



**Application Note**  
AN1005-01 2013-12-26  
Reading Range



## Notice

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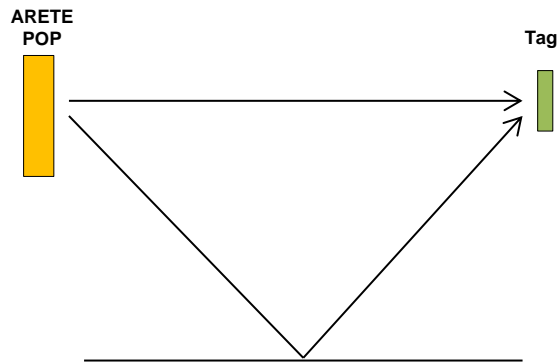
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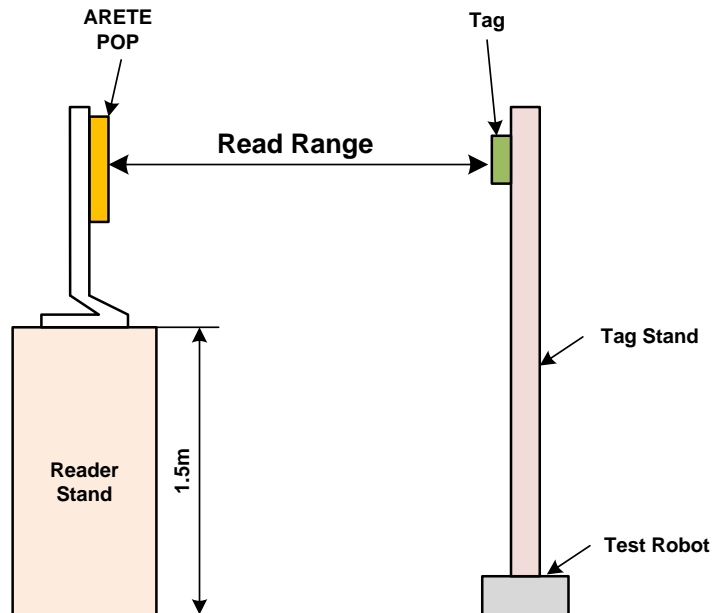
## Revision History

Version	Date	Changes
00	2013-07-23	Initial released
01	2013-12-26	Address changed Revision history added

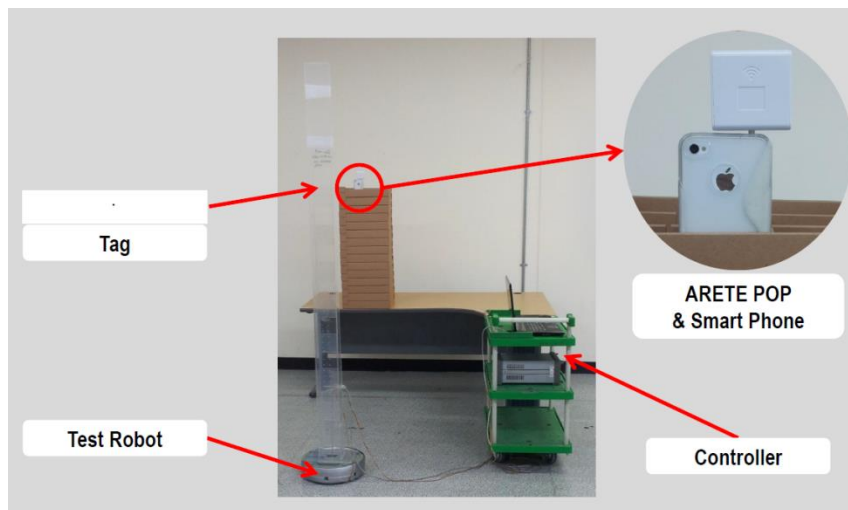
In spite of measuring uncertainty, reading range is one of the most important parameters describing the performance of the RFID system. The RFID system is easily affected by surrounding environment. ARETE POP can read tags up to 1m away in the lab. However, it can't read tags 30 cm away in poor environment such as the factory. This is mainly caused by multipath effect. The radiated power from reader antenna is transmitted to tag. Most of RF signal is directly propagated but some are reflected by floor, metallic object, wall etc. Especially, metallic material reflects RF signal well. Reflected RF signal is amplified when in-phase signal is summed. While, two RF signals 180 degree out-of-phase null each other.



In order to remove multipath effect, radio anechoic chamber can be used when measuring reading range. However, we can not avoid multipath effect in the real world. Thus, PHYCHIPS set up the standard test condition measuring reading range as shown below.






ARETE POP is attached on reader stand. The tag stand is installed on test robot which can move by the controller.

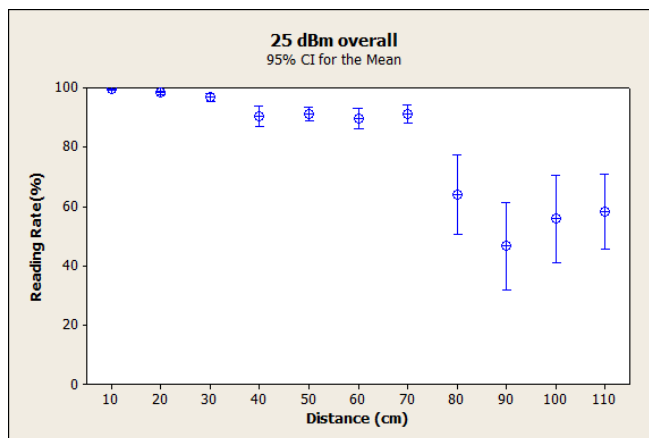
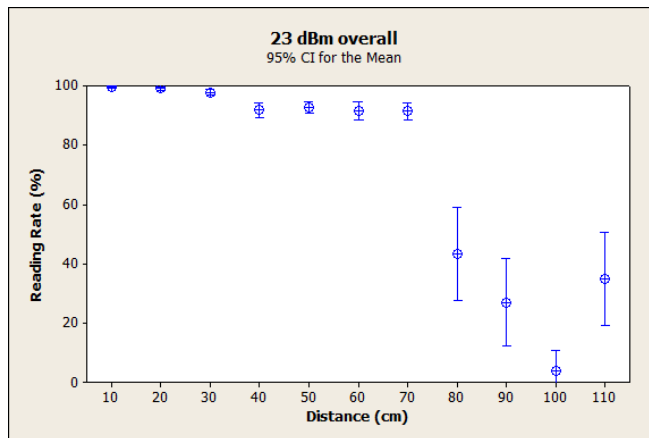
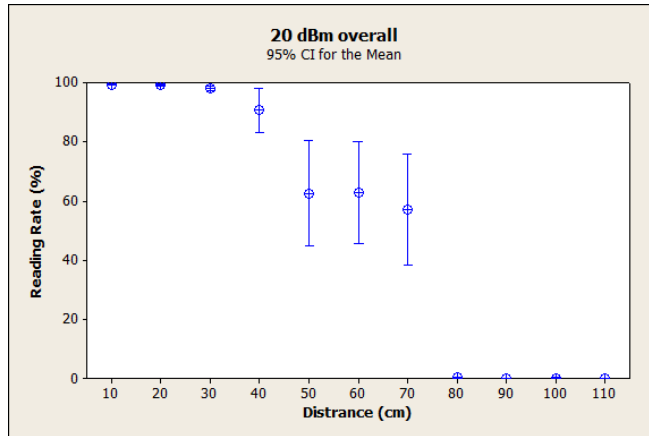


ARETE POP was tested below conditions.

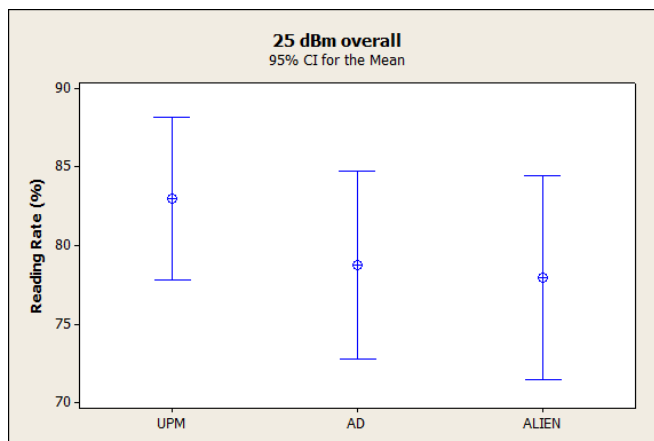
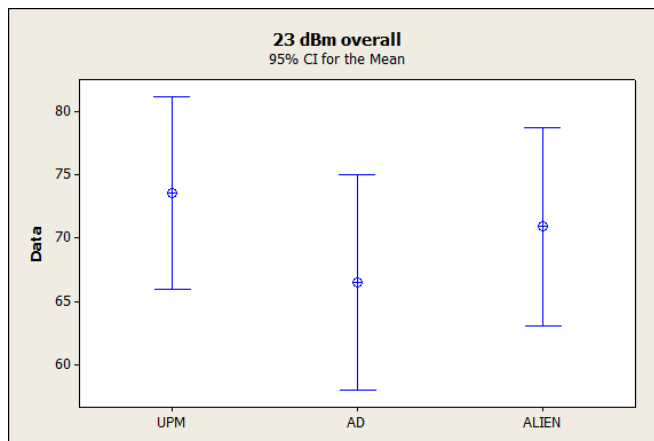
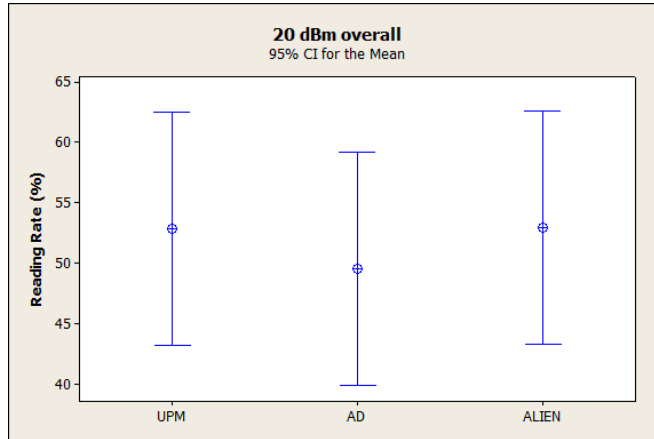
- ✓ 3 times with 3 kind of tags; UPM, AVERY DENNISON, Alien
- ✓ 1 time 100 inventory round.
- ✓ DUT: 3EA (#3,#4,#5)
- ✓ Reading Criteria: above 20%.
- ✓ Frequency at 921.8 MHz

Manufacturer	Product	Chipset	Tag Image
UPM	ShortDipole	Impinj Monza 4	
AVERY DENNISON	AD-226	NXP G2i	
Alien	ALN-9740	Higgs 4	

ARETE POP can read a tag up to 1m away at 25 dBm output power while only 70 cm at 20 dBm output power. Circles represent the mean of reading rate and bars represent 95% confidence interval in the figure below.



Tag-to-tag variance is shown in the figure below. Considering test results, UPM and ALIEN tag shows good performance. Circles represent the mean of reading rate and bars represent 95% confidence interval in the figure below.





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