FCC TEST REPORT

FOR

Shenzhen Kelvin Electronics Co,. Ltd.

RF Receiver

Model No.: KL-CWXM02

Additional model No.: KL-CW11, KL-CW12, KL-RF211B, KL-RFM83

Prepared for	:	Shenzhen Kelvin Electronics Co,. Ltd.
Address	:	Floor3, Block7, Huaxing district, Shilongkeng Village, Shuijing, Buji Street, Longgang District, Shenzhen, Guangdong, P.R China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
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Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	September 08, 2015
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	September 08, 2015 - September 21, 2015
Date of Report	:	September 21, 2015

FCC TEST REPORT

FCC CFR 47 PART 15 Subpart B: 2014

Report Reference No. .....:	**LCS1509080322E**
Date Of Issue .....:	September 21, 2015
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 .....:	**Shenzhen Kelvin Electronics Co,. Ltd.**
Address .....:	Floor3, Block7, Huaxing district, Shilongkeng Village, Shuijing, Buji Street, Longgang District, Shenzhen, Guangdong, P.R China
Test Specification	
Standard.....:	FCC CFR 47 PART 15 Subpart B: 2014, ANSI C63.4-2014
Test Report Form No.....:	LCSEMC-1.0
TRF Originator .....:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....:	Dated 2011-03

Test Item Description. .....:	**RF Receiver**
Trade Mark .....:	N/A
Model/Type Reference .....:	KL-CWXM02
Ratings.....:	Input:AC 110-120V/60Hz
Result .....:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Dick Su/ File administrators	Glin Lu/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS1509080322E	September 21, 2015 Date of issue

Type / Model.....	: KL-CWXM02
EUT.....	: RF Receiver
Applicant.....	**: Shenzhen Kelvin Electronics Co,. Ltd.**
Address.....	: Floor3, Block7, Huaxing district, Shilongkeng Village, Shuijing, Buji Street, Longgang District, Shenzhen, Guangdong, P.R China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Shenzhen Kelvin Electronics Co,. Ltd.**
Address.....	: Floor3, Block7, Huaxing district, Shilongkeng Village, Shuijing, Buji Street, Longgang District, Shenzhen, Guangdong, P.R China
Telephone.....	: /
Fax.....	: /
Factory.....	: **Shenzhen Kelvin Electronics Co,. Ltd.**
Address.....	: Floor3, Block7, Huaxing district, Shilongkeng Village, Shuijing, Buji Street, Longgang District, Shenzhen, Guangdong, P.R 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.

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Test Report Description Page

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

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 CFR 47 PART 15 Subpart B: 2014	Class B	PASS
Radiated disturbance	FCC CFR 47 PART 15 Subpart B: 2014	Class B	PASS
N/A is an abbreviation for Not Applicable.			

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : RF Receiver

Model Number : KL-CWXM02

Power Supply : Input: AC 110-120V/60Hz

Frequency Range : 433.92MHz

Modulation Technology : ASK

Antenna Type and Gain : Integral Antenna, 2.0 dBi(Max.)

Additional models No.			
KL-CW11	KL-CW12	KL-RF211B	KL-RFM83
Remark: PCB board, structure and internal of these model(s) are the same, So no additional models were tested.			

2.2. Description of Test Facility

EMC Lab. : CNAS Registration Number. is L4595.

FCC Registration Number. is 899208.

Industry Canada Registration Number. is 9642A-1.

VCCI Registration Number. is C-4260 and R-3804.

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

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 (Ulab)	Expanded uncertainty (Ucispr)
Conducted Emission	(9kHz to 150kHz)	2.63 dB	4.0 dB
	(150kHz to 30MHz)	2.35 dB	3.6 dB
Radiated Emission	(9kHz to 30MHz)	3.68 dB	N/A
Radiated Emission	(30MHz to 1000MHz)	3.48 dB	5.2 dB
Radiated Emission	(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%.

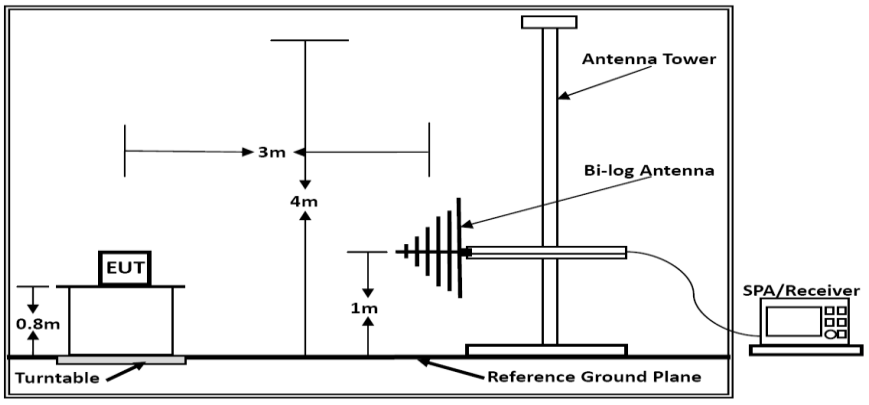
3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

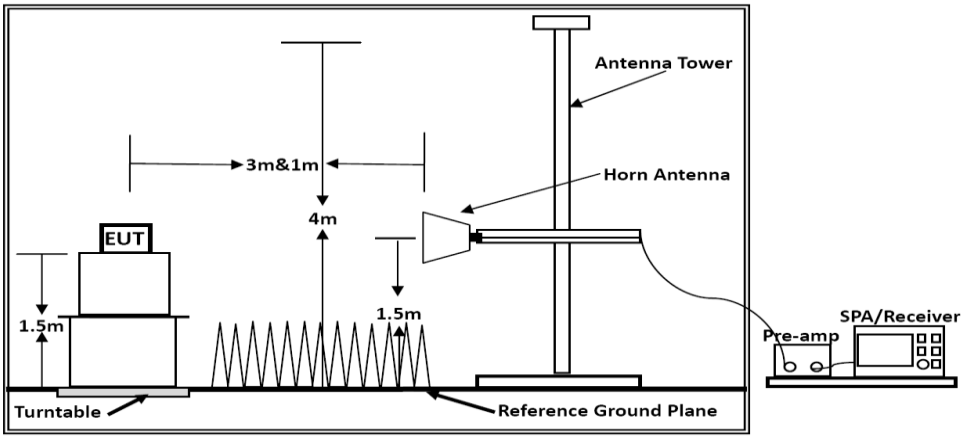
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2015/02/04
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	101840	2015/06/18
3	Log per Antenna	SCHWARZBECK	VULB9163	9163-470	2015/06/18
4	EMI Test Software	AUDIX	E3	N/A	2015/06/18
5	Positioning Controller	MF	MF-7082	/	2015/06/18

3.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz

3.3. Radiated Emission Limit (Class B)

Limits for radiated disturbance Blow 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54

Remark：(1) Emission level (dB)μV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.4. EUT Configuration on Measurement

The following equipment 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.

3.5. 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 (on) and measure it.

3.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2009 on radiated emission measurement. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Below 1G:
The bandwidth of the EMI test receiver is set at 120kHz, 1000kHz.

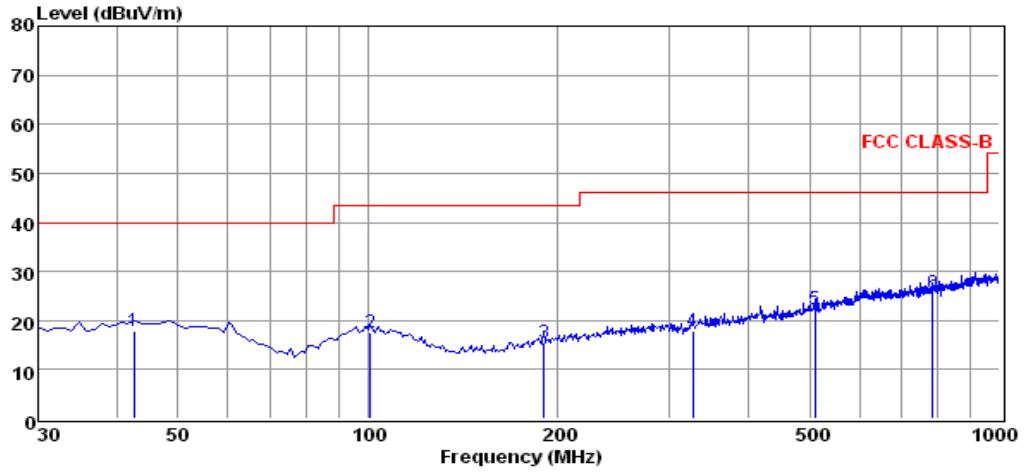
The frequency range from 30MHz to 1000MHz is checked.

Above 1G:
The bandwidth of the EMI test receiver is set at 1MHz, 3MHz for Peak detector.
The bandwidth of the EMI test receiver is set at 1MHz, 10Hz for Average detector

The frequency range from 1GHz to 26.5GHz is checked.

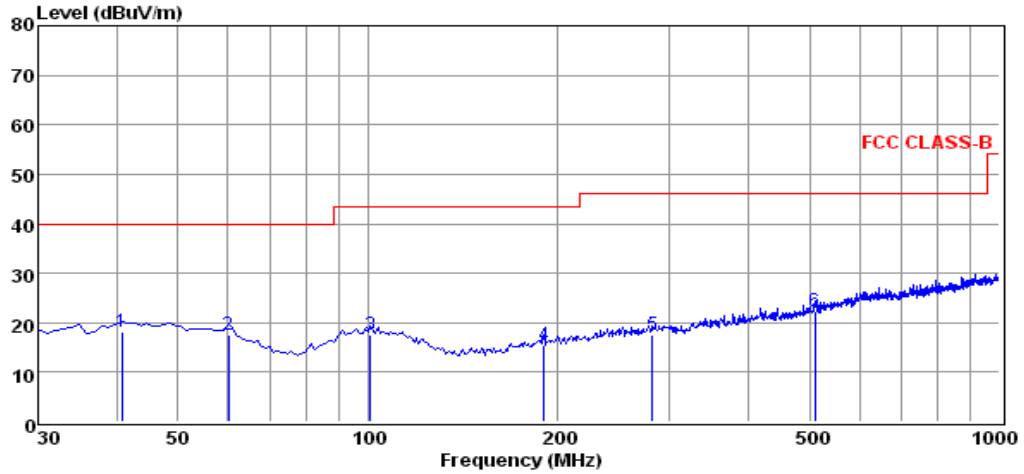
3.7. Radiated Emission Noise Measurement Result

PASS.



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	42.61	3.91	0.50	13.56	17.97	40.00	-22.03	QP
2	100.81	3.78	0.60	13.09	17.47	43.50	-26.03	QP
3	190.05	4.06	0.86	10.56	15.48	43.50	-28.02	QP
4	326.82	3.27	1.04	13.60	17.91	46.00	-28.09	QP
5	510.15	4.11	1.49	16.77	22.37	46.00	-23.63	QP
6	784.66	3.91	1.75	19.87	25.53	46.00	-20.47	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	40.67	4.18	0.50	13.58	18.26	40.00	-21.74	QP
2	60.07	4.35	0.49	12.66	17.50	40.00	-22.50	QP
3	100.81	3.78	0.60	13.09	17.47	43.50	-26.03	QP
4	190.05	4.06	0.86	10.56	15.48	43.50	-28.02	QP
5	282.20	3.68	1.06	12.71	17.45	46.00	-28.55	QP
6	510.15	4.11	1.49	16.77	22.37	46.00	-23.63	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Test Mode: Receive	**Tested by:** Dick Su
Test voltage: DC 5V	**Test Distance:** 3m
Detector Function: Peak+AV	**Test Results:** Passed

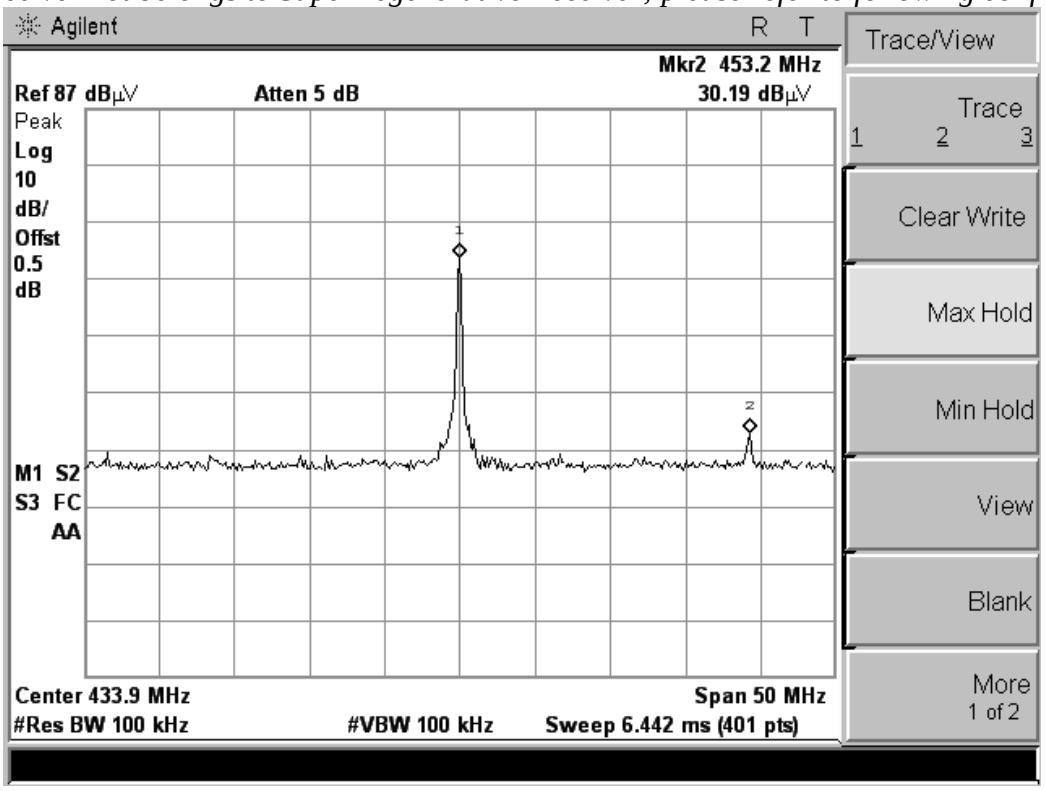
Polarization	Frequency MHz	Emission Level dBμV/m		Limits dBμV/m		Margin dBμV/m	
		Peak	AVG	Peak	AVG	Peak	AVG
Horizontal	1257.23	58.61	44.48	74.00	54.00	-15.39	-9.52
	2963.61	56.68	41.97	74.00	54.00	-17.32	-12.03
	4820.87	57.09	42.65	74.00	54.00	-16.91	-11.35
Vertical	1357.26	56.34	40.21	74.00	54.00	-17.66	-13.79
	3257.38	59.06	42.27	74.00	54.00	-14.94	-11.73
	5102.46	57.56	40.87	74.00	54.00	-16.44	-13.13

Notes:

1. *Measuring frequencies from 9k~6GHz , No emission found between lowest internal used/generated frequency to 30MHz.*
2. *Radiated emissions measured in frequency range from 9k~6GHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measure*

Receiver Type:

The receiver not belongs to Super regenerative Receiver; please refer to following confirm plots.



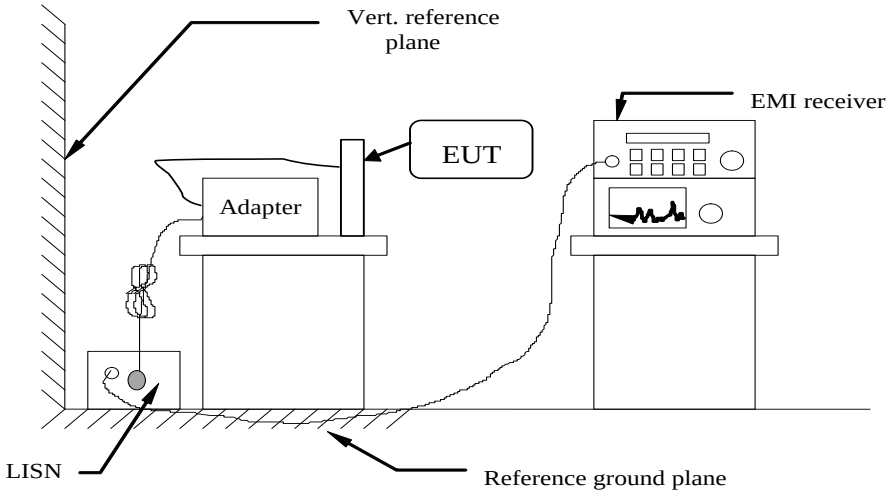
4. POWER LINE CONDUCTED EMISSIONS

4.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

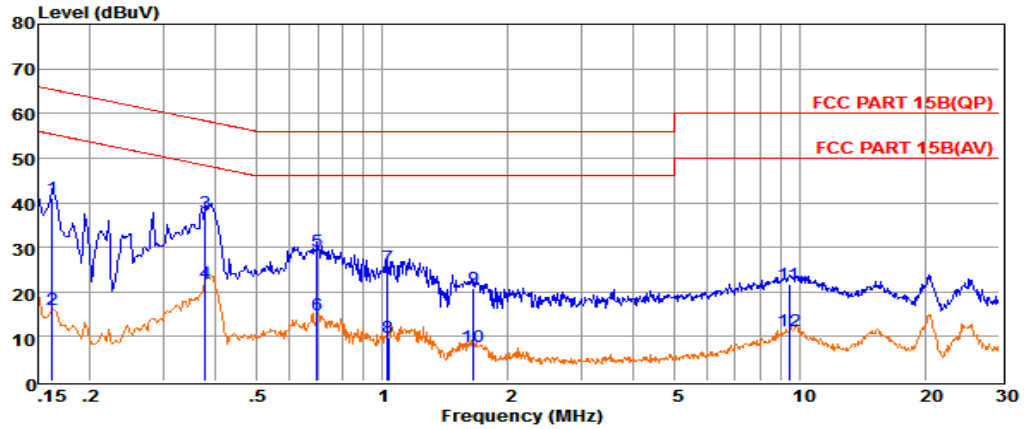
4.2 Block Diagram of Test Setup



4.3 Test Results

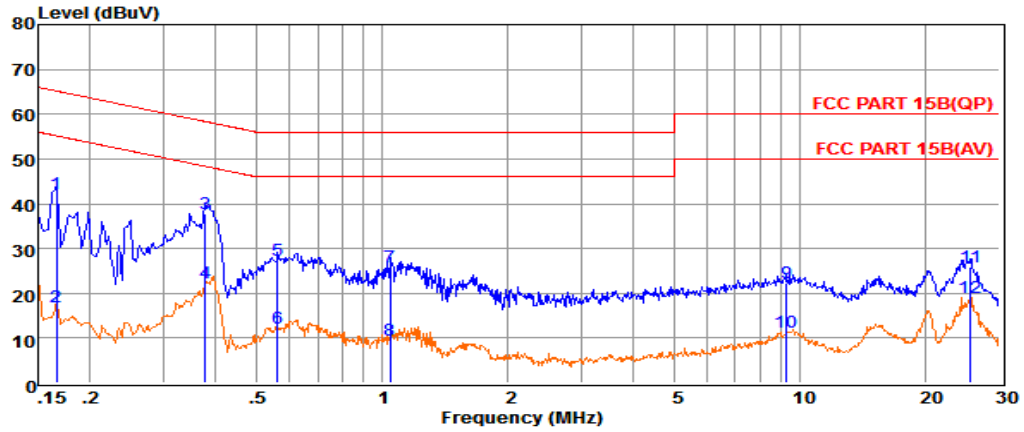
PASS.

The test data please refer to following page.



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBpW	dB	dB	dBpW	dBpW	dB	
1	0.16	21.29	9.67	0.02	40.98	65.34	-24.36	QP
2	0.16	-3.71	9.67	0.02	15.98	55.33	-39.35	Average
3	0.38	18.25	9.61	0.04	37.90	58.34	-20.44	QP
4	0.38	2.38	9.61	0.04	22.03	48.34	-26.31	Average
5	0.70	9.47	9.63	0.04	29.14	56.00	-26.86	QP
6	0.70	-4.87	9.63	0.04	14.80	46.00	-31.20	Average
7	1.03	5.90	9.63	0.05	25.58	56.00	-30.42	QP
8	1.03	-9.96	9.63	0.05	9.72	46.00	-36.28	Average
9	1.65	1.02	9.63	0.05	20.70	56.00	-35.30	QP
10	1.65	-11.81	9.63	0.05	7.87	46.00	-38.13	Average
11	9.40	1.93	9.71	0.08	21.72	60.00	-38.28	QP
12	9.40	-8.44	9.71	0.08	11.35	50.00	-38.65	Average

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBpW	dB	dB	dBpW	dBpW	dB	
1	0.17	22.50	9.59	0.02	42.11	65.16	-23.05	QP
2	0.17	-2.62	9.59	0.02	16.99	55.16	-38.17	Average
3	0.38	18.21	9.62	0.04	37.87	58.34	-20.47	QP
4	0.38	2.52	9.62	0.04	22.18	48.34	-26.16	Average
5	0.56	7.54	9.63	0.04	27.21	56.00	-28.79	QP
6	0.56	-7.38	9.63	0.04	12.29	46.00	-33.71	Average
7	1.04	6.26	9.63	0.05	25.94	56.00	-30.06	QP
8	1.04	-10.15	9.63	0.05	9.53	46.00	-36.47	Average
9	9.30	2.45	9.69	0.08	22.22	60.00	-37.78	QP
10	9.30	-8.38	9.69	0.08	11.39	50.00	-38.61	Average
11	25.59	5.92	9.71	0.13	25.76	60.00	-34.24	QP
12	25.59	-0.71	9.71	0.13	19.13	50.00	-30.87	Average

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.

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