



REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
BASIC TELEPHONE SERVICE (WIRELINER)
&
BROADBAND SERVICE
FOR
TELECOM REGULATORY AUTHORITY OF INDIA
NORTH ZONE – RAJASTHAN SERVICE AREA
(APRIL 2014 – JUNE 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 **Rajasthan circle** against the QoS bench marks laid down by TRAI in the respective regulations.



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1. BACKGROUND



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 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6th 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 (wire line) and Broadband service, a circle would be audited once in a year.

2. OBJECTIVES AND METHODOLOGY



2. OBJECTIVES AND METHODOLOGY

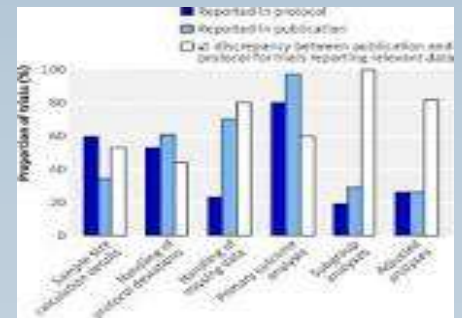
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was 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) and Broadband Services was also undertaken for Punjab, Rajasthan & Gujarat circles during the quarter April – June 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 operators were covered for QoS audit in Rajasthan circle.

Sl. No.	Service Provider	Dates of live measurement Audit			Audit Location
		April-14	May-14	June-14	
GSM Operators					
1	AIRCEL	7 to 9 April-14	2, 5 to 6 May-14	6, 9 to 10 June-14	Aircel limited, 1st & 2nd Floor, Navajyoti, Amrapali Circle,C-Block,Vaishali Nagar, Jaipur-302021
2	AIRTEL	7 to 9 April-14	17, 19 to 20 May-14	17 to 19 June-14	Bharti Hexacom Limited, K-21, Malviya Marg, c-scheme , Jaipur-302001
3	BSNL	9 to 11 April-14	5 to 7 May-14	18 to 20 June-14	Bharat Sanchar Nigam Ltd. (BSNL) Room no. 116, Bajaj Nagar MSC, First Floor, BSNL Bajaj Nagar, JLN marg, Jaipur- 302015
4	IDEA	9 to 11 April-14	3, 5 to 6 May-14	4 to 6 June-14	Idea Cellular Ltd. Plot-C, Sahkar Marg, Jaipur- 302001
5	RCOM GSM	8 to 10 April-14	6 to 8 May-14	4 to 6 June-14	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
6	TATA GSM	4 to 5, 7 April-14	5 to 7 May-14	9 to 11 June-14	Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021
7	VODAFONE	18, 21 to 22 April-14	19 to 21 May-14	9 to 11 June-14	Vodafone Ltd. 5th Floor,Gaurav Tower,Malviya Nagar jaipur, -302017
CDMA Operators					
8	MTS	1 to 3 April-14	1 to 2, 5 May-14	9 to 11 June-14	Sistema Shyam Teleservices Ltd. 3, MTS Tower, Amrapali Circle Vaishali Nagar, Jaipur.
9	RCOM CDMA	8 to 10 April-14	6 to 8 May-14	4 to 6 June-14	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
10	TATA CDMA	4 to 5, 7 April-14	5 to 7 May-14	9 to 11 June-14	Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021

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

The data generated by monthly PMR and 3-days live measurements audit for the period April 2014 to June 2014 has been successfully uploaded to the server located at TRAI premises.

3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. Based on this criterion, the QoS audit for basic (wire line) service is undertaken for assessment of quarterly performance of the service providers for quarter ended June-2014. **Out of 2183 (present no. of BSNL exchanges), audit was done for 107 sampled (16 -Urban and 91-Rural) exchanges**, 1 exchange each of Bharti, Sistema Shyam, RCL & Vodafone and 2 exchanges of TTL. As Rajasthan Circle is having 251 SDCAs, so 107 BSNL exchanges spread over 25 SDCAs (10% of total 251 SDCAs) have been taken for audit. List of BSNL exchanges undertaken for QoS audit is attached as Annex-1.

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

TUV-SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle. Based on these criteria, 110 no. of PoPs i.e. 5% of 2183 PoPs/Exchanges, spread over 10% SDCAs have been taken for QoS audit.

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

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.

Essence of compliance report of service providers with respect to the QoS:

1. Cellular Mobile Service:

(i) From the months’ audit and 3 days live assessment, it was revealed that the performance of the service providers in Rajasthan Service area was satisfactory for network related parameters except for one parameter namely ‘Worst affected cells having > 3% TCH drop’ which could not be met by **Tata Tele Services (TTSL), Tata (GSM) and Tata (CDMA)** could not meet the benchmark of this parameter with their achievement as **3.99% (April-14), 3.81% (May-14) & 3.99% (June-14)** and **5.03%, 4.60% & 4.50%** respectively. The average performance of **Tata (GSM) and Tata (CDMA)** for this parameter was **3.93% and 4.71%** respectively.

The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed in 3 days monthly live measurements during the quarter.

(ii) With regard to the **Customer Service Quality Parameters**, it is revealed that all operators except BSNL are in well compliance of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, the performance of **BSNL and Tata (CDMA)** in respect of parameters **‘% billing complaints (postpaid)’** and **‘Resolution of billing complaints resolved within 4 weeks’** was **0.23% and 99.20%** respectively. With respect to parameter **Call answered by operators (voice to voice)**, only **Airtel** failed to meet the benchmark with its performance as **89.57%**.

In case of the parameter **“Time taken for refund of deposits after closures”**, Only **Aircel** failed to meet the benchmark with its performance as **99.84%**.

In case of the parameter **“Request for Termination / Closure of Service”**, Only **Idea** failed to meet the benchmark with its performance as **99.94%**.

(iii) The performance of the service providers with respect to the Drive Test revealed that all the service providers performed well within the QoS norms. **BSNL** was the only operator which could not meet the benchmarks of the prime network parameters namely Call Drop Rate, Voice Quality and CSSR at different locations across **Bundi, Bhilwara and Jhalawar SSAs**. Apart from this, **Tata (GSM)** also could not meet the benchmark of **Voice Quality** across **Jaipur SSA**.

2. Basic (wireline) Service:

From the audit findings, it was concluded that the performance of **BSNL** was not satisfactory in respect of the parameters Fault incidences, Fault Repairs/Restoration Time, Metering & Billing Performance, Response time to customer for assistance and Termination/Closure with its non-complied performance as **6.26%**, **99.67%** for fault repaired within 3 days in urban areas and **99.80%** in rural areas, **0.21%**, **18.33%** (very poor performance) and **99.25%** respectively. The performance of the other Service providers was well within TRAI norms.

3. Broadband Service:

The QoS audit of the Broadband service revealed that the majority of the operators are largely meeting the benchmarks. However, some of the service providers have not met the benchmark as detailed below:

BSNL: Could not meet the benchmark of “% age calls answered by the operator within 60 seconds” and “% age calls answered by the operator within 90 seconds”; its achievement level was **14.52%** and **20.82%** respectively.

Pacenet: Pacenet not met the benchmark of ‘fault Repair by next working day’ with its achievement level as **85.11%**.

NSTPL: Could not meet the benchmark for the parameter “POP to ISP Gateway Node [Intra-network] Link(s)”, “%age International Bandwidth utilization during peak hours” and “Service Availability /Uptime”, its achievement level was **83.10%**, **83.10%** and **84.03%** respectively.

Tikona: Could not meet the benchmark for the parameter “POP to ISP Gateway Node [Intra-network] Link(s)”, its achievement level was **81.59%**.

TTSL: Could not meet the benchmark for the parameter “%age International Bandwidth utilization during peak hours” with its achievement level was **96.80%**.

5. PMR AUDIT REPORT



5. PMR AUDIT REPORTS:

5.1 MONTHLY PMR:

5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	June- 2014	20:00 - 21:00
2	AIRTEL	June- 2014	20:00 - 21:00
3	BSNL	June- 2014	19:00 - 20:00
4	IDEA	June- 2014	20:00 - 21:00
5	RCOM GSM	June- 2014	20:00 - 21:00
6	TATA GSM	June- 2014	20:00 - 21:00
7	VODAFONE	June- 2014	20:00 - 21:00
CDMA Operators			
8	MTS	June- 2014	20:00 - 21:00
9	RCOM CDMA	June- 2014	19:00 - 20:00
10	TATA CDMA	June- 2014	20:00 - 21:00

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

5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
GSM Operators						
1	AIRCEL	2	11	1618	NSN	NSN
2	AIRTEL	43	82	7833	Ericsson	Ericsson
3	BSNL	15	51	3895	Ericsson	NSN & Ericsson
4	IDEA	11	42	5574	Ericsson	Ericsson
5	RCOM GSM	4	15	2129	Huawei	Huawei
6	TATA GSM	3	12	1400	Huawei	Huawei
7	VODAFONE	12	85	6684	NSN	NSN
CDMA Operators						
8	MTS	2	6	1604	ZTE	ZTE
9	RCOM CDMA	6	6	943	Huawei, Lucent, Ericsson & ZTE	Huawei & Lucent
10	TATA CDMA	5	6	692	Ericsson & Huawei	Huawei & Motorola

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – APRIL-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE- APRIL-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Apr-14	0.12%	0.06%	1.78%	0.09%	0.31%	0.09%	0.03%	0.51%	0.07%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Apr-14	0.26%	0.19%	1.86%	0.04%	0.36%	0.00%	0.11%	0.97%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	97.27%	98.86%	98.64%	99.24%	99.59%	98.59%	99.78%	98.70%	99.22%	97.20%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	0.23%	0.18%	0.73%	0.31%	0.03%	0.12%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.56%	0.39%	1.45%	0.40%	0.07%	0.05%	0.22%	0.01%	0.15%	1.72%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Apr-14	0.68%	0.78%	1.30%	1.10%	0.27%	0.60%	0.68%	0.12%	0.61%	0.60%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	2.27%	1.02%	1.65%	1.79%	0.04%	3.99%	1.93%	0.44%	1.49%	5.03%
	c) Connections with good voice quality	>=95%	Apr-14	97.21%	99.02%	98.30%	96.19%	98.69%	98.60%	97.38%	99.73%	99.20%	98.85%
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	1	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – MAY-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE- MAY-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	May-14	0.29%	0.07%	1.75%	0.11%	0.36%	0.16%	0.04%	0.55%	0.12%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	May-14	1.00%	0.15%	1.86%	0.07%	0.68%	0.29%	0.08%	1.64%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	97.25%	98.80%	98.74%	99.05%	99.57%	98.52%	99.78%	98.61%	99.15%	97.28%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	0.41%	0.18%	0.74%	0.37%	0.03%	0.32%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.63%	0.42%	1.44%	0.38%	0.08%	0.05%	0.22%	0.01%	0.19%	1.75%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Apr-14	0.68%	0.78%	1.31%	1.02%	0.40%	0.60%	0.64%	0.14%	0.62%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	2.38%	1.08%	1.72%	1.69%	0.04%	3.81%	1.82%	0.34%	1.48%	4.60%
	c) Connections with good voice quality	>=95%	Apr-14	97.09%	98.99%	98.32%	96.34%	98.66%	98.51%	97.39%	99.72%	99.18%	98.84%
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	1	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE- JUNE-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Jun-14	0.28%	0.05%	1.78%	0.10%	0.32%	0.14%	0.04%	0.31%	0.06%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Jun-14	1.05%	0.14%	1.80%	0.07%	0.99%	0.00%	0.12%	0.53%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	97.24%	99.00%	98.65%	99.36%	99.60%	98.53%	99.85%	98.96%	99.18%	97.84%
	b) SDCCH/PAGING Channel congestion	<=1%	Jun-14	0.31%	0.15%	0.80%	0.25%	0.03%	0.04%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	0.56%	0.33%	1.48%	0.35%	0.07%	0.05%	0.16%	0.01%	0.16%	1.16%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Jun-14	0.73%	0.80%	1.33%	1.01%	0.37%	0.63%	0.64%	0.16%	0.61%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-14	2.71%	1.23%	1.97%	1.69%	0.05%	3.99%	2.02%	1.05%	1.57%	4.50%
	c) Connections with good voice quality	>=95%	Jun-14	96.99%	98.99%	98.40%	96.33%	98.76%	98.40%	97.43%	99.73%	99.18%	98.90%
4	No. of POI's having >=0.5% POI congestion		Jun-14	0	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE-14 (APRIL TO JUNE MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE- JUNE-14) - RAJASTHAN CIRCLE

PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.23%	0.06%	1.77%	0.10%	0.33%	0.13%	0.04%	0.46%	0.08%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.77%	0.16%	1.84%	0.06%	0.68%	0.10%	0.10%	1.05%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.25%	98.89%	98.68%	99.22%	99.59%	98.55%	99.80%	98.76%	99.18%	97.44%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.32%	0.17%	0.76%	0.31%	0.03%	0.16%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.58%	0.38%	1.46%	0.38%	0.07%	0.05%	0.20%	0.01%	0.17%	1.54%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.70%	0.79%	1.31%	1.04%	0.35%	0.61%	0.65%	0.14%	0.61%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.45%	1.11%	1.78%	1.72%	0.04%	3.93%	1.92%	0.61%	1.51%	4.71%
	c) Connections with good voice quality	>=95%	Quarterly	97.10%	99.00%	98.34%	96.29%	98.70%	98.50%	97.40%	99.73%	99.19%	98.86%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	1	0	0	0

5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

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 Rajasthan circle, **all the operators were found meeting benchmark on 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.

PMR audit revealed that all operators met the benchmark, prescribed for 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 paging 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.**

POI Congestion: With respect to this parameter, **Vodafone** was found to have congestion on **1 POI (BSNL L1 Tax Jaipur)** in the months of April and May 2014.

- **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 0.14%) 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 met the benchmark for this parameter except **Tata Tele Services (TTSL)**. **Tata (GSM)** and **Tata (CDMA)** could not meet the benchmark of this parameter with their achievement as **3.99% (Apr-14)**, **3.81% (May-14)** & **3.99% (Jun-14)** and **5.03%**, **4.60%** and **4.50%** during the respective months of the quarter. The average performance of **Tata (GSM)** and **Tata (CDMA)** for this parameter was **3.93%** and **4.71%** respectively.

Aircel has provided the data on monthly basis but not on daily basis as required for audit.

- 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 indicate that **all operators have met the bench mark during the quarter**.

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



5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):

5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – APRIL-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- APRIL-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.19%	0.05%	1.74%	0.07%	0.29%	0.07%	0.05%	0.45%	0.03%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.04%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.37%	98.94%	98.89%	99.37%	99.51%	98.65%	99.77%	99.30%	99.05%	98.10%
	b) SDCCCH/PAGING Channel congestion	<=1%	Live data	0.11%	0.16%	0.87%	0.08%	0.02%	0.03%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.35%	0.37%	1.45%	0.29%	0.07%	0.04%	0.23%	0.00%	0.23%	0.91%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.65%	0.75%	1.30%	1.09%	0.22%	0.58%	0.70%	0.07%	0.63%	0.62%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.00%	0.99%	2.19%	1.75%	0.03%	3.52%	2.02%	0.37%	1.58%	4.96%
	c) Connections with good voice quality	>=95%	Live data	97.26%	99.06%	98.33%	96.23%	98.68%	98.61%	97.34%	99.74%	99.21%	98.89%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0

5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – MAY-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- MAY-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.25%	0.05%	1.91%	0.15%	0.32%	0.05%	0.02%	0.56%	0.07%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.04%	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.40%	98.93%	98.59%	99.29%	99.60%	98.60%	99.80%	98.24%	99.20%	97.21%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.56%	0.13%	0.71%	0.55%	0.04%	0.02%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.62%	0.37%	1.55%	0.39%	0.09%	0.04%	0.20%	0.03%	0.14%	1.82%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.66%	0.81%	1.31%	1.02%	0.39%	0.58%	0.62%	0.11%	0.65%	0.55%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.37%	1.16%	2.10%	1.60%	0.02%	3.74%	1.74%	0.41%	1.65%	4.31%
	c) Connections with good voice quality	>=95%	Live data	97.15%	98.96%	98.00%	96.34%	98.66%	98.58%	97.44%	99.72%	99.19%	98.80%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0

5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – JUNE-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- JUNE-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.28%	0.06%	1.85%	0.13%	0.24%	0.11%	0.05%	0.26%	0.04%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.03%	0.21%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.26%	99.09%	98.70%	99.16%	99.65%	98.57%	99.86%	98.98%	99.24%	98.41%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.46%	0.16%	0.69%	0.44%	0.02%	0.02%	0.14%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.74%	0.28%	1.55%	0.54%	0.06%	0.03%	0.14%	0.01%	0.12%	0.71%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.70%	0.79%	1.32%	1.03%	0.34%	0.59%	0.59%	0.20%	0.58%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.64%	1.12%	2.07%	1.76%	0.02%	3.41%	1.71%	1.03%	1.48%	4.73%
	c) Connections with good voice quality	>=95%	Live data	96.94%	99.00%	98.67%	96.25%	98.74%	98.43%	97.55%	99.73%	99.18%	98.91%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	1	0	0	0

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF APRIL TO JUNE)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-JUNE-14) – RAJASTHAN CIRCLE													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.24%	0.05%	1.83%	0.12%	0.28%	0.08%	0.04%	0.42%	0.05%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.04%	0.22%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.34%	98.99%	98.73%	99.27%	99.59%	98.61%	99.81%	98.84%	99.16%	97.91%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.38%	0.15%	0.76%	0.36%	0.03%	0.02%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.57%	0.34%	1.52%	0.41%	0.07%	0.04%	0.19%	0.01%	0.16%	1.15%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.67%	0.78%	1.31%	1.05%	0.32%	0.58%	0.64%	0.13%	0.62%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.34%	1.09%	2.12%	1.70%	0.02%	3.56%	1.82%	0.60%	1.57%	4.67%
	c) Connections with good voice quality	>=95%	Quarterly	97.12%	99.01%	98.33%	96.27%	98.69%	98.54%	97.44%	99.73%	99.19%	98.87%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	1	0	0	0

5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it is found that the performance of all operators is satisfactory as they have largely met the benchmarks except the parameter ‘Worst affected cells> 3 % TCH drops’, which could not be complied with by Tata (GSM) and Tata (CDMA) in all the three months of this quarter. The average performance of Tata (GSM) and Tata (CDMA) for this parameter was 3.56% and 4.67% respectively. The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for monthly audit of the quarter.

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- April-14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		Apr-14	1547	7811	3871	5543	2212	1400	6627	1341	1596	688
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Apr-14	1369	3462	49733	3769	4931	895	1360	4953	778	180
	c) BTS Accumulated Downtime	<=2%	Apr-14	0.12%	0.06%	1.78%	0.09%	0.31%	0.09%	0.03%	0.51%	0.07%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-14	4	15	72	2	8	0	7	13	0	0
	e) Worst affected BTSs due to downtime	<=2%	Apr-14	0.26%	0.19%	1.86%	0.04%	0.36%	0.00%	0.11%	0.97%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	97.27%	98.86%	98.64%	99.24%	99.59%	98.59%	99.78%	98.70%	99.22%	97.20%
	b) SDCCH/PAGING Congestion	<=1%	Apr-14	0.23%	0.18%	0.73%	0.31%	0.03%	0.12%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.56%	0.39%	1.45%	0.40%	0.07%	0.05%	0.22%	0.01%	0.15%	1.72%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Apr-14	0.68%	0.78%	1.30%	1.10%	0.27%	0.60%	0.68%	0.12%	0.61%	0.60%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-14	2.27%	1.02%	1.65%	1.79%	0.04%	3.99%	1.93%	0.44%	1.49%	5.03%
	c) % of connections with good voice quality	>=95%	Apr-14	97.21%	99.02%	98.30%	96.19%	98.69%	98.60%	97.38%	99.73%	99.20%	98.85%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Apr-14	105	238	162	301	3	168	391	18	76	111
	e) Total no. of cells (Sector) in the licensed service area		Apr-14	4616	23342	9823	16815	6569	4201	20220	4016	5090	2204
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	1	0	0	0
	Name of POI not meeting the benchmark		Apr-14	0	0	0	0	0	0	BSNL L1 Tax Jaipur	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Apr-14	81600	445935	265400	229546	102000	68372	267935	116000	97000	170355
	b) Total traffic in TCBH in erlang (Avg.)		Apr-14	88047	411634	113734	173860	93114	28684	261403	46430	68329	32528
	c) Total no. of customers served (as per VLR) on last day of the month		Apr-14	3150432	15300564	2709239	6358202	4773755	613644	9762546	991145	1249682	399910

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- April-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	1525	7802	3852	5473	2212	1400	6626	1340	1592	688
	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	208	266	4833	281	456	75	230	438	37	2
	c) BTS Accumulated Downtime	<=2%	Live data	0.19%	0.05%	1.74%	0.07%	0.29%	0.07%	0.05%	0.45%	0.03%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	3	7	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.04%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.37%	98.94%	98.89%	99.37%	99.51%	98.65%	99.77%	99.30%	99.05%	98.10%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.11%	0.16%	0.87%	0.08%	0.02%	0.03%	0.13%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.35%	0.37%	1.45%	0.29%	0.07%	0.04%	0.23%	0.00%	0.23%	0.91%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.65%	0.75%	1.30%	1.09%	0.22%	0.58%	0.70%	0.07%	0.63%	0.62%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.00%	0.99%	2.19%	1.75%	0.03%	3.52%	2.02%	0.37%	1.58%	4.96%
	c) % of connections with good voice quality	>=95%	Live data	97.26%	99.06%	98.33%	96.23%	98.68%	98.61%	97.34%	99.74%	99.21%	98.89%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	91	231	215	294	2	148	408	15	80	109
e) Total no. of cells (Sector) in the licensed service area		Live data	4546	23341	9823	16773	6569	4201	20224	4016	5071	2204	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	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	0

TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- May-14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		May-14	1593	7822	3871	5555	2213	1400	6635	1341	1597	688
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		May-14	3455	4110	50304	4670	5892	1631	2104	5470	1475	230
	c) BTS Accumulated Downtime	<=2%	May-14	0.29%	0.07%	1.75%	0.11%	0.36%	0.16%	0.04%	0.55%	0.12%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-14	16	12	72	4	15	4	5	22	0	0
	e) Worst affected BTSs due to downtime	<=2%	May-14	1.00%	0.15%	1.86%	0.07%	0.68%	0.29%	0.08%	1.64%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	May-14	97.25%	98.80%	98.74%	99.05%	99.57%	98.52%	99.78%	98.61%	99.15%	97.28%
	b) SDCCH/PAGING Congestion	<=1%	May-14	0.41%	0.18%	0.74%	0.37%	0.03%	0.32%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	0.63%	0.42%	1.44%	0.38%	0.08%	0.05%	0.22%	0.01%	0.19%	1.75%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	May-14	0.68%	0.78%	1.31%	1.02%	0.40%	0.60%	0.64%	0.14%	0.62%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	May-14	2.38%	1.08%	1.72%	1.69%	0.04%	3.81%	1.82%	0.34%	1.48%	4.60%
	c) % of connections with good voice quality	>=95%	May-14	97.09%	98.99%	98.32%	96.34%	98.66%	98.51%	97.39%	99.72%	99.18%	98.84%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		May-14	112	254	169	288	2	160	368	14	76	101
	e) Total no. of cells (Sector) in the licensed service area		May-14	4697	23393	9823	17016	6579	4201	20229	4019	5109	2204
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		May-14	0	0	0	0	0	0	1	0	0	0
	Name of POI not meeting the benchmark		May-14	0	0	0	0	0	0	BSNL L1 Tax Jaipur	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		May-14	85454	442613	265400	231257	102000	68224	267567	116000	97000	170355
	b) Total traffic in TCBH in erlang (Avg.)		May-14	86767	403779	110150	170877	84078	27344	255307	40897	65104	30480
	c) Total no. of customers served (as per VLR) on last day of the month		May-14	3121469	14822790	2696883	6321848	4737682	583266	8672252	948509	1259058	404345

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- May-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	1561	7820	3871	5543	2212	1400	6630	1340	1597	688
	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	280	286	5320	594	515	54	94	544	77	13
	c) BTS Accumulated Downtime	<=2%	Live data	0.25%	0.05%	1.91%	0.15%	0.32%	0.05%	0.02%	0.56%	0.07%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	3	10	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.04%	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.40%	98.93%	98.59%	99.29%	99.60%	98.60%	99.80%	98.24%	99.20%	97.21%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.56%	0.13%	0.71%	0.55%	0.04%	0.02%	0.05%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.62%	0.37%	1.55%	0.39%	0.09%	0.04%	0.20%	0.03%	0.14%	1.82%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.66%	0.81%	1.31%	1.02%	0.39%	0.58%	0.62%	0.11%	0.65%	0.55%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.37%	1.16%	2.10%	1.60%	0.02%	3.74%	1.74%	0.41%	1.65%	4.31%
	c) % of connections with good voice quality	>=95%	Live data	97.15%	98.96%	98.00%	96.34%	98.66%	98.58%	97.44%	99.72%	99.19%	98.80%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	110	272	207	273	1	157	353	17	84	95
e) Total no. of cells (Sector) in the licensed service area		Live data	4654	23398	9823	16998	6575	4201	20239	4019	5106	2204	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	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	0

TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- June-14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Jun-14	1618	7833	3895	5574	2129	1400	6684	943	1604	692
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jun-14	3242	3066	49952	3927	4972	1421	2043	2131	668	248
	c) BTS Accumulated Downtime	<=2%	Jun-14	0.28%	0.05%	1.78%	0.10%	0.32%	0.14%	0.04%	0.31%	0.06%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-14	17	11	70	4	21	0	8	5	0	0
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	97.24%	99.00%	98.65%	99.36%	99.60%	98.53%	99.85%	98.96%	99.18%	97.84%
	b) SDCCH/PAGING Congestion	<=1%	Jun-14	0.31%	0.15%	0.80%	0.25%	0.03%	0.04%	0.11%	0.00%	0.00%	0.00%
3	Connection Maintenance (Retainability)												
	c) TCH congestion	<=2%	Jun-14	0.56%	0.33%	1.48%	0.35%	0.07%	0.05%	0.16%	0.01%	0.16%	1.16%
	a) Call Drop Rate (CDR)	<=2%	Jun-14	0.73%	0.80%	1.33%	1.01%	0.37%	0.63%	0.64%	0.16%	0.61%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-14	2.71%	1.23%	1.97%	1.69%	0.05%	3.99%	2.02%	1.05%	1.57%	4.50%
	c) % of connections with good voice quality	>=95%	Jun-14	96.99%	98.99%	98.40%	96.33%	98.76%	98.40%	97.43%	99.73%	99.18%	98.90%
4	No. of POI's having >=0.5% POI congestion												
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-14	130	287	194	287	3	168	411	36	81	99
5	Network Data												
	e) Total no. of cells (Sector) in the licensed service area		Jun-14	4781	23421	9823	17049	6430	4200	20315	3422	5143	2208
	a) Equipped Capacity of Network in Erlang		Jun-14	86502	440838	265400	232733	102000	68178	269462	116000	97000	170642
5	b) Total traffic in TCBH in erlang (Avg.)		Jun-14	86053	391620	106804	167020	79003	28321	244381	27788	65261	26468
	c) Total no. of customers served (as per VLR) on last day of the month		Jun-14	3270847	14750493	2694765	6337565	4870423	576909	9684178	943330	1263344	402093

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- June-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		Live data	1605	7829	3882	5557	2213	1400	6644	1341	1601	688
	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	319	316	5179	536	382	114	253	255	48	36
	c) BTS Accumulated Downtime	<=2%	Live data	0.28%	0.06%	1.85%	0.13%	0.24%	0.11%	0.05%	0.26%	0.04%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	2	8	0	0	0	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.03%	0.21%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.26%	99.09%	98.70%	99.16%	99.65%	98.57%	99.86%	98.98%	99.24%	98.41%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.46%	0.16%	0.69%	0.44%	0.02%	0.02%	0.14%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.74%	0.28%	1.55%	0.54%	0.06%	0.03%	0.14%	0.01%	0.12%	0.71%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.70%	0.79%	1.32%	1.03%	0.34%	0.59%	0.59%	0.20%	0.58%	0.44%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.64%	1.12%	2.07%	1.76%	0.02%	3.41%	1.71%	1.03%	1.48%	4.73%
	c) % of connections with good voice quality	>=95%	Live data	96.94%	99.00%	98.67%	96.25%	98.74%	98.43%	97.55%	99.73%	99.18%	98.91%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	126	262	204	300	1	143	346	41	76	104
	e) Total no. of cells (Sector) in the licensed service area		Live data	4790	23419	9823	17047	6581	4201	20287	4019	5135	2204
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	1	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	BSNL L1 Tax	0	0	0

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS



5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE JUNE-14:

5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE JUNE-14

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S / N	Name of Parameter			GSM Operators							CDMA Operators		
1 Metering & Billing Credibility -Post Paid													
	A) No. of bills issued during the quarter		RAJ	41848	246808	127346	61973	33977	NA	409138	55994	66045	45810
	B) No. of bills disputed including billing complaints during the quarter		RAJ	21	27	304	39	29	NA	327	38	62	0
	C)% of billing complaints during the quarter	<= 0.1%	RAJ	0.05%	0.01%	0.23%	0.06%	0.09%	NA	0.08%	0.07%	0.09%	0.00%
2 Metering & Billing Credibility -Pre Paid													
	A) Total No. of Pre-paid customers at the end of the quarter		RAJ	4766683	15717129	5778491	6063973	4795210	968872	9883831	2100443	887637	685878
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		RAJ	21	242	1866	775	4787	13	3128	289	539	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	RAJ	0.00%	0.00%	0.03%	0.01%	0.10%	0.00%	0.03%	0.01%	0.06%	0.00%
3 Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints													
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		RAJ	42	270	2170	1766	4816	13	3456	328	600	42
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		RAJ	42	270	2170	1766	4816	13	3456	328	600	41



CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE JUNE-14

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S / N	Name of Parameter			GSM Operators							CDMA Operators		
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	RAJ	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.20%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	RAJ	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	Response time to customers for assistance												
	A) Total no of calls attempted to customer care/Call center		RAJ	6390456	1463819	105898	576338	10460321	52917	6984507	2572127	556418	402755
	B) Total no. of calls successfully established to customer care/Call center		RAJ	6239779	1463421	102965	573243	10337878	51111	6984507	2484715	545623	388876
	C) % Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	>=95%	RAJ	97.64%	99.97%	97.23%	99.46%	98.83%	96.59%	100.00%	96.60%	98.06%	96.55%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		RAJ	1628663	3525672	34510	2603595	882674	48890	2363463	1224214	110053	50424
	E) Total number of calls answered by the operator (Voice to voice) within 60 seconds		RAJ	1472338	3157937	34348	2566229	822894	45820	2230949	1159079	104906	48390
	F) % age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec. *100 / Total call attempt)	>=90%	RAJ	90.40%	89.57%	99.53%	98.56%	93.23%	93.72%	94.39%	94.68%	95.32%	95.97%
5	Termination/closure of service												
	A) Total No. of requests for Termination / Closure of service received during the quarter		RAJ	324	588	1550	602	340	NA	2777	1064	255	165



CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE JUNE-14

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S / N	Name of Parameter			GSM Operators							CDMA Operators		
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		RAJ	324	588	1550	602	340	NA	2777	1064	255	165
	C) % of Termination/ Closure of service within 7 days	<=7days	RAJ	100.00%	100.00%	100.00%	99.94%	100.00%	NA	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		RAJ	207	425	387	466	150	NA	4460	155	232	393
	B) No. of Payments/ Refunds Cleared during the quarter		RAJ	207	425	387	466	150	NA	4460	155	232	393
	C) Time taken for refunds of deposits after closures.	100% within 60 days	RAJ	99.84%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%



5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-JUNE-14													
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE													
1	Total no of calls attempted to customer care/Call center		Rajasthan	215422	45940	3233	19124	364093	23022	245943	96752	18148	12596
	Total no. of calls successfully established to customer care/Call center		Rajasthan	212763	45940	3137	19011	360466	22801	245943	95599	17769	12207
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	Rajasthan	98.77%	100.00%	97.03%	99.41%	99.00%	99.04%	100.00%	98.81%	97.91%	96.91%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Rajasthan	56545	122846	1053	88164	21650	1650	84230	48888	2897	1404
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		Rajasthan	54287	121427	1046	87863	21394	1566	80104	48040	2843	1331
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	>=90%	Rajasthan	96.01%	98.84%	99.34%	99.66%	98.82%	94.91%	95.10%	98.27%	98.14%	94.80%

KEY FINDINGS: CUSTOMER SERVICE DELIVERY PARAMETERS

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 $\leq 0.1\%$ for all the operators except **BSNL**. **Only BSNL** could not meet the benchmark with its achievement of **0.23%** against the benchmark 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 except **Tata CDMA**, have 100 % resolved the billing complaints within stipulated period of 4 weeks. **Only Tata CDMA** could not meet the benchmark with its achievement of **99.20%** against the benchmark of 100%. In all cases where customers were due for credit / adjustment, 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, only **Airtel** have not met the benchmark of **calls answered by Operators (voice to voice) within 60 seconds**. **Airtel** achieved its performance as **89.57%**.

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 except **Idea (99.94%)**.

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 except **Aircel (99.84%)**.

The results for three days live measurements reveal that all **operators have met the benchmarks** for the parameters Accessibility to call center and call connection to operators (Voice to voice) within 60 seconds.

6. LIVE CALLING ASSESSMENT



6. LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Rajasthan 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.

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT											
Calling Operators	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
AIRCEL	Rajasthan	--	100%	93%	100%	95%	100%	100%	100%	100%	100%
AIRTEL	Rajasthan	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	Rajasthan	90%	100%	--	98%	100%	91%	100%	100%	100%	100%
IDEA	Rajasthan	95%	100%	100%	--	100%	94%	100%	100%	100%	100%
RCOM (GSM)	Rajasthan	100%	100%	100%	100%	--	92%	100%	100%	100%	100%
TATA (GSM)	Rajasthan	91%	100%	92%	100%	95%	--	100%	100%	100%	100%
VODAFONE	Rajasthan	100%	100%	100%	100%	100%	100%	--	100%	100%	100%
MTS	Rajasthan	100%	100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM (CDMA)	Rajasthan	100%	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA (CDMA)	Rajasthan	100%	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where Calls attempted from Aircel to BSNL & RCOM GSM successful interconnection was 93.0% and 95%, BSNL to Aircel, Idea & Tata GSM was 90%, 98% and 91%, Idea to Aircel & Tata GSM was 95% and 94%, RCOM GSM to Tata GSM, was 92%, Tata GSM to Aircel, BSNL & RCOM GSM was 91%, 92% and 95%. Thus there was no remarkable problem in interconnection from one operator to other operators.

6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE											
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Rajasthan	100	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Rajasthan	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Rajasthan	100	100	100	100	100	100	100	99	100	100
% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	Rajasthan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Rajasthan	100	100	96	100	100	100	100	98	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	Rajasthan	100	100	96	100	100	100	100	98	100	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	Rajasthan	100.00%	100.00%	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, 100% calls were connected to the Operator within 60 seconds.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS											
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Rajasthan	100	100	100	100	100	39	100	100	100	100
Total No. of calls Answered	Rajasthan	82	90	77	80	70	39	88	75	84	81
Cases resolved within 4 weeks	Rajasthan	82	90	77	80	70	39	88	75	84	81
%age of cases resolved	Rajasthan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was less due to less number of billing complaints. During live calling, there was mix type of the feedback. Some of the customers did not attend the calls while others reported that there complaints have been resolved but not remember of duration of their resolution. However, most of the customers reported their satisfaction on resolution of the billing complaints.

6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING														
Emergency no.	Rajasthan	SSA Name	Name of SDCA	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA GSM	TATA CDMA	MTS	VODAFONE
100,101 ,102, 108, 1090	Rajasthan	Bundi	Bundi	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Bundi	Hindoli	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Bundi	Keshoraipatan (Patan)	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Bundi	Nainwa	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Bhilwara	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Mandal	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Raipur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Mandalgarh	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Jahazpur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Kotri	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Banrea	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Hurda (Gulabpura)	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,102, 108, 1090	Rajasthan	Bhilwara	Sahapura	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Jaipur	Jaipur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Jaipur	Lalsot	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Jaipur	Dausa	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Jaipur	Bandikui	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Jaipur	Shahpura	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090	Rajasthan	Jaipur	Kotputli	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Jhalawar	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Aklera	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Khanpur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Pachpahar (Bhawani Mandi)	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Pirawa(Raipur)	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Jhalawar	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101 ,102, 108, 1090, 1098, 1095	Rajasthan	Jhalawar	Khanpur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers in the SDCAs of the three SSAs where drive tests were conducted, the calls were made from mobile phones provided by the service providers. In these SSA of Rajasthan service areas, the emergency services as mentioned in the above table were found functional in the networks of all the service providers.

7. DRIVE TEST



7. OPERATOR ASSISTED DRIVE TEST

In terms of TRAI's letter dated 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. **The drive test across Bhilwara SSA was due in the month of March, 2014, but due to some restrictions imposed by Civic Agencies in connection with the General Elections, it could not be carried out in the March-14. However, the same was conducted in the month of May-14. Thus, total four drive tests were conducted across four select SSA's namely Bundi, Bhilwara, Jaipur and Jhalawar in the months of April, May and June 2014 respectively,** The total route Kms covered during the drive tests in the respective SSAs was **363 Kms, 597 Kms, 790 Kms and 460 Kms** respectively. 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 is considered to be good, where as 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 ≥ -75 dBm for in-door coverage and ≥ -85 dBm for in-vehicle.

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



DRIVE TEST TABLE – 1

OPERATOR ASSISTED DRIVE TEST AT BUNDI SSA IN APRIL-14 MONTH- RAJASTHAN CIRCLE

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA				
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR			
			1	Call Attempts	Day 1	133	15	130	15	67	6	98	15	119	10	79	16	98	15	79	10	83	16	110	10
Day 2	134	16	176		15	161	5	146	15	110	10	82	16	164	15	21	10	101	16	99	12				
Day 3	32	16	106		15	42	6	34	15	44	11	42	15	69	15	29	10	30	15	40	11				
Overall SSA	299	47	412		45	270	17	278	45	273	31	203	47	331	45	129	30	214	47	249	33				
2	Blocked Call Rate	Day 1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
Day 2		0.00%	0.00%	0.00%	0.00%	1.24%	0.00%	2.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%				
Day 3		0.00%	0.00%	0.00%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%				
Overall SSA		0.00%	0.00%	0.00%	0.00%	1.11%	0.00%	1.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%				
3	Dropped Call Rate (<=2%)	Day 1	0.00%	0.00%	0.00%	0.00%	1.54%	0.00%	1.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.91%	0.00%			
Day 2		0.00%	0.00%	0.00%	0.00%	1.33%	0.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.03%	0.00%			
Day 3		0.00%	0.00%	0.00%	0.00%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%				
Overall SSA		0.00%	0.00%	0.00%	0.00%	1.58%	0.00%	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%			
4	Percentage connections with good voice quality (=>95%)																								
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.75%	99.90%	100%	100%	96.52%	98.89%		
		Day 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.69%	100%	100%	99.92%	98.52%	100%		
		Day 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.92%	99.77%	100%	100%	94.68%	99.83%		
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.77%	99.89%	100%	99.97%	97.05%	99.60%		
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	97.25%	96.26%	95.77%	96.76%	96.76%	99.71%	98.56%	99.32%	98.00%	96.70%	98.70%	98.89%	95.88%	97.11%	NA	NA	NA	NA	NA	NA	NA		
		Day 2	98.23%	99.98%	95.15%	98.94%	90.03%	95.76%	97.65%	100%	97.71%	99.76%	98.17%	96.43%	95.07%	99.35%	NA	NA	NA	NA	NA	NA	NA		
		Day 3	97.59%	96.53%	95.36%	99.45%	96.99%	99.35%	99.40%	100%	98.51%	98.64%	99.74%	99.96%	95.46%	98.87%	NA	NA	NA	NA	NA	NA	NA		
Overall		97.78%	97.55%	95.40%	98.30%	92.75%	97.56%	98.18%	99.80%	97.96%	98.37%	98.66%	98.27%	95.39%	98.45%	NA	NA	NA	NA	NA	NA	NA			

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



DRIVE TEST TABLE – 1

OPERATOR ASSISTED DRIVE TEST AT BUNDI SSA IN APRIL-14 MONTH- RAJASTHAN CIRCLE

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			Service Coverage																			
5	In door (>= -75dBm)	Day 1	60.04%	40.93%	78.89%	75.60%	81.08%	100%	74.43%	85.28%	74.97%	35.45%	77.56%	77.56%	53.83%	95.99%	72.89%	99.70%	85.33%	50.47%	49.51%	95.83%
		Day 2	18.97%	79.26%	68.97%	95.61%	45.40%	47.91%	49.62%	38.77%	31.20%	85.91%	66.74%	62.76%	55.56%	83.38%	63.56%	87.08%	65.19%	49.54%	41.71%	0.00%
		Day 3	14.77%	99.50%	79.36%	83.51%	59.37%	100%	61.72%	90.26%	29.51%	39.22%	70.86%	95.58%	37.85%	51.92%	66.20%	95.83%	80.55%	99.98%	77.67%	99.85%
		Overall SSA	34.26%	73.35%	74.77%	84.47%	56.51%	72.59%	59.71%	70.69%	50.31%	53.48%	71.49%	76.73%	51.36%	76.95%	69.85%	94.05%	74.49%	67.02%	50.81%	61.56%
	In-vehicle (>= -85dBm)	Day 1	90.54%	98.99%	97.03%	99.74%	95.57%	100%	94.98%	100%	96.82%	99.36%	96.65%	100%	93.93%	99.97%	95.78%	100%	96.91%	67.23%	83.99%	100%
		Day 2	71.29%	99.67%	95.87%	100%	67.54%	70.18%	84.75%	97.51%	65.59%	99.92%	80.16%	64.19%	91.83%	99.80%	97.21%	99.61%	77.38%	54.17%	81.24%	0.00%
		Day 3	50.62%	100%	95.78%	99.50%	77.91%	100%	90.18%	100%	67.74%	69.33%	92.87%	99.88%	81.53%	99.19%	93.79%	100%	94.93%	100%	93.64%	100%
		Overall SSA	76.36%	99.55%	96.22%	99.75%	76.19%	84.31%	88.86%	99.14%	79.75%	89.49%	88.63%	86.97%	90.29%	99.65%	95.59%	99.87%	86.78%	73.94%	84.41%	62.95%
	Outdoor-in city (>= -95dBm)	Day 1	98.57%	100%	99.79%	100%	99.56%	100%	99.72%	100%	99.58%	100%	99.04%	100%	99.81%	100%	99.24%	100%	99.52%	99.42%	98.30%	100%
		Day 2	94.87%	100%	99.87%	100%	90.37%	94.30%	98.83%	100%	94.30%	100%	99.60%	89.39%	99.66%	100%	100%	100%	94.24%	89.67%	99.78%	97.71%
		Day 3	95.11%	100%	98.69%	99.96%	92.67%	100%	99.74%	100%	99.08%	100%	98.83%	100%	99.53%	100%	99.98%	100%	99.47%	100%	99.42%	100%
		Overall SSA	96.32%	100%	99.55%	99.99%	93.04%	97.00%	99.25%	100%	97.39%	100%	99.25%	96.15%	99.67%	100%	99.53%	100%	96.85%	96.29%	99.08%	99.15%
6	Call Setup Success Rate (>=95%)	Day 1	100%	100%	100%	100%	97.01%	83.33%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Day 2	100%	100%	100%	100%	93.17%	100%	97.95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Day 3	100%	100%	100%	100%	90.48%	83.33%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	93.70%	88.24%	98.92%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Day 1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.53%	100%	100%	100%	100%	100%	100%	100%
		Day 2	100%	100%	100%	100%	97.30%	100%	100%	100%	100%	100%	100%	100%	99.21%	100%	100%	100%	100%	100%	100%	100%
		Day 3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.11%	100%	100%	100%	100%	100%	100%	100%
		Overall	100%	100%	100%	100%	98.25%	100%	100%	100%	100%	100%	100%	100%	99.31%	100%	100%	100%	100%	100%	100%	100%

DRIVE TEST TABLE – 2

OPERATOR-ASSISTED DRIVE TEST AT BHILWARA SSA IN MAY-14 MONTH- RAJASTHAN CIRCLE

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR
1	Call Attempts	Day 1	142	10	167	11	151	11	89	10	102	10	120	11	130	10	111	10	124	11	126	11	
		Day 2	112	10	160	12	173	7	73	10	59	10	62	10	130	10	71	10	36	11	51	10	
		Day 3	109	10	132	11	202	10	71	10	113	10	68	10	121	10	52	10	64	10	100	10	
		Overall SSA	363	30	459	34	526	28	233	30	274	30	250	31	381	30	234	30	224	32	277	31	
2	Blocked Call Rate	Day 1	0.00%	0.00%	0.00%	0.00%	1.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	0.00%	0.00%	0.00%	0.00%	10.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	0.00%	0.00%	0.00%	0.00%	6.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	6.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	0.00%	0.00%	0.00%	0.00%	6.04%	0.00%	0.00%	0.00%	0.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	0.00%	0.00%	0.00%	0.00%	5.84%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.96%	0.00%
		Day 3	0.00%	0.00%	0.00%	0.00%	3.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	4.88%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.72%	0.00%
4	Percentage connections with good voice quality (=>95%)																						
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.44%	99.74%	99.98%	100%	97.12%	97.57%
		Day 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.57%	100%	100%	100%	96.98%	99.65%
		Day 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.84%	99.92%	99.97%	100%	98.89%	100%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.34%	99.88%	99.98%	100%	97.78%	99.08%
(b) 0-5 (Day 1	96.10%	99.86%	96.79%	98.95%	92.78%	70.65%	97.43%	98.22%	96.83%	99.60%	97.48%	97.94%	95.13%	95.40%	NA	NA	NA	NA	NA	NA	NA	

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
5	with frequency hopping for GSM Operators)	Day 2	97.97%	99.96%	97.03%	99.93%	87.26%	74.42%	99.12%	99.54%	98.15%	99.68%	99.50%	96.58%	95.31%	98.63%	NA	NA	NA	NA	NA	NA	NA
		Day 3	98.16%	98.98%	95.04%	98.67%	91.87%	69.37%	99.34%	97.48%	98.68%	96.15%	98.65%	98.58%	95.86%	96.60%	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	97.17%	99.60%	96.36%	99.27%	90.50%	71.20%	98.57%	98.34%	97.87%	98.47%	98.26%	97.65%	95.41%	96.88%	NA	NA	NA	NA	NA	NA	NA
		Service Coverage																					
5	In door (>= -75dBm)	Day 1	60.31%	91.93%	74.03%	100%	69.79%	76.45%	71.89%	32.78%	74.78%	98.63%	83.22%	64.85%	85.01%	90.34%	85.02%	100%	67.96%	99.68%	63.39%	68.92%	
		Day 2	53.34%	99.72%	82.56%	96.14%	54.67%	95.35%	50.51%	98.61%	56.18%	100%	78.38%	65.77%	71.55%	69.38%	69.04%	99.92%	84.99%	50.74%	32.38%	22.92%	
		Day 3	41.35%	99.05%	73.38%	97.33%	70.93%	98.94%	61.64%	99.50%	52.92%	99.84%	80.00%	93.10%	82.09%	99.93%	59.29%	99.47%	80.80%	99.98%	46.38%	100%	
		Overall SSA	48.66%	96.83%	76.60%	97.66%	64.88%	89.37%	61.84%	55.91%	61.89%	99.49%	81.23%	74.31%	79.70%	86.51%	74.25%	99.79%	74.52%	81.17%	51.37%	64.16%	
	In-vehicle (>= -85dBm)	Day 1	87.34%	99.83%	95.54%	100%	89.48%	100%	93.86%	98.22%	91.46%	100%	97.49%	97.96%	99.53%	99.96%	96.53%	100%	93.76%	100%	91.77%	100%	
		Day 2	78.92%	100%	95.91%	100%	81.32%	100%	88.51%	100%	88.92%	100%	96.42%	84.60%	98.94%	99.85%	94.65%	100%	94.94%	80.68%	69.84%	82.18%	
		Day 3	81.79%	100%	96.10%	99.89%	90.17%	100%	92.25%	100%	90.25%	100%	99.53%	99.81%	99.66%	100%	94.34%	100%	89.70%	100%	85.75%	100%	
		Overall SSA	83.16%	99.94%	95.82%	99.97%	86.86%	100%	91.65%	98.84%	90.43%	100%	97.77%	93.65%	99.38%	99.94%	95.46%	100%	92.80%	92.65%	85.45%	94.10%	
	Outdoor-in city (>= -95dBm)	Day 1	97.64%	100%	99.81%	100%	100%	100%	99.47%	100%	98.78%	100%	100%	100%	100%	100%	99.91%	100%	98.51%	100%	99.18%	100%	
		Day 2	95.84%	100%	99.79%	100%	100%	100%	98.62%	100%	99.41%	100%	99.92%	99.77%	99.98%	100%	99.78%	100%	99.37%	99.98%	97.30%	100%	
		Day 3	98.30%	100%	99.89%	100%	100%	100%	99.64%	100%	99.01%	100%	100%	100%	100%	100%	99.79%	100%	96.37%	100%	99.50%	100%	
		Overall SSA	97.80%	100%	99.83%	100%	100%	100%	99.26%	100%	99.01%	100%	99.98%	99.92%	99.99%	100%	99.84%	100%	98.04%	99.99%	98.94%	100%	
6	Call Setup Success Rate (>=95%)	Day 1	100%	100%	100%	100%	98.68%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		Day 2	100%	100%	100%	100%	89.02%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.04%	
		Day 3	100%	100%	100%	100%	93.56%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.00%	
		Overall SSA	100%	100%	100%	100%	93.54%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.28%	

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
7	Hand Over Success Rate (HOSR)	Day 1	100%	100%	100%	100%	83.71%	100%	99.68%	100%	100%	100%	99.56%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Day 2	100%	100%	100%	100%	94.35%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Day 3	100%	100%	100%	100%	76.16%	100%	100%	100%	100%	100%	100%	100%	100%	99.53%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	82.89%	100%	99.84%	100%	100%	100%	100%	99.69%	100%	99.85%	100%	100%	100%	100%	100%	100%	100%

DRIVE TEST TABLE - 3
OPERATOR ASSISTED DRIVE TEST AT JAIPUR SSA IN MAY-14 MONTH- RAJASTHAN CIRCLE

S/N	Parameter	Classification of route covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Major Roads	168	30	171	30	190	31	156	30	183	30	172	31	169	30	143	31	181	31	187	30
		Highways	163	20	189	30	163	20	147	20	153	20	127	20	170	20	113	20	119	20	96	20
		Within City	124	40	123	30	132	40	100	40	66	40	167	49	145	40	135	40	166	50	129	40
		Overall SSA	455	90	483	90	485	91	403	90	402	90	466	100	484	90	391	91	466	101	412	90
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	0.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	0.41%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.65%	0.00%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.04%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	0.41%	0.00%	0.25%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%	0.00%
4	Percentage connections with good voice quality (=>95%)																					
	(a) 0-4 (w/o frequency hopping for CDMA)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.70%	99.88%	99.87%	100%	99.32%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.79%	99.93%	98.73%	100%	99.23%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.15%	99.69%	99.89%	99.94%	99.30%	99.73%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



SIN	Parameter	Classification of route covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
			Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.79%	99.81%	99.63%	99.97%	99.29%
5	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.33%	98.88%	96.84%	94.39%	93.74%	99.86%	98.06%	95.79%	91.73%	98.43%	95.98%	97.93%	95.22%	98.37%	NA	NA	NA	NA	NA	NA	NA
		Highways	96.05%	95.48%	94.54%	94.33%	97.26%	98.83%	97.21%	98.70%	95.88%	93.15%	95.44%	99.94%	95.36%	97.66%	NA	NA	NA	NA	NA	NA	NA
		Within City	96.41%	98.55%	96.23%	96.59%	97.70%	99.79%	96.65%	95.85%	91.57%	97.87%	96.88%	100%	95.91%	97.46%	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	95.92%	97.31%	95.78%	95.37%	96.10%	99.60%	97.36%	96.36%	93.32%	96.99%	96.20%	99.08%	95.48%	97.81%	NA	NA	NA	NA	NA	NA	NA
		Service Coverage																					
5	In door (>= -75dBm)	Major Roads	99.30%	93.50%	96.31%	86.55%	94.98%	23.78%	89.59%	53.43%	98.53%	71.22%	81.81%	72.84%	87.65%	77.74%	95.02%	81.20%	98.61%	98.22%	78.47%	76.46%	
		Highways	68.47%	96.70%	77.78%	94.08%	82.56%	23.08%	61.31%	89.06%	72.30%	100%	68.01%	93.09%	73.50%	58.55%	53.97%	0.00%	39.01%	100%	45.63%	67.44%	
		Within City	86.97%	72.70%	88.67%	98.72%	88.02%	59.89%	82.56%	98.67%	91.40%	94.10%	75.38%	81.54%	80.88%	71.13%	86.44%	99.99%	69.70%	58.84%	54.99%	73.53%	
		Overall SSA	85.14%	88.37%	87.04%	93.75%	88.40%	39.68%	76.31%	81.49%	87.09%	87.92%	76.29%	80.55%	81.00%	70.57%	80.25%	71.55%	75.07%	79.56%	63.27%	73.15%	
	In-vehicle (>= -85dBm)	Major Roads	100%	100%	100%	99.74%	99.96%	82.13%	99.31%	99.43%	99.82%	98.62%	96.89%	92.91%	99.53%	99.08%	99.92%	100%	100%	100%	99.95%	100%	
		Highways	91.21%	100%	96.99%	99.87%	96.64%	99.92%	90.91%	99.94%	96.28%	100%	76.82%	99.88%	98.79%	99.21%	89.24%	91.16%	84.22%	100%	79.32%	100%	
		Within City	97.70%	98.30%	99.41%	100%	99.61%	98.81%	98.79%	99.90%	99.73%	100%	90.98%	98.84%	99.34%	99.71%	99.60%	100%	93.00%	85.14%	85.60%	97.96%	
		Overall SSA	96.36%	99.47%	98.66%	99.89%	98.58%	93.50%	95.76%	99.75%	98.43%	99.55%	90.16%	96.50%	99.23%	99.39%	96.71%	98.04%	94.01%	92.81%	90.53%	99.08%	
	Outdoor-in city (>= -95dBm)	Major Roads	100%	100%	100%	100%	100%	99.82%	99.99%	100%	100%	100%	99.92%	99.98%	99.99%	100%	100%	100%	100%	100%	100%	100%	
		Highways	99.14%	100%	99.95%	100%	99.87%	100%	99.71%	100%	99.89%	100%	88.68%	100%	100%	100%	99.94%	100%	96.65%	100%	97.40%	100%	
		Within City	99.97%	100%	100%	100%	100%	99.98%	99.98%	100%	100%	100%	98.13%	100%	100%	100%	100%	100%	99.95%	99.99%	96.73%	100%	
		Overall SSA	99.71%	100%	99.98%	100%	99.95%	99.93%	99.87%	100%	99.96%	100%	96.73%	99.99%	100%	100%	99.98%	100%	99.26%	99.99%	98.35%	100%	
	6	Call Setup Success	Major Roads	100%	100%	100%	100%	99.47%	100%	99.36%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



S/N	Parameter	Classification of route covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
	Rate (>=95%)	Highways	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	99.24%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	99.59%	100%	99.75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	99.40%	100%	99.83%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	78.48%	100%	99.32%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	73.38%	46.67%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	84.38%	60.00%	99.71%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

DRIVE TEST TABLE – 4
OPERATOR ASSISTED DRIVE TEST AT JHALAWAR SSA IN JUNE-14 MONTH- RAJASTHAN CIRCLE

S/N	Parameter	Classification of route covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	NA	25	NA	25	NA	25	NA	30	NA	25	NA	25	NA	10	NA	25	NA	25	NA	25	
		Highways	193	25	339	25	213	25	256	25	111	25	63	25	252	25	85	26	65	25	49	25	
		Within City	247	35	188	35	190	35	229	35	170	35	262	35	209	25	204	35	266	35	193	35	
		Overall SSA	440	85	527	85	403	85	485	90	281	85	325	85	461	60	289	86	331	85	242	85	
2	Blocked Call Rate	Major Roads	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	1.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	1.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	1.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	NA	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	8.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	4.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.41%	0.00%	
4	Percentage connections with good voice quality (=>95%)																						
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.95%	NA	100%	NA	99.96%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.60%	99.45%	99.99%	100%	99.64%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.77%	99.54%	100%	100%	97.95%	99.31%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.73%	99.63%	100%	100%	98.21%	99.69%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



S/N	Parameter	Classification of route covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	NA	99.81%	NA	97.97%	NA	97.82%	NA	99.95%	NA	99.71%	NA	97.55%	NA	98.31%	NA	NA	NA	NA	NA	NA	NA
	Highways	96.98%	99.12%	95.53%	95.65%	89.50%	99.12%	98.55%	95.96%	99.08%	99.71%	98.22%	98.80%	95.94%	99.08%	NA	NA	NA	NA	NA	NA	NA
	Within City	97.76%	99.78%	96.02%	97.30%	98.16%	98.06%	98.73%	99.20%	98.29%	99.91%	99.10%	99.96%	96.43%	98.62%	NA	NA	NA	NA	NA	NA	NA
	Overall SSA	97.53%	99.59%	95.71%	97.02%	93.41%	98.24%	98.63%	98.59%	98.60%	99.79%	98.91%	98.70%	96.16%	98.73%	NA	NA	NA	NA	NA	NA	NA
Service Coverage																						
5	In door (>= -75dBm)	Major Roads	NA	43.00%	NA	97.25%	NA	5.00%	NA	99.67%	NA	7.78%	NA	69.63%	NA	59.11%	NA	100%	NA	95.43%	NA	96.09%
		Highways	41.53%	65.50%	92.03%	100%	43.28%	84.50%	67.54%	86.43%	47.92%	51.85%	71.35%	73.82%	50.56%	75.32%	52.38%	36.72%	61.95%	99.41%	59.79%	80.24%
		Within City	58.60%	44.60%	96.24%	100%	75.98%	72.00%	81.95%	62.40%	59.93%	58.94%	69.34%	60.79%	62.74%	51.77%	73.34%	79.81%	69.81%	49.48%	44.71%	70.52%
		Overall SSA	53.54%	50.50%	93.58%	99.19%	58.02%	52.10%	74.08%	81.29%	55.27%	41.81%	69.78%	68.15%	56.19%	60.12%	67.82%	73.20%	68.03%	79.67%	47.06%	80.05%
	In-vehicle (>= -85dBm)	Major Roads	NA	99.70%	NA	99.40%	NA	89.00%	NA	100%	NA	94.36%	NA	100%	NA	99.15%	NA	100%	NA	100%	NA	98.90%
		Highways	72.98%	99.00%	96.91%	100%	67.04%	99.63%	93.68%	99.88%	87.84%	99.23%	93.28%	98.62%	89.25%	99.71%	90.00%	96.03%	73.92%	99.99%	83.09%	90.68%
		Within City	88.68%	98.60%	98.10%	100%	95.69%	99.00%	98.82%	93.84%	94.86%	85.53%	94.44%	97.76%	96.77%	99.11%	95.67%	99.97%	88.81%	84.38%	79.83%	97.28%
		Overall SSA	84.03%	98.85%	97.35%	99.82%	79.96%	95.73%	96.01%	97.55%	92.13%	92.17%	94.19%	98.86%	92.72%	99.31%	94.18%	98.81%	85.44%	94.25%	80.34%	95.66%
	Outdoor-in city (>= -95dBm)	Major Roads	NA	100%	NA	100%	NA	99.94%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	98.90%
		Highways	96.77%	100%	100%	100%	87.70%	100%	99.63%	100%	99.69%	100%	99.93%	99.97%	99.52%	100%	99.54%	99.98%	89.57%	100%	96.37%	97.85%
		Within City	98.66%	100%	100%	100%	99.72%	100%	99.97%	99.94%	99.93%	99.98%	99.95%	99.92%	99.97%	100%	99.93%	100%	97.09%	99.85%	95.81%	98.19%
		Overall SSA	98.10%	100%	100%	100%	93.12%	99.98%	99.78%	99.98%	99.84%	99.99%	99.95%	99.97%	99.73%	100%	99.83%	99.99%	95.39%	99.95%	95.90%	98.27%
6	Call Setup Success Rate (>=95%)	Major Roads	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%
		Highways	100%	100%	100%	100%	85.92%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	84.74%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.48%	100%

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



S/N	Parameter	Classification of route covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		MTS CDMA		RCOM CDMA		TATA CDMA			
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR		
			Overall SSA	100%	100%	100%	100%	85.36%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.59%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%	NA	100%
		Highways	100%	100%	100%	100%	87.55%	100%	100%	100%	100%	100%	98.00%	100%	99.77%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	99.48%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	92.68%	100%	100%	100%	100%	100%	100%	99.64%	100%	99.86%	100%	100%	100%	100%	100%	100%	100%	100%



7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 5

Name of SSA	Day 1		Day 2		Day 3	
	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
BUNDI	BUNDI, HINDOLI/ 100 KM	BSNL EXCHANGE- BUNDI RAILWAY STATION- DEVPURA- POLICE LINE- GOPAL SINGH PLAZA- BUS STAND- BSNL CSE- LANKA GATE- KHOJA GATE- GAYATRI NAGAR- BSNL EXCHANGE- DEVL ROAD- STAHOOR VILLAGE- BADA NAYA VILLAGE- TAPADIA FACTORY- HINDOLI- BUS STAND HINDOLI- HINDOLI HOSPITAL- HINDOLI TEHSIL- HINDOLI POLICE STATION- DEVL ROAD- BUNDI- CHITTOR ROAD- POWER HOUSE- BSNL OFFICE. INDOOR: DHARKADISH RESTRONANT BUNDI	KESHORAIPATAN (PATAN)/ 160 KM	BSNL EXCHANGE- TALERA- JAMIT PURA- BAZED- SUWANSA- CHITAWA- SUGAR MILL- ISHWAR NAGAR- KESHORAIPATAN- BUS STAND KPATAN- MAIN MARKET KPATAN- BUS STAND KPATAN- PATAN CHORAHA- KPATAN TO KAPREN LINK ROAD- ANRATHER- ADILA VILLAGE- KAPREN- KAPREN POLICE STATION- BANK OF BARODA KAPREN- KAPREN HOSPITAL- BHARAT PETROL PUMP- BALDEVPURA- INDIAN OIL PUMP JHAPYATA VILLAGE- DEHIKHERA- POLICE STATION DEHIKHERA- LABAN - GOV. SCHOOL LABAN- PAPDI- LAKERI- MMS PUBLIC SCHOOL LAKERI- KANKRA DUNGR VILLAGE- BHUDHEL VILLAGE - GUTHA- GENDOLI- FOLAI VILLAGE- BUNDI BSNL EXCHANGE. INDOOR: JAI BHAVANI RESTRONANT	NAINWA/ 103 KM	KHATKER- MOTIPURA- LUHAPURA- SABALPUR- PIPLIYA- JETPURA- TALWAS- ANTARDA- KARWAR- INDRAGARH- KARWAR- RETHODA- NAINWA-UNEARA ROAD- TONK ROAD. INDOOR: JAIN & GOTAM RESTRONANT INDRAGARH
BHILWARA	BHILWARA,MANDAL, RAIPUR / 200KM	BHILWARA COLLECTRATE- AJMER CHAURAHA- RAILWAY STATION- RICCO HOUSING BOARD - KHUMBHA CIRCLE- OLD RTO ROAD- BIOSCOPE ROAD- R.C VYAS COLONY- SANGANERI GATE- RAM SNEHI HOSPITAL- NAGORI GARDEN- CHAURAHA- POSTEL COLONY- NAGAR PALIKA ROAD- POST OFFICE- COURT - COLLECTRATE- ASHOK LELAND- MAHARANA PRATAP CHAURAHA- BILIYA VILLAGE- PUR- GURLA-KAROJ- KOSITHAL- RAIPUR- RAIPUR MAIN MARKET- GOV. SCHOOL RAIPUR-	MANDALGARH, JAHAZPUR, KOTRI/ 227KM	SANGANERI CHAURAHA- SUWANA- BANKAKHERA- SAWAIPUR-PUDI- BIGOD- TRIVENI GATE- MANDALGARH- POLICE STATION - BUS STAND- GOV. SCHOOL- JAIL - RAILWAY STATION ROAD- PURANI ABADI- POLICE STATION - ITI- TRIVENI ROAD- MANPURA- GANESH PURA- DHOMANIYA- THALKALA- KACHOLA- BHANUNAGAR- AMERGARH-KHAJJOORI- PIPLOND- BHAVANIPURA- JAHAZPURA- PANDER - ROPEN - PAROLI- KHOTHAJ- KOTRI- GOV. HOSPITAL - POLICE STATION- KODUKOTA-	BANERA, HURDA (GULABPURA), SHAHAPURA/ 170KM	BHILWARA TO JAIPUR HIGHWAY- SHAHAPURA CHAURAHA- BANERA- POLICE STATION- GOV. HOSPITAL- SARDAR NAGAR- GOV. SCHOOL - SHAHAPURA- GOV. HOSPITAL - GOV. SCHOOL- POLICE CHOKI- SHAHAPURA BAAG- SHAHAPURA TO GULABPURA HIGHWAY- PANATIA- AKHED- KHATHIYA- LAXMIPURA- HURDA- GOV. HOSPITAL- GOV. SCHOOL- GULABPURA- POLICE STATION - RAILWAY STATION- CHARBHUJA TEMPLE- POWER HOUSE- SARERI- KANVYLAS- RAYLA- BHILWARA INDOOR: BSNL EXCHANGE, BHILWARA

Name of SSA	Day 1		Day 2		Day 3	
	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
		<p>BORAN- MANDAL- MANDAL BUS STAND- NEW NAGRI MOHALLA- TEJAJI CHOWK- SHIV TEMPLE- GOPAL DWARA SCHOOL- PARTAP NAGAR CHOWK- MAIN MARKET- BUS STAND- PANCHAYAT SAMITI- GOV. HOSPITAL- BSNL EXCHANGE - MANDAL RAILWAY STATION- MANDAL CHAURAHA- MANDAL> AJMER HIGHWAY- ORIENT ARCADE MALL.</p> <p>INDOOR: ORIENT ARCADE MALL, BHILWARA</p>		<p>SUWANA- BHILWARA.</p> <p>INDOOR: BIOSCOPE MALL, BHILWARA</p>		
JAIPUR	JAIPUR/ 190KM	<p>A) MAJOR ROAD--> MALVIYA NAGAR TO PRATAP NAGAR TO MANSAROVAR TO JHOTWARA TO VKI TO SHASTRI NAGAR TO BANIPARK TO BIAS GODAM TO GOPALPURA TO JLN MARG TO ALBART HALL TO JAIPUR OLD CITY TO VISHYADHAR NAGAR TO MURLIPURA TO VAISHALI (B) WITHIN CITY-->OLD CITY & VAISHALI</p> <p>INDOOR: SARAS PARLOUR AND EVERSHINE TOWER</p>	LALSOT , DAUSA & BANDIKUI / 350KM	<p>A) HIGHWAY--> JAIPUR TO BASSI TO TOONGA TO LALSOT TO DAUSA TO BANDIKUI</p> <p>B) WITHIN CITY-- LALSOT , DAUSA & BANDIKUI</p> <p>INDOOR: HOTEL LALSOT, DAUSA RESTAURANT</p>	SHAHPURA & KOTPUTLI / 250KM	<p>A) HIGHWAY-->JAIPUR TO NIMS TO ACHROL TO SHAHPURA TO KOTPUTLI B) WITHIN CITY-->SHAHPURA & KOTPUTLI</p> <p>INDOOR: RAJDHANI HOTEL KOTPUTLI, SHAHPURA RAHGIR HOTEL</p>
JHALAWAR	JHALAWAR,AKLERA, KHANPUR/186 KM	<p>1)JHALAWAR-(A) WITHIN CITY-->BSNL OFFICE- MANGALPURA-BADA BAZAR -MOTOR GAIRAJ- BUS STAND-STADIUM JLR-KHANDYA-POWER HOUSE-PATAN ROAD- HOUSING BOARD- GAWADI TALAB- KALIDAS COLONY-BUS STAND- SANJIVNI- (B)HIGHWAY--> JHALAWAR-TEENDHAR- ASNAWAR-AKLERA</p> <p>2)AKLERA- (A) WITHIN CITY-->AKLERA- HARNAVADA ROAD-BUS STAND AKLERA-MAIN MARKET- DAKBANGLA- NAGER PALIKA AKLERA- HERO WORKSHOP- GAYATRI PARYAG PEETH-BSNL OFFICE- NH12- GOV. HOSPITAL</p>	PACHPAHAR(BHAWANI MANDI), PIRAWA(RAIPUR)/ 170KM	<p>1) PACHPAHAR(BHAWANI MANDI)--> (A) HIGHWAY-->RAILWAY STATION- DAKBANGLA-RALAYATA- (BGR ENERGY SYSTEM) THERMAL-BHILWARI- PIPLIYA-GOV SCHOOL GARNAWAD-GATHOD VILLAGE-ANWALIKALAN- SULLIYA VILLAGE-GOV SCHOOL SULLIYA- PACHPAHAR (B) BHAWANI MANDI- WITHIN CITY--> - PACHPAHA -ANAJ MANDI-RAJASTHAN TEXTILE MILLS-COURT- GOV. HOSPITAL- RAILWAY STATION BHAWANI MANDI- BUS STAND- SABJI MANDI- NEELKANTH PARK- MAIN MARKET - BSNL OFFICE 2) PIRAWA(RAIPUR)--></p>	Jhalawar, Khanpur/ 104 KM	<p>1.)JHALAWAR-->(A)City-->jhalawar-police training center- science park-Jhalrapatan-imli gate -main market-surjpole-lanka gate- sun temple-gomti sagar-busstand- gindore gate-chandra gupt nagar- BSNL Office-bypass patan-- sanjivni hospital -hotel jhmku palace-khandiya choraha-RTO Office bagher</p> <p>(B) Highway-->Jhalawar-munderi- mandawar-aamjhar-bagher- bhemsagar dam-sarola-khanpur- Atrubaran road</p> <p>INDOOR: Chand kheri jain temple & A.J Manju Hospital Khanpur</p>



Name of SSA	Day 1		Day 2		Day 3	
	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
		ROAD. (B). HIGHWAY--> AKLERA- ASNAWAR- AKATAFA -TEENDHAR- MANDAWAR- BAGHER- NAGONIYA- GOLANA- KHANPUR 3) KHANPUR-->(A) WITHIN CITY--> KHANPUR- TH. KHANPUR-HERO WORKSHOP- MAIN MARKET- BUS STAND- CHAND KHERI JAIN MANDIR-MEGA HIGHWAY. (B) HIGHWAY--> KHANPUR- JHALAWAR INDOOR: HOTEL KRISHNA PALACE, JHALAWAR		(A) HIGHWAY--> BHAWANI MAND - GURADI VILLAGE- SUNEL- RAIPUR ROAD- HEMDA-DOLA-PIRAWA- POLICE STATION PIRAWA-GOV. HOSPITAL PIRAWA-MAIN MARKET PIRAWA-BUS STAND- DHARONIYA VILLAGE- DAM-RAIPUR. (B)WITHIN CITY--> RAIPUR- BSNL OFFICE- CENTRAL BANK-BUS STAND. (C). HIGHWAY--> RAIPUR- JHALRAPATAN- JHALAWAR INDOOR: RAILWAY STATION, BHAWANI MANDI		

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF BUNDI SSA: APRIL-14

S NO	Name of SP	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	AIRTEL	BUNDI, HINDOLI	Poor Quality and Level near hindoli, Sathoor.	KESHORAIPATAN (PATAN)	Poor level near Dahikhera, Ramganj and Ramdeen Chowk.	NAINWA	Poor quality and level near Dei and bansi
2	BSNL		Poor Level near bara naya gaon, sathoor and talab gaon.		Poor level near khatkar , dhan mandi, Baroondhan,lesarda, Ametha, kaprain and gandhipura. Poor quality near gandhipura.		Poor quality and level near kanwar and main market (nainwa)
3	TATA GSM		Poor level near hindoli, Poor quality near bara naya gaon and dhan mandi.		Poor quality and level near ramdeen chowk , Kaprain, Ametha, Suwason.		Poor level near Karwar, Main market(Naunwa), Khatkar.Poor quality near Karwar.
4	TATA CDMA		Poor quality and level near hindoli bara naya gaon, Talab gaon and dhan mandi.		Poor quality and level Ameetha, Lesarda and Baroondhan.		poor quality and level near Dei and Karwar
5	IDEA		Poor Level & Quality near Bara Naya Gaon, Poor Level near Talab Gaon		Poor level near dhan mandi, Baroondhan, Suwasan, Kaprain and gandhipura.poor quality nera khtkar, suwasan and dahikhera.		Poor level near Karwar, Main market(Naunwa), Khatkar.Poor quality near Karwar.
6	RCOM GSM		Poor quality and level near bara naya gaon and talab gaon.		Poor quality and level near ramganj and kaprain and Ramdeen chowk, Talera, Lakheri.		Poor level near indragarh, khatkar and nainwa.
7	RCOM CDMA		poor level near talab gaon.		Poor level near Ramganj, Ameetha, Kaprain and Ramdeen chowk.		Poor level near Dei.
8	MTS		They have coverage only in SDCAs.		They have coverage only in SDCAs.		They have coverage only in SDCAs.
9	VODAFONE		Poor level and quality near talab gaon, Sathoor, Dhan mandi.		poor level near Khatkar, Baroon dhan , lesarda, Dahikhera.		Poor level near khatkar and karwar.
10	AIRCEL		Poor quality near Bara Naya Gaon and Sathoor		Poor Quality and level near Khatkar,Kaprain and Ramdeen Chowk.		Poor Quality and level near Bundi.

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF BHILWARA SSA: MAY-14

S NO	Name of SP	SDCA Covered in Day 1	Poor Level and quality	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	BHILWARA,MANDAL, RAIPUR	Poor level near Dahmata, Katera, koshital, Gangapur and Mandal. Poor quality near dahmata, gangapur, nainagri..	MANDALGARH, JAHAZPUR, KOTRI	Poor level near Mansa, jahajpur, sarsiya, mahuwa. Poor level near Mansa and mahuwa.	BANERA, HURDA (GULABPURA), SHAHAPURA	Poor level near Gulabpura, Kherarajpur. Poor Quality near Taswariya, rayla, ayaran
2	BSNL		Poor Level In almost complete SDCAs		Poor Level In almost complete SDCAs		Poor Level In almost complete SDCAs
3	TATA GSM		Poor level and quality near Gangapur, Karoi, gula.		Poor level udliyas, kaharpur, and kotri.		Poor Level and quality near Balaji Mohalla, Sardar Nagar, Amiyaghora and gulabpura.
4	TATA CDMA		Poor Level near Dahmata, Bogoliya, Ganga pur and nainagri. Poor quality near Nainagri and Sangamer.		Poor Level Ropan, Paroli, Udiyas. Poor quality near Kodukoota.		Poor Level near Gulabpura, Taswariya, Sareri, Rayla, Balaji Mohalla,
5	IDEA		Poor Level and quality near katera and Gurla.		Poor level and quality near Ropan and sawaipur.		Poor Level and quality near sardarji nagar and Taswariya.
6	RCOM GSM		Poor Level near Bhagwanpura, nainagri and Deoriya.		Poor Level near Mandalgarh and kaharpura.		Poor level and quality near bcalaji mohalla.
7	RCOM CDMA		Poor Level near gangapur and gurta.		They have coverage only in SDCAs.		They have coverage only in SDCAs.
8	MTS		They have coverage only in SDCAs.		They have coverage only in SDCAs.		They have coverage only in SDCAs.
9	VODAFONE		Poor Level near Dahmata, Purbnl. Poor quality near Biliyakhurd, baagoliya, Thala.		Poor Level near Mahuwa, Khajuri and jahajpur. Poor quality near Kaharpura, peeploond, and ropan.		Poor Level near Nangajikhakhera. Poor Quality near Nangajikhakhera, Mahuwakhurd, Bhilshahpura, and sardar nagar.
10	AIRCEL		Poor Level near Dahmata, bagoliya, Purbnl.		Poor level and quality near Ropan and sawaipur.		Poor Level and quality near taswariya, Rayla, amiyaghora.

DRIVE TEST TABLE: 8
DRIVE TEST OBSERVATION OF JAIPUR SSA: JUNE-14

S NO	Name of SP	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	AIRTEL	JAIPUR	Poor Level near kalyankunj and ramgarhmod.	LALSOT , DAUSA & BANDIKUI	Poor Level and quality near todalbata and bidalkha.	SHAH PURA & KOTPUTLI	Poor Level and quality antela, bhureebaraj.
2	BSNL		Poor quality near Shri Niwas nagar, Murlipura, Shree Ram puri, Triton Mall, VT Road, Krishna Nagar.		Poor Level near Kanota, Kheri, Dausa, Sikandra, Kalas, Tunga. Poor quality near Kanota, Dausa, Barvakabad.		Poor Level and quality near Bhuchra PF, Antela, Lakner, Khordshyanda and Aker.
3	TATA GSM		Poor quality near sri nivas nagar, soni hospital, Bhagwani nagar, Gopal nagar, swarna path and gaytri nagar.		Poor Level near todabhata, Ramgarh, Doongarpur. Poor quality near kalakho, Boram hotel, Jatawada, Ramgarh, Shyampura kalan.		Poor Level near achrol, tanda ki dhani, Antela. Poor quality near Antela, Achrol.
4	TATA CDMA		Poor Level near poonum Nagar. Poor Quality near tara Nagar, hanuman nagar, anand bhawan and bajaj nagar.		Poor Level near Amiya, Kalakho, Boram hotel.		Poor Level near Bharaj bhuree, Antela village, Tanda ki Dhani, Devan , Ghasipura, chandwaji, Natata. Poor quality near Antela.
5	IDEA		Poor Level near Crystal Palm and Kanwar Nagar. Poor quality near shree ram puri, soni hospital, Tara Nagar, hanuman nagar, khushal nagar, Ajmera colony, fortis hospital, hotel rambagh palace, kanwar nagar etc.		Poor level near Peeliya, rampurabas deo gaon, Ramgarh, Baniyana, Nizampura, Amiya. Poor quality near Ramgarh, Krishna nagar.		Poor quality near ghasipura, Shiv vilas palace.
6	RCOM GSM		---		---		---
7	RCOM CDMA						
8	MTS		Poor quality near VT Road and adarsh nagar.		Poor Level near Kalakho, Boram hotel, and industrial area.		Poor Level near Tanda ki dhani, INMS university.
9	VODAFONE		Poor Level near Anand colony and bhavna colony. Quality issue in overall city.		Poor Level near todalbata, bidalkha. Poor quality near adarsh vidya mandir, sikandra city, dausakhurd, nangal, Bidarkha, kanota.		Poor quality near Devan, Ghasipura, Bhanpurkalan,.
10	AIRCEL		---		---		---

DRIVE TEST TABLE: 9

DRIVE TEST OBSERVATION OF JHALAWAR SSA: JUNE-14

S NO	Name of SP	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	Airtel	JHALAWAR, AKLERA, KHANPUR	Poor Level near Bagher and Poor quality near Jawahar colony.	PACHPAHAR (BHAWANI MANDI), PIRAWA (RAIPUR)	Poor Level near Hemraj_LW_a and Subel. Poor quality near Raipur, Suvas and Subel.	JHALAWAR, KHANPUR	Poor Level near Khanpur, Peepada and poor quality near Bagher.
2	BSNL		Poor Level near Mandawara, Telyakheri, Asnawar, Aklera. Poor quality near Mandawara, Telyakheri, Asnawar.		Poor level and quality near Subel and Ganawar.		Poor Level and quality near Peepada and Bagher.
3	TATA GSM		Poor level near jawahar colony, Bagher,.They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera
4	TATA CDMA		Poor level near bagher, jawahar colony and no coverage on highway. Poor quality near bagher.		Poor level near bhawani mandi, raipur, and no coverage on highway.		Poor Level near Jhalaraphatan and no coverage at highway.
5	Idea		Poor Level koli Mohalla, Bagher, Iktasa and Doongar gaon. Poor quality near Tahsil chowk, koli mohalla, Indira colony.		Poor level near Ward no 13 raipur, Kotri, Hemra, Bhawani Mandi. Poor quality near Kotri, Bhilwadi, and naradi.		Poor Level and Quality near khanpur highway.
6	RCOM GSM		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera
7	RCOM CDMA		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera
8	MTS		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera		They have coverage only in SDCAs..No Coverage Between Jhalawar to Khanpur & Jhalrapatan to Aklera
9	Vodafone		Poor level near Golana, Telyakheri, Budhapur Industrial area. Poor quality near ganpati temple, Budhpura industrial Area.		Poor level near Pipliya, Sooliya, Subel, Dhabla khichi, HemrajLW_A, Suvas. Poor quality near gamawada, Sooliya, HemrajLW_A, Raipur, Piplod,		Poor Level and quality near Khanpur, Bhager, Peepada.
10	Aircel		They have coverage only in SDCAs.		They have coverage only in SDCAs.		They have coverage only in SDCAs.

7.3 KEY FINDINGS ON DRIVE TEST:

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

- (i) **In the Month of April -14**, drive test was conducted at **Bundi SSA** covering Bundi, Hindoli, Keshoraipatan and Nainwa SDCAs. The performance of the service providers in general was satisfactory as all operators met all the benchmarks on SSA level **except BSNL**, which could not meet the benchmark of parameters **Voice Quality** and **Call setup Success rate** with its performance as **92.75%** and **93.70 %** (outdoor) / **88.24%** (Indoor) respectively.
- (ii) **In the Month of May-14**, drive tests were conducted across **two SSAs**.
 - (1) **Bhilwara SSA**: The drive test was conducted for three consecutive days covering Bhilwara, Mandal, Raipur, Madangarh, Jahazpur, Kotri, Banera, Hurda and Shahpur SDCAs . The drive test results for this SSA also revealed that in general, all operators were doing well within the QoS norms except **BSNL**. Only **BSNL** remained non-compliant for parameters **Call Drop rate, Voice quality, Call setup success rate and Call blocked rate** with its achieved values as **4.88%, 90.50%** (Outdoor) / **71.20%** (Indoor) and **93.54%** respectively.
 - (2) **Jaipur SSA**: The drive test was conducted covering Jaipur, Lalsot, Dausa, Bandikuin, Shahpura and Kotputali. The performance of all the service providers was within well compliance except **Tata (GSM)**, which could not meet the benchmark of parameter **Voice Quality (93.32% on SSA level)**.
- (iii) **In the month of June -14**, drive test was conducted across **Jhalawar SSA** covering Jhalawar, Aklera, Khanpur, Pachpahar (Bhawani Mandi), Pirawa, Jhalawar and Khanpur. Like above SSAs, **BSNL** again failed to meet the benchmark of the prime parameters namely **Call Drop rate, Voice Quality and Call setup rate** with its performance as **4.36%, 93.41% and 85.36%** respectively. Other operators performed well within the benchmarks.

Though the Operators have shown good performance in general, but the deficiencies with respect to adequate coverage and voice quality, observed during the drive tests, at the various locations as observed on the drive test plots are detailed in the above **table -6, table 7, table 8 and table 9** for the respective **SSAs**.

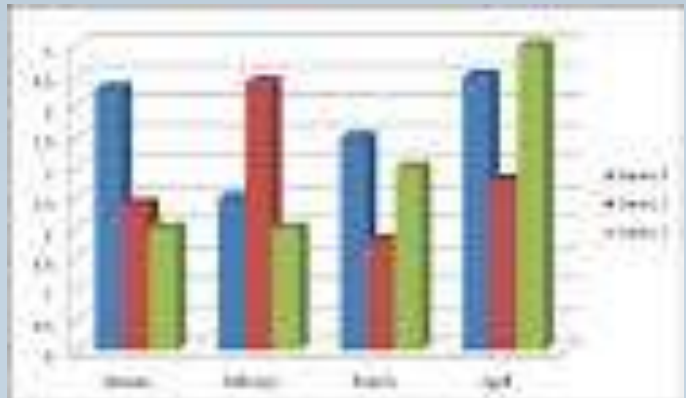
*The performance of the service providers with regard to the Drive Test revealed that all the service providers performed well within the QoS norms. **BSNL** was the only operator which could not meet the benchmarks of the prime network parameters namely **Call Drop Rate, Voice Quality and CSSR** at different locations across **Bundi, Bhilwara and Jhalawar** SSAs. Apart from this, **Tata (GSM)** also could not met the benchmark of **Voice Quality** across Jaipur SSA.*

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

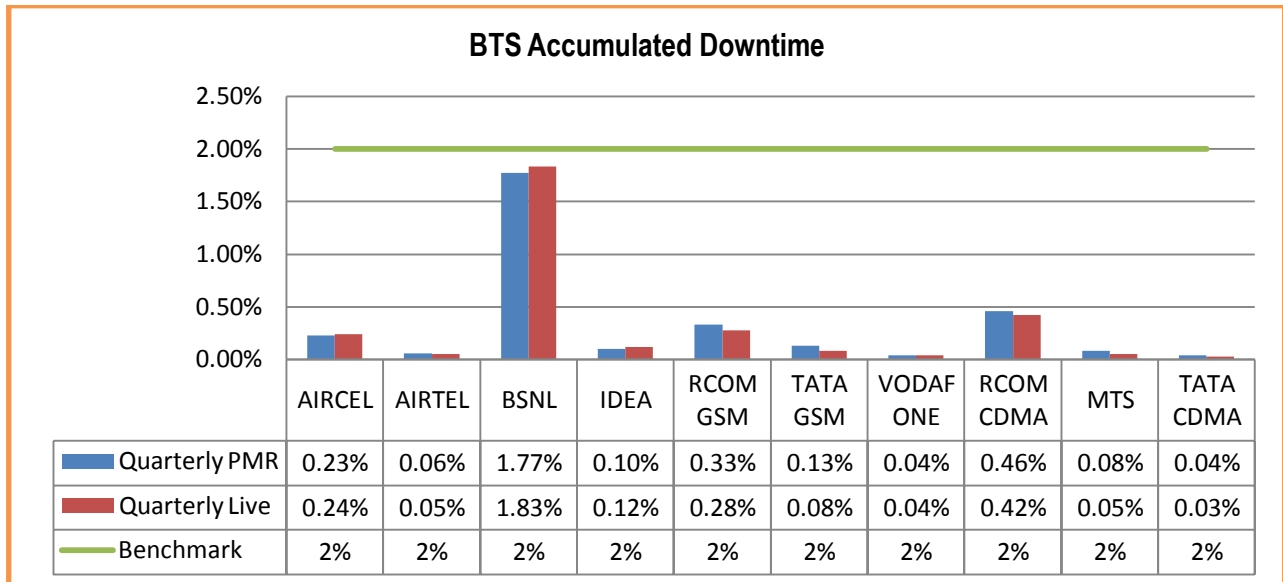
AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



8. GRAPHICAL REPRESENTATION (CMTS):

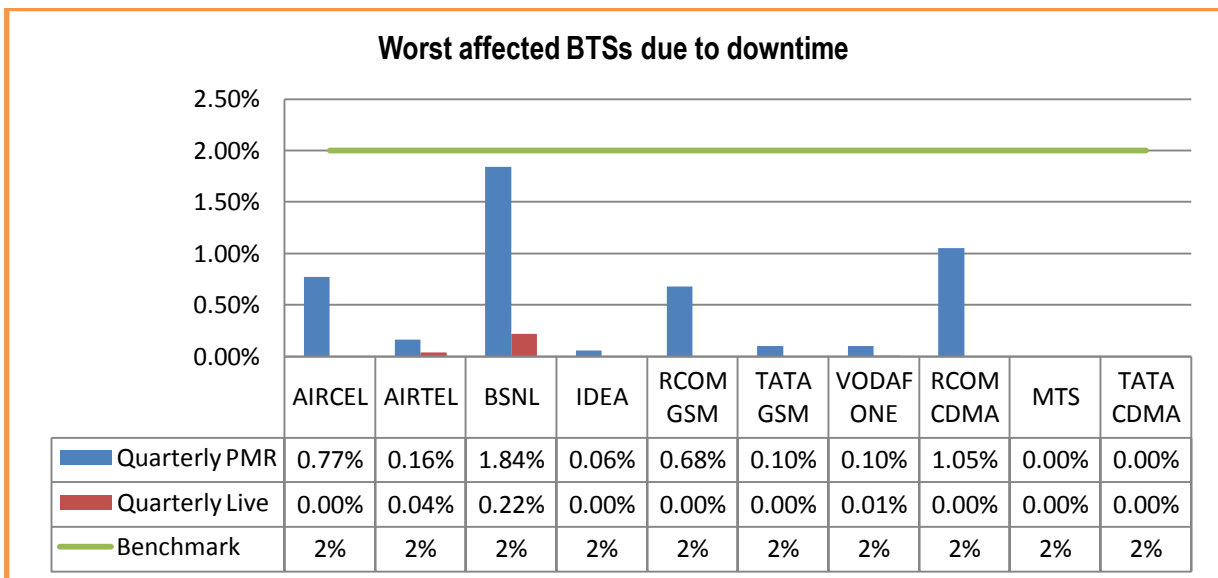
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1) BTS ACCUMULATED DOWNTIME



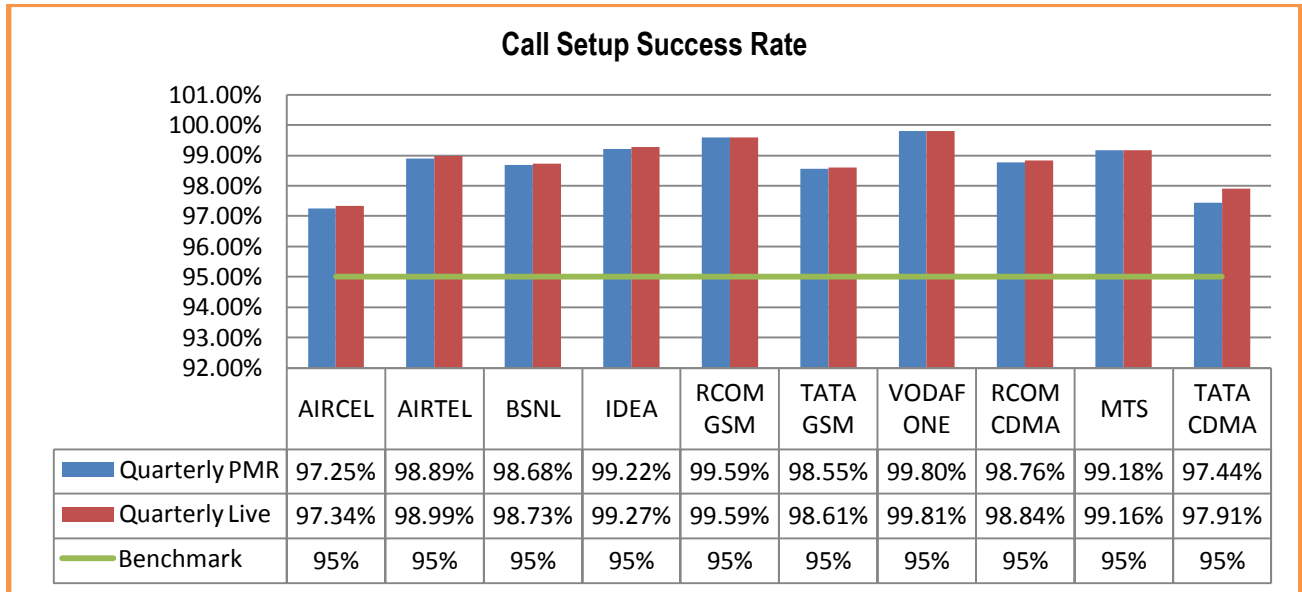
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME:



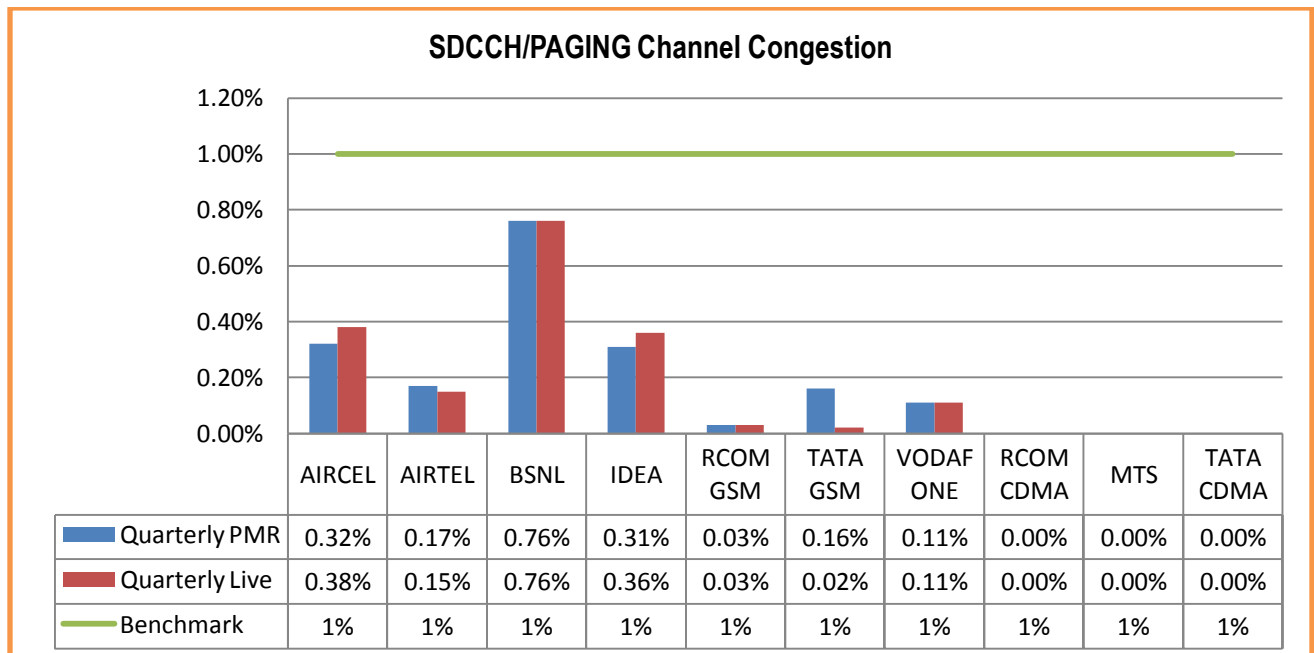
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE



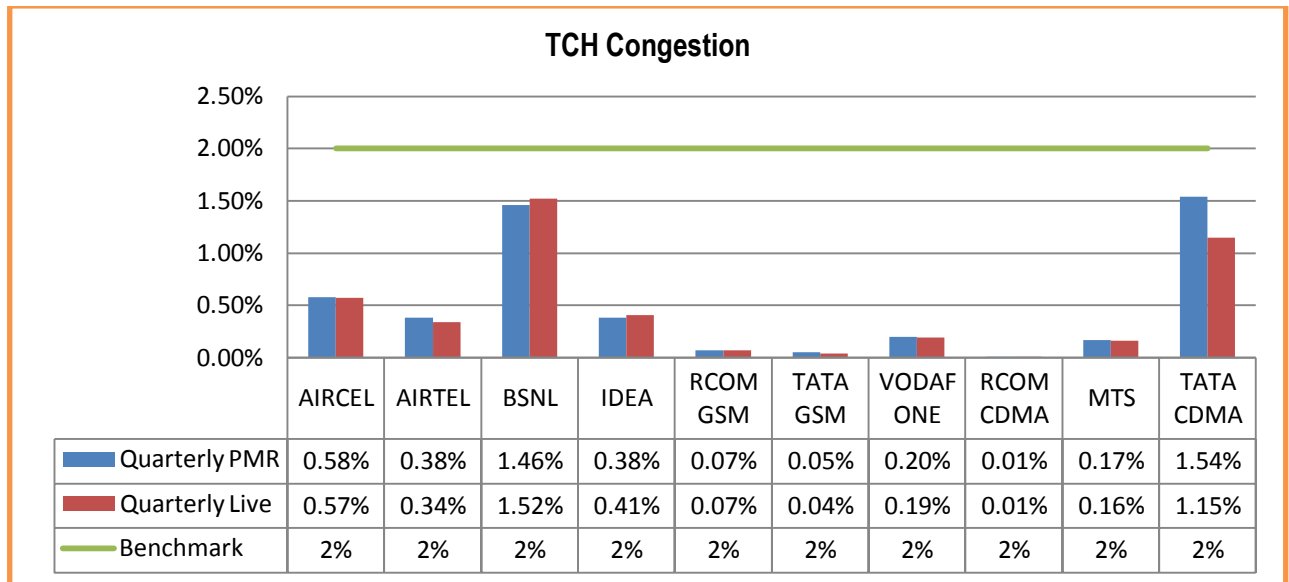
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



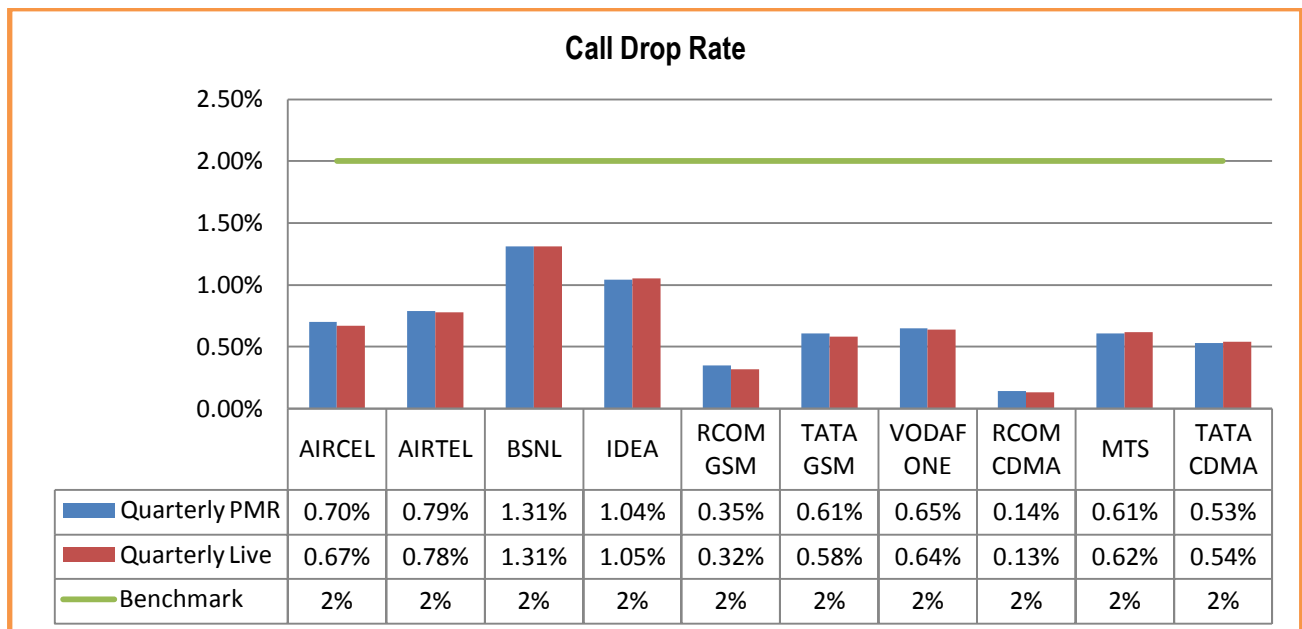
All operators are meeting the benchmarks.

5) TCH CONGESTION:



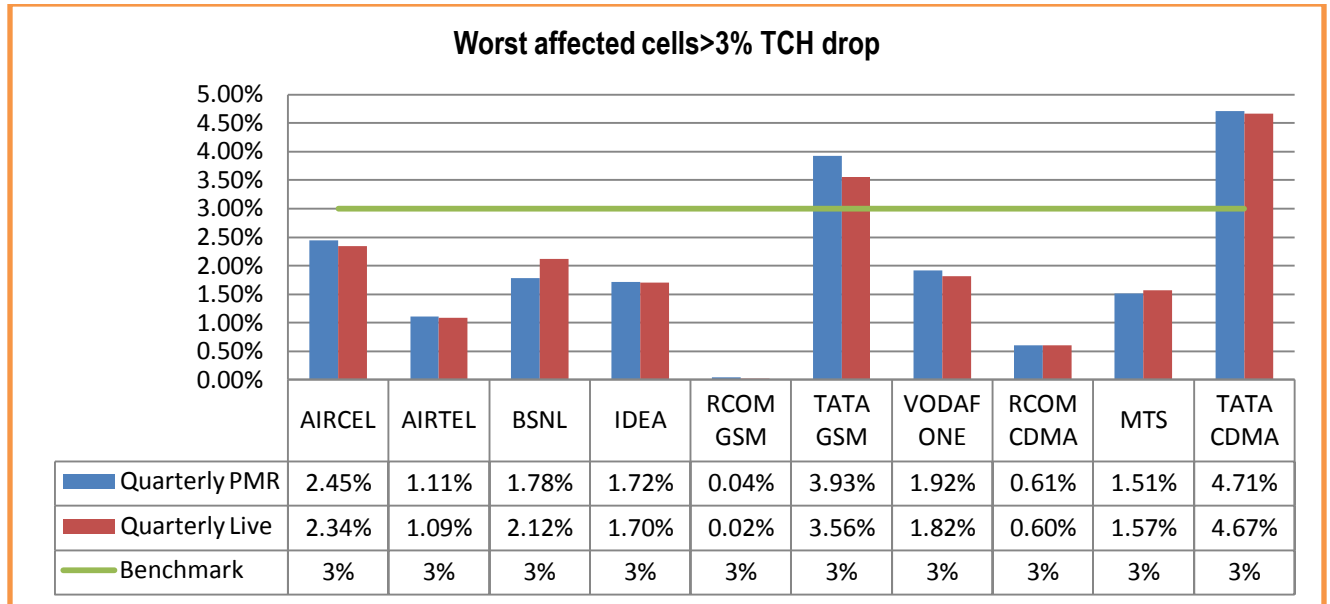
All operators are meeting the benchmarks.

6) CALL DROP RATE:



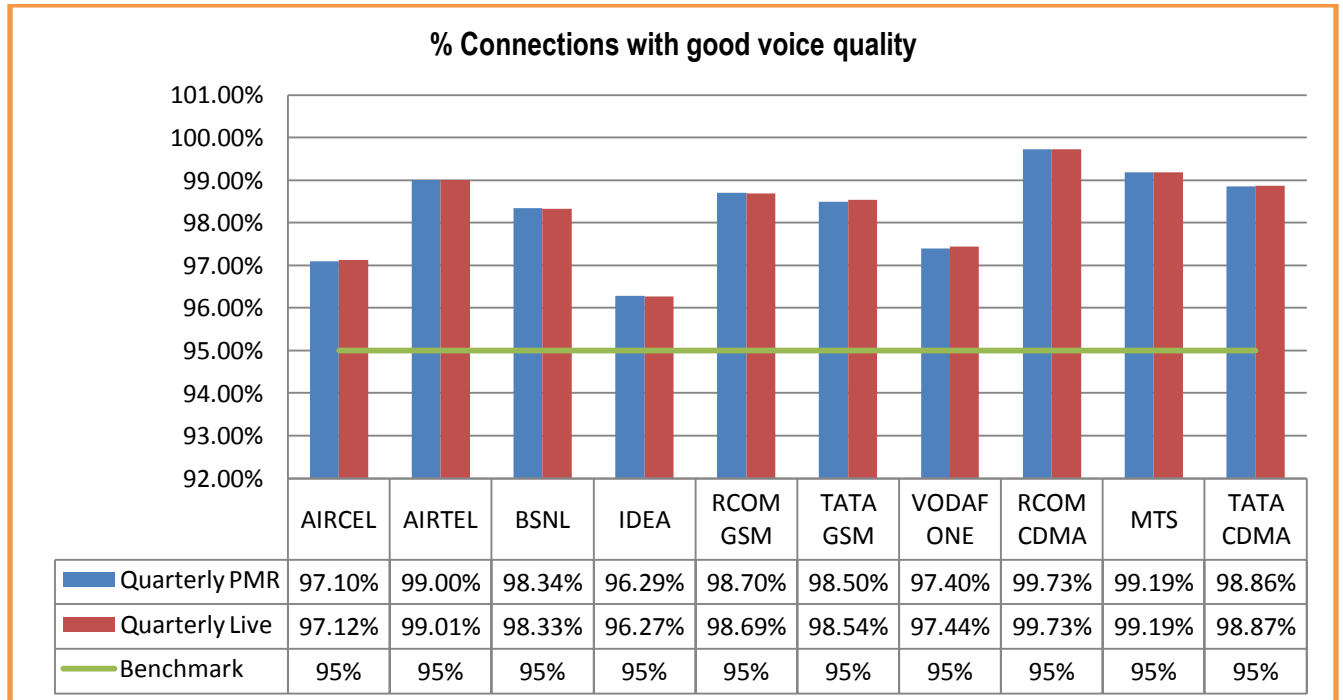
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP:



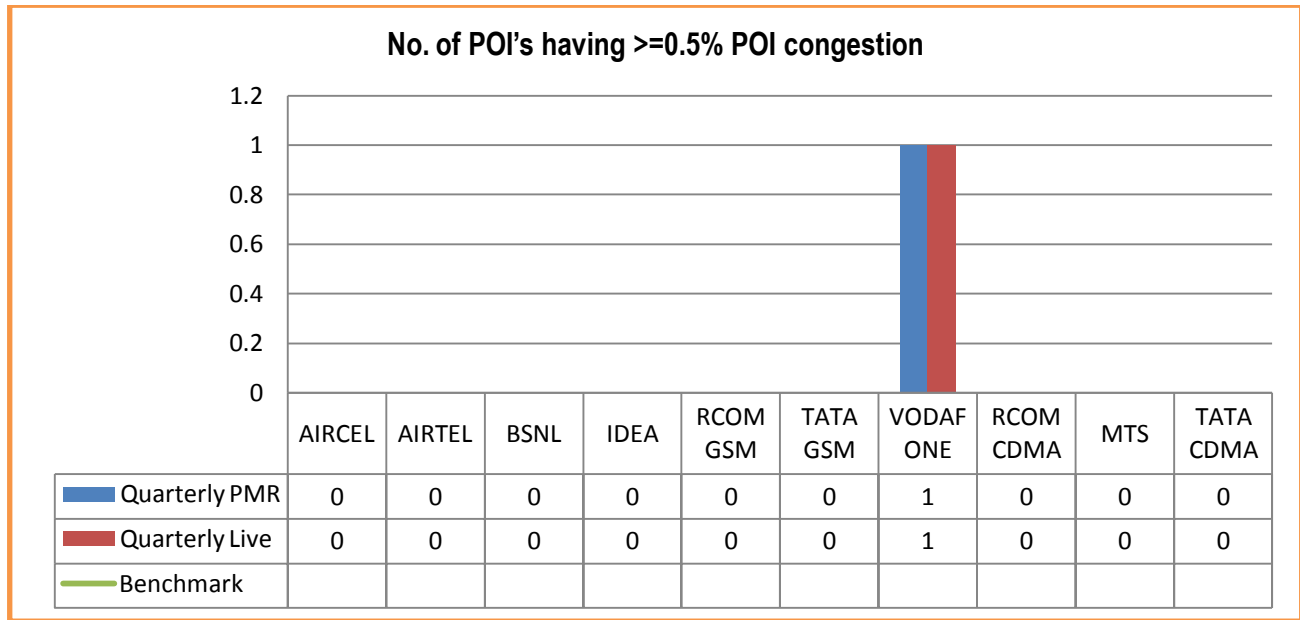
All operators are meeting the benchmarks except Tata GSM and Tata CDMA.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks.

9) POI CONGESTION:



All operators are meeting the benchmarks except Vodafone.

9. QOS AUDIT OF BASIC (WIRELINE) SERVICE PROVIDERS



9. QOS AUDIT OF BASIC TELEPHONE SERVICE (WIRELIN)

The QoS audit for basic (wire line) service is undertaken for assessment of quarterly performance of the service providers for quarter ended June-2014. **Out of 2183 (present no. of BSNL exchanges), audit was done for 107 sampled (16 - Urban and 91-Rural) exchanges**, 1 exchange each of Bharti, Sistema, RCL & Vodafone and 2 exchanges of TTL. As Rajasthan Circle is having 251 SDCAs, so 107 BSNL exchanges spread over 25 SDCAs (10% of total 251 SDCAs) have been taken for audit. List of BSNL exchanges undertaken for QoS audit is attached as Annex-1. For BSNL exchanges, performance against each parameter has been evaluated by taking average of performance value of each parameter for all the audited exchanges. The average value of each parameter has been tabulated as follows:

Sr. No	Service Provider	Circle	Urban Exchange in Rajasthan	Rural Exchange in Rajasthan	Total Exchange in Rajasthan	No. of Urban Exchanges Covered for Audit	No. of Rural Exchanges Covered for Audit
1	BSNL	Rajasthan	393	1790	2183	16	91
2	Bharti-Airtel	Rajasthan	1	0	1	1	0
3	Reliance	Rajasthan	1	0	1	1	0
4	Sistema Shayam	Rajasthan	3	0	3	1	0
5	TTL	Rajasthan	8	0	8	2	0
6	Vodafone	Rajasthan	1	0	1	1	0
Total Exchanges			407	1790	2197	22	91

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

AVERAGED AUDITED DATA FOR WIRELINE (BASIC) SERVICES – RAJASTHAN CIRCLE									
Sl. No.	Parameters	Benchmark	Period	BHARTI AIRTEL	BSNL	RELIANCE	SISTEMA SHAYAM	TTL	VODAFONE
1	Fault incidences								
	(No. of faults/100 subscribers /month)	< 5%	Quarterly	2.31%	6.26%	0.04%	1.69%	0.00%	0.80%
2	Faults Repair/Restoration Time								
	Fault repair by next working day(Urban Area)	>90%	Quarterly	95.66%	95.98%	100.00%	96.84%	NA	100.00%
	Within 3 days	100%	Quarterly	100.00%	99.67%	100.00%	100.00%	NA	100.00%
	Fault repair by next working day(Rural & hilly Area)	>90%	Quarterly	NA	97.75%	NA	97.28%	NA	NA
	Within 5 days	100%	Quarterly	NA	99.80%	NA	100.00%	NA	NA
	Mean time to Repair(MTTR)	≤8 Hrs	Quarterly	3.40	5.29	4.46	6.05	NA	1.06
3	Rent Rebate								
	Fault pending > 3 days & <7 days	Rebate for 7 days	Quarterly	0	2	0	0	0	0
	Fault Pending > 7 days & < 15 days	Rebate for 15 days	Quarterly	0	7	0	0	0	0
	Fault pending > 15 days	Rebate for 1 month	Quarterly	0	22	0	0	0	0
4	Call Completion Ratio (CCR) & Answer to seizure Ratio(ASR)								
	CCR	> 55%	Quarterly	97.43%	59.54%	NA	91.31%	89.37%	96.94%
	ASR	> 75%	Quarterly	NA	NA	92.94%	NA	NA	NA
5	Metering & Billing Performance								
	% of disputed Bills over bills issued (Post Paid)	< 0.1%	Quarterly	0.00%	0.21%	0.01%	0.02%	0.00%	0.00%
	% of Pre-paid Charging Complaints	< 0.1%	Quarterly	NA	NA	NA	NA	NA	NA
	% of billing complaints resolved within 4 weeks	100%	Quarterly	100.00%	100.00%	100.00%	100.00%	NA	NA
	Period of all refunds/payments from the date of resolution of complaints within 1weeks	100%	Quarterly	100.00%	100.00%	100.00%	100.00%	NA	NA
6	POI Congestion								
	No. of POI's having congestion >0.5%		Quarterly	0	0	0	0	0	0
7	Response Time to customer for assistance								
	Accessibility of Call centre/customer Care	>=95%	Quarterly	99.98%	97.48%	97.33%	99.28%	100.00%	96.74%
	% age of calls answered by operator(voice to voice) within 60 seconds	>=90%	Quarterly	96.62%	18.33%	98.66%	95.33%	86.00%	96.88%
8	Customer care(promptness in attending to customers request)								
	Termination / Closures	100%	Quarterly	100.00%	99.25%	100.00%	100.00%	NA	NA
	Time taken for refunds of deposit after closures	100%	Quarterly	NA	100.00%	100.00%	100.00%	NA	NA

- NA-Not Applicable

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

3 DAYS LIVE MEASUREMENT DATA FOR WIRELIN (BASIC) SERVICES - RAJASTHAN CIRCLE									
SI No.	Parameters	Benchmark	Period	BHARTI AIRTEL	BSNL	RELIANCE	SISTEMA SHAYAM	TTL	VODAFONE
Call Completion Ratio (CCR) & Answer to seizure Ratio (ASR)									
1	CCR	> 55%	Quarterly	97.50%	55.24%	NA	93.04%	89.87%	96.92%
	ASR	> 75%	Quarterly	NA	NA	92.94%	NA	NA	NA
POI Congestion									
2	No. of POI's having congestion >0.5%		Quarterly	0	0	0	0	0	0
Response Time to customer for assistance									
3	Accessibility of Call centre/customer Care	≥95%	Quarterly	100.00%	96.07%	97.26%	99.73%	100.00%	98.77%
	% age of calls answered by operator(voice to voice) within 60 seconds	≥90%	Quarterly	97.19%	19.21%	97.26%	97.89%	100.00%	96.90%

9.3 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 except **BSNL**. The performance of **BSNL** was **6.26%** for the parameter 'No. of faults/100 subscribers /month'.

Fault Repair/Restoration Time: For this parameter, **Only BSNL** failed to meet the benchmark of **fault repair within 3 days in urban & 5 days in rural areas**. The performance of **BSNL** was **99.67%** for fault repaired within 3 days in urban areas whereas their performance for the same parameters was **99.80%** in rural areas.

Mean Time to Repair: All the operators were found to be meeting the benchmark on this parameter at various exchanges.

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, **Only BSNL** failed to meet the benchmark for the parameter '**% of disputed Bills over bills issued (Post Paid)**' as **0.21%** against the benchmark **< 0.1%**.

POI Congestion: All operators were found meeting the benchmark for this parameter.

Response Time to Customer for assistance: For percentage of calls getting connected to call center and answered, all operators managed to meet the TRAI benchmark. With respect to the parameter of calls answered by operator (voice to voice within 60 sec), **BSNL and TTL** could not meet the benchmark with their performance as **18.33%** and **86.00%** respectively against the benchmark of **>= 90%**. Thus, performance of **BSNL** was very poor with respect to this parameter.

BSNL also failed to meet the benchmark for the same parameter during 3 days live measurement with their performance as **19.21%**.

Termination/Closures: All operators were found meeting the benchmark for this parameter except **BSNL**. **BSNL** could not meet the benchmark for the parameter 'Time taken for refunds of deposit after closures' with its performance as **99.25%** against the benchmark of **100%**, very marginally below the benchmark.

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

9.4 INTER OPERATOR CALL ASSESSMENT (WIRELINE SERVICES)

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in HP Circle service area 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

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT								
Calling Operators	Circle Name	Total No. of calls Made	BHARTI AIRTEL	BSNL	SISTEMA SHAYAM	RELIANCE	TTL	VODAFONE
BHARTI AIRTEL	Raj	100	--	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL	Raj	100	100.00%	--	97.00%	100.00%	93.00%	100.00%
SISTEMA SHAYAM	Raj	100	100.00%	100.00%	--	100.00%	100.00%	100.00%
RELIANCE	Raj	100	100.00%	91.00%	100.00%	--	100.00%	100.00%
TTL	Raj	100	100.00%	100.00%	100.00%	100.00%	--	100.00%
VODAFONE	Raj	100	100.00%	100.00%	100.00%	100.00%	100.00%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where calls attempted from BSNL to Sistema Shyam successful interconnection was 97.0%, BSNL to TTL was 93%, Reliance to BSNL was 91%. Thus there was no remarkable problem in interconnection from one operator to other operators.

9.5 LEVEL-1 LIVE CALLING (WIRELINE SERVICES)

LEVEL 1 LIVE CALLING										
Emergency no.	Circle Name	No. of calls made	BSNL- Jaipur SSA	BSNL- Ajmer SSA	BSNL- Alwar SSA	Bharti Airtel	SYSTEMA SHYAM	RELIANCE	TTL	VODAFONE
100	Raj	20	✓	✓	✓	✓	✓	✓	✓	✓
101	Raj	40	✓	✓	✓	✓	✓	✓	✓	✓
102	Raj	40	✓	✓	✓	✓	✓	✓	✓	✓

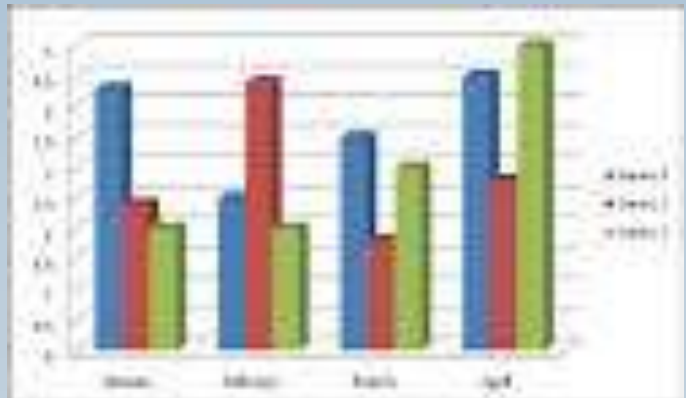
To assess the availability and efficiency of level 1 service such as police, fire, ambulance (emergency services) offered by BSNL, Bharti Airtel, Systema Shyam, Reliance, TTL and Vodafone, the calls were made from telephone provided by service providers, these services were found functional in the networks of all the service providers.

9.6 CUSTOMER CARE / HELPLINE ASSESSMENT (WIRELINE SERVICES)

LIVE CALLING TO CALL CENTRE									
Parameter.	Circle Name	BSNL-Jaipur SSA	BSNL-Ajmer SSA	BSNL-Alwar SSA	Bharti Airtel	SYSTEMA SHYAM	RELIANCE	TTL	VODAFONE
Total No. of calls Attempted	Rajasthan	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	Rajasthan	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	Rajasthan	45	40	43	100	100	100	100	100
%age of calls got answered	Rajasthan	45.00%	40.00%	43.00%	100.00%	100.00%	100.00%	100.00%	100.00%

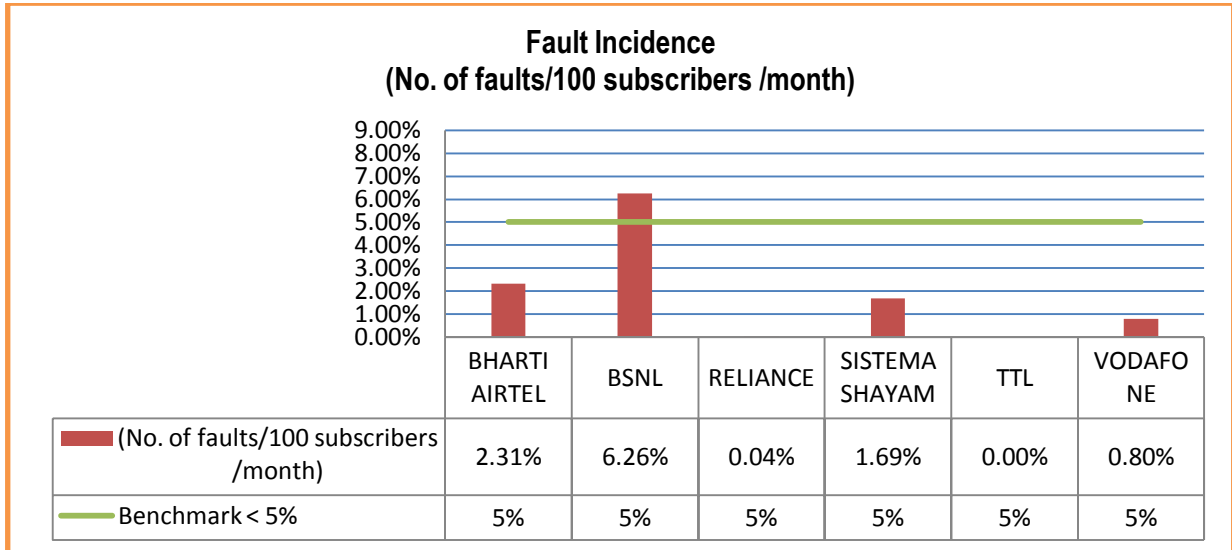
In case of calls answered by operators (voice to voice), when test calls were made to the call centers, BSNL in different SSAs could connect 45.00% (Jaipur SSA), 40.00% (Ajmer SSA) and 43.00 % (Alwar SSA) calls within 60 seconds. In case of other service providers, 100.00% calls were connected to the call center within 60 seconds.

GRAPHICAL REPRESENTATION OF BASIC (WIRELINE) SERVICES



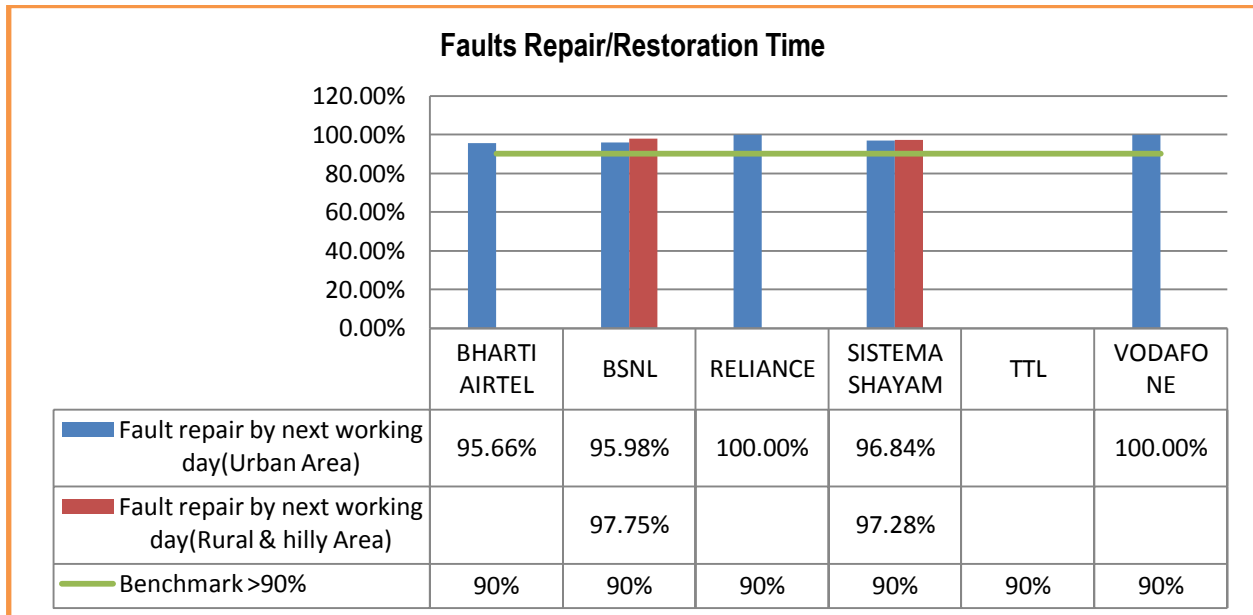
9.7 GRAPHICAL REPRESENTATION OF QUARTERLY PERFORMANCE OF THE BASIC TELEPHONE SERVICE (WIRELINER) PROVIDERS:

1) FAULT INCIDENCE:



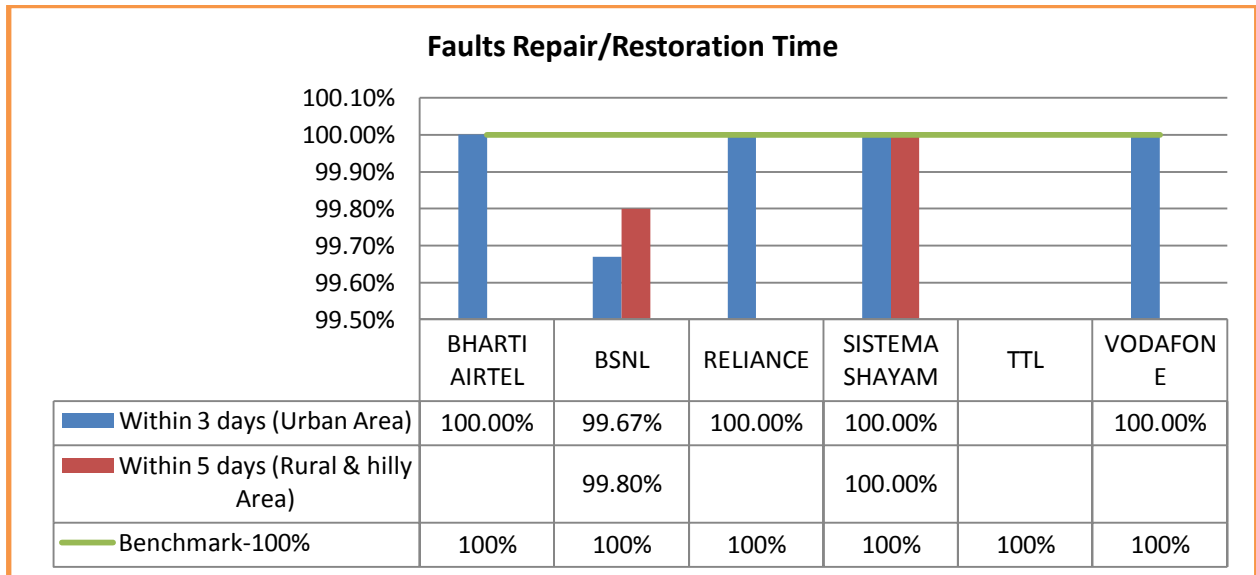
All Operators are meeting the benchmarks except BSNL.

2) FAULTS REPAIR/RESTORATION TIME:



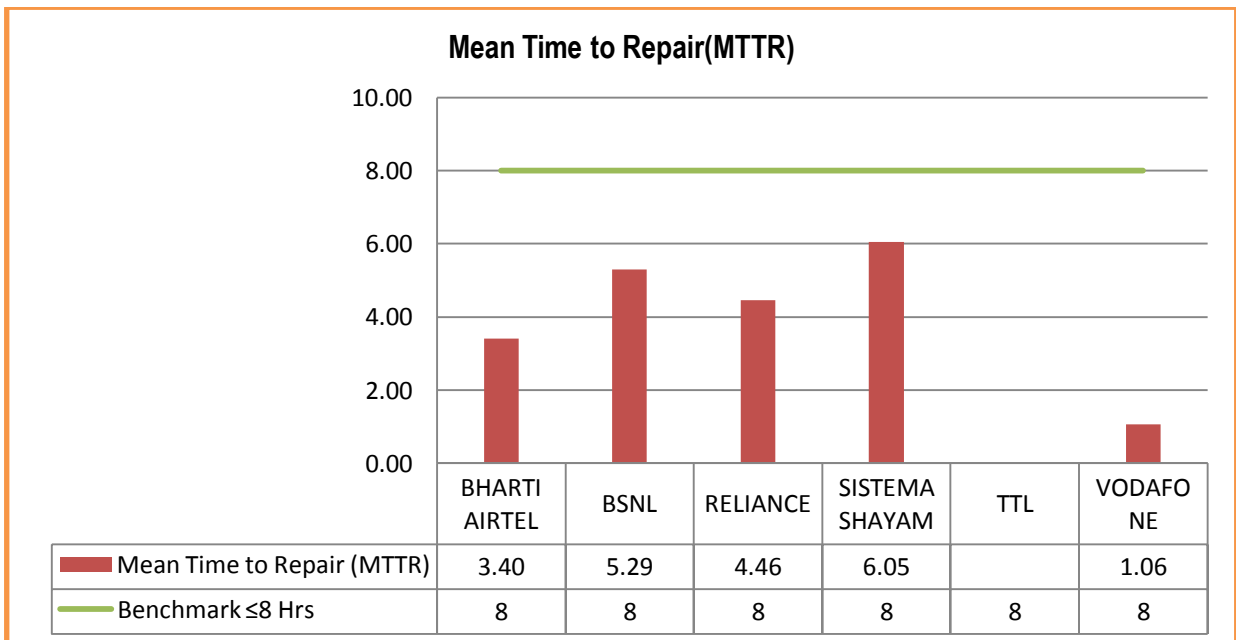
All Operators are meeting the benchmarks.

3) FAULTS REPAIR/RESTORATION TIME WITHIN 3 DAYS:



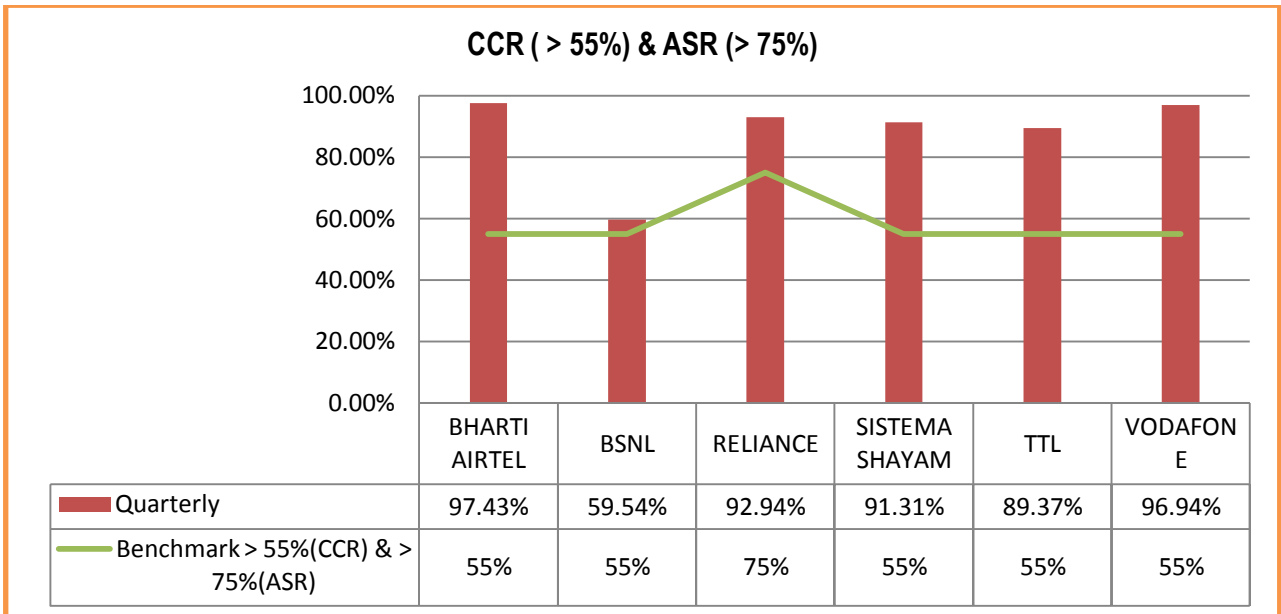
All Operators are meeting the benchmarks except BSNL.

4) MEAN TIME TO REPAIR (MTTR):



All Operators are meeting the benchmarks.

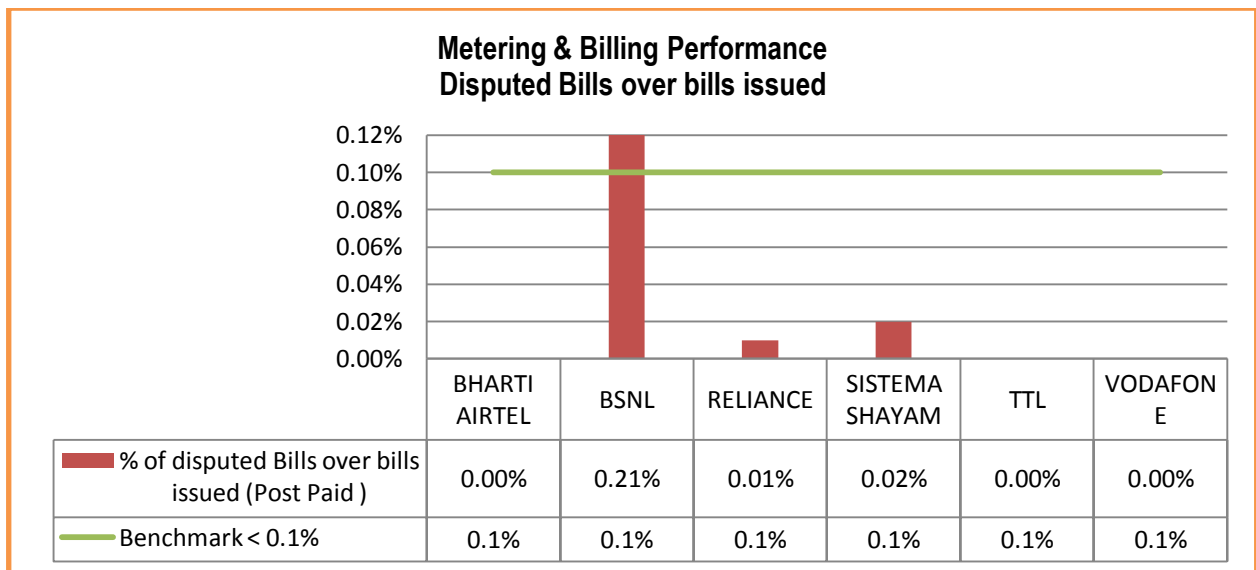
5) CALL COMPLETION RATIO (CCR) & ANSWER TO SEIZURE RATIO(ASR):



All Operators are meeting the benchmarks. Reliance has provided ASR instead of CCR.

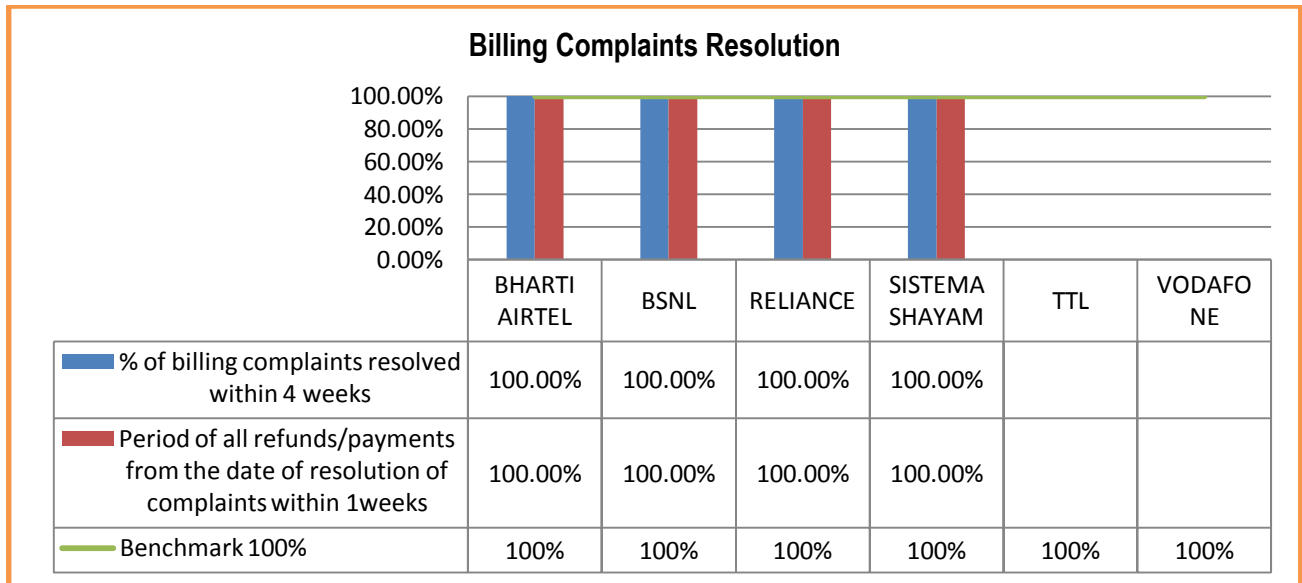
6) METERING & BILLING PERFORMANCE:

a) DISPUTED BILLS OVER BILL ISSUED :



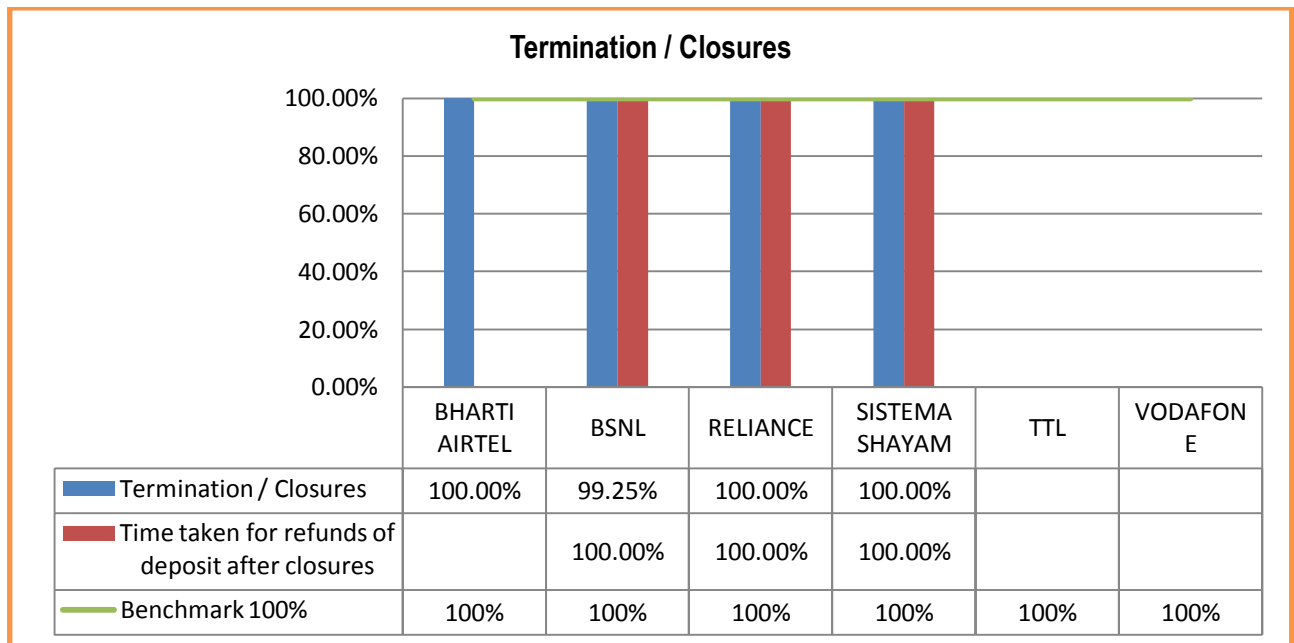
All Operators are meeting the benchmarks except BSNL.

b) BILLING COMPLAINT RESOLUTION:



All Operators are meeting the benchmarks.

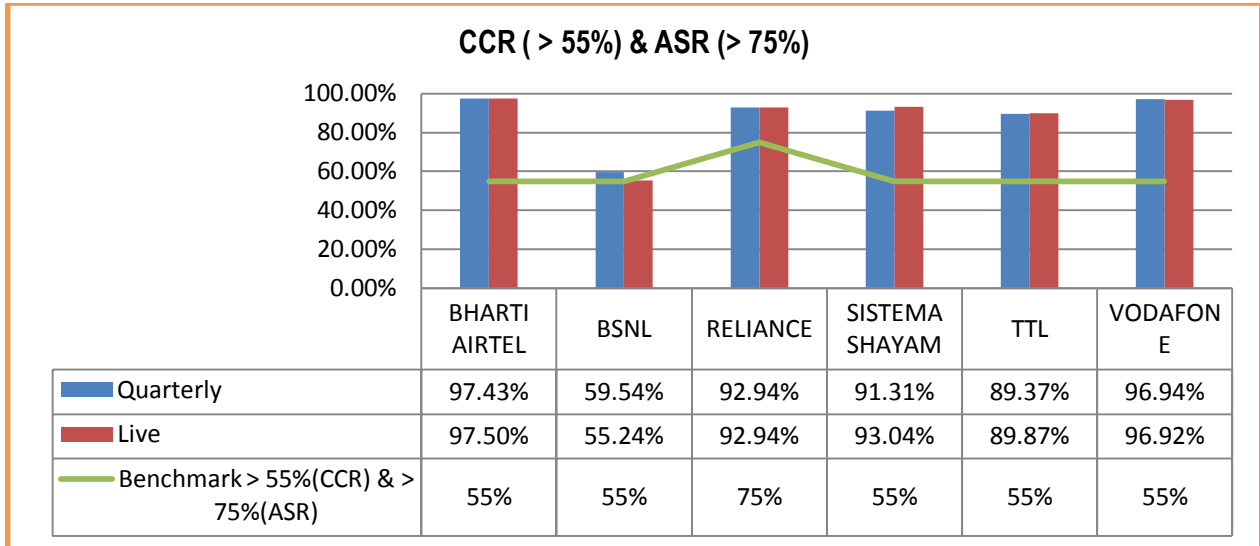
7) TERMINATION & CLOSURES:



All Operators are meeting the benchmarks except BSNL with its performance very marginally below the benchmark.

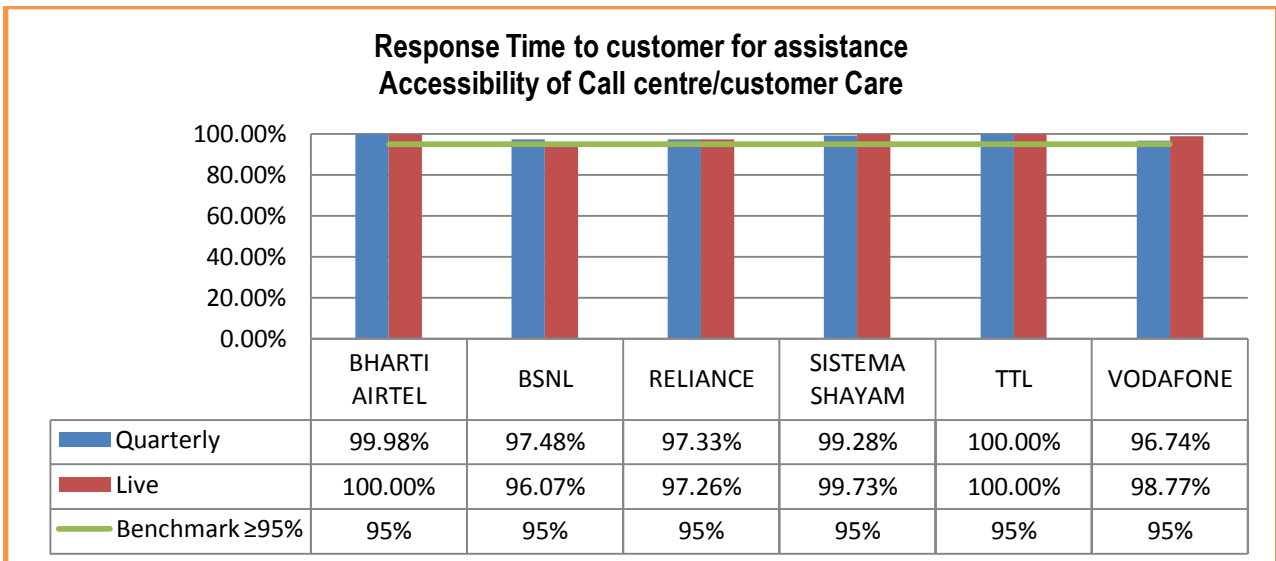
9.8 GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE BASIC TELEPHONE SERVICE (WIRELINER) PROVIDERS V/S 3-DAYS LIVE MEASUREMENT:

1) CALL COMPLETION RATIO (CCR) & ANSWER TO SEIZURE RATIO(ASR):



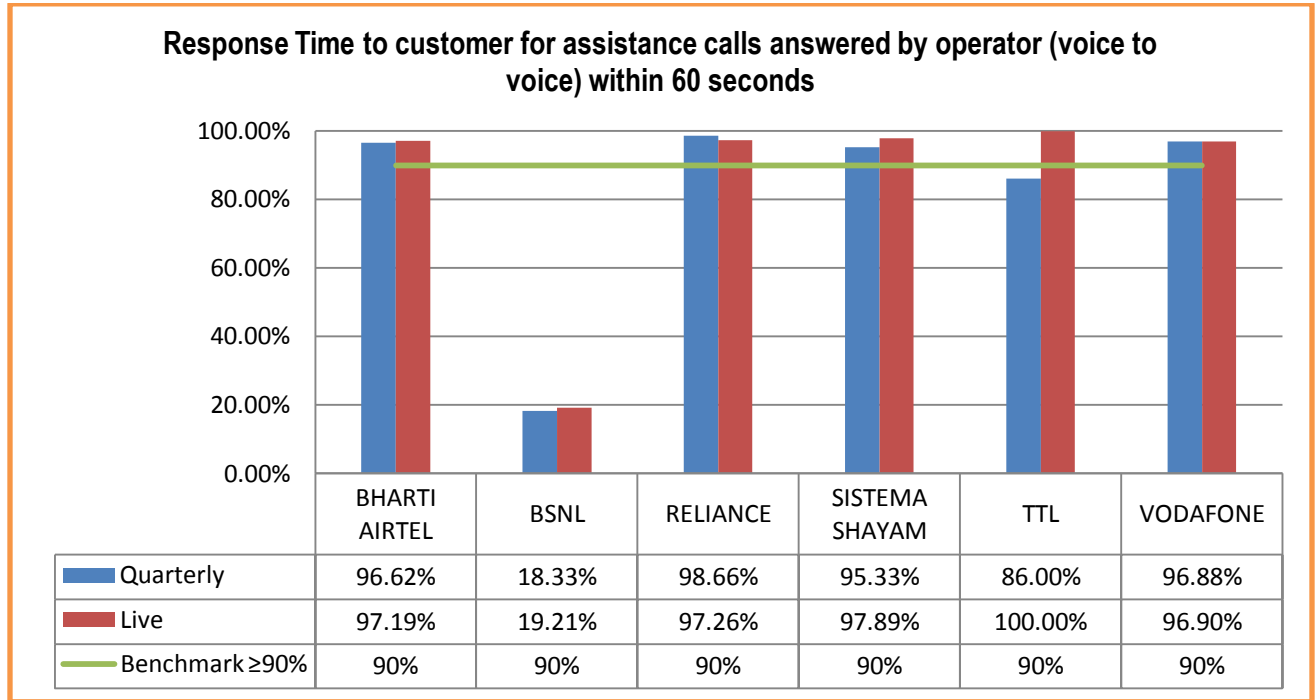
All Operators are meeting the benchmarks.

2) RESPONSE TIME TO CUSTOMER FOR ASSISTANCE ACCESSIBILITY OF CALL CENTRE/CUSTOMER CARE:



All Operators are meeting the benchmarks.

3) **RESPONSE TIME TO CUSTOMER FOR ASSISTANCE CALL ANSWERED BY OPERATORS :**



All Operators are meeting the benchmarks except BSNL (Quarterly and live) and TTL (Quarterly).

10. QOS AUDIT OF BROADBAND SERVICE PROVIDERS



10. QUALITY OF SERVICE AUDIT OF BROADBAND SERVICE PROVIDERS

TUV-SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle. Based on these criteria, 110 no. of PoPs i.e. 5% of 2183 PoPs/Exchanges, spread over 10% SDCAs have been taken for QoS audit. List of BSNL Point of Presence (PoPs) undertaken for QoS audit is attached as Annex-2. The following Broadband Service providers in Rajasthan Circle were audited for their quality of service assessment.

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

Sl. No.	Name of Broadband Service Providers	Total PoPs	Location of Audit
1	BHARTI AIRTEL LIMITED	47	Bharti Airtel Limited, Jaipur
2	BSNL	2183 (110 PoPs covered)	Bsnl Office - Ajmer, Jaipur, Alwar
3	D-VOIS BROADBAND	1	D-Vois Broadband, Jaipur
4	FIVE-NETWORKS	1	Ajmer(Varsha Palace Opp. Ram Bhawan - Ajmer)
5	NSTPL	14	NSTPL Office No.3, 3rd Floor, Shri Ji Complex, Infront of Shekhawati Hospital, Station Road, Sikar (Raj.) 332001, Sikar
6	BROADBAND PACENET INDIA PVT. LTD	3	Broadband Pacenet India Private Limited, Jaipur
7	RELIANCE COMMUNICATION LIMITED (RCL)	8	Reliance Communication Limited, Dakc, Mumbai
8	MTS (SYSTEMA SHYAM)	14	Sistema Shyam Teleservices Limited, Jaipur
9	TATA TELE SERVICES LIMITED (TTSL)	2	Tata Teleservices Ltd, Jaipur
10	TIKONA	1	Tikona Digital Networks Pvt Ltd, Jaipur

10.1 SERVICE PROVIDER PERFORMANCE REPORT BASED ON QUARTERLY MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS:

AVERAGED QUARTERLY (APR TO JUN 14) AUDIT DATA FOR BROADBAND SERVICES - RAJASTHAN CIRCLE													
Broadband Audit Data		Bench- mark	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS									
Service Provisioning/Activation Time													
1	A) No of connections registered during the period		Rajasthan	561	242	0	6	4	81	133	149	5	33
	B) Total number of connections provided within 15 days of registration on demand during the period		Rajasthan	561	242	0	6	4	81	133	149	5	33
	C) % age of connections provided within 15 days of registration on demand (subject to technical feasibility)	<15 days	Rajasthan	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	D) Total number of connections provided after 15 days of registration on demand		Rajasthan	0	0	0	0	0	0	0	0	0	0
	E) %age of connections provided after 15 days of registration on demand		Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	F) In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	credit @ Rs.10/ per day.	Rajasthan	0	0	0	0	0	0	0	0	0	0
Fault Repair/Restoration Time													
2	A) Total number of faults registered during the period		Rajasthan	633	1297	35	14	0	9	99	112	2	137
	B) Total number of faults repaired by next working day		Rajasthan	622	1272	35	14	0	8	99	107	2	128
	C) % age of faults repaired by next working day	>90%	Rajasthan	98.26%	98.07%	100.00%	100.00%	NA	85.11%	100.00%	95.54%	100.00%	93.66%
	D) Total number of faults repaired within three working days		Rajasthan	633	1295	35	14	0	9	0	112	2	137
	E) % age of faults repaired within three working days	≥99%	Rajasthan	100.00%	99.85%	100.00%	100.00%	NA	100.00%	NA	100.00%	100.00%	99.77%
Rent Rebate													
3	A) Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage)		Rajasthan	0	2	0	0	0	0	0	0	0	1



AVERAGED QUARTERLY (APR TO JUN 14) AUDIT DATA FOR BROADBAND SERVICES - RAJASTHAN CIRCLE													
Broadband Audit Data		Bench- mark	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS									
	allowance)												
	B) Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		Rajasthan	0	0	0	0	0	0	0	0	0	0
	C) Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		Rajasthan	0	0	0	0	0	0	0	0	0	0
Billing Performance													
4	A) Total bills generated during period		Rajasthan	18184	19175	1	NA	137	559	18371	3353	27	521
	B) Total complaints received from customers/ Bills disputed		Rajasthan	0	26	0	NA	0	0	58	1	0	4
	C) Billing complaints per 100 bills issued	<2%	Rajasthan	0%	0.14%	NA	NA	0.00%	0.00%	0.32%	0.03%	0.00%	0.77%
	D) Total number of complaints resolved in 4 weeks from date of receipt		Rajasthan	0	26	0	NA	0	0	58	1	0	4
	E) %age billing complaints resolved in 4 weeks	100%	Rajasthan	NA	100.00%	NA	NA	NA	NA	100.00%	100.00%	NA	100.00%
	F) Total number of cases requiring refund of deposits after closure		Rajasthan	10	393	0	NA	0	0	0	3	0	0
	G) Total number of cases where refund was made in <60 days		Rajasthan	10	393	0	NA	0	0	0	3	0	0
	H) Percentage cases in which refund received within 60 days	100%	Rajasthan	100.00%	100.00%	NA	NA	NA	NA	NA	100.00%	NA	NA
Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)													
5	A) Total number of calls received by the operator		Rajasthan	5305	7301	2725	45	0	9	30396	11430	4	1050
	B) Total number of calls answered by the operator within 60 seconds		Rajasthan	4976	1060	2623	45	0	8	28995	10896	3	630

AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-RAJASTHAN CIRCLE



AVERAGED QUARTERLY (APR TO JUN 14) AUDIT DATA FOR BROADBAND SERVICES - RAJASTHAN CIRCLE													
Broadband Audit Data		Bench- mark	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS									
	C) % age calls answered by the operator in 60 seconds	>60%	Rajasthan	93.80%	14.52%	96.27%	100.00%	NA	88.88%	95.39%	95.33%	84.53%	60.00%
	D) Total number of calls answered by the operator within 90 seconds		Rajasthan	5035	1520	NA	45	0	9	29641	NP	4	853
	E) % age calls answered by the operator within 90 seconds	>80%	Rajasthan	94.91%	20.82%	NA	100%	NA	100.00%	97.52%	NP	92.38%	81.24%
6	Bandwidth Utilization/ Throughput:												
	POP to ISP Gateway Node [Intra-network] Link(s)												
6.1	A) Total Bandwidth Available at the link for the period days		Rajasthan	4910	2048	110	20	22	154	2000	945	1024	153
	B) Total Bandwidth utilized during the period during TCBH (In Mpbs)		Rajasthan	2737	484	45	11.40	18	82	187	273	274	125
	C) % age Bandwidth utilized during the period	<80%	Rajasthan	55.74%	23.61%	41.00%	57.00%	83.10%	53.25%	9.35%	28.85%	26.79%	81.59%
	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity												
6.2	A) Total number of upstream links for International connectivity		Rajasthan	NA	91	2	NA	1	NA	8	2	1	2
	B) Number of Links having Bandwidth utilization > 90% during TCBH		Rajasthan	NA	0	0	NA	1	NA	0	0	1	0
	C) Total international bandwidth available from ISP Node to IGSP/NIXI/NAP		Rajasthan	NA	288067	110	NA	22	NA	74000	1022	9900	115
	D) Total international bandwidth utilization during peak hours (TCBH) in Mpbs		Rajasthan	NA	158557	45	NA	18	NA	28503	685	9583	70
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%	Rajasthan	NA	55.04%	41.00%	NA	83.10%	NA	38.51%	67.05%	96.80%	60.78%
	Broadband Connection Speed (download) - from ISP Node to User												
6.3	A) Total committed download speed to the sample subscribers (In mpbs)		Rajasthan	2	2	1	2	22	2	NP	2	2	2
	B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs)		Rajasthan	2	1.94	0.97	1.93	18	1.90	NP	1.70	1.86	2
	C) % age subscribed speed available to the subscriber during TCBH	>80%	Rajasthan	100.00%	97.19%	100.00%	96.50%	83.10%	95.00%	NP	84.98%	93.16%	100.00%
7	Service Availability/Uptime												



AVERAGED QUARTERLY (APR TO JUN 14) AUDIT DATA FOR BROADBAND SERVICES - RAJASTHAN CIRCLE													
Broadband Audit Data		Bench- mark	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS									
	A) Total operational Hours		Rajasthan	13238016	728	728	728	728	728	728	728	1456	728
	B) Total downtime (In hours)		Rajasthan	398	0	0	0	6	3	4	0	1	0
	C) Total time when the service was available (In Hrs)		Rajasthan	13237617	728	728	728	722	725	724	728	1455	728
	D) % age of Service availability uptime	>98%	Rajasthan	99.99%	100.00%	100.00%	100.00%	99.15%	99.63%	99.45%	100.00%	99.91%	100.00%
Packet Loss													
8	A) Total number of ping packets transmitted		Rajasthan	1000	NP	1000	30333	1000	NP	30333	30333	1000	NP
	B) Total number of ping packets lost		Rajasthan	0	NP	0	7	0	NP	190	16	3	NP
	C) % age packet loss	<1%	Rajasthan	0.00%	NP	0.00%	0.02%	0.00%	NP	0.63%	0.05%	0.30%	NP
9	Network latency (for wired broadband access)												
Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway													
9.1	A) Total number of ping packets transmitted		Rajasthan	1000	500	1000	30333	NA	NA	1000	30333	1000	NA
	B) Total round trip time for all the ping packets transmitted during the period		Rajasthan	35	21	48	2177000	NA	NA	16	444	57	NA
	C) Average round trip time for all the ping transmitted	<120 ms	Rajasthan	35	21	48	71	NA	NA	0.02	15	57	NA
Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)													
9.2	A) Total number of ping packets transmitted		Rajasthan	1000	NP	1000	NA	NA	NP	1000	NA	1000	NA
	B) Total round trip time for all the ping packets transmitted during the period		Rajasthan	76	NP	172	NA	NA	NP	14	NA	89	NA
	C) Average round trip time for all the ping transmitted	<350 ms	Rajasthan	76	NP	172	NA	NA	NP	0.01	NA	89	NA
Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)													
9.3	A) Total number of ping packets transmitted		Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	B) Total round trip time for all the ping packets transmitted during the period		Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C) Average round trip time for all the ping transmitted	<800 ms	Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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



10.2 SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS:

3 DAYS LIVE DATA FOR BROADBAND SERVICES - RAJASTHAN CIRCLE

3 days live Broadband Audit Data		Bench- mark	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS									
Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)													
1	A) Total number of calls received by the operator		Rajasthan	172	270	0	1	0	1	2236	537	2	33
	B) Total number of calls answered by the operator within 60 seconds		Rajasthan	164	47	0	1	0	1	2171	526	1	20
	C) % age calls answered by the operator in 60 seconds	>60%	Rajasthan	95.54%	17.26%	NA	100.00%	NA	100.00%	97.10%	97.89%	79.64%	60.61%
	D) Total number of calls answered by the operator within 90 seconds		Rajasthan	164	64	0	1	0	1	2236	NP	2	26
	E) % age calls answered by the operator within 90 seconds	>80%	Rajasthan	95.54%	23.80%	NA	100.00%	NA	100.00%	100.00%	NP	100.00%	78.79%
2	Bandwidth Utilization/ Throughput:												
POP to ISP Gateway Node [Intra-network] Link(s)													
2.1	A) Total Bandwidth Available at the link for the period days		Rajasthan	24	5120	110	20	25	154	2000	961	1024	153
	B) Total Bandwidth utilized during the period during TCBH (In Mbps)		Rajasthan	12	2344	19	12	20	106	250	316	277	113
	C) % age Bandwidth utilized during the period	<80%	Rajasthan	51.24%	45.78%	17.27%	58.50%	80.00%	68.83%	12.49%	32.91%	27.05%	73.73%
ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity													
2.2	A) Total number of upstream links for International connectivity		Rajasthan	NA	46	2	NA	1	NA	8	2	1	2
	B) Number of Links having Bandwidth utilization > 90% during TCBH		Rajasthan	NA	0	0	NA	0	NA	0	0	1	0
	C) Total international bandwidth available from ISP Node to IGSP/NIXI/NAP		Rajasthan	NA	125440	110	NA	25	NA	74000	1022	9000	115
	D) Total international bandwidth utilization during peak hours (TCBH) in Mbps		Rajasthan	NA	81512	15	NA	20	NA	39140	748	4531	96
	E) %age International Bandwidth utilization during peak hours (TCBH)	<80%	Rajasthan	NA	64.98%	13.33%	NA	80.00%	NA	52.89%	73.15%	50.34%	83.50%
Broadband Connection Speed (download) - from ISP Node to User													
2.3	A) Total committed download speed to the sample subscribers (In mpbs)		Rajasthan	2	9	1	2	25	1.33	1.50	2	2	2
	B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs)		Rajasthan	2	7.18	0.98	1.86	22	1.12	1.30	1.65	1.86	2



3 DAYS LIVE DATA FOR BROADBAND SERVICES - RAJASTHAN CIRCLE

3 days live Broadband Audit Data		Bench- mark	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
S/ N	Name of Parameter			BROADBAND SERVICE PROVIDERS									
	C) % age subscribed speed available to the subscriber during TCBH	>80%	Rajasthan	100.00%	82.88%	98.00%	93.00%	88.00%	84.21%	86.67%	82.50%	93.00%	100.00%
Packet Loss													
3	A) Total number of ping packets transmitted		Rajasthan	1000	7000	1000	1000	1000	1000	1000	1000	1000	1000
	B) Total number of ping packets lost		Rajasthan	0	0	0	0	0	1	0	0	4	0
	C) % age packet loss	<1%	Rajasthan	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.40%	0.00%
4	Network latency (for wired broadband access)												
Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway													
4.1	A) Total number of ping packets transmitted		Rajasthan	1000	4000	1000	1000	NA	NA	1000	1000	1000	NA
	B) Total round trip time for all the ping packets transmitted during the period		Rajasthan	1000	433	1000	1000	NA	NA	NA	1000	1000	NA
	C) Average round trip time for all the ping transmitted	<120 ms	Rajasthan	35	43	68	50	NA	NA	1	17	46	NA
Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial)													
4.2	A) Total number of ping packets transmitted		Rajasthan	1000	4000	1000	1000	NA	1000	1000	1000	1000	NA
	B) Total round trip time for all the ping packets transmitted during the period		Rajasthan	1000	558	1000	999	NA	998	NA	998	1000	NA
	C) Average round trip time for all the ping transmitted	<350 ms	Rajasthan	76	128	170	164	NA	154	2	243	80	NA
Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite)													
4.3	A) Total number of ping packets transmitted		Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	B) Total round trip time for all the ping packets transmitted during the period		Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C) Average round trip time for all the ping transmitted	<800 ms	Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Service Availability/Uptime													
5	A) Total operational Hours		Rajasthan	1323432	72	72	72	72	72	72	72	144	72
	B) Total downtime (In hours)		Rajasthan	0	0	0	0	11.50	0	0	0	0	0
	C) Total time when the service was available (In Hrs)		Rajasthan	1323432	72	72	72	60.50	72	72	72	144	72
	D) % age of Service availability uptime	>98%	Rajasthan	100.00%	100.00%	100.00%	100.00%	84.03%	100.00%	100.00%	100.00%	100.00%	100.00%

NA: Not Applicable
NP: Data not provided

10.3 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.

Fault Repair/Restoration Time: With regards to this parameter the performance of the service providers was within TRAI norms except **Pacenet**, its achievement level was **85.11%** for fault Repair by next working day.

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 except **BSNL**. BSNL could not meet the benchmark for the parameter “% age calls answered by the operator within 60 seconds”; and “% age calls answered by the operator within 90 seconds”; its achievement level was **14.52%** and **20.82%** respectively.

BSNL also failed to meet the benchmark for the same parameter during 3 days live measurement and its achievement level was **17.26% (Within 60 Sec.)** and **23.80% (Within 90 Sec.)** respectively.

Tikona could not meet the benchmark for the parameter “% age calls answered by the operator within 90 seconds” during 3 days live measurement, its achievement level for this parameter was **78.79%**.

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 NSTPL, TTSL and Tikona. **NSTPL** and **Tikona** could not meet the benchmark for the parameter “POP to ISP Gateway Node [Intra-network] Link(s)”; their achievement level was **83.10%** and **81.59%** respectively. **NSTPL** and **TTSL** also could not meet the benchmark for the parameter “%age International Bandwidth utilization during peak hours” with their achievement level was **83.10%** and **96.80%** respectively.

Live measurement: The performance of **Tikona** for the parameter “ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity” was **83.50%** during 3 days live measurement against the benchmark of <80%.

Service Availability/Uptime: All service providers were found meeting the benchmark for this parameter except **NSTPL** during live measurement. The performance of NSTPL in live measurement was **84.03%** against the benchmark of >98%.

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 were meeting the benchmark prescribed by TRAI.

10.4 CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES											
Parameter	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	FIVE NETWORK	NSTPL	PACENET	RCL	MTS	TTSL	TIKONA
Total No. of calls Attempted	Rajasthan	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator within 60 seconds	Rajasthan	100	71	100	100	100	100	100	98	88	80
% age calls answered by the operator in 60 seconds	Rajasthan	100.00%	71.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.00%	88.00%	80.00%
Total number of calls answered by the operator within 90 seconds	Rajasthan	100	73	100	100	100	100	100	100	100	88
% age calls answered by the operator within 90 seconds	Rajasthan	100.00%	73.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	88.00%

In case of calls answered by operators (voice to voice) within 60 seconds and 90 seconds, when test calls were made to the call centers, all broadband service providers were found meeting the TRAI prescribed benchmark. **BSNL, MTS, TTSL and Tikona** could connect 71%, 98%, 88% and 80% calls respectively within 60 seconds whereas, BSNL and Tikona could connect 73%, and 88% calls respectively within 90 seconds.

10.5 LIVE CALLING FOR BILLING COMPLAINTS

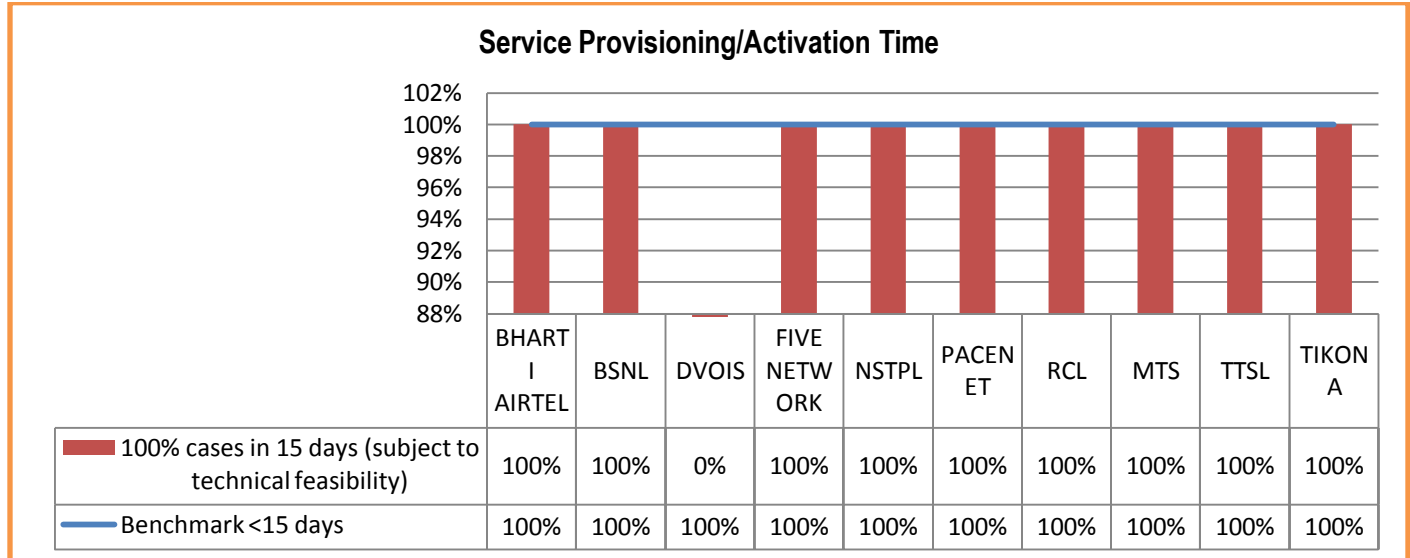
TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS								
Parameter	Circle Name	BHARTI AIRTEL	BSNL	DVOIS	NSTPL	RCL	MTS	TIKONA
Total No. of calls Attempted	Raj	1	26	3	12	100	3	13
Total No. of calls Answered	Raj	1	26	3	12	100	3	13
Cases resolved within 4 weeks	Raj	1	26	3	12	100	3	13
%age of cases resolved	Raj	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls while few others reported that their complaints have been resolved but did not remember about the duration of their resolution. However, most of the customers reported their satisfaction on resolution of the billing complaints.

GRAPHICAL REPRESENTATION OF BROADBAND SERVICES

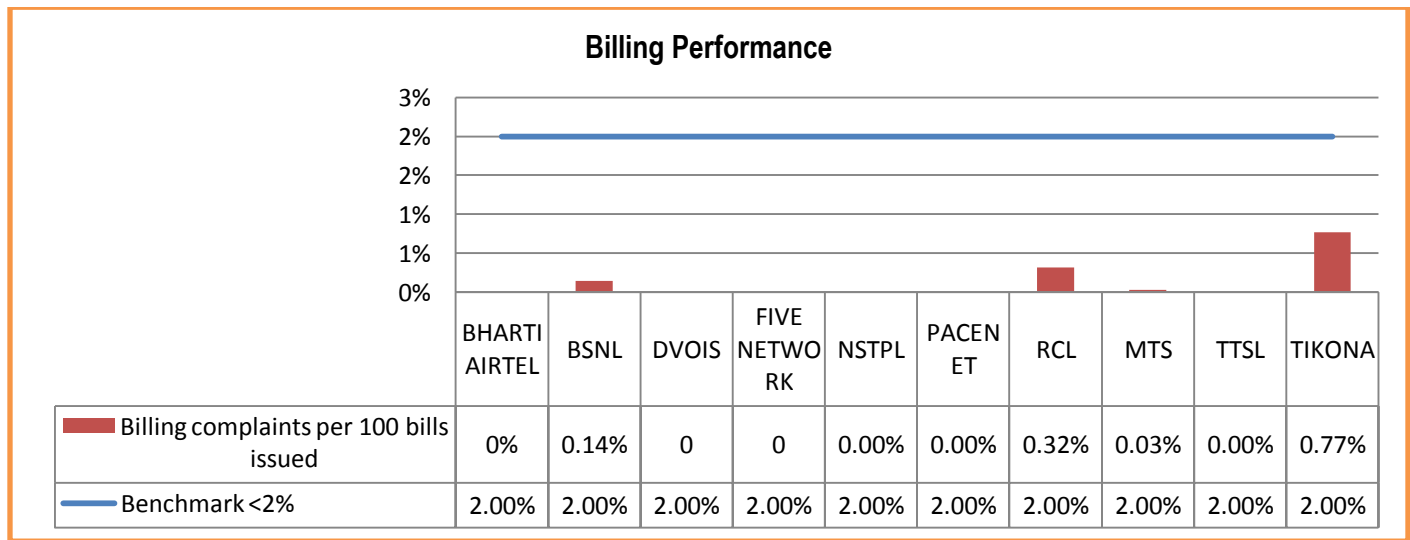
10.6 GRAPHICAL REPRESENTATION OF QUARTERLY PERFORMANCE OF BROADBAND SERVICE PROVIDERS:

1. SERVICE PROVISIONING/ACTIVATION TIME:



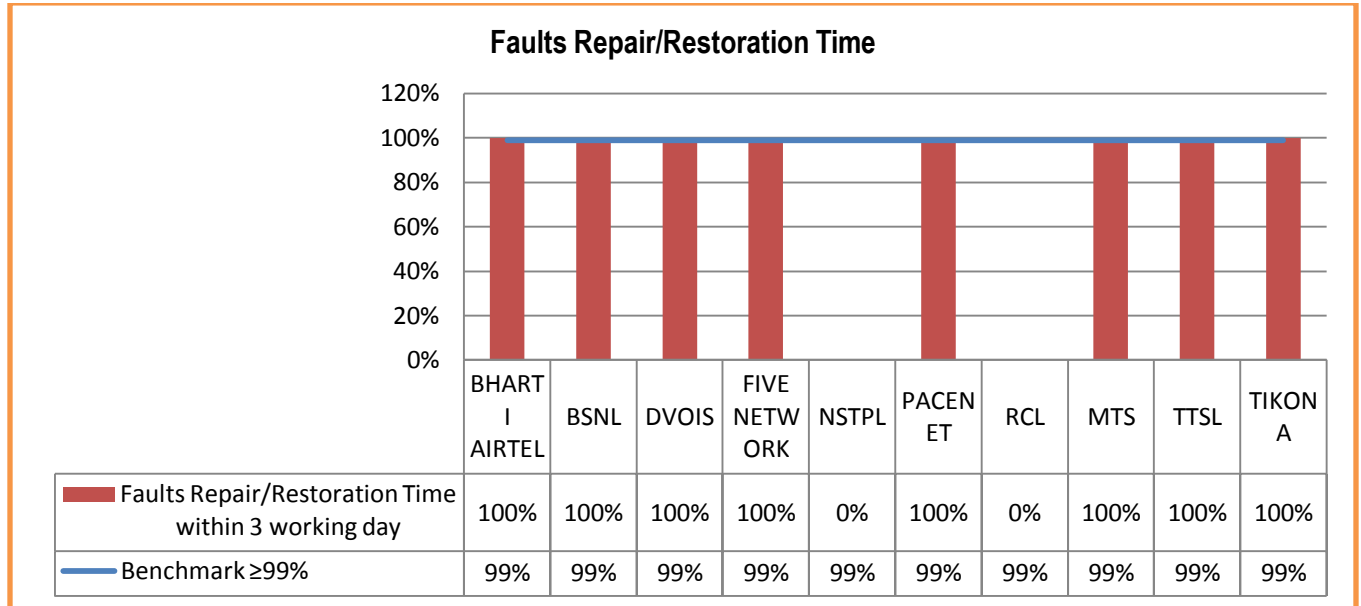
All Operators are meeting the benchmarks.

2. BILLING PERFORMANCE:



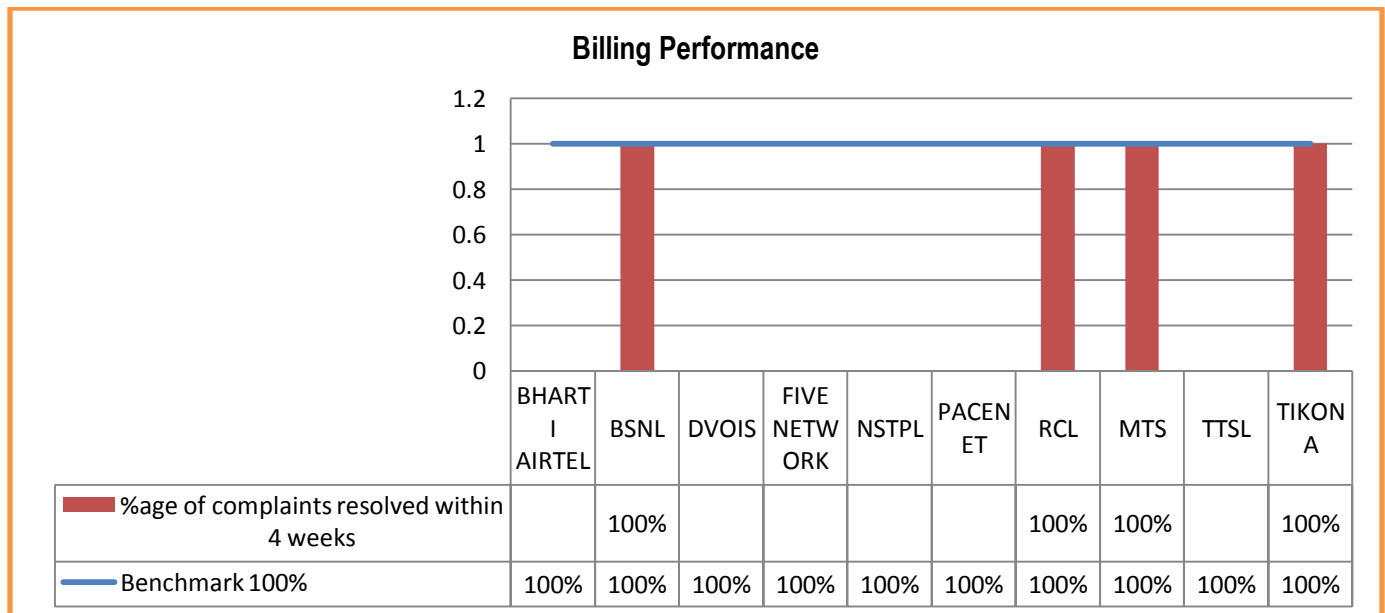
All Operators are meeting the benchmarks.

3. FAULTS REPAIR/RESTORATION TIME:



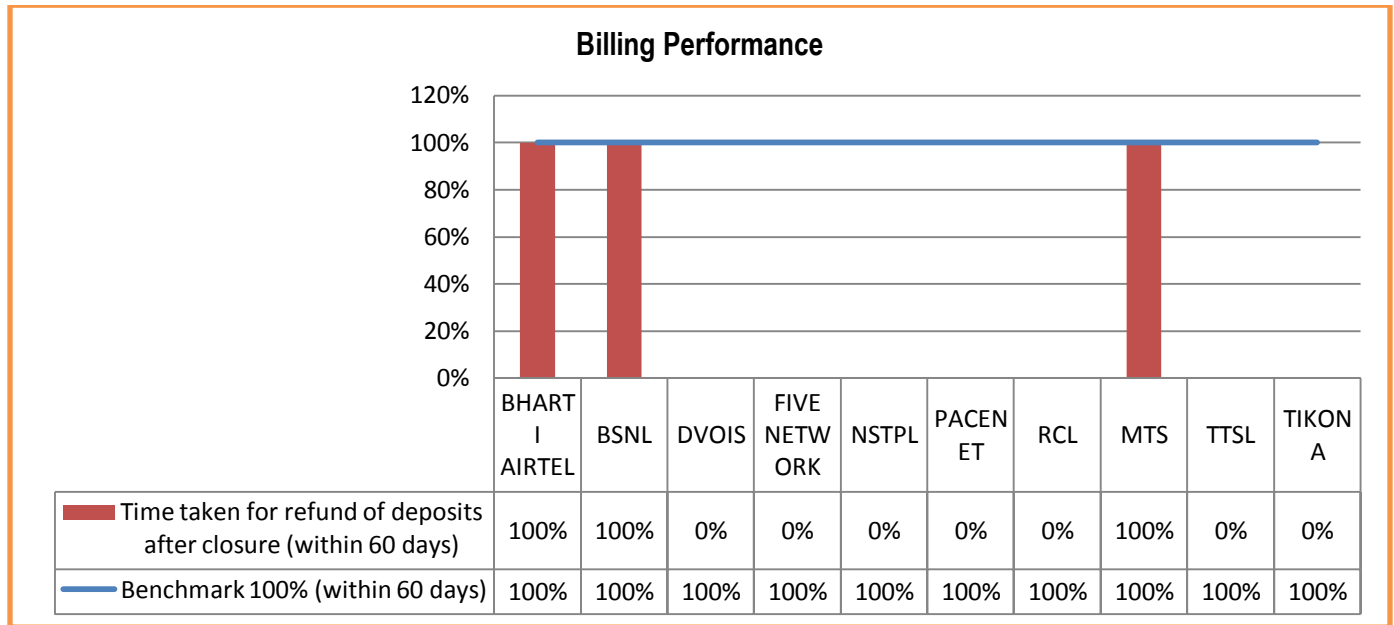
All Operators are meeting the benchmarks.

4. COMPLAINT RESOLUTION:



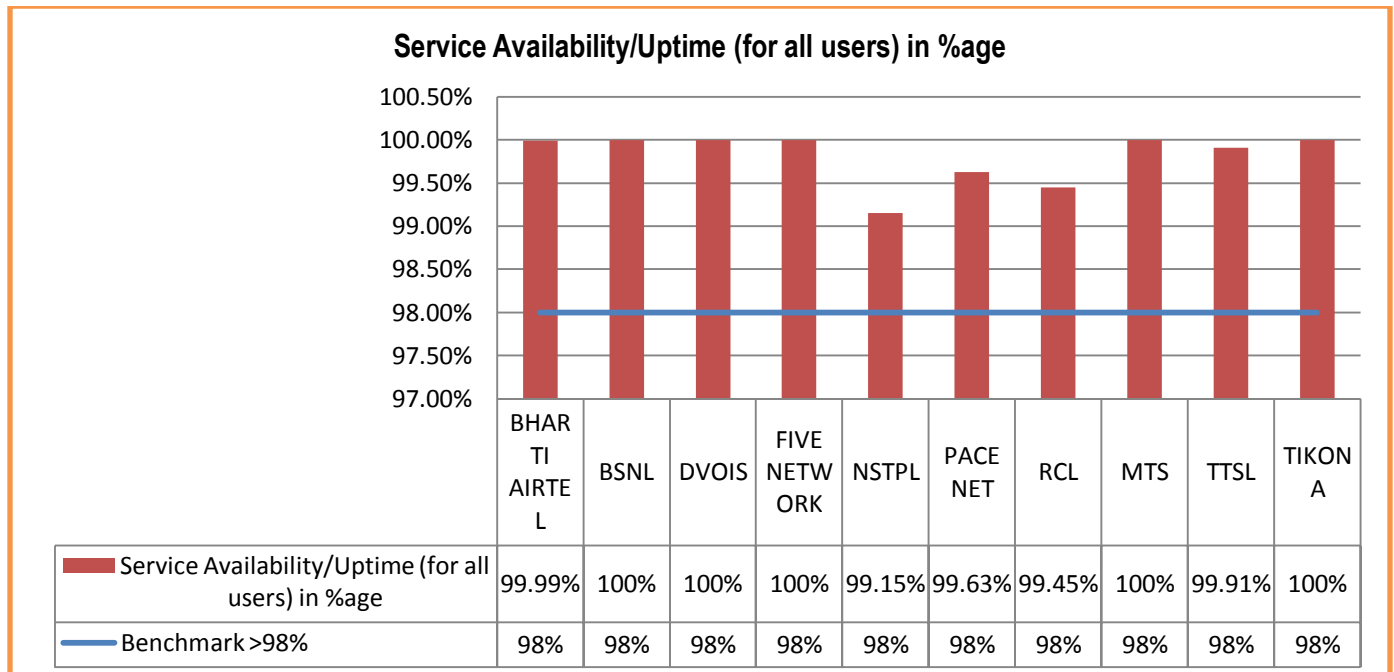
All Operators are meeting the benchmarks.

5. REFUND:



All Operators are meeting the benchmarks.

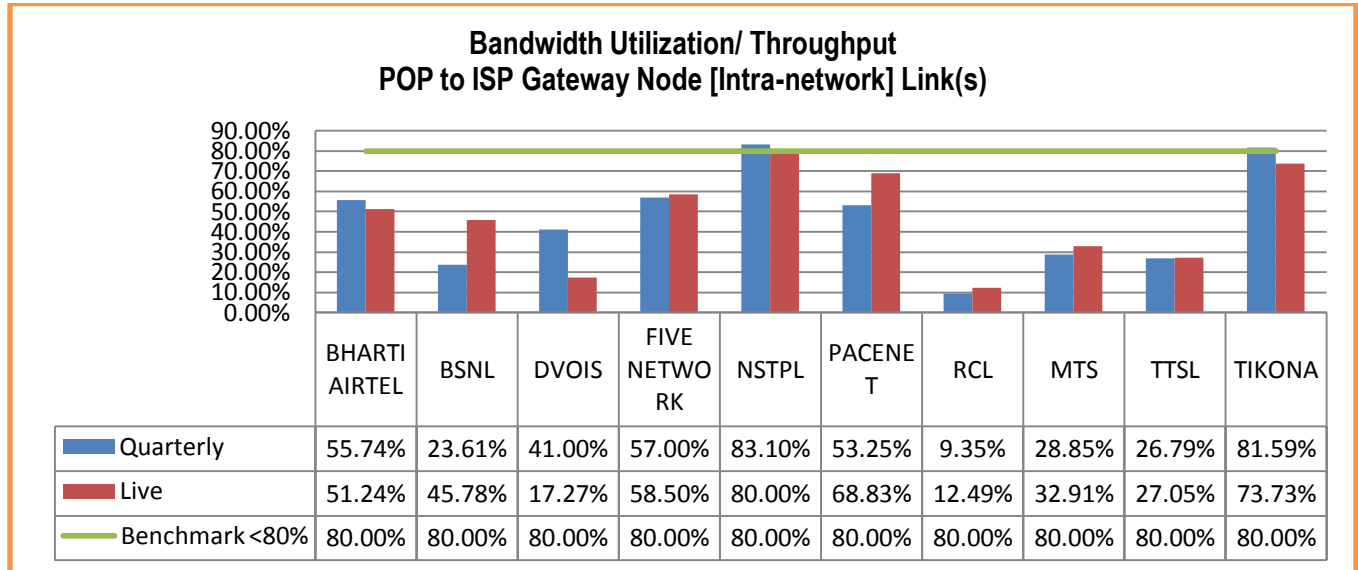
6. SERVICE AVAILABILITY/UPTIME:



All Operators are meeting the benchmarks.

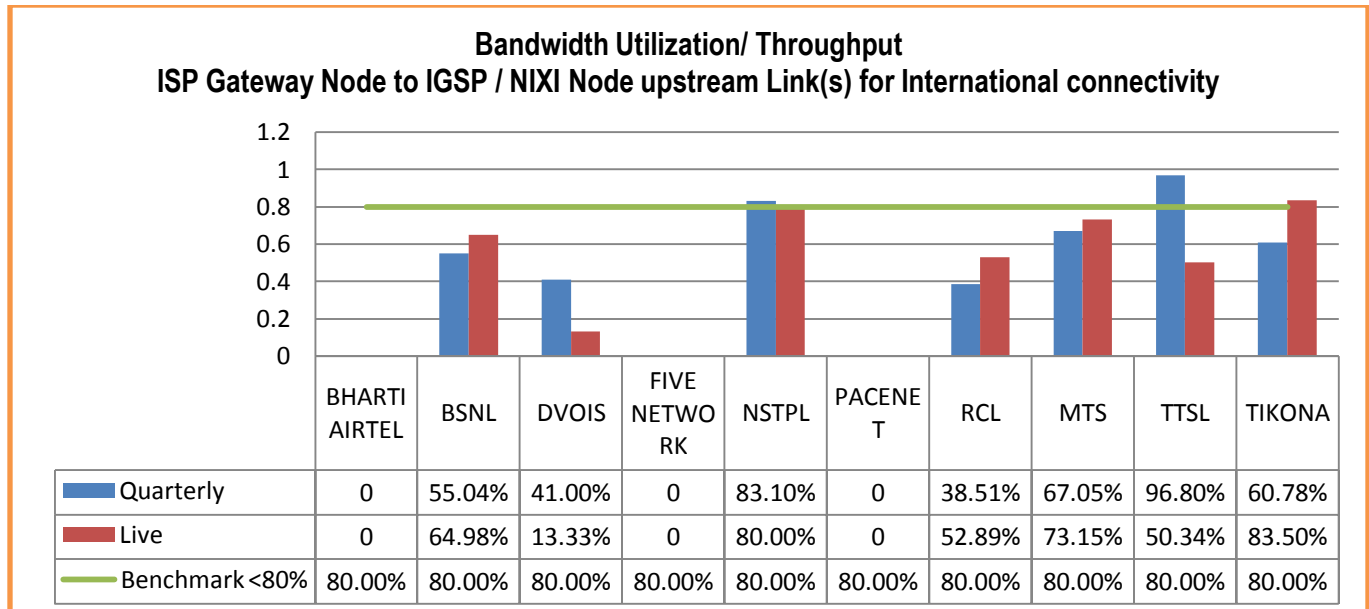
10.7 GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE BROADBAND SERVICE PROVIDERS V/S 3-DAYS LIVE MEASUREMENT:

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



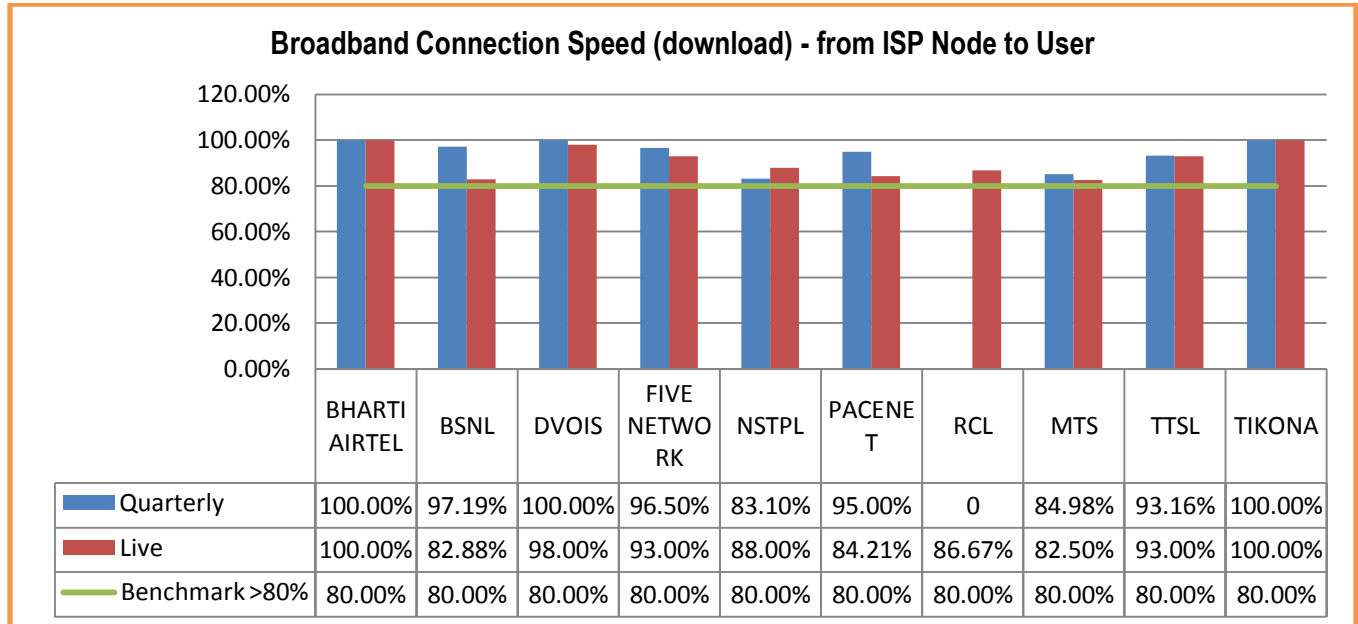
All Operators are meeting the benchmarks except NSTPL, TIKONA.s

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



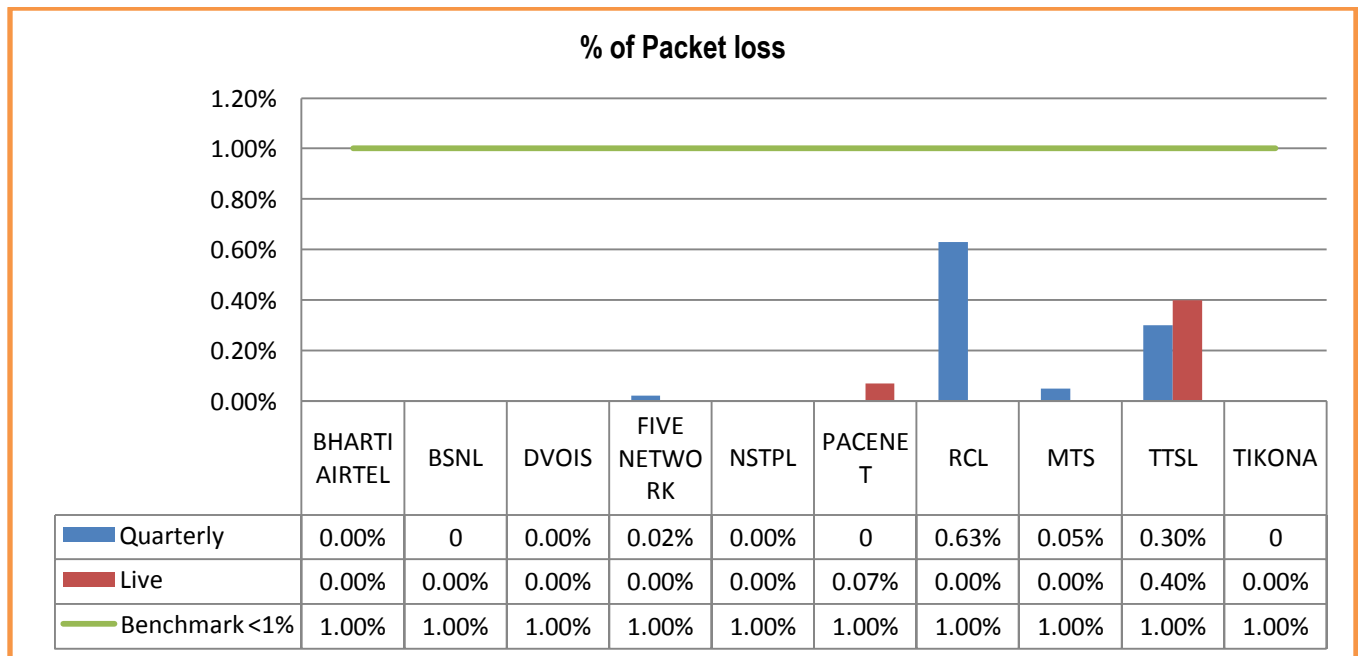
All Operators are meeting the benchmarks except NSTPL, TTSL and TIKONA in live measurements.

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



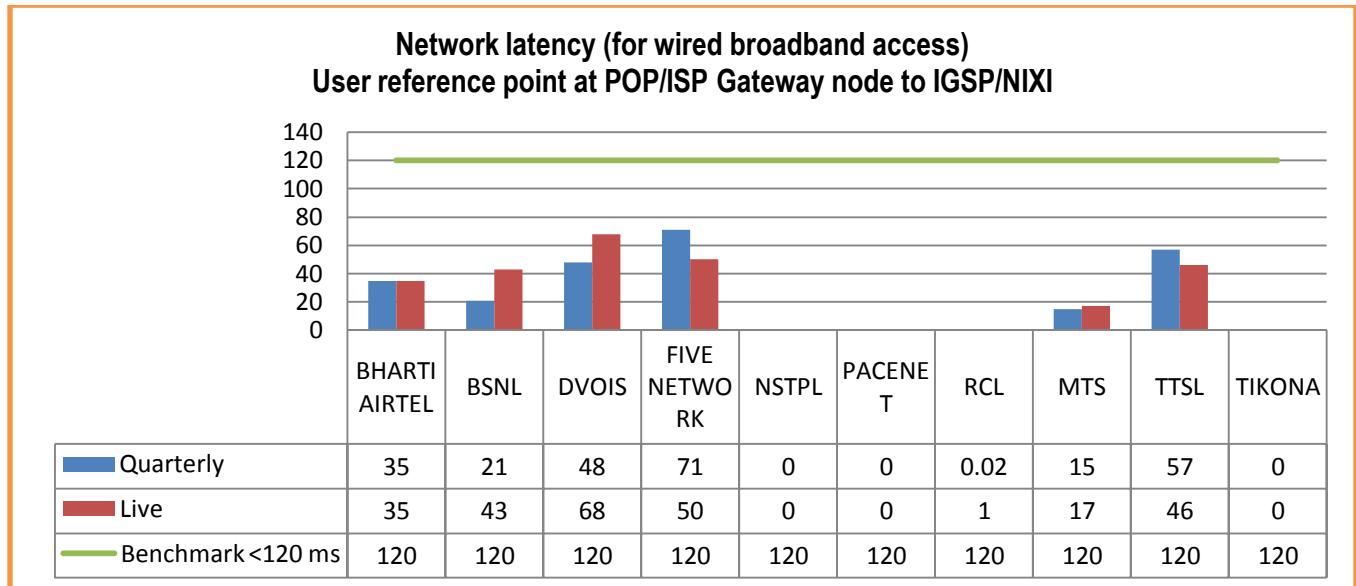
All Operators are meeting the benchmarks.

4. PACKET LOSS:



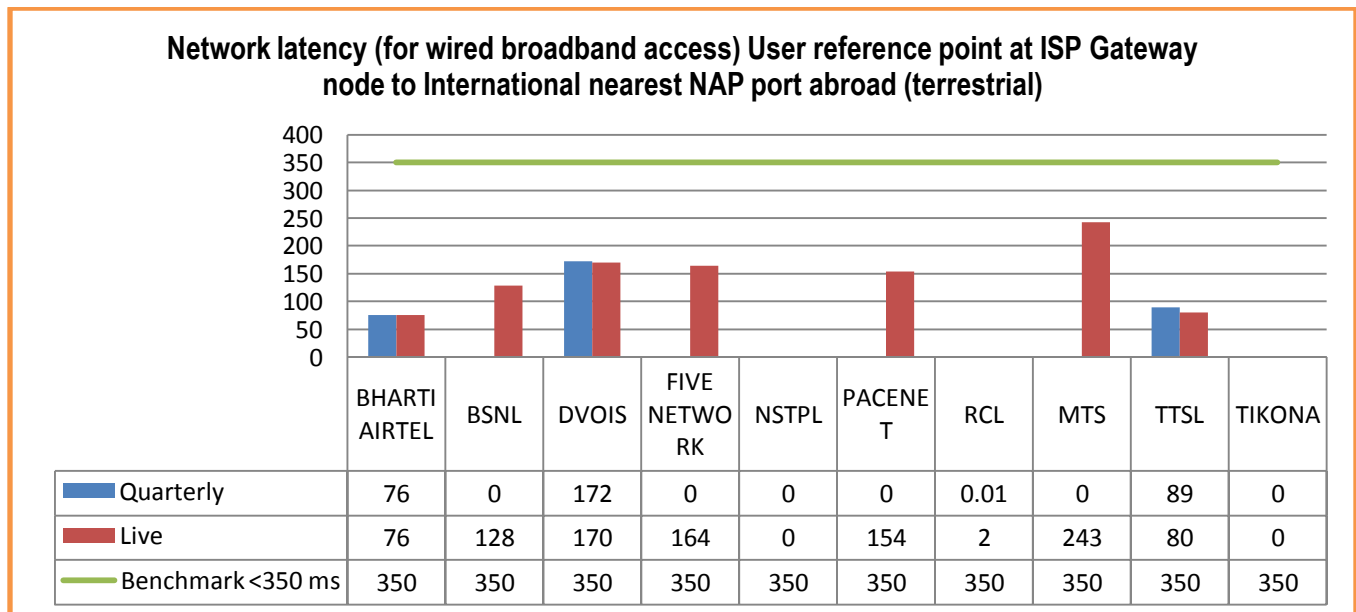
All Operators are meeting the benchmarks.

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



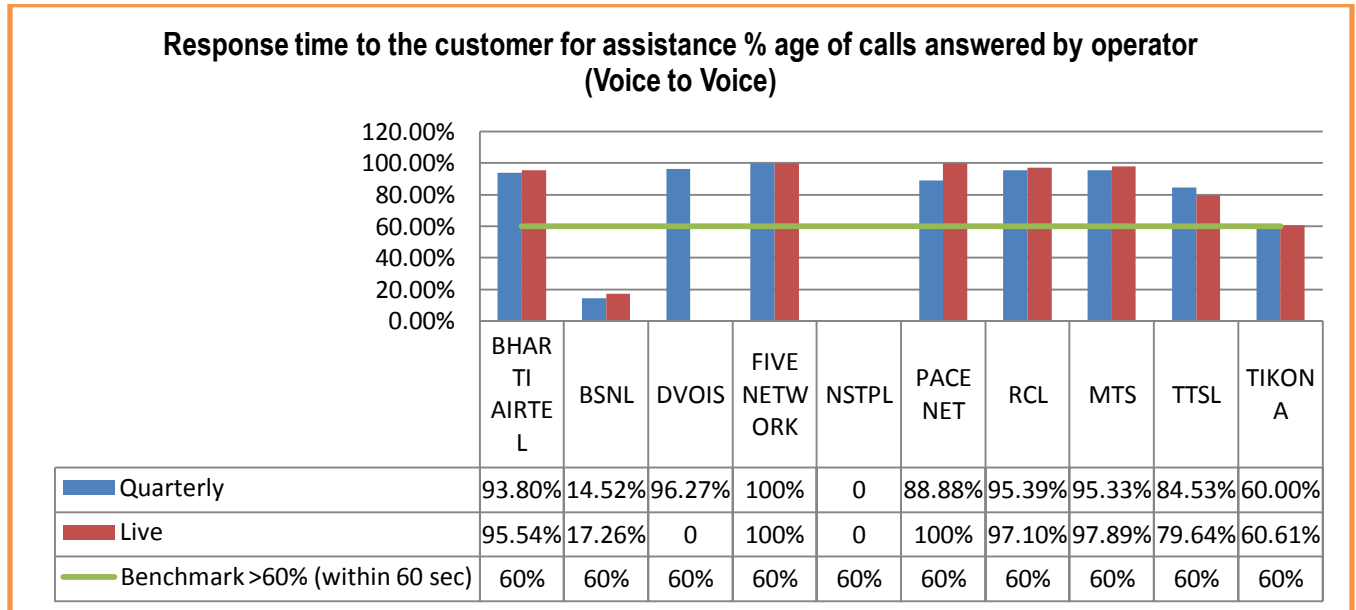
All Operators are meeting the benchmarks.

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



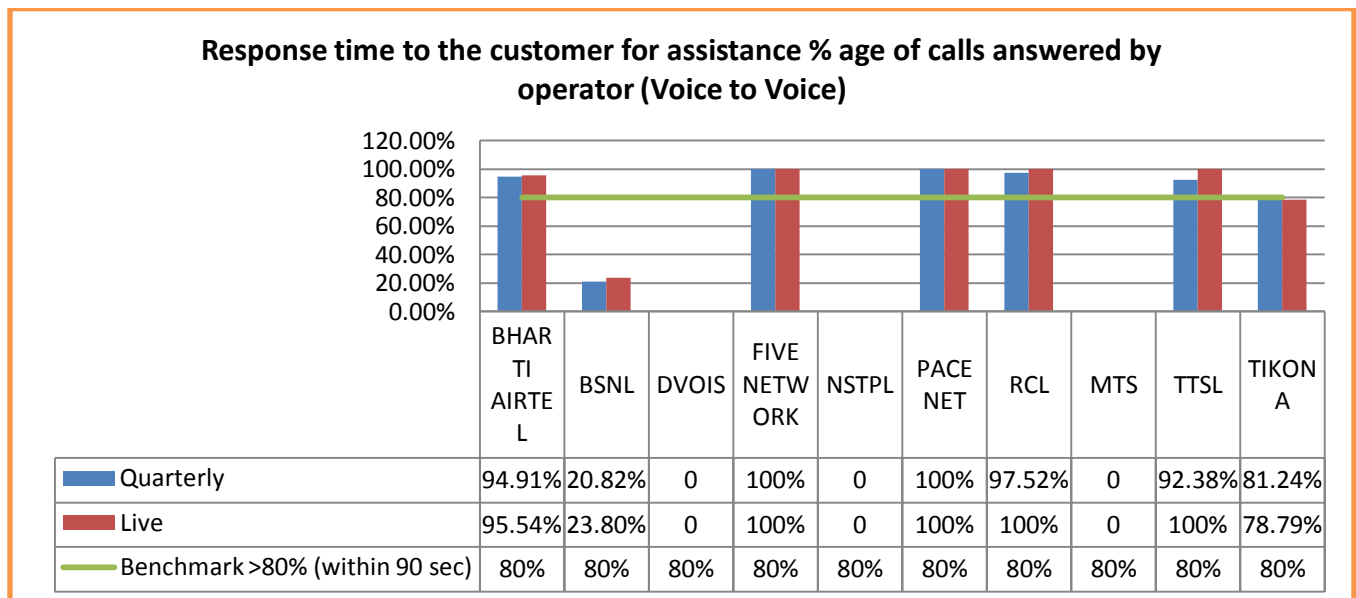
All Operators are meeting the benchmarks.

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



All Operators are meeting the benchmarks except BSNL.

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



All Operators are meeting the benchmarks except BSNL and TIKONA (3 days live).



Annex-1

LIST OF THE EXCHANGER COVERED FOR QOS AUDIT FOR QE-JUNE 2014:

Sr. No	Service Provider	NAME OF EXCHANGE	NAME OF STATION	EX CODE	SDCA (Full Name)	Exchange Level/Code	SSA (Full Name)	Switch CAPACITY	DELS	Exchange Type
1	BSNL	Ajmer EWSD	AJMER	AJM	AJMER	0145-24 & 0145-26	AJMER	16512	14362	urban
2	BSNL	Arain	Arain	ARI	MADANGANJ	1463-281	AJMER	496	136	Rural
3	BSNL	Bandarsindri	Bandarsindri	BDS	MADANGANJ	1463-238	AJMER	248	120	Rural
4	BSNL	Bangar Ngr SCL	Bangar Ngr SCL	BNS	BEAWAR	1462-228	AJMER	504	173	Rural
5	BSNL	Beawar RSU TC	Beawar	BWR	BEAWAR	1462-224 & 1462-225	AJMER	3000	1,186	urban
6	BSNL	Bhawanikhera	Bhawanikhera	BWK	NASIRABAD	1491-288	AJMER	872	52	Rural
7	BSNL	Borada	Borada	BOD	SARWAR	1496-245	AJMER	248	26	Rural
8	BSNL	Fatehgarh	Fatehgarh	FTG	SARWAR	1496-242	AJMER	248	41	Rural
9	BSNL	Harmada	Harmada	HAR	ROOPANGARH	1497-224	AJMER	248	50	Rural
10	BSNL	Hatundi	Hatundi	HAT	AJMER	0145-2796	AJMER	616	171	Rural
11	BSNL	Jamola	Jamola	JAM	BEAWAR	1462-264	AJMER	152	70	Rural
12	BSNL	Jawaja	Jawaja	JWJ	BEAWAR	1462-267	AJMER	744	61	Rural
13	BSNL	Kadel	Kadel	KDL	AJMER	0145-2780	AJMER	488	102	Rural
14	BSNL	Karkedi	Karkedi	KKR	ROOPANGARH	1497-229	AJMER	248	97	Rural
15	BSNL	Mangliawas	Mangliawas	MGS	AJMER	0145-2785	AJMER	1000	147	Rural
16	BSNL	Nasirabad	Nasirabad	NSD	NASIRABAD	01491-220 & 01491-221 & 01491-222 & 01491-223	AJMER	4316	1575	urban
17	BSNL	Rajgarh	Rajgarh	RAJ	NASIRABAD	01491-283	AJMER	248	70	Rural
18	BSNL	Srinagar	Srinagar	SIG	NASIRABAD	01491-286	AJMER	616	114	Rural
19	BSNL	Sursura	Sursura	SUR	ROOPANGARH	01497-2245	AJMER	512	62	Rural
20	BSNL	Tantoti*	Tantoti	TTI	SARWAR	01496-241	AJMER	248	30	Rural
21	BSNL	Tilonia	Tilonia	TIL	MADANGANJ	01463-288	AJMER	280	66	Rural
22	BSNL	Akbarpur	Akbarpur	AKP	ALWAR	0144-2885	Alwar	248	79	Rural
23	BSNL	Alawada	Alawada	AWD	RAMGARH	01468-266	Alwar	248	18	Rural
24	BSNL	Alwar C-DOT MAIN	Alwar	ALWALC	ALWAR	0144-2330 to 2370, 2736	Alwar	11400	9107	urban
25	BSNL	Barrod	Barrod	BRD	BEHROR	01494-243	Alwar	512	100	Rural
26	BSNL	Behror Main	Behror	BRR	BEHROR	01494-220,221,230,231,222	Alwar	2048	351	urban
27	BSNL	Bhindusi	Bhindusi	BDS	TIJARA(S)	01469-264	Alwar	248	23	Rural
28	BSNL	Bhiwadi RSU	Bhiwadi	BIA	TIJARA(N) (BHIWADI)	01493-230	Alwar	1000	1223	Rural
29	BSNL	Bhiwadi-M	Bhiwadi	BIA	TIJARA(N) (BHIWADI)	01493-220,221,222,223	Alwar	2000	253	urban
30	BSNL	Bibirani	Bibirani	BBR	KISHANGARHBAS (KHAIRTHAL)	01460-233	Alwar	744	141	Rural
31	BSNL	Burja	Burja	BRJ	ALWAR	0144-2888	Alwar	248	76	Rural
32	BSNL	Chatarpura	Chatarpura	CTP	BANSUR	01461-257	Alwar	248	18	Rural
33	BSNL	Gandhola	Gandhola	GHL	TIJARA(N) (BHIWADI)	01493-250901	Alwar	248	25	Rural

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Sr. No	Service Provider	NAME OF EXCHANGE	NAME OF STATION	EX CODE	SDCA (Full Name)	Exchange Level/Code	SSA (Full Name)	Switch CAPACITY	DELS	Exchange Type
34	BSNL	Gothda	Gothda	GTR	TIJARA(S)	01469-264	Alwar	248	18	Rural
35	BSNL	Hajipur	Hajipur	HZR	BANSUR	01461-263	Alwar	248	22	Rural
36	BSNL	Harsoli	Harsoli	HSL	KISHANGARHBAS (KHAIRTHAL)	01460-236	Alwar	1000	124	Rural
37	BSNL	Harsora	Harsora	HSR	BANSUR	01461-258	Alwar	248	30	Rural
38	BSNL	Ismailpur	Ismailpur	ISP	KISHANGARHBAS (KHAIRTHAL)	01460-238	Alwar	248	97	Rural
39	BSNL	Jakhrana	Jakhrana	JHN	BEHROR	01494-248	Alwar	512	43	Rural
40	BSNL	Jindoli	Jindoli	JDL	MANDAWAR	01495-275	Alwar	248	57	Rural
41	BSNL	Khairthal	Khairthal	KTL	KISHANGARHBAS (KHAIRTHAL)	01460-222,223,224,225	Alwar	3500	1367	urban
42	BSNL	Khanpur Ahir	Khanpur Ahir	KPA	MANDAWAR	01495-274	Alwar	248	33	Rural
43	BSNL	Khush Khera	Khush Khera	KKH	TIJARA(N) (BHIWADI)	01493-250000	Alwar	872	292	Rural
44	BSNL	Kotkasim	Kotkasim	KSM	KISHANGARHBAS (KHAIRTHAL)	01460-235	Alwar	1000	181	Rural
45	BSNL	Malakhera	Malakhera	MLK	ALWAR	0144-2764	Alwar	1000	176	Rural
46	BSNL	Mubarikpur	Mubarikpur	MBP	RAMGARH	01468-2757	Alwar	248	18	Rural
47	BSNL	Neemrana	Neemrana	NMR	BEHROR	01494-246	Alwar	1000	339	Rural
48	BSNL	Nowgaon	Nowgaon	NOG	RAMGARH	01468-2752	Alwar	248	84	Rural
49	BSNL	Pehal	Pehal	PHL	MANDAWAR	01495-286	Alwar	248	37	Rural
50	BSNL	Prithvipura	Prithvipura	PTP	ALWAR	0144-2887	Alwar	248	38	Rural
51	BSNL	Ramgarh	Ramgarh	RMG	RAMGARH	01468-232	Alwar	1000	316	Rural
52	BSNL	Rampur Kasba	Rampur Kasba	RPK	BANSUR	01461-245	Alwar	248	19	Rural
53	BSNL	Sariska	Sariska	SRK	ALWAR	0144-2841	Alwar	152	20	Rural
54	BSNL	Shajahanpur	Shajahanpur	SHP	BEHROR	01494-235236	Alwar	512	122	Rural
55	BSNL	Tapukara	Tapukara	TPK	TIJARA(N) (BHIWADI)	1493-243,244	Alwar	1000	208	Rural
56	BSNL	Tatarpur	Tatarpur	TTP	MANDAWAR	01495-283	Alwar	248	29	Rural
57	BSNL	Tijara	Tijara	TIJ	TIJARA(S)	01469-262	Alwar	1000	284	urban
58	BSNL	Umrain	Umrain	UMN	ALWAR	0144-2886	Alwar	248	79	Rural
59	BSNL	Akoda	Akoda	AKD	Sambharlake	265000-265300	Jaipur	184	112	Rural
60	BSNL	Andhi	Andhi	AND	KUKAS	287800-287999	Jaipur	256	46	Rural
61	BSNL	Dausa	Dausa	DSA	Dausa	220000-225999	Jaipur	7104	2203	Rural
62	BSNL	Asalpur	Asalpur	ASL	Sambharlake	250000-250500	Jaipur	256	172	Rural
63	BSNL	Bhadawa	Bhadawa	BDW	Renwal	258601-258899	Jaipur	256	116	urban
64	BSNL	Baghawas	Baghawas	BGW	Renwal	236000-236199	Jaipur	256	52	Rural
65	BSNL	Bandikui	Bandikui	BKI	Bandikui	222000-225999	Jaipur	3528	1474	Rural
66	BSNL	Balaji	Balaji	BAL	Bandikui	247000-247999	Jaipur	616	80	Rural
67	BSNL	Bassi	Bassi	BSI	Bassi	222000-223999	Jaipur	1900	466	Rural
68	BSNL	Banskho	Banskho	BSK	Bassi	253100-253599	Jaipur	256	139	Rural
69	BSNL	Chop	Chop	CHO	Chomu	234500-234699	Jaipur	248	63	urban
70	BSNL	Choru	Choru	CHU	Phagi	280500-280999	Jaipur	152	29	Rural

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Sr. No	Service Provider	NAME OF EXCHANGE	NAME OF STATION	EX CODE	SDCA (Full Name)	Exchange Level/Code	SSA (Full Name)	Switch CAPACITY	DELS	Exchange Type
71	BSNL	Chandwaji	Chandwaji	CWJ	KUKAS	284700-284999	Jaipur	256	33	Rural
72	BSNL	Dudu	Dudu	DUX	Dudu	227000-228100	Jaipur	1000	321	Rural
73	BSNL	Deogaon	Deogaon	DVG	Bassi	256100-256299	Jaipur	184	45	Rural
74	BSNL	Dhola	Dhola	DLA	KUKAS	289800-289999	Jaipur	192	62	Rural
75	BSNL	Daulatpura	Daulatpura	DLP	Lalsot	263300-263699	Jaipur	256	42	Rural
76	BSNL	Dhand	Dhand	DND	KUKAS	284000-284499	Jaipur	256	53	Rural
77	BSNL	Gudhaliya	Gudhaliya	GDL	Bandikui	234000-234399	Jaipur	256	86	urban
78	BSNL	Hingoniya	Hingoniya	HTG	Renwal	230000-230999	Jaipur	1000	77	Rural
79	BSNL	Hasteda	Hasteda	HSD	Chomu	236300-236699	Jaipur	256	22	Rural
80	BSNL	Jhag	Jhag	JHG	Dudu	257100-257299	Jaipur	152	85	Rural
81	BSNL	Jatwara	Jatwara	JTW	Bassi	254500-254999	Jaipur	256	43	urban
82	BSNL	Jahota	Jahota	JHT	Chomu	234000-234399	Jaipur	256	40	Rural
83	BSNL	Jobner	Jobner	JOB	Sambharlake	254000-254999	Jaipur	1000	398	Rural
84	BSNL	Jairampura	Jairampura	JRM	Chomu	244600-244799	Jaipur	256	61	Rural
85	BSNL	Kanota	Kanota	KNT	Bassi	234000-234999	Jaipur	1000	101	Rural
86	BSNL	Kotalwas	Kotalwas	KLS	Lalsot	262200-262499	Jaipur	184	10	Rural
87	BSNL	Ladana	Ladana	LDN	Phagi	285700-285999	Jaipur	152	36	Rural
88	BSNL	Mandawari	Mandawari	MDI	Lalsot	264000-264999	Jaipur	256	63	Rural
89	BSNL	Mahllan	Mahllan	MHL	Dudu	287300-287499	Jaipur	256	105	Rural
90	BSNL	Manpur	Manpur	MNP	Bandikui	245000-245399	Jaipur	256	51	Rural
91	BSNL	Madhoraj Pura	Madhoraj Pura	MRP	Phagi	285000-285499	Jaipur	256	44	Rural
92	BSNL	Mozamabad	Mozamabad	MZB	Dudu	252300-252699	Jaipur	256	119	urban
93	BSNL	Nangal Rajawatan	Nangal Rajawatan	NGR	Dausa	282200-282499	Jaipur	256	59	Rural
94	BSNL	Naraina	Naraina	NAA	Sambharlake	234000-234600	Jaipur	484	296	Rural
95	BSNL	Phagi	Phagi	PGI	Phagi	282000-282999	Jaipur	1000	115	Rural
96	BSNL	Phulera	Phulera	PHE	Sambharlake	244000-245800	Jaipur	1744	872	Rural
97	BSNL	Paparda	Paparda	PPD	Dausa	281000-281499	Jaipur	256	48	urban
98	BSNL	Ramgargh Pachwara	Ramgargh Pachwara	RMG	Lalsot	265400-265699	Jaipur	224	51	Rural
99	BSNL	Renwal	Renwal	RNL	Renwal	220000-221999	Jaipur	2000	588	Rural
100	BSNL	Sikandra	Sikandra	SKD	Bandikui	240000-241100	Jaipur	1000	105	Rural
101	BSNL	Surmalikpur	Surmalikpur	SRP	Renwal	237900-237999	Jaipur	152	32	urban
102	BSNL	Sainthal	Sainthal	STL	Dausa	284000-284799	Jaipur	256	90	Rural
103	BSNL	JP-Central L-236/237	JP-Central L-236/237	JPC	Jaipur	L-236/237/231/232/220/221/222	Jaipur	11300	9681	urban
104	BSNL	JP-Lalkothi-II L-2747	JP-Lalkothi-II L-2747	LKT	Jaipur	L-2747(centrax),L-274(BJN)	Jaipur	192	150	Rural
105	BSNL	JP-Bajajnagar-II L-2717	JP-Bajajnagar-II L-2717	BJN	Jaipur	L-2717 (centrax),L-270&271 (BJN)	Jaipur	48	38	Rural
106	BSNL	JP-World Trade Park L-2729	JP-Stock Exchange L-2729	STX	Jaipur	L-2729/2728	Jaipur	634	202	Rural

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Sr. No	Service Provider	NAME OF EXCHANGE	NAME OF STATION	EX CODE	SDCA (Full Name)	Exchange Level/Code	SSA (Full Name)	Switch CAPACITY	DELS	Exchange Type
107	BSNL	JP-Muhana L-2749	JP-Jagatpura L-2758	JGP	Jaipur	L-2739	Jaipur	430	57	Rural
108	Bharti-Airtel	Subhash Nagar, Jaipur	Subhash Nagar, Jaipur	MSU/JMS/901	NA	NP	NA	48000	38401	urban
109	Reliance	Jaipur	Jaipur	ILT AXE 10 ERICSSON SWITCH	NA	NP	NA	64K	22105	urban
110	Sistema Shayam	Jaipur	Jaipur	JPR	NA	NP	NA	140000	55988	urban
111	TTL	Jaipur	Jaipur	JPR	NA	NP	NA	--	--	urban
112	TTL	Jaipur	Jaipur	JPR	NA	NP	NA	--	--	urban
113	Vodafone	Jaipur	Jaipur	Nokia DX 200	NA	NP	NA	11729	1500	urban

Annex-2**LOCATION OF THE BSNL POPs COVERED FOR QOS AUDIT FOR QE-JUNE 2014:**

Sr. No	Broadband Service Provider	Location of PoP's Covered	Activity
1	BSNL	Ajmer EWSD	BB Audit
2	BSNL	Arain	BB Audit
3	BSNL	Bandarsindri	BB Audit
4	BSNL	Bangar Ngr SCL	BB Audit
5	BSNL	Beawar RSU TC	BB Audit
6	BSNL	Bhawanikhera	BB Audit
7	BSNL	Borada	BB Audit
8	BSNL	Fatehgarh	BB Audit
9	BSNL	Harmada	BB Audit
10	BSNL	Hatundi	BB Audit
11	BSNL	Jamola	BB Audit
12	BSNL	Jawaja	BB Audit
13	BSNL	Kadel	BB Audit
14	BSNL	Karkedi	BB Audit
15	BSNL	Mangliawas	BB Audit
16	BSNL	Nasirabad	BB Audit
17	BSNL	Rajgarh	BB Audit
18	BSNL	Srinagar	BB Audit
19	BSNL	Sursura	BB Audit
20	BSNL	Tantoti	BB Audit
21	BSNL	Tilonia	BB Audit
22	BSNL	Akbarpur	BB Audit
23	BSNL	Prithvipura	BB Audit
24	BSNL	Shahpur Dehra	BB Audit
25	BSNL	Shayam Ganga	BB Audit
26	BSNL	Alawada	BB Audit
27	BSNL	Alwar C-DOT MAIN	BB Audit
28	BSNL	Barrod	BB Audit
29	BSNL	Behror Main	BB Audit
30	BSNL	Bhindusi	BB Audit
31	BSNL	Bhiwadi RSU	BB Audit
32	BSNL	Bhiwadi-M	BB Audit
33	BSNL	Bibirani	BB Audit
34	BSNL	Burja	BB Audit
35	BSNL	Chatarpura	BB Audit

Sr. No	Broadband Service Provider	Location of PoP's Covered	Activity
36	BSNL	Gandhola	BB Audit
37	BSNL	Gothda	BB Audit
38	BSNL	Hajipur	BB Audit
39	BSNL	Harsoli	BB Audit
40	BSNL	Harsora	BB Audit
41	BSNL	Ismailpur	BB Audit
42	BSNL	Jakhrana	BB Audit
43	BSNL	Jindoli	BB Audit
44	BSNL	Khairthal	BB Audit
45	BSNL	Khanpur Ahir	BB Audit
46	BSNL	Khush Khera	BB Audit
47	BSNL	Kotkasim	BB Audit
48	BSNL	Malakhera	BB Audit
49	BSNL	Mubarikpur	BB Audit
50	BSNL	Neemrana	BB Audit
51	BSNL	Nowgaon	BB Audit
52	BSNL	Pehal	BB Audit
53	BSNL	Prithvipura	BB Audit
54	BSNL	Ramgarh	BB Audit
55	BSNL	Rampur Kasba	BB Audit
56	BSNL	Sariska	BB Audit
57	BSNL	Shajahanpur	BB Audit
58	BSNL	Tapukara	BB Audit
59	BSNL	Tatarpur	BB Audit
60	BSNL	Tijara	BB Audit
61	BSNL	Umrain	BB Audit
62	BSNL	Akoda	BB Audit
63	BSNL	Andhi	BB Audit
64	BSNL	Dausa	BB Audit
65	BSNL	Asalpur	BB Audit
66	BSNL	Bhadawa	BB Audit
67	BSNL	Baghawas	BB Audit
68	BSNL	Bandikui	BB Audit
69	BSNL	Balaji	BB Audit
70	BSNL	Bassi	BB Audit
71	BSNL	Banskho	BB Audit
72	BSNL	Chop	BB Audit
73	BSNL	Choru	BB Audit
74	BSNL	Chandwaji	BB Audit

Sr. No	Broadband Service Provider	Location of PoP's Covered	Activity
75	BSNL	Dudu	BB Audit
76	BSNL	Deogaon	BB Audit
77	BSNL	Dhola	BB Audit
78	BSNL	Daulatpura	BB Audit
79	BSNL	Dhand	BB Audit
80	BSNL	Gudhaliya	BB Audit
81	BSNL	Hingoniya	BB Audit
82	BSNL	Hasteda	BB Audit
83	BSNL	Jhag	BB Audit
84	BSNL	Jatwara	BB Audit
85	BSNL	Jahota	BB Audit
86	BSNL	Jobner	BB Audit
87	BSNL	Jairampura	BB Audit
88	BSNL	Kanota	BB Audit
89	BSNL	Kutalwas	BB Audit
90	BSNL	Ladana	BB Audit
91	BSNL	Mandawari	BB Audit
92	BSNL	Mahllan	BB Audit
93	BSNL	Manpur	BB Audit
94	BSNL	Madhoraj Pura	BB Audit
95	BSNL	Mozamabad	BB Audit
96	BSNL	Nangal Rajawatan	BB Audit
97	BSNL	Naraina	BB Audit
98	BSNL	Phagi	BB Audit
99	BSNL	Phulera	BB Audit
100	BSNL	Paparda	BB Audit
101	BSNL	Ramgargh Pachwara	BB Audit
102	BSNL	Renwal	BB Audit
103	BSNL	Sikandra	BB Audit
104	BSNL	Surmalikpur	BB Audit
105	BSNL	Sainthal	BB Audit
106	BSNL	JP-Central L-236/237	BB Audit
107	BSNL	JP-Lalkothi-II L-2747	BB Audit
108	BSNL	JP-Bajajnagar-II L-2717	BB Audit
109	BSNL	JP-World Trade Park L-2729	BB Audit
110	BSNL	JP-Muhana L-2749	BB Audit
111	BHARTI AIRTEL LIMITED	Subhash Nagar, Jaipur	BB Audit
112	D-VOIS BROADBAND	Jaipur	BB Audit
113	FIVE-NETWORKS	Ajmer	BB Audit

Sr. No	Broadband Service Provider	Location of PoP's Covered	Activity
114	NSTPL	Sikar	BB Audit
115	BROADBAND PACENET INDIA PVT. LTD	Jaipur	BB Audit
116	RELIANCE COMMUNICATION LIMITED (RCL)	DAKC, Mumbai	BB Audit
117	MTS	Jaipur	BB Audit
118	TATA TELE SERVICES LIMITED (TTSL)	Jaipur	BB Audit
119	TIKONA	Jaipur	BB Audit