CORA Mobile Edge (ME) Test Results for Mid-sized MVNO on Wholesale Carrier Network

Sky Peak Technologies (SPT) conducted supplemental CORA ME testing for a mid-sized MVNO on a Wholesale Carrier Network (WCN). SPT focused testing on only video traffic, the largest mobile data usage category, and growing. According to the 2023 Ericsson Mobility Report, streaming video accounted for up to 80% of the data traffic on mobile networks, and the impact continues to grow, driven by subscriber demand for more and more streaming content on their mobile devices. We conducted the test to demonstrate CORA ME's smart content shaping capabilities and the value proposition for MVNOs connected to tier-one carrier wholesale networks.

The MVNO furnished Android OS Private Label Devices (PLD) connected to the WCN—half of the PLDs were on the WCN's compressed data services, and the other half were on non-compressed data services. We used a similar-grade test device and a mainstream-brand Android device to support comparison benchmarking on another tier-1 carrier. We also tested another mainstream-brand Android device with a primary, post-paid subscription to WCN.

SPT collected analytics for over 33 hours of YouTube streaming, of which seven test cases used 25.4 hours. All testing was based on action video titles characterized by constantly changing foregrounds and backgrounds, which tend to consume data at higher rates.

We used CORA ME to automatically collect our QA Test Firebase analytics, using CORA ME in zero-shaping (baseline) and shaping modes, as noted in the test case descriptors. Although CORA ME can shape down to 144p, it was optimized to support 360p resolution for these tests, and testers observed that all video streamed smoothly and continuously with excellent user experience (UX).

Observations Overview

- With CORA ME shaping video on the Android Device over WCN service, video data rates were reduced by an additional 26-34% (124 MB/hr.) over the WCN compressed and non-compressed service, respectively (187 and 168 MB/hr.).

  Based on 10GB/month coming from streaming video, with the 30% average reduction in data usage from this test and an approximate $1.50/GByte wholesale cost of data, the forecasted annual savings and cost of the CORA ME service are provided in the following table.

#Active Devices	100,000	500,000	1,000,000
Monthly Data Savings	$450,000	$2,250,000	$4,500,000
Annual Data Savings	$5,400,000	$27,000,000	$54,000,000
Annual Cost of CORA ME	$270,000	$960,000	$1,860,000
Net Annual Savings	$5,130,000	$26,040,000	$52,140,000

- Data rates for the WCN compression (187 MB/hr.) service were surprisingly higher than non-compressed (168 MB/hr.) by 12%. This information was gathered from respective test cases with five (5) samples totaling 7:31 hours and four (4) samples totaling 6:25 hours. On average, this testing consumed significantly less data than we typically see.
- CORA ME held down data rates when playback video apps were manually set to higher quality. Compared to the WCN compression and non-compression services, data rates went up 300-420%, respectively.

Observation 1, Baseline Mobile Data Rates

For automatic analytics collection, the WCN non-compressed and compressed service data rates were measured using the MVNO's PLDs running CORA ME in zero-shaping mode. From a sample data set of 6:25 hours (Test Case #1) for non-compressed and 7:31 hours (Test Case #2) for compressed, a variance of 12% was observed, although values were inverse to what was expected.

As a benchmark for comparison, we ran tests to establish a baseline for the WCN (MVNO) data rates, another tier-one carrier, and the primary, post-paid subscription on the WCN. Using the MVNO's PLDs, WCN non-compression (orange bar) and compression (blue bar) data rates measured 11 to 20% lower, respectively, than the Tier 1 Carrier using a similar quality Android device (green bar graph below).
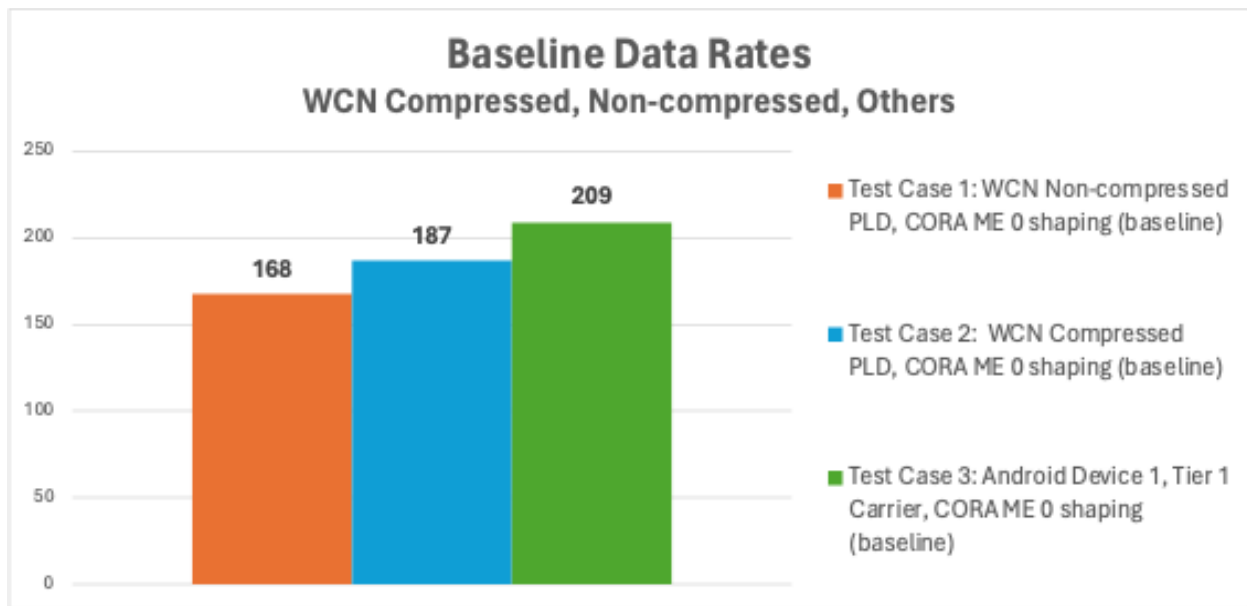

The unexpected variance between compressed and non-compressed data services illustrates possible inconsistencies with the WCN compression service and variable effectiveness. However, it may be due to specific video characteristics and encoding or device capabilities. More sample data is required to determine the root cause and draw concise conclusions.

Observation 2, CORA ME Reduced Data Usage by an Additional 30% on Average

CORA ME shaping video on the Android device with the independent WCN service reduced data usage rates by 26-34%, an average of 30%, compared to the WCN compressed and non-compressed, respectively.
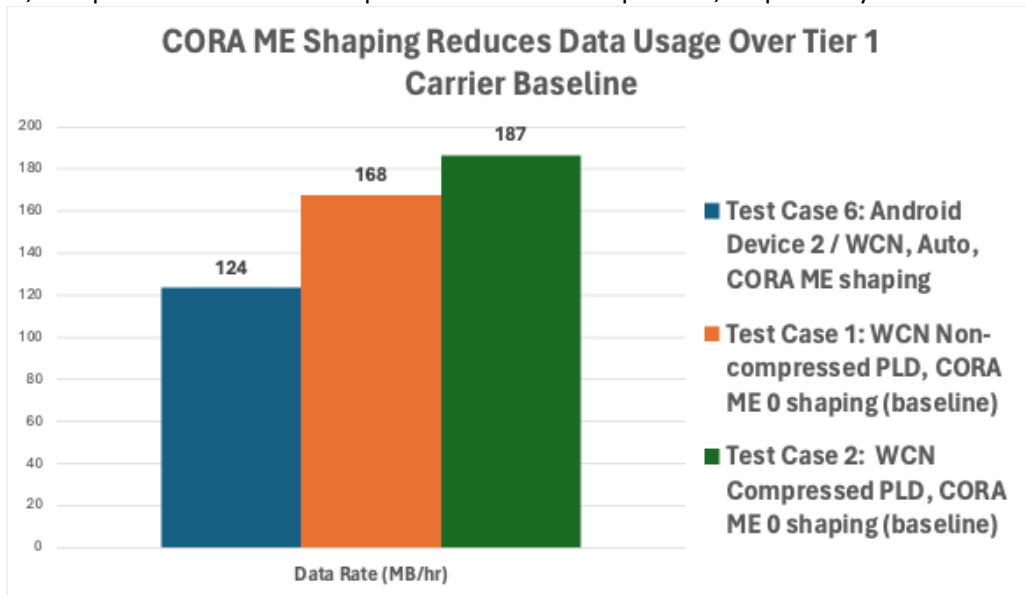

Observation 3, Impact of Manual Override of Playback Quality on Data Rates

We tested how WCN compressed data rates were affected when the user selected the High-Quality Auto playback setting, and usage jumped to 550 MB/hour compared to 187 MB/hr. (baseline), a 300% increase. Similarly, the non-compressed data rate increased to 711 compared to 168 MB/hr—a 420% increase, illustrated in the following bar chart.
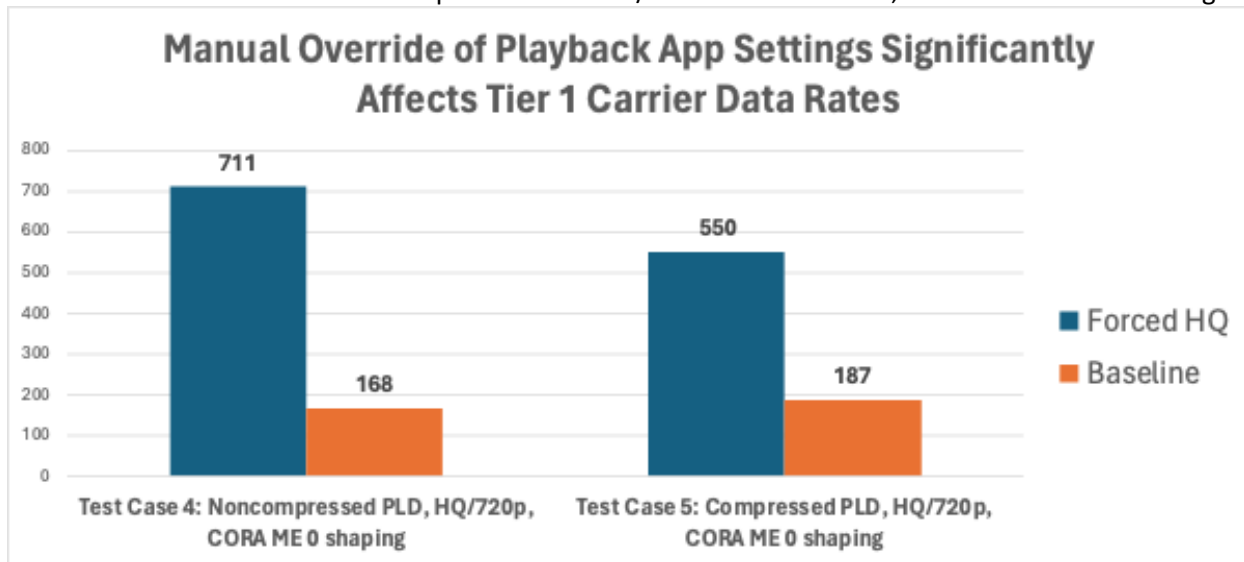
It is unknown what percentage of users manually affect playback levels. However, this shows that the WCN service doesn't provide the MVNO with positive control over data rates. In contrast, CORA ME shaping held the data rate to baseline levels when the playback app quality was set manually.
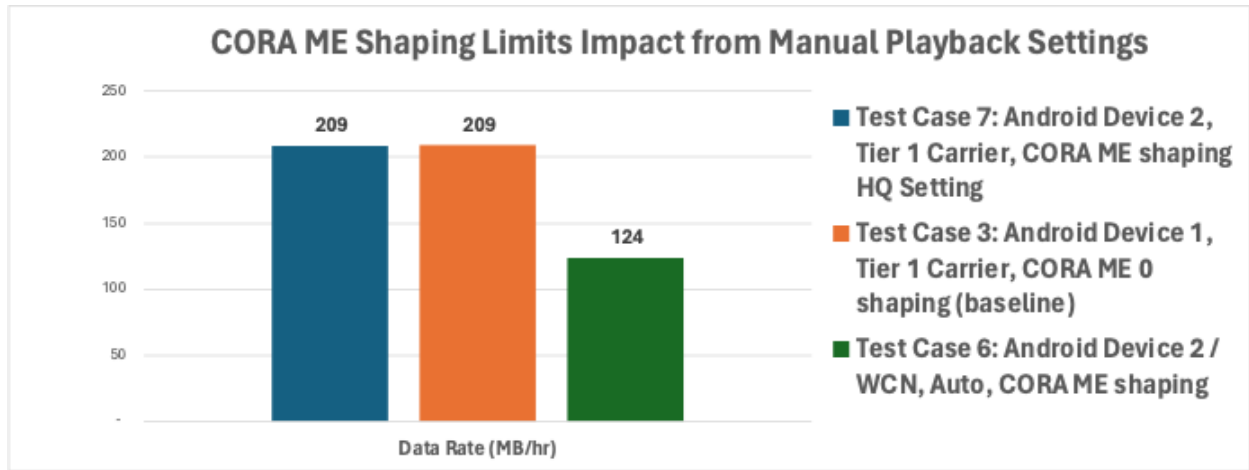
CORA ME Service provides positive management over data rates and gives control to operators via CORA Enterprise Console (EC) and configuration settings.

Summary and Conclusions

Sky Peak Technologies streamed over 33 hours of video to assist MVNO with benchmarking and identifying insights for comparing the CORA ME Service with the WCN compressed and non-compressed service. The limited data set from this testing brings valuable observations to light, suggesting that a more extensive data set is warranted to support conclusive analyses and establish actionable items for a scaled production deployment.

These test results demonstrate that the CORA ME Service provides greater consistency, reduces video data consumption to a greater degree while maintaining excellent UX, and limits the impact of users manually setting video playback levels compared to WCN compression and non-compression service.

CORA ME demonstrates significant economic and operational value over the fixed unmanageable WCN legacy compression service. Integrating CORA ME Service to manage video data consumption using live business intelligence to optimize profitability and customer experience would differentiate the MVNO in the mobile communications industry.

Baseline results must be updated over time to compare the growing data set from a scaled deployment with MVNO. Sky Peak Technologies is committed to this effort through a formal engagement with a local university to objectively quantify video data rate baselines for various content sources and networks.

Test #	Minutes streamed	MB used	Data Rate (MB / Hr)
Test Case 1: WCN Non-compressed PLD, CORA ME 0 shaping (baseline)			
1	64	138	129
2	61	171	168
3	75	165	132
4	185	602	195
Totals:	385	1076	
Average:			168
Test Case 2: WCN Compressed PLD, CORA ME 0 shaping (baseline)			
1	185	720	234
2	62	261	253
3	72	156	130
4	71	92	78
5	61	173	170
Totals:	451	1403	
Average:			187
Test Case 3: Android Device 1, Tier 1 Carrier, CORA ME 0 shaping (baseline)			
1	48	204	255
2	60	196	196
3	58	185	191
4	59	199	202
Totals:	225	784	
Average:			209
Test Case 4: Non-compressed PLD, HQ/720p, CORA ME 0 shaping			
1	67	811	726
2	61	705	694
Totals:	128	1517	
Average:			711
Test Case 5: Compressed PLD, HQ/720p, CORA ME 0 shaping			
1	71	606	512
2	99	952	577
Totals:	170	1558	
Average:			
Test Case 6: Android Device 2 / WCN, Auto, CORA ME shaping			
1	93	192	124
Test Case 7: Android Device 2, Tier 1 Carrier, CORA ME shaping HQ Setting			
1	40	133	199
2	16	34	129
3	15	80	319
Totals:	71	247	
Average:			209