

Set RADIOS to:

**147.405 simplex
carrier operation (no ctcss)**

and be ready to enable 110.9
CTCSS upon request...

CTCSS... *No Fear!*



CTCSS

- **C**ontinuous
- **T**one
- **C**oded
- **S**quelch
- **S**ystem

quite a mouthful

Called by many different names...

Called by many names...

- **PL** tone (Private Line; Motorola)

FCC says "ok, but it has to be a standard - across-the-board - for compatibility between mfgs.

Called by many names...

- **PL** tone (Private Line)
- **QC** (Quiet Call – Ritron and Johnson)

Called by many names...

- **PL** tone (Private Line)
- **QC** (Quiet Call)
- **CG** (Channel Guard – GE & Bendix King)

Called by many names...

- **PL** tone (Private Line)
- **QC** (Quiet Call)
- **CG** (Channel Guard)
- **QT** (Quiet Talk – Kenwood)

Called by many names...

- **PL** tone (Private Line)
- **QC** (Quiet Call)
- **CG** (Channel Guard)
- **QT** (Quiet Talk)

They are all describing the same thing.

Most radios offer 3 operational modes:

* **No CTCSS**

often called “carrier mode” mode.

Most radios offer 3 operational modes:

- * No CTCSS
often called “carrier mode”
- * **CTCSS** enabled for both TX and RX

Most radios offer 3 operational modes:

* No CTCSS

often called “carrier mode”

- CTCSS enabled for both TX and RX
- **CTCSS enabled for TX alone, or RX alone, or both** (individual control of encode/decode)

Some offer a 4th selection

- **DCS (Digital Coded Squelch)**

kinda like CTCSS... but does not use analog audio to create the unique marker.

DCS is a combination of an analog channel with a digital squelch component.

Not going into detail about DCS for tonights presentation

What does CTCSS do ???

What does CTCSS do ???

On the transmitter end... it adds a low amplitude audio tone to an existing voice transmission

TX Demonstration 1 of 2

Set radio to **non CTCSS** operation
“Carrier mode”

Or switch to your non-CTCSS memory channel

147.405mhz simplex

Service monitor to “TX”, show audio on projector

Ask each member to key up; hesitate a few seconds (see flat line), then give call sign.

TX Demonstration 2

Switch to CTCSS channel

Or enable CTCSS on your radio

Have each person key-up again, hesitate, then give call sign.

What does CTCSS do ???

On the **receiver** end, it makes the squelch control.... selective;

to where you won't hear any transmission audio unless it can detect the CTCSS tone present in the background.

Receive Test -1

Set radio to Carrier operation

Or to the **non-ctcss** channel

Generator to RF Gen with whip antenna

Generate signal without CTCSS; with 1000hz test tone.

Should be hearing test tone.

AND busy light indicator

Radios set to CTCSS channel

Or activate CTCSS on your radios.

- * No longer hearing audio, though the radio is indicating it is receiving an on-frequency transmission via LED or screen icon.

If you have CTCSS enabled...

And are receiving a transmission that does not have CTCSS encoded with it (or the wrong CTCSS tone)...

Your radio will indicate a busy condition (light or screen icon)

but your speaker will be silent. Current condition

Audio Generator

While continuing to generate RF without CTCSS...

Subwoofer on

Audio generator pre-level calibrated

Demonstrate audio generator into subwoofer @ **110.9**

Move audio cable to service monitor audio input

Radios should now be hearing the test tone

Called by many names...

remember this slide ?

- **PL** tone (Private Line)
- **QC** (Quiet Call)
- **CG** (Channel Guard)
- **QT** (Quiet Talk)

Called by many names...

- **PL** tone (Private Line)
- **QC** (Quiet Call)
- **CG** (Channel Guard)
- **QT** (Quiet Talk)

- **Sub Audible Tone**

Is there more than one
audio tone used in CTCSS?

Is there more than one audio tone used in CTCSS?

CTCSS TONE FREQUENCY (Hz)					
67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8
123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2
189.9	192.8	196.6	199.5	203.5	206.5
210.7	218.1	225.7	229.1	233.6	241.8
250.3	254.1	—	—	—	—

Why don't I hear this low frequency audio tone

In the background of a CTCSS encoded transmission?

Couple reasons

Why don't I hear this audio tone

In the background of a CTCSS encoded transmission?

- a. It is of low amplitude; $\pm 700\text{hz}$ of dev on a channel that allows for $\pm 5000\text{ hz}$ of deviation

Why don't I hear this audio tone

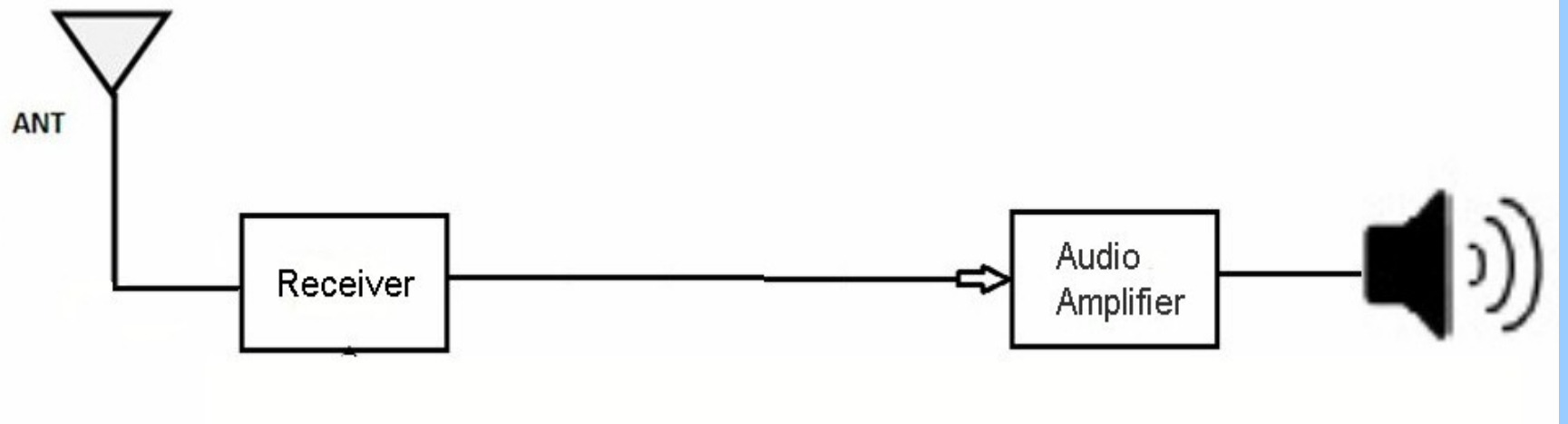
In the background of a CTCSS encoded transmission?

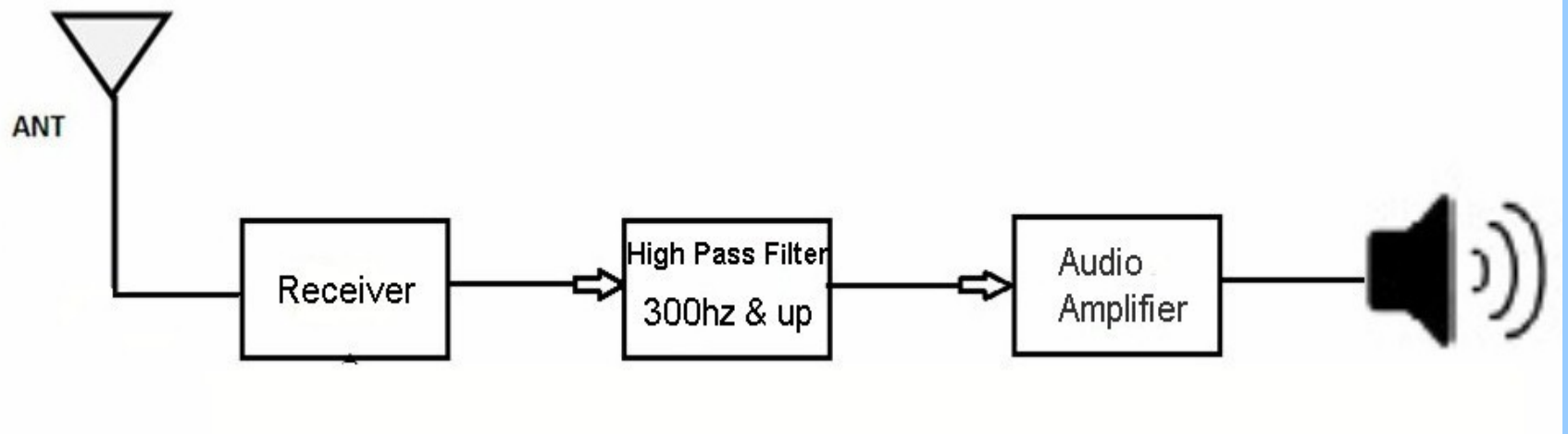
- a. It is of low amplitude.
- b. Doubtful your radios tiny speaker could reproduce such a low frequency tone.**

Why don't I hear this audio tone

In the background of a CTCSS encoded transmission?

- a. It is of low amplitude.
- b. Doubtful your radios tiny speaker could reproduce such a low frequency tone.
- c. **Radios incorporate a high pass filter in the audio section - starting @ 300hz.
aka; low cut filter.**





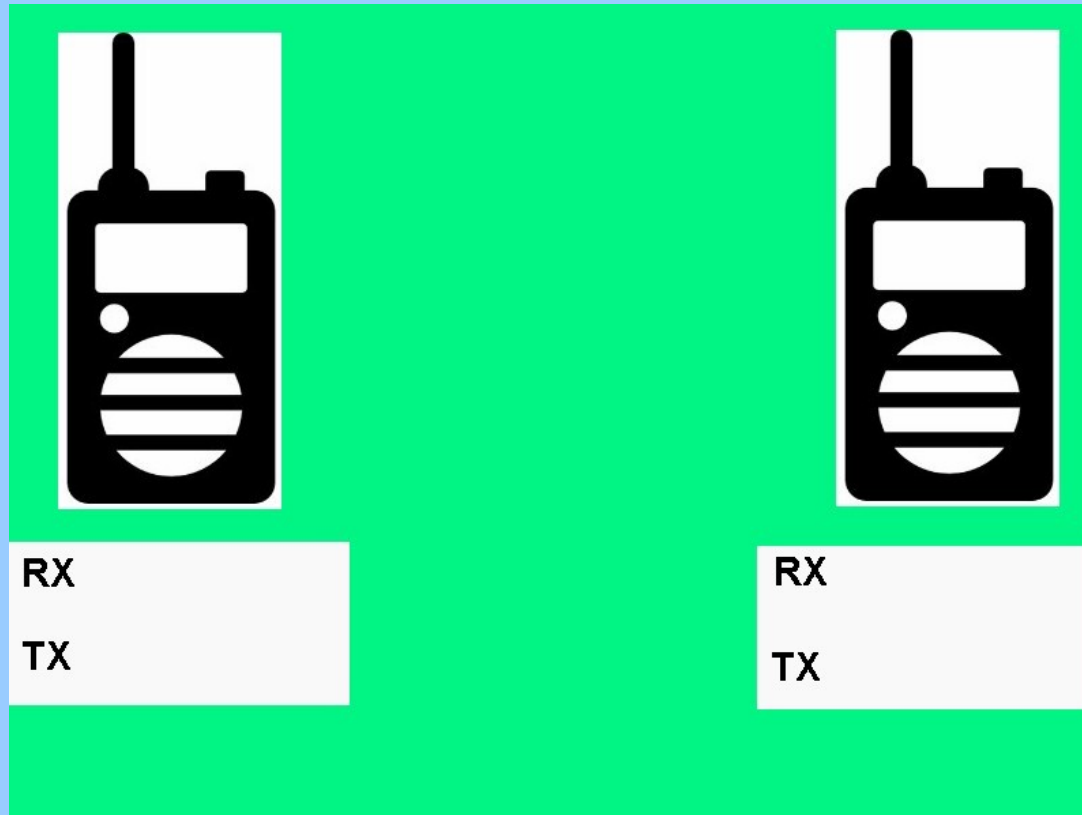
Need do 2 things...

- Enable CTCSS node on your radio
- Select the proper tone freq in use

CTCSS TONE FREQUENCY (Hz)					
67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8
123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2
189.9	192.8	196.6	199.5	203.5	206.5
210.7	218.1	225.7	229.1	233.6	241.8
250.3	254.1	—	—	—	—

Scenario Drills

-same simplex freq-



Same Simplex Freq “carrier” = no ctcss



RX carrier

TX carrier



RX carrier

TX carrier



RX 107.2 ctcss
TX 107.2 ctcss



RX 107.2 ctcss
TX 107.2 ctcss



RX 107.2 ctcss

TX 107.2 ctcss



RX carrier

TX carrier



RX carrier
TX 107.2 ctcss



RX 107.2 ctcss
TX 107.2 ctcss



RX 192.8 ctcss

TX 107.2 ctcss



RX 107.2 ctcss

TX 107.2 ctcss





Same simplex freq



RX 127.3 ctcss

TX 127.3 ctcss



carrier only



RX carrier
TX 127.3 ctcss



carrier only

Too Good to be True !

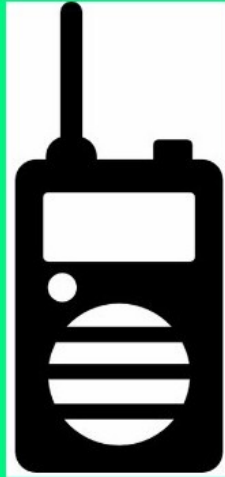
Are there any negatives to CTCSS ??

Too Good to be True !

Are there any negatives to CTCSS ??

Yes, decode time... delay in decoding.

simplex



RX 107.2 ctcss

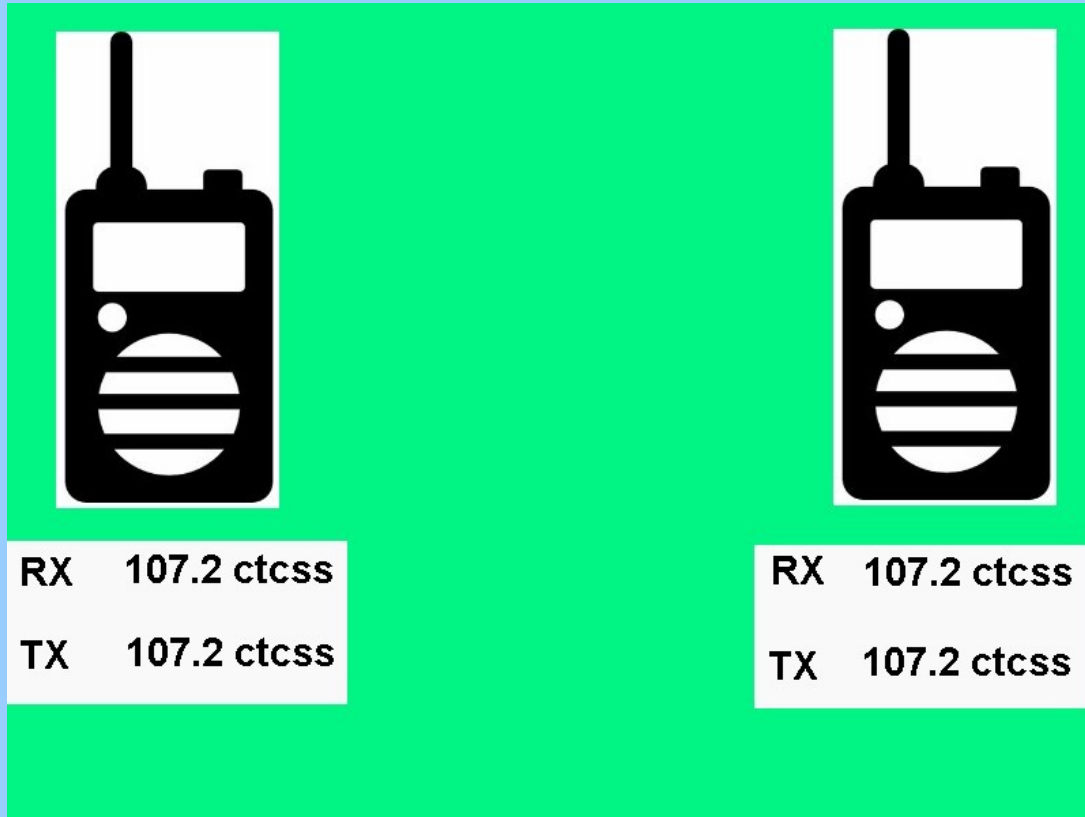
TX 107.2 ctcss



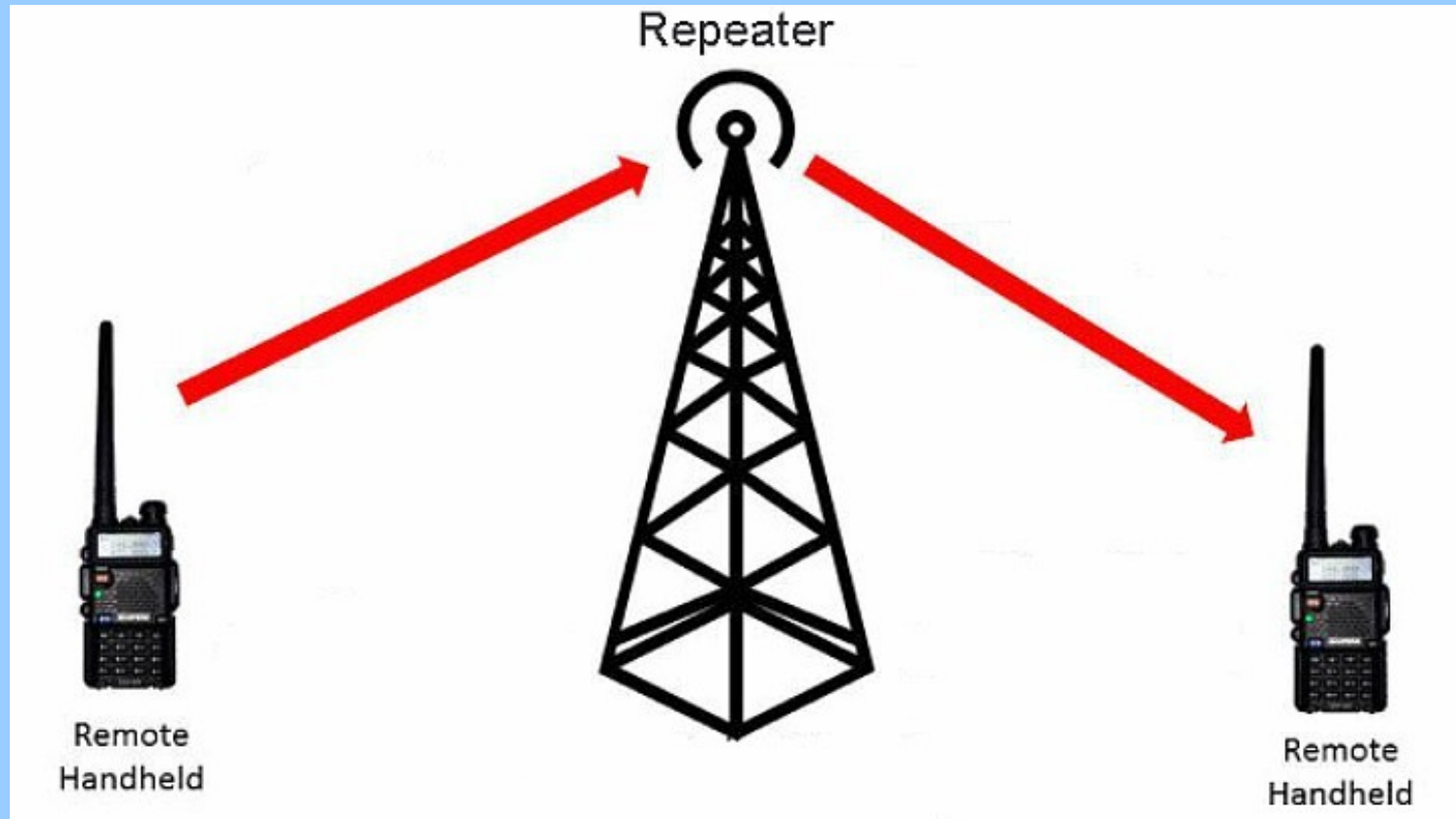
RX 107.2 ctcss

TX 107.2 ctcss

40 ms decoding time average.



80 ms through Repeater



Questions



Thank-You !

