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Control Command for Microwave Link Acknowledgment and its Troubleshooting Strategy

KEYWORDS

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ABSTRACT *Initially NEC(Name of company manufacturing Microwave, Japan) microwave is introduced briefly and then various Acknowledgments and there different troubleshooting methods. The flow chart to reduced the time of doing troubleshooting.The main aim of this is to reduce the call drop of TATA DOCOMO and if drop Occurs how to overcome the drop with in short duration of time.There exists limited published research on NEC microwave especially with regard to acknowledgments and troubleshooting. First the working of NEC microwave, classification & tools on the basis of the NEC equipment used in TATA DOCOMO & flow chart to reduced the time is described. According to different types they produce different acknowledgment and depending upon the acknowledgment the troubleshooting strategy changes.*

1. INTRODUCTION:

Today wireless technology is used in many applications well integrated into our everyday life. Planning a good, stable and reliable microwave network can be quite challenging. Careful planning and detailed analysis is required for a microwave radio system before the equipment can be installed. A poorly designed path can result in periodic system outages, resulting in increased system latency, decreased throughput, or worst case, a complete failure of the system. It is generally agreed that a microwave signal is a signal whose fundamental frequency is between 300 MHz and 300 GHz (1 GHz = 109 Hz)[1,7]. In terms of wavelength, a microwave signal has a wavelength between 0.1 cm and 100 cm A The waveguide is a hollow mechanical structure that permits propagation of microwave signals from one point to another with the least possible loss. most commonly used waveguides are those having a rectangular form. There are, however, a variety of rectangular waveguides, each being identified according to its internal dimensions. Each type of waveguide allows microwave propagation within a particular frequency band[2]. Discussing all the acknowledgment present in working link of NEC microwave and there trouble shooting methods.

2. CLASSIFICATION OF NEC MICROWAVE:

1. SDH(Synchronous Digital Hierarchy)
2. PDH (Plesiochronous Digital Hierarchy)

SDH: Pasolink+ STM1, Pasolink Neoi
PDH: Pasolink CPV, Pasolink V4

3. WORKING PRINCIPLE:

The Transmitter converts the source message into an electrical signal. The Transmitter is basically responsible for encoding the message and then this encoded message is multiplied by carrier frequency i.e. modulate the signal and then over the channel. At the receive end, the receiver demodulate the received signal and decode it and generate the original message. Minimal distortion at the receiverend is referred a good communication property [3]

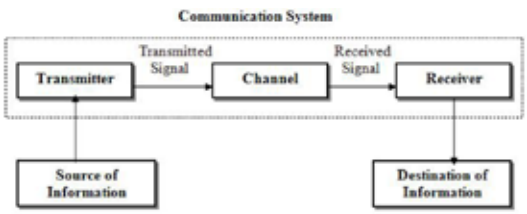

Figure 3.1 working of NEC microwave

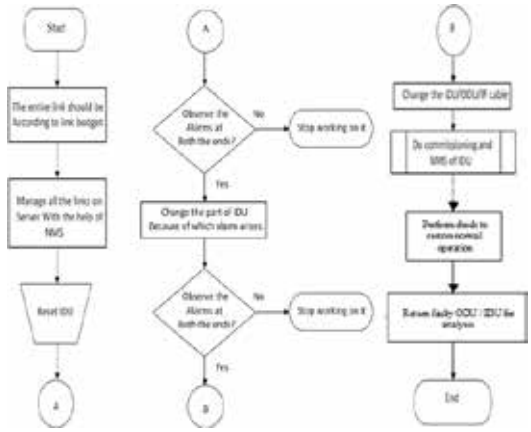

Figure:-Flow chart of trouble shooting Method.

This is the general flow chart, which can be used for any equipment(Other then NEC) & for any operator(Other then TATA), the main aim of this flow chart is to reduce the call drops of any operators, and if drop occurs how to overcome the drop within very small time spectrum.

First stage (Start-A) are written to avoid the call drops, from second stage (A-End) if call drop occurs how to overcome that drop is mention, because many operators are using NEC equipment In microwave that's why it will be helpful to that operators, near about four operators are dependent on TATA that's why it is more usefull for TATA.

The following no of operators are using NEC

- TATA DOCOMO
- Reliance
- Idea
- Airtel
- Aircel

Only Vodafone and BSNL is not using this equipment they are using NOKIA, but it will be helpful for nokia employee also for their troubleshooting method[4].

4. TOOLS:

The following tools are used in NEC Microwave

1) Software Tools
2) Hardware Tools

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1) **Software Tools:-** Four software's are used for commissioning of different types of NEC microwave and one software is used for observing all the sites from the server. The details are as follows.

a) PNMT a)PNMSj
b) PNMTj
c) LCT for STD
d) LCT for CPV

The PNMT is used for the commissioning of Passo+/Passo V4 IDU, PNMTj is used for observing the alarms of NEOi/ Neo/ic in working link, LCT for STD is used for commissioning of NEOi IDU and LCT for CPV is used for commissioning of NEO/ic IDU.

The PNMSj is used for the observation of all the types of NEC microwave from the server.

2) **Hardware Tools:-** Three hardware are used in this, the details are as follows

a) IDU
b) ODU
c) Antenna

IDU(In door Unit):- It is used for the assigning the frequency, power of ODU for microwave link. It is also used for observing the alarms in working Link.

ODU(Out Door Unit):- It is used for the allowing the different frequency and power for getting the maximum receiving power. It is of two types upper band & lower band, the upper band is having more TX frequency then the TX of lower and the RX of upper is the TX of lower and vice versa.

Antenna:- It act as transmitter which can transmit and receive the microwave signals.

5. DESCRIPTION OF ACKNOWLEDGMENT, ACKNOWLEDGMENT AND THEIR TROUBLESHOOTING METHODS

1) Description
In this four alarms is generated, details are as follows

a) EARLY WARNING
b) FRAME ID
c) LOF
d) HIGH BER

Bit Error Rate (BER) is the percentage of bits that have errors relative to the total number of bits received in a transmission, usually expressed as ten to a negative power. For example, a transmission might have a BER of 10 to the minus 6, meaning that, out of 1,000,000 bits transmitted, one bit was in error. The definition of bit error rate can be translated into a simple formula:

BER = number of errors / total number of bits sent

If the medium between the transmitter and receiver is good and the signal to noise ratio is high, then the bit error rate will be very small - possibly insignificant and having no noticeable effect on the overall system However if noise can be detected, then there is chance that the bit error rate will need to be considered.[5,6]

Early Warning:- This alarm is generated due to the increase in Bit Error Rate(BER), it is notified that the continuous increment in BER creates complications in link.

At the starting stage of BER, it generates early warning alarm and a increment of BER results in following alarms

· Low BER
· High BER
· DEM Alarm

Frame ID:- (It is the application which is inserted by NEC to avoid the interference in between the two link) This alarm is generated when there is mismatch of frame ID between the two sites of single link.

LOF(Loss Of frame):- when any tree, building, any other radio, etc comes in between the two microwave of single link then this alarm will appear. in LOF when we transmit signal does not reach at the receiver end and return to the transmitter.

High BER:- when signal to noise ratio decreases it tends to increase in BER and due to increase in bit error rate high BER is generated.

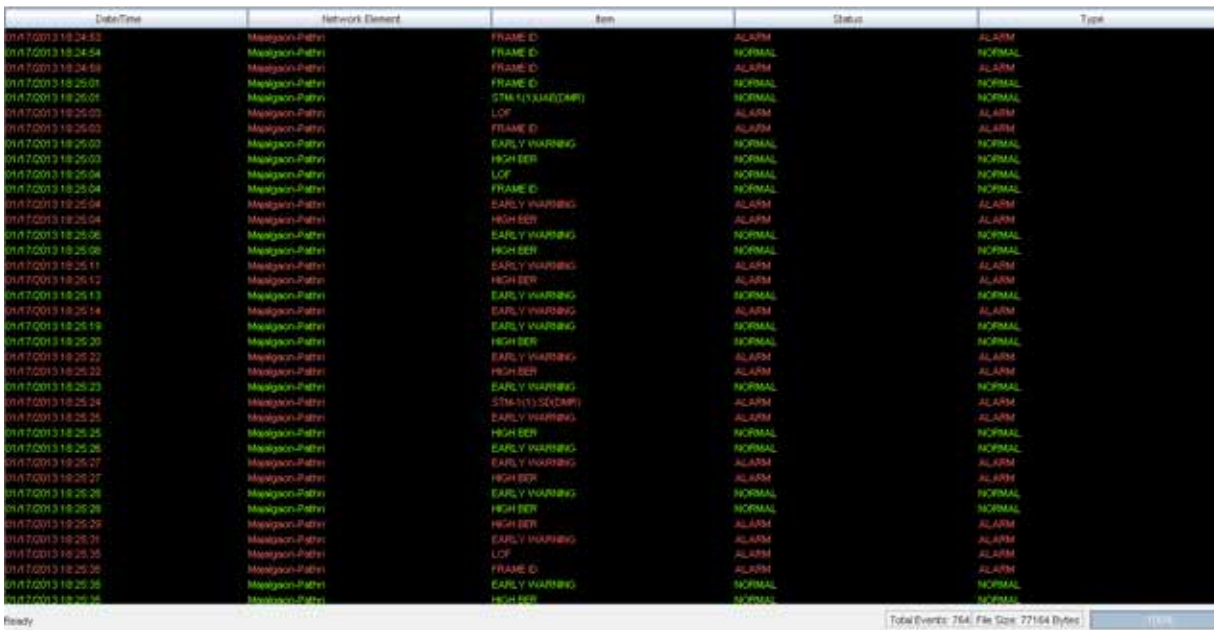

Figure 5.1 Acknlowedgment 1

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Troubleshooting
When all this alarm comes together then it means there is a major chance of interference or misalignment

(To check whether interference exist or not, disconnect power supply at one end and check the RX level at other end and vice versa, if RX level is coming in the range of -99 to -80 dbm at both the end then there is no interference)

If Interference:- we need to change the frequency & frame ID at both the end

If misalignment:- We need to make the proper alignment at both the ends.

2)Description
In this following alarm are observed

a) RX Level
b) LOF
c) STM-1(1)(DMR)
d) TCN-RX LEV-15min

RX Level:- This alarm is generated when receiving level decreases from its limit.

LOF:- when there is any frame loss takes place then this alarm will appear.

STM-1(1)(DMR):- when there is no transmission through optical port then this alarm will appear.

TCN-RX LEV-15min:- when the RX level reduces from their limit after 15 mints this alarm will appear.

Acknlowedgment 2

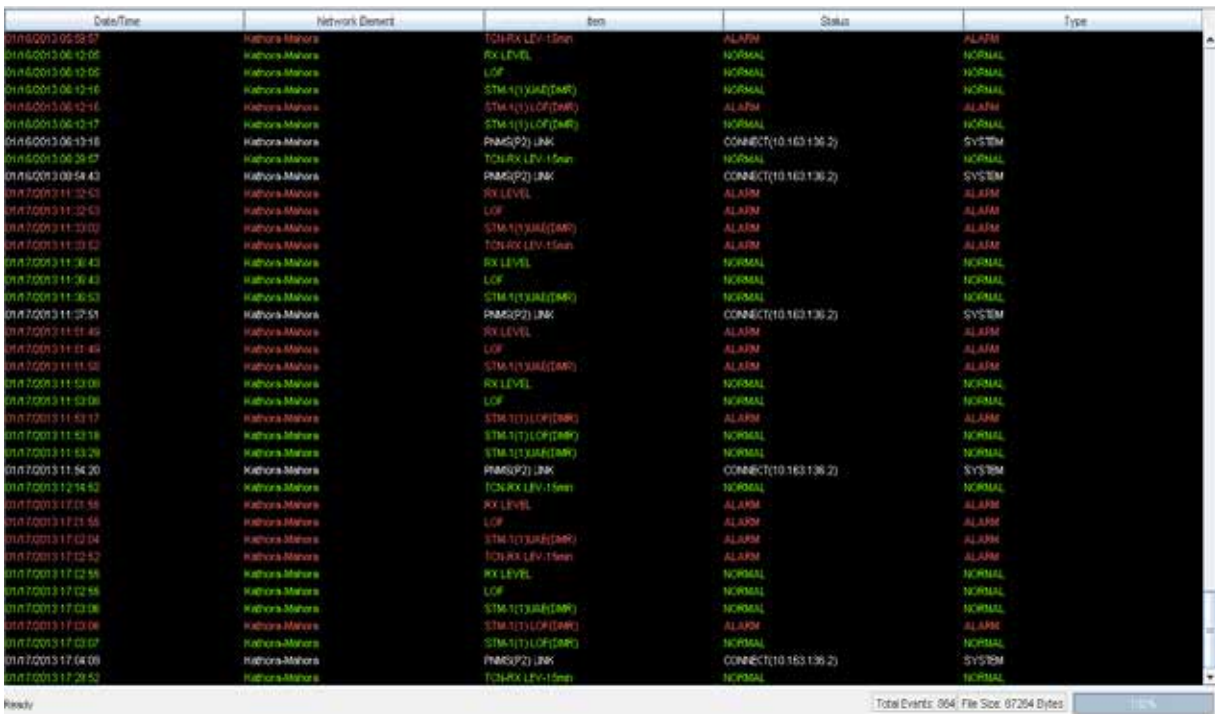

Figure 4.2 Acknlowedgm

Troubleshooting
When all this alarm comes together then it means there is a major chance of power failure at far end.

The power failure may occurs due to following reasons

- MCB Trip
- NO Power Supply
- IDU Faulty

If MCB is Trip:- Then either change the MCB or repair the MCB

If No power Supply:- Make the arrangement of power supply

If IDU faulty:-please check the power card if not working change the power card and if it may creating problem the changed the complete IDU.

REFERENCE 1. Md. Rakib Al Mahmud, "Analysis And Planning Microwave Link To Established Efficient Wireless Communications", September 2009. | 2. J. Frank Jimene, 1999, "Fundamentals of Radio Link Engineering". | 3. H. Abdullah Jr, Paulo Carvalho, Luis. F. Molinaro, Carlos Evangelista, L Bermudez, "Tools For Microwave Radio Communications System Design", April 2003. | 4. . "Basic Path Considerations For A Microwave Link", May 2010, EM Clarity White Paper. | 5. Website of NEC Corporation, Japan. | 6. Sanjeeva Gupta, 1957, Microwave Engineering. McGraw-Hill | 7. William Stalling, "Wireless Communications & Networks", 2nd ed, Prentice,Hall,2005 | 8. Telecom Regulatory Authority of India. | 9. Practical telecommunications and wireless communications for business AvEdwin Wright, Deon Reynders [Online Book].