

RADIO INTERFERENCE AND ELECTRONIC DEVICES

Application Note

Voice Communications
Division

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Since radio was first invented, radio and TV transmitters have demonstrated an ability to unintentionally interfere with other devices. A neighborhood FM station might be picked up on an intercom system, or a passing police car on a phonograph. There have even been rare but documented instances where a strong local transmitter was picked up on a rusty radiator pipe, or a loose filling! Historically, these situations did not show up very frequently and were addressed as they occurred, but the increasing use of radio transmitters in personal communications is resulting in a growing incidence of these problems. 802.11 network interfaces, cellular telephones, cordless telephones, personal data assistants, cordless headsets, and other kinds of wireless devices contain transmitters that are powerful enough to cause interference in many common systems such as telephones, stereo systems, speakerphones, personal computers, kitchen radios, and others. Polycom systems, with their sensitive microphones and electronics, are not immune to this effect.

Interference of this nature can be reduced or eliminated by taking some simple precautions. These are techniques that have been used for decades, and can be very effective.

- a. Keep any transmitters as far from sensitive components, such as microphones or consoles, as possible. The "field strength" at one foot away is ten times that at three feet away, and much more likely to cause trouble. Whenever possible, maintain at least a three-foot (one meter) separation.
- b. The strength of personal wireless transmitters can differ by over 2000 times from device to device. Many Bluetooth devices operate at power levels of 1 milliwatt, while some personal information managers and cellphones can run at 2 watts (2000 milliwatts). A two-watt transmitter at one foot produces as much signal as a major FM radio station only 100 feet away! When using a high-powered device, provide extra distance from sensitive components.
- c. Some wireless systems, such as access points, are designed with directional antennas that concentrate the signal in a particular direction. Try to point these antennas away from conferencing equipment and microphones.
- d. Most wireless devices are in at least occasional communication, even when nothing apparent is happening. A cellphone, for example, will transmit a strong signal when it is called, even if it is set to "silent," and this kind of signal can produce a "bz-t-bz-bz" sound from a nearby loudspeaker. Keep cellphones away even when they're not being actively used.
- e. Cellphones and other devices are very intelligent these days, and know how to turn up their transmit power when they are in a weak reception area. A cellphone in a well-shielded building, such as a metal or concrete building, is likely to transmit at a much higher level than a cellphone in the open because it is aware that its signal will be attenuated. Again, extra separation from those audio components is beneficial.

The industry is aware of this increasing problem. While ITU specification EN55024 provides a means of measuring this interference, it was not intended to assure immunity against the flood of high-powered personal transmitters that have emerged over the past ten years, nor does it target the cellphone and network bands which dominate the problem over 1 GHz. Additionally, EN55024 is not mandatory outside of the EU, although most Polycom equipment is compatible with its requirements worldwide, as a matter of good practice.

At this moment, there is no defined consensus regarding measurement, or determining the likelihood or level of this specific (strong personal transmitter, particularly in the higher frequency bands) radiated interference. Therefore, Polycom and other major industry members have initiated and are spearheading a forum to create standards that address this issue. This forum, of which Polycom is a founding member, is working under the umbrella of ANSI as C63 SC5 and is beginning the initial investigative work. In the future Polycom intends to apply additional requirements based upon C63/SC5 work as soon as practicably possible.

A little care in placement of wireless devices will always be needed, even as manufacturers build in more resilience. A cellphone placed right next to a microphone, for example, can produce a field strength of a thousand volts per meter (or more)! So in the same way that one is careful not to spill coffee on a telephone, one can be aware that it should not be overwhelmed with radio energy, and this will usually result in satisfactory performance for both wireless and conferencing users.