



Analysis of WLTP validation 2 results, Charge depleting tests for BEV

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Technical data of vehicles



- **The WLTP validation 2 database contains results from 6 different BEV's**

IDveh	veh class	kerb mass in kg	GVM in kg	peak power in kW	30 min power in kW	v_max in km/h
58	2	1890	2180	120	60	145
59	3	840	1150	55	30	125
77	3	1110		47		130
80	3	1590	2023	70	50	
84	2	1290	1615	56	28	130
108	3	1250		49		

Overall results, CD tests



IDveh	cycles driven for CD tests				electrical range in km			
	1	2	3	4	1	2	3	4
58	class 2, version 1.4, L&M&H	class 2, version 1.4, L&M			257.8	270.7		
59	class 3, version 5, L&M&H&L	class 3, version 5, L&M	class 3, version 5, L&M&H&XH		167.6	185.8	126.0	
77	class 3, version 5, L&M&H&XH				102.5			
80	class 3, version 5, L&M&H&L	class 3, version 5, L&M&H&XH			208.2	172.0		
84	class 1, version 2, L&M&L	class 1, version 2, L&M	class 2, version 2, L&M&H&XH	class 3, version 5, L&M&H	203.6	200.2	134.2	141.5
108	class 3, version 5, L&M, 1250 kg	class 3, version 5, L&M, 1350 kg	class 3, version 5, L&M&H&XH, 1250 kg	class 3, version 5, L&M&H&XH, 1350 kg	164.5	161.5	112.5	110.0

Table 2

detailed results, CD tests



IDveh	Test series ID	Test ID	cycle ID	description	duration in h	average in h	distance in km	average in km	v_act_end in km/h	a_15 s in m/s ²
58	1	1	20	WLTC, class 2, version 1.4, L&M&H	7.2	7.3	253.5	257.8	61.91	-1.15
58	1	2	20	WLTC, class 2, version 1.4, L&M&H	7.3		262.2		62.74	-1.16
58	2	3	26	WLTC, class 2, version 1.4, L&M	9.8	9.8	269.6	270.7	34.39	-0.64
58	2	4	26	WLTC, class 2, version 1.4, L&M	9.9		271.8		45.63	-0.85
59	1	1	14	WLTC, class 3, version 5, L&M&H&L	5.4	5.4	166.4	167.6	33.88	-0.63
59	1	2	14	WLTC, class 3, version 5, L&M&H&L	5.4		167.7		41.08	-0.76
59	1	3	14	WLTC, class 3, version 5, L&M&H&L	5.4		168.7		71.62	-1.33
59	2	4	11	WLTC, class 3, version 5, L&M	6.8	6.8	186.6	185.8	59.03	-1.09
59	2	5	11	WLTC, class 3, version 5, L&M	6.8		184.9		61.06	-1.13
59	3	6	1	WLTC, class 3, version 5, L&M&H&exH	2.8	2.8	125.7	126.0	89.63	-1.66
59	3	7	1	WLTC, class 3, version 5, L&M&H&exH	2.8		126.3		91.61	-1.70
77	1	1	1	WLTC, class 3, version 5, L&M&H&exH	2.3		102.5		40.38	-0.75
80	1	1	14	WLTC, class 3, version 5, L&M&H&L	6.6		208.2		39.76	-0.74
80	2	2	1	WLTC, class 3, version 5, L&M&H&exH	3.8		172.0		42.64	-0.79
84	1	1	31	WLTC, class 1, version 2, L&M&L	7.9	8.0	201.2	203.6	59.30	-1.10
84	1	2	31	WLTC, class 1, version 2, L&M&L	8.1		206.0		35.20	-0.65
84	2	3	3	WLTC, class 1, version 2, L&M	7.0	7.0	199.0	200.2	52.26	-0.97
84	2	4	3	WLTC, class 1, version 2, L&M	7.1		201.5		50.62	-0.94
84	3	5	2	WLTC, class 2, version 2, L&M&H&exH	3.0		134.2		108.08	-2.00
84	4	6	12	WLTC, class 3, version 5, L&M&H	3.9		141.5		69.48	-1.29
108	1	1	11	WLTC, class 3, version 5, L&M, 1250 kg	5.9		164.5		40.89	-0.76
108	2	2	11	WLTC, class 3, version 5, L&M, 1350 kg	5.9		161.5		50.45	-0.93
108	3	3	1	WLTC, class 3, version 5, L&M&H&exH, 1250 kg	2.5		112.5		112.16	-2.08
108	4	4	1	WLTC, class 3, version 5, L&M&H&exH, 1350 kg	2.4		110.0		117.28	-2.17

Table 3

Electrical range and v_{ave}

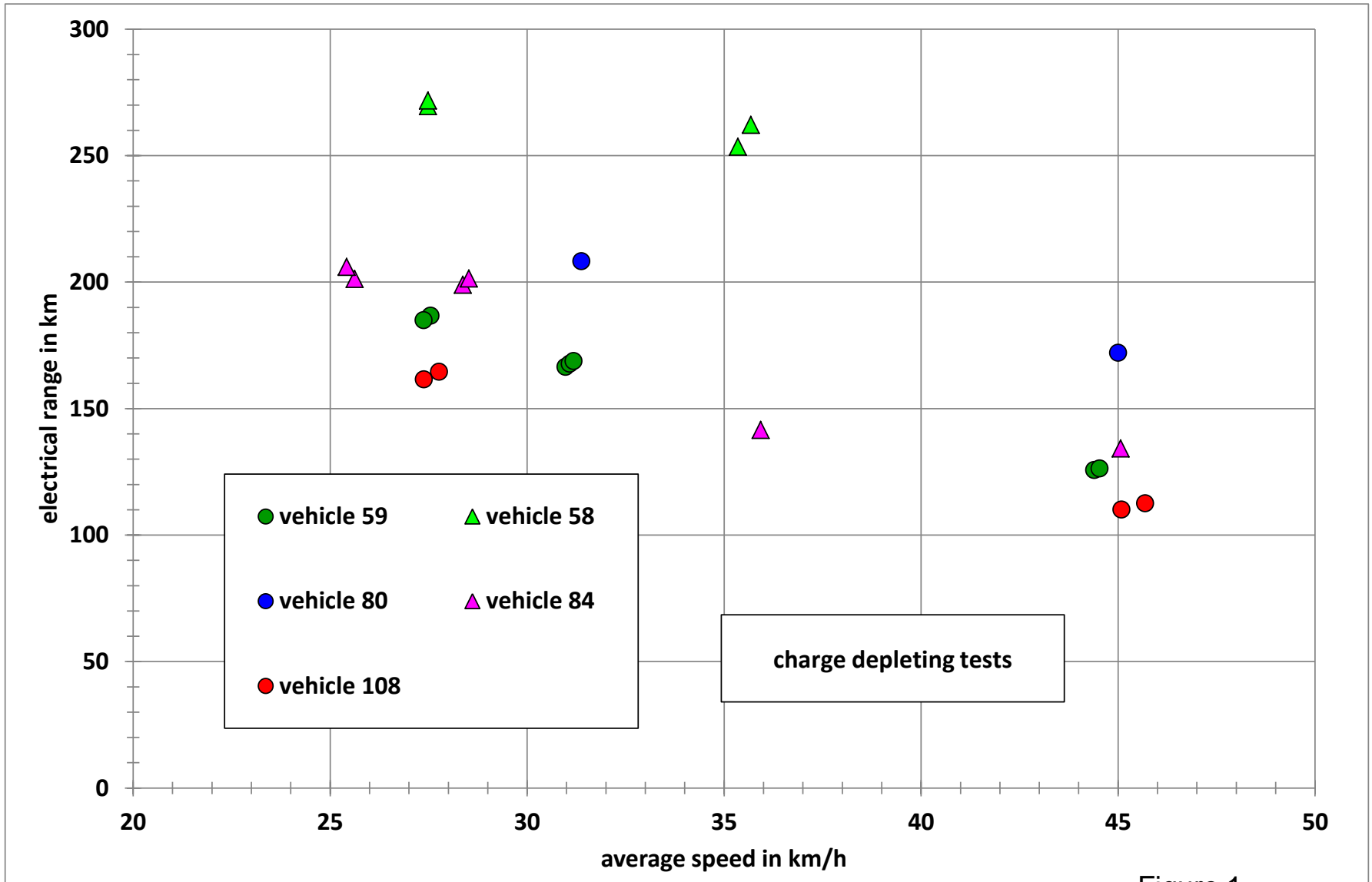


Figure 1

End of test diagrams



- **The following figures show the speed trace at the end of range test for all CD tests.**
- **The recommended drive instructions for the end of range condition were hardly followed in these tests.**
- **In this context (break off criteria) figures 3, 14, 15 and 20 need to be discussed more deeply.**

End of test vehicle speed trace

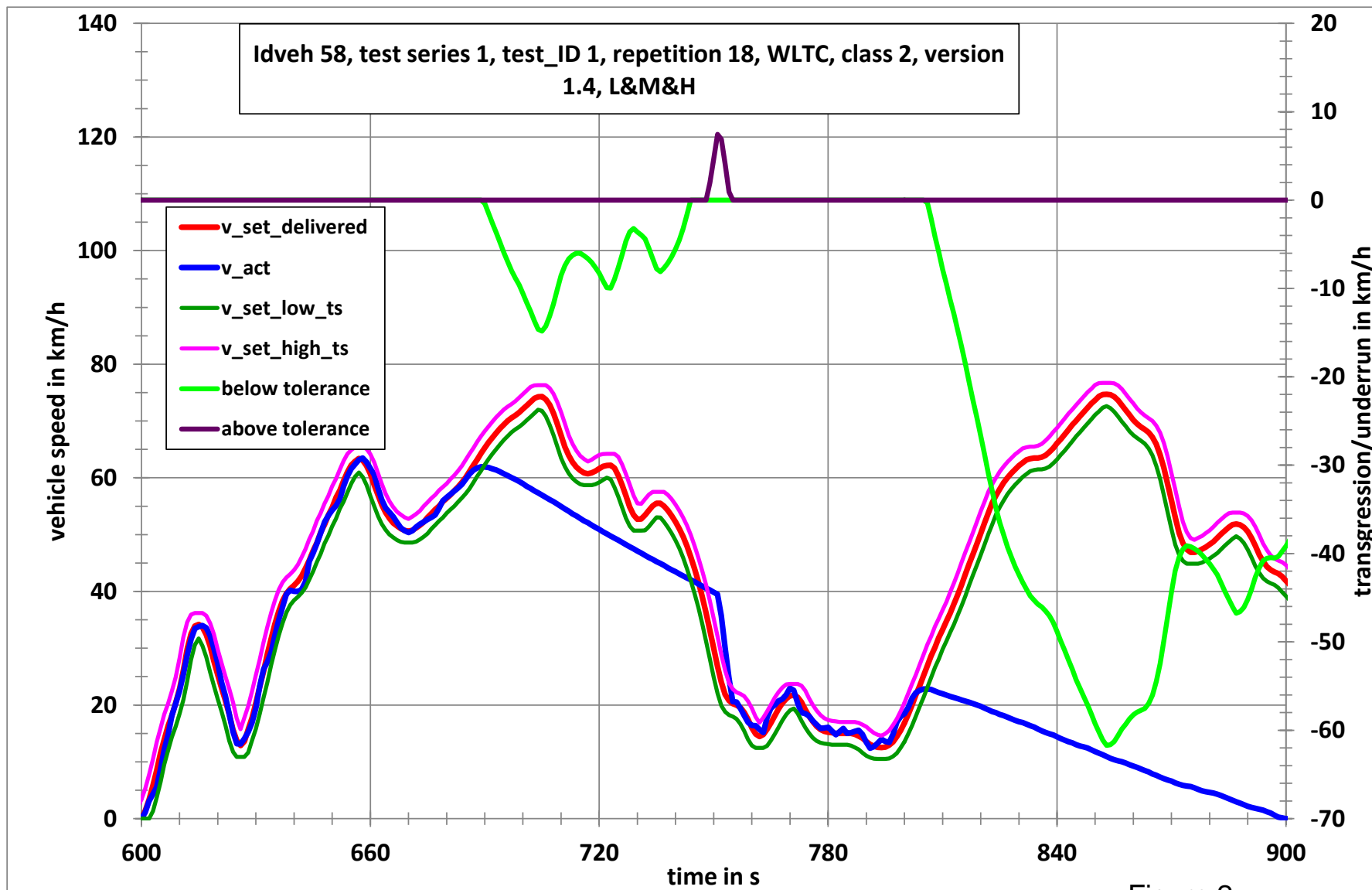
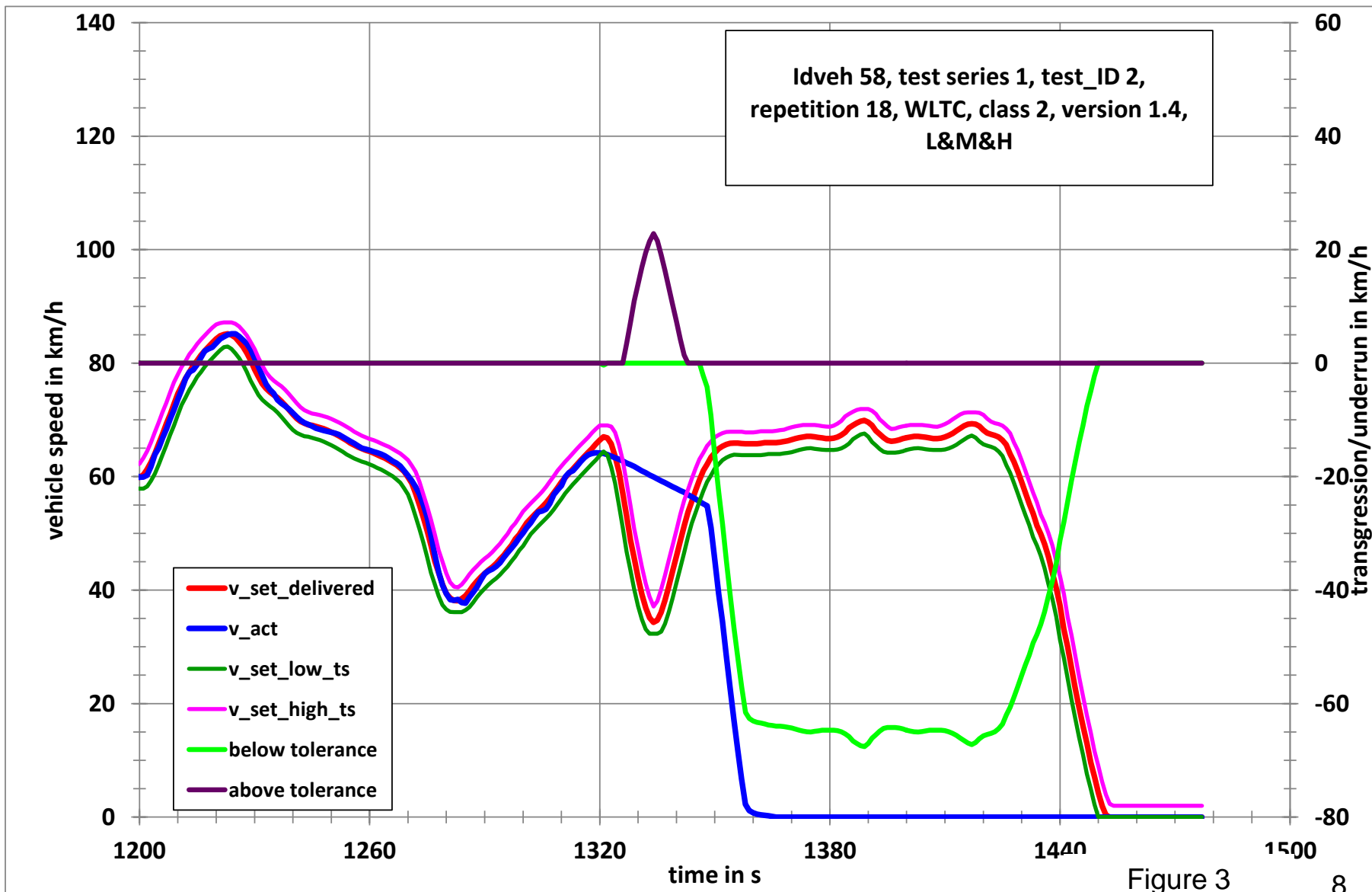


Figure 2

End of test vehicle speed trace



End of test vehicle speed trace

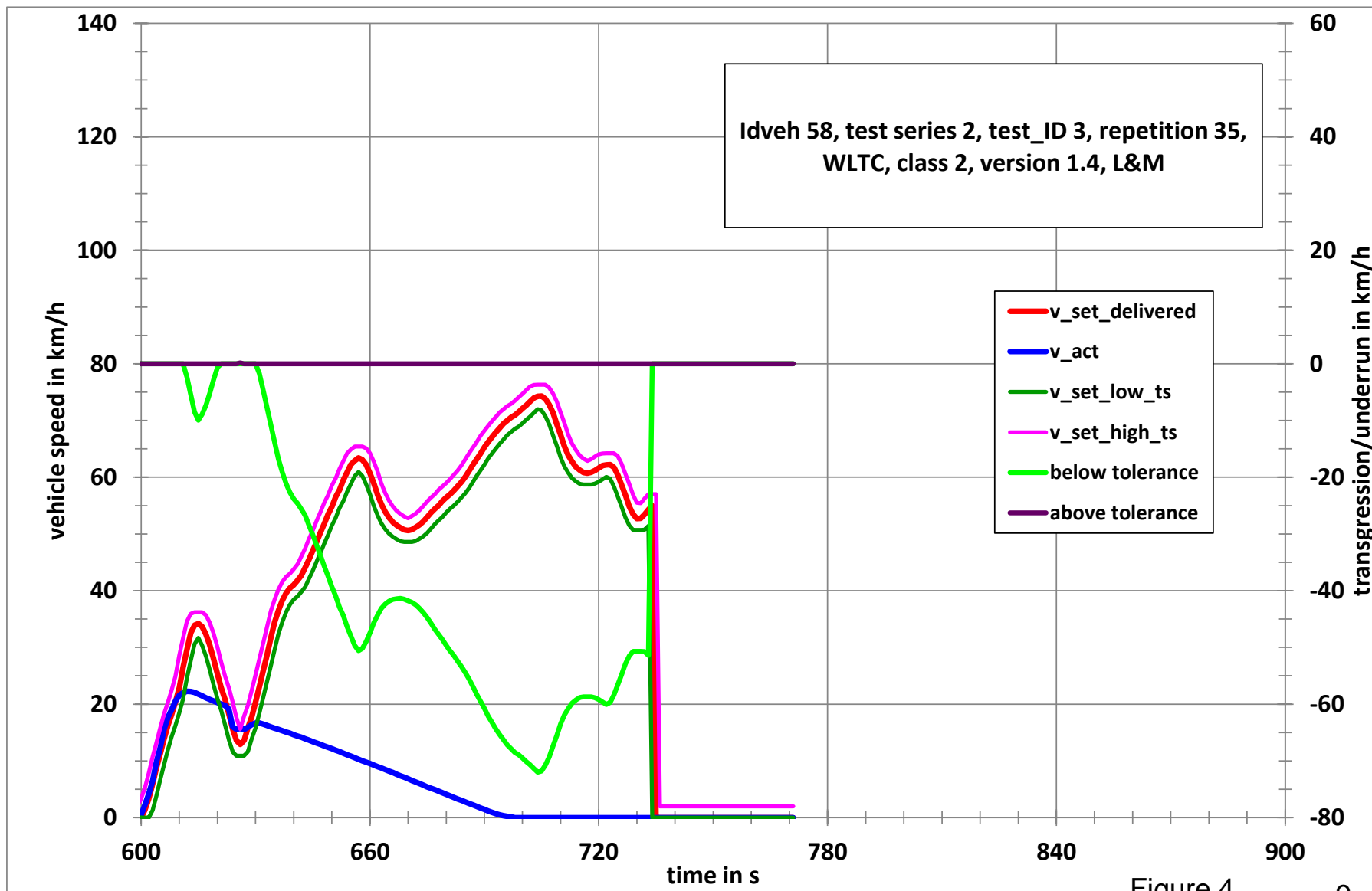


Figure 4

End of test vehicle speed trace

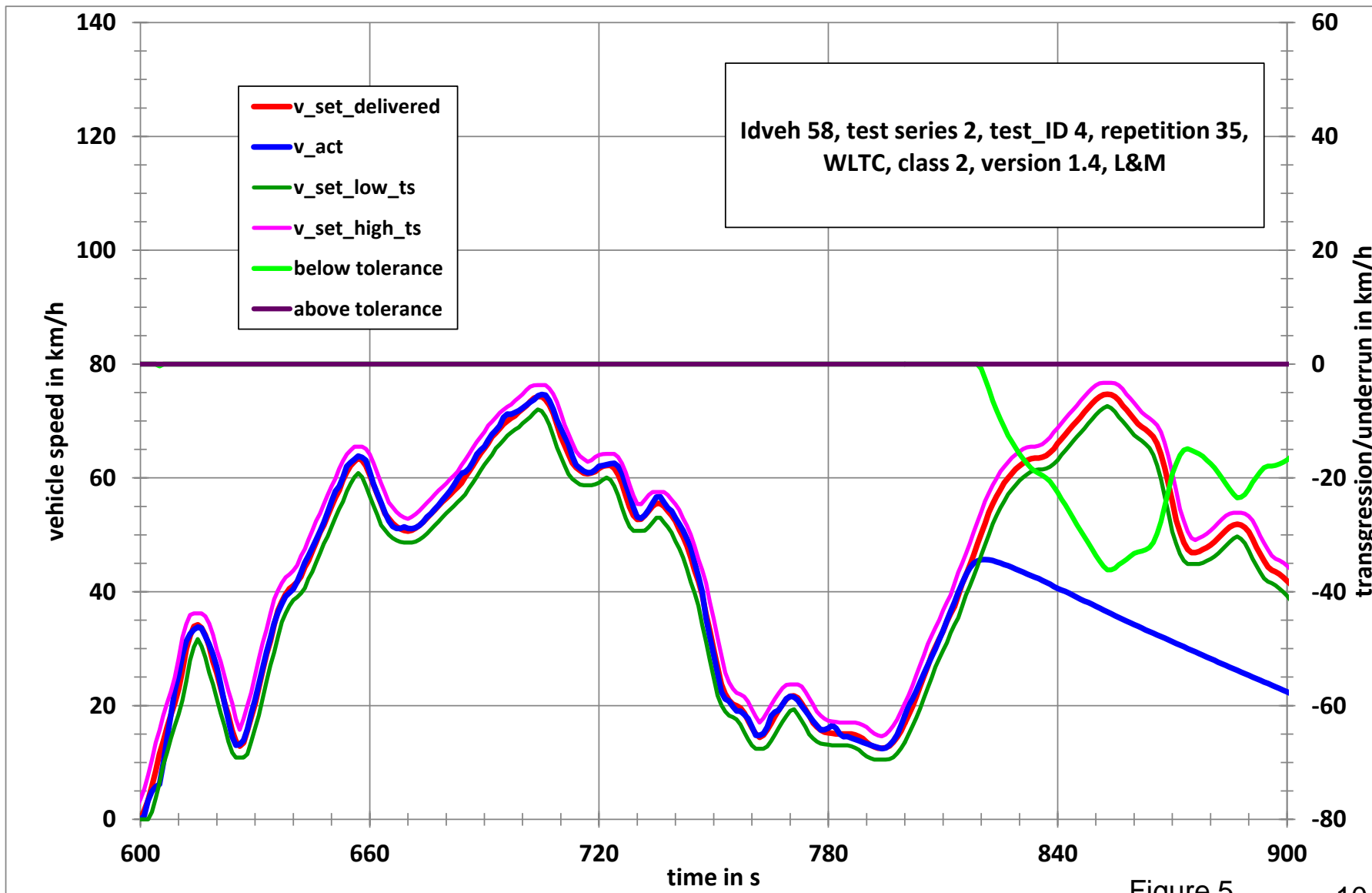


Figure 5

End of test vehicle speed trace

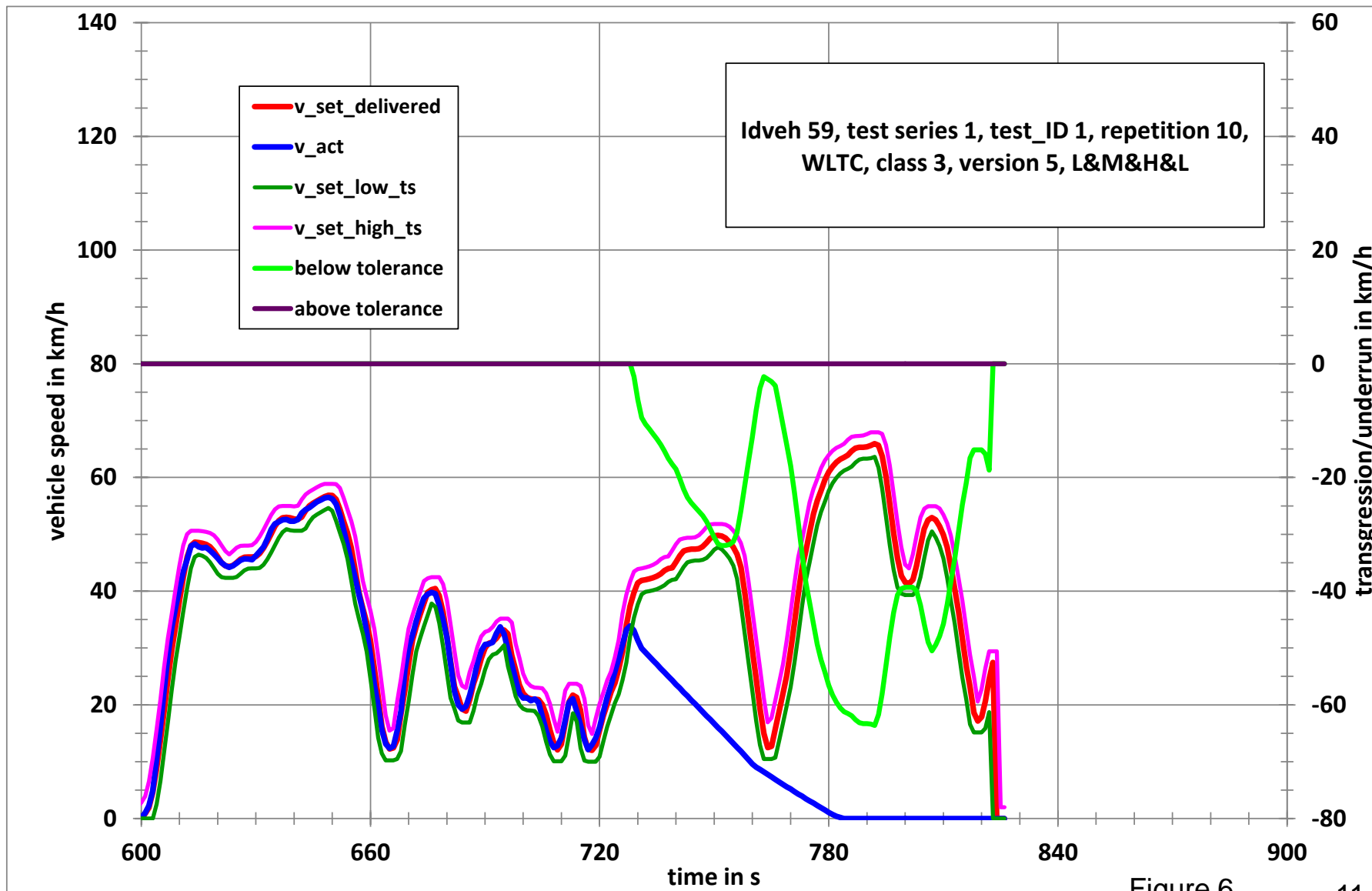


Figure 6

End of test vehicle speed trace

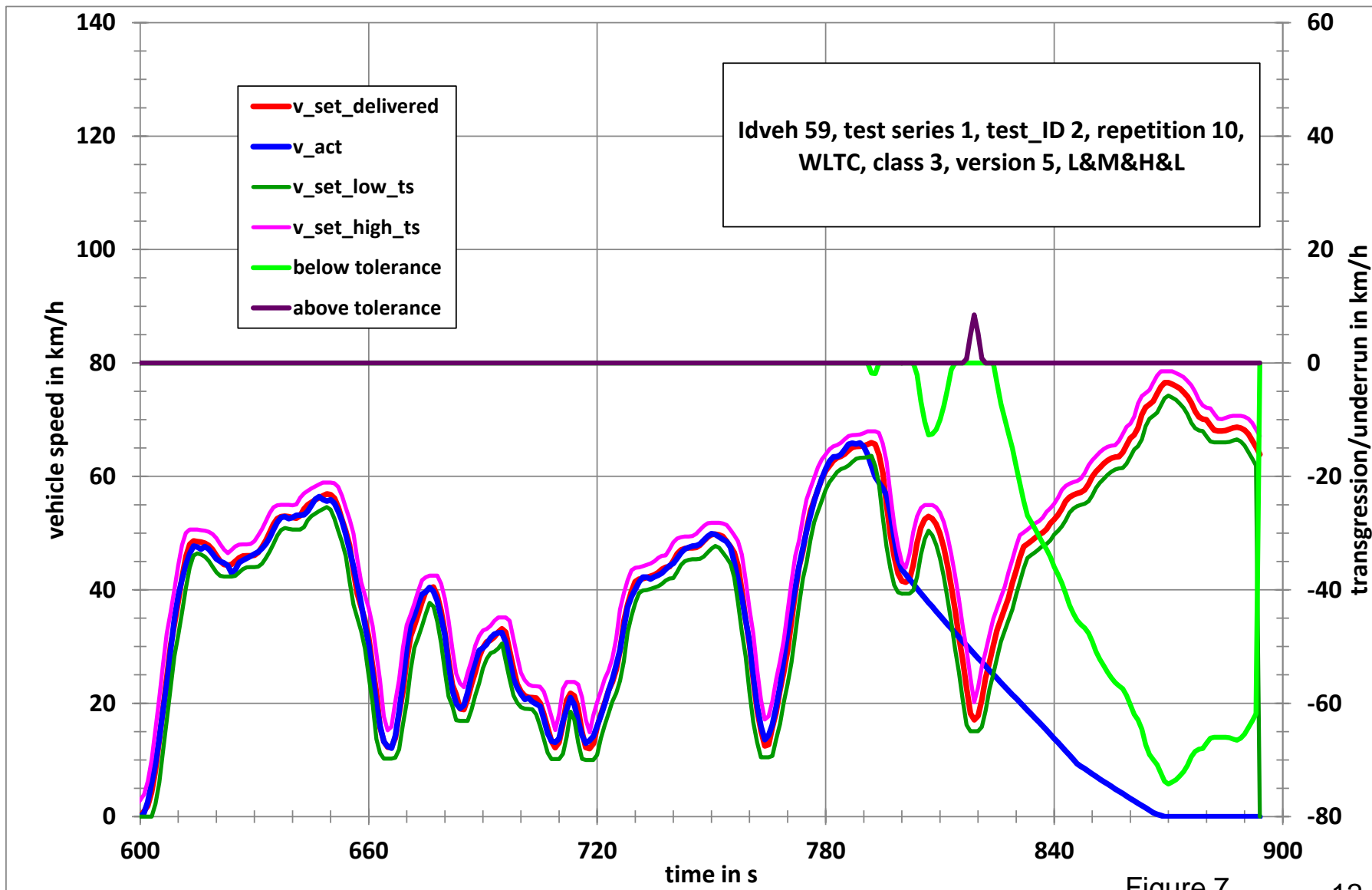


Figure 7

End of test vehicle speed trace

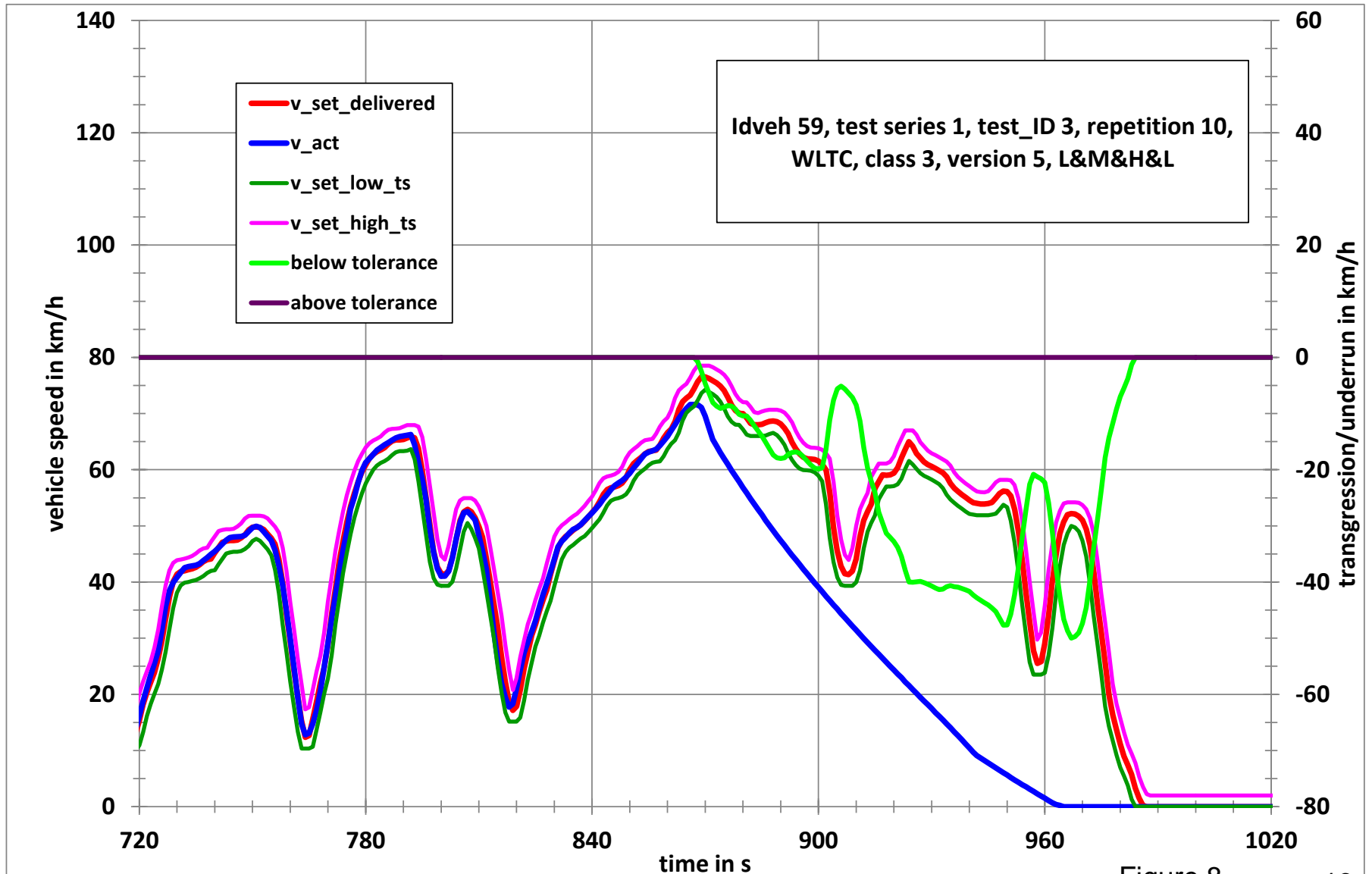


Figure 8

End of test vehicle speed trace

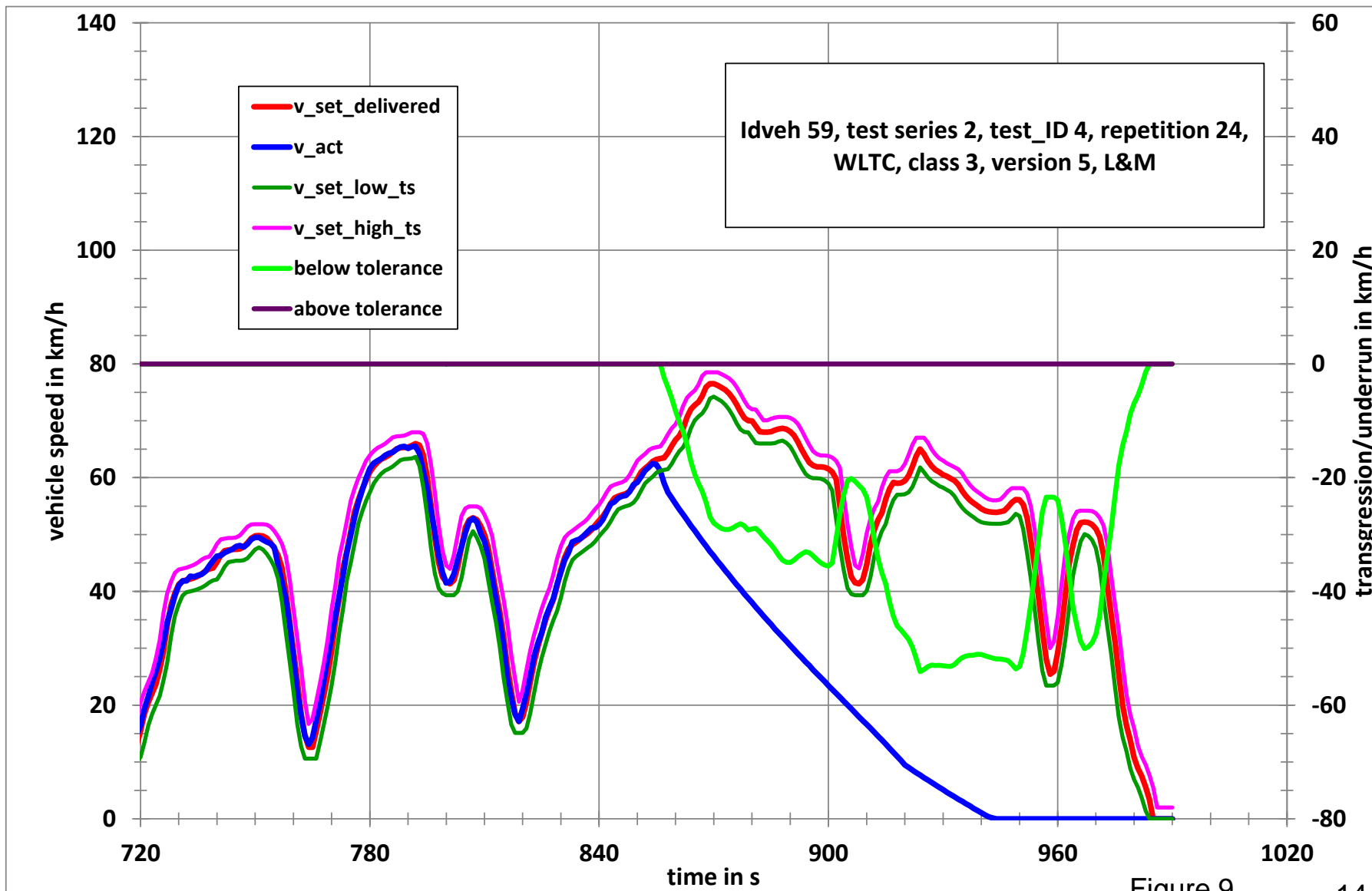


Figure 9

End of test vehicle speed trace

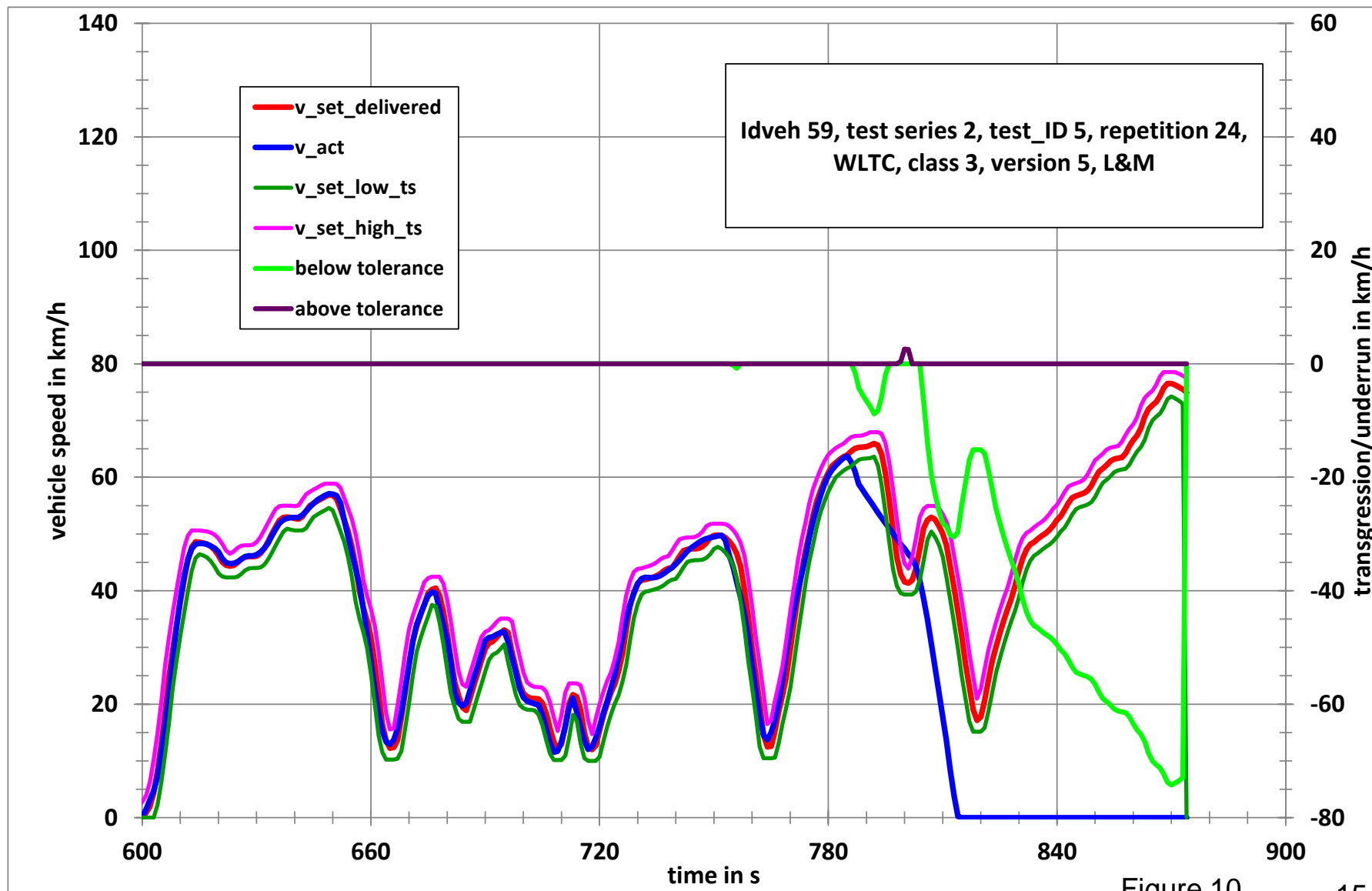


Figure 10

End of test vehicle speed trace

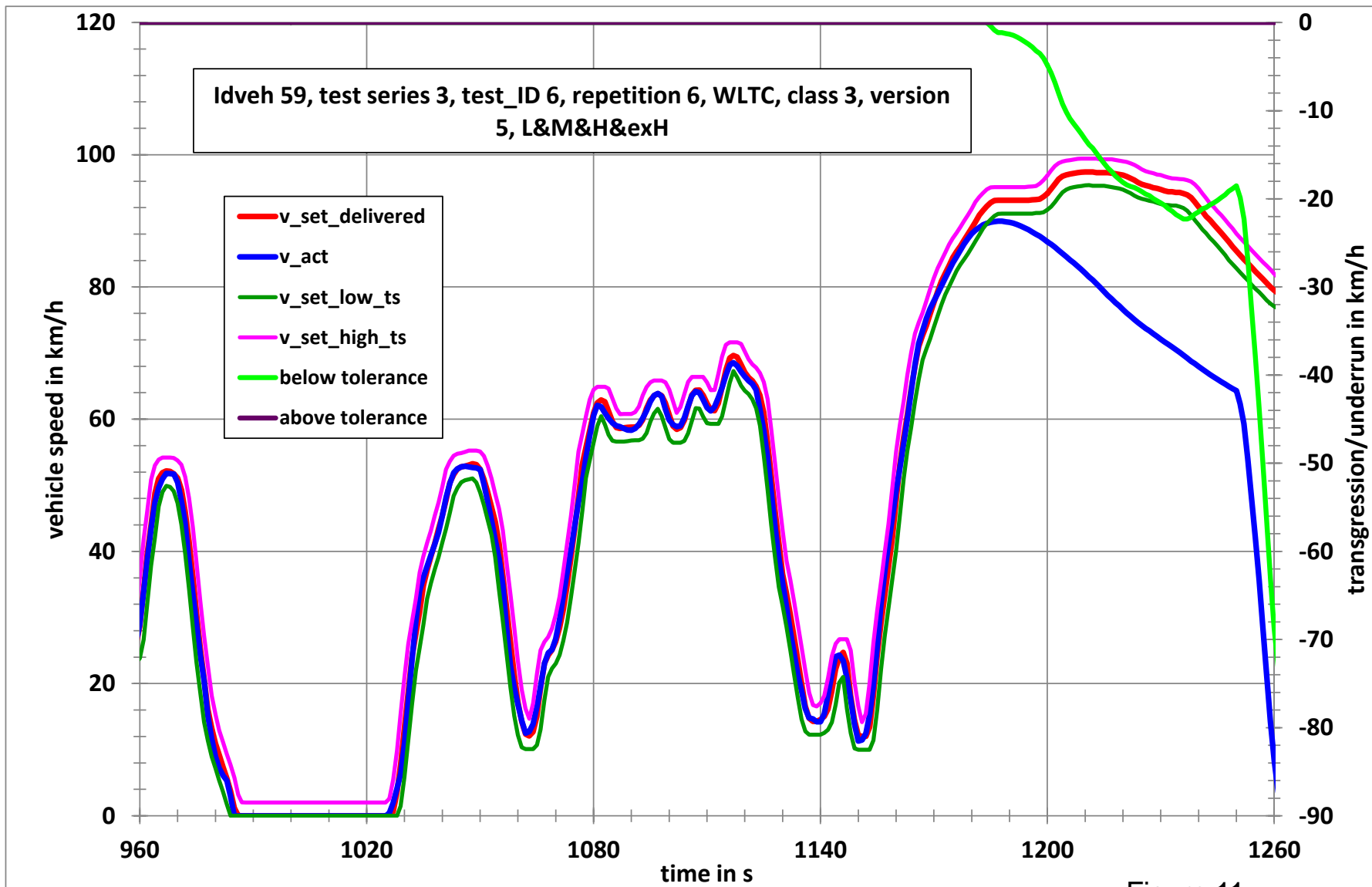


Figure 11

End of test vehicle speed trace

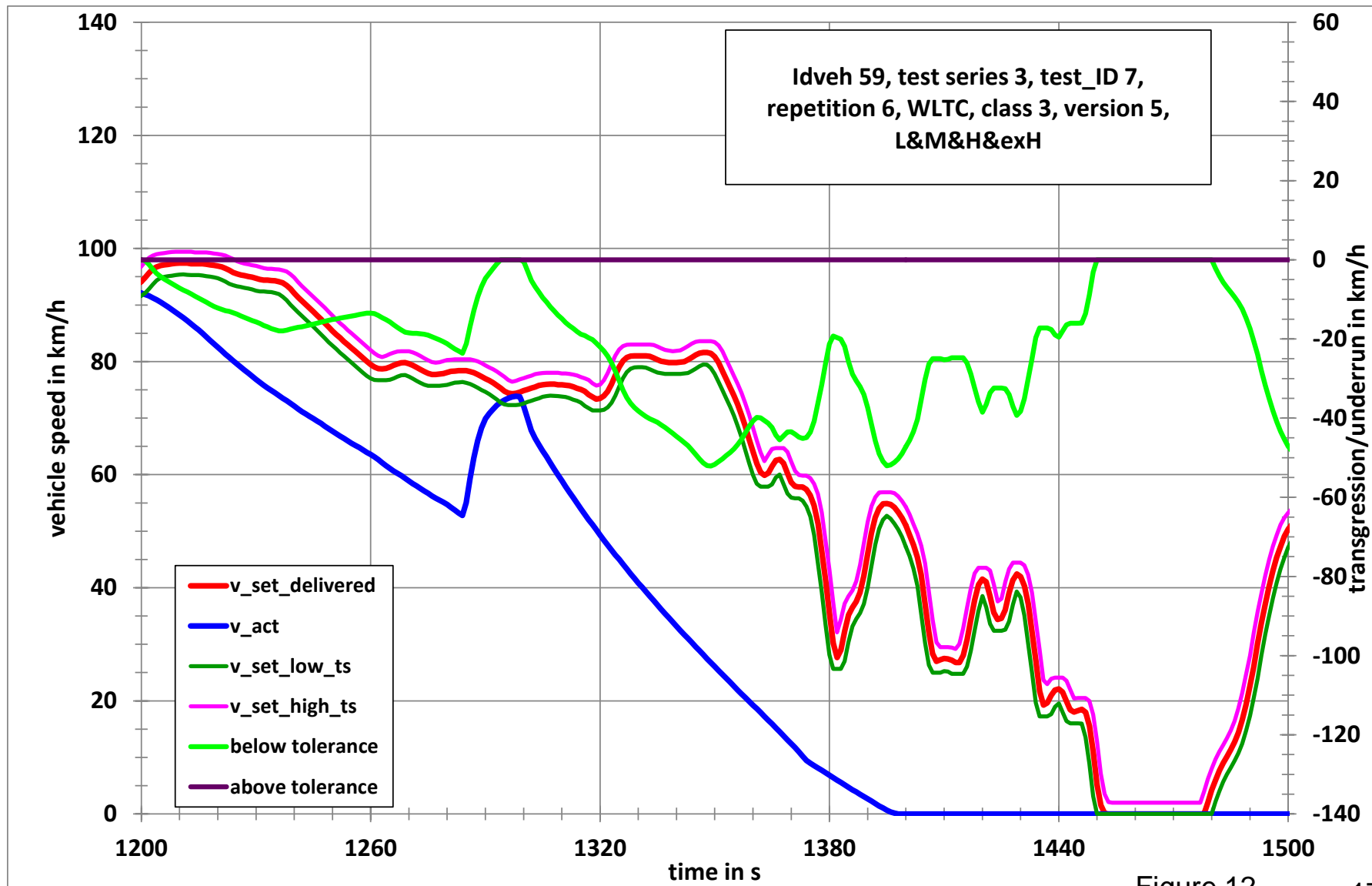
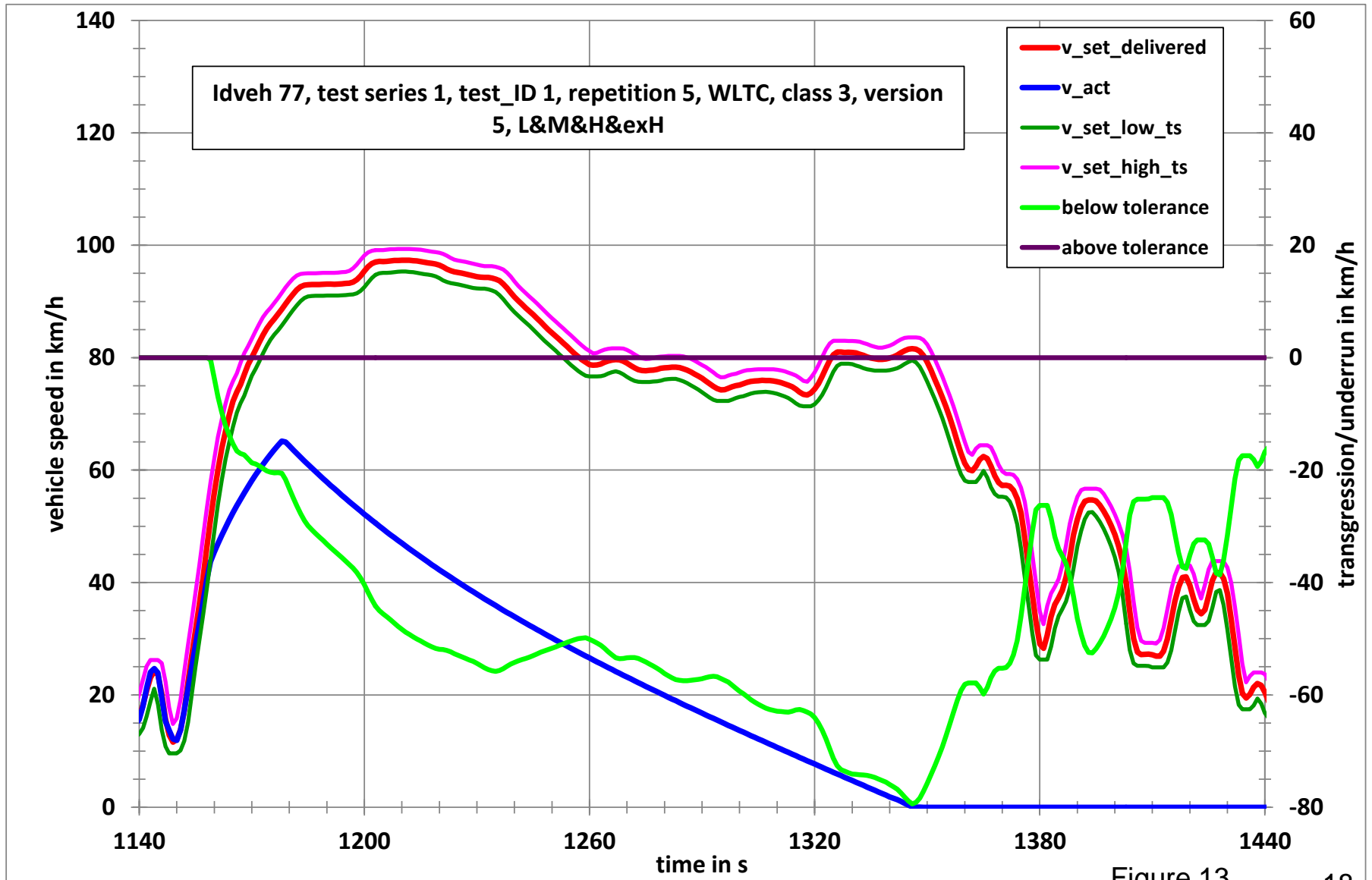


Figure 12

End of test vehicle speed trace



End of test vehicle speed trace

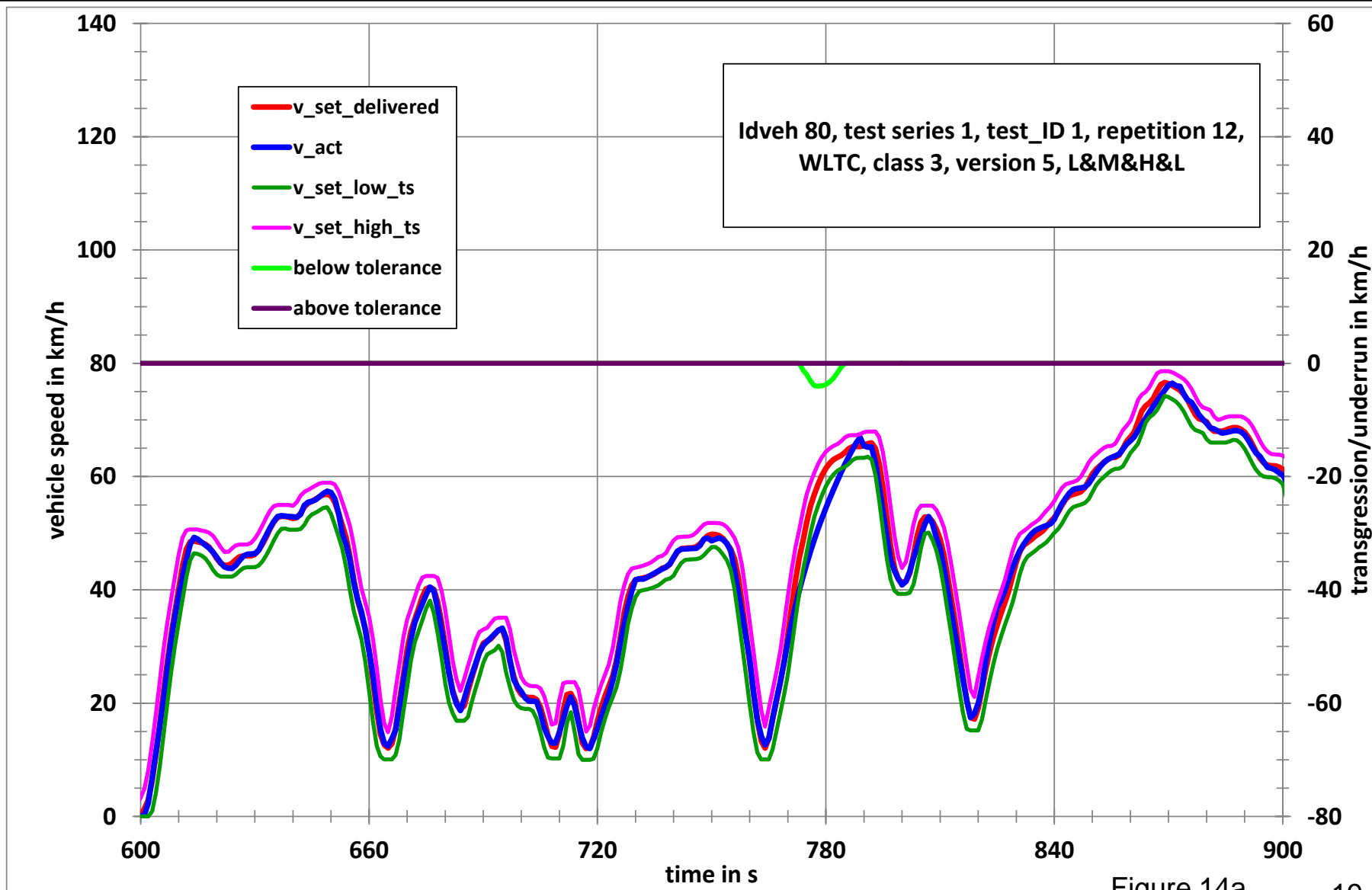


Figure 14a

End of test vehicle speed trace

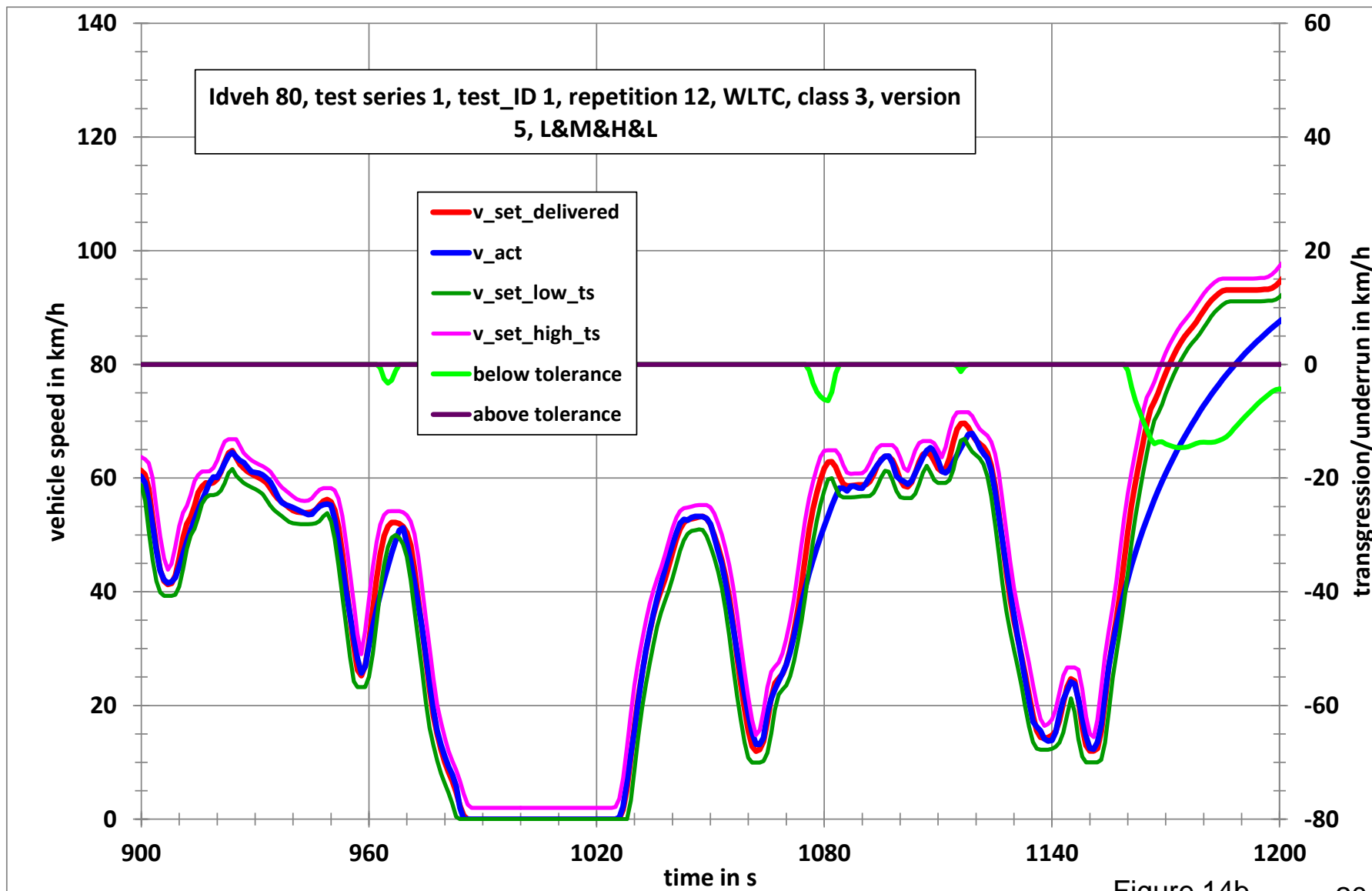
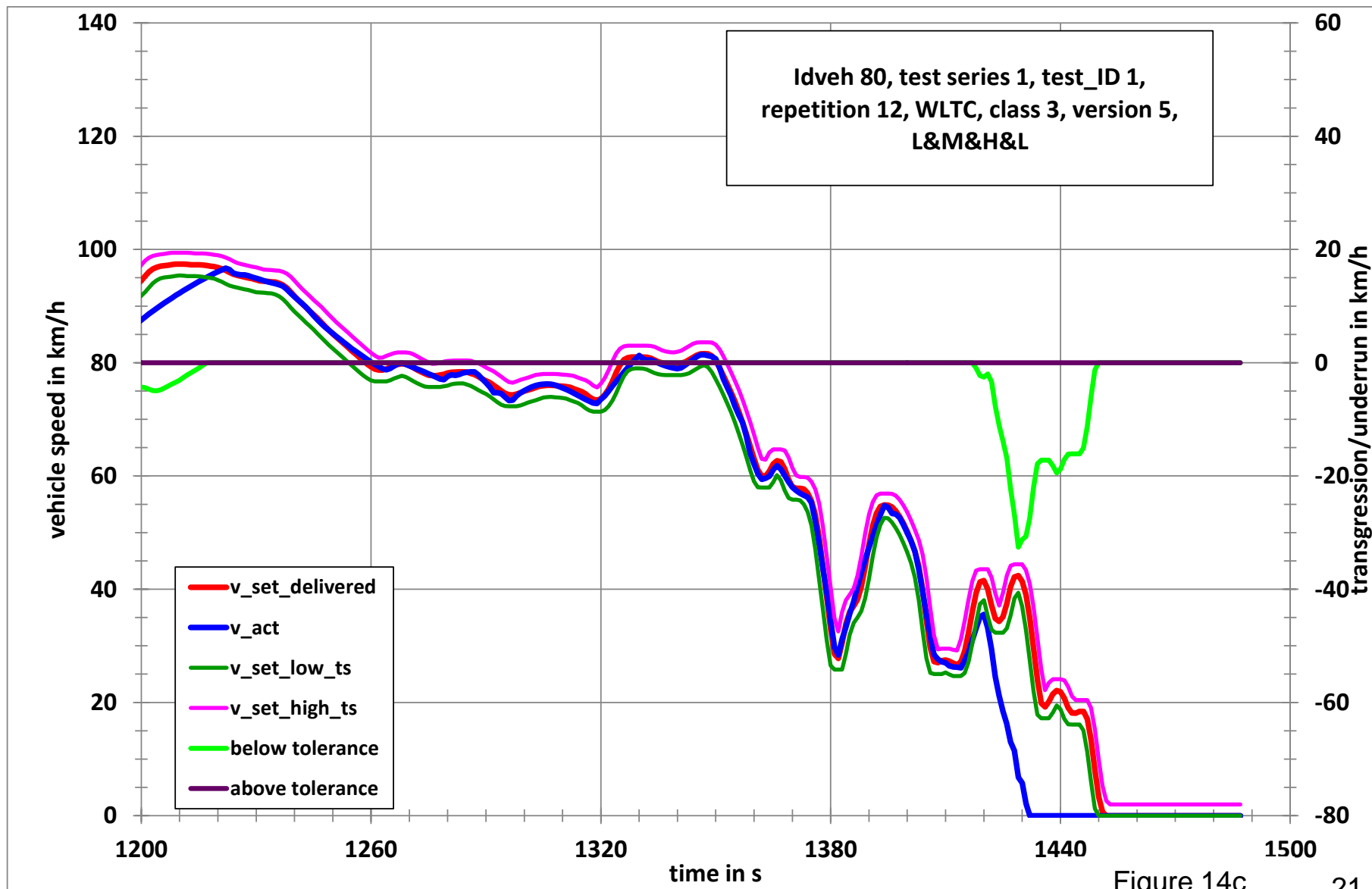


Figure 14b

End of test vehicle speed trace



End of test vehicle speed trace

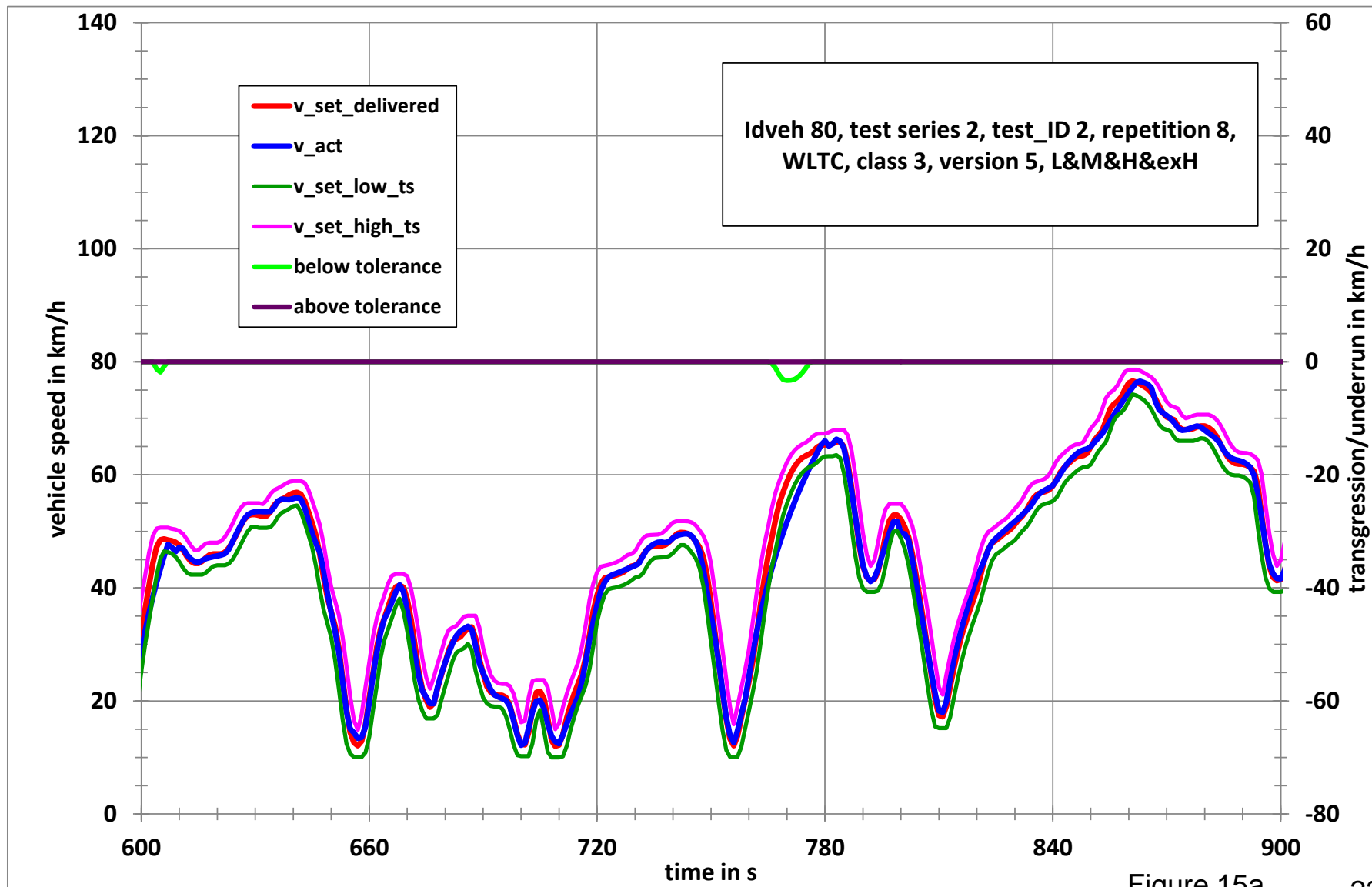


Figure 15a

End of test vehicle speed trace

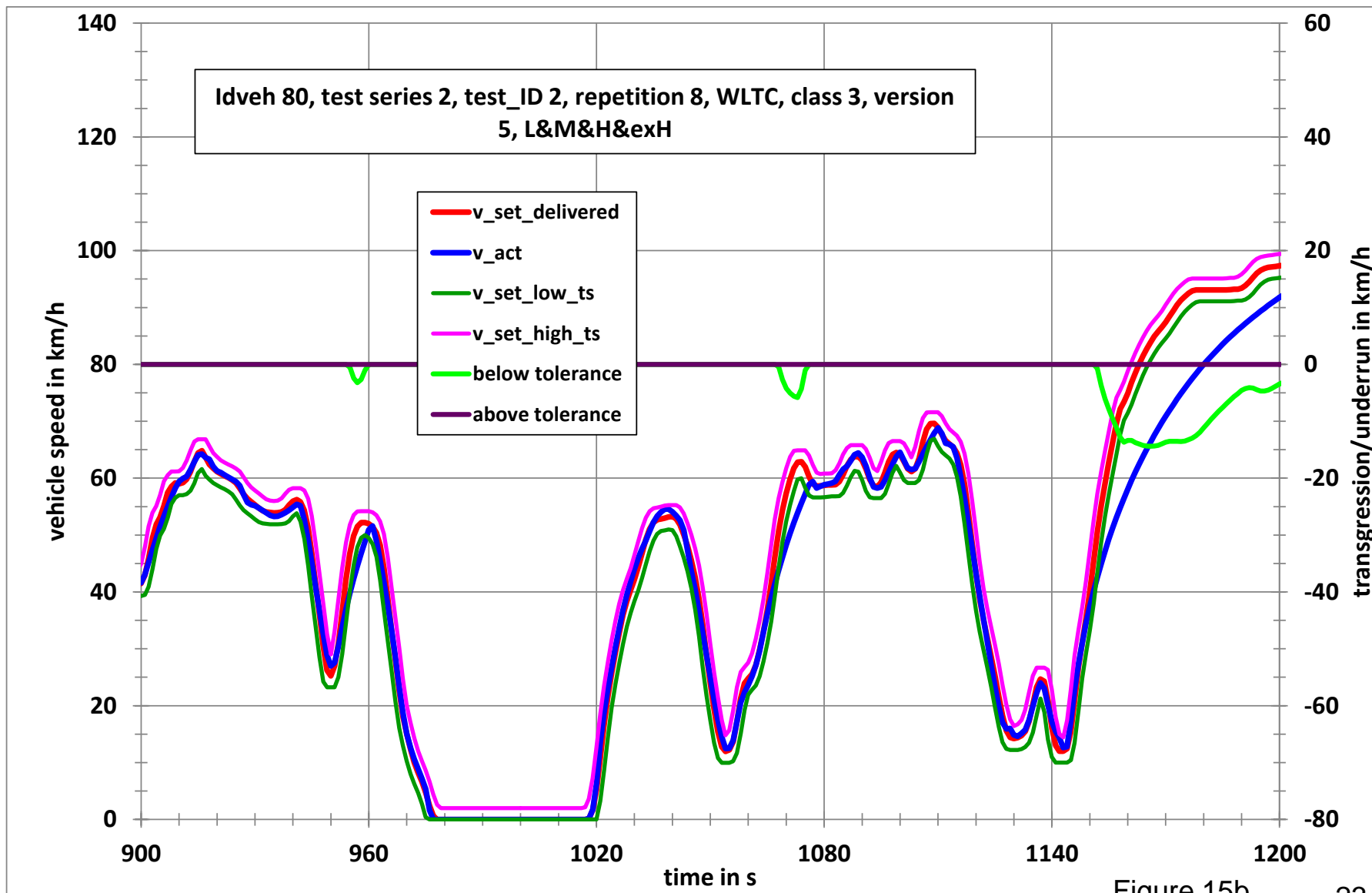
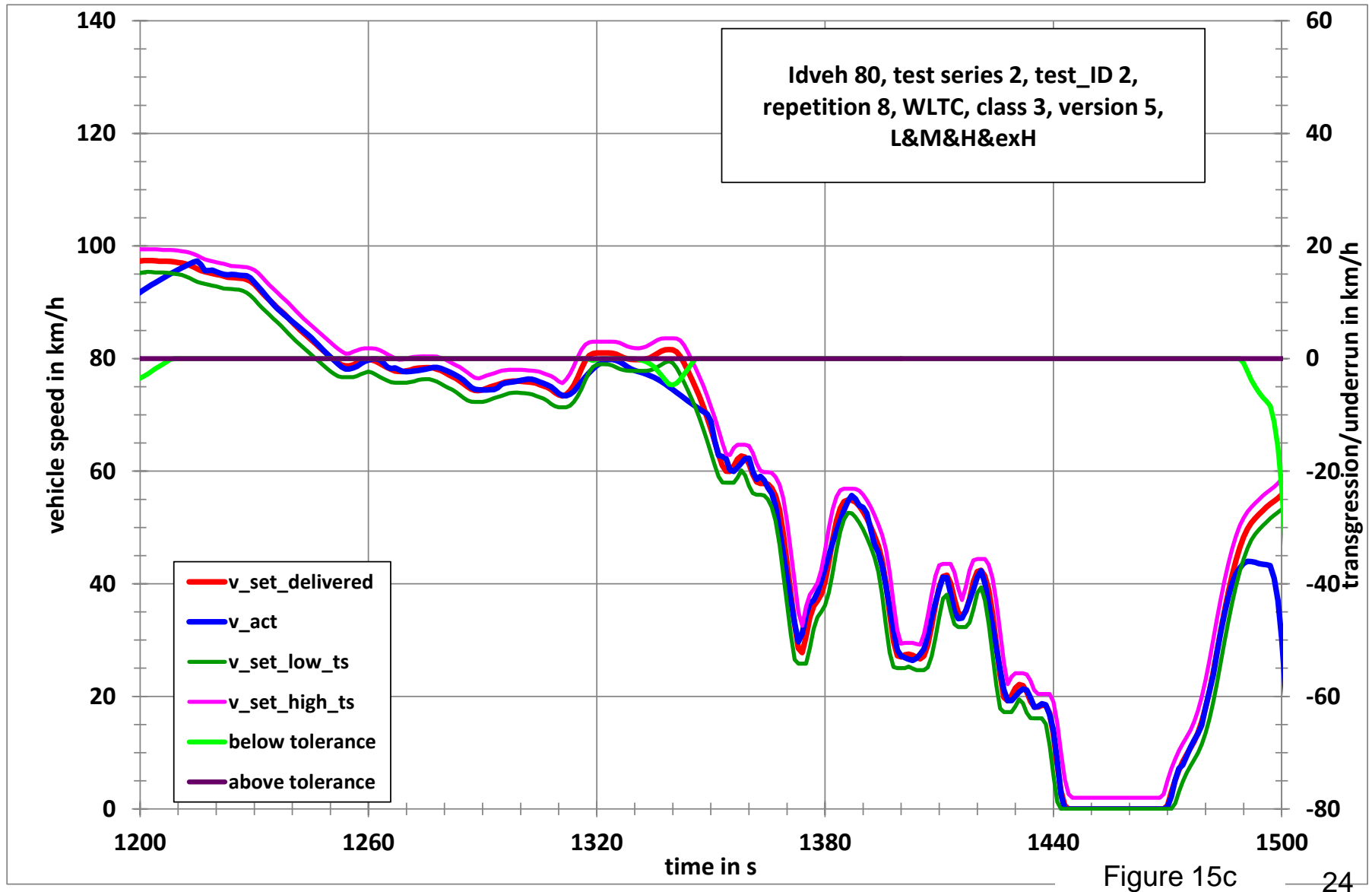


Figure 15b

End of test vehicle speed trace



End of test vehicle speed trace

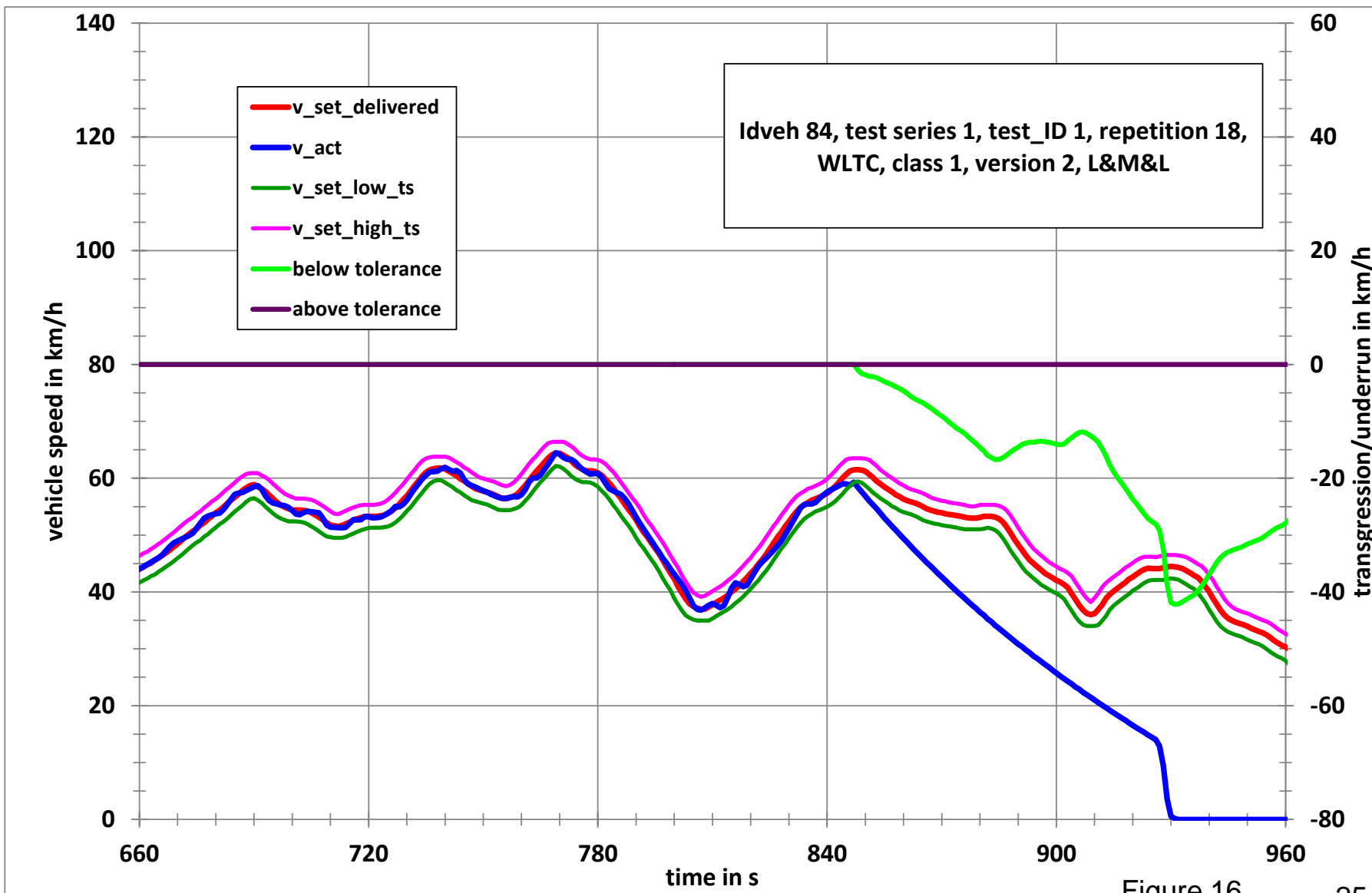


Figure 16

End of test vehicle speed trace

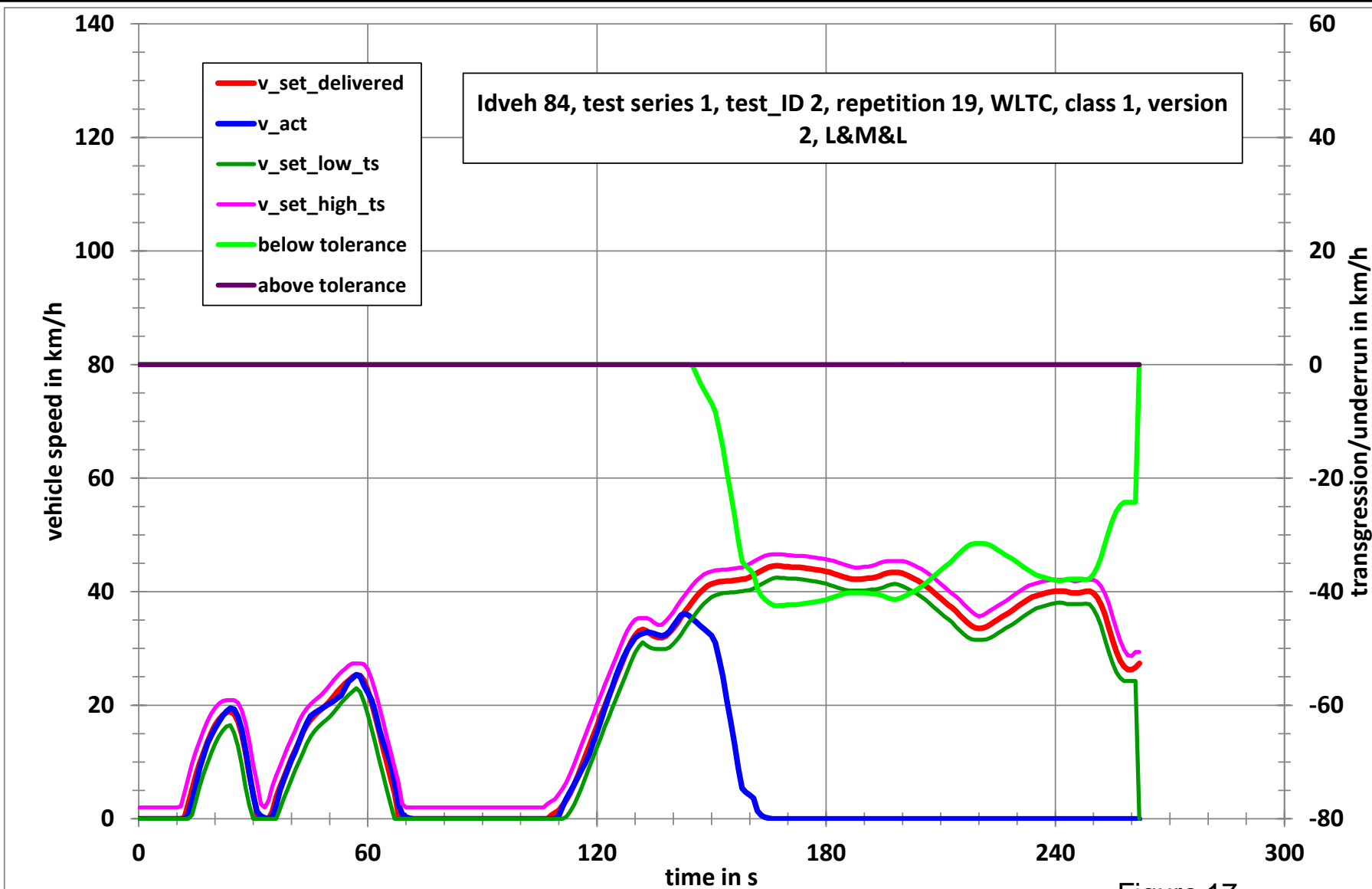


Figure 17

End of test vehicle speed trace

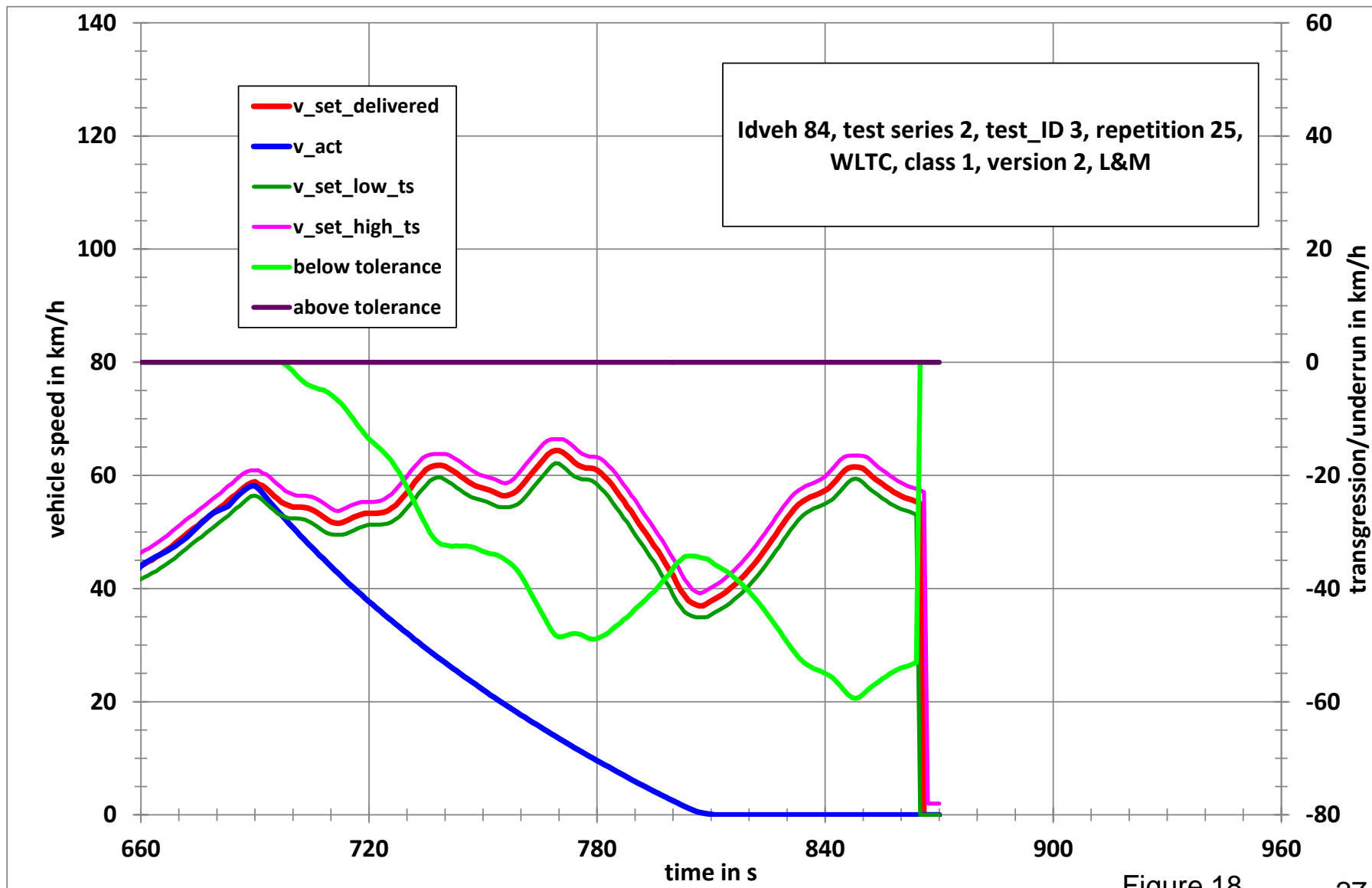


Figure 18

End of test vehicle speed trace

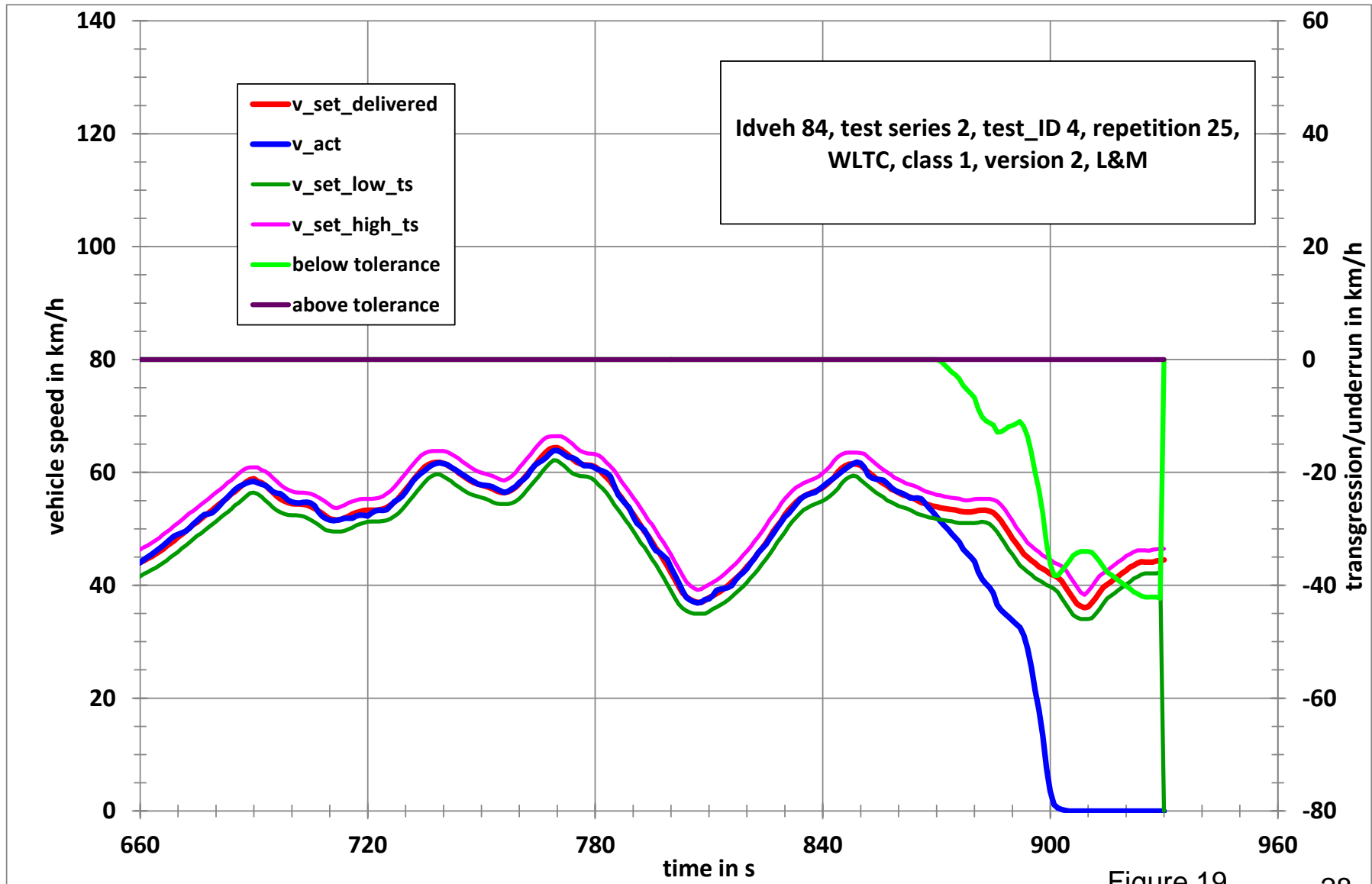


Figure 19

End of test vehicle speed trace

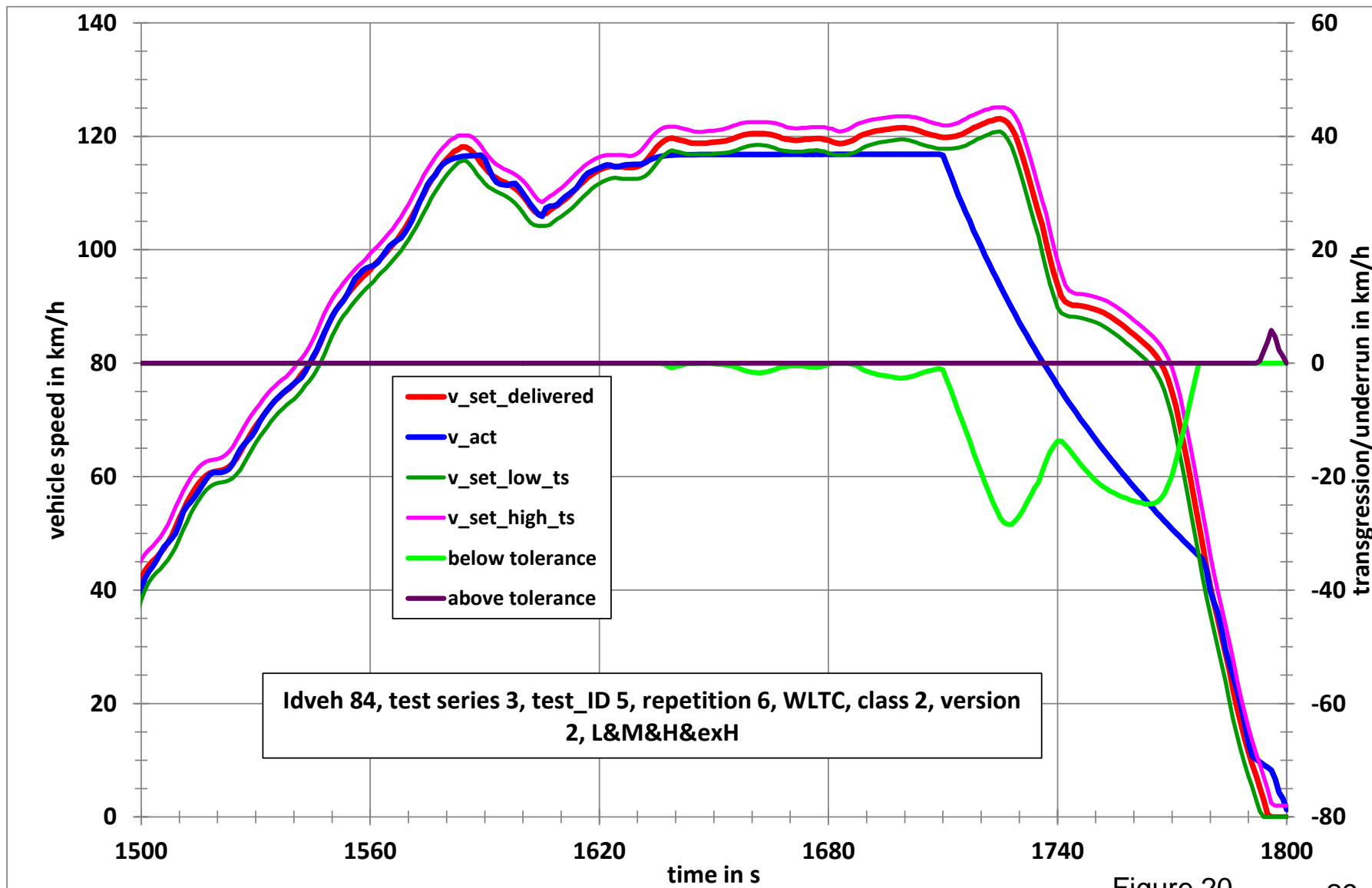
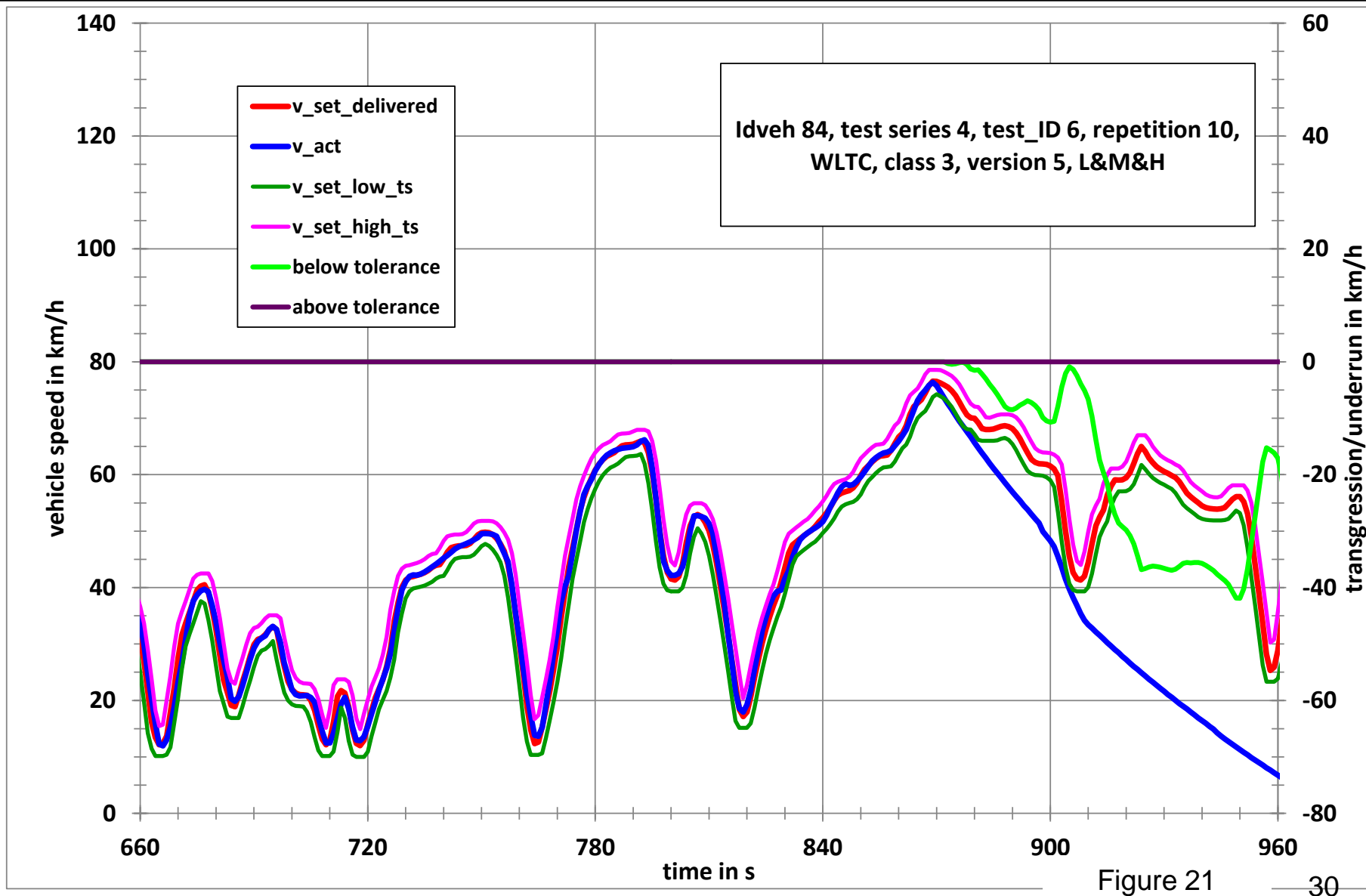


Figure 20

End of test vehicle speed trace



End of test vehicle speed trace

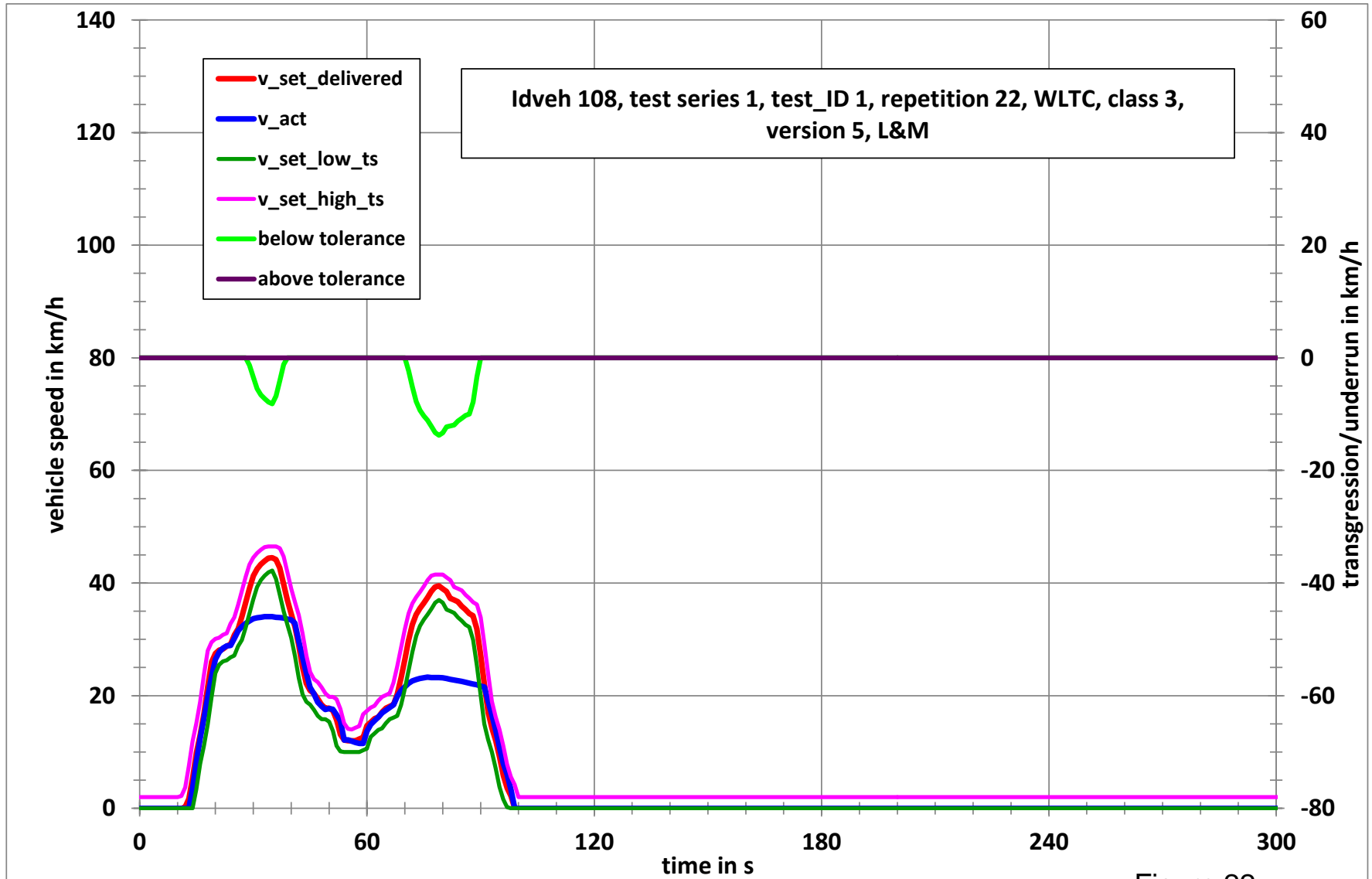


Figure 22

End of test vehicle speed trace

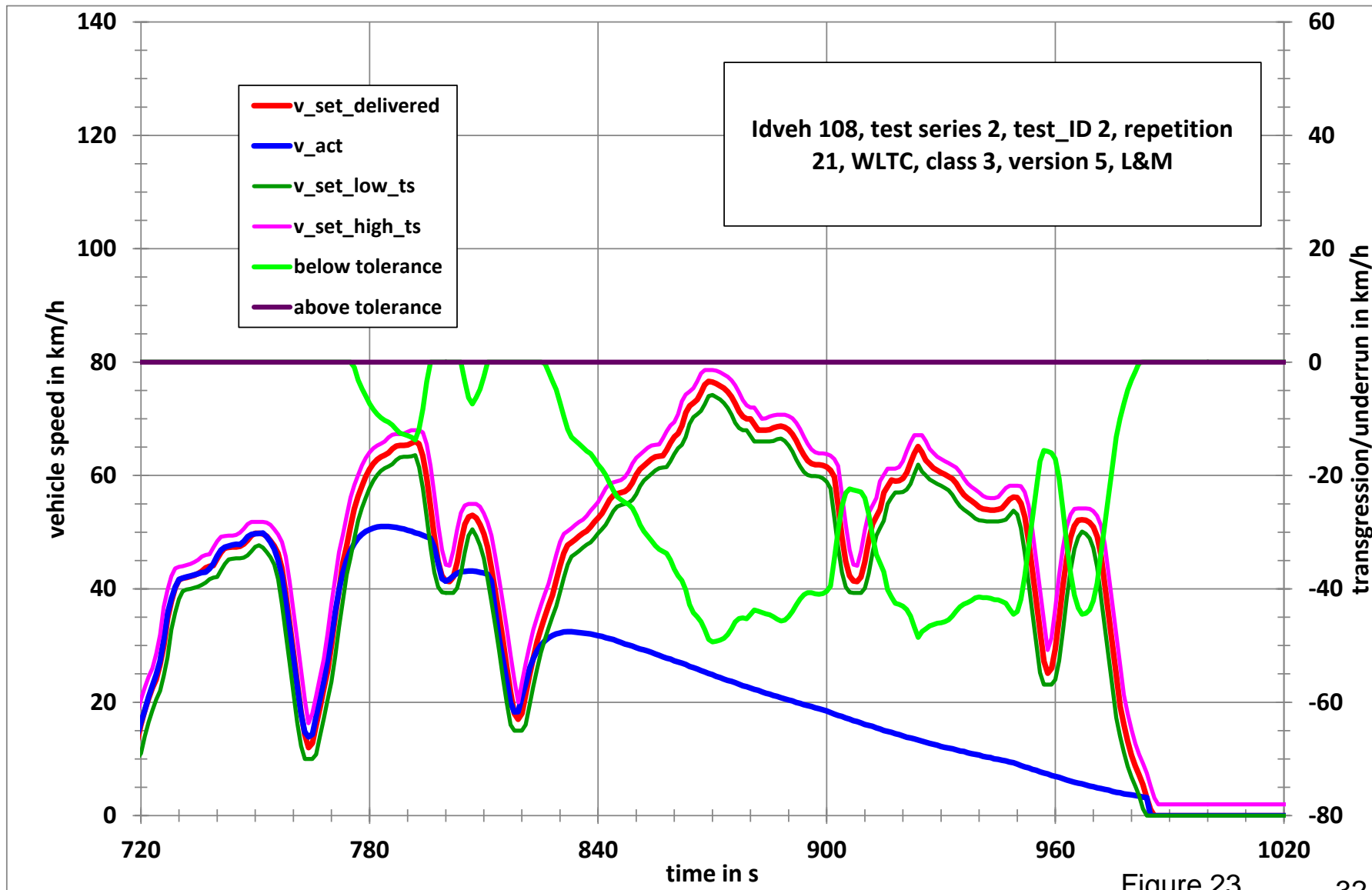


Figure 23

End of test vehicle speed trace

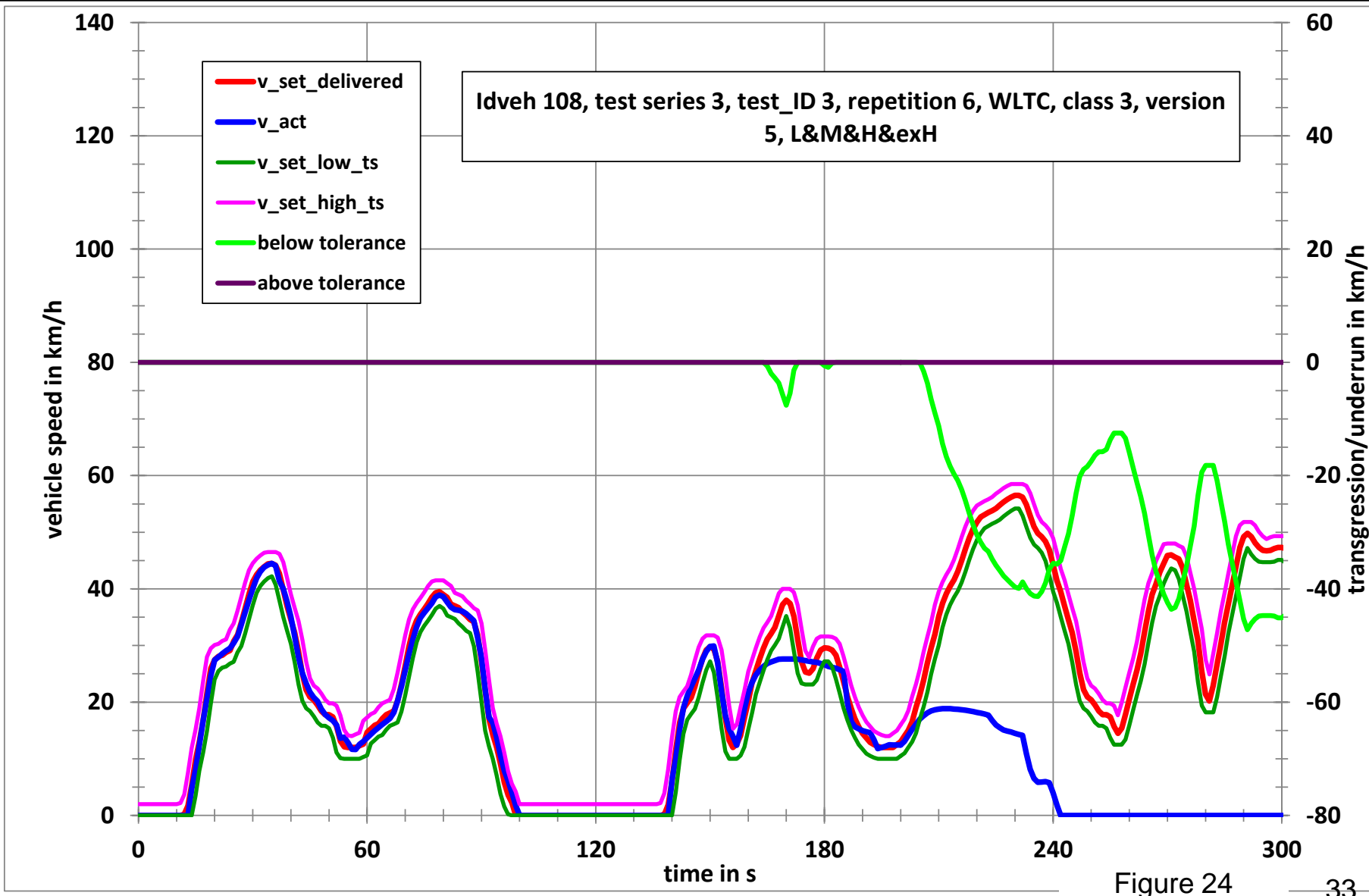


Figure 24

End of test vehicle speed trace

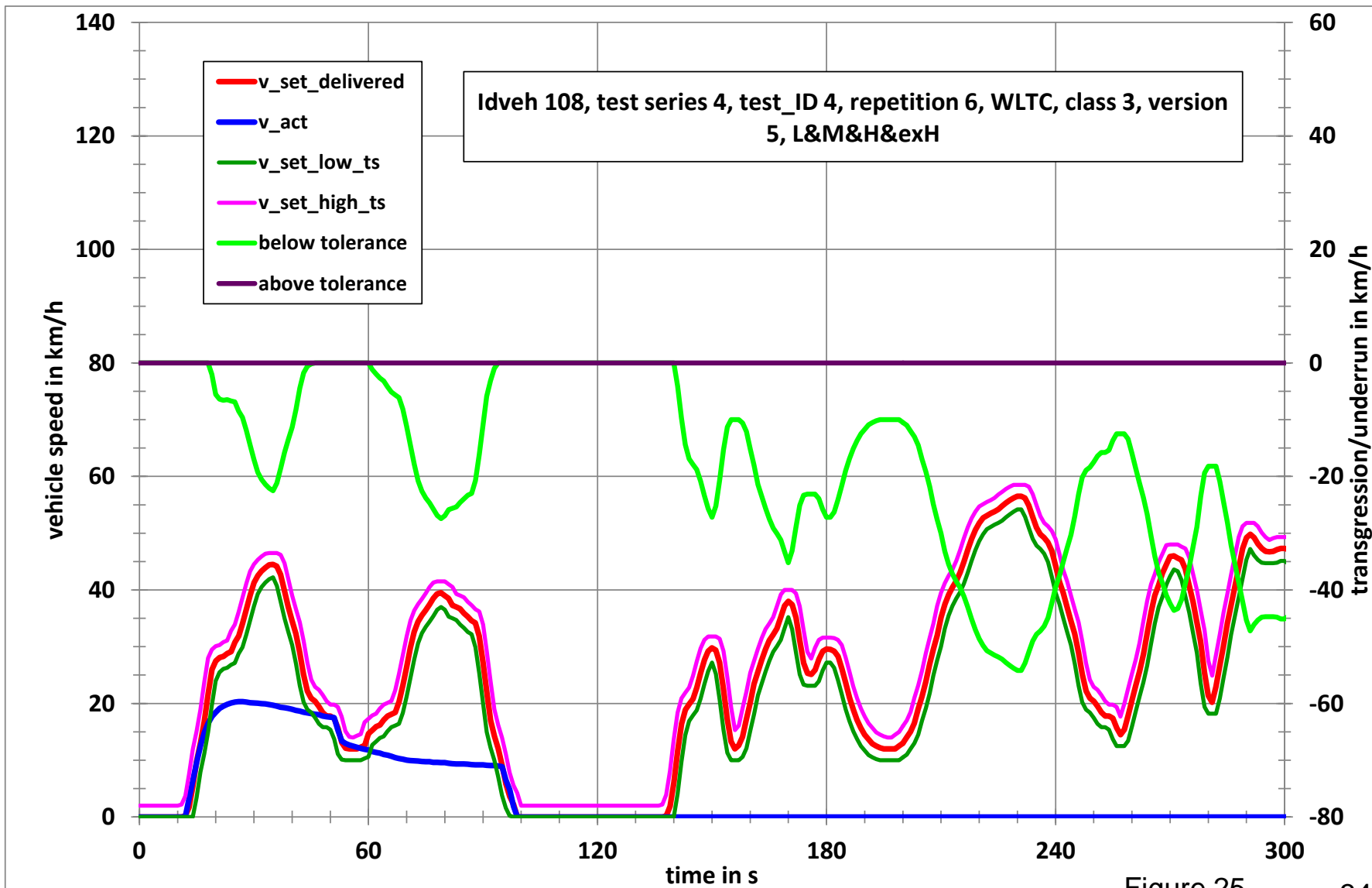


Figure 25

Cumulative discharge diagrams



- The following figures show the cumulative discharge energy over the single cycles per CD test series for two vehicles.

Cumulative discharge diagram

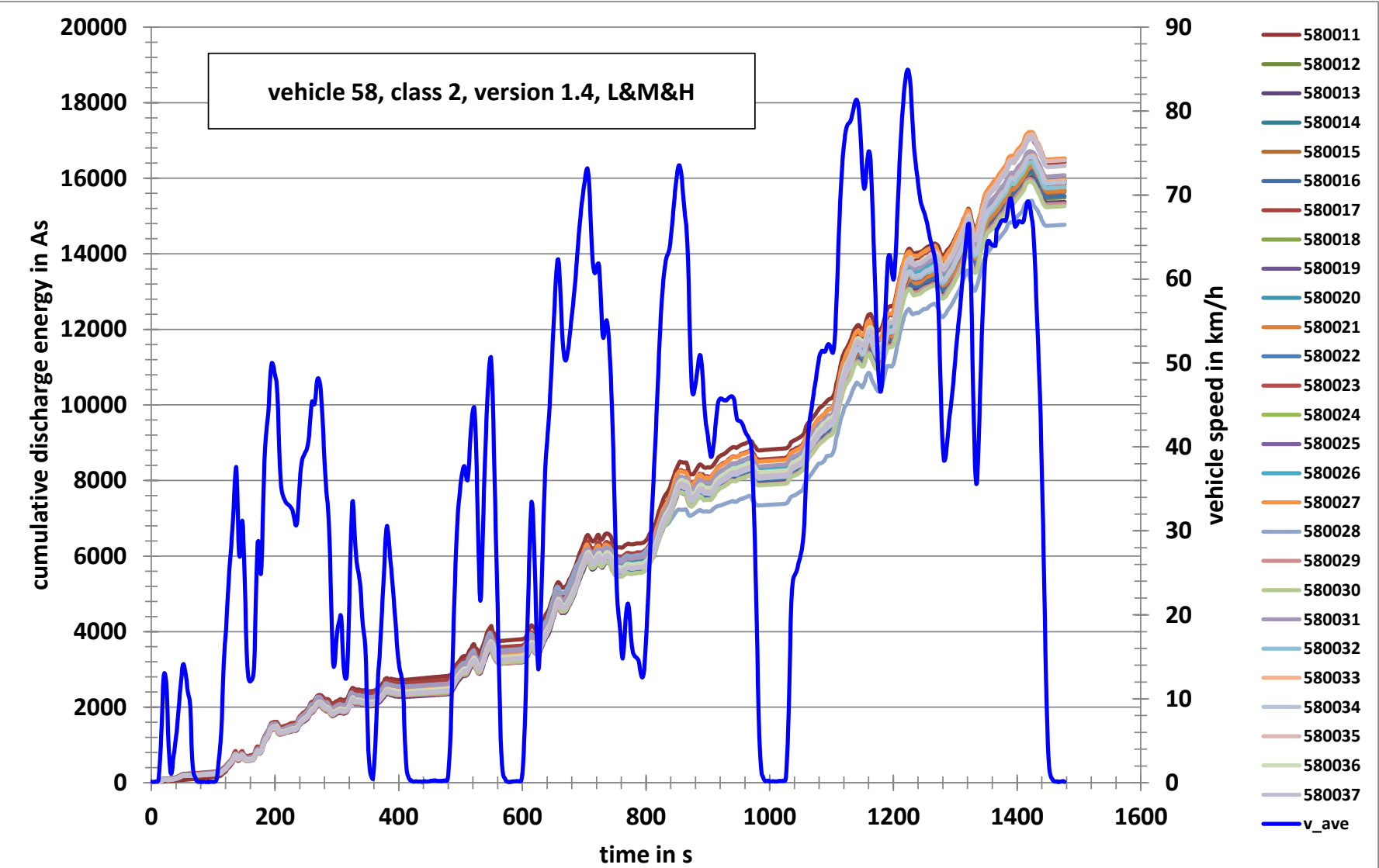
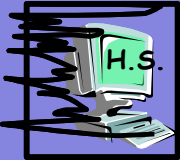


Figure 26

Cumulative discharge diagram

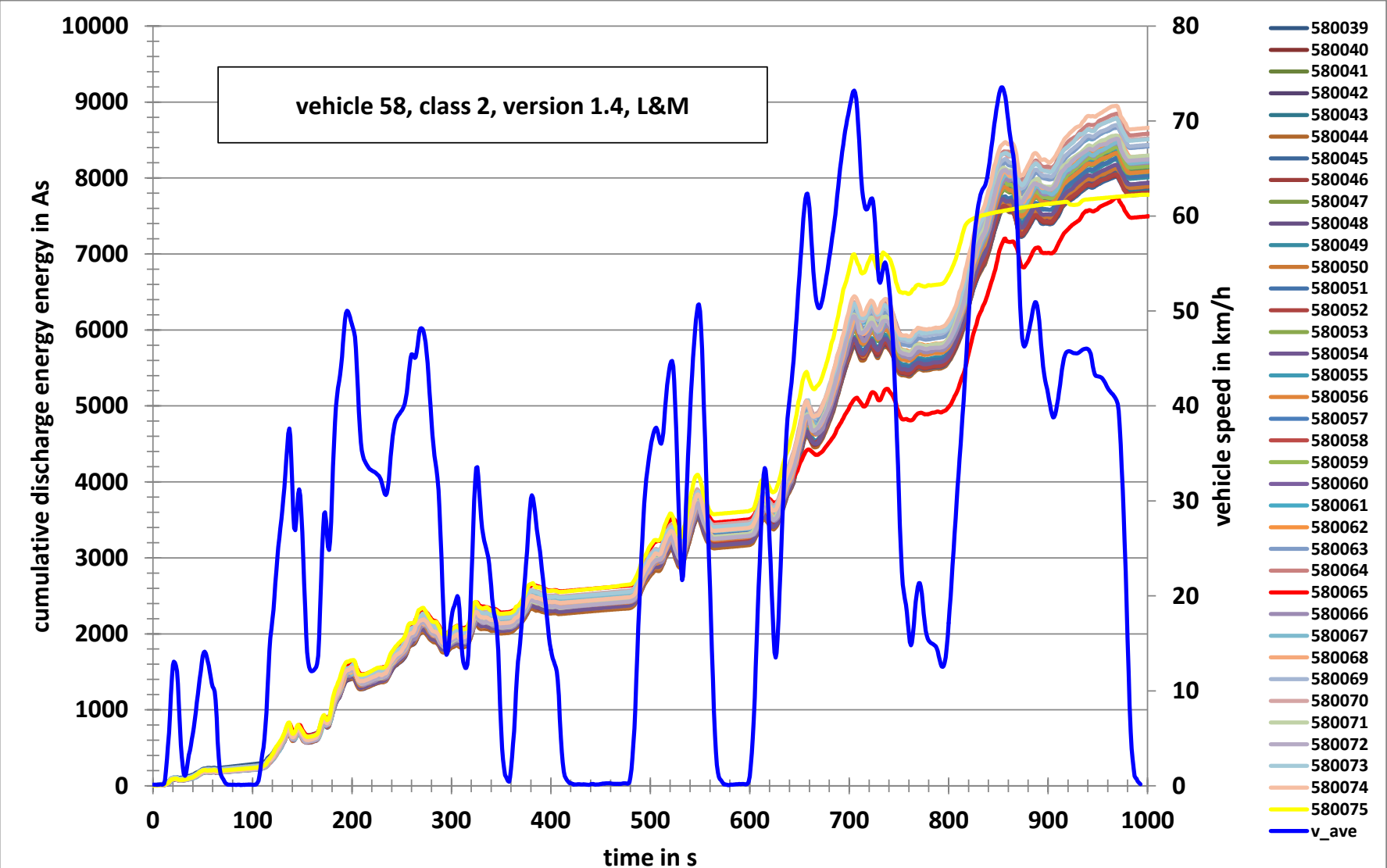


Figure 27

Cumulative discharge diagram

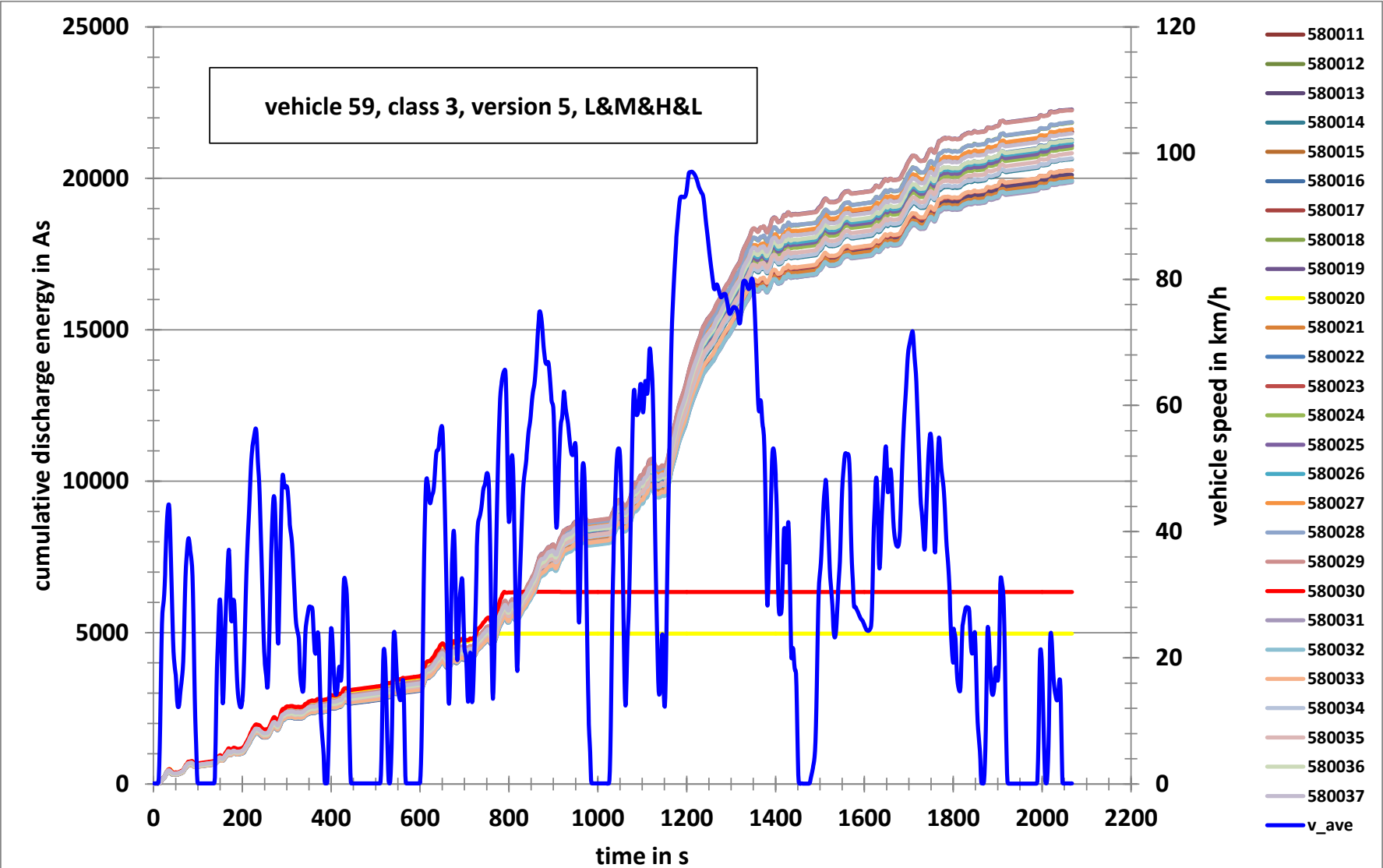


Figure 28

Cumulative discharge diagram

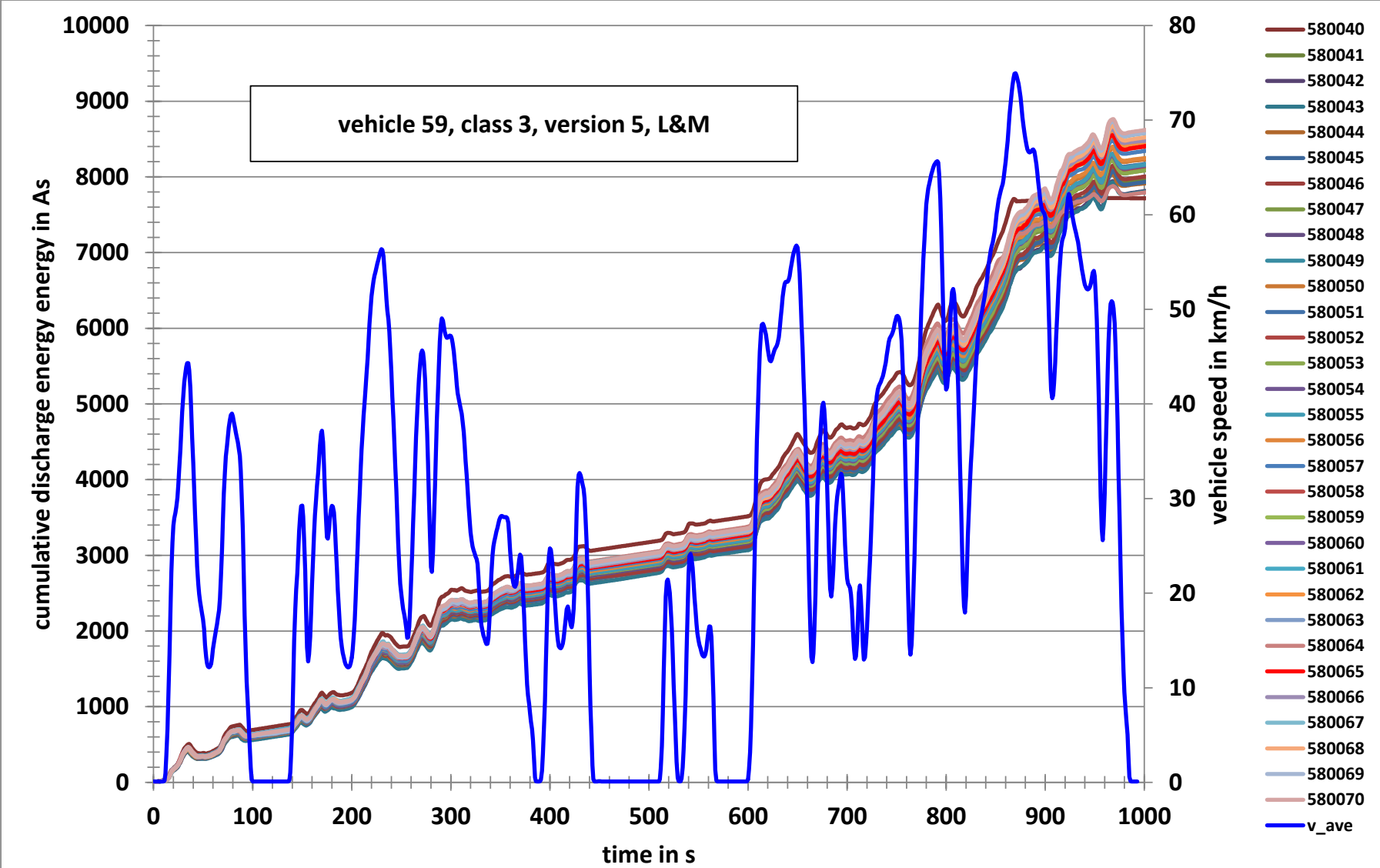


Figure 29

Cumulative discharge diagram

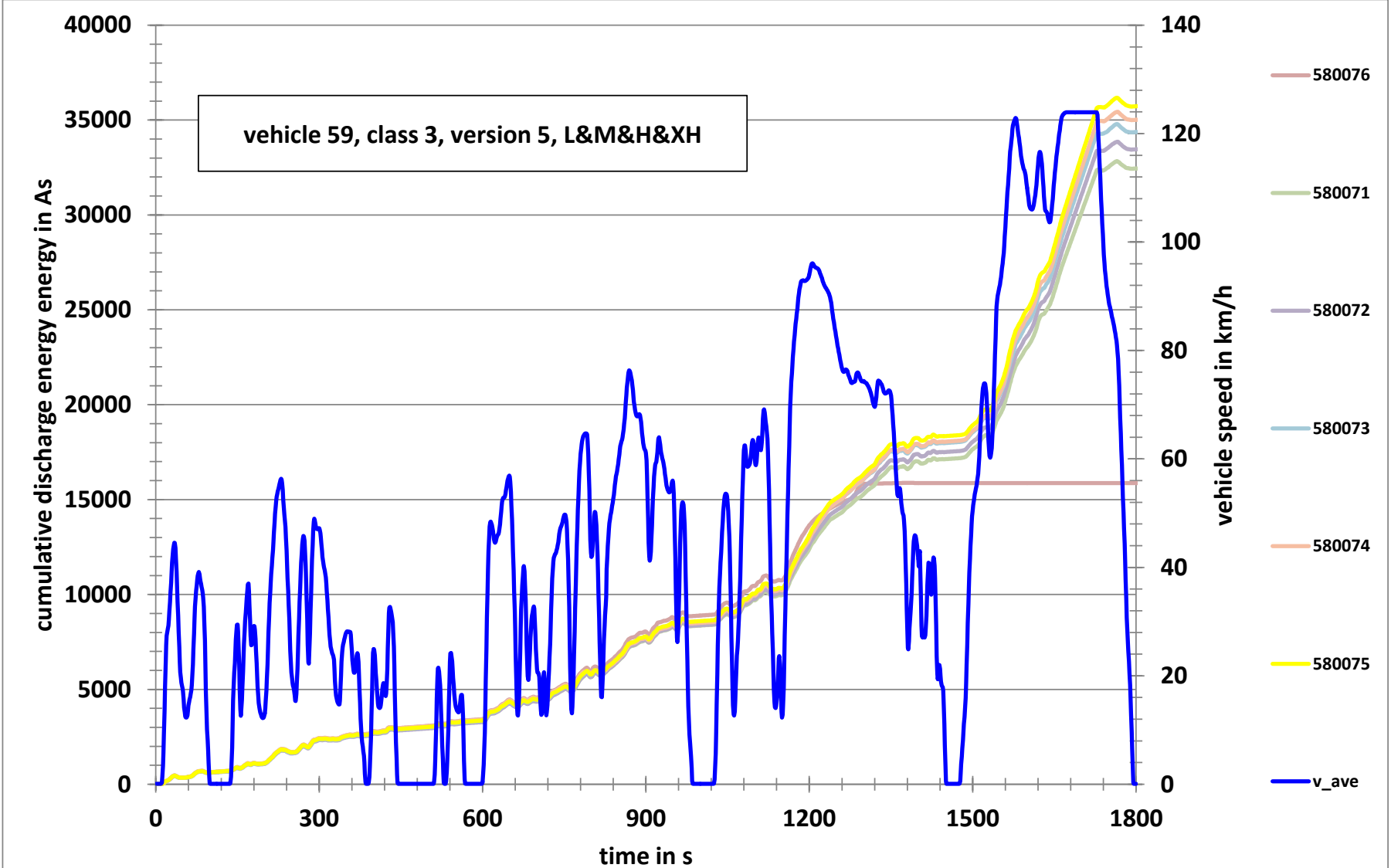


Figure 30

End



- **Thank you for your attention!**