Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

TRAI Wireless Audit Report for RAJASTHAN Circle

Q.E.March 2017

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1. EXECUTIVE SUMMARY-2G

The objective assessment of Quality of Service (QoS) carried out by TRAI Regional Office Jaipur gives an insight into the overall performance of various operators in Rajasthan circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

1.1 PMR DATA – 3 MONTHS- CONSOLIDATED FOR 2G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTS accumulated Down Time (Not Available for Service)	Worst Affected BTS due to Down Time	CSSR (Call Setup Success Rate)	SDCCH Congestion(%age)	TCH Congestion(%age)	Call Drop Rate (%age)	% of cells having more than 3% TCH drop	%age of connection with good voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Aircel	0.06%	0.05%	97.78%	0.12%	1.03%	0.67%	2.35%	97.07%
Airtel	0.09%	0.15%	96.20%	0.52%	1.48%	0.67%	0.84%	98.85%
BSNL	1.02%	0.82%	98.64%	0.72%	1.34%	1.44%	2.19%	NDR
Idea	0.05%	0.01%	99.34%	0.20%	0.41%	0.49%	1.02%	97.51%
MTS	0.16%	0.13%	99.19%	NA	0.01%	0.48%	1.83%	99.22%
Reliance Comm	0.11%	0.79%	98.32%	0.09%	0.25%	0.15%	0.73%	99.02%
Tata CDMA	0.05%	0.07%	98.93%	NA	0.14%	0.29%	2.11%	95.24%
Tata GSM	0.04%	0.00%	99.49%	0.02%	0.09%	0.27%	1.49%	99.22%
Vodafone	0.06%	0.15%	99.42%	0.16%	0.58%	0.63%	2.54%	96.72%

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

NDR: - No data received

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

BTSs Accumulated Downtime:

[All operators met the benchmark. Minimum BTS Accumulated downtime was recorded for Tata GSM at 0.04%.]

Worst Affected BTSs 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 Tata GSM with 99.49%.]

SDCCH/ Paging Chl. Congestion:

[All operators met the benchmark on SDCCH / Paging Channel Congestion. Tata GSM recorded the best SDCCH / Paging Channel Congestion having value 0.02%]

TCH Congestion:

[All operators met the benchmark on TCH congestion. MTS CDMA performed the best with a value of 0.01% on TCH congestion]

Call Drop Rate:

[All operators met the benchmark for the parameter. Minimum call drop rate was recorded for Reliance Comm. at 0.15 %.]

Worst Affected Cells Having More than 3% TCH Drop:

[All operators met the benchmark for the parameter. Best performance was recorded for Reliance Comm. at 0.73%.]

Voice Quality

[All operators met the benchmark for the parameter. Best performance was recorded for Tata GSM at 99.22%.]

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 2017 FOR 2G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTS accumulated Down Time (Not Available for Service)	Worst Affected BTS due to Down Time	CSSR (Call Setup Success Rate)	SDCCH Congestion(%age)	TCH Congestion(%age)	Call Drop Rate (%age)	% of cells having more than 3% TCH drop	%age of connection with good voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Aircel	0.07%	0.04%	97.68%	0.13%	1.13%	0.75%	2.79%	97.03%
Airtel	0.11%	0.13%	96.99%	0.34%	1.33%	0.70%	0.86%	98.85%
BSNL	1.06%	1.00%	98.60%	0.59%	1.14%	1.51%	2.26%	NDR
Idea	0.04%	0.01%	99.52%	0.13%	0.21%	0.56%	1.25%	97.46%
MTS	0.16%	0.26%	99.21%	NA	0.01%	0.53%	NA	99.23%
Reliance C	0.05%	0.34%	97.69%	0.09%	0.37%	0.14%	0.61%	98.94%
Tata CDMA	0.08%	0.00%	98.89%	NA	0.12%	0.29%	2.04%	99.16%
Tata GSM	0.03%	0.00%	99.40%	0.01%	0.15%	0.30%	1.55%	99.17%
Vodafone	0.06%	0.04%	99.49%	0.16%	0.51%	0.66%	2.76%	96.74%

1.1.2 PMR DATA –FEBRUARY 2017 FOR 2G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTS accumulated Down Time (Not Available for Service)	Worst Affected BTS due to Down Time	CSSR (Call Setup Success Rate)	SDCCH Congestion(%age)	TCH Congestion(%age)	Call Drop Rate (%age)	% of cells having more than 3% TCH drop	%age of connection with good voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Aircel	0.06%	0.08%	97.76%	0.12%	0.97%	0.66%	2.14%	97.01%
Airtel	0.08%	0.13%	96.22%	0.51%	1.77%	0.67%	0.85%	98.85%
BSNL	1.07%	0.76%	98.48%	0.84%	1.57%	1.45%	2.31%	NDR
Idea	0.05%	0.03%	99.44%	0.20%	0.31%	0.47%	0.92%	97.52%
MTS	0.17%	0.13%	99.05%	NA	0.01%	0.48%	1.81%	99.22%
Reliance C	0.08%	0.53%	98.87%	0.09%	0.20%	0.14%	0.60%	99.02%
Tata CDMA	0.01%	0.20%	99.11%	NA	0.03%	0.25%	2.01%	99.15%
Tata GSM	0.04%	0.00%	99.52%	0.02%	0.07%	0.28%	1.47%	99.19%
Vodafone	0.05%	0.03%	99.46%	0.16%	0.54%	0.62%	2.51%	96.68%

1.1.3 PMR DATA – MARCH 2017 FOR 2G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTS accumulated Down Time (Not Available for Service)	Worst Affected BTS due to Down Time	CSSR (Call Setup Success Rate)	SDCCH Congestion(%age)	TCH Congestion(%age)	Call Drop Rate (%age)	% of cells having more than 3% TCH drop	%age of connection with good voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Aircel	0.04%	0.04%	97.88%	0.10%	0.99%	0.59%	2.14%	97.17%
Airtel	0.09%	0.19%	95.39%	0.71%	1.34%	0.66%	0.81%	98.86%
BSNL	0.94%	0.69%	98.83%	0.74%	1.32%	1.37%	1.99%	NDR
Idea	0.06%	0.00%	99.07%	0.27%	0.69%	0.43%	0.90%	97.56%
MTS	0.14%	0.00%	99.30%	NA	0.02%	0.44%	1.85%	99.22%
Reliance Com	0.20%	1.50%	98.39%	0.09%	0.17%	0.17%	0.98%	99.09%
Tata CDMA	0.07%	0.00%	98.80%	NA	0.28%	0.32%	2.27%	87.40%
Tata GSM	0.04%	0.00%	99.54%	0.03%	0.07%	0.23%	1.43%	99.30%
Vodafone	0.08%	0.40%	99.31%	0.17%	0.69%	0.60%	2.34%	96.74%

1.2 3 DAY DATA – MARCH 2017 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.

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTS accumulated Down Time (Not Available for Service)	Worst Affected BTS due to Down Time	CSSR (Call Setup Success Rate)	SDCCH Congestion(%age)	TCH Congestion(%age)	Call Drop Rate (%age)	% of cells having more than 3% TCH drop	%age of connection with good voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Aircel	0.02%	0.00%	97.99%	0.04%	0.56%	0.57%	2.15%	97.22%
Airtel	0.09%	0.00%	95.44%	0.83%	1.36%	0.64%	0.83%	98.85%
BSNL	0.93%	0.00%	98.86%	0.83%	1.20%	1.34%	1.93%	98.67%
Idea	0.06%	0.00%	99.18%	0.14%	0.59%	0.40%	0.86%	97.59%
MTS	0.14%	0.00%	99.25%	NA	0.00%	0.42%	1.85%	99.21%
Reliance Comm.	1.35%	0.00%	99.45%	0.05%	0.15%	0.17%	1.05%	99.13%
Tata CDMA	0.04%	0.00%	98.76%	NA	0.44%	0.25%	2.19%	85.79%
Tata GSM	0.45%	0.00%	99.45%	0.05%	0.15%	0.17%	1.05%	99.13%
Vodafone	0.11%	0.03%	99.26%	0.28%	0.74%	0.59%	2.19%	96.80%

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

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

BTSs Accumulated Downtime:

All operators met the benchmark. Minimum BTS Accumulated downtime was recorded for Aircel at 0.02%.

Worst Affected BTSs Due to Downtime:

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

Call Set-up Success Rate (CSSR):

All operators met the benchmark for CSSR. The maximum CSSR was observed for Reliance GSM & Tata GSM with 99.45%.

SDCCH/ Paging Chl. Congestion:

All operators met the benchmark on SDCCH / Paging Channel Congestion. Aircel recorded the best SDCCH / Paging Channel Congestion having value 0.04%.

TCH Congestion:

All operators met the benchmark on TCH congestion.

Call Drop Rate:

All operators met the benchmark for the parameter. Minimum call drop rate was recorded for Tata GSM at 0.17%.

Worst Affected Cells Having More than 3% TCH Drop:

All operators met the benchmark for the parameter. Best performance was recorded for Airtel at 0.83%.

Voice Quality

Tata CDMA failed to meet the benchmark for this parameter. Best performance was recorded for MTS CDMA at 99.21%.

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

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Node B's accumulated Down Time (Not Available for Service)	Worst Affected Node B's due to Down Time	CSSR (Call Setup Success Rate)	RRC Congestion(%age)	RAB Congestion(%age)	Circuit switched voice Drop Rate (%age)	% of cells having more than 3% Circuit switch drop rate	%age of connection with good circuit switched voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Airtel	0.12%	0.14%	99.43%	0.03%	0.03%	0.51%	0.93%	98.90%
BSNL	1.10%	1.69%	98.96%	0.76%	0.99%	1.15%	1.97%	NDR
Reliance C	0.16%	0.00%	99.76%	0.16%	0.11%	0.05%	0.20%	99.31%
Vodafone	0.07%	0.10%	99.89%	0.02%	0.01%	0.26%	2.81%	98.90%

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

Node Bs downtime:

All operators met the benchmark. Minimum Node Bs downtime was recorded for Vodafone at 0.07%.

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 Vodafone with 99.89%.

RRC Congestion:

All operators met the benchmark. Minimum RRC congestion was recorded for Vodafone 3G at 0.02%.

Circuit Switched RAB Congestion:

All operators met the benchmark. Minimum Circuit Switched RAB congestion was recorded for Vodafone at 0.01%.

Call Drop Rate:

All operators met the benchmark for the parameter. Minimum call drop rate was recorded for Reliance 3G at 0.05%.

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 Reliance 3G at 0.20%.

Circuit Switch Voice Quality:

All operators met the benchmark for the parameter. Best performance was recorded for Airtel 3G & Vodafone at 98.90%.

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

1.3.1 PMR DATA – JANUARY 2017 FOR 3G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Node B's accumulated Down Time (Not Available for Service)	Worst Affected Node B's due to Down Time	CSSR (Call Setup Success Rate)	RRC Congestion(%age)	RAB Congestion(%age)	Circuit switched voice Drop Rate (%age)	% of cells having more than 3% Circuit switch drop rate	%age of connection with good circuit switched voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Airtel	0.13%	0.20%	99.27%	0.05%	0.04%	0.57%	1.16%	98.86%
BSNL	1.19%	1.90%	98.65%	0.81%	0.99%	1.21%	2.12%	NDR
Reliance Cor	0.12%	0.00%	99.72%	0.18%	0.15%	0.05%	0.18%	98.86%
Vodafone	0.06%	0.00%	99.89%	0.02%	0.02%	0.29%	2.97%	98.91%

1.3.2 PMR DATA –FEBRUARY 2017 FOR 3G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Node B's accumulated Down Time (Not Available for Service)	Worst Affected Node B's due to Down Time	CSSR (Call Setup Success Rate)	RRC Congestion(%age)	RAB Congestion(%age)	Circuit switched voice Drop Rate (%age)	% of cells having more than 3% Circuit switch drop rate	%age of connection with good circuit switched voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Airtel	0.11%	0.09%	99.56%	0.03%	0.04%	0.47%	0.84%	98.93%
BSNL	1.10%	1.72%	98.50%	0.83%	0.99%	1.21%	1.99%	NDR
Reliance Com	0.01%	0.00%	99.63%	0.31%	0.15%	0.04%	0.16%	99.49%
Vodafone	0.01%	0.00%	99.90%	0.01%	0.00%	0.24%	2.74%	98.94%

1.3.3 PMR DATA – MARCH 2017 FOR 3G

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Node B's accumulated Down Time (Not Available for Service)	Worst Affected Node B's due to Down Time	CSSR (Call Setup Success Rate)	RRC Congestion(%age)	RAB Congestion(%age)	Circuit switched voice Drop Rate (%age)	% of cells having more than 3% Circuit switch drop rate	%age of connection with good circuit switched voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Airtel	0.13%	0.13%	99.47%	0.02%	0.01%	0.47%	0.80%	98.93%
BSNL	1.02%	1.45%	99.72%	0.65%	1.00%	1.04%	1.81%	NDR
Reliance Col	0.35%	0.00%	99.94%	0.01%	0.01%	0.05%	0.26%	99.58%
Vodafone	0.12%	0.30%	99.89%	0.02%	0.00%	0.26%	2.73%	98.86%

1.4 3 DAY DATA – MARCH 2017 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.

	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	Node B's accumulated Down Time (Not Available for Service)	Worst Affected Node B's due to Down Time	CSSR (Call Setup Success Rate)	RRC Congestion(%age)	RAB Congestion(%age)	Circuit switched voice Drop Rate (%age)	% of cells having more than 3% Circuit switch drop rate	%age of connection with good circuit switched voice Quality
Benchmark	<=2%	<=2%	>=95%	<=1%	<=2%	<=2%	<=3%	>=95%
Airtel	0.11%	0.00%	99.52%	0.01%	0.00%	0.48%	0.87%	98.92%
BSNL	0.98%	0.03%	98.57%	0.98%	0.94%	1.16%	1.85%	97.00%
Reliance Comm.	0.76%	0.00%	99.97%	0.00%	0.00%	0.05%	0.32%	99.78%
Vodafone	0.18%	0.00%	99.90%	0.00%	0.00%	0.25%	2.71%	96.80%

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

Node Bs downtime:

All operators met the benchmark. Minimum Node Bs downtime was recorded for Airtel at 0.11%.

Worst affected Node Bs due to downtime:

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

Call Set-up Success Rate (CSSR):

All operators met the benchmark for CSSR. The maximum CSSR was observed for Reliance COM 3G with 99.97%.

RRC Congestion:

All operators met the benchmark.

Circuit Switched RAB Congestion:

All operators met the benchmark. Minimum Circuit Switched RAB congestion was recorded for RCOM & Vodafone 3G at 0.00%.

Call Drop Rate:

All operators met the benchmark for the parameter. Minimum call drop rate was recorded for RCOM 3G at 0.05%.

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 at 0.32%.

Circuit Switch Voice Quality:

All operators met the benchmark for the parameter. Best performance was recorded for RCOM 3G at 99.78%.

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

	PMR			3 Day Live		
	Service Activation/ Provisioning	PDP Context Activation Success Rate	TBF Drop Rate	Service Activation/ Provisioning	PDP Context Activation Success Rate	TBF Drop Rate
Benchmark	>=95% within 4 hours	>=95%	<=5%	>=95% within 4 hours	>=95%	<=5%
Aircel	NDR	97.59%	0.47%	NDR	99.08%	1.15%
Airtel	NDR	NDR	NDR	NDR	NDR	NDR
BSNL	NDR	NDR	NDR	NDR	NDR	NDR
Idea	99.98%	99.40%	0.12%	NDR	NDR	NDR
MTS	NDR	99.36%	0.63%	NDR	99.45%	0.67%
Reliance Comm.	99.99%	NDR	2.10%	100.00%	NDR	2.05%
Tata CDMA	100.00%	96.06%	1.60%	100.00%	99.06%	0.94%
Tata GSM	100.00%	99.33%	0.93%	100.00%	95.51%	1.55%
Vodafone	NDR	99.63%	3.05%	NDR	99.72%	3.11%

NDR: - No data received

Note: Airtel & BSNL have not submitted data for any parameter where as Vodafone; Reliance & Idea have submitted partial data.

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

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 for PDP Context activation success rate in PMR as well as live audit. Maximum PDP Context activation success rate was recorded for Vodafone.

Drop Rate:

All operators met the benchmark for PMR as well as 3day live. The minimum drop rate was observed for IDEA in PMR with 0.12 % & for MTS with 0.67 %

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

	PMR			3 Day Live		
	Service Activation/ Provisioning	PDP Context Activation Success Rate	TBF Drop Rate	Service Activation/ Provisioning	PDP Context Activation Success Rate	TBF Drop Rate
Benchmark	>=95% within 4 hours	>=95%	<=5%	>=95% within 4 hours	>=95%	<=5%
Airtel	NDR	NDR	NDR	NDR	NDR	NDR
BSNL	NDR	NDR	NDR	NDR	NDR	NDR
Reliance Comm.	99.99%	99.35%	0.44%	100.00%	NDR	0.42%
Vodafone	NDR	97.85%	0.75%	NDR	97.89%	0.78%

NDR: No Data Received.

Activation done within 4 hours:

Airtel, BSNL & Vodafone have not submitted data for Activation done within 4 hours for PMR as well as live audit.

PDP Context activation success rate:

Airtel & BSNL have not submitted data for PMR as well as 3days live for PDP Context activation success rate. The other two operators met the benchmark.

Drop Rate:

Airtel & BSNL have not submitted data for PMR as well as 3days live for PDP Context activation success rate. The other two operators met the benchmark.

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

1.7 LIVE CALLING DATA - CONSOLIDATED

	Metering & Billing		Response time to customer for assistance		Service requests
	%age of complaints resolved within 4 weeks	%age of complaints resolved within 6 weeks	Accessibility of Call Centre	%age of calls answered by operator voice to voice	Complaint/request attended to satisfaction
Name of Service Provider					
Benchmark	98%	100%	>=95%	>=95%	
Aircel	NA	NA	98.60%	98.47%	NA
Airtel	100.00%	100.00%	NDR	NDR	100.00%
BSNL	NDR	NDR	NDR	NDR	NDR
Idea	100.00%	100.00%	99.70%	98.61%	100.00%
MTS	100.00%	100.00%	99.94%	96.08%	96.00%
Reliance GSM	100.00%	100.00%	98.74%	99.89%	100.00%
Tata CDMA	NA	NA	NDR	NDR	NA
Tata GSM	NA	NA	NDR	NDR	NA
Reliance JIO	NDR	NDR	96.29%	17.77%	85.25%
Vodafone	100.00%	100.00%	100.00%	97.12%	100.00%

NA: Not applicable as number of complaints for quarter is Nil

NDR: No Data received

Resolution of billing complaints

As per the consumers (live calling exercise) all of the operators met the benchmark of resolving 100% complaints within 4 weeks as well as 6 weeks.

BSNL & Reliance JIO have not provided number of complaints & data related to resolution.

Accessibility of Call Centre/Customer Care-IVR

For the IVR aspect, all operators met the TRAI benchmark of 95% with Vodafone being the best having value 100%

Tata CDMA, Tata GSM, Airtel, BSNL were unable to provide the live data for call centre accessibility.

Customer Care / Helpline Assessment (voice to voice)

Reliance JIO could not met the benchmark for Customer Care / Helpline assessment (voice to voice).

Tata CDMA, Tata GSM, Airtel, BSNL were unable to provide the live data for call centre accessibility.

Complaint/Request Attended to Satisfaction

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

1.8 BILLING AND CUSTOMER CARE - CONSOLIDATED

	Metering & Billing Credibility		Billing Complaints		Customer Care		Response time to customer for assistance	
Name of Service Provider	Postpaid Subscribers	Prepaid Subscribers	% of complaints resolved in 4 weeks	% of complaints resolved in 6 weeks	% age of credit waiver received within one week	Time Taken for refund after closure of service within 60 days	Percentage of calls answered by the IVR	Percentage of calls answered by operator (Voibe to Voice)
Benchmark	<=0.1%	<=0.1%	>=98%	100%	100%	100%	>=95%	>=95%
AIRCEL	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	98.40%	95.47%
AIRTEL	0.02%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	95.33%
BSNL	0.05%	0.03%	100.00%	100.00%	100.00%	NDR	95.97%	0.00%
IDEA	0.04%	0.07%	100.00%	100.00%	70.22%	100.00%	99.75%	99.21%
RCOM (GSM)	0.09%	0.09%	100.00%	100.00%	100.00%	69.16%	99.39%	98.94%
TATA (GSM)	NA	0.00%	100.00%	100.00%	100.00%	100.00%	96.18%	96.96%
VODAFONE	0.07%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	92.20%
Reliance JIO	NDR	NDR	NDR	NDR	99.61%	NDR	95.99%	88.22%
MTS	0.04%	0.01%	100.00%	100.00%	100.00%	100.00%	99.94%	96.19%
TATA (CDMA)	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	NDR	99.08%

NA: Not applicable

NDR: No Data Received

Metering and Billing Credibility – Post-paid Subscribers

All operators met the Benchmark of Metering and Billing Credibility – Post-paid Subscribers. Reliance JIO has not provided Data for the parameter. For Tata GSM number of disputed bills was Nil hence the value for this parameter is NA.

Metering and Billing Credibility – Prepaid Subscribers

All operators except Reliance JIO met the Benchmark of Metering and Billing Credibility – Pre-paid Subscribers. Reliance JIO has not provided Data for the parameter.

Resolution of billing complaints

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

Reliance JIO has not provided Data for this parameter. Aircel, Tata GSM, Tata CDMA do not have complaints during audit period hence the value for parameter is NA.

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

Idea failed to meet the TRAI benchmark of providing credit or waiver within one week in case of complaints received.

Time Taken for refund after closure of service within 60 days

RCOM GSM failed to meet the TRAI benchmark of time taken for refund after closure of service within 60 days.

Customer Care Percentage of calls answered by the IVR

All operators met the benchmark of 95% IVR call being attended. Tata CDMA doesn't have separate IVR value.

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

Vodafone & Reliance JIO failed to meet the TRAI benchmark of 95%. Idea recorded the best performance for this parameter.

1.9 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

6. Interoperator call assessment										
Interoperator call assessment From--->	Aircel	Airtel	BSNL	Idea	MTS	RCOM GSM	Tata CDMA	Tata GSM	Reliance JIO	Vodafone
To										
Aircel	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%
RCOM GSM	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
Tata CDMA	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%
Tata GSM	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%
Reliance JIO	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA

In the inter-operator call assessment, performance of all operators was satisfactory.

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

	Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)					
	BTS accumulated Down Time (Not Available for Service)		Worst Affected BTS due to Down Time		CSSR (Call Setup Success Rate)		SDCCH Congestion(%age)		TCH Congestion(%age)		Call Drop Rate (%age)		% of cells having more than 3% TCH drop		%age of connection with good voice Quality	
Benchmark	<=2%		<=2%		>=95%		<=1%		<=2%		<=2%		<=3%		>=95%	
	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported
Aircel	0.06%	0.06%	0.05%	0.05%	97.78%	97.78%	0.12%	0.12%	1.03%	1.03%	0.67%	0.67%	2.35%	2.36%	97.07%	97.07%
Airtel	0.09%	0.09%	0.15%	0.15%	96.20%	96.20%	0.52%	0.52%	1.48%	1.48%	0.67%	0.67%	0.84%	0.84%	98.85%	98.85%
BSNL	1.02%	1.02%	0.82%	1.22%	98.64%	98.64%	0.72%	0.72%	1.34%	1.34%	1.44%	1.44%	2.19%	1.78%	NDR	97.98%
Idea	0.05%	0.05%	0.01%	0.02%	99.34%	99.34%	0.20%	0.20%	0.41%	0.40%	0.49%	0.49%	1.02%	1.02%	97.51%	97.51%
MTS	0.16%	0.15%	0.13%	0.09%	99.19%	99.19%	NA	0.00%	0.01%	0.01%	0.48%	0.48%	1.83%	1.85%	99.22%	99.22%
Reliance Comm.	0.11%	0.11%	0.79%	0.79%	98.32%	98.32%	0.09%	0.09%	0.25%	0.25%	0.15%	0.15%	0.73%	0.71%	99.02%	99.02%
Tata CDMA	0.05%	0.00%	0.07%	0.00%	98.93%	98.93%	NA	0.00%	0.14%	0.14%	0.29%	0.29%	2.11%	2.11%	95.24%	99.14%
Tata GSM	0.04%	0.00%	0.00%	0.00%	99.49%	99.49%	0.02%	0.02%	0.09%	0.10%	0.27%	0.27%	1.49%	1.48%	99.22%	99.22%
Vodafone	0.06%	0.06%	0.15%	0.13%	99.42%	99.42%	0.16%	0.16%	0.58%	0.58%	0.63%	0.63%	2.54%	2.54%	96.72%	96.72%

difference between Audited Data and reported data

out of bench mark as well as difference between Audited Data and reported data

out of bench mark

1.11 COMPARISON BETWEEN AUDITED DATA AND OPERATOR'S DATA FOR CSD

Name of Service Provider	Customer Servcice Quality Parameters																	
	Metering and billing											Response time to the customer for assistance				Termination / closure of service		
	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		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	
	≤ 0.1%		≤ 0.1%		98% within 4 weeks		100% within 6 weeks		within 1 week of resolution of complaint		≥ 95%		≥ 95%		100% within 7 days		100% within 60 days	
	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported
Aircel	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.40%	98.40%	95.47%	95.47%	100.00%	100.00%	100.00%	100.00%
AIRTEL	0.02%	0.01%	0.01%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	95.33%	95.33%	100.00%	100.00%	100.00%	100.00%
BSNL	0.05%	0.05%	0.03%	0.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	95.97%	95.00%	98.00%	98.00%	100.00%	100.00%	NDR	100.00%
IDEA	0.04%	0.04%	0.07%	0.07%	100.00%	100.00%	100.00%	100.00%	70.22%	100.00%	99.75%	99.75%	99.21%	99.21%	100.00%	100.00%	100.00%	100.00%
MTS	0.04%	0.04%	0.01%	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.94%	99.94%	96.19%	96.19%	100.00%	100.00%	100.00%	100.00%
Reliance Comm	0.09%	0.09%	0.09%	0.09%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.39%	99.39%	98.94%	98.94%	100.00%	100.00%	69.16%	69.16%
Reliance JIO	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR	99.61%	NDR	95.99%	NDR	88.22%	NDR	NDR	NDR	NDR	NDR
TATA CDMA	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NDR	100.00%	99.08%	99.08%	100.00%	100.00%	100.00%	100.00%
Tata GSM	NA	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.18%	96.18%	96.96%	96.96%	100.00%	100.00%	100.00%	100.00%
Vodafone	0.07%	0.07%	0.06%	0.06%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	92.20%	92.06%	100.00%	100.00%	100.00%	100.00%

difference between Audited Data and reported data

out of bench mark as well as difference between Audited Data and reported data

out of bench mark

1.12 COMPARISON BETWEEN AUDITED DATA AND OPERATOR'S DATA FOR PMR 3G

	Network Availability				Connection Establishment (Accessibility)						Connection Maintenance (Retainability)					
	Node B's accumulated Down Time (Not Available for Service)		Worst Affected Node B's due to Down Time		CSSR (Call Setup Success Rate)		RRC Congestion(%age)		RAB Congestion(%age)		Circuit switched voice Drop Rate (%age)		% of cells having more than 3% Circuit switch drop rate		%age of connection with good circuit switched voice Quality	
Benchmark	<=2%		<=2%		>=95%		<=1%		<=2%		<=2%		<=3%		>=95%	
	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported	Audited	Reported
Airtel	0.12%	0.12%	0.14%	0.16%	99.43%	99.43%	0.03%	0.03%	0.03%	0.03%	0.51%	0.51%	0.93%	0.91%	98.90%	98.91%
BSNL	1.10%	1.07%	1.69%	1.63%	98.96%	99.33%	0.76%	0.73%	0.99%	0.93%	1.15%	1.13%	1.97%	1.93%	NDR	97.00%
Reliance Comm.	0.16%	0.21%	0.00%	0.87%	99.76%	99.76%	0.16%	0.16%	0.11%	0.11%	0.05%	0.05%	0.20%	0.21%	99.31%	99.52%
Vodafone	0.07%	0.07%	0.10%	0.18%	99.89%	99.89%	0.02%	0.02%	0.01%	0.01%	0.26%	0.26%	2.81%	2.77%	98.90%	98.90%
Tata	NDR	0.00%	NDR	0.00%	NDR	100.00%	NDR	0.00%	NDR	0.00%	NDR	0.00%	NDR	0.00%	NDR	100.00%

difference between Audited Data and reported data

out of bench mark as well as difference between Audited Data and reported data

out of bench mark

2 CRITICAL FINDINGS

PMR Consolidated 2G (Network Parameters)

- All operators met the Benchmark for all Network parameters.

POI Congestion –consolidated

- Vodafone failed to meet the benchmark(<=0.5%) for POI with Reliance JIO

PMR March 2017 2G (Network Parameters)

- Tata CDMA Failed to meet the Benchmark for percentage of connection with good voice quality having value 87.40%

3 Day Live Measurement 2G (Network Parameters)

- Tata CDMA failed to meet the benchmark for percentage of connection with good voice quality having value 85.79%

PMR Consolidated 3G (Network Parameters)

- All operators met the Benchmark for all Network parameters.

Wireless Data Services for 2G

- Airtel & BSNL were unable to make available raw data for calculation of parameters of PMR .

Live Calling

- As per the consumers (live calling exercise) Reliance JIO was unable to meet the benchmark of percentage of calls answered by operator (voice to voice) within 90 sec. .

Customer Service Quality Parameters

- Idea failed to meet the benchmark For % age of credit waiver received within one week with value 70.22%
- RCOM GSM failed to meet the benchmark for Time Taken for "refund after closure of service within 60 days " with value 69.16%
- Vodafone & Reliance JIO failed to meet the benchmark for "percentage of calls answered by operator (voice to voice)within 90 sec." having value 92.20% & 88.22 % respectively.
- BSNL was unable to make available raw data for calculation of Call centre parameter "percentage of calls answered by operator (voice to voice)within 90 sec." .

3 PARAMETER DESCRIPTION& DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LIVE DATA AND LIVE CALLING DATA FOR 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 –**

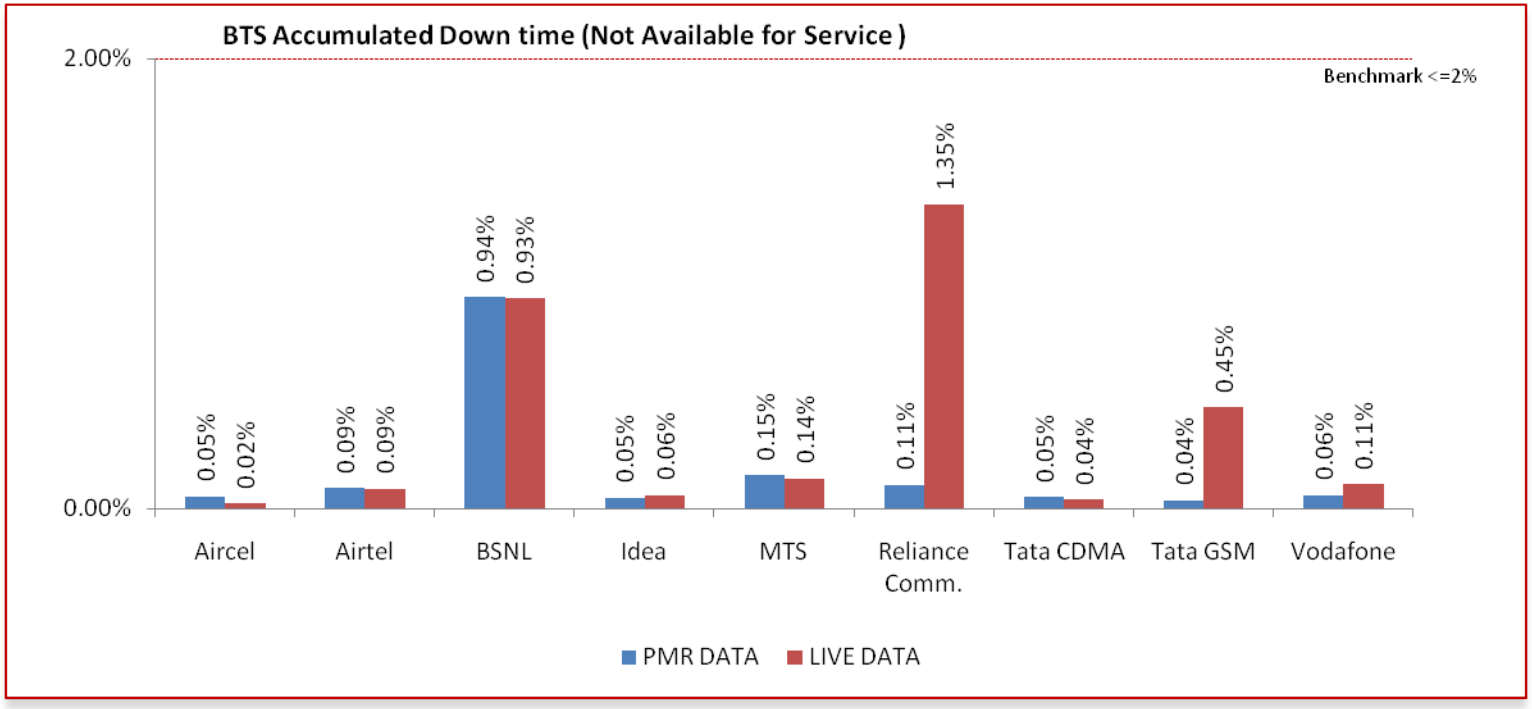
    a. BTSs Accumulated downtime (not available for service) ≤ 2%

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 in master base of the Accumulated downtime and worst affected BTS due to downtime.

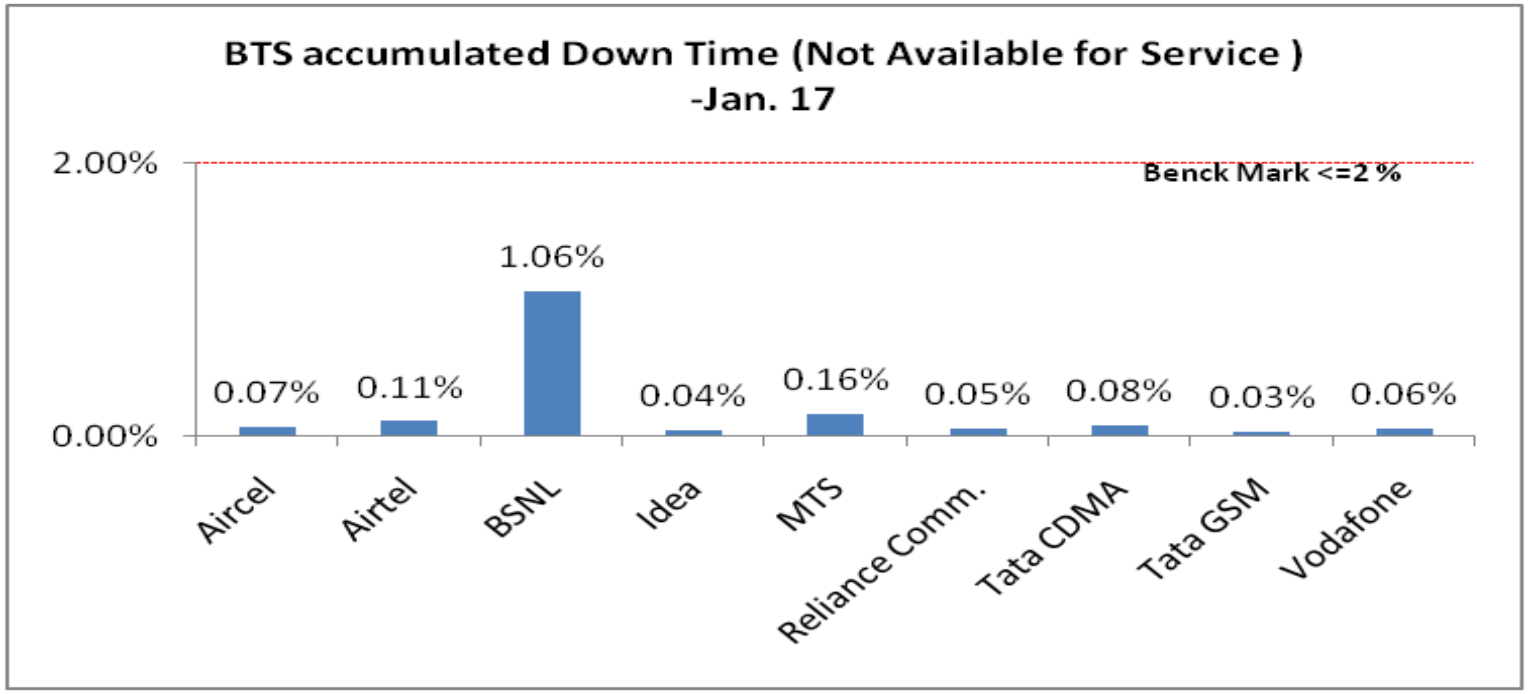
3.1.2 KEY FINDINGS - CONSOLIDATED



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

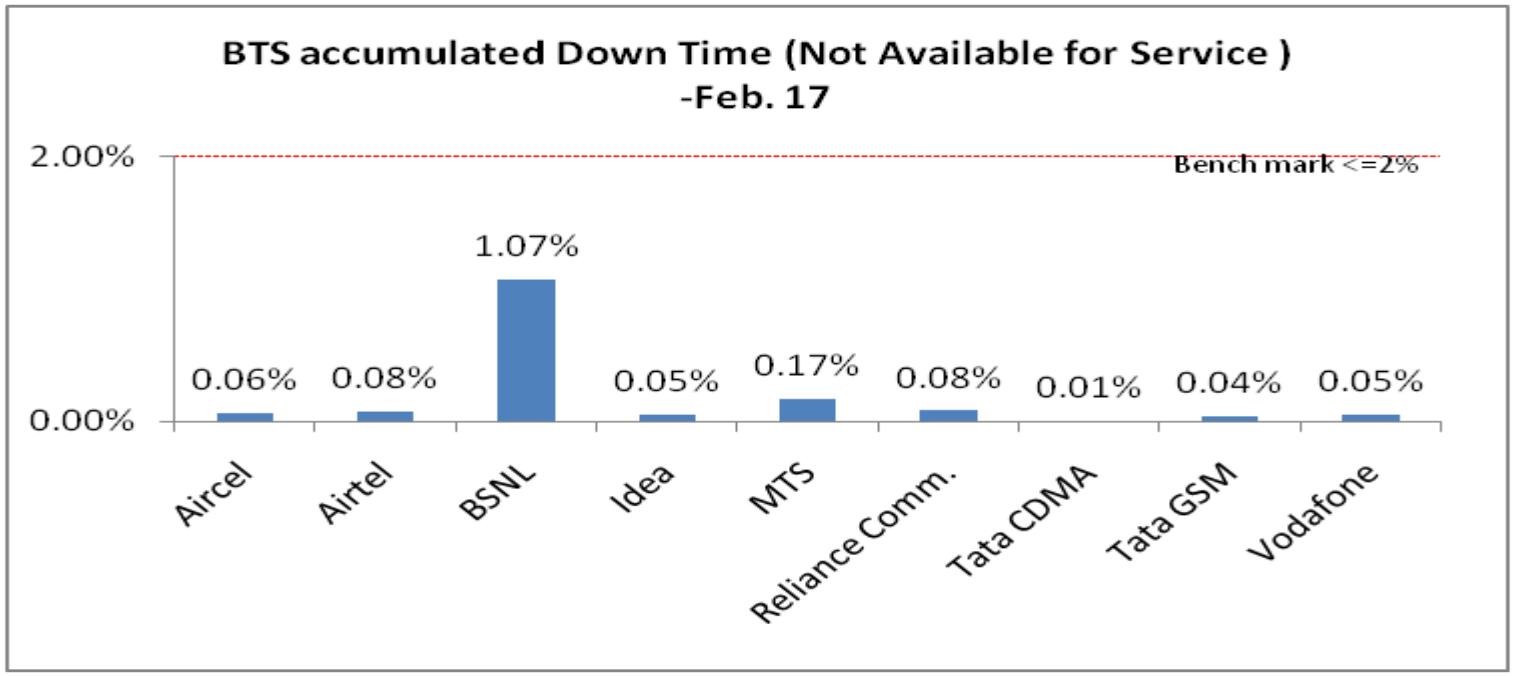
All operators met the benchmark for BTS accumulated downtime as per audit/PMR data.

3.1.2.1 KEY FINDINGS – JANUARY 2017



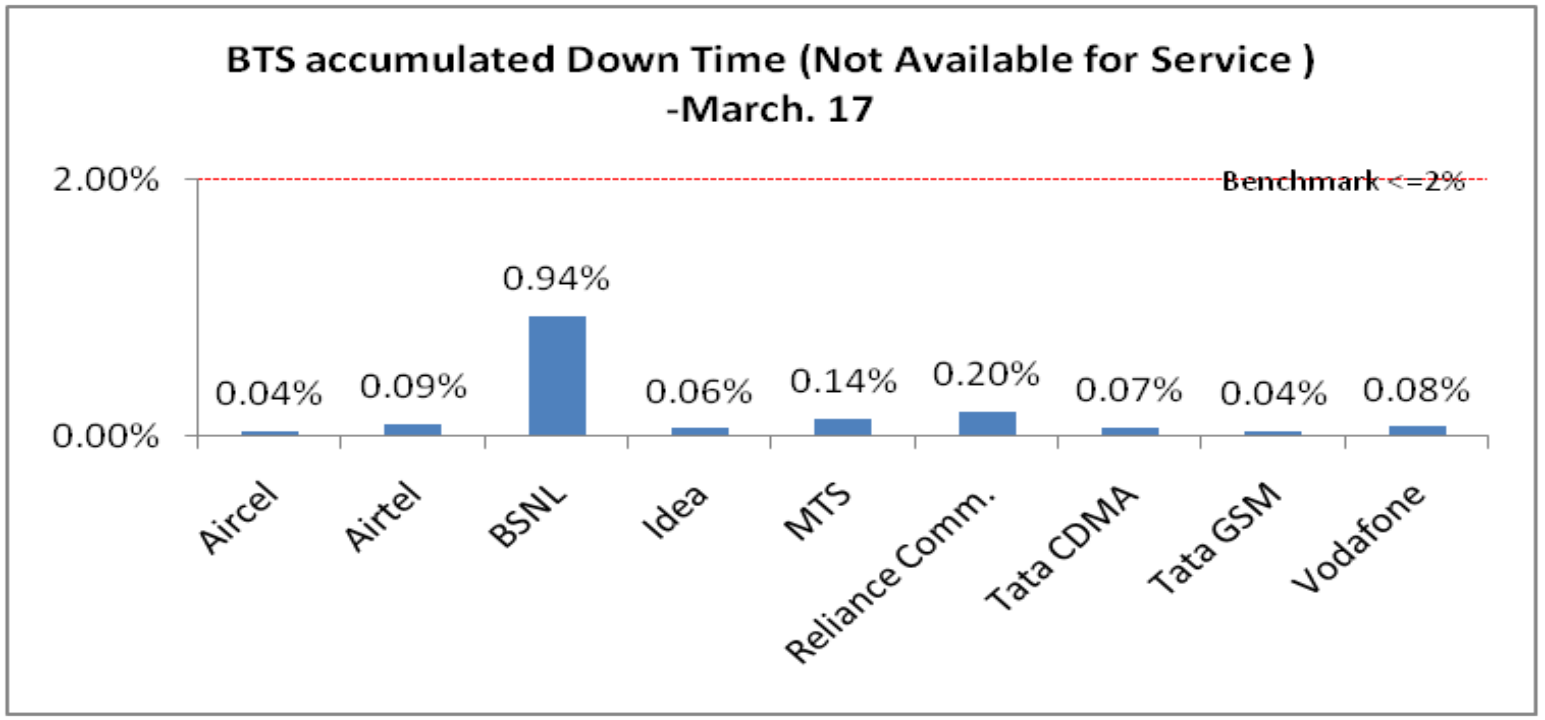
Data Source: Operations and Maintenance Center (OMC) of the operators

3.1.2.2 KEY FINDINGS – FEBRUARY 2017



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

3.1.2.3 KEY FINDINGS – MARCH 2017



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

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 ≤ 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.

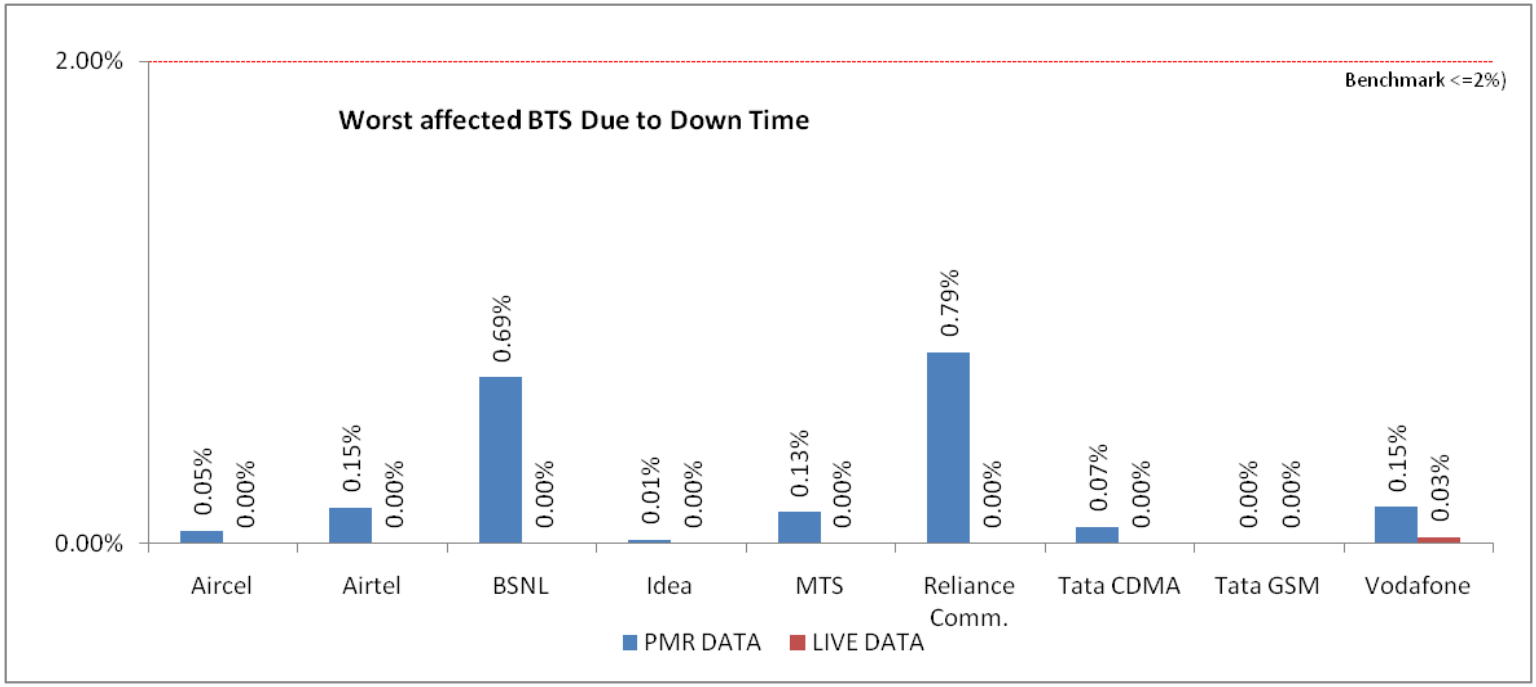
  iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.

  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

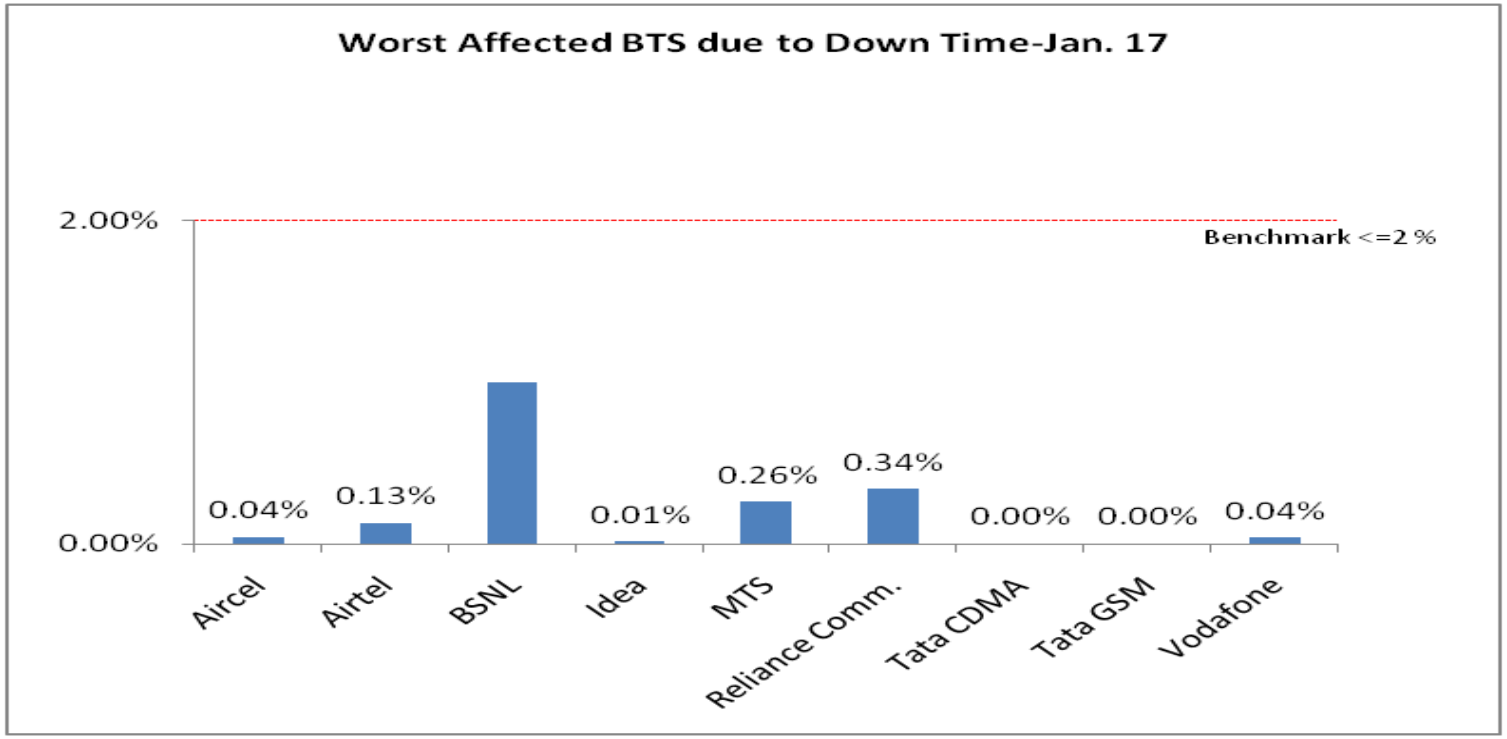


Data Source: Operations and Maintenance Center (OMC) of the operators

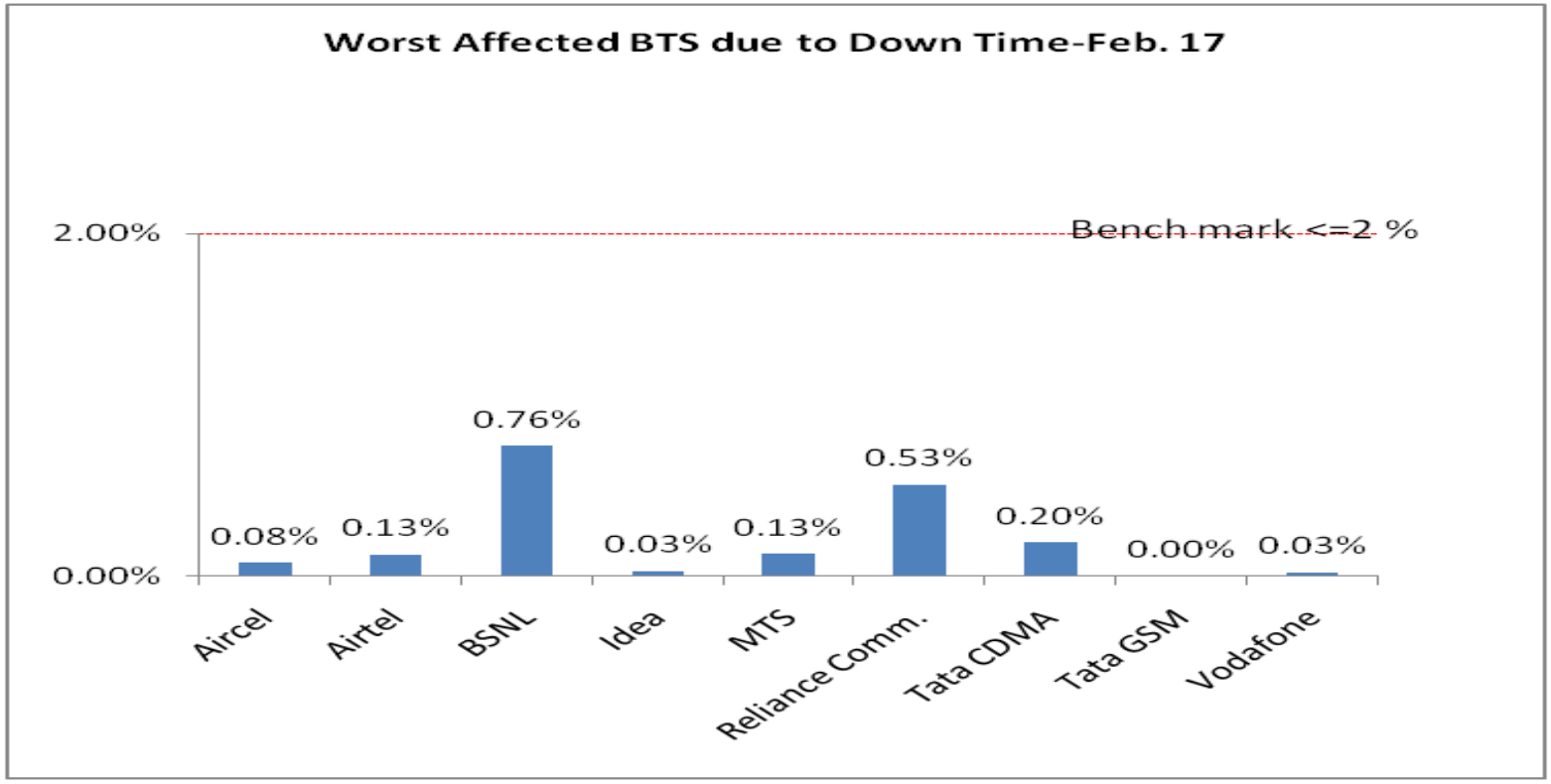
All operators met the benchmark for worst affected BTSs due to downtime as per audit/PMR data.

Significant difference was observed between PMR & live measurement data for BSNL and Reliance GSM

3.2.2.1 KEY FINDINGS – JANUARY 2017

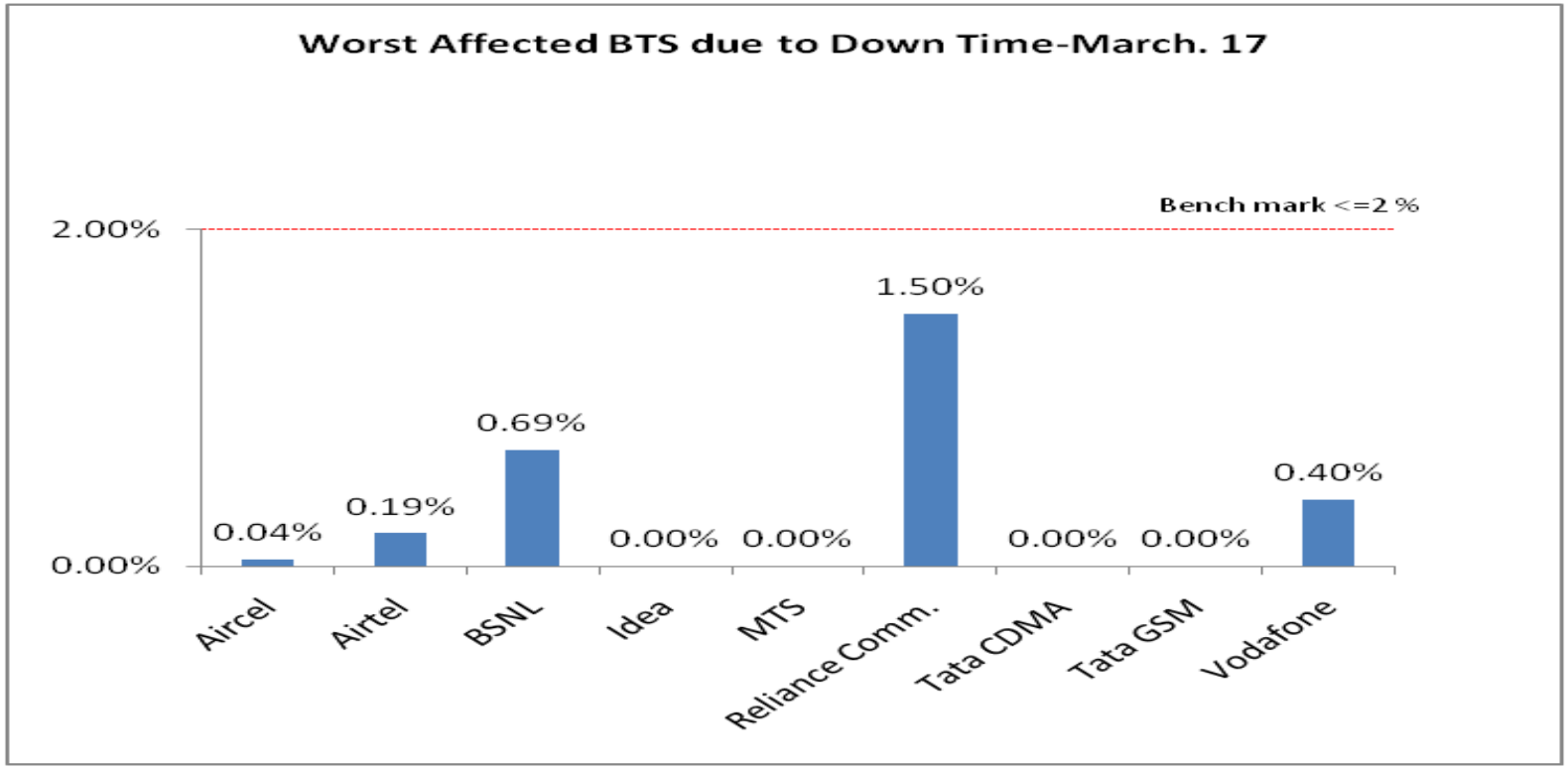


3.2.2.2 KEY FINDINGS – FEBRUARY 2017



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

3.2.2.3 KEY FINDINGS – MARCH 2017



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

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-**

   (Calls Established / Total Call Attempts) * 100

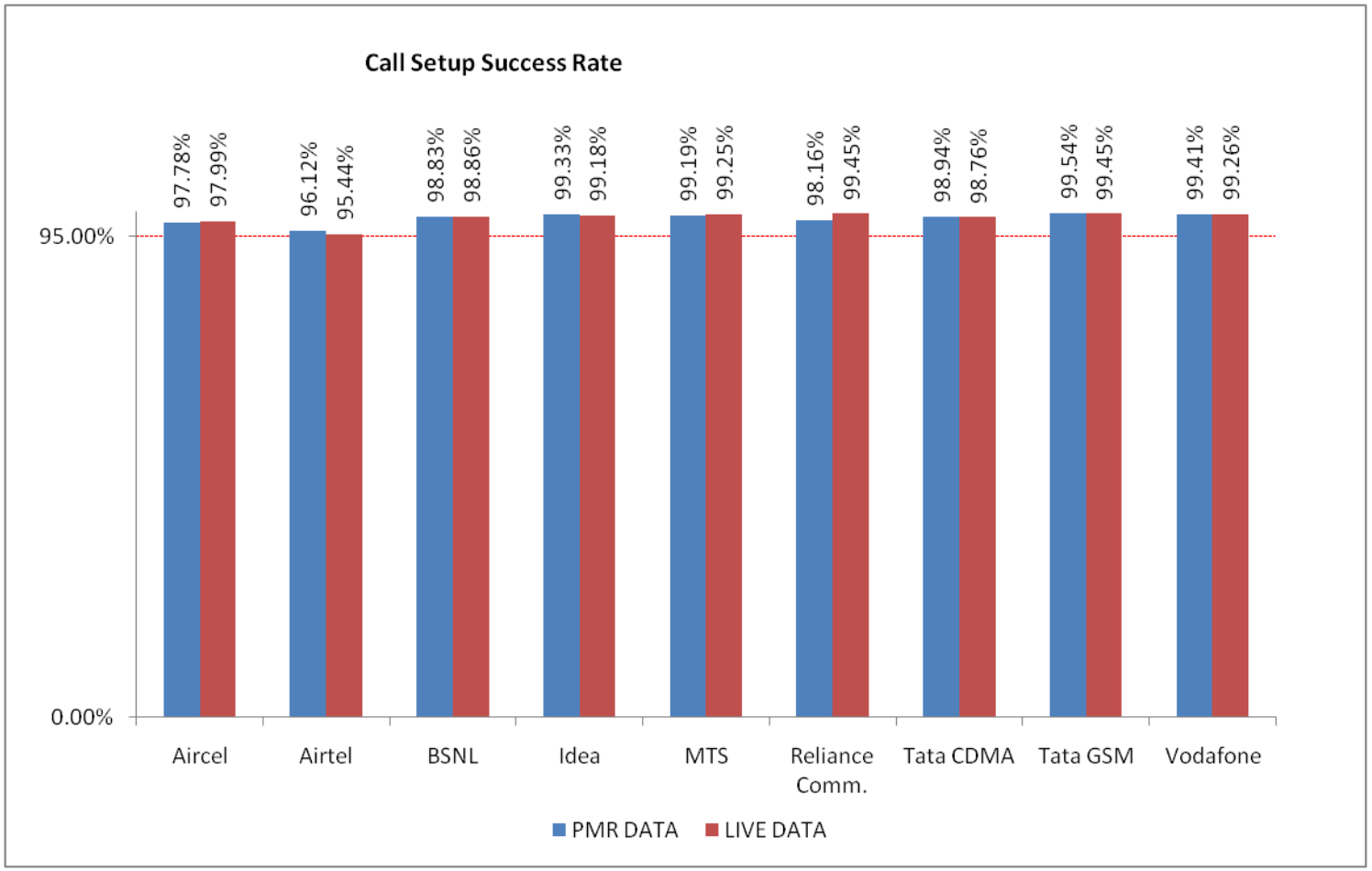
   Call Established means the following events have happened in call setup:-

   - 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.

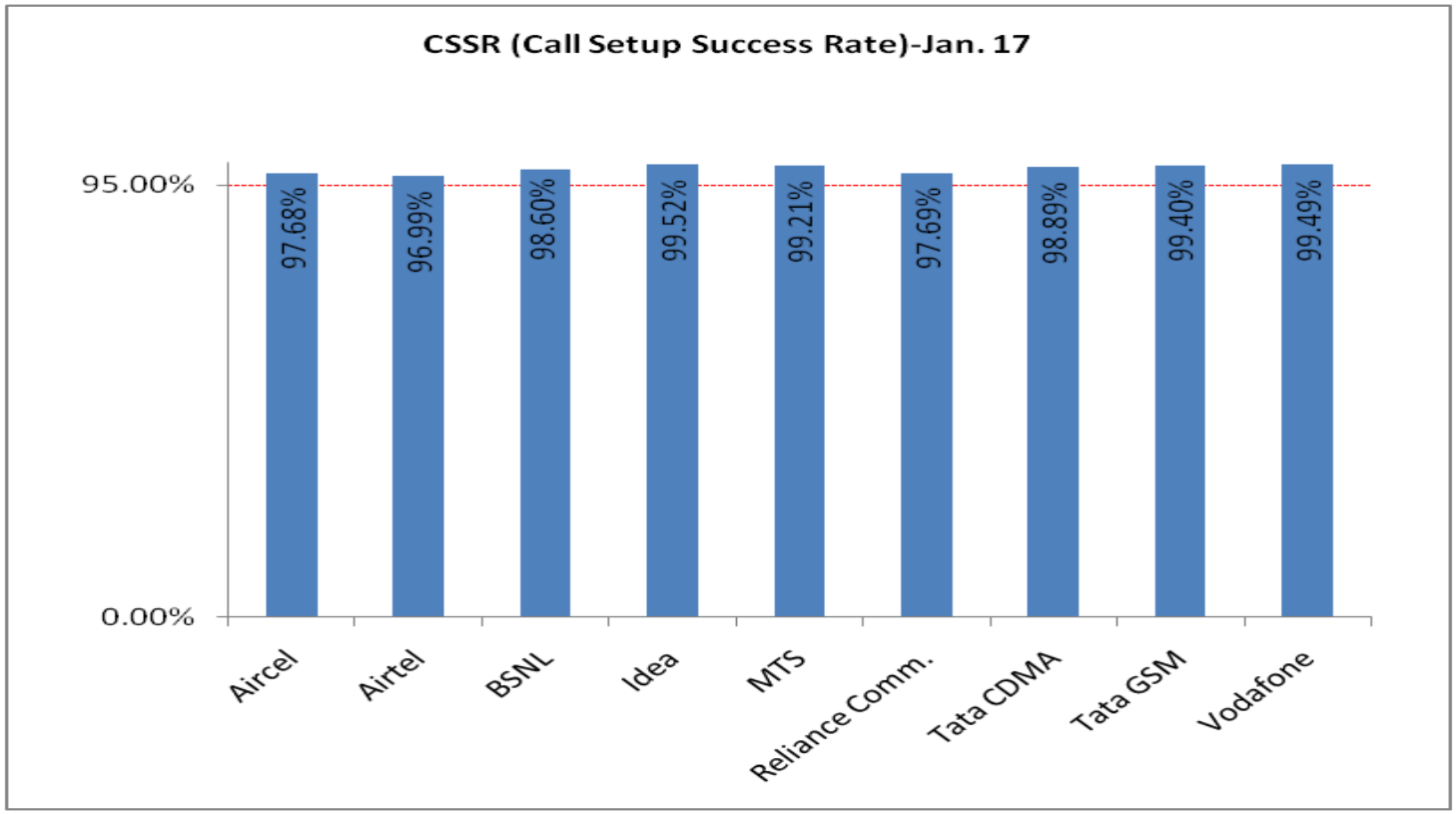
3.3.2 KEY FINDINGS - CONSOLIDATED



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

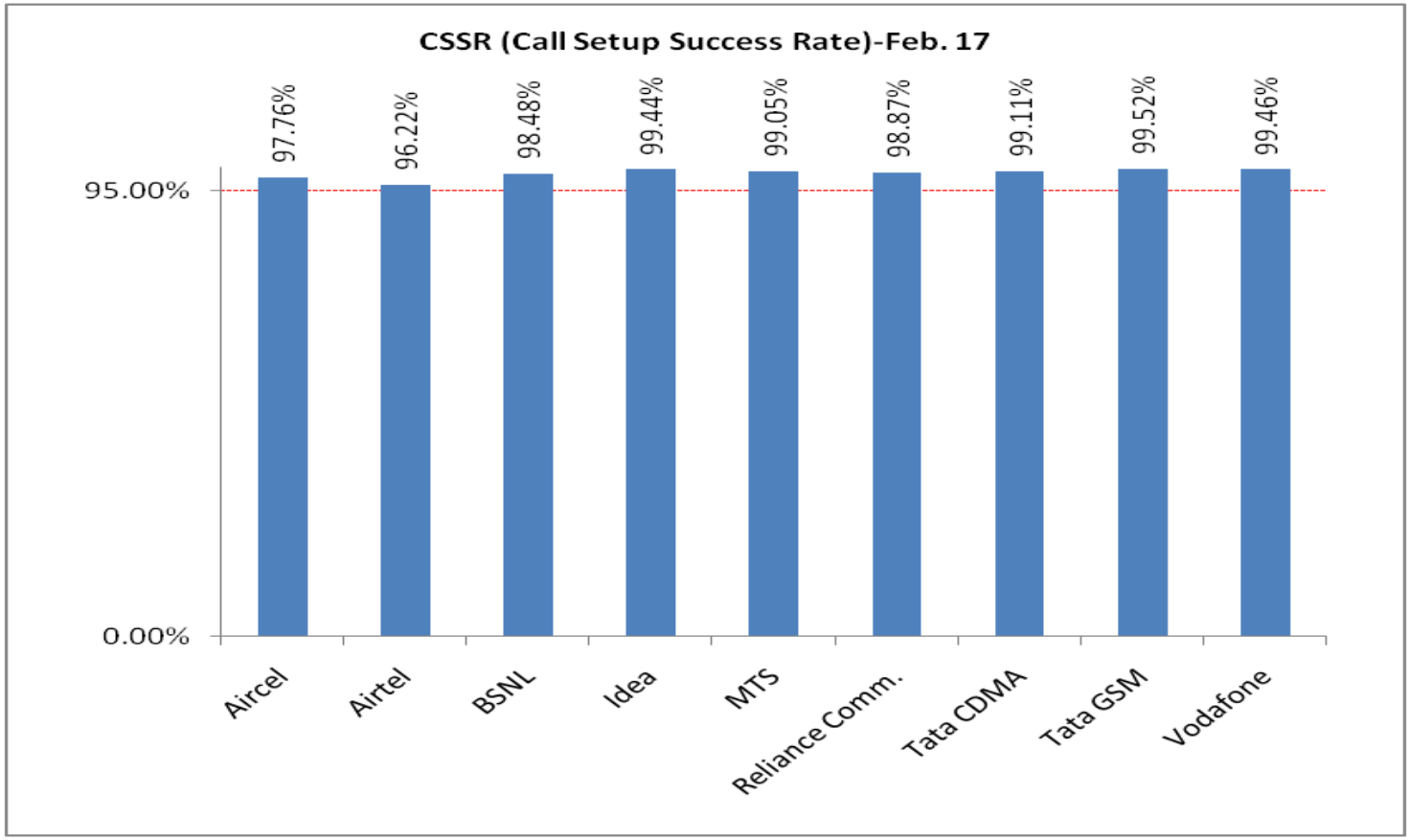
All operators met the TRAI benchmark as per audit/PMR data.

3.3.2.1 KEY FINDINGS – JANUARY 2017



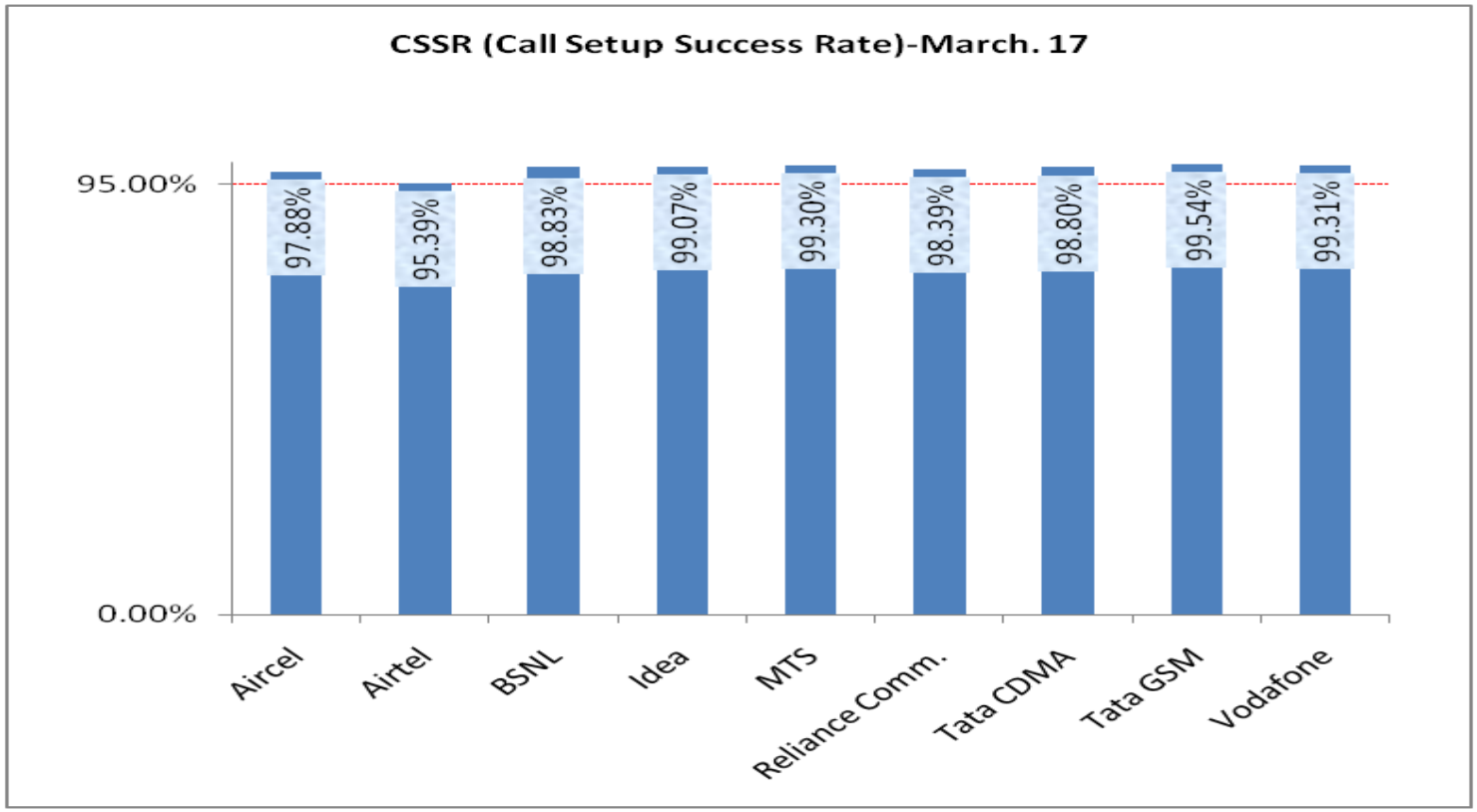
Data Source: Network Operations Center(NOC) of the operators

3.3.2.2 KEY FINDINGS – FEBRUARY 2017



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

3.3.2.3 KEY FINDINGS – MARCH 2017



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

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

3.4.1 PARAMETER DESCRIPTION

1. **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

2. **Computational Methodology:**

   - **SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
     - Where:-A1 = Number of attempts to establish SDCCH / TCH made on day 1
     - C1 = Average SDCCH / TCH Congestion % on day 1
     - A2 = Number of attempts to establish SDCCH / TCH made on day 2
     - C2 = Average SDCCH / TCH Congestion % on day 2
     - An = Number of attempts to establish SDCCH / TCH made on day n
     - Cn = Average SDCCH / TCH Congestion % on day n
   - **POI Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
     - Where:-A1 = POI traffic offered on all POIs (no. of calls) on day 1
     - C1 = Average POI Congestion % on day 1
     - A2 = POI traffic offered on all POIs (no. of calls) on day 2
     - C2 = Average POI Congestion % on day 2

- An = POI traffic offered on all POIs (no. of calls) on day n
- Cn = Average POI Congestion % on day n

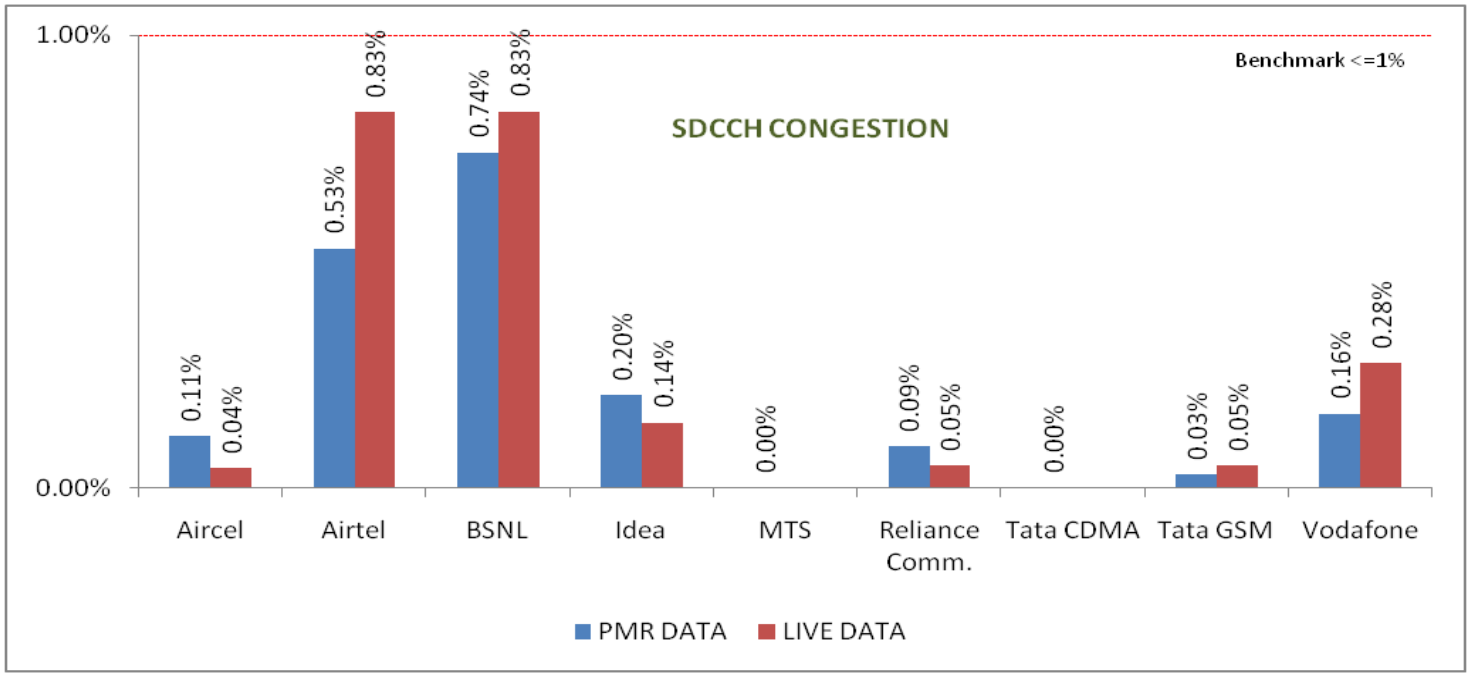
3. **Benchmark:**

   - SDCCH Congestion: ≤ 1%, TCH Congestion: ≤ 2%, POI Congestion: ≤ 0.5%

4. **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)

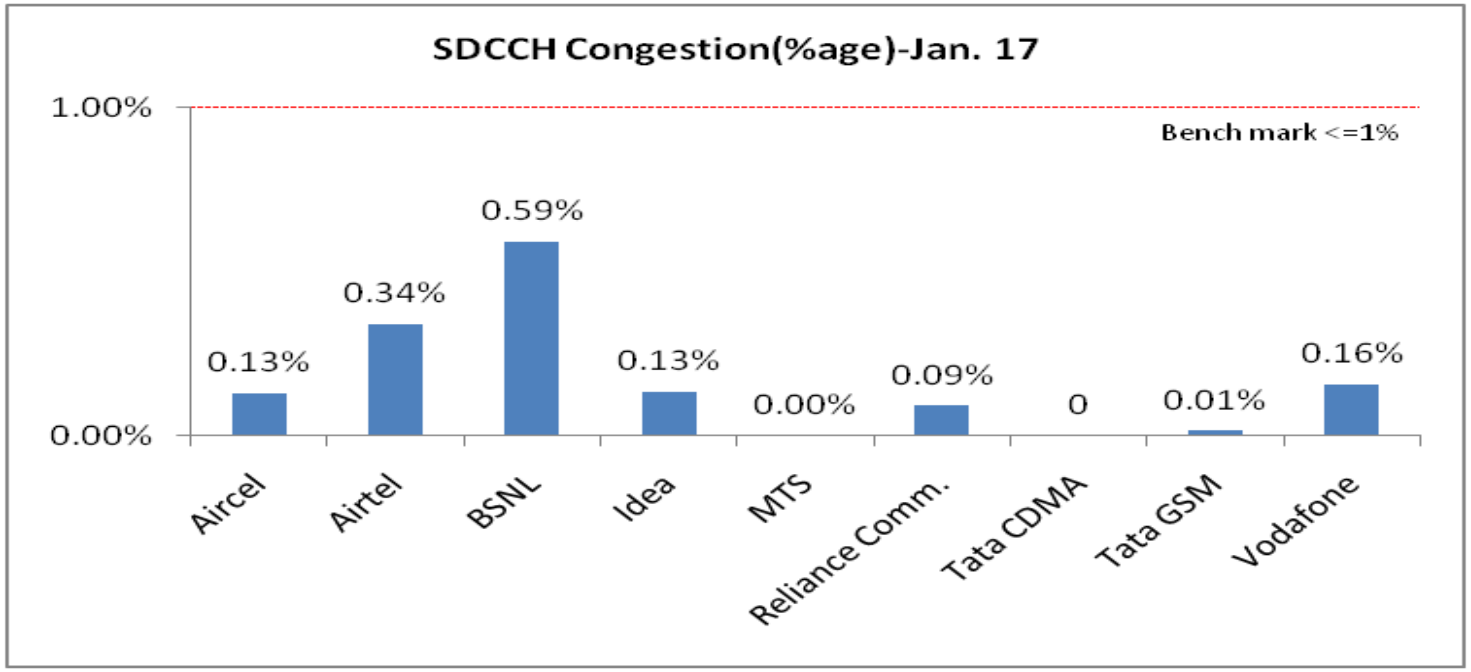


Data Source: Network Operations Center(NOC) of the operators

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

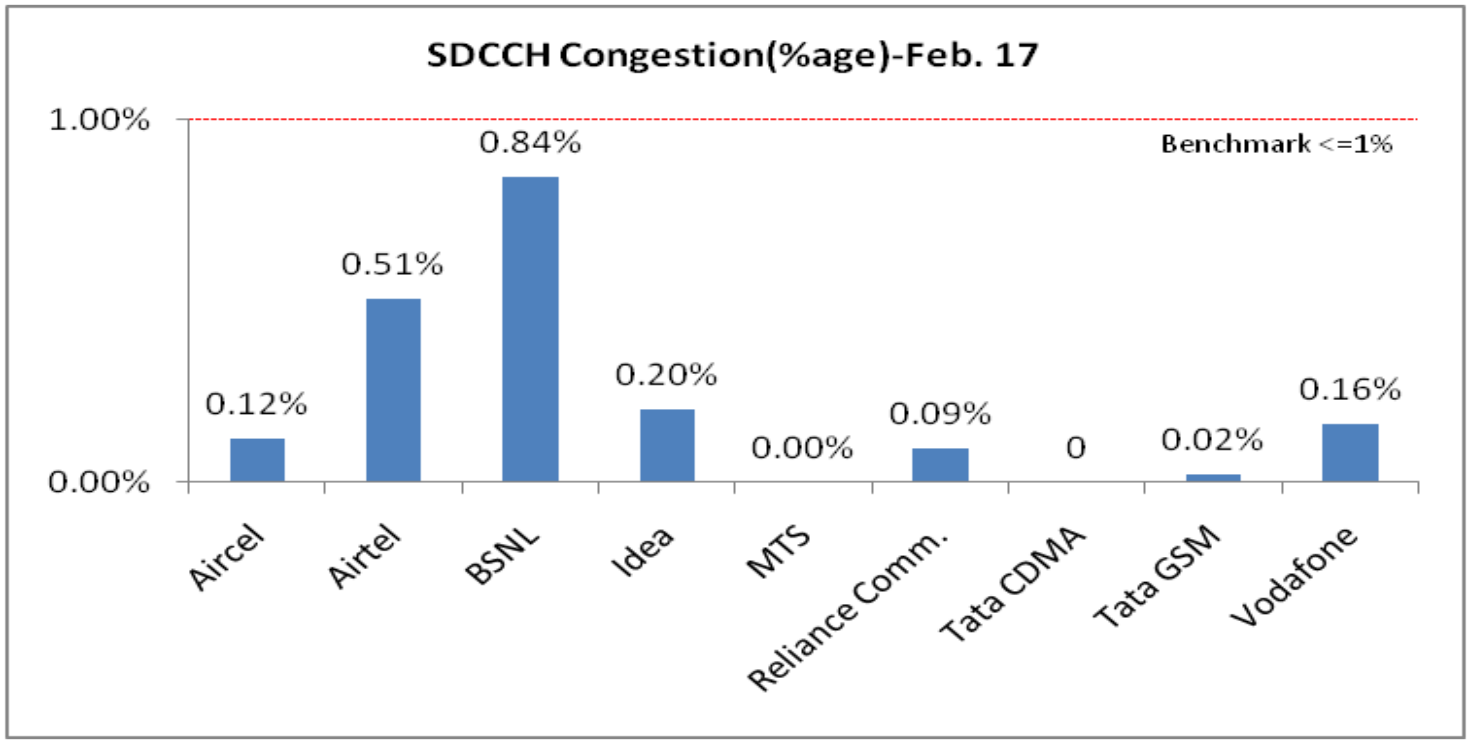
NA: SDCCH/ Paging channel congestion not applicable for CDMA operators.

3.4.2.1 KEY FINDINGS – JANUARY 2017



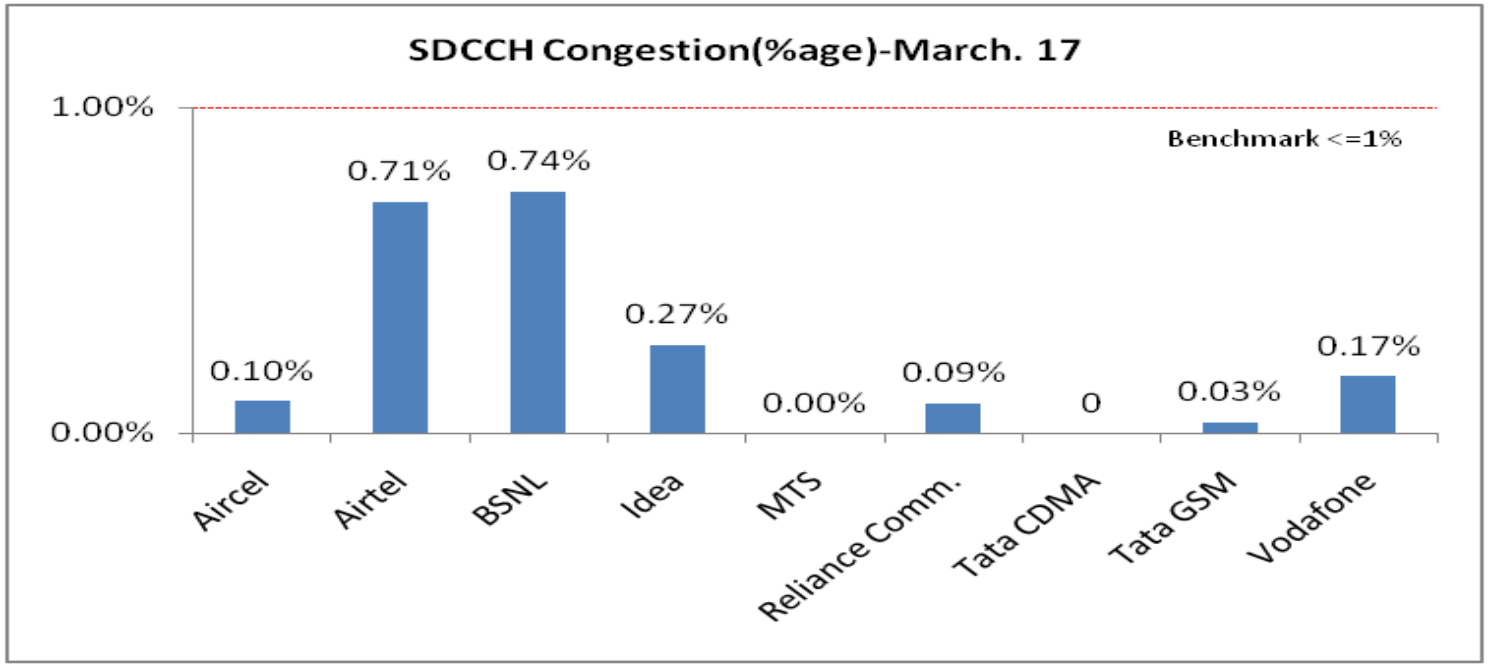
Data Source: Network Operations Center(NOC) of the operators

3.4.2.1 KEY FINDINGS – FEBRUARY 2017



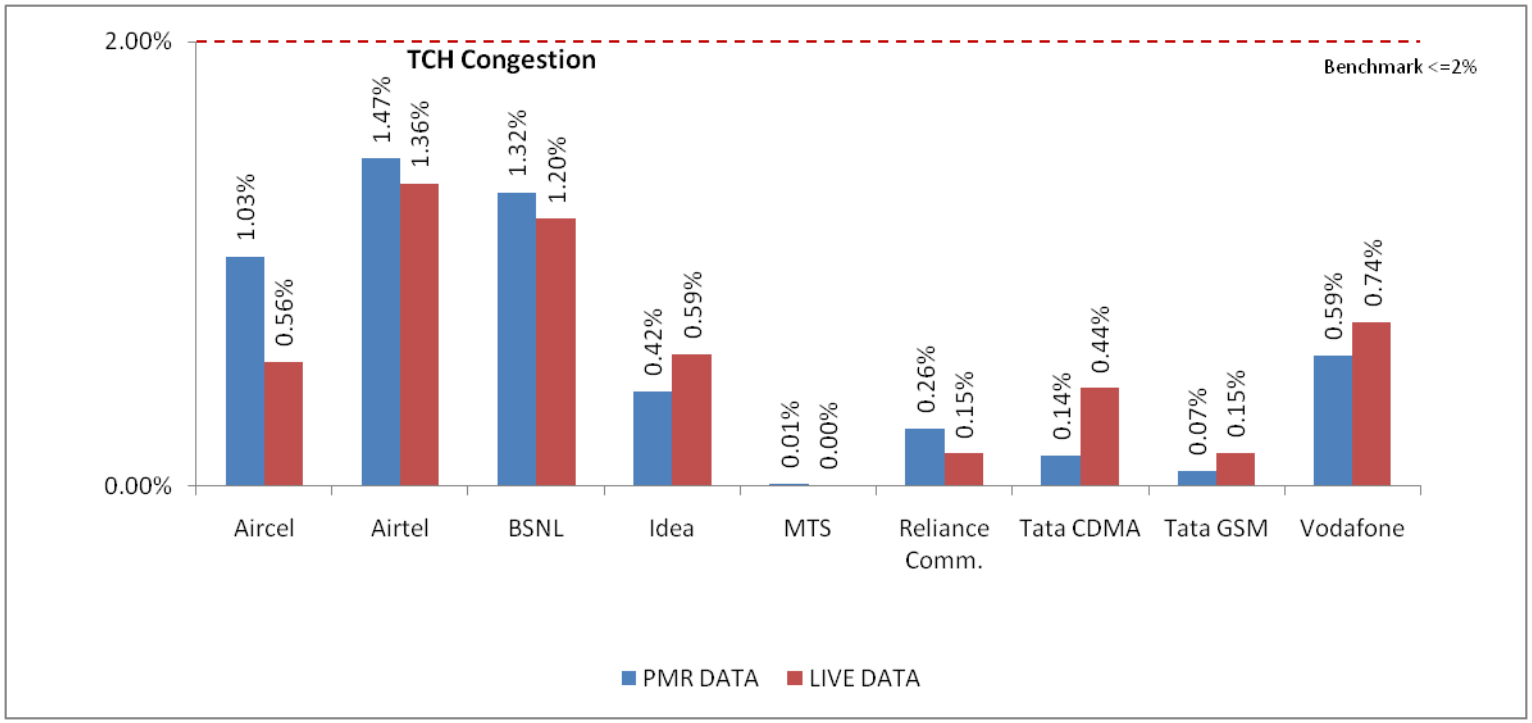
Data Source: Network Operations Center(NOC) of the operators

3.4.2.2 KEY FINDINGS – MARCH 2017



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

3.4.3 KEY FINDINGS – TCH CONGESTION (CONSOLIDATED)

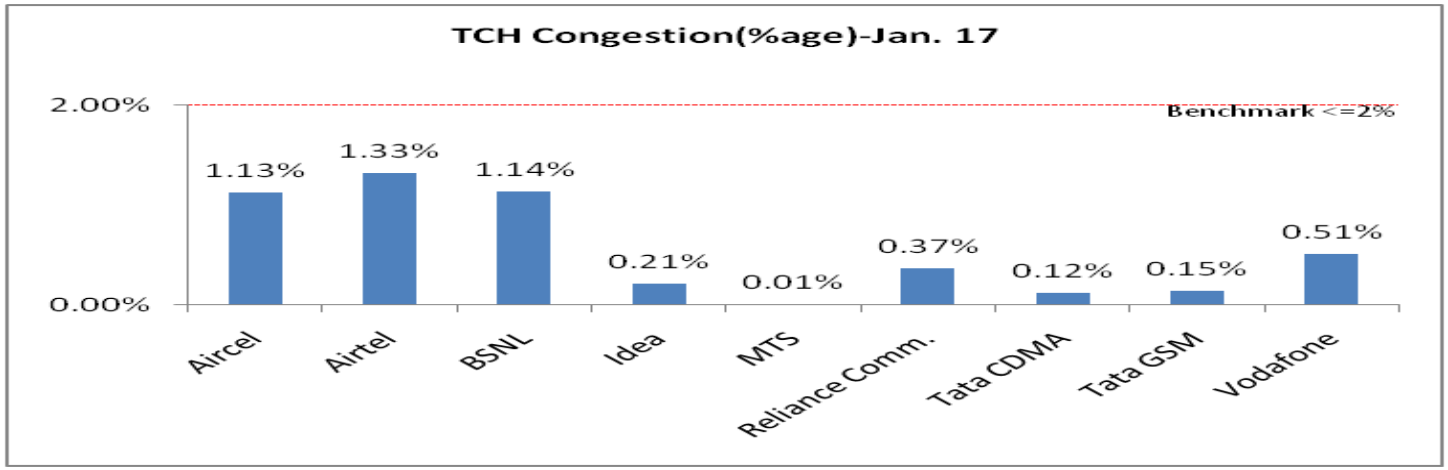


Data Source: Network Operations Center(NOC) of the operators

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

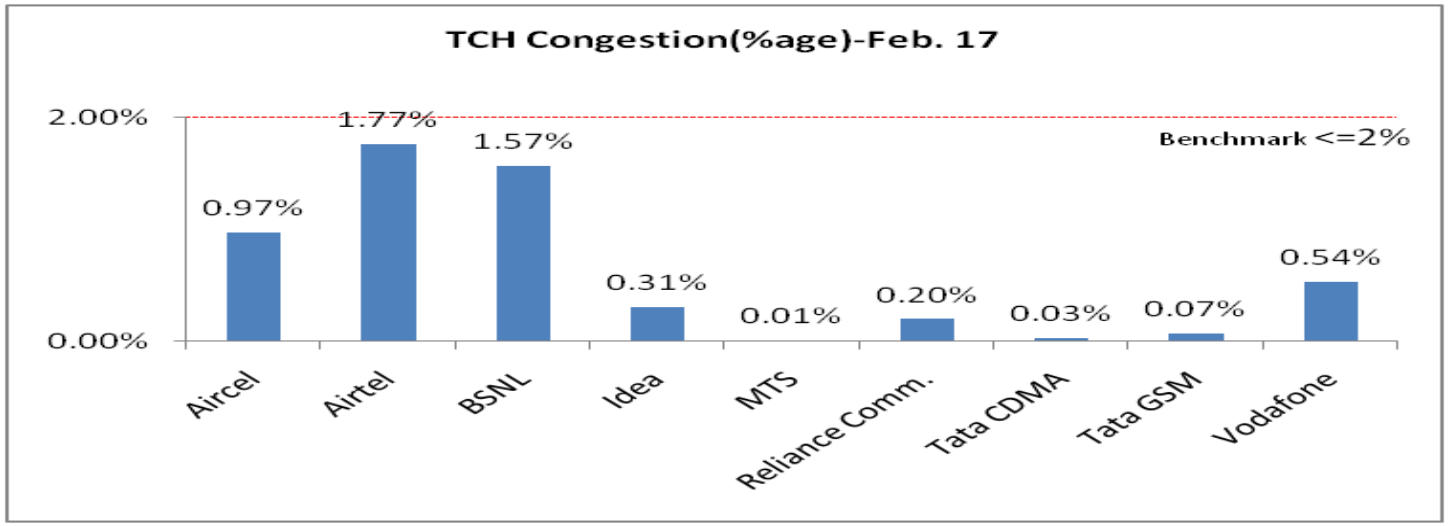
Significant difference was observed between PMR & live measurement data for Aircel .

3.4.3.1 KEY FINDINGS – JANUARY 2017



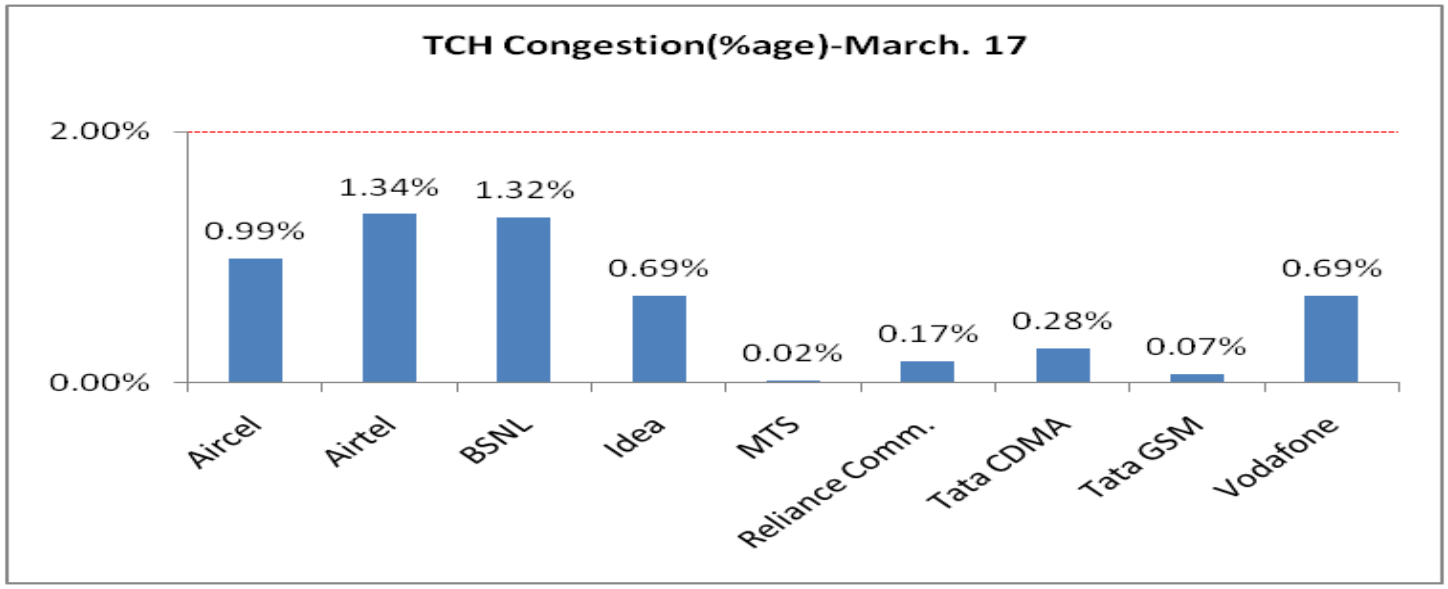
Data Source: Network Operations Center(NOC) of the operators

3.4.3.2 KEY FINDINGS – FEBRUARY 2017



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

3.4.3.3 KEY FINDINGS – MARCH 2017



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

3.4.4 KEY FINDINGS – POI CONGESTION (CONSOLIDATED) – AVERAGE OF 3 MONTHS

Audit results of POI Congestion-Average PMR Data										
	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No. of call attempts on POI		3429262	6445609	NDR	3490850	419955	1005003	351312	339088	3732775
Total traffic served on all POIs (Erlang)		85147.56	184007.73	NDR	78954.05	9553.68	25340.42	7692.01	7807.72	72200.36
Total No. of circuits on all individual POIs		192284	209788	NDR	153421	47597	52794	37785	32590	151329
Total number of working POI Service Area wise		37	119	NDR	139	65	33	149	80	65
Capacity of all POIs		188487.83	204740.43	NDR	148129.56	47691.81	49842.93	34611.46	31404.20	152762.67
No. of all POI's having >=0.5% POI congestion		0	0	NDR	0	0	0	0	0	1
Name of POI not meeting the benchmark	*>=0.5%*	NA	NA	NDR	NA	NA	NA	NA	NA	RJIO

LIVE Measurement results of POI Congestion-3 day Live Data										
	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No. of call attempts on POI		3424718	7256908	686126	3612103	433206	963965	348231	348812	4471765
Total traffic served on all POIs (Erlang)		77848.99	162105	11131	79726	8827.40	20408.52	7199	7631	83165
Total No. of circuits on all individual POIs		191425	228640	44586	150931	47448	54683	40049	30532	154527
Total number of working POI Service Area wise		37	126	137	138	65	33	161	42	65
Capacity of all POIs		187479.45	223147.96	30203.00	145675.67	47524.40	51380.64	36987.00	30249.47	155993.11
No. of all POI's having >=0.5% POI congestion		Nil	Nil	Nil	Nil	NIL	Nil	Nil	Nil	2
Name of POI not meeting the benchmark	*>=0.5%*	NA	NA	NA	NA	NA	NA	NA	NA	R JIO Local POI

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

Vodafone did not meet the benchmark of POI Congestion as per PMR/audit Data.

3.4.4.1 KEY FINDINGS – JANUARY 2017

Audit results of POI Congestion- Monthly PMR Data -January 2017										
	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No. of call attempts on POI		3290765	5605695	NDR	3397521	398887	1086492	337673	324459	3122157
Total traffic served on all POIs (Erlang)		88557.92	127654.70	NDR	77066.31	9802.42	30715.47	7646.33	8101.59	62924.95
Total No. of circuits on all individual POIs		193513	201129	NDR	154555	47683	51903	40938	27187	150144
Total number of working POI Service Area wise		37	119	NDR	139	65	33	224	36	65
Capacity of all POIs		189687.90	196334.65	NDR	149230.98	47778.53	49064.17	37324.96	26966.00	151565.80
No. of all POI's having >=0.5% POI congestion		NA	Nil	NDR	Nil	NIL	Nil	Nil	Nil	1
Name of POI not meeting the benchmark	*>=0.5%*	NA	NA	NDR	NA	NIL	0.00	NA	NA	RJIO Local POI

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

3.4.4.2 KEY FINDINGS – FEBRUARY 2017

Audit results of POI Congestion- Monthly PMR Data -February 2017										
	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No. of call attempts on POI		3668608	6902570	NDR	3594653	439541	1003287	375655	365449	3958607
Total traffic served on all POIs (Erlang)		87431.32	266833.56	NDR	81889.19	9690.87	24263.54	7730.77	8228.01	73803.26
Total No. of circuits on all individual POIs		191912	206023	NDR	154560	47678	52646	41886	30533	149720
Total number of working POI Service Area wise		37	115	NDR	140	65	33	180	42	65
Capacity of all POIs		188119.01	201036.44	NDR	149282.61	47772.51	49364.02	36259.96	30259.60	151137.69
No. of all POI's having >=0.5% POI congestion		Nil	Nil	NDR	Nil	NIL	Nil	Nil	Nil	1
Name of POI not meeting the benchmark	*>=0.5%*	NA	NA	NDR	NA	NA	NA	NA	NA	RJIO Local

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

3.4.4.3 KEY FINDINGS – MARCH 2017

Audit results of POI Congestion- Monthly PMR Data -March 2017										
	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No. of call attempts on POI		3328415	6828563	NDR	3480375	421437	925230	327356	340608	4117560
Total traffic served on all POIs (Erlang)		79453.44	157534.91	NDR	77906.65	9167.74	21042.26	7093.56	7698.93	79872.87
Total No. of circuits on all individual POIs		191425	222211	NDR	151148	47430	53832	40049	30532	154122
Total number of working POI Service Area wise		37	124	NDR	138	65	33	161	42	65
Capacity of all POIs		187656.58	216850.21	NDR	145875.08	47524.40	51100.59	36987.00	30249.47	155584.52
No. of all POI's having >=0.5% POI congestion		Nil	Nil	NDR	Nil	Nil	Nil	Nil	Nil	1
Name of POI not meeting the benchmark	>=0.5%	NA	NA	NDR	NA	NA	NA	NA	NA	RJIO Local

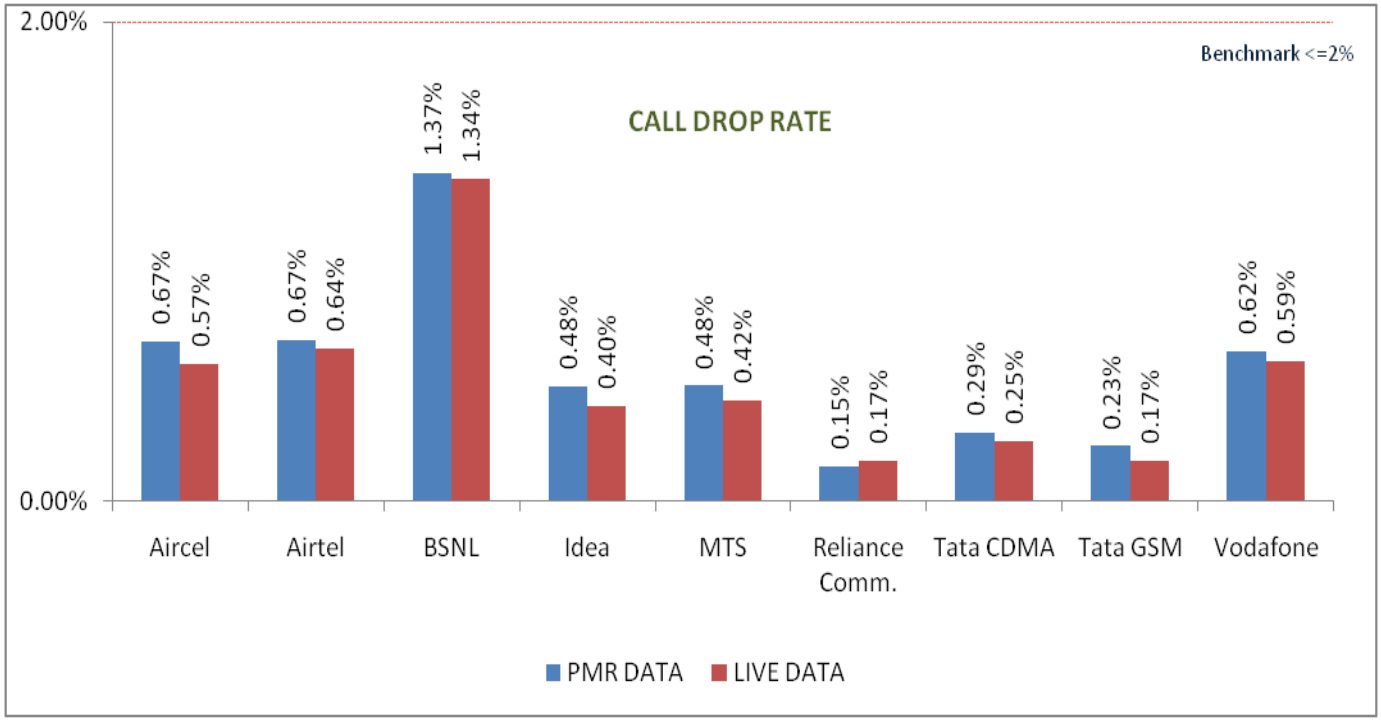
Data Source: Network Operations Center(NOC) of the operators

3.5 CALL DROP RATE

3.5.1 PARAMETER DESCRIPTION

1. **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
2. **Computational Methodology:** (**Total Calls Dropped** / **Total Calls Established) x 100**
3. **TRAI Benchmark** –
    - Call drop rate ≤ 2%
4. **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.

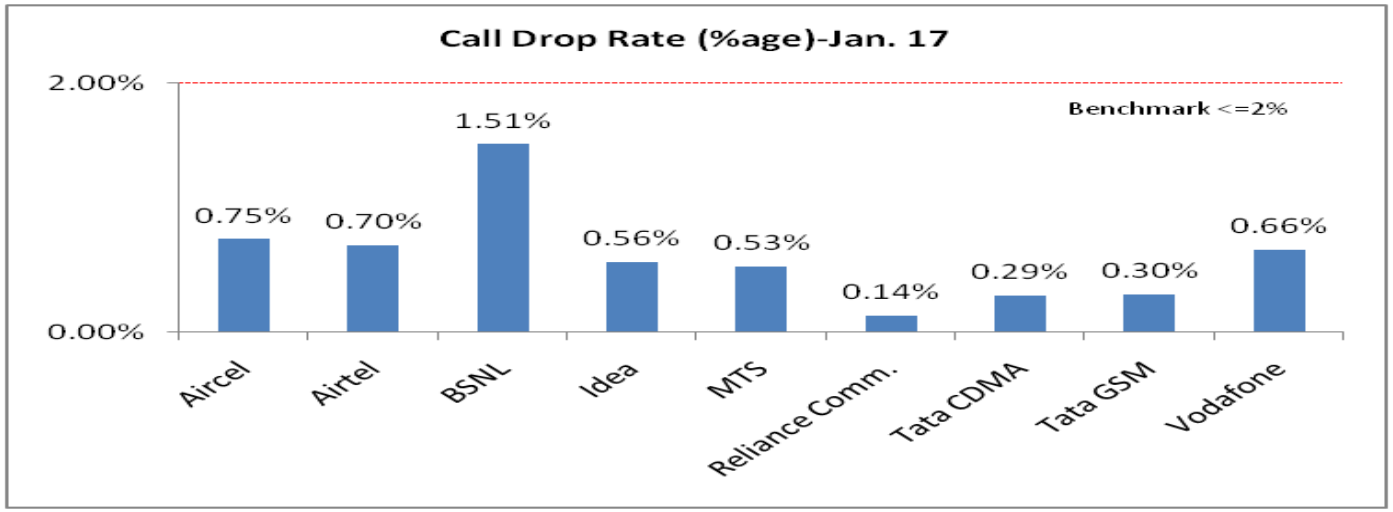
3.5.2 KEY FINDINGS – CONSOLIDATED



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

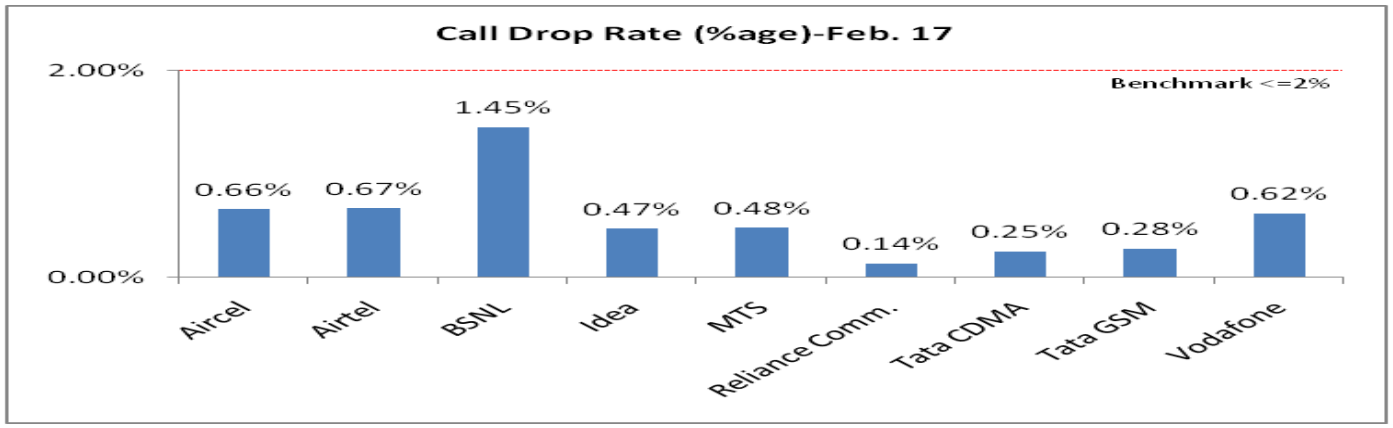
All operators met the benchmark for call drop rate during audit.

3.5.2.1 KEY FINDINGS – JANUARY 2017



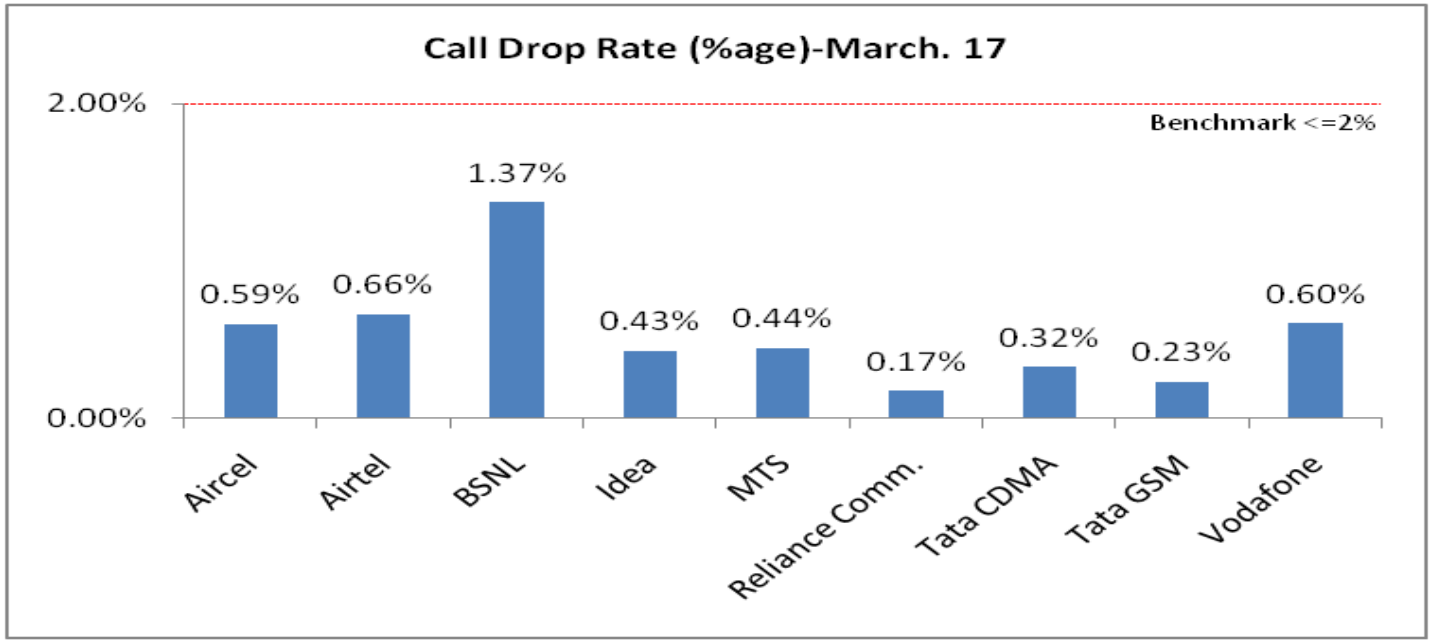
Data Source: Network Operations Center(NOC) of the operators

3.5.2.2 KEY FINDINGS – FEBRUARY 2017



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

3.5.2.3 KEY FINDINGS – MARCH 2017



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

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 –**

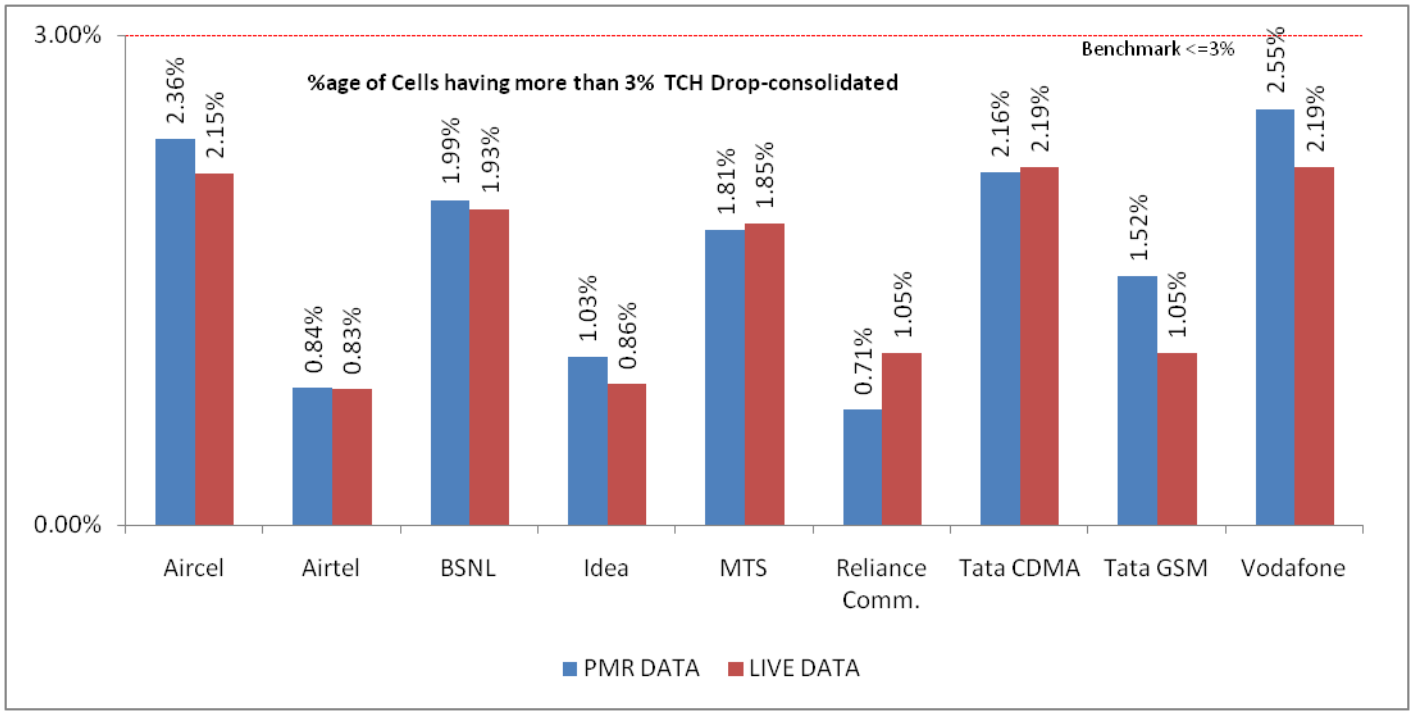
   - Worst affected cells having more than 3% TCH drop rate ≤ 3%

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

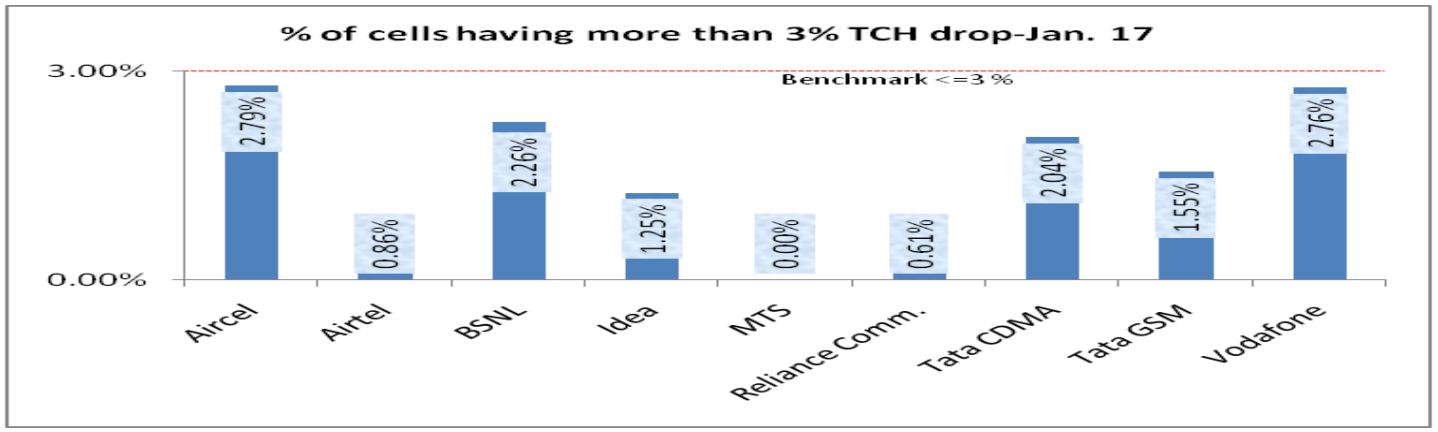


Data Source: Network Operations Center(NOC) of the operators

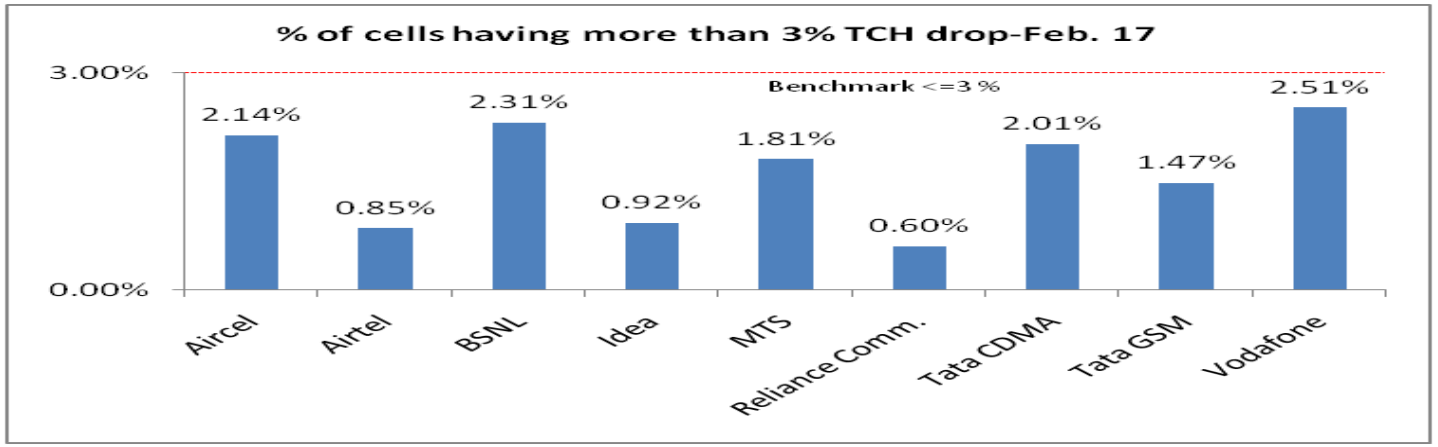
All operators met the TRAI benchmark.

No significant difference was observed between PMR & live measurement data for all TSPs .

3.6.2.1 KEY FINDINGS – JANUARY 2017

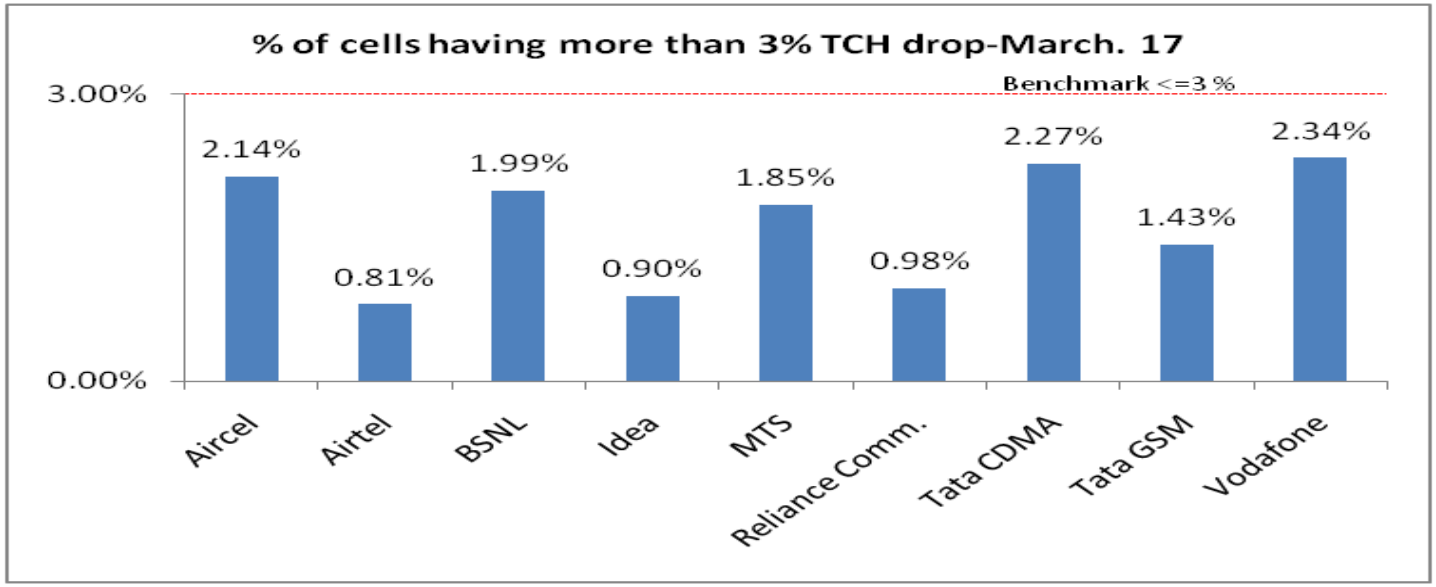


3.6.2.2 KEY FINDINGS – FEBRUARY 2017



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

3.6.2.3 KEY FINDINGS – MARCH 2017



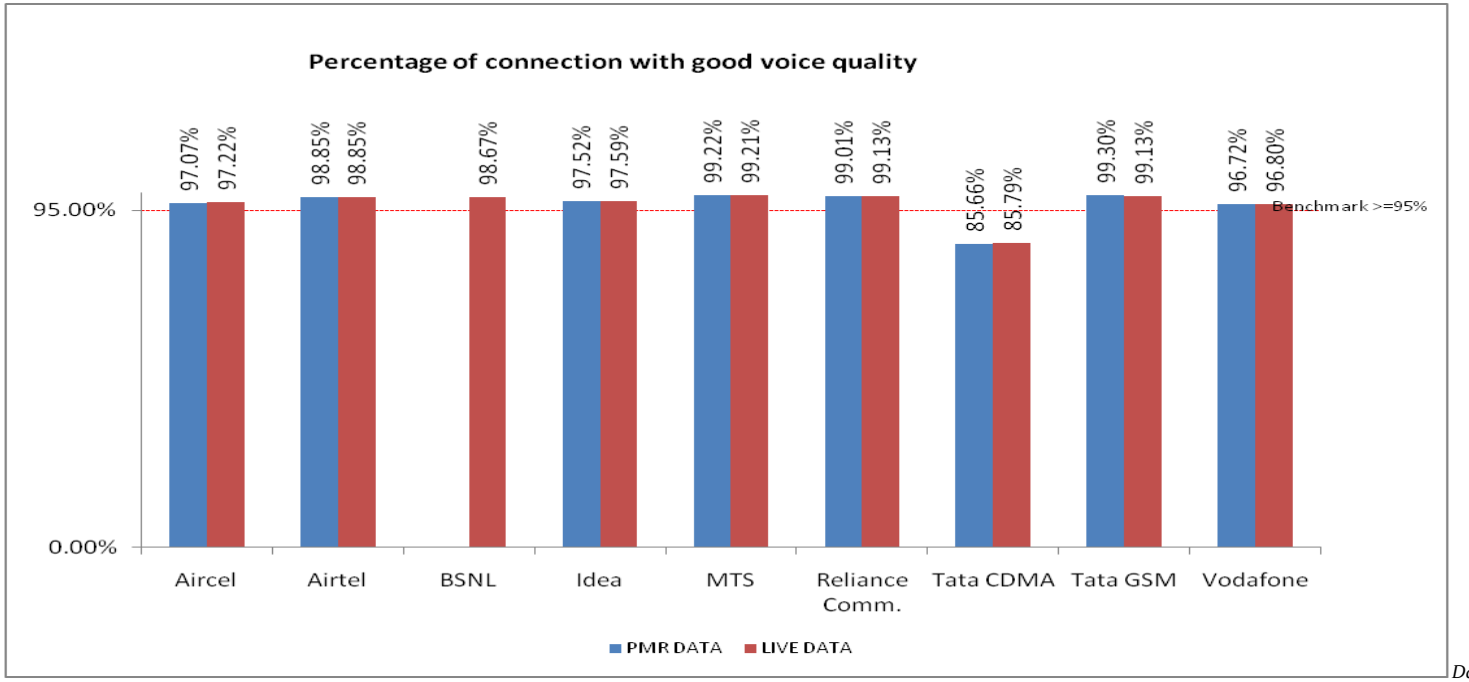
Data Source: Network Operations Center(NOC) of the operators

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:**
   - **% Connections with good voice quality = (No. of voice samples with good voice quality / Total number of samples) x 100**
3. **TRAI Benchmark:≥** 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.

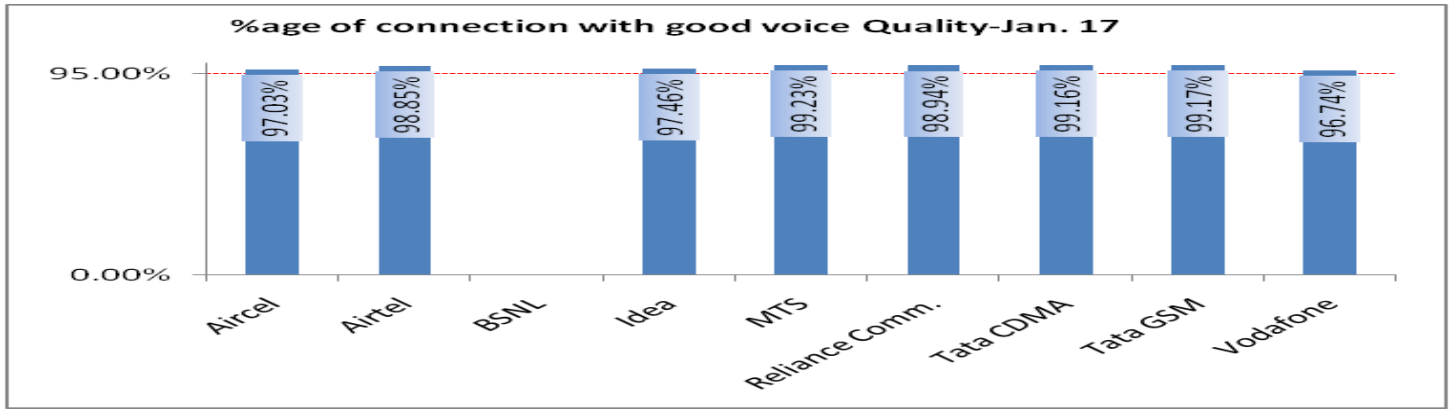
3.7.2 KEY FINDINGS



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

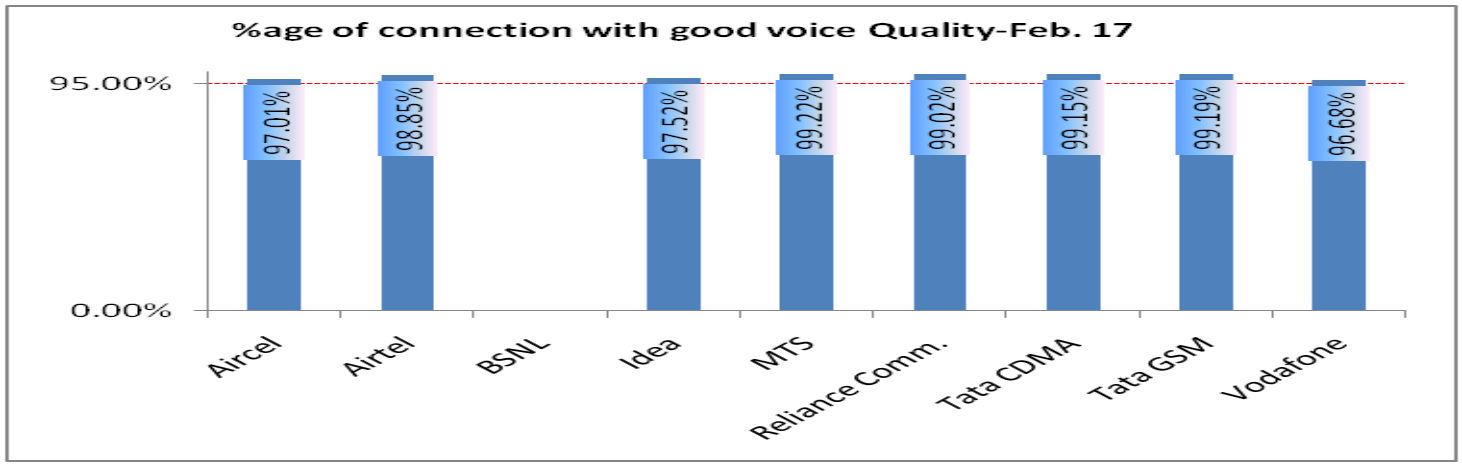
All operators met the benchmark for Voice quality as per PMR and live data.

3.7.3 KEY FINDINGS- JANUARY 2017



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

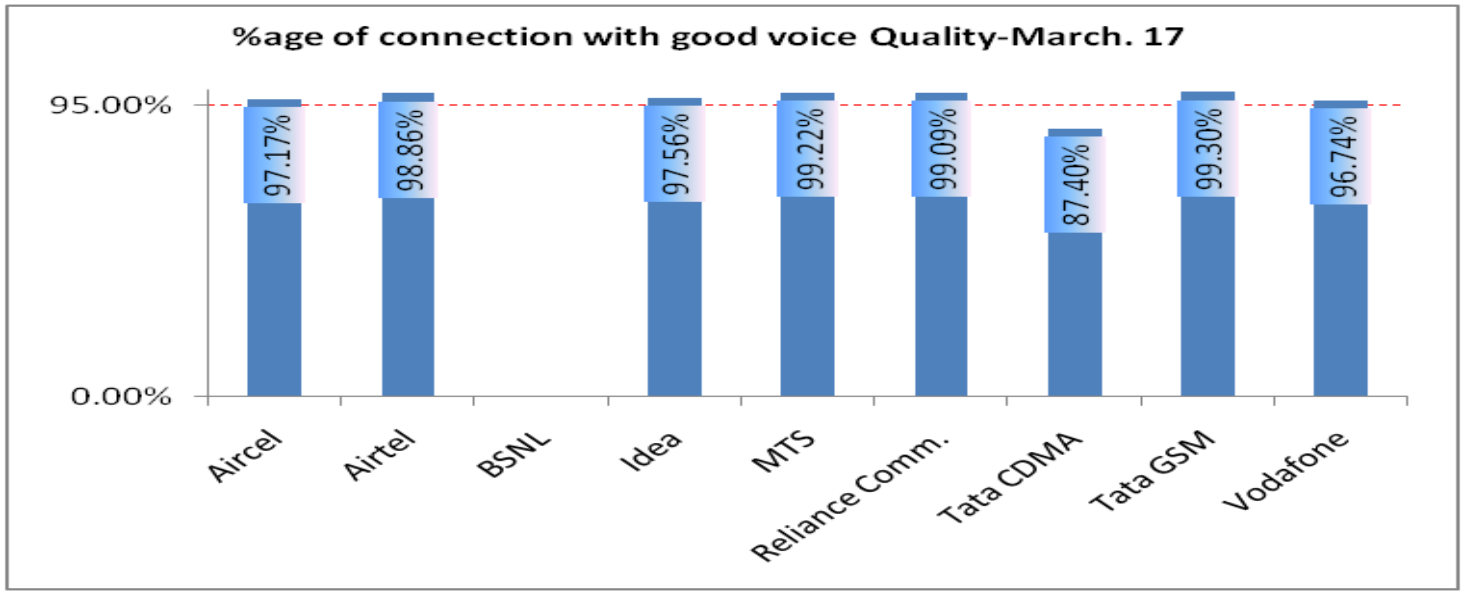
3.7.3.1 KEY FINDINGS – FEBRUARY 2017\



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

3.7.3.2 KEY FINDINGS – MONTH 3

N



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) = 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 x Number of days in a month x Number of Node Bs in the network in licensed service area) x 100

3. TRAI Benchmark –

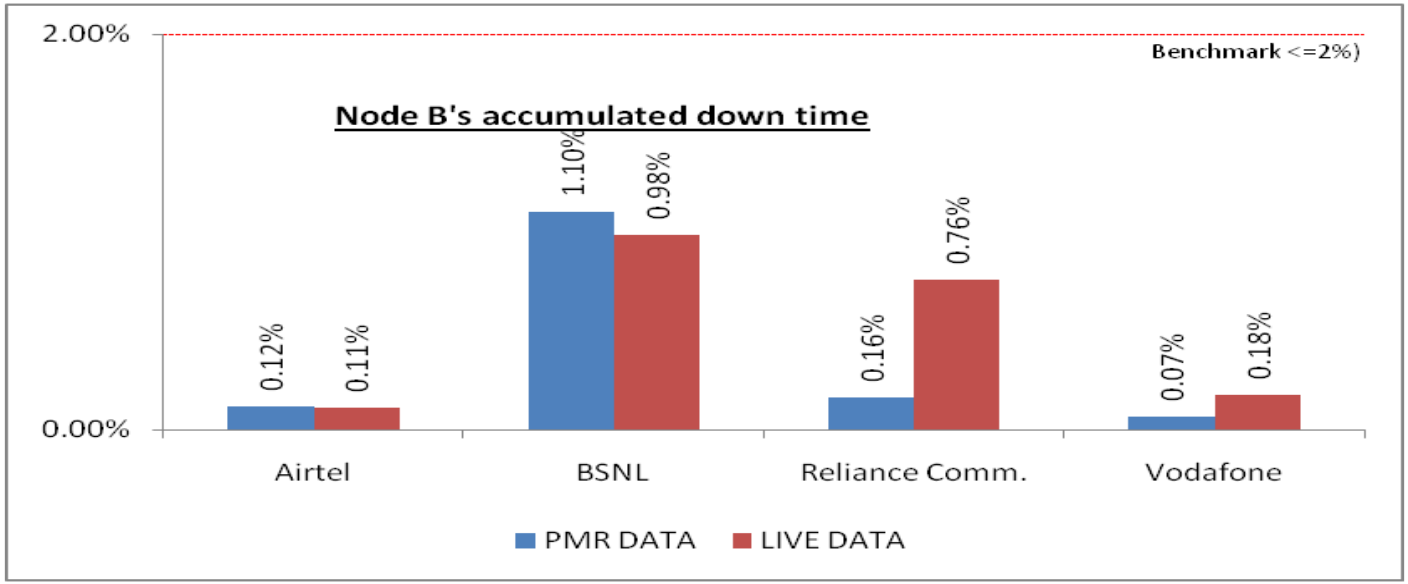
a. Node Bs downtime (not available for service) ≤ 2%

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.

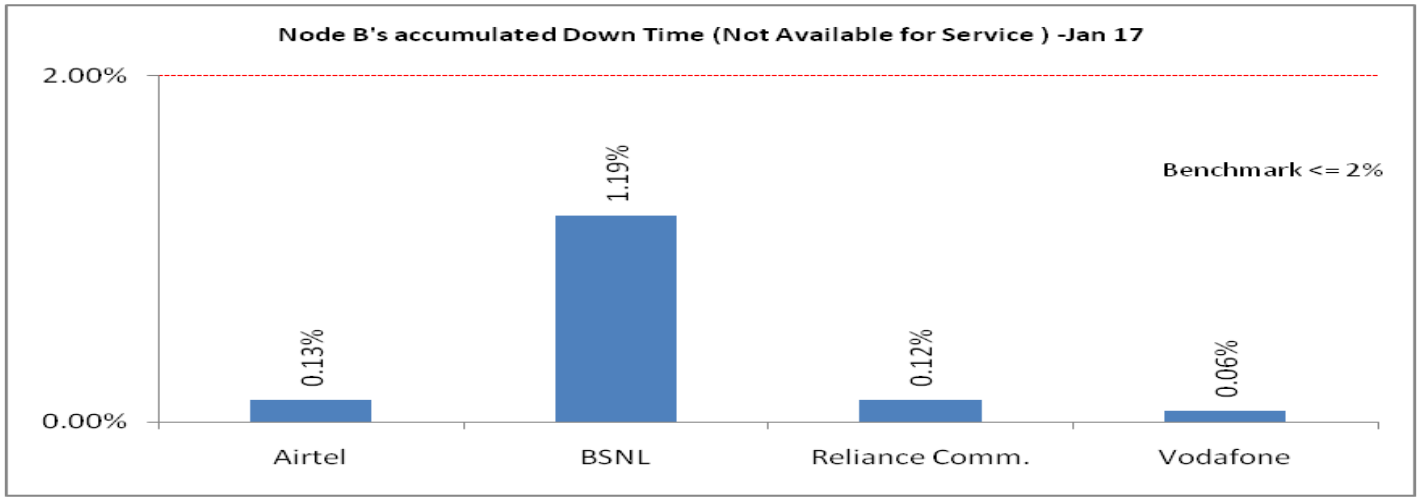
4.1.2 KEY FINDINGS - CONSOLIDATED



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

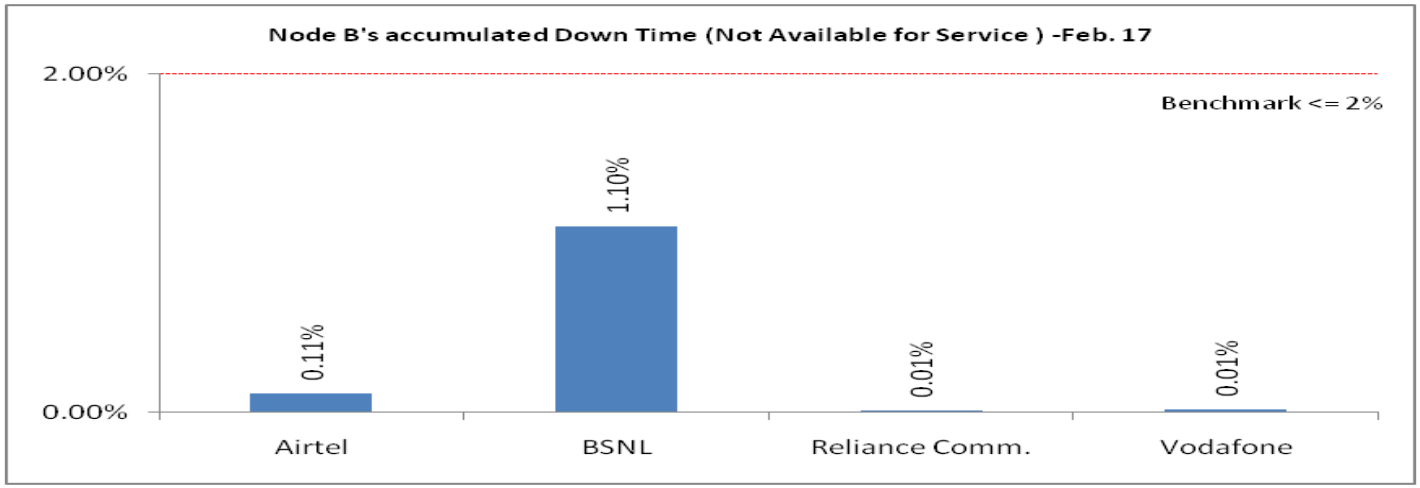
All operators met the benchmark for Node Bs downtime.

4.1.2.1 KEY FINDINGS – JANUARY 2017



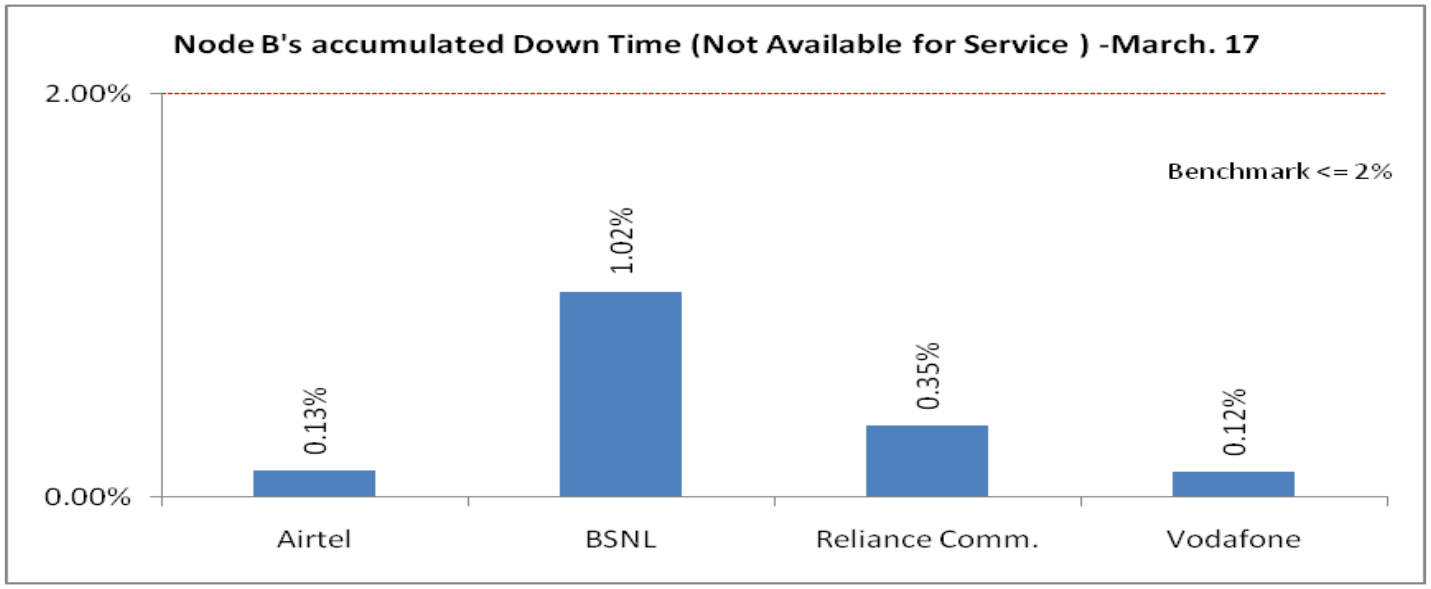
Data Source: Operations and Maintenance Center (OMC) of the operators

4.1.2.2 KEY FINDINGS – FEBRUARY 2017



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

4.1.2.3 KEY FINDINGS – MARCH 2017



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

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 ≤ 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 Node Bs in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.

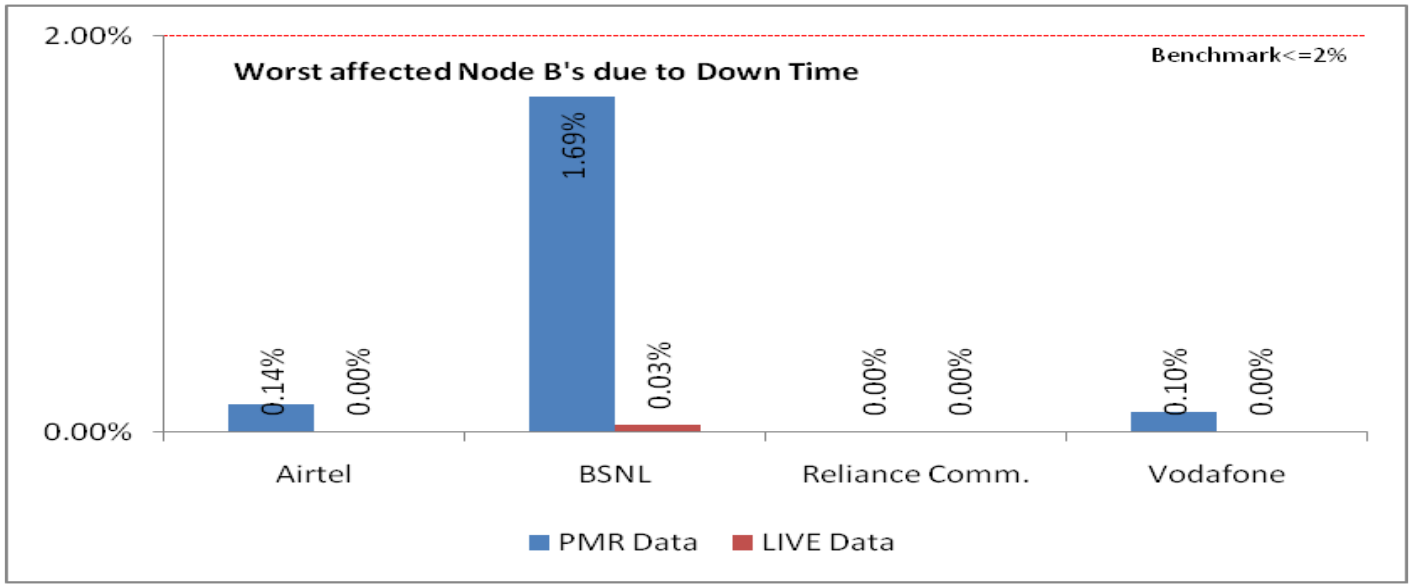
  iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.

  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 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

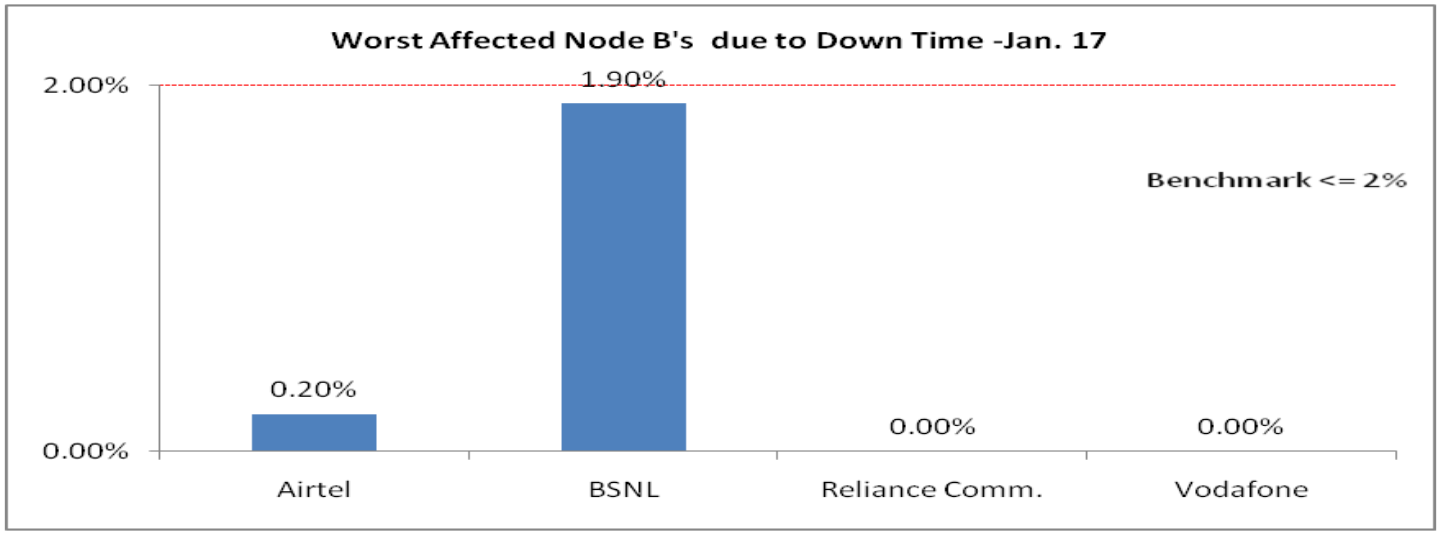


Data Source: Operations and Maintenance Center (OMC) of the operators

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

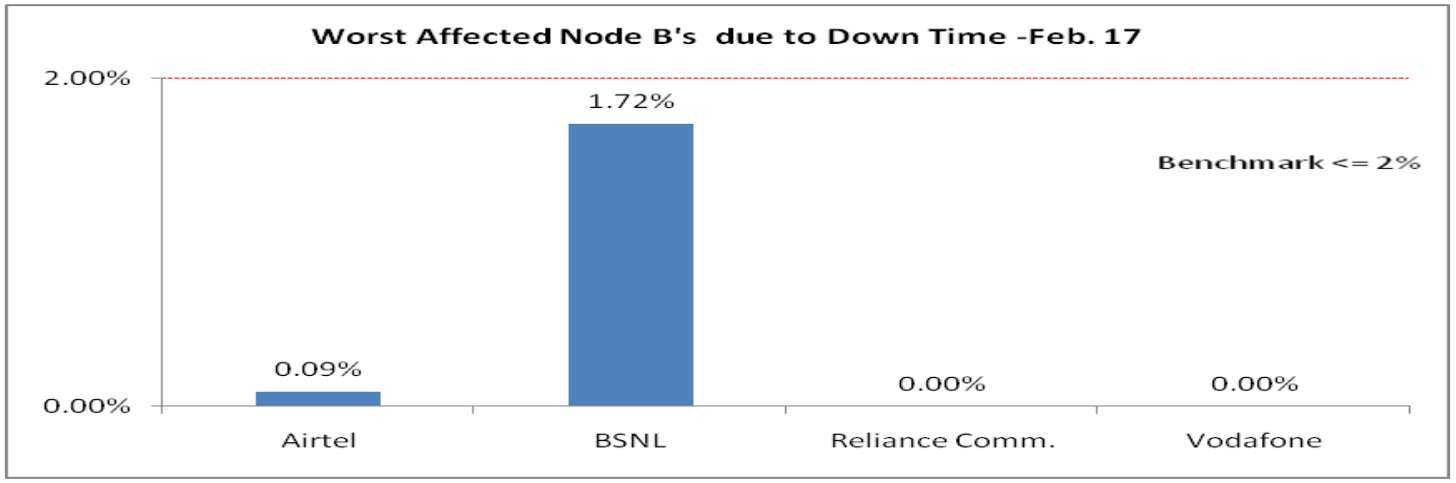
Significant difference was observed for BSNL between PMR & live measurement data .

4.2.2.1 KEY FINDINGS – JANUARY 2017



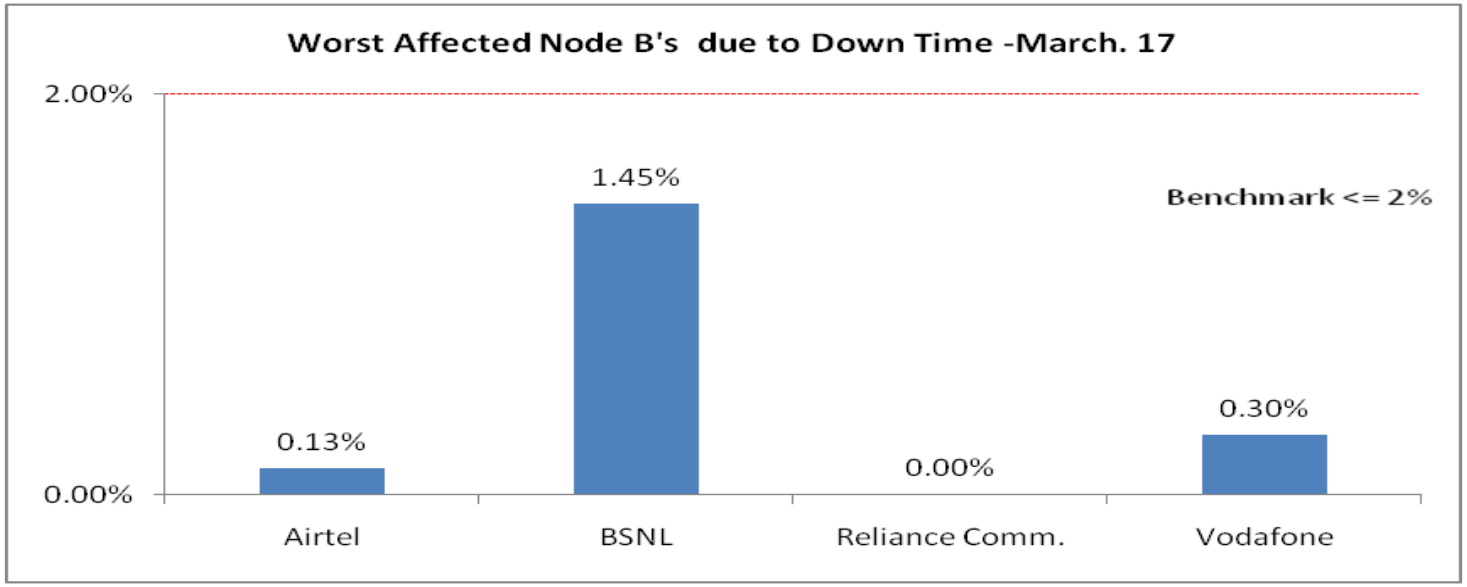
Data Source: Operations and Maintenance Center (OMC) of the operators

4.2.2.2 KEY FINDINGS – FEBRUARY 2017



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

4.2.2.3 KEY FINDINGS – MARCH 2017



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

Call Set Up Success Rate

4.2.3 PARAMETER DESCRIPTION

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-**
   (RRC Established / Total RRC Attempts) * 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

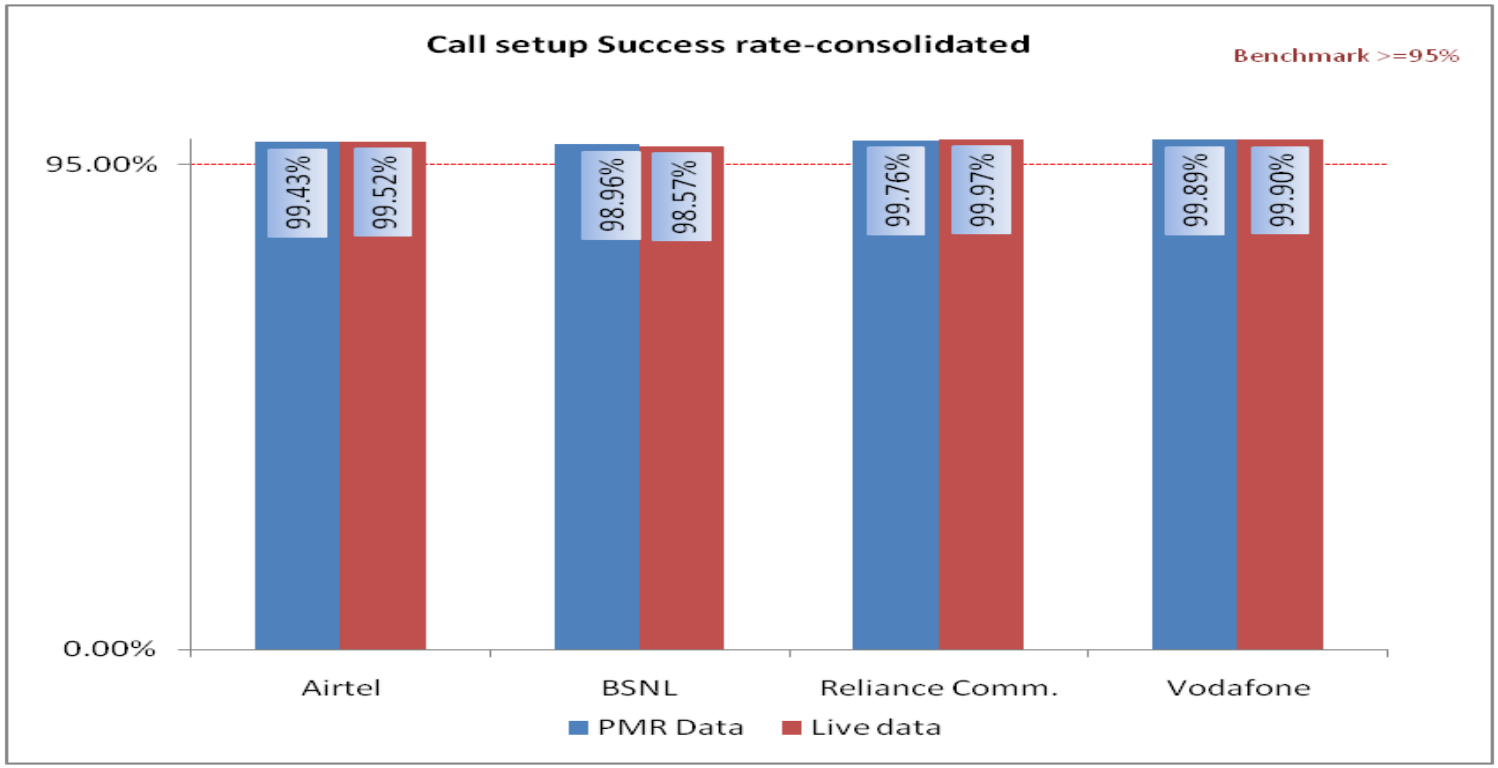
5. **TRAI Benchmark≥** 95%

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.

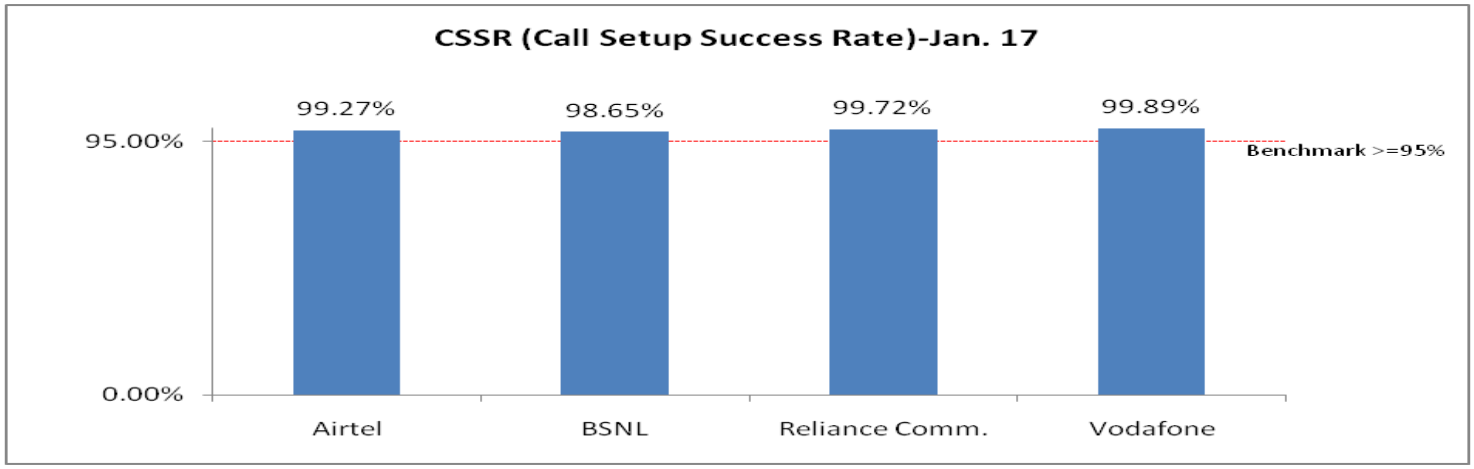
4.2.4 KEY FINDINGS - CONSOLIDATED



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

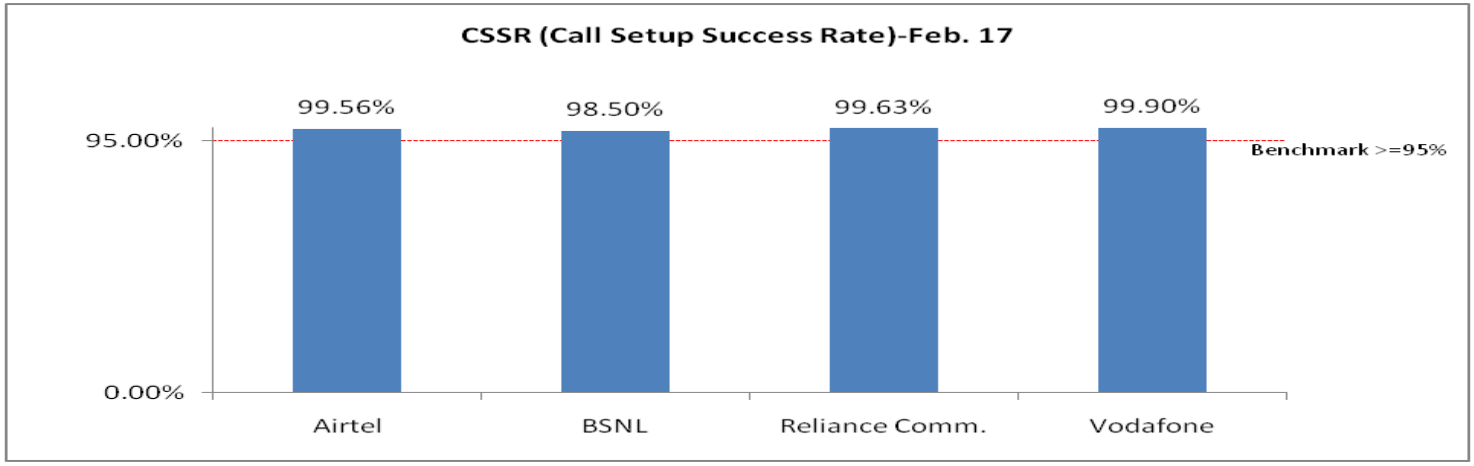
All operators met the TRAI benchmark as per audit/PMR data.

4.2.4.1 KEY FINDINGS – JANUARY 2017



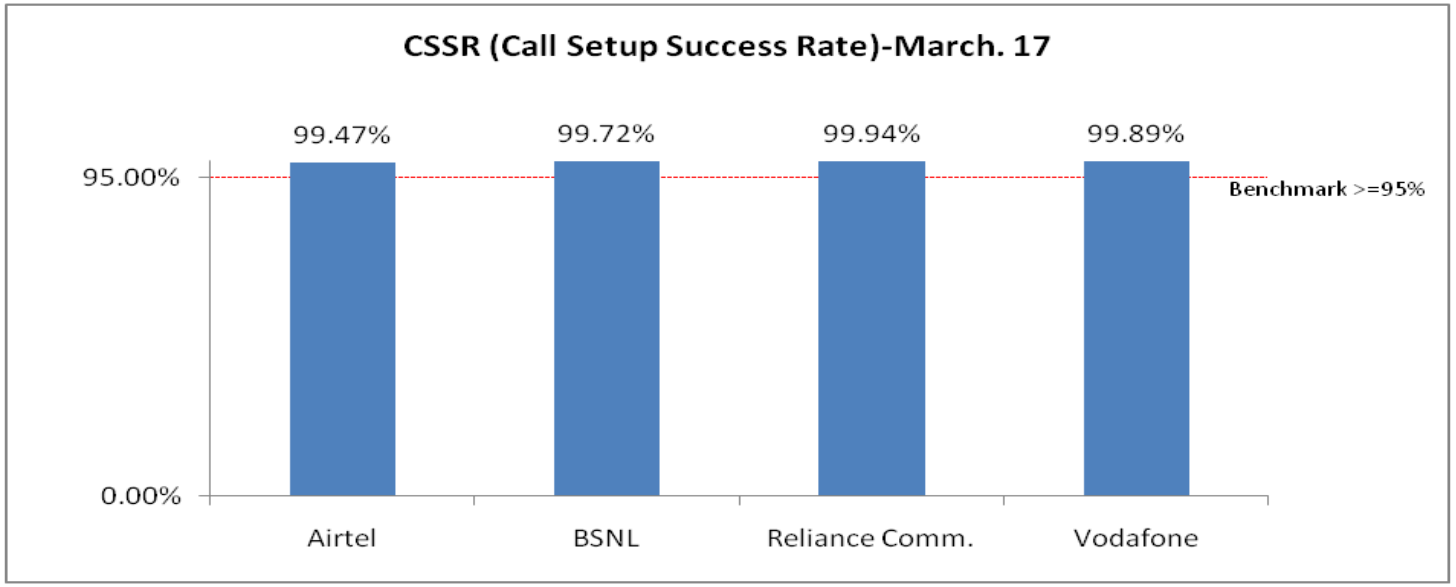
Data Source: Network Operations Center(NOC) of the operators

4.2.4.2 KEY FINDINGS – FEBRUARY 2017



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

4.2.4.3 KEY FINDINGS – MARCH 2017



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

4.3 NETWORK CHANNEL CONGESTION- RRC CONGESTION/ CIRCUIT SWITCHED RAB CONGESTION

4.3.1 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% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
        - Where:-A1 = Number of attempts to establish RRC/ RAB made on day 1
        - C1 = Average RRC / RAB Congestion % on day 1
        - A2 = Number of attempts to establish RRC / RAB made on day 2
        - C2 = Average RRC / RAB Congestion % on day 2
        - An = Number of attempts to establish RRC / RAB made on day n
        - Cn = Average RRC / RAB Congestion % on day n

- **POI Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
    - Where:-A1 = POI traffic offered on all POIs (no. of calls) on day 1
    - C1 = Average POI Congestion % on day 1
    - A2 = POI traffic offered on all POIs (no. of calls) on day 2
    - C2 = Average POI Congestion % on day 2
    - An = POI traffic offered on all POIs (no. of calls) on day n
    - Cn = Average POI Congestion % on day n

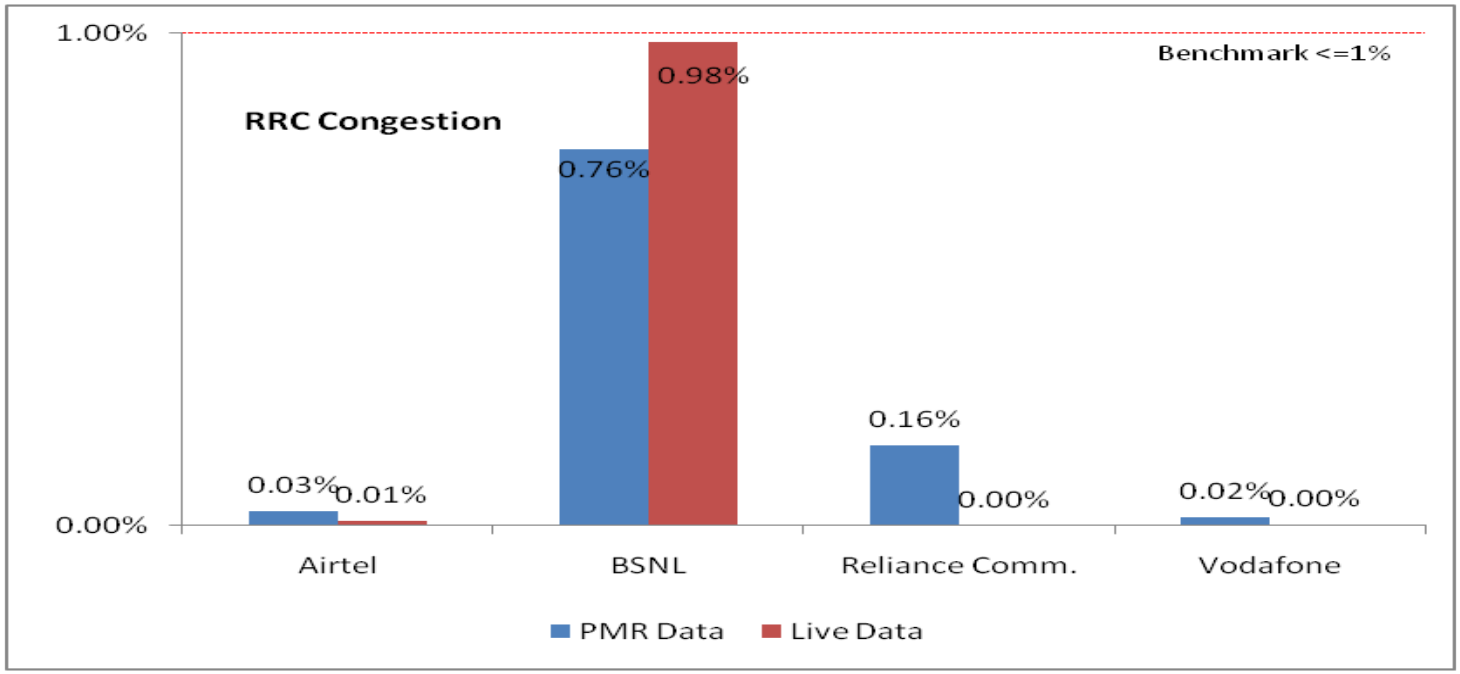
7. Benchmark:

- 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

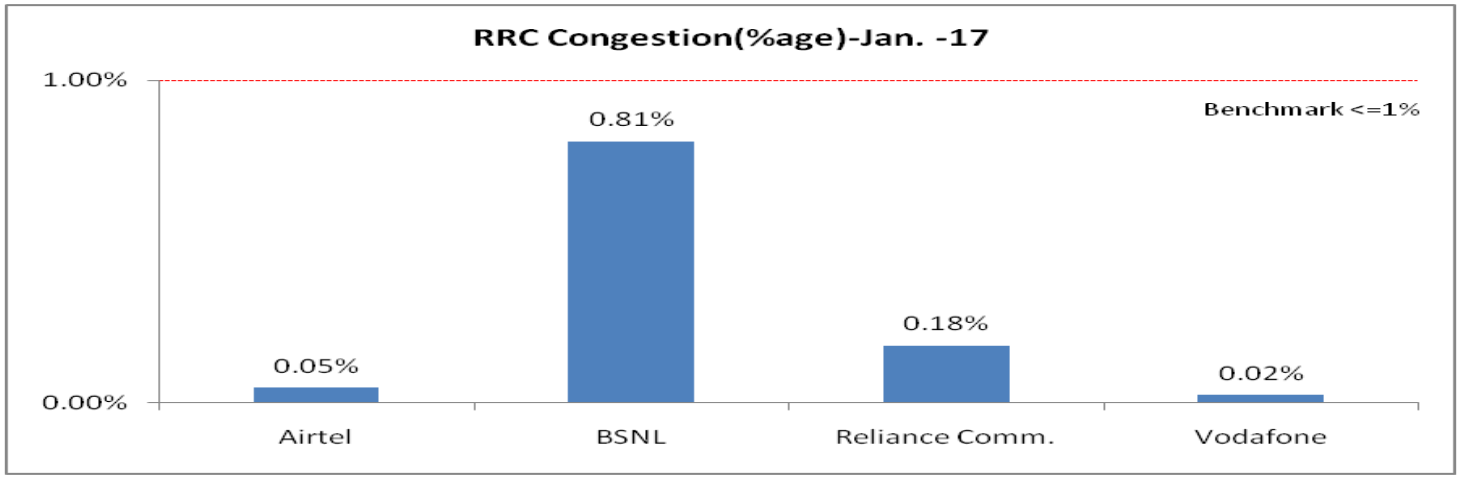
4.3.2 KEY FINDINGS - RRC CONGESTION (CONSOLIDATED)



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

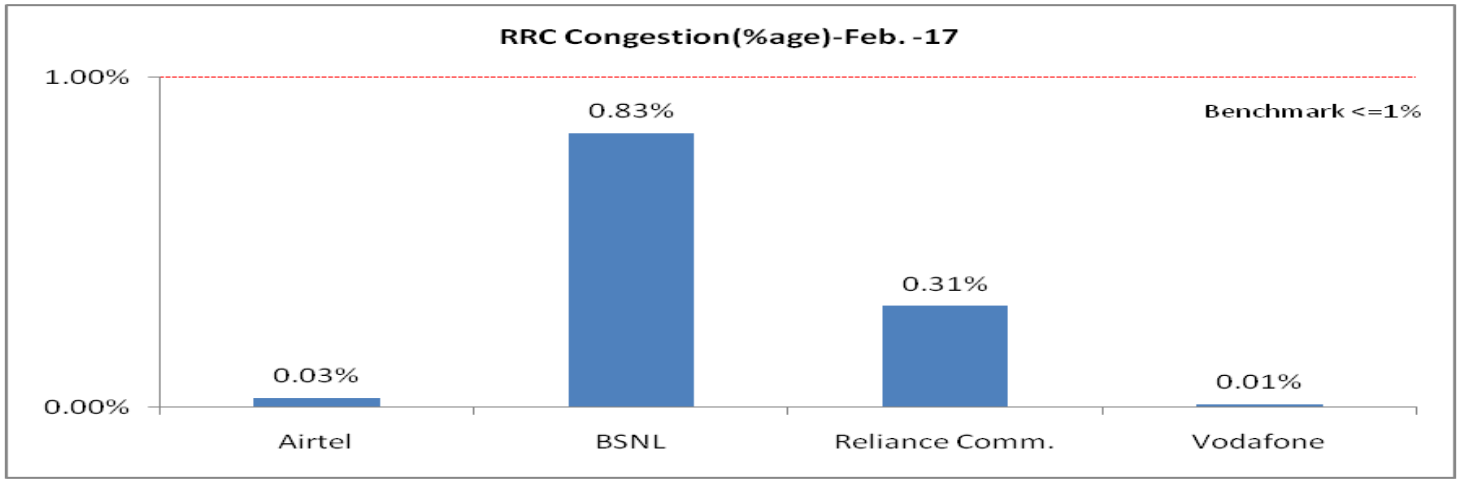
All operators met the benchmark for RRC congestion.

4.3.2.1 KEY FINDINGS – JANUARY 2017



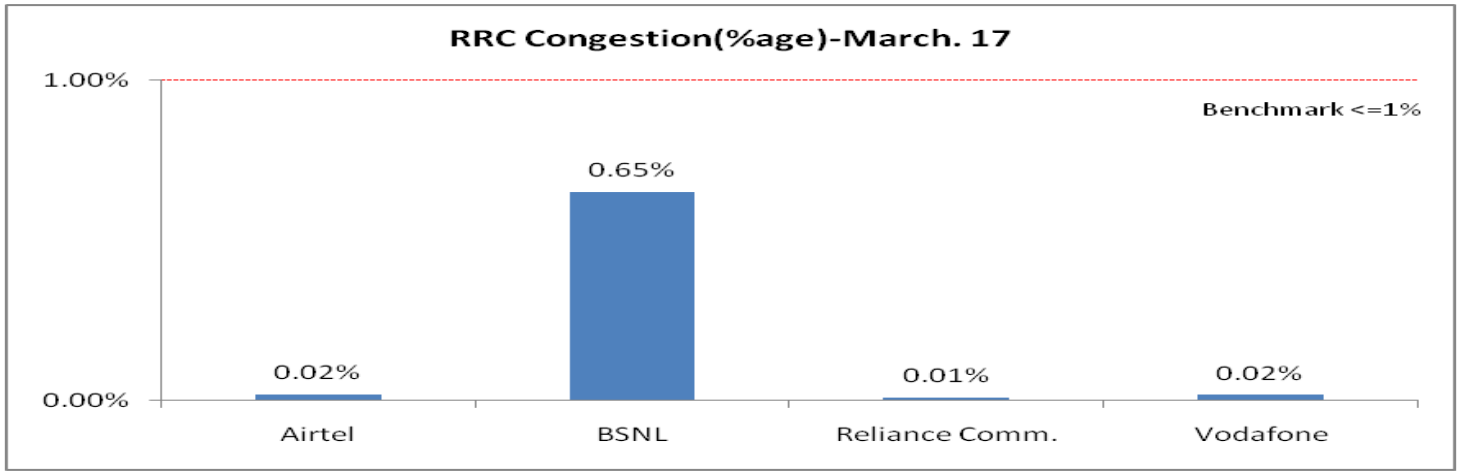
Data Source: Network Operations Center(NOC) of the operators

4.3.2.2 KEY FINDINGS – FEBRUARY 2017



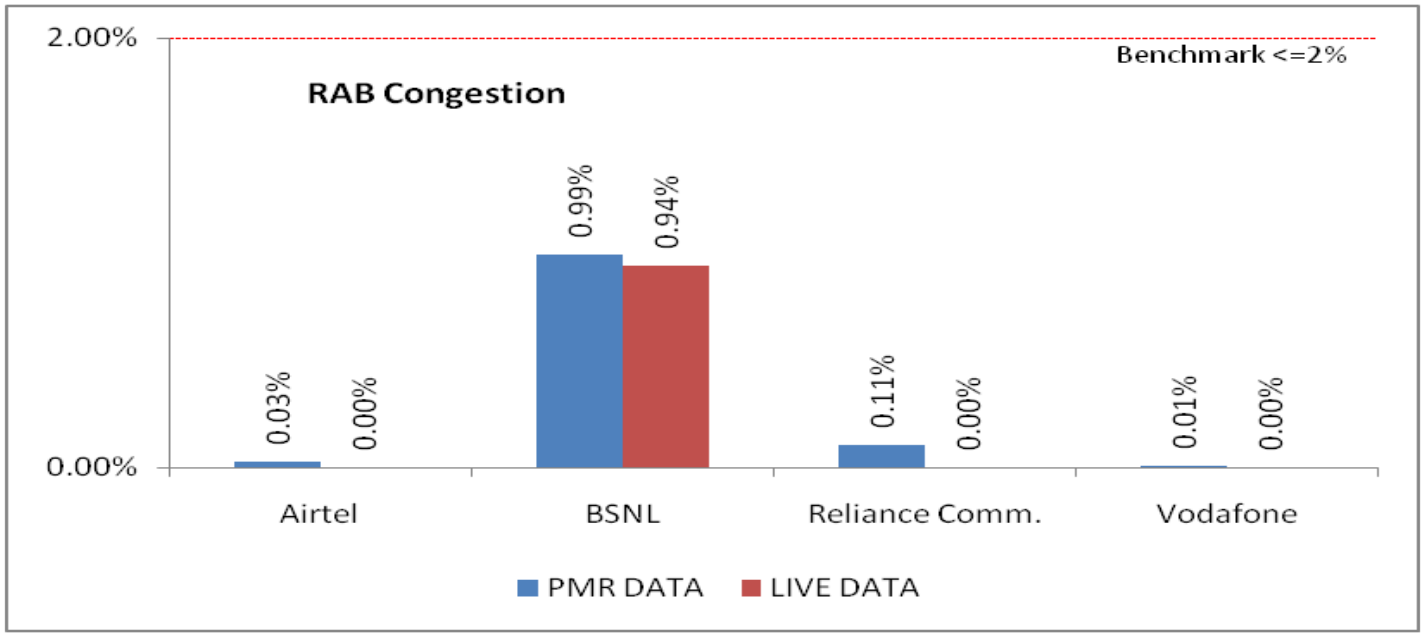
Data Source: Network Operations Center(NOC) of the operators

4.3.2.3 KEY FINDINGS – MARCH 2017



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

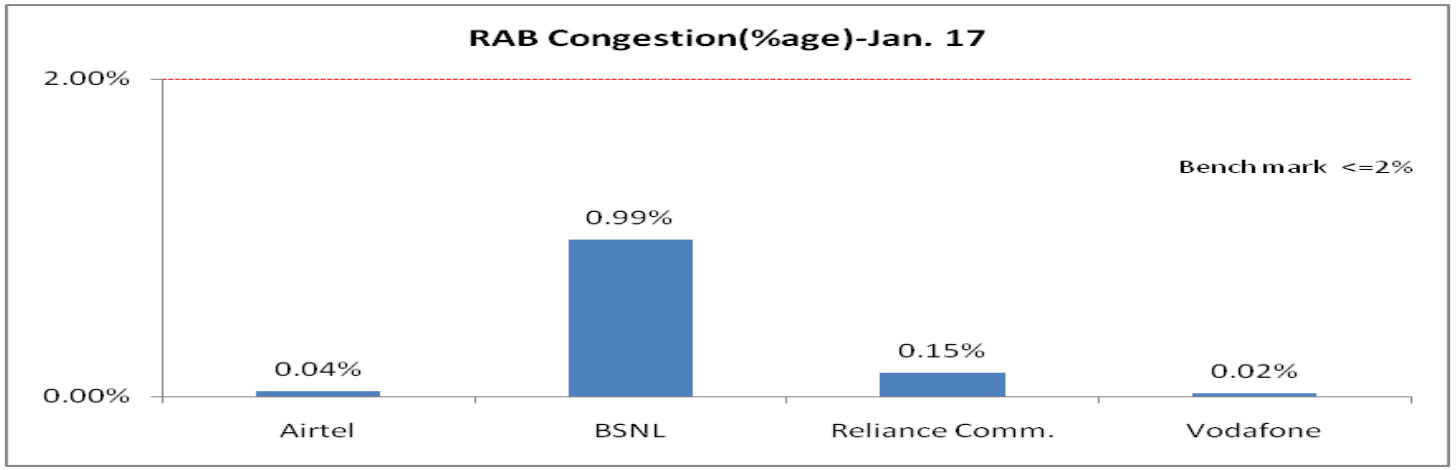
4.3.3 KEY FINDINGS – CIRCUIT SWITCHED RAB CONGESTION (CONSOLIDATED)



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

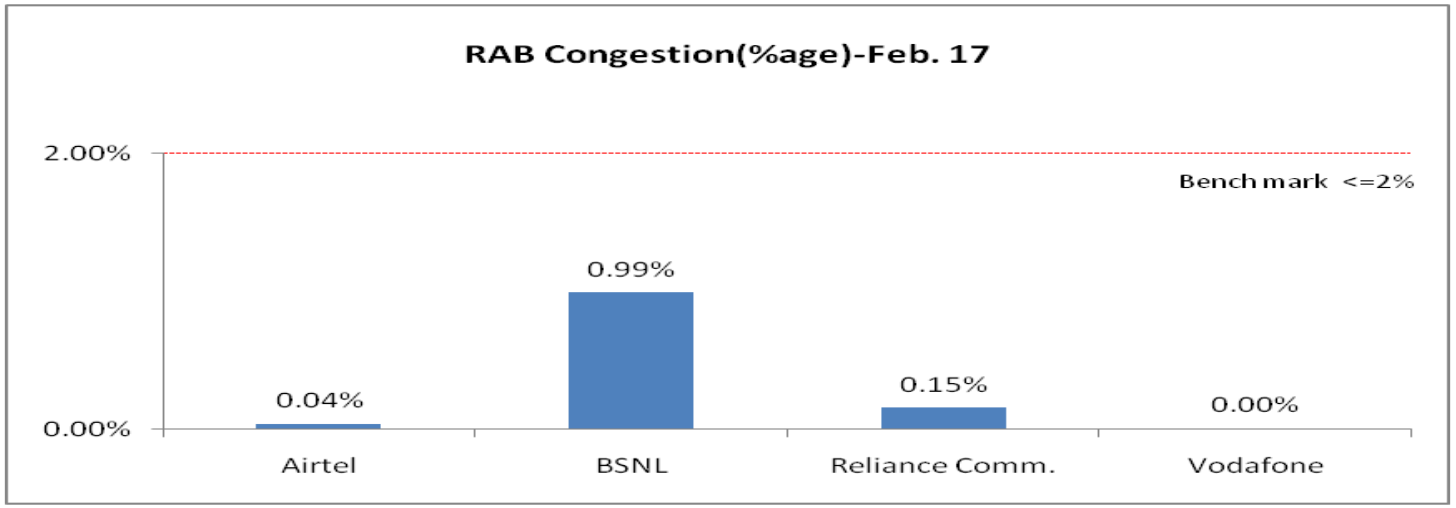
All operators met the benchmark as per audit/PMR report.

4.3.3.1 KEY FINDINGS – JANUARY 2017



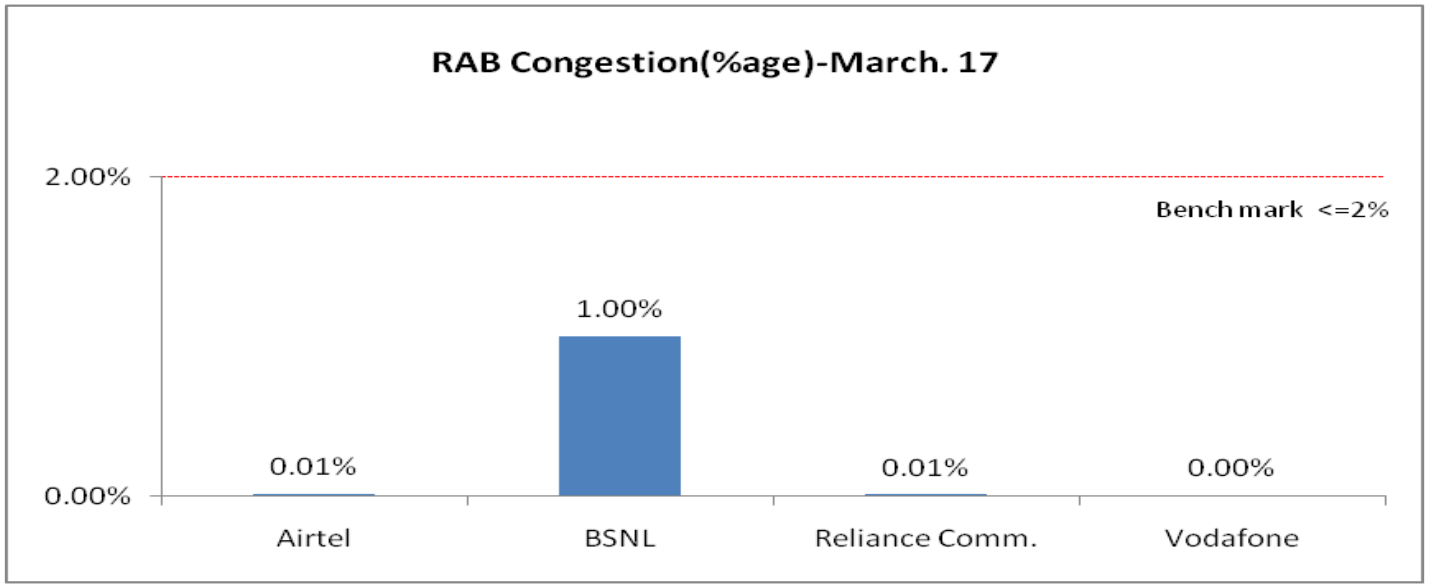
Data Source: Network Operations Center(NOC) of the operators

4.3.3.2 KEY FINDINGS – FEBRUARY 2017



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

4.3.3.3 KEY FINDINGS – MARCH 2017



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

4.4 CIRCUIT SWITCHED VOICE DROP RATE

4.4.1 PARAMETER DESCRIPTION

1. **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

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:** (**No. of voice RAB normally released / (No. of voice RAB normally released + RAB abnormally released)x 100**

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

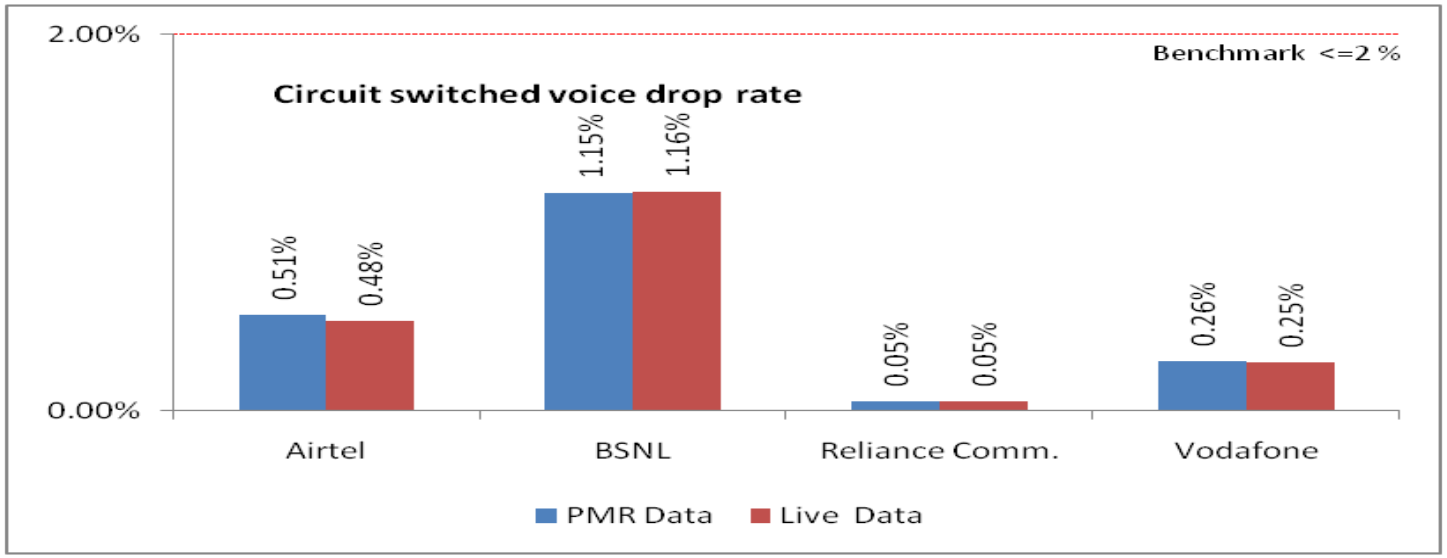
5. **TRAI Benchmark** –

    - Circuit switched voice drop rate ≤ 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.

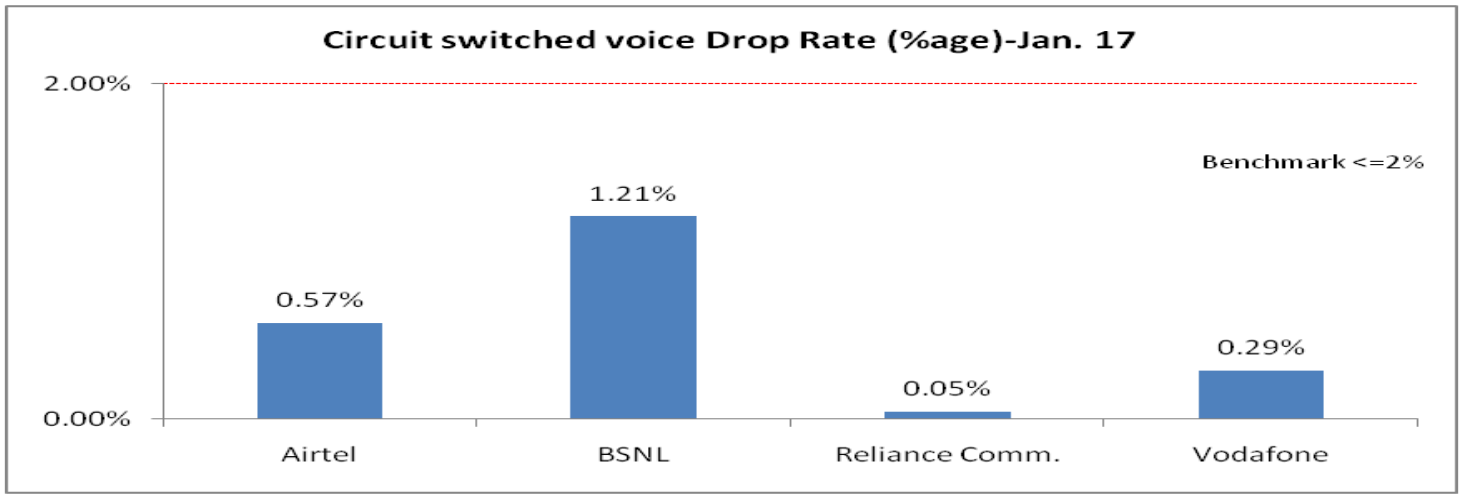
4.4.2 KEY FINDINGS – CONSOLIDATED



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

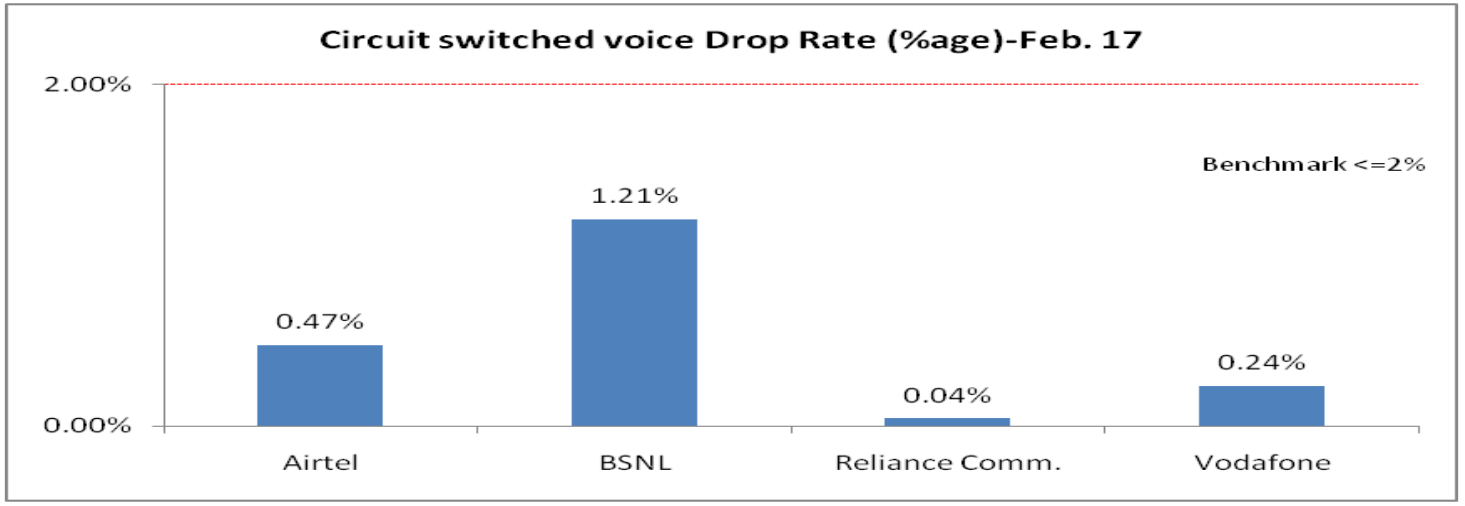
All operators met the benchmark for call drop rate during audit.

4.4.2.1 KEY FINDINGS – JANUARY 2017



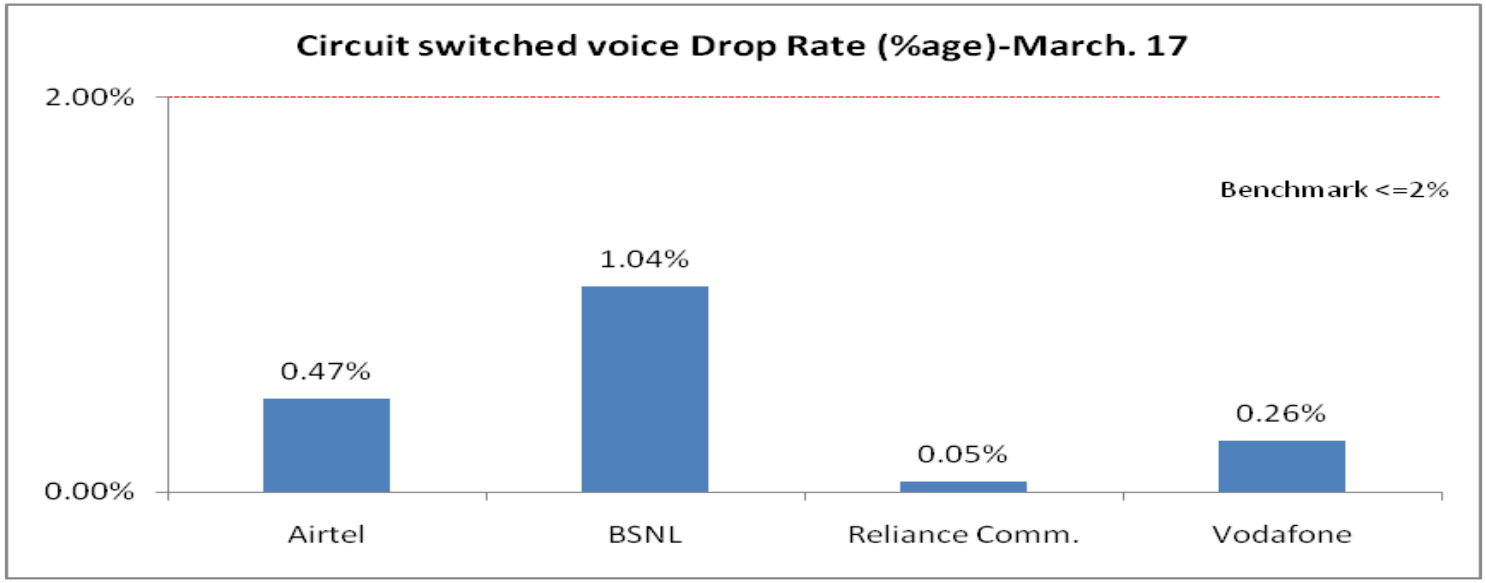
Data Source: Network Operations Center(NOC) of the operators

4.4.2.2 KEY FINDINGS – FEBRUARY 2017



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

4.4.2.3 KEY FINDINGS – MARCH 2017



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

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

4.5.1 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 –**

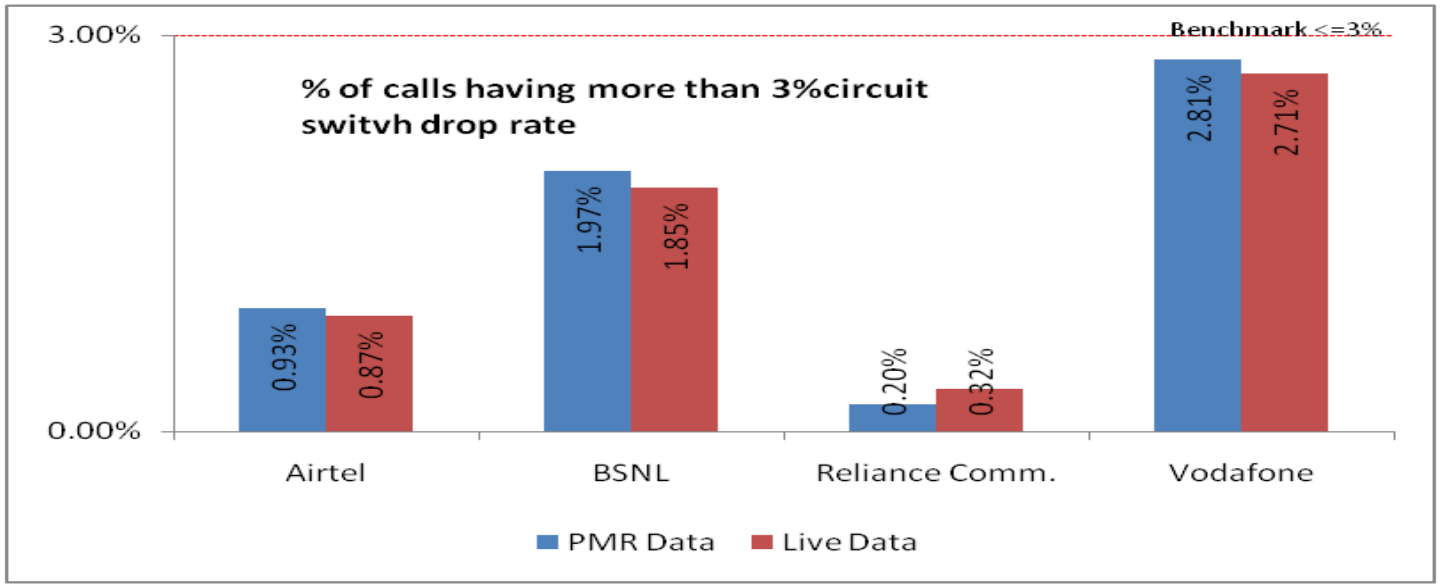
   - Worst affected cells having CSV drop rate > 3% during CBBH in a month ≤ 3%

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.

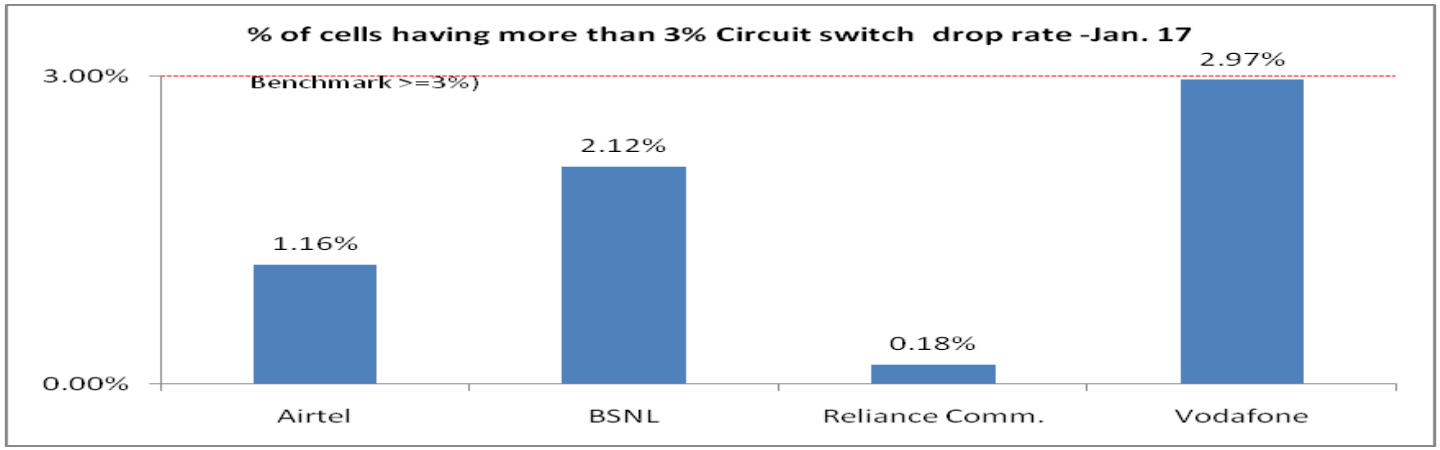
4.5.2 KEY FINDINGS – CONSOLIDATED



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

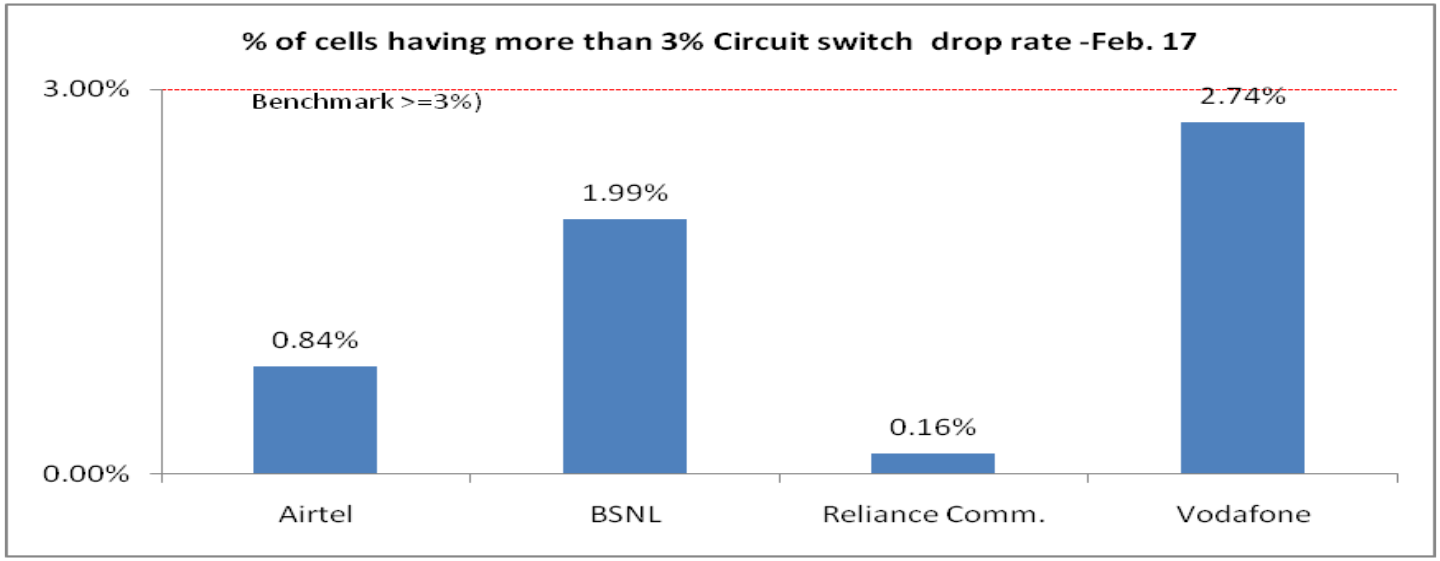
All operators met the benchmark during audit.

4.5.2.1 KEY FINDINGS – JANUARY 2017



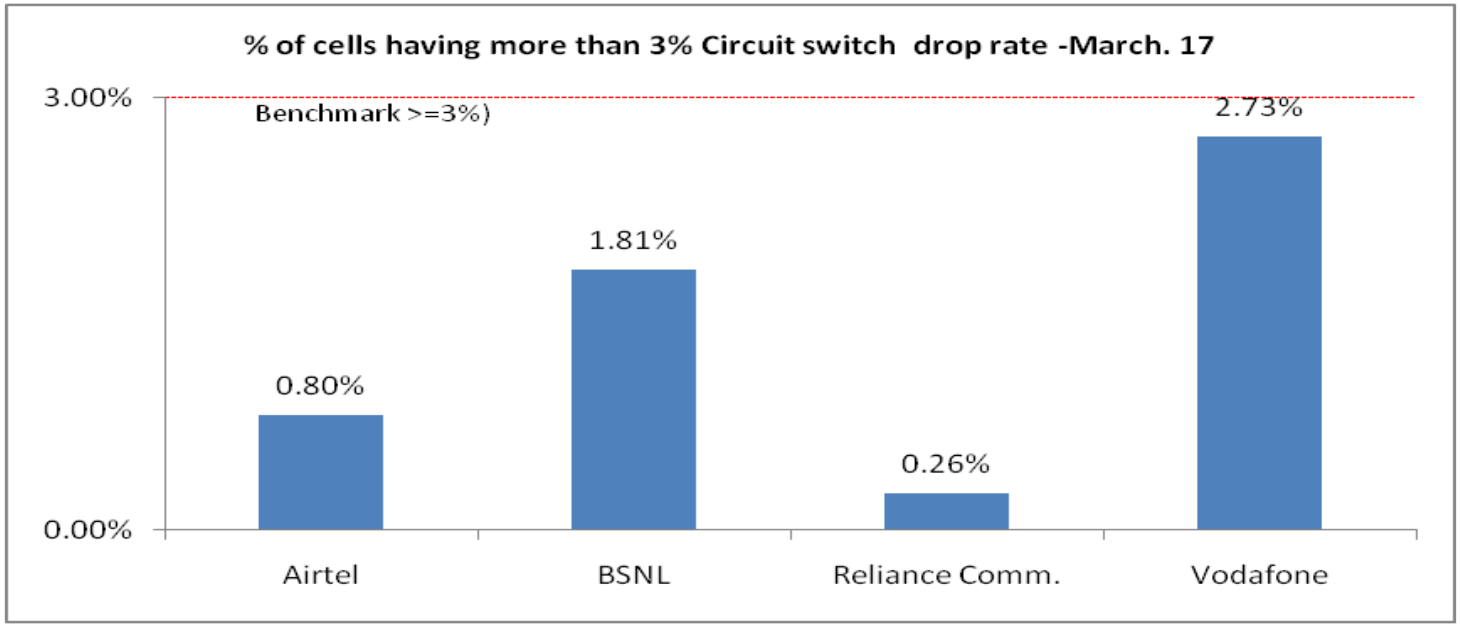
Data Source: Network Operations Center(NOC) of the operator

4.5.2.2 KEY FINDINGS – FEBRUARY 2017



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

4.5.2.3 KEY FINDINGS – MARCH 2017



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

4.6 CIRCUIT SWITCH VOICE QUALITY

4.6.1 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 it 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 –**

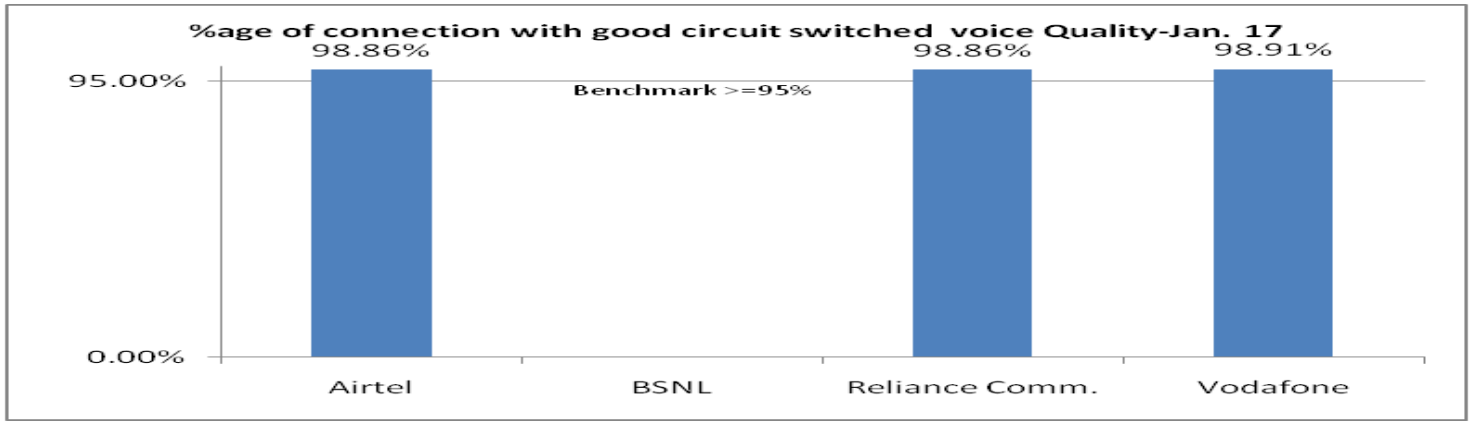
   a. A sample of calls would be taken randomly from the total calls established.

   b. The operator should only be considering those calls which are meeting the desired benchmark of good voice quality.

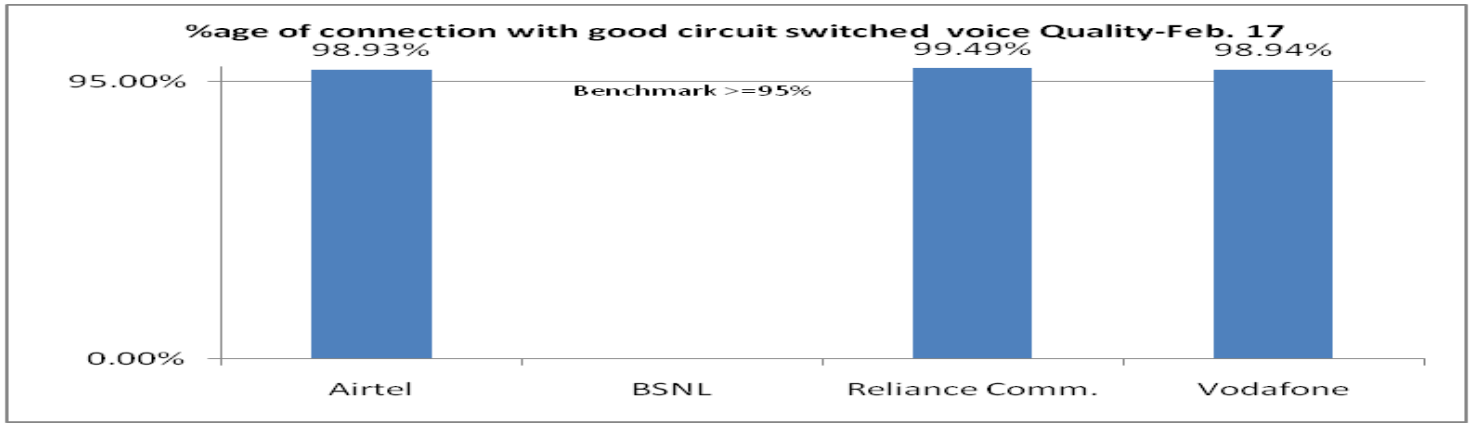
4.6.2 KEY FINDINGS

Data Source: Network Operations Center(NOC) of the operators
Bsnl has not provided the Data for parameter circuit switch Voice quality in live audit as well as monthly PMR

4.6.2.1 KEY FINDINGS – JANUARY 2017

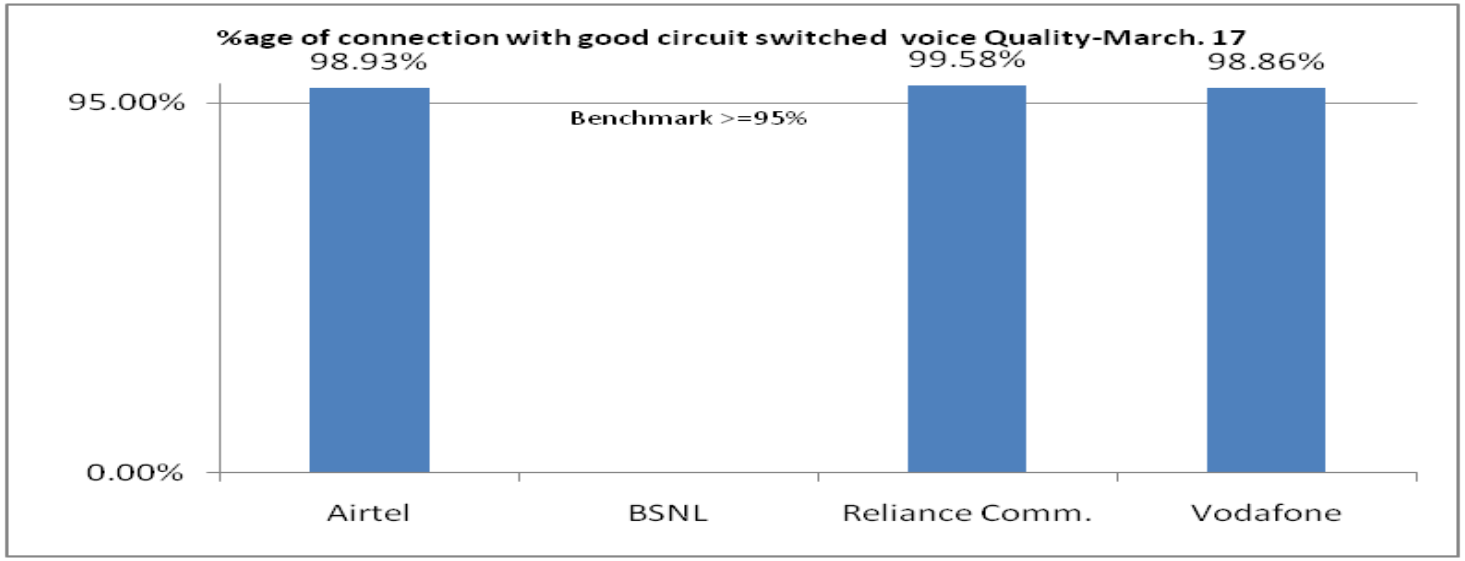


4.6.2.2 KEY FINDINGS – FEBRUARY 2017



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

4.6.2.3 KEY FINDINGS – MONTH 3



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

5 PARAMETER DESCRIPTION AND DETAILED FINDINGS – NON-NETWORK PARAMETERS

5.1 METERING AND BILLING CREDIBILITY

The billing complaintsfor 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 20th December, 2009 were covered.The types of billing complaints covered are listed below.

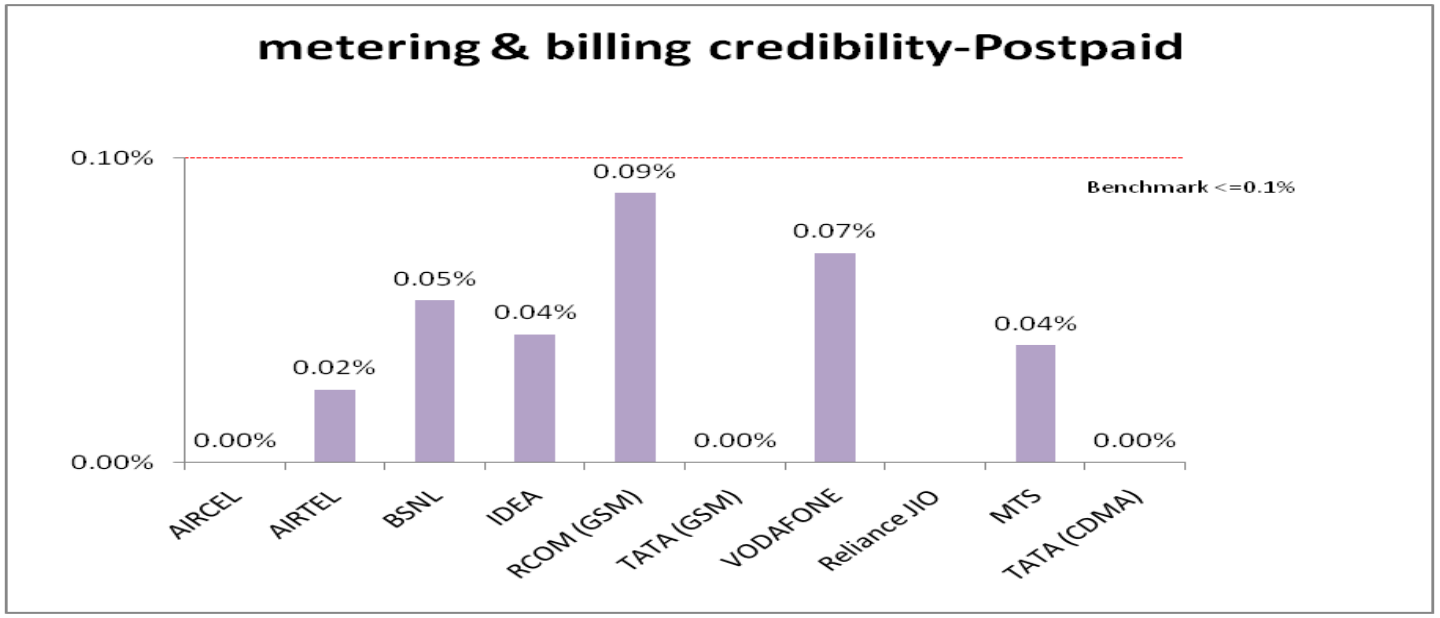
- Payments made and not credited to the subscriber account
- Payment made on time but late payment charge levied wrongly
- Wrong roaming charges
- Double charges
- Charging for toll free services
- Local calls charged/billed as STD/ISD or vice versa
- Calls or messages made disputed
- Validity related 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

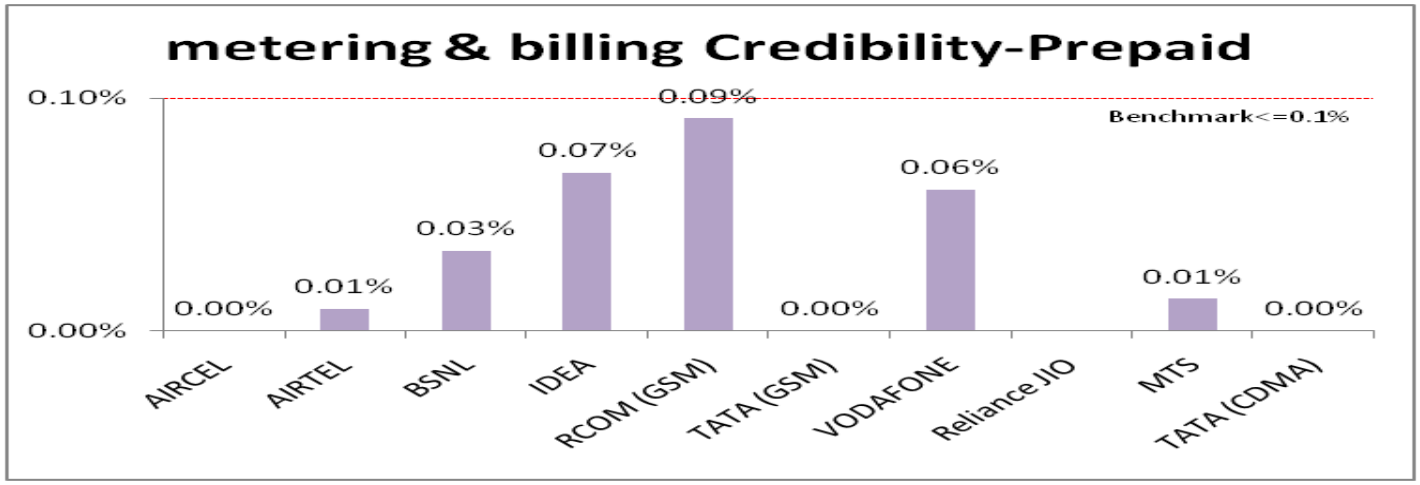
5.1.2 KEY FINDINGS – METERING AND BILLING CREDIBILITY (POSTPAID)



Data Source: Billing Center of the operators

All operators met the benchmark for metering and billing credibility of postpaid subscribers.

5.1.3 KEY FINDINGS - METERING AND BILLING CREDIBILITY (PREPAID)



Data Source: Billing Center of the operators

All operators met the benchmark for metering and billing credibility of prepaid subscribers.

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 =

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

Resolution of billing complaints within 6 weeks:

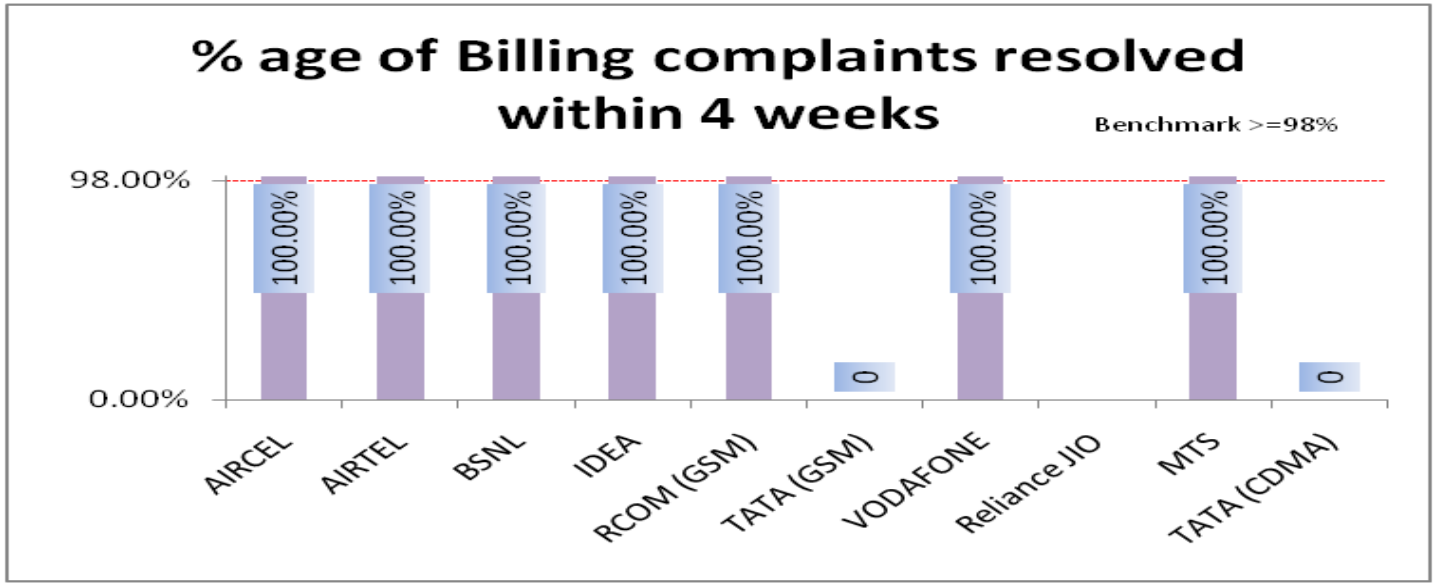
%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

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

- **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.

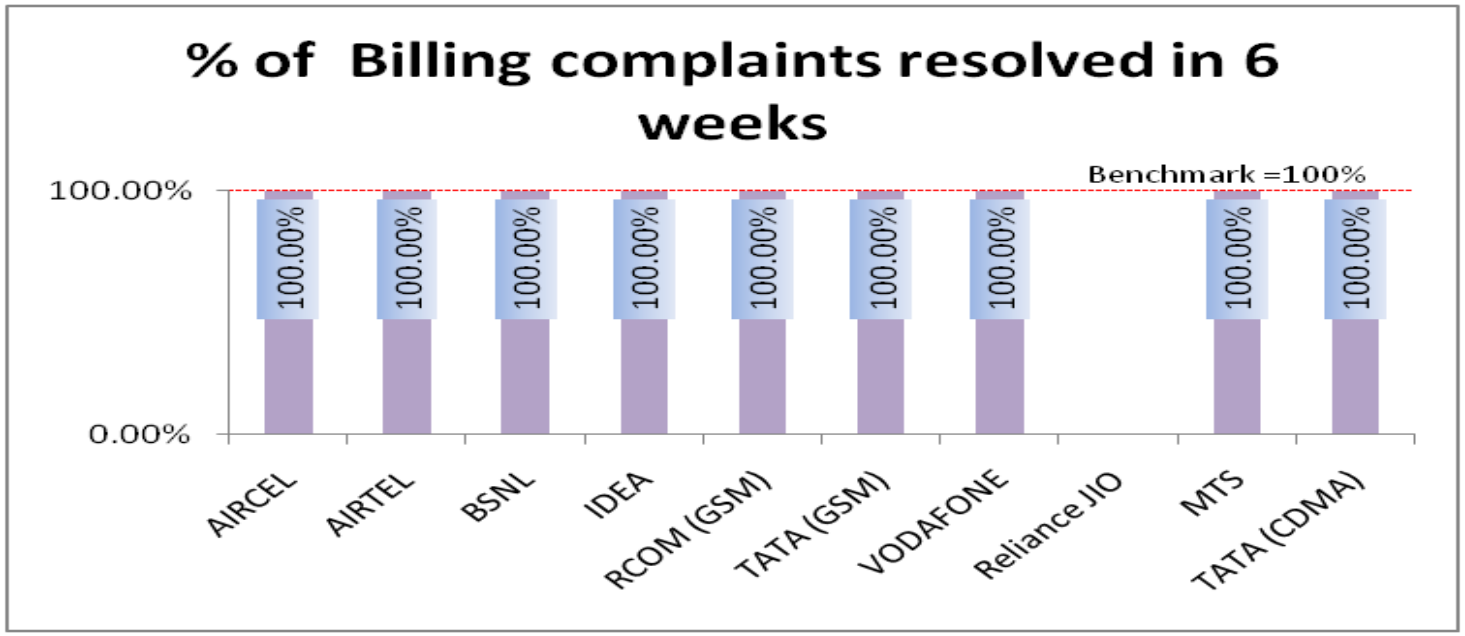
5.2.2 KEY FINDINGS- WITHIN 4 WEEKS



Data Source: Billing Center of the operators

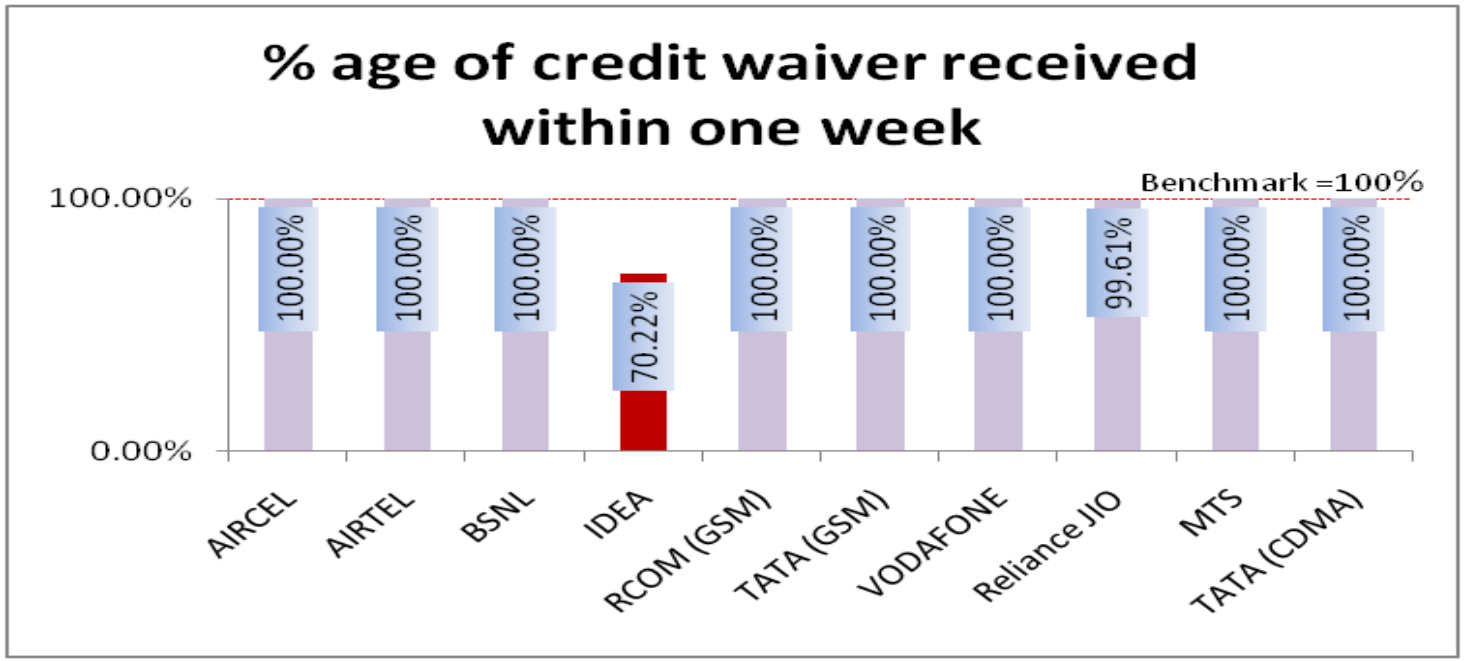
All operators met the benchmark for resolution of billing complaints within 4 weeks in PMR data. For Tata GSM the complaints were Nil .

5.2.3 KEY FINDINGS WITHIN 6 WEEKS



Data Source: Billing Center of the operators

All operators met the TRAI benchmark of resolution of billing complaints within 4 weeks as well as within 6 weeks. Reliance JIO has not submitted the data for above parameters .



Data Source: Billing Center of the operators

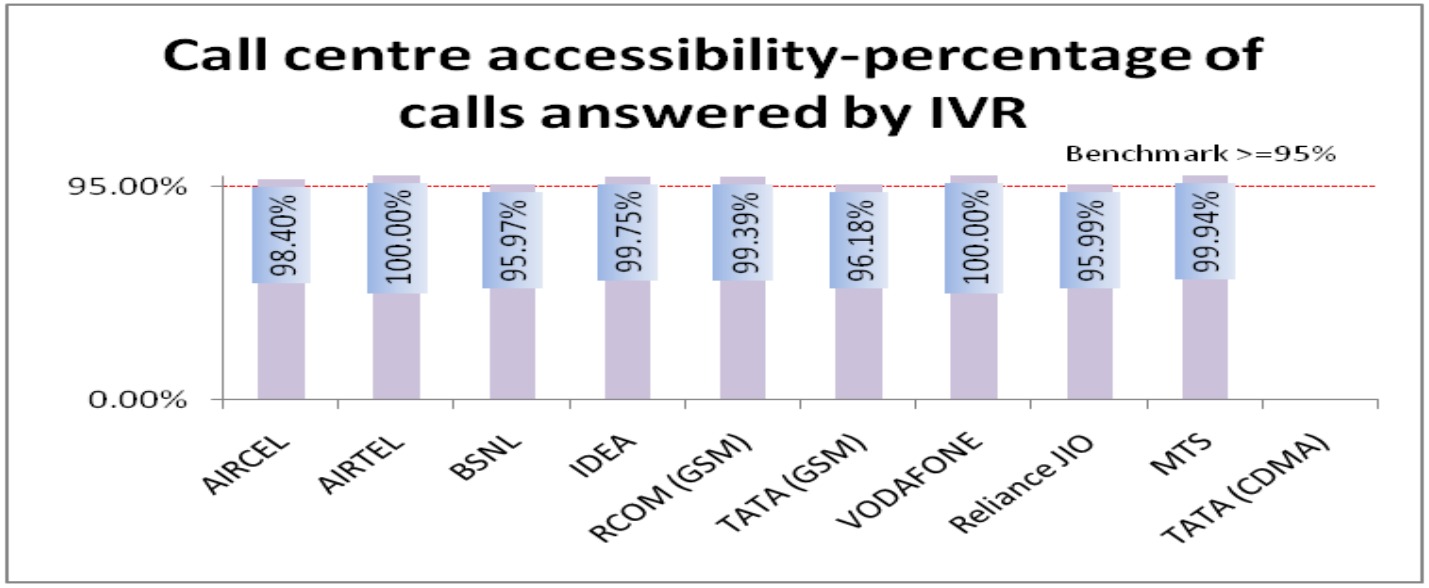
Idea failed to meet the benchmark for %age of credit waiver received within One Week ".

5.3 CALL CENTRE PERFORMANCE-IVR

5.3.1 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
  - Also live calling is done to test the calls connected and answered by IVR

5.3.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

All operators met the benchmark.

5.4 CALL CENTRE PERFORMANCE-VOICE TO VOICE

5.4.1 PARAMETER DESCRIPTION

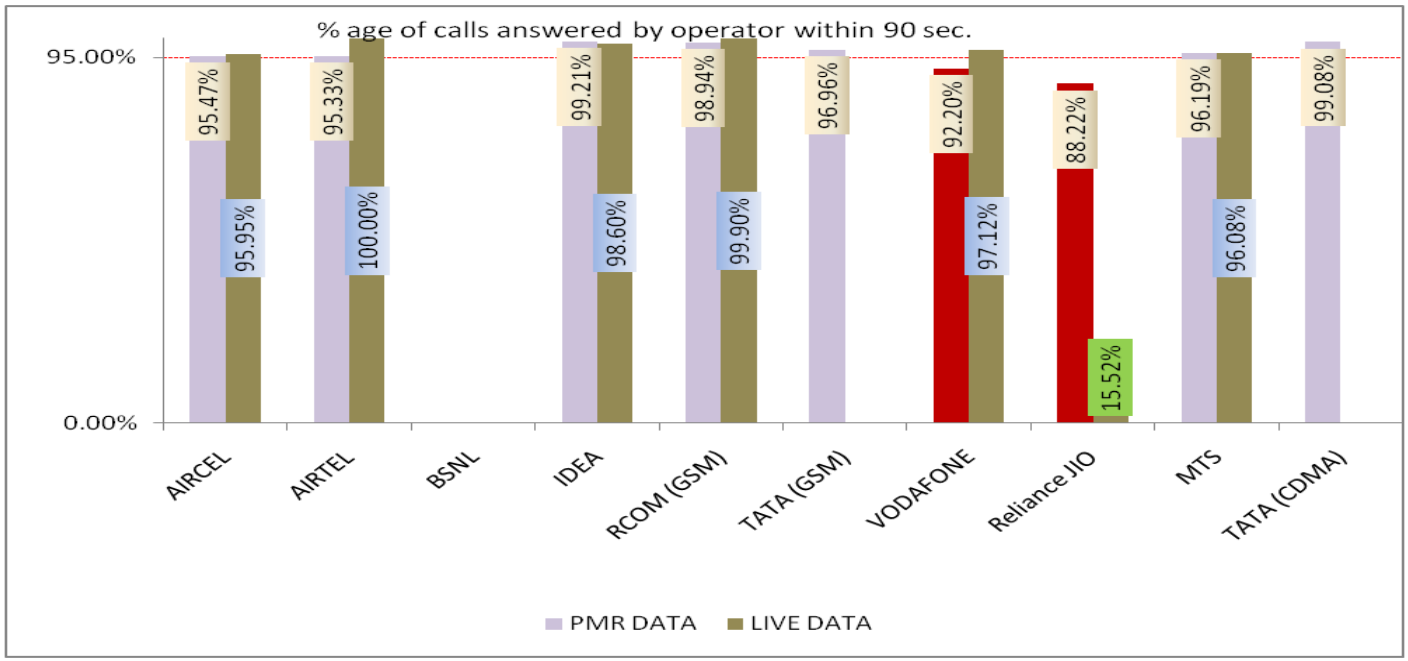
- Computational Methodology:
  - Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100
- Audit Procedure:
  - Operators provide details of the following from their central call centre/ customer service database:
    - 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

5.4.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

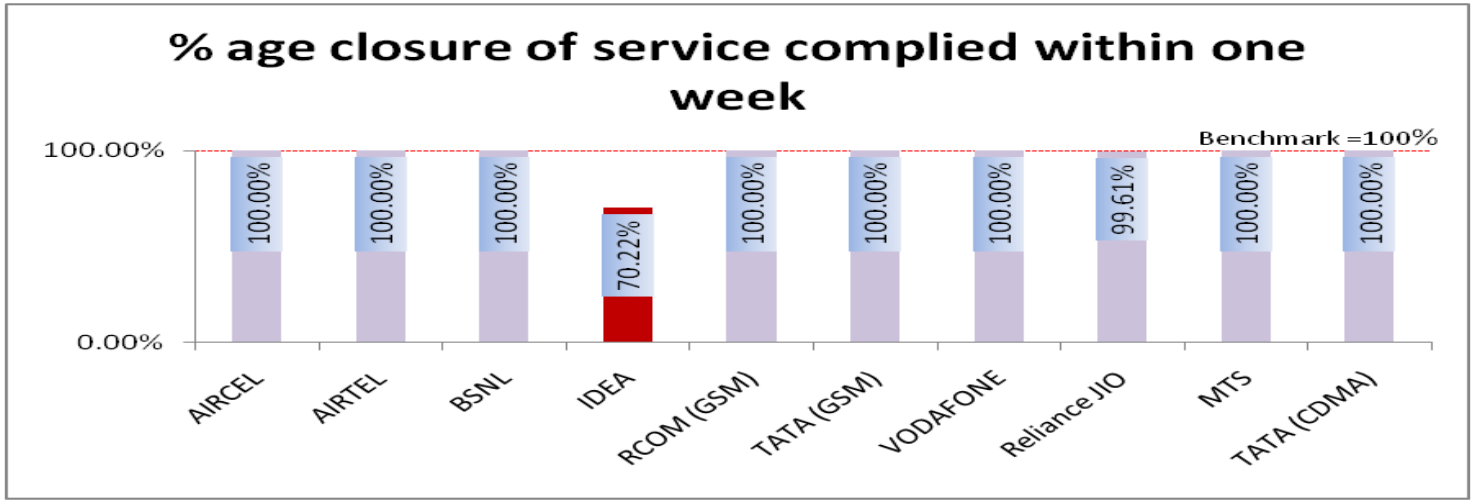
Reliance JIO & Vodafone failed to meet the benchmark as per audit. However, as per live calling done to customers, the performance of Reliance JIO,Tata GSM &Tata CDMA is far below the benchmark .BSNL was unable to perform live three day check.

5.5 TERMINATION/CLOSURE OF SERVICE

5.5.1 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

5.5.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

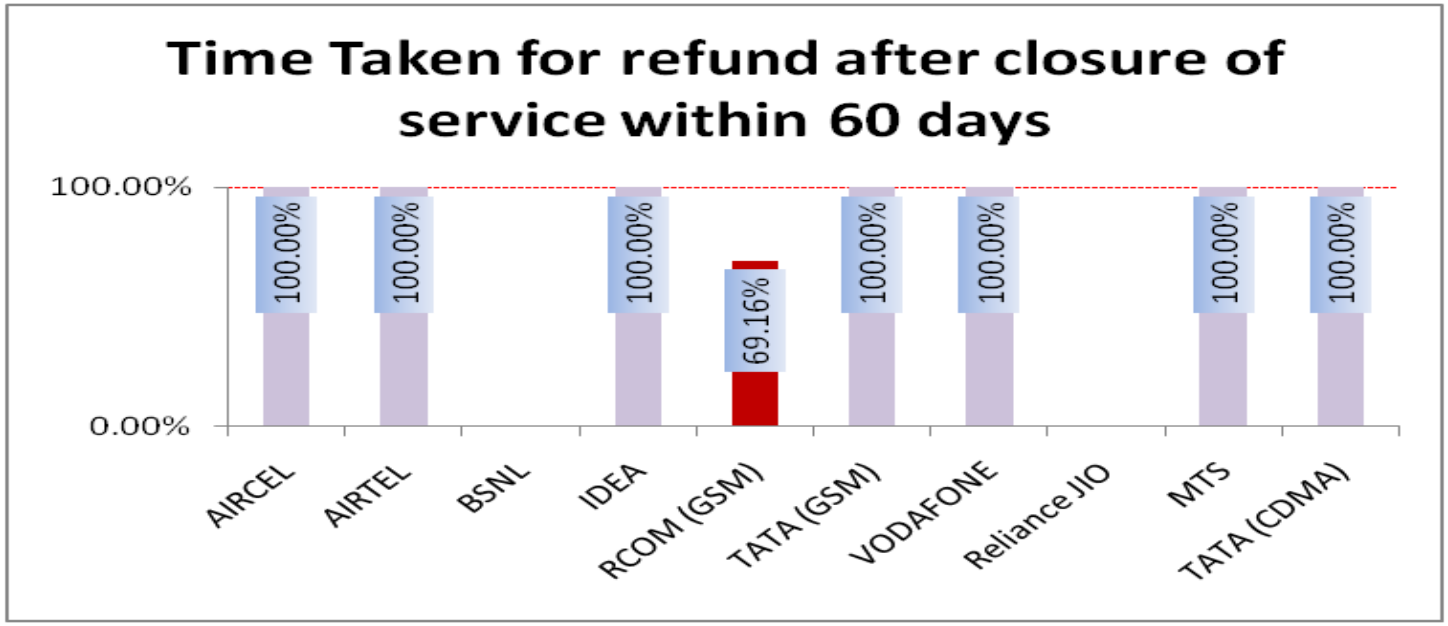
All operators met the TRAI benchmark for the parameter.

5.6 REFUND OF DEPOSITS AFTER CLOSURE

5.6.1 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

5.6.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

All operators met the TRAI benchmark for the parameter.

6 ANNEXURE– CONSOLIDATED-2G

6.1 NETWORK AVAILABILITY

2G Network Availability-QE March 2017										
		Name of Operator								
Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total no. of BTSs in the licensed service area		2563	8730	4332	6886	1532	2060	509	2064	7887
Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours in a month		1017.38	5984.08	32393	2514.24	1698.59	1635.82	258.96	680.92	3491.06
[(Sum of downtime of BTSs in a month in hrs)/(24* no. of days in the month*no. of BTSs in the licensed service area)]*100	< = 2%	0.05%	0.09%	0.32%	0.05%	0.15%	0.11%	0.05%	0.04%	0.06%
No. of BTSs having accumulated downtime of >24 hours in a month		1	13	37	1	2	16	0	0	12
(No. of BTSs having accumulated downtime of > 24 hrs in a month / Total no. of BTSs in the licensed service area)*100	< = 2%	0.05%	0.15%	0.86%	0.01%	0.13%	0.79%	0.07%	0.00%	0.15%

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

6.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Connection Establishment (Accessibility) 2G-QE March 2017										
		Name of Operator								
Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No of Call Attempts		94288857	564547341	94317850	234220683	35435030	107209580548190	8532041	262083790000	308209164
Total No. of Established Call		92192081	542660617	93008248	232640854	35147524	105234073121567	8441371	260869868337	306400535
CSSR (Total No. of Established Call/ Total No of Call Attempts)*100	>=95%	97.78%	96.12%	98.61%	99.33%	99.19%	98.16%	98.94%	99.54%	99.41%
Equipped Capacity of N/W in Erlang		3743559.32	14922431.72	30819722	9464081.44	3960000.00	102000.00	1417686.33	68731.00	9984246.51
Total traffic handled in TCBH in Erlang		3230554.89	14961963.60	236876	6835797.02	981613.32	35559.00	482603.95	NDR	8569706.11
No. of Attempted Calls		270609500	1761465207	NDR	809880693	35435030	123637301	8532041	26208379	1180662987
SDCCH Attempts (A)		270609500	1761465207	6592939	809880693	NA	123637301	NA	82746008	1180662987
SDCCH Failed (B)		311190.00	9321512.67	88773	1658676.67	NA	113894.00	NA	27027	1944443.67
SDCCH Congestion (%) [B/A]*100	<=1%	0.11%	0.53%	1.35%	0.20%	NA	0.09%	NA	0.03%	0.16%
TCH Attempts ©		95164820	564547341	6592939	234220683	35435030	74940674	8532041	26208379	308209164
TCH Failed (D)		982568	8321250	6474303	994556	4134	196360	12050	17608	1808629
TCH Congestion (%) [D/C]*100	<=2%	1.03%	1.47%	89383	0.42%	0.01%	0.26%	0.14%	0.07%	0.59%

Data Source: Network Operations Center(NOC) of the operators and Data Source: Drive test reports submitted by operators to auditors

6.3 CONNECTION MAINTENANCE (RETAINABILITY)

Connection Maintenance (Retainability) 2G-QE March 2017										
		Name of Operator								
Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Connection Maintenance (Retainability)										
Total Established Calls (A)		93569482	542660617	NDR	227453726	32708817	42606459	9399119	26076177	304316558
Calls Dropped after Establishment (B)		623314	3640680	NDR	1094586	157894	62093	26992	60005	1898907
Call Drop Rate [B/A]*100	<=2%	0.67%	0.67%	NDR	0.48%	0.48%	0.15%	0.29%	0.23%	0.62%
				NDR						
Total No. of Cells (Sector)		229935	785413	NDR	638822	73946	191797	48739	122980	509290
Total No. of Cells exceeding 3% TCH drop (call drop) in CBBH (Cell Bouncing Busy Hour)		5428	6575	NDR	6554	1336	1355	1053	1865	12967
% of cells having more than 3% TCH drop	<= 3%	2.36%	0.84%	NDR	1.03%	1.81%	0.71%	2.16%	1.52%	2.55%

Data Source: Network Operations Center(NOC) of the operators and Drive test reports submitted by operators to auditors

6.4 VOICE QUALITY

Voice quality 2G-QE March 2017										
		Name of Operator								
Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-5)]		19075805062	164504505870	NDR	38124649447	NA	6492901168	284962425	4829421284	53766509838
b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-7)]		19651667321	166413599067	NDR	39095890169	219310681772	6557994534	332677868	4863600533	55590465539
c.Percentage of connection with good voice Quality c=a/b*100	> = 95%	97.07%	98.85%	NDR	97.52%	99.22%	99.01%	85.66%	99.30%	96.72%

Data Source: Network Operations Center(NOC) of the operators and Drive test reports submitted by operators to auditors

6.5 POI CONGESTION

POI Congestion 2G-QE March 2017										
		Name of Operator								
Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Total No. of call attempts on POI		3429262	6445609	NDR	3490850	419955	1005003	10378083	10558863	3732775
Total traffic served on all POIs (Erlang)		85147.56	184007.73	NDR	78954.05	9553.68	25340.42	224466.05	238667	72200.36
Total No. of circuits on all individual POIs		192284	209788	NDR	153421	47597	52794	1227804	946492	151329
Total number of working POI Service Area wise		37	119	NDR	139	65	33	5658	1302	65
Capacity of all POIs		188487.83	204740.43	NDR	148129.56	47691.81	49842.93	1106316.53	937734	152762.67
No. of all POI's having >=0.5% POI congestion		Nil	Nil	NDR	Nil	Nil	Nil	Nil	Nil	1
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NDR	NA	NA	NA	NA	NA	RJIO Local

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

7 ANNEXURE – CONSOLIDATED-3G

7.1 NETWORK AVAILABILITY

Network Availability -3G PMR consolidated					
Name of Parameter	**Benchmark**				
		Airtel	BSNL	Reliance Comm.	Vodafone
Node Bs' Accumulated Downtime:					
Total no. of Node B's in the Licensed Service Area		6634	1803	691	3637
Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month		5846.01	14767	1128.40	1807.66
[(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	<=2%	0.13%	1.13%	0.16%	0.07%
Worst Affected Node Bs' due to Downtime:					
No. of Node B's having accumulated downtime of >24 hours in a month		9	30	0	4
((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	<=2%	0.14%	1.73%	0.00%	0.10%

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

7.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Connection Establishment (Accessibility)-3G PMR Consolidated					
Name of Parameter	**Benchmark**				
		Airtel	BSNL	Reliance Comm.	Vodafone
Call Setup Success Rate:					
Total No. of Voice Call Attempts		608823302914643000000	107743981	1027121414	51227568
Total No. of Voice Call Establishment		605557970341925000000	106875873	1024609883	51171632
CSSR	*>=95%*	99.43%	98.96%	99.76%	99.89%
RRC Congestion:					
RRC Attempts (RRC Connection Access) (A)		68580677	1110961315	49890327	43813317
RRC Failed (RRC Connection Access Failed) (B)		19428	8144581	81302	7244
RRC Congestion (%) [B/A]*100	*<=1%*	0.03%	0.76%	0.16%	0.02%
RAB Congestion:					
RAB Attempts (RAB Setup Access) (C)		86395507	107743466	7117173	51089098
RAB Failed (RAB Setup Access Failed) (D)		23318	1072078	7672	5075
RAB Congestion (%) [D/C]*100	*<=2%*	0.03%	0.99%	0.11%	0.01%

Data Source: Network Operations Center(NOC) of the operators and Data Source: Drive test reports submitted by operators to auditors

7.3 CONNECTION MAINTENANCE (RETAINABILITY)

Connection Maintenance (Retainability)-3G PMR Consolidated					
Name of Parameter	**Benchmark**				
		Airtel	BSNL	Reliance Comm.	Vodafone
Circuit Switched Voice Drop Rate					
Total Established Calls (A)		85683776	106875802	7085382	51070078
Calls Dropped after Establishment (B)		428924	1199415	3416	134129
Call Drop Rate [B/A]*100	<=2%	0.51%	1.15%	0.05%	0.26%
Worst affected cells having more than 3% Circuit					
Total No. of Cells (Sector)		912476	113739	61922	230270
Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)		8462	2226	125	6550
% of cells having more than 3% Circuit Switched Voice Drop Rate	<=3%	0.93%	1.97%	0.20%	2.81%

data Source: Network Operations Center(NOC) of the operators and Drive test reports submitted by operators to auditors

7.3.1 VOICE QUALITY

Name of Parameter	**Benchmark**				
		Airtel	BSNL	Reliance Comm.	Vodafone
Circuit Switched Voice Quality-3G PMR Consolidated					
Percentage of connection with Good Circuit Switched Voice Quality	>=95%	98.90%	NDR	99.31%	98.90%

Data Source: Network Operations Center(NOC) of the operators and Drive test reports submitted by operators to auditors

7.4 POI CONGESTION

POI Congestion -3G PMR Consolidated					
Name of Parameter	**Benchmark**				
		Airtel	BSNL	Reliance Comm.	Vodafone
Total No. of POI's in Month having <=0.5% POI					
Total No. of call attempts on POI		NA	NDR	30886655	NA
Total traffic served on all POIs (Erlang)		NA	NDR	815779.355	NA
Total No. of circuits on all individual POIs		NA	NDR	1541537	NA
Total number of working POI Service Area wise		NA	NDR	973.5	NA
Capacity of all POIs		NA	NDR	1451590.955	NA
No. of all POI's having >=0.5% POI congestion		NA	NDR	0	NA
Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NDR	0	NA

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

8 ANNEXURE –CUSTOMER SERVICES

8.1 METERING AND BILLING CREDIBILITY

Metering & Billing Credibility -Q.E. March 2017											
Name of Parameter	Bench-mark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	Reliance JIO	MTS	TATA (CDMA)
		GSM Operators								CDMA Operators	
Metering & Billing Credibility -Post Paid											
A) No. of bills issued during the quarter		133447	1256246	448152	449590	259177	0	2004859	NDR	93718	60409
B) No. of bills disputed including billing complaints during the quarter		0	301	238	189	229	0	1377	NDR	36	0
C)% of billing complaints during the quarter	*<= 0.1%*	**0.00%**	**0.02%**	**0.05%**	**0.04%**	**0.09%**	**NA**	**0.07%**	NDR	**0.04%**	**0.00%**
Metering & Billing Credibility -Pre Paid											
A) Total No. of Pre-paid customers at the end of the quarter		6641153	60146268	5368311	7924234	5533085	707372	11710467	NDR	1272569	406963
B) Total No. of complaints relating to charging, Credit and Validity during the quarter		0	5657	1843	5375	5048	0	7093	NDR	174	0
C) % of Pre-paid Charging Complaints	*<= 0.1%*	**0.00%**	**0.01%**	**0.03%**	**0.07%**	**0.09%**	**0.00%**	**0.06%**	**NDR**	**0.01%**	**0.00%**

Data Source: Billing Center of the operators

Resolution of Billing/Charging Complaints -Q.E. March 2017											
		AIRCEL	AIRTEL	BSNL	IDEA	RCOM	TATA	VODAFON	Reliance	MTS	TATA
Name of Parameter	Bench- mark	GSM Operators								CDMA Operators	
A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		0	6259	1878	14806	5277	0	8470	NDR	210	0
B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		0	6259	1878	14806	5277	0	8470	NDR	210	0
C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		0	6259	1878	14806	5277	0	8470	NDR	210	0
D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	*>=98% within 4 weeks*	NA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	NDR	100.00%	NA
E) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	*100% within 6 weeks*	NA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	NDR	100.00%	NA
F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	*<=1 week*	NA	7 days	7 days	7 days	7 days	7 days	7 days	NDR	7 days	NA

Data Source: Billing Center of the operators

8.2 CUSTOMER CARE

Call Centre Accessibility -Q.E. March 2017											
		AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	Reliance JIO	MTS	TATA (CDMA)
Name of Parameter	Bench- mark	GSM Operators								CDMA Operators	
A) Total no of calls attempted to customer care/Call center		17117402	4114466	345608	16935289	7814270	99345	14080502	231208	1899919	NDR
B) Total no. of calls successfully established to customer care/Call center.		16843101	4114370	331691	16893043	7766363	95550	14080502	221944	1898758	NDR
C) % Accessibility of Call centre /customer Care	*>=95%*	98.40%	100.00%	95.97%	99.75%	99.39%	96.18%	100.00%	95.99%	99.94%	NDR
D) Total Calls reached to operator for Voice to Voice (Total call attempts)		2844168	5798015	NDR	6449886	1247708	93331	5800998	1651468	510433	41947
E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		2715358	5527377	NDR	6399114	1234511	90491	5348515	1456956	490971	41559
F) % age of calls answered by operator (voice to voice)	*>=95%*	95.47%	95.33%	NDR	99.21%	98.94%	96.96%	92.20%	88.22%	96.19%	99.08%

Data Source: Customer Service Center of the operators

8.3 TERMINATION / CLOSURE OF SERVICE

Termination/Closure of Service -Q.E. March 2017											
	Bench- mark	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	Reliance JIO	MTS	TATA (CDMA)
Name of Parameter		GSM Operators								CDMA Operators	
A) Total No. of requests for Termination / Closure of service received during the quarter		978	5129	9352	8819	596	0	11751	2289	2590	635
B) No. of requests for Termination /		978	5129	9352	6193	596	0	11751	2280	2590	635
Closure of service complied within 7 days during the quarter											
C) % of Termination/ Closure of service within 7 days	<=7days	100.00%	100.00%	100.00%	70.22%	100.00%	NA	100.00%	99.61%	100.00%	100.00%
A) No. of Payments/ Refunds due during the quarter		2818	1191	NDR	3985	1229	0	16353	NDR	1089	162
B) No. of Payments/ Refunds Cleared during the quarter		2818	1191	NDR	3985	850	0	16353	NDR	1089	162
C) Time taken for refunds of deposits after closures.	100% within 60 days	100.00%	100.00%	NDR	100.00%	69.16%	NA	100.00%	NDR	100.00%	100.00%

Data Source: Customer Service Center of the operators

8.4 LIVE CALLING RESULTS FOR LEVEL 1 SERVICES

S.No.	Code	Allotted to	Aircel	Airtel	BSNL	Idea	MTS	Reliance GSM	Reliance JIO	Tata CDMA	Tata GSM	Vodafone
1	100	Police	Y	N	Y	Y	Y	Y	Y	N	N	Y
2	101	Fire	N	Y	N	Y	N	Y	N	N	N	Y
3	102	Ambulance	N	N	N	N	N	N	N	N	N	N
4	104	Health Information Helpline	Y	Y	Y	Y	Y	Y	N	N	N	Y
5	108	Emergency and Disaster Management Help	Y	N	Y	Y	Y	Y	N	N	N	Y
6	138	All India Helpine for Passangers	N	Y	N	Y	N	N	Y	N	N	Y
7	149	Public Road Transport Utility Service	N	N	N	N	N	N	N	N	N	N
8	181	Chief Minister Helpline	Y	N	N	Y	Y	N	Y	N	N	N
9	182	Indian Railway Security Helpline	Y	Y	N	Y	Y	Y	Y	N	N	N
10	1033	Road Accident Management Service	N	Y	N	N	N	Y	N	N	N	N
11	1037	Public Grievance Cell DoT Hq as 'Tel	N	N	N	N	N	N	N	N	N	N
12	1056	Emergency Medical Services	N	N	N	N	N	N	N	N	N	N
13	106X	State of the Art Hospitals	N	N	N	N	N	N	N	N	N	N
14	1063	Public Grievance Cell DoT Hq	N	N	N	N	N	N	N	N	N	N
15	1064	Anti Corruption Helpline	N	N	N	N	N	N	Y	N	N	N
16	1070	Relief Commission for Natural Calami	N	Y	N	N	N	N	Y	N	N	N
17	1071	Air Accident Helpline	N	N	N	Y	N	N	N	N	N	Y
18	1072	Rail Accident Helpline	N	Y	N	N	N	N	N	N	N	N
19	1073	Road Accident Helpline	N	N	N	N	N	N	N	N	N	N
22	1077	Control Room for District Collector	N	N	N	Y	N	Y	N	N	N	Y
25	1090	Call Alart (Crime Branch)	N	Y	Y	Y	N	Y	Y	N	N	Y
26	1091	Women Helpline	N	N	N	N	N	N	Y	N	N	N
27	1097	National AIDS Helpline to NACO	Y	N	N	Y	Y	N	Y	N	N	Y
28	1099	Central Accident and Trauma Services	N	N	N	N	N	N	N	N	N	N
29	10580	Educational& Vocational Guidance and councelling	N	N	N	N	N	N	N	N	N	N
30	10589	Mother and Child Tracking (MCTH)	N	N	N	N	N	N	N	N	N	N
31	10740	Central Pollution Control Board	N	N	N	N	N	N	N	N	N	N
32	10741	Pollution Control Board	N	N	N	N	N	N	N	N	N	N
33	1511	Police Related Service for all Metro Railway Project	N	N	N	N	N	N	N	N	N	N
34	1512	Prevention of Crime in Railway	Y	N	N	Y	Y	Y	Y	N	N	Y
35	1514	National Career Service(NCS)	N	N	N	N	N	Y	N	N	N	N
36	15100	Free Legal Service Helpline	N	Y	N	Y	N	N	N	N	N	N
37	155304	Municipal Corporations	N	N	N	N	N	N	N	N	N	N
38	155214	Labour Helpline	N	N	N	N	N	N	N	N	N	N
39	1903	Sashastra Seema Bal (SSB)	N	N	N	Y	N	N	N	N	N	N
40	1909	National Do Not Call Registry	N	N	Y	Y	N	Y	Y	N	N	Y
41	1912	Complaint of Electricity	Y	Y	Y	Y	Y	Y	Y	N	N	Y
42	1916	Drinking Water Supply	N	N	N	Y	N	N	N	N	N	Y
43	1950	Election Commission of India	Y	Y	N	Y	Y	N	N	N	N	Y

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

The above 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 of the same have been given below for each operator

9 ANNEXURE –JANUARY 2017-2G

1. Network-PMR Jan. 2017											
			Name of Operator								
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
	Network Service Quality Parameter										
1	**Network Availability**										
	Total no. of BTSs in the licensed service area		2563	8707	4315	6887	1535	2059	510	1388	7919
	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours in a month		1262.17	6884.27	34084.77	2132.70	1833.13	778.90	302.00	290.27	3375.94
	[(Sum of downtime of BTSs in a month in hrs)/(24* no. of days in the month*no. of BTSs in the licensed service area)]*100	*< = 2%*	0.07%	0.11%	1.06%	0.04%	0.16%	0.05%	0.08%	0.03%	0.06%
	No. of BTSs having accumulated downtime of >24 hours in a month		1	11	43	1	4	7	0	0	3
	(No. of BTSs having accumulated downtime of > 24 hrs in a month / Total no. of BTSs in the licensed service area)*100	*< = 2%*	0.04%	0.13%	1.00%	0.01%	0.26%	0.34%	0.00%	0.00%	0.04%
2	**Connection Establishment**										
	Total No of Call Attempts		94568782	494144596	198626335	212424958	35974772	163932701063049	7920491	258170010000	284514213
	Total No. of Established Call		92377466	479266705	195845566	211406950	35690366	160144101151616	7832719	256627883830	283059014
	CSSR (Total No. of Established Call/ Total No of Call Attempts)*100	*>=95%*	97.68%	96.99%	98.6	99.52%	99.21%	97.69%	98.89%	99.40%	99.49%
3	**Blocked Call Rate**										
	Equipped Capacity of N/W in Erlang		3866156	15294207.8	265400	9796534.718	4092000		1468191	72440	10170575.42
	Total traffic handled in TCBH in Erlang		3373098	13967714.29	123963	6628168.014	1050840.14		457621.33		8066623.32
	No. of Attempted Calls		272884387	1667799638	NDR	772128938	35974772	139089805	7920491	25817001	1124211552.00
	SDCCH Attempts (A)		272884387	1667799638	5068485	772128938	NA	139089805	NA	79939006	1124211552.00
	SDCCH Failed (B)		351573	5682197	36727	1024447	NA	126417	NA	11911	1768033.00
	SDCCH Congestion (%) [B/A]*100	*<=1%*	0.13%	0.34%	0.72%	0.13%	NA	0.09%	NA	0.01%	0.16%
	TCH Attempts ©		95541036	494144596	1163030	212424958	35974772	90585527	7920491	25817001	284514213.00
	TCH Failed (D)		1079841	6551552	18841	453313	2840	338485	9769	37857	1455199.00
	TCH Congestion (%) [D/C]*100	*<=2%*	1.13%	1.33%	1.62%	0.21%	0.01%	0.37%	0.12%	0.15%	0.51%
4	**Connection Maintenance**										
	Total Established Calls (A)		93639968	479266705	1144189	195845566	33266154	53372711	8722295	25657133	281107061.00
	Calls Dropped after Establishment (B)		699928	3332296	17138	1104325	175812	72773	25571	77773	1859017.00
	Call Drop Rate [B/A]*100	*<=2%*	0.75%	0.70%	1.50%	0.56%	0.53%	0.14%	0.29%	0.30%	0.66%
5	**Worst affected cells having more than 3% TCH drops (Call drop rate)**										
	Total No. of Cells (Sector)		237569	809403	8525	661375	NA		47461	129230	752654.00
	Total No. of Cells exceeding 3% TCH drop (call drop) in CBBH (Cell Bouncing Busy Hour)		6619	6939	192	8249	NA	1161	970	2009	20752.00
	% of cells having more than 3% TCH drop [(No of cells having call drop rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	*< = 3%*	2.79%	0.86%	2.25%	1.25%	NA	0.61%	2.04%	1.55%	2.76%
6	**Percentage of connections with good voice quality**										
	Total no of call Established		93639968	479266705	NDR	211406950	35690366	53372711	8722295	25657133	281107061
	a.Connection with good voice quality (w/o frequency hopping) in nos. [Scale (0-4)]		NA	NA	NDR	NA	235360755028	NA	249529445	NA	NA
	b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-5)]		20010448218	156162986498	NDR	37372164247	NA	8020347641	NA	5492889089	50560348044
	b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-7)]		20622791024	157981812945	NDR	38347913204	237187432008	8106086432	296846610	5538929719	52264726814
	c.Percentage of connection with good voice Quality c=a/b*100	*> = 95%*	97.03%	98.85%	NDR	97.46%	99.23%	98.94%	99.16	99.17%	96.74%

7	**Total No. of POI's in Month having < = 0.5% POI**										
	Total No. of call attempts on POI		3290765	5605695	NDR	3397521	398887	1086492	337673	324459	3122157
	Total traffic served on all POIs (Erlang)		88557.92	127654.70	NDR	77066.31	9802.42	30715.47	7646.33	8101.59	62924.95
	Total No. of circuits on all individual POIs		193513	201129	NDR	154555	47683	51903	40938	27187	150144
	Total number of working POI Service Area wise		37	119	NDR	139	65	33	224	36	65
	Capacity of all POIs		189687.90	196334.65	NDR	149230.98	47778.53	49064.17	37324.96	26966.00	151565.80
	No. of all POI's having >=0.5% POI congestion		NIL	NIL	NDR	NIL	NIL	NIL	NIL	NIL	1
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NDR	NA	NA	NA	NA	NA	RJIO

10 ANNEXURE –FEBRUARY 2017 -2G

1. Network-PMR Feb . 2017

Monthly TRAI Network Performance Report of			Name of Operator								
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Network Service Quality Parameter											
1	Network Availability										
	Total no. of BTSs in the licensed service area		2563	8729	4339	6,896	1532	2058	509	1388	7929
	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours in a month		1035.64	4936	31154.92	2232.77	1701.31	1123.37	206.36	358.20	2596.20
	[(Sum of downtime of BTSs in a month in hrs)/(24* no. of days in the month*no. of BTSs in the licensed service area)]*100	< = 2%	0.06%	0.08%	1.07%	0.05%	0.17%	0.08%	0.01%	0.04%	0.49%
	No. of BTSs having accumulated downtime of >24 hours in a month		2	11	33	2	2	11	1	0	2
	(No. of BTSs having accumulated downtime of > 24 hrs in a month / Total no. of BTSs in the licensed service area)*100	< = 2%	0.08%	0.13%	0.76%	0.03%	0.13%	0.53%	0.20%	0.00%	0.03%
2	Connection Establishment (Accessibility)										
	Total No of Call Attempts		91961911	541887647	1956195	226737362	34099351	83685815746349	9106850	257929090000	296445025
	Total No. of Established Call		89903680	521405947	1926461	225462490	33775762	82738330474508	9025477	256682693845	294852190
	CSSR (Total No. of Established Call/ Total No of Call Attempts)*100	>=95%	97.76%	96.22%	98.48%	99.44%	99.05%	98.87%	99.11%	99.52%	99.46%
3	Blocked Call Rate										
	Equipped Capacity of N/W in Erlang		3497940	13925940	265400	8,838,350	3696000		1322412	69721	9313365.92
	Total traffic handled in TCBH in Erlang		3106341	14271504	119153	6,539,713	923238		473706.34		8146150.80
	No. of Attempted Calls		261648030	1671632333	NDR	763454750	34099351	115465714	9106850	25792868	1129890435.00
	SDCCH Attempts (A)		261648030	1671632333	9343844	763454750	NA	115465714	NA	77024136	1129890435.00
	SDCCH Failed (B)		310519	8459827	90704	1521911	NA	107580	NA	17129	1820806.00
	SDCCH Congestion (%) [B/A]*100	<=1%	0.12%	0.51%	0.97%	0.20%	NA	0.09%	NA	0.02%	0.16%
	TCH Attempts ©		92755935	541887647	1963152	226737362	34099351	67972613	9106850	25792868	296445025.00
	TCH Failed (D)		903758	9576333	25978	708410	3558	136229	2692	18235	1592835.00
	TCH Congestion (%) [D/C]*100	<=2%	0.97%	1.77%	1.32%	0.31%	0.01%	0.20%	0.03%	0.07%	0.54%
4	Connection Maintenance (Retainability)										
	Total Established Calls (A)		91209762	521405947	1926461	225462490	31438461	38166298	10055579	25658956	292939512.00
	Calls Dropped after Establishment (B)		599816	3476500	26566	1058944	150543	51819	25075	71766	1802848.00
	Call Drop Rate [B/A]*100	<=2%	0.66%	0.67%	1.38%	0.47%	0.48%	0.14%	0.25%	0.28%	0.62%
5	Worst affected cells having more than 3%										
	Total No. of Cells (Sector)		214592	733255	11368	594,599	142800		1627	116729	24319
	Total No. of Cells exceeding 3% TCH drop (call drop) in CBBH (Cell Bouncing Busy Hour)		4584	6236	263	5493	2578	1032	33	1721	611
	% of cells having more than 3% TCH drop [(No of cells having call drop rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	< = 3%	2.14%	0.85%	2.31%	0.92%	1.81%	0.60%	2.01%	1.47%	2.51%
6	Percentage of connections with good voice										
	Total no of call Established		91209762	521405947	NDR	225462490	33775762	38166298	10055579	25658956	292939512
	a.Connection with good voice quality (w/o frequency hopping) in nos. [Scale (0-4)]				NDR	NA	203801670643	NA		NA	NA
	b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-5)]		18178850976	156708691017	NDR	36,295,810,926		5867346269	284483152	4774079023	50991293776
	b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-7)]		18739030126	158531594899	NDR	37,216,951,392	205406629203	5925627991	334046574	4813045329	52744322832
	c.Percentage of connection with good voice Quality c=a/b*100	> = 95%	97.01%	98.85%	NDR	97.52%	99.22%	99.02%	99.15%	99.19%	96.68%

7	**Total No. of POI's in Month having < = 0.5% POI**										
	Total No. of call attempts on POI		3668608	6902570	NDR	3594653	439541	1003287	375655	365449	3958607
	Total traffic served on all POIs (Erlang)		87431.32	266833.56	NDR	81889.19	9690.87	24263.54	7730.77	8228.01	73803.26
	Total No. of circuits on all individual POIs		191912	206023	NDR	154560	47678	52646	41886	30533	149720
	Total number of working POI Service Area wise		37	115	NDR	140	65	33	180	42	65
	Capacity of all POIs		188119.01	201036.44	NDR	149282.61	47772.51	49364.02	36259.96	30259.60	151137.69
	No. of all POI's having >=0.5% POI congestion		Nil	Nil	NDR	Nil	NIL	Nil	Nil	Nil	1
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NDR	NA	NA	NA	NA	NA	RJIO Local

11 ANNEXURE –MARCH 2017-2G

Monthly Network PMR : March 2017											
Monthly TRAI Network Performance Report of Cellular			Name of Operator								
S. No.	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm	Tata CDMA	Tata GSM	Vodafone
Network Service Quality Parameter											
1	Network Availability										
	Total no. of BTSs in the licensed service area		2563	8754	4343	6,874	1528	2064	508	2064	7812
	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours in a month		754.32	6132	31939	3177	1561.34	3005	269	681	4501.04
	[(Sum of downtime of BTSs in a month in hrs)/(24* no. of days in the month*no. of BTSs in the licensed service area)]*100	< = 2%	0.04%	0.09%	1.02%	0.06%	0.14%	0.20%	0.07%	0.04%	0.08%
	No. of BTSs having accumulated downtime of >24 hours in a month		1	17	36	0	0	31	0	0	31
	(No. of BTSs having accumulated downtime of > 24 hrs in a month / Total no. of BTSs in the licensed service area)*100	< = 2%	0.04%	0.19%	0.84%	0.00%	0.00%	1.50%	0.00%	0.00%	0.40%
2	Connection Establishment (Accessibility)										
	Total No of Call Attempts		96335877	657609781	82371022	263,499,730	36230966	###########	8568783	262083790000	343668254
	Total No. of Established Call		94295098	627309198	81252718	261,053,122	35976443	###########	8465917	260869868337	341290400
	CSSR (Total No. of Established Call/ Total No of Call Attempts)*100	>=95%	97.88%	95.39%	98.64%	99.07%	99.30%	98.39%	98.80%	99.54%	99.31%
3	Blocked Call Rate										
	Equipped Capacity of N/W in Erlang		3866582	15547148	294933	9,757,360	4092000	102000	1462456	68731	10468798.21
	Total traffic handled in TCBH in Erlang		3212226	16646672	120446	7,339,510	970762.26	35559	516484.17		9496344.20
	No. of Attempted Calls		277296082	1944963649	NDR	894058390	36230966	116356384	8568783	26208379	1287886974.00
	SDCCH Attempts (A)		277296082	1944963649	78046838	894058390	NA	116356384	NA	82746008	1287886974.00
	SDCCH Failed (B)		271478	13822514	583197	2429672	NA	107685	NA	27027	2244492.00
	SDCCH Congestion (%) [B/A]*100	<=1%	0.10%	0.71%	0.81%	0.27%	NA	0.09%	NA	0.03%	0.17%
	TCH Attempts ©		97197490	657609781	16652636	263499730	36230966	66263881	8568783	26208379	343668254.00
	TCH Failed (D)		964106	8835864	221501	1821946	6005	114366	23690	17608	2377854.00
	TCH Congestion (%) [D/C]*100	<=2%	0.99%	1.34%	1.42%	0.69%	0.02%	0.17%	0.28%	0.07%	0.69%
4	Connection Maintenance (Retainability)										
	Total Established Calls (A)		95858717	627309198	16352259	261053122	33421837	36280367	9419482	26076177	338903102.00
	Calls Dropped after Establishment (B)		570197	4113244	224445	1120490	147328	61687	30331	60005	2034855.00
	Call Drop Rate [B/A]*100	<=2%	0.59%	0.66%	1.42%	0.43%	0.44%	0.17%	0.32%	0.23%	0.60%
5	Worst affected cells having more than 3% TCH										
	Total No. of Cells (Sector)		237645	813582	10719	660493	5091	191797	50017	4172	750897.00
	Total No. of Cells exceeding 3% TCH drop (call drop) in CBBH (Cell Bouncing Busy Hour)		5081	6551	233	5921	94	1872	1136	60	17539.00
	% of cells having more than 3% TCH drop [(No of cells having call drop rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	< = 3%	2.14%	0.81%	2.18%	0.90%	1.85%	0.98%	2.27%	1.43%	2.34%
6	Percentage of connections with good voice quality										
	Total no of call Established		95858717	627309198	NDR	261053122	35976443	36280367	9419482	26076177	338903102
	a.Connection with good voice quality (w/o frequency hopping) in nos. [Scale (0-4)]		NA	NA	NDR	NA	213660434979	NA	320874677	NA	NA
	b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-5)]		19038115993	180641840096	NDR	40,705,973,169	NA	5591009593	NA	4829421284	59747887695
	b.Connection with good voice quality (with frequency hopping) in nos. [Scale (0-7)]		19593180813	182727389358	NDR	41,722,805,911	215337984106	5642269178	367140421	4863600533	61762346971
	c.Percentage of connection with good voice Quality c=a/b*100	> = 95%	97.17%	98.86%	NDR	97.56%	99.22%	99.09%	87.40%	99.30%	96.74%

7	**Total No. of POI's in Month having < = 0.5% POI**										
	Total No. of call attempts on POI		3328415	6828563	NDR	3480375	421437	925230	327356	340608	4117560
	Total traffic served on all POIs (Erlang)		79453.44	157534.91	NDR	77906.65	9167.74	21042.26	7093.56	7698.93	79872.87
	Total No. of circuits on all individual POIs		191425	222211	NDR	151148	47430	53832	40049	30532	154122
	Total number of working POI Service Area wise		37	124	NDR	138	65	33	161	42	65
	Capacity of all POIs		187656.58	216850.21	NDR	145875.08	47524.40	51100.59	36987.00	30249.47	155584.52
	No. of all POI's having >=0.5% POI congestion		Nil	Nil	NDR	Nil	NIL	Nil	Nil	Nil	1
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	NDR	NA	NA	NA	NA	NA	RJIO Local

1. Network-PMR 3 DAY LIVE March. 2017

S. No.	Name of Parameter	Benchmark	Name of Operator: Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
	Network Service Quality Parameter										
1	**Network Availability**										
	Total no. of BTSs in the licensed service area		2563	8755	4374	6,872	1528	2064	508	4164	7819
	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours in a month		40.27	552	2940.77	293.12	149.24	668.62	15.47	72.80	608.99
	[(Sum of downtime of BTSs in a month in hrs)/(24* no. of days in the month*no. of BTSs in the licensed service area)]*100	*< = 2%*	0.02%	0.09%	0.93%	0.06%	0.14%	1.35%	0.04%	0.02%	0.11%
	No. of BTSs having accumulated downtime of >24 hours in a month		0	0	0	0	0	0	0	0	2
	(No. of BTSs having accumulated downtime of > 24 hrs in a month / Total no. of BTSs in the licensed service area)*100	*< = 2%*	0.00%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%
2	**Connection Establishment**										
	Total No of Call Attempts		9686463	68492039	8841024	26465265	3541876	6939725446099	955087	25747530000	35390565
	Total No. of Established Call		9491814	65367772	8740567	26249503	3515336	6901593790424	943202	25621996557	35129207
	CSSR (Total No. of Established Call/ Total No of Call Attempts)*100	*>=95%*	97.99%	95.44%	0.988637	99.18%	99.25%	99.45%	98.76%	99.51%	99.26%
3	**Blocked Call Rate**										
	Equipped Capacity of N/W in Erlang		373710	503231	1062000	938,311	396000	102000	141528	206193	340208.00
	Total traffic handled in TCBH in Erlang		305898	547708	358810.5	714,359	90154	NA	50586.78	76382.97	932829.15
	No. of Attempted Calls		27114443	65757086	19595949	85561498	3541876	11195264	955087	2574753	129162568.00
	SDCCH Attempts (A)		27114443	65757086	26266271	85561498	NA	11195264	NA	7975898	129162568.00
	SDCCH Failed (B)		12015	542626	218259	123633	NA	5581	NA	1701	356838.00
	SDCCH Congestion (%) [B/A]*100	*<=1%*	0.04%	0.83%	0.008309	0.14%	#VALUE!	0.05%	#VALUE!	0.02%	0.28%
	TCH Attempts ©		9736627		5780401	26456497	3541876	6417175	955087	2574753	35390565.00
	TCH Failed (D)		54553		69474	157309	149	9373	4207	2579	261358.00
	TCH Congestion (%) [D/C]*100	*<=2%*	0.56%	1.36%	0.012019	0.59%	0.00%	0.15%	0.44%	0.10%	0.74%
4	**Connection Maintenance**										
	Total Established Calls (A)		9638388	65367772	5692214	26242024	3267915	3529158	1056662	2560832	34888042
	Calls Dropped after Establishment (B)		55290		76526	103775	13782	5932	2688	5847	204251.00
	Call Drop Rate [B/A]*100	*<=2%*	0.57%	0.64%	0.013444	0.40%	0.42%	0.17%	0.25%	0.23%	0.59%
5	**Worst affected cells having more than 3% TCH drops (Call drop rate)**										
	Total No. of Cells (Sector)		22995		38472	63,602	5091	18561	1678	4171	23984
	Total No. of Cells exceeding 3% TCH drop (call drop) in CBBH (Cell Bouncing Busy Hour)		494		744	548	94	195	35	55	525
	% of cells having more than 3% TCH drop [(No of cells having call drop rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	*< = 3%*	2.15%	0.83%	0.019339	0.86%	1.85%	1.05%	2.09%	1.33%	218.76%
	Percentage of connections with good voice quality										
	Total no of call Established		9638388	65367772	300	26242024	3267915	3529158	1056662	2560832	34888042
	a.Connection with good voice quality (w/o frequency hopping) in nos. [Scale (0-4)]		NA	NA	296	NA	19666861436	NA	NA	NA	N/A

7	**Total No. of POI's in Month having < = 0.5% POI**										
	Total No. of call attempts on POI		10274153	7256908	2058377	10836310	1299619	2891896	1044693	1046436	13415296
	Total traffic served on all POIs (Erlang)		233546.96	162105.35	33392.23	239179.20	26482.19	61225.57	21597.49	22893.65	249495.56
	Total No. of circuits on all individual POIs		574274	228640	133758	452793	142344	164049	120147	91596	463581
	Total number of working POI Service Area wise		111	126	411	138	65	99	483	126	195
	Capacity of all POIs		562438.34	223147.96	90609.00	437027.02	1477522.50	154141.93	110961.00	90748.41	467979.33
	No. of all POI's having >=0.5% POI congestion		NA	0	Nil	0	NIL	0	0	0	4
	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		NA	NA	Nil	NA	NIL	0	N/A	N/A	RJIO Local POI

12 ANNEXURE – JANUARY 2017 -3G

Network : January 2017 -3G						
Cellular Mobile Telephone Services						
S. No.	**Name of Parameter**	**Benchmark**				
Network Service Quality Parameter			Airtel	BSNL	Reliance Comm.	Vodafone
1	**Network Availability**					
a)	**Node Bs' Accumulated Downtime:**					
i)	Total no. of Node B's in the Licensed Service Area		6479	1678	692	3587
ii)	Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month		6155.3	14803	637	1681
iii)	[(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	*<=2%*	0.13%		0.12%	0.06%
b)	**Worst Affected Node Bs' due to Downtime:**			1.19%		
i)	No. of Node B's having accumulated downtime of >24 hours in a month		13	32	0	0
ii)	((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	*<=2%*	0.20%	1.90%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**					
a)	**Call Setup Success Rate:**					
i)	Total No. of Voice Call Attempts		320414088517289000000	154169798	1282970755	57970121
ii)	Total No. of Voice Call Establishment		318082786175338000000	152095457	1279384180	57904221
iii)	CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	*>=95%*	99.27%	98.65%	99.72%	99.89%
b)	**RRC Congestion:**					
i)	RRC Attempts (RRC Connection Access) (A)		56292329	1650469120	53552702	49636619
ii)	RRC Failed (RRC Connection Access Failed) (B)		26495	13415347	95046	12241
iii)	RRC Congestion (%) [B/A]*100	*<=1%*	0.05%	0.81%	0.18%	0.02%
c)	**RAB Congestion:**					
i)	RAB Attempts (RAB Setup Access) (C)		73404128	154169798	8058460	57826959
ii)	RAB Failed (RAB Setup Access Failed) (D)		26905	1531073	12235	10915
iii)	RAB Congestion (%) [D/C]*100	*<=2%*	0.04%	0.99%	0.15%	0.02%
3	**Connection Maintenance (Retainability)**					
a)	**Circuit Switched Voice Drop Rate**					
i)	Total Established Calls (A)		72861341	152095457	8021932	57797409
ii)	Calls Dropped after Establishment (B)		416613	1833812	3757	168787
iii)	Call Drop Rate [B/A]*100	*<=2%*	0.57%	1.21%	0.05%	0.29%
b)	**Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:**					
i)	Total No. of Cells (Sector)		881268	156054	64108	331841
ii)	Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)		10231	3309	118	9842
iii)	% of cells having more than 3% Circuit Switched Voice Drop Rate [(No. of cells having Circuit Switched Voice Drop Rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	*<=3%*	1.16%	2.12%	0.18%	2.97%
c)	**Percentage of connections with Good Circuit Switched Voice Quality**					
i)	Percentage of connection with Good Circuit Switched Voice Quality	*>=95%*	98.86%	NDR	98.86%	98.91%
4	**Total No. of POI's in Month having <=0.5% POI congestion**					
i)	Total No. of call attempts on POI		Nil	Nil	33681263	Nil
ii)	Total traffic served on all POIs (Erlang)		Nil	Nil	952179	Nil
iii)	Total No. of circuits on all individual POIs		Nil	Nil	1608989	Nil
iv)	Total number of working POI Service Area wise		Nil	Nil	1023	Nil
v)	Capacity of all POIs		Nil	Nil	1520989	Nil
vi)	No. of all POI's having >=0.5% POI congestion		Nil	Nil	0	Nil
vii)	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		Nil	Nil	0	Nil

13 ANNEXURE – FEBRUARY 2017-3G

Network : February 2017 -3G						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark				
Network Service Quality Parameter			Airtel	BSNL	Reliance Comm.	Vodafone
1	**Network Availability**					
a)	**Node Bs' Accumulated Downtime:**					
i)	Total no. of Node B's in the Licensed Service Area		6586	1798	692	3634
ii)	Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month		4827.08	14803	928	344
iii)	[(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	*<=2%*	0.11%		0.01%	0.01%
b)	**Worst Affected Node Bs' due to Downtime:**			1.19%		
i)	No. of Node B's having accumulated downtime of >24 hours in a month		6	31	0	0
ii)	((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	*<=2%*	0.09%	1.85%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**					
a)	**Call Setup Success Rate:**					
i)	Total No. of Voice Call Attempts		590951138494230000000.00	5015459.32	932900765	62642597
ii)	Total No. of Voice Call Establishment		588326084386012000000.00	4940138.43	929454917	62578470
iii)	CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	*>=95%*	99.56%	98.51%	99.63%	99.90%
b)	**RRC Congestion:**					
i)	RRC Attempts (RRC Connection Access) (A)		67203470.00	53368029.6	47291512	53575500
ii)	RRC Failed (RRC Connection Access Failed) (B)		18043.00	443196.393	144808	4912
iii)	RRC Congestion (%) [B/A]*100	*<=1%*	0.03%	0.83%	0.31%	0.01%
c)	**RAB Congestion:**					
i)	RAB Attempts (RAB Setup Access) (C)		82834445.00	5015459.32	6584219	62466581
ii)	RAB Failed (RAB Setup Access Failed) (D)		29562.00	49821	10154	2736
iii)	RAB Congestion (%) [D/C]*100	*<=2%*	0.04%	0.99%	0.15%	0.00%
3	**Connection Maintenance (Retainability)**					
a)	**Circuit Switched Voice Drop Rate**					
i)	Total Established Calls (A)		82236460.00	4940138.43	6551785	62472688
ii)	Calls Dropped after Establishment (B)		388098.00	59836	2931	147828
iii)	Call Drop Rate [B/A]*100	*<=2%*	0.47%	1.21%	0.04%	0.24%
b)	**Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:**					
i)	Total No. of Cells (Sector)		843091.00	5394	57736	11111
ii)	Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)		7069.00	107.107143	91	305
iii)	% of cells having more than 3% Circuit Switched Voice Drop Rate [(No. of cells having Circuit Switched Voice Drop Rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	*<=3%*	0.84%	1.99%	0.16%	2.74%
c)	**Percentage of connections with Good Circuit Switched Voice Quality**			NDR		
i)	Percentage of connection with Good Circuit Switched Voice Quality	*>=95%*	98.93%	NDR	99.49%	98.94%
4	**Total No. of POI's in Month having <=0.5% POI congestion**					
i)	Total No. of call attempts on POI		Nil	Nil	28092047	Nil
ii)	Total traffic served on all POIs (Erlang)		Nil	Nil	679379	Nil
iii)	Total No. of circuits on all individual POIs		Nil	Nil	1474084	Nil
iv)	Total number of working POI Service Area wise		Nil	Nil	924	Nil
v)	Capacity of all POIs		Nil	Nil	1382193	Nil
vi)	No. of all POI's having >=0.5% POI congestion		Nil	Nil	0	Nil
vii)	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		Nil	Nil	0	Nil

14 ANNEXURE – MARCH 2017 -3G

Network : March 2017 -3G						
Cellular Mobile Telephone Services						
S. No.	Name of Parameter	Benchmark				
Network Service Quality Parameter			Airtel	BSNL	Reliance Comm.	Vodafone
1	**Network Availability**					
a)	**Node Bs' Accumulated Downtime:**					
i)	Total no. of Node B's in the Licensed Service Area		6838	1933	690	3690
ii)	Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month		6555.65	14695	1820	3397
iii)	[(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	*<=2%*	0.13%		0.35%	0.12%
b)	**Worst Affected Node Bs' due to Downtime:**			1.02%		
i)	No. of Node B's having accumulated downtime of >24 hours in a month		9	28	0	11
ii)	((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	*<=2%*	0.13%	1.45%	0.00%	0.30%
2	**Connection Establishment (Accessibility)**					
a)	**Call Setup Success Rate:**					
i)	Total No. of Voice Call Attempts		9151046817324100000000.00	164046686	865492721	33069985
ii)	Total No. of Voice Call Establishment		9102650404644240000000.00	163592023	864990553	33032205
iii)	CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	*>=95%*	99.47%	99.72%	99.94%	99.89%
b)	**RRC Congestion:**					
i)	RRC Attempts (RRC Connection Access) (A)		82246232.00	1629046795	48826766	28227832
ii)	RRC Failed (RRC Connection Access Failed) (B)		13747.00	10575201	4053	4578
iii)	RRC Congestion (%) [B/A]*100	*<=1%*	0.02%	0.65%	0.01%	0.02%
c)	**RAB Congestion:**					
i)	RAB Attempts (RAB Setup Access) (C)		102947947.00	164045140	6708839	32973753
ii)	RAB Failed (RAB Setup Access Failed) (D)		13487.00	1635339	626	1574
iii)	RAB Congestion (%) [D/C]*100	*<=2%*	0.01%	1.00%	0.01%	0.00%
3	**Connection Maintenance (Retainability)**					
a)	**Circuit Switched Voice Drop Rate**					
i)	Total Established Calls (A)		101953526.00	163591811	6682429	32940136
ii)	Calls Dropped after Establishment (B)		482060.00	1704596	3560	85772
iii)	Call Drop Rate [B/A]*100	*<=2%*	0.47%	1.04%	0.05%	0.26%
b)	**Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:**					
i)	Total No. of Cells (Sector)		1013069.00	179769	63922	347857
ii)	Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)		8085.00	3261	165	9504
iii)	% of cells having more than 3% Circuit Switched Voice Drop Rate [(No. of cells having Circuit Switched Voice Drop Rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	*<=3%*	0.80%	1.81%	0.26%	2.73%
c)	**Percentage of connections with Good Circuit Switched Voice Quality**					
i)	Percentage of connection with Good Circuit Switched Voice Quality	*>=95%*	98.93%	NDR	99.58%	98.86%
4	**Total No. of POI's in Month having <=0.5% POI congestion**					
i)	Total No. of call attempts on POI		Nil	Nil	Nil	Nil
ii)	Total traffic served on all POIs (Erlang)		Nil	Nil	Nil	Nil
iii)	Total No. of circuits on all individual POIs		Nil	Nil	Nil	Nil
iv)	Total number of working POI Service Area wise		Nil	Nil	Nil	Nil
v)	Capacity of all POIs		Nil	Nil	Nil	Nil
vi)	No. of all POI's having >=0.5% POI congestion		Nil	Nil	Nil	Nil
vii)	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		Nil	Nil	Nil	Nil

Network : 3 DAY LIVE March 2017 -3G						
Cellular Mobile Telephone Services						
S. No.	**Name of Parameter**	**Benchmark**				
Network Service Quality Parameter			Airtel	BSNL	Reliance Comm.	Vodafone
1	**Network Availability**					
a)	**Node Bs' Accumulated Downtime:**					
i)	Total no. of Node B's in the Licensed Service Area		6844	5799	2070.00	3677
ii)	Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month		560	1368	378.20	468.10
iii)	[(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100	*<=2%*	0.11%	0.98%	0.76%	0.18%
b)	**Worst Affected Node Bs' due to Downtime:**					
i)	No. of Node B's having accumulated downtime of >24 hours in a month		0	2	0.00	0
ii)	((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100	*<=2%*	0.00%	0.03%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**					
a)	**Call Setup Success Rate:**					
i)	Total No. of Voice Call Attempts		118088692313509000000	15691246	85471541.00	3659724
ii)	Total No. of Voice Call Establishment		117516394302789000000	15466550	85447725.00	3655954
iii)	CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100)	*>=95%*	99.52%	98.57%	99.97%	99.90%
b)	**RRC Congestion:**					
i)	RRC Attempts (RRC Connection Access) (A)		8762475	165298740	4612368.00	3079680
ii)	RRC Failed (RRC Connection Access Failed) (B)		815	1620910	5.00	62
iii)	RRC Congestion (%) [B/A]*100	*<=1%*	0.01%	0.98%	0.00%	0.00%
c)	**RAB Congestion:**					
i)	RAB Attempts (RAB Setup Access) (C)		11106659	15689700	654409.00	3650364
ii)	RAB Failed (RAB Setup Access Failed) (D)		216	147539	3.00	69
iii)	RAB Congestion (%) [D/C]*100	*<=2%*	0.00%	0.94%	0.00%	0.00%
3	**Connection Maintenance (Retainability)**					
a)	**Circuit Switched Voice Drop Rate**					
i)	Total Established Calls (A)		10987966	15466338	652138.00	3646537
ii)	Calls Dropped after Establishment (B)		52303	179888	315.00	9273
iii)	Call Drop Rate [B/A]*100	*<=2%*	0.48%	1.16%	0.05%	0.25%
b)	**Worst affected cells having more than 3% Circuit Switched Voice Drop Rate:**					
i)	Total No. of Cells (Sector)		102621	17397	6186.00	11302
ii)	Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)		896	321	20.00	306
iii)	% of cells having more than 3% Circuit Switched Voice Drop Rate [(No. of cells having Circuit Switched Voice Drop Rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area]	*<=3%*	0.87%	1.85%	0.32%	2.71%
c)	**Percentage of connections with Good Circuit Switched Voice Quality**					
i)	Percentage of connection with Good Circuit Switched Voice Quality	*>=95%*	98.92%	97.00%	99.78%	96.80%
4	**Total No. of POI's in Month having <=0.5% POI congestion**					
i)	Total No. of call attempts on POI		Nil	Nil	2891896.00	Nil
ii)	Total traffic served on all POIs (Erlang)		Nil	Nil	61225.57	Nil
iii)	Total No. of circuits on all individual POIs		Nil	Nil	164049.00	Nil
iv)	Total number of working POI Service Area wise		Nil	Nil	99.00	Nil
v)	Capacity of all POIs		Nil	Nil	154141.93	Nil
vi)	No. of all POI's having >=0.5% POI congestion		Nil	Nil	0.00	Nil
vii)	Name of POI not meeting the benchmark (having >=0.5% POI congestion)		Nil	Nil	0.00	Nil

15 ANNEXURE : GENERAL PERFORMA

Audit Month & Quarter	March. 2017	March. 2017	March. 2017	March. 2017	March. 2017	March. 2017	March. 2017	March. 2017	March. 2017
Name of the Service Provider	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
Circle	Rajasthan	Rajasthan	Rajasthan	Rajasthan	Rajasthan	Rajasthan	Rajasthan	Rajasthan	Rajasthan
Service Provider Contact Person Name	**Rajeev Jhanwar**	**Ambica Singh**	Sh. B.L. Garhwal	**Tamim Nagdiwala**	**Surendra Bhatia**	**JitendraSingh**	**Sandeep Kumar Sain**	**Sandeep Kumar Sain**	**Mr.Manish Jain**
Service Provider Contact Person Mobile Number	**9782000502**	**9829004211**	9413394350	**9887005371**	**9875000568**	**9875000011**	**9214309006**	**9214309006**	**9828096997**
Auditor Name	Rakesh Purohit Sanatan Ojha	Rakesh Purohit Sanatan Ojha	Manish Lodha Amit Kumar	Rakesh Purohit Sanatan Ojha	Rakesh Purohit Sanatan Ojha	Rakesh Purohit Sanatan Ojha	Rakesh Purohit Sanatan Ojha	Rakesh Purohit Sanatan Ojha	Rakesh Purohit Sanatan Ojha
Auditor Mobile Number	9414001666 9414001755	9414001666 9414001755	9414006336 9414000198	9414001666 9414001755	9414001666 9414001755	9414001666 9414001755	9414001666 9414001755	9414001666 9414001755	9414001666 9414001755
	Name of Operator								
General Information	Aircel	Airtel	BSNL	Idea	MTS	Reliance Comm.	Tata CDMA	Tata GSM	Vodafone
No. of MSCs + GMSCs	4	51	13+3	12+1	2	3+1	2 MSCs+ 2 GMSCs	2 MSCs	9+4
No. of BSCs	18	84	54	69	7	14	5	11	92
No. of BTSs	2563	8754	4374	6,874	1528	2064	508	1388	7812
No. of RNCs	NA	22	24	NA	NA	3	NA	NA	13
No. of Node Bs'	NA	6838	1933	NA	NA	690	NA	NA	3690
No. of Cells	7665	60692	18623	21,306	5091	6187+2062	1682	4175	23963+11343
NSS make	Nokia	Ericsson	Ericsson &ZTE	Ericsson	ZTE	Huawei	Ericsson& Huawei	Huawei	Nokia and Ericsson
BSS make	Nokia	Ericsson	Ericsson &ZTE&NSN	Ericsson & ZTE	ZTE	Huawei	Huawai &	Huawei	Nokia and Ericsson
RNS make	NA	Ericsson	Ericsson &ZTE	NA	na	NA	NA	NA	Ericsson
TCBH (Network)	20:00	19:00	19:00	20:00	20:00	20:00	8:00:00 PM	8:00:00 PM	20:00
TCBH (Call Center)		19 pm	19:00	20:00		20:00	8:00:00 PM	8:00:00 PM	20:00
Equipped Capacity of N/W in Erlang	124748	503810	354000	314,754	132000	102000	47176	68731	340366.62
Network Traffic carried in Erlang (monthly average)	Noida	536989		236,758	31314.91	35559	16661	25880	306333.68
Total No. of Customers Served (as per VLR) on last day of the month	Noida	19254227		8,367,289	720523	5034737	213795	1145656	11067920.00
OMCR-R Access Location	Gurgaon	Gurgaon	Jaipur	Jaipur	JAIPUR	DAKC Mumbai	Guman-1, Vaishali Nagar,Jaipur	Gurgaon	Chennai
OMCR-S Access Location	Noida	Gurgaon	Jaipur	Jaipur	JAIPUR	DAKC Mumbai	Guman-1, Vaishali Nagar,Jaipur	Gurgaon	Chennai
Centralized Billing Location	Gurgaon	Manesar	Chnadigarh	Pune	NOIDA	DAKC Mumbai	Hyderabad	Hyderabad	Pune