Mountain Top Amateur Radio Association
May 2022
Volume 2, Issue 5

MTARA NEWS

President Lorna's KJ6GFS Message

Hello, MTARA members ~~

This summer brings opportunities for MTARA members to participate in a variety of exciting events all over the mountain. Tracy's May 9 online memo to us outlines the many places that radio communications will be needed. This year's wide range of events from June to October gives every ham a chance to contribute to the community in crucial ways.

For newer less experienced hams, every event is a valuable learning opportunity. Working side-by-side with an experienced Elmer(ette) allows for hands-on application of practical skills in a non-stressful setting (Elmers offer a lot of comfort). Also, the more frequently these skills are applied in different settings, the more capable and versatile the ham operator becomes.

I strongly encourage all less-experienced hams to volunteer for as many of these events as possible. Personally, I still benefit greatly from working with my more experienced compatriots at these varied events, and have a lot of fun doing it!

Things seem to be getting back to normal, though reasonable precautions should still be taken. As in years past, Field Day will take place at the Masonic Lodge in Twin Peaks. This year's event is on June 25.

We'll have one more regular MTARA meeting via Zoom, on June 7. The year's first in-person meeting is scheduled for July 5 at the Lake Arrowhead Community Presbyterian Church. It will be great to get together again!

Seven Three, Everyone ~~ Lorna

Officers

- **President:**

Lorna Polley, KJ6GFS

- **Vice-President:**

Chet Olson, AE6CO

- **Treasurer:**

Nancy Karlson, K6CUB

- **Secretary/Newsletter**

Debbie Johnson, WB6LVC

- **Ed/Membership:**

Tracy Lenocker, WM6T

- **Past Presidents:**

John Snedden, KT7P

Vic Marquez, KK6WKI

The Rim of the World ARES group is an ARRL affiliated organization and part of the Mountain Top Amateur Radio Association

Monthly Club Meetings

Club meetings are held on the first Tuesday of each month. Meeting begin at 7:00 p.m. and lasts until approximately 9:00 p.m.

Our meetings are open to everyone; so bring a friend, and keep the hobby growing.

There is always a presentation that will pique your interest and add to your knowledge.

Until further notice, all meetings will be held on Zoom. When this changes you will be notified of the location.

See you on Zoom!

Membership

Membership in MTARA is open to any individual interested in learning more about Amateur Radio. An FCC issued license is not required, but is encouraged. Membership is on an annual basis, running for the calendar year. There are no prorated membership fees. Club fees are $20.00 for a single membership and $30.00 for a family membership. The necessary forms can be found on the club's home page @ MTARA.club. Current members only need to send in their dues to MTARA, PO Box 2441, Lake Arrowhead, Ca. New members will need to download and send in their forms and payment to the same address.

TREASURER'S REPORT

Our ending April Balance was

$11,509.00

73, Nancy K6CUB

Local Weekly Nets

	Repeater	Time	Activity	Purpose
Monday	MTARA—2	7:00 p.m.	Weekly Check-In	MTARA News
Monday	144.330 MHz	8:00 p.m.	"Gordo Net"	Simplex Readiness
Tuesday	MTARA—5	7:00 p.m.	"Debbie Net"	Educational Topics
Wednes-day	HF	7:30 p.m. First Wednesday	7.223 MHz	Band(s) Status
Friday	MTARA—5	5:00 p.m.	YL Happy Hour	It's Friday
Daily	CBARC	7:00 a.m.	Tech. Net	Elmer Sessions

Upcoming Calendar 0f Events

- May 20-22—Dayton Hamvention, Xenia, Ohio
- May 21-22—-Lake Arrowhead Art and Wine Festival
- June 25—Field Day at the Masonic Temple in Twin Peaks
- July 3 (Sunday) - Arrowhead Lake Association 4th of July Fireworks
- August 5—Mountain Top Days Parade
- August 6—Tour de Big Bear
- August 19-20 (Friday and Saturday) - Kodiak 100
- October 8—Big Bear Gran Fondo

The Antenna Team Strikes Again by WM6T

On Thursday, April 28, members of the MTARA Antenna Team took on a very different project. One of our members, Bruce, KJ6IJM, notified me that he had sold his home in Green Valley Lake and was moving to his other home in La Quinta. With a short escrow, he needed to remove his antennas. Well, few of us in the mountains have a single-story house and none have a large 3-element beam on the very top of the roof along with a few VHF and UHF verticals and beams. Bruce has all of those antennas on a two story house and also a 133 foot wire dipole between trees.

The full MTARA Antenna team consists of Bill Fields, Bill Clark, Vic Marquez, Ron Pearne, Rick Bruns, Gary Johnson, Rick Marckstadt and myself. At this event, Bill Clark, Gary Johnson and Rick Marckstadt were not available. Additionally, we had Bruce, of course. We had a very strong team of six members.

We met at the house at 10:00 am to begin to plan the removal of the antennas. Ron and Bruce had done some of the work the day before and had the ladder set up to access the roof. Rick and Bill had also brought some tall ladders, but they were not needed.

We waited until Thursday because on Monday, which was the original planned date, there was still snow on the roof along with some ice. The weather was cool with a light breeze and clear skies which was welcome since to get there most of us had to drive in heavy fog.

The roof team consisted of Ron, Vic and Bruce. The ground team consisted of Rick, Bill and myself. We all had specific projects to complete.

Access to the Roof was From the Back of the House

A Close Up of the Antenna Removals

Meanwhile, Bill and Rick removed the 130 foot wire dipole from the top of two trees using other ladders. Fortunately, that antenna came down fairly easily. Once that was done, Bill, Rick and I were passed the parts from the antennas taken down from the roof. We took those pieces apart and carefully marked each piece so that it could be put back together by whichever club member wanted that particular antenna or other equipment. We also coiled up the two 100 ft long coax pieces and the Yaesu G540a Rotator control cable.

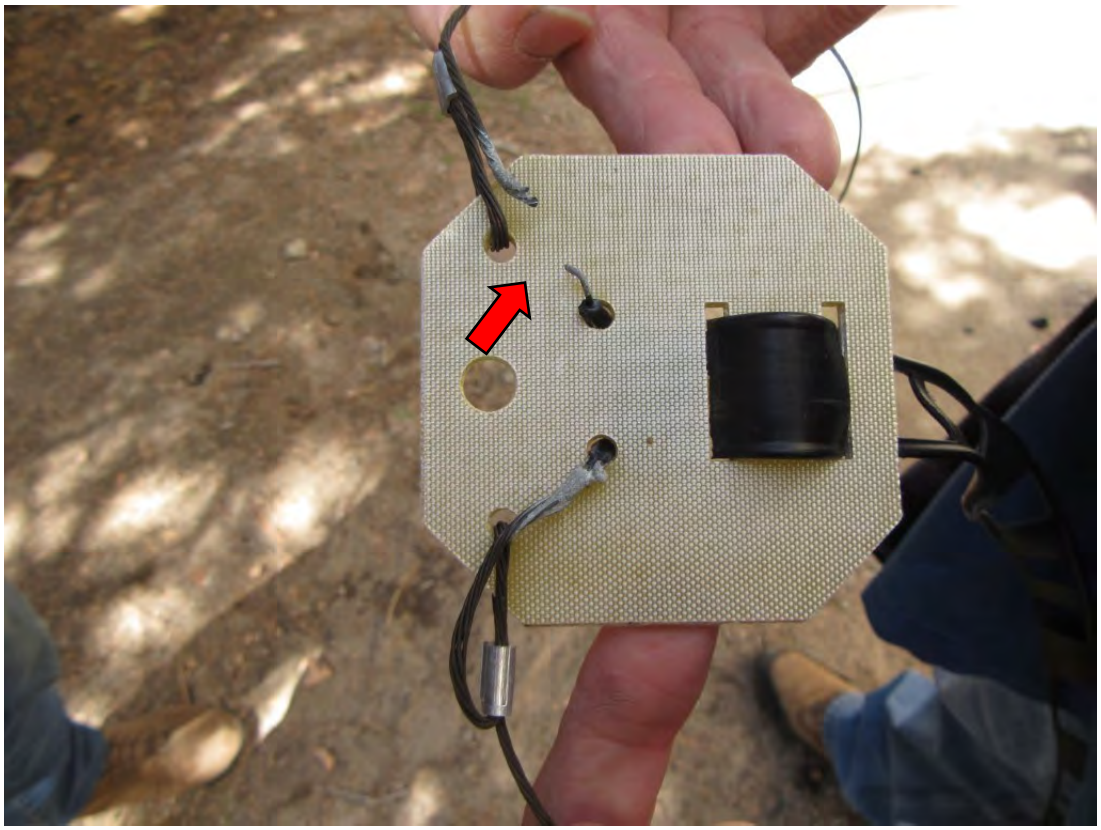
There was the Cushcraft A3S 3-element beam with a 40 meter attachment, a 7 element 2-meter beam, and 3 element 220 beam, a Yaesu G450 rotator and controller, two hanks of 100 feet of LMR400 coax and other stuff.

Coax and Disassembled Antennas. Most of the A3S Pieces are not Shown

After about 3 hours of work, all the antennas had been removed and the holes in the roof filled and caulked.

Bruce had purchased bread, meats, cheese, condiments, drinks and snacks for each person to make great sandwiches. So with everyone inside eating, we sat down and told stories and swapped lies.

An interesting finding was when we took down the long wire dipole. This was an MFJ product. The photo below shows the center connector between the two end wires and the ladder line that went to the radio.



"The Missing Link" or a "One Sided Dipole"

Bruce has graciously donated all of the antennas (except the 220 beam) to the club to offer for sale to club members. Information on the antennas and coax will be posted in a future email or may be brought to Field Day.

The antenna team is well trained, so if you have a need for an antenna to be installed, contact Tracy, WM6T to see about setting up a pre-inspection survey and a future installation.

Ponder the Pool by AA6GJ

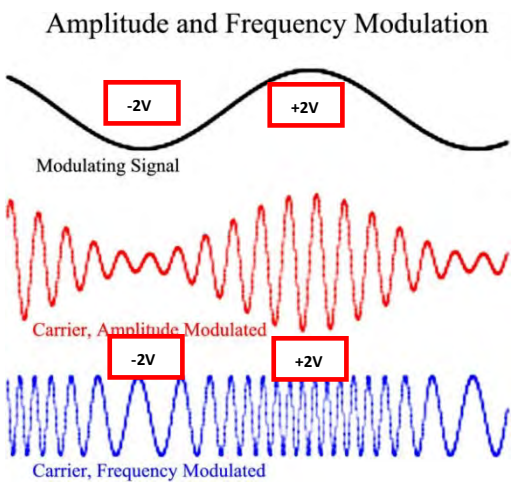
Ponder the Pool is my column for the MTARA Newsletter. Every month I pick a point to ponder (a question) from one of the three FCC question pools and try to explain it more and review the concepts because,

"If you don't use it, you lose it!"

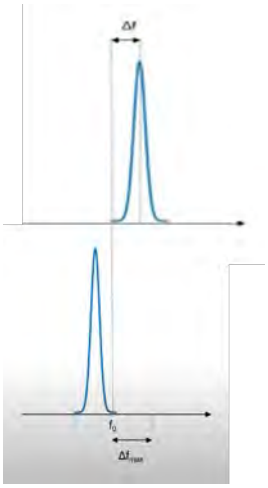
In this "Ponder the Pool" I am going to ponder 2 questions from the Extra Class pool.

Question No. E8B09
E8B09 – What is deviation Ratio?
And
Question No. E8B05
E8B05 – What is the deviation ratio of an FM phone signal having a maximum frequency swing of plus-or-minus 5 kHz when the maximum modulation frequency is 3 kHz?

I thought that since we were recently talking about modulation and bandwidth that these two questions would be appropriate.



Let's first define deviation. Remember, in amplitude modulation, we impress our modulation frequencies (voice) on the amplitude of the carrier wave like the red waveform to the left. When we frequency modulate a carrier wave, the amplitude of the carrier wave does not vary. Instead, the frequency of the carrier wave is changed by the loudness of the audio frequency. In the case to the left, the modulating frequency is shown as a voltage in the time domain of an oscilloscope. This audio voltage is modulating (changing) the carrier frequency (blue wave) This is known as frequency deviation because as we impress our audio frequencies (voice) onto the carrier, the carrier frequency is deviated (changing) plus or minus the carrier frequency. The frequency "bunches up" as the sine wave goes positive and "widens" as the sine wave goes negative. In the drawing to the right, we see a carrier in the frequency domain as seen on a spectrum analyzer. f_o would be the center frequency where we would tune our FM radio. As we can see, the carrier is "swinging" to the right and to the left as the sine wave goes through positive and negative transitions. The shift is also known as delta f (Δf). Delta means the variation of a variable. Our frequency deviating carrier is very definitely varying.



Frequency Deviation

- The amount of change in the carrier frequency produced, by the **amplitude** (loudness) of the input modulating signal, is called **frequency deviation**.
- The Carrier frequency swings between fmax and fmin as the input varies in its amplitude.
- The difference between fmax and fc is known as the frequency deviation.
  fd = fmax – fc
- Similarly, the difference between fc and fmin also is known as frequency deviation.
- fd = fc – fmin
- **It is denoted by Δf. Therefore Δf = fmax – fc = fc – fmin**
- Therefore fd = fmax – fc = fc – fmin

So, let's apply the above description to our Ham Radio. I'll pick the 2 meter Calling Frequency of 146.520 MHz. I know that my Kenwood TH-D72 has a "Maximum Frequency Deviation" of +/- 5 kHz. How do I know that? I looked in the Manual! LOL.

So, let's do the math.

$$\Delta f = f_{max} - f_{carrier} = f_{carrier} - f_{min}$$

$$5_{kHz} = 146.525_{MHz} - 146.520_{MHz} = 146.520_{MHz} - 146.515_{MHz}$$

In this case, the carrier frequency "swings" from 146.520 MHz to 146.525 MHz, and then to 146.515 MHz and finally back to 146.520 MHz.

Now we have part of the information needed to solve the problem. We now know where we got the maximum frequency swing (deviation) of ±5 kHz.

Now we can solve for the **Deviation Ratio**:
The deviation ratio is the ratio of the maximum carrier swing to the highest audio modulating frequency when you speak into the microphone. To calculate the deviation ratio, we divide the maximum carrier swing by the maximum modulation frequency. The question tells us the parameters:
Maximum frequency swing of plus-or-minus 5 kHz when the maximum modulation frequency is 3 kHz

$$Deviation\ Ratio = \frac{Maximum\ Carrier\ Frequency\ Deviation\ (Swing)\ in\ kHz}{Maximum\ Modulation\ Frequency\ in\ kHz}$$

$$1.67 = \frac{5\ kHz}{3\ kHz}$$

The deviation ratio is 1.67

At this point, lots of people get two points confused which is the **amount** and **rate** of carrier deviation. The **amount** of carrier deviation, in kHz, is the instantaneous transmitter frequency in MHz, which is the result of **adding** or **subtracting** the deviation to or from the carrier, or center frequency. The amount of carrier deviation is caused by the **amplitude** (loudness) of the modulating signal - **irrespective of its frequency**.

Rate of carrier deviation is another thing. The instantaneous frequency of the modulating signal determines the rate of carrier deviation. For instance, a 3000 Hz sine wave is modulating the transmitter at 100% modulation or causing a carrier deviation of ±5 kHz. Since the modulating signal is 3000 Hz only, it causes the transmitter frequency to deviate, as I said earlier, from 146.520 MHz to 146.525, and then to 146.515 and finally back to 146.520 MHz. That is one complete deviation cycle. Since the modulating frequency is 3000 Hz, the transmitter frequency changes or goes through that cycle 3000 times per second. Thus, the **rate** of carrier deviation is equal to the frequency of the modulating signal.

Another point of confusion is the relationship between the frequency of the modulating signal and the carrier frequency deviation. One of the terms used to describe the relationship is modulation index (which we will discuss another time); the other term is deviation ratio. These phrases are not synonymous, as some literature indicates. We are only talking about Deviation Ratio (DR) in this article.

Deviation ratio (DR) is an arbitrary limit. It is the **ratio of the maximum carrier-frequency deviation to the highest modulating frequency**. DR can be established, then, at any value one wishes. For our scenario, common Amateur Radio FM transmission, DR is 1.67. The maximum carrier-frequency deviation is 5 kHz, and the maximum modulating frequency is 3 kHz.

Deviation ratio is an important quantity in FM transmission because of the very nature of FM itself. In AM transmission, 100% modulation is not arbitrary, but a real limiting factor. Modulation in excess of 100% in an AM system produces distortion, regardless of the receiver used to pick up the signal. The same is not true of an FM system.

The 100% modulation figure for an FM system is established by the FCC for the particular class of service. In various two-way radio services, including Amateur Radio Service, the FCC defines 100% modulation as ±15 or ±5 kHz carrier frequency deviation. We are using ±5 kHz in our scenario.

No distortion is caused at the transmitter or in free space but, by exceeding this arbitrary modulation limit, the distortion is caused only at the receiver. If a ±5-kHz receiver is presented with an FM signal having ±15-kHz deviation, the receiver will produce distorted audio. And we certainly don't want that!

So, the moral of the story is talk across your microphone or HT, not directly into it. And, if someone tells you that you are "over deviating", your deviation ratio is definitely higher than 1.67, so back away from your microphone and don't yell!!!! LOL

That is why the official answer to this question is:
E8B09 – The ratio of the maximum carrier frequency deviation to the highest audio modulating frequency.
E8B05 – 1.67

That's *Ponder the Pool* for another month. I hope it was helpful.
Stay tuned, next month we will come up with another question to ponder. 73 – Gary
If you have any questions or comments, drop me an email at AA6GJ@arrl.net.

Mountain Top Amateur Radio Association

The Amateur's Code
by Paul M. Segal, W9EEA (1928)

The Radio Amateur is:

CONSIDERATE never knowingly operating in such a way as to lessen the pleasure of others.

LOYAL offering loyalty, encouragement and support to other amateurs, local clubs and the American Radio Relay League, through which Amateur Radio in the United States is represented nationally and internationally.

PROGRESSIVE with knowledge abreast of science, a well built and efficient station, and operation beyond reproach.

FRIENDLY with slow and patient operation when requested, friendly advice and counsel to the beginner, kindly assistance, co-operation and consideration for the interests of others. These are the hallmarks of the amateur spirit.

BALANCED Radio is an avocation, never interfering with duties owed to family, job, school or community.

MTARA Shirts, Jackets, and More

Classic Images is closing on July 1st

Be sure to order soon!

We have many items available with our club logo.

The information for ordering is as follows:

- Name Tags—Harlan Technologies, Name Tags by Gene (715) 340-1299, www.hampubs.com
- Mouse Pads—Check with Jodi, WA6JL
- Polo Shirts—Port Authority K420P Dark Green, L420 Dark Green, K100LS Dark Green. To order, contact Mary at Classic Images, (909) 338-2281, Tuesday through Friday. She will take your information and Callsign to be embroidered on the shirt. When completed, order must be picked at the business located at 23723 Rocky Dell Drive, Crestline, CA 92325