## UniMAP — Universiti Malaysia Perlis

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# ANCFreq:

## A NOVEL ACTIVE NOISE CANCELLATION FREQUENCY ANALYSER FOR MAGNETIC RESONANCE IMAGING
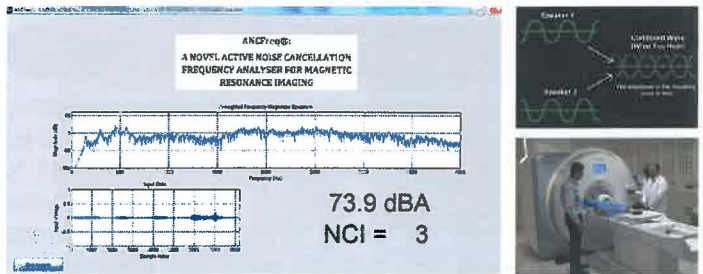
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## PROBLEM STATEMENT

Various types of acoustic noise are produced during the operation of a Magnetic Resonance Imaging (MRI) system. The noise generated can go up to 131 dB, which is a major concern. The Occupational Health and Safety regulations, suggests that the continual exposure of noise above 90 dB for continuous period of 8 hours is dangerous for the hearer. Problems associated with acoustic noise for a patients and healthcare professionals include annoyance, verbal communication difficulties, heightened anxiety, temporary hearing loss and, in extreme cases, the potential for permanent hearing impairment. The MRI imaging utilises both high and the low sound level frequency for optimum imaging results. The current sound level meter does not allow "anti-phase noise control" features. Hence an expensive noise frequency analyzer with built-in sound level meter is required to carry out such noise control task. Identifying the specific noise frequency (especially at low frequency element below 1000 Hz) during MR imaging without missing the useful frequency components remains to be a challenge.

## PRODUCT DESCRIPTION

ANCFreq is a novel active noise cancellation frequency analyzer with sound level meter for MRI application in medical facilities. It is a novel computer software, specially developed to monitor the frequency and noise level in the MRI environment for the health and safety of both patients and healthcare professionals. It has the capability to compute the continuing A-weighting frequency magnitude spectrum and the A-weighted sound pressure level (dBA), which will be a great tool to identify the frequency of the specific noise generated in the MRI imaging room. The ANCFreq software also displays and proposes beneficial Noise Cancellation Index. It is a user-friendly product for healthcare staff without additional purchase of any sound detection equipment or computer programming knowledge. It is very fast in response and can be used regularly for periodic checking of the comfort level in the MRI room.



**ANCFreq DEVELOPMENT PROCESS**

## NOVELTY

1. This product is a totally new innovation in noise analysis and control in MRI room.
2. ANCFreq can be used with any types of computers.
3. ANCFreq is an ultimate solution for finding noise cancellation index.
4. ANCFreq is developed with reference to IEC 61672-1 (2002) / NF EN 60651 (2000) / NF EN 60804 (2000) / IEC 1260 (1995) NF EN 61260/A1 (2002)/ANSI 1.11 / ANSI 1.4 EMC IEC 61000-6-1 and 2 / EMC IEC 61000-6-3 and 4 standands.
5. Search for Intellectual Property right is in progress.

## COMMERCIAL POTENTIAL

1. ANCFreq is an ultimate replacement solution to existing expensive sound level meter and frequency spectrum analyzers or noise control measures MR imaging room and other similar applications.
2. ANCFreq is maintenance free and can be an add-on feature in PC.
3. ANCFreq can be mass produced and developed with improved features.
4. Highly marketable due to its low development cost.
5. In compliance to the International Electrotechnical Commission and American National Standards Institute specification and evaluation.



**73.9 dBA**
**NCI = 3**

## PRODUCT PERFORMANCE

| Parameters | Existing SLM and Frequency Analyser | ANCFreq |
|---|---|---|
| Product Description | Hardware & manufacturer operating software | ANCFreq stand-alone software |
| Storing Capacity | Limited (internal memory or memory stick) | Maximum (computer memory capacity) |
| Functionality | Limited | Customizable |
| Hardware & Software Price (RM) | RM100,000 – RM 150,000 | One Time software purchase RM 1000 |
| Cost Reduction | 1 Time | 150 Times |

## POTENTIAL APPLICATION

- Magnetic Resonance Imaging room
- Sound rooms
- Research laboratories and analysis
- Radio stations
- Environmental and Community noise applications
- Occupational noise monitoring
- Vehicle noise measurements

## INDUSTRIAL COLLABORATION

- Ministry of Health Malaysia (JKN Perlis)
- CLTM Global Enterprise (RA0023074-A)