

Mobile Network Performance Assessment Report

Salalah Khareef Season 2015

Regulatory & Compliance Unit
Quality of Service Department



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1. Background

A comprehensive field test was conducted independently by TRA to assess the performance of Omantel and Ooredoo mobile voice and data networks in Salalah during the Khareef Season 2015.

Field Survey Date & Time: 26th – 30th July 2015, from 9:00 A.M. to 10:00 P.M.

Services Tested

Network	Service	Technology
Omantel	Voice	3G
	Data	4G (LTE)
Ooredoo	Voice	3G
	Data	4G (LTE)

Test Area

Governorate	Wilayat
Dhofar	Salalah

2. Test Methodology

The following test configuration was used for measurements:

Service Tested	Technology Mode	Objective	Test sequence	KPIs measured
Omantel- Mobile voice	3G	To check network accessibility, retain-ability, mobility, service integrity and coverage	Repetitive Calls of 90 sec. duration	CSSR, CDR, CSR, RSCP.
Omantel- Mobile data	4G	To check data network performance and coverage	HTTP file download from the service providers network and ping test.	Latency, Ping Packet Success Rate, Avg. downlink throughput, RSRP.
Ooredoo- Mobile voice	3G	To check network accessibility, retain-ability, mobility service integrity and coverage	Repetitive Calls of 90 sec. duration	CSSR, CDR, CSR, RSCP.
Ooredoo- Mobile data	4G	To check data network performance and coverage	HTTP file download from the service providers network and ping test.	Latency, Ping Packet Success Rate, Avg. downlink throughput, RSRP.

3. Key Performance Indicators (KPIs) Definition

Mobile voice performance was measured based on the following set of KPIs:

Call Setup Success Rate (CSSR)– This indicator is used to measure the percentage of calls successfully established without facing blockage in the network as a ratio of the total number of call attempts made to access and establish a voice call. [\(to check network accessibility\)](#)

Call Drop Rate (CDR) – This indicator is used to measure the percentage of calls dropped due to technical problems or coverage gaps in the service provider’s network as a ratio of the total number of calls successfully established. [\(to check network retain-ability\)](#)

Call Success Rate (CSR) – This indicator is used to measure the percentage of calls successfully established without facing blockage in the network as a ratio of the total number of call attempts made to access and establish a voice call and then successfully terminated from the user-end without being dropped or disconnected from the network side due to a technical irregularity. [\(to check service integrity\)](#)

Mobile data performance was measured based on the following set of KPIs:

Packet Latency - Packet delay, which represents the time taken for data packets to pass through the GPRS bearer in a round-trip time from the mobile to the server in the service provider’s core network and back to the mobile. [\(to check delay in the network\)](#)

Ping Packet Success Rate is the percentage of packets lost between designated routes in the network. It is used to indicate the loss of data packets during transmission over a telecommunications network. [\(to check data integrity\)](#)

HTTP Average downlink throughput - This is the average downlink throughput (rate at which data/bits are transferred to the user) experienced by a user while downloading content from the Internet. [\(to check download speed\)](#)

Performance Indicators Definition (continued)

Coverage is assessed based on the following radio parameters:

Reference Signal Received Power (RSRP) – This indicator measures the linear average of the received power on reference signal resource elements in the downlink during the drive test ([to assess 4G/LTE coverage](#)).

Received Signal Code Power (RSCP) – This indicator measures the received signal code power of the pilot channel in the downlink during the drive test ([to assess 3G/UMTS coverage](#)).

Received Signal Level (RxLevSub) - This indicator measures the received signal strength in downlink during the drive tests ([to assess 2G/GSM coverage](#)).

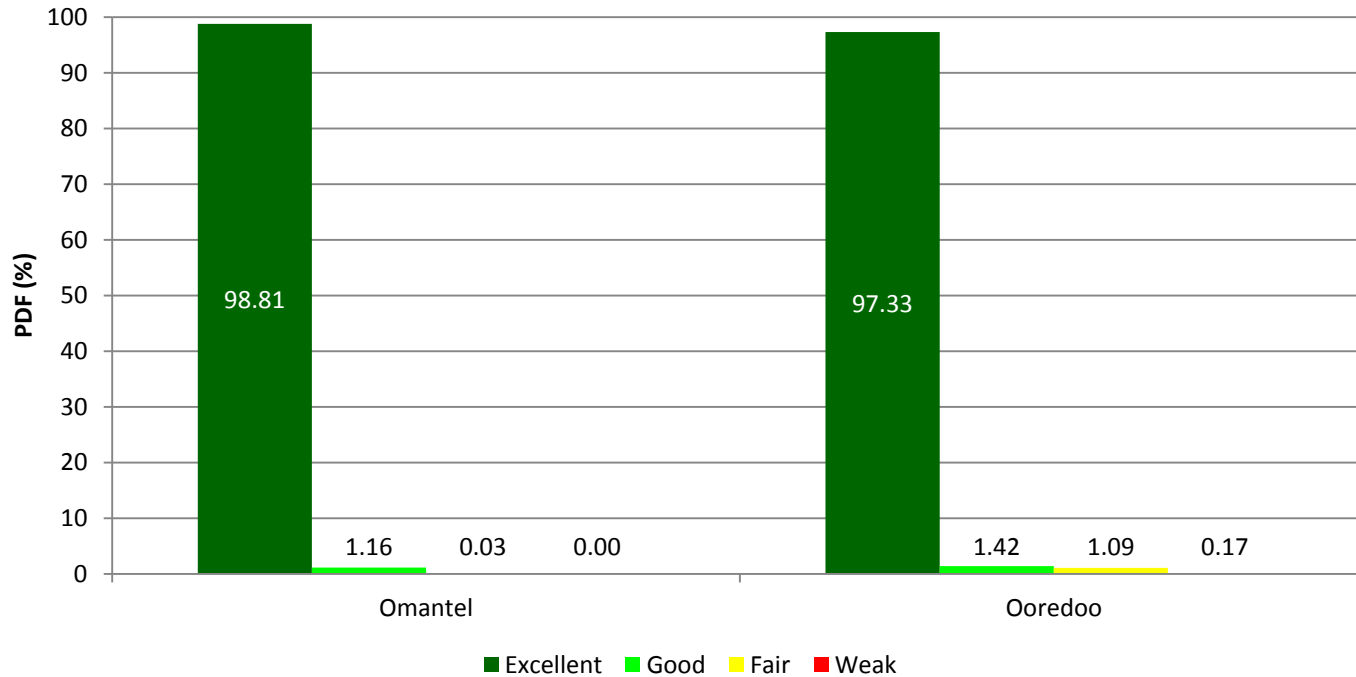
The following convention is used for the coverage plot.

Serving Cell RSRP (dBm)		CPICH RSCP (dBm)		RxLevSub (dBm)		Classification	Estimated Signal Penetration
	Range		Range		Range		
	≥ -85		≥ -80		≥ -75	Excellent	Indoor
	≥ -95 and < -85		≥ -87 and < -80		≥ -82 and < -75	Good	
	≥ -105 and < -95		≥ -100 and < -87		≥ -95 and < -82	Fair	In-Car
	≥ -120 and < -105		< -100		< -95	Weak	Outdoor Only

4. Results

4.1a Mobile Voice Coverage

Salalah Voice Coverage Distribution

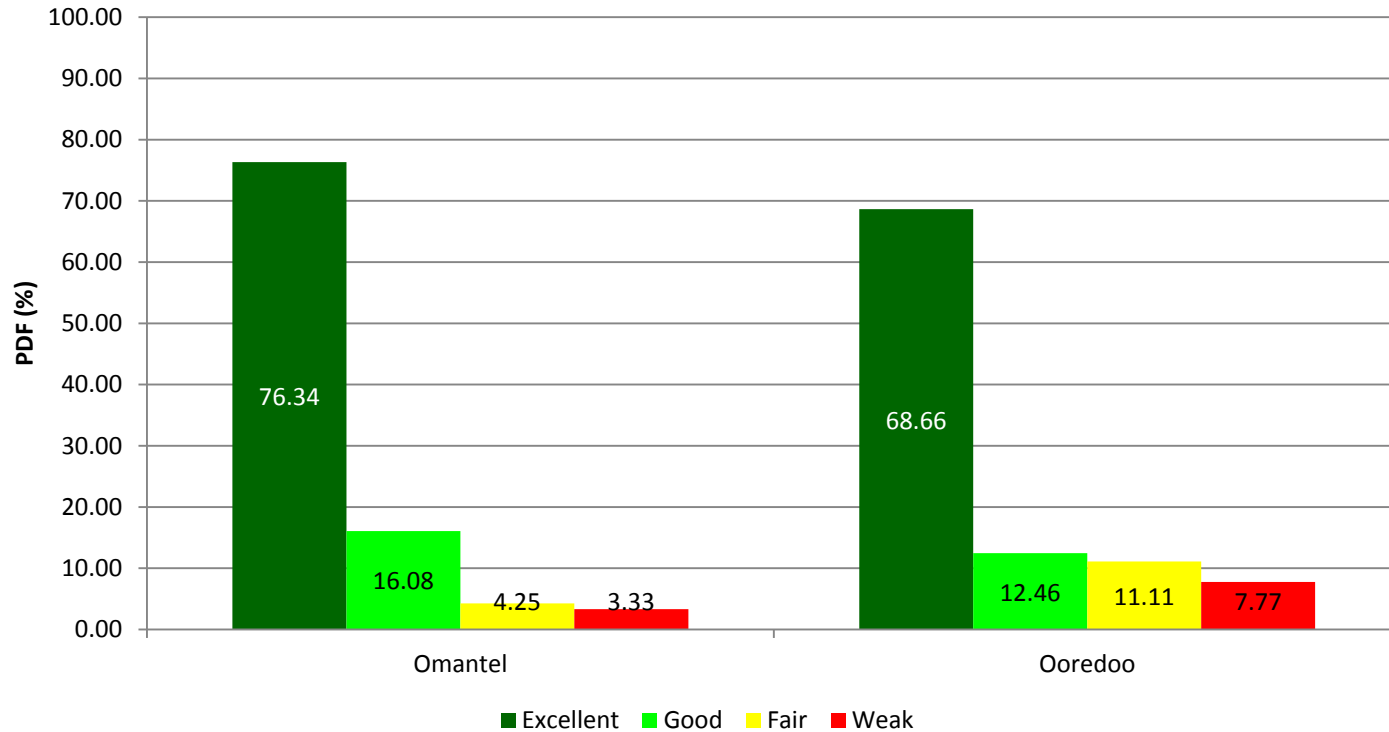


Dark Green	Indoor, In-Car & Outdoor Coverage
Light Green	In-Car & Outdoor Coverage
Yellow	No Indoor Coverage, Only Outdoor
Red	

4. Results

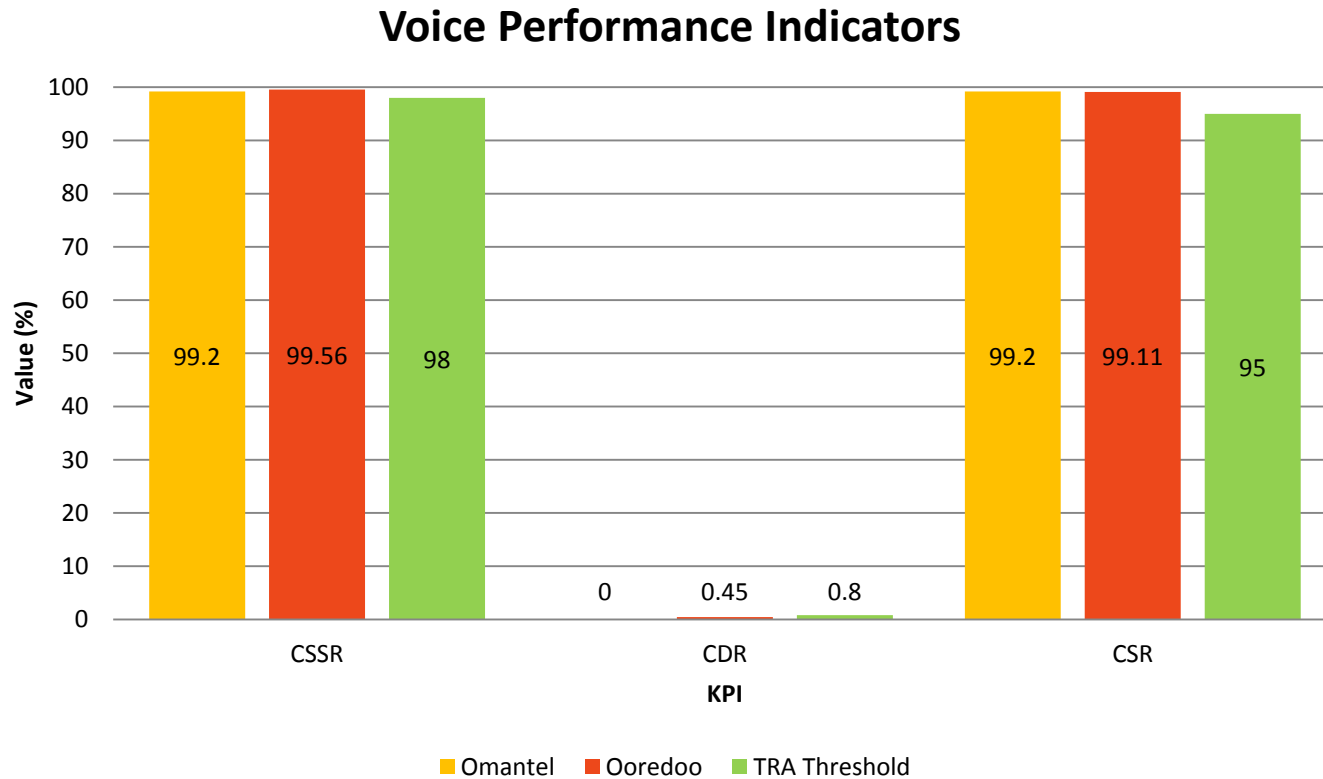
4.1b Mobile Data Coverage

Salalah Data Coverage Distribution



■	Indoor, In-Car & Outdoor Coverage
■	In-Car & Outdoor Coverage
■	No Indoor Coverage, Only Outdoor

4.2 Mobile Voice Performance



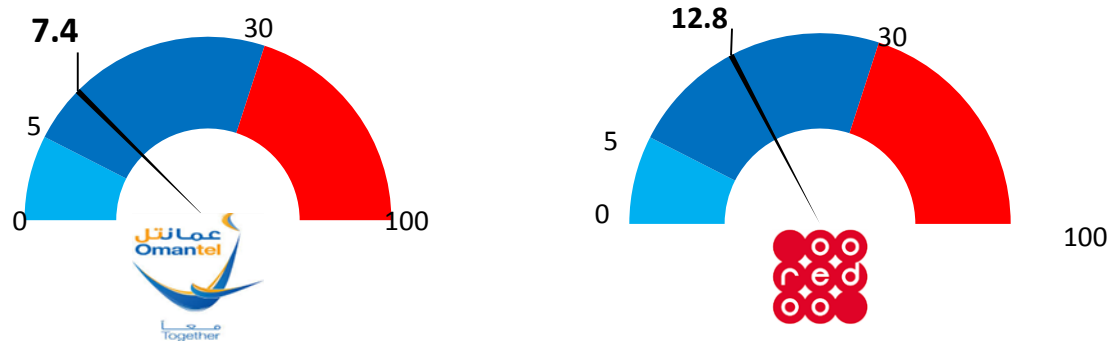
CSSR: Call Setup Success Rate (Higher is better)

CDR: Call Drop Rate (Lower is Better)

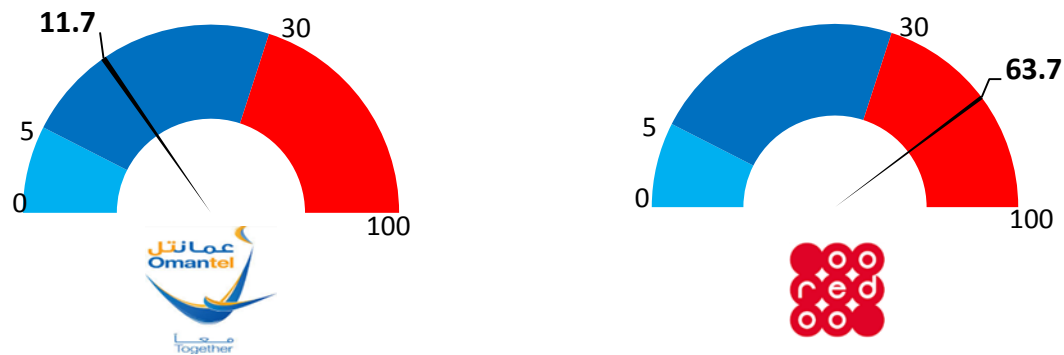
CSR: Call Success Rate (Higher is better)

4.3 Mobile Data Download Speed

Overall Average Download Speed (Mbps)



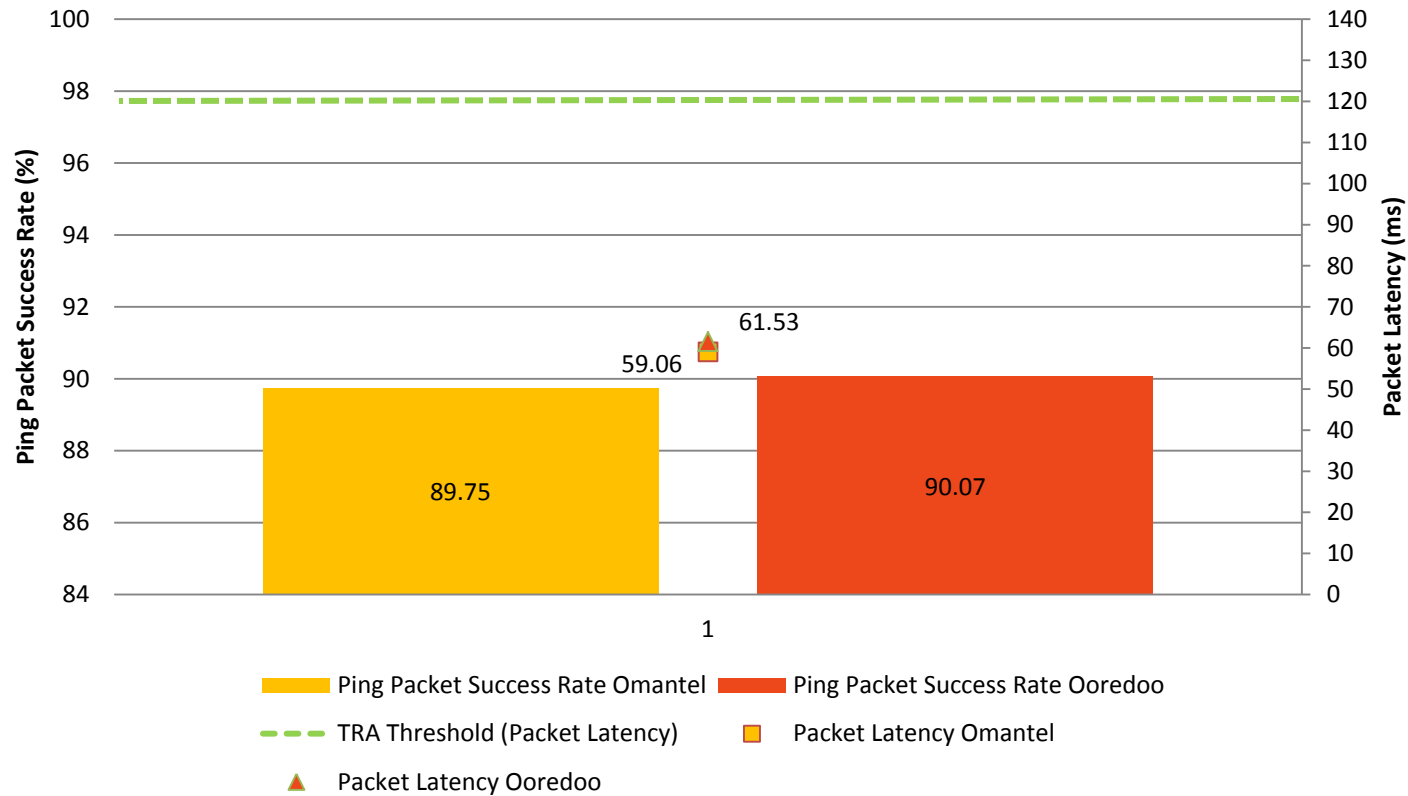
Maximum Download Speed Attained (Mbps)



Download Speed: Higher is Better

4.4 Mobile Data Performance

Data Performance Indicators



Packet Latency (ms): Lower is Better (Less than 120 ms is desired), **Ping Packet Success Rate:** Higher is Better (Greater than 99% is desired)

5 Conclusion

- In General, both Omantel and Ooredoo exhibit excellent 3G mobile voice and data coverage in and around Salalah.
- Omantel and Ooredoo exhibit strong LTE coverage in Salalah City.
- Omantel and Ooredoo mobile voice performance is found to be very good with all Key Performance Indicators meeting TRA thresholds.
- Mobile broadband download speeds (on LTE network) are found to be good with an average speed of above 5 Mbps. Ooredoo mobile broadband network exhibits faster download speeds.
- Omantel and Ooredoo mobile broadband networks (LTE) exhibit low packet delay which is well within the TRA threshold.

Basis of results and conclusion

- The coverage information is based on the geographical drive test route used during the measurement exercise.
 - The exercise has been conducted independently by the TRA without sharing any prior information with the service providers about the type of tests being performed or location.
 - The results of the exercise are based on the data collected from the field at a certain instance of time and day; network behaviour may vary with traffic variations over time and occurrence of events.
 - Industry standard tools have been used and work best practices are ensured during the whole exercise.
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