



WLTC VALIDATION 1

14/10/2011- M. CAPITAINE

- **VEHICULE TEST**
- **DYNAMOMETER**
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- **DRIVABILITY**
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- **DRIVABILITY => ~CO2**
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VEHICLE TEST



VEHICLE	A	B	C
FUEL	GASOLINE	DIESEL	DIESEL
ENGINE DISPLACEMENT	1149 cm ³	2300 cm ³	1600 cm ³
POWER	74kW at 5500rpm	92kW at 3500rpm	80kW at 4000rpm
TEST INERTIA	1250 kg	2040 kg	1470 kg
TRANSMISSION	MT (5)	MT (6)	AT
EMISSION STANDARD	Euro5	Euro5	Euro5
MANAGEMENT SPECIFICITY	AIR SURALIMENTATION	-	STOP&START



DYNAMOMETER FOR LIGHT-DUTY VEHICLES STANDARD TESTS

DYNAMOMETER SYSTEM	HORIBA - Single roller 48"
ABSORPTION NOMINAL POWER	103 kW [96 - 200 km/h]
OPERATING TEMPERATURE	+20°C to +30°C ± 2°C
HUMIDITY CONTROL	5g to 13g water / kg dry air ± 5%
ELECTRIC INERTIA RANGE	450 to 3500kg
BLOWER CONTROL	Proportional to vehicle speed
BAGS DILUTED GAS SAMPLING	HORIBA 9300T - 9 & 12m ³ /min
BAGS DILUTED GAS ANALYSIS	HORIBA MEXA 9400

MESUREMENTS



MEASUREMENTS	METHODS		
	VEHICULE A	VEHICULE B	VEHICULE C
ROLLER SPEED	Dynamometer sensor		
TIRE SPEED	CAN-Bus	CAN-Bus	Frequencemeter
GEAR SHIFT POINTS	CAN-Bus	CAN-Bus	-
ACCELERATION PEDAL ANGLE (%)	CAN-Bus	CAN-Bus	Voltage measurement
ENGINE COOLANT TEMPERATURE	CAN-Bus	CAN-Bus	-
ENGINE SPEED (VOLUNTARY)	CAN-Bus	CAN-Bus	-
POLLUTANTS EMISSIONS (VOLUNTARY)	Bag Sampling (4phases) HCt / CH4 / CO / NOX / NO / CO2 (=> Fuel consumption)		

TESTS SUMMARY

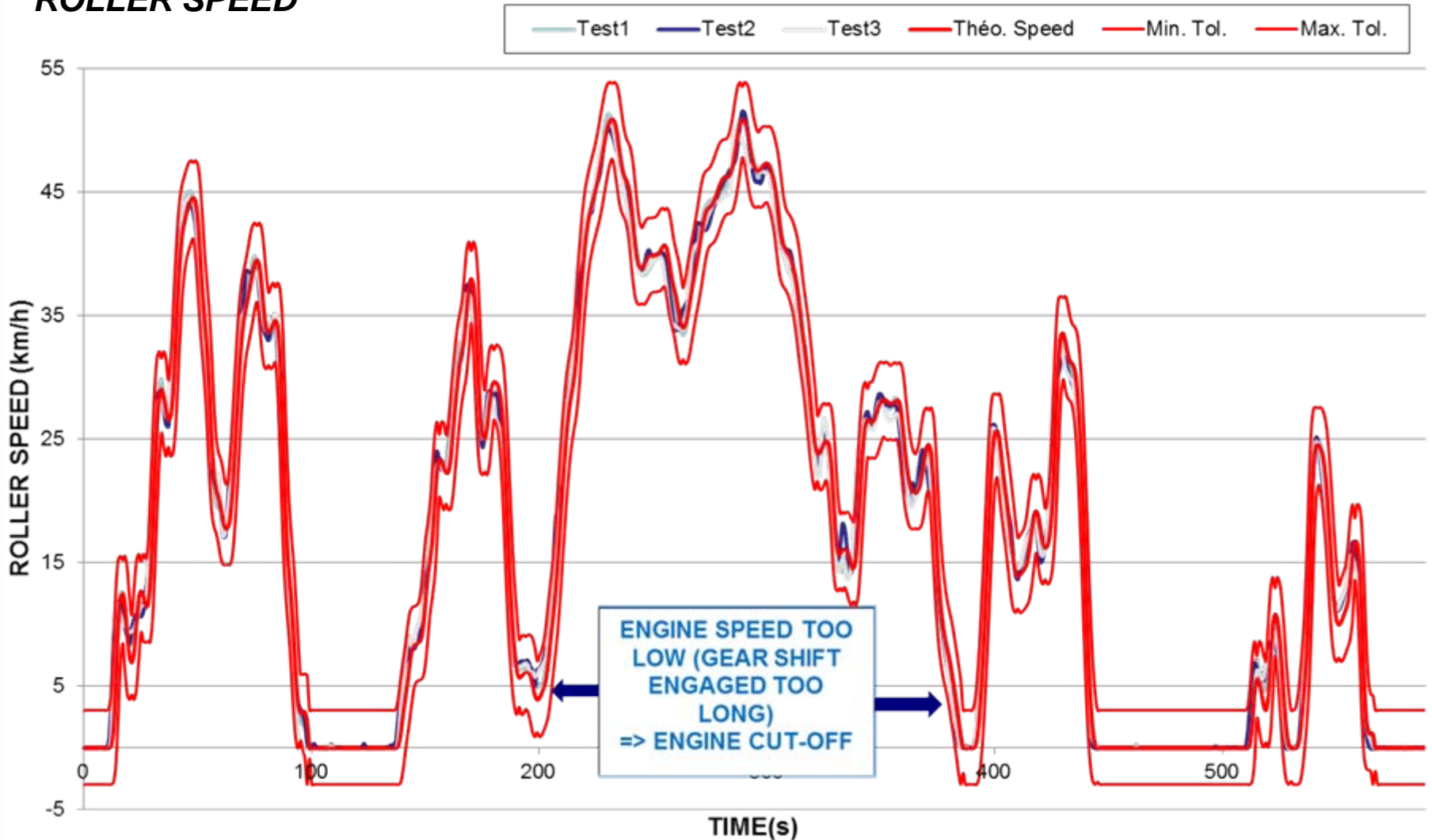


VEHICULE	CYCLE	GEAR SHIFT	VEHICULE CONDITIONS	TEST NUMBERS (DRIVE MESUREMENT)
A	WLTC	GEAR SHIFT 1 (JAPAN)	COLD	3
			HOT	6
		GEAR SHIFT 2 (STEVEN)	COLD	3
			HOT	4
	NEDC	COLD	2	
B	WLTC	GEAR SHIFT 1 (JAPAN)	COLD	2
			HOT	3
		GEAR SHIFT 2 (STEVEN)	COLD	2
			HOT	2
	NEDC	COLD	2	
C	WLTC	GEAR SHIFT 3 (AUTOMATIC)	COLD	2
			HOT	2
	NEDC	COLD	1	

Comment : Same driver for all tests

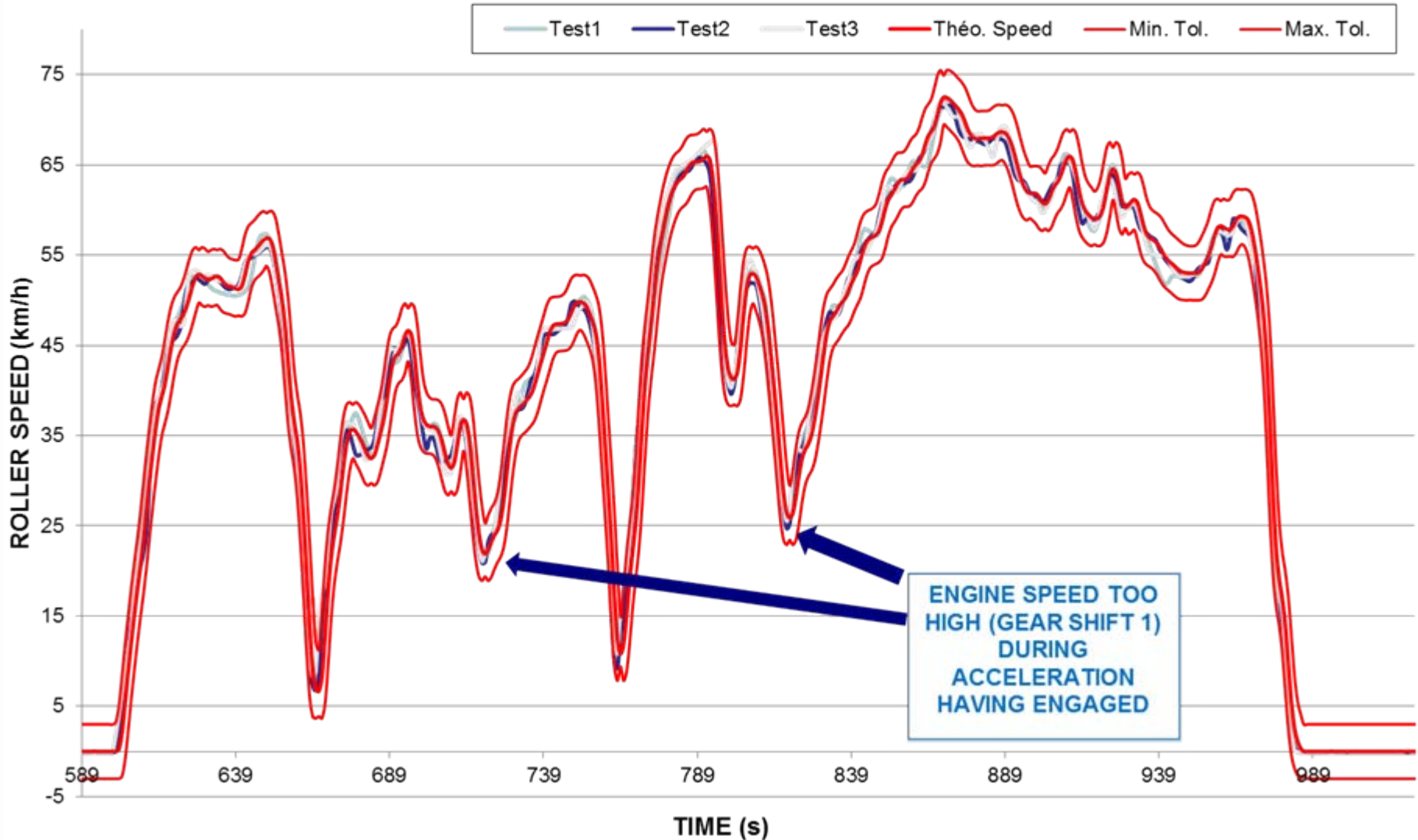
LOW / VEHICULE A / GEAR SHIFT JAPAN / COLD TEST SUMMARY

ROLLER SPEED



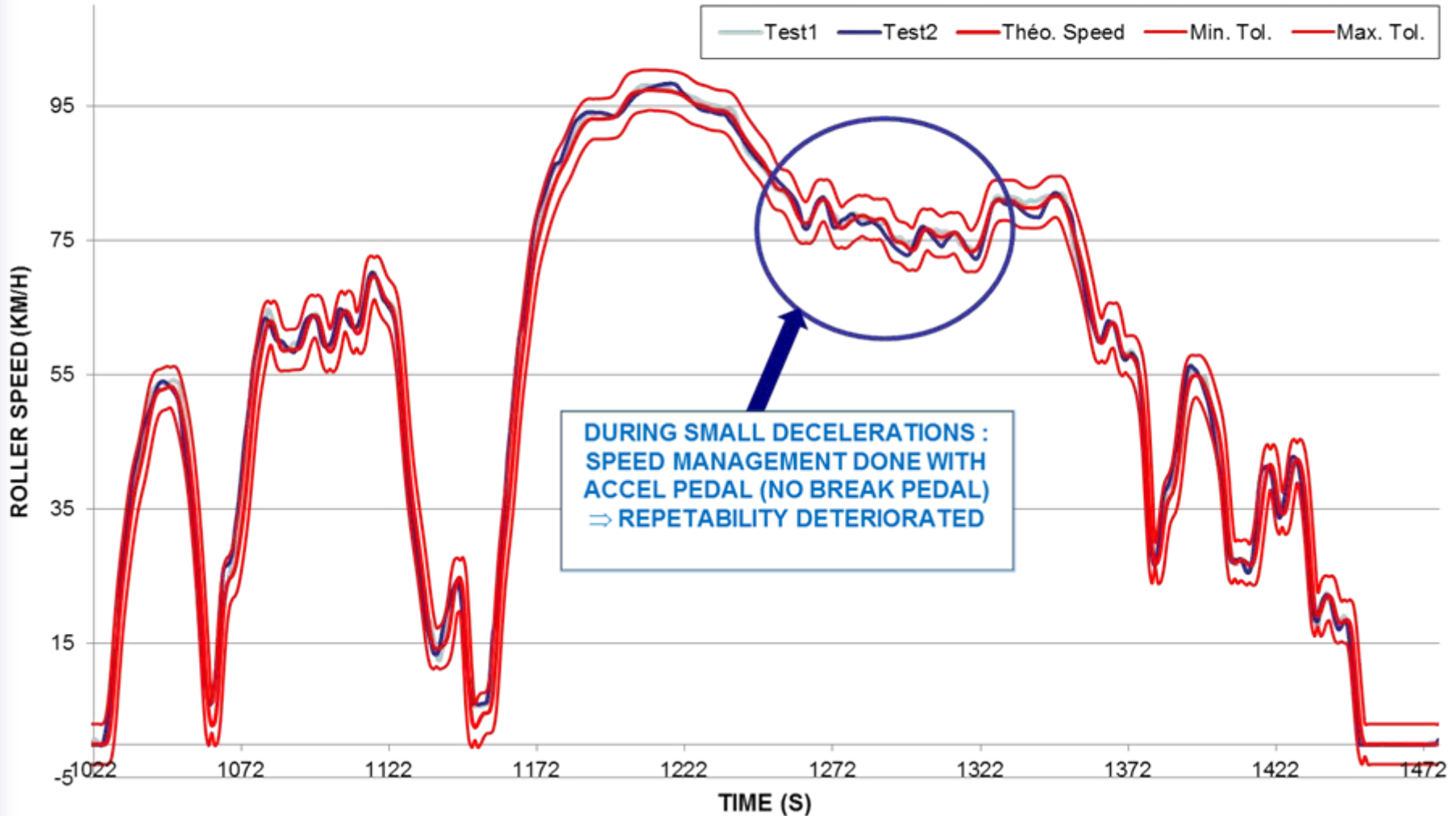
MIDDLE / VEHICULE A / GEAR SHIFT JAPAN / COLD TEST SUMMARY

ROLLER SPEED



HIGH / VEHICULE B / GEAR SHIFT JAPAN / COLD TEST SUMMARY

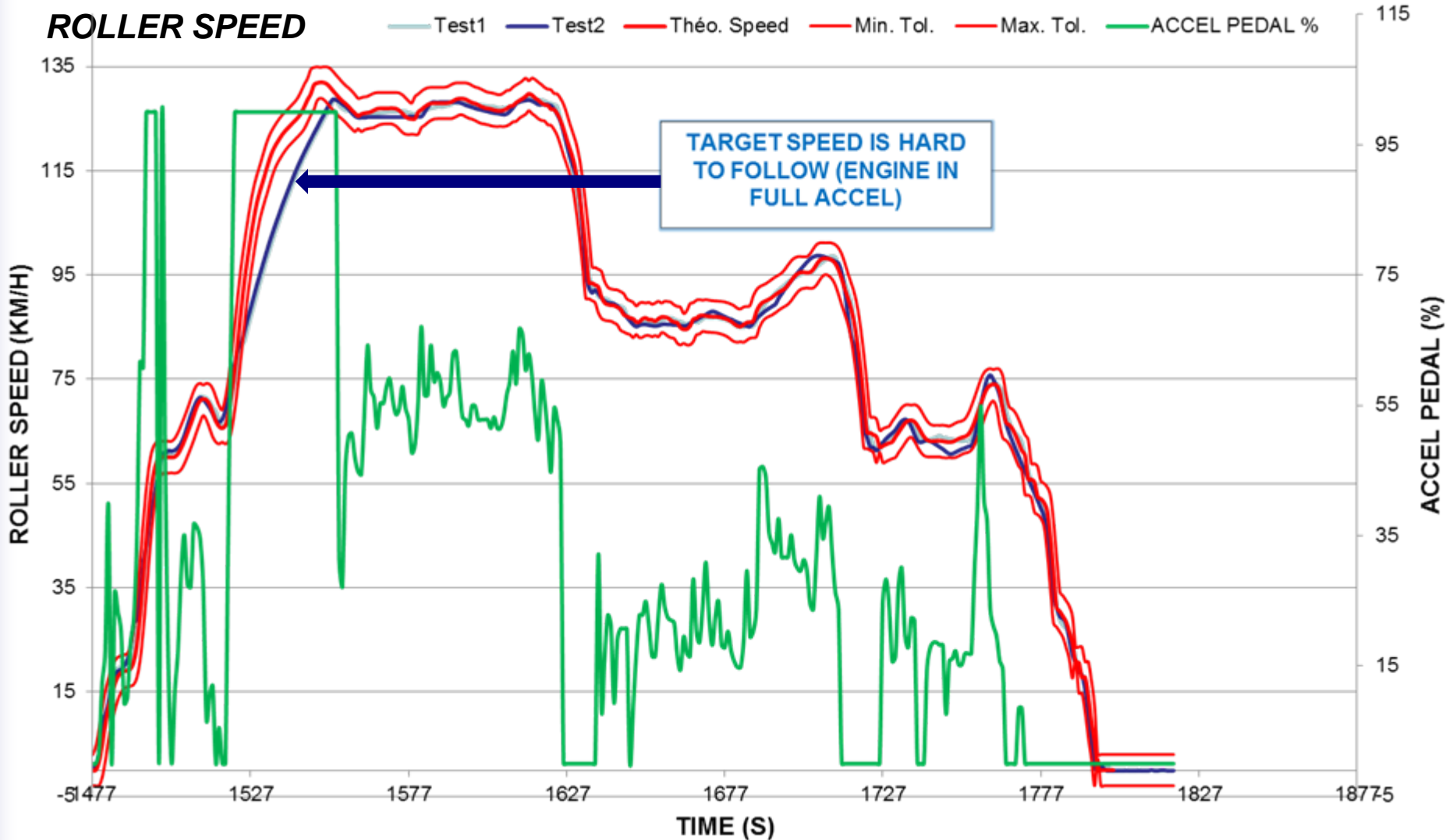
ROLLER SPEED



EXT-HIGH / VEHICULE B / GEAR SHIFT JAPAN / COLD TEST SUMMARY

ROLLER SPEED

— Test1 — Test2 — Théo. Speed — Min. Tol. — Max. Tol. — ACCEL PEDAL %



OBSERVATIONS SYNTHESIS & PROPOSALS

- **LOW**

- Observation : Engine speed too low during some low speed phases
- Cause : Gear shift engaged too long
- Result : Risk of engine cut-off
- Proposal : Disengage gear shift earlier

- **MIDDLE**

- Observation : Engine speed too high during some accelerations having engaged
- Cause : Gear shift 1
- Result : Engine point unrepresentative of reality
- Proposal : Gear shift 2

OBSERVATIONS SYNTHESIS & PROPOSALS

HIGH (& ALL PHASES)

- Observation : Speed management with accel pedal during some of the small decelerations
(engine break or small acceleration, but not with the break pedal => Otherwise with the speed was out of the tolerances)
- Result : Risk of deterioration of the repetability (??)

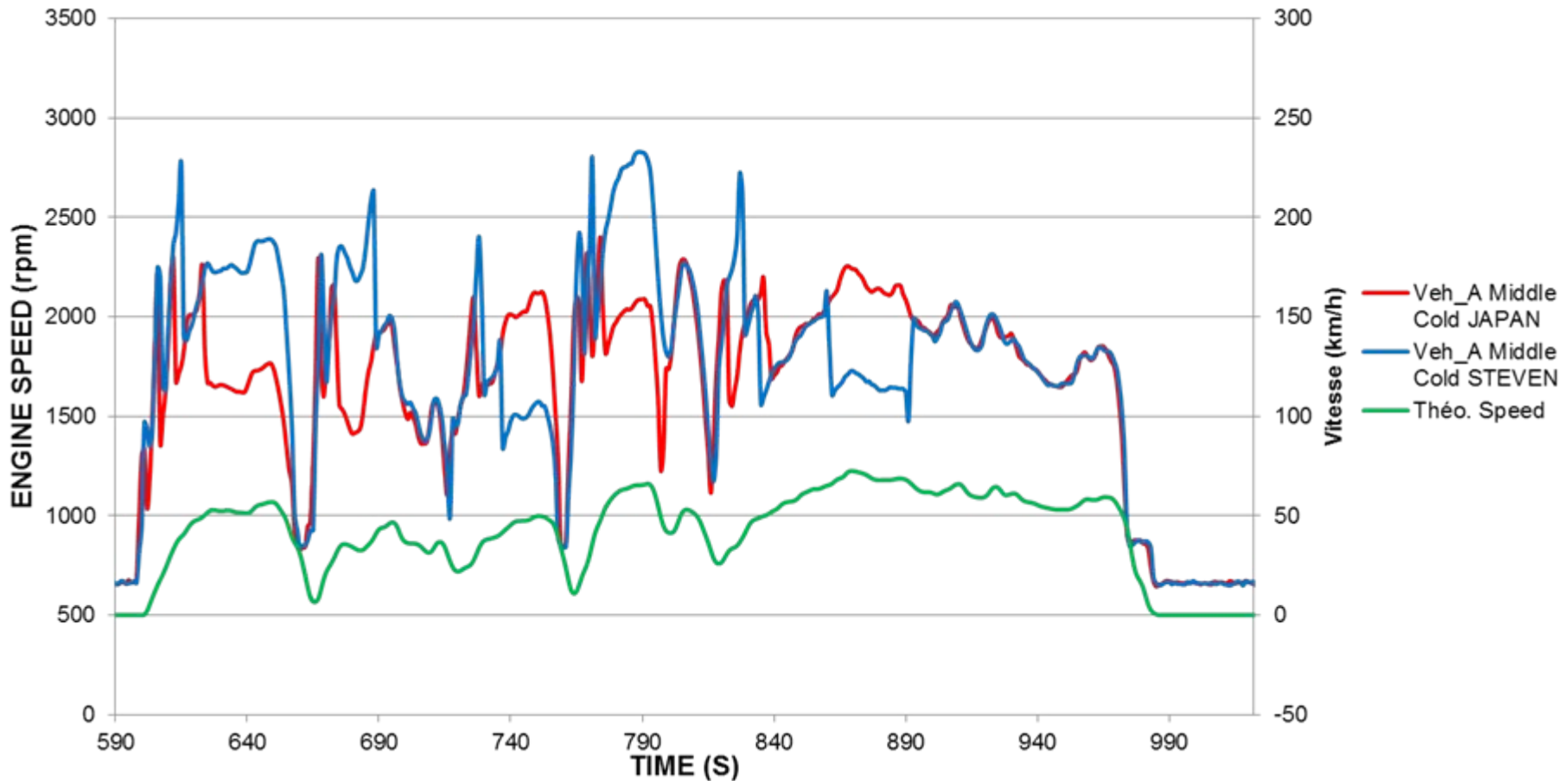
EXTRA-HIGH (& HIGH PHASE MAIN ACCELERATION, DEPENDING ON ENGINE POWER)

- Observation : Target speed is hard to follow during the main acceleration
- Cause : Engine in full acceleration (depending on engine power)
- Result :
 - Vehicule cannot follow the cycle
 - Deteriorates the repetability
 - Proposal : Limit the acceleration (not speed)

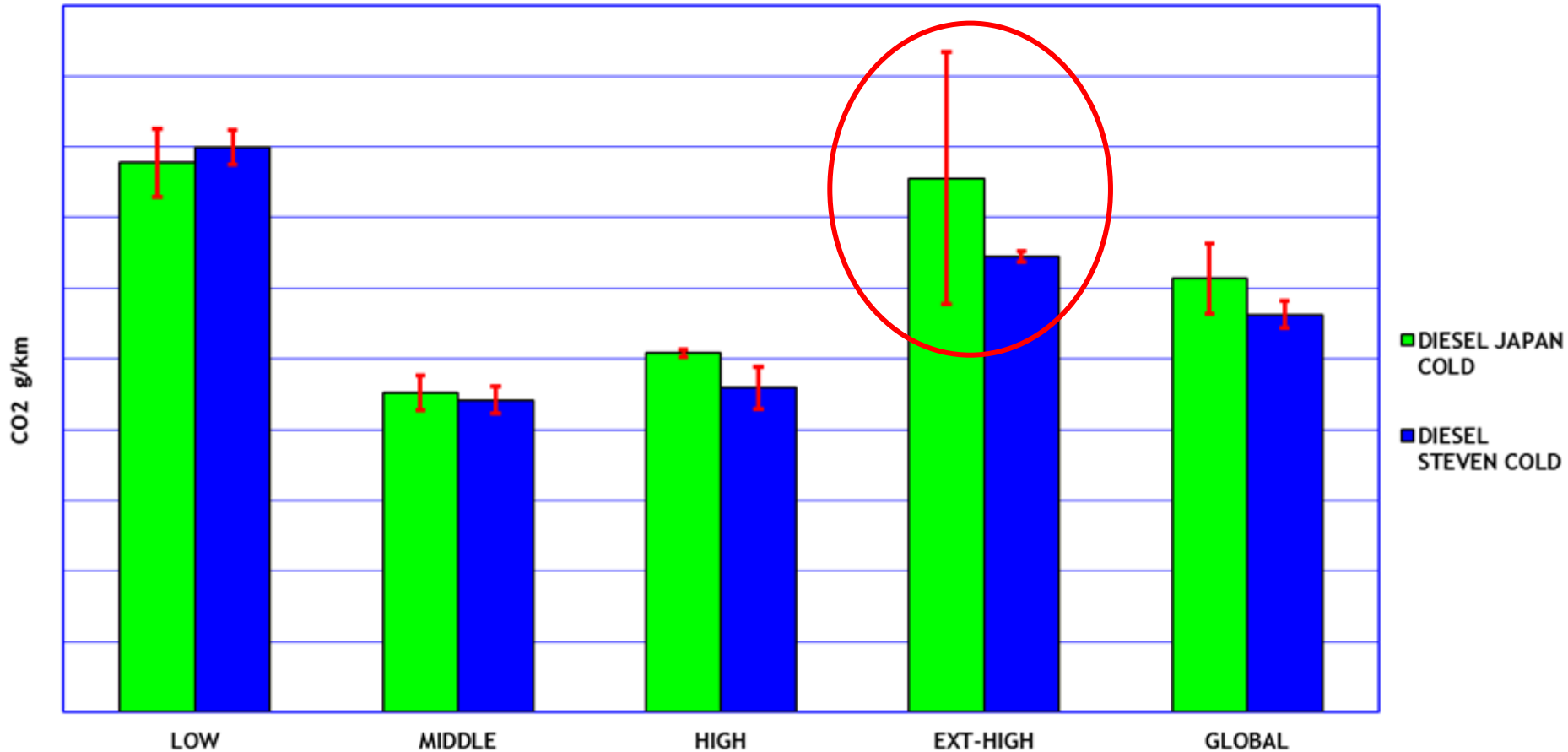
COMPAR JAPAN / STEVEN



No fundamental difference of drivability between the two gear shift procedures, but changes engine speed :

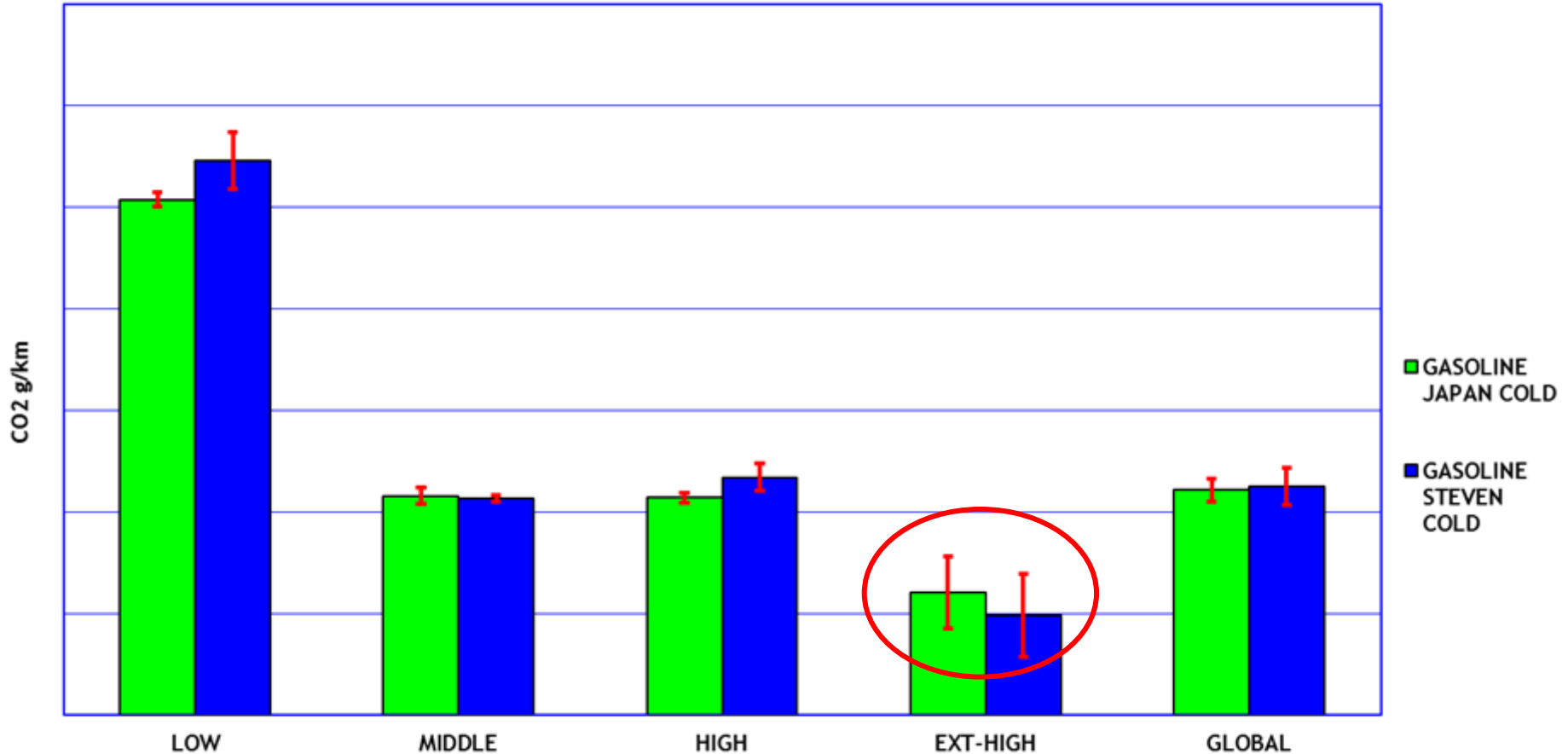


DIESEL CO2 EMISSIONS WLTC



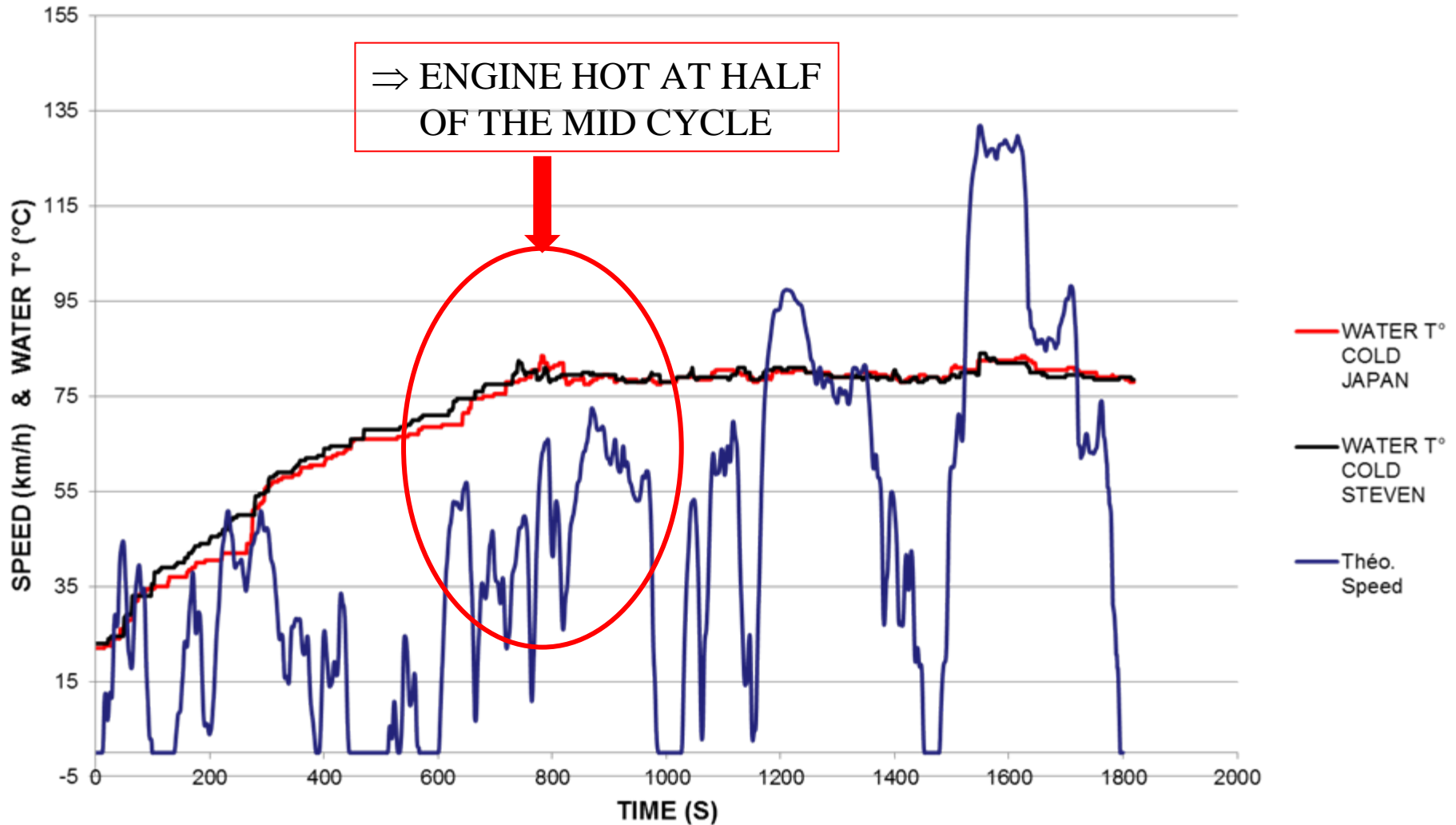
- ⇒ Significant dispersion in the Extra-High cycle
- ⇒ Cause : Engine in full acceleration

GASOLINE CO2 EMISSIONS WLTC



- ⇒ Significant dispersion in the Extra-High cycle
- ⇒ Possible cause : Engine in full acceleration

DIESEL ENGINE WARMING



THERMO MANAGEMENT



GASOLINE ENGINE WARMING

