

PC6/ RoadSnoop
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a. Description of equipment and theory of operation

RoadSnoop Pressure Watch is a tire pressure monitoring product from Nokian Tyres plc, a global tire company located in Finland. The product consists of four tire sensor/ transmitter units (RSPW-01T) and a receiver/ display unit (RSPW-01R). The tire sensor/ transmitters are fixed on each rim inside the tires using stainless steel clamps. The sensor/ transmitter units send two data packets every 12 seconds. One transmission takes approximately 20 milliseconds. Each data packet contains the sensor/ transmitter's ID-code and the measured pressure and temperature inside the tire. The receiver/ display unit is located inside the vehicle and has pre-set low-pressure limit for each tire in its memory. If the pressure in one or more tires drops below this limit, the receiver/ display will alert the driver with warning lights and sound.

*Figure 1*

The receiver/ display unit and a tire sensor/ transmitter are shown in Figure 1. Particulars of operation:

(A)	Frequency:	433.92 MHz
(B)	Power:	6 dBm at transmitter terminals
(C)		55 dBuV/m at 10 m
(D)		PEAK
(E)	Emission:	K1D
(F)	Modulating signal:	Manchester coded data 9600 symbols/s
(G)	Bandwidth:	$B_n = 86k4$
	Bandwidth calculation:	$B_n = BK + 2M$

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B = 9600
K = 5
M = 19200
=> Bn = 86.4 kHz = 86k4

b. The specific objectives sought to be accomplished

RoadSnoop Pressure Watch is a tire pressure monitoring product for the aftermarket. It is meant to work in all four-wheel light vehicles, e.g. cars, vans, light trucks, SUVs etc. However, wireless data transmission is always somewhat uncertain. External interference from other device using similar frequency, influence of the surroundings to the antenna tuning and damping of the radio signal due to distance and obstacles between the transmitters and the receiver can cause some of the transmitted data to be lost. It is a known fact that the severity and influence of these problems changes from one car to another.

The way to test the integrity of the communication between the transmitters and the receiver is to mount the sensors in the tires of a car, drive the car in different speeds and surroundings (city/ highway) and to document the functions of the receiver.

c. The goal of this program of experimentation

Many car and especially light truck models that are very common in the United States are not at all available in Europe. Nokian Tyres wants to make sure that the RoadSnoop Pressure Watch works without problems also in these American types of vehicles before launching the product in the U.S. market.

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