

HiPAP[®] Frequency Plan

Information letter



KONGSBERG

HiPAP[®], HPR 400 and Cymbal frequency and channels

HPR/HiPAP[®] Frequency overview

The HiPAP[®]/HPR 400 transponder channels are as follows:

Tx:	21-24.5kHz	Transponder interrogation	8 frequencies spaced 250Hz
Rx:	27-30.75kHz	Transponder reply	16 frequencies spaces 250Hz
Rx/Tx:	25.0-26.5kHz	Telemetry	7 frequencies spaced 250Hz

Cymbal Frequency overview

Centre frequency 25.6kHz, bandwidth +/-2kHz.

Cymbal uses identical centre frequency for both Tx and Rx, the signals are separated by different codes, BPSK.

Cymbal is utilized by HiPAP[®] 501/451/351/351P, cNODE[®] and cPAP[®] products.

Beam control and impact on interference

HiPAP[®] uses focused beams directed towards the transponder, regardless of the transponder location relative to the vessel. This beam is +/-5 degrees at 3dB points.

The narrow focused beam can also be used during transponder interrogation after a short initial phase. This is common for both HPR “analogue” frequencies and Cymbal. By this technique, HiPAP[®] only transmits energy towards the transponder.

Other acoustic positioning systems not having this technology will transmit in all directions, regardless of the transponder position, and spread the energy to transponders not being interrogated.

The narrow focused receiver beam will also suppress noise and other spurious signals from all other directions than the desired transponder.

These properties are also very important when considering the systems interference capabilities.

Interference

Practical operations on drill rigs have shown that two HiPAP[®] systems operating simultaneously, one using HiPAP[®]/HPR400 “analogue” signals, the other using Cymbal, work with no practical interference problem.

Operating Cymbal positioning simultaneously from two different asynchronous systems will cause occasional acoustic pulse overlapping in the water column. If reception on one system occurs at the same time as the other system transmits, signals may be lost, depending on the distances between the two transducers. This is valid for both wideband systems and traditional narrow band systems.

KM has carried out some trials where both Cymbal and Wideband1 (G5 transponders) were used in a shallow water LBL set up. Both systems operated simultaneously without any significant degradation.

See the next page for the channel and frequency plan.

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