WEST ZONE

TRAI AUDIT BROADBAND REPORT – MUMBAI - AUDIT OF OND QUARTER, 2015

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TRAI

सत्यमेव जयते

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

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1. INTRODUCTION

1.1 About TRAI

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace that will enable India to play a leading role in the emerging global information society. One of the main objectives of TRAI is to provide a fair and transparent policy environment which promotes a level playing field and facilitates fair competition.

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive market from a government owned monopoly. Also, the directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

TRAI initiated a regulation - The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20thMarch, 2009, the "Standards of Quality of Service for Wireless Data Services Regulations, 2012 dated 4th December 2012, and the "Quality of Service of Broadband Service Regulations", 2006 (11 of 2006) dated 6th October, 2006 that provide the benchmarks for the parameters on customer perception of service to be achieved by service provider.

In order to assess the above regulations, TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

1.2 OBJECTIVES

The primary objective of the Audit module is to:

- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).

1.3 COVERAGE

The broadband audit was conducted in Mumbai circle. For MTNL, a geographical spread among the SDCAs and POPs was maintained. For other operators, the audit was conducted for all SDCAs at overall level.

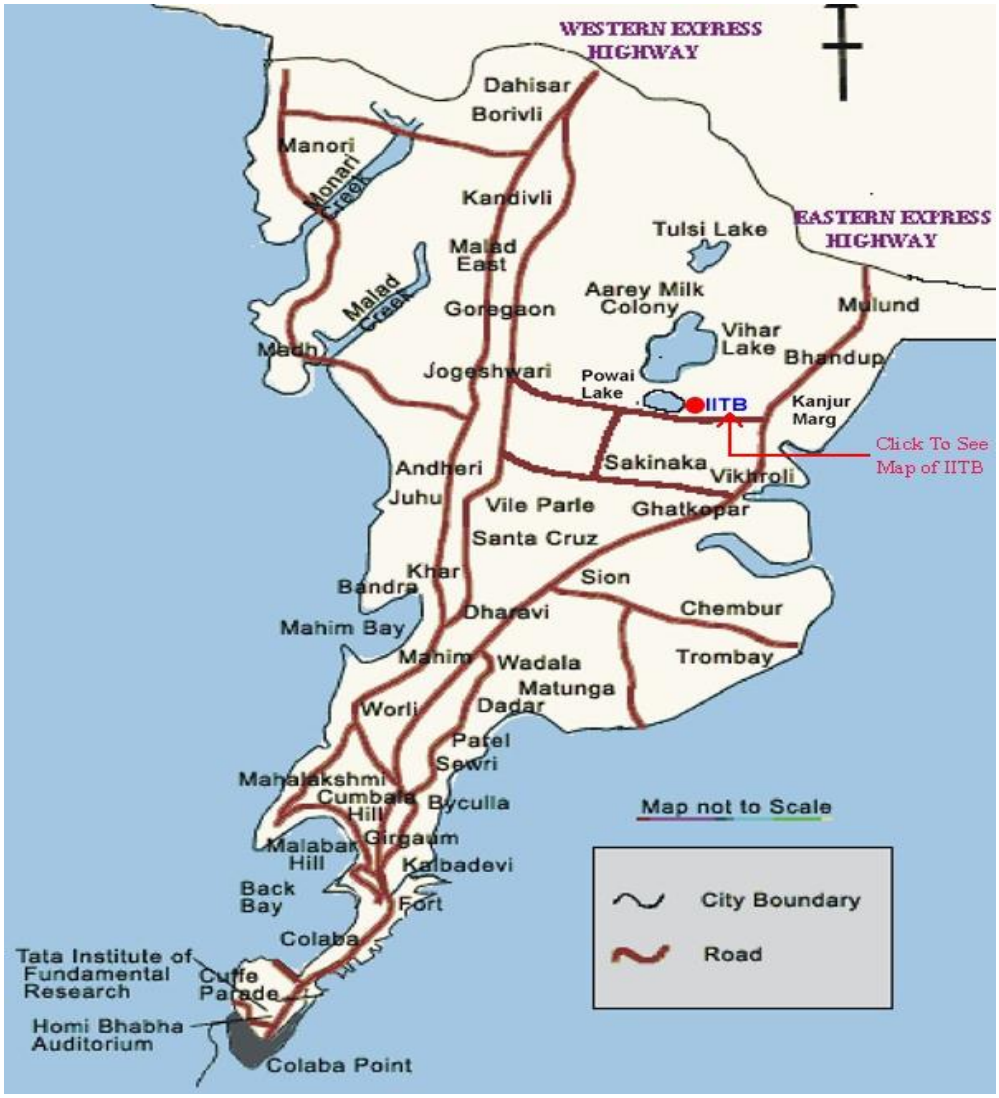


Image Source: Internet

1.4 AUDIT PROCESS AND OPERATOR SELECTION

As per TRAI guidelines, the Broadband Audit for a circle is conducted once every year.

- The operators have been assimilated as per TRAI guidelines given in QoS tender document 2015 and latest list of licensees (with more than 10,000 subscriber in their LSAs) provided by TRAI.

- To conduct the audit, IMRB auditors contacted the broadband operators given in the list below to conduct the audit in Mumbai circle for the OND 2015 quarter.
    - MTNL
    - Broadband Pacenet

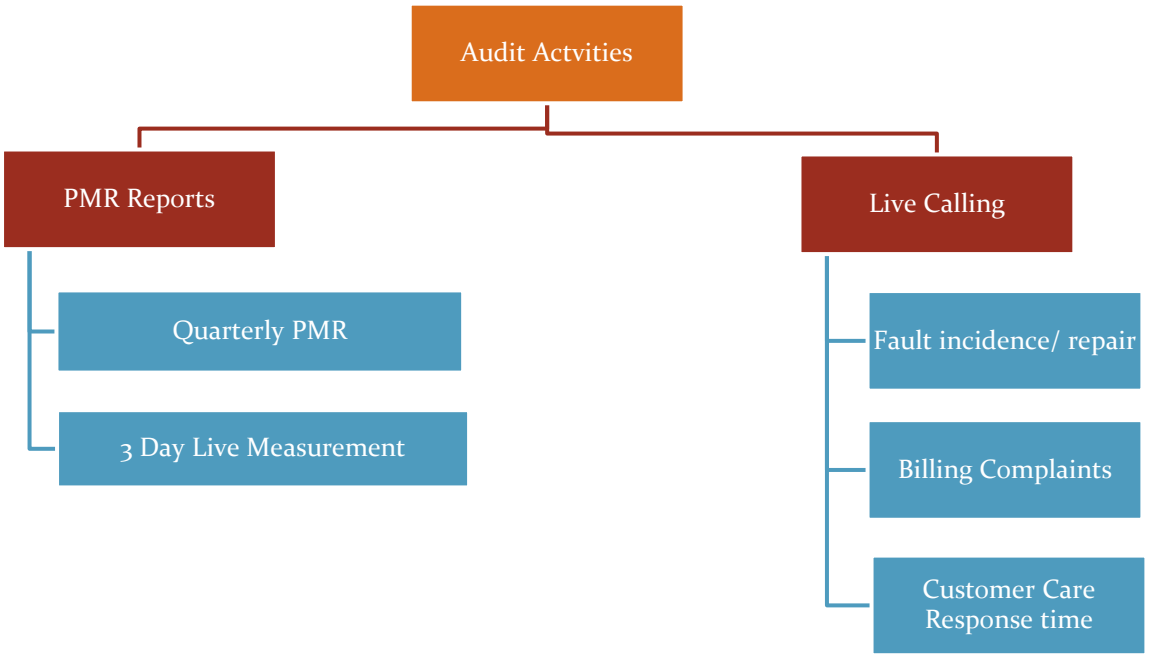
- Citycom
- D-voice
- Five Network
- Hathway
- Honesty Net
- Indus Media
- Syscon
- Reliance
- Tata Communications
- Tata Teleservices
- Siti Cable
- You Broadband

- The PMR was generated from the raw data pertaining to Oct, Nov and Dec 2015 (OND'15), which was extracted by auditor from the operator's systems during the audit conducted in the month of Jan 2016.

- Live calling activity was carried out during the period of Dec 2015. The data considered for live calling was for the month prior to the live calling month. In this round of audit, Nov 2015 data was considered for live calling for all operators.

- 3 day live measurement activity was carried out on working days during the month of Dec 2015. The data for the last three working days from the date of live measurement was extracted from operator's systems and audited by the auditors.

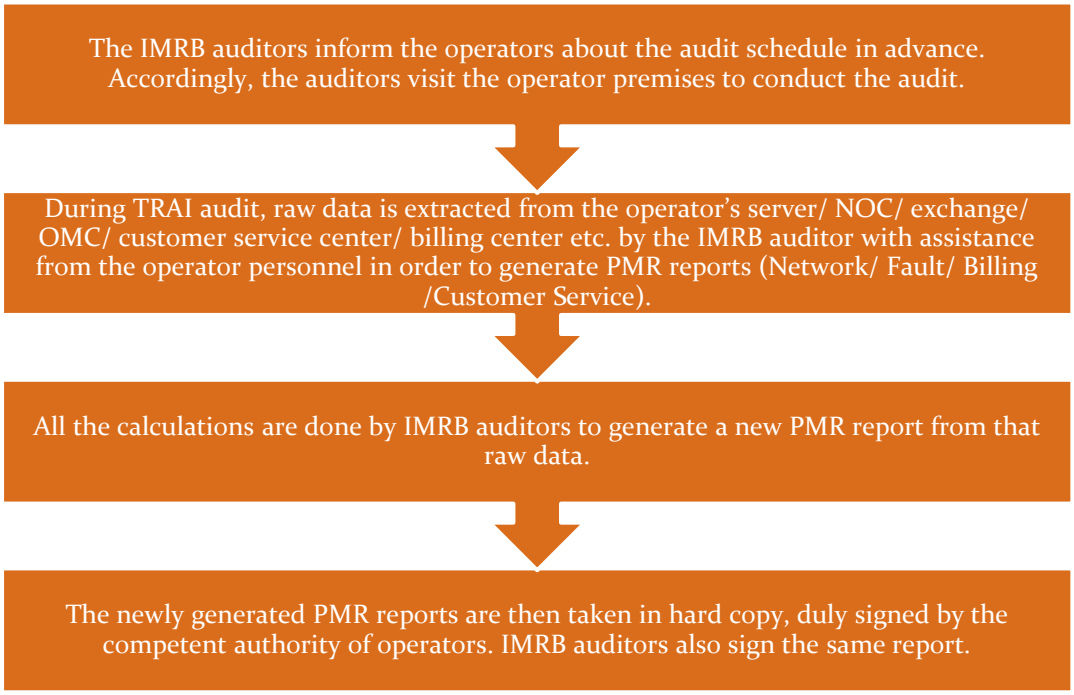
1.5 FRAMEWORK USED



1.5.1 PMR REPORTS - SIGNIFICANCE AND METHODOLOGY

The significance of PMR or Performance Monitoring Reports is to assess the various Quality of Service (QoS) parameters involved in the Broadband services, which indicate the overall health of service for an operator.

To verify the QoS performance of the operators, TRAI has appointed IMRB as their auditor in East Zone to conduct QoS audit of operators. The steps involved in the audit have been given below.



The raw data extracted is then used to generate PMR reports in the following formats.

- Quarterly PMR
- 3 Day Live Measurement Data

Let us understand these formats in detail.

This report has been prepared from the raw data extracted for the period of OND'15 during Jan 2016.

1.5.1.1 QUARTERLY PMR REPORT – PARAMETERS REVIEWED

The main purpose of quarterly PMR report is to verify the following key QoS parameters on quarterly basis as per the methodology stated above in section 1.4.

- Service Provisioning
- Fault incidence/clearance related statistic
- Billing Performance (Metering and billing credibility)
- Resolution of billing complaints
- Response time to customer for assistance
- Bandwidth Utilization
- Broadband download speed
- Service Availability/ Uptime
- Network Latency/ Packet Loss

1.5.1.2 3 DAY LIVE MEASUREMENT - SIGNIFICANCE AND METHODOLOGY

The main purpose of 3 day live measurement is to evaluate the following parameters on intraday basis. The auditors visit the sample exchanges (in case of MTNL) and main exchanges (in case of other operators) to collect the 3 day live data for the following parameters.

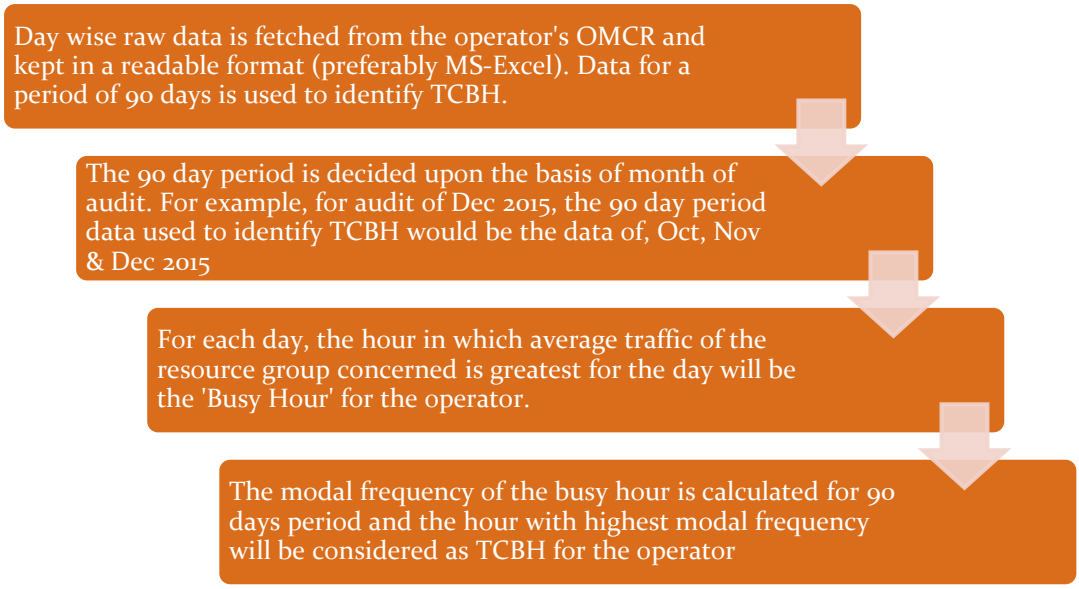
- Bandwidth Utilization
- Broadband download speed
- Service Availability/ Uptime
- Network Latency/ Packet Loss

While the quarterly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the above given parameters. All the calculations are then done on the basis of that raw data of 3 days.

1.5.1.3 TCBH – SIGNIFICANCE AND SELECTION METHODOLOGY

As per Quality of Service of Broadband Service Regulations", 2006 (11 of 2006), Time Consistent Busy Hour" or "TCBH" means the one hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration and such Time Consistent Busy Hour shall be established on the basis of analysis of traffic data for a period of ninety days.

Step by step procedure to identify TCBH for an operator:



During audit, the auditors identified following TCBHs from the raw data collected from the operators for the quarter of OND'15.

BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	YOU
11:00 - 12:00	18:00 - 19:00	15:00 - 16:00	18:00 - 19:00	19:00-20:00	18:00 - 19:00	19:00-20:00	19:00-20:00	18:00 - 19:00	18:00 - 19:00	18:00 - 19:00	20:00 - 21:00

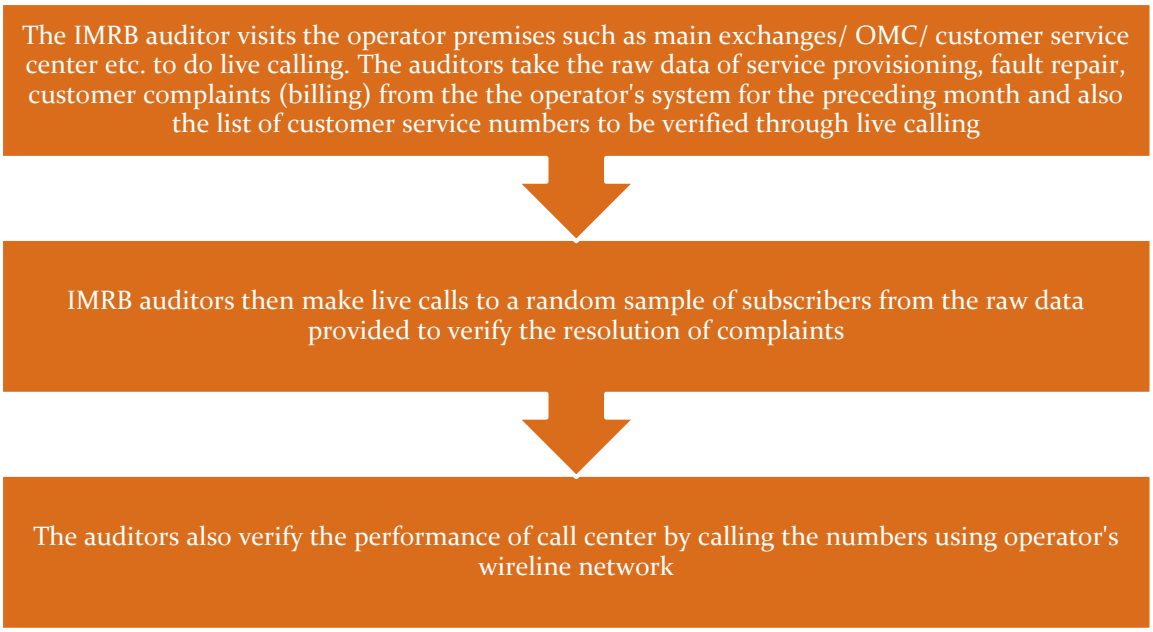
The data for network parameters has been taken as per the TCBH identified by the auditor for the operators.

1.5.2 LIVE CALLING - SIGNIFICANCE AND METHODOLOGY

The main purpose of live calling is to verify the performance of following parameters by doing test calls to the subscribers/ specific numbers.

- Service Provisioning
- Fault incidence/clearance related statistic
- Resolution of billing complaints
- Response time to customer for assistance

The process of conducting live calling has been stated below.



Let us now discuss the methodology of live calling for each parameter in detail.

1.5.2.1 SERVICE PROVISIONING

Live calling for service provisioning is done to verify the following.

- Number of connections provided in 15 days from customer request

Live Calling Process:

- Auditors request the operator to provide the database of all the subscribers who requested for a new connection in one month prior to IMRB auditor visit
- 100 Calls per service provider are made to customers or in case of MTNL, 10% or 30 per SDCA by randomly selecting from the database provided by operator
- Auditors check and record whether the connection was provided to customers within the timeframes as mentioned in the benchmark

Benchmark:

- New connections provided within 15 days: 100%

1.5.2.2 FAULT CLEARANCE

Live calling for fault clearance is done to verify the following.

- Fault repair by next working day
- Fault repair within 3 working days

Live Calling Process:

- Auditors request the operator to provide the database of all the subscribers who reported Faults in one month prior to IMRB auditor visit
- Calls are made to up to 10% or 100 complainants, whichever is less, per service provider or in case of MTNL, if there are more than 1 SDCAs selected for the sample, 10% or 30 complainants per sample SDCA by randomly selecting from the list provided by operator.
- Auditors check and record whether the fault was corrected within the timeframes as mentioned in the benchmark

Benchmarks:

- Fault repair by next working day: =>90%
- Fault repair within 3 working days: =>99%

1.5.2.3 RESOLUTION OF BILLING COMPLAINTS

Live calling is done to verify Resolution of billing complaints within stipulated time. The process for this parameter is stated below.

- Auditors request the operator provided the database of all the subscribers who reported billing complaints in one month prior to IMRB auditor visit. In case of MTNL, data for the complaints from the subscribers belonging to the sample exchanges is requested specifically
- A sample of 10% or 100 complainants, whichever is less, is selected randomly from the list provided by operator
- Calls are made by auditors to the sample of subscribers to check and record whether the complaint was resolved within the timeframes as mentioned in the benchmark.

Benchmarks:

98% complaints resolved within 4 weeks, 100% complaints resolved within 6 weeks

1.5.2.4 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

Live calling is done to verify response time for customer assistance is done to verify the performance of call center in terms of

- % age of calls answered by operator (voice to voice) within 60 seconds: In 60% of the cases or more
- % age of calls answered by operator (voice to voice) within 90 seconds: In 80% of the cases or more

The process for this parameter is stated below.

- Overall sample size was 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1000 HRS to 1300 HRS and 50 calls between 1500 HRS to 1700 HRS.
- Time to answer the call by the operator was assessed from the time interviewer pressed the requisite button for being assisted by the operator.
- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.

1.6 COLOUR CODE TO READ THE REPORT

Not Meeting the benchmark

1.7 AUDIT METHODOLOGY

As per audit tender, following table explains the audit methodology for Broadband services. Here, a YES signifies that the mentioned parameter gets audited by the given audit method (PMR/ Live Measurement/ Live Calling).

	Parameters	Quarterly PMR Data	3 day live measurement	Live calling
1	**Service Provisioning/ Activation time**	YES		YES
2	**Fault Repair/ Restoration Time**	YES		YES
3	**Billing Performance**			
(i)	Billing Complaints per 100 Bills issued	YES		
(ii)	%age of billing complaints resolved in four weeks	YES		Yes
(iii)	Refund of deposits after closure within 60 days	YES		
4	**Response time to the customer for assistance(Voice to Voice)**			
(i)	*Within 60 seconds > 60%*	YES		YES
(ii)	*Within 90 seconds > 80%*	YES		YES
5	**Bandwidth Utilization/ Throughput:**			
	A) Bandwidth Utilization			
-	POP to ISP gateway Node [Intra – network] Links	YES	YES	
-	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for international connectivity	YES	YES	
	B) Broadband Connection Speed (Download)	YES	YES	
6	**Service Availability/Uptime**	YES	YES	
7	**Packet Loss**	YES	YES	
8	**Network Latency for wired broadband access)**			
(i)	*User reference point at POP / ISP Gateway Note to International Gateway (IGSP/NIXI)*	YES	YES	
(ii)	*User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)*	YES	YES	
(iii)	*User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)*	YES	YES	

1.8 EXECUTIVE SUMMARY

1.8.1 PMR QUARTERLY DATA – OND'15

Parameters	Benchmarks	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Service provsioning uptime																
Percentage connections provided within 15 days	100%	100.00%	100.00%	100.00%	100.00%	98.47%	100.00%	95.75%	99.88%	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%
Fault repair restoration time																
Percentage faults repaired by next working days	≥ 90%	97.46%	94.93%	97.59%	NP	87.89%	84.39%	99.61%	91.87%	52.71%	100.00%	90.26%	100.00%	90.44%	86.18%	98.08%
Percentage faults repaired within three working days	≥ 99%	99.87%	99.32%	99.52%	NP	94.01%	95.60%	100.00%	97.09%	86.14%	100.00%	99.09%	100.00%	96.37%	95.73%	100.00%
Billing performance																
Billing complaints per 100 bills issued	< 2%	0.00%	0.35%	0.00%	NA	1.02%	NA	NA	0.00%	NA	0.24%	0.61%	NA	0.15%	0.22%	1.50%
%age of billing complaints resolved in 4 weeks	≥ 98%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%	100.00%
%age of billing complaints resolved in 6 weeks	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%	100.00%
%age cases in which refund of deposits after closure was made in 60 days	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	NA	NA	100.00%	100.00%	NA	100.00%	100.00%	100.00%
Customer care/helpline assessment (Voice to Voice)																
Percentage calls answered within 60 seconds	≥ 60%	95.05%	89.97%	98.08%	NP	86.56%	NP	100.00%	74.10%	100.00%	95.03%	67.22%	94.37%	87.38%	75.25%	89.21%
Percentage calls answered within 90 seconds	≥ 80%	97.24%	92.05%	100.00%	NP	89.95%	NP	NP	83.54%	NP	95.59%	81.92%	100.00%	88.89%	80.53%	90.88%
Bandwidth utilisation/Throughput																
Intra network links (POP to ISP Node)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percentage bandwidth utilised on upstream links	< 80%	11.01%	21.76%	72.70%	66.80%	62.81%	81.85%	NP	52.99%	88.59%	17.52%	70.16%	45.53%	40.90%	77.26%	NP
Broadband download speed	≥ 80%	100.00%	91.67%	26.63%	NP	92.50%	89.32%	NP	NP	91.50%	89.46%	94.33%	82.50%	93.60%	97.23%	87.50%
Service availability/uptime	≥ 98%	99.99%	99.44%	100.00%	NP	99.29%	100.00%	100.00%	99.91%	99.27%	99.47%	100.00%	100.00%	98.68%	99.42%	99.45%
Packet loss	< 1%	0.01%	0.05%	0.50%	NP	0.72%	1.16%	NP	0.00%	0.00%	0.52%	0.00%	0.00%	0.00%	0.10%	0.00%
Network Latency																
POP/ISP Node to NIXI	< 120 msec	29.69	4.35	2	NP	1	30	NA	1	9	16	NA	1.86	1	68.47	8.2
ISP node to NAP port (Terrestrial)	< 350 msec	62.22	167.8	NA	NP	90	65.97	NP	271.95	174	17.33	NA	NA	258	200.95	276.78

The objective assessment of Quality of Service (QoS) carried out by IMRB gives an insight into the overall broadband performance of various operators with a parameter wise performance evaluation as compared to TRAI benchmark.

NA: Parameters not applicable for the operators.

Following are the parameter wise observations for the operators in Mumbai circle.

1.8.1 SERVICE PROVISIONING/ ACTIVATION TIME

As per audit, all operators met the benchmark for providing new connections within 15 days except Hathway, Indus Media and MTNL.

NA: In the audit period, no new connection was registered with Reliance.

1.8.2 FAULT REPAIR/ RESTORATION

The benchmark of repairing 90% faults within the next day was not met by Hathway, Honesty Net, Pacenet and TTL.

The benchmark of repairing 99% faults within next three days of receiving complaints was not met by Hathway, Honesty Net, MTNL, TCL, Pacenet and TTL.

1.8.3 BILLING PERFORMANCE

As per audit, all operators met the benchmark for metering and billing credibility.

All operators met the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks.

NA: Subscribers of Five Network, Honesty, Indus Media, Pacenet and Syscon did not log any billing complaints. Hence, resolution of billing complaints is not applicable for the operators.

All operators met the benchmark of providing refund within 60 days of closure of service.

1.8.4 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

All operators met the benchmark for answering 60% calls within 60 seconds and 80% calls within 90 seconds as per audit.

1.8.5 BANDWIDTH UTILIZATION AND THROUGHPUT

Honesty and Pacenet failed to the benchmark for bandwidth utilized on upstream links during audit.

D-Voice failed to meet the benchmark for download speed.

All operators met the benchmark for service availability time as per audit.

Honesty failed to meet the benchmark for packet loss.

1.8.6 NETWORK LATENCY

All operators met the benchmark for Network Latency parameters.

1.9 LIVE MEASUREMENT

Parameters	Benchmarks	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Bandwidth utilisation/Throughput																
Percentage bandwidth utilised on upstream links	< 80%	69.45%	47.54%	60.98%	NP	72.01%	NA	NA	86.14%	85.83%	50.02%	78.66%	65.53%	41.64%	78.77%	73.30%
Broadband download speed	≥ 80%	115.67%	93.33%	80.53%	NP	93.33%	87.16%	97.00%	NP	91.60%	94.00%	94.33%	84.83%	93.00%	94.86%	86.00%
Service availability/uptime	≥ 98%	99.00%	98.43%	100.00%	NP	99.12%	100.00%	100.00%	98.90%	98.77%	98.78%	100.00%	100.00%	99.56%	99.34%	98.42%
Packet loss	< 1%	0.23%	0.00%	0.23%	NP	0.77%	1.17%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%
Network Latency																
POP/ISP Node to NIXI	< 120 msec	32	4.36	1.33	NP	1	30	2	1	3	3.955	NA	1.86	1	33.2	2.33
ISP node to NAP port (Terrestrial)	< 350 msec	74.6	204.58	NA	NP	90	66	NP	193.6	58	0.76	NA	NA	59	163.37	93

1.9.1 BANDWIDTH UTILIZATION AND THROUGHPUT

MTNL and Pacenet failed to meet the benchmark for bandwidth utilized on upstream links during live measurement.

All operators met the benchmark of providing committed broadband download speed as per live measurement.

All operators met the benchmark for service availability time as per live measurement.

Honesty Net failed to meet the benchmark for packet loss.

1.9.2 NETWORK LATENCY

During live measurement, all operators met the benchmark for network latency parameters.

1.10 LIVE CALLING

Parameters	Benchmarks	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Service provsioning uptime																
Percentage connections provided within 15 days	100%	98.00%	100.00%	78.00%	100.00%	89.00%	100.00%	90.00%	100.00%	100.00%	NA	98.00%	100.00%	NA	56.00%	75.00%
Fault repair restoration time																
Percentage faults repaired by next working days	≥ 90%	75.00%	87.00%	67.00%	NP	89.00%	100.00%	92.00%	100.00%	100.00%	78.00%	98.00%	100.00%	98.00%	56.00%	75.00%
Percentage faults repaired within three working days	≥ 99%	100.00%	100.00%	100.00%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Billing performance																
%age of billing complaints resolved in 4 weeks	≥ 98%	100.00%	80.00%	NA	NA	67.00%	NA	NA	NA	NA	75.00%	89.00%	NA	100.00%	76.00%	100.00%
%age of billing complaints resolved in 6 weeks	100%	100.00%	100.00%	NA	NA	79.00%	NA	NA	NA	NA	95.00%	98.00%	NA	100.00%	85.00%	100.00%
Customer care/helpline assessment (Voice to Voice)																
Percentage calls answered within 60 seconds	≥ 60%	96.99%	89.42%	98.13%	92.00%	98.66%	96.00%	100.00%	85.07%	100.00%	98.85%	69.86%	100.00%	91.16%	97.38%	97.48%
Percentage calls answered within 90 seconds	≥ 80%	98.90%	92.57%	100.00%	100.00%	99.35%	100.00%	100.00%	87.12%	100.00%	99.35%	87.70%	100.00%	92.73%	98.86%	98.20%

NA: Parameters not applicable for the operators.

1.10.1 SERVICE PROVISIONING/ ACTIVATION TIMES

As per live calling, Airtel, D-Voice, Hathway, Indus Media, Siti Cable, TTL and You Broadband failed to meet the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

1.10.2 FAULT REPAIR/ RESTORATION

Airtel, Citicom, D-Voice, Hathway, RCL, TTL and You Broadband failed to meet the benchmark of repairing 90% faults within next working day and RCL failed for repairing 99% faults within 3 days.

1.10.3 BILLING PERFORMANCE

Citycom, Hathway, RCL, Siti cable and TTL failed to meet the benchmark for resolution of billing complaints within 4 weeks and hatchway, RCL, Siti cable and TTL failed to meet the benchmark within 6 weeks.

NA: operator's live calling for 'resolution of billing complaints' has not been conducted due to very low/ zero base of billing complaints for the operators.

1.10.4 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

As per live calling, all operators met both the benchmarks for customer care promptness parameters.

2. CRITICAL FINDINGS

Service Provisioning/ Activation Time

- As per audit, all operators met the benchmark for providing new connections within 15 days except Hathway, Indus Media and MTNL.
- However as per live calling, Airtel, D-Voice, Hathway, Indus Media, Siti Cable, TTL and You Broadband failed to meet the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

Fault Repair/ Restoration

- The benchmark of repairing 90% faults within the next day was not met by Hathway, Honesty Net, Pacenet and TTL.
- The benchmark of repairing 99% faults within next three days of receiving complaints was not met by Hathway, Honesty Net, MTNL, TCL, Pacenet and TTL.
- As per live calling Airtel, Citicom, D-Voice, Hathway, RCL, TTL and You Broadband failed to meet the benchmark of repairing 90% faults within next working day and RCL failed for repairing 99% faults within 3 days.

Billing Performance

- As per audit, all operators met the benchmark for metering and billing credibility.
- All operators met the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks.
- However as per live calling Citycom, Hathway, RCL, Siti cable and TTL failed to meet the benchmark for resolution of billing complaints within 4 weeks and hatchway, RCL, Siti cable and TTL failed to meet the benchmark within 6 weeks.

Response time to customer for assistance

- All operators met the benchmark for answering 60% calls within 60 seconds and 80% calls within 90 seconds as per audit and live calling.

Bandwidth Utilization and Throughput

- Honesty and Pacenet failed to the benchmark for bandwidth utilized on upstream links during audit. However MTNL and Pacenet failed to meet the benchmark for bandwidth utilized on upstream links during live measurement.
- D-Voice failed to meet the benchmark for download speed.
- Honesty Net failed to meet the benchmark for packet loss in audit as well as live measurement.

3. DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA AND LIVE MEASUREMENT/ CALLING DATA

3.1 SERVICE PROVISIONING/ ACTIVATION TIME

3.1.1 PARAMETER EXPLANATION

3.1.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to number of applications received at the service provider's level in the following time frames:-

- Number of applications received at the service provider's level
- Number of connections provided within 15 days
- Number of connections provided after 15 days

Live Calling: -

- At least 10% of the subscribers who had requested for new connections in month prior to Audit were called to check whether connection was provided in 15 days

Data for the parameter was extracted from OMC (Operations and Maintenance Center) of the operators.

3.1.1.2 COMPUTATIONAL METHODOLOGY

- Technically Non Feasible (TNF) cases such as unavailability of Broadband infrastructure/ equipment in the Area or Spare Capacity i.e. Broadband Ports including equipment to be installed at the customer premises for activating Broadband connection were excluded from the calculation of this parameter.

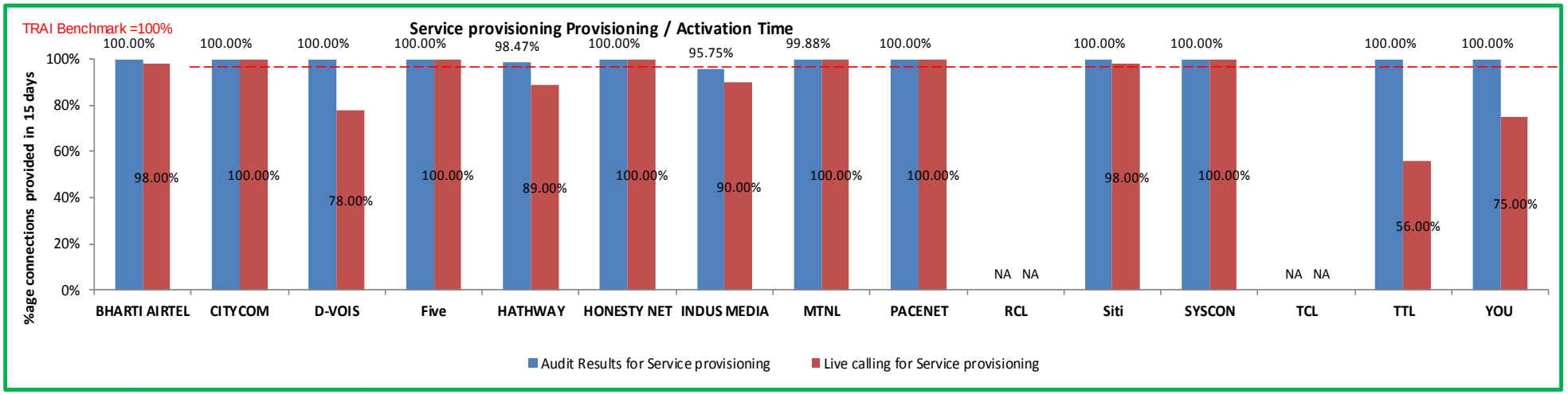
- Also, problems relating to customer owned equipment such as PC, LAN Card/ USB Port and internal wiring or non-availability of such equipment were excluded from the calculation of this parameter.

Percentage connections provided within X working days = *No of connections provided within X working days/ Total number of connections registered during the period * 100*

3.1.1.3 BENCHMARK

100 % cases in =<15 working days.

3.1.2 DETAILED FINDINGS - SERVICE PROVISONING



Data Source: OMC (Operations and Maintenance Center) of the operators

As per audit, all operators met the benchmark for providing new connections within 15 days. However, during live calling it was observed that Airtel, D-Voice, Hathway, Indus Media, Siti cable, TTL and You Broadband failed to meet the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

NA: In the audit period, no new connection was registered with Reliance and TCL.

3.2 FAULT REPAIR/ RESTORATION TIME

3.2.1 PARAMETER EXPLANATION

3.2.1.1 AUDIT PROCEDURE

IMRB Auditors to verify and collect data pertaining to number of fault received and also number of faults cleared at the service provider's level in the following time frames:-

- Number of faults cleared within 24 hours
- Number of cleared in more than 1 day but less than 3 days
- Number of cleared in more than 3 days

Live calling: -

- Live calling is done to verify 'Fault repair by next working day', 'Fault repair within 3 working days' and 'Fault repair in more than 3 working days'
- Interviewers ensure that operator provided a list of all the subscribers who reported Faults in one month prior to IMRB staff visit
- Calls are made to up to 10% or 100 complainants, whichever is less, per service provider or in case of MTNL, if there are more than 1 SDCAs selected for the sample, 10% or 30 complainants per sample SDCA by randomly selecting from the list provided by operator.
- Auditors check and record whether the fault was corrected within the timeframes as mentioned in the benchmark

Data for the parameter was extracted from OMC (Operations and Maintenance Center) of the operators.

3.2.1.2 COMPUTATIONAL METHODOLOGY

- The time period for fault repair starts from the time when the fault is reported to the service provider either through customer care help line or in person by the subscriber

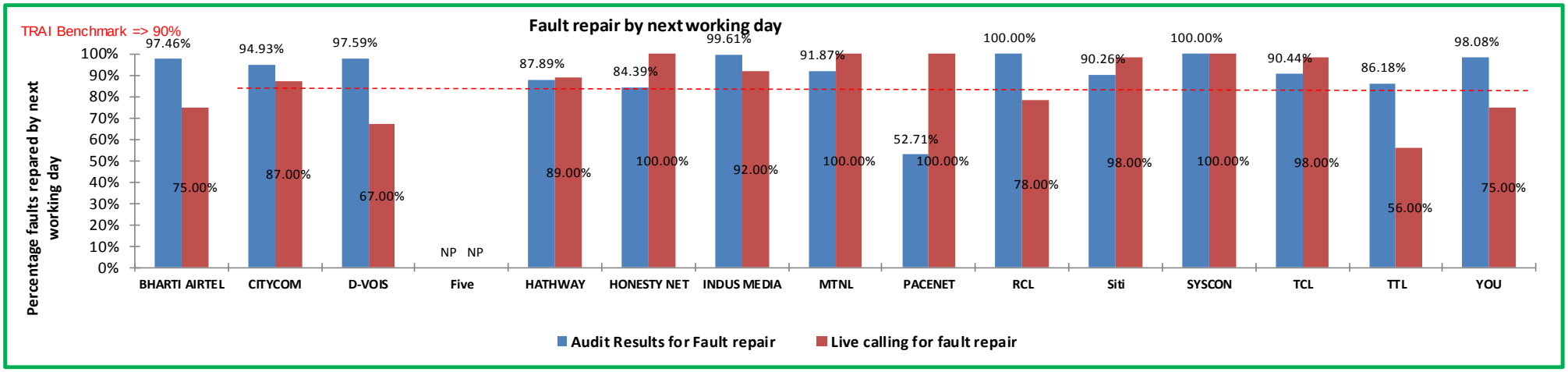
- Only the complaints registered till the close of the business hours of the day are to be taken into account. All the complaints registered after the business hours are to be considered as being registered in the next day business hours

Fault incidence = *(Total no of faults repaired in X working days /Total number of faults reported during the period)*100*

3.2.1.3 BENCHMARK

- By next working day: => 90% and within 3 working days: => 99%.

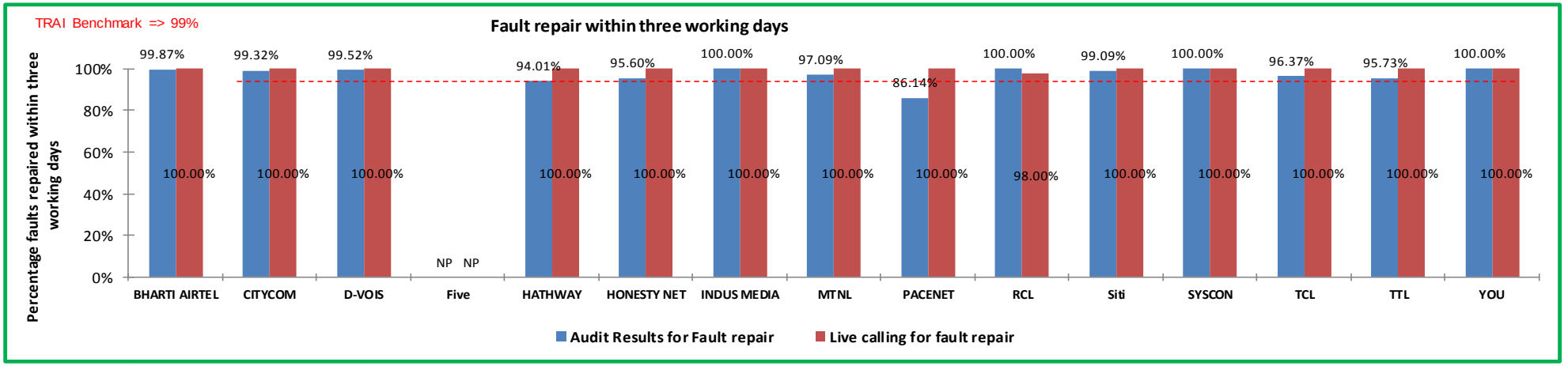
3.2.2 DETAILED FINDINGS - FAULT REPAIR WITHIN NEXT WORKING DAY



Data Source: OMC (Operations and Maintenance Center) of the operators

Hathway, Honesty, Pacenet and TTL failed to meet the benchmark for the parameter as per audit and all operators failed to meet the benchmark during live calling except Honesty, Indua Media, MTNL, Pacenet, Siti Cable, Syscon and TCL.

3.2.3 DETAILED FINDINGS - FAULT REPAIR WITHIN 3 WORKING DAYS



Data Source: OMC (Operations and Maintenance Center) of the operators

Hathway, Honesty, Pacenet, TCL, TTL and MTNL failed to meet the benchmark for the parameter as per audit and RCL failed to meet the benchmark during live calling.

3.3 METERING AND BILLING CREDIBILITY

3.3.1 PARAMETER EXPLANATION – BILLING COMPLAINTS

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th March, 2009 were covered. The types of billing complaints covered are listed below.

- Payments made and not credited to the subscriber account
- Payment made on time but late payment charge levied wrongly
- Double charges
- Credit agreed to be given in resolution of complaint, but not accounted in the bill
- Charging for services provided without consent
- Charging not as per tariff plans
- Overcharging or undercharging

In addition to the above, any billing complaint which leads to billing error, waiver, refund, credit, or any adjustment is also considered as a billing complaint for calculating the number of disputed bills.

3.3.1.1 AUDIT PROCEDURE

IMRB Auditors to verify and collect data pertaining to –

- Number of Billing complaints received at the service provider's level
- Last billing cycle stated should be such that due date for payment of bills must be beyond the date when this form is filled.
- Include all types of bills generated for customers. This could include online as well as other forms of bills presentation including printed bills

- Billing complaint is any of written complaint/ personal visit/ telephonic complaint related to: Excess metering/ wrong tariff scheme charged, Payment made in time but charged penalty/ not reflected in next bill, Last payment not reflected in bill, Adjustment/ waiver not done, Anything else related to bills, Toll free numbers charged etc.
- Billing complaints resolution database, with opening and closing date of complaint to identify the time taken to resolve a complaint

Live calling:

- Auditors request the operator provided the database of all the subscribers who reported billing complaints in one month prior to IMRB auditor visit. In case of MTNL, data for the complaints from the subscribers belonging to the sample exchanges is requested specifically. In case the sample data is too low to fulfill the target calls, auditors may call subscribers whose complaints got resolved in other months of the same audit period.
- A sample of 10% or 100 complainants, whichever is less, is selected randomly from the list provided by operator
- Calls are made by auditors to the sample of subscribers to check and record whether the complaint was resolved within the timeframes as mentioned in the benchmark.

Raw data for the parameter was extracted from central billing center of the operators.

3.3.1.2 COMPUTATIONAL METHODOLOGY – METERING AND BILLING CREDIBILITY

The calculation methodology (given below) as per QoS Regulations 2006 (11 of 2006), was followed to calculate incidence of billing complaints.

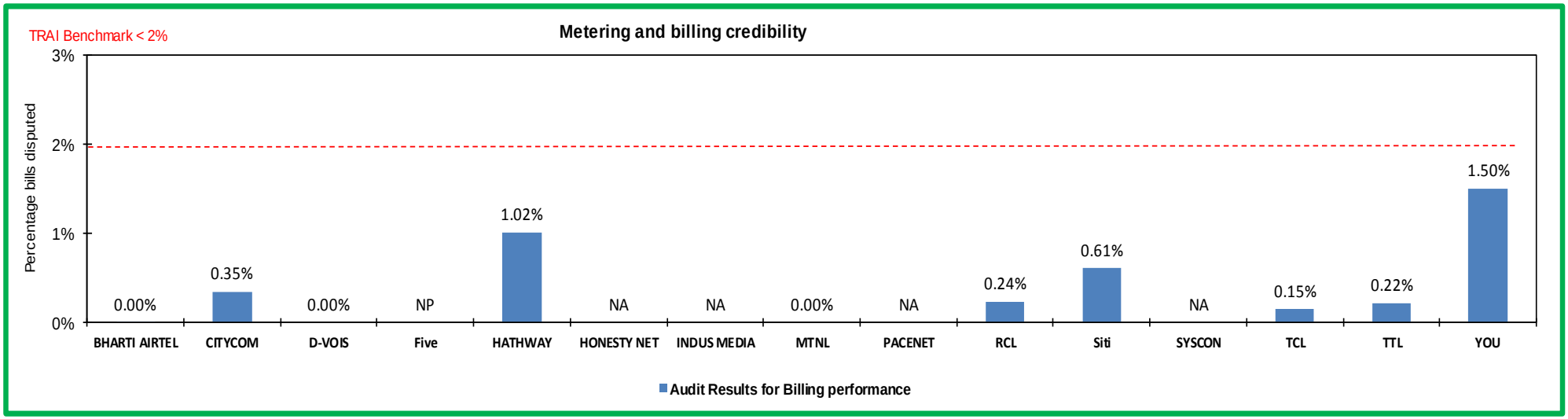
$$\text{Billing complaints (\%)} = \frac{\text{total number of disputed bills X 100}}{\text{total number of bills issued during one billing cycle.}}$$

- *Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated

- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.

TRAI Benchmark: < 2%

3.3.1.3 METERING AND BILLING CREDIBILITY – AUDIT FINDINGS



Data Source: Billing Center of the operators

All operators met the benchmark for the parameter.

3.3.1.4 COMPUTATIONAL METHODOLOGY – RESOLUTION OF BILLING COMPLAINTS

Calculation of Percentage resolution of billing complaints

The calculation methodology (given below) as per QoS Regulations 2006 (11 of 2006), and TRAI guidelines (Received on Sep 08, 2014) was followed to calculate resolution of billing complaints.

Resolution of billing complaints within 4 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 4 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 4 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

Resolution of billing complaints within 6 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

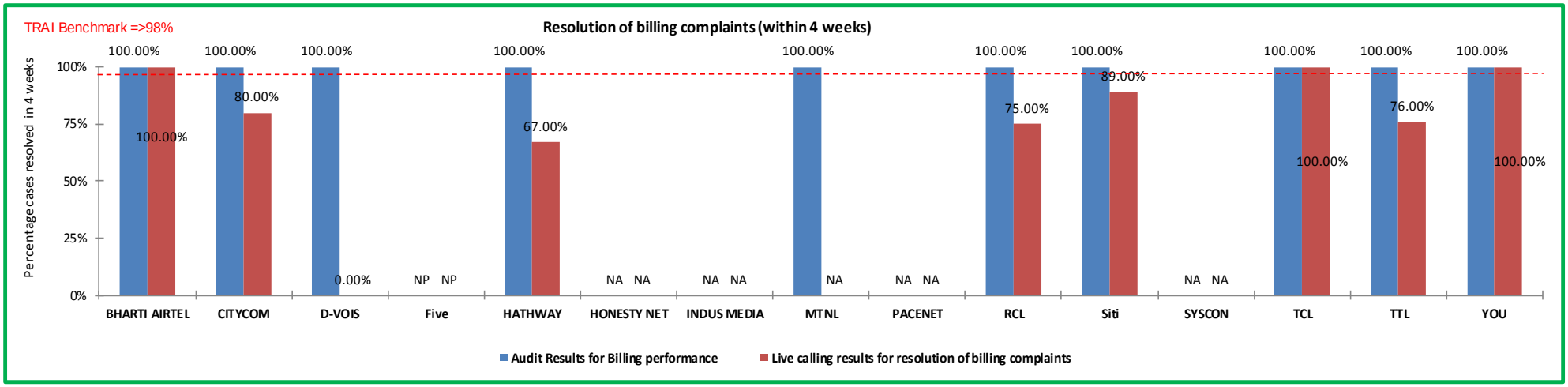
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally. Complaints raised by the consumers to operator are only considered as part of the calculation.
- The complaints that get marked as invalid by the operator are not considered for calculation as those complaints cannot be considered as resolved by the operator.

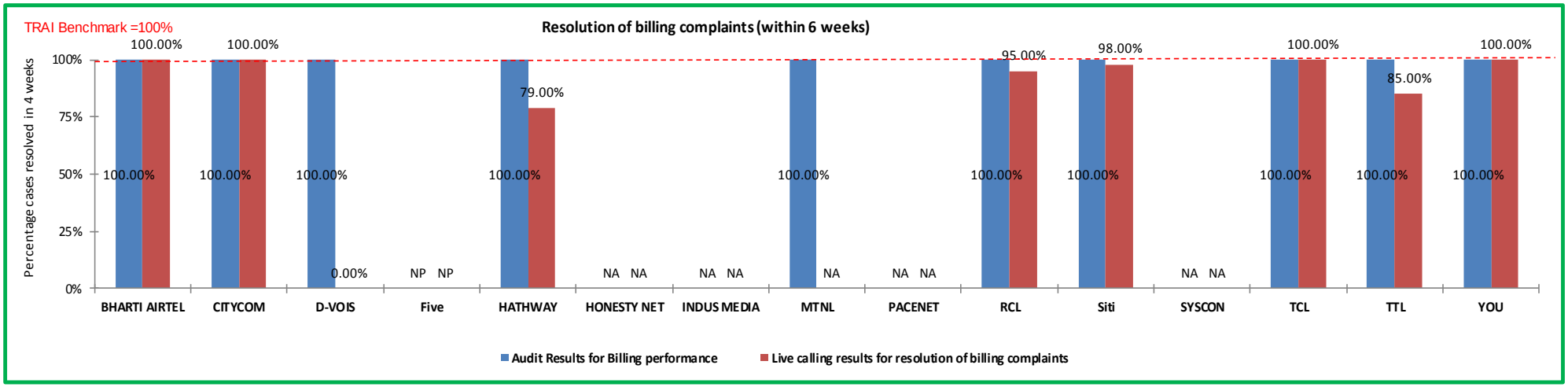
↳ *** Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.

Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

3.3.1.5 RESOLUTION OF BILLING COMPLAINTS – AUDIT FINDINGS



As per audit all operators met the benchmark for resolution of billing complaints within 4 weeks. However, it was observed during live calling that the performance of Citycom, Hathway, RCL, Siti Cable and TTL were below the benchmark of the parameter.



Data Source: Billing Center of the operators

As per audit all operators met the benchmark for resolution of billing complaints within 6 weeks. However, it was observed during live calling that the performance of Hathway, RCL, Siti Cable and TTL were below the benchmark of the parameter.

NA: No Subscribers log any billing complaints. Hence, resolution of billing complaints is not applicable for these operators.

3.4 TIME TAKEN TO REFUND AFTER CLOSURE

3.4.1 PARAMETER EXPLANATION

3.4.1.1 AUDIT PROCEDURE

IMRB Auditors collected and verified data pertaining to -

- Number of cases requiring refund of deposits
- Number of cases where refund was made within 60 days
- %age cases where refund was made within 60 days.

Data for the parameter was extracted from central billing center of the operators.

3.4.1.2 COMPUTATIONAL METHODOLOGY

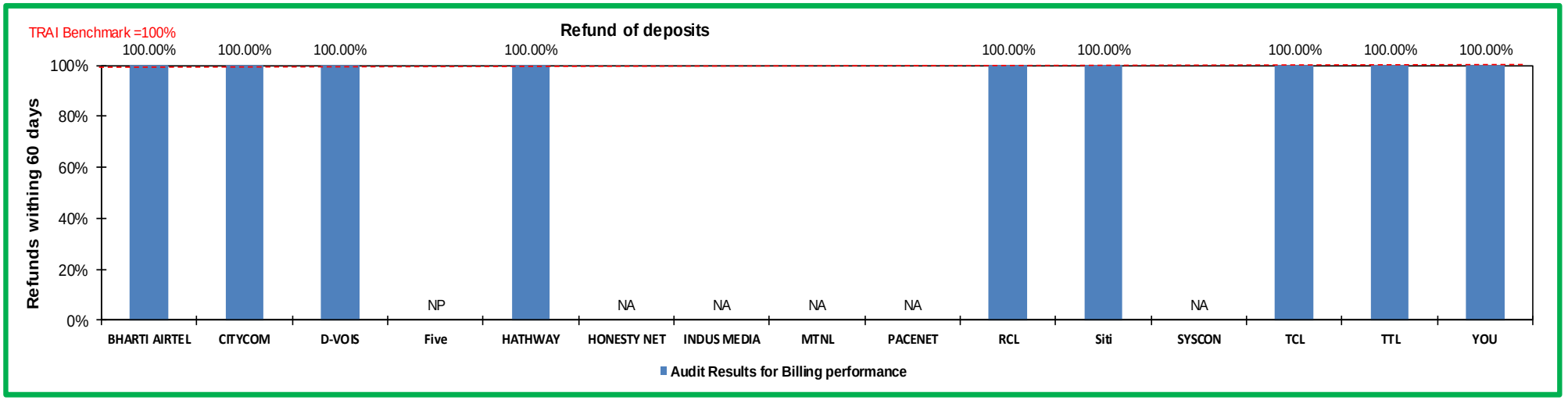
- Date of closure is considered to be the date on which the connection is discontinued in the service provider database of active customers

Time taken to refund = Date of refund – Date of closure

3.4.1.3 BENCHMARK

- 100% cases in less than 60 days

3.4.2 DETAILED FINDINGS - REFUND OF DEPOSITS



All operators met the benchmark for the parameter.

NA (0.00%): Operators had no cases where a refund was applicable.

3.5 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

3.5.1 PARAMETER EXPLANATION

3.5.1.1 AUDIT PROCEDURE

IMRB Auditors collected and verified data pertaining to

- Number of calls received by the operator
- Number and percentage calls answered within 60 seconds
- Number and percentage calls answered within 80 seconds

Live calling:

- Overall 100 number of live calls at different points of time were made in a licensed service area/circle for each service provider to assess the efficiency of the call center

Data for the parameter was extracted from central customer service center of the operators.

3.5.1.2 COMPUTATIONAL METHODOLOGY

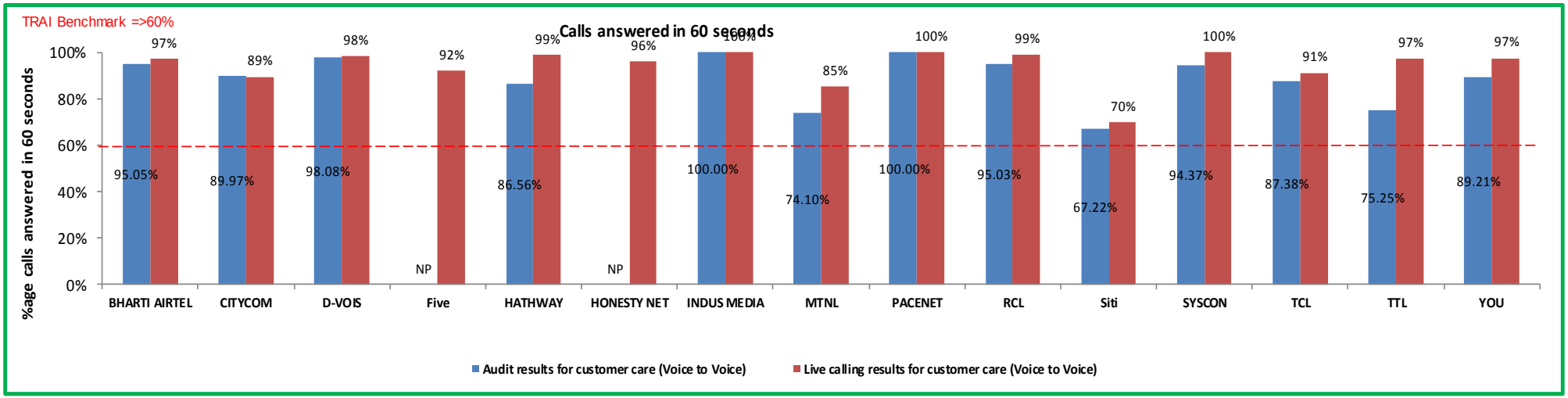
%age of calls answered by operator (voice to voice) within n seconds = *(Number of calls where time taken for operator to respond* >= n sec / Total number of calls where an attempt to route to the operator was made) x 100)*.*

Time taken for operator to respond = Time when an operator responds to a call – Time when the relevant code to reach the operator is dialled

3.5.1.3 BENCHMARK

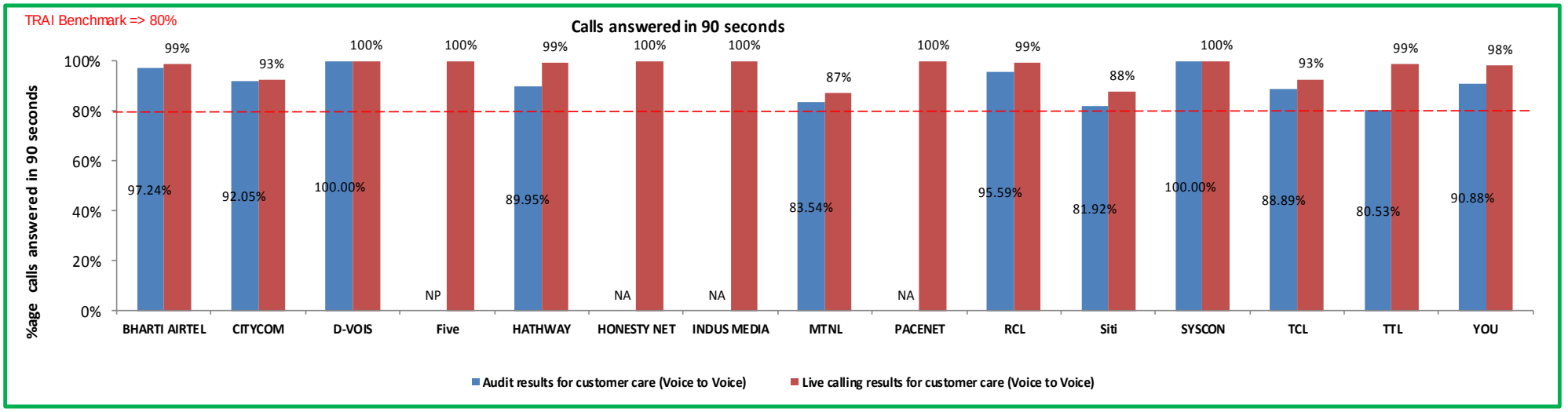
- Calls answered within 60 seconds => 60 %
- Calls answered within 90 seconds => 80%

3.5.2 DETAILED FINDINGS - CALL ANSWERED WITHIN 60 SECONDS



Data Source: Customer Service Center of the operators

3.5.3 DETAILED FINDINGS - CALL ANSWERED WITHIN 90 SECONDS



Data Source: Customer Service Center of the operators

All operators met the benchmark for answering 60% calls within 60 seconds and 80% calls within 90 seconds as per audit.

3.6 BANDWIDTH UTILIZATION & DOWNLOAD SPEED

3.6.1 PARAMETER EXPLANATION – BANDWIDTH UTILIZATION

3.6.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to –

POP to ISP gateway Node [Intra – network] Links

- Auditors to verify and collect data pertaining to Total Bandwidth available and Total Bandwidth utilized during TCBH at some of the sample intra network links (POP to ISP Node) on each of the three days of live measurement separately
- Total Bandwidth available and Total bandwidth utilized during at the sample links TCBH for the complete month of audit
- Total number of intra network links having >90% bandwidth utilization during the month of Audit

ISP Gateway Node to IGSP / NIXI Node upstream Link's) for international connectivity

- Total number of upstream links for International connectivity
- Total number of links having Bandwidth > 90%Total Bandwidth available and Total Bandwidth utilized on all the upstream links during TCBH (POP to ISP Node) on each of the three days of live measurement separately
- Total Bandwidth available and Total bandwidth utilized at all the international links during TCBH for the complete month of audit (Also obtain details separately for the days)

Data for the parameter was extracted from NOC (Network Operations Center) of the operators.

3.6.1.2 COMPUTATIONAL METHODOLOGY

Percentage Bandwidth available on the link = *Total Bandwidth* utilised in TCBH for the period/ Total Bandwidth Available during the period*100*

3.6.1.3 BENCHMARK

- < 80% link(s)/route bandwidth utilization during peak hours (TCBH).
- If on any link(s)/route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of bandwidth on immediate basis, but not later than one month is mandated.

3.6.2 DETAILED FINDINGS – BANDWIDTH UTILIZATION

Audit results for Bandwidth Utilization															
Bandwidth utilization	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	11.01%	21.76%	72.70%	66.80%	62.81%	81.85%	NP	52.99%	88.59%	17.52%	70.16%	45.53%	40.90%	77.26%	NP
Live measurment results for Bandwidth Utilization																
Bandwidth utilization	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	69.45%	47.54%	60.98%	NP	72.01%	NA	NA	86.14%	85.83%	50.02%	78.66%	65.53%	41.64%	78.77%	73.30%

Data Source: Network Operations Center (NOC) of the operators

Honesty and Pacenet failed to meet the benchmark for bandwidth utilization during audit. However during live calling MTNL and Pacenet failed to meet the benchmark.

3.6.3 PARAMETER EXPLANATION - BROADBAND DOWNLOAD SPEED

3.6.3.1 AUDIT PROCEDURE

Auditors collected and verified the following information from the operator's system.

- Total committed download speed to the all subscribers (In Mbps) (A)
- Total average download speed observed during TCBH (In Mbps)

Live Calling/ Measurement:

- Details of live customers were obtained from the service providers
- Overall 50 numbers of live calls at were made during peak hours (TCBH) in a licensed service area/circle for each service provider to assess the download speed available to subscribers. A download measurement software tool provided by the service providers was used for the same
- Details of total committed download speed and speed available to the users were recorded for each of the subscriber

3.6.3.2 COMPUTATIONAL METHODOLOGY

- The download speed for one customer is calculated by the download speed measurement software using the formula provided below:

Data Download Speed = Size of test file (data) in ISP server/ Transmission time required for error free transfer of the entire data

Percentage download speed available was calculated as = Sum of total speed available for 50 customers/Total committed download speed for 50 customers*100

3.6.3.3 BENCHMARK

Subscribed broadband connection speed to be met >= 80% from ISP Node to user

Data for the parameter was taken from "Download measurement software" installed in the server at ISP Node of the operators.

3.6.4 DETAILED FINDINGS – BROADBAND DOWNLOAD SPEED

Audit results for broadband download speed																
Broadband download speed	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	100.00%	91.67%	26.63%	NP	92.50%	89.32%	NP	NP	91.50%	89.46%	94.33%	82.50%	93.60%	97.23%	87.50%
Live measurement results for broadband download speed																
Broadband download speed	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	115.67%	93.33%	80.53%	NP	93.33%	87.16%	97.00%	NP	91.60%	94.00%	94.33%	84.83%	93.00%	94.86%	86.00%

Data Source: Download measurement software installed in the server at ISP Node of the operators

D-Voice failed to meet the benchmark of providing committed broadband download speed as per audit.

3.7 SERVICE AVAILABILITY/UPTIME

3.7.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to –

- Total operational hrs.
- Total downtime hrs.
- The above mentioned data was obtained and verified separately for three days in which the live measurement was carried out, Month in which audit was carried out/

Data for the parameter was extracted from OMC (Operations and Maintenance Center) of the operators.

3.7.1.2 COMPUTATIONAL METHODOLOGY

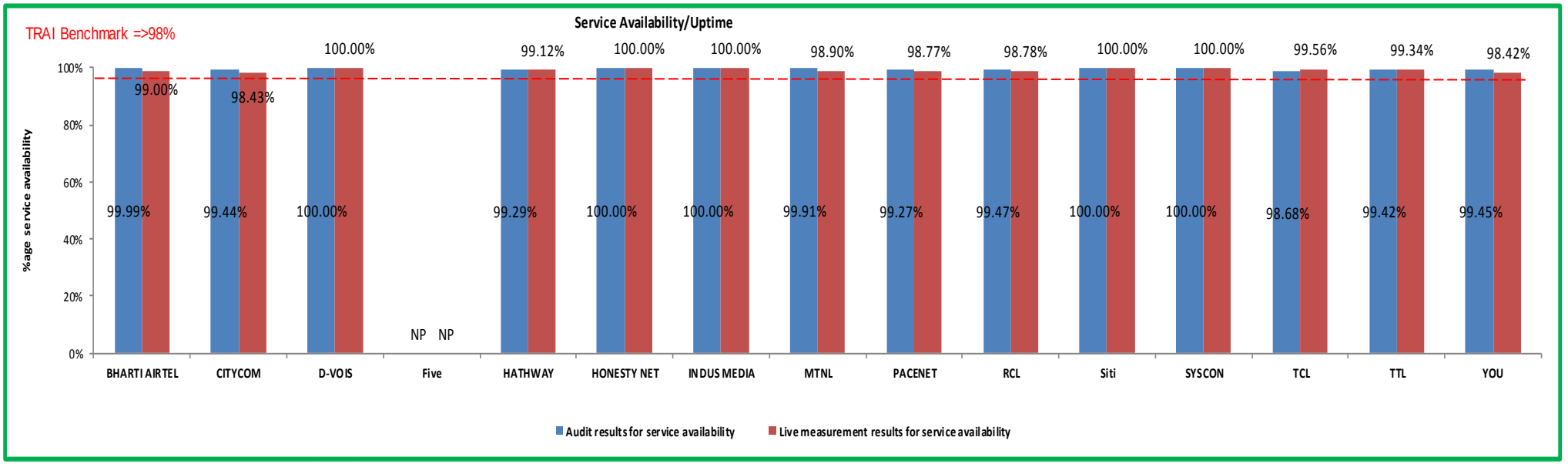
- Total downtime for all users, including the LAN switches, Routers, Servers, etc. at ISP Node and connectivity to upstream service provider are to be included
- Planned outages for routine maintenance of the system are excluded from the calculation of service availability/uptime

Service availability/Uptime = *(Total operational hours – Total Downtime hrs)*100 / Total operational hours*

3.7.1.3 BENCHMARK

- =>98% with effect from quarter ending September 2007 and onwards

3.7.2 DETAILED FINDINGS - SERVICE AVAILABILITY



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for service availability time as per audit.

3.8 NETWORK LATENCY & PACKET LOSS

3.8.1 PARAMETER EXPLANATION - NETWORK LATENCY

Network Latency: Network Latency is the measure of duration of a round trip for a data packet between specific source and destination Router Port/ Customer Premises Equipment (CPE).

3.8.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to:

- Records maintained for ping tests conducted during the period
- Smoked ping test (wherever available) results for the period
- Results of live ping tests conducted during three day live measurement and month of Audit (During peak hours)
- Live ping tests were conducting by selecting a minimum of three user reference test points at POP/ISP Node in each circle

Data for the parameter was extracted from NOC (Network Operations Center) of the operators.

3.8.1.2 COMPUTATIONAL METHODOLOGY

- Latency is the measure of duration of a round trip for a data packet between specific source and destination Router Port/Customer Premises Equipment (CPE). The round trip delay for the ping packets from ISP premises to the IGSP premises to the IGSP/NIXI gateway and to the nearest NAP port abroad are measured by computing delay for 1000 pings of 64 bytes each (Pings are to be sent subsequent to acknowledgement received for the same for previous ping)
- Service provider needs to carry out such tests daily during Time Consistent Busy Hour(TCBH) and report the average results for the month in the performance monitoring report to TRAI
- Minimum sample reference points for each service area shall be three in number or multiple reference points if required

Hence the formula for network latency would be Network latency for X days= *Total round trip time for all the ping packets transmitted in X days /No of days during the period*

3.8.1.3 BENCHMARK

- < 120 msec from user reference point at POP/ISP Node to International Gateway
- < 350 msec from User reference point at ISP Gateway Node to International nearest NAP port (Terrestrial)
- < 800 msec from User reference point at ISP Gateway Node to International nearest Nap port (Satellite)

3.8.2 PARAMETER EXPLANATION – PACKET LOSS

Packet Loss: Packet loss is the percentage of packets lost to the total packets transmitted between two designated CPE/ Router Ports.

3.8.2.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to –

- Records maintained for ping tests conducted during the period
- Smoked ping test (wherever available) results for the period
- Results of live ping tests conducted during three day live measurement and month of Audit (During TCBH)
- Live ping tests were conducting by selecting a minimum of three user reference test points at POP/ISP Node in each circle

Data for the parameter was extracted from NOC (Network Operations Center) of the operators.

3.8.2.2 COMPUTATIONAL METHODOLOGY

- Packet loss is the percentage of packets lost to total packets transmitted between two designated Customer Premises Equipment's/Router ports. It is the measurement of packet lost from the broadband customer (User) configuration/User reference point at POP/ISP Node to IGSP/NIXI Gateway and to the nearest NAP port abroad
- The packet loss is measured by computing the percent packet loss of 1000 pings of 64 byte packet each.
- Service provider needs to carry out such tests daily during Time Consistent Busy Hour(TCBH) and report the average results for the month in the performance monitoring report to TRAI
- Minimum sample reference points for each service area were three in number or multiple reference points if required

Hence Packet loss is computed by the formula: *(Total number of ping packets lost during the period/Total number of ping packets transmitted)* 100*

3.8.2.3 BENCHMARK

- Packets Loss <1 %

3.8.3 DETAILED FINDINGS - NETWORK LATENCY / PACKET LOSS

Audit results for Latency and packet loss															
Network Latency and Packet Loss	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Packet Loss (Percentage)	< 1%	0.01%	0.05%	0.50%	NP	0.72%	1.16%	NP	0.00%	0.00%	0.52%	0.00%	0.00%	0.00%	0.10%	0.00%
Network Latency																
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	29.69	4.35	2	NP	1	30	NA	1	9	16	NA	1.86	1	68.47	8.2
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	62.22	167.8	NA	NP	90	65.97	NP	271.95	174	17.33	NA	NA	258	200.95	276.78
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

2>>

Live measurement results for Latency and packet loss															
Network Latency and Packet Loss	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Packet Loss (Percentage)	< 1%	0.23%	0.00%	0.23%	NP	0.77%	1.17%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%
Network Latency																
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	32	4.36	1.33	NP	1	30	2	1	3	3.955	NA	1.86	1	33.2	2.33
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	74.6	204.58	NA	NP	90	66	NP	193.6	58	0.76	NA	NA	59	163.37	93
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Source: Network Operations Center (NOC) of the operators

All operators met the benchmark for network latency related parameters.

4. CRITICAL FINDINGS

Service Provisioning/ Activation Time

- As per audit, all operators met the benchmark for providing new connections within 15 days except Hathway, Indus Media and MTNL.
- However as per live calling, Airtel, D-Voice, Hathway, Indus Media, Siti Cable, TTL and You Broadband failed to meet the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

Fault Repair/ Restoration

- The benchmark of repairing 90% faults within the next day was not met by Hathway, Honesty Net, Pacenet and TTL.
- The benchmark of repairing 99% faults within next three days of receiving complaints was not met by Hathway, Honesty Net, MTNL, TCL, Pacenet and TTL.
- As per live calling Airtel, Citicom, D-Voice, Hathway, RCL, TTL and You Broadband failed to meet the benchmark of repairing 90% faults within next working day and RCL failed for repairing 99% faults within 3 days.

Billing Performance

- As per audit, all operators met the benchmark for metering and billing credibility.
- All operators met the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks.
- However as per live calling Citycom, Hathway, RCL, Siti cable and TTL failed to meet the benchmark for resolution of billing complaints within 4 weeks and hatchway, RCL, Siti cable and TTL failed to meet the benchmark within 6 weeks.

Response time to customer for assistance

- All operators met the benchmark for answering 60% calls within 60 seconds and 80% calls within 90 seconds as per audit and live calling.

Bandwidth Utilization and Throughput

- Honesty and Pacenet failed to the benchmark for bandwidth utilized on upstream links during audit. However MTNL and Pacenet failed to meet the benchmark for bandwidth utilized on upstream links during live measurement.
- D-Voice failed to meet the benchmark for download speed.

5. ANNEXURE – OND'15

5.1 SERVICE PROVISIONING

Audit Results for Service provisioning																
	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total connections registered during the period		4567	854	12674	9809	13515	4887	1810	16448	2567	NA	7150	15068	NA	2944	320
Number of connections provided within 15 days		4567	854	12674	9809	13308	4887	1733	16429	2567	NA	7150	15068	NA	2944	320
Percentage of connections provided within 15 days	100%	100.00%	100.00%	100.00%	100.00%	98.47%	100.00%	95.75%	99.88%	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%
Number of connections provided after 15 days of registration of demand		4567	854	12674	9809	13515	4887	1810	16448	2567	NA	7150	15068	NA	2944	320
percentage of connections provided after 15 days of registration of demand	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%
Number of customers to whom credit is given for delayed connections		0	0	0	0	0	0	0	0	0	NA	0	0	NA	0	0
Percentage of customers to whom credit is given for delayed connections	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	NA	100%	100%

2>>

Live calling for Service provisioning																
	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total connections registered during the period		100	100	100	100	100	100	100	100	100	NA	100	100	NA	100	100
Number of connections provided within 15 days		98	100	78	100	89	100	90	100	100	NA	98	100	NA	56	75
Percentage of connections provided within 15 days	100%	98.00%	100.00%	78.00%	100.00%	89.00%	100.00%	90.00%	100.00%	100.00%	NA	98.00%	100.00%	NA	56.00%	75.00%

Data Source: Operations and Maintenance Center (OMC) of the operators

5.2 FAULT REPAIR/ RESTORATION

Audit Results for Fault repair																
Fault repair	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total No. of faults registered during the period		5364	2365	65839	NP	81079	5779	4882	332950	7033	307	13390	479	2260	16083	7845
No. of faults repaired by next working day during the period		5228	2245	64253	NP	71264	4877	4863	305874	3707	307	12086	479	2044	13861	7694
Percentage of faults repaired by next working day during the period	≥ 90%	97.46%	94.93%	97.59%	NP	87.89%	84.39%	99.61%	91.87%	52.71%	100.00%	90.26%	100.00%	90.44%	86.18%	98.08%
No. of faults repaired within 3 days during the period		5357	2349	65521	NP	76226	5525	4882	323267	6058	307	13268	479	2178	15396	7845
Percentage of faults repaired within 3 days during the period	≥ 99%	99.87%	99.32%	99.52%	NP	94.01%	95.60%	100.00%	97.09%	86.14%	100.00%	99.09%	100.00%	96.37%	95.73%	100.00%

2>>

Rent rebate	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Percentage of cases where rent rebate for >3 days was given	100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percentage of cases where rent rebate for 15 days was given	100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percentage of cases where rent rebate for 30 days was given	100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Source: Operations and Maintenance Center (OMC) of the operators and live calls conducted by the auditors from operator's network

Live calling for fault repair																
Fault repair	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total Number of calls made to subscribers		100	100	100	NP	100	100	100	100	100	100	100	100	100	100	100
Number of cases where faults were repaired by next working day		75	87	67	NP	89	100	92	100	100	78	98	100	98	56	75
Percentage cases where faults were repaired by next working day	≥ 90%	75.00%	87.00%	67.00%	NP	89.00%	100.00%	92.00%	100.00%	100.00%	78.00%	98.00%	100.00%	98.00%	56.00%	75.00%
Number of cases where faults were repaired within 3 days		100	100	100	NP	100	100	100	100	100	98	100	100	100	100	100
Percentage cases where faults were repaired within 3 days	≥ 99%	100.00%	100.00%	100.00%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	100.00%

5.3 BILLING PERFORMANCE – METERING AND BILLING CREDIBILITY

Audit Results for Billing performance																
Billing Performance	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Billing diputes																
Total bills generated during the period		147043	8599	127396	NA	122085	NA	NA	1601143	NA	13182	97956	NA	2661	124012	133
Total number of bills disputed		1	30	0	NA	1240	NA	NA	0	NA	31	597	NA	4	270	2
Percentage bills disputed (Avg of 3 billing cycles)	≤ 2%	0.00%	0.35%	0.00%	NA	1.02%	NA	NA	0.00%	NA	0.24%	0.61%	NA	0.15%	0.22%	1.50%
Resolution of billing complaints																
Total number of complaints		1	30	0	NA	1240	NA	NA	0	NA	31	597	NA	4	270	2
Total complaints resolved in 4 weeks from date of receipt		1	30	0	NA	1240	NA	NA	0	NA	31	597	NA	4	270	2
Percentage complaints resolved within 4 weeks of date of receipt	≥ 98%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%	100.00%
Total complaints resolved in 6 weeks from date of receipt		1	30	0	NA	1240	NA	NA	0	NA	31	597	NA	4	270	2
Percentage complaints resolved within 6 weeks of date of receipt	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%	100.00%
Refund of deposits																
Total number of cases requiring refund		0	0	0	NA	381	NA	NA	NA	NA	0	28	NA	1	0	32
Total number of cases where refund was made within 60 days		0	0	0	NA	381	NA	NA	NA	NA	0	28	NA	1	0	32
Percentage cases in which refund was received within 60 days	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	NA	NA	100.00%	100.00%	NA	100.00%	100.00%	100.00%

Data Source: Billing Center of the operators

Live calling results for resolution of billing complaints															
Resolution of billing complaints	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total Number of calls made		1	15	NA	NA	100	NA	NA	NA	NA	20	100	NA	4	100	2
Number of cases resolved in 4 weeks		1	12	NA	NA	67	NA	NA	NA	NA	15	89	NA	4	76	2
Percentage cases resolved in 4 weeks	≥ 98%	100.00%	80.00%	NA	NA	67.00%	NA	NA	NA	NA	75.00%	89.00%	NA	100.00%	76.00%	100.00%
Number of cases resolved in 6 weeks		1	15	NA	NA	79	NA	NA	NA	NA	19	98	NA	4	85	2
Percentage cases resolved in 6 weeks	100%	100.00%	100.00%	NA	NA	79.00%	NA	NA	NA	NA	95.00%	98.00%	NA	100.00%	85.00%	100.00%

Data Source: Live calls conducted by the auditors from operator's network

5.4 RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE

Audit results for customer care (Voice to Voice)															
Calls Answered within 60 seconds															
Customer Care Assessment	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total Number of calls received		52582	74605	195278	NP	404388	NP	2252	809012	20150	38705	176791	675	124656	47053	62940
Total Number of calls answered within 60 seconds		49979	67119	191537	NP	350052	NP	2252	599490	20150	36780	118841	637	108921	35409	56146
Percentage calls answered within 60 seconds	≥ 60%	95.05%	89.97%	98.08%	NP	86.56%	NP	100.00%	74.10%	100.00%	95.03%	67.22%	94.37%	87.38%	75.25%	89.21%

Calls Answered within 90 seconds																
Total Number of calls received		52582	74605	195278	NP	404388	NP	2252	809012	20150	38705	176791	675	124656	47053	62940
Total Number of calls answered within 90 seconds		51130	68672	195278	NP	363762	NP	NP	675826	NP	37000	144826	675	110810	37893	57198
Percentage calls answered within 90 seconds	≥ 80%	97.24%	92.05%	100.00%	NP	89.95%	NP	NP	83.54%	NP	95.59%	81.92%	100.00%	88.89%	80.53%	90.88%

Data Source: Customer Service Center of the operators

Live calling results for customer care (Voice to Voice)																
Customer Care Assessment	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Total Number of calls received		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Total Number of calls answered within 60 seconds		97	89	98	92	99	96	100	85	100	99	70	100	91	97	97
Percentage calls answered within 60 seconds	≥ 60%	97%	89%	98%	92%	99%	96%	100%	85%	100%	99%	70%	100%	91%	97%	97%
Total Number of calls answered within 90 seconds		99	93	100	100	99	100	100	87	100	99	88	100	93	99	98
Percentage calls answered within 90 seconds	≥ 80%	99%	93%	100%	100%	99%	100%	100%	87%	100%	99%	88%	100%	93%	99%	98%

Data Source: Live calls conducted by the auditors from operator's network

5.5 BANDWIDTH UTILIZATION

Audit results for Bandwidth Utilization															
Bandwidth utilization	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	11.01%	21.76%	72.70%	66.80%	62.81%	81.85%	NP	52.99%	88.59%	17.52%	70.16%	45.53%	40.90%	77.26%	NP
Live measurment results for Bandwidth Utilization																
Bandwidth utilization	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	69.45%	47.54%	60.98%	NP	72.01%	NA	NA	86.14%	85.83%	50.02%	78.66%	65.53%	41.64%	78.77%	73.30%

Data Source: Network Operations Center (NOC) of the operators

5.6 BROADBAND DOWNLOAD SPEED

Audit results for broadband download speed															
Broadband download speed	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	100.00%	91.67%	26.63%	NP	92.50%	89.32%	NP	NP	91.50%	89.46%	94.33%	82.50%	93.60%	97.23%	87.50%
Live measurement results for broadband download speed																
Broadband download speed	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	115.67%	93.33%	80.53%	NP	93.33%	87.16%	97.00%	NP	91.60%	94.00%	94.33%	84.83%	93.00%	94.86%	86.00%

Data Source: Download measurement software installed in the server at ISP Node of the operators

5.7 SERVICE AVAILABILITY/ UPTIME

Audit results for service availability															
Service Availability	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Service Availability Uptime in Percentage	≥ 98%	99.99%	99.44%	100.00%	NP	99.29%	100.00%	100.00%	99.91%	99.27%	99.47%	100.00%	100.00%	98.68%	99.42%	99.45%

Live measurement results for service availability																
Service Availability	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Service Availability Uptime in Percentage	≥ 98%	99.00%	98.43%	100.00%	NP	99.12%	100.00%	100.00%	98.90%	98.77%	98.78%	100.00%	100.00%	99.56%	99.34%	98.42%

Data Source: Operations and Maintenance Center (OMC) of the operators

5.8 NETWORK LATENCY / PACKET LOSS

Audit results for Latency and packet loss																
Network Latency and Packet Loss	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Packet Loss (Percentage)	< 1%	0.01%	0.05%	0.50%	NP	0.72%	1.16%	NP	0.00%	0.00%	0.52%	0.00%	0.00%	0.00%	0.10%	0.00%
Network Latency																
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	29.69	4.35	2	NP	1	30	NA	1	9	16	NA	1.86	1	68.47	8.2
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	62.22	167.8	NA	NP	90	65.97	NP	271.95	174	17.33	NA	NA	258	200.95	276.78
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Live measurement results for Latency and packet loss																
Network Latency and Packet Loss	Benchmark	BHARTI AIRTEL	CITYCOM	D-VOIS	Five	HATHWAY	HONESTY NET	INDUS MEDIA	MTNL	PACENET	RCL	Siti	SYSCON	TCL	TTL	YOU
Packet Loss (Percentage)	< 1%	0.23%	0.00%	0.23%	NP	0.77%	1.17%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%
Network Latency																
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	32	4.36	1.33	NP	1	30	2	1	3	3.955	NA	1.86	1	33.2	2.33
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	74.6	204.58	NA	NP	90	66	NP	193.6	58	0.76	NA	NA	59	163.37	93
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Source: Network Operations Center (NOC) of the operators

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