

FCC Test Report

Report No: FCS202011015W01

Issued for

Applicant:	Adam Hall GmbH
Address:	Adam-Hall-Str.1, Neu-Anspach, 61267, Germany
Product Name:	UHF In Ear Monitor System
Brand Name:	LD SYSTEMS
Model Name:	LDU5047IEM
Series Model:	N/A
FCC ID:	2AFF6-LDU5047IEM
Add: Room 105 Floor E	sued By: Flux Compliance Service Laboratory Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan 280901 Fax:769-27280901 http://www.fcs-lab.com



TEST RESULT CERTIFICATION

Applicant's Name	Adam Hall GmbH
Address	Adam-Hall-Str.1, Neu-Anspach, 61267, Germany
Manufacture's Name	Adam Hall GmbH
Address	Adam-Hall-Str.1, Neu-Anspach, 61267, Germany
Product Description	
Product Name:	UHF In Ear Monitor System
Brand Name	LD SYSTEMS
Model Name:	LDU5047IEM
Series Model	N/A
Test Standards	FCC Rules and Regulations Part 15 Subpart C section 15.236
Test Procedure	ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests : Nov 20, 2020 ~ Nov 30, 2020

:

Date of Issue: Nov 30, 2020

Test Result..... Pass

Testing Engineer

Dukelen

(Duke Qian)

Technical Manager :

(Jack Wang)

Authorized Signatory :

Andygue

(Andy Yue)



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Revision History

Rev.	Issue Date	Effect Page	Contents
00	Nov 30, 2020	All	Initial Issue



1. SUMMARY OF TEST RESULTS

FC	CC Part 15 Subpart C section 15.236		
Standard Section	Test Item	Judgment	Remark
FCC Part 15.236(d)	Maximum Radiated Power	PASS	
FCC Part 15.236(f)(2)	Occupied Bandwidth	PASS	
FCC Part 15.236(g)	Necessary bandwidth	PASS	
FCC Part 15.236(f)(3)	Frequency stability	PASS	
FCC Part 15.236(g)	Emission within the band and outside this band	PASS	
FCC Part 15.207	Conducted Emission	PASS	

NOTE:

- (1)" N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10:2013



1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory	
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan	
Telephone:	+86-769-27280901	
Fax:	+86-769-27280901	
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01		

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.98 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±3.2 dB
6	All emissions, radiated (1GHz -18GHz)	±3.66 dB
7	All emissions, radiated (18GHz -40GHz)	±4.31 dB



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	UHF In Ear Monitor System
Model Name	LD SYSTEMS
Series Model	LDU5047IEM
Channel List	Please refer to the Note 2.
Operation frequency	470MHz- 490MHz
Modulation Type	FM
Antenna Type	External Antenna
Antenna Gain (dBi)	1.0
Power Supply	DC 12V by adapter
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.





2. Channel List

Channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
	(MHz)		(MHz)		(MHz)
01	475.75				
02	481.75				
03	487.75				

Ant.	Antenna Brand	Antenna Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	NA	Ysis	External Antenna	N/A	1.0	Antenna



2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test software:FCC tools

The test softeware was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table, the following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Mode	Channel	Frequency (MHz)	
Channel	CH 01	475.75	
	CH 02	481.75	
	CH 03	487.75	



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Support units

ltem	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in $\[$ Length $\]$ column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2020. 06.26	2021. 06.25
Signal Analyzer	R&S	FSV40-N	FCS-E012	2020.06.05	2021.06.04
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2020.08.09	2021.08.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2020.08.26	2021.08.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2020.08.26	2021.08.25
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2020.06.26	2021.06.25
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2020.06.26	2021.06.25
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2020.06.03	2021.06.02
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2020.08.08	2021.08.07
Temperature & Humidity	HTC-1	victor	FCS-E005	2020.08.26	2021.08.25

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2020.06.03	2021.06.02
LISN	R&S	ENV216	FCS-E007	2020.08.08	2021.08.07
LISN	ETS	3810/2NM	FCS-E009	2020.06.03	2021.06.02
Temperature & Humidity	HTC-1	victor	FCS-E008	2020.08.08	2021.08.07

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020B	FCS-E015	2020.06.03	2021.06.02
Spectrum Analyzer	Agilent	E4447A	MY50180039	2020.08.08	2021.08.07
Spectrum Analyzer	R&S	FSV-40	101499	2020.08.26	2021.08.25
Signal generator	Agilent	N5182A	FCS-E020	2020.08.26	2021.08.25
Audio analyzer	R&S	UPL	FCS-E021	2020.08.26	2021.08.25



3 MAXIMUM RADIATED POWER

3.1 LIMIT

Refer to FCC 15.236(d)

In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP; In the 600 MHz guard bands including the duplex gap: 20 mW EIRP

3.2 TEST PROCEDURE

A · Connect each EUT's antenna output to power sensor by RF cable and attenuator

3.3 TEST SETUP



3.4 TEST RESULTS

Test mode	Channel	FIEUDEILV	Peak Output Power (dBm)			Limit(dBm)	Verdict
Channel	01	475.75	6.215	1	7.215		PASS
	02	481.75	6.330	1	7.330	17dBm	
	03	487.75	6.316	1	7.316		



4. OCCUPIED BANDWIDTH

4.1 LIMIT

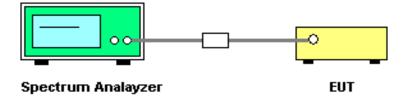
.

One or more adjacent 25 kHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz. The operating bandwidth shall not exceed 200 kHz

4.2 TEST PROCEDURE

Parameter	Setting		
Detector	Peak/AV		
Sweep time	Auto		
Resolution bandwidth	1 % to 5 % of the occupied bandwidth		
Video bandwidth:	3 x resolution bandwidth		
Span:	2 x emission bandwidth		
Trace mode:	Max. hold		
Analyzer function:	99% power occupied bandwidth function		
EUT:	Modulated signal with max. frequency		
E01.	deviation		

4.3 TEST SETUP





4.4 TEST RESULTS

Test mode	Channel		99% Bandwidth (KHz)	Limit(KHz)	Verdict
Channel	Low CH	475.75	168.85KHz		
	Middle CH	481.75	170.44KHz	200	PASS
	High CH	487.75	169.54KHz		



 Flux Compliance Service Laboratory

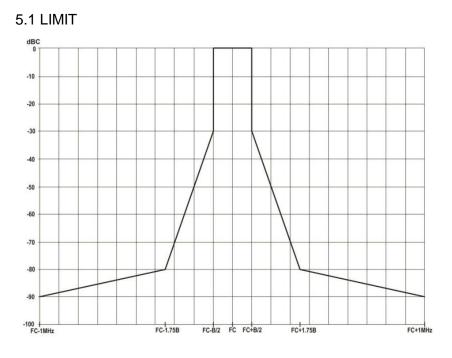
 Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan

 Tel: 769-27280901
 Fax:769-27280901

 http://www.fcs-lab.com

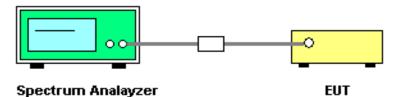


5 NECESSARY BANDWITH



5.2 TEST PROCEDURE EN300422-1 V1.4.2 Clause 8.3.

5.3 TEST SETUP

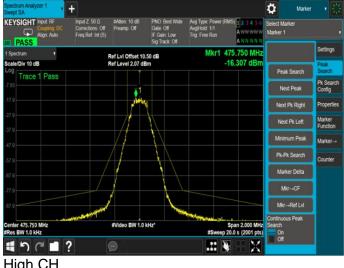


5.4 TEST RESULT

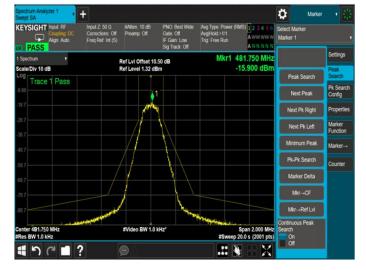
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Emission Mask Channel

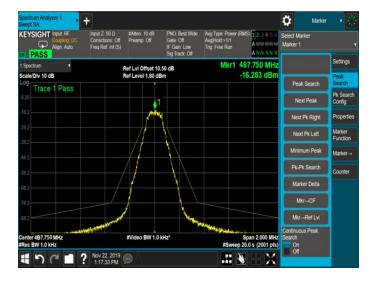
Low CH



Middle CH



High CH





6. TRANSMITTER UNWANTED EMISSIONS

6.1 LIMIT

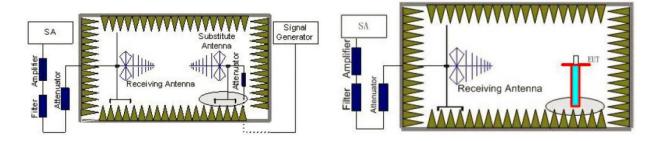
Spurious emissions are emissions outside the frequency range(s) of the equipment. The power of the spurious emissions shall not exceed the limits of table as below:

	Frequency						
State	47MHz to 74MHz, 87.5MHz to 137MHz	Other Frequencies	Frequencies above				
	174MHz to 230MHz, 470MHz to 862MHz	below 1000MHz	1000MHz				
Operation	4nW	250nW	1uW				
Standby	2nW	2nW	20nW				

5.2 TEST PROCEDURE

- The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum 1.
- analyzer start 2400MHz to 2483.5MHz with 100 KHz RBW and 300 KHz VBW
- 2 Please refer to ETSI EN 300 422-1 V1.4.2 (2011-08) clause 6.1 for the test conditions.
- 3 Please refer to ETSI EN 300 422-1 V1.4.2 (2011-08) clause 8.4.2 for the measurement method.

5.3 TEST SETUP

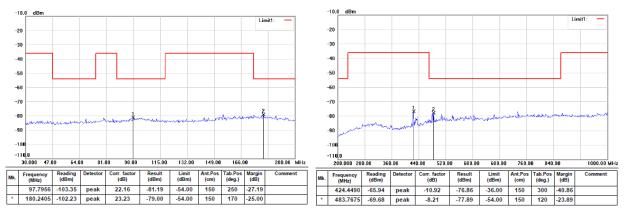




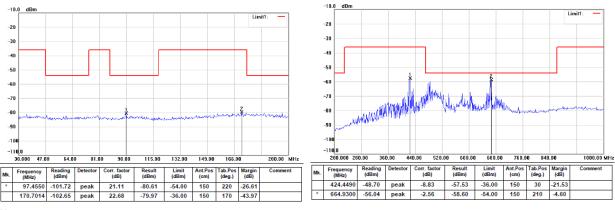
6.4 TEST RESULTS

CHNNEL -LOW CH-30MHZ-1000MHZ

Vertical



Horizontal



Note :

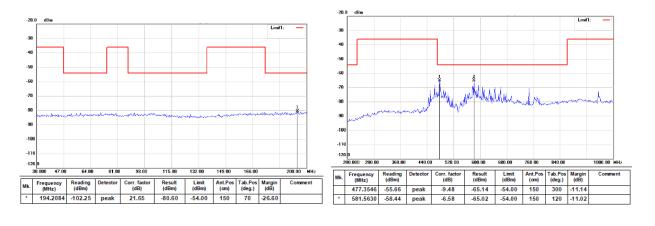
1. Result = Reading + Corrected Factor Note :

2. The fundamental wave filtered out during the test.

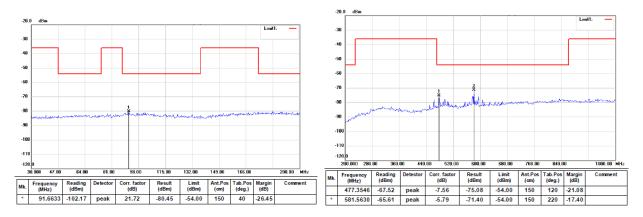


CHNNEL -MIDDLE CH-30MHZ-1000MHZ

Vertical



Horizontal



Note :

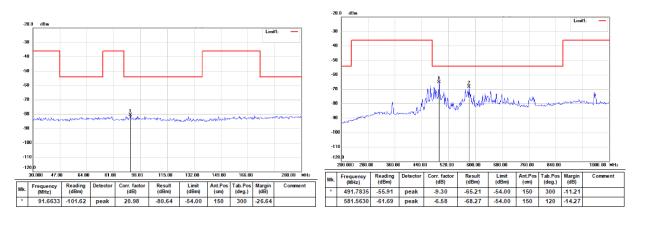
1. Result = Reading + Corrected Factor Note :

2. The fundamental wave filtered out during the test.

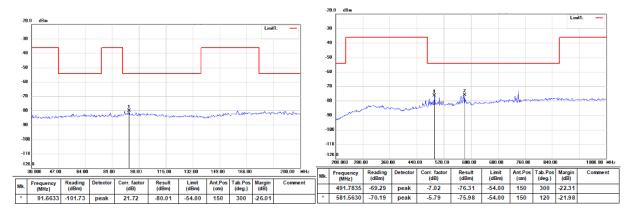


CHNNEL -HIGH CH-30MHZ-1000MHZ

Vertical



Horizontal



Note :

1. Result = Reading + Corrected Factor Note :

2. The fundamental wave filtered out during the test.



CHANNEL 1GHZ-6GHZ

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Test	Frequency	Ant. Pol.	SG	Cable Loss	Substitute	EIRP	Limit	Margin
Channel	(MHz)	(H/V)	Reading	(dB)	Antenna	(dBm)	(dBm)	(dB)
(MHz)			(dBm)		Gain (dBi)			
	1880.00	н	-63.02	3.40	10.44	-55.98	-30.00	-25.98
	2350.00	Н	-60.43	3.79	9.81	-54.41	-30.00	-24.41
475 75	2820.75	н	-62.61	4.15	11.30	-55.46	-30.00	-25.46
475.75	1880.00	V	-60.62	3.02	8.09	-55.55	-30.00	-25.55
	1996.00	V	-58.97	3.49	10.34	-52.12	-30.00	-22.12
	2350.00	V	-58.18	4.03	10.88	-51.33	-30.00	-21.33
	1920.00	н	-64.53	3.08	9.09	-58.52	-30.00	-28.52
	2400.00	Н	-62.20	4.32	11.64	-54.88	-30.00	-24.88
404 75	3598.00	Н	-62.76	4.68	12.56	-54.88	-30.00	-24.88
481.75	1920.00	V	-63.87	3.56	9.87	-57.56	-30.00	-27.56
	2400.00	V	-59.57	4.01	10.90	-52.68	-30.00	-22.68
	3598.00	V	-62.90	4.68	12.56	-55.02	-30.00	-25.02
	1470.00	н	-60.14	2.87	7.61	-55.40	-30.00	-25.40
	2940.75	Н	-62.99	4.22	11.49	-55.72	-30.00	-25.72
407.75	4901.00	н	-54.53	5.56	12.62	-47.47	-30.00	-17.47
487.75	1470.00	V	-64.65	3.46	10.38	-57.73	-30.00	-27.73
	2952.75	V	-61.02	4.22	11.49	-53.75	-30.00	-23.75
	4901.00	V	-54.92	5.56	12.62	-47.86	-30.00	-17.86



7. FREQUENCY STABILITY

7.1 LIMIT

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.005\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C

7.2 TEST PROCEDURE

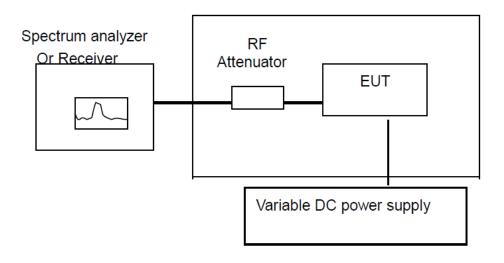
a. The EUT was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and the RF output cable, exited the chamber through an opening made for that purpose.

After the temperature stabilized the frequency output was recorded form the counter. An external variable DC power supply was connected to the battery terminals of the equipment under test.

b. For hand carried, battery powered equipment primary supply voltage was reduced to the battery operating end point as specified by the manufacturer. The output frequency was recorded for each battery voltage.

7.3 TEST SETUP

Climate Chamber





7.4 TEST RESULTS

- (1) Frequency stability versus input voltage (Supply Nominal voltage is DC 12V)
- (2) Frequency stability versus input voltage (Supply battery operating end point which shall be specified by the manufacturer DC 12V)

Refernce Frequency: 475.75MHz							
Power supply Environment Frequency Error Frequency Er							
	Temperature(℃)	(Hz)	(%)				
DC 10.2V	25	1010	0.000212				
DC 12.0V	25	1008	0.000210				
DC 13.8V	25	1015	0.000223				

Refernce Frequency: 475.75MHz									
Frequency Deviation	Frequency Deviation measured with time Elapse(30 minutes)								
Environment	Frequency Error	Frequency Error	Limit (%)	Results					
Temperature(℃)	(Hz)	(%)							
50	1021	0.000215	0.005	Pass					
40	1008	0.000210							
30	1005	0.000211							
20	1008	0.000210							
10	1007	0.000211							
0	1009	0.000212							
-10	1008	0.000210							
-20	1009	0.000212							
-30	1010	0.000212							





Refernce Frequency: 481.75MHz						
Power supply Environment Frequency Error Frequency Error						
	Temperature(°C)	(Hz)	(%)			
DC 10.2V	25	1009	0.000209			
DC 12.0V	25	1006	0.000209			
DC 13.8V	25	1010	0.000210			

Refernce Frequency: 481.75MHz								
Frequency Deviation measured with time Elapse(30 minutes)								
Environment	Frequency Error Frequency Error Limit (%) Results							
Temperature(℃)	(Hz)	(%)						
50	1011	0.000210	0.005	Pass				
40	1006	0.000209						
30	1006	0.000209						
20	1008	0.000209						
10	1007	0.000209						
0	1008	0.000209						
-10	1008	0.000209						
-20	1006	0.000209						
-30	1011	0.000210						



Refernce Frequency: 487.75MHz						
Power supply	Environment Frequency Error Frequency Error					
	Temperature(℃)	(Hz)	(%)			
DC 10.2V	25	1013	0.000208			
DC 12.0V	25	1011	0.000207			
DC 13.8V	25	1010	0.000207			

Refernce Frequency: 487.75MHz								
Frequency Deviation measured with time Elapse(30 minutes)								
Environment	onment Frequency Error Frequency Error Limit (%) Results							
Temperature(°C)	(Hz)	(%)						
50	1010	0.000207	0.00500	Pass				
40	1005	0.000206						
30	1005	0.000206						
20	1006	0.000206						
10	1007	0.000206						
0	1006	0.000206						
-10	1007	0.000206						
-20	1006	0.000206						
-30	1010	0.000207						



8 CONDUCTED EMISSION MEASUREMENT

8.1 LIMIT

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)		
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	
0.50 -5.0	56.00	46.00	
5.0 -30.0	60.00	50.00	

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

8.2 TEST PROCEDURE

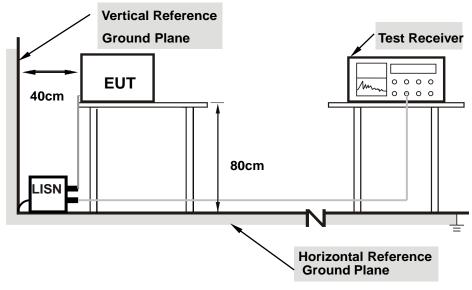
The following table is the setting of the receiver

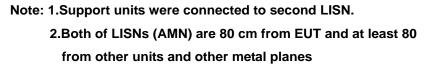
Receiver Parameters	Setting		
Attenuation	10 dB		
Start Frequency	0.15 MHz		
Stop Frequency	30 MHz		
IF Bandwidth	9 kHz		

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.





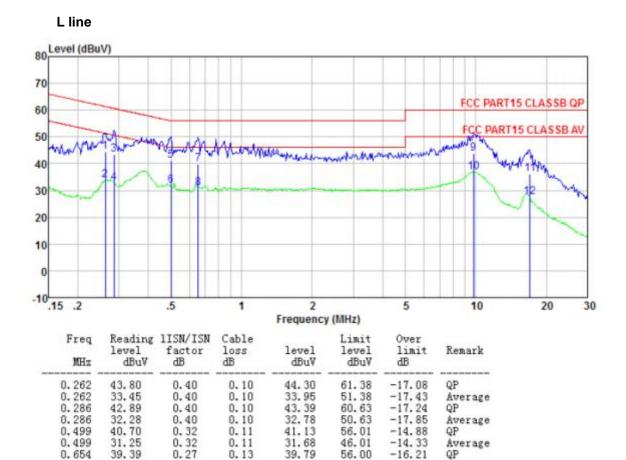




8.4 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	FM	Test Voltage:	AC 120V 60Hz
Result:	PASS		





46.00 60.00 50.00 60.00 50.00

-15.08

-16.25

-13.06 -23.81

-22.57

Average

Average

Average

QP

QP

Flux Compliance Service Laboratory

30.52

36.54 35.73

26.97

0.654

9.757

9.757

17.018

17.018

0.27

0.20 0.24 0.24 0.13

0.20

0.20 0.22 0.22 30.92

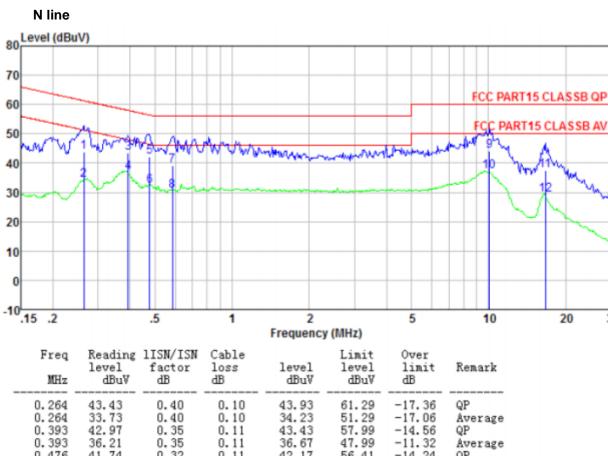
43.75

36.94 36.19

27.43

30





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0.393	42.97	0.35	0.11	43.43	57.99	-14.56	QP
0.393	36.21	0.35	0.11	36.67	47.99	-11.32	Average
0.476	41.74	0.32	0.11	42.17	56.41	-14.24	QP
0.476	31.84	0.32	0.11	32.27	46.41	-14.14	Average
0.585	38.83	0.29	0.12	39.24	56.00	-16.76	QP
0.585	30.21	0.29	0.12	30.62	46.00	-15.38	Average
10.072	43.76	0.20	0.20	44.16	60.00	-15.84	QP
10.072	36.64	0.20	0.20	37.04	50.00	-12.96	Average
16.661	36.95	0.23	0.22	37.40	60.00	-22.60	QP
16.661	28.72	0.23	0.22	29.17	50.00	-20.83	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. Final Level =Receiver Read level + LISN Factor + Cable Loss

4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

** ** ** ** END OF THE REPORT ** ** ** **