

Interference location techniques for commercial interference

This relates to interference to commercial services. Interference may be:

- from [unintended radiators](#), and
- to and from [intended radiators](#).

Unintended radiators

Because of the high power usually involved these have the potential to create a great deal of interference.

How to avoid interference from unintended radiators

All electrical equipment must meet an appropriate standard or specification as described in the various notices shown on this website.

Products must not be marketed or used unless the equipment meets the designated specification. Suppliers must hold a Supplier Code Number and mark their equipment accordingly. Equipment must be installed in accordance with the specified (usually manufacturers) installation specifications.

Locating interference from unintended radiators

Techniques for tracing the interfering noise are similar to that for domestic interference. There is often a higher radiated component and levels of interference tend to be higher.

Special difficulties surround the city environment in which tracing has to take place. Reflections and multiple standing waves may require detailed analysis before meaningful results become apparent. If the interference is difficult to locate it may be helpful for the tracing to be conducted concurrently on several different frequencies.

Typical interfering equipment

- Motor controlled equipment: Motor commentator brushes, associated variable speed drives (thyristor noise), etc..
- Microprocessor controlled equipment: Computers and other microprocessor controlled devices, air-conditioning, conveyor control, etc
- RF equipment: Radio frequency welders, sealing equipment, medical equipment, etc
- Switch mode power supplies: lightning, display lightning, etc

Intentional radiators (Transmitters)

Spurious radiation or co-channel signals

Identifying spurious radiation or co-channel signals

This is a composite process where the determination will likely be made from several observed factors.

This usually occurs where a fault condition exists or the equipment is installed on the wrong frequency. A suitable directional aerial (correct band) and a good receiver is usually used to direction find these sources.

Locating spurious radiation or co-channel signals

Suggested elements of the location process:

1. Use our [SMART](#) spectrum search utility (area search in particular) to help locate or eliminate suspect transmitters.
2. Use open reflection free sites to conduct the direction finding process where possible – watch for reflections and discard these readings. Watch for receiver overload in areas of high radio usage.
3. Weak signals may initially require a visit to the affected site and the use of sensitive but robust receiving equipment. Filters may be needed to prevent receiver over loading.
4. A good spectrum analyser may assist determine the nature of the signal. A small resolution bandwidth and narrow span is required for weak signals.
5. Listening to the modulation may give a hint as to the nature of the offending transmitter where you may be able to match it to the primary transmission.
6. Narrow down the area by triangulation and zero in on the triangle. In inner city areas portable equipment will be required and reflections will likely be a major problem.
7. Use buildings as “RF shelters” where they will assist determine the direction of the signal.
8. The direction and level of signals are the best tools in the box for this task. There will be many false readings to discard.
9. The use of helicopters with fixed aerials is often the most efficient way to track transmissions, especially in remote areas.

Spectrum analysis may allow signal repetition rates and modulation characteristics to be determined that may narrow down the type of offending transmitters.

Co-channel signals

These are same channel transmissions which occur when mobiles are operating outside of their normal operating area or where they are located in geographically high positions.

Check [SMART](#) for cancelled licences that may be still in use.

It may also occur during periods of stable weather where a high pressure weather system may be located across the country resulting in long range transmission of VHF and to a lesser extent UHF signals. This is called anomalous propagation. It will usually last for the duration of the high pressure system (may be several days) and normally occurs in mid to late summer. Often, trans-Tasman signals may be heard at the same time where interference is often received from high power FM broadcasting and TV stations.

While channel blocking can not be prevented selective calling e.g. CTCSS (tone group calling), may be employed so annoying signals are not evident until equipment receives the assigned code.

Adjacent channel signals

All receivers have limited ability to reject adjacent channel transmissions when in close proximity to a transmitter on an adjacent channel. The ability of receivers to reject adjacent channel transmissions varies between makes. Where several channels are used in the same band simultaneously, like at port company premises while unloading a ship, careful planning of frequency usage will assist reduce the occurrence of interference.