FCC DoC
TEST REPORT

for

Outdoor Lantern And Wireless Speaker
Brand: Acoustic Research
Model: AW850
Test Report Number: SZ090409B05-EF
Issued Date: May 19, 2009

Issued for

Uni-Art Precise Products Ltd
11-12/F, Yue Xiu Industrial Building, 87 Hung To Road, Kowloon, HongKong

Issued by:

Compliance Certification Services Inc.
No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township
Taoyuan County, Taiwan
TEL: +886-3-3240332
FAX: +886-3-3245235

ACCREDITED
TESTING CERT #0824.01

ilac-MRA

TAF
Testing Laboratory
0363

Revision History

Rev.	Issue No.	Revisions	Effect Page	Revised By
00	SZ090409B05-EF	Initial Issue	ALL	Clinton Kao

CCS Report Format Version 2.0

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1 TEST RESULT CERTIFICATION

Product:	Outdoor Lantern And Wireless Speaker
Model:	AW850
Brand:	Acoustic Research
Applicant:	**Uni-Art Precise Products Ltd** 11-12/F, Yue Xiu Industrial Building, 87 Hung To Road, Kowloon, HongKong
Manufacturer:	**Arkon (Sha Jing) Manufacturing Factory** NO. 50 Xin Sha Road Sha Jing Town, Baoan District, Shenzhen, China
Tested Date:	April 10~May 19, 2009
Tested Voltage:	AC120V/60Hz

EMISSION			
Standard	**Item**	**Result**	**Remarks**
FCC 47 CFR Part 15 Subpart B, ANSI C63.4-2003	Conducted (Main Port)	PASS	Meet Class B limit
	Radiated	PASS	Meet Class B limit

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.
2. The information of measurement uncertainty is available upon the customer's request.

Deviation from Applicable Standard
None

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Clinton Kao
Manger
Compliance Certification Service Inc.

Reviewed by:

Vincent Yao
Assistant manager
Compliance Certification Service Inc.

2 EUT DESCRIPTION

Product	Outdoor Lantern And Wireless Speaker
Brand Name	Acoustic Research
Model	AW850
Test Item	Product Sample
Applicant	Uni-Art Precise Products Ltd
Housing material	Plastic
EUT Type	☐ Engineering Sample, ☒ Product Sample, ☐ Mass Product Sample.
Serial Number	SZ090409B05-EF
Power Cable	Shielded, 1.00m
EUT Power Rating	AC120V/60Hz

I/O PORT OF EUT

I/O PORT TYPE	Q'TY	TESTED WITH
Power Port	1	1

3 TEST METHODOLOGY

3.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode		
Emission	Conducted Emission	Mode 1: Normal
	Radiated Emission	Mode 1: Normal

After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Conducted Emission	Mode 1
	Radiated Emission	Mode 1

Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test items.

3.2. EUT SYSTEM OPERATION

1. Install the EUT with the other external peripheral devices.
2. Set up the EUT to the right mode and play MP3 with the IPOD.
3. Make sure the EUT works normally during the test.

4 SETUP OF EQUIPMENT UNDER TEST

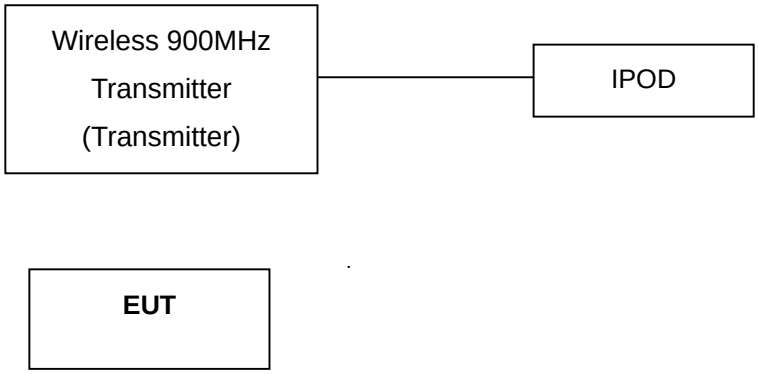
4.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	IPOD	D0022012POD	JQ8070LBYMV	N/A	APPLE	Unshielded 1.80m	N/A
2	Wireless 900MHz Transmitter (Transmitter)	AW850	N/A	MVASP3791-001T	Acoustic Research	Unshielded 1.90m	Unshielded 1.80m

1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2. CONFIGURATION OF SYSTEM UNDER TEST



5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at

NO.81-1, Lane 210, Bade 2nd Rd., Lujhu Township Taoyuan County, Taiwan

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

USA	**A2LA**
Taiwan	**TAF**

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA	**FCC**
Japan	**VCCI**
Canada	**INDUSTRY CANADA**
Taiwan	**BSMI**

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccsrf.com

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	+/- 3.18dB
Radiated emissions	30MHz ~ 200MHz	+/- 3.79dB
	200MHz ~1000MHz	+/- 3.62dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.

6 POWER LINE CONDUCTED EMISSION MEASUREMENT

6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE:

(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2. TEST INSTRUMENTS

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
ESCI EMI TEST RECEIV.ESCI	ROHDE&SCHWARZ	1166.5950 03	100088	02/25/2009	02/24/2010
LISN	FCC	FCC-LISN-50-50-2-M	0168	03/01/2009	03/01/2010
LISN	EMCO	3825/2	8901-1459	03/01/2009	03/01/2010
CDN	FCC	FCC-TILISN-T4	20182	03/01/2009	03/01/2010
CISPR22 FOUR BALANCED PAIRS ISN	FCC	FCC-TLISN-T8-02	20183	03/01/2009	03/01/2010
CISPR22 FOUR BALANCED PAIRS ISN	FCC	FCC-TLISN-T4-02	20382	03/01/2009	03/01/2010
CISPR22 FOUR BALANCED PAIRS ISN	FCC	FCC-TLISN-T4-02	20383	03/01/2009	03/01/2010
Current Probe	STODDART AIRCRAFT	91550-1	345-73	03/01/2009	03/01/2010

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.

6.3.TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

Procedure of Preliminary Test

The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

The EUT received AC120V/60Hz through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.

All support equipment power received from a second LISN.

The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in Item 3.1 were scanned during the preliminary test.

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

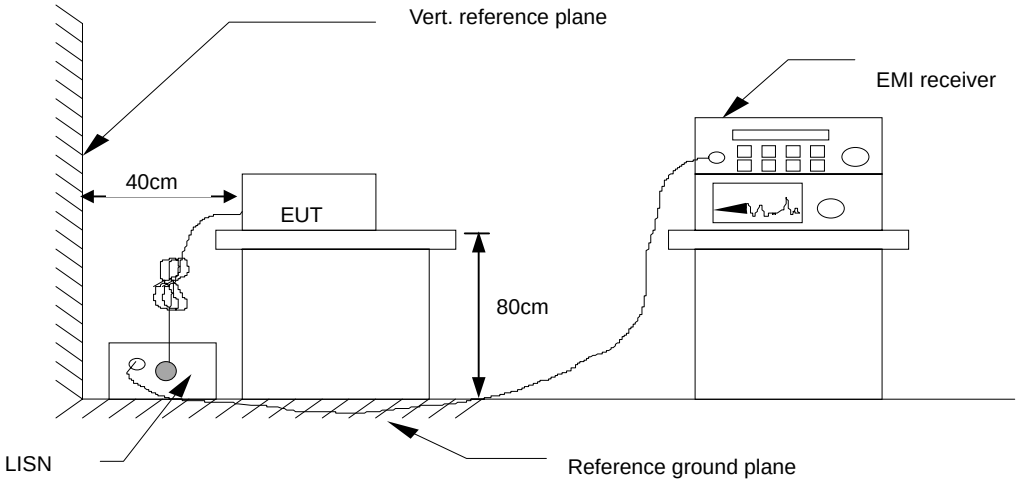
EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

For details, please refer to measurement standard or CCS SOP PA-031

6.4.TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.5. Data Sample:

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	Note
x.xx	50.27	49.16	48.17	65.47	55.47	-16.31	-7.30	L

Freq. = Emission frequency in MHz
RAW dBuV = Uncorrected Analyzer/Received Reading +INSERTION LOSS of LISN+CABLE LOSS+pulse limiter loss
Q.P. Limit dBuV = Limit stated in standard
AVG Limit dBuV = Limit stated in standard
Q.P. Margin dB = Q.P. RAW (dBuV) –Q.P. Limit (dBuV)
AVG Margin dB = AVG RAW (dBuV) –AVG Limit (dBuV)
Note = Current carrying line of reading
Q.P.: =Quasi-Peak

Calculation Formula

Margin (dB) = Amptd (dBuV) – Limit (dBuV)

6.6. TEST RESULTS

Model No.	AW850	Test Mode	Mode 1
Environmental Conditions	27°C, 56% RH	RBW,VBW	10 KHz
Tested by	Simple Guan		

(The chart below shows the highest readings taken from the final data.)

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.402	53.50	50.08	36.62	58.80	48.80	-8.72	-12.18	L1
0.572	48.40	45.53	33.73	56.00	46.00	-10.47	-12.27	L1
0.935	48.86	45.67	33.6	56.00	46.00	-10.33	-12.40	L1
1.388	48.36	43.78	31.37	56.00	46.00	-12.22	-14.63	L1
1.707	48.75	44.68	32.22	56.00	46.00	-11.32	-13.78	L1
2.112	48.68	43.15	30.83	56.00	46.00	-12.85	-15.17	L1
0.409	53.12	49.85	36.78	58.59	48.59	-8.74	-11.81	L2
0.609	49.14	46.26	33.27	56.00	46.00	-9.74	-12.73	L2
0.987	48.60	45.07	33.38	56.00	46.00	-10.93	-12.62	L2
1.254	48.31	44.16	32.68	56.00	46.00	-11.84	-13.32	L2
1.632	48.46	43.94	32.24	56.00	46.00	-12.06	-13.76	L2
2.072	48.01	42.89	30.05	56.00	46.00	-13.11	-15.95	L2

Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.

2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.

3. "---" denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.

4. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.

5. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

7. RADIATED EMISSION MEASUREMENT

7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

Maximum permissible level of Radiated Emission measured at 3 meter

Ranges of frequency are from 30MHZ to 1000MHz

FREQUENCY (MHz)	dBuV/m (At 3m)	
	Class A	Class B
30 ~ 88	39.00	40.00
88 ~ 216	43.50	43.50
216 ~ 960	46.00	46.00
960 ~ 1000	49.50	54.00

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

Ranges of frequency are above 1000MHz

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBu V/m/ Peak)	Maximum Field Strength Limit(dBu V/m/Avg)
Above 1000	3	74	54

7.2. TEST INSTRUMENTS

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
ESCI EMI TEST RECEIV.ESCI	ROHDE&SCHWARZ	1166.5950 03	100783	03/20/2009	03/20/2010
Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2009	03/01/2010
Low Noise Amplifier	MITEQ	AM-1604-3000	1123808	02/06/2009	02/06/2010
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
High Noise Amplifier	Agilent	8449B	3008A01838	02/06/2009	02/06/2010
Site NSA	C&C	N/A	N/A	N.C.R	N.C.R
BILOG ANTENNA	SCHAFFNER	CBL6143	5082	06/08/2008	06/09/2009
Horn Antenna	SCHAFFNER	BBHA9120D	1201	03/19/2009	03/19/2010
Signal Generator	Anritsu	MG3694A	#050125	03/01/2009	03/01/2010

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R = No Calibration Request.

7.3.TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

Procedure of Preliminary Test

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

Support equipment, if needed, was placed as per ANSI C63.4.

All I/O cables were positioned to simulate typical usage as per ANSI C63.4.

The EUT received AC120V/60Hz through the outlet socket under the turntable. All support equipment power received from another socket under the turntable.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

The antenna was placed at 3/10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The test mode(s) described in Item 3.1 were scanned during the preliminary test:

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The EUT and worse cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

When measuring emissions above 1GHz, the frequencies of maximum emission shall be determined by manually positioning the antenna close to the EUT and by moving the antenna over all sides of the EUT while observing a spectral display. It will be advantageous to have prior knowledge of the frequencies of emissions above 1GHz.If the EUT is a device with dimensions approximately equal to that of the measurement antenna beam width, the measurement antenna shall be aligned with the EUT.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

For the measurement above 1GHz, use the cable, EUT arrangement, and mode of operation determined in the exploratory testing to produce the emission that has the highest amplitude relative to the limit.

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the antenna in the “cone of radiation” from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.

The antenna may have to be higher or lower than the EUT, depending on the EUT’s size and mounting height, but the antenna should be restricted to a range of height of from 1m to 4m above the ground or reference ground plane.

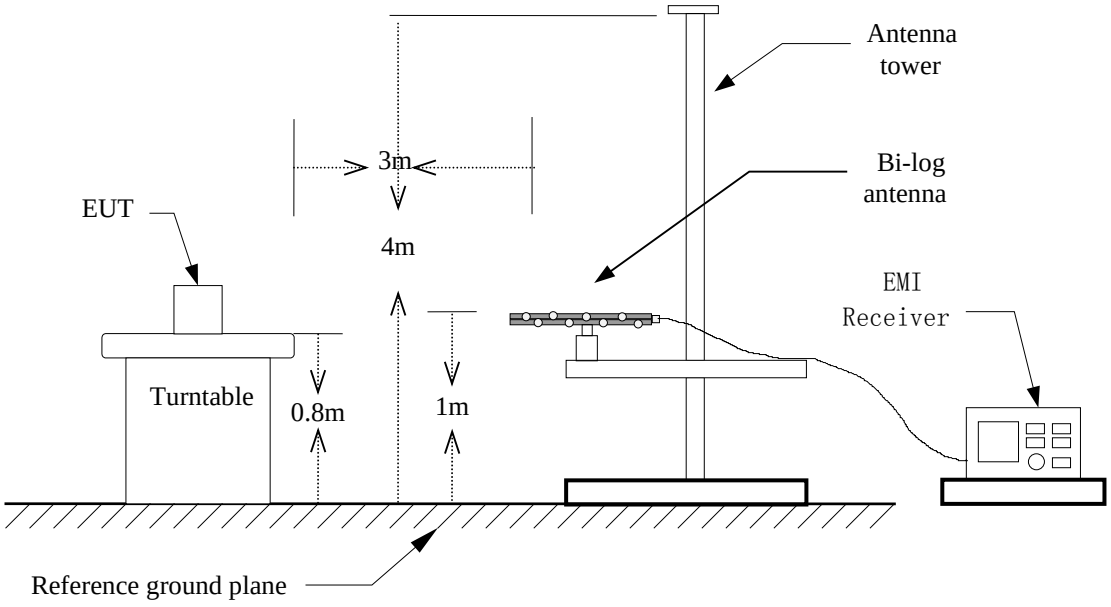
If the transmission line for the measurement antenna restricts its range of height and polarization, the steps needed to ensure the correct measurement of the maximum emissions, shall be described in detail in the report of the measurements.

1) using the procedures above to measure with peak detector function, if the result comply with the average limit specified by the appropriate regulation, record the EUT arrangement, mode of operation, and cable positions used for final radiated emission measurement , this can be done with either diagrams or photographs.

2) Set the detector function of the measuring instrument to average mode, using the procedures above and remeasure only those emissions that complied with the peak limits but exceeded the average limits.

Recorded at least the six highest emissions.

7.4. TEST SETUP



7.5. Data Sample:

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
xx.xx	V	Peak	48.18	-17.55	30.63	40.00	-9.37

Freq. = Emission frequency in MHz
Read =Uncorrected Analyzer / Receiver Reading
Corr. Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Emiss. Level (dBuV/m) = Raw reading converted to dBuV/m and C.F added
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Reading in reference to limit
Pk = Peak Reading
Q.P. = Quasi-peak Reading

Calculation Formula

Margin (dB) = Emiss. Level (dBuV/m) – Limits (dBuV/m)

Emission Level (dBuV/m) = Raw Data (dBuV) + Corr. Factor (dB)

7.6. TEST RESULTS

Model No.	AW850	Test Mode	Mode 1
Environmental Conditions	27°C, 56% RH	RBW,VBW	120 KHz
Antenna Pole	Vertical / Horizontal	Antenna Distance	3m
Detector Function	Peak / Quasi-peak	Tested by	Simple Guan

(The chart below shows the highest readings taken from the final data)

Frequency Range Investigated (30 MHz TO 1000 MHz)							
Freq. (MHz)	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Ant. H/V	Mark
33.246	40.53	-15.15	25.38	40.00	-14.62	V	Q
41.362	38.04	-19.55	18.49	40.00	-21.51	V	Q
60.300	47.28	-20.12	27.16	40.00	-12.84	V	Q
84.108	47.63	-21.20	26.43	40.00	-13.57	V	Q
110.080	44.73	-21.18	23.55	43.50	-19.95	V	Q
200.440	46.05	-18.11	27.94	43.50	-15.56	V	Q
31.623	41.35	-14.04	27.31	40.00	-12.69	H	Q
61.923	45.42	-20.24	25.18	40.00	-14.82	H	Q
107.915	44.72	-21.30	23.42	43.50	-20.08	H	Q
202.064	45.63	-18.08	27.55	43.50	-15.95	H	Q
268.617	44.53	-16.27	28.26	46.00	-17.74	H	Q
295.130	43.20	-15.67	27.53	46.00	-18.47	H	Q

REMARKS: *1. P= Peak Reading; Q= Quasi-peak Reading A= Average Reading.*
2. The other emission levels were very low against the limit.

Model No.	AW850	**Test Mode**	Mode 1
Environmental Conditions	27°C, 56% RH	**RBW,VBW**	1MHz
Antenna Pole	Vertical / Horizontal	**Antenna Distance**	3m
Detector Function	Peak / Quasi-peak	**Tested by**	Simple Guan

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1290.00	V	48.55	---	-10.57	37.98	---	74.00	54.00	-16.02	Peak
1386.67	V	50.01	---	-10.04	39.97	-–	74.00	54.00	-14.03	Peak
2036.67	V	48.89	---	-7.31	41.58	---	74.00	54.00	-12.42	Peak
2663.33	V	48.71	---	-5.03	43.68	---	74.00	54.00	-10.32	Peak
4033.33	V	46.41	---	-1.54	44.87	---	74.00	54.00	-9.13	Peak
5325.00	V	45.58	---	2.12	47.70	---	74.00	54.00	-6.30	Peak
1100.00	H	48.89	---	-11.62	37.27	---	74.00	54.00	-16.73	Peak
1466.67	H	47.19	---	-9.60	37.59	-–	74.00	54.00	-16.41	Peak
1656.67	H	48.39	---	-8.81	39.58	---	74.00	54.00	-14.42	Peak
1836.67	H	47.10	---	-8.10	39.00	---	74.00	54.00	-15.00	Peak
3425.00	H	46.21	---	-3.14	43.07	---	74.00	54.00	-10.93	Peak
4875.00	H	45.02	---	0.77	45.79	---	74.00	54.00	-8.21	Peak

REMARKS: *1. P= Peak Reading; Q= Quasi-peak Reading A= Average Reading.*

2. The other emission levels were very low against the limit.