



**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**  
**(APRIL 2014 – JUNE 2014)**

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## **PREFACE**

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

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

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **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**





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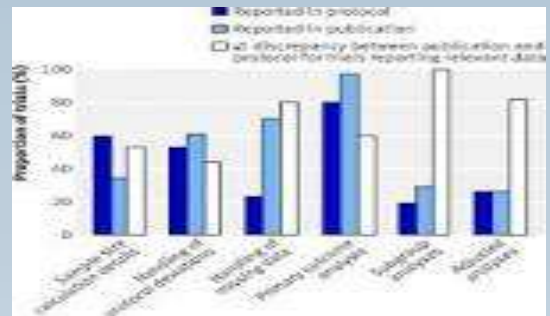
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for Punjab, Rajasthan & Gujarat circles during the quarter April – June 2014.**

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

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

### 3. SAMPLE SIZE



### 3. SAMPLE SIZE

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

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

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location/Address
		April-14	May-14	June-14	
<b>GSM Operators</b>					
1	AIRCEL	2 to 4 April-14	2 to 3, 6 May-14	4 to 6 June-14	3rd floor,Ratan Square,Hajratganj,Lucknow
2	AIRTEL	2 to 4 April-14	7 to 9 May-14	4 to 6 June-14	TCG 7/7,vibhuti khand,Gomti Nagar,Lucknow
3	BSNL	10 to 12 April-14	8 to 10 May-14	8 to 10 June-14	BSNL,Mahanager , Lucknow
4	IDEA	8 to 10 April-14	6 to 8 May-14	8 to 10 June-14	Idea Cellular Ltd., Fortuna Towers, 10 Rana Pratap Road, Lucknow-226001
5	RCOM GSM	7 to 9 April-14	7 to 9 May-14	5 to 6, 8 June-14	House No. 12, C\O BTC House Eldeco Greens, Gomti Nagar, Lucknow-226010
6	VODAFONE	7 to 9 April-14	7 to 9 May-14	11 to 13 June-14	Shalimar Titanium , Vibhuti Khand, Gomti Nagar , Lucknow
7	UNINOR	20 to 21, 24 April-14	15 to 16 , 19 May-14	9 to 11 June-14	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
8	TATA GSM	13 to 15 April-14	9 to 11 May-14	7 to 9 June-14	Tata Teleservices Ltd., Prem Plaza Building 2, RF Bahadurji Marg, Lucknow
<b>CDMA Operators</b>					
9	RCOM CDMA	7 to 9 April-14	7 to 9 May-14	5 to 6, 8 June-14	House No. 12, C\O BTC House Eldeco Greens, Gomti Nagar, Lucknow-226010
10	TATA CDMA	13 to 15 April-14	9 to 11 May-14	7 to 9 June-14	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 June 2014.

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

### 3.2 SAMPLING FOR BASIC (WIRELIN) 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 (wire line) service was not required to be done for UP (E) Circle in the quarter ended June- 2014.**

### 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle. **However, the QoS audit for Broadband service was not required to be done for UP (E) Circle in the quarter ended June-2014.**

## **4. EXECUTIVE SUMMARY**



## 4. EXECUTIVE SUMMARY

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

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

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

(i) From monthly audit findings, it was concluded that the service providers largely met the benchmarks except **Aircel, BSNL, Uninor, Tata (GSM) and Tata (CDMA)** failed to meet the benchmarks of one or the other parameter. **Aircel** could not meet the benchmark of the parameters **‘Worst affected BTS due to down Time’, SDCCH Congestion and Worst affected cells** with its performance as **2.49%, 1.31% and 3.59%** respectively. **BSNL** and **Uninor** could not meet the benchmark of **Voice Quality** with their achieved level as **94.83%** and **93.21%** respectively. The parameter **‘Worst affected cells having > 3% TCH drop’** remained non-complied by **Tata (GSM)** and **Tata (CDMA)** achieving performance as **6.46%** and **7.20% respectively**.

(ii) From three days live assessment, it was found that the operators were meeting the benchmark of most of the parameters. However, **Aircel, 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 **3.50%, 6.63%** and **7.54%** 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 **93.33%**. **Idea** and **Aircel** could not meet the benchmark for the parameter **‘SDCCH Channel congestion’** and their average performance for this parameter was **1.06%** and **1.11%** respectively

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

(iii) 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. Only **Aircel** failed to achieve the benchmark for the parameter '**Accessibility of call center/Customer care**' with its performance as **78.06%**.

(iv) With regard to the **Drive Test** results, it was exposed that the performance of some of the operators namely **Aircel, Airtel, BSNL, RCOM (GSM), RCOM (CDMA), Vodafone, Uninor** and **Idea** was not satisfactory as they failed to meet the benchmarks of prime network parameters namely **Voice Quality, CDR, CSSR** and **Blocked Call Rate** in the SSAs where the drive tests were conducted during the quarter ended June 2014. The service providers need to improve their network quality with respect to these parameters immediately.

## **5. PMR AUDIT REPORT**





## 5. PMR AUDIT REPORTS:

### 5.1 MONTHLY PMR:

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

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

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

#### 5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRCEL	4	25	3186	ZTE	ZTE
2	AIRTEL	45	108	9645	Ericsson	Ericsson
3	BSNL	25	96	6095	Ericsson & ZTE	Ericsson, NSN & ZTE
4	IDEA	10	41	7274	NSN	NSN
5	RCOM GSM	4	19	2105	Huawei	Huawei
6	UNINOR	12	31	4286	Ericsson	Ericsson
7	TATA GSM	4	22	2361	NSN	NSN
8	VODAFONE	18	140	8806	NSN	NSN
<b>CDMA Operators</b>						
9	RCOM CDMA	9	11	1143	Huawei & Lucent	Huawei & Lucent
10	TATA CDMA	4	6	321	Huawei & Ericsson	Huawei, ZTE & Motorola



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

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- APRIL-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%	Apr-14	0.29%	0.47%	1.64%	0.23%	0.22%	0.52%	0.01%	0.23%	0.24%	0.09%
	b) Worst affected BTSs due to downtime	<=2%	Apr-14	1.61%	0.87%	1.44%	0.74%	0.47%	1.93%	0.00%	1.05%	0.94%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	98.55%	99.50%	98.20%	98.23%	99.39%	97.28%	98.24%	99.74%	97.47%	98.66%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	1.00%	0.10%	0.62%	0.84%	0.08%	0.88%	0.18%	0.19%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.73%	0.36%	1.47%	1.76%	0.08%	1.69%	0.64%	0.26%	0.05%	0.09%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Apr-14	0.67%	0.54%	0.50%	0.81%	0.26%	0.72%	0.72%	0.88%	0.33%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	3.23%	2.69%	2.10%	2.76%	0.01%	2.64%	5.98%	2.44%	1.10%	6.64%
	c) Connections with good voice quality	>=95%	Apr-14	96.54%	98.91%	92.50%	97.38%	98.82%	93.21%	97.80%	97.20%	99.82%	99.24%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Apr-14	0	0	0	0	0	0	0	0	0	0

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

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- MAY-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>													
1	<b>Network Availability</b>												
	a) BTS Accumulated Downtime	<=2%	May-14	0.47%	0.49%	1.43%	0.34%	0.24%	0.98%	0.10%	0.17%	0.31%	0.16%
	b) Worst affected BTSs due to downtime	<=2%	May-14	2.83%	0.90%	1.02%	1.24%	0.56%	1.83%	0.00%	0.89%	0.66%	0.82%
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	May-14	98.63%	99.49%	98.21%	98.07%	99.29%	97.31%	97.43%	99.64%	96.90%	98.09%
	b) SDCCH/PAGING Channel congestion	<=1%	May-14	1.50%	0.12%	0.61%	0.98%	0.11%	0.97%	0.33%	0.29%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	1.07%	0.36%	1.48%	1.91%	0.09%	1.65%	1.10%	0.35%	0.08%	0.27%
3	<b>Connection maintenance (Retainability)</b>												
	a) CDR (Call Drop Rate)	<=2%	May-14	0.73%	0.54%	0.49%	0.83%	0.35%	0.70%	0.92%	0.90%	0.41%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	May-14	3.44%	2.54%	1.64%	2.70%	0.01%	2.35%	6.60%	2.27%	1.66%	7.81%
	c) Connections with good voice quality	>=95%	May-14	96.55%	98.84%	96.00%	97.41%	98.66%	93.31%	97.58%	97.15%	99.83%	99.13%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	May-14	1	0	0	0	0	0	0	2	0	0



5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- JUNE-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%	Jun-14	0.52%	0.55%	1.50%	0.39%	0.34%	0.82%	0.25%	0.12%	0.54%	0.11%
	b) Worst affected BTSs due to downtime	<=2%	Jun-14	3.04%	0.85%	1.71%	1.40%	0.05%	1.87%	0.00%	0.48%	1.40%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	98.50%	99.48%	95.50%	98.21%	99.33%	97.57%	97.08%	99.73%	96.01%	97.91%
	b) SDCCH/PAGING Channel congestion	<=1%	Jun-14	1.44%	0.11%	0.87%	0.97%	0.12%	0.80%	0.43%	0.30%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	1.27%	0.37%	1.90%	1.82%	0.08%	1.53%	1.31%	0.27%	0.10%	0.48%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Jun-14	0.79%	0.61%	1.97%	0.89%	0.36%	0.70%	0.95%	0.99%	0.46%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-14	4.11%	2.50%	2.87%	2.82%	0.02%	2.15%	6.80%	2.59%	2.22%	7.14%
	c) Connections with good voice quality	>=95%	Jun-14	96.35%	98.75%	96.00%	97.25%	98.81%	93.10%	97.37%	97.04%	99.83%	99.18%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jun-14	0	0	0	0	0	0	0	0	0	0



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

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-JUNE-14) 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	0.43%	0.50%	1.52%	0.32%	0.27%	0.77%	0.12%	0.17%	0.36%	0.12%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	2.49%	0.87%	1.39%	1.13%	0.36%	1.88%	0.00%	0.81%	1.00%	0.27%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.56%	99.49%	97.30%	98.17%	99.34%	97.39%	97.58%	99.70%	96.79%	98.22%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	1.31%	0.11%	0.70%	0.93%	0.10%	0.88%	0.31%	0.26%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.02%	0.36%	1.62%	1.83%	0.08%	1.62%	1.02%	0.29%	0.08%	0.28%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.73%	0.56%	0.99%	0.84%	0.32%	0.71%	0.86%	0.92%	0.40%	0.51%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.59%	2.60%	2.20%	2.76%	0.01%	2.38%	6.46%	2.43%	1.66%	7.20%
	c) Connections with good voice quality	>=95%	Quarterly	96.48%	98.83%	94.83%	97.35%	98.76%	93.21%	97.58%	97.13%	99.83%	99.18%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0	0

### 5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

The audit of network related parameters for cellular mobile service providers was conducted at their respective MSCs in the 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' **except Aircel. Aircel** could not meet the benchmark for the parameter '**worst affected BTSs due to down time**'. The performance level of **Aircel** was **2.49%** on an average for 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 **except Aircel. Aircel** could not meet the benchmark for the

parameter 'SDCCH / Paging Channel Congestion'. The performance level of **Aircel** was **1.31%** on an average for the quarter.

- **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 0.32%) was for RCOM GSM 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 **Aircel, Tata (GSM)** and **CDMA** which remained non compliant in all the 3 months of the quarter. The performance level of **Aircel, Tata (GSM)** and **Tata (CDMA)** was **3.59 %**, **6.46%** and **7.20%** 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 **BSNL and Uninor**. **BSNL** and **Uninor** failed to meet the benchmark with their average performance of **94.83%** and **93.21%** respectively.

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





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

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

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE- APRIL-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		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.25%	0.45%	1.67%	0.27%	0.15%	0.37%	0.00%	0.40%	0.17%	0.10%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.07%	0.33%	0.00%	0.06%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.14%	99.53%	98.59%	98.25%	99.47%	96.73%	98.37%	99.76%	97.63%	98.84%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.91%	0.09%	0.66%	0.47%	0.03%	0.97%	0.52%	0.15%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.49%	0.39%	1.46%	1.73%	0.08%	1.79%	0.73%	0.24%	0.05%	0.06%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.68%	0.55%	0.36%	0.76%	0.22%	0.71%	0.68%	0.89%	0.29%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	3.31%	2.17%	0.42%	2.76%	0.01%	2.65%	5.97%	2.09%	2.01%	6.72%
	c) Connections with good voice quality	>=95%	Live data	96.58%	98.86%	96.99%	97.47%	98.81%	93.30%	97.83%	97.18%	99.80%	98.77%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0



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

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE – MAY -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	0.48%	0.37%	1.94%	0.00%	0.32%	0.60%	0.16%	0.32%	0.35%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.06%	0.37%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.64%	99.44%	98.10%	98.06%	99.26%	97.20%	97.62%	99.76%	98.19%	97.75%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	1.24%	0.13%	0.66%	1.38%	0.34%	0.92%	0.23%	0.23%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.08%	0.40%	0.55%	1.92%	0.09%	1.83%	1.00%	0.24%	0.03%	0.37%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.70%	0.57%	1.39%	0.94%	0.35%	0.64%	0.97%	0.94%	0.35%	0.66%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	3.35%	2.06%	0.08%	2.48%	0.01%	2.27%	6.80%	2.14%	2.49%	8.18%
	c) Connections with good voice quality	>=95%	Live data	96.59%	98.83%	96.76%	96.88%	97.95%	93.55%	97.48%	97.03%	99.82%	98.88%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	1	0	0



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

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE- JUNE-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	0.49%	0.57%	1.99%	0.38%	0.32%	1.07%	0.16%	0.44%	0.45%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.03%	0.34%	0.00%	0.10%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.57%	99.50%	99.10%	97.89%	99.53%	97.78%	97.30%	99.80%	95.79%	98.49%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	1.17%	0.10%	0.65%	1.32%	0.31%	0.81%	0.33%	0.22%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.10%	0.36%	1.73%	2.10%	0.05%	1.33%	1.10%	0.20%	0.09%	0.08%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.75%	0.59%	0.35%	0.88%	0.28%	0.68%	1.03%	0.85%	0.48%	0.34%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	3.84%	2.08%	0.14%	2.94%	0.01%	2.10%	7.12%	2.34%	2.15%	7.72%
	c) Connections with good voice quality	>=95%	Live data	96.26%	98.77%	97.11%	97.42%	98.93%	93.14%	97.44%	97.33%	99.82%	99.15%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	1	0	0	0	0	0	0	0	0	0

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

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE- JUNE -14) – 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	0.41%	0.46%	1.87%	0.22%	0.26%	0.68%	0.11%	0.39%	0.32%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.05%	0.35%	0.00%	0.05%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.45%	99.49%	98.60%	98.07%	99.42%	97.24%	97.76%	99.77%	97.20%	98.36%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	1.11%	0.11%	0.66%	1.06%	0.23%	0.90%	0.36%	0.20%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.89%	0.38%	1.25%	1.92%	0.07%	1.65%	0.94%	0.23%	0.06%	0.17%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.71%	0.57%	0.70%	0.86%	0.28%	0.68%	0.89%	0.89%	0.37%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.50%	2.10%	0.21%	2.73%	0.01%	2.34%	6.63%	2.19%	2.22%	7.54%
	c) Connections with good voice quality	>=95%	Quarterly	96.48%	98.82%	96.95%	97.26%	98.56%	93.33%	97.58%	97.18%	99.81%	98.93%
4	No. of POI having >=0.5% congestion	<0.5%	Quarterly	0	0	0	0	0	0	0	0	0	0

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

From three days live assessment, it was found that the operators were meeting the benchmark of most of the parameters. However, **Aircel, 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 **3.50%, 6.63%** and **7.54%** 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 **93.33%**. **Idea and Aircel** could not meet the benchmark for the parameter ‘**SDCCH/PAGING Channel congestion**’ and their average performance for this parameter was **1.06%** and **1.11%** respectively

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

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle- April 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		Apr-14	3110	9619	1870	7123	3213	4254	2383	9076	1811	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		Apr-14	6485	32888	22134	11597	5075	15861	209	15227	3144	223
	c) BTS Accumulated Downtime	<=2%	Apr-14	0.29%	0.47%	1.64%	0.23%	0.22%	0.52%	0.01%	0.23%	0.24%	0.09%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-14	50	84	27	53	15	82	0	95	17	0
	e) Worst affected BTSs due to downtime	<=2%	Apr-14	1.61%	0.87%	1.44%	0.74%	0.47%	1.93%	0.00%	1.05%	0.94%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	98.55%	99.50%	98.20%	98.23%	99.39%	97.28%	98.24%	99.74%	97.47%	98.66%
	b) SDCCCH/PAGING Congestion	<=1%	Apr-14	1.00%	0.10%	0.62%	0.84%	0.08%	0.88%	0.18%	0.19%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.73%	0.36%	1.47%	1.76%	0.08%	1.69%	0.64%	0.26%	0.05%	0.09%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Apr-14	0.67%	0.54%	0.50%	0.81%	0.26%	0.72%	0.72%	0.88%	0.33%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-14	3.23%	2.69%	2.10%	2.76%	0.01%	2.64%	5.98%	2.44%	1.10%	6.64%
	c) % of connections with good voice quality	>=95%	Apr-14	96.54%	98.91%	92.50%	97.38%	98.82%	93.21%	97.80%	97.20%	99.82%	99.24%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Apr-14	303	774	118	591	1	338	426	653	60	73
	e) Total no. of cells (Sector) in the licensed service area		Apr-14	9374	28753	5610	21430	9610	12816	7131	26760	5440	1096
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Apr-14	0	0	0	0	0	0	0	0	0	0



Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle- April 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	
5	<b>Network Data</b>												
	a) Equipped Capacity of Network in Erlang		Apr-14	138998	514426	451800	216154	140000	214893	138228	561579	176000	69233
	b) Total traffic in TCBH in erlang (Avg.)		Apr-14	114852	531054	238287	211719	131970	299196	52869	493964	70463	8904
	c) Total no. of customers served (as per VLR) on last day of the month		Apr-14	3586757	16401386	4624988	8671744	5552997	6752537	2333840	16114274	2586697	141462



TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle- April-14 month													
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>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Live data	3066	9607	1870	7089	3213	4238	2380	9056	1811	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		Live data	555	3097	2243	1397	345	1142	6	2602	227	27
	c) BTS Accumulated Downtime	<=2%	Live data	0.25%	0.45%	1.67%	0.27%	0.15%	0.37%	0.00%	0.40%	0.17%	0.10%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	2	32	0	4	0	2	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.07%	0.33%	0.00%	0.06%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.14%	99.53%	98.59%	98.25%	99.47%	96.73%	98.37%	99.76%	97.63%	98.84%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.91%	0.09%	0.66%	0.47%	0.03%	0.97%	0.52%	0.15%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.49%	0.39%	1.46%	1.73%	0.08%	1.79%	0.73%	0.24%	0.05%	0.06%
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.68%	0.55%	0.36%	0.76%	0.22%	0.71%	0.68%	0.89%	0.29%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	3.31%	2.17%	0.42%	2.76%	0.01%	2.65%	5.97%	2.09%	2.01%	6.72%
	c) % of connections with good voice quality	>=95%	Live data	96.58%	98.86%	96.99%	97.47%	98.81%	93.30%	97.83%	97.18%	99.80%	98.77%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	306	622	23	590	1	340	426	557	109	74
	e) Total no. of cells (Sector) in the licensed service area		Live data	9235	28693	5610	21362	9610	12834	7132	26679	5440	1096
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle- May 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		May-14	3141	9639	1870	7198	3019	4269	2384	9056	1810	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		May-14	10977	35086	19859	18409	5362	31128	1728	11173	4180	427
	c) BTS Accumulated Downtime	<=2%	May-14	0.47%	0.49%	1.43%	0.34%	0.24%	0.98%	0.10%	0.17%	0.31%	0.16%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-14	89	87	19	89	17	78	0	81	12	3
	e) Worst affected BTSs due to downtime	<=2%	May-14	2.83%	0.90%	1.02%	1.24%	0.56%	1.83%	0.00%	0.89%	0.66%	0.82%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	May-14	98.63%	99.49%	98.21%	98.07%	99.29%	97.31%	97.43%	99.64%	96.90%	98.09%
	b) SDCCH/PAGING Congestion	<=1%	May-14	1.50%	0.12%	0.61%	0.98%	0.11%	0.97%	0.33%	0.29%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	1.07%	0.36%	1.48%	1.91%	0.09%	1.65%	1.10%	0.35%	0.08%	0.27%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	May-14	0.73%	0.54%	0.49%	0.83%	0.35%	0.70%	0.92%	0.90%	0.41%	0.49%
	b) Worst affected cells>3% TCH drop	<=3%	May-14	3.44%	2.54%	1.64%	2.70%	0.01%	2.35%	6.60%	2.27%	1.66%	7.81%
	c) % of connections with good voice quality	>=95%	May-14	96.55%	98.84%	96.00%	97.41%	98.66%	93.31%	97.58%	97.15%	99.83%	99.13%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		May-14	326	732	92	582	1	305	471	611	90	86
	e) Total no. of cells (Sector) in the licensed service area		May-14	9465	28782	5610	21556	9026	12950	7141	26900	5437	1096
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		May-14	1	0	0	0	0	0	0	2	0	0
	Name of POI not meeting the benchmark		May-14	BSNL L1 NLD	0	0	0	0	0	0	Uninor UPE, TATA ICR	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		May-14	140322	514261	451800	218568	140000	304692	138048	561733	176000	60557
	b) Total traffic in TCBH in erlang (Avg.)		May-14	115020	522375	306422	219642	118820	220451	59451	499655	65117	6206
	c) Total no. of customers served (as per VLR) on last day of the month		May-14	3676777	16731268	4621435	9066774	5212805	6871117	2391595	16566328	2549699	137490



TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle- May 14 month													
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>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	3114	9619	1870	7129	3213	4276	2385	9076	1811	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		Live data	1085	2530	2616	1308	738	1840	280	2108	460	18
	c) BTS Accumulated Downtime	<=2%	Live data	0.48%	0.37%	1.94%	0.25%	0.32%	0.60%	0.16%	0.32%	0.35%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	2	36	0	6	0	4	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.06%	0.37%	0.00%	0.08%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.64%	99.44%	98.10%	98.06%	99.26%	97.20%	97.62%	99.76%	98.19%	97.75%
	b) SDCCH/PAGING Congestion	<=1%	Live data	1.24%	0.13%	0.66%	1.38%	0.34%	0.92%	0.23%	0.23%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.08%	0.40%	0.55%	1.92%	0.09%	1.83%	1.00%	0.24%	0.03%	0.37%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.70%	0.57%	1.39%	0.94%	0.35%	0.64%	0.97%	0.94%	0.35%	0.66%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	3.35%	2.06%	0.08%	2.48%	0.01%	2.27%	6.80%	2.14%	2.49%	8.18%
	c) % of connections with good voice quality	>=95%	Live data	96.59%	98.83%	96.76%	96.88%	97.95%	93.55%	97.48%	97.03%	99.82%	98.88%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	314	593	5	534	1	294	486	572	136	90
	e) Total no. of cells (Sector) in the licensed service area		Live data	9386	28738	5610	21496	9610	12957	7143	26760	5440	1096
<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	1	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	Uninor	0	0



TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle - June 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		Jun-14	3186	9645	6095	7274	2105	4286	2361	8806	1143	321
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jun-14	11849	38182	65824	20512	1550	25322	4224	7550	4304	247
	c) BTS Accumulated Downtime	<=2%	Jun-14	0.52%	0.55%	1.50%	0.39%	0.34%	0.82%	0.25%	0.12%	0.54%	0.11%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-14	97	82	104	102	1	80	0	42	16	0
	e) Worst affected BTSs due to downtime	<=2%	Jun-14	3.04%	0.85%	1.71%	1.40%	0.05%	1.87%	0.00%	0.48%	1.40%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	98.50%	99.48%	95.50%	98.21%	99.33%	97.57%	97.08%	99.73%	96.01%	97.91%
	b) SDCCH/PAGING Congestion	<=1%	Jun-14	1.44%	0.11%	0.87%	0.97%	0.12%	0.80%	0.43%	0.30%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	1.27%	0.37%	1.90%	1.82%	0.08%	1.53%	1.31%	0.27%	0.10%	0.48%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Jun-14	0.79%	0.61%	1.97%	0.89%	0.36%	0.70%	0.95%	0.99%	0.46%	0.58%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-14	4.11%	2.50%	2.87%	2.82%	0.02%	2.15%	6.80%	2.59%	2.22%	7.14%
	c) % of connections with good voice quality	>=95%	Jun-14	96.35%	98.75%	96.00%	97.25%	98.81%	93.10%	97.37%	97.04%	99.83%	99.18%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-14	394	721	161	614	1	278	480	678	97	69
	e) Total no. of cells (Sector) in the licensed service area		Jun-14	9603	28815	5610	21749	7513	12948	7067	26189	4371	967
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Jun-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jun-14	0	0	0	0	0	0	0	0	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		Jun-14	142376	513171	451800	220149	140000	225549	137610	561784	176000	51455
	b) Total traffic in TCBH in erlang (Avg.)		Jun-14	117449	519987	233832	214837	113356	302404	63836	491872	65459	6142
	c) Total no. of customers served (as per VLR) on last day of the month		Jun-14	3558900	15595672	4605359	8580002	5121449	6824763	2400779	13890725	2561864	125577

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle- June 14 month													
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>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	3154	9639	1870	7207	3019	4278	2359	9120	1810	321
	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	1106	3944	2673	1988	232	3282	279	2867	394	14
	c) BTS Accumulated Downtime	<=2%	Live data	0.49%	0.57%	1.99%	0.38%	0.32%	1.07%	0.16%	0.44%	0.45%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	1	33	0	7	0	7	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.03%	0.34%	0.00%	0.10%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.57%	99.50%	99.10%	97.89%	99.53%	97.78%	97.30%	99.80%	95.79%	98.49%
	b) SDCCH/PAGING Congestion	<=1%	Live data	1.17%	0.10%	0.65%	1.32%	0.31%	0.81%	0.33%	0.22%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.10%	0.36%	1.73%	2.10%	0.05%	1.33%	1.10%	0.20%	0.09%	0.08%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.75%	0.59%	0.35%	0.88%	0.28%	0.68%	1.03%	0.85%	0.48%	0.34%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	3.84%	2.08%	0.14%	2.94%	0.01%	2.10%	7.12%	2.34%	2.15%	7.72%
	c) % of connections with good voice quality	>=95%	Live data	96.26%	98.77%	97.11%	97.42%	98.93%	93.14%	97.44%	97.33%	99.82%	99.15%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	365	597	8	638	1	273	503	630	117	75
	e) Total no. of cells (Sector) in the licensed service area		Live data	9507	28704	5610	21708	9026	12955	7065	26900	5437	967
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Live data	1	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	BSNL L1 NLD	0	0	0	0	0	0	0	0	0

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



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

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

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

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	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	1965	125128	86787	61803	23551	32202	NA	372718	91156	16093
	B) No. of bills disputed including billing complaints during the quarter		UPE	0	10	47	66	19	0	NA	189	86	0
	C)% of billing complaints during the quarter	<= 0.1%	UPE	0.00%	0.01%	0.05%	0.11%	0.08%	0.00%	NA	0.05%	0.09%	0.00%
<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	5402074	17043677	10152333	8181619	5317716	4057297	8911737	15754583	2487213	364778
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		UPE	2	466	713	2471	5315	0	238	3556	840	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	UPE	0.00%	0.00%	0.01%	0.03%	0.10%	0.00%	0.00%	0.02%	0.03%	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	476	713	5759	5333	98	238	3745	926	4
	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	476	713	5759	5333	98	238	3745	926	4
	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%	99.66%	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%	99.66%	100.00%	100.00%	100.00%	100.00%

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



4 Response time to customers for assistance												
A) Total no of calls attempted to customer care/Call center		UPE	8386548	1700649	2175851	641632	2653461	419323	13643643	13101721	1401828	21785
B) Total no. of calls successfully established to customer care/Call center		UPE	6546532	1700649	2175851	641632.333	2623312	416448	13111158	13101721	1372589	21637
C) % Accessibility of Call centre /customer Care (Total call successfully established*100/ Total call attempt)	>=95%	UPE	78.06%	100.00%	100.00%	100.00%	98.86%	99.31%	96.10%	100.00%	97.91%	99.32%
D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		UPE	1562660	3627079	911321	2396599	616291	517055	3515623	2886335	277891	17090
E) Total number of calls answered by the operator (Voice to voice) within 60 seconds		UPE	1489764	3294908	837616	2376041	581762	489981	3403028	2746471	260252	16471
F) % age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec*100/Total call attempt .)	>=90%	UPE	95.34%	90.84%	91.91%	99.14%	94.40%	94.76%	96.80%	95.15%	93.65%	96.37%
5 Termination/closure of service												
A) Total No. of requests for Termination / Closure of service received during the quarter		UPE	22	779	54392	216	29	171	NA	5064	166	45
B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		UPE	22	779	54392	216	29	171	NA	5064	166	45
C) % of Termination/ Closure of service within 7 days	<=7days	UPE	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
6 Time taken for refunds of deposits after closures.												
A) No. of Payments/ Refunds due during the quarter		UPE	60	387	743	251	99	234	NA	645	215	92
B) No. of Payments/ Refunds Cleared during the quarter		UPE	60	387	743	251	99	234	NA	645	215	92
C) Time taken for refunds of deposits after closures.	100% within 60 days	UPE	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%

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

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

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

3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	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	263121	52930	66003	20601	461922	75599	16787	458100	43843	694
	Total no. of calls successfully established to customer care/Call center		UP East	212393	52930	66003	20610	445744	74979	16624	458100	42670	692
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	UP East	80.72%	100.00%	100.00%	100.00%	96.50%	99.18%	99.03%	100.00%	97.33%	99.76%
2	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		UP East	50365	117810	31154	80857	121302	17399	17056	101058	9221	601
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		UP East	45476	109967	26547	80598	115482	17065	16253	97133	9123	544
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	>=90%	UP East	90.29%	93.34%	85.21%	99.68%	95.20%	98.08%	95.29%	96.12%	98.94%	90.52%

### 5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS

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

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

#### 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 **78.06%**.

#### 4. Termination/Closure of Service

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

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

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

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 **80.72%**. In case of '**calls answered by operators (voice to voice) within 60 seconds**', all operators were meeting the benchmark except BSNL. The performance of **BSNL** for this parameter was recorded as **85.21%**



## **6. LIVE CALLING ASSESSMENT**



## 6. LIVE CALLING ASSESSMENT:

### 6.1 INTER OPERATOR CALLS ASSESSMENT:

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

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT											
Calling Operators	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	RCOM CDMA	TATA CDMA
AIRCEL	UP-E	--	100.0%	95.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
AIRTEL	UP-E	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
BSNL	UP-E	97.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
IDEA	UP-E	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
RCOM GSM	UP-E	100.0%	100.0%	100.0%	100.0%	--	92.0%	100.0%	100.0%	100.0%	100.0%
TATA GSM	UP-E	100.0%	100.0%	100.0%	100.0%	96.0%	--	100.0%	100.0%	100.0%	100.0%
UNINOR	UP-E	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%
VODAFONE	UP-E	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%
RCOM CDMA	UP-E	100.0%	100.0%	100.0%	100.0%	100.0%	95.0%	100.0%	100.0%	--	100.0%
TATA CDMA	UP-E	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where Calls attempted from Aircel to BSNL successful interconnection was 93.0%, BSNL to Aircel was 97%, Aircel to BSNL 95%, RCOM GSM to Tata GSM 92%, RCOM CDMA to Tata GSM 95% and Tata GSM to RCOM GSM was 96%. Thus there was no remarkable problem in interconnection from one operator to other operators.

## 6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE											
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	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	100	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	100.00%	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	100	92	90	100	92	92	96	97	96	96
% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100/ Total call attempt)	UP East	100.00%	92.00%	90.00%	100.00%	92.00%	92.00%	96.00%	97.00%	96.00%	96.00%

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. However, Airtel, BSNL, Uninor, RCOM (GSM), Tata (GSM), Vodafone, RCOM (CDMA) and Tata (CDMA) could achieve their performance as 92.00%, 90.00%, 92.00%, 92.00%, 96.00%, 97.00%, 96.00% and 96.00% respectively.

## 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS											
	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	UP East	6	100	100	100	100	100	100	100	100	12
Total No. of calls Answered	UP East	6	78	73	82	85	85	87	90	89	12
Cases resolved within 4 weeks	UP East	6	78	73	82	85	85	87	90	89	12
%age of cases resolved	UP East	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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



6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING														
Emergency no.	Circle Name	SSA Name	Name of SDCA	No. of calls made per operator	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	TATA GSM	UNINOR	VODAFONE
100	UPE	Lucknow	Lucknow	5	√	√	√	√	√	√	√	√	√	√
101	UPE	Lucknow	Lucknow	5	√	√	√	√	√	√	√	√	√	√
102	UPE	Lucknow	Lucknow	5	√	√	√	√	√	√	√	√	√	√
108	UPE	Lucknow	Lucknow	5	√	√	√	√	√	√	√	√	√	√
1098	UPE	Lucknow	Lucknow	5	√	√	√	√	√	√	√	√	√	√
1090	UPE	Lucknow	Lucknow	5	√	√	√	√	√	√	√	√	√	√
100	UPE	Lucknow	Malhiabad	5	√	√	√	√	√	√	√	√	√	√
101	UPE	Lucknow	Malhiabad	5	√	√	√	√	X	√	√	X	√	√
102	UPE	Lucknow	Malhiabad	5	√	√	√	√	√	√	√	√	√	√
108	UPE	Lucknow	Malhiabad	5	√	√	√	√	√	X	X	√	√	√
1098	UPE	Lucknow	Malhiabad	5	√	√	X	√	X	√	√	√	√	X
1090	UPE	Lucknow	Malhiabad	5	√	√	√	X	√	√	√	√	√	√
100	UPE	Raebareli	Raebareli	5	X	√	ND	√	√	√	√	√	√	X
101	UPE	Raebareli	Raebareli	5	X	√	ND	√	√	√	√	√	√	X
102	UPE	Raebareli	Raebareli	5	√	X	ND	√	√	√	√	√	√	√
108	UPE	Raebareli	Raebareli	5	√	√	ND	√	√	√	√	√	√	√
1098	UPE	Raebareli	Raebareli	5	X	√	ND	√	√	√	√	√	√	X
1090	UPE	Raebareli	Raebareli	5	√	X	ND	√	√	√	√	√	√	√
100	UPE	Raebareli	Jais	5	X	√	ND	X	X	X	X	√	√	√
101	UPE	Raebareli	Jais	5	X	√	ND	√	X	X	X	√	X	√
102	UPE	Raebareli	Jais	5	√	X	ND	√	√	X	X	√	√	√
108	UPE	Raebareli	Jais	5	√	√	ND	√	√	X	X	√	√	√
1098	UPE	Raebareli	Jais	5	√	√	ND	X	√	X	X	√	X	√
1090	UPE	Raebareli	Jais	5	√	X	ND	√	√	X	X	√	√	√
100	UPE	Raebareli	Salon	5	X	√	ND	√	√	√	√	√	√	√
101	UPE	Raebareli	Salon	5	X	√	ND	√	√	√	√	√	√	√
102	UPE	Raebareli	Salon	5	√	X	ND	√	√	√	√	√	√	√
108	UPE	Raebareli	Salon	5	√	√	ND	√	√	√	√	√	√	√
1098	UPE	Raebareli	Salon	5	√	√	ND	√	√	√	√	√	√	√
1090	UPE	Raebareli	Salon	5	√	X	ND	√	√	√	√	√	√	√
100	UPE	Raebareli	Lalganj	5	X	√	ND	√	√	√	√	√	X	√
101	UPE	Raebareli	Lalganj	5	X	X	ND	√	√	√	√	√	√	X
102	UPE	Raebareli	Lalganj	5	√	√	ND	√	√	√	√	√	√	√



LEVEL 1 LIVE CALLING														
Emergency no.	Circle Name	SSA Name	Name of SDCA	No. of calls made per operator	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	TATA GSM	UNINOR	VODAFONE
108	UPE	Raebareli	Lalganj	5	√	√	ND	√	√	√	√	√	√	√
1098	UPE	Raebareli	Lalganj	5	√	√	ND	√	√	√	√	√	√	√
1090	UPE	Raebareli	Lalganj	5	√	X	ND	√	√	√	√	√	√	√
100	UPE	Raebareli	Dalmau	5	X	√	ND	X	√	√	√	√	√	√
101	UPE	Raebareli	Dalmau	5	X	X	ND	√	√	√	√	√	√	X
102	UPE	Raebareli	Dalmau	5	√	√	ND	√	√	√	√	√	√	√
108	UPE	Raebareli	Dalmau	5	√	√	ND	√	√	√	√	√	√	√
1098	UPE	Raebareli	Dalmau	5	√	√	ND	√	√	√	√	√	X	√
1090	UPE	Raebareli	Dalmau	5	√	X	ND	√	√	√	√	√	√	√
100	UPE	Basti	Harraiya	5	√	√	√	√	X	X	X	√	√	√
101	UPE	Basti	Harraiya	5	√	√	√	√	√	X	X	X	√	√
102	UPE	Basti	Harraiya	5	√	√	√	√	X	X	X	√	√	√
108	UPE	Basti	Harraiya	5	√	√	√	√	√	X	X	√	√	√
1098	UPE	Basti	Harraiya	5	√	√	X	√	√	X	X	√	√	√
1090	UPE	Basti	Harraiya	5	√	√	√	X	X	X	X	√	√	√
100	UPE	Basti	Basti	5	√	√	√	√	√	√	X	√	√	√
101	UPE	Basti	Basti	5	√	√	√	√	√	√	√	√	√	√
102	UPE	Basti	Basti	5	√	√	√	√	√	√	√	X	√	√
108	UPE	Basti	Basti	5	√	√	√	√	√	√	√	√	√	√
1098	UPE	Basti	Basti	5	√	√	X	√	√	√	√	√	√	√
1090	UPE	Basti	Basti	5	√	√	√	√	√	√	X	√	√	√

ND: BSNL did not turn-up drive test in Raebareli SSA, hence level -1 calling could not be done.

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers in the SDCAs where the drive tests were conducted, 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 largely found functional except for some of the service providers, level-1 calling was not matured in the SDCAs and have been ticked as "X".

## 7. DRIVE TEST



## **7. OPERATOR ASSISTED 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 **Lucknow, Raebareli and Basti** in the months of April, May and June 2014 respectively. The total route Kms covered during the drive tests in respective SSAs was **310 Kms, 320 Kms and 370 Kms** respectively. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength  $\geq -75$  dBm for in-door coverage and  $\geq -85$  dBm for in-vehicle.

7.1 OPERATOR ASSISTED DRIVE TEST: LUCKNOW SSA (APRIL-14)

DRIVE TEST TABLE: 1

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
			1	Call Attempts	Day 1	175	15	142	15	154	15	158	16	163	17	122	15	177	16	144	16	113	15
Day 2	154	15			169	15	145	15	154	15	137	15	91	15	178	15	161	15	119	15	105	15	
Day 3	128	15			104	15	119	15	115	15	138	17	86	15	101	15	122	15	99	15	86	15	
Overall SSA	457	45			415	45	418	45	427	46	438	49	299	45	456	46	427	46	331	45	338	45	
2	Blocked Call Rate	Day 1	2.29%	0.00%	2.11%	0.00%	3.25%	6.67%	1.27%	0.00%	0.61%	0.00%	3.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.36%	0.00%
		Day 2	4.55%	0.00%	1.18%	0.00%	2.07%	0.00%	3.25%	0.00%	1.46%	0.00%	1.10%	0.00%	0.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.81%	0.00%
		Day 3	3.13%	0.00%	0.00%	0.00%	1.68%	0.00%	0.00%	6.67%	0.00%	0.00%	1.16%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	3.49%	0.00%
		Overall SSA	3.28%	0.00%	1.20%	0.00%	2.39%	2.22%	1.64%	2.17%	0.68%	0.00%	2.01%	0.00%	0.22%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	2.66%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	0.00%	0.00%	0.00%	0.00%	0.68%	0.00%	0.65%	0.00%	0.62%	0.00%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.65%	0.00%	1.40%	0.00%
		Day 2	0.00%	0.00%	0.00%	0.00%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	0.00%	0.57%	0.00%	0.00%	0.00%	0.00%	3.36%	0.00%	0.00%	0.00%
		Day 3	1.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.04%	0.00%	2.47%	0.00%
		Overall SSA	0.46%	0.00%	0.00%	0.00%	1.01%	0.00%	0.24%	0.00%	0.23%	0.00%	2.39%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	3.32%	0.00%	1.23%	0.00%
Percentage connections with good voice quality (=>95%)																							
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.65%	100.0%	98.39%	99.89%
		Day 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.84%	99.93%	97.70%	100.0%
		Day 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.70%	100.0%	97.64%	99.89%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.13%	99.97%	97.98%	99.92%



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

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	93.50%	99.38%	94.70%	99.54%	93.11%	98.85%	95.58%	97.70%	96.20%	99.73%	92.78%	99.12%	93.78%	98.65%	94.01%	93.81%	NA	NA	NA	NA	
	Day 2	94.05%	98.36%	94.82%	97.57%	92.27%	92.96%	96.39%	98.11%	96.14%	100.0%	90.12%	98.33%	95.31%	97.67%	94.90%	98.46%	NA	NA	NA	NA	
	Day 3	91.66%	98.65%	93.96%	94.98%	92.36%	81.71%	95.72%	98.16%	95.05%	99.11%	90.63%	95.86%	94.72%	91.24%	95.96%	95.28%	NA	NA	NA	NA	
	Overall SSA	93.18%	98.80%	94.55%	96.85%	92.61%	91.50%	95.90%	97.98%	95.87%	99.61%	91.35%	97.73%	94.54%	95.91%	94.87%	95.70%	NA	NA	NA	NA	
<b>Service Coverage</b>																						
5	In door (>= -75dBm)	Day 1	68.93%	20.14%	89.14%	97.50%	79.91%	96.27%	79.23%	99.88%	82.58%	99.78%	31.66%	95.88%	94.36%	100.0%	72.45%	96.79%	83.81%	100.0%	78.17%	97.14%
		Day 2	51.28%	34.64%	73.01%	98.12%	66.65%	99.81%	68.16%	58.80%	72.98%	99.72%	35.54%	12.82%	82.66%	99.72%	52.02%	34.15%	57.64%	57.30%	64.30%	96.96%
		Day 3	54.38%	33.39%	63.60%	98.66%	51.23%	96.25%	71.14%	82.74%	49.46%	98.42%	25.26%	46.23%	77.43%	99.16%	43.03%	92.84%	62.72%	99.98%	76.98%	98.50%
		Overall SSA	58.90%	29.41%	76.04%	98.20%	67.28%	97.47%	73.08%	80.84%	70.00%	99.33%	30.90%	51.48%	86.27%	99.63%	56.98%	76.33%	71.20%	84.86%	73.96%	97.54%
	In-vehicle (>= -85dBm)	Day 1	98.29%	99.73%	99.16%	99.81%	98.40%	100.0%	98.69%	100.0%	96.55%	100.0%	77.46%	100.0%	99.77%	100.0%	97.41%	100.0%	97.89%	100.0%	97.35%	98.55%
		Day 2	94.70%	97.78%	94.41%	100.0%	89.89%	100.0%	96.53%	99.28%	92.61%	99.97%	79.04%	71.94%	96.39%	100.0%	87.93%	97.17%	96.78%	100.0%	93.76%	98.69%
		Day 3	86.13%	98.64%	90.54%	99.83%	81.15%	100.0%	95.07%	100.0%	88.26%	100.0%	66.54%	96.92%	93.70%	100.0%	86.91%	99.80%	90.17%	100.0%	91.61%	98.64%
		Overall SSA	93.71%	98.71%	95.00%	99.87%	90.61%	100.0%	96.94%	99.76%	92.84%	99.99%	74.66%	89.57%	97.16%	100.0%	91.05%	99.07%	95.22%	100.0%	94.55%	98.63%
	Outdoor-in city (>= -95dBm)	Day 1	99.95%	100.0%	99.93%	99.94%	99.94%	100.0%	99.90%	100.0%	100.0%	100.0%	98.49%	100.0%	99.98%	100.0%	99.89%	100.0%	100.0%	100.0%	99.17%	99.16%
		Day 2	99.19%	100.0%	99.76%	100.0%	98.51%	100.0%	99.92%	100.0%	100.0%	100.0%	96.88%	99.35%	99.74%	100.0%	99.08%	100.0%	100.0%	100.0%	98.90%	99.77%
		Day 3	96.92%	100.0%	99.28%	100.0%	94.88%	100.0%	99.79%	100.0%	100.0%	100.0%	92.32%	99.95%	98.85%	100.0%	98.75%	100.0%	100.0%	100.0%	98.38%	99.72%
		Overall SSA	98.85%	100.0%	99.69%	99.98%	98.03%	100.0%	99.88%	100.0%	100.0%	100.0%	96.16%	99.76%	99.64%	100.0%	99.28%	100.0%	100.0%	100.0%	98.85%	99.55%
6	Call Setup Success Rate (>=95%)	Day 1	97.14%	100.0%	97.18%	100.0%	96.10%	100.0%	98.10%	100.0%	98.77%	100.0%	96.72%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.28%	100.0%
		Day 2	94.81%	100.0%	98.22%	100.0%	96.55%	100.0%	96.10%	100.0%	98.54%	100.0%	98.90%	100.0%	98.88%	100.0%	100.0%	100.0%	100.0%	100.0%	96.19%	100.0%
		Day 3	95.31%	100.0%	100.0%	100.0%	91.60%	100.0%	100.0%	93.33%	100.0%	100.0%	98.84%	100.0%	100.0%	100.0%	99.18%	100.0%	100.0%	100.0%	94.19%	100.0%
		Overall SSA	95.84%	100.0%	98.31%	100.0%	94.98%	100.0%	97.89%	97.83%	99.09%	100.0%	97.99%	100.0%	99.56%	100.0%	99.77%	100.0%	100.0%	100.0%	96.15%	100.0%

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

S/N	Parameter	Days of drive test	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
7	Hand Over Success Rate (HOSR)	Day 1	99.13%	100.0%	97.27%	100.0%	97.16%	100.0%	98.99%	100.0%	97.65%	100.0%	99.69%	100.0%	97.15%	100.0%	99.37%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Day 2	98.28%	100.0%	100.0%	100.0%	98.36%	100.0%	97.14%	100.0%	98.81%	100.0%	99.19%	100.0%	97.46%	100.0%	97.98%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Day 3	99.01%	100.0%	100.0%	100.0%	96.38%	100.0%	99.31%	100.0%	97.44%	100.0%	100.0%	100.0%	98.65%	96.70%	99.53%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Overall SSA	98.81%	100.0%	98.94%	100.0%	97.36%	100.0%	98.50%	100.0%	98.02%	100.0%	99.61%	100.0%	97.54%	97.03%	98.87%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

7.2 OPERATOR ASSISTED DRIVE TEST: RAEBARELI SSA (MAY-14)

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Major Road	99	26	100	26	ND	ND	119	28	87	27	101	31	110	26	100	25	92	31	50	25
		Highway	167	25	196	26	ND	ND	154	33	104	25	144	25	148	25	208	25	120	ND	83	25
		Within City	134	25	96	25	ND	ND	109	28	125	25	103	28	108	25	106	25	93	20	104	25
		<b>Overall SSA</b>	<b>400</b>	<b>76</b>	<b>392</b>	<b>77</b>	<b>ND</b>	<b>ND</b>	<b>382</b>	<b>89</b>	<b>316</b>	<b>77</b>	<b>348</b>	<b>84</b>	<b>366</b>	<b>76</b>	<b>414</b>	<b>75</b>	<b>305</b>	<b>51</b>	<b>237</b>	<b>75</b>
2	Blocked Call Rate	Major Road	2.02%	0.00%	1.00%	0.00%	ND	ND	4.20%	0.00%	0.00%	0.00%	3.96%	0.00%	0.91%	0.00%	0.00%	0.00%	2.17%	0.00%	2.00%	0.00%
		Highway	7.19%	0.00%	0.51%	0.00%	ND	ND	2.60%	0.00%	0.00%	0.00%	4.17%	0.00%	0.68%	0.00%	0.96%	0.00%	0.00%	ND	2.41%	0.00%
		Within City	0.75%	0.00%	0.00%	0.00%	ND	ND	0.92%	0.00%	0.80%	0.00%	18.45%	0.00%	0.93%	4.00%	0.00%	0.00%	0.00%	0.00%	2.88%	0.00%
		<b>Overall SSA</b>	<b>3.75%</b>	<b>0.00%</b>	<b>0.51%</b>	<b>0.00%</b>	<b>ND</b>	<b>ND</b>	<b>2.62%</b>	<b>0.00%</b>	<b>0.32%</b>	<b>0.00%</b>	<b>8.33%</b>	<b>0.00%</b>	<b>0.82%</b>	<b>1.32%</b>	<b>0.48%</b>	<b>0.00%</b>	<b>0.66%</b>	<b>0.00%</b>	<b>2.53%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Major Road	4.12%	0.00%	0.00%	0.00%	ND	ND	0.00%	0.00%	1.16%	0.00%	2.06%	3.23%	0.92%	0.00%	0.00%	0.00%	15.56%	6.45%	0.00%	0.00%
		Highway	1.29%	0.00%	0.00%	0.00%	ND	ND	0.00%	0.00%	0.00%	0.00%	1.45%	0.00%	1.36%	0.00%	0.00%	0.00%	8.33%	ND	0.00%	0.00%
		Within City	0.75%	0.00%	1.04%	0.00%	ND	ND	0.00%	0.00%	0.00%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	29.03%	0.00%	0.00%	0.00%
		<b>Overall SSA</b>	<b>1.82%</b>	<b>0.00%</b>	<b>0.26%</b>	<b>0.00%</b>	<b>ND</b>	<b>ND</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.32%</b>	<b>0.00%</b>	<b>1.88%</b>	<b>1.19%</b>	<b>0.83%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>16.83%</b>	<b>3.92%</b>	<b>0.00%</b>	<b>0.00%</b>
Percentage connections with good voice quality (=>95%)																						
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.24%	99.93%	97.46%	96.28%
		Highway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	88.71%	ND	97.96%	96.42%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.99%	95.99%	98.04%	97.50%
		<b>Overall</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>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>91.01%</b>	<b>98.05%</b>	<b>97.81%</b>	<b>96.74%</b>

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



S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
			SSA																			
(b) 0-5 (with frequency hopping for GSM Operators)	Major Road		96.34%	97.45%	96.05%	99.20%	ND	ND	93.73%	98.55%	97.80%	98.57%	92.45%	98.00%	95.86%	90.01%	98.30%	98.42%	NA	NA	NA	NA
	Highway		95.44%	99.18%	94.58%	99.49%	ND	ND	92.37%	99.39%	98.49%	98.85%	90.28%	98.67%	94.81%	98.24%	96.49%	97.58%	NA	NA	NA	NA
	Within City		98.22%	97.74%	96.54%	98.21%	ND	ND	97.63%	99.49%	98.94%	99.76%	96.74%	97.32%	97.20%	99.13%	96.72%	99.67%	NA	NA	NA	NA
	Overall SSA		96.66%	98.12%	95.40%	98.97%	ND	ND	94.22%	99.15%	98.44%	99.23%	92.82%	97.86%	95.85%	95.74%	97.03%	98.55%	NA	NA	NA	NA
<b>Service Coverage</b>																						
5	In door (>= -75dBm)	Major Road	22.45%	20.50%	65.21%	82.60%	ND	ND	54.75%	49.41%	58.52%	97.38%	15.11%	24.16%	74.46%	99.98%	31.93%	54.81%	49.51%	60.28%	48.93%	51.92%
		Highway	15.69%	20.70%	48.85%	63.10%	ND	ND	31.33%	53.98%	41.73%	59.63%	10.92%	16.21%	56.20%	92.40%	22.88%	27.98%	28.44%	ND	56.06%	23.46%
		Within City	18.89%	46.10%	61.73%	98.20%	ND	ND	37.09%	39.77%	32.76%	89.70%	17.71%	76.64%	66.55%	64.50%	33.78%	41.25%	44.56%	32.60%	54.33%	0.00%
		Overall SSA	18.41%	29.16%	55.87%	81.23%	ND	ND	40.18%	48.04%	42.61%	82.49%	13.93%	43.22%	64.86%	85.74%	27.95%	41.35%	38.99%	46.67%	53.13%	25.21%
	In-vehicle (>= -85dBm)	Major Road	79.25%	92.40%	92.85%	99.50%	ND	ND	84.18%	96.14%	86.30%	99.63%	53.67%	95.09%	90.87%	100.0%	85.47%	96.70%	67.59%	95.93%	83.40%	97.53%
		Highway	61.94%	96.00%	83.68%	99.40%	ND	ND	75.68%	95.38%	80.34%	99.72%	28.63%	90.32%	80.95%	100.0%	74.39%	89.52%	47.87%	ND	74.58%	99.26%
		Within City	79.00%	99.10%	91.99%	100.0%	ND	ND	83.41%	95.06%	72.29%	99.10%	63.03%	99.54%	94.41%	100.0%	82.68%	99.69%	66.78%	94.78%	86.24%	62.89%
		Overall SSA	71.92%	95.82%	87.86%	99.63%	ND	ND	80.42%	95.52%	78.47%	99.49%	44.94%	95.94%	87.93%	100.0%	79.37%	95.30%	58.72%	95.36%	81.42%	86.55%
	Outdoor-in city (>= -95dBm)	Major Road	97.32%	99.90%	99.82%	100.0%	ND	ND	96.93%	99.86%	95.43%	100.0%	87.97%	100.0%	96.98%	100.0%	100.0%	100.0%	78.70%	100.0%	99.27%	100.0%
		Highway	87.16%	99.90%	98.85%	100.0%	ND	ND	95.20%	99.82%	94.11%	100.0%	63.72%	99.86%	94.18%	100.0%	100.0%	100.0%	75.76%	ND	93.99%	100.0%
		Within City	98.16%	100.0%	99.49%	100.0%	ND	ND	98.35%	99.86%	91.66%	100.0%	91.58%	99.99%	100.0%	100.0%	100.0%	100.0%	78.12%	100.0%	98.03%	99.94%
		Overall SSA	93.35%	99.93%	99.24%	100.0%	ND	ND	96.59%	99.85%	93.40%	100.0%	78.06%	99.97%	96.73%	100.0%	100.0%	100.0%	77.26%	100.0%	97.09%	99.98%
6	Call Setup Success Rate (>=95%)	Major Road	97.98%	100.0%	99.00%	100.0%	ND	ND	95.80%	100.0%	98.85%	100.0%	96.04%	100.0%	99.09%	100.0%	100.0%	100.0%	97.83%	100.0%	98.00%	100.0%
		Highway	92.81%	100.0%	99.49%	100.0%	ND	ND	96.10%	96.97%	100.0%	100.0%	95.83%	100.0%	99.32%	100.0%	99.04%	100.0%	100.0%	ND	97.59%	100.0%
		Within City	99.25%	100.0%	100.0%	100.0%	ND	ND	98.17%	100.0%	99.20%	100.0%	81.55%	100.0%	99.07%	96.00%	100.0%	100.0%	100.0%	100.0%	97.12%	100.0%
		Overall	96.25%	100.0%	99.49%	100.0%	ND	ND	96.60%	98.88%	99.37%	100.0%	91.67%	100.0%	99.18%	98.68%	99.52%	100.0%	99.34%	100.0%	97.47%	100.0%



S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA			
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR		
		SSA																						
7	Hand Over Success Rate (HOSR)	Major Road	100.0%	100.0%	100.0%	100.0%	ND	ND	96.00%	100.0%	100.0%	100.0%	99.42%	100.0%	97.74%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
		Highway	100.0%	100.0%	100.0%	100.0%	ND	ND	97.44%	100.0%	100.0%	100.0%	100.0%	100.0%	98.13%	100.0%	98.84%	100.0%	100.0%	ND	100.0%	100.0%	100.0%	
		Within City	98.95%	100.0%	100.0%	100.0%	ND	ND	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.53%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Overall SSA	99.68%	100.0%	100.0%	100.0%	ND	ND	97.39%	100.0%	100.0%	100.0%	99.70%	100.0%	98.41%	100.0%	99.30%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ND: Not done, BSNL did not perform drive test due to incomplete drive test kit and RCOM CDMA also did not turn up for drive test on Day-2 due to fiber cut.

7.3 OPERATOR ASSISTED DRIVE TEST: BASTI SSA (JUNE-14)

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Major Road	56	30	196	25	227	25	200	25	41	25	50	25	172	25	227	25	67	25	26	25
		Highway	39	26	41	25	40	26	36	25	61	25	18	25	32	26	42	25	15	25	20	25
		Within City	198	25	127	25	192	25	173	25	206	25	128	23	157	25	182	25	121	25	99	25
		<b>Overall SSA</b>	<b>293</b>	<b>81</b>	<b>364</b>	<b>75</b>	<b>459</b>	<b>76</b>	<b>409</b>	<b>75</b>	<b>308</b>	<b>75</b>	<b>196</b>	<b>73</b>	<b>361</b>	<b>76</b>	<b>451</b>	<b>75</b>	<b>203</b>	<b>75</b>	<b>145</b>	<b>75</b>
2	Blocked Call Rate	Major Road	8.93%	0.00%	1.02%	0.00%	4.85%	0.00%	2.00%	0.00%	0.00%	0.00%	4.00%	0.00%	0.00%	0.00%	0.44%	0.00%	8.86%	0.00%	0.00%	0.00%
		Highway	0.00%	0.00%	2.44%	0.00%	0.00%	3.70%	0.00%	0.00%	0.00%	0.00%	11.11%	0.00%	3.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.52%	0.00%	0.00%	0.00%	3.65%	0.00%	0.00%	0.00%	0.97%	0.00%	0.78%	0.00%	0.64%	0.00%	1.65%	0.00%	3.31%	0.00%	1.01%	0.00%
		<b>Overall SSA</b>	<b>2.73%</b>	<b>0.00%</b>	<b>0.82%</b>	<b>0.00%</b>	<b>3.92%</b>	<b>1.30%</b>	<b>0.98%</b>	<b>0.00%</b>	<b>0.65%</b>	<b>0.00%</b>	<b>2.55%</b>	<b>0.00%</b>	<b>0.55%</b>	<b>0.00%</b>	<b>0.89%</b>	<b>0.00%</b>	<b>4.93%</b>	<b>0.00%</b>	<b>0.69%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Major Road	0.00%	0.00%	0.00%	0.00%	7.62%	0.00%	1.03%	0.00%	0.00%	0.00%	2.08%	0.00%	1.16%	0.00%	0.00%	0.00%	1.64%	0.00%	0.00%	0.00%
		Highway	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.25%	0.00%	3.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	1.09%	0.00%	0.00%	0.00%	0.49%	0.00%	0.79%	0.00%	0.00%	0.00%	1.13%	0.00%	1.71%	0.00%	0.00%	0.00%
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>4.16%</b>	<b>0.00%</b>	<b>0.50%</b>	<b>0.00%</b>	<b>0.33%</b>	<b>0.00%</b>	<b>1.57%</b>	<b>0.00%</b>	<b>0.84%</b>	<b>0.00%</b>	<b>0.45%</b>	<b>0.00%</b>	<b>1.55%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>
4	Percentage connections with good voice quality (=>95%)																					
	(a) 0-4 (w/o frequency)	Major Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.58%	100%	98.72%	98.40%
	Highway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	94.84%	100%	96.55%	99.59%

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

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	hopping for CDMA Operators)	Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.98%	99.91%	98.07%	99.73%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	94.10%	99.97%	97.97%
	(b) 0-5 ( with frequency hopping for GSM Operators)	Major Road	92.72%	96.15%	98.55%	97.90%	87.40%	96.46%	95.00%	99.64%	96.58%	99.83%	95.98%	98.43%	97.05%	92.08%	94.83%	97.63%	NA	NA	NA	NA
		Highway	95.40%	98.10%	97.32%	98.46%	89.60%	94.50%	96.20%	98.91%	92.50%	98.95%	92.17%	97.67%	95.60%	98.34%	94.09%	97.17%	NA	NA	NA	NA
		Within City	96.84%	97.67%	98.08%	96.89%	90.33%	99.57%	98.70%	99.24%	98.35%	99.75%	95.80%	99.46%	96.75%	99.65%	95.14%	96.25%	NA	NA	NA	NA
		Overall SSA	95.94%	97.25%	98.17%	97.75%	88.88%	96.82%	96.67%	99.26%	97.09%	99.51%	95.61%	98.52%	96.78%	96.73%	94.88%	97.02%	NA	NA	NA	NA
<b>Service Coverage</b>																						
5	In door (>= - 75dBm)	Major Road	18.54%	90.68%	73.31%	99.60%	26.18%	99.80%	60.35%	100%	24.50%	100%	24.80%	26.79%	29.77%	91.20%	36.51%	61.30%	12.18%	99.94%	46.51%	100%
		Highway	28.71%	51.85%	82.95%	61.61%	28.10%	99.60%	64.96%	100%	33.27%	86.00%	13.72%	16.69%	44.44%	69.20%	36.50%	91.50%	26.57%	89.43%	61.38%	100%
		Within City	28.85%	48.14%	76.19%	83.62%	44.35%	83.50%	81.37%	99.55%	69.92%	32.20%	13.96%	16.56%	54.79%	67.10%	39.77%	66.99%	54.21%	34.26%	87.14%	100%
		Overall SSA	26.04%	64.67%	75.85%	81.12%	34.27%	94.47%	69.56%	99.87%	53.80%	72.68%	18.39%	20.18%	41.29%	75.82%	37.66%	73.27%	36.05%	75.53%	76.28%	100%
5	In-vehicle (>= - 85dBm)	Major Road	50.15%	99.86%	90.82%	100%	61.87%	100%	80.78%	100%	51.70%	100%	43.33%	96.01%	59.24%	99.60%	89.24%	98.80%	32.61%	100%	89.23%	100%
		Highway	84.69%	98.93%	94.00%	99.89%	66.60%	100%	93.67%	100%	64.71%	99.99%	39.54%	74.03%	67.04%	97.80%	85.85%	99.99%	57.99%	99.99%	93.19%	100%
		Within City	86.41%	89.01%	94.41%	99.95%	81.83%	99.90%	97.57%	100%	95.08%	98.05%	49.78%	33.77%	84.84%	97.80%	89.47%	99.16%	84.08%	65.34%	98.79%	100%
		Overall SSA	76.40%	96.00%	92.75%	99.95%	71.01%	99.97%	89.02%	100%	80.63%	99.35%	46.23%	69.01%	70.43%	98.40%	89.05%	99.32%	62.68%	89.06%	96.30%	100%
5	Outdoor-in city (>= - 95dBm)	Major Road	80.53%	100%	98.89%	100%	95.94%	100%	94.69%	100%	80.00%	100%	67.11%	100%	89.77%	99.96%	100%	100%	77.10%	100%	98.32%	100%
		Highway	99.01%	99.98%	99.58%	100%	98.30%	100%	99.94%	100%	91.63%	100%	84.12%	99.62%	93.20%	100%	100%	100%	94.55%	100%	99.86%	100%
		Within City	98.68%	98.78%	99.75%	100%	97.03%	100%	99.43%	100%	99.91%	99.99%	87.55%	98.56%	98.81%	99.88%	100%	100%	98.42%	95.23%	99.55%	100%
		Overall SSA	93.81%	99.59%	99.34%	100%	96.64%	100%	97.17%	100%	94.43%	100%	78.86%	99.42%	93.78%	99.95%	100%	100%	100%	90.31%	98.50%	99.37%

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



S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		UNINOR		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
6	Call Setup Success Rate (>=95%)	Major Road	91.07%	100%	98.98%	100%	92.51%	100%	97.00%	100%	100%	100%	96.00%	100%	100%	100%	99.56%	100%	91.04%	100%	100%	100%
		Highway	100%	100%	100%	100%	100%	96.30%	100%	100%	100%	100%	88.89%	100%	96.88%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.48%	100%	99.21%	100%	95.31%	100%	100%	100%	98.54%	100%	99.22%	100%	98.73%	100%	97.25%	100%	96.69%	100%	98.99%	100%
		Overall SSA	97.27%	100%	99.18%	100%	94.34%	98.70%	98.53%	100%	99.03%	100%	97.45%	100%	99.17%	100%	98.67%	100%	95.07%	100%	99.31%	100%
7	Hand Over Success Rate (HOSR)	Major Road	100%	100%	100%	100%	86.08%	100%	98.95%	100%	92.31%	100%	100%	100%	100%	100%	98.08%	100%	100%	100%	100%	100%
		Highway	100%	100%	99.43%	100%	98.41%	96.67%	100%	100%	95.83%	100%	100%	100%	97.50%	100%	97.96%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	99.58%	100%	100%	100%	96.97%	100%	100%	100%	100%	100%	99.39%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	99.94%	100%	93.19%	96.88%	99.47%	100%	96.25%	100%	100%	100%	99.75%	100%	98.48%	100%	100%	100%	100%	100%



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

**DRIVE TEST TABLE: 4**

Name of SSA	Day 1		Day 2		Day 3	
	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
<b>LUCKNOW</b>	Lucknow City / 100km	<p>Matiyari Choraha, Chinhut Tiraha, Gomti Nagar, Politechnic Choraha, Indra Nagar, Nishat Ganj, Ali Ganj, Nh24, Jankipuram</p> <p><b>Indoor:</b> Fun Mall</p>	Lucknow City / 110km	<p>Barlington, Naka , Kgm, Rakabganj, Charbaag, Alambag , Airport, Nh 25(Lucknow-Bantra), Nh 24a (Mohanlalganj-Lucknow), Bantra-Mohanlalganj</p> <p><b>Indoor:</b> Srs Mall</p>	Lucknow City, Malihabad / 100km	<p>Lucknow, Daliganj Pul, Thakurganj, Balaganj, Rajajipuram , Nehria, Rdso Colony, Alambag , Budheswar Choraha, Dubagga ; Malihabad, Tehsil, Railway Station, Market</p> <p><b>Indoor:</b> Phoenix Mall</p>
<b>RAEBARELI</b>	Raebareli City / 100km	<p>1) Raebareli- A) Highway: Bachgahwa To Raibrelli B) Major Road: Raibrelli To Gurubaxganj C) Raebareli City: Ratapur Choraha, Railway Stn., Main Mkt., Bus Stand, Dm Office, Niralanagar, Indranagar, Pragati Puram, Sbi, Civil Lines</p> <p><b>Indoor:</b> Shomu Restaurant</p>	Jais, Salon / 120km	<p>1) Jais- A) Within City- Jais Mkt., Nagar Palika, Thana, Sbi, Jagdishpur Road, Kasimpur Railway Stn. 2) Salon-A) Within City- Poorva Madhyamic Vidhyalaya, Varanshi Road, Mkt., Sarvodaya Inter College, Sbi, Thana B) Major Road: Raebareli, Jais-Salon- Jagatpur-Raebareli</p> <p><b>Indoor:</b> Tennis Court Rbs Club</p>	Lalganj, Dalmau / 100km	<p>1) Dalmau-A) Highway : Bacharawan-Gurubaxganj-Lalganj-Dalmau B) Major Road : Dalmau-Raebareli 2) Lalganj- C) Within City: Cimema Hall, S.B.I. Bank, Galla Mandi, Fatepur Road Choraha ; Dalmau- Murai Baag, Sarainpur, Jamarwan, Ganga Ghat</p> <p><b>Indoor:</b> St. James School</p>



<p><b>BASTI</b></p>	<p>Harraiya,Basti,Khalilabad /110km</p>	<p>A) Harraiya- 1) Within City--&gt; Thana, Main Market, Sbi, Hospital, Busstop, Hera Honda                  B) Basti- 1) Within City--&gt;Malviya Road, Pani Ki Tanki, Awas Vikas, Gandhi Nagar,Gic, Busstop, Pachpadiya Road, Lic, Routa Chauraha                  C) Khalilabad-1) Within City--&gt; Busstop, Hospital, Tehsil, Main Market, Rly Stn, Bypass Chauraha                  2) Highway--&gt; Nh28 (Harraiya- Basti-Khalilabad)</p> <p><b>Indoor:</b> Bsnl Office</p>	<p>Barhani Bazar, Doariyaganj /110km</p>	<p>A) Dumariyaganj-1) Within City--&gt; Lic, Sbi, Thana, Roadways Stand, Hospital, Rapti Pul, Pipuls Inter College                  B) Badhni Bazar 1) Within City--&gt;Balrampur Road, Rly Stn, Nepal Border, Market                  2) Major Road--&gt; Basti , Dumariyaganj, Badhni Bazar</p> <p><b>Indoor:</b> V-Mart</p>	<p>Mehdawal,Bansi, Naughar/150km</p> <p>A) Naugadh 1) Within City--&gt;Dm Ofc, Sidharth University, Police Chowki, Busstand, Tetri Bazar, Rly Stn B)                  Bansi 1) Within City--&gt;Busstand, Market-Thana, Tehsil, Tirupati Chowk                  C) Mehdawal 1) Within City--&gt; Hospital, Main Market, Thana, Sbi, Dharmshala                  2) Major Road--&gt; Debarva, Naugadh, Bansi, Mehdawal, Basti</p> <p><b>Indoor:</b> Krishi Bhavan</p>
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**7.5 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF LUCKNOW SSA - APRIL-14**

S NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	Aircel	Lucknow City	Poor Quality near Imt Tiraha, Mina Market, Indira Nagar, Daliganj, Manojpandey	Lucknow City	Poor Quality & Level near Jaitikhera, Niwa, Sarojani nagar, Transport Nagar, Arjunganj, Omaxe City	Lucknow City, Malihabad	Poor Level & Quality near Habibpur, Katauli, Shitla Apprt
2	AIRTEL		Poor Level & Quality near Chinhut		Poor Level & Quality near Bagiya, Sindhu Nagar, Transport Nagar, Mohanlalganj, Khargupur		Poor Quality near Mahmud Nagar, Madhuban Nagar, Shitla Appart
3	BSNL		Poor Quality near Sitaour RD, Manojpande, Vikashkhand, Breakvenue, City Center, Aliganj		Poor Level & Quality near Arjunganj, Ghuswal, transport Nagar, Mansarovar, Jaitikhera		Poor Level near Mahilabad, Katauli, Habibpur, Poor Quality near Dubga, Shitla Appart, Alambag
4	TATA GSM		Poor Quality near Imt Tiraha, hanuman Sethu, Indira Nagar, Laxmipur		Poor Level near Bagiya to Mohanlalganj		Poor Level & Qquality near Sindhu Nagar, Alam Bagh
5	TATA CDMA		Poor Level & Quality near Daliganj, Poor level near Manojpandey		No coverage between Bagiya to Mohanlalganj, Poor Level near Darogakher, Transport Nagar		Poor Level near Habibpur, Mohmud Nagar
6	IDEA		Poor Level & Quality near Niketan Ext, Manojpandey, City Center, Saharsa Ext		Poor Quality patches near Ghusal, Sindhu Nagar, Noorbari		Poor Level near Katauli, Poor Quality near Sitla Appart, Madhuban Nagar
7	RCOM GSM		Poor Level & Quality near Daliganj, Balirampur, Sitapur RD, Mina Market, manojpandey, City Center		Poor Level & Quality near Bagiya, Sarojini, Noorbali, Narhal		Poor Level & Quality Malihabad, Habibpur, Sitla Appart, Chaupatika
8	RCOM CDMA		Poor Quality near Balrampur		Poor Quality near Transport Nagar, Shivdhari, Asiyanaaph		Poor Level & Quality near Habibnagar, Mahmudnagar, Aishbagh
9	UNINOR		Poor Quality near Mina Market, Chinhut, viraj Ext, Maonjpandey, Park RD		Poor Level & Quality near Arjunganj, Shivdhari, Mohanlalganj		poor Level near Katauli, Poor Quality near Madhuban Nagar
10	VODAFONE		Poor Quality near City Center		Poor Level near Shivdhari, Mohanlalganj, Darogakher, Poor Quality near Madhuban Nagar		Poor Quality & Level near Shitla Appart

DRIVE TEST TABLE: 6

**DRIVE TEST OBSERVATION OF RAEBARELI SSA - MAY-14**

S NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Raebareli City	Poor Level & Quality near Raibareily station towards Dedar Rd, Dedar to Sata, Poor quality near Gangj	Jais, Salon	Poor level near Dighi, Fursa, Salon, Bhaon	Lalganj, Dalmau	Poor Level near Satan, Konsa, Dalmau Outer
2	AIRTEL		Poor Level & Quality near Raibareily station towards Dedar Rd, Dedar to Sata		Poor Level & Quality at Jais outer, Paras		Poor Level & quality near Lalganj outer
3	BSNL		---		---		---
4	TATA GSM		Poor Level near Porae, kumdanganj, Dedar		Poor Level at Jais outer, Salon, between Chhichrauli to munshiganj		Poor Level on whole highway with poor quality
5	TATA CDMA		No coverage between katwara to Bachrawan, Porae to Rubaxganj Poor Level at Raibareily		They have coverage only in Jais		They have coverage only in Dalmau & Lalganj
6	IDEA		Poor Level & Quality near Sata, Poor quality near Kanwa		Poor Level & Quality near Nasirabad, Parsadepur		Poor Level & Quality near Manehroo, Dalmau Outer, Jawa Sakri
7	RCOM GSM		Poor Level on whole highway with poor quality on some places		Poor Level & Quality at Jais outer and Poor Level on whole highway with poor quality on some places		Poor Level on whole highway with poor quality
8	RCOM CDMA		Poor Level on whole highway with poor quality on some places		Poor Level & Quality at Jais outer and Poor Level on whole highway with poor quality on some places		Poor Level on whole highway with poor quality
9	UNINOR		Poor Level & Quality at Raibareily outer towards Dedar Rd, Dedar to Sata, Poor quality near Gangj		Poor Level & Quality near Dighi , Fursa		Poor Level near Satan, Konsa
10	VODAFONE		Poor Level near Porae, Rubaxganj, Dader		Poor Level & Qquality near Munshiganj, Esspari, parsadepur, Kunwarmau, Nazirabad		Poor Level & quality near Adhoura, Niralnagar, Dalmau Outer

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF BASTI SSA - JUNE-14

S NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Harraiya, Basti, Khalilabad	Poor Quality at Basti Outer	Barhani Bazar, Doariyaganj	Poor Level near Lahnaura Outer, bairihawa Outer	Mehdawal, Bansi, Naugarh	Poor Level & Quality between Lakhnaura to Barsha via Mahadevpur
2	AIRTEL		Poor level & Quality near Bhujani, Sirapar		Poor Level near Rasulpur, Sariya		Poor Level near Matiyar, Parigwa
3	BSNL		Poor Level & Quality between Basti to Bhujani, Basti to Sujat		Poor Level & Quality between Lakhnaura to Bairihawa		Poor Level & Quality between Lakhnaura to Barsha via Mahadevpur
4	TATA GSM		Poor Level & Quality near Marahkatiya, mangal Bazar		Poor Level near Dhanohara, Sariya, Dumariyaganj Outer		Poor Level at all SDCAs outer covered in day 3
5	TATA CDMA		They have coverage in only in SDCAs		They have coverage in only in SDCAs		No Coverage
6	IDEA		Poor Level & Quality near Bhujani		Poor Level & Quality near Sariya, Dharora, Bairipawa, Rasulpur, Domariyaganj Outer		Poor Level near Parsa
7	RCOM GSM		They have coverage in only in SDCAs & Major towns		They have coverage in only in SDCAs & Major towns		They have coverage in only in SDCAs & Major towns
8	RCOM CDMA		They have coverage in only in SDCAs & Major towns		They have coverage in only in SDCAs & Major towns		They have coverage in only in SDCAs & Major towns
9	UNINOR		Poor Level & Quality near Hariya, Gotwa, Bhujani		Poor Level & Quality near Itwan, Chakukhera, Bewan Chauraha, Bhanpur, Laximanpur		Poor Level & Quality near Sohoratagarh, Chilla, Naugarh, Samriawan, Nandpur
10	VODAFONE		Poor level & Quality near Bhujani, Marhakatya, Gandhi Nagar		Poor Level & Quality near Dhanohara, Sariya		Poor Level & Quality near kusrukhurd, Nesari, Raniganj Bazar, Matiyar

## 7.6 KEY FINDINGS ON DRIVE TEST:

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

- (i) **In the Month of April-14**, drive tests were conducted across **Lucknow SSA**. The performance of majority of the operators was not satisfactory as they failed to meet the benchmarks of the key network parameters. On SSA level, **non-compliance** of the service providers was as follows:

**Aircel:** Voice Quality (93.18%) and Blocked Call Rate (3.28%)

**Airtel:** Voice Quality (94.55%)

**BSNL:** Voice Quality 92.61% (outdoor) / 91.50% (Indoor) and Call set up success rate (94.98%).

**RCOM (GSM):** Call Drop rate (2.39%) and Voice Quality (91.35%).

**RCOM (CDMA):** Call Drop rate (3.32%)

**Uninor and Vodafone:** Voice Quality 94.54% and 94.87% respectively.

- (ii) **In the Month of May-14**, drive tests were conducted across **Raebareli SSA**. BSNL not conducted the drive test due to incomplete drive test kit available with their staff. RCOM (CDMA) did not turn up for drive test on day-2 due to fiber cut. The performance of some of the service providers on SSA level remained under performed for different network parameters. On SSA level, **non-compliance** of the service providers was as follows:

**Aircel:** Blocked Call rate (3.75%)

**Idea:** Voice Quality (94.22%)

**RCOM (GSM):** Voice Quality (92.82%), CSSR (91.67%), Blocked Call rate (8.33%)

**RCOM (CDMA):** Call Drop rate (16.83% - outdoor / 3.92% - indoor), Voice Quality (91.01%). **The performance of RCOM for parameter CDR was way beyond the benchmark.**

- (iii) **In the month of June -14**, drive tests were conducted at **Basti SSA**. The drive test results suggest that **BSNL** needs to improve their network quality in this SSA for the prime network parameters **Call Drop rate, Voice Quality, Call Setup success rate and Blocked Call rate**. On SSA level, **non-compliance** of the service providers was as follows:

**BSNL:** Call Drop rate (4.16%), Voice Quality (88.88%), CSSR (94.34%) and Blocked Call rate (3.92%)

**Vodafone:** Voice Quality (94.88%)

**RCOM (CDMA):** Voice Quality (94.10%), Blocked Call rate (4.93%).

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.-5, table-6 and table-7.

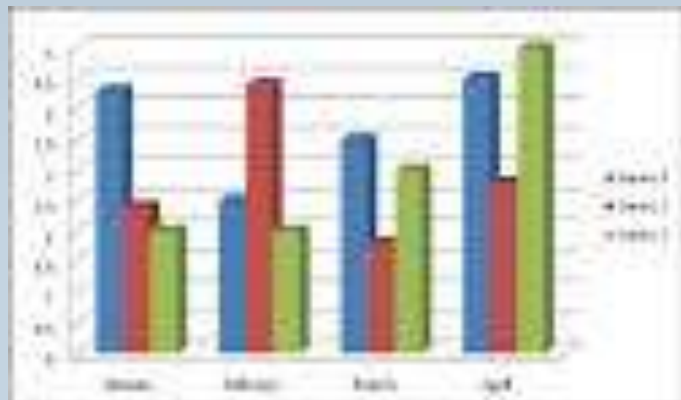
*Thus, the performance of some of the operators as mentioned above was not satisfactory as they failed to meet the benchmarks of the prime network parameters namely Voice Quality , CDR ,CSSR and Blocked Call Rate in all the three SSAs where the drive tests were conducted during the quarter ended June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

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

### AVERAGED QUARTERLY PMR

V/S

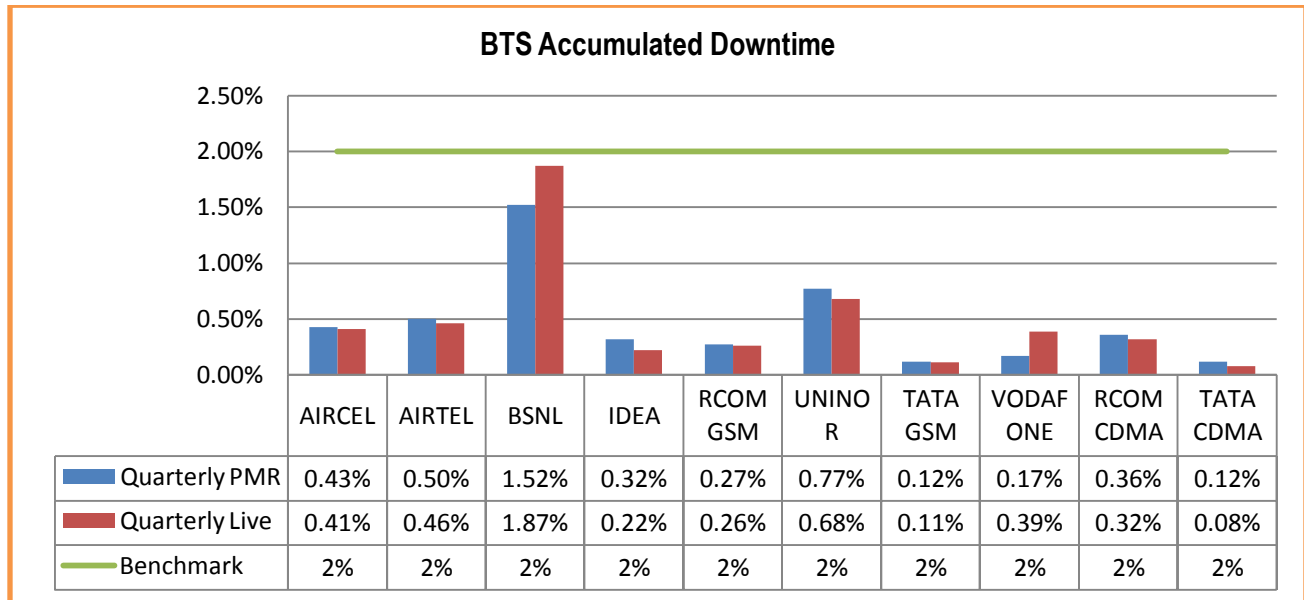
### AVERAGED QUARTERLY 3-DAYS LIVE MEASUREMENT



## 8. GRAPHICAL REPRESENTATION:

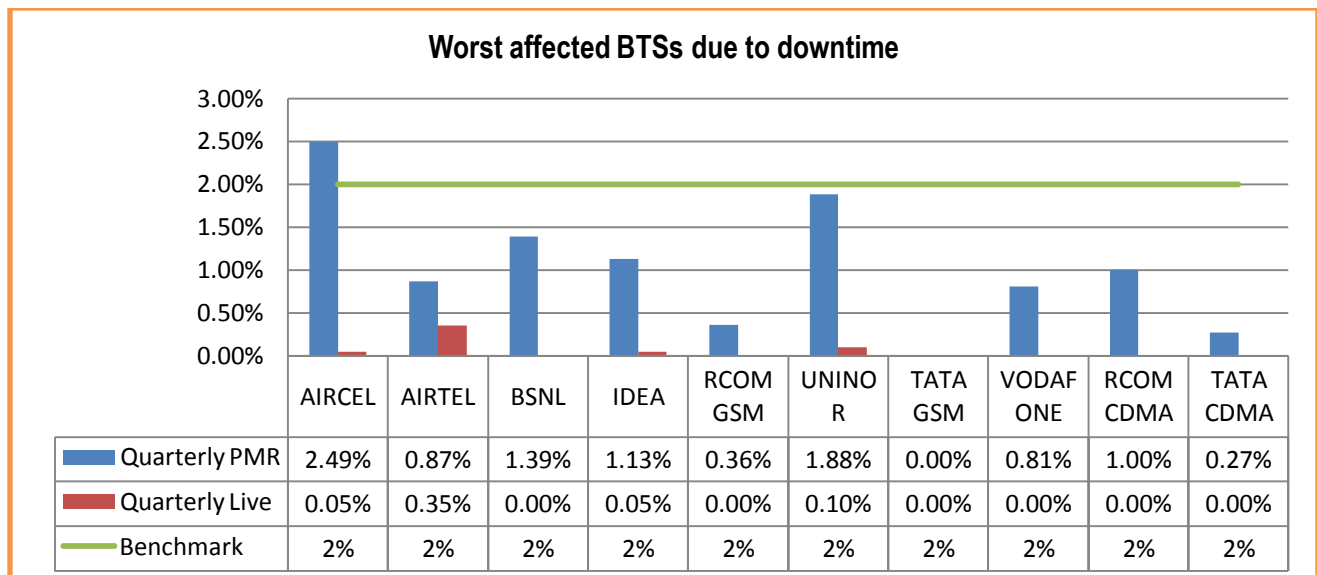
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

### 1) BTS ACCUMULATED DOWNTIMES:



All operators are meeting the benchmarks.

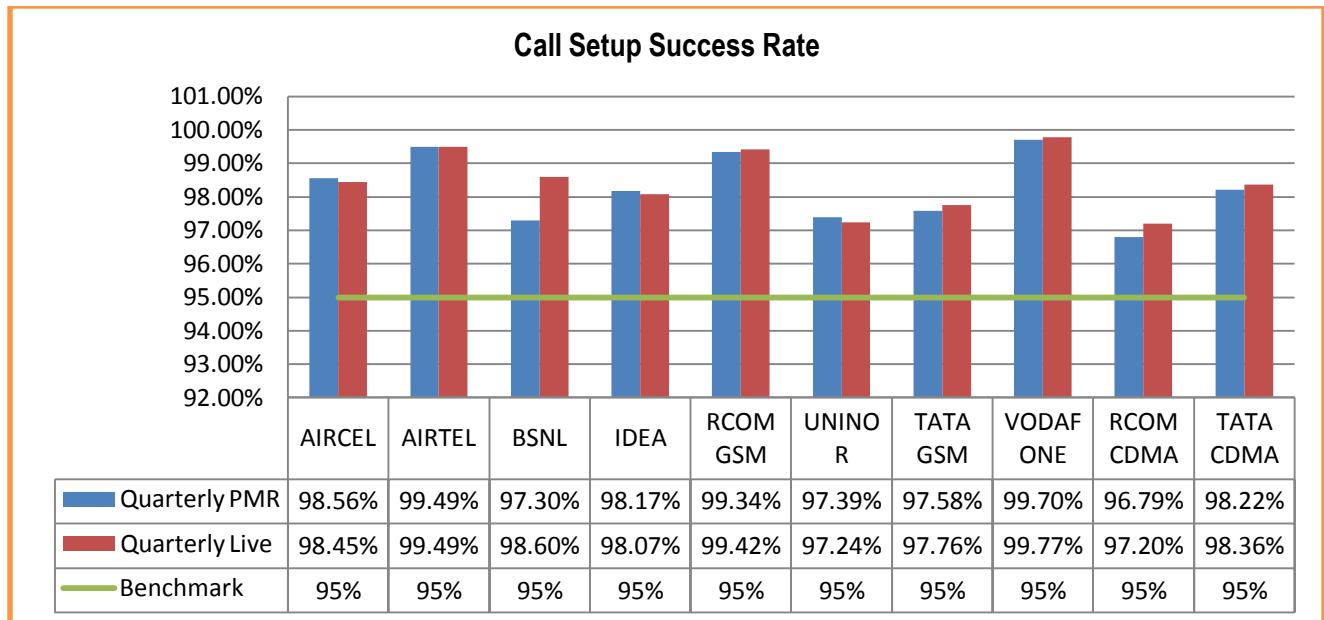
### 2) WORST AFFECTED BTSs DUE TO DOWNTIME:



All operators are meeting the benchmarks except Aircel.

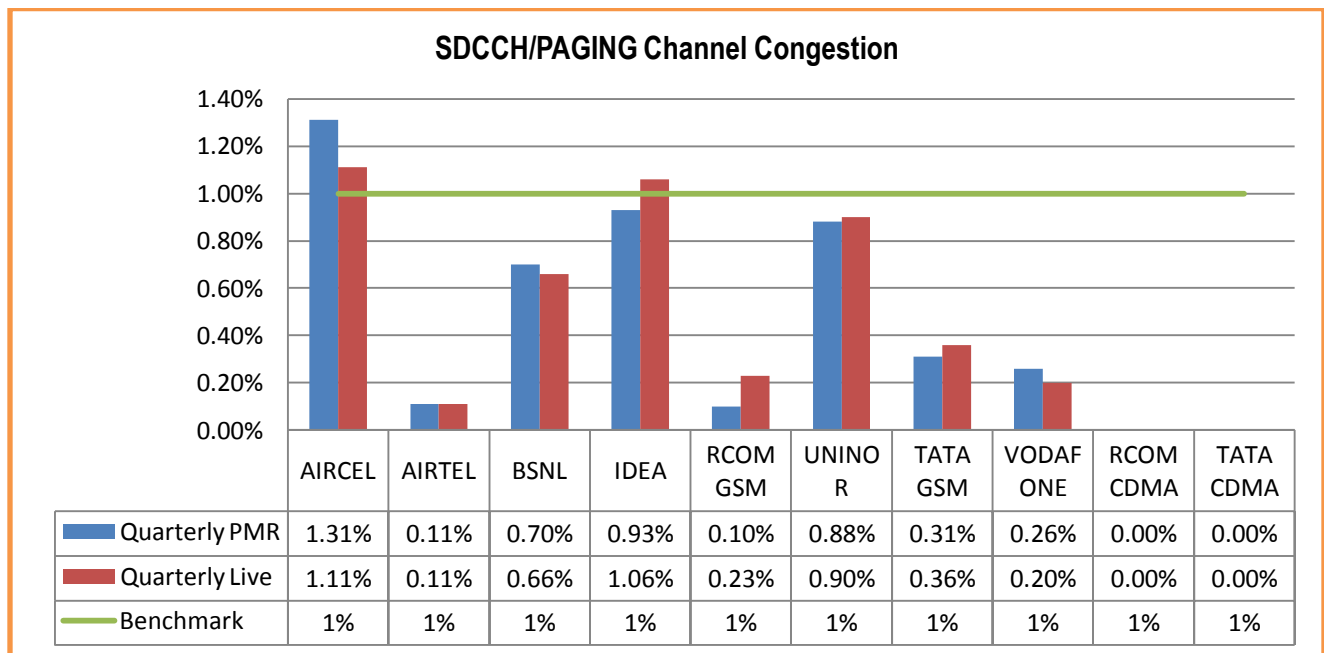


3) CALL SETUP SUCCESS RATE:



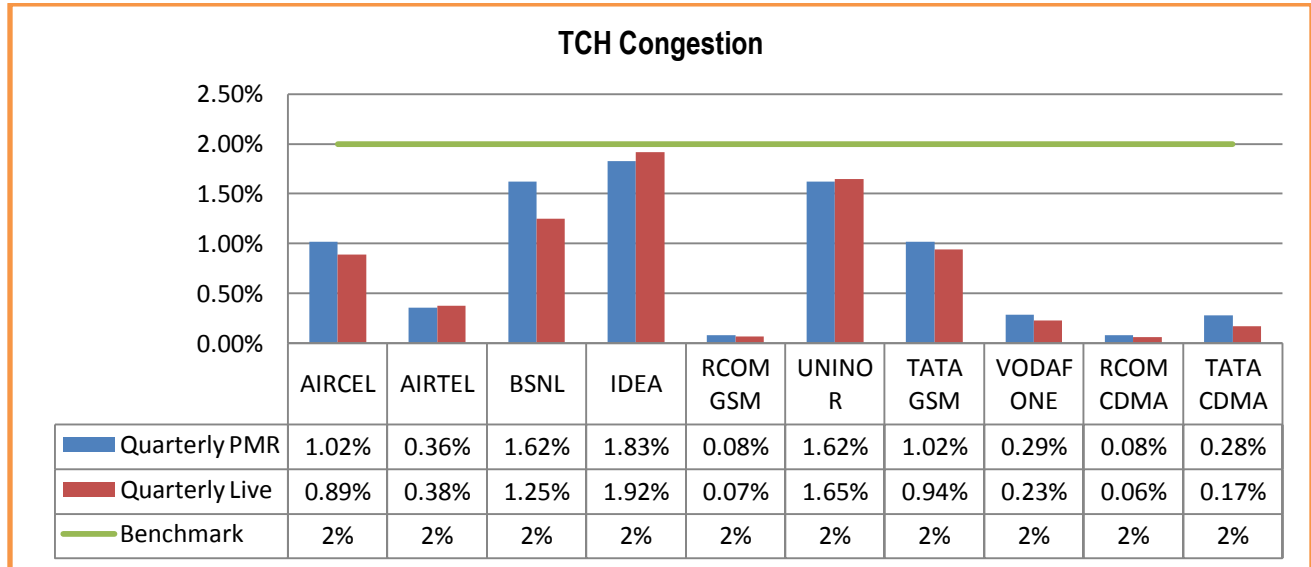
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



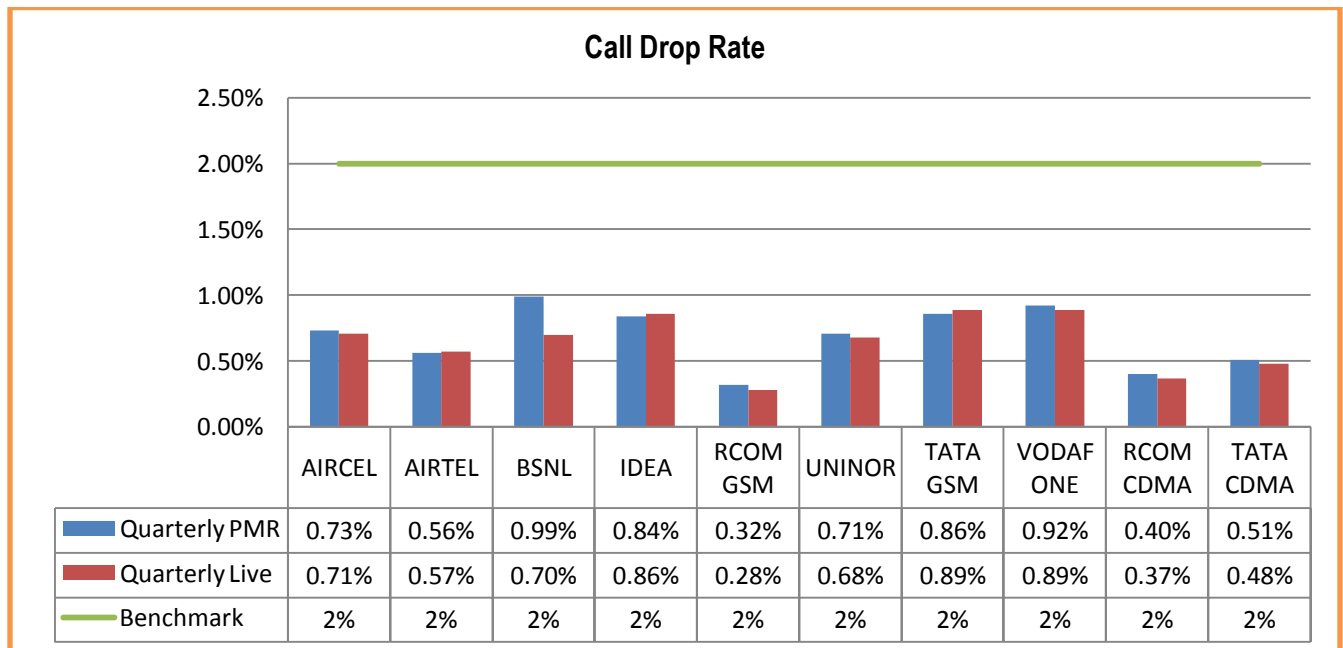
All operators are meeting the benchmarks except Aircel. Idea also failed to meet the benchmark during 3 days live measurement.

5) TCH CONGESTION:



All operators are meeting the benchmarks.

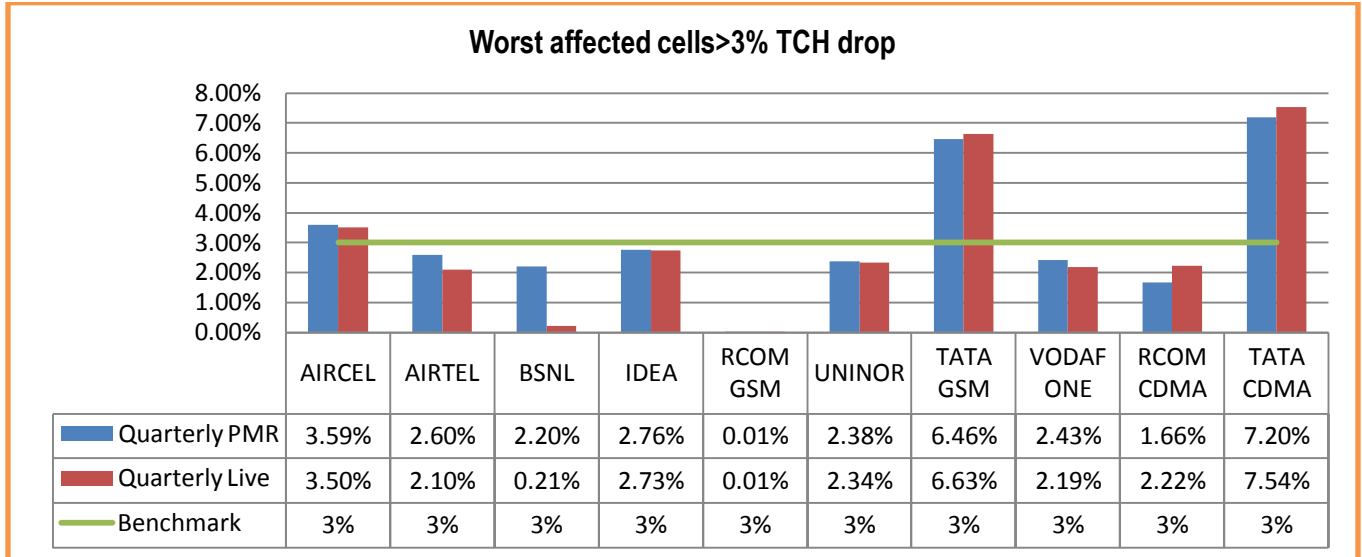
6) CALL DROP RATE:



All operators are meeting the benchmarks.

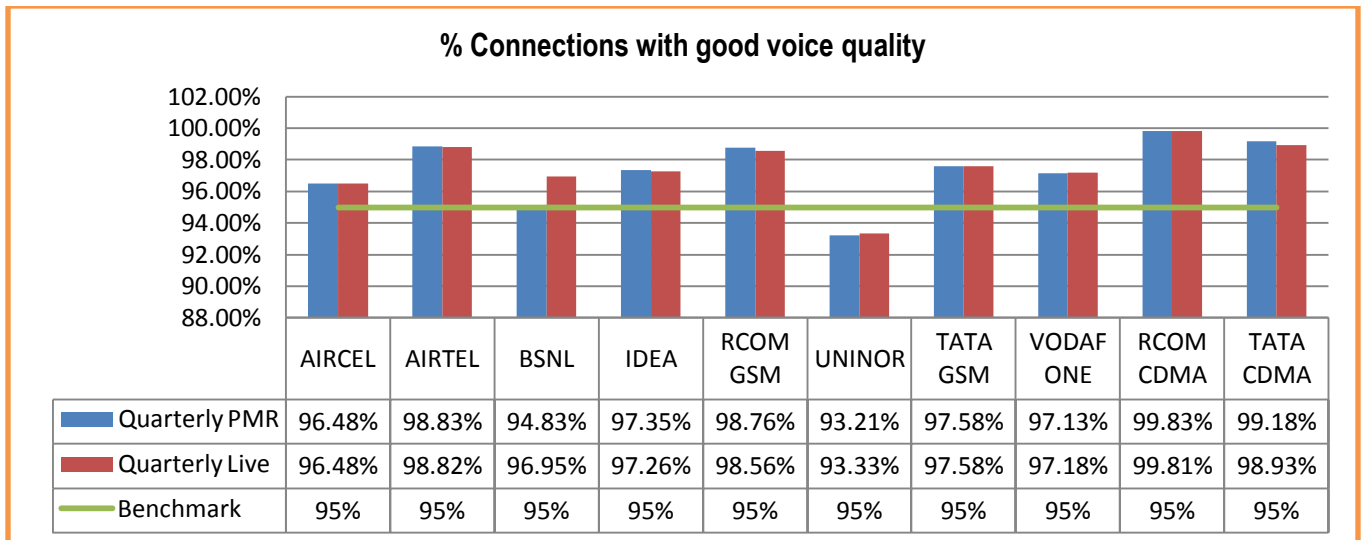


7) WORST AFFECTED CELLS>3% TCH DROP:



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

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks except BSNL and Uninor.