

# Design Services Capability

WiWo Tech Systems Pvt Ltd

## Company Profile

- WiWoTech Systems Private Ltd is an Engineering design services company located in Bangalore
- WiWoTech supports Engineering design services in the areas of RF design, Antenna design, IC and SIP Package design, PCB design, RF and Antenna testing, EM CAD tool based simulations that include SI analysis, PI analysis, EMI/EMC analysis
- Servicing industries include Consumer Electronics, Defence, Medical, Avionics, Tele-Communication, Industrial
- Our esteemed clients list include PayPal, Marvell, Ineda, Rangson, Kaynes
- Our vision is to be your first choice partner in RF/Electronic design, Antenna design, IC Package/SIP design and prototyping services

## RF Design Capability

Wireless Module Design

RF/Wireless system Design

Post silicon board design

RF Circuit Design

RF Simulations

Evaluation board design

- WiWoTech Systems Private Ltd can be your one stop destination for all your RF design requirements
- WiWo Tech can design and develop RF/Wireless modules, circuits and systems up to 12 GHz frequency range
- WiWo Tech has the necessary expertise in Architecture development, Specification development, Component selection, Schematic design, Layout design, RF simulations, Cascade budget analysis required for carrying out RF designs

# RF Design Capability

## Wireless Module Design



- Bluetooth
- Bluetooth low energy
- 802.15.4 / ZigBee
- RFID
- NFC
- Wi-Fi (802.11 a/b/g/n)
- WiMAX
- 3G/4G
- GPS

## RF Circuit Design



- Power Amplifiers
- Low noise amplifiers
- Power divider/combiner
- Coupler
- Filter
- Balun
- T/R Switch
- Mixer
- Frequency synthesizer
- Diplexer /Duplexer

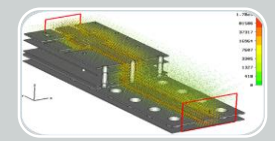
# RF Design Capability

## RF/Wireless System Design



- 3G/4G Repeaters
- BLE based Medical devices
- GPS based tracking devices
- Wi-Fi based phone system
- Wi-Fi based Asset tracking system
- Active/Passive RFID Tag and Reader
- WiMAX CPE
- Bluetooth based HID devices
- RF Up/Down Converters
- Transmit/Receive modules
- Any Custom /Standard RF & Wireless designs

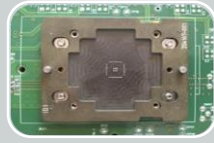
## RF Simulations



- Impedance matching
- 50 ohm RF trace check
- Link budget analysis
- Cascaded RF front end analysis
- Noise figure analysis
- Circuit/Component design
- System analysis
- Gain/Loss analysis
- EMI/EMC analysis
- Parasitic extraction
- RF propagation analysis

# RF Design Capability

## Post Silicon Validation Board Design



- Socket board design for post silicon system validation of RF chipset across PVT corners
- Capability to design post silicon system validation board design for low power chipsets like Bluetooth low energy
- Capability to design the post silicon validation board which will comply with EMI/EMC and FCC/ETSI regulations
- Capability to design impedance controlled Post silicon validation boards
- Capability to provide the necessary signal conditioning circuits to characterize the silicon completely without errors creeping in measurement
- Capability to provide the necessary test points to completely characterize each of the sub systems of the RF chipset
- Capability to interact with cross functional teams and provide the necessary interfaces on the validation board to support programming and debug
- Architecture definition, Component selection, Schematic design, Layout design, RF simulations towards post silicon validation board design

## Evaluation Board Design



- Capability to design evaluation board which can be used to characterize multiple radio modules
- Capability to carry out 2 layer or more evaluation board designs depending on component density, routing complexity
- Capability to design evaluation board with high density of analog, high speed, RF components and interfaces
- Capability to design the evaluation boards which will comply with EMI/EMC and FCC/ETSI regulations
- Capability to design impedance controlled evaluation boards
- Capability to design evaluation board with user peripherals like LCD display
- Capability to provide the necessary test points to completely characterize each of the sub systems of the design
- Architecture definition, Component selection, Schematic design, Layout design, RF simulations towards evaluation board design

## RF Design Services Offered

Wireless Module Design

RF/Wireless system Design

Post silicon board design

Wireless link budget analysis

Custom Transmitter/Receiver Design

Multi radio designs

RF Circuit Design

RF Simulations

Evaluation board design

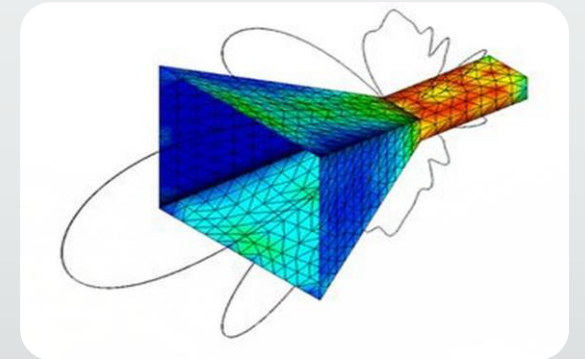
Propagation analysis

Military RF Applications

Cascaded RF Chain analysis

# Antenna Design Capability

- WiWoTech Systems Private Ltd offers unique design solution to all your antenna requirements right from concept study to the stage of implementation and testing of antenna in real time
- WiWoTech can design and develop antenna up to 12GHz frequency range
- WiWoTech has the capability to design low profile wireless antennas for most of the wireless technologies like Wi-Fi,Bluetooth,RFID,GPS,NFC,3G/4G,Zigbee
- WiWoTech has the capability to study the effect of PCB layout/ components, enclosures on antenna performance metric
- WiWoTech has expert engineers trained in popular antenna simulation CAD tools like CST Microwave studio/HFSS
- WiWoTech can design wide range of antennas including array antenna, wide band antenna,multi band antenna, active antenna, high gain antenna,MIMO antenna





# Antenna Design Capability

Low profile wireless antenna

High gain antenna

Wide band antenna

MIMO antenna

Chip antenna

Phased array antenna

Array antenna

Multi band antenna

Base station antenna

Beam forming antenna

Diversity antenna

Active antenna

# Antenna Design Services Offered

Antenna design

Antenna modelling and simulation

Antenna placement analysis

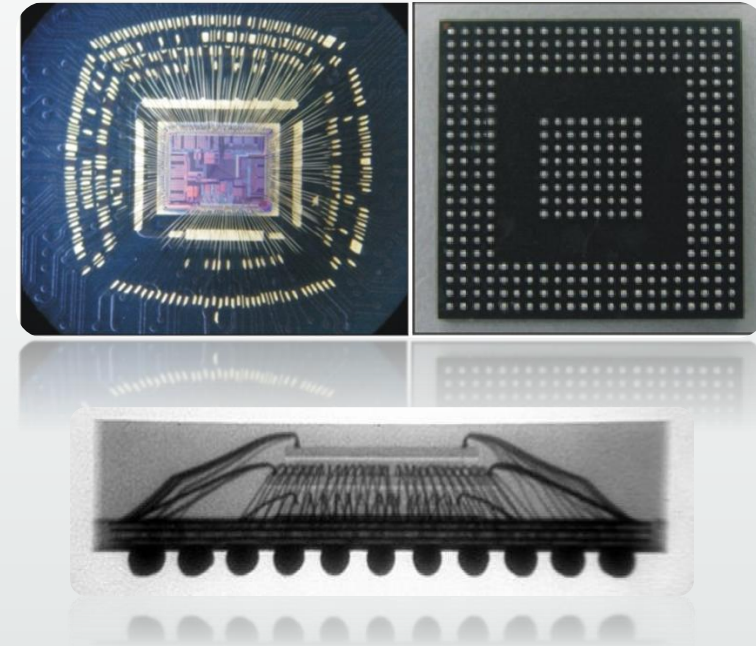
Analysis of PCB Board effect

Analysis of Enclosure effect

Antenna tuning

## IC Package/SIP Design Capability

- WiWoTech Systems Private Ltd has experienced engineers who have considerable experience in designing semiconductor packages
- WiWoTech is capable of handling high density packages(BGA/LGA/CSP)
- The following package technology can be handled by WiWo Tech
  - ❖ Single die, Multi die, Stacked die and SIP
  - ❖ FC-BGA,WB-BGA,CSP,QFN,POP,LGA, Custom leaded and leadless Package
- WiWo Tech is capable of supporting the following material technology
  - ❖ Organic,Polyimide,Rogers,LTCC,HTCC,FR<sub>4</sub>,Thick and Thin Film
- WiWoTech offers IC/SIP package services,SI/PI/Thermal analysis and single window prototyping services to customers



# PCB Design Capability

- WiWoTech Systems Private Ltd has experienced engineers who have considerable experience in having carrying out PCB design for multiple designs
- WiWoTech is capable of handling PCB designs from single layer up to 32 layers
- WiWo Tech can handle RF, Analog, Digital, Mixed signal PCB designs
- WiWo Tech has the expertise to carry out PCB design on rigid/flex substrates
- Expertise to design PCBs with blind and buried vias
- Expertise to design PCB boards that meets DFM,DFA and DFT
- Expertise to design impedance controlled PCB boards
- Expertise to design thermal enhanced PCB
- Expertise in carrying out PCB design which will meet regulatory requirements



# PCB Design Capability

Single Layer to Up to 32 Layer PCB design

Rigid/Flex Substrate PCB design

PCB design to meet Regulatory requirements

RF, Analog, Digital, Mixed Signal PCB design

Thermal enhanced PCB design

Impedance controlled PCB design

- WiWoTech offers cutting edge PCB solutions to the global market. We specialize in high-speed, mixed signals, multi-layer design including RF PCB designing. We also provide PCB fabrication and Assembly as value added services.
- Meeting today's challenges in PCB design requires balanced knowledge of PCB manufacturing process, assembly & EDA tools. We at WiWoTech specialize in High speed Digital, Analog, RF and mixed signal design including Printed antenna Designs.

## PCB Design Services Offered

Schematic Design

Signal Integrity analysis

Thermal analysis

Parasitic extraction

Signal Integrity analysis

PCB Stack up analysis

Layout Design

Component Library development

EM Simulation of PCB layout

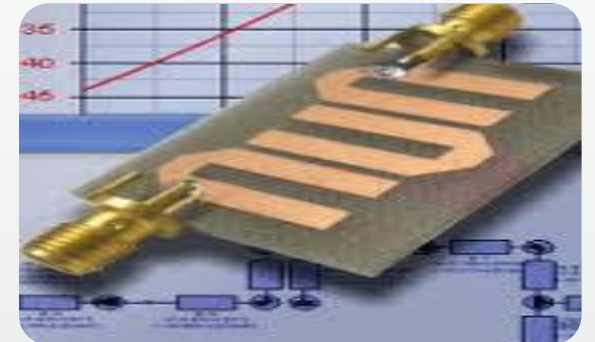
EMI/EMC analysis of PCB Layout

Reverse Engineering

Impedance analysis

# RF Testing Capability

- ❑ Expertise in carrying out RF testing of wireless modules and systems
  - ❑ Bluetooth / Bluetooth low energy
  - ❑ ZigBee
  - ❑ Wi-Fi (802.11a/b/g/n/ac)
  - ❑ RFID
  - ❑ NFC
  - ❑ GPS
  - ❑ Cellular Technologies(3G/4G)
  - ❑ WiMAX
- ❑ Expertise in carrying out RF testing of Circuits
  - ❑ Amplifiers / Low noise amplifiers
  - ❑ Frequency synthesizer
  - ❑ Mixer
  - ❑ Filters/ Balun
  - ❑ T/R Switch
  - ❑ Power divider/combiner
  - ❑ Couplers/ Diplexers / Duplexer
- ❑ Expertise in carrying out post silicon system validation testing for RF chipsets



## RF Testing Capability

Wireless Module Testing

RF/Wireless system Testing

FCC/ETSI Regulatory Testing

RF Circuit Testing

Post silicon system validation testing

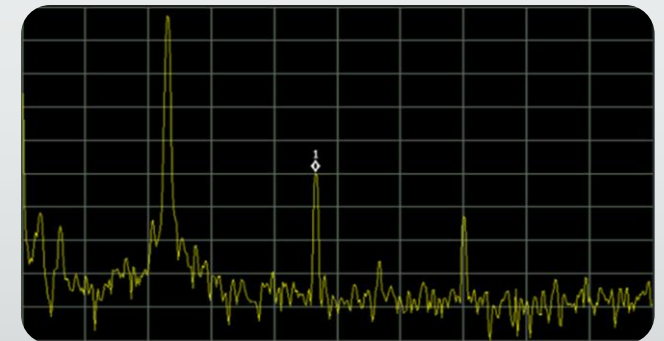
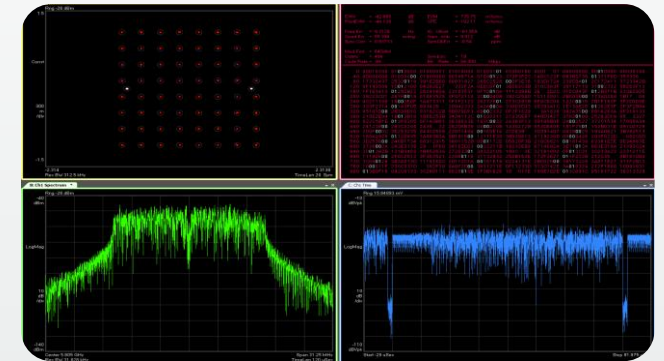
EMI/EMC Testing

- WiWoTech Systems Private Ltd can be your one stop destination for all your RF Testing requirements
- WiWo Tech can carry out the RF testing of Wireless modules, RF circuits and RF/Wireless systems up to 12 GHz frequency range
- WiWo Tech has the necessary expertise in setting up the measurement equipment's for accurate RF measurement



# RF Testing Capability

- ❑ WiWoTech team can carry out the following RF tests for you
  - ❑ Noise figure measurement
  - ❑ Intermodulation measurement
  - ❑ Gain compression measurement
  - ❑ Peak, Average power measurements
  - ❑ Harmonic/Spurious measurement
  - ❑ C/I receiver selectivity measurement
  - ❑ Blocking measurements
  - ❑ Phase noise measurements
  - ❑ Adjacent channel transmit power measurement
  - ❑ Spectral mask measurements
  - ❑ Insertion loss/Gain measurement
  - ❑ Return loss/VSWR measurement
  - ❑ Impedance/S-Parameter measurement
  - ❑ EVM measurement
  - ❑ Radio Range measurement



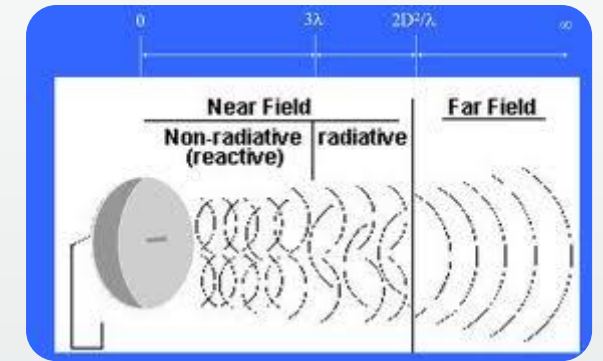
# RF Testing Capability

- ❑ WiWoTech team has expertise in handling the following measurement equipment's for carrying out the RF testing
  - ❑ Network analyser
  - ❑ Spectrum analyser
  - ❑ RF power meter
  - ❑ Noise figure analyser
  - ❑ Phase noise analyser
  - ❑ LCR meter
  - ❑ Vector signal generator
  - ❑ Vector signal analyser
  - ❑ VSWR meter
  - ❑ Frequency counter
  - ❑ Oscilloscope



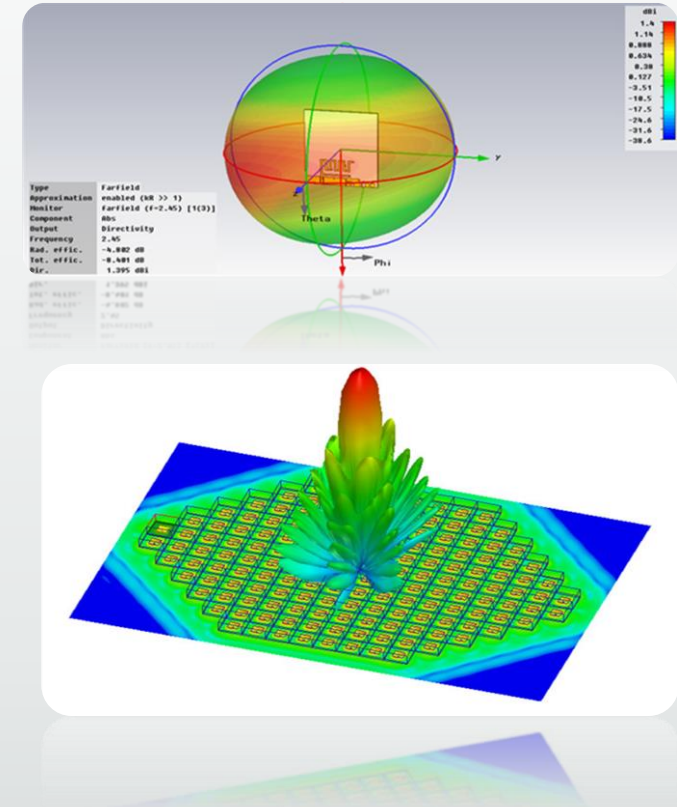
# Antenna Testing Capability

- ❑ WiWo Tech has rich expertise in testing different types of antenna in near field ranges as well as in far field ranges
  - ❑ Low profile wireless antenna
  - ❑ Chip antenna
  - ❑ High gain antenna
  - ❑ Multi band antenna
  - ❑ Wide band antenna
  - ❑ Array antenna
  - ❑ Beam forming antenna
  - ❑ MIMO antenna
  - ❑ Diversity antenna
  - ❑ Active antenna
  - ❑ Phased array antenna
- ❑ Expertise in selection of near field ranges (Spherical, Planar..) and far field range for testing depending on antenna type
- ❑ Expertise in impedance matching, antenna tuning



# Antenna Testing Capability

- ❑ WiWo Tech has expertise in testing the following antenna performance metric parameters
  - ❑ Beam width
  - ❑ Directivity
  - ❑ Gain
  - ❑ Radiation efficiency
  - ❑ Impedance
  - ❑ Return loss
  - ❑ Bandwidth
  - ❑ Radiation pattern
  - ❑ Cross polarization
  - ❑ Co-polarization



## RF & Antenna Test Services Offered

RF Testing of Wireless Modules

RF Testing of Wireless System

RF Tuning of circuits and systems

Far Field range antenna testing

FCC /ETSI regulatory testing

Radio Range Testing

RF Testing of Circuits

System validation testing of chips

Near field range antenna testing

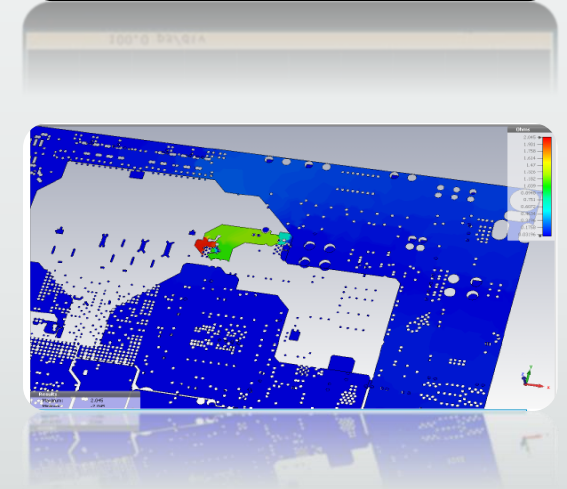
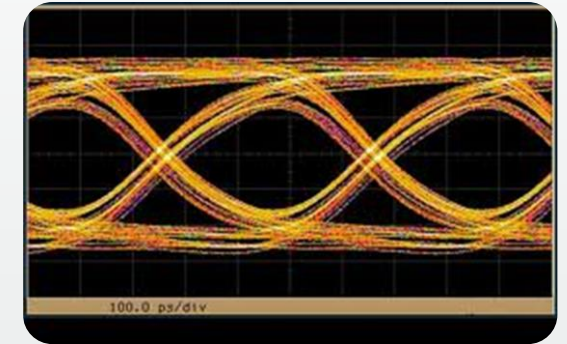
Antenna tuning

EMI/EMC testing

Production Testing

# EM Simulation Capability

- ❑ WiWo Tech can carry out the following EM CAD Tool based simulation based services for your designs
  - ❑ Signal integrity analysis
  - ❑ Power integrity analysis
  - ❑ EMI/EMC analysis
  - ❑ S-Parameter extraction
  - ❑ Link budget analysis
  - ❑ Wireless system analysis
  - ❑ Cross talk analysis
  - ❑ PCB board Stack up / Impedance analysis
  - ❑ RF Circuit design
  - ❑ Antenna design
  - ❑ RF Front end cascaded chain analysis
  - ❑ RF Propagation analysis



## Why WiWo Tech

- Competitive market rates
- Experienced engineering team with rich expertise of having carried out multiple successful designs in RF/Antenna/IC Packaging/PCB design domains
- Guaranteed customer satisfaction
- Requirements met on time with high quality
- Flexible business models
- Expertise in various EM simulation tools like ADS,MWO,CST,HFSS for carrying out simulation based analysis
- Interaction with high quality fabricators in India and abroad for fabrication and assembly of boards and packages
- Complete documentation package of work carried out







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