

LWC Internal Communications System Radio Test

LWC Safety Committee (15-August-2024)

➤ Why did you conduct this test?

- We wanted to check radio coverage throughout LWC when transmitting from the Crow's Nest (3rd floor) LWC Rec Center.
- We wanted to compare reception and transmission with 2 different handheld radios and 1 mobile radio.

➤ How did you conduct this test?

- Mike Tomlinson used a Midland MXT275[®] mobile radio transmitting at 15 watts on Channel 15 with a 6-inch whip antenna mounted on a 13 X 13-inch metal ground plane at a height above the bottom of the two upper windows in the Crow's Nest of the LWC Rec Center.
- Bill Albright drove/walked to different locations throughout LWC carrying a BTECH GMRS-PRO[®] *high-end* radio transmitting at 5 watts and a Midland T51 X-Talker[®] *low-end* radio transmitting at 2 watts (see below).
- We used the RST Signal Reporting System where "R" is *Readability* (on a scale from 1 to 5) and "S" signal *Strength* (on a scale from 1 to 9) but Readability was most important for our purpose.



BTECH GMRS-PRO[®]
Maximum Power = 5 watts
(requires a GMRS license)



Midland T51 X-Talker[®]
Maximum Power = 2 watts
(does not require a GMRS license)

- **Did you test anything else?**
 - Yes, we also tested the reception of the Midland MXT275[®] mobile radio (with the antenna located inside the Crow's Nest at the Rec Center) of transmissions from each LWC location with the handheld BTECH and the Midland radios.

- **Before discussing the results, is there anything else we should know about this test?**
 - Yes, the results represent only a snapshot. There are many factors that can affect radio reception including, but not limited to:
 1. Type of radio and transmission power;
 2. Type and location of the antenna;
 3. Precise location of the user;
 4. Topography, buildings, and vegetation between radios;
 5. Atmospheric weather; and
 6. *Space weather* such as high solar activity.
 - Also, remember that during the test, reception and transmission from the various areas around LWC were always conducted **outside**. Reception and transmission from **inside** a home in these same areas may not be as good. And Safety Captains who are in their homes may find that communication depends on where in their home they are located.
 - Nevertheless, that being said, the results should provide some idea of what radio reception might be like throughout LWC when transmitting from the Crow's Nest of the LWC Rec Center with a higher-powered mobile GMRS radio (with the antenna **inside**).

- **So, what did you find when you conducted this test?**
 - Bill reported that readability throughout LWC (**outside**) was mostly R = 5 ("Perfectly Readable") with some locations at R = 4 ("Readable with practically no difficulty"). He also reported that sometimes the less powerful T51 X-Talker[®] received a clearer transmission. This **may** be attributed to the fact that this radio has an auto-squelch feature. You can almost think of "squelch" as radio sensitivity. If a signal is too weak for reception of anything but noise, the radio cuts off. On some radios, this can be adjusted by the user; however, the X-Talker radios have a built-in auto-squelch feature which seems to work fairly well.
 - The table on the next page indicates the reception (readability and strength) at the Crow's Nest in the LWC Rec Center from the 2-watt T51 X-Talker[®] radio (R = 4 or 5) and 5-watt GMRS-PRO[®] radio (with one exception, R = 5 in 16 transmissions) from different locations within LWC and an R = 5 from the top step of the Depoe Bay City Hall!

LWC Internal Communications System (ICS) Radio Test Log

Date:		15-Aug-24		Channel:		FRS/GMRS 15 @ 15 watts
Time:		1510-1620		Location:		LWC Rec Center Crow's Nest
Event:		ICS Radio Test, MXT275 & Mag-Mount 6" Antenna		ICS Control:		Michael Tomlinson
Safety Area	Location Description (Street & #, other)	T51 X-Talker		GMRS-PRO		Comments
		Readability (1-5)*	Strength (1-9)*	Readability (1-5)*	Strength (1-9)*	
1		5	9	5	9	Using a steel 13 x 13-inch ground plane
2		4	7	5	9	cul-de-sac
3		5	9	5	9	cul-de-sac
4	Breakers Scarp	5	9	5	9	
	475 Overlook	4	8	5	9	Paul Caldron
5		5	9	5	9	
6		4	8	5	9	
7		5	7	5	9	
8		5	9	5	9	
9						
10						
11		5	9	5	9	141 The Pines
12						The ravine on Tintinnabulary (see below)
13		5	9	5	9	The ravine on Tintinnabulary
		5	9	5	9	cul-de-sac
14						
15		4	7	5	9	
Other						
Gate House		5	9	5	9	No discernible difference between radios
North Gate						
SOC						
E Heli-Drop						
W Heli-Drop						
Cove		4	6	4	8	
4		4	7	5	9	440 Overlook (Safety Area #4)
Other	Depoe Bay City Hall	---	---	5	8	On top step, no reception from parking
						Weather - No rain

* Refer to Radio RST Signal Reporting System

- **Do you have any suggestions regarding radios after this test?**
- Yes, first and foremost, please consider getting a Midland T51 X-Talker® (dual power option) **or** some other equivalent **pre-programmed** FRS (Family Radio Service) radio and get used to turning the radio on to Channel 7 whenever something untoward (power outage, smoke in the neighborhood, etc.) happens. **It does not have to be an emergency for the Safety Committee to activate the ICS or Internal Communication System!** For example, a Safety Captain may activate the ICS if the power is off in their Safety Area, in part, to see if other areas are without power. If the problem persists, a Safety Captain will be selected to serve as ICS Control and may transmit periodically with updated information from the Rec Center (to improve coverage) until the issue is resolved.
 - If a problem transitions to a **declared emergency**, the Lincoln County Sheriff's Office (LCSO) may activate the Auxiliary Communication Service (ACS) and its ham radio operators. At that time, LWC's Net Control (typically a ham radio operator) will take over external communications and keep members of the LWC ICS, particularly Safety Captains, apprised of status.
 - If you would like to serve as a Safety Captain, consider purchasing a **GMRS-certified radio** such as the BTECH GMRS-PRO® or one of the other GMRS-certified and possibly less expensive radios. These radios require a GMRS license which is inexpensive and easy to obtain but you can legally transmit on Channel 7 at 5 watts (refer to the bullet discussing this further). Please note that many of the Baofeng ham radios are **not** GMRS-certified (but virtually any radio can be used in a home- or life-threatening emergency **but ONLY if it is an EMERGENCY and in these cases, you should try "911" on your phone first!**).
 - Please note that **911** should **only be used for home- or life-threatening emergencies** (e.g., house fire or life-threatening medical emergency, respectively). It is **important** that these guidelines are followed. If 911 is called when the power goes off (for example), the 911 system will quickly become overloaded, and it will go down. The key words for **911** are "**home- or life-threatening emergencies**".
 - While there are a number of GMRS-certified radios available, the BTECH GMRS-PRO®, while more expensive (Amazon currently sells this radio for \$155), is one good choice because:
 1. It transmits at 5 watts;
 2. It is pre-programmed with the GMRS and NOAA NWS weather channels;
 3. It can monitor two channels at a time;

4. You can add other channels (listening only) easily with the app, Bluetooth[®], and your smartphone; and
 5. It has a built-in compass and GPS (global positioning system).
- Other choices for GMRS-certified radios (some less expensive) that require licenses include, but are not limited to:
 1. Wouxun (pronounced Oh Sheng) Model KG-935G Plus[®] radio. Buy Two Way Radios currently sells this radio for \$150. Wouxun also sells a number of other GMRS-certified radios for less cost.
 2. Baofeng GMRS-9R GMRS Radio Waterproof IP67 Two Way Radio which is currently available from Amazon for \$43. In addition to this particular radio, Baofeng sells other GMRS-certified radios offering differing features and costs.
 3. Remember, GMRS-certified radios:
 - a. require a **GMRS license**,
 - b. are **pre-programmed**, and
 - c. some allow the user to **listen (only)** to ham and other radio transmissions.
 - The Safety Committee is considering the idea of switching from Channel 7 to one of the channels between 15 and 22. This would allow someone with a mobile (**not** handheld) GMRS radio to transmit up to 50 watts, although we will most likely limit our transmission to 20 watts or less, so we cover LWC but do not interfere with more distant receivers. In fact, the FCC (Federal Communications Commission) strongly recommends that operators transmit at the minimum power that is effective for the range they are attempting to communicate. The advantage of Channels 15 through 22 is, not only can a GMRS mobile radio transmit at >5 watts but FRS radios can receive (listen) **and transmit** on these channels (albeit at only 2 watts).
 - Alternatively, we could continue transmitting on Channel 7, but this would limit our transmissions from the Crow's Nest to 5 watts. We could switch to one of the channels between 15 and 22 for actual emergencies but it would require all users to know how to change their radio channel, which might be problematic during an emergency. That being said, it would be good if people knew how to change channels because, even if we select a specific channel between 15 and 22, during an emergency, we might find that our chosen channel is being used by some other group and that may interfere with our communications. This will be a topic of discussion during the 07-September-2024 Safety Committee meeting.

➤ **Where to we go from here?**

- The Communications Subcommittee and the Chair of the Safety Committee is currently working with the LWC Board of Directors (BoD) in a **staged** approach to upgrading our ICS (Internal Communications System). The communications-related stages, as currently planned, include:
 1. Approaching the BoD regarding using the Crow's Nest on the 3rd floor of the LWC Rec Center as a Communications Hub – permission was granted.
 2. Meeting with Michael Dane and Eric Williams with the Depoe Bay Emergency Operations Center (EOC) – completed on 17-August-2024;
 3. Meetings with three electrical contractors to solicit estimates for:
 - a. Installing external antennas (and grounding them) for the ham and GMRS radios;
 - b. the possibility of installing electrical outlets in the Crow's Nest (possibly on one or more separate circuits);
 - c. installing 3rd-floor switches for the lights (and using battery backup bulbs);
 - d. possibly installing a ductless heat pump to heat the Crow's Nest in the winter and cool it in the summer; and
 - e. Install OSHA-required fall protection.

The 3 estimates received all differed in what the contractors would provide and how much it would cost but, in each case, it was more than we feel we can afford at this time;
- Proceed with purchasing the communications-related equipment deemed necessary for setting up an operational, interim ICS Communications Hub in the Crow's Nest including, but not limited to:
 - A mobile GMRS-certified radio (serving as the ICS base station) capable of transmitting on Channels 15-22 at 15-20 watts and equipped with an antenna that can be located inside;
 - Two DC (direct current) transportable power banks that can provide power to the radio that are alternately charged on the ground floor of the Rec Center and carried up to the Crow's Nest;
 - A small table and 2-3 chairs; and
 - Battery powered lights and a fan that can be used if there is a relatively short power outage.
- Determine if there is a similar interim plan for the Safety Committee's ham radio and its antenna.