



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

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## PREFACE

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

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

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **UP(E) 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 (wireline) and Broadband service, a circle would be audited once in a year.

## **2. OBJECTIVES AND METHODOLOGY**





## **2. OBJECTIVES AND METHODOLOGY**

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

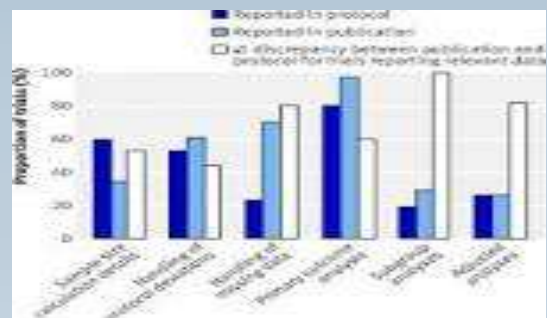
The audit and assessment of Quality of Service is carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) is undertaken for J&K , Himachal Pradesh & Mumbai circles and for Broadband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

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

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



### 3. SAMPLE SIZE



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### 3. SAMPLE SIZE

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

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

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location/Address
		Jan-14	Feb-14	March-14	
<b>GSM Operators</b>					
1	AIRCEL	2,3,4 Jan	5,6,7 Feb	5,6,7 Mar	3rd floor,Ratan Square,Hajratganj,Lucknow
2	AIRTEL	2,3,6 Jan	5,6,7 Feb	5,6,7 Mar	TCG 7/7,vibhuti khand,Gomti Nagar,Lucknow
3	BSNL	7,8,9 Jan	11,12,13 Feb	3,4,5 Mar	BSNL,Mahanager , Lucknow
4	IDEA	9,10,11 Jan	11,12,13 Feb	9,10,11 Mar	Idea Cellular Ltd., Fortuna Towers, 10 Rana Pratap Road, Lucknow-226001
5	RCOM GSM	7,8,9 Jan	3,4,5 Feb	3,4,5 Mar	House No. 12, C\O BTC House Eldeco Greens, Gomti Nagar, Lucknow-226010
6	VODAFONE	6,7,8 Jan	6,7,10 Feb	5,6,8 Mar	Shalimar Titanium , Vibhuti Khand, Gomti Nagar , Lucknow
7	UNINOR	20,21,22 Jan	19,20,21 Feb	20 to 24 Mar	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
8	TATA GSM	7,8,9 Jan	10,11,12 Feb	6,7,8 Mar	Tata Teleservices Ltd., Prem Plaza Building 2, RF Bahadurji Marg, Lucknow
<b>CDMA Operators</b>					
9	RCOM CDMA	7,8,9 Jan	3,4,5 Feb	3,4,5 Mar	House No. 12, C\O BTC House Eldeco Greens, Gomti Nagar, Lucknow-226010
10	TATA CDMA	7,8,9 Jan	10,11,12 Feb	6,7,8 Mar	Tata Teleservices Ltd., Prem Plaza Building 2, RF Bahadurji Marg, Lucknow

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

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



### 3.2 SAMPLING FOR BASIC (WIRELINE) 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. **However, QoS audit for basic (wireline) service was not required to be done for UP (E) Circle in the quarter ended March 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. **However, the QoS audit for Broadband service was not required to be done for UP (E) Circle in the quarter ended March-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.

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





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

#### BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

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

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the UP(E) circle.

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

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRCEL	3	24	3053	ZTE	ZTE
2	AIRTEL	45	107	9607	Ericsson	Ericsson
3	BSNL	27	99	6095	Ericsson & ZTE	Ericsson, NSN & ZTE
4	IDEA	10	41	7075	NSN	NSN
5	RCOM GSM	4	19	3213	Huawei	Huawei
6	UNINOR	11	31	4207	Ericsson	Ericsson
7	TATA GSM	4	22	2380	NSN	NSN
8	VODAFONE	3	24	3053	NSN	NSN
<b>CDMA Operators</b>						
9	RCOM CDMA	9	11	1819	Huawei & Lucent	Huawei & Lucent
10	TATA CDMA	4	6	364	Huawei & Ericsson	Huawei, ZTE & Motorola

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**TABLES OF MONTHLY QoS PERFORMANCE:**

**TABLE: 1**

<b>CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- JAN-14 MONTH</b>													
<b>PMR Generation Data</b>		<b>Bench- mark</b>	<b>Audit Period</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>UNINOR</b>	<b>TATA GSM</b>	<b>VODAFONE</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>							<b>CDMA Operators</b>		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Jan-14	0.37%	0.63%	1.40%	0.21%	0.20%	0.34%	0.64%	0.30%	0.30%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Jan-14	1.54%	1.00%	0.85%	0.73%	0.50%	1.88%	0.00%	1.61%	0.77%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	98.74%	99.48%	98.03%	98.77%	99.46%	97.71%	98.39%	99.52%	98.19%	98.50%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-14	0.65%	0.10%	0.76%	0.46%	0.10%	0.73%	0.09%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.44%	0.38%	1.22%	1.14%	0.06%	1.36%	0.44%	0.48%	0.02%	0.24%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Jan-14	0.65%	0.72%	0.37%	0.99%	0.29%	0.70%	0.85%	0.99%	0.18%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-14	2.64%	2.69%	1.62%	2.79%	0.01%	2.10%	<b>7.00%</b>	2.09%	0.74%	<b>7.26%</b>
	c) Connections with good voice quality	>=95%	Jan-14	96.84%	98.71%	98.00%	97.02%	98.82%	<b>93.40%</b>	97.63%	96.39%	99.77%	99.21%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jan-14	0	0	0	0	0	0	0	<b>2</b>	0	0





**TABLE: 2**

<b>CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- FEB-14 MONTH</b>													
<b>PMR Generation Data</b>		<b>Bench- mark</b>	<b>Audit Period</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>UNINOR</b>	<b>TATA GSM</b>	<b>VODAFONE</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>								<b>CDMA Operators</b>	
<b>Network Service Quality Parameter</b>													
<b>1</b>	<b>Network Availability</b>												
	a) BTS Accumulated Downtime	<=2%	Feb-14	0.24%	0.61%	0.25%	0.14%	0.17%	0.32%	0.00%	0.30%	0.20%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Feb-14	1.42%	0.93%	0.27%	0.54%	0.28%	1.61%	0.00%	1.32%	0.49%	0.00%
<b>2</b>	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	98.79%	99.45%	98.15%	98.40%	99.46%	97.24%	98.34%	99.52%	98.26%	97.85%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-14	0.87%	0.13%	0.59%	0.68%	0.07%	0.44%	0.10%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.38%	0.40%	1.35%	1.58%	0.06%	1.91%	0.55%	0.48%	0.02%	0.15%
<b>3</b>	<b>Connection maintenance (Retainability)</b>												
	a) CDR (Call Drop Rate)	<=2%	Feb-14	0.59%	0.72%	0.51%	0.89%	0.28%	0.69%	0.78%	1.01%	0.18%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-14	1.32%	2.56%	2.60%	2.68%	0.03%	1.84%	<b>6.00%</b>	2.22%	0.76%	<b>7.51%</b>
	c) Connections with good voice quality	>=95%	Feb-14	97.16%	98.60%	97.00%	96.92%	98.82%	<b>93.26%</b>	97.69%	96.43%	99.76%	99.18%
<b>4</b>	<b>No. of POI's having &gt;=0.5% POI congestion</b>	<b>&lt;=0.5%</b>	Feb-14	0	0	0	0	0	0	0	<b>9</b>	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- MAR-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Mar-14	0.21%	0.49%	1.17%	0.17%	0.15%	0.19%	0.05%	0.24%	0.19%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Mar-14	1.11%	0.90%	0.96%	0.42%	0.03%	1.07%	0.00%	1.10%	0.55%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	98.62%	99.36%	97.70%	98.23%	99.39%	96.97%	98.16%	99.59%	98.46%	98.43%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-14	0.76%	0.12%	0.61%	0.85%	0.05%	0.74%	0.15%	0.20%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.53%	0.55%	0.96%	1.75%	0.07%	1.90%	0.71%	0.41%	0.02%	0.09%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Mar-14	0.60%	0.68%	1.19%	0.90%	0.31%	0.74%	0.74%	1.11%	0.20%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-14	2.76%	2.64%	2.94%	2.75%	0.02%	2.43%	5.97%	2.04%	0.69%	7.66%
	c) Connections with good voice quality	>=95%	Mar-14	96.82%	98.61%	98.00%	96.69%	98.80%	92.69%	97.71%	96.56%	99.77%	98.73%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Mar-14	2	0	0	0	0	0	0	4	0	0



TABLES OF QUARTERLY QOS PERFORMANCE:

TABLE: 4

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-MARCH-14) OF UP(E) CIRCLE													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.27%	0.58%	0.94%	0.17%	0.17%	0.28%	0.23%	0.28%	0.23%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.36%	0.94%	0.69%	0.56%	0.27%	1.52%	0.00%	1.34%	0.60%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.72%	99.43%	97.96%	98.47%	99.44%	97.31%	98.30%	99.54%	98.30%	98.47%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.76%	0.12%	0.65%	0.66%	0.07%	0.64%	0.11%	0.16%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.45%	0.44%	1.18%	1.49%	0.06%	1.72%	0.57%	0.46%	0.02%	0.17%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.61%	0.71%	0.69%	0.93%	0.29%	0.71%	0.79%	1.04%	0.19%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.24%	2.64%	2.39%	2.74%	0.02%	2.12%	6.32%	2.12%	0.73%	7.46%
	c) Connections with good voice quality	>=95%	Quarterly	96.94%	98.64%	97.67%	96.88%	98.81%	93.12%	97.68%	96.46%	99.77%	98.97%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	1	0	0	0	0	0	0	5	0	0

**KEY FINDINGS: CELLULAR MOBILE SERVICES**

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

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.**

The audit for BSNL has been done for the network coming under jurisdiction of GM / BSNL/ Lucknow in all the three months.



**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 UP(E) circle, all the operators were found meeting benchmark on the above parameters 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter.

▪ **Connection Establishment (Accessibility)**

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

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

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

▪ **Parameters related to Network Congestion:**

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

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

With respect to this parameter, the performance of the operators is quite satisfactory as all operators met the TRAI specified benchmarks on the congestion parameters.

**POI Congestion:** With respect to this parameter, **Vodafone** was found to have congestion on **2 POIs** in month of Jan, on **9 POIs** in Feb and **4 POIs** in March-2014, whereas **Aircel** was having congestion on **2 POIs** in the month of March-14.



▪ **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 0.19 %) 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 (GSM / CDMA)** which remained non compliant in all the 3 months of the quarter. The performance level of **Tata (GSM) and Tata (CDMA)** was **6.32 % and 7.46 %** respectively on an average for the quarter.

iii. Connections with good voice quality:

The audit results for this parameter indicates that all operators have met the bench mark for the parameter except Uninor. **Uninor** failed to meet the benchmark in all the three months of the quarter with its average performance of **93.12%**.

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



**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



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

**CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE MAR-14**

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Customer Service Quality Parameters</b>													
<b>1</b>	<b>Metering &amp; Billing Credibility -Post Paid</b>												
	A) No. of bills issued during the quarter		UPE	1990	133838	86930	94113	22161	27931	NA	345323	94038	16100
	B) No. of bills disputed including billing complaints during the quarter		UPE	0	15	14	61	20	0	NA	222	91	1
	C)% of billing complaints during the quarter	<= 0.1%	UPE	0.00%	0.01%	0.02%	0.06%	0.09%	0.00%	NA	0.06%	0.10%	0.01%
<b>2</b>	<b>Metering &amp; Billing Credibility -Pre Paid</b>												
	A) Total No. of Pre-paid customers at the end of the quarter		UPE	4391731	16263465	10123967	7732621	5647270	4083103	8264781	15042815	2755655	373639
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		UPE	2	371	1029	5529	5642	0	146	3311	2428	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	UPE	0.00%	0.00%	0.01%	0.07%	0.10%	0.00%	0.00%	0.02%	0.09%	0.00%
<b>3</b>	<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>												
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		UPE	2	386	1029	8993	5662	43	146	3533	2519	44
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		UPE	2	386	1029	8993	5662	43	146	3533	2519	44
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	UPE	100.00%	100.00%	100.00%	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	UPE	100.00%	100.00%	100.00%	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) Accessibility of call centre/Customer Care	>=95%	UPE	74.26%	100.00%	100.00%	100.00%	99.23%	99.33%	95.83%	100.00%	97.75%	99.23%

## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE



	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	UPE	88.91%	89.58%	68.36%	95.87%	90.62%	91.75%	94.00%	92.20%	89.18%	93.09%
5	<b>Termination/closure of service</b>												
	A) Total No. of requests for Termination / Closure of service received during the quarter		UPE	32	901	60569	148	29	241	NA	4827	181	60
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		UPE	32	901	58716	148	29	241	NA	4827	181	60
	C) % of Termination/ Closure of service within 7 days	<=7days	UPE	100.00%	100.00%	96.94%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
6	<b>Time taken for refunds of deposits after closures.</b>												
	A) No. of Payments/ Refunds due during the quarter		UPE	55	305	3251	440	123	139	NA	759	400	98
	B) No. of Payments/ Refunds Cleared during the quarter		UPE	55	305	3251	364	123	139	NA	759	400	98
	C)Time taken for refunds of deposits after closures.	100% within 60 days	UPE	100.00%	100.00%	100.00%	82.73%	100.00%	100%	NA	100.00%	100.00%	100.00%

- NA-Not Applicable as Uninor is not having Post paid connections.

### KEY FINDINGS:

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

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

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

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

All operators 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 except Aircel. **Aircel** failed to achieve the benchmark for the parameter 'Accessibility of call center/Customer care' with its performance as





**74.26%. Aircel, Airtel, BSNL and RCOM CDMA** have not met the benchmark of parameter 'Calls answered by Operators (voice to voice) within 60 sec'. They have achieved their performance as **88.91%, 89.58%, 68.36% and 89.18% respectively.**

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

In case of this parameters also, all service providers have settled the closure/termination within the benchmark of 7 days except BSNL. **BSNL** could achieve its performance as **96.94%**.

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

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure except **Idea**. **Idea** could achieve its performance as **82.73%**.

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





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

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

**TABLE: 1**

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE- JAN-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCON GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.71%	0.67%	1.95%	0.22%	0.20%	0.29%	0.03%	0.51%	0.33%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.55%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.76%	99.42%	97.30%	99.12%	99.44%	97.77%	98.69%	99.69%	98.21%	98.85%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.45%	0.17%	0.65%	0.39%	0.03%	0.44%	0.09%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.44%	0.79%	1.27%	0.86%	0.06%	1.27%	0.26%	0.31%	0.02%	0.09%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.64%	0.61%	0.45%	1.03%	0.27%	0.74%	0.85%	0.94%	0.21%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.46%	2.43%	0.20%	2.80%	0.00%	2.31%	7.52%	1.90%	0.85%	7.45%
	c) Connections with good voice quality	>=95%	Live data	96.75%	98.91%	96.48%	96.94%	98.83%	93.17%	97.72%	96.56%	99.77%	98.94%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE- FEB-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.21%	0.66%	1.55%	0.20%	0.18%	0.26%	0.15%	0.42%	0.20%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.01%	0.52%	0.00%	0.06%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.76%	99.33%	98.42%	98.27%	99.44%	97.21%	98.41%	99.56%	98.88%	98.89%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.72%	0.21%	0.61%	0.51%	0.04%	0.52%	0.10%	0.11%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.33%	0.47%	0.90%	1.70%	0.06%	1.94%	0.51%	0.44%	0.01%	0.04%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.57%	0.76%	0.39%	0.89%	0.28%	0.66%	0.72%	0.95%	0.17%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.79%	2.37%	0.13%	2.69%	0.00%	1.83%	5.55%	2.09%	0.88%	6.52%
	c) Connections with good voice quality	>=95%	Live data	96.99%	98.55%	97.32%	96.61%	98.79%	93.28%	97.74%	96.33%	99.77%	99.18%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	3	0	0



**TABLE: 3**

<b>CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE- MAR-14 MONTH</b>													
<u>Live measurement Data</u>		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.22%	0.44%	1.59%	0.23%	0.06%	0.17%	0.42%	0.35%	0.18%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.36%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.38%	99.42%	98.02%	97.97%	99.43%	96.63%	98.15%	99.60%	98.73%	98.55%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.71%	0.11%	0.76%	0.71%	0.03%	0.73%	0.14%	0.19%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.37%	0.45%	1.26%	1.89%	0.06%	2.17%	0.72%	0.40%	0.01%	0.21%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.56%	0.73%	0.37%	0.91%	0.30%	0.77%	0.75%	1.15%	0.14%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.54%	2.26%	0.42%	2.69%	0.00%	2.60%	5.59%	2.04%	0.78%	7.27%
	c) Connections with good voice quality	>=95%	Live data	97.02%	98.54%	97.52%	96.66%	98.74%	92.70%	97.62%	96.47%	99.77%	99.23%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	2	0	0



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

TABLE: 4

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-MARCH-14) – UP (E) CIRCLE													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.38%	0.59%	1.70%	0.22%	0.15%	0.24%	0.20%	0.43%	0.24%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.48%	0.00%	0.07%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.63%	99.39%	97.91%	98.45%	99.44%	97.20%	98.42%	99.62%	98.61%	98.76%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.63%	0.16%	0.67%	0.54%	0.03%	0.56%	0.11%	0.13%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.38%	0.57%	1.14%	1.48%	0.06%	1.79%	0.50%	0.38%	0.01%	0.11%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.59%	0.70%	0.40%	0.94%	0.28%	0.72%	0.77%	1.01%	0.17%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.60%	2.35%	0.25%	2.73%	0.00%	2.25%	6.22%	2.01%	0.84%	7.08%
	c) Connections with good voice quality	>=95%	Quarterly	96.92%	98.67%	97.11%	96.74%	98.79%	93.05%	97.69%	96.45%	99.77%	99.12%
4	No. of POI having >=0.5% congestion	<0.5%	Quarterly	0	0	0	0	0	0	0	2	0	0

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

From three days live assessment, it was found that the operators were largely meeting the benchmark of most of the parameters. However, **Tata (GSM) and Tata (CDMA)** failed to meet the benchmark for the parameter “**worst affected Cell > 3% TCH Drop**” in all the three month of the quarter. Their average performance for this parameter was **6.22%** and **7.08 %** respectively. **Uninor**, lagged behind in meeting the benchmark for the parameter ‘**Voice Quality**’ in all the three months of the quarter with its average performance as **93.05 %**. **Vodafone** was having congestion on **3** and **2 POIs** in the months of Feb and March -14 respectively.

Similar non-compliance of Tata (GSM), Tata (CDMA), Uninor and Vodafone with respect to above indicated parameters was also observed in monthly PMR audit.



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

**CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES -QE- MARCH-14**

3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators									
<b>RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE</b>													
1	Total no of calls attempted to customer care/Call center		UP East	308286	429579	74520	201153	36635	90316	118588	423812	40479	3674
	Total no. of calls successfully established to customer care/Call center		UP East	226684	429579	74520	201153	35394	89331	118588	423812	39702	3674
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	UP East	73.53%	100.00%	100.00%	100.00%	96.61%	98.91%	100.00%	100.00%	98.08%	100%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		UP East	57974	115167	33797	76318	117498	20488	15799	92697	8519	435
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		UP East	55476	104327	30507	74626	113861	19739	14866	86338	8155	408
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	>=90%	UP East	95.69%	90.59%	90.27%	97.78%	96.90%	96.34%	94.09%	93.14%	95.73%	93.72%



**CUSTOMER CARE / HELPLINE ASSESSMENT**

LIVE CALLING TO CALL CENTRE											
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	UP East	100	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	UP East	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	UP East	95	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call successfully established*100/ Total call attempt)	UP East	95.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	UP East	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	UP East	90	90	92	100	92	100	96	92	96	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100/ Total call attempt)	UP East	90.00%	90.00%	92.00%	100.00%	92.00%	100.00%	96.00%	92.00%	96.00%	100.00%

The results for three days live measurements reveal that all service providers (except **Aircel**) were in compliance with respect to the parameter accessibility of call center. The performance of **Aircel** for this parameter was recorded as **73.53%**. In case of calls answered by operators (voice to voice) within 60 seconds, all operators were meeting the benchmark.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, all operators were able to connect the calls with their call center operators/agents successfully except Aircel, Airtel, BSNL, Uninor, Tata (GSM), Vodafone and RCOM (CDMA), they could achieve their performance as 90.00%, 90.00%, 92.00%, 92.00%, 96.00%, 92.00% and 96.00% respectively.



## **INTER OPERATOR CALLS ASSESSMENT**





**INTER OPERATOR CALLS ASSESSMENT**

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

<b>INTER OPERATOR CALL ASSESSMENTBASED ON LIVE MEASUREMENT</b>											
<b>Calling Operators</b>	<b>Circle Name</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>IDEA</b>	<b>RCOM GSM</b>	<b>TATA GSM</b>	<b>UNINOR</b>	<b>VODAFONE</b>	<b>RCOM CDMA</b>	<b>TATA CDMA</b>
<b>AIRCEL</b>	<i>UP-E</i>	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>AIRTEL</b>	<i>UP-E</i>	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>BSNL</b>	<i>UP-E</i>	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>IDEA</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>RCOM GSM</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%
<b>TATA GSM</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%
<b>UNINOR</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%
<b>VODAFONE</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%
<b>RCOM CDMA</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%
<b>TATA CDMA</b>	<i>UP-E</i>	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory as there was hardly any problem in interconnection from one operator to other operators which indicated there was no congestion on the individual POIs of the service providers.

**LEVEL-1 LIVE CALLING**





**LEVEL-1 LIVE CALLING**

LEVEL 1 LIVE CALLING													
Emergency no.	Circle Name	SDCA Name	No. of calls made	Aircel	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	UNINOR	VODAFONE	RCOM (CDMA)	TATA (CDMA)
100,101,108	UP-E	Phafamau	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Phoolpur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Handia	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Soraon	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Shankar garh	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Karcchna	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Bansgaon	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Maharaj ganj	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Pharenda-2 (Anand Nagar)	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Akbarpur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Bhognipur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Jhinhak	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	UP-E	Ghatampur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

## 5. DRIVE TEST





## 5. DRIVE TEST

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

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators 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.

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**DRIVE TEST TABLE: 1**

<b>OPERATOR-ASSISTED DRIVE TEST ATALLAHABAD SSA IN JAN-14 MONTH- UP(E) CIRCLE</b>													
S/N	Parameter	SSA Name: Allahabad	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators									CDMA Operators
1	Call Attempts	Day 1	Jan-14	174	179	146	169	98	176	157	174	139	175
		Day 2	Jan-14	145	145	168	157	140	130	155	166	69	141
		Day 3	Jan-14	144	167	152	142	120	139	148	157	50	138
		<b>Overall SSA</b>	<b>Total</b>	<b>463</b>	<b>491</b>	<b>466</b>	<b>468</b>	<b>358</b>	<b>445</b>	<b>460</b>	<b>497</b>	<b>258</b>	<b>454</b>
2	Blocked Call Rate	Day 1	Jan-14	2.30%	1.12%	0.68%	1.18%	5.10%	0.57%	4.46%	0.00%	0.72%	0.00%
		Day 2	Jan-14	4.83%	1.38%	4.17%	12.10%	22.14%	6.15%	1.29%	3.01%	1.45%	1.42%
		Day 3	Jan-14	5.56%	2.40%	3.29%	1.41%	10.83%	1.44%	1.35%	0.00%	2.00%	1.45%
		<b>Overall SSA</b>	<b>Total</b>	<b>4.10%</b>	1.63%	2.79%	4.91%	13.69%	2.47%	2.39%	1.01%	1.16%	0.88%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	1.18%	0.00%	2.10%	0.00%	2.20%	0.57%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	2.94%	0.00%	3.80%	7.25%	0.95%	3.28%	0.65%	0.00%	0.00%	9.35%
		Day 3	Jan-14	1.47%	1.84%	3.65%	1.43%	0.97%	2.92%	0.68%	0.64%	0.00%	5.88%
		<b>Overall SSA</b>	<b>Total</b>	<b>1.81%</b>	0.63%	3.20%	2.70%	1.34%	2.07%	0.45%	0.20%	0.00%	4.67%
<b>PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=&gt;95%)</b>													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	97.14%	98.28%
		Day 2	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	93.83%	92.69%
		Day 3	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	96.70%	90.40%
		<b>Overall SSA</b>	<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>96.19%</b>	<b>94.10%</b>
	(b) 0-5 ( with frequency hopping for GSM Operators)	Day 1	Jan-14	92.15%	95.60%	94.93%	98.08%	93.46%	92.56%	94.51%	96.71%	NA	NA
		Day 2	Jan-14	92.67%	95.52%	95.19%	93.28%	93.12%	86.78%	95.11%	95.53%	NA	NA
		Day 3	Jan-14	94.68%	95.61%	92.99%	99.12%	95.68%	82.64%	95.46%	94.53%	NA	NA
		<b>Overall SSA</b>	<b>Total</b>	<b>93.16%</b>	95.58%	94.42%	96.86%	94.10%	87.71%	95.00%	96.03%	NA	NA
<b>SERVICE COVERAGE</b>													
5	In door (>= -75dBm)	Day 1	Jan-14	72.52%	84.36%	73.06%	97.13%	72.68%	58.52%	83.42%	90.06%	63.77%	44.34%
		Day 2	Jan-14	41.66%	77.76%	54.39%	64.79%	52.29%	25.55%	52.20%	85.36%	61.12%	84.62%
		Day 3	Jan-14	36.28%	58.16%	35.37%	74.02%	63.10%	19.37%	45.96%	86.24%	50.50%	69.73%
		<b>Overall SSA</b>	<b>Total</b>	<b>51.80%</b>	74.62%	54.95%	78.65%	62.38%	36.68%	61.24%	87.67%	60.60%	62.07%
	In-vehicle (>= -85dBm)	Day 1	Jan-14	98.51%	98.56%	96.70%	99.94%	95.20%	94.33%	98.32%	99.34%	98.63%	75.12%
		Day 2	Jan-14	79.24%	96.52%	85.66%	87.73%	86.35%	53.39%	83.05%	91.88%	92.15%	99.95%
		Day 3	Jan-14	81.56%	85.00%	66.55%	96.91%	85.82%	42.83%	74.40%	94.90%	83.07%	79.45%
		<b>Overall SSA</b>	<b>Total</b>	<b>87.52%</b>	93.97%	83.57%	94.86%	89.09%	66.33%	85.78%	95.67%	94.02%	82.84%
	Outdoor- in city (>= -95dBm)	Day 1	Jan-14	100.00%	99.99%	99.96%	100.00%	100.00%	99.98%	99.92%	100.00%	100.00%	100.00%
		Day 2	Jan-14	100.00%	99.96%	98.26%	95.97%	100.00%	90.37%	96.86%	100.00%	99.65%	100.00%
		Day 3	Jan-14	100.00%	96.30%	92.85%	99.79%	100.00%	80.54%	96.32%	100.00%	98.56%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>100.00%</b>	98.02%	97.18%	98.58%	100.00%	91.14%	97.77%	100.00%	99.64%	100.00%

## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE



6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	97.13%	96.09%	97.95%	98.82%	92.86%	99.43%	95.54%	98.28%	94.24%	100.00%
		Day 2	Jan-14	93.39%	98.62%	94.05%	87.90%	75.00%	93.85%	98.71%	96.99%	89.86%	98.58%
		Day 3	Jan-14	94.44%	97.60%	90.13%	98.59%	85.83%	98.56%	98.65%	99.36%	86.00%	98.55%
		Overall SSA	Total	95.25%	97.35%	93.99%	95.09%	83.52%	97.53%	97.61%	98.19%	91.47%	99.12%
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	98.80%	99.36%	95.91%	99.43%	89.84%	99.07%	98.46%	100.00%	100.00%	100.00%
		Day 2	Jan-14	91.30%	98.41%	92.16%	95.51%	96.39%	99.20%	99.50%	98.16%	100.00%	100.00%
		Day 3	Jan-14	98.02%	98.77%	88.89%	80.22%	95.45%	99.32%	99.36%	97.47%	100.00%	100.00%
		Overall SSA	Total	96.34%	98.90%	93.43%	93.54%	93.31%	99.14%	99.03%	98.34%	100.00%	100.00%

- NA-Not Applicable





**DRIVE TEST TABLE: 2**

**OPERATOR-ASSISTED DRIVE TEST ATALLAHABAD SSA IN JAN-14 MONTH- UP(E) CIRCLE - INDOOR**

S/N	Parameter	Allahabad SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
					GSM Operators						CDMA Operators			
1	Call Attempts	Day 1	Jan-14	City Life,Civil Lines	16	14	15	15	15	12	16	15	13	16
		Day 2	Jan-14	Hotel Invert	15	15	15	14	15	15	15	15	15	15
		Day 3	Jan-14	Indra Bhawan	15	16	15	14	15	15	15	15	15	15
		Overall SSA	Jan-14		<b>46</b>	<b>45</b>	<b>45</b>	<b>43</b>	<b>45</b>	<b>42</b>	<b>46</b>	<b>45</b>	<b>43</b>	<b>46</b>
2	Blocked Call Rate	Day 1	Jan-14	City Life,Civil Lines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	<b>12.50%</b>	0.00%	0.00%	<b>6.25%</b>
		Day 2	Jan-14	Hotel Invert	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	Indra Bhawan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Jan-14		<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>4.35%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>2.17%</b>
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	City Life,Civil Lines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Jan-14	Hotel Invert	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	Indra Bhawan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Jan-14		<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>	<b>0.00%</b>
<b>Percentage connections with good voice quality (=&gt;95%)</b>														
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	City Life,Civil Lines	NA	NA	NA	NA	NA	NA	NA	96.69%	99.36%	98.13%
		Day 2	Jan-14	Hotel Invert	NA	NA	NA	NA	NA	NA	NA	<b>94.47%</b>	<b>88.85%</b>	97.24%
		Day 3	Jan-14	Indra Bhawan	NA	NA	NA	NA	NA	NA	NA	<b>94.25%</b>	99.24%	96.88%
		Overall SSA	Jan-14		NA	NA	NA	NA	NA	NA	NA	95.18%	96.16%	97.43%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	City Life,Civil Lines	98.03%	99.80%	98.18%	95.47%	95.37%	100.00%	98.37%	NA	NA	NA
		Day 2	Jan-14	Hotel Invert	96.96%	98.92%	99.04%	<b>88.73%</b>	96.46%	96.25%	95.87%	NA	NA	NA
		Day 3	Jan-14	Indra Bhawan	98.10%	98.23%	98.43%	95.00%	<b>93.94%</b>	<b>91.90%</b>	97.73%	NA	NA	NA
		Overall SSA	Jan-14		<b>97.70%</b>	<b>98.97%</b>	<b>98.57%</b>	<b>93.16%</b>	<b>95.24%</b>	<b>96.45%</b>	<b>97.17%</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Service Coverage</b>														
5	In door (>= -75dBm)	Day 1	Jan-14	City Life,Civil Lines	76.57%	100.00%	99.76%	99.62%	71.09%	99.97%	86.10%	88.26%	81.77%	81.23%
		Day 2	Jan-14	Hotel Invert	88.50%	95.00%	99.85%	99.95%	77.75%	71.44%	98.96%	96.05%	99.94%	44.54%
		Day 3	Jan-14	Indra Bhawan	80.17%	81.88%	99.65%	100.00%	74.68%	83.81%	98.33%	99.90%	100.00%	68.06%

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



		<b>Overall SSA</b>	<b>Jan-14</b>		<b>81.61%</b>	<b>92.15%</b>	<b>99.75%</b>	<b>99.85%</b>	<b>73.35%</b>	<b>84.66%</b>	<b>95.74%</b>	<b>94.74%</b>	<b>94.58%</b>	<b>64.89%</b>	
	<b>In-vehicle (&gt;= -85dBm)</b>	Day 1	Jan-14	City Life,Civil Lines	99.98%	100.00%	100.00%	100.00%	86.20%	100.00%	99.20%	99.80%	100.00%	99.91%	
		Day 2	Jan-14	Hotel Invert	99.97%	100.00%	100.00%	100.00%	91.22%	99.90%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Jan-14	Indra Bhawan	100.00%	99.97%	100.00%	100.00%	91.13%	99.57%	100.00%	100.00%	100.00%	100.00%	94.08%
		<b>Overall SSA</b>	<b>Jan-14</b>			<b>99.98%</b>	<b>99.99%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>88.82%</b>	<b>99.81%</b>	<b>99.81%</b>	<b>99.93%</b>	<b>100.00%</b>	<b>98.03%</b>
	<b>Outdoor-in city (&gt;= -95dBm)</b>	Day 1	Jan-14	City Life,Civil Lines	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 2	Jan-14	Hotel Invert	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Jan-14	Indra Bhawan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		<b>Overall SSA</b>	<b>Jan-14</b>			<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
6	<b>Call Setup Success Rate (&gt;=95%)</b>	Day 1	Jan-14	City Life,Civil Lines	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	<b>87.50%</b>	100.00%	100.00%	<b>93.75%</b>	
		Day 2	Jan-14	Hotel Invert	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Jan-14	Indra Bhawan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		<b>Overall SSA</b>	<b>Jan-14</b>			<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>95.65%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>97.83%</b>
7	<b>Hand Over Success Rate (HOSR)</b>	Day 1	Jan-14	City Life,Civil Lines	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 2	Jan-14	Hotel Invert	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Jan-14	Indra Bhawan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
		<b>Overall SSA</b>	<b>Jan-14</b>			<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**DRIVE TEST TABLE: 3**

**OPERATOR-ASSISTED DRIVE TEST AT GORAKHPUR SSA IN FEB-14 MONTH- UP(E) CIRCLE**

S/N	Parameter	SSA Name: Gorakhpur	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators	
1	Call Attempts	Day 1	Feb-14	130	138	167	195	186	160	171	153	153	193
		Day 2	Feb-14	124	177	142	156	104	102	150	161	106	207
		Day 3	Feb-14	181	185	222	178	145	127	192	165	59	189
		<b>Overall SSA</b>	<b>Total</b>	<b>435</b>	<b>500</b>	<b>531</b>	<b>529</b>	<b>435</b>	<b>389</b>	<b>513</b>	<b>479</b>	<b>318</b>	<b>589</b>
2	Blocked Call Rate	Day 1	Feb-14	0.77%	0.72%	2.40%	1.03%	1.08%	1.25%	1.75%	0.00%	0.65%	0.00%
		Day 2	Feb-14	5.65%	0.00%	11.27%	2.56%	17.31%	1.96%	1.33%	0.62%	2.83%	0.00%
		Day 3	Feb-14	8.29%	0.54%	9.01%	0.56%	9.66%	2.36%	1.04%	0.00%	3.39%	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>5.29%</b>	<b>0.40%</b>	<b>7.53%</b>	<b>1.32%</b>	<b>7.82%</b>	<b>1.80%</b>	<b>1.36%</b>	<b>0.21%</b>	<b>1.89%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	0.00%	0.00%	0.72%	1.04%	0.54%	0.00%	1.79%	1.32%	0.00%	0.52%
		Day 2	Feb-14	0.00%	0.00%	16.39%	0.00%	0.00%	2.00%	0.68%	0.00%	0.97%	1.93%
		Day 3	Feb-14	0.00%	0.00%	15.54%	0.56%	1.53%	0.81%	0.00%	0.00%	0.00%	1.06%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.00%</b>	<b>0.00%</b>	<b>11.23%</b>	<b>0.57%</b>	<b>0.75%</b>	<b>0.79%</b>	<b>0.79%</b>	<b>0.42%</b>	<b>0.32%</b>	<b>1.19%</b>
<b>PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=&gt;95%)</b>													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	96.73%	95.63%
		Day 2	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	95.11%	90.67%
		Day 3	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	96.04%	94.39%
		<b>Overall SSA</b>	<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>96.07%</b>	<b>94.09%</b>
	(b) 0-5 ( with frequency hopping for GSM Operators)	Day 1	Feb-14	94.99%	95.27%	91.88%	94.21%	95.97%	95.39%	90.45%	95.03%	NA	NA
		Day 2	Feb-14	96.94%	96.24%	76.81%	95.11%	95.36%	93.50%	91.09%	95.28%	NA	NA
		Day 3	Feb-14	93.41%	95.20%	82.74%	95.11%	92.21%	92.75%	93.91%	95.20%	NA	NA
		<b>Overall SSA</b>	<b>Total</b>	<b>94.93%</b>	<b>95.55%</b>	<b>84.36%</b>	<b>94.77%</b>	<b>94.62%</b>	<b>93.96%</b>	<b>92.12%</b>	<b>95.17%</b>	<b>NA</b>	<b>NA</b>
<b>SERVICE COVERAGE</b>													
5	In door (>= -75dBm)	Day 1	Feb-14	64.93%	97.83%	70.11%	83.97%	56.42%	20.22%	74.28%	99.41%	85.67%	93.89%
		Day 2	Feb-14	22.24%	85.52%	32.39%	46.19%	54.67%	17.04%	45.58%	95.59%	38.08%	66.18%
		Day 3	Feb-14	24.59%	86.85%	43.90%	32.40%	31.96%	32.66%	49.27%	94.66%	23.00%	59.80%
		<b>Overall SSA</b>	<b>Total</b>	<b>36.66%</b>	<b>89.86%</b>	<b>49.84%</b>	<b>55.82%</b>	<b>48.39%</b>	<b>26.40%</b>	<b>56.29%</b>	<b>96.32%</b>	<b>56.72%</b>	<b>74.41%</b>
5	In-vehicle (>= -85dBm)	Day 1	Feb-14	97.45%	99.97%	96.29%	99.14%	94.48%	74.15%	98.41%	99.99%	99.49%	98.86%
		Day 2	Feb-14	75.62%	98.90%	66.84%	82.26%	84.00%	46.37%	86.70%	100.00%	55.46%	85.62%
		Day 3	Feb-14	72.70%	99.28%	73.60%	74.33%	67.18%	51.94%	79.09%	100.00%	43.50%	77.11%
		<b>Overall SSA</b>	<b>Total</b>	<b>81.40%</b>	<b>99.38%</b>	<b>79.55%</b>	<b>85.95%</b>	<b>83.37%</b>	<b>56.89%</b>	<b>87.69%</b>	<b>99.99%</b>	<b>73.08%</b>	<b>87.72%</b>
5	Outdoor- in city (>= -95dBm)	Day 1	Feb-14	99.98%	100.00%	99.75%	99.95%	100.00%	97.92%	99.97%	100.00%	99.99%	100.00%
		Day 2	Feb-14	95.62%	100.00%	93.04%	97.61%	100.00%	83.39%	98.93%	100.00%	74.35%	96.55%
		Day 3	Feb-14	96.11%	99.93%	96.67%	95.52%	100.00%	75.68%	98.59%	100.00%	84.31%	99.30%
		<b>Overall SSA</b>	<b>Total</b>	<b>97.19%</b>	<b>99.97%</b>	<b>96.79%</b>	<b>97.78%</b>	<b>100.00%</b>	<b>83.10%</b>	<b>99.15%</b>	<b>100.00%</b>	<b>97.77%</b>	<b>98.76%</b>
6	Call Setup Success	Day 1	Feb-14	99.23%	99.28%	83.23%	98.97%	98.92%	98.75%	98.25%	99.35%	99.35%	100.00%

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	Rate (>=95%)	Day 2	Feb-14	94.35%	100.00%	85.92%	97.44%	82.69%	98.04%	98.67%	99.38%	97.17%	100.00%
		Day 3	Feb-14	91.71%	99.46%	86.94%	99.44%	90.34%	97.64%	98.96%	98.18%	96.61%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>94.71%</b>	<b>99.60%</b>	<b>85.50%</b>	<b>98.68%</b>	<b>92.18%</b>	<b>98.20%</b>	<b>98.64%</b>	<b>98.96%</b>	<b>98.11%</b>	<b>100.00%</b>
		Day 1	Feb-14	99.47%	98.39%	98.85%	99.53%	99.17%	99.34%	98.10%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 2	Feb-14	100.00%	100.00%	79.31%	93.86%	98.82%	98.70%	98.96%	97.54%	100.00%	100.00%
		Day 3	Feb-14	97.77%	99.59%	72.76%	100.00%	96.03%	100.00%	98.79%	97.06%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>98.99%</b>	<b>99.25%</b>	<b>86.31%</b>	<b>98.26%</b>	<b>98.23%</b>	<b>99.35%</b>	<b>98.44%</b>	<b>98.26%</b>	<b>100.00%</b>	<b>100.00%</b>

- NA-Not Applicable



**DRIVE TEST TABLE: 4**

**OPERATOR-ASSISTED DRIVE TEST AT GORAKHPUR SSA IN FEB-14 MONTH- UP(E) CIRCLE - INDOOR**

S/N	Parameter	Gorakhpur SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA	
					GSM Operators						CDMA Operators				
1	Call Attempts	Day 1	Feb-14	City Mall	17	15	17	15	17	15	15	15	15	15	
		Day 2	Feb-14	Hotel Adarsh Palace	16	15	17	15	16	15	15	15	15	15	
		Day 3	Feb-14	Sardar Motors	18	15	15	15	15	15	15	15	15	16	
		Overall SSA	Feb-14		51	45	49	45	48	45	45	45	45	45	
2	Blocked Call Rate	Day 1	Feb-14	City Mall	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Feb-14	Hotel Adarsh Palace	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Feb-14	Sardar Motors	0.00%	0.00%	6.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Feb-14		0.00%	0.00%	2.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	City Mall	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Feb-14	Hotel Adarsh Palace	0.00%	0.00%	17.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Feb-14	Sardar Motors	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Feb-14		0.00%	0.00%	6.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
4	<b>Percentage connections with good voice quality (=&gt;95%)</b>														
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	City Mall	NA	NA	NA	NA	NA	NA	NA	NA	96.77%	99.42%	97.46%
		Day 2	Feb-14	Hotel Adarsh Palace	NA	NA	NA	NA	NA	NA	NA	NA	97.74%	99.02%	97.15%
		Day 3	Feb-14	Sardar Motors	NA	NA	NA	NA	NA	NA	NA	NA	97.67%	99.19%	97.60%
		Overall SSA	Feb-14		NA	NA	NA	NA	NA	NA	NA	NA	97.43%	99.23%	97.40%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	City Mall	95.70%	96.37%	94.20%	96.61%	95.76%	98.19%	90.41%	NA	NA	NA	
		Day 2	Feb-14	Hotel Adarsh Palace	99.22%	99.01%	86.63%	84.14%	97.32%	92.58%	65.67%	NA	NA	NA	
		Day 3	Feb-14	Sardar Motors	97.00%	96.92%	88.99%	99.38%	97.98%	99.48%	92.54%	NA	NA	NA	
Overall SSA		Feb-14		97.32%	97.41%	90.30%	93.41%	96.99%	96.96%	82.90%	NA	NA	NA		
5	<b>Service Coverage</b>														
	In door (>= -75dBm)	Day 1	Feb-14	City Mall	80.05%	100.00%	96.28%	99.98%	59.34%	13.02%	89.75%	100.00%	100.00%	100.00%	
		Day 2	Feb-14	Hotel Adarsh Palace	15.02%	99.89%	45.82%	61.12%	46.77%	4.20%	1.02%	100.00%	87.25%	100.00%	

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		Day 3	Feb-14	Sardar Motors	41.23%	99.92%	97.29%	99.70%	56.19%	98.26%	97.64%	96.86%	95.80%	89.63%	
		<b>Overall SSA</b>	<b>Feb-14</b>		<b>44.85%</b>	<b>99.94%</b>	<b>81.62%</b>	<b>87.07%</b>	<b>54.31%</b>	<b>34.99%</b>	<b>63.16%</b>	<b>98.92%</b>	<b>94.94%</b>	<b>96.42%</b>	
	<b>In-vehicle (&gt;= -85dBm)</b>		Day 1	Feb-14	City Mall	99.93%	100.00%	99.77%	100.00%	99.84%	97.84%	99.97%	100.00%	100.00%	100.00%
			Day 2	Feb-14	Hotel Adarsh Palace	94.25%	100.00%	95.23%	99.53%	98.62%	48.11%	98.93%	100.00%	100.00%	100.00%
			Day 3	Feb-14	Sardar Motors	97.23%	100.00%	99.21%	100.00%	99.82%	100.00%	100.00%	100.00%	100.00%	100.00%
			<b>Overall SSA</b>	<b>Feb-14</b>		<b>97.10%</b>	<b>100.00%</b>	<b>98.25%</b>	<b>99.84%</b>	<b>99.44%</b>	<b>84.02%</b>	<b>99.64%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
	<b>Outdoor-in city (&gt;= -95dBm)</b>		Day 1	Feb-14	City Mall	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
			Day 2	Feb-14	Hotel Adarsh Palace	99.88%	100.00%	99.53%	100.00%	100.00%	99.48%	100.00%	100.00%	100.00%	100.00%
			Day 3	Feb-14	Sardar Motors	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
			<b>Overall SSA</b>	<b>Feb-14</b>		<b>99.96%</b>	<b>100.00%</b>	<b>99.85%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>99.85%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
	6	<b>Call Setup Success Rate (&gt;=95%)</b>		Day 1	Feb-14	City Mall	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
				Day 2	Feb-14	Hotel Adarsh Palace	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Day 3				Feb-14	Sardar Motors	100.00%	100.00%	93.33%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
<b>Overall SSA</b>				<b>Feb-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>97.96%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	
7	<b>Hand Over Success Rate (HOSR)</b>		Day 1	Feb-14	City Mall	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
			Day 2	Feb-14	Hotel Adarsh Palace	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
			Day 3	Feb-14	Sardar Motors	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
			<b>Overall SSA</b>	<b>Feb-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**DRIVE TEST TABLE: 5**

OPERATOR-ASSISTED DRIVE TEST AT KANPUR SSA IN MAR-14 MONTH- UP(E) CIRCLE													
S/N	Parameter	SSA Name: Kanpur	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators	
1	Call Attempts	Day 1	Mar-14	161	155	161	162	167	168	169	143	170	169
		Day 2	Mar-14	176	196	218	207	177	73	193	190	66	184
		Day 3	Mar-14	149	158	211	160	168	120	160	173	79	131
		<b>Overall SSA</b>	<b>Total</b>	<b>486</b>	<b>509</b>	<b>590</b>	<b>529</b>	<b>512</b>	<b>361</b>	<b>522</b>	<b>506</b>	<b>315</b>	<b>484</b>
2	Blocked Call Rate	Day 1	Mar-14	0.62%	0.00%	3.73%	0.00%	0.00%	0.60%	0.00%	0.00%	5.29%	0.59%
		Day 2	Mar-14	4.55%	0.00%	3.67%	0.00%	1.69%	0.00%	2.07%	0.00%	6.06%	0.54%
		Day 3	Mar-14	1.34%	0.00%	2.84%	1.25%	0.00%	1.67%	3.75%	0.00%	6.33%	0.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>2.26%</b>	<b>0.00%</b>	<b>3.39%</b>	<b>0.38%</b>	<b>0.59%</b>	<b>0.83%</b>	<b>1.92%</b>	<b>0.00%</b>	<b>5.71%</b>	<b>0.41%</b>
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	0.63%	0.00%	1.30%	0.63%	0.60%	0.60%	0.00%	0.00%	0.00%	1.19%
		Day 2	Mar-14	1.19%	0.00%	4.76%	0.49%	0.00%	4.23%	1.06%	0.00%	1.64%	1.64%
		Day 3	Mar-14	0.00%	0.00%	2.93%	0.65%	1.20%	1.69%	0.65%	0.00%	1.37%	2.29%
		<b>Overall SSA</b>	<b>Total</b>	<b>0.63%</b>	<b>0.00%</b>	<b>3.16%</b>	<b>0.58%</b>	<b>0.59%</b>	<b>1.69%</b>	<b>0.59%</b>	<b>0.00%</b>	<b>0.68%</b>	<b>1.66%</b>
<b>PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=&gt;95%)</b>													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	99.16%	99.36%
		Day 2	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	97.15%	97.98%
		Day 3	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	98.62%	97.68%
		<b>Overall SSA</b>	<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>98.62%</b>	<b>98.35%</b>
	(b) 0-5 ( with frequency hopping for GSM Operators)	Day 1	Mar-14	92.57%	96.60%	96.79%	92.07%	96.08%	89.29%	94.02%	95.77%	NA	NA
		Day 2	Mar-14	96.72%	95.91%	96.61%	95.92%	96.49%	90.18%	96.90%	97.41%	NA	NA
		Day 3	Mar-14	96.05%	96.52%	95.63%	95.00%	95.49%	91.45%	96.19%	96.94%	NA	NA
		<b>Overall SSA</b>	<b>Total</b>	<b>95.14%</b>	<b>96.33%</b>	<b>96.35%</b>	<b>94.30%</b>	<b>96.03%</b>	<b>90.31%</b>	<b>95.69%</b>	<b>96.72%</b>	<b>NA</b>	<b>NA</b>
<b>SERVICE COVERAGE</b>													
5	In door (>= -75dBm)	Day 1	Mar-14	61.56%	97.21%	73.75%	94.08%	42.50%	43.34%	88.61%	84.41%	93.94%	96.03%
		Day 2	Mar-14	24.80%	76.35%	42.81%	66.21%	48.82%	40.46%	55.62%	61.14%	62.24%	52.96%
		Day 3	Mar-14	41.06%	88.38%	49.03%	70.01%	51.29%	53.19%	74.16%	57.43%	68.58%	76.38%
		<b>Overall SSA</b>	<b>Total</b>	<b>41.79%</b>	<b>87.17%</b>	<b>54.29%</b>	<b>76.64%</b>	<b>47.80%</b>	<b>44.87%</b>	<b>72.11%</b>	<b>67.31%</b>	<b>81.11%</b>	<b>74.13%</b>
	In-vehicle (>= -85dBm)	Day 1	Mar-14	96.05%	99.67%	97.79%	99.79%	94.47%	82.45%	99.53%	97.99%	98.36%	99.46%
		Day 2	Mar-14	75.38%	96.96%	79.05%	95.01%	71.30%	70.39%	84.94%	94.70%	86.61%	80.90%
		Day 3	Mar-14	84.96%	99.19%	84.06%	95.92%	82.46%	72.83%	93.95%	95.05%	89.58%	85.83%
		<b>Overall SSA</b>	<b>Total</b>	<b>85.07%</b>	<b>98.57%</b>	<b>86.41%</b>	<b>96.87%</b>	<b>76.65%</b>	<b>74.05%</b>	<b>92.46%</b>	<b>95.86%</b>	<b>93.76%</b>	<b>88.38%</b>
Outdoor- in city (>= -95dBm)	Day 1	Mar-14	99.76%	100.00%	99.92%	100.00%	100.00%	98.36%	99.90%	99.98%	99.54%	100.00%	
	Day 2	Mar-14	93.34%	99.95%	95.67%	100.00%	100.00%	89.82%	97.83%	99.86%	95.44%	93.84%	
	Day 3	Mar-14	97.19%	99.95%	98.40%	100.00%	100.00%	90.28%	99.09%	99.85%	99.52%	95.71%	
	<b>Overall SSA</b>	<b>Total</b>	<b>96.62%</b>	<b>99.97%</b>	<b>97.86%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>91.97%</b>	<b>98.89%</b>	<b>99.89%</b>	<b>98.70%</b>	<b>96.40%</b>	

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6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	99.38%	100.00%	95.65%	98.77%	99.40%	99.40%	100.00%	100.00%	94.71%	99.41%
		Day 2	Mar-14	95.45%	100.00%	96.33%	98.07%	98.31%	97.26%	97.41%	100.00%	92.42%	99.46%
		Day 3	Mar-14	98.66%	100.00%	97.16%	96.88%	98.81%	98.33%	96.25%	100.00%	92.41%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>97.74%</b>	<b>100.00%</b>	<b>96.44%</b>	<b>97.92%</b>	<b>98.83%</b>	<b>98.61%</b>	<b>97.89%</b>	<b>100.00%</b>	<b>93.65%</b>	<b>99.59%</b>
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	98.40%	99.59%	95.35%	98.32%	95.73%	100.00%	98.59%	99.35%	100.00%	100.00%
		Day 2	Mar-14	100.00%	98.91%	84.49%	99.00%	84.62%	100.00%	99.56%	99.26%	100.00%	100.00%
		Day 3	Mar-14	100.00%	99.29%	94.81%	96.59%	97.75%	100.00%	98.90%	99.17%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Total</b>	<b>99.14%</b>	<b>99.29%</b>	<b>92.29%</b>	<b>97.96%</b>	<b>93.92%</b>	<b>100.00%</b>	<b>98.88%</b>	<b>99.27%</b>	<b>100.00%</b>	<b>100.00%</b>

- NA-Not Applicable



**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**DRIVE TEST TABLE: 6**

**OPERATOR-ASSISTED DRIVE TEST AT KANPUR SSA IN MAR-14 MONTH- UP(E) CIRCLE - INDOOR**

S/N	Parameter	Kanpur SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA	
					GSM Operators						CDMA Operators				
1	Call Attempts	Day 1	Mar-14	Kanchan Tower	15	17	15	15	15	15	15	15	15	15	15
		Day 2	Mar-14	South Mall Big Baza	15	15	15	15	15	15	15	16	16	15	15
		Day 3	Mar-14	Rave 3 Mall	15	15	15	15	15	15	15	15	15	15	15
		Overall SSA	Mar-14		45	47	45	45	45	45	45	46	46	45	45
2	Blocked Call Rate	Day 1	Mar-14	Kanchan Tower	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	South Mall Big Baza	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Rave 3 Mall	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	Kanchan Tower	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	South Mall Big Baza	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	Rave 3 Mall	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Percentage connections with good voice quality (=&gt;95%)</b>															
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	Kanchan Tower	NA	NA	NA	NA	NA	NA	NA	99.02%	100.00%	100.00%	
		Day 2	Mar-14	South Mall Big Baza	NA	NA	NA	NA	NA	NA	NA	98.81%	100.00%	100.00%	
		Day 3	Mar-14	Rave 3 Mall	NA	NA	NA	NA	NA	NA	NA	98.26%	100.00%	100.00%	
		Overall SSA	Mar-14		NA	NA	NA	NA	NA	NA	NA	98.70%	100.00%	100.00%	
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	Kanchan Tower	92.79%	98.85%	95.27%	94.94%	99.53%	99.60%	99.34%	NA	NA	NA	
		Day 2	Mar-14	South Mall Big Baza	91.07%	99.29%	99.83%	98.14%	99.56%	99.57%	99.32%	NA	NA	NA	
		Day 3	Mar-14	Rave 3 Mall	97.95%	98.24%	89.16%	98.80%	98.93%	99.40%	99.22%	NA	NA	NA	
		Overall SSA	Mar-14		93.94%	98.80%	95.11%	97.28%	99.34%	99.52%	99.30%	NA	NA	NA	
<b>Service Coverage</b>															
5	In door (>= -75dBm)	Day 1	Mar-14	Kanchan Tower	65.74%	100.00%	75.81%	99.37%	74.24%	61.93%	98.93%	42.28%	99.98%	97.25%	
		Day 2	Mar-14	South Mall Big Baza	53.65%	90.45%	57.91%	95.23%	94.28%	24.01%	74.10%	59.06%	67.61%	60.24%	
		Day 3	Mar-14	Rave 3 Mall	68.88%	99.95%	7.77%	93.90%	66.97%	98.10%	99.69%	91.30%	100.00%	97.79%	
		Overall	Mar-14		62.76%	96.93%	47.82%	96.12%	74.05%	61.96%	90.40%	64.15%	88.80%	85.00%	

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



		SSA												
	<b>In-vehicle (&gt;= -85dBm)</b>	Day 1	Mar-14	Kanchan Tower	99.85%	100.00%	99.22%	99.82%	93.65%	99.92%	100.00%	92.38%	100.00%	99.20%
		Day 2	Mar-14	South Mall Big Baza	99.33%	99.87%	98.12%	99.96%	100.00%	90.21%	99.95%	99.06%	99.38%	96.79%
		Day 3	Mar-14	Rave 3 Mall	99.90%	100.00%	90.45%	99.94%	99.97%	99.97%	100.00%	100.00%	100.00%	98.62%
		<b>Overall SSA</b>	<b>Mar-14</b>		<b>99.69%</b>	<b>99.96%</b>	<b>96.05%</b>	<b>99.91%</b>	<b>97.22%</b>	<b>96.83%</b>	<b>99.98%</b>	<b>97.16%</b>	<b>99.79%</b>	<b>98.20%</b>
	<b>Outdoor-in city (&gt;= -95dBm)</b>	Day 1	Mar-14	Kanchan Tower	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.88%	100.00%	99.40%
		Day 2	Mar-14	South Mall Big Baza	100.00%	99.97%	99.35%	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	99.60%
		Day 3	Mar-14	Rave 3 Mall	100.00%	100.00%	99.87%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.16%
		<b>Overall SSA</b>	<b>Mar-14</b>		<b>100.00%</b>	<b>99.99%</b>	<b>99.72%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>99.99%</b>	<b>100.00%</b>	<b>99.96%</b>	<b>100.00%</b>	<b>99.39%</b>
6	<b>Call Setup Success Rate (&gt;=95%)</b>	Day 1	Mar-14	Kanchan Tower	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	South Mall Big Baza	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	Rave 3 Mall	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Mar-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
7	<b>Hand Over Success Rate (HOSR)</b>	Day 1	Mar-14	Kanchan Tower	100.00%	100.00%	86.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	South Mall Big Baza	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	Rave 3 Mall	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		<b>Overall SSA</b>	<b>Mar-14</b>		<b>100.00%</b>	<b>100.00%</b>	<b>88.24%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>



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

**DRIVE TEST TABLE: 7**

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
<b>ALLAHABAD</b>	Allahabad (90 Km)	Railway station to mundera ,civi line to tarffic chauraha , teliyarganj to katra mumfordganj, balson chauraha to alopibagh	Phoolpur, Soraon (148 Km)	Phafamau(railway stn.,bus stand, chawk), phoolpur,handia,soraon	Shankargarh, Naini, Karchhna (120 Km)	Naini ,sankar garh(police stn, sbi, bsnl) ,nari bari,karchhna
<b>GORAKHPUR</b>	Gorakhpur (100 Km)	GKP-Railway Station to Surajkund to Ilahinagar,Transport Nagar to Rustampur to Engg College,Medical College, GKP-Railway Station	Campierganj,Pharienda (Anand Nagar), Maharajganj (128 Km)	Bargadwa to Campierganj, Pharienda (Anand Nagar),Maharajganj, Gorakhpur Rly Stn	Bansgaon -I (BANSGAON), Bansgaon-II (Barhalganj) (137 Km)	Nausadh to Badhalganj,Badhalganj to Bansgaon,Bansgaon to Nausadh
<b>KANPUR</b>	Kanpur (102 Km)	KNP-Railway Station Kalyanpur, RBI, bsnlknpur Univercity, panki, Rtanal Nagar,yshodanagar, Imali,Govind nagar, Ramadevi, Kakadev	Bilhour, Derapur, Akabarpur (160 Km)	Kalyanpur Railway Stn. ,Chobepur,Uttari Pura, Bilhour(Uttampur, Bilhour Police Stn.,Railway Stn.,Brd Inter College ,shishumandir), Jhinjak,Rashulabad, Mangalpur, Derapur,Rura,Akabarpur(Aknbarpur Intrer college, gandhi park,rkm hospital,Police Chowki,Tehshil, Ahiliyabai Holkar Inter college,NH2),Banar Ali	Ghatmapur, Bhognipur (140 Km)	Jajmau, naubasta, bidhnu, Ghatampur(SBI, Tehshil,Janta degree college), Aladpur, Bhognipur,Pukhrayan, Barhauili,Chatteni,Swarooppur, Banar Ali Bus Stop,NH2,Rania,SAIL Kanpur,Panki



**SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 8**

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

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Jan-14	Allahabad	Allahabad	Poor Level & Quality near mehdauri, Bulaki Purwa, Pawanvihar, Civilines, Dhumanganj, Bhamrauli, Shohbatlabag	Phoolpur, Soraon	Poor Level & Quality near Gohari, Bhopatpur, Kasturakhurd, Poor Level near Molawakalan, Muhaddipur, Salidabad	Shankergarh, Karchhana	Poor Level & Quality near Kareha, Karama, Bara Khas, Bahari, Shankargarh
2	AIRTEL				Poor Quality near Bulaki Purwa, City Center, Sarein Neem,		Poor Level & Quality near Tharwal, Phulpur Outer, Muhaddipur, Bashupur Handia		Poor Level & Quality near nari Bari, Poor Level near Kareha, Nibi
3	BSNL				----		----		----
4	TATA GSM				Poor Quality near Mahadauri, Mumfordganj, Chota Bagad		Poor Level & Quality near Bhopatpur Outer, MolawaKalan, Sewa		Poor Level & Quality near Kanti, Jari Bazar
5	TATA CDMA				----		They have coverage in only 3-4 villages, The route covered in Day 2		They have coverage in only 2-3 villages, The route covered in Day 3
6	IDEA				Poor Quality near Bulaki Purwa, Railway Station, Sardar Patel Marg		Poor Level & Quality near Tharwal, Bhopatpur, Paiguwa, Basupur Handia		Poor Level & Quality near Nari Bari
7	RCOM GSM				Poor Level & Quality near Kalindipuram, Sulem Sarai, Biniganj Road, Civilines Railway Station, Old Katra, Chintamani Road, Bulaki Purwa		Poor Level & Quality near Tharwal, Bhopatpur, Phulpur outer, Munaddipur, Bashupur Handia, Sahidabad, Jhunsi		Poor Level & Quality near Mahurwari, Mama Bhanja Talab, Zari Bazar, Nari Bari, Bahari, Nibi, Bara Khas
8	RCOM CDMA				Poor Quality near Kalindipuram, Sulem Sarai		Poor Level & Quality near Bhopatpur, Muhaddipur, Sewa, Saripur, Uppardha Pipram, Sahidabad, Jhunsi		Poor Level & Quality near Rampur Chauraha, Ghoorpur, Nibi, Bahari, Kareha, Ganne
9	UNINOR				Poor Quality near City center, Civilines, Sardar Patelmarg		Poor Quality near Chita village, Poor Level near Muhaddipur, Sewa, Sahidabad, Kaithwal, Gohari		Poor Level & Quality near Racron factory, Ghoorpur, Poor Rx Level near Bara Khas, Bahari, Ganne
10	VODAFONE				----		Poor Quality near Kaithwal, Palguwa		Poor Quality near Bahari



**DRIVE TEST TABLE: 9**

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

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Feb-14	Gorakhpur	Gorakhpur	Poor Quality near FCI Gate Jhugia, Daudpur	Maharajganj, Pharenda-I (Compierganj), Pharenda-II (Anand Nagar)	Poor Level & Quality near Mahalganj, Sekhui, Ratanpur Khurd Outer, Nawalpurwa	Bansgaon - I, Bansgaon -II (Barhalganj)	Poor Level & Quality near Kahjini, Harauli, Gola Bazar, Rajahata
2	AIRTEL				Poor Quality near FCI Gate Jhugia, Basratpur, Medical College		Poor Quality near Bhathat, Siyarahiban, Laxmipur Khas, Maharajganj Outer		Poor Level & Quality near Kauriram, Harauli, Darwapar,
3	BSNL				Poor Level & Quality near Krishan Nagar, Mohaddipur, Jharkhandi, MMM engg college, Poor Quality near Vikasnagar, Bethihata		Poor Level & Quality near Harakpurwa, Chehari, Thkurnagar, Compierganj Outer, Tepipiganj, Tejulgekauria, Medical collage, Guleria, Teparawal		Poor Level & Quality near Belipar, Temahudapar, ChahpiaBazar, Tebansgaon, Gopalpur Devpali, Barhalganj Outer
4	TATA GSM				Poor Level & Quality near Vikas Nagar		Poor Level & Quality near Compierganj, Tejulgekauria		Poor Level & Quality near Chhapiabazar, Pakridubey, Belipar, outer of Gola
5	TATA CDMA				Poor Level near Fci Gate Jhungia, Poor Quality near Gorakhnath, Ashuram Chowk, Bethihata		No Coverage between Maharajganj to Compierganj, Poor Level & Qquality at outer of Maharajganj		They have Coverage in only Barhalganj,
6	IDEA				Poor Quality near Manasd vihar Colony		Poor Level & Quality near Nawalpurwa, Mahalganj, Tarkulwa		Poor Level & Quality near Bhatauli, Khajini, Poor Level near Harauli, Barhalganj, Gagaha, Katiya
7	RCOM GSM				Poor Level & Quality near Betiya Hata, Suraj Khurd, Railway Station, Mohaddipur, Poor Rx Level near Fci Gate Jhugia, Deoria Rd Khoral		Poor Level near Sirsiyal, Bhathat, Maharajganj Outer, No Coverage between Maharajganj to Compierganj, Tarkulwa to Maharajganj		Poor Level & Quality near Harauli, Baraipur, Rajhata, Jaitpur, Bhatauli, No coverage between Jaitpur to Khajini
8	RCOM CDMA				Poor Level near Fci Gate jhungia, Ranidha		No Coverage between Maharajganj to Compierganj, Poor Level near Bhathat, at Outer of Maharajganj		Poor Level near Harauli, Baraipur, Barhalganj Outer, Bhatauli, Jaitpur
9	UNINOR				Poor Quality near Basantpuram, Dandpur, Railway Station, Gorakhnath Hospital, Saraswati Puram, Basratpur, Vikas Nagar		Poor Level & Quality near Jungalkodia, Compierganj Outer, Poor Level near Siswa		Poor Quality near Jaitpur, Bansgaon
10	VODAFONE				---		---		Poor Quality near Khajini, Bansgaon, Darwapar



**DRIVE TEST TABLE: 10**

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

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Mar-14	Kanpur	Kanpur	Poor Level & Quality near Saraimeta, Poor Quality near Pandu Nagar	Bilhaur, Derapur, Akabarpur	Poor Level & Quality near Anei, Tisti, Tighia, Poor Level near Sataura, Nonaribujurg	Ghatmapur, Bhognipur	Poor Level & Quality near Ahrudha, Pateypur, Poor Rx Level near Chaparghata, Ghughuwa
2	AIRTEL				Poor Quality near Swaraj Nagar, Barra, Civillines, Bangali Colony		Poor Level & Quality near Sataura, Poor Quality near Tisti, Shahpur, Tighia		Poor Quality patches near Akbarpur, Chaparghata, Rampur
3	BSNL				Poor Quality near Civillines, Barra, Panki		Poor Level & Quality near Shahpur, Tighia, Saibas		Poor Level & Quality near Pateypur, Ghatampur Ext, Rampur
4	TATA GSM				Poor Quality near Saimeta, Gopal Nagar		Poor Level near Anei, Tisti, Ashlathganj, Shahpur, Tighia		Poor Level & Quality near Rampur, Sarai, Pateypur, poor Level near Ghughwa
5	TATA CDMA				Poor Level & Quality near Vishnupuri, Poor Quality near Nai Sadak, Patarkapuram, Vikas Ext, Shaksingh Market, Kakadev, Vivek Vihar		They have coverage in only 3-4 villages, The route covered in Day 2		They have coverage in only 6-7 villages, The route covered in Day 3
6	IDEA				Poor Quality near Swaraj Nagar, Barra, Vivek Vihar, bank Colony		Poor Quality near Sarghaon, Tighia, Bithoor Village		Poor Level & Quality near Sarauta, Sarai Village
7	RCOM GSM				Poor Level & Quality near Vishnupuri, Vikas Ext, Civillines, Tulsi Ext, Swaraj Nagar, Panki, Vivek Vihar, Clock Tower, Gopal Nagar, Ramdevi, Ahirawan		Poor Level & Quality near Pachor, Sihura, Tisiti, Shahpur, Sataura, Patra, Tighia		Poor Level & Quality near Ghatam Ext, Bindhnu, Rampur, Ranya, Pateypur, Ahraundha, No Coverage between Ahraundha to Chaparghata
8	RCOM CDMA				Poor Level near Patrakapuram		Poor Level & Quality near Mandhana, Shivrajpur, Ashlatganj, Jhinhak, Poor Level near Shahpur, Tisti, Sataura, Tighia		Poor Level & Quality near Rampur, Chaparghata, Raniya, Poor Level near Ghughawa, Bindhnu
9	UNINOR				Poor Quality near Vikas Ext, Panki		Poor Level near Shahpurnala, Saibas, Anei, Shahpur, Nonaribujarg		Poor Level & Quality near Sarai, Poor level near Ghughwa, Ghatam Ext
10	VODAFONE				----		Poor Level near Shahpur		----



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

- (i) **In the Month of Jan-14**, drive tests were conducted at **Allahabad SSA**. The performance of majority of the operators was not satisfactory as they failed to meet the benchmarks of the prime network parameters. On SSA level, performance of **Aircel** for parameters **Blocked Call Rate** and **Voice Quality** was **4.10%** and **93.16%**, the performance of **BSNL** with respect to the parameters **Call drop rate**, **Voice Quality** and **Call set up success rate (CSSR)** was **3.20%**, **94.42 %** and **93.99 %** respectively. **Idea** failed to meet the benchmark for parameters, **Blocked Call Rate** and **Call Drop Rate (CDR)** with its performance as **4.91%** and **2.70 %** respectively. **Tata (GSM)** lagged behind in meeting the benchmarks of parameters **Blocked Call rate (13.69%)**, **Voice Quality (94.10%)** and **Call setup success rate (83.52%)** where as **Tata (CDMA)** could not meet the benchmark of **CSSR (91.47%)**. **RCOM (GSM)** and **RCOM (CDMA)** also failed to meet the bench mark of the parameters **Call Drop rate** and **Voice Quality** with their performance as **2.07% & 87.71 %** and **4.67% & 94.10%** respectively.

In case of indoor drive test, **Uninor** and **Idea** failed to meet the benchmark for the parameter '**Blocked Call Rate**' and '**Good Voice Quality**' with their performance as **4.35% & 93.16%** respectively.

- (ii) **In the Month of Feb-14**, drive tests were conducted at **Gorakhpur SSA**. The results of the drive tests carried out in this month revealed that performance of the service providers on SSA level was largely remained under performed with respect to different network parameters. The performance of **BSNL** was very poor with respect to the parameters **Blocked Call rate**, **Call Drop rate**, **Voice Quality** and **Call setup success rate (CSSR)** with its performance as **7.53%**, **11.23%**, **84.36%** and **85.50 %** respectively. **Aircel and Tata (GSM)** were non-compliant for parameters **Blocked Call rate** with their performance as **5.29% & 7.82%**, for parameter **Voice Quality** their performance was **94.93 % & 94.62%** and for parameter **CSSR** their achievement level was **94.71% & 92.18%** respectively. Further, **Idea Cellular**, **RCOM (GSM)**, **Uninor and RCOM (CDMA)** remained non-compliant for parameter **Voice quality** with their performance as **94.77%**, **93.96%**, **92.12%** and **94.09%** respectively. Thus, the service providers need to improve their network quality in Gorakhpur SSA immediately as quality of the network is **not satisfactory** at all.

In case of indoor drive test, **BSNL** could not meet the parameter '**Call Drop Rate**' and '**Good Voice Quality**' with their performance as **6.25% & 90.30%** respectively. **Uninor & Idea** also failed to meet the parameter '**Good Voice Quality**' with their performance as **82.90% & 93.41%**.

- (iii) **In the month of March-14**, drive tests were conducted at **Kanpur SSA**. The drive test results suggest that **BSNL**, **Idea**, **RCOM (GSM)** and **Tata (CDMA)** need to improve their network quality in Kanpur SSA for the network parameters **Blocked Call rate**, **Call Drop rate**, **Voice Quality** and **Call Setup success rate**. **BSNL** failed to meet the benchmarks of parameters namely **Blocked call rate** and **Call drop rate** with its performance as **3.39%** and **3.16%** respectively. **Idea Cellular and RCOM (GSM)** could not meet the benchmarks of parameter **Voice Quality** with their performance as **94.30%** and **90.31 %** respectively. **Tata (CDMA)** also remained non-compliant for parameters **Blocked Call rate** and **CSSR** with its achievement level as **5.71%** and **93.65%** respectively. In case of indoor drive test, **Aircel** could not meet the benchmark for the parameter '**Good Voice Quality**' with its performance as **93.94%**.

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

*Thus, the performance of majority of the operators was not satisfactory as they failed to meet the benchmarks of the prime network parameters namely Voice Quality , CDR , Blocked Call Rate and CSSR in all the three SSAs where the drive tests were conducted during the quarter ended March 2014. The service providers need to improve their network quality with respect to these parameters immediately.*

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







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

From monthly audit findings, it was concluded that the service providers largely met the benchmarks except for one parameter namely 'Worst affected cells having > 3% TCH drop' which could not be met by Tata (GSM) and Tata (CDMA). Tata (GSM / CDMA) remained non compliant in all the 3 months of the quarter. The performance level of Tata (GSM) and Tata (CDMA) was 6.32 % and 7.47 % respectively on an average for the quarter.

With respect to the parameter 'Congestion on Individual POI', Vodafone was found to have congestion on 2 POIs in month of Jan on 9 POIs in Feb and 4 POIs in March-2014, whereas Aircel was having congestion on 2 POIs in the month of March-14.

The three days live assessment also revealed that the operators were largely meeting the benchmark of most of the parameters. However, Tata (GSM) and Tata (CDMA) failed to meet the benchmark for the parameter "worst affected Cell > 3% TCH Drop" in all the three month of the quarter. Their average performance for this parameter was 6.22% and 7.08 % respectively. Uninor, lagged behind in meeting the benchmark for the parameter 'Voice Quality' in all the three months of the quarter with its average performance as 93.05 %. Vodafone was having congestion on 3 and 2 POIs in the months of Feb and March -14 respectively.

Thus the performance of the operators was similar for monthly audit and 3days live measurements as well.

With regard to the **Customer Service Quality Parameters**, it is revealed that most of the operators were in well compliance of the parameters on Metering and Billing Credibility, Termination of Service and Time taken for refunds. However, in case of the parameter 'Response Time to Customers', Aircel failed to achieve the benchmark for the parameter 'Accessibility of call center/Customer cares' with its performance as 74.26. In case of parameter 'Calls answered by Operators (voice to voice) within 60 sec', **Aircel, Airtel, BSNL and RCOM CDMA** remained non-compliant with their performance as **88.91%, 89.58%, 68.36% and 89.18%**.

In case of parameter 'Termination/Closure of Service', **BSNL** could settle **96.94%** of cases within 7 days, whereas in respect of the parameter 'Refund of deposits within 60 days of closure', only **Idea Cellular** could not meet the benchmark with its performance of **82.73%**.

With regard to the drive test results, it was exposed that the performance of majority of the operators was not satisfactory as they failed to meet the benchmarks of the prime network parameters namely Voice Quality, CDR, Blocked Call Rate and CSSR in all the three SSAs of UP (E) where the drive tests were conducted during the quarter ended March 2014. The service providers need to improve their network quality with respect to these parameters immediately.

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





## 7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE:

TABLE: 1

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle- Jan 14 month**

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Jan-14	2921	9504	6095	6973	3211	4086	2423	9017	1819	444
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-14	7977.74	44657.58	63495	10751.78	4795	10348.31	116	19895	4045	110.41
	c) BTS Accumulated Downtime	<=2%	Jan-14	0.37%	0.63%	1.40%	0.21%	0.20%	0.34%	0.64%	0.30%	0.30%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-14	45	95	52	51	16	77	0	145	14	0
e) Worst affected BTSs due to downtime	<=2%	Jan-14	1.54%	1.00%	0.85%	0.73%	0.50%	1.88%	0.00%	1.61%	0.77%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	98.74%	99.48%	98.03%	98.77%	99.46%	97.71%	98.39%	99.52%	98.19%	98.50%
	b) SDCCH/PAGING Congestion	<=1%	Jan-14	0.65%	0.10%	0.76%	0.46%	0.10%	0.73%	0.09%	0.14%	0.00%	0.00%
c) TCH congestion	<=2%	Jan-14	0.44%	0.38%	1.22%	1.14%	0.06%	1.36%	0.44%	0.48%	0.02%	0.24%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Jan-14	0.65%	0.72%	0.37%	0.99%	0.29%	0.70%	0.85%	0.99%	0.18%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-14	2.64%	2.69%	1.62%	2.79%	0.01%	2.10%	7.00%	2.09%	0.74%	7.26%
	c) % of connections with good voice quality	>=95%	Jan-14	96.84%	98.71%	98.00%	97.02%	98.82%	93.40%	97.63%	96.39%	99.77%	99.21%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jan-14	233	765	5610	588	1	258	507	555	40	98
e) Total no. of cells (Sector) in the licensed service area		Jan-14	8797	28397	91	21030	9604	12289	7242	26567	5467	1353	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Jan-14	0	0	0	0	0	0	0	2	0	0
	Name of POI not meeting the benchmark		Jan-14	0	0	0	0	0	0	0	Aircel UPW, Uninor UPW	0	0
5	<b>Network Data</b>												
a) Equipped Capacity of		Jan-14	128731	500836	435800	211758	140000	202902	139842	549316	176000	76588	

## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE



Network in Erlang												
b) Total traffic in TCBH in erlang (Avg.)	Jan-14	97309	470187	234020	180564	126420	265158	84056	437484	72276	8157	
c) Total no. of customers served (as per VLR) on last day of the month	Jan-14	3406945	15388615	4586846	8007531	5420748	6178616	2201451	14906795	2683263	185514	

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**TABLE: 2**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle- Jan-14 month</b>													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	2893	9469	528	6971	3227	4054	2419	8980	1819	456
	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	1480.79	4562	742.62	1112	472.17	856.14	50	3273.56	438	4.79
	c) BTS Accumulated Downtime	<=2%	Live data	0.71%	0.67%	1.95%	0.22%	0.20%	0.29%	0.03%	0.51%	0.33%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	52	0	6	0	1	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.55%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.76%	99.42%	97.30%	99.12%	99.44%	97.77%	98.69%	99.69%	98.21%	98.85%
	b) SDCC/PAGING Congestion	<=1%	Live data	0.45%	0.17%	0.65%	0.39%	0.03%	0.44%	0.09%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.44%	0.79%	1.27%	0.86%	0.06%	1.27%	0.26%	0.31%	0.02%	0.09%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.64%	0.61%	0.45%	1.03%	0.27%	0.74%	0.85%	0.94%	0.21%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.46%	2.43%	0.20%	2.80%	0.00%	2.31%	7.52%	1.90%	0.85%	7.45%
	c) % of connections with good voice quality	>=95%	Live data	96.75%	98.91%	96.48%	96.94%	98.83%	93.17%	97.72%	96.56%	99.77%	98.94%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	214	689	37	588	0	284	544	504	46	102
	e) Total no. of cells (Sector) in the licensed service area		Live data	8709	28321	18285	21020	9652	12292	7236	26572	5467	1370
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**TABLE: 3**

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle- Feb 14 month**

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Feb-14	2968	9552	1870	6988	3213	4157	2374	9049	1819	444
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-14	4831.73	39061	3105.44	6787	3683	8952.47	65	18053	2460	73.88
	c) BTS Accumulated Downtime	<=2%	Feb-14	0.24%	0.61%	0.25%	0.14%	0.17%	0.32%	0.00%	0.30%	0.20%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-14	42	89	5	38	9	67	0	119	9	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-14	1.42%	0.93%	0.27%	0.54%	0.28%	1.61%	0.00%	1.32%	0.49%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	98.79%	99.45%	98.15%	98.40%	99.46%	97.24%	98.34%	99.52%	98.26%	97.85%
	b) SDCCH/PAGING Congestion	<=1%	Feb-14	0.87%	0.13%	0.59%	0.68%	0.07%	0.44%	0.10%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.38%	0.40%	1.35%	1.58%	0.06%	1.91%	0.55%	0.48%	0.02%	0.15%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Feb-14	0.59%	0.72%	0.51%	0.89%	0.28%	0.69%	0.78%	1.01%	0.18%	0.48%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-14	1.32%	2.56%	2.60%	2.68%	0.03%	1.84%	6.00%	2.22%	0.76%	7.51%
	c) % of connections with good voice quality	>=95%	Feb-14	97.16%	98.60%	97.00%	96.92%	98.82%	93.26%	97.69%	96.43%	99.76%	99.18%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-14	118	733	146	564	3	230	430	593	42	100
	e) Total no. of cells (Sector) in the licensed service area		Feb-14	8938	28611	5610	21025	9610	12489	7154	26679	5467	1334
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	9	0	0

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	Name of POI not meeting the benchmark		Feb-14	0	0	0	0	0	0	0	BSNL L2 Tax, Cellone UPW, Vodafone NLD, Cellone UPE, Reliance UPW, BSNL L1 Tax, Aircel UPW, VSNL ILD, VSNL NLD	0	0
	<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Feb-14	131366	497392	435800	213249	140000	205960	138512	487147	176000	74005
	b) Total traffic in TCBH in erlang (Avg.)		Feb-14	106886	500641	231979	196383	128409	283725	50991	465803	74822	9128
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-14	3475503	15754187	4607177	8227513	5459976	6427450	2202554	15361454	2570117	152993

**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**TABLE: 4**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle- Feb 14 month</b>													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	2928	9504	1870	6973	3210	4131	2373	9017	1819	444
	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	435	4530	2090.35	797	408	770.96	2.6	2746.36	259	8.75
	c) BTS Accumulated Downtime	<=2%	Live data	0.21%	0.66%	1.55%	0.20%	0.18%	0.26%	0.15%	0.42%	0.20%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	1	49	0	4	0	1	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.01%	0.52%	0.00%	0.06%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.76%	99.33%	98.42%	98.27%	99.44%	97.21%	98.41%	99.56%	98.88%	98.89%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.72%	0.21%	0.61%	0.51%	0.04%	0.52%	0.10%	0.11%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.33%	0.47%	0.90%	1.70%	0.06%	1.94%	0.51%	0.44%	0.01%	0.04%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.57%	0.76%	0.39%	0.89%	0.28%	0.66%	0.72%	0.95%	0.17%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.79%	2.37%	0.13%	2.69%	0.00%	1.83%	5.55%	2.09%	0.88%	6.52%
	c) % of connections with good voice quality	>=95%	Live data	96.99%	98.55%	97.32%	96.61%	98.79%	93.28%	97.74%	96.33%	99.77%	99.18%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	246	673	24	566	0	229	394	557	48	87
	e) Total no. of cells (Sector) in the licensed service area		Live data	8819	28413	18285	21017	9601	12521	7106	26647	5467	1334
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	3	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	Cellone UOW, Vodafone NLD, BSNL L2 Tax	0	0



**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**TABLE: 5**

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle- Mar 14 month**

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Mar-14	3053	9607	1870	7075	3213	4207	2380	9056	1819	364
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-14	4726.75	34798	16264	9125	1964	5990.07	29.73	16224	2634	85.44
	c) BTS Accumulated Downtime	<=2%	Mar-14	0.21%	0.49%	1.17%	0.17%	0.15%	0.19%	0.05%	0.24%	0.19%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-14	34	86	18	30	1	45	0	100	10	0
	e) Worst affected BTSs due to downtime	<=2%	Mar-14	1.11%	0.90%	0.96%	0.42%	0.03%	1.07%	0.00%	1.10%	0.55%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	98.62%	99.36%	97.70%	98.23%	99.39%	96.97%	98.16%	99.59%	98.46%	98.43%
	b) SDCCH/PAGING Congestion	<=1%	Mar-14	0.76%	0.12%	0.61%	0.85%	0.05%	0.74%	0.15%	0.20%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.53%	0.55%	0.96%	1.75%	0.07%	1.90%	0.71%	0.41%	0.02%	0.09%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Mar-14	0.60%	0.68%	1.19%	0.90%	0.31%	0.74%	0.74%	1.11%	0.20%	0.48%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-14	2.76%	2.64%	2.94%	2.75%	0.02%	2.43%	<b>5.97%</b>	2.04%	0.69%	<b>7.66%</b>
	c) % of connections with good voice quality	>=95%	Mar-14	96.82%	98.61%	98.00%	96.69%	98.80%	<b>92.69%</b>	97.71%	96.56%	99.77%	98.73%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-14	253	758	165	580	2	309	425	543	37	96
	e) Total no. of cells (Sector) in the licensed service area		Mar-14	9197	28684	5610	21103	9610	12708	7120	26700	5467	1250
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Mar-14	<b>2</b>	0	0	0	0	0	0	<b>4</b>	0	0
	Name of POI not meeting the benchmark		Mar-14	BSNL L1 NLD, BSNL L2 Jaunpur	0	0	0	0	0	0	BSNL L2 Tax, Cellone UPW, Uninor UPE, Reliance NLD	0	0
5	<b>Network Data</b>												

## AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE



a) Equipped Capacity of Network in Erlang	Mar-14	136057	503464	451800	211631	140000	209474	138040	561107	176000	69233
b) Total traffic in TCBH in erlang (Avg.)	Mar-14	111902	522109	241126	234891	130612	297758	52468	496128	71922	8904
c) Total no. of customers served (as per VLR) on last day of the month	Mar-14	3576455	15976682	4576362	8369683	5518307	6570009	2244830	13653284	2593942	141462

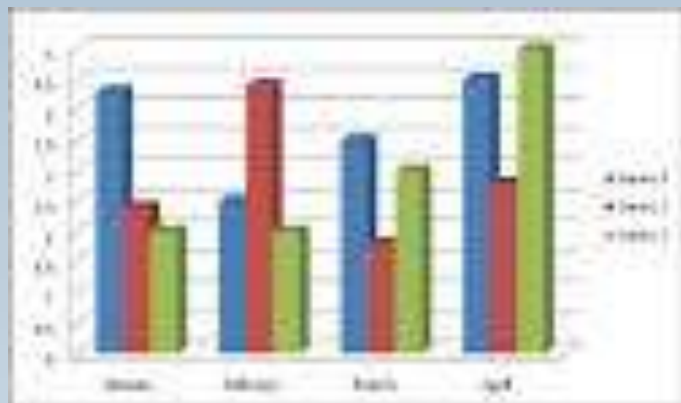
**AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (EAST) CIRCLE**



**TABLE: 6**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle- Mar 14 month</b>													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators									
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Live data	3004	9552	1870	6991	3213	4197	2375	9049	1809	444
	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	479	3032	2138.9	1168	148	509.28	7.24	2296.08	236	3.94
	c) BTS Accumulated Downtime	<=2%	Live data	0.22%	0.44%	1.59%	0.23%	0.06%	0.17%	0.42%	0.35%	0.18%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	34	0	4	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.36%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.38%	99.42%	98.02%	97.97%	99.43%	96.63%	98.15%	99.60%	98.73%	98.55%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.71%	0.11%	0.76%	0.71%	0.03%	0.73%	0.14%	0.19%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.37%	0.45%	1.26%	1.89%	0.06%	2.17%	0.72%	0.40%	0.01%	0.21%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.56%	0.73%	0.37%	0.91%	0.30%	0.77%	0.75%	1.15%	0.14%	0.53%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.54%	2.26%	0.42%	2.69%	0.00%	2.60%	5.59%	2.04%	0.78%	7.27%
	c) % of connections with good voice quality	>=95%	Live data	97.02%	98.54%	97.52%	96.66%	98.74%	92.70%	97.62%	96.47%	99.77%	99.23%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	230	647	24	566	0	331	398	545	42	97
e) Total no. of cells (Sector) in the licensed service area		Live data	9044	28614	5610	21017	9610	12714	7114	26679	5437	1334	
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	2	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	Cellone UPW, Uninor UPE	0	0

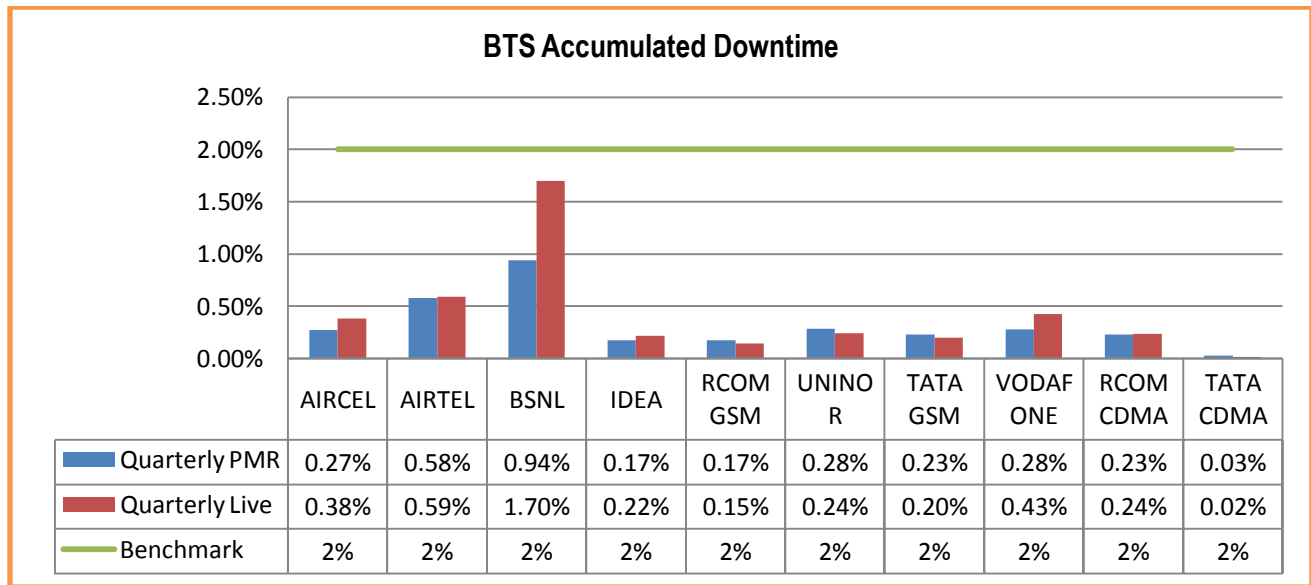
## 8. GRAPHICAL REPRESENTATION





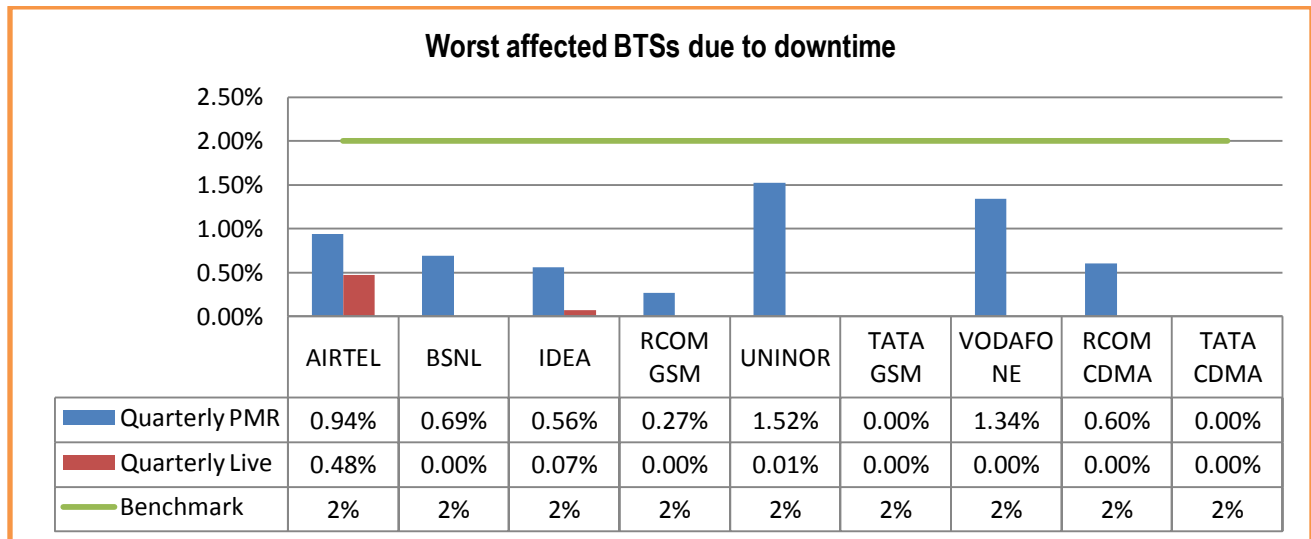
**8. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:**

**1) BTS ACCUMULATED DOWNTIMES:**



All operators are meeting the benchmarks.

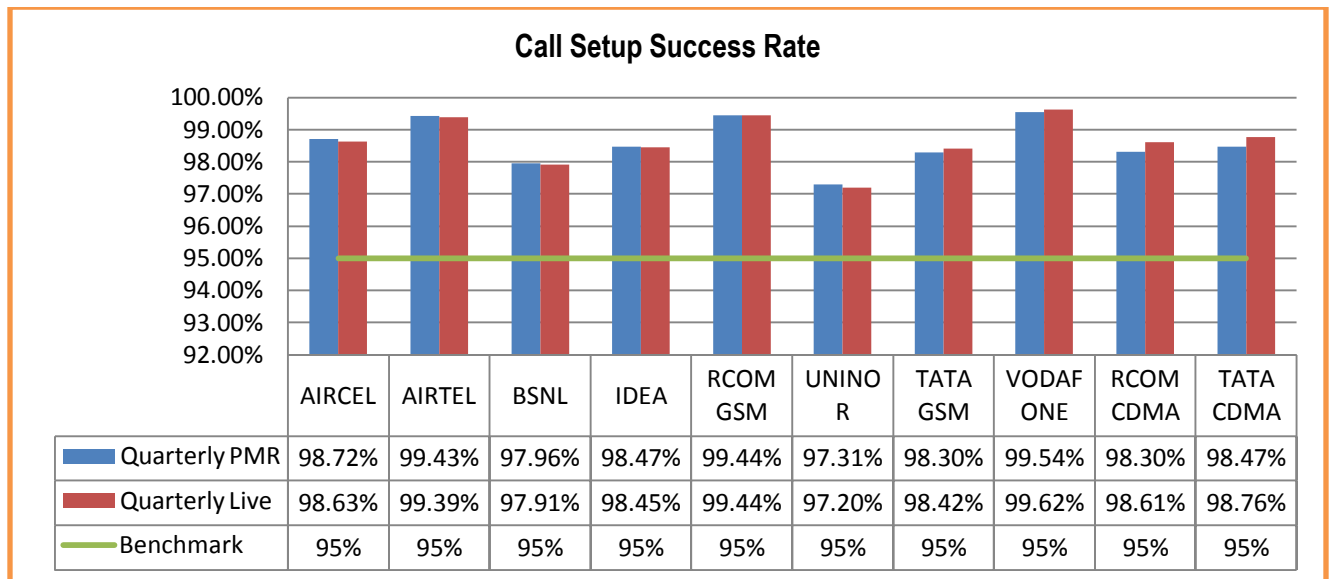
**2) WORST AFFECTED BTSs DUE TO DOWNTIME:**



All operators are meeting the benchmarks.

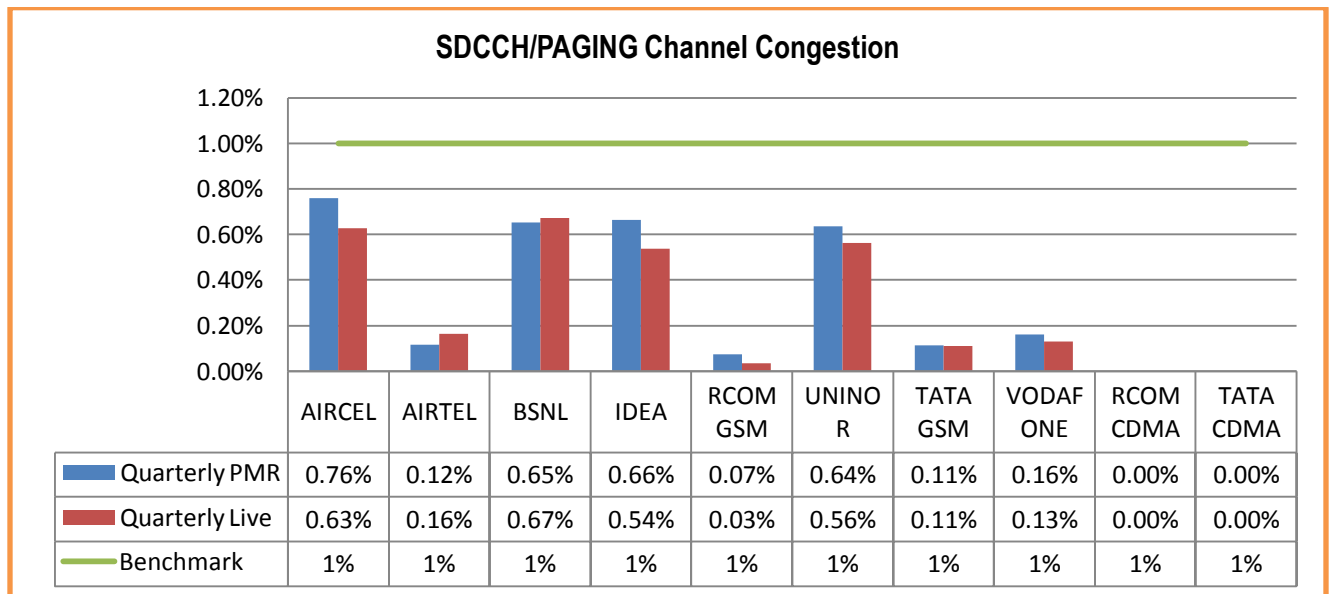


3) CALL SETUP SUCCESS RATE:



All operators are meeting the benchmarks.

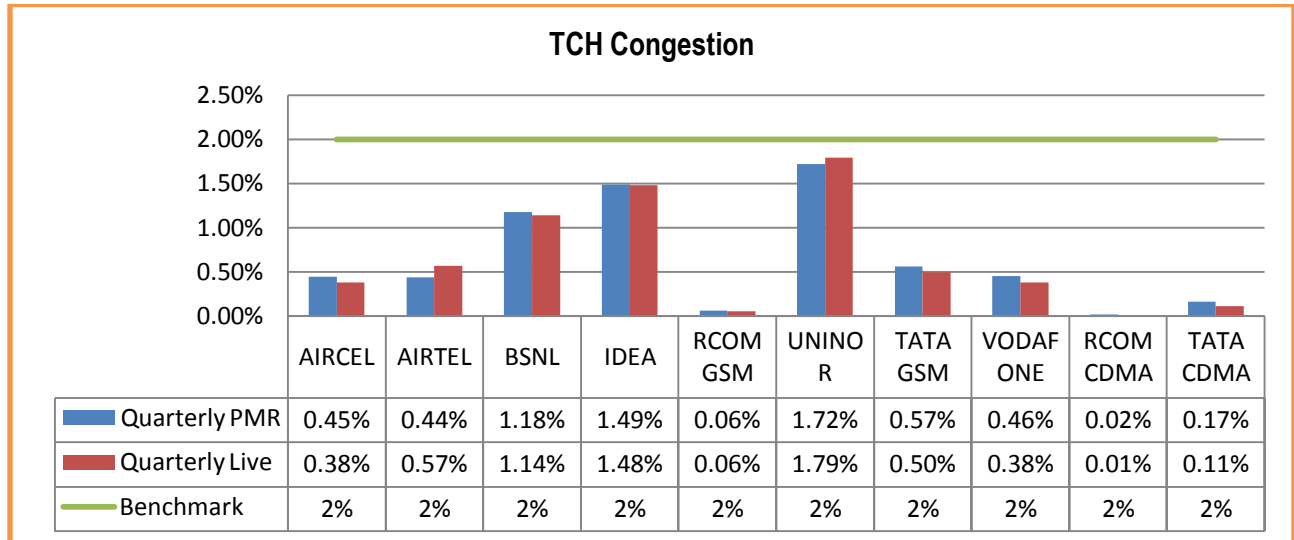
4) SDCCH/PAGING CHANNEL CONGESTION:



All operators are meeting the benchmarks.

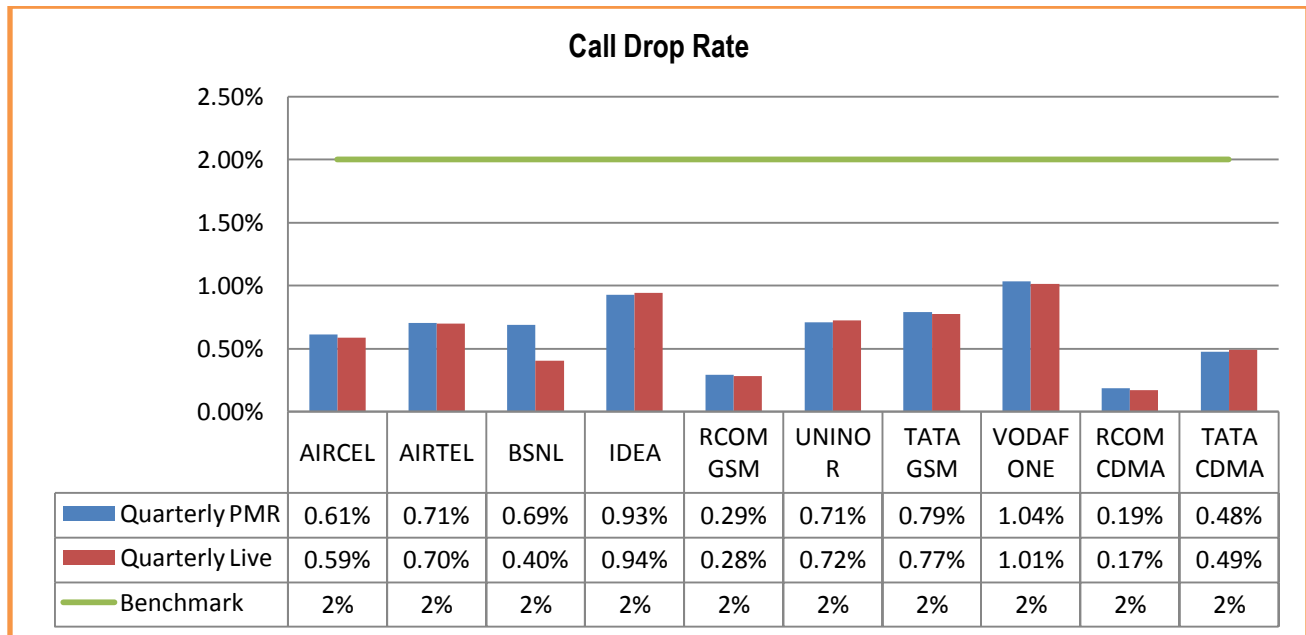


5) TCH CONGESTION:



All operators are meeting the benchmarks.

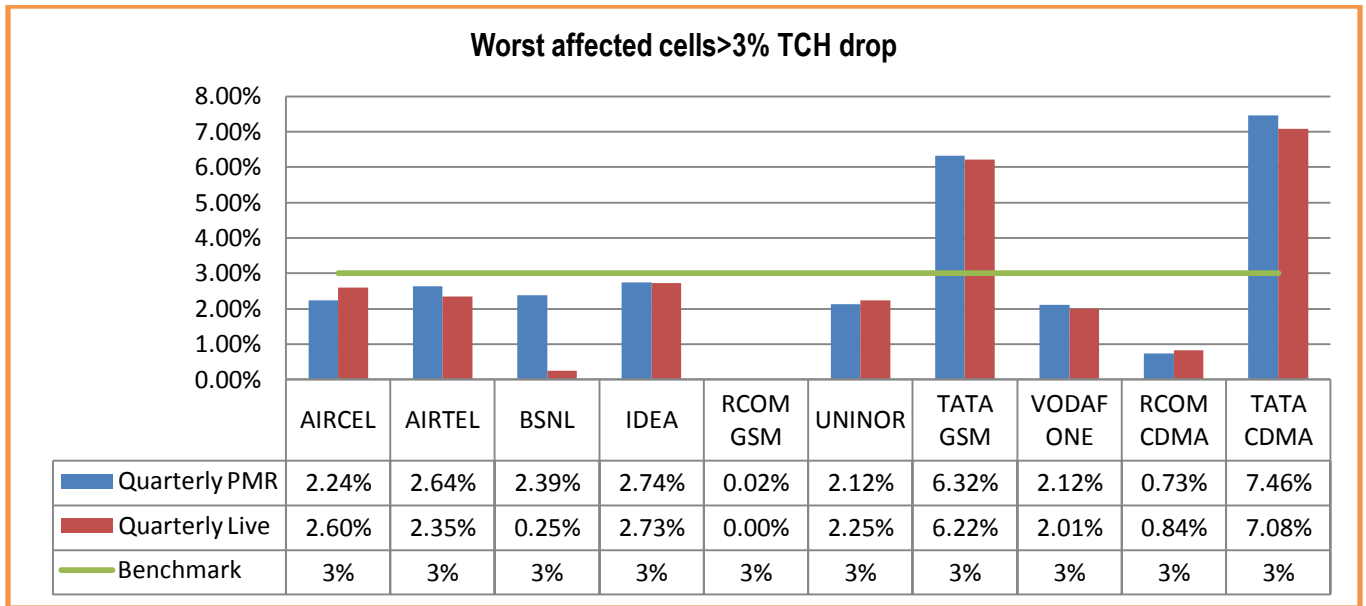
6) CALL DROP RATE:



All operators are meeting the benchmarks.

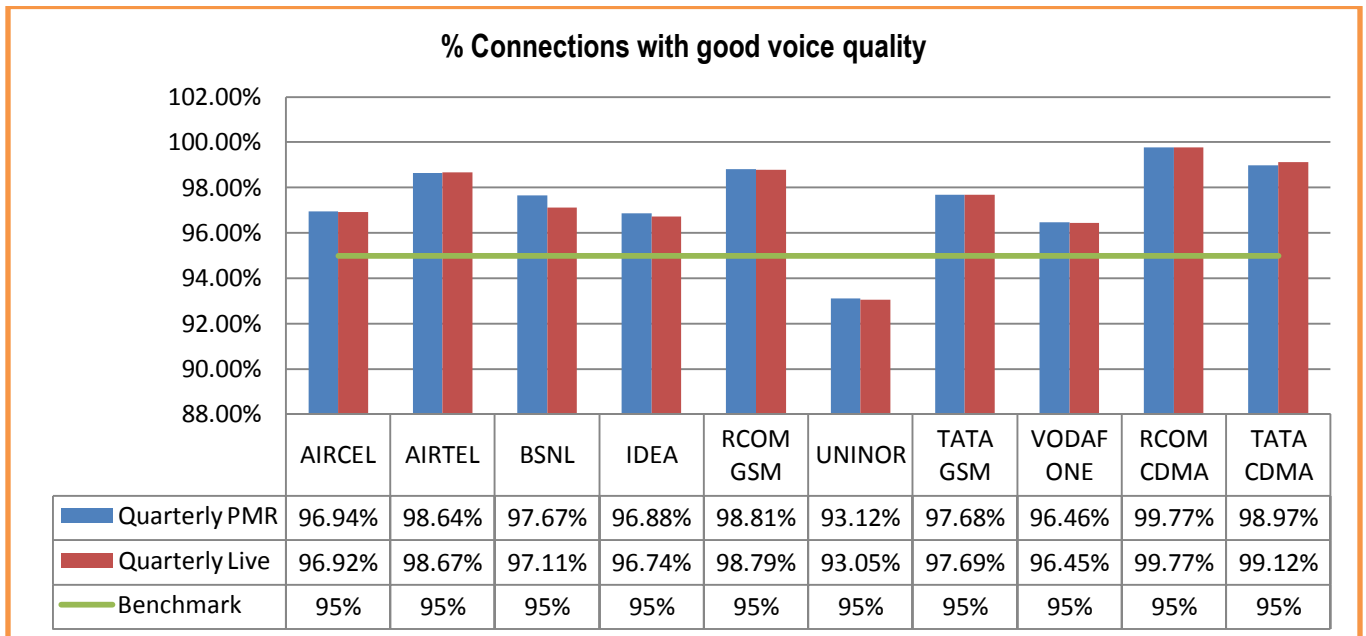


7) WORST AFFECTED CELLS>3% TCH DROP:



All operators are meeting the benchmarks except Tata (GSM & CDMA).

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:

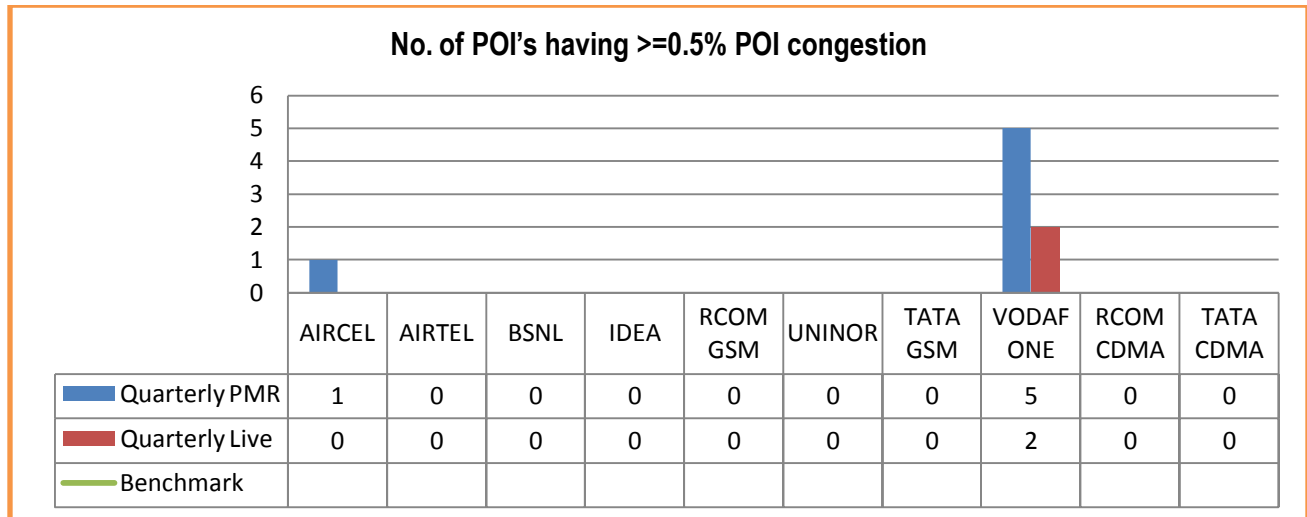


All operators are meeting the benchmarks except Uninor.





9) NO. OF POI'S HAVING  $\geq 0.5\%$  POI CONGESTION:



All operators are meeting the benchmarks except Aircel and Vodafone.