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Client: Hunter Engineering Company
Model: 45-1637
Standards: FCC 15.249/IC RSS-210
ID's: LS3-45-1637/2938A-451637
Report #: 2017285

Appendix H: Technical Operational Description

Please refer to the following pages.

Operational Description of Hunter Radio 45-1637

General Description

The Hunter radio 45-1637 consists of 3 major components:
1. A combined 32-bit microcontroller/radio IC (MCU/Radio) The MCU is used to prepare and validate data for radio transmission and reception. The radio is a short range, low power 2.4GHz ISM band transceiver. The MCU/Radio also contains a voltage regulator.
2. A single 32MHz crystal that is used to develop a time base for all components and RF frequencies.
3. On-board transmit and receive antennae.
4. An RF amplifier that boosts the power level of the transmitted and received signals.

Data related to an automotive tire's tread depth is read in from the on board potentiometer and transmitted to a central console on demand.

Data Transmission

Data is collected from on-board transducers and encapsulated in a packet structure that allows for reliable radio transmission. When requested the packet is sent to the radio for RF transmission. (Figure 1.1)

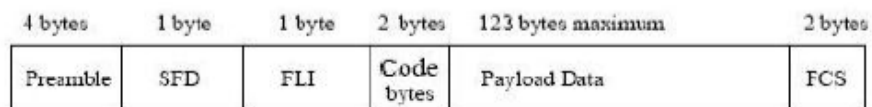| 4 bytes	1 byte	1 byte	2 bytes	123 bytes maximum	2 bytes
Preamble	SFD	FLI	Code bytes	Payload Data	FCS

Figure 1-1. SMAC Packet Structure

The MKW21D512 contains a short range, low power 2.4GHz ISM band transceiver. It is compliant with IEEE standard 802.15.4. RF data is amplified and transmitted via an onboard antenna. The antenna is etched in the copper of the radio printed circuit board as described in Figure 2.
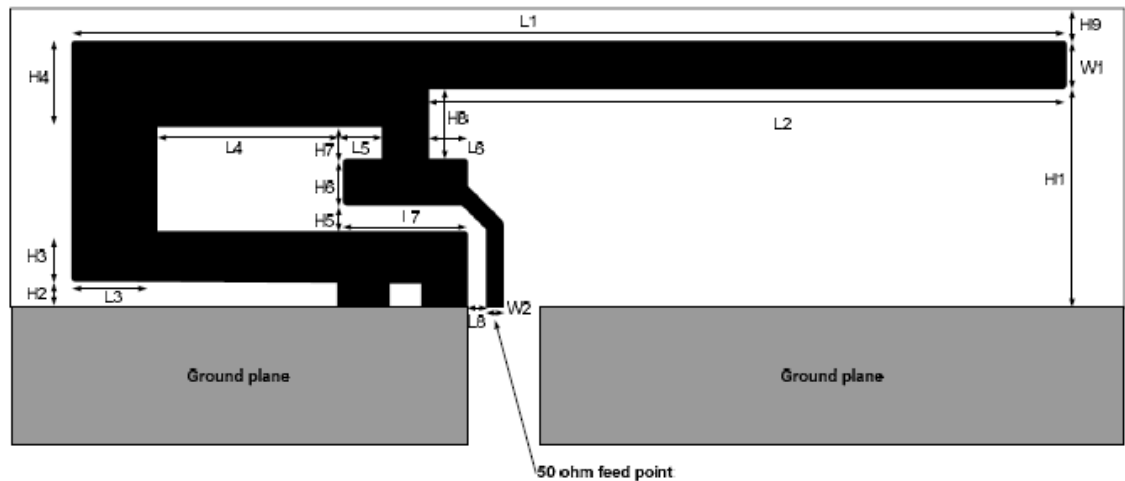

Figure 1. IFA Dimensions

H1	5.70 mm	W2	0.46 mm
H2	0.74 mm	L1	25.58 mm
H3	1.29 mm	L2	16.40 mm
H4	2.21 mm	L3	2.18 mm
H5	0.66 mm	L4	4.80 mm
H6	1.21 mm	L5	1.00 mm
H7	0.80 mm	L6	1.00 mm
H8	1.80 mm	L7	3.20 mm
H9	0.61 mm	L8	0.45 mm
W1	1.21 mm		

Table 1. IFA Dimensions
Figure 2

Inverted F Antenna Gain = 3.3 dBi

Data Reception

Incoming RF data is amplified, received by the radio and sent to the MCU. The MCU validates the message (i.e. "request for data) and responds accordingly.