

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
WEST ZONE – MUMBAI CIRCLE

Report Period: April 2011 – June 2011

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- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter

CHAPTER-1: INTRODUCTION

I. Background

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace, which will enable India to play a leading role in emerging global information society. One of the main objectives of Telecom Regulatory Authority of India (TRAI) is to provide a fair and transparent policy environment, which promotes a level playing field and facilitates fair competition.

In pursuance of above objective TRAI has issued from time to time a large number of regulations, orders and directives to deal with issues coming before it and provided the required direction to the evolution of Indian telecom market from a Government owned monopoly to a multi-operator multi service open competitive market.

The directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

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 has been carrying out regular reviews of the status of quality of service of the networks of all operators. In continuation to these efforts, TRAI has selected through bidding process TCIL as the Audit Agency to audit and assess the Quality of Service rendered by the service providers' namely Basic (Wireline) Services, Cellular Mobile Telephone (Wireless) Services and Broadband Services. The Audit for various telecom circles within the Zones has been distributed across four quarterly periods.

The parameters that need to be measured for Basic and Cellular Mobile Services have been specified in the TRAI notification on Quality of Service of Basic (Wireline) and Cellular Mobile (wireless) Services, 2009. The parameters for Broadband Services have been specified in the TRAI notification for Quality of Services of Broadband Service Regulation, 2006.

II. Objectives and Methodology

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband services against the parameters notified by TRAI. The audit and assessment of Quality of Service is conducted for all the basic service providers, unified access service providers, cellular mobile service providers and ISPs (Internet Service Provider) for basic wireline, Cellular Mobile Telephone Services and broadband service. TCIL has undertaken the following audit works as per the Terms of Reference (TOR):

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.

To fulfill the above mentioned Scope of Work audit was performed on different Systems, Facilities and Field data collection.

Systems audited:-

1. Network Switching Centre (NSS)
2. Base Station Subsystem(BSS)
3. Billing Applications
4. Customer Care applications

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

1. RF network coverage including KPIs (Key Performance Index)
2. Inter Operator Call Assessment
3. Checking of Customer Billing/Refund Complaints (Random sample)
4. Customer Care efficiency
5. The live calling was made to assess the quality of services for Inter Operator Call Assessment, Customer Billing/Refund Complaints and Customer Care efficiency.

In order to carry out the above scope of work:-

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Mumbai circle. But for parameters such as ‘Worst affected cell exceeding 3% TCH drop’ and ‘BTSs accumulated down time’ CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009. This has resulted in high value for ‘Cell exceeding 3% TCH drop’ parameter for some of the service providers.

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Mumbai Circle in 2nd quarter (April – June 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period October-December 2011.

Following are the various operators covered in Mumbai circle (West Zone) for Cellular Mobile (Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below:

Sl.	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	May-2011	1900-2000 Hrs
2	Airtel Ltd	May-2011	1900-2000 Hrs
3	MTNL (GSM)	May-2011	1900-2000 Hrs
4	Tata Communications (GSM)	May-2011	1900-2000 Hrs
5	Idea	May-2011	1900-2000 Hrs
6	Etisalat	May-2011	1900-2000 Hrs
7	Reliance Communication (GSM)	May-2011	1900-2000 Hrs
8	Loop	May-2011	1900-2000 Hrs
9	Vodafone	May-2011	1900-2000 Hrs
10	Videocon	May-2011	1900-2000 Hrs
11	Uninor	May-2011	1900-2000 Hrs
CDMA Operators			
12	Tata Communications (CDMA)	May-2011	1900-2000 Hrs
13	MTS	May-2011	1900-2000 Hrs
14	Reliance Communication (CDMA)	May-2011	1900-2000 Hrs
15	MTNL (CDMA)	May-2011	1900-2000 Hrs

II. Findings from Quality of Service Audit (Operator wise for each parameter)

(A) Cellular Mobile Telephone Services

3 days Live Data Audit		Bench- mark	Aircel	Airtel	MTN L	TATA	Idea	Etisalat	Reliance	LOOP	V- FONE	Videocon	Unino r	TATA	MTS	RCO M	MTN L
S/ N	Name of Parameter																
1	Connection Establishment (Accessibility)																
	a) CSSR (Call Setup Success Rate)	>=95%	99.68%	99.66%	97.40%	99.23%	99.25%	98.54%	99.68%	98.99%	99.50%	99.75%	99.36%	99.13%	99.40%	99.66%	98.80%
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.02%	0.32%	0.25%	0.05%	0.02%	0.12%	0.05%	0.06%	0.05%	0.03%	0.00%	0.00%	0.00%	0.52%
	c) TCH congestion	<=2%	0.01%	0.03%	0.84%	0.12%	0.15%	1.25%	0.01%	0.01%	0.33%	0.01%	0.02%	0.00%	0.00%	0.03%	0.01%
2	Connection maintenance (Retainability)																
	a) CDR	<=2%	0.77%	0.77%	1.58%	0.95%	1.21%	1.43%	0.29%	0.54%	0.69%	0.54%	1.32%	0.59%	0.17%	0.47%	1.26%
	b) Worst affected cells>3% TCH drop	<=3%	1.94%	2.00%	2.11%	2.30%	2.90%	18.99%	0.46%	0.46%	1.80%	0.46%	2.26%	1.55%	0.99%	1.82%	0.08%
	c) Good voice quality	>=95%	98.21%	99.60%	96.69%	97.31%	98.86%	98.15%	98.56%	98.31%	98.39%	98.31%	98.96%	NA	NA	NA	NA
3	No. of POI's having >0.5% POI congestion	>0.5%	0	0	0	0	0	1	0	2	0	1	0	0	0	0	NR
4	Response time to customers for assistance																
	a) Accessibility of call centre/Customer Care	>=95%	100%	100%	96.09%	99.00%	100%	100%	100%	100%	100%	100%	100%	99.63%	100%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	86.5%	100%	84%	95%	99.9%	100%	100%	100%	100%	95.4%	100.0%	90.0%	100.0%	95.5%	100%

NA: Not Applicable, NR: Not Received

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for Etisalat not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 18.99%. Etisalat, Loop & Videocon have POIs with >=0.5% congestion. Performance related to customer care data is found to be satisfactory for most of the operators in the case for the parameter “calls answered by operators (voice-to-voice)”. Aircel, MTNL GSM are having a below benchmark value for this parameter.

One Month Data Audit		Bench-mark	Aircel	Airtel	MTNL	Tata	Idea	ETISALAT	RELIANCE	LOOP	VODAFONE	VIDEOCON	UNINOR	TATA CDMA	MTS	RELIANCE CDMA	MTNL CDMA												
S/N	Name of Parameter																	GSM Operators										CDMA	
(A)	Network Service Quality Parameter																												
1	Network Availability																												
	a) BTS Accumulated Downtime	<=2%	0.09%	0.03%	0.81%	0.03%	0.01%	0.79%	0.25%	0.04%	0.01%	0.04%	0.04%	0.01%	0.31%	0.18%	0.06%												
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.16%	1.55%	0.09%	0.00%	2.30%	0.31%	0.15%	0.00%	0.15%	0.00%	0.00%	0.00%	0.13%	0.75%												
2	Connection Establishment (Accessibility)																												
	a) CSSR (Call Setup Success Rate)	>=95%	99.66%	99.66%	97.12 %	99.34 %	99.24%	97.75%	99.68 %	98.99 %	99.43%	99.80%	99.36 %	99.10%	99.29 %	99.57 %	98.53%												
	b) SDCCCH/PAGING congestion	<=1%	0.03%	0.02%	0.83%	0.20%	0.06%	0.04%	0.14%	0.05%	0.07%	0.05%	0.02%	0.00%	0.00%	0.00%	0.63%												
	c) TCH congestion	<=2%	0.01%	0.03%	1.81%	0.13%	0.16%	2.00%	0.03%	0.01%	0.37%	0.01%	0.01%	0.04%	0.00%	0.02%	0.01%												
3	Connection maintenance (Retainability)																												
	a) CDR	<=2%	0.72%	0.76%	1.44%	0.94%	1.19%	1.54%	0.29%	0.50%	0.67%	0.49%	1.25%	0.53%	0.16%	0.45%	1.32%												
	b) Worst affected cells>3% TCH drop	<=3%	2.00%	1.91%	2.23%	2.17%	2.71%	18.91%	0.54%	0.41%	1.81%	0.41%	2.01%	1.70%	1.14%	0.65%	0.08%												
	c) Good voice quality	>=95%	98.24%	99.60%	97.04 %	97.40 %	98.86%	98.09%	98.47 %	98.29 %	98.40%	98.29%	98.74 %	NA	NA	NA	NA												
4	No. of POI's having >0.5% POI congestion	>0.5%	0	0	0	0	0	1	0	2	0	1	0	0	0	0	NR												
(B)	Customer Service Quality Parameters																												
5	Metering/billing credibility- Post paid	<= 0.1%	0.54%	0.06%	0.10%	0.45%	0.04%	NA	0.10%	0.03%	0.01%	NA	NA	0.32%	0.33%	0.05%	0.08%												
6	Metering /billing credibility- Pre paid	<= 0.1%	0.05%	0.01%	NR	0.10%	0.04%	0.31%	0.01%	0.02%	0.00%	0.04%	0.17%	0.01%	0.02%	0.01%	0.00%												

One Month Data Audit		Bench-mark	Aircel	Airtel	MTNL	Tata	Idea	ETISALAT	RELIANCE	LOOP	VODAFONE	VIDEOCON	UNINOR	TATA CDMA	MTS	RELIANCE CDMA	MTNL CDMA	
S/N	Name of Parameter		GSM Operators										CDMA					
7	Resolution of billing/charging complaints	<i>100% within 4 weeks</i>	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%	100%	90%	100%	100%	100%	
	a) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<i><=1 week</i>	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	NR	
8	Response time to customers for assistance																	
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	95.73%	100%	95.56 %	99.00 %	NP	98.90%	100.00 %	98.91 %	99.28%	96.00%	99.83 %	100.00 %	94.85 %	100.00 %	95.36%	
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	96.77%	94.89%	55.97 %	93.00 %	98.41%	99.60%	95.42 %	97.04 %	61.14%	96.00%	99.56 %	99.63%	97.20 %	94.91 %	96.18%	
9	Termination/closure of service	<i><=7days</i>	67%	92%	NR	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%	100%	
10	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	97%	100%	100%	100%	

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting the network parameters by and large, except for Etisalat not meeting the benchmark for worst affected BTS " and for "Worst affected cells>3% TCH drop" with the value of 2.30% & 18.91% respectively. Etisalat, Loop & Videocon have POIs with >=0.5% congestion.

Performance related to customer care data is found to be satisfactory for most of the operators for the parameter "Metering/billing credibility-post paid' except for Tata GSM, Aircel, Tata CDMA and MTS & for prepaid Etisalat and Uninor are not meeting benchmark. A below benchmark performance is observed in case of Tata CDMA (90%) for resolution of billing/charging complaints. Tata CDMA (94.85%) is below for accessibility of call centre" parameter, while MTNL and Vodafone are showing below benchmark for "% call answered by operators (voice-voice)" parameter. Tata CDMA is not meeting the benchmark for "Termination/closure of service. Tata CDMA found below benchmark performance in refunds of deposits (97%).

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Mumbai Circle for all the operators. Route covered was about around 200Km depending on city areas within the speed limit of 40Km/hr. The areas covered were Western Expressway Nariman Point to Dahisar; Eastern Expressway CST to Thane-Turbhe & Andheri to Lokhandwala, Versova and covered different density areas (High, Medium & Low dense areas).

SN	Parameter	Benchmark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Uninor	TTML	MTS	Rcom	MTNL
			GSM Operators										CDMA Operators			
1.1	Blocked Call Rate (<=3%)	MUMBAI	0	0	4.31	0	2.47	2.06	1.66	0.7	1.3	2.11	0	0	1.53	0
1.2	Dropped Call Rate (<=2%)	MUMBAI	1.36	0	0	3.22	2.47	1.37	1.92	1.41	0	0.7	2	1	2.82	2.01
1.3	Percentage of connections with good voice quality (=>95%)															
	(i) 0-4 (w/o frequency hopping)	MUMBAI											96.2	99.32	96.11	84.53
	(ii) 0-5 (with frequency hopping)	MUMBAI	88.16	96.02	92	97.3	84.29	95	95.32	95.3	96.27	93.72				
1.4	Call Setup Success Rate (>=95%)	MUMBAI	100	100	95.69	100	97.53	97.94	98.34	99.3	98.7	97.89	100	100	98.47	100

Key observations as could be derived from the table are as under:

- Blocked Call Rate benchmark is not met by MTNL GSM in Mumbai Circle.
- Drop call rate benchmark is not met by REL GSM, TATA GSM, and MTNL CDMA & IDEA in Mumbai.
- Percentage of connections with good voice quality is not met by Aircel, Uninor, Idea and MTNL both GSM & CDMA in Mumbai.

Independent Drive Test

The Independent Drive Test was conducted at Mumbai Circle in Mumbai. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	Idea	Loop	V-fone	Uninor
1.1	Blocked Call Rate (<=3%)	Mumbai	159	97	174	130	125	241
1.2	Dropped Call Rate (<=2%)	Mumbai	0.62	0	0	0	0	0.41
1.3	Percentage of connections with good voice quality (=>95%)							
	(i) 0-4 (w/o frequency hopping)	MUMBAI						
	(ii) 0-5 (with frequency hopping)	MUMBAI	96.3	96.05	88.16	97.2	98.43	92.52
1.4	Call Setup Success Rate (>=95%)	MUMBAI	99.48	100	100	98.68	99.46	98.45

Key observations as could be derived from the table are as under:

- Good Voice Quality parameter is not met by Idea (88.16%) in Mumbai.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	MTNL	TATA	Idea	Etsalat	Reliance	LOOP	V-FONE	Videocon	UNINOR	TATA CDMA	MTS	REL CDMA
S/N	Name of Parameter			GSM											CDMA		
(A)	Network Service Quality Parameter																
1	Network Availability																
	BTS Accumulated Downtime	<=2%	Reported	0.04	0.26	0.72	0.04	0.02	3.21	0.19	0.18	0.01	0.41	0.04	0.01	0.09	0.16
			Verified	0.04	0.26	0.72	0.04	0.02	3.21	0.19	0.18	0.01	0.41	0.04	0.01	0.09	0.16
	Worst affected BTSs due to downtime	<=2%	Reported	0.13	1.33	1.2	0.18	0	13.76	0.27	0.34	0	0	0	0	0	0
Verified			0.13	1.33	1.2	0.18	0	13.76	0.27	0.34	0	0	0	0	0	0	0.14
2	Connection Establishment (Accessibility)																
	CSSR (Call Setup Success Rate)	>=95%	Reported	98.37	98.31	98.17	98.99	99.26	99.58	99.19	99.64	99.05	98.83	99.36	99.54	99.1	99.06
			Verified	98.37	98.31	98.17	98.99	99.26	99.58	99.19	99.64	99.05	98.83	99.36	99.54	99.1	99.06
	SDCCH/PAGING congestion	<=1%	Reported	0.15	0.33	0.34	0.26	0.11	0	0.22	0.25	0.16	0.05	0.01	0	0	0
			Verified	0.15	0.33	0.34	0.26	0.11	0	0.22	0.25	0.16	0.05	0.01	0	0	0
	TCH congestion	<=2%	Reported	0.01	0.62	1.93	0.36	0.21	0	0.48	0.06	0.34	0.01	0.02	0.01	0	0.21
Verified			0.01	0.62	1.93	0.36	0.21	0	0.48	0.06	0.34	0.01	0.02	0.01	0	0.21	
3	Connection maintenance (Retainability)																
	CDR	<=2%	Reported	0.78	1.15	1.91	0.93	1.18	1.89	0.35	0.85	0.69	1.14	0.8	0.29	0.14	0.59
			Verified	0.78	1.15	1.91	0.93	1.18	1.89	0.35	0.85	0.69	1.14	0.8	0.29	0.14	0.59
	Worst affected cells>3% TCH drop	<=5%	Reported	2.25	1.88	3.24	1.84	7.08	9.04	0.52	0.64	1.3	0	2.09	0.38	2.01	0.4
Verified			2.25	1.88	3.24	1.84	7.08	9.04	0.52	0.64	1.3	0	2.09	0.38	2.01	0.4	

PMR		Bench- mark	Audit	Aircel	Airtel	MTNL	TATA	Idea	Etsalat	Reliance	LOOP	V-FONE	Videocon	UNINOR	TATA CDMA	MTS	REL CDMA
S/N	Name of Parameter			GSM										CDMA			
	Good voice quality	>=95%	Reported	98.29	98.39	95.71	97.38	98.85	97.21	98.4	98.22	98.54	99.18	99.01	99.84	99.59	98.92
			Verified	98.29	98.39	95.71	97.38	98.85	97.21	98.4	98.22	98.54	99.18	99.01	99.84	99.59	98.92
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	0	0	0	2	2	0	0	0
			Verified	0	0	0	0	0	0	0	0	0	2	2	0	0	0
(B)	Customer Service Quality Parameters																
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.14	0.02	0.6	0.1	0.04	NA	0.09	0.02	0	NA	NA	0.09	0.06	0.09
			Verified	0.14	0.02	0.6	0.1	0.04	NA	0.09	0.02	0	NA	NA	0.09	0.06	0.09
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.12	0	0.08	0.01	0.04	0	0.03	0.05	0.01	0.1	0	0.02	0.03	0.03
			Verified	0.12	0	0.08	0.01	0.04	0	0.03	0.05	0.01	0.1	0	0.02	0.03	0.03
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100	100	100	100	100	100	100	100	100	100	100	92.5	100	100
			Verified	100	100	100	100	100	100	100	100	100	100	100	92.5	100	100
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100	100	100	100	100	100	100	100	100	100	NA	99.22	100	100
			Verified	100	100	100	100	100	100	100	100	100	100	NA	99.22	100	100
8	Response time to customers for assistance																
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	95.96%	95.01%	97%	98.6%	98%	97.38%	100%	95%	95%	96%	99%	96%
			Verified	100%	100%	95.96%	95.01%	97%	98.6%	98%	97.38%	100%	95%	95%	96%	99%	96%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	89.77%	82%	93.09%	96.36%	90%	93.34%	92%	95.55%	83.00%	91%	91.60%	93.05%	94%	90%
			Verified	89.77%	82%	93.09%	96.36%	90%	93.34%	92%	95.55%	83.00%	91%	91.60%	93.05%	94%	90%

PMR		Bench-mark	Audit	Aircel	Airtel	MTNL	TATA	Idea	Etisalat	Reliance	LOOP	V-FONE	Videocon	UNINOR	TATA CDMA	MTS	REL CDMA
S/N	Name of Parameter			GSM										CDMA			
9	Termination/closure of service																
	No. of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	97%	100%	NA	100%	100%	100%	NA	NA	84%	100%	100%
			Verified	100%	100%	100%	97%	100%	NA	100%	100%	100%	NA	NA	84%	100%	100%

Critical Analysis (PMR Verification):

- The figures proved by all the operators match the figures obtained on verification.
- Only Etisalat is not meeting the benchmark for the parameter "BTS Accumulated Downtime "& "Worst affected cells>3% TCH drop" with high margins respectively.
- Idea is not meeting the benchmark for "Worst affected cells>3% TCH drop" with a value of 7.09%.
- Tata CDMA fails to meet bench mark for parameter " Resolution of billing/ charging complaints within 4 weeks", "Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints" and "Time Taken for refunds of deposits after closures "respectively.
- Aircel, Airtel & Vodafone are not meeting the benchmark for the parameter "% call answered by operators (voice-voice).
- TATA GSM Fails to meet benchmark for the parameter "Time Taken for refunds of deposits after closures".

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videocon	Uninor	TTML	MTS	Rcom	MTNL	
			GSM Operators										CDMA Operators					
A	Network Service Quality Parameter																	
1	Connection Establishment (Accessibility)																	
	a) CSSR	>=95%	99.68%	99.66%	97.40%	99.23%	99.25%	98.54%	99.68%	98.99%	99.50%	99.75%	99.36%	99.13%	99.40%	99.66%	98.80%	
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.02%	0.32%	0.25%	0.05%	0.02%	0.12%	0.05%	0.06%	0.05%	0.03%	0.00%	0.00%	0.00%	0.52%	
	c) TCH congestion	<=2%	0.01%	0.03%	0.84%	0.12%	0.15%	1.25%	0.01%	0.01%	0.33%	0.01%	0.02%	0.00%	0.00%	0.03%	0.01%	
2	Connection maintenance																	
	a) CDR	<=2%	0.77%	0.77%	1.58%	0.95%	1.21%	1.43%	0.29%	0.54%	0.69%	0.54%	1.32%	0.59%	0.17%	0.47%	1.26%	
	b) Cells having > 3% TCH drop	<=3%	1.94%	2.00%	2.11%	2.30%	2.90%	18.99%	0.46%	0.46%	1.80%	0.46%	2.26%	1.55%	0.99%	1.82%	0.08%	
	c) Good voice quality	>=95%	98.21%	99.60%	96.69%	97.31%	98.86%	98.15%	98.56%	98.31%	98.39%	98.31%	98.96%	NA	NA	NA	NA	
	d) No. of cells > 3% TCH drop		112	156	54	139	188	464	27	26	148	26	74	41	13	14	2	
	e) Total no. of cells in the network		5787	7792	2560	6035	6489	2443	5898	5671	8223	5671	3279	2643	1317	770	2640	

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videocon	Uninor	TTML	MTS	Rcom	MTNL		
			GSM Operators											CDMA Operators					
3	No. of POI's having $\geq 0.5\%$ POI congestion	$\geq 0.5\%$	0	0	0	0	0	1	0	2	0	1	0	0	0	0	NP		
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	BSNL	Nil	V-fone	Nil	Loop	Nil	Nil	Nil	Nil	NP		
	b) Total No. of circuits on POI		27651	82227	23372	67297	90622	8503	79605	66980	222768	10775	18028	67297	10554	87213	1375		
	c) Avg No. of call attempts on POI		419879	1850899	241479	1063756	1474604	132129	1031723	920711	3029469	207278	362869	1065080	77801	1031723	NP		
	d) Avg traffic served on POI (Erlang)		7919	34782	6989	24926	49079	4060	36358	15276	67868	3089	7627	25139	1375	36358	NP		
	e) Total number of working POI Service Area wise		77	238	68	181	238	20	193	71	456	40	42	181	41	193	11		
	f) Equipped Capacity of Network in respect of Traffic in erlang		76311	169460	1322959	75277	73780	16529	NP	140585	194822	14085	140582	130759	42000	23400	36000		
	g) Total traffic handled in TCBH in erlang		15656	89519	518642	25784	60831	4300	NP	6186	151590	61501	61501	57740	2861	99727	1124		
(B)	Customer Service Quality Parameters																		

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videocon	Uninor	TTML	MTS	Rcom	MTNL	
			GSM Operators											CDMA Operators				
4	Response time to customers for assistance																	
	a) Accessibility of call centre	>=95%	100%	100%	96.09 %	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	86.50 %	100%	84%	95.00 %	99.90 %	100%	100%	100%	100%	95.44 %	100%	90%	100%	95.54 %	100%	100%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		100	100	96	99	100	100	100	100	100	100	100	100	100	100	100	100

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Mumbai Service Area are as given below:-

- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.40% and 99.75%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0.02% and 0.52%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.25%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.17% and 1.58%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Etisalat with a value of 18.99% rest of the operators are satisfying the benchmark with value in between 0.08 and 2.90%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 96.69% and 99.60%. CDMA operators have submitted that this data is not system generated.
- **No. of POI having Congestion $>0.5\%$:** Etisalat, Loop & Videocon have POIs with more than 0.5% congestion. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark $>95\%$):** All operators are meeting the benchmark with values lying b/w 96.09% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$): %):** Except for Aircel 86.50% and MTNL GSM 84.00% All other operators are meeting the benchmark with values lying between 90% and 100

2) One month audit data report & summarized findings

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videocon	Uninor	TTML	MTS	Rcom	MTNL		
			GSM Operators											CDMA Operators					
(A)	Network Service Quality Parameter																		
1	Network Availability																		
	a) BTS Accumulated Downtime	<=2%	0.09 %	0.03 %	0.81 %	0.03 %	0.01%	0.79%	0.25%	0.04%	0.01 %	0.04%	0.04%	0.01%	0.03%	0.18%	0.06%		
	b) Worst affected BTSs due to downtime	<=2%	0%	0.16 %	1.55 %	0.09 %	0.00%	2.30%	0.31%	0.15%	0.00 %	0.15%	0%	0%	0.00%	0.13%	0.75%		
	c) Total no. of BTSs in the licensed service area		2055	3133	902	2188	2286	826	1966	2048	3390	2048	1468	881	439	770	535		
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		1342	802	5415	435	NR	4875	3594	678	262	678	476	60	87	1003	220		
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	5	14	2	NR	19	6	3	0	3	0	0	0	1	4		
2	Connection Establishment (Accessibility)																		
	a) CSSR (Call Setup Success Rate)	>=95 %	99.66 %	99.66 %	97.12 %	99.34 %	99.24 %	97.75%	99.68 %	98.99 %	99.43 %	99.80 %	99.36 %	99.10 %	99.29 %	99.57 %	98.53 %		
	b) SDCCH/PAGING congestion	<=1%	0.03 %	0.02 %	0.83 %	0.20 %	0.06%	0.04%	0.14%	0.05%	0.07 %	0.05%	0.02%	0.00%	0.00%	0.00%	0.63%		
	c) TCH congestion	<=2%	0.01 %	0.03 %	1.81 %	0.13 %	0.16%	2.00%	0.03%	0.01%	0.37 %	0.01%	0.01%	0.04%	0.00%	0.02%	0.01%		
3	Connection maintenance (Retainability)																		
	a) CDR	<=2%	0.72 %	0.76 %	1.44 %	0.94 %	1.19%	1.54%	0.29%	0.50%	0.67 %	0.49%	1.25%	0.53%	0.16%	0.45%	1.32%		
	b) Worst affected cells>3% TCH drop	<=3%	2.00 %	1.91 %	2.23 %	2.17 %	2.71%	18.91%	0.54%	0.41%	1.81 %	0.41%	2.01%	1.70%	1.14%	0.65%	0.08%		
	c) Good voice quality	>=95 %	98.24 %	99.60 %	97.04 %	97.40 %	98.86 %	98.09%	98.47 %	98.29 %	98.40 %	98.29 %	98.74 %	NA	NA	NA	NA		
	d) Total No. of cells exceeding 3% TCH drop (call drop)		116	149	57	131	176	462	32	23	149	23	66	45	15	5	2		

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videocon	Uninor	TTML	MTS	Rcom	MTNL		
			GSM Operators											CDMA Operators					
	e) Total no. of cells in the network		5787	7792	2560	6035	6489	2443	5898	5671	8223	5671	3279	2643	1317	770	2640		
4	No. of POI's having >=0.5% POI congestion	>=0.5 %	0	0	0	0	0	1	0	2	0	1	0	0	0	0	NP		
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NIL	NIL	NIL	V-fone	NIL	Loop	NIL	NIL	NIL	NIL	NP		
	b) Total No. of call attempts on POI (Avg.)		42577 7	17353 62	72639 05	18038 29	1543906	209188	1272117 8	929808	30739 49	7211636	1221368 0	1083829	79821	1272178	NP		
	c) Total traffic served on POI (Erlang) (Avg.)		8130	32055. 84	204878	25715. 34	50315.1	4602.02	40192.34	15317.45	69088. 97	104517.9	291404.6 4	67297	1410.04	40192.34	NP		
	d) Total No. of circuits on POI		27651	82227	23372	67297	90622	8503	79605	66980	222768	10775	18028	67297	10554	87213	1375		
	e) Total number of working POI Service Area wise		77	238	68	181	238	20	193	71	456	40	42	181	41	193	11		
	f) Capacity of POI		26059 .5	75280 .2	18525 .6	64062	83951. 4	7801	81007. 6	61347. 6	21245 0	9785.5 9	16292. 9	64061. 7	9380	78638	1100		
5	Network Data																		
	a) Equipped Capacity of Network Erlang		76311	16946 0	13229 59	75277	73780	16529	NR	140585	19482 2	14085	140582	130759	42000	23400	36000		
	b) Total traffic in TCBH in erlang (Avg.)		15656	89519	51864 2	25784	60831	4300	NR	6186	15159 0	61501	61501	57740	2861	99727	1124		
	c) Total no. of customers served (as per VLR) on last day of the month		56278 0	26060 64	75447 3	96569 5	1733979	88189	NR	1687401	32184 91	474074	403933	102420 1	10840	NP	39880		
(B)	Customer Service Quality Parameters																		
5	Metering/billing credibility- Post paid	<= 0.1%	0.54 %	0.06 %	0.10 %	0.45 %	0.04%	NA	0.10%	0.03%	0.01 %	NA	NA	0.32%	0.33%	0.05%	0.08%		
	a) No. of bills issued during the period		26468	35622 9	16400 2	34338	155304	NA	53613	300773	99544 9	NA	NA	378586	912	561583	18372		
	b) No. of bills disputed including billing complaints during the period		144	203	158	156	59	NA	55	76	131	NA	NA	1217	3	301	15		

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videocn	Uninor	TTML	MTS	Rcom	MTNL	
			GSM Operators											CDMA Operators				
6	Metering /billing credibility- Pre paid	<= 0.1%	0.05 %	0.01 %	NP	0.10 %	0.04%	0.31%	0.01%	0.02%	0.00 %	0.04%	0.17%	0.01%	0.02%	0.01%	0.00%	
	a) No. of charging / credit / validity complaints during the quarter		611	402	NP	4415	794	1106	350	494	6	535	1870	232	125	350	2	
	b) Total no. of pre-paid customers at the end of the quarter		12303 51	79848 50	NP	44968 89	187043 4	355814	365685 3	281272 8	44879 26	134806 9	110649 5	291872 0	685679	334055 8	75124	
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	NP	100%	100%	100%	100.0 %	100.0 %	100%	100%	100%	90%	100%	100%	100%	
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		755	605	158	4412	853	1106	405	570	137	535	1870	1409	133	651	17	
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		755	605	158	4412	853	1106	405	570	137	535	1870	1449	133	651	17	
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		44	605	158	1746	853	0	116	351	137	535	883	1409	131	262	17	
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		711	0	0	2666	0	1106	289	219	0	0	987	0	2	389	0	
	e) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<=1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	<1 week	NP

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	Loop	V-fone	Videcon	Uninor	TTML	MTS	Rcom	MTNL	
			GSM Operators											CDMA Operators				
8	Response time to customers for assistance																	
	a) Accessibility of call centre/Customer Care	>=95 %	95.73 %	100%	95.56 %	99%	NP	98.90%	100%	98.91%	99.28 %	96.00%	99.83%	100%	94.85%	100%	95.36%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90 %	96.77 %	94.89 %	55.97 %	93%	98.41%	99.60%	95.42%	97.04%	61.14 %	96.00%	99.56%	99.63%	97.20%	94.91%	96.18%	
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		31601 4	13042 41	15963	11681 7	405597	99846	480231	1122711	12329 93	39483	112020	144154	18413	28028	1804	
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		30582 3	12378 57	15251	11257 1	399164	99404	458253	108948 7	75386 8	37770	111523	37595	17466	26014	1737	
9	Termination/closure of service	<=7days	66.78 %	91.97 %	NP	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%	100%	
	a) Total No. of requests for Termination / Closure of service received during the quarter		286	6,476	987	673	1,807	NA	508	1,180	864	NA	NA	3,333	4	3,272	2,776	
	b) No. of requests for Termination / Closure of service complied within 7 days during the quarter		191	5,956	NP	673	1,807	NA	508	1,180	864	NA	NA	3,333	4	3,272	2,776	
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	97.06 %	100%	100%	100%	

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Mumbai Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.01% and 0.81%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** Except for Etisalat with a value of 2.3%, all operators are meeting the benchmark with values lying between 0% and 1.55%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.12% and 99.80%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.83%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 2%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.16% and 1.54%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Etisalat with a value of 18.91%, all other operators are satisfying the benchmark with value in between 0.08% and 2.72%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 97.04% and 99.60%.
- **No. of POI having Congestion > 0.5%:** Etisalat, Loop & Videocon have POIs with more than 0.5% congestion. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark > 95):** Except for MTS (94.85%), all operators are meeting the benchmark with values lying between 95.36% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark > 90):** Except for MTNL GSM (55.97%) and Vodafone (61.14%). Rest all other operators are meeting the benchmark with values lying between 94.89% and 100%.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** Except Aircel (0.54%), TATA Docomo (0.45%), TATA CDMA (0.32%) and MTS (0.33%). Rest all other operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** Except for Etisalat (0.31%) and Uninor (0.17%), rest all other operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** Except TTML, All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days):** Except Aircel (66.78%) & Airtel (91.97); rest all other operators have satisfied the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** Except Tata CDMA, all operators have satisfied the benchmark.

(1) Sample Coverage

Switches/BSC/BTS details of operators:

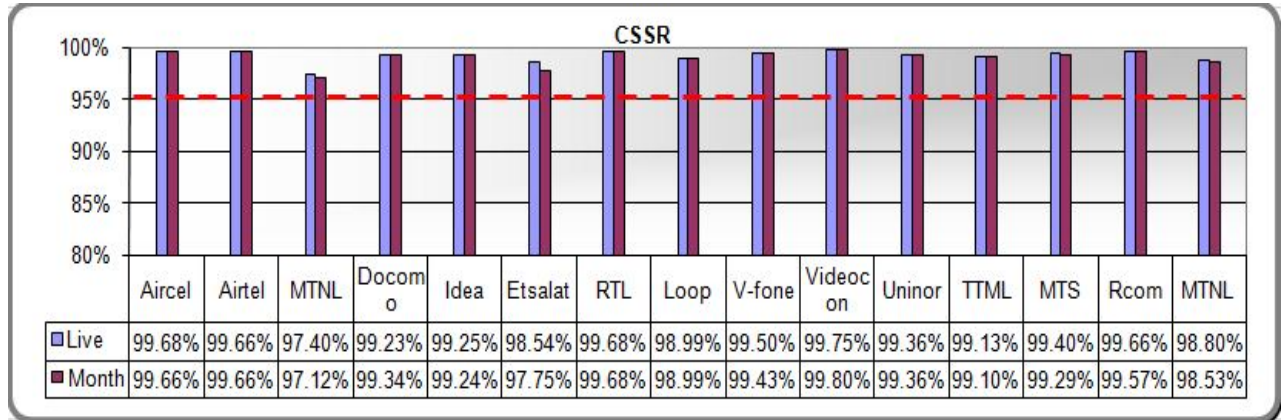
Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	2	21	2055
2	Airtel Ltd	9	64	3133
3	MTNL	5	38	902
4	Tata Communications	3	15	2188
5	Idea	6	22	2286
6	Etisalat			826
7	Reliance Communication	2	11	1966
8	Loop	2	20	2048
9	Vodafone	17	62	3390
10	Videocon	2	11	2048
11	Uninor	2	14	1468
CDMA Operators				
12	Tata Communications	3	6	884
13	MTS	1	2	439
14	Reliance Communication	2	11	770
15	MTNL	2	3	220

(2) Performance (Graphical Representation)

Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

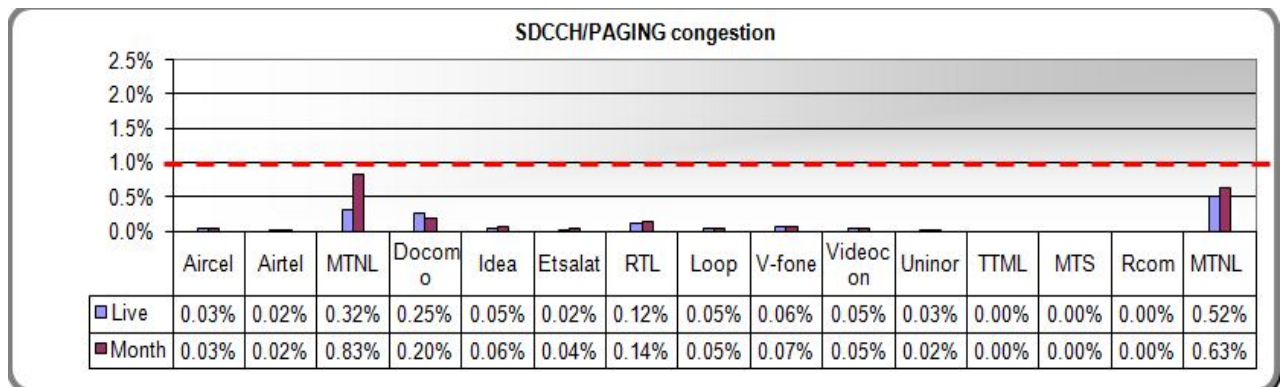
A) NETWORK PERFORMANCE

I. **Call setup success rate:** All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

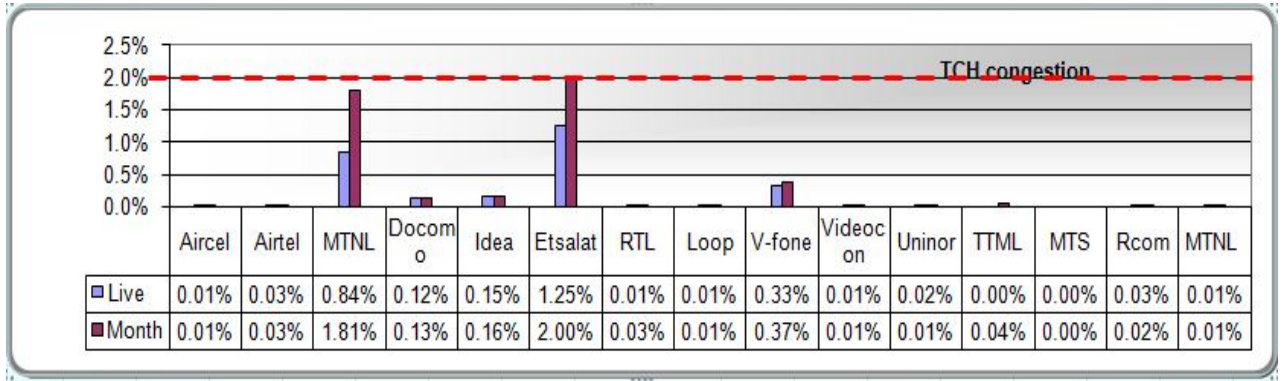


II. Blocked call rate:

SDCCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 1\%$) for both one month data and 3 days live data taken in the month of audit.

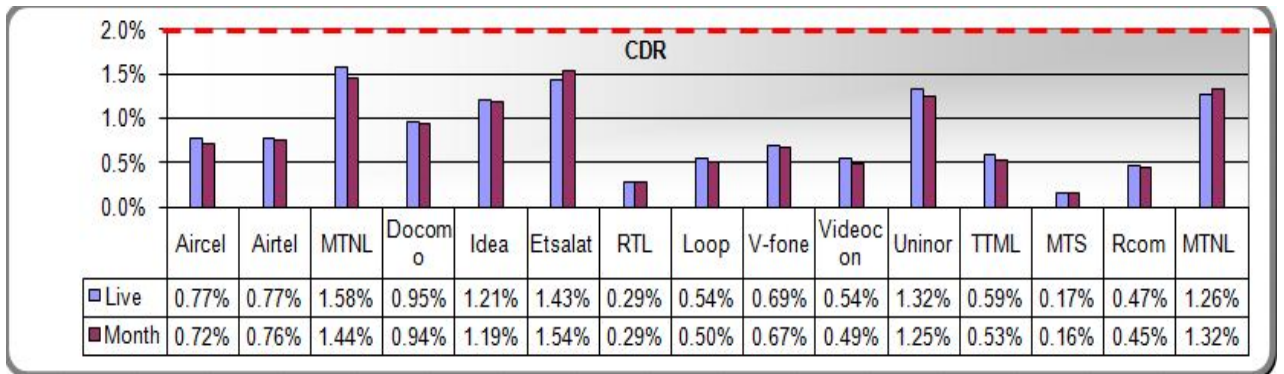


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

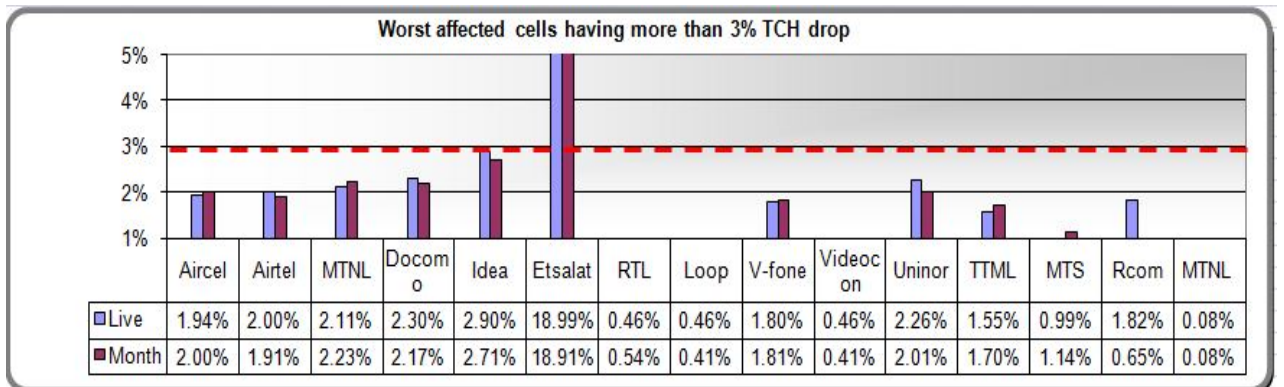


III. Connection Maintainability (Retainability):

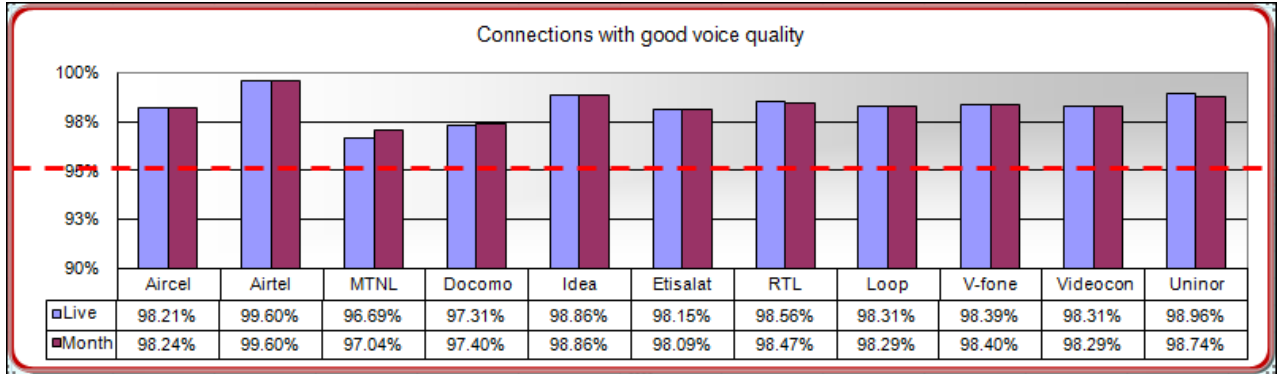
Call drop rate (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



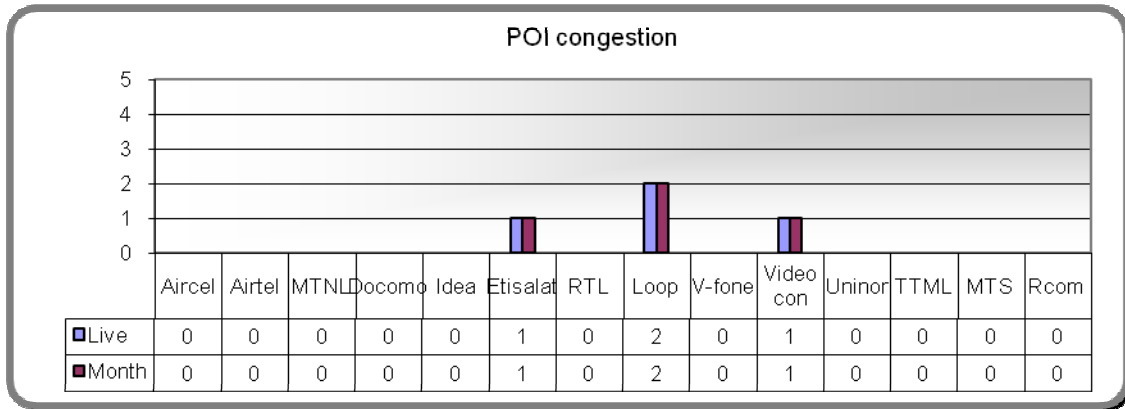
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Etsalat is found not meeting the benchmark of $\leq 3\%$. Rests of the operators are meeting the benchmark for both cases.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.



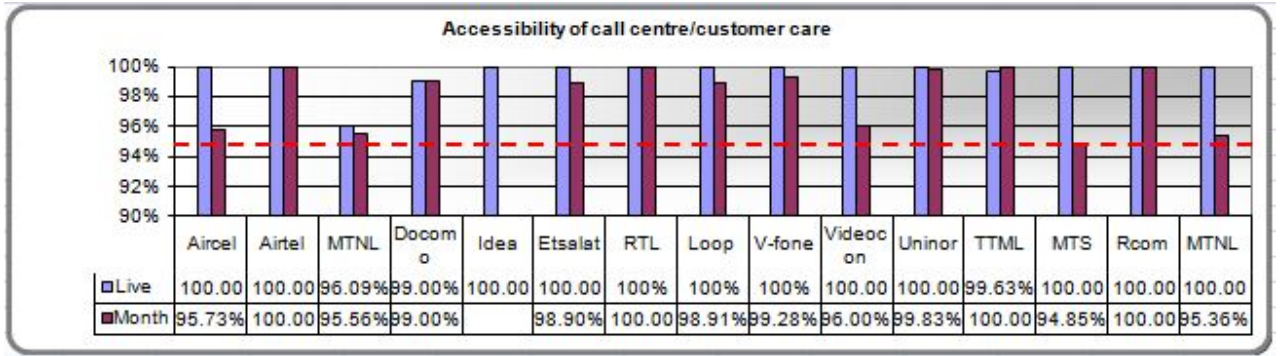
No. of POI's having $\geq 0.5\%$ Congestion: All the operators are meeting the benchmark with value of 0%. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage.



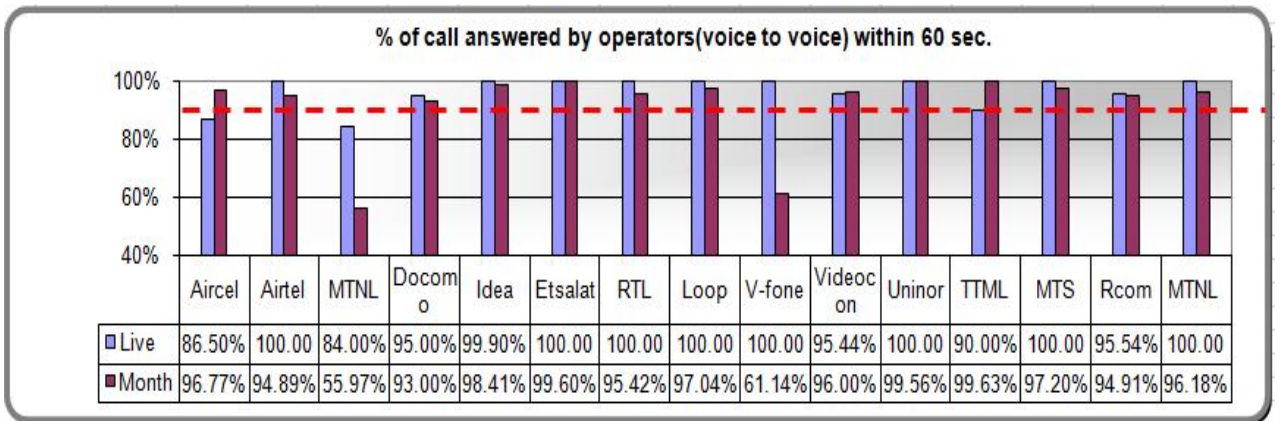
B) CUSTOMER SERVICE QUALITY PARAMETERS

(A) Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data except for MTS, in month data audit (94.85%),



Percentage of call answered by operators (Voice to voice) within 60 sec: For Live data except Aircel & MTNL, all operators are meeting the benchmark. For month data, only MTNL GSM & Vodafone are not meeting the benchmark. Rest all operators are meeting the prescribed benchmark.



(3) Critical Analysis

From the data table it can be seen that only Etsalat is not meeting the benchmark for the parameter of ‘Worst affected cells have more than 3% TCH drop rate’ and with high margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction. To be noted that except for all GSM & CDMA operators are satisfying the benchmark for the same thus reflecting better performance in terms of Connection maintenance (retain ability).

Regarding %age of connections with good voice quality all the operators are found to be performing quite well in terms of meeting the benchmark (<= 95%).

In case of POI congestion all the operators are found to be performing quite well in terms of meeting the benchmark (<= 0.5%). It is noticed that most of the operators are having individual POI satisfying the benchmark. But in some case overflows on individual POI are noticed causing traffic diversions to obtain the net result for POI congestion.

(B) Redressal**(1) Sample coverage**

A sample of billing complaints was taken for each operator and calls were made for assessing the resolution of billing/charging complaints within 4 weeks as claimed by the respective operators.

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	MTNL	TATA GSM	IDEA	ETISAL AT	RELIANCE GSM	LOOP	Vodafone	VIDEOCON	UNINOR	TATA CDMA	MTS	Reliance CDMA	MTNL CDMA
Total No. of calls	11	8	5	9	7	5	8	8	10	6	7	5	6	-	2
Cases resolved with 4 weeks	11	8	5	9	7	5	8	8	10	6	7	5	6	-	2
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%

3. Live calling to Call centre:

Fifty nos. of calls were made in each half and below given no. of calls got connected to the call centre within 60 Secs.

CALL CENTRE CALLING STATISTICS

	OPERATORS NAME													
	Aircel	Airtel	MTNL	Etisalat	Idea	Rcom	Tata	Videocore	Vodafone	Loop	Rcom	Tata	MTS	MTNL
	GSM										CDMA			
1ST HALF (10AM TO 01 PM)	48	48	47	48	48	47	47	46	47	48	47	47	46	47
2ND HALF (04PM TO 07 PM)	44	43	44	44	47	42	49	43	44	43	41	39	38	44
In % age	92.00	91.00	91.00	92.00	95.00	89.00	96.00	89.00	91.00	91.00	88.00	86.00	84.00	91.00

4. Level 1 Calling:

Level 1 calling such as calling at emergency no. (Police, Fire, Hospital), Railway enquiry system etc were made in few nos. so as to check the service of such short codes. In Mumbai it was found to be functional.

5. Critical Analysis

Random numbers were selected from the operators' data base of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. It was found that the operators had made refunds in 100% cases as claimed by their records.

(C) Inter operator call assessment

(1) Sample coverage

A sample of 2x50 test calls per Service Providers within the licensed service area (Mumbai Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs so that TCBH hours for all the operators were covered.

(2) Performance based on live measurement

Calling Operator	Aircel	Airtel	MTNL	TATA GSM	IDEA	ETISAL AT	RELIANCE GSM	LOOP	Vodafone	VIDEOCON	UNINOR	TATA CDMA	MTS	Reliance CDMA
Aircel	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
MTNL	100%		-	100%	100%	100%	100%	100%	99%	100%	100%	100%	100%	100%
TATA GSM	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	99%	100%	100%	100%
Idea	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance GSM	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Loop	100%	100%	99%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Vodafone	100%	99%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
Tata CDMA	100%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	-	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Reliance CDMA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

(3) Critical Analysis

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The result shows that there is not much congestion on the operator networks.

(D) Drive test of the mobile network of service providers

i) Sample Coverage

The Operator Assisted Drive Test was conducted at Mumbai for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations

MUMBAI;-

HIGH DENSE:

Western Express Highway from Bandra to Borivali Bandra to Nariman point via Dadar, Worli Naka, Haji Ali, Peddar Road, Babulnath Road, Charni Raod, Marine Drive, Trident Hotel Nariman Point

MEDIUM DENSE:

CST to Turbhe via Eastern express highway

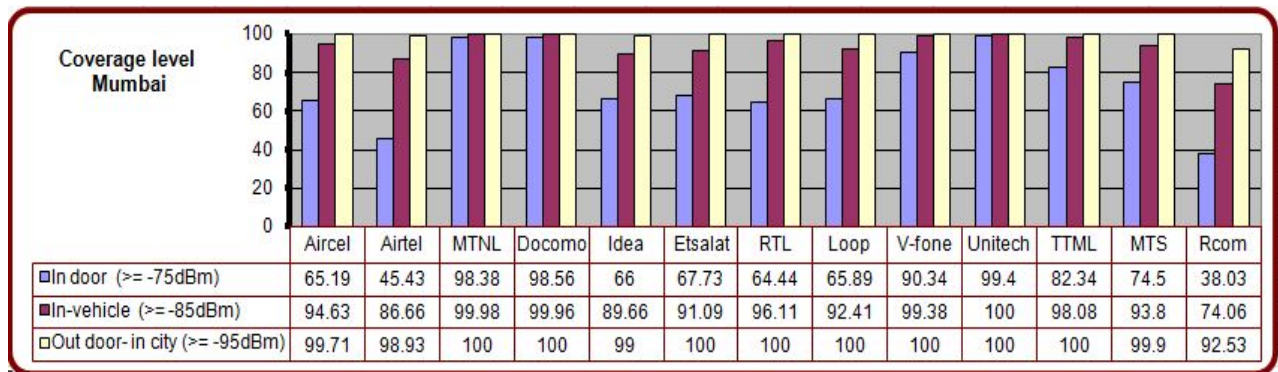
LOW DENSE;-

Andheri, Vesrova, Lokhandwala, Oshiwara link Road

2) Drive Test Performance Report dependent(for the respective cities)

S.No.	Parameter	City Name	Aircel	Airtel	MTNL	Docomo	Idea	Etsalat	RTL	Loop	V-fone	Unitech	TTML	MTS	Rcom	MTNL CDMA
1.1	Call Attempts	MUMBAI	146	179	116	148	121	145	144	141	153	142	158	137	151	149
1.2	Blocked Call Rate (<=3%)	MUMBAI	0	0	4.31	0	2.47	2.06	1.66	0.7	1.3	2.11	0	0	1.53	0
1.3	Dropped Call Rate (<=2%)	MUMBAI	1.36	0	0	3.22	2.47	1.37	1.92	1.41	0	0.7	2	1	2.82	2.01
1.4	Percentage of connections with good voice quality (=>95%)															
	(i) 0-4 (w/o frequency hopping)	MUMBAI											96.2	99.3	96.1	84.5
	(ii) 0-5 (with frequency hopping)	MUMBAI	88.2	96	92	97.3	84.3	95	95.3	95.3	96.3	93.7				
1.5	Service Coverage															
	In door (>= -75dBm)	MUMBAI	84.4	65.2	45.4	98.4	98.6	66	67.7	64.4	65.9	90.3	99.4	82.3	74.5	38
	In-vehicle (>= -85dBm)	MUMBAI	95.2	94.6	86.7	100	100	89.7	91.1	96.1	92.4	99.4	100	98.1	93.8	74.1
	Out door- in city (>= -95dBm)	MUMBAI	100	99.7	98.9	100	100	99	100	100	100	100	100	100	99.9	92.5
1.6	Call Setup Success Rate (>=95%)	MUMBAI	100	100	95.7	100	97.5	97.9	98.3	99.3	98.7	97.9	100	100	98.5	100

Graphical Representation CITY 1 MUMBAI



(3) Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- Blocked Call Rate benchmark is not met by MTNL in Mumbai (4.31%).
- Drop call Rate benchmark is not met by MTNL CDMA (2.01%), TATA GSM (3.22%), REL CDMA (2.82%) & IDEA (2.47%) in Mumbai.

(E) Independent Drive Test

(1) Sample Coverage

The Independent Drive Test was conducted at Mumbai after operators assisted drive test was over for respective operators. Route cover was about around 200Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations

MUMBAI

High Dense:

Western Express Highway from Bandra to Borivali Bandra to Nariman point via Dadar, Worli Naka, Haji Ali, Peddar Road, Babulnath Road, Charni Raod, Marine Drive, Trident Hotel Nariman Point

Medium Dense:

CST to Turbhe via Eastern express highway

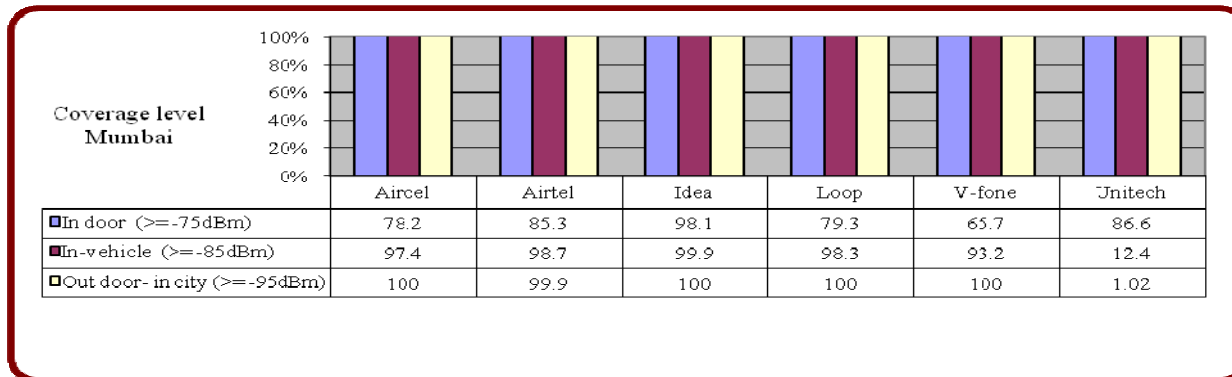
Low Dense:

Andheri, Vesrova, Lokhandwala, Oshiwara link Road

2) Drive Test Performance Report Independent(for the respective cities)

S.No.	Parameter	City Name	Aircel	Airtel	Idea	Loop	V-fone	Unitech
1.1	Call Attempts	MUMBAI	159	97	174	130	125	241
1.2	Blocked Call Rate (<=3%)	MUMBAI	0	0	0	1.53	0.8	2.48
1.3	Dropped Call Rate (<=2%)	MUMBAI	0.62	0	0	0	0	0.41
1.4	Percentage of connections with good voice quality (=>95%)							
	(i) 0-4 (w/o frequency hopping)	MUMBAI						
	(ii) 0-5 (with frequency hopping)	MUMBAI	96.3	96.1	88.2	97.2	98.4	92.5
1.5	Service Coverage							
	In door (>= -75dBm)	MUMBAI	78.2	85.3	98.1	79.3	65.7	86.6
	In-vehicle (>= -85dBm)	MUMBAI	97.4	98.7	99.9	98.3	93.2	12.4
	Out door- in city (>= -95dBm)	MUMBAI	100	99.9	100	100	100	1.02
1.6	Call Setup Success Rate (>=95%)	MUMBAI	99.5	100	100	98.7	99.5	98.5

Graphical Representation



(3) Critical Analysis : Good Voice Quality, Drop Call Rate, Block Call Rate & CSSR parameter are met by all the operators in the DT.

(F) Compliance report (Status of service providers with respect to the QoS)

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (MUMBAI) is by and large satisfactory for **Network Parameters**. However, the benchmark of $\leq 2\%$ for 'Worst affected BTS due to down time' by Etisalat (2.30%) is not met.

The benchmark for "worst affected cells $> 3\%$ TCH drop" is not met by Etisalat for 3days Live data and monthly report (19.27% & 18.99% for month & live data respectively). For POIs congestion, Loop, Etisalat & Videocon were found to have POIs with $\geq 0.5\%$ congestion.

Under **Customer Service Quality Parameter** "operator answered calls (voice-to-voice) within 60 seconds" parameter it is found that most of the operators are fulfilling TRAI benchmark of $\geq 90\%$. Apart from this, the "accessibility of call centre" parameter benchmark is not met by Aircel, MTS and MTNL.

Regarding **Metering/Billing Credibility** issues, MTNL GSM and Tata CDMA & GSM both shows below benchmark value for Post-paid connections; similarly for Pre-paid Etisalat could not meet benchmark. For resolution of billing/charging complaints only Tata CDMA was unable to achieve benchmark.

During **Drive Tests**, Blocked Call Rate observed more in case of MTNL GSM .Drop call found more in case of Tata GSM (3.22%), Idea (2.47%), Reliance CDMA (2.82%) and MTNL CDMA (2.01%). MTNL GSM, Idea, MTNL CDMA and Uninor have below benchmark %age of connections with good voice quality.

III. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

IV. Broadband Service Providers

.....Audit not done for this quarter