

**Audit & Assessment of Quality of Service  
Of  
Cellular Mobile Telephone Service  
For  
Telecom Regulatory Authority of India  
West Zone – Gujarat Service Area  
(July 2014 – September 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 **Gujarat circle** against the QoS bench marks laid down by TRAI in the respective regulations.

## Index of Contents

1. BACKGROUND .....	6
2. OBJECTIVES AND METHODOLOGY .....	9
3. SAMPLE SIZE .....	11
3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS .....	11
3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES .....	12
3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS .....	12
4. EXECUTIVE SUMMARY .....	14
5. PMR AUDIT REPORTS:.....	17
5.1 MONTHLY PMR: .....	17
5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:.....	17
5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS: .....	18
5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY-14 MONTH.....	19
5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST 14 MONTH.....	20
5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER 14 MONTH .....	21
5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- SEPTEMBER 14 (JULY TO SEPTEMBER MONTHS AUDITED DATA) .....	22
5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:.....	23
5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):.....	26
5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – JULY 14 MONTH:.....	26
5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – AUGUST 14 MONTH:.....	27
5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – SEPTEMBER-14 MONTH:.....	28
5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JULY TO SEPTEMBER 2014).....	29
5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:.....	29
5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:.....	30
5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS: .....	40
5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY to SEPTEMBER 2014 MONTHS AUDITED DATA):.....	40
5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES: .....	43
KEY FINDINGS: CUSTOMER SERVICE DELIVERY PARAMETERS .....	44
6. LIVE CALLING ASSESSMENT: .....	46
6.1 INTER OPERATOR CALLS ASSESSMENT:.....	46
6.2 CUSTOMER CARE / HELPLINE ASSESSMENT: .....	47
6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:.....	48

6.4 LEVEL -1 CALLING ASSESSMENT: .....	49
7. OPERATOR ASSESTID DRIVE TEST.....	51
7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:.....	64
7.2 SSA WISE DRIVE TEST OBSERVATION:.....	66
7.3 KEY FINDINGS ON DRIVE TEST:.....	69
8. GRAPHICAL REPRESENTATION (CMTS): .....	71



## 1. BACKGROUND



## 1. BACKGROUND

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

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

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

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

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

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

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

## **2. OBJECTIVES AND METHODOLOGY**





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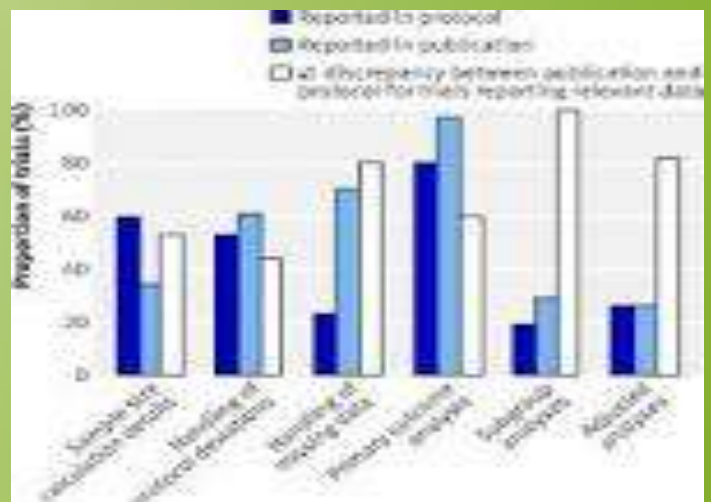
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for UP (E), UP (W) and MP&CG circles during the quarter July – September 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 Gujarat circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
		July-14	August-14	September-14	
<b>GSM Operators</b>					
1	AIRCEL	8th to 10th July'14	11th to 13th Aug'14	10th to 12th Sept'14	Aircel limited, 204 , 2nd floor, c block, Ganesh meridian, opp. Amiraj farm, near new gujarat high court, s.g highway, Ahmedabad-380 060
2	AIRTEL	10th to 12th July'14	13th to 15th Aug'14	8th to 10th Sept'14	Bharti Airtel Limited, 2nd Floor, Zodiac Square, Opposite Gurudwara, S.G Highway, Ahmedabad-380054
3	BSNL	6th to 8th July'14	7th to 9th Aug'14	9th to 11th Sept'14	BSNL, Vastrapur Telephone Exchange, Bima Nagar, Vastrapur, Ahmedabad.
4	VIDEOCON	12th to 14th July'14	11th to 13th Aug'14	22nd to 24th Sept'14	Videcon Telecommunications Ltd, 4th floor, Campus Corner 2, Opp AUDA Garden, Prahladnagar Ahmedabad- 380 015, Gujarat
5	TATA GSM	21st to 23rd July'14	19th to 21st Aug'14	10th to 12th Sept'14	Tata Teleservices Ltd, 2nd Floor- Citygold Building, Near Shyamal Cross Road, 132 Feet Ring Road, Ahmedabad
6	IDEA	9th to 11th July'14	12th to 14th Aug'14	22nd to 24th Sept'14	Idea Cellular Ltd, Venus Atlantis, 2nd Floor, 100ft road, Prahlad Nagar, Ahmedabad-380015
7	RCOM GSM	21st to 23rd July'14	26th to 28th Aug'14	9th to 11th Sept'14	Reliance Communications Limited, 103/106, Gate No: 6, Near Muthiyagaam Bus Stand, Naroda GIDC, Naroda, Ahmedabad- 382330
8	VODAFONE	19th to 21st July'14	18th to 20th Aug'14	24th to 26th Sept'14	House A, Vodafone West Limited, Vodafone House Corporate Road, Prahladnagar , Off S. G. Highway, Ahmedabad -380051 Gujarat, India
9	UNINOR	18 <sup>th</sup> , 21 <sup>st</sup> & 22 <sup>nd</sup> July'14	19th to 21st Aug'14	17th to 19th Sept'14	Telewings Communications Services Pvt Ltd. (Uninor), Welldone Technology Park Sec-48 Sohana Road Gurgaon
<b>CDMA Operators</b>					
10	MTS	14th to 16th July'14	6th to 8th Aug	13th to 15th Sept'14	Sistema Shyam Teleservices Limited, C Block, Office No-2, 3rd Floor, 'The Acropolis Mall', Thaltej Cross Road, Ahmedabad- 380054
11	RCOM CDMA	21st to 23rd July'14	26th to 28th Aug'14	9th to 11th Sept'14	Reliance Communications Limited, 103/106, Gate No: 6, Near Muthiyagaam Bus Stand, Naroda GIDC, Naroda, Ahmedabad- 382330
12	TATA CDMA	21st to 23rd July'14	19th to 21st Aug'14	10th to 12th Sept'14	Tata Teleservices Ltd, 2nd Floor- Citygold Building, Near Shyamal Cross Road, 132 Feet Ring Road, Ahmedabad

- For all the above operators, audit was conducted in all the three months of the Quarter ended Sept 2014.
- The data generated by monthly PMR and 3-days live measurements audit for the period July 2014 to September 2014 has been successfully uploaded to the server located at TRAI premises.

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

- The QoS audit for basic (wire line) service was to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. As per the clause 17.3 of the tender document, the QoS audit of Basis Telephone Service (Wireline) in a service area / circle is to be done only once in a year. **Since it has already been done during the QE June 2014, hence QoS audit of Wireline service in Gujarat circle is not required to be done during QE September-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. As per the clause 17.3 of the tender document, the QoS audit of Broadband service in a service area / circle is to be done only once in a year. **Since it has already been done during the QE June 2014, hence QoS audit of broadband service in Gujarat circle is not required to be done during QE September-14.**

## **4. EXECUTIVE SUMMARY**



#### 4. EXECUTIVE SUMMARY

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

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

##### Cellular Mobile Telephone Service:

(i) From analysis of monthly audit and 3 days live measurements results, it was concluded that performance of the operators in the Gujarat service area is fairly satisfactory for **Network parameters** as all operators (except Aircel, Tata-GSM/Tata (CDMA)) were found to have met the benchmarks of all parameters. **Aircel, Tata (GSM) / Tata (CDMA)** were having non-compliance for parameter ‘ **Worst affected Cells > 3% TCH drops**’ in all the three months of the quarter with their average performance of **3.26% , 6.14% and 6.36%** respectively.

In case of 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 **Aircel, Tata (GSM) and Tata (CDMA)** in all the three months of the quarter. The quarterly average performance of **Aircel, Tata (GSM) and Tata (CDMA)** for this parameter was **3.12%, 6.37% and 6.36 %** respectively

(ii) 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, **RCOM (GSM)** could not meet the benchmark of Metering and Billing credibility for pre-paid with its performance level as **0.30%**.

The compliance with respect to the parameter ‘ **Calls answered by Operators (voice to voice) within 60 seconds**’ was not met by **RCOM (GSM), Tata(GSM) and RCOM (CDMA)** with their performance of **62.15% , 88.97% and 65.90%** respectively.

In case of the parameters '**Time taken for refund of deposit after closure**', the performance of **Tata (GSM)** was **99.87%** marginally below the benchmark of 100%.

(iii) The **Drive Tests** results suggest satisfactory working of the network of the service providers except BSNL having non-compliance with regard to Voice Quality in Gandhinagar SSA.

*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 and Calls answered by operator (voice to voice)** need further improvement for those operators who could not meet the benchmarks of these parameters. In case of **Customer Service Quality Parameters**, the operators lagging behind the benchmark of parameter **Billing Complaint - Prepaid and Calls answered by operators (Voice to Voice)** need improvements enough to meet the benchmarks.*

## **5. PMR AUDIT REPORT**





## 5. PMR AUDIT REPORTS:

### 5.1 MONTHLY PMR:

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

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
<b>GSM Operators</b>			
1	AIRTEL	Sept-14	20:00 - 21:00
2	AIRCEL	Sept-14	20:00 - 21:00
3	TATA GSM	Sept-14	21:00 - 22:00
4	BSNL	Sept-14	21:00 - 22:00
5	IDEA	Sept-14	20:00 - 21:00
6	UNINOR	Sept-14	21:00 - 22:00
7	RCOM GSM	Sept-14	20:00 - 21:00
8	VIDEOCON	Sept-14	20:00 - 21:00
9	VODAFONE	Sept-14	20:00 - 21:00
<b>CDMA Operators</b>			
10	RCOM CDMA	Sept-14	19:00 - 20:00
11	MTS	Sept-14	11:00 - 12:00
12	TATA CDMA	Sept-14	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.

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

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRTEL	17	109	7369	NSN	NSN
2	AIRCEL	1	6	823	ZTE	ZTE
3	TATA GSM	3	14	2160	Huawei	Huawei
4	BSNL	9	90	4289	Alcatel-Lucent	Alcatel-Lucent
5	IDEA	21	44	6339	Ericsson	Ericsson
6	UNINOR	7	19	3726	NSN	NSN+Huawei
7	RCOM GSM	5	18	2531	Huawei	Huawei
8	VIDEOCON	2	11	1907	Huawei	Huawei
9	VODAFONE	20	147	7778	NSN	NSN
<b>CDMA Operators</b>						
10	RCOM CDMA	7	4	1104	Lucent, ZTE, Ericsson, Huawei	Lucent, Huawei
11	MTS	1	3	566	ZTE	ZTE
12	TATA CDMA	7	6	581	Ericsson	Motorola, Huawei

**5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY-14 MONTH**

CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE- JULY 14 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%	July-14	0.12%	0.04%	0.01%	1.93%	0.08%	0.35%	0.36%	0.12%	0.03%	0.37%	0.05%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	July-14	0.15%	0.00%	0.00%	1.98%	0.05%	1.81%	0.94%	0.26%	0.00%	1.17%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	99.70%	99.26%	98.14%	96.42%	99.21%	97.29%	99.61%	97.95%	99.62%	98.84%	99.70%	98.60%
	b) SDCCH/PAGING Channel congestion	<=1%	July-14	0.04%	0.02%	0.05%	0.09%	0.29%	0.43%	0.02%	0.20%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.44%	0.72%	0.10%	0.76%	0.52%	1.56%	0.07%	0.52%	0.38%	0.01%	0.05%	0.37%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	July-14	0.68%	0.59%	0.97%	0.94%	1.10%	0.48%	0.35%	0.67%	0.80%	0.08%	0.25%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-14	1.14%	<b>4.00%</b>	<b>6.62%</b>	2.87%	0.61%	2.37%	0.02%	1.46%	1.85%	0.09%	2.73%	<b>6.26%</b>
	c) Connections with good voice quality	>=95%	July-14	97.18%	98.05%	98.06%	NP	96.35%	97.89%	98.77%	97.63%	97.43%	99.85%	99.20%	99.34%
4	No. of POI's having >=0.5% POI congestion		July-14	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

Note: BSNL has not provided data for date 9, 28 & 29 July 2014 due to some fault in their OMCR.

**5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST 14 MONTH**

**CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE- AUG 14 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%	Aug-14	0.05%	0.05%	0.01%	1.37%	0.04%	0.19%	0.17%	0.08%	0.02%	0.15%	0.04%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Aug-14	0.10%	0.00%	0.00%	1.77%	0.10%	0.50%	0.24%	0.42%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	99.66%	99.24%	98.10%	96.55%	99.17%	97.09%	99.58%	98.35%	99.67%	98.79%	99.72%	98.55%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-14	0.05%	0.13%	0.03%	0.06%	0.27%	0.41%	0.01%	0.22%	0.12%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	0.51%	0.28%	0.08%	0.84%	0.51%	1.48%	0.07%	0.34%	0.33%	0.01%	0.01%	0.36%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Aug-14	0.76%	0.44%	0.93%	0.97%	1.27%	0.50%	0.37%	0.65%	0.90%	0.07%	0.33%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-14	1.33%	<b>3.05%</b>	<b>6.36%</b>	2.86%	0.71%	2.71%	0.02%	1.42%	2.36%	0.08%	2.97%	<b>6.14%</b>
	c) Connections with good voice quality	>=95%	Aug-14	96.97%	98.03%	98.05%	NP	95.95%	97.85%	98.73%	97.66%	97.25%	99.84%	99.20%	99.34%
4	No. of POI's having >=0.5% POI congestion		Aug-14	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided, BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

**5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER 14 MONTH**

CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE - SEP 14 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%	Sep-14	0.10%	0.04%	0.00%	1.20%	0.11%	0.18%	0.22%	0.09%	0.03%	0.20%	0.03%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Sep-14	0.27%	0.00%	0.00%	1.59%	0.54%	0.64%	0.00%	0.16%	0.00%	0.18%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	99.64%	99.14%	98.12%	95.75%	98.84%	97.49%	99.57%	98.60%	99.55%	99.14%	99.69%	96.59%
	b) SDCCH/PAGING Channel congestion	<=1%	Sep-14	0.05%	0.13%	0.03%	0.06%	0.68%	0.49%	0.01%	0.26%	0.22%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	0.60%	0.25%	0.09%	0.94%	0.77%	1.26%	0.07%	0.29%	0.45%	0.00%	0.05%	<b>2.40%</b>
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Sep-14	0.79%	0.45%	0.87%	0.97%	1.27%	0.52%	0.36%	0.63%	0.98%	0.05%	0.19%	0.60%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Sep-14	1.42%	2.73%	<b>5.44%</b>	2.83%	0.94%	2.65%	0.03%	1.40%	2.83%	0.14%	2.36%	<b>6.67%</b>
	c) Connections with good voice quality	>=95%	Sep-14	96.94%	97.92%	98.07%	NP	95.63%	97.93%	98.72%	97.59%	97.14%	99.85%	99.20%	99.35%
4	No. of POI's having >=0.5% POI congestion		Sep-14	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not Support this parameter.

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

QUARTERLY QOS PERFORMANCE (AVERAGE OF THREE MONTHS) OF GUJARAT CIRCLE															
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%	Quarterly	0.09%	0.04%	0.01%	1.50%	0.08%	0.24%	0.25%	0.10%	0.03%	0.24%	0.04%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.17%	0.00%	0.00%	1.78%	0.23%	0.98%	0.39%	0.28%	0.00%	0.45%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.67%	99.21%	98.12%	96.24%	99.07%	97.29%	99.59%	98.30%	99.61%	98.92%	99.70%	97.91%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.05%	0.09%	0.04%	0.07%	0.41%	0.44%	0.01%	0.23%	0.15%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.52%	0.42%	0.09%	0.85%	0.60%	1.43%	0.07%	0.38%	0.39%	0.01%	0.04%	1.04%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.74%	0.49%	0.92%	0.96%	1.21%	0.50%	0.36%	0.65%	0.89%	0.07%	0.26%	0.57%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	1.30%	<b>3.26%</b>	<b>6.14%</b>	2.85%	0.75%	2.58%	0.02%	1.43%	2.35%	0.10%	2.69%	<b>6.36%</b>
	c) Connections with good voice quality	>=95%	Quarterly	97.03%	98.00%	98.06%	NP	95.98%	97.89%	98.74%	97.63%	97.27%	99.85%	99.20%	99.34%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not Support this parameter.

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

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

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.

▪ **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 0.07 %) 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 **Aircel, Tata (GSM) and Tata (CDMA)** were non-compliants in the three months of the quarter with their average performance of **3.26%, 6.14% and 6.36%** respectively.

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.



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



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

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

CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE- JULY 14 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	0.07%	0.02%	0.00%	1.78%	0.04%	0.60%	0.26%	0.07%	0.05%	0.22%	0.03%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.01%	0.00%	0.00%	0.05%	0.00%	0.49%	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	99.75%	99.35%	98.15%	95.68%	99.04%	97.26%	99.62%	97.70%	99.61%	99.05%	99.78%	98.81%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.02%	0.02%	0.05%	0.05%	0.22%	0.19%	0.02%	0.18%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.27%	0.60%	0.10%	0.75%	0.72%	1.68%	0.07%	0.69%	0.39%	0.01%	0.00%	0.24%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.60%	0.55%	0.98%	0.90%	0.96%	0.49%	0.35%	0.65%	0.86%	0.08%	0.15%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.86%	3.56%	6.76%	2.79%	0.38%	2.52%	0.03%	1.23%	2.04%	0.15%	2.47%	5.89%
	c) Connections with good voice quality	>=95%	Live data	97.38%	98.11%	98.02%	NP	96.59%	97.84%	98.72%	97.57%	97.34%	99.85%	99.20%	99.34%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not Support this parameter.

**5.2.2 LIVE MEASUREMENT DATA (3-DAYS) - AUGUST 14 MONTH:**

CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE- AUG 14 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	0.03%	0.00%	0.00%	1.57%	0.04%	0.19%	0.16%	0.09%	0.03%	0.09%	0.05%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.09%	0.00%	0.11%	0.00%	0.05%	0.01%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.70%	99.28%	98.11%	97.21%	99.21%	96.69%	99.60%	98.57%	99.71%	99.03%	99.69%	98.07%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.03%	0.01%	0.01%	0.07%	0.31%	0.24%	0.01%	0.22%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.41%	0.05%	0.05%	0.86%	0.50%	1.31%	0.05%	0.22%	0.29%	0.01%	0.03%	0.68%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.70%	0.40%	0.93%	0.59%	1.17%	0.51%	0.35%	0.62%	0.94%	0.05%	0.41%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	1.12%	2.80%	<b>6.25%</b>	2.85%	0.60%	2.78%	0.01%	1.36%	2.88%	0.09%	2.95%	<b>6.18%</b>
	c) Connections with good voice quality	>=95%	Live data	97.05%	98.10%	98.10%	NP	96.10%	97.83%	98.73%	97.72%	97.09%	99.85%	99.21%	99.35%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

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

CELLULAR MOBILE TELEPHONE SERVICES GUJARAT CIRCLE- SEP -14 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	0.30%	0.09%	0.00%	1.47%	0.05%	0.15%	0.25%	0.06%	0.01%	0.22%	0.02%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.03%	0.00%	0.00%	0.14%	0.02%	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	99.71%	99.10%	98.14%	95.67%	98.92%	97.35%	99.58%	98.76%	99.64%	99.18%	99.76%	98.88%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.02%	0.01%	0.01%	0.05%	0.36%	0.41%	0.01%	0.20%	0.21%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.34%	0.00%	0.07%	1.06%	0.71%	1.39%	0.06%	0.19%	0.76%	0.00%	0.00%	0.13%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.86%	0.51%	0.93%	0.98%	1.23%	0.55%	0.36%	0.61%	0.94%	0.05%	0.20%	0.60%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	1.77%	3.00%	6.09%	2.91%	0.83%	2.87%	0.03%	1.45%	2.83%	0.17%	2.69%	7.02%
	c) Connections with good voice quality	>=95%	Live data	96.92%	97.91%	98.00%	NP	95.75%	97.88%	98.68%	97.60%	97.14%	99.85%	99.18%	99.34%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

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

QUARTERLY QOS PERFORMANCE BASED ON 3-DAYS LIVE MEASUREMENT (AVERAGE OF THREE MONTHS) – GUJARAT CIRCLE															
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%	Quarterly	0.13%	0.04%	0.00%	1.61%	0.04%	0.31%	0.22%	0.07%	0.03%	0.18%	0.03%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.01%	0.00%	0.00%	0.09%	0.01%	0.20%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.72%	99.24%	98.13%	96.19%	99.06%	97.10%	99.60%	98.34%	99.65%	99.09%	99.74%	98.59%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.02%	0.01%	0.02%	0.06%	0.30%	0.28%	0.01%	0.20%	0.13%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.34%	0.22%	0.07%	0.89%	0.64%	1.46%	0.06%	0.37%	0.48%	0.01%	0.01%	0.35%
<b>Connection maintenance (Retainability)</b>															
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.72%	0.49%	0.95%	0.82%	1.12%	0.52%	0.35%	0.63%	0.91%	0.06%	0.25%	0.55%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	1.25%	<b>3.12%</b>	<b>6.37%</b>	2.85%	0.60%	2.72%	0.02%	1.35%	2.58%	0.14%	2.70%	<b>6.36%</b>
	c) Connections with good voice quality	>=95%	Quarterly	97.12%	98.04%	98.04%	NP	96.15%	97.85%	98.71%	97.63%	97.19%	99.85%	99.20%	99.34%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0	0	0	0

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

**5.2.5 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 **Aircel, Tata (GSM) and Tata (CDMA)** in all the three months of the quarter. The quarterly average performance of **Aircel, Tata (GSM) and Tata (CDMA)** for this parameter was **3.12%, 6.37% and 6.36 %** respectively.

**5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:**

**TABLE: 1**

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle- July 14 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		July-14	7294	825	2161	4289	6278	3484	2541	1892	7624	1108	561	580
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		July-14	6674	259	108	61742	3740	9145	6721	1690	1680	3057	196	24
	c) BTS Accumulated Downtime	<=2%	July-14	0.12%	0.04%	0.01%	1.93%	0.08%	0.35%	0.36%	0.12%	0.03%	0.37%	0.05%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-14	11	0	0	85	3	63	24	5	0	13	0	0
e) Worst affected BTSs due to downtime	<=2%	July-14	0.15%	0.00%	0.00%	1.98%	0.05%	1.81%	0.94%	0.26%	0.00%	1.17%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	July-14	99.70%	99.26%	98.14%	96.42%	99.21%	97.29%	99.61%	97.95%	99.62%	98.84%	99.70%	98.60%
	b) SDCCH/PAGING Congestion	<=1%	July-14	0.04%	0.02%	0.05%	0.09%	0.29%	0.43%	0.02%	0.20%	0.11%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	July-14	0.44%	0.72%	0.10%	0.76%	0.52%	1.56%	0.07%	0.52%	0.38%	0.01%	0.05%	0.37%	
3	<b>Connection Maintenance (Retainability)</b>														
	a) Call Drop Rate (CDR)	<=2%	July-14	0.68%	0.59%	0.97%	0.94%	1.10%	0.48%	0.35%	0.67%	0.80%	0.08%	0.25%	0.54%
b) Worst affected cells>3% TCH drop	<=3%	July-14	1.14%	<b>4.00%</b>	<b>6.62%</b>	2.87%	0.61%	2.37%	0.02%	1.46%	1.85%	0.09%	2.73%	<b>6.26%</b>	

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle- July 14 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		
	c) % of connections with good voice quality	>=95%	July-14	97.18%	98.05%	98.06%	NP	96.35%	97.89%	98.77%	97.63%	97.43%	99.85%	99.20%	99.34%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		July-14	257	99	430	366	115	258	2	83	428	3	47	99
	e) Total no. of cells (Sector) in the licensed service area		July-14	22554	2475	6490	12774	18805	10870	7485	5712	23078	3323	1722	1579
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>														
	No. of POI's having >=0.5% POI congestion		July-14	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-14	0	0	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>														
	a) Equipped Capacity of Network in Erlang		July-14	229700	32055	113808	317000	266570	133147	144000	84249	414942	144000	21000	96596
	b) Total traffic in TCBH in erlang (Avg.)		July-14	172125	8285	34883	85848	213850	160797	41740	26062	371398	104211	2435	15176
	c) Total no. of customers served (as per VLR) on last day of the month		July-14	7102148	9516	1430826	2739835	10123487	4241126	1272625	960591	16497370	4777816	146521	286011

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

**TABLE: 2**

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Gujarat Circle- July-14 month															
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	7336	825	2161	4289	6264	3459	2541	1889	7600	1108	564	580
	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	369	15	6	5483	167	1501	477	93	270	178	13	5
	c) BTS Accumulated Downtime	<=2%	Live data	0.07%	0.02%	0.00%	1.78%	0.04%	0.60%	0.26%	0.07%	0.05%	0.22%	0.03%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	1	0	0	2	0	17	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.01%	0.00%	0.00%	0.05%	0.00%	0.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.75%	99.35%	98.15%	95.68%	99.04%	97.26%	99.62%	97.70%	99.61%	99.05%	99.78%	98.81%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.02%	0.05%	0.05%	0.22%	0.19%	0.02%	0.18%	0.10%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.27%	0.60%	0.10%	0.75%	0.72%	1.68%	0.07%	0.69%	0.39%	0.01%	0.00%	0.24%	
3	<b>Connection Maintenance (Retainability)</b>														
	a) Call Drop Rate (CDR)	<=2%	Live data	0.60%	0.55%	0.98%	0.90%	0.96%	0.49%	0.35%	0.65%	0.86%	0.08%	0.15%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.86%	<b>3.56%</b>	<b>6.76%</b>	2.79%	0.38%	2.52%	0.03%	1.23%	2.04%	0.15%	2.47%	<b>5.89%</b>
	c) % of connections with good voice quality	>=95%	Live data	97.38%	98.11%	98.02%	NP	96.59%	97.84%	98.72%	97.57%	97.34%	99.85%	99.20%	99.34%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	195	88	439	359	72	274	2	70	469	5	43	104
e) Total no. of cells (Sector) in the licensed service area		Live data	22581	2475	6490	12853	18814	10884	7480	5710	22999	3322	1725	1765	
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

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.



**TABLE: 3**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle - August 14 month</b>															
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		Aug-14	7341	823	2160	4289	6311	3630	2533	1899	7678	1105	563	580
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Aug-14	2939	287	81	43783	2064	5048	3294	1137	1377	1244	149	13
	c) BTS Accumulated Downtime	<=2%	Aug-14	0.05%	0.05%	0.01%	1.37%	0.04%	0.19%	0.17%	0.08%	0.02%	0.15%	0.04%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-14	7	0	0	76	6	18	6	8	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Aug-14	0.10%	0.00%	0.00%	1.77%	0.10%	0.50%	0.24%	0.42%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	99.66%	99.24%	98.10%	96.55%	99.17%	97.09%	99.58%	98.35%	99.67%	98.79%	99.72%	98.55%
	b) SDCCH/PAGING Congestion	<=1%	Aug-14	0.05%	0.13%	0.03%	0.06%	0.27%	0.41%	0.01%	0.22%	0.12%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Aug-14	0.51%	0.28%	0.08%	0.84%	0.51%	1.48%	0.07%	0.34%	0.33%	0.01%	0.01%	0.36%	
3	<b>Connection Maintenance (Retainability)</b>														
	a) Call Drop Rate (CDR)	<=2%	Aug-14	0.76%	0.44%	0.93%	0.97%	1.27%	0.50%	0.37%	0.65%	0.90%	0.07%	0.33%	0.58%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-14	1.33%	<b>3.05%</b>	<b>6.36%</b>	2.86%	0.71%	2.71%	0.02%	1.42%	2.36%	0.08%	2.97%	<b>6.14%</b>
	c) % of connections with good voice quality	>=95%	Aug-14	96.97%	98.03%	98.05%	NP	95.95%	97.85%	98.73%	97.66%	97.25%	99.84%	99.20%	99.34%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Aug-14	300	75	412	362	135	304	2	81	548	3	51	108
e) Total no. of cells (Sector) in the licensed service area		Aug-14	22599	2473	6487	12630	18915	11199	7465	5730	23257	3318	1732	1765	

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle - August 14 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		
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>														
	No. of POI's having >=0.5% POI congestion		Aug-14	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-14	0	0	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>														
	a) Equipped Capacity of Network in Erlang		Aug-14	226015	32015	113876	317000	267262	136254	144000	84787	418021	144000	21000	96596
	b) Total traffic in TCBH in erlang (Avg.)		Aug-14	166692	7905	33758	81791	207720	158353	107452	24779	353632	40136	2308	15176
	c) Total no. of customers served (as per VLR) on last day of the month		Aug-14	7116331	9652	1430423	2723521	10283557	4321401	4830963	988710	16670187	1238633	144187	270166

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not Support this parameter.

**TABLE: 4**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Gujarat Circle- August 14 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	7348	825	2160	4289	6284	3581	2533	1894	7624	1105	563	580
	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	163	3	0	4853	193	485	290	121	137	72	20	3
	c) BTS Accumulated Downtime	<=2%	Live data	0.03%	0.00%	0.00%	1.57%	0.04%	0.19%	0.16%	0.09%	0.03%	0.09%	0.05%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	0	4	0	4	0	1	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.09%	0.00%	0.11%	0.00%	0.05%	0.01%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.70%	99.28%	98.11%	97.21%	99.21%	96.69%	99.60%	98.57%	99.71%	99.03%	99.69%	98.07%
	b) SDCCCH/PAGING Congestion	<=1%	Live data	0.03%	0.01%	0.01%	0.07%	0.31%	0.24%	0.01%	0.22%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.41%	0.05%	0.05%	0.86%	0.50%	1.31%	0.05%	0.22%	0.29%	0.01%	0.03%	0.68%
<b>Connection Maintenance (Retainability)</b>															
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.70%	0.40%	0.93%	0.59%	1.17%	0.51%	0.35%	0.62%	0.94%	0.05%	0.41%	0.58%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	1.12%	2.80%	<b>6.25%</b>	2.85%	0.60%	2.78%	0.01%	1.36%	2.88%	0.09%	2.95%	<b>6.18%</b>
	c) % of connections with good voice quality	>=95%	Live data	97.05%	98.10%	98.10%	NP	96.10%	97.83%	98.73%	97.72%	97.09%	99.85%	99.21%	99.35%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	254	69	406	355	113	314	1	78	665	3	51	109
	e) Total no. of cells (Sector) in the licensed service area		Live data	22619	2475	6487	12456	18899	11285	7458	5726	23078	3315	1729	1765
<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

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

# AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

**TABLE: 5**

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle - September 14 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		Sep-14	7369	823	2159	4289	6339	3726	2531	1883	7778	1104	567	581
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Sep-14	5304	234	7	37098	4911	4915	3927	1253	1940	1561	130	121
	c) BTS Accumulated Downtime	<=2%	Sep-14	0.10%	0.04%	0.00%	1.20%	0.11%	0.18%	0.22%	0.09%	0.03%	0.20%	0.03%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-14	20	0	0	68	34	24	0	3	0	2	0	0
	e) Worst affected BTSs due to downtime	<=2%	Sep-14	0.27%	0.00%	0.00%	1.59%	0.54%	0.64%	0.00%	0.16%	0.00%	0.18%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>															
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	99.64%	99.14%	98.12%	95.75%	98.84%	97.49%	99.57%	98.60%	99.55%	99.14%	99.69%	96.59%
	b) SDCCH/PAGING Congestion	<=1%	Sep-14	0.05%	0.13%	0.03%	0.06%	0.68%	0.49%	0.01%	0.26%	0.22%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	0.60%	0.25%	0.09%	0.94%	0.77%	1.26%	0.07%	0.29%	0.45%	0.00%	0.05%	2.40%
<b>Connection Maintenance (Retainability)</b>															
3	a) Call Drop Rate (CDR)	<=2%	Sep-14	0.79%	0.45%	0.87%	0.97%	1.27%	0.52%	0.36%	0.63%	0.98%	0.05%	0.19%	0.60%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-14	1.42%	2.73%	5.44%	2.83%	0.94%	2.65%	0.03%	1.40%	2.83%	0.14%	2.36%	6.67%
	c) % of connections with good voice quality	>=95%	Sep-14	96.94%	97.92%	98.07%	NP	95.63%	97.93%	98.72%	97.59%	97.14%	99.85%	99.20%	99.35%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Sep-14	322	67.47	353	359.67	178.67	306	2.3	80	666.37	5	41	117.77
	e) Total no. of cells (Sector) in the licensed service area		Sep-14	22636	2469	6484	12698	18962	11535	7477	5754	23569	3311	1745	1766

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

### Detailed Network Data Assessment of Cellular Mobile Telephone Services- Gujarat Circle - September 14 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			
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>															
	No. of POI's having >=0.5% POI congestion		Sep-14	0	0	0	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-14	0	0	0	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>															
	a) Equipped Capacity of Network in Erlang		Sep-14	225264	31973	113876	317000	267006	139577	144000	85194	416948	144000	21000	96697	
	b) Total traffic in TCBH in erlang (Avg.)		Sep-14	171712	8396	33758	83997	215363	159658	116058	25812	361731	40581	2331	16441	
	c) Total no. of customers served (as per VLR) on last day of the month		Sep-14	7138988	9259	1430423	2716690	10395188	4397017	4844681	995117	16835078	1210185	144855	262687	

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not Support this parameter.

**TABLE: 6**

<b>Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Gujarat Circle- September 14 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	7321	823	2159	4289	6325	3666	2533	1905	7678	1103	568	580
	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	1560	55	0	4550	214	407	457	77	73	176	9	6
	c) BTS Accumulated Downtime	<=2%	Live data	0.30%	0.09%	0.00%	1.47%	0.05%	0.15%	0.25%	0.06%	0.01%	0.22%	0.02%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	2	0	0	6	1	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.03%	0.00%	0.00%	0.14%	0.02%	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	99.71%	99.10%	98.14%	95.67%	98.92%	97.35%	99.58%	98.76%	99.64%	99.18%	99.76%	98.88%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.01%	0.01%	0.05%	0.36%	0.41%	0.01%	0.20%	0.21%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.34%	0.00%	0.07%	1.06%	0.71%	1.39%	0.06%	0.19%	0.76%	0.00%	0.00%	0.13%
<b>Connection Maintenance (Retainability)</b>															
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.86%	0.51%	0.93%	0.98%	1.23%	0.55%	0.36%	0.61%	0.94%	0.05%	0.20%	0.60%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	1.77%	<b>3.00%</b>	<b>6.09%</b>	2.91%	0.83%	2.87%	0.03%	1.45%	2.83%	0.17%	2.69%	<b>7.02%</b>
	c) % of connections with good voice quality	>=95%	Live data	96.92%	97.91%	98.00%	NP	95.75%	97.88%	98.68%	97.60%	97.14%	99.85%	99.18%	99.34%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	399	74	394.67	372	157	331	2	83.33	657	5.67	47	124
	e) Total no. of cells (Sector) in the licensed service area		Live data	22562	2469	6484	12799	19002	11531	7458	5758	23257	3309	1746	1766
<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

NP: Data not provided: BSNL has not provided data for the parameter "Connections with good voice quality" because its OMCR (ALCATEL LUCENT Technology being used by BSNL) does not support this parameter.

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





### 5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS:

#### 5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY to SEPTEMBER 2014 MONTHS AUDITED DATA):

QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES															
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM GSM	TATA GSM	VIDEOCON	VODA FONE	MTS	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators	
Customer Service Quality Parameters															
<b>Metering &amp; Billing Credibility -Post Paid</b>															
1	A) No. of bills issued during the quarter		GUJ	NA	1210139	168866	850559	NA	183328	163265	NA	4794181	66854	525378	60674
	B) No. of bills disputed including billing complaints during the quarter		GUJ	NA	42	28	921	NA	174	0	NA	4336	6	524	0
	C)% of billing complaints during the quarter	<= 0.1%	GUJ	NA	0.00%	0.00%	0.001%	NA	0.001%	0.00%	NA	0.001%	0.00%	0.001%	0.00%
<b>Metering &amp; Billing Credibility -Pre Paid</b>															
2	A) Total No. of Pre-paid customers at the end of the quarter		GUJ	18435	6869202	3045815	9632121	6299248	4841193	3019425	2019730	16540944	179032	1064450	302984
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		GUJ	0	278	2709	7229	1001	14406	0	23	7404	8	918	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	GUJ	0.00%	0.004%	0.09%	0.08%	0.02%	0.30%	0.00%	0.001%	0.04%	0.004%	0.09%	0.00%
<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>															
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		GUJ	NA	320	2725	14740	1001	14580	2376	23	11740	14	1433	65
	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	NA	320	2725	14740	1001	14580	2376	23	11740	14	1433	65
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 weeks	GUJ	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES															
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM GSM	TATA GSM	VIDEOCON	VODA FONE	MTS	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators										CDMA Operators	
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	GUJ	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Response time to customers for assistance</b>															
	A) Total no of calls attempted to customer care/Call center		GUJ	15985	1867242	347956	21981024	1797111	8280597	1003569	257126	43456380	3611	1188544	69645
	B) Total no. of calls successfully established to customer care/Call center		GUJ	15333	1867242	333037	21848483	1722271	8174859	988572	251754	43456354	3491	1166496	68098
4	C) % Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	>=95%	GUJ	95.92%	100%	95.71%	99.40%	95.84%	98.72%	98.51%	97.91%	99.99%	98.68%	98.14%	97.78%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		GUJ	4266	5165362	1782698	7846514	4896057	1311854	1573292	879283	10458856	44921	213399	108246
	E) Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		GUJ	4140	5039490	1668559	7730726	4548877	815260	1399740	853563	10233765	43802	140625	100420
	F) % age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec/90 sec.*100 / Total call attempts )	>=90% (60 Sec.) & >=95% (90 Sec.)	GUJ	97.05%	97.56%	93.60%	98.52%	92.91%	62.15%	88.97%	97.07%	97.85%	97.51%	65.90%	92.77%
<b>Termination/closure of service</b>															
5	A) Total No. of requests for Termination / Closure of service received during the quarter		GUJ	NA	3116	7702	7999	NA	600	2199	NA	22047	2211	3045	1183
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		GUJ	NA	3116	7702	7577	NA	600	2199	NA	22047	2211	3045	1183

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES															
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM GSM	TATA GSM	VIDEOCON	VODA FONE	MTS	RCOM CDMA	TATA CDMA
S/ N	Name of Parameter			GSM Operators										CDMA Operators	
	C) % of Termination/ Closure of service within 7 days	<=7days	GUJ	NA	100%	100%	100%	NA	100%	100%	NA	100%	100%	100%	100%
<b>Time taken for refunds of deposits after closures.</b>															
6	A) No. of Payments/ Refunds due during the quarter		GUJ	NA	2428	1491	4177	NA	1300	824	NA	5921	NA	2181	648
	B) No. of Payments/ Refunds Cleared during the quarter		GUJ	NA	2428	1491	4177	NA	1300	823	NA	5921	NA	2181	648
	C) Time taken for refunds of deposits after closures.	100% within 60 days	GUJ	NA	100%	100%	100%	NA	100%	99.87%	NA	100%	NA	100%	100%

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

Note: For the parameter "% age of calls answered by operator (voice to voice)" – All Service Providers except **Aircel, BSNL, Idea and MTS** have given the data for 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21<sup>st</sup> August 2014.

**5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES:**

<b>CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE SEPTEMBER 2014</b>															
<b>3 days live CSD Audit Data</b>		<b>Benchmark</b>	<b>Circle Name</b>	<b>AIRCEL</b>	<b>AIRTEL</b>	<b>BSNL</b>	<b>IDEA</b>	<b>UNINOR</b>	<b>RCOM (GSM)</b>	<b>TATA (GSM)</b>	<b>VIDEOCON</b>	<b>VODAFONE</b>	<b>MTS</b>	<b>RCOM (CDMA)</b>	<b>TATA (CDMA)</b>
<b>S/N</b>	<b>Name of Parameter</b>			<b>GSM Operators</b>									<b>CDMA Operators</b>		
<b>Response time to customers for assistance</b>															
1	Total no of calls attempted to customer care/Call center		<b>GUJ</b>	669	67835	11762	706418	56198	419298	29750	11595	1395115	135	42138	2353
	Total no. of calls successfully established to customer care/Call center		<b>GUJ</b>	646	67835	11262	701654	54081	414970	29513	11565	1395115	132	41298	2326
	% Accessibility of Call centre /customer Care (Total call successfully established*100 / Total call attempts)	>=95%	<b>GUJ</b>	<b>96.56%</b>	<b>100.00%</b>	<b>95.74%</b>	<b>99.33%</b>	<b>96.23%</b>	<b>98.97%</b>	<b>99.20%</b>	<b>99.74%</b>	<b>100.00%</b>	<b>97.78%</b>	<b>98.01%</b>	<b>98.85%</b>
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		<b>GUJ</b>	191	146755	64424	256923	156828	65868	56412	22727	355511	1407	9451	3250
	Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		<b>GUJ</b>	185	143712	62698	255116	142572	44776	51183	22405	353546	1389	6289	3194
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60/90 Sec.*100 / Total call attempts)	>=90% (60 Sec.) & >=95% (90 Sec.)	<b>GUJ</b>	<b>96.86%</b>	<b>97.93%</b>	<b>97.32%</b>	<b>99.30%</b>	<b>90.91%</b>	<b>67.98%</b>	<b>90.73%</b>	<b>98.58%</b>	<b>99.45%</b>	<b>98.72%</b>	<b>66.54%</b>	<b>98.28%</b>

Note: For the parameter “% age of calls answered by operator (voice to voice)” – All Service Providers except **Aircel, BSNL, Idea and MTS** have given the data for 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21<sup>st</sup> August 2014.

## KEY FINDINGS: CUSTOMER SERVICE DELIVERY PARAMETERS

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

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid was well within the prescribed benchmark of  $\leq 0.1\%$ . However, RCOM(GSM) could not meet the benchmark of Metering and Billing credibility for pre-paid with its performance level as 0.30%.

### 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 4/6 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, **RCOM (GSM), Tata (GSM) and RCOM (CDMA)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 90 seconds. They have achieved their performance as **62.15%, 88.97% and 65.90%** 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 **Tata (GSM)** were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure. **Only Tata (GSM)** remained short of benchmark with its performance as **99.87%**.

### Live Measurements:

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center. However, **RCOM (GSM) and RCOM (CDMA)** failed to meet the benchmark of 'Call connection to operators (Voice to voice) within 90 seconds' with their performance as **67.98% and 66.54%** respectively.

## **6. LIVE CALLING ASSESSMENT**



## 6. LIVE CALLING ASSESSMENT:

### 6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in 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	UNINOR	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA GSM	TATA CDMA	VIDEOCON	MTS	VODAFONE
AIRCEL	Gujarat	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
AIRTEL	Gujarat	100%	-	100%	100%	100%	100%	100%	99%	98%	100%	100%	97%
UNINOR	Gujarat	100%	100%	-	100%	100%	99%	99%	100%	100%	99%	98%	100%
BSNL	Gujarat	98%	100%	99%	-	99%	100%	100%	100%	98%	100%	100%	99%
IDEA	Gujarat	100%	97%	100%	100%	-	100%	100%	100%	100%	99%	98%	100%
RCOM GSM	Gujarat	100%	100%	100%	98%	100%	-	99%	99%	100%	100%	100%	100%
RCOM CDMA	Gujarat	100%	100%	100%	100%	100%	100%	-	100%	99%	98%	100%	100%
TATA GSM	Gujarat	100%	100%	100%	100%	98%	99%	100%	-	100%	100%	99%	99%
TATA CDMA	Gujarat	98%	100%	99%	100%	100%	100%	100%	100%	-	100%	100%	100%
VIDEOCON	Gujarat	100%	98%	100%	99%	100%	98%	99%	98%	100%	-	100%	100%
MTS	Gujarat	100%	100%	100%	100%	100%	100%	100%	100%	98%	100%	-	99%
VODAFONE	Gujarat	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. However, in some cases the successful interconnections between the operators were in the range of 97-99% as mentioned in the above table.

## 6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE													
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total no. of calls attempted to customer care/Call center	GUJ	100	100	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	GUJ	98	100	96	99	97	98	98	97	100	98	98	99
% Accessibility of Call centre /customer Care (Total call successfully established *100 /Total call attempts)	GUJ	98.00%	100.00%	96.00%	99.00%	97.00%	98.00%	98.00%	97.00%	100.00%	98.00%	98.00%	99.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempts)	GUJ	96	100	95	98	95	90	95	95	98	95	90	98
Total number of calls answered by the operator (Voice to voice) within 90 seconds	GUJ	94	98	94	97	92	79	90	93	96	93	88	97
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100/Total call attempts)	GUJ	97.92%	98.00%	98.95%	98.98%	96.84%	87.78%	94.74%	97.89%	97.96%	97.89%	97.78%	98.98%

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, RCOM (GSM) and Tata (GSM) could connect 87.78% & 94.74% of calls to the operator within 90 Seconds respectively. For other operators, the call connections were in the range of 96.84% to 98.98%.

### 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS													
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	UNINOR	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Gujarat	60	100	100	100	70	100	50	60	90	60	100	50
Total No. of calls Answered	Gujarat	60	100	100	100	70	100	50	60	90	60	100	50
Resolution of Billing complaints	Gujarat	60	100	100	100	70	100	50	60	90	60	100	50
%age of cases resolved	Gujarat	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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



6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING																
Emergency no.	SSA Name	Name of SDCA	No. of calls made	AIRCEL	AIRTEL	UNINOR	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA GSM	TATA CDMA	VIDEOCON	MTS	VODAFONE	
100, 108, 1091, 1098, 1095	Mehsana SSA	Mehsana	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Kheralu	10	✓	✓	✓	✓	✓	✓	✓	✓	NC	✓	✓	✓	
		Patan	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Sidhhpur	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Visnagar	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Vijapur	10	NC	✓	✓	✓	✓	✓	✓	✓	NC	✓	NC	NC	✓
		Harij	10	NC	✓	✓	✓	✓	✓	✓	✓	NC	NC	NC	NC	✓
100, 108, 1091, 1098, 1095	Ahmedabad SSA	Ahmedabad	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Sanand	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Viramgam	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Dholka	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Bareja	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Dehgam	10	✓	✓	✓	✓	✓	✓	✓	✓	NC	✓	NC	✓	
		Gandhinagar	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
100, 108, 1091, 1098, 1095	Bhavnagar SSA	Bhavnagar	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Palitana	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Talaja	10	NC	✓	✓	✓	✓	✓	✓	✓	NC	✓	✓	✓	
		Mahuva	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Botad	10	NC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Gadhadha	10	NC	✓	✓	✓	✓	✓	✓	✓	NC	NC	✓	NC	✓
		Gariyadhar	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	NC	✓	NC	✓

NC: No Coverage

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, the calls were made during drive tests from different SDCA in Mehsana, Ahemdabad and Bhavnagar SSAs. In Gujarat service area, these services were found functional in the networks of all the service providers except for those operators who were not having their coverage in particular SDCAs as indicated above.

## 7. DRIVE TEST



## **7. OPERATOR ASSESTID DRIVE TEST**

In terms of TRAI's letter dated 21<sup>st</sup> January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Mehsana, Ahmedabad** and **Bhavnagar** in the months of July, August and September 2014 respectively. The total route Kms covered during drive tests in respective SSAs was **327 Kms, 491 Kms** and **339 Kms**. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour

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

DRIVE TEST TABLE-1A

OPERATOR-ASSISTED DRIVE TEST AT MEHSANA SSA IN JULY 14 MONTH - GUJRAT CIRCLE														
S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
1	Call Attempts	Highways	4	25	84	31	68	27	49	25	67	26	81	27
		Major Roads	3	NC	92	25	89	27	64	25	107	25	92	26
		Within City	7	NC	158	26	135	27	113	25	146	25	135	26
		Overall SSA	14	25	334	82	292	81	226	75	320	76	308	79
2	Blocked Call Rate	Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.00%	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.00%	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	Percentage connections with good voice quality (=>95%)													
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	(b) 0-5 ( with frequency hopping for GSM Operators)	Highways	99.13%	99.22%	97.22%	99.59%	96.07%	99.92%	96.95%	99.68%	97.04%	99.49%	97.52%	97.89%
		Major Roads	99.55%	NC	97.40%	98.29%	95.17%	99.95%	98.65%	99.62%	97.64%	98.10%	97.23%	99.62%
		Within City	99.19%	NC	97.60%	99.50%	96.69%	91.11%	97.11%	99.94%	97.88%	99.34%	97.66%	100.00%
Overall SSA		99.25%	99.22%	97.45%	99.06%	96.06%	96.97%	97.52%	99.74%	97.63%	98.99%	97.50%	99.31%	
5	Service Coverage													
	In door (>= -75dBm)	Highways	44.47%	96.96%	97.26%	100.00%	76.32%	95.05%	85.87%	96.92%	73.88%	100.00%	84.96%	100.00%
		Major Roads	10.82%	NC	95.89%	99.99%	72.89%	99.32%	88.34%	87.26%	85.02%	99.97%	82.15%	100.00%
		Within City	22.44%	NC	92.52%	99.88%	67.46%	56.10%	89.27%	100.00%	76.76%	100.00%	87.56%	100.00%
		Overall SSA	25.84%	96.96%	94.67%	99.96%	71.74%	83.40%	88.33%	94.68%	78.98%	99.99%	85.28%	100.00%

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

<b>OPERATOR-ASSISTED DRIVE TEST AT MEHSANA SSA IN JULY 14 MONTH - GUJRAT CIRCLE</b>														
S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
	In-vehicle (>= -85dBm)	Highways	89.82%	100.00%	99.57%	100.00%	96.33%	100.00%	97.29%	100.00%	92.60%	100.00%	98.29%	100.00%
		Major Roads	78.36%	NC	99.46%	100.00%	94.18%	100.00%	98.44%	95.56%	96.08%	100.00%	96.44%	100.00%
		Within City	73.25%	NC	99.31%	100.00%	94.15%	99.78%	99.59%	100.00%	90.85%	100.00%	98.87%	100.00%
		Overall SSA	79.41%	100%	99.42%	100.00%	94.82%	99.93%	98.81%	98.50%	92.98%	100.00%	97.99%	100.00%
	Outdoor- in city (>= -95dBm)	Highways	100%	100.00%	99.89%	100.00%	99.89%	100.00%	99.71%	100.00%	100.00%	100.00%	99.85%	100.00%
		Major Roads	100%	NC	99.89%	100.00%	99.83%	100.00%	99.97%	100.00%	100.00%	100.00%	99.87%	100.00%
		Within City	99.70%	NC	99.96%	100.00%	99.72%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	99.86%	100%	99.92%	100.00%	99.80%	100.00%	99.93%	100.00%	100.00%	100.00%	99.92%	100.00%
6	Call Setup Success Rate (>=95%)	Highways	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	100.00%	NC	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	100.00%	NC	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	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)	Highways	100%	100%	99.54%	100.00%	98.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	100%	NC	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	100%	NC	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	100%	100%	99.86%	100.00%	99.75%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

NA: Not Applicable; NC: No Coverage

Aircel: Coverage only in Kheralu SDCA during day-1 (No coverage area Mehsana, Patan, Siddhpur, Harij, Visnagar, Vijapur)

TATA GSM: Has no coverage in Harji & Vijaypur during day-2 & Day-3 drive.

DRIVE TEST TABLE-1B

OPERATOR-ASSISTED DRIVE TEST AT MEHSANA SSA IN JULY 14 MONTH - GUJRAT CIRCLE															
S/N	Parameter	Classification of routes covered	UNINOR		VIDEOCON		VODAFONE		MTS CDMA		TATA CDMA		RCOM CDMA		
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	
1	Call Attempts	Highways	81	25	58	25	80	26	65	25	64	25	81	28	
		Major Roads	95	25	71	25	105	26	66	25	60	25	92	26	
		Within City	160	25	108	25	142	26	113	25	123	25	135	26	
		Overall SSA	336	75	237	75	327	78	244	75	247	75	308	80	
2	Blocked Call Rate	Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	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	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	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	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
4	Percentage connections with good voice quality (=>95%)														
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.47%	99.55%	99.40%	100.00%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.65%	99.96%	99.89%	100.00%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.43%	100.00%	99.89%	100.00%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.49%	99.83%	99.77%	100.00%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	96.67%	99.72%	96.44%	99.75%	95.41%	98.31%	99.76%	99.89%	NA	NA	NA	NA	
		Major Roads	96.30%	97.89%	96.95%	99.74%	96.28%	98.83%	99.72%	99.85%	NA	NA	NA	NA	
		Within City	96.98%	98.82%	97.61%	98.31%	96.67%	98.63%	99.76%	99.49%	NA	NA	NA	NA	
Overall SSA		96.70%	98.85%	97.12%	99.11%	96.24%	98.60%	99.75%	99.74%	NA	NA	NA	NA		
5	Service Coverage														
	In door (>= -75dBm)	Highways	97.61%	18.48%	83.87%	99.27%	83.86%	98.06%	61.42%	61.64%	60.24%	86.95%	81.68%	100.00%	
		Major Roads	97.85%	22.00%	90.91%	100.00%	84.73%	99.26%	67.47%	98.54%	55.57%	66.81%	88.52%	100.00%	
		Within City	96.84%	25.29%	85.21%	99.90%	79.91%	99.74%	69.84%	100.00%	66.15%	100.00%	85.62%	99.46%	
		Overall SSA	97.34%	21.97%	86.65%	99.61%	82.39%	99.05%	66.96%	86.62%	61.83%	84.99%	85.79%	99.84%	

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

<b>OPERATOR-ASSISTED DRIVE TEST AT MEHSANA SSA IN JULY 14 MONTH - GUJRAT CIRCLE</b>														
S/N	Parameter	Classification of routes covered	UNINOR		VIDEOCON		VODAFONE		MTS CDMA		TATA CDMA		RCOM CDMA	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
	In-vehicle (>= - 85dBm)	Highways	99.46%	99.19%	97.61%	100.00%	98.62%	99.97%	96.01%	98.66%	92.04%	100.00%	97.50%	100.00%
		Major Roads	99.58%	99.73%	99.20%	100.00%	96.45%	100.00%	96.14%	99.87%	93.38%	99.84%	98.53%	100.00%
		Within City	99.55%	98.58%	98.86%	100.00%	96.55%	100.00%	97.32%	100.00%	95.31%	100.00%	96.75%	100.00%
		Overall SSA	99.53%	99.14%	98.64%	100.00%	97.04%	99.99%	96.65%	99.51%	93.92%	99.95%	97.53%	100.00%
	Outdoor- in city (>= - 95dBm)	Highways	99.90%	100.00%	99.58%	100.00%	99.79%	100.00%	99.95%	100.00%	99.90%	100.00%	100.00%	100.00%
		Major Roads	99.89%	100.00%	99.96%	100.00%	99.14%	100.00%	100.00%	100.00%	99.99%	100.00%	99.93%	100.00%
		Within City	99.94%	100.00%	99.91%	100.00%	99.52%	100.00%	99.97%	100.00%	99.97%	100.00%	99.85%	100.00%
		Overall SSA	99.91%	100.00%	99.84%	100.00%	99.47%	100.00%	99.97%	100.00%	99.96%	100.00%	99.91%	100.00%
6	Call Setup Success Rate (>=95%)	Highways	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	99.38%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	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)	Highways	98.39%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	97.18%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	99.07%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	98.34%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

NA: Not Applicable; NC: No Coverage

TATA CDMA: Has no coverage in Kheralu & Harji during day-1 & Day-2 drive.

Videocon: Has no coverage in Harji & Vijaypur during day-2 & Day-3 drive (Patan , sidhpur & Visnagar towns are on ICR with TATA GSM )

MTS: Has no coverage in Harji & Vijaypur during day-2 & Day-3 drive (Patan, Sidhpur & Visnagar towns are on ICR with TATA GSM)

DRIVE TEST TABLE-2A

OPERATOR-ASSISTED DRIVE TEST AT AHMEDABAD SSA IN AUGUST 14 MONTH - GUJRAT CIRCLE														
S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
1	Call Attempts	Highways	181	25	301	27	176	28	143	25	245	25	164	25
		Major Roads	141	25	314	25	203	28	161	25	221	25	180	25
		Within City	187	25	273	26	232	28	217	25	294	25	246	26
		Overall SSA	509	75	888	78	611	84	521	75	760	75	590	76
2	Blocked Call Rate	Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%	0.70%	0.00%	0.00%	0.00%	0.61%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	1.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%
		Within City	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	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.19%	0.00%	0.00%	0.00%	0.34%	0.00%
4	Percentage connections with good voice quality (=>95%)													
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	(b) 0-5 ( with frequency hopping for GSM Operators)	Highways	96.36%	97.51%	95.40%	99.71%	91.98%	97.79%	96.47%	98.63%	96.86%	99.47%	94.15%	87.35%
		Major Roads	96.45%	98.44%	95.78%	97.79%	91.57%	100.00%	95.82%	100.00%	97.32%	99.19%	98.44%	96.85%
		Within City	97.09%	99.48%	95.83%	97.90%	92.20%	99.13%	98.18%	99.94%	97.13%	99.34%	98.91%	98.35%
Overall SSA		96.68%	98.44%	95.66%	98.47%	91.93%	99.01%	96.97%	99.51%	97.10%	99.33%	97.44%	96.17%	
5	Service Coverage													
	In door (>= -75dBm)	Highways	82.26%	96.80%	91.32%	100.00%	35.46%	26.46%	66.14%	100.00%	98.83%	99.76%	85.13%	100.00%
		Major Roads	84.99%	83.93%	91.33%	100.00%	33.07%	96.54%	65.16%	79.43%	99.01%	99.91%	84.18%	100.00%
		Within City	82.11%	90.34%	90.22%	98.50%	31.05%	91.97%	67.45%	99.70%	97.58%	100.00%	92.45%	94.06%
		Overall SSA	83.07%	90.31%	90.98%	99.49%	33.00%	73.39%	66.37%	93.07%	98.40%	99.89%	87.85%	98.37%



## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

OPERATOR-ASSISTED DRIVE TEST AT AHMEDABAD SSA IN AUGUST 14 MONTH - GUJRAT CIRCLE														
S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
	In-vehicle (>= -85dBm)	Highways	95.25%	99.91%	98.49%	100.00%	86.79%	99.30%	87.07%	100.00%	99.97%	100.00%	96.55%	100.00%
		Major Roads	98.83%	99.88%	98.50%	100.00%	85.51%	99.77%	92.81%	98.93%	99.99%	100.00%	97.75%	100.00%
		Within City	98.36%	100.00%	99.14%	99.57%	85.27%	99.71%	93.38%	99.70%	99.63%	100.00%	99.46%	100.00%
		Overall SSA	97.67%	99.93%	98.70%	99.86%	85.79%	99.61%	91.52%	99.55%	99.85%	100.00%	98.12%	100.00%
	Outdoor- in city (>= -95dBm)	Highways	99.36%	100.00%	99.84%	100.00%	99.61%	99.98%	97.83%	100.00%	100.00%	100.00%	99.95%	100.00%
		Major Roads	99.98%	100.00%	99.83%	100.00%	99.71%	100.00%	99.51%	100.00%	100.00%	100.00%	99.86%	100.00%
		Within City	100.00%	100.00%	99.84%	99.80%	99.63%	100.00%	99.76%	100.00%	99.99%	100.00%	100.00%	100.00%
		Overall SSA	99.82%	100.00%	99.84%	99.93%	99.65%	99.99%	99.17%	100.00%	100.00%	100.00%	99.94%	100.00%
6	Call Setup Success Rate (>=95%)	Highways	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.30%	100.00%	100.00%	100.00%	99.39%	100.00%
		Major Roads	100.00%	100.00%	100.00%	100.00%	99.51%	100.00%	100.00%	100.00%	99.55%	100.00%	100.00%	100.00%
		Within City	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.54%	100.00%	98.30%	100.00%	100.00%	100.00%
		Overall SSA	100.00%	100.00%	100.00%	100.00%	99.84%	100.00%	99.62%	100.00%	99.21%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Highways	100.00%	100.00%	100.00%	100.00%	98.83%	100.00%	100.00%	100.00%	100.00%	100.00%	99.74%	100.00%
		Major Roads	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.74%	100.00%	99.75%	100.00%	99.09%	100.00%
		Within City	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.43%	100.00%	98.98%	100.00%
		Overall SSA	100.00%	100.00%	100.00%	100.00%	99.63%	100.00%	99.92%	100.00%	99.70%	100.00%	99.22%	100.00%

NA: Not Applicable

Aircel: No coverage at Gandhinagar SDCA

TATA GSM: On ICR with Aircel at Ahmedabad, Sanand, Viramgam, Dholka & Bareja SDCA

DRIVE TEST TABLE-2B

OPERATOR-ASSISTED DRIVE TEST AT AHMEDABAD SSA IN AUGUST 14 MONTH - GUJRAT CIRCLE															
S/N	Parameter	Classification of routes covered	UNINOR		VIDEOCON		VODAFONE		MTS CDMA		TATA CDMA		RCOM CDMA		
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	
1	Call Attempts	Highways	213	25	159	25	192	26	144	25	129	25	163	25	
		Major Roads	268	26	233	25	202	26	166	25	141	25	182	25	
		Within City	304	24	197	25	238	26	211	25	194	25	246	26	
		Overall SSA	785	75	589	75	632	78	521	75	464	75	591	76	
2	Blocked Call Rate	Highways	0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Major Roads	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Highways	0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	
		Within City	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	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.34%	0.00%	
4	Percentage connections with good voice quality (=>95%)														
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.10%	98.81%	98.92%	100.00%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.43%	100.00%	98.60%	99.71%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.74%	99.80%	98.42%	99.34%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.48%	99.53%	98.62%	99.64%
	(b) 0-5 (with frequency hopping for GSM Operators)	Highways	95.58%	98.70%	96.68%	99.88%	95.23%	97.66%	99.78%	98.76%	NA	NA	NA	NA	
		Major Roads	95.41%	99.38%	95.88%	99.97%	95.36%	99.38%	99.87%	99.98%	NA	NA	NA	NA	
		Within City	95.50%	99.46%	96.54%	99.71%	95.51%	99.42%	99.89%	99.95%	NA	NA	NA	NA	
Overall SSA		95.49%	99.18%	96.37%	99.85%	95.37%	98.82%	99.85%	99.56%	NA	NA	NA	NA		
5	Service Coverage														
	In door (>= -75dBm)	Highways	89.25%	95.73%	91.62%	94.70%	93.76%	100.00%	77.26%	99.98%	79.71%	100.00%	85.17%	100.00%	
		Major Roads	92.74%	99.92%	87.48%	95.28%	91.75%	84.64%	85.32%	99.88%	77.98%	100.00%	89.77%	100.00%	
		Within City	90.32%	99.07%	91.20%	72.81%	93.20%	99.91%	81.09%	81.29%	80.02%	77.93%	91.21%	100.00%	
		Overall SSA	90.87%	98.25%	90.06%	87.64%	92.94%	94.41%	81.38%	93.72%	79.29%	92.66%	89.07%	100.00%	

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

OPERATOR-ASSISTED DRIVE TEST AT AHMEDABAD SSA IN AUGUST 14 MONTH - GUJRAT CIRCLE														
S/N	Parameter	Classification of routes covered	UNINOR		VIDEOCON		VODAFONE		MTS CDMA		TATA CDMA		RCOM CDMA	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
	In-vehicle (>= -85dBm)	Highways	97.70%	99.16%	98.01%	99.95%	99.08%	100.00%	97.58%	100.00%	95.86%	100.00%	98.15%	100.00%
		Major Roads	98.44%	100.00%	98.10%	100.00%	98.68%	100.00%	98.77%	99.98%	96.05%	100.00%	99.12%	100.00%
		Within City	98.55%	100.00%	99.39%	99.40%	99.29%	100.00%	97.81%	99.67%	96.77%	99.95%	99.68%	100.00%
		Overall SSA	98.27%	99.72%	98.57%	99.78%	99.19%	100.00%	98.06%	99.88%	96.30%	99.98%	99.08%	100.00%
	Outdoor- in city (>= -95dBm)	Highways	100.00%	100.00%	99.66%	99.95%	99.80%	100.00%	99.92%	100.00%	99.70%	100.00%	100.00%	100.00%
		Major Roads	100.00%	100.00%	99.81%	100.00%	99.78%	100.00%	99.94%	99.98%	99.66%	100.00%	99.99%	100.00%
		Within City	100.00%	100.00%	99.92%	99.73%	99.94%	100.00%	99.97%	100.00%	99.76%	99.97%	100.00%	100.00%
		Overall SSA	100.00%	100.00%	99.81%	99.91%	99.85%	100.00%	99.95%	99.99%	99.71%	99.99%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Highways	98.12%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	98.51%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	97.04%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	97.83%	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)	Highways	97.52%	100.00%	98.19%	100.00%	98.19%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	98.95%	100.00%	98.96%	100.00%	98.96%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	98.50%	100.00%	97.85%	100.00%	97.85%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	98.33%	100.00%	98.41%	100.00%	98.41%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

NA: Not Applicable

Videocon: On ICR with TATA GSM at Dehgam SDCA

MTS: On ICR with TATA CDMA at Birgam & Bareja SDCA and No coverage at Dehgam SDCA.

DRIVE TEST TABLE-3A

OPERATOR-ASSISTED DRIVE TEST AT BHAVNAGAR SSA IN SEPTEMBER 14 MONTH - GUJRAT CIRCLE														
S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
1	Call Attempts	Highways	13	NC	186	25	147	25	176	25	189	25	194	30
		Major Roads	13	NC	193	25	172	25	217	25	230	25	232	29
		Within City	11	25	156	25	150	25	159	25	190	25	201	28
		Overall SSA	37	25	535	75	469	75	552	75	609	75	627	87
2	Blocked Call Rate	Highways	0.00%	NS	0.00%	0.00%	0.68%	0.00%	0.57%	0.00%	0.53%	0.00%	0.00%	0.00%
		Major Roads	0.00%	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	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	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%	0.18%	0.00%	0.16%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.00%	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.00%	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	0.21%	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)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	(b) 0-5 ( with frequency hopping for GSM Operators)	Highways	99.40%	NC	97.59%	99.80%	96.05%	97.26%	98.39%	96.54%	96.71%	98.38%	97.80%	100.00%
		Major Roads	99.44%	NC	97.09%	99.53%	93.47%	99.04%	97.50%	99.87%	96.69%	98.85%	98.37%	100.00%
		Within City	99.48%	99.04%	97.34%	96.99%	96.94%	98.60%	98.11%	99.36%	97.81%	98.85%	98.34%	100.00%
		Overall SSA	99.43%	99.04%	97.33%	98.81%	95.39%	98.38%	97.95%	98.59%	97.04%	98.69%	98.18%	100.00%
Service Coverage														
5	In door (>= -75dBm)	Highways	85.10%	NC	98.26%	100.00%	29.00%	56.30%	86.02%	0.00%	98.58%	100.00%	81.81%	99.21%
		Major Roads	68.80%	NC	97.95%	100.00%	31.66%	6.82%	82.52%	62.94%	99.48%	99.96%	82.35%	64.97%
		Within City	54.54%	72.88%	98.13%	100.00%	24.64%	13.99%	84.75%	60.20%	99.01%	100.00%	83.02%	100.00%
		Overall SSA	70.74%	72.88%	98.11%	100.00%	28.60%	23.10%	84.43%	41.05%	99.05%	99.98%	82.40%	93.30%

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

<b>OPERATOR-ASSISTED DRIVE TEST AT BHAVNAGAR SSA IN SEPTEMBER 14 MONTH - GUJRAT CIRCLE</b>														
S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
	In-vehicle (>= -85dBm)	Highways	99.61%	NC	99.92%	100.00%	89.94%	99.91%	97.96%	95.20%	99.97%	100.00%	96.20%	100.00%
		Major Roads	97.65%	NC	99.80%	100.00%	90.48%	97.41%	96.19%	100.00%	100.00%	100.00%	96.07%	100.00%
		Within City	97.02%	99.86%	99.95%	100.00%	86.43%	94.64%	98.73%	98.03%	100.00%	100.00%	99.02%	100.00%
		Overall SSA	98.17%	99.86%	99.89%	100.00%	89.04%	97.02%	97.63%	97.74%	99.99%	100.00%	97.07%	100.00%
	Outdoor- in city (>= -95dBm)	Highways	100.00%	NC	99.98%	100.00%	99.85%	100.00%	99.85%	100.00%	100.00%	100.00%	99.62%	100.00%
		Major Roads	100.00%	NC	99.99%	100.00%	99.82%	100.00%	99.81%	100.00%	100.00%	100.00%	99.37%	100.00%
		Within City	100.00%	100.00%	99.99%	100.00%	99.37%	100.00%	100.00%	100.00%	100.00%	100.00%	99.98%	100.00%
		Overall SSA	100.00%	100.00%	99.98%	100.00%	99.69%	100.00%	99.88%	100.00%	100.00%	100.00%	99.65%	100.00%
6	Call Setup Success Rate (>=95%)	Highways	100.00%	NC	100.00%	100.00%	99.32%	100.00%	99.43%	100.00%	99.47%	100.00%	100.00%	100.00%
		Major Roads	100.00%	NC	100.00%	100.00%	99.42%	100.00%	100.00%	100.00%	98.70%	100.00%	100.00%	100.00%
		Within City	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.95%	100.00%	100.00%	100.00%
		Overall SSA	100.00%	100.00%	100.00%	100.00%	99.57%	100.00%	99.82%	100.00%	99.01%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Highways	100.00%	NC	100.00%	100.00%	99.53%	100.00%	100.00%	100.00%	99.35%	100.00%	100.00%	100.00%
		Major Roads	100.00%	NC	100.00%	100.00%	99.29%	100.00%	100.00%	100.00%	99.42%	100.00%	100.00%	100.00%
		Within City	100.00%	100.00%	99.65%	100.00%	99.23%	100.00%	99.58%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	100.00%	100.00%	99.89%	100.00%	99.34%	100.00%	99.88%	100.00%	99.60%	100.00%	100.00%	100.00%

NA: Not Applicable, NC: No Coverage

Aircel: No coverage area at Bhavnagar, Mahuva, Talaja, Palitana, Botad, Gadhada SDCA (Reports belong Gariya SDCA only)

TATA GSM: No coverage at Gadhada SDCA.

DRIVE TEST TABLE-3B

OPERATOR-ASSISTED DRIVE TEST AT BHAVNAGAR SSA IN SEPTEMBER 14 MONTH - GUJRAT CIRCLE														
S/N	Parameter	Classification of routes covered	UNINOR		VIDEOCON		VODAFONE		MTS CDMA		TATA CDMA		RCOM CDMA	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
1	Call Attempts	Highways	202	25	205	25	167	25	125	25	130	25	194	30
		Major Roads	228	25	177	25	194	25	142	25	148	25	233	29
		Within City	163	25	175	25	170	25	114	25	143	25	201	28
		Overall SSA	593	75	557	75	531	75	381	75	421	75	628	87
2	Blocked Call Rate	Highways	0.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.84%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	0.84%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	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	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)	Highways	NA	NA	NA	NA	NA	NA	NA	NA	99.69%	99.86%	99.88%	100.00%
		Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	99.28%	100.00%	99.86%	100.00%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	99.45%	99.98%	99.95%	100.00%
		Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	99.47%	99.95%	99.90%	100.00%
	(b) 0-5 ( with frequency hopping for GSM Operators)	Highways	96.85%	99.72%	96.26%	99.80%	96.16%	99.36%	99.93%	100.00%	NA	NA	NA	NA
		Major Roads	95.78%	99.70%	95.79%	99.57%	96.46%	99.59%	99.84%	100.00%	NA	NA	NA	NA
		Within City	96.48%	98.51%	95.87%	99.06%	96.48%	99.05%	99.96%	100.00%	NA	NA	NA	NA
		Overall SSA	96.41%	99.27%	95.98%	99.48%	96.37%	99.34%	99.91%	100.00%	NA	NA	NA	NA
Service Coverage														
5	In door (>= -75dBm)	Highways	97.10%	96.89%	84.33%	87.23%	97.48%	100.00%	84.13%	99.97%	56.93%	99.98%	81.64%	100.00%
		Major Roads	95.63%	100.00%	85.16%	100.00%	97.59%	100.00%	78.78%	99.93%	59.38%	81.90%	77.79%	98.73%
		Within City	94.47%	97.85%	83.23%	100.00%	99.31%	99.69%	83.08%	99.47%	61.25%	87.87%	78.33%	100.00%
		Overall SSA	95.82%	98.04%	84.35%	95.73%	98.10%	99.90%	81.81%	99.80%	59.25%	89.92%	79.17%	99.76%

## AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE

<b>OPERATOR-ASSISTED DRIVE TEST AT BHAVNAGAR SSA IN SEPTEMBER 14 MONTH - GUJRAT CIRCLE</b>														
S/N	Parameter	Classification of routes covered	UNINOR		VIDEOCON		VODAFONE		MTS CDMA		TATA CDMA		RCOM CDMA	
			Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor
	In-vehicle (>= -85dBm)	Highways	99.39%	99.76%	97.36%	99.04%	99.73%	100.00%	96.98%	100.00%	90.91%	100.00%	96.05%	100.00%
		Major Roads	99.39%	100.00%	95.92%	100.00%	99.75%	100.00%	97.26%	100.00%	91.39%	100.00%	93.24%	100.00%
		Within City	99.35%	100.00%	97.75%	100.00%	99.95%	99.78%	98.65%	100.00%	93.91%	99.53%	93.05%	100.00%
		Overall SSA	99.30%	99.91%	96.89%	99.68%	99.81%	99.93%	97.59%	100.00%	92.10%	99.84%	94.05%	100.00%
	Outdoor- in city (>= -95dBm)	Highways	100.00%	100.00%	99.81%	99.04%	99.98%	100.00%	99.76%	100.00%	99.33%	100.00%	99.73%	100.00%
		Major Roads	100.00%	100.00%	99.60%	100.00%	99.90%	100.00%	99.89%	100.00%	98.76%	100.00%	99.93%	100.00%
		Within City	100.00%	100.00%	99.68%	100.00%	100.00%	99.86%	99.91%	100.00%	98.88%	100.00%	99.26%	100.00%
		Overall SSA	100.00%	100.00%	99.69%	100.00%	99.96%	99.95%	99.86%	100.00%	98.98%	100.00%	99.65%	100.00%
6	Call Setup Success Rate (>=95%)	Highways	98.51%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	96.49%	100.00%	98.87%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	97.55%	100.00%	99.43%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	97.47%	100.00%	99.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Highways	98.96%	100.00%	99.63%	100.00%	99.63%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Major Roads	98.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Within City	98.49%	100.00%	99.70%	100.00%	99.23%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	98.48%	100.00%	99.76%	100.00%	99.63%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

NA: Not Applicable, NC: No Coverage

**MTS CDMA:** No service area at Gadhada, Gariadhar and on ICR with TATA CDMA at Palitana, Mahuva & Botad SDCAs.

**TATA CDMA:** No service area at Talaja, Gadhada & Gariyadhar SDCAs

**Videocon:** On ICR with TATA GSM at Palitana and Gariyadhar SDCAs.

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

**DRIVE TEST TABLE: 4**

DRIVE TEST ROUTE OF JULY TO SEPTEMBER 14 – GUJARAT CIRCLE									
Name of SSA	Day 1			Day 2			Day 3		
	Name of SDCA Covered /Total KM covered	Outdoor Route Covered	Indoor Office/Complex Name	Name of SDCA Covered /Total KM covered	Outdoor Route Covered	Indoor Office/Complex Name	Name of SDCA Covered /Total KM covered	Outdoor Route Covered	Indoor Office/Complex Name
<b>MEHSANA</b>	Mahesana, Kheralu / <b>107 KM</b>	Mahesana:- Palavasna, Nagalpur, GIDC, D ediyasan, ONGC Nagar, Kailashnagar, Radhan pur Chokdi, Modhera Chokdi, Viratnagar, Railway Colony, Ramdevnagar, Delan agar, Bus Station, Railway station.//Kheralu:- Mahesana-Ambaji Highway, Kheralu Bus stand, Chabutarwas, Desaiwado, vaghwadi..	Taluka seva Sadan, kheralu / Wide angle	Patan, Sidhpur & Harji / <b>142 KM</b>	Patan:- Hemchanracharya University, Cadila, Mohannagar, Soniwado, Gundipatipart, Tirupatinagar, Pragti Maidan, Indraprasth, Gud di, Bhagwatinagar. Hansapur //Sidhpur:- Ganeshpura, Nagwasan, Sa rshwati, Navavas, Mayuvar, Fulpura, Madhavnagar, Saifeepura, Islampura, Ambawadi, Marketyard.//Harji: Bus stand, Hospotal ,Baba road, Galla mandi road	Asopalav Restaurant /Gopi Avenue	Visnagar & Vijapur / <b>78 KM</b>	Visnagar:- Ganjbazar, Anandnagar, Bharatnagar, Parishram Society, Dharoi Colony, Adarshnagar, Satyagrah Savani, Vijaypara, SPCE Campus, Kansa, Mahesana-Ambaji Highway// Vijapur: Hospital, Jasraj clinic, abbedkar circle, guest house road, Market	Tirupati Complex



**AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 2014-GUJARAT CIRCLE**

<p align="center"><b>AHMEDABAD</b></p>	<p align="center">Ahmedabad / 201 KM</p>	<p>S G Highway, Gota, Bopal, Drive in Road, Chandkheda, 132 ft Ring Road, Paldi, Gujarat University, Usmanpura, Wadaj, Sarkhej-Juhapura road, Narol, Danilimda, Gitamandir, Jamalpur, Astodia, Maninagar, Vatva-Isanpur Road, Airport Road, Meghaninagar, Naroda, Odhav GIDC, Kathawada Highway</p>	<p align="center">Iscon Mall, Ahmedabad</p>	<p align="center">Dholka, Viramgam, Sanand / 130 KM</p>	<p>Sanand:- Ahmedabad Highway, Narmada Vasahat, Water Tank, Krushnagar, Gheepara, Sanand-shela Road, Dambha road, Market Area. //Viramgam:- Meladinagar, Nagarwada, Setwad, Axamagar, Golpitha, Aligadh, Amargadh, Dindayalnagar, Dalwadi, Nano Bhatwado, Bordibazar. //Dholka:- Hariom Nagar, Radhanpur, Maghiya, Lilajpar, Bhavani Society, Kaliyakud.</p>	<p align="center">Apana cinema, sanand</p>	<p align="center">Gandhinagar, Bareja, Dehgam / 160 KM</p>	<p>Gandhinagar:- Infocity, Sec 1, Sec 2, Sec 3, Sec 4, Sec 5, Sec 7, Sec 26, Sec 28, Sec 27, Pethapur, Vavol, Chiloda road. //Bareja:- Ahmedabad Highway, Bareja Lake, Teenbhata, Sahjannd park.</p>	<p align="center">Shri Ji Enclave, Bareja</p>
<p align="center"><b>BHAVNAGAR</b></p>	<p align="center">Bhavnagar / 105 KM</p>	<p>Bhavnagar:- Vertej, Nari Circle, Chitra GIDC, RTO Circle, Panwadi, Hill area, Vijayrajnagar, Darbargadh, Sardamagar, Tarsamiya, Rajpara, Shashtrinagar, Vithalwadi, Krishnanagar, Airport road.</p>	<p align="center">Himalaya Mall, Bhavnagar</p>	<p align="center">Palitana, Talaja, Mahuva / 120 KM</p>	<p>Palitana:- Taletigam, Ashwamegh Society, Baharpara, Jivapur, Jesar, Master Colony, Paras society, Vrundavan, Bhairavpara, Sardamagar, Hawamahel, Vrundavan // Talaja:- Shivajinagar, Mahuva, Policeline, Bus stand, Mahuva road, Bhavnagar Road //Mahuva :- Talaja Road, Ambawadi, Shreejinagar, Neswad GIDC, Shantinagar, Muninagar, Sarvoday Society, Corporative Housing Society, Khokhra, Gayatrinagar, Nagarwada, Barpara, una Road.</p>	<p align="center">Parshwanath complex, Mahuva</p>	<p align="center">Botad, Gadhada, Gariyadhar / 114 KM</p>	<p>Botad:- Khodiyamagar, Railway Colony, Bharwad Vado, Kharama, Hanumantpuri, Vithalपुरi, Rangali Street, Zavernagar, Ramnagar, Bhagavan Para, Mahakali nagar.</p>	<p align="center">Shriji Complex, Gariyadhar</p>

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF MEHSANA SSA (JULY-14)

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Mahesana , Kheralu	--	Patan, Sidhpur & Harji	NC	Visnagar & Vijapur	NC
2	AIRTEL BHARTI		Poor voice quality observed at Mahesana : Visnagar – Ambaji Highway		--		--
3	BSNL		--		Poor voice quality observed at Patan: Hansapur Tin Rasta & Near Hotel Siddhraj // Sidhpur : Dethali Road		--
4	IDEA CELLULAR		Poor voice quality observed at Mehasana : Mehsana-Ahmedabad Highway, Panchlimdi, – High Dense area		Poor voice quality observed at Patan: Matarvadi periphery of the town, Hansapur // Sidhpur : Neelam cinema road		Poor voice quality observed at: Visnagar: Anand market, MN College road / Vijapur: Police station road
5	UNINOR		--		Poor voice quality observed at Patan: Near Hotel Siddharth		--
6	VIDEOCON		--		--		--
7	VODAFONE		--		Poor voice quality observed at Patan: Matarvadi		Poor voice quality observed at Visnagar: Police Station area // Vijapur: Suramya Society
8	MTS		--		--		--
9	TATA GSM		Poor voice quality observed at Mehsana -Palanpur(SH-41) Highway		--		--
10	TATA CDMA		Poor voice quality observed at Mehsana -Shiv Society.		--		--
11	RCOM GSM		--		--		--
12	RCOM CDMA		--		--		Poor voice quality observed at Visnagar: Police Station area, Market area.

NC: No Coverage

**DRIVE TEST TABLE: 6**

**DRIVE TEST OBSERVATION OF AHMEDABAD SSA (AUGUST-14)**

S. No	Name of SP	SDCA Covered in Day 2	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Ahmedabad	Ahmedabad : Poor Rx Quality observed at Ring road	Dholka, Viramgam, Sanand	--	Gandhinagar, Bareja, Dehgam	Poor Rx Quality observed at Bareja : Barejdi Road
2	AIRTEL BHARTI		--		--		
3	BSNL		Poor Rx Quality observed at all over SDCA, Mazor worst quality at Gota Road Area ,Cantonment Area Road ,SP Ring Road		Poor Rx Quality observed at all over SDCA / Mazor worst quality at Dhokla : Maghiya/BekaTekri		--
4	IDEA CELLULAR		--		Poor Rx Quality observed at Viramgam: Viramgam Bypass,Sanand Highway		Poor Rx Quality observed at Dehgam: Dehgam - Nandol , Dehgam Chiloda road / Gandhinagar : GH-5 road.
5	UNINOR		Poor Rx Quality observed at Airport road koratpur		Poor Rx Quality observed at Virgam: Over the highway		Poor Rx Quality observed at Bareja outskirts Area
6	VIDEOCON		Poor Rx Quality observed at Kathwada Village, Chandolia Talav, Ambli Village, Shastri Bridge		--		--
7	VODAFONE		--		Poor Rx Quality observed at Viramgam : Phoolwadi Kabristan & Viramgam ByPass Rd		--
8	MTS		--		--		--
9	TATA GSM		Poor RX Quality observed at Ahmedabad -SP Ring Road near Vaishnodevi Temple , Ahmedabad-National Highway No. 8A (Ahmedabad-Mandvi)		--		--
10	TATA CDMA		--		--		Poor Rx Quality observed at Gandhinagar : Area : "G" Road
11	RCOM GSM		--		--		--
12	RCOM CDMA		--		--		--

DRIVE TEST TABLE: 7

**DRIVE TEST OBSERVATION OF BHAVNAGAR SSA (SEPTEMBER-14)**

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Bhavnagar	NC	Palitana, Talaja, Mahuva	NC	Botad, Gadhada, Gariyadhar	--
2	AIRTEL BHARTI		--		Poor Rx Quality patch observed at Palitana: Adpur palitana RD		--
3	BSNL		Poor Rx Quality patch observed at Iscon mall road , Vidya nagar , Jail road.		Palitana :Poor Rx Quality patch observed at Talaja Road		--
4	IDEA CELLULAR		Poor Rx Quality patch observed at Polytechnic road, Sardarnagar circle		--		Poor Rx Quality patch observed at Botad : Diamond market , Rajput street ,Bhagwan para
5	UNINOR		Poor Rx Quality patch observed at Talaza road, market area , Danapith		--		Botad : Near Braman society
6	VIDEOCON		Poor Rx Quality patch observed at Rajkot Road,Talaja Road, bhavnagar		Talaja, :Poor Rx Quality patch observed at police line area		Botad :Poor Rx Quality patch observed at Bhagavan para area
7	VODAFONE		Poor Rx Quality patch observed at Jethva Niwas		--		Botad :Poor Rx Quality patch observed at Near Sabiha Hospital, Near Hitesh jadav bhavya.
8	MTS		--		--		--
9	TATA GSM		--		--		--
10	TATA CDMA		Poor Rx Quality patch observed at Waghavadi Road		--		--
11	RCOM GSM		Poor Rx Quality patch observed at Jail road & Airport road		--		--
12	RCOM CDMA		--		--		--

NC: No Coverage

### 7.3 KEY FINDINGS ON DRIVE TEST:

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

#### 1. July -14 : Mehsana SSA

**SDCAs covered:** Mehsana, Kheralu, Patan, Sidhpur, Harji, Visunagar & Vijaypur.

**No Coverage:**

- i) Aircel: Has no coverage in Mehsana, Patan, Siddhpur, Harji, Visnagar,& Vijapur areas.
- ii) TATA GSM: Has no coverage in Harji & Vijaypur
- iii) TATA CDMA: Has no coverage in Kheralu & Harji
- iv) Videocon: Has no coverage in Harji & Vijaypur (Patan , sidhpur & Visnagar towns are on ICR with TATA GSM )
- v) MTS: Has no coverage in Harji & Vijaypur (Patan,Sidhpur & Visnagar towns are on ICR with TATA GSM)

The results of the drive test, carried out across Mesana SSA for all service providers revealed that they were largely in compliance of benchmarks of all the parameters, except **BSNL was** having Voice Quality Problem in Indoor drive test with its performance as 91.11 %. However, on overall SSA level its performance was well within the benchmark.

#### 2. August-14: Ahmedabad SSA

**SDCA covered:** Ahmedabad, Dholka, Viramgam Sanand, Gandhinagar, Bareja Dehgam

**No Coverage:**

No Coverage: Aircel has any coverage in Gandhinagar SDCA

The results of the drive test, carried out across Ahmedabad SSA for all service providers revealed that they were largely in compliance of benchmarks for all the parameters, except **BSNL** not met the benchmark for parameter '**Good Voice Quality**' with its performance as **91.93%** on overall SSA level. The voice Quality of RCOM also remained under performed on Highways with its performance as **94.15 %** .However, its performance on Overall SSA level was well within the benchmark.

#### September-14: Bhavnagar SSA

**No Coverage:** Aircel has no coverage in Bhavnagar SSA except in Gariya SDCA.

The results of the drive test, carried out in Bhavnagr SSA revealed that the operators were doing well with regard to compliance of the TRAI norms.

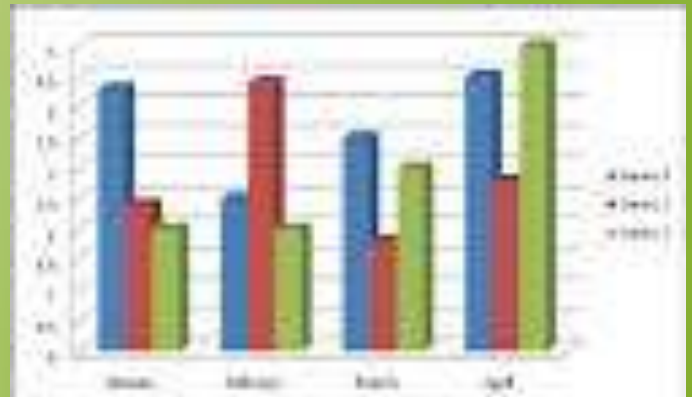
The drive test results suggest satisfactory working of the network of the service providers except BSNL having non-compliance with regard to Voice Quality in Gandhnagar SSA. The deficiencies with respect to adequate coverage and voice quality, encountered by different Service providers at the various places as shown in the drive tests plots, are detailed in the above table.-5, table-6 and table-7 for Mehesana, Ahemdbad and Bhavnagar SSAs respectively.

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

**AVERAGED QUARTERLY PMR**

**V/S**

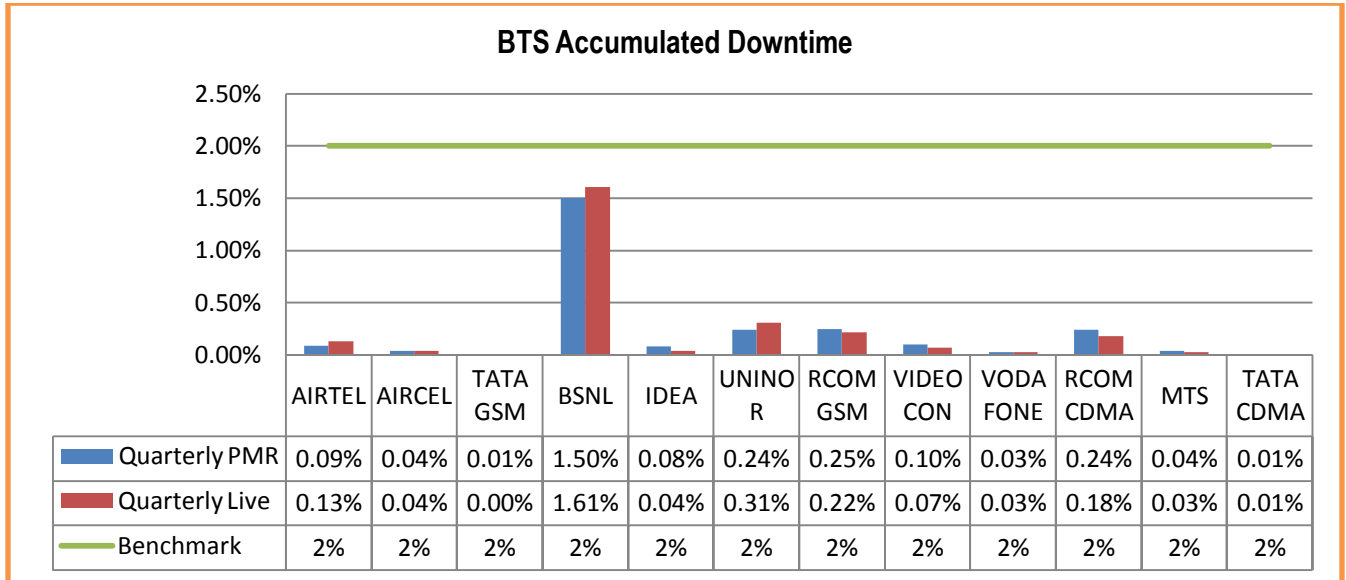
**AVERAGED QUARTERLY 3-DAYS LIVE MEASUREMENT**



**8. GRAPHICAL REPRESENTATION (CMTS):**

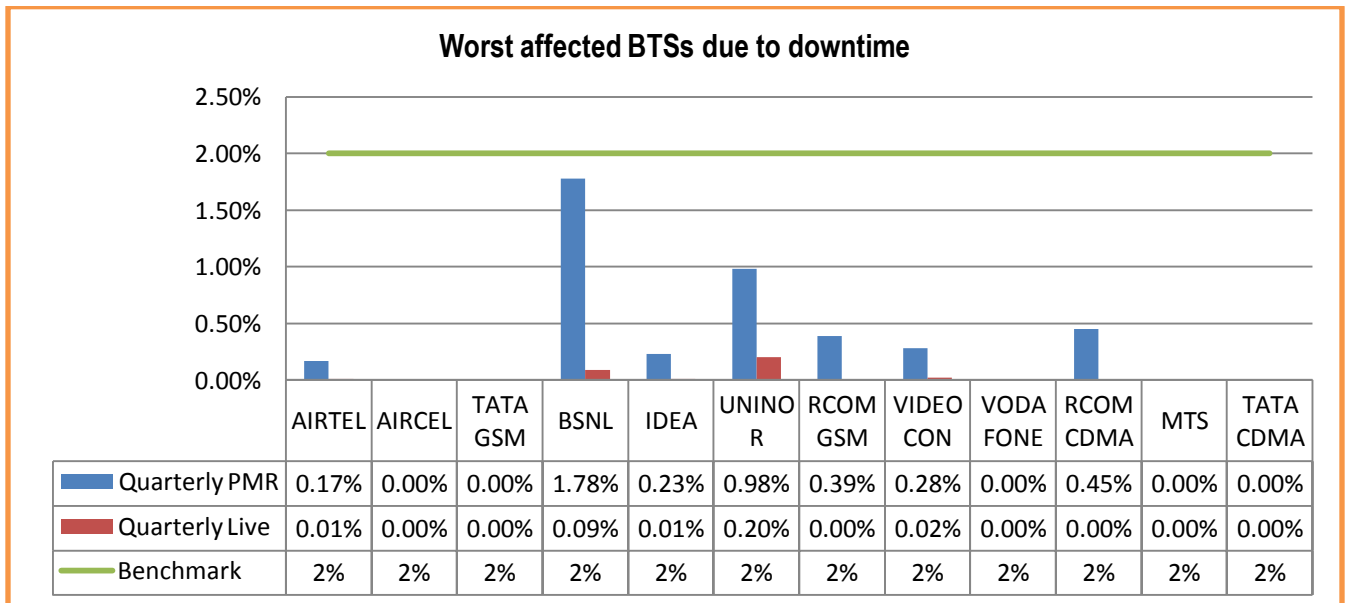
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

**1. BTS ACCUMULATED DOWNTIME:**



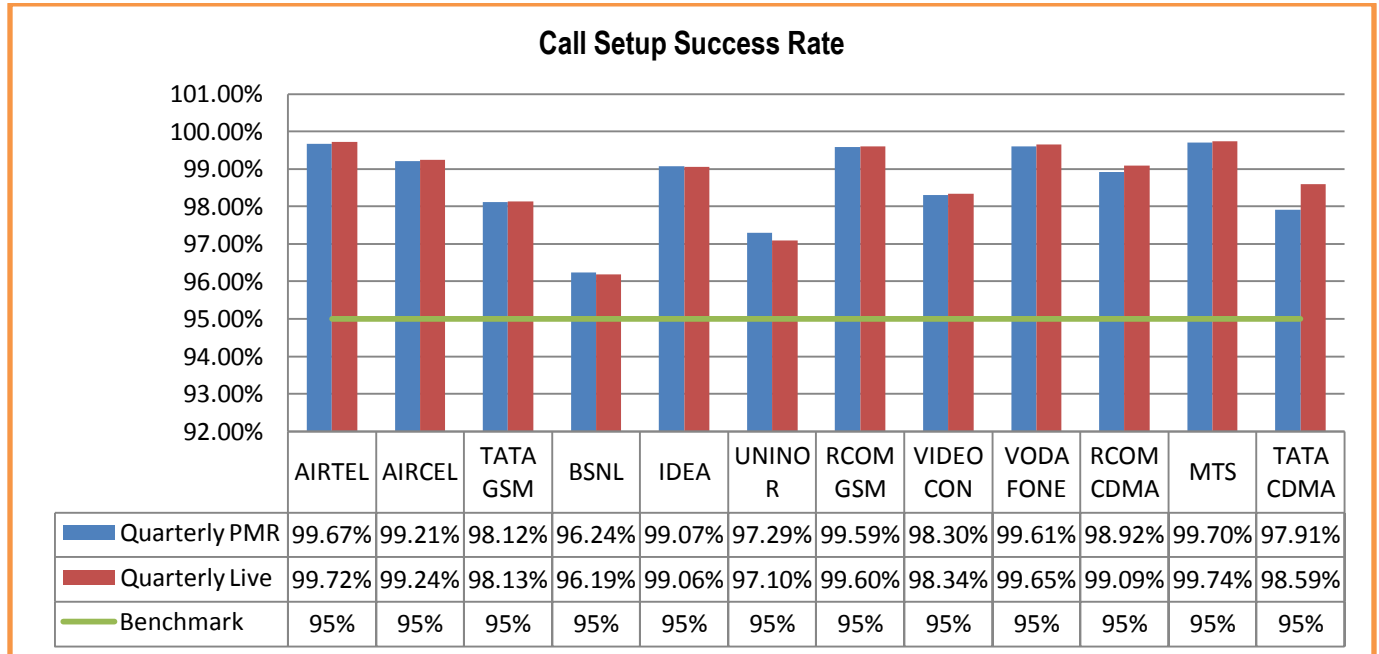
All operators are meeting the benchmarks.

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



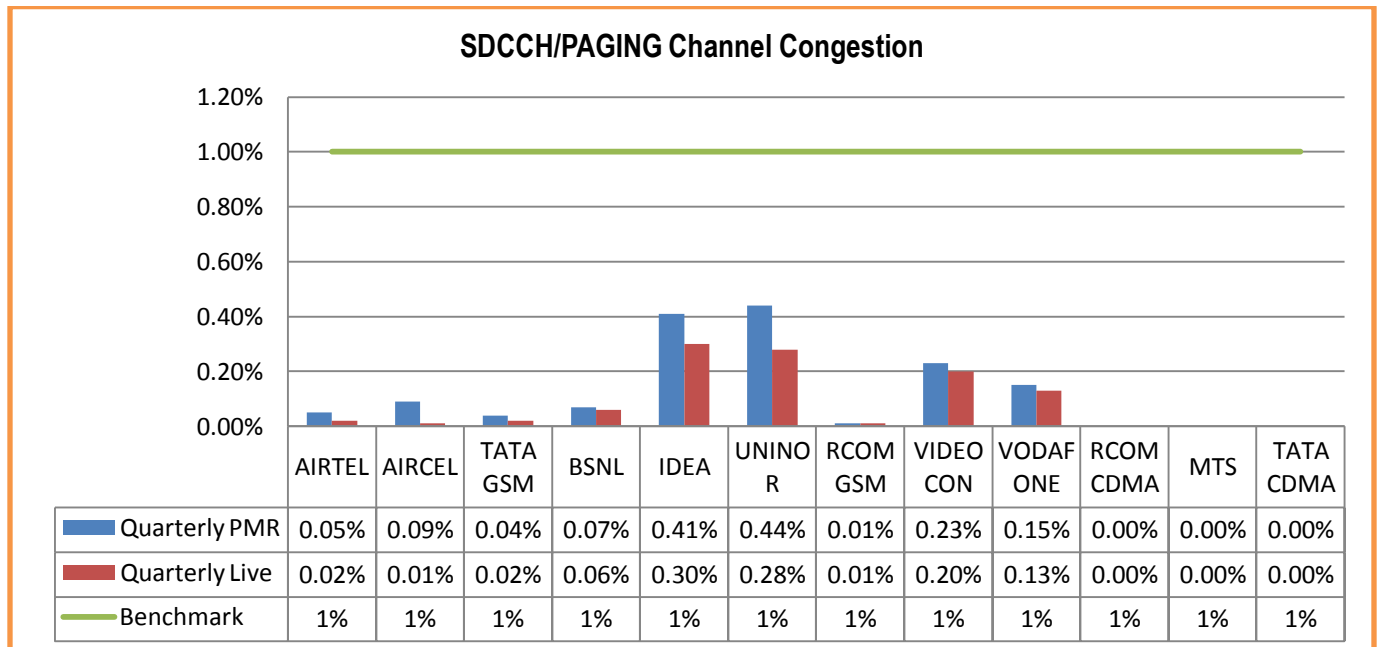
All operators are meeting the benchmarks.

**3. CALL SETUP SUCCESS RATE:**



All operators are meeting the benchmarks.

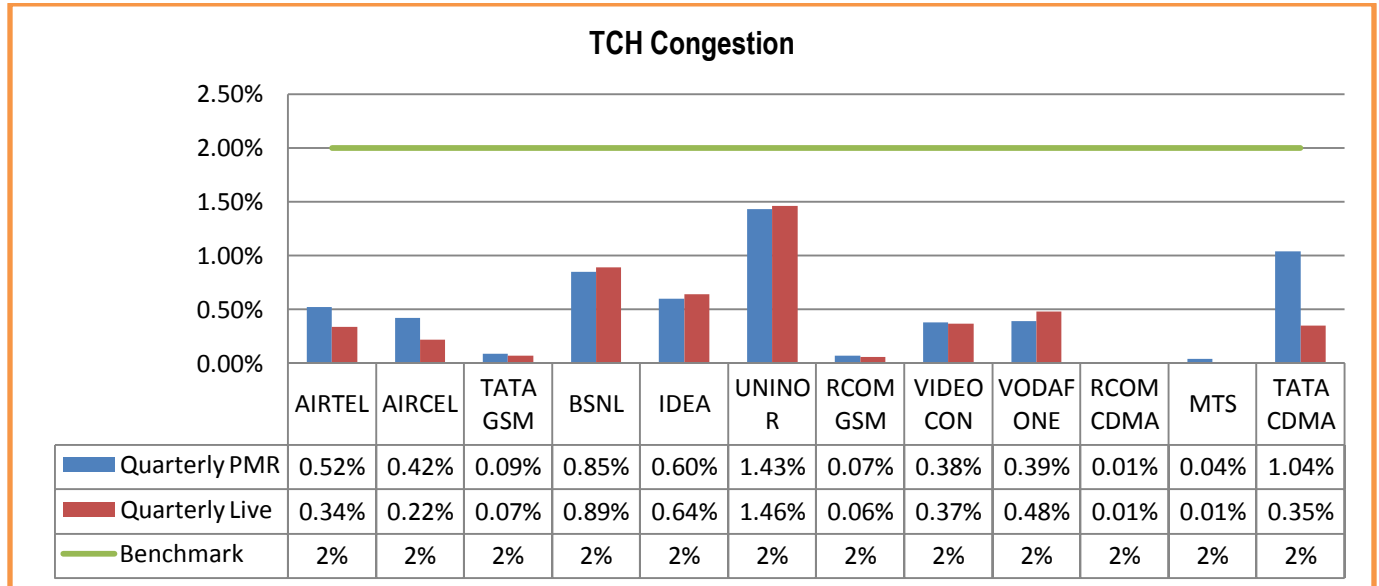
**4. SDCCH/PAGING CHANNEL CONGESTION:**



All operators are meeting the benchmarks.

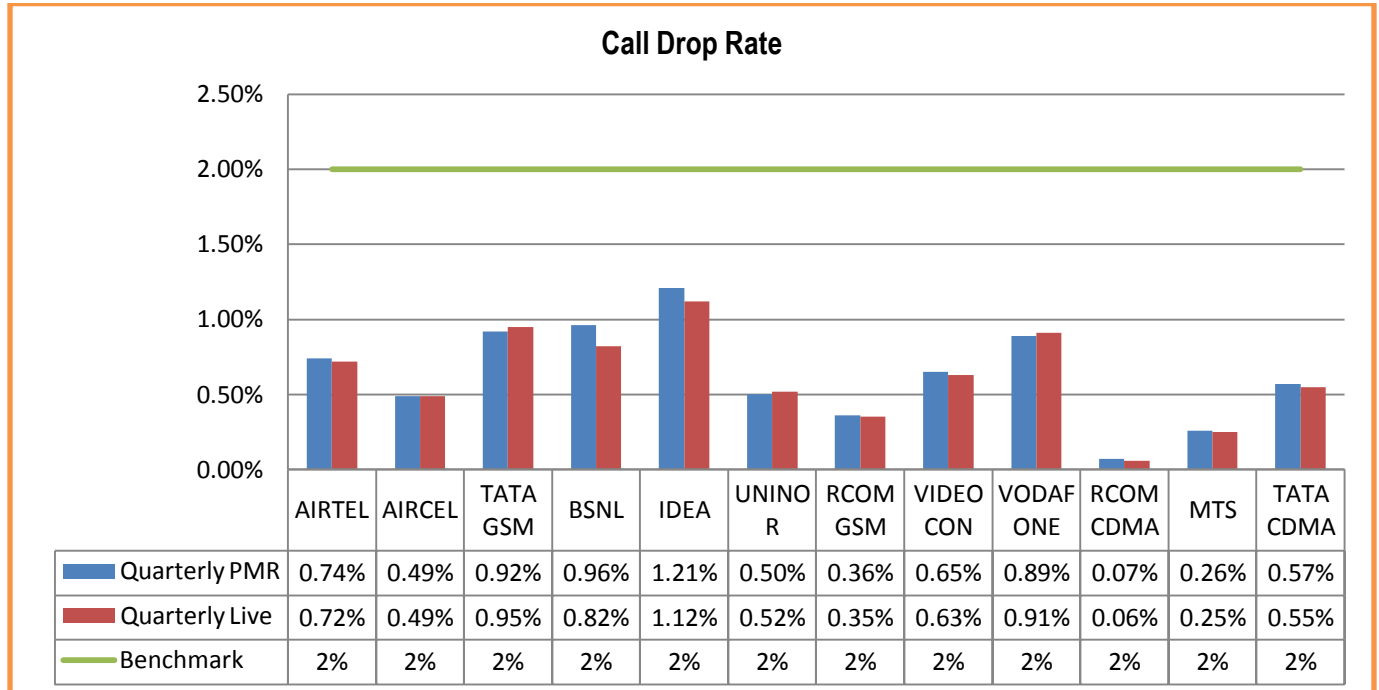


**5. TCH CONGESTION:**



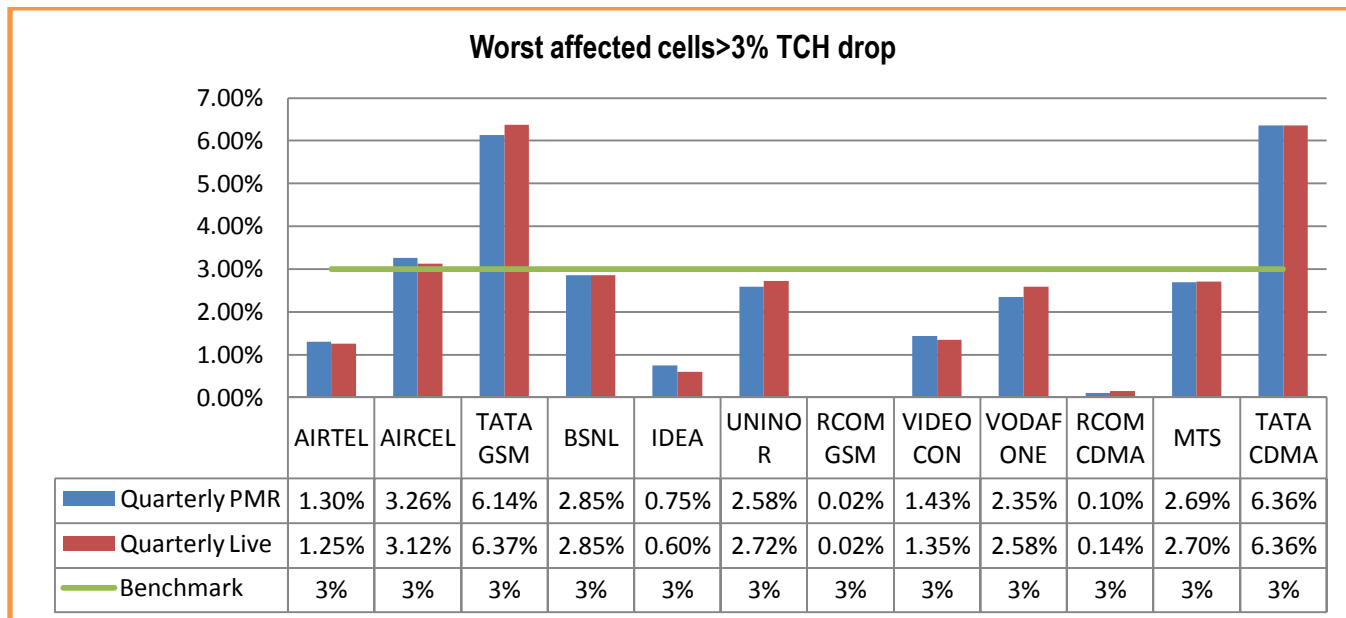
All operators are meeting the benchmarks.

**6. CALL DROP RATE:**



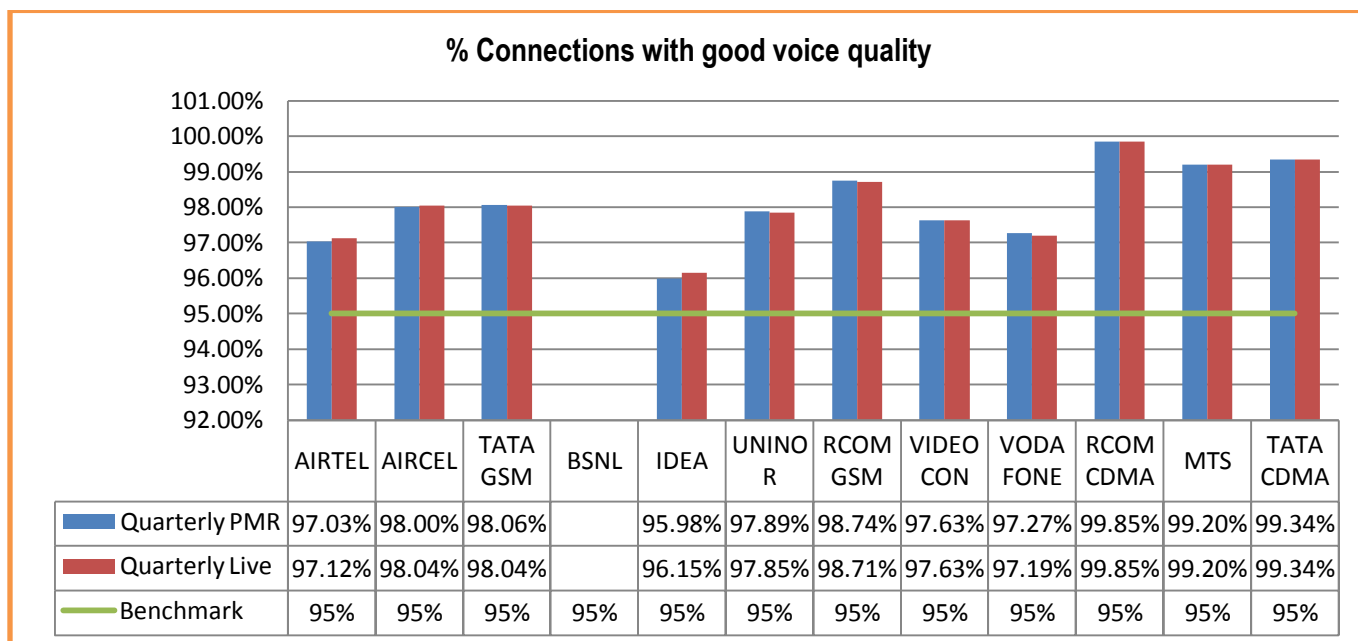
All operators are meeting the benchmarks.

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



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

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



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