FCC TEST REPORT

FOR

Towin Optoelectronics Co., LTD

Microwave Sensor

TEST Model No.: MSC

Additional Model NO.:N/A

Prepared for	:	Towin Optoelectronics Co., LTD
Address	:	Liuxing Rd.1 Liujia Industry Hengli Town, Dongguan, 523473 Guangdong, China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd
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Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	December 18, 2018
Number of tested samples	:	1
Sample number	:	Prototype
Date of Test	:	December 18, 2018 ~ December 25, 2018
Date of Report	:	January 11, 2019

FCC TEST REPORT

FCC CFR 47 PART 15 C (15.249)

Report Reference No.	**:**	**LCS181210123AEA**
Date of Issue.....	:	January 11, 2019
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	**:**	**Towin Optoelectronics Co., LTD**
Address.....	:	Liuxing Rd.1 Liujia Industry Hengli Town, Dongguan, 523473 Guangdong, China
Test Specification		
Standard	:	FCC CFR 47 PART 15 C(15.249) / ANSI C63.10: 2013
Test Report Form No.....	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

Test Item Description.	**:**	Microwave Sensor
Trade Mark	:	TOWIN
Test Model.....	:	MSC
Ratings.....	:	Input: 120/230/277V~, 50/60Hz Max. Load : Electronic Ballast 120V AC, 5A; 230/277VAC, 3A Standard Ballast/Tungsten: 120V AC, 800W; 230/277V AC, 1200W
Result	**:**	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Ryan Hu	Calvin Weng	Gavin Liang
Ryan Hu/ Administrators	Calvin Weng/Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. :	**LCS181210123AEA**	January 11, 2019 Date of issue

Test Model.....	:	MSC
EUT.....	:	Microwave Sensor
Applicant.....	**:**	**Towin Optoelectronics Co., LTD**
Address.....	:	Liuxing Rd.1 Liujia Industry Hengli Town, Dongguan, 523473 Guangdong, China
Telephone.....	:	/
Fax.....	:	/
Manufacturer.....	**:**	**Towin Optoelectronics Co., LTD**
Address.....	:	Liuxing Rd.1 Liujia Industry Hengli Town, Dongguan, 523473 Guangdong, China
Telephone.....	:	/
Fax.....	:	/
Factory.....	**:**	**Towin Optoelectronics Co., LTD**
Address.....	:	Liuxing Rd.1 Liujia Industry Hengli Town, Dongguan, 523473 Guangdong, China
Telephone.....	:	/
Fax.....	:	/

Test Result	**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	January 11, 2019	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	:	Microwave Sensor
Test Model	:	MSC
List Model No.	:	N/A
Model Declaration	:	N/A
Power Supply	:	Input: 120/230/277V~, 50/60Hz Max. Load : Electronic Ballast 120V AC, 5A; 230/277VAC, 3A Standard Ballast/Tungsten: 120V AC, 800W; 230/277V AC, 1200W
Hardware Version	:	E2.0
Software Version	:	1.0
5.8G	:	
Frequency Range	:	5800 MHz +/-75 MHz
Channel Number	:	1 channels
Modulation Type	:	No modulation
Antenna Description	:	Internal Antenna, 1.0dBi (max.)

1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
--	--	--	--	--

1.3 External I/O Cable

I/O Port Description	Quantity	Cable
--	--	--

1.4 Description of Test Facility

FCC Registration Number. is 254912.

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

NVLAP Registration Code is 600167-0

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.

1.5 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.

1.6 Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
		200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

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

1.7 Description of Test Modes

The EUT operates in the unlicensed ISM band at 5.8GHz. 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.

The EUT is considered a portable unit and was set to transmit at 100% duty cycle. It was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane.

Mode of operations	Transmitting frequency (MHz)
	5800
For Conducted Emission	
Test Mode	TX Mode
For Radiated Emission	
Test Mode	TX Mode

***Note: Using a temporary antenna connector for the EUT when the conducted measurements are performed.

1.8 Channel List and Frequency

Test Mode	Channel	Frequency Range (MHz)
TX	1	5800
Standby	--	--

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10: 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10 for Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10 for radiated emission.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a continuous transmit condition. Continuous transmitting.

The EUT After the power is switched on, the hand is placed over the microwave module, and the continuous transmit signal.

3.2 EUT Exercise Software

N/A.

3.3. Special Accessories

N/A.

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Power Line Conducted Emissions	Compliant
§15.205(a), §15.209(a), §15.249(a), §15.249(c)	Radiated Emissions Measurement	Compliant
§15.205	Band Edges Measurement	Compliant
§15.249, §15.215	99% and 20dB Bandwidth	Compliant

5. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2018-11-15	2019-11-14
2	DC Power Supply	Agilent	E3642A	N/A	2018-11-15	2019-11-14
3	Temperature & Humidity Chamber	GUANGZHOU GOGNWEN	GDS-100	70932	2018-10-10	2019-10-09
4	EMI Test Software	AUDIX	E3	/	/	/
5	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2018-06-16	2019-06-15
6	Positioning Controller	MF	MF-7082	/	2018-06-16	2019-06-15
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018-07-26	2019-07-25
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26	2019-07-25
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2019-07-01
10	EMI Test Receiver	R&S	ESR 7	101181	2018-06-16	2019-06-15
11	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2018-11-15	2019-11-14
12	AMPLIFIER	QuieTek	QTK	CHM/0809065	2018-11-15	2019-11-14
13	RF Cable-R03m	Jye Bao	RG142	CB021	2018-06-16	2019-06-15
14	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2018-06-16	2019-06-15
15	EMI Test Receiver	R&S	ESPI	101840	2018-06-16	2019-06-15
16	Artificial Mains	R&S	ENV216	101288	2018-06-16	2019-06-15
17	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2018-06-16	2019-06-15
Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.						

6. ANTENNA REQUIREMENT

6.1. Standard Applicable

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 1.0dBi, and the antenna is connect to PCB board and no consideration of replacement, meet FCC §15.203 antenna requirement.

6.3. Result: Compliance.

7. RADIATED EMISSION MEASUREMENT

7.1. Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) and 15.249 limit in the table below has to be followed.

Fundamental Frequency	Field Strength of fundamental (millivolts/meter)	Field Strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

7.2. Instruments Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

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

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

7.3. Test Procedure

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

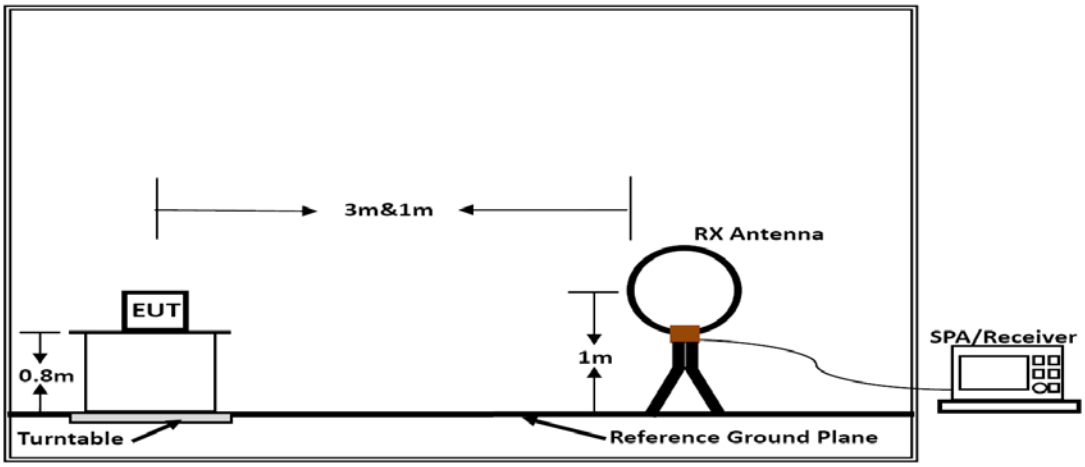
--- The antenna is moved spherical over the EUT in different polarizations of the antenna.

Final measurement:

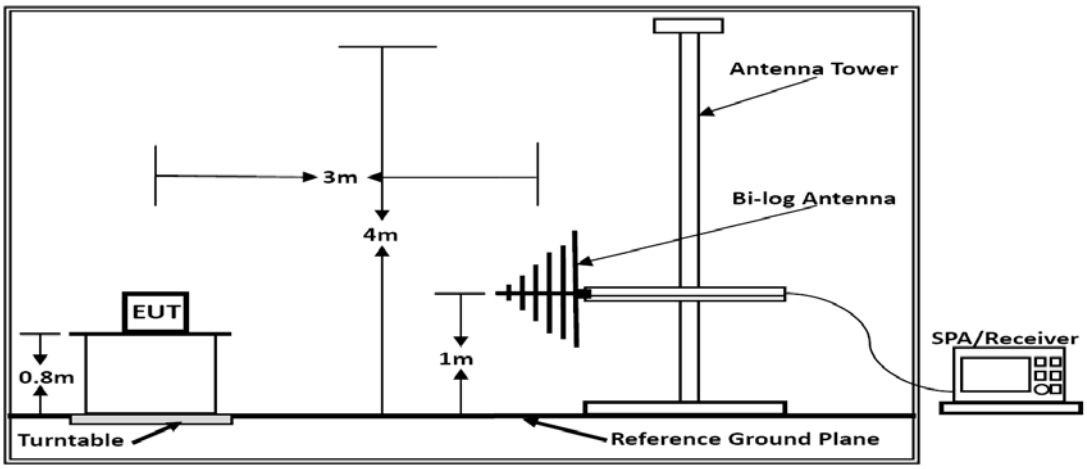
--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

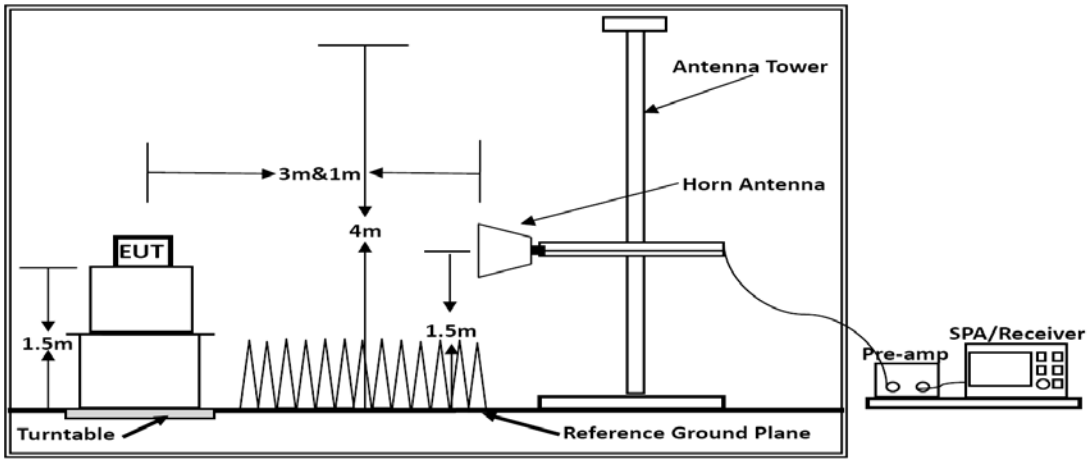
7.4. Block Diagram of Test Setup



Below 30MHz



Below 1GHz



Above 1GHz

7.5. Test Results

Results of Radiated Emissions (9 KHz – 30 MHz)

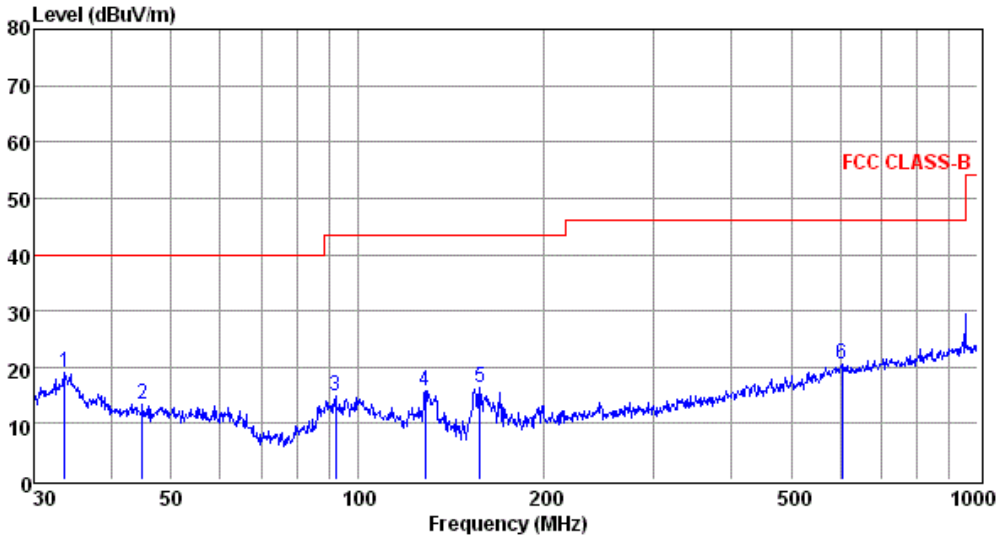
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:
The radiated emissions from 9 KHz to 30 MHz are at least 20dB below the official limit and no need to report.
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

Results of Radiated Emissions (30 MHz – 1000 MHz)

Temperature	23.6℃	Humidity	53.1%
Test Engineer	Diamond Lu	Test Mode	TX

Vertical

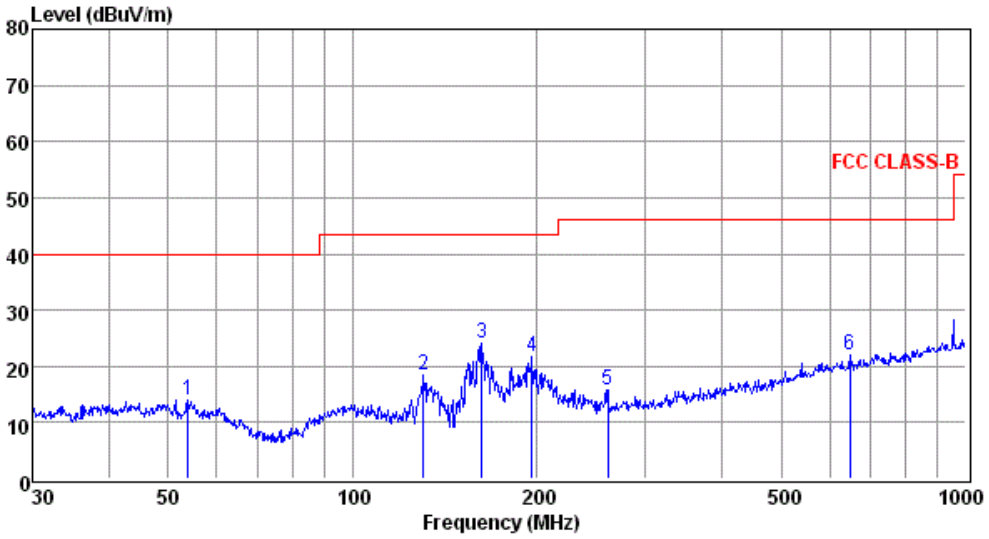


Env./Ins: 23.6℃/53.1%
pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	33.68	6.26	0.37	12.31	18.94	40.00	-21.06	QP
2	44.90	-0.62	0.41	13.55	13.34	40.00	-26.66	QP
3	92.14	2.05	0.56	12.30	14.91	43.50	-28.59	QP
4	128.56	5.96	0.67	9.15	15.78	43.50	-27.72	QP
5	157.56	7.00	0.83	8.57	16.40	43.50	-27.10	QP
6	603.54	0.38	1.55	18.46	20.39	46.00	-25.61	QP

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

Horizontal



Env./Ins: 23.6℃/53.1%
pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	53.88	0.45	0.46	13.07	13.98	40.00	-26.02	QP
2	130.38	8.81	0.76	8.90	18.47	43.50	-25.03	QP
3	162.61	14.55	0.86	8.75	24.16	43.50	-19.34	QP
4	195.82	10.26	0.96	10.57	21.79	43.50	-21.71	QP
5	261.06	2.85	0.96	12.08	15.89	46.00	-30.11	QP
6	647.39	1.82	1.54	18.62	21.98	46.00	-24.02	QP

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

Note:

1). Pre-scan all modes and recorded the worst case results in this report.
2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
3). Corrected Reading: Antenna Factor + Cable Loss + Read Level = Level.

Results for Radiated Emissions (Above 1GHz)

Field Strength of Fundamental (TX-5800MHz)						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
5800.00	H	86.51	74.27	114.00	94.00	PASS
5800.00	V	86.39	74.42	114.00	94.00	PASS

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11490	59.88	33.06	35.04	3.94	61.84	74.00	-12.16	Peak	Horizontal
11490	42.02	33.06	35.04	3.94	43.98	54.00	-10.02	Average	Horizontal
11490	53.54	33.06	35.04	3.94	55.50	74.00	-18.50	Peak	Vertical
11490	39.97	33.06	35.04	3.94	41.93	54.00	-12.07	Average	Vertical

Notes:

1). Measuring frequencies from 9 KHz - 10th harmonic (ex. 40GHz), No emission found between lowest internal used/generated frequency to 30 MHz.

2). Radiated emissions measured in frequency range from 9 KHz - 10th harmonic (ex. 40GHz) were made with an instrument using Peak detector mode.

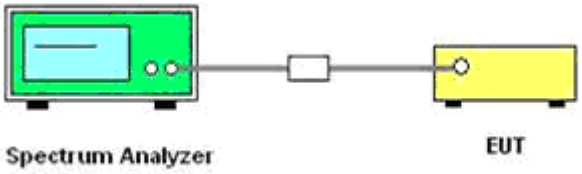
3). 18~40GHz at least have 20dB margin. No recording in the test report.

8. 99% AND 20DB BANDWIDTH MEASUREMENT

8.1. Standard Applicable

No Limit

8.2. Block Diagram of Test Setup



8.3. Test Procedure

Use the following spectrum analyzer settings:

Span = 150 MHz

RBW = 100 KHz

VBW = 300 KHz

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

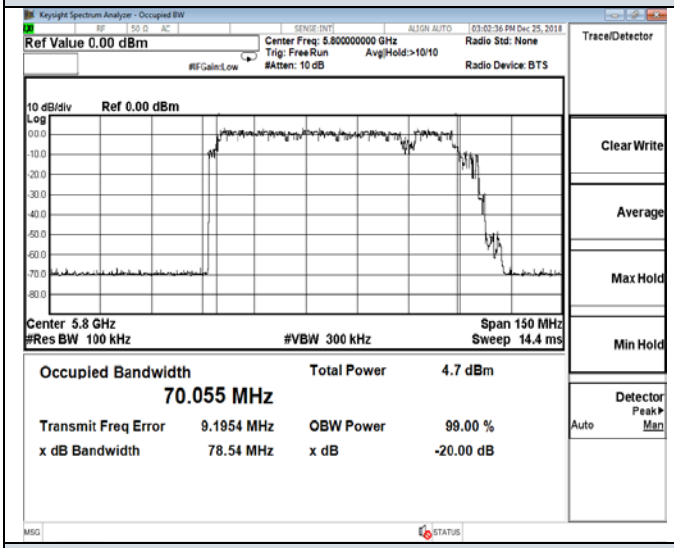
8.4. Test Results

Test Result of 99% and 20dB Bandwidth Measurement					
Test Mode	Frequency (MHz)	99% Bandwidth Measurement (MHz)	20dB Bandwidth Measurement (MHz)	Limits (MHz)	Verdict
No modulation	5800	70.055	78.540	/	PASS

Operating Frequency					
Test Mode	Frequency (MHz)	f_L (MHz)	F_H (MHz)	Limits (MHz)	Verdict
No modulation	5800	>5725	<5875	5725-5875	PASS

Remark:

1. *Test results including cable loss;*
2. *Please refer to following plots;*

99% and 20dB Bandwidth	
	
5800 MHz	

9. AC POWER LINE CONDUCTED EMISSIONS

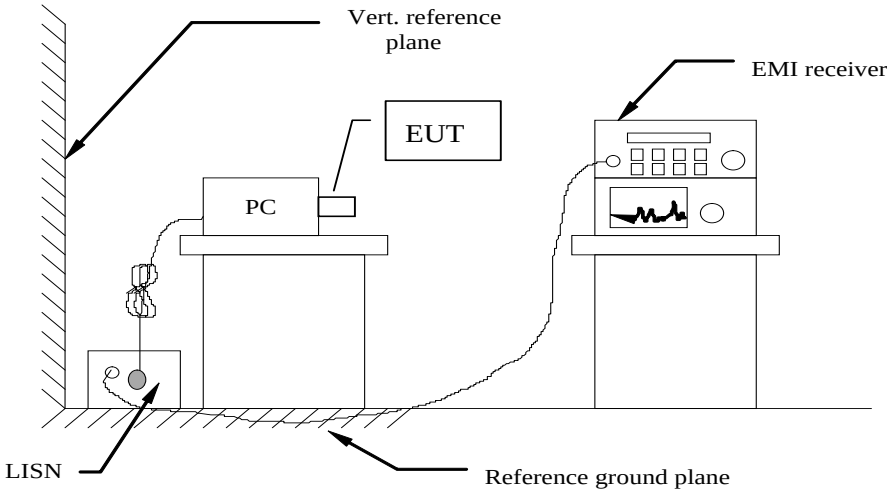
9.1 Standard Applicable

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 are 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

* Decreasing linearly with the logarithm of the frequency

9.2 Block Diagram of Test Setup



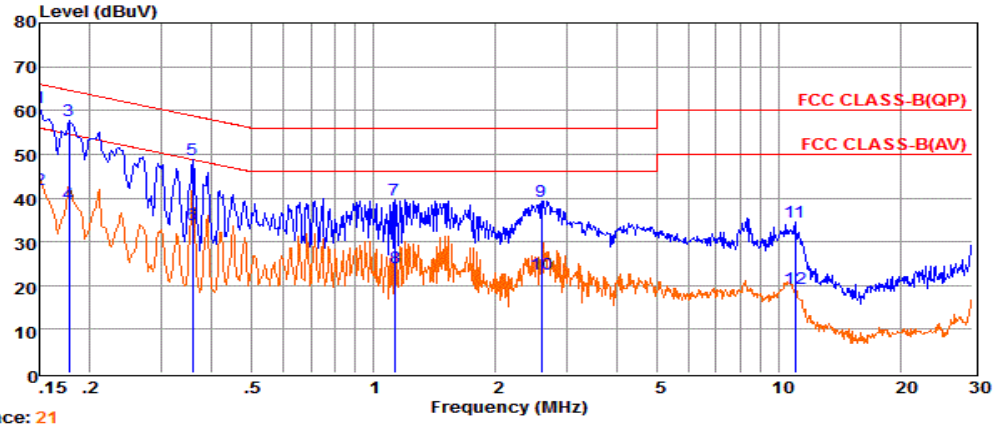
9.3 Test Results

PASS.

The test data please refer to following page.

AC Conducted Emission @ AC 120V/60Hz @ TX (worst case)

Line

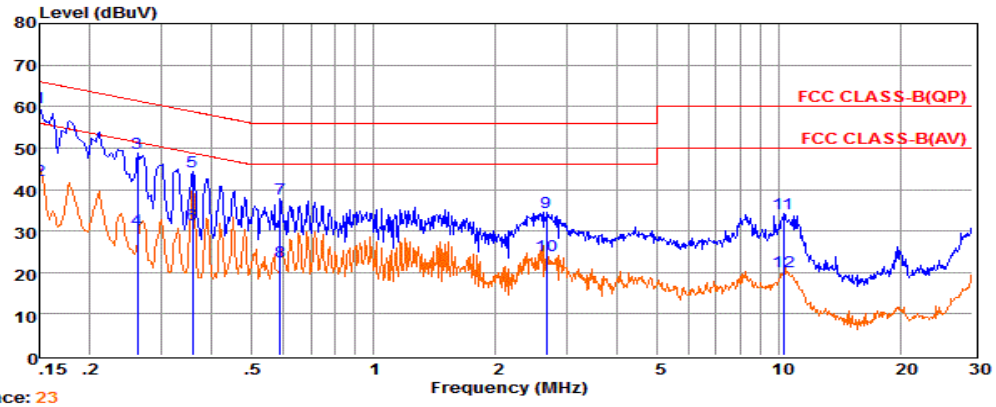


Trace: 21
Env. Ins: 24.5*/54.1%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.15	41.07	9.57	0.02	10.00	60.66	66.00	-5.34	QP
2	0.15	22.29	9.57	0.02	10.00	41.88	55.99	-14.11	Average
3	0.18	38.05	9.61	0.02	10.00	57.68	64.59	-6.91	QP
4	0.18	19.11	9.61	0.02	10.00	38.74	54.59	-15.85	Average
5	0.36	29.18	9.62	0.03	10.00	48.83	58.78	-9.95	QP
6	0.36	14.17	9.62	0.03	10.00	33.82	48.78	-14.96	Average
7	1.13	19.87	9.63	0.05	10.00	39.55	56.00	-16.45	QP
8	1.13	4.28	9.63	0.05	10.00	23.96	46.00	-22.04	Average
9	2.59	19.63	9.64	0.05	10.00	39.32	56.00	-16.68	QP
10	2.60	2.79	9.64	0.05	10.00	22.48	46.00	-23.52	Average
11	10.96	14.58	9.70	0.09	10.00	34.37	60.00	-25.63	QP
12	10.96	-0.53	9.70	0.09	10.00	19.26	50.00	-30.74	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Neutral



Trace: 23
Env. Ins: 24.5*/54.1%
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.15	40.00	9.70	0.02	10.00	59.72	66.00	-6.28	QP
2	0.15	22.58	9.70	0.02	10.00	42.30	55.99	-13.69	Average
3	0.26	29.04	9.60	0.03	10.00	48.67	61.38	-12.71	QP
4	0.26	10.82	9.60	0.03	10.00	30.45	51.38	-20.93	Average
5	0.36	24.53	9.61	0.03	10.00	44.17	58.78	-14.61	QP
6	0.36	11.95	9.61	0.03	10.00	31.59	48.78	-17.19	Average
7	0.59	18.09	9.62	0.04	10.00	37.75	56.00	-18.25	QP
8	0.59	2.93	9.62	0.04	10.00	22.59	46.00	-23.41	Average
9	2.66	14.84	9.64	0.05	10.00	34.53	56.00	-21.47	QP
10	2.67	4.54	9.64	0.05	10.00	24.23	46.00	-21.77	Average
11	10.23	14.38	9.72	0.08	10.00	34.18	60.00	-25.82	QP
12	10.23	0.28	9.72	0.08	10.00	20.08	50.00	-29.92	Average

Remarks: 1. Measured = Reading + Cable Loss + LISNFac + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

****Note: Pre-scan all modes and recorded the worst case results in this report.*

10. TEST SETUP PHOTOGRAPHS

Please refer to separated files for Test Setup Photos of the EUT.

11. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

12. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

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