International Journal of Engineering Research & Management Technology ISSN: 2348-4039
November-2016 Volume 3, Issue-6
Email: editor@ijermt.org www.ijermt.org

IMPROVING VOICE QUALITY IN GSM BANDS BY USING FILTERS

Ashutosh Kumar
Assistant Professor
Department of computer Science
Swami Vivekanand Subharti
University Meerut

Iltefat Fatima
M.Tech
Department of Computer Science
Swami Vivekanand Subharti
University Meerut

ABSTRACT:- Today's In the Technologies Era We used GSM for voice Communication in RAN Technology. In this paper We proposefilters by which we can improve our voice quality inGSM band. The bands are (900, 1800, 2100, and 2300). There are various converters like convert Audio / voice codecs and vocoderthat canconvert the voice signals which are required to be transmitted over a GSM link into a compact digital format. Voice codec technologies used with GSM are include LPC-RPE, EFR, Full Rate, Half Rate, AMR codec and AMR-WB codec & CELP, ACELP, VSELP, speech codec technologies. Audio codecs or vocoder is universally used within the GSM system. The bit rate of speech is reduced and has been converted from its analogue for into a digital format to enable it to be carried within the available bandwidth for the channel. Without the use of a speech codec, the digitized speech would occupy a much wider bandwidth then would be available. Accordingly GSM codecs are a particularly most important element in the overall system. By using of TEMS we can done easily optimization for the RAN bands like- 900, 1800, 2100& 2300 of any Operators in GSM Technologies.

KEYWORDS- Voice quality, GSM .RAN, GSM Handover

1. INTRODUCTION

Vocoder or speech codes are used within many areas of voice communications. Obviously the focus here is on GSM audio codecs or vocoder, but the same principles apply to any form of codec. If speech were digitized in a linear fashion it would require a high data rate that would occupy a very wide bandwidth. As bandwidth is normally limited in any communications system, it is necessary to compress the data to send it through the available channel. Once through the channel it can then be expanded to regenerate the audio in a fashion that is as close to the original as possible.

To meet the requirements of the codec system, the speech must be captured at a high enough sample rate and resolution to allow clear reproduction of the original sound. It must then be compressed in such a way as to maintain the fidelity of the audio over a limited bit rate, error-prone wireless transmission channel. Audio codecs or vocoder can use a variety of techniques, but many modern audio codecs use a technique known as linear prediction. In many ways this can be likened to a mathematical modeling of the human vocal tract. To achieve this the spectral envelope of the signal is estimated using a filter technique. Even where signals with many non-harmonically related signals are used it is possible for voice codecs to give very large levels of compression.

A variety of different codec methodologies are used for GSM codecs:

CELP: The CELP or Code Excited Linear Prediction codec is a vocoder algorithm that was originally proposed in 1985 and gave a significant improvement over other voice codecs of the day. The basic principle of the CELP codec has been developed and used as the basis of other voice codecs including ACELP, RCELP, VSELP, etc. As such the CELP codec methodology is now the most widely used speech coding algorithm. Accordingly CELP is now we used as a generic term for a particular class of Vocoder or speech codec's and not a particular codec. The main principle behind the CELP codec is that it uses a principle known as "Analysis by Synthesis". In this process, the encoding is performed by perceptually optimizing the decoded signal in a closed loop system. One way in which this could be achieved is to compare a variety of generated bit streams and choose the one that produces the best sounding signal.

Types of GSM Handover:

In the GSM system there are four types of handover that can be performed for GSM are namely

Intra-BTS handover: This form of GSM handover occurs if it is required to change the frequency or slot being used by a mobile because of interference, or for the other reasons. In this form of GSM handover, the mobile remains attached with the same base station transceiver, but itchange the channel or slot. .A BTS can form a several cells

Inter-BTS Intra BSC handover: This form of GSM handover or GSM handoff occurs when the mobile moves out of the coverage area of one BTS but into another controlled by the same BSC. In this instance the BSC is able to perform the handover and it assigns a new channel and slot to the mobile, before releasing the old BTS from communicating with the mobile.

Inter-BSC handover: The work of BSC is it looks over a certain number of BTS. When the mobile moves out of the range of cells controlled by one BSC, a more involved form of handover has to be performed, handing over not only from one BTS to another but one BSC to another. For this the handover is controlled by the MSC.

Inter-MSC handover: This form of handover occurs when changing between networks. The two MSCs involved negotiate to control the handover It performs telephony functions of the system.

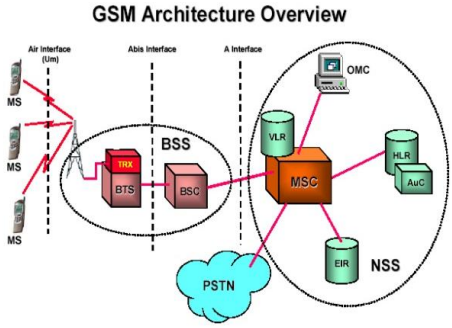
RAN

A radio access network (RAN) is an important part of a mobile telecommunication system. It implements a radio access technology. Conceptually, it resides between a devices such as a mobile phone, a computer, or any remotely controlled machine and provides connection with its core network (CN). Depending on the standard, mobile phones and other wireless connected devices are varyingly known as user equipment (UE), terminal equipment, mobile station (MS), etc. RAN functionality is typically provided by a silicon chip residing in both the core network as well as the user equipment.

2. BACKGROUND

GSM Radio Frequency Optimization (GSM RF Optimization) is the optimization of GSM radio frequencies. GSM networks mainly consist of different cells and each cell transmit its own signals to and receive signals from each mobile station, for proper working of base station many parameters are defined before functioning the base station such as the coverage area of a cell its depends on different factors which including the transmitting power of the base station, obstructing buildings in cells, height of the base station and location of base station. Radio Frequency Optimization is a process through which different soft (Cell Reselect Offset, BTS power) and hard (e.g. Electrical, Mechanical Tilt, Azimuth etc.) parameters of the Base transceiver stations that can changed in order to improve the coverage area and help in improve quality of signal. Besides that there are various key performance indicators which have to be constantly monitored and necessary changes proposed in order to keep KPIs in agreed limits with the mobile operator. There are various control channels in GSM network which involved in setting up of a voice call. On Broadcast Channels system information and various parameters along with synchronization and frequency correction information is transmitted. Common Control Channels we used mainly for informing the mobile or the GSM network about a service (voice, data, SMS) initiation and Dedicated Control Channels are used for call setup, authentication, location updating and SMS. A mobile is informed on a paging channel (PCH) that it has a call or SMS, to which the mobile station responds with a Random Access Channel (RACH) request. The mobile station is notified on an Access Grant Channel (AGCH) that it may tune to a specific Stand-alone dedicated control channel (SDCCH) which is called Immediate Assignment. The user is authenticated and ciphering commands are received on this channel. After successful authentication the mobile station is requested to tune to an assigned traffic channel (TCH). This process is called TCH assignment. Then the user are starts to move from one cell to another and the process of smooth transitioning of call from one cell to

the other is called a handover. While on the SDCCH or TCH a call may get dropped which is accounted to SDCCH drop or TCH drop respectively.



3. Proposed Methodology:

We used GSM for voice Communication in RAN Technology. We can improve our voice quality in GSM Bands by using filters. The bands are (900, 1800, 2100, and 2300).

GSM 850 Full Band Transmit: 894 MHz

Model 18527 Pass Band Transmit: 900 Band pass Filters

Model 14541 or Model 18601:- These transmit (downlink) filters provides superior rejection of

GSM 2100 Bandpass filter

4. RESULT

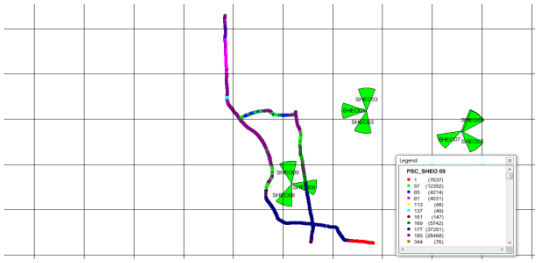
1. Improve Voice Quality.
2. Remove Voice Breaking problemfrom GSM Network.
3. Drive testing is a method of measuring and assessing the coverage, capacity and Quality of Service (QoS) of a mobile radio network In GSM network
4. The technique consists of using a motor vehicle containing mobile radio network air interface measurement equipment that can help in detect and record a wide variety of the physical and virtual parameters of mobile cellular service in a given geographical area.
5. By measuring what a wireless network subscriber would experience in any specific area, wireless carried make directed changes to their networks that can provide better coverage and service to their customers. “out of band” frequencies from DC to 2000 MHz Ideal for base station operators looking to clean up their transmit signal.

GSM 1800 Bandpass filter

Model 14542 or Model 18602:- These receive band pass filters isolate the receive band from potential interference from the transmit band and virtually all other transmissions from DC to 2000 MHz

Passband Receive: 1735-1755 MHz

Grid View of PSC



5. CONCLUSION

1. In this work we have tried to give and over view of the GSM system. We hope that we gave the general flavor of GSM and the philosophy behind its design. The GSM is standard that insures interoperability without stifling competition and innovation among the suppliers to the benefit of the public both in terms of cost and service quality's GSM is most successful digital telecommunication used in the world today
2. The communication development and the increase of living standard of people are directly related to the more use of cellular mobile. Cellular mobile radio-the high end sophisticated technology that enables everyone to communicate anywhere with anybody. The mobile telephony industry rapidly growing and that has become backbone for business success and efficiency and a part of modern lifestyles all over the world.
3. The Wireless Radio Resource Management (WRRM) is the most significant and challenging aspect in the provisioning of Quality of Service (QoS) for wireless mobile multimedia networks. Conceptually, radio resource management policies, in conjunction with the network planning and air interface design, determines QoS performance of the individual mobile user and at the network.

6. FUTURE ASPECTS

1. The features and benefits expected in the GSM systems are superior speech quality, low terminal, operational and service costs, a high level security, providing international roaming support of low power hand portable terminals and variety of new services and network facilities. In near forth coming days, the third generation mobile telephony becomes available whole over the world, which will give the facility of videoconference in mobile telephone.
2. In PRA method, resource allocation of new calls and handoff calls are considered. If the required resource is not available for Model-3 calls, proposed PRA method reject low rate video call, postpone high rate video call and allocate bandwidth to voice part of Model-3 call. The resource allocation of postponed video call and the respective delay analysis may be considered.
3. In RER the priority queue such as Real Time(RT) and Non Real Time(NRT) service class queue may be considered so that, the real time services can get more priority and benefited.

REFERENCES

1. C. Eklund, R. Marks, K. Stanwood, and S. Wang, "IEEE standard 802.16: A technical overview of the wireless man air interface for the broadband wireless access," in IEEE Communications Magazine, June 2014
2. L .Bos and S. Leroy, "Toward an all-IP-based UMTS system architecture," IEEE Network, January 2013.
3. G. Heijenk, G. Karagiannis, V. Rexhepi, and L. Westberg, "Diffserv resource management in IP-based radio access networks," in Proceedings of 4th International Symposium on Wireless Personal Multimedia Communications (WPMC'01), (Aalborg, Denmark), September 2012.
4. M. W. I. Forum, "Mtr.006v2, IP as transport in the ran," April 2012.
5. S. Kasera, R. Ramjee, S. Thule, and X. Wang, "Congestion control policies for IP-based CDMA radio access networks," in Proceedings of Infocom, (San Francisco, CA), April 2013.
6. H. EL Allali and G. Heijenk, "Resource management in IP-based radio access networks," in Proceedings CTIT Workshop on Mobile Communications, February 2013.
7. T. Bu, M. Chan, and R. Ramjee, "Connectivity, resilience and performance of IP-based radio access networks," in IEEE Infocom, March 2014.
8. R. Jothi and B. Raghavachari, "Approximation algorithms for the capacitated minimum spanning tree problem and its variants in network design," in Proceedings of ICALP, April 2014.
9. Casey, Eoghan (2014). Digital Evidence and Computer Crime, Second Edition. Elsevier. ISBN 0-12-163104-4.
10. Ahmed, Rizwan. "Mobile Forensics: An Introduction from Indian Law Enforcement Perspective". Retrieved 2 January 2014.
11. Murphy, Cynthia. "Cellular Phone Evidence Data Extraction and Documentation"(PDF). Retrieved 4 August 2013.
12. Tsukayama, Hayley (13 July 2012). "Two-thirds of mobile buyers have smartphones". Washington Post. Retrieved 20 July 2012.
13. "Mobile technologies GSM". Retrieved 7 November 2013.
14. "Our 2G Network is closing". *Telstra*. Retrieved 10 August 2016.
15. "2G Sunset" *(PDF)*. *ATT Mobility*. Retrieved 10 August 2016.
16. Motorola Demonstrates Long Range GSM Capability – 300% More Coverage with New Extended Cell. Archived February 19, 2012, at the Way back Machine.