

19 May 2016

To whom it may concern:

TUV SUD America Inc. has an A2LA accredited open area test site at a remote location about 5 miles from the town of Taylors Falls, MN. We have several shield rooms at our facility in New Brighton, MN for testing products per the international requirements for electromagnetic compatibility radiated immunity testing. We have some customers, who have construction vehicles too physically large to fit in our shield rooms. Our open area test site can accommodate these machines. A new immunity standard has come out with requirements for testing in the 1-2.7 GHz range. TUV SUD America has developed a bulk current injection method of testing below 1 GHz, but this method is not supported above 1 GHz. We are looking into the possibility of performing these tests at our open area test site. Wild Mountain Ski Resort/Water Park is one mile from our OATS, and a couple of residences are within a mile of our OATS in the opposite direction. Based on past business from these customers, we would estimate this testing would occur for 1 day at a time, about 6 times per a year.

Our proposed test would be using a directional horn antenna, placed 10 centimeters away from the electronic modules on the vehicle under test, the antenna will be less than 6 meters above the ground. We are in a river valley, so there is much natural attenuation in addition to our remote location. We would transmit at each frequency range at a rate of 1% step sizes with a 3 second dwell time, to all modules of the equipment under test with both antenna polarizations, so the actual on time would be very minimal at each frequency on the above mentioned days. The signal generator output will be pulse modulated with $t_{on} 577 \mu s$, period $4 600 \mu s$. It is our estimation that this will have no impact on licensed services (there is no cell phone coverage at our location, as an example). The fall-off of our signal will be negligible by the time it would get to the distance of our neighbors.

Our test equipment system will consist of:

HP 83640B signal generator

Amplifier Research 25S1G4A amplifier below 4 GHz

MAC Technologies CA3333 rf coupler below 4 GHz

Agilent E4440A spectrum analyzer for power meter

Amplifier Research AT4510 horn antenna – beamwidth about 16 inches at 3 GHz

Sincerely

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TUV SUD America Inc