

RF Interference - Detection and Remediation

Because of the increasing prevalence and portability of wireless devices, it is important to be aware of the ways in which signals from these devices can interfere with measurements and feedback results derived from electrophysiological signals.

Cellular phones, portable phones, wireless networking devices and any other device which intentionally radiates RF energy, should not be operated in the same room as the equipment. If it is necessary to operate such a device close to the equipment, test it first to make sure that it does not interfere with the signal pickup. A thorough test will include all operating modes of the radiating and measuring equipment, and all combinations of sensors and channels that will be employed in the actual patient setup.

Connect the sensors as for a normal session, or use a dummy load (for information on dummy loads, contact Thought Technology). Operate the RF radiating device 4 times closer to the patient or dummy load than you plan to allow in a real patient session. In the case of the dummy load, no significant signal should be seen. In the case of a live patient, signals should appear normal (see below for signs of RF interference). Any effect on the acquired signal, that seems to come and go as the RF radiating device is activated and deactivated should be noted, and may indicate an RF interference problem.

Even if you have eliminated or controlled all routine sources of RF interference within your building, interference can also come from sources that are beyond your control – for example, mobile radios in vehicles driving near your office. For this reason, it is a good idea to maintain a raw signal display, in time and/or frequency domain, on a screen visible to the clinician. The following indications may point to an RF interference problem, particularly if they occur intermittently or seem to be related to patient or electrode wire orientation:

- Unusually noisy signal*
- Sudden shifts in signal level which do not seem to correspond to patient effort or action (or movement artifact)*
- Appearance of signal frequency components or signal levels, outside the normal range for the type of signal being acquired*
- Unusually narrow spectral peaks (apart from power line frequencies)*

The following measures may be helpful in resolving an RF interference problem:

- *Identify and remove the source of the RF energy, or restrict its operating times.*
- *Move the equipment farther away from the RF energy source, or re-orient equipment and cables to diminish the effect.*
- *If the problem occurs with a biopotential signal, ensure that the skin under the electrodes is adequately prepared, as demonstrated by low electrode impedance readings.*
- *Contact Thought Technology for more information if unable to resolve the problem.*