Annex acc. to FCC Title 47 CFR Part 15
relating to
ADEC Technologies AG
TDC3-X

Annex no. 8
Operational Description

Title 47 - Telecommunication
Part 15 - Radio Frequency Devices
Subpart C – Intentional Radiators
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Akkreditierungsstelle
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m. dudde hochfrequenz-technik **Rottland 5a** **D-51429 Bergisch Gladbach/ Germany** **Tel: +49 2207-96890** **Fax +49 2207-968920**

1 Version

	Date	Description	Author
1.0	12-Nov-09	Initial draft	hartmann
1.1	13-Dec-16	Updated for FCC application	hartmann

2 Summary

This document shows a block-diagram of the TDC3-type traffic detectors, which includes all TDC3 variants. Variation is by software / firmware only, such as implementation of specific protocols.

3 Functional Description

The TDC3 type traffic detectors are mounted overhead (above the traffic lane to be monitored) or on the side of the lane. Three detection zones exist: (1) Doppler radar (2) ultrasonic (3) passive infrared. The passive infrared subsystem uses 6 or 7 detection zones, which are covered by means of Fresnel lenses or by means of individual PIR sensor.

3.1 Detection Zones

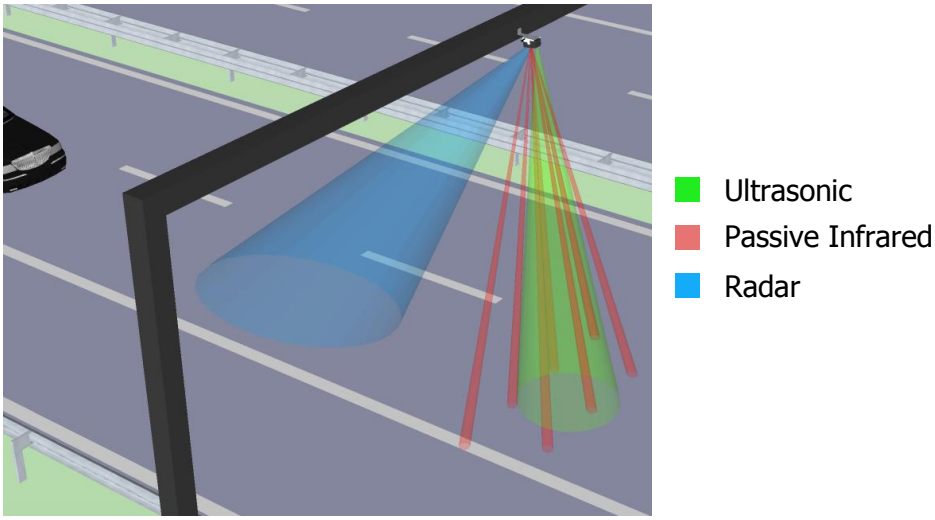

Figure 1: TDC3 detection zones

The vehicle travels through the detection zones, whereby the sequence of the detection zones depends on the model, the radar exits the device facing the oncoming traffic or the receding traffic. Once a vehicle is deemed to have left the last detection zone, the collected data is analyzed and the speed, vehicle class and related information made available to the so-called traffic data collector (not subject of this document, typically provided by 3rd party integrator) which is connected to the TDC3 by means of RS 458 half-duplex physical layer.

3.2 Block Diagramm Description

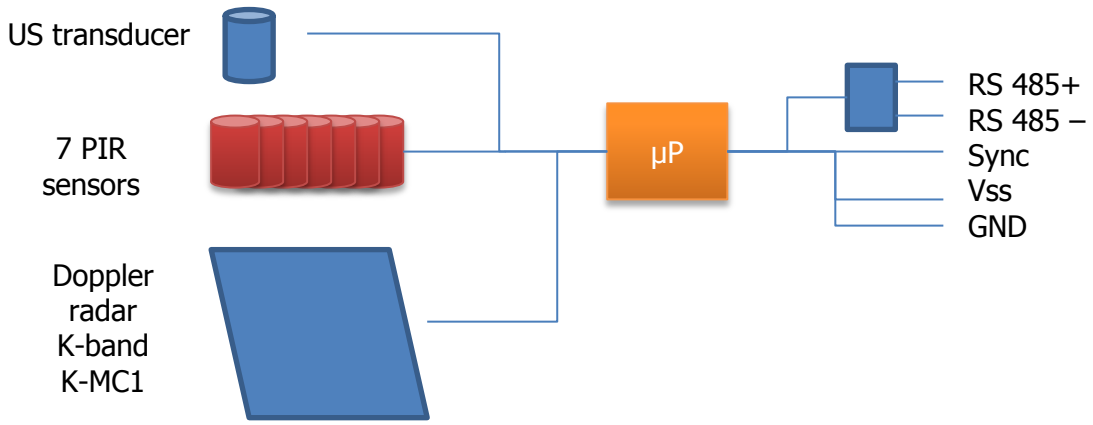

Figure 2: Schematic Overview

The µP, a MSP430F5418 by Texas Instruments, measures the sensor's values and using the algorithms in the firmware determines the speed and other per-vehicle information. The radar operates at constant frequency (Doppler radar), whereby the frequency shift provides information about the speed of the vehicle. The ultrasonic transducer sends 20-25 40KHz pulses per second to determine the distance between the detector and any object below (in front) of the detector. The PIR sensors are aligned such that signals generated by these sensors can be interpreted as position and/or width of the vehicle in the lane.
The processor's firmware further implements supporting functionality, such as the TLS (Technische Lieferbedingungen für Streckenstationen, a German bus-standard for road-side equipment) protocol stack. The protocol is implemented on half-duplex RS 485 in a request-response manner, that means that the detector waits for a request for traffic data before responding with the requested information. Up to 16 detectors can share a bus segment.
The synchronization (Sync line) is to allow the detectors to cooperate on a bus-segment while not causing ultrasonic interference, it works such that all detectors in close proximity send out the 40KHz ultrasonic pulse at the same time.