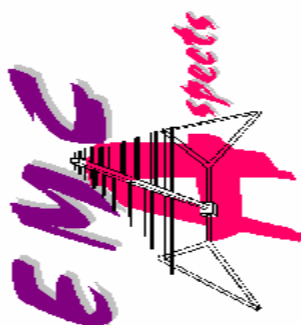


OC Light 1200 45 phosfect Test Report 2180202



All Possible Tests	Tests Completed
Conducted Mains	Fully
Conducted Load Terminals	NA
Conducted Control Line	NA
Radiated Loop	NA
Radiated to 300MHz	Fully



EMC Aspects Pty Ltd. Electromagnetic Compatibility Conformance Tests for r.f.i. emission from phosfect OC Light 1200 45 Sensor Dimmable Luminaire

The results presented in this Test Report No. 2180202 are generally in accordance with IEC CISPR 15 Edition 8.2,

EN55015:2016 as well as Australian Standard **CISPR 15:2017** "Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment", except that the spectrum analyser used does not fully conform to CISPR 16-1 see details within.

When testing was completed on March 18th 2018 for Tony Simons of phosfect, Suite 11 / 20 Narabang Way, Belrose, NSW 2085 Australia, the model **Complied**.

Measurements on the luminaire indicated a pass by 15.2 dB below the Quasi-peak and by 16.6 dB below the Average line mains conducted limits. The radiated disturbance in the frequency range 30 MHz to 300 MHz, at the worst case was 13.6 dB below the quasi-peak limit.

Uncertainty of measurement ± 4 dB conducted and ± 6 dB radiated at 95% confidence level.

Report Issued

19th March 2018

by _____

David Ford Authorised Signatory

Description of Equipment Under Test (EUT)

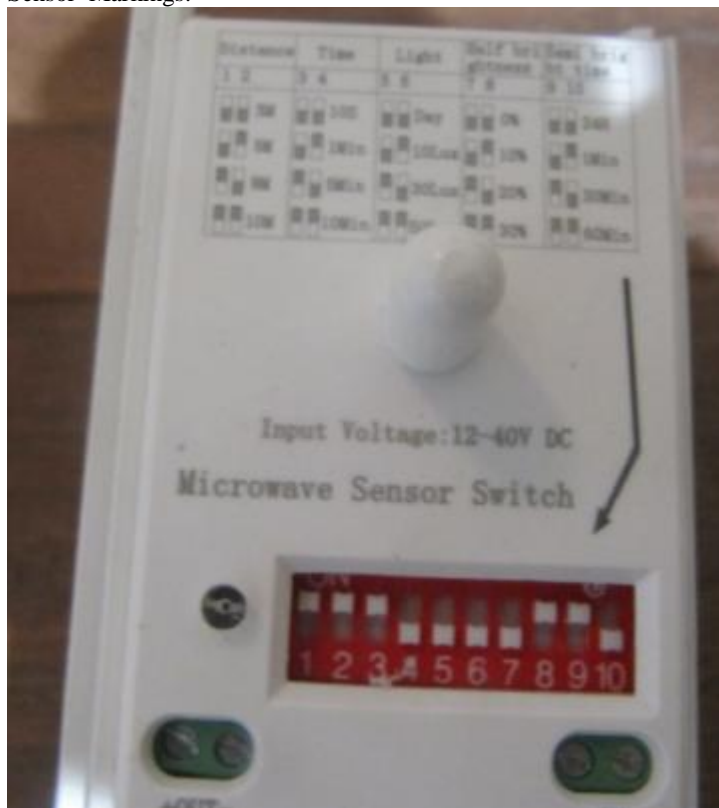
Fixed Class I LED Sensor Dimmable batten style luminaire Model Number OC Light 1200 45. A metal extrusion body with end plates and plastic diffuser encloses a constant voltage Power Supply powering the downward facing LED array strip glues to a metal gear tray through a microwave sensor. The adjustable sensor switch reduces the voltage to the LEDs allowing the luminaire to dim down to 6W when no activity occurs but come back to 45W with movement. Supply is via three core tails or plug and cord direct to earthed frame and supply terminals of the Power Supply.

Luminaire Markings: Nil

Power Supply markings:



Sensor Markings:



Test Conditions

Tests were performed at EMC Aspects, Turrumurra laboratory. All tests were conducted in a shielded room at a temperature of 32°C, a relative humidity 65% and barometric pressure of 997 hPa.

Test Equipment used and Laboratory Intercomparisons

	Make	Model	Serial No	Lab ID.	Test Used
<u>Intercompared Eqmt.</u>					
Spectrum Analyser	Advantest	R3261D	31720169	962	1 to 8
LISN (AMN).	Chase	MN2050B	1163	963	1 & 2
Transient Limiter	Chase	Within	LISN		1 & 2
Attenuator	Huber & Suhner	6810.17.A		10dB	1 & 2
Coaxial Cable	Radiall	N-BNC	1.5 meter	1.5	1 to 8
ISN	Schwarzbeck	NTFM 8136	8136139	271	4 & 5
Loop Antenna	DGH Aust	2 meter	UniLobal	982	-
Coaxial Cable	Radiall	N-BNC	5.13meter	5.13	-
Attenuator	Radiall	R412.406.124	A13.31	6dB	8
300MHz CD-N	Teseq	CDNE M310	32961	120	8
<u>Used in Assistance</u>					
Laptop Computer	Compaq	Presario 500	T54864T	271	1 to 8
Computer Software	Teseq	EMIPAK3	Version 4		1 to 8
Interface & Cable	N. I.	IEEE	PCMCIA	Card	1 to 8
Signal Generator	Marconi	2030	119354/001	AO1615	Cal
Line Regulator	Ferguson	ACV133/4	143	251	1 to 8
Variable transformer	AE	15D-1P	696/9578	964	1 to 8
Power Meter	Yokagawa	250901	51AH1051	965	1 to 8

The equipment used to collect measurements for this report including the correction factors used in the software was last intercompared using Test Report 2130203 to EMC Technologies NATA report T131216 in December 2013. The Spectrum Analyser was calibrated in December 2007 and matched the Signal Generator calibrated in 2012 within 0.5dB at all critical frequencies.

Tests Performed

AS/NZS CISPR 15:2011 Clause 5.2.4 Table 2a, 8.1.1, 8.1.4.1 & 8.2

Test 1&2 Mains Terminals Disturbance Voltage 9kHz to 30MHz

The luminaire was measured with full light output and with minimum light output as specified in the standard Artificial Mains Network (AMN) or (LISN) of 50 Ω /50 μ H construction, was used as the interference coupling device. The unit is calibrated three monthly using the Marconi Signal Generator and correction factors determined. The AMN incorporates a transient limiter with 10dB attenuation which was switched on. These combined spectral correction values were used to adjust voltage values measured. The AMN was supplied with Australian Rated Voltage (240 VAC) from the line conditioner and variable transformer (50Hz) and passed this on to the Equipment Under Test (EUT). The luminaire was measured with full light output and with minimum light output as specified in clause 8.1.4 of CISPR 15.

The EUT was positioned on a wooden table 0.4 m above the shielded room floor (Ground Plane) and 0.8m from the metallic wall. A three core supply flexible cord was attached to the supply terminal block such that the overall distance from EUT to AMN was 0.8m. Mains borne interference from the EUT is switched from either Active Line or Neutral Line to the AMN receiver output. Coaxial Cable of length 1.5 meters with characteristic 50 Ω construction, transfers the interference voltage to the Spectrum Analyser. External calibrations have shown it complies with CISPR 16-1 down to 10Hz pulse repetition rate at all frequencies provided care is taken to maintain measurements within its dynamic range. Not being fully compliant it is important to study the nature of the interference from the EUT and assess the measurement capability. Manual measurements were taken with the spectrum analyzer in zero scan mode to validate computer software operation and data obtained.

A laptop computer running "Teseq" software was used with a IEEE PCMCIA card and cable to control the functions and running of the analyser. It scans the analyser across the spectrum, collects the peak readings at each frequency, corrects them and displays them as shown in the graphs within this report. It makes an automatic selection of critical frequencies then the operator manually adds other interested frequencies or deletes unnecessary frequencies or known extraneous sources. This results in a frequency list which is then re-measured in zero span mode with manual analyser operation. This helps find the exact frequency which maximises interference and allows accurate Quasi-peak and Average readings to be collected. The frequency lists show limit values and a comparison of the result to these values expressed as a margin. Results that are -ve by more than the expressed uncertainty comply. There is doubt about margins within the expressed uncertainty but any +ve margin is expressed as a failure. The worst case, lowest margin, frequency list is superimposed onto the result graph as dots. Graphs also show limit lines as specified in AS/NZS CISPR 15 to give a fast visual presentation.

The nature of interference of the worst results is also studied with Spectrum Analyzer run manually. This is set in zero span mode peak detection to determine frequency of r.f.i. pulses, see results. Then the Quasi-peak and average detectors are introduced to verify computer collected results.

The overall setup for Test 1 is shown in the photograph for Conducted Setup.

Test 3 Load Terminals Disturbance Voltage 150kHz to 30MHz

AS/NZS CISPR 15:2011 Clause 5.2.4 Table 2b not called up. Not Applicable.

Test 4&5 Control Terminals Disturbance Voltage 150kHz to 30MHz

AS/NZS CISPR 15:2011 Clause 5.2.4 clause 4.3.3 and Table 2c called up but Not Applicable as no connections.

AS/NZS CISPR 15:2006 Clause 5.2.4 Table 3

Test 6&7 Radiated Electromagnetic Disturbance, magnetic field strength 9kHz to 30MHz

AS/NZS CISPR 15:2011 Clause 5.2.4 clause 4.3.3 and Table 3a called up but Not Applicable as LEDs are supplied with DC (less than 100Hz).

Test 8 Radiated Disturbance, 30MHz to 300MHz by alternate method *Annex B*

The tests, calibrations or measurements covered by this document have been performed to the requirements of AS ISO/IEC 17025-2005, and are traceable to Australian national or other national standards of measurement. This document shall only be reproduced in full unless otherwise approved by EMC Aspect Pty Ltd, At EMC HOUSE, 11 Terrigal Ave, Turrumurra N.S.W. 2074 AUSTRALIA.

AS/NZS CISPR 15:2011 Clause 5.2.4 Table 3b called up. A coupling decoupling network (CDN) in accordance with impedance parameters as described in clause B2 is used as the interference coupling device. The unit constructed by "Teseq" Model No CDNE M310, was supplied with its individual correction factors. These spectral correction values were used to adjust voltage values at the computer, the unit has a nominal 9.5dB designed insertion loss and is used with a 6 dB external attenuator.

Coaxial Cable of length 1.5 meters with characteristic $50\ \Omega$ construction, transfers the interference voltage from the 6 db attenuator to the Spectrum Analyser. The Advantest Model R3261D ID No. 962 Spectrum Analyser was used to detect the spectral voltages. Its calibration and limitations are discussed in "Test 1".

An AMN was supplied with Australian Rated Voltage (240 VAC) from the line conditioner and variable transformer (50Hz) and passed this on to the input terminals (AE) of the CDN. The CDN, well earthed to the ground plane, then passed this to the Equipment Under Test (EUT). The EUT is positioned on wooden blocks 0.1 m above the ground plane. A Specially prepared lead 0.2 m in length with gold plated banana plugs connected the CDN to the supply opening of the EUT, this being on a wooden support so it remains 0.04 m above the ground plane.

A laptop computer running "Teseq" software was used with a IEEE PCMCIA card and cable to control the functions and running of the analyser. It scans the analyser across the spectrum, collects the peak readings at each frequency, corrects them and displays them as shown in the graphs within this report. It makes an automatic selection of critical frequencies then the operator manually adds other interested frequencies or deletes unnecessary frequencies or known extraneous sources. This results in a frequency list which is then re-measured in zero span mode with manual analyser operation. This helps find the exact frequency which maximises interference and allows accurate Quasi-peak readings to be collected. The frequency lists show limit values and a comparison of the result to these values expressed as a margin. Results that are -ve by more than the expressed uncertainty comply. There is doubt about margins within the expressed uncertainty but any +ve margin is expressed as a failure. The worst case, lowest margin, frequency list is superimposed onto the result graph as dots. Graphs also show limit lines as specified in AS/NZS CISPR 15 to give a fast visual presentation.

The nature of interference of the worst results is also studied with Spectrum Analyzer run manually. This is set in zero span mode peak detection to give a time domain view at important frequencies listed to determine frequency of r.f.i. pulses, see results. Then the Quasi-peak detector is introduced to verify computer collected results.

Results

The interference was found to consist of a 100Hz semi-wave at 35 to 55 kHz falling to a lower trapezoid wave above 150kHz but varying in intensity at different frequencies. This was evident at the many conducted frequencies checked. As the noise is of similar magnitude and close together in time the test analyzer used is suitable for the measurement. See CISPR/A/764/CD concerning use of Quasi-peak detectors in Spectrum Analyzers without pre-selection. Proposed annex E to CISPR 16-2-1 indicates that if pulse repetition frequencies are 20Hz or greater then if there is less than 5dB difference between peak and Quasi-peak (9-150kHz) the analyser is suitable. If there is less than 12.5dB difference between peak and Quasi-peak (150kHz-30MHz) the analyser is suitable. This is verified in this report.

The supply terminal test measurements on phosfect Model OC Light 1200 45 at the worst case was 15.18 dB below the quasi-peak limit at full output and 16.22 dB below the quasi-peak limit at minimum output.

The model was 21.28 dB below the average limit at full output and 16.63 dB below the average limit at minimum output

The radiated disturbance in the frequency range 30 MHz to 300 MHz , at the worst case was 13.57 dB below the quasi-peak limit. The test was performed using method in Annex B. Only broadband noise was detected.

See Following Result pages for details and final Photopage.

Active Peak Scan and Conducted Quasi-peak Values, Full Output

EMC Aspects Report

Manufacturer or Submitter Name

Phosfect

Type of Equipment

Sensor Dimmable Luminaire

Serial or Model Number

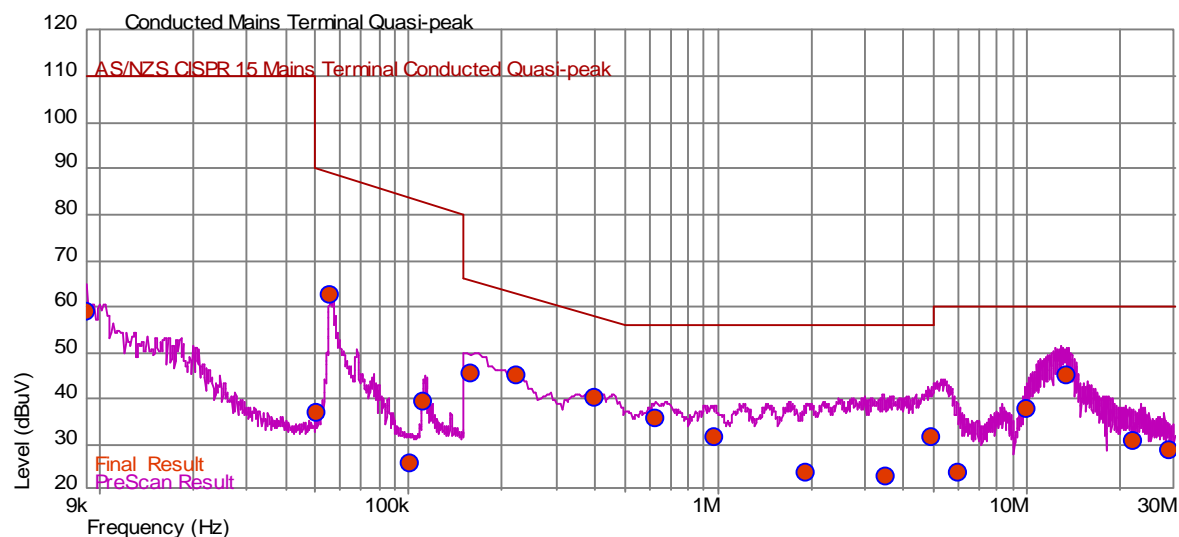
OC Light 1200 45

Date & Tester

15/03/18 David

Test Report Number & Time

2180202 3pm



Final Result

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
9.0 k	58.72	110.00	-51.28
50.1 k	36.95	89.98	-53.03
55.33 k	62.32	89.08	-26.76
100.5 k	26.01	83.65	-57.63
111.05 k	39.45	82.74	-43.28
160.0 k	45.59	65.46	-19.87
222.0 k	45.01	62.74	-17.74
402.0 k	40.24	57.81	-17.57
631.5 k	35.70	56.00	-20.30
973.5 k	31.52	56.00	-24.48
1.932 M	23.95	56.00	-32.05
3.5 M	23.10	56.00	-32.91
4.888 M	31.73	56.00	-24.27
6.0 M	23.79	60.00	-36.21
10.0 M	37.57	60.00	-22.43
13.424 M	44.82	60.00	-15.18
22.0 M	30.92	60.00	-29.08
29.0 M	28.90	60.00	-31.10

Average Pre Scan and Conducted Average Values, Full Output

EMC Aspects Report

Manufacturer or Submitter Name

Phosfect

Type of Equipment

Sensor Dimmable Luminaire

Serial or Model Number

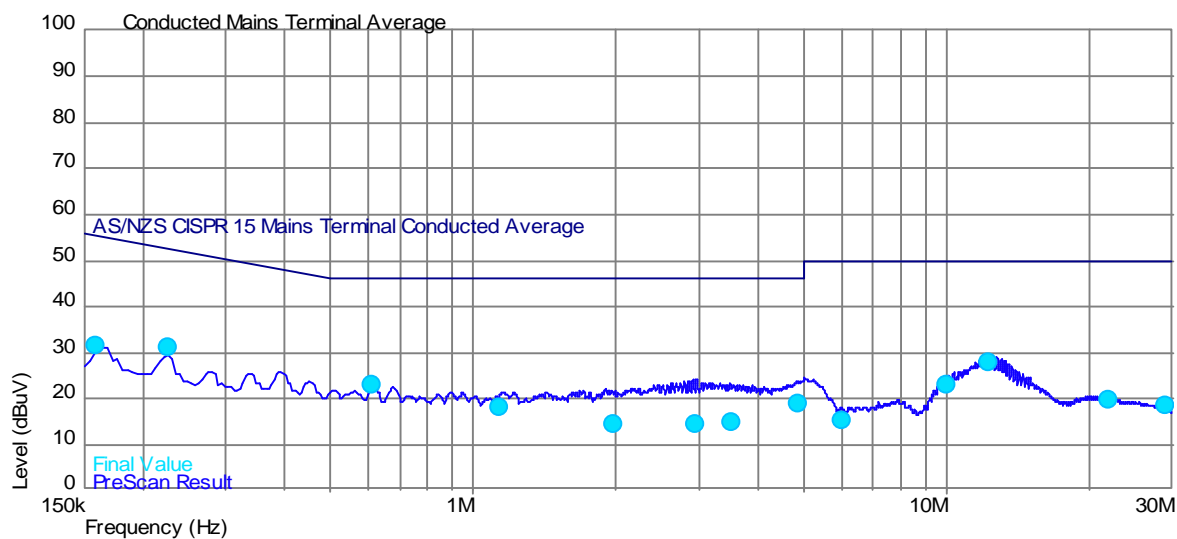
OC Light 1200 45

Date & Tester

17/03/18 David

Test Report Number & Time

218020? 10:32am



Final Value

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
160.0 k	31.49	55.46	-23.97
226.5 k	31.01	52.58	-21.57
608.4 k	22.77	46.00	-23.23
1.14 M	17.94	46.00	-28.06
1.9815 M	14.45	46.00	-31.55
2.9395 M	14.50	46.00	-31.50
3.5 M	14.91	46.00	-31.10
4.881 M	19.09	46.00	-26.91
6.0 M	15.32	50.00	-34.68
10.0 M	22.85	50.00	-27.15
12.2706 M	27.82	50.00	-22.18
22.0 M	19.68	50.00	-30.32
29.0 M	18.38	50.00	-31.62

Active Peak Scan and Conducted Quasi-peak Values, Minimum Output

EMC Aspects Report

Manufacturer or Submitter Name

Phosfect

Type of Equipment

Sensor Dimmable Luminaire

Serial or Model Number

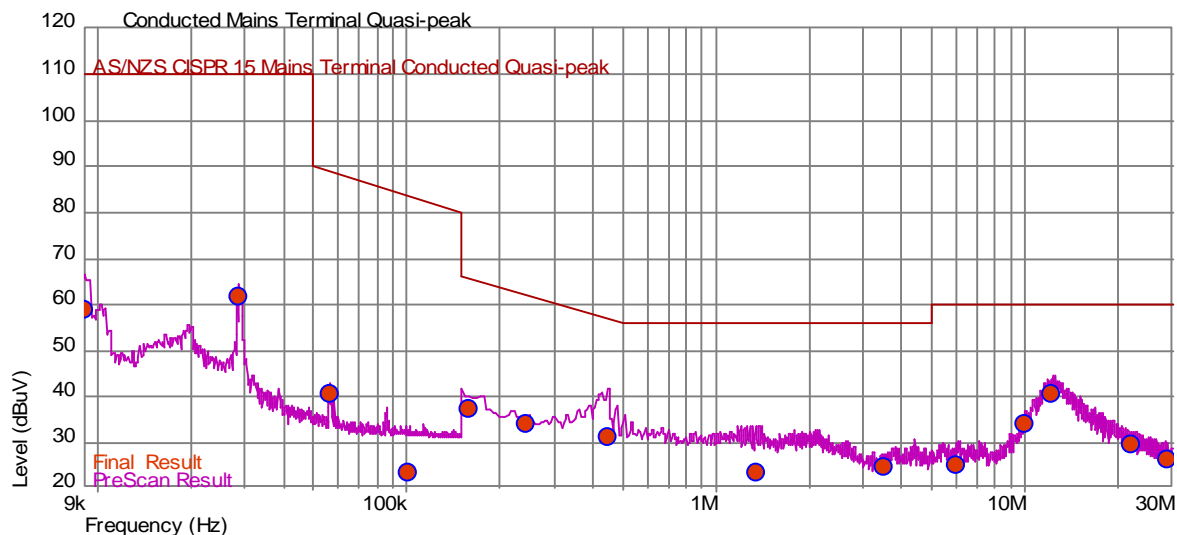
OC Light 1200 45

Date & Tester

17/03/18 David

Test Report Number & Time

2180202 1pm



Final Result

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
9.0 k	58.77	110.00	-51.23
28.58 k	61.71	110.00	-48.29
56.76 k	40.61	88.85	-48.24
100.5 k	23.64	83.65	-60.00
160.0 k	37.29	65.46	-28.17
244.5 k	33.95	61.94	-27.99
447.0 k	30.98	56.93	-25.95
1.347 M	23.50	56.00	-32.50
3.5 M	24.48	56.00	-31.53
6.0 M	25.24	60.00	-34.76
10.0 M	33.92	60.00	-26.08
12.128 M	40.60	60.00	-19.40
22.0 M	29.57	60.00	-30.43
29.0 M	26.32	60.00	-33.68

Active Average Pre Scan and Conducted Average Values, Minimum Output

EMC Aspects Report

Manufacturer or Submitter Name

Phosfect

Type of Equipment

Sensor Dimmable Luminaire

Serial or Model Number

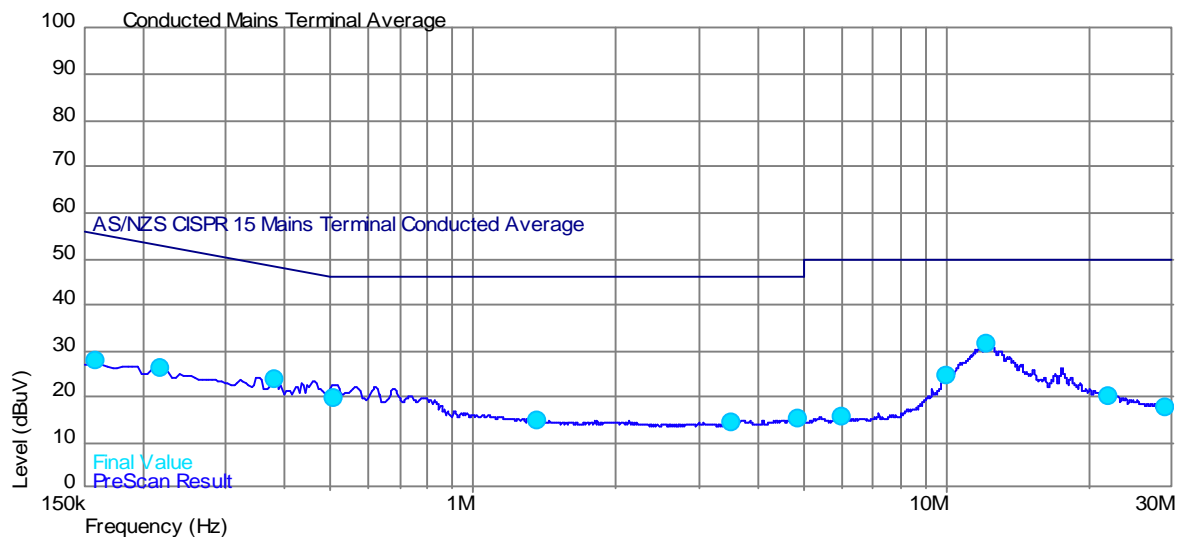
OC Light 1200 45

Date & Tester

17/03/18 David

Test Report Number & Time

218020? 10:32am



Final Value

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
160.0 k	28.04	55.46	-27.42
217.5 k	26.11	52.91	-26.80
379.5 k	23.63	48.29	-24.66
505.5 k	19.55	46.00	-26.45
1.3605 M	14.93	46.00	-31.07
3.5 M	14.58	46.00	-31.43
4.881 M	15.11	46.00	-30.89
6.0 M	15.85	50.00	-34.15
10.0 M	24.50	50.00	-25.50
12.189 M	31.52	50.00	-18.48
22.0 M	20.25	50.00	-29.75
29.0 M	17.60	50.00	-32.40

Neutral Peak Scan and Conducted Quasi-peak Values, Full Output

EMC Aspects Report

Manufacturer or Submitter Name

Type of Equipment

Serial or Model Number

Date & Tester

Test Report Number & Time

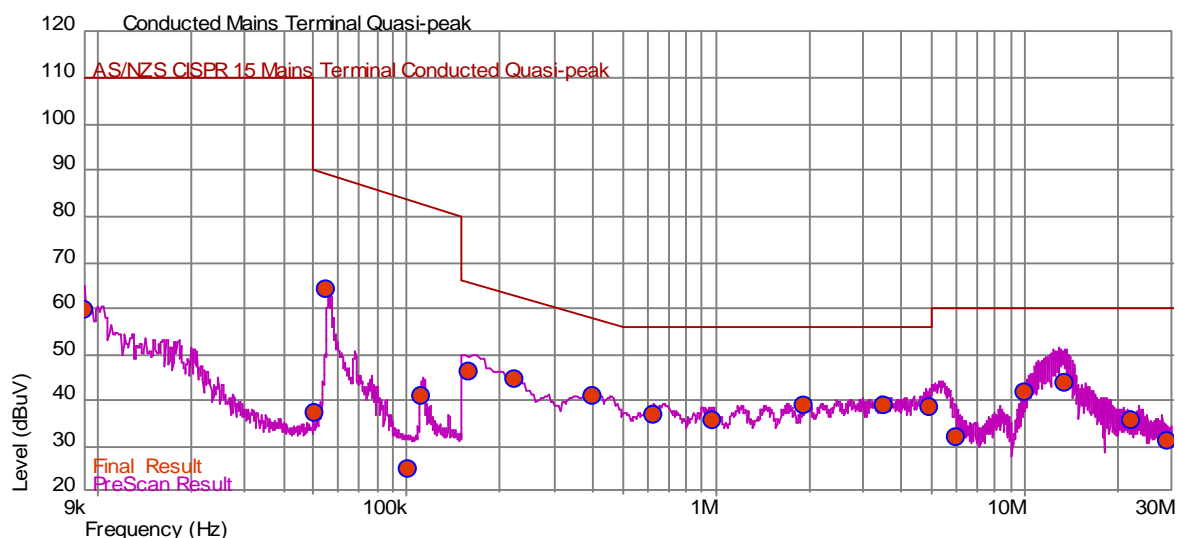
Phosfect

Sensor Dimmable Luminaire

OC Light 1200 45

15/03/18 David

2180202 3pm



Final Result

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
9.0 k	59.82	110.00	-50.18
50.1 k	37.37	89.98	-52.61
54.96 k	64.04	89.14	-25.10
100.5 k	25.16	83.65	-58.48
111.05 k	41.00	82.74	-41.73
160.0 k	46.34	65.46	-19.12
222.0 k	44.64	62.74	-18.11
402.0 k	40.82	57.81	-16.99
631.5 k	36.92	56.00	-19.08
973.5 k	35.47	56.00	-20.53
1.932 M	38.85	56.00	-17.15
3.5 M	39.08	56.00	-16.93
4.888 M	38.68	56.00	-17.32
6.0 M	32.02	60.00	-27.98
10.0 M	41.87	60.00	-18.13
13.424 M	43.95	60.00	-16.05
22.0 M	35.45	60.00	-24.55
29.0 M	31.25	60.00	-28.75

Neutral Average Pre Scan and Conducted Average Values, Full Output

EMC Aspects Report

Manufacturer or Submitter Name

Phosfect

Type of Equipment

Sensor Dimmable Luminaire

Serial or Model Number

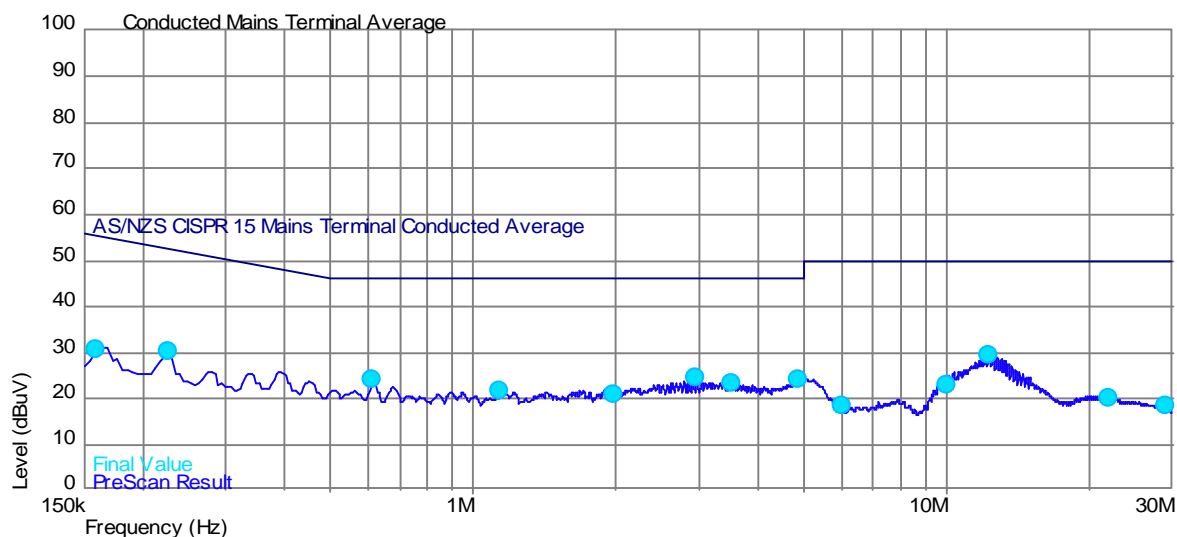
OC Light 1200 45

Date & Tester

17/03/18 David

Test Report Number & Time

218020? 10:32am



Final Value

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
160.0 k	30.57	55.46	-24.89
226.5 k	30.44	52.58	-22.14
608.4 k	24.10	46.00	-21.90
1.14 M	21.86	46.00	-24.14
1.9815 M	20.97	46.00	-25.03
2.9395 M	24.72	46.00	-21.28
3.5 M	23.48	46.00	-22.53
4.881 M	24.28	46.00	-21.72
6.0 M	18.65	50.00	-31.35
10.0 M	23.17	50.00	-26.83
12.2706 M	29.27	50.00	-20.73
22.0 M	20.25	50.00	-29.75
29.0 M	18.40	50.00	-31.60

Neutral Peak Scan and Conducted Quasi-peak Values, Minimum Output

EMC Aspects Report

Manufacturer or Submitter Name

Phosfect

Type of Equipment

Sensor Dimmable Luminaire

Serial or Model Number

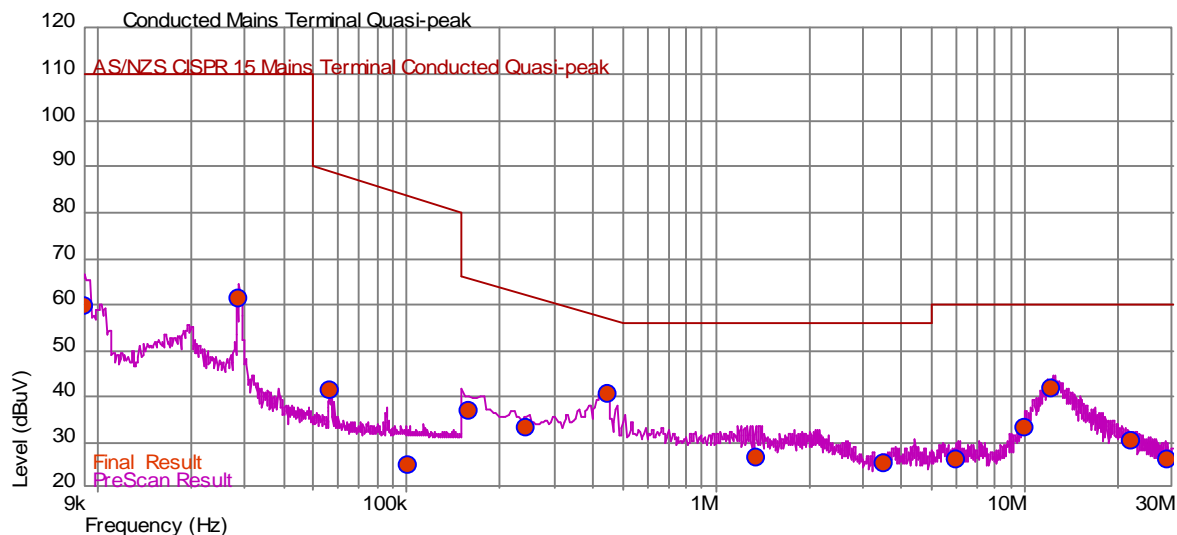
OC Light 1200 45

Date & Tester

17/03/18 David

Test Report Number & Time

2180202 1pm

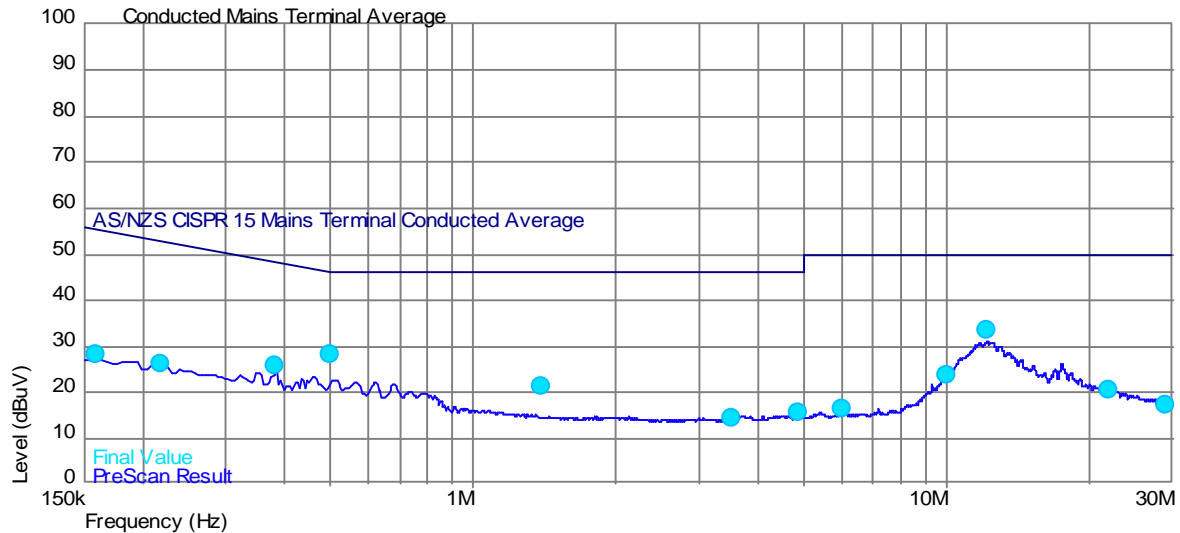


Final Result

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
9.0 k	59.52	110.00	-50.48
28.58 k	61.06	110.00	-48.94
56.76 k	41.28	88.85	-47.57
100.5 k	25.16	83.65	-58.48
160.0 k	36.77	65.46	-28.69
244.5 k	33.30	61.94	-28.64
447.0 k	40.71	56.93	-16.22
1.347 M	26.80	56.00	-29.20
3.5 M	25.40	56.00	-30.61
6.0 M	26.42	60.00	-33.58
10.0 M	33.20	60.00	-26.80
12.128 M	41.55	60.00	-18.45
22.0 M	30.50	60.00	-29.50
29.0 M	26.12	60.00	-33.88

Neutral Average Pre Scan and Conducted Average Values, Minimum Output

EMC Aspects Report	Phosfect
Manufacturer or Submitter Name	Sensor Dimmable Luminaire
Type of Equipment	OC Light 1200 45
Serial or Model Number	17/03/18 David
Date & Tester	218020? 10:32am
Test Report Number & Time	

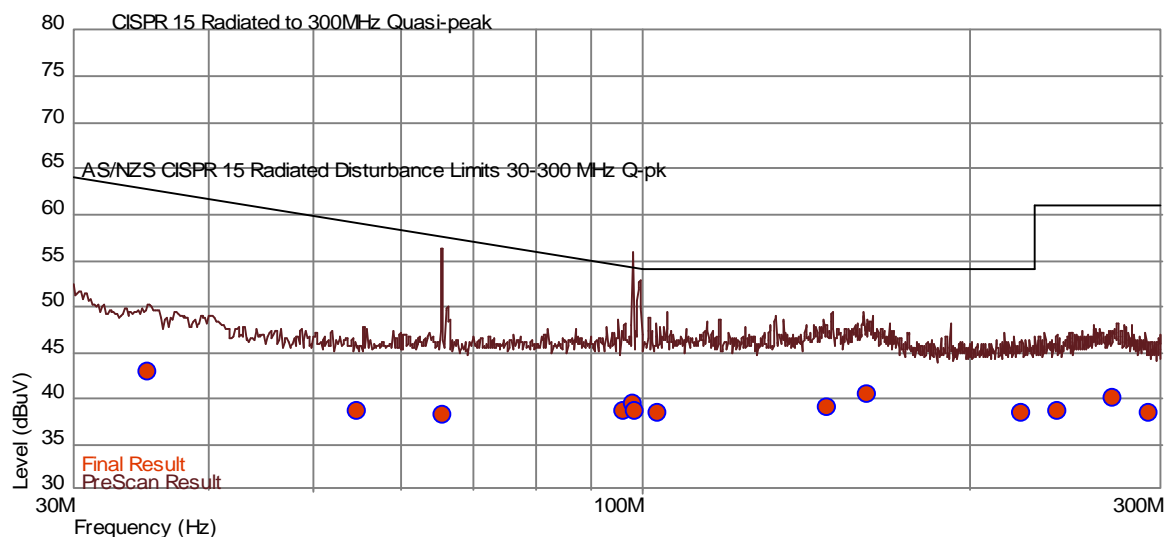


Final Value

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
160.0 k	28.27	55.46	-27.19
217.5 k	26.34	52.91	-26.57
379.5 k	25.80	48.29	-22.49
499.9 k	28.07	46.00	-17.93
1.3875 M	21.45	46.00	-24.55
3.5 M	14.58	46.00	-31.43
4.881 M	15.61	46.00	-30.39
6.0 M	16.55	50.00	-33.45
10.0 M	23.72	50.00	-26.28
12.1971 M	33.37	50.00	-16.63
22.0 M	20.42	50.00	-29.58
29.0 M	17.43	50.00	-32.57

Peak Pre Scan and Radiated Quasi-peak Values to 300MHz, Full Output

EMC Aspects Report	
Manufacturer and Submitter Name	phosfect
Type of Equipment	Sensor Dimmable Luminaire
Serial or Model Number	OC Light 1200 45
Date & Tester	18/3/2018 David
Test Report Number & Time	2180204 3pm



Final Result

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)
35.16 M	42.92	62.68	-19.77
54.84 M	38.61	58.99	-20.38
65.76 M	38.31	57.48	-19.17
96.24 M	38.59	54.32	-15.73
98.16 M	39.39	54.15	-14.76
98.52 M	38.64	54.12	-15.48
103.32 M	38.36	54.00	-15.64
148.08 M	39.10	54.00	-14.90
161.04 M	40.43	54.00	-13.57
222.84 M	38.34	54.00	-15.66
240.6 M	38.70	61.00	-22.30
270.48 M	40.02	61.00	-20.98
292.08 M	38.45	61.00	-22.55



EMC Aspects Test
Report 2180202
phosfect Sensor
Dimmable batten
Luminaire Photopage

