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ANALYSIS OF GENIECLIP™ - MOUNT

The efficacy of Pliteq GenieClip™ - Mount to reduce structure-borne noise and vibration from kitchen cabinet door slams while maintaining high sound transmission loss

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Over the last two decades, the use of resilient sound isolation clips, such as Pliteq GENIECLIP™ products, have become increasingly common to increase the sound transmission loss of a wall or floor/ceiling assembly. They are designed to resiliently support drywall furring channel to studs or joists. As such, they are only designed to carry the load of eight square feet of one or two layers of drywall. Often there is a need to support various non-structural architectural components, such as:

- Kitchen Cabinets
- TVs
- Hotel Headboards
- Garage Door Openers
- Various Medical Equipment in Healthcare Offices

These items are too heavy to be supported by the resiliently suspended drywall furring channel alone. To that end, Pliteq has developed a novel acoustical mount that will support, in shear and tension, a piece of 6” metal stud track at the same elevation as the resiliently isolated drywall furring channel. This white paper will describe the new mount along with its load carrying capacity, effect on the sound transmission loss of an assembly, and ability to reduce structure-borne sound and vibration due to kitchen cabinet door slams.

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INTRODUCTION

The Pliteq GENIECLIP™, **Fig. 1**, was first brought to market in 2008. It was designed to connect to a stud or joist and resiliently support a 25 gauge piece of drywall furring channel, **Fig. 2**.



Figure 1: Pliteq GENIECLIP™.

The drywall furring channel supports up to two layers of gypsum board, thereby resiliently isolating the gypsum board from the rest of the structure. This configuration results in greatly increased acoustic isolation over direct attached assemblies. In laboratory testing, the GENIECLIP™ and drywall furring channel assembly can safely support the load of eight square feet of two layers of “Type C” gypsum board. This is approximately 36 lbs. While adequate to support gypsum board, some non-structural architectural components need more support. These components include:

- Kitchen cabinets
- TVs
- Hotel headboards
- Garage door openers
- Medical equipment in healthcare offices
- Hand rails in corridors and stairwells

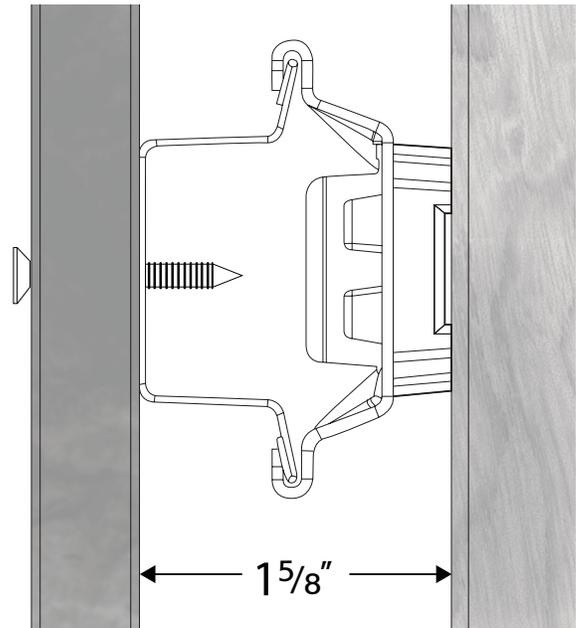


Figure 2: Pliteq GENIECLIP™ supporting drywall furring channel and drywall in profile.

Once this need was recognized within Pliteq, a suitable solution was designed.

GENIECLIP™ - MOUNT

The design of the new GENIECLIP™ - MOUNT started with creating a list of design requirements. These requirements included:

- Must support at least 100 lbs per clip
- Support a non-combustible material
- Easy installation
- Versatile
- No exposed screw to interfere with gypsum board
- Face of supported material must be coplaner with face of drywall furring channel on GENIECLIP™

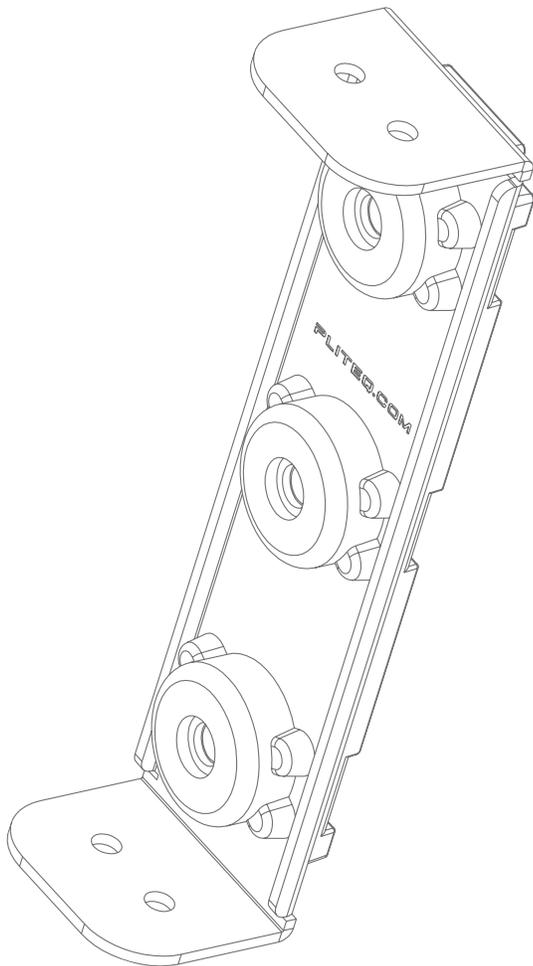


Figure 3: Pliteq GENIECLIP™ - MOUNT.

After these requirements were set, a suitable mounting element was selected. Pliteq’s team of engineers settled on a 20 gauge 6” metal stud track. (Specification for this track can be found in the GENIECLIP™ - MOUNT installation instructions.) The rest of the design quickly followed. The resulting GENIECLIP™ - MOUNT™ design, **Fig. 3**, and installation, **Fig. 4**, met all of the design requirements.

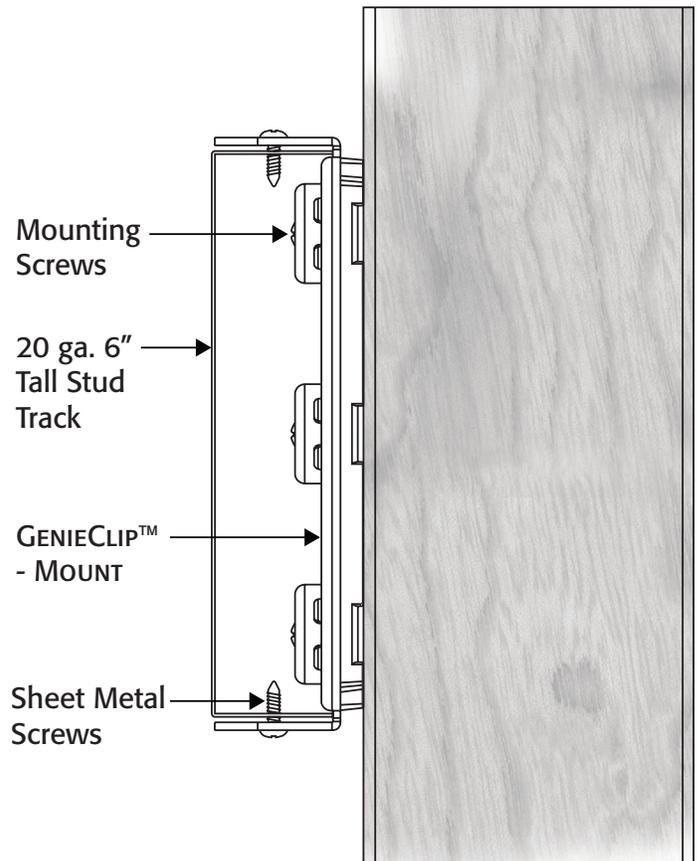


Figure 4: Side View of GENIECLIP™ - MOUNT Installed on a Wood Stud.

EXPERIMENTAL DESIGN

In order to determine the efficacy of the Pliteq GENIECLIP™ - MOUNT to reduce structure-borne noise from kitchen cabinet door slams while maintaining a high sound transmission loss, a series of experiments were designed. These measurements were conducted at Intertek/ATI's ASTM E90 transmission loss facility in York, PA and summarized in report number E2160.01-113-11. The assemblies and measurements performed were:

ASSEMBLY 1

A standard single wood stud wall was built and the transmission loss according to ASTM E90 was measured.

ASSEMBLY 2

A kitchen cabinet with a custom spring hinge closing system was mounted onto the source room side of the assembly. Accelerometers were mounted onto the assembly on the receiver room side. One was located on the gypsum board at a stud and the other was located on the gypsum board between studs. The transmission loss according to ASTM E90 was measured along with the acceleration levels and sound pressure levels in the receiver room due to cabinet door slams.

ASSEMBLY 3

The cabinet and gypsum board on the source side were removed. GENIECLIP™ and drywall furring channels were installed. New gypsum board was then installed onto the drywall furring channel. The transmission loss according to ASTM E90 was measured.

ASSEMBLY 4

The gypsum board on the source side was removed. Two sets of GENIECLIP™ - MOUNTS with a 20 gauge metal stud track were installed, **Fig. 5**. New gypsum board was then installed onto the drywall furring channel. The transmission loss according to ASTM E90 was measured.



Figure 5: Front View of Installed GENIECLIP™ - MOUNT and Metal Stud Track.

ASSEMBLY 5

A kitchen cabinet with a custom spring hinge closing system was mounted onto metal track that was supported by the GENIECLIP™ - MOUNTS on the source room side of the assembly. Accelerometers were mounted onto the assembly on the receiver room side as per assembly 1. The transmission loss according to ASTM E90 was measured along with the acceleration levels and sound pressure levels in the receiver room due to cabinet door slams.

RESULTS & DISCUSSION

The transmission loss of assembly 1 and assembly 2 was compared to assess the effect of the installation of a kitchen cabinet on the wall, **Fig. 6**. It can be seen that the installation of the kitchen cabinet had no effect outside of the repeatability of the test method.

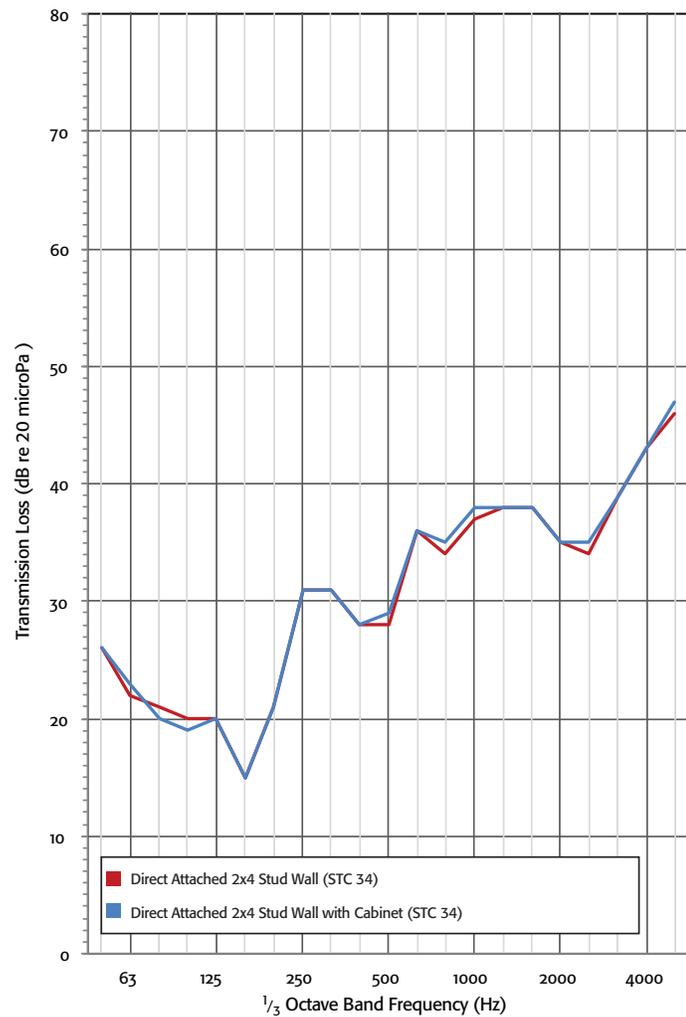


Figure 6: Transmission Loss of Single Wood Stud Wall with and without a Kitchen Cabinet Mounted to the Wall.

The transmission loss of assembly 1 and assembly 3 was compared to assess the effect of using Pliteq GENIECLIP™ to resiliently isolate the gypsum

board on the source room side, **Fig. 7**. It can be seen that the installation of the Pliteq GENIECLIP™ had a very significant effect on the transmission loss of the assembly.

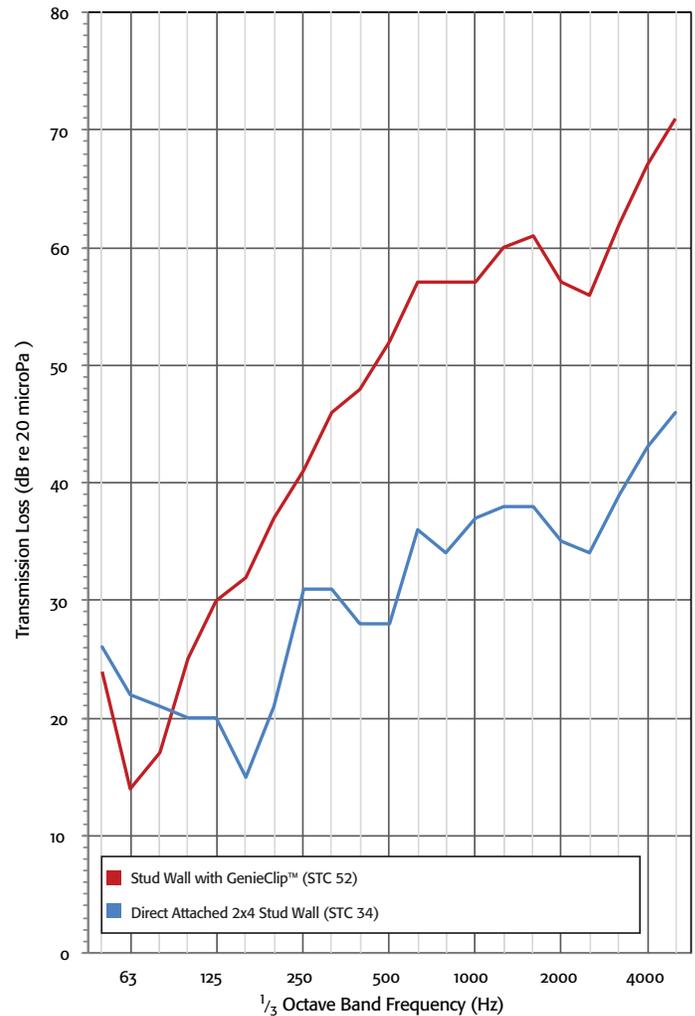


Figure 7: Transmission Loss of Single Wood Stud Wall with and without the use of Pliteq GENIECLIP™ - MOUNTS.

The transmission loss of assembly 3 and assembly 4 was compared to assess the effect of the installation of GENIECLIP™ - MOUNTS and metal stud track on the

wall, **Fig. 8**. It can be seen that the installation of the GENIECLIP™ - MOUNTS had no effect outside of the repeatability of the test method.

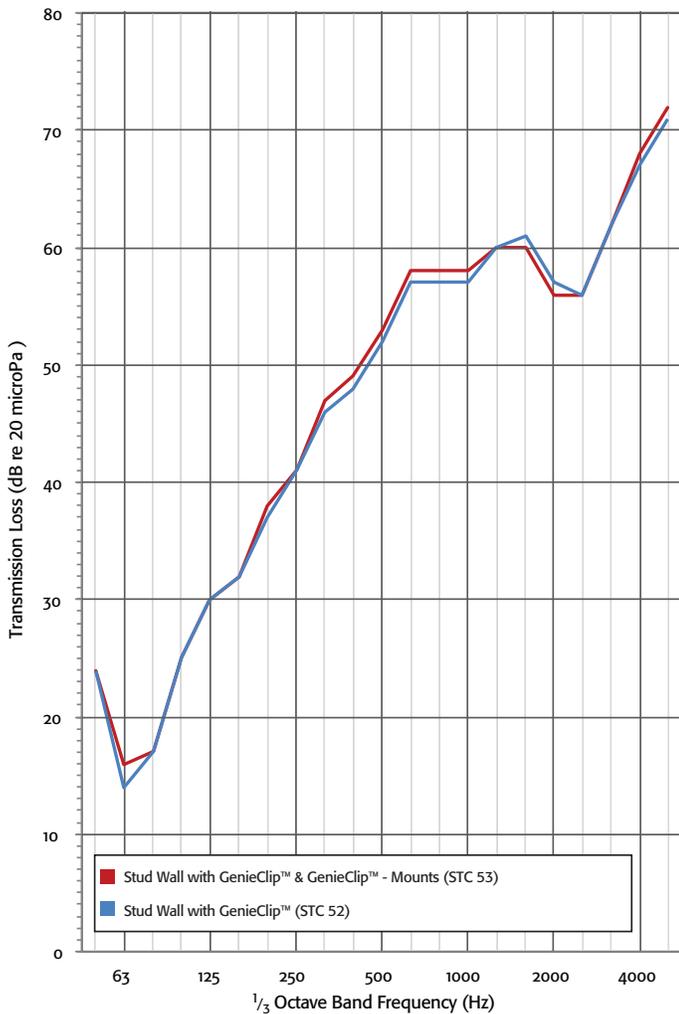


Figure 8: Transmission Loss of GENIECLIP™ Isolated Single Wood Stud wall with and without GENIECLIP™ - MOUNTS and Metal Track Installed.

The transmission loss of assembly 4 and assembly 5 was compared to assess the effect of the installation of the kitchen cabinet on metal stud track supported by the GENIECLIP™ - MOUNTS, **Fig. 9**. It can be seen that the installation of the kitchen cabinet on the GENIECLIP™ - MOUNTS had no effect outside of the repeatability of the test method.

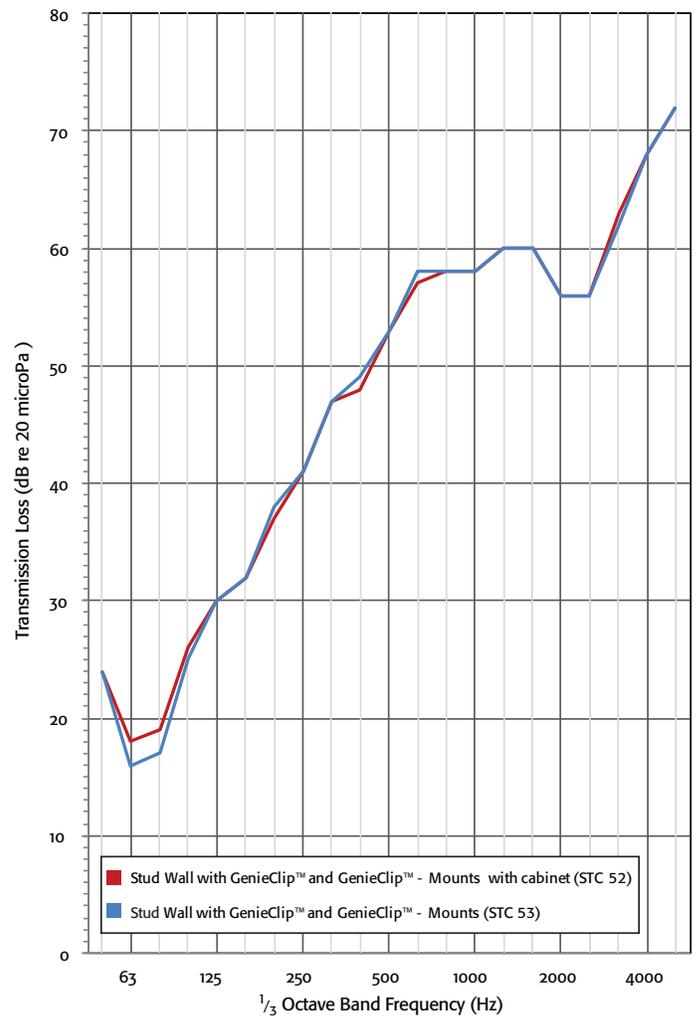


Figure 9: Transmission Loss of GENIECLIP™ Isolated Single Wood Stud with GENIECLIP™ - MOUNTS and Track Install wall with and without a Kitchen Cabinet Mounted to the Wall.

The fast max sound pressure level in the receiver room due to the kitchen cabinet door slams for assembly 2 and assembly 5 was compared to assess the effect of the installation by the GENIECLIP™ - MOUNTS, **Fig. 10**. It can be seen that the installation of the kitchen cabinet on the GENIECLIP™ - MOUNTS had a very significant effect; over 20 dB at some frequencies.

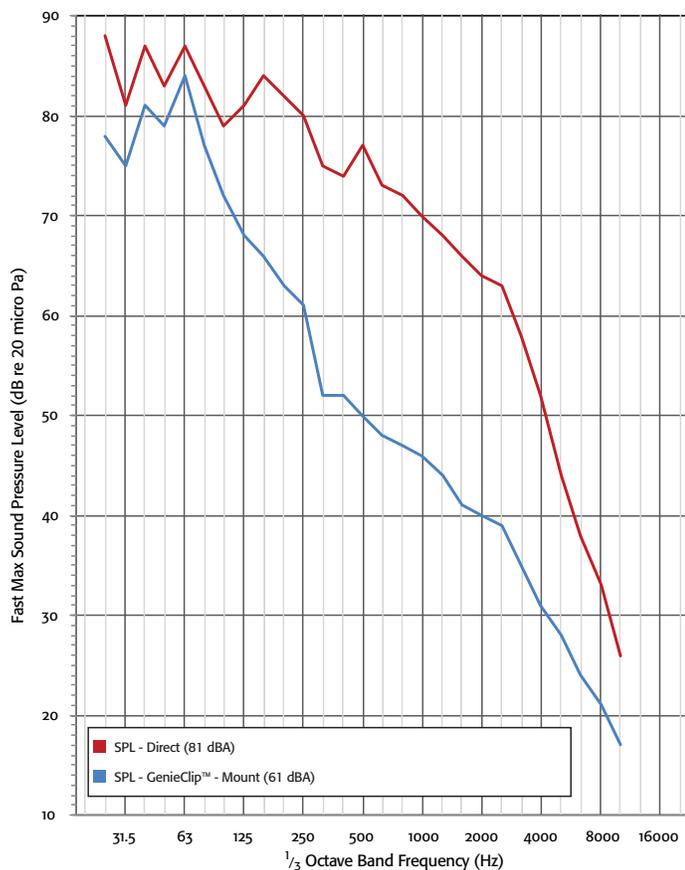


Figure 10: Receiver Room Sound Pressure Level due to Kitchen Cabinet Door Slams with and without GENIECLIP™ - MOUNTS.

The fast max vibration level on the receiver room side of the wall due to the kitchen cabinet door slams for assembly 2 and assembly 5 was compared to assess the effect of the installation of the kitchen cabinet by the GENIECLIP™ - MOUNTS, **Fig. 11**. It can be seen that the

installation of the kitchen cabinet on the GENIECLIP™ - MOUNTS had a very significant effect; over 40 dB at some frequencies. *Note: Accel 1 mounted on the drywall at the location of a stud. Accel 2 mounted on the drywall between the studs.*

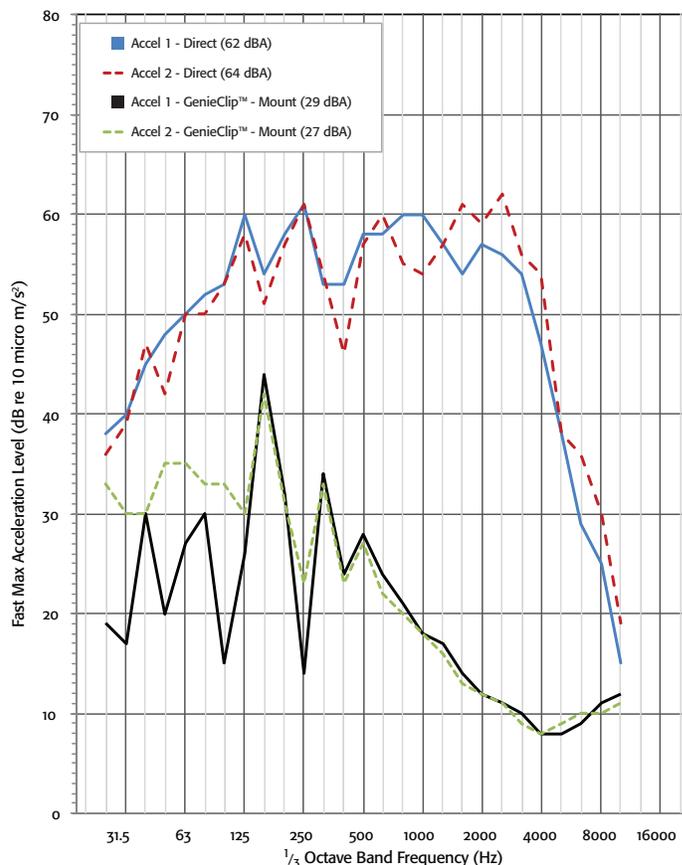


Figure 11: Vibration Level on Receiver Room Side of Wall due to Kitchen Cabinet Door Slams with and without GENIECLIP™ - MOUNTS.

CONCLUSIONS

The GENIECLIP™ - MOUNTS are effective at supporting kitchen cabinets and reducing structure-borne noise and vibration while maintaining the the sound transmission loss performance of a GENIECLIP™ wall.

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