



**Audit & Assessment of Quality of Service  
Of  
Cellular Mobile Telephone Service  
For  
Telecom Regulatory Authority Of India  
North Zone – Rajasthan Service Area  
(July 2014 – September 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 20<sup>th</sup> March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6<sup>th</sup> October, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas:

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

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



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

## **2. OBJECTIVES AND METHODOLOGY**





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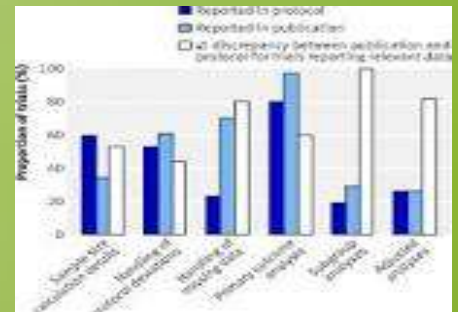
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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 UP (E), UP (W) and MP&CG circles during the quarter July – September 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
		July-14	August-14	September-14	
<b>GSM Operators</b>					
1	AIRCEL	2 to 4 Jul-14	25 to 27 Aug-14	13, 15 to 16 Sep-14	Aircel limited, 1st & 2nd Floor, Navajyoti, Amrapali Circle,C-Block,Vaishali Nagar, Jaipur-302021
2	AIRTEL	16 to 18 Jul-14	23, 25 to 26 Aug-14	11 to 13 Sep-14	Bharti Hexacom Limited, K-21, Malviya Marg, c-scheme , Jaipur-302001
3	BSNL	7 to 9 Jul-14	6 to 8 Aug-14	7 to 9 Sep-14	Bharat Sanchar Nigam Ltd. (BSNL) Room no. 116, Bajaj Nagar MSC, First Floor, BSNL Bajaj Nagar, JLN marg, Jaipur- 302015
4	IDEA	10 to 12 Jul-14	7 to 9 Aug-14	10 to 12 Sep-14	Idea Cellular Ltd. Plot-C, Sahkar Marg, Jaipur- 302001
5	RCOM GSM	16 to 18 Jul-14	7 to 9 Aug-14	1 to 3 Sep-14	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
6	TATA GSM	7 to 9 Jul-14	6 to 8 Aug-14	13, 15 to 16 Sep-14	Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021
7	VODAFONE	23 to 25 Jul-14	9, 11 to 12 Aug-14	3 to 5 Sep-14	Vodafone Ltd. 5th Floor,Gaurav Tower,Malviya Nagar jaipur,-302017
<b>CDMA Operators</b>					
8	MTS	2 to 4 Jul-14	22 to 23 & 25 Aug-14	12 to 13 & 15 Sep-14	Sistema Shyam Teleservices Ltd. 3, MTS Tower, Amrapali Circle Vaishali Nagar, Jaipur.
9	RCOM CDMA	16 to 18 Jul-14	7 to 9 Aug-14	1 to 3 Sep-14	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
10	TATA CDMA	7 to 9 Jul-14	6 to 8 Aug-14	13, 15 to 16 Sep-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 September 2014.

The data generated by monthly PMR and 3-days live measurements audit for the period July 2014 to September 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 once a year. **However, QoS audit for basic (wire line) service was not required to be done for Rajasthan Circle in the quarter ended September- 2014, as it has already been done in QE June 2014.**

### 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 once a year. **However, the QoS audit for Broadband service was not required to be done for Rajasthan Circle in the quarter ended September- 2014, as it has already been done in QE June 2014.**

## **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:**

##### Cellular Mobile Service:

(i) From the monthly audit, 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 **5.38% and 5.69%** respectively.

(ii) 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 **5.59% and 5.96%** respectively. **The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for monthly audit of the quarter.**

(iii) With regard to the **Customer Service Quality Parameters**, it is revealed that all operators 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 **RCOM (GSM)** and **RCOM (CDMA)** remained non-complied for parameter ‘**Billing Complaints – Prepaid**’ with their achieved values as **0.29% and 0.21%**. With respect to parameter **Call**

**answered by operators (voice to voice within 60 sec.), Aircel** has not met the benchmark with its performance as **81.70%**. Whereas **Tata (GSM), MTS and Tata**

**(CDMA)** have not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds** (as they provided the data for 90 seconds). They have achieved their performance as **94.31%, 93.31% and 94.20%** respectively against the benchmark of  $\geq 95\%$ .

During 3 days live measurement, **Aircel** has not met the benchmark of **calls answered by Operators (voice to voice) within 60 seconds**. **Aircel** achieved its performance as **72.49%**. Whereas **Tata (CDMA)** have not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds (94.67%)**.

(iv) 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 and Voice Quality** across the three SSAs. Apart from this, **Idea** and **RCOM (GSM)** also could not meet the benchmark of **Voice Quality** in Indoor locations in Bikaner SSA.

## 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
<b>GSM Operators</b>			
1	AIRCEL	Sept - 2014	20:00 - 21:00
2	AIRTEL	Sept - 2014	20:00 - 21:00
3	BSNL	Sept - 2014	19:00 - 20:00
4	IDEA	Sept - 2014	20:00 - 21:00
5	RCOM GSM	Sept - 2014	20:00 - 21:00
6	TATA GSM	Sept - 2014	20:00 - 21:00
7	VODAFONE	Sept - 2014	20:00 - 21:00
<b>CDMA Operators</b>			
8	MTS	Sept - 2014	20:00 - 21:00
9	RCOM CDMA	Sept - 2014	19:00 - 20:00
10	TATA CDMA	Sept - 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
<b>GSM Operators</b>						
1	AIRCEL	2	11	1754	NSN	NSN
2	AIRTEL	44	82	7903	Ericsson	Ericsson
3	BSNL	15	51	3926	Ericsson	NSN & Ericsson
4	IDEA	11	42	5834	Ericsson	Ericsson
5	RCOM GSM	4	15	2076	Huawei	Huawei
6	TATA GSM	3	12	1398	Huawei	Huawei
7	VODAFONE	12	88	6838	NSN	NSN
<b>CDMA Operators</b>						
8	MTS	2	6	1611	ZTE	ZTE
9	RCOM CDMA	6	6	943	Huawei, Lucent, Ericsson & ZTE	Huawei & Lucent
10	TATA CDMA	5	6	693	Ericsson & Huawei	Huawei & Motorola

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE - JULY 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		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	July-14	0.38%	0.08%	1.68%	0.13%	0.39%	0.23%	0.07%	0.51%	0.07%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	July-14	2.47%	0.22%	1.84%	0.23%	1.19%	0.29%	0.36%	1.38%	0.00%	0.14%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	96.85%	98.89%	98.71%	99.29%	99.58%	98.45%	99.79%	99.07%	99.13%	97.56%
	b) SDCCH/PAGING Channel congestion	<=1%	July-14	0.32%	0.21%	0.81%	0.25%	0.03%	0.04%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.85%	0.36%	1.50%	0.38%	0.07%	0.09%	0.21%	0.00%	0.18%	1.39%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	July-14	0.84%	0.93%	1.40%	1.18%	0.39%	0.84%	0.74%	0.14%	0.70%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-14	2.73%	1.55%	2.13%	2.03%	0.03%	4.84%	2.46%	0.59%	1.28%	5.22%
	c) Connections with good voice quality	>=95%	July-14	96.70%	98.88%	98.39%	96.01%	98.66%	98.37%	97.29%	99.72%	99.18%	98.87%
4	No. of POI's having >=0.5% POI congestion		July-14	0	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE – AUGUST 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Aug-14	0.21%	0.11%	1.72%	0.13%	0.25%	0.13%	0.07%	0.25%	0.09%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Aug-14	1.18%	0.11%	1.83%	0.23%	0.29%	0.00%	0.36%	0.00%	0.25%	0.14%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	96.46%	98.60%	98.70%	99.12%	99.58%	98.38%	99.72%	98.98%	99.08%	97.52%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-14	0.33%	0.39%	0.66%	0.42%	0.02%	0.05%	0.20%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	0.65%	0.44%	1.48%	0.47%	0.06%	0.05%	0.28%	0.01%	0.16%	1.53%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Aug-14	0.92%	1.04%	1.53%	1.42%	0.40%	0.95%	0.84%	0.15%	0.76%	0.72%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-14	2.95%	1.61%	2.41%	2.60%	0.03%	5.77%	2.64%	0.57%	1.13%	5.87%
	c) Connections with good voice quality	>=95%	Aug-14	96.59%	98.80%	98.29%	95.45%	98.65%	98.26%	97.00%	99.72%	99.16%	98.83%
4	No. of POI's having >=0.5% POI congestion		Aug-14	0	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE – SEPTEMBER 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Sep-14	0.16%	0.08%	1.74%	0.09%	0.19%	0.14%	0.04%	0.21%	0.06%	0.14%
	b) Worst affected BTSs due to downtime	<=2%	Sep-14	0.68%	0.14%	1.80%	0.03%	0.10%	0.07%	0.06%	0.32%	0.06%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	96.61%	98.95%	98.67%	99.35%	99.55%	98.48%	99.74%	98.75%	99.02%	96.35%
	b) SDCCH/PAGING Channel congestion	<=1%	Sep-14	0.16%	0.17%	0.48%	0.33%	0.02%	0.07%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	0.74%	0.35%	1.54%	0.27%	0.07%	0.06%	0.26%	0.01%	0.19%	1.98%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Sep-14	0.94%	1.09%	1.60%	1.36%	0.41%	0.82%	0.83%	0.14%	0.78%	0.75%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Sep-14	2.97%	1.88%	2.63%	2.76%	0.02%	5.53%	2.59%	0.68%	1.04%	5.99%
	c) Connections with good voice quality	>=95%	Sep-14	96.83%	98.77%	98.33%	95.65%	98.56%	98.23%	96.91%	99.72%	99.17%	98.78%
4	No. of POI's having >=0.5% POI congestion		Sep-14	0	0	0	0	0	0	0	0	0	0

**5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- SEPTEMBER 14 (JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA)**

**QUARTERLY QOS PERFORMANCE (AVERAGE OF QE- SEPTEMBER 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.25%	0.09%	1.71%	0.12%	0.28%	0.17%	0.06%	0.32%	0.07%	0.09%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.44%	0.16%	1.82%	0.16%	0.53%	0.12%	0.26%	0.57%	0.10%	0.09%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	96.64%	98.81%	98.69%	99.25%	99.57%	98.44%	99.75%	98.93%	99.08%	97.14%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.27%	0.26%	0.65%	0.33%	0.02%	0.05%	0.15%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.75%	0.38%	1.51%	0.37%	0.07%	0.07%	0.25%	0.01%	0.18%	1.63%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.90%	1.02%	1.51%	1.32%	0.40%	0.87%	0.80%	0.14%	0.75%	0.68%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.88%	1.68%	2.39%	2.46%	0.03%	<b>5.38%</b>	2.56%	0.61%	1.15%	<b>5.69%</b>
	c) Connections with good voice quality	>=95%	Quarterly	96.71%	98.82%	98.34%	95.70%	98.62%	98.29%	97.07%	99.72%	99.17%	98.83%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	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. Only Aircel could not meet the benchmark of 'Worst affected BTSs due to downtime' having achieved value as **2.47%** in the month of July-14, however, its quarterly performance on this parameter was within the benchmark.

- **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, all operators were found having congestion within the prescribed benchmark of < 0.5%.

- **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 average achievement as **5.38%** and **5.69%** respectively.

- 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) - JULY 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE - JULY 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.66%	0.05%	1.64%	0.09%	0.47%	0.12%	0.09%	0.58%	0.05%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.03%	0.18%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.98%	98.88%	98.77%	99.19%	99.60%	98.46%	99.76%	99.17%	99.20%	97.35%
	b) SDCCCH/PAGING Channel congestion	<=1%	Live data	0.36%	0.23%	0.88%	0.53%	0.03%	0.03%	0.12%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.01%	0.36%	1.43%	0.51%	0.07%	0.08%	0.24%	0.00%	0.13%	1.71%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.78%	1.05%	1.35%	1.02%	0.38%	0.71%	0.75%	0.12%	0.64%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.72%	1.83%	2.24%	1.64%	0.03%	<b>3.98%</b>	2.71%	0.85%	1.68%	<b>4.54%</b>
	c) Connections with good voice quality	>=95%	Live data	96.73%	98.81%	98.67%	96.33%	98.64%	98.43%	97.40%	99.73%	99.18%	98.85%
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) – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- AUGUST 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.10%	0.12%	1.65%	0.20%	0.37%	0.42%	0.13%	0.35%	0.10%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.04%	0.18%	0.00%	0.00%	0.00%	0.04%	0.00%	0.06%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.64%	98.56%	98.76%	99.23%	99.56%	98.52%	99.76%	98.99%	99.05%	97.36%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.53%	0.42%	0.75%	0.23%	0.03%	0.07%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.14%	0.45%	1.48%	0.35%	0.06%	0.07%	0.24%	0.00%	0.18%	1.71%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.89%	1.01%	1.54%	1.51%	0.41%	1.04%	0.87%	0.12%	0.69%	0.78%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.51%	1.51%	2.54%	2.78%	0.03%	7.02%	2.77%	0.75%	0.75%	7.28%
	c) Connections with good voice quality	>=95%	Live data	96.55%	98.83%	98.33%	95.32%	98.60%	98.19%	97.03%	99.71%	99.16%	98.84%
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) – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- SEPTEMBER 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		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.16%	0.10%	1.65%	0.11%	0.16%	0.24%	0.08%	0.17%	0.19%	0.20%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.05%	0.20%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.37%	99.09%	98.26%	99.27%	99.60%	98.52%	99.76%	99.12%	98.98%	96.88%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.14%	0.12%	0.61%	0.26%	0.02%	0.04%	0.12%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.95%	0.29%	1.53%	0.32%	0.05%	0.06%	0.24%	0.00%	0.23%	2.22%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.00%	1.15%	1.72%	1.58%	0.37%	0.86%	0.83%	0.11%	0.85%	0.77%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.81%	2.17%	2.73%	2.74%	0.02%	5.76%	2.55%	0.58%	1.31%	6.05%
	c) Connections with good voice quality	>=95%	Live data	96.79%	98.73%	99.67%	95.46%	98.68%	98.20%	97.07%	99.72%	99.16%	98.77%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0

**5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JULY TO SEPTEMBER 2014)**

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE - SEPT 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.31%	0.09%	1.65%	0.13%	0.33%	0.26%	0.10%	0.37%	0.11%	0.10%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.04%	0.19%	0.00%	0.00%	0.00%	0.04%	0.00%	0.02%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	96.66%	98.84%	98.60%	99.23%	99.59%	98.50%	99.76%	99.09%	99.08%	97.20%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.34%	0.26%	0.75%	0.34%	0.03%	0.05%	0.12%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.03%	0.37%	1.48%	0.39%	0.06%	0.07%	0.24%	0.00%	0.18%	1.88%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.89%	1.07%	1.54%	1.37%	0.39%	0.87%	0.82%	0.12%	0.73%	0.69%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.68%	1.84%	2.50%	2.39%	0.03%	5.59%	2.68%	0.73%	1.25%	5.96%
	c) Connections with good voice quality	>=95%	Quarterly	96.69%	98.79%	98.89%	95.70%	98.64%	98.27%	97.17%	99.72%	99.17%	98.82%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	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 **5.59%** and **5.96%** 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- July-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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		July-14	1661	7852	3916	5596	2107	1400	6734	943	1607	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		July-14	4641	4745	48932	5427	6075	2425	3726	3583	896	437
	c) BTS Accumulated Downtime	<=2%	July-14	0.38%	0.08%	1.68%	0.13%	0.39%	0.23%	0.07%	0.51%	0.07%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-14	41	17	72	13	25	4	24	13	0	1
	e) Worst affected BTSs due to downtime	<=2%	July-14	2.47%	0.22%	1.84%	0.23%	1.19%	0.29%	0.36%	1.38%	0.00%	0.14%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	96.85%	98.89%	98.71%	99.29%	99.58%	98.45%	99.79%	99.07%	99.13%	97.56%
	b) SDCCH/PAGING Congestion	<=1%	July-14	0.32%	0.21%	0.81%	0.25%	0.03%	0.04%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.85%	0.36%	1.50%	0.38%	0.07%	0.09%	0.21%	0.00%	0.18%	1.39%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	July-14	0.84%	0.93%	1.40%	1.18%	0.39%	0.84%	0.74%	0.14%	0.70%	0.58%
	b) Worst affected cells>3% TCH drop	<=3%	July-14	2.73%	1.55%	2.13%	2.03%	0.03%	4.84%	2.46%	0.59%	1.28%	5.22%
	c) % of connections with good voice quality	>=95%	July-14	96.70%	98.88%	98.39%	96.01%	98.66%	98.37%	97.29%	99.72%	99.18%	98.87%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		July-14	134	365	209	347	2	203	504	17	66	116
	e) Total no. of cells (Sector) in the licensed service area		July-14	4904	23476	9823	17104	6261	4199	20464	2825	5185	2216
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		July-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-14	0	0	0	0	0	0	0	0	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		July-14	88710	439881	265400	233072	102000	67989	270484	116000	122000	171339
	b) Total traffic in TCBH in erlang (Avg.)		July-14	90246	395216	106341	170220	75145	28968	243600	26740	69544	27993
	c) Total no. of customers served (as per VLR) on last day of the month		July-14	3371948	14331883	2672704	6391761	4746678	577880	9629628	927604	1275084	391933

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- July-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			
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Live data	1626	7851	3895	5572	2107	1400	6727	943	1605	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		Live data	774	280	4594	375	720	123	447	392	56	13
	c) BTS Accumulated Downtime	<=2%	Live data	0.66%	0.05%	1.64%	0.09%	0.47%	0.12%	0.09%	0.58%	0.05%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	2	7	0	0	0	5	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.03%	0.18%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.98%	98.88%	98.77%	99.19%	99.60%	98.46%	99.76%	99.17%	99.20%	97.35%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.36%	0.23%	0.88%	0.53%	0.03%	0.03%	0.12%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	1.01%	0.36%	1.43%	0.51%	0.07%	0.08%	0.24%	0.00%	0.13%	1.71%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.78%	1.05%	1.35%	1.02%	0.38%	0.71%	0.75%	0.12%	0.64%	0.53%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.72%	1.83%	2.24%	1.64%	0.03%	3.98%	2.71%	0.85%	1.68%	4.54%
	c) % of connections with good voice quality	>=95%	Live data	96.73%	98.81%	98.67%	96.33%	98.64%	98.43%	97.40%	99.73%	99.18%	98.85%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	132	429	220	280	2	167	558	24	87	101
e) Total no. of cells (Sector) in the licensed service area		Live data	4848	23483	9823	17098	6261	4201	20542	2825	5174	2216	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	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- August 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			
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Aug-14	1689	7870	3926	5726	2095	1400	6760	943	1620	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		Aug-14	2679	3923	50245	5479	3904	1316	3333	1776	1053	265
	c) BTS Accumulated Downtime	<=2%	Aug-14	0.21%	0.11%	1.72%	0.13%	0.25%	0.13%	0.07%	0.25%	0.09%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-14	20	9	72	13	6	0	24	0	4	1
	e) Worst affected BTSs due to downtime	<=2%	Aug-14	1.18%	0.11%	1.83%	0.23%	0.29%	0.00%	0.36%	0.00%	0.25%	0.14%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	96.46%	98.60%	98.70%	99.12%	99.58%	98.38%	99.72%	98.98%	99.08%	97.52%
	b) SDCCH/PAGING Congestion	<=1%	Aug-14	0.33%	0.39%	0.66%	0.42%	0.02%	0.05%	0.20%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	0.65%	0.44%	1.48%	0.47%	0.06%	0.05%	0.28%	0.01%	0.16%	1.53%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Aug-14	0.92%	1.04%	1.53%	1.42%	0.40%	0.95%	0.84%	0.15%	0.76%	0.72%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-14	2.95%	1.61%	2.41%	2.60%	0.03%	5.77%	2.64%	0.57%	1.13%	5.87%
	c) % of connections with good voice quality	>=95%	Aug-14	96.59%	98.80%	98.29%	95.45%	98.65%	98.26%	97.00%	99.72%	99.16%	98.83%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Aug-14	148	380	237	450	2	242	545	16	59	130
	e) Total no. of cells (Sector) in the licensed service area		Aug-14	5006	23522	9823	17283	6247	4185	20610	2821	5233	2216
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Aug-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-14	0	0	0	0	0	0	0	0	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		Aug-14	89196	436882	265400	236287	102000	67015	272154	116000	122000	171339
	b) Total traffic in TCBH in erlang (Avg.)		Aug-14	89082	381146	104454	161387	75245	27424	236215	26520	69817	26913
	c) Total no. of customers served (as per VLR) on last day of the month		Aug-14	3362943	15426853	2611738	6463579	4812283	574404	9682519	910278	1262035	377645

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- August 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			
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Live data	1688	7873	3916	5596	2102	1400	6746	943	1618	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		Live data	125	663	4661	786	561	425	644	236	120	38
	c) BTS Accumulated Downtime	<=2%	Live data	0.10%	0.12%	1.65%	0.20%	0.37%	0.42%	0.13%	0.35%	0.10%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	3	7	0	0	0	3	0	1	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.04%	0.18%	0.00%	0.00%	0.00%	0.04%	0.00%	0.06%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.64%	98.56%	98.76%	99.23%	99.56%	98.52%	99.76%	98.99%	99.05%	97.36%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.53%	0.42%	0.75%	0.23%	0.03%	0.07%	0.11%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	1.14%	0.45%	1.48%	0.35%	0.06%	0.07%	0.24%	0.00%	0.18%	1.71%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.89%	1.01%	1.54%	1.51%	0.41%	1.04%	0.87%	0.12%	0.69%	0.78%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.51%	1.51%	2.54%	2.78%	0.03%	<b>7.02%</b>	2.77%	0.75%	0.75%	<b>7.28%</b>
	c) % of connections with good voice quality	>=95%	Live data	96.55%	98.83%	98.33%	95.32%	98.60%	98.19%	97.03%	99.71%	99.16%	98.84%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	127	354	249	477	2	295	571	21	39	161
e) Total no. of cells (Sector) in the licensed service area		Live data	5039	23542	9823	17185	6247	4198	20603	2783	5245	2216	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	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- September 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			
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Sep-14	1754	7903	3949	5834	2076	1398	6838	943	1611	693
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Sep-14	1975	4683	49437	3755	2900	1458	2171	1414	665	681
	c) BTS Accumulated Downtime	<=2%	Sep-14	0.16%	0.08%	1.74%	0.09%	0.19%	0.14%	0.04%	0.21%	0.06%	0.14%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-14	12	11	71	2	2	1	4	3	1	0
e) Worst affected BTSs due to downtime	<=2%	Sep-14	0.68%	0.14%	1.80%	0.03%	0.10%	0.07%	0.06%	0.32%	0.06%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	96.61%	98.95%	98.67%	99.35%	99.55%	98.48%	99.74%	98.75%	99.02%	96.35%
	b) SDCCH/PAGING Congestion	<=1%	Sep-14	0.16%	0.17%	0.48%	0.33%	0.02%	0.07%	0.13%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Sep-14	0.74%	0.35%	1.54%	0.27%	0.07%	0.06%	0.26%	0.01%	0.19%	1.98%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Sep-14	0.94%	1.09%	1.60%	1.36%	0.41%	0.82%	0.83%	0.14%	0.78%	0.75%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-14	2.97%	1.88%	2.63%	2.76%	0.02%	5.53%	2.59%	0.68%	1.04%	5.99%
	c) % of connections with good voice quality	>=95%	Sep-14	96.83%	98.77%	98.33%	95.65%	98.56%	98.23%	96.91%	99.72%	99.17%	98.78%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Sep-14	153	445	258	490	1	232	537	19	54	133
e) Total no. of cells (Sector) in the licensed service area		Sep-14	5140	23613	9823	17739	6213	4193	20762	2825	5244	2219	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Sep-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-14	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>												
	a) Equipped Capacity of Network in Erlang		Sep-14	92502	440772	265400	241397	102000	66023	274193	116000	122000	171585
	b) Total traffic in TCBH in erlang (Avg.)		Sep-14	92893	387350	107459	168548	82599	29256	236927	28109	73745	28346
c) Total no. of customers served (as per VLR) on last day of the month		Sep-14	3384746	15472056	2615126	6407459	4873101	575404	9760567	915492	1277034	372824	

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- September-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			
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Live data	1728	7887	3926	5739	2095	1396	6587	943	1612	693
	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	199.86	556.85	4670	473.90	246.20	242.60	356.44	113.95	218.88	101.65
	c) BTS Accumulated Downtime	<=2%	Live data	0.16%	0.10%	1.65%	0.11%	0.16%	0.24%	0.08%	0.17%	0.19%	0.20%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	4	8	0	0	0	1	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.05%	0.20%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.37%	99.09%	98.26%	99.27%	99.60%	98.52%	99.76%	99.12%	98.98%	96.88%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.14%	0.12%	0.61%	0.26%	0.02%	0.04%	0.12%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.95%	0.29%	1.53%	0.32%	0.05%	0.06%	0.24%	0.00%	0.23%	2.22%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	1.00%	1.15%	1.72%	1.58%	0.37%	0.86%	0.83%	0.11%	0.85%	0.77%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.81%	2.17%	2.73%	2.74%	0.02%	5.76%	2.55%	0.58%	1.31%	6.05%
	c) % of connections with good voice quality	>=95%	Live data	96.79%	98.73%	99.67%	95.46%	98.68%	98.20%	97.07%	99.72%	99.16%	98.77%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	145	513	268	483	1	242	528	16	69	134
e) Total no. of cells (Sector) in the licensed service area		Live data	5159	23605	9823	17647	6228	4196	20711	2825	5247	2219	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

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



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

#### 5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA):

#### QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES

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>1 Metering &amp; Billing Credibility -Post Paid</b>													
	A) No. of bills issued during the quarter		RAJ	130819	776285	385214	199609	100331	NA	1427975	184931	185297	119437
	B) No. of bills disputed including billing complaints during the quarter		RAJ	11	119	NP	157	92	NA	826	133	177	0
	C)% of billing complaints during the quarter	<= 0.1%	RAJ	0.01%	0.02%	NP	0.08%	0.09%	NA	0.06%	0.07%	0.10%	0.00%
<b>2 Metering &amp; Billing Credibility -Pre Paid</b>													
	A) Total No. of Pre-paid customers at the end of the quarter		RAJ	5206235	15885033	NP	6174768	4936264	852296	9981144	2121233	894752	625567
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		RAJ	19	363	NP	2133	14499	1	4902	428	1838	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	RAJ	0.00%	0.00%	NP	0.03%	<b>0.29%</b>	0.00%	0.05%	0.02%	<b>0.21%</b>	0.00%
<b>3 Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>													
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		RAJ	30	482	NP	5171	14591	44	5728	561	2015	97
	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	30	482	NP	5171	14591	44	5728	561	2015	97



QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES

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%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	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%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>4</b>	<b>Response time to customers for assistance</b>												
	A) Total no of calls attempted to customer care/Call center		RAJ	21922225	5006442	NP	21047058	37714654	173068	20763132	7366303	1865841	97415
	B) Total no. of calls successfully established to customer care/Call center		RAJ	21515016	5006328	NP	20916419	37318080	171642	20763132	7140693	1830194	93745
	C) % Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	>=95%	RAJ	98.14%	100.00%	NP	99.38%	98.95%	99.18%	100.00%	96.94%	98.09%	96.23%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		RAJ	5615328	11073688	NP	8347378	1654960	162689	7741857	3408794	279031	153622
	E) Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		RAJ	4587636	10833865	NP	8195847	1629988	153433	7613255	3180893	272972	144707
	F) % age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec./ 90 sec *100 / Total call attempt)	>=90% (60 Sec.) & >=95% (90 Sec.)	RAJ	<b>81.70%</b>	*97.83%	NP	98.18%	*98.49%	<b>*94.31%</b>	*98.34%	<b>*93.31%</b>	*97.83%	<b>*94.20%</b>
<b>5</b>	<b>Termination/closure of service</b>												
	A) Total No. of requests for Termination / Closure of service received during the quarter		RAJ	976	1450	5542	2238	670	NA	8423	4109	792	982



**QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES**

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	976	1450	5542	2238	670	NA	8423	4109	792	982
	C) % of Termination/ Closure of service within 7 days	<=7days	RAJ	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%
<b>6</b>	<b>Time taken for refunds of deposits after closures.</b>												
	A) No. of Payments/ Refunds due during the quarter		RAJ	770	1420	1799	1533	513	2	16815	137	925	1168
	B) No. of Payments/ Refunds Cleared during the quarter		RAJ	770	1420	1799	1533	513	2	16815	137	925	1168
	C) Time taken for refunds of deposits after closures.	100% within 60 days	RAJ	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

i) NP: Data not provided

ii) BSNL was having some technical problem in fetching the data related to the billing and call centre, as their new Call centre was under commissioning, so they did not provide the data for this quarter.

iii) MTS has given the call centre data for the parameter "Response time to customers for assistance in months of July, Aug for 60 Sec and Sep data is given for 90 Sec.

iv) \*Calls answered by operators (Voice to voice) in 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21<sup>st</sup> August 2014.

v) NA\*: Tata (GSM) has no post-paid connections, so no request of Termination/Closure.

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-SEPTEMBER 14													
3 days live CSD Audit Data		Benchmark	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>RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE</b>													
1	Total no of calls attempted to customer care/Call center		Rajasthan	726474	184510	NP	660502	350713	69278	623170	222447	47596	43687
	Total no. of calls successfully established to customer care/Call center		Rajasthan	717000	184510	NP	657362	347144	68758	623170	217539	46671	43184
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	Rajasthan	98.70%	100.00%	NP	99.52%	98.98%	99.25%	100.00%	97.79%	98.06%	98.85%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Rajasthan	200172	307564	NP	260697	39110	4820	245006	103777	6167	4787
	Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		Rajasthan	145114	300854	NP	256838	38097	4627	241018	101556	5981	4532
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60/90 Sec.*100 / Total call attempt)	>=90% (60 Sec.) & >=95% (90 Sec.)	Rajasthan	72.49%	*97.82%	NP	98.52%	*97.41%	*96.00%	*98.37%	*97.86%	*96.98%	*94.67%

NP: Data not provided

ii) BSNL was having some technical problem in fetching the data related to the billing and call centre, as their new Call centre was under commissioning, so they did not provide the data for this quarter..

iii) \*Calls answered by operators (Voice to voice) in 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21<sup>st</sup> August 2014.

## 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 **RCOM(GSM)** and **RCOM(CDMA)**. The performance of **RCOM (GSM)** and **RCOM (CDMA)** remained non-complied for parameter 'Billing Complaints – Prepaid' with their achieved values as **0.29%** and **0.21%**. **BSNL** was having some technical problem in fetching the billing and call centre related data, as their new Call centre was under commissioning, so they did not provide the data for this quarter.

### 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 have 100 % resolved the billing complaints within stipulated period of 4 weeks. 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, **Aircel** has not met the benchmark of **calls answered by Operators (voice to voice) within 60 seconds**. **Aircel** achieved its performance as **81.70%** whereas **Tata (GSM)**, **MTS** and **Tata (CDMA)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 90 seconds' as they provided the data for 90 seconds. They have achieved their performance as **94.31%**, **93.31%** and **94.20%** respectively against the benchmark of  $\geq 95\%$ .

### 4. Termination/Closure of Service

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

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

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure.

### Live Measurements:

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 / 90 seconds. Only **Aircel** has not met the benchmark of **calls answered by Operators (voice to voice) within 60 seconds**. **Aircel** achieved its performance as **72.49%**. whereas **Tata (CDMA)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 90 seconds (**94.67%**).



## **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%	100%	95%	100%	100%	100%	96%	100%	100%
AIRTEL	Rajasthan	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	Rajasthan	100%	100%	--	100%	100%	100%	100%	100%	100%	100%
IDEA	Rajasthan	94%	100%	100%	--	100%	100%	100%	97%	100%	100%
RCOM (GSM)	Rajasthan	100%	100%	100%	100%	--	100%	100%	100%	100%	100%
TATA (GSM)	Rajasthan	100%	100%	100%	96%	94%	--	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 Idea & MTS, successful interconnection was 95.0% and 96%, Idea to Aircel and MTS was 94% and 97% and Tata (GSM) to Idea & RCOM GSM was 96% and 94%, respectively. 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	95	100	100	100	96	100
% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	Rajasthan	100.00%	100.00%	100.00%	100.00%	95.00%	100.00%	100.00%	100.00%	96.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Rajasthan	100	100	100	100	95	100	100	100	96	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	Rajasthan	100	100	91	100	85	100	100	100	90	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempt)	Rajasthan	100.00%	100.00%	91.00%	100.00%	85.00%	100.00%	100.00%	100.00%	90.00%	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 except for BSNL, RCOM(GSM) and RCOM(CDMA), the calls answered by operators were 91%, 90% and 94% respectively.

## 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	30	100	ND	100	100	44	100	100	100	97
Total No. of calls Answered	Rajasthan	20	81	ND	77	72	37	79	67	61	55
Cases resolved within 4 weeks	Rajasthan	20	81	ND	77	72	37	79	67	61	55
%age of cases resolved	Rajasthan	100.00%	100.00%	ND	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

ND: Not done due to BSNL not provided the detail of billing complaints. NA: Not Applicable as Tata (GSM) has no post-paid customers.

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 reported that their complaints have been resolved but not remember of duration of their resolution. However, the customers generally reported their satisfaction on resolution of the billing complaints.

**6.4 LEVEL -1 CALLING ASSESSMENT:**

LEVEL 1 LIVE CALLING																
Emergency no.	Circle	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	Rajasthan	Bikaner	Bikaner (s)	8	√	√	√	√	√	√	√	√	√	√		
			Nokha	8	√	√	√	√	√	√	√	√	√	√	√	
			Bikaner (e) (jamsar),	8	√	√	√	√	√	√	√	√	√	√	√	√
			Lunkaransar-iv,	8	√	√	√	√	√	√	√	√	√	√	√	√
			Lunkaransar-ii (mahajan)	8	√	√	√	√	√	√	√	√	√	√	√	√
			Bikaner(c) (jaimalsar)	8	√	√	√	√	√	√	√	√	√	√	√	√
			Kolayat-ii	8	√	√	√	√	√	√	√	√	√	√	√	√
			Kolayat-iv (daitra)	8	√	√	√	√	√	√	√	√	√	√	√	√
100, 101, 102, 108	Rajasthan	Churu	Churu	8	√	√	√	√	√	√	√	√	√	√		
			Rajgarh	8	√	√	√	√	√	√	√	√	√	√		
			Ratangarh	8	√	√	√	√	√	√	√	√	√	√		
			Sardarshahar (s)	8	√	√	√	√	√	√	√	√	√	√		
			Sridungargarh (n)-dungargh	8	√	√	√	√	√	√	√	√	√	√		
			Sujangarh(c) (bidasar)	8	√	√	√	√	√	√	√	√	√	√		
			Taranagar	8	√	√	√	√	√	√	√	√	√	√		
100, 101, 102, 108	Rajasthan	Udaipur	Girwa (udaipur)	8	√	√	√	√	√	√	√	√	√	√		
			Nathdwara	8	√	√	√	√	√	√	√	√	√	√		
			Rajsamand (kankorli)	8	√	√	√	√	√	√	√	√	√	√		
			Malvi (fatenagar)	8	√	√	√	√	√	√	√	√	√	√		
			Vallabhnagar	8	√	√	√	√	√	√	√	√	√	√		

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 SDCA's of the three SSAs where drive tests were conducted, the calls were made from mobile phones provided by the service providers during the drive test. 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 ASSESTID DRIVE TEST**

In terms of TRAI's letter dated 21<sup>st</sup> January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Bikaner, Churu and Udaipur** in the months of July, August and September 2014 respectively .The total route Kms covered during the drive tests in the respective SSAs was **472Kms, 588Kms and 483Kms**. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

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

DRIVE TEST TABLE – 1

OPERATOR-ASSISTED DRIVE TEST AT BIKANER SSA IN JULY-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	43	30	38	30	37	30	36	31	51	31	43	30	46	30	52	30	47	30	38	34	
		Highways	160	30	252	30	253	48	67	31	156	30	152	30	248	30	149	31	82	33	90	31	
		Within City	241	30	184	30	197	31	152	30	153	31	211	30	195	30	201	30	133	32	251	34	
		Overall SSA	444	90	474	90	487	109	255	92	360	92	406	90	489	90	402	91	262	95	379	99	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	2.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	1.98%	2.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	2.54%	3.23%	0.00%	3.33%	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%	2.26%	1.83%	0.00%	1.09%	0.00%	0.00%	0.00%	0.00%	0.20%	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%	0.00%	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%	
		Highways	0.00%	0.00%	0.00%	0.00%	2.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	0.00%	2.44%	0.00%	1.11%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.95%	0.00%	0.00%	0.00%	0.00%	0.00%	1.50%	0.00%	0.00%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	2.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	1.53%	0.00%	0.26%	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	NA	97.52%	99.01%	96.39%	99.02%	97.00%	90.05%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.64%	99.97%	96.12%	99.85%	96.93%	99.16%
Within City		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.39%	99.90%	95.65%	98.13%	99.13%	97.46%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-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	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.22%	99.63%	95.92%	99.00%	98.34%
5	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.04%	95.66%	95.87%	99.43%	79.66%	86.95%	97.24%	91.15%	93.89%	95.46%	96.84%	96.42%	95.41%	96.22%	NA	NA	NA	NA	NA	NA	NA
		Highways	95.43%	96.07%	96.10%	99.46%	89.64%	97.03%	97.10%	99.54%	97.51%	99.54%	94.95%	99.05%	96.59%	97.66%	NA	NA	NA	NA	NA	NA	NA
		Within City	96.37%	97.20%	96.77%	95.39%	85.74%	86.54%	97.52%	100%	97.45%	93.05%	96.88%	87.71%	96.62%	97.89%	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	95.86%	96.31%	96.41%	98.32%	87.29%	90.90%	97.36%	94.93%	97.13%	96.00%	96.20%	94.39%	96.47%	97.26%	NA	NA	NA	NA	NA	NA	NA
Service Coverage																							
5	In door (>= - 75dBm)	Major Roads	96.80%	13.12%	98.36%	98.01%	90.88%	40.73%	80.60%	0.06%	95.24%	11.49%	89.72%	49.73%	92.85%	52.10%	80.39%	8.78%	80.68%	50.89%	57.46%	28.74%	
		Highways	41.03%	95.00%	96.21%	99.14%	64.25%	99.68%	52.03%	83.78%	43.08%	47.62%	50.40%	67.38%	50.99%	99.09%	46.44%	99.38%	72.93%	100%	71.34%	100%	
		Within City	56.55%	48.80%	97.75%	98.74%	72.39%	89.84%	72.44%	98.72%	67.78%	96.86%	79.56%	19.17%	70.11%	65.35%	80.64%	99.96%	84.95%	98.77%	78.43%	84.36%	
		Overall SSA	56.07%	52.29%	97.12%	98.54%	69.64%	79.31%	67.90%	29.55%	60.22%	53.14%	70.36%	45.41%	63.00%	72.20%	68.04%	69.74%	80.68%	83.27%	79.51%	69.95%	
	In-vehicle (>= - 85dBm)	Major Roads	99.97%	38.25%	100%	98.97%	99.95%	96.22%	98.48%	12.42%	100%	59.53%	99.90%	72.42%	99.97%	98.71%	97.58%	65.86%	98.25%	88.71%	100%	72.31%	
		Highways	77.91%	99.90%	99.82%	99.70%	87.77%	100%	88.64%	99.77%	87.57%	100%	75.95%	98.00%	83.67%	99.99%	69.54%	100%	87.82%	100%	96.67%	100%	
		Within City	91.98%	98.06%	99.85%	99.21%	96.11%	100%	95.22%	100%	96.20%	100%	96.00%	86.79%	96.47%	99.88%	98.73%	100%	98.05%	99.97%	97.52%	100%	
		Overall SSA	87.94%	78.72%	99.85%	99.25%	92.04%	98.88%	93.85%	41.09%	92.68%	87.10%	89.34%	85.76%	90.42%	99.53%	87.85%	88.76%	95.11%	96.24%	97.75%	90.27%	
	Outdoor-in city (>= - 95dBm)	Major Roads	99.98%	98.09%	100%	100%	100%	100%	100%	88.60%	100%	99.94%	100%	99.13%	100%	100%	100%	100%	99.98%	100%	100%	100%	
		Highways	95.73%	100%	99.92%	100%	98.29%	100%	99.61%	100%	98.79%	100%	94.74%	100%	97.67%	100%	98.95%	100%	96.67%	100%	99.87%	100%	
		Within City	99.45%	99.99%	100%	100%	99.97%	100%	99.84%	100%	99.86%	100%	98.12%	99.97%	99.93%	100%	100%	100%	99.95%	100%	99.92%	100%	
		Overall SSA	98.19%	99.36%	99.97%	100%	99.09%	100%	99.80%	92.33%	99.39%	99.98%	97.13%	99.70%	98.80%	100%	99.61%	100%	99.00%	100%	99.92%	100%	
6	Call Setup Success	Major Roads	100%	100%	100%	100%	97.30%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		



**AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-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%)																				
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	98.25%	100%	100%	100%	100%	100%	98.31%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	94.67%	100%	99.07%	100%	98.91%	100%	99.60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	93.63%	98.63%	99.81%	100%	100%	100%	99.50%	100%	99.70%	100%	100%	100%	100%	100%	100%	100%	100%
		<b>Overall SSA</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>94.78%</b>	<b>98.63%</b>	<b>99.67%</b>	<b>100%</b>	<b>99.60%</b>	<b>100%</b>	<b>99.44%</b>	<b>100%</b>	<b>99.87%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

NA: Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

DRIVE TEST TABLE – 2

OPERATOR-ASSISTED DRIVE TEST AT CHURU SSA IN AUGUST-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	26	30	31	30	29	33	32	30	32	30	32	30	29	30	33	37	31	30	31	30	
		Highways	180	30	323	30	263	30	135	33	35	30	141	32	279	30	142	30	152	30	51	31	
		Within City	236	30	219	30	226	31	202	30	164	30	210	30	203	30	160	33	209	30	233	30	
		<b>Overall SSA</b>	<b>442</b>	<b>90</b>	<b>573</b>	<b>90</b>	<b>518</b>	<b>94</b>	<b>369</b>	<b>93</b>	<b>231</b>	<b>90</b>	<b>383</b>	<b>92</b>	<b>511</b>	<b>90</b>	<b>335</b>	<b>100</b>	<b>392</b>	<b>90</b>	<b>315</b>	<b>91</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.13%	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%	1.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%	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%	2.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.95%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.54%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.04%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.23%	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%	3.85%	0.00%	0.00%	0.00%	0.00%	0.00%	1.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	3.92%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	1.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	0.43%	0.00%	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>2.75%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.79%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.51%</b>	<b>0.00%</b>	<b>0.95%</b>	<b>0.00%</b>	
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	NA	99.81%	98.54%	92.68%	100%	99.60%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.47%	99.74%	98.48%	99.87%	100%	100%
Within City		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.85%	99.96%	99.45%	99.98%	99.90%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-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	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.79%	99.36%	98.54%	99.94%	99.89%
Operators)	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.57%	95.74%	96.04%	98.79%	97.95%	94.35%	96.06%	97.84%	97.70%	97.66%	96.17%	99.98%	96.03%	98.36%	NA	NA	NA	NA	NA	NA	NA
	Highways	95.74%	99.52%	96.29%	99.36%	90.61%	97.74%	95.66%	96.27%	98.48%	99.65%	93.38%	99.82%	95.51%	97.88%	NA	NA	NA	NA	NA	NA	NA	
	Within City	96.10%	99.92%	97.65%	98.77%	95.85%	98.73%	94.59%	100%	97.82%	99.73%	97.01%	99.59%	95.55%	96.17%	NA	NA	NA	NA	NA	NA	NA	
	Overall SSA	95.90%	98.33%	96.80%	98.97%	93.50%	96.73%	95.14%	98.39%	97.90%	99.01%	95.63%	99.86%	95.56%	97.48%	NA	NA	NA	NA	NA	NA	NA	
Service Coverage																							
5	In door (>= -75dBm)	Major Roads	60.10%	65.70%	95.53%	93.03%	95.24%	93.40%	56.73%	55.25%	76.68%	51.80%	52.04%	100%	56.10%	99.97%	81.95%	51.97%	67.17%	97.15%	24.30%	100%	
		Highways	29.88%	51.40%	96.91%	98.62%	40.38%	67.76%	36.32%	33.23%	42.44%	32.82%	36.10%	99.85%	33.39%	79.15%	56.62%	95.55%	63.71%	97.84%	34.76%	100%	
		Within City	44.33%	99.90%	96.94%	99.09%	60.65%	69.78%	65.22%	93.70%	47.82%	91.13%	54.93%	99.30%	59.33%	99.82%	64.76%	100%	70.99%	98.27%	45.12%	100%	
		Overall SSA	38.44%	70.83%	96.90%	96.82%	53.25%	78.18%	53.43%	66.42%	51.00%	58.61%	47.90%	99.80%	45.23%	92.96%	63.29%	80.53%	68.09%	97.73%	41.74%	100%	
	In-vehicle (>= -85dBm)	Major Roads	98.20%	99.70%	99.87%	97.61%	100%	100%	94.42%	100%	99.40%	99.33%	87.20%	100%	95.03%	100%	98.48%	98.18%	82.21%	99.99%	61.14%	100%	
		Highways	69.29%	95.40%	99.71%	99.52%	78.83%	100%	73.18%	98.13%	86.98%	97.39%	64.42%	100%	70.87%	99.56%	93.68%	100%	76.88%	100%	58.32%	100%	
		Within City	86.82%	100%	99.91%	99.69%	95.89%	99.04%	95.71%	100%	91.79%	99.92%	91.12%	100%	93.95%	100%	95.85%	100%	88.38%	100%	78.91%	100%	
		Overall SSA	79.24%	98.27%	99.79%	98.91%	88.26%	99.71%	87.04%	99.56%	92.11%	98.88%	81.17%	100%	81.65%	99.85%	95.26%	99.31%	83.79%	100%	74.51%	100%	
	Outdoor-in city (>= -95dBm)	Major Roads	100%	100%	100%	100%	100%	100%	99.94%	100%	100%	100%	96.32%	100%	100%	100%	100%	100%	96.71%	100%	93.85%	100%	
		Highways	91.86%	99.80%	100%	99.88%	99.13%	100%	95.87%	100%	99.69%	100%	92.90%	100%	96.02%	100%	99.96%	100%	94.21%	100%	88.98%	100%	
		Within City	98.12%	100%	100%	99.84%	99.87%	100%	99.56%	100%	99.93%	100%	99.28%	100%	99.78%	100%	100%	100%	98.47%	100%	98.46%	100%	
		Overall SSA	95.29%	99.93%	100%	99.91%	99.54%	100%	98.19%	100%	99.90%	100%	96.73%	100%	97.78%	100%	99.98%	100%	96.81%	100%	96.78%	100%	
6	Call Setup Success	Major Roads	100%	100%	100%	100%	100%	100%	96.88%	100%	100%	100%	96.88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-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	
7	Rate (>=95%)	Highways	100%	100%	100%	100%	98.86%	100%	100%	100%	100%	100%	99.29%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	97.79%	100%	100%	100%	100%	100%	99.05%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		<b>Overall SSA</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>98.46%</b>	<b>100%</b>	<b>99.73%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>98.96%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
		Major Roads	100%	100%	100%	100%	100%	100%	97.87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Highways	100%	100%	100%	100%	96.68%	100%	100%	100%	100%	100%	97.17%	100%	99.76%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	96.53%	100%	99.85%	100%	100%	100%	99.69%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		<b>Overall SSA</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>96.96%</b>	<b>100%</b>	<b>99.71%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>99.17%</b>	<b>100%</b>	<b>99.89%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
		Major Roads	100%	100%	100%	100%	100%	100%	97.87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

DRIVE TEST TABLE - 3

OPERATOR ASSISTED DRIVE TEST AT UDAIPUR SSA IN SEPTEMBER 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	60	30	67	30	65	30	71	30	65	33	70	30	71	30	53	31	65	31	68	30	
		Highways	153	30	235	30	145	30	149	36	131	31	116	30	210	30	127	30	127	31	80	31	
		Within City	184	30	204	30	161	30	170	30	171	31	273	30	193	30	202	32	286	31	240	33	
		Overall SSA	397	90	506	90	371	90	390	96	367	95	459	90	474	90	382	93	478	93	388	94	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	3.08%	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%	0.00%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	2.07%	0.00%	0.67%	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%	0.62%	0.00%	0.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.70%	0.00%	0.00%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	1.62%	0.00%	0.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	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%	
		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%	0.00%	0.00%	0.00%	0.00%	0.79%	0.00%	1.25%	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%	0.70%	0.00%	0.42%	0.00%	
		Overall SSA	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%	0.63%	0.00%	0.52%	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	NA	99.52%	99.87%	99.10%	100%	97.01%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.51%	99.86%	98.86%	100%	99.23%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.61%	99.94%	99.36%	100%	99.55%	99.55%

**AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-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	
			Service Coverage																				
Operators)	Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.56%	99.89%	99.22%	100%	99.01%	99.85%	
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.62%	99.53%	96.02%	97.13%	87.64%	91.87%	96.61%	97.62%	96.00%	99.77%	95.16%	99.00%	95.12%	97.53%	NA	NA	NA	NA	NA	NA	NA
		Highways	97.32%	99.93%	96.30%	98.88%	88.28%	96.27%	98.95%	98.38%	97.74%	99.49%	96.51%	98.70%	95.75%	97.91%	NA	NA	NA	NA	NA	NA	NA
		Within City	96.51%	97.80%	96.34%	98.26%	90.73%	98.67%	97.18%	95.78%	96.79%	99.46%	97.59%	97.28%	96.05%	97.57%	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	96.67%	99.08%	96.28%	98.10%	89.24%	95.65%	97.71%	97.00%	96.99%	99.58%	96.96%	98.33%	95.77%	97.67%	NA	NA	NA	NA	NA	NA	NA
5	In door (>= - 75dBm)	Major Roads	64.47%	98.30%	96.77%	96.87%	45.99%	88.26%	91.62%	91.72%	43.15%	99.10%	92.02%	100%	96.36%	100%	58.15%	84.75%	87.83%	100%	99.47%	100%	
		Highways	35.01%	95.00%	96.36%	98.88%	37.58%	99.79%	55.31%	96.05%	40.72%	80.75%	63.97%	0.05%	60.42%	89.32%	62.08%	13.36%	74.39%	83.45%	64.07%	74.41%	
		Within City	64.24%	74.10%	97.32%	97.06%	63.07%	99.98%	62.16%	81.10%	48.78%	72.36%	77.18%	88.24%	85.81%	96.39%	70.58%	100%	77.79%	100%	72.96%	97.72%	
		Overall SSA	55.20%	90.48%	96.80%	97.62%	50.22%	96.10%	65.01%	89.96%	44.95%	84.33%	76.12%	62.86%	76.25%	95.24%	65.97%	70.22%	78.83%	93.44%	76.46%	90.66%	
	In-vehicle (>= - 85dBm)	Major Roads	94.40%	100%	99.75%	99.78%	84.30%	99.82%	99.98%	99.89%	91.45%	100%	99.50%	100%	99.88%	100%	94.52%	100%	98.24%	100%	100%	100%	
		Highways	71.16%	99.90%	99.83%	99.89%	61.61%	100%	84.60%	99.99%	77.14%	99.84%	79.06%	84.16%	93.46%	99.99%	91.81%	99.89%	87.67%	100%	91.88%	99.95%	
		Within City	91.90%	99.80%	99.83%	99.11%	89.56%	100%	92.92%	99.68%	86.28%	99.57%	93.98%	100%	98.99%	100%	97.34%	100%	91.91%	100%	95.75%	100%	
		Overall SSA	85.94%	99.91%	99.82%	99.59%	77.79%	99.94%	91.19%	99.86%	83.95%	99.81%	91.12%	94.74%	96.69%	100%	95.11%	99.97%	92.16%	100%	95.90%	99.98%	
	Outdoor-in city (>= - 95dBm)	Major Roads	99.90%	100%	100%	100%	100%	100%	100%	100%	99.94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		Highways	94.49%	100%	100%	100%	100%	100%	98.96%	100%	97.84%	100%	91.37%	99.97%	99.89%	100%	99.82%	100%	97.62%	100%	99.27%	100%	
		Within City	99.50%	100%	100%	100%	100%	100%	99.85%	100%	99.06%	100%	99.41%	99.97%	99.98%	100%	99.95%	100%	98.92%	100%	99.88%	100%	
		Overall SSA	98.02%	100%	100%	100%	100%	100%	99.56%	100%	98.78%	100%	97.51%	99.99%	99.95%	100%	99.92%	100%	98.85%	100%	99.80%	100%	
	6	Call Setup Success	Major Roads	100%	100%	100%	100%	96.92%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-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%	97.93%	100%	99.33%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	99.38%	100%	99.41%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.30%	100%	100%	100%
		<b>Overall SSA</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>98.38%</b>	<b>100%</b>	<b>99.49%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>99.58%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	95.69%	100%	100%	100%	99.06%	100%	98.28%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.42%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	100%	100%	100%	100%	99.57%	100%	99.12%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		<b>Overall SSA</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>99.03%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>99.62%</b>	<b>100%</b>	<b>98.97%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

NA: Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

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
BIKANER	BIKANER (S), NOKHA / 145 KM	<p>1.) Bikaner- -&gt; (A) Major Road - -&gt; BSNL Office - Ganga nagar choraha - MS collage - Kothari hospital - Jaisalmer road - sabji mandi - HP collony - sarvodaya basti - police line chocki - ganga nagar choraha - Gov. Bus stand - Annaz mandi - The Central Cooperative bank- karni nagar- Doordarshan kendra - dindayal circle - dayanand public school - sandal pura - safia school - vyas colony.</p> <p>(B). With in city- -&gt; Vyas colony – murti circle – Sector 5 circle – old university – Rajvansh circle – Gov. polo technical collage – Medical collage – LIC office – PBH Gov. hospital – Ambedker circle – Medical collage- Rani bazar circle – incomtax office –transport gali – old jail – Bikaner old city – GOGA gate – Shree Jain Sen. Sec school.- Gopeshwar mandir – Mahadev mandir – Nathusar gate – Murlidhar vyas colony – Gangasar – Indra chock – Gandhi chock - Big cinema – Rani bazar industrial area – Railway station.</p> <p>(C) Highway - -&gt; Bikaner – palana – deshnok – rasrisar – bhamadsar – Nokha.</p> <p>2.) NOKHA - -&gt; (A) City - -&gt; BSNL telephone Ex. – Jarrasar road – Gattani Girls school – Rajsar road – 132 kv gss – Aadarsh vidha mandir school – Doordarshan Kendra – LIC office – Sanjivani hospital – Main market nokha- lekra chock – Pansari chock – Ramdev chock – Gov. school – Gov. hospital.</p> <p><b>INDOOR: LAL JI HOTEL, BIKANER</b></p>	BIKANER (E) (JAMSAR), LUNKARANSAR - IV, LUNKARANSAR -II (MAHAJAN) / 147 KM	<p>1.) BIKANER ( E ) (JAMSAR) - -&gt;(A) City - -&gt; Gov. school- BSNL TELEPHONE EXCHANGE – Jamsar – Police station jamsar.</p> <p>(B) Highway - -&gt; Bikaner to BIKANER (E) (JAMSAR) - -&gt; BSNL Ex. Bikaner – Bhimsen choudary circle – Bus stand- Raj. Agri. University – Khara village.</p> <p>2.) LUNKARANSAR-IV - -&gt;(A) City - -&gt; police station – Gurudwara – ADM office – Railway station lunkaransar – Noori masjid – Khariya kua – Gov. School – Krishi mandi – old bus stand – BSNL Ex..</p> <p>(B) Highway - -&gt; BIKANER ( E ) (JAMSAR) to LUNKARANSAR-IV - -&gt; Jamsar – bamahwali – kisturiya – Hansera – lunkaransar.</p> <p>3.) LUNKARANSAR-II (MAHAJAN) - -&gt; (A) City - -&gt; police staion – Gov. school – Mahajan garh – krishi mandi.</p> <p>Arjunsar - -&gt; BSNL Ex. – Water tank – railway qtr – Railway station.</p> <p>(B). Highway - -&gt; LUNKARANSAR-IV to LUNKARANSAR-IV (MAHAJAN) - -&gt; Lunkaransar – Hanasar – Malkisar – Mahajan.</p> <p><b>INDOOR: BSNL CMTS BIKANER</b></p>	BIKANER(C) (JAIMALSAR), KOLAYAT-II , KOLAYAT-IV (DAITRA) , KOLAYAT- III (BAJJU) / 180 KM	<p>1.) BIKANER ( C ) (JAIMALSAR) - -&gt; (A) City - -&gt; JAIMALSAR – panchayat smiti – Rathi Vidha Niketan – SBI bank – Bhanipura road- Kolayat road.</p> <p>(B) Highway - -&gt; BIKANER to BIKANER (C) (JAIMALSAR) highway - -&gt; Bikaner MN hospital – Stambh tirth – Mgsu – Nal – Airport nal – kodaimdesar village – jaimalsar.</p> <p>2.) KOLAYAT-II - -&gt; (A) City- -&gt; Hospital – police station – power house – Panchayat smiti – kolayat railway station – Main market – Ambedker circle – BSNL Telephone exchange – DSP office – Sankhla pranta – Power plant – Gov. school.</p> <p>(B) Highway - -&gt; BIKANER (C) (JAIMALSAR) to KOLAYAT-II Highway - -&gt; JAIMALSAR – Gajner – Golri – kolayat.</p> <p>3.) KOLAYAT – iv ( DAITRA ) - -&gt; (A) City - -&gt; Police station – Gov. hospital – SBI BANK – BSNL EX. – Rajiv Gandhi sewa Kendra – Gov. school – Bajju road.</p> <p>4.) KOLAYAT-iii( BAJJU) - -&gt; (A) City - -&gt; RSEB Sub station – 132 KV GSS – Dairy – Bajju - BSNL ex. - Main market – Bargadsar road – MD degree collage – PHS bajju – Krishi mandi .</p> <p>(B) Highway - -&gt; KOLAYAT – iv ( DAITRA ) to KOLAYAT-iii( BAJJU) Highway - -&gt; Daitra – madmogarh village – Beethnok village – Bajju.</p> <p><b>INDOOR: KOTHARI HOSHPIAL, BIKANER</b></p>



**AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2014-RAJASTHAN CIRCLE**



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
CHURU	CHURU, RAJGARH, TARANAGAR / 184 KM	<p>1.) CHURU--&gt; (A) Major Road - -&gt; BSNL Exchange- Post office-Railway station- collect rate -Police line- K.V School - Gov. hospital- Gov. Bus stand- CHURU Jail- Industrial Area- Housing Board- Pankha circle- Gov. bagala school- Jharia mori - Gov. Gopi Ram s.s. school - Shri Nath Math- Panchmukhi Balaji-Garh circle- Main market Churu - PNB Bank- Gov. Girls Collage - Lal ghanagarh circle- Gov. lohiya circle- Railway station.</p> <p>(B) City - -&gt; Naya Bass colony - Gov. sarda school - UCO Bank - Back side to lohiya collage - Gandhi Nagar - Punia colony - Shiv colony - OM colony - Agrasen colony - Lal ghanagarh Circle - cooperative BANK- Railway crossing - Rajgarh Road.</p> <p>(C) Highway - -&gt; Churu - Dhadhar Village - Lakha - Dhani Laxman singh - Dudhwa Railway station - Raju Ki Dhani- Raran pura - Dokwa village- Dokwa railway station - Rajgarh.</p> <p>2.) Rajgarh - -&gt; (A) City - -&gt; Police Station Rajgarh - Shahid smarak - Panchayat samiti - electricity board- Mini sachivalaya - Gov. Bus Stand - Krishi upaj Mandi- Rajgarh Jail- BSNL Office - Bhagat singh chowk - Ambedkar chowk- Hisar Road. - M.P chowk - Goga ji Mandir - Jain Hospital - Nagar palika - Gov. School - Four poll - Gov. High S.S. School - Police station- Main Market - Railway Station - Post Office- Bus stand - LIC office - Tatanagar Road.</p> <p>(B)Highway - -&gt; Rajgarh - Nayangali - Dadrewa - Taranagar.</p> <p>3.) Taranagar - -&gt; (A) City - -&gt; Indian oil petrol pump- Sahawa Tiraha - chaudhary collage - Prerna school - Balaji temple - Court - electricity board - P.W.D office - Gov. Hospital - Nagar palika - Bus stand - BSNL office - police station - Post office - Gov. high S.S. School - Rest house - Ambedkar chowk- Gov. collage - Churu road.</p> <p>(B)Highway - -&gt; Taranagar - Chalkoie -</p>	SARDARSHAHAR (S), SRIDUNGARGARH (N)- DUNGARGARH / 214 KM	<p>1.) SARDARSHAHAR (S) - -&gt; (A) City - -&gt; Panchayat Samiti - Bimla Devi Science building - saras dairy- Navoday School - Partap colony - Bahadur singh colony - Terahpanth building - Ghanta garh- Sabji Mandi - Gandhi chowk - Court - Nagar palika - Main market- Bus stand - P.H.C hospital - Agricultural science centre - Jaitsar Road - Taranagar Road - Partap bhawan- I.A.S university - Ratangarh road.</p> <p>(B) Highway - -&gt;</p> <p>(a) Churu to Sardarshahar Highway - -&gt; Churu - District Stadium - Adarsh vidya mandir school - M.S public school - Khariya - Rampura - Jasrasar - Balrasar - Dhadhariya chaman - Udasar - Phulasar - K.K.C collage Sardarshahar- Sardarshahar.</p> <p>(b) Sardarshahar to SRIDUNGARGARH (N)- DUNGARGH highway - -&gt; RICCO Area Sardarshahar- Sawai - Bandhnaw - bhadhasar - aadhsar - Gov. school aadhsar - Dhirdesar - Thukriasar - Toliyasar - Jetasar - SRIDUNGARGARH (N)- DUNGARGH.</p> <p>2.) SRIDUNGARGARH (N)- DUNGARGH - -&gt; (A) City - -&gt; DUNGARGH Circle - Mahesh dwar - momasar bas - Gov. hospital - Post office - Aadhsar bas - Main market - BSNL Office - Jodhpur vidyut Nigam - Railway station - Regional forest office ( R.F.O) - Krishi mandi - Bikaner road - Bharat petrol pump - Sesomu school - Doordarshan Relay kendra - police station - SDM office - Panchyat smiti - Nagar palika - court - Shir dungarha collage- Maruti Suzuki - Ratan garh road.</p> <p>(B) Highway - -&gt; SRIDUNGARGARH (N)- DUNGARGH to Ratangarh higaway- -&gt; DUNGARGH- Sathlera - Bigga - Gitasar- Jhorawpur- persaneu - Payli - Ratangarh.</p> <p><b>INDOOR: GOPAL HOTEL DUNGARGH</b></p>	RATANGARH , SUJANGARH(C) (BIDASAR), / 190 KM	<p>1.) RATANGARH - -&gt; (A) City - -&gt; BSNL OFFICE - Post office - Gandhi bal nicketan - Bus stand - Hanuman park - Sabji mandi - White ghanagarh - Railway crossing - Railway quarter - Ambedkar nagar - Sati temple - HP petrol pump - White ghanagarh - Bajoria school - Ward no. 31 - P.W.D Office - ITI - Regional forest office ( R.F.O) - 440 KV GSS - Pareek colony - Adarsh vidya mandir school - Ramchandra mandir - police station - bus stand - Gov. hospital - Panchyat smiti - Sujangarh road.</p> <p>(B) Highway - -&gt;</p> <p>Churu to Ratangarh Highway - -&gt; Churu- TRM Public school - Binasar - sathda - sehala - Gorisar - Jaleu - Ratangarh.</p> <p>Ratangarh to SUJANGARH(C) (BIDASAR) highway - -&gt; Ratangarh - Loha - Khathari - parihara - Randhisar - Chapar - chadwas - SUJANGARH(C) (BIDASAR).</p> <p>2.) SUJANGARH(C) (BIDASAR) - -&gt; (A) City - -&gt; indian oil petrol pump - police station - BSNL Exchange - Theh. Office - Bus stand - Sujangarh road.</p> <p>Salasar with in city - -&gt; Indian oil petrol pump - BSNL Ex. - salasar Balaji temple - Gov. school - salasar circle - Gov. hospital - Bus stand - salasar Balaji temple.</p> <p>(B) Highway - -&gt; SUJANGARH(C) (BIDASAR) to salasar - -&gt;</p> <p>Bidasar - chadwas - chapar - sujangarh - loadshar - dhan- salasar</p>

**AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2014-RAJASTHAN CIRCLE**

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
		Bharusar – chajusar village- Churu.  <b>INDOOR: BSNL OFFICE, RAJGARH</b>				<b>INDOOR: SALASAR BALAJI TEMPLE.</b>
<b>UDAIPUR</b>	<b>GIRWA (UDAIPUR) / 104 KM</b>	1.) Udaipur--> (A) Major Road - -> BSNL Exchange – Court choraha – M.G collage – Sukhadiya circle – fatehpura circle – Vidya bhawan school –Fateh sagar – fatehpura circle- Bedla Road – Shiphon circle – Celebration Mall – Suket circle – Mahila police station – ST GREGORIOS Collage – Ambience Hotel – Mewar circle – Sukhadiya university – Bohra ganeshji – K.V School – Partap nagar circle – Rajasthan vidyapeeth university – Pacific university – Debari – Madri industrial area – Secure meter – Ekling circle – Gov. School – Geetanjali Medical hospital- Ford showroom. (B) City - - > Sector 6 – sector 5- NBM Center – Narayan seva sansthan – Akash vani colony – Sector 4 – Chaudhary hospital – Jain temple sector 4 – vidha niketan school – sector 3 – Shiv ashram choraha – subhash circle- BN Collage- Thoker circle – Aayad – Lakecity mall – Delhi gate – Town mall – Nagar nigam – suraj poll circle – Bus stand – Natraj hotel – Gulab bag road – Ashoka sinema – Bank of baroda- Gov. hospital – Hathi poll – Chatek marg – Police station hathi poll - Gov. guru govind school – Jhariya Road – Savroop sagar – Hindustan zink office – Fateh sagar – Rada circle – Subhash circle – Malla Talai – Rampura circle – Radisson bill hotel – Fateh sagar – Rani road- Rajiv Gandhi park – Police station fatehpura – Saheliyon ki bari - UIT Circle- Moti magri.  <b>INDOOR: NATRAJ HOTEL, UDAIPUR</b>	<b>NATHDWARA, RAJSAMAND (KANKORLI) / 134 KM</b>	1.) Nathdwara --> (A) City - -> Malvi Road- Shree hotel- Nathdwara temple – Malvi road – Rajmahal hotel – Nagar palika – Sukhidiya nagar – BSNL Exchange – Bus stand – Shri vilas hotel – Police station Nathdwara – Lal bagh- Honda showroom – Rajsamand Highway. (B) Highway- - > Udaipur to Nathdwara highway - -> BSNL exchange Udaipur – Suker – Amberi – Kelashpuri – Delwara- Police station Delwara – Rapcha – Uplioden – Nathdwara.  2.) Rajsamand (Kankorli) - - > (A) City - - > Bus stand – TVS circle – Maharana partap circle – collectrate – Post office- police station – No chockey Road – PWD Office – Rajsamand lake – police station – Rajnagar bus stand – Old market – Ratan palace hotel – Babu market – Kelwa road – Hotel amar palace – Bajrang circle- RTO office- police line- polo-technical collage – Somnath circle – Housing board colony – Gov. Hospital – Carrier point – Railway station kankorli – JK colony – JK circle- Manohar hospital – Nagar parisad – Bus stand- DHARKADISH Temple. (B) Highway - - > Nathdwara to Rajsamand (Kankorli) HIGHWAY - - > Nathdwara – Karjiya – piperda village - Rajsamand. Rajsamand to Charbhujaji Highway - - > Rajsamand – Kelwa – Padasali – Mewad ki dhani – Gombti.  <b>INDOOR: ACP HOTEL RAJSAMAND</b>	<b>MALVI (Fatenagar), VALLABHNAGAR / 245 KM</b>	1.) MALVI (Fatenagar)--> (A) City - - >Malvi Govshala – Hero showroom – Sabji mandi – Gov. Sen. Sec. school – Panchyat Smiti – Malvi railway station – Police station – Nath dwara road – Railway station – Fatenagar Highway. Fatenagar - - > Suzuki showroom – PWD office – State bank – Main market – Gov. Hospital – Gov. school – Bus stand – Krishi mandi – Electricity board – Shanidev mandir – Chitoorgarh road – Chungi naka – Police station fatenagar – BSNL ex. (B) Highway - - > Udaipur to Malvi Highway - - > BSNL Ex. – Hindusthan zink – Power house circle – Dabok village – Geetanjali collage – Udaipur airport – Mavli road – Nahar Mogra- malvi.  Malvi to Fatenagar Highway - - > Malvi – ladani – Police station Fatenagar – Fatenagar. 2.) VALLABHNAGAR - - > (A) City - - > Court – Gov. hospital – police station – Panchyat smiti – Hero showroom – Rundher tiraha – Bhatewar road.  (Highway ) - - > Malvi to Vallabhnagar Highway - - > Techsil malvi – Malvi jail – Post office – Galwara- Gov. hospital galwara – Vallabhnagar.  Vallabhnagar to Salumber Highway - - > Vallabhnagar – menar village – badgaon – Hinta – vhinder – Bambara – Fita – karakala – Gudel – ginggola – ladha – khera – utherda – jagat – Jhamarkatra – police station jhamarkatra - lakedbass – industrial area umrada – Police station – umrada – S.S Engineering Collage – Eklingpura – Udaipur.  <b>INDOOR: MAIN BSNL EXCHANGE, UDAIPUR</b>

**7.2 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF BIKANER SSA: JULY 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	Bikaner & Nokha	----	Bikaner, Lunkaransar, Arjunsar, Jamsar	----	Kolayat, Diyatra, Nall, Bithnok	----
2	BSNL		----		Poor Level & Quality near Lunkaransar, malkisar, Jamsar		Poor Level & Quality near Bajju, Beethnok, Nall
3	TATA GSM		Poor Level & Quality near Palan Outer, Nokha Outer		Poor Level & Quality near Jamsar, Mahajan, Lunkaransar		Poor Level & QUQuality near Bajju, Daytra
4	TATA CDMA		No Highway Coverage and Poor Level & Quality near Nokha Outer		No Highway Coverage and Poor Level Patches near Arjunsar		Poor Level & Quality near Kolayat to Bikaner Rd
5	IDEA		Poor Level & Quality near Palana, Ramsar, Harkhanio ka bas, Bhamatsar, Nokha, Rora, Poor Quality near Rly Stn, Chandelo ki Bagichi		No Highway Coverage and Poor Level near Bhichwal Ind Area, Khara, Lunkaransar Outer, Mahajan		No Highway Coverage and Poor Level near Kolayat, Bajju
6	RCOM GSM		No Highway Coverage and Poor Level & Quality on Nokha Rd, Nokha Outer		Poor Level & Quality near Lunkaransar Outer, Mahajan, Bichwal Ind Area		Poor Level & Quality near Gajner, Kolayat
7	RCOM CDMA		No Highway Coverage and Poor Level & Quality at Nokha Ward 9, Jorapura		Poor Level & Quality near Lunkaransar Outer, Mahajan, Bichwal Ind Area		Poor Level & Quality near Nall wari
8	MTS		No Highway Coverage and Poor Level near Deshnok, Bhamatsar		No Highway Coverage and Poor Level near Khara, Jagdewala		No Highway Coverage and Poor Level near kolayat Outer
9	VODAFONE		Poor Quality near Bhuto ka bas, Court Gate, Rani Bazar		Poor Level & Quality near Mahajan, Delva Basti, Jamsar, Bamanwali		Poor Level & Quality near Sarankulera, Nalbari, Kishyat Budhan, Bajju
10	AIRCEL		Poor Level near Deshnok		Poor Level near Kansar, Bamanwali, Arjunsar, Mahajan, Malkisar, Lunkaransar Outer		Poor Level near Nalbari, Kalyat Outer

DRIVE TEST TABLE: 6

**DRIVE TEST OBSERVATION OF CHURU SSA: AUGUST 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	Churu, Taranagar, Rajgarh	Poor Quality at Churu Outer	Sardarsahar, Ratangarh, Dungargarh	Poor Quality at Ratangarh Outer	Ratangarh, Beenasar, Sujangarh, Salasar	---
2	BSNL		Poor Level & Quality near Taranagar, Dedrewa, Churu Outer		Poor Level & Quality near Thukriasar, Sardarsahar Outer, Jetasar		Poor Level & Quality near Churu Outer, Sujangarh, Chapar
3	TATA GSM		They have only in SDCA's with Poor Level & Quality at Outers		They have only in SDCA's with Poor Level & Quality at Outers		They have only in SDCA's with Poor Level & Quality at Outers
4	TATA CDMA		They have only in SDCA's with Poor Level & Quality at Outers		They have only in SDCA's with Poor Level & Quality at Outers		They have only in SDCA's with Poor Level & Quality at Outers
5	IDEA		No Highway Coverage and Poor Level & Quality patches near Churu Outer, Dhadhar, Dedrewa, Baneerotan, Poor Quality near Shayam Chowk, Sainik Basti		No Highway Coverage and Poor Level & Quality near Dungarhgarh, Bigga, Kitasar, Dikhanada, Rajadalesar, Jinani Bagh Sardarsahar		Poor Level & Quality at Chapar Outer, Parihara, Ratangarh Outer, Satra, Panditpura Ratangarh
6	RCOM GSM		No Highway Coverage and Poor Level & Quality patches near Taranagar Outer, Rajgarh, Churu Outer		They have only in SDCA's with Poor Level & Quality at Outers		They have only in SDCA's with Poor Level & Quality at Outers
7	RCOM CDMA		No Highway Coverage and Poor Level & Quality patches near Taranagar Outer, Rajgarh, Churu Outer		They have only in SDCA's with Poor Level & Quality at Outers		They have only in SDCA's with Poor Level & Quality at Outers
8	MTS		No Highway Coverage and Poor Level near Churu Outer		No Highway Coverage and Poor Level near Dungargarh Outer		No Highway Coverage and Poor Level near Chaprawas, Loha
9	VODAFONE		Poor Level & Quality near Tatanagar Outer, Dedrewa, Rajgarh Outer, Ratanpura, Dokwa, Inderapura, Dudwakhar, karwasar		Poor Level & Quality near Adsarpurohitan, ChotiSawai, Sardarsahar to Churu HW, Rajaldesar, Dungargarh Outer, Thukriyasar		Poor Level & Quality near Panditpura, Jaleubari, Beenasar, Chapar, Sujangarh Outer
10	AIRCEL		No Highway Coverage and Poor Level & Quality patches near Churu Outer, Dedrewa		No Highway Coverage and Poor Level & Quality near Sardarsahar Outer, Dungargarh Outer, Ratangarh, Dadabari Outer		No Highway Coverage and Poor Level near Ratangarh Outer, Bindasar, Chapar

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF UDAIPUR SSA: SEPTEMBER 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	Udaipur	Poor Quality near Fatehpura	Rajsamad, Nathdwara	Poor Quality near Kelwa	Malvi (Fatenagar), Vallabhnagar	Poor Quality near Ginggola
2	BSNL		---		---		
3	TATA GSM		Poor Level near Lake, Nimach Mata, Chitrakoot, MIA		Poor Level near Kelwa, ITI College, Nathdwara Outer, Amberi		Poor Level near Jamar Kotra, Umreda, Debok, Pratapnagar, Mawali Outer, Sanwad Circle, Zinc
4	TATA CDMA		Poor Quality near Chitrakoot, Prayan Nagar, Delhi Gate		No Highway Coverage and Poor Level at Outer of all SDCA's		No Highway Coverage and Poor Level at Outer of all SDCA's
5	IDEA		Poor Quality near MG College, Prayan Nagar, Hiranmagri		Poor Level & Quality near Ghoda Ghati, Delwara, Poor Quality near Sukharia Nagar, Badarda, Kalawati Rajsamand		Poor Level near Menal, Pacific College, Nahar Magla, Fatehnagar, Mawali Outer
6	RCOM GSM		Poor Quality near Nimach Mata, Sukhadiya Circle, Chitrakoot Nagar, MIA RD-9, Siddharth Nagar		Poor Level near Kelwa, ITI College, Nathdwara Outer, Amberi		Poor Level near Jamar Kotra, Umreda, Debok, Pratapnagar, Mawali Outer, Sanwad Circle, Zinc
7	RCOM CDMA		Poor Level & Quality near Akashwani Colony, Poor Quality near Siddharth Nagar, MIA RD-9, Hiran Magri		Poor Level near Kelwa, ITI College, Nathdwara Outer, Amberi		Poor Level near Jamar Kotra, Umreda, Debok, Pratapnagar, Mawali Outer, Sanwad Circle, Zinc
8	MTS		Poor Level near Prayan Nagar		They have coverage only in SDCA's covered in day2		They have coverage only in SDCA's covered in day2
9	VODAFONE		Poor Quality near Redisson Hotel, Fatehpura, LaxmiVilas, Chitrakoot Bhawan, Bohra Ganesh, Subhash Nagar, Delhi Gate		Poor Level & Quality near Parsoli, Jaichakki, Dabiyaguran		Poor Level & Quality near Zinc, Boyana, ladani, Vanaitalai, Kheri, Umra
10	AIRCEL		Poor Level near MG College, UIT Circle		Poor Level near Mohanpura, Kelwa, Post Office		Poor Level near Mawali Outer, Fatehnagar, Vallabhnagar, Debok

### 7.3 KEY FINDINGS ON DRIVE TEST:

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

- (i) **In the Month of July-14**, drive test was conducted across **Bikaner SSA** covering Bikaner (S), Nokha, Bikaner (E), Lunkaransar-iv, Lunkaransar-ii (Mahajan), Bikaner (C)(Jaimalsar), Kolayat-ii, Kolayat-iv (Daitra), and Kolayat-iii SDCAs. The performance of the service providers in general was satisfactory as all operators largely met the benchmarks on SSA level **except BSNL, Idea and RCOM** which could not meet the benchmark of parameters **Call Drop Rate** and **Voice Quality**. The parameter **CDR** could not be met by **BSNL** with its performance as **2.32%**, whereas parameter **Voice Quality** could not be met by **BSNL (87.29% - Out door / 90.90% - Indoor), Idea (94.93% - Indoor) and RCOM-GSM (94.39% - Indoor)** on over all SSA basis.
- (ii) **In the Month of August-14**, drive tests were conducted across **Churu SSA** covering Churu, Rajgarh, Taranagar, Sardarshahar(S), Sridungarpur(N), Dungargarh, Ratangarh, and sujangarh (C) SDCAs.. The drive test results for this SSA also revealed that in general, all operators were doing well within the QoS norms on overall SSA basis except **BSNL**. Only **BSNL** remained non-compliant for parameters **Call Drop rate** and **Voice quality** with its achieved values as **2.75% and 93.50%** (Outdoor) respectively.
- (iii) **In the month of September -14**, drive test was conducted across **Udaipur SSA** covering Girva (Udaipur), Nathdwara, Rajsamand (Kankorli), Malvi and Vallabhnagar SDCAs.. Like above SSAs, **BSNL** again failed to meet the benchmark of parameter **Voice Quality** with its performance as **89.24%** on overall SSA level. 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 -5, table 6 and table 7** for the respective **SSAs**.

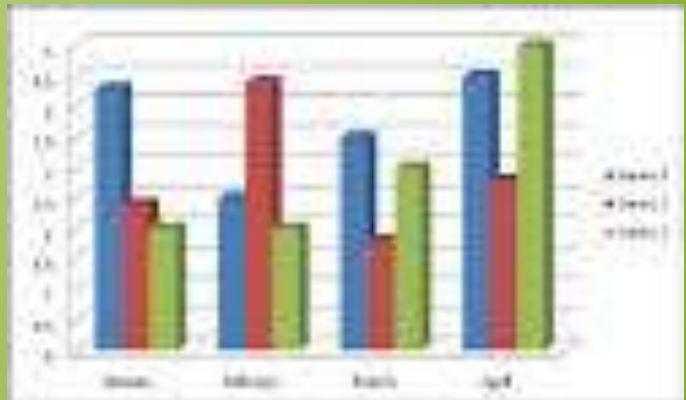
*The performance of the service providers with regard to the Drive Test revealed that all the service providers performed well within the QoS norms. **BSNL** was the only operator which could not meet the benchmarks of the prime network parameters namely **Call Drop Rate and Voice Quality** across the three SSAs. Apart from this, **Idea and RCOM (GSM)** also could not met the benchmark of **Voice Quality** in Indoor locations in Bikaner SSA.*

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

AVERAGED QUARTERLY PMR

V/S

AVERAGED QUARTERLY 3-DAYs LIVE MEASUREMENT

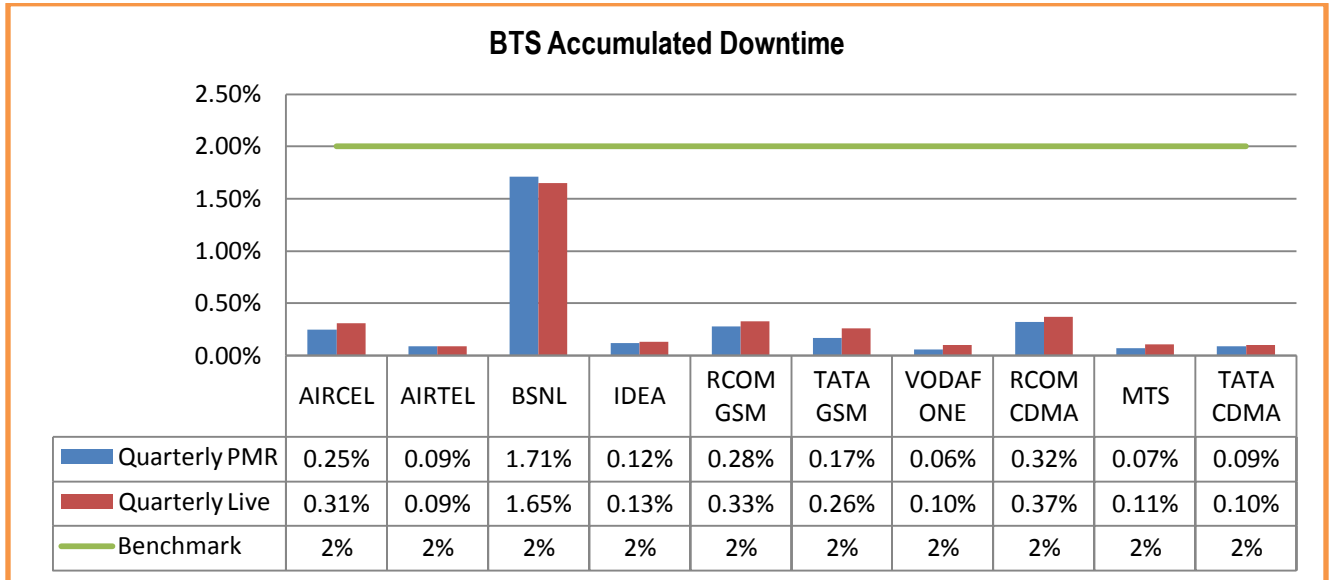




**8. GRAPHICAL REPRESENTATION (CMTS):**

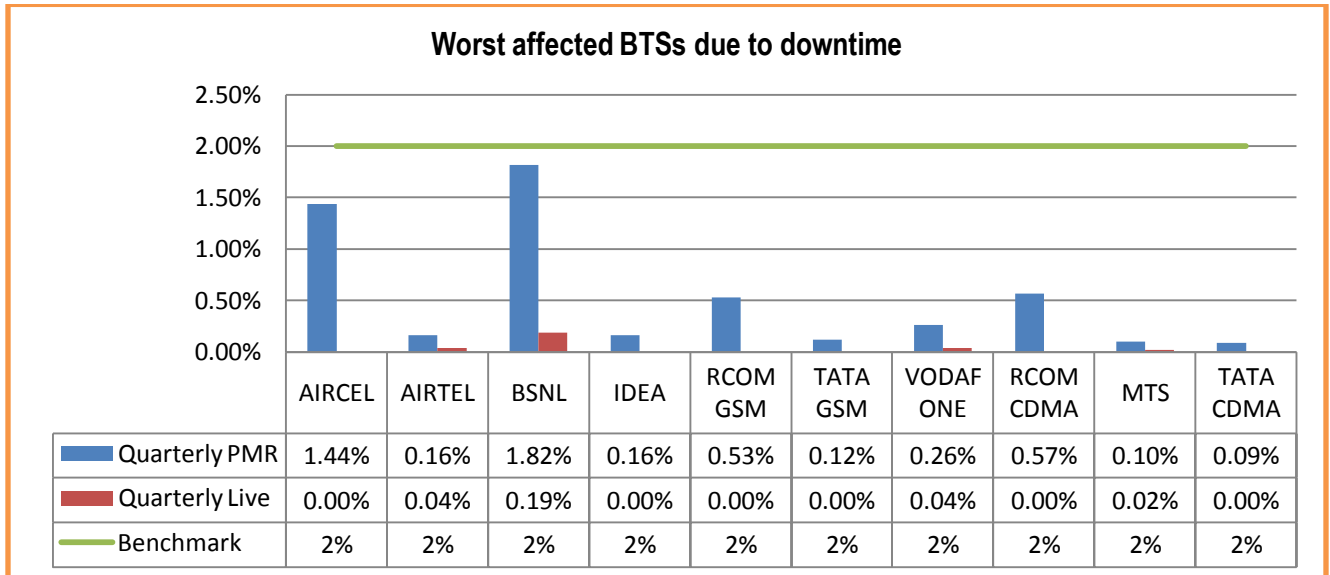
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

**1) BTS ACCUMULATED DOWNTIME**



All operators are meeting the benchmarks.

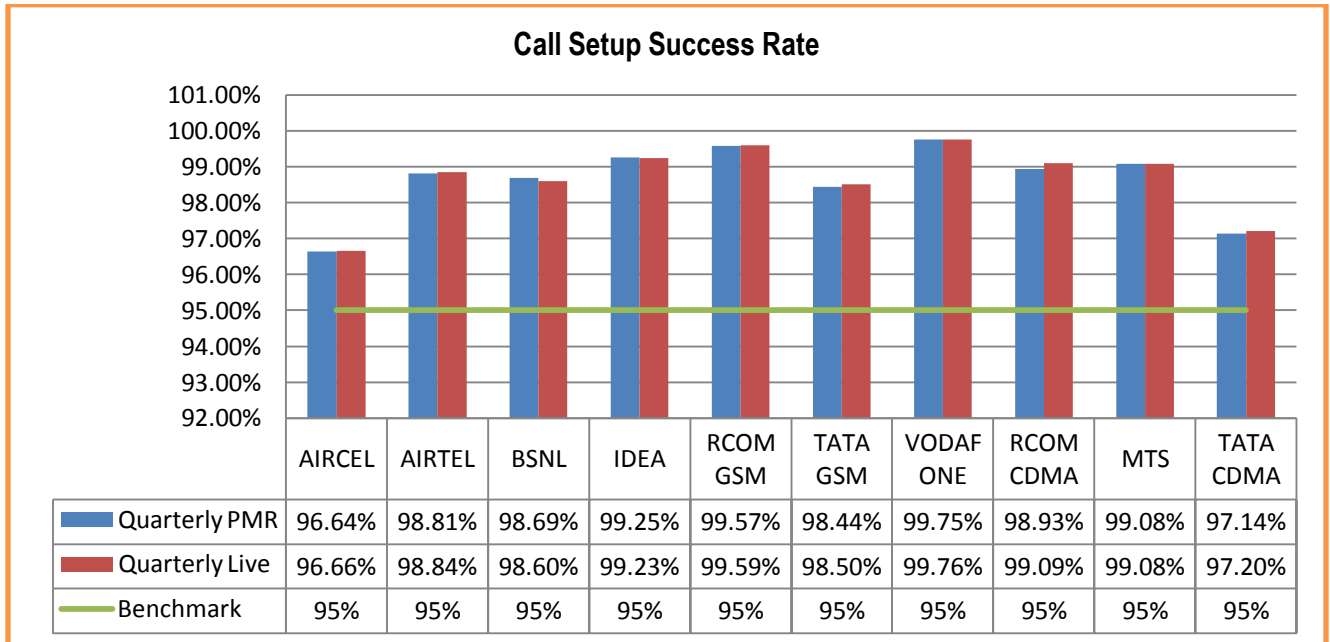
**2) WORST AFFECTED BTSS DUE TO DOWNTIME:**



All operators are meeting the benchmarks.

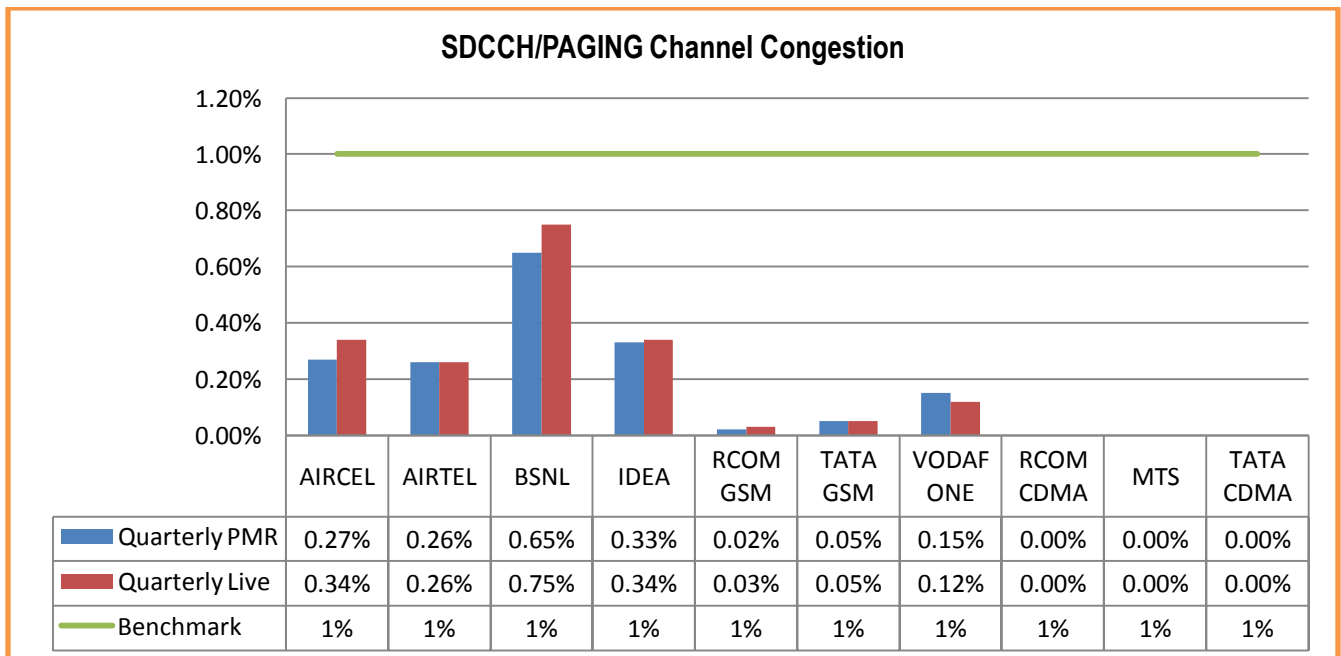


3) CALL SETUP SUCCESS RATE:



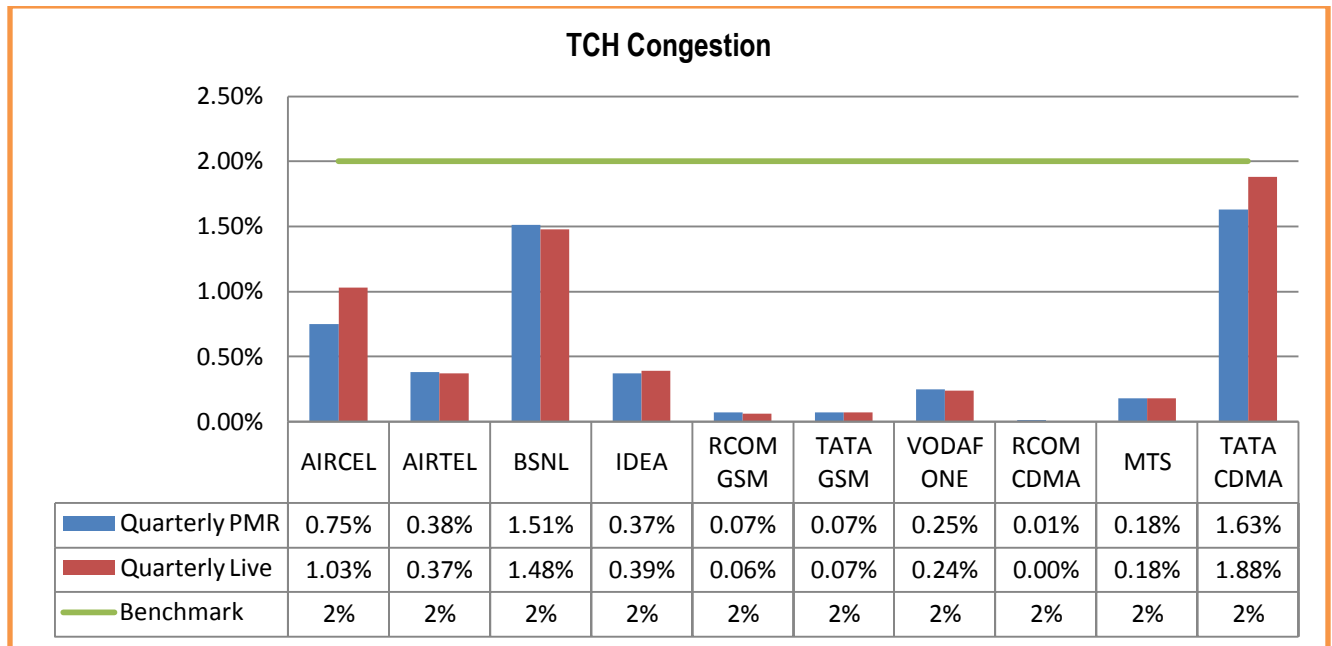
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



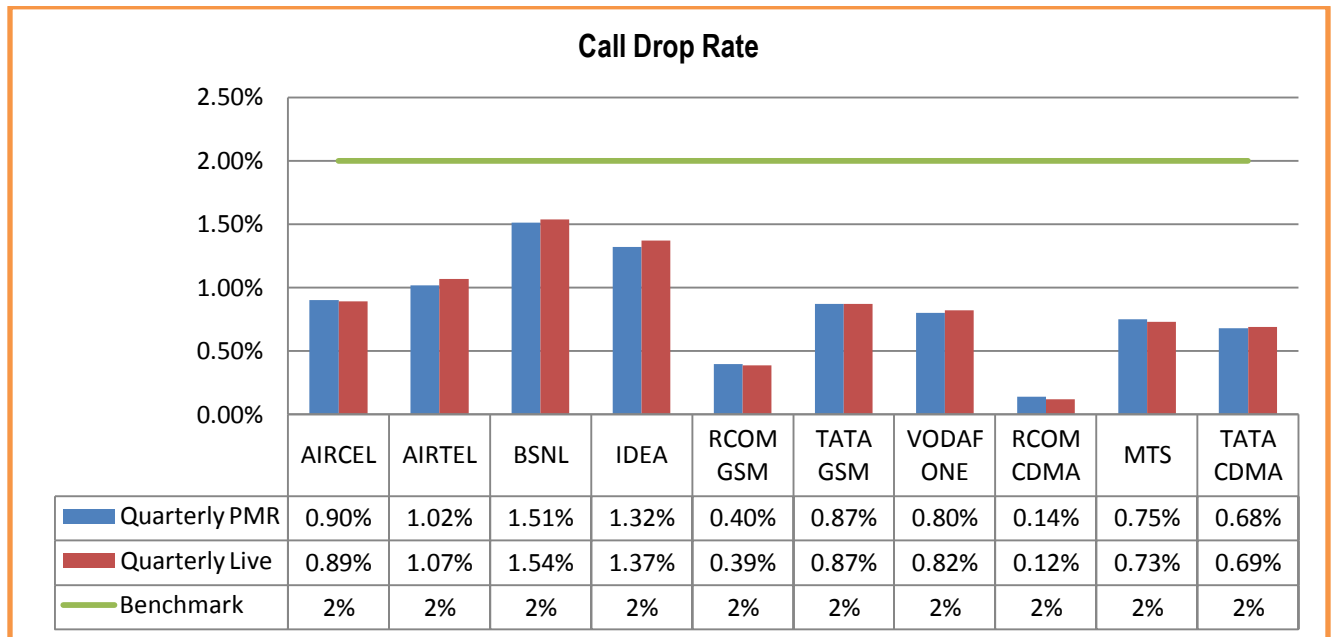
All operators are meeting the benchmarks.

5) TCH CONGESTION:



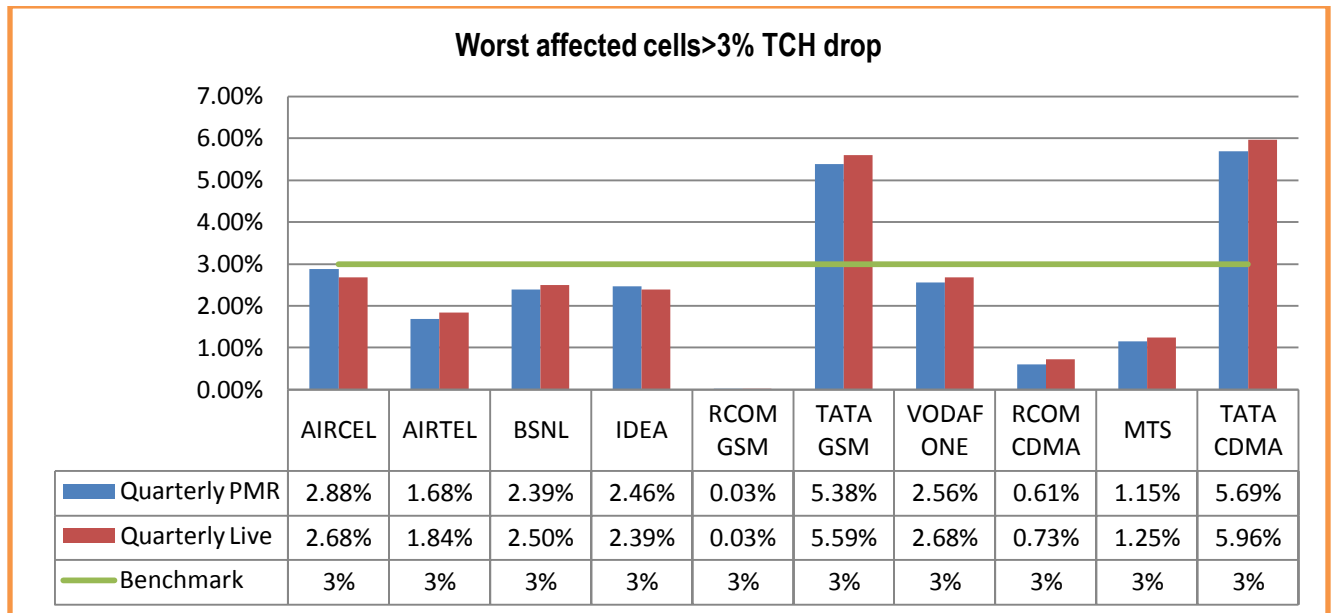
All operators are meeting the benchmarks.

6) CALL DROP RATE:



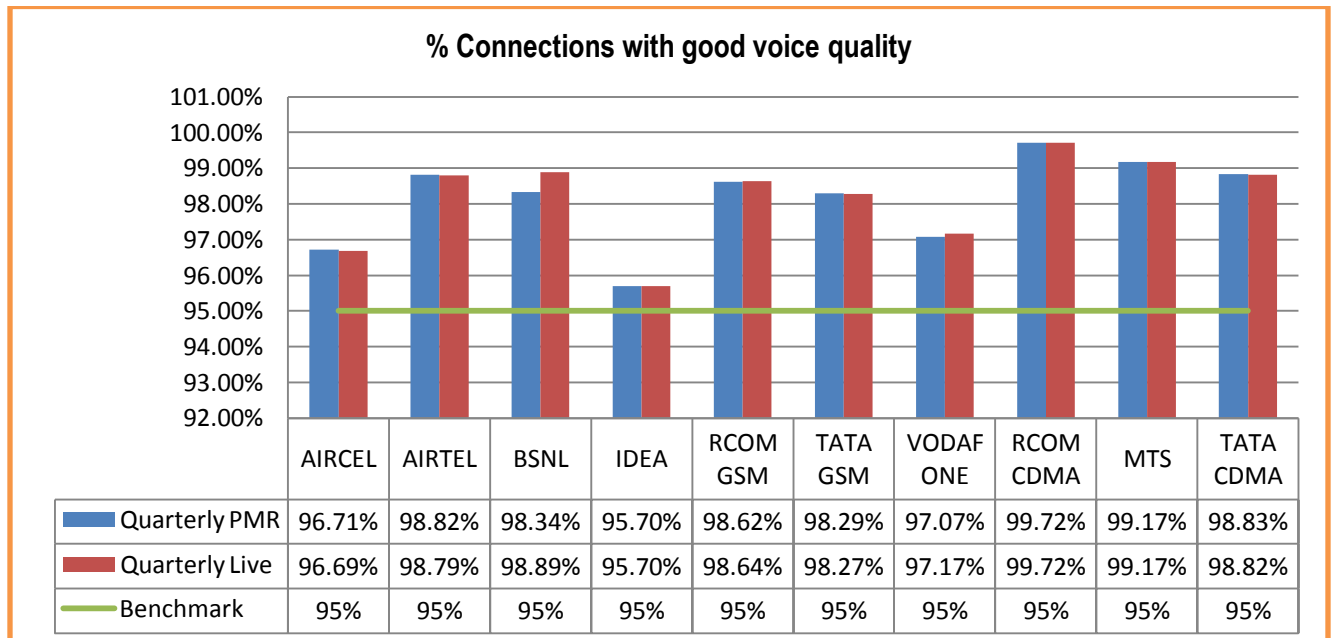
All operators are meeting the benchmarks.

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.