TELECOM REGULATORY AUTHORITY OF INDIA

REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICES

FOR

TAMIL NADU CIRCLE

Report Period-January- March 2016

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CHAPTER-1:INTRODUCTION

1.0 Objectives of the Audit and Assessment of Quality of Service:

Telecom Regulatory Authority of India has been entrusted important task of laying down the standards of quality of service to be provided by the service providers and ensuring that the quality of service is provided as per norms; and also TRAI is responsible for conducting the periodical audit of such services provided by the service providers so as to protect the interest of the consumers of telecommunications service. TRAI engaged Datamation for the Southern Zone (TAMIL NADU circle) for the audit and assessment of Quality of Service of service provided for Basic (Wire line) Telephone Services, Broadband and Cellular Mobile Telephone Services by various Operators, as per the scope of work detailed in the tender document.

2.0. Scope of work to be undertaken:

The scope of work Audit and Assessment of Quality of Service of service providers as mandated by TRAI includes:

a) Preparation of Performance Monitoring reports (PMRs) and up- loading in the system.
b) Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.
c) Monthly audit based on one month data of the SPs.
d) Drive test of the RF networks.
e) Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.
f) Transfer of data generated by the RF drive test / live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

3.0. Quality Parameters to be audited in respect of the Basic (Wire line), Telephone Services, and Mobile Telephone Services:

Basic (Wire line Services): The parameters for Basic Telephone Service (Wire line) consist ofvarious QoS indicators, which can be audited and assessed objectively, and include parameters like fault incidences, call completion rates / answer to seizure ratio, POI congestion and customer service

parameters viz. mean time to repair faults, metering and billing credibility (post-paid and pre-paid), resolution of billing/charging complaints, period of applying credit/waiver/adjustment to customer's account, response time to the customer for assistance, termination/closure of service, time taken for refund of security deposit after closures; provision of a telephone after registration of demand, shift of telephone connection, etc. This work was not carried out in the Q2.

Mobile Telephone Services: The parameters of Quality of Service for cellular mobile telephone services have been specified under the head (A) Network Service Quality Parameters (B) Customer Service Quality Parameters. The Network Service Quality Parameters include the parameters related to (i) Network Availability (ii) Connection Establishment, (iii) Connection Maintenance (iv) POI Congestion. The Customer Service Quality Parameters include metering and billing credibility (post-paid and pre-paid), resolution of billing/charging complaints, and period of applying credit/waiver/adjustment to customer's account, response time to the customer for assistance, termination/closure of service and time taken for refund of security deposit after closures. The parameters related to the Service coverage are to be audited and monitored during drive test. All of these parameters have been covered in the Q2.

Cellular Mobile Telephone Service:

S.N	Name of Parameter	Benchmark	Avg. over a Period
A	**Network Service Quality Parameters:**		
(i)	Network Availability		
	(a) BTSs Accumulated downtime (not available for service)	≤2%	One Month
	(b) Worst affected BTSs due to downtime	≤2%	One Month
(ii)	Connection Establishment (Accessibility)		
	(a) Call Set-up Success Rate(within licensee's own network)	≥95%	One Month
	(b) SDCCH/ Paging Channel Congestion	≤1%	One Month
	(c) TCH Congestion	≤2%	One Month
(iii)	Connection maintenance (Retain ability)		
	(a) Call Drop Rate	≤2%	One Month

	(b) Worst affected cells having more than 3% TCH drop (call drop) rate	≤5% up to 31.03.2011 ≤3% From01.04.2011	One Month
	(c) connections with good voice quality	≥ 95%	One Month
(iv)	Point of Interconnection(POI) Congestion (on individual POI)	≤0.5%	One Month
B	**Customer Service Quality Parameters:**		
(v)	Metering and billing credibility– post-Paid	Not more than 0.1% of bills issued should be disputed over a billing cycle	One Billing Cycle
(vi)	Metering and billing credibility–- pre- paid	Not more than 1 complaint per 1000 customers i.e.0.1% complaints for metering, charging, credit, and validity	One Quarter
vii)	(a)Resolution of billing/ charging complaints	100% within 4 weeks	One Quarter
	(b) Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	within 1 week of resolution of complaint	One Quarter
(viii)	Response Time to the customer for assistance		
	(a) Accessibility of call centre/ customer care	≥ 95%	One Quarter
	(b) Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%	One Quarter
(ix)	Termination/closure of service	≤ 7 days	One Quarter
(x)	Time taken for refund of deposits after closures	100% within 60 days	One Quarter

(ii) Basic Service (wire line):

S.N	Name of Parameter	Benchmark	Avg. over a Period
(i)	Fault incidences (No. of faults/100 subscribers/month)	≤5	One Quarter
(ii)	Fault repair by next working day	For urban areas: By next working day: ≥90% and within 3 days: 100%. For rural and hilly areas: By next working day: ≥90% and Within 5 days: 100%. Rent Rebate Faults pending for >3 days and ≤7 d ay s : Rent rebate for 7 days. Faults pending for >7 days and≤15days: Rent rebate for 15 days	One Quarter
		Faults pending for >15Days: rent rebate for one month.	
(iii)	Mean Time To Repair (MTTR)	≤8Hrs	One Quarter
(iv)	(a) Call Completion Rate within a local network shall be better than	≥55%	One Quarter
	or,		
	(b) Answer to Seizure Ratio (ASR)	≥75%	One Quarter
(v)	Point of Interconnection (POI) Congestion (on individual POI)	≤0.5%	One month
(vi)	Metering and billing credibility–post paid	Not more than 0.1% of bills issued should be disputed over a billing cycle	One Billing Cycle
(vii)	Metering and billing credibility- pre-paid	Not more than 1 complaint per 1000 customers, i.e.,0.1% complaints for metering, charging, credit, and validity	One Quarter
(viii)	Resolution of billing/ charging Complaints	100% within 4 weeks	One Quarter
(ix)	Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	within 1 week of resolution of complaint	One Quarter
(x)	Response Time to the customer for assistance		
	(a) Accessibility of call centre/ customer care	≥ 95%	One Quarter
	(b)Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%	One Quarter
(xi)	Termination/closure of service	≤7days	One Quarter
(xii)	Time taken for refund of deposits after Closures	100% within 60 days.	One Quarter

4. Detailed Scope of Work implemented & Universe:

We have been undertaking audit and assessment of Quality of Service provided by every service provider (licensee) in each of the telecom circles/metro service areas under the respective Zone in the following manner:-

a. In respect of Cellular Mobile Telephone service, all the service areas/circles in each Zone are to be audited in every quarter of the year i.e. a service area will be audited four times in a year.

b. In respect of Basic service (wire line) and Broadband service, a service area/circle in the contracted Zone is to be audited only once in a year.

We under took the audit work for the Mobile services as follows: -.

(a) Generation of reports at service providers site as part of QoS monitoring reports i.e. quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnect (POI) Congestion Reports for Basic and Cellular Mobile Services with reference to the records maintained by the service provider and the system logs for the period. We generated the quarterly PMR at site and uploaded it on real time basis on the server at TRAI, Delhi.

The PMR report formats and parameters were finalized and any modifications or additions of parameters were undertaken in consultation with TRAI. The scope covered all future PMR parameters as and when defined by TRAI during the duration of the contract. The PMRs were generated on monthly basis for the Network Service Quality Parameters of cellular mobile telephone services and on quarterly basis for Customer Service Quality Parameters of cellular mobile telephone services, basic (wire line) services and broadband services as per the parameters specified. The PMRs so

generated were up-loaded on the server latest by 7th of the following month.

(b) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for three days for the parameters for the services as specified during the month in which the audit and assessment is carried out. The results were uploaded live on the server;

(c) Verification of the performance of service providers against the Quality of Service benchmarks, for the parameters and for the services as specified in clause 1.9, laid down by TRAI using the data for the entire month during which the live measurement as per clause (b) above is carried out; the results were uploaded live on the server;

(d) Drive tests of the mobile networks of service providers; the results were uploaded live on the server. We carried out an analysis of the drive test and loaded the results giving such information and in such format as agreed by TRAI.

(e) Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators, test calling and random customer feedback by calling the customers to get feedback of the services of the service providers was also carried out by Datamation. The Automatic Call Distribution (ACD) records were also verified for the calls answered by the operators within 60 seconds.

3.1 Sampling Universe:

The Telecom Licensed Service Areas / Circle for the purpose of audit and assessment are:

South Zone: TAMIL NADU

The audit and assessment of Quality of Service has been conducted for BSNL, MTNL, private basic service providers, unified access service providers, cellular mobile service providers and ISPs (providing broadband service) in various service areas for basic telephone service (wire line), cellular mobile telephone service and broadband service. We were required to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area. The updated data in respect of licensees (service providers) who have commissioned service and their subscriber base/Mobile Switching Centre (MSCs)/BTS"/ Exchanges / Internet Service Providers Central Nodes (ISP Nodes) is supposed to be intimated by TRAI from time to time and we carried out the audit and assessment of Quality of Service accordingly thereafter.

The audit and assessment of Quality of Service for all the service providers in a Telecom Circle/Metro Service Area/ Licensed Service Area were completed in the same quarterly period.

Generation of performance reports against QOS benchmarks:

4.0 Coverage, Sampling & Research Methodology for the Southern Zone (TAMIL NADU):

Sample size for cellular mobile services:

100% Gate way MSCs (GMSC) and Mobile Switching Centre (MSC) of all the Cellular Mobile Service Provider (CMSP) or Unified Access Service Providers (UASP) were covered in specified circles/ service areas in respective Zone in each of the quarterly period.

Number of exchanges to be covered for Basic (Wire line) services: (Not covered in this Quarter)

The break-up of the total number of exchanges of BSNL, MTNL and private basic service operators circle/ service area-wise, including urban and rural exchanges, and the number of exchanges, both urban and rural, that shall be covered during the year (i.e. four quarters) for audit and assessment of the Quality of Service shall be obtained from TRAI. As per the break-up of number of exchanges to be covered in a year, 556 urban exchanges and 1508 rural exchanges, totaling 2064 exchanges are proposed to be covered. The exchanges shall evenly be spread over in about 10% of SDCAs to the extent possible with each service provider in specified circles/ service areas. A service area/circle in the contracted Zone shall be audited only once in a year.

Number of POPs to be covered for Broadband Services: (Not covered in this Quarter)

We propose to first visit the ISP‟s Central Node in licensed service area and identify the total number of Point of Presence (POPs) in each service area. Thereafter, the sample for audit and assessment of Point of Presence shall be decided in such a way that minimum 5% (five percent) of the Points of Presence of ISP

spread over in 10% (ten percent) SDCAs in specified service area/telecom circle shall be covered. The POPs are proposed to be evenly spread over in the licensed service area. A service area/circle shall be audited only once in a year.

5.0. Procedure adopted for Quality and Assessment of the Services:

The generation and verification of performance of service providers against QOS benchmarks involved measuring of specified reporting parameters, checking of complete records, analysis of procedure and method utilized by various service providers in measuring the parameters and method of averaging for the purpose of reporting. We included critical findings licensee-wise in each *quarterly* report.

Audit methods and procedures:

To measure each quality of service parameter defined by TRAI, the two main sources of data collection identified were:

- Audit of the MIS reports at exchanges (OMC or MSCs) or ISP Node of the service provider.
- Primary data collection and check back calls (live observations done during the visits)

The audit was conducted in each center of study to generate various types of data. Thus, for data collection, following activities were undertaken during the appraisal exercise.

Collection of MIS data of OMC or MSC or ISP Node:

For this TRAI has suggested to the service providers to maintain the QoS source data in a proper format. From the source data, we generated the quarterly/monthly performance monitoring reports (PMR). Methodology adopted was checked against instructions and standards to see if the measurements adhere to specifications.

Live Measurements and Live Data Collation:

During the audit and assessment, following activities were undertaken for live measurements and live data collection.

a) Audit and Assessment of complaint redressal and provisioning of new broadband Connections: (Not conducted this Quarter)

Telephonic interviews are proposed to be conducted among a sample of subscribers of telephone –

- In basic service (wireline) for those customers who reported a fault complaint, billing dispute
- In case of Mobile operators, who have had a recent billing dispute
- In case of Broadband service for those who requested for a new connection reported a fault complaint, billing dispute, complaint of Broadband connection speed (download).

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- In case of Mobile operators, who have had a recent billing dispute
- In case of Broadband service for those who requested for a new connection reported a fault complaint, billing dispute, complaint of Broadband connection speed (download).

Data shall be obtained on:

- Occurrence of fault complaints
- Clearance of fault within stipulated time
- Incidence of billing disputes
- Clearance of billing complaints within stipulated time
- Attendance to requests for closure/ termination of service

Sampling Procedure & quality control: In order to get a correct and meaningful result from audit it is important to ensure that the right sampling procedure is followed. Equally important is the process of ensuring that quality control parameters are put in place. Care shall be taken to distribute the sample to obtain a random list. The distribution of sample sizes shall be evenly distributed. The sampling procedure for various activities to be carried is given below:

Sample for telephonic interview for billing complaints:

The sample size for telephonic interview of billing complaints in each audit shall be 100 subscribers or the total number of complaints, whichever is less per service provider for each service in a licensed service area. All the complaints booked shall be treated as the total population for selection of samples.

Sample for telephonic interview for new connection for Broadband Service:

The sampling frame shall be for Point of Presence /ISP Node of Broadband Service Provider. Here, the total sample size (10% of the applicants in the previous month or 100 whichever is less for every service provider) has been randomly selected from the records /registers to make check back calls.

Sample for telephonic interview for service complaints/ requests:

The operator is required to provide the details of the service complaints/ requests for the month previous to the audit month for Cellular Mobile Telephone Services, Basic (wireline) Services and Broadband Services. For broadband services, complaints related to download speed are proposed to be covered. From the list of these complaints /requests (10% or 100 per service provider per license service area, whichever is less) sample has been drawn randomly to make check back calls. A notice of minimum3 (three) weeks was provided to the service provider by us for arranging and supplying the data required for audit of exchanges, ISP nodes and MSCs to be covered.

b) Audit and Assessment of Call Centre/ customer care promptness and live measurement through test calls:

Test calls were made to assess the availability and efficiency of Level 1 services and complaint centre accessibility. The telephone /SIM Cards/Instruments for testing purposes were provided by the concerned service provider(s) in whose network the audit and assessment of Quality of Service is carried out. The details regarding test calls are:

(a) Testing of Level 1Services:

Level1 Services include police, fire, ambulance (Emergency services) in the case of both Mobile service providers and basic telephone service providers. Test calls were made from all the levels working in a particular SDCA visited. Again, the total sample sizes (150 per license service area per service per quarter) were equally distributed among the different SDCAs visited, and the distribution among the active levels is in proportion to the capacity of each level in that SDCA.

(b) Inter-operator call assessment:

Inter Network calls i.e. calls made from one operator to another within the same license were made to judge the ease of connectivity amongst the operators.

A sample of 2 X50 test calls per service provider within the licensed service area was made at different point of time to the free test numbers of another service provider (50 calls between 1000 to1300 Hrs and 50 calls between 1500 to 1700 hrs for basic service and between 1100 to 1400 hrs and between 1600 to 1900 hrs) for cellular mobile service. The results of these calls were compiled and reported separately for each service provider service area-wise.

The telephone/ SIM Cards /Instruments for testing purposes were provided by the concerned service provider(s) in whose network the audit and assessment of Quality of Service is carried out.

(c) Testing of Complaint Centre Accessibility and response time:

(i) Basic Telephone Service (wire line) and Cellular Mobile Telephone Service:

We measured the performance of both basic telephone service (wire line) & cellular mobile services against the benchmarks of the following Quality of Service parameters:-

Response time to the customer for assistance:

(a) Accessibility of call center/customer care >= 95%

(b) % age of calls answered by the operator (voice to voice): Within 60 seconds = 90%

The procedure for assessment of the performance in respect of above parameters was made using the traffic data at the point of termination to call center from mobile/ basic telephone network. Traffic at the tandem or trunk or gateway MSC outgoing circuits to IVR of call center w a s measured as per the traffic counter available in the respective switch to assess the accessibility of call center.

In the case of parameter % of call answered by the operator voice to voice, assessment of IVR traffic data and CRM traffic data was analyzed during the time consistent busy hour (TCBH) of call center. In addition, we also made the test calls and correlated the results with the traffic data analysis.

The procedure (IVR menu and sub-menu) and ease of accessing the operator within the benchmark laid down by TRAI, both post-paid and pre-paid customers were assessed and reported. In this regard para3.11.4of the Explanatory Memorandum to to the Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 and provisions of the Telecom Consumers Complaint Redressal Regulations, 2012 was be followed.

Measurement:

A sample of 2 X 50 calls per service provider is proposed to be made at different point of time to the call centre of each service provider from each licensed service area (50 calls between 1000 to 1300 Hrs. and 50 calls between 1500 to1700 hrs.) for basic telephone service (wireline) and similarly, 2X50 calls to the call centre of each service provider (50 calls between 1100 to 1400 hrs. and 50 calls between 1600 to 1900 hrs.) for cellular mobile telephone service from each licensed service area to ensure statistical significance. The time to connect to IVR shall be noted for all these calls. This is the wait time before an automatic answer machine (IVR) message begins. We then propose to measure the gap between the time when the last digit of the number is dialed, and the time when the IVR message begins. Similarly the wait time before a Call Centre agent responds to a test call shall be measured for all such test calls.

Verification and audit of records:

We propose to verify and audit the following records in respect of Basic Telephone Service (wire line):

- Call Centre records for complaints
- FRS details for fault complaints, fault repair and MTTR (Mean Time to Repair)
- Commercial records for billing details, billing disputes and redressal there of
- Past traffic reports at local and TAX (Trunk Automatic exchanges) for Call
- Completion Rate/*Answer to Seizure Ratio* calculations
- Checking of customer complaint handling through live test at the call center
- 100 Nos. of service complaints / requests and 100 Nos. of billing related complaints shall be taken up by the auditing agency for verifying their redressal as per the record of the service provider.

System / Network outage details, Call Set-up Success Rate, Blocked Call Rate, Call Drop Rate, worst affected cells having more than 3 % TCH drop rate, Voice Quality, Service Coverage and POI congestion

- Commercial and customer care records for billing disputes, redressal and refunds of payment
- Checking of customer complaint handling through live test at the call center
- 100 Nos. of service complaints/ requests and 100 Nos. of billing related complaints w e r e taken up by the auditing Agency for verifying their redressal as per the record of the service provider

We propose to verify& audit records maintained by Broadband service providers relating to:

- Call Centre records for complaints
- FRS details for fault complaints, fault repair
- Records for requests for new connection, and supplementary services
- Commercial records for billing details, billing disputes and redressal there of
- Checking of customer complaint handling through live test at the call center
- Service complaints/ requests and billing related complaints shall be taken up by the auditing agency for verifying their redressal as per the record of the service provider.
- Bandwidth Utilization/ Throughput
- Broadband connection speed
- Service Availability/Uptime
- Packet Loss and Latency measurements

Network performance parameters like Bandwidth Utilization/Throughput including Broadband Connection Speed, Packet Loss and Latency shall be measured on sample basis.

The detailed methodology for each Quality of Service parameter as given in the Explanatory Memorandum to the Quality of Service of Broadband Service Regulations, 2006 dated 6th October 2006 (11 of 2006) was followed. The signature of the Nodal Officer nominated by the service provider for coordination with the audit agency were taken on all the formats containing the verified data for all the parameters

We shall take live measurements and collection of one month data or audit by actual visit to such NOC, OMC, call center and billing center.

Procedure followed for cellular mobile telephone service data generation, verification and audit

S.N	Parameter	Procedure
i)	Network availability (a) BTS accumulated down time (b) Worst affected BTSs due to down time	The fault Alarm tracking details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) were verified for arriving at the figures reported to TRAI.
ii)	Call Set-up Success Rate	The cell wise data generated through counters/ MMC available in the switch for traffic measurements were verified.
iii)	Blocked Call Rate	Both for SDCCH and TCH congestions the data in MSCs was verified and compared with the data reported to TRAI in the Quarterly PMRs.
iv)	Call Drop Rate	This parameter was measured by the system generated (defined counters are available in the system for traffic measurement) cell wise dropped call data and total calls established figures to arrive at the authenticity and accuracy of the benchmark reported to TRAI.
v)	% Connections with good voice quality	This parameter was measured from the system generated data on a scale from 0 to7 for GSM and FER value for CDMA technology. We also collected the relevant city wise drive log files for all drive tests conducted to verify the parameter.

vi)	Service coverage	We also collected the relevant city wise drive log files for all drive tests conducted to verify the parameter.
vii)	POI Congestion	The traffic data generated through Gateway MSCs (GMSCs) and reported to TRAI in POI congestion reports were verified
vii)	Metering and Billing Credibility	We audited the billing complaints details on complaints received during the quarter and used for arriving at the figures reported to TRAI.
ix)	% of Billing Complaints resolved	Audit of billing complaints resolved and the total complaints received w e r e carried out to check the figures reported to TRAI. At the same time, we also conducted random live back checks of complaints.
x)	Period of applying credit/waiver/adjustment to customers account from the date of resolution	We checked the billing complaints for which credit/waiver/ adjustment were made on resolution of the complaints within one week.
xi)	Termination/closure of service	The data was verified for termination /closure of the services within 7 days from the date of request.
xii)	Time taken for refund of deposits after closure	We verified that 100 % deposits should be refunded within 60 days. At the same time, we also conducted a random live back check so fall such subscribers entitled for a refund.

Drive Tests:

In the case of Cellular Mobile Service, the exercise of QoS assessment shall not be limited to generation, verification and audit of data, but we shall also verify the parameters by conducting extensive drive test in all service areas, as per the details given below, to assess the network performance.

There are two types of drive tests that were conducted. One is operator assisted drive test and the other is independent drive tests. The details of these drive tests are given below:

Operator Assisted Drive Tests: The primary aims of these drive tests is to cross-check/ validate thedata on Quality of Service being provided by the telecom service providers to TRAI. These drive tests were conducted in such a manner so as to enable identification of network element deficiency and initiation of improvements. The operator assistance was desired to ensure a greater audit transparency.

In each licensed service area drive test in three cities, having high population, medium population and low population, were conducted every month for each service provider covering a minimum distance of 100 kilometers in city area and adjoining are as including important indoor sites. These cities were proposed and finalized by TRAI. The results of analysis of data generated during such drive tests were uploaded, immediately on completion of the drive test, to the central server at TRAI.

Independent Drive Tests: We shall do independent drive tests in Q2 spread across the contracted zone limited to a maximum of 10 drive tests per licensed service area, in a year. The location for these drive tests was selected based on the subscriber complaints being received by TRAI or as decided by *TRAI*. Independent drive test covered a city and adjoining areas covering a minimum distance of 100 kilometers including congested areas and important indoor sites. The results of analysis of data generated during such drive tests will be uploaded, immediately on completion of the drive test, to the central server at TRAI.

Drive Test Methodology:

For drive test following procedure was adopted:

i. We obtained a coverage map from the service provider before starting the drive test and studied the coverage detail in terms of the signal strength. Based on the signal strength as depicted in the coverage map, the drive test was done to check the following parameters:

a. Coverage-Signal strength

b. Voice quality

c. Call setup success rate

d. Blocked calls e. Call drop rate

ii. The drive test covered selected cities and adjoining towns/ rural areas where the service provider has commenced service, including congested areas and indoor sites.

iii. The drive test covered the routes including expressways, major and secondary roads / streets, Commercial, residential areas/Commercials estates to check the in-building network performance.

iv. The drive tests of each mobile network were conducted between 10 am and 8 pm on weekdays.

v. The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.

vi. The speed of the vehicle was kept at around 30-50 km/hour (around 30 km/hr in case of geographically small cities)

vii. The holding period of each test call was 120 seconds.

viii. A test call was generated 10 seconds after the previous test call is completed. ix. Measurement using engineering handsets was not done

x. The dedicated originating and terminating mobile unit's antenna was placed at the same height and in the same vehicle. Moreover, the height of the antenna was uniform in case of all service providers.

6.0 Reporting Formats:

We developed data formats including executive summary, critical findings and detailed data analysis thereof for reporting the results of such audit and assessment. We submitted to TRAI sample design and sample reporting formats within 4 weeks of signing of the agreement. All these reports were enabled as online reports with sufficient flexibility of querying against various parameters.

6.1 Deliverables:

Quarterly Reports: We are submitting quarterly reports in the formats approved by TRAI for the purpose. Five copies of such report during the quarterly period were submitted to TRAI within the time period given in the delivery schedule.

The report also contained the Audit results of service areas including executive summary, critical findings and comparison of performance of the service providers on various qualities of service parameters for which Audit work was undertaken during the *quarter.*

Reports were submitted for approval within one month of the completion of each *quarter* for audit and assessment of QoS parameters for basic service, cellular mobile service and broadband service. The report contained the findings on audit and assessment of QOS provided by service providers carried out in accordance with Clause 2 above. The report contained performance of each service provider for each licensed service area against the Quality of Service parameters. The report also contained a comparative analysis of performance of all the service providers in a licensed service area. The report also contained an Executive Summary and critical finding along with detailed analysis.

A separate report shall also be submitted for each company/group of companies at the end of the year. The report contained an Executive Summary and critical finding along with detailed analysis to share with the service provider and take further follow-up action.

7.0. Work Plan and Delivery Schedule:

S. No.	Deliverable	Period
	Date of award of work as per the contract say (D)	
1.	Submission of all sample design and reporting formats by the Audit agency	D+4 weeks
2.	Submission of final design and reporting formats by the Audit agency incorporating modifications and corrections suggested by TRAI and its acceptance	D+8 weeks
3.	Commencement of audit and assessment of Quality of Service	Beginning of – the quarter following date of award of work (D)or any subsequent quarter, as decided by TRAI
4.	Submission of first quarterly report	One month from the end of the first quarter
5.	Submission of second quarterly report	One month from the end of the second quarter
6.	Submission of third quarterly report	One month from the end of the third quarter
7.	Submission of fourth quarterly report	One month from the end of the fourth quarter

8.	Commencement of audit and assessment of Quality of Service for the first quarter for the extended period	From the end of the fourth quarter or any later period as decided by TRAI
9.	Submission of first quarterly report for the extended period, if any	One month from the end of the first quarter of extended period
10.	Submission of second quarterly report for the extended period , if any	One month from the end of the second quarter of extended period
11.	Submission of third quarterly report for the extended period, if any	One month from the end of the third quarter of extended period
12.	Submission of fourth quarterly report for the extended period , if any	One month from the end of the fourth quarter of extended period

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report presents the growth trends for the telecom services in India for the quarter endingSept.2015.This report provides a broad perspective on the Telecom Services to serve as a reference document for various stakeholders, research agencies and analysts. Under the Unified Access Service (UAS) Regime, the details of subscriber base under wireless services, both GSM & CDMA technologies have been combined.

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services, Wire line Services & Broadband Services in **South Circle**(TAMIL NADU) in 2nd Quarter (Jan – Mar.2016). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period Jan – Mar.2016.

Following are the various operators covered in TAMIL NADU circle (South Zone) for Cellular Mobile

(Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below:

S.I.	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	Jan-mar'16	1900-2000 Hrs
2	Airtel Ltd	Jan-mar'16	1900-2000 Hrs
3	BSNL	Jan-mar'16	1900-2000 Hrs
4	Idea	Jan-mar'16	1900-2000 Hrs
5	Reliance Communication (GSM)	Jan-mar'16	1900-2000 Hrs
6	Tata Communications (GSM)	Jan-mar'16	1900-2000 Hrs
7	Vodafone	Jan-mar'16	1900-2000 Hrs
CDMA Operators			
8	MTS (CDMA)	Jan-mar'16	1900-2000 Hrs
9	Reliance Communication (CDMA)	Jan-mar'16	1900-2000 Hrs.
10	Tata Communications (CDMA)	Jan-mar'16	1900-2000 Hrs

2.1Findings from Quality of Service Audit (Operator wise for each parameter)

Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

- **<u>As per PMR Data Verification Results for-</u>**
  - **TAMIL NADU Circle (jan'16):-**
    - Tata 2G, Tata CDMA, Aircel (2G&3G) service provider are not meeting the benchmark for the parameter **Worst affected cells>3% TCH drop (Call drop) rate.**
  - **TAMIL NADU Circle (Feb.'16):-**
    - Aircel (2G & 3G), and Airtel 2G operators are not meeting the benchmark for **Worst affected cells having more than 3% TCH drop (call drop) rate.**
    - Airtel 2G,3G operator not meeting the benchmark for the KPI **Worst affected BTS dueto downtime.**
  - **TAMIL NADU Circle (Mar'16):-**
    - Aircel(2G,3G), operators are not meeting the benchmark of **worstaffected cells having more than 3% TCH drop (call drop) rate.**

- **<u>As per 3 Days Live Test Audit Report (2nd Quarter), TAMIL NADU Circle:</u>**

  Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using Live measurements for 3 days during the month in which the Audit and Assessment is carried out.

  - Airtel 2G ,Aircel (2G,3G),Tata CDMA operators are not meeting the benchmark of **worstaffected cells having more than 3% TCH drop (call drop) rate.**

➢ **As per Operator Assisted Drive Test:**

The Operator Assisted Drive Test was conducted for all the Operators. Route covered was about 100 Km depending on city areas within the speed limit of 30-40 km/hour. In all the cities Zones were selected for covering different density areas (High/Medium/Low).

❖ **TAMIL NADU Circle:**

- ❖ According to the Drive test, It shows the no. of calls attempted in TAMIL NADU circle**.**
- ❖ Vodafone is not meeting the benchmark KPI for **Blocked call rate (<=3%)** in Vellore SSA.
- ❖ TATA CDMA, RCOM CDMA is not meeting the benchmark KPI for **Drop call rate (<=2%)** in Ooty SSA , Vodafone not meeting in Vellore and Ooty SSA
- ❖ Vodafone, Reliance GSM & CDMA, Tata GSM is not meeting the benchmark KPI for % of connections with good voice quality>=95% in Ooty SSA.
- ❖ According to the Drive test, It shows that all service providers are meeting the benchmark of **indoor (>= -75dBm).**
- ❖ According to the Drive test, It shows that all service providers are meeting their benchmark of **In-vehicle (>= -85dBm**).
- ❖ According to the Drive test, It shows that all service providers are meeting their benchmark of **Outdoor- in city (>= -95dBm)**.

According to the Drive test, It shows that all the service providers are meeting the benchmark of **Call Setup Success Rate**

➢ **Level 1 Live Calling (Emergency No.):-**

- Level 1 calling such as calling at emergency no. like Police, Fire, and Ambulance were made so as to check the service of such short codes. In TAMIL NADU it was found to be functional.

CUSTOMER SERVICE QUALITY PARAMETERS

❖ **2nd Quarter data Assessment (TAMIL NADU Circle)**

- According to the parameter metering/billing credibility post-paid we found that all the service providers are meeting the benchmark
- According to the parameter metering /billing credibility pre-paid we found that all the service providers are meeting the benchmark.
- According to the parameter Resolution of billing/ charging complaints we found that all the service providers are meeting the benchmark**.**
- According to the parameter Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints we found that all the service providers are meeting the benchmark.
- According to the parameter Accessibility of call centre/Customer Care we found that all the service providers are meeting the benchmark.
- According to the parameter % call answered by operators (voice to voice) within 60 sec we found that all the service providers are meeting the benchmark except
- According to the parameter no. of requests for Termination / Closure of service complied within 7 days during the quarter we found that all the service providers are meeting the benchmark
- According to the parameter Time taken for refunds of deposits after closures we found that all the service providers are meeting the benchmark

➢ **Inter Operator Call Assessment:**

- In the inter-operator call assessment test, calls were made from one operator to other operator so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in between the operators are involved and hence if any congestion is found in the network, it Nov be due to any of these parts. The result shows that there were congestion with all operators BSNL, Aircel, Idea, Rcom, Vodafone, Airtel, MTS and TATA service providers.

CHAPTER-3: AUDIT –PMR DATA VERIFICATION RESULTS

Cellular Mobile Telephone Service
3.0 PMR Data Verification Results for TAMIL NADU

3.1 TAMIL NADU(JAN'16):

Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

JANUARY month PMR Generation Data		Bench-mark	Audit Period	Aircel 2G	Aircel 3g	Airtel2G	Airtel 3G	BSNL 2G	BSNL 3G	RCOM 2G	RCOM CDMA	Vodafone 2G	Vodafone 3G	IDEA 2G	MTS	TATA 2G	TATA CDMA
S/N	Name of Parameter						GSM							CDMA			
			Network Service Quality														
1	a) BTS Accumulated Downtime	*<=2%*	One Month	0.18	0.22	0.04	0.03%	0.72	0.49%	0.19	0.04%	0.02%	0.03%	0.03%	0.02%	0.06%	0.06%
	b) Worst affected BTSs due to downtime	*<=2%*	One Month	0.58%	1.01%	0.1	0.06%	1.75	1.96%	0.75	0.39%	0.04%	0.09%	0.00%	0.00%	0.00%	0.00%
2			**Connection Establishment**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	One Month	98.28%	98.41%	98.55	98.79	98.30	98.61%	99.65	98.19%	99.55%	99.80%	99.31%	99.53%	99.53%	98.87%
	b) SDCCH/PAGING Channel congestion	*<=1%*	One Month	0.71%	0.62%	0.56	0.04%	0.17	0.22%	0.04	0.00%	0.11%	0.17%	0.15%	0.00%	0.06%	0.00%
	c) TCH congestion	*<=2%*	One Month	1.23%	0.04%	1.16	0.12%	0.79	1.16%	0.03	0.74%	0.45%	0.07%	0.19%	0.00%	0.01%	0.00%
3			**Connection maintenance**														
	a) CDR (Call Drop Rate)	*<=2%*	One Month	1.08%	0.49%	0.81	0.17%	1.09	0.15%	0.07	0.17%	0.61%	0.22%	0.20%	0.38%	0.57%	0.32%
	b) Worst affected cells>3% TCH drop (Call drop) rate	*<=3%*	One Month	**5.38%**	**4.90%**	**4.26**	1.57%	2.09	1.10%	0.42	0.79%	1.88	1.65%	0.76%	2.97%	2.40%	1.84%
	c) Connections with good voice quality	*>=95%*	One Month	95.48%	99.45%	98.07	99.31	96.73	99.68%	99.45	98.51%	97.96%	99.05%	98.31%	99.21%	98.70%	98.85%
4	No. of POI's having >=0.5% POI congestion	*<=0.5%*	One Month	0.00%	0.00%	0	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Airtel2G , Aircel(2G&3G)service provider are not meeting the benchmark for the parameter

  Worst affected cells>3% TCH drop (Call drop) rate.

3.2 TAMIL NADU Circle (FEB'16):-

Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

february month PMR Generation Data		Bench-mark	Audit Period	Aircel 2G	Aircel 3g	Airtel2G	Airtel 3G	BSNL 2G	BSNL 3G	RCOM 2G	RCOM CDMA	Vodafone 2G	Vodafone 3G	IDEA 2G	MTS	TATA 2G	TATA CDMA
S/N	Name of Parameter						GSM Operators							CDMA			
			Network Service Quality Parameter														
1	a) BTS Accumulated Downtime	*<=2%*	One Month	0.13	0.19	0.07	0.06%	0.8	0.53%	0.28	0.20%	0.03%	0.10%	0.10%	0.01%	0.06%	0.03%
	b) Worst affected BTSs due to downtime	*<=2%*	One Month	0.40%	0.61%	0.35	0.21%	1.96	1.75%	0.75	0.06%	0.06%	0.16%	0.02%	0.00%	0.04%	0.00%
2			**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	One Month	98.49%	98.89%	98.64	99.76	98.6	98.55%	98.78	98.18%	99.38%	99.78%	99.59%	99.55%	99.41%	99.02%
	b) SDCCH/PAGING Channel congestion	*<=1%*	One Month	0.53%	0.32%	0.54	0.12%	0.16	0.18%	0.05	0.00%	0.22%	0.17%	0.20%	0.00%	0.04%	0.00%
	c) TCH congestion	*<=2%*	One Month	1.06%	0.02%	1.07	0.12%	0.63	1.21%	0.05	0.76%	0.62%	0.07%	0.21%	0.01%	0.02%	0.01%
3			**Connection maintenance (Retainability)**														
	a) CDR (Call Drop Rate)	*<=2%*	One Month	1.05%	0.45%	0.73	0.19%	1.08	0.17%	0.08	0.14%	0.56%	0.21%	0.20%	0.37%	0.55%	0.28%
	b) Worst affected cells>3% TCH drop (Call drop) rate	*<=3%*	One Month	**5.68%**	**4.91%**	**2.98**	1.29%	2.09	0.12%	0.4	0.72%	2.03	1.33%	1.07%	2.78%	2.40%	1.56%
	c) Connections with good voice quality	*>=95%*	One Month	95.57%	99.47%	98.28	99.28	96.71	99.70%	99.43	98.49%	98.15%	99.01%	98.27%	99.20%	98.65%	98.87%
4	No. of POI's having >=0.5% POI congestion	*<=0.5%*	One Month	0.00%	0.00%	0%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Aircel (2G,3G), operator are not meeting the benchmark for **Worst affected cells having more than3% TCH drop (call drop) rate.**

3.3 TAMIL NADU Circle (MAR.'16):

Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

March month PMR Generation Data		Bench-mark	Audit Period	Aircel 2G	Aircel 3g	Airtel2G	Airtel 3G	BSNL 2G	BSNL 3G	RCOM 2G	RCOM CDMA	Vodafone 2G	Vodafone 3G	IDEA 2G	MTS	TATA 2G	TATA CDMA
S/N	Name of Parameter						GSM Operators							CDMA			
			Network Service Quality Parameter														
1	a) BTS Accumulated Downtime	*<=2%*	One Month	0.1	0.19	0.06	0.07%	0.84	0.51%	0.22	0.02%	0.02%	0.04%	0.09%	0.00%	0.07%	0.06%
	b) Worst affected BTSs due to downtime	*<=2%*	One Month	0.34%	0.74%	1.06	0.15%	1.92	1.86%	0.84	0.11%	0.07%	0.08%	0.31%	0.00%	0.00%	0.00%
2		**Connection Establishment (Accessibility)**															
	a) CSSR (Call Setup Success Rate)	*>=95%*	One Month	98.65%	99.22%	98.8	99.78	98.7	98.64%	99.4	98.18%	99.56%	99.81%	99.71%	99.56%	99.46%	99.16%
	b) SDCCH/PAGING Channel congestion	*<=1%*	One Month	0.54%	0.13%	0.48	0.09%	0.18	0.13%	0.07	0.00%	0.10%	0.07%	0.15%	0.00%	0.02%	0.00%
	c) TCH congestion	*<=2%*	One Month	0.96%	0.02%	0.93	0.08%	0.68	1.06%	0.05	0.75%	0.44%	0.05%	0.18%	0.00%	0.02%	0.01%
3		**Connection maintenance (Retainability)**															
	a) CDR (Call Drop Rate)	*<=2%*	One Month	1.04%	0.43%	0.68	0.20%	1.09	0.19%	0.08	0.13%	0.55%	0.21%	0.19%	0.00%	0.50%	0.29%
	b) Worst affected cells>3% TCH drop (Call drop) rate	*<=3%*	One Month	**5.75%**	**5.16%**	**2.94**	1.16%	2.2	1.32%	0.31	0.63%	2.18	1.53%	1.05%	2.74%	2.23%	1.58%
	c) Connections with good voice quality	*>=95%*	One Month	95.58%	99.37%	98.32	99.57	96.78	99.70%	99.43	98.48%	98.17%	99.06%	98.33%	99.20%	98.69%	98.87%
4	No. of POI's having >=0.5% POI congestion	*<=0.5%*	One Month	0.00%	0.00%	0%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Aircel(2G,3G) operators are not meeting the benchmark of **worst affected cells having more than3% TCH drop (call drop) rate.**

3.4 PMR Summarized Data Results in Table TAMIL NADU Circle (Jan. – Mar.'16):

Tamil Nadu Circle (Jan to Mar '16)																
QUARTERLY PMR Generation Data		Bench-mark	Audit Period	Aircel 2G	Aircel 3g	Airtel2G	Airtel 3G	BSNL 2G	BSNL 3G	RCOM 2G	RCOM CDMA	Vodafone 2G	Vodafone 3G	IDEA 2G	MTS	TATA 2G	TATA CDMA
S/N	Name of Parameter						GSM Operators							CDMA			
			Network Service Quality Parameter														
1	a) BTS Accumulated Downtime	*<=2%*	One Month	0.14	0.2	0.06	0.05%	0.78	0.51%	0.23	0.09%	0.02%	0.06%	0.07%	0.01%	0.06%	0.05%
	b) Worst affected BTSs due to downtime	*<=2%*	One Month	0.44%	0.79%	0.5	0.14%	1.88	1.86%	0.78	0.19%	0.06%	0.11%	0.11%	0.00%	0.01%	0.00%
2			**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	One Month	98.47%	98.84%	98.66	99.44	98.53	98.60%	99.28	98.18%	99.50%	99.80%	99.53%	99.54%	99.47%	99.02%
	b) SDCCH/PAGING Channel congestion	*<=1%*	One Month	0.59%	0.36%	0.53	0.08%	0.17	0.18%	0.05	0.00%	0.14%	0.14%	0.17%	0.00%	0.04%	0.00%
	c) TCH congestion	*<=2%*	One Month	1.08%	0.03%	1.05	0.11%	0.7	1.14%	0.04	0.75%	0.50%	0.06%	0.19%	0.00%	0.02%	0.01%
3			**Connection maintenance (Retainability)**														
	a) CDR (Call Drop Rate)	*<=2%*	One Month	1.06%	0.46%	0.74	0.19%	1.09	0.17%	0.08	0.15%	0.57%	0.21%	0.20%	0.37%	0.54%	0.29%
	b) Worst affected cells>3% TCH drop (Call drop) rate	*<=3%*	One Month	**5.60%**	**4.99%**	**3.39**	1.34%	2.13	0.85%	0.38	0.71%	2.03	1.50%	0.96%	2.84%	2.34%	1.66%
	c) Connections with good voice quality	*>=95%*	One Month	95.54%	99.43%	98.22	99.39	96.74	99.69%	99.44	98.49%	98.09%	99.04%	98.30%	99.20%	98.68%	98.86%
4	No. of POI's having >=0.5% POI congestion	*<=0.5%*	One Month	0.00%	0.00%	0%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Findings & Critical Analysis:-

;• Airtel (2G) and Aircel (2G, 3G) are not meeting the benchmark for worst affected cells having more than 3% TCH drop (call drop) rate.

3.5 Comparison between the data given by TRAI and the data collected by Audit Agency

Tamil Nadu Circle (Jan to Mar '16)																	
QUARTERLY PMR Generation Data		Bench-mark	Audit Period	Aircel 2G	Aircel 3g	Airtel2 G	Airtel 3G	BSNL 2G	BSNL 3G	RCOM 2G	RCOM CDMA	Vodafone 2G	Vodafone 3G	IDEA 2G	MTS	TATA 2G	TATA CDMA
S/N	Name of Parameter			GSM Operators										CDMA			
			Network Service Quality Parameter														
1	a) BTS Accumulated Downtime	*<=2%*	Reported	0.14	0.2	0.06	0.05%	0.78	0.51%	0.23	0.09%	0.02%	0.06%	0.07%	0.01%	0.06%	0.05%
			verified	0.14	0.20	0.11	0.11	0.79	0.47	0.23	0.03	0.02	0.08	0.07	0.01	0.06	0.05
	b) Worst affected BTSs due to downtime	*<=2%*	Reported	0.44%	0.79%	0.5	0.14%	1.88	1.86%	0.78	0.19%	0.06%	0.11%	0.11%	0.00%	0.01%	0.00%
			verified	0.44	0.79	0.61	0.55	1.88	1.80	0.75	0.18	0.06	0.19	0 .11	0.00	0.01	0.00
2			**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	Reported	98.47 %	98.84 %	98.66	99.44	98.53	98.60 %	99.28	98.18%	99.50%	99.80%	99.53 %	99.54 %	99.47 %	99.02%
			verified	98.47	98.84	98.70	99.75	98.53	99.00	99.28	98.18	99.54	99.78	99.54	99.55	99.47	99.02
	b) SDCCH/PAGING Channel congestion	*<=1%*	Reported	0.59%	0.36%	0.53	0.08%	0.17	0.18%	0.05	0.00%	0.14%	0.14%	0.17%	0.00%	0.04%	0.00%
			verified	0.59	0.36	0.46	0.12	0.17	0.13	0.05	0.00	0.16	0.14	0.16	0.00	0.04	0.00
	c) TCH congestion	*<=2%*	Reported	1.08%	0.03%	1.05	0.11%	0.7	1.14%	0.04	0.75%	0.50%	0.06%	0.19%	0.00%	0.02%	0.01%
			verified	1.08	0.03	0.96	0.12	0.70	1.10	0.05	0.75	0.46	0.07	0.19	0.01	0.02	0.01
3			**Connection maintenance (Retainability)**														
	a) CDR (Call Drop Rate)	*<=2%*	Reported	1.06%	0.46%	0.74	0.19%	1.09	0.17%	0.08	0.15%	0.57%	0.21%	0.20%	0.37%	0.54%	0.29%
			verified	1.06	0.46	0.73	0.19	1.09	1.10	0.08	0.15	0.55	0.23	0.20	0.39	0.54	0 .30
	b) Worst affected cells>3% TCH drop (Call drop) rate	*<=3%*	Reported	**5.60%**	**4.99%**	**3.39**	1.34%	2.13	0.85%	0.38	0.71%	2.03	1.50%	0.96%	2.84%	2.34%	1.66%
			verified	**5.60**	**4.99**	**3.40**	1.25	2.13	0.83	0.36	0.71	2.14	1.51	0.96	2.83	2.34	1.66
	c) Connections with good voice quality	*>=95%*	Reported	95.54 %	99.43 %	98.22	99.39	96.74	99.69 %	99.44	98.49%	98.09%	99.04%	98.30 %	99.20 %	98.68 %	98.86%
			verified	95.54	99.43	98.29	99.35	96.74	99.67	99.44	98.49	98.27	99.03	98.30	99.20	98.68	98.86
4	No. of POI's having >=0.5% POI congestion	*<=0.5 %*	Reported	0.00%	0.00%	0%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			verified	0.00%	0.00%	0%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Findings:-

- According to the data given by TRAI and data collected by agency, there are differences in Airtel 2G&3G, & BSNL 2G&3G we have considered the differences of data up to 1st cimal part. The difference data are shown in highlights.
- AIRCEL 2G &3G ,AIRTEL 2G not meeting the bench mark in **Worst affected cells>3% TCH drop (Call drop) rate**

,

Not matching with TRAI data. **Not matching the TRAI DATA**

4.0Days Live Test Audit Report, TAMIL NADU Circle (January 2016):

Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using Live measurements for 3 days during the month in which the Audit and Assessment is carried out.

JANUARY			TAMILNADU Q2(Jan-Mar'16)													
3 days Live Test Audit Data			AIRCEL 2G	AIRCEL3G	AIRTEL 2G	AIRTEL 3G	BSNL 2G	BSNL 3G	RCOM GSM	IDEA 2G	VODAFONE 2G	VODAFONE 3G	TATA GSM	TATA CDMA	RCOM CDMA	MTS
S.N	PARAMETER	BENCH MARK														
Network Availability																
1	BTS / Node-B accumulated downtime (not	≤ 2%	0.16	0.22	0.05	0.01	0.72	0.49	0.32	0.01	0.02	0.04	0.06	0.06	0.02	0.02
			0.14	0.24	0.09	0.02	0.75	0.52	0.31	0.02	0.03	0.03	0.05	0.07	0.02	0.03
			0.11	0.22	0.06	0.06	0.71	0.48	0.33	0.01	0.02	0.03	0.08	0.07	0.03	0.02
	Worst affected BTS/Node-B due to	≤ 2%	0.48	1.01	0.03	0.43	1.75	1.96	0	0	0.05	0.09	0	0	0	0
			0.52	1.01	0.01	0.52	1.72	1.94	0	0	0.03	0.08	0	0	0	0
			0.47	1.02	0.05	0.31	1.69	1.92	0	0	0.03	0.09	0	0	0	0
Connection establishment (Accessibility)																
2	Call Setup Success Rate	≥ 95%	98.6	98.69	98.50	99.87	98.63	98.61	99.97	99.72	99.66	99.86	99.57	99.3	98.17	99.59
			98.53	98.63	98.61	99.86	98.73	98.72	99.94	99.69	99.59	99.85	99.55	99.24	98.19	99.59
			98.55	98.08	98.48	99.86	98.57	98.64	99.94	99.74	99.66	99.85	99.62	98.76	98.21	99.48
	SDCCH/ Paging Channel Congestion/	≤ 1%	0.44	0.54	0.46	0.02	0.12	0.22	0.02	0.20	0.15	0.17	0.03	0	0	0
			0.44	0.42	0.32	0.01	0.15	0.25	0.03	0.10	0.09	0.14	0.01	0	0	0
			0.5	0.47	0.38	0.02	0.27	0.19	0.03	0.10	0.11	0.15	0.02	0	0	0
	TCH congestion/ Circuit Switched	≤ 2%	0.91	0.03	1.23	0.04	0.63	1.17	0.03	0.15	0.34	0.11	0.01	0	0.76	0.36
			0.98	0.02	1.12	0.06	0.64	1.19	0.03	0.18	0.41	0.07	0.01	0	0.77	0.37
			0.97	0.02	1.25	0.06	0.72	1.19	0.03	0.15	0.34	0.13	0.02	0	0.76	0.39
Connection Maintainability (Retain ability)																
3	Call Drop Rate/Circuit Switched Voice Drop	≤ 2%	0.01	0.45	0.78	0.16	1.1	0.15	0.07	0.2	0.61	0.22	0.59	0.21	0.16	0.38
			0.01	0.46	0.77	0.16	1.19	0.19	0.07	0.2	0.59	0.19	0.55	0.22	0.13	0.36
			0.01	0.45	0.79	0.16	1.09	0.12	0.06	0.22	0.60	0.21	0.58	0.44	0.13	0.35
	Worst affected cells having more than	≤ 3%	5.37	4.92	3.99	1.48	1.86	1.12	0.39	0.76	1.80	1.59	2.5	2.18	0.65	3.01
			5.26	4.9	3.96	1.52	2.08	1.1	0.37	0.74	1.91	1.65	2.32	1.65	0.63	2.62
			5.38	4.93	3.82	1.58	2.20	1.16	0.39	0.76	1.88	1.68	2.65	2.18	0.71	2.89
	% of Connections with good voice	≥ 95%	95.58	99.45	98.09	99.47	96.75	99.68	99.46	98.31	98.03	99.2	98.7	98.85	98.53	99.22
			95.55	99.45	98.07	99.28	96.68	99.66	99.47	98.31	98.00	99.31	98.74	98.92	98.56	99.21
			98.52	99.46	98.10	99.26	96.68	99.65	99.46	98.3	97.96	99.35	98.67	98.86	98.52	99.21
	Point of Interconnections (POI) congestion (	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Airtel 2G ,Aircel (2G,3G),MTS CDMA operators are not meeting the benchmark of **worst affected cells having more than3% TCH drop (call drop) rate.**

4.1 3 DAYS LIVE TEST FOR FEB'16

FEBUARY			TAMILNADU Q2(Jan-Mar'16)													
3 days Live Test Audit Data			AIRCEL 2G	AIRCEL3G	AIRTEL 2G	AIRTEL 3G	BSNL 2G	BSNL 3G	RCOM GSM	IDEA 2G	VODAFONE 2G	VODAFONE 3G	TATA GSM	TATA CDMA	RCOM CDMA	MTS
S.N	PARAMETER	BENCH MARK														
Network Availability																
1	BTS / Node-B accumulated downtime	≤ 2%	0.13	0.17	0.06	0.03	**0.82**	**0.53**	**0.01%**	**0.13%**	**0.02**	0.09	0.05	0.02	0.02	0
			0.11	0.19	0.07	0.04	**0.79**	**0.52**	**0.02%**	**0.11%**	**0.03**	0.1	0.06	0.03	0.02	0.01
			0.15	0.19	0.07	0.04	**0.80**	**0.49**	**0.02%**	**0.13%**	**0.05**	0.11	0.06	0.03	0.03	0
	Worst affected BTS/Node-B due to	≤ 2%	0.4	0.63	0.01	0	**1.96**	**1.76**	**0.00%**	**0.00%**	**0.05**	0.17	0.03	0	0	0
			0.38	0.61	0.02	0.01	**1.95**	**1.76**	**0.00%**	**0.00%**	**0.08**	0.16	0.04	0	0	0
			0.45	0.59	0.02	0	**1.96**	**1.82**	**0.00%**	**0.00%**	**0.06**	0.16	0.04	0	0	0
Connection establishment (Accessibility)																
2	Call Setup Success Rate	≥ 95%	98.38	98.92	98.68	99.79	**98.75**	**98.54**	**99.94**	**99.76%**	**99.34**	99.82	99.46	99.02	98.16	99.59
			98.57	98.98	98.62	99.79	**98.76**	**98.55**	**99.93**	**99.74%**	**99.41**	99.8	99.48	99.05	98.17	99.57
			98.56	98.94	98.68	99.79	**98.78**	**98.58**	**99.84**	**99.68%**	**99.63**	99.79	99.43	98.98	98.16	99.56
	SDCCH/ Paging Channel Congestion/	≤ 1%	0.58	0.35	0.2	0.1	**0.21**	**0.19**	**0.02**	**0.11%**	**0.05**	0.19	0.03	0	0	0
			0.26	0.28	0.34	0.1	**0.14**	**0.2**	**0.03**	**0.08%**	**0.13**	0.17	0.04	0	0	0
			0.29	0.32	0.24	0.1	**0.13**	**0.18**	**0.06**	**0.08%**	**0.04**	0.17	0.03	0	0	0
	TCH congestion/ Circuit Switched	≤ 2%	1.15	0.01	1.03	0.09	**0.70**	**1.2**	**0.04**	**0.15%**	**0.66**	0.04	0.01	0.01	0.79	0.01
			0.96	0.02	1.08	0.09	**0.62**	**1.19**	**0.05**	**0.17%**	**0.59**	0.06	0.02	0	0.77	0
			0.94	0.02	1.03	0.09	**0.64**	**1.18**	**0.05**	**0.15%**	**0.37**	0.04	0.02	0.01	0.74	0.01
Connection Maintainability (Retain ability)																
3	Call Drop Rate/Circuit Switched Voice Drop	≤ 2%	1.06	0.44	0.71	0.18	**1.1**	**0.17**	**0.08**	**0.13%**	**0.56**	0.19	0.59	0.28	0.11	0.33
			1.1	0.45	0.72	0.19	**1.16**	**0.15**	**0.09**	**0.20%**	**0.59**	0.21	0.57	0.23	0.13	0.34
			1.11	0.45	0.71	0.19	**1.11**	**0.17**	**0.09**	**0.13%**	**0.61**	0.21	0.57	0.25	0.12	0.6
	Worst affected cells having more than	≤ 3%	**5.68**	**4.73**	**3.03**	1.23	**1.80**	**0.16**	**0.50**	**0.96%**	**2.09**	1.32	2.44	1.56	0.65	2.82
			5.36	**4.91**	2.97	1.24	**1.90**	**0.25**	**0.52**	**1.04%**	**2.03**	1.33	2.38	1.6	0.63	2.78
			5.61	**4.93**	2.98	1.3	**1.86**	**0.19**	**0.55**	**0.92%**	**2.01**	1.35	2.62	1.48	0.65	2.81
	% of Connections with good voice	≥ 95%	95.58	99.47	98.27	99.21	**96.69**	**99.7**	**99.43**	**98.34%**	**98.15**	99.02	98.63	98.86	98.53	99.21
			95.5	99.51	98.27	99.24	**96.66**	**99.69**	**99.42**	**98.30%**	**98.10**	99.02	98.64	99.3	98.56	99.21
			95.41	99.48	98.26	99.23	**96.68**	**99.68**	**99.39**	**98.33%**	**98.03**	99.01	98.61	98.25	98.52	99.19
	Point of Interconnections (POI) congestion (	≤ 0.5%	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
			0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
			0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Finding & Critical Analysis:

- Airtel 2G ,Aircel (2G,3G), operators are not meeting the benchmark of **worst affected cells having more than3% TCH drop (call drop) rate.**

4.2 3 Days Live Test Audit Report, TAMIL NADU Circle (MARCH 2016):

MARCH			TAMILNADU Q2(Jan-Mar'16)													
3 days Live Test Audit Data			AIRCEL 2G	AIRCEL3G	AIRTEL 2G	AIRTEL 3G	BSNL 2G	BSNL 3G	RCOM GSM	IDEA 2G	VODAFONE 2G	VODAFONE 3G	TATA GSM	TATA CDMA	RCOM CDMA	MTS
S.N	PARAMETER	BENCH MARK														
Network Availability																
1	BTS / Node-B accumulated downtime	≤ 2%	0.10%	0.17	0.05	0.03	0.81	0.49	0.33	0.07%	0.01	0.02	0.08	0.16	0.00%	0
			0.11%	0.19	0.06	0.04	0.84	0.51	0.31	0.06%	0.02	0.04	0.09	0.17	0.01%	0.01
			0.09%	0.21	0.05	0.04	0.83	0.50	0.32	0.07%	0.02	0.04	0.07	0.16	0.00%	0
	Worst affected BTS/Node-B due to	≤ 2%	0.32%	0.73	1.03	0.01	1.92	1.92	0	0.11%	0.06	0.09	0	0	0.00%	0
			0.34%	0.74	1.06	0	1.93	1.86	0	0.13%	0.08	0.08	0	0	0.00%	0
			0.28%	0.72	1.04	0	1.68	1.82	0.01	0.12%	0.07	0.07	0	0	0.00%	0
Connection establishment (Accessibility)																
2	Call Setup Success Rate	≥ 95%	98.69%	99.3	98.84	99.82	98.72	98.41	99.83	99.70%	99.59	99.83	99.5	98.86	98.24	99.47
			98.72%	99.23	98.82	99.83	98.71	98.76	99.91	99.71%	99.73	99.83	99.51	99.18	98.19	99.53
			98.81%	99.28	98.83	99.71	98.69	98.74	99.91	99.61%	99.64	99.8	99.51	99.25	98.23	99.41
	SDCCH/ Paging Channel Congestion/	≤ 1%	0.32%	0.07	0.2	0.07	0.09	0.12	0.07	0.16%	0.12	0.06	0.02	0	0.00	0
			0.18%	0.07	0.21	0.08	0.08	0.13	0.02	0.14%	0.09	0.07	0.02	0	0.00	0
			0.17%	0.08	0.42	0.1	0.18	0.14	0.03	0.20%	0.13	0.07	0.03	0	0.00	0
	TCH congestion/ Circuit Switched	≤ 2%	0.92%	0.03	0.9	0.06	0.70	1.36	0.05	0.21%	0.41	0.02	0.03	0.06	0.76	0
			0.89%	0.02	0.88	0.07	0.70	1.1	0.04	0.16%	0.27	0.03	0.03	0.02	0.80	0.01
			0.79%	0.02	0.94	0.2	0.92	1.24	0.04	0.18%	0.36	0.04	0.03	0.02	0.75	0
Connection Maintainability (Retain ability)																
3	Call Drop Rate/Circuit Switched Voice Drop	≤ 2%	1.03%	0.42	0.97	0.19	1.06	0.15	0.08	0.12%	0.51	0.21	0.64	0.5	0.11	0.49
			1.01%	0.41	0.68	0.18	1.09	0.17	0.09	0.21%	0.52	0.2	0.63	0.36	0.12	0.49
			1.00%	0.41	0.68	0.19	1.07	0.14	0.09	0.15%	0.58	0.22	0.62	0.32	0.11	0.41
	Worst affected cells having more than	≤ 3%	5.61	5.13	2.97	1.22	2.10	1.32	0.39	0.62%	2.16	1.49	3.25	1.58	0.61	2.44
			5.68	5.16	2.94	1.16	2.16	1.29	0.37	0.89%	2.15	1.52	3.18	1.56	0.63	2.84
			5.49	5.17	2.96	1.21	2.20	1.29	0.41	0.80%	2.18	1.58	3.19	1.52	0.61	2.92
	% of Connections with good voice	≥ 95%	95.66%	99.32	98.28	99.48	97.10	99.68	99.42	98.39%	98.25	99.06	98.76	98.86	98.55	99.19
			95.67%	99.37	98.29	99.53	96.80	99.72	99.42	98.33%	98.26	99.06	98.79	98.81	98.50	99.19
			95.63%	99.36	98.31	99.48	96.91	99.7	99.43	98.37%	98.09	99.07	98.82	98.92	98.47	99.2
	Point of Interconnections (POI) congestion (	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Airtel 2G ,Aircel (2G,3G),Tata GSM operators are not meeting the benchmark of **worst affected cells having more than3% TCH drop (call drop) rate.**

4.3 3 Days Live Test Audit Report, TAMIL NADU Circle (JANUARY- MARCH 2016):

JAN-MAR'16			TAMILNADU Q2(Jan-Mar'16)													
3 days Live Test Audit Data			AIRCEL 2G	AIRCEL3G	AIRTEL 2G	AIRTEL 3G	BSNL 2G	BSNL 3G	RCOM GSM	IDEA 2G	VODAFONE 2G	VODAFONE 3G	TATA GSM	TATA CDMA	RCOM CDMA	MTS
S.N	PARAMETER	BENCH MARK														
Network Availability																
1	BTS / Node-B accumulated downtime	≤ 2%	0.13	0.19	0.05	0.02	0.78	0.50	0.22	0.07	0.02	0.05	0.06	0.08	0.01	0.01
			0.12	0.21	0.07	0.03	0.79	0.52	0.21	0.06	0.03	0.06	0.07	0.09	0.02	0.02
			0.12	0.21	0.06	0.05	0.78	0.49	0.22	0.07	0.03	0.06	0.07	0.09	0.02	0.01
	Worst affected BTS/Node-B due to	≤ 2%	0.40	0.79	0.36	0.15	1.88	1.88	0.00	0.04	0.05	0.12	0.01	0.00	0.00	0.00
			0.41	0.79	0.36	0.18	1.87	1.85	0.00	0.04	0.06	0.11	0.01	0.00	0.00	0.00
			0.40	0.78	0.37	0.10	1.78	1.85	0.00	0.04	0.05	0.11	0.01	0.00	0.00	0.00
Connection establishment (Accessibility)																
2	Call Setup Success Rate	≥ 95%	98.56	98.97	98.67	99.83	98.70	98.52	99.91	99.73	99.53	99.84	99.51	99.06	98.19	99.55
			98.61	98.95	98.68	99.83	98.73	98.68	99.93	99.71	99.58	99.83	99.51	99.16	98.18	99.56
			98.64	98.77	98.66	99.79	98.68	98.65	99.90	99.68	99.64	99.81	99.52	99.00	98.20	99.48
	SDCCH/ Paging Channel Congestion/	≤ 1%	0.45	0.32	0.29	0.06	0.14	0.18	0.04	0.16	0.11	0.14	0.03	0.00	0.00	0.00
			0.29	0.26	0.29	0.06	0.12	0.19	0.03	0.11	0.10	0.13	0.02	0.00	0.00	0.00
			0.32	0.29	0.35	0.07	0.19	0.17	0.04	0.13	0.09	0.13	0.03	0.00	0.00	0.00
	TCH congestion/ Circuit Switched	≤ 2%	0.99	0.02	1.05	0.06	0.68	1.24	0.04	0.17	0.47	0.06	0.02	0.02	0.77	0.12
			0.94	0.02	1.03	0.07	0.65	1.16	0.04	0.17	0.42	0.05	0.02	0.01	0.78	0.13
			0.90	0.02	1.07	0.12	0.76	1.20	0.04	0.16	0.36	0.07	0.02	0.01	0.75	0.13
Connection Maintainability (Retain ability)																
3	Call Drop Rate/Circuit Switched Voice Drop	≤ 2%	0.70	0.44	0.82	0.18	1.09	0.16	0.08	0.15	0.56	0.21	0.61	0.33	0.13	0.40
			0.71	0.44	0.72	0.18	1.15	0.17	0.08	0.20	0.57	0.20	0.58	0.27	0.13	0.40
			0.71	0.44	0.73	0.18	1.09	0.14	0.08	0.17	0.60	0.21	0.59	0.34	0.12	0.45
	Worst affected cells having more than	≤ 3%	5.55	4.93	3.33	1.31	1.92	0.87	0.43	0.78	2.02	1.47	2.73	1.77	0.64	2.76
			5.43	4.99	3.29	1.31	2.05	0.88	0.42	0.89	2.03	1.50	2.63	1.60	0.63	2.75
			5.49	5.01	3.25	1.36	2.09	0.88	0.45	0.83	2.02	1.54	2.82	1.73	0.66	2.87
	% of Connections with good voice	≥ 95%	96.61	99.41	98.21	99.39	96.85	99.69	99.44	98.35	98.14	99.09	98.70	98.86	98.54	99.21
			95.57	99.44	98.21	99.35	96.71	99.69	99.44	98.31	98.12	99.13	98.72	99.01	98.54	99.20
			96.52	99.43	98.22	99.32	96.76	99.68	99.43	98.34	98.03	99.14	98.70	98.68	98.50	99.20
	Point of Interconnections (POI) congestion (	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Airtel 2G ,Aircel (2G,3G) operators are not meeting the benchmark of **worst affected cells having more than3% TCH drop (call drop) rate.**

5.0 Operator Assisted Drive Test TAMILNADU Circle(JAN. – MAR.'16):

Drive Test Measurements												
			GSM OPERATORS							CDMA OPERATORS		
S N	PARAMETER	CITY NAME	AIRTEL	IDEA	VODA	BSNL	AIRCEL	RCOM	TATA	RCOM	TATA	MTS
		ERODE	506	409	408	433	500	514	274	567	381	371
		Karikudi	333	297	296	326	290	327	315	313	**349**	340
1.1	Call Attempts	Tanjore	417	388	422	412	432	331	388	333	350	343
		ERODE	0.00%	0.40%	0.32%	0.33%	0.78%	0.97%	0.70%	0.71%	0.00%	0.00%
1.2		Karikudi	0.22%	0.00%	0.36%	0.61%	0.98%	1.53%	0.70%	0.00%	0.00%	0.00%
	Blocked Call Rate (<=3%)	Tanjore	0.00%	0.00%	0.22%	0.97%	0.82%	2.72%	0.00%	0.00%	0.00%	0.00%
		ERODE	0.00%	0.00%	0.69%	0.46%	0.44%	0.78%	0.79%	1.47%	5.00%	0.00%
1.3		Karikudi	0.31%	0.00%	0.72%	0.61%	1.00%	0.00%	0.90%	0.32%	1.00%	0.00%
	Dropped Call Rate (<=2%)	Tanjore	0..28%	0.00%	0.34%	0.97%	0.68%	0.62%	0.00%	0.00%	1.00%	0.00%
	Percentage of connections with good voice quality (=>95%)											
		ERODE	-	-	-	-	-	-	-		96.74%	
	(i)0-4 (w/o frequency hopping)	Karikudi	-	-	-	-	-	-	-		99.89%	
		Tanjore									99.92%	
		ERODE	99.00%	98.80%	97.11%	95.21%	95.25%	98.00%	98.05%	-	-	-
	(ii) 0-5 (with frequency hopping)	Karikudi	99.70%	98.60%	98.78%	98.76%	95.07%	97.29%	94.74%	-	-	-
1.4		Tanjore	99.07%	98.72%	99.08%	98.14%	95.23%	94.90%	95.70%	-	-	-
	Service Coverage											
		ERODE	57.82%	58.70%	46.89%	84.31%	92.03%	71.10%	41.06%	80.04%	51.89%	35.86%
		Karikudi	45.74%	54.60%	48.88%	77.40%	97.95%	46.61%	54.13%	29.50%	45.78%	37.44%
	In door (>= -75dBm)	Tanjore	58.44%	58.70%	42.70%	98.69%	94.08%	35.54%	60.29%	27.55%	31.01%	33.28%
		ERODE	80.56%	88.20%	74.70%	97.46%	79.45%	91.33%	77.04%	91.73%	33.61%	12.71%
		Karikudi	68.48%	90.00%	80.78%	95.50%	34.03%	76.63%	79.41%	51.65%	85.35%	9.99%
	In-vehicle (>= -85dBm)	Tanjore	84.50%	98.87%	94.05%	98.95%	35.55%	67.07%	90.17%	62.20%	74.52%	11.91%
		ERODE	96.26%	98.30%	95.83%	100.00%	100.00%	98.85%	96.06%	93.86%	97.80%	8.22%
1.5	Outdoor- in city (>= -95dBm)	Karikudi	87.76%	98.70%	97.82%	100.00%	48.02%	95.78%	95.68%	96.65%	98.81%	9.74%

		Tanjore	94.88%	99.06%	96.58%	100.00%	44.80%	92.67%	99.41%	94.99%	98.68%	12.32%
		ERODE	100.00%	99.30%	100.00%	99.77%	99.20%	99.03%	98.27%	99.29%	99.70%	100.00%
		Karikudi	99.03%	100.00%	100.00%	99.39%	99.27%	98.47%	99.31%	100.00%	100.00%	100.00%
1.6	Call Setup Success Rate (>=95%)	Tanjore	99.60%	100.00%	100.00%	99.04%	99.33%	97.28%	100.00%	98.31%	99.71%	100.00%
		ERODE	99.56%	100.00%	99.54%	98.97%	98.07%	100.00%	99.23%	100.00%	100.00%	100.00%
		Karikudi	100.00%	100.00%	100.00%	100.00%	99.05%	100.00%	98.80%	100.00%	100.00%	100.00%
1.7	Hand Over Success Rate (HOSR)	Tanjore	100.00%	100.00%	100.00%	98.77%	99.43%	100.00%	99.60%	100.00%	100.00%	100.00%
		ERODE	435	437	438	438	43500.00%	436	435	437	433	432
		Karikudi	296	337	335	340	293	339	296	338	337	336
1.8	Km's driven	Tanjore	332	329	333	330	337	327	329	332	330	325

The Operator Assisted Drive Test was conducted for all the Operators. Route covered was about 300 Km depending on city areas within the speed limit of 30-40 km/hour. In all the cities Zones were selected for covering different density areas.

Finding & Critical Analysis:

- According to the table, it shows the no. of calls attempted in TAMIL NADU circle**.**
- Vodafone is not meeting the benchmark KPI for **Blocked call rate (<=3%)** in Vellore SSA.
- TATA CDMA, RCOM CDMA is not meeting the benchmark KPI for **Drop call rate (<=2%)** in Ooty SSA , Vodafone not meeting in Vellore and Ooty SSA
- Vodafone, Reliance GSM & CDMA, Tata GSM is not meeting the benchmark KPI for % of connections with good voice quality>=95% in Ooty SSA.
- According to the table it shows that all service providers are meeting the benchmark of **indoor (>= -75dBm).**
- According to the table, it shows that all service providers are meeting their benchmark of **In-vehicle (>= -85dBm**).
- According to the table, it shows that all service providers are meeting their benchmark of **Outdoor- in city (>= -95dBm)**.
- According to the table, it shows that all the service providers are meeting the benchmark of **Call Setup Success Rate**.

5.CUSTOMER SERVICE QUALITY PARAMETERS

JANUARY to MARCH 2016 Data Assessment:

Customer Service Quality Q2(Jan-Mar'16)													
s. no	Parameters	Bench mark	Audit	Aircel	Airtel	Bsnl	Idea	RCOM GSM	Tata GSM	Vodafone	RCOMCDMA	Tata CDMA	MTS CDMA
1	Metering/billing credibility Post	<= 0.1%	2nd quar.	0	0.02	0.03	0.10	0.09	0	0.24	0.09	0	0.1
2	Metering /billing credibility Prepaid	<= 0.1%	2nd quar.	0	0	0	0.16	0.09	0	0.17	0.02	0	0
3	Resolution of billing/ charging	100% within 4 week	2nd quar.	100	100	100	100	100	100	100	100	100	100
		100% within 6 week	2nd quar.	100	100	100	100	100	100	100	100	100	100
4	Period of applying, edit/waiver/adjustment to the customer count from date of resolution of complain	<=1 week	2nd quar.	100	100	100	100	100	100	99.58	100	100	100
	Response time to customers for assistance												
5	a) Accessibility of call,Centre/Customer Care	>=95%	2nd quar.	97.53	100	100	99.22	99.27	98.88	97.59	97.91	100	97.22
	b) % call answered by operators	>=95%	2nd quar.	95.72	94.14	90.91	98.11	97.06	91.85	97	97.12	94.54	95.02
	Termination/closure of service												
6	No. of requests for Termination /clouse of service request within 7 days during the quarter	<=7days	2nd quar.	100	100	100	100	100	100	100	100	100	100
7	Time taken for refunds of deposits after closures.	100% within 60 days	2nd quar.	93.03	100	100	100	100	100	98.87	100	99.5	100

Finding &Critical Analysis:-

- According to the parameter metering/billing credibility post-paid we found that all the service providers are meeting the benchmark except IDEA & MTS.
- According to the parameter metering /billing credibility pre-paid we found that all the service providers are meeting the benchmark except IDEA.
- According to the parameter Resolution of billing/ charging complaints we found that all the service providers are meeting the benchmark
- According to the parameter Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints we found that all the service providers are meeting the benchmark. Except Vodafone.
- According to the parameter Accessibility of call centre/Customer Care we found that all the service providers are meeting the benchmark except Tata CDMA.
- According to the parameter % call answered by operators (voice to voice) within 60 sec we found that all the service providers are meeting the benchmark except Airtel, BSNL,Tata GSM & CDMA.
- According to the parameter no. of requests for Termination / Closure of service complied within 7 days during the quarter we found that all the service providers are meeting the benchmark
- According to the parameter Time taken for refunds of deposits after closures we found that all the service providers are meeting the benchmark except AIRCELand Vodafone.

Redressal

5.1 Level 1 Live Calling (Emergency No.):- Level 1 calling such as calling at emergency no.Police, Fire, and Ambulance etc. were made so as to check the service of such short codes. In TAMIL NADU we have

Dialed 5times from each service providers' no. i.e. we have done 450 calls to the 9 emergency numbers.

								Rcom	Tata	Rcom	Tata
Emergency No.	**No. of calls**	**Vodafone**	**Airtel**	**Idea**	**MTS**	**Aircel**	**BSNL**	**GSM**	**GSM**	**CDMA**	**CDMA**
100(Police)	50	5	5	5	5	5	5	5	5	5	5
101 (Fire)	50	5	5	5	5	5	5	5	5	5	5
108(Ambulance)	50	5	5	5	5	5	5	5	5	5	5
104(Health Information Helpline)	50	5	5	5	5	5	5	5	5	5	5
182(Indian Railway Security Helpline)	50	5	5	5	5	5	5	5	5	5	5
1091(Women Helpline)	50	5	5	5	5	5	5	5	5	5	5
1072(Rail Accident Helpline)	50	5	5	5	5	5	5	5	5	5	5
1064(Anti Corruption Helpline)	50	5	5	5	5	5	5	5	5	5	5
1090(Call Alart (Crime Branch))	50	5	5	5	5	5	5	5	5	5	5

Critical Analysis:-

Level 1 calling such as calling at emergency no. like Police, Fire, & Ambulance e t c .were made so as to check the service of such short codes. In TAMIL NADU circle it was found to be functional.

3.6Inter Operator Call Assessment

3.6.1 Sample overage

A sample of 2x50 test calls per Service Provider within the licensed service area (TAMIL NADU circle) were made between 1100 to 1400 hrs and 1600 to 1900 hrs so that TCBH hours for all the operators were covered.

Performance Based on Live Measurement

Calling Operator	Vodafone	Airtel	Idea	Aircel	BSNL	Rcom GSM	Tata GSM	RCOM CDMA	Tata CDMA	MTS
Vodafone	-	98.00%	99.00%	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.00%
Airtel	100.00%	-	100.00%	99.00%	99.00%	100.00%	98.00%	100.00%	98.00%	100.00%
Idea	98.00%	98.00%	-	100.00%	94.00%	100.00%	100.00%	100.00%	94.00%	100.00%
Aircel	100.00%	96.00%	100.00%	-	98.00%	99.00%	90.00%	100.00%	100.00%	100.00%
BSNL	99.00%	98.00%	100.00%	100.00%	-	100.00%	100.00%	98.00%	100.00%	100.00%
Rcom GSM	100.00%	97.00%	99.00%	98.00%	100.00%	-	100.00%	100.00%	100.00%	100.00%
Tata GSM	100.00%	100.00%	98.00%	98.00%	100.00%	100.00%	-	100.00%	100.00%	100.00%
RCOM CDMA	99.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	-	100.00%	100.00%
Tata CDMA	97.00%	100.00%	100.00%	100.00%	98.00%	99.00%	100.00%	97.00%	-	99.00%
MTS	99.00%	100.00%	99.00%	98.00%	99.00%	98.00%	100.00%	98.00%	99.00%	-

Critical Analysis:-

In the inter-operator call assessment test, calls were made from one operator to other operator so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in between the operators are involved and hence if any congestion is found in the network, it Nov be due to any of these parts. The result shows that there were congestion with all operators BSNL,Aircel, Idea,Rcom, Vodafone,airtel,MTSandTATAserviceproviders.

CHAPTER-6: DETAILED FINDINGS, ANALYSIS AND GRAPHICAL REPRESENTATION

CUSTOMER SERVICE QUALITY PARAMETERS

Customer Service Quality Q2(Jan-Mar'16)														
s.no	Parameters	Benchmark	Audit	Aircel	Airtel	BSNL	Idea	RCOM GSM	Tata GSM	Vodafone	RCOM CDMA	Tata CDMA	MTS CDMA	
1	Metering/billing credibility Post	<= 0.1%	Reported	0	0.02	0.03	0.10	0.09	0	0.24	0.09	0	0.1	
			Verified	0	0.02	0.03	0.14	0.09	0	0.24	0.09	0	0.1	
2	Metering /billing credibility Prepaid	<= 0.1%	Reported	0	0	0	0.16	0.09	0	0.17	0.02	0	0	
			Verified	0	0	0	0.16	0.09	0	0.17	0.02	0	0	
3	Resolution of billing/ charging	100% within 4 week	Reported	100	100	100	100	100	100	100	100	100	100	
			Verified	100	100	100	100	100	100	100	100	100	100	
		100% within 6 week	Reported	100	100	100	100	100	100	100	100	100	100	
			Verified	100	100	100	100	100	100	100	100	100	100	
4	Period of applying, edit/waiver/adjustment to the customer count from date of resolution of complain	<=1 week	Reported	100	100	100	100	100	100	99.58	100	100	100	
			Verified	100	100	100	100	100	100	99.58	100	100	100	
	Response time to customers for assistance													
5	a) Accessibility of call,Centre/Customer Care	>=95%	Reported	97.53	100	100	99.22	99.27	98.88	97.59	97.91	100	97.22	
			Verified	97.53	100	100	99.22	99.27	98.88	97.59	97.91	100	97.22	
	b) % call answered by operators	>=95%	Reported	95.72	94.14	90.91	98.14	97.06	91.85	97	97.12	94.54	95.02	
			Verified	95.72	94.14	91.00	98.14	97.06	91.85	97	97.12	94.54	95.02	
	Termination/closure of service													
6	No. of requests for Termination /clouse of service request within 7 days during the quarter	<=7days	Reported	100	100	100	100	100	100	100	100	100	100	
			Verified	100	100	100	100	100	100	100	100	100	100	
7	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	93.03	100	100	100	100	100	98.87	100	99.5	100	
			Verified	93.03	100	100	100	100	100	98.87	100	99.5	100	

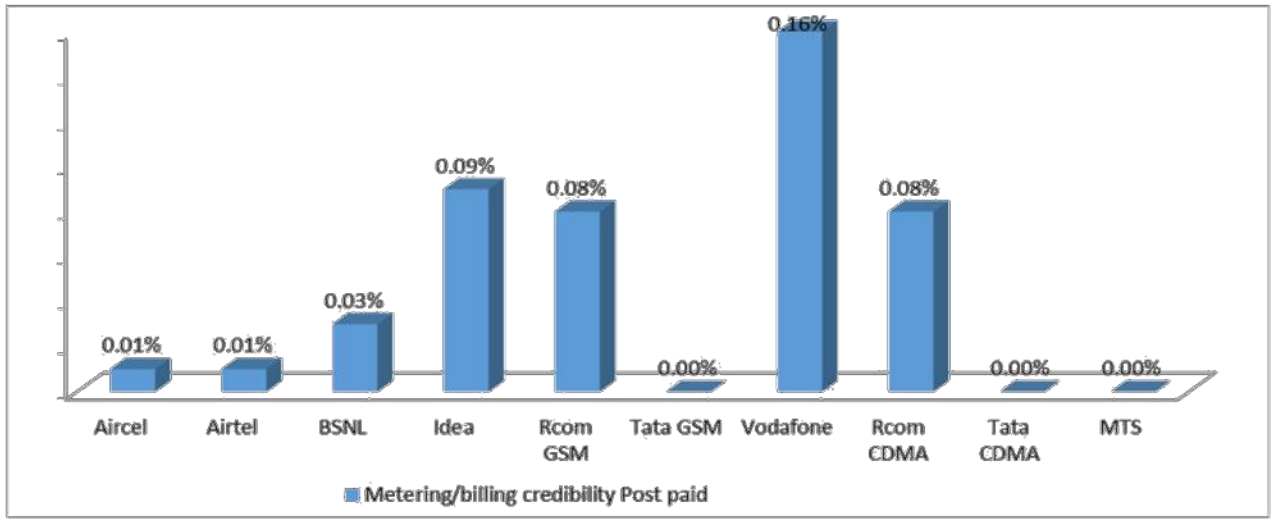

Fig. 1

Showing the parameter metering/billing credibility post-paid in the table **4.2.1** and the Fig.1 we found that all the service providers are meeting the benchmark except Vodafone

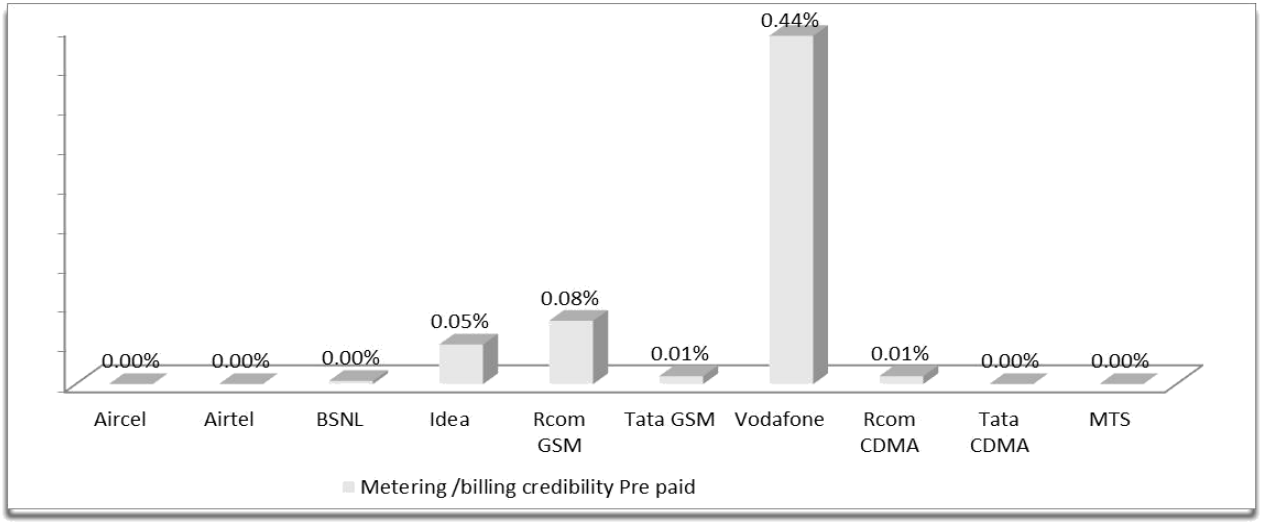

Fig. 2

According to the parameter metering /billing credibility pre-paid in the table **4.2.1** and theFig.2 we found that all the service providers are meeting the benchmark except Vodafone

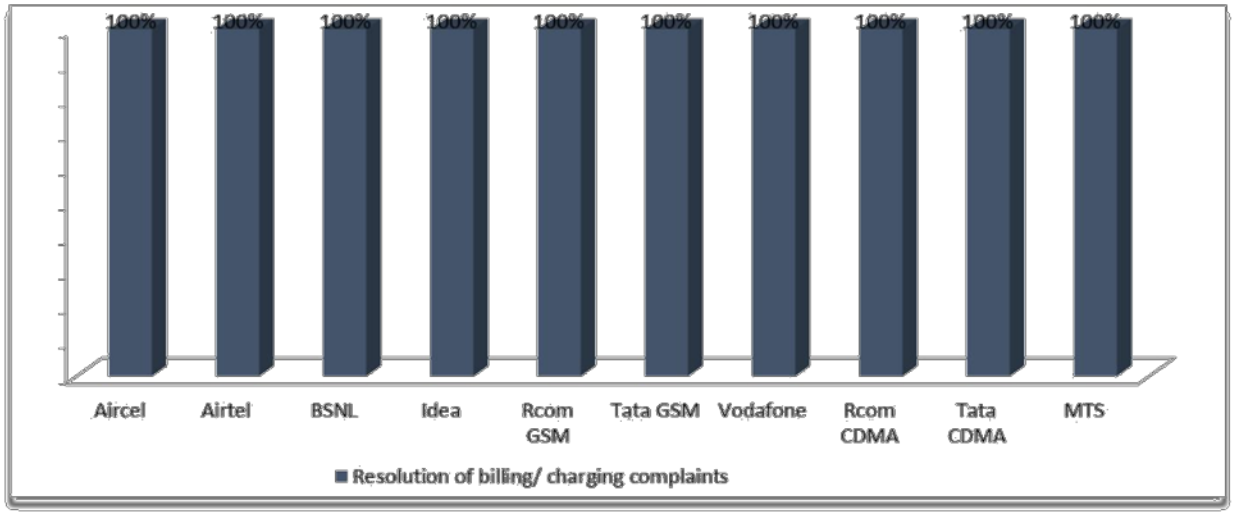

Fig. 3

According to the parameter Resolution of billing/ charging complaints in the table **4.2.1** and theFig.3 we found that all the service providers are meeting the benchmark.

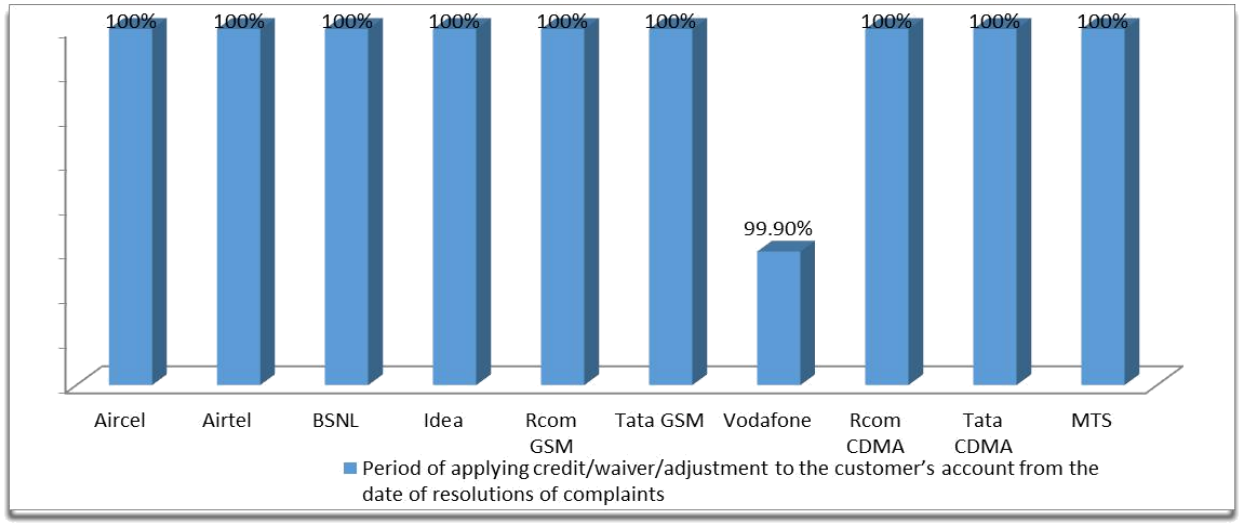

Fig. 4

According to the parameter Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints in the table **4.2.1** and theFig.4 we found that all the service providers are meeting the benchmark.

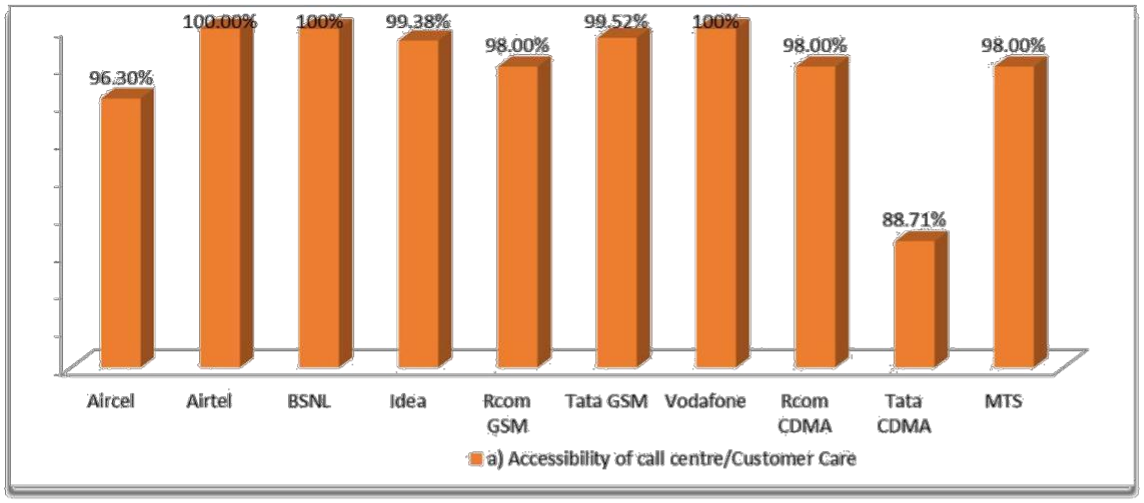

Fig. 5

According to the parameter Accessibility of call centre/Customer Care in the table **4.2.1** and theFig.5 we found that all the service providers are meeting the benchmark, Except Tata CDMA

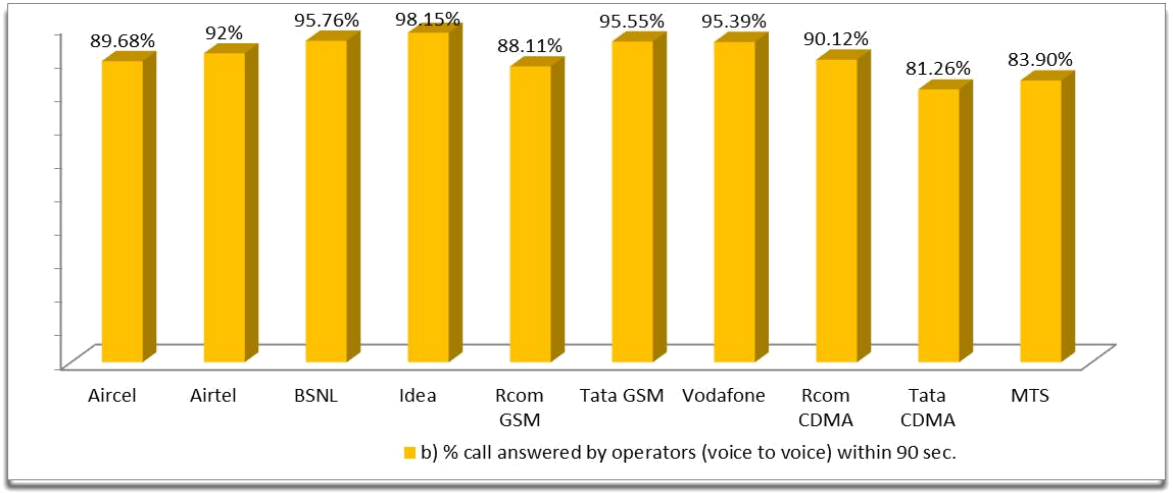

Fig. 6

According to the parameter % call answered by operators (voice to voice) within 60 sec in the table **4.2.1** and theFig.6 we found that all the service providers are meeting the benchmark except Aircel RCOM GSM ,Tata CDMA and MTS

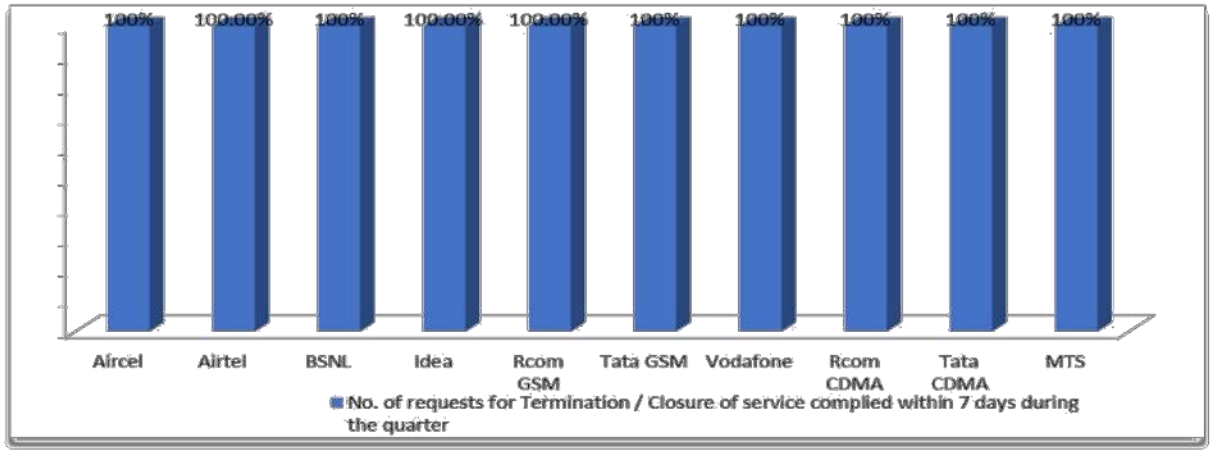

Fig. 7

According to the parameter no. of requests for Termination / Closure of service complied within 7 days during the quarter in the table **4.2.1** and theFig.7we found that all the service providers are meeting the benchmark.

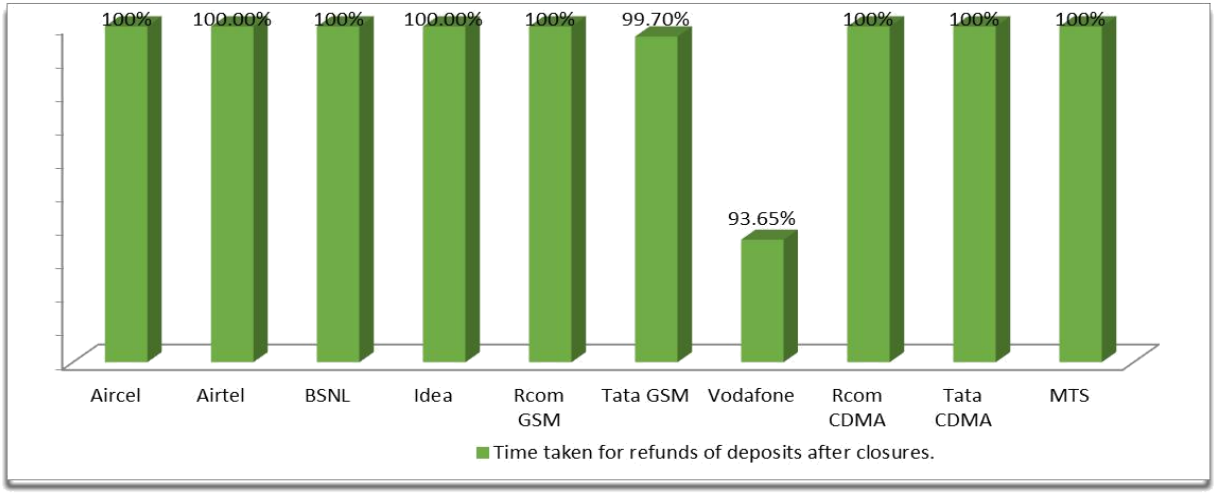

Fig. 8

According to the parameter Time taken for refunds of deposits after closures in the table **4.2.1** and theFig.8wefound that all the service providers are meeting the benchmark except Vodafone.

PMR Summarized Data Results in Table &Graphical

TAMIL NADU Circle Summarized data (Jan.-Mar.'16):

Tamil Nadu Circle (Jan to Mar '16)																	
QUARTERLY PMR Generation Data		Bench-mark	Audit Period	Aircel 2G	Aircel 3g	Airtel2 G	Airtel 3G	BSNL 2G	BSNL 3G	RCOM 2G	RCOM CDMA	Vodafone 2G	Vodafone 3G	IDEA 2G	MTS	TATA 2G	TATA CDMA
S/N	Name of Parameter						GSM Operators							CDMA			
			Network Service Quality Parameter														
1	a) BTS Accumulated Downtime	*<=2%*	One Month	0.14	0.2	0.06	0.05 %	0.78	0.51%	0.23	0.09%	0.02%	0.06%	0.07%	0.01%	0.06%	0.05%
	b) Worst affected BTSs due to downtime	*<=2%*	One Month	0.44%	0.79%	0.5	0.14 %	1.88	1.86%	0.78	0.19%	0.06%	0.11%	0.11%	0.00%	0.01%	0.00%
2			**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	One Month	98.47 %	98.84 %	98.66	99.44	98.53	98.60 %	99.28	98.18%	99.50%	99.80%	99.53 %	99.54 %	99.47 %	99.02%
	b) SDCCH/PAGING Channel congestion	*<=1%*	One Month	0.59%	0.36%	0.53	0.08 %	0.17	0.18%	0.05	0.00%	0.14%	0.14%	0.17%	0.00%	0.04%	0.00%
	c) TCH congestion	*<=2%*	One Month	1.08%	0.03%	1.05	0.11 %	0.7	1.14%	0.04	0.75%	0.50%	0.06%	0.19%	0.00%	0.02%	0.01%
3			**Connection maintenance (Retainability)**														
	a) CDR (Call Drop Rate)	*<=2%*	One Month	1.06%	0.46%	0.74	0.19 %	1.09	0.17%	0.08	0.15%	0.57%	0.21%	0.20%	0.37%	0.54%	0.29%
	b) Worst affected cells>3% TCH drop (Call drop) rate	*<=3%*	One Month	**5.60%**	**4.99%**	**3.39**	1.34 %	2.13	0.85%	0.38	0.71%	2.03	1.50%	0.96%	2.84%	2.34%	1.66%
	c) Connections with good voice quality	*>=95%*	One Month	95.54 %	99.43 %	98.22	99.39	96.74	99.69 %	99.44	98.49%	98.09%	99.04%	98.30 %	99.20 %	98.68 %	98.86%
4	No. of POI's having >=0.5% POI congestion	*<=0.5 %*	One Month	0.00%	0.00%	0%	0.00 %	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding:

Aircel 2G & 3G ,Airtel 2G Not meeting the benchmark in Worst affected cells>3% TCH drop (Call drop) rate.

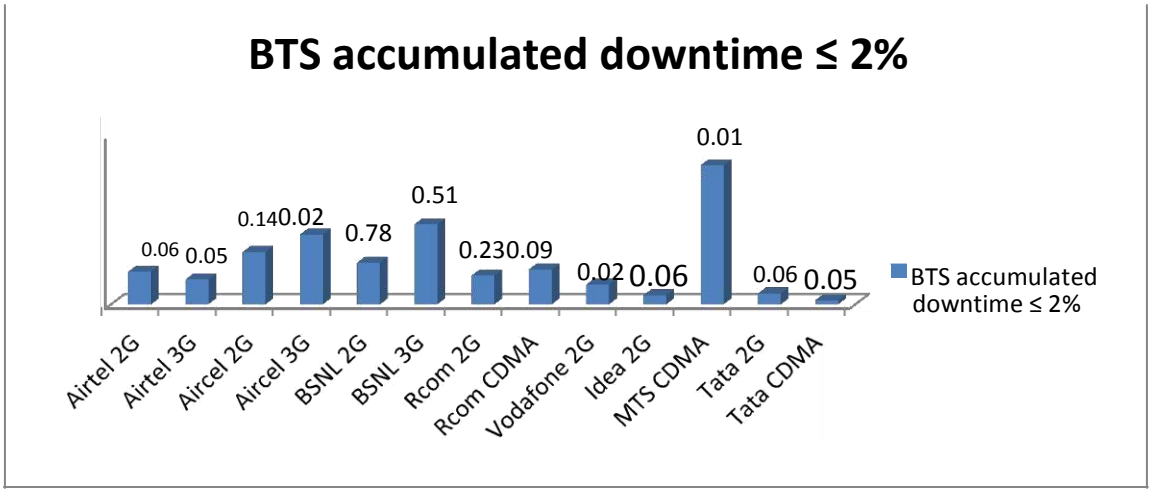

Fig.1

According to the data on the table **4.3.1** and the **Fig.1**it is found that found that all service providers are meeting the benchmark.

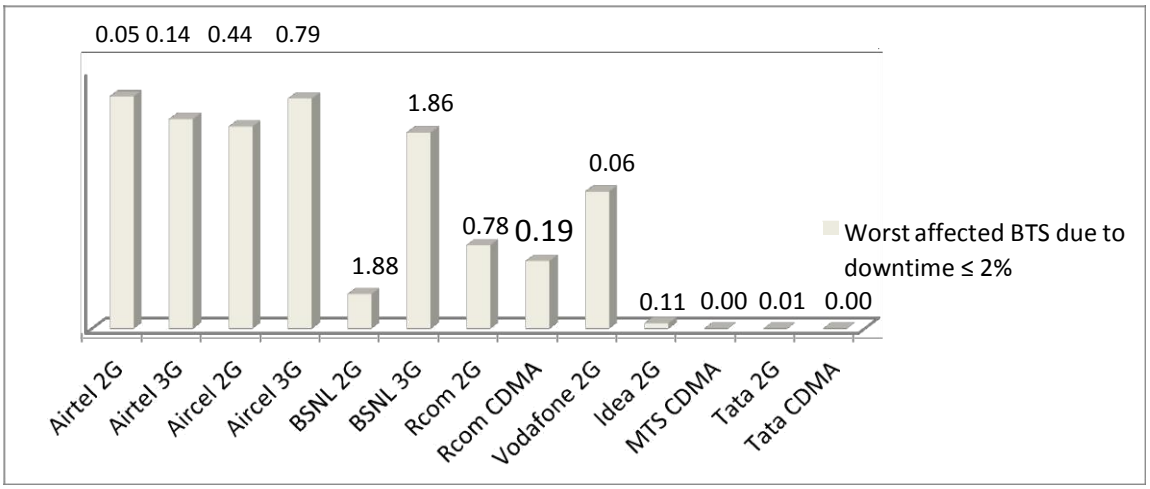

Fig.2

According to the data on the table **4.3.1**and the **Fig.2**it is found that all operators are meeting the benchmark for **worst affected BTS due to downtime.**

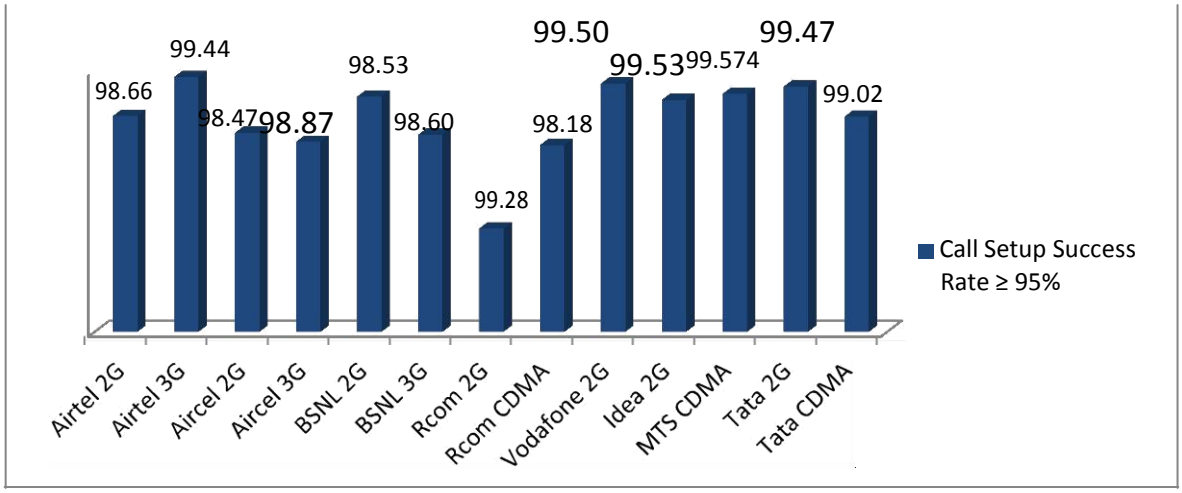

Fig. 3

According to the data on the table **4.3.1**and the **Fig.3** it is found that all operators meeting the benchmark.

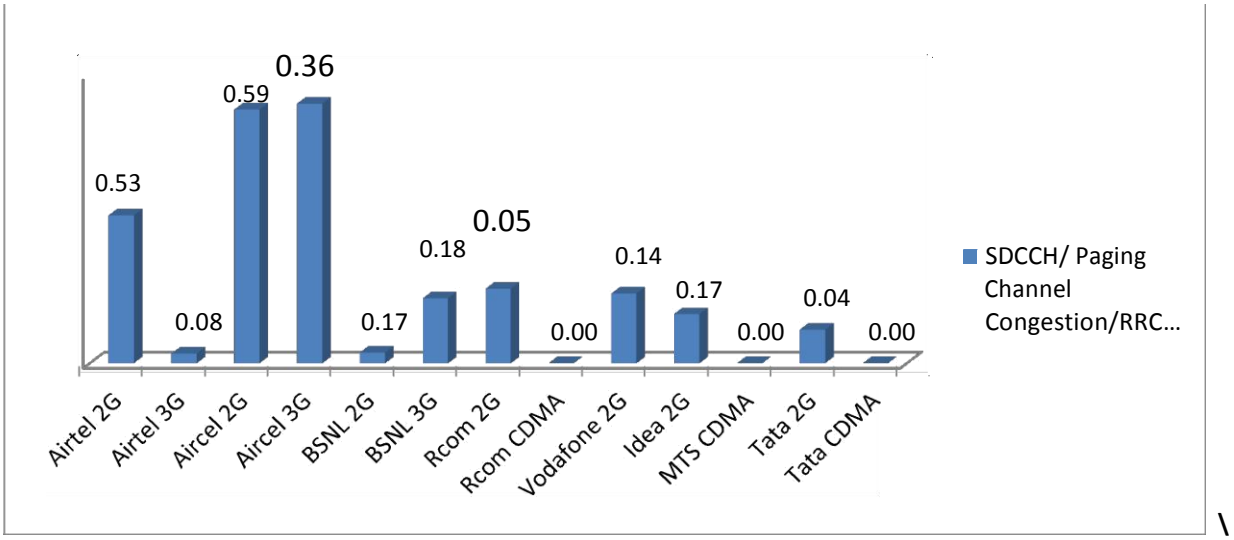

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Fig. 4

According to the data on the table **4.3.1**and the **Fig.4** it is found that all the service providers are meeting the benchmark.

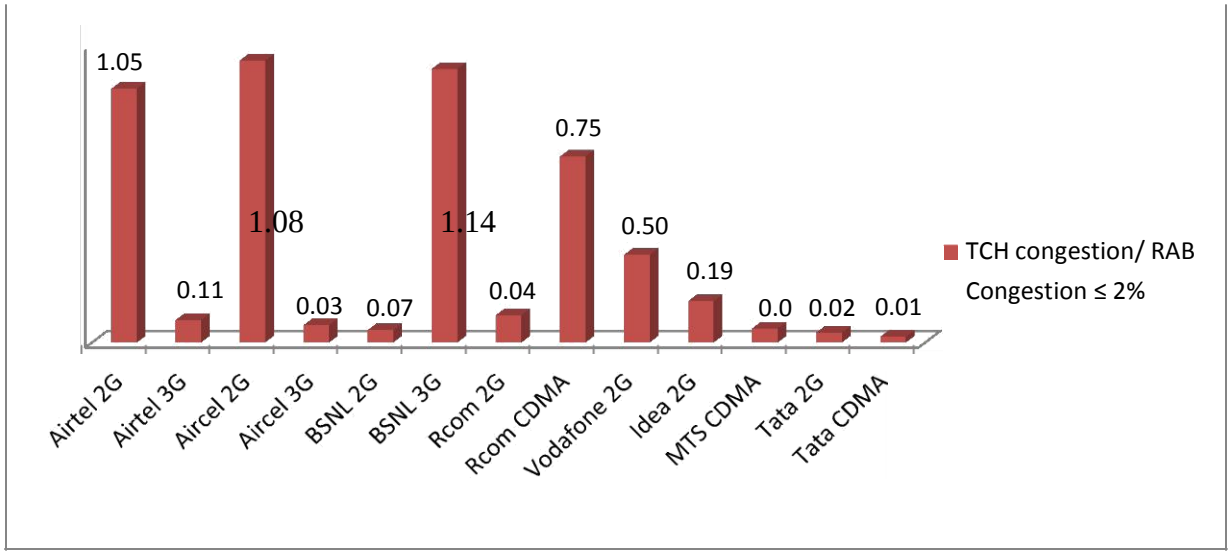


Fig. 5

According to the data on the table **4.3.1**and the **Fig.5** it is found that all the service providers are meeting the benchmark.

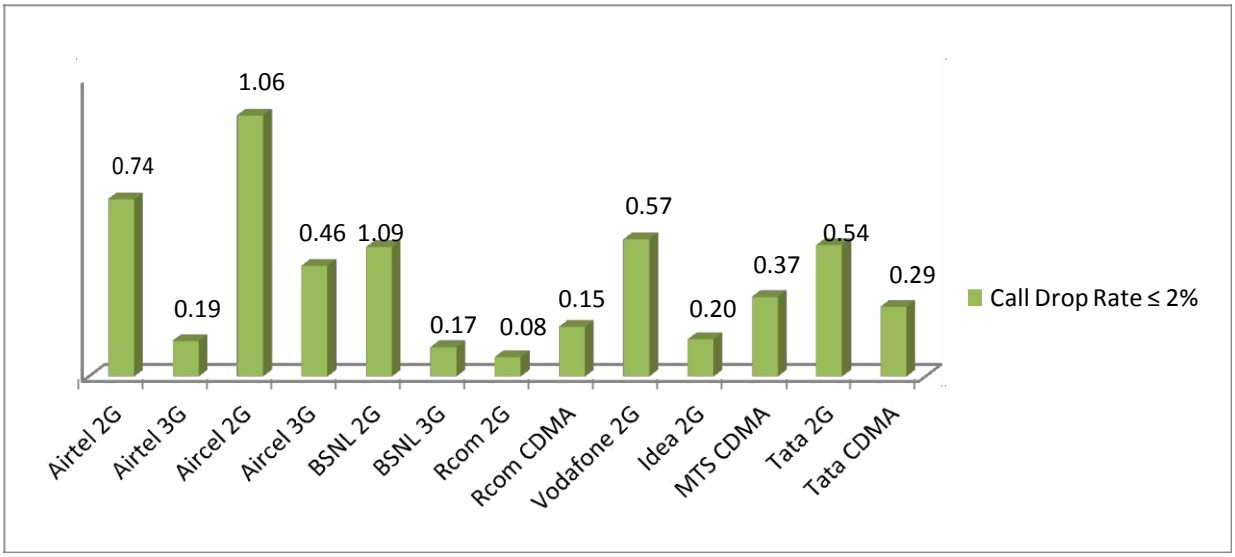


Fig. 6

According to the data on the table **4.3.1**and the **Fig.6** it is found that all the service providers are meeting the benchmark.

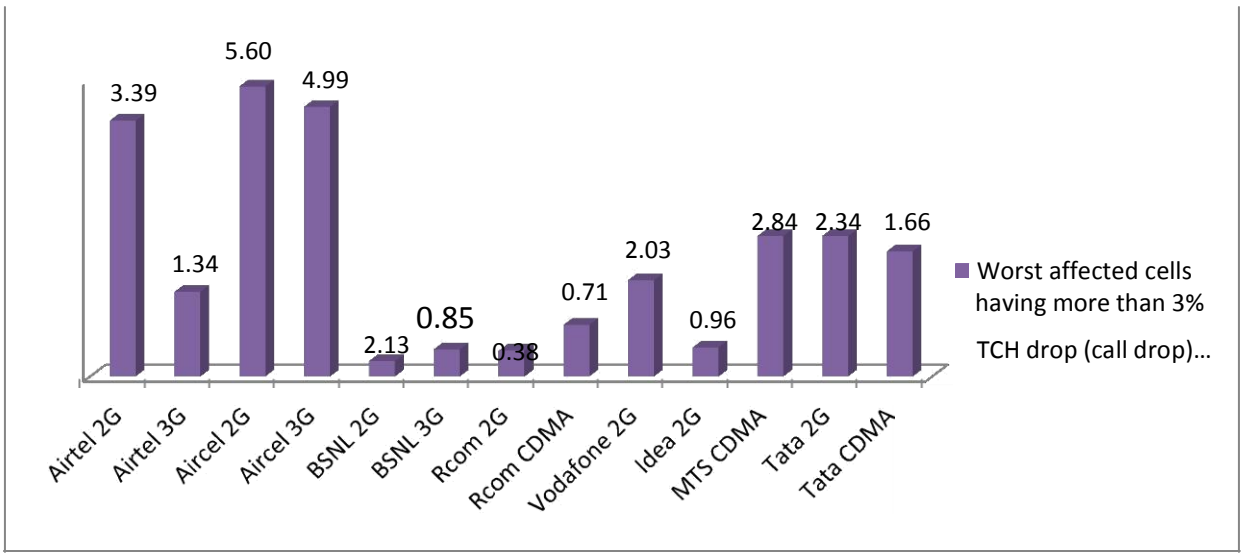


Fig.7

According to the data on the table **4.3.1**and the **Fig.7** it is found that Airtel 2G ,Aircel2G and 3G is not meeting the benchmark for **worst affected cells having more than 3% TCH drop (call drop) rate.**

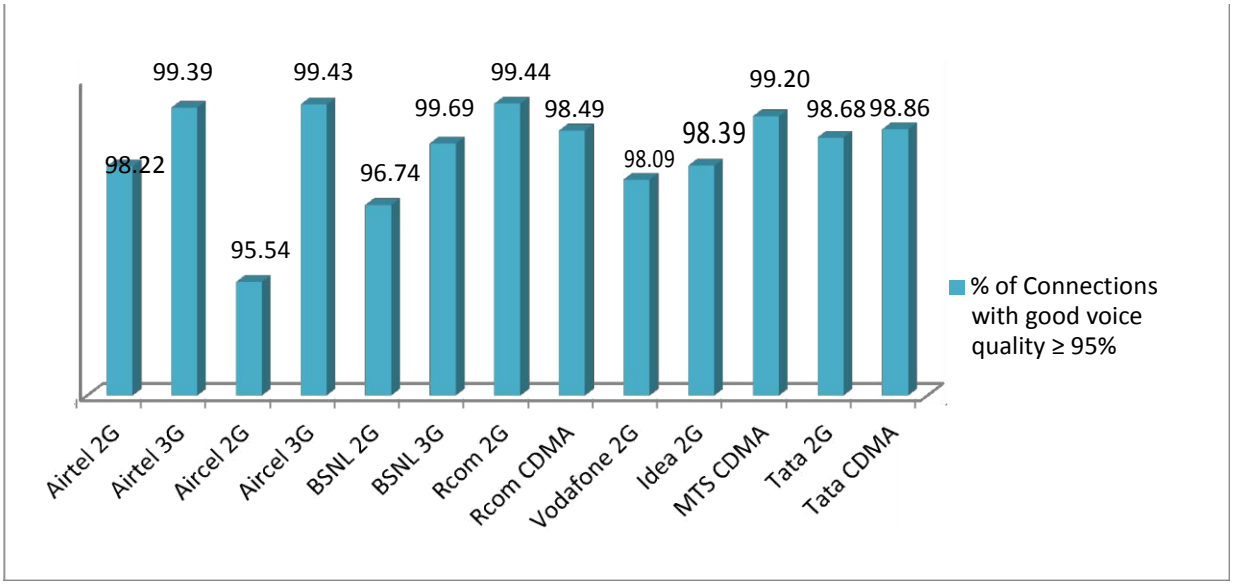


Fig. 8

According to the data on the table **4.3.1**and the **Fig.8** it is found that all the service providers are meeting the benchmark.

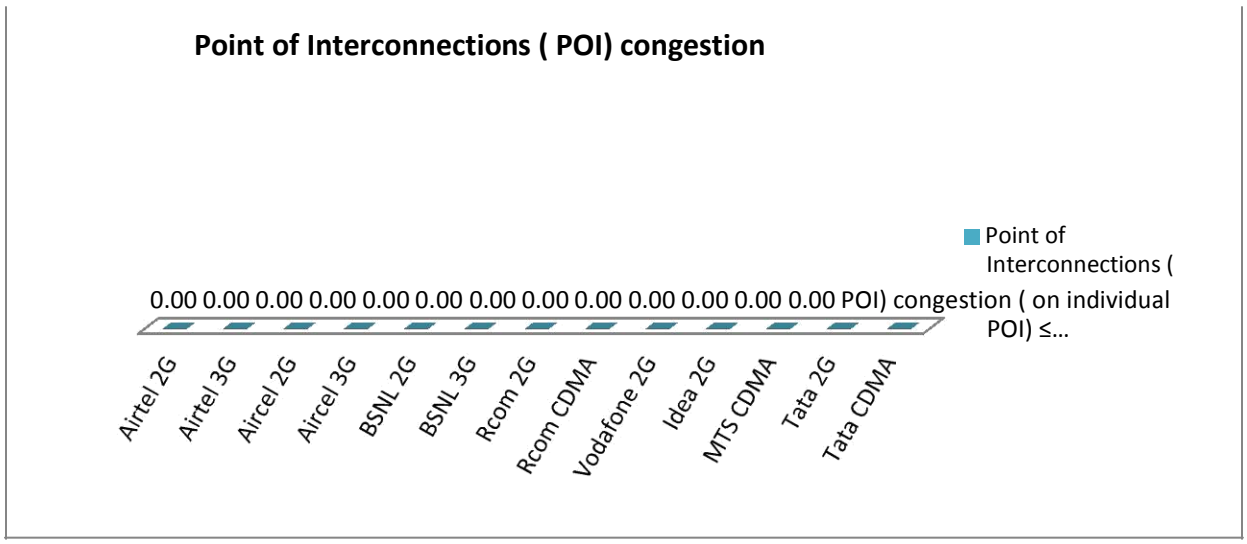


Fig. 9

According to the data on the table **4.3.1**and the **Fig.9** it is found that all the service providers are meeting the benchmark.

Drive Test Measurements Audit Report TAMIL NADU Circle

(GraphicalRepresentation)

Drive Test Measurements												
			GSM OPERATORS							CDMA OPERATORS		
SN	PARAMETER	CITY NAME	AIRTEL	IDEA	VODA	BSNL	AIRCEL	RCOM	TATA	RCOM	TATA	MTS
		ERODE	506	409	408	433	500	514	274	567	381	371
		Karikudi	333	297	296	326	290	327	315	313	**349**	340
1.1	Call Attempts	Tanjore	417	388	422	412	432	331	388	333	350	343
		ERODE	0.00%	0.40%	0.32%	0.33%	0.78%	0.97%	0.70%	0.71%	0.00%	0.00%
1.2	Blocked Call Rate (<=3%)	Karikudi	0.22%	0.00%	0.36%	0.61%	0.98%	1.53%	0.70%	0.00%	0.00%	0.00%
		Tanjore	0.00%	0.00%	0.22%	0.97%	0.82%	2.72%	0.00%	0.00%	0.00%	0.00%
		ERODE	0.00%	0.00%	0.69%	0.46%	0.44%	0.78%	0.79%	1.47%	5.00%	0.00%
1.3	Dropped Call Rate (<=2%)	Karikudi	0.31%	0.00%	0.72%	0.61%	1.00%	0.00%	0.90%	0.32%	1.00%	0.00%
		Tanjore	0..28%	0.00%	0.34%	0.97%	0.68%	0.62%	0.00%	0.00%	1.00%	0.00%
1.4	**Percentage of connections with good voice quality (=>95%)**											
	(i)0-4 (w/o frequency hopping)	ERODE	-	-	-	-	-	-	-		96.74 %	
		Karikudi	-	-	-	-	-	-	-		99.89 %	
		Tanjore									99.92 %	
	(ii) 0-5 (with frequency hopping)	ERODE	99.00%	98.80 %	97.11 %	95.21 %	95.25%	98.00 %	98.05 %	-	-	-
		Karikudi	99.70%	98.60 %	98.78 %	98.76 %	95.07%	97.29 %	94.74 %	-	-	-
		Tanjore	99.07%	98.72 %	99.08 %	98.14 %	95.23%	94.90 %	95.70 %	-	-	-
1.5	**Service Coverage**											
	In door (>= -75dBm)	ERODE	57.82%	58.70 %	46.89 %	84.31 %	92.03%	71.10 %	41.06 %	80.04 %	51.89 %	35.86 %
		Karikudi	45.74%	54.60 %	48.88 %	77.40 %	97.95%	46.61 %	54.13 %	29.50 %	45.78 %	37.44 %
		Tanjore	58.44%	58.70 %	42.70 %	98.69 %	94.08%	35.54 %	60.29 %	27.55 %	31.01 %	33.28 %
	In-vehicle (>= -85dBm)	ERODE	80.56%	88.20 %	74.70 %	97.46 %	79.45%	91.33 %	77.04 %	91.73 %	33.61 %	12.71 %
		Karikudi	68.48%	90.00 %	80.78 %	95.50 %	34.03%	76.63 %	79.41 %	51.65 %	85.35 %	9.99%
		Tanjore	84.50%	98.87 %	94.05 %	98.95 %	35.55%	67.07 %	90.17 %	62.20 %	74.52 %	11.91 %
	Outdoor- in city (>= -95dBm)	ERODE	96.26%	98.30 %	95.83 %	100.00 %	100.00%	98.85 %	96.06 %	93.86 %	97.80 %	8.22%
		Karikudi	87.76%	98.70 %	97.82 %	100.00 %	48.02%	95.78 %	95.68 %	96.65 %	98.81 %	9.74%
		Tanjore	94.88%	99.06 %	96.58 %	100.00 %	44.80%	92.67 %	99.41 %	94.99 %	98.68 %	12.32 %
1.6	Call Setup Success Rate (>=95%)	ERODE	100.00 %	99.30 %	100.00 %	99.77 %	99.20%	99.03 %	98.27 %	99.29 %	99.70 %	100.00 %
		Karikudi	99.03%	100.00 %	100.00 %	99.39 %	99.27%	98.47 %	99.31 %	100.00 %	100.00 %	100.00 %
		Tanjore	99.60%	100.00 %	100.00 %	99.04 %	99.33%	97.28 %	100.00 %	98.31 %	99.71 %	100.00 %

1.7	Hand Over	ERODE	99.56%	100.00	99.54	98.97	98.07%	100.00	99.23	100.00	100.00	100.00
				%	%	%		%	%	%	%	%
		Karikudi	100.00 %	100.00 %	100.00 %	100.00 %	99.05%	100.00 %	98.80 %	100.00 %	100.00 %	100.00 %
	Success Rate (HOSR)	Tanjore	100.00 %	100.00 %	100.00 %	98.77 %	99.43%	100.00 %	99.60 %	100.00 %	100.00 %	100.00 %
		ERODE	435	437	438	438	43500.00 %	436	435	437	433	432
		Karikudi	296	337	335	340	293	339	296	338	337	336
1.8	Km's driven	Tanjore	332	329	333	330	337	327	329	332	330	325

4.4.1 Call Attempts:-

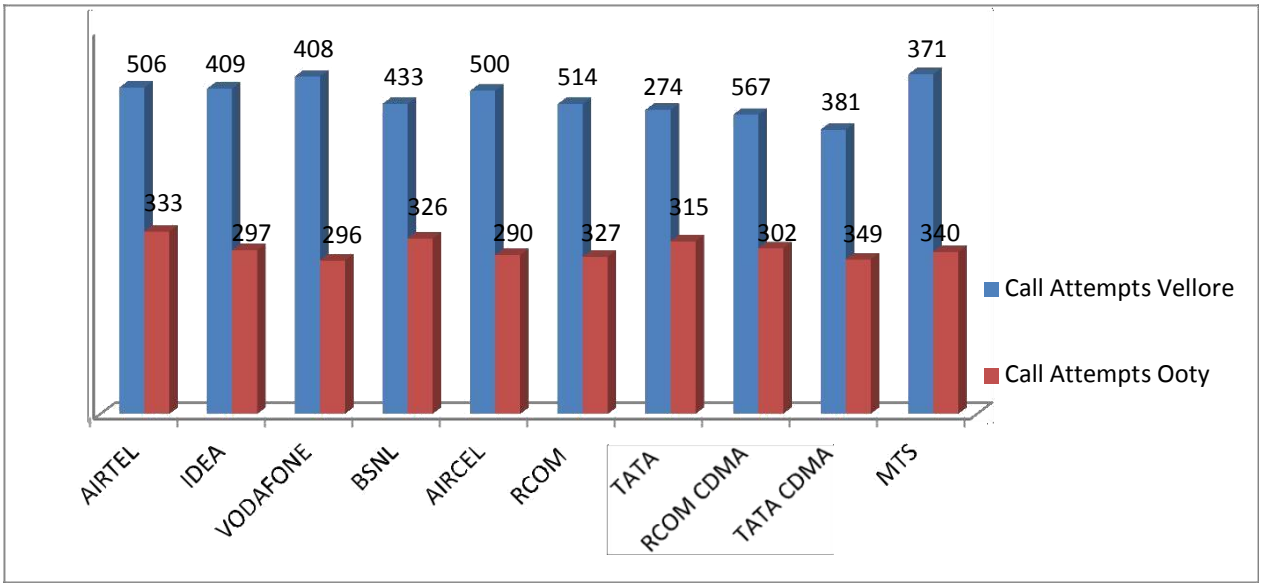


Fig.4.4.1

According to the table and the fig. 4.4.1 it shows the no. of calls attempted in Vellore, Ooty city**.**

4.4.2 Blocked Call Rate (<=3%):-

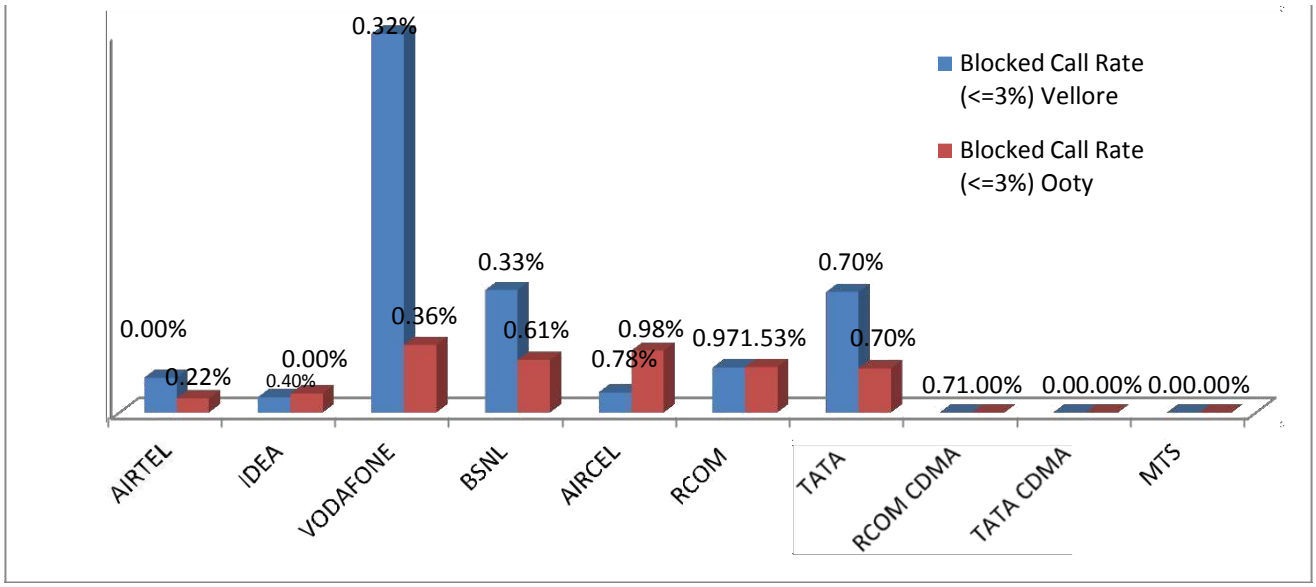


Fig.4.4.2

According to the table and the fig. 4.4.2 it shows that all service providers are meeting the benchmark for **Blocked Call Rate** in ROTN except Vodafone in Vellore.

4.4.3 Dropped Call Rate (<=2):

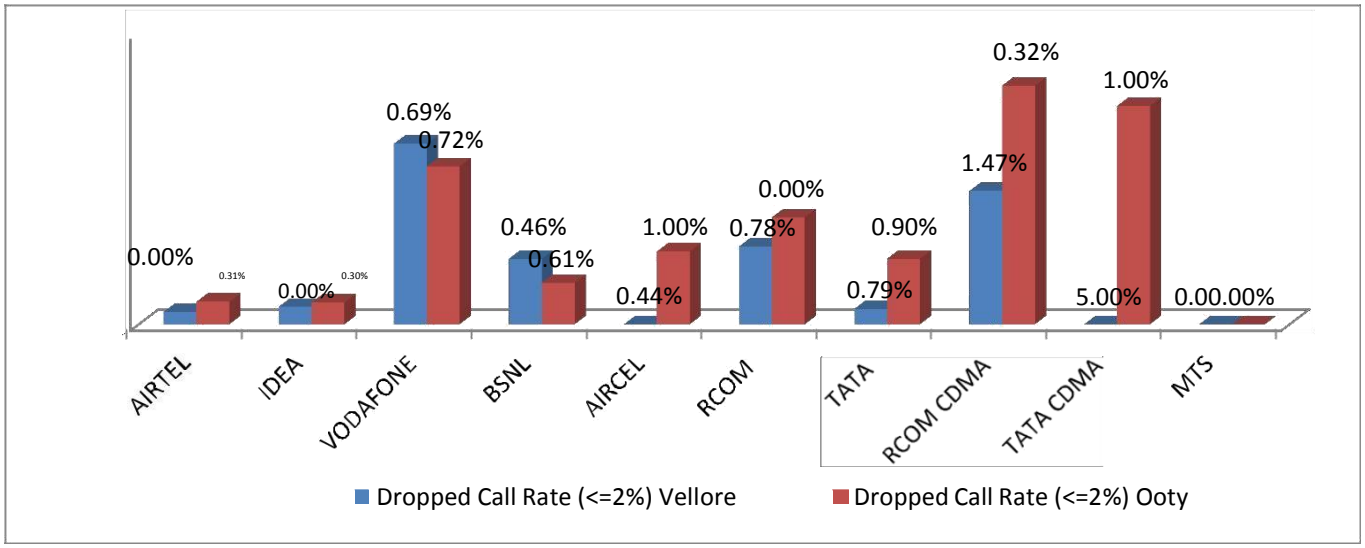
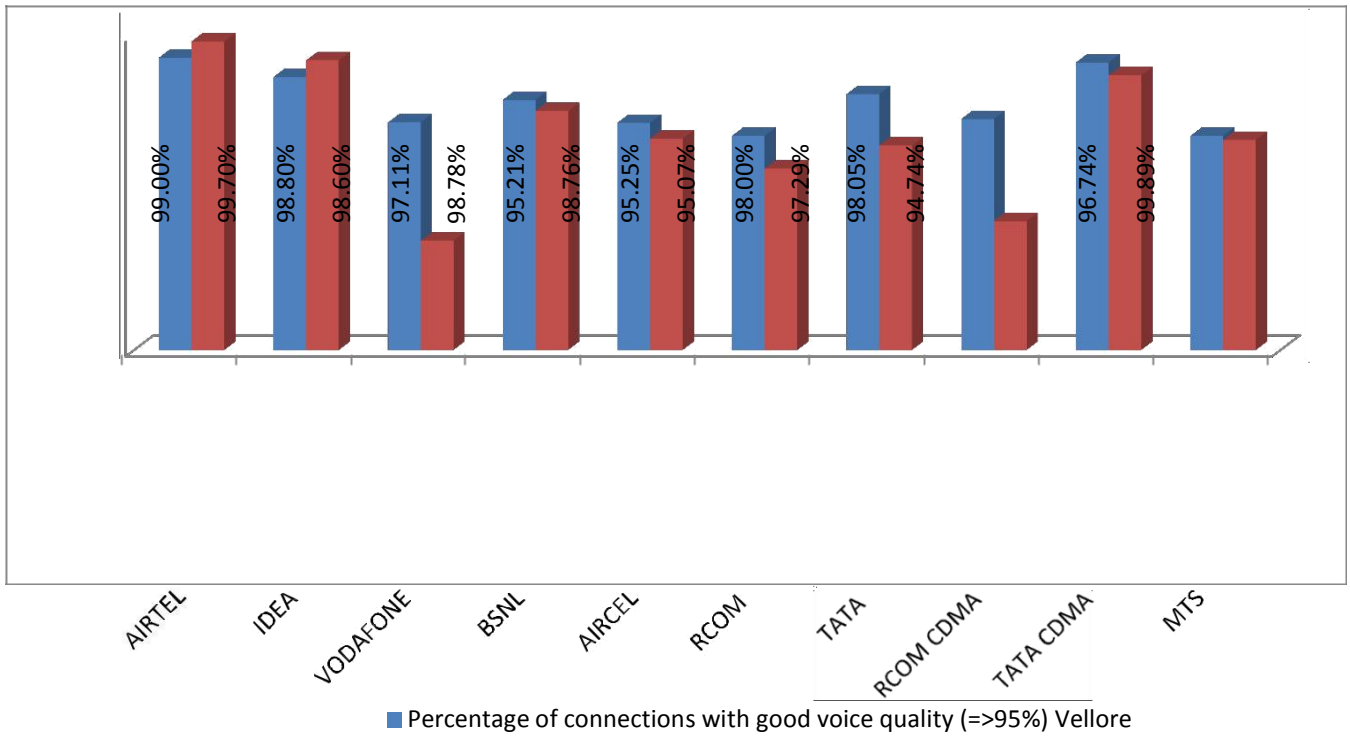


Fig. 4.4.3

- According to the table and the fig. 4.4.3 it shows that all service provider is meeting the benchmark of **Dropped Call Rate (<=2%)**in ROTN except Vodafone ,RCOM CDMA and Tata CDMA.

4.4.4 Percentage of connections with good voice quality (=>95%)



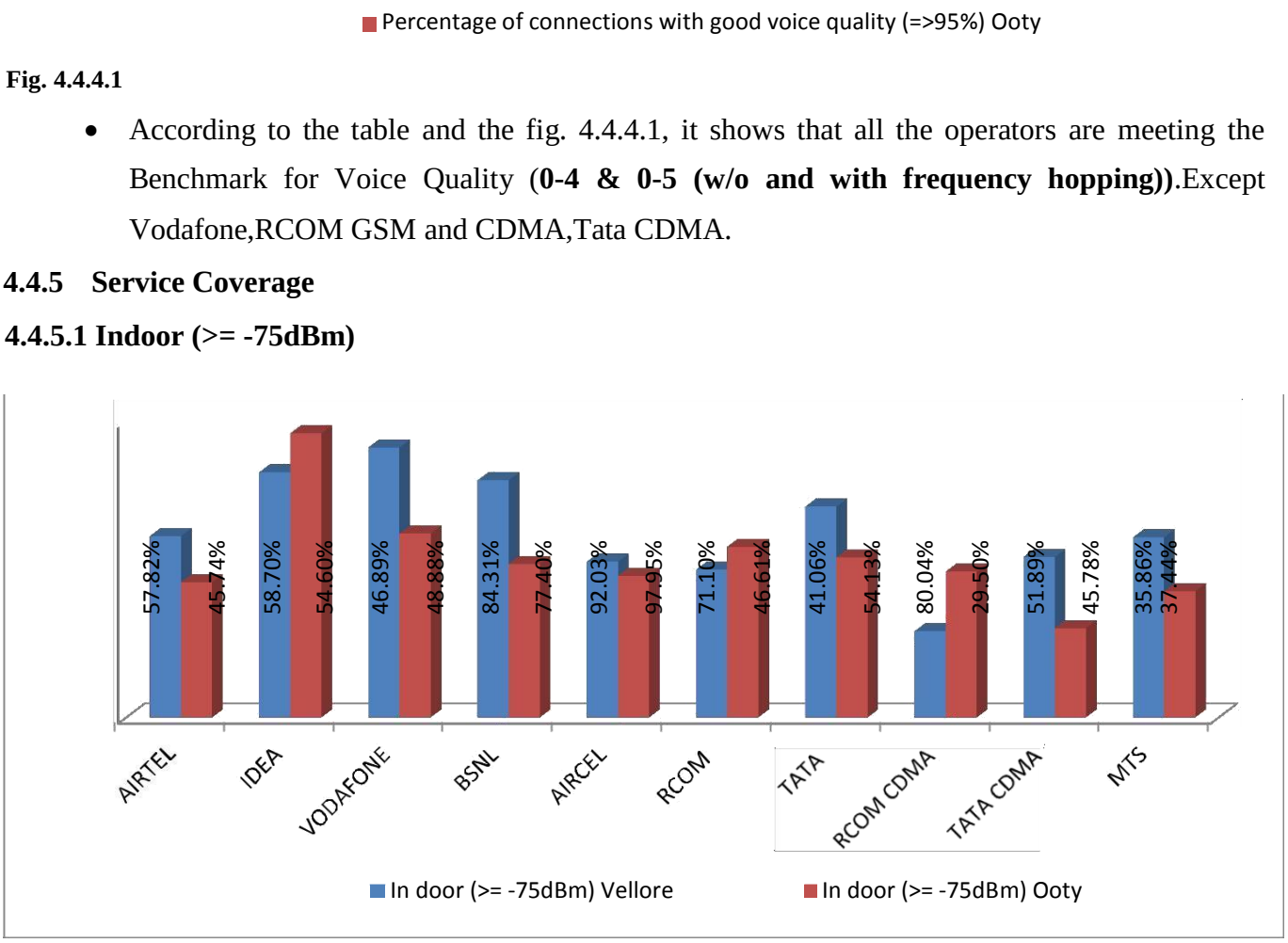


Fig. 4.4.4.1

- According to the table and the fig. 4.4.4.1, it shows that all the operators are meeting the Benchmark for Voice Quality (**0-4 & 0-5 (w/o and with frequency hopping)**).Except Vodafone,RCOM GSM and CDMA,Tata CDMA.

4.4.5 Service Coverage

4.4.5.1 Indoor (>= -75dBm)

Fig.4.4.5.1

- According to the table and the fig. 4.4.5.1, it shows the service providers service coverage with **indoor (>= -75dBm).**

4.4.5.2 In-vehicle (>= -85dBm)

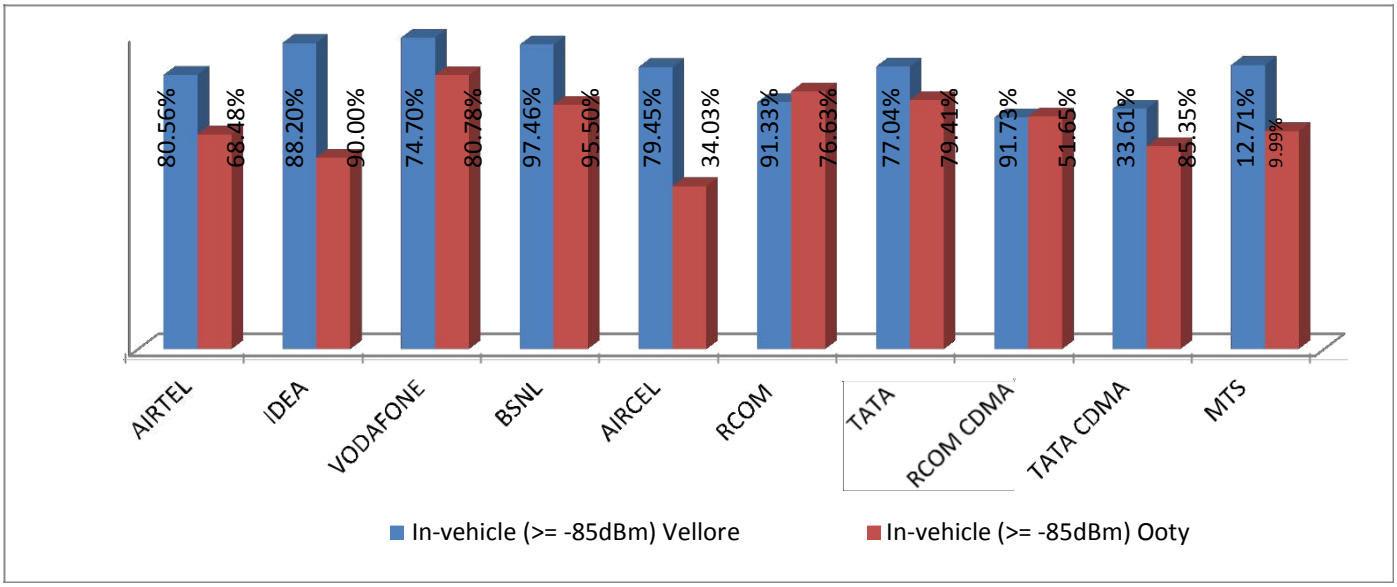


Fig. 4.4.5.2

- According to the table and the fig. 4.4.5.2, it shows the service providers service coverage with **In-vehicle (>= -85dBm)**.

4.4.5.3 Outdoor- in city (>= -95dBm):-

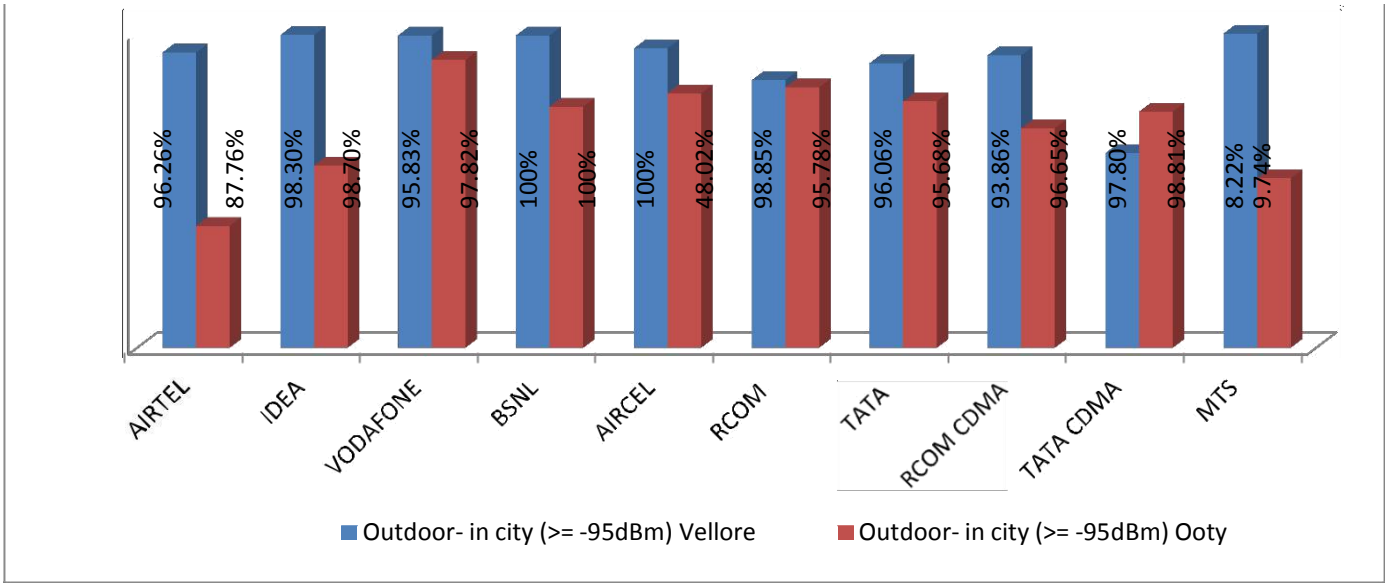


Fig. 4.4.5.3

- According to the table and the fig. 4.4.5.3, it shows the service providers service coverage with **Outdoor- in city (>= -95dBm)**.

4.4.6 Call Setup Success Rate (>=95%)

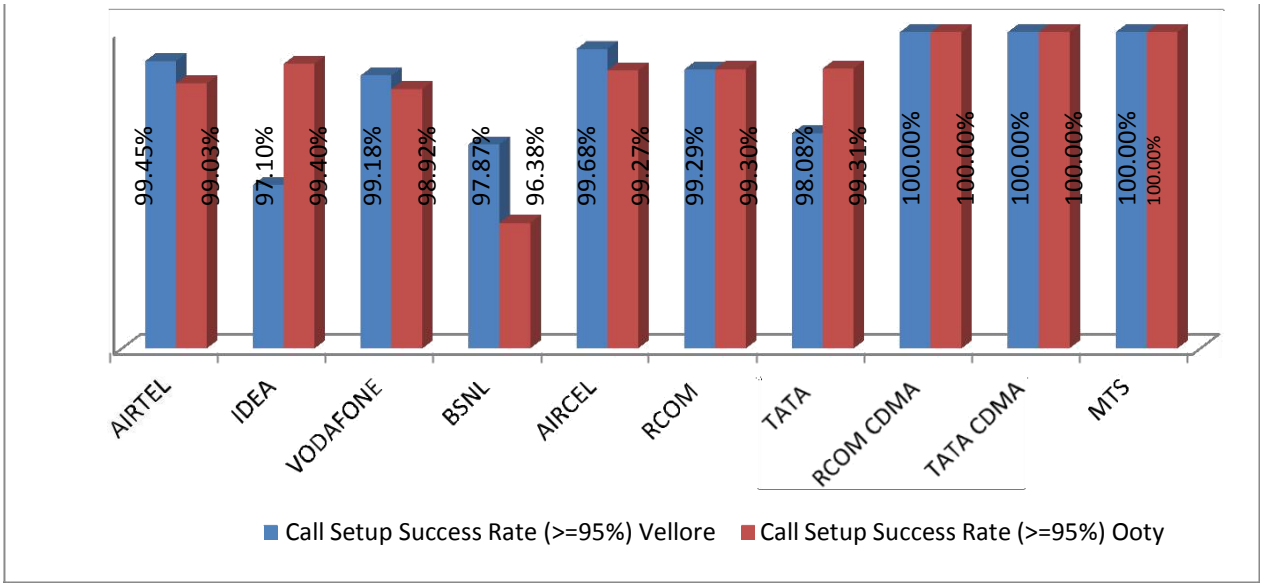


Fig. 4.4.6

According to the table and the fig. 4.4.6, it shows that all the service providers are meeting the benchmark of **Call Setup Success Rate**.

4.4.7 Handover Success Rate (HOSR):-

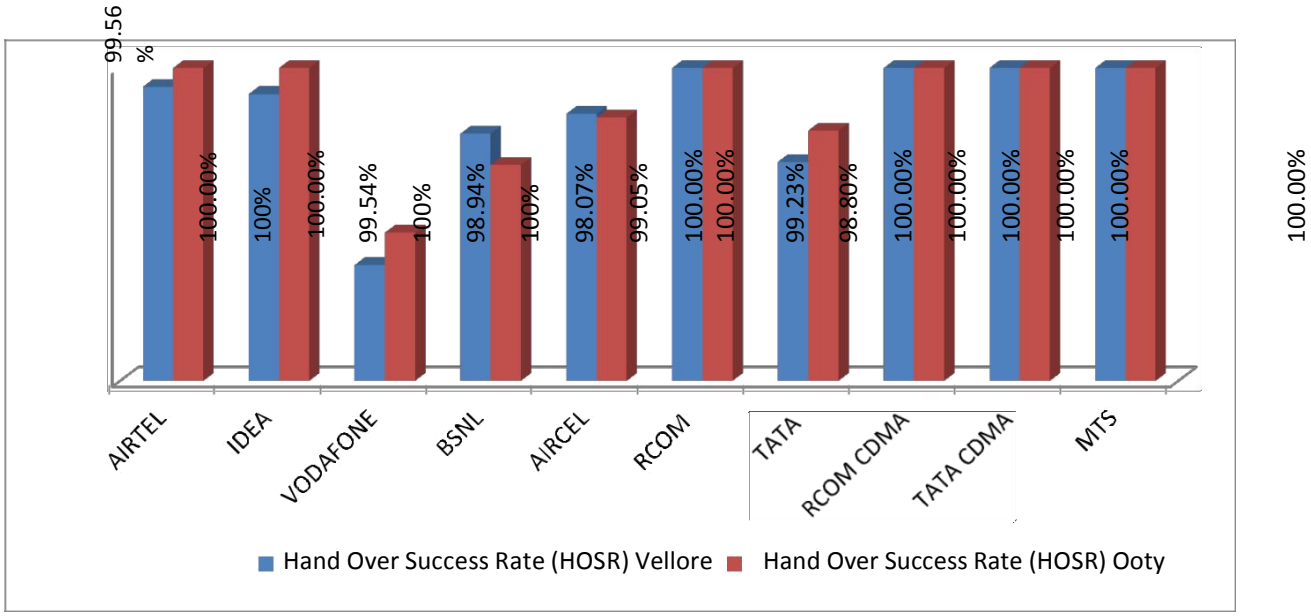


Fig.4.4.7

According to the table and the fig. 4.4.6, it shows that all the service providers are meeting the benchmark of H**OSR.**

Live Test Summary and Graphical RepresentationforQ2_TAMIL NADU Circle

JAN-MAR'16			TAMILNADU Q2(Jan-Mar'16)													
3 days Live Test Audit Data			AIRCEL 2G	AIRCEL3G	AIRTEL 2G	AIRTEL 3G	BSNL 2G	BSNL 3G	RCOM GSM	IDEA 2G	VODAFONE 2G	VODAFONE 3G	TATA GSM	TATA CDMA	RCOM CDMA	MTS
S.N	PARAMETER	BENCH MARK														
Network Availability																
1	BTS / Node-B accumulated downtime	≤ 2%	0.13	0.19	0.05	0.02	0.78	0.50	0.22	0.07	0.02	0.05	0.06	0.08	0.01	0.01
			0.12	0.21	0.07	0.03	0.79	0.52	0.21	0.06	0.03	0.06	0.07	0.09	0.02	0.02
			0.12	0.21	0.06	0.05	0.78	0.49	0.22	0.07	0.03	0.06	0.07	0.09	0.02	0.01
	Worst affected BTS/Node-B due to	≤ 2%	0.40	0.79	0.36	0.15	1.88	1.88	0.00	0.04	0.05	0.12	0.01	0.00	0.00	0.00
			0.41	0.79	0.36	0.18	1.87	1.85	0.00	0.04	0.06	0.11	0.01	0.00	0.00	0.00
			0.40	0.78	0.37	0.10	1.78	1.85	0.00	0.04	0.05	0.11	0.01	0.00	0.00	0.00
Connection establishment (Accessibility)																
2	Call Setup Success Rate	≥ 95%	98.56	98.97	98.67	99.83	98.70	98.52	99.91	99.73	99.53	99.84	99.51	99.06	98.19	99.55
			98.61	98.95	98.68	99.83	98.73	98.68	99.93	99.71	99.58	99.83	99.51	99.16	98.18	99.56
			98.64	98.77	98.66	99.79	98.68	98.65	99.90	99.68	99.64	99.81	99.52	99.00	98.20	99.48
	SDCCH/ Paging Channel Congestion/	≤ 1%	0.45	0.32	0.29	0.06	0.14	0.18	0.04	0.16	0.11	0.14	0.03	0.00	0.00	0.00
			0.29	0.26	0.29	0.06	0.12	0.19	0.03	0.11	0.10	0.13	0.02	0.00	0.00	0.00
			0.32	0.29	0.35	0.07	0.19	0.17	0.04	0.13	0.09	0.13	0.03	0.00	0.00	0.00
	TCH congestion/ Circuit Switched	≤ 2%	0.99	0.02	1.05	0.06	0.68	1.24	0.04	0.17	0.47	0.06	0.02	0.02	0.77	0.12
			0.94	0.02	1.03	0.07	0.65	1.16	0.04	0.17	0.42	0.05	0.02	0.01	0.78	0.13
			0.90	0.02	1.07	0.12	0.76	1.20	0.04	0.16	0.36	0.07	0.02	0.01	0.75	0.13
Connection Maintainability (Retain ability)																
3	Call Drop Rate/Circuit Switched Voice Drop	≤ 2%	0.70	0.44	0.82	0.18	1.09	0.16	0.08	0.15	0.56	0.21	0.61	0.33	0.13	0.40
			0.71	0.44	0.72	0.18	1.15	0.17	0.08	0.20	0.57	0.20	0.58	0.27	0.13	0.40
			0.71	0.44	0.73	0.18	1.09	0.14	0.08	0.17	0.60	0.21	0.59	0.34	0.12	0.45
	Worst affected cells having more than	≤ 3%	5.55	4.93	3.33	1.31	1.92	0.87	0.43	0.78	2.02	1.47	2.73	1.77	0.64	2.76
			5.43	4.99	3.29	1.31	2.05	0.88	0.42	0.89	2.03	1.50	2.63	1.60	0.63	2.75
			5.49	5.01	3.25	1.36	2.09	0.88	0.45	0.83	2.02	1.54	2.82	1.73	0.66	2.87
	% of Connections with good voice	≥ 95%	96.61	99.41	98.21	99.39	96.85	99.69	99.44	98.35	98.14	99.09	98.70	98.86	98.54	99.21
			95.57	99.44	98.21	99.35	96.71	99.69	99.44	98.31	98.12	99.13	98.72	99.01	98.54	99.20
			96.52	99.43	98.22	99.32	96.76	99.68	99.43	98.34	98.03	99.14	98.70	98.68	98.50	99.20
	Point of Interconnections (POI) congestion (	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Finding & Critical Analysis:

- Airtel 2G ,Aircel (2G,3G) operators are not meeting the benchmark of **worst affected cells having more than3% TCH drop (call drop) rate.**

Network Availability

4.5.1.1 BTS accumulated downtime (≤ 2%)

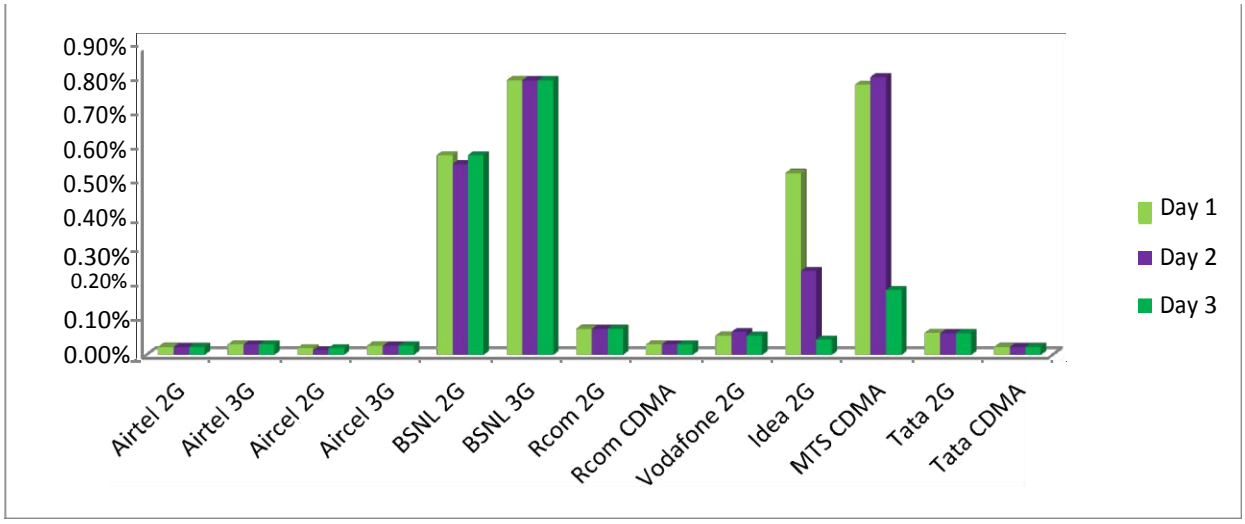


Fig. 4.5.1.1

All operators are meeting the TRAI benchmarks for **BTS accumulated downtime(≤2%)**for 3 days live data taken in the month of audit.

4.5.1.2 Worst affected BTS due to downtime (≤ 2%)

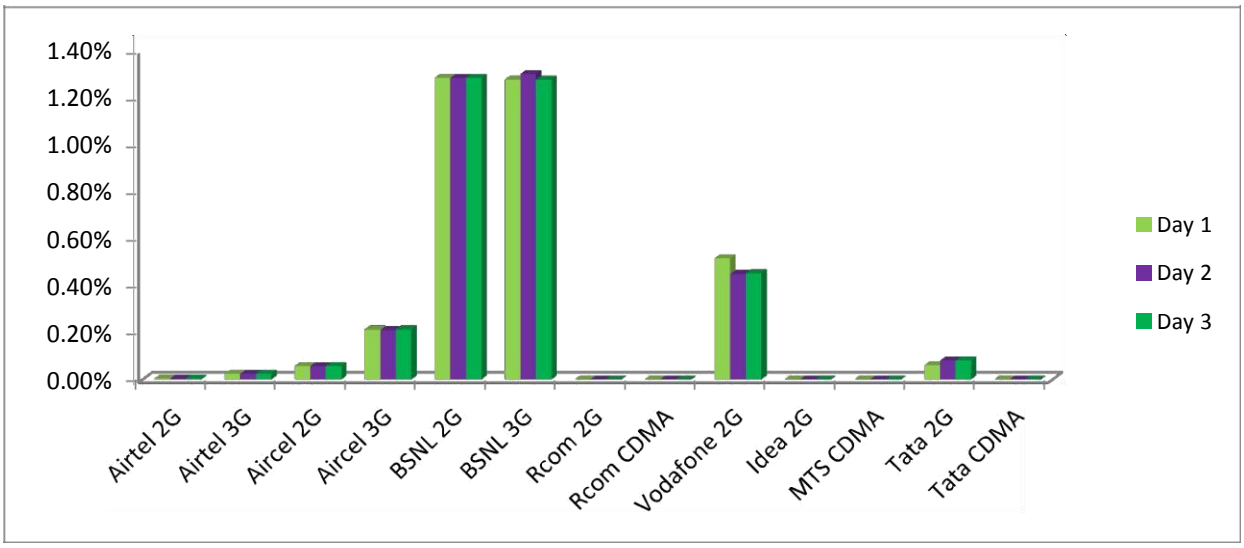


Fig. 4.5.1.2

All operators are meeting the TRAI benchmarks for **worst affected BTS due to downtime(≤2%)** for 3 days live data taken in the month of audit.

4.5.2 Connection establishment (Accessibility)

4.5.2.1 Call Setup Success Rate≥ 95%

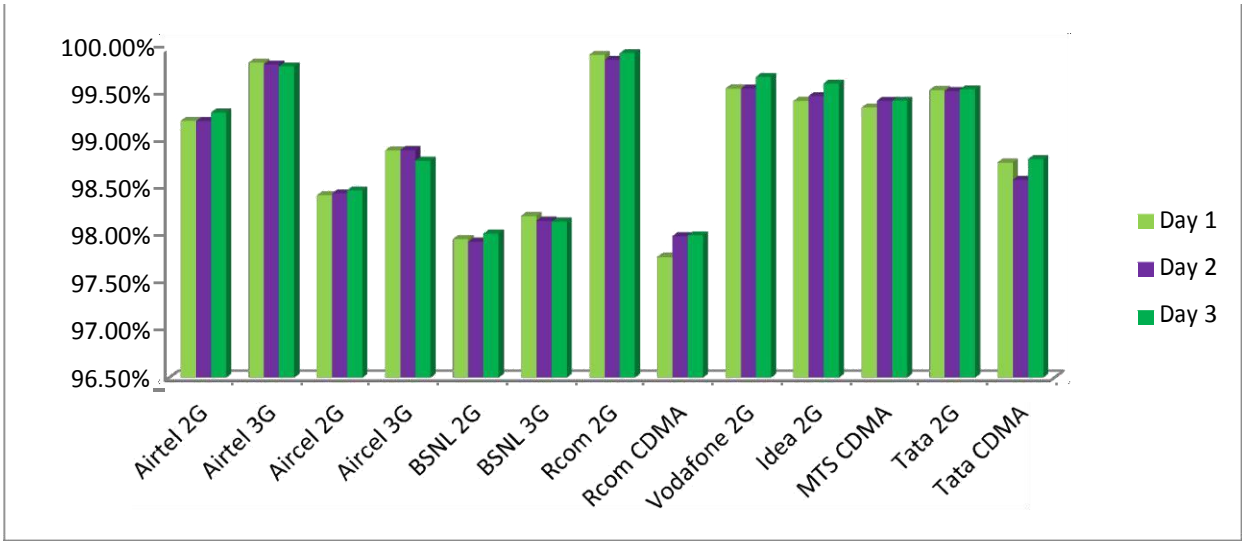


Fig. 4.5.2.1

All operators are meeting the TRAI benchmarks for **Call Setup Success Rate≥95** for 3 days live data taken in the month of audit.

4.5.2.2 SDCCH/ Paging Channel Congestion ≤ 1%

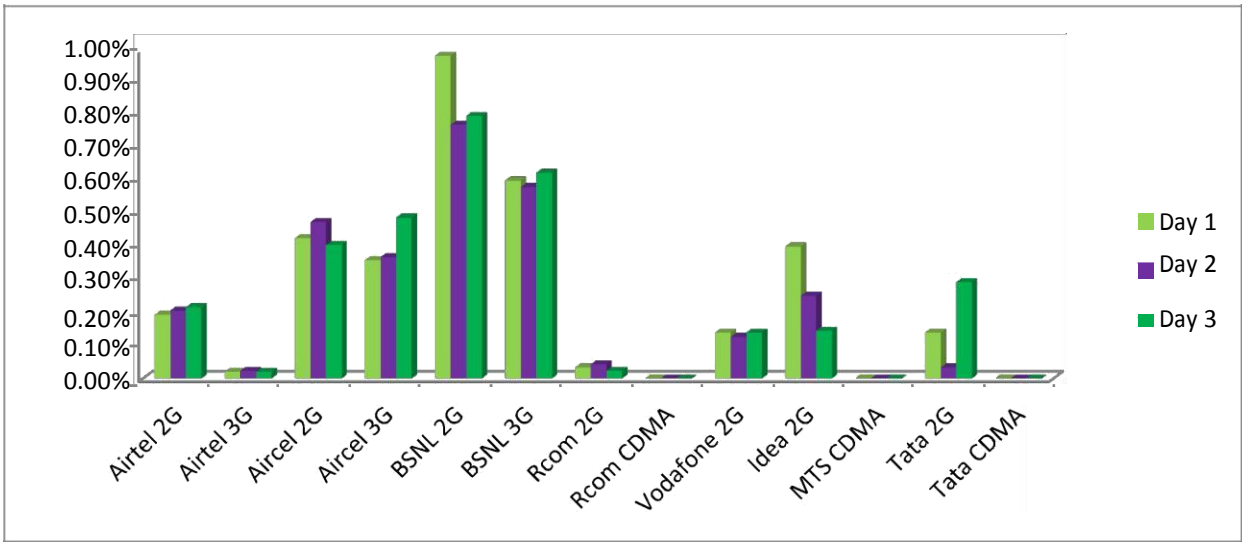


Fig. 4.5.2.2

All operators are meeting the TRAI benchmarks **SDCCH/ Paging Channel Congestion≤1** for 3 days live data taken in the month of audit.

4.5.2.3 TCH congestion ≤ 2%

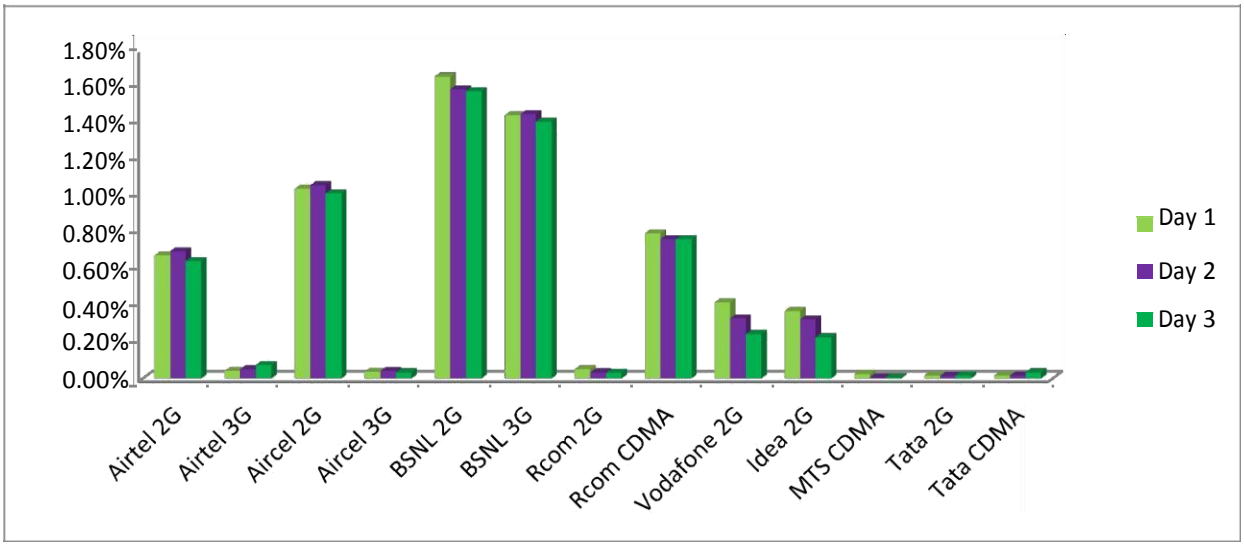


Fig. 4.5.2.3

All operators are meeting the TRAI benchmarks for **TCH congestion≤ 2%** for 3 days live data taken in the month of audit.

4.5.3 Connection Maintainability (Retain ability)

4.5.3.1 Call Drop Rate ≤ 2%

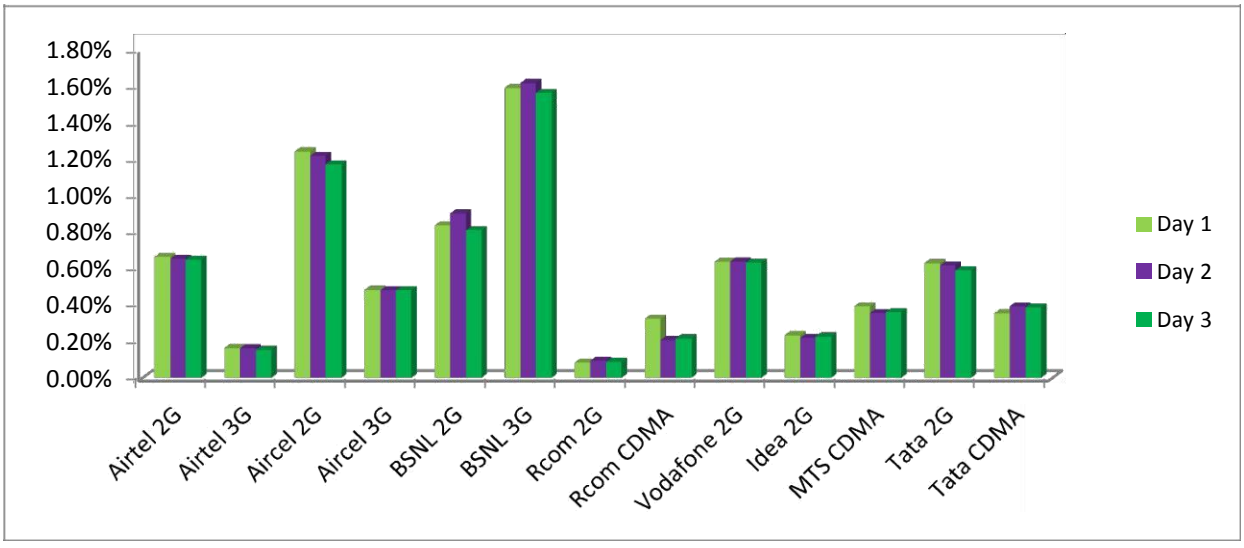


Fig. 4.5.3.1

All operators are meeting the TRAI benchmarks for **Call Drop Rate≤ 2%** (<=2%) for 3 days live data taken in the month of audit.

4.5.3.2 Worst affected cells having more than 3% TCH drop (call drop) rate

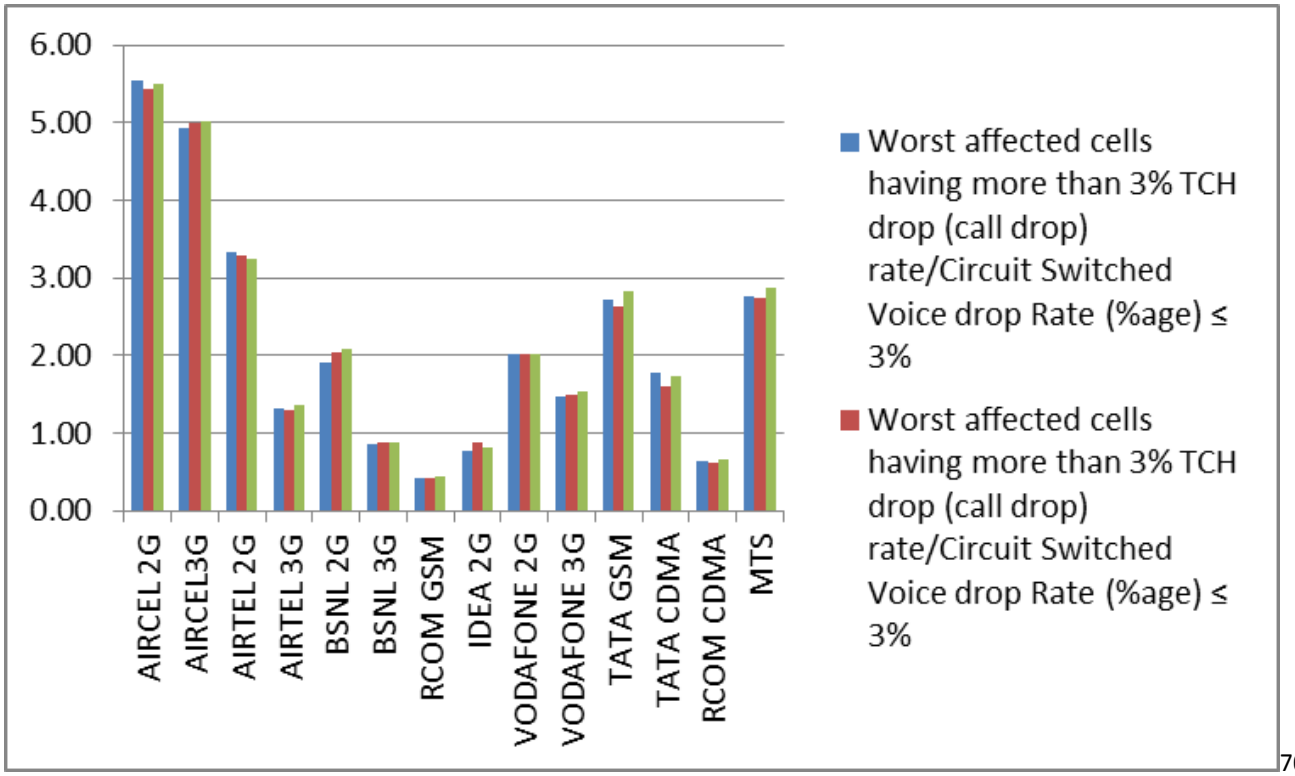


Fig. 4.5.3.2

All operators meeting the benchmark for **worst affected cells having more than 3% TCH drop (calldrop) rate**. Except Airtel,Aircel,Tata.

4.5.3.2 % of Connections with good voice quality ≥ 95%

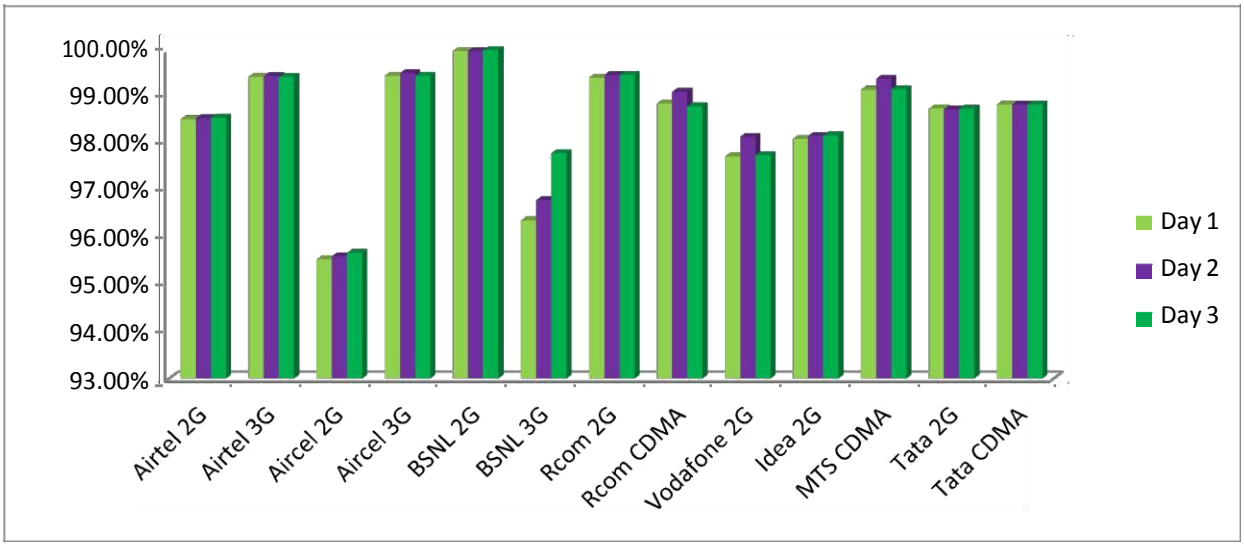


Fig. 4.5.3.3

All operators are meeting the TRAI benchmarks "**% of Connections with good voice quality ≥ 95%"** for 3 days live data taken in the month of audit.

4.5.3.4 Point of Interconnections (POI) congestion (on individual POI) ≤ 0.5%

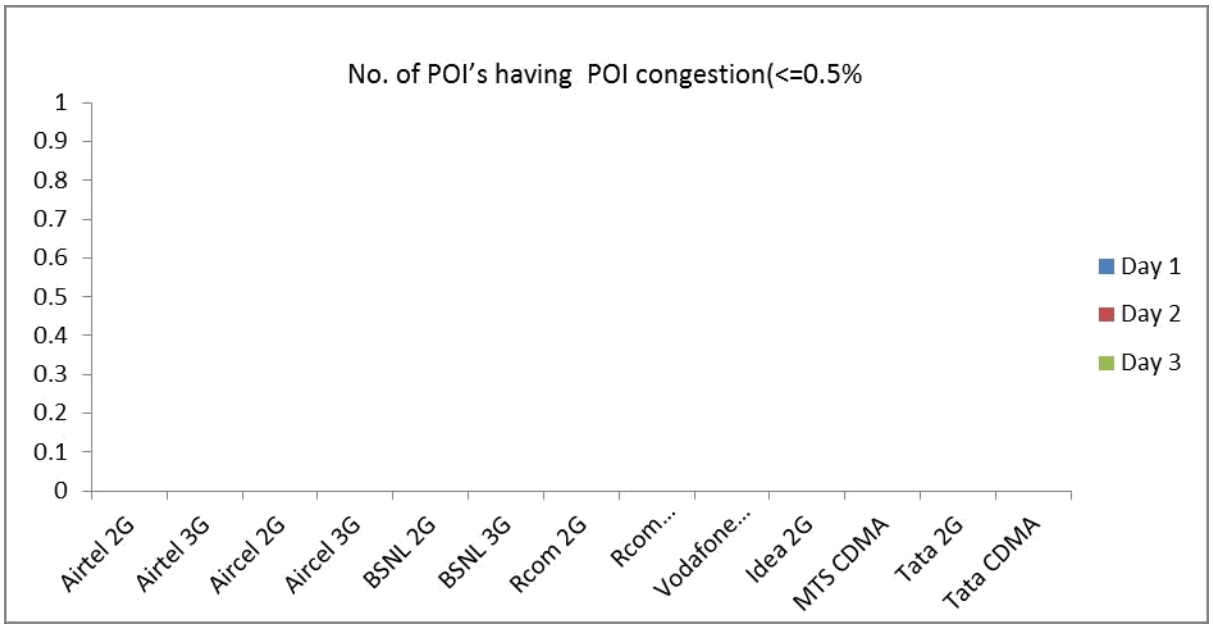


Fig. 4.5.3.4

- All operators are meeting the TRAI benchmarks **Point of Interconnections (POI) congestion(on individual POI) ≤ 0.5%**(≤ 0.5%) for 3 days live data taken in the month of audit.

Compliance report Status of service providers with respect to the QoS

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (TAMIL NADU) is satisfactory for Network Parameters. However, the benchmark for "**Worst affected cells having more than 3% TCH drop (call drop) rate, worst affected BTSs due to downtime**, For live test TATA &Aircel operators are not meeting the benchmarksfor worst affected cells>3% TCH drop (Call drop) rate.

Under Customer Service Quality Parameter, "From the 2nd Quarter data assessment, it is found that the performance related to customer care data is not found to be satisfactory for the parameter "calls answered operators (voice-to-voice)" for **.** Parameter "Time taken for refunds of deposits after closures" in the table 4.2.1 and the Fig.8we found that all the service providers are meeting the benchmark.

The "Metering/billing credibility – pre-paid" and post- paid benchmark is meeting by all service providers in TAMIL NADU circle.

During Operated assisted Drive Tests, Operators are meeting benchmark of **Blocked Call Rate Dropped**

Call Rate (<=2%)and meeting the Benchmark of **Voice Quality (0-5 (with frequency hopping).**

CHAPTER-7: FINDINGS AND ANALYSIS

Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

- **As per PMR Data Verification Results for-**
  - **TAMIL NADU Circle (Jan 16):-**
    - Aircel (2G&3G) & Airtel 2G service provider are not meeting the benchmark for the parameter **Worst affected cells>3% TCH drop (Call drop) rate.**
  - **TAMIL NADU Circle (Feb.'16):-**
    - Aircel (2G & 3G), operators are not meeting the benchmark for **Worst affected cells having more than 3% TCH drop (call drop) rate.**
  - **TAMIL NADU Circle (Mar'16):-**
  - Aircel(2G,3G), operators are not meeting the benchmark of **worstaffected cells having more than 3% TCH drop (call drop) rate.**

- **As per 3 Days Live Test Audit Report (2nd Quarter), TAMIL NADU Circle:**

  Verification of the Performance of Service Providers against the Quality of Service benchmarks laid down by TRAI using Live measurements for 3 days during the month in which the Audit and Assessment is carried out.

  - Aircel 2G ,Airtel (2G,3G), operators are not meeting the benchmark of **worst affected cells having more than 3% TCH drop (call drop) rate.**

- **As per Operator Assisted Drive Test:**

  The Operator Assisted Drive Test was conducted for all the Operators. Route covered was about 100 Km depending on city areas within the speed limit of 30-40 km/hour. In all the cities Zones were selected for covering different density areas (High/Medium/Low).

❖ **TAMIL NADU Circle:**

- ❖ According to the Drive test, It shows the no. of calls attempted in TAMIL NADU circle**.**
- ❖ Vodafone is not meeting the benchmark KPI for **Blocked call rate (<=3%)** in Vellore SSA.
- ❖ TATA CDMA, RCOM CDMA is not meeting the benchmark KPI for **Drop call rate (<=2%)** in Ooty SSA , Vodafone not meeting in Vellore and Ooty SSA
- ❖ Vodafone, Reliance GSM & CDMA, Tata GSM is not meeting the benchmark KPI for % of connections with good voice quality>=95% in Ooty SSA.
- ❖ According to the Drive test, It shows that all service providers are meeting the benchmark of **indoor (>= -75dBm).**
- ❖ According to the Drive test, It shows that all service providers are meeting their benchmark of

  In-vehicle (>= -85dBm).
- ❖ According to the Drive test, It shows that all service providers are meeting their benchmark of

  Outdoor- in city (>= -95dBm).

According to the Drive test, It shows that all the service providers are meeting the benchmark of **Call Setup Success Rate**

➢ **Level 1 Live Calling (EmergencyNo):-**

Level 1 calling such as calling at emergency no. like Police, Fire, and Ambulance were made so as to check the service of such short codes. In TAMIL NADU it was found to be functional.

CUSTOMER SERVICE QUALITY PARAMETERS

❖ **2nd Quarter data Assessment (TAMIL NADU Circle)**

According to the parameter metering/billing credibility post-paid we found that all the service providers are meeting the benchmark except IDEA & MTS.

- According to the parameter metering /billing credibility pre-paid we found that all the service providers are meeting the benchmark except IDEA.
- According to the parameter Resolution of billing/ charging complaints we found that all the service providers are meeting the benchmark

- According to the parameter Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints we found that all the service providers are meeting the benchmark. Except Vodafone.

- According to the parameter Accessibility of call centre/Customer Care we found that all the service providers are meeting the benchmark except Tata CDMA.

- According to the parameter % call answered by operators (voice to voice) within 60 sec we found that all the service providers are meeting the benchmark except Airtel, BSNL,Tata GSM & CDMA.

- According to the parameter no. of requests for Termination / Closure of service complied within 7 days during the quarter we found that all the service providers are meeting the benchmark

- According to the parameter Time taken for refunds of deposits after closures we found that all the service providers are meeting the benchmark except AIRCELand Vodafone.

➢ **Inter Operator Call Assessment:**

In the inter-operator call assessment test, calls were made from one operator to other operator so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in between the operators are involved and hence if any congestion is found in the network, it Nov be due to any of these parts. The result shows that there was congestion with all operators BSNL, Aircel, Idea, Rcom, Vodafone, Airtel,