

Investigate the Cases and Propose Solutions for the Tuning Disturbances of FM Sound Wave Communication Services at Sri Lanka Broadcasting Corporation

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ABSTRACT

Investigations were carried out at the Sri Lanka Broadcasting Cooperation in order to provide solutions for tuning disturbance problem of FM sound wave communication service at SLBC. There are more than 230 FM frequencies from 88 MHz to 108 MHz allocated for the channels in Sri Lanka by the TRC. When considering about the Colombo area there are more than 60 FM channels. However the tuning disturbance has begun to occur in these FM sound waves today. So, listeners who live in both rural and town areas fall in trouble when they tune FM channel from their receivers. Some channels cannot be tuned well and some channels are difficult to be tuned. Sometimes other neighboring channels disturb (overlap) or make unwanted noises. This project aims at finding reasons and solution for such FM channel disturbance.

KEYWORDS: Channel Bandwidth, Deviation (side bands), FM (Frequency modulation), FM sound wave communication, Overlapping.

INTRODUCTION

Sri Lanka has lot of FM radio channels today which broadcast between 88 – 108 MHz. Each channel has been permitted their license and frequencies by telecommunications Regulatory Commission (TRC) in Sri Lanka.

The main target of a FM radio service would be providing a quality service for its listeners (customers) without any tuning disturbances. But today it has stopped such frequency allocations for FM channels due to lack of frequency space in the particular range.

Now, there are over 230 frequencies licensed for both island wide and regional services. There are some regulations for this FM channels issued by the Telecommunications Regulatory Commission (TRC) such as Transmitter

Power, Deviation from assigned bandwidth etc.

However, today the tuning disturbance has begun to occur in these FM sound wave channels. So listeners who live in both rural and town areas fall in trouble when they tune to their favorite FM channels using their receivers. Some channels cannot be tuned well and some channels are difficult to be tuned. Sometimes other neighboring channels overlap (disturb) or make unwanted electronic noises. Above problems frequently occur when the listeners use radios in their vehicles. There are some FM radio services which can be clearly tuned in narrow band ranges. Now a-days such narrow band channels are very difficult to be tuned especially when the listeners use manual FM receivers.

So the research and data analysis about the above problems also helped to identify the reasons for them.

There are many good programs broadcast over the FM radios, today, like Dhamma Dessana, Pirith, News, Educational, etc. Most of people are used to listen to their programs. As a result the broadcasting station owners making good profit by

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broadcasting such programs on the other hand. Listeners also need well tuned FM services from their radios.

But in some parts of the country FM channels are not tuned well which cause problems to the producers as well as to the listeners. The major FM service provider; SLBC also faced with this problem therefore this problem was mainly focused on this research.

Research Objective

By providing good FM radio service SLBC can be more popularized among Sri Lankan listeners. Also such useful FM broadcasting service will help to create a better culture in Sri Lanka. Therefore, the FM receiver must be tuned well for customer's favorite channel. Otherwise, they cannot listen clearly, hence making bad reputations for the relevant authority of the existing government.

My objective was to find reasons and subject solution for above problems. So that favorite FM channels should be tuned well at any part of Sri Lanka. For that the overlaps should be minimized with my proposed solutions. That is the ultimate benefit for the FM broadcasting organization as the result of this research project.

THE ORITICAL VIEW

How frequency allocate for the FM channel

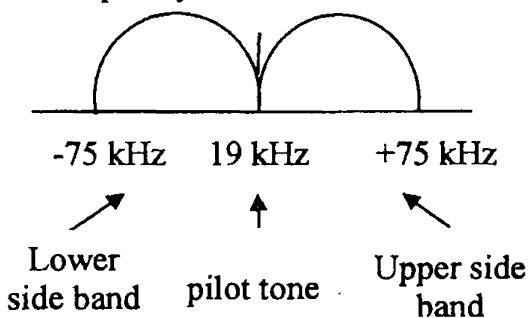


Figure 1: Deviation of the FM channel

The FM broadcast band is from 88.1 to 107.9 MHz by 200 kHz steps. In side of this 200 kHz band gap there are two side bands with ± 75 kHz deviation and pilot tone of 19

kHz which is help to log the channel to receiver as shown in figure 1. The base band signal is travel through those side bands.

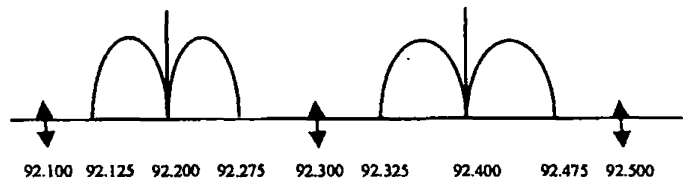


Figure 2: Deviation and Band Gap of the Two FM Channels (92.2 and 92.4)

Between the two channels there is 50 kHz band due to protection for the both channels as shown in Figure 2.

DATA COLLECTION AND ANALYSIS

Primary Data

Primary Data were collected by giving the questioner to the People who are living in mountain areas, rural areas(far from the towers) and city areas(all over the country) using simple random sampling method. More than 200 data were primarily collected.

Secondary data

The already recorded data collected by the TRC were obtained.

Field Experiment Data

Such data were collected by field experiment using simple random sampling method. Digital FM receivers are used to obtain the usable data (practical) frequency bandwidth in this experiment which the data have three points. The covered districts and areas for the experiment are;

Colombo; Colombo 07, Nugegoda, Kalaniya

Kurunagala; Kurunagala, Giriulla, Narammala,

Kandy; Kandy, Peradeniya, Kadugannawa,

Anuradapuraya; Anuradapuraya, Galenbidunuwawa, Kahatagasdigiliya

Badulla; Badulla, Mahiyanganaya, Bibila

Galle; Galle, Ambalangoda, Hikkaduwa

Data Analysis

When considering the data sample 41.3% of listeners have faced severe tuning disturbance problem. In that case several reasons could be identified. Out of them, the major reasons were distinguished using above data for the tuning disturbance in FM sound wave communication. After analysis, the primary data could be recognized into four major reasons and plotted as shown in figure 3.

The major reasons are,

1. Tuning Disturbance due to Mountain.
2. Tuning Disturbance due to huge buildings.
3. By overlapping with the other channel frequencies.
4. Others, due to Time, radio type etc.

MAJOR REASON FOR TUNING DISTURBANCE IN SRI LANKA

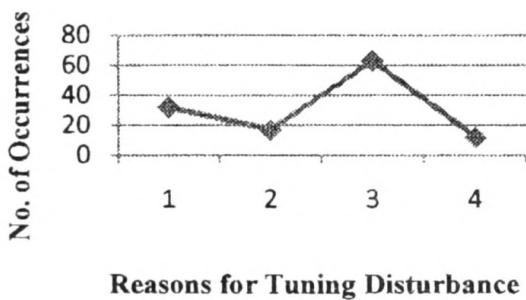


Figure 3: Major reasons for tuning disturbance

Field Experiment Data

Colombo District

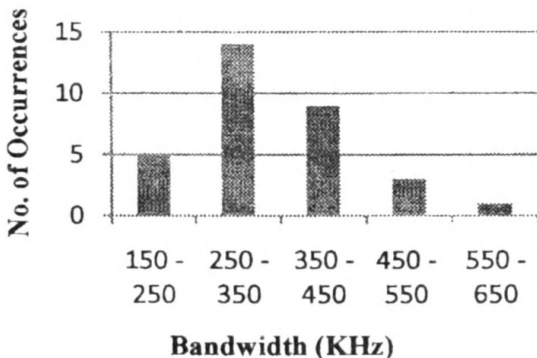


Figure 4: Bandwidths of the channels in Colombo district

Kandy District

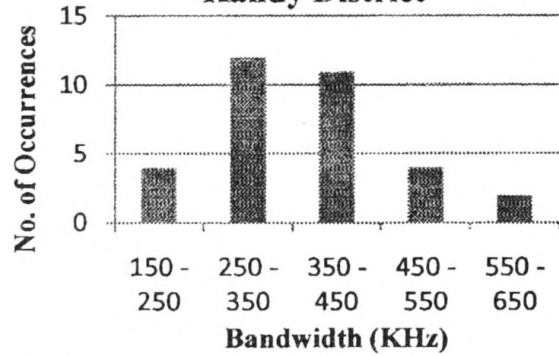


Figure 5: Bandwidths of the channels in Kandy district

Kurunagala District

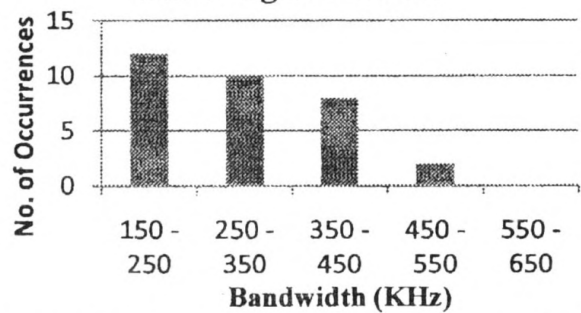


Figure 6: Bandwidths of the channels in Kurunagala district

Anuradapura District

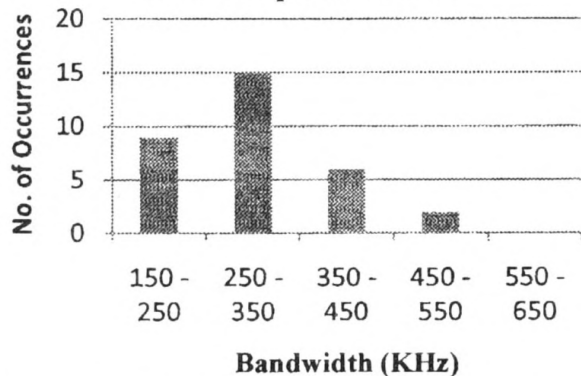


Figure 7: Bandwidths of the channels in Anuradapura district

Badulla District

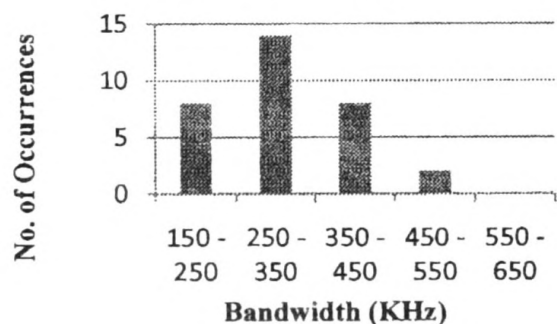


Figure 8: Bandwidths of the channels in Badulla district

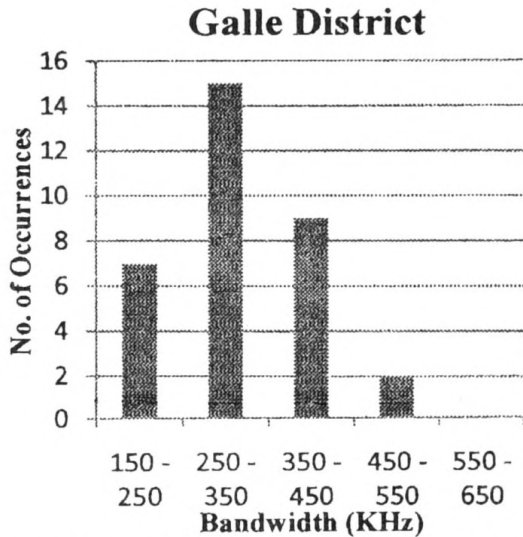


Figure 9: Bandwidths of the channels in Galle district

RESULTS AND CONCLUSION

There are more than 230 FM frequencies from 88 MHz to 108 MHz allocated for the channels in Sri Lanka by the TRC. When considering about the Colombo area, there are more than 60 FM channels. According to the TRC regulation it has allocated only 200 kHz bandwidth for each channel (from LSB to USB). But practically, channels are not operating in this frequency band gap as shown in the graphs (Figure 4 to 9). It could be noticed that most of these channels have operational bandwidth more than 250 KHz. Therefore, these channels begin to overlap which is the main reason for the tuning disturbance of the FM channels. As the results most of the private organizations began to increase their transmitter power and the frequency deviation to give a clear FM service for their listeners. Then due to that problem, channel bandwidth also increase making tuner overlapping of channels. Even if the government does not issue licenses for new channels today, the problem has not been solved yet. High mountains, tall buildings and other cases are not making much effect than the above mentioned overlapping problem.

Proposing of Alternative Solutions

Currently over 20 companies have been permitted by the TRC (Telecommunication Regularly commission) to transmit nearly 50 radio channels in Sri Lanka, in FM sound wave broadcast band from 88 MHz to 108 MHz by 200 kHz allowable bandwidth (from lower side band to upper side band) for each service.

The telecommunication regularly commission (TRC) should construct a common transmission tower in a place like Nuwara Eliya which can cover the whole country and can provide an island wide transmission to FM services. Then, each radio channel should be allocated the 400 kHz frequency bandwidth.

Same frequencies should be reused (utilized) for some of the regional FM broadcasting services such as Wayamba Handa. Then the same broadcast band can be allocated for other regional channels avoiding this overlapping problem. Also government should limit allocating number of frequencies for private sector; today the numbers of FM frequencies are allowed to transmit for some of organization.

The other best solution is establishing a digital broadcasting system for radio sound waves. Then overlapping will not occurred and also the number of channel can be increased in the same FM range. Even in Sri Lanka this technology is under testing today. Therefore it is better to propose Digital Radio Mondiale technology as an alternative. The DRM is a set of digital audio broadcasting technologies designed to work over the bands currently used for AM broadcasting, particularly in shortwave range. The DRM can fit more channels than AM, at higher quality, into a given amount of bandwidth.

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