

Japanese View on Shorten Test Procedure (STP) for PEV

6th WLTP E-Lab. SG Meeting

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Pune, India

Prepared by JAPAN

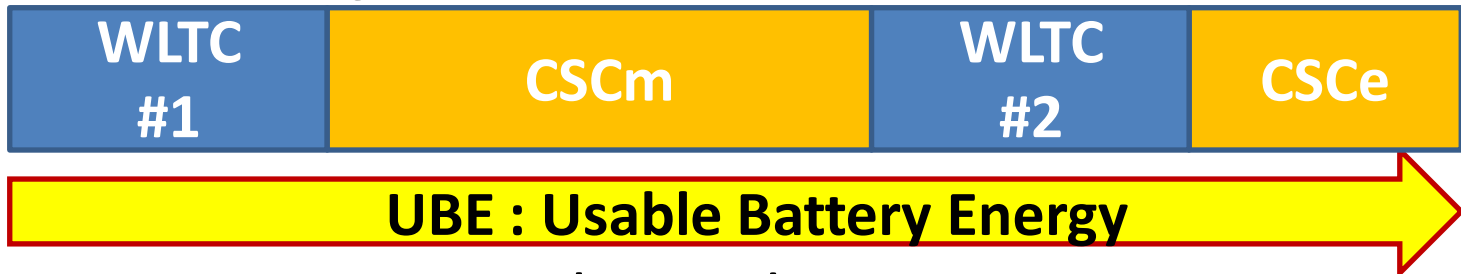
1. General View of STP

Same Test Procedure defined in current gtr except

1. **Test Cycle** (WLTC + Constant Speed Cycle (CSC) ←repeat WLTC)
2. **Measure UBE* during test cycle**

Preconditioning → Charge during soaking

→ Drive **test cycle** (in case of WLTP)



→ Measure E_{AC} : AC Charged Energy

$AER_{phase} = UBE \times \text{Energy Consumption}_{@each\ phase}$

$$EC_{phase} = \frac{AER_{phase}}{E_{AC}}$$

2. Features of STP

		Current	STP
1. Accuracy		Δ final SOC is up to end of test unstable driving index/driver exhaustion/different drivers/driver break due to long test duration	\bigcirc final SOC is stable better driving index/less driver exhaustion/a few break due to limited test duration
2. Repeatability		Δ less repeatability due to uncertain factors(see above)	\bigcirc better repeatability due to concentrated test and include multiple phase driving(L/M : 4, H/Ex-H : 2 times)
3. Test duration	Each phase (L/M/H/exH)	No test (obtain from calculation)	One test covers all requirement (each phase range, combined phase range –L+M, L+M+H, L+M+H+Ex-H) (Tesla model S : approx. 3.5hours)
	L+M	\times Test (Tesla model S : approx. 25.0hours)	
	L+M+H	\times Test (Tesla model S : approx. 16.0hours)	
	L+M+H+Ex-H	Δ Test (Tesla model S : approx. 5.5hours)	
4-1. Combined approach		\times no linear correlation between range and cycle energy	\bigcirc easy to apply, linear correlation between UBE and cycle energy
4-2. Normalization		\times Not available	\bigcirc easy to apply, UBE method is kind of normalization

Japan supports to adopt STP for PEV as baseline test due to its features.

<reference>

US : already adopted,
manufacture use STP without pre-approval by EPA

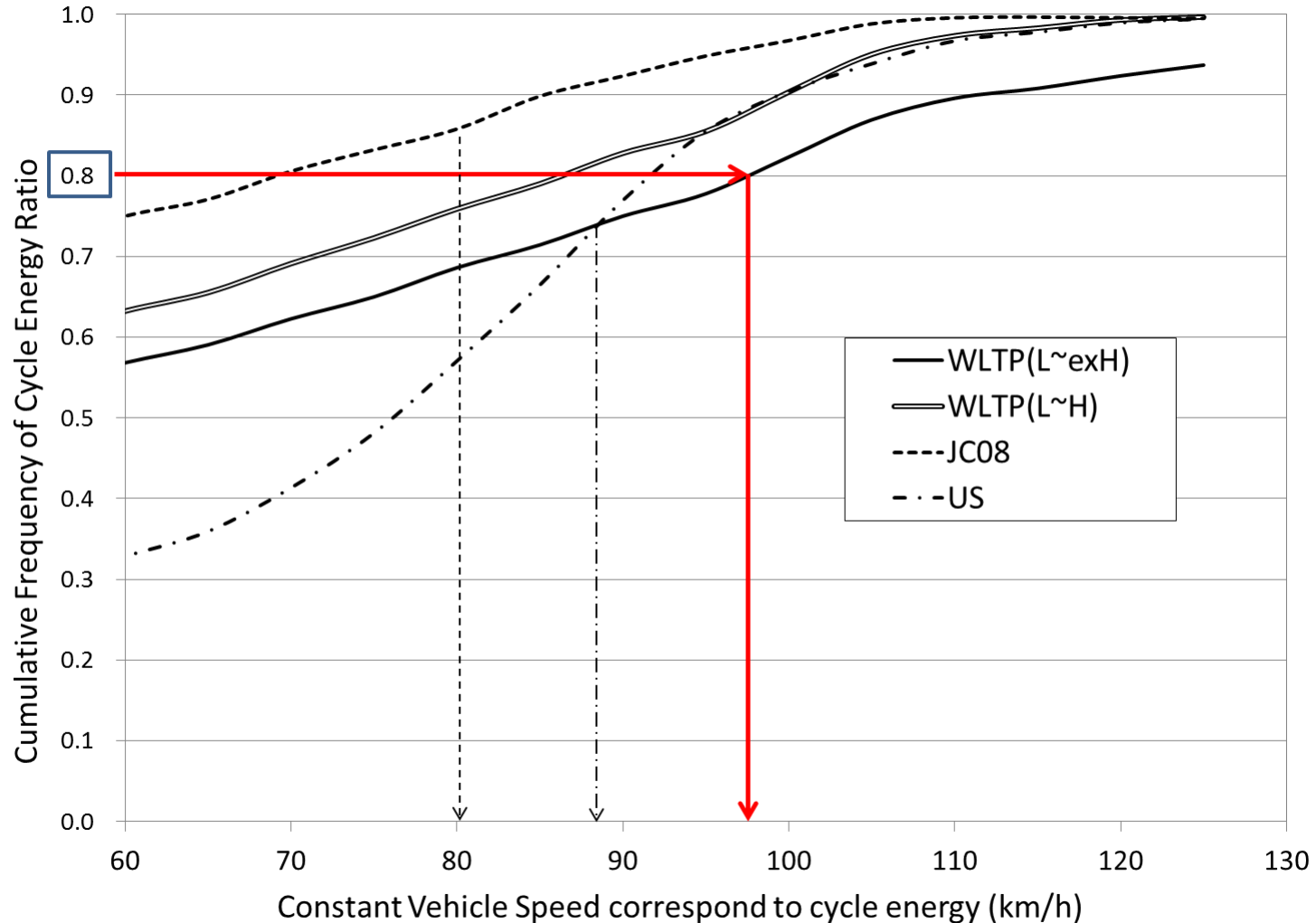
JPN : under the development, ready to adopt soon

3. Discussion Points

		WLTP	US SAE J1634	JPN TRIAS
1	Minimum Range for STP	TBD	> 60 mile(97km)	TBD
2	CSC Speed	Refer Slide_6	Fixed @55mph	Fixed @80km/h
3	CSC Duration	TBD	CSCe : 20% or less than travel distance	CSCe : 5% (TBC)
4	Battery load at CSC	Refer Slide_6	No description in the paper	N.A.
5	Acceptable error	TBD	Done	TBD

4. CSC speed

CSC defined in SAE and possible TRIASE is set @ approximately 80% of cycle energy point.



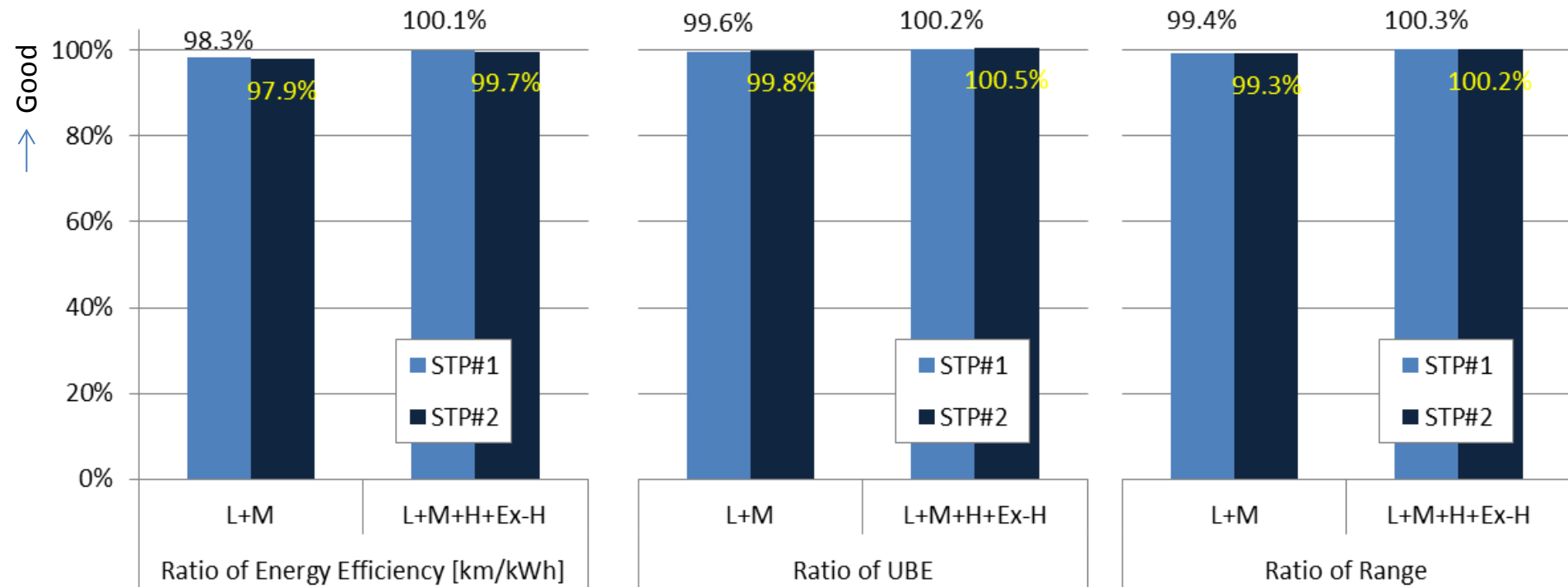
5. Next Actions

		Today	8 th meeting @Geneva	9 th meeting
1	Minimum Range for STP			
2	CSC Speed	97kph proposed by JPN	Correct input from SG member	FIXED, if possible
3	CSC Duration			
4	Battery load at CSC			
5	Acceptable error			
6	others			

(ref.) Validation Results

Conditions : CSC Speed : CSCm = CSCe = 97km/h
CSCe Duration : 55km
CSCm Duration : 25km

Test vehicle: 2013MY Nissan LEAF



(ref.) approximate testing duration

		30kWh		40kWh		60kWh		80kWh	
		SCT	STP	SCT	STP	SCT	STP	SCT	STP
Combined Cycle Test	L+M+H+Ex-H	5	3	7	4	10	6	13	8
	L+M+H	8		11		16		21	
	L+M (City)	12		16		24		32	
	Total [hr]	25	3	34	4	50	6	66	8
Each Cycle Test	L	19		25		37		50	
	M	9		11		17		22	
	H	5		6		9		12	
	Ex-H	2		3		4		5	
	Total [hr]	35	3	45	4	67	6	89	8