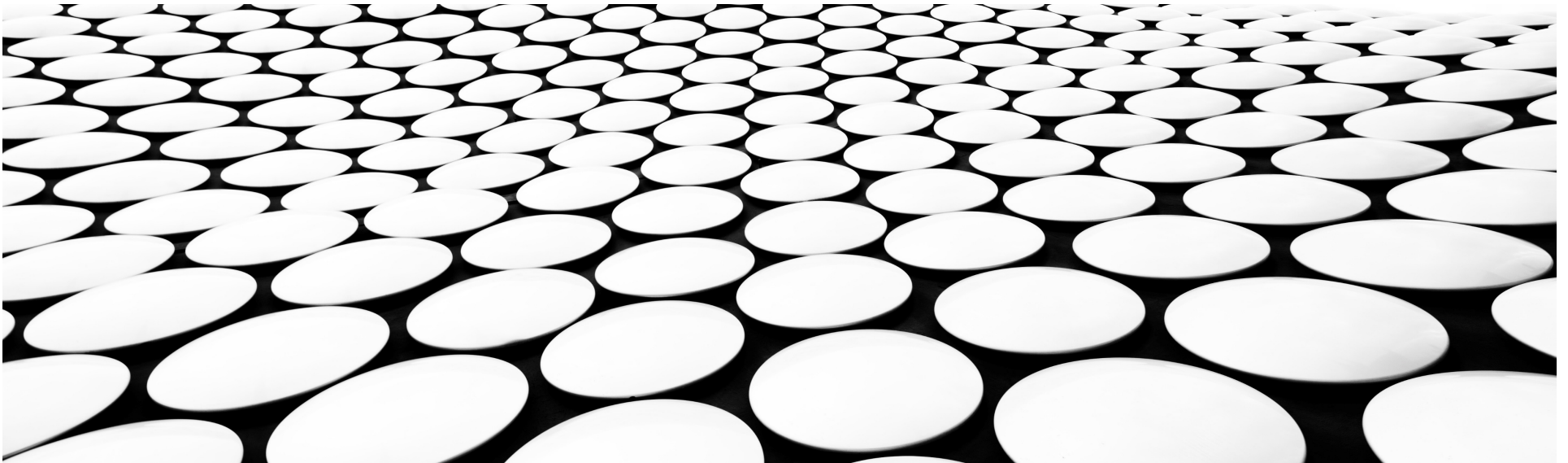

COMMUNICATION AND ALTERNATIVE COMS

LAND LINE TO OVER THE AIR, AND WHY WE NEED MORE THAN ONE TYPE TO COMMUNICATE IN VARIOUS SITUATIONS



FREQUENCY AND IMPACT, AND COMMUNICATION CHOICES

Frequency and Impact

- Low Impact, High Likelihood Situations
 - Job Loss, less than 8-Hours No Power...
- Medium Impact, Medium Likelihood Situation
 - Small Area Evacuation, Low to Moderate Earthquake, 8 to 24-Hour without Power....
- High Impact, Low likelihood Situations
 - Major Earthquake, Multi-day power Outage, Large area Evacuation....

Communication Choices

- Land Line
- Software Applications
- Cell Phone
- Walkie-Talkies
- FRS Radios
- Citizen Band (CB) Radios
- GMRS Radios
- HAM Radios



COMMUNICATION PLANS

- Personal or Immediate Family
- Extended Family
- Neighborhood or Block
- Ward
- Stake

COMMUNICATION SUMMARY SHEETS

Land Line Phone

Cost: Monthly Fee (Starting at \$10)

Great for Day-to-day communication and may work depending on the event and severity. System is not mobile, and does not have added services or features



Cell Phone

Cost: Monthly Fee (Starting at \$20)

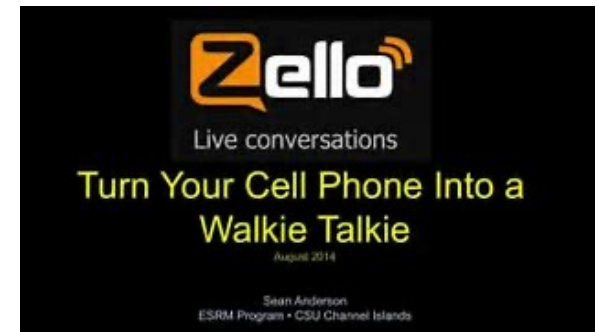
Great for Day-to-day communication and may work depending on the event and severity. Can be use wherever service providers have communication towers and has access to text and other application software.



Zello Application

Cost: Free

Can be downloaded on cell phone, tablets, or computers. Person to person or group communication is possible. May not function without wired internet, wireless internet, or cellular service. Ward and Stake may already have dedicated channels or groups set up.



COMMUNICATION SUMMARY SHEETS

Walkie Talkie

Cost: \$15 to \$80 per unit

No privacy from others on use

Urban Range 200 yards or vertical about 5 floors in buildings to 2 miles in open area with no obstructions



Citizen Band Radios (CB)

Cost: Handheld \$40 - \$80 - Base Station \$90 to \$180 per unit

40 communication channels

Must have power source and no privacy from others on the same channel

Urban range of 0.5 to 1.5 miles depending on integrated or external antenna and power of system. Up to 25 mile in open area with no obstruction



Family Radio Service (FRS)

Cost: \$30 to \$200 per unit

15 Channels with up to 42 privacy codes per channel

May have compatibility with GMRS systems on channels 1-15

Urban Range if ~0.5 mile and in open area with no obstructions 3-5-mile range



COMMUNICATION SUMMARY SHEETS

General Mobile Radio Service (GMRS)

Cost: \$35 to \$400+

Requires an FCC license (no testing required) at ~\$80 and license covers the entire household for 10 years

Systems can be low power handheld to high power base systems, some sources require power sources other than batteries

22 channels (15 with the FRS) 8 repeater channels, with up to 142 privacy codes.

Range depends on wattage, antenna, and chosen operation channel, and if Repeaters are available. Urban range from 0.5 mile to 10 mile and in unobstructed areas up to 65-mile range.



HAM Radio

Cost: \$80 to \$800+

Requires an FCC license and testing fees (starting at \$15 and up) Three different License levels (Technician, General, Amateur). License is for an individual only and is good for 10 years.

Multiple frequency bands, ability to send digital data in some bands depending on equipment. Some equipment requires power sources other than batteries.


Range is dependent on wattage, antenna, repeaters, and chosen operation band (HF, UHF, VHF, etc.) some systems can communicate around the world, where other systems will only reach 10 miles in very dense urban terrain.



CURRENT STAKE PLAN ON COMMUNICATION

- 1) Phone
- 2) Internet (email, social media)
- 3) Mass Text Message
- 4) Radio
 - 1) FRS/GMRS
 - 1) Was Channel 14, privacy 14
 - 2) To Channel 7, privacy 7
 - 2) HAM Radio
 - 1) Repeater at 147.21MHz
 - 2) Backup at 147.15MHz
- 5) Personal Contact
 - 1) Foot/Bicycle/Car/ATV. Etc.





WHAT'S YOUR PLAN?



DETAILED COMMUNICATION METHODS INFORMATION

INFORMATION BEYOND THE BASICS

LAND LINE PHONES

- Requires Hardwire Connection
- May operate without Power
- Applications allow identification and near exact location of caller





CELL PHONES

- Requires Tower or other wireless data connection
- Towers can be overloaded in Emergency Situation
- Text and email data options
- Call 911 without a plan
- Most are Waterproof
- Batteries will need to be re-charged

SOFTWARE APPLICATIONS

- Requires Computer or Phone Device
- Requires power locally and to the network
- Requires wired or wireless data connection
- Application may require pre-set up for use, and acceptance into group chat modes
- Applications
 - HeyTell
 - Two Way
 - Voxer
 - Zello
 - Carrier PPT



WALKIE-TALKIE

■ Pros

- No Grid required
- Direct immediate communication
- Common Battery size
- Reasonable priced
- No License

■ Cons

- Ideal range is by Line of Site (LOS)
- Moderate to heavy terrain will greatly reduce operating range
- Single channel operation, no privacy



CITIZEN BAND (CB) RADIOS

- 12 V Power Connection required
- No Age Restriction for use
- 40 channels including weather, traffic alerts, and an emergency channel
- Can adjust the sound, signal , and audio quality
- Limited range to > 5 miles open line of sight down to <1 mile in dense urban settings.



FAMILY RADIO SERVICE (FRS)

- Multiple Channel
- Multiple Privacy channels
- 0.5 W on channels 8-14 and 2W on channels 1-7 and 15-22
- Limited range typically from 0.3 to 1 mile depending on terrain
- Can only have permanently attached antennas
- Overlapping band usage with GMRS systems and some FRS and GMRS radios can communicate on common channels and privacy code sub channels.
- Requires no FCC License



GENERAL MOBILE RADIO SERVICE (GMRS)

- Use Specific Channels in the same band as FRS
- Multiple Privacy channels
- Up to 5W on channels 1-7, 0.5W on channels 8-14, up to 50W on channels 15-22
- Range is dependent on power, channel, and terrain. From 0.3 to 1 mile on channels 8-14, and up to ~60 miles channels 15-22 with open line of sight
- Can be handheld units or may be a station.
- Requires an FCC license to use but no test required, license is extended to household



GMRS AND FRS FREQUENCY AND POWER CHART

FREQUENCY / CHANNEL CHART
FRS / GMRS TRANSCEIVERS in the United States
as of August 27, 2020

Channel type	Frequency (MHz)	Channel Number		Radio Service	GMRS license required?	Maximum permitted power		Equipment requirements	
		Most radios	Some radios			under FRS	under GMRS	under FRS	under GMRS
Shared	462.5625	1	9	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	462.5875	2	10	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	462.6125	3	11	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	462.6375	4	12	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	462.6625	5	13	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	462.6875	6	14	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	462.7125	7	15	FRS or GMRS	(a)	2 watts	5 watts	(c)	(d)
Shared	467.5625	8	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	467.5875	9	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	467.6125	10	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	467.6375	11	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	467.6625	12	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	467.6875	13	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	467.7125	14	not available	FRS or GMRS	(a)	0.5 watt	0.5 watt	(c)	(e)
Shared	462.5500	15	1	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.5750	16	2	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.6000	17	3	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.6250	18	4	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.6500	19	5	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.6750	20	6	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.7000	21	7	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
Shared	462.7250	22	8	FRS or GMRS	(a)	2 watts	50 watts (f)	(c)	(d)
GMRS	467.5500	15 (b)	1 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.5750	16 (b)	2 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.6000	17 (b)	3 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.6250	18 (b)	4 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.6500	19 (b)	5 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.6750	20 (b)	6 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.7000	21 (b)	7 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)
GMRS	467.7250	22 (b)	8 (b)	GMRS	yes (b)	prohibited	50 watts (f)	not applicable	(d)

(a) No GMRS license is required in order to transmit on this frequency if FRS limits and restrictions are followed.

(b) This is a repeater input frequency and may be used only by licensed GMRS users.

(c) FRS restrictions apply and include: integral (non-detachable) antenna; bandwidth maximum 12.5 kHz.

(d) GMRS restrictions apply. Antennas may be detachable.

(e) GMRS restrictions apply. Antennas may be detachable. Only handheld units may transmit and bandwidth maximum is 12.5 kHz on this frequency.

(f) Base stations are limited to 15 watts.

Operators with GMRS licenses transmitting in the GMRS (the General Mobile Radio Service) must comply with all applicable regulations. These requirements include: "The GMRS station call sign must be transmitted following a single transmission or a series of transmissions; and, after 15 minutes and at least once every 15 minutes thereafter during a series of transmissions lasting more than 15 minutes." (47 CFR 95.1751)

HAM RADIO (SLIDE 1)

- Can Transmit depending on type between 5W to 100W
- Range is dependent on power and antenna
- Area has multiple repeater towers in the area which can greatly increase range of transmission
- Multiple levels of FCC licensing available, and limited to individual use
 - Tech – interested in talking around , limited in frequencies
 - General – adding in most emergency communication, expanded frequency ranges
 - Amateur Extra – shorter call sign, even more operation frequencies, ability to admin tests



HAM RADIO (SLIDE 2)

- 80 Meter (Technician)
 - 3.525 to 4.0MHz
- 160 Meter (General amateur Extra)
 - 1.8 to 2.0MHz
- 630 Meter
 - 472-479 KHz
 - 5W Equivalent, Isotropically Radiated Power (EIRP) max except in Alaska or 1W
- 2200 Meter
 - 135.7 to 137.8 KHz
 - 1W EIRP max

To operate on 2200 or 630 meters, amateurs must first register with the Utilities Technology Council

