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## **Report on: BMW Motorcycles Utilising Baehr Noise Cancelling Equipment**

### **Executive Summary:**

Tests results showed that with the addition of Baehr Equipment, speech quality and readability were considerably enhanced. Overall quality improved, as measured by Northcomms, from 'noisy', readability strength 2 to 3 up to good 'clear' comms strength 4 to 5.

At lower speeds with less wind noise the affect is not so pronounced however at speeds from 100 kph to above 140 kph the difference is considerable and the huge reduction in wind noise makes the riders much more understandable as a result of clearer audio with little background noise.

My overall conclusion is that Rider safety would be considerably enhanced by the inclusion of Baehr equipment on all the BMW motorcycles, which addresses common wind noise problems at high road speeds and especially in chase scenarios. All motorcycles should also be fitted up to a common standard for better servicing and better inter-operability between different riders.

### **Testing:**

Several tests were conducted to evaluate the audio quality of radio signals received from the motorcycles. High noise levels are inherent with the wind generated by motorcycles travelling at speed.

Initially a new BMW Motorcycle was installed with a completely standard VHF radio fit. The resultant radio communications were compared with the communications available from the existing Auckland Honda Motorcycles. At this early stage, double screening of radio data cables and common earth bonding was employed to further reduce electronic noise being injected into the radios from the BMW Motorcycle.

### **Initial Results:**

The BMW was initially taken to Auckland Airport where we could conduct high speed runs to emulate the conditions riders would encounter during normal patrol work.

Test runs at speed were conducted and audio quality was compared between the BMW and the Honda which was fitted with Baehr noise cancelling equipment. At this stage the BMW helmet being used simply had a Nautech noise cancelling microphone fitted as opposed to the more complex electronic noise cancelling system employed by Baehr.

These early results showed that a marked improvement could be gained by using Baehr equipment however we were not strictly comparing apples with apples as the Motorcycles were different and each induced different noise into the radios.

This first series of tests clearly came out in favour of the BMW being tested properly with Baehr Equipment fitted

### **Final Results**

To further confirm these initial results the BMW was installed with Baehr equipment in such a way that it could have the Baehr Noise Cancelling equipment enabled or disabled. Tests were then conducted in both modes, first with the equipment disabled and using a Helmet with a standard Microphone and then with the Baehr equipment enabled and using a Baehr equipped Helmet.

Results with the standard microphone and Baehr equipment disabled were not disappointing and produce quite readable signals up to about 80 kph. Above this speed, audibility reduced as the speed increased with the voice becoming more and more muffled by the higher wind noise. At speeds between 100 kph and 140 kph the audio signal was described as about strength 2 and listeners struggled to discern what was said, but it was intelligible

With the Baehr equipment enabled results were most marked at speeds above 80 kph as would be expected. Speech clarity was much improved with a noticeable decrease in wind noise. Signals were quite audible right up to 140 kph and signal strengths of 4 were returned from North Comms to the tests conducted.

Noise levels were still clearly higher than similar tests conducted from the cabin of a Patrol car however the enhancement produced by the Baehr equipment definitely improves Radio Communications for the Motorcycles in the higher speed ranges.

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