

Technical Description:

The equipment under test (EUT) is a portable Bluetooth Speaker. The EUT is equipped with a micro-USB, an audio interface and contains a Bluetooth module. The Bluetooth module in the EUT is operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing). The EUT is powered by USB 5.0VDC or / and 3.7 VDC (1 X 3.7V rechargeable battery). The EUT is using adaptive frequency hopping in the Bluetooth module as declared by the applicant. The USB interface of the EUT does not contain PC Connectivity which is for charging use only. The NFC function of the Bluetooth module is disabled for use as declared by the applicant.

The brief circuit description is listed as follows:

1. Bluetooth RF module (U3)

U3 (GWB004) is a module which fully supports the features and functional compliance of Bluetooth 3.0 standards. This module operates in 2.4GHz frequency bands.

U3 consists of:

- 1) U8 (WS9621NLSF) is a single-chip Bluetooth 3.0 compliant IC for audio applications.
- 2) Y1 is 26MHz crystal oscillator providing clock for U8.
- 3) U9 (M24C32RMB6TP) is the EEPROM for parameter setup for the Bluetooth module.

2. Charging Regulation Circuit Portion

- 1) U5 (S8261) and U6 (8205 SOT23-6) are battery protection ICs.

3. U4 (HT6809) acts as audio power amplifier for the speakers.

Antenna Used:

An internal, integral antenna has been used.

Antenna Gain: 0dBi

Production tolerance: -8dBm (Minimum) to -2dBm (Maximum)

GOOWI

GWB004
Bluetooth Module
Data Sheet

(Document Number:GWB004-01A)

GooWi Technology Co., Ltd

GOOWI

GWB004 Module

Vimicro

Rev2.0

Dec. 2012

Device Features

- Stereo single-ended output
- A small and cost effective Bluetooth® System
- Bluetooth® specification v3.0+EDR compliant
- NFC function, let the bluetooth application more simple
- Class 2, up to 10-meter range
- Security simple pairing
- Bluetooth® Profile Supported: HSP, HFP, A2DP ,AVRCP
- Vimicro support for echo and noise reduction
- transcoders for A-law, μ -law and linear voice from host and A-law, μ -law and CVSD voice over air.
- Parameters configurable
- Power management: low power 1.2V operation for Bluetooth® core , 3.3V I/O
- Integrated 200mA lithium battery charger, Powered by 3.0-4.2V Li-Ion battery, charged by 3.0-6.5V Adapter or USB.
- PCB antenna
- Compact size: 21.50 mm x 18.00 mm
- Surface mount package for embedded applications
- 2 LED outputs

General Description

The GWB004 module from GooWi is a complete Bluetooth® solution. It is built on Vimicro Core and NXP NFC processor. It's a short range, compact and cost effective module. Be able to be embedded into your electronics devices which need Bluetooth® connection, such as, Home Audio, Car kit, Handsfree applications...

Applications

- Stereo Bluetooth® headset/headphone
- Bluetooth Speaker
- High-end noise cancellation Stereo headset

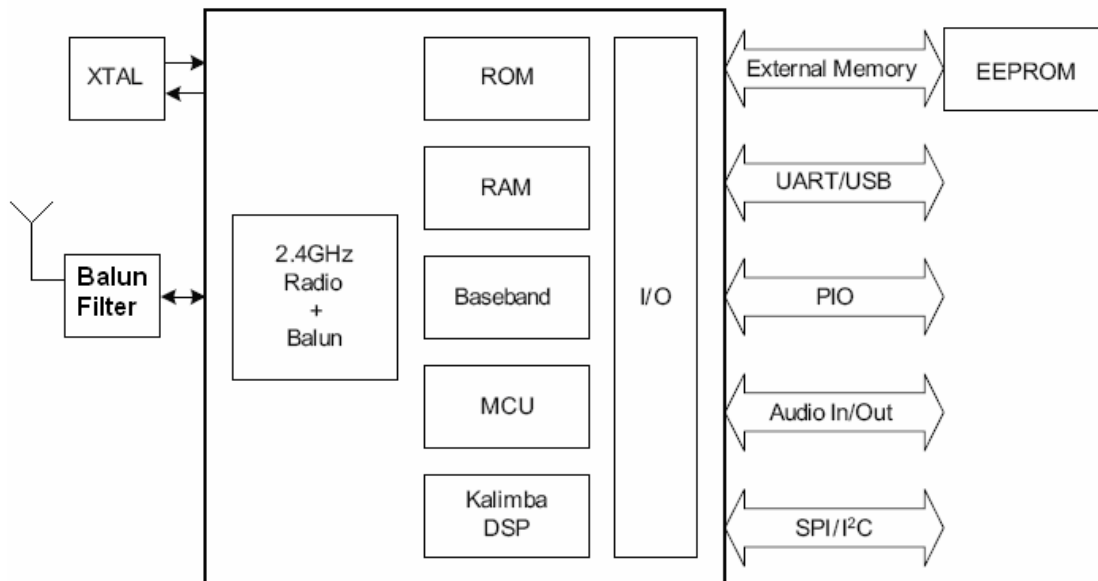
Version History

Version No	Author	Date	Remark
Rev1.0		2013-01-10	Init Version
Rev2.0		2013-05-23	Add NFC functions

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System Architecture



Specifications

Operating Frequency Band	2.4GHz ~ 2.48GHz unlicensed ISM band
Bluetooth Specification	V3.0
Output Power Class	Class 2
Operating Voltage	1.2V / 3.3V
Host Interface	UART
Audio Interface	Analog
Dimension	21.50mm (L) x 18 (W) mm

NFC Specifications

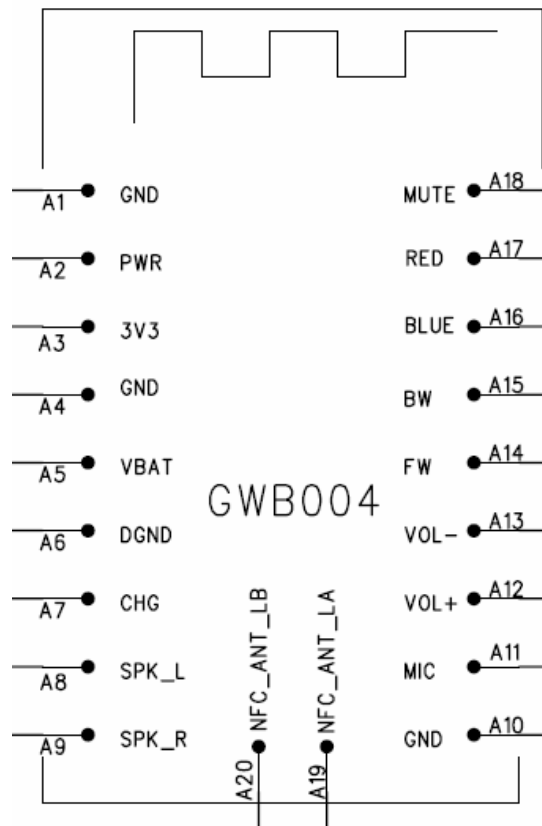
Operating Frequency Band	13.56MHZ
Operating distance	Up to 100mm
Fast data transfer	106Kbit/s
High data integrity	16bit CRC,parity,bit coding,bit counting
7 byte serial number	Cascade lever 2 according to ISO/IEC14443-3

NOTES: Specifications are subject to change without prior notice

Electrical Characteristics

RF specifications					
Parameters	Mode and Conditions	Min	Typ	Max	Unitz
Frequency Range	-	2402	-	2480	MHz
Rx sensitivity	-	-	-80	-90	dbm
Maximum Output Power	Class 2	-3	2	4	dbm
Output power range	-	-30	-	4	dbm
Power Supply Current (With a normal 3.7V battery voltage)					
Parameters	Mode and Conditions	Min	Typ	Max	Unitz
A2DP Active Mode			18		mA
Single HFP Sniff			410		uA
Deep Sleep (off) Mode			5.0		uA
Recommended Operating Conditions					
Storage temperature		-40		85	°C
Operating temperature range		-10		70	°C
Supply voltage: VBAT			3.7	4.2	V

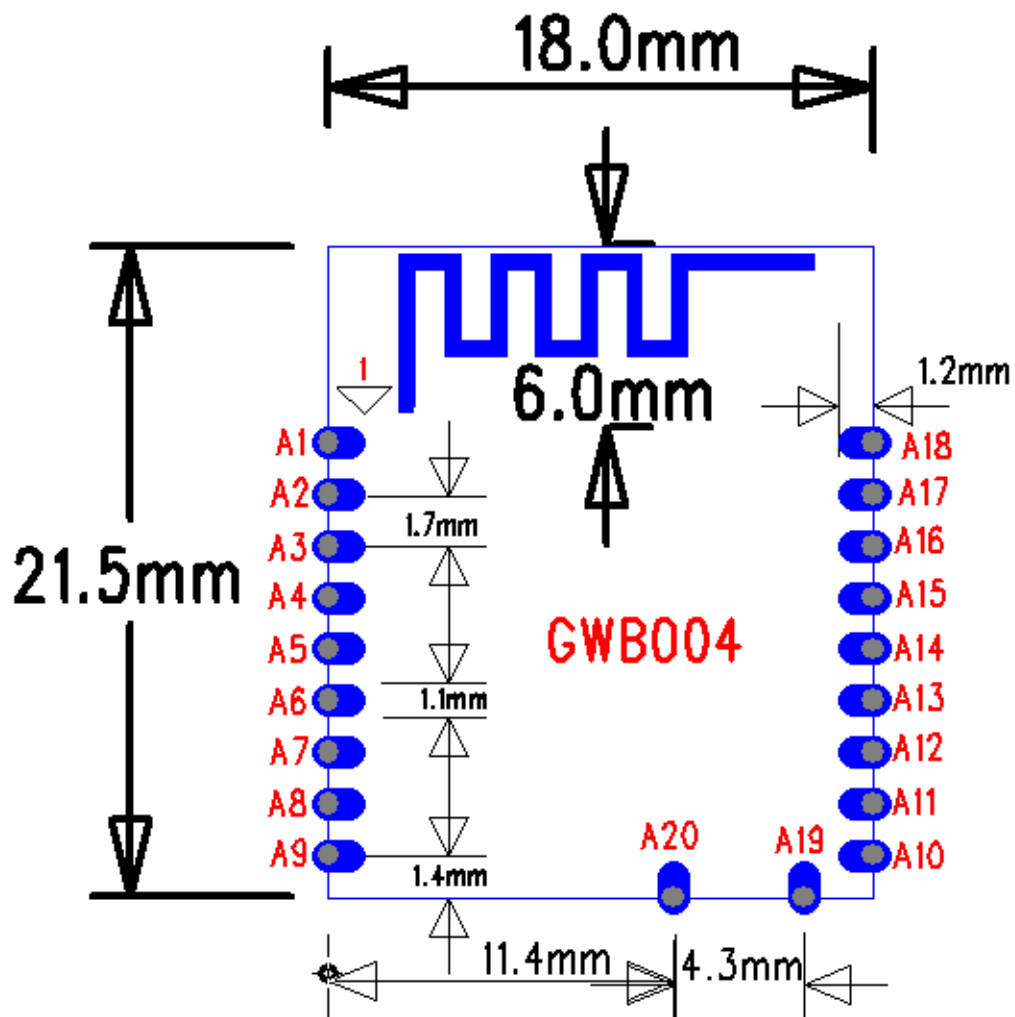
Pin Configurations



Pin No	Name	Type	Function	Remark
A1	GND	GND	Ground	
A2	PWR	Analogue	Regulator enable input. Can also be sensed as an input. Regulator enable and multifunction button.	
A3	3V3	Power	3.3V bypass linear regulator output.	
A4	GND	GND	Ground	
A5	VBAT	Battery terminal +	Lithium ion/polymer battery positive terminal. Battery charger output and input to switch- mode regulator	
A6	DGND	GND	Digital Ground	
A7	CHG	Charger input	Lithium ion/polymer battery charger input	

A8	SPK-L	Analogue	Speaker output ,left	
A9	SPK-R	Analogue	Speaker output ,right	
A10	GND	GND	Microphone Ground	
A11	MIC_	Analogue	Microphone Input	
A12	VOL+	Bi-directional	Programmable Input/Output Line 0	
			Soft default : VOL+	
A13	VOL-	Bi-directional	Programmable Input/Output Line 1	
			Soft default : VOL-	
A14	FW	Bi-directional	Programmable Input/Output Line 2	
			Soft default : A2DP forward	
A15	BW	Bi-directional	Programmable Input/Output Line 3	
			Soft default : A2DP backward	
A16	BLUE	Bi-directional	Programmable Input/Output Line 5	
			Soft default : Blue LED Driver	
A17	RED	Bi-directional	Programmable Input/Output Line 6	
			Soft default : Red LED Driver	
A18	MUTE	Bi-directional	Programmable Input/Output Line 7	
			Soft default : Audio Amplifier mute,low for mute	
A19	NFC_ANT_LA	NFC RF	NFC Antenna	
A20	NFC_ANT_LB	NFC RF	NFC Antenna	

Mechanical Drawing



PCB LAYOUT

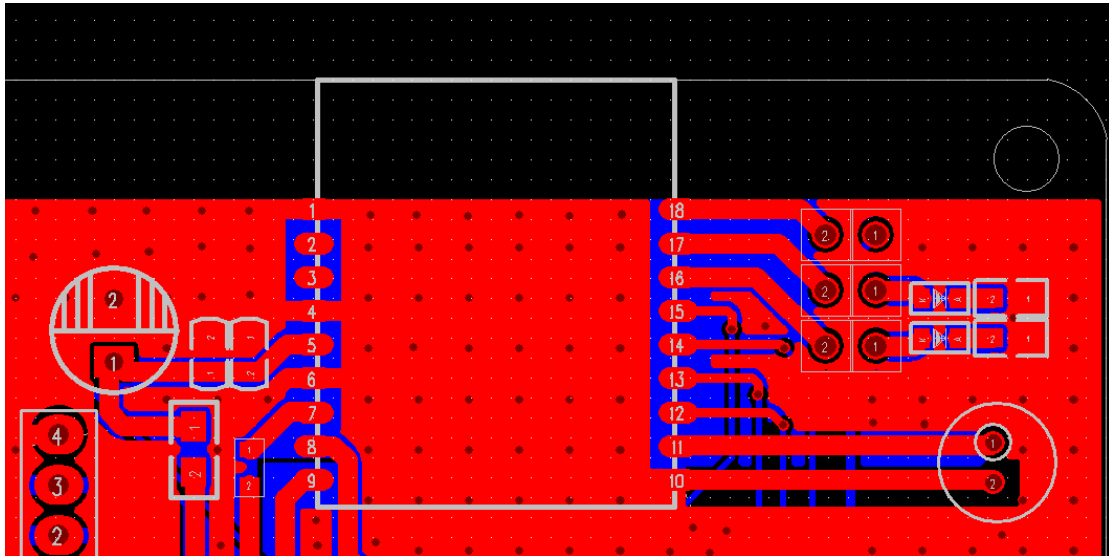
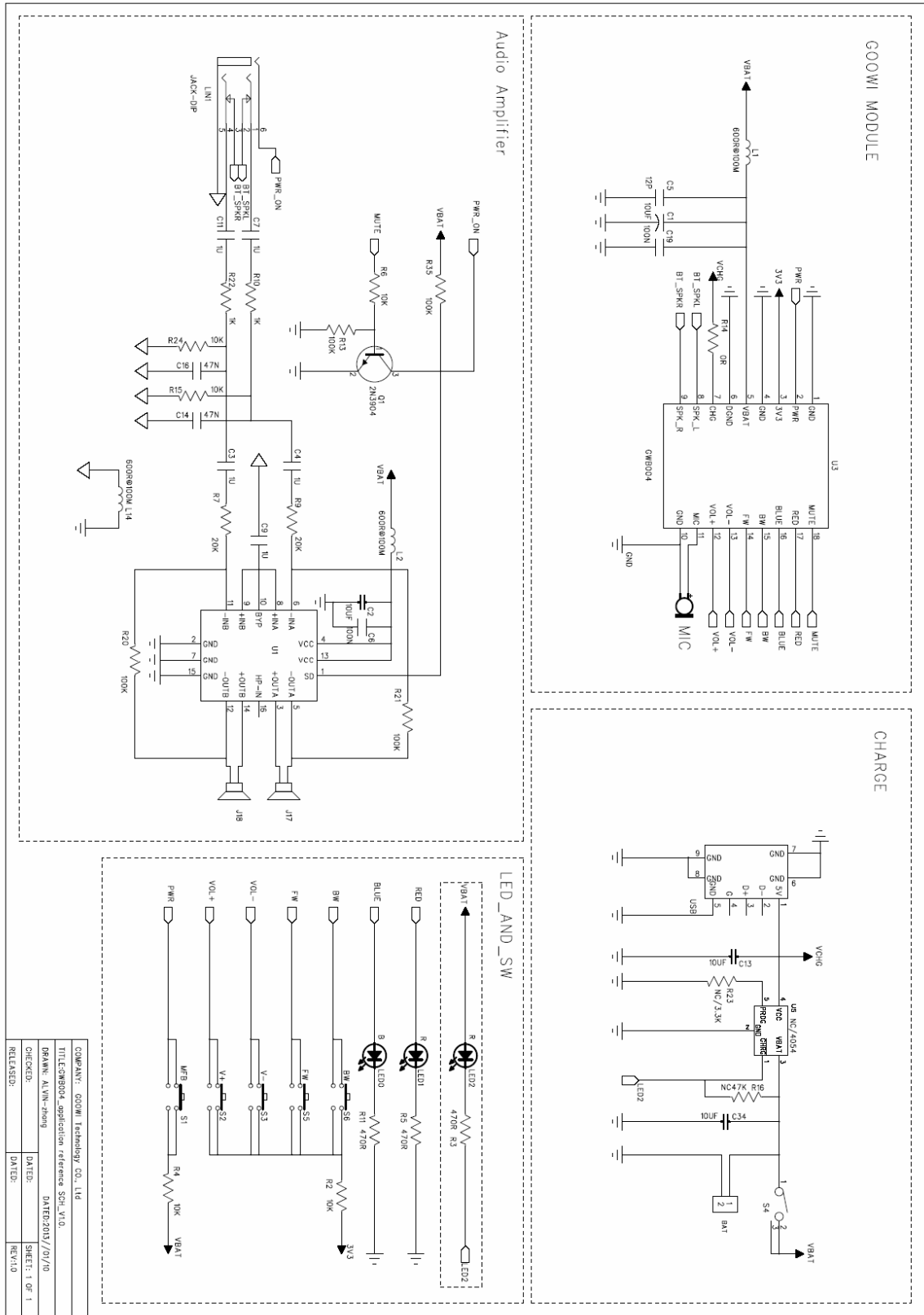


Figure 1: Example layout

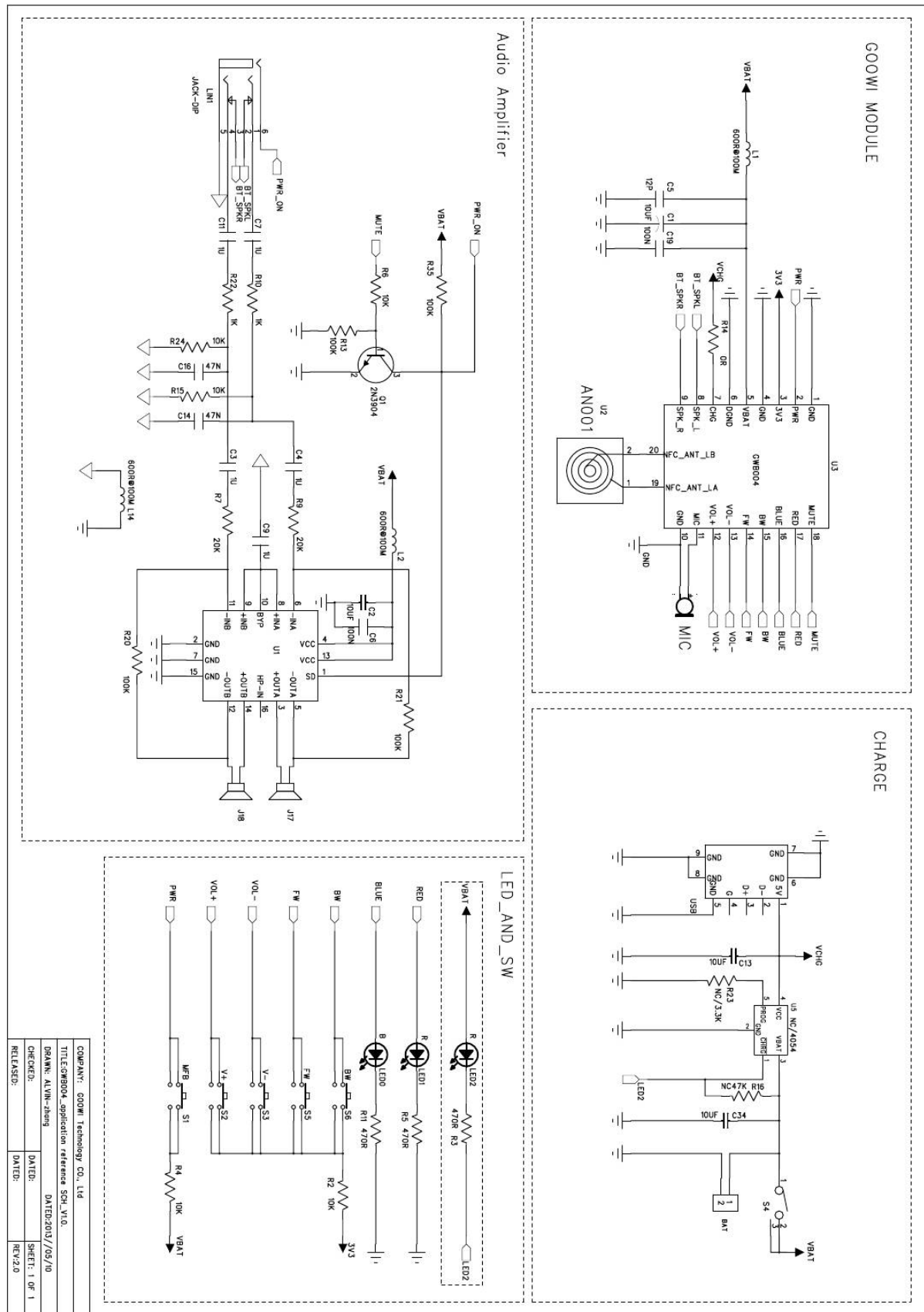
The following list is aimed to avoid EMC problems caused by RF part of the module.

- Do not remove copper from the PCB more than needed. Use ground filling as much as possible. However remove small floating islands after copper pour.
- Do not place a ground plane underneath the antenna. The grounding areas under the module should be designed as shown in Figure 1.
- When using overlapping ground areas use conductive vias separated max. 3 mm apart at the edge of the ground areas. This prevents RF to penetrate inside the PCB. Use ground vias extensively all over the PCB. All the traces in (and on) the PCB are potential antennas.
- Avoid loops.
- Ensure that signal lines have return paths as short as possible. With sensitive analog signals, such as analog audio, use solid ground plane and make sure that the return path for the signal lines is low impedance and follows the signal lines all the way.

Application reference SCH



Application reference SCH for NFC



Document Reference

Document	Reference,Date
Vimicro_DATASHEET_V1.3_EN.pdf	Copyright © Vimicro_wx, Inc. 1999-2013
Core Specification of the Bluetooth System	V3.0 + EDR
GooWi GWB004 reference schematic	GWBM-004-01B