



**REPORT**  
**ON**  
**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**  
**OF**  
**CELLULAR MOBILE TELEPHONE SERVICE**  
**FOR**  
**TELECOM REGULATORY AUTHORITY OF INDIA**  
**WEST ZONE – GUJARAT SERVICE AREA**  
**(OCTOBER 2013 – DECEMBER 2013)**

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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 **Gujarat circle** against the QoS bench marks laid down by TRAI in the respective regulations.



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## **1. BACKGROUND**

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

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

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

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

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

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

The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service



benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of **North** and **West** Zones for Cellular Mobile Service. However, in respect of Basic telephone service (wire line) and Broadband service, a circle would be audited once in a year.

## **2. OBJECTIVES AND METHODOLOGY**

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, Delhi, Haryana & Maharashtra Circles also include audit for Basic (Wire line) and Broadband services as mandated by TRAI, during the quarter October- December 2013.**

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

#### 3.1 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 Gujarat circle

Sl. No.	Name of Service Provider
<b>GSM Operators</b>	
1	AIRTEL
2	AIRCEL
3	TATA GSM
4	BSNL
5	IDEA
6	UNINOR
7	RCOM GSM
8	VIDEOCON
9	VODAFONE
<b>CDMA Operators</b>	
10	RCOM CDMA
11	MTS
12	TATA CDMA

For all the above operators, audit was conducted in all the three months of the Quarter ended December 2013.

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

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **However, QoS audit for basic (wire line) service was not required to be done for Gujarat Circle in the quarter ended December 2013.**



### 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 Gujarat Circle in the quarter ended December 2013.**

## 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 3 drive tests in different cities of a circle/service area per service provider per month. Thus total 108 (3x12x3) drive tests in three months of quarter ended December 2013 were carried out in **Gujarat circle.**

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

**BUSY HOUR OF VARIOUS SERVICE PROVIDERS:**

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
<b>GSM Operators</b>			
1	AIRTEL	Dec-13	20:00 - 21:00
2	AIRCEL	Dec-13	20:00 - 21:00
3	TATA GSM	Dec-13	20:00 - 21:00
4	BSNL	Dec-13	21:00 - 22:00
5	IDEA	Dec-13	20:00 - 21:00
6	UNINOR	Dec-13	21:00 - 22:00
7	RCOM GSM	Dec-13	20:00 - 21:00
8	VIDEOCON	Dec-13	20:00 - 21:00
9	VODAFONE	Dec-13	19:00 - 20:00
<b>CDMA Operators</b>			
10	RCOM CDMA	Dec-13	19:00 - 20:00
11	MTS	Dec-13	18:00 - 19:00
12	TATA CDMA	Dec-13	11:00 - 12:00

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Gujarat circle.





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

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRTEL	15	106	7309	NSN	NSN
2	AIRCEL	1	6	829	ZTE	ZTE
3	TATA GSM	3	13	2126	Huawei	Huawei
4	BSNL	9	92	4591	Alcatel-Lucent	Alcatel-Lucent
5	IDEA	22	39	6153	Ericsson	Ericsson
6	UNINOR	7	16	3088	NSN	NSN+Huawei
7	RCOM GSM	5	18	2934	Huawei	Huawei
8	VIDEOCON	2	11	1825	Huawei	Huawei
9	VODAFONE	20	143	7473	NSN	NSN
<b>CDMA Operators</b>						
10	RCOM CDMA	7	4	1675	Lucent,ZTE,Ericsson,Huawei	Lucent,Huawei
11	MTS	1	3	566	ZTE	ZTE
12	TATA CDMA	7	6	567	Ericsson	Motorola,Huawei

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



## TABLES OF MONTHLY QOS PERFORMANCE:

**TABLE: 1**

### Cellular Mobile Telephone Services Gujarat Circle- Oct-13 month

PMR Generation Data		Bench- mark	Audit Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter	GSM Operators									CDMA Operators				
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) BTS Accumulated Downtime	<=2%	Oct-13	0.10%	0.04%	0.00%	1.61%	0.04%	0.18%	0.17%	0.07%	0.01%	0.20%	0.03%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Oct-13	0.30%	0.11%	0.00%	1.89%	0.00%	0.64%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-13	99.71%	99.41%	98.23%	96.59%	99.35%	97.43%	99.58%	99.21%	99.74%	99.17%	99.72%	98.97%
	b) SDCCH/PAGING Channel congestion	<=1%	Oct-13	0.03%	0.03%	0.02%	0.04%	0.21%	0.09%	0.01%	0.02%	0.06%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-13	0.20%	0.02%	0.01%	0.67%	0.21%	0.42%	0.06%	0.05%	0.26%	0.00%	0.00%	0.11%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Oct-13	0.80%	0.52%	0.83%	1.03%	1.27%	1.40%	0.25%	0.47%	0.78%	0.03%	0.20%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-13	0.36%	2.62%	2.23%	2.49%	1.77%	1.28%	0.02%	0.90%	0.89%	0.06%	2.47%	1.16%
	c) Connections with good voice quality	>=95%	Oct-13	97.14%	98.56%	98.43%	NP	95.51%	98.20%	98.79%	98.79%	97.35%	98.79%	98.25%	99.33%
4	No. of POI's having >=0.5% POI congestion		Oct-13	0	0	0	1	0	0	0	0	0	0	0	0

**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE**



**TABLE: 2**

Cellular Mobile Telephone Services Gujarat Circle- Nov-13 month															
PMR Generation Data		Bench- mark	Audit Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) BTS Accumulated Downtime	<=2%	Nov-13	0.06%	0.02%	0.00%	1.82%	0.02%	0.06%	0.11%	0.04%	0.01%	0.11%	0.01%	0.25%
	b) Worst affected BTSs due to downtime	<=2%	Nov-13	0.19%	0.00%	0.00%	0.06%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-13	99.71%	99.56%	98.22%	97.38%	99.33%	98.05%	99.66%	99.15%	99.75%	99.33%	99.51%	98.93%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-13	0.03%	0.01%	0.01%	0.03%	0.30%	0.07%	0.01%	0.02%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-13	0.32%	0.01%	0.01%	0.56%	0.26%	0.27%	0.05%	0.12%	0.25%	0.00%	0.22%	0.08%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Nov-13	0.74%	0.45%	0.77%	1.00%	1.22%	0.86%	0.13%	0.43%	0.82%	0.02%	0.13%	0.41%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-13	0.33%	1.49%	2.21%	2.70%	1.16%	1.85%	0.01%	0.85%	0.94%	0.04%	1.81%	0.76%
	c) Connections with good voice quality	>=95%	Nov-13	97.09%	98.69%	98.48%	NP	95.97%	98.37%	98.97%	98.72%	97.09%	99.86%	98.26%	99.34%
4	No. of POI's having >=0.5% POI congestion		Nov-13	0	0	0	0	0	0	0	0	0	0	0	0

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



**TABLE: 3**

Cellular Mobile Telephone Services Gujarat Circle- Dec-13 month															
PMR Generation Data		Bench- mark	Audit Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) BTS Accumulated Downtime	<=2%	Dec-13	0.08%	0.01%	0.00%	1.35%	0.03%	0.03%	0.13%	0.03%	0.01%	0.12%	0.02%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Dec-13	0.22%	0.00%	0.00%	1.87%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-13	99.69%	99.51%	98.11%	98.12%	99.36%	97.88%	99.65%	98.88%	99.77%	99.37%	99.74%	97.87%
	b) SDCCCH/PAGING Channel congestion	<=1%	Dec-13	0.05%	0.02%	0.02%	0.03%	0.23%	0.21%	0.01%	0.05%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-13	0.22%	0.03%	0.03%	0.44%	0.31%	0.43%	0.06%	0.20%	0.22%	0.00%	0.02%	1.08%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Dec-13	0.71%	0.46%	0.85%	0.99%	1.08%	0.43%	0.21%	0.48%	0.74%	0.02%	0.15%	0.56%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-13	0.31%	1.41%	2.41%	2.65%	0.98%	1.53%	0.01%	0.90%	1.93%	0.04%	1.71%	1.69%
	c) Connections with good voice quality	>=95%	Dec-13	97.02%	98.56%	98.39%	NP	96.38%	98.30%	98.83%	98.45%	97.43%	99.87%	98.91%	99.34%
4	No. of POI's having >=0.5% POI congestion		Dec-13	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 circle. However, in case of Reliance Communication, the audit of Customer service related parameters was conducted at their central NOC at DAKC Mumbai.

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



**Network Service Quality Parameters:**

▪ **Network Availability**

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

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

In Gujarat 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 comfortably meeting the benchmark 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 except BSNL was found having congestion on only one POI with Unitech in the month of October-13.

▪ **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 .09 %) 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 operators performing well within the benchmark of 3%.

iii. Connections with good voice quality:

Some of the Operators are measuring this parameter through the system generated data at their switches whereas some are measuring through their periodic drive tests. The audit results for this parameter indicates that all operators have met the bench mark successfully during the quarter.

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



## 4.2 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT-QE DEC-13:

### CSD Data for Cellular Mobile Telephone Services-QE Dec-13

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM & CDMA)	VIDEOCON	VODA FONE	MTS	RCOM (CDMA)
S/ N	Name of Parameter			GSM Operators									CDMA Operators	
<b>Customer Service Quality Parameters</b>														
<b>1 Metering &amp; Billing Credibility -Post Paid</b>														
	A) No. of bills issued during the quarter		GUJ	*Not App.	513997	60705	395949	*Not App.	57470	157244	Not App.	1441137	8714	206992
	B) No. of bills disputed including billing complaints during the quarter		GUJ	Not App.	61	35	327	Not App.	53	0	Not App.	1645	7	203
	C)% of billing complaints during the quarter	<= 0.1%	GUJ	Not App.	0.01%	0.05%	0.08%	Not App.	0.1%	Not App.	Not App.	0.12%	0.04%	0.09%
<b>2 Metering &amp; Billing Credibility -Pre Paid</b>														
	A) Total No. of Pre-paid customers at the end of the quarter		GUJ	59080	6631445	4161215	8370859	4975083	5103651	2930360	1133530	15473293	177483	1308108
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		GUJ	0	595	2334	2857	619	5094	0	91	1293	4	1293
	C) % of Pre-paid Charging Complaints	<= 0.1%	GUJ	Not App.	0.01%	0.06%	0.03%	0.01%	0.09%	Not App.	0.007%	0.01%	0.01%	0.10%
<b>3 Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>														
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		GUJ	0.00	656	2369	3184	619	5147	393	91	2938	11	1496
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		GUJ	0.00	656	2334	5388	619	5147	393	91	2938	11	1496
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	GUJ	Not App.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	GUJ	Not App.	100%	100%	100%	100%	100%	Not App.	100%	100%	100%	100%
<b>4 Response time to customers for assistance</b>														
	A) Accessibility of call centre/Customer Care	>=95%	GUJ	100%	100%	96.36	100%	95.72%	98.85%	99.80%	100%	100.00%	100%	98%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	GUJ	97%	93%	69%	99%	94%	70%	92%	93.67%	94.00%	97%	94%

## AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



5 Termination/closure of service													
A) Total No. of requests for Termination / Closure of service received during the quarter		GUJ	Not App.	1508	NP	1850	Not App.	233	1175	Not App.	5598	0.00	1019
B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		GUJ	Not App.	1508	NP	1850	Not App.	233	1175	Not App.	5598	NIL	1019
C) % of Termination/ Closure of service within 7 days	<=7days	GUJ	Not App.	100%	NP	100%	Not App.	100%	100%	Not App.	100%	Not App.	100%
6 Time taken for refunds of deposits after closures.													
A) No. of Payments/ Refunds due during the quarter		GUJ	Not App.	784	14	1485	Not App.	565	142	Not App.	3002	Not App.	1038
B) No. of Payments/ Refunds Cleared during the quarter		GUJ	Not App.	784	14	1485	Not App.	565	142	Not App.	2034	Not App.	1038
C) Time taken for refunds of deposits after closures.	100% within 60 days	GUJ	Not App.	100%	100%	100%	Not App.	100%	100%	Not App.	68%	Not App.	100%

\*Not App.: Aircel, Uninor and Videocon have no post-paid customers, so data for parameters related to post-paid bills not applicable for them.





**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 was well within the prescribed bench mark of  $\leq 0.1\%$ . However only Vodafone could not meet the benchmark for the parameter “% of billing complaints ” with its performance as 0.12%.

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

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

All operators have 100 % resolved the billing complaints within stipulated period of 4 weeks. Similarly, in all cases where customers were due for credit / adjustment, all the service providers have complied with the benchmark of 100 % refund in one week.

***3. Response Time to the Customer for assistance***

- i. Accessibility of call centre/customer care*
- ii. Percentage of calls answered by Operators (Voice to Voice) within 60 seconds*

All service providers are in compliance with respect to the parameter accessibility of call center. However, BSNL and RCOM (GSM) have not met the benchmark of ‘calls answered by Operators (voice to voice) within 60 seconds. They have achieved their performance as 69% and 70% respectively.

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

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

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

All operators, except Vodafone were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure. Vodafone, failed to comply with the TRAI norms as its achievement was 68 % only.



**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 Gujarat Circle- Oct-13 month															
Live measurement Data		Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators			
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) BTS Accumulated Downtime	<=2%	Live data	0.11%	0.04%	0.00%	1.31%	0.07%	0.18%	0.20%	0.05%	NP	0.24%	0.03%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.14%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	NP	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.73%	99.36%	98.25%	96.76%	99.31%	97.19%	99.61%	99.20%	99.80%	99.29%	99.66%	98.07%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.01%	0.03%	0.01%	0.02%	0.45%	0.08%	0.01%	0.01%	0.08%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.12%	0.01%	0.00%	0.06%	0.20%	0.49%	0.14%	0.02%	0.20%	0.00%	0.09%	0.91%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.82%	0.52%	0.83%	0.46%	1.34%	0.51%	0.27%	0.45%	0.89%	0.03%	0.21%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.47%	2.06%	3.74%	1.83%	1.90%	1.35%	0.00%	0.67%	NP	0.04%	2.57%	2.65%
	c) Connections with good voice quality	>=95%	Live data	97.06%	98.52%	98.43%	NP	95.27%	98.18%	98.79%	98.75%	97.05%	99.86%	98.25%	NP
4	No. of POI having >=0.5% congestion		Live data	0	0	0	1	0	0	0	0	0	0	0	0

**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE**



**TABLE: 2**

Cellular Mobile Telephone Services Gujarat Circle- Nov-13 month															
Live measurement Data		Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) BTS Accumulated Downtime	<=2%	Live data	1.14%	0.04%	0.00%	1.22%	0.02%	0.05%	0.09%	0.02%	NP	0.08%	0.00%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.32%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.77%	99.59%	98.20%	97.29%	99.37%	98.06%	99.66%	99.28%	99.84%	99.23%	99.58%	98.99%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.01%	0.00%	0.01%	0.03%	0.39%	0.15%	0.01%	0.02%	0.06%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.06%	0.00%	0.00%	0.56%	0.23%	0.20%	0.05%	0.06%	0.16%	0.00%	0.16%	0.04%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.72%	0.44%	0.80%	0.56%	1.18%	0.62%	0.10%	0.41%	0.78%	0.03%	0.17%	0.43%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.36%	2.50%	4.23%	2.64%	1.03%	2.31%	0.00%	0.77%	NP	0.04%	2.17%	2.44%
	c) Connections with good voice quality	>=95%	Live data	97.01%	98.74%	98.46%	NP	95.82%	98.34%	98.84%	98.81%	97.18%	99.87%	98.30%	99.33%
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 Gujarat Circle- Dec-13 month															
Live measurement Data		Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) BTS Accumulated Downtime	<=2%	Live data	0.06%	0.01%	0.00%	1.10%	0.02%	0.03%	0.08%	0.02%	0.05%	0.08%	0.01%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.01%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.66%	99.47%	98.18%	97.74%	99.48%	98.03%	99.67%	98.94%	99.81%	99.37%	99.74%	97.19%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.06%	0.04%	0.02%	0.02%	0.11%	0.11%	0.01%	0.04%	0.06%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.26%	0.01%	0.02%	0.49%	0.16%	0.43%	0.05%	0.19%	0.19%	0.00%	0.02%	1.74%
<b>Connection maintenance (retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.71%	0.48%	0.81%	0.53%	1.14%	0.43%	0.18%	0.45%	0.79%	0.01%	0.17%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.41%	2.74%	<b>3.58%</b>	2.54%	1.03%	1.96%	0.00%	0.81%	NP	0.01%	1.99%	2.36%
	c) Connections with good voice quality	>=95%	Live data	96.96%	98.59%	98.41%	NP	96.15%	98.27%	98.90%	98.52%	97.30%	99.88%	98.25%	99.34%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0

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

From three days live measurement assessment, it is found that the performance of all operators is satisfactory as they have largely met the benchmarks except the parameter 'Worst affected cells> 3 % TCH drops', which could not be complied with by Tata (GSM) in all the three months of this quarter. The performance of Tata (GSM) was 3.74%, 4.23% and 3.58% in the months of Oct., Nov. and Dec.-13 respectively. BSNL was found having congestion on only one POI with Unitech in the month of October-13.



**INTER OPERATOR CALLS ASSESSMENT**

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

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT													
Calling Operators	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM GSM	TATA GSM	VIDEOCON	VODAFONE	MTS	RCOM CDMA	TATA CDMA
AIRCEL	GUJ	--	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
AIRTEL	GUJ	100%	--	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	GUJ	100%	100%	--	100%	100%	100%	100%	100%	100%	100%	100%	100%
IDEA	GUJ	100%	100%	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
UNINOR	GUJ	100%	100%	100%	100%	--	100%	100%	100%	100%	100%	100%	100%
RCOM GSM	GUJ	100%	100%	100%	100%	100%	--	100%	100%	100%	100%	100%	100%
TATA GSM	GUJ	100%	100%	100%	100%	100%	100%	--	100%	100%	100%	100%	100%
VIDEOCON	GUJ	100%	100%	100%	100%	100%	100%	100%	--	100%	100%	100%	100%
VODAFONE	GUJ	100%	100%	100%	100%	100%	100%	100%	100%	--	100%	100%	100%
MTS	GUJ	100%	100%	100%	100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM CDMA	GUJ	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA CDMA	GUJ	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that the inter connection performance among the operators is 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.



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

CSD 3 days live data for Cellular Mobile Telephone Services-QE-Dec-13														
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM GSM	TATA (GSM & CDMA)	VIDEOCON	VODAFONE	MTS	RCOM CDMA
S/ N	Name of Parameter			GSM Operators								CDMA Operators		
Response time to customers for assistance														
1	A) Accessibility of call centre/Customer Care	>=95%	GUJ	100%	100%	97%	100%	100%	98.71%	100%	100%	100%	100%	98.12%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	GUJ	93%	97%	29%	89%	99%	77.25%	94%	95%	97%	97%	78.92%

**CUSTOMER CARE / HELPLINE ASSESSMENT**

LIVE CALLING TO CALL CENTRE													
	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	GUJ	100	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	GUJ	100	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	GUJ	100	100	91	94	100	92	100	96	100	100	93	100
%age of calls got answered	GUJ	100%	100%	91%	94%	100%	92%	100%	96%	100%	100%	93%	100%

**KEY FINDINGS:** The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center. However, BSNL, Idea, RCOM (GSM) and RCOM (CDMA) failed to meet the benchmark of 'Call connection to operators (Voice to voice) within 60 seconds. Their performance was 29% (BSNL), 89% (Idea), 77.25% (RCOM-GSM) and 78.92% (RCOM-CDMA).

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, BSNL, Idea, RCOM(GSM), Videocon and RCOM(CDMA) could connect 91%, 94%, 92%, 96% and 93% of calls to the operator within 60 Seconds.



**LEVEL-1 LIVE CALLING**

LEVEL 1 LIVE CALLING														
Emergency no.	Circle Name	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
100	GUJ	30	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
101	GUJ	40	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
102	GUJ	40	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1091	GUJ	40	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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 Gujarat service area, these services were found functional in the networks of all the service providers.

**5. DRIVE TEST**

**5.1 OPERATOR ASSISTED DRIVE TEST:**

In Gujarat Service area, total 108 drive tests in three months of the quarter ended December 2013 @ of 3 drive tests per operator per month (total 3x12x3= 108 drive tests) were conducted covering Ahmedabad, Vadodara and Mehsana during the month of October-13, Surat, Bharuch and Anand during November -13 and Rajkot, Jamnagar and Porbander cities during December-2013. 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. A sample of about 120 - 150 test calls were made during a drive test covering about a distance of 100 K.M. 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. The routs were so selected that the drive test could cover the congested areas/commercial areas of the above 09 cities in Gujarat circle.

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

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



## DRIVE TEST TABLE: 1

Operator-Assisted Drive Test-Gujarat Circle-Oct-13 Month															
S/N	Parameter	City Name	Drive Test Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators									CDMA Operators		
1	Blocked Call Rate (<=3%)	Ahmedabad	Oct-13	0.00%	0.83%	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Vadodara	Oct-13	0.00%	0.97%	ICR	0.00%	1.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Mehsana	Oct-13	0.00%	NS	0.00%	0.00%	0.86%	0.76%	0.00%	0.73%	0.00%	0.00%	0.00%	0.00%
2	Dropped Call Rate (<=2%)	Ahmedabad	Oct-13	0.00%	0.00%	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Vadodara	Oct-13	0.00%	0.00%	ICR	0.70%	0.59%	0.00%	0.00%	0.49%	0.00%	0.00%	0.00%	0.00%
		Mehsana	Oct-13	0.00%	NS	0.00%	0.00%	0.87%	0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%
Percentage connections with good voice quality (=>95%)															
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Ahmedabad	Oct-13	NA	NA	ICR	NA	NA	NA	NA	NA	NA	99.38%	97.95%	99.86%
		Vadodara	Oct-13	NA	NA	ICR	NA	NA	NA	NA	NA	NA	99.58%	96.24%	99.83%
		Mehsana	Oct-13	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.11%	98.58%	97.43%
	(b) 0-5 (with frequency hopping for GSM Operators)	Ahmedabad	Oct-13	95.42%	97.56%	ICR	93.97%	97.97%	95.33%	97.15%	97.67%	95.93%	NA	NA	NA
		Vadodara	Oct-13	99.46%	97.45%	ICR	100.00%	96.67%	96.05%	98.19%	97.99%	95.08%	NA	NA	NA
		Mehsana	Oct-13	97.33%	NS	98.12%	81.25%	97.17%	95.99%	99.75%	97.58%	97.59%	NA	NA	NA
Service Coverage															
4	In door (>= -75dBm)	Ahmedabad	Oct-13	97.66%	86.56%	ICR	41.65%	99.84%	96.27%	97.50%	95.68%	94.30%	96.97%	85.17%	99.13%
		Vadodara	Oct-13	96.84%	87.56%	ICR	88.96%	98.77%	62.10%	95.61%	96.24%	90.72%	96.99%	93.91%	91.70%
		Mehsana	Oct-13	98.41%	NS	84.00%	94.40%	99.93%	81.40%	96.78%	96.50%	96.78%	99.61%	75.32%	91.87%
	In-vehicle (>= -85dBm)	Ahmedabad	Oct-13	99.48%	98.82%	ICR	95.96%	100.00%	99.37%	99.57%	99.08%	99.75%	99.98%	99.28%	100.00%
		Vadodara	Oct-13	99.64%	99.57%	ICR	99.54%	100.00%	98.70%	99.80%	99.64%	99.10%	99.99%	99.94%	99.68%
		Mehsana	Oct-13	99.75%	NS	89.58%	99.78%	100.00%	97.21%	100.00%	99.66%	99.89%	100.00%	98.62%	99.88%
	Outdoor-in city (>= -95dBm)	Ahmedabad	Oct-13	99.78%	99.84%	ICR	100.00%	100.00%	99.78%	100.00%	99.77%	100.00%	99.99%	98.36%	100.00%
		Vadodara	Oct-13	99.89%	100.00%	ICR	100.00%	100.00%	99.92%	100.00%	99.93%	100.00%	100.00%	100.00%	100.00%
		Mehsana	Oct-13	99.91%	NS	99.98%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%
5	Call Setup Success Rate (>=95%)	Ahmedabad	Oct-13	100.00%	99.17%	ICR	100.00%	100.00%	100.00%	100.00%	97.24%	100.00%	100.00%	100.00%	100.00%
		Vadodara	Oct-13	100.00%	99.03%	ICR	100.00%	98.83%	100.00%	100.00%	96.70%	100.00%	100.00%	100.00%	100.00%
		Mehsana	Oct-13	100.00%	NS	100.00%	100.00%	99.14%	99.24%	100.00%	98.53%	100.00%	100.00%	100.00%	100.00%

\*NS: No Service, \*NA: Not Applicable



# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



## DRIVE TEST TABLE: 2

Operator-Assisted Drive Test-Gujarat Circle-Nov-13 Month															
S/N	Parameter	City Name	Drive Test Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
GSM Operators											CDMA Operators				
1	Blocked Call Rate (<=3%)	Surat	Nov-13	0.00%	NS	0.00%	1.35%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Bharuch	Nov-13	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Anand	Nov-13	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	Dropped Call Rate (<=2%)	Surat	Nov-13	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%
		Bharuch	Nov-13	0.00%	NS	0.00%	1.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Anand	Nov-13	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Percentage connections with good voice quality (=&gt;95%)</b>															
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Surat	Nov-13	NA	NS	NA	NA	NA	NA	NA	NA	NA	98.73%	96.40%	99.48%
		Bharuch	Nov-13	NA	NS	NA	NA	NA	NA	NA	NA	NA	99.78%	98.19%	96.60%
		Anand	Nov-13	NA	NS	NA	NA	NA	NA	NA	NA	NA	99.48%	97.00%	97.92%
	(b) 0-5 (with frequency hopping for GSM Operators)	Surat	Nov-13	95.38%	NS	97.47%	94.58%	97.23%	95.49%	95.20%	96.59%	97.37%	NA	NA	NA
		Bharuch	Nov-13	95.69%	NS	98.08%	93.98%	97.59%	96.71%	97.62%	96.63%	97.64%	NA	NA	NA
		Anand	Nov-13	95.38%	NS	97.82%	98.34%	97.95%	96.26%	95.02%	96.16%	97.14%	NA	NA	NA
<b>Service Coverage</b>															
4	In door (>= -75dBm)	Surat	Nov-13	98.13%	NS	82.08%	62.30%	85.80%	96.98%	94.40%	97.47%	91.41%	99.89%	99.45%	93.41%
		Bharuch	Nov-13	98.34%	NS	71.87%	79.44%	82.53%	90.94%	90.09%	98.23%	71.54%	96.09%	90.64%	58.52%
		Anand	Nov-13	98.31%	NS	90.62%	20.97%	99.79%	99.26%	82.21%	90.49%	82.24%	95.97%	98.42%	93.32%
	In-vehicle (>= -85dBm)	Surat	Nov-13	99.70%	NS	95.48%	97.92%	99.05%	99.58%	99.89%	99.79%	99.47%	100.00%	100.00%	100.00%
		Bharuch	Nov-13	99.72%	NS	96.30%	96.94%	97.17%	98.42%	99.74%	99.95%	96.85%	99.78%	99.52%	92.11%
		Anand	Nov-13	99.84%	NS	99.66%	79.27%	100.00%	99.89%	99.49%	99.68%	98.14%	100.00%	100.00%	100.00%
	Outdoor- in city (>= -95dBm)	Surat	Nov-13	99.92%	NS	100.00%	99.85%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%
		Bharuch	Nov-13	99.96%	NS	100.00%	100.00%	99.85%	100.00%	100.00%	100.00%	99.93%	100.00%	100.00%	100.00%
		Anand	Nov-13	99.95%	NS	99.98%	85.54%	100.00%	100.00%	100.00%	100.00%	99.92%	100.00%	100.00%	100.00%
5	Call Setup Success Rate (>=95%)	Surat	Nov-13	100.00%	NS	100.00%	99.00%	100.00%	99.45%	100.00%	98.92%	100.00%	100.00%	100.00%	99.31%
		Bharuch	Nov-13	100.00%	NS	100.00%	98.73%	100.00%	100.00%	100.00%	99.15%	100.00%	100.00%	100.00%	100.00%
		Anand	Nov-13	100.00%	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

\*NS: No Service, \*NA: Not Applicable

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



### DRIVE TEST TABLE: 3

#### Operator-Assisted Drive Test-Gujarat Circle-Dec-13 Month

S/N	Parameter	City Name	Drive Test Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators									CDMA Operators		
1	Blocked Call Rate (<=3%)	Rajkot	Dec-13	0.00%	NS	0.00%	1.75%	0.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Jamnagar	Dec-13	0.00%	0.00%	ICR	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Porbander	Dec-13	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NS
2	Dropped Call Rate (<=2%)	Rajkot	Dec-13	0.00%	NS	0.00%	1.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Jamnagar	Dec-13	0.00%	0.00%	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Porbander	Dec-13	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NS
<b>Percentage connections with good voice quality (=&gt;95%)</b>															
3	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Rajkot	Dec-13	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.11%	99.64%	99.91%
		Jamnagar	Dec-13	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.59%	99.89%	99.91%
		Porbander	Dec-13	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.64%	NS	99.11%
	(b) 0-5 ( with frequency hopping for GSM Operators)	Rajkot	Dec-13	96.16%	NS	98.39%	89.34%	95.49%	95.03%	96.72%	95.36%	94.99%	NA	NA	NA
		Jamnagar	Dec-13	96.80%	97.00%	ICR	92.06%	97.24%	95.33%	97.72%	95.55%	95.66%	NA	NA	NA
		Porbander	Dec-13	96.98%	NS	97.75%	94.47%	98.23%	95.85%	99.02%	96.38%	96.80%	NA	NA	NA
<b>Service Coverage</b>															
4	In door (>= -75dBm)	Rajkot	Dec-13	98.46%	NS	94.10%	59.10%	99.99%	97.25%	87.11%	95.54%	95.42%	98.60%	99.41%	99.83%
		Jamnagar	Dec-13	98.72%	79.40%	ICR	68.30%	99.91%	95.58%	92.99%	94.33%	94.12%	96.85%	96.88%	98.29%
		Porbander	Dec-13	97.95%	NS	93.88%	57.14%	92.85%	97.71%	95.25%	89.43%	78.12%	95.30%	NS	81.40%
	In-vehicle (>= -85dBm)	Rajkot	Dec-13	100.00%	NS	99.86%	96.13%	100.00%	99.60%	99.33%	99.29%	99.93%	100.00%	100.00%	100.00%
		Jamnagar	Dec-13	99.89%	97.57%	ICR	98.84%	100.00%	99.54%	99.64%	99.35%	99.91%	99.99%	100.00%	99.99%
		Porbander	Dec-13	99.82%	NS	99.52%	96.30%	98.34%	99.61%	99.72%	99.13%	97.68%	99.95%	NS	96.72%
	Outdoor- in city (>= -95dBm)	Rajkot	Dec-13	100.00%	NS	100.00%	99.90%	100.00%	99.89%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Jamnagar	Dec-13	99.98%	100.00%	ICR	100.00%	100.00%	99.94%	100.00%	99.90%	100.00%	100.00%	100.00%	100.00%
		Porbander	Dec-13	99.92%	NS	100.00%	99.89%	100.00%	99.92%	100.00%	99.78%	100.00%	100.00%	100.00%	NS
5	Call Setup Success Rate (>=95%)	Rajkot	Dec-13	100.00%	NS	100.00%	98.24%	99.40%	98.57%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Jamnagar	Dec-13	100.00%	100.00%	ICR	99.25%	99.40%	99.54%	100.00%	99.56%	100.00%	100.00%	100.00%	100.00%
		Porbander	Dec-13	100.00%	NS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NS

\*NS: No Service, \*NA: Not Applicable, \* ICR: Intra Circle Roaming.



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

**DRIVE TEST TABLE: 4**

<b>Drive Test Gujarat Circle Oct-13 to Dec-13</b>					
<b>Month/Year</b>	<b>City</b>	<b>P1</b>	<b>P2</b>	<b>Across</b>	<b>Congested</b>
<b>Oct-13</b>	<b>Ahamdabad</b>	Naroda GIDC,Naroda Patiya,Nana Chiloda Road,Cantonment	S G Highway,Karnavati Club to Thaltej cross road,Naranpura	Ellisebridge,C.G.Road,Law Garden,Mithakhadi	Kalupur,Relief Road,Gandhi Road,Jamalpur , Behrampura
	<b>Badodara</b>	Ranoli , Chhani , Nizampura ,Fatehgunj, Amitnagar,VIP Road	Majalpur , Makarpura,Makarpura GIDC , Vishwamitri,Dabhoi Road	O.P. Road , Diwalipura,Vasna , Akota,Genda circle , Pandya Bridge,BIDC Road	Salatwada,Dandiya Bazar , R.V. Desai Road,Navapura , Mandvi,Chittehkhani gali , Shahibag Garden
	<b>Mehasana</b>	Ramosara Chowkdi,Manav Ashram,Visnagar Link Road,Saibaba Mandir	College Road,ONGC,Modhera Chowkdi,Radhanpur Road	Green City,Kasba,DK Cinema,GIDC	Choksi Bazar,Para,Jail Road,Rly Station Road
<b>Nov-13</b>	<b>Surat</b>	Udhna Darwaja,Khatodra,Pandesara,Pandesara GIDC	Adajan,Rander,Athwa Gate,Piplod Road	Varachha Road, Ring Road,Sahara Darwaja - Kadodra Road	Katargam,Muglisara,Chowk-Bhagal,Varachha
	<b>Bhurach</b>	Dahej BY Road,Link Road,Jambusar chowkdi,Muhamad pura Cross Road	NH-8,Zadeshwar Village,GNFC Colony,Zadeshwar Road	Bholav,College Road,Bharuch GIDC,Narayan Nagar	Station Bharuch Old City,Shantinath Cross Road,Vejalpur,Chakla
	<b>Ananad</b>	Amul Dairy Road,Ganesh Chokdi,Borsad Chokdi,NDDDB	Samarkha Road,Mahendra Shah Road,80 Feet Road,Mahavir Road	Big Bazar Area,A.V. Road,B/H area,Town Hall Area	New Bus-station Area,Gayatalav road,Nehru Baug,Gamdiwad /soni Bazar
<b>Dec-13</b>	<b>Rajkot</b>	Greenland Circle, Kuvada Road,Sardar patel Colony, Old Morbi road, Shakti society, Gujarat Society, Arya nagar, Shakti Industrial estate, Aji Industrial estate	Civil Hospital,Sheth Eye Hospital,Pathikashram,Balmi kivadi,Shashtrinagar,Bajrang wadi,Railway station Road, Railway Colony, Jamnagar Highway, Airport, Kasturba Rd,Sadar Bazar,Rajput Para, Bhaktinagar,Udhyognagar, Gondal Road, Viratnagar, Vavdi	Kalawad Road, Ghanshyamnagar,Royal park,Hinglajnagar, Panchayatnagar, Yoginagar, Harinagar, Golden park, Race course ring road, Kishanpara,Police head quarter	Kesari Wadi, Watson Museum,Mohandas Gandhi Highschool,Lohanapara,Diwanpara,,Vardhmannagar,Soni Bazar,Old City Area Rajkot,Dhudhsagar road, Randhira Nagar,Sant kabir Road
	<b>Jamnagar</b>	Bedi road, St anns girls high school,TB Hospital, Mohannagar,Patel Colony, Servoday Enginners, Shree MP shah Medical college, Guru Govind singh Hospital, St Xaviers School, pathikashram Road.	Khodiyar colony,Royal pushpark society,Hotel Fortune Palace,Mayurnagar,Dhinchda road,Defence colony,Bedeshwar road, Govt school, Bedi Bhundar road.	Summair club,Oswal colony, Ranjitnagar,nanddham society,Elite Industries, Raj rajeshwarinagar,Pavan chakki, Lalapur,Indira Marg, Gokulnagar.	Indira Gandhi Road,Gurudwara,Bhiddhanjan Road,Pancheshwar Tower Road,kadiawad, Jalani jar, Jumma masjid,Central bank road, Navtanpuri,Shankar tekri, Kuwarbai Jain Dharamshala.
	<b>Porbander</b>	Chhaya Vistar, Birla Colony, SBS Society, Rameswar Socity, GEB Colony, Tulsi Nagar,	GIDC, Bokhira, Shreeji Nagar, Mopatiya Para, Royal Bunglalows	Kedeshvar Road, Dream land cinema, Bhatiya Bazar, Kirti Mandir	Fishries Colony, Kadia Plot,Arya Nagar Socity, Railway Colony



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

- (i)
  - (a) Aircel has its services only in three cities namely Ahmadabad, Vadhodra and Jamnagar out of 9 cities where the drive tests were conducted during the quarter.
  - (b) Tata (GSM) is on ICR with Aircel in Ahmadabad, Vadhodra and Jamnagar cities.
  - (c) In the above drive test tables, NA means not applicable for voice quality (0-4) without frequency hopping for GSM operators and Voice quality (0-5) with frequency hopping for CDMA operators.
- (ii) The results of the drive test, carried out during three months of the quarter ended December-13 for all service providers revealed that they were in compliance of benchmarks for all the parameters. BSNL was the only one service provider that could not meet the bench mark of parameter '% Connection with Good Voice Quality'. The performance of BSNL was 93.97% (Ahmedabad), 81.25% (Mehsana), 94.58% (Surat), 93.98% (Bharuch), 89.34% (Rajkot), 92.06% (Jamnagar) and 94.47% (Porbander).

## 5.2 INDEPENDENT DRIVE TEST:

The independent drive tests are to be carried out by M/s TUV for any service provider on receiving advice from TRAI, based on any complaint from subscribers, relating to poor network coverage in certain areas of the cities. As TUV was not advised by TRAI to conduct the drive test independently on the basis of Subscribers complaint or otherwise, the independent drive tests were not conducted by TUV in this quarter.



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

From analysis of monthly audit and 3 days live measurements results, it can be concluded that performance of the operators in the Gujarat service area is fairly satisfactory for **Network parameters** as all operators (except Tata-GSM) were found to have met the benchmarks of all parameters. Tata (GSM) was the only operator that could not meet benchmark of parameter 'Worst affected cells having > 3% TCH drop' during 3 days live measurements in all three months of quarter ended Dec-13. **The performance of Tata (GSM) was 3.74% (Oct.), 4.23% (Nov.) and 3.58% (Dec.)**

With regard to the **Customer Service Quality Parameters**, the performance of operators remained satisfactory as most of the service providers were found in compliance of most of the benchmarks. However, BSNL and RCOM (GSM) have not met the benchmark of 'calls answered by Operators (voice to voice) within 60 seconds'. They have achieved their performance as 69 % and 70 % respectively. Further, Vodafone was found non-compliant in respect of parameter 'Time taken for refunds of deposits after closure' and "% of billing complaints". Its achievement was 68 % against the benchmark of 100% within 60 days and 0.12% against the benchmark of <=0.1% respectively.

With regard to the **Drive Tests**, all service providers were again found meeting the benchmarks for all the parameters, except BSNL which remained non-compliant for parameter "% age connection with Good Voice Quality" in seven out of nine cities where the drive tests were carried out.

*Thus, taking cognizance on overall performance of the service providers, it was concluded that service providers were doing fairly well in Gujarat Circle for most of the parameters. However, the performance with respect to the parameters 'Worst affected cell having > 3 % TCH drop', 'Good Voice Quality' and 'Calls answered by operator (voice to voice)' need further improvement for those operators who could not meet the benchmarks of these parameters during live measurement and drive tests.*



**7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE:**

**TABLE: 1**

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle- Oct-13 month**

S/N	Name of Parameter	Bench- mark	Audit Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
1	<b>Network Availability</b>														
	a) Total no. of BTSs in the licensed service area		Oct-13	7284	891	2109	4589	6033	3102	2934	1798	7443	1675	566	680
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Oct-13	5454.04	279.69	16.87	53214.93	1806	4048	3678.16	873	796.41	2514	139.1	10.42
	c) BTS Accumulated Downtime	<=2%	Oct-13	0.10%	0.04%	0.00%	1.61%	0.04%	0.18%	0.17%	0.07%	0.01%	0.20%	0.03%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-13	22	1	0	87	0	20	0	4	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Oct-13	0.30%	0.11%	0.00%	1.89%	0.00%	0.64%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	Oct-13	99.71%	99.41%	98.23%	96.59%	99.35%	97.43%	99.58%	99.21%	99.74%	99.17%	99.72%	98.97%
	b)SDCCH/PAGING Congestion	<=1%	Oct-13	0.03%	0.03%	0.02%	0.04%	0.21%	0.09%	0.01%	0.02%	0.06%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Oct-13	0.20%	0.02%	0.01%	0.67%	0.21%	0.42%	0.06%	0.05%	0.26%	0.00%	0.00%	0.11%	
3	<b>Connection Maintenance (Retainability)</b>														
	a) Call Drop Rate (CDR)	<=2%	Oct-13	0.80%	0.52%	0.83%	1.03%	1.27%	1.40%	0.25%	0.47%	0.78%	0.03%	0.20%	0.44%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-13	0.36%	2.62%	2.23%	2.49%	1.77%	1.28%	0.02%	0.90%	0.89%	0.06%	2.47%	1.16%
c) % of connections with good voice quality	>=95%	Oct-13	97.14%	98.56%	98.43%	NP	95.51%	98.20%	98.79%	98.79%	97.35%	98.79%	98.25%	99.33%	

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	d) Total No. of cells exceeding 3% TCH drop (call drop)	Oct-13	79	70	141	321	317	125	1	47	199	3	43	24	
	e) Total no. of cells (Sector) in the licensed service area	Oct-13	22020	2673	6334	12883	17910	9733	8802	5347	22496	5025	1724	2011	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>														
	No. of POI's having >=0.5% POI congestion	Oct-13	0	0	0	1	0	0	0	0	0	0	0	0	
	Name of POI not meeting the benchmark	Oct-13	0	0	0	Unitech	0	0	0	0	0	0	0	0	
5	<b>Network Data</b>														
	a) Equipped Capacity of Network in Erlang	Oct-13	259092.3	33836.2	111087.2	317000	254820.6	116341.3	144000	78056.08	418769.8	144000	21000	129068	
	b) Total traffic in TCBH in erlang (Avg.)	Oct-13	173301.6	6372.1	28307.8	81709	187808.6	125588.7	80906.49	12892.07	361444.5	48885.9	1343	28476	
	c) Total no. of customers served (as per VLR) on last day of the month	Oct-13	6683704	15803	1171317	2579547	8545009	3295014	4855751	492990	15478450	1416662	73916	379674	

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**TABLE: 2**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Gujarat Circle- Oct-13 month</b>															
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEO CON	VODA FONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators								CDMA Operators			
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) Total no. of BTSs in the licensed service area		Live data	7263	891	2109	4589	5952	3101	2934	1777	NP	1675	566	679
	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	3029.89	25.01	2.2	4321.78	307.25	397	416.17	62	NP	287	1078	1.05
	c) BTS Accumulated Downtime	<=2%	Live data	0.11%	0.04%	0.00%	1.31%	0.07%	0.18%	0.20%	0.05%	NP	0.24%	0.03%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	10	0	0	3	0	0	0	0		0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.14%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	NP	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.73%	99.36%	98.25%	96.76%	99.31%	97.19%	99.61%	99.20%	99.80%	99.29%	99.66%	98.07%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.01%	0.03%	0.01%	0.02%	0.45%	0.08%	0.01%	0.01%	0.08%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.12%	0.01%	0.00%	0.06%	0.20%	0.49%	0.04%	0.02%	0.20%	0.00%	0.09%	0.91%
<b>Connection Maintenance (Retainability)</b>															
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.82%	0.52%	0.83%	0.46%	1.34%	0.51%	0.27%	0.45%	0.89%	0.03%	0.21%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.47%	2.06%	<b>3.74%</b>	1.83%	1.90%	1.35%	0.00%	0.67%	NP	0.04%	2.57%	2.65%
	c) % of connections with good voice quality	>=95%	Live data	97.06%	98.52%	98.43%	NP	95.27%	98.18%	98.79%	98.75%	97.05%	99.86%	98.25%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	103	55	237	238	339	131	0	36	NP	2	44	55
	e) Total no. of cells (Sector) in the licensed service area		Live data	21936	2673	6334	12966	17867	9734	8658	5348	NP	5028	1724	2074
<b>No. of POI's having &gt;=0.5% POI congestion</b>															
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	<b>1</b>	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	Unitech CMTS	0	0	0	0	0	0	0	0

\*NP: Data Not Provided



**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE**



**TABLE: 3**

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle- Nov-13 month															
S/N	Name of Parameter	Bench- mark	Audit Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators								CDMA Operators			
<b>Network Service Quality Parameter</b>															
1	<b>Network Availability</b>														
	a) Total no. of BTSs in the licensed service area		Nov-13	7283	828	2111	4589	6074	3102	2934	536	7443	1675	566	687
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Nov-13	3052.59	136.81	31.41	32052.81	1084.48	1399	2393.72	1804	604.37	1268.65	58.29	12.17
	c) BTS Accumulated Downtime	<=2%	Nov-13	0.06%	0.02%	0.00%	1.82%	0.02%	0.06%	0.11%	0.04%	0.01%	0.11%	0.01%	0.25%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-13	14	0	0	2.67	0	6	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Nov-13	0.19%	0.00%	0.00%	0.06%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	Nov-13	99.71%	99.56%	98.22%	97.38%	99.33%	98.05%	99.66%	99.15%	99.75%	99.33%	99.51%	98.93%
	b) SDCCH/PAGING Congestion	<=1%	Nov-13	0.03%	0.01%	0.01%	0.03%	0.30%	0.07%	0.01%	0.02%	0.09%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Nov-13	0.32%	0.01%	0.01%	0.56%	0.26%	0.27%	0.05%	0.12%	0.25%	0.00%	0.22%	0.08%	
3	<b>Connection Maintenance (Retainability)</b>														
	a) Call Drop Rate (CDR)	<=2%	Nov-13	0.74%	0.45%	0.77%	1.00%	1.22%	0.86%	0.13%	0.43%	0.82%	0.02%	0.13%	0.41%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-13	0.33%	1.49%	2.21%	2.70%	1.16%	1.85%	0.01%	0.85%	0.94%	0.04%	1.81%	0.76%
	c) % of connections with good voice quality	>=95%	Nov-13	97.09%	98.69%	98.48%	NP	95.97%	98.37%	98.97%	98.72%	97.09%	99.86%	98.26%	99.34%
d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-13	72	37	140	348	211	180	1	46	211	2	31	16	

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



	e) Total no. of cells (Sector) in the licensed service area		Nov-13	22032	2484	6340	12854	18157	9734	8657	5430	22497	5028	1724	2098
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>														
	No. of POI's having >=0.5% POI congestion		Nov-13	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Nov-13	0	0	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>														
	a) Equipped Capacity of Network in Erlang		Nov-13	258146	32172	111244	317000	257379	116925	NP	78495	418204	NP	21000	111971
	b) Total traffic in TCBH in erlang (Avg.)		Nov-13	166481	5773	26379	89091	182746	107296	NP	11684	363225	NP	2378	20517
	c) Total no. of customers served (as per VLR) on last day of the month		Nov-13	6727088	14179	1173726	2597700	8690320	3398577	NP	540800	15644984	NP	132666	315444

\*NP: Data Not Provided

**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE**



**TABLE: 4**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Gujarat Circle- Nov-13 month</b>															
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators								CDMA Operators			
<b>Network Service Quality Parameter</b>															
1	<b>Network Availability</b>														
	a) Total no. of BTSs in the licensed service area		Live data	7285	828	211	4592	6046	3103	2934	1804	NP	1675	566	554
	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	6031	25.57	6.93	4032	76.07	114.6	180.72	30.14	NP	101	2.8	0
	c) BTS Accumulated Downtime	<=2%	Live data	1.14%	0.04%	0.00%	1.22%	0.02%	0.05%	0.09%	0.02%	NP	0.08%	0.00%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	23	0	0	2	0	0	0	0	NP	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.32%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	NP	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.77%	99.59%	98.20%	97.29%	99.37%	98.06%	99.66%	99.28%	99.84%	99.23%	99.58%	98.99%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.01%	0.00%	0.01%	0.03%	0.39%	0.15%	0.01%	0.02%	0.06%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.06%	0.00%	0.00%	0.56%	0.23%	0.20%	0.05%	0.06%	0.16%	0.00%	0.16%	0.04%	
3	<b>Connection Maintenance (Retainability)</b>														
	a) Call Drop Rate (CDR)	<=2%	Live data	0.72%	0.44%	0.80%	0.56%	1.18%	0.62%	0.10%	0.41%	0.78%	0.03%	0.17%	0.43%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.36%	2.50%	4.23%	2.64%	1.03%	2.31%	0.00%	0.77%	NP	0.04%	2.17%	2.44%
	c) % of connections with good voice quality	>=95%	Live data	97.01%	98.74%	98.46%	NP	95.82%	98.34%	98.84%	98.81%	97.18%	99.87%	98.30%	99.33%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	80	62	268	338	186	225	0	42	NP	2	37	41
e) Total no. of cells (Sector) in the licensed service area		Live data	22015	2484	6340	12966	18142	9736	8657	5427	NP	5028	1724	1677	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>														
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0	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-DECEMBER-2013-GUJARAT CIRCLE**



**TABLE: 5**

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle- Dec-13 month**

S/N	Name of Parameter	Bench- mark	Audit Period	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) Total no. of BTSs in the licensed service area		Dec-13	7309	829	2126	4591	6153	3085	2934	1825	7473	1675	566	567
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Dec-13	4112	73.22	6.85	46286	1428	631.47	2901	471	758.35	1506	98.78	11.3
	c) BTS Accumulated Downtime	<=2%	Dec-13	0.08%	0.01%	0.00%	1.35%	0.03%	0.03%	0.13%	0.03%	0.01%	0.12%	0.02%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-13	16	0	0	86	0	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Dec-13	0.22%	0.00%	0.00%	1.87%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-13	99.69%	99.51%	98.11%	98.12%	99.36%	97.88%	99.65%	98.88%	99.77%	99.37%	99.74%	97.87%
	b) SDCCH/PAGING Congestion	<=1%	Dec-13	0.05%	0.02%	0.02%	0.03%	0.23%	0.21%	0.01%	0.05%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-13	0.22%	0.03%	0.03%	0.44%	0.31%	0.43%	0.06%	0.20%	0.22%	0.00%	0.02%	1.08%
<b>Connection Maintenance (Retainability)</b>															
3	a) Call Drop Rate (CDR)	<=2%	Dec-13	0.71%	0.46%	0.85%	0.99%	1.08%	0.43%	0.21%	0.48%	0.74%	0.02%	0.15%	0.56%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-13	0.31%	1.41%	2.41%	2.65%	0.98%	1.53%	0.01%	0.90%	1.93%	0.04%	1.71%	1.69%
	c) % of connections with good voice quality	>=95%	Dec-13	97.02%	98.56%	98.39%	NP	96.38%	98.30%	98.83%	98.45%	97.43%	99.87%	98.91%	99.34%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-13	68	35	154	341	180	149	1	49	435	2	30	29

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	e) Total no. of cells (Sector) in the licensed service area		Dec-13	22030	2487	6385	12830	18332	9691	8659	5468	22599	5028	1727	1714
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>														
	No. of POI's having >=0.5% POI congestion		Dec-13	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Dec-13	0	0	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>														
	a) Equipped Capacity of Network in Erlang		Dec-13	258324.7	32213.1	113818.2	317000	259874	113308.8	144000	79200.8	416199	144000	21000	94013
	b) Total traffic in TCBH in erlang (Avg.)		Dec-13	169326.7	6666.4	28610.4	82293	190241	124832.5	121498	14931.5	374947	48247	2805.67	19158
	c) Total no. of customers served (as per VLR) on last day of the month		Dec-13	7060357	14024	1274015	2649644	9041826	3555726	4911354	657937	16039105	1395472	135138	312633

**AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE**



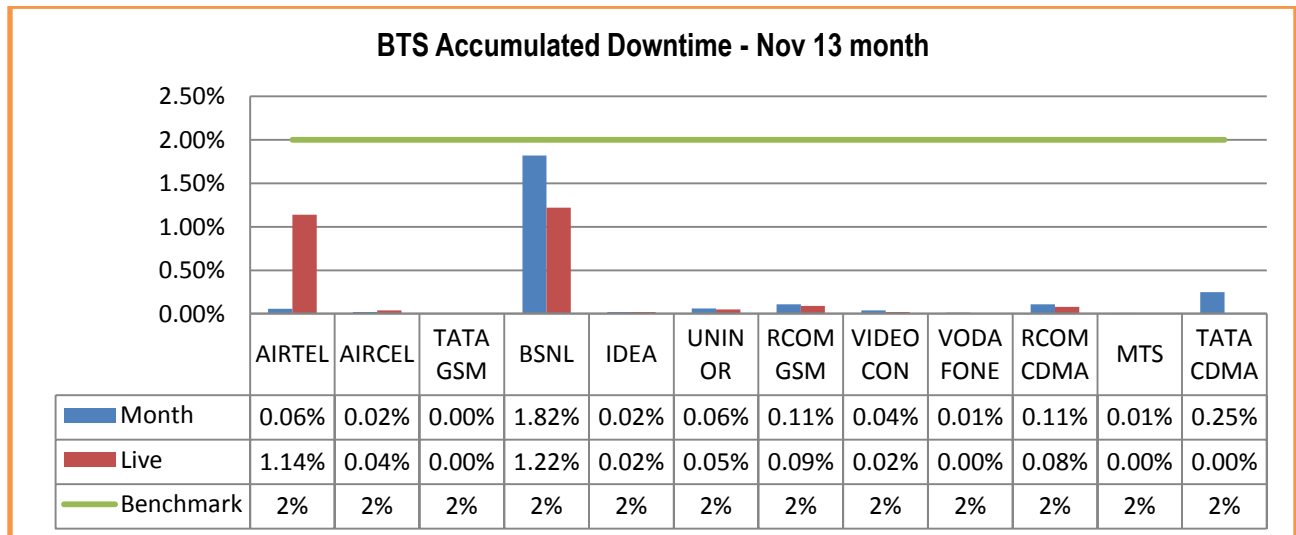
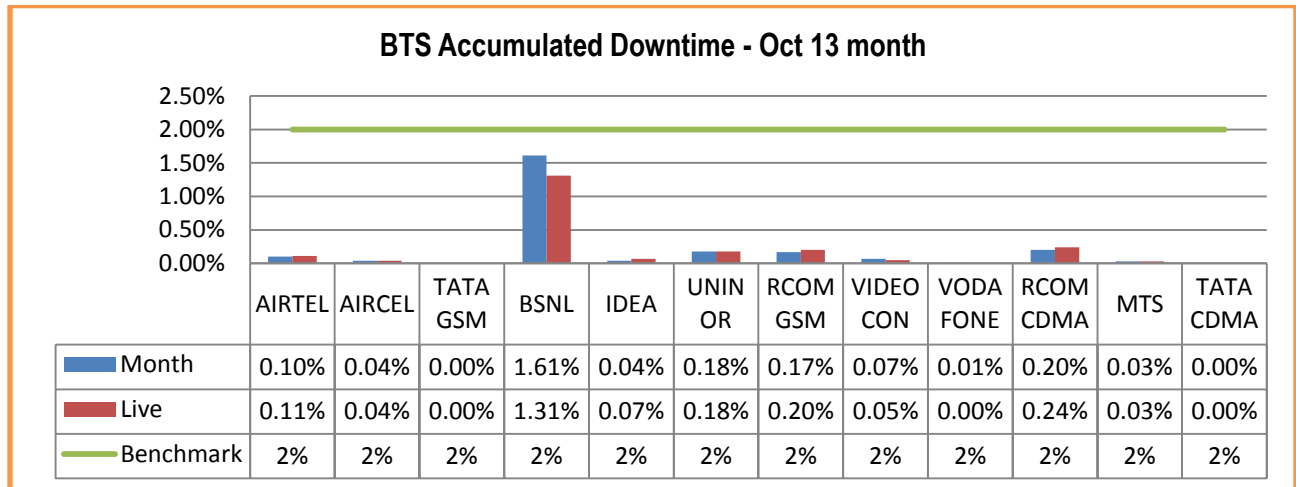
**TABLE: 6**

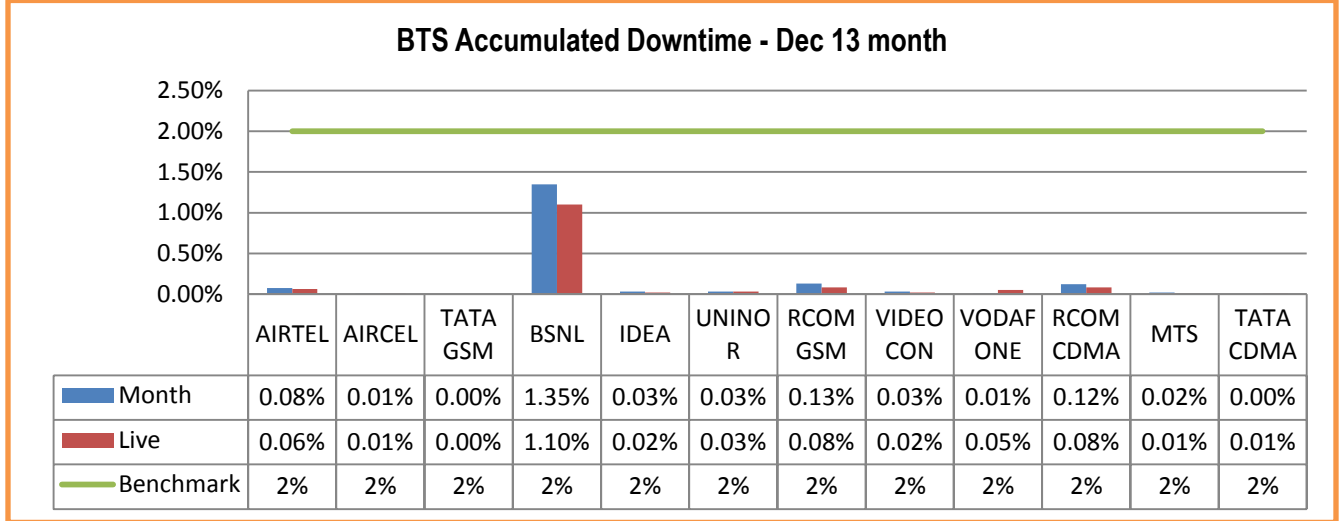
<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Gujarat Circle- Dec-13 month</b>															
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRTEL	AIRCEL	TATA GSM	BSNL	IDEA	UNINOR	RCOM GSM	VIDEOCON	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators									CDMA Operators		
<b>Network Service Quality Parameter</b>															
<b>Network Availability</b>															
1	a) Total no. of BTSs in the licensed service area		Live data	7275	828	2111	4592	6101	3088	2934	1814	7443	1675	566	560
	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	325.01	3.3	0	3652.44	96.17	73	119.27	15.18	85	32	5.02	2.07
	c) BTS Accumulated Downtime	<=2%	Live data	0.06%	0.01%	0.00%	1.10%	0.02%	0.03%	0.08%	0.02%	0.05%	0.08%	0.01%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	1	0	0	40	0	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.01%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.66%	99.47%	98.18%	97.74%	99.48%	98.03%	99.67%	98.94%	99.81%	99.37%	99.74%	97.19%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.06%	0.04%	0.02%	0.02%	0.11%	0.11%	0.01%	0.04%	0.06%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.26%	0.01%	0.02%	0.49%	0.16%	0.43%	0.05%	0.19%	0.19%	0.00%	0.02%	1.74%
<b>Connection Maintenance (Retainability)</b>															
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.71%	0.48%	0.81%	0.53%	1.14%	0.43%	0.18%	0.45%	0.79%	0.01%	0.17%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.41%	2.74%	<b>3.58%</b>	2.54%	1.03%	1.96%	0.00%	0.81%	NP	0.01%	1.99%	2.36%
	c) % of connections with good voice quality	>=95%	Live data	96.96%	98.59%	98.41%	NP	96.15%	98.27%	98.90%	98.52%	97.30%	99.88%	98.25%	99.34%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	90	68	227	325	189	190	0	44	NP	1	34	40
	e) Total no. of cells (Sector) in the licensed service area		Live data	21959	2484	6340	12966	18251	9691	8658	5462	NP	5034	1727	1693
<b>No. of POI's having &gt;=0.5% POI congestion</b>															
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0	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 OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS-MONTHLY V/S 3-DAYS LIVE MEASUREMENT:**

**1. BTS ACCUMULATED DOWNTIME**



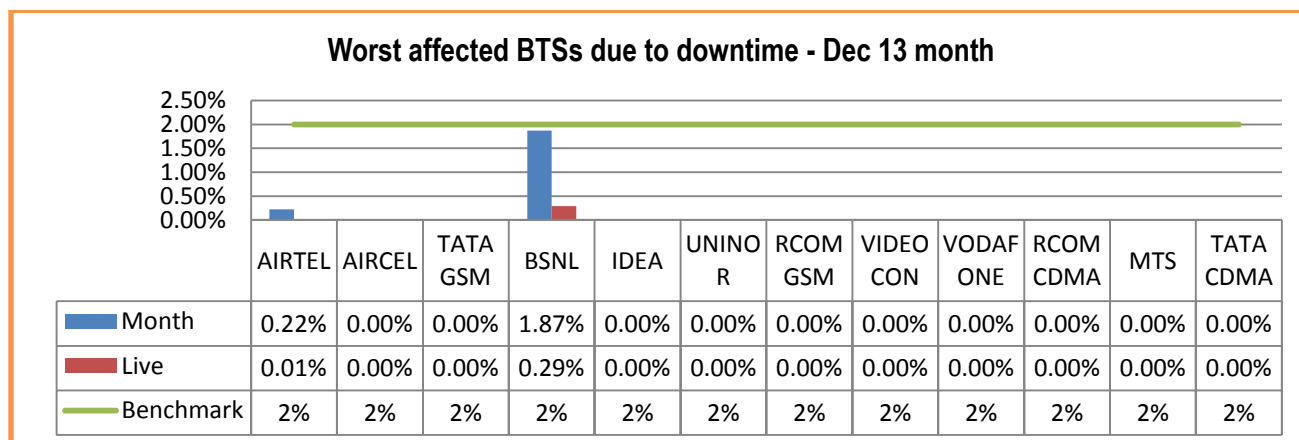
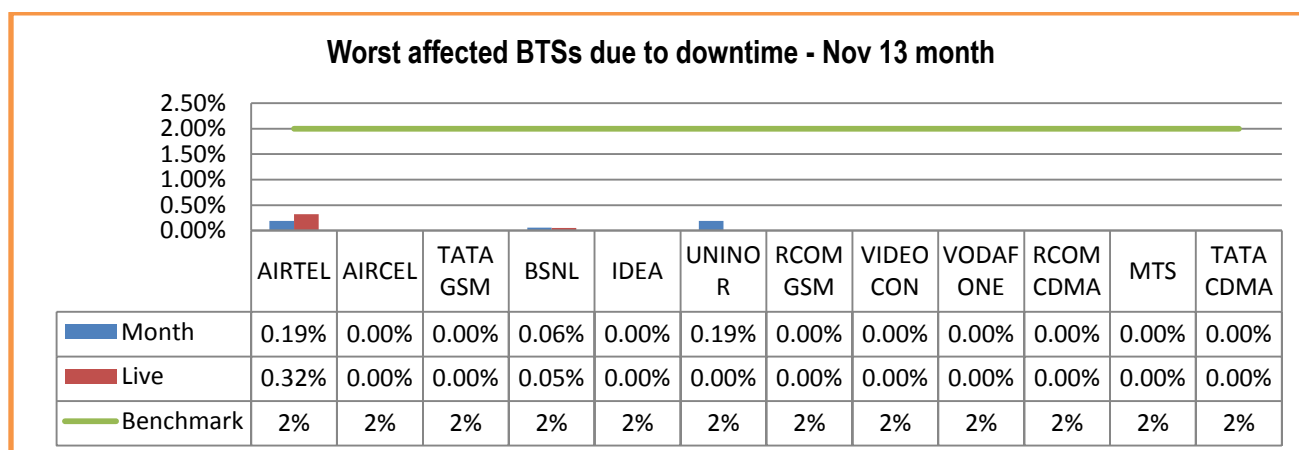
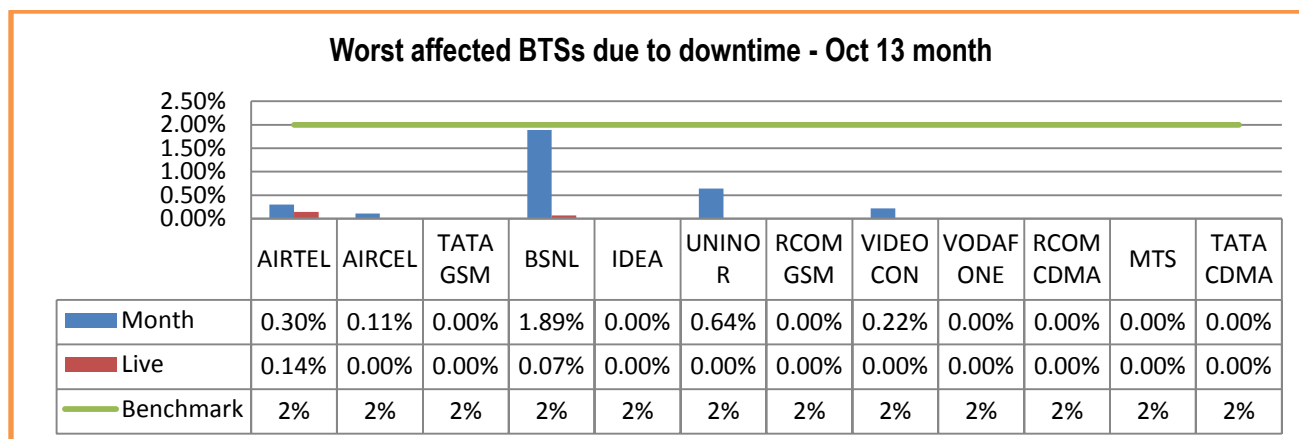


All operators are meeting the benchmarks.





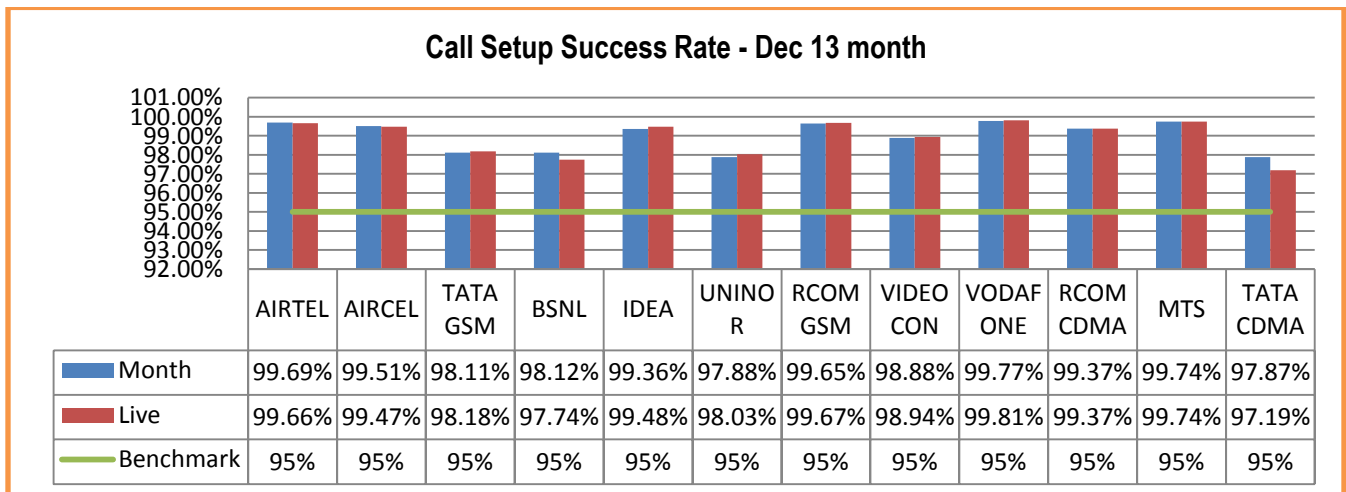
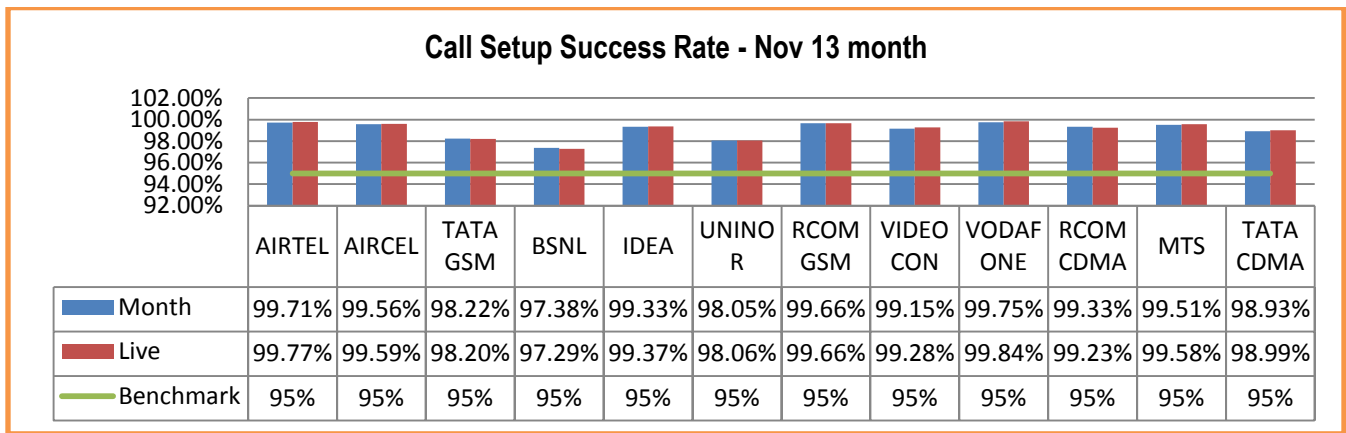
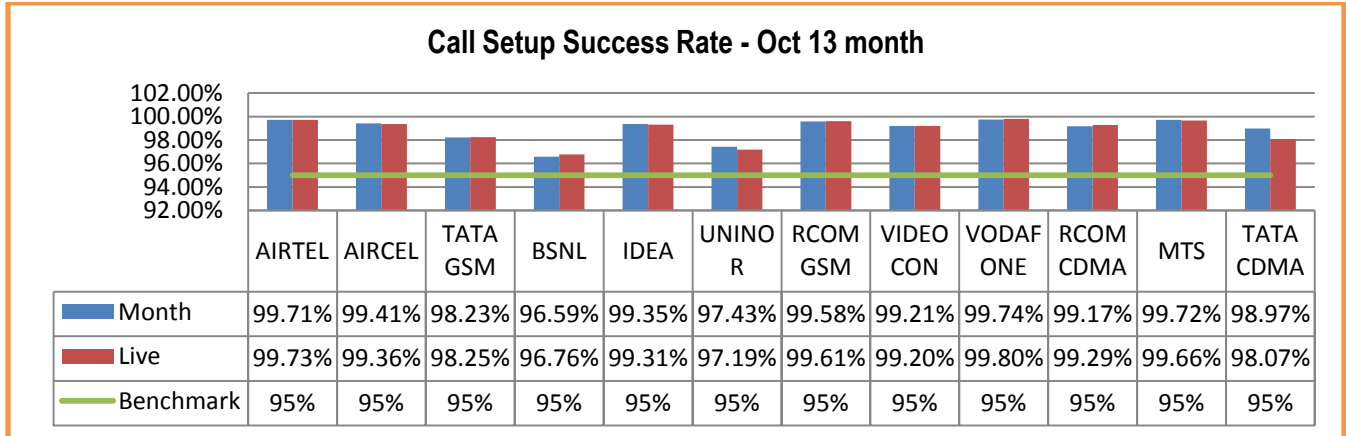
2. WORST AFFECTED BTSS DUE TO DOWNTIME:



All operators are meeting the benchmarks.



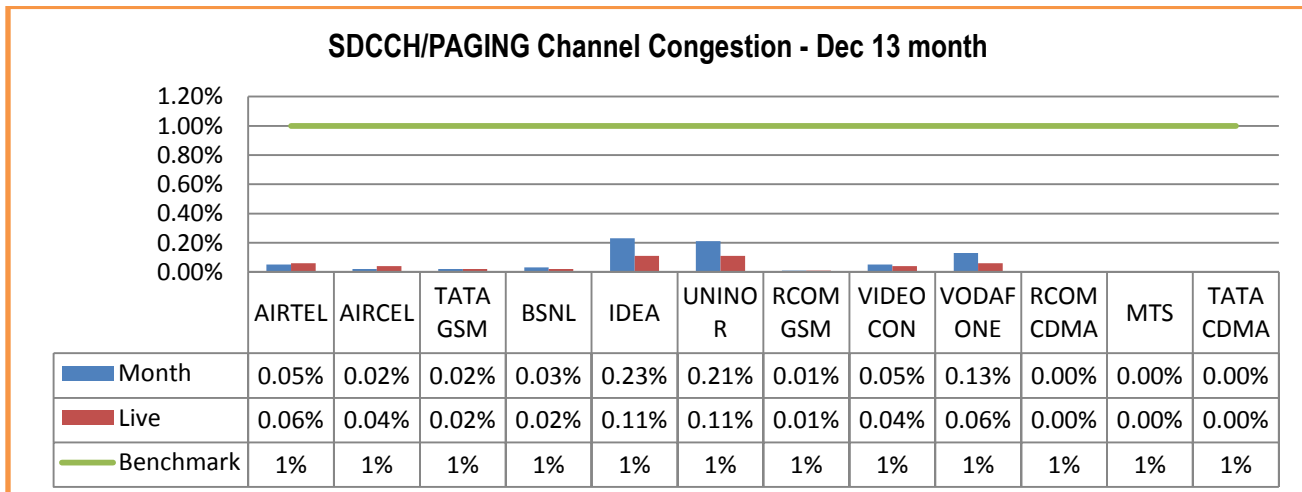
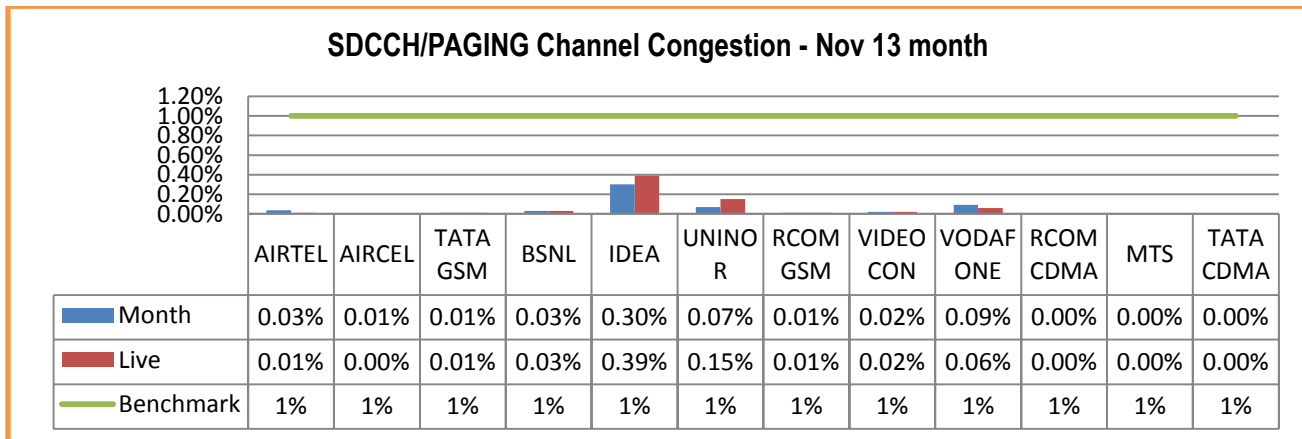
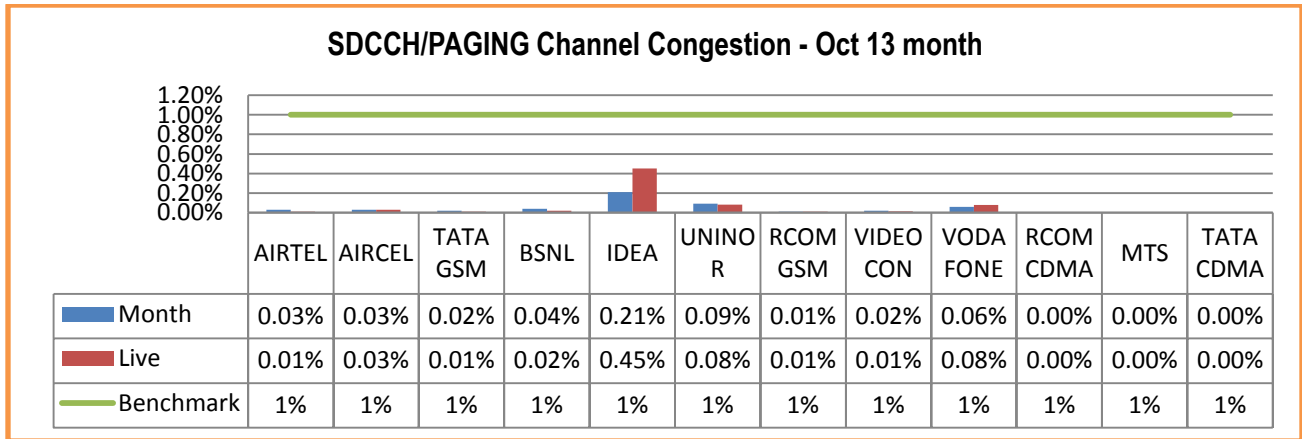
3. CALL SETUP SUCCESS RATE



All operators are meeting the benchmarks.



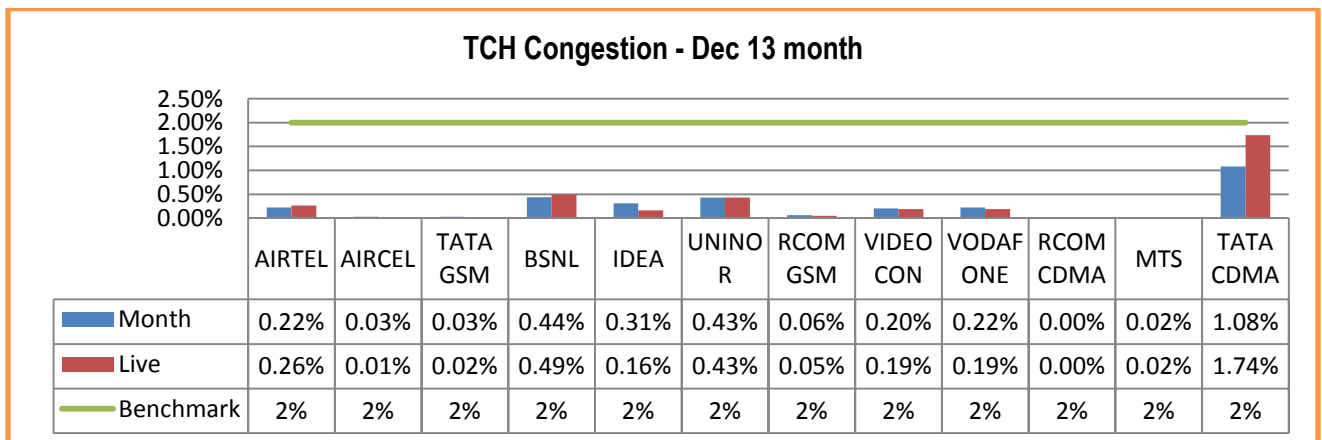
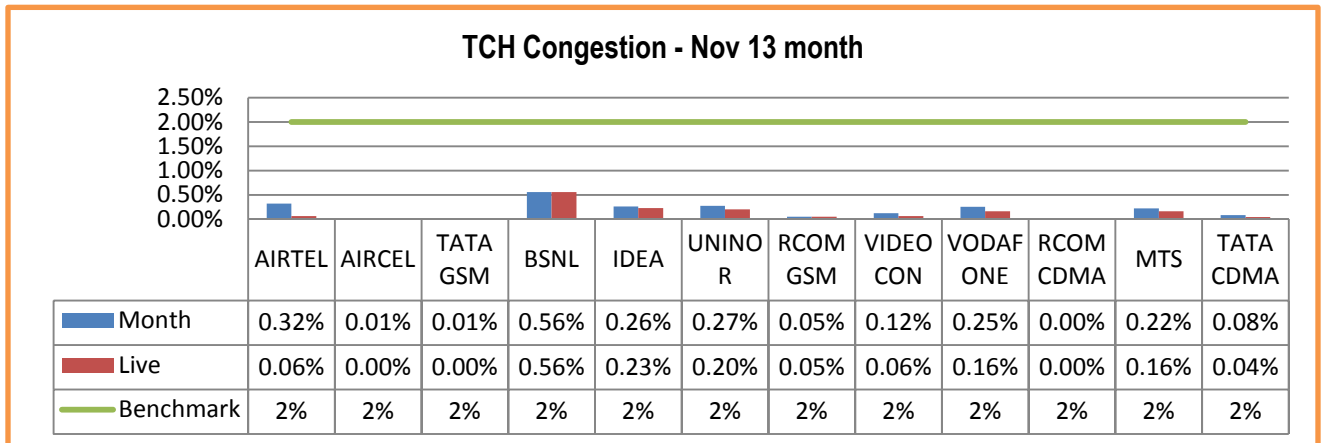
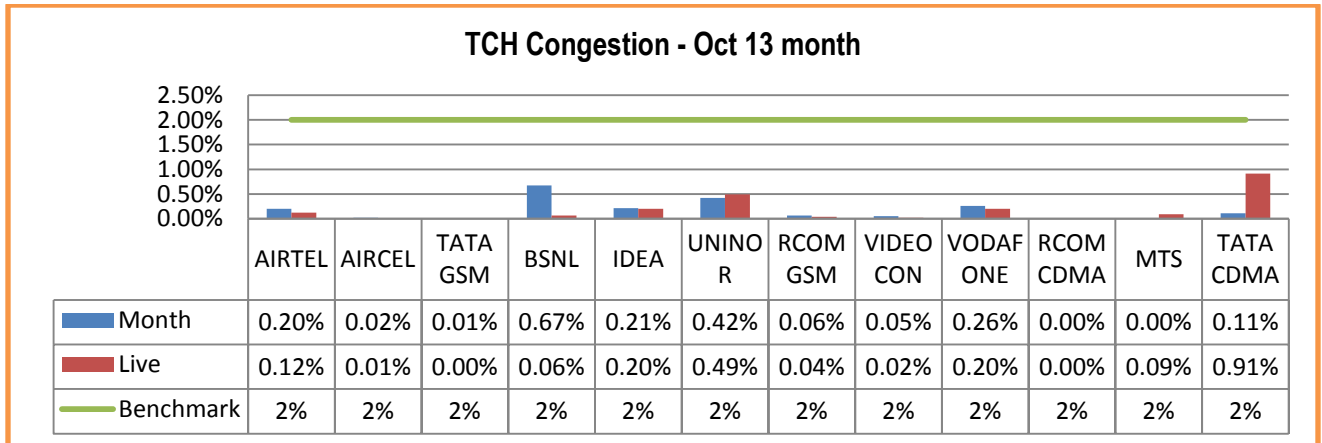
4. SDCCH/PAGING CHANNEL CONGESTION:



All operators are meeting the benchmarks.



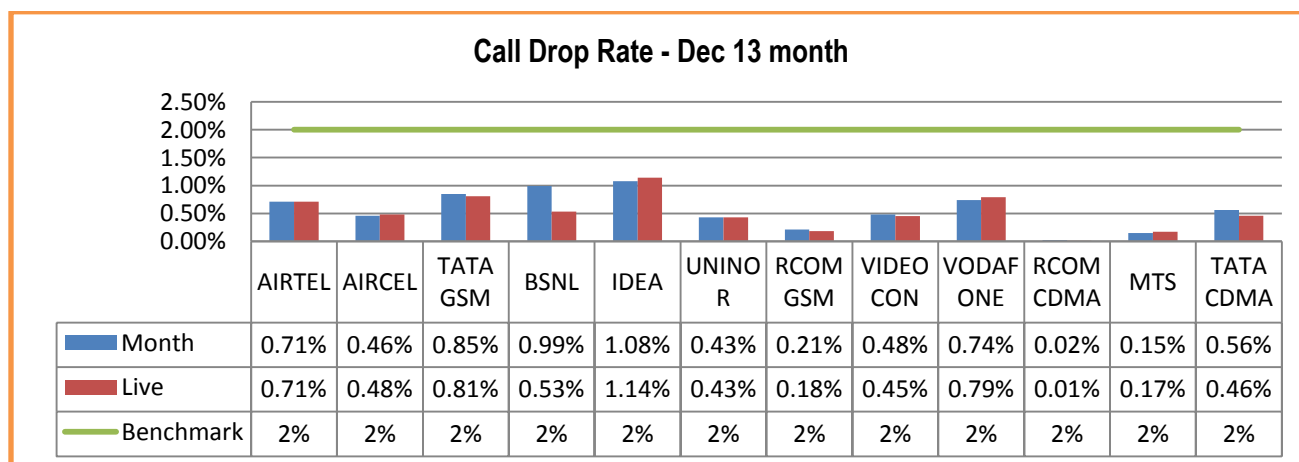
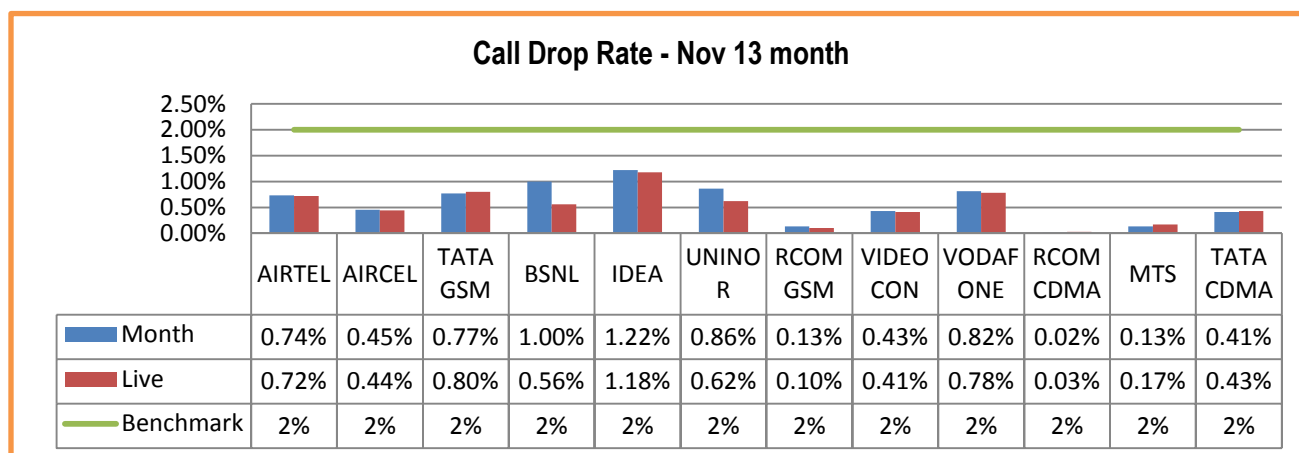
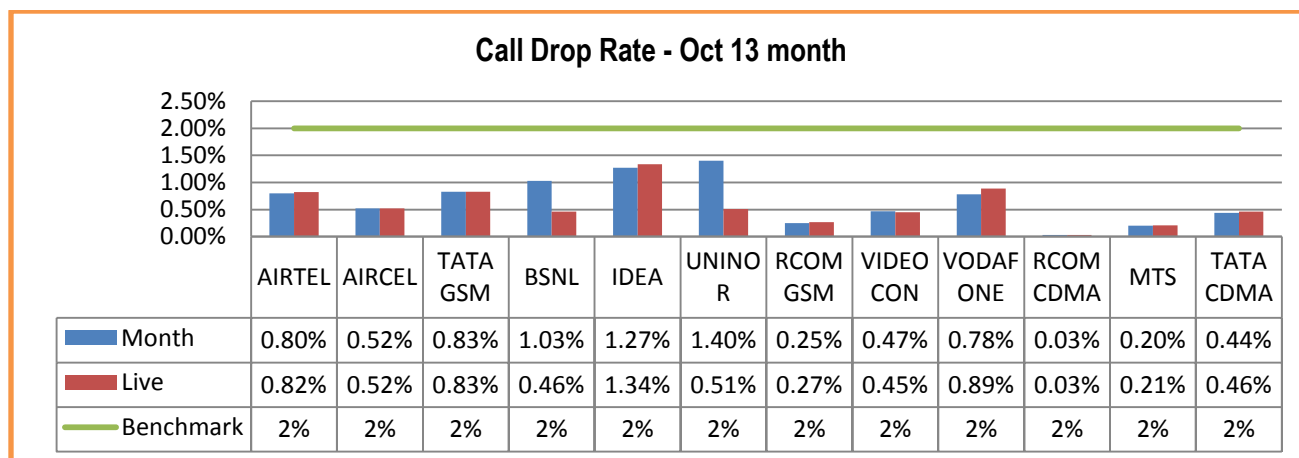
5. TCH CONGESTION:



All operators are meeting the benchmarks.



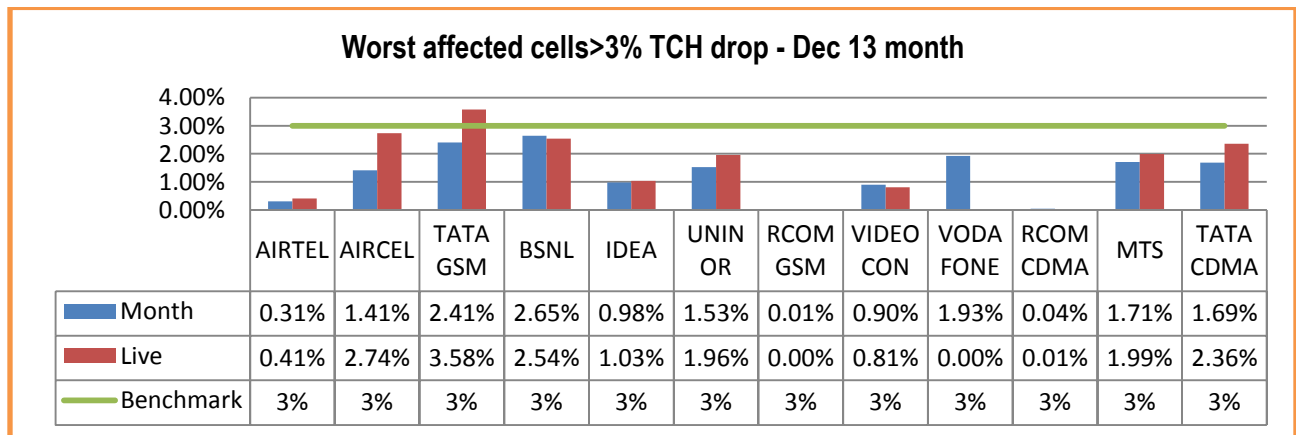
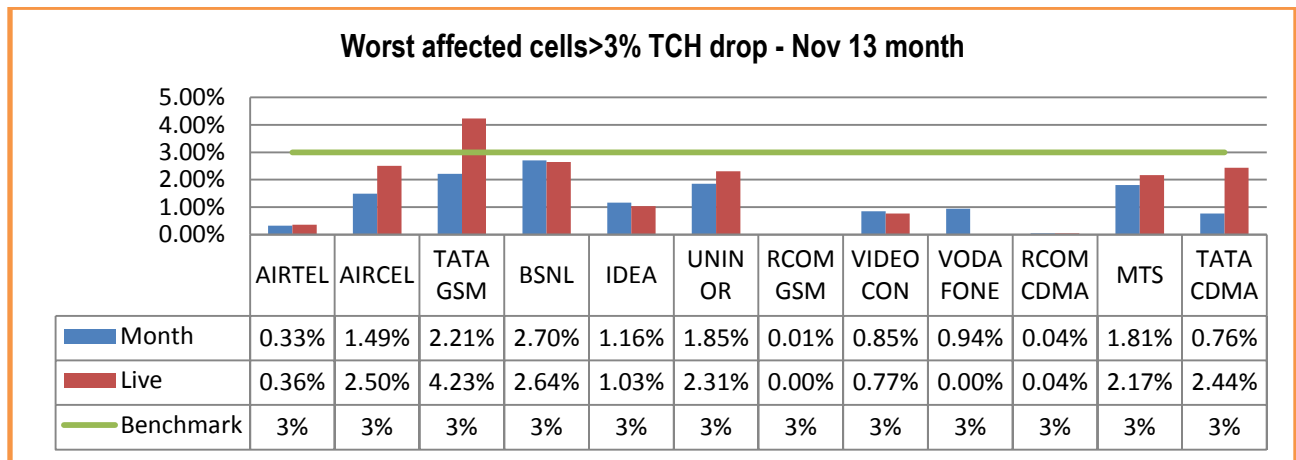
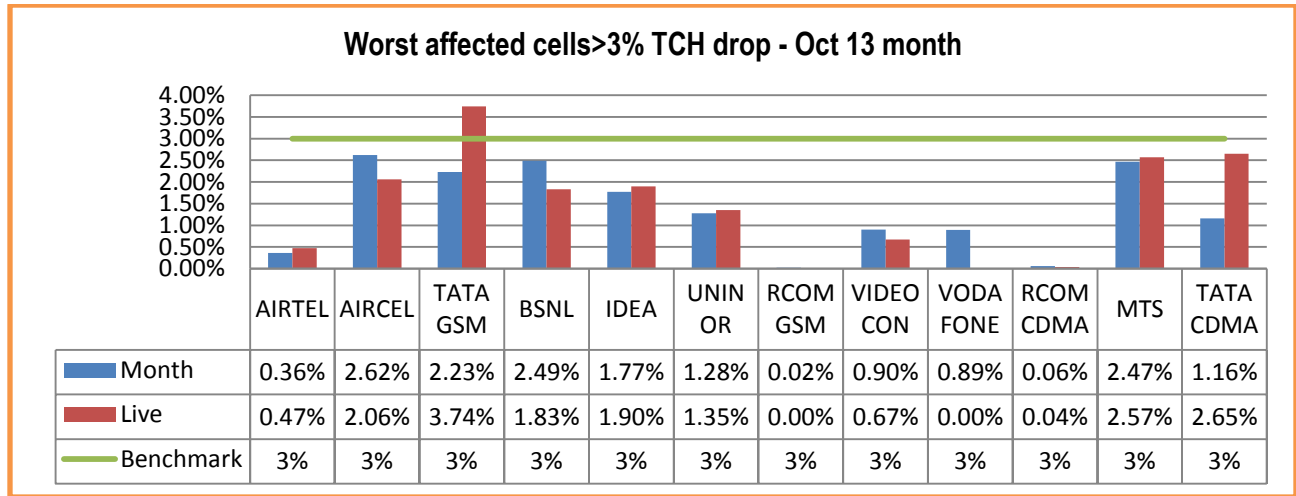
6. CALL DROP RATE:



All operators are meeting the benchmarks.



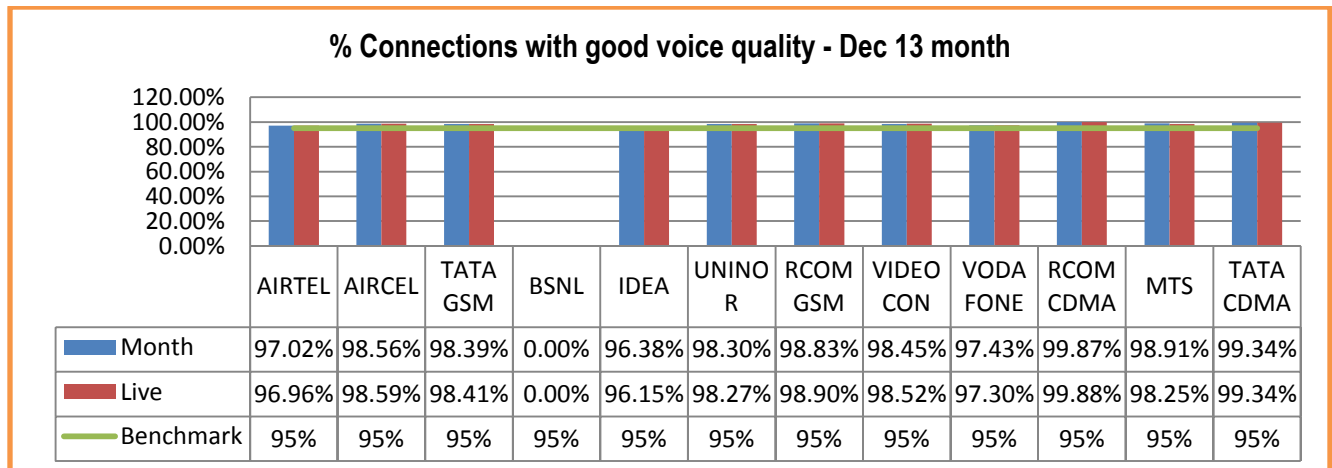
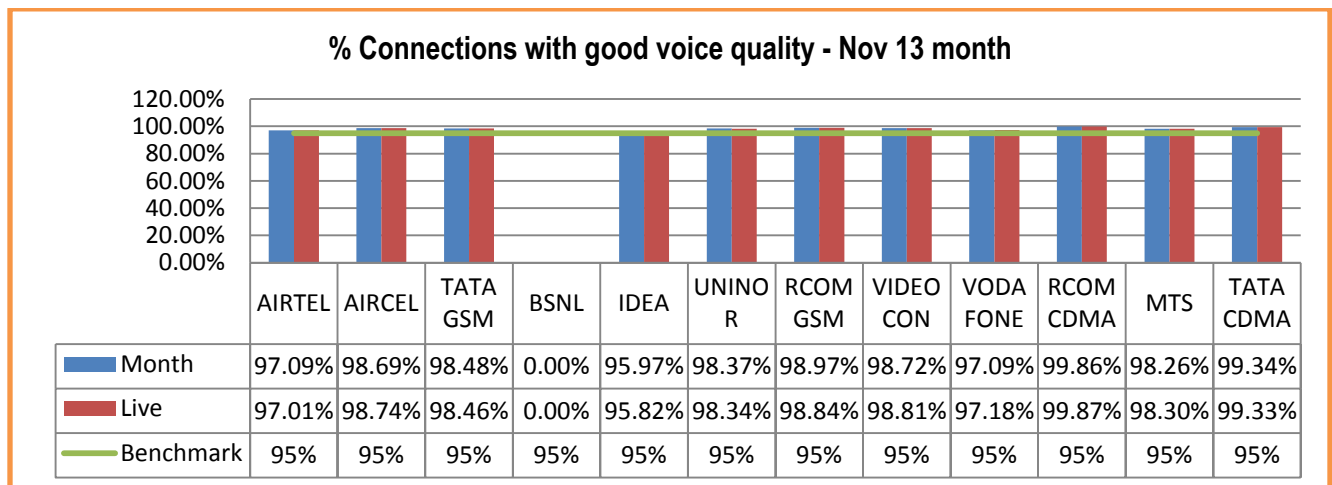
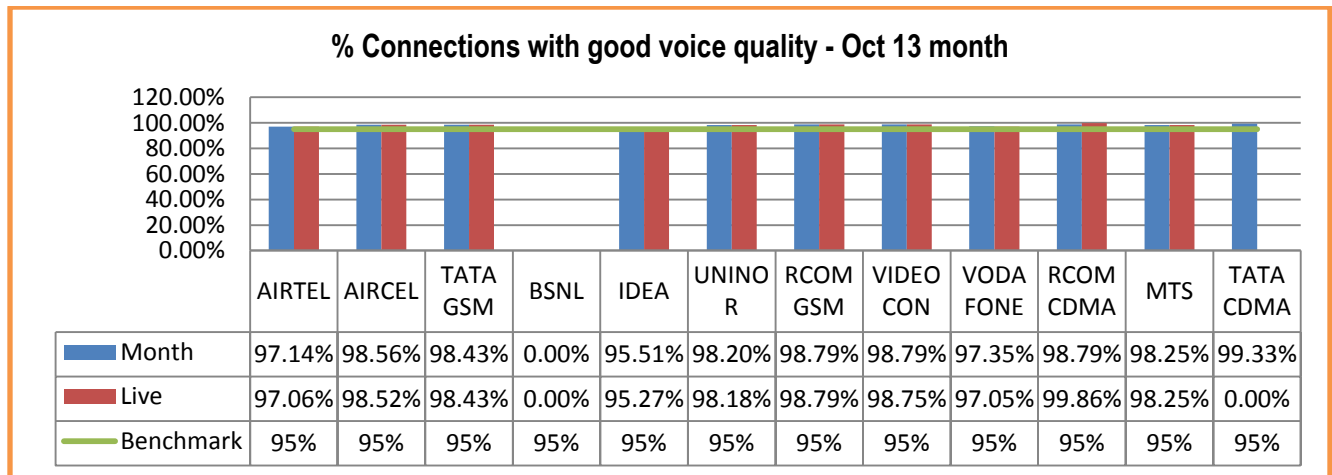
7. WORST AFFECTED CELLS>3% TCH DROP:



Tata (GSM) has not met the benchmark during 3 days live measurement in all three months.



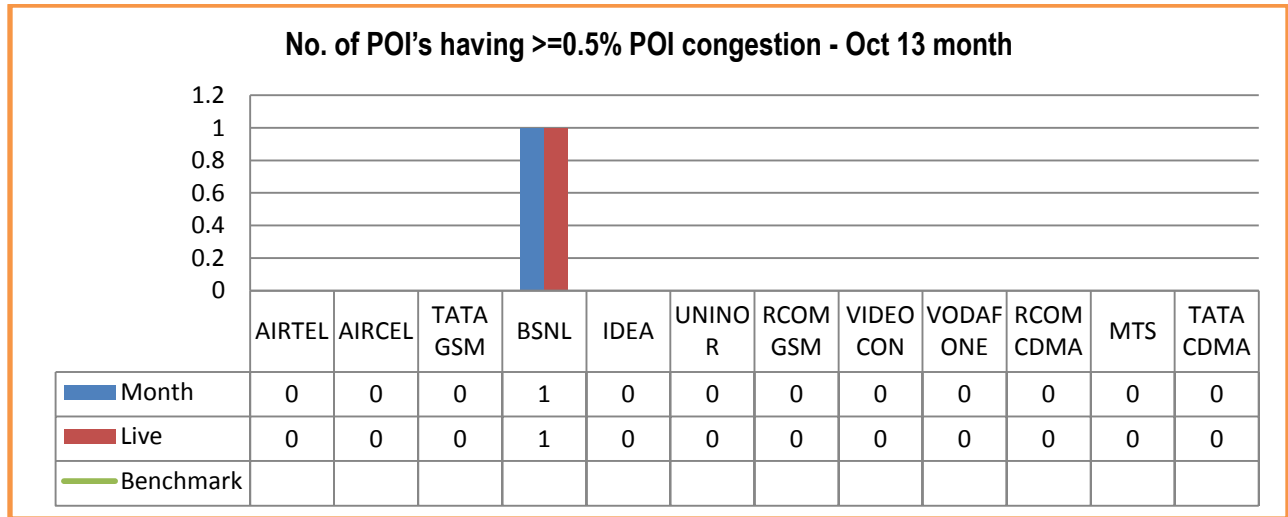
8. PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks. BSNL has not provided the data for Voice Quality.



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



BSNL was having congestion on one POI only with Unitech during month of October 2013





**9. PMR VERIFICATION SHEET:**

**a) NETWORK RELATED PARAMETER:**

Gujarat Circle		BTS Accumulated Downtime	Worst affected BTSs due to downtime	CSSR (Call Setup Success Rate)	SDCCH/PAGING Channel congestion	TCH congestion	CDR (Call Drop Rate)	Worst affected cells>3% TCH drop (Call drop) rate	Connections with good voice quality	No. of POI's having >=0.5% POI congestion
<b>Benchmark</b>		≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%	≤ 0.5%
AIRTEL	Reported	0.08	0.24	99.70	0.04	0.25	0.75	0.33	97.08	0.0
	Verified	0.08%	0.24%	99.70%	0.04%	0.25%	0.75%	0.33%	97.08%	0
AIRCEL	Reported	0.02	0.04	99.49	0.02	0.02	0.48	1.84	98.60	0
	Verified	0.02%	0.04%	99.49%	0.02%	0.02%	0.48%	1.84%	98.60%	0
TATA GSM	Reported	0.00	0.00	98.19	0.02	0.02	0.82	2.28	98.43	0
	Verified	0.00%	0.00%	98.19%	0.02%	0.02%	0.82%	2.28%	98.43%	0
BSNL	Reported	1.33	1.83	99.00	0.10	1.03	1.50	2.70	100.00	0
	Verified	1.59%	1.27%	97.36%	0.03%	0.56%	1.01%	2.61%	NP	0
IDEA	Reported	0.03	0.00	99.35	0.24	0.26	1.19	1.30	95.89	0
	Verified	0.03%	0.00%	99.35%	0.25%	0.26%	1.19%	1.30%	95.95%	0
UNINOR	Reported	0.09	0.28	97.78	0.12	0.38	0.89	1.56	98.29	0
	Verified	0.09%	0.28%	97.79%	0.12%	0.37%	0.90%	1.55%	98.29%	0
RCOM GSM	Reported	0.14	0.23	99.63	0.01	0.05	0.20	0.01	98.83	0
	Verified	0.14%	0.00%	99.63%	0.01%	0.06%	0.20%	0.01%	98.86%	0
VIDEOCON	Reported	0.05	0.07	99.08	0.03	0.13	0.46	0.87	98.65	0
	Verified	0.05%	0.07%	99.08%	0.03%	0.12%	0.46%	0.88%	98.65%	0
VODAFONE	Reported	0.01	0.00	99.77	0.10	0.23	0.80	0.83	97.25	0
	Verified	0.01%	0.00%	99.75%	0.09%	0.24%	0.78%	1.25%	97.29%	0
RCOM CDMA	Reported	0.15	0.22	99.29	0.00	0.00	0.02	0.04	99.87	0
	Verified	0.14%	0.00%	99.29%	0.00%	0.00%	0.02%	0.05%	99.51%	0
MTS	Reported	0.02	0.00	99.73	0.00	0.01	0.17	1.99	98.47	0
	Verified	0.02%	0.00%	99.66%	0.00%	0.08%	0.16%	2.00%	98.47%	0
TATA CDMA	Reported	0.00	0.00	98.59	0.00	0.43	0.47	1.20	99.34	0
	Verified	0.08%	0.00%	98.59%	0.00%	0.42%	0.47%	1.20%	99.34%	0

- I. The above data is averaged for three months of the quarter ending December-2013.
- II. The PMR data provided by the service providers is matching with verified (audited) data. Hence there is no discrepancy between reported and verified data.

# AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER-2013-GUJARAT CIRCLE



## b) CUSTOMER SERVICE DELIVERY (CSD) RELATED PARAMETER:

Gujarat Circle		% of billing complaints during the quarter	% of Pre-paid Charging Complaints	% of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	% of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	Accessibility of call centre/Customer Care	% call answered by operators(voice to voice) within 60 sec.	% of Termination/ Closure of service within 7 days	Time taken for refunds of deposits after closures.
<b>Benchmark</b>		<b>&lt;= 0.1%</b>	<b>&lt;= 0.1%</b>	<b>100 % within 4 week</b>	<b>&lt;=1 week</b>	<b>&gt;=95%</b>	<b>&gt;=90%</b>	<b>100% within &lt;=7days</b>	<b>100% within 60 days</b>
AIRCEL	Reported	0.00	0.00	100.00	100.00	93.61	96.38	100.00	100.00
	Verified	0.00	0.00	100.00	100.00	100%	97%	100.00	100.00
AIRTEL	Reported	0.01	0.01	100.00	100.00	100.00	93.00	100.00	100.00
	Verified	0.01%	0.01%	100%	100%	100%	93%	100%	100%
BSNL	Reported	0.03	0.00	100.00	100.00	98.00	92.00	100.00	100.00
	Verified	0.05%	0.06%	100%	100%	96.36	69%	NP	100%
IDEA	Reported	0.08	0.03	100.00	100.00	99.64	99.24	100.00	100.00
	Verified	0.08%	0.03%	100%	100%	100%	99%	100%	100%
UNINOR	Reported	NA	0.04	100.00	NA	96.25	93.57	NA	NA
	Verified	NA	0.01%	100%	100%	95.72%	94%	NA	NA
RCOM (GSM)	Reported	0.09	0.10	100.00	100.00	98.85	69.69	100.00	100.00
	Verified	0.10%	0.09%	100%	100%	98.85%	70%	100%	100%
TATA (GSM)	Reported	0.00	0.00	100.00	100.00	99.28	85.19	100.00	100.00
	Verified	0.00	0.00	100.00	100.00	99.80%	92%	100%	100%
TATA (CDMA)	Reported	0.00	0.00	100.00	100.00	96.93	92.92	100.00	100.00
	Verified	0.00	0.00	100.00	100.00	99.80%	92%	100%	100%
VIDEOCON	Reported	NA	0.02	100.00	100.00	98.65	93.91	NA	NA
	Verified	NA	0.01%	100%	100%	100%	93.67%	NA	NA
VODAFONE	Reported	0.10	0.01	100.00	100.00	100.00	96.19	100.00	43.00
	Verified	0.12%	0.01%	100%	100%	100.00%	94.00%	100%	68%
MTS	Reported	0.07	0.01	100.00	100.00	100.00	97.00	NA	NA
	Verified	0.04%	0.01%	100%	100%	100%	97%	NA	NA
RCOM (CDMA)	Reported	0.10	0.10	100.00	100.00	98.41	93.57	100.00	100.00
	Verified	0.09%	0.10%	100%	100%	98%	94%	100%	100%

NA: Not Applicable and NP: Data not provided

- i. The above data is averaged for three months of the quarter ending December-2013.
- ii. The PMR data provided by the service providers is largely matching with verified (audited) data.
- iii. BSNL and RCOM GSM have not met the benchmark for the parameter “% call answered by operators (voice to voice) within 60 sec.”
- iv. Vodafone has not met the benchmark for the parameter “% of billing complaints during the quarter” and “Time taken for refunds of deposits after closures”.