HME TECHNICAL BULLETIN

Wi-Fi & 2.4GHz Cordless Interference

Often times the question comes up, "why won't the DX100/200/300 be interfered with by Wi-Fi and/or 2.4 GHz cordless telephones?" It is not that there have been cases of interference; rather, there is concern with the potential that it could occur.

Frequency hopping is part of the answer. Wi-Fi is direct sequence spread spectrum (DSSS) for 802.11b and Orthogonal Frequency Division Multiplexing (OFDM) for the newer versions.

DSSS is a wideband signal (~10MHz out of 83 MHz) centered on a given frequency (no hopping). When our radio tunes to a nearby channel the intercepted energy is low in our bandwidth (1MHz). Wi-Fi is spread evenly over its bandwidth 50mW/10MHz = 5mW/MHz. Our radio can cope with it as though it were just noise because the level is low compared to our GFSK signal. Also because our radio is hopping, it can reject a channel if the received signal strength indicator (RSSI) is too high.

OFDM is a multi-carrier system. Each carrier is modulated by binary phase shift keying (BPSK). If you had 16 carriers you could transmit 16 bit words with a BPSK rate of 1/16. For Wi-Fi, 802.11g, the bandwidth is ~30MHz out of 83 MHz. Again if our radio “hops” to one of these carriers, it would lose only one 10ms chunk of information because it would then “hop” to another channel for the next chunk of information. Again, our radio will work to reject a channel if the RSSI is too high; at least for some time. OFDM is low power on a given channel compared to our signal so we likely will not even lose packets.

Then comes the question, “won’t the DX200 interfere with my Wi-Fi and/or cordless phones?” HME has helped solve this issue by introducing a spectrum friendly method of operation to further reduce any potential for interference. HME equipment can be set to hop the entire band, or the upper or lower half of the band to avoid local Wi-Fi signals altogether. Table 1 shows the Wi-Fi center frequencies used around the world. The “X” indicated what channels are available in each geographic region.

Table 1

Wi-Fi Channel #	Frequency MHz	Nearest HME Frequency	USA	Canada	Europe	Spain	France	Japan
1	2412	2412.288	X	X	X			X
2	2417	2417.472	X	X	X			X
3	2422	2422.656	X	X	X			X
4	2427	2427.840	X	X	X			X
5	2432	2431.296	X	X	X			X
6	2437	2436.480	X	X	X			X
7	2442	2441.664	X	X	X			X
8	2447	2446.848	X	X	X			X
9	2452	2452.032	X	X	X			X
10	2457	2457.216	X	X	X	X	X	X
11	2462	2462.400	X	X	X	X	X	X
12	2467	2467.584			X		X	X
13	2472	2472.768			X		X	X

Looking at Table 1 it is recommended to set Wi-Fi systems to the highest frequency channel allowed in a region. Then, the HME system should be set to hop in the lower half of the band for best separation to minimize any interference with the Wi-Fi system. The center of the 2.4GHz band is 2.442 GHz. The HME system will not hop beyond 2.442GHz when set to hop in the lower half of the band.

As for cordless telephones, most of these are frequency-hopping spread spectrum (FHSS), just like HME equipment in the 2.4GHz band. New cordless phones are being produced in the 1.9GHz and 5.8GHz bands with little new production in the 2.4GHz band. Any hop sequence, phone or HME, is pseudo-random. Thus there is low probability that they will be on the same frequency at the same time. A phone’s specific hop frequencies are different from HME and if they do collide, HME would lose only one 10ms chunk of information because it would then “hop” to another frequency for the next chunk of information.

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Our radio design also provides encryption. This secures the transmitted information and prevents unauthorized people from understanding the audio or data even if they could follow the frequency hopping sequence.

Please contact HME if you have any questions or require additional support: proaudiosupport@hme.com