	145.2875	145.2875	88.5 Hz	EchoLink	Moira, Lisburn
MB7ILD-L	145.2875	145.2875	110.9 Hz	EchoLink	Co. Derry
MB7INI-L	145.3375	145.3375	77 Hz	EchoLink	Carrickfergus, Co. Antrim
MB7ICU-L	145.3375	145.3375	110.9 Hz	EchoLink	Omagh, Co. Tyrone
EI2TBR	145.6250	145.6250	Carrier	IRLP	Tonabrucky, Galway
EI2IPG	145.7125	145.1125	67 Hz	EchoLink	Carndonagh, Co. Donegal
EI7CRG-L	430.0500	430.0500	77 Hz	EchoLink	Castlebar, Co. Mayo
MB7AND-L	430.0500	430.0500	77 Hz	Echolink	Magherafelt, Co Derry
EI7WHG	430.0750	430.0750	67 Hz	Echolink	Watergrasshill, Cork
EI7CRG	430.0500	430.0500	77 Hz	IRLP	Castlebar, Co. Mayo
EI7MLR	430.9500	438.5500	Carrier	IRLP	Waterford

APPENDIX 6: DEPLOYMENT KIT (GO KIT)

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

What you need to take with you to your assigned event location is entirely dependent on the nature of your assignment and the length of time that you will be in the field. The best thing that you can do in order to ensure your preparedness is to have the equipment that you will generally need for an event organized into a Go-Kit. Even better, keep a checklist inventory with your go-kit so that you can quickly inventory it and make sure that it is fully stocked before you head out.

Your clothing should be considered as part of your equipment. Wear and bring with you clothing that is appropriate for the anticipated weather conditions (check the forecast) and it should be clothing that is clean and has a professional look about it.

6.1 ALL DEPLOYMENTS REGARDLESS OF LENGTH

6.1.2 IDENTIFICATION & INFORMATION

Check	Equipment Item
	ID cards and other authorizations
	Copy of Amateur Radio license
	Driver's License
	ELARC Field Manual, including:
	Communications plan(s)
	Frequency lists and net schedules
	Maps, both street and topographic for your area of operations
	Key phone numbers, email and internet addresses
	Contact information for other members in your group.
	Copy of emergency plans
	Log sheets, Message forms, note paper, pencils, pens.

6.2 THREE TO SIX HOUR DEPLOYMENT KIT

6.2.1 RADIOS AND ACCESSORIES

Check	Equipment Item
	Handheld VHF or dual-band radio with manual or operating guide.
	Spare rechargeable batteries for handhelds.
	Battery pack for handhelds (if available).
	Spare Alkaline batteries (AA, AAA, 9 Volt).
	Speaker Mic and earphone for handhelds.
	Battery chargers, AC and DC for handhelds.
	External antenna, e.g. mag mount, J-pole, ground plane plus adapters & Co-ax.
	Mast, (Telescopic or other), plus Halyards, cordage, fittings, ground pegs or other equipment to enable an elevated antenna.

6.2.2 PERSONAL GEAR

Check	Equipment Item
	Appropriate Personal Protective Equipment (PPE).
	Visi-Vest
	Safety Glasses
	Appropriate Footwear.
	Helmet (if needed)
	Dust-Mask
	Clothing appropriate for the season and deployment (including Emergency vest).
	Foul weather or protective gear, warm coats, hats, etc. as needed.
	Emergency Bothy Shelter (if Needed)
	Food, Snacks and water.
	First aid kit, personal medications and prescriptions.
	Money, including Euro coins for vending machines, tolls, etc., and credit card.
	Multi-purpose tool (e.g., Leatherman) and/or multi-purpose knife (e.g.,
	Swiss Army), Allen Keys, Snips, screwdrivers, adjustable spanner.
	Flashlight or Mini-Mag light, spare bulb and batteries.
	Prescription Glasses.

6.2.3 OPERATING SUPPLIES

Check	Equipment Item
	Standard forms used by the served agencies
	Extension cord(s), multiple outlet power strip
	Clipboard(s)
	Compass/GPS
	Note-Books, Pens (Blue, Black, Red), Pencils.
	ELARC Field Manual

6.4 OPTIONAL ITEMS FOR YOU (Complete as required, ahead of time)

Check	Equipment Item

6.5 THREE DAY DEPLOYMENT KIT

(Modify according to your own situation)

Check	Equipment Item
	Suitable size backpack or duffel bag for clothing and personal gear
	Plastic storage tub for food, cooking gear.
	Toilet kit—soap, comb, deodorant, shampoo, toothbrush, toothpaste
	Toilet paper in zipper-lock freezer bag
	Small towel and washcloth
	Lip balm
	Facial tissues

Check	Equipment Item
	Sunscreen
	Insect repellent
	Prescription medications (1 week supply)
	Copies of medication and eyeglass/contact lens
	Prescriptions
	Spare eyeglasses or contact lenses and supplies
	Hand lotion for dry skin
	Small First Aid Kit
	Non-prescription medications, including painkiller, antacids, anti-diarrheal, etc.
	Extra basic clothing—shirts, socks, underwear
	Gloves, for protection or warmth
	Pocket flashlight and extra batteries
	Folding pocketknife (Leatherman type)
	Sleeping bag, closed-cell foam pad or air mattress, pillow
	Magnetic compass, maps
	Duct tape, parachute cord
	Outer clothing for season and conditions (rain gear, parka, hat, face
	mask, etc)
	Hardhat
	Chemical light sticks
	Police or signal whistle
	Phone/e-mail/address list for family, friends, neighbours, physician, pharmacy
	Emergency contact/medical information card in your wallet
	Spare car and house keys
	High energy or high protein snacks
	Food—Freeze-dried or MREs
	Coffee, tea, drink mixes
	Plate or bowl, knife, fork and spoon, insulated mug
	Camp stove, small pot, fuel and matches
	Battery or other lantern
	Water, in heavy plastic jugs
	Water purification filter or tablets
	Shelter (Tent, Tarp, Bothy)

APPENDIX 7: PRO-WORDS

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

PRO-WORDS:

Word / Phrase	Use for or to
Affirmative	Yes
All Before	Used when asking to repeat that portion of a message preceding or following a key word contained in the text
All Stations	A call for the attention of all stations on the Net usually followed by the transmission of traffic relevant to each station.
Available	Self-explanatory.
Available at residence	To indicate that you are at home and available for an assignment.
Can handle	To indicate that the equipment at hand is sufficient to handle to job.
Contact _____	Relay message to person indicated.
Copy, copies	Acknowledging message received and understood.
Continue	I have received the last part of your message, continue sending the rest.
Correction (I Say Again)	Indicates that an error has been made and that the transmission will continue from the last word correctly sent.
Difficult	Communication is workable only with difficulty. Care and extra measures are needed.
Disregard last message.	Self-explanatory.
Emergency Traffic	Gain control of the radio frequency to report an emergency.
Emergency Traffic Only	Used by Net Control or Net Supervisor to restrict all radio transmissions to an emergency in progress or a new incident.
Enroute	Proceeding to or responding to assignment.
ETA	Estimated Time of Arrival. Can be either a query, for example," What is your ETA to XXX?" or a statement for example "My ETA to XXX is 14:30."
Fire	Use to declare a fire emergency.
From	Originator of the message is
Go ahead	Indicates another EmComm operator may transmit. Example., "Go ahead St. John's Shelter."
Grid	Used when giving a grid reference.
How do you copy?	Signal report request.

Word / Phrase	Use for or to
In-service	An EmComm operator can handle traffic at his/her assigned position.
Is _____ available for a phone call?	Self-explanatory.
Let me talk to _____	Use to engage traffic with a non-licensed Amateur Operator.
Loud and clear	Signal reporting. Good signal strength (including full quieting), good, readable audio.
Message	Offer of an unregistered message that needs to be written down.
Negative	No
Nothing Heard	Indication that no signals have been received from a particular station
Number(s)	Numerals follow.
Out	This is the end of my transmission. No reply is expected.
Out-of-contact	To indicate an EmComm operator is on assignment but out of radio contact.
Out-of-service	An EmComm operator at an assigned position cannot communicate due to equipment problems.
Over	This is the end of my transmission to you. A reply or acknowledgement is required, go ahead and transmit.
Read Back	Request to a station to repeat back a message exactly as received.
Relay To	Transmit this message to the addressee(s) indicated.
Repeat	Say your last message again.
Report on conditions	Self-explanatory.
Resume normal traffic	Used by Net Control or Net Supervisor to re-open the net to routine traffic.
Return to _____	Used by Net Control to direct operators back to the location specified.
Roger	Message received and understood.
Say Again	I will re-transmit the message or part message. [request] Re transmit all (or all after) your transmission.
Send	You have permission to send your message.
Spell	The next word will be spelled. In difficult conditions, use phonetics.
Stand-by	Cease further transmissions and wait for queries, instructions, and so forth. From Net Control or station with whom you were communicating.
Stop transmitting	Self-explanatory.
Uncovered	An EmComm position lacking a radio operator.
Unreadable	Signal reporting: received signal is not clear. In most cases, try to add the specific trouble. Example, “unreadable, background noise.”
Wait`	I have paused for a few second’s, no other station is to transmit during this time.

Word / Phrase	Use for or to
Wait Out	I will call you again - a wait for longer than a few seconds. A further transmission on the same subject will follow later.
What is your location?	Self-explanatory.
Wilco	I will comply with your message/request. Used by the person who is complying.
This is	Shall be used to separate the call-sign of the station being called from the call-sign of the calling station.
Over	"I have finished transmitting" —"please go ahead with your reply".
Out	This conversation is ended the frequency is now free for other users.

APPENDIX 8: Q-CODES.

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Code	Question	Answer
QRK	What is the readability of my signals?	The readability of your signals is …
QRM	Are you being interfered with?	I am being interfered with
QRN	Are you troubled by static?	I am troubled by static
QRO	Shall I increase transmitter power?	Increase transmitter power
QRP	Shall I decrease transmitter power?	Decrease transmitter power
QRT	Shall I stop sending?	Stop sending
QRZ	Who is calling me?	You are being called by …
QRV	Are you ready?	I am ready
QSB	Are my signals fading?	Your signals are fading
QSL	Can you acknowledge receipt?	I am acknowledging receipt
QSO	Can you communicate with … direct?	I can communicate … direct
QSY	Shall I change to transmission on another frequency?	Change transmission to another frequency
QRX	When will you call again?	I will call you again at … hours on … kHz (or MHz)
QTH	What is your current location	My current location is …

APPENDIX 9: COMMON COUNTRY CODES.

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Prefix	Country	Prefix	Country	Prefix	Country
OE	Austria	**SV**	Greece	**CT**	Portugal
ON	Belgium	**HA**	Hungary	**YO**	Romania
LZ	Bulgaria	**LA**	Norway	**OM**	Slovakia
9A	Croatia	**I**	Italy	**GD,MD**	Isle of Man
DL	Germany	**YL**	Latvia	**GJ,MJ**	Jersey
OK	Czech Republic	**LY**	Lithuania	**GU,MU**	Guernsey
OZ	Denmark	**LX**	Luxembourg	**G,M**	England
ES	Estonia	**9H**	Malta	**GM,MM**	Scotland
OH	Finland	**PA**	Netherlands	**GW,MW**	Wales
F	France	**SP**	Poland	**GI,MI**	Northern Ireland
S5	Slovenia	**HB**	Switzerland	**UA**	Russia
EA	Spain	**TF**	Iceland	**UR**	Ukraine
SM	Sweden	**K,N,W**	USA	**VE**	**Canada**

APPENDIX 10: SUMMARY OF AMATEUR BANDS IARU R1

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

10.1 Amateur Bands In Ireland

Frequency (MHz)	Band	Status	Power Limit	/MM?
1.800 – 2.000	**160m**	Primary	400W (26 dBW)	Yes
3.500 - 3.800	**80m**	Primary	400W (26 dBW)	Yes
7.000 - 7.200	**40m**	Primary	400W (26 dBW)	Yes
10.100 - 10.150	**30m**	*Secondary*	400W (26 dBW)	*No*
14.000 - 14.350	**20m**	Primary	400W (26 dBW)	Yes
18.068 - 18.168	**17m**	Primary	400W (26 dBW)	Yes
21.000 - 21.450	**15m**	Primary	400W (26 dBW)	Yes
24.890 - 24.990	**12m**	Primary	400W (26 dBW)	Yes
28.000 - 29.700	**10m**	Primary	400W (26 dBW)	Yes
50.000 - 52.000	**6m**	*Secondary*	100W (20 dBW)	*No*
69.900 - 70.500	**4m**	*Secondary*	50W (17 dBW)	*No*
144.000 - 146.000	**2m**	Primary	400W (26 dBW)	Yes
430.000 - 432.000	**70cm**	Primary	50W (17 dBW)	*No*
432.000 - 440.000	**70cm**	Primary	400W (26 dBW)	*No*

10.2 4M BAND PLAN, (69.9 – 70.5 MHz)

The 70MHz band is allocated on a Secondary basis.
Maximum power permitted from a fixed station is 50watts, and maximum 25 watts for mobile operation. All modes permitted.

Frequency MHz	Maximum Bandwidth Hz	MODE	Usage
69.900 to 70.000	1000	No Info.	No Information
70.0000 to 70.0900	1000	TELEGRAPHY MGM	Co-ordinated Beacons
70.0900 to 70.1000	1000	BEACONS	Temporary and personal beacons
70.1000 to 70250	2700	TELEGRAPHY SSB MGM	70.1850 Crossband centre of activity 70.2000 Telegraphy/SSB Calling 70.2500 MS calling
70.2500 to 70.2940	12000	AM / FM	70.2600 AM calling 70.2625 FM Calling 70.2700 MGM centre of activity
70.2940 to 70.5000	12000	FM CHANNELS 12.5 kHz spacing	70.3125 Digital communications 70.3250 Digital communications 70.4500 FM calling 70.4625 70.4750 70.4875 Digital communications

10.3 2 M BAND PLAN (144 – 146 MHz)

Frequency MHz	Mode
144.000 - 144.150	CW
144.150 - 144.400	SSB
144.400 - 144.500	Beacons only
144.500 - 144.794	All modes
144.794 - 145.000	Machine Generated Modes
145.000 - 145.1875	FM – Repeater Input only
145.200 - 145.575	FM – Simplex
145.600 - 145.7875	FM – Repeater Output only
145.800 - 146.000	All modes, Satellite Ops.

APPENDIX 11 MARINE VHF CHANNELS

Revision History

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Marine Radio Certificate / Licence may be required.
Short Range Certificate (VHF)
Long Range Certificate (MF, HF, INMARSAT-C / Fleet 77 and VHF)

Frequency	Marine Channel	Typical Usage in Ireland
156.000	Ch 0	Coastguard/RNLI
156.300	Ch 6	Ship to ship
156.400	Ch 8	Ship to ship
156.500	Ch 10	Rescue helicopter winch
156.375	Ch 67	Rescue helicopter
156.800	Ch 16	Emergency
157.550	Ch 31a	Lifeboats nationwide
157.850	Ch 37A/M1	Marina channel
161.425	Ch P4/M2	Marina channel

APPENDIX 12: AERONAUTICAL FREQUENCYS

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

International Airport	ICAO	Tower	Ground	Approach	ATIS	Clearance
Cork	EICK	119.3000	121.8500	119.9000	120.9250	NA
Donegal	EIDL	129.8000	129.8000	NA	129.9250	NA
Dublin	EIDW	118.6000	121.8000	121.1000	124.5250	121.8700
Galway	EICM	122.5000	121.8250	NA	NA	NA
Kerry	EIKY	123.3250	121.6000	NA	118.0250	NA
Knock	EIKN	130.7000	121.9000	NA	NA	NA
Shannon	EINN	118.7000	121.8000	121.4000	130.9500	NA
Sligo	EISG	122.1000	122.1000	NA	NA	NA
Waterford	EIWF	129.8500	121.6000	NA	121.1500	NA

High Level Frequency's

(NOTA) - Northern Oceanic Transition Area
(SOTA) - SHANNON Oceanic Transition Area

Station	Sector	Service	Frequency
Shannon	Cork	ACC	131.1500
Shannon	SOTA	ACC	135.6000
Shannon	Shannon	ACC	134.2800
Shannon	Shannon	ACC	134.6300
Shannon	Shannon North	ACC	119.0750
Shannon	**EMERGENCY FREQ**	**ACC**	**121.5000**
Shannon	BABAN / DEVOL	ACC	132.1500
Shannon	Oceanic Clearance	ACC	121.7000
Shannon	SOTA	ACC	135.2300
Shannon	NOTA	ACC	122.9750
Shannon	NOTA	ACC	125.8750

Regional Airport Frequency's

Airport	ICAO	Tower	Ground	Approach	ATIS	Clearance
Cork	EICK	119.3000	121.8500	119.9000	120.9250	NA
Donegal	EIDL	129.8000	129.8000	NA	129.9250	NA
Dublin	EIDW	118.6000	121.8000	121.1000	124.5250	121.8700
Galway	EICM	122.5000	121.8250	NA	NA	NA
Kerry	EIKY	123.3250	121.6000	NA	118.0250	NA
Knock	EIKN	130.7000	121.9000	NA	NA	NA
Shannon	EINN	118.7000	121.8000	121.4000	130.9500	NA
Sligo	EISG	122.1000	122.1000	NA	NA	NA
Waterford	EIWF	129.8500	121.6000	NA	121.1500	NA

Airfield Frequency's

Airfield	ICAO	Frequency	Type
Aerphort Chonamara	EICA	123.0000	A/G
Ballyboy	EIMH	118.5500	A/G
Bantry	EIBN	122.4000	A/G
Belmullet	EIBT	123.6000	A/G
Birr	EIBR	122.9500	A/G
Erinagh	EIER	118.1750	A/G
Hacketstown	EIHN	129.9000	A/G
Inisheer	EIIR	123.0000	A/G
Inishmaan	EIMN	123.0000	A/G
Inishmore	EIIM	123.0000	A/G
Kilkenny	EIKK	122.9000	A/G
Navan	EIHH	118.1250	A/G
Newcastle	EINC	122.5500	A/G
Rathcoole	EIRT	NA	NA
Trevet	EITT	118.2750	A/G
Trim	EITM	123.3000	A/G
Weston	EIWT	122.4000	TWR

APPENDIX 13: CB FREQUENCY'S, (IRELAND / UK)

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Ireland CB Frequencies AM			
Channel	**Freq. Mhz**	**Channel**	**Freq. Mhz**
1	26.96500	**21**	27.21500
2	26.97500	**22**	27.22500
3	26.98500	**23**	27.23500
4	27.00500	**24**	27.24500
5	27.01500	**25**	27.25500
6	27.02500	**26**	27.26500
7	27.03500	**27**	27.27500
8	27.05500	**28**	27.28500
9	27.06500	**29**	27.29500
10	27.07500	**30**	27.30500
11	27.08500	**31**	27.31500
12	27.10500	**32**	27.32500
13	27.11500	**33**	27.33500
14	27.12500	**34**	27.34500
15	27.13500	**35**	27.35500
16	27.15500	**36**	27.36500
17	27.16500	**37**	27.37500
18	27.17500	**38**	27.38500
19	27.18500	**39**	27.39500
20	27.20500	**40**	27.40500

UK CB Frequencies - 27/81 UK FM Channels			
Channel	**Freq. Mhz**	**Channel**	**Freq. Mhz**
1	27.60125	**21**	27.80125
2	27.61125	**22**	27.81125
3	27.62125	**23**	27.82125
4	27.63125	**24**	27.83125
5	27.64125	**25**	27.84125
6	27.65125	**26**	27.85125
7	27.66125	**27**	27.86125
8	27.67125	**28**	27.87125
9	27.68125	**29**	27.88125
10	27.69125	**30**	27.89125
11	27.70125	**31**	27.90125
12	27.71125	**32**	27.91125
13	27.72125	**33**	27.92125
14	27.73125	**34**	27.93125
15	27.74125	**35**	27.94125
16	27.75125	**36**	27.95125
17	27.76125	**37**	27.96125
18	27.77125	**38**	27.97125
19	27.78125	**39**	27.98125
20	27.79125	**40**	27.99125

APPENDIX 14: EMERGENCY ANTENNA DESIGNS.

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Notes:

14.1 TAPE MEASURE BEAM OPTIMIZED FOR RADIO DIRECTION FINDING

Joe Leggio WB2HOL

14.2 Description

This antenna evolved during my search for a beam with a really great front-to-back ratio to use in hidden transmitter hunts. This design exhibits a very clean pattern and is perfect for RDF use. It trades a bit of forward gain in exchange for a very deep notch in the pattern toward the rear. (You could optimize the design for more forward gain, but at the expense of a really good notch in the pattern toward the rear.) It is a design that can be constructed using only simple hand tools (no machine shop needed) and still perform well. It has been duplicated several dozen times by other local hams and has been successfully used as a club construction project.

When I designed this antenna I had one basic idea in mind. It had to be easy to get in and out of the car when hunting for a hidden transmitter. This would be accomplished by the use of steel "tape measure" elements. These elements could fold easily when fitting the antenna into my car and yet still be self supporting. I decided to use three elements to keep the boom from getting too long.

Another of my design goals was to use materials that were easy to obtain. I chose to use Schedule-40 PVC pipe and fittings available at my local hardware store for the boom and element supports. These kept the cost for the antenna very low. The element supports consist of PVC crosses and tees.

Performance Predicted by YAGI-CAD	
GAIN	7.3 dBd
Front-to-Back Ratio	>50 db
3 db Beamwidth	E = 67.5 degrees
3 db Beamwidth	H = 110 degrees

This antenna requires a matching network, I used a "hairpin match." This is simply a 5 inch length of wire that is connected across the feed points of the driven element. The antenna has some capacitive reactance without the matching network. The 5 inch length of wire has just enough inductance to cancel the capacitive reactance. This resulted in a better match than anything else I had tried.

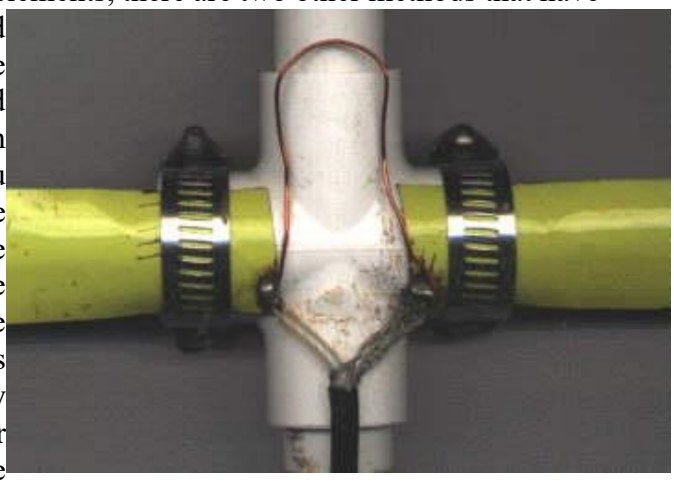
The wire I used for the hairpin match was enamel insulated 18 gauge solid. Other hams who have duplicated this beam have used just about anything they had on hand. 14 gauge house wire works well, so does a length of 22 gauge hookup wire. It does not seem to matter if it is stranded or solid, use whatever you have available. This results in a very good match across the two meter band once you have adjusted the distance between the halves of the driven element for minimum SWR. (1 inch apart on my prototype).

I used a pair of shears to cut the tape measure elements to length. An old pair of scissors will probably do as well. No matter how you cut the elements be very careful. Those edges are very sharp and will inflict a nasty cut if you are careless. Use some sandpaper to remove the really sharp edges and burrs resulting from cutting the elements to size. I put some vinyl electrical tape on the ends of the elements to protect myself from getting cut. I encourage you to do the same. It will probably be best if you round the corners of the elements once you cut them. Wear safety glasses while cutting the elements. Those bits of tape measure can be hazardous.

The RG58 coax feedline is connected directly to the driven element. No matter what method you use to attach the feedline, make sure you scrape or sand the paint off the tape measure element where the feedline is attached. Most tape measures have a very durable paint finish designed to stand up to heavy use. You do not want the paint to insulate your feedline connection.

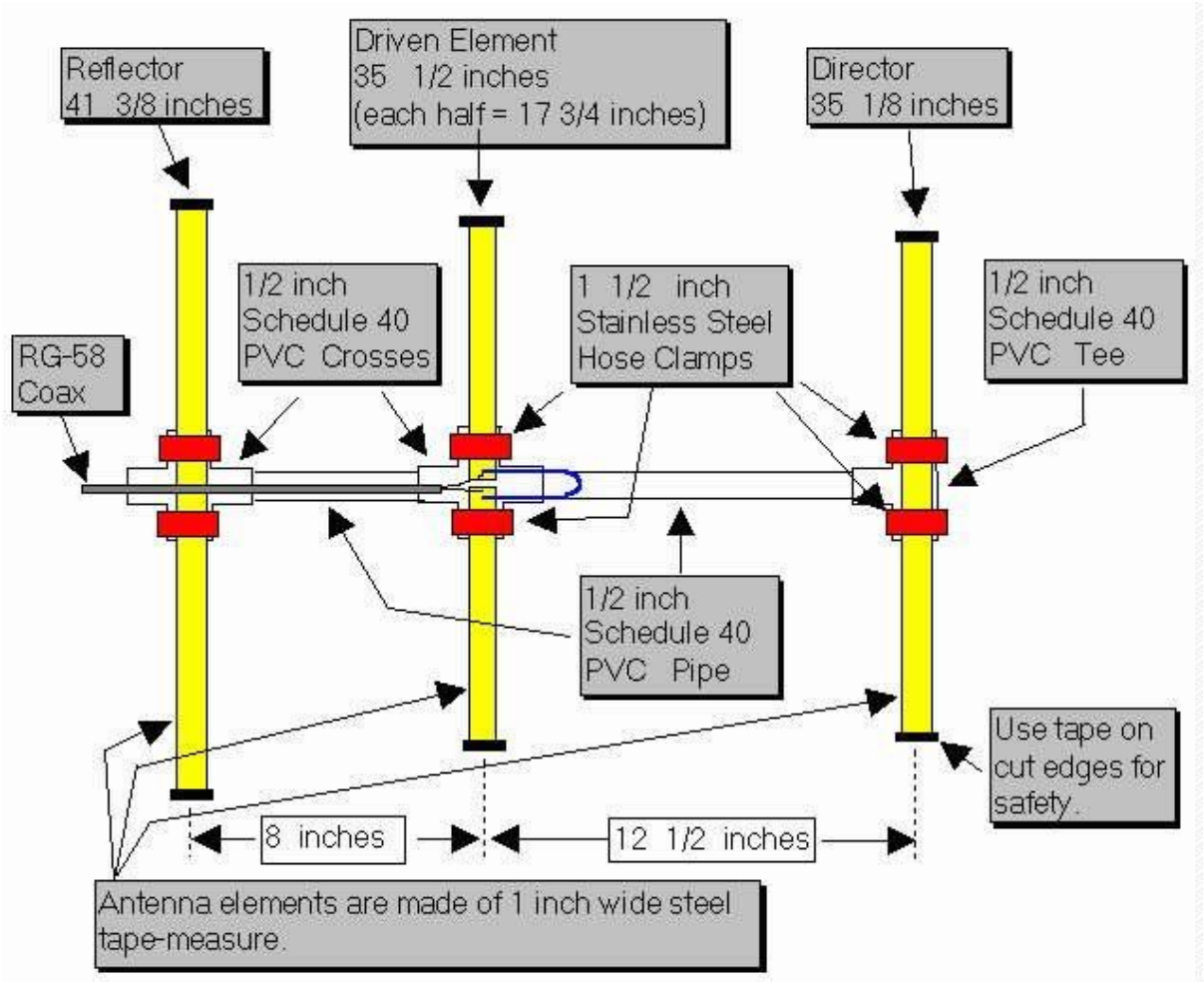
If you are careful, It is possible to solder the feedline to the element halves. Care must be taken since the steel tape measure does not solder easily and since the PVC supports are easily melted. You might want to tin the tape measure elements before mounting them to the PVC cross.

If you decide not to solder to the tape measure elements, there are two other methods that have been used to attach the feedline. One method employs ring terminals on the end of the feedline. The ring terminals are then secured under self tapping screws which hold the driven element halves. This method does not allow you to tune the antenna by moving the halves of the driven element. 6-32 bolts and nuts could be used if holes are drilled in the elements near the ends. If the bolt heads are placed nearest the PVC fitting, you could secure ring-terminals with nuts and lock washers. Another possibility is to simply slide the ends of the feedline under the driven element hose clamps and tighten the clamps to hold the ends of the coax. I know this is low-tech, but it works just fine.



Stainless steel hose clamps are used to attach the driven element halves to the PVC cross which acts as its support. This has the added benefit of allowing you to fine tune your antenna for lowest SWR simply by loosening the hose clamps and sliding the halves of the driven element either closer or further apart. By using the dimensions specified, I found that the SWR was 1:1 at 146.565 Mhz (our Fox-Hunt frequency) when the two elements were spaced approximately 1 inch apart. Figure 1 shows the method used to attach the driven element to the PVC cross.

I used 1 1/2 inch hose clamps to attach all the elements on my prototype beam. Others who have duplicated my design have used self tapping screws to attach the elements to the PVC crosses and tees. Performance is the same using either method.



14.3 Construction:

Cut a length of tape measure to 41 3/8 inches. It will be the Reflector element. Cut two lengths of tape measure to 17 3/4 inches. These will be used for the Driven element. Cut one length of tape measure to 35 1/8 inches. It will be used for the Director. Once you have cut the tape measure to length, put vinyl tape on the cut ends to protect yourself from the sharp edges. You will want to scrape or sand off the paint from one end of each of the driven element halves so you can make a good electrical connection to the feedline.

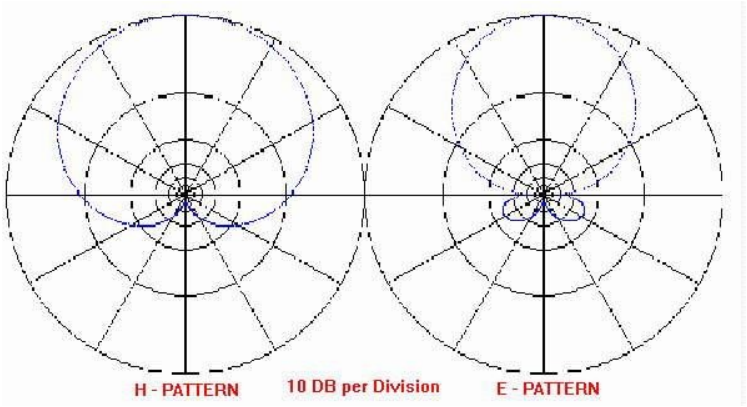
If you are planning to solder the feedline to the driven elements it is best to tin the elements first before attaching them to the PVC cross. If you don't, the PVC will melt as you apply heat to the element. It would be a good idea to also take the time to form the wire used for the hairpin match into a "U" shape with the two legs of the "U" about 3/4 inch apart. Tin the ends of the hairpin if you plan on soldering it to the driven element. If you tin 1/4 inch of each end of the hairpin it will leave 4 1/2 inches to shape into the "U".

You will need to cut two lengths of PVC pipe to use as the boom. One should be cut to 11 1/2 inches. It is used to form the boom between the Director and the driven element. The other

piece of PVC should be cut to 7 inches. It will be used between the Reflector and the Driven element. Just about any saw will cut through the soft PVC pipe. I used a hacksaw. When we mass produced this antenna as a club project, we marked the pipe and used a portable jig saw to cut the lengths in assembly line fashion. It took longer to measure the pipe than to actually make the cuts. Since the pipe is available in ten foot lengths, you can make a few beams from a single 10 foot length. In any case, you might want to cut a few extras lengths for your friends. They will want to duplicate this once they see your completed antenna.

At this time you can pre-assemble the PVC boom, crosses and tee which will support the tape measure elements. I did not use any cement or glue when I assembled mine. The PVC pipe is secured in the fittings with a friction fit.

The hose clamps I used are stainless steel and have a worm-drive screw which is used to tighten them. They are about 1/2 inch wide and are adjustable from 11/16 inch to 1 1/2 inch diameter. Attach the tape measure elements to the PVC fittings as shown in the accompanying drawing. It is normal for the Reflector and Director elements to buckle a bit as it is tightened to the PVC Tee and Cross. You can eliminate this buckle if you use the washers and self tapping screws to attach these elements instead of the hose clamps. I do not think the beam will withstand as rough a treatment as when hose clamps are used.



14.4 Summary

This beam has been used on Fox-Hunts, on mountain tops, at local public service events, outdoors, indoors in attics, just about everywhere. The SWR is typically very close to 1:1 once adjusted. Front to back performance is exactly as predicted. The null in the rear of the pattern is perfect for transmitter hunts. When tested using a sensitive field strength meter and a low powered fox transmitter, full scale readings were seen from a distance of ten feet. With the same field strength meter I was able to point the antenna away from the transmitter and move the reflector element to within a few inches of the transmitter antenna and still not see a reading The flexible elements have taken a lot of abuse. My antenna has seen a lot of use and has held up quite well.

14.5 Zip Cord Antenna

The information was based on a March 1979 QST article by Jerry Hall, K1TD and it has been updated according to the March 2009 QST article by William Parmley, KR8L.
A lighter weight style of zip cord (#22 AWG speaker wire) was used compared to the heavier ac power zip cord in the original article.
The tables give the measured values for velocity factor and loss in dB/100 feet. The characteristic impedance was estimated to be 150 W, somewhat higher than the 105 W for ac power cord. Performance of the lighter zip cord appears to be intermediate between the miniature RG-174 coaxial cable (light, but lossy) and RG-58 (less lossy, but heavy). This may be a good trade-off for your application.

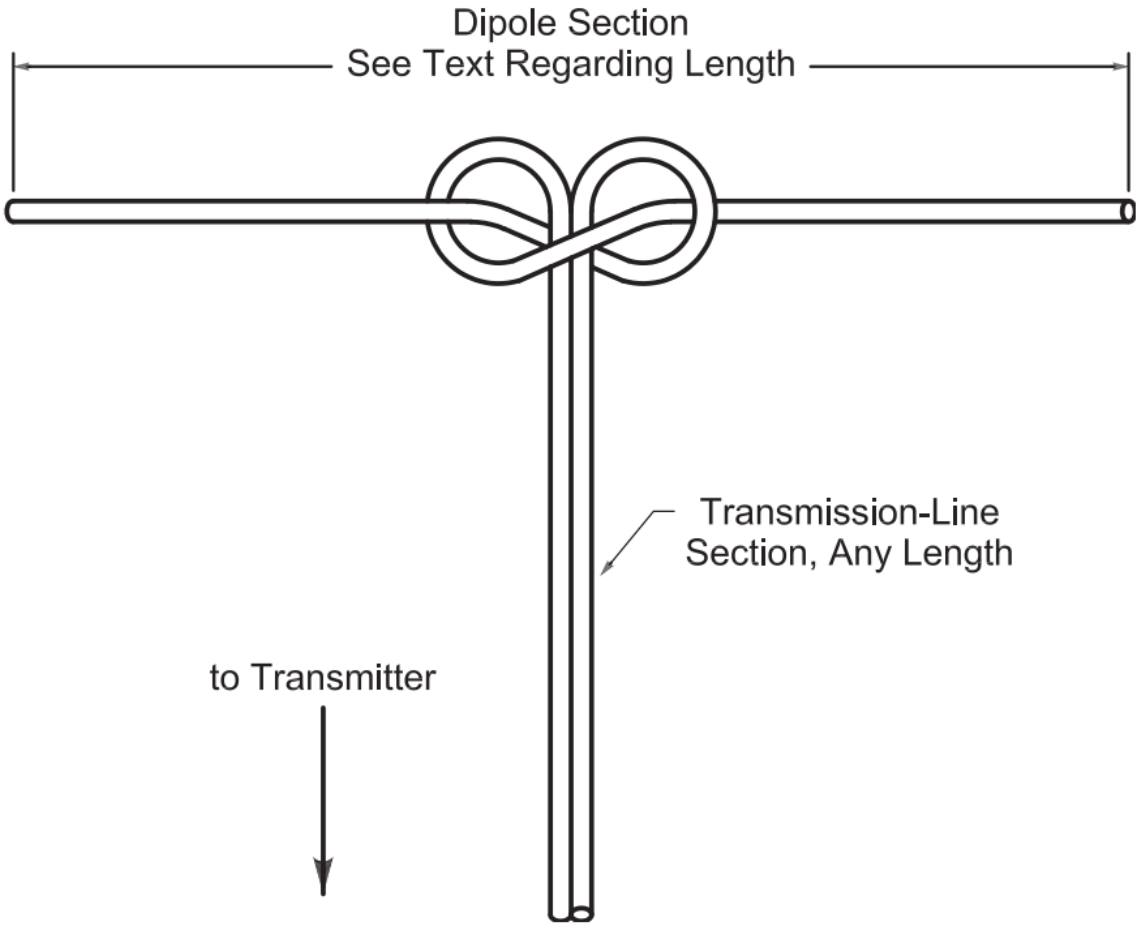
Measured Velocity Factor	
Frequency MHz	Velocity Factor
3.31	0.68
6.75	0.69
13.67	0.7
27.77	0.71

Calculated Attenuation of Zip Cord Compared to Small Coax, dB/100 feet			
Frequency MHz	RS 278-1385	RG-174	RG-58
3.31	0.97	2.7	0.8
6.75	1.48	3.3	1.2
13.67	2.39	4.0	1.6
27.77	3.41	5.3	2.4

The author notes that some samples of light speaker cord were measured to be more lossy and suggests that loss be measured before committing to a particular type of line. Antennas are made using the electrician's knot shown below is a handy knot to use whenever zip cord is used.

The dipole length is calculated as described in the Dipoles and Ground-Planes chapter. At the end of the dipole, extra wire folded back on itself to make a loop for attachment to a support line.

If a low SWR at the transmitter is important, the feed line length can be cut to some multiple of λ/2 using the measured velocity factor. This causes the dipole's feed point impedance to be replicated at the opposite end of the feed line, regardless of the line's characteristic impedance. At the transmitter end of the feed line, unzip the wire a couple of inches and attach a banana plug to one side and an alligator clip to the other. The banana plug fits perfectly in the centre conductor of a transceiver's SO-239 coax connector, while the alligator clip makes a convenient way to attach to the transceiver's ground connection. At low power or QRP levels, the unbalanced connection did not present any problems.



After building antennas and feed lines for 30, 20 and 17 meters, the antennas were installed in an inverted-V configuration with the apex at about 20 feet. This was done using either a telescoping fishing pole, or by tossing a line over a tree branch and pulling the dipole up with that. The ends of the dipole were brought down to 6 to 8 feet off the ground and tied off with nylon line that was then tied to tent stakes.

The dipole was pruned to resonance by changing the fold point at the end. The extra wire was left in place and was not trimmed off. The 20 meter and 17 meter antennas were also tested as indoor dipoles by attaching the apex to a ceiling lamp and taping the ends to the walls with masking tape. In this configuration they were easily tuned to resonance. Once the antenna was tuned to resonance it was possible to adjust and optimize the feed point impedance by changing both the horizontal and vertical angles between the two legs. For the author's outdoor installation the best match was obtained with the dipole legs arranged at a horizontal (azimuthal) angle of between 90 and 120°. For indoor applications the feed point impedance was found to be adjustable by changing the amount of droop in the legs, proximity to walls or floors, and the angle between the legs.

As should always be done with parallel-wire feeders, keep the feed line clear of other objects and equidistant from both legs of the dipole to the maximum extent practical.

14.6 FIELD EXPEDIENT - DIPOLE ANTENNAS

Half-wave dipoles and variations of these can be a very good choice for an HF antenna. Where only single-band operation is desired, the λ/2 antenna fed with 50- or 75-Ω coaxial cable is a popular and inexpensive antenna. It can also be used on the third harmonic with some adjustment as explained in the project at the end of this section. The basic and most common construction is shown in Figure 9.1.

The length of the λ/2 dipole in feet is often stated as Length = 143/freq (MHz) although this rarely results in an antenna resonant at the desired frequency as discussed in the chapter Dipoles and Monopoles. It is more practical to begin with a length of 148/freq or 150/freq (Table 1 gives lengths for each of the amateur radio bands from 1.8 through 50 MHz) and then adjust the antenna according to the following procedure:

- Assemble the antenna with length L1 for a desired frequency of f1 but do not make the attachments to the end insulators permanent. Twisting the antenna wire at the insulators will suffice during adjustment.
- Raise the antenna to its desired position and determine the frequency of lowest SWR, f2.
- Assuming that f2 is too low (the antenna is too long), calculate the desired length.

$$\text{Length2} = \text{Length1} \times f2 / f1.$$

Trim the antenna to the desired length by removing equal amounts of wire on each end to maintain electrical balance at the feed point.

Example: A dipole intended to be used at 14.250 MHz is initially built with a physical length f 490 / 14.250 = 34.4 feet (34 feet 5 in).

Once in place, f2 is determined to be 13.795 MHz. Using step 3, the desired length should be 34.4× 13.795 / 14.250 = 33.3 feet and the antenna is 34.4 – 33.3 = 1.1 feet (1 foot 1 inch) too long.

Remove 6.5 inches from each end of the antenna. Coaxial lines present support problems as a concentrated weight at the centre of the antenna, tending to pull the centre of the antenna down, so care must be taken to make the feed point connections strong and provide support for the cable.

If a centre support or conveniently located tree is available, insulators with a rope attachment point can be used to support the weight.

The feed line should come away from the antenna at right angles for the longest practical distance so as to preserve electrical balance and minimize the effect of the feed line shield's outer surface on the antenna.

Adding a choke or current Balun at the feed point helps to electrically isolate the shield surface and prevent common-mode current from flowing on the feed line. Exact electrical balance is generally not critical for a dipole antenna to perform well.

Common-mode current induced on the dipole's feed line shield will radiate a signal that generally serves to partially fill in some of the dipole's pattern nulls.
Unless the common-mode current creates RF related problems in the station, a Balun is not required.

14.7 Shortening the Dipole

The simplest way to shorten a dipole is shown in Figure 9.2. If you do not have sufficient length between the supports, simply hang as much of the centre of the antenna as possible between the supports and let the ends hang down. The ends can be straight down or may be at an angle as indicated but in either case should be secured so that they do not move in the wind. As long as the centre portion between the supports is at least λ/4, the radiation pattern will be very nearly the same as a full-length dipole. The resonant length of the wire will be somewhat shorter than a full-length dipole and can best be determined by experimentally adjusting the length of ends, which may be conveniently near ground. Keep in mind that there can be very high voltages at the ends of the wires and for safety the ends should be kept out of reach.

Letting the ends hang down as shown is a form of capacitive end loading. Folding the ends back on the antenna is a type of linear loading. Both types of loading are discussed later in this chapter. While both techniques are efficient, it will also reduce the matching bandwidth — as does any form of loading.

Table 1: Starting Lengths for Amateur Band Dipoles

		Total Length of Di-Pole in Metres, (Radiator + Counterpoise)		
Freq (Mhz) : F	Band	143/F	148/F	150/F
1.850 Mhz	160 m	77.110m	80.000m	81.081m
3.650 Mhz	80 m	39.080m	40.548m	41.096m
7.100 Mhz	40 m	20.140m	20.845m	21.127m
14.200 Mhz	20m	10.070m	10.422m	10.563m
18.100 Mhz	17m	7.900m	8.176m	8.287m
21.300 Mhz	15m	6.713m	6.948m	7.042m
24.900 Mhz	12m	5.743m	5.944m	6.024m
28.000 Mhz	10m	5.107m	5.286m	5.357m
29.700 Mhz	10m	4.815m	4.983m	5.050m
69.900 Mhz	4m	2.046m	2.117m	2.146m
70.450 Mhz	4m	2.030m	2.101m	2.129m
145.400 Mhz	2m	0.983m	1.018m	1.032m

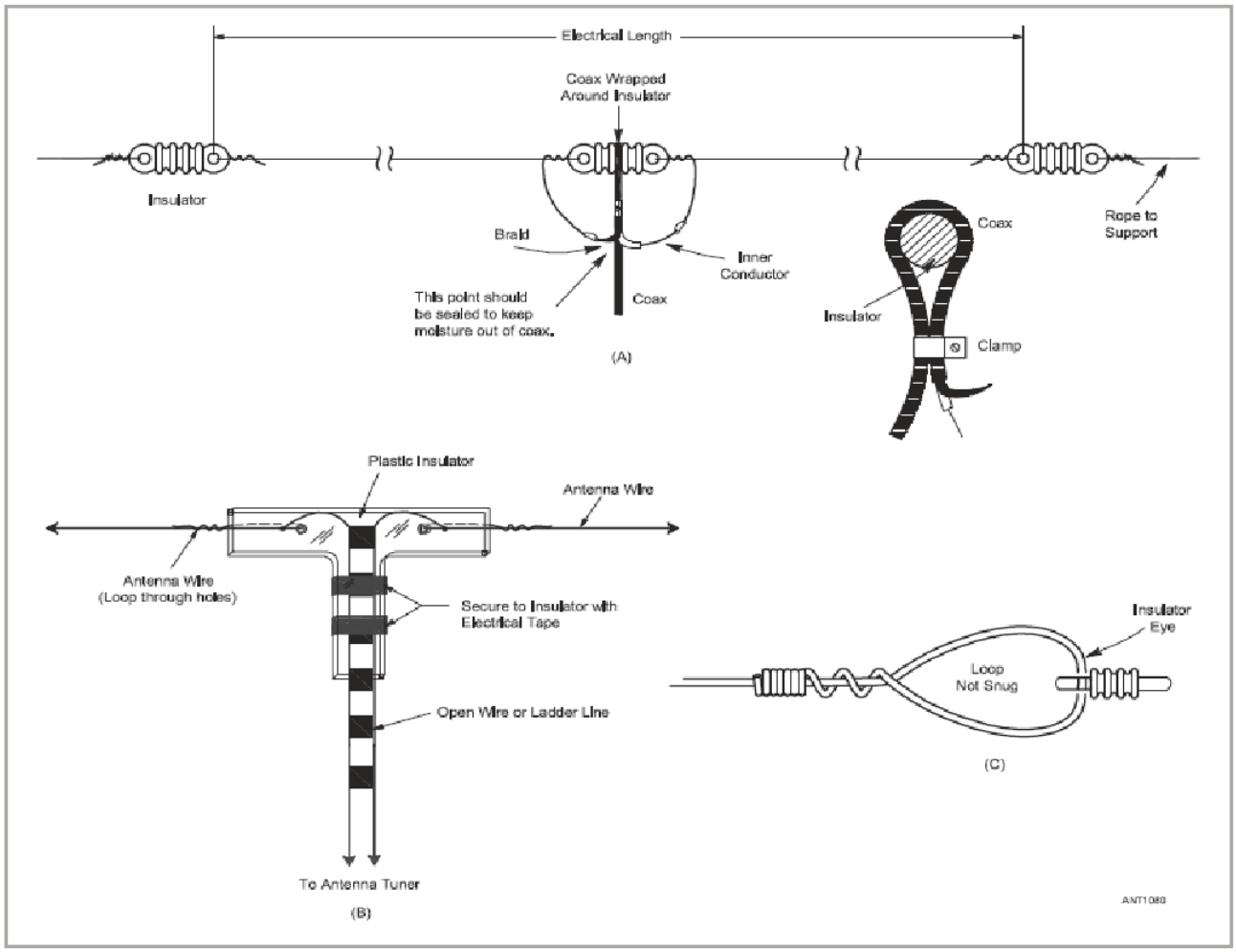


Figure 9.1 — Details of coax-fed dipole construction at A. The center-fed dipole is a balanced antenna and if coaxial cable feed line is used, a balun may be added at the feed point as described in the text. The dipole can also be fed with open-wire or ladder-line as shown at B. Detail of attaching an end insulator is shown at C. Note that the electrical length of the dipole extends to the tips of the loops of wire attached to the insulator.

APPENDIX 15 POWERPOLE CONNECTORS

Revision History

Author	Date	Revision	Comments
ELARC	30 Jan 2022	1.0	First draft

PowerPole Connector Assembly

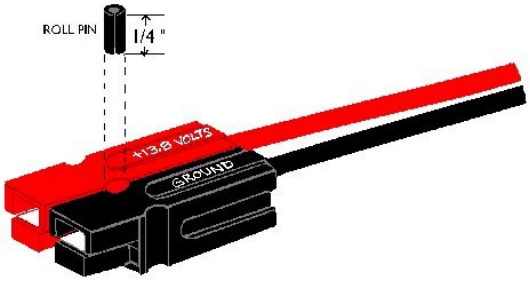
Assemble the red and black plastic housings together correctly on the first try, they fit snugly and can be difficult to get apart. See the picture on the right for accepted radio standard orientation. Note that you can assemble the red and black insulated housings in other ways for special applications.

Put the connector housings together before putting the connector pins in, this is easier, especially when using heavy paired wire.

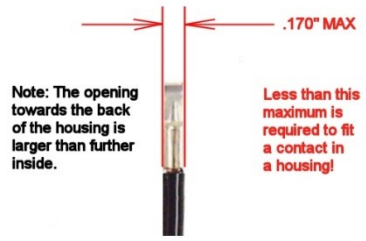
Before soldering or crimping the contacts on to heavy paired wire, orient the contacts so that they are both facing the correct direction so that they go in the housings without twisting the wire.

The plastic housings are held together with dovetail joints. Always slide these joints together! They will be damaged if you try to snap them together or apart. They ONLY slide together in one direction. This should be obvious by looking at them carefully.

Powerwerx recommends the use of slotted retaining pins. Others do not like the possibility of them falling out in service. If your application is critical and that you want to make the pairing permanent you can use a glue to hold the connector bodies together.

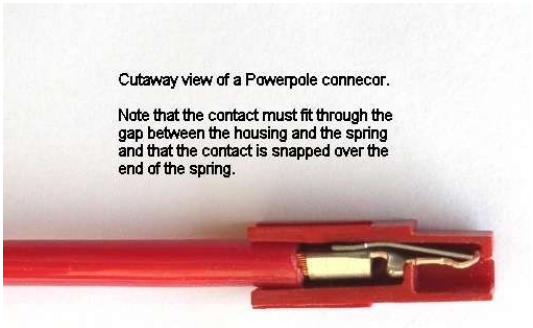


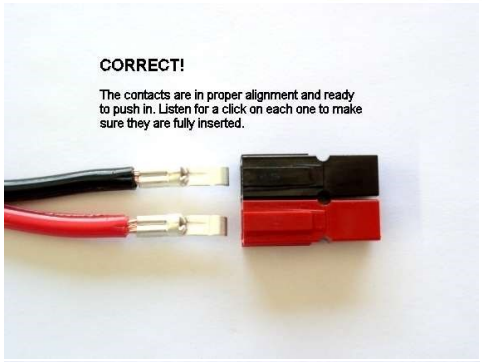
The contacts go in the housings in only one way. Insert the contacts with their sharp edge down against the flat spring that is in the housing. They should slide in and click. If you do not hear a click or they are not fully seated, fix them. When they are inserted fully you should notice that the contact and it's wire "floats" slightly inside it's housing. When looking in from the front of the housing the contact tip should slide over the top of the internal hosing spring. This is the clicking sound that you hear.

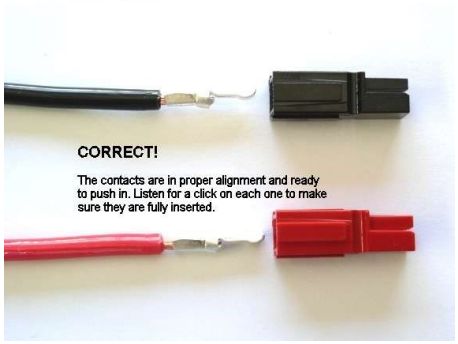


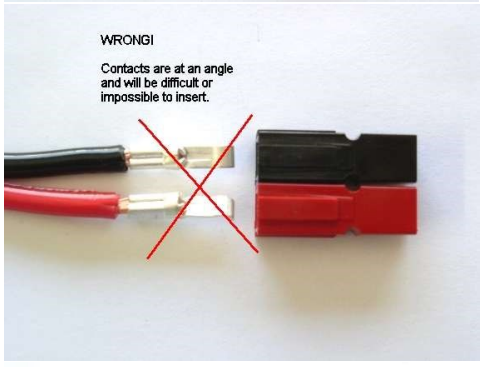
Be careful when crimping. You may make the contact out of round and it will not slide into the contact easily. This may occur with different types of crimpers and various gauges of wire. To fix this situation you may have to rotate the contact 90 degrees from the original crimping orientation and re-crimp either with the original crimper or a pair of pliers. In any case you need to make the barrel of the contact round again so it can slide in the housing.

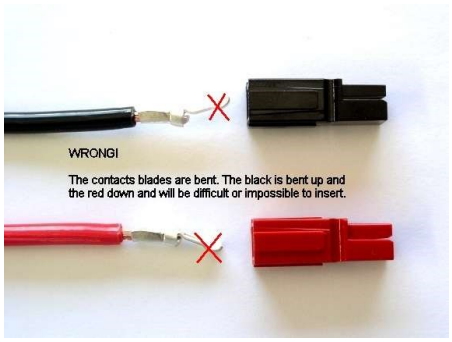
You will not be able to insert the contacts into the housings if they are too wide after soldering or crimping!

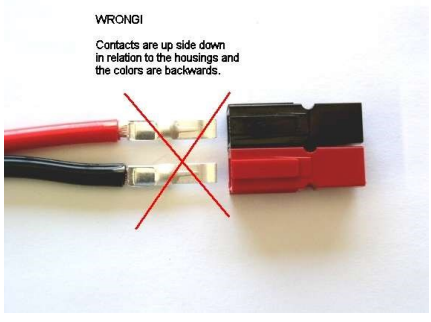












Tug slightly on the assembled connector to make sure the contacts are locked in place. If you have trouble getting the contact to lock in to the housing you may have squashed the contact wider deformed it somehow. Look at the side profile of the contacts before and after crimping, you may have to bend it back straight before inserting it in to the housing.

When soldering the contact pins, be careful not to use too much solder. Keep the solder inside, where the wire goes. If a blob of solder gets on the outside of the connector body you may have trouble putting the contact into the housing. If you get solder on the contact surface area you will not make a good contact.

When crimping the contact pins use a crimp that contains the wire completely inside the pin and doesn't spread the connector apart. A good crimp is one where the dimensions of the crimped portion are no more than an un-crimped pin. If the crimp is flattened out you will not be able to easily push the pin in to the body. If you bend the contact blade in relation to the crimp area you should straighten it before putting it in to the body.

It is possibly to use larger or smaller gauge wire with the 30 amp and 45 amp connectors. The 30 amp contacts will work with difficulty with #10 wire if you cut the end cleanly and carefully put each and every strand of that wire in to the pin. It may be is easier to use 45 amp connectors on #10 wire. Using 16 gauge or smaller wire in a 30 amp contact requires that you double or triple up the wire to fill the crimp receptacle of the contact to get a good crimp.

A properly crimped contact should have a minimum hold on the wire of more than 25 pounds. A pair of connectors should snap together with 6 to 8 pounds force.

Last but not least, make sure you have the polarity correct before plugging in your equipment. "Measure twice, cut once" as the saying goes.
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APPENDIX 16: FIELD DAY, PREPERATION CHECKLIST:

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

CLUB STATION

HAVE	LOCATION	ITEM(S)	STAGED	LOADED
		Radio (HF, VHF)		
		Radio Power Supply		
		Antenna Tuner (if Needed)		
		12 V. Battery (High Amp Hour Capacity, as needed)		
		12 V DC Distribution block, wiring, fuse blocks.		
		Batteries, Other (as needed for Lighting, Computer, etc)		
		Spare 12 V Fuses, (Various Amp ratings as needed)		
		Wattmeter/SWR Meter		
		Microphone(s)		
		Headset(s) (as needed)		
		Bug/Key (for CW operators)		
		Coax		
		Coax Jumpers		
		Coax Fittings/Adapters		
		Antenna(s)		
		Antenna Ropes/Guys		
		Guys Wire Stakes (as needed)		
		Mast(s)		
		Ground / Earth Stake, with Heavy Gauge Ground Wire		
		Paper Pads		
		Pencils/Pens		
		Computer (if needed)		
		Logging Software		
		Paper Logbook		
		Clip Board		
		Field Day Paperwork (Rules, Logs, etc)		
		Station Table (if needed)		
		Chair(s) Operator(s)		
		Chair(s) Logger(s)		
		Station Clock		
		Task Lighting for Operator / Logger		
		Area Lighting within Shelter		
		Area Lighting outside Shelter		
		(When 220 V AC available)		
		Power Strip/Surge Protector		
		3-Prong Adapter(s)		

		Extension Cord(s)		
		Copy of ComReg Operators License		
		Copy of ComReg Club License		

Miscellaneous Tools

HAVE	LOCATION	ITEM(S)	STAGED	LOADED
		Antenna Analyser		
		Electrical Multi-Meter		
		Screwdrivers, Various.		
		Hammer, Mallet,		
		Pliers, (Long-Nose, Stub-Nose, Snips)		
		Spanners, Adjustable / Various		
		Hack Saw		
		Drill w/ Bit Set		
		Staple Gun		
		Rubber mallet		
		Hammer, Sledge (small)		
		Jack, Hydraulic		
		Tape, Duck		
		Tape, Electrical		
		Tape, Masking		
		Tool Box, E-Tools		
		Soldering Iron/Gun		
		Solder		
		WD-40 or equivalent		
		Flashlight		
		Lamp, AC (spare bulb)		
		Lamp, Battery Operated/Crank		
		Antenna Launcher		
		Rope/Twine		
		Tarps, Various		
		Air Pump		
		Camera, Digital/Film		
		Camera Tripod		
		Alarm Clock		
		Magnifying Glasses		
		Spare copper cable.		

Lodging / Food / Water

HAVE	LOCATION	ITEM(S)	STAGED	LOADED
		Water (5 litres per person per day)		
		Stove with Fuel.		
		Food, (2,000 Calories per person per day)		
		Gazebo / Tent, (Shelter for Station)		
		Tents (Shelter for Operators).		
		First Aid Kit (Suitable for No of people & environment).		
		Fire Extinguisher, (Dry Powder or CO2)		
		Hazard / Warning Signage to inform the Public.		
		Hazard Tape for Antenna's, Masts and Guys.		

Suggested Instructions for use of this list:

HAVE	LOCATION		STAGED	LOADED
Preparing for Field Day:				
/	<<<<<<<<<< When you have acquired the Item put an "/" here			
/	Garage	<<<<<<<<< Where you have it stored goes here.		
When you have it ready to go for Field Day, put an "/" here >>>>>>>>>>>>			/	
When you have physically loaded it in the car or on the trailer, put an "/" here >>>>>>>>				/
After Field Day:				
When you have prepared (repacked) the item, put an "\" here >>>>>>>>>>>>			X	
When you have loaded the item into your vehicle/trailer, put an "\" here >>>>>>>>>>>>>				X
X	<<<<<<<<<<<<< When you have unloaded the item at home, put an "\" here			
Done! The item is back where you stored it and it is ready for the next Field Day.				
X	Garage	Item	X	X
Courtesy of John, WD8IQJ, (Silent Key) for the original version of this checklist.				

IARU Region 1 HF band plan

Effective 01 June 2016 edited by DK4VW

	FREQUENCY SEGMENT (kHz)	MAX BANDWIDTH (Hz)	PREFERRED MODE AND USAGE	
	135,7 - 137,8	200	CW	CW, QRSS, narrow band digital modes
	472 - 475	200	CW	CW, See NOTES
	475 - 479	(#)	Narrow band modes	CW, Digimodes See NOTES
1.8 MHz	1810 - 1838	200	CW	1836 kHz - CW QRP Centre of Activity
	1838 - 1840	500	Narrow band modes	
	1840 - 1843	2700	All modes (1)	Digimodes
	1843 - 2000	2700	All modes (1)	
3.5 MHz	3500 - 3510	200	CW	Priority for intercontinental operation
	3510 - 3560	200	CW	CW contest preferred 3555 kHz - CW QRS Centre of Activity
	3560 - 3570	200	CW	3560 kHz - CW QRP Centre of Activity
	3570 - 3580	200	Narrow band modes	Digimodes
	3580 - 3590	500	Narrow band modes	Digimodes
	3590 - 3600	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	3600 - 3620	2700	All modes (1)	Digimodes, automatically controlled data stations (unattended)
	3600 - 3650	2700	All modes (1)	SSB contest preferred 3630 kHz - Digital Voice Centre of Activity
	3650 - 3700	2700	All modes	3690 kHz - SSB QRP Centre of Activity
	3700 - 3775	2700	All modes	SSB contest preferred 3735 kHz - Image Centre of Activity 3760 kHz - R1 Emergency Centre of Activity
	3775 - 3800	2700	All modes	SSB contest preferred, Priority for intercontinental operation
5 MHz	5351.5 - 5354.0	200		CW, Narrow band modes see NOTES
	5354.0 - 5366.0	2700	All modes	USB recommended for voice operation (##) see NOTES
	5366.0 - 5366.5	20 (!)		Weak signal narrow band modes see NOTES
7 MHz	7000 - 7040	200	CW	7030 kHz - CW, QRP Centre of Activity
	7040 - 7047	500	Narrow band modes	Digimodes
	7047 - 7050	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	7050 - 7053	2700	All modes (1)	Digimodes, automatically controlled data stations (unattended)
	7053 - 7060	2700	All modes	Digimodes
	7060 -7100	2700	All modes	SSB contest preferred 7070 kHz - Digital Voice Centre of Activity 7090 kHz - SSB QRP Centre of Activity
	7100 - 7130	2700	All modes	7110 kHz - Region 1 Emergency Centre
	7130 - 7175	2700	All modes	SSB contest preferred 7165 kHz - Image Centre of Activity
	7175 - 7200	2700	All modes	SSB contest preferred, Priority for intercontinental Activity
10 MHz	10100 - 10130	200	CW	10116 kHz - CW QRP Centre of Activity
	10130 - 10150	500	Narrow band modes	Digimodes
14 MHz	14000 - 14060	200	CW	CW contest preferred, 14055 kHz - QRS Centre of Activity
	14060 - 14070	200	CW	14060 kHz CW QRP Centre of Activity
	14070 - 14089	500	Narrow band modes	Digimodes
	14089 - 14099	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	14099 - 14101		International Beacon Project	Beacons exclusively
	14101 - 14112	2700	All modes	Digimodes, automatically controlled data stations (unattended)
	14112 - 14125	2700	All modes	
	14125 - 14300	2700	All modes	SSB contest preferred 14130 kHz - Digital Voice Centre of Activity 14195 +/- 5 kHz - Priority for DX-peditions 14230 kHz - Image Centre of Activity 14285 kHz - SSB QRP Centre of Activity
	14300 - 14350	2700	All modes	14300 kHz - Global Emergency Centre of Activity

IARU Region 1 HF band plan

Effective 01 June 2016 edited by DK4VW

	FREQUENCY SEGMENT (kHz)	MAX BANDWIDTH (Hz)	PREFERRED MODE AND USAGE	
18 MHz	18068 - 18095	200	CW	18086 kHz - CW QRP Centre of Activity
	18095 - 18105	500	Narrow band modes	Digimodes
	18105 - 18109	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	18109 - 18111		International Beacon Project	Beacons exclusively
	18111 - 18120	2700	All modes	Digimode, automatically controlled data stations (unattended)
	18120 - 18168	2700	All modes	18130 kHz - SSB QRP Centre of Activity 18150 kHz - Digital Voice Centre of Activity 18160 kHz - Emergency Centre of Activity
21 MHz	21000 - 21070	200	CW	21055 kHz - QRS Centre of Activity 21060 kHz - QRP Centre of Activity
	21070 - 21090	500	Narrow band modes	Digimodes
	21090 - 21110	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	21110 - 21120	2700	All modes	Digimodes, automatically controlled data stations (unattended), (not SSB)
	21120 - 21149	500	Narrow band modes	
	21149 - 21151		International Beacon Project	Beacons exclusively
	21151 - 21450	2700	All modes	21180 kHz - Digital Voice Centre of Activity 21285 kHz - SSB QRP Centre of Activity 21340 kHz - Image Centre of Activity 21360 kHz - Global Emergency Centre of Activity
24 MHz	24890 - 24915	200	CW	24906 kHz - CW QRP Centre of Activity
	24915 - 24925	500	Narrow band modes	Digimodes
	24925 - 24929	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	24929 - 24931		International Beacon Project	Beacons exclusively
	24931 - 24940	2700	All modes	Digimodes, automatically controlled data stations (unattended)
	24940 - 24990	2700	All modes	24950 kHz - Centre of Activity SSB QRP 24960 kHz - Digital Voice Centre of Activity
28 MHz	28000 - 28070	200	CW	28055 kHz - QRS Centre of Activity 28060 kHz - QRP Centre of Activity
	28070 - 28120	500	Narrow band modes	Digimodes
	28120 - 28150	500	Narrow band modes	Digimodes, automatically controlled data stations (unattended)
	28150 - 28190	500	Narrow band modes	
	28190 - 28199		International Beacon Project	Regional time shared beacons, exclusively
	28199 - 28201		International Beacon Project	Worldwide time shared beacons, exclusively
	28201 - 28225		International Beacon Project	Continuous duty beacons, exclusively
	28225 - 28300	2700	All modes	Beacons
	28300 -28320	2700	All modes	Digimodes, automatically controlled data stations (unattended)
	28320 - 29000	2700	All modes	28330 kHz - Digital Voice Centre of Activity 28360 kHz - SSB QRP Centre of Activity 28680 kHz - Image Centre of Activity
	29000 - 29100	6000	All modes	
	29100 - 29200	6000	All modes	FM simplex - 10 kHz channels
	29200 - 29300	6000	All modes	Digimodes, automatically controlled data stations (unattended)
	29300 - 29510	6000	Satellite Links	
	29510 - 29520		Guard Channel	
	29520 - 29590	6000	All modes	FM-Repeater input (RH1 - RH8)
	29600	6000	All modes	FM Calling channel
	29610	6000	All modes	FM Simplex-Repeater (parrot, input + output)
	29620 - 29700	6000	All modes	FM-Repeater output (RH1-RH8)

DEFINITIONS

All modes	CW, Phone and those other modes listed as Centres of Activity, plus AM (consideration should then be given to adjacent channel users)
Narrow band modes	All modes using up to 500 Hz bandwidth, including CW, RTTY, PSK etc.
Digimodes	Any digital mode within the appropriate bandwidth, e.g. RTTY, PSK, MT63 etc.
Image modes	Any analogue or digital image modes within the appropriate bandwidth, e.g. SSTV, FAX

NOTES

The frequencies in the bandplan are understood as “transmitted frequencies” (not those of the suppressed carrier!)

(1)	Lowest dial setting for LSB Voice mode: 1843, 3603, 7053 kHz
(#)	maximum bandwidth not specified, 500 Hz suggested
(##)	Highest dial setting for USB Voice mode on the 60m band: 5363 kHz

CW	CW QSOs are accepted across all bands, except within beacon segments. (DV05_C4_Rec_13)
Sideband usage	Sideband Usage: Below 10 MHz lower sideband (LSB) is recommended, and above 10 MHz use upper sideband (USB). The exception to this is on the 5 MHz band where USB is recommended.
AM	Amplitude modulation (AM) may be used in the telephony sub-bands providing consideration is given to adjacent channel users. (NRRL Davos 05).
OUT OF BAND:	To prevent any out of band transmission the maximum dial setting for USB (upper sideband) Voice mode should be 3 kHz below upper band edge on bands 20m to 10m.

630m band - 472 - 479 kHz:
Details shown in band plan above should be understood as "proposed usage" (VA14_C4_Rec_02)

If a frequency is to be selected, particular attention must be paid to still existing Non Directional Beacons (NDB) of the radionavigaton service!

60m band - 5351.5 - 5366.5 kHz
Details shown in band plan above should be understood as "proposed usage" (LA17_C4_REC_02)

It is strongly recommended that frequencies within WRC-15 allocation only be used if there are no other frequencies available at 5 MHz under domestic (ITU-R article 4.4) permissions.
Local nets and long rag chew QSOS should not use the WRC-15 allocation at 5 MHz but should instead make use of the 3.5 MHz, 5 MHz domestic, or 7 MHz bands where there is more spectrum available.

Contests

Contest activity shall not take place on the 5, 10, 18 and 24 MHz bands.

Non-contesting radio amateurs are recommended to use the contest-free HF bands (30, 17 and 12m) during the largest international contests. (DV05_C4_Rec_07)

Member societies are encouraged to publish contest operating segments clearly in the rules of their contest and that those segments are considered with due respect to the IARU band plans. (Rec SC11_C4_02).

The CW contest-preferred segment from 7000-7025 kHz has been withdrawn from the Region 1 band plan. Societies should (therefore) encourage contest organisers to include a rule that restricts contest activity to a limited frequency range within the CW allocation. The choice of the frequency segment is left to the disccretion of the contest organisers, but should take into account expected activity levels and show consideration for non-contest operation. (SC11_C4_Rec_05).

Unmanned transmitting stations

The term “automatically controlled data stations” includes Store and Forward stations.

Member Societies are reminded of the recommendation in the IARU Region 1 HF Band Plan ‘that any unmanned transmitting stations on HF shall only be activated under operator control, except for beacons agreed with the IARU Region 1 Beacon Coordinator’.

Unmanned transmitting stations, and operation involving unmanned transmitting stations, must adhere to the frequency and bandwidth limits of the band plan.
The operator connecting to an automatically controlled unmanned transmitting station is responsible for not causing interference.
This is particularly important in the 30 meter band where the amateur service only has secondary status.
Amateur radio operators may transmit messages via unmanned transmitting stations during coordinated emergency, and disaster preparedness exercises, limited to the duration of such exercises, using a bandwidth not exceeding 2 700 Hz.
Such communication should be announced regularly on the frequency, and radio amateurs not participating in the communication should cooperate by not transmitting on the frequency. (VA14_C4_Rec_06)

Remote controlled operation on HF

Remote controlled operation is defined to mean operation where a licensed operator controls an amateur radio station from a remote control terminal.
Where a station is operated remotely, the following conditions shall apply:
Remote operation must be permitted, or not objected to, by the Regulatory Authority of the country where the station is located.

1. The call sign to be used should be the call sign issued by the Regulatory Authority of the country in which the station is located. This applies irrespective of the location of the operator.
2. It should be noted that the CEPT T/R 61-01 agreement only applies to people using their own call sign, with the appropriate country prefix, when the operator is actually vising that country, not for operation.
3. Any further requirements regardingthe participationof remotely controlled stations in contests or award programms are a matter for the various contests or award program organisers. (SC11_C4_REC_07) , (VA14_C4_REC_04)

History

2005 Davos	Introduction of band plan by bandwidth.	Effective 1 January 2006
2008 Cavtat	Several modifications	Effective 29 March 2009
	CW segment extended from 7000-7035 kHz to 7000-7040 kHz. Narrow band modes, digimodes segment moved and extended from 7035-7038 kHz to 7040-7047 kHz.	
	Narrow band modes, digimodes, segment for automatically controlled stations (unattended) moved and extended from 7038-7040 kHz to 7047-7050 kHz.	
	All modes, digimodes, segment for automatically controlled stations (unattended) moved from 7040-7043 kHz to 7050-7053 kHz.	
	Introduction of all modes, digimodes segment 7053-7060 kHz.	
	Introduction of CW preferred contest segment 7000-7025 kHz.	
	Introduction of SSB preferred contest segments 7060-7100 kHz and 7130-7200 kHz	
	Introduction of Digital Voice Activity Centres: 3630 kHz, 7070 kHz, 14130 kHz, 18150 kHz, 21180 kHz, 24960 kHz, 28330 kHz.	
2011 Sun City	Several modifications	Effective 17 August 2011
	CW contest preferred segment 7000-7025 kHz withdrawn.	
	Segment 29100-29200 kHz changed from max. bandwidth 2700 Hz to max. 6000 Hz.	
	Introduction of new segment 29100-29200 kHz for FM simplex operation (10 kHz channels).	
	Removal of FM simplex channels 29520-29550 kHz and 29610-29650 kHz. Number of FM Repeater channels increased to eight; former FM simplex channels became new repeater input, respectively repeater output channels.	
	FM repeater channels renumbered, RH1 = 29520 kHz / 29620 kHz, RH8 = 29590 kHz / 29690 kHz	
	Introduction of FM Simplex Repeater 29610 kHz (parrot, input + output)	
2014 Varna	Several modifications	Effective 26 September 2014
	Change of max. bandwidth from 2700 Hz to max. 6000 Hz in segment 29000 - 29100 kHz.	
	Satellite segment 29300 - 29510 kHz: removal of downlink restriction	
2016 Vienna	Several modifications * * to be ratified at 2017 General Conference	Effective 01 June 2016
	Digimode segment with max. bandwidth of 500 Hz extended from 10130 kHz to 10150 kHz	
	Introduction of Digimode segment 3570 kHz - 3580 kHz with max. bandwidth of 200 Hz	

IARU Region 1 UHF band plan

Effective December 2020 (VGC - Novi Sad) edited by ON4AVJ (18/03/2020)

	FREQUENCY SEGMENT (MHz)	MAX BANDWIDTH (Hz)		PREFERRED MODE AND USAGE
430 -440 MHz	430,000 - 431,975	20 KHz	all mode	430.025 - 430.375 FM repeater output (1.6 MHz shift) 430.400 - 430.575 digital communications 430.600 . 430.925 digital communications repeater channels 430.925 - 431.025 multimode channels 431.050 - 431.825 Repeater input channel freqs 7.6 MHz shift 431.625 - 431.975 Repeater input channels (1.6MHz shift)
	432,000 - 432,100	500	MGM &Telegraphy	432.050 Telegraphy Centre of activity
	432,100 - 432,400	2700	MGM, Telegraphy &SSB	432.200 SSB centre of activity 432.350 Microwave talkback centre of acitivity 432.370 Meteo Scatter centre cf activity
	432,400 - 432,490	500	MGM &Telegraphy	Beacons Exclusive
	432,191 -432,193	500	EMGM	Experimental MGM
	432,500 - 432,975	12 KHz	all mode	432.500 New APRS frequency 432,600-432,9875 REPEATER INPUT REGION 1 STANDARD, 25 kHz spacing, 2 MHz shift(Channel freq 432.600 - 432.975MHz)
	433,000 -433,375	12 KHz	FM / Digital Voice repeaters	REPEATER INPUT REGION 1 STANDARD, 25 kHz spacing, 1.6 MHz shift
	433,400 - 433,575	12 KHz	FM / Digital Voice	433.400 SSTV (FM/AFSK) 433.450 Digital Voice calling 433.500 FM calling
	433,600 - 434,000	none	all mode	433.625 - 433.775 Digital communications channels 434.000 Centre frequency of digital experiments
	434,000 - 434,594	12 KHz	All mode - ATV	434.450-434.575 Digital communications channels
	434,594 - 434,981	12 KHz	All mode	434.600-434.9875 Repeater Output (12.5 Khz spacing 1.6 or 2MHz shift)
	435,000 -436,000	none	Sattelite service	
	436,000 -438,000	none	Sattelite service & DATV/data	DATV/data centre of activity
	438,000 -440,000	none	All mode	438.025 - 438.175 Digital communication channels 438.200 - 438.525 Digital communication repeater channels 438.550 - 438.625 Multi mode 438.650 - 439.425 Repeater output channels (7.6 MHz shift) 439.800 - 439.975 Digital communication link channels

1240 -1300 MHz	1240,000 -1240,500	2700	all modes	Reserved for the future
	1240,500 - 1240,750	500	MGM & Telegraphy	Beacons (reserved for the future)
	1240,750 - 1241,000	20 Khz	FM/ Digital Voice	Reserved for the future
	1241,000 - 1243,250	20 Khz	all modes	1242.025 - 1242.250 repeater output 1242.275 - 1242.700 repeater output 1242.725 - 1243.250 Digital communications
	1243,250 - 1260,000	*	(D)ATV	1258.150 - 1259.350 Repeater output
	1260,000 - 1270,000	*	Sattelite service	
	1270,000 - 1272,000	20 Khz	all modes	1270.025 - 1270.700 Repeater input 1270.725 - 1271.250 Digital Communication
	1272,000 - 1290,994	*	(D)ATV	
	1290,994 - 1291,481	20 Khz	FM/ Digital Voice	Repeater Input 25 KHz spacing
	1291,494 - 1296,000	*	all modes	1293.150 - 1294.350 repeater input R20 - R68
	1296,000 - 1296,150	500	MGM & Telegraphy	1296.000 - 1296.025 Moonbounce 1296.138 PSK31 Centre of activity
	1296,150 - 1296,800	2700	MGM, Telegraphy & SSB	1296.200 Narrow band centre of activity 1296.400 - 1296.600 linear transponder input 1296.500 fax 1296.600 Narrowband data centre of activity (MGM,RTTY,...) 1296.600 - 1296.700 lineartransponder output 1296.741- 1296.743 experimental MGM (500Hz) 1296.750 - 1296.800 local beacons
	1296,800 - 1296,994	500	MGM & Telegraphy	Beacons exclusive
	1296,994 - 1297,481	20 Khz	FM/ Digital Voice	Repeater Output 25 KHz spacing
	1297,494 - 1297,981	20 Khz	FM/ Digital Voice	1297.500 SM20 1297.500 centre of FM acitivity 1297.725 digital voice calling frequency 1297.900 - 1297.975 Simplex FM internet gateways 1297.975 SM39
	1298,000 - 1299,000	20 Khz	all modes	General mixed analogue or digital use 25 KHz spacing channels 1298.025 RS1 1298.975 RS39
	1299,000 - 1299,750	150 KHz	all modes	Arranged as 5 x150kHz channels for high speed Digital Data (DD) usage: Centres: 1299.075, 1299.225, 1299.375, 1299.525, 1299.675 MHz (+/- 75kHz)
	1299,750 -1300,000	20 Khz	all modes	8x25kHz channels (available for FM/DV use) : Centres: 1299.775-1299.975

* Bandwidth limits according to national regulations.

2300 - 2450 MHz	2300,000 - 2320,000	20 KHz	all modes	2304 - 2306 Narrow band segment in countries where the 2320-2322 segment is not available 2308 - 2310 Narrow band segment in HB
	2320,000 -2320,800	none	all modes	2320.000-2320.025EME 2320.200 SSB centre of activity 2320.750-2320.800 Local Beacons(10W ERP max)
	2320,800 - 2321,000		MGM & Telegraphy	Beacons exclusive
	2321,000 - 2322,000	20 KHz	FM / Digital Voice	Voice simplex and repeaters
	2322,000 - 2400,000	none	all modes	2322.000-2355.000 ATV 2355.000-2365.000 Digital communications 2365.000-2370.000 Repeaters 2370.000-2392.000 ATV 2392.000-2400.000 Digital communications
	2400,000 - 2450,000		amateu sattelite service	2400 - 2402 Narrow band segment in countries where the 2320-2322 segment is not available 2427.00 - 2443.00 ATV if no satellite uses this segment

IARU Region 1 VHF band plan

Effective December 2020 (VGC Novi Sad) edited by ON4AVJ (02/12/2020)

	FREQUENCY SEGMENT (kHz)	MAX BANDWIDTH (Hz)		PREFERRED MODE AND USAGE
50 MHz	50,000 - 50,100	500	Coordinated Beacon Project	000 - 010 Region 1, 010-020 Region 2, 020-030 Region 3
			Telegraphy	50,050 centre of activity 50,090 intercontinental centre of activity
	50,100 - 50,200	2700	SSB and Telegraphy	50,100-50,130: intercontental.Centre of activity: 50,110 50,130-50,200: international. Centre of activity: 50,150
	50,200 - 50,300	2700	SSB and Telegraphy	General use. 50,285: crossband
	50,300 - 50,400	2700	Narrow band modes, MGM	50.305 PSK Center of activity 50.310 - 320 EME center of activity 50.320 - 380 MS center of activity
	50,400 - 50,500	1000	MGM and Telegraphy	Beacons exclusive (50.401 MHz +/- 500Hz WSPR Beacons)
	50,500 - 52,000	12 KHz	all mode	50.510 SSTV 50.520 - 540 Simplex FM Internet Voice Gateways 50.550 Image working frequency 50.600 RTTY (FSK) 50.620 - 750 Digital communications 50.630 Digital Voice (DV) calling 51.210 - 390 FM/DV Repeater Inputs 51.410 - 590 FM/DV Simplex 51.510 FM calling frequency 51.810 - 51.990 FM repeaters output channels
	50,500 -50,700	none	all mode	50.540 - 580 Simplex FM/DV Internet Voice Gateways 50.600-50.700 Digital communications; including 50.630 DV calling
	50,700 -50,900	12 KHz	FM/Digital voice	50.710 - 50.890 FM/DV repeater output channels
	50,900 -51,200	none	all mode	For wideband digital experiments
	51,200 -51,400	12 KHz	FM/Digital voice	51.210 - 390 FM/DV Repeater Input channels
	51,400 - 52,000	none	all mode	51.410 - 590 FM/DV Simplex 51.510 FM calling frequency 51.810 – 990 FM/DV repeaters output channels For wideband digital experiments
	52,000 - 54,000	500 KHz	all mode	

70 MHz	70,000 - 70,090	1000	MGM and Telegraphy	Coordinated beacons
	70,090 - 70,100	1000	MGM and Telegraphy	Temporary and personal beacons 70.091 Personal WSPR beacons
	70,100 - 70,250	2700	SSB, Telegraphy, MGM	70.185 Crossband center of activity 70.200 Centre of activity CW/SSB calling 70.250 Centre of activity MS
	70,250 - 70,294	12 KHz	AM, FM	70.260 AM/FM calling 70.270 MGM centre of activity
	70,294 - 70,500	12 KHz	FM Channels 12,5 KHz spacing	70.3125 digital communications 70.3250 digital communications 70.4500 FM calling 70.4875 digital communications

144 MHz	144,000 -144,025	2700	all mode	sattelite downlink only
	144,025 -144,100	500	Telegraphy	144.050 Telagraphy calling 144.100 Random MS
	144,100 - 144,150	500	MGM and Telegraphy	144.110-144-160 CW and MGM EME
	144,150 - 144,400	2700	SSB, Telegraphy, MGM	144.195-144.205 Random MS SSB 144.300 SSB Centre of activity
	144,400 - 144,490	500	MGM and Telegraphy	Beacons exclusive
	144,491 - 144,493	500	Personal weak signal MGM Beacons	Experimental MGM
	144,500 - 144,794	20 KHz	All mode	144.500 Image mode centre (SSTV, Fax,...) 144.600 Data Centre of activity (MGM, RTTY,..) 144.750 ATV Talk back
	144,794 - 144,9625	12 KHz	MGMDigital Communication	144.800 APRS 144.8125 DV internet voice gateway 144.8250 DV internet voice gateway 144.8375 DV internet voice gateway 144.8500 DV internet voice gateway 144.8625 DV internet voice gateway
	144,975 - 145,194	12 KHz	FM/Digital Voice	Repeater input exclusive
	145,194 - 145,206	12 KHz	FM/Digital Voice	Space Communication
	145,206 - 145,5625	12 KHz	FM/Digital Voice	145.2375 FM Internet Voice Gateway 145.2875 FM Internet Voice Gateway 145.3375 FM Internet Vocie Gatway 145.375 digital voice calling 145.500 FM calling
	145,575 - 145,7935	12 KHz	FM/Digital Voice	Repeater output exclusive
	145,794 - 145,806	12 KHz	FM/Digital Voice	Space Communication
	145,806 -146,000	12 KHz	All mode	Sattelite exclusive

APPENDIX 20: IARU REGION 1, BAND PLAN:

Band											
160m	CW (QRP)		Narrow Digimodes	All Mode, no FM							
	1,810	1,838	1,840	2,000							
80m	CW (intercontinent)		CW (contest)	CW (QRP)	Narrow Digimodes	All Mode, no FM	Global Emergency				
	3,500	3,510	3,560	3,580	3,600	3,800	3,760				
40m	CW		Narrow Digimodes	All Mode, no FM	Global Emergency Centre						
	7,000	7,040	7,050	7,200	7,110						
30m	CW		Narrow Digimodes								
	10,100	10,140	10,150								
20m	CW		Narrow Digimodes	Beacons	All Mode, no FM	Global Emergency Centre					
	14,000	14,080	14,099	14,101	14,350	14,300					
16m	CW		Narrow Digimodes	Beacons	All Mode, no FM	Global Emergency Centre					
	18,068	18,095	18,109	18,111	18,168	18,160					
14m	CW		Narrow Digimodes	All Mode, no FM, no SSB	Narrow Digimodes	Beacons	All Mode, no FM	Global Emergency Centre			
	21,000	21,070	21,110	21,120	21,149	21,151	21,455	21,360			
12m	CW		Narrow Digimodes	Beacons	All Mode, no FM						
	24,890	24,915	24,929	24,931	24,990						
10m	CW		Narrow Digimodes	Beacons	All Mode, no FM	All Mode	Satelite Downlink	Guard Channel	FM Repeater Input	All mode	FM Repeater Output
	28,000	28,070	28,190	28,225	29,100	29,300	295,110	29,520	29,590	29,620	29,700
6m	Beacons		CW	All Mode, no FM	All Mode						
	50,020	50,080	50,100	50,500	52,000						
4m	CW		Beacons	All Mode, no FM, no AM	AM/FM	12.5kHz FM					
	70,000	70,090	70,100	70,250	70,294	70,500					
2m	E.ME USB CW		CW	SSB	Beacons	All Mode	Digimodes	Repeater Input	12.5kHz Channels	Repeater Output	Satelite
	144,000	144,035	144,150	144,400	144,500	144,800	144,994	145,194	145,594	145,800	146,000
70cm	Repeater Output		Narrow Digimodes	Repeater Input	CW	Digimodes	Beacons	Repeater Input	25kHz Channels	All Mode	ATV	Multimode / Digimodes
	430,000	430,400	431,050	432,000	432,150	432,800	432,990	433,400	433,600	434,000	438,000	440,000

APPENDIX 21: FIELD STATION LOG:

REVISION HISTORY

Author	Date	Revision	Comments
ELARC – EI0EL	30 June 2022	1.0	First draft

Notes:

FIELD STATION LOG: **Station Callsign:**_____ **Operator Name:**_____

STATION CALLED	OPERATOR CALLED	TIME (UTC)	DATE	FREQUENCY (MHz)	MODE	REPORT		COMMENTS: (Power, QTH, Rig, Antenna, etc.)
						SENT	REC.D	

FIELD STATION LOG: **Station Callsign:**_____ **Operator Name:**_____

STATION CALLED	OPERATOR CALLED	TIME (UTC)	DATE	FREQUENCY (MHz)	MODE	REPORT		COMMENTS: (Power, QTH, Rig, Antenna, etc.)
						SENT	REC.D	