



AUBURN

UNIVERSITY

RFID LAB

TAGGED CATEGORY PERFORMANCE SPECIFICATION

W6

VERSION 1.1

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1 TEST OVERVIEW

| | |
|-------------------------------------|--|
| Equipment | ARC Benchmarking Equipment Document |
| Test process | ARC Benchmarking Methodology Document |
| Distance between antennas and inlay | Antenna 1: 1.5 meter Antenna 2: 1.5 meter Antenna 3: 1.5 meter Antenna 4: 1.5 meter |
| Test configurations | Single Inlay on Cardstock Multi Inlay Proximity Test with 1.27 cm Spacing Single Inlay between Two Denim Articles Single Inlay on Rubber2 |



2 READ SENSITIVITY

The inlay should meet the following read sensitivity (dBm) requirements in the following test configurations through the frequency range. All of the inlay samples tested should meet the minimum requirements. It is noted that the sensitivity is calculated at the tag by calibrating the measured power at the transmitter with the loss/gain during transmission.



2.1 Standard Test - Single Inlay on Cardstock

Frequency 902 MHz to 928 MHz in steps of 1 MHz

| | | | |
|---------------------|---------------------|---------------------|---------------------|
| Position 0 Ant 1 | Position 0: Ant 2 | Position 0: Ant 3 | Position 0: Ant 4 |
| -13 | -12 | -12.5 | -12.5 |
| Position 30: Ant 1 | Position 30: Ant 2 | Position 30: Ant 3 | Position 30: Ant 4 |
| -11 | -11 | -11 | -11 |
| Position 60: Ant 1 | Position 60: Ant 2 | Position 60: Ant 3 | Position 60: Ant 4 |
| -5 | -5 | -5 | -2 |
| Position 120: Ant 1 | Position 120: Ant 2 | Position 120: Ant 3 | Position 120: Ant 4 |
| -5 | -5 | -5 | -2 |
| Position 150: Ant 1 | Position 150: Ant 2 | Position 150: Ant 3 | Position 150: Ant 4 |
| -11 | -11 | -11 | -11 |
| Position 180: Ant 1 | Position 180: Ant 2 | Position 180: Ant 3 | Position 180: Ant 4 |
| -13 | -12 | -12.5 | -12.5 |
| Position 210: Ant 1 | Position 210: Ant 2 | Position 210: Ant 3 | Position 210: Ant 4 |
| -11 | -11 | -11 | -11 |
| Position 240: Ant 1 | Position 240: Ant 2 | Position 240: Ant 3 | Position 240: Ant 4 |
| -5 | -5 | -5 | -2 |
| Position 300: Ant 1 | Position 300: Ant 2 | Position 300: Ant 3 | Position 300: Ant 4 |
| -5 | -5 | -5 | -2 |
| Position 330 Ant 1 | Position 330: Ant 2 | Position 330: Ant 3 | Position 330: Ant 4 |
| -11 | -11 | -11 | -11 |



2.2 Standard Test - Multi Inlay Proximity Test with 1.27 cm Spacing

Frequency 902 MHz to 928 MHz in steps of 1 MHz

| | | | |
|---------------------|---------------------|--------------------|---------------------|
| Position 0 Ant 1 | Position 0: Ant 2 | Position 0: Ant 3 | Position 0: Ant 4 |
| -4 | -4 | -6 | -1 |
| Position 180: Ant 1 | Position 180: Ant 2 | Position180: Ant 3 | Position 180: Ant 4 |
| -4 | -4 | -6 | -1 |



2.3 Custom Test - Single Inlay between Two Denim Articles

Frequency 902 MHz to 928 MHz in steps of 1 MHz

| | | | |
|---------------------|---------------------|---------------------|---------------------|
| Position 0 Ant 1 | Position 0: Ant 2 | Position 0: Ant 3 | Position 0: Ant 4 |
| -13 | -11.5 | -12 | -11.5 |
| Position 30: Ant 1 | Position 30: Ant 2 | Position 30: Ant 3 | Position 30: Ant 4 |
| -9.5 | -9 | -9 | -9 |
| Position 60: Ant 1 | Position 60: Ant 2 | Position 60: Ant 3 | Position 60: Ant 4 |
| -3.5 | -3 | -3 | NA |
| Position 120: Ant 1 | Position 120: Ant 2 | Position 120: Ant 3 | Position 120: Ant 4 |
| -3.5 | -3 | -3 | NA |
| Position 150: Ant 1 | Position 150: Ant 2 | Position 150: Ant 3 | Position 150: Ant 4 |
| -9.5 | -9 | -9 | -9 |
| Position 180: Ant 1 | Position 180: Ant 2 | Position 180: Ant 3 | Position 180: Ant 4 |
| -13 | -11.5 | -12 | -11.5 |
| Position 210: Ant 1 | Position 210: Ant 2 | Position 210: Ant 3 | Position 210: Ant 4 |
| -9.5 | -9 | -9 | -9 |
| Position 240: Ant 1 | Position 240: Ant 2 | Position 240: Ant 3 | Position 240: Ant 4 |
| -3.5 | -3 | -3 | NA |
| Position 300: Ant 1 | Position 300: Ant 2 | Position 300: Ant 3 | Position 300: Ant 4 |
| -3.5 | -3 | -3 | NA |
| Position 330 Ant 1 | Position 330: Ant 2 | Position 330: Ant 3 | Position 330: Ant 4 |
| -9.5 | -9 | -9 | -9 |



2.4 Standard Test - Single Inlay on Rubber2

Frequency 902 MHz to 928 MHz in steps of 1 MHz

| | | | |
|---------------------|---------------------|---------------------|---------------------|
| Position 0 Ant 1 | Position 0: Ant 2 | Position 0: Ant 3 | Position 0: Ant 4 |
| -8 | -7 | -6 | -6 |
| Position 30: Ant 1 | Position 30: Ant 2 | Position 30: Ant 3 | Position 30: Ant 4 |
| NA | NA | NA | NA |
| Position 60: Ant 1 | Position 60: Ant 2 | Position 60: Ant 3 | Position 60: Ant 4 |
| NA | NA | NA | NA |
| Position 120: Ant 1 | Position 120: Ant 2 | Position 120: Ant 3 | Position 120: Ant 4 |
| NA | NA | NA | NA |
| Position 150: Ant 1 | Position 150: Ant 2 | Position 150: Ant 3 | Position 150: Ant 4 |
| NA | NA | NA | NA |
| Position 180: Ant 1 | Position 180: Ant 2 | Position 180: Ant 3 | Position 180: Ant 4 |
| -8 | -7 | -6 | -6 |
| Position 210: Ant 1 | Position 210: Ant 2 | Position 210: Ant 3 | Position 210: Ant 4 |
| NA | NA | NA | NA |
| Position 240: Ant 1 | Position 240: Ant 2 | Position 240: Ant 3 | Position 240: Ant 4 |
| NA | NA | NA | NA |
| Position 300: Ant 1 | Position 300: Ant 2 | Position 300: Ant 3 | Position 300: Ant 4 |
| NA | NA | NA | NA |
| Position 330 Ant 1 | Position 330: Ant 2 | Position 330: Ant 3 | Position 330: Ant 4 |
| NA | NA | NA | NA |



3. READ BACKSCATTER

The inlay should meet the following read backscatter (dBm) requirements in the following test configurations through the entire frequency range. The backscatter value in this section is the minimum backscatter that should be observed at the corresponding minimum read sensitivity value in section 2. All the tagged item samples tested should meet the minimum requirements. It is noted that the backscatter is calculated at the tag by calibrating the measured power at the receiver with the loss/gain during transmission



3.1 Standard Test - Single Inlay on Cardstock

Frequency 902 MHz to 928 MHz in steps of 1 MHz

| | | | |
|---------------------|---------------------|---------------------|---------------------|
| Position 0 Ant 1 | Position 0: Ant 2 | Position 0: Ant 3 | Position 0: Ant 4 |
| -27 | -28 | -28 | -27 |
| Position 30: Ant 1 | Position 30: Ant 2 | Position 30: Ant 3 | Position 30: Ant 4 |
| NA | NA | NA | NA |
| Position 60: Ant 1 | Position 60: Ant 2 | Position 60: Ant 3 | Position 60: Ant 4 |
| NA | NA | NA | NA |
| Position 120: Ant 1 | Position 120: Ant 2 | Position 120: Ant 3 | Position 120: Ant 4 |
| NA | NA | NA | NA |
| Position 150: Ant 1 | Position 150: Ant 2 | Position 150: Ant 3 | Position 150: Ant 4 |
| NA | NA | NA | NA |
| Position 180: Ant 1 | Position 180: Ant 2 | Position 180: Ant 3 | Position 180: Ant 4 |
| -27 | -28 | -28 | -27 |
| Position 210: Ant 1 | Position 210: Ant 2 | Position 210: Ant 3 | Position 210: Ant 4 |
| NA | NA | NA | NA |
| Position 240: Ant 1 | Position 240: Ant 2 | Position 240: Ant 3 | Position 240: Ant 4 |
| NA | NA | NA | NA |
| Position 300: Ant 1 | Position 300: Ant 2 | Position 300: Ant 3 | Position 300: Ant 4 |
| NA | NA | NA | NA |
| Position 330 Ant 1 | Position 330: Ant 2 | Position 330: Ant 3 | Position 330: Ant 4 |
| NA | NA | NA | NA |



3.2 Custom Test - Single Inlay between Two Denim Articles

Frequency 902 MHz to 928 MHz in steps of 1 MHz

| | | | |
|---------------------|---------------------|---------------------|---------------------|
| Position 0 Ant 1 | Position 0: Ant 2 | Position 0: Ant 3 | Position 0: Ant 4 |
| -25 | -28 | -28 | -26.5 |
| Position 30: Ant 1 | Position 30: Ant 2 | Position 30: Ant 3 | Position 30: Ant 4 |
| NA | NA | NA | NA |
| Position 60: Ant 1 | Position 60: Ant 2 | Position 60: Ant 3 | Position 60: Ant 4 |
| NA | NA | NA | NA |
| Position 120: Ant 1 | Position 120: Ant 2 | Position 120: Ant 3 | Position 120: Ant 4 |
| NA | NA | NA | NA |
| Position 150: Ant 1 | Position 150: Ant 2 | Position 150: Ant 3 | Position 150: Ant 4 |
| NA | NA | NA | NA |
| Position 180: Ant 1 | Position 180: Ant 2 | Position 180: Ant 3 | Position 180: Ant 4 |
| -25 | -28 | -28 | -26.5 |
| Position 210: Ant 1 | Position 210: Ant 2 | Position 210: Ant 3 | Position 210: Ant 4 |
| NA | NA | NA | NA |
| Position 240: Ant 1 | Position 240: Ant 2 | Position 240: Ant 3 | Position 240: Ant 4 |
| NA | NA | NA | NA |
| Position 300: Ant 1 | Position 300: Ant 2 | Position 300: Ant 3 | Position 300: Ant 4 |
| NA | NA | NA | NA |
| Position 330 Ant 1 | Position 330: Ant 2 | Position 330: Ant 3 | Position 330: Ant 4 |
| NA | NA | NA | NA |