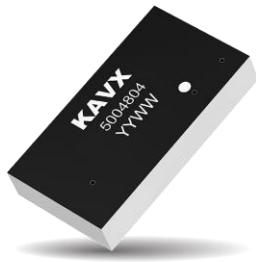


Part No. 5004804

Wi-SUN / ISM FR4 Embedded SMT Antenna

868-928 MHz

Supports: ISM, LoRa, Wi-SUN, Sub-1GHz, LPWAN, EITres



KYOCERA AVX IMD technology enables the advance antenna design that delivers superior performance in reception critical applications. 5004804 is a small SMT FR4 Embedded Antenna. Its advantage is its small clearance with 20x12mm. The 5004804 cover 915 MHz LoRa (US) and 924 Wi-SUN (Japan). It can also cover 868 MHz ISM/LoRa (EU) with proper layout shown on Appendix 1.

Wi-SUN / ISM FR4 Embedded SMT Antenna

902 – 928 MHz or 863 – 870 MHz

KEY BENEFITS

Stay-in-Tune

IMD antenna technology provides superior RF field containment, resulting in less interaction with surrounding components.

Quicker Time-to-Market

By optimizing antenna size, performance and emissions, customer and regulatory specifications are more easily met.

Environmental Compliance

Products are the latest RoHS version compliant.

APPLICATIONS

- IoT, Industrial devices
- Telematics
- Tracking
- Smart Metering
- Home/Factory automation

Electrical Specifications

Typical Characteristics, on 60 x 100 mm PCB

| Frequency (GHz) | 902 – 928 (US) | 920 – 928 (Japan) | 863 – 870 (EU) |
|----------------------|-----------------|-------------------|----------------------------|
| Peak Gain | 1.24 dBi | 1.24 dBi | <i>Refer to Appendix 1</i> |
| Efficiency | 49% | 55% | |
| VSWR | < 3.7:1 | <1.5:1 | |
| Power Handling | 2W | | |
| Polarization | Linear | | |
| Feed Point Impedance | 50 Ω unbalanced | | |

Mechanical Specifications & Ordering Part Number

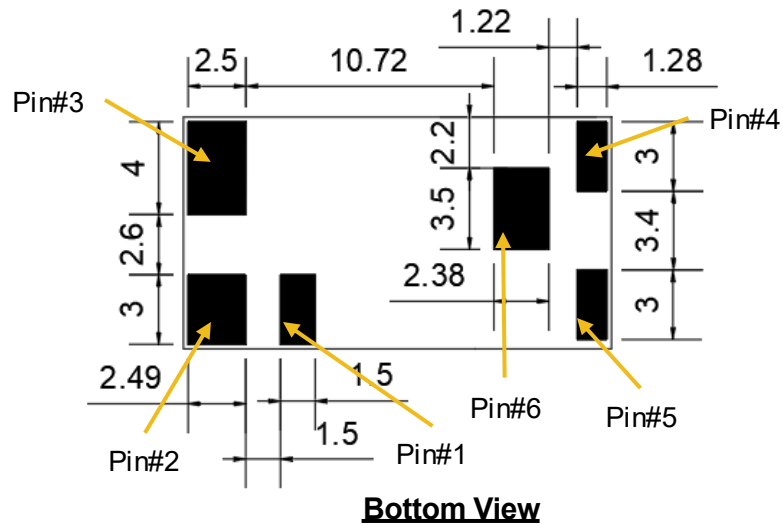
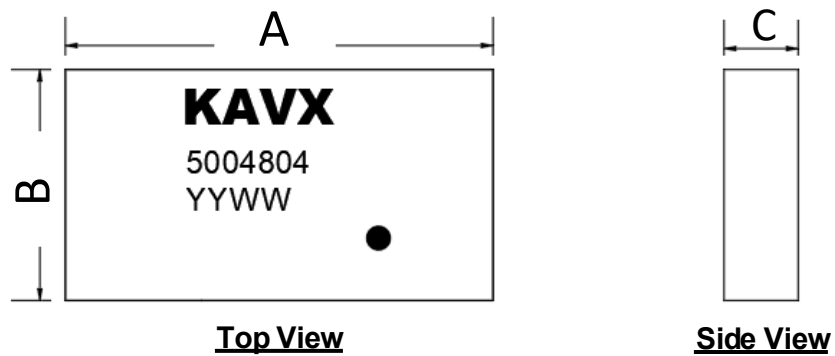
| Ordering Part Number | 5004804 |
|-----------------------|----------------------------------|
| Size (mm) | 18.5 x 10 x 3.2 |
| Mounting | Surface mounted to the PCB (SMT) |
| Weight (grams) | 1.37 |
| Packaging | Tape & Reel |
| Demo Board | 5004804-01 (902-928 MHz) |
| | 5004804-02 (863-975 MHz) |
| Versions | Corner version: 5004805 |
| Operating Temperature | -40°C to +85°C |

Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Dimensions

Typical antenna dimensions (mm)

| Part Number | A (mm) | B (mm) | C (mm) |
|-------------|--------|--------|--------|
| 5004804 | 18.5 | 10 | 3.2 |



Pin Descriptions

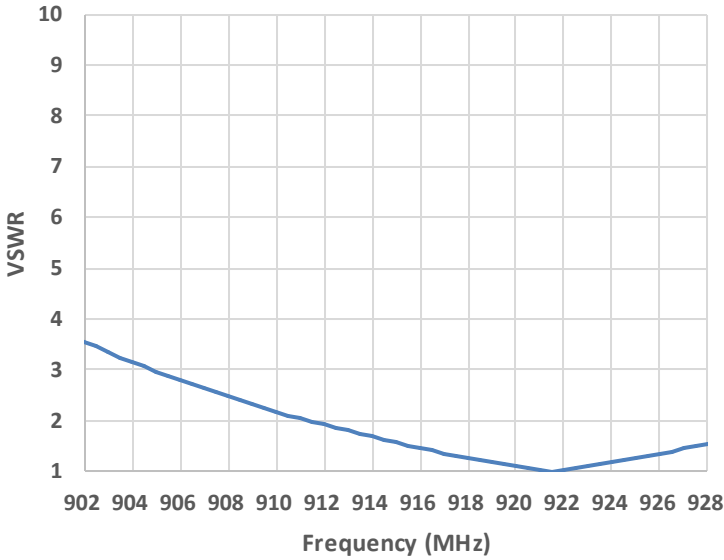
| Pin# | Description |
|------|-------------|
| 1 | Feed |
| 2 | Dummy Pad |
| 3 | Dummy Pad |
| 4 | Dummy Pad |
| 5 | Dummy Pad |
| 6 | Dummy Pad |

Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
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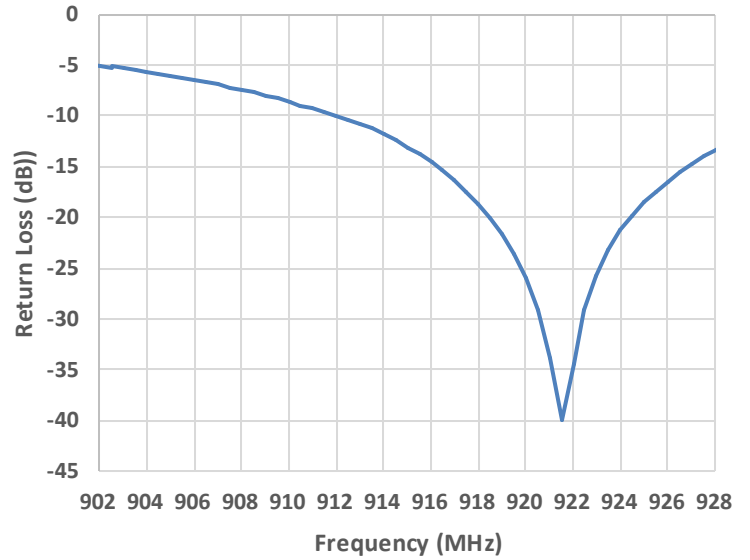
VSWR, Return Loss, Efficiency and Peak Gain Plots

Typical Performances on 60 x 100 mm PCB

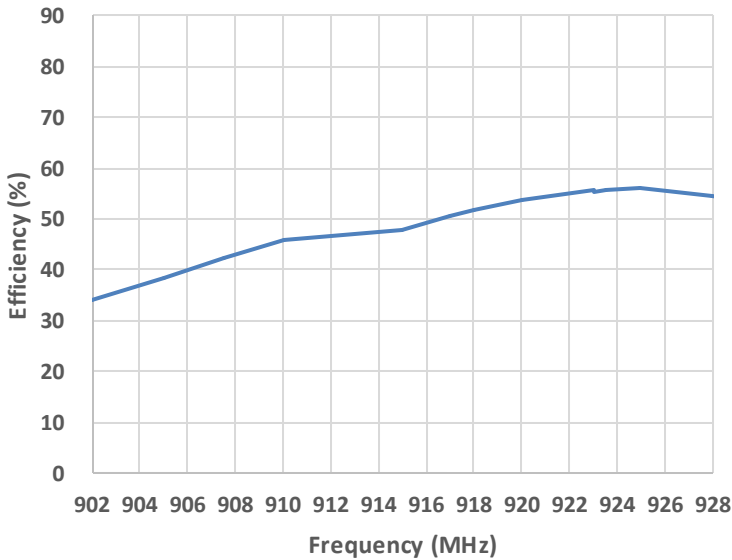
VSWR (902 – 928MHz)



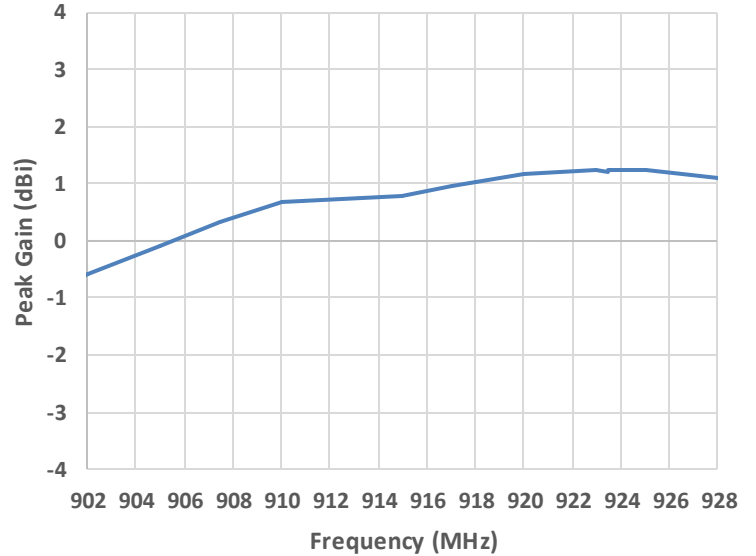
Return Loss (902 – 928MHz)



Efficiency (902 – 928MHz)



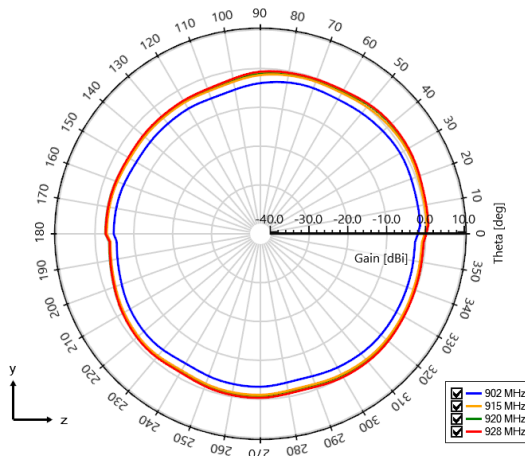
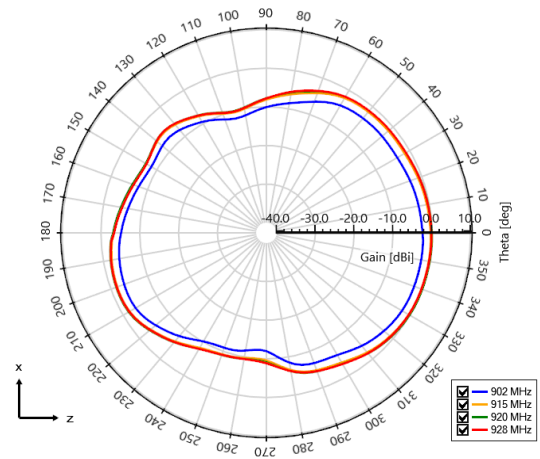
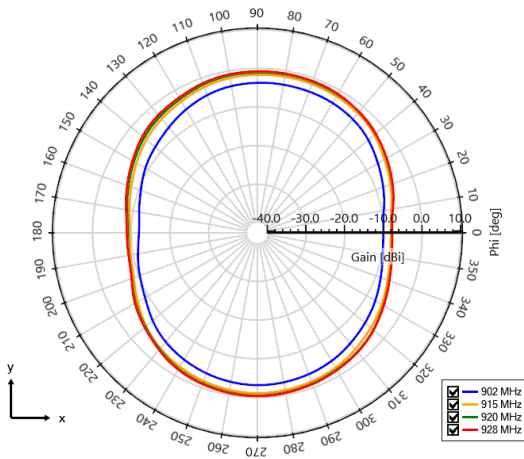
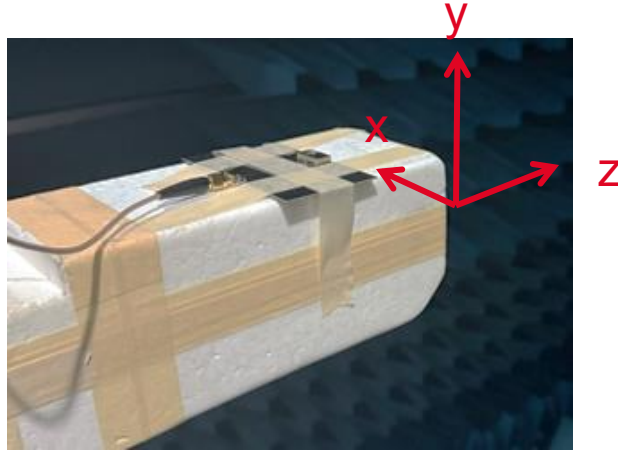
Peak Gain (902 – 928MHz)



Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Radiation Patterns Plots

Typical Performances on 60 x 100 mm PCB
 Measured at 902, 915, 920 and 928 MHz



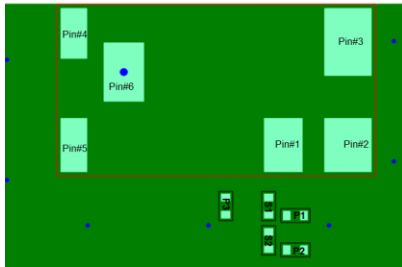
Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Layout (EVB: 5004804-01)

Typical layout dimensions (mm)
 Clearance: 20 x 12 mm

* VIAS: Diam. 0.2mm, (no vias on transmission lines).
 Via holes must be covered by solder mask

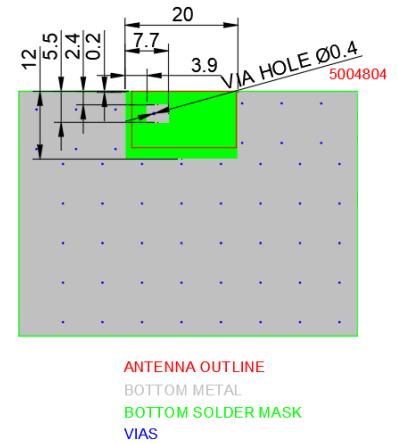
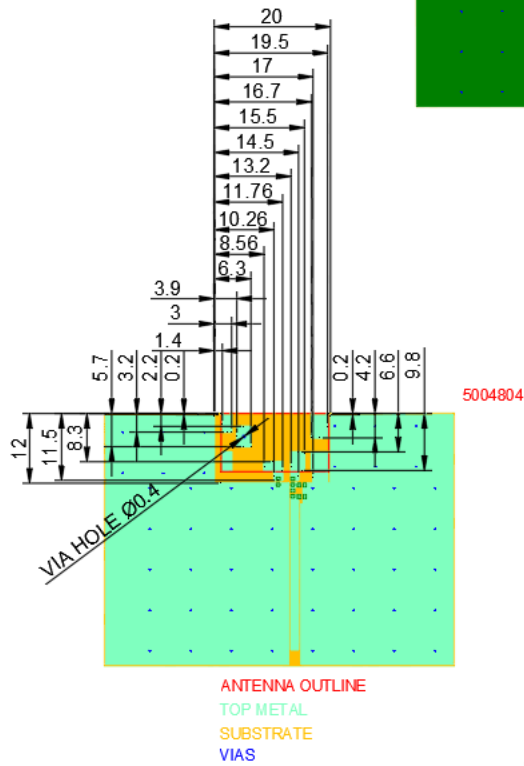
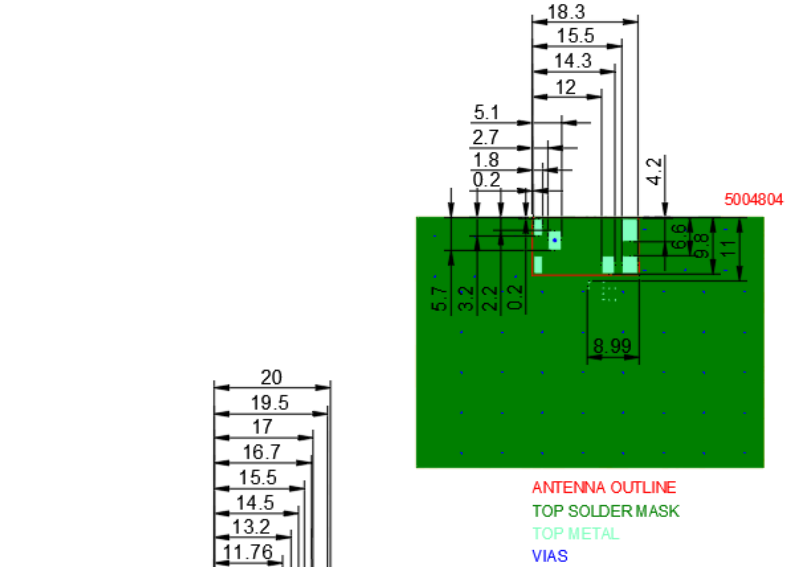
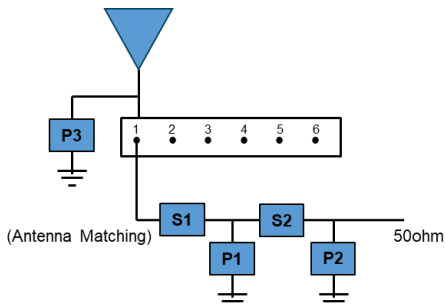
| Pin# | Description |
|------|----------------|
| 1 | Feed |
| 2 | Ground |
| 3 | Dummy Pad |
| 4 | Dummy Pad |
| 5 | Dummy Pad |
| 6 | Antenna Tuning |



Matching Pi Network (Demo Board)

| Component | Value | Tolerance |
|-----------|--------|-----------|
| S1 | 0Ω | N/A |
| P1 | 0.2 pF | ±0.05pF |
| S2 | 0Ω | N/A |
| P2 | 12 nH | ±5% |
| P3 | 0Ω | N/A |

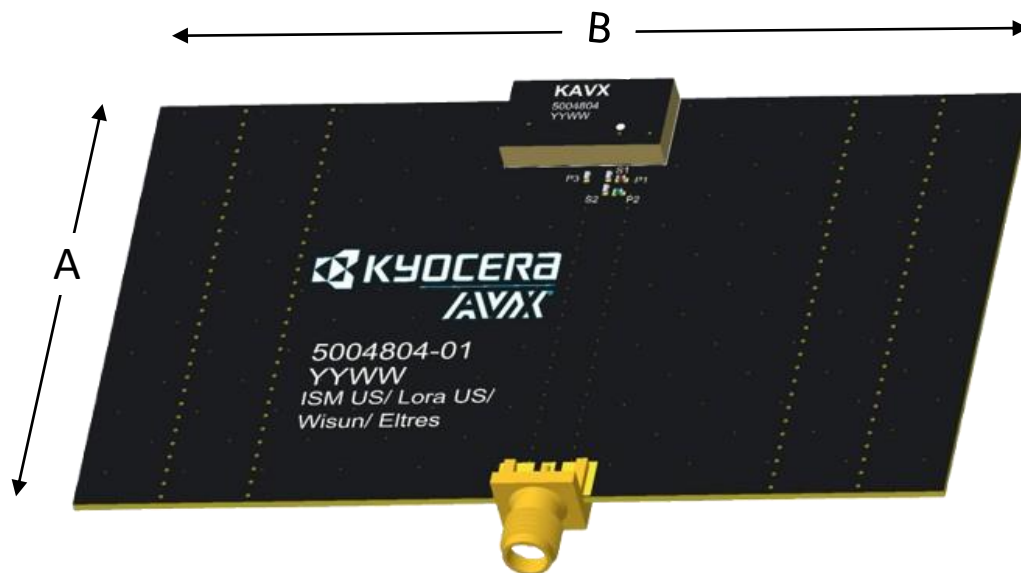
*Actual matching values depend on customer design



Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Demo Board

| Part Number | A (mm) | B (mm) |
|-------------|--------|--------|
| 5004804-01 | 60 | 100 |



Appendix 1 Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1

Appendix 1 gives instructions on how achieve ISM (863-870 MHz) with matching components.

| Frequency (MHz) | 863 - 870 |
|----------------------|------------------------|
| Peak Gain | 0.95 dBi |
| Efficiency | 44% |
| VSWR | < 2.1:1 |
| Power Handling | 2 W |
| Feed Point Impedance | 50 Ω unbalanced |
| Polarization | Linear |
| Radiation Pattern | Omni-directional |

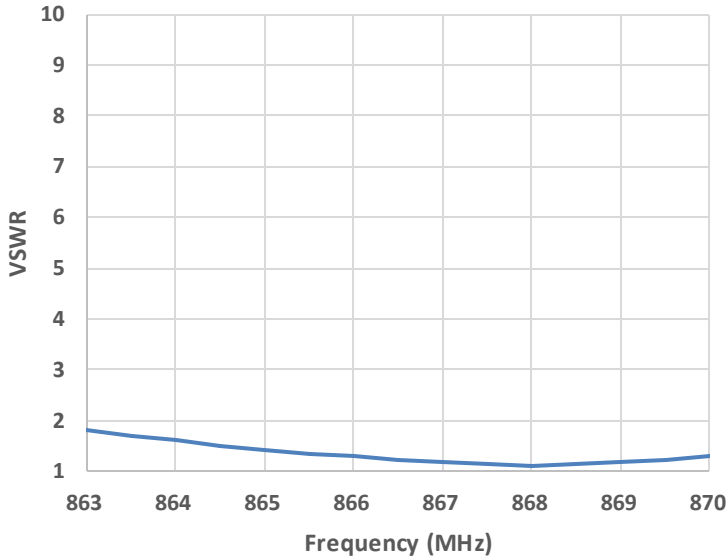
*Data shown above has Appendix 1 matching applied on 60 x 100 mm PCB

Appendix 1 Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

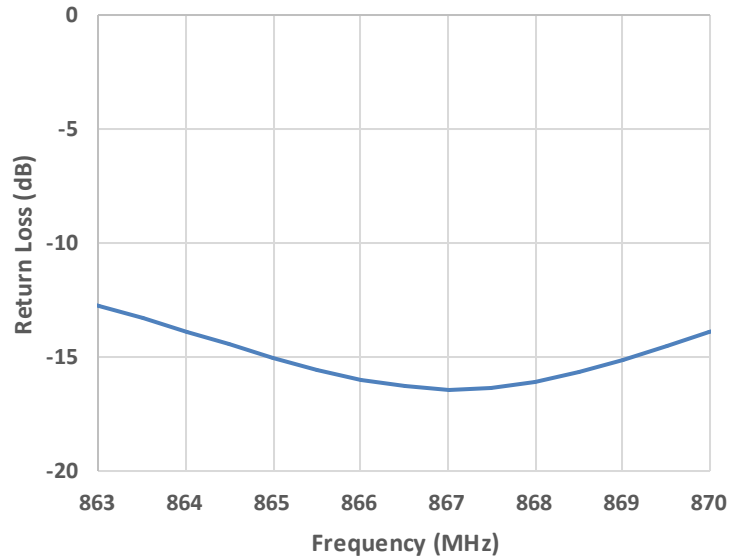
Appendix 1: VSWR, Return Loss, Efficiency and Peak Gain Plots

Typical Performances on 60 x 100 mm PCB

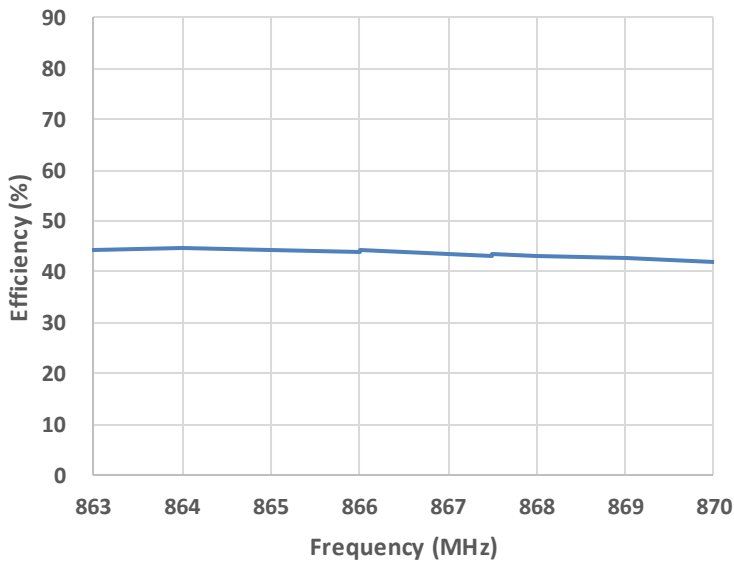
VSWR (863 – 870 MHz)



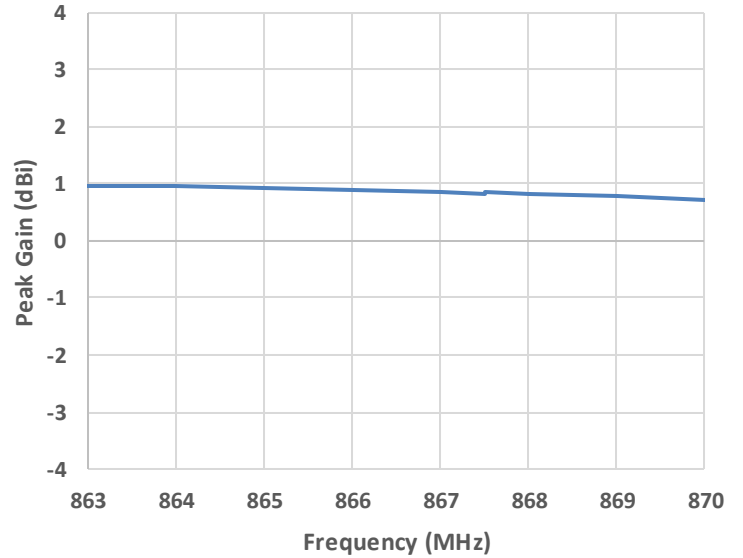
Return Loss (863 – 870 MHz)



Efficiency (863 – 870 MHz)



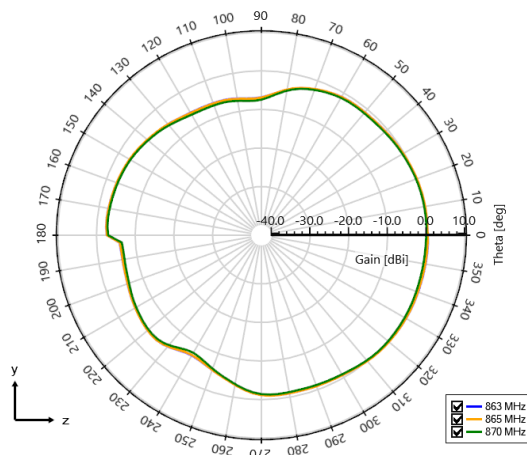
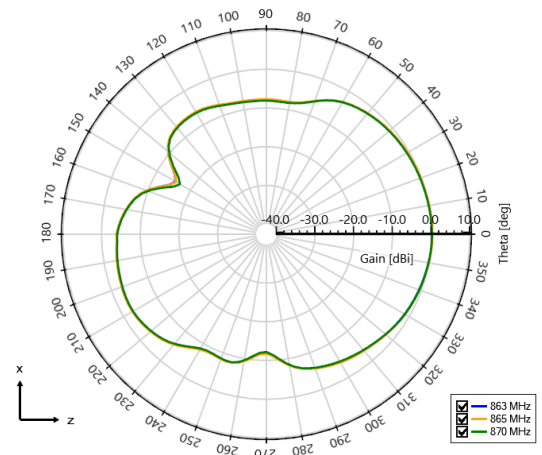
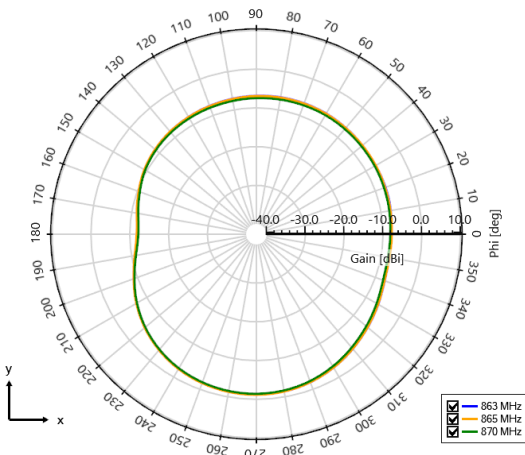
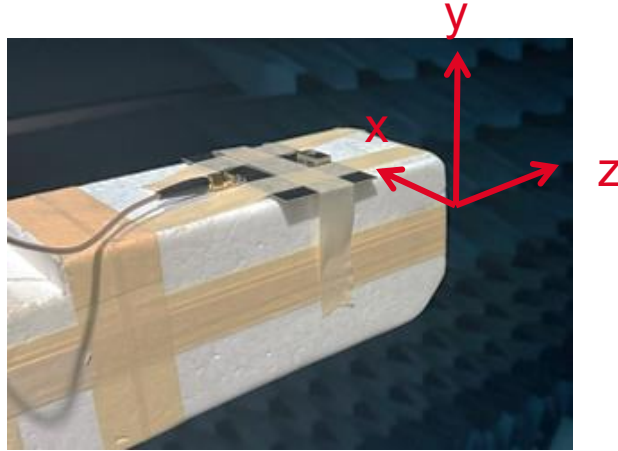
Peak Gain (863 – 870 MHz)



Appendix 1 Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1: Antenna Radiation Patterns Plots

Typical Performances on 60 x 100 mm PCB
 Measured at 863, 865 and 870 MHz



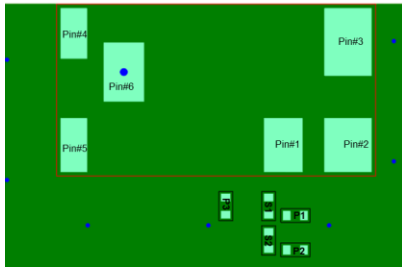
Appendix 1 Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1 Antenna Layout (EVB: 5004804-02)

Typical layout dimensions (mm)
 Clearance: 20 x 12 mm

* VIAS: Diam. 0.2mm, (no vias on transmission lines).
 Via holes must be covered by solder mask

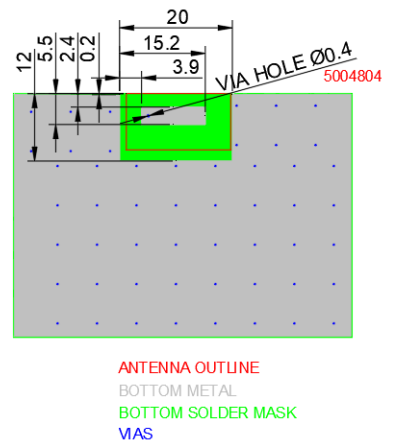
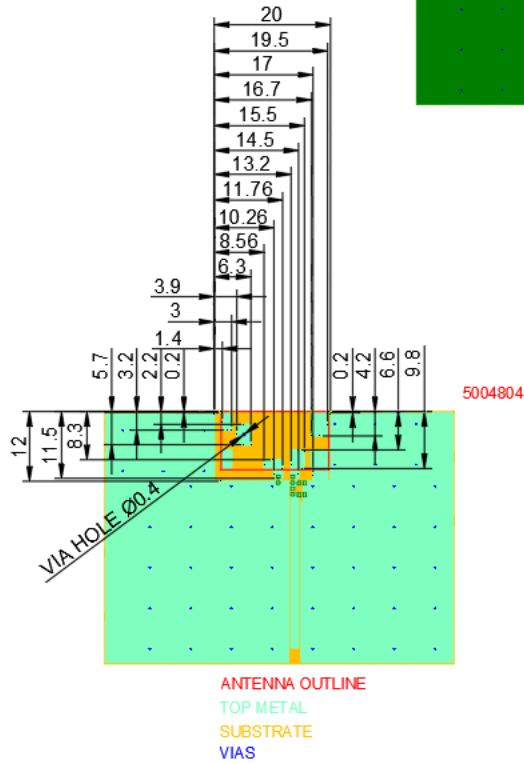
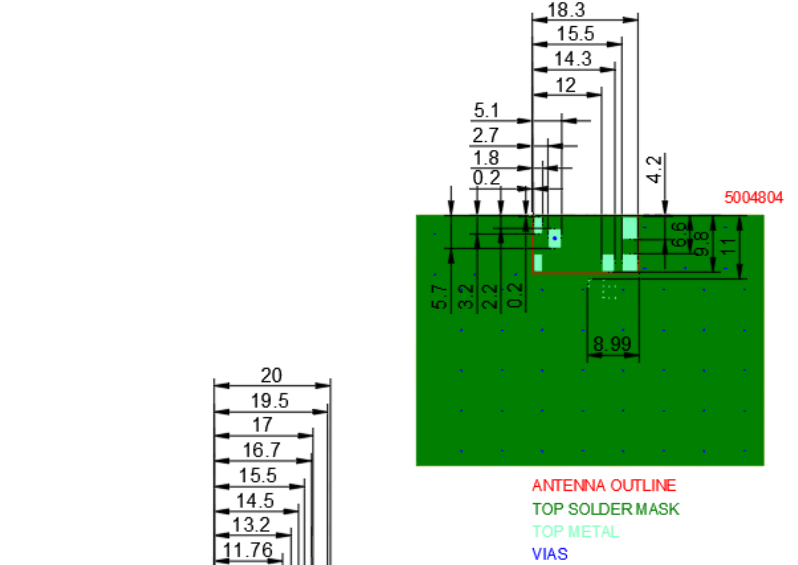
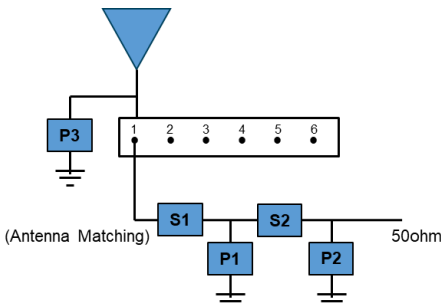
| Pin# | Description |
|------|----------------|
| 1 | Feed |
| 2 | Ground |
| 3 | Dummy Pad |
| 4 | Dummy Pad |
| 5 | Dummy Pad |
| 6 | Antenna Tuning |



Matching Pi Network (Demo Board)

| Component | Value | Tolerance |
|-----------|-------|-----------|
| S1 | 0Ω | N/A |
| P1 | DNI | N/A |
| S2 | 6 pF | ±0.25 pF |
| P2 | 12nH | ±5% |
| P3 | 0.2pF | ±0.05pF |

*Actual matching values depend on customer design



Appendix 1 Wi-SUN / ISM KYOCERA AVX FR4 Embedded SMT Antenna Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Demo Board

| Part Number | A (mm) | B (mm) |
|-------------|--------|--------|
| 5004804-02 | 60 | 100 |

