

Collaborative Research Programme Project Definition (1 of 2)



Project Number:	002
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Project Title:	Using Signal Processing for the Reduction of Key Sources of EMC.
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Relation to Research Areas:
<i>Main</i> Processor architectures
<i>Secondary</i> Advanced Wireless- applying equalization in a novel way. This also relates to EMC.

Background of Project Provider:
Tait Electronics are seen as the main beneficiary of this project, due to them proposing the project and providing the funding to support the project.

Statement of Need:
<p>EMC is an inevitable problem faced in the design of a digital system. Traditionally, we think of EMC as being an emissions problem external to a unit. EMC that occurs internally however is also a problem. Typically, digital signals propagating along PCB tracks lead to emissions that can interfere with the operation of other parts of the system. Within a mobile radio system, one significant source of interference occurs when clock sources or their harmonics lie directly on the wanted receiver frequency which has the effect of de-sensitizing the radio (this is known within Tait as the birdie problem). De-sensitization occurs on both analog and digital radio units which manifests itself as a loss of usable range. The issue is particularly noticeable in analog radios since the interference source is heard by the user.</p> <p>To manage this problem several techniques are applied including an array of shielding and deliberate alteration of the clock sources. The shielding approach yields a dollar cost and physical size issues. The method of changing the clock alters the operation of the signal processing.</p> <p>In an ideal world, it would be preferable to reduce shielding and avoid clock rate alterations. Thus methods of eliminating the effect of EMC (in particular birdies) are of value.</p> <p>Two methods are seen as presenting potential solutions to the above problem</p> <ol style="list-style-type: none">The application of channel equalization techniques to remove the unwanted interferer. The unwanted interferer typically presents itself in the IQ domain as an oscillating vector. It is hoped that techniques currently used for channel equalization may be applied to solve this problem.The deployment of digitally dithered clock sources. The use of digitally dithered clocks generally spreads the noise power of the interferer thus eliminating the problem at source. <p>The aim then is the reduction of EMC interference through the deployment of current or new signal processing techniques</p> <p>The output of the activity will be following</p> <ul style="list-style-type: none">Algorithms for the reduction of EMC sourcesPerformance assessment of techniques proposed

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Potential for Follow On Work:

Dependant on the outcomes of the research, there is the potential of follow on work to build on the findings the research undertaken in this project or to investigate related other related areas.

Anticipated Duration:

The anticipated period for undertaking this project is 12 months, although the industry partner expects continuous engagement with the researchers, in order to make use of findings as early as possible and to transfer knowledge in the subject area to their staff and the WRC.

Project Budget:

\$75,000

(This is a nominal figure, the actually funding provided will be finalised once the project has been fully scoped.)

For further information Contact:

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Appendices

Schedule A – Non-Disclosure Agreement

Schedule B – Intellectual Property Agreement