

General Radio Information

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Fhz (Channels) Information for NZ Motorsport

In the first instance to clear up a interchangeable term, channels and Fhz (frequency)

A Fhz is what the radio is tuned in to, a little like in the old days we used to have an old style car radio we used to tune up and down the dial to find a radio station. What we were doing is changing the receive fhz in order to find a station.

A channel is like the presets that you memorise when you find the radio station. The channels allow you to easily come back to the radio station at a latter date, so a channel contains a fhz. In reality these terms are interchangeable and often mean the same thing.

What is CTCSS or Tone?

Modern radios have the ability to not only hear a transmission on a specific fhz, but they also can apply a filter. This filter is done by the way of sending a CTCSS tone. These tones are often referred to as sub-audioable as they are outside the range of what we can hear.

When set on a receiver, it will only allow you to hear the audio on the specific fhz set that contains the correct CTCSS tone. So what they do is act as a filter on the channel. While your radio may hear other transmissions or noise on the channel, if it does not contain the correct tone, it will NOT be able to be heard by the user of the radio.

What are the Dangers with using CTCSS tones?

While they sound like the answer to a lot of problems, they only work when transmitters are configured to send them. Our experience has seen that, while they are mandated, not all tracks have them set to be sent. If your receiver is configured only to hear transmissions with a tone and the organisers of the event has radios that are not set to send them, you will NOT hear their transmission.

What happens if my Receiver does NOT have a CTCSS tone set?

Nothing, what this means is that you will hear all transmissions on the channel. It will not in any way affect your ability to hear race control. The downside of not having the tones configured is that because your radio will hear everything on the set channel, you can be susceptible to hearing noise or interference.

NZ Circuit Track and GT cars fhz: 455.16875 MHz

NZ Circuit CTCSS and GT cars Tone: 179.9 hz

Speedway Track fhz: 455.0625 Mhz

Speedway CTCSS Tone: 123.0 hz

Who and what is RSM? (And why should I care?)

RSM (Radio Spectrum Management)

RSM is the NZ governing body when it comes to anything related to radio in NZ. They are set up to ensure that all radio services in NZ co-exist and don't cause problems with each other. They have the power to prosecute and confiscate equipment for any breaches where radio equipment used does not comply with the regulations.

In simple terms, they are the "Radio Police" and have wide reaching powers.

website: <https://www.rsm.govt.nz/>

Do Radio Regulations Change from Country to Country?

Yes, this is one of the most common questions we are asked. Regulations on both the equipment we are allowed to use and the channels (fhz) we can use vastly changes from country to country. Chances are if you have purchased equipment from overseas it will be illegal to use in NZ.

Something to be Aware of regarding Radio Regulations

Something many fail to understand about radio regulations and rules is that they are not like the road regulations. You can own a car that can do over the speed limit, but you only get fined if you get speeding. This is NOT how the radio regulations work. All you have to do is be caught with equipment that is capable of transmitting on a illegal channel or fhz and by the letter of the law that is enough reason to have your equipment confiscated and or fined.

While this does not often happen, it does happen and especially if you cause interference to a licensed user.

[please see here for more information](#)

Overseas Radio Equipment Purchases

Purchasing radio equipment from non-nz licensed radio dealers is fraught with danger. The NZ regulations are policed and mandated by RSM. The rules are complex and carry heavy fines for those found in breach.

There are basically two components that matter about using radio equipment in NZ. Firstly if it's only a receiver, then anything goes. But when it comes to any type of transmitters then you must comply with the NZ regulations. If you are found to have radio equipment that does not comply with the regulations (even if not using it at the time) then you are liable for prosecution.

NZ radio equipment must pass the hardware standards mandated (most AliExpress radio will not pass these standards) and be set to only use the channels/fhz you are allowed to use.

<https://www.rsm.govt.nz/assets/Uploads/documents/RSM-Illegal-Two-Way-Radio-Leaflet-FINAL.pdf>

DMR vs Analogue Radios: What's the Difference?

If you've ever used a 2-way radio, you've probably experienced analog-FM (frequency modulation) radio. FM is the old way of sending voice over radio waves, and it's been around for decades. When you talk into an FM radio, your voice gets turned into a wave pattern that travels through the air to other radios on the same frequency. It works pretty well, but there's a catch: only one person can talk at a time on the same channel, and the signal can get fuzzy or drop out if you're far away or in a crowded area.

DMR (Digital Mobile Radio) is the newer, smarter way to send radio signals. Instead of turning your voice into a wave pattern like FM does, DMR converts your voice into digital data—basically 1s and 0s, like how computers work. This might sound complicated, but it has some awesome benefits. Two people can talk on the same frequency at the same time without stepping on each other. The sound is crystal clear and doesn't get fuzzy. You can send text messages and data, and the signal works better over longer distances. Plus, DMR radios are more secure because they can encrypt conversations, making it harder for people to listen in.

The bottom line? FM radios are simple, and they work, but DMR is like upgrading from a bicycle to a motorcycle. DMR is faster, more reliable, lets more people communicate at once, and offers features that FM just can't match. For businesses and emergency services that need their radios to work perfectly every single time, DMR is worth the switch.

DMR RADIO (DIGITAL)

DIGITAL MOBILE RADIO

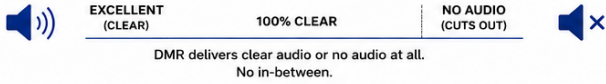
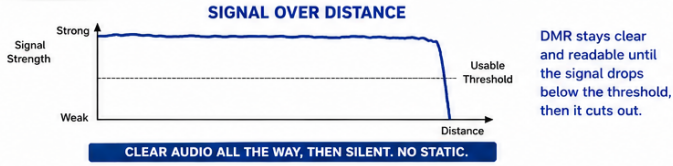
VS

FM RADIO (ANALOG)

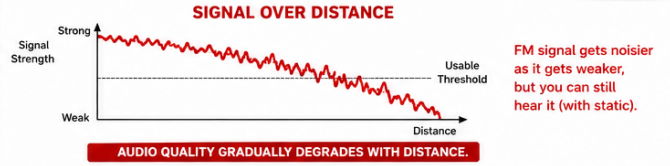
FREQUENCY MODULATION



Voice is converted to digital data (1s and 0s) and transmitted as a clean digital signal.



Voice is transmitted as an analog signal by varying the frequency of the wave.



WHY DMR IS BETTER FOR MOTORSPORT

- EXTENDED BATTERY LIFE**
DMR is more power efficient, delivering up to 40% longer battery life - critical for long race days and multi-session weekends.
- AMBIENT NOISE FILTERING**
Digital noise-canceling technology filters out engine, wind and track noise for clearer communication when it matters most.
- MORE CAPACITY**
One DMR channel can carry 2 time slots (2 calls) - perfect for separating crews, driver channels and officials.
- SECURE COMMUNICATIONS**
Built-in encryption helps prevent eavesdropping - keep your race strategy private.
- RELIABLE & CONSISTENT**
Clear, dependable audio with no static - even in tough RF environments.



BUILT FOR PERFORMANCE. BUILT FOR WINNING.

DMR = CLEAR. RELIABLE. EFFICIENT.
When performance matters, communication makes the difference.

LIMITATIONS OF FM IN MOTORSPORT

- HIGHER BATTERY DRAIN**
Less efficient power usage means more frequent charging or battery swaps.
- POOR IN NOISY ENVIRONMENTS**
Engine, wind and crowd noise come through, making it harder to hear important calls.
- LIMITED CAPACITY**
One channel = one conversation. Harder to manage multiple teams or groups.
- NO ENCRYPTION**
Conversations can be easily monitored by others.
- AUDIO DEGRADES WITH DISTANCE**
More static and noise as you move further from the transmitter.

FM = SIMPLE. BASIC. LIMITED.
It works - but not when performance matters most.