



**REPORT**  
**ON**  
**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**  
**OF**  
**CELLULAR MOBILE TELEPHONE SERVICE**  
**BASIC (WIRELINER) SERVICE**  
**&**  
**BROADBAND SERVICE**  
**FOR**  
**TELECOM REGULATORY AUTHORITY OF INDIA**  
**NORTH ZONE – HIMACHAL PRADESH SERVICE AREA**  
**(JANUARY 2014 – MARCH 2014)**

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## PREFACE

The Telecom Regulatory Authority of India (TRAI) was established in 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services. The Authority's mission is to ensure that the interest of consumers are protected and at the same time to nurture conditions for growth of telecommunications, broadcasting and cable services in a manner and at a pace which will enable India to play a leading role in emerging global information society.

The Authority, in exercise of its functions as per the provisions in the TRAI Act, has been entrusted to measure the Quality of Service provided by the Service Providers from time to time and to compare them with the benchmarks so as to assess the level of performance. In pursuance of this, TRAI has appointed **M/s TUV-SUD South Asia Pvt. Ltd.** to carry out "Audit and Assessment of Quality of Service" provided by Basic (Wire line), Cellular Mobile and Broadband service providers in terms of the benchmarks specified in the respective regulations, in North and West Zones.

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **Himachal Pradesh circle** against the QoS bench marks laid down by TRAI in the respective regulations.



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## 1. BACKGROUND

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## **1. BACKGROUND**

Telecom Regulatory Authority of India has been entrusted to “lay down the standards of quality of service to be provided by the service providers and ensure the quality of service and conduct the periodical survey of such service provided by the service providers so as to protect interest of the consumers of telecommunication services” vide sub-clause (v) of clause (b) of sub-section (1) of section 11 of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997).

The purpose of laying down Quality of Service Parameters is to:

- i) Create conditions for consumer satisfaction by making known the quality of service, which the Service provider is required to provide, and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) Generally protect the interests of consumers of telecommunication services.

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd.** for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the “The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20<sup>th</sup> March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6<sup>th</sup> October, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas:

**North Zone:** Delhi, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Uttar Pradesh-East and Uttar Pradesh-West (including Uttarakhand). For the cellular mobile telephone service the service area of Delhi includes Ghaziabad, Faridabad, Noida and Gurgaon.

**West Zone:** Mumbai, Maharashtra (including Goa and excluding Mumbai), Gujarat and Madhya Pradesh (including Chhattisgarh).



The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. However, in respect of Basic telephone service (wireline) and Broadband service, a circle would be audited once in a year.

## **2. OBJECTIVES AND METHODOLOGY**







## **2. OBJECTIVES AND METHODOLOGY**

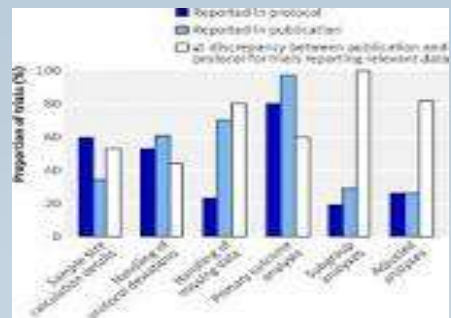
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service is carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) is undertaken for J&K , Himachal Pradesh & Mumbai circles and for Broadband service, the audit is done for J&K , Himachal Pradesh, Haryana, Delhi & Mumbai Circles during the quarter January – March 2014.**

The Scope of work as per the Terms of Reference (TOR) includes the following:

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

### 3. SAMPLE SIZE





### 3. SAMPLE SIZE

#### 3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

- 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centers (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) were covered for audit in specified circles/service areas. Following are the various operators covered in Himachal Pradesh circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location/Address
		Jan-14	Feb-14	March-14	
<b>GSM Operators</b>					
1	AIRCEL	13 to 15 Jan-14	08 to 10 Feb-14	07 to 09 Mar-14	3rd Floor Keothal Complex Khalini Shimla.
2	AIRTEL	07 to 09 Jan-14	08 to 10 Feb-14	09 to 11 Mar-14	Bharti Airtel Campus, Plot No 21, Rajiv Gandhi Information and Technology Park, Chandigarh, 160101
3	BSNL	01 to 03 Jan-14	01 to 03 Feb-14	01 to 03 Mar-14	BSNL Shimla
4	IDEA	06 to 08 Jan-14	10 to 12 Feb-14	10 to 12 Mar-14	Idea Cellular Limited, Phase -7 Industrial Area, Mohali
5	RCOM GSM	12 to 14 Jan-14	08 to 10 Feb-14	07 to 09 Mar-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
6	TATA GSM	12 to 14 Jan-14	10 to 12 Feb-14	09 to 11 Mar-14	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti
7	VODAFONE	07 to 09 Jan-14	09 to 11 Feb-14	10 to 12 Mar-14	130 durga cottage SDA complex Kasumpti Shimla
<b>CDMA Operators</b>					
8	RCOM CDMA	12 to 14 Jan-14	08 to 10 Feb-14	07 to 09 Mar-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
9	TATA CDMA	12 to 14 Jan-14	10 to 12 Feb-14	09 to 11 Mar-14	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti

For all the above operators, audit was conducted in all the three months of the Quarter ended March 2014.

**Transfer of data generated by monthly PMR and 3-days live measurements audit for the period January 2014 to March 2014 has been successfully uploaded on the server located at TRAI premises.**



### 3.2 SAMPLING FOR BASIC (WIRELIN) SERVICES

- The QoS audit for basic (wireline) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **The following Basic Service providers in HP circle were audited in quarter ended March 2014.**

Sl. No.	Name of Basic (Wireline)Service Provider
1	BSNL
2	RCL

### 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia had to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who were having broadband subscriber base of more than 10,000 subscribers in their licensed service area. The following Service providers in HP Circle, providing broadband service were audited for their quality of service assessment.

Sl. No.	Name of Broadband Service Provider
1	BSNL
2	BROADBAND PACENET INDIA PVT. LTD
3	RELIANCE COMMUNICATION LIMITED (RCL)
4	TATA COMMUNICATION LIMITED (TCL)

## **4. EXECUTIVE SUMMARY**





#### **4. EXECUTIVE SUMMARY**

The executive summary put in a nutshell the key findings of the Audit by providing: -

- “Service provider performance report” for Cellular mobile, Basic (wire line) and Broadband services , which gives a foretaste of the performance of various operators against the benchmark specified by TRAI, during the months in which the Audit was carried out by TUV-SUD Auditors
- “Parameter wise critical findings” for Cellular mobile, Basic (wire line) and Broadband services: This indicates key observations and findings from different activities carried out during the Audit process
- TUV-SUD conducted audit involved a 3 stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. On the basis of the three days live measurement, the auditors checked the busy hour of the day for the service provider and collected the data for this busy hour for the month in which the audit was conducted Finally, the performance of the service providers was also gauged by conducting drive tests in three select SSAs per service provider per quarter.
- The three stage audit / verification viz audit of the records, live measurements and drive tests of all the cellular mobile operators was repeated every month. In case of Basic (Wire line) and Broadband, this exercise is required to be carried out on quarterly basis.

**4.1 MONTHLY DATA VERIFICATION FOR CELLULAR  
MOBILE SERVICE PROVIDERS  
(NETWORK SERVICE QUALITY PARAMETER)**





#### 4.1 SERVICE PROVIDER PERFORMANCE REPORT BASED ON MONTHLY DATA VERIFICATION: NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES.

##### BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
<b>GSM Operators</b>			
1	AIRCEL	Mar-14	20:00 - 21:00
2	AIRTEL	Mar-14	20:00 - 21:00
3	BSNL	Mar-14	19:00 - 20:00
4	IDEA	Mar-14	20:00 - 21:00
5	VODAFONE	Mar-14	20:00 - 21:00
6	RCOM GSM	Mar-14	19:00 - 20:00
7	TATA GSM	Mar-14	19:00 - 20:00
<b>CDMA Operators</b>			
8	RCOM CDMA	Mar-14	20:00 - 21:00
9	TATA CDMA	Mar-14	12:00 - 13:00

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Himachal Pradesh circle.

##### SWITCHES/BSC/BTS DETAILS OF OPERATORS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRCEL	1	8	662	Ericsson	Ericsson
2	AIRTEL	5	16	1394	Ericsson	Ericsson
3	BSNL	5	18	1069	Ericsson	Ericsson, NSN & ZTE
4	VODAFONE	1	9	730	NSN	NSN
5	IDEA	2	6	848	Ericsson	Ericsson
6	RCOM GSM	3	12	896	Huawei & Ericsson	ZTE
7	TATA GSM	1	1	5	NSN	NSN
<b>CDMA Operators</b>						
8	RCOM CDMA	1	NA	397	Lucent	Lucent
9	TATA CDMA	1	1	131	Ericsson	ZTE





**TABLES OF MONTHLY QOS PERFORMANCE:**

**TABLE: 1**

<b>CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- JAN-14 MONTH</b>												
<b>PMR Generation Data</b>		<b>Bench- mark</b>	<b>Audit Period</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>VODAFONE</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>TATA GSM</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>						<b>CDMA Operators</b>		
<b>Network Service Quality Parameter</b>												
<b>1</b>	<b>Network Availability</b>											
	a) BTS Accumulated Downtime	<=2%	Jan-14	0.40%	0.02%	1.98%	0.07%	0.26%	0.18%	0.00%	0.08%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Jan-14	1.66%	0.00%	1.98%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%
<b>2</b>	<b>Connection Establishment (Accessibility)</b>											
	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	99.56%	99.21%	98.00%	98.14%	98.53%	98.65%	99.26%	99.10%	99.17%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-14	0.03%	0.07%	0.81%	0.00%	0.17%	0.16%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.18%	0.14%	1.98%	0.09%	0.84%	0.08%	0.00%	0.01%	0.03%
<b>3</b>	<b>Connection maintenance (Retainability)</b>											
	a) CDR (Call Drop Rate)	<=2%	Jan-14	0.62%	0.61%	1.45%	0.63%	1.16%	0.64%	1.63%	0.05%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-14	0.86%	2.03%	2.79%	1.91%	2.27%	0.04%	<b>17.80%</b>	0.25%	1.47%
	c) Connections with good voice quality	>=95%	Jan-14	95.06%	98.91%	NP	98.20%	95.23%	98.02%	97.87%	99.78%	98.23%
<b>4</b>	<b>No. of POI's having &gt;=0.5% POI congestion</b>											
		<=0.5%	Jan-14	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



**TABLE: 2**

<b>CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- FEB-14 MONTH</b>												
<b>PMR Generation Data</b>		<b>Bench- mark</b>	<b>Audit Period</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>VODAFONE</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>TATA GSM</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>						<b>CDMA Operators</b>		
	<b>Network Service Quality Parameter</b>											
<b>1</b>	<b>Network Availability</b>											
	a) BTS Accumulated Downtime	<=2%	Feb-14	0.63%	0.02%	1.98%	0.17%	0.57%	0.33%	0.00%	0.12%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Feb-14	1.81%	0.00%	0.89%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%
<b>2</b>	<b>Connection Establishment (Accessibility)</b>											
	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	99.56%	99.16%	98.40%	98.19%	98.51%	98.70%	98.90%	99.20%	99.08%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-14	0.03%	0.10%	0.90%	0.00%	0.16%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.19%	0.16%	1.59%	0.07%	0.82%	0.05%	0.00%	0.00%	0.05%
<b>3</b>	<b>Connection maintenance (Retainability)</b>											
	a) CDR (Call Drop Rate)	<=2%	Feb-14	1.22%	0.61%	1.35%	0.64%	1.19%	0.64%	1.38%	0.06%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-14	2.79%	2.02%	2.86%	2.00%	2.91%	0.04%	<b>14.27%</b>	0.17%	1.42%
	c) Connections with good voice quality	>=95%	Feb-14	95.00%	98.89%	NP	98.49%	95.34%	98.02%	98.24%	99.78%	98.23%
<b>4</b>	<b>No. of POI's having &gt;=0.5% POI congestion</b>											
		<=0.5%	Feb-14	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



**TABLE: 3**

<b>CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- MAR-14 MONTH</b>												
<b>PMR Generation Data</b>		<b>Bench-mark</b>	<b>Audit Period</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>VODAFONE</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>TATA GSM</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>						<b>CDMA Operators</b>		
<b>Network Service Quality Parameter</b>												
<b>1</b>	<b>Network Availability</b>											
	a) BTS Accumulated Downtime	<=2%	Mar-14	0.49%	0.01%	1.96%	0.10%	0.26%	0.19%	0.00%	0.10%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Mar-14	1.81%	0.00%	1.87%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%
<b>2</b>	<b>Connection Establishment (Accessibility)</b>											
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	99.35%	99.09%	98.12%	98.24%	97.88%	98.72%	99.39%	99.20%	98.20%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-14	0.05%	0.14%	0.82%	0.01%	0.85%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.37%	0.16%	1.88%	0.10%	1.28%	0.05%	0.00%	0.00%	0.12%
<b>3</b>	<b>Connection maintenance (Retainability)</b>											
	a) CDR (Call Drop Rate)	<=2%	Mar-14	1.22%	0.62%	0.89%	0.61%	1.29%	0.64%	1.19%	0.06%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-14	2.89%	2.14%	2.80%	2.07%	2.60%	0.06%	<b>18.71%</b>	0.32%	1.43%
	c) Connections with good voice quality	>=95%	Mar-14	<b>94.81%</b>	98.86%	NP	98.49%	95.27%	98.02%	98.39%	99.78%	98.21%
<b>4</b>	<b>No. of POI's having &gt;=0.5% POI congestion</b>											
		<=0.5%	Mar-14	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



**TABLES OF QUARTERLY QOS PERFORMANCE:**

**TABLE: 4**

<b>QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-MARCH-14) OF HIMACHAL PRADESH CIRCLE</b>												
<b>PMR Generation Data</b>		<b>Bench- mark</b>	<b>Audit Period</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>VODAFONE</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>TATA GSM</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>						<b>CDMA Operators</b>		
	<b>Network Service Quality Parameter</b>											
<b>1</b>	<b>Network Availability</b>											
	a) BTS Accumulated Downtime	<=2%	Quarterly	0.51%	0.02%	1.97%	0.11%	0.36%	0.23%	0.00%	0.10%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.76%	0.00%	1.93%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%
<b>2</b>	<b>Connection Establishment (Accessibility)</b>											
	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.49%	99.15%	98.17%	98.19%	98.31%	98.69%	99.18%	99.17%	98.82%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.04%	0.10%	0.84%	0.00%	0.39%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.25%	0.15%	1.82%	0.09%	0.98%	0.06%	0.00%	0.00%	0.07%
<b>3</b>	<b>Connection maintenance (Retainability)</b>											
	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.02%	0.61%	1.23%	0.63%	1.21%	0.64%	1.41%	0.06%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.89%	2.06%	2.82%	1.99%	2.59%	0.05%	<b>16.93%</b>	0.25%	1.44%
	c) Connections with good voice quality	>=95%	Quarterly	<b>94.96%</b>	98.89%	NP	98.39%	95.28%	98.02%	98.17%	99.78%	98.22%
<b>4</b>	<b>No. of POI's having &gt;=0.5% POI congestion</b>	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



## KEY FINDINGS: CELLULAR MOBILE SERVICES

The audit of network related parameters for cellular mobile service providers was conducted at their respective MSCs in the circle.

TUV conducted audit for cellular mobile operators based on **three stage audit / verification viz audit of the records, live measurements and drive tests. This exercise has been repeated every month for CMSPs.**

### Network Service Quality Parameters:

#### ▪ **Network Availability**

- i. BTS Accumulated Downtime (Not Available for Service):
- ii. Worst affected BTSs due to downtime

For measuring the performance against the benchmark for this parameter, down time of each BTS lasting for more than 1 hour at a time in a day during the period of a month has been taken for computation.

In Himachal Pradesh circle, all the operators were found meeting benchmarks of the above parameters 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter.

#### ▪ **Connection Establishment (Accessibility)**

- i. Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made. All the operators were found to be calculating the parameter as per the TRAI's specified norms.

All the operators were found meeting the benchmark on this parameter.

#### ▪ **Parameters related to Network Congestion:**

The parameters namely SDCCH / Paging Channel Congestion, TCH and POI are prescribed with the aim of measuring the congestion in the network.

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (PCH Average Using Ratio) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the pegging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as all operators met the TRAI specified benchmarks on the congestion parameters. There was no congestion on individual POI links between a service provider vis-à-vis other service providers.



▪ **Connection Maintenance (Retainability)**

i. Call Drop Rate:

This parameter gives a reliable measurement of the mobile network used by the service provider for maintaining a call once it has been correctly established. Failures in coverage, network congestion and network failures have important impact on this parameter.

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, all the service providers were found to be meeting the TRAI specified benchmark. The lowest call drop rate (average 0.06 %) was for RCOM (CDMA) during the quarter.

ii. Worst affected cells having more than 3% TCH drops

Worst affected cells are defined as cells in which the call drop rate exceeds 3% during cell Bouncing Busy Hour (CBBH) or at any other hour of a day.

The audit with respect to this parameter revealed that all the operators except **Tata (GSM)** met the benchmark for this parameter in all the three months of the quarter. The performance of Tata (GSM) on an average for three months was **16.93 %**, which was way beyond the benchmark. In fact, Tata (GSM) is having only five sites with 15 cells which are resulting in poor performance, remaining network are on ICR with other service provider (RCOM-GSM).

Aircel has provided the data on monthly basis but not on daily basis. For audit purpose, data was required on daily basis.

(iii) Connections with good voice quality:

Some of the Operators are measuring this parameter through the system generated data at their switches whereas some are measuring through their periodic drive tests. The audit results for this parameter indicates that all operators have met the bench mark successfully during the quarter. Only Aircel, marginally lagged behind the benchmark with its average performance of **94.96%**. BSNL has not provided the data for this parameter as they are not able to fetch the system generated data.

## **4.2 CUSTOMER SERVICE QUALITY (CSD) PARAMETERS**





**4.2 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT-QE MARCH-14:**

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE MAR-14												
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Customer Service Quality Parameters</b>												
1	<b>Metering &amp; Billing Credibility -Post Paid</b>											
	A) No. of bills issued during the quarter		HP	1838	42032	49526	1511	7456	3114	6754	5766	2945
	B) No. of bills disputed including billing complaints during the quarter		HP	0	27	12	0	5	0	1	4	0
	C)% of billing complaints during the quarter	<= 0.1%	HP	0.00%	0.06%	0.02%	0.00%	0.07%	0.00%	0.01%	0.07%	0.00%
2	<b>Metering &amp; Billing Credibility -Pre Paid</b>											
	A) Total No. of Pre-paid customers at the end of the quarter		HP	816541	2127634	1363837	526151	1277916	64286	521909	192803	38685
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		HP	1	63	50	29	1279	0	8	166	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	HP	0.00%	0.00%	0.00%	0.01%	0.10%	0.00%	0.00%	0.09%	0.00%
3	<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>											
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		HP	1	90	62	29	1284	0	9	170	0
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		HP	1	90	62	29	1284	0	9	170	0
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	HP	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	NA
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	HP	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	NA
4	<b>Response time to customers for assistance</b>											
	A) Accessibility of call centre/Customer Care	>=95%	HP	98.24%	100.00%	100.00%	98.55%	98.98%	99.34%	100.00%	99.27%	96.53%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	HP	92.21%	92.96%	2.97%	99.23%	74.38%	98.25%	98.99%	94.12%	95.27%



## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE



5 Termination/closure of service											
A) Total No. of requests for Termination / Closure of service received during the quarter		HP	0	251	236	35	4	34	27	6	52
B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		HP	NA	251	236	35	4	34	27	6	52
C) % of Termination/ Closure of service within 7 days	<=7days	HP	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
6 Time taken for refunds of deposits after closures.											
A) No. of Payments/ Refunds due during the quarter		HP	0	26	NP	6	26	9	1	17	12
B) No. of Payments/ Refunds Cleared during the quarter		HP	NA	26	NP	6	26	9	1	17	12
C)Time taken for refunds of deposits after closures.	100% within 60 days	HP	NA	100.00%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

\*NA: Not Applicable and NP: Data not provided



## KEY FINDINGS:

### *1. Metering and billing credibility-(Post paid & Pre-paid)*

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is well within the prescribed bench mark of  $\leq 0.1\%$ .

### *2. Resolution of Billing complaints and applying credits*

- i. Resolution of billing /charging complaints*
- ii. Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints*

All operators were found to have 100 % resolved the billing complaints within stipulated period of 4 weeks. Also, where customers were due for credit / adjustment, in all such cases, all the service providers have met the benchmark of 100 % refund in one week.

### *3. Response Time to the Customer for assistance*

- i. Accessibility of call centre/customer care*
- ii. Percentage of calls answered by Operators (Voice to Voice)*

All service providers are in compliance with respect to the parameter accessibility of call center. However, **BSNL and RCOM (GSM)** have not met the benchmark of calls answered by Operators (voice to voice) within 60 seconds. They have achieved their performance as **2.97% and 74.38%** respectively.

### *4. Termination/Closure of Service*

In case of this parameters also, all service providers have settled the closure/termination within the benchmark of 7 days.

### *5. Time Taken for Refund of deposits after closures*

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure. BSNL has not provided the data for this parameter.

**4.3 3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR  
CELLULAR MOBILE SERVICE PROVIDERS  
(NETWORK SERVICE QUALITY PARAMETER)**





**4.3 SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3-DAYS LIVE MEASUREMENT DATA VERIFICATION CONDUCTED IN EACH MONTH OF THE QUARTER:**

**A) NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES**

**TABLE: 1**

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- JAN-14 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.19%	0.00%	1.96%	0.06%	0.35%	0.17%	0.00%	0.04%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.71%	99.25%	94.45%	98.16%	98.64%	98.66%	98.92%	98.12%	99.19%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.02%	0.08%	2.28%	0.00%	0.05%	1.48%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.04%	0.11%	5.55%	0.07%	0.76%	0.07%	0.00%	0.02%	0.06%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.61%	0.62%	2.43%	0.67%	1.12%	0.63%	1.38%	0.04%	0.07%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	1.93%	2.18%	2.75%	1.91%	1.95%	0.00%	20.00%	0.20%	0.00%
	c) Connections with good voice quality	>=95%	Live data	95.07%	98.92%	NP	98.22%	95.37%	98.02%	98.00%	99.71%	98.22%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- FEB-14 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.63%	0.01%	1.96%	0.02%	0.09%	0.33%	0.00%	0.04%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.27%	99.24%	96.68%	98.27%	98.49%	98.66%	98.88%	99.30%	99.14%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.04%	1.72%	0.00%	0.15%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.49%	0.14%	3.32%	0.08%	0.87%	0.05%	0.00%	0.00%	0.01%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.60%	0.60%	0.99%	0.65%	1.16%	0.64%	2.84%	0.06%	0.13%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.28%	1.85%	2.90%	1.79%	2.43%	0.02%	15.56%	0.11%	1.25%
	c) Connections with good voice quality	>=95%	Live data	95.06%	98.89%	NP	98.52%	95.52%	97.99%	98.28%	99.79%	98.24%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- MAR-14 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.55%	0.01%	1.98%	0.38%	0.47%	0.12%	0.00%	0.06%	0.03%
	b) Worst affected BTSS due to downtime	<=2%	Live data	0.00%	0.00%	2.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.48%	99.12%	94.10%	98.31%	96.55%	98.65%	99.28%	99.15%	98.70%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.06%	0.06%	2.79%	0.00%	0.34%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.29%	0.21%	5.90%	0.08%	1.35%	0.05%	0.00%	0.00%	0.03%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.12%	0.62%	1.08%	0.63%	1.35%	0.64%	1.27%	0.07%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.74%	2.17%	2.91%	1.93%	2.38%	0.03%	28.87%	0.09%	0.31%
	c) Connections with good voice quality	>=95%	Live data	95.03%	98.87%	NP	98.53%	95.23%	98.01%	98.72%	99.78%	98.22%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

\*NP: Data not provided



TABLES OF QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT DATA:

TABLE: 4

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-MARCH-14) – HP CIRCLE												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.46%	0.01%	1.97%	0.15%	0.30%	0.21%	0.00%	0.05%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	1.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.49%	99.20%	95.08%	98.25%	97.89%	98.66%	99.03%	98.86%	99.01%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.03%	0.06%	2.26%	0.00%	0.18%	0.50%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.27%	0.15%	4.92%	0.08%	0.99%	0.06%	0.00%	0.01%	0.03%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.78%	0.61%	1.50%	0.65%	1.21%	0.64%	1.83%	0.06%	0.12%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.32%	2.07%	2.85%	1.88%	2.25%	0.02%	21.48%	0.13%	0.16%
	c) Connections with good voice quality	>=95%	Quarterly	95.05%	98.89%	NP	98.42%	95.37%	98.01%	98.33%	99.76%	98.23%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0

\*NP: Data not provided

**KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:**

The three days live assessment, revealed that the performance of all operators except **BSNL and Tata (GSM)** was within the benchmarks for all the three months of the quarter. BSNL failed to meet the benchmarks of the parameters 'TCH congestion', 'SDCCH congestion' and 'Call drop rate', whereas Tata (GSM) could not meet the benchmarks of the parameters 'Worst affected cells> 3 % TCH drops' and 'Call Drop Rate' in one or the other month. The average performance of **BSNL** for three months of quarter for parameters SDCCH Congestion and TCH congestion was **2.26% and 4.92%** respectively. However, in the month of Jan-14, the performance of BSNL for parameters CSSR and CDR was **94.45 % and 2.43%** respectively. Further, in respect of parameter 'Worst affected cells> 3 % TCH drops', average performance of Tata (GSM) was **21.48%**, way beyond the benchmark of 3% and its CDR in the month of Feb-14 was **2.84%**.



**B) CUSTOMER SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES**

**CSD 3 days live data for Cellular Mobile Telephone Services-QE-Mar-14**

3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators								CDMA Operators
<b>RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE</b>												
1	Total no of calls attempted to customer care/Call center		HP	2171	7152	1149	1378	72121	147	12272	1864	149
	Total no. of calls successfully established to customer care/Call center		HP	2155	7152	1149	1362	71385	146	12272	1848	143
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	HP	99.26%	100.00%	100.00%	98.84%	98.98%	99.32%	100.00%	99.14%	95.97%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		HP	4247	13528	569	4706	15015	117	3247	258	56
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		HP	4048	12391	2	4683	14323	114	3208	252	55
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	>=90%	HP	95.31%	91.60%	0.35%	99.51%	95.39%	97.44%	98.80%	97.67%	98.21%





**CUSTOMER CARE / HELPLINE ASSESSMENT**

LIVE CALLING TO CALL CENTRE										
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	HP	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	HP	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	HP	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	HP	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	HP	100	100	16	100	100	100	90	100	100
% age of calls answered by operator (voice to voice) (Total call attempt*100/ Total call successfully established within 60 Sec.)	HP	100.00%	100.00%	16.00%	100.00%	100.00%	100.00%	90.00%	100.00%	100.00%

**KEY FINDINGS:** The results for three days live measurements reveal that all operators have met the benchmark for the parameter 'Accessibility to call center and call connection to operators (Voice to voice) within 60 seconds except **BSNL** which could perform with only **0.35%** of calls connected to operator within 60 seconds only. Hence the performance of BSNL with respect to this parameter is extremely poor.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, all operators were able to connect the calls with their call center operators/agents successfully except BSNL and Vodafone as they have achieved their performance as 16.0% and 90.0% respectively.

## **INTER OPERATOR CALLS ASSESSMENT**





**INTER OPERATOR CALLS ASSESSMENT**

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Himachal Pradesh service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

<b>INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT</b>										
<b>CALLING OPERATORS</b>	<b>CIRCLE NAME</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>IDEA</b>	<b>VODAFONE</b>	<b>RCOM GSM</b>	<b>TATA GSM</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>AIRCEL</b>	<i>HP</i>	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>AIRTEL</b>	<i>HP</i>	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>BSNL</b>	<i>HP</i>	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>IDEA</b>	<i>HP</i>	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%
<b>VODAFONE</b>	<i>HP</i>	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%
<b>RCOM GSM</b>	<i>HP</i>	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%
<b>TATA GSM</b>	<i>HP</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%
<b>RCOM CDMA</b>	<i>HP</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%
<b>TATA CDMA</b>	<i>HP</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--

The result of the testing revealed that the inter connection performance among the operators were comfortably meeting the benchmark.

**LEVEL-1 LIVE CALLING**





**LEVEL-1 LIVE CALLING**

LEVEL 1 LIVE CALLING												
Emergency no.	Circle Name	SDCA Name	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
100, 101, 108	HP	Dehra	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Palampur	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Kangra	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Noorpur	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Chamba	15	✓	✓	✓	✓	✓	✓	✓	✓	NS
100, 101, 108	HP	Bilaspur	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Hamirpur	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Una	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Sundernagar	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Mandi	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108	HP	Joginder nagar	15	✓	✓	✓	✓	✓	✓	✓	✓	✓

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, the calls were made from mobile phones provided by the service providers. In these SDCAs of Himachal Pradesh service area, these services were found functional in the networks of all the service providers.

## 5. DRIVE TEST





## 5. DRIVE TEST

In terms of TRAI's letter dated 21<sup>st</sup> January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Kangra (Dharamsala), Hamirpur and Mandi** in the months of January, February and March 2014 respectively, covering minimum 300 Km distance in each SSA. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators FERs is considered to be good, whereas Rx Qual beyond this benchmark is considered to be 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 at street level with strength  $\geq -75$  dBm for in-door coverage and  $\geq -85$  dBm for in-vehicle.

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE**



**DRIVE TEST TABLE: 1**

OPERATOR-ASSISTED DRIVE TEST AT KANGRA SSA IN JAN-14 MONTH- HP CIRCLE												
S/N	Parameter	SSA Name: Kangra	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators							CDMA Operators	
1	Call Attempts	Day 1	Jan-14	191	133	124	160	134	ICR	135	163	126
		Day 2	Jan-14	153	147	110	121	143	ICR	133	88	117
		Day 3	Jan-14	157	112	114	134	136	94	128	NS	134
		<b>Overall SSA</b>	<b>Total</b>	<b>501</b>	<b>392</b>	<b>348</b>	<b>415</b>	<b>413</b>	<b>94</b>	<b>396</b>	<b>251</b>	<b>377</b>
2	Blocked Call Rate	Day 1	Jan-14	1.05%	0.00%	1.61%	0.00%	0.00%	ICR	0.00%	0.61%	0.00%
		Day 2	Jan-14	0.00%	0.00%	0.00%	1.65%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 3	Jan-14	0.64%	0.00%	2.63%	0.00%	0.00%	1.06%	0.00%	NS	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.60%</b>	<b>0.00%</b>	<b>1.44%</b>	<b>0.48%</b>	<b>0.00%</b>	<b>1.06%</b>	<b>0.00%</b>	<b>0.40%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	0.53%	0.00%	0.00%	1.25%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 2	Jan-14	0.00%	0.00%	0.00%	0.84%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 3	Jan-14	1.27%	0.00%	0.00%	<b>2.24%</b>	0.00%	<b>2.25%</b>	0.00%	NS	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.60%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.45%</b>	<b>0.00%</b>	<b>2.25%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>
<b>PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=&gt;95%)</b>												
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	NA	NA	NA	NA	NA	NA	NA	98.42%	97.30%
		Day 2	Jan-14	NA	NA	NA	NA	NA	NA	NA	98.91%	98.31%
		Day 3	Jan-14	NA	NA	NA	NA	NA	NA	NA	NS	98.35%
		<b>Overall SSA</b>	<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>98.60%</b>	<b>97.99%</b>
	(b) 0-5 ( with frequency hopping for GSM Operators)	Day 1	Jan-14	95.54%	96.18%	<b>94.05%</b>	96.23%	96.38%	ICR	97.75%	NA	NA
		Day 2	Jan-14	<b>94.66%</b>	96.86%	<b>94.96%</b>	95.79%	97.84%	ICR	98.96%	NA	NA
		Day 3	Jan-14	95.21%	96.11%	<b>94.07%</b>	96.53%	96.94%	95.38%	98.34%	NA	NA
		<b>Overall SSA</b>	<b>Total</b>	<b>95.17%</b>	<b>96.42%</b>	<b>94.33%</b>	<b>96.21%</b>	<b>97.04%</b>	<b>95.38%</b>	<b>98.33%</b>	<b>NA</b>	<b>NA</b>
<b>SERVICE COVERAGE</b>												
5	In door (>= -75dBm)	Day 1	Jan-14	17.22%	59.86%	50.29%	35.02%	44.70%	ICR	63.13%	58.62%	47.07%
		Day 2	Jan-14	20.01%	71.17%	57.23%	36.28%	37.38%	ICR	73.91%	59.53%	30.10%
		Day 3	Jan-14	33.29%	70.40%	57.87%	35.70%	43.29%	43.58%	60.28%	NS	45.32%
		<b>Overall SSA</b>	<b>Total</b>	<b>23.16%</b>	<b>67.60%</b>	<b>54.63%</b>	<b>35.60%</b>	<b>41.89%</b>	<b>43.58%</b>	<b>65.94%</b>	<b>58.94%</b>	<b>40.93%</b>
	In-vehicle (>= -85dBm)	Day 1	Jan-14	54.05%	90.39%	93.28%	72.61%	85.34%	ICR	90.78%	84.36%	76.34%
		Day 2	Jan-14	49.03%	90.06%	91.55%	71.16%	90.50%	ICR	94.39%	94.50%	70.63%
		Day 3	Jan-14	73.77%	91.09%	89.37%	73.78%	88.77%	89.62%	88.85%	NS	80.69%
		<b>Overall SSA</b>	<b>Total</b>	<b>58.75%</b>	<b>90.49%</b>	<b>91.59%</b>	<b>72.59%</b>	<b>88.18%</b>	<b>89.62%</b>	<b>91.42%</b>	<b>87.93%</b>	<b>75.96%</b>
	Outdoor- in city (>= -95dBm)	Day 1	Jan-14	91.89%	100.00%	100.00%	96.97%	96.92%	ICR	99.20%	98.63%	97.39%
		Day 2	Jan-14	86.11%	100.00%	100.00%	97.07%	99.87%	ICR	99.70%	99.99%	96.98%
		Day 3	Jan-14	95.27%	100.00%	100.00%	93.80%	99.42%	99.77%	97.99%	NS	98.99%
		<b>Overall SSA</b>	<b>Total</b>	<b>91.09%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>95.28%</b>	<b>99.07%</b>	<b>99.74%</b>	<b>99.54%</b>	<b>99.57%</b>	<b>98.45%</b>



## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE



		Overall SSA	Total	91.19%	100.00%	100.00%	95.95%	98.73%	99.77%	98.99%	99.11%	97.80%
6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	98.95%	100.00%	98.39%	100.00%	100.00%	ICR	100.00%	99.39%	100.00%
		Day 2	Jan-14	100.00%	100.00%	100.00%	98.35%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 3	Jan-14	99.36%	100.00%	97.37%	100.00%	100.00%	94.68%	100.00%	NS	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>99.40%</b>	<b>100.00%</b>	<b>98.56%</b>	<b>99.52%</b>	<b>100.00%</b>	<b>94.68%</b>	<b>100.00%</b>	<b>99.60%</b>	<b>100.00%</b>
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	100.00%	100.00%	100.00%	99.01%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 2	Jan-14	98.75%	99.17%	100.00%	97.93%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 3	Jan-14	98.33%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>98.90%</b>	<b>99.72%</b>	<b>100.00%</b>	<b>98.91%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

\*NA: Not Applicable, ICR: Intra Circle Roaming



**DRIVE TEST TABLE: 2**

**OPERATOR-ASSISTED DRIVE TEST AT KANGRA SSA IN JAN-14 MONTH- HP CIRCLE - INDOOR**

S/N	Parameter	Kangra SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	TATA CDMA	RCOM CDMA
					GSM Operators							CDMA Operators	
1	Call Attempts	Day 1	Jan-14	Bagwan Hospital Nagrota	12	13	12	13	13	ICR	10	13	13
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	28	22	28	27	28	ICR	19	26	25
		Day 3	Jan-14	Circuit House, DC House	27	22	28	24	26	22	26	NS	24
		Overall SSA	Jan-14		67	57	68	64	67	22	55	39	62
2	Blocked Call Rate	Day 1	Jan-14	Bagwan Hospital Nagrota	0.00%	0.00%	0.00%	0.00%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	0.00%	0.00%	0.00%	0.00%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 3	Jan-14	Circuit House, DC House	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%
		Overall SSA	Jan-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	Bagwan Hospital Nagrota	0.00%	0.00%	0.00%	0.00%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	0.00%	0.00%	0.00%	0.00%	0.00%	ICR	0.00%	0.00%	0.00%
		Day 3	Jan-14	Circuit House, DC House	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%
		Overall SSA	Jan-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Percentage connections with good voice quality (=&gt;95%)</b>													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	Bagwan Hospital Nagrota	NA	NA	NA	NA	NA	NA	NA	99.11%	100.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	NA	NA	NA	NA	NA	NA	NA	99.88%	99.97%
		Day 3	Jan-14	Circuit House, DC House	NA	NA	NA	NA	NA	NA	NA	NS	99.89%
		Overall SSA	Jan-14		NA	NA	NA	NA	NA	NA	NA	99.62%	99.95%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	Bagwan Hospital Nagrota	94.25%	95.69%	99.82%	94.84%	98.35%	ICR	99.22%	NA	NA
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	97.98%	97.88%	97.58%	97.61%	99.61%	ICR	99.36%	NA	NA
		Day 3	Jan-14	Circuit House, DC House	95.97%	96.89%	98.45%	98.10%	99.26%	99.18%	99.13%	NA	NA

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE**



		Overall SSA	Jan-14		96.50%	97.18%	98.38%	97.24%	99.22%	99.18%	99.25%	NA	NA
<b>Service Coverage</b>													
5	<b>In door (&gt;= - 75dBm)</b>	Day 1	Jan-14	Bagwan Hospital Nagrota	0.00%	99.79%	17.03%	72.78%	61.27%	ICR	91.10%	64.78%	91.37%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	36.41%	83.56%	76.97%	23.78%	40.23%	ICR	90.16%	42.51%	57.79%
		Day 3	Jan-14	Circuit House, DC House	32.68%	88.20%	89.08%	52.40%	57.76%	38.29%	72.72%	NS	93.07%
		<b>Overall SSA</b>	<b>Jan-14</b>		<b>28.41%</b>	<b>87.01%</b>	<b>68.65%</b>	<b>44.32%</b>	<b>51.27%</b>	<b>38.29%</b>	<b>83.58%</b>	<b>49.92%</b>	<b>78.38%</b>
	<b>In-vehicle (&gt;= - 85dBm)</b>	Day 1	Jan-14	Bagwan Hospital Nagrota	15.50%	100.00%	98.77%	100.00%	98.67%	ICR	97.19%	99.54%	100.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	59.60%	85.59%	92.58%	64.04%	94.05%	ICR	99.32%	95.34%	99.77%
		Day 3	Jan-14	Circuit House, DC House	86.04%	97.06%	99.29%	98.86%	94.38%	97.75%	99.22%	NS	100.00%
		<b>Overall SSA</b>	<b>Jan-14</b>		<b>62.40%</b>	<b>92.39%</b>	<b>96.40%</b>	<b>84.30%</b>	<b>95.11%</b>	<b>97.75%</b>	<b>99.19%</b>	<b>96.74%</b>	<b>99.90%</b>
	<b>Outdoor-in city (&gt;= - 95dBm)</b>	Day 1	Jan-14	Bagwan Hospital Nagrota	97.72%	100.00%	100.00%	100.00%	100.00%	ICR	99.88%	100.00%	100.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	93.51%	100.00%	100.00%	97.78%	99.91%	ICR	100.00%	99.98%	100.00%
		Day 3	Jan-14	Circuit House, DC House	99.86%	100.00%	100.00%	99.98%	99.97%	98.89%	100.00%	NS	100.00%
		<b>Overall SSA</b>	<b>Jan-14</b>		<b>96.83%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>99.05%</b>	<b>99.95%</b>	<b>98.89%</b>	<b>100.00%</b>	<b>99.99%</b>	<b>100.00%</b>
6	<b>Call Setup Success Rate (&gt;=95%)</b>	Day 1	Jan-14	Bagwan Hospital Nagrota	100.00%	100.00%	100.00%	100.00%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	100.00%	100.00%	100.00%	100.00%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 3	Jan-14	Circuit House, DC House	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%
		<b>Overall SSA</b>	<b>Jan-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
7	<b>Hand Over Success Rate (HOSR)</b>	Day 1	Jan-14	Bagwan Hospital Nagrota	100.00%	100.00%	100.00%	100.00%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 2	Jan-14	Civil Hospital Nurpur, SDM Court	100.00%	100.00%	100.00%	100.00%	100.00%	ICR	100.00%	100.00%	100.00%
		Day 3	Jan-14	Circuit House, DC House	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%
		<b>Overall SSA</b>	<b>Jan-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>



**DRIVE TEST TABLE: 3**

<b>OPERATOR-ASSISTED DRIVE TEST AT HAMIRPUR SSA IN FEB-14 MONTH- HP CIRCLE</b>												
S/N	Parameter	SSA Name: Hamirpur	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators
1	Call Attempts	Day 1	Feb-14	173	248	112	175	210	309	186	156	220
		Day 2	Feb-14	168	238	74	201	194	159	158	120	221
		Day 3	Feb-14	124	162	93	160	145	99	124	78	171
		<b>Overall SSA</b>	<b>Total</b>	<b>465</b>	<b>648</b>	<b>279</b>	<b>536</b>	<b>549</b>	<b>567</b>	<b>468</b>	<b>354</b>	<b>612</b>
2	Blocked Call Rate	Day 1	Feb-14	0.00%	0.40%	0.00%	0.00%	0.00%	0.97%	0.00%	0.00%	0.00%
		Day 2	Feb-14	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	0.00%	2.47%	0.00%	0.00%	0.00%	2.02%	0.00%	0.00%	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.00%</b>	<b>0.93%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.88%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	1.16%	0.00%	1.79%	1.71%	0.00%	0.65%	0.00%	0.00%	0.00%
		Day 2	Feb-14	0.60%	2.11%	0.00%	1.00%	0.00%	0.63%	0.00%	0.00%	0.00%
		Day 3	Feb-14	1.61%	0.63%	1.08%	0.63%	0.00%	0.00%	0.00%	1.28%	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>1.08%</b>	<b>0.93%</b>	<b>1.08%</b>	<b>1.12%</b>	<b>0.00%</b>	<b>0.53%</b>	<b>0.00%</b>	<b>0.28%</b>	<b>0.00%</b>
<b>PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=&gt;95%)</b>												
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	NA	NA	NA	NA	NA	NA	NA	98.84%	98.70%
		Day 2	Feb-14	NA	NA	NA	NA	NA	NA	NA	97.11%	96.87%
		Day 3	Feb-14	NA	NA	NA	NA	NA	NA	NA	98.71%	94.73%
		<b>Overall SSA</b>	<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>98.24%</b>	<b>96.97%</b>
	(b) 0-5 ( with frequency hopping for GSM Operators)	Day 1	Feb-14	93.94%	93.09%	94.05%	95.48%	97.37%	94.89%	97.46%	NA	NA
		Day 2	Feb-14	92.74%	86.61%	94.96%	89.40%	94.65%	94.72%	96.58%	NA	NA
		Day 3	Feb-14	88.44%	85.57%	93.97%	92.73%	92.44%	95.45%	97.44%	NA	NA
		<b>Overall SSA</b>	<b>Total</b>	<b>92.06%</b>	<b>88.98%</b>	<b>94.31%</b>	<b>92.26%</b>	95.17%	<b>94.97%</b>	<b>97.14%</b>	<b>NA</b>	<b>NA</b>
<b>SERVICE COVERAGE</b>												
5	In door (>= - 75dBm)	Day 1	Feb-14	29.98%	56.36%	50.29%	18.07%	56.98%	47.12%	61.37%	53.97%	63.42%
		Day 2	Feb-14	37.57%	69.85%	57.23%	39.20%	59.42%	61.37%	67.68%	68.51%	77.86%
		Day 3	Feb-14	35.38%	68.15%	56.23%	33.07%	46.45%	41.28%	49.90%	56.22%	63.64%
		<b>Overall SSA</b>	<b>Total</b>	<b>34.31%</b>	<b>64.36%</b>	<b>54.10%</b>	<b>30.81%</b>	<b>55.25%</b>	<b>50.27%</b>	<b>60.87%</b>	<b>59.30%</b>	<b>68.47%</b>
	In-vehicle (>= - 85dBm)	Day 1	Feb-14	60.10%	89.97%	93.28%	56.53%	94.39%	86.92%	86.54%	83.31%	92.73%
		Day 2	Feb-14	69.06%	94.85%	91.55%	72.21%	95.10%	92.91%	88.47%	94.37%	96.98%
		Day 3	Feb-14	73.66%	92.73%	88.71%	67.24%	84.77%	63.35%	82.11%	87.46%	88.07%
		<b>Overall SSA</b>	<b>Total</b>	<b>67.31%</b>	<b>92.50%</b>	<b>91.45%</b>	<b>65.97%</b>	<b>92.27%</b>	<b>83.10%</b>	<b>86.18%</b>	<b>87.89%</b>	<b>92.91%</b>
	Outdoor- in city (>= - 95dBm)	Day 1	Feb-14	92.08%	99.68%	100.00%	92.72%	99.78%	98.71%	96.34%	98.17%	99.96%
		Day 2	Feb-14	95.00%	99.79%	100.00%	94.72%	99.94%	99.78%	98.98%	99.93%	99.99%
		Day 3	Feb-14	96.35%	99.01%	100.00%	92.45%	98.22%	88.84%	97.28%	99.91%	99.70%

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		Overall SSA	Total	94.38%	99.56%	100.00%	93.44%	99.45%	96.65%	97.42%	99.13%	99.90%
6	Call Setup Success Rate (>=95%)	Day 1	Feb-14	100.00%	99.60%	100.00%	100.00%	100.00%	99.03%	100.00%	100.00%	100.00%
		Day 2	Feb-14	100.00%	99.58%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	100.00%	97.53%	100.00%	100.00%	100.00%	97.98%	100.00%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>100.00%</b>	<b>99.07%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>99.12%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
7	Hand Over Success Rate (HOSR)	Day 1	Feb-14	99.25%	99.15%	95.65%	98.45%	100.00%	99.56%	100.00%	100.00%	100.00%
		Day 2	Feb-14	96.86%	95.85%	100.00%	99.41%	100.00%	97.10%	99.09%	100.00%	100.00%
		Day 3	Feb-14	100.00%	97.40%	93.48%	98.24%	100.00%	98.08%	100.00%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>98.51%</b>	<b>97.51%</b>	<b>95.93%</b>	<b>98.86%</b>	<b>100.00%</b>	<b>98.30%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

\*NA: Not Applicable



**DRIVE TEST TABLE: 4**

<b>OPERATOR-ASSISTED DRIVE TEST AT HAMIRPUR SSA IN FEB-14 MONTH- HP CIRCLE - INDOOR</b>														
S/N	Parameter	Hamirpur SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	TATA CDMA	RCOM CDMA	
					GSM Operators						CDMA Operators			
1	Call Attempts	Day 1	Feb-14	Hotel Soni Place	14	18	10	16	15	16	14	15	15	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	16	17	12	16	16	25	16	15	16	
		Day 3	Feb-14	Bombay Picnic Spot	10	8	7	11	10	9	10	10	10	
		Overall SSA	Feb-14		40	43	29	43	41	50	40	40	41	
2	Blocked Call Rate	Day 1	Feb-14	Hotel Soni Place	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Feb-14	Bombay Picnic Spot	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Feb-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	Hotel Soni Place	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Feb-14	Bombay Picnic Spot	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Feb-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
4	<b>Percentage connections with good voice quality (=&gt;95%)</b>													
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	Hotel Soni Place	NA	NA	NA	NA	NA	NA	NA	NA	100.00%	99.72%
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	NA	NA	NA	NA	NA	NA	NA	NA	99.97%	99.74%
		Day 3	Feb-14	Bombay Picnic Spot	NA	NA	NA	NA	NA	NA	NA	NA	100.00%	96.77%
		Overall SSA	Feb-14		NA	NA	NA	NA	NA	NA	NA	NA	99.99%	99.00%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	Hotel Soni Place	99.61%	97.71%	99.82%	99.61%	99.49%	96.24%	99.86%	NA	NA	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	98.56%	98.59%	97.58%	98.27%	98.72%	98.36%	99.66%	NA	NA	
Day 3		Feb-14	Bombay Picnic Spot	93.97%	79.10%	98.22%	99.65%	93.83%	99.61%	99.25%	NA	NA		

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		Overall SSA	Feb-14		97.77%	94.67%	98.32%	99.08%	97.85%	97.72%	99.62%	NA	NA	
5	<b>Service Coverage</b>													
	<b>In door (&gt;= - 75dBm)</b>	Day 1	Feb-14	Hotel Soni Place	34.75%	11.79%	17.03%	22.11%	95.82%	69.95%	58.60%	98.98%	54.74%	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	85.65%	72.14%	76.97%	60.31%	83.90%	89.91%	64.02%	100.00%	100.00%	
		Day 3	Feb-14	Bombay Picnic Spot	17.32%	22.06%	93.94%	38.81%	0.97%	0.25%	55.30%	0.32%	0.00%	
		<b>Overall SSA</b>	<b>Feb-14</b>		<b>52.47%</b>	<b>38.48%</b>	<b>66.66%</b>	<b>41.93%</b>	<b>68.73%</b>	<b>53.49%</b>	<b>59.62%</b>	<b>74.99%</b>	<b>58.98%</b>	
	<b>In-vehicle (&gt;= - 85dBm)</b>	Day 1	Feb-14	Hotel Soni Place	97.77%	62.56%	98.77%	91.43%	99.95%	99.08%	85.57%	100.00%	98.71%	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	99.95%	99.80%	92.58%	90.05%	98.97%	100.00%	87.13%	100.00%	100.00%	
		Day 3	Feb-14	Bombay Picnic Spot	88.43%	94.96%	99.76%	98.23%	61.61%	18.50%	82.78%	99.92%	39.92%	
		<b>Overall SSA</b>	<b>Feb-14</b>		<b>96.15%</b>	<b>83.58%</b>	<b>96.05%</b>	<b>92.77%</b>	<b>90.49%</b>	<b>75.14%</b>	<b>85.45%</b>	<b>99.98%</b>	<b>84.75%</b>	
	<b>Outdoor-in city (&gt;= - 95dBm)</b>	Day 1	Feb-14	Hotel Soni Place	100.00%	99.94%	100.00%	99.88%	100.00%	100.00%	96.08%	100.00%	100.00%	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	100.00%	100.00%	100.00%	98.82%	99.95%	100.00%	98.86%	100.00%	100.00%	
		Day 3	Feb-14	Bombay Picnic Spot	100.00%	99.66%	100.00%	99.97%	97.10%	81.75%	97.07%	100.00%	100.00%	
		<b>Overall SSA</b>	<b>Feb-14</b>		<b>100.00%</b>	<b>99.92%</b>	<b>100.00%</b>	<b>99.48%</b>	<b>99.29%</b>	<b>94.53%</b>	<b>97.20%</b>	<b>100.00%</b>	<b>100.00%</b>	
	6	<b>Call Setup Success Rate (&gt;=95%)</b>	Day 1	Feb-14	Hotel Soni Place	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
			Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
			Day 3	Feb-14	Bombay Picnic Spot	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Overall SSA</b>			<b>Feb-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	
7	<b>Hand Over Success Rate (HOSR)</b>	Day 1	Feb-14	Hotel Soni Place	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 2	Feb-14	Hotel Suvidha Place, Hotel Bangana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Feb-14	Bombay Picnic Spot	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		<b>Overall SSA</b>	<b>Feb-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE**



**DRIVE TEST TABLE: 5**

<b>OPERATOR-ASSISTED DRIVE TEST AT MANDI SSA IN MAR-14 MONTH- HP CIRCLE</b>												
S/N	Parameter	Mandi SSA	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators							CDMA Operators	
1	Call Attempts	Day 1	Mar-14	104	105	123	136	152	60	123	150	107
		Day 2	Mar-14	92	105	136	94	129	91	95	47	107
		Day 3	Mar-14	94	92	105	94	108	102	99	126	116
		<b>Overall SSA</b>	<b>Total</b>	<b>290</b>	<b>302</b>	<b>364</b>	<b>324</b>	<b>389</b>	<b>253</b>	<b>317</b>	<b>323</b>	<b>330</b>
2	Blocked Call Rate	Day 1	Mar-14	0.00%	0.00%	1.63%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%
		Day 2	Mar-14	0.00%	0.00%	0.74%	1.06%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	0.00%	0.00%	0.00%	1.06%	0.00%	0.98%	0.00%	0.79%	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.82%</b>	<b>0.62%</b>	<b>0.00%</b>	<b>0.79%</b>	<b>0.00%</b>	<b>0.31%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	0.00%	0.00%	0.00%	0.00%	0.00%	1.69%	0.00%	0.00%	0.00%
		Day 2	Mar-14	0.00%	0.00%	0.74%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%
		Day 3	Mar-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.00%	0.80%	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.28%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.20%</b>	<b>0.00%</b>	<b>0.31%</b>	<b>0.00%</b>
<b>PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=&gt;95%)</b>												
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	NA	NA	NA	NA	NA	NA	NA	98.64%	96.91%
		Day 2	Mar-14	NA	NA	NA	NA	NA	NA	NA	98.70%	97.63%
		Day 3	Mar-14	NA	NA	NA	NA	NA	NA	NA	99.33%	98.35%
		<b>Overall SSA</b>	<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>98.92%</b>	<b>97.64%</b>
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	93.54%	96.28%	96.06%	93.57%	98.68%	92.13%	97.70%	NA	NA
		Day 2	Mar-14	95.24%	98.24%	95.79%	96.60%	99.25%	98.63%	99.03%	NA	NA
		Day 3	Mar-14	93.75%	96.92%	95.83%	94.31%	98.03%	96.64%	98.90%	NA	NA
		<b>Overall SSA</b>	<b>Total</b>	<b>94.17%</b>	<b>97.06%</b>	<b>95.89%</b>	<b>94.65%</b>	<b>98.64%</b>	<b>96.28%</b>	<b>98.49%</b>	<b>NA</b>	<b>NA</b>
<b>SERVICE COVERAGE</b>												
5	In door (>= -75dBm)	Day 1	Mar-14	55.95%	83.47%	21.20%	55.20%	65.53%	48.97%	65.46%	65.97%	60.47%
		Day 2	Mar-14	41.77%	54.89%	18.62%	38.62%	49.66%	36.67%	65.20%	35.74%	46.29%
		Day 3	Mar-14	41.66%	54.40%	25.67%	31.18%	40.88%	35.48%	62.04%	41.37%	48.05%
		<b>Overall SSA</b>	<b>Total</b>	<b>46.75%</b>	<b>66.42%</b>	<b>21.56%</b>	<b>43.40%</b>	<b>51.93%</b>	<b>39.06%</b>	<b>64.33%</b>	<b>52.13%</b>	<b>51.66%</b>
	In-vehicle (>= -85dBm)	Day 1	Mar-14	81.37%	96.72%	60.68%	86.99%	93.80%	76.24%	87.17%	95.47%	91.95%
		Day 2	Mar-14	70.84%	80.82%	53.71%	69.16%	84.57%	80.31%	86.14%	79.38%	78.09%
		Day 3	Mar-14	73.91%	95.88%	60.06%	84.65%	87.49%	85.45%	88.80%	88.94%	85.78%
		<b>Overall SSA</b>	<b>Total</b>	<b>75.47%</b>	<b>91.45%</b>	<b>58.05%</b>	<b>81.04%</b>	<b>88.66%</b>	<b>81.48%</b>	<b>87.37%</b>	<b>90.68%</b>	<b>85.39%</b>
	Outdoor-in city (>= -95dBm)	Day 1	Mar-14	95.28%	100.00%	100.00%	97.83%	99.92%	96.45%	98.47%	99.85%	99.88%
		Day 2	Mar-14	92.08%	100.00%	100.00%	90.34%	99.06%	94.83%	97.94%	96.50%	96.91%
		Day 3	Mar-14	95.23%	100.00%	99.99%	98.24%	99.33%	98.71%	98.59%	99.77%	99.48%
		<b>Overall SSA</b>	<b>Total</b>	<b>94.18%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>95.40%</b>	<b>99.44%</b>	<b>96.54%</b>	<b>98.47%</b>	<b>99.08%</b>	<b>99.09%</b>



## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE



		Overall SSA	Total	94.14%	100.00%	100.00%	95.73%	99.44%	96.82%	98.35%	99.35%	98.79%
6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	100.00%	100.00%	98.37%	100.00%	100.00%	98.33%	100.00%	100.00%	100.00%
		Day 2	Mar-14	100.00%	100.00%	99.26%	98.94%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	100.00%	100.00%	100.00%	98.94%	100.00%	99.02%	100.00%	99.21%	100.00%
		Overall SSA	Total	100.00%	100.00%	99.18%	99.38%	100.00%	99.21%	100.00%	99.69%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	98.03%	100.00%	100.00%	98.52%	100.00%	98.39%	100.00%	100.00%	100.00%
		Day 2	Mar-14	100.00%	100.00%	100.00%	100.00%	100.00%	97.83%	100.00%	100.00%	100.00%
		Day 3	Mar-14	100.00%	100.00%	100.00%	95.33%	100.00%	97.74%	100.00%	99.85%	100.00%
		Overall SSA	Total	98.89%	100.00%	100.00%	97.98%	100.00%	97.89%	100.00%	99.95%	100.00%

\*NA: Not Applicable



**DRIVE TEST TABLE: 6**

**OPERATOR-ASSISTED DRIVE TEST AT MANDI SSA IN MAR-14 MONTH- HP CIRCLE - INDOOR**

S/N	Parameter	Mandi SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	TATA CDMA	RCOM CDMA
					GSM Operators								CDMA Operators
1	Call Attempts	Day 1	Mar-14	Delhi Darbar Hotel	7	7	7	8	7	7	7	7	7
		Day 2	Mar-14	Hotel Pratap Place	8	9	7	18	7	7	7	7	7
		Day 3	Mar-14	Bus Stand Rewalsar	7	7	7	10	7	7	7	8	7
		Overall SSA	Mar-14		22	23	21	36	21	21	21	22	21
2	Blocked Call Rate	Day 1	Mar-14	Delhi Darbar Hotel	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	Hotel Pratap Place	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Bus Stand Rewalsar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	Delhi Darbar Hotel	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	Hotel Pratap Place	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Bus Stand Rewalsar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Percentage connections with good voice quality (=&gt;95%)</b>													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	Delhi Darbar Hotel	NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%
		Day 2	Mar-14	Hotel Pratap Place	NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%
		Day 3	Mar-14	Bus Stand Rewalsar	NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%
		Overall SSA	Mar-14		NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	Delhi Darbar Hotel	96.65%	98.94%	99.82%	99.74%	99.88%	99.65%	99.16%	NA	NA
		Day 2	Mar-14	Hotel Pratap Place	99.76%	98.91%	97.58%	99.51%	100.00%	99.63%	99.44%	NA	NA
		Day 3	Mar-14	Bus Stand Rewalsar	99.94%	99.54%	98.22%	99.91%	99.78%	99.75%	99.50%	NA	NA
		Overall SSA	Mar-14		98.84%	99.21%	98.32%	99.73%	99.88%	99.67%	99.37%	NA	NA
<b>Service Coverage</b>													
5	In door (>= -75dBm)	Day 1	Mar-14	Delhi Darbar Hotel	99.40%	78.63%	17.03%	57.74%	90.46%	84.61%	98.82%	0.17%	100.00%
		Day 2	Mar-14	Hotel Pratap Place	99.10%	91.74%	76.97%	79.15%	87.95%	50.04%	100.00%	54.47%	91.99%
		Day 3	Mar-14	Bus Stand Rewalsar	32.91%	36.04%	93.94%	93.34%	69.00%	12.42%	96.96%	0.83%	52.38%
		Overall SSA	Mar-14										

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	<b>Overall SSA</b>	<b>Mar-14</b>		<b>78.04%</b>	<b>64.98%</b>	<b>66.66%</b>	<b>77.86%</b>	<b>81.93%</b>	<b>50.14%</b>	<b>98.70%</b>	<b>17.69%</b>	<b>81.97%</b>
<b>In-vehicle (&gt;= - 85dBm)</b>	Day 1	Mar-14	Delhi Darbar Hotel	99.88%	97.09%	98.77%	99.90%	100.00%	99.95%	100.00%	100.00%	100.00%
	Day 2	Mar-14	Hotel Pratap Place	99.97%	99.91%	92.58%	99.91%	99.76%	97.18%	100.00%	100.00%	100.00%
	Day 3	Mar-14	Bus Stand Rewalsar	84.52%	99.40%	99.76%	99.92%	97.63%	81.21%	100.00%	99.69%	97.44%
	<b>Overall SSA</b>	<b>Mar-14</b>		<b>95.00%</b>	<b>98.65%</b>	<b>96.05%</b>	<b>99.91%</b>	<b>99.07%</b>	<b>93.00%</b>	<b>100.00%</b>	<b>99.89%</b>	<b>99.17%</b>
<b>Outdoor-in city (&gt;= - 95dBm)</b>	Day 1	Mar-14	Delhi Darbar Hotel	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Day 2	Mar-14	Hotel Pratap Place	100.00%	100.00%	100.00%	100.00%	100.00%	99.88%	100.00%	100.00%	100.00%
	Day 3	Mar-14	Bus Stand Rewalsar	99.88%	100.00%	100.00%	100.00%	100.00%	99.49%	100.00%	100.00%	100.00%
	<b>Overall SSA</b>	<b>Mar-14</b>		<b>99.96%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>99.79%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
<b>6</b>	<b>Call Setup Success Rate (&gt;=95%)</b>	Day 1	Mar-14	Delhi Darbar Hotel	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Hotel Pratap Place	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	Bus Stand Rewalsar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Mar-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
<b>7</b>	<b>Hand Over Success Rate (HOSR)</b>	Day 1	Mar-14	Delhi Darbar Hotel	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Hotel Pratap Place	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	Bus Stand Rewalsar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Mar-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>



**DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:**

**DRIVE TEST TABLE: 7**

DRIVE TEST ROUTE OF JAN TO MAR - 14 – HIMACHAL PRADESH CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
<b>KANGRA (DHARMSALA)</b>	<b>Jan-14</b>	Kangra,dehra, palampur (140 Km)	Jawala ji- dehra-bankhandi-doltpur-old kangra-kangra-bhuwarna-palampur	Nurpur (130 Km)	Gagal -jaunta-jwali-kandwal-jasur-sadwan-nurpur	Chamba (120 Km)	Kharidhar-banikhet-dalhausi- banikhet-bathri-sarol-chamba
<b>HAMIRPUR</b>	<b>Feb-14</b>	Bilaspur (160 Km)	Namol-ghaghas-chandpur-kandrou-bhaghd-ghumarvi-barthi-shahtalai-jhaunta-bangana-bhota-hamirpur	Hamirpur (140 Km)	Hamirpur-rangas-kangoo-bangana-sada shiv mandir-sahori takoli-baduhi- dhusara-jhalera-jhalera-talhiwal-santoshgarh-mehatpur-una indoor hotel suvidha palace , hotel bangana	Una (120 Km)	Amb-salohi-takolichani devi-bharwain-chintpurni-dalwari-jalo di bar-badhwana-jorbad-gindpur malon-pirthipur-daultpur-gagret-mubarikpur
<b>MANDI</b>	<b>Mar-14</b>	Sundernagar (130 Km)	Handeti-khariri-banaik-bari-mahamaya-mlsm collage-haripur-pungh-doduan-kapahi-jakheru-leda-dhargi-hatgarg-baginalsar-kumi-gagal-chandiyal-behana-pulgharat	Mandi, Jogindernagar (140 Km)	Bhueli-khaliyaar-bijni-dharang-palikunnu-padhar-chuku-gathasni-ghatingri-tikkan-barot-multhan-guma-galla-jimjima-jogindernagar	Mandi (125 Km)	Nerchowk-ratti-mergalma-manjhali-rivalser-sat sarovar jheel-nainadevi-kalkhar-sidhyani-dhanu-



**SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 8**

**DRIVE TEST OBSERVATION OF KANGRA SSA - JAN-14**

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Jan-14	Kangra	Kangra,dehra, palampur	Poor Quality near Samela, Dhaliyara	Nurpur	Poor Level & Quality near Jonta, Poor Level near Rait, Gagal	Chamba	Poor Level & Quality near Braridhar, Bathari
2	AIRTEL				Poor Level at Outer of Samela, near Dhaliyara		Poor Level near Gagal		Poor Level near Bathari, Dalhousi Outer
3	BSNL								
4	TATA GSM								Poor Level & Quality near Bradidhar, Bathari, Dalhousi Outer, Shubhash Chowk
5	TATA CDMA				Poor Level & Quality near Ranital, Dehra Gopi		No Coverage at Jonta, Hastgarh, Raja ka Talab, Poor Quality near Sadwa		No Coverage
6	IDEA				Poor Quality near Samela, Dhaliyara		Poor Quality near Rait, Gagal, Poor Level near Jonta		Poor Rx Level & Quality near Saru, Braridhar, Poor Quality near Barthari, Dalhousi
7	RCOM GSM				Poor Level & Quality near Ranital, Dehra Gopi		Poor Quality & Level near Kotla, Rait, Gagal		Poor level & Quality near Baridhar, Shubash chowk
8	RCOM CDMA				Poor Level near Tillu, Samela		Poor Rx Level near Padwar, Palion		Poor Rx Level near Saru
9	VODAFONE				Poor Level & Quality near Ranital, Dehra Gopi, Samela, Dhaliyara		Poor Level & Quality near Kotla, Podwar, Rait		Poor Level & Quality near Saru, Barthari, Outer of Dalhousi, Poor Coverage between Barthari to Udaipur



**DRIVE TEST TABLE: 9**

**DRIVE TEST OBSERVATION OF HAMIRPUR SSA - FEB-14**

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Feb-14	Hamirpur	Bilaspur	Poor Level & Quality near Mattan Sidh, Barthi, Sargal	Hamirpur	Poor Level & Quality near Bathera, Talmehra, Baruhi, Lahri, Palkwah	Una	Poor Level & Quality near Jorbad, Prithvipur, Chintapurni, Gagret
2	AIRTEL				Poor Quality near Salooni, Sargal		Poor Quality near Talmera, Palkwah, Bathera, Baruhi		Poor Quality near Chintapurni, Mathera, Gagret, Jorbad
3	BSNL								
4	TATA GSM				Poor Level & Quality near Mattan Sidh, Barthi, Sidh, Delag Bus Stop		Poor Quality near Talmera, Palkwah, Bathera, Baruhi		Poor Level & Quality near Jorbad, Prithvipur, Mathera, Kuneran
5	TATA CDMA				No Coverage at Bhota, Shahtalai, Jhanduta, Ghagas, Poor Quality & Level near Sargal		No Coverage at Taliwal, Pansai, Piplu, Bangana, Jhadoli, Chokimuniyar, Panoh & Teuri, Poor quality near Palkwah		No Coverage at Jorbad, Gindpur, Daulatpur, Poor Level & Quality near Mathera, Kuneran
6	IDEA				Poor Level & Quality near Mattan Sidh, Salooni, Barthi, Sargal		Poor Level & Quality near Bathera, Talmehra, Baruhi, Piplughat, Lahri, Palkwah		Poor Level & Quality near Jorbad, Prithvipur, Mathera, Chintapurni, Gagret
7	RCOM GSM				Poor Quality & Level near Mattan Sidh, Delag Bus Stop		Poor Quality near Gharuwal, Palkwah		Poor Level & Quality near Shitlamata, Chintapurni, Kinnu, Jorbad
8	RCOM CDMA				Poor Quality near Bhota		No Coverage near Talmehra, Poor Quality at outer of Una		Poor Quality near jorbad, Prithvipur, Kuneran, Mathera
9	VODAFONE				Poor Level & Quality near Barthi, Salooni, Sargal		Poor Level & Quality near Bathera, Baruhi, Palkwah, Lehri, No Coverage at Talmehra,		No Coverage from Jorbad to Gindpur & Daulatpur, Poor Level & Quality near Mathera, Prithvipur



**DRIVE TEST TABLE: 10**

**DRIVE TEST OBSERVATION OF MANDI SSA - MAR-14**

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Mar-14	Mandi	Sunder nagar	Poor Quality & Level near Lahardi, Kapahi, Kummi	Mandi, Jogindernagar	Poor Rx Level & Quality near Gumma & Charang, Barot, Magal	Mandi	Poor Quality & Level near naina Devi Ralesar Rd, Garlauni, Galma, Mathlehar
2	AIRTEL				Poor Level near Kummi		Poor Rx Level near Magal, Barot		Poor Level & Quality near Galma
3	BSNL								
4	TATA GSM				Poor Level & Quality near Kummi, Kapahi, No Coverage from Kummi to Kapahi		Poor Level & Quality near Gumma, Barot, Kotrupi, urla, Magal		Poor Quality & Level near Naina Devi Raleasar Rd, Galma, Samlon, No Coverage from Thana to Gurlani, at Garau
5	TATA CDMA				No Coverage at Ledha, Dharagi, Hatgarg, Bagi		No Coverage Barot Kunnu, Chuku, Pali, Bijli, Tharang		Poor Level & Quality near Galma, Gararu
6	IDEA				Poor Quality & Level near Lahardi, Kapahi, Kummi		Poor Rx Level near Gumma & Charang, Barot, Kotrupi, Magal, Poor Quality & Level near Urla		Poor Quality & Level near naina Devi Ralesar Rd, Garlauni, Galma, Mathlehar
7	RCOM GSM				No Coverage after Kapahi, Poor Level & Quality near Kummi		Poor Level & Quality near Ghatasni		Poor Quality & Level near Naina Devi Outer & Galma
s	RCOM CDMA				Poor Quality near Ghatasni		Poor Level & Quality near Gumma, Magal, Kotrupi, Urla, Barot		Poor Level near Sadhyani, Galma
9	VODAFONE				No Coverage from Wah to Chandial, Bhiura to Kummi, Arthi to Deshra, Poor Level & Quality near Kapahi		Poor Level & Quality near Harganen, Jandrola, Gumma, Kotrupi		No Coverage from Thana to Garlauni, at Gobarata, Gararu, Dehnum, Samlon, Poor Quality & Level near Galma, Garlauni



**KEY FINDINGS:** The key observations that could be derived from the results of the drive tests are as under –

- (i) Tata (GSM), is operating its services with its own 05 no. of BTSs only, however is on ICR with Reliance (GSM) in most of the HP licensed service area.
- (ii) **Drive test in Jan-14:** Drive tests were conducted across the **Kangra SSA** covering Kangra, Dehra, Palampur Nurpur and Chamba SDCAs. The drive test results revealed that performance of the service providers was by and large satisfactory as most of the service providers were found meeting the benchmarks of most of the parameters during the drive tests across the Kangra SSA. Only **BSNL** could not meet the benchmark of parameter '% connection with Good Voice Quality' with its performance on SSA level as **94.33%**. **Idea Cellular and Tata (GSM)** were having CDR as **2.24 % and 2.25%** respectively in Chamba SDCA. Tata (GSM) also could not meet the benchmark of CSSR with its performance as 94.68%.
- (iii) **Drive Test in Feb-14:** Drive tests were conducted in **Hamirpur SSA** covering Bilaspur, Hamirpur and Una SDCAs. The drive tests results indicated that **Aircel, Airtel, BSNL, Idea and Tata (GSM)** could not perform up to the benchmark for the parameter Voice quality with their performance on SSA level as **92.06%, 88.98%, 94.31%, 92.26% and 94. 97%** respectively. However, **RCOM (GSM)** was also having Voice Quality problem in Hamirpur and Una SDCAs as its performance was **94.65% and 92.44%** in these SDCAs respectively. **Airtel** was under performed for CDR in Hamirpur with its performance as **2.11%**.  
  
In case of indoor drive test, **Airtel** could not meet the benchmark for the parameter 'Good voice quality' with its performance as **94.67%**.
- (iv) **Drive Test in March-14:** Drive tests were conducted in **Mandi SSA** covering Sundernagar, Mandi, Jogindernagar and Mandi SDCAs. In this SSA, Voice Quality problem was observed with the service providers **Aircel and Idea Cellular**, with their performance as **94.17% and 94.65%** respectively.

The deficiencies with respect to inadequate coverage and voice quality, encountered by different Service providers at various places as shown in the drive tests plots, are detailed in the above drive test table.- 8, 9 & 10.

*Thus from the above, it is concluded that Voice Quality and Call drop rate was the area of concern for some of the service providers namely BSNL, Idea, Tata(GSM), RCOM(GSM) and Airtel across the above SSAs and the defaulter Service providers need to take corrective actions to improve their network quality.*



**6. ESSENCE OF COMPLIANCE REPORT OF SERVICE PROVIDERS WITH RESPECT TO THE QOS**





## **6. ESSENCE OF COMPLIANCE REPORT OF SERVICE PROVIDERS WITH RESPECT TO THE QOS**

From month audit & 3 days live findings, it can be concluded that on an average, performance of the operators in the Himachal Pradesh service is satisfactory for Network related Parameters, audited for monthly PMR data. However, the audit with respect to the parameter 'Worst affected cell> 3% TCH Drop' revealed that the performance of **Tata (GSM)** on an average for three months was **16.93 %**, which was way beyond the benchmark. In fact, Tata (GSM) is having only five sites with 15 cells which is resulting in poor performance, remaining network is on ICR with other service provider (RCOM-GSM).

In case of 3 days live measurements, the performance of all operators except **BSNL and Tata (GSM)** was within the benchmarks for all the three months of the quarter. BSNL failed to meet the benchmarks of the parameters 'TCH congestion', 'SDCCH congestion' and 'Call drop rate', whereas **Tata (GSM)** could not meet the benchmarks of the parameters 'Worst affected cells> 3 % TCH drops' and 'Call Drop Rate' in one or the other month. The average performance of **BSNL** for three months of quarter for parameters SDCCH Congestion and TCH congestion was **2.26% and 4.92%** respectively. However, in the month of Jan-14, the performance of **BSNL** for parameters CSSR and CDR was **94.45 % and 2.43%** respectively. Further, in respect of parameter 'Worst affected cells> 3 % TCH drops', performance of **Tata (GSM)** on average was **21.48%**, way beyond the benchmark of 3% and its CDR in the month of Feb-14 was **2.84%**.

With regard to the **Customer Service Quality Parameters**, all service providers were in compliance with most of the parameters. However, **BSNL and RCOM (GSM)** have not met the benchmark of calls answered by Operators (voice to voice). They have achieved their performance as **2.97% (very poor) and 74.38%** respectively.

In case of live measurements also the performance of **BSNL** was extremely poor as they could connect only **0.35%** of calls to operator within 60 seconds.

The performance of the service providers with respect to drive test, it was concluded that Voice Quality and Call drop rate were the area of concern for some of the service providers namely BSNL, Idea, Tata (GSM), RCOM(GSM) and Airtel across the three SSAs..The defaulter Service providers need to take corrective actions to improve their network quality.

## **7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES**





## 7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle- Jan-14 month												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Jan-14	662	1372	1060	730	824	896	5	397	133
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-14	1965.87	154.08	15603	406.11	1597.12	1191	0	224	7.10
	c) BTS Accumulated Downtime	<=2%	Jan-14	0.40%	0.02%	1.98%	0.07%	0.26%	0.18%	0.00%	0.08%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-14	11	0	21	0	0	7	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Jan-14	1.66%	0.00%	1.98%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	99.56%	99.21%	98.00%	98.14%	98.53%	98.65%	99.26%	99.10%	99.17%
	b) SDCCH/PAGING Congestion	<=1%	Jan-14	0.03%	0.07%	0.81%	0.00%	0.17%	0.16%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.18%	0.14%	1.98%	0.09%	0.84%	0.08%	0.00%	0.01%	0.03%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Jan-14	0.62%	0.61%	1.45%	0.63%	1.16%	0.64%	1.63%	0.05%	0.14%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-14	0.86%	2.03%	2.79%	1.91%	2.27%	0.04%	17.80%	0.25%	1.47%
	c) % of connections with good voice quality	>=95%	Jan-14	95.06%	98.91%	NP	98.20%	95.23%	98.02%	97.87%	99.78%	98.23%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jan-14	17	81	88	42	55	1	3	3	6
	e) Total no. of cells (Sector) in the licensed service area		Jan-14	1974	3991	3148	2199	2421	2688	15	1191	432
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Jan-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jan-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Jan-14	32039	66428	74000	19385	28389	40000	165	28000	17712
	b) Total traffic in TCBH in erlang (Avg.)		Jan-14	11768	54169	33233	11686	12221	31104	8.44	3100	2345
	c) Total no. of customers served (as per VLR) on last day of the month		Jan-14	429438	2027530	1077975	539028	537426	1235975	686	128591	42239

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**TABLE: 2**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Himachal Pradesh Circle- Jan-14 month</b>												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
1	<b>Network Availability</b>											
	a) Total no. of BTSs in the licensed service area		Live data	662	1371	1053	730	807	895	5	397	100
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	89	4.66	1488	31.84	201.54	107	0	12	0.00
	c) BTS Accumulated Downtime	<=2%	Live data	0.19%	0.00%	1.96%	0.06%	0.35%	0.17%	0.00%	0.04%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	21	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.71%	99.25%	94.45%	98.16%	98.64%	98.66%	98.92%	98.12%	99.19%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.08%	2.28%	0.00%	0.05%	1.48%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.04%	0.11%	5.55%	0.07%	0.76%	0.07%	0.00%	0.02%	0.06%	
3	<b>Connection Maintenance (Retainability)</b>											
	a) Call Drop Rate (CDR)	<=2%	Live data	0.61%	0.62%	2.43%	0.67%	1.12%	0.63%	1.38%	0.04%	0.07%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	1.93%	2.18%	2.75%	1.91%	1.95%	0.00%	20.00%	0.20%	0.00%
	c) % of connections with good voice quality	>=95%	Live data	95.07%	98.92%	NP	98.22%	95.37%	98.02%	98.00%	99.71%	98.22%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	38	87	86	42	47	0	3	2	0
e) Total no. of cells (Sector) in the licensed service area		Live data	1974	3988	3140	2199	2407	2685	15	1191	432	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>											
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0



**TABLE: 3**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle- Feb-14 month</b>												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Feb-14	662	1381	1069	730	842	896	5	397	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-14	2791.67	146.77	14196	846.53	3227.75	1978	0	327	0.00
	c) BTS Accumulated Downtime	<=2%	Feb-14	0.63%	0.02%	1.98%	0.17%	0.57%	0.33%	0.00%	0.12%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-14	12	0	10	0	0	7	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-14	1.81%	0.00%	0.89%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	99.56%	99.16%	98.40%	98.19%	98.51%	98.70%	98.90%	99.20%	99.08%
	b) SDCCH/PAGING Congestion	<=1%	Feb-14	0.03%	0.10%	0.90%	0.00%	0.16%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.19%	0.16%	1.59%	0.07%	0.82%	0.05%	0.00%	0.00%	0.05%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Feb-14	1.22%	0.61%	1.35%	0.64%	1.19%	0.64%	1.38%	0.06%	0.14%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-14	2.79%	2.02%	2.86%	2.00%	2.91%	0.04%	<b>14.27%</b>	0.17%	1.42%
	c) % of connections with good voice quality	>=95%	Feb-14	95.00%	98.89%	NP	98.49%	95.34%	98.02%	98.24%	99.78%	98.23%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-14	55	81	91	44	72	1	2	2	6
	e) Total no. of cells (Sector) in the licensed service area		Feb-14	1974	4009	3171	2199	2474	2685	15	1191	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Feb-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Feb-14	32398	65218	74000	19484	29065	40000	165	28000	17712
	b) Total traffic in TCBH in erlang (Avg.)		Feb-14	11910	55688	35143	11036	13012	29227	8.32	2969.61	2264
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-14	433716	2080810	1056238	477328	558174	1241432	650	122883	NA



**TABLE: 4**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Himachal Pradesh Circle- Feb-14 month</b>												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1372	1060	730	827	896	5	397	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	302.3	11.17	1497	35.94	51.05	212.57	0	13	0.00
	c) BTS Accumulated Downtime	<=2%	Live data	0.63%	0.01%	1.96%	0.02%	0.09%	0.33%	0.00%	0.04%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	7	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.27%	99.24%	96.68%	98.27%	98.49%	98.66%	98.88%	99.30%	99.14%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.04%	1.72%	0.00%	0.15%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.49%	0.14%	3.32%	0.08%	0.87%	0.05%	0.00%	0.00%	0.01%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.60%	0.60%	0.99%	0.65%	1.16%	0.64%	2.84%	0.06%	0.13%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.28%	1.85%	2.90%	1.79%	2.43%	0.02%	15.56%	0.11%	1.25%
	c) % of connections with good voice quality	>=95%	Live data	95.06%	98.89%	NP	98.52%	95.52%	97.99%	98.28%	99.79%	98.24%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	45	74	92	39	60	1	2	1	5
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	3991	3161	2199	2469	2685	15	1191	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0



**TABLE: 5**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle- Mar-14 month</b>												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Mar-14	662	1394	1074	730	848	896	5	397	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-14	2428.72	102.17	15701	565.34	1667.69	1264	0	299	12.00
	c) BTS Accumulated Downtime	<=2%	Mar-14	0.49%	0.01%	1.96%	0.10%	0.26%	0.19%	0.00%	0.10%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-14	12	0	20	0	0	2	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Mar-14	1.81%	0.00%	1.87%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	99.35%	99.09%	98.12%	98.24%	97.88%	98.72%	99.39%	99.20%	98.20%
	b) SDCCCH/PAGING Congestion	<=1%	Mar-14	0.05%	0.14%	0.82%	0.01%	0.85%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.37%	0.16%	1.88%	0.10%	1.28%	0.05%	0.00%	0.00%	0.12%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Mar-14	1.22%	0.62%	0.89%	0.61%	1.29%	0.64%	1.19%	0.06%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-14	2.89%	2.14%	2.80%	2.07%	2.60%	0.06%	<b>18.71%</b>	0.32%	1.43%
	c) % of connections with good voice quality	>=95%	Mar-14	<b>94.81%</b>	98.86%	NP	98.49%	95.27%	98.02%	98.39%	99.78%	98.21%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-14	57	87	90	46	66	2	3	4	6
	e) Total no. of cells (Sector) in the licensed service area		Mar-14	1974	4048	3200	2221	2521	2685	15	1191	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Mar-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Mar-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Mar-14	32655	65148	74000	19550	29894	40000	19550	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Mar-14	12543	57239	39232	11380	13745	31577	11380	3189	2258
	c) Total no. of customers served (as per VLR) on last day of the month		Mar-14	449112	2106970	1072062	488683	583398	1234086	488683	122815	NA





**TABLE: 6**

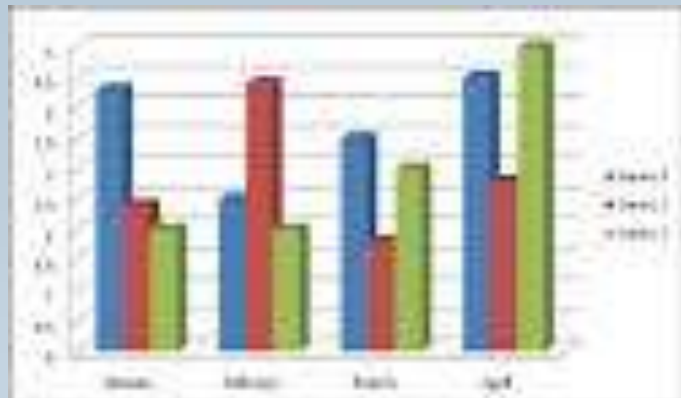
<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Himachal Pradesh Circle- Mar-14 month</b>												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1381	1069	730	843	896	5	397	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	261.68	8.17	1523	199.37	284	78	0	18	2.72
	c) BTS Accumulated Downtime	<=2%	Live data	0.55%	0.01%	1.98%	0.38%	0.47%	0.12%	0.00%	0.06%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	25	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	2.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.48%	99.12%	94.10%	98.31%	96.55%	98.65%	99.28%	99.15%	98.70%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.06%	0.06%	2.79%	0.00%	0.34%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.29%	0.21%	5.90%	0.08%	1.35%	0.05%	0.00%	0.00%	0.03%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.12%	0.62%	1.08%	0.63%	1.35%	0.64%	1.27%	0.07%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.74%	2.17%	2.91%	1.93%	2.38%	0.03%	28.87%	0.09%	0.31%
	c) % of connections with good voice quality	>=95%	Live data	95.03%	98.87%	NP	98.53%	95.23%	98.01%	98.72%	99.78%	98.22%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	54	87	93	42	60	1	4	2	1
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4009	3185	2199	2518	1191	15	2685	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

## 8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

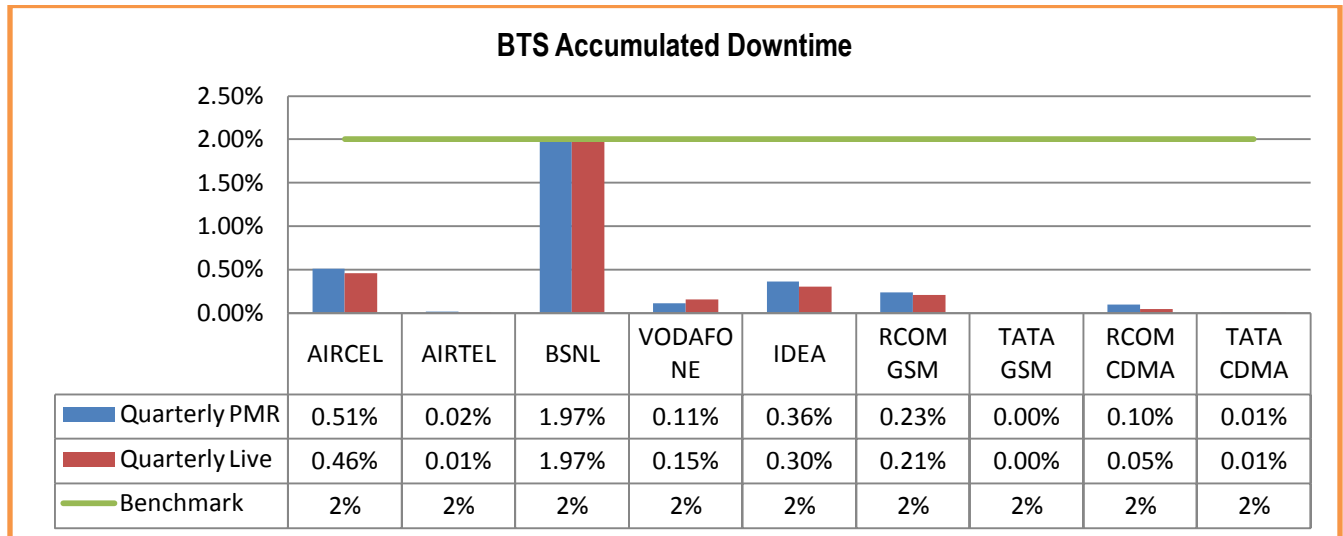
AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT





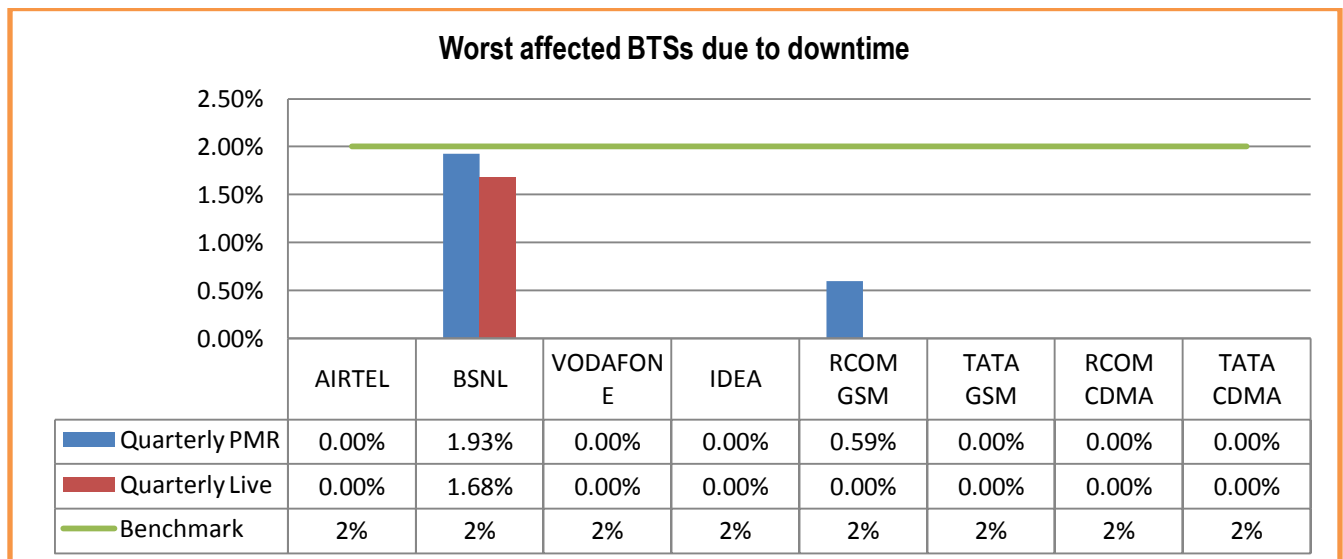
**8. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:**

**1) BTS ACCUMULATED DOWNTIME :**



All operators are meeting the benchmarks.

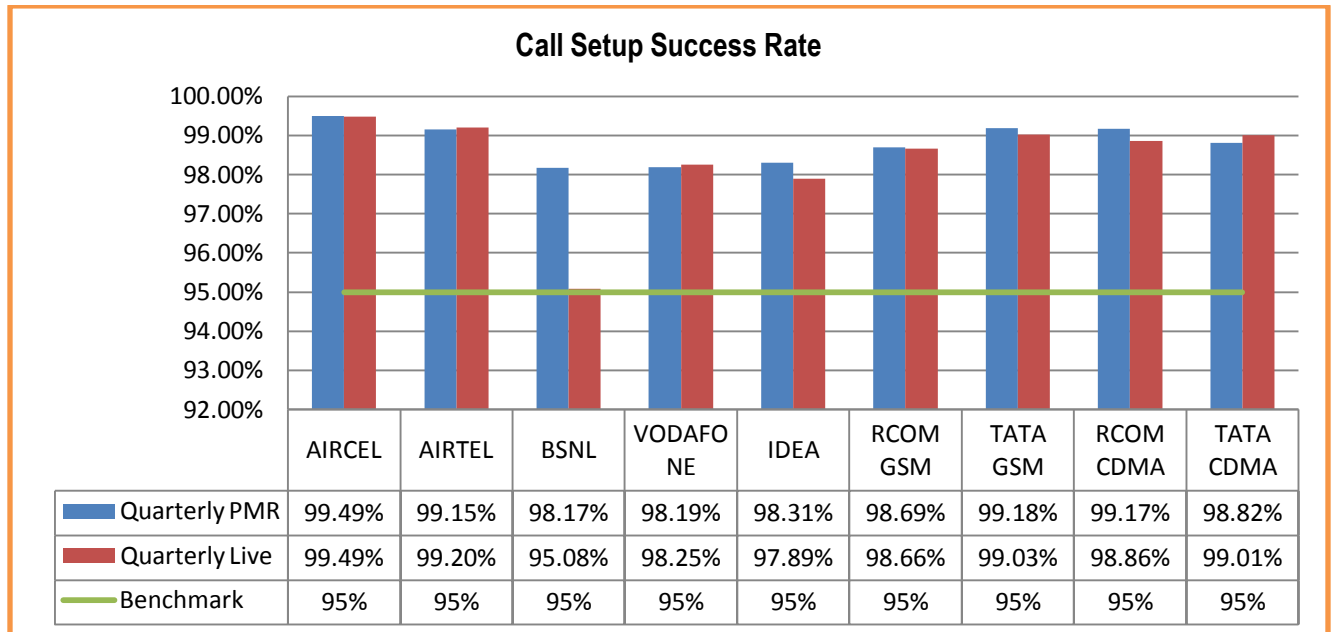
**2) WORST AFFECTED BTSS DUE TO DOWNTIME :**



All operators are meeting the benchmarks.

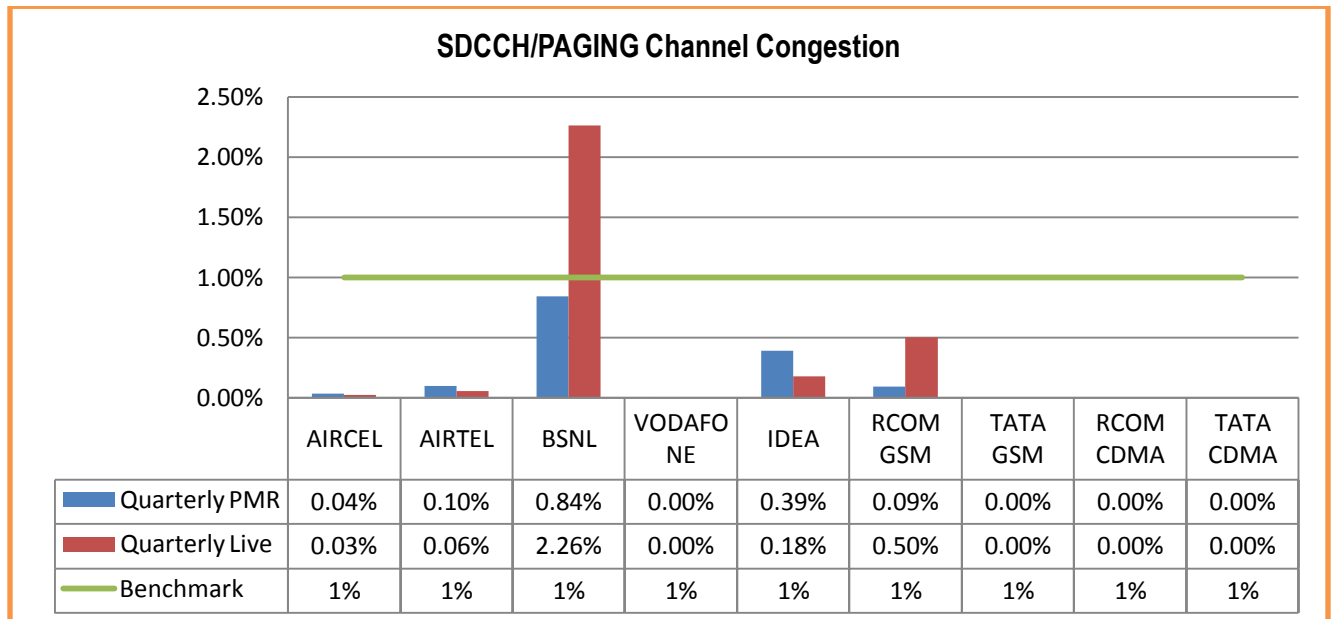


3) CALL SETUP SUCCESS RATE :



All operators are meeting the benchmarks.

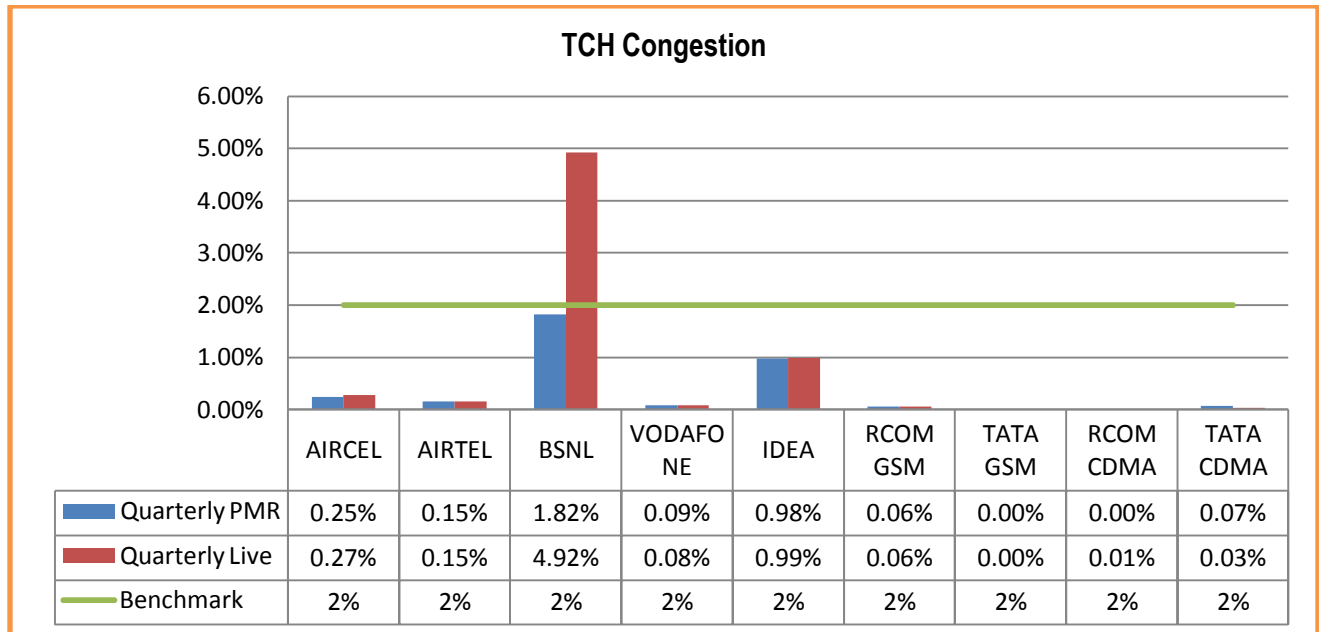
4) SDCCH/PAGING CHANNEL CONGESTION :



All operators are meeting the benchmarks except BSNL (3 days live).

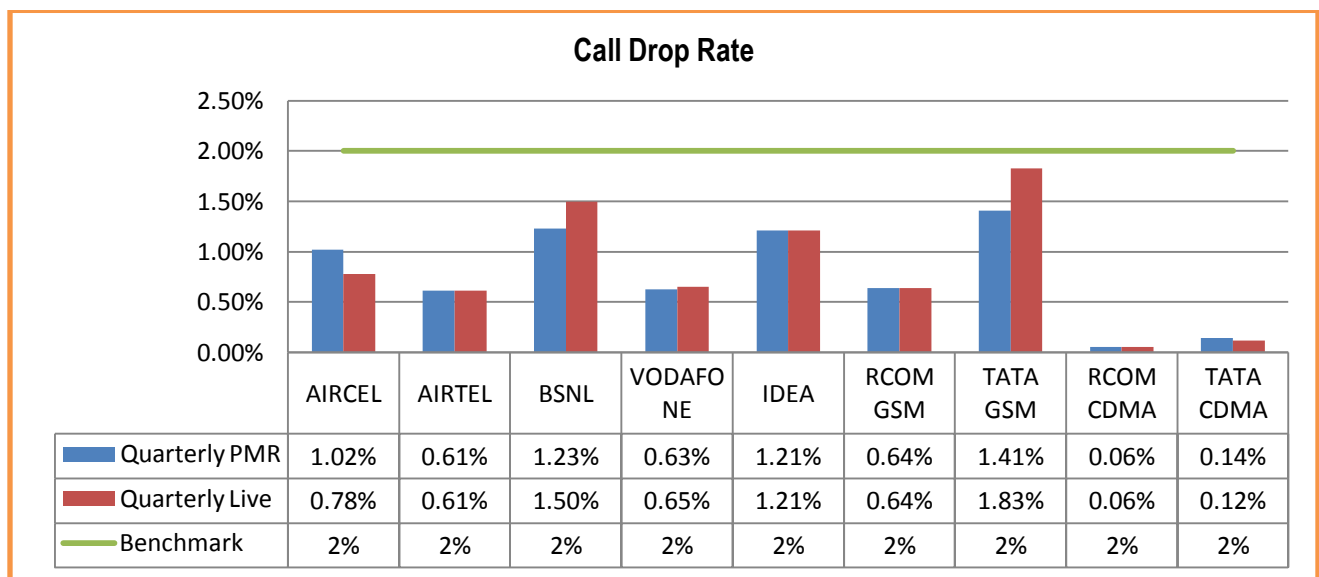


5) TCH CONGESTION :



All operators are meeting the benchmarks except BSNL (3 days live data).

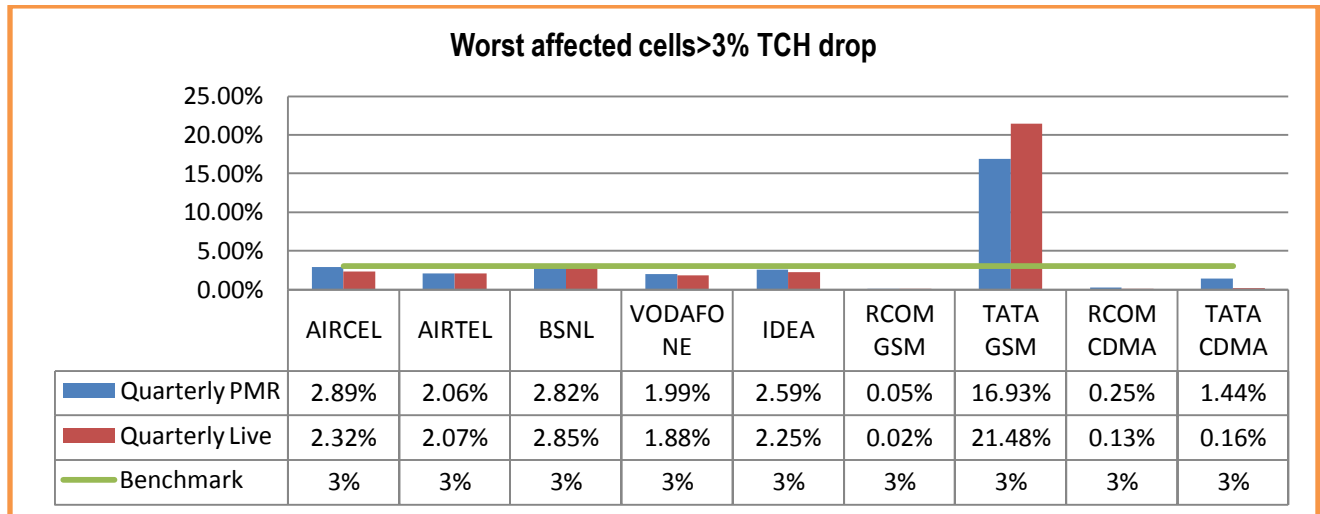
6) CALL DROP RATE :



All operators are meeting the benchmarks.

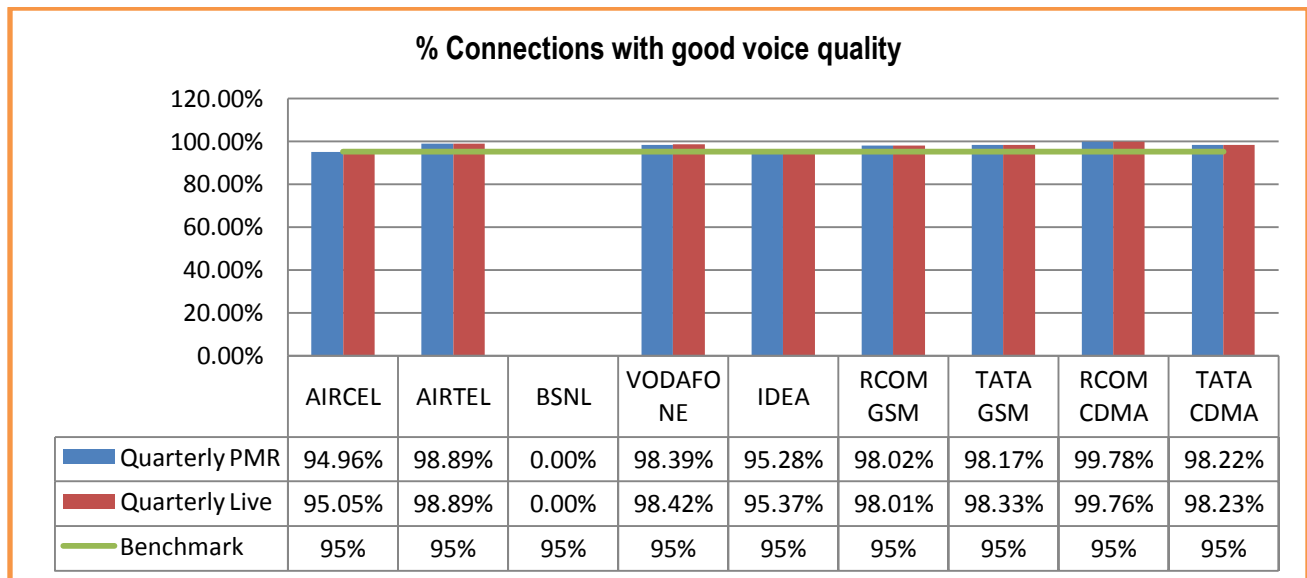


7) WORST AFFECTED CELLS>3% TCH DROP :



All operators are meeting the benchmarks except TATA (GSM).

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :



All operators are meeting the benchmarks. BSNL has not provided the data as they are not able to fetch the system generated data.

## **9. QOS AUDIT OF BASIC (WIRELINER) SERVICE PROVIDERS**





## 9. QOS AUDIT OF BASIC TELEPHONE SERVICE (WIRELINER)

The QoS audit for basic (wireline) service was undertaken for assessment of quarterly performance of the service providers for quarter ended March-2014. In HP Circle, the QoS audit of Basic (wireline) Service is done for BSNL and RCL only. M/S Tata Teleservices (TTL) is not providing their Basic (wireline) service in HP Circle, as confirmed by TTL in writing. For BSNL, **Total 58 Exchanges (6 Urban + 52 Rural)** were required to be audited in about 10 % of SDCAs. Since HP is a small Telecom Circle having only 6 SSAs and 33 SDCAs, we have audited 58 exchanges covering 10 SDCAs spread over all the SSAs to cover more area of the HP Circle. Detail of 6 urban and 52 rural exchanges where QoS audit was undertaken is given in Table at Annex 1. RCL is having only 1 exchange in HP circle and the same has been audited. 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:

Averaged Audited data for Wireline (Basic) Services – HP circle					
Sl. No.	Parameters	Benchmark	Audit Period	BSNL	RCL
1	<b>Fault incidences</b>				
	(No. of faults/100 subscribers /month)	< 5%	Quarterly	4.04%	NIL
2	<b>Faults Repair/Restoration Time</b>				
	Fault repair by next working day(Urban Area)	>90%	Quarterly	68.21%	NA
	Within 3 days day	100%	Quarterly	83.77%	NA
	Fault repair by next working day(Rural & hilly Area)	>90%	Quarterly	66.73%	NA
	Within 5 days	100%	Quarterly	84.98%	NA
	Mean time to Repair(MTTR)	≤8 Hrs	Quarterly	20 hrs	NA
3	<b>Rent Rebate</b>				
	Fault pending > 3 days & <7 days	Rebate for 7 days	Quarterly	0	NA
	Fault Pending > 7 days & < 15 days	Rebate for 15 days	Quarterly	0	NA
	Fault pending > 15 days	Rebate for 1 month	Quarterly	2	NA
4	<b>Call Completion Ratio (CCR) &amp; Answer to seizure Ratio(ASR)</b>				
	CCR	> 55%	Quarterly	60.33%	--
	ASR	> 75%	Quarterly	--	80.90%
5	<b>Metering &amp; Billing Performance</b>				
	% of disputed Bills over bills issued (Post Paid )	< 0.1%	Quarterly	0.00%	0.00%
	% of Pre-paid Charging Complaints	< 0.1%	Quarterly	NA	NA
	% of billing complaints resolved within 4 weeks	100%	Quarterly	NA	NA
	Period of all refunds/payments from the date of resolution of complaints within 1weeks	100%	Quarterly	NA	NA





6	<b>POI Congestion</b>				
	No. of POI's having congestion >0.5%		Quarterly	0	0
7	<b>Response Time to customer for assistance</b>				
	Accessibility of Call centre/customer Care	>=95%	Quarterly	96.00%	94.91%
	% age of calls answered by operator(voice to voice) within 60 seconds	>=90%	Quarterly	92.00%	94.90%
8	<b>Customer care(promptness in attending to customers request)</b>				
	Termination / Closures	100%	Quarterly	100.00%	NA
	Time taken for refunds of deposit after closures	100%	Quarterly	100.00%	NA

- NA-Not Applicable

### 10. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS LIVE MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELIN) PROVIDERS:

3 days live measurement data for Wireline (Basic) Services - HP Circle					
SI No.	Parameters	Benchmark	Period	BSNL	RCL
1	<b>Call Completion Ratio (CCR) &amp; Answer to seizure Ratio(ASR)</b>				
	CCR	> 55%	Quarterly	65.65%	NA
	ASR	> 75%	Quarterly	NA	80.52%
2	<b>POI Congestion</b>				
	No. of POI's having congestion >0.5%		Quarterly	0	0
3	<b>Response Time to customer for assistance</b>				
	Accessibility of Call centre/customer Care	≥95%	Quarterly	96.81%	96.22%
	% age of calls answered by operator(voice to voice) within 60 seconds	≥90%	Quarterly	46.98%	96.20%



## KEY FINDINGS: BASIC TELEPHONE SERVICES (WIRELINE)

**Fault Incidences:** The audit of the service providers revealed that the performance of all service providers was well within the benchmark. RCL is having only 55 telephone connections in HP circle and no fault has been reported.

**Fault Repair/Restoration Time:** For this parameter, **Only BSNL failed to meet the benchmark of fault repair by next working day and restoration time both in urban & rural areas.** The performance of BSNL was **68.21%** for 'Fault repaired by next working day' and **83.77%** for fault repaired within 3 days in urban areas whereas their performance for the same parameters was **66.73% & 84.98%** respectively in rural areas.

**Mean Time to Repair:** BSNL was also failed to meet the benchmark for MTTR with their performance as **20 hrs** against the benchmark of  $\leq 8$  Hrs.

**Call Completion Rate/Answer to seizure ratio:** All the operators were found to be meeting the benchmark on this parameter at various exchanges.

**Metering and 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:** For percentage of calls getting connected to call center and answered, all operators except RCOM managed to meet the TRAI benchmark. **RCOM could connect 94.91 % of calls to its call center against the benchmark of 95%.** With respect to the parameter of calls answered by operator (voice to voice), **BSNL** could not meet the benchmark with their performance as **46.98%** against the benchmark of  $\geq 90\%$  during live measurements.

**Termination/Closures:** All operators were found meeting the benchmark for this parameter.

*Thus, from the above findings that, it was concluded that the performance of BSNL was not satisfactory in respect of the parameters Fault Repairs/Restoration Time, MTTR and Response time to customer for assistance. Hence, BSNL need to improve their services in respect of these parameters.*



**INTER OPERATOR CALL ASSESSMENT**

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in HP Circle during the time 1000 to 1300 Hrs and 1500 to 1700 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators.

<b>INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT</b>				
<b>Calling Operators</b>	<b>Circle Name</b>	<b>Total No. of calls Made</b>	<b>BSNL</b>	<b>RCL</b>
BSNL	HP	100	-	100.00%
RCL	HP	100	100.00%	--

The result of the testing revealed that there was no problem in interconnecting the calls between the two operators.

**LEVEL-1 LIVE CALLING**

<b>LEVEL 1 LIVE CALLING</b>									
<b>Emergenc y no.</b>	<b>Circle Name</b>	<b>No. of calls made</b>	<b>BSNL-Solan SSA</b>	<b>BSNL-Shimla SSA</b>	<b>BSNL-Dharamshala SSA</b>	<b>BSNL-Mandi SSA</b>	<b>BSNL - Kullu SSA</b>	<b>BSNL - Hamirpur SSA</b>	<b>RCL</b>
100	HP	30	✓	✓	✓	✓	✓	✓	✓
101	HP	30	✓	✓	✓	✓	✓	✓	✓
102	HP	40	✓	✓	✓	✓	✓	✓	✓

To assess the availability and efficiency of level 1 service such as police, fire, ambulance (emergency services) offered by BSNL and RCL, the calls were made from telephone provided by BSNL in different SSAs and RCL in Shimla, these services were found functional in the networks of all the service providers.



**CUSTOMER CARE / HELPLINE ASSESSMENT**

<b>LIVE CALLING TO CALL CENTRE</b>								
<b>Parameter</b>	<b>Circle Name</b>	<b>BSNL - Solan SSA</b>	<b>BSNL - Shimla SSA</b>	<b>BSNL - Dharamshala SSA</b>	<b>BSNL - Mandi SSA</b>	<b>BSNL - Kullu SSA</b>	<b>BSNL - Hamirpur SSA</b>	<b>RCL</b>
<i>Total No. of calls Attempted</i>	<i>HP</i>	100	100	100	100	100	100	100
<i>Total No. of calls connected to IVR</i>	<i>HP</i>	100	100	100	100	100	100	100
<i>Calls got connected to agent within 60 Sec</i>	<i>HP</i>	48	48	48	55	55	72	100
<i>%age of calls got answered</i>	<i>HP</i>	48.00%	48.00%	48.00%	55.00%	55.00%	72.00%	100.00%

In case of calls answered by operators (voice to voice), when test calls were made to the call centers, BSNL in different SSAs could connect 48.00% (Solan, Shimla and Dharamshala ), 55.00% (Mandi and Kullu) and 72.00 % (Hamirpur) calls within 60 seconds. In Case of RCL, 100% of calls were connected to the call center within 60 seconds.

## 11. QOS AUDIT OF BROADBAND SERVICE PROVIDERS





## **11. QUALITY OF SERVICE AUDIT OF BROADBAND SERVICE PROVIDERS**

TUV–SUD South Asia conducted the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who were having broadband subscriber base of more than 10,000 subscribers in their licensed service area. The following Broadband Service providers in Himachal Pradesh Circle were audited for their quality of service assessment.

SI. No.	Name of Broadband Service Provider
1	BSNL
2	BROADBAND PACENET INDIA PVT. LTD
3	RELIANCE COMMUNICATION LIMITED (RCL)
4	TATA COMMUNICATION LIMITED (TCL)

**THE AUDITED DATA HAS BEEN GIVEN IN THE FOLLOWING TABLE:**

Averaged Audited data for Broadband Services – HP Circle							
S/N	Parameters	Benchmark	Period	BSNL	PACENET	RCL	TCL
1	<b>Service Provisioning/Activation Time</b>						
	100% cases in 15 days (subject to technical feasibility)	<15 days	Quarterly	99.75%	100.00%	NA	NA
	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.	Quarterly	0	0	NA	NA
2	<b>Faults Repair/Restoration Time</b>						
	By next working day	>90%	Quarterly	56.86%	100.00%	NA	100.00%
	within 3 working day	≥99%	Quarterly	77.60%	100.00%	NA	NA
2.1	<b>Rebate</b>						
	Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)		Quarterly	0	0	NA	NA
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		Quarterly	1	0	NA	NA

## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-HIMACHAL PRADESH CIRCLE



	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		Quarterly	4	0	NA	NA
<b>3</b>	<b>Billing Performance</b>						
	Billing complaints per 100 bills issued	<2%	Quarterly	0.03%	0.00%	NIL	0.00%
	%age of complaints resolved within 4 weeks	100%	Quarterly	100.00%	100.00%	NA	100.00%
	Time taken for refund of deposits after closure (within 60 days)	100%	Quarterly	100.00%	NA	NA	NA
<b>4</b>	<b>Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)</b>						
	within 60 sec	>60%	Quarterly	88.99%	87.50%	96.42%	90.46%
	within 90 sec	>80%	Quarterly	96.00%	NP	98.59%	92.58%
<b>5</b>	<b>Bandwidth Utilization/ Throughput:</b>						
	POP to ISP Gateway Node [Intra-network] Link(s)	<80%	Quarterly	NP	84.15%	15.17%	52.27%
	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	<80%	Quarterly	NP	NA	45.44%	48.11%
	Broadband Connection Speed (download) - from ISP Node to User	>80%	Quarterly	NP	NP	NP	98.05%
<b>6</b>	<b>Service Availability/Uptime (for all users) in %age</b>						
	Service Availability (%)	>98%	Quarterly	99.81%	99.31%	100.00%	100.00%
<b>7</b>	<b>Packet Loss</b>						
	% of Packet loss	<1%	Quarterly	NP	NP	0.54%	0.00%
<b>8</b>	<b>Network latency (for wired broadband access)</b>						
	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Quarterly	NP	NA	50	18
	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Quarterly	NP	NA	19	274
	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Quarterly	NA	NA	NA	NA

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



**12. 3 DAYS LIVE MEASUREMENT FOR BROADBAND SERVICE PROVIDERS:**

3 Days Live Data for Broadband Services - HP Circle							
S/N	Parameters	Benchmark	Audit Period	BSNL	PACENET	RCL	TCL
1	<b>Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)</b>						
	Within 60 sec	>60%	Live	74.34%	100.00%	95.63%	97.67%
	Within 90 sec	>80%	Live	80.19%	NP	98.65%	98.39%
2	<b>Bandwidth Utilization/ Throughput</b>						
2.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 80%	Live	57.45%	68.91%	34.82%	39.20%
2.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 80%	Live	69.00%	NA	55.42%	68.56%
2.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	Live	80.60%	95.00%	92.50%	80.47%
3	<b>Packet loss</b>						
	% of Packet loss	<1%	Live	1.38%	0.50%	0.00%	0.00%
4	<b>Network latency (for wired broadband access)</b>						
4.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Live	41	NA	0.7	1
4.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Live	191	NA	1.93	242
4.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Live	NA	NA	NA	NA

NA: Not Applicable  
NP: Data not provided





## 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 except BSNL. **BSNL** could not meet the benchmark for the parameter “100% cases in 15 days (subject to technical feasibility)” and its achievement level was **99.75%**.

**Fault Repair/Restoration Time:** With regards to this parameter the performance of the service providers was within TRAI norms except **BSNL**, its achievement level was **56.86%** for fault Repair by next working day and **77.60%** for fault Repair by 3 working days.

**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 percentage of calls getting connected to call center and answered, all service providers were found meeting the benchmark for this parameter

**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 except Pacenet. **Pacenet** could not meet the benchmark for the parameter “POP to ISP Gateway Node [Intra-network] Link(s)”; its achievement level was **84.15%**.

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

**Packet Loss and Network Latency:** It was observed that almost all operators were measuring packet loss and latency by conducting ping test on random basis for their internal assessment.

However, the ping test conducted during live measurement revealed that all service providers (**except BSNL**) were meeting the benchmark prescribed by TRAI. The performance of BSNL in live measurement was **1.38%** against the benchmark of < 1%.

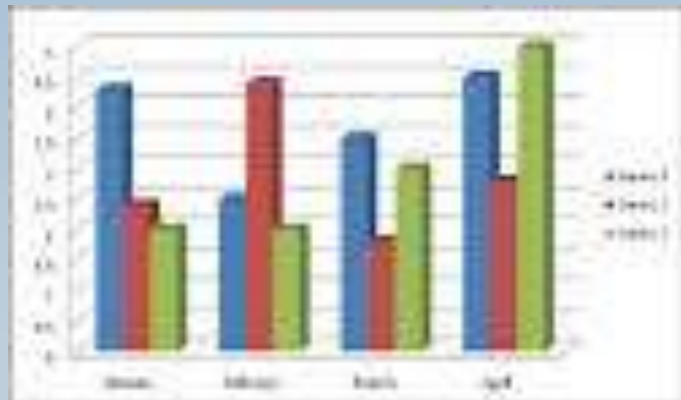


**CUSTOMER CARE / HELPLINE ASSESSMENT**

<b>LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES</b>					
<b>Parameter</b>	<b>Circle Name</b>	<b>BSNL</b>	<b>PACENET</b>	<b>RCL</b>	<b>TCL</b>
<b>Total No. of calls Attempted</b>	HP	100	100	100	100
<b>Total number of calls answered by the operator within 60 seconds</b>	HP	94	86	88	92
<b>% age calls answered by the operator in 60 seconds</b>	HP	94.00%	86.00%	88.00%	92.00%
<b>Total number of calls answered by the operator within 90 seconds</b>	HP	98	90	94	100
<b>% age calls answered by the operator within 90 seconds</b>	HP	98.00%	90.00%	94.00%	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. BSNL, Pacenet and RCL could connect 98%, 90% and 94% of calls to the operator within 90 Seconds.

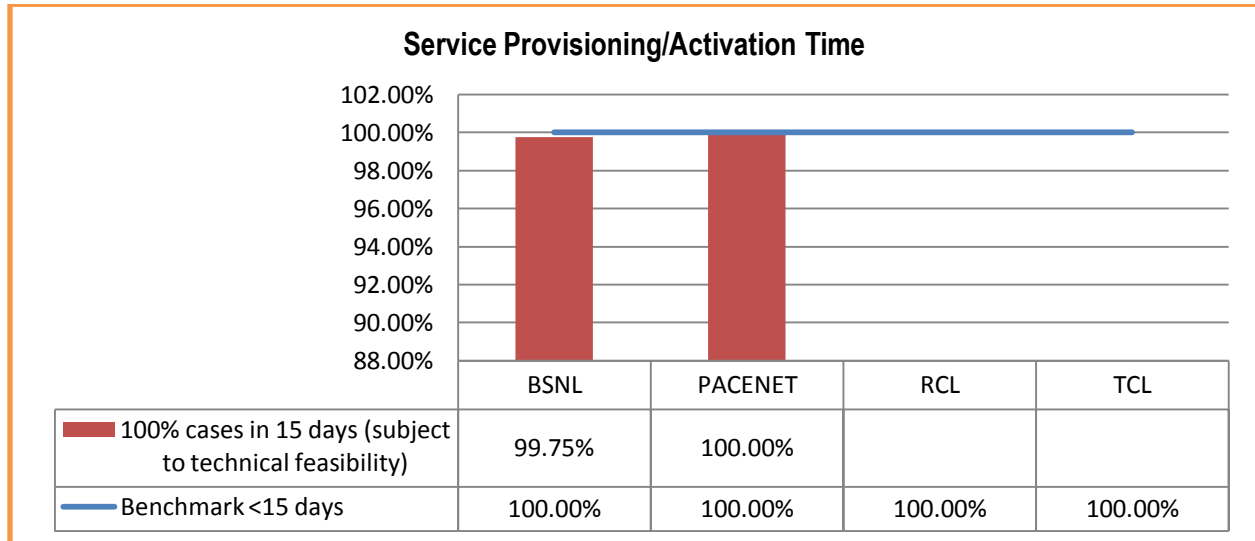
### 13. GRAPHICAL REPRESENTATION OF BROADBAND SERVICES





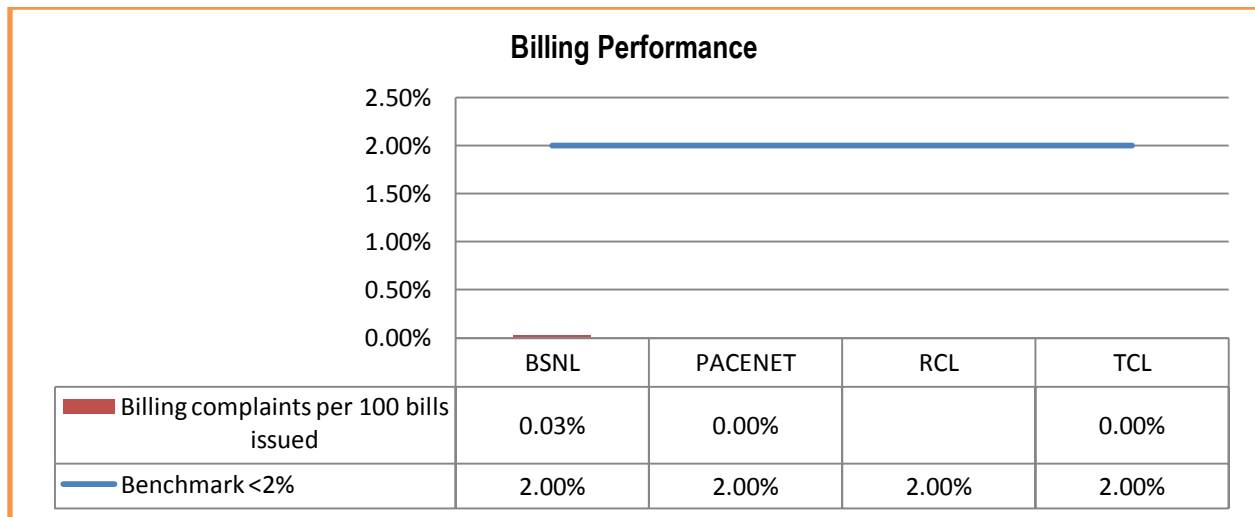
### 13. GRAPHICAL REPRESENTATION OF QUARTERLY PERFORMANCE OF BROADBAND SERVICE PROVIDERS:

#### 1. SERVICE PROVISIONING/ACTIVATION TIME:



All Operators are meeting the benchmarks except BSNL. In case of RCL and TTL, no new connections and Installations were registered during this quarter.

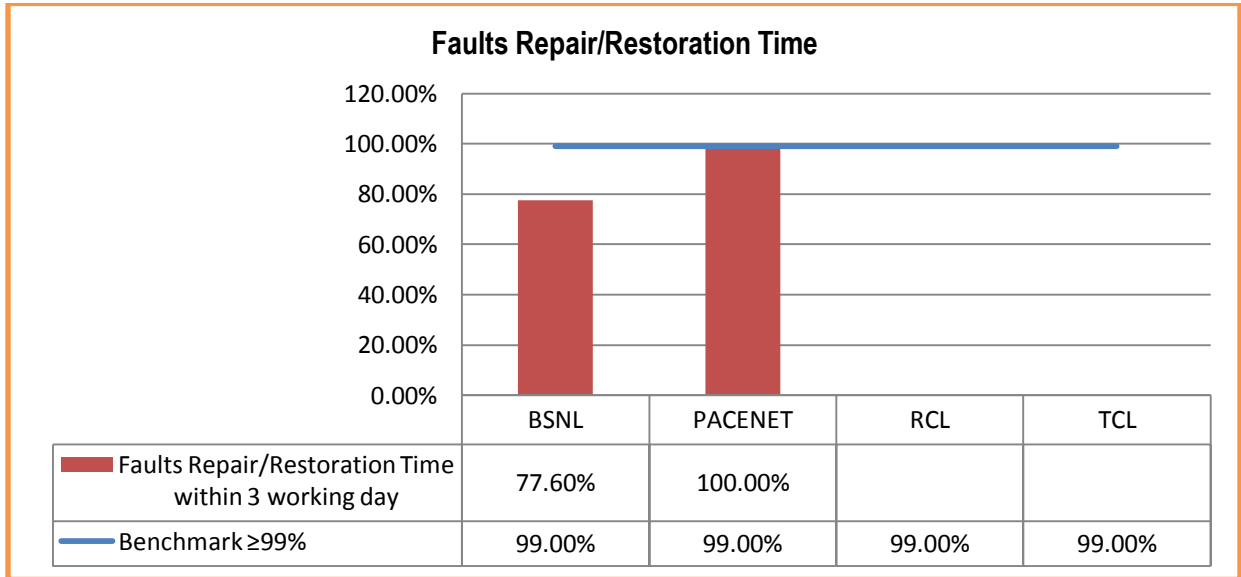
#### 2. BILLING PERFORMANCE:



All Operators are meeting the benchmarks.

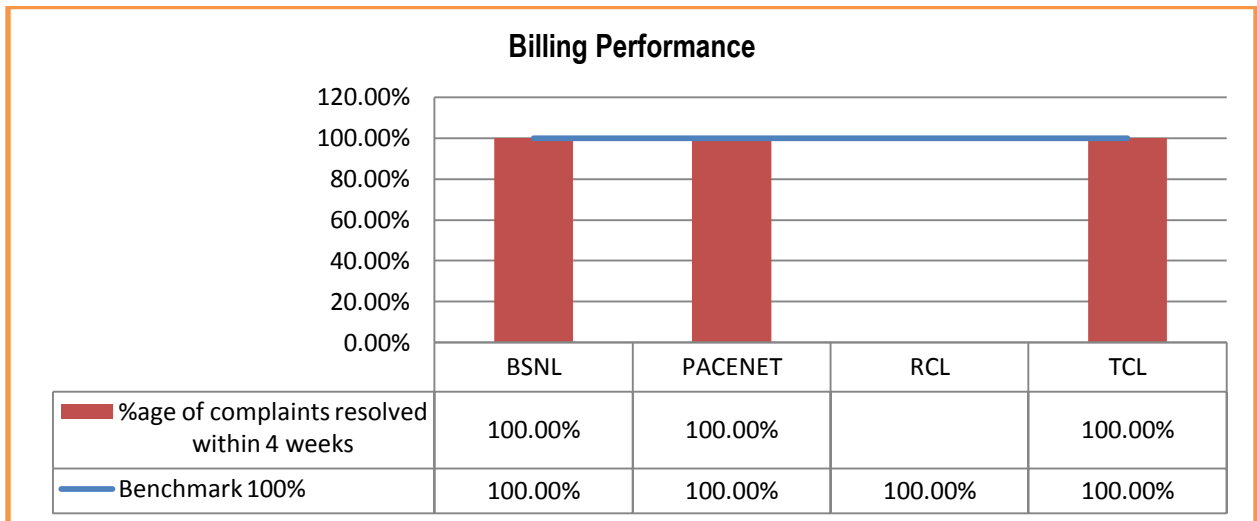


**3. FAULTS REPAIR/RESTORATION TIME:**



All Operators are meeting the benchmarks except BSNL.

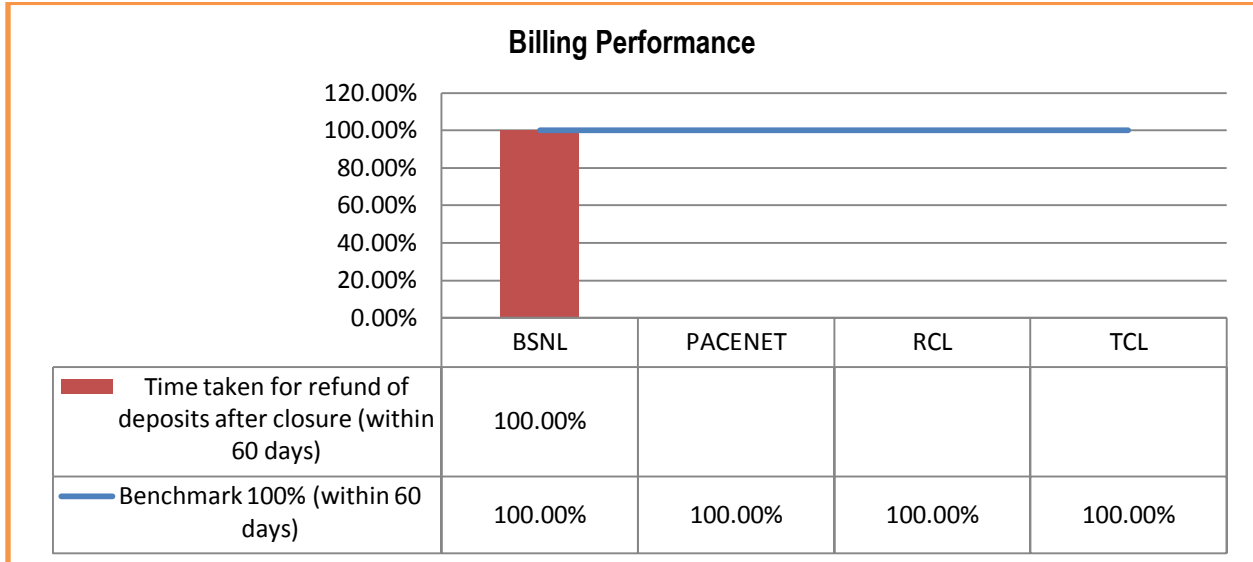
**4. COMPLAINT RESOLUTION:**



All Operators are meeting the benchmarks.

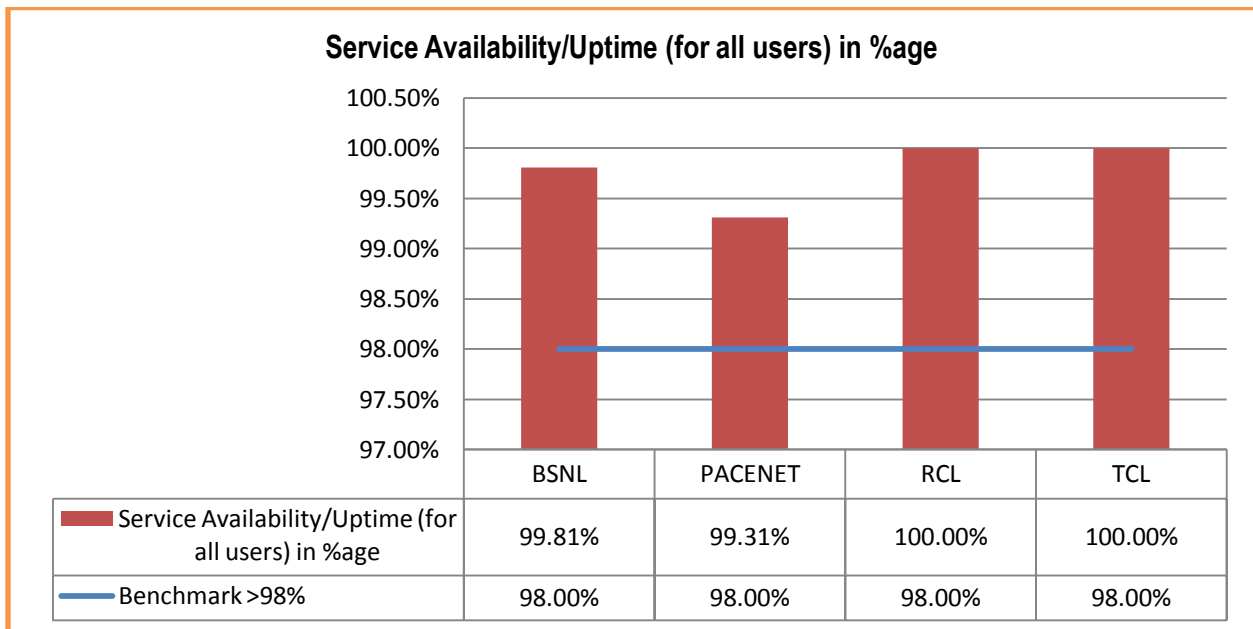


**5. REFUND:**



All Operators are meeting the benchmarks.

**6. SERVICE AVAILABILITY/UPTIME:**

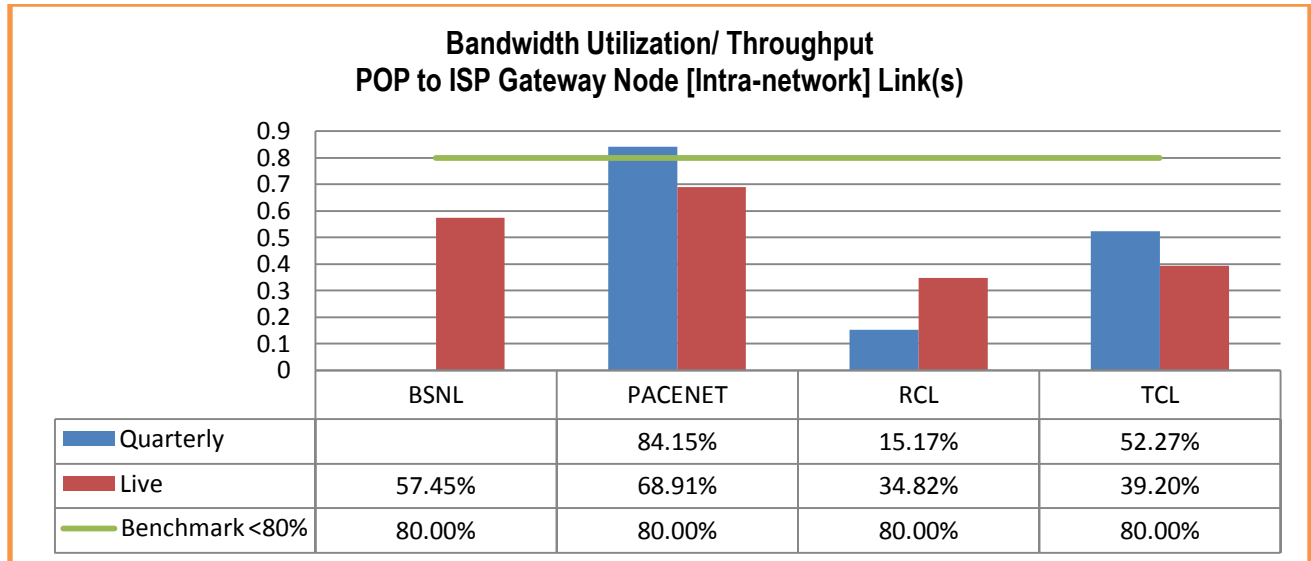


All Operators are meeting the benchmarks.



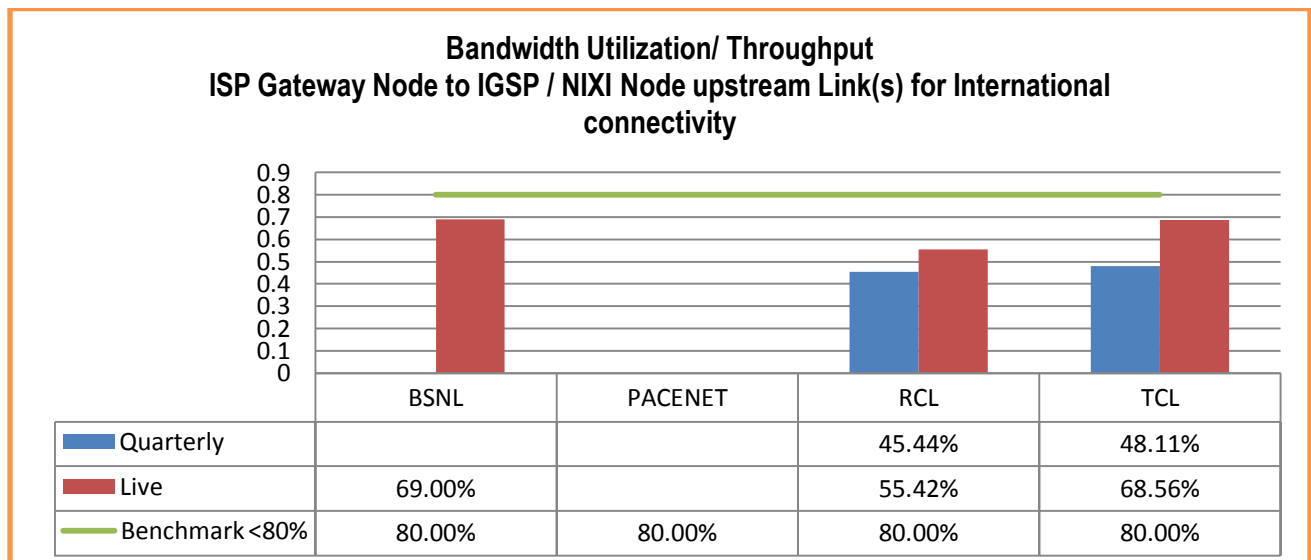
**14. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE BROADBAND SERVICE PROVIDERS V/S 3-DAYS LIVE MEASUREMENT:**

**1. BROADBAND UTILIZATION/THROUGHPUT POP TO ISP GATEWAY NODE:**



All Operators are meeting the benchmarks except Pacenet.

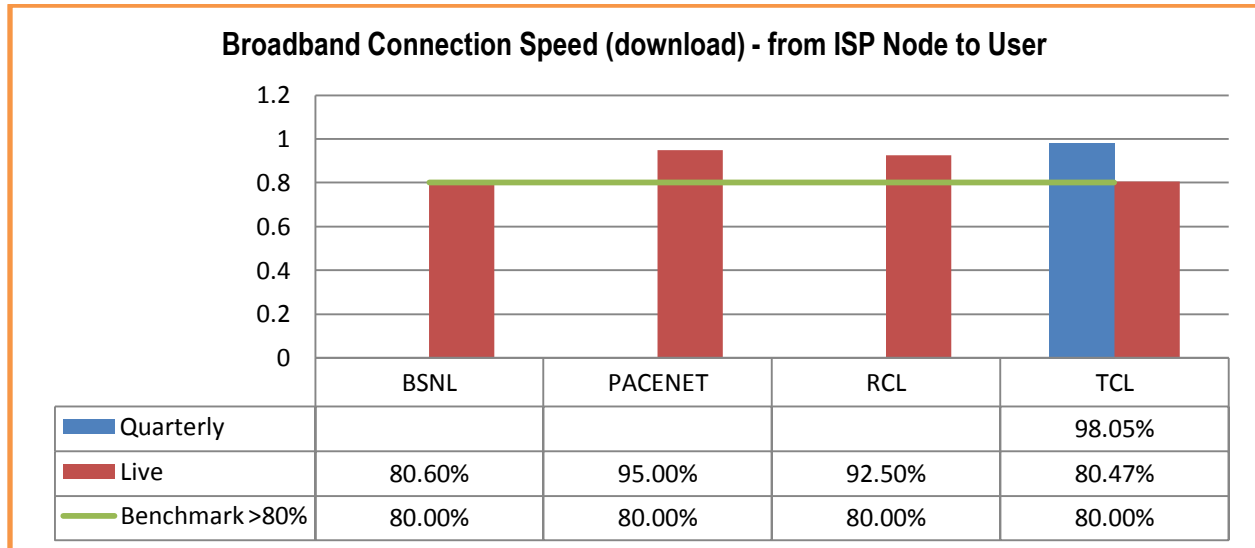
**2. BROADBAND UTILIZATION/THROUGHPUT ISP GATEWAY NODE TO IGSP/NIXI NODE:**



All Operators are meeting the benchmarks.

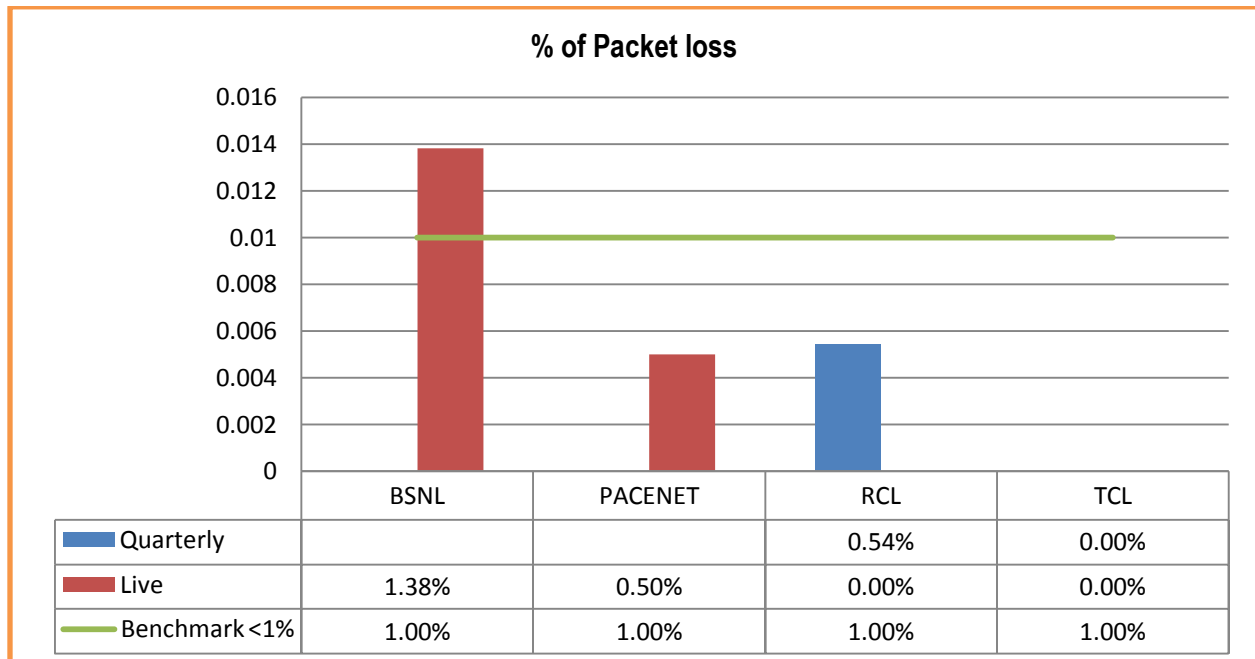


**3. BROADBAND CONNECTION SPEED (DOWNLOAD) FROM ISP NODE TO USER:**



All Operators are meeting the benchmarks.

**4. PACKET LOSS:**

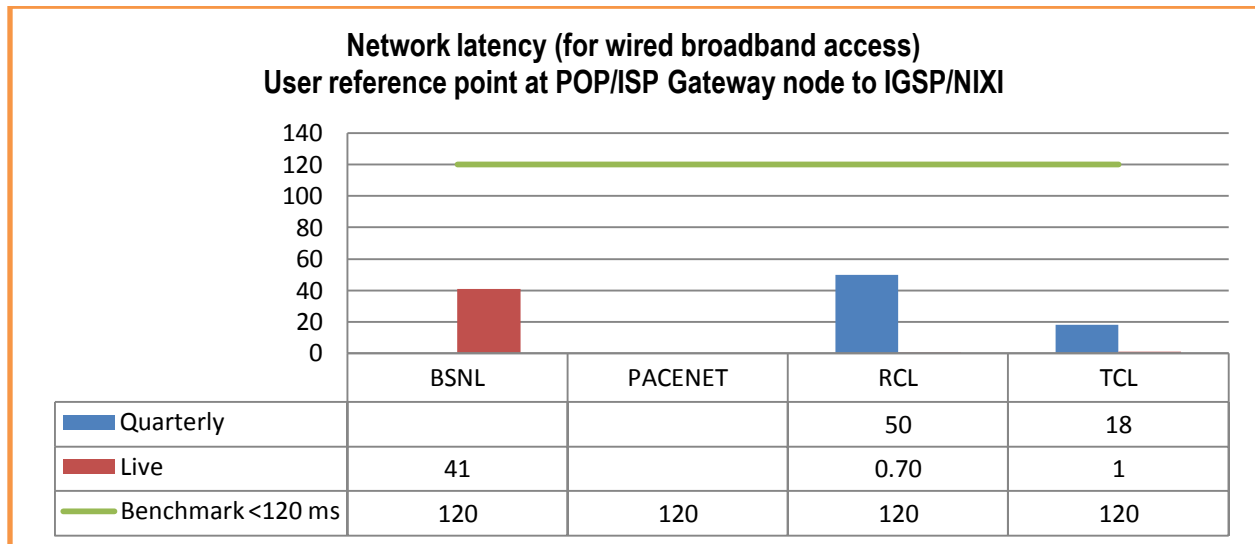


All Operators are meeting the benchmarks except BSNL.



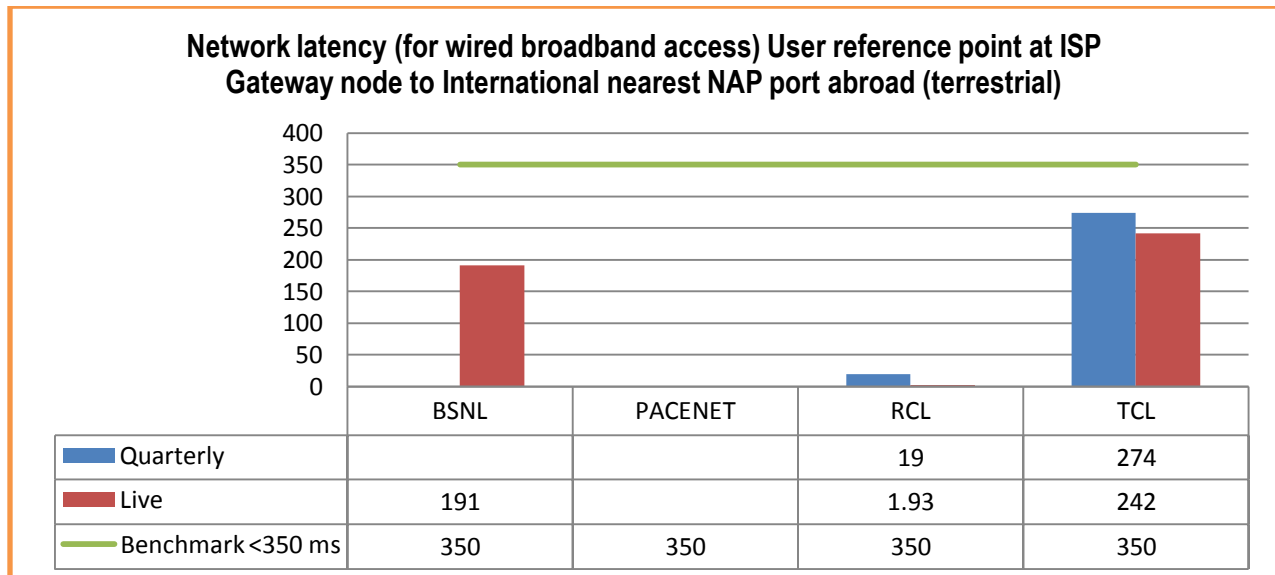


**5. NETWORK LATENCY USER REFERENCE POINT AT POP/ISP GATEWAY NODE TO IGSP/NIXI:**



All Operators are meeting the benchmarks.

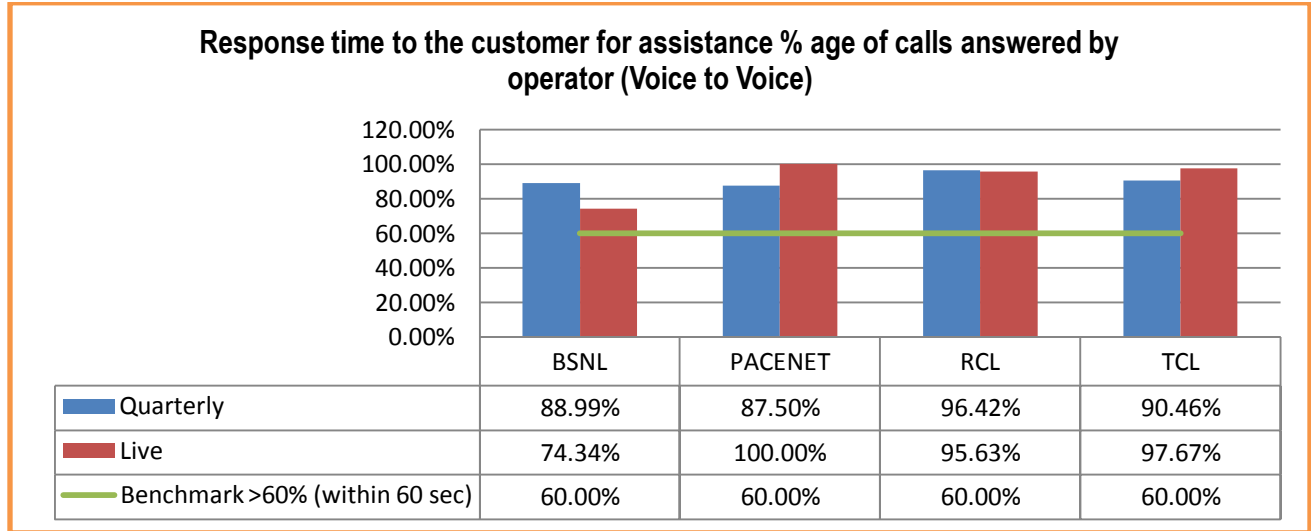
**6. NETWORK LATENCY USER REFERENCE POINT AT ISP GATEWAY NODE TO INTERNATIONAL NEAREST NAP PORT ABROAD (TERRESTRIAL):**



All Operators are meeting the benchmarks.

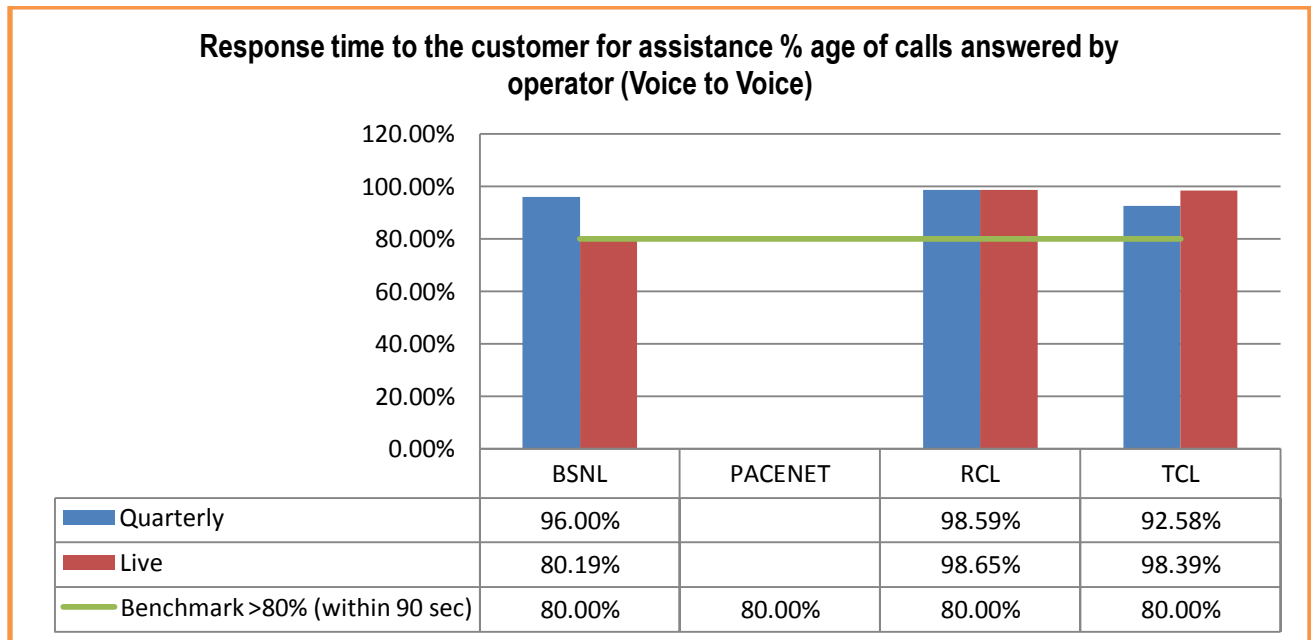


**7. RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE ACCESSIBILITY BY OPERATOR WITHIN 60 SECONDS:**



All Operators are meeting the benchmarks.

**8. RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE ACCESSIBILITY BY OPERATOR WITHIN 90 SECONDS:**



All Operators are meeting the benchmarks.

Annex-1



**List of BSNL telephone exchanges audited during QE March 2014.**

S No	Circle	Name of Wireline Provider	SSA Covered	SDCA Covered	Type of Exchange	Name of Main Exchange
1	HP	BSNL	Solan	Solan	Urban	Solan BSNL OCB
2	HP	BSNL	Solan	Solan	Rural	BSNL KANDAGHAT
3	HP	BSNL	Solan	Solan	Rural	BSNL JAUNJI
4	HP	BSNL	Solan	Solan	Rural	BSNL OACHGHAT
5	HP	BSNL	Solan	Solan	Rural	BSNL DHARAT
6	HP	BSNL	Solan	Solan	Rural	BSNL GAURA
7	HP	BSNL	Solan	Solan	Rural	BSNL DHARAMPUR
8	HP	BSNL	Solan	Solan	Rural	BSNL JABLI
9	HP	BSNL	Solan	Solan	Rural	BSNL SANAWAR
10	HP	BSNL	Solan	Solan	Rural	BSNL SALAGRA
11	HP	BSNL	Shimla	Shimla	Urban	BSNL OCB
12	HP	BSNL	Shimla	Theog	Rural	BSNL MATIANA
13	HP	BSNL	Shimla	Shimla	Rural	BSNL SHOGHI
14	HP	BSNL	Shimla	Theog	Rural	BSNL SANDHU
15	HP	BSNL	Shimla	Shimla	Rural	BSNL MASHOBRA
16	HP	BSNL	Shimla	Shimla	Rural	BSNL DHAMI
17	HP	BSNL	Shimla	Shimla	Rural	BSNL GHANAHATTI
18	HP	BSNL	Shimla	Theog	Rural	BSNL FAGU
19	HP	BSNL	Shimla	Shimla	Rural	BSNL DURGAPUR
20	HP	BSNL	Shimla	Shimla	Rural	BSNL JUNGA
21	HP	BSNL	Dharmshala	Dharmshala	Urban	BSNL OCB
22	HP	BSNL	Dharmshala	Palampur	Rural	BSNL BAIJNATH
23	HP	BSNL	Dharmshala	Palampur	Rural	BSNL BHAWARNA
24	HP	BSNL	Dharmshala	Palampur	Rural	BSNL DHEERA
25	HP	BSNL	Dharmshala	Palampur	Rural	BSNL GOPALPUR
26	HP	BSNL	Dharmshala	Palampur	Rural	BSNL MARANDA
27	HP	BSNL	Dharmshala	Palampur	Rural	BSNL PANCHRUKHI
28	HP	BSNL	Dharmshala	Palampur	Rural	BSNL PAPROLA
29	HP	BSNL	Dharmshala	Palampur	Rural	BSNL PAROUR
30	HP	BSNL	Dharmshala	Palampur	Rural	BSNL SULLAH
31	HP	BSNL	Mandi	Mandi	Urban	BSNL MANDI
32	HP	BSNL	Mandi	Mandi	Rural	BSNL BHANGROTU
33	HP	BSNL	Mandi	Mandi	Rural	BSNL BIR
34	HP	BSNL	Mandi	Sundernagar	Rural	BSNL JAROL
35	HP	BSNL	Mandi	Mandi	Rural	BSNL KATHALAG



36	HP	BSNL	Mandi	Mandi	Rural	BSNL KOTLI
37	HP	BSNL	Mandi	Mandi	Rural	BSNL CHANDYAL
38	HP	BSNL	Mandi	Mandi	Rural	BSNL RANDHARA
39	HP	BSNL	Mandi	Sundernagar	Rural	BSNL SALAAPER
40	HP	BSNL	Mandi	Mandi	Rural	BSNL PANDOH
41	HP	BSNL	Kullu	Kullu	Urban	BSNL KULLU
42	HP	BSNL	Kullu	Kullu	Rural	BSNL JARI
43	HP	BSNL	Kullu	Kullu	Rural	BSNL MANIKARAN
44	HP	BSNL	Kullu	Kullu	Rural	BSNL SHAMSI
45	HP	BSNL	Kullu	Kullu	Rural	BSNL GARSA
46	HP	BSNL	Kullu	Kullu	Rural	BSNL KATRAIN
47	HP	BSNL	Kullu	Kullu	Rural	BSNL BANDROL
48	HP	BSNL	Kullu	Kullu	Rural	BSNL NAGGAR
49	HP	BSNL	Kullu	Kullu	Rural	BSNL RAISON
50	HP	BSNL	Kullu	Kullu	Rural	BSNL SHAMSI
51	HP	BSNL	Hamirpur	Hamirpur	Urban	BSNL HAMIRPUR
52	HP	BSNL	Hamirpur	Hamirpur	Rural	BSNL BARSAR
53	HP	BSNL	Hamirpur	Hamirpur	Rural	BSNL BIJHARI
54	HP	BSNL	Hamirpur	Hamirpur	Rural	BSNL GALORE
55	HP	BSNL	Hamirpur	Una	Rural	BSNL GINDPUR MALON
56	HP	BSNL	Hamirpur	Una	Rural	BSNL LOHARA
57	HP	BSNL	Hamirpur	Hamirpur	Rural	BSNL SALONI
58	HP	BSNL	Hamirpur	Hamirpur	Rural	BSNL TONI DEVI