



The

# **Broadcasters' Desktop Resource**

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... edited by Barry Mishkind – the Eclectic Engineer

## **Focus on Regulation**

### **We Need to Act on AM Improvement Now**



**By Tom King**

*[September 2014] There has been a lot of talk over the past year or so about “AM Improvement,” especially since FCC Commission Ajit Pai showed his keen interest in helping AM operators.*

*This month, a special meeting is scheduled with Commission Pai and Media Bureau Chief Peter Doyle. Tom King thinks all AM broadcasters ought to take this opportunity to be heard at the FCC.*

Kintronic Labs is concerned about the declining position of the AM radio service in the United States, which we reflected in our Reply Comments to the FCC NPRM Docket No. 13-249 on the subject of “AM Revitalization,” issued on October 31, 2013.

In the interest of preserving this great national resource for local public media, we have scheduled a meeting [on September 23<sup>rd</sup>] with FCC Commissioner Ajit Pai and Audio Media Chief, Mr. Peter Doyle, to address what we believe are the critical steps toward putting AM radio on a more competitive basis with FM.

#### **MEETING AGENDA**

The main points to be discussed are:

- (1) FCC enforcement of regulations relative to the power distribution industry and the consumer electronics industry that are not currently being enforced, resulting in a constantly worsening electromagnetic environment for AM radio service.
- (2) The need for parity between AM and FM receivers through the establishment of minimum technical standards for AM receivers that would become effective as soon as January 2016.

We plan to demonstrate a comparison of full-bandwidth CQUAM AM stereo reception with a local FM station and with a typical AM receiver in a popular consumer multi-band receiver.

The effects of adjust-ing the AM bandwidth from 2.5 to 10 kHz in 2.5-kHz steps will also be demonstrated.

- (3) The need for FCC authorization of AM synchronous boosters. Unlike FM translators, such on-channel boosters would serve to increase the AM stations' audiences while concurrently maintaining the future viability of the band. The related technique of wide-area AM synchronization for coverage improvement will also be addressed.

## RECEIVERS ARE THE KEY

Referring to Step #2, it is absolutely essential that very close to full parity be established for new AM radio receivers versus their FM radio counterparts. This includes all key AM receiver performance attributes, including:

- (1) **Low internal noise floor**, well below the average AM-band atmospheric noise level. This includes all internal synthesizer and DSP circuitry within the receiver (and in the immediate environment for integrated automotive applications).
- (2) **High overall RF sensitivity, selectivity, and dynamic range**, to provide adequate amplification of weak signals, even in the presence of significant adjacent- and/or alternate-channel signals, especially in strong-signal environments.

This would incorporate typical advanced, multi-stage AGC action, with appropriate interaction between the RF and IF AGC control mechanisms to maximize overall receiver dynamic range, including adaptive front-end attenuation for signal-overload protection in very strong-signal areas. Useful typical specs include: sensitivity – 1  $\mu$ V for 10 dB SNR; selectivity (adjacent-channel) – 25-50 dB (adaptive).

- (3) **Highly effective noise (EMI) rejection**, including staged RF and IF noise blanking, accompanied by appropriate audio blanking and/or expansion when required. These features were developed and included in Motorola chip sets in the 1990's in the AMAX program, and are easily integrated

into modern, high-density AM/FM receiver chips.

- (4) **Full 10-kHz audio bandwidth capability with low detector distortion**. This would obviously incorporate dynamic, signal-controlled bandwidth control (including AMAX-style adaptive 10-kHz notch filtering) as dictated by noise and adjacent-channel interference.
- (5) **Stereo capability**. If the receiver has FM stereo capability, it must have corresponding CQUAM decoding for AM.

Without fulfillment of the first three requirements (this also includes the associated AM antennas both for vehicles and for home use), basic AM reception will suffer significantly compared with FM.

Without the last two, the output sound quality cannot be closely competitive with FM (i.e., 10 kHz full bandwidth on AM versus 15 kHz nominal for FM).

## A PROPOSAL FOR ACTION

We therefore petition the FCC to mandate the following minimum allowable performance specifications for all AM receivers that will be manufactured and installed in new automobiles as of January 1, 2016:

**Audio Bandwidth:** 10 kHz typical, adaptive, with a minimum nominal bandwidth of 7.5 kHz

**Signal-to-Noise Ratio:** minimum 55 dB, preferably 60 dB

**Sensitivity:** -120 dBm for a signal-to-noise ratio (SNR) of 10 dB

**Selectivity:** 25-50 dB (adaptive filtering, using co-, adjacent-, and alternate-channel detection)

**Dynamic Range:** 100 dB

**Noise Figure:** 1 - 3 dB

**Image Rejection:** -50 dB

**Intermod:** IP<sub>2</sub>, IP<sub>3</sub> intercepts +10 to +40 dBm

*IF:* low with image-rejecting down-conversion, or double-conversion

*Stereo Separation:* minimum 25 dB

### **INDUSTRY SUPPORT NEEDED**

We need the full support and backing of you, the AM radio broadcasters, to be able to communicate with Commissioner Pai and Mr. Doyle how imperative it is that these measures be implemented on a fast approval track without further delay in order to put AM radio in a more competitive position with FM radio.

We request that you indicate your support simply by [clicking here and responding](#) to this mat-

ter with a brief email response. All you have to do is tell us: "I approve." (Of course, you are welcome to add any further comments that you may wish, but the most important point is to add your name to those seeking quick action to help AM stations.)

Working together, we can restore AM radio to provide the high-fidelity audio reception that the public listening audience demands.

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