

# Test Report

*Electromagnetic Compatibility (EMC)*



Equipment Under Test: reader

Type: instalink

Manufacturer: Mirion Technologies (RADOS) Oy  
PL 506  
20101 TURKU

Customer: Mirion Technologies (RADOS) Oy  
PL 506  
20101 TURKU

## The Equipment Under Test Complies With Following Requirements

FCC CFR 47 Part 15 (October 2014)	Subpart B	Class B
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Date: 22 December 2014

Issued by:

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Testing Engineer

Date: 29 December 2014

Checked by:

Janne Nyman  
Compliance Specialist

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## Equipment Under Test (EUT)

### reader

Type: instalink  
Serial no: -

## Type of the EUT

The EUT will be tested as a tabletop unit.

## Power requirements

Rated voltage: 5.0V DC (USB)  
Rated current: -  
Rated frequency: -  
Rated power: -

## Cable lengths and types

Cable:	Length:	Type:
data/power	0.75	USB, shielded
mouse	1.8	USB, shielded
headset	1.05	audio, unshielded
LAN	2.0	LAN, unshielded

## Peripherals

Computer, model: Dell Latitude 6430  
Mouse, model: IBM MO09BO  
headset, model: HS-125  
LAN-board, model: 3com EtherLink III

**Disclaimer**

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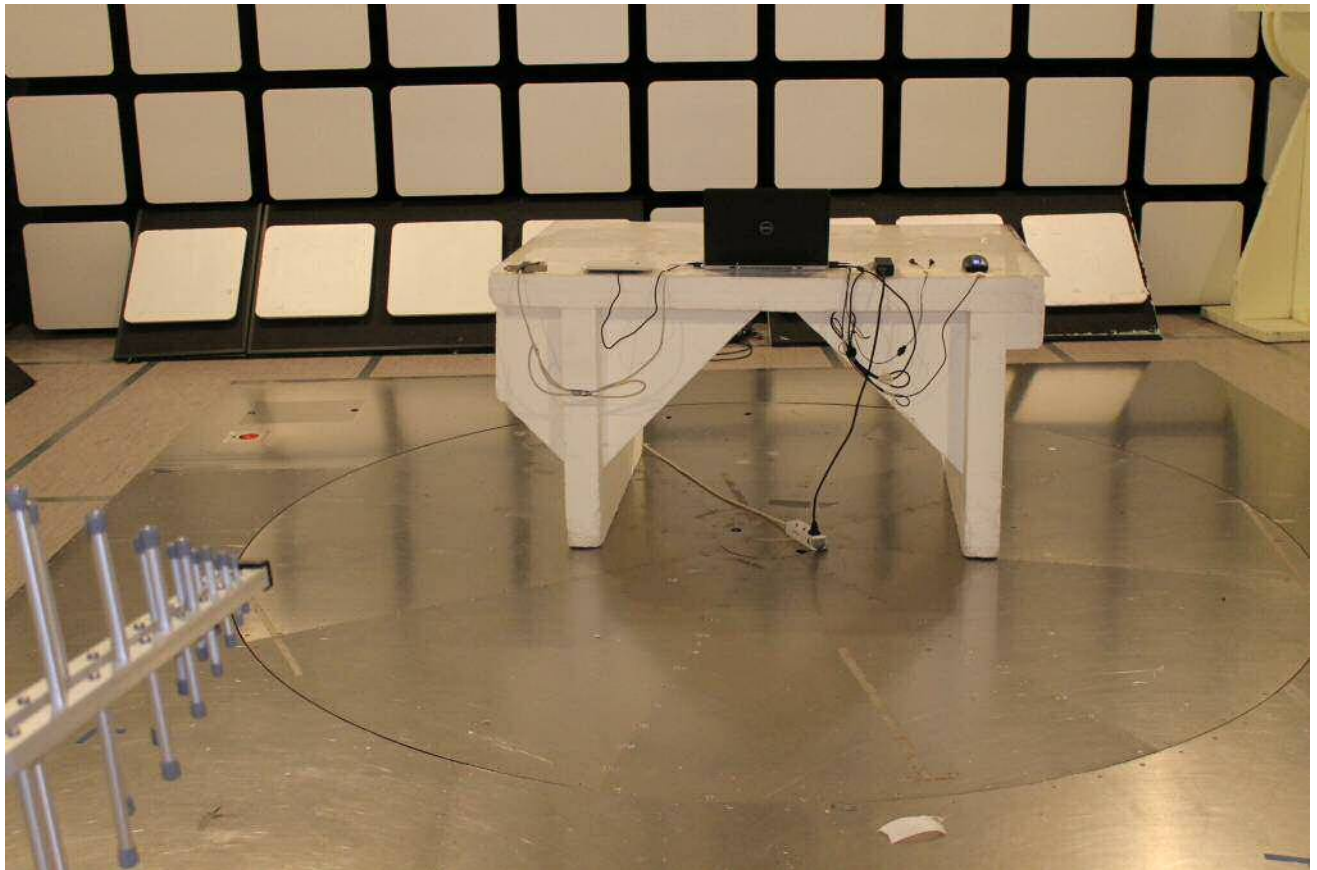
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*Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. This document cannot be reproduced except in full, without prior approval of the Company.*

## **EUT Test Conditions During EMC-Testing**

The EUT was connected to a computer. The computer was set to transfer data between EUT and computer via USB.

## **Photographs of the EUT**



**Picture 1** The EUT and test set-up for radiated emission test.

## SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.107	Radiated Emissions	PASS

## Test Facility

<input type="checkbox"/>	Testing Location / address: FCC registration number: <b>90598</b>	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
<input checked="" type="checkbox"/>	Testing Location / address: FCC registration number: <b>178986</b> Industry Canada registration number: <b>8708A-2</b>	SGS Fimko Ltd Karakaarenkuja 4 FI-02610, ESPOO FINLAND

## Radiated Emissions In The Frequency Range 30 MHz - 3000 MHz.

<b>Standard:</b>	ANSI C63.4 (2009)	
<b>Tested by:</b>	PKA	
<b>Date:</b>	18.12.2014	
<b>Humidity:</b>	30 – 60 %	
<b>Temperature:</b>	22 ± 3 °C	
<b>Barometric pressure</b>	860 – 1 060 mbar	
<b>Measurement uncertainty</b>	± 5.1 dB (30 – 200 MHz) ± 4.2 dB (200 – 1 000 MHz) ± 3.7 dB (1 – 18 GHz)	Level of confidence 95 % (k = 2).

### Test plan

The radiated emission measurements were done within a semi anechoic screened chamber. Additional floor absorbers were used on the floor between the EUT and receiving antenna in radiated emission test above 1 GHz. The EUT was placed on a table 0.8 m above the reflecting ground plane. The measurement distance was 3 meters for the frequencies below 1 GHz and 3 for the frequencies above 1 GHz. The worst interferences were determined during measurements by rotating the turntable and adjusting the antenna height. The measurements were done in horizontal and vertical antenna polarizations. The supply voltage to the turntable was fed through the filter.

### Radiated measurement settings

30-1000MHz

#### Preliminary testing:

Turntable movement: 20 ° step  
Turntable position: 10 ° to 350°  
Antenna movement: 1.5 m step  
Antenna height: 1.0 m to 4.0 m  
Antenna polarization: Vertical and horizontal

#### Final testing:

Turntable movement: Continuous  
Turntable position: ± 15 °  
Antenna movement: Continuous  
Antenna height: ± 0.75 m  
Antenna polarization: Vertical and horizontal

1000-3000MHz

#### Preliminary testing:

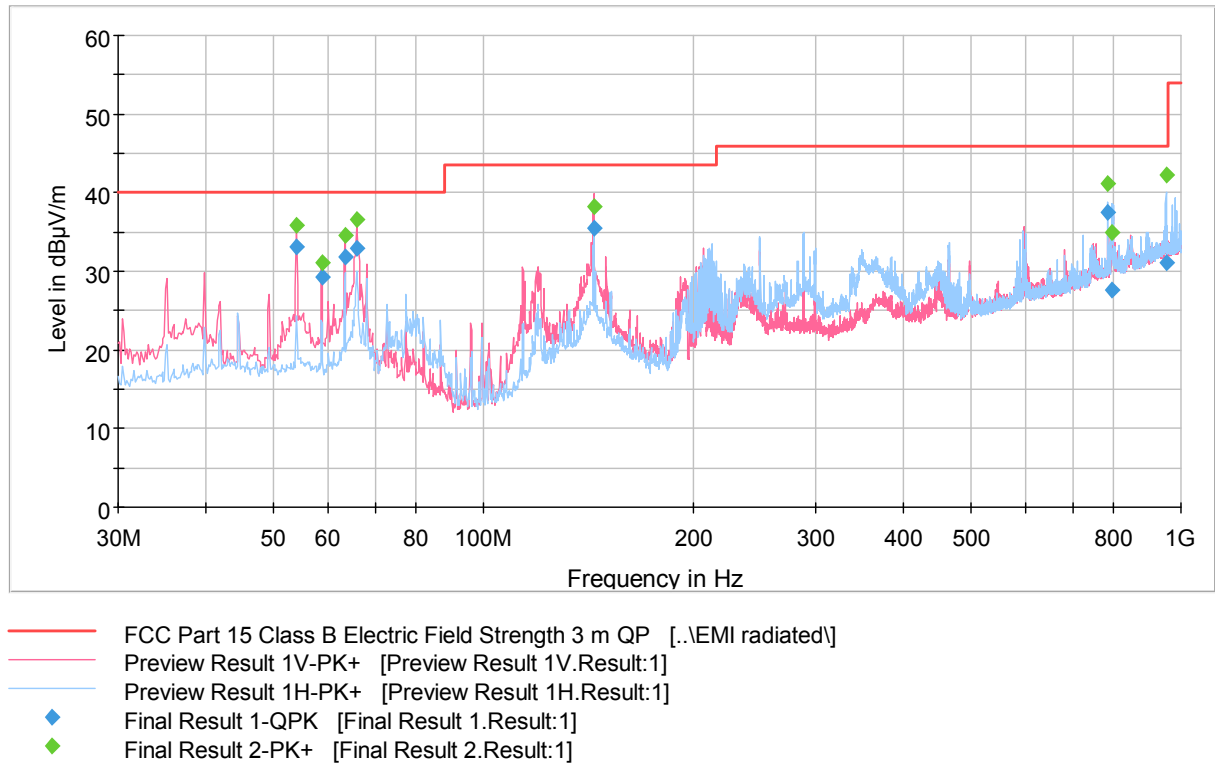
Turntable movement: 15 ° step  
Turntable position: 0 ° to 345°  
Antenna movement: 1.0 m step  
Antenna height: 1.0 m to 4.0 m  
Antenna polarization: Vertical and horizontal

#### Final testing:

Turntable movement: Continuous  
Turntable position: ± 15 °  
Antenna movement: Continuous  
Antenna height: ± 0.75 m  
Antenna polarization: Vertical and horizontal

## Measured Quasi-Peak Values In The Frequency Range 30 MHz - 1000 MHz.

Radiated Emission FCC Part 15 Class B 30-1000MHz 3m



**Figure 1** Measured curve with peak-detector. Final results 2-PK only for information

## Final measurements from the worst frequencies

**Table 1** Final quasi-peak measurement from the worst frequencies

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
54.105000	33.2	1000.0	120.000	100.0	V	107.0	15.1	6.8	40.0
58.795000	29.2	1000.0	120.000	100.0	V	122.0	14.9	10.8	40.0
63.495000	31.8	1000.0	120.000	100.0	V	143.0	14.3	8.2	40.0
65.935000	33.0	1000.0	120.000	100.0	V	187.0	13.9	7.0	40.0
144.175000	35.4	1000.0	120.000	100.0	V	131.0	14.5	8.1	43.5
785.445000	37.6	1000.0	120.000	100.0	H	343.0	25.8	8.4	46.0
795.645000	27.6	1000.0	120.000	100.0	H	111.0	25.9	18.4	46.0
951.455000	31.1	1000.0	120.000	100.0	H	211.0	28.3	14.9	46.0

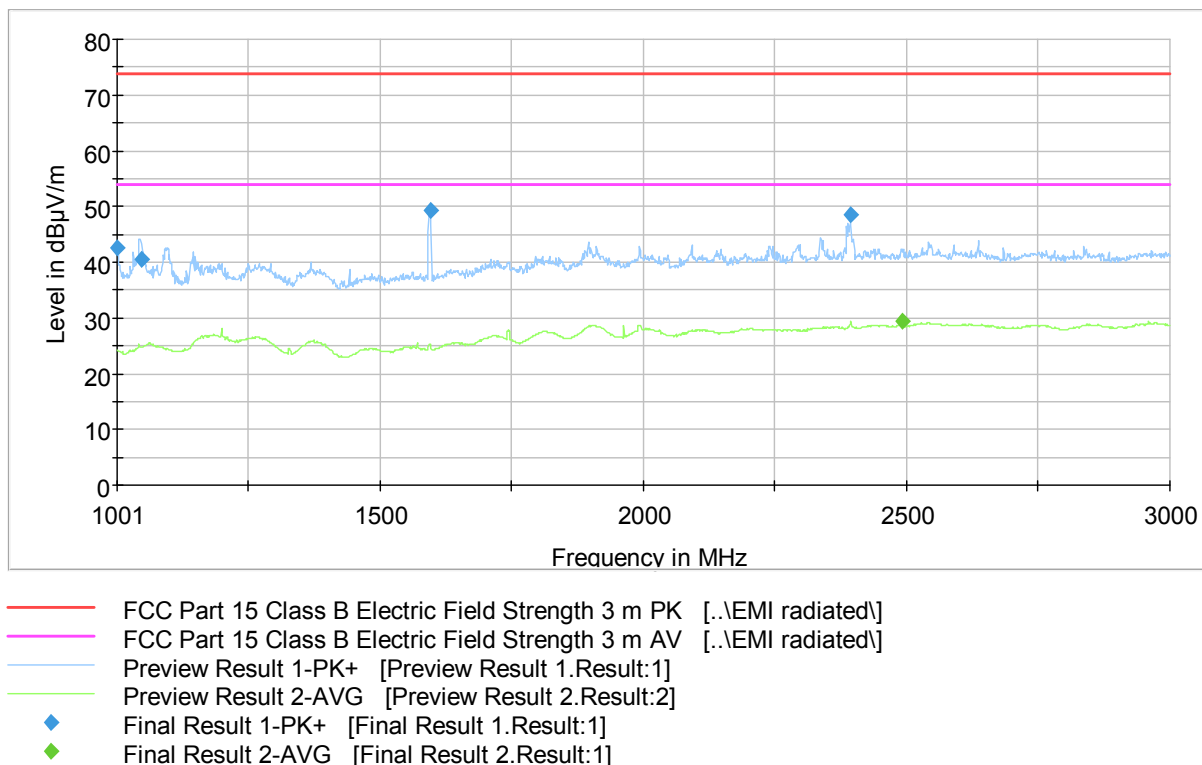
Correction factor (dB) in the final result tables contains the sum of the transducers (antenna + amplifier + cables).

QuasiPeak values are measured values corrected with the correction factor.



## Measured Quasi-Peak Values In The Frequency Range 1000 MHz - 3000 MHz.

Radiated Emission FCC Part 15 Class B 1-18GHz 3m



**Figure 2** Measured curve with peak and average detectors.

## Final measurements from the worst frequencies

**Table 2** Final peak measurement from the worst frequencies

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1002.200000	42.5	1000.0	1000.000	130.0	V	345.0	-4.3	31.4	73.9
1048.775000	40.6	1000.0	1000.000	172.0	H	181.0	-4.9	33.3	73.9
1596.525000	49.3	1000.0	1000.000	130.0	V	99.0	-2.2	24.6	73.9
2393.175000	48.6	1000.0	1000.000	239.0	V	241.0	3.9	25.3	73.9

**Table 3** Final average measurement from the worst frequencies

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2491.175000	29.4	1000.0	1000.000	100.0	V	3.0	4.3	24.5	53.9

Correction factor (dB) in the final result tables contains the sum of the transducers (antenna + amplifier + cables).

QuasiPeak values are measured values corrected with the correction factor.

## TEST EQUIPMENT

Manufacturer	Type	Serial no	Cal. date	Cal. due
<b>ROHDE &amp; SCHWARZ</b>				
EMI Test receiver	ESU 26	100185	24.09.2014	24.09.2015
Test software	EMC32	Ver. 8.30.0	-	-
LISN	ESH2-Z5	863794/014	15.10.2014	15.10.2015
Transient limiter	ESH3-Z2	#1	24.10.2014	24.10.2015
<b>DAVIS</b>				
Weather station	Vantage Pro	A10808A03	09.04.2014	09.04.2015
<b>EMCO</b>				
Antenna (1 - 18 GHz)	3117	29617	23.04.2013	23.04.2015
<b>SCHWARZBECK</b>				
Antenna (30 MHz - 1 GHz)	VULB9168	9168-503	28.08.2013	28.02.2015
<b>HEWLETT - PACKARD</b>				
Microwave amplifier	83017A	3950M00102	15.08.2014	15.08.2015
<b>DEISEL</b>				
Antenna mast	MA 240 T	240/394/96	-	-
Tilt option	KE 220	220/307/96	-	-
Controller	HD 100	100/413/96	-	-
Turntable	DS 420	420/420/96	-	-
<b>CALIFORNIA INSTRUMENTS</b>				
Power Supply	5001 iX Series II	58209	-	-