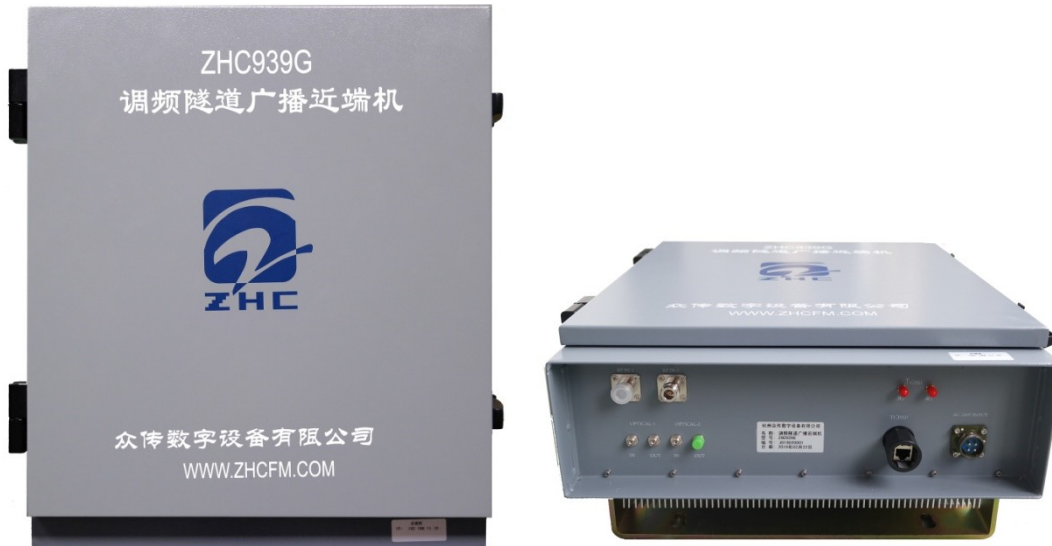# ZHC939G FM Tunnel Broadcast Near-end Transmitter

1. Overview

The ZHC939G FM tunnel broadcast near-end transmitter is a front-end device that receives and processes the front-end signal in the tunnel broadcasting system, converts it into an optical signal and transmits it to the remote transmitter of the tunnel. It and the remote transmitter are the main transceiver equipment in the tunnel broadcasting system. They are connected by optical cables. Cooperating with leaky cables or transmitting antennas, it can effectively fill the coverage blind area and extend the coverage of the transmitting station. Mainly used in highway tunnels, underground parking lots, subway tunnels and station halls, civil defense facilities, schools, etc.

2. Features

This transmitter is distinguished from functional modules and can be divided into five parts: FM antenna reception and pre-amplification, FM broadcast signal digital processing unit, electro-optical conversion and optical signal transmission unit, remote monitoring unit, and emergency carrier insertion unit.

● FM antenna reception pre-amplification: frequency range: 87-108MHz, gain: ≥20dB.
● FM broadcast signal digital processing digital frequency selection, digital filtering (using FPGA+DDS digital filtering technology.
● The near-end machine with 4 optical ports can adopt various forms of networking structure, such as chain type, star type, tree type, ring, etc.

● The wireless link established by the channel 4G router and the monitoring center realize remote monitoring.
● In an emergency, all 16 output carriers can be used to broadcast emergency interrupt audio.
● Adopt modular design.
● The bidirectional optical channel can simultaneously transmit 16 FM carrier frequency signals.
● Realize remote monitoring.
● With optical bypass function.
● This machine is a **near-end transmitter** in the tunnel broadcast coverage system and must be used in conjunction with a **remote transmitter** including optical receivers and power amplifiers.

3. Diagram

Near-end Transmitter Diagram
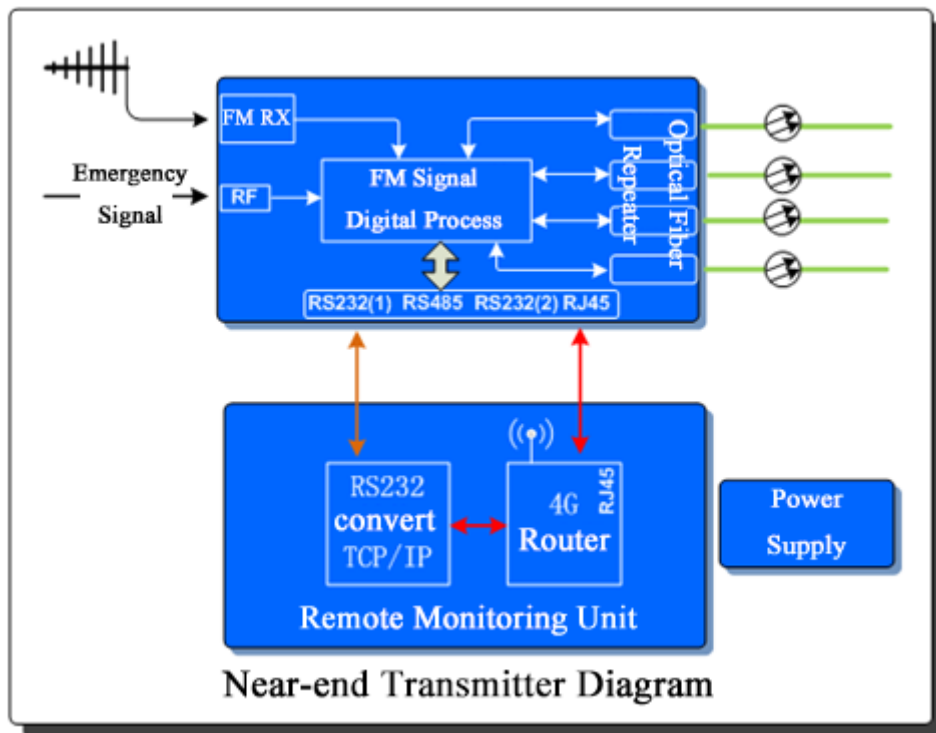
4. Technical Specifications

Working frequency band		87~108MHz	21MHz
Carrier number		16	
Channel bandwidth		150KHz, the lowest step can be set to 100KHz	
Gain (AGC off)	Antenna input	42dB±2dB (add LNA)	N type connector
	Intermission	5dB±2dB	N type connector

Gain adjustment range and step length	0dB~50dB adjustable, 1dB stepping		Remote/ Near-End
Gain adjustment error (1dB)	1-20dB	≤±1.0dB	
	20-50dB	≤±1.5dB	
Output power (maximum)	-5dBm±1dB		Multi-carrier total power
Automatic level control range	≥20dB		
Automatic channel equalization range	±15dB		
Interrupt frequency setting range	86～108MHz (4 digits after the decimal point)		
Inter-modulation	≤-55dB		
Frequency stability	0.05ppm		
Time delay	≤25us		Customizable
Delay compensation	Time delay compensation range: 125µs Delay compensation mode: automatic Time delay adjustment accuracy: 1µs		
Spurious emission	Spurious emission in effective working frequency band	≤-60dBc	
	Outside the working frequency band	9kHz~1GHz in band ≤-36dBm 1GHz~12.75GHz in band≤-36dBm	
SWR	Input	≤1.30	
Optical loop function	Support		
Optical transceiver alarm function	Support		
Number of optical ports	REC support 4 ports		Interface FC/UPC
Optical module rate	1.25Gb/s		
Optical module type	SFP		
Networking function	Star, chain, ring and hybrid networking, etc.		

Software upgrade	Support remote online upgrade, support any node upgrade, support version rollback.	
4G router antenna interface	SMA*2	SMA
Operating Voltage	220ACV±20%, 50Hz	Aviation plug
Operating Temperature	-40℃~+55℃	
Working atmosphere	70KPa~106KPa	
Local and remote Ethernet RJ45	Can be used for local and remote communication	RJ45