IEA Technology Collaboration Programme
on Energy Efficient End-Use Equipment

IEA 4E SSL ANNEX
Task 4 Interlaboratory Comparison – TLM Measurement

Webinar 2021-10-14

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iea-4e.org

3rd Term Work Plan

Task 4 – Objectives

- Promote a harmonised and effective global proficiency test for temporal light modulation (TLM) focusing on :
  - IEC TR 61547-1 which provides a measurement procedure for short-term light modulation (P^{st}_{LM}), and
  - IEC TR 63158 which provides a procedure for measuring stroboscopic visibility measure (SVM)

- Develop and offer a new interlaboratory comparison focusing on test methods for TLM

3rd Interlaboratory Comparison by IEA SSL Annex

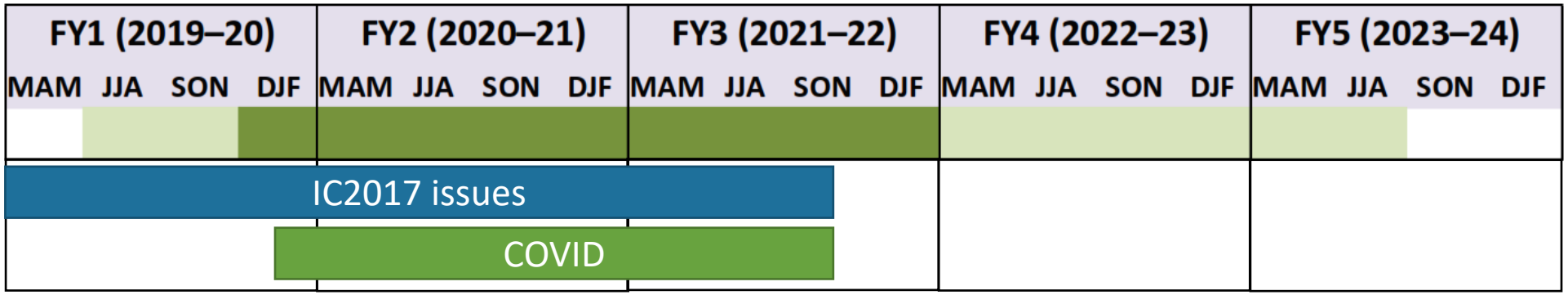
Demand

- ***EU Ecodesign regulation*** *lighting omnibus has PstLM and SVM requirements. (Sept 2021)*
  - *Expected to be adopted by* ***Aust*** *and* ***NZ*** *(expected 2023)*
- ***US Energy Star*** *requires reporting of nominated TLM metrics for dimmable lamps under dimmed conditions (2015)*
- ***California Energy Commission*** *has TLM limits for dimmable lighting products under dimmed conditions (2016)*
- *UNEnvironment* ***U4E Model Regulations*** *for lamps has PstLM requirements. (Pakistan, some countries starting 2021/2) Supposed to also follow EU with inclusion of SVM.*
- *Other countries (in Southern & Eastern Africa, SE Asia, Central & South America) supported by* ***CLASP*** *activities*

3rd Term Work Plan

Planned Schedule

- Follow processes of previous two ICs
- But that has been and continues to be impeded by:
  - Finalisation of IC2017 report
  - COVID-19
  - Member country laboratory commitments to EURAMET MetTLM project
    - started 1 May 2021, ends 31 Apr 2024



3rd Term Work Plan

Proposed Plan

- Stage 1: Nucleus Laboratory IC
- Stage 2: Assess NL IC $\Rightarrow$ decide on IC2022
- Stage 3: IC2022

❖No public announcements on IC2022 until Annex Experts & MC agree that positive NLIC outcomes indicate manageable (low) risk profile for IC2022

While ascertaining “relationship” with EMPIR project

Engaging Potential Nucleus Laboratories

- Seek interest from Annex member laboratories
- Ascertain:
  - Capability and experience in TLM measurement
  - Capacity and availability for testing
  - Willingness to assist with sourcing and preparing artefacts

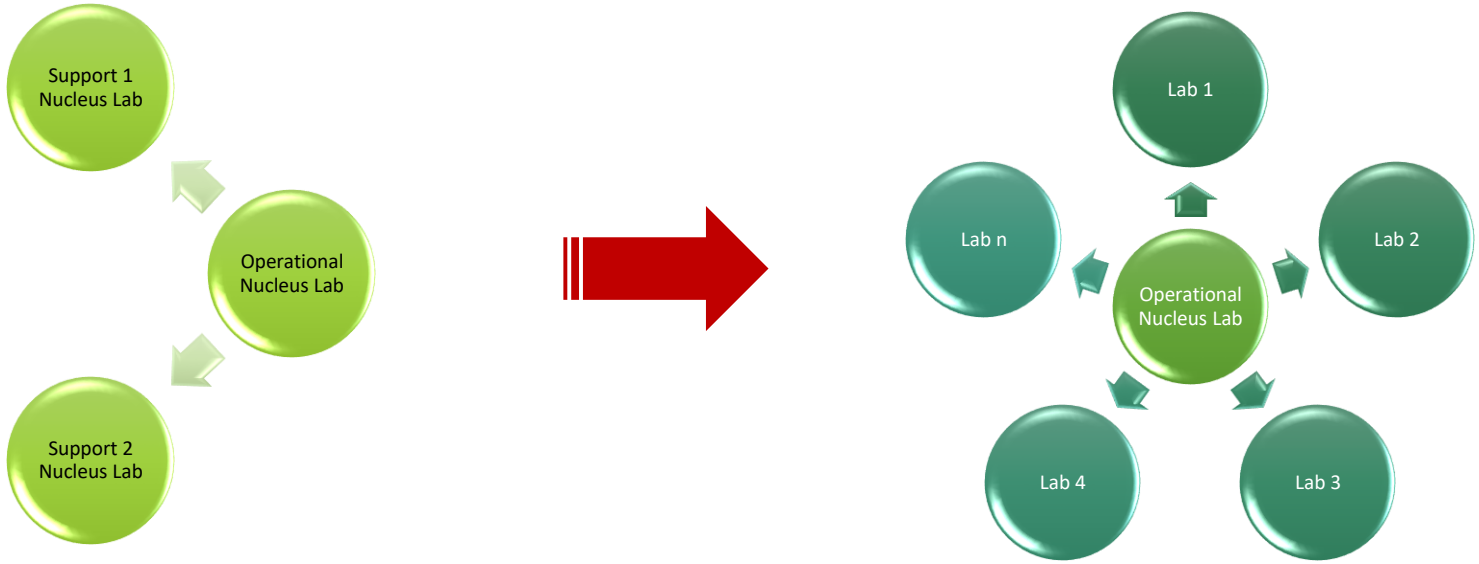
Capacity of sufficient nucleus laboratories

Country	Lab	Status	Capacity
Denmark	DTU	Involved in EMPIR project	Unlikely
Sweden	SEA	Preparing to physically relocate lab	No
Australia	No Gov lab.	**Steve Jenkins & Assoc lab (Tony Bergen)**	**Yes**
France	LNE, CSTB, Laplace	??	
Canada	NRC	?? No prior experience	
Korea	KILT	??	
UK	No Gov lab.	??	

Proposal for a Nucleus Labs

- One “operational” nucleus lab and at least 2 “supporting” nucleus labs to participate in Nucleus Lab

- The operational nucleus lab (Steve Jenkins & Assoc Lab): to administer General Laboratory IC



Artefacts

Opportunity

1. VISO Systems – Temporal Light Modulation Simulator “Labarazzi”
   - Waveforms: Square, PWM, Sine, Triangle, Sawtooth
   - Frequency range: 2 - 10,000 Hz
   - Modulation: 1 – 100%
   - Duty Cycle (PWM): 1 – 100%

   - Multiple clean waveforms

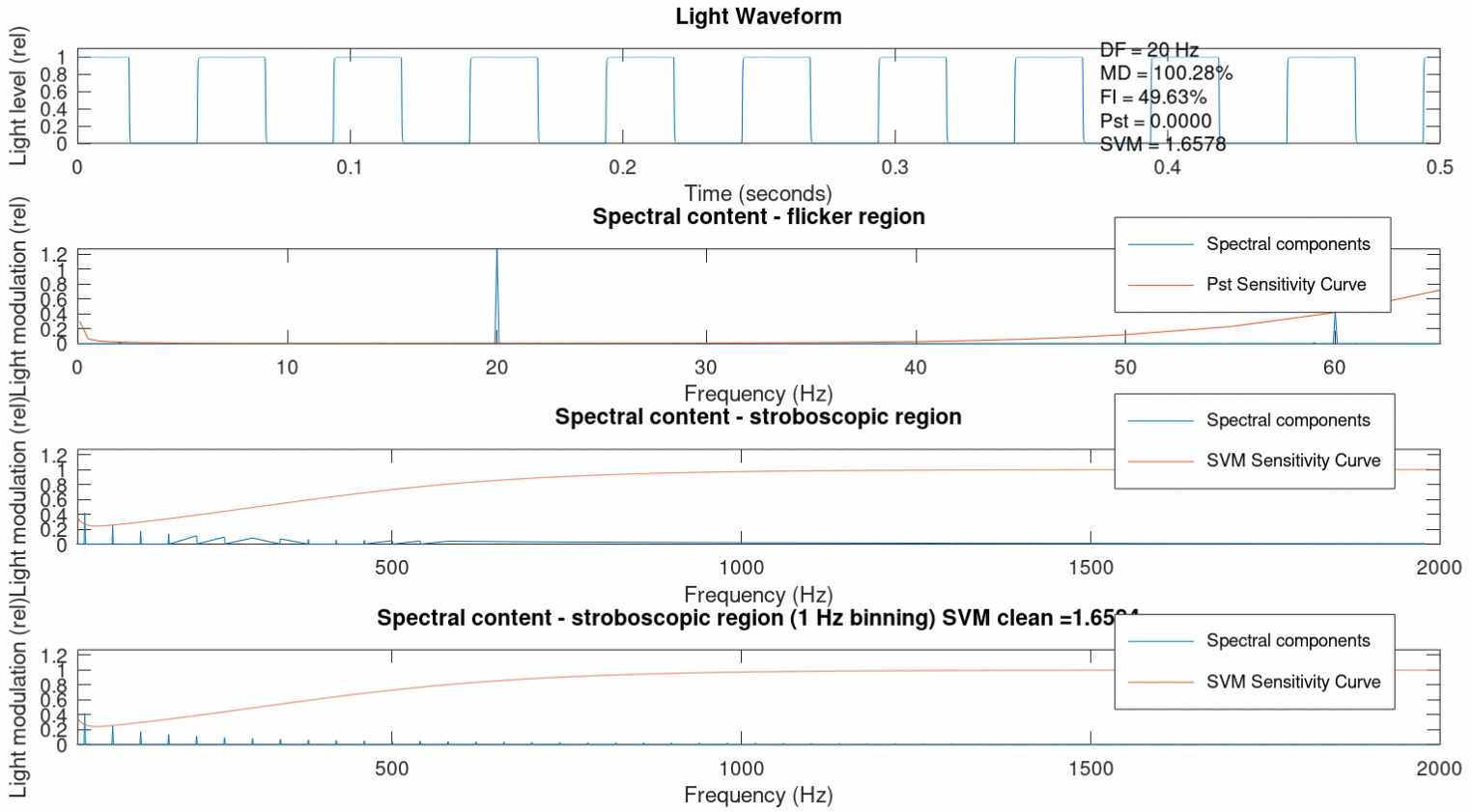
2. One lamp with relatively complex waveform

Need revision of the Revised Schedule

FY3 (‘21 – ’22)		FY4 (‘22 – ’23)				FY4 (‘23 – ’24)			
S O N	D J F	M A M	J J A	S O N	D J F	M A M	J J A	S O N	D J F
Nucleus labs intercomparison									
	Nucleus labs identified. Test protocol agreed & artefacts prepared	Nucleus labs (Operational & Supporting) intercomparison	Prepare artefacts for IC 2022	Coordinate IC 2022 laboratories					
Expert Panel & Management Committee									
1) Experts assessment of nucleus lab IC outcomes 2) MC decision on IC2022			Public call for IC 2022						
Laboratories									
				Laboratories participate in IC 2022					
Task 4 Leaders									
			Report on Nucleus IC results		Prepare Issues paper (if no IC 2022)			Report on IC 2022 results	

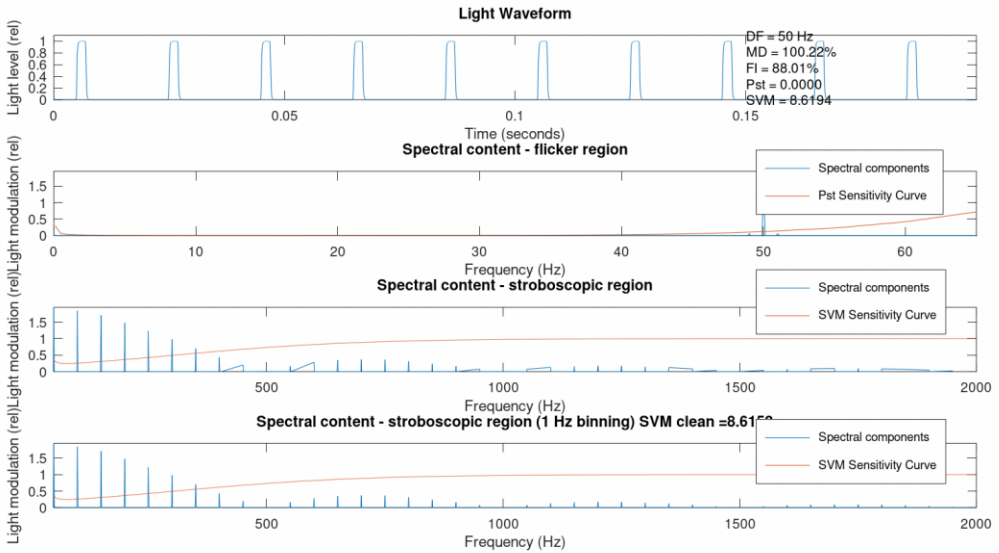
Labarazzi waveforms

20Hz, 50% Duty Cycle, 100% Modulation

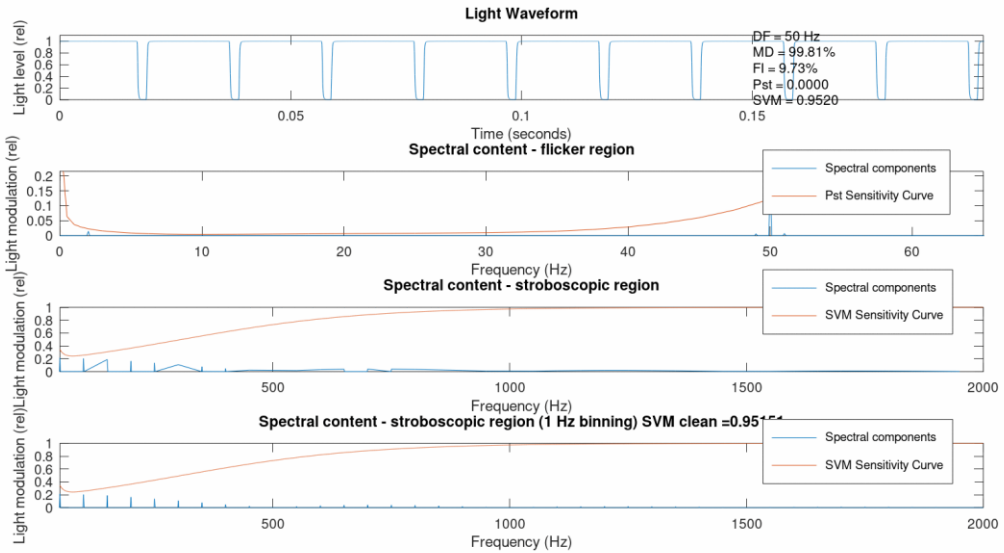


Labarazzi waveforms

PWM: 50Hz, 10% Duty Cycle, 100% Modulation

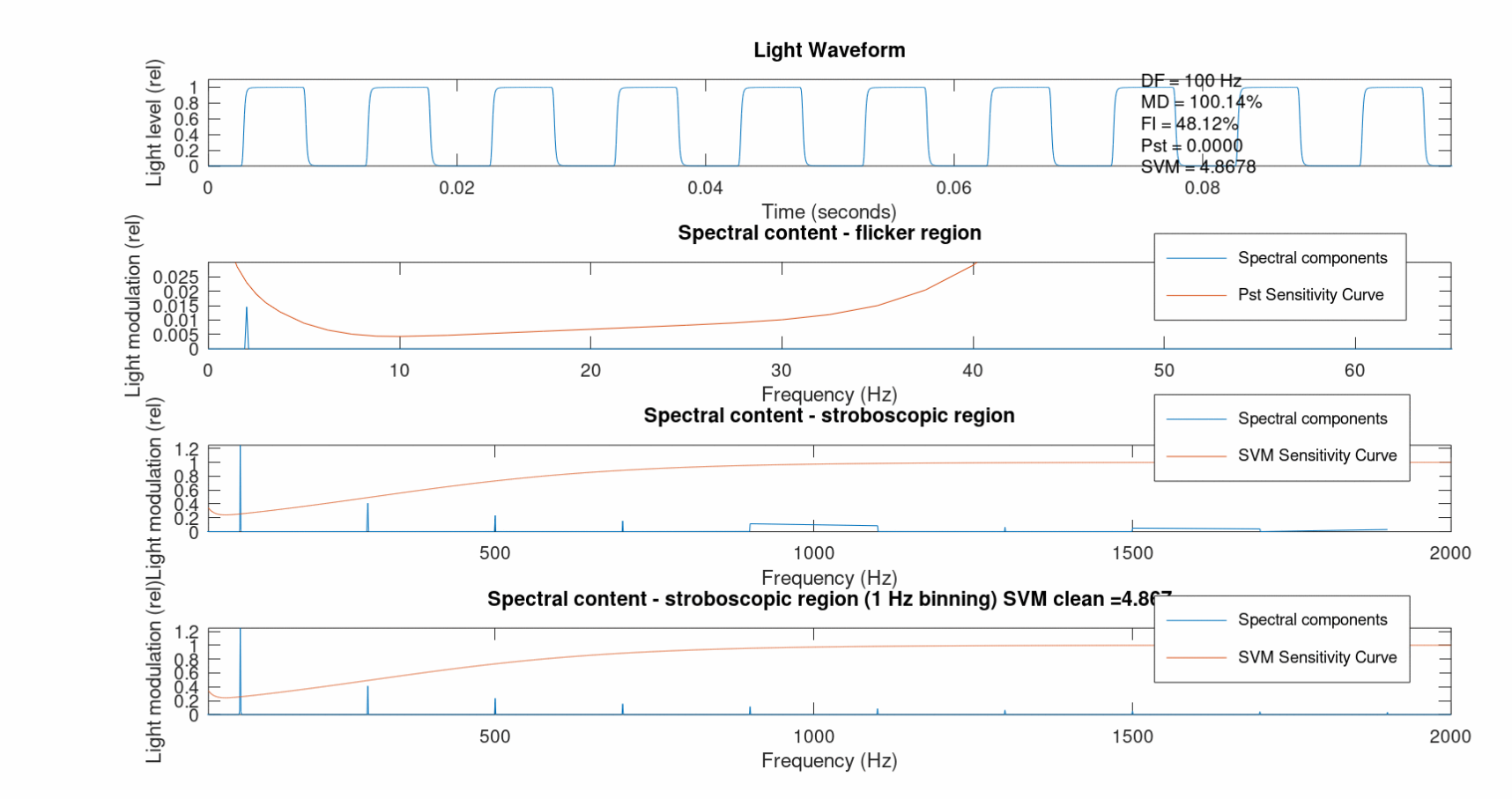


50Hz, 90% Duty Cycle, 100% Modulation



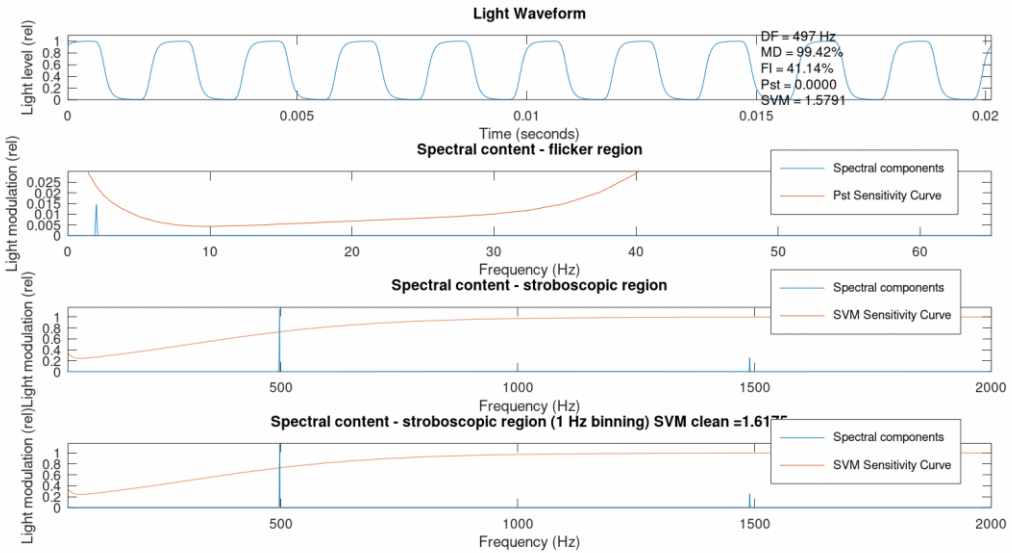
Labarazzi waveforms

100Hz, 50% Duty Cycle, 100% Modulation

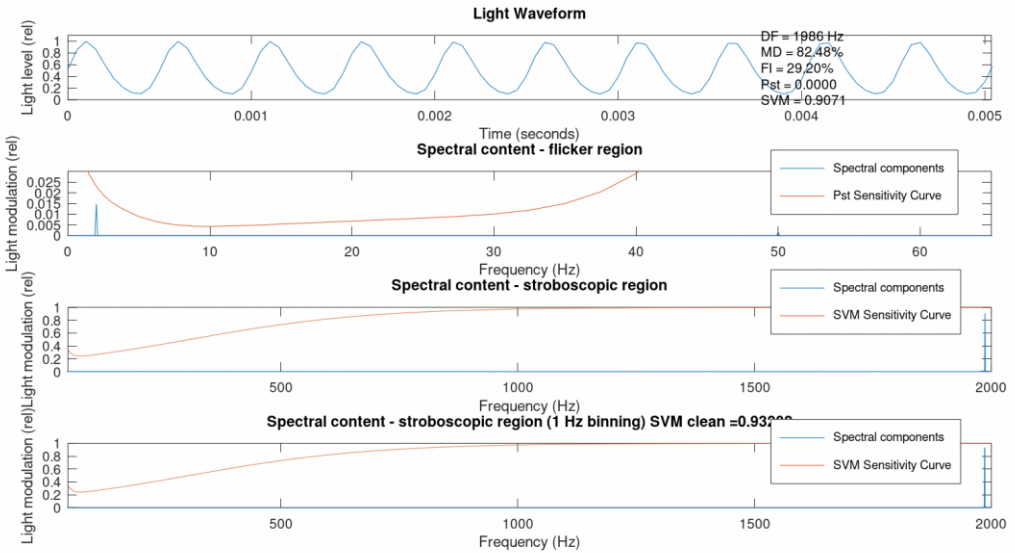


Labarazzi waveforms

PWM: 2kHz, 20% Duty Cycle, 100% Modulation



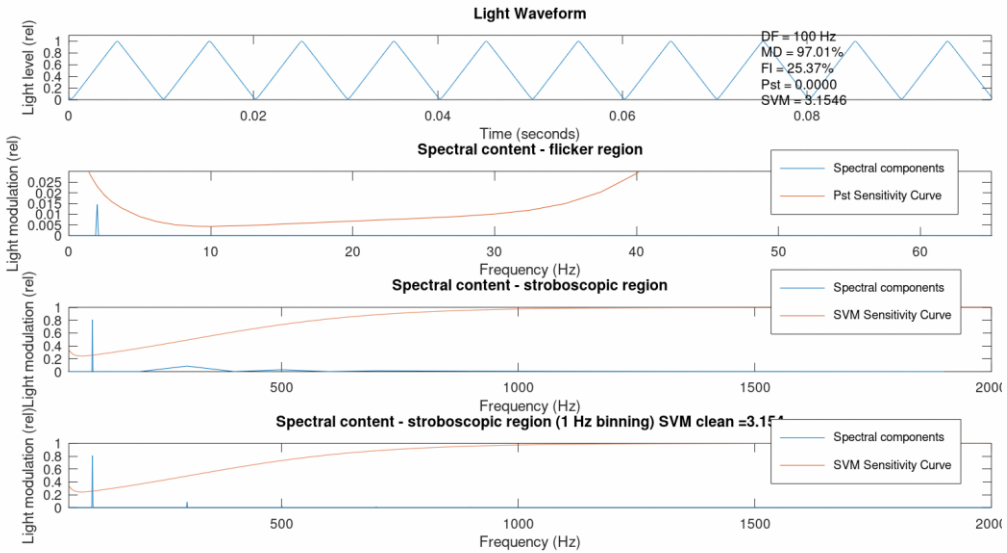
2kHz, 20% Duty Cycle, 100% Modulation



Note: Realised after meeting that the TLM acquisition system has a low pass filter with -3dB cutoff @ approx. 3kHz

Labarazzi waveforms

100Hz, 100% Modulation



500Hz, 100% Modulation