Transceivers: What Rescue Personnel Need To Know

How old is your transceiver?
Avalanche transceivers are fragile electronic devices. Manufacturers will not stand behind any device older than 10 years.

Has it been maintained?
Check the recommended maintenance schedule. Most companies recommend your transceiver be returned to check it's electronic function every 3 years.

Any known issues with your transceiver?
There are compatibility issues between analogue and digital transceivers (digital transceivers searching for analogue transceivers). Source: Manuel Genswein, Snowbird 2006 *"You have to be careful not to walk past older 'out of range beacons' when searching... Analog beacons send out a signal that has quite a bit of background noise, so it's harder for digital beacons to separate the signal from the noise. So you need to use a narrower search strip when searching for an analog beacon when you use a fully digital beacon"*

Most recreational backcountry users (but not all) have digital transceivers. Some analogue and digital transceivers—particularly older devices-- are more prone to frequency drift, battery compartment malfunction and antenna fracturing and malfunction (Source: Genswein, BCA, and others).

Is your unit a three-antenna transceiver?
The world wide average burial depth is approximately 1.2m. Deep burials are more difficult to target using a transceiver. This becomes more challenging when using analogue single antenna transceivers (example, Ortovox F1, M2).

The two antenna units (example, Tracker DTS, Barryvox Opti3000) provide a more accurate induction search (following the signal indicators to the target, rather than strip searching) and therefore less likely to focus on false targets.

Three antenna units (example: Tracker 2, Barryvox Pulse, Peips DSP) or the Ortovox S1 are more likely to accurately pinpoint deeper burials (>1m).

Are your batteries the best type-- and new?
Most transceivers will only take alkaline batteries. Unless your transceiver is specifically programmed to take lithium batteries they will not work. Duracell Powerpix type will affect the transceiver negatively.

Note that sizing is standardized but not regulated. Batteries that are the right type (example, AAA) but slightly too small have been known to cause transceivers to "shut off" with a light knock. Batteries should fit snugly, "snapping" into place but not forced into place (source, http://www.beaconreviews.com)

Check the manufacturers' suggestion when to replace the batteries. Note that searching in very cold or wet conditions can challenge a transceiver search function and in ideal conditions with new batteries you may get one hour of search time at -10C. Always arrive on a rescue scene with fresh batteries in your transceiver. (Source: http://www.beaconreviews.com)

Wear and Care?
Any electronic device including cell phones, GPS units, GoPro and digital cameras, and VHF radios can seriously affect and may attenuate the transceiver signal (both in transmit and search function) if turned on. All electronic units should be turned off or if required for the search put in a pack and not adjacent to the transceiver. *At least one fatality has occurred where a victim's cell phone in close proximity to his transceiver resulted in no detection of his transmitting signal by searchers on the surface.* Devices with a wireless or bluetooth connector unit (new GoPro Hero 3

with remote connection) have been observed to seriously compromise the transceiver search capability within a 10m distance (from CAA instructor/guide observations during a practice in January 2013). Observers have also reported snowmobile interference within a similar range when the machine is running.

Note that IKAR (international rescue commission) recommends 15cm minimum distance between VHF radios and transceivers. www.ikar-cisa.or This minimum distance may be hard to maintain if both worn on your chest, or when compromised by an avalanche or treewell incident. A separation of greater than 15cm is preferable. Some ski pants are being designed with specific transceiver pockets to facilitate this unit separation for working ski patrollers and guides.

Some units ON/OFF switches (example. Barryvox Opti3000) are affected by magnetic buttons. The magnets in some jackets snaps will shut a transceiver off. (*Source. Barryvox*)
- Never keep your transceiver in your vehicle in cold temperatures. Repeated low temperature cooling and room temperature warming can detune the transceiver antenna (*source. BCA*)

Further reading:
THE EFFECT OF EXTERNAL INTERFERENCE ON AVALANCHE TRANSCEIVER FUNCTIONALITY
John Barkhausen, Prescott College and Alaska Pacific University
http://arc.lib.montana.edu/snow-science/item/1698

Do you complete a recommended transceiver function check every day prior to entering the field?
A function check includes checking that each party member knows how to use his or her device, that the device functions in search and send mode, and that the party member knows how to wear the device.

- ❑ All Units Switch ON: Batteries? Display? Transmit indicator? Test unit in search mode checks all units transmit.
- ❑ All units Switch to SEARCH: Test unit (leader) waits until all are in search mode an no signals are picked up (no transmitting units left on in packs), switches to transmit and ensures each party member device can search for a signal.
- ❑ All units switch to TRANSMIT and properly wears units: Test unit (leader) moves forward and switches to search and ensures all units are in transmit mode prior to entering field.
- ❑ Once all party members are checked, Test unit (leader) switches to TRANSMIT, double checks own transmit indicator light before carefully stowing unit.

How often do you complete a range check?
IKAR recommends the strip search pattern for a signal search (for visual clues and a transceiver signal) for 3 antenna digital transceivers are approximately approx. 1.4x “the realistic maximum range” of the group transceivers. Group transceivers are range checked and the shortest “realistic max.” found is used. *For example, if one transceiver’s realistic max. is 25m during a range check, then the search strip width is 35m between searchers.* As the search strip pattern provides for overlap this accounts for issues affecting reception in search mode. (see, http://www.ikar-cisa.org, avalanche rescue/recommendations)

Complete a range check each time you travel with a new group, with new untested units.
Complete a range check once a week with familiar units.

If you haven’t completed a range check prior to entering the rescue site, err on a conservative search strip width distance for either single or multiple searcher patterns (30m distance between searchers).