

FCC 47 CFR PART 15 SUBPART B
TEST REPORT
Autonomic Controls, Inc.
MMS-1e MIRAGE MEDIA STREAMER
Test Model No.: AU-MMS-1e-R2
List Model No.: /

Prepared for : Autonomic Controls, Inc.
Address : 28 Kaysal Court, Armonk, NY 10504, USA

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of receipt of test sample : Jul 05, 2017
Number of tested samples : 1
Serial number : Prototype
Date of Test : Jul 05, 2017 ~ Jul 12, 2017
Date of Report : Jul 21, 2017

FCC TEST REPORT
FCC 47 CFR PART 15 SUBPART B

Report Reference No. : **LCS170705113AE**

Date Of Issue : Jul 21, 2017

Testing Laboratory Name : **Shenzhen LCS Compliance Testing Laboratory Ltd.**

Address : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure : Full application of Harmonised standards Partial application of Harmonised standards Other standard testing method

Applicant's Name : **Autonomic Controls, Inc.**

Address : 28 Kaysal Court, Armonk, NY 10504, USA

Test Specification

Standard : FCC 47 CFR Part 15 Subpart B, ANSI C63.4 -2014

Test Report Form No. : LCSEMC-1.0

TRF Originator : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF : Dated 2011-03

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Test Item Description : **MMS-1e MIRAGE MEDIA STREAMER**

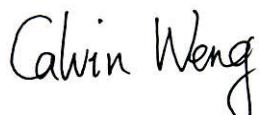
Model/ Type Reference : AU-MMS-1e-R2

Trade Mark : AUTONOMIC

Ratings : DC 5.2V/2.1A by power adapter
Adapter input:100-240VAC, 50/60Hz, 0.5A

Result : **Positive**

Compiled by:



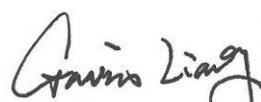
Calvin Weng/ Administrators

Supervised by:



Dick Su / Technique principal

Approved by:



Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS170705113AE

Jul 21, 2017
Date of issue

Type / Model..... : AU-MMS-1e-R2

EUT..... : MMS-1e MIRAGE MEDIA STREAMER

Applicant..... : Autonomic Controls, Inc.

Address..... : 28 Kaysal Court, Armonk, NY 10504, USA

Telephone..... : /

Fax..... : /

Manufacturer..... : Shenzhen ZHIQU Technology Limited

Address..... : RM1101, Tower B, Haisong Building, Tairan 9th Road, Futian District, Shenzhen, China.

Telephone..... : /

Fax..... : /

Factory..... : Shenzhen ZHIQU Technology Limited

Address..... : RM1101, Tower B, Haisong Building, Tairan 9th Road, Futian District, Shenzhen, China.

Telephone..... : /

Fax..... : /

Test Result according to the standards on page 5: **Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	Jul 21, 2017	Initial Issue	Gavin Liang

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1. SUMMARY OF STANDARDS AND RESULTS

1.1. Summary

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B ANSI C63.4:2014	Class B	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B ANSI C63.4:2014	Class B	PASS
Conducted disturbance at Antenna terminals	FCC 47 CFR Part 15 Subpart B ANSI C63.4:2014	-----	N/A

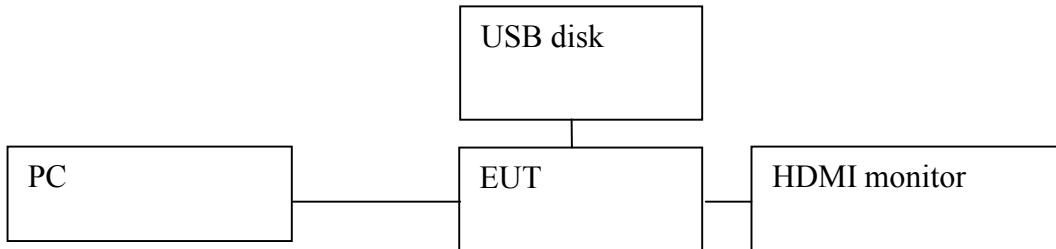
N/A is an abbreviation for Not Applicable.

1.2. Test Modes

The test mode(s) are selected according to relevant radio technology specifications.

Test mode:	
TM 1	USB port connected to PC for data exchange, Media Play & HDMI output

1.3. Block Diagram of Test Setup



Equipment Used in Tested System

Items	Equipment	Manufacturer	Model number or Type	Serial No	Length	shielded/unshielded	Notes
1	PC	Lenovo	ThinkPad	A131101117	/	/	FCC DOC
2	Power adapter (PC)	Lenovo	CPA-A176	/	1.0m	unshielded	FCC DOC
3	USB Disk	Kingston	DT 100G3	/	/	/	FCC DOC
4	Monitor	Sony	KDL-32W700B	2011083	/	/	FCC DOC
5	RJ45 Line	Huawei	/	/	1.0m	unshielded	/
6	Power adapter for EUT	Shenzhen ZHIQU Technology Limited	XS-0522100DH	/	1.0m	unshielded	FCC VOC

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : MMS-1e MIRAGE MEDIA STREAMER

Trade Mark : AUTONOMIC

Test Model No. : AU-MMS-1e-R2

List Model No. /

Power Supply : DC 5.2V/2.1A by power adapter
Adapter input:100-240VAC, 50/60Hz, 0.5A

Hardware version : V1.0

Software version : V1.0

Highest working frequency : 5.825GHz

2.2. Description of Test Facility

Site Description
EMC Lab. : CNAS Registration Number. is L4595.
FCC Registration Number. is 899208.
Industry Canada Registration Number. is 9642A-1.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

2.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. to DIN EN ISO/IEC 17025. Furthermore,

component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.4. Measurement Uncertainty

Test Item	Frequency Range	Expanded uncertainty (U _{lab})	Expanded uncertainty (U _{CISPR})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 4.0 dB ± 3.6 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.2 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	N/A

- (1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.
- (2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

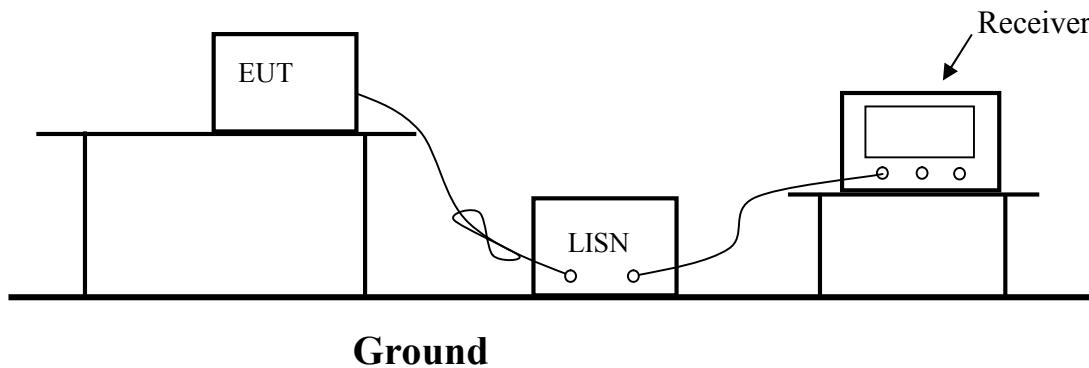
3. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

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

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal. Day	Cal. Due Day
1	EMI Test Receiver	ROHDE & SCHWARZ	ESR 7	101181	2017-06-18	2018-06-17
2	10dB Attenuator	SCHWARZBECK	MTS-IMP136	261115-001-0032	2017-06-18	2018-06-17
3	Artificial Mains	ROHDE & SCHWARZ	ENV216	101288	2017-06-18	2018-06-17
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	RF Cable	Harbour Industries	1452	N/A	2017-06-18	2018-06-17

3.2. Block Diagram of Test Setup



3.3. Test Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)			Limit (dB μ V)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.

NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.4. EUT Configuration on Test

The following equipment are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

3.5. Operating Condition of EUT

- 3.4.1. Setup the EUT as shown on Section 3.2
- 3.4.2. Turn on the power of all equipments.
- 3.4.3. Let the EUT work in test mode and measure it.

3.6. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane. Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 3.1 of this report.

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

All support equipment power received from a second LISN.

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 150 kHz 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 clause 2.3 were scanned during the preliminary test.

After the preliminary scan, we found the test mode 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.

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, Neutral and Line, 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.

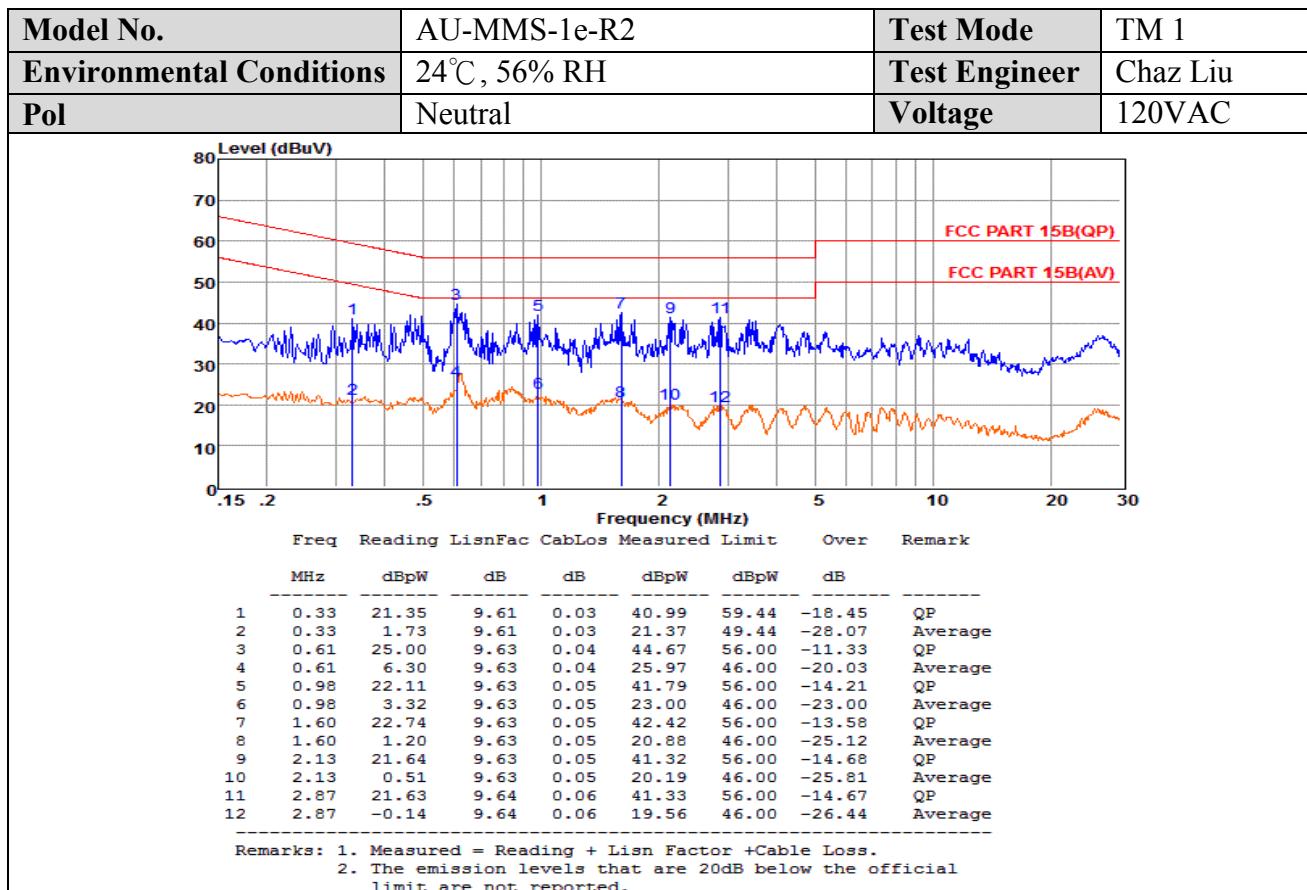
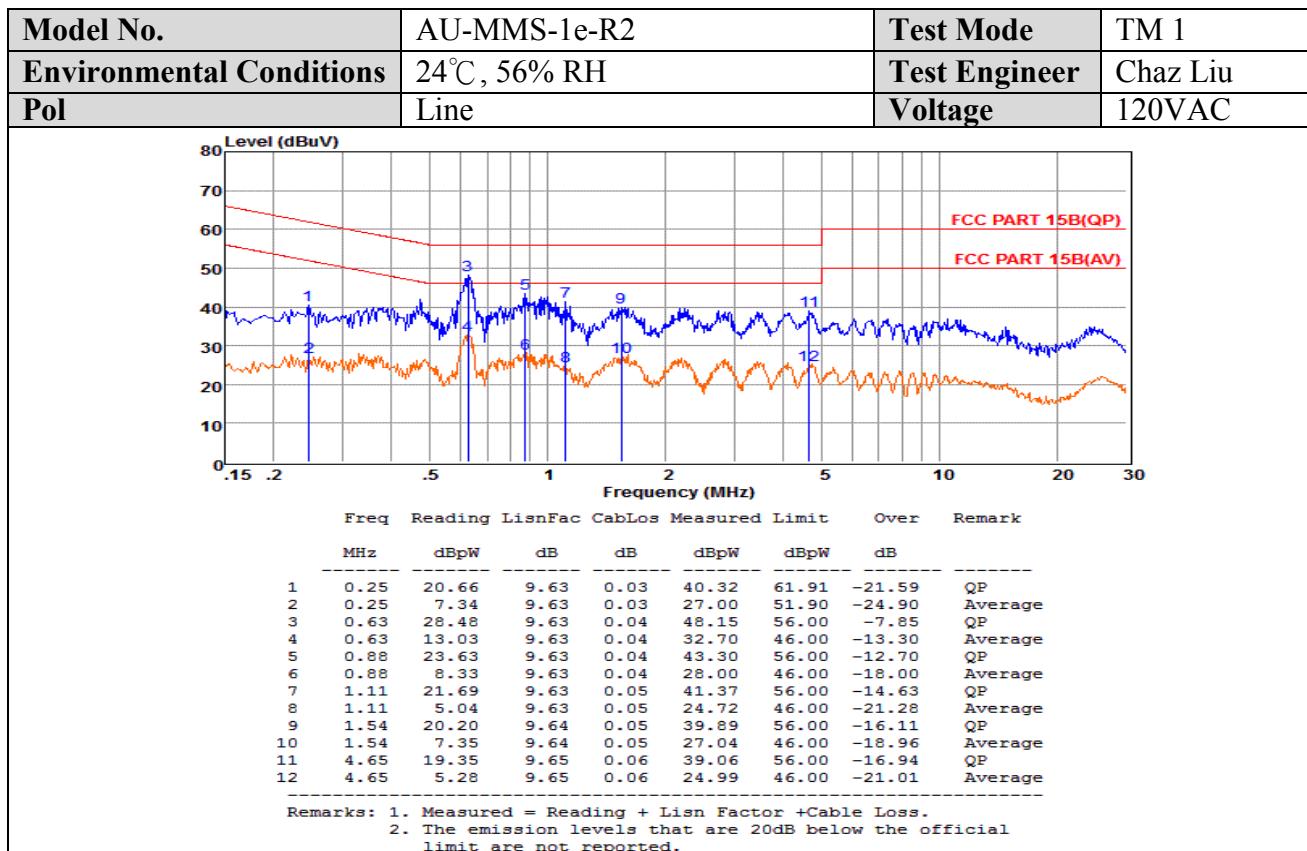
The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

3.7. Test Results

PASS.

Note: All modes operated at 120VAC and 240VAC are tested for pre-scan, only recorded the worst case data in the report.



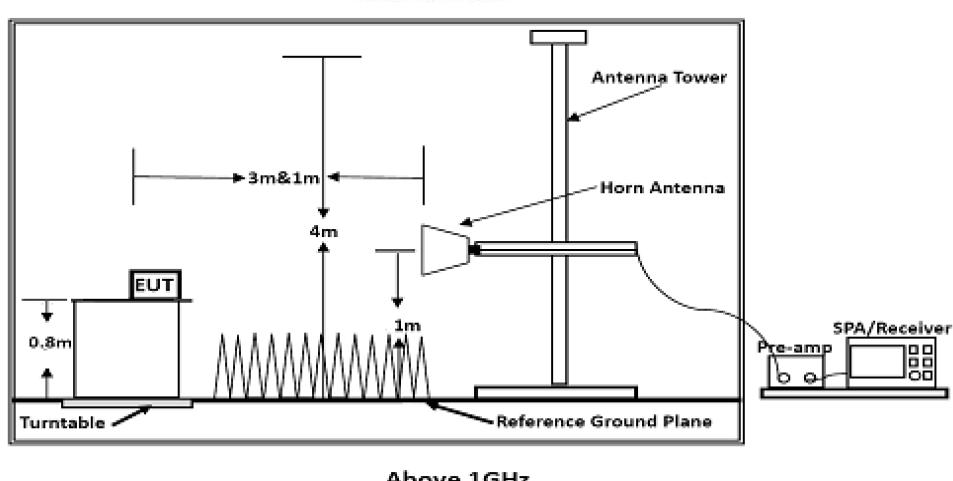
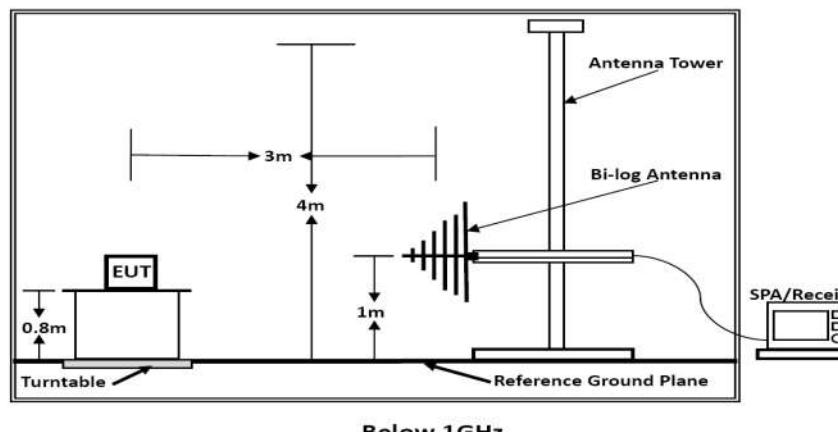
4. RADIATED EMISSION MEASUREMENT

4.1. Test Equipment

The following test equipment are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal. Day	Cal. Due Day
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2017-06-18	2018-06-17
2	EMI Test Receiver	ROHDE & SCHWARZ	ESR 7	101181	2017-06-18	2018-06-17
3	Log per Antenna	SCHWARZBECK	VULB9163	9163-470	2017-06-10	2018-06-09
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Positioning Controller	MF	MF-7082	/	N/A	N/A
6	RF Cable	Hubersuhner	Sucoflex104	FP2RX2	2017-06-18	2018-06-17
7	Horn Antenna	EMCO	3115	6741	2017-06-10	2018-06-09
8	Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170	2017-04-18	2018-04-17
9	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2017-06-18	2018-06-17
10	Amplifier	SCHAFFNER	COA9231A	18667	2017-06-18	2018-06-17
11	Amplifier	Agilent	8449B	3008A02120	2017-06-18	2018-06-17
12	Amplifier	MITEQ	AMF-6F-260400	9121372	2017-06-18	2018-06-17

4.2. Block Diagram of Test Setup



4.3. Radiated Emission Limit (Class B)

Limits for radiated disturbance Blow 1GHz

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.

(2) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

4.4. EUT Configuration on Measurement

The following equipments are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.5. Operating Condition of EUT

- 4.5.1. Setup the EUT as shown in Section 4.2.
- 4.5.2. Let the EUT work in test mode and measure it.

4.6. Test Procedure

Procedure of Preliminary Test

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80 cm above the ground plane for below 1GHz and 80 cm above the ground with absorber.

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 4.1 of this report.

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

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 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 Analyzer / Receiver quickly scanned from 1000MHz to 12750MHz. 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 clause 2.3 were scanned during the preliminary test:

After the preliminary scan, we found the test mode producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

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.

The Analyzer / Receiver scanned from 1000MHz to 12750MHz. 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 below 1GHz.

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 both Peak and Average reading is presented for above 1GHz.

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

The bandwidth setting of the test receiver/spectrum as follows.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	5 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10 Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10 Hz for Average

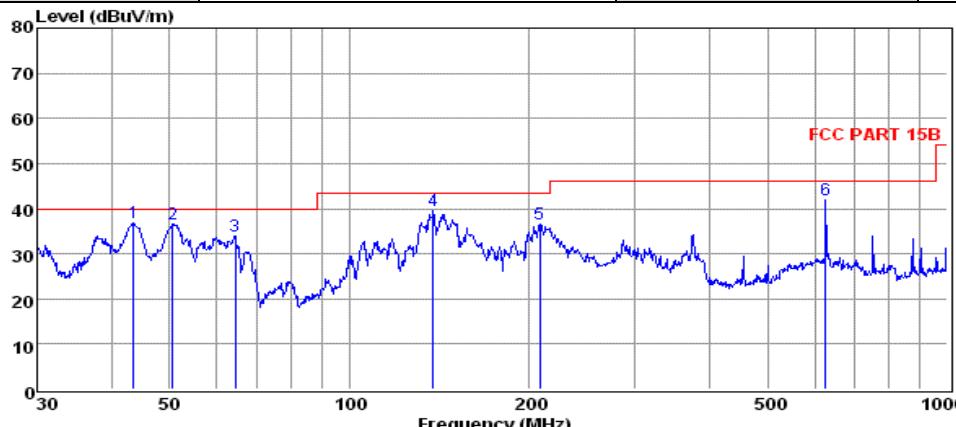
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

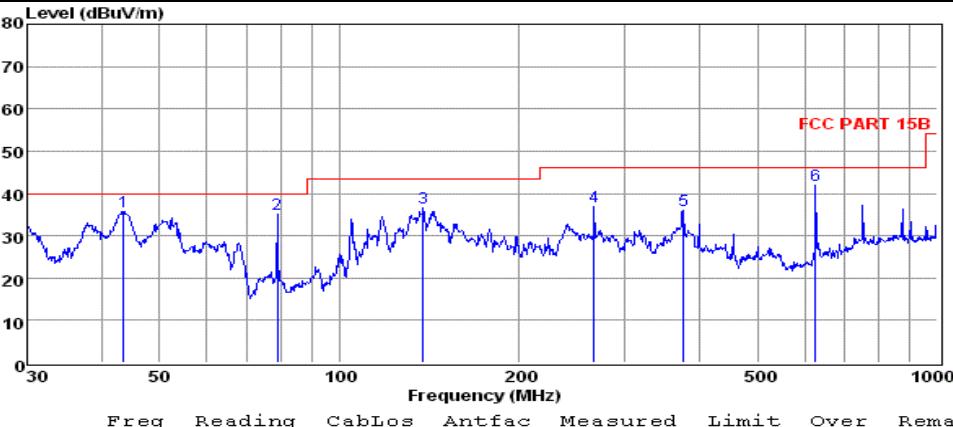
As the highest working frequency of the device is 5.825GHz, according to the requirement, the investigated frequency range is 30MHz-40GHz.

4.7. Radiated Emission Noise Measurement Result

PASS.

Please refer to the next page for test data.

Model No.	AU-MMS-1e-R2	Test Mode	TM 1																																																																
Environmental Conditions	24°C, 56% RH	Detector Function	Quasi-peak																																																																
Pol	Vertical	Distance	3m																																																																
Test Engineer	Chaz Liu																																																																		
																																																																			
<table border="1"> <thead> <tr> <th>Freq</th> <th>Reading</th> <th>CabLoss</th> <th>Antfac</th> <th>Measured</th> <th>Limit</th> <th>Over</th> <th>Remark</th> </tr> <tr> <th>MHz</th> <th>dBuV</th> <th>dB</th> <th>dB/m</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>43.51</td> <td>22.76</td> <td>0.41</td> <td>13.56</td> <td>36.73</td> <td>40.00</td> <td>-3.27 QP</td> </tr> <tr> <td>2</td> <td>50.59</td> <td>22.95</td> <td>0.54</td> <td>13.22</td> <td>36.71</td> <td>40.00</td> <td>-3.29 QP</td> </tr> <tr> <td>3</td> <td>64.43</td> <td>22.53</td> <td>0.52</td> <td>10.93</td> <td>33.98</td> <td>40.00</td> <td>-6.02 QP</td> </tr> <tr> <td>4</td> <td>137.90</td> <td>30.38</td> <td>0.70</td> <td>8.35</td> <td>39.43</td> <td>43.50</td> <td>-4.07 QP</td> </tr> <tr> <td>5</td> <td>207.85</td> <td>24.92</td> <td>0.86</td> <td>10.82</td> <td>36.60</td> <td>43.50</td> <td>-6.90 QP</td> </tr> <tr> <td>6</td> <td>625.08</td> <td>21.89</td> <td>1.49</td> <td>18.54</td> <td>41.92</td> <td>46.00</td> <td>-4.08 QP</td> </tr> </tbody> </table>				Freq	Reading	CabLoss	Antfac	Measured	Limit	Over	Remark	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB		1	43.51	22.76	0.41	13.56	36.73	40.00	-3.27 QP	2	50.59	22.95	0.54	13.22	36.71	40.00	-3.29 QP	3	64.43	22.53	0.52	10.93	33.98	40.00	-6.02 QP	4	137.90	30.38	0.70	8.35	39.43	43.50	-4.07 QP	5	207.85	24.92	0.86	10.82	36.60	43.50	-6.90 QP	6	625.08	21.89	1.49	18.54	41.92	46.00	-4.08 QP
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<p>Note: 1. All readings are Quasi-peak values. 2. Measured= Reading + Antenna Factor + Cable Loss 3. The emission that ate 20db blow the offical limit are not reported</p>																																																																			

Model No.	AU-MMS-1e-R2	Test Mode	TM 1																																																																
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Note: for frequency range from 18GHz-40GHz, there's no any radiation signal detected, therefore, test data is not recorded here.

5. PHOTOGRAPH OF TEST SETUP

Please refer to separated file for test setup photos.

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Please refer to seperated file for external and internal photos of eut.

-----THE END OF TEST REPORT-----