

# TRAI Audit Wireless Report for MP(Including CG) Circle

**QE JAN-MAR 2017**

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Submitted to:

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## 1 EXECUTIVE SUMMARY-2G

The objective assessment of Quality of Service (QoS) carried out by R O Bhopal gives an insight into the overall performance of various operators in the MP(Including CG) circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

### 1.1 PMR DATA – 3 MONTHS- CONSOLIDATED FOR 2G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retanability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate(Withing License's own network)	SDCCH/Paging Chl.Congestion	TCH Congestion	Call drop Rate	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Aircel	0.23%	1.04%	97.77%	0.35%	0.09%	0.92%	0.68%	98.71%
Airtel	0.10%	0.14%	98.71%	0.12%	1.19%	0.83%	1.64%	97.25%
BSNL MP	1.81%	1.72%	97.20%	0.51%	1.28%	1.50%	2.29%	NAI
BSNL CG	0.71%	0.97%	97.90%	0.33%	0.85%	1.08%	1.54%	NA
IDEA	0.08%	0.12%	96.64%	0.43%	1.43%	0.67%	1.73%	97.96%
RCOM	0.36%	1.27%	96.89%	0.04%	1.05%	0.17%	0.38%	98.93%
TATA GSM	0.02%	0.00%	99.46%	0.02%	0.02%	0.34%	1.57%	99.29%
TATA CDMA	0.07%	0.00%	98.59%	NA	0.00%	0.21%	1.82%	99.25%
Vodafone	0.05%	0.11%	99.53%	0.07%	0.47%	0.56%	3.25%	98.98%

NA: SDCCH/ Paging channel congestion not applicable for CDMA operators.

NAL: Data not available

Following are the parameter wise observations for wireless operators for MP circle:

#### BTs Accumulated Downtime:

[All met the benchmark . Minimum BTS Accumulated downtime was recorded for TATA GSM at 0.02%.]

#### Worst Affected BTs Due to Downtime:

[All met the benchmark. Minimum worst affected BTs due to downtime was recorded for TATA GSM & CDMA at 0.00%.]

#### Call Set-up Success Rate (CSSR):

[All operators met the benchmark for CSSR. The maximum CSSR was observed for Vodafone with 99.53%. ]

**SDCCH/ Paging Chl. Congestion:**

[All operators met the benchmark on SDCCH / Paging Channel Congestion. TATA GSM recorded the best SDCCH / Paging Channel Congestion at 0.02%]

**TCH Congestion:**

[All operators met the benchmark on TCH congestion Tata CDMA performed the best on TCH congestion at 0.00%]

**Call Drop Rate:**

[All operators met the benchmark for the parameter. Minimum call drop rate was recorded for RCOM at 0.17%.]

**Worst Affected Cells Having More than 3% TCH Drop:**

[Telenor failed to meet the benchmark for the parameter. Best performance was recorded for RCOM at 0.38% ]

**Voice Quality**

[All operators met the benchmark for the parameter. Best performance was recorded for TATA GSM at 99.29%].

All the service providers were measuring this parameter as per the TRAI guidelines that have been stated in parameter description section.]

Below are the month wise summary tables for each network parameter basis PMR data.

### 1.1.1 PMR DATA – JANUARY FOR 2G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retanability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate(Withing License's own network)	SDCCH/Paginh Chl.Congestion	TCH Congestion	Call drop Rate	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Aircel	0.16%	0.00%	98.31%	0.04%	0.26%	1.24%	0.62%	99.18%
Airtel	0.10%	0.08%	98.65%	0.07%	1.01%	0.88%	1.66%	97.18%
BSNL MP	1.80%	1.57%	97.46%	0.40%	1.00%	1.30%	2.26%	NA
BSNL CG	1.86%	1.84%	97.72%	0.28%	1.48%	0.92%	2.29%	NA
IDEA	0.07%	0.22%	96.91%	0.33%	1.78%	0.65%	1.50%	97.90%
RCOM	0.35%	1.27%	96.61%	0.05%	1.60%	0.17%	0.32%	98.87%
TATA GSM	0.03%	0.00%	99.44%	0.02%	0.02%	0.37%	1.73%	99.12%
TATA CDMA	0.08%	0.00%	99.20%	0.00%	0.00%	0.19%	1.79%	99.23%
Vodafone	0.04%	0.13%	99.61%	0.06%	0.39%	0.59%	3.77%	98.97%

### 1.1.2 PMR DATA –FEBRUARY FOR 2G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retanability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate(Withing License's own network)	SDCCH/Paginh Chl.Congestion	TCH Congestion	Call drop Rate	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Aircel	0.14%	0.00%	97.55%	0.03%	0.00%	0.56%	0.77%	98.51%
Airtel	0.11%	0.26%	98.75%	0.11%	1.23%	0.80%	1.60%	97.23%
BSNL MP	1.92%	1.80%	97.28%	0.65%	1.30%	1.61%	2.78%	NA
BSNL CG	1.85%	1.78%	97.83%	0.30%	0.70%	0.87%	2.04%	NA
IDEA	0.08%	0.04%	96.61%	0.40%	1.26%	0.68%	1.65%	97.93%
RCOM	0.34%	1.09%	96.82%	0.04%	0.90%	0.17%	0.38%	98.92%
TATA GSM	0.01%	0.00%	99.44%	0.03%	0.02%	0.34%	1.55%	99.35%
TATA CDMA	0.07%	0.00%	98.36%	0.00%	0.00%	0.23%	1.89%	99.25%
Vodafone	0.06%	0.12%	99.48%	0.07%	0.52%	0.55%	3.16%	98.97%

## 1.1.3 PMR DATA - MARCH FOR 2G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate(Withing License's own network)	SDCCH/Pagin h Chl.Congestion	TCH Congestion	Call drop Rate	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Aircel	0.38%	3.13%	97.45%	1.00%	0.00%	0.96%	0.65%	98.43%
Airtel	0.08%	0.07%	98.74%	0.19%	1.32%	0.81%	1.67%	97.35%
BSNL MP	1.71%	1.79%	96.87%	0.47%	1.54%	1.58%	1.82%	NA
BSNL CG	1.88%	1.89%	96.83%	0.33%	0.73%	0.90%	2.10%	NA
IDEA	0.09%	0.10%	96.40%	0.55%	1.25%	0.69%	2.03%	98.05%
RCOM	0.38%	1.45%	97.24%	0.04%	0.66%	0.16%	0.44%	98.98%
TATA GSM	0.02%	0.00%	99.51%	0.02%	0.02%	0.31%	1.43%	99.39%
TATA CDMA	0.06%	0.00%	98.23%	0.00%	0.00%	0.21%	1.79%	99.27%
Vodafone	0.05%	0.07%	99.50%	0.08%	0.50%	0.54%	2.82%	99.01%

## 1.2 3 DAY DATA – CONSOLIDATED FOR 2G

A three day live measurement was conducted to measure the QoS provided by the operators. The table provided below gives a snapshot of the performance of all operators during live measurement.

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate(Withing License's own network)	SDCCH/Paging Chl. Congestion	TCH Congestion	Call drop Rate	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Aircel	0.48%	0.00%	98.77%	0.07%	0.00%	0.00%	0.87%	97.92%
Airtel	0.00%	0.00%	98.81%	0.14%	1.31%	0.69%	2.49%	97.33%
BSNL MP	1.82%	1.32%	97.26%	0.73%	1.54%	1.60%	1.91%	NAL
BSNL CG	1.13%	0.17%	96.40%	0.30%	0.68%	0.79%	2.07%	NA
IDEA	0.18%	0.00%	96.09%	0.56%	1.46%	0.66%	2.14%	98.11%
RCOM	0.54%	0.05%	97.40%	0.05%	0.54%	0.16%	0.51%	99.04%
TATA GSM	0.02%	0.00%	99.51%	0.02%	0.04%	0.32%	1.31%	99.39%
TATA CDMA	0.00%	0.00%	98.75%	NA	0.00%	0.13%	1.85%	99.21%
Vodafone	0.07%	0.00%	99.53%	0.04%	0.47%	0.54%	2.82%	99.06%

NA: SDCCH/ Paging channel congestion not applicable for CDMA operators.

NAL: Not available

Following are the parameter wise observations for wireless operators for MP circle:

### BTs Accumulated Downtime:

All operators met the benchmark. Minimum BTS Accumulated downtime was recorded for Airtel & Tata CDMA at 0.00%.

### Worst Affected BTs Due to Downtime:

All operators met the benchmark for worst affected BTs due to downtime.

### Call Set-up Success Rate (CSSR):

All operators met the benchmark for CSSR. The maximum CSSR was observed for Vodafone GSM with 99.53%.

### SDCCH/ Paging Chl. Congestion:

All operators met the benchmark on SDCCH / Paging Channel Congestion. TATA GSM recorded the best SDCCH / Paging Channel Congestion .

**TCH Congestion:**

All operators met the benchmark on TCH congestion, while Aircel & TATA CDMA performed the best on TCH congestion.

**Call Drop Rate:**

All operators met the benchmark for the parameter. Minimum call drop rate was recorded for Aircel .

**Worst Affected Cells Having More than 3% TCH Drop:**

Telenor failed to meet the benchmark for the parameter. Best performance was recorded for Aircel.

**Voice Quality**

All operators met the benchmark for the parameter. Best performance was recorded for Tata GSM.

All the service providers were measuring this parameter as per the TRAI guidelines that have been stated in parameter description section.

**1.3 PMR DATA – 3 MONTHS- CONSOLIDATED FOR 3G**

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retanability)		
	Node Bs downtime (not available for service)	Worst affected Node Bs due to downtime	Call Set-up Success Rate(Withing License's own network)	RRC Congestion	Circuit Switched RAB Congestion	Call drop Rate	Worst affected cells having more than 3% Circuit Switched Voice drop rate	%age Circuit Switch Voice quality(CSV quality)
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Airtel 3G	0.15%	0.31%	99.86%	0.01%	0.02%	0.26%	1.43%	99.39%
BSNL MP 3G	1.62%	1.65%	97.77%	0.57%	0.34%	0.83%	2.54%	NA
BSNL CG 3G	1.90%	1.76%	96.38%	0.92%	0.92%	0.63%	2.67%	NA
IDEA 3G	0.10%	0.06%	99.72%	0.04%	0.05%	0.48%	1.96%	98.95%
TATA 3G	0.02%	0.00%	99.65%	0.02%	0.13%	0.29%	1.93%	99.84%
RCOM 3G	0.08%	0.15%	99.94%	0.04%	0.00%	0.04%	0.16%	99.90%

Following are the parameter wise observations for wireless operators for MP circle:

**Node Bs downtime:**

All operators met the benchmark. Minimum Node Bs downtime was recorded for TATA 3G.

**Worst affected Node Bs due to downtime:**

All operators met the benchmark. Minimum worst affected Node Bs due to downtime was recorded for TATA 3G at 0.00%.

**Call Set-up Success Rate (CSSR):**

All operators met the benchmark for CSSR. The maximum CSSR was observed for RCOM 3G .

**RRC Congestion:**

All operators met the benchmark. Minimum RRC congestion was recorded for Airtel 3G

**Circuit Switched RAB Congestion:**

All operators met the benchmark. Minimum Circuit Switched RAB congestion was recorded for RCOM 3G

**Call Drop Rate:**

All operators met the benchmark for the parameter. Minimum call drop rate was recorded for RCOM 3G

**Worst affected cells having more than 3% Circuit switched voice drop rate:**

All operators met the benchmark for the parameter. Best performance was recorded for RCOM 3G.

**Circuit Switch Voice Quality:**

All operators met the benchmark for the parameter. Best performance was recorded for RCOM 3G

Below are the month wise summary tables for each network parameter basis PMR data.

### 1.3.1 PMR DATA – JANUARY FOR 3G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retainability)		
	Node Bs downtime (not available for service)	Worst affected Node Bs due to downtime	Call Set-up Success Rate(Withing License's own network)	RRC Congestion	Circuit Switched RAB Congestion	Call drop Rate	Worst affected cells having more than 3% Circuit Switched Voice drop rate	%age Circuit Switch Voice quality(CSV quality)
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Airtel 3G	0.17%	0.50%	99.87%	0.01%	0.02%	0.25%	1.50%	99.37%
BSNL MP 3G	1.53%	1.65%	98.28%	0.55%	0.31%	0.85%	2.52%	NA
BSNL CG 3G	1.94%	1.94%	96.96%	0.96%	0.62%	0.62%	2.89%	NA
IDEA 3G	0.07%	0.07%	99.67%	0.05%	0.10%	0.49%	2.08%	99.15%
TATA 3G	0.02%	0.00%	99.61%	0.02%	0.13%	0.33%	2.34%	99.83%
RCOM 3G	0.08%	0.09%	99.94%	0.05%	0.00%	0.04%	0.18%	99.89%

### 1.3.2 PMR DATA –FEBUARY FOR 3G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retainability)		
	Node Bs downtime (not available for service)	Worst affected Node Bs due to downtime	Call Set-up Success Rate(Withing License's own network)	RRC Congestion	Circuit Switched RAB Congestion	Call drop Rate	Worst affected cells having more than 3% Circuit Switched Voice drop rate	%age Circuit Switch Voice quality(CSV quality)
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Airtel 3G	0.17%	0.39%	99.85%	0.01%	0.02%	0.26%	1.34%	99.39%
BSNL MP 3G	1.69%	1.65%	96.68%	0.55%	0.31%	0.93%	2.52%	NA
BSNL CG 3G	1.88%	1.76%	96.73%	0.88%	0.72%	0.56%	2.66%	NA
IDEA 3G	0.08%	0.05%	99.75%	0.05%	0.03%	0.47%	1.99%	99.12%
TATA 3G	0.02%	0.00%	99.64%	0.02%	0.16%	0.30%	1.91%	99.84%
RCOM 3G	0.06%	0.09%	99.92%	0.04%	0.00%	0.04%	0.15%	99.90%

## 1.3.3 PMR DATA - MARCH FOR 3G

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retainability)		
	Node Bs downtime (not available for service)	Worst affected Node Bs due to downtime	Call Set-up Success Rate(Withing License's own network)	RRC Congestion	Circuit Switched RAB Congestion	Call drop Rate	Worst affected cells having more than 3% Circuit Switched Voice drop rate	%age Circuit Switch Voice quality(CSV quality)
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Airtel 3G	0.10%	0.03%	99.87%	0.01%	0.02%	0.28%	1.46%	99.42%
BSNL MP 3G	1.63%	1.65%	98.35%	0.62%	0.40%	0.70%	2.58%	NA
BSNL CG 3G	1.88%	1.57%	95.45%	0.93%	1.42%	0.69%	2.47%	NA
IDEA 3G	0.14%	0.07%	99.76%	0.01%	0.01%	0.47%	1.81%	98.58%
TATA 3G	0.03%	0.00%	99.70%	0.02%	0.11%	0.23%	1.55%	99.85%
RCOM 3G	0.11%	0.27%	99.95%	0.03%	0.00%	0.03%	0.15%	99.90%

## 1.4 3 DAY DATA – CONSOLIDATED FOR 3G

A three day live measurement was conducted to measure the QoS provided by the operators. The table provided below gives a snapshot of the performance of all operators during live measurement.

Name of Service Providers	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance(Retainability)		
	Node Bs downtime (not available for service)	Worst affected Node Bs due to downtime	Call Set-up Success Rate(Withing License's own network)	RRC Congestion	Circuit Switched RAB Congestion	Call drop Rate	Worst affected cells having more than 3% Circuit Switched Voice drop rate	%age Circuit Switch Voice quality(CSV quality)
Benchmark	<= 2%	<= 2%	>=95 %	<=1 %	<= 2%	<= 2%	<=3 %	>= 95 %
Airtel 3G	0.11%	0.00%	99.79%	0.02%	0.06%	0.26%	1.44%	98.84%
BSNL MP 3G	1.11%	1.83%	97.57%	0.52%	0.27%	0.27%	1.05%	NA
IDEA 3G	0.32%	0.01%	99.75%	0.01%	0.00%	0.47%	1.60%	98.61%
TATA 3G	0.00%	0.00%	99.77%	0.01%	0.06%	0.20%	1.29%	99.85%
RCOM 3G	0.32%	0.00%	99.99%	0.01%	0.00%	0.04%	0.21%	99.90%

Following are the parameter wise observations for wireless operators for MP circle:

### Node Bs downtime:

All operators met the benchmark. Minimum Node Bs downtime was recorded for TATA 3G.

### Worst affected Node Bs due to downtime:

All operators met the benchmark.

### Call Set-up Success Rate (CSSR):

All operators met the benchmark for CSSR. The maximum CSSR was observed for RCOM 3G.

### RRC Congestion:

All operators met the benchmark.

### Circuit Switched RAB Congestion:

All operators met the benchmark.

### Call Drop Rate:

All operators met the benchmark for the parameter. Minimum call drop rate was recorded for RCOM 3G.

### Worst affected cells having more than 3% Circuit switched voice drop rate:

All operators met the benchmark for the parameter. Best performance was recorded for RCOM 3G.

### Circuit Switch Voice Quality:

All operators met the benchmark for the parameter. Best performance was recorded for RCOM 3G.

## 1.5 WIRELESS DATA PMR & 3 DAY LIVE – CONSOLIDATED FOR 2G

Name of Service Provider	Wireless data PMR			Wireless data -Live data		
	Activation done within 4 hours	PDP Context activation success rate	Drop Rate	Activation done within 4 hours	PDP Context activation success rate	Drop Rate
Benchmark	>=95%	>=95%	<=5%	>=95%	>=95%	<=5%
Aircel	NDR	99.58%	8.61%	NDR	99.62%	8.99%
Airtel	98.20%	99.35%	2.54%	NDR	99.26%	3.72%
BSNL MP	NDR	NDR	NDR	NDR	NDR	NDR
BSNL CG	NDR	99.23%	0.33%	NDR	97.61%	3.54%
IDEA	99.98%	99.81%	0.40%	99.75%	99.93%	0.42%
RCOM	NDR	99.88%	3.05%	NDR	99.86%	2.80%
TATA GSM	99.19%	99.97%	1.34%	NDR	NDR	NDR
TATA CDMA	93.75%	96.54%	0.92%	NDR	NDR	NDR
Vodafone	100.00%	99.97%	1.63%	100.0%	99.97%	1.73%

NDR: - No data received

Note: Some of the operators are not submitted data.

Following are the parameter wise observations for wireless operators :

### Activation done within 4 hours:

All operators met the benchmark for Activation done within 4 hours in PMR as well as live audit.

### PDP Context activation success rate:

All operators met the benchmark

### Drop Rate:

Aircel failed to meet the benchmark in PMR as well as 3day live. The minimum drop rate was observed for Vodafone in PMR as well as 3days

## 1.6 WIRELESS DATA PMR & 3 DAY LIVE – CONSOLIDATED FOR 3G

Name of Service Provider	Wireless data PMR			Wireless data -Live data		
	Activation done within 4 hours	PDP Context activation success rate	Drop Rate	Activation done within 4 hours	PDP Context activation success rate	Drop Rate
Benchmark	>=95%	>=95%	<=5%	>=95%	>=95%	<=5%
Airtel 3G	98.20%	99.35%	2.54%	NDR	99.98%	0.04%
BSNL MP	NDR	NDR	NDR	NDR	NDR	NDR
BSNL CG	NDR	NDR	NDR	NDR	NDR	NDR
IDEA	99.98%	99.32%	0.53%	99.75%	99.28%	0.59%
RCOM	NDR	99.43%	0.31%	NDR	99.40%	0.15%
TATA 3G	99.17%	99.05%	0.91%	NDR	NDR	NDR

**NDR:** No Data Received

Note: Some of the operators are not submitted data

### Activation done within 4 hours:

As per data available operators met the benchmark in PMR as well as 3day live .

### PDP Context activation success rate:

In PMR as well as 3days live all operators met the benchmark.

### Drop Rate:

All operators met the benchmark in PMR as well as 3day live.

## 1.7 LIVE CALLING DATA – CONSOLIDATED

Name of Service Provider	Metering and Billing		Response time to customer for assistance		Level 1 Service	Service Requests
	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	Accessibility of call centre/ customer care	Percentage of call answered by the operators (voice to voice) within 90 seconds	Call answered	Complaint/ Request attended to Satisfaction
Benchmark	98%	100%	>= 95%	>= 95%	>= 95%	
Aircel	NA	NA	100	100	33.33	NA
Airtel	100	100	100	100	46.15	100
BSNL MP	100	100	100	100	**	100
Idea	100	100	100	100	33.33	100
Reliance GSM	100	100	100	100	58.79	92.31
Tata CDMA	NA	NA	100	100	30.77	100
Tata GSM	100	100	100	100	30.77	100
Vodafone	100	100	100	100	32.65	100
RJIo	NA	NA	100	100	53.85	NA

\*\* Data not submitted , NA=Not applicable

### Resolution of billing complaints

As per the consumers (live calling exercise) all of the operators met the benchmark of resolving 100% complaints within 6 weeks..

### Accessibility of Call Centre/Customer Care-IVR

For the IVR aspect, all operators met the TRAI benchmark of 95%

### Customer Care / Helpline Assessment (voice to voice)

All operators met the benchmark for Customer Care / Helpline assessment (voice to voice).

### Level 1 Service

As per the live calling results, None of the operators met the TRAI benchmark for level 1 service with calls being answered on different level 1 numbers as provided by RO from previous audit report. Though, TSPs informed that many level 1 number are changed or modified.

### Complaint/Request Attended to Satisfaction

All operators except Reliance GSM performed satisfactorily in terms of satisfaction of the customers for service requests.

**1.8 BILLING AND CUSTOMER CARE – CONSOLIDATED**

Name of Service Provider	Metering and billing credibility		Billing Complaints		Response time to customer for assistance	Customer care	
	Postpaid Subscribers	Prepaid Subscribers	% of complaints resolved in 4 weeks	% of complaints resolved in 6 weeks	% of cases where credit/waiver is received within one week	Percentage of calls answered by the IVR	Percentage of calls answer by the operators (voice to voice) within 90 seconds
Benchmark	<= 0.1%	<= 0.1%	>= 98%	>= 100%	>= 100%	>= 95%	>= 95%
Aircel	0.00	0.00	NA	NA	NA	98.01	98.57
Airtel	0.10	0.19	100	100	100	100	98.58
BSNL	0.01	0.21	99.16	99.16	NA	99.78	96.63
Idea	0.66	0.13	100	100	100	98.7	99.12
Reliance GSM	0.09	0.09	100	100	100	99.84	97.69
Tata CDMA	0.02	0.00	100	100	100	100	99.26
Tata GSM	0.05	0.00	100	100	100	97.62	98.55
Vodafone	0.12	0.08	100	100	100	100	98.79
RJIO	NA	NA	NA	NA	NA	96.27	87.67

NA: Not applicable, For BSNL only MP information is received, BSNL CG did not provide the data.

**Metering and Billing Credibility – Post-paid Subscribers**

All operators met the TRAI benchmark except IDEA & Vodafone as per RO calculation.

**Metering and Billing Credibility – Prepaid Subscribers**

All operators met the TRAI benchmark except IDEA,Airtel and BSNL as per RO calculation

**Resolution of billing complaints**

All operators met the TRAI benchmark of resolution of billing complaints within 4 weeks and resolving 100% complaints within 6 weeks.

**Response Time to customer for assistance - % of cases in which advance waiver is received within one week**

All operators met the TRAI benchmark

**Customer Care Percentage of calls answered by the IVR**

All operators met the benchmark of 95% IVR call being attended.

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**Customer Care Percentage of calls answered by the operators (Voice to Voice) within 90 seconds**

Except Rjio , All operators met the benchmark .

**1.9 COMPARISON BETWEEN AUDITED DATA AND OPERATOR'S DATA FOR PMR 2G**

Performance Monitoring Report on Quality of Service of Cellular Mobile Service Providers for quarter ending, March, 2017 in respect of 2G services																			
Name of Service Area	Name of Service Provider	Network Related Parameters																	
		Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)						POI	
		BTSS-Accumulated downtime (not available for service) (%age)		Worst affected BTSS due to downtime (%age)		Call Set-up Success Rate (within licensee's own network)		SDCCH/ Paging Chl. Congestion (%age)		TCH Congestion (%age)		Call Drop Rate (%age)		Worst affected cells having more than 3% TCH drop (call drop) rate (%age)		Connection with good voice quality		Point of interconnection (POI) Congestion (No. of POIs not meeting the benchmark) (Averaged over a period of quarter)	
		≤ 2%		≤ 2%		≥ 95%		≤ 1%		≤ 2%		≤ 2%		≤ 3%		≥ 95%		≤ 0.5%	
		Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO
Madhya Pradesh	Aircel	0.23	0.23	1.04	1.04	97.77	97.77	0.36	0.35	0.09	0.09	0.92	0.92	0.68	0.68	98.71	98.71	0	0
	AIRTEL	0.09	0.10	0.14	0.14	98.71	98.71	0.12	0.12	1.19	1.19	0.83	0.83	1.64	1.64	97.25	97.25	0	0
	BSNL	1.81	1.78	1.78	1.76	97.33	97.21	0.35	0.50	0.90	1.27	1.22	1.46	2.20	2.25	97.74	NA	0	0
	IDEA	0.08	0.08	0.12	0.12	96.64	96.64	0.43	0.43	1.43	1.43	0.67	0.67	1.73	1.73	97.96	97.96	0	0
	RTL	0.36	0.36	1.27	1.27	96.89	96.89	0.04	0.04	1.05	1.05	0.17	0.17	0.38	0.38	98.93	98.93	0	0
	TTSL CDMA	0.07	0.07	0.00	0.00	98.60	98.59	0.00	0.00	0.00	0.00	0.21	0.21	1.82	1.82	99.25	99.25	0	0
	TTSL GSM	0.02	0.02	0.00	0.00	99.46	99.46	0.02	0.02	0.02	0.02	0.34	0.34	1.57	1.57	99.29	99.29	0	0
	Vodafone	0.05	0.05	0.11	0.11	99.53	99.53	0.07	0.07	0.47	0.47	0.56	0.56	3.25	3.25	98.98	98.98	0	0

## Customer Service Quality Parameters

Name of Service Area	Name of Service Provider	Customer Service Quality Parameters											
		Metering and billing										Response time to the customer for assistance	
		Metering and billing credibility - post paid		Metering and billing credibility - pre paid		Resolution of billing/charging complaints		Resolution of billing/charging complaints		Period of applying credit/waiver/ adjustment to customer's account from the date of resolution of complaints		Accessibility of call centre/customer care	
		≤ 0.1%		≤ 0.1%		98% within 4 weeks		100% within 6 weeks		within 1 week of resolution of complaint		≥ 95%	
		Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO
Madhya Pradesh	Aircel	0.00	0	0.00	0	100.00	NA	100.00	NA	100.00	NA	98.01	98.01
	AIRTEL	0.01	0.1	0.06	0.19	100.00	100	100.00	100	100.00	100	100.00	100.00
	BSNL*	0.01	0.01	0.04	0.21	100.00	99.16	100.00	99.16	100.00	NA	98.00	99.78
	IDEA	0.09	0.66	0.03	0.13	100.00	100	100.00	100	100.00	100	98.70	98.70
	RTL	0.09	0.09	0.09	0.09	100.00	100	100.00	100	100.00	100	99.84	99.84
	TTSL CDMA	0.00	0.02	0.00	0	100.00	100	100.00	100	100.00	100	100.00	100.00
	TTSL GSM	0.00	0.05	0.00	0	100.00	100	100.00	100	100.00	100	97.62	97.62
	Vodafone	0.04	0.12	0.05	0.08	100.00	100	100.00	100	100.00	100	100.00	100.00
	Rjio		NA		NA		NA		NA		NA		96.27

\*In RO the information for commercial and billing was furnished by only BSNL MP ,BSNL CG not submitted the same.

Performance Monitoring Report on Quality of Service of Cellular Mobile Service Providers for quarter ending, March, 2017 in respect of 2G services							
Name of Service Area	Name of Service Provider	Customer Service Quality Parameters					
		Response time to the customer for assistance		Termination / closure of service			
		Percentage of calls answered by the operators (voice to voice) within 90 seconds		%age requests for Termination / Closure of service complied within 7 days		Time taken for refund of deposits after closures	
		≥ 95%		100% within 7 days		100% within 60 days	
		Operators	RO	Operators	RO	Operators	RO
Madhya Pradesh	Aircel	98.57	98.57	100.00	NA	100.00	NA
	AIRTEL	97.21	98.58	100.00	100.00	100.00	100.00
	BSNL *	97.40	96.63	100.00	NA	100.00	NA
	IDEA	99.12	99.12	100.00	100.00	100.00	100.00
	RTL	97.69	97.69	100.00	100.00	57.76	NA
	TTSL CDMA	99.26	99.26	100.00	100.00	100.00	100.00
	TTSL GSM	98.55	98.55	100.00	100.00	100.00	100.00
	Vodafone	98.73	98.79	100.00	100.00	100.00	100.00
	Rjio		87.67		NA		NA

### Comparison Between Audited Data and Operator's data for PMR 3G

Performance Monitoring Report on Quality of Service of Cellular Mobile Service Providers for quarter ending March , 2017 in respect of 3G services											
Name of the Service Area / City	Name of Service Provider	Network Availability				Connection Establishment (Accessibility)					
		BTS and Node-B's Accumulated downtime (not available for service) (%age)		Worst affected BTSs and Node-B's due to downtime (%age)		Call Set-up Success Rate (within licensee's own network)		SDCCH/Paging Channel and RRC Congestion (%age)		TCH and Circuit Switched RAB Congestion (%age)	
		1	2	3	4	5	6	7	8	9	10
		Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	Operators	RO	Operators	RO
		Operators	RO	Operators	RO	Operators	RO	Operators	RO	Operators	RO
Madhya Pradesh	Airtel	0.15	0.15	0.31	0.31	99.86	99.86	0.01	0.01	0.02	0.02
	BSNL	1.72	1.68	1.65	1.74	97.00	98.58	0.72	0.54	0.63	1.15
	IDEA	0.10	0.10	0.06	0.06	99.72	99.72	0.04	0.04	0.05	0.05
	RTL	0.08	0.08	0.15	0.15	99.94	99.94	0.04	0.04	0.00	0.00
	Tata	0.02	0.02	0.00	0.00	99.65	99.65	0.02	0.02	0.13	0.13

Value calculated by Operator and AUDITED DATA of RO do not match are Red colored

		Performance Monitoring Report on Quality of Service of Cellular Mobile Service Providers for quarter ending March , 2017 in respect of 3G services							
Name of the Service Area / City	Name of Service Provider	Connection Maintenance (Retainability)						POI	
		Call Drop and Circuit Switched Voice Drop Rate: (%age)		Worst affected cells having more than 3% TCH drop (call drop) and Circuit Switched Voice Drop Rate:- CBBH		Connections with good voice quality and Circuit Switch Voice Quality (CSV quality)		Point of Interconnection (POI) Congestion	
		1	7	8		9		10	
Benchmark	≤ 2%		≤ 3%		≥ 95%		≤ 0.5%		
		Operators	RO	Operators	RO	Operators	RO	Operators	RO
Madhya Pradesh	Airtel	0.26	0.26	1.43	1.43	99.39	99.39	0	0
	BSNL	0.72	1.34	2.53	2.20	97.72	NA	0	0
	IDEA	0.48	0.48	1.96	1.96	98.95	98.95	0	0
	RTL	0.04	0.04	0.16	0.16	99.90	99.90	0	0
	Tata	0.29	0.29	1.93	1.93	99.84	99.84	0	0

Value calculated by Operator and AUDITED DATA of RO do not match are Red colored

## 2 CRITICAL FINDINGS

### PMR Consolidated 2G (Network Parameters)

- All operators met the benchmark in PMR

### 3 Day Live Measurement 2G (Network Parameters)

- All operators met the benchmark in 3day live.

### Wireless Data Services for 2G

Aircel failed to meet the benchmark in Drop rate as well as 3day live.

### Live Calling

- All operators met the benchmark.

### Customer Service Quality Parameters

- For the billing disputes of post-paid subscribers and pre-paid subscribers it was observed that Idea & Vodafone failed to meet the TRAI benchmark for the parameter.
- Rjio failed the benchmarks for Customer Care Percentage of calls answered by the operators (Voice to Voice) within 90 seconds



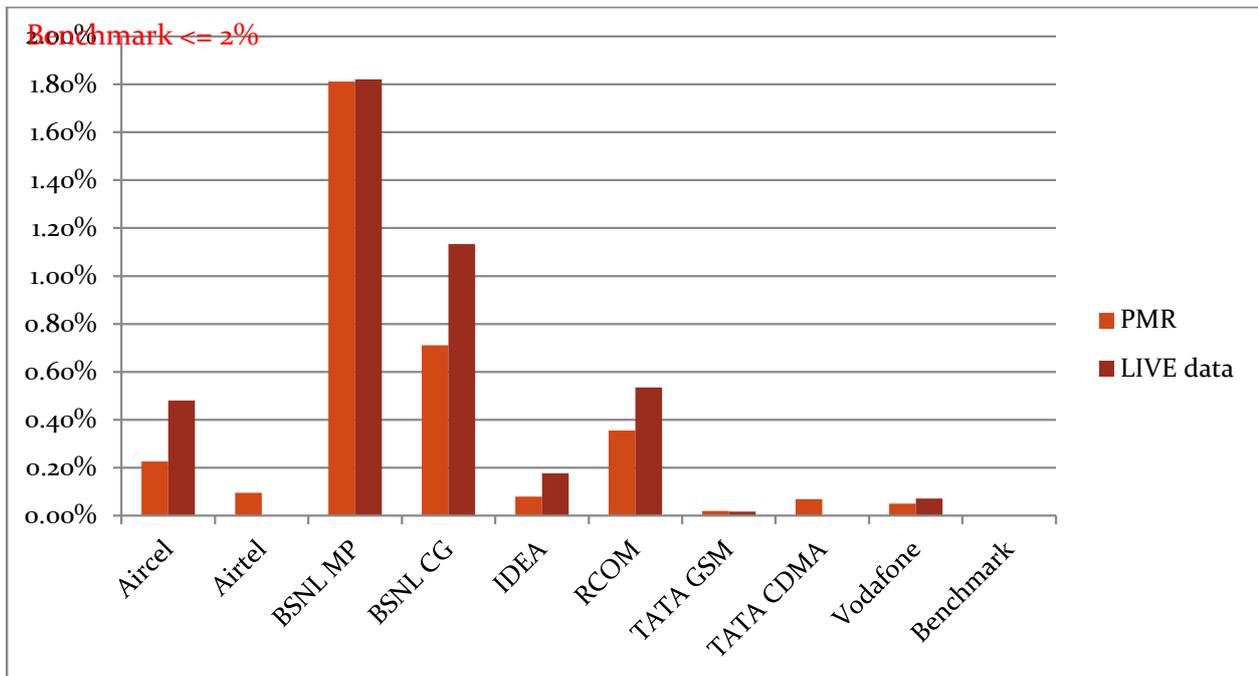
### 3 PARAMETER DESCRIPTION & DETAILED FINDINGS - COMPARISON OF CONSOLIDATED PMR DATA AND LIVE DATA OF 2G

#### 3.1 BTS ACCUMULATED DOWNTIME

##### 3.1.1 PARAMETER DESCRIPTION

- The parameter of network availability would be measured from following sub-parameters
  1. BTSs Accumulated downtime (not available for service)
  2. Worst affected BTSs due to downtime
- 1. **Definition - BTSs (Base Transceiver Station) accumulated downtime** (not available for service) shall basically measure the downtime of the BTSs, including its transmission links/circuits during the period of a month, but excludes all planned service downtime for any maintenance or software up gradation. For measuring the performance against the benchmark for this parameter the downtime of each BTS lasting more than 1 hour at a time in a day during the period of a month were considered.
- 2. **Computation Methodology -**  
**BTS accumulated downtime (not available for service) = Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100**
- 3. **TRAI Benchmark -**
  - a. BTSs Accumulated downtime (not available for service)  $\leq 2\%$
- 4. **Audit Procedure -**
  - The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
  - All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
  - Any outage as a result of force majeure were not considered at the time of calculation
  - Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
  - List of operating sites with cell details and ids are taken from the operator.
  - When there is any outage a performance report gets generated in line with that cell resulting and master base of the Accumulated downtime and worst affected BTS due to downtime.

##### 3.1.2 KEY FINDINGS – CONSOLIDATED



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for BTS accumulated downtime as per audit/PMR data.

## 3.2 WORST AFFECTED BTS DUE TO DOWNTIME

### 3.2.1 PARAMETER DESCRIPTION

- **Definition – Worst Affected BTS due to downtime** shall basically measure percentage of BTS having downtime greater than 24 hours in a month. Planned outages were not considered as part while computing.

For measuring the parameter “Percentage of worst affected BTSs due to downtime” the downtime of each BTS lasting for more than 1 hour at a time in a day during the period of a month was considered.

- **Computation Methodology –**

**Worst affected BTSs due to downtime = (Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) \* 100**

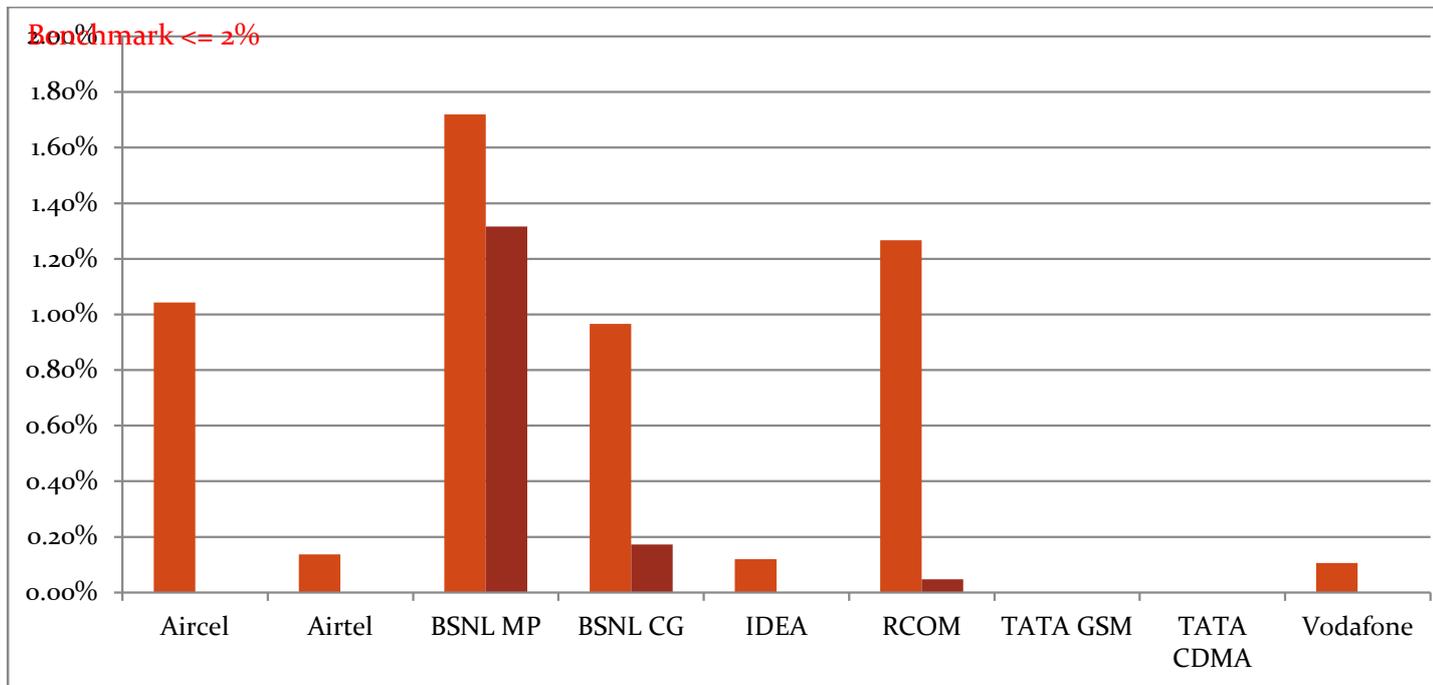
- **TRAI Benchmark –**

- a. Worst affected BTSs due to downtime  $\leq 2\%$

- **Audit Procedure –**

- i. The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
- ii. All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
- iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
- iv. Any outage as a result of force majeure was not considered at the time of calculation.
- v. List of operating sites with cell details and ids are taken from the operator.
- vi. All the BTS having down time greater than 24 hours is assessed and values of BTS accumulated downtime is computed in accordance.

### 3.2.2 KEY FINDINGS– CONSOLIDATED



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for worst affected BTSs due to downtime as per audit/PMR data.

### 3.3 CALL SET UP SUCCESS RATE

#### 3.3.1 PARAMETER DESCRIPTION

1. **Definition:** The ratio of successful calls established to total calls is known as Call Set-Up Success Rate (CSSR).

2. **Computation Methodology-**

$$\left( \frac{\text{Calls Established}}{\text{Total Call Attempts}} \right) * 100$$

Call Established means the following events have happened in call setup:-

- ↳ call attempt is made
- ↳ the TCH is allocated
- ↳ the call is routed to the outward path of the concerned MSC

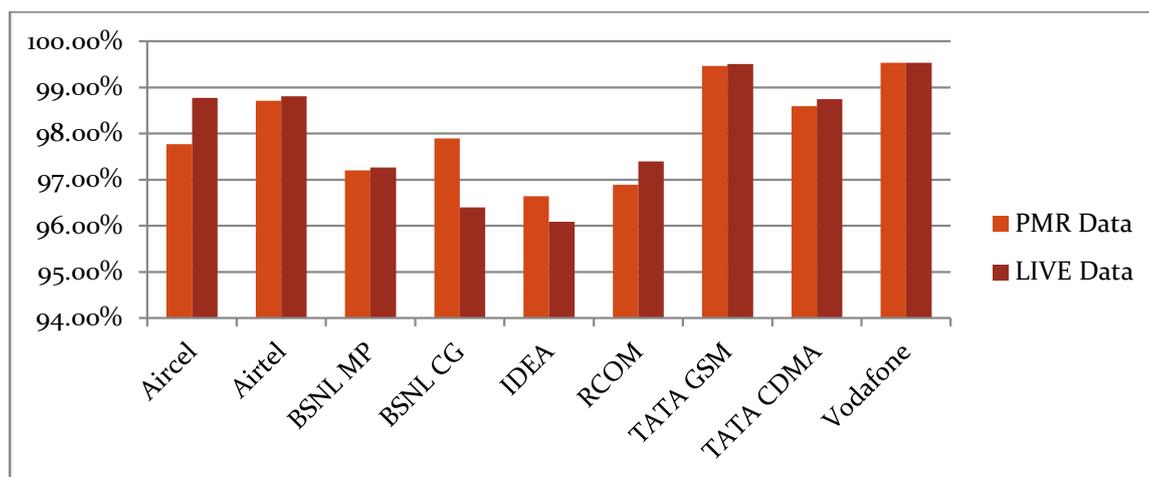
3. **TRAI Benchmark** ≥ 95%

4. **Audit Procedure -**

- ↳ The cell-wise data generated through counters/ MMC available in the switch for traffic measurements
- ↳ CSSR calculation should be measured using OMC generated data only

- ↪ Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week
- ↪ Counter data is extracted from the NOC of the operators.
- ↪ Total calls established include all calls established excluding Signaling blocking, TCH Drop and TCH blocking.
- ↪ The numerator and denominator values are derived from adding the counter values from the MSC.

### Key Findings – Consolidated



Data Source: Network Operations Center(NOC) of the operators

All operators met the TRAI benchmark as per audit/PMR data.

### 3.4 NETWORK CHANNEL CONGESTION- PAGING CHANNEL /TCH CONGESTION/POI

#### 3.4.1 PARAMETER DESCRIPTION

- Definition:** It means a call is not connected because there is no free channel to serve the call attempt. This parameter represents congestion in the network. It happens at three levels:

- ↳ SDCCH Level: Stand-alone dedicated control channel
- ↳ TCH Level: Traffic Channel
- ↳ POI Level: Point of Interconnect

- Computational Methodology:**

↳ **SDCCH / TCH Congestion%** =  $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$

- Where:- $A_1$  = Number of attempts to establish SDCCH / TCH made on day 1
- $C_1$  = Average SDCCH / TCH Congestion % on day 1
- $A_2$  = Number of attempts to establish SDCCH / TCH made on day 2
- $C_2$  = Average SDCCH / TCH Congestion % on day 2
- $A_n$  = Number of attempts to establish SDCCH / TCH made on day n
- $C_n$  = Average SDCCH / TCH Congestion % on day n

↳ **POI Congestion%** =  $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$

- Where:- $A_1$  = POI traffic offered on all POIs (no. of calls) on day 1
- $C_1$  = Average POI Congestion % on day 1
- $A_2$  = POI traffic offered on all POIs (no. of calls) on day 2
- $C_2$  = Average POI Congestion % on day 2
- $A_n$  = POI traffic offered on all POIs (no. of calls) on day n
- $C_n$  = Average POI Congestion % on day n

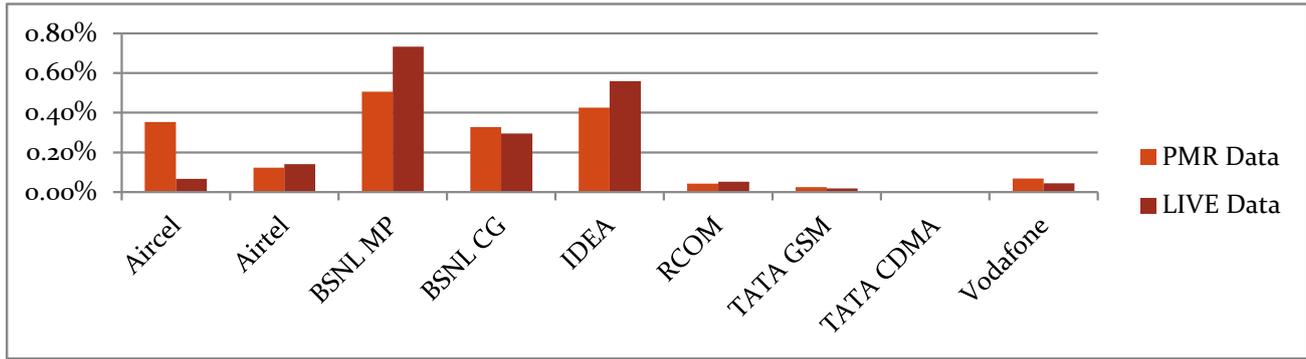
- Benchmark:**

↳ SDCCH Congestion:  $\leq 1\%$ , TCH Congestion:  $\leq 2\%$ , POI Congestion:  $\leq 0.5\%$

- Audit Procedure -**

- ↳ Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC-Switch data only) would be conducted
- ↳ The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH

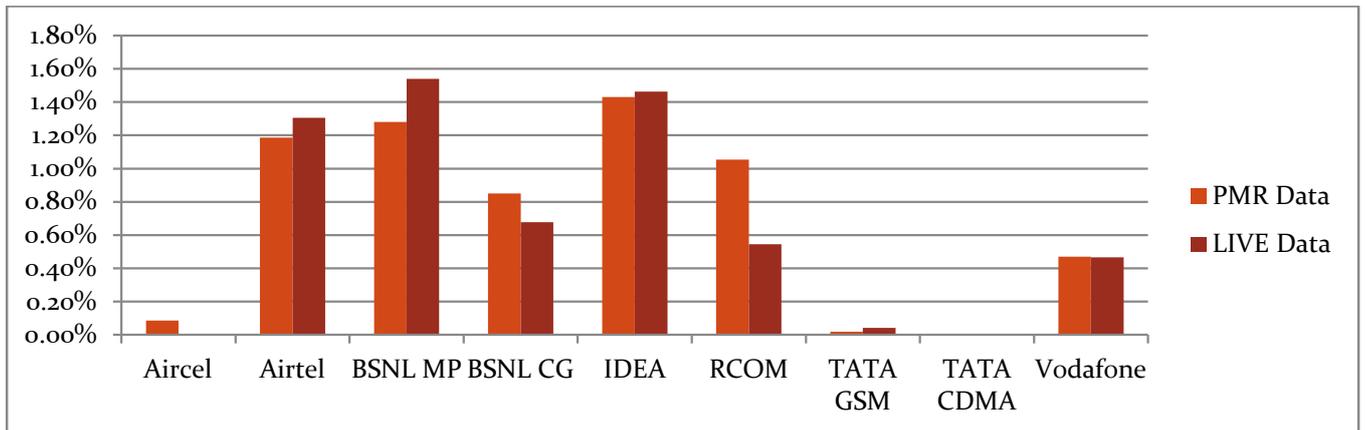
**3.4.2 KEY FINDINGS - SDCCH/PAGING CHANNEL CONGESTION (CONSOLIDATED)**



All operators met the benchmark during audit.

Data Source: Network Operations Center(NOC) of the operators

**3.4.3 KEY FINDINGS – TCH CONGESTION (CONSOLIDATED)**



All operators met the benchmark during audit.

### 3.5 CALL DROP RATE

#### 3.5.1 PARAMETER DESCRIPTION

- Definition** - The dropped call rate is the ratio of successfully originated calls that were found to drop to the total number of successfully originated calls that were correctly released.

↳ **Total calls dropped** = All calls ceasing unnaturally i.e. due to handover or due to radio loss

↳ **Total calls established** = All calls that have TCH allocation during busy hour

- Computational Methodology:**  $(\text{Total Calls Dropped} / \text{Total Calls Established}) \times 100$

- TRAI Benchmark** -

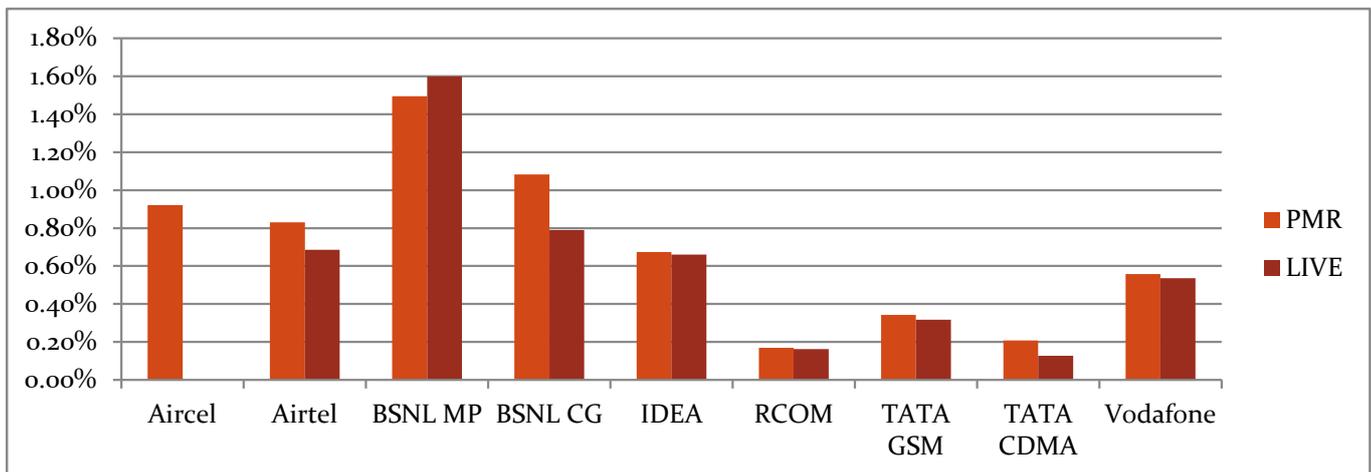
↳ Call drop rate  $\leq 2\%$

- Audit Procedure** -

↳ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was used

↳ The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter.

#### 3.5.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark for call drop rate during audit.

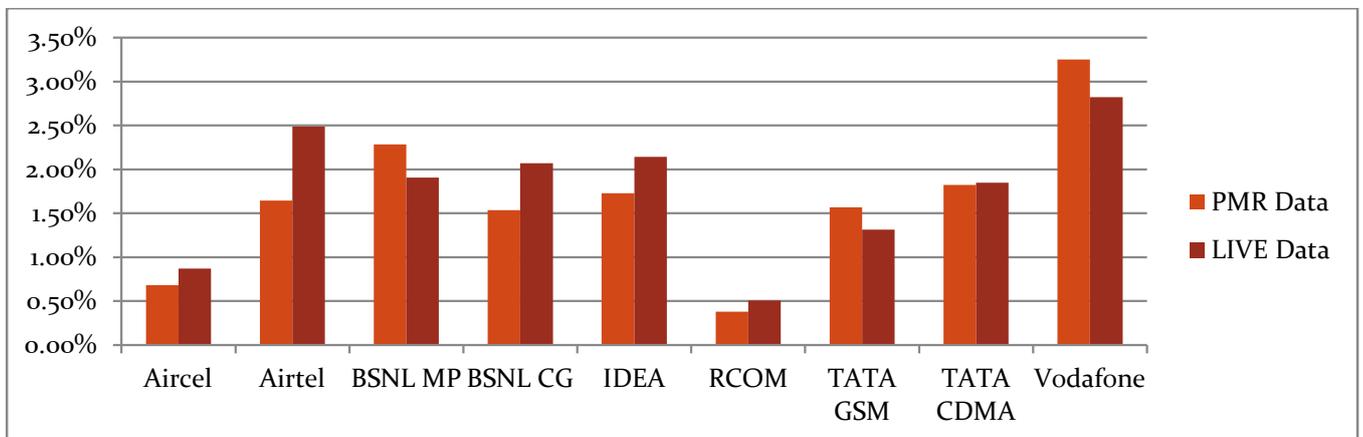
### 3.6 CELLS HAVING GREATER THAN 3% TCH DROP

#### 3.6.1 PARAMETER DESCRIPTION

1. **Definition- Worst Affected Cells having more than 3% TCH drop** shall measure the ratio of total number of cells in the network to the ratio of cells having more than 3% TCH drop.
2. **Computational Methodology: (Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the network) x 100**
3. **TRAI Benchmark –**
  - ↳ Worst affected cells having more than 3% TCH drop rate ≤ 3%
4. **Audit Procedure –**
  - ↳ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR would be conducted.

The operator should only be considering those calls which are dropped during Cell Bouncing Busy hour (CBBH) for all days of the relevant quarter.

#### 3.6.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark

## 3.7 VOICE QUALITY

### 3.7.1 PARAMETER DESCRIPTION

#### 1. Definition:

- ↳ for GSM service providers the calls having a value of 0 – 5 are considered to be of good quality (on a seven point scale)
- ↳ For CDMA the measure of voice quality is Frame Error Rate (FER). FER is the probability that a transmitted frame will be received incorrectly. Good voice quality of a call is considered when it FER value lies between 0 – 4 %

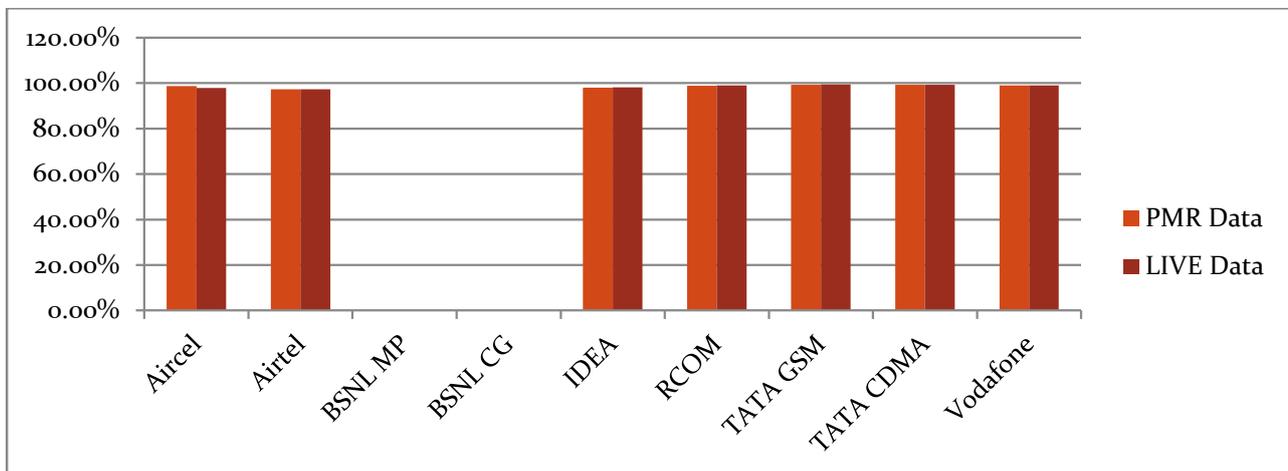
#### 2. Computational Methodology:

$$\% \text{ Connections with good voice quality} = \left( \frac{\text{No. of voice samples with good voice quality}}{\text{Total number of samples}} \right) \times 100$$

#### 3. TRAI Benchmark: $\geq 95\%$

#### 4. Audit Procedure –

- a. A sample of calls would be taken randomly from the total calls established.
- b. The operator should only be considering those calls which are meeting the desired benchmark of good voice quality.



All operators met the benchmark

Data Source: Network Operations Center(NOC) of the operators

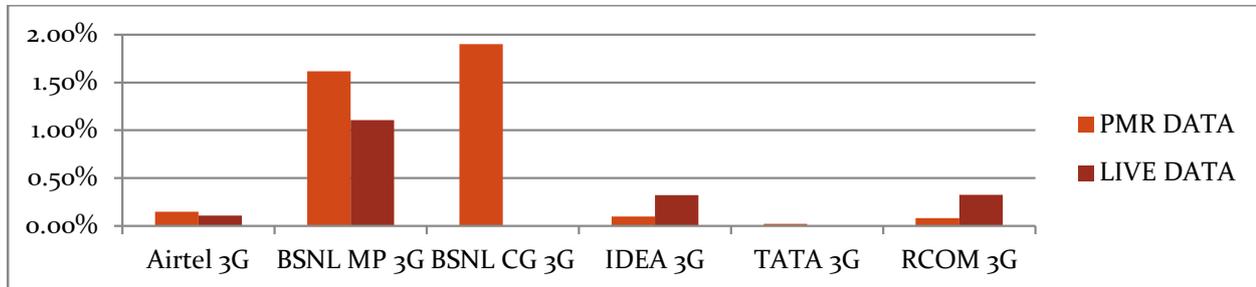
## 4 PARAMETER DESCRIPTION & DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LIVE DATA AND LIVE CALLING DATA FOR 3G

### 4.1 NODE BS DOWNTIME

#### 4.1.1 PARAMETER DESCRIPTION

- The parameter of network availability would be measured from following sub-parameters
  1. Node Bs downtime (not available for service)
  2. Worst affected Node Bs due to downtime
- **Definition - Node Bs downtime (not available for service):** In the case of 3G networks, instead of BTS the nomenclature is Node B. The measurement methodology for the parameter Node B Accumulated downtime (not available for service) will be similar to the existing parameter for BTSs Accumulated downtime (not available for service).
- **Data Extraction/collection methodology -** Data extraction to be done from appropriate counters. Auditors should be aware of counter details and definitions for each operator.
- **Source of Data:** Network Operation Center (NOC) or a Central Server
- **Computation Methodology -**  
**Node Bs downtime (not available for service) =  $\frac{\text{Sum of downtime of Node Bs in a month in hours i.e. total outage time of all Node Bs in hours during a month}}{(24 \times \text{Number of days in a month} \times \text{Number of Node Bs in the network in licensed service area}) \times 100}$**
- 3. TRAI Benchmark –
  - a. Node Bs downtime (not available for service)  $\leq 2\%$
- 4. Audit Procedure –
  - The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
  - All the Node Bs in service area was considered. Planned outages due to network up gradation, routine maintenance were not considered.
  - Any outage as a result of force majeure were not considered at the time of calculation
  - Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
  - List of operating sites with cell details and ids are taken from the operator.
    - When there is any outage a performance report gets generated in line with that cell resulting and master base of the Node Bsdowntime and worst affected Node Bs due to downtime.

#### 4.1.2 KEY FINDINGS – CONSOLIDATED



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for Node Bs downtime.

## 4.2 WORST AFFECTED NODE BS DUE TO DOWNTIME

### 4.2.1 PARAMETER DESCRIPTION

- **Definition – Worst Affected Node Bs due to downtime** shall basically measure percentage of Node Bs having downtime greater than 24 hours in a month. Planned outages were not considered as part while computing.

For measuring the parameter “Percentage of worst affected Node Bs due to downtime” the downtime of each Node B lasting for more than 1 hour at a time in a day during the period of a month was considered.

- **Computation Methodology –**

**Worst affected Node Bs due to downtime = (Number of Node Bs having accumulated downtime greater than 24 hours in a month / Number of Node Bs in Licensed Service Area) \* 100**

- **TRAI Benchmark –**

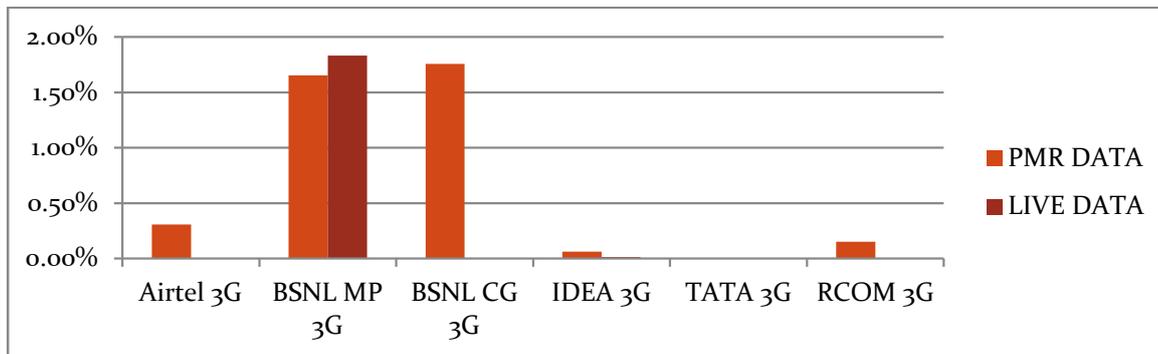
b. Worst affected Node Bss due to downtime  $\leq 2\%$

- **Audit Procedure –**

- The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
- All the Node Bs in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
- Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.

- iv. Any outage as a result of force majeure was not considered at the time of calculation.
- v. List of operating sites with cell details and ids are taken from the operator.
- vi. All the Node Bs having down time greater than 24 hours is assessed and values of Node Bs accumulated downtime is computed in accordance.

#### 4.2.2 KEY FINDINGS – CONSOLIDATED



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for worst affected BTSs due to downtime as per audit/PMR data.

### 4.3

#### Call Set Up Success Rate

##### 4.3.1 PARAMETER DESCRIPTION (CALL SET UP SUCCESS RATE)

1. **Definition:** This parameter is same for 2G Networks as well as 3G Networks. However, the network elements involved in both the networks are different. Call Set-up Success Rate is defined as the ratio of Established Calls to Call Attempts. For establishing a call in 3G Networks, User Equipment (UE) accesses the Universal Terrestrial Radio Access Network (UTRAN) and establishes an RRC connection. Once RRC connection is established the Non Access Stratum (NAS) messages are exchanged between the UE and the Core Network (CN). The last step of the call setup is the establishment of a Radio Access Bearer (RAB) between the CN and the UE. However, any RAB abnormal release after RAB Assignment Response or Alerting/Connect message is to be considered as a dropped call.
2. **Data Extraction/collection methodology** - Data extraction to be done from appropriate counters. Auditors should be aware of counter details and definitions for each operator.
3. **Source of Data:** Network Operation Center (NOC) or a Central Server
4. **Computation Methodology-**  

$$\left( \frac{\text{RRC Established}}{\text{Total RRC Attempts}} \right) * 100$$

RRC Established means the following events have happened in RRC setup:-

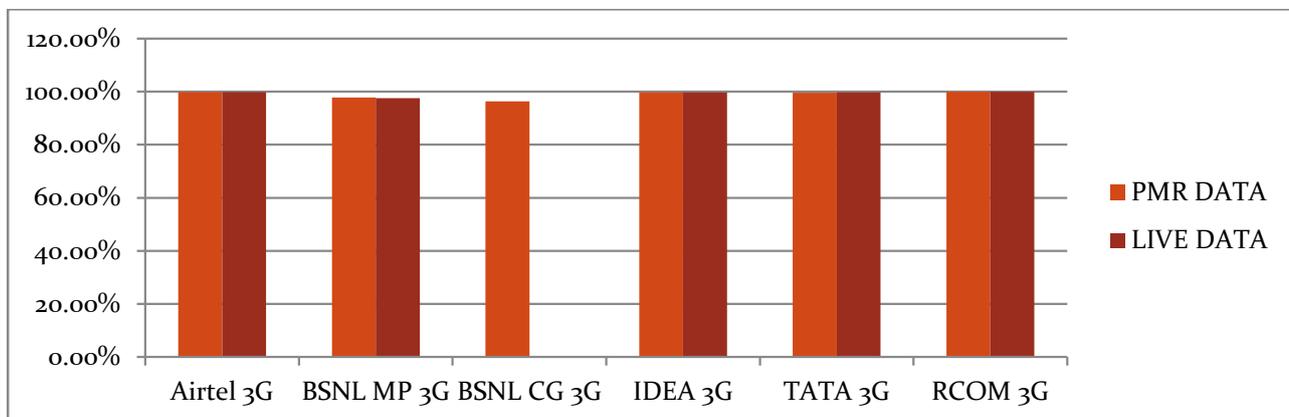
- ↪ RRC attempt is made
- ↪ The RRC established
- ↪ The RRC is routed to the outward path of the concerned MSC

#### 5. TRAI Benchmark $\geq$ 95%

#### 6. Audit Procedure –

- The cell-wise data generated through counters/ MMC available in the switch for traffic measurements
- CSSR calculation should be measured using OMC generated data only
- Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week
- Counter data is extracted from the NOC of the operators.
- Total calls established include all calls established excluding RAB congestion.
  - ↪ The numerator and denominator values are derived from adding the counter values from the MSC.

#### 4.3.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center(NOC) of the operators

All operators met the TRAI benchmark as per audit/PMR data.

## 4.4 NETWORK CHANNEL CONGESTION- RRC CONGESTION/ CIRCUIT SWITCHED RAB CONGESTION

### 4.4.1 PARAMETER DESCRIPTION

1. **Definition(RRC Congestion):** This parameter has been amended to include RRC Congestion in 3G Networks.
2. **Definition(Circuit Switched RAB congestion):** Circuit Switched RAB congestion is similar to Traffic Channel Congestion. Therefore, the existing parameter has been amended to include RAB congestion in 3G Networks.
3. **Point of Interconnection (POI) Congestion:** This parameter denotes congestion at the outgoing traffic between two networks and is equally applicable for 2G networks and 3G networks.

↳ RRC Level: Stand-alone dedicated control channel

↳ RAB Level: Traffic Channel

↳ POI Level: Point of Interconnect

4. **Data Extraction/collection methodology** - Data extraction to be done from appropriate counters. Auditors should be aware of counter details and definitions for each operator.

5. **Source of Data:** Network Operation Center (NOC) or a Central Server

6. **Computational Methodology:**

↳ **RRC / RAB Congestion%** =  $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$

- Where:- $A_1$  = Number of attempts to establish RRC / RAB made on day 1
- $C_1$  = Average RRC / RAB Congestion % on day 1
- $A_2$  = Number of attempts to establish RRC / RAB made on day 2
- $C_2$  = Average RRC / RAB Congestion % on day 2
- $A_n$  = Number of attempts to establish RRC / RAB made on day n
- $C_n$  = Average RRC / RAB Congestion % on day n

↳ **POI Congestion%** =  $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$

- Where:- $A_1$  = POI traffic offered on all POIs (no. of calls) on day 1
- $C_1$  = Average POI Congestion % on day 1
- $A_2$  = POI traffic offered on all POIs (no. of calls) on day 2
- $C_2$  = Average POI Congestion % on day 2
- $A_n$  = POI traffic offered on all POIs (no. of calls) on day n

- Cn = Average POI Congestion % on day n

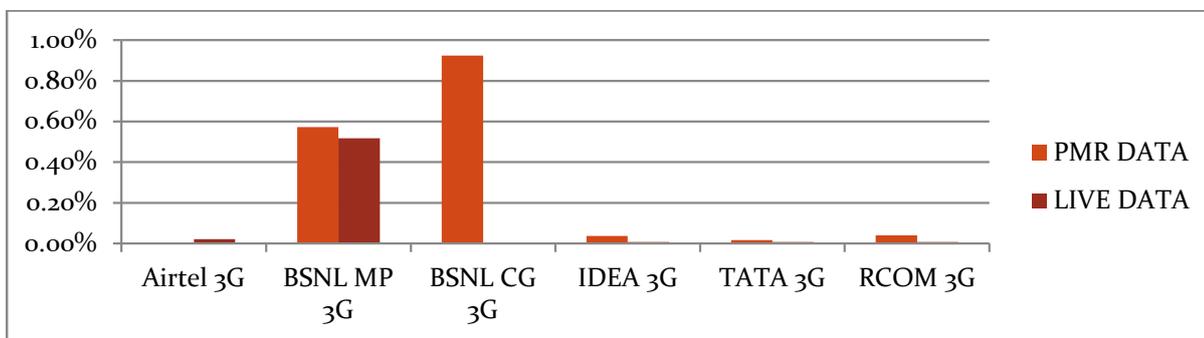
**7. Benchmark:**

↳ RRC Congestion: ≤ 1%, RAB Congestion: ≤ 2%, POI Congestion: ≤ 0.5%

**8. Audit Procedure –**

- Audit of the details of RRC and RAB congestion percentages computed by the operator (using OMC-Switch data only) would be conducted
  - ↳ The operator should be measuring this parameter during Time consistent busy hour (TCBH) only RRC

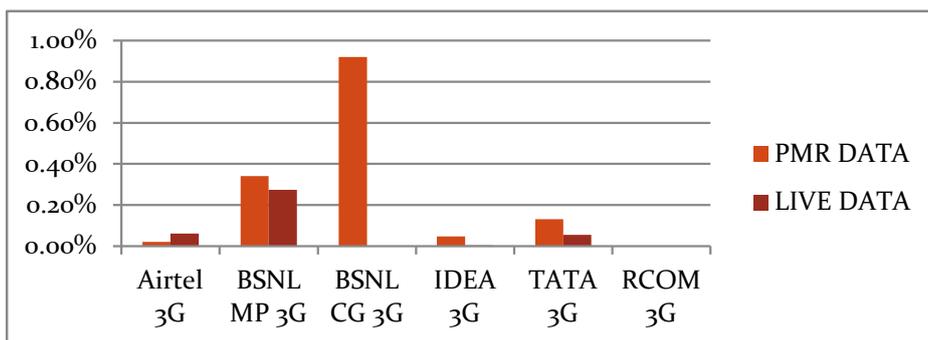
**4.4.2 KEY FINDINGS - RRC CONGESTION (CONSOLIDATED)**



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark for RRC congestion.

**4.4.3 KEY FINDINGS – CIRCUIT SWITCHED RAB CONGESTION (CONSOLIDATED)**



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark as per audit/PMR report.

## 4.5 CIRCUIT SWITCHED VOICE DROP RATE

### 4.5.1 PARAMETER DESCRIPTION

- Definition** - The Call Drop Rate measures the inability of Network to maintain a call and is defined as the ratio of abnormal speech disconnects with respect to all speech disconnects (both normal and abnormal). In 3G Networks, a normal disconnect is initiated from the Mobile Switching Centre (MSC) at completion of the call by a RAB Disconnect message. An abnormal RAB disconnect can be initiated by either UTRAN or CN and includes Radio Link Failures, Uplink (UL) or Downlink (DL) interference or any other reason.

↳ **Total No. of voice RAB abnormally released** = All calls ceasing unnaturally i.e. due to handover or due to radio loss

↳ **No. of voice RAB normally released** = All calls that have RAB allocation during busy hour

- Data Extraction/collection methodology** - Data extraction to be done from appropriate counters. Auditors should be aware of counter details and definitions for each operator.
- Source of Data:** Network Operation Center (NOC) or a Central Server
- Computational Methodology:**  $(\text{No. of voice RAB normally released} / (\text{No. of voice RAB normally released} + \text{RAB abnormally released})) \times 100$

Key Performance Indicator Term	Definition
#RAB Normal Release(CSV)	Number of voice RAB normally Released
#RAB Abnormal Release(CSV)	Number of voice RAB abnormally Released

### 5. TRAI Benchmark –

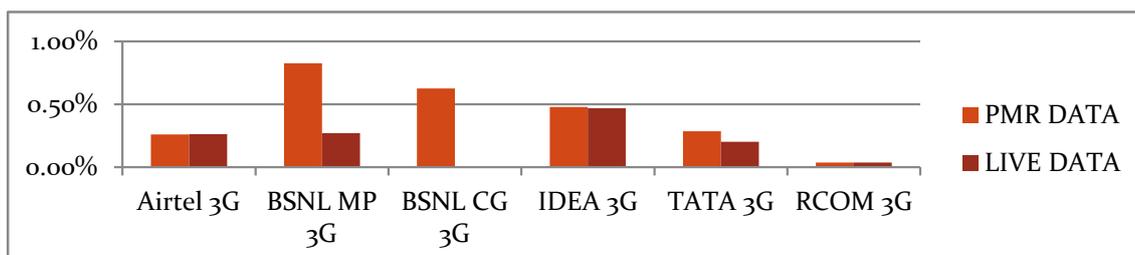
↳ Circuit switched voice drop rate  $\leq 2\%$

### 6. Audit Procedure –

➡ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was used

↳ The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter.

### 4.5.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark for call drop rate during audit.

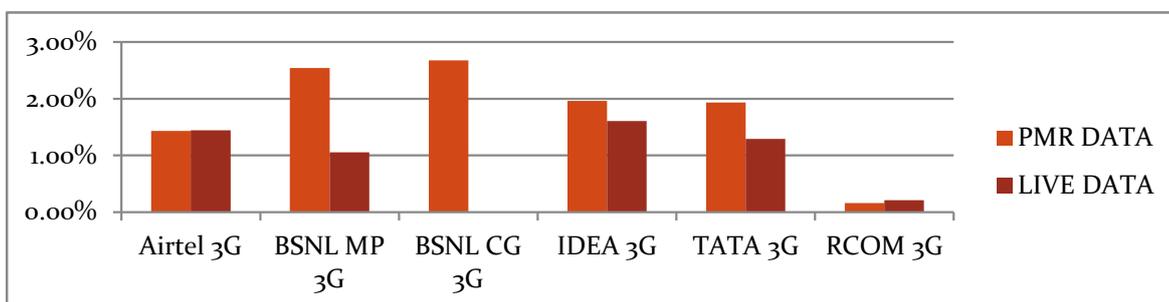
## 4.6 WORST AFFECTED CELLS HAVING MORE THAN 3% CIRCUIT SWITCHED VOICE DROP RATE

### 4.6.1 PARAMETER DESCRIPTION

1. **Definition- Cells having more than 3% circuit switch voice quality:**The existing parameter has been amended to cover 3G Networks to assess worst affected cells having more than 3% CSV Drop Rate.
2. **Data Extraction/collection methodology -** Data extraction to be done from appropriate counters. Auditors should be aware of counter details and definitions for each operator.
3. **Source of Data:** Network Operation Center (NOC) or a Central Server
4. **Computational Methodology:** **(Number of cells having CSV drop rate > 3% during CBBH in a month/ Total number of cells in the licensed area) x 100**
5. **TRAI Benchmark -**
  - ↳ Worst affected cells having CSV drop rate > 3% during CBBH in a month  $\leq$  3%
6. **Audit Procedure -**
  - ➡ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR would be conducted.

The operator should only be considering those calls which are dropped during Cell Bouncing Busy hour (CBBH) for all days of the relevant quarter.

### 4.6.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark during audit.

## 4.7 CIRCUIT SWITCH VOICE QUALITY

4.7.1 PARAMETER DESCRIPTION

5. Definition:

- ↳ for GSM service providers the calls having a value of 0-5 are considered to be of good quality (on a seven point scale)
- ↳ For CDMA the measure of voice quality is Frame Error Rate (FER). FER is the probability that a transmitted frame will be received incorrectly. Good voice quality of a call is considered when its FER value lies between 0-4%

6. Computational Methodology:

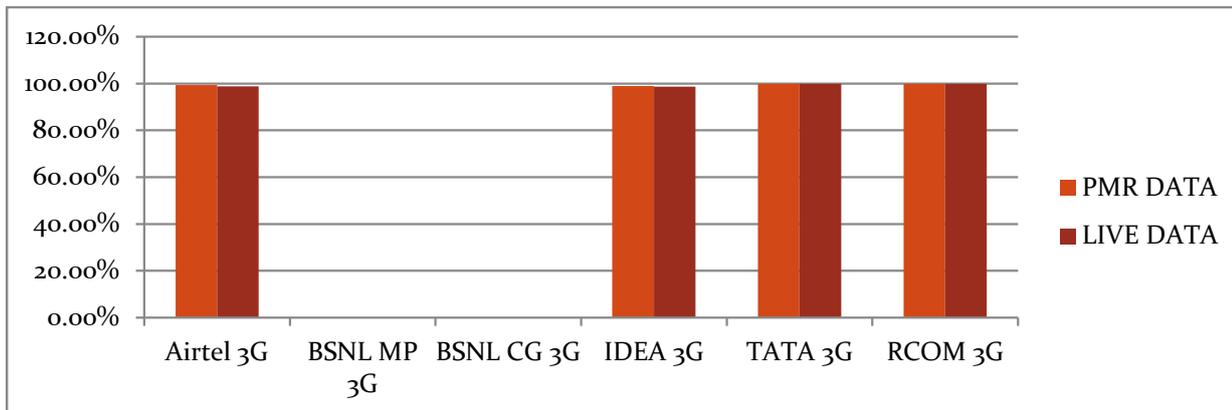
↳ **% Connections with good voice quality = (No. of voice samples with good voice quality / Total number of samples) x 100**

7. TRAI Benchmark: ≥ 95%

8. Audit Procedure –

- a. A sample of calls would be taken randomly from the total calls established.
- b. The operator should only be considering those calls which are meeting the desired benchmark of good voice quality.

Key Findings



Data Source: Network Operations Center(NOC) of the operators

All operators met the benchmark for circuit switch Voice quality in live audit.

## 5 PARAMETER DESCRIPTION AND DETAILED FINDINGS – NON-NETWORK PARAMETERS

### 5.1 METERING AND BILLING CREDIBILITY

The billing complaints for postpaid are calculated by averaging over one billing cycle in a quarter. For example, there are three billing cycles in a quarter, the data for each billing cycle is calculated separately and then averaged over.

The charging complaints for prepaid are calculated by taking all complaints in a quarter.

#### 5.1.1 PARAMETER DESCRIPTION

All the complaints related to billing/ charging as per clause 3.7.2 of QoS regulation of 20<sup>th</sup> December, 2009 were covered. The types of billing complaints covered are listed below.

- ↳ Payments made and not credited to the subscriber account
- ↳ Payment made on time but late payment charge levied wrongly
- ↳ Wrong roaming charges
- ↳ Double charges
- ↳ Charging for toll free services
- ↳ Local calls charged/billed as STD/ISD or vice versa
- ↳ Calls or messages made disputed
- ↳ Validity related complaints
- ↳ Credit agreed to be given in resolution of complaint, but not accounted in the bill
- ↳ Charging for services provided without consent
- ↳ Charging not as per tariff plans or top up vouchers/ special packs etc.
- ↳ Overcharging or undercharging

In addition to the above, any billing complaint which leads to billing error, waiver, refund, credit, or any adjustment is also considered as valid billing complaint for calculating the number of disputed bills.

#### ↳ Computational Methodology:

- ↳ **Billing complaints per 100 bills issued (Post-paid)** = (Total billing complaints\*\* received during the relevant billing cycle / Total bills generated\* during the relevant billing cycle)\*100
- ↳ \*Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated
- ↳ \*\*Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any

provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.

↳ **Charging complaints per 100 subscribers (Prepaid)** = (Total charging complaints received during the quarter/ Total number of subscribers reported by the operator at the end of the quarter) \* 100

➤ TRAI Benchmark: <= 0.1%

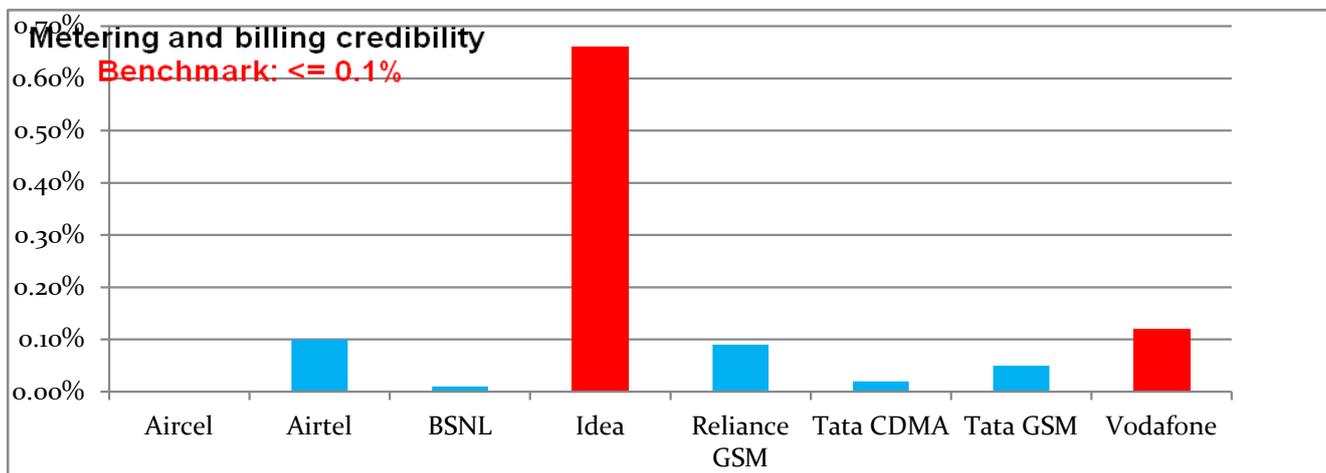
➤ Audit Procedure:

↳ Audit of billing complaint details for the complaints received during the quarter and used for arriving at the benchmark reported to TRAI would be conducted

➤ For Postpaid, the total billing complaints would be audited by averaging over billing cycles in a quarter

➤ For Prepaid, the data of total charging complaints in a quarter would be taken for the purpose of audit

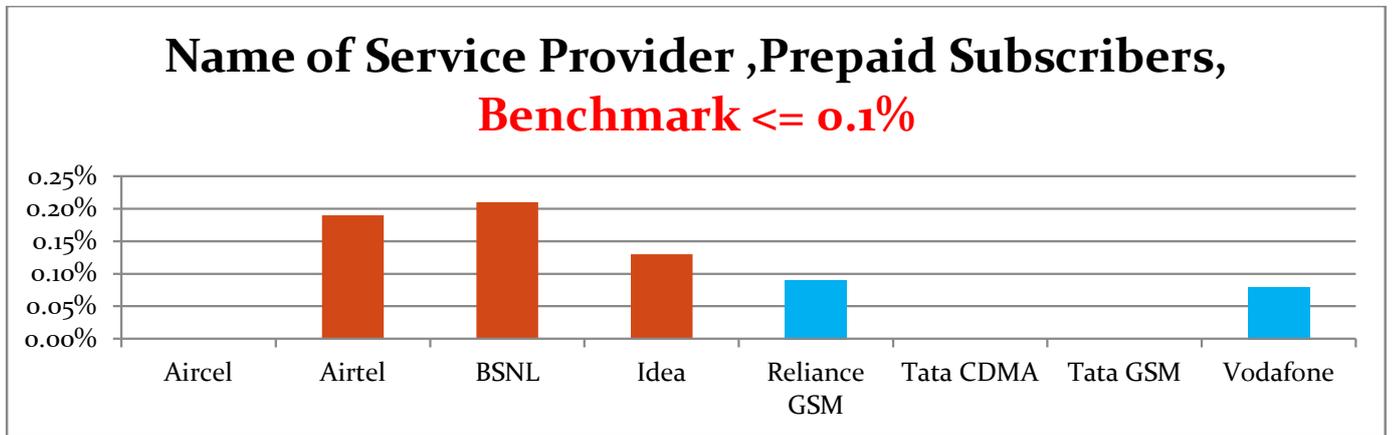
### 5.1.2 KEY FINDINGS – METERING AND BILLING CREDIBILITY (POSTPAID)



Data Source: Billing Center of the operators

All operators met the benchmark except IDEA and Vodafone.

### 5.1.3 KEY FINDINGS - METERING AND BILLING CREDIBILITY (PREPAID)



Airtel,BSNL MP, IDEA were failed to meet benchmark.

## 5.2 RESOLUTION OF BILLING/ CHARGING COMPLAINTS

### 5.2.1 PARAMETER DESCRIPTION

#### Calculation of Percentage resolution of billing complaints

The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to - calculate resolution of billing complaints.

#### Resolution of billing complaints within 4 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 4 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 4 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

-----  
 number of billing/charging, credit / validity complaints received during the quarter

#### Resolution of billing complaints within 6 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

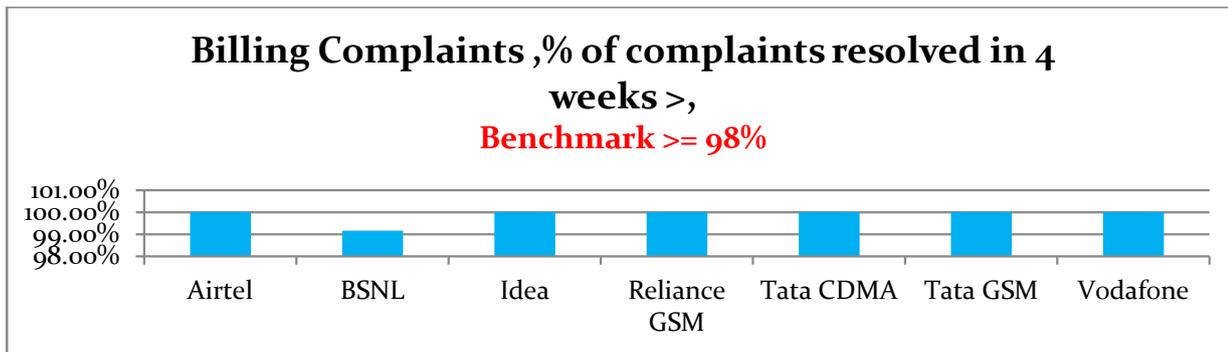
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

-----  
 number of billing/charging, credit / validity complaints received during the quarter

- ↳ \*\*Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally. Complaints raised by the consumers to operator are only considered as part of the calculation.
- ↳ The complaints that get marked as invalid by the operator are not considered for calculation as those complaints cannot be considered as resolved by the operator.
- ⦿ \*\*\* Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.

Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

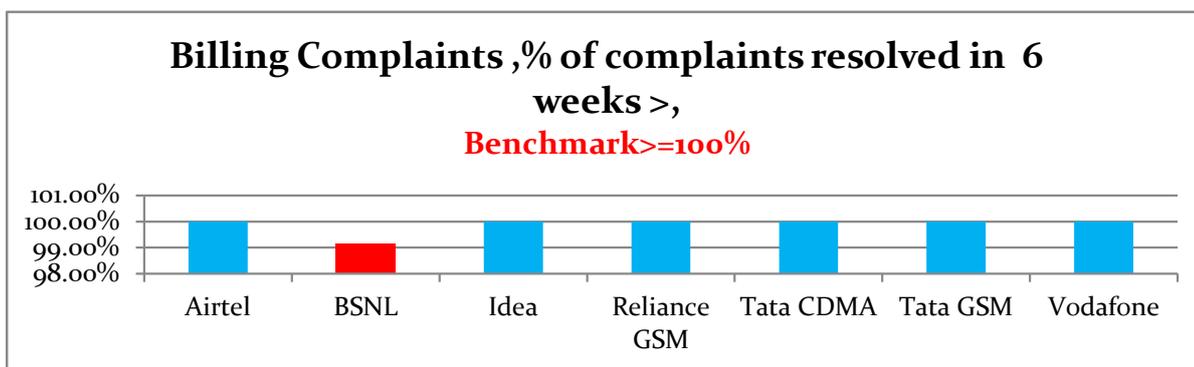
### 5.2.2 KEY FINDINGS- WITHIN 4 WEEKS



Data Source: Billing Center of the operators

All operators met the benchmark

### 5.2.3 KEY FINDINGS WITHIN 6 WEEKS



Data Source: Billing Center of the operators

All operators (except BSNL MP )met the TRAI benchmark of resolution of billing complaints within 6 weeks.(BSNL CG not submitted data)

### 5.3 PERIOD OF APPLYING CREDIT/WAVIER

#### 5.3.1 PARAMETER DESCRIPTION

➤ Computational Methodology:

↳ **Period of applying credit waiver = (number of cases where credit waiver is applied within 7 days/ total number of cases eligible for credit waiver) \* 100**

➤ TRAI Benchmark:

↳ Period of applying credit waiver within 7 days: 100%

➤ Audit Procedure:

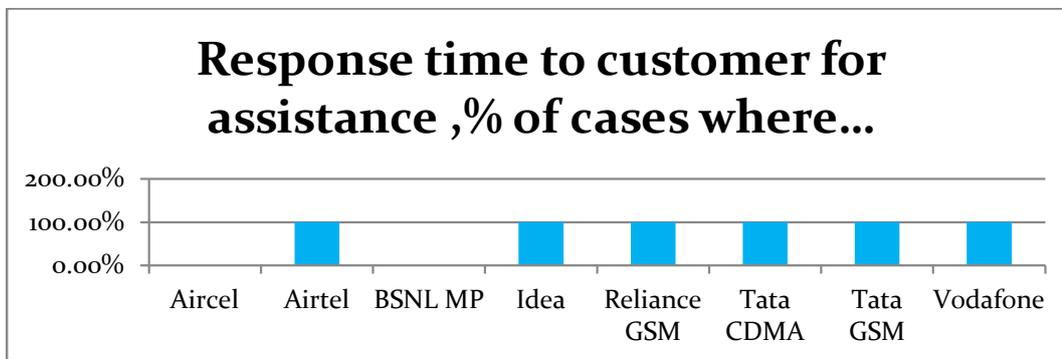
↳ Operator to provide details of:-

▸ List of all eligible cases along with

➤ Date of applying credit waiver to all the eligible cases.

➤ Date of resolution of complaint for all eligible cases

#### 5.3.2 KEY FINDINGS



Data Source: Billing Center of the operators

All operators met the TRAI benchmark

## 5.4 CALL CENTRE PERFORMANCE-IVR

### 5.4.1 PARAMETER DESCRIPTION

➤ Computational Methodology:

↳ **Call centre performance IVR = (Number of calls connected and answered by IVR/ All calls attempted to IVR) \* 100**

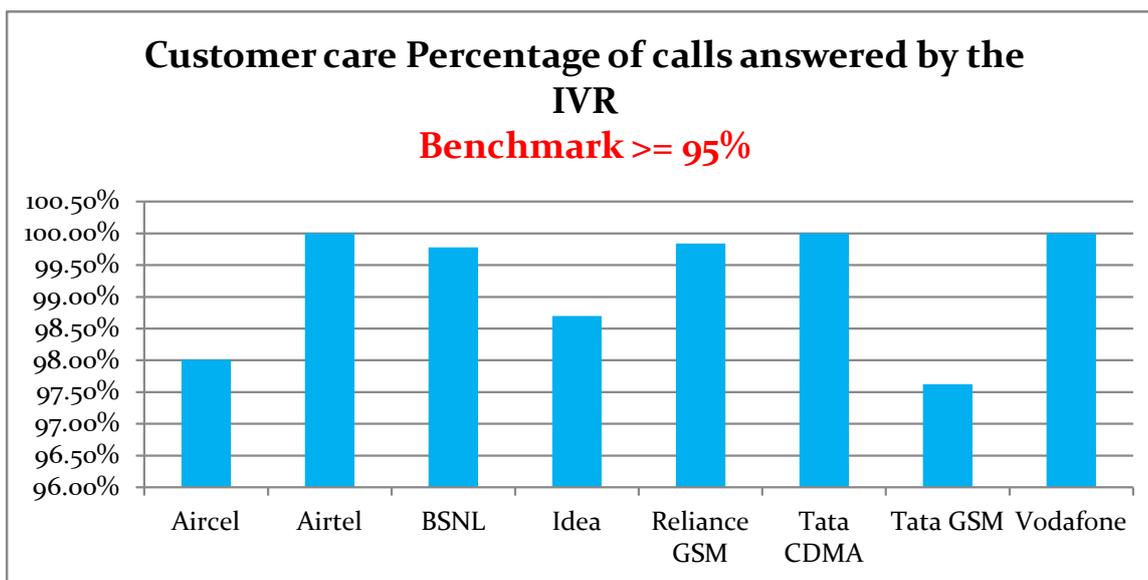
➤ TRAI Benchmark: >= 95%

➤ Audit Procedure:

↳ Operators provide details of the following from their central call centre/ customer service database:

- Total calls connected and answered by IVR
- Total calls attempted to IVR

### 5.4.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

All operators met the TRAI benchmark

## 5.5 CALL CENTER PERFORMANCE-VOICE TO VOICE

### 5.5.1 PARAMETER DESCRIPTION

#### ➤ Computational Methodology:

↳ Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) \* 100

#### ➤ Audit Procedure:

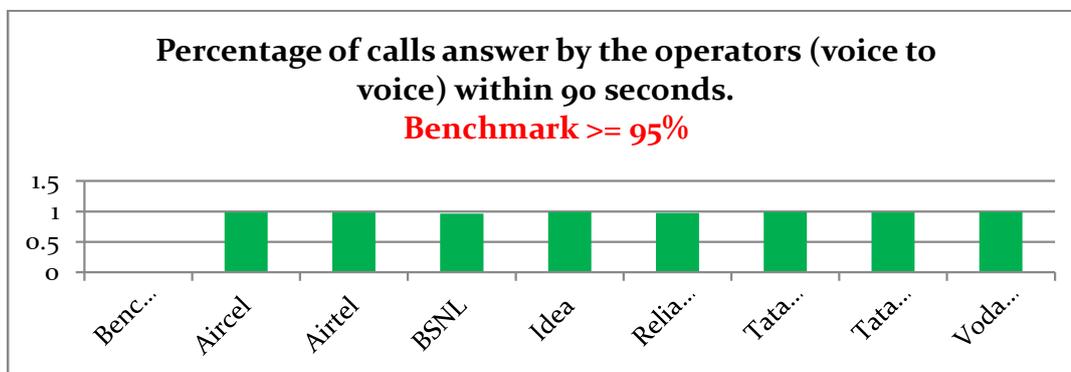
↳ Operators provide details of the following from their central call centre/ customer service database:

- Total calls connected and answered by operator within 90 seconds
- Total calls attempted to connect to the operator

↳ Also live calling was done to test the calls answered within 90 seconds by the operator

**Benchmark:** 95% calls to be answered within 90 seconds

### 5.5.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

All operators met the TRAI benchmark

## 5.6 TERMINATION/CLOSURE OF SERVICE

### 5.6.1 PARAMETER DESCRIPTION

➤ Computational Methodology:

↳ **Time taken for closure of service = (number of closures done within 7 days/ total number of closure requests) \* 100**

➤ TRAI Benchmark:

↳ Termination/Closure of Service: <=7 days

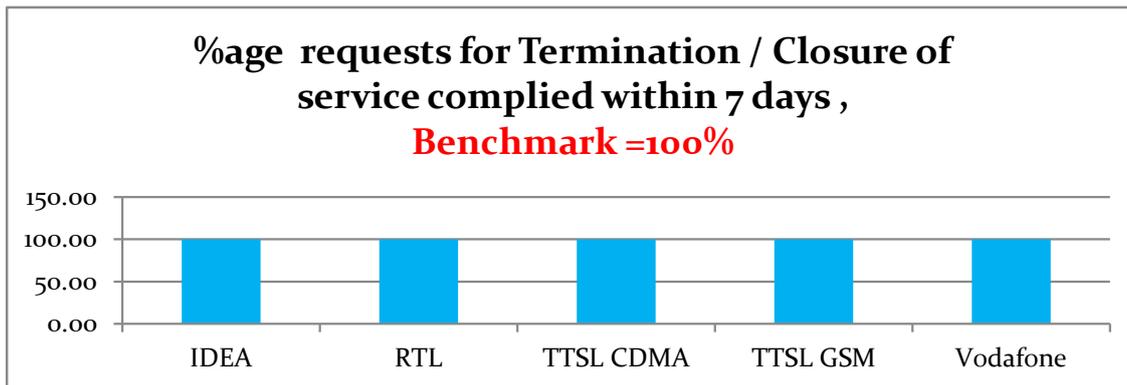
➤ Audit Procedure:

↳ Operator provide details of the following from their central billing/CS database:

➤ Date of lodging the closure request (all requests in given period)

➤ Date of closure of service

### 5.6.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

All operators met the TRAI benchmark for the parameter.

## 5.7 REFUND OF DEPOSITS AFTER CLOSURE

### 5.7.1 PARAMETER DESCRIPTION

#### ➤ Computational Methodology:

↳ **Time taken for refund for deposit after closures = (number of cases of refund after closure done within 60 days/ total number of cases of refund after closure) \* 100**

↳ Any case where the operators need to return the amount back to consumers post closure of service in form of cheque/cash is considered to be refund.

#### ➤ TRAI Benchmark:

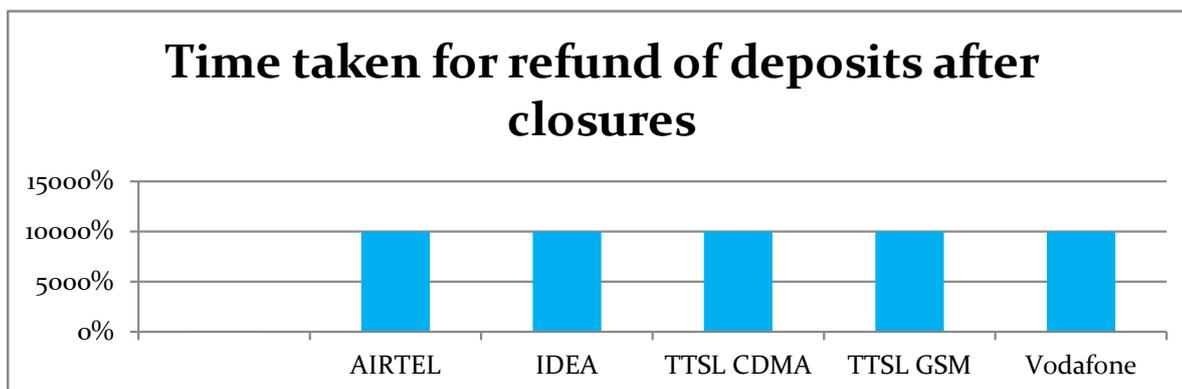
↳ Time taken for refund for deposit after closures: 100% within 60 days

#### ➤ Audit Procedure:

↳ Operator provide details of the following from their central billing/refund database:

- Dates of completion of all 'closure requests' resulting in requirement of a refund by the operator.
- Dates of refund pertaining to all closure request received during the relevant quarter

### 5.7.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

As per submission All operators met the TRAI benchmark for the parameter.

## 6 ANNEXURE –CUSTOMER SERVICES

### Termination/ closure of service

Termination	Benchmark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Total number of closure request		0	1373	0	20251	1159	655	1783	9103
Number of requests attended within 7 days		0	1373	0	20251	1159	655	1783	9103
Percentage of cases in which termination is done within 7 days	100	NA	100	NA	100	100	100	100	100

### Time taken to Refund of Deposits after closure

Refund	Benchmark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Total number of cases requiring refund of deposits		0	237	0	2920	0	88	217	9687
Total number of cases where refund was made within 60 days		0	237	0	2920	0	88	217	9687
Percentage cases in which refund was received with in 60 days	100	NA	100	NA	100	NA	100	100	100

NA =not applicable

\*Vodafone information seems to be incorrect

**Audit results for customer care**

Customer Care Assessment	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Total number of call attempts to customer care for assistance		9302	2131352	4711813	77805172	13277181	0	777677	11375795
Number of calls getting connected and answered (electronically)		9117	2131350	4701316	76792387	13256083	0	759198	11375795
Percentage of calls getting connected and answered	>=95 %	98.01	100.00	99.78	98.70	99.84	NA	0.98	100

## Audit results for customer care (voice-to-voice) - (Avg of 3 months)-Consolidated

Customer Care Assessment	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Total number of call attempts to customer care for assistance		560	3250911	2184358	12457460	1654044	22231	1083169	3983249
Number of calls getting connected and answered (electronically)		552	3204705	2110714	12348289	1615762	22067	1067476	3935095
Percentage of calls getting connected and answered	>=95 %	98.57	98.58	96.63	99.12	97.69	0.99	0.99	98.79

## Audit results for customer care (voice-to-voice) - Monthly

## January

Total calls received (Month 1)		268	1146392	749360	4125859	606644	8150	365931	1262237
Total calls answered within 90 seconds (Month 1)		263	1128324	731123	4081450	589138	8091	361423	1246103
% calls answered within 90 seconds (Month 1)	>=95 %	98.13	98.42	97.57	98.92	97.11	0.99	0.99	98.72

Audit results for customer care (voice-to-voice) - Monthly

February

Total calls received (Month 2)		131	1022362	645808	3672699	485361	8280	362374	1305510
Total calls answered within 90 seconds (Month 2)		131	1007801	629801	3650823	472496	8220	355372	1288880
% calls answered within 90 seconds (Month 2)	>=95 %	1.00	98.58	97.52	99.40	97.35	0.99	0.98	98.73

Audit results for customer care (voice-to-voice) - Monthly

March

Total calls received (Month 3)		161	1082157	789190	4658902	562039	5801	354864	1415502
Total calls answered within 90 seconds (Month 3)		158	1068580	749790	4616016	554128	5756	350681	1400112
% calls answered within 90 seconds (Month 3)	>=95 %	98.14	98.75	95.01	99.08	98.59	0.99	0.99	98.91

\*TATA CDMA did not provided, CDMA data due to switch issue.

\*TATA GSM provided busy hour data for IVRS responses.

\*RJIL and Idea information seems to be incomplete as number IVR call cases are less than voice to voice call cases, May be only busy related information is provided.

**Audit results for Billing performance**

**Audit Results for Billing performance Postpaid - Consolidated**

Billing Performance	Benchmark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Metering and billing credibility-Postpaid (Avg of 3 billing cycles)									
Total bills generated during the period		9	1063025	843232	1683882	368532	12786	108938	491854
Total number of bills disputed		0	1081	80	11196	327	2	54	603
Total number of valid billing complaints		0	162	0	1549	237	0	54	175
Total complaints considered invalid		0	919	80	9647	90	2	0	428
Percentage of bills disputed (Avg of 3 billing cycles)	<=0.1%	0.00	0.10	0.01	0.66	0.09	0.02	0.05	0.12
January									
Total bills generated during the first billing cycle		3	349984	283820	550586	131692	4458	39242	166904
Total number of bills disputed in first billing cycle		0	229	34	3442	117	0	18	185
Total number of valid billing complaints (billing cycle 1)		0	30	34	508	79	0	0	59
Total complaints considered invalid (billing cycle 1)		0	199	0	2934	38	0	18	126
Percentage of bills disputed (first billing cycle)	<=0.1%	0.00	0.07	0.01	0.63	0.09	0.00	0.05	0.11
February									
Total bills generated during the second billing cycle		3	353885	282315	554788	122204	4271	36264	164573
Total number of bills disputed in second billing cycle		0	408	27	3715	108	1	17	168
Total number of valid billing complaints (billing cycle 2)		0	89	27	546	79	1	0	63
Total complaints considered invalid (billing cycle 2)		0	319	0	3169	29	0	17	105
Percentage of bills disputed (second billing cycle)	<=0.1%	0	0.12	0.01	0.67	0.09	0.02	0.05	0.10
Total bills generated during the third billing cycle		3	359156	277097	578508	114636	4057	33432	160377
Total number of bills disputed in third billing cycle		0	444	19	4039	102	1	19	250

Total number of valid billing complaints (billing cycle 3)		0	43	19	495	79	1	0	53
Total complaints considered invalid (billing cycle 3)		0	401	0	3544	23	0	19	197
Percentage of bills disputed (third billing cycle)	<=0.1%	0.00	0.12	0.01	0.70	0.09	0.02	0.06	0.16

Audit Results for Billing performance Prepaid - Consolidated									
Billing Performance	Benchmark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Metering and billing credibility-Prepaid (Avg of 3 billing cycles)									
Total bills generated during the period		20691	12266961	4717601	22639467	7166524	157857	5670622	6654122
Total number of bills disputed		0	23354	10042	29338	6358	0	0	5479
Total number of valid billing complaints		0	7623	10042	6186	4853	0	0	3189
Total complaints considered invalid		0	15731	0	23152	1505	0	0	2290
Percentage of bills disputed (Avg of 3 billing cycles)	<=0.1%	0.00	0.19	0.21	0.13	0.09	0.00	0.00	0.08

## Resolution of billing complaints(Postpaid+Prepaid)-Consolidated

Billing Performance	Benachmark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone
Total number of billing/charging complaints		0	24435	10122	40534	6685	2	54	6082
Total number of complaints resolved in favour of customer		NA	7785	10122	7735	5090	2	0	3364
Total complaints considered invalid		NA	16650	0	32799	1595	0	54	2718
Number of complaints resolved in 4 weeks		NA	7785	10037	40534	6685	2	0	3364
Percentage cases resolved in 4 weeks	>=98%	NA	31.86	99.16	100	100	100	0	55.31
Number of cases resolved in 6 weeks		NA	7785	10037	40534	6685	2	0	3364
Percentage of cases resolved in 6 weeks	100%	NA	31.86	99.16	100	100	100	0	55.31
Total number of complaints where credit/waiver is required		NA	7785	10122	7735	5090	2	0	1686
Percentage cases in which credit/waiver was received within 1 week	100%	NA	100	0	100	100	100	NA	50.12

## 6.1 LIVE CALLING RESULTS

### 1) RESULTS FOR LEVEL 1 SERVICES

Level 1 services	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone	RJIL
Total no. of calls made	39	39	NP	39	39	39	39	49	39
Calls answered	13	18	NP	13	23	12	12	16	21
% of calls connected	33.33	46.15	NP	33.33	58.97	30.77	30.77	32.65	53.85

NP=not provided

Data Source: Live calls made by auditors from operator's network

### 2) Live Calling billing complaints

Live calling results for resolution of billing complaints										
Resolution of billing complaints	Benachmark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone	RJIO
Total number of calls made		NA	18	12	10	10	NA	18	10	NA
Number of cases resolved in 4 weeks		NA	18	12	10	10	NA	18	10	NA
Percentage cases resolved in 4 weeks	>=98%	NA	100	100	100	100	NA	100	100	NA
Number of cases resolved in 6 weeks		NA	18	12	10	10	NA	18	10	NA
Percentage cases resolved in 6 weeks	100%	NA	100	100	100	100	NA	100	100	NA

**3)Live Customer care -IVR**

Customer care Assessment	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone	RJIO
Total number of call attempts to customer care for assistance		10	5	15	13	10	10	10	NP	10
Number of calls getting connected and answered (electronically)		10	5	15	13	10	10	10	NP	10
Percentage of calls getting connected and answered	>=95%	100	100	100	100	100	100	100	NP	100

**4) LIVE Operator Assistance (Voice to Voice)**

Customer care Assessment	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance GSM	Tata CDMA	Tata GSM	Vodafone	RJIO
Total number of calls received		10	5	9	13	10	10	10	NP	10
Total number of calls getting connected and answered		10	5	9	13	10	10	10	NP	10
Live Calling Percentage calls getting connected and answered	>=95%	100	100	100	100	100	100	100	NP	100

*Rjio also included as live testing was done*

## 6.2 LEVEL 1 SERVICE CALLS MADE

All the numbers given in mandatory list in Section 2.4.2.4.1 were tested. The following table provides the numbers that are activated for each operator. A tick (✓) for an operator signifies that the number was active for the operator.

Live calls were made to the active numbers to test the calls answered. The details list as under was given to each operator.

Level 1 Number	Type of Service
100	Police
101	Fire
102	Ambulance
104	Health Information Helpline
108	Emergency & Disaster Management
138	All India Helpline for Passengers
149	Public Road Transport Utility
181	Chief Minister Helpline
182	Indian Railway Security Helpline
1033	Road Accident Management Service
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'
1056	Emergency Medical Services
1066	State of the Art Hospital
1063	Public Grievance Cell DoT Hq
1064	Anti Corruption Helpline
1070	Relief Commission for Natural Calamities
1071	Air Accident Helpline
1072	Rail Accident Helpline
1073	Road Accident Helpline
1077	Control Room for District Collector
1090	Call Alert (Crime Branch)
1091	Women Helpline
1097	National AIDS Helpline to NACO
1099	Central Accident and Trauma Services (CATS)

10580	Educations & Vocation Guidance and Counselling
10589	Mother and Child Tracking(MCTH)
10740	Central Pollution Control Board
10741	Pollution Control Board
1511	Police Related Service for all Metro Railway Project
1512	Prevention of Crime in Railway
1514	National Career Service(NCS)
15100	Free Legal Service Helpline
155304	Municipal Corporations
155214	Labour Helpline
1903	Sashastra Seema Bal (SSB)
1909	National Do Not Call Registry
1912	Complaint of Electricity
1916	Drinking Water Supply
1950	Election Commission of India



## Rjio Commercial information/Parameters

Data have been collected from Rjio for commercial services and but only live data is compared with others . The information submitted are as under:

Metering and Billing credibility					
	Bench	January	February	March	Total
<b>Metering and Billing credibility</b>					
<b>Postpaid</b>					
Total No. off bills issued during the Period		NA	NA	NA	NA
Total No. off valid billing complaints during the Period		NA	NA	NA	NA
Total No. of complaints considered invalid during the Period		NA	NA	NA	NA
No. of complaints from customers / bills disputed during the Period		NA	NA	NA	NA
Percentage of Billing complaints per 100 bills issued during the Period	< 0.1%	NA	NA	NA	NA
<b>Prepaid</b>					
Total No. of prepaid customers during the Period		NA	NA	NA	NA
Total no. of valid billing complaints during the Period		NA	NA	NA	NA
Total No. of complaints considered invalid during the Period		NA	NA	NA	NA
Total no. of complaints related to charging, credit & validity during the Period		NA	NA	NA	NA
Percentage of complaints per 100 customers during the Period	< 0.1%	NA	NA	NA	NA
<b>Resolution of billing/charging complaints</b>					
Total No. off billing/charging complaints during the Period		NA	NA	NA	NA
Total No. off valid billing complaints during the Period		NA	NA	NA	NA
Total No. off complaints considered invalid during the Period		NA	NA	NA	NA
Total No. off Number of complaints resolved in 4 weeks from date of receipt for complaints listed		NA	NA	NA	NA
Percentage of complaints resolved in 4 weeks from date of receipt	98%	NA	NA	NA	NA
Total No. off complaints resolved in 6 weeks from date of receipt for complaints listed		NA	NA	NA	NA
Percentage of complaints resolved in 6 weeks from date of receipt	100%	NA	NA	NA	NA
Total No. off complaints where credit/waiver is required		NA	NA	NA	NA
Percentage of complaints where period of applying credit/waiver to customer's account from date of resolution of complaint is < 1 week	100%	NA	NA	NA	NA
<b>Response time to the customer for assistance</b>					

Total number of call attempts to customer care for assistance		82154	42320	139800	264274
Number of calls getting connected and answered (electronically)		79114	40505	134804	254423
% age of calls getting connected and answered (electronically)	≥ 95%	96.30%	95.71%	96.43%	96.27%
Number of calls getting transferred to the operator		494895	398653	815836	1709384
Number of calls answered by operator (voice to voice) within 90 seconds		492361	398202	608044	1498607
% age of calls answered by operator (voice to voice) within 90 seconds	≥ 95%	99.49%	99.96%	74.53%	87.67%
<b>Termination / closure of service</b>					
Total number of closure requests		NA	24	578	602
Number of requests attended within 7 days		NA	24	578	602
% age cases in which termination done within 7 days	100%	NA	100.00%	100.00%	100.00%
<b>Time taken for refund of deposits after closures</b>					
Total no. of cases requiring refund		NA	NA	NA	NA
Total no. of cases where refund was made in <60 days		NA	NA	NA	NA
% age cases in which refund received within 60 days	100%	NA	NA	NA	NA
<b>Exchange capacity and Subscribers</b>					
Equipped Capacity of the network in erlangs	NA				
Total traffic handled during TCBH in erlangs	NA				
Total number of customers served (as per VLR)	NA				

## 7 ANNEXURE –JANUARY17 -2G

### PMR Data

S.No.	Name of Parameter - 2G	Aircel	Airtel	BSNL MP	BSNL CG	IDEA	RCOM	TATA GSM	TATA CDMA	Vodafone
1	<b>*Network Availability</b>									
	No of Days in a Month	31	31	31	31	31	31	31	31	31
1.1	Number of BTSs in the network in the licensed service area (A)	128	10014	3879	1740	10849	4186	2960	352	6006
1.2	Sum of downtime (i.e. total outage time) of BTSs	150.329537	7182.928391	52042	24018.82444	330731	10888.886	611.18	212.2897222	1941.255345
1.3	BTSs Accumulated downtime (not available for service) = $((B \times 100) / (24 \times 3 \times A))$	0.16%	0.10%	1.80%	1.86%	0.07%	0.35%	0.03%	0.08%	0.04%
1.4	Number of BTSs having accumulated downtime of >24 hours in a month (C)	0	8	61	32	24	53	0	0	8
1.5	Worst affected BTSs due to downtime = $(C \times 100) / A$	0.00%	0.08%	1.57%	1.84%	0.22%	1.27%	0.00%	0	0.001332001
2	<b>Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only</b>									
2.1	Call Set-up Success Rate – CSSR (within licensees own network)									
2.1.1	Total number of call attempts (A)	1772	292541811	1093578129	61289007	696671854	1683803080854540		4229991	144019031
2.1.2	Total number of calls established (B)	1742	288595917	1065789034	59889786	675139333	1626704740873060		4195947	143450430
2.1.3	Call setup success rate $(B/A \times 100)$	98.31%	98.65%	97.46%	97.72%	96.91%	96.61%	99.44%	99.20%	99.61%
2.2	Standalone Dedicated Control Channel (SDCCH) / Paging Channel Congestion									
2.2.1	SDCCH/Paging channel attempts (A)	3432116	1964868318	6009714592	123186762	3197509757	532019116	234737306	4229991	455294509
2.2.2	Number of successful SDCCH/Paging channel attempts (B)	1238	1457894	5985773761	122840447	10527064	531754044	234692709	4229991	455019743
2.2.3	SDCCH/Paging channel congestion % age $(1-B/A)$	0.04%	0.07%	0.40%	0.28%	0.33%	0.05%	0.02%	0.00%	0.06%
2.3	Traffic Channel (TCH) Congestion									

2.3.1	TCH attempts (A)	1924	292541811	1092678631	61289007	696671854	354895602	67751861	4229991	144019031
2.3.2	Number of successful TCH attempts (B)	5	2943003	1081787037	60384014	12392819	349233549	67736636	4229991	143450430
2.3.3	TCH congestion % age (1-B/A)	0.26%	1.01%	1.00%	1.48%	1.78%	1.60%	0.02%	0.00%	0.39%
3	<b>Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only</b>									
3.1	Call Drop Rate									
3.1.1	Total calls successfully established (A)	1857	288595917	1068460111	59148523	675139333	199703106	69071200	3954516	141426441
3.1.2	Total calls dropped after establishment (B)	23	2526650	13918553	544442	4413574	338363	257489	7373	826039
3.1.3	Call drop rate (B/A*100)	1.24%	0.88%	1.30%	0.92%	0.65%	0.17%	0.37%	0.19%	0.58%
3.2	<b>*Worst Affected Cells – Measurement should be only in Cell Bouncing Busy Hour (CBBH) period</b>									
3.2.1	Total no. of cells in the licensed service area (B)	384	31172	11924	5215	32318	12444	8888	1064	18040
3.2.2	No. of affected cells having call drop rate >3% during CBBH in a month (A)	2	518	269	119	486	40	153	19	680
3.2.3	Worst affected cells having more than 3% TCH drop rate (A/B*100)	0.62%	1.66%	2.26%	2.29%	1.50%	0.32%	1.73%	1.79%	3.77%
3.3	Voice Quality – CDMA									
3.3.1	Total number of sample calls (A)	0	0						73667289.6	
3.3.2	Number of calls with voice quality with FER value 0-4% (B)	0	0						73099030.48	
3.3.3	%age of calls with voice quality with FER value 0-4% (B/A*100)	#DIV/0!	#DIV/0!						0.992286141	
3.4	Voice Quality – GSM									
3.4.1	Total number of sample calls (A)	161889	96830632128			75590700869	26057098816	9987659189		759467984
3.4.2	Number of calls with voice quality with Rx Qual value 0-5 (B)	160566	94099680706			74005067123	25763372929	9900068902		751663157
3.4.3	%age of calls with voice quality with Rx Qual value 0-5 (B/A*100)	99.18%	97.18%			97.90%	98.87%	99.12%		98.97%
4	<b>*Point of Interconnection (POI) Congestion</b>									

4.1	Total number of working POI Service Area wise	17	96.03846154	161	65	276	237.6129032	57	155	41
4.2	No. POIs not meeting benchmark	0	0	0	0	0	0	0	0	0.193548387
4.3	Total Capacity of all POIs (A) - in erlangs	2183.8	253822.7212	199114	2434368	180625.6524	137067.4903	48774.81	19521.524	99409.42
4.4	Traffic served for all POIs (B)- in erlangs	0.78516129	157791.2167	34006	918981	103601.5799	82387.76774	21551.66	7170.615978	47580.86903
4.50%	POI congestion (if B>A = (B/A-1); if B≤A = 0)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%	0.00%	0%
5	Exchange capacity and Subscribers									
5.1	Equipped Capacity of the network in erlangs - 2G	659.1069925	315001.8659	224500	13000000.00%	490082.4219	Not Available	142617	85122.46868	129660
5.2	Total traffic handled during TCBH in erlangs - 2G	0.93	280000.4279	2679788	60920	486464.1167	Not Available	56150	5320.001883	108941
5.3	Total number of customers served (as per VLR) - 2G	189	12347733	2408152	1052820	24480789	Not Available	2610087	98959	5239297

**8 ANNEXURE –FEBUARY 17-2G**

PMR Data

		Aircel	Airtel	BSNL MP	BSNL CG	IDEA	RCOM	TATA GSM	TATA CDMA	Vodafone
S.No.	Name of Parameter - 2G									
1	*Network Availability									
	No of Days in a Month	28	28	28	28	28	28	28	28	28
1.1	Number of BTSs in the network in the licensed service area (A)	128	9989	3897	1740	10863	4219	2957	352	6010
1.2	Sum of downtime (i.e. total outage time) of BTSs	119.5277778	7151.475278	50303	23992	357848	9607.672333	294.4380556	171.0916667	2383.132029
130.00%	BTs Accumulated downtime (not available for service) = ((Bx100)/(24 x 3 x A))	0.14%	0.11%	1.92%	1.85%	0.08%	0.34%	0.01%	0.07%	0.06%
1.4	Number of BTs having accumulated downtime of >24 hours in a month (C)	0	26	70	31	4	46	0	0	7
1.5	Worst affected BTs due to downtime = (C x 100) / A	0.00%	0.26%	1.80%	1.78%	0.04%	1.09%	0.00%	0.00%	0.12%
2	Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only									
2.1	Call Set-up Success Rate – CSSR (within licensee's own network)									
2.1.1	Total number of call attempts (A)	1468	348258911	1066161352	62897598	681621707	1098165814006370		3940918	132210593
2.1.2	Total number of calls established (B)	1432	343900827	1037213709	61532156	658504756	1063265141420210		3876237	131524209
2.1.3	Call setup success rate (B/A*100)	97.55%	98.75%	97.28%	97.83%	96.61%	96.82%	99.44%	98.36%	99.48%
2.2	Standalone Dedicated Control Channel (SDCCH) / Paging Channel Congestion									
2.2.1	SDCCH/Paging channel attempts (A)	3285139	2035605511	6014136094	118819651	3041485146	447434121	222714318	3940918	405655820
2.2.2	Number of successful SDCCH/Paging channel attempts (B)	833	2199148	5975344797	118461655	12120511	447276399	222639994	3940918	405367355
2.2.3	SDCCH/Paging channel congestion % age (1-B/A)	0.03%	0.11%	0.65%	0.30%	0.40%	0.04%	0.03%	0.00%	0.07%
2.3	Traffic Channel (TCH) Congestion									
2.3.1	TCH attempts (A)	1468	348317944	1701308117	62897598	681621707	278998311	65901030	3940918	132210593

2.3.2	Number of successful TCH attempts (B)	0	4291300	1679132683	62458946	8599263	276479401	65890026	3940918	131524209
2.3.3	TCH congestion % age (1-B/A)	0.00%	1.23%	1.30%	0.70%	1.26%	0.90%	0.02%	0.00%	0.52%
3	Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only									
3.1	Call Drop Rate									
3.1.1	Total calls successfully established (A)	1431	343900827	1041059636	57954296	658504756	150483075	67466351	3617442	129817015
3.1.2	Total calls dropped after establishment (B)	8	2755364	16713830	506753	4495114	261597	230826	8280	708272
3.1.3	Call drop rate (B/A*100)	0.56%	0.80%	1.61%	0.87%	0.68%	0.17%	0.34%	0.23%	0.55%
3.2	*Worst Affected Cells – Measurement should be only in Cell Bouncing Busy Hour (CBBH) period									
3.2.1	Total no. of cells in the licensed service area (B)	384	31137	12914	5215	32253	12456	8879	1064	18068
3.2.2	No. of affected cells having call drop rate >3% during CBBH in a month (A)	2.964285714	497.0714286	359.3571429	107	532	47	137.3571429	20.10714286	571.4285714
3.2.3	Worst affected cells having more than 3% TCH drop rate (A/B*100)	0.77%	1.60%	2.78%	2.04%	1.65%	0.38%	1.55%	1.89%	3.16%
3.3	Voice Quality – CDMA									
3.3.1	Total number of sample calls (A)								65516631.9	
3.3.2	Number of calls with voice quality with FER value 0-4% (B)								65024213.12	
3.3.3	%age of calls with voice quality with FER value 0-4% (B/A*100)								0.992484065	
3.4	Voice Quality – GSM									
3.4.1	Total number of sample calls (A)	149927	109410175397			71419553739	21275473365	9196922596		826190213
3.4.2	Number of calls with voice quality with Rx Qual value 0-5 (B)	147697	106377589643			69942787657	21046109450	9137245309		817650206
3.4.3	%age of calls with voice quality with Rx Qual value 0-5 (B/A*100)	98.51%	97.23%			97.93%	98.92%	99.35%		98.97%
4	*Point of Interconnection (POI) Congestion									
4.1	Total number of working POI Service Area wise	17	93.07142857	171	67	277	239.9642857	57.25	155	41
4.2	No. POIs not meeting benchmark	0	0	0	0	0	0	0	0	0.142857143
4.3	Total Capacity of all POIs (A) - in erlangs	2425.017886	324762.3375	219135	2292771.00	185481.2121	139235.8804	41818.91818	19521.524	99571.72571
4.4	Traffic served for all POIs (B)- in erlangs	0.894285714	194266.2626	34894.85714	885826.00	105294.0973	72962.06357	20219.21321	7147.760713	45517.74
450.00%	POI congestion (if B>A = (B/A-1); if B≤A = 0)	0.00%	0.00%	0.00%	0%	0.00%	0.00%	0.00%	0.00%	0
5	Exchange capacity and Subscribers									
5.1	Equipped Capacity of the network in erlangs - 2G	657.3057668	319202	224500	130000	557052.76	Not Available	143221	85122.46868	130852
5.2	Total traffic handled during TCBH in erlangs - 2G	0.943821429	278459	2408127	62188	511329.3637	Not Available	57878.52829	5498.058949	116947
5.3	Total number of customers served (as per VLR) - 2G	189	12266860	2325324	1057811	24694663	Not Available	2612893	95981	5341826

## 9 ANNEXURE –MAR-17-2G

### PMR Data

S.No.	Name of Parameter - 2G	Aircel	Airtel	BSNL MP	BSNL CG	IDEA	RCOM	TATA GSM	TATA CDMA	Vodafone
1	*Network Availability									
	No of Days in a Month	31	31	31	31	31	31	31	31	31
1.1	Number of BTSs in the network in the licensed service area (A)	128	10046	4025	1742	10863	4221	2947	337	6015
1.2	Sum of downtime (i.e. total outage time) of BTSs	363.3541 667	5878.003056	51190	24416.66472	424706	11890.83517	370.2572222	136.71	2074.427466
130.00%	BTSs Accumulated downtime (not available for service) = $((B \times 100) / (24 \times 3 \times A))$	0.38%	0.08%	1.71%	1.88%	0.09%	0.38%	0.02%	0.06%	0.05%
1.4	Number of BTSs having accumulated downtime of >24 hours in a month (C)	4	7	72	33	11	61	0	0	4
150.00%	Worst affected BTSs due to downtime = $(C \times 100) / A$	3.13%	0.07%	1.79%	1.89%	0.10%	1.45%	0.00%	0.00%	0.07%
2	Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only									
2.1	Call Set-up Success Rate – CSSR (within licensee's own network)									
2.1.1	Total number of call attempts (A)	1493	355043583	1129658657	75486385	800674745	972880881817726		4109438	152545234
2.1.2	Total number of calls established (B)	1455	350566613	1094280207	73090866	771851459	946060346369681		4036709	151778466
2.1.3	Call setup success rate $(B/A \times 100)$	97.45%	98.74%	96.87%	96.83%	96.40%	97.24%	99.51%	98.23%	99.50%
2.2	Standalone Dedicated Control Channel (SDCCH) / Paging Channel Congestion									
2.2.1	SDCCH/Paging channel attempts (A)	3341705	2025813738	6036327837	143031373	3485614154	465724718	238559901	4109438	453310626
2.2.2	Number of successful SDCCH/Paging channel attempts (B)	33384	3803189	6007737812	142559080	19200335	465527711	238511879	4109438	452969530
2.2.3	SDCCH/Paging channel congestion % age $(1-B/A)$	1.00%	0.19%	0.47%	0.33%	0.55%	0.04%	0.02%	0.00%	0.08%
2.3	Traffic Channel (TCH) Congestion									
2.3.1	TCH attempts (A)	1493	355043583	1205252305	75486385	800674745	279259228	72984285	4109438	152545234
2.3.2	Number of successful TCH attempts (B)	0	4696415	1186686842	74938688	10034370	277406691	72972423	4109438	151778466

2.3.3	TCH congestion % age (1-B/A)	0.00%	1.32%	1.54%	0.73%	1.25%	0.66%	0.02%	0.00%	0.50%
3	Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only									
3.1	Call Drop Rate									
3.1.1	Total calls successfully established (A)	1453	350566613	1109812362	60285338	771851459	147288600	74665318	3810910	149822550
3.1.2	Total calls dropped after establishment (B)	14	2843138	17508948	541104	5306420	242154	234141	7815	813689
3.1.3	Call drop rate (B/A*100)	0.96%	0.81%	1.58%	0.90%	0.69%	0.16%	0.31%	0.21%	0.54%
3.2	*Worst Affected Cells – Measurement should be only in Cell Bouncing Busy Hour (CBBH) period									
3.2.1	Total no. of cells in the licensed service area (B)	384	31302	11740	5302	32755	12398	8850	1011	18093
3.2.2	No. of affected cells having call drop rate >3% during CBBH in a month (A)	2.483870 968	522.2903226	213.4516129	111.1935484	664	54	126.3870968	18	510.1290323
3.2.3	Worst affected cells having more than 3% TCH drop rate (A/B*100)	0.65%	1.67%	1.82%	2.10%	2.03%	0.44%	1.43%	1.79%	2.82%
3.3	Voice Quality – CDMA									
3.3.1	Total number of sample calls (A)	0	0						62268503	
3.3.2	Number of calls with voice quality with FER value 0-4% (B)	0	0						61815620	
3.3.3	%age of calls with voice quality with FER value 0-4% (B/A*100)	#DIV/0!	#DIV/0!						99.27%	
3.4	Voice Quality – GSM									
3.4.1	Total number of sample calls (A)	145530	1.10971E+11			79338604971	22043116687	9926723045		864373005
3.4.2	Number of calls with voice quality with Rx Qual value 0-5 (B)	143243	1.0803E+11			77788242420	21819204630	9866023752		855851060
3.4.3	%age of calls with voice quality with Rx Qual value 0-5 (B/A*100)	98.43%	97.35%			98.05%	98.98%	99.39%		99.01%
4	*Point of Interconnection (POI) Congestion									
4.1	Total number of working POI Service Area wise	17	90.06451613	172	68.48387097	280	243.1612903	50	153	41
4.2	No. POIs not meeting benchmark	0	0	0	0	0	0	0	0	0.258064516
4.3	Total Capacity of all POIs (A) - in erlangs	2183.8	326419.8267	219988	2801705	186659.7963	145006.4306	41965.71404	19334.59	100162.0787
4.4	Traffic served for all POIs (B)- in erlangs	0.522580 645	208691.4304	34668.6129	1022379	105082.4718	72175.28097	19977.99194	7041.01	51275.72387
450.00%	POI congestion (if B>A = (B/A-1); if B≤A = 0)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%	0.00%
5	Exchange capacity and Subscribers									
5.1	Equipped Capacity of the network in erlangs - 2G	648.7667 321	344508	224500	130000	557060	Not Available	143525	80882	133973
5.2	Total traffic handled during TCBH in erlangs - 2G	0.8676	310256.72	2679788	63574	519690.0451	Not Available	56596.39619	4917	123512
5.3	Total number of customers served (as per VLR) - 2G	199	12499794	2408152	1057744	24973006	Not Available	2624242	91348	5355833

**BSNL MP+CG Total quarterly performance 2G**

		JAN17	JAN18	FEB17	FEB18	Mar17	Mar17	Total
S.No.	Name of Parameter - 2G	BSNL MP	BSNL CG	BSNL MP	BSNL CG	BSNL MP	BSNL CG	BSNL
1	<b>*Network Availability</b>							
	No of Days in a Month	31	31	28	28	31	31	
1.1	Number of BTSs in the network in the licensed service area (A)	3879	1740	3897	1740	4025	1742	5637
1.2	Sum of downtime (i.e. total outage time) of BTSs	52042	24018.82444	50303	23992	51190	24416.66472	74294.69694
1.3	BTSs Accumulated downtime (not available for service) = ((Bx100)/(24 x 3 x A))	1.80%	1.86%	1.92%	1.85%	1.71%	1.88%	1.77%
1.4	Number of BTSs having accumulated downtime of >24 hours in a month (C)	61	32	70	31	72	33	101
1.5	Worst affected BTSs due to downtime = (C x 100) / A	1.57%	1.84%	1.80%	1.78%	1.79%	1.89%	1.79%
2	<b>Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only</b>							
2.1	Call Set-up Success Rate – CSSR (within licensees own network)							
2.1.1	Total number of call attempts (A)	1093578129	61289007	1066161352	62897598	1129658657	75486385	1129058950
2.1.2	Total number of calls established (B)	1065789034	59889786	1037213709	61532156	1094280207	73090866	1098745865
2.1.3	Call setup success rate (B/A*100)	97.46%	97.72%	97.28%	97.83%	96.87%	96.83%	97.32%
2.2	Standalone Dedicated Control Channel (SDCCH) / Paging Channel Congestion							
2.2.1	SDCCH/Paging channel attempts (A)	6009714592	123186762	6014136094	118819651	6036327837	143031373	6132955745
2.2.2	Number of successful SDCCH/Paging channel attempts (B)	5985773761	122840447	5975344797	118461655	6007737812	142559080	6093806452
2.2.3	SDCCH/Paging channel congestion % age (1-B/A)	0.40%	0.28%	0.65%	0.30%	0.47%	0.33%	0.64%
2.3	Traffic Channel (TCH) Congestion							
2.3.1	TCH attempts (A)	1092678631	61289007	1701308117	62897598	1205252305	75486385	1764205715

2.3.2	Number of successful TCH attempts (B)	1081787037	60384014	1679132683	62458946	1186686842	74938688	1741591629
2.3.3	TCH congestion % age (1-B/A)	1.00%	1.48%	1.30%	0.70%	1.54%	0.73%	1.28%
3	<b>Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only</b>							
3.1	Call Drop Rate							
3.1.1	Total calls successfully established (A)	1068460111	59148523	1041059636	57954296	1109812362	60285338	1099013932
3.1.2	Total calls dropped after establishment (B)	13918553	544442	16713830	506753	17508948	541104	17220583
3.1.3	Call drop rate (B/A*100)	1.30%	0.92%	1.61%	0.87%	1.58%	0.90%	1.57%
3.2	*Worst Affected Cells – Measurement should be only in Cell Bouncing Busy Hour (CBBH) period							
3.2.1	Total no. of cells in the licensed service area (B)	11924	5215	12914	5215	11740	5302	18129
3.2.2	No. of affected cells having call drop rate >3% during CBBH in a month (A)	269	119	359.3571429	107	213.4516129	111.1935484	466
3.2.3	Worst affected cells having more than 3% TCH drop rate (A/B*100)	2.26%	2.29%	2.78%	2.04%	1.82%	2.10%	2.57%
3.3	Voice Quality – CDMA							
3.3.1	Total number of sample calls (A)							
3.3.2	Number of calls with voice quality with FER value 0-4% (B)							
3.3.3	%age of calls with voice quality with FER value 0-4% (B/A*100)							
3.4	Voice Quality – GSM							
3.4.1	Total number of sample calls (A)							
3.4.2	Number of calls with voice quality with Rx Qual value 0-5 (B)							
3.4.3	%age of calls with voice quality with Rx Qual value 0-5 (B/A*100)							
4	*Point of Interconnection (POI) Congestion							
4.1	Total number of working POI Service Area wise	161	65	171	67	172	68.48387097	704.6981567

4.2	No. POIs not meeting benchmark	0	0	0	0	0	0	0
4.3	Total Capacity of all POIs (A) - in erlangs	199114	2434368	219135	2292771.00	219988	2801705	8167081
4.4	Traffic served for all POIs (B)- in erlangs	34006	918981	34894.85714	885826.00	34668.6129	1022379	2930755.47
4.50%	POI congestion (if B>A = (B/A-1); if B≤A = 0)	0.00%	0.00%	0.00%	0%	0.00%	0.00%	0.00%
5	Exchange capacity and Subscribers							
5.1	Equipped Capacity of the network in erlangs - 2G	224500	130000	224500	130000	224500	130000	1063500
5.2	Total traffic handled during TCBH in erlangs - 2G	2679788	60920	2408127	62188	2679788	63574	7954385
5.3	Total number of customers served (as per VLR) - 2G	2408152	1052820	2325324	1057811	2408152	1057744	

## 10 ANNEXURE – JANUARY-17 -3G

S.No.	Name of Parameter - 3G	Benchmark	AIRTEL Month	BSNL MP	BSNL CG	IDEA	RCOM	TATA 3G
1	*Network Availability							
	No of Days in a Month		31	31	31	31	31	31
1.1	(Number of Node Bs in the network in the licensed service area		5603	1331	515	7441	1103	1637
1.2	Sum of downtime (i.e. total outage time) of Node Bs		7231	15139	7448	218205	622.0711667	270.755
1.3	Node Bs downtime (not available for service)	≤ 2%	0.17%	1.53%	1.94%	0.07%	0.08%	0.02%
1.4	Number of Node Bs having accumulated downtime of >24 hours in a month		28	22	10	5	1	0
150.00%	Worst affected Node Bs due to downtime	≤ 2%	0.50%	1.65%	1.94%	0.07%	0.09%	0.00%
2	Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only							
2.1	Call Set-up Success Rate – CSSR (within licensees own network)							
2.1.1	Total number of RRC established (A)		27237156638085	1355608142	421531975	90343355	3075655236	
2.1.2	Total number of RRC attempts (B)		27201134174398	1332293002	434727148	90643750	3073887390	
2.1.3	Call setup success rate (B/A*100)	≥ 95%	99.87%	98.28%	96.96%	99.67%	99.94%	99.61%
2.2	RRC Congestion							
2.2.1	RRC attempts (A)		228144827	998427476.4	434727148	166146150	115132537	160640471
2.2.2	Number of successfut RRC attempts (B)		13560	992887640.6	430533850	75075	115070223	160615023
2.2.3	RRC Congestion % age (1-B/A)	≤ 1%	0.01%	0.55%	0.96%	0.05%	0.05%	0.02%
2.3	Circuit Switched RAB Congestion							

2.3.1	RAB attempts (A)		29513779	193915997.1	189214394	90643750	13679641	16488792
2.3.2	Number of successful RAB attempts (B)		6261	193308019	188047732	94785	13679577	16468122
2.3.3	RAB Congestion % age (1-B/A)	≤ 2%	0.02%	0.31%	0.62%	0.10%	0.00%	0.13%
3	Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only							
3.1	Circuit Switched voice drop rate							
3.1.1	Total calls successfully established (A) (Number of voice RAB normally released)		29980544	196759487.7	52140590	89874832	13534916	16823744
3.1.2	Total calls dropped after establishment (B) (Number of voice RAB abnormally released)		73822	1668296	323854	442884	5141	55667
3.1.3	Call drop rate (B/A*100)	≤ 2%	0.25%	0.85%	0.62%	0.49%	0.04%	0.33%
3.2	Worst affected cells having more than 3% Circuit switched voice drop rate							
3.2.1	Total no. of cells in the licensed service area (B)		17462	3973	1591	25516	3301	4902
3.2.2	No. of affected cells having CSV call drop rate >3% during (CBBH) in a month (A)		263	99.96774194	46	531	6	114.5806452
3.2.3	Worst affected cells having more than 3% Circuit switched voice drop rate (A/B*100)	≤ 3%	1.50%	2.52%	2.89%	2.08%	0.18%	2.34%
3.4	Circuit Switch Voice Quality (CSV quality) – GSM							
3.4.1	Total Transport Blocks InUplink downlink After Selection Combining Speech-10Sec		NA			1.41739E+11	82753051289	38554562500
3.4.2	Faulty Transport Blocks InUplink downlink After Selection Combining Speech-10Sec		NA			1200398237	82664701331	64011904
3.4.3	%Circuit Switch Voice Quality (CSV quality) (B/A*100)	≥ 95%	99.37%			99.15%	99.89%	99.83%
4	*Point of Interconnection (POI) Congestion							
4.1	Total number of working POI Service Area wise		96	161	67	POI Is common for 2G & 3G ,Details already shared with 2G PMR	Same as GSM NO New Poi for 3G	57.32258065
4.2	No. POIs not meeting benchmark		0	0	0		0	0
4.3	Total Capacity of all POIs (A) - in erlangs		253822.72	199114	130000		0	48774.81

4.4	Traffic served for all POIs (B)- in erlangs		157791.22	34006	60920		0	21551.66
4.5	POI congestion (if B>A = (B/A-1); if B≤A = 0)	≤ 0.5%	0%	0.00%	0.00%		0.00%	0.00%
5	Exchange capacity and Subscribers							
5.1	Equipped Capacity of the network in erlangs - 3G		0	0	130000	NA	Not Available	147060
5.2	Total traffic handled during TCBH in erlangs - 3G		25387	2679788	60920	47977.55694	Not Available	16265.914
5.3	Total number of customers served (as per VLR) - 3G		959686	2408152	1052820	VLR is common for 2G & 3G ,Details already shared in 2G PMR	Not Available	523111

**11 ANNEXURE – FEBRUARY-17 -3G**

			AIRTEL	BSNL MP	BSNL CG	IDEA	RCOM	TATA 3G
S.No.	Name of Parameter - 3G	Benchmark	Month					
1	*Network Availability							
	No of Days in a Month		28	28	28	28	28	28
1.1	(Number of Node Bs in the network in the licensed service area		5653	1331	512	10863	1106	1636
1.2	Sum of downtime (i.e. total outage time) of Node Bs		6329	15139	6483	357848	439.0676667	190.2522222
1.3	Node Bs downtime (not available for service)	≤ 2%	0.17%	1.69%	1.88%	0.08%	0.06%	0.02%
1.4	Number of Node Bs having accumulated downtime of >24 hours in a month		22	22	9	4	1	0
1.5	Worst affected Node Bs due to downtime	≤ 2%	0.39%	1.65%	1.76%	0.04%	0.09%	0.00%
2	Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only							
2.1	Call Set-up Success Rate – CSSR (within licensees own network)							

2.1.1	Total number of RRC established (A)		22318596270849	1271819206	368568913	681621707	2288067298	
2.1.2	Total number of RRC attempts (B)		22285945144048	1229602854	381014616	658504756	2286307686	
2.1.3	Call setup success rate (B/A*100)	≥ 95%	99.85%	96.68%	96.73%	96.61%	99.92%	99.64%
2.2	RRC Congestion							
2.2.1	RRC attempts (A)		211790047	946407706	381014616	3041485146	92850691	148019481
2.2.2	Number of successful RRC attempts (B)		14710	941219811	377657068	12120511	92811555	147992675
2.2.3	RRC Congestion % age (1-B/A)	≤ 1%	0.01%	0.55%	0.88%	0.40%	0.04%	0.02%
2.3	Circuit Switched RAB Congestion							
2.3.1	RAB attempts (A)		27622673	176169402	153277805	681621707	11287260	15977514
2.3.2	Number of successful RAB attempts (B)		6411	175626443	152174205	8599263	11287130	15952612
2.3.3	RAB Congestion % age (1-B/A)	≤ 2%	0.02%	0.31%	0.72%	1.26%	0.00%	0.16%
3	Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only							
3.1	Circuit Switched voice drop rate							
3.1.1	Total calls successfully established (A) (Number of voice RAB normally released)		28191964	178633301	47386538	658504756	11184702	16317697
3.1.2	Total calls dropped after establishment (B) (Number of voice RAB abnormally released)		72230	1654771	267029	4495114	4463	48758
3.1.3	Call drop rate (B/A*100)	≤ 2%	0.26%	0.93%	0.56%	0.68%	0.04%	0.30%

3.2	Worst affected cells having more than 3% Circuit switched voice drop rate							
3.2.1	Total no. of cells in the licensed service area (B)		17595	2894	1581	32253	3300	4899
3.2.2	No. of affected cells having CSV call drop rate >3% during (CBBH) in a month (A)		236	73.03571429	42	532	5	93.71428571
3.2.3	Worst affected cells having more than 3% Circuit switched voice drop rate (A/B*100)	≤ 3%	1.34%	2.52%	2.66%	1.65%	0.15%	1.91%
3.4	Circuit Switch Voice Quality (CSV quality) – GSM							
3.4.1	Total Transport Blocks InUplink downlink After Selection Combining Speech-10Sec		NA			71419553739	72109738920	34242875500
3.4.2	Faulty Transport Blocks InUplink downlink After Selection Combining Speech-10Sec		NA			69942787657	72036497286	53727618
3.4.3	%Circuit Switch Voice Quality (CSV quality) (B/A*100)	≥ 95%	99.39%			97.93%	99.90%	99.84%
4	*Point of Interconnection (POI) Congestion							
4.1	Total number of working POI Service Area wise		93	171	67	277	Same as GSM NO New Pol for 3G	57.25
4.2	No. POIs not meeting benchmark		0	0	0	0	0	0
4.3	Total Capacity of all POIs (A) - in erlangs		324762.34	219135	130000	185481.2121	0	41818.91818
4.4	Traffic served for all POIs (B)- in erlangs		194266.26	34894.85714	62188	105294.0973	0	20219.21321
4.5	POI congestion (if B>A = (B/A-1); if B≤A = 0)	≤ 0.5%	0%	0.00%	0.00%	0.00%	0.00%	0.00%

5	Exchange capacity and Subscribers							
5.1	Equipped Capacity of the network in erlangs - 3G		0	0	130000	557052.76	Not Available	146970
5.2	Total traffic handled during TCBH in erlangs - 3G		31190	7943	62188	511329.3637	Not Available	16201
5.3	Total number of customers served (as per VLR) - 3G		1166955	0	1057811	24694663	Not Available	528633

## 12 ANNEXURE – MARCH17-3G

S.No.	Name of Parameter - 3G	Benchmark	AIRTEL Month	BSNL MP	BSNL CG	IDEA	RCOM	TATA 3G
1	*Network Availability							
	No of Days in a Month		31	31	31	31	31	31
1.1	(Number of Node Bs in the network in the licensed service area		10046	4025	510	7645	1111	1633
1.2	Sum of downtime (i.e. total outage time) of Node Bs		5878	51190	7141	481645	896.9888333	310.6561111
1.3	Node Bs downtime (not available for service)	≤ 2%	0.08%	1.71%	1.88%	0.14%	0.11%	0.03%
1.4	Number of Node Bs having accumulated downtime of >24 hours in a month		7	72	8	5	3	0
1.5	Worst affected Node Bs due to downtime	≤ 2%	0.07%	1.79%	1.57%	0.07%	0.27%	0.00%

2	Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only							
2.1	Call Set-up Success Rate – CSSR (within licensees own network)							
2.1.1	Total number of RRC established (A)		355043583	1129658657	174673344	92829747	1922695060	
2.1.2	Total number of RRC attempts (B)		350566613	1094280207	182994868	93051896	1921723264	
2.1.3	Call setup success rate (B/A*100)	≥ 95%	98.74%	96.87%	95.45%	99.76%	99.95%	99.70%
2.2	RRC Congestion							
2.2.1	RRC attempts (A)		2025813738	6036327837	182994868	163779693	96627650	156196081
2.2.2	Number of successful RRC attempts (B)		3803189	6007737812	181300645	20478	96602073	156167842
2.2.3	RRC Congestion % age (1-B/A)	≤ 1%	0.19%	0.47%	0.93%	0.01%	0.03%	0.02%
2.3	Circuit Switched RAB Congestion							
2.3.1	RAB attempts (A)		355043583	1205252305	50254126	93051896	10554738	17301586
2.3.2	Number of successful RAB attempts (B)		4696415	1186686842	49539205	7314	10554706	17282354
2.3.3	RAB Congestion % age (1-B/A)	≤ 2%	1.32%	1.54%	1.42%	0.01%	0.00%	0.11%
3	Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only							
3.1	Circuit Switched voice drop rate							
3.1.1	Total calls successfully established (A) (Number of voice RAB normally released)		350566613	1109812362	37752981	92280443	10489618	17652387
3.1.2	Total calls dropped after establishment (B) (Number of voice RAB abnormally released)		2843138	17508948	260743	436426	3337	40056
3.1.3	Call drop rate (B/A*100)	≤ 2%	0.81%	1.58%	0.69%	0.47%	0.03%	0.23%
3.2	Worst affected cells having more than 3% Circuit switched voice drop rate							

3.2.1	Total no. of cells in the licensed service area (B)		31302	11740	1576	26414	3306	4890
3.2.2	No. of affected cells having CSV call drop rate >3% during (CBBH) in a month (A)		522	213.4516129	39	478	5	75.93548387
3.2.3	Worst affected cells having more than 3% Circuit switched voice drop rate (A/B*100)	≤ 3%	1.67%	1.82%	2.47%	1.81%	0.15%	1.55%
3.4	Circuit Switch Voice Quality (CSV quality) – GSM							
3.4.1	Total Transport Blocks InUplink downlink After Selection Combining Speech-10Sec		0			1.48767E+11	70853226250	37445422000
3.4.2	Faulty Transport Blocks InUplink downlink After Selection Combining Speech-10Sec		0			2116925409	70783236566	55598638
3.4.3	%Circuit Switch Voice Quality (CSV quality) (B/A*100)	≥ 95%	#DIV/0!			98.58%	99.90%	99.85%
4	*Point of Interconnection (POI) Congestion							
4.1	Total number of working POI Service Area wise		110970509632	172	67	POI Is common for 2G & 3G ,Details already shared with 2G PMR	Same as GSM NO New Pol for 3G	54
4.2	No. POIs not meeting benchmark		108029811034	0	0		0	0
4.3	Total Capacity of all POIs (A) - in erlangs		0.97	219988	130000		0	41965.71404
4.4	Traffic served for all POIs (B)- in erlangs			34668.6129	63574		0	19977.99194
4.5	POI congestion (if B>A = (B/A-1); if B≤A = 0)	≤ 0.5%	9006%	0.00%	0.00%		0.00%	0.00%
5	Exchange capacity and Subscribers		0					
5.1	Equipped Capacity of the network in erlangs - 3G		326420	224500	130000	NA	Not Available	146700
5.2	Total traffic handled during TCBH in erlangs - 3G		208691	2679788	63574	51040.65718	Not Available	15487
5.3	Total number of customers served (as per VLR) - 3G		0	2408152	1057744	VLR is common for 2G & 3G ,Details already shared in 2G PMR	Not Available	526536



**BSNL MP+CG Total quarterly performance 3G**

		<b>JAN17</b>	<b>JAN18</b>	<b>FEB17</b>	<b>FEB18</b>	<b>17-Mar</b>	<b>17-Mar</b>	
		<b>BSNL MP</b>	<b>BSNL CG</b>	<b>BSNL MP</b>	<b>BSNL CG</b>	<b>BSNL MP</b>	<b>BSNL CG</b>	<b>BSNL Total</b>
Name of Parameter - 3G	Benchmark							
*Network Availability								
No of Days in a Month		<b>31</b>	<b>31</b>	<b>28</b>	<b>28</b>	<b>31</b>	<b>31</b>	
(Number of Node Bs in the network in the licensed service area		<b>1331</b>	<b>515</b>	<b>1331</b>	<b>512</b>	<b>4025</b>	<b>510</b>	<b>6378</b>
Sum of downtime (i.e. total outage time) of Node Bs		<b>15139</b>	<b>7448</b>	<b>15139</b>	<b>6483</b>	<b>51190</b>	<b>7141</b>	<b>79953</b>
Node Bs downtime (not available for service)	≤ 2%	<b>1.53%</b>	<b>1.94%</b>	<b>1.69%</b>	<b>1.88%</b>	<b>1.71%</b>	<b>1.88%</b>	<b>1.68%</b>
Number of Node Bs having accumulated downtime of >24 hours in a month		<b>22</b>	<b>10</b>	<b>22</b>	<b>9</b>	<b>72</b>	<b>8</b>	<b>111</b>
Worst affected Node Bs due to downtime	≤ 2%	<b>1.65%</b>	<b>1.94%</b>	<b>1.65%</b>	<b>1.76%</b>	<b>1.79%</b>	<b>1.57%</b>	<b>1.74%</b>
Connection Establishment (Accessibility) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only								
Call Set-up Success Rate – CSSR (within licensees own network)								
Total number of RRC established (A)		<b>1355608142</b>	<b>421531975</b>	<b>1271819206</b>	<b>368568913</b>	<b>1129658657</b>	<b>174673344</b>	<b>2944720120</b>
Total number of RRC attempts (B)		<b>1332293002</b>	<b>434727148</b>	<b>1229602854</b>	<b>381014616</b>	<b>1094280207</b>	<b>182994868</b>	<b>2887892545</b>
Call setup success rate (B/A*100)	≥ 95%	<b>98.28%</b>	<b>96.96%</b>	<b>96.68%</b>	<b>96.73%</b>	<b>96.87%</b>	<b>95.45%</b>	<b>98.07%</b>
RRC Congestion								
RRC attempts (A)		<b>998427476.4</b>	<b>434727148</b>	<b>946407706</b>	<b>381014616</b>	<b>6036327837</b>	<b>182994868</b>	<b>7546745027</b>
Number of successful RRC attempts (B)		<b>992887640.6</b>	<b>430533850</b>	<b>941219811</b>	<b>377657068</b>	<b>6007737812</b>	<b>181300645</b>	<b>7507915336</b>
RRC Congestion % age (1-B/A)	≤ 1%	<b>0.55%</b>	<b>0.96%</b>	<b>0.55%</b>	<b>0.88%</b>	<b>0.47%</b>	<b>0.93%</b>	<b>0.51%</b>
Circuit Switched RAB Congestion								
RAB attempts (A)		<b>193915997.1</b>	<b>189214394</b>	<b>176169402</b>	<b>153277805</b>	<b>1205252305</b>	<b>50254126</b>	<b>1584953638</b>
Number of successful RAB attempts (B)		<b>193308019</b>	<b>188047732</b>	<b>175626443</b>	<b>152174205</b>	<b>1186686842</b>	<b>49539205</b>	<b>1564026695</b>
RAB Congestion % age (1-B/A)	≤ 2%	<b>0.31%</b>	<b>0.62%</b>	<b>0.31%</b>	<b>0.72%</b>	<b>1.54%</b>	<b>1.42%</b>	<b>1.32%</b>

Connection Maintenance (Retainability) – Measurement should be only in Time Consistent Busy Hour (TCBH) period and using OMC–Switch data only								
Circuit Switched voice drop rate								
Total calls successfully established (A) (Number of voice RAB normally released)		<b>196759487.7</b>	<b>52140590</b>	<b>178633301</b>	<b>47386538</b>	<b>1109812362</b>	<b>37752981</b>	<b>1373585182</b>
Total calls dropped after establishment (B) (Number of voice RAB abnormally released)		<b>1668296</b>	<b>323854</b>	<b>1654771</b>	<b>267029</b>	<b>17508948</b>	<b>260743</b>	<b>19691491</b>
Call drop rate (B/A*100)	≤ 2%	<b>0.85%</b>	<b>0.62%</b>	<b>0.93%</b>	<b>0.56%</b>	<b>1.58%</b>	<b>0.69%</b>	<b>1.43%</b>
Worst affected cells having more than 3% Circuit switched voice drop rate								
Total no. of cells in the licensed service area (B)		<b>3973</b>	<b>1591</b>	<b>2894</b>	<b>1581</b>	<b>11740</b>	<b>1576</b>	<b>17791</b>
No. of affected cells having CSV call drop rate >3% during (CBBH) in a month (A)		<b>99.96774194</b>	<b>46</b>	<b>73.03571429</b>	<b>42</b>	<b>213.4516129</b>	<b>39</b>	<b>367</b>
Worst affected cells having more than 3% Circuit switched voice drop rate (A/B*100)	≤ 3%	<b>2.52%</b>	<b>2.89%</b>	<b>2.52%</b>	<b>2.66%</b>	<b>1.82%</b>	<b>2.47%</b>	<b>2.07%</b>
Circuit Switch Voice Quality (CSV quality) – GSM								
Total Transport Blocks InUplink downlink After Selection Combining Speech-10Sec								
Faulty Transport Blocks InUplink downlink After Selection Combining Speech-10Sec								
%Circuit Switch Voice Quality (CSV quality) (B/A*100)	≥ 95%							
*Point of Interconnection (POI) Congestion								
Total number of working POI Service Area wise		<b>161</b>	<b>67</b>	<b>171</b>	<b>67</b>	<b>172</b>	<b>67</b>	
No. POIs not meeting benchmark		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Total Capacity of all POIs (A) - in erlangs		<b>199114</b>	<b>130000</b>	<b>219135</b>	<b>130000</b>	<b>219988</b>	<b>130000</b>	
Traffic served for all POIs (B)- in erlangs		<b>34006</b>	<b>60920</b>	<b>34894.85714</b>	<b>62188</b>	<b>34668.6129</b>	<b>63574</b>	
POI congestion (if B>A = (B/A-1); if B≤A = 0)	≤ 0.5%	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	
Exchange capacity and Subscribers								

Equipped Capacity of the network in erlangs - 3G		<b>0</b>	<b>130000</b>	<b>0</b>	<b>130000</b>	<b>224500</b>	<b>130000</b>	
Total traffic handled during TCBH in erlangs - 3G		<b>2679788</b>	<b>60920</b>	<b>7943</b>	<b>62188</b>	<b>2679788</b>	<b>63574</b>	
Total number of customers served (as per VLR) - 3G		<b>2408152</b>	<b>1052820</b>	<b>0</b>	<b>1057811</b>	<b>2408152</b>	<b>1057744</b>	

## Rjio Network Parameters

Data have been collected from Rjio and as most of qos parameters /equivalent parameters have yet not defined so not compared with other operators. The information submitted are as under:

Month	Name of Service Area	Busy Hour (NBH)	Network Availability					Connection Establishment (Accessibility)	
			Total no. of NodeB's in the licensed service area	Sum of downtime of Nodes in a month in hours i.e. total outage time of all NodeBs in hours during a month	Node Bs Accumulated downtime (not available for service) (%)	No. of Node B's having accumulated downtime of >24 hours in a month	Worst affected NodeB's due to downtime (%)	Session Establishment Success Rate(within licensee's own network) (%)	Traffic Channel Blocking (%)
	1	2	3	4	5	6	7	8	10
	<b>Benchmark</b>	<b>JAN17</b>			<b>&lt;= 2%</b>		<b>&lt;= 2%</b>	<b>&gt;= 95%</b>	<b>&lt;= 2%</b>
JAN17	MADHYA PRADESH	20:00	5354	10019	0.25%	46	0.86%	99.47	0.00
FEB17	MADHYA PRADESH	20:00	5409	6021	0.17%	32	0.59%	99.44	0.00
MAR17	MADHYA PRADESH	20:00	5537	9515	0.23%	22	0.40%	99.50	0.00
Average			5433.33	8518.45	0.22%	33.33	0.62%	99.47	0.00



Month	Name of Service Area	Busy Hour (NBH)	Connection Maintenance (Retainability)					POI	Network Traffic Capacity and Utilization		
			VOLTE Drop Rate (%)	Total No. of cells exceeding 3% drop (call drop)	Total no. of cells in the network	Worst affected cells having more than 3% Drop Rate (%)	Connections with good voice quality(%)	Point of Interconnection (POI) Congestion (No. of POIs not meeting the benchmark)	Equipped Capacity of Network wrt No of Suscibers in Million	Total traffic handled (total no of Call attempted )in NBH	Total no. of customers served (as per VLR) on last day of the month
	1	2	11	12	13	14	15	16	17	18	19
	<b>Benchmark</b>	<b>JAN17</b>	<= 2%			<=3%	>= 95%	<= 0.5%			
JAN17	MADHYA PRADESH	20:00	0.51	130	47856	0.27	100	5	6	6182465	3699503
FEB17	MADHYA PRADESH	20:00	0.51	487	48291	1.01	98.87	3	7.5	7466177	4138719
MAR17	MADHYA PRADESH	20:00	0.32	226	49531	0.46	99.3087097	1	7.5	8761230	4712958
Average			0.45	281.16	48559.33	0.58	99.39	3.00	7.00	7469957.28	4183726.67