

Kanye West's Sound Engineer is Probably Wrong...

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Kanye West was the main performer at the Pan American games that were just completed in Toronto, Canada. (Actually I think that they should be called the Pan Canadian games...). It was the most successful of games ever with the largest number of athletes of any previous Pan Am games. It was also a nightmare when it came to traffic. Most residents were asked to take a vacation during the games and never to use the high occupancy vehicle (HOV) lanes on the highway unless there were three or more people in the car... and of course, there were stories about one driver with 2 or 3 blow up dummies in the passenger seats.

At the end of Kanye West's performance, he threw his microphone in to the audience. Since I was watching this from home on television, everything seemed fine (at least until he threw his microphone away). It turns out that for home television watchers, the audio was fine, but for those at the stadium during closing night, the microphone had cut off about $\frac{3}{4}$ of the way through his song.

Being an avid consumer of hip hop and alternative music, I just assumed that this was part of his act. After all I grew up during the era of Robert Plant, Kiss, the Grateful Dead, Alice Cooper, and AC/DC – I am used to having helicopters fly over the field during the performance dropping dirty underwear on the listeners... ah... the good days!

Actually I thought that the most entertaining thing about Kanye West's performance was him [throwing his microphone away](#). It was true hip hop at its very best!

Well, it turned out that Kanye West's people, and his stage manager and brother Kanye East (that's a joke) were using their own equipment and nobody was at fault from the Pan Am games since Kanye's people had brought in their own amplification equipment. After the performance, they said that the microphone broke because the music was too loud.

Well, not to cast aspersions at Kanye West's sound engineers but loud music will not cause a microphone to shut down. It will, however, cause distortion that will continue to increase with increasing input. There is nothing in modern microphone technology that causes a microphone to shut off.

The increased distortion of his microphone may actually improve the music.

When one hears the word "distortion" the connotation is immediately negative, but distortion is nothing more than well-defined creation of additional energy components at different frequencies. In many cases the distortion components are quite predictable. For example, if there was peak clipping involved, where the peaks and (usually but not always) valleys are "squared off", this would create odd numbered harmonics of the distorting primary to be created. If energy around 1000 Hz was peak clipped, then there would be additional components at 3000 Hz, 5000 Hz, 7000 Hz, and so on.

In other forms of distortion, there can be lower frequency (intermodulation) distortion components that are created. Depending on the medium and the sound level (and sound power) this could actually increase the warmth of the sound.