



AUBURN

UNIVERSITY

RFID LAB

TAGGED CATEGORY PERFORMANCE SPECIFICATION

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VERSION 1.1

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Contact information:

ARC - RFID Lab
Auburn University
Auburn, AL 36849
arc@rfidlab.org



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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 meter Antenna 2: 1 meter Antenna 3: 1 meter Antenna 4: 1 meter
Test configurations	Single Inlay on Cardstock Multi Inlay Proximity Test with 1.27 cm Spacing Single Inlay on Plastic3 Single Inlay between Rubber2



2 READ SENSITIVITY

The inlay should meet the following read sensitivity (dBm) requirements in the following test configurations through the frequency range. All 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 Single Inlay on Cardstock

Frequency 865 MHz to 868 MHz in steps of 1 MHz

Position 0 Ant 1	Position 0: Ant 2	Position 0: Ant 3	Position 0: Ant 4
-10	-9.5	-9.5	-10
Position 30: Ant 1	Position 30: Ant 2	Position 30: Ant 3	Position 30: Ant 4
-7	-6	-6	-5.5
Position 60: Ant 1	Position 60: Ant 2	Position 60: Ant 3	Position 60: Ant 4
-2	-2	NA	NA
Position 120: Ant 1	Position 120: Ant 2	Position 120: Ant 3	Position 120: Ant 4
-2	-2	NA	NA
Position 150: Ant 1	Position 150: Ant 2	Position 150: Ant 3	Position 150: Ant 4
-7	-6	-6	-5.5
Position 180: Ant 1	Position 180: Ant 2	Position 180: Ant 3	Position 180: Ant 4
-10	-9.5	-9.5	-10
Position 210: Ant 1	Position 210: Ant 2	Position 210: Ant 3	Position 210: Ant 4
-7	-6	-6	-5.5
Position 240: Ant 1	Position 240: Ant 2	Position 240: Ant 3	Position 240: Ant 4
-2	-2	NA	NA
Position 300: Ant 1	Position 300: Ant 2	Position 300: Ant 3	Position 300: Ant 4
-2	-2	NA	NA
Position 330 Ant 1	Position 330: Ant 2	Position 330: Ant 3	Position 330: Ant 4
-7	-6	-6	-5.5



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
-14.5	-13.5	-13.5	-13.5
Position 30: Ant 1	Position 30: Ant 2	Position 30: Ant 3	Position 30: Ant 4
-10	-9	-9	-9
Position 60: Ant 1	Position 60: Ant 2	Position 60: Ant 3	Position 60: Ant 4
-4	-4	NA	NA
Position 120: Ant 1	Position 120: Ant 2	Position 120: Ant 3	Position 120: Ant 4
-4	-4	NA	NA
Position 150: Ant 1	Position 150: Ant 2	Position 150: Ant 3	Position 150: Ant 4
-10	-9	-9	-9
Position 180: Ant 1	Position 180: Ant 2	Position 180: Ant 3	Position 180: Ant 4
-14.5	-13.5	-13.5	-13.5
Position 210: Ant 1	Position 210: Ant 2	Position 210: Ant 3	Position 210: Ant 4
-10	-9	-9	-9
Position 240: Ant 1	Position 240: Ant 2	Position 240: Ant 3	Position 240: Ant 4
-4	-4	NA	NA
Position 300: Ant 1	Position 300: Ant 2	Position 300: Ant 3	Position 300: Ant 4
-4	-4	NA	NA
Position 330 Ant 1	Position 330: Ant 2	Position 330: Ant 3	Position 330: Ant 4
-10	-9	-9	-9



2.2 Multi Inlay Proximity Test with 1.27 cm Spacing

A total of 21 tags in the stack and the center tag in the stack should meet the minimum requirements

Frequency 865 MHz to 868 MHz in steps of 1 MHz

Position 0 Ant 1	Position 0: Ant 2	Position 0: Ant 3	Position 0: Ant 4
1	NA	NA	1
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
1	NA	NA	1
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



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
-2.5	NA	NA	-2.5
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
-2.5	NA	NA	-2.5
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



Frequency 980 MHz

Position 0 Ant 1	Position 0: Ant 2	Position 0: Ant 3	Position 0: Ant 4
-8	NA	NA	-8
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	NA	NA	-8
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



2.3 Single Inlay on Plastic3

Frequency 865 MHz to 868 MHz in steps of 1 MHz

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
-14	-13	-13	-13
Position 30: Ant 1	Position 30: Ant 2	Position 30: Ant 3	Position 30: Ant 4
-10	-10	-10	-10
Position 60: Ant 1	Position 60: Ant 2	Position 60: Ant 3	Position 60: Ant 4
-5	-5	NA	NA
Position 120: Ant 1	Position 120: Ant 2	Position 120: Ant 3	Position 120: Ant 4
-5	-5	NA	NA
Position 150: Ant 1	Position 150: Ant 2	Position 150: Ant 3	Position 150: Ant 4
-10	-10	-10	-10
Position 180: Ant 1	Position 180: Ant 2	Position 180: Ant 3	Position 180: Ant 4
-14	-13	-13	-13
Position 210: Ant 1	Position 210: Ant 2	Position 210: Ant 3	Position 210: Ant 4
-10	-10	-10	-10
Position 240: Ant 1	Position 240: Ant 2	Position 240: Ant 3	Position 240: Ant 4
-5	-5	NA	NA
Position 300: Ant 1	Position 300: Ant 2	Position 300: Ant 3	Position 300: Ant 4
-5	-5	NA	NA
Position 330 Ant 1	Position 330: Ant 2	Position 330: Ant 3	Position 330: Ant 4
-10	-10	-10	-10



2.4 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 the table below is the minimum backscatter that should be observed at the corresponding minimum read sensitivity value in section 3. 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 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
-24	-25	-26	-26
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
-24	-25	-26	-26
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 Single Inlay on Plastic3

Frequency 865 MHz to 868 MHz in steps of 1 MHz

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
-24	-25	-26	-26
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
-24	-25	-26	-26
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