

Call Drops Decoded

Why Call Drops happen - And how the smartphone you choose may make the problem worse



We Measured Call drops on different phones across over 20 cities in India

CALL DROPS IN INDIA ARE HIGHER THAN THE GLOBALLY ACCEPTED 3% STANDARD.

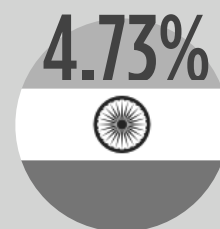
There are 3 major reasons why mobile networks drop calls.

<p style="text-align: center; font-size: 2em; font-weight: bold;">1</p> <p style="text-align: center; font-weight: bold; margin-top: 10px;">POOR COVERAGE</p> <p>A call may drop when the phone or tower does not receive the radio signal with enough strength to hold the call.</p>	<p style="text-align: center; font-size: 2em; font-weight: bold;">2</p> <p style="text-align: center; font-weight: bold; margin-top: 10px;">POOR QUALITY</p> <p>A call may drop when there is a lot of interference in the connection between the phone & the tower</p>	<p style="text-align: center; font-size: 2em; font-weight: bold;">3</p> <p style="text-align: center; font-weight: bold; margin-top: 10px;">NETWORK FAILURES</p> <p>A call may also drop due to various network issues such as congestion or a failed Handover between two towers</p>
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Figure 1: Why Calls Drop Source - RedMango Analytics Study across 20 cities in India



A Call Drop is when an ongoing call is suddenly interrupted against the wishes of the user.



Call Drop rates in India

averaged around 4.73% according to a RedMango study of 20 Cities in 2015. (www.mobileindia.me)



TRAI prescribes 2% As the acceptable call drop rate for the country.

1. Poor Coverage

Reception of the Signal from the tower to the mobile or vice versa may result in a call being dropped.

There are various factors that can contribute to the signal not being received with enough power to be able to sustain a conversation.

The primary reason for this is a lack of mobile towers.

However another reason may also be due to what is known as the cell breathing effect.

Imagine a room packed with people trying to have a conversation. The more people there are talking, the harder it is to hear your conversation and as a result everyone needs to speak louder. With UMTS (3G) and LTE (4G) FDD technology, mobile towers work with a similar concept. Due to many users transmitting at the same time, a tower needs to receive the signal from each phone with a higher power level to decipher it. This creates a virtual shrinking of the area covered by that tower whereby the mobile phones at the edge of the area are unable to sustain a call.

Most operators account for this effect while planning their networks, but sudden high loads, poor planning or lack of towers magnify this problem resulting in higher call drops.

2. Poor Quality

High amount of Interference in the radio signal from the mobile phone to the tower and vice versa may cause calls to drop.

Chances are fairly high that you have experienced a call with voice quality issues. Some of the issues you may have faced include cracking voice, audible noise in the call, inability of one side to hear the other, blank speech, voice echo etc.

Most of these are caused by radio interference. Interference in the signal can occur due to several reasons. The leading causes of interference are:

- **Signal Noise from neighboring towers** - This happens when the network is not optimized properly and signals from neighboring towers infiltrate the coverage area of the serving tower
- **Inefficient use of spectrum** - In case spectrum is not reused efficiently, this can cause a virtual scarcity of spectrum for a particular service resulting in interference issues. For eg. If Operators allocate a large amount of spectrum for data services while neglecting voice, call quality suffers.
- **High congestion due to lack of spectrum** - In a country like India, where there are a vast number of mobile users, multiple mobile operators and a finite amount of spectrum resources, networks inadvertently have to support a large number of users on limited spectrum. This causes congestion, and subsequently, interference.

3. Network Failures

Calls may also be dropped due to various faults in the network.

Apart from Coverage and Quality, another leading factor of dropped calls are network faults.

Network failures occur mainly due to incorrect definition of network parameters causing some parts of the network to behave incorrectly.

They also occur due to faulty network hardware.

Network faults are often the most unpredictable. You may have experienced a dropped call due to a network fault when the call suddenly dropped while everything was fine.

Calls also tend to drop more when you are on the move. As you move from the coverage area of one cell tower to another, the conversation “hands off” to the nearest tower with the best signal. Sometimes this handoff fails to happen and your call drops.

WHILE THE THREE CAUSES LISTED ARE THE REASONS WHY CALLS DROP, NOT ALL REASONS ARE EQUALLY RESPONSIBLE FOR THE CALL DROP PROBLEM IN INDIA.

Calls Drop mainly due to poor Quality and Network Faults.

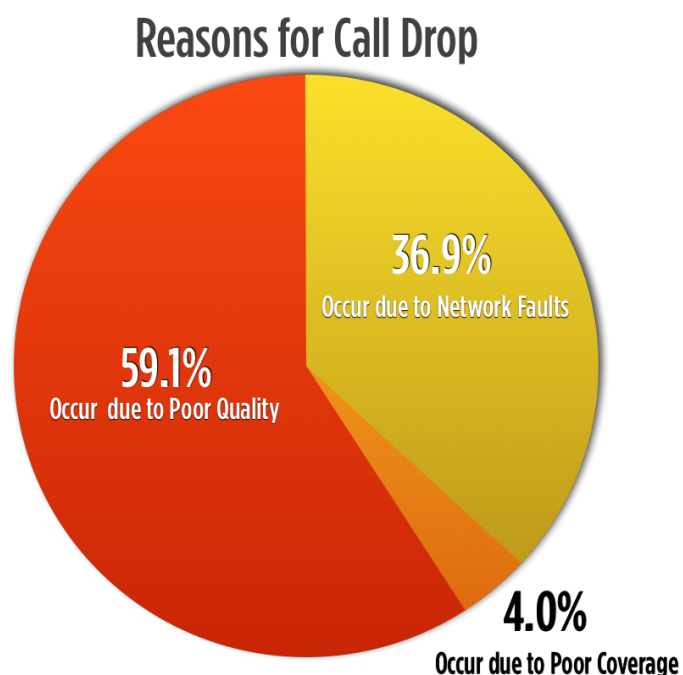


Figure 2: Reasons for Call Drops

Source: RedMango Analytics study of over 10,000 calls across 20 top cities in India

ONLY 4% OF ALL THE DROPPED CALLS WERE IN POOR COVERAGE AREAS.

This indicates that while the lack of mobile towers results in call drops, it is not the leading factor that contributes to the problem.

59.1% OF ALL THE DROPPED CALLS WERE DUE TO POOR QUALITY.

Most call drops occur due to interference and other quality related issues. While lack of spectrum and high user concentration may be to blame for some of these problems, Network optimization can result in a significant reduction in call drop problems.

36.9% OF ALL THE DROPPED CALLS WERE DUE TO NETWORK FAULTS.

A significant number of call drops also occur due to network infrastructure problems.

However... Your Smartphone plays a significant role in your call drop experience.

The average smartphone today is an amalgamation of various parts such as radio devices, operating systems and applications.

This multitude of systems often means that each type, model and version of a smartphone has a different experience on a mobile network.

In order to measure how significant this difference in experience is, we selected an Android and iOS device from each of the price ranges:

- Low Range (Rs. 0-20,000),
- Mid Range (Rs. 21,000 - 30,000)
- High Range (Above Rs. 30,000)

We then measured the voice experience of these handsets across multiple networks and cities.

The measurements were designed such that all handsets were used to measure the same network in the same city at the same time to have an objective comparison of their performance.

Figure 3: How call drop experience varies from device to device
Source: RedMango Analytics Study using Android & iOS devices across 20 top cities in India.

What we found was that the call drop experience of Handsets in each price range varied significantly on the same network.

High Range Smartphones

Lowest Call Drops

Users of High Range Smartphones (eg. Samsung Galaxy S5, iPhone 6 and higher) have the lowest call drops

Mid Range Smartphones

Up to 22% More Call Drops

Users of Mid Range Smartphones (eg. Samsung Galaxy Grand, Micromax A311, iPhone 5c) experience up to 22% more call drops than users with High Range smartphones.

Low Range Smartphones

Up to 67% More Call Drops

Users of Low Range Smartphones(eg Samsung Duos & iPhone 4s) experience up to 67% more call drops than users with High Range smartphones.

“The type, version & operating system significantly impacts the call drop experience of smartphones. Since awareness of this is low among users in India, mobile operators must compensate for this by designing their networks for the lowest performing smartphones that proliferate the market.”

About RedMango Analytics

RedMango Analytics, a local tech startup that measures customer experience on mobile devices has launched www.mobileindia.me, a consumer portal that helps mobile users better understand the quality of service that mobile operators provide in their city or locality.

The data that is used to generate the portal is collected independently through RedMango Analytics' application, Experience.Me. The experience data is crowd sourced through mobile users that have installed the application on their devices in various cities.