ATTENTION:
GENERAL MANAGER ❑
PARTS MANAGER ❑
CLAIMS PERSONNEL ❑
SERVICE MANAGER ❑

IMPORTANT - All Service Personnel Should Read and Initial in the boxes provided, right.

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SUBARU

QUALITY DRIVEN® SERVICE

SERVICE BULLETIN

APPLICABILITY: 2018-23MY Legacy and Outback
2017-23MY Impreza
2018-23MY Crosstrek
2019-23MY Forester
2019-23MY Ascent

NUMBER: 16-132-20R
DATE: 12/18/20
REVISED: 11/17/22

SUBJECT: Diagnostic Information for Alleged Chain Slip Condition
on TR580 / TR690 Transmissions

INTRODUCTION:

This Service Information Bulletin provides updated diagnostic procedures to follow and a brief questionnaire to complete when diagnosing an alleged Chain Slip condition on the TR580 and TR690 model CVT transmissions used in the models listed above. In some cases, the customer may have had a concern of hearing an abnormal sound and / or felt an unusual vibration while driving. This information is intended to provide Technicians a user-friendly procedure which will help to ensure an accurate diagnosis and reduce the possibility of unnecessary CVT replacements.

SERVICE PROCEDURE / INFORMATION:

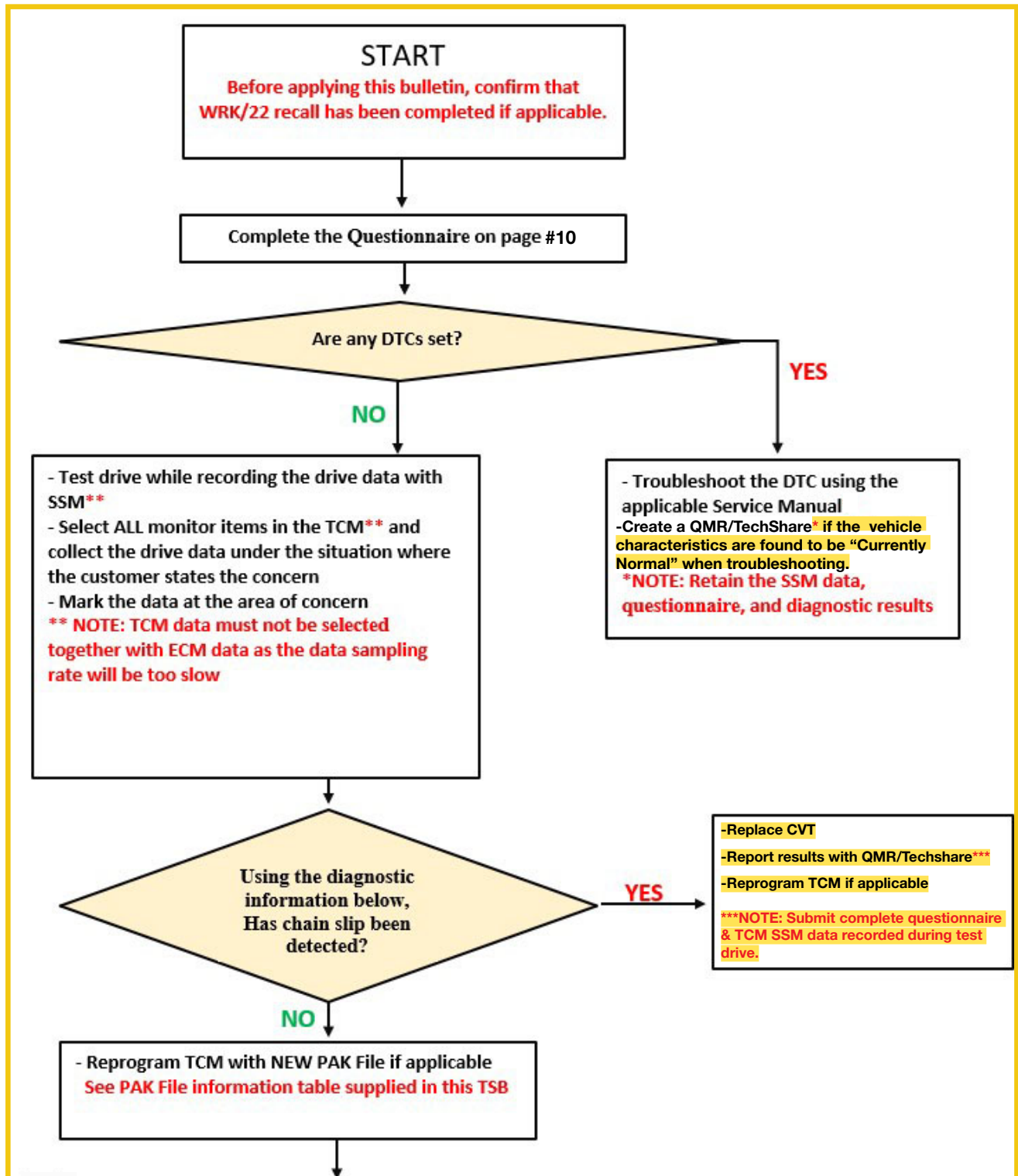Customer satisfaction and retention starts with performing quality repairs.

After completing the questionnaire located at the end of the Troubleshooting section, following the diagnostic procedures supplied in this bulletin and when determined necessary, service procedures for CVT and / or TCM replacement remain unchanged. Always refer to the applicable Service Manual and review the full requirements of the repair being performed. The Service Manual procedures contain information critical to performing an effective repair the first time, every time. This includes but is not limited to important SAFETY precautions, proper inspection criteria, necessary special tools, required processes and related one-time-use parts needed for a complete and lasting repair.

VERY IMPORTANT: With any customer concern, it is important to get a complete and detailed description from them so their condition can be duplicated. Duplicating the condition is critical for a proper diagnosis and successful repair. **Whenever using this TSB for alleged CVT Chain Slip diagnosis, Technicians are required to submit a completed QMR which includes all Flow Chart test results, SSM data and a COMPLETED copy of the questionnaire found on pg. 10.** This information will be extremely helpful for SBR Engineers when analyzing what the customer was experiencing as Chain Slip. Cooperation with this special information request is greatly appreciated!
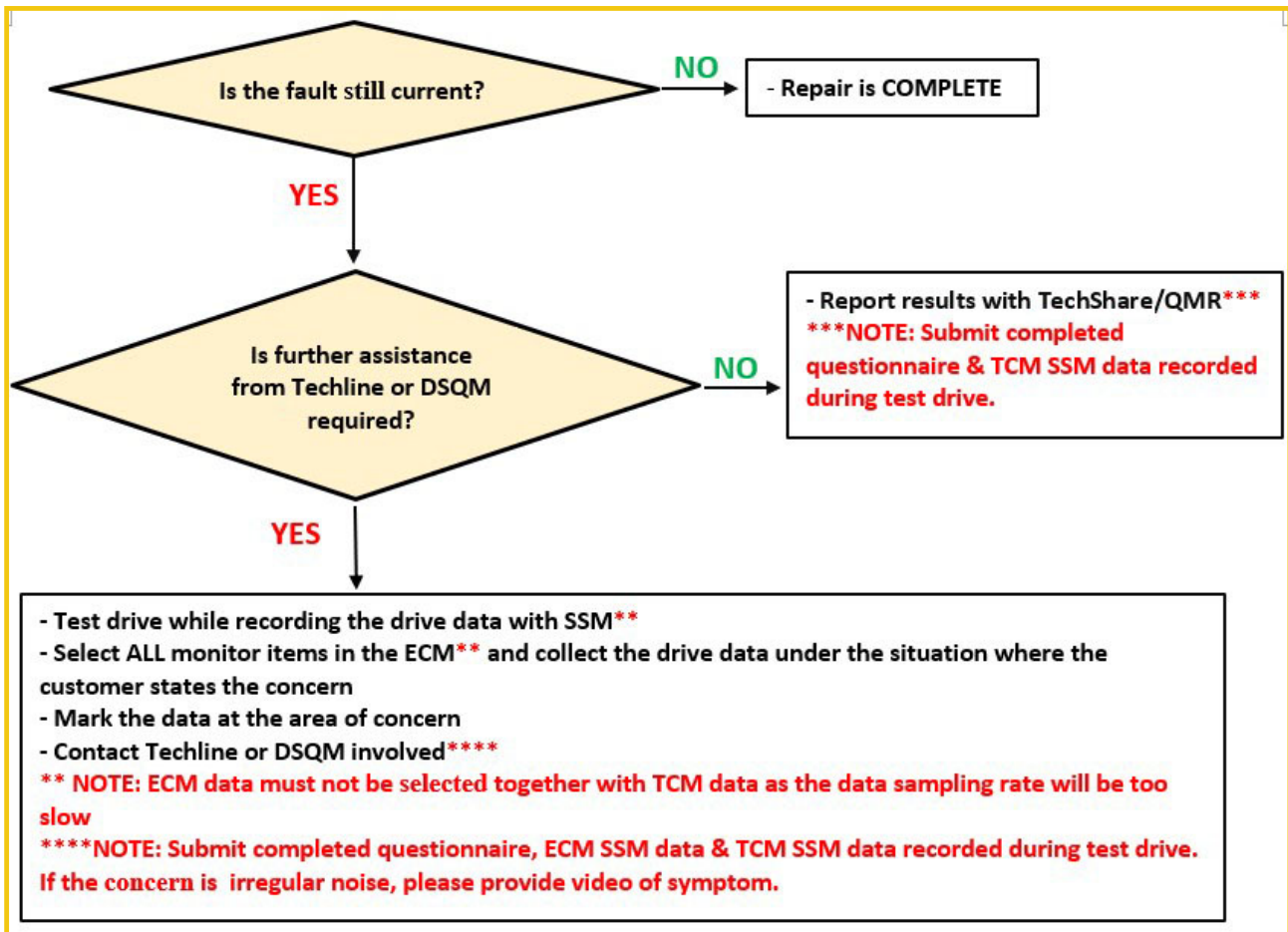
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Troubleshooting Flow Chart for Alleged CVT Chain Slip:

START
Before applying this bulletin, confirm that
WRK/22 recall has been completed if applicable.

↓

Complete the Questionnaire on page #10

↓

Are any DTCs set?

YES →

NO ↓

- Test drive while recording the drive data with SSM**
- Select ALL monitor items in the TCM** and collect the drive data under the situation where the customer states the concern
- Mark the data at the area of concern
** NOTE: TCM data must not be selected together with ECM data as the data sampling rate will be too slow

- Troubleshoot the DTC using the applicable Service Manual
-Create a QMR/TechShare* if the vehicle characteristics are found to be "Currently Normal" when troubleshooting.
*NOTE: Retain the SSM data, questionnaire, and diagnostic results

↓

Using the diagnostic information below, Has chain slip been detected?

YES →

-Replace CVT
-Report results with QMR/Techshare***
-Reprogram TCM if applicable

***NOTE: Submit complete questionnaire & TCM SSM data recorded during test drive.

NO ↓

- Reprogram TCM with NEW PAK File if applicable
See PAK File information table supplied in this TSB

↓

Continued...

PAK FILE INFORMATION:

IMPORTANT NOTES:

- When performing and CVT replacement or TCU reprogramming, always confirm the fault has been corrected.

- When submitting TechShare/QMR reports, include the TSB number of this document (16-132-20R) as a keyword. This is used to manage cases.

If the vehicle being repaired is not listed in the table below, or if the reprogramming file listed in the table below is already installed , proceed to the next Step in diagnosis procedure. The reprogramming file may be further updated in the future. Always refer to the most current revisions.

Model	MY	File name	Specification	Old Part Number	Keyword	New CID
ASCENT	19	30919AF98E.pak	2.4L DIT CVT without CVTF cooler (air cool)	30919AF98D	347BBBA5	R8FEE900
	19	30919AF99E.pak	2.4L DIT CVT with CVTF cooler (air cool)	30919AF99D	AF4E5A81	R8FEF900
	20-21	30919AH13F.pk2	2.4L DIT CVT without CVTF cooler (air cool)	30919AH13E	Q9FEFA00	Q9FEEA00
	20-21	30919AH14F.pk2	2.4L DIT CVT with CVTF cooler (air cool)	30919AH14E	935CAE53	Q9FEFA00
	22	30919AJ53B.pk2	2.4L DIT CVT without CVTF cooler (air cool)	30919AJ53A	D3DF9A7B	N2FEE600
	22	30919AJ54B.pk2	2.4L DIT CVT with CVTF cooler (air cool)	30919AJ54A	CED94BB7	N2FEF600

CVT Chain Slip Assessment:

There are three main forms of CVT chain slip.

- Continuous Micro-Slip
- Short-Time Slip
- Long-Time Slip

Using Subaru Select Monitor (SSM), check and record data monitors and compare to the three examples listed below. If the recorded data from the vehicle matches the examples below, the CVT will require replacement. The SSM data will be required for claim submission. A QMR containing the same information will also be required.

1. **Continuous Micro-Slip:**

   During a continuous micro-slip, while the Accelerator Opening Angle monitor displays a stable value for more than one second, there are fluctuations in the Actual Gear Ratio monitor:

   Peak to Peak > 0.02

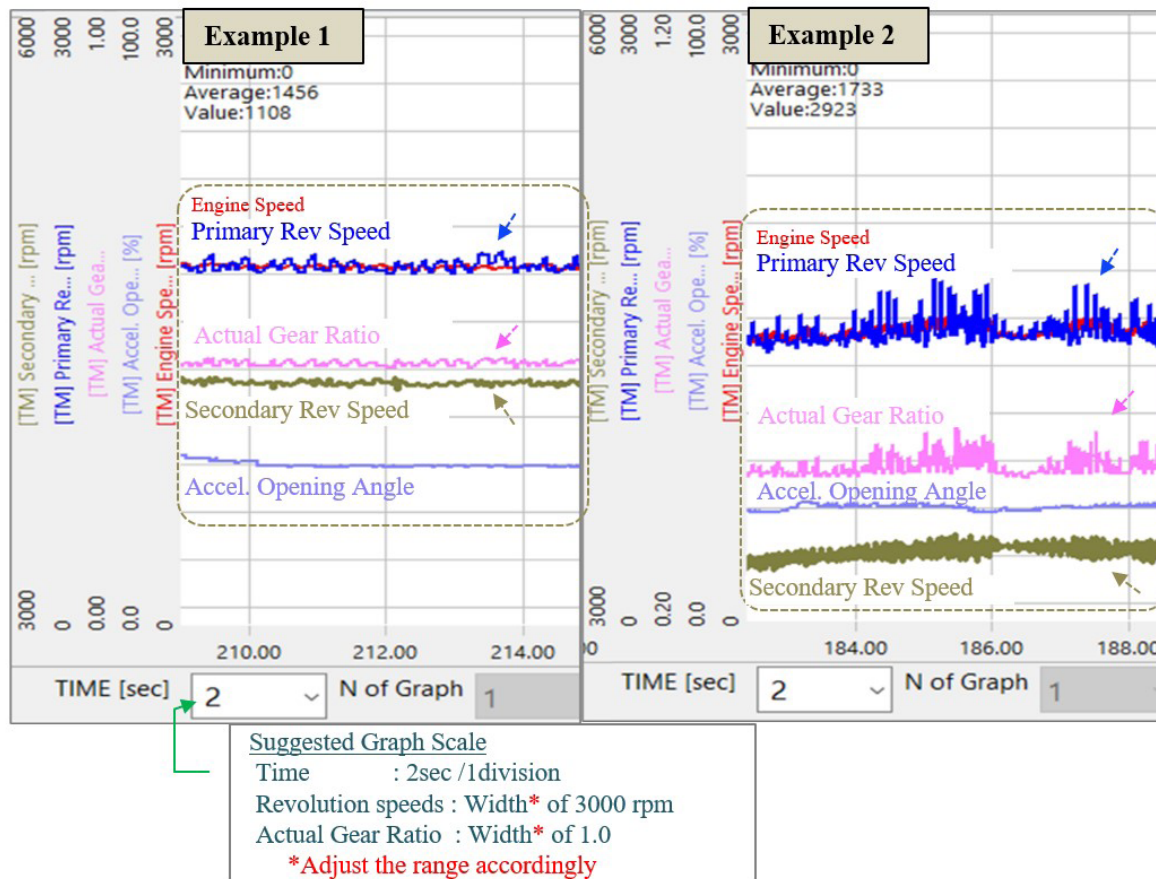   **Frequency > 3 cycles per 1 second**

   There are fluctuations in the Primary Rev Speed and/or Secondary Rev Speed monitor:

   Peak to Peak > 50 rpm
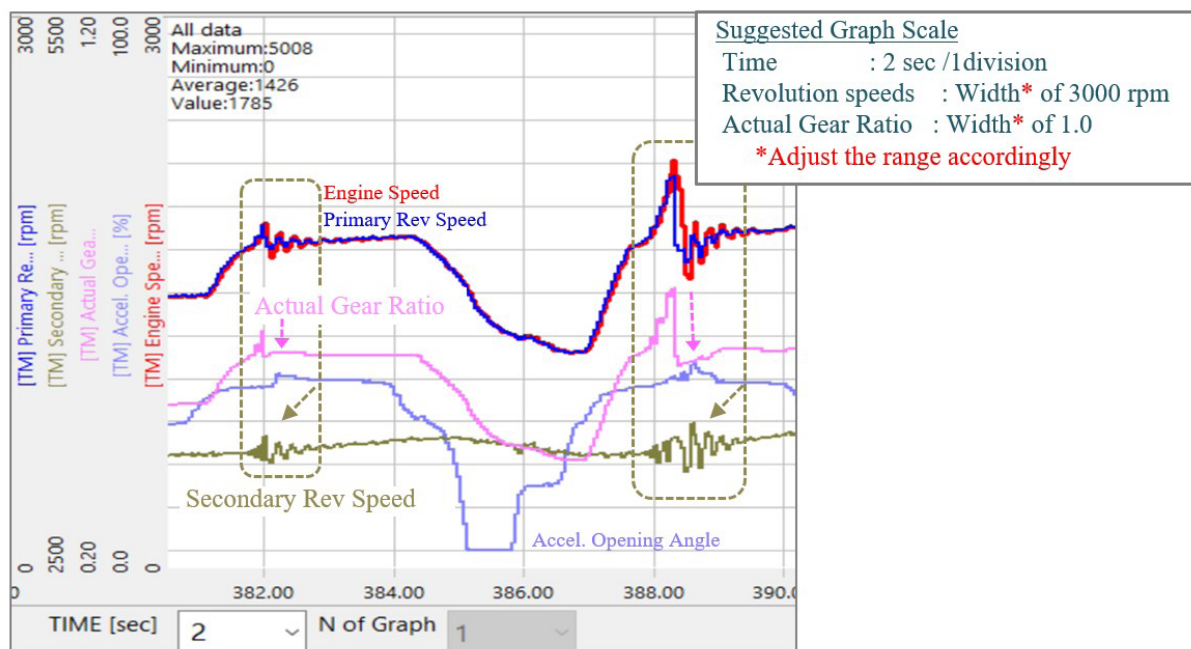
   Frequency > 3 cycles per 1 second

   Continued...

Below are two examples of the data monitoring during Continuous Micro-Slip

Example 1

Minimum:0
Average:1456
Value:1108

Engine Speed
Primary Rev Speed

Actual Gear Ratio

Secondary Rev Speed

Accel. Opening Angle

210.00   212.00   214.00

TIME [sec]   2   N of Graph   1

Example 2

Minimum:0
Average:1733
Value:2923

Engine Speed
Primary Rev Speed

Actual Gear Ratio

Accel. Opening Angle

Secondary Rev Speed

184.00   186.00   188.00

TIME [sec]   2   N of Graph   1

Suggested Graph Scale
Time   : 2sec /1division
Revolution speeds : Width* of 3000 rpm
Actual Gear Ratio : Width* of 1.0
*Adjust the range accordingly

2. **Short-Time Slip:**

When a short-time slip occurs, the changes in the Actual Gear Ratio monitor will be larger than 0.1 per 0.1 second. After the Actual Gear Ratio monitor resumes to stable conditions, distinct fluctuations in revolution speed continues.


All data
Maximum:5008
Minimum:0
Average:1426
Value:1785

Engine Speed
Primary Rev Speed

Actual Gear Ratio

Secondary Rev Speed

Accel. Opening Angle

382.00   384.00   386.00   388.00   390.0

TIME [sec]   2   N of Graph   1

Suggested Graph Scale
Time   : 2 sec /1division
Revolution speeds   : Width* of 3000 rpm
Actual Gear Ratio   : Width* of 1.0
*Adjust the range accordingly

Continued...

3. **Long-Time Slip:**

When a long-time slip occurs, the Primary UP Duty monitor will be larger than 90% and the Actual Pulley Ratio monitor lowers for a duration of 0.5 seconds or more. Even after the Actual Gear Ratio monitor resumes to stable conditions, distinct fluctuations in revolution speed continues.
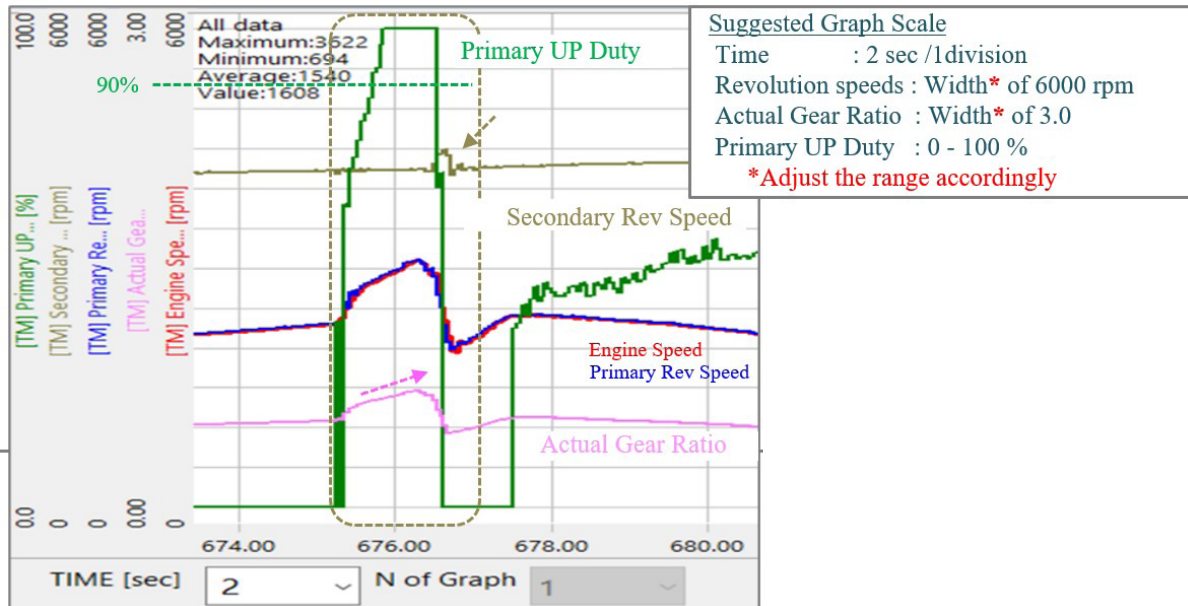
Reference Material: Similar Symptoms To CVT Chain Slip

In some cases, a customer may report symptoms of chain slip when in fact there is no actual slippage within the CVT. Listed below are examples of situations than can mimic the symptoms of chain slip.

1. **Forward Clutch Slip Shock:**

This shock can occur when the forward clutch slips. If this situation is reported, reprogram the TCM with new software if it is available. If there is no new software available or the reprograming does not remedy the issue, report the situation to Techline.

The rotation speeds for the upstream and downstream sides of the forward clutch do not synchronize when driving.

Continued...

<table>
<tr><td>

Example for
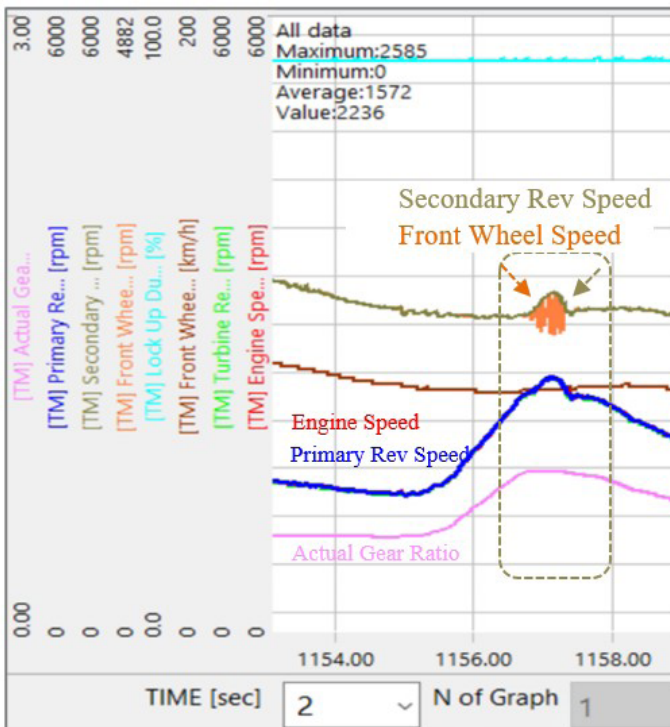2.4L Turbo or 3.6L NA equipped vehicles

Upstream side of the forward clutch-
Secondary Rev Speed

Downstream side of the forward clutch-
Front Wheel Speed

</td><td>

Example for vehicles **WITHOUT**
2.4L Turbo or 3.6L NA

Upstream side of the forward clutch-
Turbine Revolution Speed

Downstream side of the forward clutch-
Primary Rev Speed

</td></tr>
</table>

Suggested Graph Scale
Time   : 2sec /1division
Engine Speed   : 0 - 6000 rpm
Primary Rev Speed : 0 - 6000 rpm
Secondary Rev Speed : 0 - 6000 rpm
Front Wheel Speed : 0 - 4882**** rpm
Actual Gear Ratio : 0.0 - 3.0
Lock Up Duty Ratio : 0 - 100 %

Note**** : Due to the secondary reduction
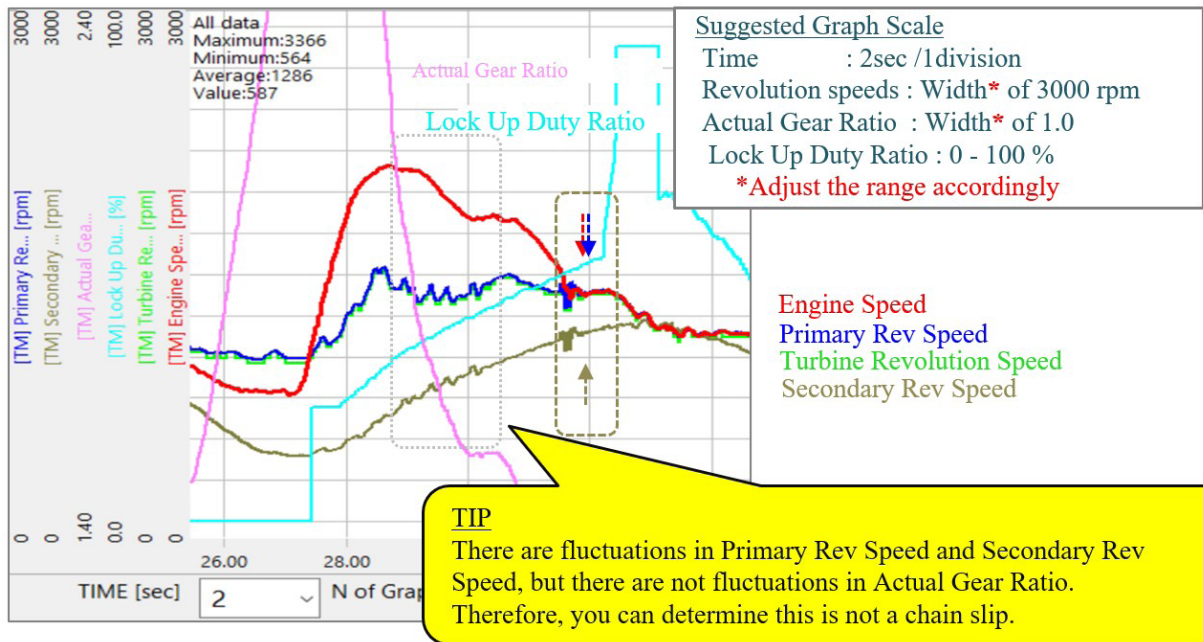   gear ratio 1.229
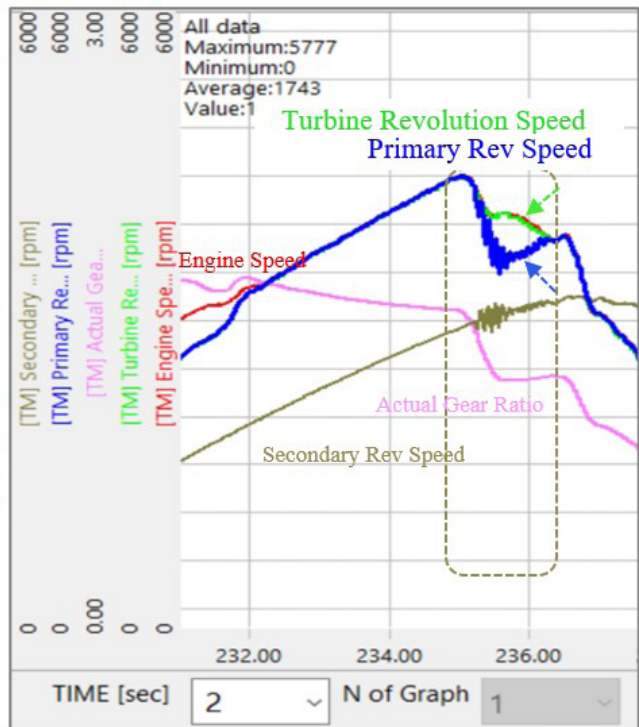
Suggested Graph Scale
Time   : 2sec /1division
Engine Speed   : 0 - 6000 rpm
Turbine Revolution Speed : 0 – 6000 rpm
Primary Rev Speed   : 0 - 6000 rpm
Secondary Rev Speed : 0 - 6000 rpm
Front Wheel Speed   : 0 - 6000 rpm
Actual Gear Ratio : 0.0 - 3.0
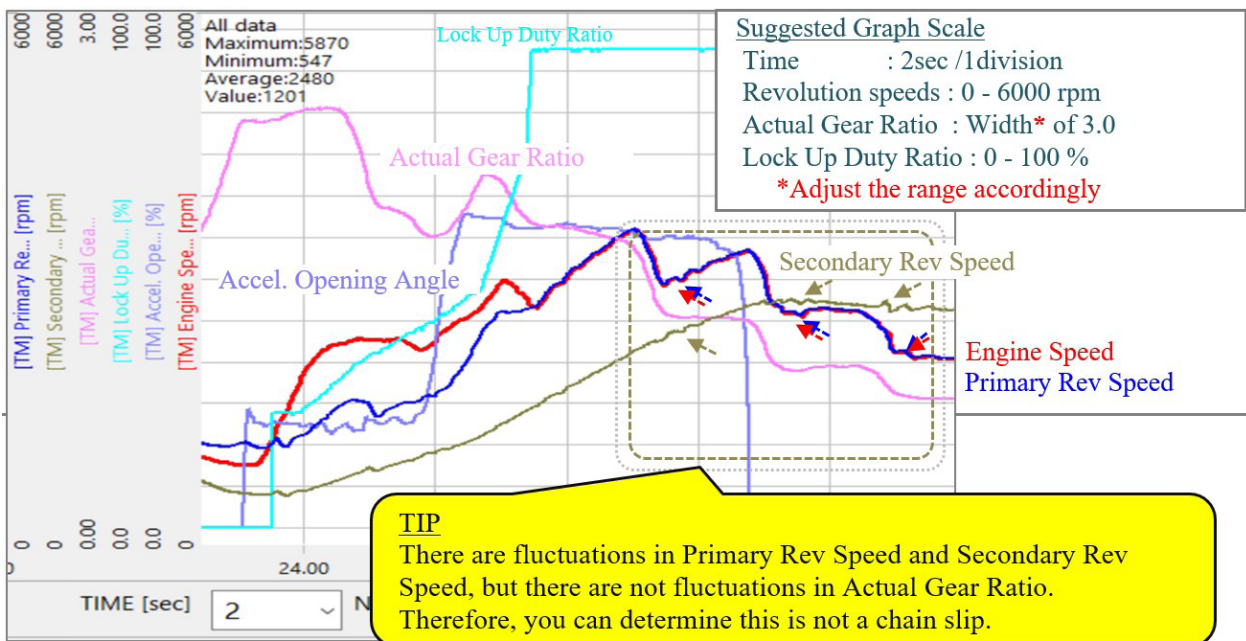Lock Up Duty Ratio : 0 - 100 %

Continued...

2. Lock Up Clutch Engagement Shock:

This shock can occur when the lock up clutch engages rapidly. If this situation is reported, reprogram the TCM with new software if it is available. If there is no new software available or the reprograming does not remedy the issue, report the situation to Techline.

Suggested Graph Scale
Time   : 2sec /1division
Revolution speeds : Width* of 3000 rpm
Actual Gear Ratio : Width* of 1.0
 Lock Up Duty Ratio : 0 - 100 %
    *Adjust the range accordingly

Engine Speed
Primary Rev Speed
Turbine Revolution Speed
Secondary Rev Speed

TIP
There are fluctuations in Primary Rev Speed and Secondary Rev Speed, but there are not fluctuations in Actual Gear Ratio. Therefore, you can determine this is not a chain slip.

3. Shift Up Shock:

This shock can occur when the CVT upshifts. If this situation is reported, reprogram the TCM with new software if it is available. If there is no new software available or the reprograming does not remedy the issue, report the situation to Techline.
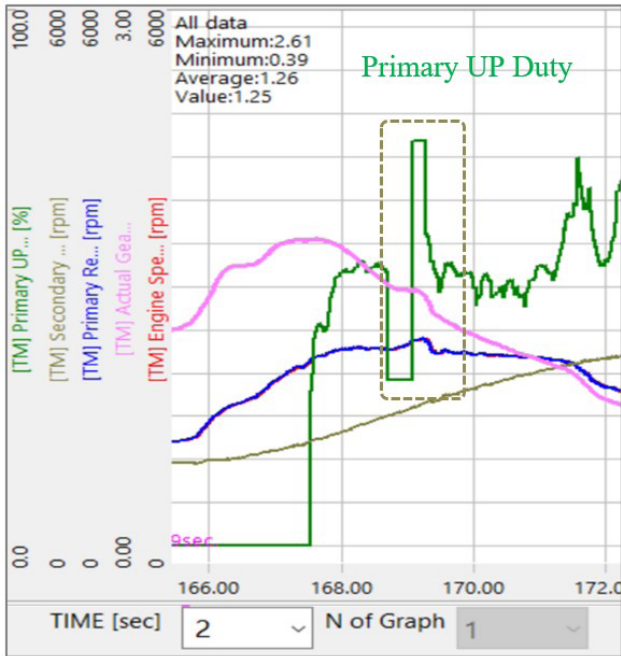

Suggested Graph Scale
Time   : 2sec /1division
Revolution speeds : 0 - 6000 rpm
Actual Gear Ratio : Width* of 3.0
Lock Up Duty Ratio : 0 - 100 %
    *Adjust the range accordingly

Engine Speed
Primary Rev Speed

TIP
There are fluctuations in Primary Rev Speed and Secondary Rev Speed, but there are not fluctuations in Actual Gear Ratio. Therefore, you can determine this is not a chain slip.

Continued...

4. Primary Up Duty Square Control (Ascent Models up to 2021MY):

A harsh shift can be felt while driving. If this situation is reported, reprogram the TCM with new software if it is available. If there is no new software available or the reprograming does not remedy the issue, report the situation to Techline.

IMPORTANT REMINDERS:

- SOA strongly discourages the printing and/or local storage of service information as previously released information and electronic publications may be updated at any time.

- Always check for any open recalls or campaigns anytime a vehicle is in for servicing.

- Always refer to STIS for the latest service information before performing any repairs.

Continued...

Questionnaire for Alleged CVT Chain Slip Condition

Please use all applicable check boxes.

Please enter a number value in ☐ vehicle speed box.

Please attach SSM data files for both before and after pre- and post-repair.

No.	Item		Answer
1	Condition:	CVT Temperature	☐ Immediately after starting the engine ☐ Warming-up ☐ After warming-up
2		Location	☐ Highway ☐ Paved-road ☐ Rough-road
3		Vehicle Speed	[ ] mph
4		Driving Condition	☐ While accelerating ☐ While decelerating ☐ While cruising ☐ While turning
5		Vehicle Used for Towing?	☐ Yes ☐ No
6		Frequency of Slip Condition	☐ Only once ☐ A few times ☐ Intermittent ☐ Always
7		How Long Has Condition Been Occurring?	☐ It just started ☐ Within the last month ☐ From new
8	Symptoms:		☐ Noise ☐ Vibration ☐ Shock/Bump ☐ Hesitation/Surge ☐ Shudder ☐ Jerking/Bucking ☐ Engine RPM rise/flare ☐ Lack of power / not accelerate ☐ Deceleration feeling ☐ Engine RPM not rise ☐ Engine RPM fluctuation / hunting gear ☐ Other (please describe:)
9	Repair(s):		☐ T/M assy replacement ☐ T/M part(s) replacement ☐ TCM Re-programing ☐ AT relearn / torque converter relearn ☐ No repair made (inspection only) ☐ Other (please describe:)
10	Customer Comments Post-Repair:		Example: Satisfaction / dissatisfaction level, further improvement requirements.