



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

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PREFACE

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

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

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **UP (W) circle** against the QoS bench marks laid down by TRAI in the respective regulations.



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1. BACKGROUND





1. BACKGROUND

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

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

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

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

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

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



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

2. OBJECTIVES AND METHODOLOGY





2. OBJECTIVES AND METHODOLOGY

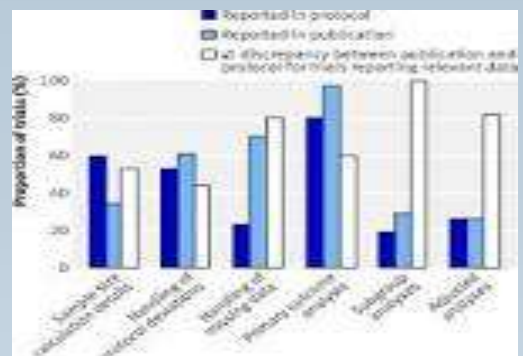
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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

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

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

3. SAMPLE SIZE





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(W) circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location/Address
		Jan-14	Feb-14	March-14	
GSM Operators					
1	AIRCEL	13 TO 15 JAN-14	3 TO 5 FEB-14	2 TO 4 MAR-14	325/1,DISHNET WIRELESS LTD. SHIKHAR TOWER,MANGAL PANDEY NAGAR, GARH ROAD, MEERUT
2	AIRTEL	21 TO 23 JAN-14	9 TO 11 FEB-14	8 TO 10 MAR-14	BHARTI AIRTEL LTD., DIVIDER CHOWK,GANGANAGAR,MWANA ROAD, MEERUT
3	BSNL (UK)	7 TO 9 JAN-14	15 TO 17 FEB-14	11 TO 13 MAR-14	BSNL TELEPHONE EXCHANGE,PATEL NAGAR NEAR LAL PUL,DEHRADUN UK.
5	BSNL (UPW)	10 TO 12 JAN-14	24 TO 26 FEB-14	9 TO 11 MAR-14	BSNL TELEPHONE EXCHANGE,BRAHAMPURI,DELHI ROAD,MEERUT
4	IDEA	17 TO 21 JAN-14	25 TO 27 FEB-14	18 TO 20 MAR-14	Idea Cellular Limited, First Floor A-68, Sector-64, Noida (UP)
6	RCOM GSM	19 TO 21 JAN-14	8 TO 10 FEB-14	6 TO 8 MAR-14	RCOM LTD.,VILL-JATAULI,NEAR KRISHNA PUBLIC SCHOOL,BYPASS ROAD MEERUT
7	UNINOR	20 TO 22 JAN-14	19 TO 21 FEB-14	20 TO 24 MAR-14	Telewings Communications Services Pvt Ltd. (Uninor) Welldone Technology Park Sec-48 Sohana Road Gurgaon
8	TATA GSM	17 TO 19 JAN-14	7 TO 9 FEB-14	4 TO 6 MAR-14	TTSL,NEAR CCS UNIVERSITY, MEERUT
9	VODAFONE	12 TO 14 JAN-14	9 TO 11 FEB-14	7 TO 9 MAR-14	VODAFONE SOUTH LTD.,NISHYAM KUNJ BUILDING,NEAR KAILASH PRKASH STADIUM,CIVIL LINES,MEERUT
CDMA Operators					
10	MTS	9 TO 11 JAN-14	2 TO 4 FEB-14	3 TO 5 MAR-14	SSTL,NEAR SRI RAM PLAZA,OPP.CCS UNIVERSITY, MEERUT
11	RCOM CDMA	19 TO 21 JAN-14	8 TO 10 FEB-14	6 TO 8 MAR-14	RCOM LTD.,VILL-JATAULI,NEAR KRISHNA PUBLIC SCHOOL,BYPASS ROAD MEERUT
12	TATA CDMA	17 TO 19 JAN-14	7 TO 9 FEB-14	4 TO 6 MAR-14	TTSL,NEAR CCS UNIVERSITY, MEERUT

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



3.2 SAMPLING FOR BASIC (WIRELINE) SERVICES

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **However, QoS audit for basic (wireline) service was not required to be done for UP (W) Circle in the quarter ended March-14.**

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

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

4. EXECUTIVE SUMMARY





4. EXECUTIVE SUMMARY

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

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

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





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

BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	Mar-14	20:00 - 21:00
2	AIRTEL	Mar-14	20:00 - 21:00
3	BSNL (UP-W)	Mar-14	19:00 - 20:00
4	BSNL UTTRAKHAND	Mar-14	20:00 - 21:00
5	IDEA	Mar-14	20:00 - 21:00
6	RCOM GSM	Mar-14	19:00 - 20:00
7	TATA GSM	Mar-14	20:00 - 21:00
8	UNINOR	Mar-14	20:00 - 21:00
9	VODAFONE	Mar-14	20:00 - 21:00
CDMA Operators			
10	MTS	Mar-14	19:00 - 20:00
11	RCOM CDMA	Mar-14	19:00 - 20:00
12	TATA CDMA	Mar-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 (W) circle.

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



SWITCHES/BSC/BTS DETAILS OF OPERATORS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
GSM Operators						
1	AIRCEL	3	7	628	ZTE	ZTE
2	AIRTEL	19	71	6589	Ericsson	Ericsson
3	BSNL (UP-W)	12	32	2233	Ericsson, NSN & ZTE	Ericsson, NSN & ZTE
4	BSNL UTTRAKHAND	5	13	840	Ericsson & ZTE	Ericsson, NSN & ZTE
5	IDEA	16	55	7176	NSN	NSN
6	RCOM GSM	4	14	2391	Huawei	Huawei
7	TATA GSM	3	18	1832	NSN	NSN
8	UNINOR	10	25	3107	Ericsson	Ericsson
9	VODAFONE	11	95	6118	NSN	NSN
CDMA Operators						
10	MTS	1	1	323	Huawei	Huawei
11	RCOM CDMA	3	4	1305	Huawei & Lucent	Huawei & Lucent
12	TATA CDMA	5	4	591	Huawei & Ericsson	Huawei & Motorola

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



TABLES OF MONTHLY QOS PERFORMANCE:

TABLE: 1

CELLULAR MOBILE TELEPHONE SERVICES- UP(W) CIRCLE- JAN 14 MONTH

PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators	
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Jan-14	0.26%	0.15%	1.26%	0.66%	0.05%	0.23%	0.10%	0.13%	0.17%	0.03%	0.28%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Jan-14	0.85%	0.27%	1.91%	0.00%	0.06%	0.00%	0.22%	0.13%	1.16%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	99.31%	97.74%	96.25%	97.16%	99.98%	99.64%	98.87%	97.93%	99.29%	99.62%	98.68%	99.02%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-14	0.43%	0.56%	0.55%	0.49%	0.56%	0.05%	0.04%	0.19%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.09%	1.36%	0.94%	1.77%	0.80%	0.03%	0.20%	1.53%	0.71%	0.00%	0.01%	0.16%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Jan-14	0.60%	1.27%	0.81%	1.51%	0.86%	0.25%	0.77%	0.49%	0.75%	0.43%	0.17%	0.41%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-14	6.21%	1.76%	2.06%	2.63%	2.37%	0.01%	5.77%	1.44%	2.40%	1.26%	0.54%	3.36%
	c) Connections with good voice quality	>=95%	Jan-14	97.83%	97.46%	97.02%	96.36%	96.43%	98.96%	97.97%	94.76%	97.69%	99.22%	99.78%	98.92%
4	No. of POI's having >=0.5% POI congestion		Jan-14	0	0	0	0	0	0	0	0	0	0	0	0

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



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES - UP(W) CIRCLE- FEB-14 MONTH

PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators	
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Feb-14	0.13%	0.16%	1.25%	0.83%	0.05%	0.18%	0.10%	0.20%	0.18%	0.04%	0.21%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Feb-14	0.19%	0.36%	1.85%	0.00%	0.00%	0.00%	0.22%	0.36%	1.05%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	99.25%	97.87%	96.65%	97.93%	99.98%	99.60%	99.08%	97.52%	99.28%	99.61%	98.90%	99.09%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-14	0.31%	0.47%	0.77%	0.74%	0.66%	0.03%	0.03%	0.30%	0.15%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.29%	1.21%	1.29%	1.66%	0.95%	0.03%	0.18%	1.93%	0.72%	0.00%	0.00%	0.06%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Feb-14	0.55%	1.18%	0.88%	1.40%	0.84%	0.25%	0.74%	0.50%	0.67%	0.39%	0.15%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-14	6.10%	2.32%	2.32%	2.42%	2.37%	0.03%	5.41%	1.50%	2.09%	1.00%	0.55%	3.33%
	c) Connections with good voice quality	>=95%	Feb-14	97.82%	97.48%	96.20%	97.25%	96.25%	98.92%	97.93%	94.70%	98.02%	99.22%	99.77%	98.92%
4	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	0	0	0	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES - UP(W) CIRCLE- MAR-14 MONTH

<u>PMR Generation Data</u>		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Mar-14	0.12%	0.16%	1.36%	0.69%	0.04%	0.20%	0.11%	0.13%	0.15%	0.05%	0.19%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Mar-14	0.64%	0.32%	1.84%	0.00%	0.00%	0.00%	0.33%	0.58%	0.87%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	99.32%	97.90%	96.28%	97.32%	99.98%	99.63%	98.92%	97.45%	99.09%	99.61%	98.98%	98.96%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-14	0.33%	0.53%	0.69%	0.79%	0.61%	0.04%	0.04%	0.44%	0.23%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.38%	1.03%	1.16%	1.72%	1.12%	0.04%	0.12%	1.85%	0.91%	0.00%	0.00%	0.16%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Mar-14	0.51%	1.15%	0.94%	1.54%	0.92%	0.27%	0.73%	0.55%	0.81%	0.35%	0.19%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-14	5.83%	1.96%	2.05%	2.38%	2.53%	0.02%	6.41%	2.22%	2.65%	1.12%	0.64%	3.55%
	c) Connections with good voice quality	>=95%	Mar-14	97.79%	97.54%	96.89%	96.39%	95.86%	98.84%	97.99%	94.49%	97.55%	99.22%	99.78%	98.93%
4	No. of POI's having >=0.5% POI congestion		Mar-14	0	0	0	0	0	0	0	0	0	0	0	0



TABLE OF QUARTERLY QOS PERFORMANCE:

TABLE: 4

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-MARCH-14) OF UP (W) CIRCLE															
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators			
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.17%	0.16%	1.29%	0.73%	0.05%	0.20%	0.10%	0.15%	0.17%	0.04%	0.23%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.75%	0.32%	1.87%	0.00%	0.02%	0.00%	0.26%	0.36%	1.02%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.29%	97.84%	96.39%	97.47%	99.98%	99.62%	98.96%	97.63%	99.22%	99.61%	98.85%	99.02%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.36%	0.52%	0.67%	0.67%	0.61%	0.04%	0.04%	0.31%	0.16%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.25%	1.20%	1.13%	1.72%	0.96%	0.03%	0.17%	1.77%	0.78%	0.00%	0.00%	0.13%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.55%	1.20%	0.88%	1.48%	0.87%	0.26%	0.75%	0.51%	0.74%	0.39%	0.17%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	6.05%	1.96%	2.14%	2.48%	2.42%	0.02%	5.86%	1.72%	2.38%	1.13%	0.58%	3.41%
	c) Connections with good voice quality	>=95%	Quarterly	97.81%	97.49%	96.70%	96.67%	96.18%	98.91%	97.96%	94.65%	97.75%	99.22%	99.78%	98.92%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	0	0	0	0	0



KEY FINDINGS: CELLULAR MOBILE SERVICES

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

TUV-SUD conducted audit for cellular mobile operators based on **three stage audit / verification viz audit of the records, live measurements and drive tests. This exercise has been repeated every month for CMSPs.**

Network Service Quality Parameters:

- **Network Availability**

- i. BTS Accumulated Downtime (Not Available for Service):
- ii. Worst affected BTSs due to downtime

For measuring the performance against the benchmark for this parameter, down time of each BTS lasting for more than 1 hour at a time in a day during the period of a month has been taken for computation.

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

- **Connection Establishment (Accessibility)**

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

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

All the operators were meeting the benchmark successfully of 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. There was no congestion on individual POI links between a service provider vis-à-vis other service providers.



▪ **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 0.17 %) 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) and Tata (CDMA) which failed to meet the benchmark in all the three months of the quarter.** Their quarterly average performance with respect to this parameter was **6.04%, 5.86% and 3.41%** respectively.

Aircel has provided the data on monthly basis but not on daily basis. For audit purpose, data was required on daily basis.

iii. Connections with good voice quality:

The audit results for this parameter indicates that all operators have met the bench mark during the quarter except **Uninor** which remained under performed with its performance as **94.65%**.

4.2 CUSTOMER SERVICE QUALITY (CSD) PARAMETERS





4.2 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT-QE MARCH-14:

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE MAR-14															
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL (UK)	BSNL (UP-W)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S / N	Name of Parameter			GSM Operators									CDMA Operators		
Customer Service Quality Parameters															
1	Metering & Billing Credibility -Post Paid														
	A) No. of bills issued during the quarter		UPW	20	146566	23468	34957	416699	18139	26826	NA	210398	6766	59983	29574
	B) No. of bills disputed including billing complaints during the quarter		UPW	0	43	0	7	160	14	1	NA	118	2	56	0
	C)% of billing complaints during the quarter	<= 0.1%	UPW	0.00%	0.03%	0.00%	0.02%	0.04%	0.08%	0.00%	NA	0.06%	0.03%	0.09%	0.00%
2	Metering & Billing Credibility -Pre Paid														
	A) Total No. of Pre-paid customers at the end of the quarter		UPW	109132	6722619	883547	3393363	11128399	4253928	3386238	5566953	9561698	227023	1333166	605362
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		UPW	0	240	5	33	365	4273	0	515	2315	88	1314	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	UPW	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.01%	0.02%	0.04%	0.10%	0.00%
3	Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints														
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		UPW	0	283	5	40	525	4287	53	515	2433	90	1370	20
	B) No. of billing complaints for Post paid customers/Charging /Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		UPW	NA	283	5	40	525	4288	53	515	2433	90	1370	20
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved	100 % within 4 week	UPW	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.0%

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within 4 weeks															
D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	UPW	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.0%
4 Response time to customers for assistance															
A) Accessibility of call centre/Customer Care	>=95 %	UPW	82.87%	100.00%	100.00%	100.00%	99.51%	98.84%	99.35%	96.26%	100.00%	96.48%	97.85%	99.14%	
B) % call answered by operators(voice to voice) within 60 sec.	>=90 %	UPW	94.74%	91.90%	27.42%	25.51%	97.33%	91.39%	90.71%	95.93%	97.44%	96.96%	91.51%	96.41%	
5 Termination/closure of service															
A) Total No. of requests for Termination / Closure of service received during the quarter		UPW	0	695	0	165	791	32	250	NA	740	178	178	113	
B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		UPW	NA	695	0	165	791	32	250	NA	740	178	178	113	
C) % of Termination/ Closure of service within 7 days	<=7d ays	UPW	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.0%	
6 Time taken for refunds of deposits after closures.															
A) No. of Payments/ Refunds due during the quarter		UPW	0	272	0	58	1562	147	109	NA	103	0	435	67	
B) No. of Payments/ Refunds Cleared during the quarter		UPW	NA	272	0	58	1562	147	109	NA	103	0	435	67	
C) Time taken for refunds of deposits after closures.	100 % within 60 days	UPW	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.0%	

*NA-Not Applicable



KEY FINDINGS:

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

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is well within the prescribed bench mark of $\leq 0.1\%$. Uninor was not having the post paid customers.

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 were found to have met the benchmarks for the above parameters.

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 **Aircel** were in compliance with respect to the parameter Accessibility of call center. The performance of **Aircel** for this parameter was recorded as **82.87%**. **BSNL (UK and UP-W)** have failed to meet the benchmark of calls answered by Operators (voice to voice) within 60 seconds. Their achievement for this parameter was **27.42% and 25.51%** respectively against the benchmark of $> 90\%$. Thus performance of BSNL was very poor with respect to this parameter. The call center is common for BSNL (Uttarakhand) and BSNL (UPW).

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.

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





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

A) NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

TABLE: 1

CELLULAR MOBILE TELEPHONE SERVICES- UP(W) CIRCLE- JAN-14 MONTH															
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Live data	0.07%	0.10%	1.41%	1.11%	0.05%	0.26%	0.19%	0.13%	0.20%	0.00%	0.24%	0.10%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.09%	2.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.38%	98.00%	95.95%	98.27%	99.98%	99.63%	98.83%	98.18%	99.30%	99.58%	98.84%	99.12%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.25%	0.27%	0.40%	0.65%	0.42%	0.02%	0.02%	0.14%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.04%	1.38%	1.03%	1.68%	0.74%	0.04%	0.16%	1.27%	0.70%	0.00%	0.00%	0.04%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.52%	1.28%	0.53%	1.47%	0.88%	0.27%	0.80%	0.51%	0.71%	0.43%	0.17%	0.39%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	5.94%	1.73%	2.30%	2.78%	2.41%	0.00%	6.22%	1.44%	1.87%	1.55%	0.69%	3.54%
	c) Connections with good voice quality	>=95%	Live data	97.92%	97.32%	97.13%	96.07%	96.43%	98.96%	97.94%	94.70%	97.74%	99.22%	99.76%	98.90%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES UP(W) CIRCLE- FEB-14 MONTH															
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Live data	0.21%	0.15%	1.34%	1.66%	0.05%	0.20%	0.07%	0.17%	0.13%	0.07%	0.22%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.08%	0.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.24%	97.89%	96.32%	98.83%	99.98%	99.66%	98.83%	97.41%	99.25%	99.65%	97.72%	99.17%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.13%	0.51%	0.81%	0.66%	1.01%	0.02%	0.01%	0.18%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.26%	1.14%	1.19%	1.72%	1.26%	0.04%	0.19%	2.11%	0.75%	0.00%	0.03%	0.02%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.54%	1.15%	0.60%	1.29%	0.88%	0.27%	0.76%	0.48%	0.66%	0.41%	0.26%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	5.25%	1.87%	2.42%	2.84%	2.50%	0.00%	5.42%	1.44%	2.00%	0.97%	1.38%	3.16%
	c) Connections with good voice quality	>=95%	Live data	97.84%	97.67%	96.27%	96.08%	96.14%	98.97%	97.96%	94.93%	98.07%	99.23%	99.69%	98.92%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES UP(W) CIRCLE- MAR-14 MONTH															
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.17%	1.23%	1.54%	0.07%	0.34%	0.06%	0.15%	0.12%	0.05%	0.22%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.08%	1.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.27%	97.89%	96.50%	97.50%	99.98%	99.68%	98.95%	97.23%	99.41%	99.63%	99.03%	98.90%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.27%	0.51%	0.77%	0.75%	0.56%	0.20%	0.02%	0.77%	0.18%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.05%	1.08%	1.51%	1.76%	1.13%	0.03%	0.06%	2.06%	0.59%	0.00%	0.00%	0.16%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.51%	1.18%	1.03%	1.62%	0.91%	0.22%	0.80%	0.60%	0.63%	0.35%	0.14%	0.59%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	5.91%	1.93%	2.40%	2.71%	2.52%	0.00%	6.81%	2.68%	2.13%	1.10%	0.67%	3.90%
	c) Connections with good voice quality	>=95%	Live data	97.76%	97.64%	96.61%	97.27%	95.94%	99.03%	98.02%	94.34%	97.95%	99.22%	99.76%	98.92%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0



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

TABLE: 4

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-MARCH-14) – UP (W) CIRCLE															
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UP-W)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
Network Service Quality Parameter															
Network Availability															
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.12%	0.14%	1.33%	1.44%	0.06%	0.27%	0.11%	0.15%	0.15%	0.04%	0.23%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.08%	1.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.30%	97.93%	96.26%	98.20%	99.98%	99.66%	98.87%	97.61%	99.32%	99.62%	98.53%	99.06%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.22%	0.43%	0.66%	0.69%	0.66%	0.08%	0.02%	0.36%	0.12%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.12%	1.20%	1.24%	1.72%	1.04%	0.04%	0.14%	1.81%	0.68%	0.00%	0.01%	0.07%
Connection maintenance (Retainability)															
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.52%	1.20%	0.72%	1.46%	0.89%	0.25%	0.79%	0.53%	0.67%	0.40%	0.19%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	5.70%	1.84%	2.37%	2.78%	2.48%	0.00%	6.15%	1.85%	2.00%	1.21%	0.91%	3.53%
	c) Connections with good voice quality	>=95%	Quarterly	97.84%	97.54%	96.67%	96.47%	96.17%	98.99%	97.97%	94.66%	97.92%	99.22%	99.74%	98.91%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0	0	0	0

KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live assessment, it was found that the performance of the operators was in compliance for most of the parameters except for the parameter 'Worst affected cells> 3 % TCH drops" which could not be met by **Aircel, Tata (GSM) and Tata (CDMA)** in all the three months of the quarter with their average performance as **5.70%, 6.15% and 3.53%** respectively. **Uninor** failed to meet the bench mark of Voice Quality with its performance as **94.66%**. The similar non-compliance of these operators was also observed in the monthly audit.



B) CUSTOMER SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

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

3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL UPW	BSNL UK	IDEA	TATA GSM	RCOM (GSM)	UNINOR	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S/N	Name of Parameter			GSM Operators										CDMA Operators	
RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE															
1	Total no of calls attempted to customer care/Call center		UP West	77	180392	49780	16080	336116	9941	64162	351763	292486	5477	29324	1132
	Total no. of calls successfully established to customer care/Call center		UP West	77	180392	49780	16080	334670	9861	62711	337522	292486	5096	29018	1122
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	UP West	100.00%	100.00%	100.00%	100.00%	99.57%	99.20%	97.74%	95.95%	100.00%	93.04%	98.96%	99.12%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		UP West	77	45357	22819	6568	105519	13588	10080	62492	90825	1285	2458	1200
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		UP West	75	41579	5571	1767	101525	13082	9982	60948	89416	1270	2426	1172
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec. *100 / Total call attempt)	>=90%	UP West	97.40%	91.67%	24.41%	26.90%	96.21%	96.28%	99.03%	97.53%	98.45%	98.83%	98.70%	97.67%



CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE

Parameter	Circle Name	AIRCEL	AIRTEL	BSNL UPW	BSNL UK	IDEA	TATA GSM	RCOM (GSM)	UNINOR	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	UP West	100	100	100	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	UP West	100	100	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	UP West	96	100	100	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total calls successfully established*100/ Total call attempt)	UP West	96.00%	100.00%	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 West	96	100	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	UP West	94	92	50	60	100	100	100	100	100	100	100	100
% age of calls answered by operator(voice to voice) (Total calls successfully established within 60 Sec.*100/ Total call attempt)	UP West	98.00%	92.00%	50.00%	60.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The results for three days live measurements reveal that all service providers except **MTS** were in compliance with respect to the parameter accessibility of call center. The performance of **MTS** for this parameter was recorded as **93.04%**. **BSNL (UP-W and UK)** have failed to meet the benchmark of calls answered by Operators (voice to voice within 60 Sec). Their achievement for this parameter was **24.41%** and **26.90%** respectively. Thus performance of BSNL was very poor with respect to this parameter as also revealed in quarterly audit of CSD parameters.

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, all operators were able to connect the calls with their call center operators/agents successfully except Aircel, Airtel, BSNL (UP-W) and BSNL (UK), they can achieve its performance as 98.00%, 92.00%, 50.00% and 60.00% respectively.

INTER OPERATOR CALLS ASSESSMENT





INTER OPERATOR CALLS ASSESSMENT

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in UP(W) 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 (UK)	BSNL (UP-W)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
AIRCEL	UPW	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
AIRTEL	UPW	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL (UK)	UPW	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL (UP-W)	UPW	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
IDEA	UPW	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
RCOM GSM	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
TATA GSM	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%	100.00%
UNINOR	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%	100.00%
VODAFONE	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%	100.00%
MTS	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%	100.00%
RCOM CDMA	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--	100.00%
TATA CDMA	UPW	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	--

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

LEVEL-1 LIVE CALLING





LEVEL-1 LIVE CALLING

LEVEL 1 LIVE CALLING														
Emergency no.	Circle Name	SDCA Name	No. of calls made	Aircel	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	Uninor	VODAFONE	RCOM (CDMA)	TATA (CDMA)	MTS
100,101,108,1090	UP(W)	CHMPAWAT	50	NS	✓	✓	✓	✓	✓	NS	✓	NS	NS	NS
100,101,108,1090	UP(W)	DEHRADUN	24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108,1090	UP(W)	CHAKRATA	26	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,102,108,1090	UP(W)	AGRA	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,102,108,1090	UP(W)	FEROZABAD	20	NS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,102,108,1090	UP(W)	JARAR	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	NS	NS
100,101,102,108,1090	UP(W)	ACCHNERA	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	NS	NS

*NS: No Service

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

5. DRIVE TEST





5. DRIVE TEST

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

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

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DRIVE TEST TABLE: 1

OPERATOR-ASSISTED DRIVE TEST AT ALMORA SSA IN JAN-14 MONTH- UP(W) CIRCLE														
S/N	Parameter	SSA Name: Almora	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	MTS	TATA CDMA	RCOM CDMA
				GSM Operators							CDMA Operators			
1	Call Attempts	Day 1	Jan-14	NS	125	155	134	97	79	NS	244	ICR	61	63
		Day 2	Jan-14	NS	137	141	132	96	83	NS	131	ICR	NS	NS
		Day 3	Jan-14	NS	156	122	119	108	89	NS	137	ICR	NS	NS
		Overall SSA	Total	NS	418	418	385	301	251	NS	512	ICR	61	63
2	Blocked Call Rate	Day 1	Jan-14	NS	0.00%	8.39%	2.99%	1.03%	6.33%	NS	0.00%	ICR	0.00%	0.00%
		Day 2	Jan-14	NS	0.73%	7.09%	0.76%	1.04%	0.01%	NS	2.29%	ICR	NS	NS
		Day 3	Jan-14	NS	0.64%	4.10%	0.84%	0.00%	1.12%	NS	2.92%	ICR	NS	NS
		Overall SSA	Total	NS	0.48%	6.70%	1.56%	0.66%	2.39%	NS	1.37%	ICR	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	NS	0.00%	6.47%	1.57%	0.00%	4.05%	NS	0.00%	ICR	0.00%	6.35%
		Day 2	Jan-14	NS	0.74%	8.66%	3.17%	0.00%	1.20%	NS	0.79%	ICR	NS	NS
		Day 3	Jan-14	NS	0.65%	0.90%	0.00%	0.00%	0.00%	NS	0.75%	ICR	NS	NS
		Overall SSA	Total	NS	0.48%	5.57%	1.63%	0.00%	1.63%	NS	0.40%	ICR	0.00%	6.35%
PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)														
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	ICR	98.60%	91.75%
		Day 2	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	ICR	NS	NS
		Day 3	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	ICR	NS	NS
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	ICR	98.60%	91.75%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	NS	97.65%	81.19%	84.63%	97.31%	82.57%	NS	96.13%	NA	NA	NA
		Day 2	Jan-14	NS	96.05%	85.69%	88.01%	95.40%	78.59%	NS	94.12%	NA	NA	NA
		Day 3	Jan-14	NS	98.89%	92.61%	91.88%	97.31%	75.82%	NS	96.76%	NA	NA	NA
		Overall SSA	Total	NS	97.58%	86.38%	88.01%	96.73%	78.67%	NS	95.77%	NA	NA	NA
SERVICE COVERAGE														
5	In door (>= -75dBm)	Day 1	Jan-14	NS	78.02%	33.26%	68.64%	60.83%	47.37%	NS	75.61%	ICR	66.50%	56.92%
		Day 2	Jan-14	NS	72.80%	58.17%	80.83%	51.40%	27.47%	NS	50.46%	ICR	NS	NS
		Day 3	Jan-14	NS	73.56%	46.04%	58.26%	41.57%	18.43%	NS	38.93%	ICR	NS	NS
		Overall SSA	Total	NS	74.59%	45.49%	69.79%	51.09%	29.77%	NS	48.88%	ICR	66.50%	56.92%
	In-vehicle (>= -85dBm)	Day 1	Jan-14	NS	95.97%	63.16%	91.05%	80.37%	74.65%	NS	93.14%	ICR	93.00%	95.52%
		Day 2	Jan-14	NS	90.43%	81.97%	95.38%	94.87%	54.63%	NS	75.77%	ICR	NS	NS
		Day 3	Jan-14	NS	90.67%	84.98%	84.77%	94.27%	51.36%	NS	65.06%	ICR	NS	NS
		Overall SSA	Total	NS	92.12%	76.38%	90.66%	89.77%	59.04%	NS	73.48%	ICR	93.00%	95.52%
	Outdoor- in city (>= -95dBm)	Day 1	Jan-14	NS	98.26%	89.19%	99.03%	100.00%	93.42%	NS	98.93%	ICR	99.56%	100.00%
		Day 2	Jan-14	NS	97.81%	96.37%	99.06%	100.00%	82.92%	NS	95.29%	ICR	NS	NS
		Day 3	Jan-14	NS	96.59%	97.59%	96.59%	100.00%	91.31%	NS	93.74%	ICR	NS	NS
		Overall SSA	Total	NS	97.47%	94.26%	98.29%	100.00%	88.87%	NS	95.11%	ICR	99.56%	100.00%
6	Call Setup Success	Day 1	Jan-14	NS	100.00%	89.68%	94.78%	98.97%	93.67%	NS	100.00%	ICR	100.00%	100.00%

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	Rate (>=95%)	Day 2	Jan-14	NS	99.27%	90.07%	95.45%	98.96%	100.00%	NS	97.71%	ICR	NS	NS
		Day 3	Jan-14	NS	99.36%	90.98%	96.64%	100.00%	98.88%	NS	97.08%	ICR	NS	NS
		Overall SSA	Total	NS	99.52%	90.19%	95.58%	99.34%	97.61%	NS	98.63%	ICR	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	NS	100.00%	92.58%	92.31%	98.28%	100.00%	NS	100.00%	ICR	100.00%	100.00%
		Day 2	Jan-14	NS	98.86%	95.91%	94.40%	100.00%	100.00%	NS	91.75%	ICR	NS	NS
		Day 3	Jan-14	NS	99.32%	97.14%	99.00%	98.82%	98.77%	NS	100.00%	ICR	NS	NS
		Overall SSA	Total	NS	99.36%	94.89%	94.93%	98.95%	99.62%	NS	97.84%	ICR	100.00%	100.00%

- NS-Not in Service
- ICR-Intra Circle Roaming
- NA-Not Applicable

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DRIVE TEST TABLE: 2

OPERATOR-ASSISTED DRIVE TEST AT ALMORA SSA IN JAN-14 MONTH- UP(W) CIRCLE - INDOOR

S/N	Parameter	Almora SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	MTS	TATA CDMA	RCOM CDMA
					GSM Operators								CDMA Operators		
1	Call Attempts	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	20	19	22	20	20	NS	21	ICR	12	10
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	20	14	23	20	20	NS	22	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	21	20	23	20	20	NS	22	NS	NS	NS
		Overall SSA	Jan-14		NS	61	53	68	60	60	NS	65		12	10
2	Blocked Call Rate	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%	ICR	0.00%	0.00%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%	NS	NS	NS
		Overall SSA	Jan-14		NS	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%		0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	0.00%	5.26%	0.00%	0.00%	0.00%	NS	0.00%	ICR	0.00%	0.00%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	0.00%	0.00%	0.00%	0.00%	0.00%	NS	0.00%	NS	NS	NS
		Overall SSA	Jan-14		NS	0.00%	1.89%	0.00%	0.00%	0.00%	NS	0.00%		0.00%	0.00%
Percentage connections with good voice quality (=>95%)															
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NA	NA	NA	NA	NA	NA	NA	NA	ICR	99.06%	99.60%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
		Overall SSA	Jan-14		NA	NA	NA	NA	NA	NA	NA	NA		99.06%	99.60%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	99.19%	59.66%	90.77%	99.93%	99.91%	NS	98.92%	NA	NA	NA
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	97.61%	93.65%	95.41%	99.34%	97.16%	NS	99.23%	NA	NA	NA
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	99.79%	94.08%	93.82%	96.47%	99.97%	NS	97.56%	NA	NA	NA
		Overall SSA	Jan-14		NS	98.84%	82.36%	93.34%	98.66%	99.01%	NS	98.55%	NA	NA	NA

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Service Coverage															
5	In door (>= - 75dBm)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	81.58%	32.98%	86.38%	99.65%	81.85%	NS	100.00%	ICR	99.82%	99.28%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	100.00%	99.75%	100.00%	100.00%	100.00%	NS	97.64%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	87.76%	55.19%	97.97%	100.00%	87.67%	NS	66.08%	NS	NS	NS
		Overall SSA	Jan-14		NS	89.65%	57.19%	94.63%	99.88%	89.84%	NS	84.06%		99.82%	99.28%
	In-vehicle (>= - 85dBm)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	98.60%	38.56%	100.00%	100.00%	98.06%	NS	100.00%	ICR	100.00%	100.00%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	99.46%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	99.90%	97.90%	100.00%	100.00%	99.09%	NS	87.79%	NS	NS	NS
		Overall SSA	Jan-14		NS	99.47%	78.30%	100.00%	100.00%	99.05%	NS	94.40%		100.00%	100.00%
	Outdoor- in city (>= - 95dBm)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	100.00%	89.76%	100.00%	100.00%	100.00%	NS	100.00%	ICR	100.00%	100.00%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	100.00%	99.86%	100.00%	100.00%	100.00%	NS	99.28%	NS	NS	NS
		Overall SSA	Jan-14		NS	100.00%	96.48%	100.00%	100.00%	100.00%	NS	99.68%		100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	ICR	100.00%	100.00%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	NS	NS	NS
		Overall SSA	Jan-14		NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%		100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	Hotel Tribhuvan, Hotel Shikhar	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	ICR	100.00%	100.00%
		Day 2	Jan-14	Dist Hospital, Nagarkoti Restaurent	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	NS	NS	NS
		Day 3	Jan-14	Hotel Bobs, Hotel Tiwari	NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%	NS	NS	NS
		Overall SSA	Jan-14		NS	100.00%	100.00%	100.00%	100.00%	100.00%	NS	100.00%		100.00%	100.00%

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DRIVE TEST TABLE: 3

OPERATOR-ASSISTED DRIVE TEST AT DEHRADUN SSA IN FEB-14 MONTH- UP(W) CIRCLE

S/N	Parameter	SSA Name: Dehradun	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	MTS	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators		
1	Call Attempts	Day 1	Feb-14	171	150	167	161	163	161	152	152	160	151	163
		Day 2	Feb-14	91	130	68	149	79	79	82	145	65	87	95
		Day 3	Feb-14	145	127	136	135	121	130	99	127	127	118	129
		Overall SSA	Total	407	407	371	445	363	370	333	424	352	356	387
2	Blocked Call Rate	Day 1	Feb-14	0.58%	0.00%	1.80%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	0.00%	0.00%	2.94%	0.67%	1.27%	0.00%	1.22%	0.00%	0.00%	0.00%	2.11%
		Day 3	Feb-14	0.00%	0.00%	0.00%	0.00%	0.83%	0.77%	0.00%	0.79%	0.00%	0.00%	1.55%
		Overall SSA	Total	0.25%	0.00%	1.35%	0.22%	0.55%	0.27%	0.60%	0.24%	0.00%	0.00%	1.03%
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	2.65%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	0.00%	0.00%	0.00%	2.04%	0.00%	0.00%	2.47%	0.69%	0.00%	0.00%	0.00%
		Day 3	Feb-14	0.70%	0.00%	3.85%	0.00%	0.83%	0.00%	2.02%	0.00%	0.00%	0.00%	1.57%
		Overall SSA	Total	0.25%	0.00%	1.40%	0.68%	0.28%	0.27%	2.42%	0.24%	0.00%	0.00%	0.52%
PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)														
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	98.47%	99.04%	90.91%
		Day 2	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	98.37%	96.16%	98.06%
		Day 3	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	98.26%	98.22%	93.08%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	98.38%	98.06%	93.31%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	97.07%	95.27%	89.45%	93.03%	98.64%	88.08%	86.89%	98.33%	NA	NA	NA
		Day 2	Feb-14	98.70%	96.63%	87.57%	93.23%	99.34%	95.21%	93.83%	97.67%	NA	NA	NA
		Day 3	Feb-14	98.79%	96.03%	88.97%	94.39%	99.20%	93.81%	89.73%	97.44%	NA	NA	NA
		Overall SSA	Total	98.01%	95.92%	88.93%	93.49%	98.97%	91.70%	89.52%	97.99%	NA	NA	NA
SERVICE COVERAGE														
5	In door (>= -75dBm)	Day 1	Feb-14	92.30%	96.31%	86.96%	99.77%	89.73%	92.72%	52.26%	77.13%	97.07%	98.08%	98.83%
		Day 2	Feb-14	71.75%	63.41%	64.27%	77.48%	55.13%	52.65%	62.34%	46.15%	70.31%	72.00%	70.95%
		Day 3	Feb-14	74.75%	87.45%	69.77%	93.10%	80.03%	72.24%	54.53%	71.74%	63.70%	69.11%	73.00%
		Overall SSA	Total	81.66%	83.43%	76.41%	91.44%	78.67%	76.46%	55.59%	69.07%	79.95%	82.31%	83.82%
	In-vehicle (>= -85dBm)	Day 1	Feb-14	98.96%	99.78%	96.90%	99.96%	99.72%	99.21%	90.51%	98.92%	99.66%	100.00%	100.00%
		Day 2	Feb-14	89.12%	88.89%	88.28%	92.59%	95.89%	80.57%	86.40%	87.43%	87.12%	91.53%	94.12%
		Day 3	Feb-14	91.77%	97.02%	90.99%	98.51%	99.44%	88.98%	82.61%	93.32%	78.69%	89.52%	91.15%
		Overall SSA	Total	94.27%	95.58%	93.11%	97.43%	98.74%	91.41%	87.25%	95.14%	89.70%	94.53%	95.73%
	Outdoor- in city (>= -95dBm)	Day 1	Feb-14	99.93%	99.99%	99.90%	99.99%	100.00%	100.00%	98.91%	99.84%	100.00%	100.00%	100.00%
		Day 2	Feb-14	98.81%	98.57%	99.42%	99.07%	100.00%	98.58%	96.89%	96.97%	100.00%	99.66%	100.00%
		Day 3	Feb-14	99.03%	99.77%	98.67%	99.97%	100.00%	97.42%	96.30%	99.21%	100.00%	99.27%	100.00%
		Overall SSA	Total	99.37%	99.50%	99.36%	99.72%	100.00%	98.80%	97.65%	99.07%	100.00%	99.68%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Feb-14	98.25%	100.00%	97.01%	100.00%	100.00%	100.00%	99.34%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	97.80%	100.00%	97.06%	98.66%	98.73%	100.00%	98.78%	100.00%	100.00%	100.00%	97.89%
		Day 3	Feb-14	98.62%	100.00%	95.59%	98.52%	99.17%	99.23%	100.00%	99.21%	100.00%	100.00%	98.45%

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		Overall SSA	Total	98.28%	100.00%	96.50%	99.10%	99.45%	99.73%	99.40%	99.76%	100.00%	100.00%	98.97%
7	Hand Over Success Rate (HOSR)	Day 1	Feb-14	99.55%	98.54%	98.99%	96.80%	99.62%	99.75%	98.48%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	98.65%	100.00%	91.09%	99.15%	100.00%	100.00%	100.00%	98.11%	100.00%	100.00%	100.00%
		Day 3	Feb-14	99.17%	99.34%	85.98%	97.47%	98.82%	99.26%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Total	99.28%	99.04%	95.44%	97.59%	99.52%	99.67%	99.11%	99.65%	100.00%	100.00%	100.00%

- NA-Not Applicable

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



DRIVE TEST TABLE: 4

OPERATOR-ASSISTED DRIVE TEST AT DEHRADUN SSA IN FEB-14 MONTH- UP(W) CIRCLE - INDOOR

S/N	Parameter	Dehradun SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	MTS	TATA CDMA	RCOM CDMA	
					GSM Operators							CDMA Operators				
1	Call Attempts	Day 1	Feb-14	Hotel Him Place, Big Bazar	20	20	23	20	20	20	20	20	20	20	20	20
		Day 2	Feb-14	Geeta Bhavan	10	20	10	20	10	10	10	10	21	20	11	10
		Day 3	Feb-14	Rahul Restaurent	20	20	21	20	20	20	20	20	21	20	20	20
		Overall SSA	Feb-14		50	60	54	60	50	50	50	50	62	60	51	50
2	Blocked Call Rate	Day 1	Feb-14	Hotel Him Place, Big Bazar	0.00%	0.00%	4.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	Geeta Bhavan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	Rahul Restaurent	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Feb-14		0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	Hotel Him Place, Big Bazar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Feb-14	Geeta Bhavan	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	Rahul Restaurent	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Feb-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Percentage connections with good voice quality (=>95%)																
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	Hotel Him Place, Big Bazar	NA	NA	NA	NA	NA	NA	NA	NA	99.17%	99.51%	99.71%	
		Day 2	Feb-14	Geeta Bhavan	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.84%	98.51%	98.48%
		Day 3	Feb-14	Rahul Restaurent	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.23%	99.59%	98.32%
		Overall SSA	Feb-14		NA	NA	NA	NA	NA	NA	NA	NA	NA	98.70%	99.32%	98.84%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	Hotel Him Place, Big Bazar	99.84%	98.57%	97.87%	98.88%	100.00%	99.48%	94.44%	98.05%	NA	NA	NA	
		Day 2	Feb-14	Geeta Bhavan	99.69%	98.77%	99.42%	98.57%	100.00%	99.96%	97.72%	99.55%	NA	NA	NA	
		Day 3	Feb-14	Rahul Restaurent	99.81%	99.65%	97.05%	99.60%	100.00%	99.18%	98.73%	97.45%	NA	NA	NA	
		Overall SSA	Feb-14		99.80%	99.00%	97.85%	99.03%	100.00%	99.54%	96.82%	98.35%	NA	NA	NA	
Service Coverage																
5	In door (>= -75dBm)	Day 1	Feb-14	Hotel Him Place, Big Bazar	99.93%	99.89%	99.81%	100.00%	100.00%	99.39%	49.46%	97.53%	98.54%	100.00%	98.45%	
		Day 2	Feb-14	Geeta Bhavan	99.70%	74.88%	100.00%	98.90%	98.98%	99.07%	73.85%	85.64%	100.00%	100.00%	100.00%	
		Day 3	Feb-14	Rahul Restaurent	99.96%	99.64%	95.87%	98.23%	99.90%	99.69%	69.95%	74.32%	98.67%	99.66%	98.76%	
		Overall SSA	Feb-14		99.90%	92.38%	98.32%	99.04%	99.78%	99.38%	62.55%	85.77%	99.07%	99.87%	99.07%	
	In-vehicle (>= -)	Day 1	Feb-14	Hotel Him Place, Big Bazar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.05%	99.98%	99.52%	100.00%	99.25%	

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	85dBm)	Day 2	Feb-14	Geeta Bhavan	99.96%	98.15%	100.00%	99.95%	100.00%	99.69%	99.74%	96.93%	100.00%	100.00%	100.00%	
		Day 3	Feb-14	Rahul Restaurent	99.98%	99.97%	100.00%	100.00%	100.00%	99.89%	98.55%	93.89%	100.00%	100.00%	100.00%	
		Overall SSA	Feb-14		99.99%	99.44%	100.00%	99.98%	100.00%	99.86%	98.59%	96.92%	99.84%	100.00%	99.75%	
	Outdoor-in city (>= 95dBm)	Day 1	Feb-14	Hotel Him Place, Big Bazar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Geeta Bhavan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.40%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Rahul Restaurent	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.50%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	99.62%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Feb-14	Hotel Him Place, Big Bazar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Geeta Bhavan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Rahul Restaurent	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Feb-14	Hotel Him Place, Big Bazar	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Geeta Bhavan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Rahul Restaurent	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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DRIVE TEST TABLE: 5

OPERATOR-ASSISTED DRIVE TEST AT AGRA SSA IN MAR-14 MONTH- UP(W) CIRCLE

S/N	Parameter	SSA Name: Agra	Drive Test Period	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	MTS	TATA CDMA	RCOM CDMA
				GSM Operators							CDMA Operators			
1	Call Attempts	Day 1	Mar-14	145	178	176	160	159	174	172	155	147	161	180
		Day 2	Mar-14	43	135	167	155	88	142	92	126	78	56	149
		Day 3	Mar-14	116	163	210	135	98	148	124	158	91	32	165
		Overall SSA	Mar-14	304	476	553	450	345	464	388	439	316	249	494
2	Blocked Call Rate	Day 1	Mar-14	0.69%	0.00%	2.27%	0.00%	1.89%	0.00%	0.58%	0.65%	0.00%	0.00%	4.44%
		Day 2	Mar-14	0.00%	0.00%	5.99%	0.00%	1.14%	3.52%	1.09%	0.00%	0.00%	0.00%	2.01%
		Day 3	Mar-14	0.00%	0.00%	4.29%	0.00%	0.00%	4.73%	1.61%	1.90%	0.00%	0.00%	3.03%
		Overall SSA	Mar-14	0.33%	0.00%	4.16%	0.00%	1.16%	2.59%	1.03%	0.91%	0.00%	0.00%	3.24%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	0.69%	0.00%	6.98%	0.00%	0.00%	0.00%	0.58%	0.65%	0.00%	0.00%	2.38%
		Day 2	Mar-14	0.00%	0.00%	14.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%
		Day 3	Mar-14	0.00%	0.00%	17.41%	0.00%	0.00%	0.71%	0.00%	0.65%	0.00%	0.00%	1.91%
		Overall SSA	Mar-14	0.33%	0.00%	13.02%	0.00%	0.00%	0.22%	0.26%	0.46%	0.00%	0.00%	1.70%
PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)														
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	97.99%	97.41%	99.51%
		Day 2	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	97.61%	97.45%	98.13%
		Day 3	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	97.60%	97.63%	98.92%
		Overall SSA	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	97.78%	97.45%	98.91%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	93.42%	97.05%	84.10%	97.02%	96.03%	88.02%	91.05%	95.44%	NA	NA	NA
		Day 2	Mar-14	97.84%	97.15%	79.54%	96.54%	97.39%	85.55%	94.80%	96.09%	NA	NA	NA
		Day 3	Mar-14	97.68%	96.39%	76.35%	96.97%	98.68%	89.06%	96.15%	96.50%	NA	NA	NA
		Overall SSA	Mar-14	95.69%	96.86%	80.92%	96.79%	97.12%	87.88%	93.91%	96.01%	NA	NA	NA
SERVICE COVERAGE														
5	In door (>= -75dBm)	Day 1	Mar-14	83.86%	96.85%	72.46%	99.74%	84.51%	76.78%	68.49%	77.16%	77.97%	88.90%	96.36%
		Day 2	Mar-14	63.29%	89.86%	42.54%	95.32%	54.95%	41.63%	75.03%	73.57%	70.68%	90.46%	28.26%
		Day 3	Mar-14	69.44%	88.28%	43.75%	95.34%	44.34%	55.55%	56.86%	70.65%	23.55%	77.14%	57.24%
		Overall SSA	Mar-14	75.32%	92.13%	54.34%	96.63%	65.66%	70.31%	66.03%	73.74%	60.61%	87.68%	72.17%
	In-vehicle (>= -85dBm)	Day 1	Mar-14	98.44%	99.67%	96.36%	99.98%	99.62%	94.90%	95.13%	96.06%	93.17%	99.55%	99.99%
		Day 2	Mar-14	86.63%	99.00%	69.28%	99.69%	98.21%	65.93%	88.07%	94.00%	88.57%	99.87%	53.98%
		Day 3	Mar-14	93.90%	99.26%	83.17%	99.71%	97.20%	80.49%	87.85%	94.14%	74.04%	97.88%	89.81%
		Overall SSA	Mar-14	94.96%	99.34%	84.25%	99.78%	98.59%	89.93%	90.61%	94.76%	86.54%	99.40%	87.63%
	Outdoor- in city (>= -95dBm)	Day 1	Mar-14	100.00%	99.93%	99.84%	100.00%	100.00%	99.99%	100.00%	99.70%	99.02%	100.00%	99.99%
		Day 2	Mar-14	97.70%	99.84%	91.24%	100.00%	100.00%	87.50%	100.00%	99.62%	99.20%	100.00%	90.89%
		Day 3	Mar-14	99.72%	99.93%	97.65%	100.00%	100.00%	96.74%	100.00%	99.21%	99.54%	100.00%	99.81%
		Overall SSA	Mar-14	99.55%	99.90%	96.67%	100.00%	100.00%	98.21%	100.00%	99.49%	99.21%	100.00%	98.00%
6	Call Setup	Day 1	Mar-14	99.31%	100.00%	97.73%	100.00%	98.11%	100.00%	99.42%	99.35%	100.00%	100.00%	93.33%

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	Success Rate (>=95%)	Day 2	Mar-14	100.00%	98.52%	94.01%	100.00%	98.86%	96.48%	98.91%	100.00%	100.00%	100.00%	97.32%	
		Day 3	Mar-14	100.00%	99.39%	95.71%	100.00%	100.00%	95.27%	98.39%	98.10%	100.00%	100.00%	100.00%	95.15%
		Overall SSA	Mar-14	99.67%	99.37%	95.84%	100.00%	98.84%	97.41%	98.97%	99.09%	100.00%	100.00%	100.00%	95.14%
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	99.21%	99.57%	99.75%	100.00%	98.63%	100.00%	97.55%	100.00%	100.00%	100.00%	100.00%	
		Day 2	Mar-14	100.00%	99.60%	99.27%	100.00%	98.63%	98.19%	98.17%	99.08%	100.00%	100.00%	100.00%	
		Day 3	Mar-14	100.00%	100.00%	92.86%	100.00%	98.68%	100.00%	100.00%	93.48%	100.00%	100.00%	100.00%	
		Overall SSA	Mar-14	99.45%	99.69%	99.12%	100.00%	98.64%	99.48%	98.33%	98.25%	100.00%	100.00%	100.00%	

- NA-Not Applicable

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



DRIVE TEST TABLE: 6

OPERATOR-ASSISTED DRIVE TEST AT AGRA SSA IN MAR-14 MONTH- UP(W) CIRCLE - INDOOR

S/N	Parameter	Agra SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL	IDEA	TATA GSM	RCOM GSM	UNINOR	VODAFONE	MTS	TATA CDMA	RCOM CDMA
					GSM Operators								CDMA Operators		
1	Call Attempts	Day 1	Mar-14	Hotel Grand Casa	20	22	21	20	23	21	20	22	20	22	21
		Day 2	Mar-14	ICICI & SBI Baha	11	20	24	20	20	20	20	21	10	11	21
		Day 3	Mar-14	SBI, Gulista Complex	20	20	23	20	20	20	20	21	10	10	21
		Overall SSA	Mar-14		51	62	68	60	63	61	60	64	40	43	63
2	Blocked Call Rate	Day 1	Mar-14	Hotel Grand Casa	0.00%	0.00%	4.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	ICICI & SBI Baha	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	SBI, Gulista Complex	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.76%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		0.00%	0.00%	1.47%	0.00%	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	Hotel Grand Casa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Mar-14	ICICI & SBI Baha	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	SBI, Gulista Complex	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Mar-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Percentage connections with good voice quality (=>95%)															
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	Hotel Grand Casa	NA	NA	NA	NA	NA	NA	NA	NA	99.00%	98.53%	98.35%
		Day 2	Mar-14	ICICI & SBI Baha	NA	NA	NA	NA	NA	NA	NA	NA	97.68%	99.12%	99.21%
		Day 3	Mar-14	SBI, Gulista Complex	NA	NA	NA	NA	NA	NA	NA	NA	97.68%	99.84%	99.48%
		Overall SSA	Mar-14		NA	NA	NA	NA	NA	NA	NA	NA	98.34%	98.99%	99.01%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	Hotel Grand Casa	98.83%	99.31%	66.90%	98.80%	99.69%	99.96%	97.73%	98.18%	NA	NA	NA
		Day 2	Mar-14	ICICI & SBI Baha	99.75%	99.71%	72.52%	99.40%	98.90%	98.09%	97.44%	99.23%	NA	NA	NA
		Day 3	Mar-14	SBI, Gulista Complex	99.71%	99.71%	83.52%	96.79%	99.96%	99.69%	98.03%	97.10%	NA	NA	NA
		Overall SSA	Mar-14		99.38%	99.57%	72.84%	96.95%	99.52%	99.25%	97.77%	98.16%	NA	NA	NA
Service Coverage															
5	In door (>= -75dBm)	Day 1	Mar-14	Hotel Grand Casa	77.33%	97.47%	83.07%	99.92%	87.47%	97.74%	68.94%	69.36%	91.71%	97.09%	97.90%
		Day 2	Mar-14	ICICI & SBI Baha	78.08%	99.50%	68.00%	100.00%	23.64%	99.05%	96.16%	92.11%	98.00%	100.00%	100.00%
		Day 3	Mar-14	SBI, Gulista Complex	85.53%	90.43%	71.01%	99.33%	52.57%	90.34%	74.50%	61.51%	0.00%	100.00%	100.00%
		Overall SSA	Mar-14		80.70%	96.33%	73.17%	99.78%	55.37%	95.71%	78.90%	74.09%	70.39%	98.51%	99.30%

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	In-vehicle (>= - 85dBm)	Day 1	Mar-14	Hotel Grand Casa	99.01%	100.00%	99.64%	100.00%	100.00%	100.00%	95.41%	91.40%	100.00%	100.00%	100.00%
		Day 2	Mar-14	ICICI & SBI Baha	98.88%	100.00%	98.92%	100.00%	100.00%	100.00%	99.70%	99.37%	100.00%	100.00%	100.00%
		Day 3	Mar-14	SBI, Gulista Complex	99.79%	99.59%	99.13%	100.00%	99.19%	99.95%	98.55%	93.64%	70.55%	100.00%	100.00%
		Overall SSA	Mar-14		99.29%	99.89%	99.19%	100.00%	99.75%	99.98%	97.93%	94.73%	92.65%	100.00%	100.00%
	Outdoor-in city (>= - 95dBm)	Day 1	Mar-14	Hotel Grand Casa	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.33%	100.00%	100.00%	100.00%
		Day 2	Mar-14	ICICI & SBI Baha	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	SBI, Gulista Complex	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.57%	100.00%	100.00%	100.00%
		Overall SSA	Mar-14		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.63%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	Hotel Grand Casa	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	ICICI & SBI Baha	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	SBI, Gulista Complex	100.00%	100.00%	95.65%	100.00%	100.00%	100.00%	100.00%	95.24%	100.00%	100.00%	100.00%
		Overall SSA	Mar-14		100.00%	100.00%	98.53%	100.00%	100.00%	100.00%	100.00%	98.44%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	Hotel Grand Casa	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	ICICI & SBI Baha	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	SBI, Gulista Complex	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Mar-14		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%



DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 7

Name of SSA	Date of Drive Test	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
ALMORA	29th to 31th Jan-14	ALMORA&RANIKHET (81 Km)	KARBLA CHOWK EXCHNAGE ALMORA- LOWER MALL ROAD- DHARANAULA ROAD- FALSIMA-NTD- VISHWANATH ROAD- ALMORA MAIN MALL ROAD,MAJKHALI-GOLF COURSE RANIKHET- RANIKHET CANTT.- CHILIANOLA-RANIKHET MAIN MALL ROAD- MAJKHALI- INBUILDING(HOTEL TRIBHUVAN RANIKHET- HOTEL SHIKHAR ALMORA)	PITHORAGARH (148 Km)	GHAT BRIDGE-GURNA TEMPLE-ENCHOLI-SHILING- HYDLE SUBSTATION-VIKAS BHAVAN-PANDEY GAO- TKANA ROAD-ROADWAYS BUSSTAND-DISTRIC COURT- CHNDAK-VDDA-MILITARY HOSPITAL-ITBP-RANGOLIS PLAZA- INBUILDING(DISTT.HOSPITAL PITHORAGARH-NAGARKOTI BHOJNALYA PITHORAGARH)	CHMPAWAT (120 Km)	GHAT BRIDGE- LOHAGHAT-NH-9- LOHAGHAT BUS STAND-PULA ROAD-MEENA BZAR LOHAGHAT- BHAGIRATI INSTITUTE OF MANGEMENT LOHAGHAT- LOHAGHAT CHMPAWAT ROAD-KARNATK HOSPITAL CHMPAWAT- UNION BANK OF INDIA CHMPAWAT-BUS STAND CHMPAWAT-GIC CHMPAWAT.- INBUILDING(BOBS HOTEL CHMPAWAT- TIWARI HOTEL CHMPAWAT)
DEHRADUN	19th to 21th Feb-14	DEHRADUN (100 Km)	SAI TEMPLE-RAJPUR CHOWK-GANDHIPARK- GHANTAGHAR-MAJRA- ISBT-SUBHASHNAGAR- GRAPHIC ERA-GMS ROAD-BALLUPUR CHOWK-CANAUGHT PALACE-SURVEY CHOWK-ARAGHAR- RISPNA BRIDGE- HARIDWAR BYPASS- IBS(BIGBZAR)- AZABPUR KHURD- POLICE LINE RACE COURSE-LUXMI ROAD- NEHRU COLONY- IBS(HOTEL HIMPALACE)-LIC- SURVEY CHOCK-DL CHOWK-GHARI CANTT.- BASANT VIHAR-SHIMLA BYPASS- CLEMENTOWN-ISBT	CHAKRATA (DAKPATHAR) (128 Km)	BALLUPUR CHOWK(DDN)- SHUDDUWALA-SELAQUI- HARBARTPUR-VIKASNAGAR- KOTWALI-BULAKIWALA- MAINBZAR-IBS(GEETA BHWAN)-DAKPATHAR- BARWALA-KALSI-HASYA- SIYA-KORBA-CHAKRATA TOWN-IBS(CHAKRATA TEHSIL).	DEHRADUN (RISHIKESH) (137 Km)	RISPNA BRIDGE- MOHKAMPUR- DOIWALA- JOLLYGRANT- RANIPOKHRI- NATRAJ CHOWK- MUNI KI RETI- RAMJHULA- SHIVAJI NAGAR- RAILWAY STATION-THDC INDIA LTD.- GUMANIWALA- SHYAMPUR- RAIWALA- IBS(RAHUL FAMILY REASTAURENT RAIWALA)-NEPALI FARM- LALTAPPAR-FUN VELLY- BHANIYAVALA- IBS(SHER-E- PUNJAB DHABHA BHANIYAVALA)..

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



<p align="center">AGRA</p>	<p align="center">24th to 26th Mar-14</p>	<p align="center">AGRA (101 Km)</p>	<p>HOTEL MANSINGH PALACE NEAR TAJ MAHAL-FATEHABAD ROAD-PRATAPURA-DM RESIDENCE-MG ROAD-SHUBHASH PARK-RAJA KI MANDI-SANJAY PLACE-ST. JOHNS CROSSING-BHAGWAN TALKIZ-TULSI TALKIES-KHNDARI-ARTONI-RUNAKTA-HINDI SANSTHAN-DAYALBAGH-KAMLA NAGAR-BALKESHWAR COLONY-SHUBHASH NAGAR-SULTANGANJ KI PULIA-SIKANDRA-IBS(BHAGWATI DHABA)-INDUSTRIAL AREA SIKANDRA-PASCHIMPURI-SHASTRIPURAM-BODLA-SHAHGANJ-LOHA MANDI-MG ROAD-TDI MALL-ITC MUGHAL-JAYPEE HOTEL-HOTEL MANSINGH PALACE-IBS(HOTEL KUMAR GRAND CASA).</p>	<p align="center">FEROZABAD & JARAR (160 Km)</p>	<p>SHADARA CHUNGI-JHARNANALA-YAMUNA EXPRESS WAY-KUBER CHOWK-KUBERPUR-TUNDLA-HAZRATPUR-SUHAG NAGAR FEROZABAD-JAIN MANDIR-ROADWAYS BUS STAND FZBD.-RAILWAY STATION FZBD.-JATANPURI-IBS(ICICI BANK)-ASFABAD-FEROZABAD FATEHABAD ROAD-SOFIPUR-NAGLACHURA-GADI TIWARI KI PULIA-KHANDER-ARNOTA-PINAHUT-MANIKPURA-SHYAHI PURA-GAJORA-BHADROLI-JARAR-N.D.JAIN COLEEGE BAH-BAH BLOCK-MAIN MARKET BAH-BUS STAND BAH-KOTWALI BAH-IBS(SBI BAH)</p>	<p align="center">ACCHNERA (140 Km)</p> <p>KARGIL PETROL PUMP AGRA-BODLA CHOWK-PATHOLI-MIDHAKUR-KIRWALI-UJRAI-TOLL PLAZA-FATEHPUR SIKRI-AGRA GATE-RAILWAY STATION FATEHPUR SIKRI-BULAND DARWAJA-IBS(SBI FATEHPUR SIKRI)-IBS(GULISTAN TOURIST COMPLEX)-FATEHPUR SIKRI BYPASS-KIRAWALI-MORI-CHIKORA-JAIGARA-SUBPOST OFFICE KAGAROL-MAIN MARKET KAGAROL-SBI KAGAROL-KIRAWALI-ACCHNERA ROAD KIRAWALI-PS GULAVNAGAR ACCHNERA-BHARATPUR ROAD ACHNERA-SABJI MANDI CHOURAHA ACHNERA-MAIN MARKET ACHNERA-IBS(SBI ACCHNERA)-SIDHI VINAYAK DEGREE COLLEGE RAIBHA-RAIBHA RAILWAY STATION-THAPISHAI-BICHPURI-PATHOLI AGRA.</p>
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SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 8

DRIVE TEST OBSERVATION OF ALMORA SSA - JAN-14

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Jan-14	Almora	Almora, Ranikhet	No Coverage	PITHORAGARH	No Coverage	CHMPAWAT	No Coverage
2	AIRTEL				No Coverage at Dadgaliya, Poor Quality near NTD Almora		No Coverage at Marsolibhat		Poor Level near Gweneda, between Lohaghat to Champawat
3	BSNL				Poor Quality & Level near Lower Road Chilianaula, Kalika, No Coverage between Majkhali to Ranikhet		Poor Level & Quality between Ghat to Guna, Jajerdewal		Poor Level at Maneshwar Camp
4	TATA GSM				Poor Level & Quality near Maikhali		No Coverage Vikash Nagar to Chakrata, Poor Quality near Jamunipur		No Coverage Rani ki Pokhari to Rishikesh
5	TATA CDMA				Poor Level & Quality near NTD Almora, between Shavli to Gharsum Ghunt		No Coverage		No Coverage
6	IDEA				Poor Level & Quality between Maikhali to Ranikhet, between Shavli to Gharsum Ghunt		Poor Level & Quality between Gurna to Marsolibhat, between Ghat to Gogana, between Encholi to Marsolibhat		Poor Level & Quality between Lohaghat to Champawat, No Coverage at Pithoragarh
7	RCOM GSM				Poor Rx Level & Quality near Maikhali, NTD Almora, Shavli to Gharsum		----		Poor Level & Quality Lohaghat & Pitoragarh Outer
8	RCOM CDMA				Poor Rx Level & Quality near Maikhali, NTD Almora, Shavli to Gharsum		No Coverage		No Coverage
9	MTS				No Coverage		No Coverage between Prem Nagar to Selaqui, between Vikash Nagar to Chakrata, Poor Quality near Jamunipur		No Coverage
10	UNINOR				No Coverage		No Coverage		No Coverage
11	VODAFONE				Poor Level & Quality near Hawalbagh, Knaw, Jhaser Thana, Khatwadi, Baishori, Dugalkhola & between Maikhali to Ranikhet		Poor Level at Pithoragarh, Poor Level & Quality between Pithoragarh to Tharkot, between Tharkot to Gurna		Poor Level at outer of Lohaghat, Lohaghat to Chaura Dhek, near Pau, near Gogna Village



DRIVE TEST TABLE: 9

DRIVE TEST OBSERVATION OF DEHRADUN SSA – FEB 14

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Feb-14	Dehradun	Dehradun	Poor Level near Jakhan & Barkula, Poor Quality near cant Area, Turner Road	Chakrata, Dakpathar	No Coverage between Kalsi to Pahuwa, Poor Level near Korba Village, Selaquia	Rishikesh	Poor Level & Quality near Doiwala, Rani Ki Pokhari (Raja Ji Park)
2	AIRTEL				Poor Quality near Boharwal		Poor Rx Level between Kalsi to Pahuwa, Poor Level near Korba Village, Selaquia, Poor Quality at Jamunipur		Poor Level at Lachhiwala, near Rani Pokhari & poor Quality near Dhalwala
3	BSNL				Poor Quality near GMS Road & Jakhan		Poor Quality & Level near Mahunwala, Sara Industrial Area & Sudhuwala		Poor Quality & Level near Rani ki Pokhari, Tapowan, Lachhiwala
4	TATA GSM				Poor Quality near Radhanagar		No Coverage Vikash Nagar to Chakrata, Poor Quality near Jamunipur		No Coverage Rani ki Pokhari to Rishikesh
5	TATA CDMA				Poor Quality near Radhanagar		No Coverage Vikash Nagar to Chakrata, Poor Quality near Jamunipur		No Coverage Rani ki Pokhari to Rishikesh
6	IDEA				Poor Quality near Jakhan & Barkula		Poor Quality & Level between Kalsi to Panuwa, Panuwa to Chakrata, Poor Quality near Nawabgarh		Poor Level & Quality near Doiwala, Rani Ki Pokhari (Raja Ji Park), Poor Quality near Komkaranand School
7	RCOM GSM				Poor Quality near Jakhan, Barkula & Kaulagarh		No Coverage Vikash Nagar to Chakrata, Poor Level & Quality near Sudhuwala, Poor Level near Geeta Bhavan (Vikash Nagar)		No Coverage at Lachhiwala & Poor Level & Quality near Rani Ki Pokhari, Majrigrant
8	RCOM CDMA				Poor Quality near Tibetan Colony		---		No Coverage at Lachhiwala & Rani ki Pokhari to Rishikesh, Poor Quality between Diowala to Chiddarwala
9	MTS				Poor Quality near Radhanagar		No Coverage between Prem Nagar to Selaqui, between Vikash Nagar to Chakrata, Poor Quality near Jamunipur		Poor Level & Quality near Sahab Nagar, Rani Ki Pokhari (Raja Ji Park), No Coverage at Sathmod
10	UNINOR				Poor Level & Quality near Raipur Road, Poor Quality Chakrata Road		No Coverage from Kalsi to Chakrata, Poor Rx Level near Lakhnawala, Ghamolan, Poor Quality & Level near Dhulkot Mafi		No Coverage at Majhri Grant, Rani Ki Pokhari
11	VODAFONE				---		Poor Level & Quality between Tipau to Tigara, between Vyas Nagar to Kalsi, Vikasnagar to Bulakiwala, Jhahira to Silaqui		Poor Level & Quality near Lachhiwala, Rani Ki Pokhari (Raja Ji Park)



DRIVE TEST TABLE: 10

DRIVE TEST OBSERVATION OF AGRA SSA – MAR 14

S NO	Name of SP	Month	SSA Covered	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Mar-14	Agra	AGRA	Poor Quality near Babarpur, Mohammadpur, Albatia	FEROZABAD & JARAR	They Don't have coverage after Etmadpur	ACCHNERA	No Coverage between Abhoudpura to Namaul
2	AIRTEL				Poor Quality near Lakahmpur, Babarpur & Bassai		Poor Quality near Prempur, Sahidpur		No Coverage between Abhoudpura to Sahara, between Chauhatna to Raibha, Poor Quality near Sahara, Kalwari
3	BSNL				Poor Quality near Lakhanpur, Babarpur		Poor Quality at outer of Fatehabad, Yamuna River Bank, Dhaurra, Sufipur, Gajaura		Poor Quality at Achnera, Sehri, Mirahkur, Singarpur
4	TATA GSM				Poor Quality near Babarpur, Mohammadpur		No Coverage between Firozabad to Fatehabad Road, Fatehbad to Beh, Poor Level & Quality near Dhaurra, Bakarpur		No Coverage between Agra to Fatehpur Sikri, fatehpur Sikri to kangroal Road, Poor Quality near Sahara, Kalwari, Chaunatna
5	TATA CDMA				Poor Quality near Babarpur, Mohammadpur		No Coverage between Firozabad to Fatehabad Road, Fatehbad to Beh, Poor Level & Quality near Dhaurra, Bakarpur		No Coverage between Agra to Fatehpur Sikri, fatehpur Sikri to kangroal Road, Poor Quality near Sahara, Kalwari, Chaunatna
6	IDEA				Poor Quality near Lakahmpur		Poor Quality near Etmadpur, Tun Deep Chowk, Chandwar, Mithpura		Poor Quality near Cahinkora, Achnera Rambha
7	RCOM GSM				Poor Level & Quality near Shashtripuram, babrpur, Basai		Poor Level & quality near Dhaurra, Sahidpur, Muruwal, Armota, Manikpura, No coverage between Kandhar to Jarar		Poor Level & Quality near Madhukar Area, Jaingara Area, Raibha, Thapi Village
8	RCOM CDMA				---		Poor Level near Dhaurra, Sahidpur, Muruwal, Armota, Manikpura, Kanghar to Jarar		Poor Level near Raibha, Thapi, Korai Village
9	MTS				Poor Rx Level Kailash Mod to Runukta		Poor Level & Quality from Chhalseera to Budhiva, GarhiJafar, No Coverage at Mohammadabad		No Coverage between Midhakur to korai
10	UNINOR				Poor Level at Artauni, Runkata Villages, Poor Quality near Lakhanpur, Babarpur, Basai		No Coverage at Dhrera, between Murawal to Manikpura		No Coverage at Rasoolpur Sadar, Jaingara, Poor Quality & Level near Sahara, Nimbaya,
11	VODAFONE				Poor Quality & Level near Naglapadi, near Dehotra		Poor Level & Quality near Ratauti		---



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

- (i) **In the Month of Jan-14**, drive tests were conducted at **Almora SSA**. **BSNL** failed to meet the benchmarks of the key network parameters **Blocked Call rate, Call Drop rate, Voice Quality and Call set up success rate** (CSSR) with its performance on SSA level as **6.70%, 5.57%, 86.38% and 90.19%** respectively. **Idea Cellular, RCOM (GSM) and RCOM (CDMA)** remained non-compliant of benchmark for parameter '**Good Voice Quality**' with their performance as **88.01%, 78.67% and 91.75%** respectively.

In case of indoor drive test, **BSNL and Idea** could not meet the benchmark for the parameter '**Good Voice Quality**' with their performance as **82.36% & 93.34%** respectively.

- (ii) **In the Month of Feb-14**, drive test was conducted at **Dehradun SSA**. The results of the drive tests carried out in this month revealed that performance of **BSNL, Idea Cellular, RCOM (GSM), Uninor and RCOM (CDMA)** on SSA level was not in compliance of the parameter **Voice Quality** with their performance as **88.93%, 93.49%, 91.70%, 89.52% and 93.31%** respectively. **Uninor** also could not meet the benchmark of the parameter **Call drop rate** (2.42%).

- (iii) **In the month of March-14**, drive test was conducted at **Agra SSA**. The drive test results exposed that **BSNL** failed to meet the bench mark of the parameters **Blocked call rate, Call Drop rate and Voice quality** with its performance as **4.16%, 13.02%** (way beyond the benchmark) and **80.92 %** (way below the benchmark). **RCOM (GSM) and Uninor** remained under performed for parameter **Voice Quality** with their performance as **87.88 % and 93.91%** respectively. **RCOM (CDMA)** also remained non-compliant for parameter **Blocked Call Rate** (3.24%).

In case of indoor drive test, **BSNL** could not meet the benchmark for the parameter '**Good Voice Quality**' with its performance as **72.84%**.

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

Thus, the parameters Voice Quality ,CDR , Blocked Call Rate and CSSR remained non-compliant largely by some of the service providers namely BSNL, RCOM(GSM/CDMA), Idea and Uninor in different parts of the three SSAs where drive tests were conducted during the quarter ended March 2014. The service providers need to improve their network quality with respect to these parameters.

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





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

From month audit & 3 days live findings, it was concluded that on an average, performance of the operators in the UP (W) service area was satisfactory for **Network Parameters** as most of the parameters were found to be in compliance during monthly QoS audit except only one parameter namely '**Worst affected cells having > 3% TCH drop**' which could not be met by **Aircel, Tata (GSM) and Tata (CDMA) in all the three months of the quarter**. Their performance with respect to this parameter on an average for the quarter was 6.04%, 5.86% and 3.41 % respectively. **Uninor** remained under performed for parameter Voice Quality with its performance as 94.65%. In case of 3 days live measurements, **similar non-compliance of these operators was observed for these parameters in all the three months of the quarter**.

With regard to the **Customer Service Quality Parameters**, all service providers were found to have complied with the most of the parameters. However, the benchmark of parameter 'Accessibility of call center' could not be met by **Aircel** with its performance as **82.87%** and the benchmark of parameter 'Calls answered by Operators (voice to voice) within 60 seconds' could not be met by BSNL (UK and UP-W) with their performance as **27.42% and 25.51%** respectively against the benchmark of > 90%. Thus performance of BSNL was very poor with respect to this parameter. The call center is common for BSNL (Uttarakhand) and BSNL (UPW).

Drive test finding revealed that the parameters Voice Quality ,CDR , Blocked Call Rate and CSSR remained non-compliant largely by some of the service providers namely BSNL, RCOM(GSM/CDMA), Idea and Uninor in different parts of Almora, Dehradun and Agra SSAs where drive tests were conducted during the quarter ended March 2014. The service providers need to improve their network quality with respect to these parameters.

7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES





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

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- UP(W) Circle- Jan14 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UPW)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators		
Network Service Quality Parameter															
1	Network Availability														
	a) Total no. of BTSs in the licensed service area		Jan-14	628	6582	2201	837	7077	2394	1853	3002	6118	323	1306	591
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-14	1199.75	7578.30	20631	4125.86	2733	4087	1400.15	2940.13	7937.21	74.01	2757	123.41
	c) BTS Accumulated Downtime	<=2%	Jan-14	0.26%	0.15%	1.26%	0.66%	0.05%	0.23%	0.10%	0.13%	0.17%	0.03%	0.28%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-14	5	18	42	0	4	0	4	4	71	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Jan-14	0.85%	0.27%	1.91%	0.00%	0.06%	0.00%	0.22%	0.13%	1.16%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	99.31%	97.74%	96.25%	97.16%	99.98%	99.64%	98.87%	97.93%	99.29%	99.62%	98.68%	99.02%
	b) SDCCH/PAGING Congestion	<=1%	Jan-14	0.43%	0.56%	0.55%	0.49%	0.56%	0.05%	0.04%	0.19%	0.10%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Jan-14	0.09%	1.36%	0.94%	1.77%	0.80%	0.03%	0.20%	1.53%	0.71%	0.00%	0.01%	0.16%	
3	Connection Maintenance (Retainability)														
	a) Call Drop Rate (CDR)	<=2%	Jan-14	0.60%	1.27%	0.81%	1.51%	0.86%	0.25%	0.77%	0.49%	0.75%	0.43%	0.17%	0.41%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-14	6.21%	1.76%	2.06%	2.63%	2.37%	0.01%	5.77%	1.44%	2.40%	1.26%	0.54%	3.36%
	c) % of connections with good voice quality	>=95%	Jan-14	97.83%	97.46%	97.02%	96.36%	96.43%	98.96%	97.97%	94.76%	97.69%	99.22%	99.78%	98.92%
d) Total No. of cells exceeding 3% TCH drop		Jan-14	117	346	125	66	502	1	323	129	443	13	21	62	

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



	(call drop)													
	e) Total no. of cells (Sector) in the licensed service area	Jan-14	1892	19625	6173	2499	21150	7182	5595	8950	18419	1029	3918	1856
	No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion	Jan-14	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark	Jan-14	0	0	0	0	0	0	0	0	0	0	0	0
	Network Data													
5	a) Equipped Capacity of Network in Erlang	Jan-14	28577	196356	130688	118000	279956	122000	115887	147829	261368	21000	86000	109552
	b) Total traffic in TCBH in erlang (Avg.)	Jan-14	200	139636	41964	292060	285747	96928	31827	182177	246379	3196	30537	28916
	c) Total no. of customers served (as per VLR) on last day of the month	Jan-14	21735	6090659	1504102	747935	10911551	3132923	1626107	4469236	9301524	132211	1420826	451863

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



TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(W) Circle- Jan-14 month															
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UPW)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators		
Network Service Quality Parameter															
1	Network Availability														
	a) Total no. of BTSs in the licensed service area		Live data	628	6557	2194	837	7014	2392	1853	2977	6109	323	1355	591
	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	31.68	492.00	744.33	667.24	244	449	252.42	281.37	864.56	0.00	235	43.93
	c) BTS Accumulated Downtime	<=2%	Live data	0.07%	0.10%	1.41%	1.11%	0.05%	0.26%	0.19%	0.13%	0.20%	0.00%	0.24%	0.10%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	6	60	0	0	0	0	0	1	0	0.0024	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.09%	2.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.38%	98.00%	95.95%	98.27%	99.98%	99.63%	98.83%	98.18%	99.30%	99.58%	98.84%	99.12%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.25%	0.27%	0.40%	0.65%	0.42%	0.02%	0.02%	0.14%	0.09%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.04%	1.38%	1.03%	1.68%	0.74%	0.04%	0.16%	1.27%	0.70%	0.00%	0.00%	0.04%	
3	Connection Maintenance (Retainability)														
	a) Call Drop Rate (CDR)	<=2%	Live data	0.52%	1.28%	0.53%	1.47%	0.88%	0.27%	0.80%	0.51%	0.71%	0.43%	0.17%	0.39%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.94%	1.73%	2.30%	2.78%	2.41%	0.00%	6.22%	1.44%	1.87%	1.55%	0.69%	3.54%
	c) % of connections with good voice quality	>=95%	Live data	97.92%	97.32%	97.13%	96.07%	96.43%	98.96%	97.94%	94.70%	97.74%	99.22%	99.76%	98.90%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	112	338	143	69	509	0	349	130	343	16	27	66
e) Total no. of cells (Sector) in the licensed service area		Live data	1892	19517	6240	2498	21138	7164	5607	9017	18376	1029	3891	1856	
4	No. of POI's having >=0.5% POI congestion														
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0	0	0

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



TABLE: 3

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

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UPW)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators		
Network Service Quality Parameter															
1	Network Availability														
	a) Total no. of BTSs in the licensed service area		Feb-14	627	6584	2214	840	7077	2393	1846	3040	6118	323	1358	591
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-14	544.01	6975.77	18644.7	4688.7	2232	2879	1300.33	4170.71	7212.27	82.59	1929	260.11
	c) BTS Accumulated Downtime	<=2%	Feb-14	0.13%	0.16%	1.25%	0.83%	0.05%	0.18%	0.10%	0.20%	0.18%	0.04%	0.21%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-14	1	24	41	0	0	0	4	11	64	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Feb-14	0.19%	0.36%	1.85%	0.00%	0.00%	0.00%	0.22%	0.36%	1.05%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	99.25%	97.87%	96.65%	97.93%	99.98%	99.60%	99.08%	97.52%	99.28%	99.61%	98.90%	99.09%
	b) SDCCH/PAGING Congestion	<=1%	Feb-14	0.31%	0.47%	0.77%	0.74%	0.66%	0.03%	0.03%	0.30%	0.15%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Feb-14	0.29%	1.21%	1.29%	1.66%	0.95%	0.03%	0.18%	1.93%	0.72%	0.00%	0.00%	0.06%	
3	Connection Maintenance (Retainability)														
	a) Call Drop Rate (CDR)	<=2%	Feb-14	0.55%	1.18%	0.88%	1.40%	0.84%	0.25%	0.74%	0.50%	0.67%	0.39%	0.15%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-14	6.10%	2.32%	2.32%	2.42%	2.37%	0.03%	5.41%	1.50%	2.09%	1.00%	0.55%	3.33%
	c) % of connections with good voice quality	>=95%	Feb-14	97.82%	97.48%	96.20%	97.25%	96.25%	98.92%	97.93%	94.70%	98.02%	99.22%	99.77%	98.92%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-14	115	458	149	61	507	2	301	136	385	10	22	62
e) Total no. of cells (Sector) in the licensed service area		Feb-14	1889	19719	6395	2504	21400	7179	5567	9076	18419	1029	4074	1856	
4	No. of POI's having >=0.5% POI congestion														
	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Feb-14	0	0	0	0	0	0	0	0	0	0	0	0

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



Network Data															
5	a) Equipped Capacity of Network in Erlang		Feb-14	28533	195375	131460	118000	284268	122000	115592	152783	276588	21000	86000	104181
	b) Total traffic in TCBH in erlang (Avg.)		Feb-14	210	144864	45355	302497	298417	97663	33145	191696	253081	3137	30943	30647
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-14	23141	6257696	1556552	757153	11556221	4203717	1636049	4625520	9539841	129663	1412539	452004

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



TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(W) Circle- Feb 14 month															
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UPW)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators		
Network Service Quality Parameter															
Network Availability															
1	a) Total no. of BTSs in the licensed service area		Live data	628	6582	2114	837	7077	2394	1838	2973	6118	323	1359	591
	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	93.07	719.00	2133.6	1002.78	248	339	90.5	363.79	557.07	16.49	213	3.39
	c) BTS Accumulated Downtime	<=2%	Live data	0.21%	0.15%	1.34%	1.66%	0.05%	0.20%	0.07%	0.17%	0.13%	0.07%	0.22%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	5	19	0	0	0	0	0	2	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.08%	0.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.24%	97.89%	96.32%	98.83%	99.98%	99.66%	98.83%	97.41%	99.25%	99.65%	97.72%	99.17%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.13%	0.51%	0.81%	0.66%	1.01%	0.02%	0.01%	0.18%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.26%	1.14%	1.19%	1.72%	1.26%	0.04%	0.19%	2.11%	0.75%	0.00%	0.03%	0.02%
Connection Maintenance (Retainability)															
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.54%	1.15%	0.60%	1.29%	0.88%	0.27%	0.76%	0.48%	0.66%	0.41%	0.26%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.25%	1.87%	2.42%	2.84%	2.50%	0.00%	5.42%	1.44%	2.00%	0.97%	1.38%	3.16%
	c) % of connections with good voice quality	>=95%	Live data	97.84%	97.67%	96.27%	96.08%	96.14%	98.97%	97.96%	94.93%	98.07%	99.23%	99.69%	98.92%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	99	367	162	71	535	0	301	130	369	10	27	59
	e) Total no. of cells (Sector) in the licensed service area		Live data	1892	19616	6706	2498	21406	7173	5563	9012	18419	1029	2377	1856
No. of POI's having >=0.5% POI congestion															
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	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	0	0

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



TABLE: 5

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

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL (UPW)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators		
Network Service Quality Parameter															
1	Network Availability														
	a) Total no. of BTSs in the licensed service area		Mar-14	628	6589	2233	840	7176	2391	1844	3107	6118	323	1305	591
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-14	564.81	7765.67	22522	4340.2	2190	3624	1537.27	3017.88	6602.18	128.00	1830	144.06
	c) BTS Accumulated Downtime	<=2%	Mar-14	0.12%	0.16%	1.36%	0.69%	0.04%	0.20%	0.11%	0.13%	0.15%	0.05%	0.19%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-14	4	21	41	0	0	0	6	18	53	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Mar-14	0.64%	0.32%	1.84%	0.00%	0.00%	0.00%	0.33%	0.58%	0.87%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	99.32%	97.90%	96.28%	97.32%	99.98%	99.63%	98.92%	97.45%	99.09%	99.61%	98.98%	98.96%
	b) SDCCH/PAGING Congestion	<=1%	Mar-14	0.33%	0.53%	0.69%	0.79%	0.61%	0.04%	0.04%	0.44%	0.23%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.38%	1.03%	1.16%	1.72%	1.12%	0.04%	0.12%	1.85%	0.91%	0.00%	0.00%	0.16%
3	Connection Maintenance (Retainability)														
	a) Call Drop Rate (CDR)	<=2%	Mar-14	0.51%	1.15%	0.94%	1.54%	0.92%	0.27%	0.73%	0.55%	0.81%	0.35%	0.19%	0.48%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-14	5.83%	1.96%	2.05%	2.38%	2.53%	0.02%	6.41%	2.22%	2.65%	1.12%	0.64%	3.55%
	c) % of connections with good voice quality	>=95%	Mar-14	97.79%	97.54%	96.89%	96.39%	95.86%	98.84%	97.99%	94.49%	97.55%	99.22%	99.78%	98.93%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-14	110	385	135	60	542	2	358	205	489	12	25	66
	e) Total no. of cells (Sector) in the licensed service area		Mar-14	1891	19601	6592	2515	21454	7173	5587	9251	18419	1029	3915	1856
4	No. of POI's having >=0.5% POI congestion														
	No. of POI's having >=0.5% POI congestion		Mar-14	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Mar-14	0	0	0	0	0	0	0	0	0	0	0	0

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



5	Network Data														
	a) Equipped Capacity of Network in Erlang		Mar-14	28572	191649	132587	118000	287018	122000	115312	155481	277580	21000	86000	104181
	b) Total traffic in TCBH in erlang (Avg.)		Mar-14	218	121505	42105	299458	312631	107271	33307	203977	266722	3034	29732	27539
c) Total no. of customers served (as per VLR) on last day of the month		Mar-14	20376	6322178	1557696	775733	11708887	4252769	1624388	4781347	9567836	126425	1389457	439607	

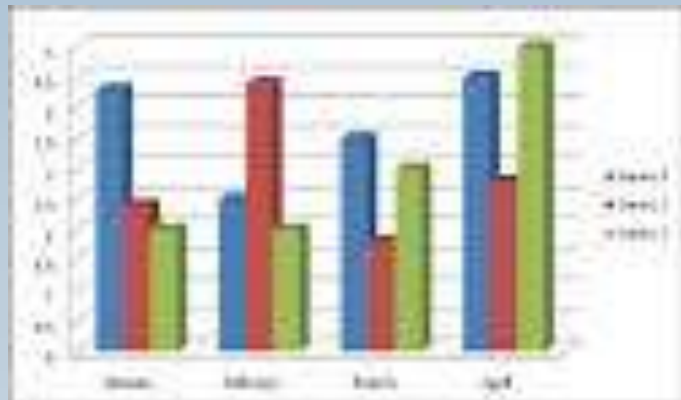
AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-UP (WEST) CIRCLE



TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- UP(W) Circle- Feb 14 month															
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL (UPW)	BSNL (UK)	IDEA	RCOM GSM	TATA GSM	UNINOR	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators		
Network Service Quality Parameter															
1	Network Availability														
	a) Total no. of BTSs in the licensed service area		Live data	627	6584	2223	840	7077	2393	1846	3086	6118	323	1307	591
	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	41.6	818.63	1965.6	929.8	350	594	84.29	343.89	521	12.40	204	8.45
	c) BTS Accumulated Downtime	<=2%	Live data	0.09%	0.17%	1.23%	1.54%	0.07%	0.34%	0.06%	0.15%	0.12%	0.05%	0.22%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	5	31	0	0	0	0	0	2	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.08%	1.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.27%	97.89%	96.50%	97.50%	99.98%	99.68%	98.95%	97.23%	99.41%	99.63%	99.03%	98.90%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.27%	0.51%	0.77%	0.75%	0.56%	0.20%	0.02%	0.77%	0.18%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.05%	1.08%	1.51%	1.76%	1.13%	0.03%	0.06%	2.06%	0.59%	0.00%	0.00%	0.16%
3	Connection Maintenance (Retainability)														
	a) Call Drop Rate (CDR)	<=2%	Live data	0.51%	1.18%	1.03%	1.62%	0.91%	0.22%	0.80%	0.60%	0.63%	0.35%	0.14%	0.59%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.91%	1.93%	2.40%	2.71%	2.52%	0.00%	6.81%	2.68%	2.13%	1.10%	0.67%	3.90%
	c) % of connections with good voice quality	>=95%	Live data	97.76%	97.64%	96.61%	97.27%	95.94%	99.03%	98.02%	94.34%	97.95%	99.22%	99.76%	98.92%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	112	379	164	68	545	0	381	250	392	11	26	72
	e) Total no. of cells (Sector) in the licensed service area		Live data	1889	19662	6840	2512	21579	7170	5588	9313	18419	1029	3912	1856
4	No. of POI's having >=0.5% POI congestion														
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0	0	0

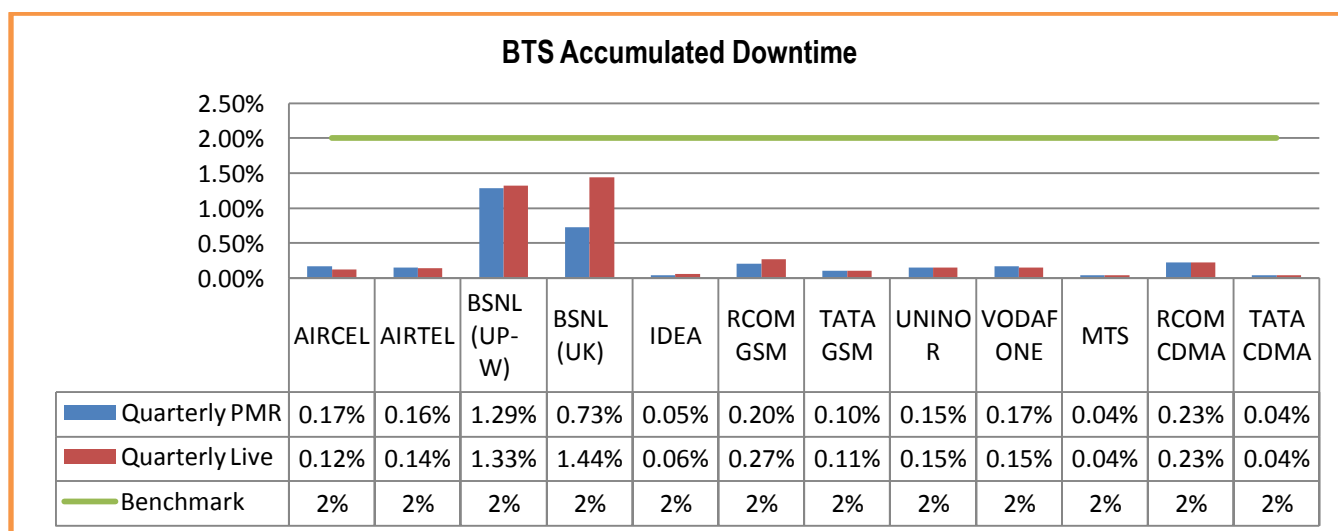
8. GRAPHICAL REPRESENTATION





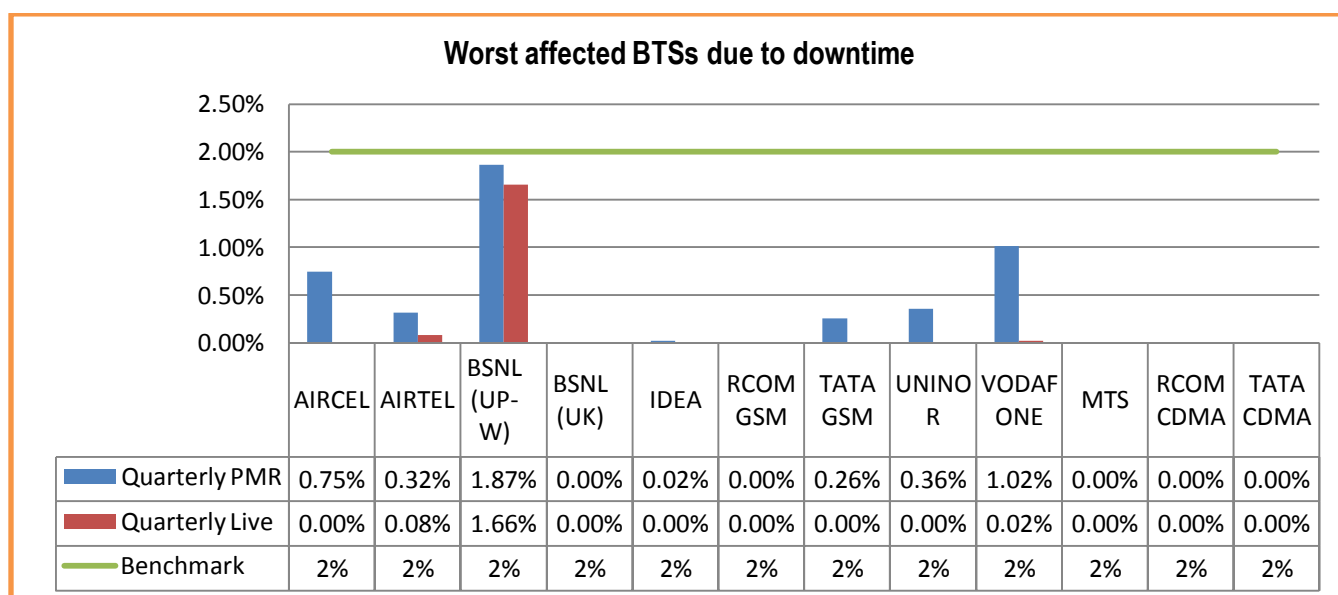
8. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:

1) **BTS ACCUMULATED DOWNTIME :**



All operators are meeting the benchmarks.

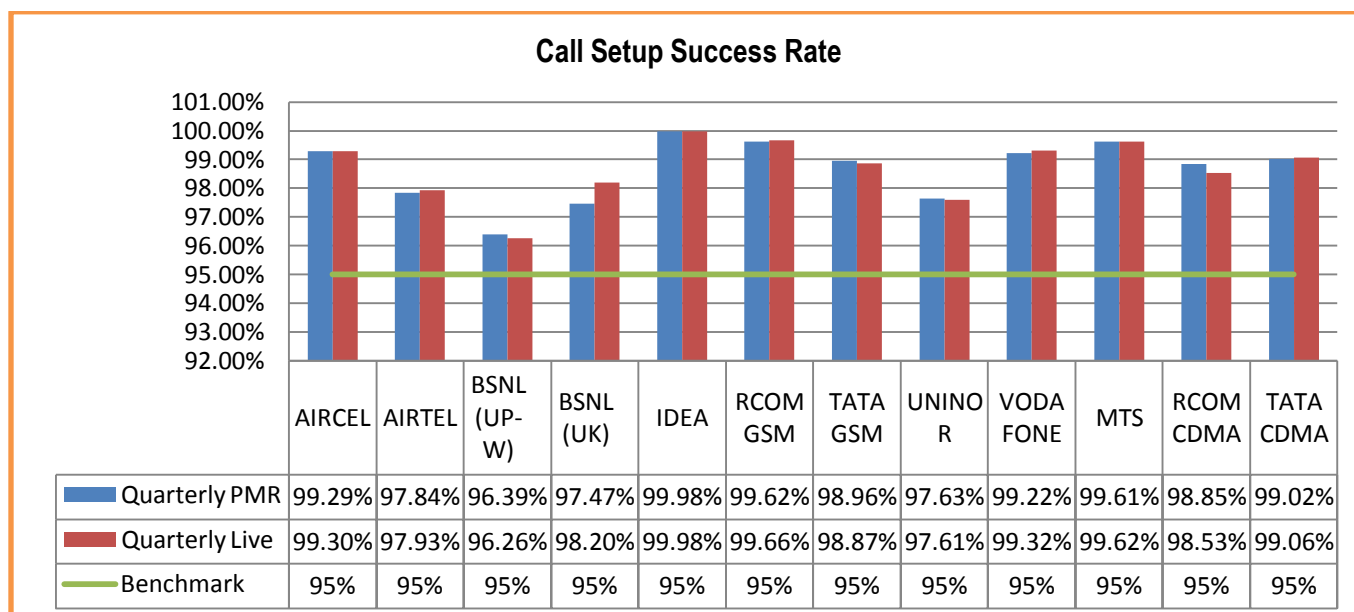
2) **WORST AFFECTED BTSs DUE TO DOWNTIME :**



All operators are meeting the benchmarks.

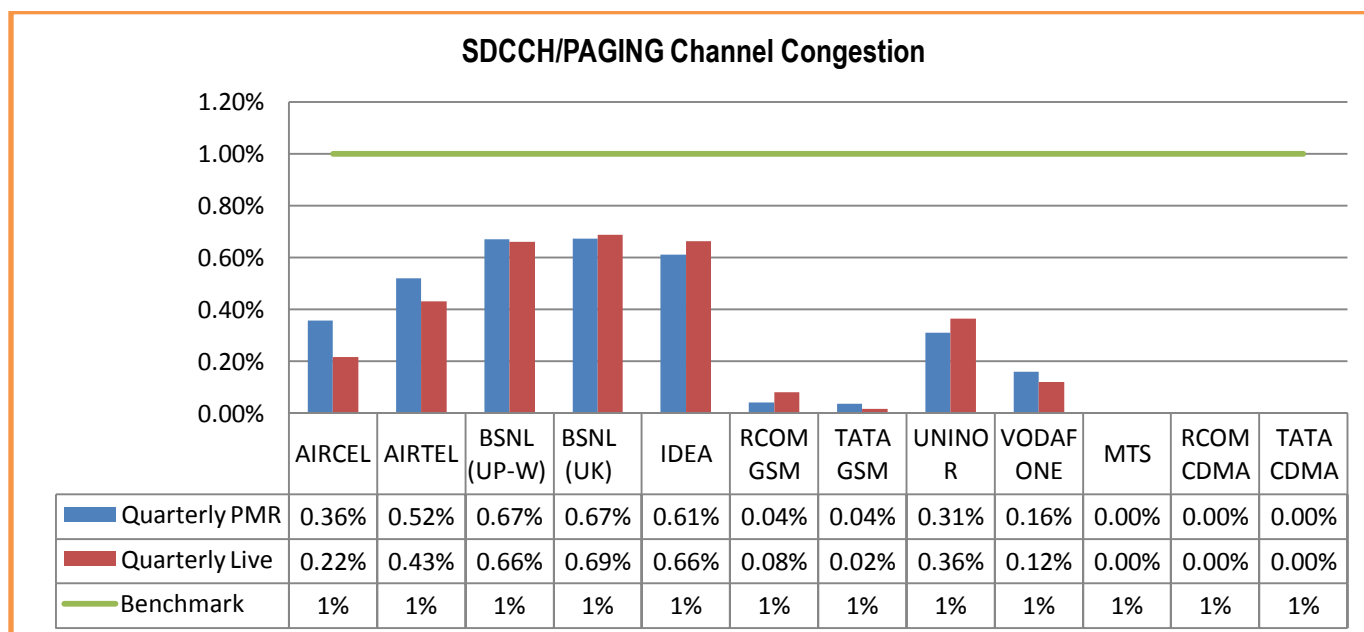


3) CALL SETUP SUCCESS RATE :



All operators are meeting the benchmarks.

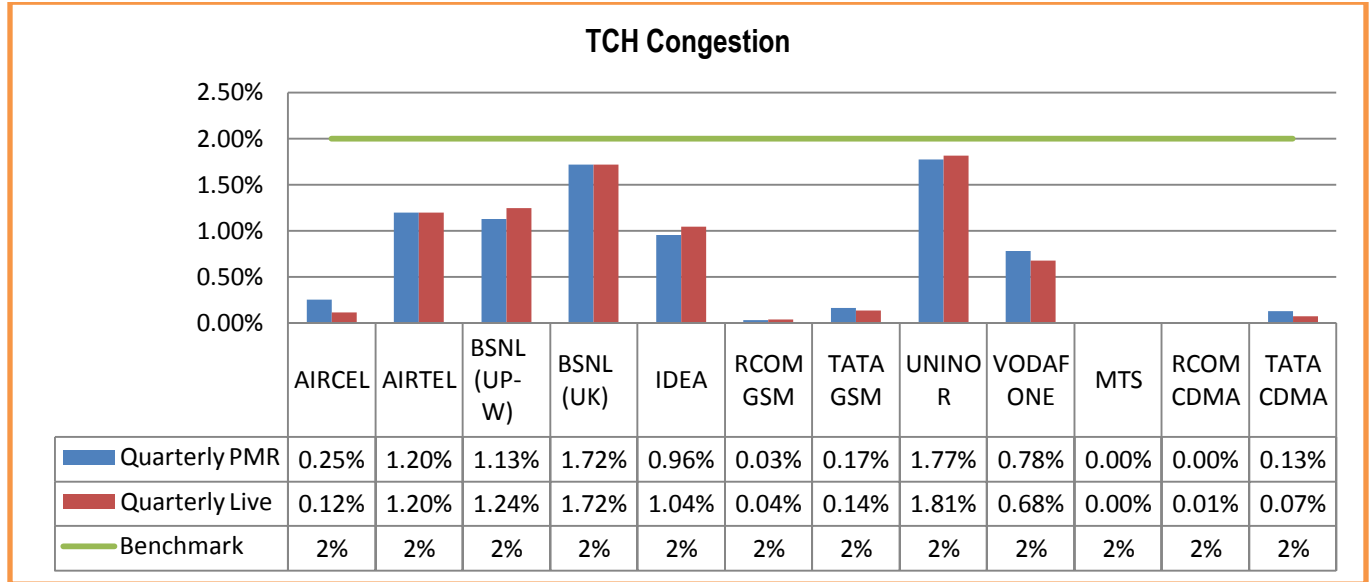
4) SDCCH/PAGING CHANNEL CONGESTION :



All operators are meeting the benchmarks.

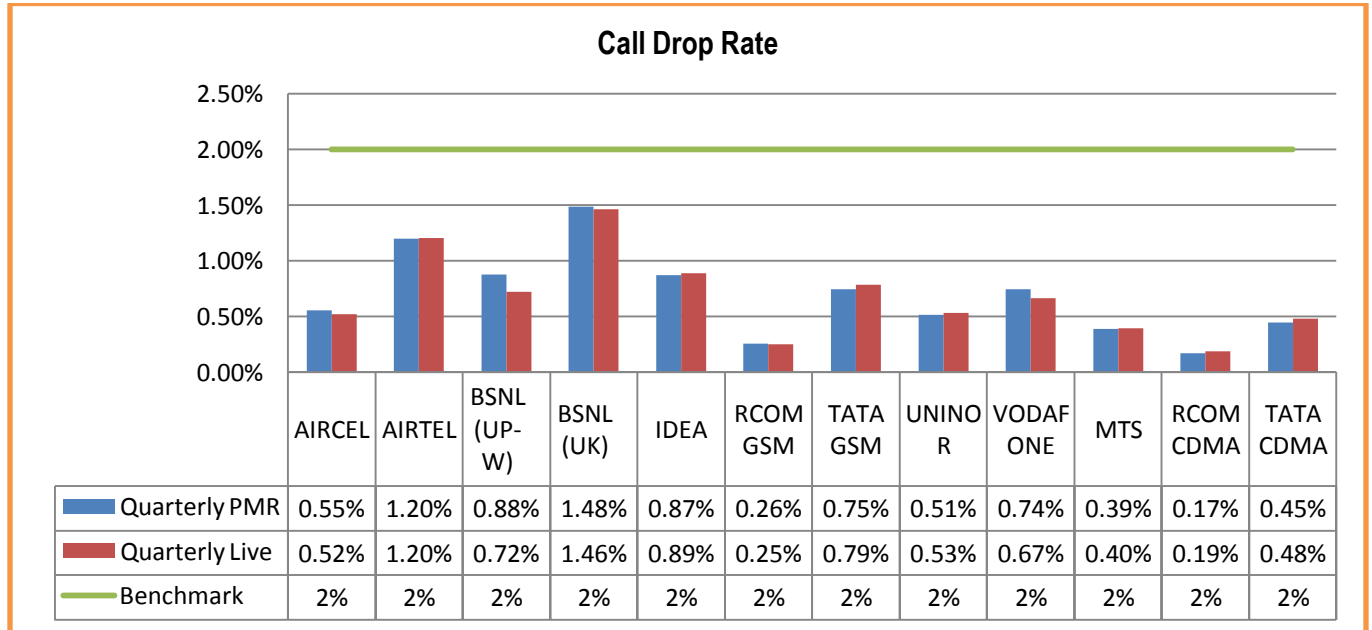


5) TCH CONGESTION:



All operators are meeting the benchmarks.

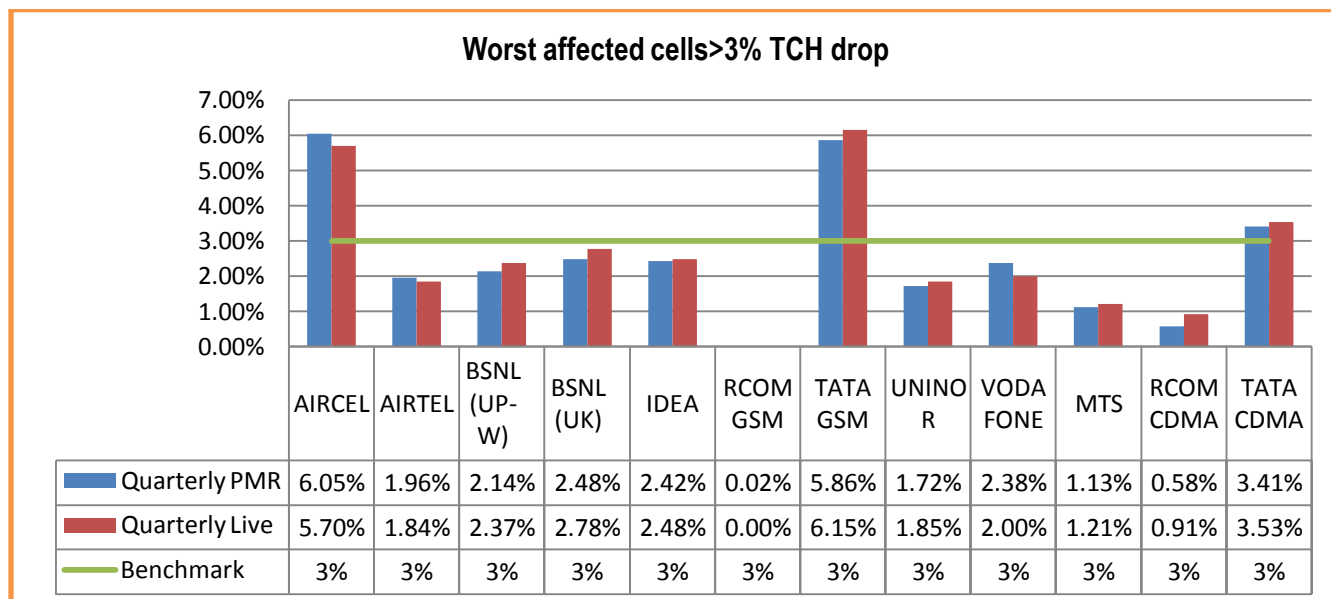
6) CALL DROP RATE :



All operators are meeting the benchmarks.

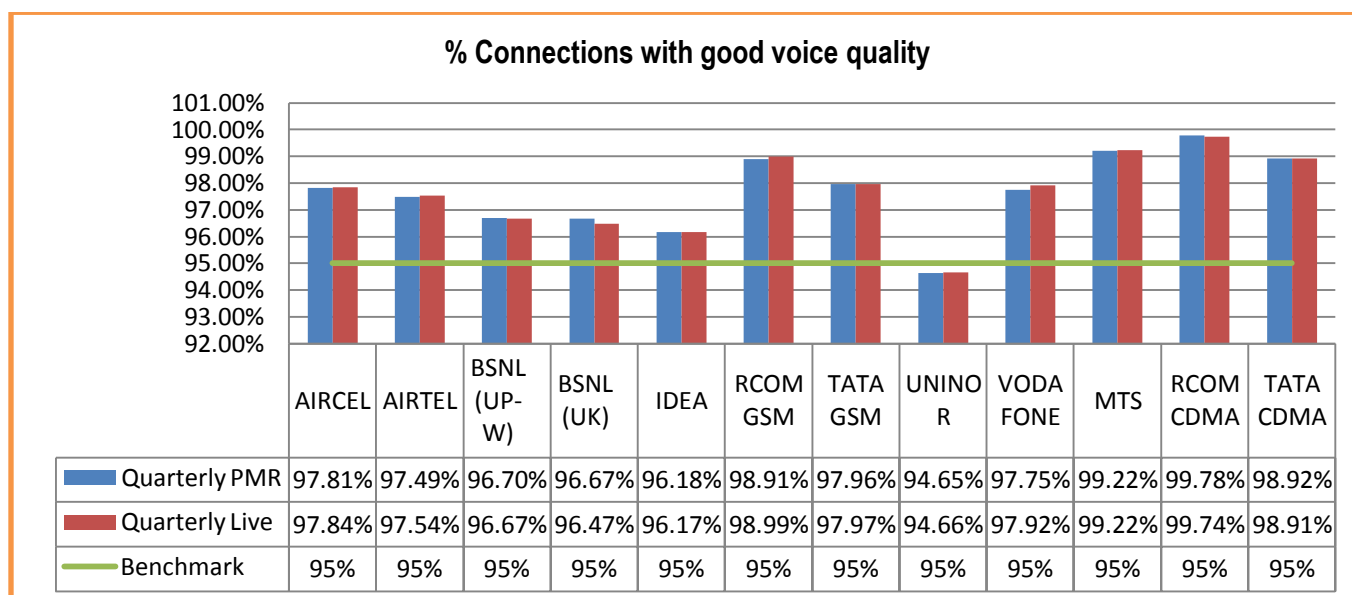


7) **WORST AFFECTED CELLS>3% TCH DROP :**



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

8) **PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :**



All operators are meeting the benchmarks except Uninor.