



**Audit & Assessment of Quality of Service  
Of  
Cellular Mobile Telephone Service  
For  
Telecom Regulatory Authority of India**

**North Zone – UP (East) Service Area  
(October 2014 – December 2014)**

**Prepared by  
TÜV SÜD SOUTH ASIA PVT. LTD,  
C-153/1, Okhla Industrial Estate,  
Phase-1, New Delhi – 110020  
Telephone 011- 30889611  
Fax: 011-30889595**

## 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.

## Table of Contents

1. BACKGROUND .....	6
2. OBJECTIVES AND METHODOLOGY .....	9
3. SAMPLE SIZE .....	11
3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS .....	11
3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES .....	12
3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS .....	12
4. EXECUTIVE SUMMARY .....	14
5. PMR AUDIT REPORTS: .....	17
5.1 MONTHLY PMR: .....	17
5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS: .....	17
5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS: .....	17
5.1.3 QOS PERFORMANCE OF MONTHLY PMR – OCTOBER 14 MONTH: .....	18
5.1.4 QOS PERFORMANCE OF MONTHLY PMR – NOVEMBER 14 MONTH: .....	19
5.1.5 QOS PERFORMANCE OF MONTHLY PMR – DECEMBER 14 MONTH .....	20
5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- DECEMBER 14 (OCT. TO DEC. 2014 MONTHS AUDITED DATA) .....	21
5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS: .....	22
5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER): .....	25
5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – OCTOBER 14 MONTH: .....	25
5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – NOVEMBER 14 MONTH: .....	26
5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – DECEMBER 14 MONTH: .....	27
5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF OCTOBER TO DECEMBER 2014) .....	28
5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS: .....	28
5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES: .....	29
5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS - QE DEC 14: .....	37
5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (OCTOBER TO DECEMBER 2014 MONTHS AUDITED DATA): .....	37
5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-DEC 2014): .....	40

5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS	41
6. LIVE CALLING ASSESSMENT:	43
6.1 INTER OPERATOR CALLS ASSESSMENT:	43
6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:	44
6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:	44
6.4 LEVEL -1 CALLING ASSESSMENT:	45
7. OPERATOR ASSISTED DRIVE TEST	47
7.1 OPERATOR ASSISTED DRIVE TEST: SULTANPUR SSA (OCTOBER-14)	48
7.2 OPERATOR ASSISTED DRIVE TEST: LAKHIMPUR KHERI SSA (NOVEMBER-14)	51
7.3 OPERATOR ASSISTED DRIVE TEST: ALLAHABAD SSA (DECEMBER-14)	54
7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:	57
7.5 SSA WISE DRIVE TEST OBSERVATION:	59
7.6 KEY FINDINGS ON DRIVE TEST:	64
8. GRAPHICAL REPRESENTATION:	66



## **1. BACKGROUND**



## 1. BACKGROUND

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

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

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

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

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

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

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

## **2. OBJECTIVES AND METHODOLOGY**





## **2. OBJECTIVES AND METHODOLOGY**

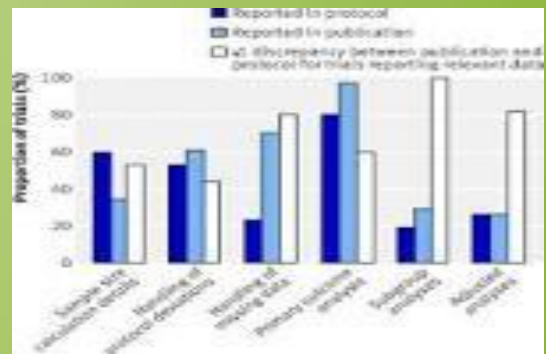
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service 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 Delhi, Haryana and Mumbai circles during the quarter October – December 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
		October-14	November-14	December-14	
<b>GSM Operators</b>					
1	AIRCEL	18, 21 & 22 Oct-14	1, 3 & 4 Nov-14	22 to 24 Dec-14	3rd floor,Ratan Square,Hajratganj,Lucknow
2	AIRTEL	6 to 8 Oct-14	3 to 5 Nov-14	8 to 10 Dec-14	TCG 7/7, vibhuti khand, Gomti Nagar,Lucknow
3	BSNL	16 to 18 Oct-14	19 to 21 Nov-14	22 to 24 Dec-14	BSNL, Mahanager , Lucknow
4	IDEA	10, 11 & 13 Oct-14	10 to 12 Nov-14	10 to 12 Dec-14	Idea Cellular Ltd., Fortuna Towers, 10 Rana Pratap Road, Lucknow-226001
5	RCOM GSM	20 to 22 Oct-14	12 to 14 Nov-14	9 to 11 Dec-14	House No. 12, C\O BTC House Eldeco Greens, Gomti Nagar, Lucknow-226010
6	VODAFONE	25, 27 & 28 Oct-14	3 to 5 Nov-14	8 to 10 Dec-14	Shalimar Titanium , Vibhuti Khand, Gomti Nagar , Lucknow
7	UNINOR	22 to 24 Oct-14	13, 14 & 17 Nov-14	5, 8 & 9 Dec-14	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
8	TATA GSM	26 to 28 Oct-14	5 to 7 Nov-14	8 to 10 Dec-14	Tata Teleservices Ltd., Prem Plaza Building 2, RF Bahadurji Marg, Lucknow
<b>CDMA Operators</b>					
9	RCOM CDMA	20 to 22 Oct-14	12 to 14 Nov-14	9 to 11 Dec-14	House No. 12, C\O BTC House Eldeco Greens, Gomti Nagar, Lucknow-226010
10	TATA CDMA	26 to 28 Oct-14	5 to 7 Nov-14	8 to 10 Dec-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 Dec - 2014.
- The data generated by monthly PMR and 3-days live measurements audit for the period October 2014 to December 2014 has been successfully uploaded to the server located at TRAI premises.

### 3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles **once in a year. Based on this criterion, QoS audit for basic (wire line) service was not required to be done for UP(E) Circle in the quarter ended December- 2014.**

### 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

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

### 1. Cellular Mobile

(i) From monthly audit findings, it was concluded that the service providers largely met the benchmarks except **Aircel, Tata (GSM), Tata (CDMA), Vodafone** failed to meet the benchmarks of some of the parameter **Worst affected cells > 3% TCH drop** with their quarterly average performance as **3.09%, 7.37%, 8.90% and 7.00%** respectively. Further, **Uninor** lagged behind the benchmark of parameter **Voice Quality** having achieved the value of **92.32%**.

(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), Tata (CDMA) and Vodafone** 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 **3.18%, 8.03%, 9.36% and 8.22%** respectively. Further, **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 **92.17%**.

Similar non-compliance of **Aircel, Tata (GSM), Tata (CDMA), Vodafone 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 was revealed that most of the operators were in well compliance of the parameters on Metering and Billing Credibility, Termination of Service and Time taken for refunds. However, BSNL failed to meet the benchmark of parameter Accessibility with achieved performance as **92.52%**. Whereas, **RCOM CDMA** remained non-complied for parameter '**Calls answered by Operators (Voice to Voice)**' with its performance as **94.58%**.

In respect of the parameter **Time taken for refunds of deposits after closure**, only **Tata (CDMA)** failed to meet the benchmark achieving **98.81%**, against the benchmark of 100%.

(iv) With regard to the **Drive Test** results, it was revealed that the performance of majority of operators namely **BSNL, Tata (GSM) / (CDMA), RCOM (GSM) / (CDMA), Uninor, Vodafone, Airtel and Idea** was not satisfactory as they failed to meet the benchmarks of some of the parameters.. *The drive test results further suggest that **BSNL** needs to pay special attention to improve their network quality in respect the prime network parameters **Call Drop rate, Voice Quality, Call Setup success rate and Blocked Call rate**. However, for other service providers, the network parameters **Voice Quality and Call Drop rate also**, were the areas of concern.*

## **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	Dec-14	19:00 - 20:00
2	AIRTEL	Dec-14	20:00 - 21:00
3	BSNL	Dec-14	20:00 - 21:00
4	IDEA	Dec-14	19:00 - 20:00
5	RCOM GSM	Dec-14	19:00 - 20:00
6	UNINOR	Dec-14	19:00 - 20:00
7	TATA GSM	Dec-14	19:00 - 20:00
8	VODAFONE	Dec-14	19:00 - 20:00
<b>CDMA Operators</b>			
9	RCOM CDMA	Dec-14	19:00 - 20:00
10	TATA CDMA	Dec-14	19:00 - 20:00

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

#### 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	5	28	3382	ZTE	ZTE
2	AIRTEL	47	109	9877	Ericsson	Ericsson
3	BSNL	26	96	6405	Ericsson & ZTE	Ericsson, NSN & ZTE
4	IDEA	10	43	7291	NSN	NSN
5	RCOM GSM	4	19	2106	Huawei	Huawei
6	UNINOR	14	32	4812	Ericsson	Ericsson
7	TATA GSM	4	22	2358	NSN	NSN
8	VODAFONE	18	140	9495	NSN	NSN
<b>CDMA Operators</b>						
9	RCOM CDMA	9	11	1152	Huawei & Lucent	Huawei & Lucent
10	TATA CDMA	4	6	321	Huawei & Ericsson	Huawei, ZTE & Motorola

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – OCTOBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- OCTOBER 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%	Oct-14	0.48%	0.49%	1.85%	0.39%	0.29%	0.63%	0.20%	0.14%	0.38%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Oct-14	4.29%	1.88%	1.72%	1.55%	0.90%	1.80%	1.95%	0.69%	1.56%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	98.47%	98.46%	98.62%	97.82%	99.45%	97.34%	96.31%	99.05%	97.98%	98.51%
	b) SDCCH/PAGING Channel congestion	<=1%	Oct-14	0.66%	0.39%	0.99%	0.77%	0.05%	0.48%	0.32%	0.36%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.93%	0.60%	1.85%	1.80%	0.09%	1.31%	1.86%	0.95%	0.04%	0.18%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Oct-14	0.64%	0.93%	1.88%	1.14%	0.47%	0.74%	0.98%	1.59%	0.29%	0.59%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-14	3.76%	2.81%	2.57%	2.81%	0.03%	2.74%	7.52%	9.89%	1.71%	9.01%
	c) Connections with good voice quality	>=95%	Oct-14	96.68%	97.22%	96.50%	96.34%	98.90%	92.17%	96.91%	95.92%	99.83%	99.17%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Oct-14	0	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – NOVEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE - NOVEMBER 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%	Nov-14	0.26%	0.34%	1.95%	0.27%	0.19%	0.41%	0.09%	0.09%	0.44%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Nov-14	1.04%	1.16%	1.87%	1.00%	0.38%	1.84%	0.30%	0.32%	1.65%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	98.64%	98.70%	97.50%	98.03%	99.47%	97.70%	96.74%	99.38%	98.66%	98.66%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-14	0.58%	0.33%	1.00%	0.86%	0.06%	0.38%	0.26%	0.17%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-14	0.60%	0.42%	1.88%	1.95%	0.09%	1.03%	1.49%	0.62%	0.02%	0.06%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Nov-14	0.57%	0.85%	1.87%	1.12%	0.46%	0.64%	1.07%	1.38%	0.25%	0.56%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-14	2.98%	2.81%	2.02%	2.79%	0.01%	1.78%	7.63%	6.62%	1.36%	8.74%
	c) Connections with good voice quality	>=95%	Nov-14	97.39%	97.53%	96.50%	96.39%	98.93%	92.13%	96.92%	96.50%	99.83%	99.19%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Nov-14	0	0	0	0	0	0	0	1	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – DECEMBER 14 MONTH

CELLULAR MOBILE TELEPHONE SERVICES - UP(E) CIRCLE- DECEMBER 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%	Dec-14	0.15%	0.44%	1.75%	0.25%	0.38%	0.36%	0.10%	0.11%	0.48%	0.12%
	b) Worst affected BTSs due to downtime	<=2%	Dec-14	0.41%	1.42%	1.80%	0.78%	0.66%	1.89%	0.30%	0.36%	1.91%	0.31%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	98.94%	98.84%	97.74%	98.49%	99.47%	97.97%	97.44%	99.24%	98.71%	98.73%
	b) SDCCH/PAGING Channel congestion	<=1%	Dec-14	0.56%	0.29%	0.86%	0.42%	0.02%	0.30%	0.18%	0.21%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.59%	0.36%	1.69%	1.47%	0.08%	0.94%	1.20%	0.77%	0.02%	0.05%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Dec-14	0.52%	0.73%	1.37%	1.21%	0.37%	0.62%	1.00%	1.10%	0.23%	0.55%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-14	2.54%	2.77%	2.81%	2.74%	0.03%	1.54%	<b>6.95%</b>	<b>4.50%</b>	1.05%	<b>8.95%</b>
	c) Connections with good voice quality	>=95%	Dec-14	98.36%	97.77%	96.50%	96.76%	98.97%	<b>92.67%</b>	97.09%	97.03%	99.86%	99.22%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Dec-14	0	0	0	0	0	0	0	<b>1</b>	0	0

**5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- DECEMBER 14 (OCT. TO DEC. 2014 MONTHS AUDITED DATA)**

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-DECEMBER-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	0.30%	0.42%	1.85%	0.30%	0.29%	0.47%	0.13%	0.11%	0.43%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.91%	1.49%	1.80%	1.11%	0.65%	1.84%	0.85%	0.46%	1.71%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.68%	98.67%	97.95%	98.11%	99.46%	97.67%	96.83%	99.22%	98.45%	98.63%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.60%	0.34%	0.95%	0.68%	0.04%	0.39%	0.25%	0.25%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.71%	0.46%	1.81%	1.74%	0.09%	1.09%	1.52%	0.78%	0.03%	0.10%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.58%	0.84%	1.71%	1.16%	0.43%	0.67%	1.02%	1.36%	0.26%	0.57%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.09%	2.80%	2.47%	2.78%	0.02%	2.02%	7.37%	7.00%	1.37%	8.90%
	c) Connections with good voice quality	>=95%	Quarterly	97.48%	97.51%	96.50%	96.50%	98.93%	92.32%	96.97%	96.48%	99.84%	99.19%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	1	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'. **Aircel** could not meet the benchmark for the parameter '**worst affected BTSs due to down time**' with its performance as **4.29%** in the month of October-14. However, its average performance was within the benchmark.

- **Connection Establishment (Accessibility)**

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

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

**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.

- **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 0.26%) was for RCOM CDMA during the quarter.

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

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

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Aircel, Tata (GSM), Tata (CDMA) and Vodafone** which remained non-complied in all the 3 months of the quarter. The quarterly average performance level of **Aircel, Tata (GSM), Tata (CDMA) and Vodafone** was **3.09 %**, **7.37%**, **8.90% and 7.00%** respectively.

- iii. Connections with good voice quality:

The audit results for this parameter indicates that all operators have met the bench mark for the parameter except **Uninor**. **Uninor** failed to meet the benchmark with its average performance of **92.32%**.

- vi. No. of POI's having  $\geq 0.5\%$  POI congestion:

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter as there was no individual POI having congestion  $> 0.5\%$ . Only **Vodafone** was having congestion on **One** POI.

**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) – OCTOBER 14 MONTH:**

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE- OCTOBER 14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCON GSM	UNINOR	TATA GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.30%	0.31%	1.93%	0.29%	0.27%	0.34%	0.07%	0.98%	0.29%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.09%	0.16%	0.14%	0.05%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.62%	98.50%	97.58%	98.29%	99.52%	96.85%	96.73%	99.15%	97.56%	98.51%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.54%	0.42%	0.65%	0.78%	0.02%	0.39%	0.22%	0.26%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.63%	0.53%	1.83%	1.70%	0.07%	1.71%	1.59%	0.85%	0.05%	0.29%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.60%	0.89%	1.25%	1.14%	0.45%	0.85%	0.95%	1.45%	0.26%	0.59%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	3.51%	2.77%	0.55%	2.82%	0.02%	2.88%	7.49%	10.63%	1.46%	9.55%
	c) Connections with good voice quality	>=95%	Live data	96.87%	97.29%	96.67%	96.49%	98.92%	91.66%	96.92%	96.14%	99.83%	99.18%
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) – NOVEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE – NOVEMBER 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	1.07%	0.35%	1.96%	0.28%	0.09%	0.33%	0.11%	0.62%	0.39%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.21%	0.20%	0.20%	0.04%	0.00%	0.06%	0.00%	0.26%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.55%	98.55%	97.42%	98.16%	99.48%	97.85%	96.08%	99.34%	98.07%	98.52%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.71%	0.49%	0.73%	0.59%	0.07%	0.25%	0.75%	0.22%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.70%	0.40%	1.51%	1.82%	0.08%	0.96%	1.71%	0.66%	0.03%	0.09%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.63%	0.92%	1.73%	1.12%	0.44%	0.62%	1.08%	1.65%	0.27%	0.60%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	3.93%	2.82%	0.34%	2.70%	0.01%	1.76%	9.13%	9.88%	1.49%	8.92%
	c) Connections with good voice quality	>=95%	Live data	96.89%	97.31%	96.65%	96.20%	98.95%	92.20%	96.93%	96.01%	99.81%	99.17%
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) – DECEMBER 14 MONTH:**

CELLULAR MOBILE TELEPHONE SERVICES UP(E) CIRCLE - DECEMBER 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	0.14%	0.28%	1.97%	0.28%	0.38%	0.44%	0.05%	0.46%	0.52%	0.16%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.14%	0.27%	0.04%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.98%	98.80%	97.00%	98.47%	99.43%	98.02%	96.81%	99.34%	98.92%	98.64%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.44%	0.34%	0.76%	0.43%	0.02%	0.34%	0.20%	0.25%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.55%	0.33%	1.50%	1.51%	0.09%	0.92%	1.18%	0.66%	0.02%	0.04%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.47%	0.75%	1.85%	1.19%	0.44%	0.59%	1.01%	1.10%	0.21%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.11%	2.77%	0.47%	2.74%	0.01%	1.52%	<b>7.46%</b>	<b>4.14%</b>	1.30%	<b>9.62%</b>
	c) Connections with good voice quality	>=95%	Live data	98.56%	97.74%	96.66%	96.70%	98.96%	<b>92.64%</b>	97.10%	96.98%	99.85%	99.23%
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	<b>1</b>	0	0

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

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE- DEC 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	0.50%	0.31%	1.95%	0.28%	0.25%	0.37%	0.08%	0.69%	0.40%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.10%	0.17%	0.20%	0.04%	0.00%	0.03%	0.00%	0.12%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.72%	98.62%	97.33%	98.31%	99.48%	97.57%	96.54%	99.28%	98.18%	98.56%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.56%	0.42%	0.71%	0.60%	0.04%	0.33%	0.39%	0.24%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.63%	0.42%	1.61%	1.68%	0.08%	1.20%	1.49%	0.72%	0.03%	0.14%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.57%	0.85%	1.61%	1.15%	0.44%	0.69%	1.01%	1.40%	0.25%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	<b>3.18%</b>	2.79%	0.45%	2.75%	0.01%	2.05%	<b>8.03%</b>	<b>8.22%</b>	1.42%	<b>9.36%</b>
	c) Connections with good voice quality	>=95%	Quarterly	97.44%	97.45%	96.66%	96.46%	98.94%	<b>92.17%</b>	96.98%	96.38%	99.83%	99.19%
4	No. of POI having >=0.5% congestion	<0.5%	Quarterly	0	0	0	0	0	0	0	<b>1</b>	0	0

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

Three days live assessment revealed that the operators were meeting the benchmark of most of the parameters. However, **Aircel, Tata (GSM), Tata (CDMA) and Vodafone** 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 **3.18%, 8.03%, 9.36%** and **8.22%** respectively. Further, **Uninor**, lagged behind the benchmark for the parameter ‘**Voice Quality**’ in all the three months of the quarter with its average performance as **92.17%**. Only **Vodafone** was having congestion on **One** POI.

Similar non-compliance of **Aircel, Tata (GSM), Tata (CDMA), Vodafone 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 - October 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		Oct-14	3357	9809	6405	7284	2118	4772	2360	9370	1153	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		Oct-14	12100.05	35947.47	88158.73	21141.00	4629.07	22242.60	3570.87	9645.39	3253.22	86.51
	c) BTS Accumulated Downtime	<=2%	Oct-14	0.48%	0.49%	1.85%	0.39%	0.29%	0.63%	0.20%	0.14%	0.38%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-14	144	184	110	113	19	86	46	65	18	0
	e) Worst affected BTSs due to downtime	<=2%	Oct-14	4.29%	1.88%	1.72%	1.55%	0.90%	1.80%	1.95%	0.69%	1.56%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	98.47%	98.46%	98.62%	97.82%	99.45%	97.34%	96.31%	99.05%	97.98%	98.51%
	b) SDCCH/PAGING Congestion	<=1%	Oct-14	0.66%	0.39%	0.99%	0.77%	0.05%	0.48%	0.32%	0.36%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.93%	0.60%	1.85%	1.80%	0.09%	1.31%	1.86%	0.95%	0.04%	0.18%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Oct-14	0.64%	0.93%	1.88%	1.14%	0.47%	0.74%	0.98%	1.59%	0.29%	0.59%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-14	3.76%	2.81%	2.57%	2.81%	0.03%	2.74%	7.52%	9.89%	1.71%	9.01%
	c) % of connections with good voice quality	>=95%	Oct-14	96.68%	97.22%	96.50%	96.34%	98.90%	92.17%	96.91%	95.92%	99.83%	99.17%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Oct-14	381	827	153	617	2	392	531	2764	59	87
	e) Total no. of cells (Sector) in the licensed service area		Oct-14	10124	29417	5946	21960	6323	14311	7056	27941	3469	967
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Oct-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Oct-14	0	0	0	0	0	0	0	0	0	0

Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(E) Circle - October 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 Data</b>													
5	a) Equipped Capacity of Network in Erlang		Oct-14	153055	538487	469000	215379	140000	248249	136562	570749	176000	51455
	b) Total traffic in TCBH in erlang (Avg.)		Oct-14	109215	509069	240523	207245	101011	307394	62407	467444	56665	5176
	c) Total no. of customers served (as per VLR) on last day of the month		Oct-14	3842137	17242697	4561544	8898303	5257020	7486423	2588282	16471023	2426295	131345

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(E) Circle – October 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	3340	9753	6405	7284	2118	4764	2360	9300	1153	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	716.88	2186.32	8908.99	1531.43	407.87	1149.92	119.91	6565.10	242.10	2.82
	c) BTS Accumulated Downtime	<=2%	Live data	0.30%	0.31%	1.93%	0.29%	0.27%	0.34%	0.07%	0.98%	0.29%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	3	16	9	4	0	0	0	8	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.09%	0.16%	0.14%	0.05%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.62%	98.50%	97.58%	98.29%	99.52%	96.85%	96.73%	99.15%	97.56%	98.51%
	b) SDCC/PAGING Congestion	<=1%	Live data	0.54%	0.42%	0.65%	0.78%	0.02%	0.39%	0.22%	0.26%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.63%	0.53%	1.83%	1.70%	0.07%	1.71%	1.59%	0.85%	0.05%	0.29%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.60%	0.89%	1.25%	1.14%	0.45%	0.85%	0.95%	1.45%	0.26%	0.59%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	3.51%	2.77%	0.55%	2.82%	0.02%	2.88%	7.49%	10.63%	1.46%	9.55%
	c) % of connections with good voice quality	>=95%	Live data	96.87%	97.29%	96.67%	96.49%	98.92%	91.66%	96.92%	96.14%	99.83%	99.18%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	353	809	33	619	1	414	528	2941	51	92
	e) Total no. of cells (Sector) in the licensed service area		Live data	10073	29234	5946	21960	6323	14368	7056	27671	3469	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	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 - November 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									
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Nov-14	3357	9853	6405	7285	2106	4795	2360	9475	1152	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		Nov-14	6198.16	24148.43	89926.20	14068.50	2870.58	14045.81	1486.77	6418.13	3623.33	166.49
	c) BTS Accumulated Downtime	<=2%	Nov-14	0.26%	0.34%	1.95%	0.27%	0.19%	0.41%	0.09%	0.09%	0.44%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-14	35	114	120	73	8	88	7	30	19	0
e) Worst affected BTSs due to downtime	<=2%	Nov-14	1.04%	1.16%	1.87%	1.00%	0.38%	1.84%	0.30%	0.32%	1.65%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	98.64%	98.70%	97.50%	98.03%	99.47%	97.70%	96.74%	99.38%	98.66%	98.66%
	b) SDCCCH/PAGING Congestion	<=1%	Nov-14	0.58%	0.33%	1.00%	0.86%	0.06%	0.38%	0.26%	0.17%	0.00%	0.00%
c) TCH congestion	<=2%	Nov-14	0.60%	0.42%	1.88%	1.95%	0.09%	1.03%	1.49%	0.62%	0.02%	0.06%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Nov-14	0.57%	0.85%	1.87%	1.12%	0.46%	0.64%	1.07%	1.38%	0.25%	0.56%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-14	2.98%	2.81%	2.02%	2.79%	0.01%	1.78%	<b>7.63%</b>	<b>6.62%</b>	1.36%	<b>8.74%</b>
	c) % of connections with good voice quality	>=95%	Nov-14	97.39%	97.53%	96.50%	96.39%	98.93%	<b>92.13%</b>	96.92%	96.50%	99.83%	99.19%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-14	303	832	120	613	1	257	537	1866	47	84
e) Total no. of cells (Sector) in the licensed service area		Nov-14	10169	29556	5946	21962	6323	14431	7042	28196	3421	964	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Nov-14	0	0	0	0	0	0	0	<b>1</b>	0	0
	Name of POI not meeting the benchmark		Nov-14	0	0	0	0	0	0	0	Airtel Fixed line	0	0
5	<b>Network Data</b>												
	a) Equipped Capacity of Network in Erlang		Nov-14	153785	539837	469000	216065	140000	254394	136507	571828	176000	51455
	b) Total traffic in TCBH in erlang (Avg.)		Nov-14	112017	496962	219512	208921	94951	322372	64705	474962	50757	5100
c) Total no. of customers served (as per VLR) on last day of the month		Nov-14	3947377	17303814	4569760	9000021	5403384	7681952	2664279	16549703	2402615	97559	



TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - UP(E) Circle - November 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	3358	9814	6405	7284	2106	4792	2360	9370	1152	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	2591.60	2446.57	9021.16	1466.25	134.20	1121.76	184.09	4204.73	321.80	3.62
	c) BTS Accumulated Downtime	<=2%	Live data	1.07%	0.35%	1.96%	0.28%	0.09%	0.33%	0.11%	0.62%	0.39%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	7	20	13	3	0	3	0	24	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.21%	0.20%	0.20%	0.04%	0.00%	0.06%	0.00%	0.26%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.55%	98.55%	97.42%	98.16%	99.48%	97.85%	96.08%	99.34%	98.07%	98.52%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.71%	0.49%	0.73%	0.59%	0.07%	0.25%	0.75%	0.22%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.70%	0.40%	1.51%	1.82%	0.08%	0.96%	1.71%	0.66%	0.03%	0.09%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.63%	0.92%	1.73%	1.12%	0.44%	0.62%	1.08%	1.65%	0.27%	0.60%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	<b>3.93%</b>	2.82%	0.34%	2.70%	0.01%	1.76%	<b>9.13%</b>	<b>9.88%</b>	1.49%	<b>8.92%</b>
	c) % of connections with good voice quality	>=95%	Live data	96.89%	97.31%	96.65%	96.20%	98.95%	<b>92.20%</b>	96.93%	96.01%	99.81%	99.17%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	399	829	20	594	1	254	643	2729	45	86
	e) Total no. of cells (Sector) in the licensed service area		Live data	10142	29426	5946	21960	6323	14442	7044	27618	3011	964
<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	<b>1</b>	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	Airtel Fixed Line	0	0



**TABLE: 5**

Detailed Network Data Assessment of Cellular Mobile Telephone Services - UP(E) Circle - December 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									
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Dec-14	3382	9877	6405	7291	2106	4812	2358	9495	1152	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		Dec-14	3659.02	32332.12	83393.10	13299.03	3631.62	12972.15	1811.66	7510.73	4118.50	277.82
	c) BTS Accumulated Downtime	<=2%	Dec-14	0.15%	0.44%	1.75%	0.25%	0.38%	0.36%	0.10%	0.11%	0.48%	0.12%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-14	14	140	115	57	14	91	7	34	22	1
	e) Worst affected BTSs due to downtime	<=2%	Dec-14	0.41%	1.42%	1.80%	0.78%	0.66%	1.89%	0.30%	0.36%	1.91%	0.31%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	98.94%	98.84%	97.74%	98.49%	99.47%	97.97%	97.44%	99.24%	98.71%	98.73%
	b) SDCCCH/PAGING Congestion	<=1%	Dec-14	0.56%	0.29%	0.86%	0.42%	0.02%	0.30%	0.18%	0.21%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.59%	0.36%	1.69%	1.47%	0.08%	0.94%	1.20%	0.77%	0.02%	0.05%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Dec-14	0.52%	0.73%	1.37%	1.21%	0.37%	0.62%	1.00%	1.10%	0.23%	0.55%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-14	2.54%	2.77%	2.81%	2.74%	0.03%	1.54%	<b>6.95%</b>	<b>4.50%</b>	1.05%	<b>8.95%</b>
	c) % of connections with good voice quality	>=95%	Dec-14	98.36%	97.77%	96.50%	96.76%	98.97%	<b>92.67%</b>	97.09%	97.03%	99.86%	99.22%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-14	259	823	167	603	2	218	491	1276	36	87
	e) Total no. of cells (Sector) in the licensed service area		Dec-14	10197	29662	5946	21980	6289	14173	7061	28377	3466	967
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Dec-14	0	0	0	0	0	0	0	<b>1</b>	0	0
	Name of POI not meeting the benchmark		Dec-14	0	0	0	0	0	0	0	Airtel Fixed line	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		Dec-14	151720	540254	469000	216052	140000	251673	136378	574869	176000	51455
	b) Total traffic in TCBH in erlang (Avg.)		Dec-14	109178	452426	230485	208724	95347	316956	64090	453977	46449	4523
	c) Total no. of customers served (as per VLR) on last day of the month		Dec-14	3954958	17181150	4549285	9062078	5418490	7739959	2706912	16381768	2332920	98837

NP: Not Provided

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - UP(E) Circle - December 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>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	3377	9853	6405	7285	2106	4804	2358	9475	1152	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	328.69	1959.08	9100.00	1477.62	581.53	1520.41	78.69	3127.98	431.33	37.04
	c) BTS Accumulated Downtime	<=2%	Live data	0.14%	0.28%	1.97%	0.28%	0.38%	0.44%	0.05%	0.46%	0.52%	0.16%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	14	17	3	0	1	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.14%	0.27%	0.04%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.98%	98.80%	97.00%	98.47%	99.43%	98.02%	96.81%	99.34%	98.92%	98.64%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.44%	0.34%	0.76%	0.43%	0.02%	0.34%	0.20%	0.25%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.55%	0.33%	1.50%	1.51%	0.09%	0.92%	1.18%	0.66%	0.02%	0.04%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.47%	0.75%	1.85%	1.19%	0.44%	0.59%	1.01%	1.10%	0.21%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.11%	2.77%	0.47%	2.74%	0.01%	1.52%	<b>7.46%</b>	<b>4.14%</b>	1.30%	<b>9.62%</b>
	c) % of connections with good voice quality	>=95%	Live data	98.56%	97.74%	96.66%	96.70%	98.96%	<b>92.64%</b>	97.10%	96.98%	99.85%	99.23%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	215	820	28	602	1	221	527	1167	45	93
	e) Total no. of cells (Sector) in the licensed service area		Live data	10185	29559	5946	21962	6289	14482	7061	28196	3466	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	0	0	0	0	0	0	0	<b>1</b>	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	Airtel Fixed Line	0	0

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



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

**5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (OCTOBER TO DECEMBER 2014 MONTHS AUDITED DATA):**

**QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE DECEMBER 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>Metering &amp; Billing Credibility -Post Paid</b>													
1	A) No. of bills issued during the quarter		UPE	5748	447837	257364	191755	62490	97899	NA	1259773	227690	21881
	B) No. of bills disputed including billing complaints during the quarter		UPE	0	67	117	146	34	0	NA	855	182	0
	C)% of billing complaints during the quarter	<= 0.1%	UPE	0.00%	0.01%	0.05%	0.08%	0.05%	0.00%	NA	0.07%	0.08%	0.00%
<b>Metering &amp; Billing Credibility -Pre Paid</b>													
2	A) Total No. of Pre-paid customers at the end of the quarter		UPE	6006253	17478838	7627990	8668445	5446360	4539456	9742641	16482011	2371628	288945
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		UPE	0	266	2571	3073	4858	0	6708	6147	1554	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	UPE	0.000%	0.002%	0.03%	0.04%	0.09%	0.00%	0.07%	0.04%	0.07%	0.00%
<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>													
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		UPE	0	333	2571	14869	4892	282	6708	7002	1736	17
	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	0	333	2571	14869	4892	282	6708	7002	1736	17
	C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		UPE	0	333	2571	14869	4892	282	6708	7002	1736	17

**QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE DECEMBER 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	
	D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	>=98% within 4 weeks	UPE	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	E) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	100% within 6 weeks	UPE	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	UPE	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	<b>Response time to customers for assistance</b>												
	A) Total no of calls attempted to customer care/Call center		UPE	23877105	6800440	7482638	19766083	6628625	1376347	37304228	34754237	3109364	58298
	B) Total no. of calls successfully established to customer care/Call center.		UPE	22788389	6800440	6923159	19721145	6556445	1366490	36078634	34754237	3035278	58016
4	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	UPE	95.44%	100.00%	92.52%	99.77%	98.91%	99.28%	96.71%	100.00%	97.62%	99.52%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		UPE	5172969	8932641	3082578	7023910	1460709	1790415	11164255	9031622	463869	44833
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		UPE	5048898	8632953	2955444	7014167	1402790	1745513	11108886	8926578	438746	43668
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	UPE	97.60%	96.65%	95.88%	99.86%	96.03%	97.49%	99.50%	98.84%	94.58%	97.40%
	<b>Termination/closure of service</b>												
5	A) Total No. of requests for Termination / Closure of service received during the quarter		UPE	72	1912	55407	2586	261	1272	NA	17533	1048	258
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		UPE	72	1912	55407	2586	261	1272	NA	17533	1048	258

**QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE DECEMBER 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	
	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	<b>Time taken for refunds of deposits after closures.</b>												
	A) No. of Payments/ Refunds due during the quarter		UPE	122	1459	938	1210	511	165	NA	3375	1758	84
	B) No. of Payments/ Refunds Cleared during the quarter		UPE	122	1459	938	1210	511	165	NA	3375	1758	83
	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%	98.81%

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-DEC 2014):**

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE- DECEMBER 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	A) Total no of calls attempted to customer care/Call center		UP East	875368	250591	194940	825730	1306503	260250	42579	1208346	84395	1660
	B) Total no. of calls successfully established to customer care/Call center.		UP East	862168	250591	194679	825730	1291675	258143	42325	1208346	82337	1652
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	UP East	98.49%	100.00%	99.87%	100.00%	98.87%	99.19%	99.40%	100.00%	97.56%	99.52%
2	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		UP East	189912	294577	92064	277309	467501	50947	60126	303320	15986	1233
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		UP East	182043	285387	91926	276300	449762	49007	59725	298780	15508	1221
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts )	>=95%	UP East	95.86%	96.88%	99.85%	99.64%	96.21%	96.19%	99.33%	98.50%	97.01%	99.03%



### 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 and within 6 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 except BSNL are in compliance with respect to the parameter Accessibility of call center. **BSNL** failed to meet the benchmark with achieved performance as **92.52%**. Whereas, **RCOM CDMA** remained non-complied for parameter **Calls answered by Operators (Voice to Voice)** with its performance as **94.58%**.

#### 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 except **Tata (CDMA)**, which could achieve **98.81%**, against the benchmark of 100%.

#### Live Measurements

The results for three days live measurements revealed that all service providers were in compliance with respect to the parameter '**Accessibility of call center**' and '**calls answered by operators (voice to voice)**' against the benchmark of  $\geq 95\%$ .

## **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	RCOM CDMA	TATA GSM	TATA CDMA	VODAFONE	UNINOR
AIRCEL	UP-E	---	100.00%	97.00%	100.00%	100.00%	100.00%	100.00%	96.00%	100.00%	97.00%
AIRTEL	UP-E	100.00%	---	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL	UP-E	100.00%	100.00%	---	100.00%	95.00%	96.00%	100.00%	100.00%	100.00%	96.00%
IDEA	UP-E	100.00%	100.00%	100.00%	---	100.00%	100.00%	100.00%	99.00%	100.00%	100.00%
RCOM GSM	UP-E	100.00%	100.00%	95.00%	100.00%	---	100.00%	100.00%	96.00%	100.00%	100.00%
RCOM CDMA	UP-E	100.00%	99.00%	100.00%	100.00%	100.00%	---	100.00%	100.00%	100.00%	99.00%
TATA GSM	UP-E	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	---	100.00%	100.00%	100.00%
TATA CDMA	UP-E	100.00%	100.00%	95.00%	100.00%	100.00%	97.00%	100.00%	---	100.00%	96.00%
VODAFONE	UP-E	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	---	100.00%
UNINOR	UP-E	96.00%	100.00%	97.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	---

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where calls attempted from Aircel to BSNL, Tata CDMA and Uninor, successful interconnection was 97%, 96% and 97%, Airtel to BSNL was 99% , BSNL to RCOM(GSM), RCOM (CDMA) and Uninor was 95%, 96% and 96%, RCOM (GSM) to BSNL and Tata CDMA was 95% and 96%, RCOM (CDMA) to Airtel and Uninor was 99% and 99%, Tata (CDMA) to BSNL, RCOM (CDMA) and Uninor was 95%, 97% and 96%, and Uninor to Aircel, BSNL and RCOM (CDMA) was 96%, 97% and 98%. 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 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 90 seconds	UP East	100	99	100	100	99	97	98	99	98	99
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100/ Total call attempts)	UP East	100.00%	99.00%	100.00%	100.00%	99.00%	97.00%	98.00%	99.00%	98.00%	99.00%

In case of calls answered by operators (voice to voice) within 90 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, Uninor, RCOM (GSM), Tata (GSM), Vodafone, RCOM (CDMA) and Tata (CDMA) could achieve their performance as 99.00%, 99.00%, 97.00%, 98.00%, 99.00%, 98.00%, and 99.00% 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	0	100	100	100	100	100	100	100	100	17
Total No. of calls Answered	UP East	0	65	43	52	57	49	61	66	38	9
Cases resolved within 4 weeks	UP East	0	65	43	52	57	49	61	66	38	9
%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/ or their mobile was off, while few others reported that their complaints have been resolved but not remembering 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 GSM	TATA CDMA	UNINOR	VODAFONE	
100, 101, 102, 108, 1090	UPE	Sultanpur	Sultanpur	10	√	√	√	√	√	√	√	√	√	√	
			Musafirkhana	10	√	√	√	√	√	NC	√	√	√	√	
			Kadipur	10	√	√	√	√	√	√	√	NC	√	√	
			Amethi	10	√	√	√	√	√	√	√	√	√	√	
100, 101, 102, 108, 1090	UPE	Lakhimpur Kheri	Kheri	10	√	√	√	√	√	√	√	√	√	√	
			Bhira	10	√	√	√	√	√	√	√	NC	√	√	
			Mohammadi	10	√	√	√	√	√	√	√	√	√	√	
			Maigalganj	10	√	√	√	√	√	√	√	√	√	√	
			Palliakalan	10	√	√	√	√	√	√	√	NC	√	√	
			Tikonja	10	√	NC	√	√	√	√	√	√	NC	√	√
			Dhaurahra	10	√	√	√	√	√	√	√	√	NC	√	√
100, 101, 102, 108, 1090	UPE	Allahabad	Allahabad	10	√	√	√	√	√	√	√	√	√	√	
			Bharwari	10	√	√	√	√	√	√	√	NC	√	√	
			Meja	10	√	√	√	√	√	√	√	NC	√	√	
			Karchhana	10	√	√	√	√	√	√	√	NC	√	√	
			Phoolpur	10	√	√	√	√	√	√	√	NC	√	√	
			Soraon	10	√	√	√	√	√	√	√	NC	√	√	

NC: No Coverage

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 drive tests were conducted, the calls were made from mobile phones provided by the service providers. In these SDCAs of UP (East) service areas, the emergency services as mentioned in the above table were found functional in the networks of all the service providers except at some places where there was no coverage as mentioned in the table above.

## 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 **Sultanpur, Lakhimpur Kheri and Allahabad** in the months of October, November and December 2014 respectively. The total route Kms covered during the drive tests in respective SSAs was **347 Kms, 436 Kms and 490 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: SULTANPUR SSA (OCTOBER-14)

DRIVE TEST TABLE: 1

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	33	26	94	25	48	27	55	25	28	25	NC	28	53	32	76	20	NC	28	3	28
		Highway	146	26	126	26	181	45	176	25	81	NC	35	30	116	26	155	25	46	38	13	NC
		Within City	120	26	41	26	64	85	87	27	75	25	57	28	48	25	102	25	69	31	64	27
		Overall SSA	299	78	261	77	293	157	318	77	184	50	92	86	217	83	333	70	115	97	80	55
2	Blocked Call Rate	Major Road	0.00%	0.00%	1.06%	0.00%	6.25%	0.00%	1.82%	0.00%	0.00%	8.00%	NC	3.57%	0.00%	0.00%	0.00%	0.00%	NC	0.00%	0.00%	0.00%
		Highway	1.37%	0.00%	0.00%	0.00%	8.29%	0.00%	1.14%	0.00%	0.00%	NC	2.86%	0.00%	0.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC
		Within City	0.00%	0.00%	0.00%	0.00%	7.81%	14.12%	2.30%	0.00%	0.00%	0.00%	1.75%	0.00%	2.08%	0.00%	0.00%	0.00%	0.00%	0.00%	1.56%	0.00%
		Overall SSA	0.67%	0.00%	0.38%	0.00%	7.85%	7.64%	1.57%	0.00%	0.00%	4.00%	2.17%	1.16%	0.92%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%
3	Dropped Call Rate (<=2%)	Major Road	0.00%	0.00%	0.00%	0.00%	8.57%	0.00%	1.96%	0.00%	0.00%	0.00%	NC	3.70%	0.00%	0.00%	0.00%	0.00%	NC	3.57%	0.00%	0.00%
		Highway	0.00%	0.00%	0.00%	0.00%	5.60%	0.00%	0.00%	0.00%	2.47%	NC	0.00%	0.00%	1.74%	0.00%	0.00%	0.00%	2.17%	0.00%	0.00%	NC
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.23%	0.00%	0.00%	0.00%	0.00%	0.00%	2.13%	0.00%	0.00%	0.00%	1.45%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	4.88%	0.00%	0.65%	0.00%	1.09%	0.00%	0.00%	1.18%	1.40%	0.00%	0.00%	0.00%	1.74%	1.03%	0.00%	0.00%
4	Percentage connections with good voice quality (=>95%)																					
	(a) 0-4 (w/o)	Major Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC	100%	100%	99.65%



**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-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
			frequency hopping for CDMA Operators)	Highway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.61%
	Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.65%	99.81%	97.45%	98.48%
	Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.22%	99.92%	97.00%	99.05%
(b) 0-5 ( with frequency hopping for GSM Operators)	Major Road	96.20%	96.66%	96.18%	97.98%	85.50%	79.41%	93.07%	91.93%	97.70%	94.42%	NC	99.91%	97.10%	89.86%	96.74%	95.02%	NA	NA	NA	NA	
	Highway	97.31%	99.52%	94.44%	97.98%	81.76%	86.70%	90.86%	99.79%	95.16%	NC	94.02%	99.87%	93.67%	98.94%	95.84%	95.06%	NA	NA	NA	NA	
	Within City	96.88%	98.40%	92.82%	99.32%	90.80%	96.04%	94.01%	98.93%	96.26%	99.33%	98.64%	99.94%	95.27%	92.56%	96.52%	98.02%	NA	NA	NA	NA	
	Overall SSA	97.01%	98.25%	94.74%	98.41%	84.37%	87.76%	92.03%	96.89%	96.00%	96.91%	96.81%	99.91%	94.89%	93.56%	96.21%	96.05%	NA	NA	NA	NA	
<b>Service Coverage</b>																						
5	In door (>= - 75dBm)	Major Road	39.32%	100%	32.08%	9.57%	7.15%	89.77%	37.46%	67.68%	11.58%	15.70%	NC	19.98%	25.15%	98.20%	89.20%	100%	NC	97.45%	48.05%	100%
		Highway	56.55%	52.12%	54.88%	9.57%	1.98%	0.00%	24.16%	8.98%	34.91%	NC	17.88%	4.01%	33.02%	1.00%	86.73%	99.20%	1.27%	100%	10.58%	NC
		Within City	86.68%	97.31%	66.54%	99.97%	11.16%	0.00%	37.81%	7.51%	28.72%	85.80%	55.46%	2.51%	52.18%	57.70%	92.82%	97.00%	77.29%	40.23%	45.02%	96.45%
		Overall SSA	64.48%	82.52%	49.09%	39.20%	4.89%	27.22%	30.36%	28.06%	29.91%	50.57%	40.72%	8.58%	35.29%	55.23%	88.67%	98.67%	47.45%	82.42%	38.68%	98.18%
In-vehicle (>= - 85dBm)	Major Road	57.03%	100%	75.92%	41.11%	20.47%	99.73%	85.66%	99.79%	51.04%	83.90%	NC	90.49%	68.84%	99.90%	98.39%	100%	NC	100%	65.58%	100%	
	Highway	77.47%	97.54%	84.94%	41.11%	12.49%	0.00%	77.19%	98.27%	72.66%	NC	47.93%	8.60%	62.41%	68.30%	98.35%	100%	41.79%	100%	48.79%	NC	
	Within City	97.57%	100%	89.01%	100%	40.71%	8.96%	86.31%	83.01%	75.89%	99.00%	88.12%	11.97%	80.43%	66.30%	99.62%	100%	95.10%	84.30%	80.56%	96.91%	
	Overall SSA	81.54%	99.15%	82.55%	60.42%	20.00%	33.39%	81.24%	93.74%	70.92%	91.41%	72.36%	35.68%	67.93%	79.89%	98.64%	100%	74.17%	95.61%	74.02%	98.42%	
Outdoor-in city (>= - 95dBm)	Major Road	81.96%	100%	97.57%	99.59%	59.17%	100.00%	98.52%	100%	90.42%	99.80%	NC	99.59%	95.44%	100%	100%	100%	NC	100%	78.25%	100%	
	Highway	92.85%	100%	98.12%	99.59%	52.14%	61.46%	97.09%	100%	91.97%	NC	83.47%	92.09%	92.35%	98.90%	100%	100%	85.04%	100%	95.89%	NC	
	Within City	99.43%	100%	99.25%	99.59%	66.22%	61.46%	99.53%	100%	95.95%	100%	97.88%	92.09%	96.77%	98.90%	100%	100%	99.43%	100%	97.74%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-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
			Overall SSA	93.61%	100%	98.14%	99.72%	56.44%	83.47%	98.00%	99.73%	93.05%	99.90%	92.23%	96.34%	94.07%	98.55%	100%	100%	93.78%	100%	96.64%
6	Call Setup Success Rate (>=95%)	Major Road	100%	100%	98.94%	100%	72.92%	92.59%	92.73%	100%	100%	100%	NC	96.43%	100%	100%	100%	100%	NC	100%	100%	100%
		Highway	98.63%	100%	100%	100%	69.06%	66.67%	98.86%	100%	100%	NC	97.14%	100%	99.14%	100%	99.35%	100%	100%	100%	100%	NC
		Within City	100%	100%	100%	100%	70.31%	36.47%	93.10%	96.30%	100%	100%	98.25%	100%	97.92%	100%	99.02%	100%	100%	100%	100%	100%
		Overall SSA	99.33%	100%	99.62%	100%	69.97%	54.78%	96.23%	98.70%	100%	100%	97.83%	98.84%	99.08%	100%	99.40%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Road	100%	100%	100%	100%	81.03%	100.00%	100%	100%	100%	100%	NC	100%	100%	87.50%	98.51%	100%	NC	100%	100%	100%
		Highway	98.53%	100%	99.29%	100%	86.84%	100.00%	100%	100%	100%	NC	100%	100%	100%	100%	100%	100%	100%	100%	100%	NC
		Within City	99.13%	100%	98.61%	100%	97.39%	100.00%	100%	100%	100%	100%	100%	100%	97.94%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.03%	100%	99.28%	100%	88.84%	100.00%	100%	100%	100%	100%	100%	100%	99.35%	91.15%	99.70%	100%	100%	100%	100%	100%

NA: Not Applicable

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

7.2 OPERATOR ASSISTED DRIVE TEST: LAKHIMPUR KHERI SSA (NOVEMBER-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	108	28	354	25	203	26	267	25	119	25	51	25	250	32	247	25	40	35	43	26
		Highway	122	26	258	25	205	31	214	25	97	26	44	27	241	25	265	25	56	34	20	28
		Within City	256	27	155	25	310	28	231	25	114	25	140	28	228	26	272	25	174	27	87	NC
		Overall SSA	486	81	767	75	718	85	712	75	330	76	235	80	719	83	784	75	270	96	150	54
2	Blocked Call Rate	Major Road	3.70%	0.00%	0.28%	0.00%	15.76%	0.00%	1.50%	0.00%	2.52%	0.00%	1.96%	0.00%	4.40%	3.13%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highway	4.10%	0.00%	0.00%	0.00%	12.20%	22.58%	1.40%	0.00%	2.06%	3.85%	0.00%	0.00%	4.56%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.39%	3.70%	0.00%	0.00%	2.90%	3.57%	0.00%	0.00%	0.88%	0.00%	3.57%	0.00%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC
		Overall SSA	2.06%	1.23%	0.13%	0.00%	9.19%	9.41%	0.98%	0.00%	1.82%	1.32%	2.55%	0.00%	3.20%	1.20%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Major Road	0.96%	0.00%	0.28%	0.00%	3.18%	0.00%	1.16%	0.00%	0.00%	0.00%	2.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highway	1.71%	0.00%	0.00%	0.00%	2.06%	3.70%	1.44%	0.00%	0.00%	4.00%	0.00%	0.00%	0.43%	0.00%	0.38%	0.00%	1.79%	0.00%	0.00%	0.00%
		Within City	0.00%	3.85%	0.00%	0.00%	1.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%	NC
		Overall SSA	0.63%	1.25%	0.13%	0.00%	2.11%	1.23%	0.86%	0.00%	0.00%	1.33%	0.44%	0.00%	0.14%	0.00%	0.38%	0.00%	0.74%	0.00%	0.00%	0.00%
4	Percentage connections with good voice quality (=>95%)																					
	(a) 0-4 (w/o)	Major Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.82%	100%	97.58%	92.26%

**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-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
	frequency hopping for CDMA Operators)	Highway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.97%	99.98%	93.79%	95.71%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.15%	100%	94.88%	NC
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.05%	99.99%	95.50%	94.03%
		(b) 0-5 ( with frequency hopping for GSM Operators)	Major Road	98.40%	99.41%	97.66%	98.23%	93.59%	99.23%	97.65%	98.27%	95.16%	97.67%	94.32%	99.39%	94.27%	89.70%	96.33%	97.64%	NA	NA	NA
	(b) 0-5 ( with frequency hopping for GSM Operators)	Highway	97.38%	99.90%	96.65%	98.34%	91.48%	87.77%	96.06%	98.80%	95.48%	97.51%	95.74%	96.06%	95.21%	96.05%	94.57%	96.11%	NA	NA	NA	NA
		Within City	97.37%	98.26%	97.06%	98.33%	96.17%	99.68%	98.22%	99.10%	96.29%	99.84%	92.77%	99.94%	94.25%	99.75%	96.32%	99.26%	NA	NA	NA	NA
		Overall SSA	97.61%	99.20%	97.23%	98.32%	94.03%	95.76%	97.36%	98.72%	95.64%	98.34%	93.75%	98.43%	94.59%	95.09%	95.77%	97.67%	NA	NA	NA	NA
		<b>Service Coverage</b>																				
5	In door (>= - 75dBm)	Major Road	47.67%	100%	9009.98%	99.40%	32.32%	78.00%	63.72%	100%	38.42%	44.87%	43.35%	99.67%	58.56%	99.86%	88.87%	100%	75.88%	96.10%	59.81%	0.00%
		Highway	41.10%	100%	69.39%	72.10%	29.45%	88.60%	59.71%	99.14%	45.79%	85.53%	75.04%	100%	59.85%	99.90%	83.45%	100%	82.31%	100%	16.80%	0.00%
		Within City	67.68%	99.79%	72.02%	72.10%	43.13%	22.70%	74.54%	99.20%	39.49%	99.65%	66.65%	84.93%	78.75%	98.90%	98.53%	98.47%	89.70%	100%	35.34%	NC
		Overall SSA	55.24%	99.93%	42.14%	74.10%	36.04%	61.72%	65.53%	99.46%	40.90%	76.65%	63.76%	94.75%	65.31%	99.56%	90.88%	99.49%	85.73%	98.64%	39.66%	0.00%
	In-vehicle (>= - 85dBm)	Major Road	68.02%	100%	9431.26%	100%	71.14%	99.80%	91.69%	100%	64.98%	96.45%	83.80%	100%	80.07%	100%	99.33%	100%	85.01%	99.97%	83.60%	57.64%
		Highway	62.80%	100%	89.97%	93.80%	66.99%	100%	89.87%	100%	66.31%	98.65%	90.52%	100%	80.20%	100%	99.66%	100%	95.40%	100%	59.48%	72.91%
		Within City	90.98%	100%	94.72%	93.80%	88.39%	94.10%	96.23%	100%	76.13%	100%	87.75%	100%	96.59%	100%	99.99%	100%	95.90%	100%	78.81%	NC
		Overall SSA	77.35%	100%	53.18%	94.25%	77.21%	97.84%	92.40%	100%	68.85%	98.36%	87.49%	100%	85.27%	100%	99.69%	100%	93.77%	99.99%	77.51%	65.48%
	Outdoor-in city (>= - 95dBm)	Major Road	90.47%	100%	34.59%	100%	93.81%	100%	99.59%	100%	85.97%	99.98%	97.38%	100%	95.87%	100%	100%	100%	95.72%	100%	98.11%	99.85%
		Highway	88.46%	100%	98.33%	99.80%	91.90%	100%	99.26%	100%	89.07%	99.28%	99.57%	100%	95.07%	100%	100%	100%	98.93%	100%	92.64%	100%
		Within City	98.11%	100%	99.92%	99.80%	98.81%	100%	99.93%	100%	92.68%	99.28%	98.02%	100%	99.79%	100%	100%	100%	99.95%	100%	98.07%	NC

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-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
			Overall SSA	93.50%	100%	56.74%	99.81%	95.35%	100%	99.58%	100%	88.97%	99.75%	98.16%	100%	96.81%	100%	100%	100%	98.97%	100%	97.34%
6	Call Setup Success Rate (>=95%)	Major Road	96.30%	100%	99.72%	100%	77.34%	100%	97.00%	100%	93.28%	100%	98.04%	100%	95.60%	96.88%	99.19%	100%	100%	100%	100%	100%
		Highway	95.90%	100%	100%	100%	94.63%	87.10%	97.66%	100%	96.91%	96.15%	100%	100%	95.44%	100%	99.62%	100%	100%	100%	100%	100%
		Within City	99.61%	96.30%	100%	100%	85.16%	100%	98.70%	100%	98.25%	100%	96.43%	100%	99.56%	100%	100%	100%	100%	100%	100%	NC
		Overall SSA	97.94%	98.77%	99.87%	100%	85.65%	95.29%	97.75%	100%	96.06%	98.68%	97.45%	100%	96.80%	98.80%	99.62%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Road	98.18%	100%	99.83%	100%	91.42%	100%	97.69%	100%	100%	100%	100%	100%	97.63%	100%	95.27%	100%	100%	100%	100%	100%
		Highway	100%	100%	99.72%	100%	84.21%	99.31%	97.19%	100%	100%	100%	100%	100%	98.13%	100%	96.77%	100%	100%	100%	100%	100%
		Within City	98.53%	100%	100%	100%	95.20%	100%	100%	100%	100%	100%	100%	100%	96.47%	100%	93.24%	100%	100%	100%	100%	NC
		Overall SSA	98.78%	100%	99.83%	100%	90.33%	99.37%	98.30%	100%	100%	100%	100%	100%	97.26%	100%	95.32%	100%	100%	100%	100%	100%

NA: Not Applicable

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

7.3 OPERATOR ASSISTED DRIVE TEST: ALLAHABAD SSA (DECEMBER-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	139	27	166	25	133	25	189	25	175	25	180	26	174	25	191	25	218	32	123	25
		Highway	114	27	99	25	100	25	69	25	112	26	118	26	136	25	154	35	163	33	22	NC
		Within City	124	25	210	25	152	25	170	25	127	27	185	27	172	25	190	26	192	35	37	25
		Overall SSA	377	79	475	75	385	75	428	75	414	78	483	79	482	75	535	86	573	100	182	50
2	Blocked Call Rate	Major Road	2.16%	0.00%	0.60%	0.00%	1.50%	0.00%	1.06%	0.00%	1.71%	0.00%	2.22%	0.00%	1.72%	0.00%	1.57%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highway	3.51%	0.00%	0.00%	0.00%	7.00%	4.00%	1.45%	0.00%	4.46%	0.00%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	1.23%	0.00%	4.55%	NC
		Within City	0.81%	0.00%	0.00%	0.00%	3.29%	0.00%	0.00%	0.00%	1.57%	0.00%	2.70%	0.00%	1.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	2.12%	0.00%	0.21%	0.00%	3.64%	1.33%	0.70%	0.00%	2.42%	0.00%	2.28%	0.00%	1.04%	0.00%	0.56%	0.00%	0.35%	0.00%	0.55%	0.00%
3	Dropped Call Rate (<=2%)	Major Road	0.00%	0.00%	0.00%	0.00%	4.62%	0.00%	1.07%	0.00%	0.00%	0.00%	1.14%	0.00%	0.00%	0.00%	0.54%	0.00%	1.83%	0.00%	0.83%	0.00%
		Highway	0.00%	0.00%	0.00%	0.00%	2.15%	0.00%	0.00%	0.00%	0.95%	3.85%	1.72%	0.00%	0.74%	0.00%	0.00%	0.00%	3.11%	0.00%	0.00%	NC
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.11%	0.00%	0.00%	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	2.16%	0.00%	0.47%	0.00%	0.25%	1.28%	1.27%	0.00%	0.21%	0.00%	0.19%	0.00%	2.10%	0.00%	0.56%	0.00%
4	Percentage connections with good voice quality (=>95%)																					
	(a) 0-4 (w/o)	Major Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.03%	98.29%	95.65%	98.95%

**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-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
			frequency hopping for CDMA Operators)	Highway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	94.53%
Within City	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.73%	97.71%	94.10%	93.70%
Overall SSA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.68%	98.66%	95.06%	96.18%
(b) 0-5 ( with frequency hopping for GSM Operators)	Major Road	93.70%		99.03%	93.11%	98.39%	94.35%	99.73%	89.63%	97.47%	86.08%	96.59%	96.50%	98.66%	95.30%	98.76%	90.86%	97.87%	NA	NA	NA	NA
	Highway	95.56%	97.97%	93.31%	99.45%	95.70%	99.74%	92.11%	99.55%	91.78%	96.71%	97.65%	100%	95.74%	99.35%	93.98%	99.46%	NA	NA	NA	NA	
	Within City	96.76%	96.31%	96.36%	97.62%	98.12%	98.14%	94.12%	99.40%	94.67%	94.19%	98.07%	99.35%	94.40%	99.35%	95.12%	97.67%	NA	NA	NA	NA	
	Overall SSA	95.31%	97.78%	94.44%	98.57%	96.23%	99.20%	91.82%	98.81%	90.26%	95.80%	97.37%	99.34%	95.07%	99.15%	93.34%	98.46%	NA	NA	NA	NA	
	<b>Service Coverage</b>																					
5	In door (>= - 75dBm)	Major Road	54.07%	98.30%	69.14%	99.72%	54.89%	99.30%	69.89%	99.70%	49.72%	99.94%	52.27%	99.94%	73.83%	100%	98.06%	100%	87.25%	99.65%	95.74%	100%
		Highway	57.23%	95.29%	60.78%	79.64%	56.20%	25.10%	63.70%	77.80%	41.45%	99.27%	41.94%	97.67%	57.67%	88.48%	96.67%	100%	78.44%	99.88%	68.45%	NC
		Within City	52.12%	98.23%	59.21%	99.92%	43.91%	99.60%	57.20%	80.86%	42.22%	58.34%	49.79%	99.81%	67.87%	99.94%	95.93%	100%	75.02%	100%	96.67%	100%
		Overall SSA	54.27%	97.27%	63.33%	93.10%	50.77%	75.17%	63.84%	86.01%	45.23%	85.29%	48.80%	99.14%	67.30%	96.02%	96.87%	100%	80.68%	99.84%	92.55%	100%
	In-vehicle (>= - 85dBm)	Major Road	87.21%	99.91%	93.83%	100%	92.57%	99.70%	96.12%	100%	82.85%	100%	82.07%	100%	94.83%	100%	99.99%	100%	94.59%	100%	99.63%	100%
		Highway	80.97%	100%	91.88%	90.38%	92.55%	99.10%	95.12%	100%	75.52%	100%	74.17%	100%	92.80%	99.53%	100%	100%	87.09%	99.99%	95.73%	NC
		Within City	84.80%	99.88%	93.15%	100%	93.86%	100%	94.18%	100%	87.55%	100%	76.27%	100%	94.26%	100%	99.98%	100%	85.68%	100%	99.98%	100%
		Overall SSA	84.65%	99.93%	93.08%	96.80%	93.09%	99.61%	95.18%	100%	82.39%	100%	77.96%	100%	94.08%	99.84%	99.99%	100%	89.54%	100%	99.22%	100%
	Outdoor-in city (>= - 95dBm)	Major Road	96.93%	100%	99.78%	100%	99.59%	100%	100%	100%	98.60%	100%	95.22%	100%	99.43%	100%	100%	100%	99.66%	100%	100%	100%
		Highway	96.34%	100%	99.58%	100%	99.44%	100%	100%	100%	97.67%	100%	91.01%	100%	99.52%	100%	100%	100%	97.03%	100%	100%	NC
		Within City	98.05%	100%	99.71%	100%	99.90%	100%	100%	100%	99.81%	100%	96.04%	100%	99.77%	100%	100%	100%	96.56%	100%	100%	0.00%

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-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
			Overall SSA	97.16%	100%	99.71%	100%	99.67%	100%	100%	100%	98.73%	100%	94.49%	100%	99.59%	100%	100%	100%	97.90%	100%	100%
6	Call Setup Success Rate (>=95%)	Major Road	97.84%	100%	99.40%	100%	97.74%	100%	98.94%	100%	98.29%	100%	97.78%	100%	98.28%	100%	96.86%	100%	100%	100%	97.56%	100%
		Highway	96.49%	100%	100%	100%	93.00%	96.00%	98.55%	100%	93.75%	100%	98.31%	100%	100%	100%	99.35%	100%	98.77%	100%	95.45%	NC
		Within City	99.19%	100%	100%	100%	96.71%	100%	100%	100%	97.64%	100%	97.30%	100%	98.84%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	97.88%	100%	99.79%	100%	96.10%	98.67%	99.30%	100%	96.86%	100%	97.72%	100%	98.96%	100%	98.69%	100%	99.65%	100%	97.80%	100%
7	Hand Over Success Rate (HOSR)	Major Road	99.22%	100%	99.50%	100%	97.31%	100%	95.61%	100%	92.99%	100%	100%	100%	99.23%	100%	93.55%	100%	100%	100%	100%	100%
		Highway	100%	100%	100%	100%	96.93%	100%	100%	100%	94.92%	100%	100%	100%	100%	100%	99.18%	100%	100%	100%	100%	NC
		Within City	100%	100%	100%	100%	90.21%	100%	100%	100%	96.70%	100%	100%	100%	98.57%	100%	99.37%	100%	100%	100%	100%	100%
		Overall SSA	99.66%	100%	99.78%	100%	95.41%	100%	97.64%	100%	94.46%	100%	100%	100%	99.18%	100%	97.25%	100%	100%	100%	100%	100%

NA: Not Applicable

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



**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 & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
<b>SULTANPUR</b>	Sultanpur / 160 KM	Within City-(Rly Stn Road, Amhat, Diwani Katchehri, KNIT Campus, Kadipur)  Major road-(Kadipur, Akhand Nagar, Devnagar )  Highway-(Kadipur, Sultanpur, Akhand Nagar, Motigarpur, Dostpur)  <b>Indoor:</b> Sultanpur railway station	Amethi/ 97 KM	Within City (Block Road, Kotwali, BSNL Exchange, Pratapgarh Road)  Major Road (Amethi, Jangle Ramnagar, Khushitali, Gauriganj)  Highway (Sultanpur, Amethi, Dhamaur, Gauriganj, Hal Korwar)  <b>Indoor:</b> HAL, Korwa	Musafirkhana / 90 KM	Within City-(Musafirkhana, Kotwali, Dadar Road, Jamo Jagdishpur, Industrial Area, BHEL, Indogulf)  Major road-(Musafirkhana, BHEL, Industrial Area, Jagdishpur Township)  Highway-(Sultanpur, Musafirkhana, Aliganj)  <b>Indoor:</b> Amhat Sabji Mandi
<b>LAKHIMPUR KHERI</b>	Kheri/ 160 KM	Highway-(Lakhimpur, Gola road, gola-Mohamadi road)  Major Roads-(Moahamdi to khutar connecting road in Gola, Gola-bankeyganj road, gola-lakhimpur road)  Within City-(Rajapur,LRP,Chauch Chouraha, Garhi Road, Nighasn road,Mahewaganj, Kheri-Town)  <b>Indoor:</b> LRP CHOURAHA	Mohammadi & Maigalganj / 180 KM	Highway (lakhimpur-Maigalganj, maigalganj-Jahanikhera, Mohamadi-Lakhimpur )  Major Roads (jhanikhera, barwar, mohamadi)  Within City : (BSNL Exchange, kashi nagar, bus station, hidayat nagar, behajm road, hospital raod, kotwali, mohamadi)  <b>Indoor:</b> Lakhimpur Kheri Railway station	Nighasan / 96KM	Highway-(Lakhimpur, Sisy,Dhaurara,Dakherva,Rakheti, Nighasan-Palia, Palia-Bhira)  Major Roads-(-Nighasan,Belrayan,Tikunya, Palia Kalan)  Within City-(Dhaurara,Tikonია City,Nighasan Bhira,BhatTa Muhlla,Dudhwa Road,Chandni Chowk ,Machli Mandi,Palia-kalan)  <b>Indoor:</b> Surabhi Hotel

<p><b>ALLAHABAD</b></p>	<p>Phoolpur and Soraon / <b>160 KM</b></p>	<p>WITHIN CITY- ALLAHABAD ( Railway Station - Chaufatka - IIIT Jhalwa -Chakia - Khuldabaad - Alopibagh) SORAON ( Chamanbagh Chauraha- Devrgal Road ) PHOOLPUR ( Phoolpur town - IFFCO Campus)</p> <p>HIGHWAY (Teliarganj - Phaphamau - Soraon)</p> <p>MAJOR ROADS ( Alopibagh - Medical Chauraha - Teliarganj - Phoolpur to Sahson - Allahabad)</p> <p><b>Indoor:</b> Allahabad Railway Station</p>	<p>Meja &amp; Karchhana/ <b>210 KM</b></p>	<p>WITHIN CITY- MEJA ( Meja Road - Sirsa - Patel Nagar - Gol Chauraha) KARCHHANA (Karchhana Bazar - Gauhaniya Road - Shankergarh Market - Shivrajpur)</p> <p>MAJOR ROADS ( Allahabad Bus Stand - Ashok Nagar - Circular Road - Balson Chauraha - Alopibagh to Naini Bridge - Meja Road to Karchhana - Gauhaniya to Shankergarh)</p> <p>HIGHWAY ( Naini Bridge to Meja- Gauhaniya to Naini Bridge)</p> <p><b>Indoor:</b> Karcchana Market</p>	<p>Bharwari / <b>120 KM</b></p>	<p>WITHIN CITY -BHARWARI ( Gaura Road - Bisara Road - Railway Station Bharwari - Mooratganj Bypass - Bharwari Market - Manjanpur Road - Mehta Market)</p> <p>MAJOR ROADS ( Bharwari to Mooratganj - Pooramufti - Sulem Sarai - Preetam Nagar)</p> <p>HIGHWAY-(Dhumanganj Thana - Bamrauli Airport - Mundera Mandi - Charwa Road- Kanpur Bypass)</p> <p><b>Indoor:</b> Allahabad Bus Stand</p>
-------------------------	--	---	--	--	---------------------------------	---

**7.5 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF SULTANPUR SSA – OCTOBER 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	Sultanpur, Kadipur & Akhand Nagar	Poor Level on Highway covered in day 1	Amethi & Korwa	Poor Level on Highway covered in day 2	Musafirkhana	Poor Level on Highway covered in day 3
2	AIRTEL		Poor Level & Quality at Sultanpur outer, Diyra, Alipur, Bankegaun, Belware, Dostpur		Poor Level & Quality near Paliya, Dhmmaur, ACC Factory, Madhopur		Poor Level & Quality near Jagdishpur, Sakdandihshah
3	BSNL		NP		NP		NP
4	TATA GSM		Poor Level on Highway covered in day 1		Poor Level on Highway covered in day 2		Poor Level on Highway covered in day 3
5	TATA CDMA		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer
6	IDEA		Poor Level & Quality on Highway covered in day 1, Poor Quality near Rly Station		Poor Level & Quality on Highway covered in day 2, near Amethi Rly Station, Gauriganj		Poor Level & Quality on Highway covered in day 3
7	RCOM GSM		Poor Level & Quality on Highway covered in day 1		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer
8	RCOM CDMA		Poor Level & Quality near Kadipur, Akhand Nagar, near Rly Station, Priyagipur		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer
9	UNINOR		Poor Level near Sahpura, Dhamla, Shekhapur, Khalispur, Saifullaganj, Dhampur, Rampur		Poor Level & Quality near Kushitali, Rudhauri, Bheera, Bandoiva, Dhamma		Poor Level & Quality near Mangaura, Rampur
10	VODAFONE		Poor Levele & Quality near Motigarhpur, Basaha, Dhamma		Poor Quality near Madhopur, balipurkhrdwan, Tikariya		Poor Quality at Jagdishpur outer, Chakbehar

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF LAKHIMPUR KHERI SSA – NOVEMBER 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	Kheri	Poor Level at Lakhimpur Kheri outer, Manikapur, Gola outer	Mohammadi & Maigalganj	Poor Level near Mitauli, Barber, Mohammadi	Nighasan	Poor Level near Rangial Nagar, Ashok Nagar, Sisyan Kalan, Mahuwa, Trilokpur, between Palyakalan to Bihar, Poor Quality near Mahuwa
2	AIRTEL		Poor Level & Quality at Gola outer, Kheri		Poor Level & Quality near Mitauli, Mohammadi		Poor Level & Quality near Rakheti, Nigashan Paliya, Belrayan
3	BSNL		Poor Level & Quality on Highway covered day 1 and outers of SDCA's		Poor Level & Quality on Highway covered day 2 and outers of SDCA's		Poor Level & Quality on Highway covered day 3 and outers of SDCA's
4	TATA GSM		Poor Level & Quality near Rajaganj, Rly Station, Poor Level on Highway covered in day 1		Poor Level on Highway covered in day 2		Poor Level on Highway covered in day 3, Poor Quality near Paliya Kalan
5	TATA CDMA		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer		No Coverage on Day 3
6	IDEA		Poor Level & Quality near Gola, Phardhan, Rajaganj		Poor Level & Quality near Amir Nagar, Dilawarpur, Mohammadi, Mitauli		Poor Level & Quality near Dhaurahara, Adispur, Sisya Kalan, Nigashan, Paliyakalan
7	RCOM GSM		They have coverage only in SDCA's with Poor Level & Quality at outer, Poor Level & Quality near Lalahpur Gola, Dixitana, Civillines, Paliya HW		They have coverage only in SDCA's with Poor Level & Quality at outer, Poor Level & Quality near Amir Nagar, Mohammadi, Rajapur		They have coverage only in SDCA's with Poor Level & Quality at outer, Poor Level & Quality near Near Singhai, Rajapur Chowk
8	RCOM CDMA		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer
9	UNINOR		Poor Level & Quality near Grant No. 11, Nipania, Pachperwa, Banwaripur, Rajapur Chowk		Poor Level & Quality near Bagbahi, Palabhai, Bhadura, Gauria, Usri		Poor Level & Quality near Matahiya, Ramnagar, Ramia, Copa, Nayagaon
10	VODAFONE		Poor Level & Quality near Bhaliya, Grant No.11, Rukandipur, Agnihotri Nagar		Poor Level & Quality near Bhudikhurd, Maksoo, Jajupara, Aurangabad		Poor Level & Quality near Bhiraura, Lodhauri, Dhaurahara, Basaigapur

DRIVE TEST TABLE: 7

**DRIVE TEST OBSERVATION OF ALLAHABAD SSA – DECEMBER 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	Allahabad, Soraon & Phoolpur	Poor Level & Quality at Kalanderpur, Chintawanpur, Sahson, Bhopatpur, Jhunsi, Nai Basti, Highcourt	Meja & Karchhana	Poor Level & Quality near Bara, Jasra, Ghoorpur, Karchanna, Shankargarh outer, Meja, Kachari, Mungari	Bharwari	Poor Level & Quality near Mahagaon, Wazidpur
2	AIRTEL		Poor Level near Kaanderpur, Phoolpur outer, Bhopatpur, Jhunsi, Highcourt, Phaphamau, Poor Quality near Soraon outer, Iffco		Poor Level & Quality near Mungari, Meja, Karchanna, Sartapansa, Jarsa, Bara		Poor Quality near Muratganj, Mahagaon
3	BSNL		NP		NP		NP
4	TATA GSM		Poor Level & Quality near Bhavapur, Kalander, Phoolpur Iffco, Bhopatpur, Jhunsi, Nai Basti, Highcourt		Poor Level & Quality near Sarpatansa, Kachari		Poor Level & Quality near Bhuriwari, Puramufti
5	TATA CDMA		They have coverage only in Allahabad city, Phaphamau, Poor Level & Quality at Phaphamau outer		They have coverage only in Allahabad city		They have coverage only in Allahabad city
6	IDEA		Poor Level & Quality near Bhavapur, Soraon outer, Chintawanpur, Phoolpur outer, Iffco, Naibasti, Highcourt		Poor Level & Quality near Hatigan, Shankargarh outer		Poor Level & Quality near Muratganj, Puramufti
7	RCOM GSM		Poor Level & Quality near Lakhani, Phoolpur Iffco, Jhunsi, SigraMau, No coverage between Phoolpur to Soraon		Poor Level & Quality near Ghoorpur, Karchanna, Meja, Shankargarh outer, Bara, Jasra		Poor Level & Quality near Muratganj, Mahagaon, Syed Sarwan, Bamrauli
8	RCOM CDMA		Poor Level & Quality near Lakhani, Phoolpur Iffco, Jhunsi, SigraMau, No coverage between Phoolpur to Soraon		Poor Level & Quality near Ghoorpur, Karchanna, Meja, Shankargarh outer, Bara, Jasra		Poor Level & Quality near Muratganj, Mahagaon, Syed Sarwan, Bamrauli
9	UNINOR		Poor Level near Soraon outer, Jhunsi, Poor Quality near Bhavapur, Kalanderpur, Phoolpur outer		Poor Level & Quality near Umapur, Naini, Ghoorpur, Kachari		Poor Level & Quality near Bhuriwari, Muratganj, Mahagaon
10	VODAFONE		Poor Level & Quality near Kamla Nagar, Phoolpur outer, Iffco, Poor Quality near Phaphamau, Jhunsi,		Poor Quality near Nai Basti, Kharkauni, Shankargarh outer		Poor Level & Quality near Mahagaon

DRIVE TEST TABLE: 8

**NO NETWORK COVERAGE STATUS OF DRIVE TEST – OCTOBER TO DECEMBER 14**

Sr. No	Month	Name of Operator	SSA	SDCA Covered	Status of no network coverage area	ICR Status
1	Oct'14	AIRCEL	Sultanpur	Sultanpur, Amethi, Kadipur & Musafirkhana	Akhand Nagar, Devnagar, Motinagar, Dostpur, Khushtali, Damaur, Jungle Ramnagar	NO
		AIRTEL		Sultanpur, Amethi, Kadipur & Musafirkhana	---	NO
		BSNL			---	NO
		IDEA			---	NO
		RCOM (GSM)		Sultanpur, Amethi, Kadipur & Musafirkhana	Kadipur, Akhand Nagar, Dev Nagar, Motigarpur, Dhammaur, Gauriganj, Amethi bypass, Sahabganj, Aliganj,, Musafirkhana, Kankupur, Saikatiya	ICR with Tata GSM
		TATA (GSM)		Sultanpur, Amethi, Kadipur & Musafirkhana	Major road fully not covered in this these route - Kadipur To Akhand Nagar, Devnagar, Indoor Coverage ( HAL, Korwa)	NO
		VODAFONE		Sultanpur, Amethi, Kadipur & Musafirkhana	---	NO
		UNINOR		Sultanpur, Amethi, Kadipur & Musafirkhana	No coverage in Badaunadih village, Sahupara village, Khalispur Mubarakpur village, Surhur village, Mangraura village, Rampur Urf Lokrai village	NO
		RCOM (CDMA)		Sultanpur, Amethi, Kadipur & Musafirkhana	Kadipur, Akhand Nagar, Dev Nagar, Motigarpur, Dhammaur, Gauriganj, Amethi bypass, Sahabganj, Aliganj,, Musafirkhana, Kankupur, Saikatiya	NO
TATA (CDMA)	Sultanpur, Amethi, Kadipur & Musafirkhana	No network Coverage on Major roads (Kadipur, Akhand Nagar, Devnagar, Amethi, Jangle Ramnagar, Khushtali, Gauriganj), Highway (Kadipur, Sultanpur, Akhand Nagar, Motigarpur, Dostpur, HAL, Korwa, Amethi, Dhamaur, Gauriganj, Hal Korwar), City (Block Road, Kotwali, BSNL Exchange, Pratapgarh Road)	NO			
2	Nov'14	AIRCEL	Lakhimpur Kheri	Kheri, Mohamadi, Tikonia, Dhaurahra, Bhira & Maigalganj	Fardhan, Manikpur, adharpur, Rajagang, Gauria, Mailgaon, Kasta, Babuna, ali nger, usari, Sohana, Banvari, Sekhpur, Dulahapur, Rasulpur, Harinager grant, Amirnager, Chubey, Islamabad, Bagbahi, Bilochpur, Bhadura, Ravanahi, Chahmalpur, Zagsar, Khanipur, Ludhouni, Rehua, Chandpura, Ramiya behar, BangalhaTikya, Hardawari, Tikonia, Bamhanpur, Ganga behad, Melenya, Bela, Atereya, Majhaura	NO
		AIRTEL		Kheri, Mohamadi, Tikonia, Dhaurahra, Bhira & Maigalganj	---	NO
		BSNL			---	NO
		IDEA			---	NO
		VODAFONE			---	NO
		RCOM (GSM)		Kheri, Mohamadi, Tikonia, Dhaurahra, Bhira & Maigalganj	No Coverage in Amir Nagar, Tikonia, Palia, Bhira, Nighasan, Dhaurahra, Datauli, Aurangabad	ICR with AIRCEL

Sr. No	Month	Name of Operator	SSA	SDCA Covered	Status of no network coverage area	ICR Status
		TATA (GSM)		Kheri, Mohamadi , Tikonía	Rajagang, Gauria, Mailgaon, Zagsar, Khanipur, Ludhouni, Rehua, Chandpura, Ramiya behar, BangalhaTikya, Hardawari, Tikonía	NO
		UNINOR		Kheri , Mohamadi , Tikonía , Dhaurahra , Bhira & Maigalganj	No coverage in Pachperwa village , Raghunath Pur village , Palabhai Kachnar village , Atava village , Bhdura village , Kaimharai village , Gauria village , Usri village , Mataihiya village , Ramnagar Sankalpa village , Ramia Beahar village , Naya Gaon village , Naya Chopá village	NO
		RCOM (CDMA)		Kheri, Mohamadi, Tikonía, Dhaurahra, Bhira & Maigalganj	No Coverage in Amir Nagar, Tikonía , Palía , Bhira , Nighasan , Dhaurahra , Datauli , Aurangabad	NO
		TATA (CDMA)		Tikonía , Dhaurahra , Bhira & Palliakalan	Tikonía, Palliakalan, Nighasan, Bhira , Dhaurahra	NO
		AIRCEL			---	NO
		AIRTEL			---	NO
		VODAFONE			---	NO
		BSNL			---	NO
		IDEA			---	NO
		RCOM (GSM)		Allahabad, Bharwari, Karchhana, Meja (Sirsa), Phoolpur, Soraon	No Coverage in Phoolpur , IFFCO , Sewaith , Ibrahimpur , Ramnagar , Baharia , Sigramau, Sahson , Meja	AIRCEL
		TATA (GSM)		Allahabad, Bharwari, Karchhana, Meja (Sirsa), Phoolpur, Soraon	Meja City -(Sirsa)	ICR with RCOM GSM & AIRCEL
		UNINOR		Allahabad, Bharwari, Karchhana, Meja (Sirsa), Phoolpur, Soraon	Karchhana (Shankergarh), Allahabad-No coverage in Umapur village , Rasoolpur Kagi village	NO
3	Dec'14	RCOM (CDMA)	Allahabad	Allahabad, Bharwari, Karchhana, Meja (Sirsa), Phoolpur, Soraon	No Coverage in Phoolpur , IFFCO , Sewaith , Nimi , Ibrahimpur , Ramnagar , Baharia , Sigramau,Sahson , Meja	NO
		TATA (CDMA)		Allahabad, Bharwari, Karchhana, Meja (Sirsa), Phoolpur, Soraon	No Coverage on Major road (Phaphamau - Soraon, Balson Chauraha - Alopibagh to Naini Bridge - Meja Road to Karchhana - Gauhaniya to Shankergarh, Pooramufti - Sulem Sarai - Preetam Nagar) , Highway(Phaphamau - Soraon,Naini Bridge to Meja- Gauhaniya to Naini Bridge, Charwa Road- Kanpur Bypass) , City(Phaphamau - Soraon, KARCHHANA (Karchhana Bazar - Gauhaniya Road - Shankergarh Market - Shivrajpur, Sirsa - Patel Nagar - Gol Chauraha, Gaura Road - Bisara Road - Railway Station Bharwari - Mooratganj Bypass - Bharwari Market)	ICR with RCOM CDMA



## 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 October-14**, drive tests were conducted across **Sultanpur SSA** covering Sultanpur, Kadipur, Akhandnagar, Amethi, Korwa and Musafirkhana SDCAs. The performance of some of the operators was not satisfactory as they failed to meet the benchmarks of some of the parameters. On SSA level, **non-compliance** of the service providers was as follows:

**BSNL:** Call drop rate (4.88%), Voice Quality (84.37%-outdoor) / (87.76%-Indoor) and Call set up success rate (69.97%- Outdoor) / (54.78%-Indoor) and Blocked Call rate (7.85%-Outdoor) / (7.64%-Indoor). Thus the performance of BSNL was poor in respect of the above parameters.

**Airtel, Idea and Uninor: Voice Quality—(94.74%, 92.03% and 94.89% respectively).**

- (ii) **In the Month of November-14**, drive tests were conducted across **Lakhimpur Kheri SSA** covering Kheri, Mohammadi, Maigaljanj and Nighasan SDCAs. 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:

**BSNL:** Call Drop rate (2.11%), Voice Quality (94.03%), CSSR (85.65%) and Blocked Call rate (9.19%-Outdoor) / (9.41%-Indoor).

**RCOM GSM, Uninor and Tata CDMA:** Voice Quality – (93.75%, 94.59% and 94.03% (Indoor) respectively).

**Uninor:** Blocked Call Rate (3.20%)

- (iii) **In the month of December-14**, drive tests were conducted across **Allahabad SSA** covering Allahabad, Phoolpur, Soraon, Mejaroad, Karchhana, and Bharwari SDCAs. On SSA level, **non-compliance** of the service providers was as follows:

**BSNL:** Call Drop rate (2.16%) and Blocked Call rate (3.64%).

**Airtel, Idea, Tata (GSM) and Vodafone:** Voice Quality – (94.44%, 91.82%, 90.26% and 93.34% respectively).

**RCOM CDMA:** Call Drop Rate (2.10%).

The deficiencies with respect to adequate coverage and voice quality, encountered by different Service providers at various places, shown in the drive tests plots, are detailed in the above table-5, table-6 and table-7.

**The detail of Network coverage and Intra Circle Roaming (ICR) status of different service providers at various locations in the three SSAs is given in table-8.**

*Thus, the performance of the operators namely BSNL, Tata (GSM)/ Tata (CDMA), RCOM (GSM) / (CDMA), Uninor, Vodafone, Airtel and Idea was not satisfactory with respect to some of the parameters as mentioned above. The drive test results further suggest that **BSNL** needs to pay special attention to improve their network quality in respect the prime network parameters **Call Drop rate, Voice Quality, Call Setup success rate and Blocked Call rate**. However, for other service providers, the network parameters **Voice Quality and Call Drop rate also**, were the areas of concern.*

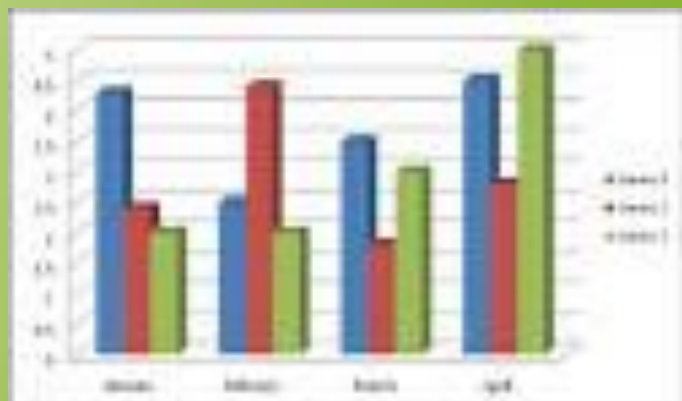


## 8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

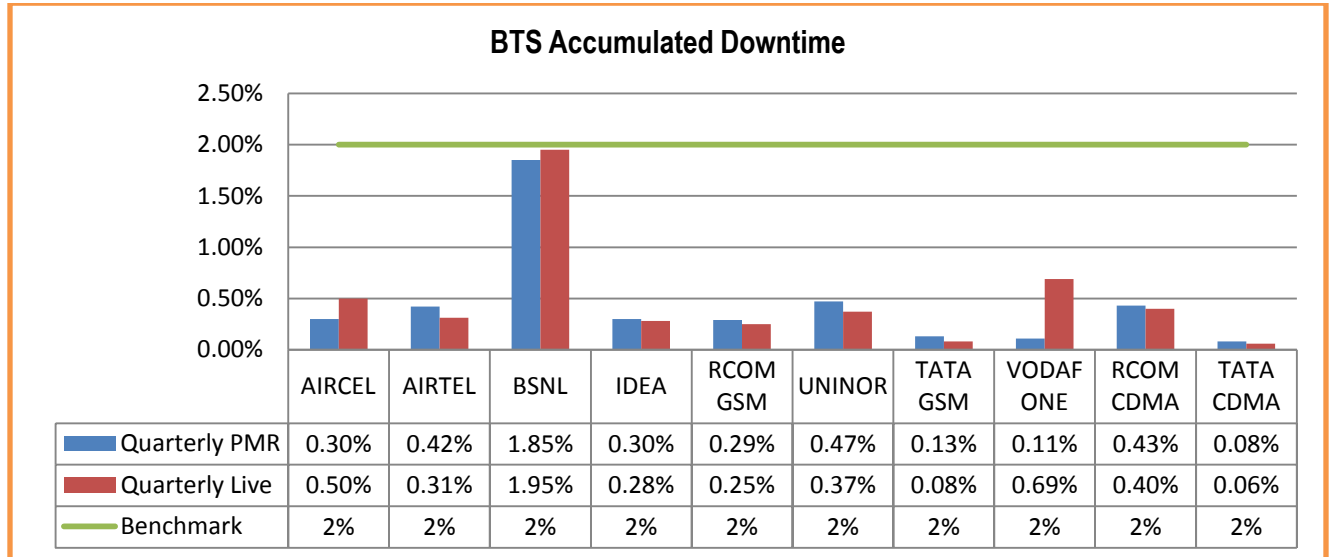
AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



## 8. GRAPHICAL REPRESENTATION:

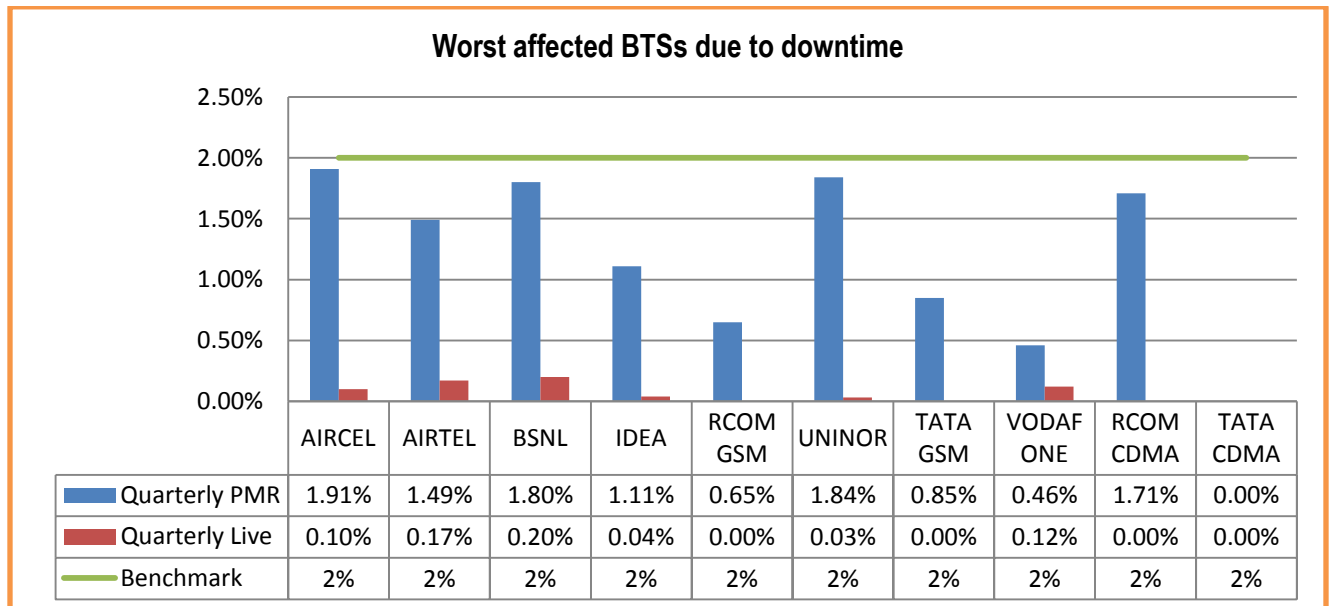
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

### 1) BTS ACCUMULATED DOWNTIMES:



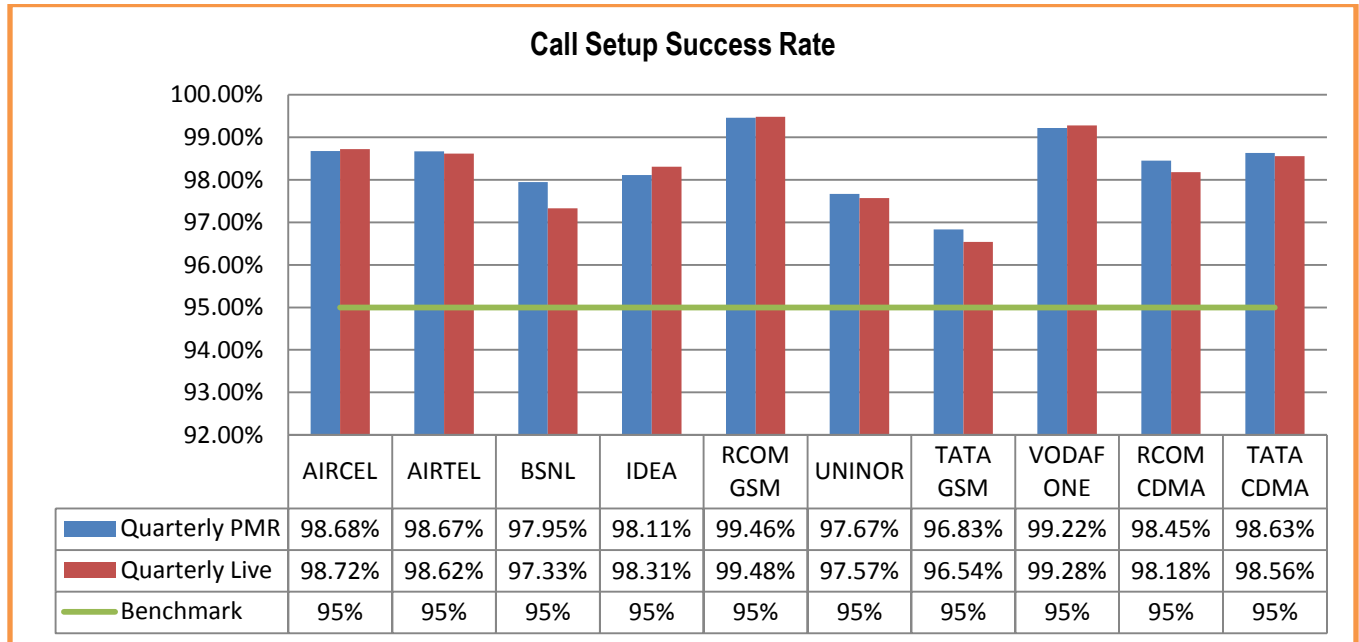
All operators are meeting the benchmarks.

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



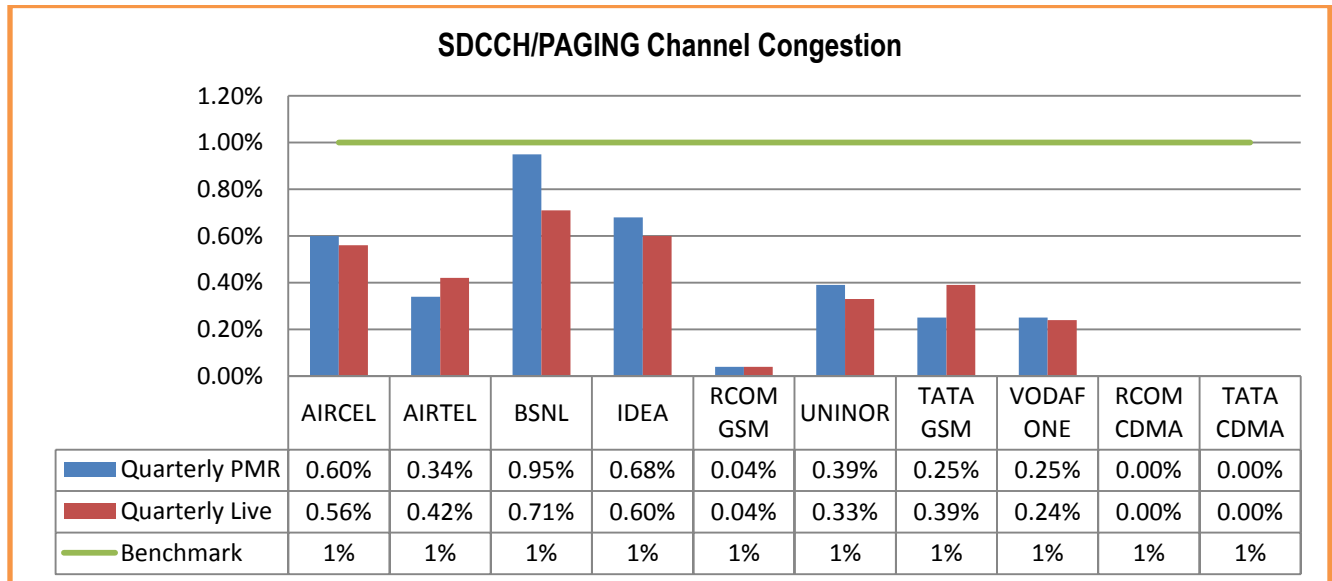
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE:



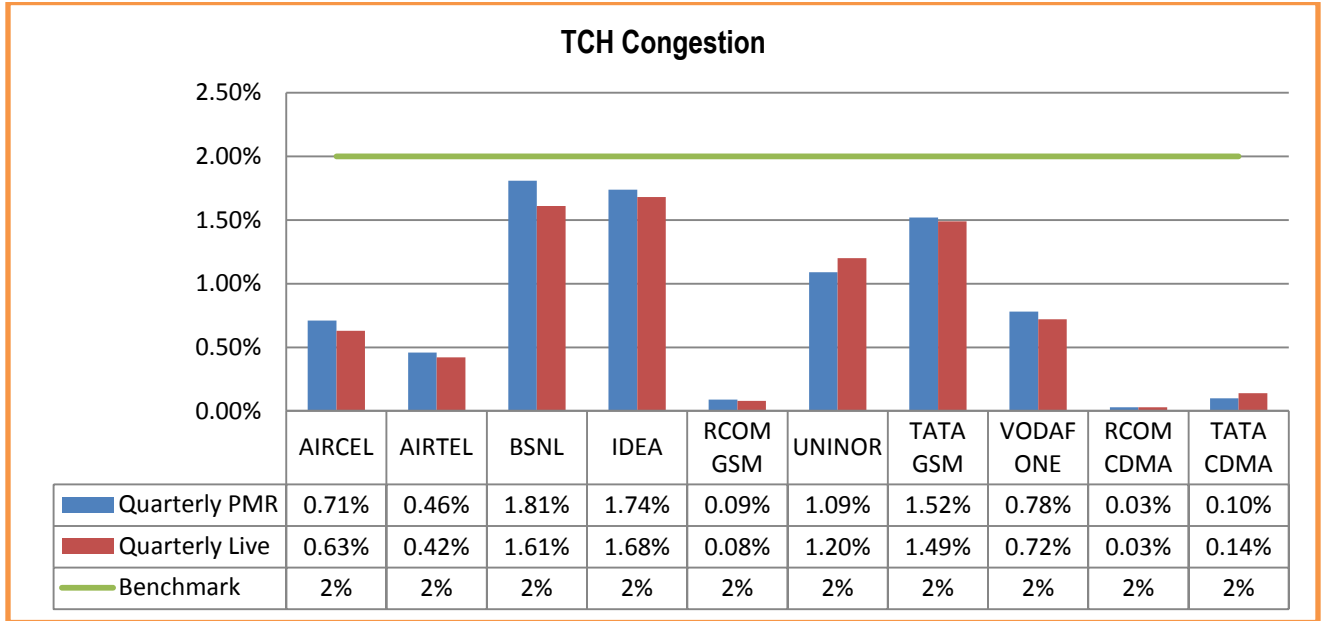
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



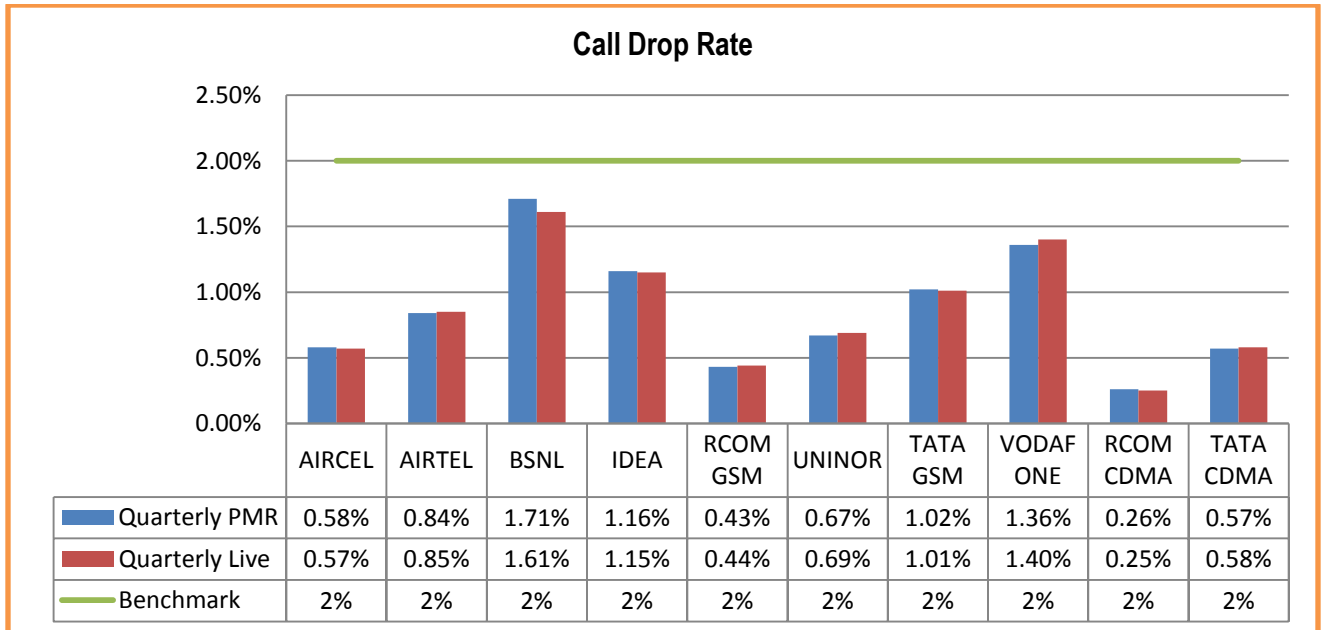
All operators are meeting the benchmarks.

5) TCH CONGESTION:



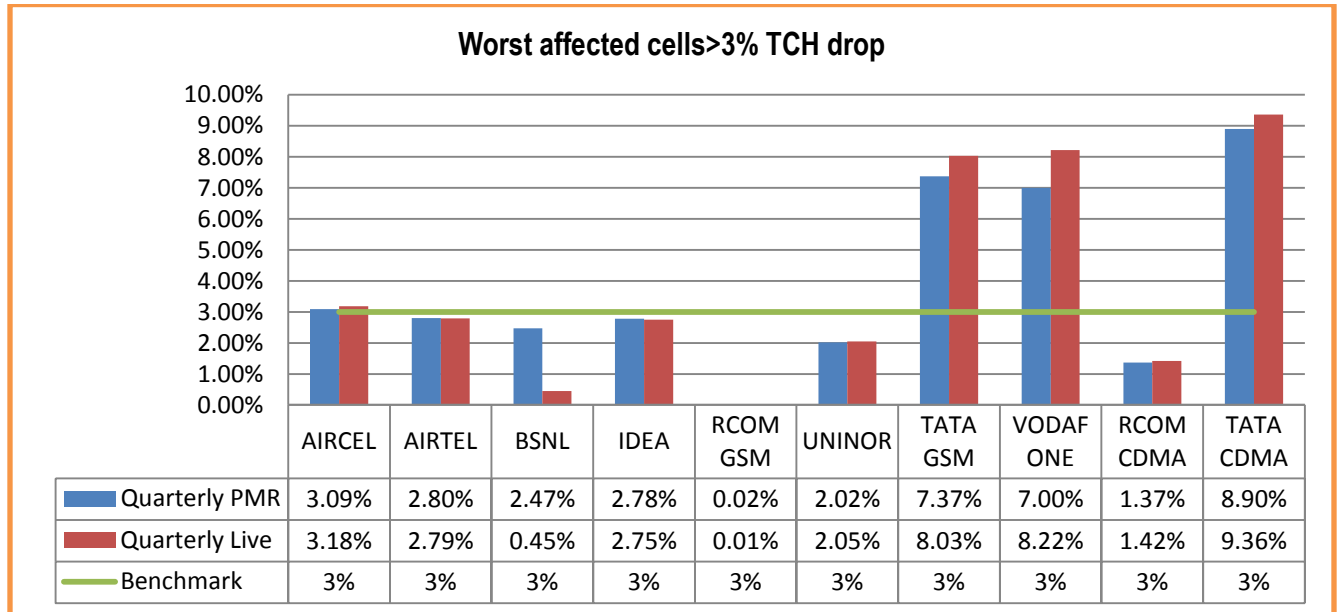
All operators are meeting the benchmarks.

6) CALL DROP RATE:



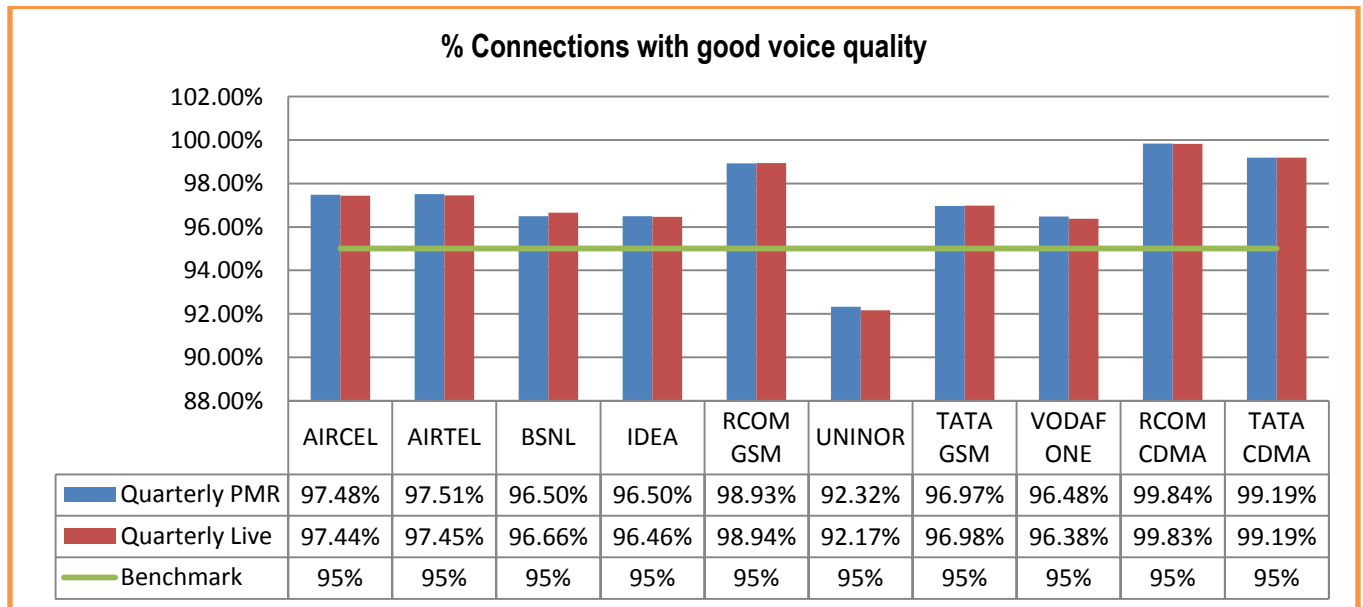
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP:



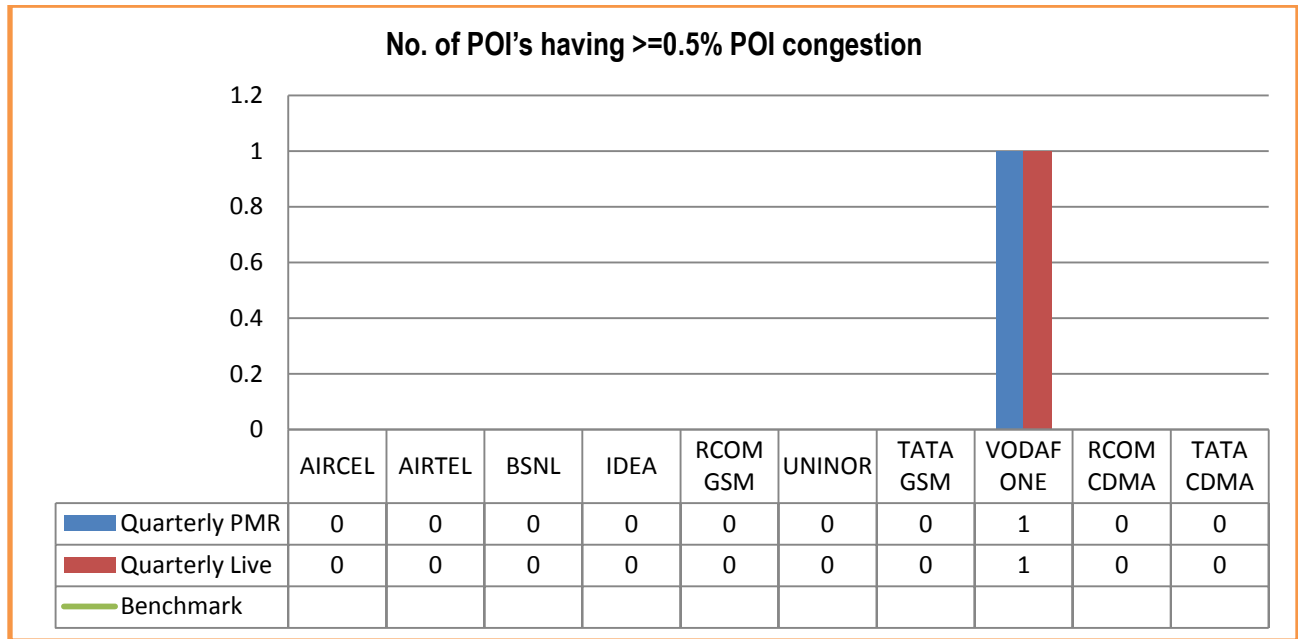
All operators are meeting the benchmarks except Aircel, Vodafone, Tata GSM and Tata CDMA.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks except Uninor.

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



All operators are meeting the benchmarks except Vodafone.