



AUDIT & ASSESSMENT OF QUALITY OF SERVICE

NORTH ZONE – JAMMU & KASHMIR CIRCLE

WIRELINE & BROADBAND SERVICES (APRIL TO JUNE 2016)

PREPARED BY:

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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 Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated June 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated April 6, 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. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

Phistream Consulting Private Limited is an ISO 9001 : 2008 certified company who are one of the pioneers in the field of technical audit, quality assurance and third party inspection services. Established more than a decade ago in 2004, we aspire to provide longer term savings based on year-on-year productivity. With our size, we are nimble and aspire to being a full service partner for providing consultancy services.

We have been helping our clients by determining the best solutions and enabling businesses to enjoy the benefits of top-notch support without distracting their team from the main business focus. Our business analysts have enough experience to get involved at the requirements gathering stage through consulting work handing off a detailed requirements document to our operations staff who in turn can train our support and maintenance resources for ongoing engagement.

In keeping with our goal of being a one stop quality assurance and consulting partner, our specialists employ a strategy and consulting-based implementation methodology and capitalize on strong program governance to offer a wide range of services for various industry verticals.

1.3. 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).

1.4. COVERAGE

The audit was conducted in Jammu and Kashmir Circle covering all SSAs (Secondary Switching Areas).



Image Source: Wikipedia

1.5. 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, Phistream auditors contacted the broadband operators given in the list to conduct the audit in Jammu and Kashmir circle for the AMJ 2016 quarter.
- The PMR was generated from the raw data pertaining to April, May and June 2016, which was extracted by auditor from the operator's systems during the audit conducted in the month of July 2016.
- Live calling activity was carried out during the period of June 2016. The data considered for live calling was for the month prior to the live calling month. In this round of audit, June 2016 data was considered for live calling for all operators whereas live measurement was carried out at the centralised operation centres of the operators, as per tender document.
- 3 day live measurement activity was carried out on working days during the month of June 2016.
- 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.

1.6. FRAMEWORK USED

Audit Activities

PMR Reports	Drive Test	CSD Audit	Wireline & Broadband	Inter Operator Call Assessment
Monthly PMR	Operator Assisted	Billing Complain	Billing Complain	
3 Days Live Data	Independent	Service request	Service Request	
Customer Service	Level 1 Service	Customer Service	Level 1 Service	
			Customer Service	

2. BASIC TELEPHONE SERVICE (WIRELINE) AND BROADBAND SERVICES

2.1. WIRELINE SERVICE PARAMETER

S. No.	Name of Parameter	Benchmark
1	Fault incidences (Fault incidences subscribers / month)	≤ 7
2	Fault repair by next working day	<p>For urban areas: By next working day: $\geq 85\%$ and within 5 days: 100%.</p> <p>For rural and hilly areas: By next working day: $\geq 75\%$ and within 7 days: 100%.</p> <p>Rent Rebate: Faults pending for >3 days and ≤ 7 days: Rent rebate for 7 days. Faults pending for >7 days and ≤ 15 days: Rent rebate for 15 days. Faults pending for > 15 days: rent rebate for one month.</p>
3	Mean Time To Repair (MTTR)	≤ 10 Hrs
4	Point of Interconnection (POI) Congestion (on individual POI)	$\leq 0.5\%$
5	Metering and billing credibility – post paid	Not more than 0.1% of bills issued should be disputed over a billing cycle
6	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
7	Resolution of billing / charging complaints	$\geq 98\%$ within 4 weeks 100% within 6 weeks
8	Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	Within one week of resolution of complaint
9	Response Time to the customer for assistance	
	(a) Accessibility of call centre/ customer care	$\geq 95\%$
	(b) Percentage of calls answered by the operators (voice to voice) within 60 seconds	$\geq 95\%$
10	Termination/ closure of service	≤ 7
11	Time taken for refund of deposits after closures	100% within 60 days.

2.2. BROADBAND SERVICE PARAMETER

S. No.	Name of Parameter	Benchmark
1	Service provisioning\ Activation	100% cases in ≤ 15 working days (subject to technical feasibility). In all cases where payment towards installation charge & security deposit is taken and the Broadband connection is not provided within 15 working days, a credit at the rate of Rs.10/ per day, subject to a maximum of installation charge or equivalent usage allowance shall be given to the customer, at the time of issue of first bill.
2	Fault Repair\Restoration Time	By next working day: > 90% and within 3 working days: 99% Rebate: (a) Faults Pending for > 3 working days and < 7 working days: rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance (b) Faults Pending for > 7 working days and < 15 working days: rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance (c) Faults Pending for > 15 working to one month of minimum monthly usage allowance.
3	Billing Performance	
	• Billing complaints per 100 bills issued	<2%
	• %age of Billing Complaints Resolved	100% within 4 weeks
	• Time taken for refund of deposits after closure	100% within 60 days
4	Response time to the customer assistance	% age of calls answered by operator (Voice to Voice) Within 60 seconds > 60% Within 90 seconds > 80%
5	Bandwidth Utilization/ throughput	
	a) Bandwidth Utilization	
	i) POP to ISP Gateway Node (Intra – Network) Links.	<80% link(s)/route bandwidth utilization during peak hours (TCBH).
	ii) ISP Gateway Node to IGSP / NIXI upstream links for international connectivity.	
	b) Broadband connection speed (download).	Subscribed Broadband Connection Speed to be met >80% from ISP Node to User.
6	Service Availability / Uptime for all users	> 98%
7	Packet Loss (for wired broadband access)	<1%
8	Network Latency (for wired broadband access)	
	• User reference point at POP\ ISP gateway node to international gateway.	<120 msec
	• User reference point at ISP Gateway Node to international nearest NAP port abroad.	<350 msec
	• User reference point at ISP Gateway Node to international nearest NAP port abroad	<800 msec

9	Customer perception of services	
a	% satisfied with the provision of services.	>90%
b	% satisfied with the billing performance.	>90%
c	% satisfied with help services	>90%
d	% satisfied with network performance, reliability and availability	>85%
e	% satisfied with maintainability	>85%
f	% satisfied with Overall customer satisfaction	>85%
g	% satisfied	>85%
	Customer satisfaction with offered supplementary services such as allocation of static/fixed IP addresses, email-id's.	

3. EXECUTIVE SUMMARY : BASIC (WIRELINE)

The objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various wireline operators in the Jammu and Kashmir Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

3.1. BASIC (WIRELINE)

The QoS audit for basic (wire line) service was undertaken for assessment of quarterly performance of the service providers for quarter ended June-2016.

Sampling has been done for each service provider separately as per TRAI Guideline. In an LSA, sample has been included all POPs located in 10% of SDCAs in the LSA or 10 SDCAs, whichever is more, subject to maximum of the number of SDCAs covered by the service provider in the LSA. SDCAs selected should be evenly spread over the LSA and shall include major population centers. List and details of POPs shall be obtained from NOC/ISP Node of the operators. The performance of the Service providers against each parameter has been evaluated by taking average of performance value of each parameter for all the exchanges of the respective service providers. The averaged value of each parameter has been tabulated as follows.

Sr. No	Service Provider	Circle	Total Exchange (Urban+Rural)	No. of Urban/Rural Exchanges Covered for audit	Total SDCA Covered for audit
1	BSNL	J&K	371	61	10
Total Exchanges at present			371	61	10

3.2. SERVICE PROVIDER PERFORMANCE REPORT BASED ON QUARTERLY MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS

AVERAGED AUDITED DATA FOR WIRELINE (BASIC) SERVICES – J&K CIRCLE					
Wireline Audit Data		Benchmark	Audit Period	Circle Name	BSNL
S/ N	Name of Parameter				
1	Fault incidences				
	% of (No. of faults/100 subscribers /month)	< 7%	Quarterly	J&K	26.38
2	Faults Repair/Restoration Time				
	% of fault repair by next working day(Urban Area)	>85%	Quarterly	J&K	95.67%
	% of fault repair Within 5 days (Urban Area)	100%	Quarterly	J&K	100.00%
	% of fault repair by next working day(Rural & hilly Area)	>75%	Quarterly	J&K	98.36%
	% of fault repair Within 7 days(Rural & hilly Area)	100%	Quarterly	J&K	100.00%
	Mean time to Repair(MTTR)	≤10 Hrs	Quarterly	J&K	3.72
3	Rent Rebate				
	Fault pending > 3 days & <7 days	Rebate for 7 days	Quarterly	J&K	0
	Fault Pending > 7 days & < 15 days	Rebate for 15 days	Quarterly	J&K	0
	Fault pending > 15 days	Rebate for 1 month	Quarterly	J&K	0

4	Metering & Billing Credibility				
	% of disputed Bills over bills issued (Post Paid)	< 0.1%	Quarterly	J&K	0.02%
	% of Pre-paid Charging Complaints	< 0.1%	Quarterly	J&K	NA
	% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	98% within 4 weeks	Quarterly	J&K	100.00%
	% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	100% within 6 weeks	Quarterly	J&K	100.00%
5	POI Congestion				
	No. of POI's having congestion >0.5%		Quarterly	J&K	0
6	Response Time to customer for assistance				
	% age of Accessibility of Call centre/customer Care	>=95%	Quarterly	J&K	98.68%
	% age of calls answered by perator(voice to voice) within 90 seconds	>=95%	Quarterly	J&K	99.92%
7	Customer care(promptness in attending to customers request)				
	Termination / Closures	100%	Quarterly	J&K	100.00%
	Time taken for refunds of deposit after closure	100%	Quarterly	J&K	100.00%

- NA-Not Applicable

3.3. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS LIVE MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS

3 DAYS LIVE MEASUREMENT DATA FOR WIRELINE (BASIC) SERVICES - J&K CIRCLE					
<u>3 days live Wireline Audit Data</u>		Benchmark	Audit Period	Circle Name	BSNL
S/ N	Name of Parameter				
1	POI Congestion				
	No. of POI's having congestion >0.5%		Live	J&K	0
2	Response Time to customer for assistance				
	Accessibility of Call centre/customer Care	>=95%	Live	J&K	97.79%
	% age of calls answered by operator(voice to voice) within 90 seconds	>=95%	Live	J&K	100.00%

3.4. KEY FINDINGS: BASIC TELEPHONE SERVICES (WIRELINE)

Fault Incidences: For this parameter, the performance of the service provider was found well within the compliance benchmarks except BSNL as 26.38%.

Fault Repair/Restoration Time: For this parameter, the performance of the service provider was found well within the compliance benchmarks.

Mean Time to Repair: BSNL have met the benchmark for this parameter.

Metering and Billing performance: For this parameter, the performance of the service provider was found well within the compliance benchmarks.

Period of refund/adjustment from date of resolution of complaints: The performance of the service provider was within the benchmark of ≤ 1 week.

Response Time to Customer for assistance: For this parameter, the performance of the service provider was found well within the compliance benchmarks.

Termination/Closures: For this parameter, the performance of the service provider was found well within the compliance benchmarks.

3.5. LIVE MEASUREMENT

For this parameter, the performance of the service provider was found well within the compliance benchmarks.

3.6. INTER OPERATOR CALL ASSESSMENT (WIRELINE)

As there is only one basic (wireline) operator i.e. BSNL, so inter operator Call assessment is not done.

3.7. LEVEL-1 LIVE CALLING (WIRELINE)

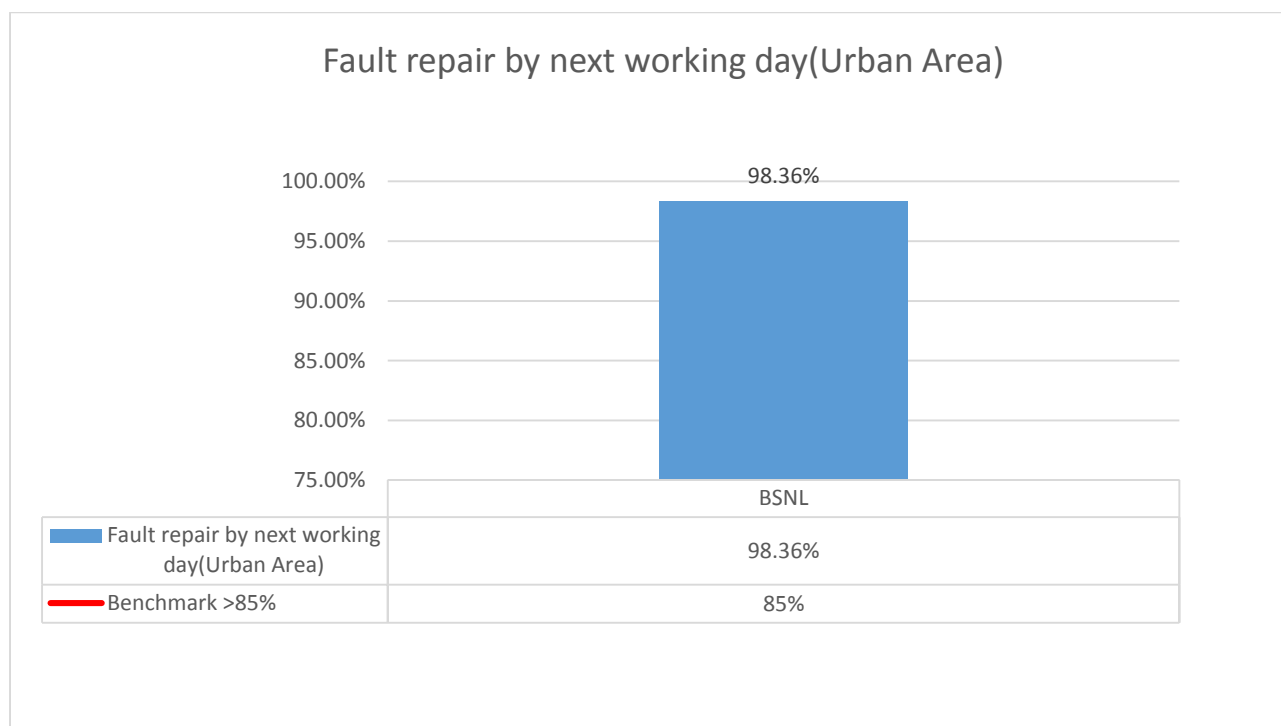
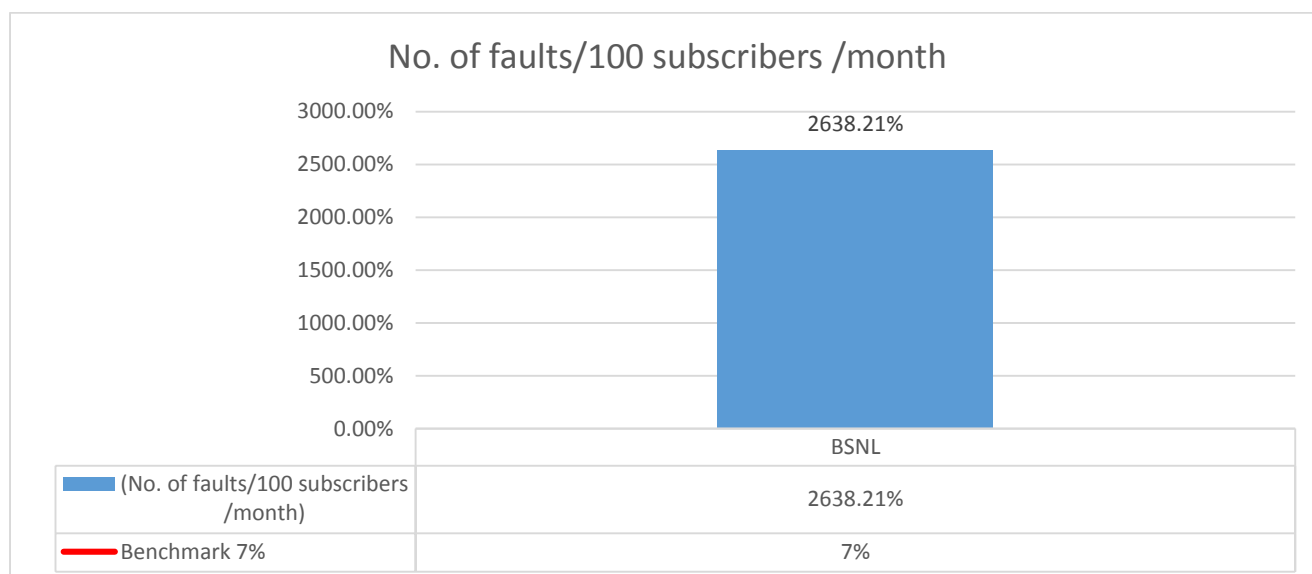
LEVEL 1 LIVE CALLING			
Emergency no.	Circle Name	No. of calls made	BSNL
100	J&K	50	√
101	J&K	50	√
102	J&K	50	√

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by the service provider, the calls were made from telephone provided by the service providers. In J&K circle, these services were found functional in the networks of both the service providers.

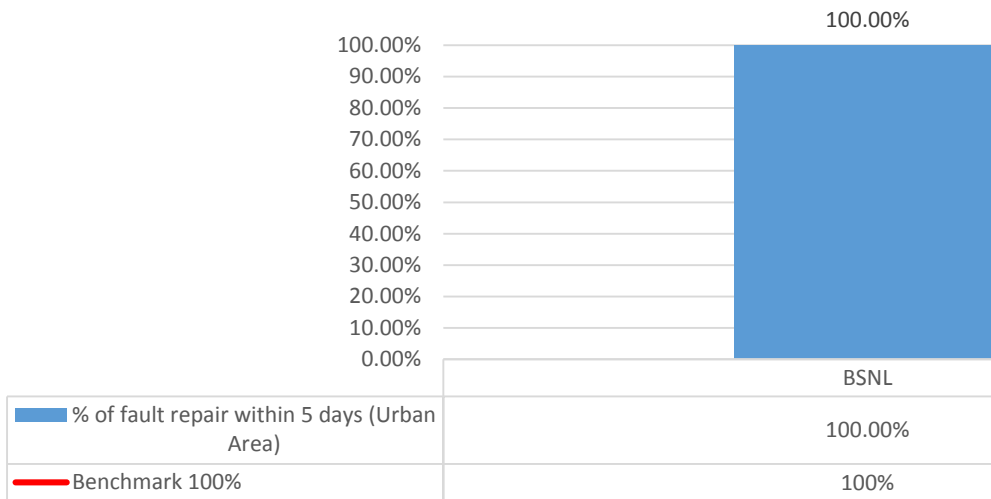
3.8. CUSTOMER CARE / HELPLINE ASSESSMENT (WIRELINE SERVICES)

LIVE CALLING TO CALL CENTRE		
Parameters	Benchmark	BSNL
A) Total no of calls attempted to customer care/Call center		100
B) Total no. of calls successfully established to customer care/Call center		100
C) % Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)	$\geq 95\%$	100.00%
D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		100
E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		90
F) % age of calls answered by the operators (voice to voice) within 90 seconds	$\geq 95\%$	90.00%

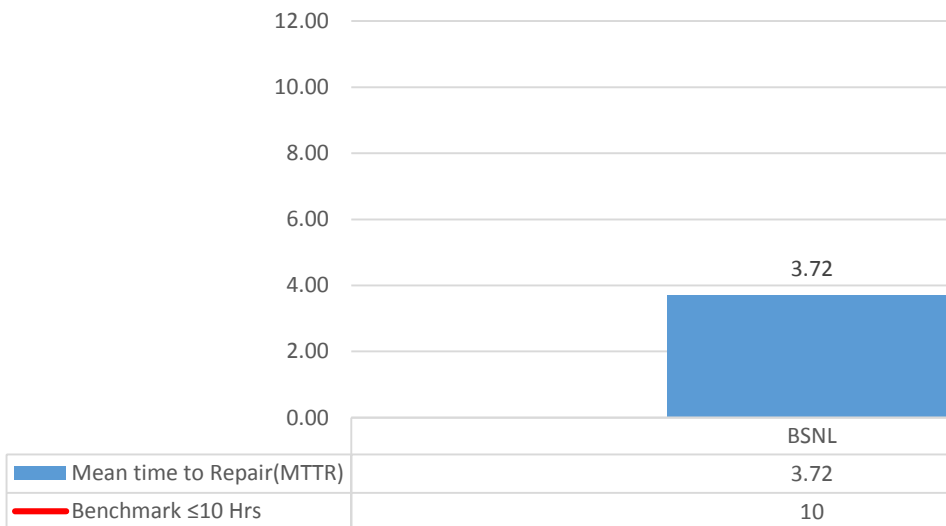
3.9. GRAPHICAL REPRESENTATION



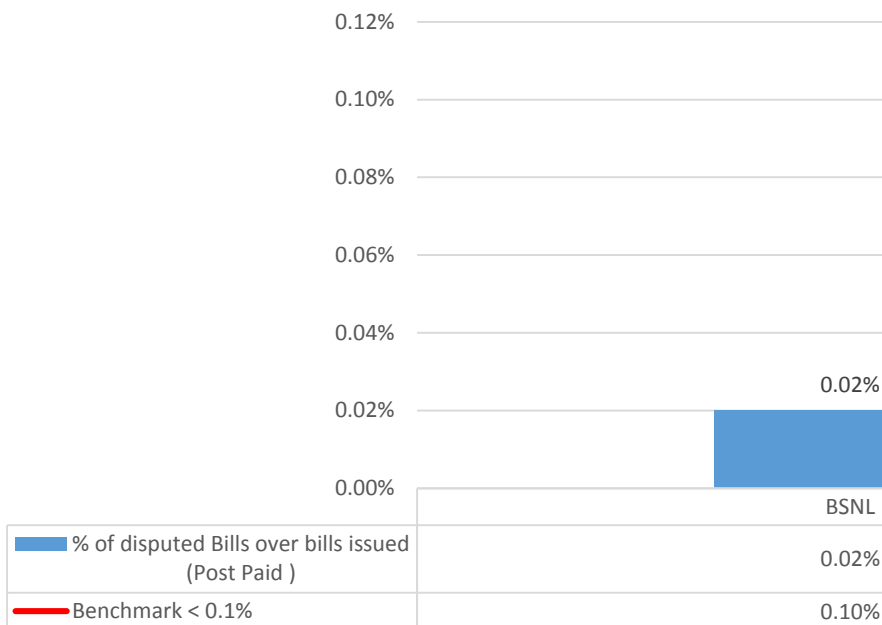
%Age of fault repair within 5 days (Urban Area)



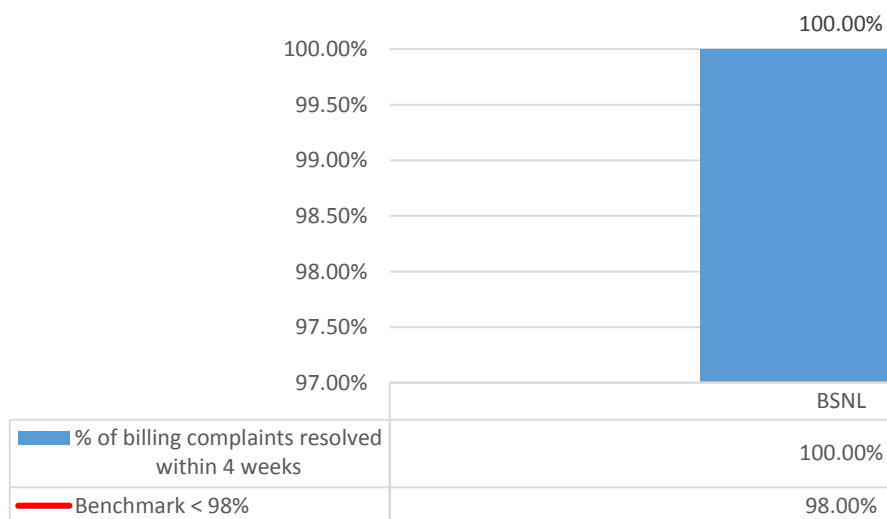
Mean time to Repair(MTTR)



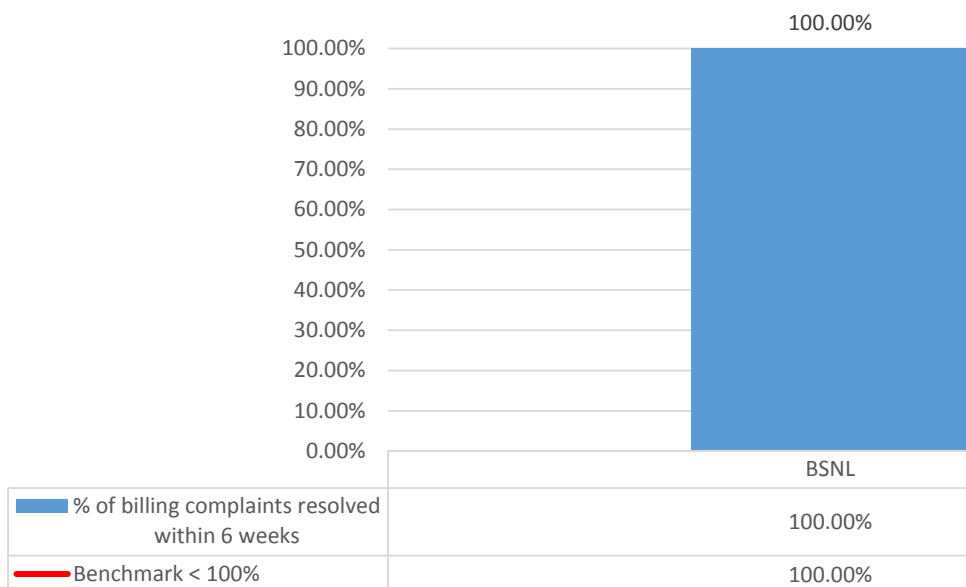
Metering & Billing Performance



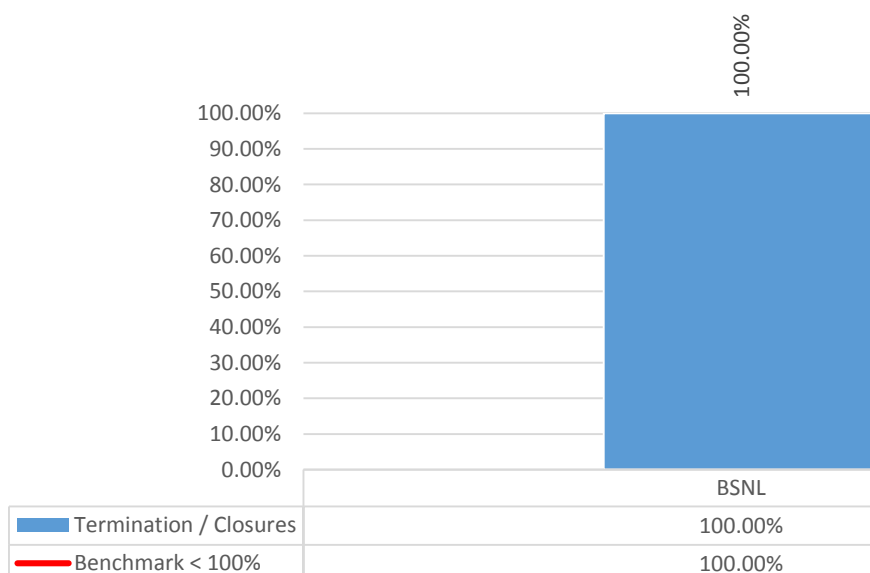
Percentage of billing complaints resolved within 4 weeks



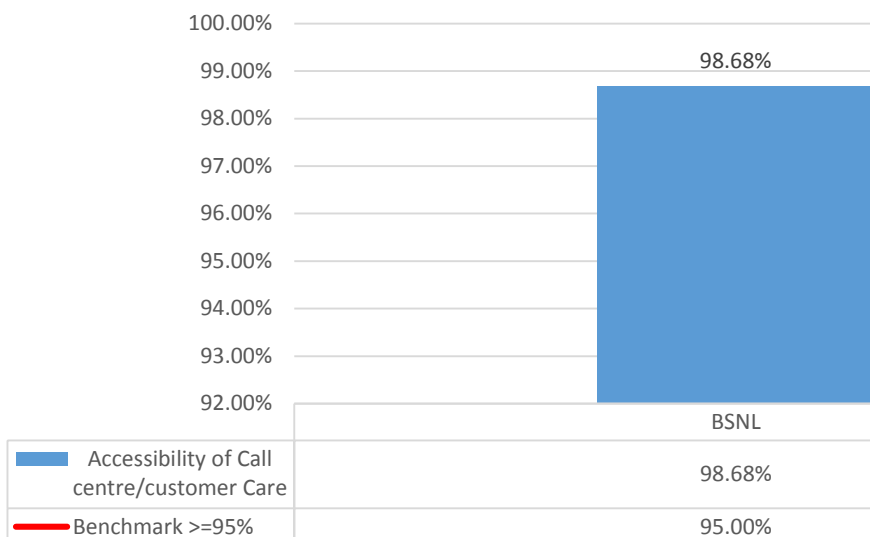
Percentage of billing complaints resolved within 6 weeks



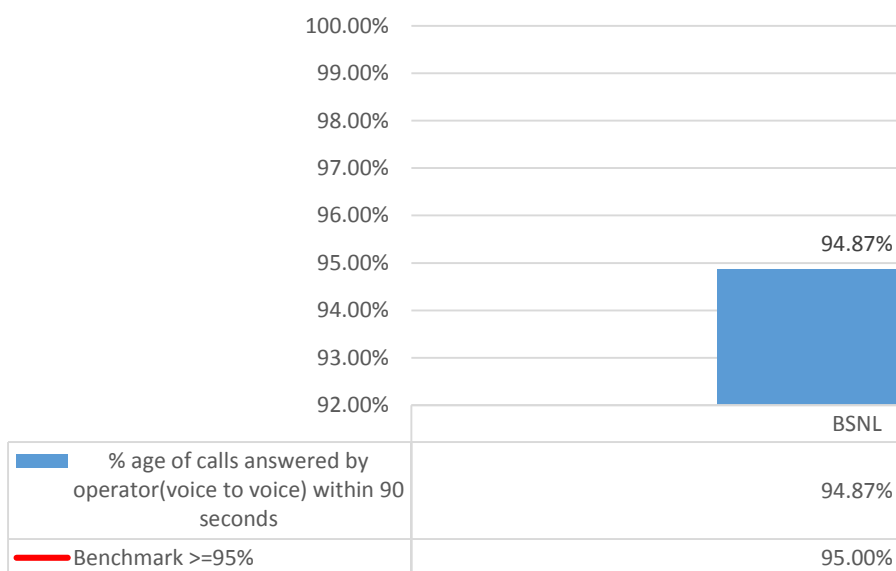
Customer care(promptness in attending to customers request)



Accessibility of Call centre/customer Care



Percentage of calls answered by operator(voice to voice) within 90 seconds



4. EXECUTIVE SUMMARY : BROADBAND

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

4.1. QUALITY OF SERVICE AUDIT OF BROADBAND SERVICE PROVIDERS

Phistream has 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 as per TRAI guideline; Sampling shall be done for each service provider separately. In an LSA, sample shall include all POPs located in 10% of SDCAs in the LSA or 10 SDCAs, whichever is more, subject to maximum of the number of SDCAs covered by the service provider in the LSA. SDCAs selected should be evenly spread over the LSA and shall include major population centers. List and details of POPs shall be obtained from NOC/ISP Node of the operators. A service areal circle in the contracted Zone shall be audited only once in a year.

Discussion with the private broadband service providers reveals that there is no concept of their PoPs on SDCA basis; they are maintaining their entire data on centralized basis so audit has been done for the centralized data.

Audit was done for the following Broadband Service Providers in J&K Circle.

S. NO.	NAME OF BROADBAND SERVICE PROVIDER	LOCATION OF AUDIT
1	BHARAT SANCHAR NIGAM LIMITED (BSNL)	BSNL OFFICE JAMMU, UDHAMPUR
2	RELIANCE COMMUNICATION LIMITED (RCL)	DAKC, MUMBAI

4.2. QUARTERLY MEASUREMENT DATA FOR BROADBAND SERVICE PROVIDERS

AVERAGED QUARTERLY (APR to JUNE 16) AUDIT DATA FOR BROADBAND SERVICES – J&K CIRCLE					
<u>Broadband Audit Data</u>		Bench- mark	Circle Name	BSNL	RCL
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS	
1	Service Provisioning/Activation Time				
	A) No of connections registered during the period		J&K	4316	3
	B) Total number of connections provided within 15 days of registration on demand during the period		J&K	4316	3
	C) % age of connections provided within 15 days of registration on demand (subject to technical feasibility)	<15 days	J&K	100.00%	100.00%
	D)Total number of connections provided after 15 days of registration on demand		J&K	0	0
	E) %age of connections provided after 15 days of registration on demand		J&K	0.00%	0.00%
	F) In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	Credit @ Rs.10/ per day.	J&K	0	0
2	Fault Repair/Restoration Time				
	A) Total number of faults registered during the period		J&K	8390	0
	B) Total number of faults repaired by next working day		J&K	8118	0
	C) % age of faults repaired by next working day	>90%	J&K	96.76%	100.00%
	D) Total number of faults repaired within three working days		J&K	8378	0
	E)% age of faults repaired within three working days	≥99%	J&K	99.86%	100.00%
3	Rent Rebate				
	A) Faults Pending for > 3 working days and < 7		J&K	DNA	0
	working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)				
	B) Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		J&K	DNA	0
	C) Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		J&K	DNA	0
4	Billing Performance				
	A) Total bills generated during period		J&K	58062	62
	B) Total complaints received from customers/ Bills disputed		J&K	0	0
	C) Billing complaints per 100 bills issued	<2%	J&K	0.00%	0.00%

	D) Total number of complaints resolved in 4 weeks from date of receipt		J&K	DNA	0
	E) %age billing complaints resolved in 4 weeks	100%	J&K	DNA	100.00%
	F) Total number of cases requiring refund of deposits after closure		J&K	DNA	0
	G) Total number of cases where refund was made in <60 days		J&K	DNA	0
	H) Percentage cases in which refund received within 60 days	100%	J&K	DNA	100.00%
5	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)				
	A) Total number of calls received by the operator		J&K	29885	98281
	B) Total number of calls answered by the operator within 60 seconds		J&K	29835	93118
	C) % age calls answered by the operator in 60 seconds	>60%	J&K	99.83%	94.75%
	D) Total number of calls answered by the operator within 90 seconds		J&K	29868	93864
	E) % age calls answered by the operator within 90 seconds	>80%	J&K	99.94%	95.51%
6	Bandwidth Utilization/ Throughput:				
6.1	POP to ISP Gateway Node [Intra-network] Link(s)				
	A) Total Bandwidth Available at the link for the peak hours of the day		J&K	19000	21000
	B) Total Bandwidth utilized during the peak hours i.e. TCBH (In Mbps)		J&K	10129	737
	C) % age Bandwidth utilized during the peak hour	<80%	J&K	53.31%	3.51%
6.2	A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity				
	A) Total number of upstream links for International connectivity		J&K	DNA	12
	B) Number of Links having Bandwidth utilization > 90% during TCBH		J&K	DNA	0
	C) Total international bandwidth available from ISP Node to IGSP/NIXI/NAP		J&K	DNA	348000
	D) Total international bandwidth utilization during peak hours (TCBH) in Mbps		J&K	DNA	142714
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%	J&K	DNA	41.01%
6.3	Broadband Connection Speed (download) - from ISP Node to User				
	A) Total committed download speed to the sample subscribers (In mpbs)		J&K	6	840
	B) Total average download speed observed for the sample subscribers during TCBH (In Mbps)		J&K	5.3	741
	C) % age subscribed speed available to the subscriber during TCBH	>80%	J&K	88.33%	88.21%

7	Service Availability/Uptime				
	A) Total operational Hours		J&K	2184	2184
	B) Total downtime (In hours)		J&K	1	0
	C) Total time when the service was available (In Hrs)		J&K	2183	2184
	D) % age of Service availability uptime	>98%	J&K	99.95%	100.00%
8	Packet Loss				
	A) Total number of ping packets transmitted		J&K	3000	91000
	B) Total number of ping packets lost		J&K	5	419
	C) % age packet loss	<1%	J&K	0.17%	0.45%
9	Network latency (for wired broadband access)				
9.1	Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway				
	A) Total number of ping packets transmitted		J&K	3000	3000
	B) Total round trip time for all the ping packets transmitted during the period		J&K	40.62	9
	C) Average round trip tip time for all the ping transmitted	<120 ms	J&K	13.54	3
9.2	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)				
	A) Total number of ping packets transmitted		J&K	3000	3000
	B) Total round trip time for all the ping packets transmitted during the period		J&K	270.27	24
	C) Average round trip tip time for all the ping transmitted	<350 ms	J&K	90.09	8
9.3	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)				
	A) Total number of ping packets transmitted		J&K	DNA	DNA
	B) Total round trip time for all the ping packets transmitted during the period		J&K	DNA	DNA
	C) Average round trip tip time for all the ping transmitted	<800 ms	J&K	DNA	DNA

- NA- Not Applicable
- NP-Not Provided- Monthly Data Not Monitored by ISPs.

4.3. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS

3 DAYS LIVE DATA FOR BROADBAND SERVICES – J&K CIRCLE					
3 days live Broadband Audit Data		Bench- mark	Circle Name	BSNL	RCL
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS	
1	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)				
	A) Total number of calls received by the operator		J&K	1157	3674
	B) Total number of calls answered by the operator within 60 seconds		J&K	1157	3593
	C) % age calls answered by the operator in 60 seconds	>60%	J&K	100.00%	97.80%
	D) Total number of calls answered by the operator within 90 seconds		J&K	1157	3629
	E) % age calls answered by the operator within 90 seconds	>80%	J&K	100.00%	98.78%
2	Bandwidth Utilization/ Throughput:				
2.1	POP to ISP Gateway Node [Intra-network] Link(s)				
	A) Total Bandwidth Available at the link for the period days		J&K	21000	21000
	B) Total Bandwidth utilized during the period during TCBH (In Mbps)		J&K	11076	877.85
	C) % age Bandwidth utilized during the period	<80%	J&K	52.74%	4.18%
	A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity				
2.2	A) Total number of upstream links for International connectivity		J&K	DNA	12
	B) Number of Links having Bandwidth utilization > 90% during TCBH		J&K	DNA	0
	C) Total international bandwidth available from ISP Node to IGSP/NIXI/NAP		J&K	DNA	348000
	D) Total international bandwidth utilization during peak hours (TCBH) in Mbps		J&K	DNA	176971
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%	J&K	DNA	50.85%
	Broadband Connection Speed (download) - from ISP Node to User				
2.3	A) Total committed download speed to the sample subscribers (In mpbs)		J&K	12	1
	B) Total average download speed observed for the sample subscribers during TCBH (In Mbps)		J&K	9.98	0.94
	C) % age subscribed speed available to the subscriber during TCBH	>80%	J&K	83.17%	94.00%
	Packet Loss				
3	A) Total number of ping packets transmitted		J&K	3000	3000
	B) Total number of ping packets lost		J&K	6	0
	C) % age packet loss	<1%	J&K	0.20%	0.00%
	4	Network latency (for wired broadband access)			
4.1	Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway				
	A) Total number of ping packets transmitted		J&K	3000	3000
	B) Total round trip time for all the ping packets transmitted during the period		J&K	45.57	5.46
	C) Average round trip tip time for all the ping transmitted	<120 ms	J&K	15.19	1.82
	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)				
4.2	A) Total number of ping packets transmitted		J&K	3000	3000

	B) Total round trip time for all the ping packets transmitted during the period		J&K	124.86	5.43
	C) Average round trip time for all the ping transmitted	<350 ms	J&K	41.62	1.81
	Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)				
4.3	A) Total number of ping packets transmitted		J&K	NA	NA
	B) Total round trip time for all the ping packets transmitted during the period		J&K	NA	NA
	C) Average round trip time for all the ping transmitted	<800 ms	J&K	NA	NA
5	Service Availability/Uptime				
	A) Total operational Hours		J&K	72	72
	B) Total downtime (In hours)		J&K	0	0
	C) Total time when the service was available (In Hrs)		J&K	72	72
	D) % age of Service availability uptime	>98%	J&K	100.00%	100.00%

NA: Not Applicable

NP: Data not provided:

4.4. KEY FINDINGS: BROADBAND SERVICES

Service Provisioning / Activation Time: The audit of the service providers revealed that all Broadband service providers were well within the benchmark for this parameter.

Fault Repair/Restoration Time: With regards to this parameter the performance of the service providers was within TRAI norms for all the three service providers

Billing Performance: For this parameter also the performance of the service providers was found well within the compliance benchmarks.

Response Time to Customer for assistance by operator (Voice to Voice): For this parameter also the performance of the service providers was found well within the compliance benchmarks.

Bandwidth Utilization/ Throughput: All the service providers were found using Multiple Router Traffic Grapher (MRTG) and also it was observed that all service providers were reporting combined bandwidth utilization for corporate customers and household customers.

The performance of service providers with respect of these parameters was found satisfactory i.e. within benchmark during quarterly audit as well as 3 days live measurement.

Service Availability/Uptime: All service providers were found meeting the benchmark for this parameter.

Packet Loss and Network Latency: It was observed that most of the operators were measuring packet loss and latency by conducting ping test on random basis for their internal assessment and didn't maintain the data of the parameter.

Thus the performance of the service providers was well within the benchmark.

4.5. CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES

	Circle Name	BSNL	RCL
Total No. of calls Attempted	J&K	100	100
Total number of calls answered by the operator within 60 seconds	J&K	80	100
% age calls answered by the operator in 60 seconds	J&K	80.00%	100.00%
Total number of calls answered by the operator within 90 seconds	J&K	100	100
% age calls answered by the operator within 90 seconds	J&K	100.00%	100.00%

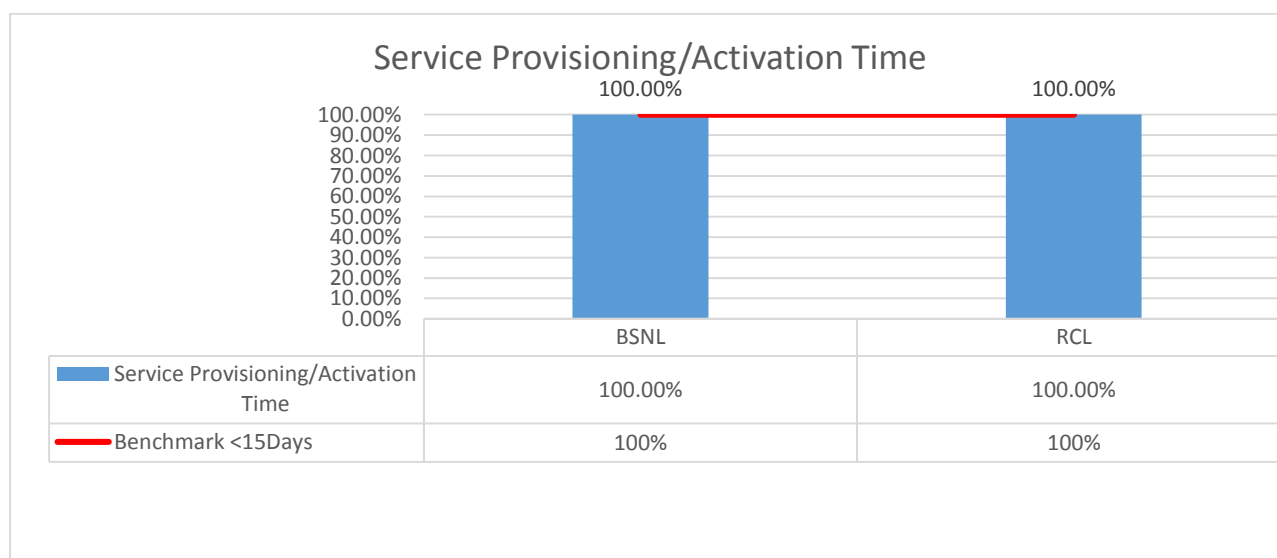
In case of calls answered by operators (voice to voice) within 60 seconds and 90 seconds, when test calls were made to the call centers, all broadband service providers were found meeting the TRAI prescribed benchmark.

4.6. LIVE CALLING FOR BILLING COMPLAINTS

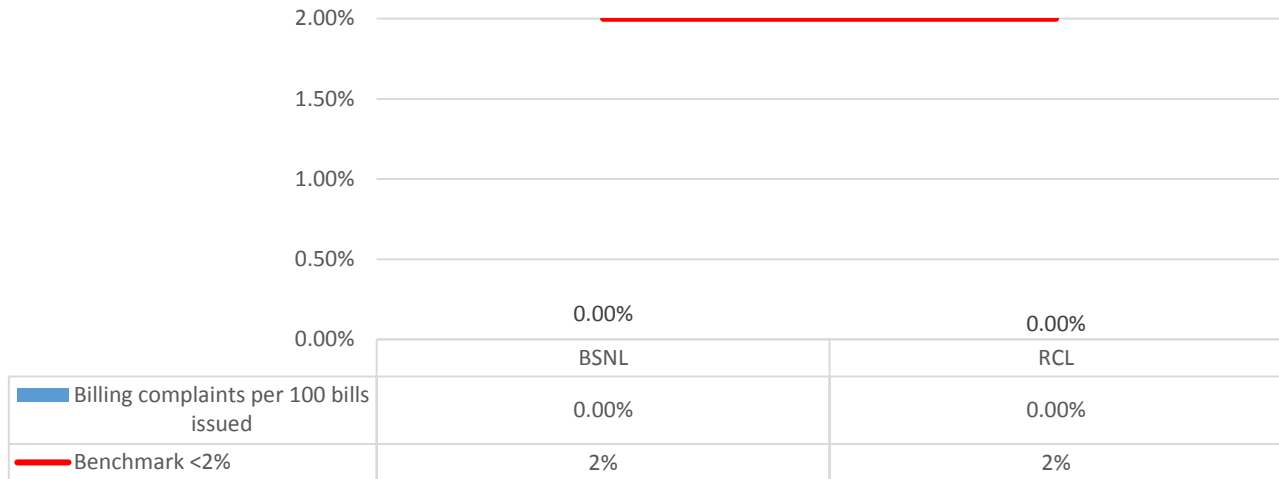
	Circle Name	BSNL	RCL
Total No. of calls Attempted	J&K	NA	0
Total No. of calls Answered	J&K	NA	0
Cases resolved within 4 weeks	J&K	NA	0
%age of cases resolved	J&K	NA	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, auditors conducted a customer feedback calling the effected customers. However, in one case, the number of customers contacted for verification was very less due to less number of billing complaints and in other cases the billing complaints were Zero. In case of the operators having billing complaints, the customers reported their satisfaction on resolution of the billing complaints.

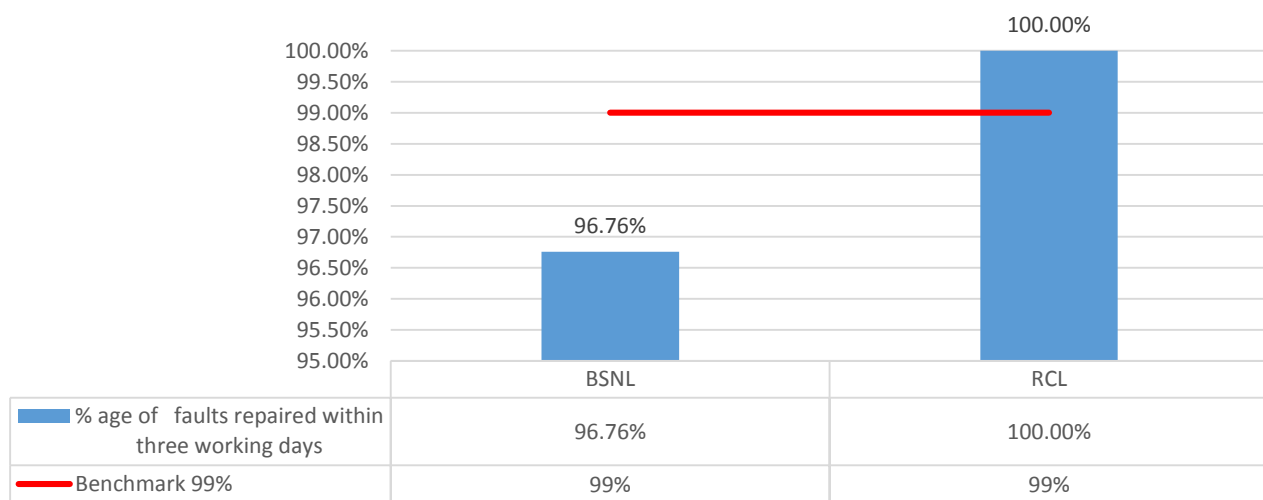
4.7. GRAPHICAL REPRESENTATION



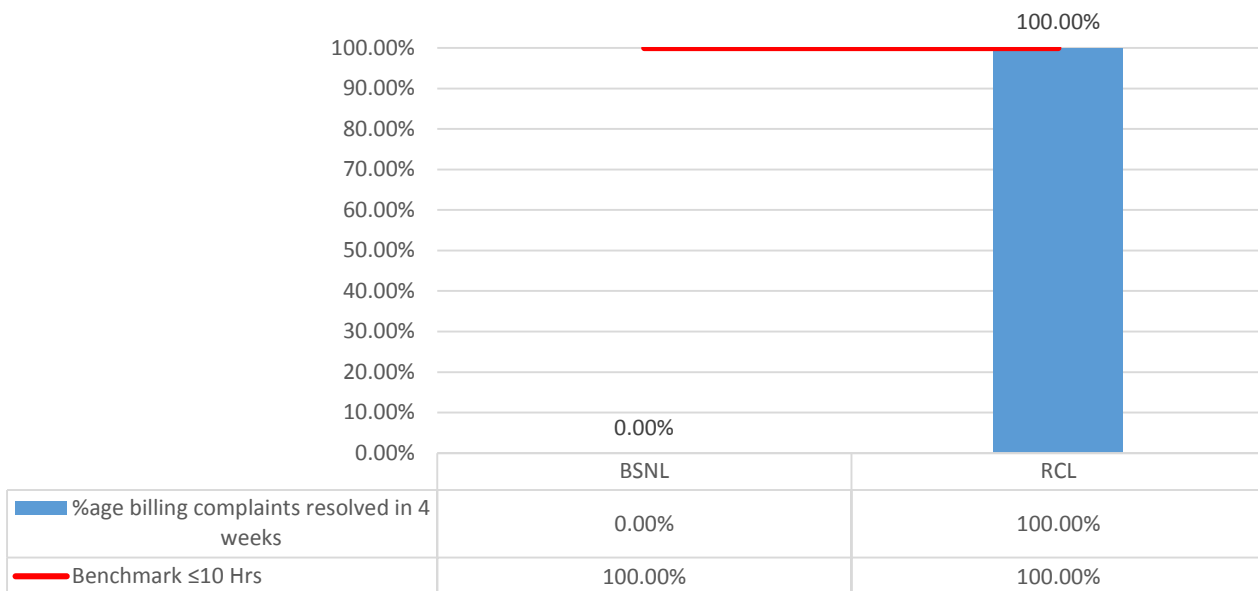
Billing Performance



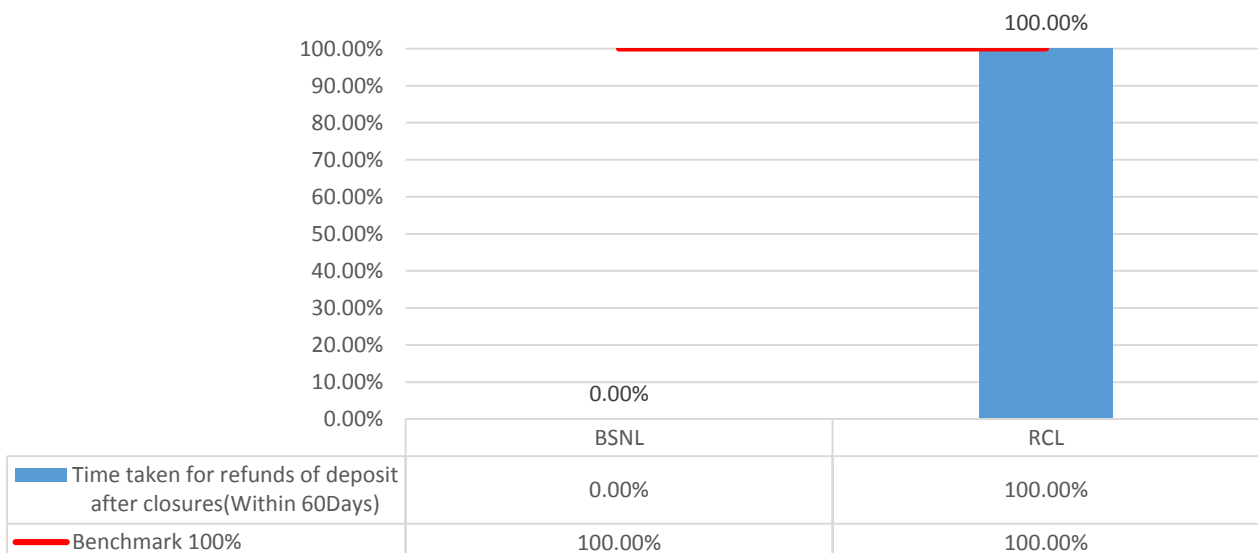
Service Provisioning/Activation Time



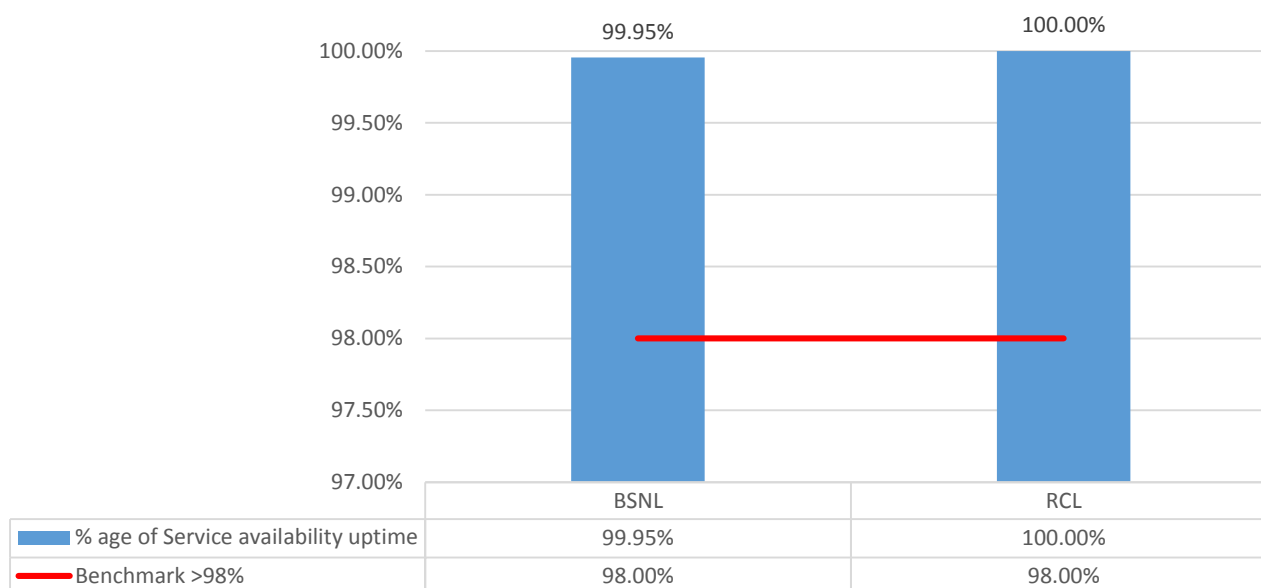
Billing Performance



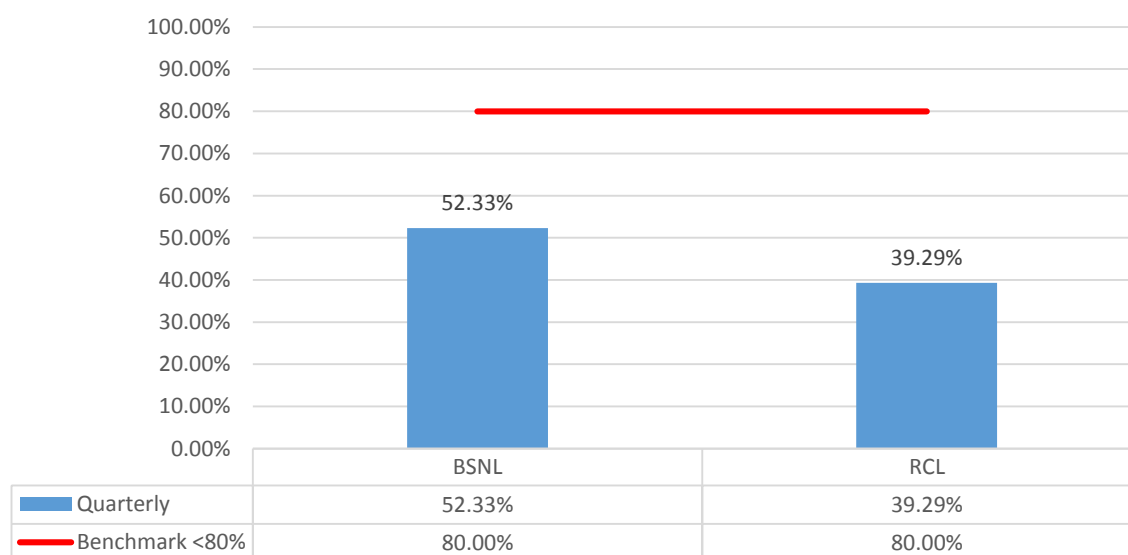
Time taken for refunds of deposit after closures(Within 60Days)



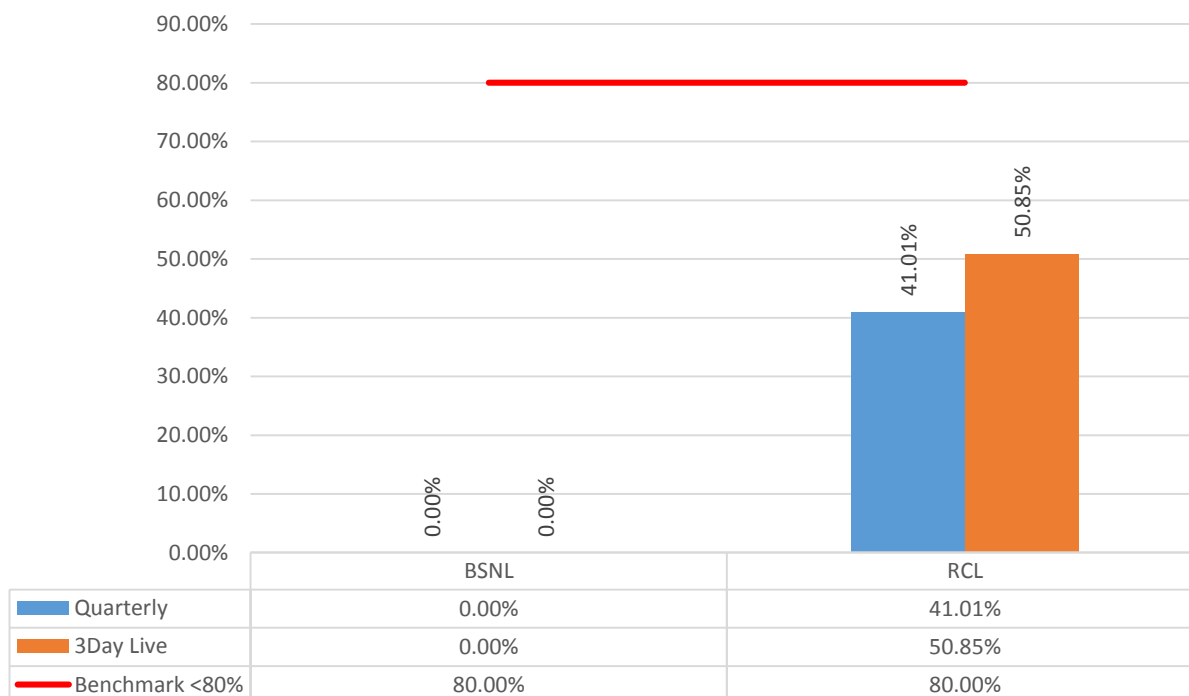
Service Availability/Uptime



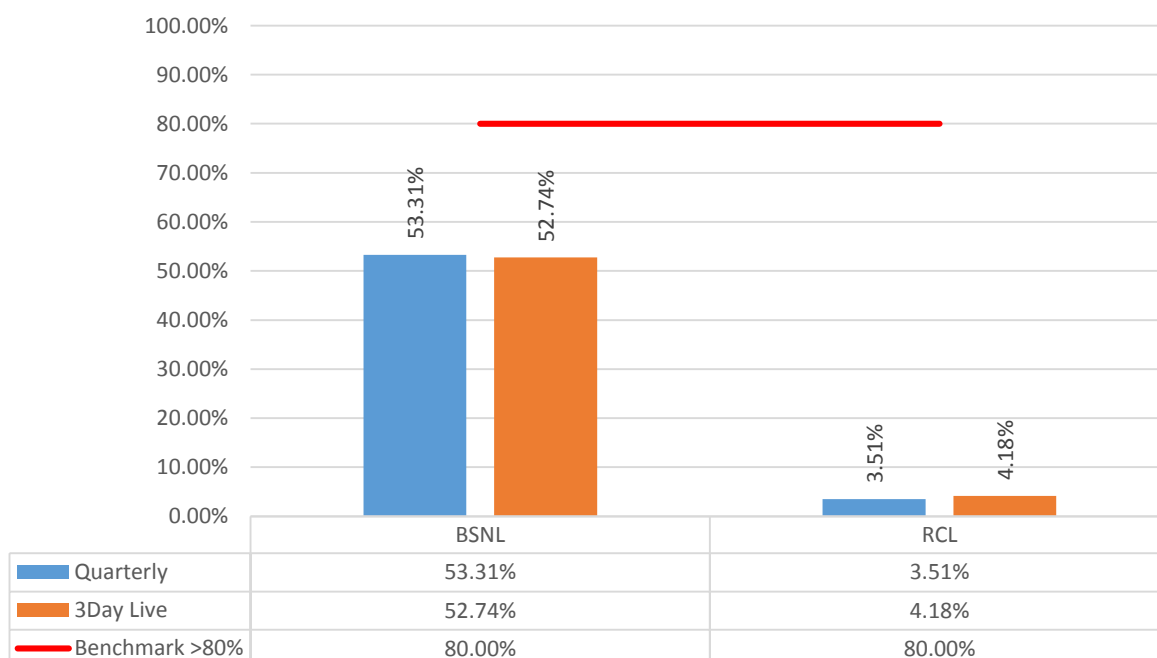
Bandwidth Utilization/ Throughput POP to ISP Gateway Node [Intra-network] Link(s)



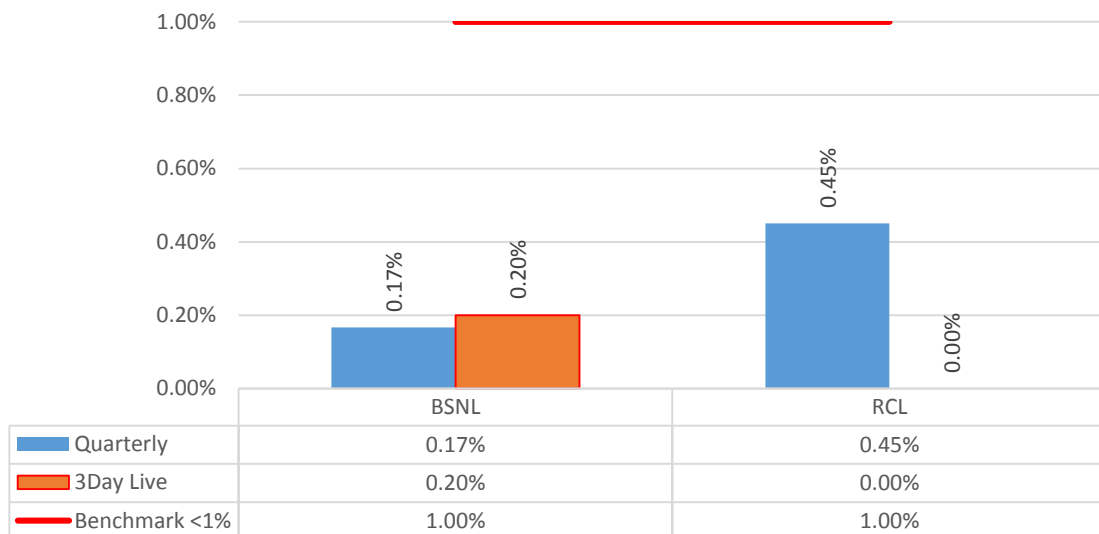
Bandwidth Utilization/ Throughput ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity



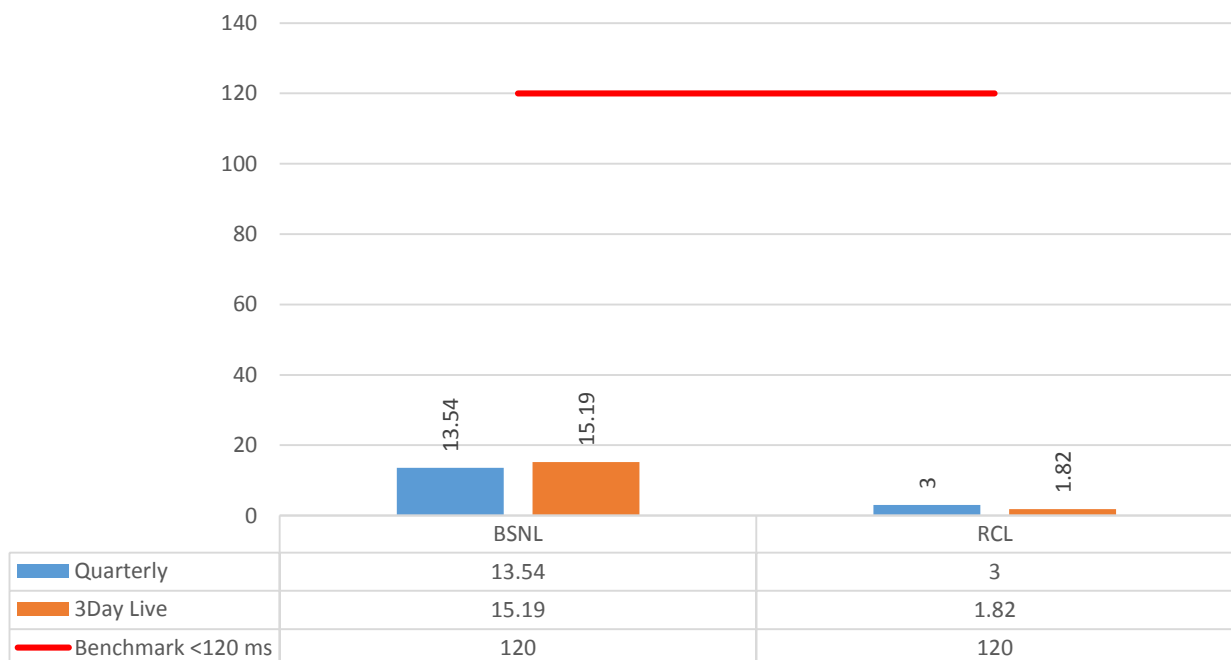
Broadband Connection Speed (download) from ISP Node to User



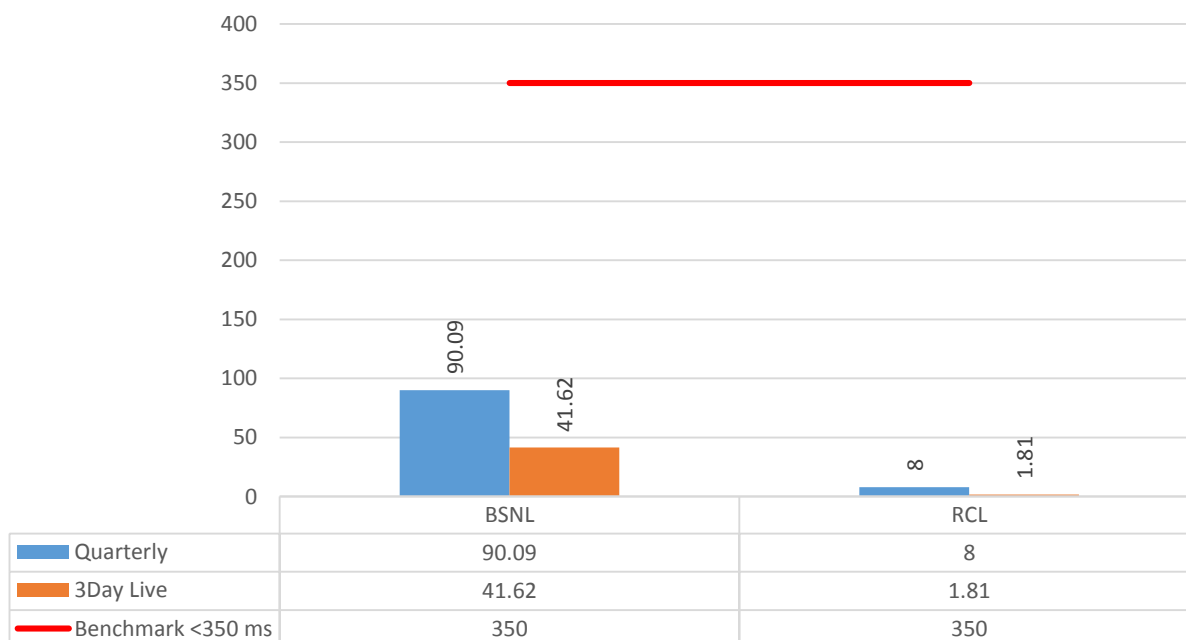
Percentage Packet loss



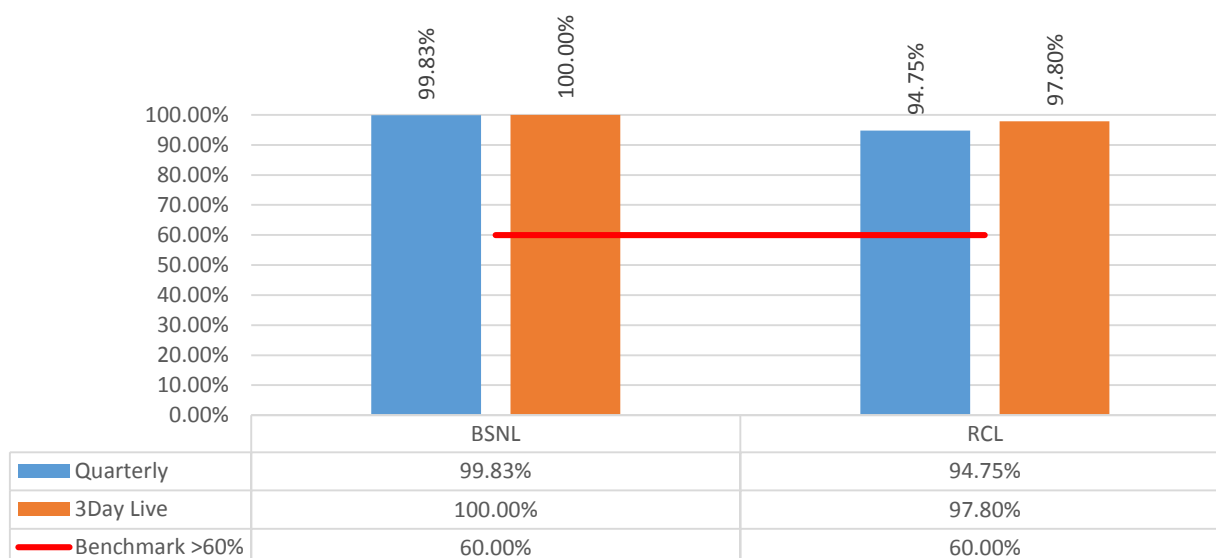
Network latency User reference point at POP/ISP Gateway node to IGSP/NIXI



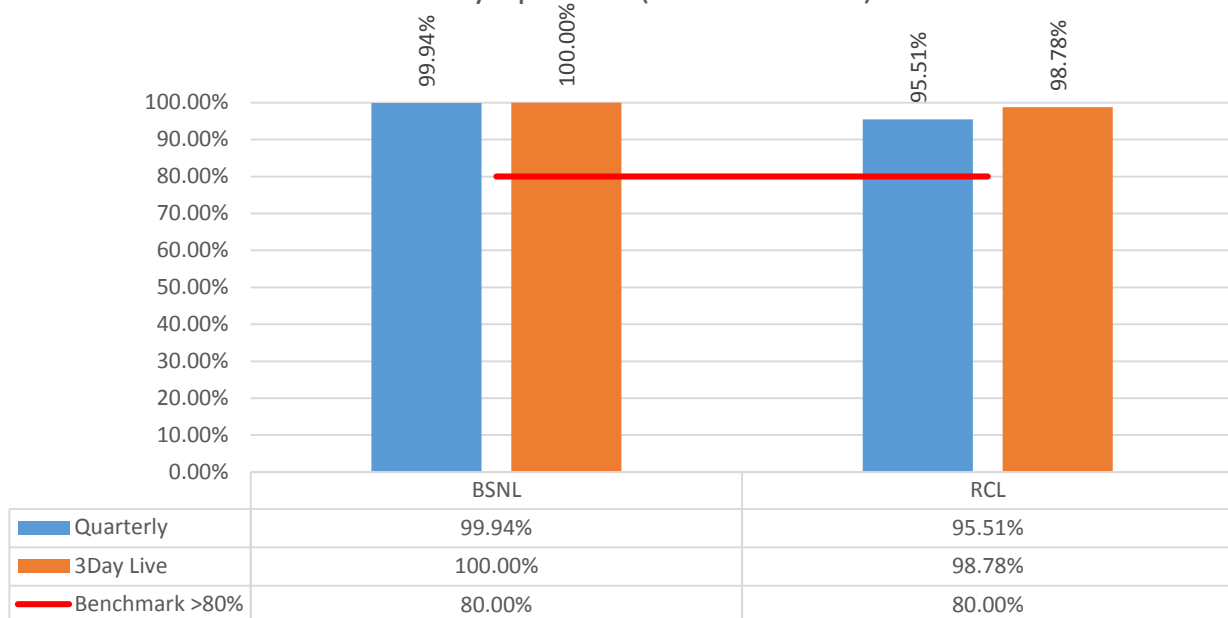
Network latency User reference point at ISP Gateway Node to International nearest NAP port abroad (terrestrial)



Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)



Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)



5. ABBREVIATIONS

Following terms/abbreviations have been used in this report. This section provides meaning of the abbreviations used in the report.

- TRAI – Telecom Regulatory Authority of India
- PCPL – Phistream Consulting Private Limited
- QoS – Quality of Service
- AMJ'16 – Refers to the quarter of April, May and June 2016
- SSA – Secondary Switching Area
- NOC – Network Operation Centre
- OMC – Operations and Maintenance Centre
- MSC – Mobile Switching Centre
- PMR – Performance Monitoring Reports
- TCBH – Time Consistent Busy Hour
- CBBH - Cell Bouncing Busy Hour
- BTS – Base Transceiver Station
- CSSR – Call Setup Success Rate
- TCH – Traffic Channel
- SDCCH – Standalone Dedicated Control Channel
- CDR – Call Drop Rate
- FER – Frame Error Rate
- SIM – Subscriber Identity Module
- GSM – Global System for Mobile
- CDMA – Code Division Multiple Access
- NA – Not Applicable
- NC – Non Compliance
- POI – Point of Interconnection
- IVR – Interactive Voice Response
- STD – Standard Trunk Dialling
- ISD – International Subscriber Dialling



AUDIT & ASSESSMENT OF QUALITY OF SERVICE

**NORTH ZONE – JAMMU & KASHMIR CIRCLE
CELLULAR MOBILE TELEPHONE SERVICE
(CMTS)
(APRIL TO JUNE 2016)**

PREPARED BY:

PHISTREAM CONSULTING PRIVATE LIMITED
(An ISO – 9001:2008 Certified Company)

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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 Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated June 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated April 6, 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. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

Phistream Consulting Private Limited is an ISO:9001 2008 certified company who are one of the pioneers in the field of technical audit, quality assurance and third party inspection services. Established more than a decade ago in 2004, we aspire to provide longer term savings based on year-on-year productivity. With our size, we are nimble and aspire to being a full service partner for providing consultancy services.

We have been helping our clients by determining the best solutions and enabling businesses to enjoy the benefits of top-notch support without distracting their team from the main business focus. Our business analysts have enough experience to get involved at the requirements gathering stage through consulting work handing off a detailed requirements document to our operations staff who in turn can train our support and maintenance resources for ongoing engagement.

In keeping with our goal of being a one stop quality assurance and consulting partner, our specialists employ a strategy and consulting-based implementation methodology and capitalize on strong program governance to offer a wide range of services for various industry verticals.

1.3. 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).
- This report covers the audit results of the audit conducted for Cellular Mobile (Wireless) services in Jammu & Kashmir circle.

1.4. COVERAGE

The audit was conducted in Jammu and Kashmir Circle covering all SSAs (Secondary Switching Areas).



Image Source: Wikipedia

1.5. SSA LIST

S. No.	Circle	SSA Name	SDCA Name
1	JK	Jammu	Akhnoor
2	JK	Jammu	Basholi
3	JK	Jammu	Jammu
4	JK	Jammu	Kathua
5	JK	Jammu	Samba
6	JK	Leh	Kargil
7	JK	Leh	Leh
8	JK	Leh	Nobra
9	JK	Leh	Nyoma
10	JK	Leh	Zanaskar
11	JK	Rajouri	Kalakot
12	JK	Rajouri	Nowshera
13	JK	Rajouri	Poonch
14	JK	Rajouri	Rajouri
15	JK	Srinagar	Anantnag
16	JK	Srinagar	Badgam
17	JK	Srinagar	Bandipur
18	JK	Srinagar	Baramulla
19	JK	Srinagar	Karnah
20	JK	Srinagar	Kulgam
21	JK	Srinagar	Kupwara
22	JK	Srinagar	Pahalgam
23	JK	Srinagar	Pulwama
24	JK	Srinagar	Sopore
25	JK	Srinagar	Srinagar
26	JK	Srinagar	Uri
27	JK	Udhampur	Bedarwah
28	JK	Udhampur	Doda
29	JK	Udhampur	Kishtwar
30	JK	Udhampur	Mahore
31	JK	Udhampur	Ramban
32	JK	Udhampur	Ramnagar
33	JK	Udhampur	Reasi
34	JK	Udhampur	Udhampur

1.6. FRAMEWORK USED

Audit Activities

PMR Reports

Drive Test

CSD Audit

Wireline &
Broadband

Inter Operator
Call Assessment

Monthly PMR

Operator
Assisted

Billing Complain

Billing Complain

3 Days Live Data

Independent

Service request

Service Request

Customer
Service

Level 1 Service

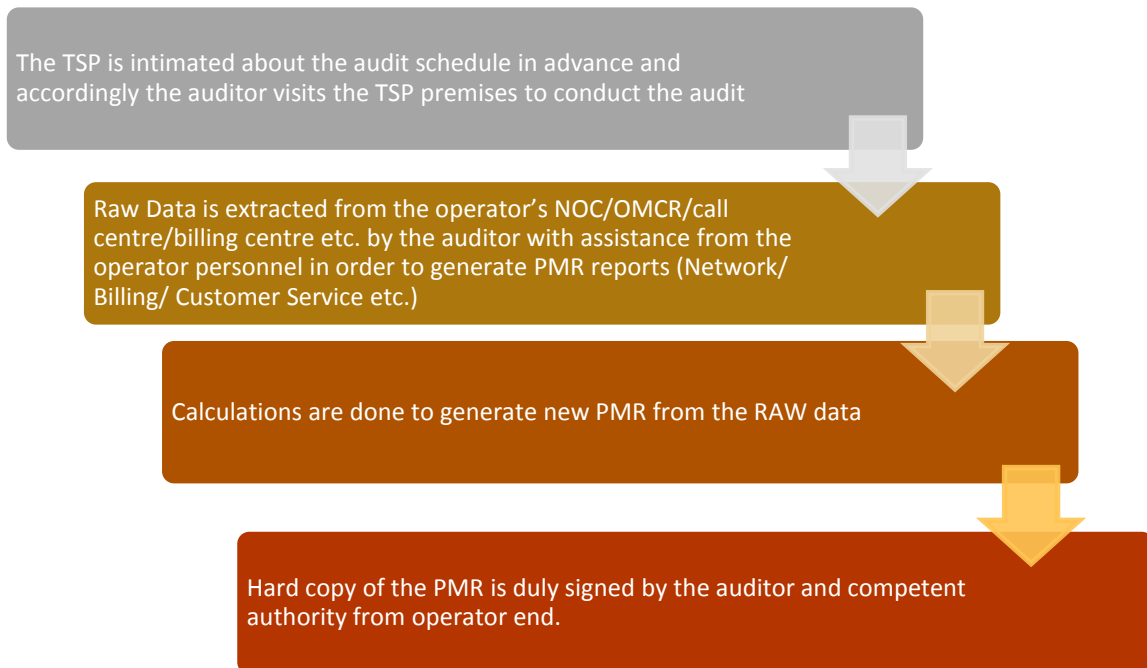
Customer
Service

Level 1 Service

Customer
Service

2. PMR REPORTS

Significance and methodology: PMR or Performance Monitoring Reports are generated to assess the various Quality of Service parameters involved in the mobile telephony service, which indicate the overall health of service for an operator.



The PMR report for network parameters is taken for each month of the audit quarter and is extracted and verified in the first week of the subsequent month of the audit month. For example, April 2016 audit data was collected in the month of May 2016.

The PMR report for customer service parameters is extracted from Customer Service Centre and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June 2016 was collected in the month of June 2016.

The raw data extracted from operator's systems is used to create PMR in the following three formats:

- Monthly PMR (Network Parameters)
- 3 Day Live Measurement Data (Network Parameters)
- Customer Service Data

Let us understand these formats in details.

2.1. MONTHLY PMR

This involved calculation of the various Quality of Service network parameters through monthly Performance Monitoring Reports (PMR). The PMR reports were generated from the data extracted from operator's systems by the auditor with the assistance of the operator at the operator's premises for the month of April, May and June 2016. The performance of operators on various parameters was assessed against the benchmarks.

Parameters includes:

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

- SDCCH/Paging Channel Congestion
- TCH Congestion
- Point of Interconnection

Connection Maintenance

- Call Drop rate
- Worst affected cells having more than 3% TCH drop

Voice Quality

- % Connections with good voice quality

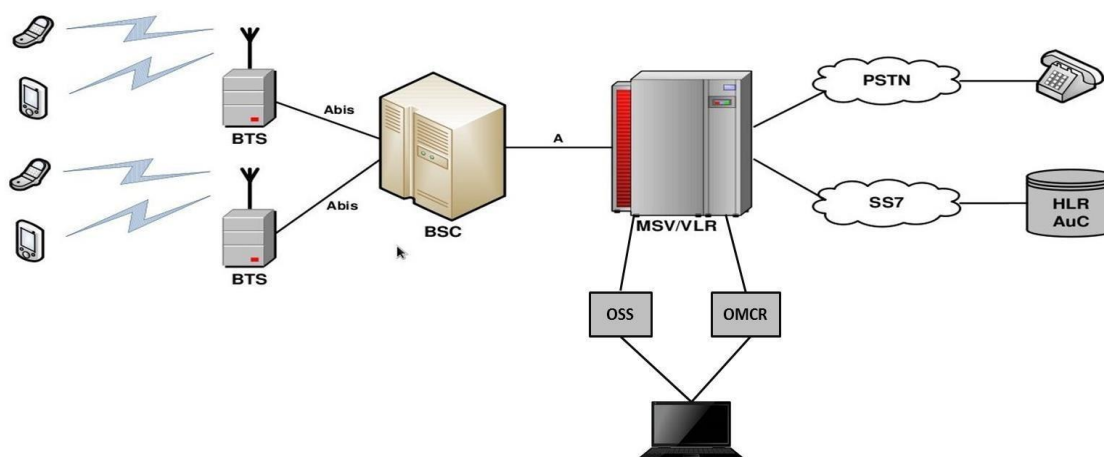
2.2. AUDIT PARAMETER: NETWORK

Let us now look at the various parameters involved in the audit reports.

Network Availability	
BTSs Accumulated downtime (not available for service)	$\leq 2\%$
Worst affected BTSs due to downtime	$\leq 2\%$
Connection Establishment (Accessibility)	
Call Set-up Success Rate (within licensee's own network)	$\geq 95\%$
SDCCH/ Paging Channel Congestion	$\leq 1\%$
TCH Congestion	$\leq 2\%$
Connection Maintenance (Retainability)	
Call Drop Rate	$\leq 2\%$
Worst affected cells having more than 3% TCH drop (call drop) rate	$\leq 3\%$
Connections with good voice quality	$\geq 95\%$
Point of Interconnection	
(POI) Congestion (on individual POI)	$\leq 0.5\%$

2.3. DATA EXTRACTION POINTS

The data is extracted from a terminal/computer connected to OMCR & OSS on the operator network.



2.4. AUDIT PROCEDURE

Tender document and latest list of licencees as per TRAI is taken as a reference document for assimilating the presence of operators. All the wireless operators are then informed about the audit schedule

Audit formats and schedule is shared with the operators in advance. Details include day of the visit and date of 3 day data collection and other requirements.

Auditors visit the operator's server/exchange/central NOC to extract data from operator's systems. Operator personnel assist the auditor in extraction process.

The extracted data is validated and verified by the Auditors.

Auditors then prepare a PMR report from the extracted data with assistance from the operator.

Extracted data is calculated as per the counter details provided by the operators. The details of counters have been provided in the report. The calculation methodology for each parameter has been stated in the table given in the following pages.

2.5. NETWORK CALCULATION METHODOLOGY

Parameter	Calculation Methodology
BTS Accumulated Downtime	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100
Worst Affected BTS Due to Downtime	(Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) * 100
Call Setup Success Rate	(Calls Established / Total Call Attempts) * 100
SDCCH/ Paging Channel Congestion	$\text{SDCCH / TCH Congestion\%} = [(A1 \times C1) + (A2 \times C2) + \dots + (An \times Cn)] / (A1 + A2 + \dots + An)$ <p>Where: A1 = Number of attempts to establish SDCCH / TCH made on day 1 C1 = Average SDCCH / TCH Congestion % on day 1 A2 = Number of attempts to establish SDCCH / TCH made on day 2</p>
TCH Congestion	C2 = Average SDCCH / TCH Congestion % on day 2 An = Number of attempts to establish SDCCH / TCH made on day n Cn = Average SDCCH / TCH Congestion % on day n
POI Congestion	$\text{POI Congestion\%} = [(A1 \times C1) + (A2 \times C2) + \dots + (An \times Cn)] / (A1 + A2 + \dots + An)$ <p>Where: A1 = POI traffic offered on all POIs (no. of calls) on day 1 C1 = Average POI Congestion % on day 1 A2 = POI traffic offered on all POIs (no. of calls) on day 2 C2 = Average POI Congestion % on day 2 An = POI traffic offered on all POIs (no. of calls) on day n Cn = Average POI Congestion % on day n</p>
Call Drop Rate	Total Calls Dropped / Total Calls Established x 100
Worst Affected Cells having more than 3% TCH drop	Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the LSA x 100
Connections with good voice quality	No. of voice samples with good voice quality / Total number of samples x 100

2.6. 3G VOICE

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Network Availability			
a.	Total no. of Node B's in LSA	Total no. of Node B's Licensed in LSA		
b.	Total downtime of all Node B's	When all the sector(s) of a Node B's are down for > 60 minutes at an instant in a whole day		
c.	No. of Worst Affected Node B's	Node B'ss having more than 24 hours of Downtime in 3 Days	No. of Node B's having accumulated downtime of >24 hours in a month $\left(\frac{\text{No. of Node B's having Accumulated Downtime of } > 24 \text{ hrs in a month}}{\text{Total no. of BTSs in the licensed service area}} \right) * 100$	$\leq 2\%$
d.	Node B's accumulated downtime	Node B's downtime more than 24 hr in 3 days	Total no. of Node B's in the Licensed Service Area Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month $\left[\frac{\text{Sum of downtime of Node B's in a month in hrs}}{24 * \text{no. of days in the month} * \text{no. of Node B's in the licensed service area}} \right] * 100$	$\leq 2\%$
2	Connection Establishment (Accessibility)			
a.	Call Setup Success Rate:	It is the % of total no. of call established to the total no. of call attempt	Total No. of Voice Call Attempts Total No. of Voice Call Establishment $\text{CSSR (Call Setup Success Rate)} = \left(\frac{\text{Total No. of Voice Call Attempts}}{\text{Total No. of Voice Call Establishment}} \right) * 100$	$\geq 95\%$
b.	RRC Congestion:	RRC Congestion rate is the % of Total No. of RRC Failed Calls to the Total no. of RRC Assigned Calls	RRC Attempts (RRC Connection Access) (A) RRC Failed (RRC Connection Access Failed) (B) $\text{RRC Congestion (\%)} [B/A] * 100$	$\leq 1\%$
c.	RAB Congestion:	RAB Congestion rate is the % of Total No. of RAB Failed Calls to the	RAB Attempts (RAB Setup Access) (C) RAB Failed (RAB Setup Access Failed) (D) $\text{RAB Congestion (\%)} [D/C] * 100$	$\leq 2\%$

		Total no. of RAB Assigned Calls		
3	Connection Maintenance (Retainability)			
a.	Circuit Switched Voice Drop Rate	It is the % of total no. of Dropped Calls to the total no. of Calls Established	Total Established Calls (A) Calls Dropped after Establishment (B) Call Drop Rate $[B/A]*100$	$\leq 2\%$
b.	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	It is the % of total no. of Cells having > 3% Circuit Switched Voice drop to the total no. cells	Total No. of Cells (Sector) Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour) % of cells having more than 3% Circuit Switched Voice Drop Rate $[(\text{No. of cells having Circuit Switched Voice Drop Rate} > 3\% \text{ during CBBH in 31 days} * 100) / \text{Total no. of cells in the licensed service area}]$	$\leq 3\%$
c.	Percentage of connections with Good Circuit Switched Voice Quality	It can be defined as the % of Good Voice Quality Samples to the total No. of Quality Samples	Percentage of connection with Good Circuit Switched Voice Quality	$\geq 95\%$
4	Total No. of POI's in Month having $\geq 0.5\%$ POI congestion	Total no. Of POI's which are exceeding the POI congestion more than 0.5 %.	Total No. of call attempts on POI Total traffic served on all POIs (Erlang) Total No. of circuits on all individual POIs Total number of working POI Service Area wise Capacity of all POIs No. of all POI's having $\geq 0.5\%$ POI congestion Name of POI not meeting the benchmark (having $\geq 0.5\%$ POI congestion)	$\leq 0.5\%$

2.7. 2G & 3G WIRELESS

S. No.	Name of Parameter	Definition	Formula	Benchmark
1	Service Activation/ Provisioning	This refers to the activation of services after activation of the SIM. This involves programming the various databases with the customer's information and any gateways to standard Internet chat or mail services or any data services.	Total No. of Subscribers for Service Activation (A)	Within 4 Hours with 95% Success Rate
			Total Service Activations provided within 4 Hours (B)	
			Service Activation / Provisioning = (B/A) * 100	
2	PDP Context Activation Success Rate	PDP Context Activation Success Rate is the ratio of total number of successfully completed PDP context activations to the total attempts of context activation	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)	>=95%
			Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)	
			PDP Context Activation Success Rate = (B/A) * 100	
3	Drop Rate	It measures the inability of Network to maintain a connection and is defined as the ratio of abnormal disconnects w.r.t. all disconnects.	RNC originated PS Domain lu Connection Setup Success (A)	<=5%
			RNC originated PS Domain lu Connection Release (B)	
			Drop Rate = (B/A) * 100	

3. 3 DAYS LIVE DATA

The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the calculations are done on the basis of that raw data of 3 days.

The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the QoS network parameters. For example, network congestion being faced by an operator during busy/peak hours.

Network related parameters were evaluated for a period of 3 days in each month. 3 day live audit was conducted for 3 consecutive weekdays for each month. The data was extracted from each operator's server/ NOC etc. at the end of the 3rd day. The extracted data is then used to create a report (similar to PMR report) to assess the various QoS parameters.

3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

As per QoS regulations 2009 (7 of 2009), 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.

Daywise RAW Data is fetched from the operator's OMCR and kept in readable format (preferably in MS- Excel). Data for a period of 90 days is used to identify TCBH.

90 Days period is Junided upon the basis of month of audit. For example, for the audit of June 2015, the 90 day period data used to identify TCBH would be the data of April, May & June 2015.

For each day, the hour in which average traffic of the resource group concerned is greatest for the day will be the 'Busy Hour' for the operator.

The model frequency of te busy hour is calculated for 90 days period and the hour with highest model frequency will be considered as TCBH for the operator.

During audit, the auditors identified from the raw data that the TCBH for the operators in Apr – May – Jun 2016 was the time period as given below:

Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone
19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00	19:00-20:00

3.2. CBBH: SIGNIFICANCE AND SELECTION METHODOLOGY

As per QoS regulations 2009 (7 of 2009), Cell Bouncing Busy Hour (CBBH) means the one hour period in a day during which a cell in cellular mobile telephone network experiences the maximum traffic.

Step by step procedure to identify CBBH for an operator:

Daywise RAW Data is fetched from the operator's OMCR and kept in readable format (preferably in MS- Excel). Data for a period of 90 days is used to identify CBBH.

For each day the hour in which a cell in cellular mobile telephone network experiences maximum traffic for the day will be the 'Busy Hour' for the operator.

The model frequency of the busy hour is calculated for 90 days period and the hour with highest model frequency will be considered as CBBH for the operator.

4. CUSTOMER SERVICE PARAMETERS

The data to generate PMR report for customer service parameters is extracted at the operator premises and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June 2016 was collected in the month of June 2016. To extract the data for customer service parameters for the purpose of audit, auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

The operators are duly informed in advance about the audit schedule.

The Customer Service Quality Parameters include the following:

- Metering and billing credibility (post-paid and prepaid)
- 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.

Most of the customer service parameters were calculated by averaging over the quarter; however billing parameters were calculated by averaging over one billing cycle for a quarter. All the parameters have been described in detail along with key findings of the parameter in the report.

The benchmark values for each parameter have been given in the table below.

4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

Metering and Billing Credibility	Benchmark
No of billing complaints received - Post paid	≤ 0.1%
No. of billing complaints received- Prepaid	≤ 0.1%
Resolution of billing/ charging complaints within 4 weeks	98%
Resolution of billing/ charging complaints within 6 weeks	100%
Period of applying credit/ waiver within 1 week of resolution of complaint	100%
Response Time to the Customer form Assistance	
Accessibility of call centre/customer care	≥ 95%
Percentage of calls answered by the operators (voice to voice) within 90 seconds	≥ 95%
Termination/ closure of service	≤ 7 days
Time taken for refund of deposits after closures within 60 days	100%

4.2. CALCULATION METHODOLOGY: CUSTOMER SERVICE PARAMETER

Parameter	Calculation Methodology
Metering and billing credibility : Post-paid	Total billing complaints received during the relevant billing cycle / Total bills generated during the relevant billing cycle * 100
Metering and billing credibility : Pre-paid	Total charging complaints received during the quarter/ Total number of subscribers reported by the operator at the end of the quarter * 100
Resolution of billing/ charging complaints (Post-paid + Pre-paid)	<p>There are two benchmarks involved here:</p> <p>Billing or Charging Complaints resolved in 4 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100</p> <p>Billing or Charging Complaints resolved in 6 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100</p>
Period of applying credit waiver	Number of cases where credit waiver is applied within 7 days/ total number of cases eligible for credit waiver * 100
Call centre performance IVR (Calling getting connected and answered by IVR)	Number of calls connected and answered by IVR/ All calls attempted to IVR * 100
Call centre performance (Voice to Voice)	<p>Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100</p> <p>The calculation excludes the calls dropped before 90 seconds</p>
Time taken for termination/ closure of service	Number of closures done within 7 days/ total number of closure requests * 100
Time taken for refund for deposit after closures	Number of cases of refund after closure done within 60 days/ total number of cases of refund after closure * 100

4.3. LIVE CALLING: SIGNIFICANCE AND METHODOLOGY

The auditor visits the operator premises for Live Calling. The operators provide the RAW data of customer complaints (billing and services) and also the list of customer service numbers to be verified through live calling

The auditor makes the live calls using operator SIM to a random sample of subscribers from the RAW data provided to verify the resolution of complaints

The auditor verifies the performance of call centre, level 1 services by calling the numbers using operator SIM. The list of call centre numbers is provided by the operator.

The auditors also make test calls to subscribers of other operators to assess the inter-operator call connectivity in the same licensed service area

Live calling activity was carried out during the period of June 2016. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. In this case, data of April 2016 was considered for live calling activity conducted in May 2016.

A detailed explanation of each parameter is explained below:

4.4. 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 the auditor visit. In case of BSNL, 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.

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th June, 2016 were considered as population for selection of samples.

TRAI Benchmark: Resolution of billing/ charging complaints: 98% within 4 weeks, 100% within 6 weeks.

4.5. SERVICE COMPLAINTS REQUESTS

“Service request” means a request made to a service provider by its consumer pertaining to his account, and includes:

- A request for change of tariff plan
- A request for activation or deactivation of a value added service or a supplementary service or a special pack
- A request for activation of any service available on the service provider’s network
- A request for shift or closure or termination of service or for billing details

All the complaints other than billing were covered. A total of 100 calls per service provider for each service in licensed service area were done by the auditors.

4.6. LEVEL 1

Level 1 is used for accessing special services like emergency services, supplementary services, inquiry and operator-assisted services.

Level 1 Services include services such as police, fire, ambulance (Emergency services). Test calls were made from operator SIMs. A total of 150 test calls were made per service provider in the quarter.

While most of the Level 1 services are toll free, it has been observed that some Level 1 services may not be toll free. In April, May and June’15, auditor has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

4.6.1. PROCESS TO TEST LEVEL 1 SERVICE

- During the operator assisted drive test, auditors ask the operator authorized personnel to make 5 calls in each SDCA on the Level 1 Service numbers provided by TRAI. The list contains a description of the numbers along with dialling code.
- Operators might also provide a list of L1 services. To identify emergency L1 service numbers, auditors check if there is any number that starts with code ‘10’ in that list. If auditors find any emergency number in addition to the below list, that number is also tested during live calling.
- On receiving the list, auditors verify it if the below given list of numbers are active in the service provider’s network.
- If there are any other additional numbers provided by the operator, auditors also do live calling on those numbers along with below list.
- If any of these numbers is not active, then we would write the same in our report, auditors write in the report.
- Post verifying the list, auditors do live calling by equally distributing the calls among the various numbers and update the results in the live calling sheet.

L1 Number Details
100 Police
101 Fire
102 Ambulance
104 Health Information Helpline
108 Emergency and Disaster Management Helpline
138 All India Helpline for Passangers
149 Public Road Transport Utility Service
181 Chief Minister Helpline
182 Indian Railway Security Helpline
1033 Road Accident Management Service
1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline'
1056 Emergency Medical Services
106X State of the Art Hospitals - AIIMS
1063 Public Grievance Cell DoT Hq
1064 Anti Corruption Helpline
1070 Relief Commission for Natural Calamities
1071 Air Accident Helpline
1072 Rail Accident Helpline
1073 Road Accident Helpline
1077 Control Room for District Collector
1090 Call Alert (Crime Branch)
1091 Women Helpline
1097 National AIDS Helpline to NACO
1099 Central Accident and Trauma Services (CATS)
10580 Educational& Vocational Guidance and Counselling
10589 Mother and Child Tracking (MCTH)
10740 Central Pollution Control Board
10741 Pollution Control Board
1511 Police Related Service for all Metro Railway Project
1512 Prevention of Crime in Railway
1514 National Career Service(NCS)
15100 Free Legal Service Helpline
155304 Municipal Corporations
155214 Labour Helpline
1903 Sashastra Seema Bal (SSB)
1909 National Do Not Call Registry
1912 Complaint of Electricity
1916 Drinking Water Supply
1950 Election Commission of India

4.7. CUSTOMER CARE

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

- Calls getting connected and answered by operator's IVR.
- % age of calls answered by operator / voice to voice) within 90 seconds: In 95% of the cases or more

The process for this parameter is stated below:

- Overall sample size is 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1100 HRS to 1400 HRS and 50 calls between 1600 HRS to 1900 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.

4.8. INTER OPERATOR CALL ASSESSMENT

A total of 100 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

Inter Operator Call Assessment	Aircel	Airtel	BSNL	Idea	Reliance GSM	Vodafone
Aircel	-	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%
Reliance GSM	100%	100%	100%	100%	-	100%
Vodafone	100%	100%	100%	100%	100%	-

5. DRIVE TEST: SIGNIFICANCE AND METHODOLOGY

Drive test, as the name suggests, is conducted to measure the outdoor coverage in a moving vehicle in a specified network coverage area.

The main purpose of the drive test is to check the health of the mobile network of various operators in the area in terms of coverage (signal strength), voice quality, call drop rate, call set up success rate etc.

To assess the indoor coverage, the test is also conducted at two static indoor locations in each SSA, such as Malls, office buildings, shopping complexes, government buildings etc.

There are two types of drive test as mentioned below.

- Operator Assisted Drive Test
- Independent Drive Test

The main difference between the two is that in the operator assisted, operators participate in the drive test along with their hardware, software, phones etc. while in the independent drive test PhiStream conducts the drive test on solitary basis and uses its own hardware. Operators generally do not have any knowledge of the independent drive test being conducted.

5.1. OPERATOR ASSISTED DRIVE TEST

Jammu and Kashmir circle consist of total 5 SSA's and each SSA needs to be audit in the span of 12 months.

The methodology adopted for the drive test:

- 3 consecutive days drive test in each SSA. SSA would be defined as per DOT guidelines and month wise SSA list is finalized by regional TRAI office.
- On an average, a minimum of 80 kilometres are covered each day
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads and we can start from the point from where we had left last day (if possible).
- The route was classified as – Within City, Major Roads, Highways, Shopping complex/ Mall and Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

5.2. INDEPENDENT DRIVE TEST

The number of independent drive tests to be conducted and their locations are decided basis TRAI recommendation.

- A minimum of 80 kilometres was traversed during the independent drive test in a SSA. The SSA would be defined as per BSNL and SSA list will be finalized by regional TRAI office.
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads (if possible).
- The route was classified as – Within city, Major Roads, Highways, Shopping complex / Mall and Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

5.3. PARAMETERS EVALUATED DURING DRIVE TEST

The parameters which were captured during the drive test include. Below are the parameters which are captured for the GSM and CDMA operators.

- Coverage-Signal strength (GSM)
 - Total calls made (A)
 - Number of calls with signal strength between 0 to -75 dBm
 - Number of calls with signal strength between 0 to -85 dBm
 - Number of calls with signal strength between 0 to -95 dBm
- Coverage-Signal strength (CDMA)
 - Total Ec/Io BINS (A)
 - Total Ec/Io BINS with less than -15 (B)
 - Low Interference = $[1 - (B/A)] \times 100$
- Voice quality (GSM)
 - Total RxQual Samples – A
 - RxQual samples with 0-5 value – B
 - %age samples with good voice quality = $B/A \times 100$
- Voice quality (CDMA)
 - Total FER BINS (forward FER) – A
 - FER BINS with 0-2 value (forward FER) – B
 - FER BINS with 0-4 value (forward FER) – C
 - %age samples with FER bins having 0-2 value (forward FER) = $B/A \times 100$
 - %age samples with FER bins having 0-4 value (forward FER) = $C/A \times 100$
 - No. of FER samples with value > 4 = $[A-C]$
- Call setup success rate
 - Total number of call attempts – A
 - Total Calls successfully established – B
 - Call success rate (%age) = $(B/A) \times 100$
- Blocked calls
 - 100% - Call Set up Rate
- Call drop rate
 - Total Calls successfully established – A
 - Total calls dropped after being established – B
 - Call Drop Rate (%age) = $(B/A) \times 100$

6. EXECUTIVE SUMMARY

The objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various operators in the Jammu and Kashmir Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

6.1. OPERATORS COVERED

Name of Operator	Number of Subscriber (as on 30 th Jun 2016)
AIRCEL	2598564
AIRTEL	3373404
BSNL	1299935
IDEA	656994
RCOM GSM	970758
VODAFONE	1064328

TSP	No. of cells	BTS	BSC	MSC+GMSC	Node B	RNC
AIRCEL	2G-6896/3G-1731	2313	22	7	577	3
AIRTEL	1745	2903	33	12	1745	5
BSNL	3243	1092	21	8	392	7
IDEA	2G - 3632/ 3G - 1556	1240	8	2	522	2
RCOM GSM	2558	854	4	1	458	1
VODAFONE	5098	1691	17	2	NA	NA

Note: Node B & RNC is marked as Not Applicable (N.A.) for the services providers who do not have 3G services licence in the circle.

6.2. AUDIT SCHEDULE

Operator	(3 Days Live) April 2016	April 2016	May 2016	June 2016
Airtel	12th Apr 2016	6th May 2016	15th Jun 2016	12th Jul 2016
Vodafone	7th Apr 2016	9th May 2016	9th Jun 2016	7th Jul 2016
Idea	14th Apr 2016	9th May 2016	14th Jun 2016	14th Jul 2016
Reliance	6th Apr 2016	7th May 2016	8th Jun 2016	6th Jul 2016
BSNL	8th Apr 2016	10th May 2016	10th Jun 2016	8th Jul 2016
Aircel	5th Apr 2016	5th May 2016	7th Jun 2016	5th Jul 2016

Note: Audit schedule mentioned above is for the PMR audit for the last month. 3 day live monitoring for the current month was carried along with the PMR audit.

Colour codes to read the report:

	Not meeting the benchmark
NA	Not Applicable
DNA	Data Not Available

6.3. 2G VOICE PMR DATA: APRIL

Apr-16								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	ODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.61%	0.12%	1.65%	0.12%	0.05%	0.25%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	2.80%	0.14%	0.68%	0.48%	0.00%	1.18%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	98.12%	98.30%	98.77%	98.74%	98.82%	99.09%
	SDDCH/Paging chl. Congestion	≤ 1%	0.37%	0.60%	0.60%	0.11%	0.03%	0.07%
	TCH Congestion	≤ 2%	1.30%	1.07%	1.20%	0.80%	0.14%	0.91%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.05%	1.27%	1.13%	1.47%	0.11%	0.64%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	9.97%	0.26%	1.64%	2.17%	0.00%	2.62%
	%age of connection with good voice quality	≥ 95%	95.41%	97.89%	96.64%	95.91%	99.21%	98.63%

6.4. 2G VOICE PMR DATA: MAY

May-16								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	ODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.59%	0.12%	1.40%	0.19%	0.07%	0.17%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	2.89%	0.14%	0.53%	0.32%	0.00%	0.99%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.57%	98.36%	98.73%	98.76%	99.22%	99.36%
	SDDCH/Paging chl. Congestion	≤ 1%	0.31%	0.41%	0.61%	0.21%	0.07%	0.08%
	TCH Congestion	≤ 2%	1.85%	1.06%	1.26%	0.86%	0.19%	0.64%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.53%	1.29%	1.00%	1.06%	0.13%	0.57%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	12.09%	0.30%	1.83%	1.44%	0.45%	2.57%
	%age of connection with good voice quality	≥ 95%	95.25%	97.84%	96.81%	97.38%	99.16%	98.52%

6.5. 2G VOICE PMR DATA: JUNE

		Jun-16						
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.66%	0.12%	1.32%	0.16%	0.04%	0.27%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	3.43%	0.10%	0.70%	0.56%	0.00%	1.28%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.15%	98.49%	98.79%	98.10%	97.54%	99.51%
	SDDCH/Paging chl. Congestion	≤ 1%	0.55%	0.48%	0.54%	0.24%	0.11%	0.02%
	TCH Congestion	≤ 2%	1.82%	1.05%	1.24%	1.19%	0.18%	0.49%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.35%	1.39%	1.15%	1.28%	0.16%	0.62%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.92%	0.33%	1.87%	2.02%	0.56%	2.59%
	%age of connection with good voice quality	≥ 95%	95.44%	97.95%	96.92%	95.65%	99.09%	98.51%

6.6. 2G VOICE PMR DATA: CONSOLIDATED

		Consolidated						
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.62%	0.12%	1.46%	0.16%	0.05%	0.23%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	3.04%	0.13%	0.64%	0.46%	0.00%	1.15%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.61%	98.38%	98.76%	98.53%	98.53%	99.32%
	SDDCH/Paging chl. Congestion	≤ 1%	0.41%	0.50%	0.58%	0.19%	0.07%	0.06%
	TCH Congestion	≤ 2%	1.66%	1.06%	1.23%	0.95%	0.17%	0.68%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.31%	1.32%	1.10%	1.27%	0.13%	0.61%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.99%	0.30%	1.78%	1.88%	0.34%	2.59%
	%age of connection with good voice quality	≥ 95%	95.37%	97.90%	96.79%	96.31%	99.15%	98.56%

- AIRCEL has parameter value of 3.04% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month
- AIRCEL has parameter value of 10.99% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop

6.7. 2G VOICE 3 DAYS LIVE DATA

A three day live measurement was conducted to measure the QoS provided by the operators. It was seen from the live data collected, that the performance of the operators across all parameters more or less corroborated with the audit data collected.

6.8. 2G VOICE 3 DAYS LIVE DATA: APRIL

Apr-16								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.77%	0.04%	1.76%	0.18%	0.05%	0.40%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.43%	0.00%	0.00%	0.00%	0.00%	0.41%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	96.56%	98.43%	98.94%	98.49%	99.59%	98.89%
	SDDCH/Paging chl. Congestion	≤ 1%	0.60%	0.52%	0.57%	0.04%	0.02%	0.05%
	TCH Congestion	≤ 2%	2.55%	1.02%	1.06%	1.14%	0.27%	1.11%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.33%	1.27%	0.78%	1.47%	0.00%	0.63%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.82%	0.32%	2.17%	1.77%	0.00%	2.56%
	%age of connection with good voice quality	≥ 95%	95.06%	97.83%	96.51%	95.94%	99.21%	98.66%

6.9. 2G VOICE 3 DAYS LIVE DATA: MAY

May-16								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.77%	0.04%	1.43%	0.23%	0.04%	0.20%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.39%	0.00%	0.00%	0.00%	0.00%	0.23%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	98.08%	98.57%	98.79%	98.80%	99.11%	99.37%
	SDDCH/Paging chl. Congestion	≤ 1%	0.18%	0.38%	0.57%	0.21%	0.08%	0.08%
	TCH Congestion	≤ 2%	1.34%	0.81%	1.21%	0.94%	0.16%	0.63%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.36%	1.14%	0.98%	1.09%	0.12%	0.53%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.96%	0.33%	2.50%	1.48%	0.47%	2.64%
	%age of connection with good voice quality	≥ 95%	95.13%	97.91%	96.75%	97.09%	99.15%	98.50%

6.10. 2G VOICE 3 DAYS LIVE DATA: JUNE

Jun-16								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.11%	0.05%	1.72%	0.19%	0.03%	0.28%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.78%	0.00%	0.00%	0.00%	0.00%	0.23%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.30%	98.45%	98.68%	97.62%	99.52%	99.58%
	SDDCH/Paging chl. Congestion	≤ 1%	0.89%	0.21%	0.59%	0.08%	0.12%	0.01%
	TCH Congestion	≤ 2%	2.13%	1.06%	1.32%	1.39%	0.21%	0.42%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.60%	1.45%	0.85%	1.22%	0.14%	0.61%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.83%	0.36%	1.79%	1.71%	0.58%	2.65%
	%age of connection with good voice quality	≥ 95%	95.28%	97.91%	97.28%	95.79%	99.07%	98.55%

6.11. 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.88%	0.04%	1.64%	0.20%	0.04%	0.29%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.53%	0.00%	0.00%	0.00%	0.00%	0.29%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.31%	98.48%	98.80%	98.30%	99.41%	99.28%
	SDDCH/Paging chl. Congestion	≤ 1%	0.56%	0.37%	0.57%	0.11%	0.07%	0.05%
	TCH Congestion	≤ 2%	2.01%	0.96%	1.20%	1.16%	0.22%	0.72%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.43%	1.29%	0.87%	1.26%	0.08%	0.59%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	11.20%	0.33%	2.15%	1.65%	0.35%	2.62%
	%age of connection with good voice quality	≥ 95%	95.16%	97.89%	96.85%	96.28%	99.15%	98.57%

- AIRCEL has parameter value of 2.01% and failed to meet the benchmark of ≤ 2% TCH Congestion
- AIRCEL has parameter value of 11.20% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop

6.12. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.79%	0.17%	1.01%	0.19%	0.61%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	2.91%	0.15%	0.51%	0.38%	1.02%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.40%	99.26%	97.30%	99.38%	98.31%
	RRC Congestion:	≤ 1%	0.35%	0.00%	0.76%	0.39%	0.29%
	RAB Congestion:	≤ 2%	0.08%	0.01%	1.27%	0.22%	0.16%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	1.89%	0.45%	0.76%	1.41%	0.13%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	16.12%	1.00%	2.16%	1.76%	0.57%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.95%	98.67%	96.65%	97.30%	99.81%

- AIRCEL has parameter value of 2.91% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month
- AIRCEL has parameter value of 16.12% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

6.13. 3G VOICE PMR: APRIL

Apr-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.79%	0.20%	1.65%	0.16%	0.56%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	1.44%	0.17%	0.26%	0.38%	1.53%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	96.80%	99.37%	98.40%	99.25%	99.84%
	RRC Congestion:	≤ 1%	0.38%	0.01%	0.86%	0.56%	0.15%
	RAB Congestion:	≤ 2%	0.11%	0.00%	1.68%	0.28%	0.09%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	2.38%	0.55%	0.66%	1.18%	0.10%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	20.28%	1.00%	2.55%	1.58%	0.55%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.81%	99.08%	95.94%	97.71%	DNA

6.14. 3G VOICE PMR: MAY

May-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.79%	0.12%	1.53%	0.25%	0.86%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	3.38%	0.13%	0.51%	0.00%	1.53%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.58%	99.00%	96.61%	99.46%	96.16%
	RRC Congestion:	≤ 1%	0.32%	0.00%	0.72%	0.36%	0.14%
	RAB Congestion:	≤ 2%	0.07%	0.02%	1.23%	0.16%	0.21%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	1.84%	0.11%	0.53%	1.18%	0.13%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	15.36%	0.87%	1.96%	1.79%	0.55%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.05%	97.89%	97.84%	96.98%	DNA

6.15. 3G VOICE PMR: JUNE

Jun-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	$\leq 2\%$	0.78%	0.18%	1.45%	0.17%	0.40%
	No. of BTSs having accumulated downtime of >24 hours in a month	$\leq 2\%$	3.91%	0.15%	0.77%	0.77%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	$\geq 95\%$	97.82%	99.43%	96.88%	99.42%	98.93%
	RRC Congestion:	$\leq 1\%$	0.36%	0.00%	0.70%	0.24%	0.58%
	RAB Congestion:	$\leq 2\%$	0.06%	0.00%	0.90%	0.23%	0.17%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	$\leq 2\%$	1.46%	0.68%	1.08%	1.86%	0.17%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	$\leq 3\%$	12.71%	1.13%	1.96%	1.91%	0.61%
	Percentage of connections with Good Circuit Switched Voice Quality	$\geq 95\%$	9799.76%	99.03%	9616.24%	97.20%	9981.15%

6.16. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.91%	0.33%	1.48%	0.24%	1.68%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.43%	0.00%	0.09%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	96.80%	99.22%	96.99%	99.49%	98.86%
	RRC Congestion:	≤ 1%	0.42%	0.11%	0.75%	0.29%	0.12%
	RAB Congestion:	≤ 2%	0.08%	0.02%	1.44%	0.15%	0.12%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	2.06%	0.62%	0.62%	1.47%	0.11%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	17.99%	1.05%	2.24%	2.01%	0.72%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.95%	98.89%	64.66%	97.05%	99.76%

- AIRCEL has parameter value of 2.06% and failed to meet the benchmark of ≤ 2% Circuit Switched Voice Drop Rate
- AIRCEL has parameter value of 17.99% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:
- AIRCEL has parameter value of 64.66% and failed to meet the benchmark of ≥ 95% Percentage of connections with Good Circuit Switched Voice Quality

6.17. 3G VOICE 3 DAYS LIVE DATA: APRIL

Apr-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.76%	0.33%	1.68%	0.16%	0.67%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.52%	0.00%	0.26%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	96.87%	99.40%	97.75%	99.54%	100.00%
	RRC Congestion:	≤ 1%	0.29%	0.00%	0.91%	0.35%	0.09%
	RAB Congestion:	≤ 2%	0.12%	0.00%	1.72%	0.17%	0.08%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	2.34%	0.53%	0.79%	1.39%	0.09%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	26.40%	0.86%	2.21%	1.97%	0.39%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.76%	99.09%	96.76%	97.58%	99.76%

6.18. 3G VOICE 3 DAYS LIVE DATA: MAY

May-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	1.06%	0.32%	1.46%	0.21%	0.67%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.39%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	96.98%	98.86%	96.60%	99.36%	100.00%
	RRC Congestion:	≤ 1%	0.16%	0.33%	0.80%	0.40%	0.09%
	RAB Congestion:	≤ 2%	0.02%	0.04%	1.59%	0.17%	0.08%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	1.98%	0.61%	0.54%	1.41%	0.09%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	14.45%	1.13%	2.55%	2.33%	0.39%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	97.93%	98.82%	0.00%	97.07%	DNA

6.19. 3G VOICE 3 DAYS LIVE DATA: JUNE

Jun-16							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.92%	0.33%	1.29%	0.36%	3.71%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	0.39%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	96.56%	99.40%	96.61%	99.58%	96.58%
	RRC Congestion:	≤ 1%	0.81%	0.01%	0.54%	0.13%	0.17%
	RAB Congestion:	≤ 2%	0.12%	0.00%	1.01%	0.10%	0.19%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	1.85%	0.72%	0.52%	1.62%	0.16%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	13.13%	1.17%	1.96%	1.73%	1.38%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	98.16%	98.77%	97.22%	96.50%	DNA

6.20. POI CONGESTION: CONSOLIDATED

Consolidated								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Total No. of POI's in Month having $\leq 0.5\%$ POI congestion							
	Total No. of call attempts on POI		1951047.7	1179498.1	875803.89	192333.85	463548.16	883239.65
	Total traffic served on all POIs (Erlang)		35680.984	25751.281	23750.498	6452.223	7584.3544	30894.293
	Total No. of circuits on all individual POIs		70526.161	54356.335	29938	12138.133	10438.356	42102.989
	Total number of working POI Service Area wise		47.441577	34	23	12	9630.6499	55.222222
	Capacity of all POIs		67749.797	53812.772	20956.6	11699.549	20	40931.195
	No. of all POI's having $\geq 0.5\%$ POI congestion		1	NIL	NIL	NIL	NIL	1
	Name of POI not meeting the benchmark (having $\geq 0.5\%$ POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

6.20.1. POI CONGESTION: APRIL

Apr-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Total No. of POI's in Month having $\leq 0.5\%$ POI congestion							
	Total No. of call attempts on POI		1536682	1262888	792544	116205	446917	844469
	Total traffic served on all POIs (Erlang)		32178	27508.35533	42223.455	4343.33	7309	16906
	Total No. of circuits on all individual POIs		70076	54490.56667	29938	11658	10417	42067
	Total number of working POI Service Area wise		47	34	23	12	9609	55
	Capacity of all POIs		67334	53946	20957	11234	20	40895
	No. of all POI's having $\geq 0.5\%$ POI congestion		NIL	NIL	NIL	NIL	NIL	NIL
	Name of POI not meeting the benchmark (having $\geq 0.5\%$ POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

6.20.2. POI CONGESTION: MAY

May-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Total No. of POI's in Month having $\leq 0.5\%$ POI congestion							
	Total No. of call attempts on POI		2236459	1248786	918673	246132	513909	987970
	Total traffic served on all POIs (Erlang)		38766	26266.58194	14960.65133	7712.22	7995.70082	18476.50548
	Total No. of circuits on all individual POIs		70637	54290.83871	29938	12000	10417	42082
	Total number of working POI Service Area wise		47	34	23	12	9607	55
	Capacity of all POIs		67857	53748	20956.60	11555	20	40914
	No. of all POI's having $\geq 0.5\%$ POI congestion		1	NIL	NIL	NIL	NIL	NIL
	Name of POI not meeting the benchmark (having $\geq 0.5\%$ POI congestion)		Reliance Local	NIL	NIL	NIL	NIL	NIL

6.20.3. POI CONGESTION: JUNE

Jun-16								
Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Total No. of POI's in Month having $\leq 0.5\%$ POI congestion							
	Total No. of call attempts on POI		2080002	1026820	916194.23	214665.2333	429818.3	817280.7
	Total traffic served on all POIs (Erlang)		36098.64915	23478.906	14067.39	7301.112963	7448.658	57300.697
	Total No. of circuits on all individual POIs		70865	54288	29938	12756.4	10481.06667	42160.3
	Total number of working POI Service Area wise		48	34	23	12	9675.510667	55.7
	Capacity of all POIs		68058	53745	20957	12310	20	40985
	No. of all POI's having $\geq 0.5\%$ POI congestion		NIL	NIL	NIL	NIL	NIL	1
	Name of POI not meeting the benchmark (having $\geq 0.5\%$ POI congestion)		NIL	NIL	NIL	NIL	NIL	NIL

6.21. 2G WIRELESS DATA: APRIL

Apr-16								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		316272	DNA	2469	35653	18235	DNA
ii)	Total Service Activations provided within 4 Hours (B)		315689	DNA	2469	35650	18229	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.82%	DNA	100.00%	99.99%	99.97%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		561498444	11764944	675311	45564513	DNA	87493764
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		555005237	11749532	655192	45372855	DNA	86955729
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	98.84%	99.87%	97.02%	99.58%	99.28%	99.39%
3	Drop Rate							
i)	TBF originated PS Domain lu Connection Setup Success (A)		1825605237	2.956E+09	1659316160.00	7796088051	8184928844	DNA
ii)	TBF originated PS Domain lu Connection Release (B)		23770734	34835901	44461445.00	47642091	164616808	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.30%	1.18%	2.68%	0.61%	2.01%	2.88%

6.22. 2G WIRELESS DATA: MAY

May-16								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		663686	DNA	3269	49348	43651	DNA
ii)	Total Service Activations provided within 4 Hours (B)		661506	DNA	3269	49348	43651	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.67%	DNA	100%	100.00%	100	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		595111112	15870752	691196	51390349.00	DNA	92467692
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		594599641	15867181	671112	51379907.00	DNA	92440381
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.91%	99.98%	97.09%	99.98%	99.16%	99.97%
3	Drop Rate							
i)	TBF originated PS Domain lu Connection Setup Success (A)		2026665275.00	2.216E+09	1936710683	9154174860.00	752029598	DNA
ii)	TBF originated PS Domain lu Connection Release (B)		25719771.00	17635484	58077157	59823173.00	16272496	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.27%	0.80%	3.00%	0.65%	2.16%	3.01%

6.23. 2G WIRELESS DATA: JUNE

Jun-16								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		530905	DNA	3522	53433	42696	DNA
ii)	Total Service Activations provided within 4 Hours (B)		528221	DNA	3522	53432	42696	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.49%	DNA	100.00%	100%	100%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		604832444	12497072	638308	46131668.00	DNA	137872.87
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		604647124	12478734	624126	46018036.00	DNA	137857.93
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.97%	99.85%	97.78%	99.75%	98.45%	99.99%
3	Drop Rate							
i)	TBF originated PS Domain lu Connection Setup Success (A)		1728188555	3152273621	11254183	884281573.00	15012793	DNA
ii)	TBF originated PS Domain lu Connection Release (B)		23117227	39212393	310065	5740771.00	711942696	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.34%	1.24%	2.76%	0.65%	2.11%	3.29%

6.24. 2G WIRELESS DATA: CONSOLIDATED

Consolidated								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		503621	DNA	3086.666667	46144.66667	34860.66667	DNA
ii)	Total Service Activations provided within 4 Hours (B)		501805.3333	DNA	3086.666667	46143.33333	34858.66667	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.66%	DNA	100%	100.00%	99.99%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		587147333.3	13377589.33	668271.7509	47695510	DNA	60033109.62
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		584750667.3	13365149	650143.3394	47590266	DNA	59844655.98
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.58%	99.90%	97.30%	99.77%	98.96%	99.78%
3	Drop Rate							
i)	TBF originated PS Domain lu Connection Setup Success (A)		1860153022	2774718325	1202427009	5944848161	2983990412	DNA
ii)	TBF originated PS Domain lu Connection Release (B)		24202577.33	30561259.33	34282889	37735345	297610666.7	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.30%	1.07%	2.81%	0.64%	2.09%	3.06%

6.25. 2G WIRELESS 3 DAYS LIVE DATA: APRIL

Apr-16								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
	Total No. of Subscribers for Service Activation (A)		DNA	DNA	359	3711	1113	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	359	3711	1107	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	99.46%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		58464428	1221699	67688	4517447	DNA	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		57700775	1220397	64712	4510061	DNA	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.69%	99.89%	95.60%	99.84%	99.19%	DNA
3	Drop Rate							
i)	TBF originated PS Domain lu Connection Setup Success (A)		179159291	307677422	44462366.00	99407137	1017671159	DNA
ii)	TBF originated PS Domain lu Connection Release (B)		2394682	3691236	1466595.00	551164	20122895	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.34%	1.20%	3.30%	0.55%	1.98%	DNA

6.26. 2G WIRELESS 3 DAYS LIVE DATA: MAY

May-16								
Cellular Mobile Telephone Services								
Network Service	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	332	5461	3979	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	332	5461	3979	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	100%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		60356885	1395368	68915	5009834	DNA	8814144
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		60334222	1393304	66344	5009296	DNA	8813157
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.96%	99.85%	96.27%	99.99%	99.25%	99.99%
3	Drop Rate							
i)	RNC originated PS Domain lu Connection Setup Success (A)		200463339.00	346071929	191011963.00	906252263	80831607	DNA
ii)	RNC originated PS Domain lu Connection Release (B)		2709815.00	4315129	5515995.00	6412438	1753187	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.35%	1.25%	2.89%	0.71%	2.17%	3.06%

6.27. 2G WIRELESS 3 DAYS LIVE DATA: JUNE

Jun-16								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	337	4783	4167	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	337	4783	4167	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	100.00%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		61624877	1257839	65001	4012889	DNA	2623923.7
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		61617253	1256161	63646	4011527	DNA	2623136
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.99%	99.87%	97.91%	99.97%	99.16%	99.97%
3	Drop Rate							
i)	RNC originated PS Domain lu Connection Setup Success (A)		171037659.00	334203845.00	160014423.00	92621741	DNA	DNA
ii)	RNC originated PS Domain lu Connection Release (B)		2312872	4148950	4544549.00	611814	DNA	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.35%	1.24%	2.84%	0.66%	0.47%	3.11%

6.28. 2G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated								
Cellular Mobile Telephone Services								
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Service Quality Parameter								
1	Service Activation/ Provisioning							
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	342.6666667	4651.666667	3086.333333	DNA
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	342.6666667	4651.666667	3084.333333	DNA
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	99.82%	DNA
2	PDP Context Activation Success Rate							
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		60148730	1291635.333	67201.47742	4513390	DNA	5719033.8
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		59884083.33	1289954	64900.45987	4510294.667	DNA	5718146.5
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.55%	99.87%	96.60%	99.93%	99.20%	99.98%
3	Drop Rate							
i)	TBF originated PS Domain lu Connection Setup Success (A)		183553429.7	329317732	131829584	366093713.7	549251383	DNA
ii)	TBF originated PS Domain lu Connection Release (B)		2472456.333	4051771.667	3842379.667	2525138.667	10938041	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	1.35%	1.23%	3.01%	0.64%	1.54%	3.08%

6.29. 3G WIRELESS DATA: APRIL

Apr-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		316272	DNA	2469	35653	7428
ii)	Total Service Activations provided within 4 Hours (B)		315689	DNA	2469	35650	7426
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.82%	DNA	100.0%	100%	100%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		561498444	3055139	322936.60	19850520.00	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		555005237	3055066	314535.51	19435709.00	DNA
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	98.84%	100.00%	97.40%	97.91%	99.19%
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		DNA	216980635.00	580524101.00	50966060.00	37306117
ii)	RNC originated PS Domain lu Connection Release (B)		DNA	1194561	14062426.00	1212196.00	269944
iii)	Drop Rate = (B/A) * 100	<=5%	2.44%	0.55%	2.42%	2.38%	0.72%

6.30. 3G WIRELESS DATA: MAY

May-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		663686	DNA	3269	49348	9857
ii)	Total Service Activations provided within 4 Hours (B)		661506	DNA	3269	49348	9750
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.67%	DNA	100%	100.00%	98.91%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		595111112	3496700	351497	33340941	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		594599641	3493502	342511	32721049	DNA
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.91%	99.91%	97.44%	98.14%	99.19%
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		66879781	228487349	433960791	66880761	40657539
ii)	RNC originated PS Domain lu Connection Release (B)		1733331	110405	7811002	1630557	294993
iii)	Drop Rate = (B/A) * 100	<=5%	2.59%	0.05%	1.80%	2.44%	0.73%

6.31. 3G WIRELESS DATA: JUNE

Jun-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		530905	DNA	3522	53433	42696
ii)	Total Service Activations provided within 4 Hours (B)		528221	DNA	3522	53432	42696
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	99.49%	DNA	100.00%	100.00%	100%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		604832444	2451302	11639.75	31785091.00	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		604647124	2451225	11383.68	31170802.00	DNA
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.97%	100.00%	98%	98.07%	99.18%
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		59078788	208188654	409200526.00	60392423.00	42417668
ii)	RNC originated PS Domain lu Connection Release (B)		1377009	1072059	13523520.00	1486431.00	422563
iii)	Drop Rate = (B/A) * 100	<=5%	2.33%	0.51%	3.30%	2.46%	1.00%

6.32. 3G WIRELESS DATA: CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		503621	DNA	3086.66667	46144.66667	19993.66667
ii)	Total Service Activations provided within 4 Hours (B)		501805.3333	DNA	3086.66667	46143.33333	19957.33333
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	0.996605482	DNA	1	0.999965714	0.99629184
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		587147333.3	3001047	228691.049	28325517.33	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		584750667.3	2999931	222810.1983	27775853.33	DNA
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	0.995756692	0.999676706	0.975474038	0.980394809	0.991844838
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		62979284.5	217885546	474561806	59413081.33	40127108
ii)	RNC originated PS Domain lu Connection Release (B)		1555170	792341.6667	11798982.67	1443061.333	329166.6667
iii)	Drop Rate = (B/A) * 100	<=5%	0.024544342	0.00371268	0.025090546	0.024259103	0.008151143

6.33. 3G WIRELESS 3 DAYS LIVE DATA: APRIL

Apr-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
	Total No. of Subscribers for Service Activation (A)		DNA	DNA	359	3711	618
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	359	3711	616
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.0%	100.0%	99.68%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		58464428	358216	34386	1215044	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		57700775	358210	33741	1193972	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	98.69%	100.00%	98.12%	98.27%	99.16%
3	Drop Rate						
i)	TBF originated PS Domain lu Connection Setup Success (A)		DNA	27860669	44462366.00	2066323	3830200
ii)	TBF originated PS Domain lu Connection Release (B)		DNA	137869	1466595.00	66042	25955
iii)	Drop Rate = (B/A) * 100	<=5%	2.25%	0.49%	3.30%	3.20%	0.68%

6.34. 3G WIRELESS 3 DAYS LIVE DATA: MAY

May-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	332	5461	618
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	332	5461	616
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	99.68%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		60356885	266106	33576	3247960	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		60334222	266103	32873	3183943	DNA
iii)	PDP Context Activation Success Rate =(B/A) *100	>=95%	99.96%	100.00%	97.91%	98.03%	99.16%
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		DNA	28949999	41417834.00	6504132	3830200
ii)	RNC originated PS Domain lu Connection Release (B)		DNA	146081	751492.00	167068	25955
iii)	Drop Rate = (B/A) * 100	<=5%	2.49%	0.50%	1.81%	2.57%	0.68%

6.35. 3G WIRELESS 3 DAYS LIVE DATA: JUNE

Jun-16							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	337	4783	4167
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	337	4783	4167
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	100.00%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		20541626	243276	31305.966	3208414.00	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		20539084	243267	30294.208	3153452.00	DNA
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.99%	100.00%	96.77%	98.29%	99.16%
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		DNA	21023214	38007051	6564291.00	DNA
ii)	RNC originated PS Domain lu Connection Release (B)		DNA	112248	685568	171174.00	DNA
iii)	Drop Rate = (B/A) * 100	<=5%	2.54%	0.53%	1.80%	2.61%	0.47%

6.36. 3G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

Consolidated							
Cellular Mobile Telephone Services							
S. No.	Name of Parameter	Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Service Quality Parameter							
1	Service Activation/ Provisioning						
i)	Total No. of Subscribers for Service Activation (A)		DNA	DNA	342.6666667	4651.6667	1801
ii)	Total Service Activations provided within 4 Hours (B)		DNA	DNA	342.6666667	4651.6667	1799.6667
iii)	Service Activation / Provisioning = (B/A) * 100	Within 4 Hours with 95% Success Rate	DNA	DNA	100.00%	100.00%	99.78%
2	PDP Context Activation Success Rate						
i)	Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)		46454313	289199.33	33089.48401	2557139.3	DNA
ii)	Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)		46191360	289193.33	32302.77454	2510455.7	DNA
iii)	PDP Context Activation Success Rate = (B/A) * 100	>=95%	99.55%	100.00%	97.60%	98.19%	99.16%
3	Drop Rate						
i)	RNC originated PS Domain lu Connection Setup Success (A)		DNA	25944627	41295750.33	5044915.3	3830200
ii)	RNC originated PS Domain lu Connection Release (B)		DNA	132066	967885	134761.33	25955
iii)	Drop Rate = (B/A) * 100	<=5%	2.43%	0.51%	2.31%	2.79%	0.61%

7. CUSTOMER SERVICE DELIVERY

7.1. BILLING AND CUSTOMER CARE

Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.25%	93.01%
AIRTEL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.23%	63.30%
BSNL	0.04%	0.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%	96.37%
IDEA	0.01%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	96.45%	95.17%
RCOM GSM	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	85.98%	98.97%	94.26%
VODAFONE	0.04%	0.10%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.58%

Name of Service Provider	Customer Care & Grievances Redressal	
	% of Complaints addressed at call center level	% of Complaints addressed by Appellate Authority
Benchmark		
AIRCEL	99.65%	100.00%
AIRTEL	100.00%	100.00%
BSNL	98.48%	100.00%
IDEA	89.60%	100.00%
RCOM GSM	100.00%	100.00%
VODAFONE	100.00%	100.00%

7.2. LIVE CALLING DATA: CONSOLIDATED

Name of Service Provider	Metering and Billing (Service Request)				Response time to customer for Assistanse	
	Total Calls Attempted	No. of Subscribers reached	Compalints/ Request attended to satisfaction	% of Complaints/ Request attended to satisfaction	Accessibility of call centre / Customer care	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark					≥ 95%	≥ 95%
AIRCEL	80	60	60	100.00%	100.00%	100.00%
AIRTEL	211	119	115	96.64%	100.00%	96.00%
BSNL	147	84	82	97.62%	100.00%	97.00%
IDEA	180	60	58	96.67%	100.00%	100.00%
RCOM GSM	140	43	40	93.02%	100.00%	98.00%
VODAFONE	229	63	62	98.41%	100.00%	98.00%

7.3. 3 DAYS LIVE CALL CENTRE DATA

Response time to customer assistance						
OPERATOR	Total no of calls attempted to customer care/Call center	Total no. of calls successfully established to customer care/Call center	% age of Accessibility of Call centre	Total Calls reached to operator for (Voice to Voice)	Total number of calls answered by the operator (Voice to voice) within 90 seconds	% age calls answered by the operator within 90 seconds
AVERAGE						
OPERATOR			≥95%			≥95%
AIRCEL	418850	405570	96.83%	70138	68130	97.14%
AIRTEL	28333	28333	100.00%	67879	64590	95.15%
BSNL	2355	2355	100.00%	1166	1166	100.00%
IDEA	33793	32662	96.65%	12211	12110	99.17%
RCOM GSM	168712	167888	99.51%	20794	12985	62.45%
VODAFONE	76459	76459	100.00%	23552	23041	97.83%

8. L1 CALLING DATA

Due to extreme weather conditions and unrest in the Jammu and Kashmir circle Operator Assisted Drive Test could not be completed. Hence the L1 calling was completed at the respective TSP premise at Jammu.

8.1. AIRCEL

SR. NO.	EMERGENCY NUMBER	JAMMU
1	100	✓
2	101	✓
3	102	✓
4	104	☒
5	108	☒
6	138	☒
7	149	☒
8	181	✓
9	182	✓
10	1033	☒
11	1037	☒
12	1056	☒
13	1060	☒
14	1063	☒
15	1064	☒
16	1070	✓
17	1071	✓
18	1072	✓
19	1073	☒
20	1077	✓
21	1090	✓
22	1091	✓
23	1097	✓
24	1099	☒
25	1511	☒
26	1512	✓
27	1514	☒
28	1903	☒
29	1909	✓
30	1912	✓
31	1916	✓
32	1950	✓
33	10580	☒
34	10589	☒
35	10740	☒
36	10741	☒
37	15100	☒
38	155214	☒
39	155304	☒

8.2. AIRTEL

SR. NO.	EMERGENCY NUMBER	JAMMU
1	100	✓
2	101	✓
3	102	☒
4	104	☒
5	108	☒
6	138	✓
7	149	☒
8	181	☒
9	182	✓
10	1033	✓
11	1037	☒
12	1056	☒
13	1060	☒
14	1063	☒
15	1064	☒
16	1070	☒
17	1071	✓
18	1072	✓
19	1073	☒
20	1077	✓
21	1090	☒
22	1091	☒
23	1097	✓
24	1099	☒
25	1511	☒
26	1512	☒
27	1514	☒
28	1903	☒
29	1909	☒
30	1912	☒
31	1916	☒
32	1950	☒
33	10580	☒
34	10589	☒
35	10740	✓
36	10741	✓
37	15100	☒
38	155214	☒
39	155304	✓

8.3. RCOM GSM

SR. NO.	EMERGENCY NUMBER	JAMMU
1	100	✓
2	101	✓
3	102	✓
4	104	☒
5	108	☒
6	138	☒
7	149	☒
8	181	✓
9	182	✓
10	1033	☒
11	1037	☒
12	1056	☒
13	1060	☒
14	1063	☒
15	1064	☒
16	1070	✓
17	1071	✓
18	1072	✓
19	1073	☒
20	1077	✓
21	1090	✓
22	1091	✓
23	1097	✓
24	1099	☒
25	1511	☒
26	1512	☒
27	1514	☒
28	1903	☒
29	1909	☒
30	1912	✓
31	1916	☒
32	1950	☒
33	10580	☒
34	10589	☒
35	10740	☒
36	10741	✓
37	15100	✓
38	155214	✓
39	155304	✓

8.4. VODAFONE

SR. NO.	EMERGENCY NUMBER	JAMMU
1	100	✓
2	101	✓
3	102	☒
4	104	☒
5	108	☒
6	138	✓
7	149	☒
8	181	☒
9	182	✓
10	1033	☒
11	1037	☒
12	1056	☒
13	1060	☒
14	1063	☒
15	1064	☒
16	1070	☒
17	1071	✓
18	1072	✓
19	1073	☒
20	1077	✓
21	1090	☒
22	1091	☒
23	1097	✓
24	1099	☒
25	1511	☒
26	1512	☒
27	1514	☒
28	1903	☒
29	1909	☒
30	1912	✓
31	1916	☒
32	1950	✓
33	10580	☒
34	10589	✓
35	10740	✓
36	10741	✓
37	15100	✓
38	155214	☒
39	155304	✓

8.5. BSNL

SR. NO.	EMERGENCY NUMBER	JAMMU
1	100	✓
2	101	✓
3	102	☒
4	104	☒
5	108	☒
6	138	✓
7	149	☒
8	181	☒
9	182	✓
10	1033	✓
11	1037	☒
12	1056	☒
13	1060	☒
14	1063	☒
15	1064	☒
16	1070	☒
17	1071	✓
18	1072	✓
19	1073	☒
20	1077	✓
21	1090	☒
22	1091	☒
23	1097	✓
24	1099	☒
25	1511	☒
26	1512	☒
27	1514	☒
28	1903	☒
29	1909	☒
30	1912	☒
31	1916	☒
32	1950	☒
33	10580	☒
34	10589	☒
35	10740	✓
36	10741	✓
37	15100	☒
38	155214	☒
39	155304	✓

8.6. RCOM GSM

SR. NO.	EMERGENCY NUMBER	JAMMU
1	100	✓
2	101	✓
3	102	✓
4	104	☒
5	108	☒
6	138	☒
7	149	☒
8	181	✓
9	182	✓
10	1033	☒
11	1037	☒
12	1056	☒
13	1060	☒
14	1063	☒
15	1064	☒
16	1070	✓
17	1071	✓
18	1072	✓
19	1073	☒
20	1077	✓
21	1090	✓
22	1091	✓
23	1097	✓
24	1099	☒
25	1511	☒
26	1512	☒
27	1514	☒
28	1903	☒
29	1909	☒
30	1912	✓
31	1916	☒
32	1950	☒
33	10580	☒
34	10589	☒
35	10740	☒
36	10741	✓
37	15100	✓
38	155214	✓
39	155304	✓

9. OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the Jammu & Kashmir circle. As per the new directive given by TRAI headquarters, drive test for the month of April, May and June, 2016 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected on basis of the complaints received from the customers. The auditors were present in vehicles of every operator. The holding period for all test calls was 120 seconds and the gap between calls was 10 seconds.

For measuring voice quality RxQual samples for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. RxQual greater than 5 meant that the sample was not of appropriate voice quality and for CDMA operators FERs of more than 4 were considered bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in Dbm with strength > -75dbm for indoor, -85 dbm for in-vehicle and > -95 dbm outdoor routes. Below is the schedule and operators involved in the drive test for the Jammu & Kashmir circle.

Due to extreme weather conditions and unrest in the below mentioned regions of Jammu and Kashmir, the following drive tests were planned in this quarter but couldn't take place:

- Leh SSA
- Srinagar SSA
- Udhampur SSA

10. COUNTER DETAILS

S No.	KPI	Formula with Counter Description
1	CSSR= (No of established Calls / No of Attempted Calls)%	$\text{No of established Calls} = ([\text{Assignment Requests}] - [\text{Failed Assignments (Signaling Channel)}] + [\text{Failed Assignments during MOC on the A Interface (Including Directed Retry)}] + [\text{Failed Assignments during MTC on the A Interface (Including Directed Retry)}] + [\text{Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)}] + [\text{Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)}] + [\text{Failed Mode Modify Attempts (MOC) (TCHF)}] + [\text{Failed Mode Modify Attempts (MTC) (TCHF)}] + [\text{Failed Mode Modify Attempts (Emergency Call) (TCHF)}] + [\text{Failed Mode Modify Attempts (Call Re-establishment) (TCHF)}] + [\text{Failed Mode Modify Attempts (MOC) (TCHH)}] + [\text{Failed Mode Modify Attempts (MTC) (TCHH)}] + [\text{Failed Mode Modify Attempts (Call Re-establishment) (TCHH)}]) / [\text{No of Attempted Calls} = ([\text{Assignment Requests (Signaling Channel) (TCH)}] + [\text{Assignment Requests (Signaling Channel) (SDCCH)}] + [\text{Assignment Requests (TCHF Only)}] + [\text{Assignment Requests (TCHH Only)}] + [\text{Assignment Requests (TCHF Preferred, Channel Type Unchangeable)}] + [\text{Assignment Requests (TCHH Preferred, Channel Type Unchangeable)}] + [\text{Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)}] + [\text{Assignment Requests (TCHF Preferred, Channel Type Changeable)}] + [\text{Assignment Requests (TCHH Preferred, Channel Type Changeable)}] + [\text{Assignment Requests (TCHF or TCHH, Channel Type Changeable)}])$
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	$\text{SDCCH Failure} = ([\text{Channel Assignment Failures (All Channels Busy or Channels Unconfigured) in Immediate Assignment Procedure (SDCCH)}] + [\text{Failed Internal Intra-Cell Handovers (No Channel Available) (SDCCH)}] + [\text{Number of Unsuccessful Incoming Internal Inter-Cell Handovers (No Channel Available) (SDCCH)}] + [\text{Failed Incoming External Inter-Cell Handovers (No Channel Available) (SDCCH)}]) / [\text{SDCCH attempts} = ([\text{Channel Assignment Requests in Immediate Assignment Procedure (SDCCH)}] + [\text{Internal Intra-Cell Handover Requests (SDCCH)}] + [\text{Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)}] + [\text{Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)}] + [\text{Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)}] + [\text{Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)}] + [\text{Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)}] + [\text{Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)}] + [\text{Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)}] + [\text{Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)}])$
3	TCH congestion= (TCH Failures /TCH Attempts)%	$\text{TCH Failures} = ([\text{Failed TCH Seizures due to Busy TCH (Signaling Channel)}] + [\text{Failed Assignments (First Assignment, No Channel Available in Assignment Procedure)}] + [\text{Failed Assignments (First Assignment, No Channel Available in Directed Retry Procedure)}] + [\text{Failed Assignments (Reconnection to Old Channels, No Channel Available in Assignment)}] + [\text{Failed Assignments (Reconnection to Old Channels, No Channel Available in Directed Retry)}]) / [\text{TCH Attempts} = ([\text{Assignment Requests (Signaling Channel) (TCH)}] + [\text{Assignment Requests (Signaling Channel) (SDCCH)}] + [\text{Assignment Requests (TCHF Only)}] + [\text{Assignment Requests (TCHH Only)}] + [\text{Assignment Requests (TCHF Preferred, Channel Type Unchangeable)}] + [\text{Assignment Requests (TCHH Preferred, Channel Type Unchangeable)}] + [\text{Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)}] + [\text{Assignment Requests (TCHF Preferred, Channel Type Changeable)}] + [\text{Assignment Requests (TCHH Preferred, Channel Type Changeable)}] + [\text{Assignment Requests (TCHF or TCHH, Channel Type Changeable)}])$
4	Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)	$\text{The total no of dropped calls} = ([\text{Call Drops on Radio Interface in Stable State (Traffic Channel)}] + [\text{Call Drops on Radio Interface in Handover State (Traffic Channel)}] + [\text{Call Drops Due to No MR from MS for a Long Time (Traffic Channel)}] + [\text{Call Drops due to Abis Terrestrial Link Failure (Traffic Channel)}] + [\text{Call Drops due to Equipment Failure (Traffic Channel)}] + [\text{Call Drops due to Forced Handover (Traffic Channel)}] + [\text{Call Drops due to local switching Start Failure}] + [\text{Call Drops due to Failures to Return to Normal Call from local switching}]) / [\text{Total no of calls}]$

		$\text{successfully established (where traffic channel is allotted)} = ([\text{Assignment Requests}] - ([\text{Failed Assignments (Signaling Channel)}] + [\text{Failed Assignments during MOC on the A Interface (Including Directed Retry)}] + [\text{Failed Assignments during MTC on the A Interface (Including Directed Retry)}] + [\text{Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)}] + [\text{Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)}] + [\text{Failed Mode Modify Attempts (MOC) (TCHF)}] + [\text{Failed Mode Modify Attempts (MTC) (TCHF)}] + [\text{Failed Mode Modify Attempts (Emergency Call) (TCHF)}] + [\text{Failed Mode Modify Attempts (Call Re-establishment) (TCHF)}] + [\text{Failed Mode Modify Attempts (MOC) (TCHH)}] + [\text{Failed Mode Modify Attempts (MTC) (TCHH)}] + [\text{Failed Mode Modify Attempts (Call Re-establishment) (TCHH)}])$
5	Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area	Above formula with counters being used in CBBH.
6	Connection with good quality voice= (Connection with good quality voice/Total voice samples)%	$\text{Connection with good quality voice} = ((\text{Number of MRs on Downlink TCHF (Receive Quality Rank 0)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 1)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 2)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 3)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 4)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 5)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 0)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 1)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 2)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 3)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 4)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 5)}) / \text{Total voice samples} = ((\text{Number of MRs on Downlink TCHF (Receive Quality Rank 0)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 1)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 2)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 3)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 4)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 5)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 6)} + \text{Number of MRs on Downlink TCHF (Receive Quality Rank 7)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 0)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 1)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 2)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 3)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 4)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 5)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 6)} + \text{Number of MRs on Downlink TCHH (Receive Quality Rank 7)})$

10.1. ERICSSON

S No.	KPI	Ericsson
1	CSSR= (No of established Calls / No of Attempted Calls)%	CSSR (No of established Calls / No of Attempted Calls)=(TCASSALL/TASSALL)*100
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	SDCCH congestion (SDCCH Failure/SDCCH attempts)% = (CCONGS/CCALLS)*100
3	TCH congestion= (TCH Failures /TCH Attempts)%	TCH congestion (TCH Failures /TCH Attempts)%= (CNRELCONG+TNRELCONG)/TASSALL)*100
4	Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)	Call Drop Rate (Total no dropped calls/No of established calls)%= (TNDROP)/TCASSALL*100
5	Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a	Above formula with counters being used in CBBH.

	month*100)/Total no of cells in the licensed service area	
6	Connection with good quality voice= (Connection with good quality voice/Total voice samples)%	Connection with good quality voice (Connection with good quality voice samples 0-5 /Total voice samples)= 100 * (QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL) / (QUAL70DL + QUAL60DL + QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL)

Ericsson Counters

Counter	Counter Description
TCASSALL	Number of assignment complete messages on TCH for all MS classes
TASSALL	Number of first assignment attempts on TCH for all MS classes.
CNRELCONG	Number of released connections on SDCCH due to TCH or Transcoder (TRA) congestion.
TNRELCONG	Number of released TCH signalling connections due to transcoder resource congestion during immediate assignment on TCH
CCONGS	Congestion counter for SDCCH. Stepped per congested allocation attempt.
CCALLS	Channel allocation attempt counter on SDCCH.
TNDROP	The total number of dropped TCH Connections.
QUAL00DL	Number of quality 0 reported on downlink.
QUAL10DL	Number of quality 1 reported on downlink.
QUAL20DL	Number of quality 2 reported on downlink.
QUAL30DL	Number of quality 3 reported on downlink.
QUAL40DL	Number of quality 4 reported on downlink.
QUAL50DL	Number of quality 5 reported on downlink.
QUAL60DL	Number of quality 6 reported on downlink.
QUAL70DL	Number of quality 7 reported on downlink

10.2. NSN (NOKIA SIEMENS NETWORK)

SI N o.	KPI	NSN
1	CSSR= (No of established Calls / No of Attempted Calls)%	CSSR= 100-100*((SDCCH_BUSY_ATT)-(TCH_SEIZ_DUE_SDCCH_CON) + (SDCCH_RADIO_FAIL)+(SDCCH_RF_OLD_HO)+(SDCCH_USER_ACT)+(SDCCH_BCSU_RES ET)+(SDCCH_NETW_ACT)+(SDCCH_BTS_FAIL)+(SDCCH_LAPD_FAIL)+(BLCK_8I_NOM)/ {(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}- {(GHOST_CCCH_RES)- (REJ_SEIZ_ATT_DUE_DIST)})
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	SDCCH congestion = (sdccch_busy_att - .tch_seiz_due_sdcch_con)/{(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}- {(GHOST_CCCH_RES)- (REJ_SEIZ_ATT_DUE_DIST)})
3	TCH congestion= (TCH Failures /TCH Attempts)%	TCH congestion = BLCK_8I_NOM / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)}
4	Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)	TCH Drop = (drop_after_tch_assign)-(tch_re_est_release) / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)}
5	Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area	Above formula with counters being used in CBBH.
6	Connection with good quality voice= (Connection with good quality voice/Total voice samples)%	Connection with good quality voice= (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5) / (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5+FREQ_DL_QUAL6+FREQ_DL_QUAL7)

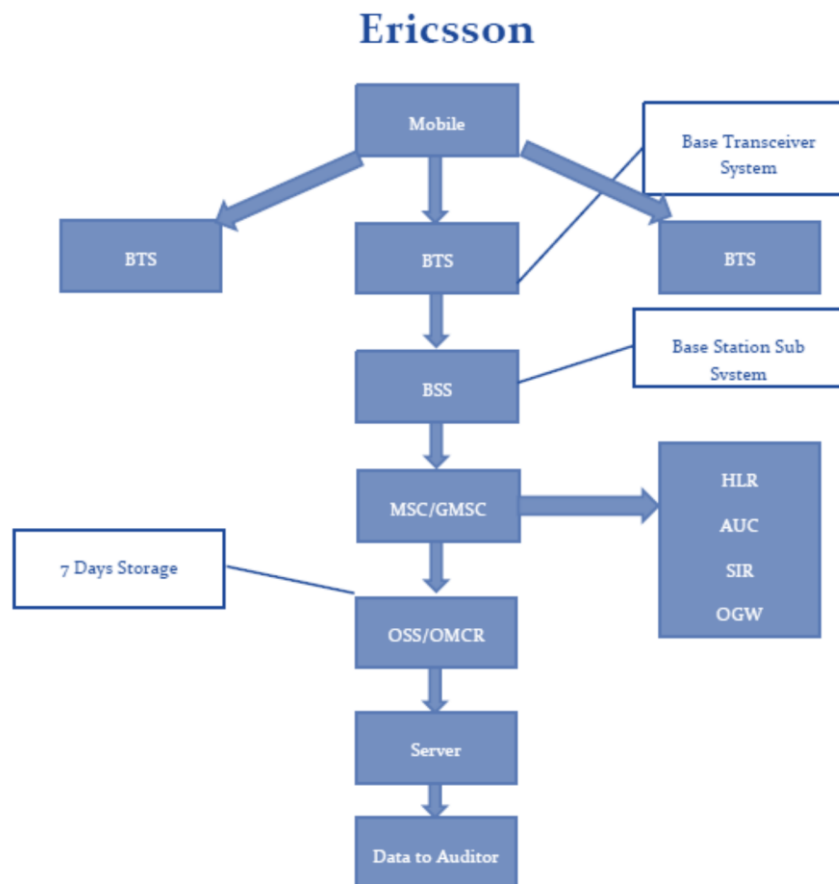
10.3. HUAWEI

SR NO	KPI	HUAWEI FORMULA
1	CALL SETUP SUCCE (NUM)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups] ([1157628567] + [1157628587] + [1157628568] + [1157628588])

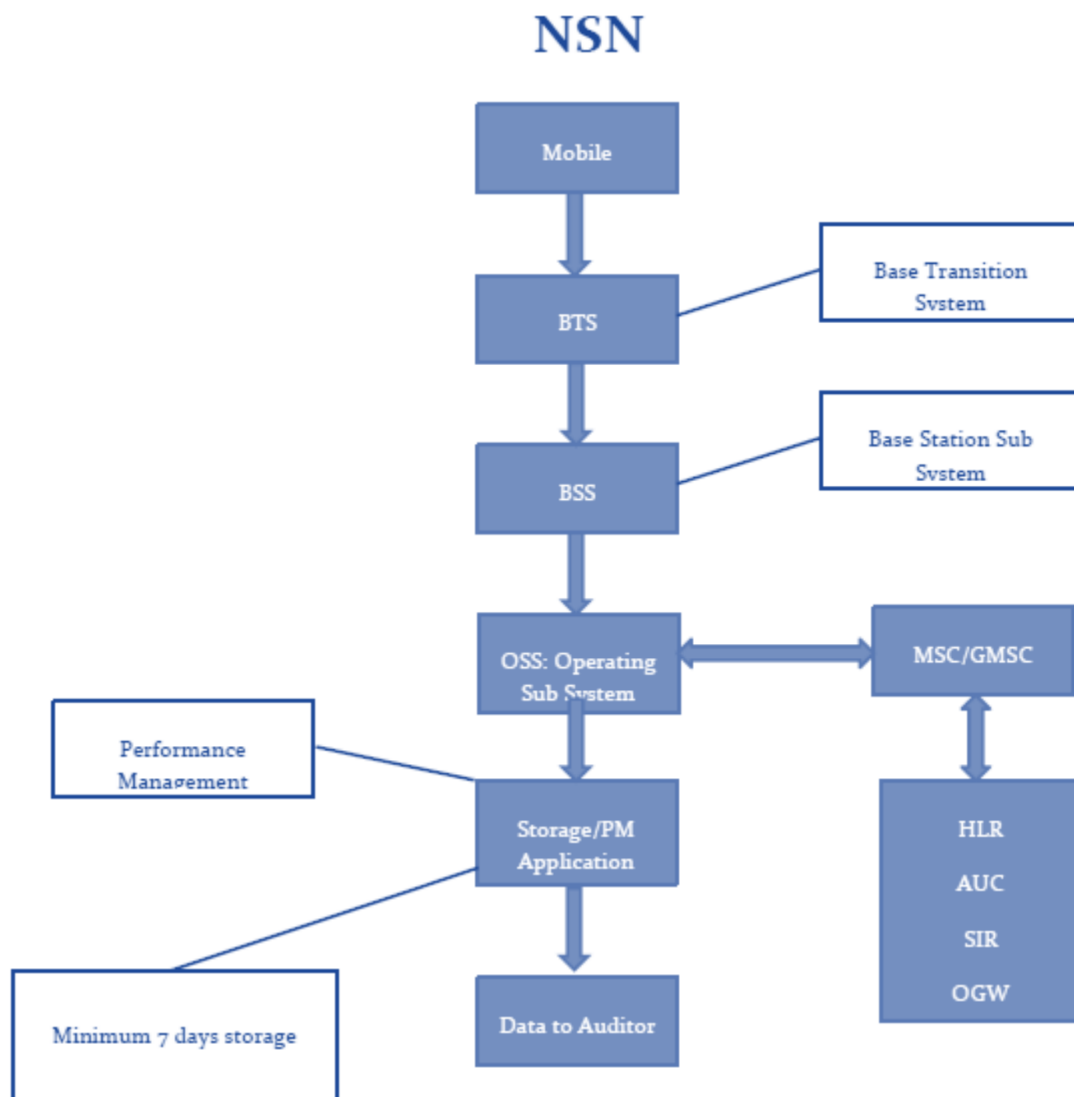
2	CALL SETUP SUCCES (DEN)	[CS IS-95 Orig Attempts + CS IS-2000 Orig Attempts + CS IS-95 Term Attempts + CS IS-2000 Term Attempts] ([1157628553] + [1157628573] + [1157628554] + [1157628574])
3	CALL SETUP SUCCESS RATE (%)	CALL SETUP SUCCES (NUM) / CALL SETUP SUCCES (DEN) * 100\
4	CALL DROP RATE (NUM)	[CS IS-95 Call Drops (Too many Erasure frames) + CS IS-2000 Call Drops (Too many Erasure frames) + CS IS-95 Call Drops (No reverse frame received) + CS IS-2000 Call Drops (No reverse frame received) + CS IS-95 Call Drops (Abis interface abnormal) + CS IS-2000 Call Drops (Abis interface abnormal) + CS IS-95 Call Drops (A2 interface abnormal) + CS IS-2000 Call Drops (A2 interface abnormal) + CS IS-95 Call Drops (HHO fail) + CS IS-2000 Call Drops (HHO fail) + CS IS-95 Call Drops (Other causes) + CS IS-2000 Call Drops (Other causes)] ([1157628608] + [1157628614] + [1157628609] + [1157628615] + [1157628610] + [1157628616] + [1157628611] + [1157628617] + [1157628612] + [1157628618] + [1157628613] + [1157628619])
5	CALL DROP RATE(DEN)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups + CS IS-95 Successful Incoming Hard HOs + CS IS-2000 Successful Incoming Hard HOs] [1157628619]) x 100/([1157628567] + [1157628587] + [1157628568] + [1157628588] + [1157628569] + [1157628589])]
6	Call DROP Rate	CALL DROP RATE (NUM) / CALL DROP RATE (DEN) * 100\
7	RF BLOCK RATE (NUM)	{[(TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]) - (Successful TCH Assignments-CS Orig-IS95[Times] + Successful TCH Assignments-CS Orig-IS2000[Times] + Successful TCH Assignments-CS Term-IS95[Times] + Successful TCH Assignments-CS Term-IS2000[Times])]} [(1157628621 + 1157628628 + 1157628635+ 1157628642)
8	RF BLOCK RATE (DEN)	{[(TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times])]} [(1157628621 + 1157628628 + 1157628635+ 1157628642)]
9	RF BLOCK RATE	RF BLOCK RATE (NUM) / RF BLOCK RATE (DEN) *100
10	Call Quality (RFER)	CS Reverse Link Average FER of Carrier[%

11. BLOCK SCHEMATIC DIAGRAM

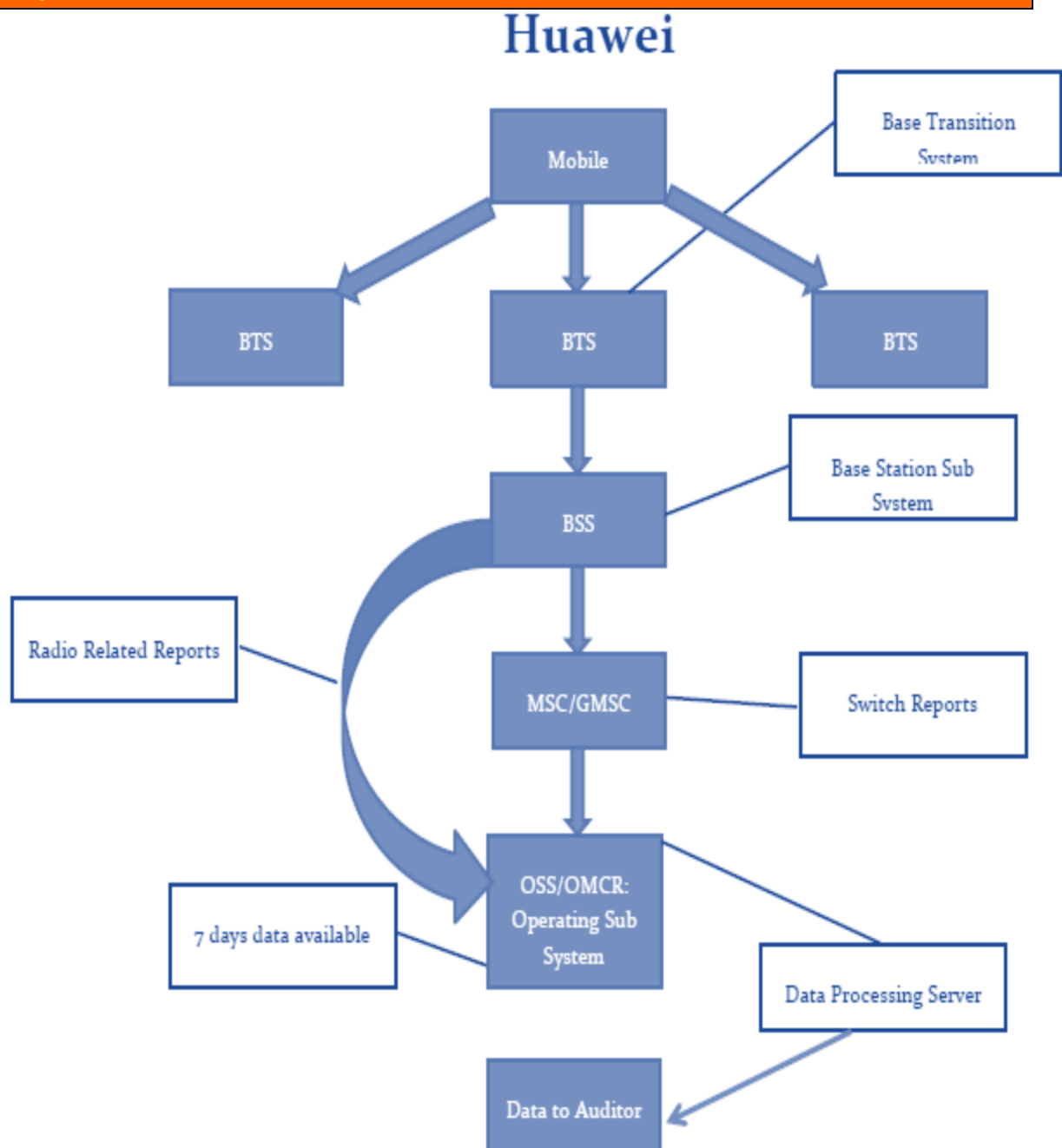
11.1. ERICSSON



11.2. NSN



11.3. HUAWEI



12. ABBREVIATIONS

Following terms/abbreviations have been used in this report. This section provides meaning of the abbreviations used in the report.

- TRAI – Telecom Regulatory Authority of India
- PCPL – Phistream Consulting Private Limited
- QoS – Quality of Service
- AMJ'16 – Refers to the quarter of April, May and June 2016
- SSA – Secondary Switching Area
- NOC – Network Operation Center
- OMC – Operations and Maintenance Center
- MSC – Mobile Switching Center
- PMR – Performance Monitoring Reports
- TCBH – Time Consistent Busy Hour
- CBBH - Cell Bouncing Busy Hour
- BTS – Base Transceiver Station
- CSSR – Call Setup Success Rate
- TCH – Traffic Channel
- SDCCH – Standalone Dedicated Control Channel
- CDR – Call Drop Rate
- FER – Frame Error Rate
- SIM – Subscriber Identity Module
- GSM – Global System for Mobile
- CDMA – Code Division Multiple Access
- NA – Not Applicable
- NC – Non Compliance
- POI – Point of Interconnection
- IVR – Interactive Voice Response
- STD – Standard Trunk Dialing
- ISD – International Subscriber Dialing

13. ANNEXURE

13.1. 2G VOICE PMR DATA: CONSOLIDATED

Consolidated								
Network Parameters		Name of Service Provider						
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	0.62%	0.12%	1.46%	0.16%	0.05%	0.23%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	3.04%	0.13%	0.64%	0.46%	0.00%	1.15%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	97.61%	98.38 %	98.76 %	98.53 %	98.53%	99.32%
	SDDCH/Paging chl. Congestion	≤ 1%	0.41%	0.50%	0.58%	0.19%	0.07%	0.06%
	TCH Congestion	≤ 2%	1.66%	1.06%	1.23%	0.95%	0.17%	0.68%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	1.31%	1.32%	1.10%	1.27%	0.13%	0.61%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	10.99%	0.30%	1.78%	1.88%	0.34%	2.59%
	%age of connection with good voice quality	≥ 95%	95.37%	97.90 %	96.79 %	96.31 %	99.15%	98.56%

13.2. 3G VOICE PMR: CONSOLIDATED

Consolidated							
Network Parameters		Name of Service Provider					
		Benchmark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	$\leq 2\%$	0.79%	0.17%	1.01%	0.19%	0.61%
	No. of BTSs having accumulated downtime of >24 hours in a month	$\leq 2\%$	2.91%	0.15%	0.51%	0.38%	1.02%
Connection Establishment (Accessibility) Connection Maintenance (Retainability)	Call Set-up Success Rate (Within Licensee own network)	$\geq 95\%$	97.40%	99.26%	97.30%	99.38%	98.31%
	RRC Congestion:	$\leq 1\%$	0.35%	0.00%	0.76%	0.39%	0.29%
	RAB Congestion:	$\leq 2\%$	0.08%	0.01%	1.27%	0.22%	0.16%
	Circuit Switched Voice Drop Rate	$\leq 2\%$	1.89%	0.45%	0.76%	1.41%	0.13%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	$\leq 3\%$	16.12%	1.00%	2.16%	1.76%	0.57%
	Percentage of connections with Good Circuit Switched Voice Quality	$\geq 95\%$	97.95%	98.67%	96.65%	97.30%	99.81%

13.3. BILLING AND CUSTOMER CARE

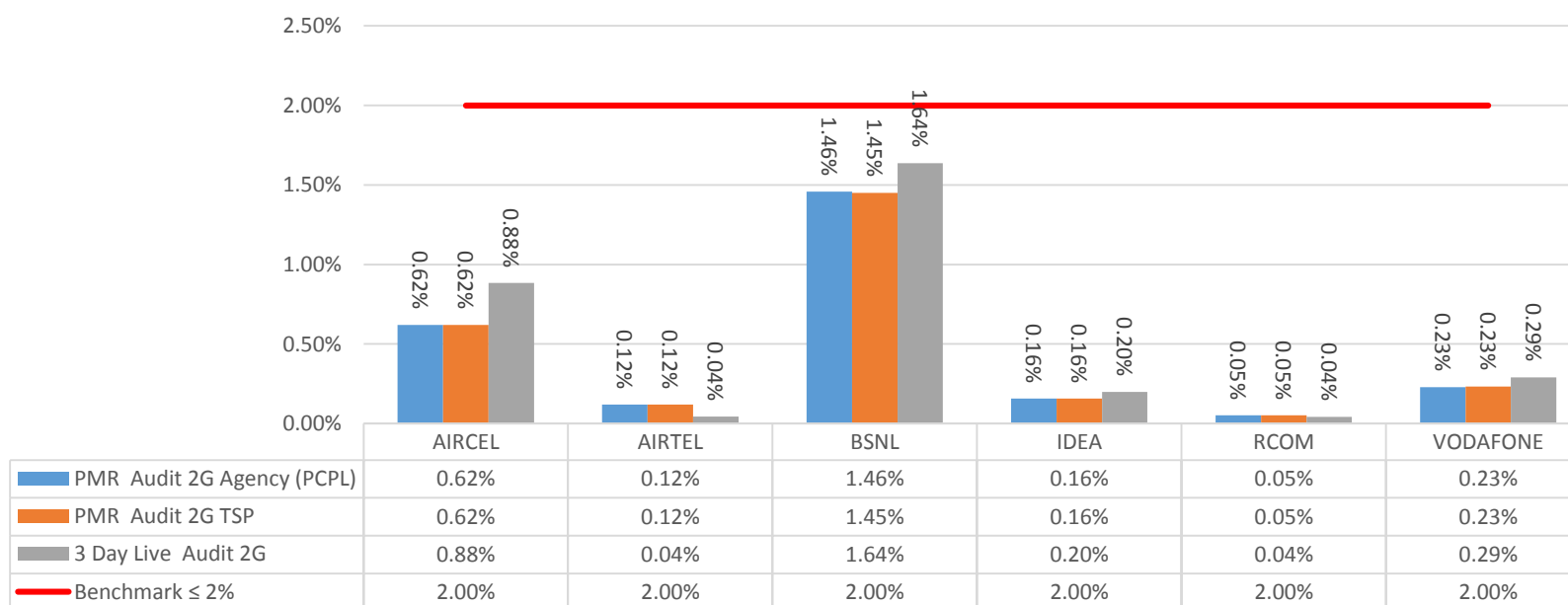
Name of Service Provider	Metering and Billing credibility		Billing Complaints			Termination & Closures	Time taken for refund of deposits after closures: Benchmark	Response time to customer for assistance	
	Postpaid Subscribers	Prepaid Subscribers	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	%age of where credit/waiver is received within one week	% of Termination/ Closure of service within 7 days (100 %)	Cleared over a period of <60 days (100%)	%age of calls answered by the IVR	%age of call answered by the operators (voice to voice) within 90 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	= 100%	= 100%	= 100%	= 100%	≥ 95%	≥ 95%
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.25%	93.01%
AIRTEL	0.01%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.23%	63.30%
BSNL	0.04%	0.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%	96.37%
IDEA	0.01%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	96.45%	95.17%
RCOM GSM	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	85.98%	98.97%	94.26%
VODAFONE	0.04%	0.10%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.58%

13.4. PMR COMPARISON (TSP vs. AUDIT AGENCY): NETWORK PARAMETERS

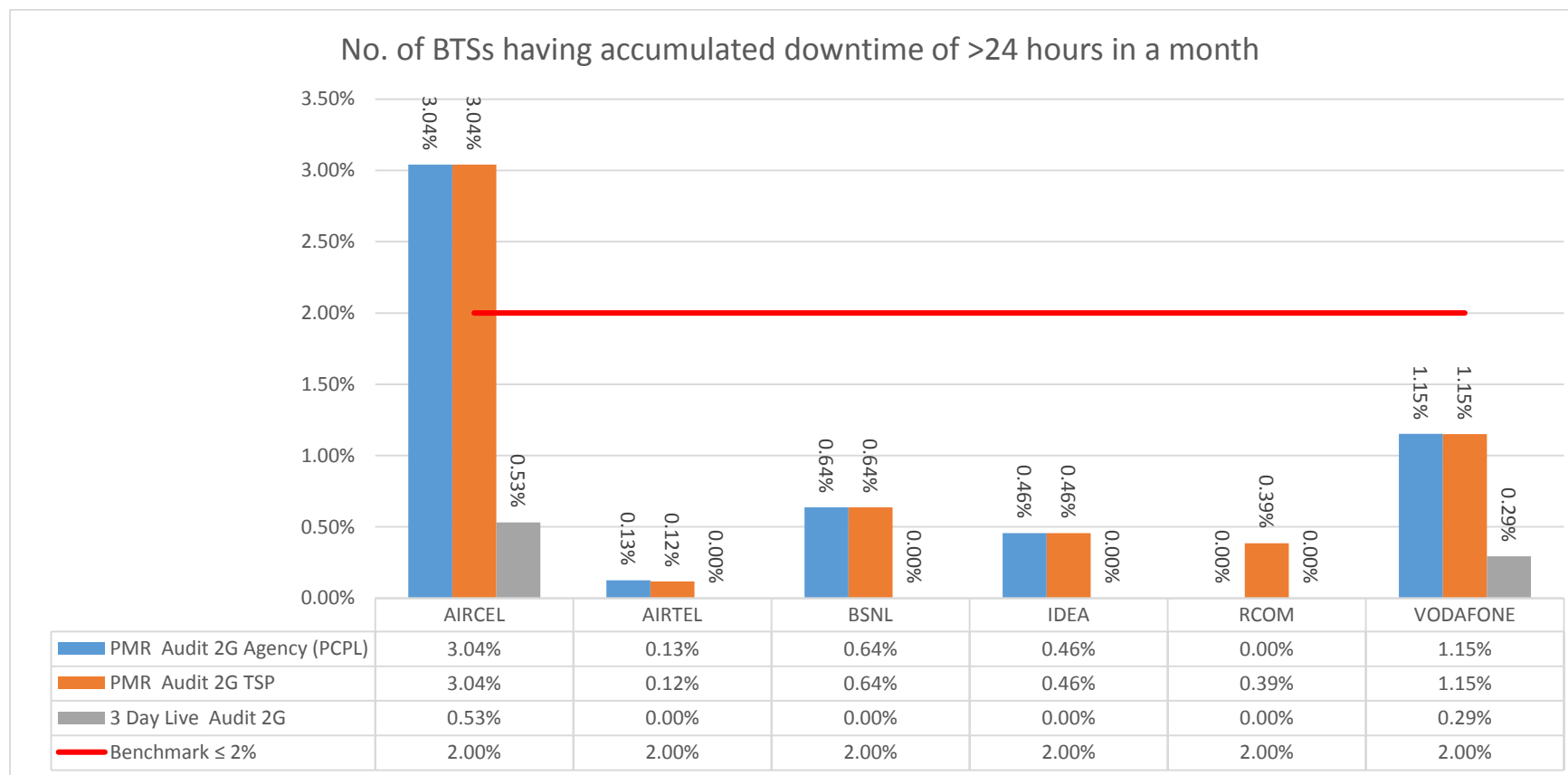
PMR Report Comparison between Audit Agency and TSP									
Network Parameters		Name of Service Provider							
		Benchmark		AIRCEL	AIRTEL	BSNL	IDEA	RCOM	VODAFONE
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.62%	0.12%	1.46%	0.16%	0.05%	0.23%
			TSP	0.62%	0.12%	1.45%	0.16%	0.05%	0.23%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	3.04%	0.13%	0.64%	0.46%	0.00%	1.15%
			TSP	3.04%	0.12%	0.64%	0.46%	0.39%	1.15%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	Agency	97.61%	98.38%	98.76%	98.53%	98.53%	99.32%
			TSP	97.61%	98.35%	98.76%	98.53%	98.25%	99.32%
	SDDCH/Paging chl. Congestion	≤ 1%	Agency	0.41%	0.50%	0.58%	0.19%	0.07%	0.06%
			TSP	0.41%	0.50%	0.58%	0.19%	0.07%	0.06%
	TCH Congestion	≤ 2%	Agency	1.66%	1.06%	1.23%	0.95%	0.17%	0.68%
			TSP	1.66%	1.07%	1.23%	0.95%	0.17%	0.68%
Connection Maintenance (Retainability)	Call Drop Rate (%age)	≤ 2%	Agency	1.31%	1.32%	1.10%	1.27%	0.13%	0.61%
			TSP	1.31%	1.29%	1.09%	1.27%	0.14%	0.61%
	Worst Affected cell having more than 3% TCH drop	≤ 3%	Agency	10.99%	0.30%	1.78%	1.88%	0.34%	2.59%
			TSP	10.99%	0.28%	1.78%	1.88%	0.48%	2.59%
	%age of connection with good voice quality	≥ 95%	Agency	95.37%	97.90%	96.79%	96.31%	99.15%	98.56%
			TSP	95.37%	97.88%	96.72%	96.31%	99.15%	98.55%

13.4.1. SUM OF DOWNTIME OF BTSs IN A MONTH IN HRS. IN THE LICENSED SERVICE

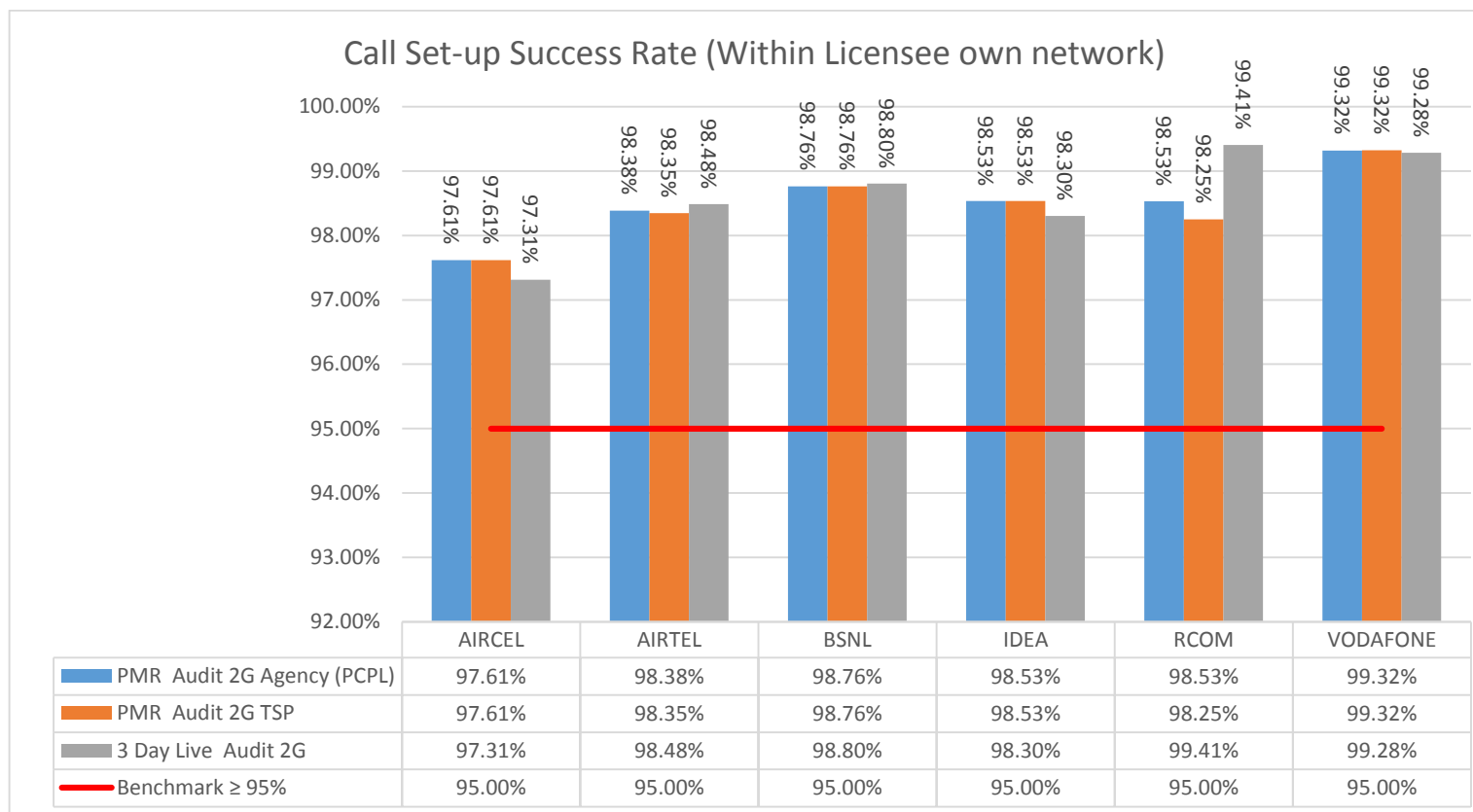
Sum of downtime of BTSs in a month in hrs. in the licensed service area



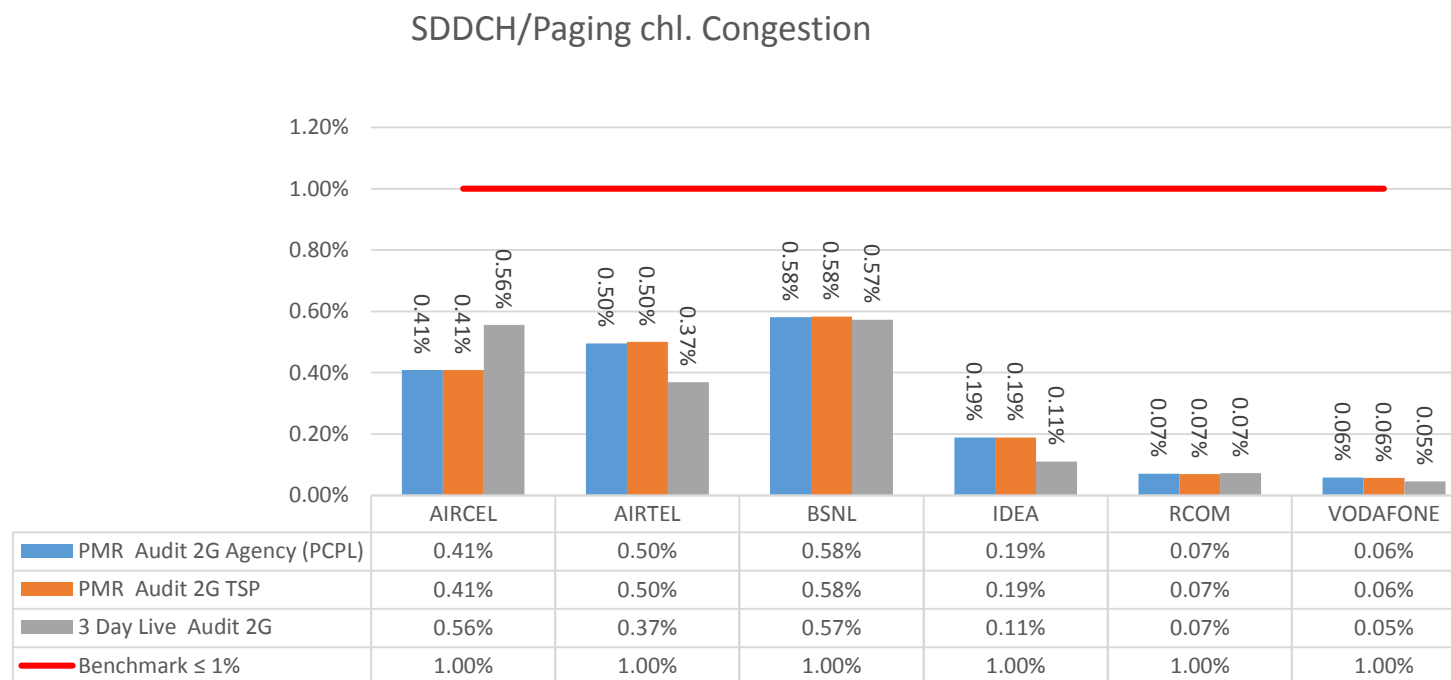
13.4.2. No. of BTSs Having Accumulated Downtime of >24 Hours in a Month



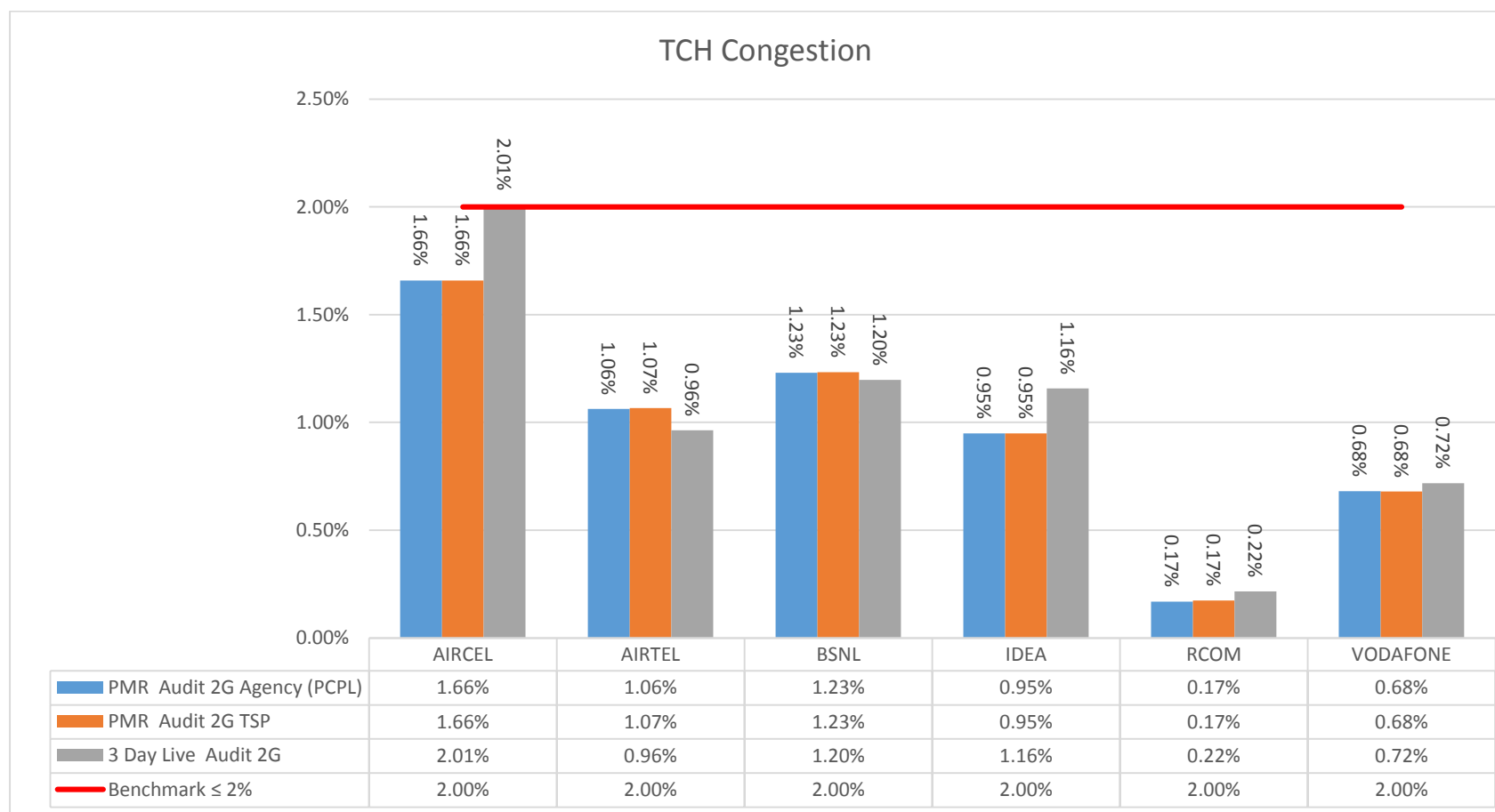
13.4.3. CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)



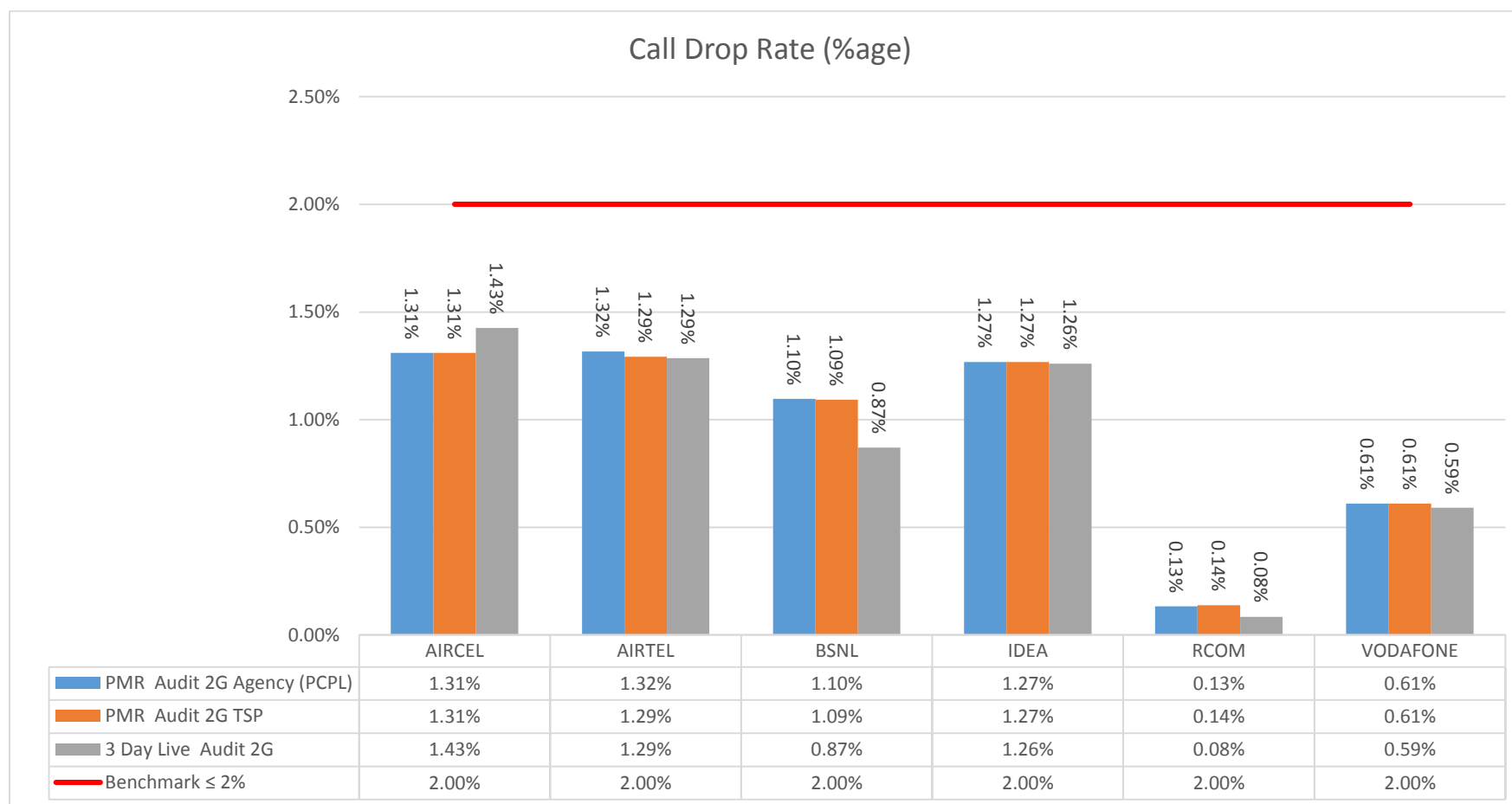
13.4.4. SDDCH/PAGING CHL. CONGESTION



13.4.5. TCH CONGESTION

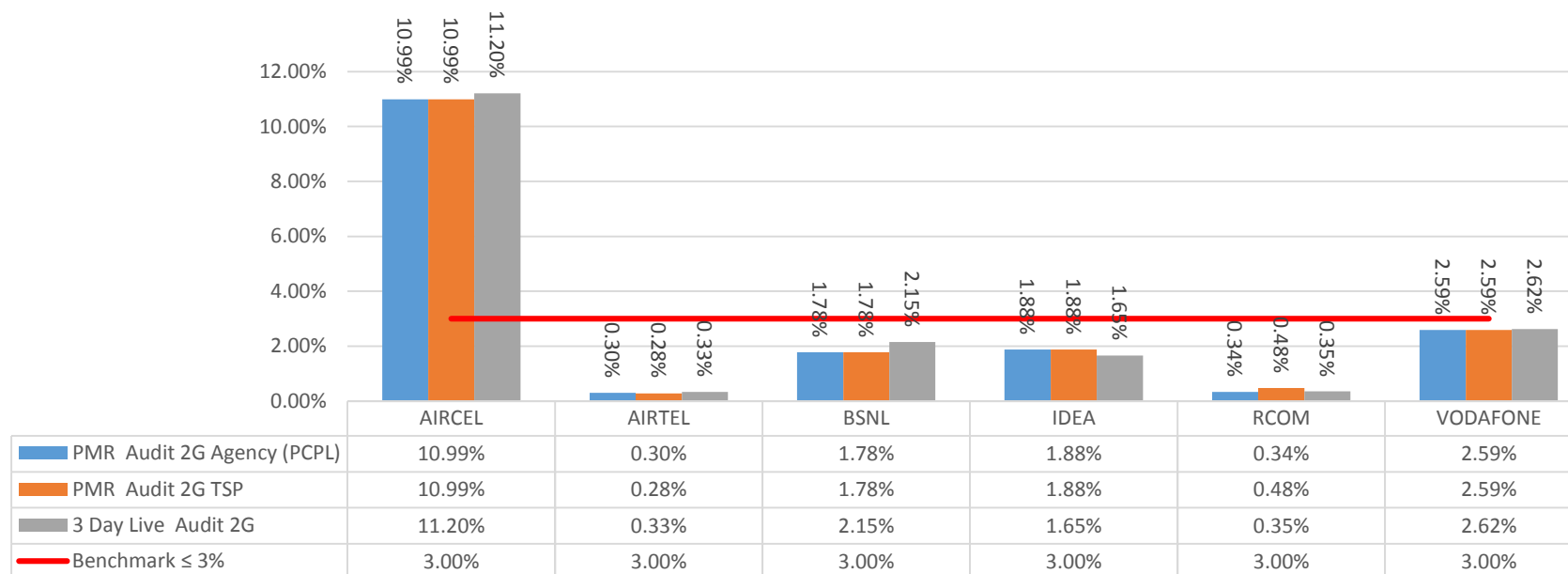


13.4.6. CALL DROP RATE (%AGE)

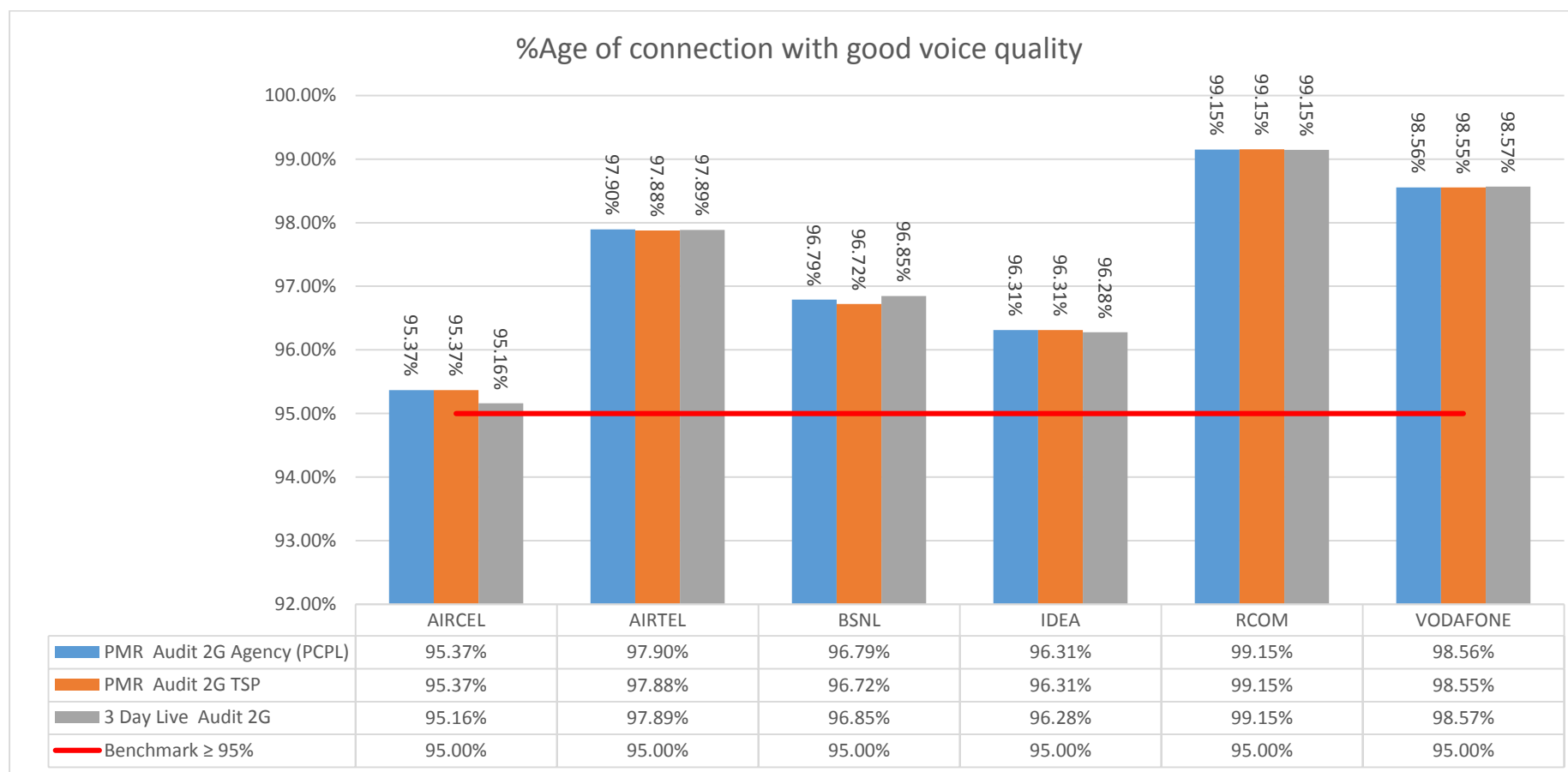


13.4.7. WORST AFFECTED CELL HAVING MORE THAN 3% TCH DROP

Worst Affected cell having more than 3% TCH drop



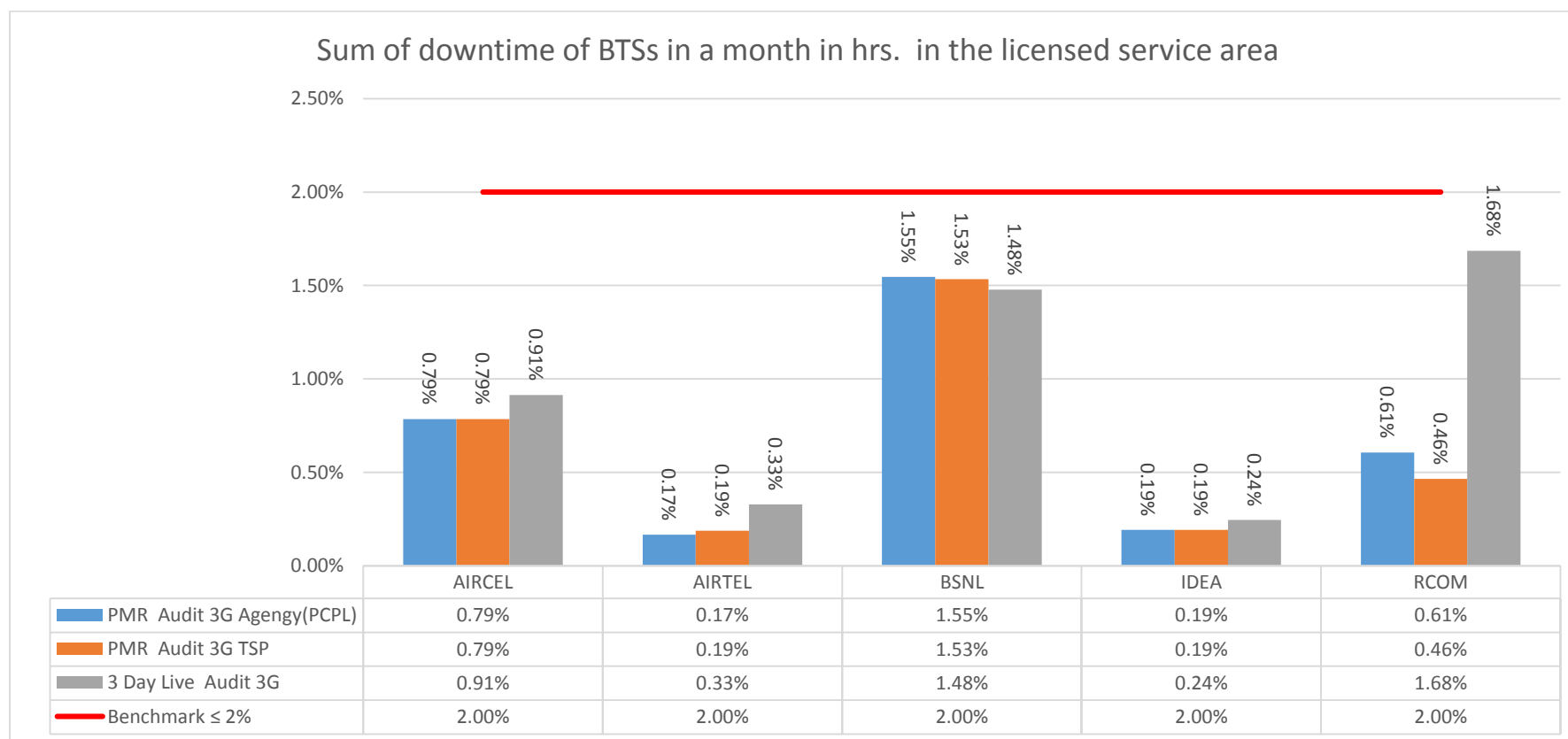
13.4.8. %AGE OF CONNECTION WITH GOOD VOICE QUALITY



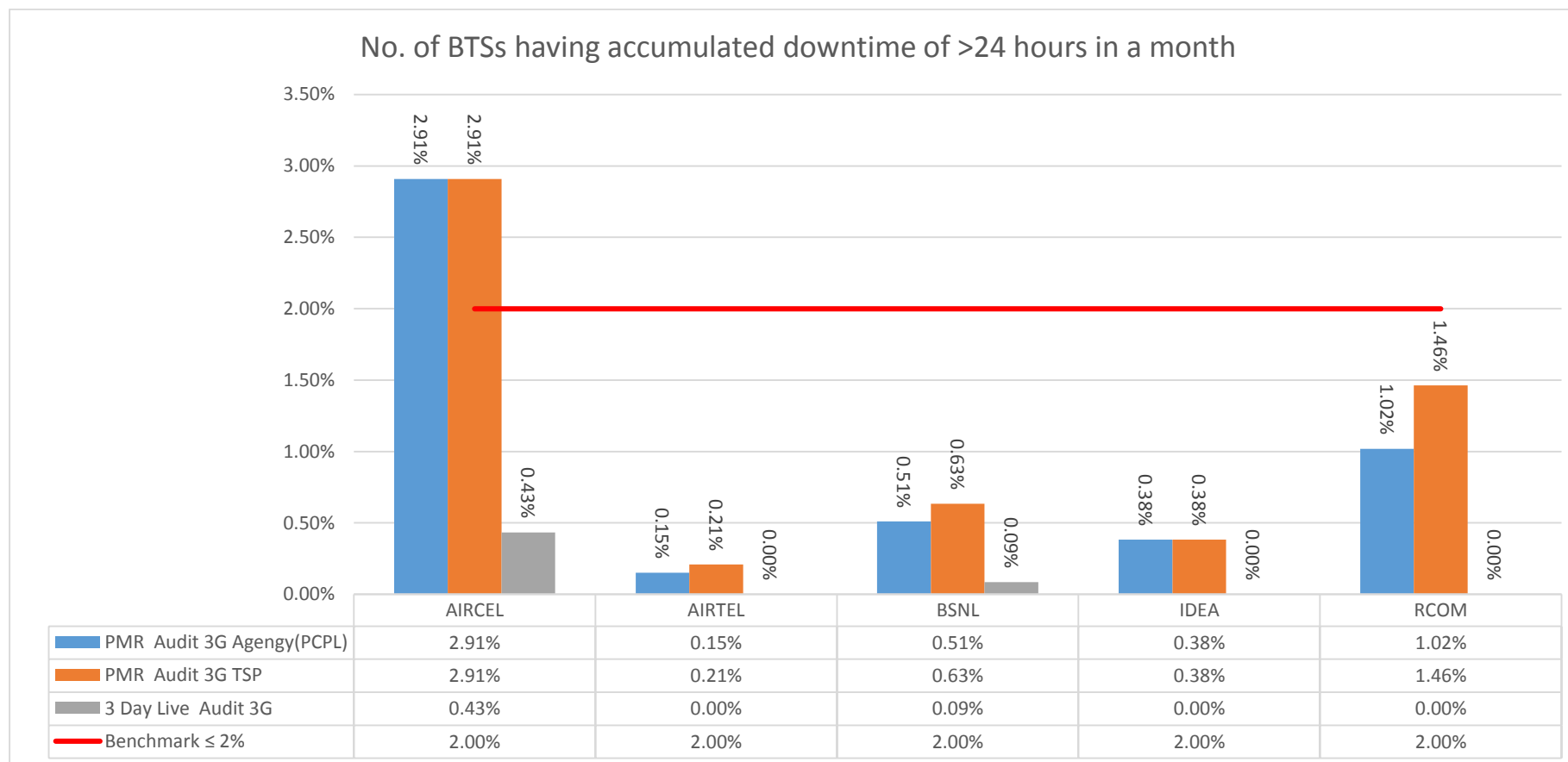
13.5. PMR COMPARISON (TSP vs. AUDIT AGENCY): NETWORK PARAMETERS

PMR Report Comparison between Audit Agency and TSP								
Network Parameters		Benchmark	Name of Service Provider					
				AIRCEL	AIRTEL	BSNL	IDEA	RCOM
Network Availability	Sum of downtime of BTSs in a month in hrs. in the licensed service area	≤ 2%	Agency	0.79%	0.17%	1.55%	0.19%	0.61%
			TSP	0.79%	0.19%	1.53%	0.19%	0.46%
	No. of BTSs having accumulated downtime of >24 hours in a month	≤ 2%	Agency	2.91%	0.15%	0.51%	0.38%	1.02%
			TSP	2.91%	0.21%	0.63%	0.38%	1.46%
Connection Establishment (Accessibility)	Call Set-up Success Rate (Within Licensee own network)	≥ 95%	Agency	97.40%	99.26%	97.30%	99.38%	98.31%
			TSP	97.40%	99.34%	97.33%	99.38%	98.06%
	RRC Congestion:	≤ 1%	Agency	0.35%	0.00%	0.76%	0.39%	0.29%
			TSP	0.35%	0.02%	0.73%	0.39%	0.45%
	RAB Congestion:	≤ 2%	Agency	0.08%	0.01%	1.27%	0.22%	0.16%
			TSP	0.08%	0.00%	1.23%	0.22%	0.19%
Connection Maintenance (Retainability)	Circuit Switched Voice Drop Rate	≤ 2%	Agency	1.89%	0.45%	0.76%	1.41%	0.13%
			TSP	1.89%	0.61%	0.70%	1.41%	0.14%
	Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:	≤ 3%	Agency	16.12%	1.00%	2.16%	1.76%	0.57%
			TSP	16.12%	1.06%	2.10%	1.76%	0.78%
	Percentage of connections with Good Circuit Switched Voice Quality	≥ 95%	Agency	97.95%	98.67%	96.65%	97.30%	99.81%
			TSP	97.95%	99.07%	96.53%	97.18%	99.79%

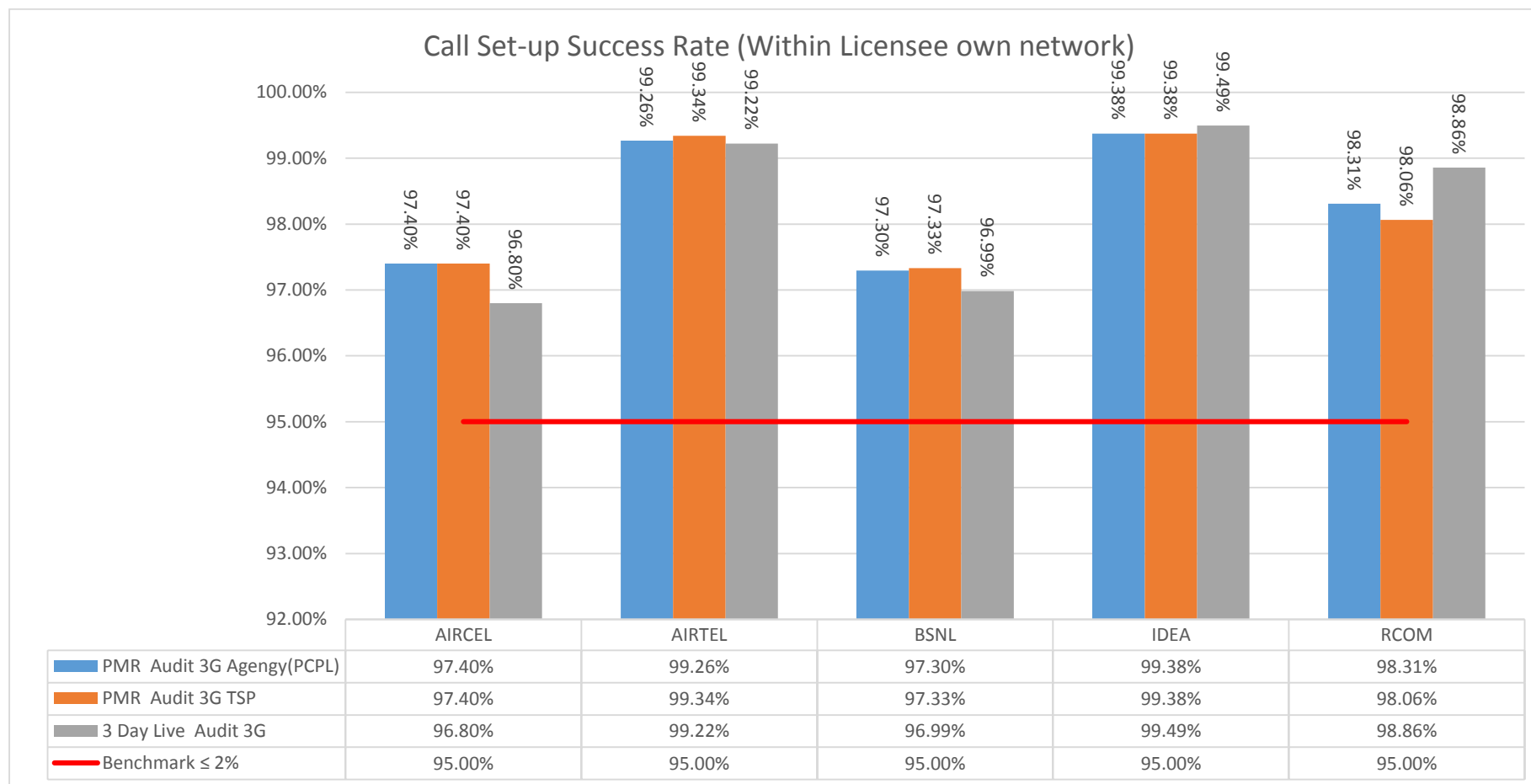
13.5.1. SUM OF DOWNTIME OF BTSS IN A MONTH IN HRS. IN THE LICENSED SERVICE AREA



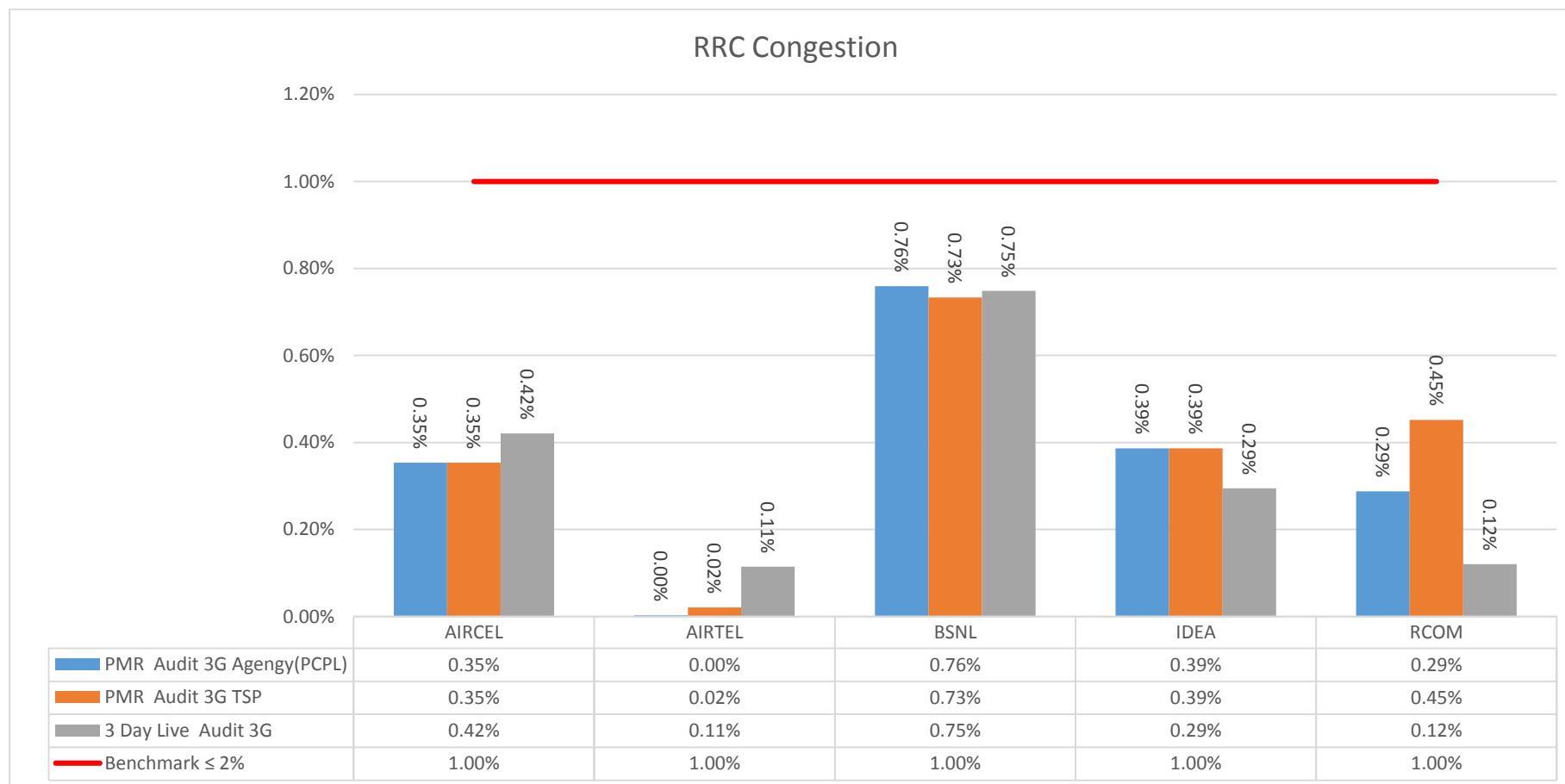
13.5.2. No. of BTSs Having Accumulated Downtime of >24 Hours in a Month



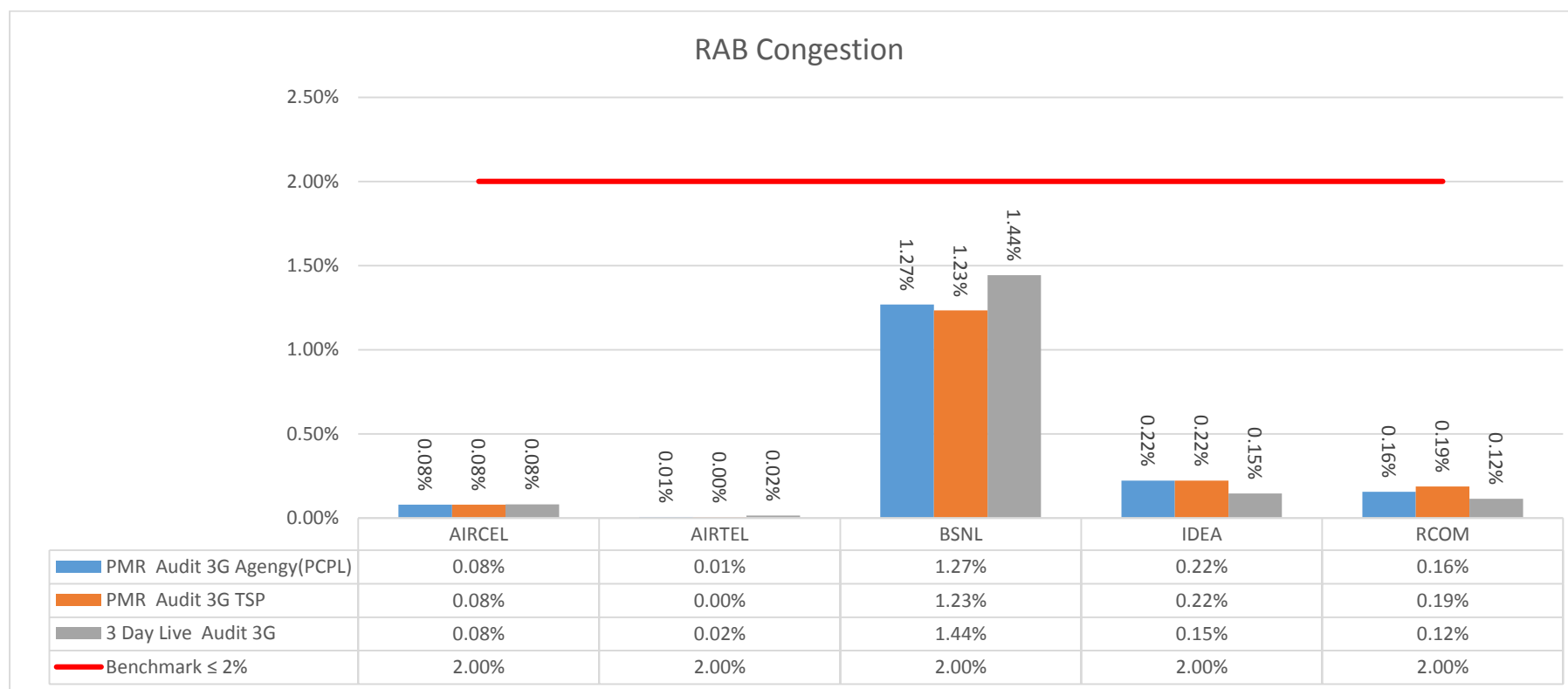
13.5.3. CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)



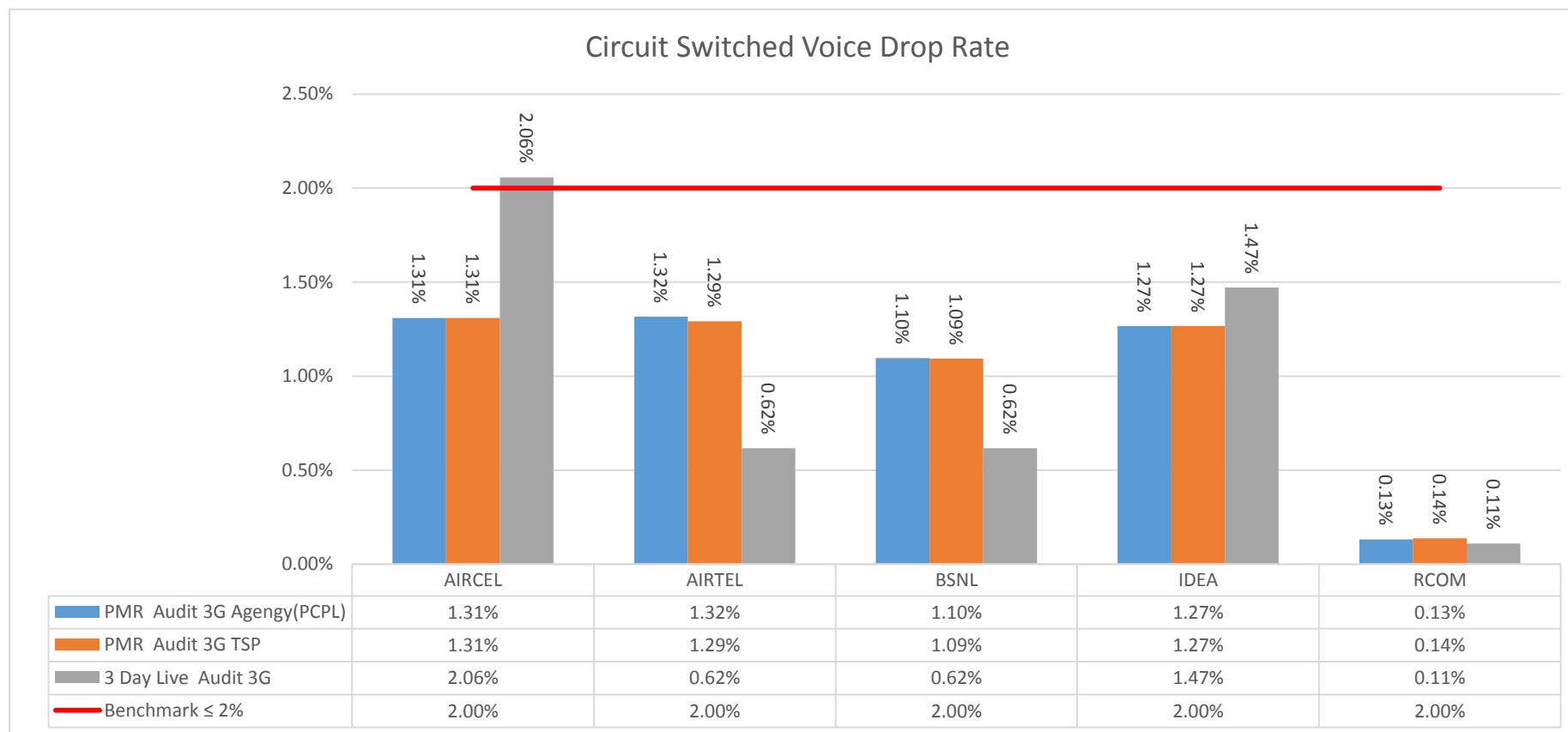
13.5.4. RRC CONGESTION



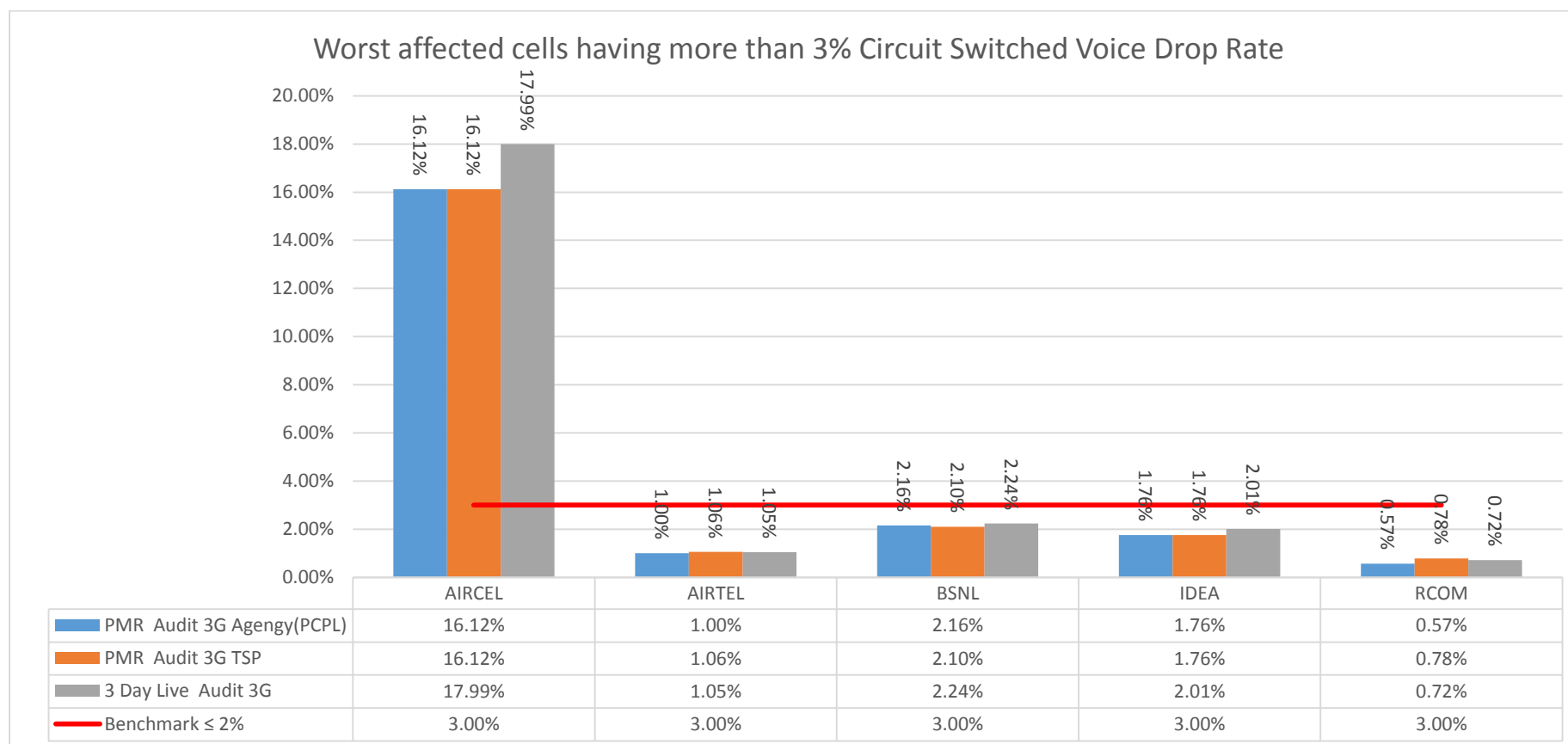
13.5.5. RAB CONGESTION



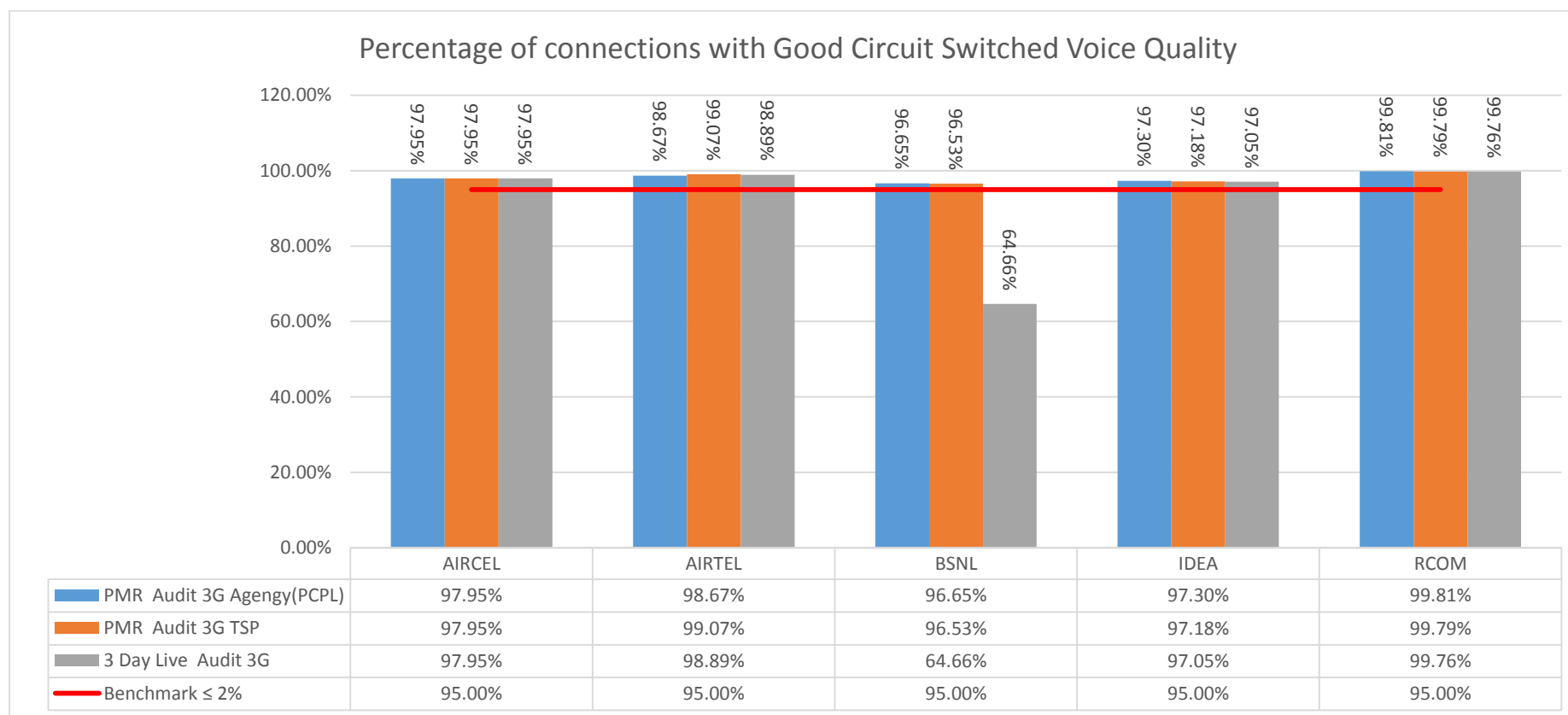
13.5.6. CIRCUIT SWITCHED VOICE DROP RATE



13.5.7. WORST AFFECTED CELLS HAVING MORE THAN 3% CIRCUIT SWITCHED VOICE DROP RATE



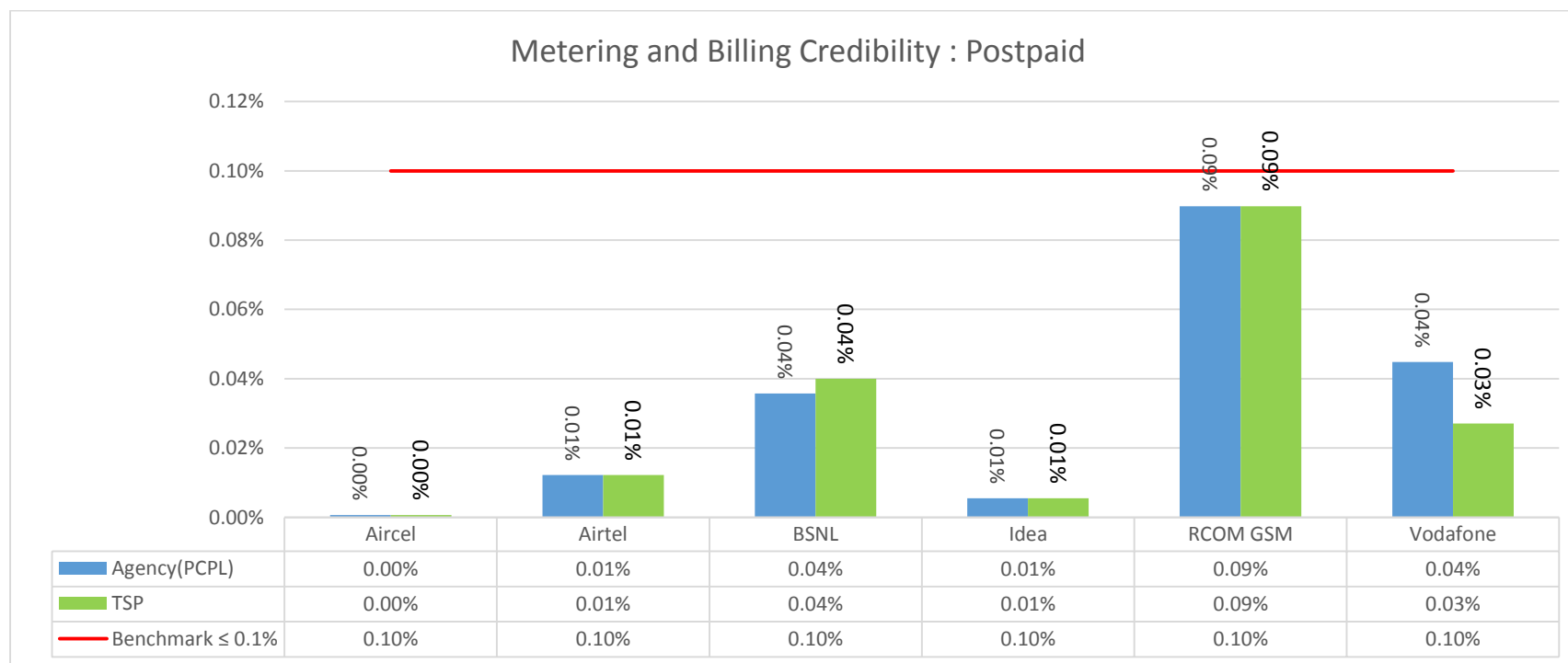
13.5.8. PERCENTAGE OF CONNECTIONS WITH GOOD CIRCUIT SWITCHED VOICE QUALITY



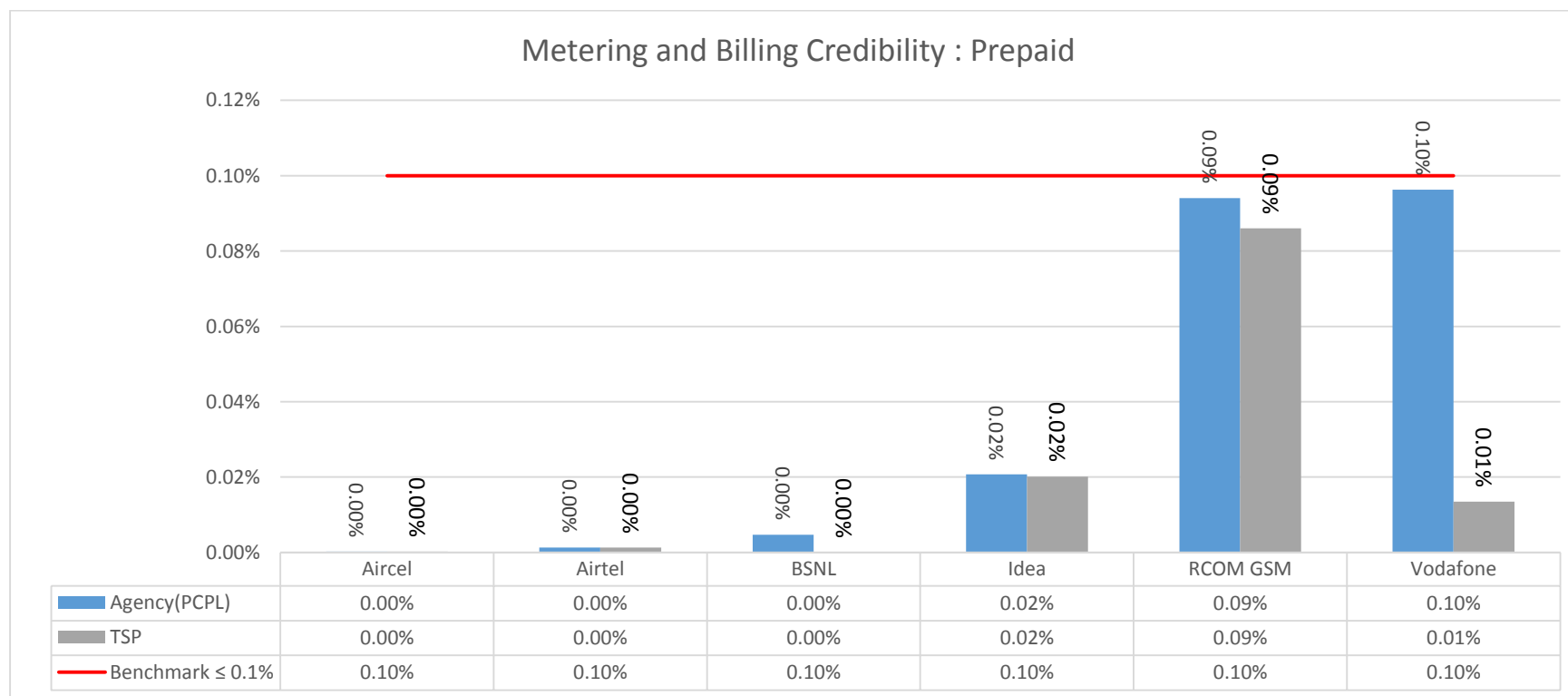
13.6. PMR COMPARISON (TSP vs. AUDIT AGENCY): CSD PARAMETERS

Name of Service Provider	Metering and Billing credibility				Billing Complaints						Termination & Closures		Time taken for refund of deposits after closures: Benchmark		Response time to customer for assistance			
	Postpaid Subscribers		Prepaid Subscribers		%age complaints resolved within 4 weeks		%age complaints resolved within 6 weeks		%age of where credit/waiver is received within one week		% of Termination/ Closure of service within 7 days (100 %)		Cleared over a period of <60 days (100%)		%age of calls answered by the IVR		%age of call answered by the operators (voice to voice) within 90 seconds	
Benchmark	≤ 0.1%		≤ 0.1%		≥ 98%		= 100%		= 100%		= 100%		= 100%		≥ 95%		≥ 95%	
	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP	Agency	TSP
AIRCEL	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.25%	97.25%	93.01%	92.56%
AIRTEL	0.01%	0.01%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.23%	99.23%	63.30%	63.31%
BSNL	0.04%	0.04%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.37%	99.00%
IDEA	0.01%	0.01%	0.02%	0.02%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.45%	96.45%	95.17%	95.17%
RCOM GSM	0.09%	0.09%	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	85.98%	85.98%	98.97%	98.97%	94.26%	94.26%
VODAFONE	0.04%	0.03%	0.10%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.58%	99.37%

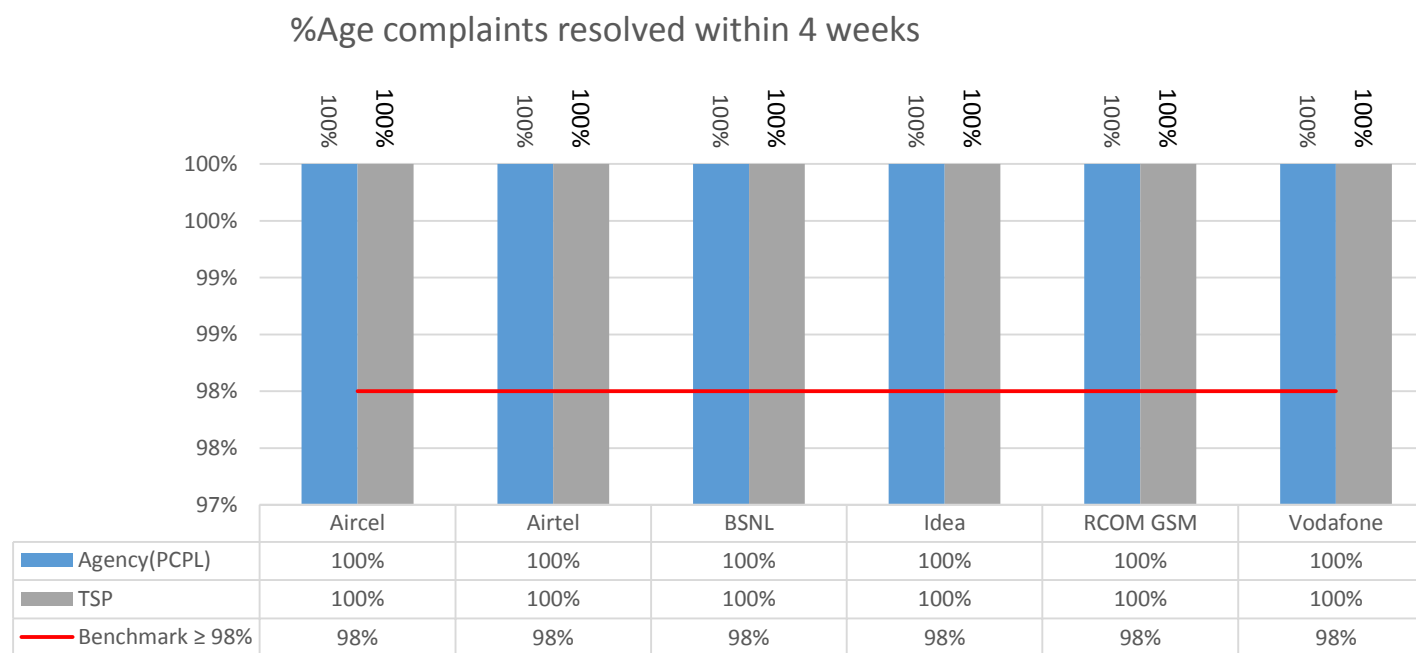
13.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



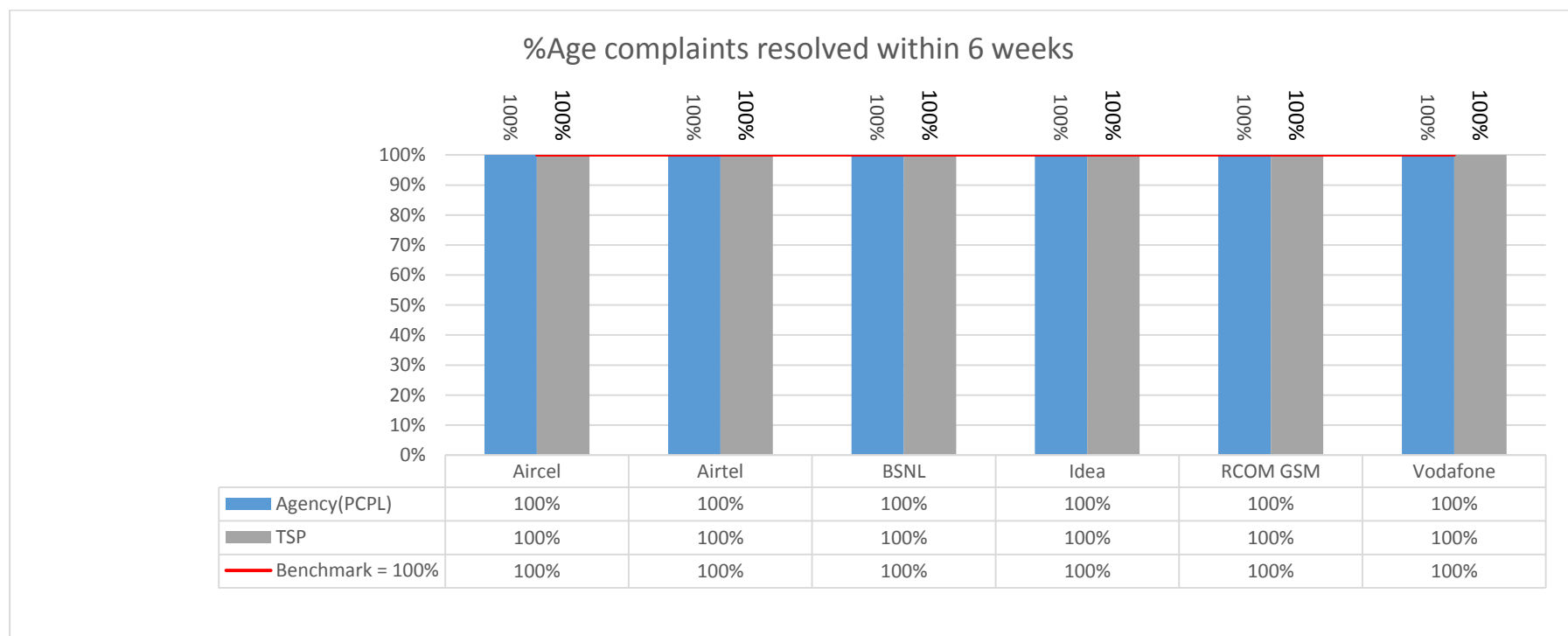
13.6.2. METERING AND BILLING CREDIBILITY : PREPAID



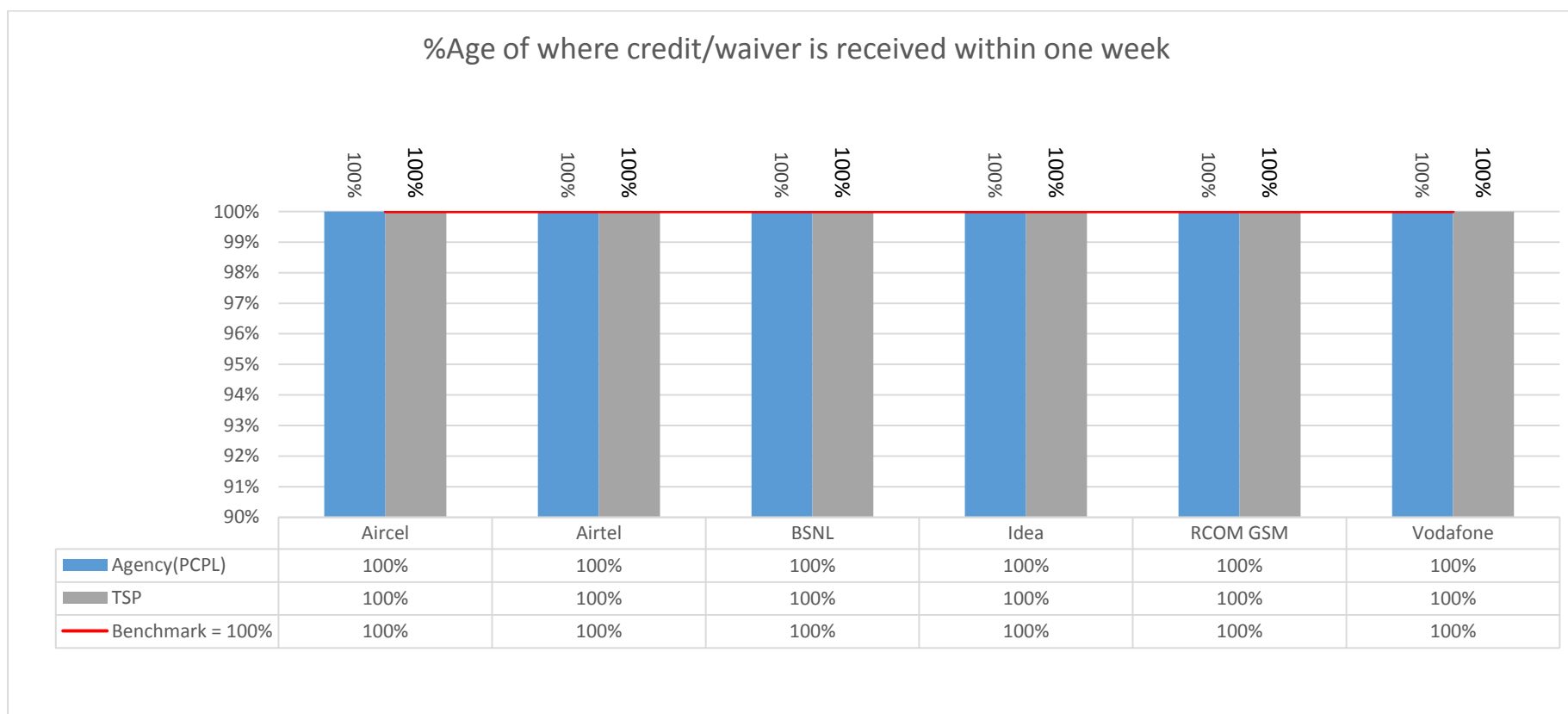
13.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



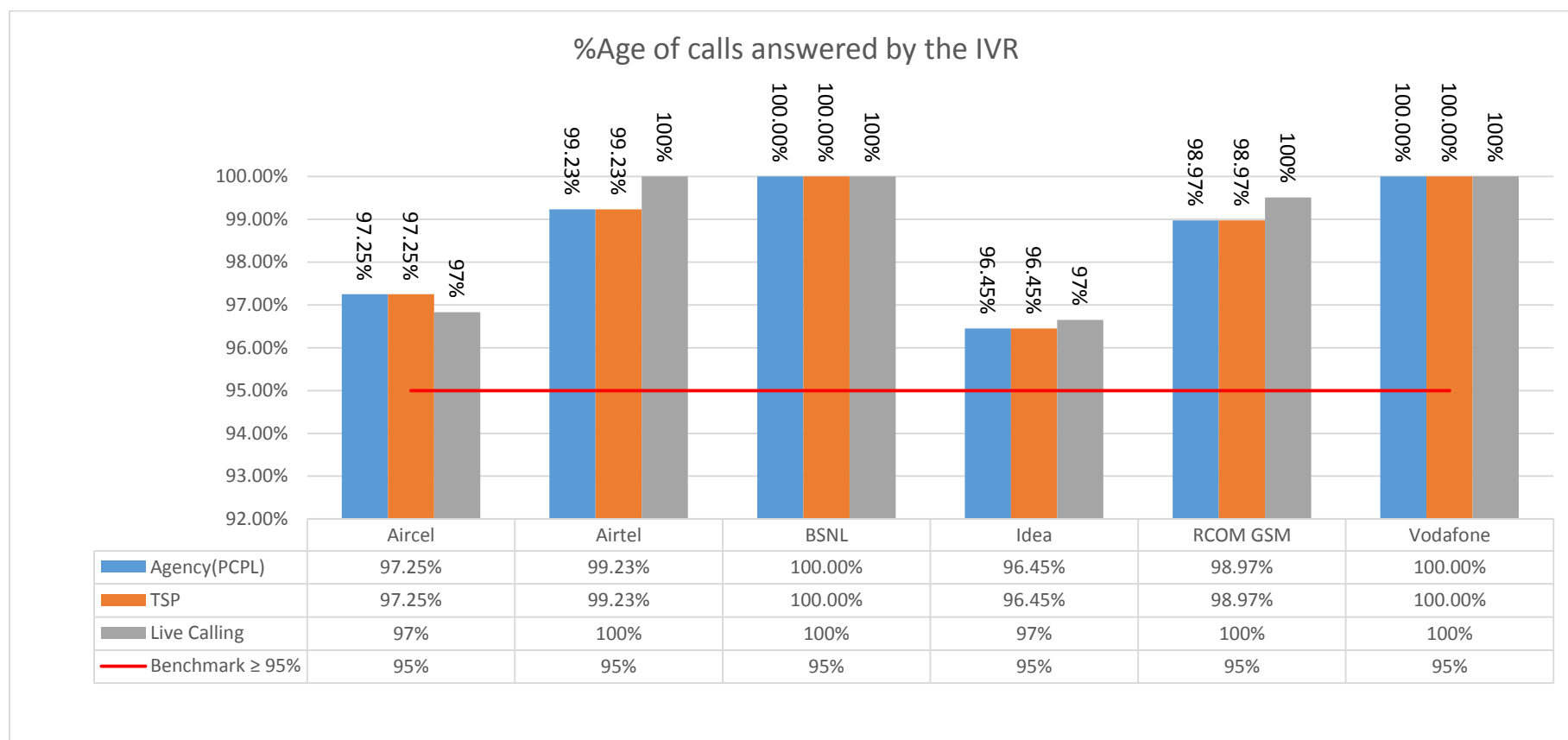
13.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



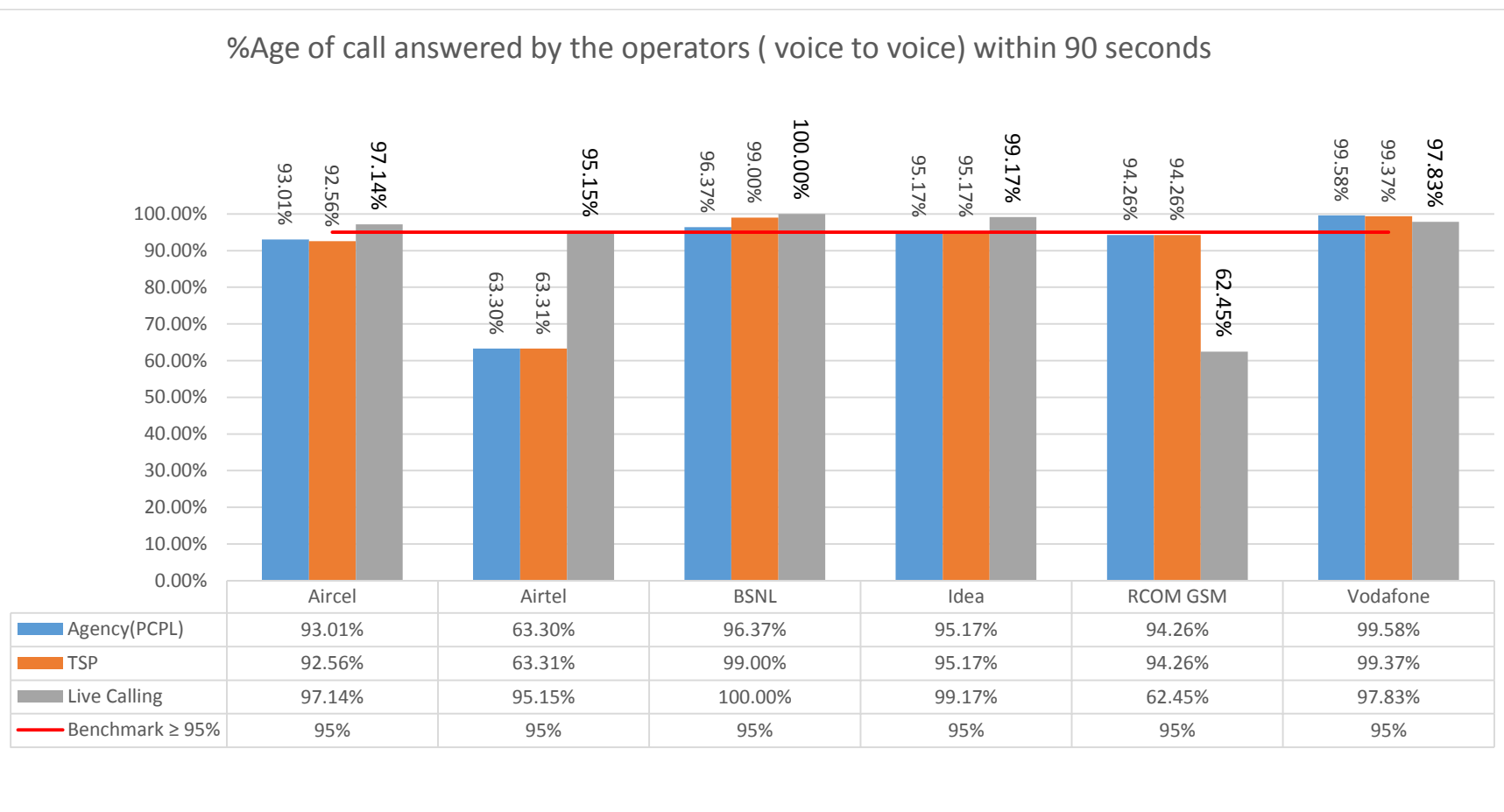
13.6.5. %AGE OF WHERE CREDIT/WAIVER IS RECEIVED WITHIN ONE WEEK



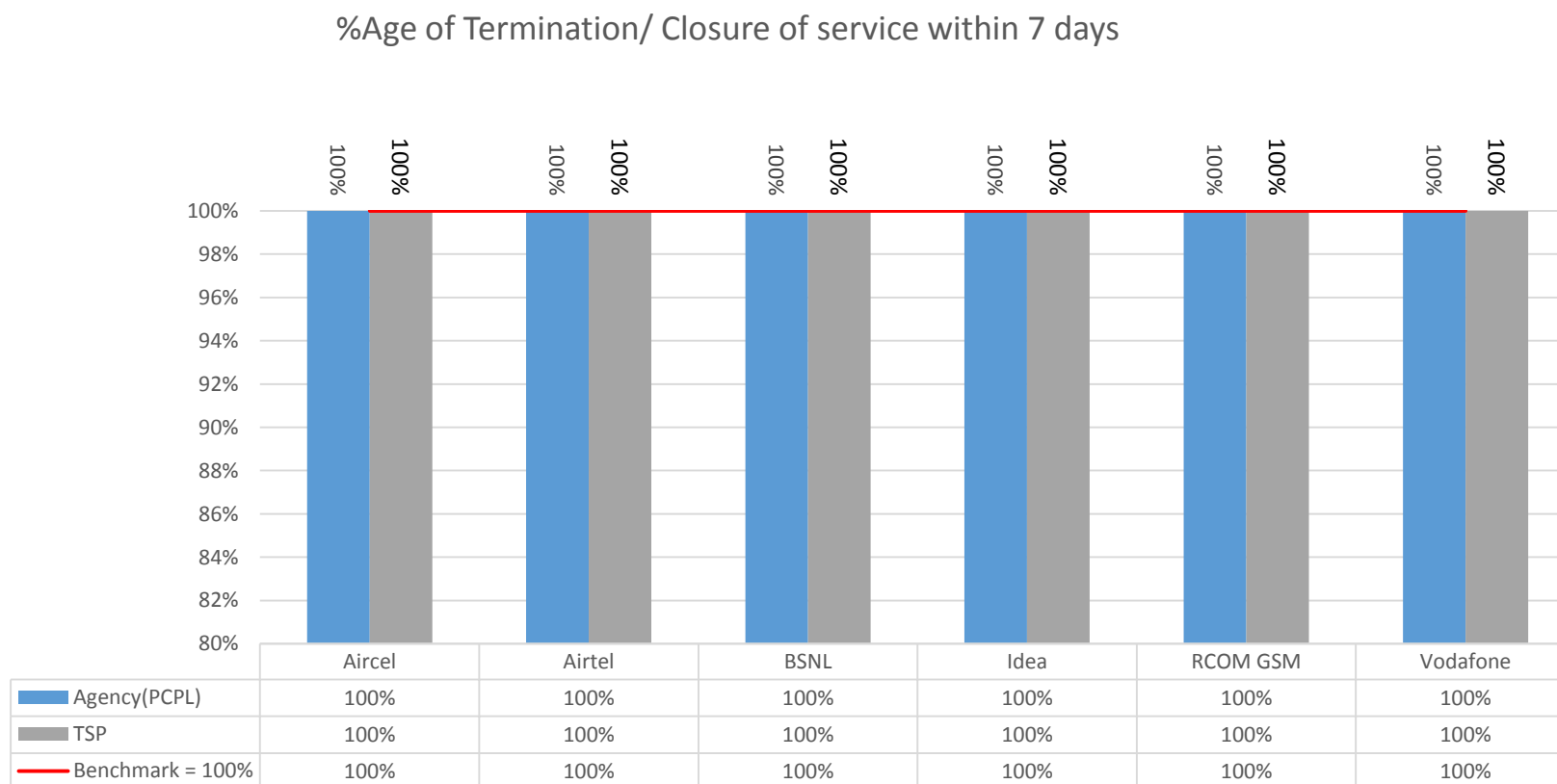
13.6.6. %AGE OF CALLS ANSWERED BY THE IVR



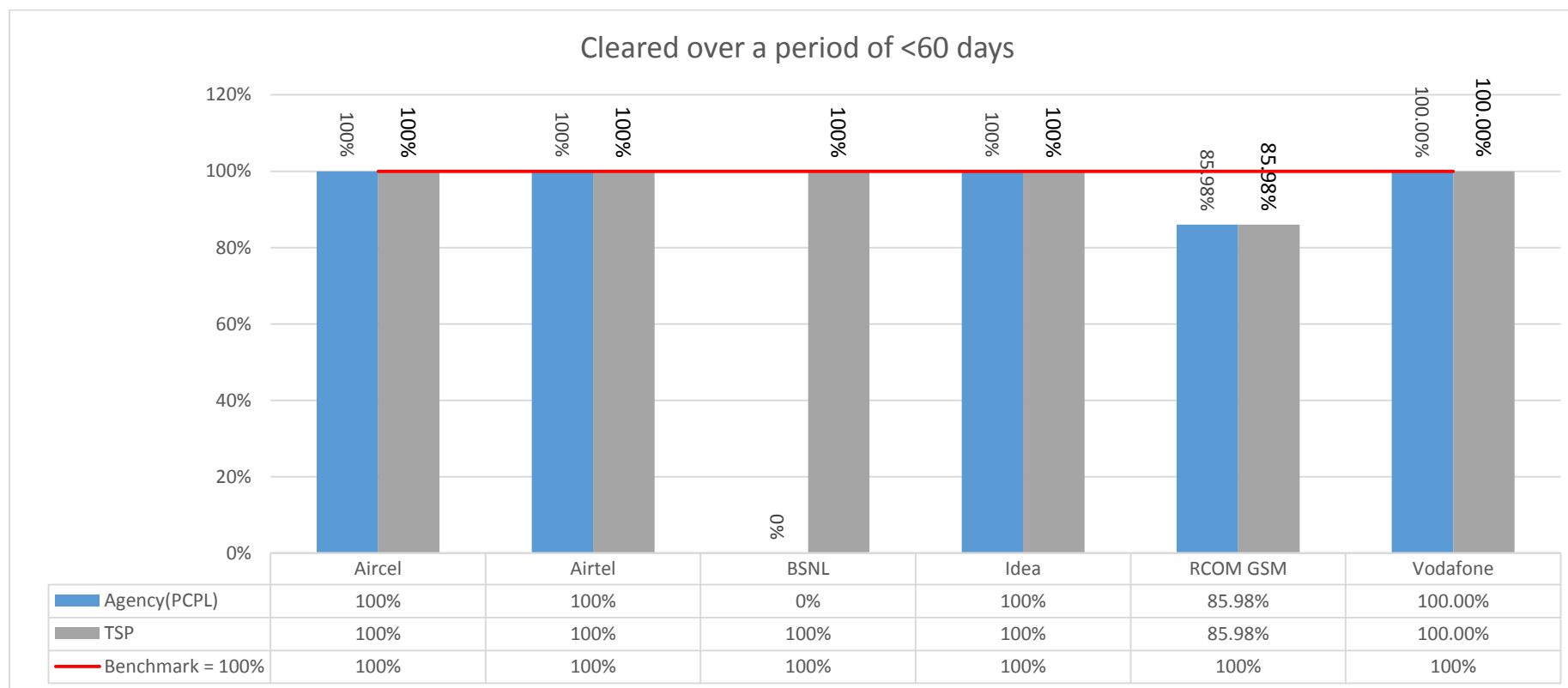
13.6.7. %AGE OF CALLS ANSWERED BY THE OPERATORS (VOICE TO VOICE) WITHIN 90 SECONDS



13.6.8. %AGE OF TERMINATION/CLOSURE OF SERVICE WITHIN 7 DAYS



13.6.9. CLEARED OVER A PERIOD OF <60 DAYS



14. KEY FINDINGS

NETWORK FINDINGS (2G):

- AIRCEL has a parameter value of 3.04% and has failed to meet the benchmark of $\leq 2\%$ for Number of BTSs having downtime of > 24 hours in a month.
- AIRCEL has a parameter value of 10.99% and has failed to meet the benchmark of $\leq 3\%$ for Worst affected cells having more than 3% circuit switched voice drop rate.

NETWORK FINDINGS (3G):

- AIRCEL has a parameter value of 2.91% and has failed to meet the benchmark of $\leq 2\%$ for Number of BTSs having downtime of > 24 hours in a month.
- AIRCEL has a parameter value of 16.12% and has failed to meet the benchmark of $\leq 3\%$ for Worst affected cells having more than 3% circuit switched voice drop rate.

CUSTOMER SERVICE DELIVERY:

- AIRCEL has a parameter value of 93.01% and has failed to meet the benchmark of $\geq 95\%$ for percentage of call answered by the operators (voice to voice) within 90 seconds.
- AIRTEL has a parameter value of 63.30% and has failed to meet the benchmark of $\geq 95\%$ for percentage of call answered by the operators (voice to voice) within 90 seconds.
- RCOM GSM has a parameter value of 94.26% and has failed to meet the benchmark of $\geq 95\%$ for percentage of call answered by the operators (voice to voice) within 90 seconds.
- RCOM GSM has a parameter value of 85.98% and has failed to meet the benchmark of $= 100\%$ for refund of deposits after closure cleared over a period of < 60 days.