

EMF Measurements of Cars and Trucks

by Jens Bil

The levels of EMF vary greatly between different models and makes of vehicles. There are many sources of EMF in a vehicle, such as the alternator, ignition system, wiring harness, fuel pump, etc. The design and location of these determine the EMF radiation level at the driver's seat.

Measurements on a variety of vehicles were done using a gaussmeter, the TriField meter from Alpha Labs, which is widely available. Eight locations are selected to measure in all the vehicles, mostly where different body parts of the driver would be. The measurements were done with the engine running and unneeded equipment turned off.

It is important to understand that these measurements do not produce the full picture of the radiation in a given vehicle. First of all, the TriField meter does not measure frequencies beyond about 100 kilohertz, so radiation from onboard computer control systems are not included. The meter also does not measure below 50 hertz. Where some magnetized metal parts possibly may radiate. Also, the meter is calibrated for 60 hertz, and thus less accurate for the higher frequencies.

Some EMF is only generated while the car is moving, such as from magnetized tires and transmission parts, anti-lock brakes, electronic speedometer, etc. These measurements were only done with the vehicle at a standstill. In ordinary cars, these types of EMF emissions do not make a significant contribution to the overall level of EMF at the driver's seat.

These measurements should not be used to choose which vehicle to buy, they are only a rough comparison. A low number is not a guarantee that a vehicle is suitable for a particular person, only that person can determine that through taking the vehicle for a test drive.

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Methodology

The measurements were done in a standardized way, following these guidelines:

- Vehicle is stationary
- There are no substantial ambient EMF's around the vehicle
- All electronic equipment in the vehicle is turned off, such as fans, air conditioner, radio, lights, etc.
- The battery must be in good condition and charged, as a low battery would make the alternator work harder,

- The engine is idling for the first eight measurements. For the last two, the gas pedal is pressed down until the engine roars. The exact speed (RPM) of the engine is not important.
- Eight points are measured; seven around the driver's seat, one in the passenger-side footwell. See diagram below.

- (1) Top of gas pedal
- (2) Top of brake pedal
- (3) Left-front corner of foot well
- (4) Middle of foot well
- (5) Highest measurement on seat
- (6) Location of driver's left knee
- (7) Location of driver's right knee
- (8) Highest measurement in passenger-side foot well, but only where a foot may actually be placed.

Reading the tables

For each vehicle, up to ten measurements are shown. The numbers are in the unit milligauss (10milligauss = 1 microtesla). The columns correspond to the eight locations, as shown on the diagram. Location 1 and 4 are done twice; with the engine idling and with the engine revved up.

Test point 1 through 7 are places where a driver would be exposed while driving the vehicle. For most people, the highest reading is the most significant.

Some electrically sensitive people may be more sensitive in some body parts than in others. In that case, give more weight to the appropriate measurement point.

Point eight is only of interest if a sensitive person is largely going to be a passenger, In that case, the back seat is usually better anyway.

The highest rating for any vehicle is usually test point 1, with the engine revved up. This is the gas pedal, where the right foot will receive the measured level of EMF exposure continuously, while driving the car, unless using cruise control. However, cruise control can be problematic in itself.

Looking over the tables, a pattern emerges, with trucks tending to have lower readings than cars, Great variation is seen between models of trucks, however. Two model-years of the Ford F-150 V6 truck have very different values, with the 1993 model showing 35 milligauss as the highest reading, while the 2000 model only shows 7 milligauss. The F-150 was redesigned between those model years. The best truck is the Dodge Dakota V8 from 1997, with many close contenders.

Some specialty vehicles were measured. That a hybrid car shows up high is no surprise, and it probably would really light up when moving. Hybrid cars are partially electrically driven and have a lot of power-handling equipment on board, which a gaussmeter does not measure well. The author found this car the most bothersome to drive of all vehicles tested.

The number of cylinders in the engine do not seem to be significant which is surprising as there are more spark plugs to fire. Perhaps the reason is that the extra cylinders tend to be further from the driver.

The table does not show any measurement for the Prius with a revved up engine, as the computer control refuses to do that at a standstill.

The 1966 Volkswagen has the engine in the back and shows nice low numbers. Had the car been longer, it would have shown much better numbers yet. The EMF measured came largely from the battery cable under the rear seat, and the ignition key.

The best gasoline-powered cars are the 1987 Dodge Aries Wagon and the 1991 Cadillac Sedan deVille . The 1982 diesel Mercedes came in as the overall best, when the alternator and cruise control were disconnected. At those low levels, EMF from the speedometer and other moving parts become dominant when the car was running. With further work, that car got down to only 0.02 milligauss. More recent diesel vehicles are unlikely to get as good, as they have more electronics, including electronic fuel injectors.

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Vans and Wagons

Type	Year	Engine Idling								Engine Revved	
		1	2	3	4	5	6	7	8	1	4
Chevy Astro	1992	110	40	20	12	3	4	8	100	120	20
Dodge Aries Wagon	1987	5	7	30	7	0.8	1	1	2	6	8
Dodge Caravan	1988	5	6	40	20	3	3	2	4	5	20
Dodge 1500V8 van	1998	60	22	10	20	2	28	4	14	100	30
Ford Econoline	1988	35	10	5	20	3	1	4	15	110	100
Ford Taurus SE Wagon	2000	14	6	90	20	9	15	6	4	50	50
Mercury Sable Wagon V6	1997	15	40	90	50	10	15	12	5	20	25
Toyota LE Van	1989	5	5	2	3	10	4	8	5	12	10

Cars

Type of car	Year	Engine Idling						Engine Revved			
		1	2	3	4	5	6	7	8	1	4
Acura Integra	1990	15	13	22	8	1.5	1.5	1	5	25	20
Buick Century	1987	90	40	90	-	9	20	15	25	120	60
Cadillac Sedan deVille	1991	8	4.5	4	4	1	1	1.5	5	10	5
Dodge Intrepid	1998	40	50	90	25	20	22	22	6	40	30
Hyundai Accent	2005	9	20	90	25	8	14	6	6	40	25
Mazda Protégé	1995	35	25	50	10	8	15	8	6	100	12
Olds Cutlass Ciera	1989	30	25	18	15	8	14	30	15	30	15
Toyota Avalon V6	2000	20	35	100	15	12	7	15	10	20	15
Toyota Camry 4 cyl.	1992	12	35	60	25	15	22	15	8	30	25
Toyota Corolla	1990	60	8	40	25	6	3.5	8	-	25	2.5

Special Vehicles

Type of vehicle	Year	Engine Idling						Engine Revved			
		1	2	3	4	5	6	7	8	1	4
Dodge 2500 diesel V6	1994	3	3	4	2	0.4	0.4	0.6	2	3	2
Mercedes 240D diesel	1983	8	4	3	5	0.8	0.6	1.2	4	3	2
Mercedes 300SD turbo diesel	1982	1.8	1	0.6	0.8	0.3	0.6	0.8	1	1.8	0.8
Mercedes 300SD turbo diesel (alternator disconnected)	1982	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.2
Toyota Prius hybrid	2006	80	35	80	-	5	5	4	-	-	-
Volkswagen Beetle	1966	0.7	0.7	2	1.7	1.8	0.8	0.6	2	2	3

Trucks and SUV's

Type of truck or SUV	Year	Engine Idling							Engine Revved		
		1	2	3	4	5	6	7	8	1	4
Chevy Suburban V8	2001	3.5	2.5	2.5	2.5	0.4	0.8	0.8	0.8	20	2.5
Chevy Suburban V8	2004	5	5	8	5	0.6	1	1	2	12	7
Chevy Silverado 2500	2004	4	3	3	3	1	1	0.6	1.5	8	3
Dodge Dakota V8	1997	2	2	2	1	0.1	0.2	0.2	2	3	1.5
Dodge 2500 turbo diesel V6	1994	3	3	4	2	0.4	0.4	0.6	2	3	2
Dodge Ram V8	1998	4	2	4	1.5	0.2	0.4	0.4	2	6	2.5
Ford F-150 V6	1993	14	6	8	2.5	1	1.8	1.8	-	35	6
Ford F-150 V8	1998	3	4	7	5	0.2	0.8	0.6	5	7	6
Ford F-150 V8	1999	4	10	25	15	0.6	1.5	1	3	5	20
Ford F-150 V6	2000	4	6	15	6	1.5	3	2	15	7	15
Ford F-350	1967	15	30	50	5	2	3	3	-	25	7
GMC Jimmy (350)	1989	15	3	2.5	7	0.6	0.8	0.8	2	15	7
Jeep Grand Cherokee	1995	35	90	110	16	12	12	15	12	35	16
Jeep Grand Wagoneer	1989	3	1.2	2.5	2	0.2	0.4	0.4	-	6	2
Jeep Wrangler 4 cyl.	1995	15	2.5	1.5	4	1.5	0.6	2.5	30	40	8
Mazda B2200	1990	3	3	15	2	1.5	1.5	1	3	8	5
Toyota Tacoma LX	1996	25	50	25	10	2.5	4	5	15	25	10