

Technical Description of Unit

Application of Use

The equipment is a wireless LAN transmitter and receiver for use in an indoor environment. The equipment includes an integral antenna.

Frequency range of operation

2412 to 2462 MHz (5 MHz interval, 11 waves)

25 mW EIRP

Modulation

CCK, QPSK or BPSK

Chip rate

11 Mchips/s

Data rate

11 Mbps

Integral antenna

Gain 2.14 dBi

Other antennas

None

Determination and Stabilization of Frequency

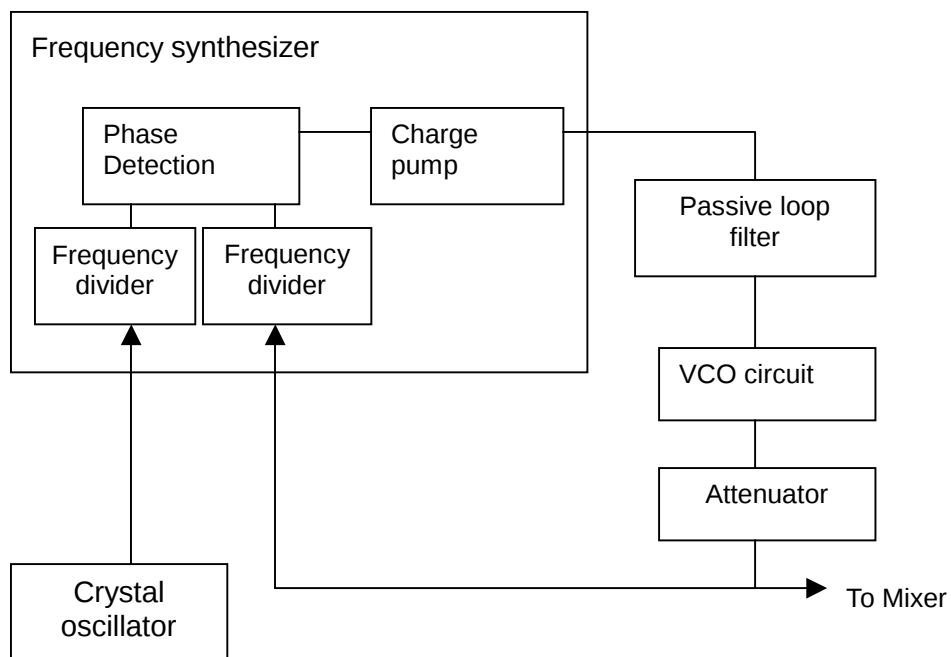
The equipment outputs 2412 to 2462 MHz (5MHz interval, 11 waves). The channel (frequency) is decided by a driver software.

The frequency deviation is minimized to ± 25 ppm or lower (at -10 to 70°C) by adapting synthesizer method in which the 44.0MHz crystal oscillator is used as a reference.

The equipment includes regulator and supply electricity to each circuit shown below independently. The power to the PLL circuit is supplied separately in order to keep a constant supply voltage and for frequency stabilization.

- Modulation circuit
- PLL circuit
- RF mixture, amplifier circuit

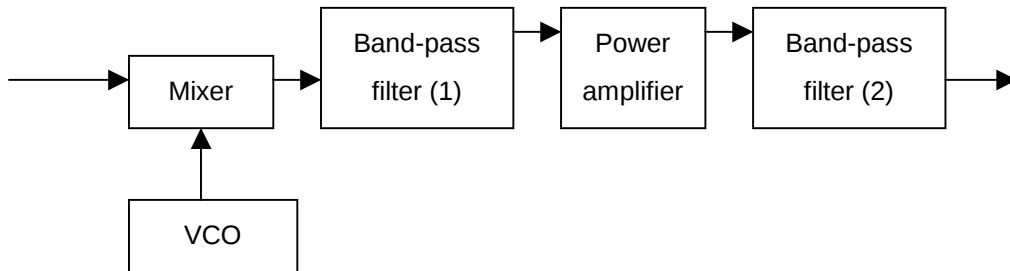
PLL circuit



Suppression of spurious radiation

Band-pass filters are installed in two stages to suppress the harmonics spurious radiation ($2 \times \text{RF} = 4824$ to 4924 MHz, $3 \times \text{RF} = 7236$ to 7386 MHz and image spurious radiation caused by mixing ($\text{Lo} - \text{IF} = 1664$ to 1704 MHz). The attenuation at each frequency is shown in the lists below.

Transmission circuit



Specifications of band-pass filter (1)

Item	Specification
Type	MDR642E
Manufacturer	Soshin Electric
Center frequency	2450 MHz
3dB band	± 50 MHz
Insertion loss	2.5 dB Max.
Attenuation Lo - IF 1664 to 1714 MHz	50 dB or more
Attenuation $2 \times \text{RF}$ 4824 to 4924 MHz	35 dB or more
Attenuation $3 \times \text{RF}$ 7236 to 7386 MHz	30 dB or more

Specifications of band-pass filter (2)

Item	Specification
Type	TDFM1B-2450T-10
Manufacturer	Toko
Center frequency	2450 MHz
3dB band	± 50 MHz
Insertion loss	2.0 dB Max.
Attenuation Lo - IF 1664 to 1714 MHz	50 dB or more
Attenuation $2 \times \text{RF}$ 4824 to 4924 MHz	50 dB or more
Attenuation $3 \times \text{RF}$ 7236 to 7386 MHz	50 dB or more

Lo = VCO oscillation frequency

IF = IF frequency

RF = RF frequency

Limiting Modulation

The equipment includes base band processor HFA3861A which conducts the PSK (transmission rate 1, 2 Mbp) or CCK (transmission rate 5.5, 11 Mbp) modulation.

The modulated signal is mixed with local oscillation signal at HFA3783 and be IF signal (374 MHz).

The IF signal passes the SAW filter to suppress the 1st side lobe to -45 dBc.

Specifications of SAW filter

Item	Specifications
Type	855653
Manufacturer	SAWTEK
Center frequency	374 MHz
3dB band	± 8.5 MHz
Insertion loss	11 dB Max.
Attenuation 274 to 341 MHz	55 dB Typ
Attenuation 341 to 352 MHz	60 dB Typ
Attenuation 352 to 357.5 MHz	50 dB Typ
Attenuation 390.5 to 396MHz	37 dB Typ
Attenuation 396 to 430MHz	45 dB Typ
Attenuation 430 to 474MHz	50 dB Typ

Limiting power

The equipment limits the power by keeping power supply voltage constant.

The equipment is inserted into the PC card slot of personal computer or access point.

The power supplied to the PC card slot should be $5V \pm 5\%$ according to the PC card standard.

The equipment includes regulator and supplies electricity to each circuit shown below independently. Power limitation is carried out by supplying power independently to each circuit and keeping power supply voltage constant.

- Modulation circuit
- PLL circuit
- RF mixture, amplifier circuit

Also the APC function is employed to keep the output voltage constant by comparing pre-set power value to detected power value.

RF circuit

1) Modulation block

The equipment performs PSK or CCK modulation/demodulation and spread/back spread spectrum by base band processor HFA3861A. The spread code used is 11 bit (transmission rate is 1, 2 Mbps) or 8 bit (transmission rate is 5.5, 11 Mbps) Code rate is 11 MChips/s.

2) Oscillation block

The equipment has two VCO's which are controlled by the frequency synthesizer referencing to 44.0 MHz. Oscillation frequencies are 748 MHz and 2038 to 2088 MHz.

3) IF block

The 748MHz oscillation signal is divided into two frequencies in the mixer HFA3783. Then it is mixed with modulation signal and be a 374MHz IF signal. The IF signal is amplified by the HFA3783 and then brought to the SAW filter (made by SAWTEK, model 855653, center frequency is 374MHz, and bandwidth is ± 8.5).

HFA3783 also incorporates a receiving circuit. For receiving, modulation signal is selected from IF signals. During receiving, AGC circuit works to control gains according to the receiving power.

4) RF block

The oscillation signal of 2038 to 2088 MHz is input to the mixer HFA3683 and mixed with IF signal to be RF signal. Then the RF signal passes band-pass filter to remove spurious emission and is amplified for about 27dB by power amplifier HFA3983. The amplified RF signal passes the transmitting/receiving switch, band-pass filter and antenna switching switch, and then is radiated to the air.

The received RF signal passes antenna switching switch, band-pass filter and transmitting/receiving switch, and then is amplified by a low noise amplifier incorporated in HFA3683. The amplified signal is then mixed with 2038 to 2088 MHz signal to be IF signal.