

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
--------------------------------------	-----------	---------

Date: 22 December 2014

Issued by:



Pekka Kälviäinen
Testing Engineer

Date: 29 December 2014

Checked by:



Janne Nyman
Compliance Specialist

Table of Contents

PRODUCT DESCRIPTION	3
Equipment Under Test (EUT)	3
Type of the EUT	3
Power requirements	3
Cable lengths and types	3
Peripherals	3
GENERAL REMARKS	4
Disclaimer	4
TEST CONDITIONS	5
EUT Test Conditions During EMC-Testing	5
Photographs of the EUT	5
SUMMARY OF TESTING	6
EMISSION TEST RESULTS	7
Radiated Emissions In The Frequency Range 30 MHz - 3000 MHz.	7
TEST EQUIPMENT	10

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

This document is issued by the Company under its General Conditions of service accessible at http://www.sgs.com/terms_and_conditions.htm. attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

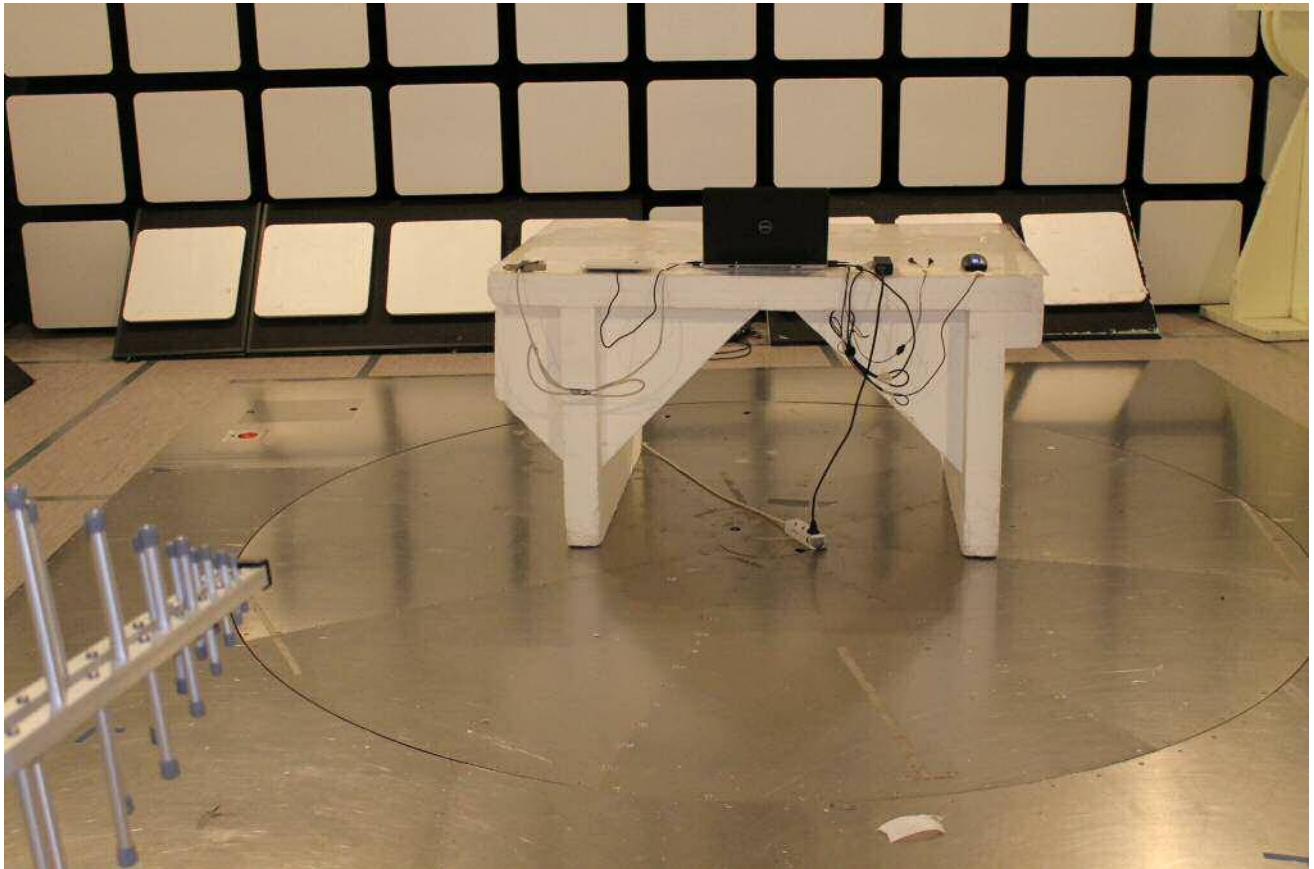
Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

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

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

Standard:	ANSI C63.4 (2009)
Tested by:	PKA
Date:	18.12.2014
Humidity:	30 – 60 %
Temperature:	22 ± 3 °C
Barometric pressure	860 – 1 060 mbar
Measurement uncertainty	± 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:**

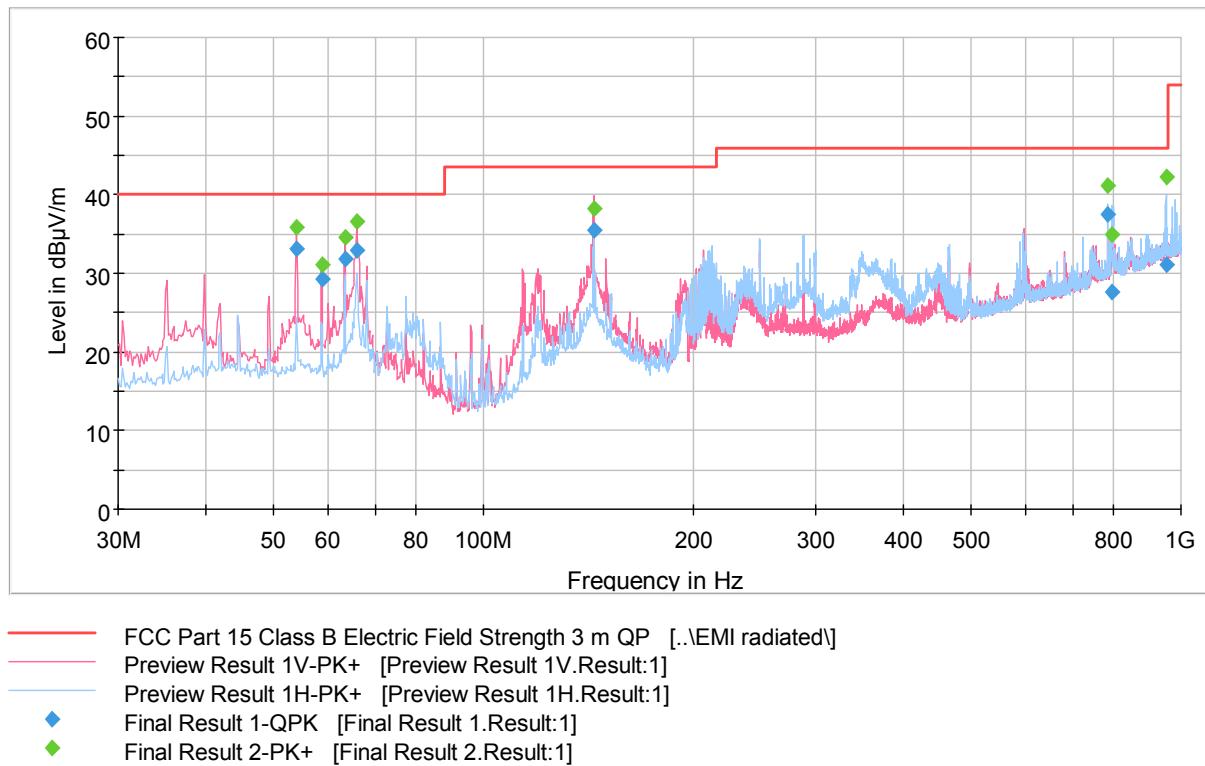
Turntable movement: 15 ° step
Turntable position: 0 ° to 345°
Antenna movement: 1.0 m step
Antenna height: 1.0 m to 4.0 m
Antenna polarization: Vertical and horizontal

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

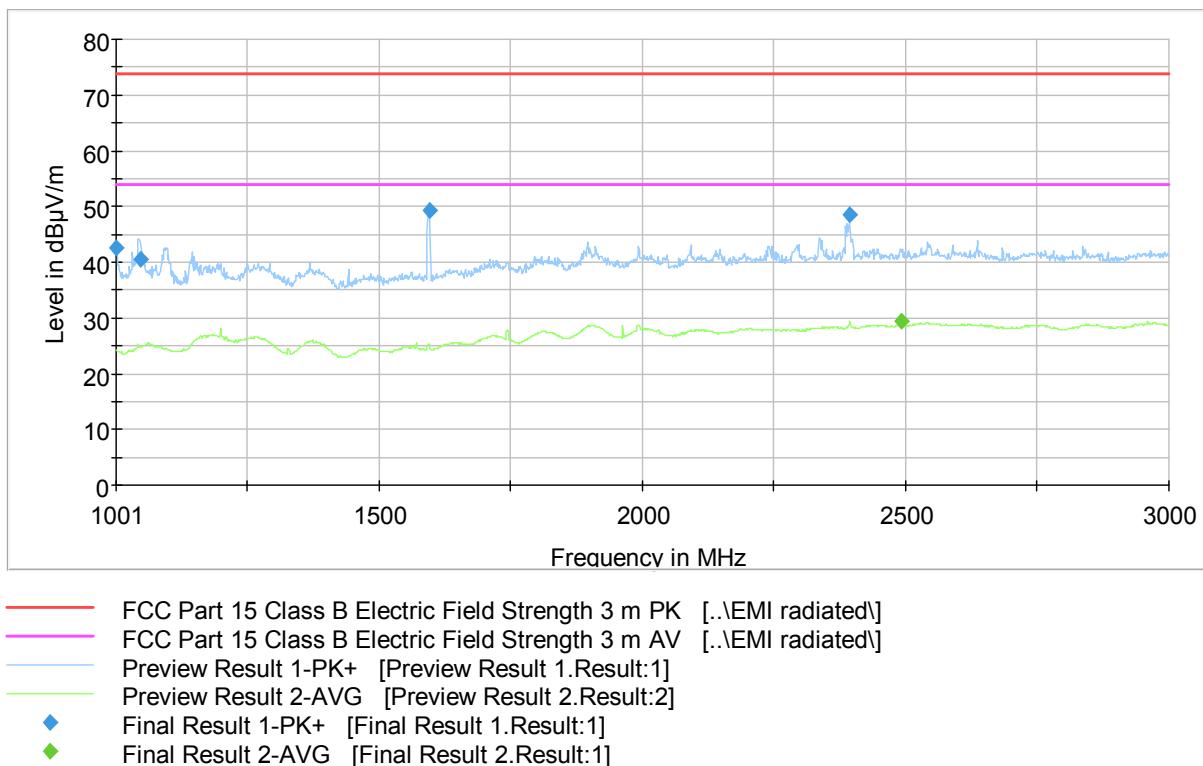
Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
54.105000	33.2	1000.0	120.000	100.0	V	107.0	15.1	6.8	40.0
58.795000	29.2	1000.0	120.000	100.0	V	122.0	14.9	10.8	40.0
63.495000	31.8	1000.0	120.000	100.0	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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/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
ROHDE & SCHWARZ				
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
DAVIS				
Weather station	Vantage Pro	A10808A03	09.04.2014	09.04.2015
EMCO				
Antenna (1 - 18 GHz)	3117	29617	23.04.2013	23.04.2015
SCHWARZBECK				
Antenna (30 MHz - 1 GHz)	VULB9168	9168-503	28.08.2013	28.02.2015
HEWLETT- PACKARD				
Microwave amplifier	83017A	3950M00102	15.08.2014	15.08.2015
DEISEL				
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	-	-
CALIFORNIA INSTRUMENTS				
Power Supply	5001 iX Series II	58209	-	-