

FCC TEST REPORT

FOR

NingBo ShengHe Lighting Co.,LTD

Star raker remote

Test Model: CL-SRR-XXX

Additional Model No.: CL-SRR-XXXXXX ("X" can be A to Z and/or 1 to 9
(commercial code))

Prepared for : NingBo ShengHe Lighting Co.,LTD
Address : No.311 PengLai Road. Xiangshan Industrial Zone, Ningbo, Zhejiang,
315700, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd
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Date of receipt of test sample : December 09, 2019
Number of tested samples : 1
Sample number : Prototype
Date of Test : December 09, 2019 ~ December 25, 2019
Date of Report : December 25, 2019

FCC TEST REPORT
FCC CFR 47 PART 15 C(15.249)

Report Reference No. : LCS191206052AEA

Date of Issue : December 25, 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 [checked]
Partial application of Harmonised standards [unchecked]
Other standard testing method [unchecked]

Applicant's Name : NingBo ShengHe Lighting Co.,LTD

Address : No.311 PengLai Road. Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700, 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 2019-03

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Test Item Description : Star raker remote

Trade Mark : ARTIKA

Test Model : CL-SRR-XXX

Ratings : AC 100-135V 50/60Hz 21W

Result : Positive

Compiled by:

Scent Hu

Scent Hu/ Administrators

Supervised by:

Calvin Weng

Calvin Weng/ Technique principal

Approved by:

Gavin Liang

Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS191206052AEA	<u>December 25, 2019</u> Date of issue
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Test Model.....	: CL-SRR-XXX
EUT.....	: Star raker remote
Applicant.....	: NingBo ShengHe Lighting Co.,LTD
Address.....	: No.311 PengLai Road. Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: NingBo ShengHe Lighting Co.,LTD
Address.....	: No.311 PengLai Road. Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700, China
Telephone.....	: /
Fax.....	: /
Factory.....	: NingBo ShengHe Lighting Co.,LTD
Address.....	: No.311 PengLai Road. Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700, China
Telephone.....	: /
Fax.....	: /

Test Result	Positive
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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	December 25, 2019	Initial Issue	Gavin Liang

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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT : Star raker remote
 Test Model : CL-SRR-XXX
 Model List No. : CL-SRR-XXX, CL-SRR-XXXXXX("X" can be A to Z and/or 1 to 9 (commercial code))
 Model Declaration : PCB board, structure and internal of these model(s) are the same,So no additional models were tested.
 Power Supply : AC 100-135V 50/60Hz 21W
 Hardware Version : 1.0.5
 Software Version : V1.2

5G

Frequency Range : 5800 MHz +/-75 MHz
 Channel Number : 1 channels(5800MHz)
 Modulation Type : PWM
 Antenna Description : Internal antenna, 5.0dBi (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.
 EMSD 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 Accreditation Code is 600167-0.
 FCC Designation Number is CN5024.
 CAB identifier: CN0071.

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 at 5.8GHz. The EUT works in the X-axis, Y-axis, Z-axis. 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

Mode of Operations	Frequency Range (MHz)
N/A	5800
For Conducted Emission	
Test Mode	TX Mode
For Radiated Emission	
Test Mode	TX Mode

Worst-case mode used for 9 KHz-1000 MHz radiated emissions was the TX mode with the highest output power.

Worst-case mode used for 150 KHz-30 MHz AC conducted emission was the TX mode with the highest output power.

Radiated emissions pre-test at AC 120V/60Hz modes, recorded worst case;

AC conducted emission pre-test at AC 120V/60Hz modes, recorded worst case;

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

1.8 Channel List & 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 Section 6.2.1 of ANSI C63.10-2013 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 Section 6.3 of ANSI C63.10-2013

3. CONNECTION DIAGRAM OF TEST SYSTEM

3.1. Justification

The system was configured for testing in a continuous transmit condition. Continuous transmitting was pre-programmed. It'll keep transmitting when it's powered up.

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 RESULTS

Applied Standard: FCC Part 15 Subpart C §15.249		
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 20 dB Bandwidth	Compliant

Remark:

N/A* - Not Applicable for this device!!!

5. LIST OF MEASURING EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Power Meter	R&S	NRVS	100444	2019-06-16	2020-06-15
2	Power Sensor	R&S	NRV-Z81	100458	2019-06-16	2020-06-15
3	Power Sensor	R&S	NRV-Z32	10057	2019-06-16	2020-06-15
4	ESA-E SERIES SPECTRUM ANALYZER	Agilent	E4407B	MY41440754	2019-06-16	2020-06-15
5	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2019-06-16	2020-06-15
6	SPECTRUM ANALYZER	R&S	FSP	100503	2019-06-16	2020-06-15
7	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-16	2020-06-15
8	Positioning Controller	MF	MF-7082	/	2019-06-16	2020-06-15
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	EMI Test Receiver	R&S	ESR 7	101181	2019-06-16	2020-06-15
11	AMPLIFIER	QuieTek	QTK-A2525G	CHM10809065	2019-06-16	2020-06-15
12	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2019-06-16	2020-06-15
13	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2019-06-16	2020-06-15
14	Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1925	2019-06-16	2020-06-15
15	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2019-06-16	2020-06-15
16	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-025	2019-06-16	2020-06-15
17	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-16	2020-06-15
18	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-16	2020-06-15
19	TEST RECEIVER	R&S	ESCI	101142	2019-06-16	2020-06-15
20	RF Cable-CON	UTIFLEX	3102-26886-4	CB049	2019-06-16	2020-06-15
21	10dB Attenuator	SCHWARZBECK	MTS-IMP136	261115-001-0032	2019-06-16	2020-06-15
22	Artificial Mains	R&S	ENV216	101288	2019-06-16	2020-06-15
23	RF Control Unit	JS Tonscend Corporation	JS0806-2	178060073	2019-06-16	2020-06-15
24	JS1120-3 BT/WIFI Test Software	JS Tonscend Corporation	JS1120-3	/	N/A	N/A

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 EUT use an internal antenna and maximum antenna gain is 5.0 dBi, antenna cannot replacement, meets FCC Part §15.203 antenna requirement. Please see EUT photo for details.

6.3. Results

Compliance.

7. POWER LINE CONDUCTED EMISSIONS

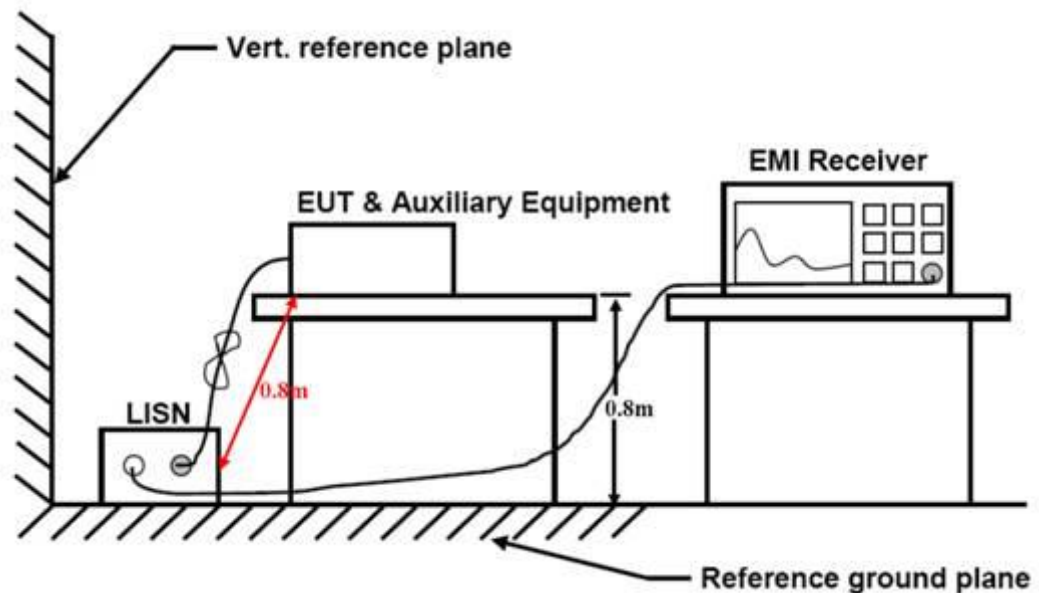
7.1. Standard Applicable

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 (dB μ V)	
	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

7.2. Block Diagram of Test Setup



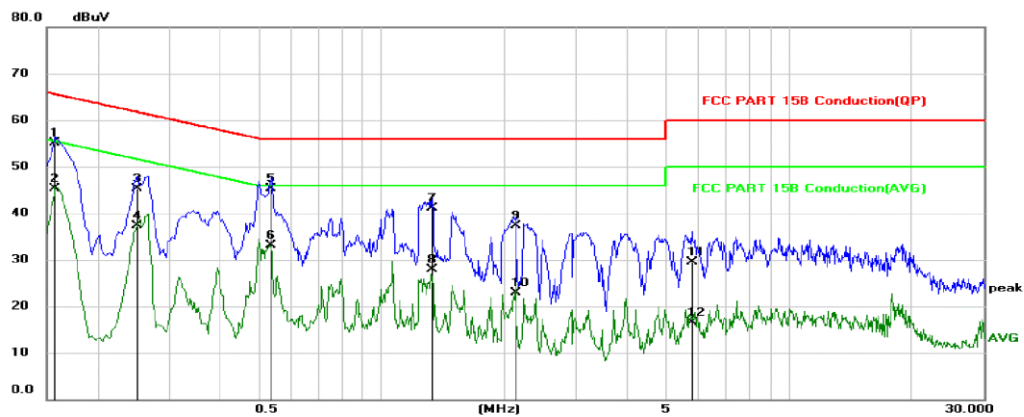
7.3. Test Results

PASS.

The test data please refer to following page.

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

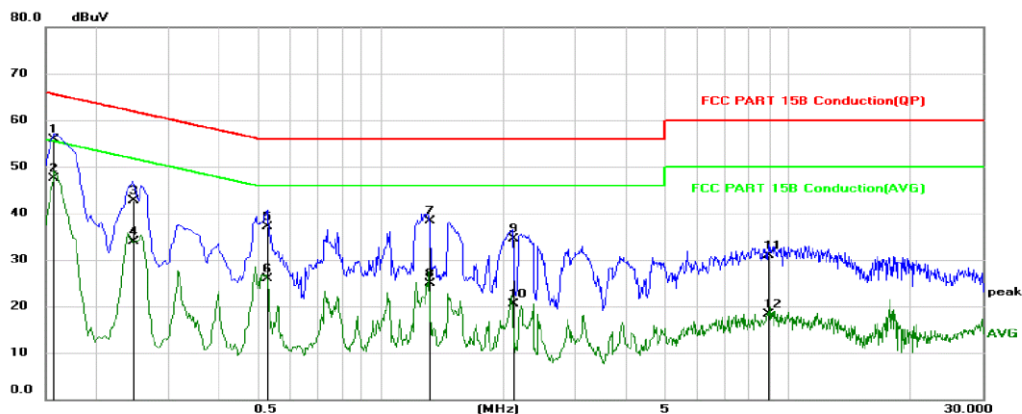
Line



Site Chamber #1 Phase: **L1**
 Limit: FCC PART 15B Conduction(QP) Power: AC 120V/60Hz

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1573	44.82	10.24	55.06	65.61	-10.55	QP	
2	*	0.1573	35.06	10.24	45.30	55.61	-10.31	AVG	
3		0.2485	35.00	10.21	45.21	61.81	-16.60	QP	
4		0.2485	27.10	10.21	37.31	51.81	-14.50	AVG	
5		0.5338	35.09	10.20	45.29	56.00	-10.71	QP	
6		0.5338	22.85	10.20	33.05	46.00	-12.95	AVG	
7		1.3336	30.87	10.20	41.07	56.00	-14.93	QP	
8		1.3336	17.66	10.20	27.86	46.00	-18.14	AVG	
9		2.1375	27.15	10.20	37.35	56.00	-18.65	QP	
10		2.1375	12.75	10.20	22.95	46.00	-23.05	AVG	
11		5.8017	19.27	10.20	29.47	60.00	-30.53	QP	
12		5.8017	6.40	10.20	16.60	50.00	-33.40	AVG	

Neutral



Site Chamber #1 Phase: **N**
 Limit: FCC PART 15B Conduction(QP) Power: AC 120V/60Hz

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1580	45.69	10.24	55.93	65.57	-9.64	QP	
2	*	0.1580	37.36	10.24	47.60	55.57	-7.97	AVG	
3		0.2470	32.51	10.21	42.72	61.86	-19.14	QP	
4		0.2470	23.71	10.21	33.92	51.86	-17.94	AVG	
5		0.5297	26.95	10.20	37.15	56.00	-18.85	QP	
6		0.5297	15.69	10.20	25.89	46.00	-20.11	AVG	
7		1.3232	28.13	10.20	38.33	56.00	-17.67	QP	
8		1.3232	14.72	10.20	24.92	46.00	-21.08	AVG	
9		2.1169	24.28	10.20	34.48	56.00	-21.52	QP	
10		2.1169	10.36	10.20	20.56	46.00	-25.44	AVG	
11		8.9429	20.63	10.20	30.83	60.00	-29.17	QP	
12		8.9429	8.04	10.20	18.24	50.00	-31.76	AVG	

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

8. RADIATED EMISSION MEASUREMENT

8.1. Standard Applicable

According to FCC § 15.249: 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)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	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

8.2. 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

8.3. 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 ($\pm 45^\circ$) 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 ($\pm 45^\circ$) 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.

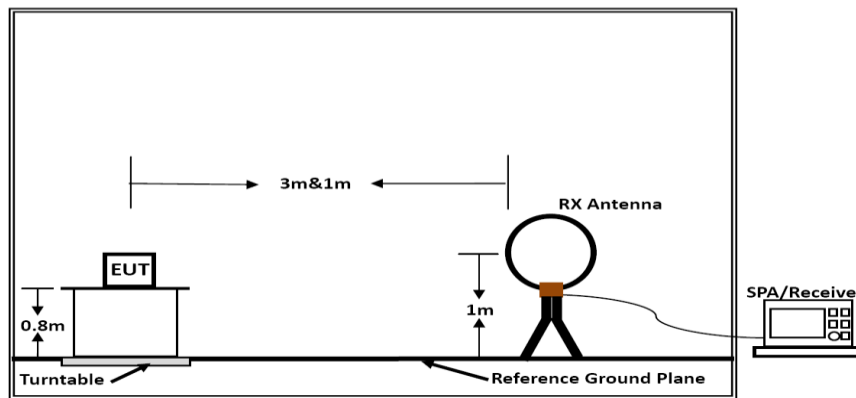
Premeasurement:

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

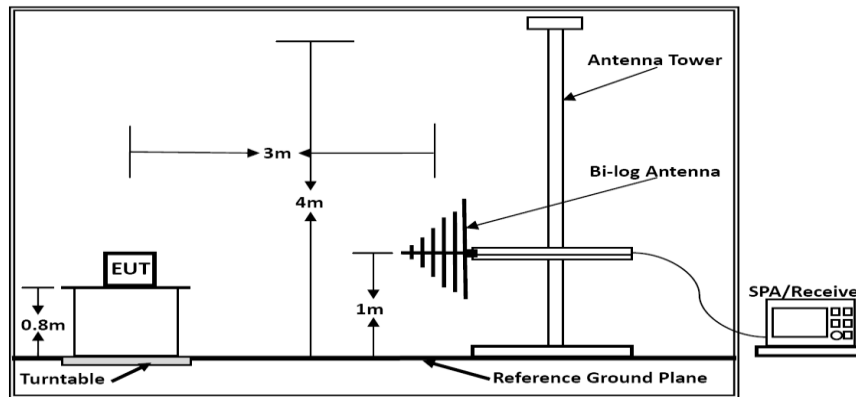
Final measurement:

- 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.

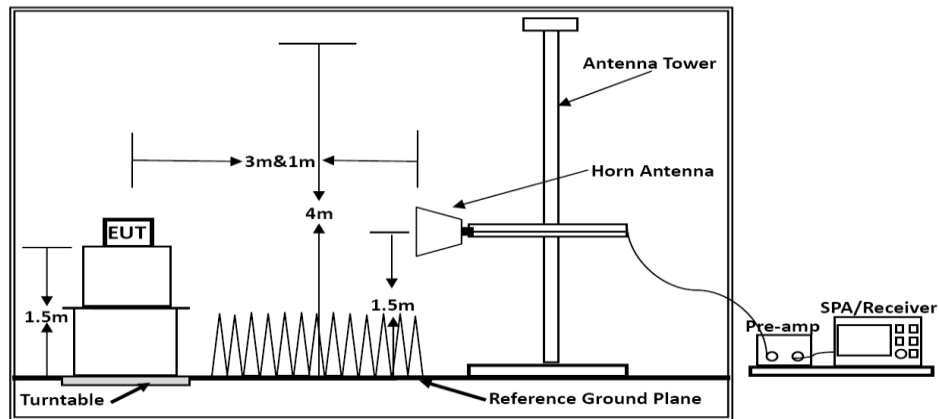
8.4. Block Diagram of Test Setup



Below 30MHz



Below 1GHz



Above 1GHz

Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$ (dB);
 Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

8.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

8.6. Test Results of Radiated Emissions (9 KHz~30 MHz)

Temperature	23.7°C	Humidity	52%
Test Engineer	CHUANG WANG	Configurations	5800MHz

Freq. (MHz)	Level (dBUV)	Over Limit (dB)	Over Limit (dBUV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBUV) + distance extrapolation factor.

8.7. Test Results of Radiated Emissions (30 MHz – 1000 MHz)

Temperature	23.7°C	Humidity	52%
Test Engineer	CHUANG WANG	Configurations	5800MHz

Vertical



Site LAB		Polarization: Vertical									
Limit: FCC PART 15B		Power: AC 120V/60Hz									
No.	Mk.	Freq. MHz	Reading Level dBUV	Correct Factor dB	Measurement dBuV/m	Limit dB/m	Margin dB	Detector	Antenna Height cm	Table Degree	Comment
1		42.3579	10.00	13.65	23.65	40.00	-16.35	QP			
2		50.8082	11.89	13.13	25.02	40.00	-14.98	QP			
3	*	78.0704	21.67	9.79	31.46	40.00	-8.54	QP			
4		102.6292	12.00	11.00	23.00	43.50	-20.50	QP			
5		147.3390	9.02	13.50	22.52	43.50	-20.98	QP			
6		365.5391	5.14	14.68	19.82	46.00	-26.18	QP			

Horizontal



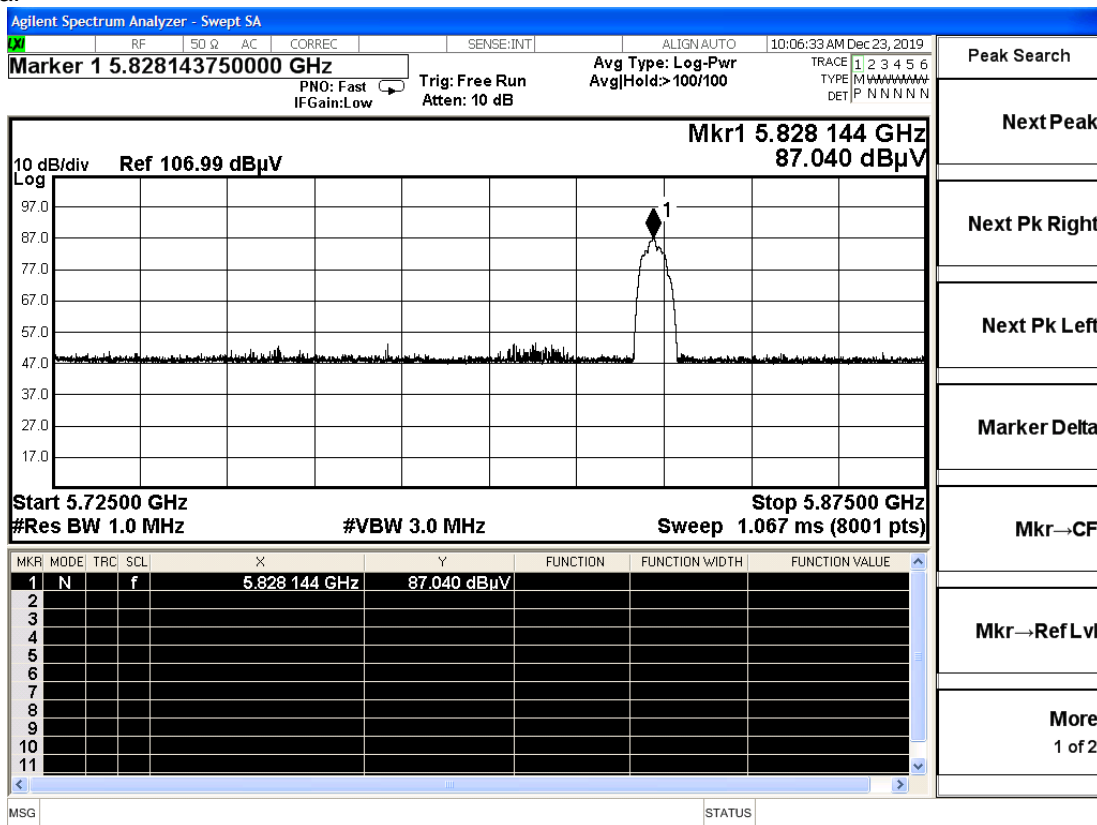
Site LAB		Polarization: Horizontal									
Limit: FCC PART 15B		Power: AC 120V/60Hz									
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Margin dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	77.7290	17.51	9.58	27.09	40.00	-12.91	QP			
2		102.8544	12.38	13.18	25.56	43.50	-17.94	QP			
3		148.4410	10.61	9.34	19.95	43.50	-23.55	QP			
4		183.1202	8.62	10.88	19.50	43.50	-24.00	QP			
5		299.5784	7.68	12.78	20.46	46.00	-25.54	QP			
6		336.1825	9.50	14.64	24.14	46.00	-21.86	QP			

Note:

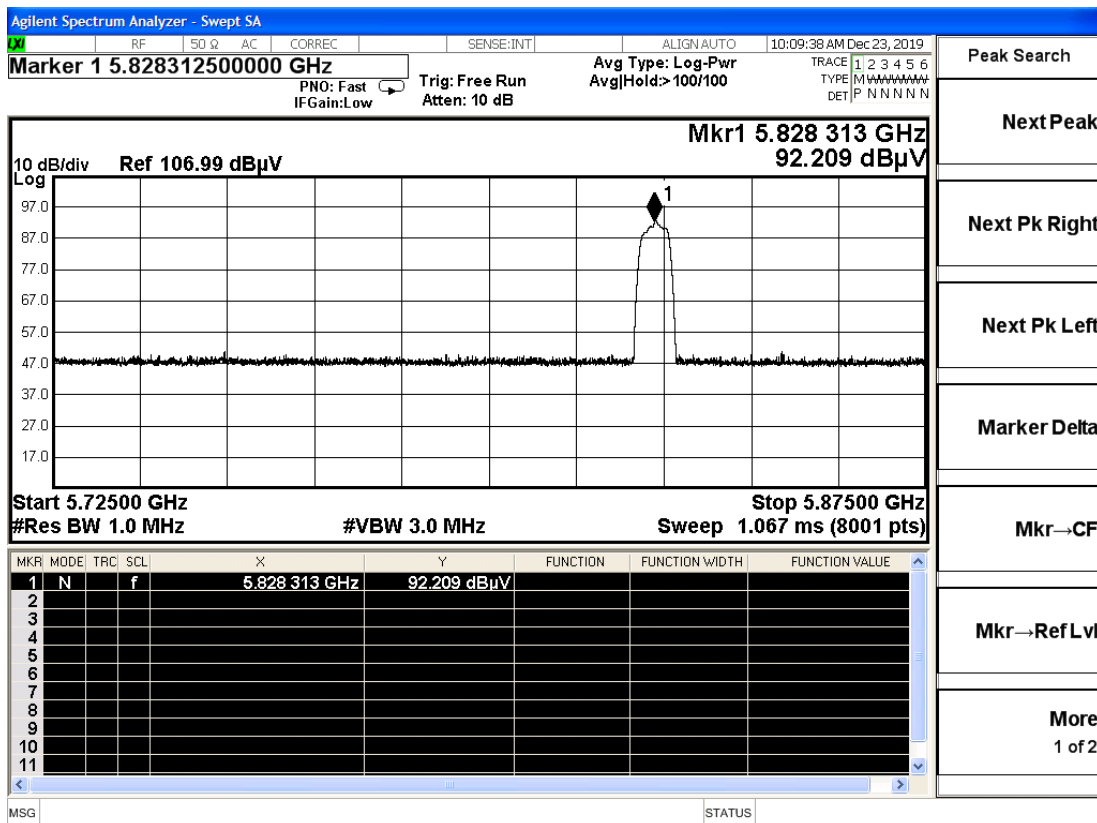
- 1). Pre-scan all modes and recorded the worst case results in this report.
- 2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3). Corrected Reading: Antenna Factor + Cable Loss + Read Level = Level.

8.8. Results for Radiated Emissions (1 – 40 GHz)

Horizontal



Vertical



Note: The Peak value is lower than 94dBuV/m, The AVG does not need to be considered.

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	87.04	/	114.00	94.00	PASS
5800.00	V	92.21	/	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.
11600.00	49.12	33.06	35.04	3.94	51.08	74.00	-22.92	Peak	Horizontal
11600.00	32.80	33.06	35.04	3.94	34.76	54.00	-19.24	Average	Horizontal
11600.00	49.53	33.06	35.04	3.94	51.49	74.00	-22.51	Peak	Vertical
11600.00	33.81	33.06	35.04	3.94	35.77	54.00	-18.23	Average	Vertical

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.
- 4). Measuring frequencies from 9 KHz - 10th harmonic (ex. 40GHz), No emission found between lowest internal used/generated frequency to 30 MHz.
- 5). Radiated emissions measured in frequency range from 9 KHz - 10th harmonic (ex. 40GHz) were made with an instrument using Peak detector mode.
- 6). 18~40GHz at least have 20dB margin. No recording in the test report.

9. 99% OCCUPIED BANDWIDTH AND 20 DB BANDWIDTH MEASUREMENT

9.1. Standard Applicable

“The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

9.2. Test Procedure

Use the following spectrum analyzer settings:

Span = 50MHz

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).

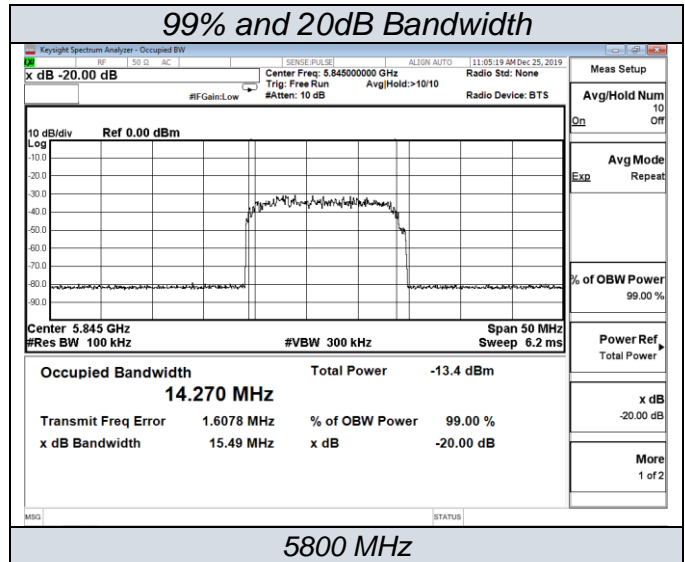
9.3. Test Results

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	15.49	14.27	/	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;



10. TEST SETUP PHOTOGRAPHS OF THE EUT

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-----