

INVENTION DISCLOSURE

1. **Invention Title.**

Remote Detection and of LTE interference on CableTV Networks

2. **Invention Summary.**

By analyzing the CM Downstream Equalization information, determine a pattern that provides indication of burst type service interferences residing in the same band. For example, LTE same channel interference in the 800 MHz band.

3. **Invention Description.**

a. Describe the invention in detail and/or attach a description, drawing(s) and/or diagram(s), if available

The paper [Cobhan] describes field tests on LTE interference in the 800 MHz band. Primarily devices (e.g., STBs with DOCSIS devices) with holes in the metallic box maybe affected by LTE transmitters. This interference can cause service degradation and hard to detect causes due the intermittent nature of the LTE transmissions. This invention explores the usage of a DOCSIS feature available on cable modems: Downstream Equalization. The DOCSIS cable modem compensates signal distortion in the downstream. By analyzing the real time variability of the Downstream equalization information, channel interference is inferred.

Figure 1 shows the effect of a simulated burst noise in the same downstream channel as the CM resides. The constant downstream equalization calculations by the CM will allow the detection or variation of the tap energy over time, which is atypical compared to the regular non-interference model of a clean plan. While the simulation shows a no variability of the tap energy in a clean environment, in a bursty LTE environment the variability is observed. This shows characteristic patterns for interference vs. non interference periods.

By simulation there was observed high packet loss due the presence of interference in the cable band (as pointed in [Cobhan]). Alternatively, the absence of Downstream equalization coefficients (or partial equalization coefficients t) can less accurate determine by high rate polling of FEC coefficients – if available).

b. Why was the invention developed? What problem(s) does the invention solve? How is it better?

There are several efforts in place to determine LTE interference on cable systems as the 700 MHz and 800 MHz bands are slated to be used for bidirectional wireless transmission using LTE technology. This solution provides a cost efficient, universal and reliable way to diagnose and troubleshoot for potential LTE and other burty interferers. A Cable TV operator as user of the spectrum even though in the closed coaxial environment can experience service degradation in the frequency regions in

common with LTE services. Operators can use interference detection systems such as the one described here to bring attention and/or resolve these types of issues

c. Briefly outline the potential commercial value and customers of the invention.

The industry is looking for LTE ingress mitigation mechanisms to detect and understand the effects of LTE interference on different type of devices

4. HOW is your invention different from existing products, processes, systems?

There may not be any solutions for LTE interference detection at this point – this procedure may outline many lab strategies, characterization, real time detection and inventory of potential devices affected with high margin potential.

References:

[Cobhan] Field Test investigating the potential interference into Cable TV from LTE deployment in the 800 MHz band, Cobhan Technical Services, 2010