ROAD-INFORMATION SYSTEMS

I wish to respond to a letter in the July 1982 **Radio-Electronics** by Mr. Charles E. Koontz regarding road-information systems. First thing, I feel that such systems are really not needed in most areas of the United States. Just listen to any local radio station during the morning or afternoon drive-times, and you will hear plenty of traffic information. I think that the functions of roadside-information stations and auxiliary services that Mr. Koontz is discussing are already fulfilled by most radio stations. I also think that the FM system discussed in his letter is not as practical as the proposals for roadside stations that would have been located at the low end of the standard AM broadcast-band. Those AM stations could give better coverage and at lower transmitter power for the same area served. Also low-power and auxiliary services broadcast in FM would only be more difficult to receive in a moving automobile. I also wonder whether the public and the radio stations are interested at all in a system to transmit pictures over the existing FM band. That *sounds* interesting—but what real purpose could it serve?

Mr. Koontz must understand that the main-channel carrier space of a modern FM broadcaster is very valuable material. To the broadcaster, it is far more profitable to sell advertising time than to rent space on his carrier for SCA or other auxiliary services, possibly downgrading his signal. Mr. Koontz should remember that the broadcaster must give up about 10% modulation percentage for each auxiliary service. In most cases, that is not permissible. Note that most stations that carry SCA or other auxiliary services are non-commercial. The FM broadcast industry is more competitive now than it was 25 years ago. Modern broadcast-equipment designers are really more concerned in allowing the broadcaster to get the most out of his main channel.

Now to a discussion on modern FM-broadcast technology: Mr. Koontz points out "reduced coverage" from Class-B and Class-C FM-radio stations; that is far from the real truth. Modern FM broadcasting antennas, built from the late 1960's to date, use a circularly polarized radiation pattern—that is, the antenna radiates in *both* the horizontal and vertical planes. Older antennas radiated only a horizontally polarized signal. Such horizontally polarized antennas are totally useless to the modern broadcaster. A majority of the FM receivers now used by the public use *vertically* polarized antennas. That includes portable radios and automobile receivers. A modern broadcaster is most concerned with "penetration"—the number of receivers that

his signal can reach in the station's service area. It is true that horizontal-polarized antennas could give the station better range, but that would be useless to people who have vertically polarized antennas on their receivers.

As far as transmitters and exciters are concerned, any station still using a 25-year-old exciter and transmitter would not survive. You could get by with using a 25-year-old transmitter in AM radio and TV, but not FM broadcast. In fact, most of those old FM transmitters were relegated to auxiliary service, or even scrapped, when FM stereo came about. This is why: Old transmitters used modulator and multiplier stages that had insufficient bandwidth to handle the stereo-modulating signal. Also, the multiplier stages distorted the stereo information. A modern, solid-state FM exciter is actually a marvelous instrument compared to the primitive exciters. Its solid-state modulator and AFC circuits require little or no adjustments, and are capable of far lower distortion and greater bandwidth. There are only a few or no multiplier stages that don't require tuning. The new exciters are compact and efficient, and not susceptible to microphonics.

The modern transmitter is a far superior performer compared to the older models. The newer and more efficient stages give wider bandwidth, easier tuning, and are much more efficient. They are less likely to cause distortion and harmonics. The modern transmitter is very "transparent" to the exciter's signal. As far as interference is concerned, such problems are very rare, because both transmitters and exciters are well shielded.

Here are some other considerations that broadcasters use in evaluating transmitters: They want something that is very energy-efficent, because the transmitter uses more electricity than any other device that the station uses. Older transmitters are just too inefficient, and every kilowatt the transmitter uses means bigger bucks each year on the power bill. That is getting very important. Also, parts and tubes for 25-year-old transmitters are getting very expensive, and difficult—if not impossible—to obtain, because so many of the manufacturers have long gone out of business. Even parts for equipment 10-15 years old have become hard to obtain. Also, old transmitters were not available in the power levels that broadcasters require now. The use of lower-gain, wide-beamwidth antennas requires a higher-power transmitter.

To sum it up: If Mr. Koontz would listen carefully to an FM radio station using new equipment, he would be surprised at how well it can perform: far better than 25-year-old or even 10-year-old technology. It's just like trying to say that a 20-year-old black-and-white tube-type TV set is better than a solid-state 1982 color receiver.

I can agree with Mr. Koontz on FM tuners. If someone asks me about them, I will reply that spending more than $500 on a tuner is a waste of money. I laugh at people who spend $1000 on a tuner and brag about the reception. These days, hi-fi FM listeners are in a minority; modern radio stations try to cater to those listeners who have portable radios. What sounds good on a portable may sound loud, dense, and harsh over your stereo. Whether you like it or not, that's the way it is—I don't agree with it, either.

To tell Mr. Koontz more: The transmitter is actually a minor cause of signal degradation for his station. The most probable cause is the telephone lines that the station may be using to relay program material to a remotely located transmitter. Those telephone lines can have unstable frequency response and distortion. Also, transients, intermodulation, and phase distortion over those lines are a problem. I don't want to downgrade the telephone companies that provide those lines. Most of them try to be cooperative and are sympathic to the stations' needs; they do try very hard to provide adequate service under tough conditions.

If the station is lucky enough to be using a microwave STL system, the improvement in sound quality can be very startling. Another problem that stations have is distortion in phono and tape systems—those can have more distortion than a typical new transmitter. The problems are the same as those you have with phono and tape machines in your stereo at home.

I can also agree with Mr. Koontz about the Grundig FM receivers: They were high quality for their time. True, the older ones aren't stereo, but they could give excellent results. I have a Grundig radio-phono console that has an AM/FM shortwave tuner that suffered the same fate as some of Mr. Koontz's receivers: bad switches, old capacitors, and old age. The person who gave it to me said that he purchased it in 1959. I am now unable to repair it because the switches are unavailable, along with some of the tubes.

I apologize for the length of this letter, but I had to go to lengths to explain what is going on these days in modern radio stations. I

know because I have worked, and still work, as a Maintenance Engineer for a prominent AM/FM station in the Washington, DC area. I have lived here for close to 10 years.
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