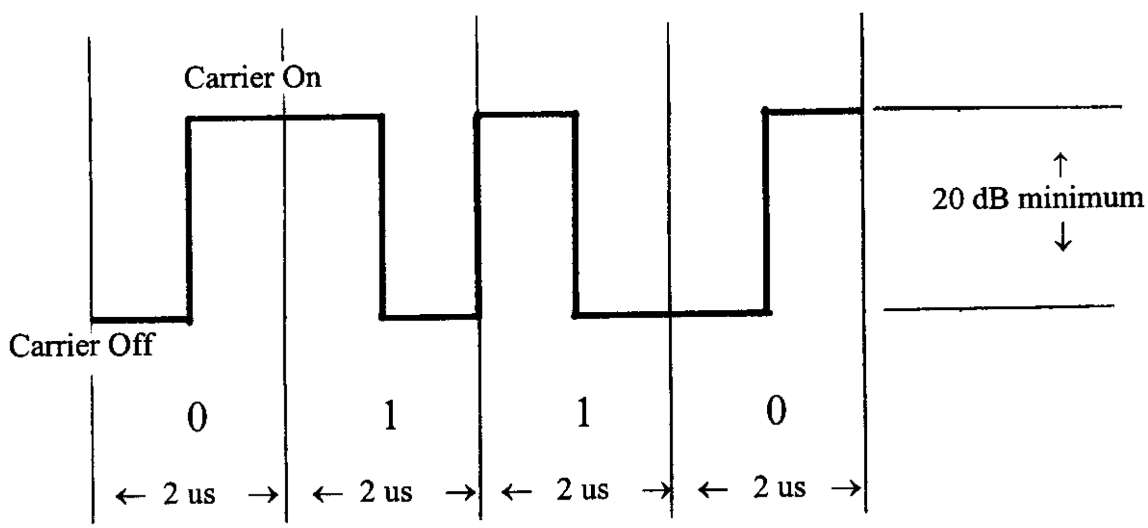
Exhibit 1

The communications "frame" (see below for further explanation) is 9.676 ms in duration; therefore it is possible to communicate with a vehicle's transponders up to 103 times per second. The actual communications rate is dependent upon the number of the transponders in the communications net and what function is being performed with the transponders.

The modulation technique is unipolar amplitude shift keying (ASK) of the RF carrier using Manchester encoding as shown in the illustration. A data bit "1" is transmitted by sending a RF pulse during the first half of the bit period and no signal during the second half. A "0" data bit is transmitted as no signal during the first half of the bit period and an RF pulse transmission during the second half.



The frequency of the carrier is 915MHz and is exempt from frequency toleraance specification per Section 90.213 footnote 13.

The measured rise time of the modulation signal (10% to 90%) is 100 nanoseconds.

Bit transmission rates, duration and interval between bits: Bits are transmitted 500 kilobits per second, meaning that a bit duration is 2 microseconds. There is no specified or controlled interval between bits, which is inherent with the Manchester encoding used.

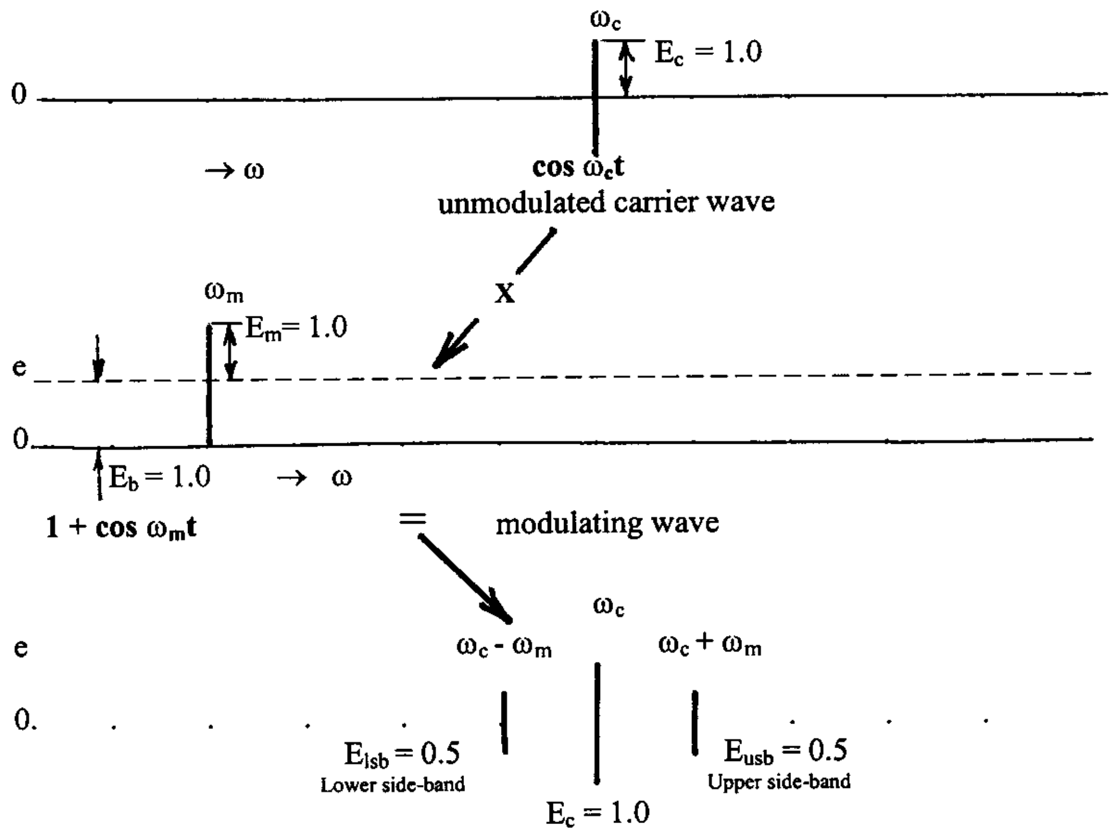
For an all zeros or all ones pattern, the frequency of the digital signal is 500 KHz for a continuous pattern of 10101010, the repetition rate is 250 KHz.

Exhibit 2

4. Particulars of Operation

(G) Describe how necessary bandwidth was determined

The figures below show the multiplication of the carrier and the modulating wave as applied to the frequency domain.



$$
\begin{aligned}
e &= \cos \omega_c t\,(1 + \cos \omega_m t) \\
&= \cos \omega_c t + \cos \omega_c t \cos \omega_m t \\
&= \cos \omega_c t + \tfrac{1}{2} \cos(\omega_c t + \omega_m t) + \tfrac{1}{2} \cos(\omega_c t - \omega_m t)
\end{aligned}
$$

Spectrum of Amplitude – Modulated Carrier Wave

As shown in the plots above, if mathematical expressions for the two waves are multiplied together, three separate frequencies can be seen to result. That is the carrier frequency +/- the modulation frequency. With an all ones or an all zeros pattern, the lower side-band would be the carrier frequency minus 500 kHz and the upper side-band of plus 500kHz.

Hughes Information Systems (the developer of the system) used 6.5 MHz as the occupied bandwidth for FCC Type Acceptance (MRQVRC001-101). **Necessary Bandwidth sufficient to ensure the transmission of data with the quality required was determined by 2M + 2DK or 2.125 MHz or <u>2M13</u>. CFR 47 - 2.202 (b)**

Exhibit 3

The system we plan to use in experiments and demonstrations is a Dedicated Short-Range Communications (DSRC) system. The DSRC system consists of a reader (fixed) and a transponder (mobile). The reader is an automatic vehicle identification devise that transmits and receives radio frequency (RF) data to/from transponder equipped vehicles or assemblies. The reader works in conjunction with a host computer system to identify and log a passing transponder. Then takes actions such as reading data stored on the transponder, writing a message to the transponder, signaling the driver via lights and/or buzzers built into the transponder, opening barrier gates etc. The communications zone between the reader and transponder is approximately 30 meters in the direction of the antenna boresite. Antennas are generally pointed toward the oncoming traffic with an elevation angle of 10 to 90 degrees downward from the horizontal.
Our demonstrations will be conducted throughout the United States at potential customer locations and at transportation trade shows.

Our experiments will be conducted primarily in the San Jose, California area and in the Boca Raton, Florida area. Our experiments will be primarily in evaluating software for new applications such as gate control, monitoring of vehicle engine functions, global positioning etc. These applications will interact with the DSRC system. Other experiments will evaluate new hardware, which will interface with the software functions. We will also evaluate different antennas; different types of sensors and other hardware needed to implement new applications.

Our primary application of the DSRC system is in Weigh Station ByPass on State and Interstate Highways. Continuing our experiments with new sensors, Weigh In Motion (WIM) scales, different antenna types is bound to contribute to the utilization of radio art by improving on an already existing application.

Exhibit 4

13. List of transmitting equipment

The DSRC system utilizes the following major components.

1) Model 100 or 200 VRC Reader manufactured by Raytheon IMS; Fullerton, California (Formerly Hughes IMS). A reader (sometimes referred to as a beacon) consists of the following:
   a) Transceiver, P/N VRC001 (FCC ID: MRQVC001-101)
   b) Applications Processor, to control the transceiver and interface to the host computer
   c) Power supply, fans, heaters, interconnecting wiring and enclosure

2) Scala RY-900A yagi antenna and/or Sinclair Model 4702 dipole antenna, 10 dB gain and other antennas with less gain 6 dB. Antennas are used to produce horizontally polarized signals.
3) Type II+ and/or Type III Transponders manufactured by Delco Electronics, Kokomo, Indiana. The Transponders have FCC Type Acceptance.

   Type II+ FCC ID: L2CTYPE-IIPLUS
   Type III FCC ID: L2CTYPE-III