


## Research background

- Advantages of EV conversion
  - ... Silence in the interior of the vehicle
- ✕ Disadvantages of EV conversion
  - ... New noise, such as motor noise, affects discomfort



Countermeasures against this discomfort will be a challenge

## Research purpose

Inhibits perception of unpleasant sounds → **Masking**  
Masking theory vs EV interior  
 Frequency characteristics  
 → Flat, Decreasing to the right  
 Sensory stimuli → Auditory, Visual etc.  
 Masking theory  
 → Not applicable to EV interior

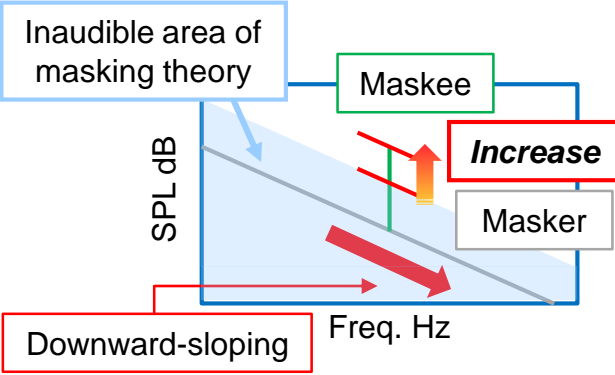
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Evaluation in conditions near the EV interior  
**Establish evaluation guidelines by masking**

## Content


### Masking by frequency characteristics

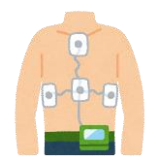
Frequency characteristics sound sources and masking theory to identify difference



### Masking by visual stimuli

#### Evaluation the load of visual stimuli

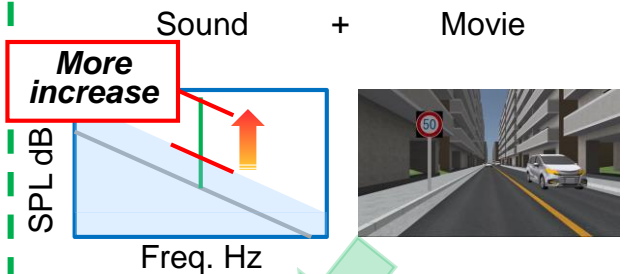
Subjective evaluation: NASA-TLX  


Objective evaluation: ECG measurement  


#### Masking with visual stimuli

Near **EV interior environment**

Sound + Movie



Visualization of masking characteristics by load in EV interior