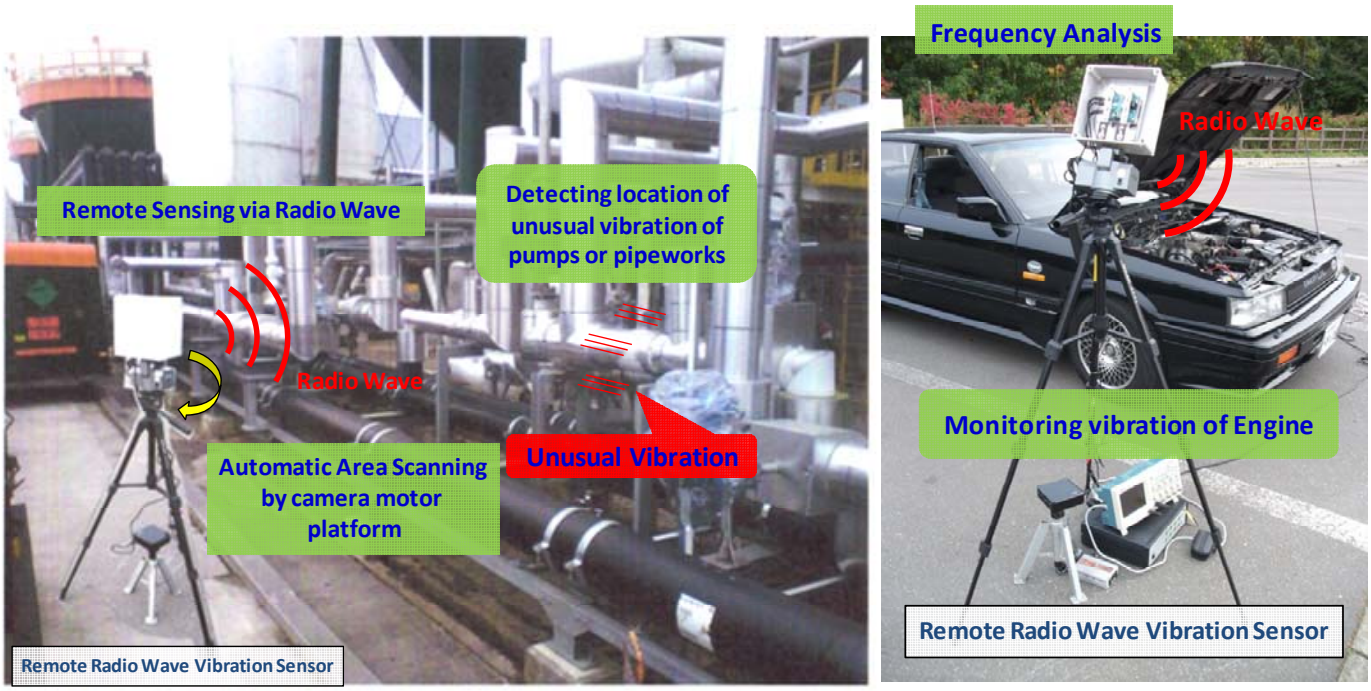
Remote Radio Wave Vibration Sensor OEL4232－02

17/Mar/2014 Rev1

Opto-Electronic Engineering Laboratory Corporation

Alice Lab Inc.



1． Features

1)Remote Sensing a vibration of mechanical machines via 24GHz Radio wave.

2)Detecting the location of unusual vibration on machines such as pumps, engines, electrical motors and so on.

3)Frequency analysis with FFT(Fourier Transform) by DSP(Digital Signal Processor).

4)Automatic Area Scanning by camera motor platform.

5)High temperature objects is OK with remote sensing via radio wave.

6) Approved Test Certification as specified low power radio station with no license in Japan.

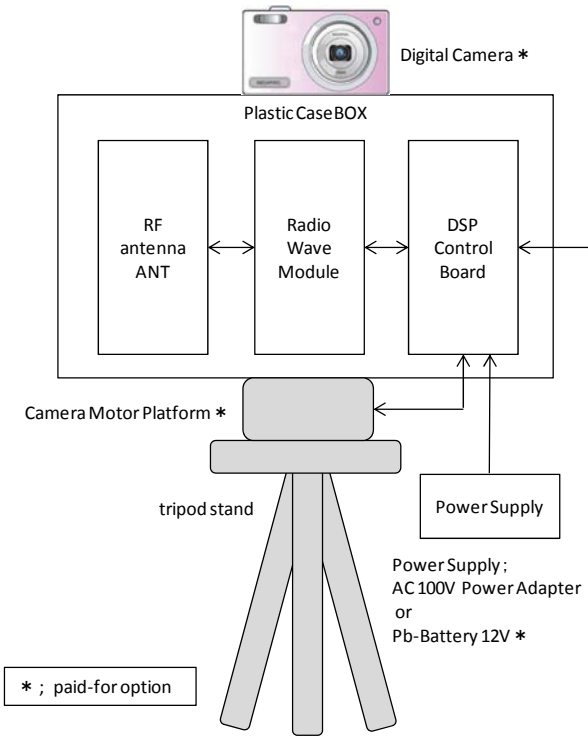
7)Supplying the methods to measure a distance to object and velocity of moving object.

8)Supplying a mini-Computer as a paid-for option.

9)Supplying a camera motor platform as a paid-for option.

10)Taking a photo of objects by digital camera with color tone graph per vibration strength.

2. General Descriptions



■Schematics of systems

■Photo

3. Functions

1)Monitoring a time-waveform of vibration with displaying on graph

2)Frequency Analysis of vibration by FFT(Fast Fourier Transform)

3)Automatic Area Scanning by camera motor platform with a color toned graph photo of objects per vibration strength shot by digital camera.

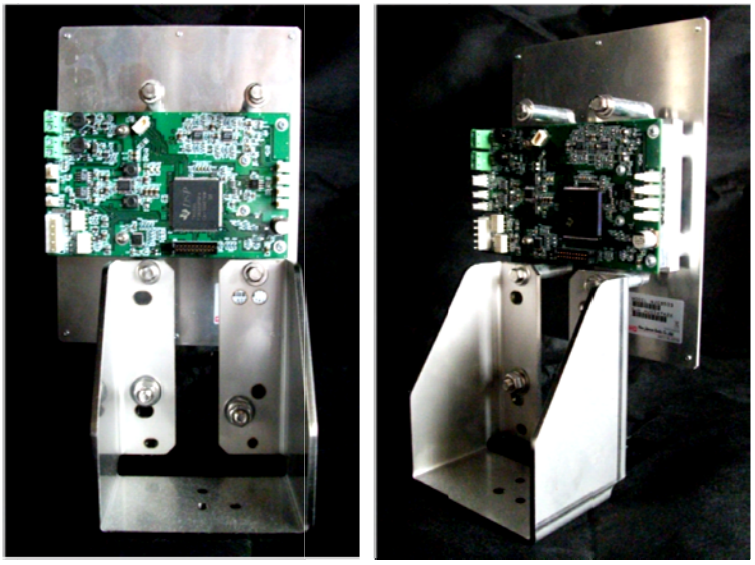
4)Measuring a distance to object and velocity of moving object.

4. Articles Contents

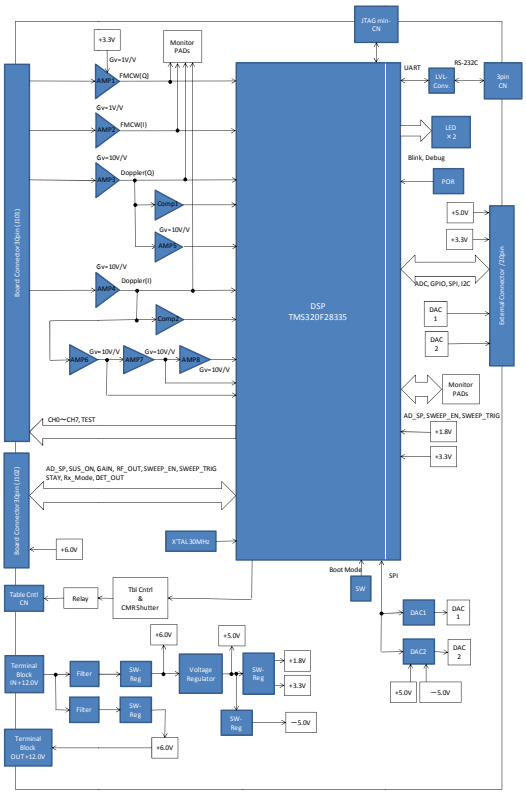
Parts	Contents	Baisc/Option	QTY
Radio Wave Vibration Sensor Module	Radio Wave Module, Control Board, Plastic Case Box	Basic Sets	1
AC Power Adapter	DC+12V Output	Basic Sets	1
Application Software	Install CD	Basic Sets	1
Tripod Stand		Basic Sets	1
Camera Motor Platform	included cable sets	Paid-for Option	1
mini Computer		Paid-for Option	1
USB-RS232C Cable		Paid-for Option	1
Display Monitor		Paid-for Option	1
Key Board		Paid-for Option	1
Digital Camera	included cable sets	Paid-for Option	1

5． Specifications

Item	Specifications	Remarks
Range of vibration measurements	300Hz～50kHz	
Frequency Resolution	100Hz	FFT size 1024points, Ts=10us, ADC 12bits
Distance of measurements	15m	T.B.D.
Radio Frequency	24.05 ～ 24.25 GHz	
Radio Wave Output Power	EIRP 100mW	
Setting channel of Radio Wave	Up to 256ch Max 24.050 ～ 24.064GHz 50kHz step / 256 ch	
ANT Gain	20dBi	
ANT Directionality	E-Plane 6deg, H-Plane 15deg	FWHM
Range of velocity measurements	10km/hr～450km/hr	
Distance of velocity measurements	more than 100m	Objects = Human
Range of distance measurements	10m～800m	800m is case of Large Vehicle
Resolution of distance measurements	2m	
Power Supply	AC100V Adapter +12V Output	＋12V Pb Battery is applicable.
Temperature Range	－10℃～+55℃	except mini Computer
Weights	Radio Wave Vibration Sensor Module ; 1.2kg Tripod Stand ; 1.5kg Camera Motor Platform ; 0.9kg	Plastic Case Box ; 0.4kg Except Digital Camera Except mini-Computer
Size	Plastic Case Box ; 200mm×200mm×100mm Camera Motor Platform ; 110mm×150mm×120mmH Tripod Stand ; Max Height 1470mmH, Legs Interval 900mmMax Min Height 490mmH, Legs Interval 330mmMin	

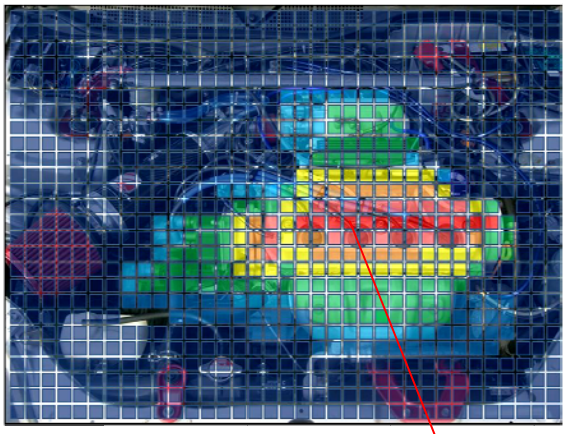


■A Photo of High Performance DSP control Board



■Block schematics of control Board

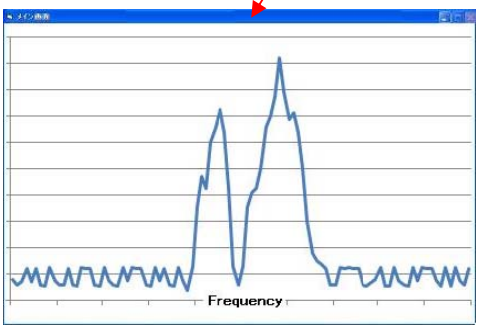
6． Displaying vibration strength on Digital Camera Photo with color tone graph



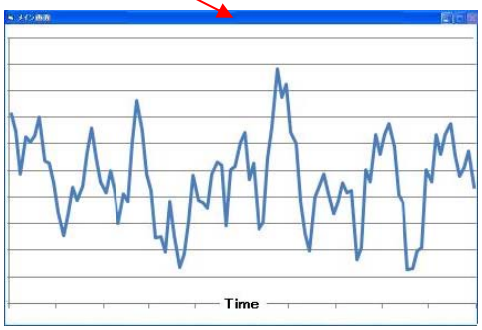
■A photo of vibration strength with color tone graph what are available from area scan via the Camera motor platform. The red is most strong, and the blue is very weak strength of vibration.

■An original photo of engine shot by its digital camera

Click a certain cell in color tone graph



■FFT graph



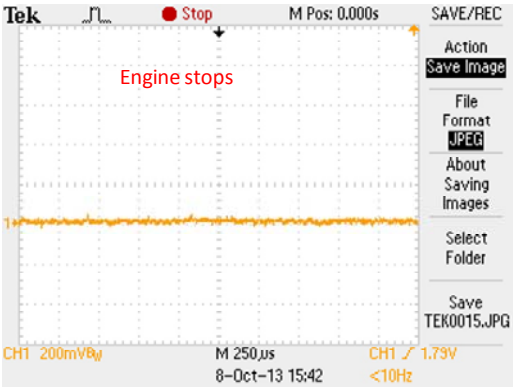
■time-wave form graph of vibration signal

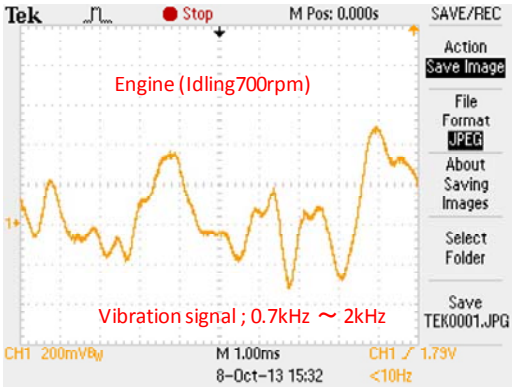
6． Example-1 of vibration measurement

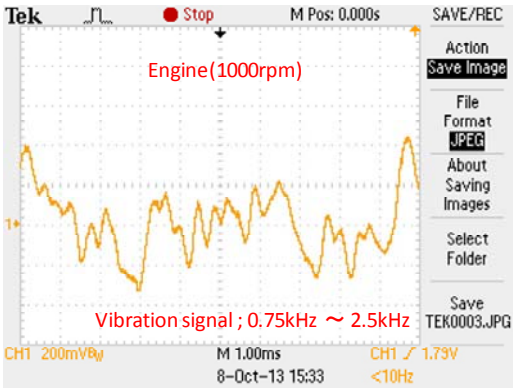
1） Objects ; Vehicle Engine

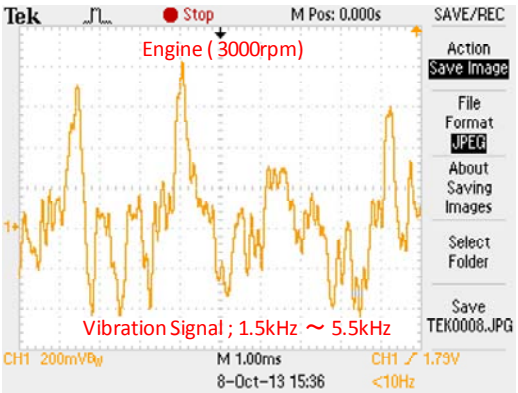
2） Measurement item ; vibration time-waveform on engine

■View of measurement



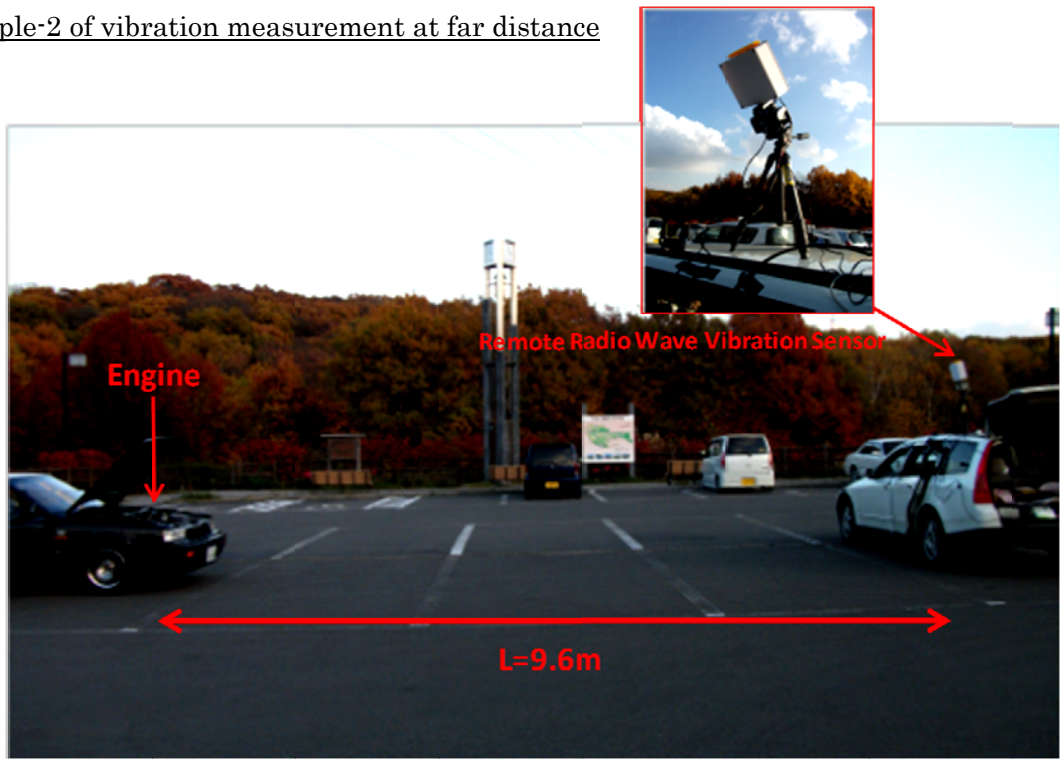




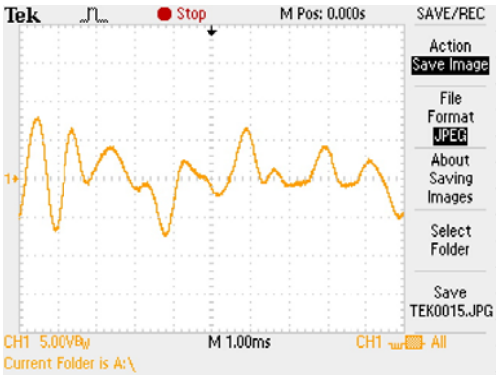


■Time-waveform graph of vibration signal

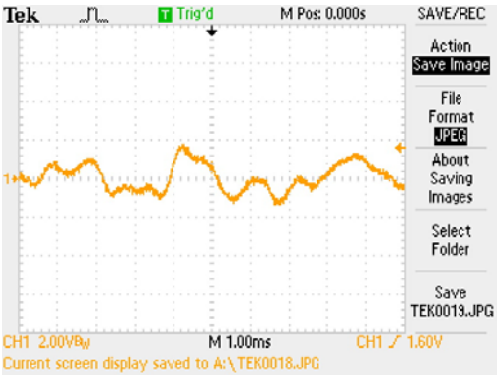
7． Example-2 of vibration measurement at far distance



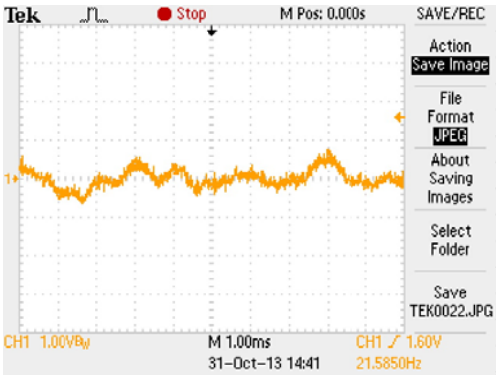
■View of measurement at far distance



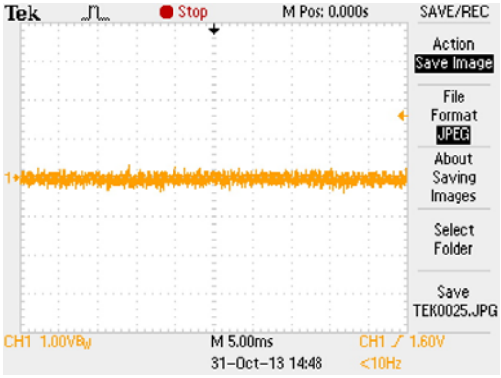
Vibration Wave form (700RPM, L=2.3m)



Vibration Wave form (700RPM, L=4.3m)

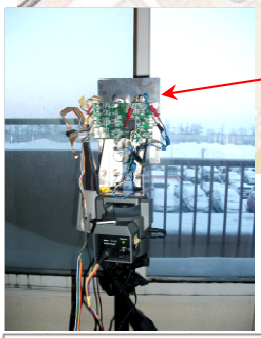


Vibration Wave form (700RPM, L=9.6m)



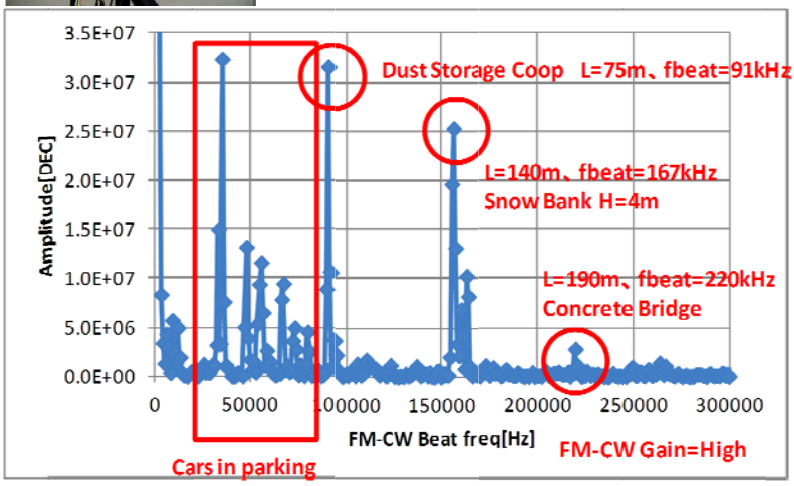
Vibration Wave form (Engine stops L=9.6m)

8． Example of distance measurement

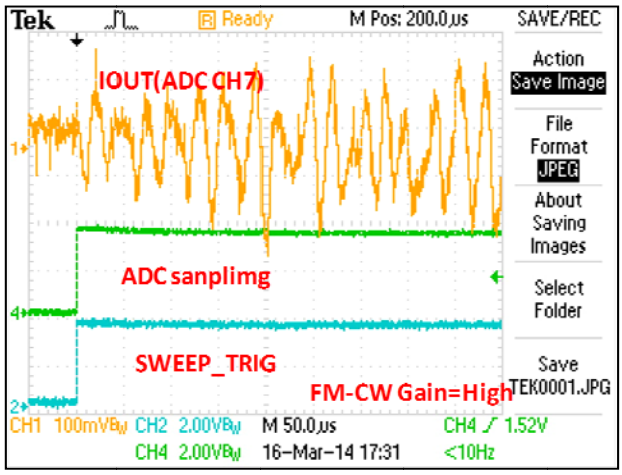


Geometry Map of measuring distance by FM-CW

Direction of ANT



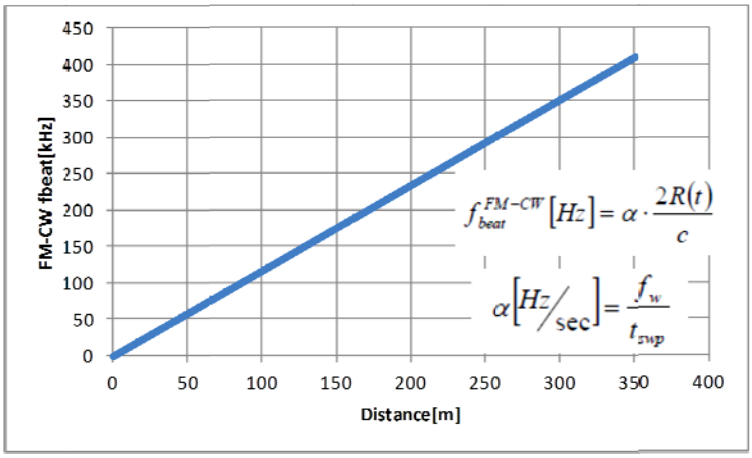
FFT Result of simultaneously FM-CW beat frequency

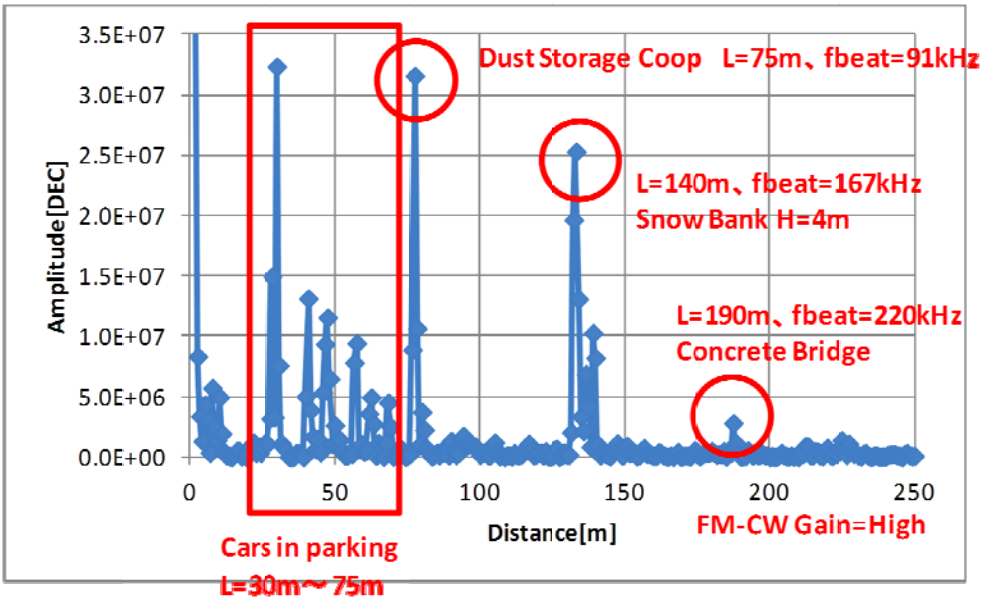


Time waveform of FM-CW beat for Car

Relation between FM-CW beat frequency and Distance

fw=180MHz, tswp=1024us





Test Result of measuring distance by FM-CW with FFT

9． Contact us

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