

FCC 15.209 & RSS-216 Wireless Power Transfer Report

for

Acer Incorporated

**8F., No.88, Sec. 1, Xintai 5th Rd., Xizhi,
New Taipei City 22181, Taiwan (R.O.C)**

Product Name : CWT Module-WTM1A15
Model Name : WTM1A15
Brand : acer
FCC ID : HLZWPC4
IC : 1754F-WPC4

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

TABLE OF CONTENTS

Description	Page
TEST REPORT CERTIFICATION.....	4
1. REVISION RECORD OF TEST REPORT.....	4
2. SUMMARY OF TEST RESULTS.....	5
3. GENERAL INFORMATION.....	6
3.1. Description of Application.....	6
3.2. Description of EUT.....	6
3.3. EUT Specifications Assessed in Current Report.....	7
3.4. Antenna Information.....	7
3.5. Description of Key Components.....	7
3.6. Test Configuration.....	7
3.7. Tested Supporting System List.....	8
3.8. Setup Configuration.....	9
3.9. Operating Condition of EUT.....	9
3.10. Description of Test Facility.....	10
3.11. Measurement Uncertainty.....	10
4. MEASUREMENT EQUIPMENT LIST.....	11
4.1. Conducted Emission Measurement.....	11
4.2. Radiated Emission Measurement.....	11
5. CONDUCTED EMISSION.....	12
5.1. Block Diagram of Test Setup.....	12
5.2. Conducted Emission Limit.....	12
5.3. Test Procedure.....	12
5.4. Test Results.....	13
6. RADIATED SPURIOUS EMISSION.....	14
6.1. Block Diagram of Test Setup.....	14
6.2. Radiated Emission Limits.....	15
6.3. Test Procedure.....	15
6.4. Measurement Limit Formula.....	16
6.5. Test Results.....	16
7. 20dB/99%dB BANDWIDTH.....	17
7.1. Block Diagram of Test Setup.....	17
7.2. Specification Limits.....	17
7.3. Test Procedure.....	17
7.4. Test Results.....	17
8. DEVIATION TO TEST SPECIFICATIONS.....	18

APPENDIX A TEST DATA AND PLOTS

APPENDIX B TEST PHOTOGRAPHS

TEST REPORT CERTIFICATION

Applicant : Acer Incorporated
Manufacture : Acer Incorporated
EUT Description
(1) Product : CWT Module-WTM1A15
(2) Model : WTM1A15
(3) Brand : acer
(4) Power Supply: DC 12V

Applicable Standards:

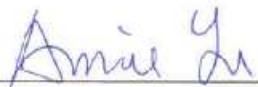
47CFR FCC Part 15 Subpart C
RSS-Gen (Issue 4), November 2014
RSS-216 (Issue 2), January 2016
ANSI C63.10:2013

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2019. 05. 07

Reviewed by:



(Annie Yu/Administrator)

Approved by:



(Ben Cheng/Manager)

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2019. 05. 07	Original Report	EM-F190155

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	PASS
15.209	RSS-Gen §8.9	Radio Spurious Emission	PASS
15.215 (c)	---	20dB Bandwidth	PASS
---	RSS-Gen §6.6	99%dB Bandwidth	PASS
15.203	RSS-Gen §8.3	Antenna Requirement	Compliance

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	Acer Incorporated 8F., No.88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)
Manufacture	Acer Incorporated 8F., No.88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)
Product	CWT Module-WTM1A15
Model	WTM1A15
Brand	acer

3.2. Description of EUT

Test Model	WTM1A15
Serial Number	N/A
Power Rating	DC 12V
RF Features	Wireless Power Transfer
WPC device or system that includes	Component: Wireless module ; Type: Category I
Host	Host Name: Personal Computer, Host Brand: acer Host Model: D19E4
Accessories	N/A
Date of Receipt	2019. 04. 19
Date of Test	2019. 05. 07

3.3. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Modulation
WPC	110-148 kHz	FSK

3.4. Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain(dBi)
1	---	---	Loop	---	---

3.5. Description of Key Components

None

3.6. Test Configuration

AC Conduction	
Test Case	Normal operation

	Item	Mode	Test Frequency
Radiated Test Case	Radiated Spurious Emission	WPC	113.174kHz
Conducted Test Case	20dB Bandwidth	WPC	113.174kHz

Note 1:

Mobile Device:.

Portable Device, and 3 axis were assessed.

Lie

Side

Stand

3.7. Tested Supporting System List

3.7.1. Support Peripheral Unit

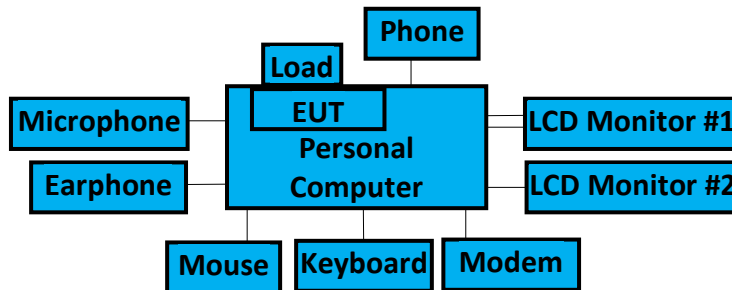
No.	Product	Brand	Model No.	Serial No.	Approval
1.	Personal Computer	acer	D19E4	N/A	FCC by DoC
2.	LCD Monitor #1	DELL	U2718Qb	CN-0M5R5F-QD C00-8BK-05EL	FCC by DoC
3.	LCD Monitor #2	ASUS	VE228	N/A	FCC by DoC
4.	Keyboard	DELL	KB216-BK-S CHI	CN-0MM1GD-7 1616-748-06NU	FCC by DoC
5.	Mouse	Microsoft	1111	N/A	FCC by DoC
6.	Microphone	Cheng Jia	CJ-M02	N/A	N/A
7.	Mobile Phone	ASUS	ASUS_T001	EAAZB711U219	N/A
8.	Modem	ACEEX	DM-1414	980034395	N/A
9.	Earphone	Cheng Jia	CJ-323	N/A	N/A
10.	Load (15Ω)	N/A	N/A	N/A	N/A

3.7.2. Cable Lists

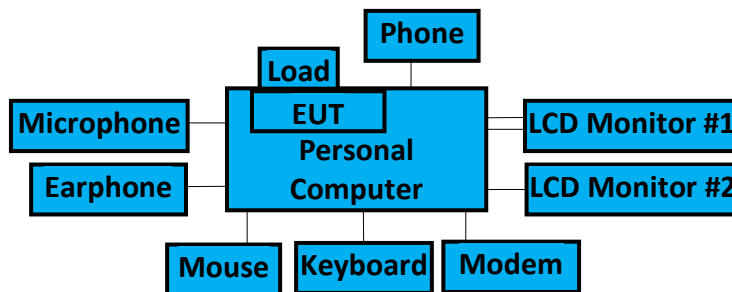
No.	Cable Description Of The Above Support Units
1.	AC Power Cord: Unshielded, Detachable, 1.8m
2.	HDMI Cable: Shielded, Detachable, 1.5m DP Cable: Shielded, Detachable, 1.5m AC Power Cord: Unshielded, Detachable, 1.8m
3.	D-Sub Cable: Shielded, Detachable, 1.5m AC Power Cord: Unshielded, Detachable, 1.8m
4.	USB Cable: Unshielded, Undetachable, 1.8m
5.	USB Cable: Unshielded, Undetachable, 1.8m
6.	Audio Cable: Unshielded, Undetachable, 1.8m
7.	Type C Cable: Unshielded, Detachable, 2.0m
8.	Cable: Shielded, Detachable, 1.5m AC Power Cord: Unshielded, Detachable, 1.8m
9.	Earphone Cable: Unshielded, Detachable, 2.0m
10.	N/A

3.8. Setup Configuration

3.8.1. For AC Conduction Test



3.8.2. For Radiated Spurious Emission Test



3.9. Operating Condition of EUT

To Set EUT RF function on continues transmitting.

3.10. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: sales@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 (1) No. 8 Shielding Room (2) Semi-Anechoic Chamber (IC Test Site Registration No.:5183B-1)

3.11. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	±5.82dB

Remark : Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz

4. MEASUREMENT EQUIPMENTLIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Test Receiver	R&S	ESR3	101774	2019. 01. 23	1 Year
2.	A.M.N.	R&S	ENV4200	100169	2018. 11. 14	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2018. 11. 19	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2019. 01. 12	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.8 S/R	2019. 04. 20	1 Year
6.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2019. 09. 12	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2018. 06. 20	1 Year
3.	Amplifier	HP	8447D	2944A06305	2019. 01. 30	1 Year
4.	Bilog Antenna	CHASE	CBL6112D	33821	2019. 01. 19	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2017. 12. 18	2 Year
6.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2019. 04. 20	1 Year
7.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.

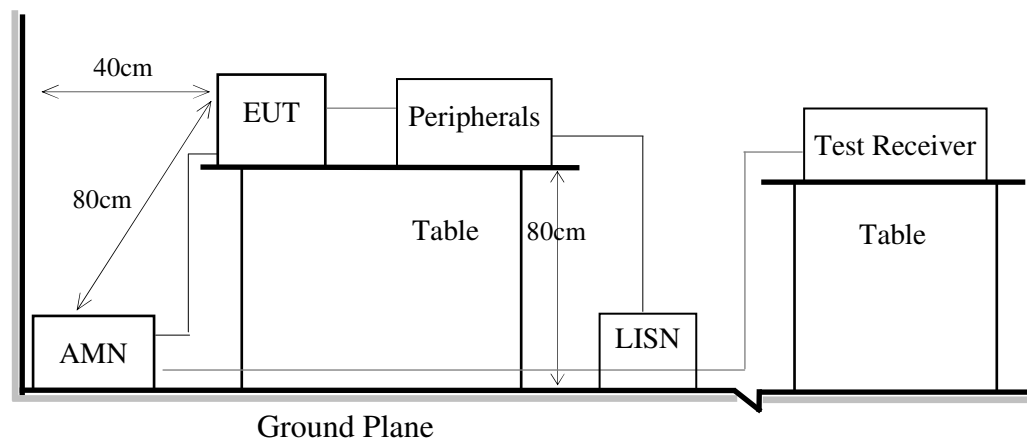
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.8

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

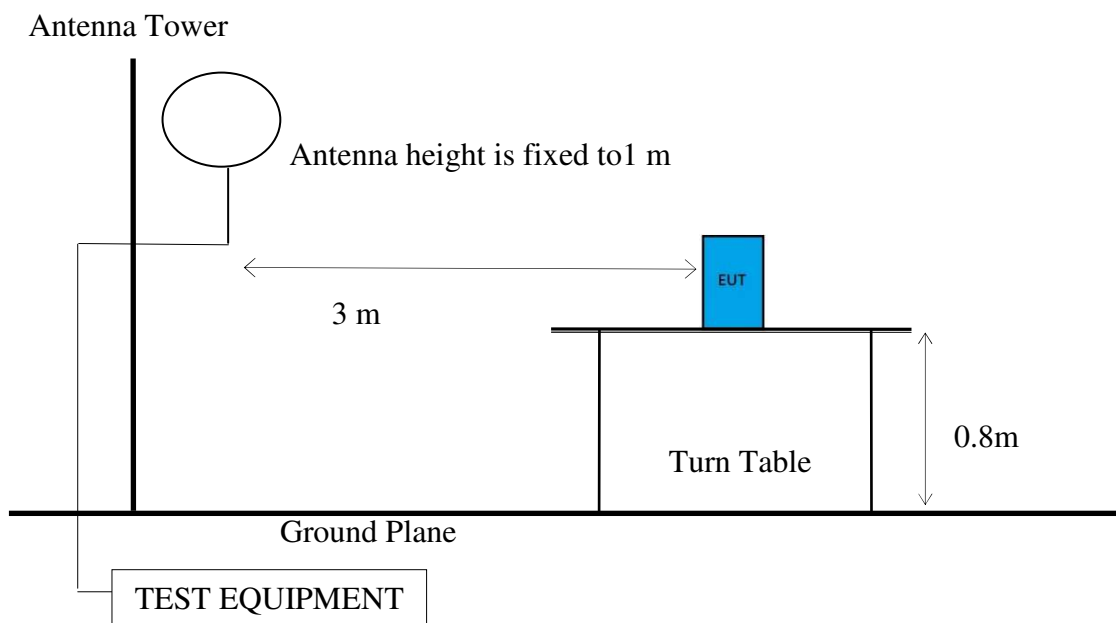
6. RADIATED SPURIOUS EMISSION

6.1. Block Diagram of Test Setup

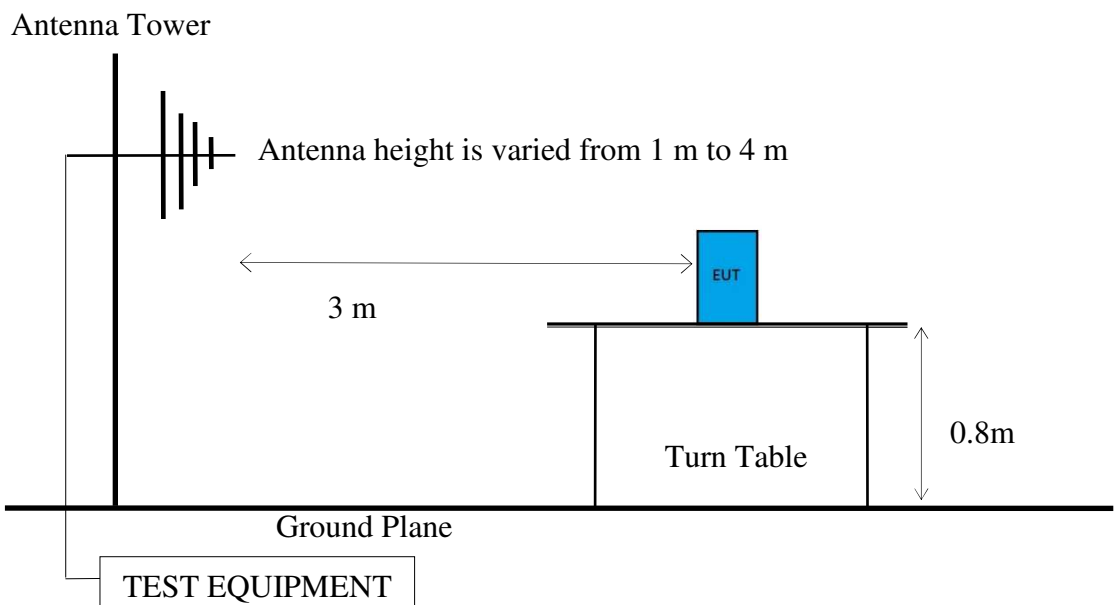
6.1.1. Block Diagram of EUT

Indicated as section 3.8

6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30MHz-1000MHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205/RSS-Gen Section 8.10 table 6 must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance(m)	Limits	
		dB μ V/m	μ V/m
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)	

Remark : (1) dB μ V/m = 20 log (μ V/m)

(2) The tighter limit applies to the edge between two frequency bands.

(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

(4) Fundamental and emission fall within operation band are exempted from this section.

(5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.3. Test Procedure

Frequency Range 9kHz~30MHz:

The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level.

In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

(1) RBW = 9kHz with peak and average detector.

(2) Detector: average and peak (10kHz-490kHz)

Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 1000MHz:

The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 regulation.

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW \geq 3 x RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.
- (7) When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

6.4. Measurement Limit Formula

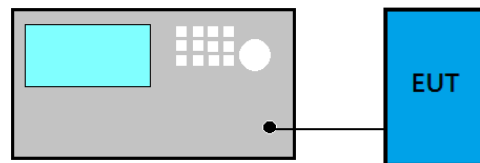
Frequency (MHz)	Formula
0.009 - 0.490MHz	3 Limit (dB μ V/m) = $20\log(2400/F^{\text{Note}})+40\log(300\text{m}/3\text{m})$
0.490-1.705MHz	3 Limit (dB μ V/m) = $20\log(24000/F^{\text{Note}})+40\log(300\text{m}/3\text{m})$
1.750-30MHz	3 Limit (dB μ V/m) = $20\log(30)+40\log(300\text{m}/3\text{m})$
Note: F is test frequency	

6.5. Test Results

Please refer to Appendix A.

7. 20dB/99%dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

The 20dB bandwidth shall be specified in operating frequency band.

7.3. Test Procedure

Following measurement procedure:

- (1) Set RBW close to 1% of OBW.
- (2) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

8. DEVIATION TO TEST SPECIFICATIONS

【NONE】



Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

APPENDIX A

Tel: +886 2 26099301
Fax: +886 2 26099303

APPDNDIX A

TEST DATA AND PLOTS

(Model: WTM1A15)



Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

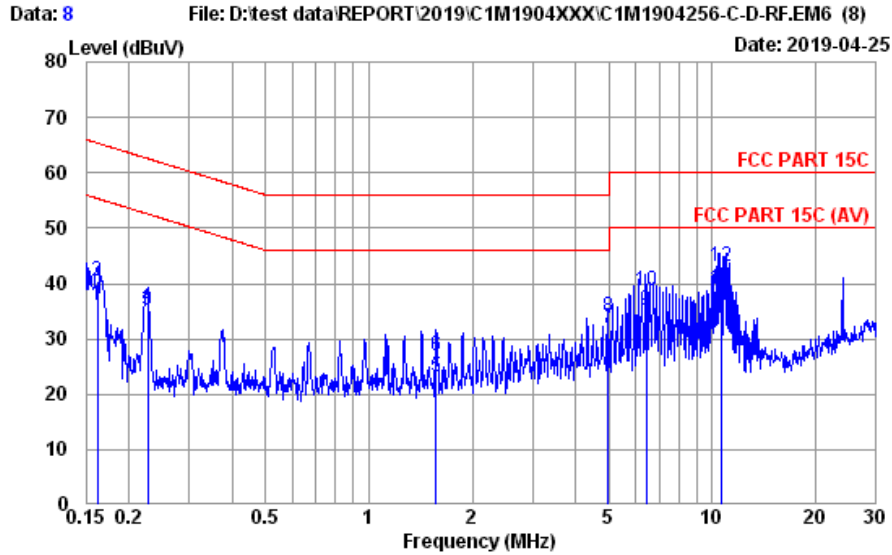
Tel: +886 2 26099301
Fax: +886 2 26099303

TABLE OF CONTENTS

A.1 CONDUCTED EMISSION.....	2
A.2 RADIATED SPURIOUS EMISSION.....	4
A.3 20dB/99% dB BANDWIDTH.....	7

A.1 CONDUCTED EMISSION

Test Date	2019/04/25	Temp./Hum.	22°C/55%
Test Voltage	AC 120V/60Hz (Via Personal Computer)		

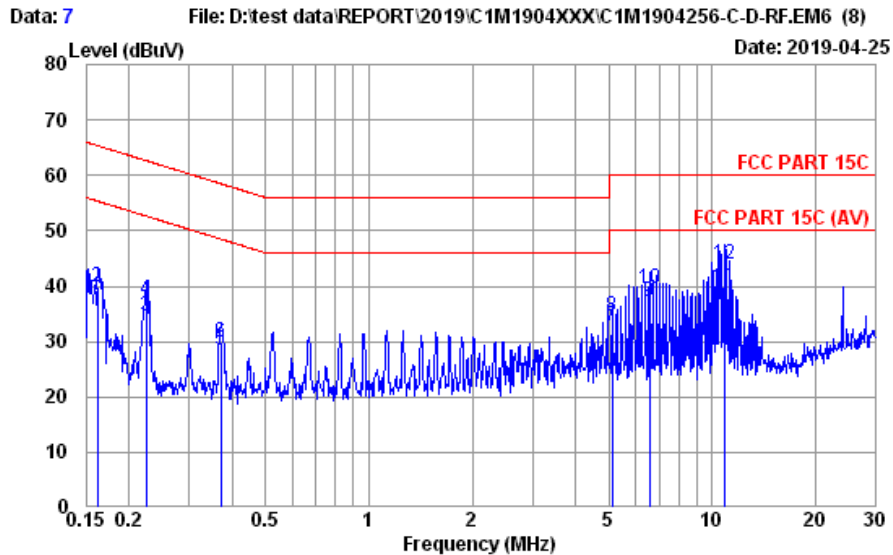


Site no. : No.8 Shielded Room Data no. : 8
 Condition : ENV4200 100169 LISN Phase : NEUTRAL
 Limit : FCC PART 15C
 Env. / Ins. : 22°C / 55% ESR3 (1774) Engineer : Xar Zhuo
 EUT : WTM1A15
 Power Rating : 120Vac/60Hz
 Test Mode : Operating
 10W

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.162	10.68	0.03	9.86	15.34	35.91	55.38	19.47	Average
2	0.162	10.68	0.03	9.86	19.87	40.44	65.38	24.94	QP
3	0.227	10.60	0.03	9.86	14.78	35.27	52.57	17.30	Average
4	0.227	10.60	0.03	9.86	15.33	35.82	62.57	26.75	QP
5	1.568	10.50	0.06	9.86	2.60	23.02	46.00	22.98	Average
6	1.568	10.50	0.06	9.86	6.65	27.07	56.00	28.93	QP
7	4.968	10.81	0.13	9.87	11.20	32.01	46.00	13.99	Average
8	4.968	10.81	0.13	9.87	13.06	33.87	56.00	22.13	QP
9	6.411	11.01	0.15	9.88	14.23	35.27	50.00	14.73	Average
10	6.411	11.01	0.15	9.88	17.58	38.62	60.00	21.38	QP
11	10.574	11.54	0.20	9.89	17.35	38.98	50.00	11.02	Average
12	10.574	11.54	0.20	9.89	21.54	43.17	60.00	16.83	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Date	2019/04/25	Temp./Hum.	22°C/55%
Test Voltage	AC 120V/60Hz (Via Personal Computer)		



Site no. : No.8 Shielded Room Data no. : 7
 Condition : ENV4200 100169 LISN Phase : LINE
 Limit : FCC PART 15C
 Env. / Ins. : 22°C / 55% ESR3 (1774) Engineer : Xar Zhuo
 EUT : WTM1A15
 Power Rating : 120Vac/60Hz
 Test Mode : Operating
 10W

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.162	10.60	0.03	9.86	15.07	35.56	55.39	19.83	Average
2	0.162	10.60	0.03	9.86	19.42	39.91	65.39	25.48	QP
3	0.225	10.52	0.03	9.86	14.20	34.61	52.63	18.02	Average
4	0.225	10.52	0.03	9.86	17.06	37.47	62.63	25.16	QP
5	0.371	10.46	0.04	9.86	8.09	28.45	48.47	20.02	Average
6	0.371	10.46	0.04	9.86	9.43	29.79	58.47	28.68	QP
7	5.117	10.71	0.13	9.87	12.04	32.75	50.00	17.25	Average
8	5.117	10.71	0.13	9.87	13.75	34.46	60.00	25.54	QP
9	6.557	10.87	0.15	9.88	16.21	37.11	50.00	12.89	Average
10	6.557	10.87	0.15	9.88	18.72	39.62	60.00	20.38	QP
11	10.874	11.39	0.20	9.90	18.26	39.75	50.00	10.25	Average
12	10.874	11.39	0.20	9.90	22.55	44.04	60.00	15.96	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
 2. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

A.2 RADIATED SPURIOUS EMISSION

Test Date	2019/04/29	Temp./Hum.	21°C/45%
Test Voltage	DC 12V (Via Personal Computer)		
Test Frequency	TX 113.174kHz		

A.2.1. Frequency 9kHz~30MHz

Antenna at 0 Degree

Test Frequency (kHz)	Test Result (dB μ V/m at 3m)	Limits (dB μ V/m at 3m)	Margin (dB)	Detector
113.174	92.20	106.53	14.330	Peak ^{Note 2}
339.522	71.00	96.99	25.990	Peak ^{Note 2}
565.870	59.90	72.55	12.650	QP
792.218	53.10	69.63	16.530	QP
1018.566	48.00	67.44	19.440	QP

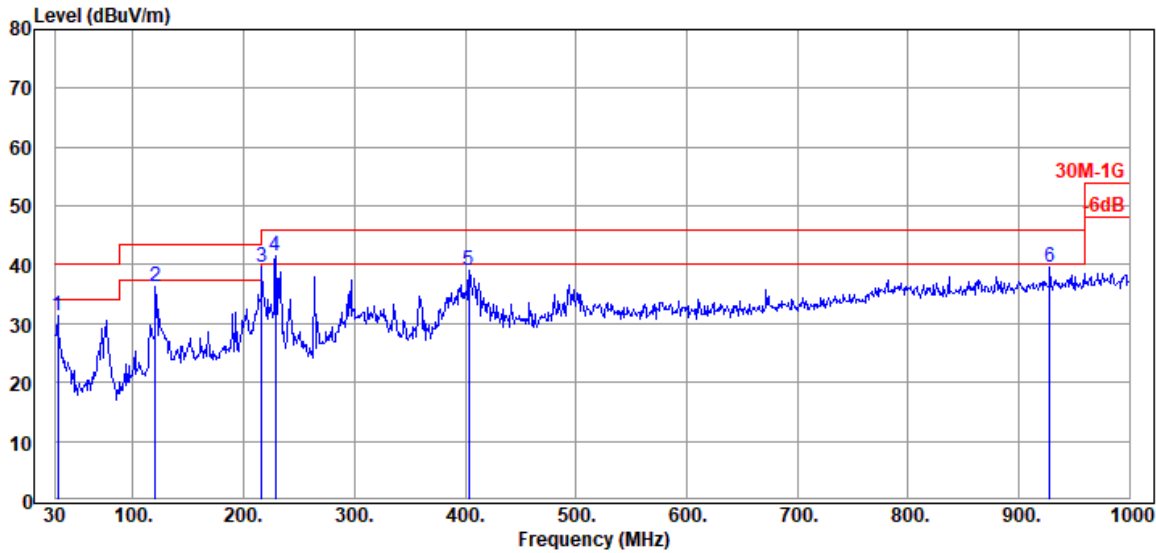
Antenna at 90 Degree

Test Frequency (kHz)	Test Result (dB μ V/m at 3m)	Limits (dB μ V/m at 3m)	Margin (dB)	Detector
113.174	86.60	106.53	19.930	Peak ^{Note 2}
339.522	65.00	96.99	31.990	Peak ^{Note 2}
565.870	54.70	72.55	17.850	QP
792.218	48.00	69.63	21.630	QP
1018.566	44.00	67.44	23.440	QP

Note: 1. All emissions are lower than the ambient level cannot be measured.

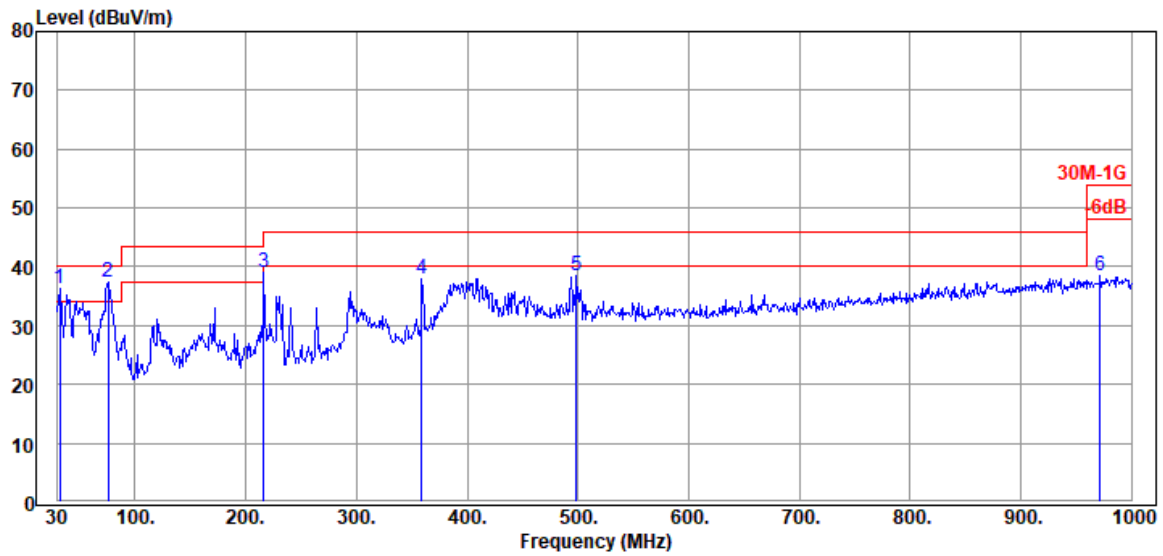
2. The Peak value has been compliance with Average limit, thus measurement with Average is not needed.

A.2.2. Frequency 30MHz ~ 1000MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
31.94	24.34	1.23	5.73	31.30	40.00	8.70	Peak
120.21	18.63	2.53	15.16	36.32	43.50	7.18	Peak
216.24	17.15	3.60	18.91	39.66	46.00	6.34	Peak
228.85	17.78	3.73	19.96	41.47	46.00	4.53	Peak
403.45	22.44	5.90	10.59	38.93	46.00	7.07	Peak
928.22	27.54	8.62	3.35	39.51	46.00	6.49	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
31.94	24.34	1.23	10.79	36.36	40.00	3.64	Peak
75.59	13.06	1.97	22.30	37.33	40.00	2.67	Peak
216.24	17.15	3.60	18.36	39.11	46.00	6.89	Peak
358.83	21.38	5.33	11.12	37.83	46.00	8.17	Peak
498.51	23.68	6.74	8.08	38.50	46.00	7.50	Peak
971.87	27.87	8.88	1.83	38.58	54.00	15.42	Peak

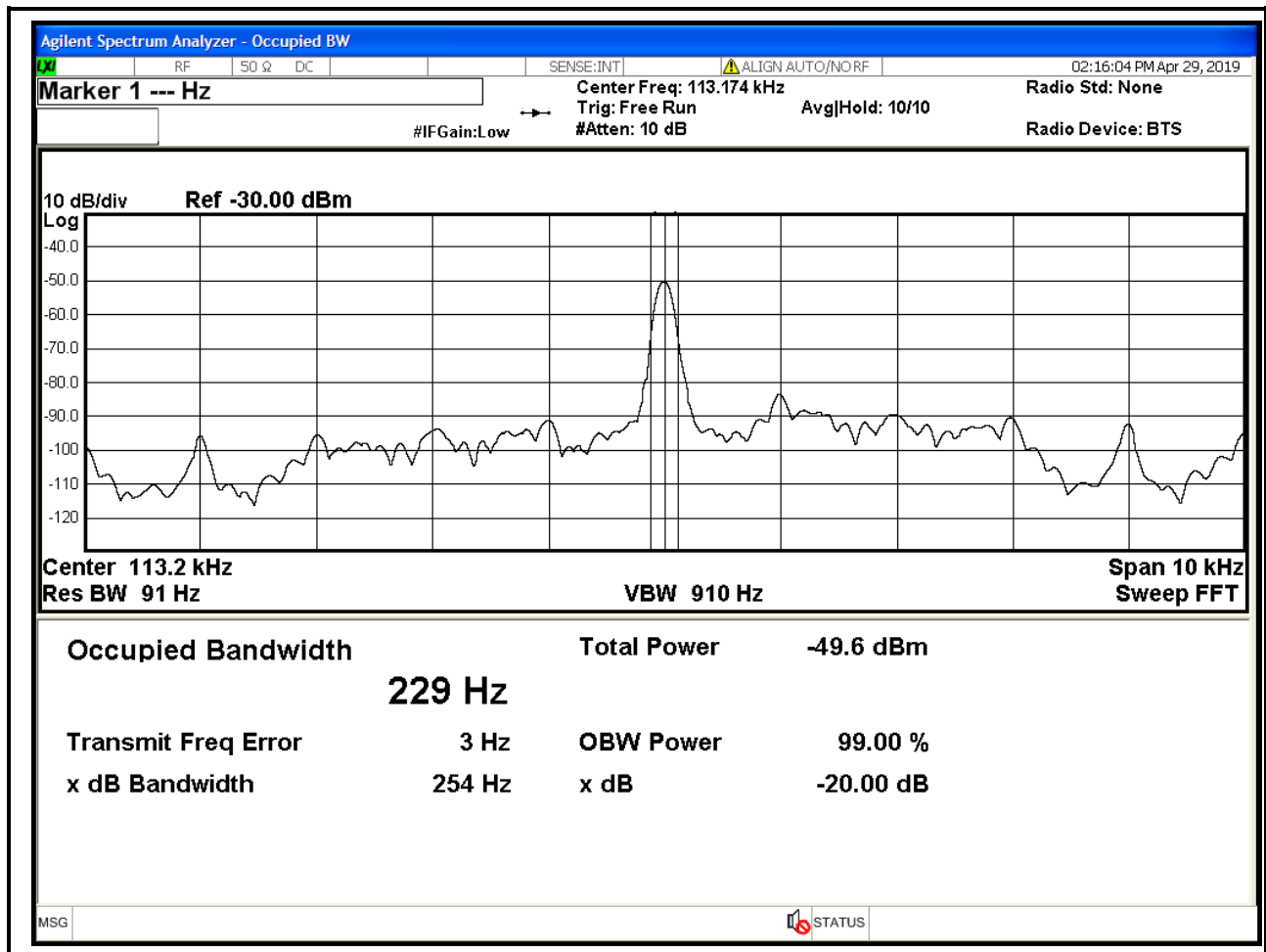
A.3 20dB/99% dB BANDWIDTH

Test Date	2019/04/29	Temp./Hum.	25°C/54%
Cable Loss	N/A	Test Voltage	DC 12V (Via Personal Computer)

A.4.1.1 20dB/99dB Bandwidth Result

Centre Frequency (kHz)	20 dB Bandwidth (Hz)	99% dB Bandwidth (Hz)
113.174	254	229

A.4.1.2 Measurement Plots





Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

APPENDIX B

Tel: +886 2 26099301
Fax: +886 2 26099303

APPDNDIX B

TEST PHOTOGRAPHS

(Model: WTM1A15)