EMC TEST REPORT
for
AOK LED LIGHT COMPANY LIMITED

LED Street Light
Model No. : AOK-30WiL, AOK-40WiL, AOK-60WiL, AOK-80WiL, AOK-90WiL, AOK-120WiL, AOK-160WiL, AOK-150WiL, AOK-200WiL, AOK-180WiL, AOK-240WiL

Applicant	:	AOK LED LIGHT COMPANY LIMITED Building 1 St George's Science and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen, Guangdong, China
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number	:	R011501450I
Date of Test	:	Jan. 19~29, 2015
Date of Report	:	Jan. 30, 2015

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TEST REPORT VERIFICATION

Applicant : AOK LED LIGHT COMPANY LIMITED

Manufacturer : AOK LED LIGHT COMPANY LIMITED

EUT : LED Street Light

(A) Model No.: AOK-30WiL, AOK-40WiL, AOK-60WiL, AOK-80WiL, AOK-90WiL, AOK-120WiL, AOK-160WiL, AOK-150WiL, AOK-200WiL, AOK-180WiL, AOK-240WiL

(B)Trade Mark: AOK

(C)Rating: See Chapter 1.5 for model list

Measurement Procedure Used:

AS/NZS CISPR 15: 2011

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels em anating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the AS/NZS CISPR 15 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited

Date of Test : Jan. 19~29, 2015

Prepared by : Kebo Zhang
(Engineer/ Kebo Zhang)

Reviewer : Dolly Mo
(Project Manager/ Dolly Mo)

Approved & Authorized Signer : Tom Chen
(Manager/Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	LED Street Light
Model Number	:	AOK-30WiL, AOK-40WiL, AOK-60WiL, AOK-80WiL, AOK-90WiL, AOK-120WiL, AOK-160WiL, AOK-150WiL, AOK-200WiL, AOK-180WiL, AOK-240WiL (Note: All samples are the same except the model number & output of appliances, so we prepare "AOK-240WiL" for EMC test only.)
Test Power Supply	:	AC 240, 50Hz
Applicant	:	AOK LED LIGHT COMPANY LIMITED Building 1 St George's Science and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen, Guangdong, China
Manufacturer	:	AOK LED LIGHT COMPANY LIMITED
Address	:	Building 1 St George's Science and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen, Guangdong, China
Factory	:	AOK LED LIGHT COMPANY LIMITED
Address	:	Building 1 St George's Science and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen, Guangdong, China
Date of receipt	:	Jan. 19, 2015
Date of Test	:	Jan. 19~29, 2015

1.2.Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503
Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021
Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013

IC-Registration No.: 8058A-1
Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, Feb. 22, 2013

Test Location
All Emissions tests were performed:
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.3. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.1dB (Horizontal)
Ur = 4.3dB (vertical)

Conduction Uncertainty : Uc =3.4dB

1.4. Test Summary

Tests Carried Out Under AS/NZS CISPR 15: 2011

Standard	Test Items	Status
AS/NZS CISPR 15: 2011	Power Line Conducted Emission Test (9kHz To 30MHz)	√
AS/NZS CISPR 15: 2011	Radiated Emission Test (30MHz To 300MHz)	√
AS/NZS CISPR 15: 2011	Magnetic Radiated emission Test (9KHz To 30MHz)	√

√ Indicates that the test is applicable
x Indicates that the test is not applicable

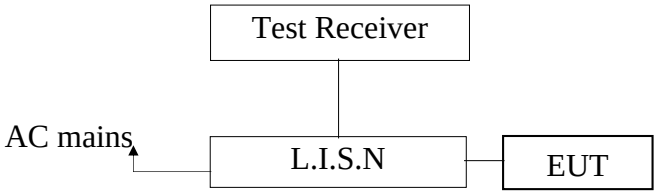
1.5. Model list

Model	Power	Driver	LED quantity	Module quantity	Dimension (mm)
AOK-30WiL	40W	HLG-60H-48A	14	1 Module	495x300x107
AOK-40WiL					
AOK-60WiL	80W	HLG-100H-48A	28	2 Module	576x300x107
AOK-80WiL					
AOK-90WiL	120W	HLG-150H-48A	42	3 Module	657x300x107
AOK-120WiL					
AOK-160WiL	160W	HLG-185H-48A	56	4 Module	738x300x107
AOK-150WiL	200W	HLG-240H-48A	70	5 Module	819x300x107
AOK-200WiL					
AOK-180WiL	240W	HLG-240H-48A	84	6 Module	900x300x107
AOK-240WiL					

2. CONDUCTED EMISSION TEST

2.1. Block Diagram of Test Setup

2.1.1. Block diagram of connection between the EUT and simulators



2.2. Measuring Standard

AS/NZS CISPR 15: 2011

2.3. Power Line Conducted Emission Limits

Frequency	At mains terminals (dBμV)	
	Quasi-peak Level	Average Level
9KHz ~ 50KHz	110	--
50KHz ~ 150KHz	90 ~ 80*	--
150KHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 5.0MHz	56	46
5.0MHz ~ 30MHz	60	50

1. At the transition frequency the lower limit applies.
2. * decreasing linearly with logarithm of the frequency.

2.4. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet AS/NZS CISPR 15: 2011 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

2.5. Operating Condition of EUT

2.5.1. Setup the EUT as shown on Section 2.1.

2.5.2. Turn on the power of all equipments.

2.5.3. Let the EUT work in measuring mode (On) and measure it.

2.6. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the AS/NZS CISPR 15 regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz in 150kHz~30MHz.

The frequency range from 9kHz to 30MHz is investigated for AC mains.

The test results are listed in Section 2.8.

2.7. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 22, 2014	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 22, 2014	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 22, 2014	1 Year

2.8. Measuring Results

PASS.

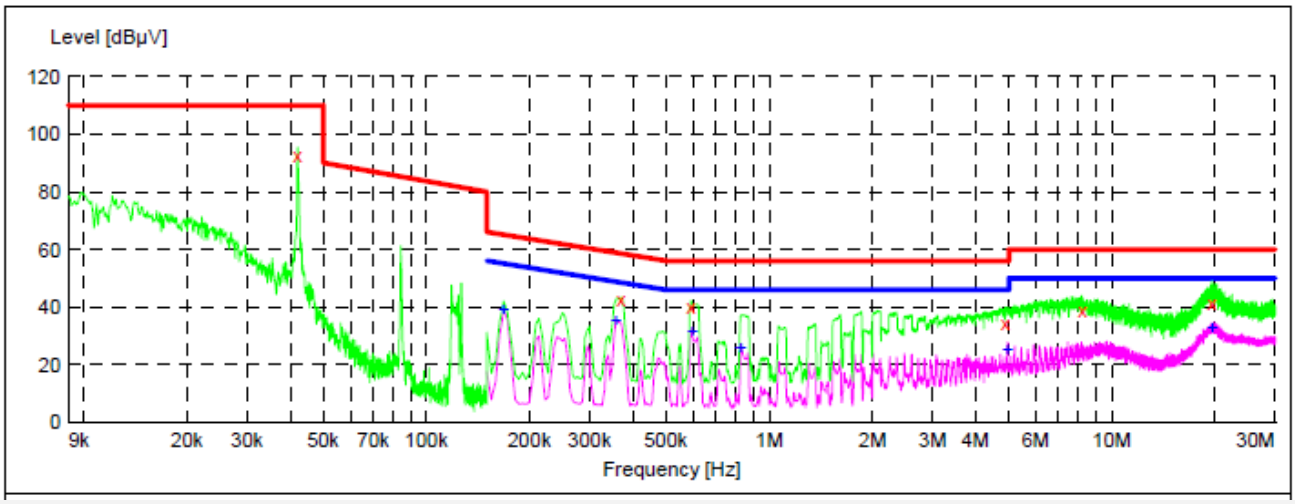
The frequency range 9kHz to 30MHz is investigated.

The test curves are shown in the following pages.

CONDUCTED EMISSION TEST DATA

Test Site:	1# Shielded Room
Operating Condition:	On
Test Specification:	AC 240, 50Hz
Comment:	L
	Temp.:22.2℃ Hum:60%

SCAN TABLE: "Voltage(9K~30M)FIN"
Short Description: 9K-30M Disturbance Voltages



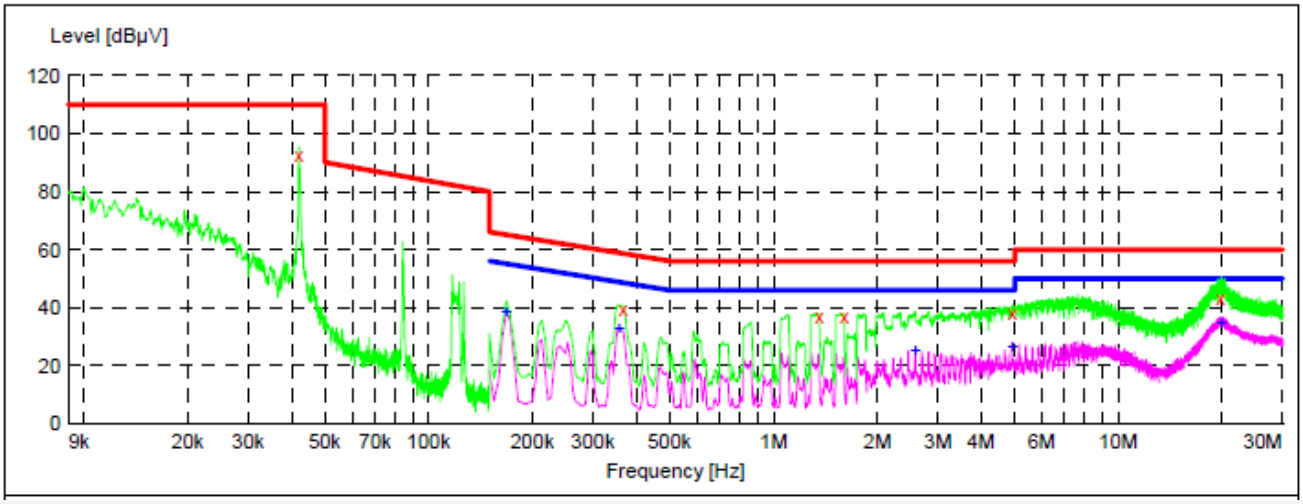
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.042100	92.70	20.0	110	17.3	QP	L1	GND
0.370500	42.50	20.1	59	16.0	QP	L1	GND
0.591000	40.30	20.1	56	15.7	QP	L1	GND
4.879500	34.50	20.5	56	21.5	QP	L1	GND
8.187000	39.10	20.5	60	20.9	QP	L1	GND
19.617000	41.50	20.8	60	18.5	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	39.40	20.1	55	15.7	AV	L1	GND
0.357000	35.60	20.1	49	13.2	AV	L1	GND
0.595500	31.70	20.1	46	14.3	AV	L1	GND
0.829500	26.00	20.1	46	20.0	AV	L1	GND
4.969500	25.90	20.5	46	20.1	AV	L1	GND
19.644000	33.30	20.8	50	16.7	AV	L1	GND

CONDUCTED EMISSION TEST DATA

Test Site:	1# Shielded Room
Operating Condition:	On
Test Specification:	AC 240, 50Hz
Comment:	N
	Temp.:22.2℃ Hum:60%

SCAN TABLE: "Voltage(9K~30M)FIN"
Short Description: 9K-30M Disturbance Voltages



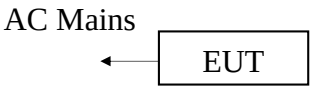
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.042100	92.80	20.0	110	17.2	QP	N	GND
0.366000	39.20	20.1	59	19.4	QP	N	GND
1.356000	36.90	20.2	56	19.1	QP	N	GND
1.603500	36.80	20.3	56	19.2	QP	N	GND
4.938000	38.40	20.5	56	17.6	QP	N	GND
19.869000	43.00	20.8	60	17.0	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	39.10	20.1	55	16.0	AV	N	GND
0.357000	33.30	20.1	49	15.5	AV	N	GND
2.584500	25.50	20.4	46	20.5	AV	N	GND
4.929000	26.70	20.5	46	19.3	AV	N	GND
19.932000	35.10	20.8	50	14.9	AV	N	GND

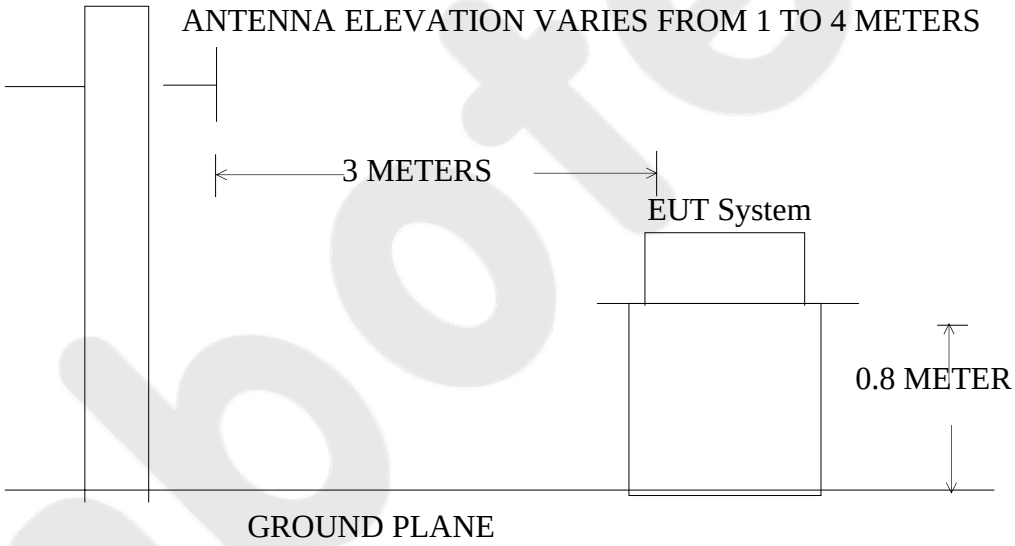
3. RADIATED EMISSION TEST

3.1. Block Diagram of Test

3.1.1. Block diagram of connection between the EUT and simulators



3.1.2. Block diagram of test setup (In chamber)



3.2. Measuring Standard

AS/NZS CISPR 15: 2011

3.3. Radiated Emission Limits

3.3.1. AS/NZS CISPR 15

Radiated Emission Limits

All emanations from a CISPR 15 device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
30 ~ 230	3	40
230 ~ 300	3	47

Note: (1) The smaller limit shall apply at the combination point between

two frequency bands.

(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

3.4. EUT Configuration on Test

The AS/NZS CISPR 15: 2011 regulations test method must be used to find the maximum emission during radiated emission measurement.

3.5. Operating Condition of EUT

3.5.1. Turn on the power.

3.5.2. Let the EUT work in test mode (On) and measure it.

3.6. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCI) is set at 120kHz.

The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 3.8.

3.7. Test Equipment

The following test equipments are used during radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 22, 2014	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 14, 2013	3 Year
3.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year

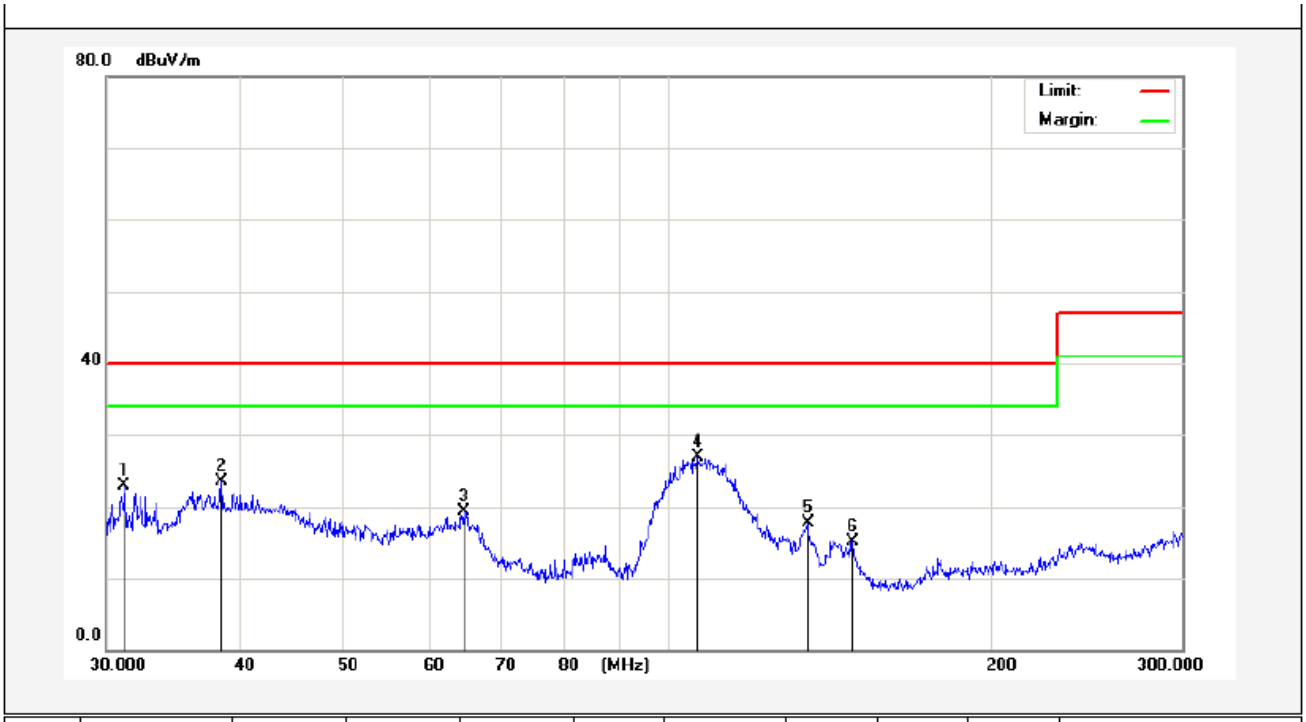
3.8. Measuring Results

PASS.

The frequency range from 30MHz to 300MHz is investigated.

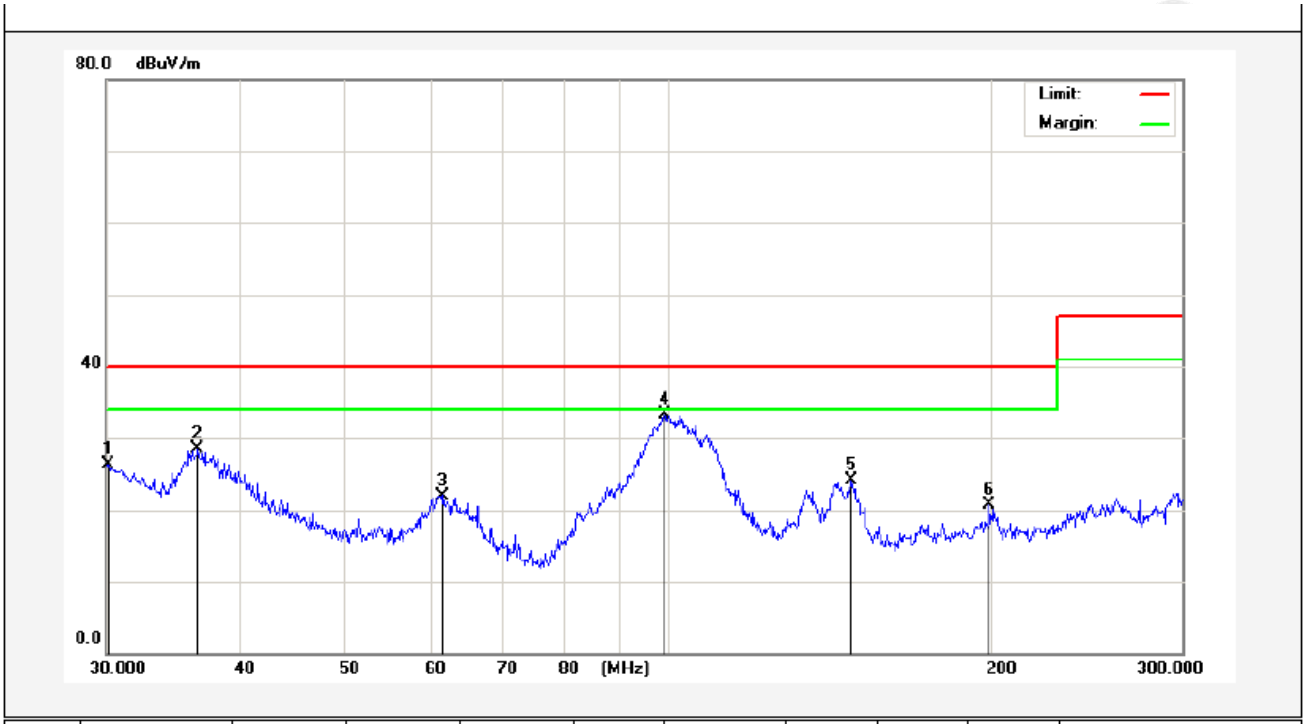
Test data see the following pages.

Job No.:	**AT011501450I**	**Polarization:**	**Horizontal**
Standard:	**(RE)AS/NZS CISPR 15_3m**	**Power Source:**	**AC 240, 50Hz**
Test item:	**Radiation Test**	**Temp.(℃)/Hum.(%RH):**	**24.3(℃)/55%RH**
Note:	**On**	**Distance:**	**3m**



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.1976	39.21	-16.32	22.89	40.00	-17.11	peak			
2	38.3814	35.11	-11.63	23.48	40.00	-16.52	peak			
3	64.4349	36.47	-17.24	19.23	40.00	-20.77	peak			
4	106.4440	47.51	-20.68	26.83	40.00	-13.17	peak			
5	134.6236	40.79	-23.12	17.67	40.00	-22.33	peak			
6	148.2932	38.52	-23.36	15.16	40.00	-24.84	peak			

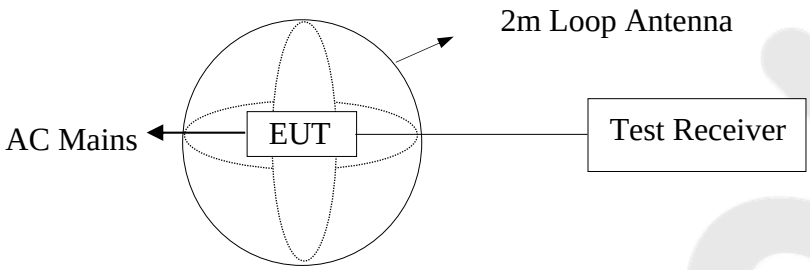
Job No.:	**AT011501450I**	**Polarization:**	**Vertical**
Standard:	**(RE)AS/NZS CISPR 15_3m**	**Power Source:**	**AC 240, 50Hz**
Test item:	**Radiation Test**	**Temp.(℃)/Hum.(%RH):**	**24.3(℃)/55%RH**
Note:	**On**	**Distance:**	**3m**



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.1385	43.14	-16.88	26.26	40.00	-13.74	peak			
2	36.4856	41.61	-13.13	28.48	40.00	-11.52	peak			
3	61.6767	38.09	-16.09	22.00	40.00	-18.00	peak			
4	99.1109	49.14	-15.82	33.32	40.00	-6.68	peak			
5	147.6119	42.39	-18.38	24.01	40.00	-15.99	peak			
6	198.6649	36.61	-15.88	20.73	40.00	-19.27	peak			

4. MAGNETIC RADIATED EMISSION TEST

4.1. Block Diagram of Test Setup



4.2. Magnetic Field Emission Measurement Standard and Limits

4.2.1. Measuring Standard

AS/NZS CISPR 15: 2011

4.2.2. Measuring Limits

Frequency	Limits for loop diameter (dBμA)
	2m
9KHz ~ 70KHz	88
70KHz ~ 150KHz	88 ~ 58*
150KHz ~ 3MHz	58 ~ 22*
3MHz ~ 30MHz	22

1. At the transition frequency the lower limit applies.
2. * decreasing linearly with logarithm of the frequency.

4.3. EUT Configuration on Measurement

The following equipments are installed on Magnetic Radiated emission Measurement to meet AS/NZS CISPR 15 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.4. Operating Condition of EUT

4.4.1. Setup the EUT as shown in Section 4.1.

4.4.2. Turn on the power of all equipments.

4.4.3. Let the EUT work in test mode (On) and measure it.

4.5. Test Procedure

The EUT is placed on a wood table in the center of a loop antenna. The induced current in the loop antenna is measured by means of a current probe and the test receiver. Three field components are checked by means of a coaxial switch.

The frequency range from 9KHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9KHz to 150KHz, the bandwidth of the test receiver (ESCI) is set at 200Hz. For frequency band 150KHz to 30MHz, the bandwidth is set at 9KHz.

All the test results are listed in Section 4.7.

4.6. Test Equipment

The following test equipments are used during the Magnetic Radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 22, 2014	1 Year
2.	Triple-Loop Antenna(2M)	EVERFINE	LLA-2	905003	Apr. 22, 2014	3 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 22, 2014	1 Year

4.7. Measuring Results

PASS.

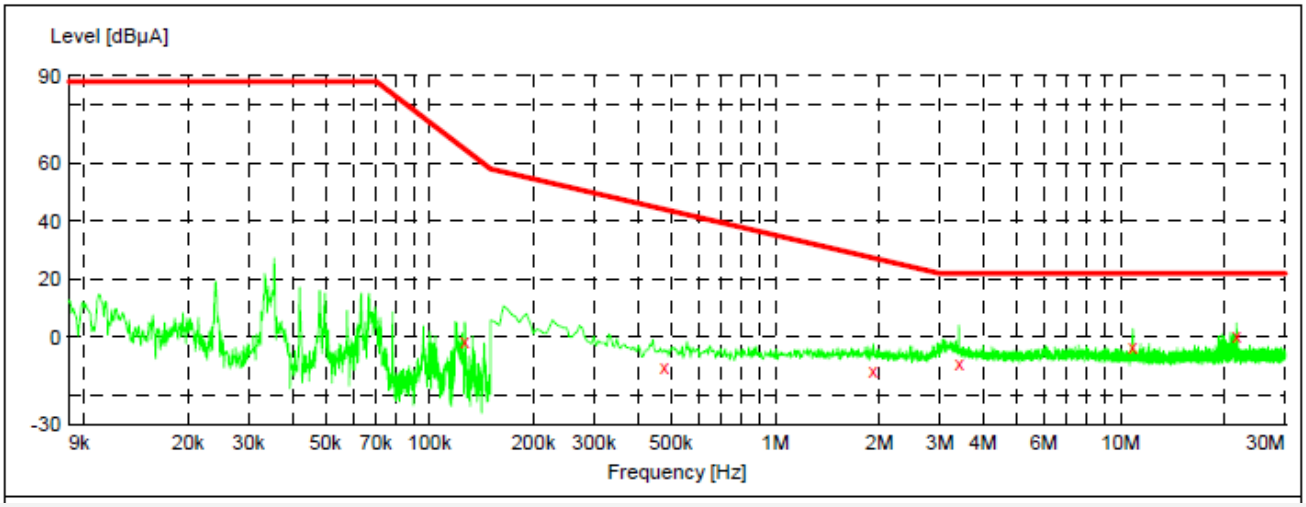
The frequency range from 9KHz to 30MHz is investigated.

Test data see the following pages.

MAGNETIC RADIATED EMISSION TEST

Test Site:	1# Shielded Room
Operating Condition:	On
Test Specification:	AC 240, 50Hz
Comment:	X
	Temp.:22.2℃ Hum:60%

SCAN TABLE: "Macm (9K-30M) FIN"
Short Description: 9K~30M Magn. Field

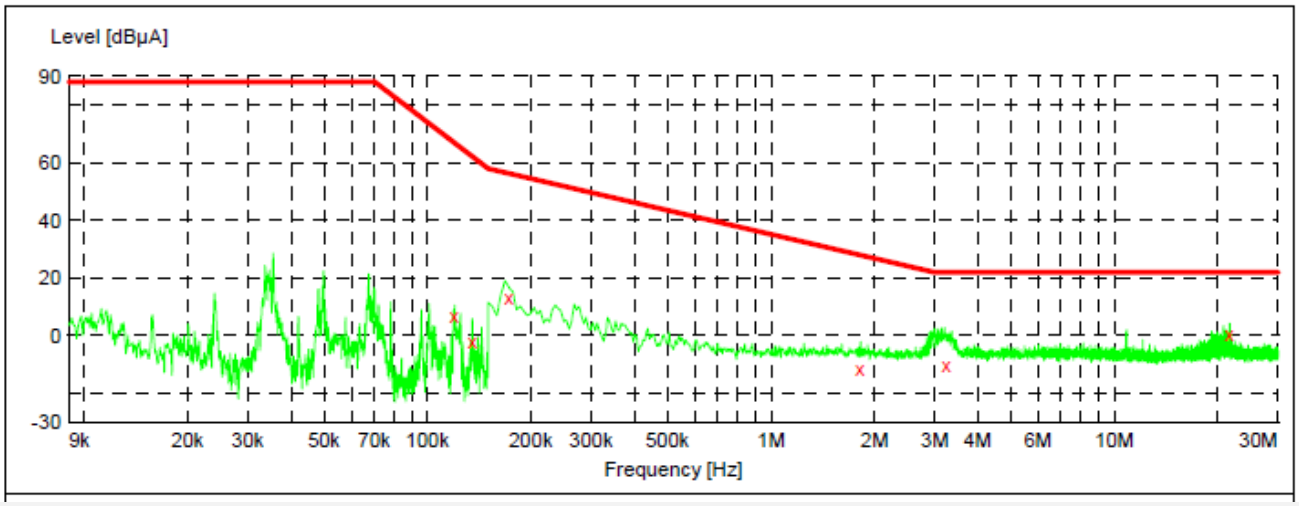


Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.126500	-5.20	0.0	65	70.2	QP	X	0.00
0.478500	-10.10	0.0	44	54.2	QP	X	0.00
1.918500	-11.70	0.0	27	39.1	QP	X	0.00
3.417000	-9.10	0.0	22	31.1	QP	X	0.00
10.842000	-3.00	0.0	22	25.0	QP	X	0.00
21.673500	0.80	0.0	22	21.2	QP	X	0.00

MAGNETIC RADIATED EMISSION TEST

Test Site:	1# Shielded Room
Operating Condition:	On
Test Specification:	AC 240, 50Hz
Comment:	Y
	Temp: 22.2℃ Hum: 59%

SCAN TABLE: "Macn(9K-30M)FIN"
Short Description: 9K~30M Magn. Field

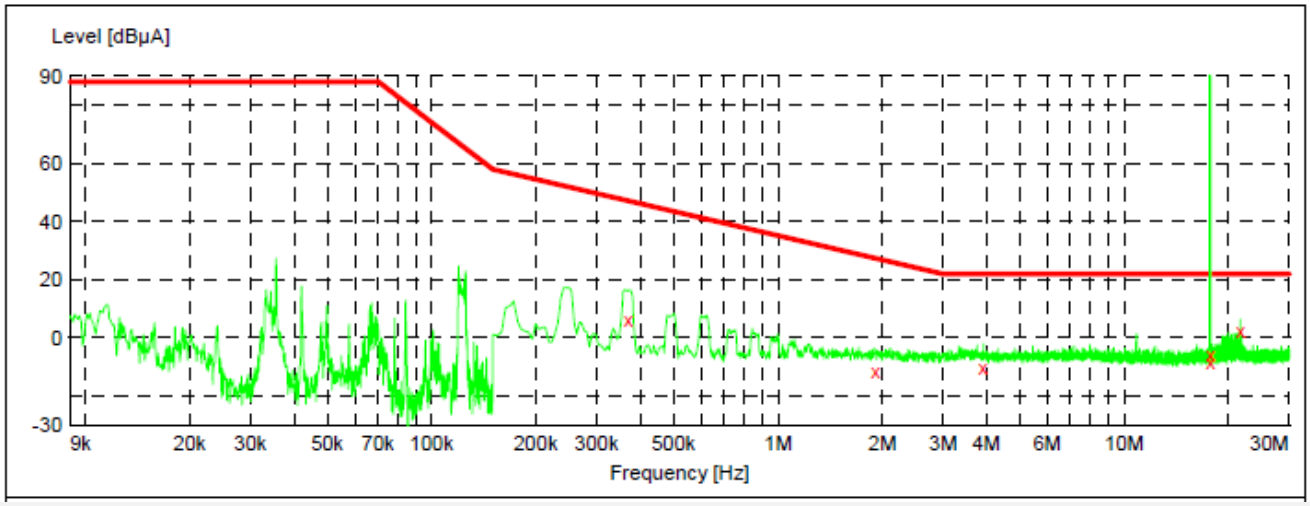


Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.119400	7.20	0.0	67	59.8	QP	Y	0.00
0.134500	-1.50	0.0	62	63.8	QP	Y	0.00
0.172500	13.30	0.0	56	43.0	QP	Y	0.00
1.815000	-11.40	0.0	28	39.4	QP	Y	0.00
3.237000	-10.00	0.0	22	32.0	QP	Y	0.00
21.619500	0.70	0.0	22	21.3	QP	Y	0.00

MAGNETIC RADIATED EMISSION TEST

Test Site:	1# Shielded Room
Operating Condition:	On
Test Specification:	AC 240, 50Hz
Comment:	Z
	Temp: 22.2℃ Hum: 59%

SCAN TABLE: "Macn(9K-30M)FIN"
Short Description: 9K~30M Magn. Field

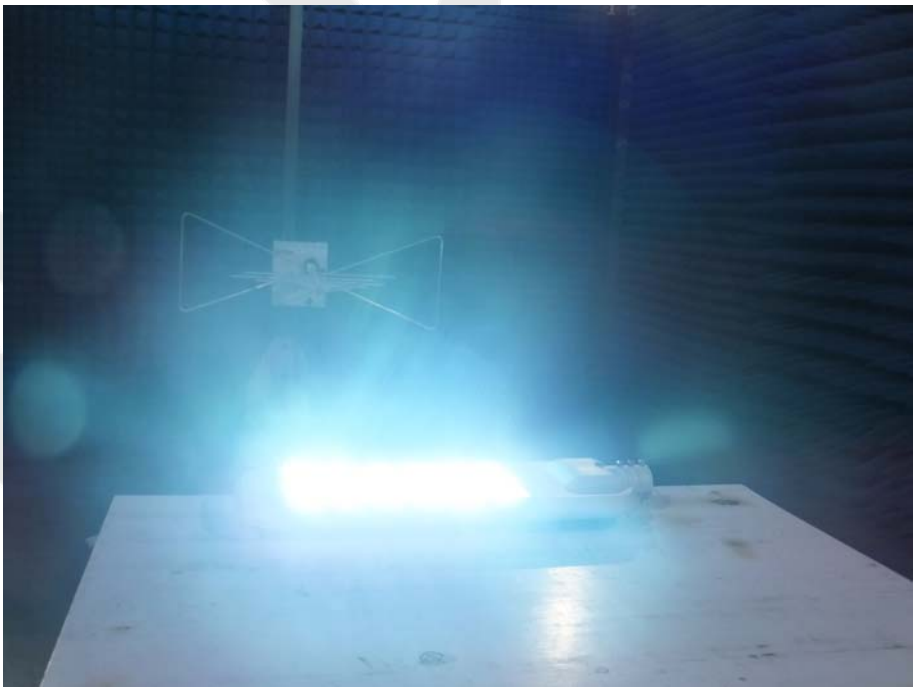


Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.370500	5.4	0.0	47	52.4	QP	Z	0.00
1.914000	-11.20	0.0	27	38.6	QP	Z	0.00
3.912000	-9.80	0.0	22	31.8	QP	Z	0.00
17.749500	-8.10	0.0	22	30.1	QP	Z	0.00
17.754000	-5.90	0.0	22	27.9	QP	Z	0.00
21.669000	2.80	0.0	22	19.2	QP	Z	0.00

5. PHOTOGRAPH

5.1. Photo of Conducted Emission Test

5.2. Photo of Radiation Emission Test



5.3. Photo of Magnetic Radiated Emission Test

APPENDIX I
(Photos of EUT)

Figure 1
The EUT-Front View

Figure 2
The EUT-Back View

Figure 3
The EUT-Inside View

Figure 4
The EUT-Inside View

Figure 5
The EUT-Inside View

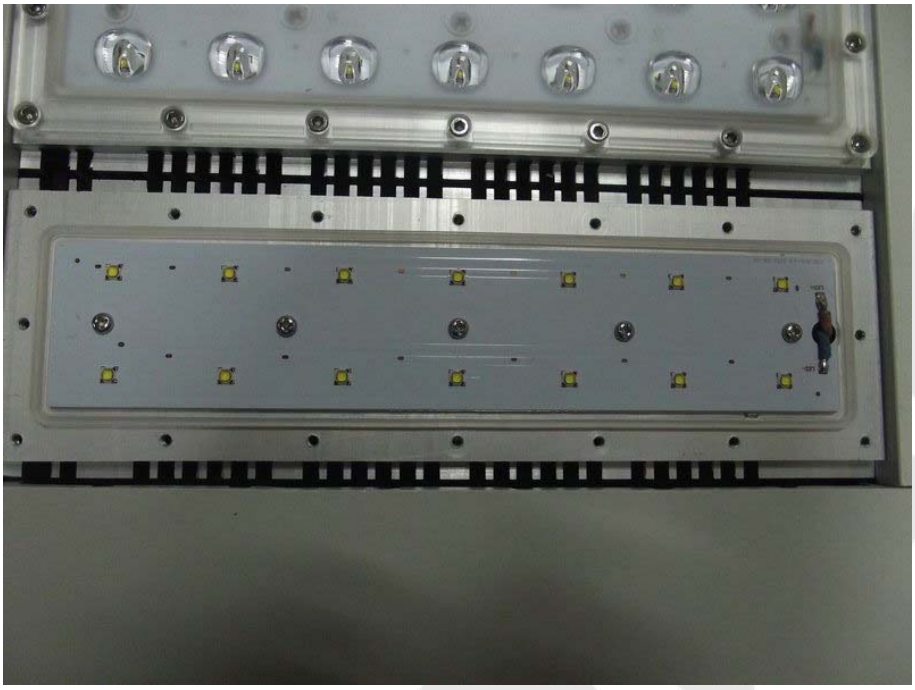


Figure 6
The EUT-Outside View(Model No.:AOK-200Wi)

Figure 7
The EUT-Outside View(Model No.:AOK-160WiL)

Figure 8
The EUT-Outside View(Model No.:AOK-120Wi)

Figure 9
The EUT-Outside View(Model No.:AOK-80WiL)

Figure 10
The EUT-Outside View(Model No.:AOK-40WiL)