On Sat, 2006-08-26 at 16:51, Dan Strassberg wrote:
I know that the synchronization of the nearby transmitters was sometimes accomplished by sending the "master" carrier by wire to the "slave" station. That is, at one point, WBZ used coax to send its carrier the roughly 100 miles to Springfield. This arrangement might later have been replaced by the use of frequency dividers to produce an audio-frequency signal that could be sent over commercial voice-grade lines to Springfield, where the the signal was used to drive chain of frequency multipliers. From what I can tell, the frequency divider/multiplier scheme must have been problematic and very likely never worked satisfactorily but for stations widely separated geographically (KEX and KOB, for example) may have been the only scheme that could be implemented because long runs of coax must have presented many technical and legal challenges.

Something similar was tried with *TV* in the late 1940s. WRC-TV in Washington and WNBT in New York were both on channel 4, and co-channel interference in Jersey suburbs further from NYC was pretty serious. (there's also a story that President Truman once rang up the FCC to demand they fix the CCI, after he was unable to enjoy a program on WRC-TV. I suspect this is an urban legend.)

They figured synchronization of the WRC and WNBT carriers would fix the problem. So they installed equipment at the base of a telephone microwave tower near Camden. One antenna was aimed at NYC, the other at Washington. The heterodyne between the WRC and WNBT signals was then fed to New York by phone line & used to control the frequency of the WNBT transmitter - the goal of course being to zero-beat the two transmitters.

It reportedly worked. And would have worked well for AM as well. As it turns out, for TV it's just as effective to have an intentional heterodyne at about an even multiple of half the sweep rate - for that reason, many TV stations intentionally operate 10KHz off-frequency. (indeed, are required by the FCC to do so) Do it that way, and you don't need the roomful of gear midway between stations - you just maintain the 10KHz offset with the normal accuracy available from a crystal. That was an especially welcome discovery in this case, as it seemed likely WBZ-TV, WRGB-TV (associated with WGY-810), and WGAL-TV (Lancaster, Pa., I think their AM was on 1490?), all then also on channel 4, would have to be added to the scheme. I can see the poor WNBT transmitter being dragged in five different directions at once<grin>.

As far back as 1980 (maybe further) some TV stations did maintain precise frequency control to reduce midpoint heterodyne interference even further. A laboratory-quality frequency reference was used to control a phased-lock-loop synthesizer to keep the station on frequency; a strip-chart recorder would compare the reference against WWVB to verify proper function. (it was interesting to leave the strip

chart running as the sun went down, and watch the changes of the ionosphere affect the WWVB propagation delays. Official runs for the transmitter log were always run at midday when WWVB would stay put<g>)

Today, however, such a scheme, if it had any value, might be implemented with the aid of geosynchronous satellites instead of any sort of wired connection between stations. As I see it, the potential value, if any, would be limited to a few AM stations, on whose channels nearly all co-channel interference comes from one dominant station.

Here in the Boston area, I can think of two examples, WBIX 1060, whose only significant co-channel interference comes from KYW and WAMG 890, whose only significant co-channel interference comes from WLS. WBNW 1120 has in the past received more interference from WPRX Bristol CT than from KMOX. The satellite-based scheme should not be extraordinarily expensive to implement. My question is whether it would have any value. Would elimination of the sub-audio heterodyne between the carriers improve the listenability of the signal from stations subject to co-channel interference from a single dominant station?

I don't think it would accomplish much today. Even the worst-maintained U.S. stations are almost without exception within 20Hz of the right frequency; getting any closer than that really won't be noticed by the listener.

Doug Smith W9WI