28021A Circuit Description

Handset

1. Receiving Path

The receiving path is established as followed,

Antenna, Antenna Switch & 5.8 GHz Converter

RF signal is picked up by a solid wire antenna and it is sent to the antenna switch U2 (XD2458) and it passes the RF signal to 5.8 GHz LC filter FL2 at the RX cycle.

The output signal from the antenna switch IC U2 (XD2458) goes to the 5.8GHz LC filter FL2 for filtering out unwanted signal and just allow the 5.8GHz RF signal sending to the 5.8GHz converter U3 (DH58RFC05).

After the 5.8 GHz RF signal sending to the RX of U3 (5.8GHz converter DH58RFC05), it is mixed with the LO (local oscillator, inside U3) at about 3.3GHz to make a down-conversion to 2.4GHz for U4 (DH24RF17B).

DH24RF17B Transceiver IC

The receive path of the transceiver IC U4 (DH24RF17B) consists of LNA (use to amplify the input 2.4GHz RF signal), Image-Reject Mixer (use to mix the RF signal with the built-in local oscillator signal that operates within 2.3987-2.4837 GHz in order to convert the input 2.4 GHz to 2 MHz), Channel Selection Bandpass Filter (use to reject the unwanted signal) and FM Demodulation. The resulting demodulated signal is FSK data that is sent to the baseband chip for further processing.

EDCT Controller Chip on Baseband

The FSK data goes to the EDCT controller chip U2 (DCH36107) for decoding the FSK data to audio signal before sending to the handset receiver or speaker through the internal amplifier.

2. Transmitting Path

The transmitting path is established as followed,

Microphone Amplifier & Encoder

Audio signal picked up by the handset microphone is amplified by the internal microphone amplifier that is built inside the EDCT controller chip U2 (DCH36107). Then the amplified microphone signal sends to the encoder for encoding the audio signal to FSK data.

DH24RF17B Transceiver IC

The 2.4 GHz LO (local oscillator) is generated by an integrated VCO and PLL synthesizer. The transmit FSK data is modulated to LO and the resulting 2.4 GHz RF signal is amplified by the internal power amplifier before sending to the 5.8 GHz converter.

5.8 GHz Converter, Power Amplifier, Antenna Switch & Antenna

After the 2.4 GHz RF signal sending to the U3 (5.8GHz converter DH58RFC05), it is mixed with the LO (local oscillator, inside U3) at about 3.3GHz to make a up-conversion to 5.8 GHz for U1 (XM5800PD).

The Power Amplifier U1 (XM5800PD) is used to amplify the 5.8 GHz RF signal before it sends to the 5.8 GHz LC filter for filtering the unwanted signal.

The antenna switch IC U2 (XM2458SD) is used to let 5.8 GHz TX RF signal output to a solid wire antenna for transmission.

Base Unit

1. Receiving Path

The receiving path is established as followed,

Antenna, Antenna Switch & 5.8 GHz Converter

RF signal is picked up by a solid wire antenna and it is sent to the antenna switch U2 (XD2458) and it passes the RF signal to 5.8 GHz LC filter FL2 at RX cycle. The antenna switch U2 is also used to select one of the solid-wire antenna (ANT1 or ANT2) for which it can provide a better receiving performance to the handset.

The output signal from the antenna switch IC U2 (XD2458) goes to the 5.8GHz LC filter FL2 for filtering out unwanted signal and just allow the 5.8GHz RF signal sending to the 5.8GHz converter U3 (DH58RFC05).

After the 5.8 GHz RF signal sending to the RX of U3 (5.8GHz converter DH58RFC05), it is mixed with the LO (local oscillator, inside U3) at about 3.3GHz to make a down-conversion to 2.4GHz for U4 (DH24RF17B).

DH24RF17B Transceiver IC

The receive path of the transceiver IC U4 (DH24RF17B) consists of LNA (use to amplify the input 2.4GHz RF signal), Image-Reject Mixer (use to mix the RF signal with the built-in local oscillator signal that operates within 2.3987-2.4837 GHz in order to convert the input 2.4 GHz to 2 MHz), Channel Selection Bandpass Filter (use to reject the unwanted signal) and FM Demodulation. The resulting demodulated signal is FSK data that is sent to the baseband chip for further processing.

EDCT Controller Chip on Baseband

The FSK data goes to the EDCT controller chip U1 (DCH36119) for decoding the FSK data to audio signal before sending to telephone line interface circuit.

2. Transmitting Path

The transmitting path is established as followed,

Microphone Amplifier & Encoder

The input signal from the telephone line interface is sent to the EDCT controller chip U1 (DCH36119) for encoding the audio signal to FSK data before sending to the DH24RF17B transceiver IC.

DH24RF17B Transceiver IC

The 2.4 GHz LO (local oscillator) is generated by an integrated VCO and PLL synthesizer. The transmit FSK data is modulated to LO and the resulting 2.4 GHz RF signal is amplified by the internal power amplifier before sending to the 5.8 GHz converter.

5.8 GHz Converter, Power Amplifier, Antenna Switch & Antenna

After the 2.4 GHz RF signal sending to the U3 (5.8GHz converter DH58RFC05), it is mixed with the LO (local oscillator, inside U3) at about 3.3GHz to make a up-conversion to 5.8 GHz for U1 (XM5800PD).

The Power Amplifier U1 (XM5800PD) is used to amplify the 5.8 GHz RF signal before it sends to the 5.8 GHz LC filter for filtering the unwanted signal.

The antenna switch IC U2 (XM2458SD) is used to select one of the solid-wire antenna (ANT1 or ANT2) for which it can provide a better receiving performance to the handset and use this solid-wire antenna for transmission.

3. Telephone Line Interface

The telephone line interface circuit is established by below sections

Line seize and isolation

Line isolation is mainly preformed by Q13, Q10 and Q12. Q12 also has a function of controlling Line-seize. Both audio input and output will though Q13 and Q10. The audio signal from the telephone line is firstly amplified (Q11) before sending to EDCT controller chip U1 (DCH36119) for encoding the audio signal to FSK data while the FSK data received by the RF module passes to EDCT controller chip U1 (DCH36119) for decoding to the audio signal and then is amplified by Q15 and Q18 before sending to the telephone.

Ring detect circuit and Caller ID System.

The ringer signal and CID signals though C43, C44 (22n, 400V), R113 and R114 (470K ohm) input to U1 DCH36119 EDCT controller. The EDCT controller U1 decodes the CID data and then sends it to the handset for displaying the CID on the Handset LCD display.

4. Digital Security coding system

The handset unit and base unit of 28021A will registration on both 32bit digital random generated security code with manufacturer ID code. This is fulfilling the FCC Part 15.214(d) requirement that there must be at least 256 discrete digital codes.