

Transmitted by the experts from IMMA

Informal document GRBP-71-19-Rev.1
(71st GRBP, 28-31 January 2020,
agenda item 2)

IMMA INTERNATIONAL MOTORCYCLE
MANUFACTURERS' ASSOCIATION

R41 ASEP Revision

History:

Starting point for the R51 revision:

GRB-64-16 (FR) with the result of a questionnaire to CP's, NGO's and manufacturers about ASEP in R51 & R41.

Conclusion (slide 15):

- *Lot of comments on ASEP for ECE51.03. Further work is needed.*
- *Only few comments and questions on ASEP for ECE41.04. It seems that no need for further work*

IWG ASEP established for R51 revision

Starting point for the R41 revision:

GRB-67-03 (DE) "Problems with noise emissions from L-cat"

Identified areas of concern:

- NORESS
- "Grey Areas" (=flaps) in UNECE

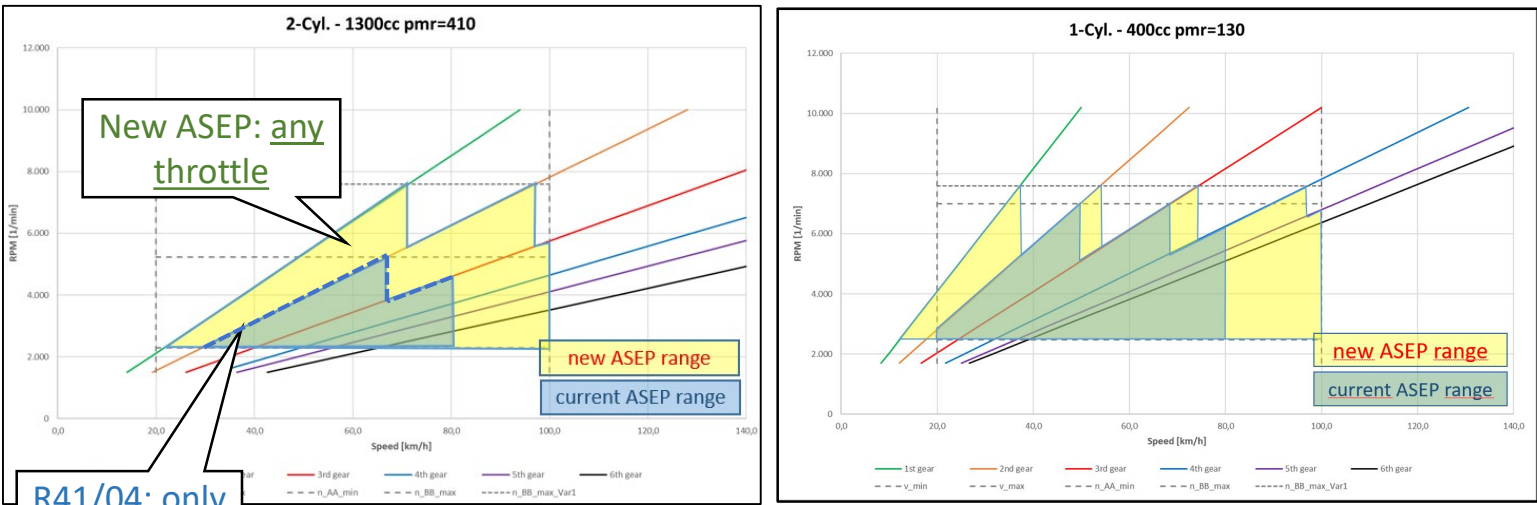
IMMA started working on a revised R41 ASEP test procedure, independently from IWG ASEP

Revision Focus: Real Driving

- Test range expanded
- Grey areas covered = aggressive exhaust flap controls avoided
- Covers any acceleration, in any mode
- Mandatory for Type Approval

Expanded ASEP test range:

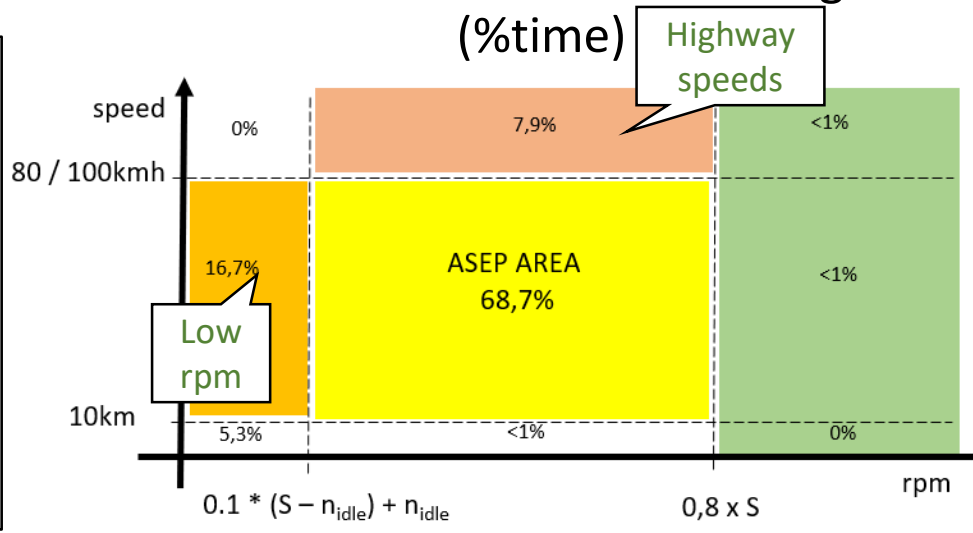
New ASEP engine map coverage



R41/04: only WOT

ASEP's enlarged rpm & speed range increases the engine map coverage

New ASEP real world coverage (%time)



ASEP test range covers ~69% of real world conditions. Remaining conditions are in non-critical areas: low rpm, highway speeds

With the expanded test range, ASEP now has have major coverage of conditions possible in real driving

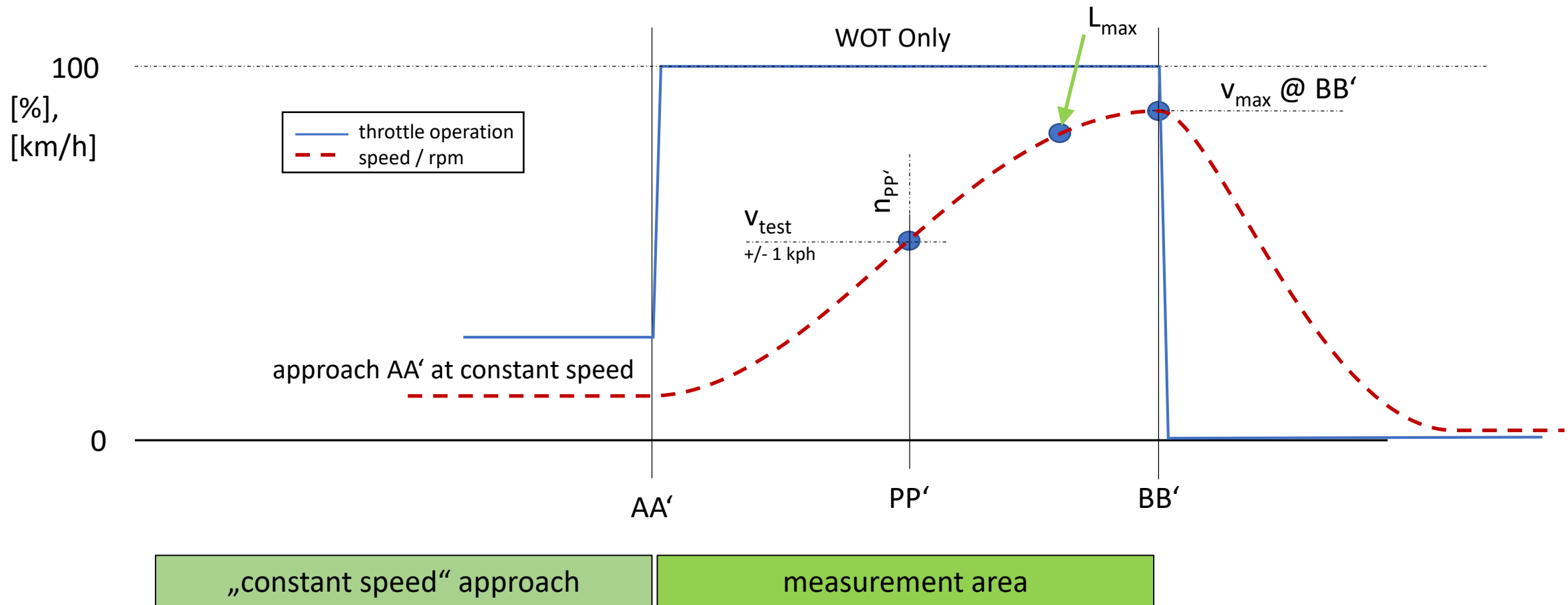
ASEP comparison:

	<i>R41/04</i>	<i>R41 new ASEP proposal</i>	<i>R51 new ASEP proposal</i>
Speed range	20 – 80 km/h	10 – 100km/h (for PMR ≥ 150)	0 – 100km/h
Max rpm	$3.4 * PMR^{-0.33} * (S - n_{idle}) + n_{idle}$	0,8 x S (= increased)	0,8 x S (= increased)
Gears tested	Fixed gear (not including 1 st)	Any gear (including 1 st)	Any gear (including 1 st)
Throttle operation (between AA' & BB')	WOT only	Any constant throttle	Any constant throttle
Approach (pre AA')	Constant speed	Any approach (constant speed, acceleration, deceleration)	Constant speed
Applicability	All (PMR>50)	All (PMR>50)	Vehicles with flap systems or sound generators
ASEP limits	Established for R41/04 based on fleet data	Established for R41/04 based on fleet data	ASEP sound expectation model

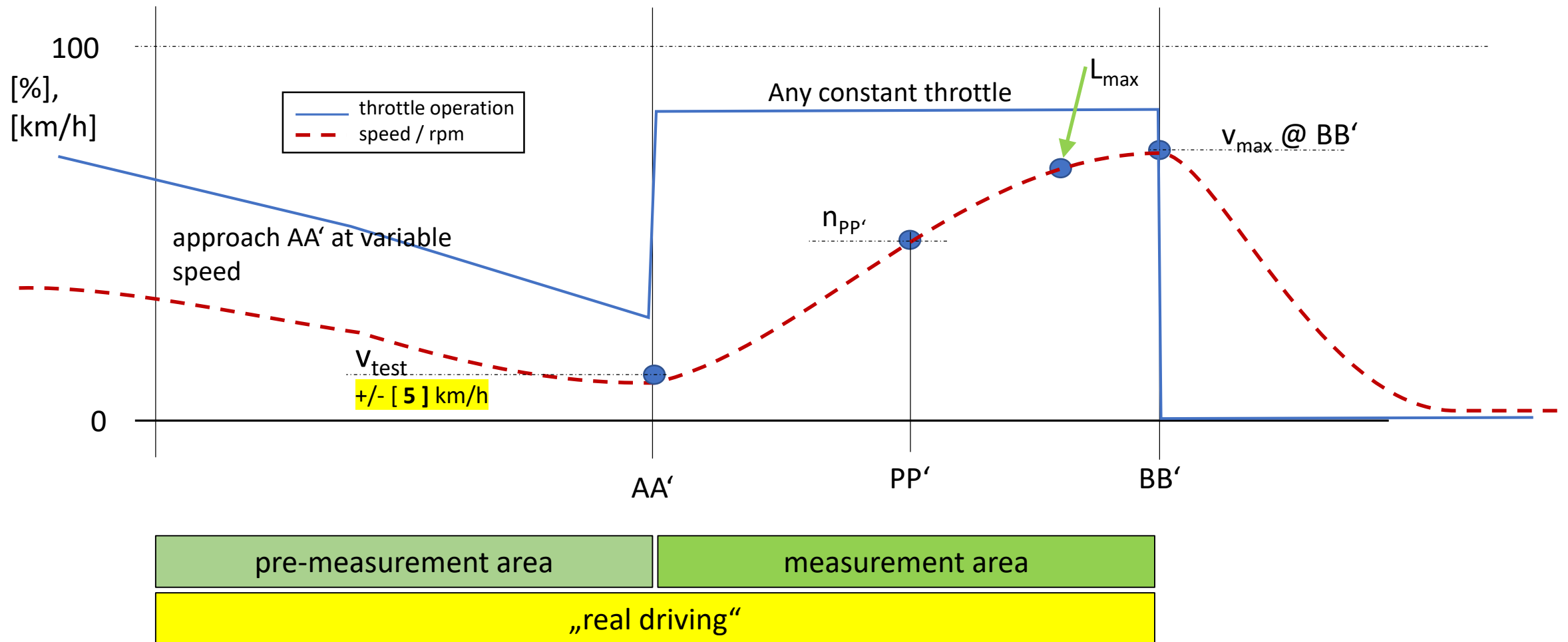
Alignment

IMMA's approach for ASEP revision: Expand current test range
= straightforward & ready for implementation

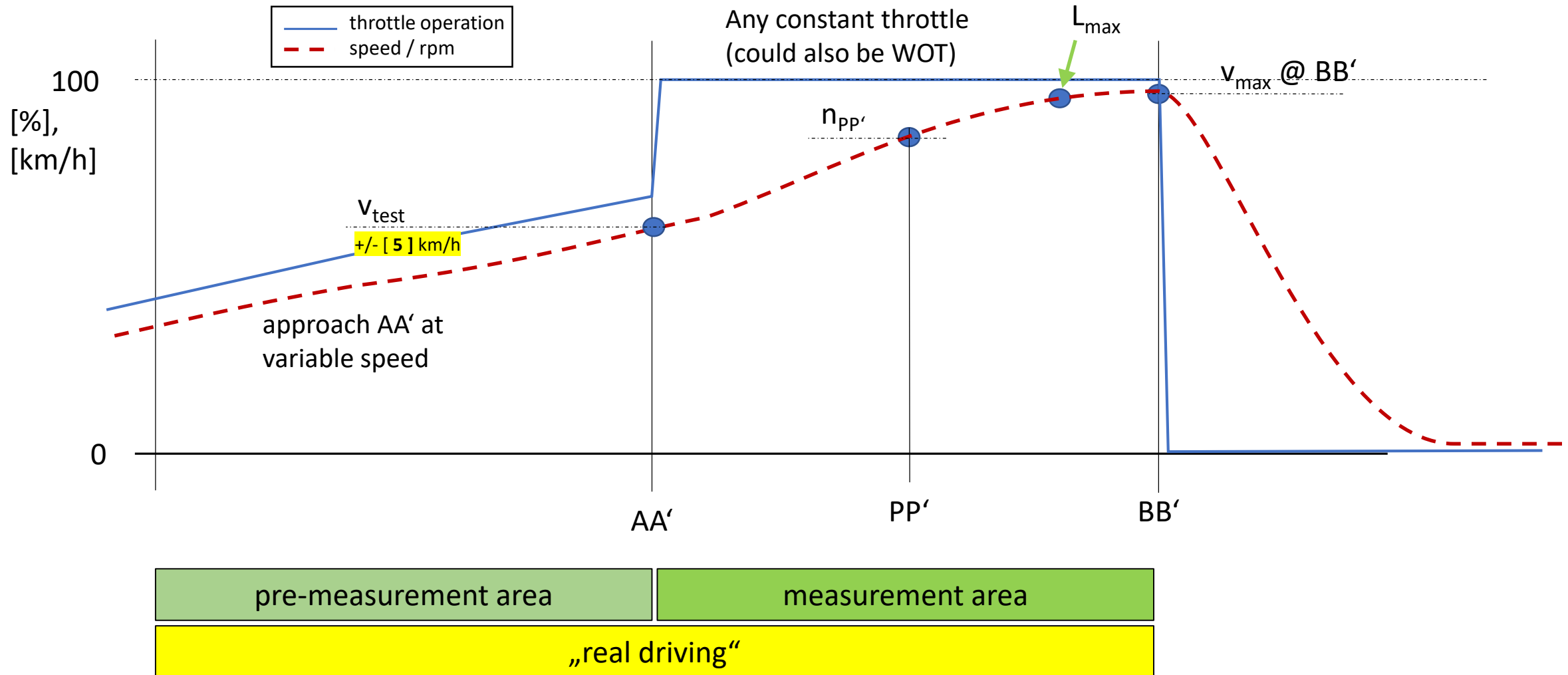
Current R41 ASEP WOT Test:



Proposal for a Revised R41 ASEP (example 1):



Proposal for a Revised R41 ASEP (example 2):



IWG ASEP different approach for R51:

IMMA is aware that the R51 proposal is introducing a new approach based on a sound expectation model.

IMMA's preliminary investigation of this (car-based) model reveals that substantial modifications are necessary for the model to be suitable for motorcycles.

To cover for the motor-cycle specific characteristics (less tyre noise but more mechanical noise due to exposed engine, shorter and exposed exhaust, chain drive, different transmission & clutch, ...), at least following items need adjusting:

- Tyre noise calculation,
- Mechanical no load,
- Partial load transient functions (e.g. form factor α)
- Dynamic load slopes,
- Performance factor $v \times a$,
- Motorcycle (R41) specific formulas needed for A_{wotref} , A_{urban} , N_{max} , ...

- The R51 model approach in its current form is not suitable for motorcycles.
- IMMA requests adequate time to investigate the necessary adjustments for potential future application on motorcycles.
- Until that time, implementing IMMA's ASEP proposal as a 1st step will already solve the existing 'grey zones' in current R41 ASEP test procedure.

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Thank you.