

FCC TEST REPORT

For

Guangzhou Sanmak Lighting Co., Ltd.

Wireless remote work light

Model No.: SM2009

Additional Model No. : SM2019, SM2029, SM2039, SM2109, SM2209

Prepared for : Guangzhou Sanmak Lighting Co., Ltd.
Address : Block 6, Jiahe Creative Industry Zone, No.63 Huangbian
North Rd., Guangzhou, 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

Date of receipt of test sample : August 05, 2013
Number of tested samples : 1
Serial number : Prototype
Date of Test : August 05, 2013 - September 12, 2013
Date of Report : September 12, 2013

FCC TEST REPORT
FCC CFR 47 PART 15 Subpart B: 2012

Report Reference No. : LCS130805077TF

Date Of Issue..... : September 12, 2013

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..... : Guangzhou Sanmak Lighting Co., Ltd.

**Address..... : Block 6, Jiahe Creative Industry Zone, No.63 Huangbian North
Rd., Guangzhou, China**

Test Specification

Standard : FCC CFR 47 PART 15 Subpart B:2012, ANSI C63.4-2009

Test Report Form No. : LCSEMC-1.0

TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF : Dated 2011-03

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Test Item Description..... : Wireless remote work light

Trade Mark..... : Sanmak

Model/ Type Reference..... : SM2009

Ratings : DC 12V(Nominal Voltage)

Result : Positive

Compiled by:

Leo Lee

Leo Lee/ File administrators

Supervised by:

Fox Zhang

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Approved by:

Gavin Liang

Gavin Liang/ Manager

FCC TEST REPORT

Test Report No. : LCS130805077TFSeptember 12, 2013

Date of issue

Type/ Model..... : SM2009

EUT..... : Wireless remote work light

Applicant..... : Guangzhou Sanmak Lighting Co., Ltd.

Address..... : Block 6, Jiahe Creative Industry Zone, No.63 Huangbian North Rd., Guangzhou, China

Telephone..... : /

Fax..... : /

Manufacturer..... : Guangzhou Sanmak Lighting Co., Ltd.

Address..... : Block 6, Jiahe Creative Industry Zone, No.63 Huangbian North Rd., Guangzhou, China

Telephone..... : /

Fax..... : /

Factory..... : Guangzhou Sanmak Lighting Co., Ltd.

Address..... : Block 6, Jiahe Creative Industry Zone, No.63 Huangbian North Rd., Guangzhou, 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.

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1. SUMMARY 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: 2012	Class B	N/A
Radiated disturbance	FCC CFR 47 PART 15 Subpart B: 2012	Class B	PASS
Note: 1.N/A is an abbreviation for Not Applicable. 2.This EUT is designed to use on vehicle and there is no interface for this device to attach to the public power supply system, so conducted disturbance testing at mains terminals is not applicable.			

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : Wireless remote work light

Model Number : SM2009

Power Supply : DC 12V(Nominal Voltage)

Receiving Frequency : 315MHz

Receiving Antenna : Integral Antenna

2.2. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
renewable energy company	lead-acid battery	RM 12-18	N/A	VOC

Note: A new lead-acid battery supplied DC 12V power to the EUT for testing.

2.3. External I/O Cable

I/O Cable	Quantity	Description
DC Power Cable	1	2.8m, unshielded

2.4. Description of Test Facility

Site Description

EMC Lab.

: Accredited by CNAS, June 04, 2010
The Certificate Registration Number. is L4595.

Accredited by FCC, July 14, 2011
The Certificate Registration Number. is 899208.

Accredited by Industry Canada, May. 02, 2011
The Certificate Registration Number. is 9642A-1

Accredited by VCCI, Japan January 30, 2012
The Certificate Registration Number. is C-4260 and R-380

2.5.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.

2.6.Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	30MHz~200MHz	$\pm 2.96\text{dB}$	(1)
	:	200MHz~1000MHz	$\pm 3.10\text{dB}$	(1)
	:	1GHz~26.5GHz	$\pm 3.80\text{dB}$	(1)
Conduction Uncertainty	:	150kHz~30MHz	$\pm 1.63\text{dB}$	(1)
Power disturbance	:	30MHz~300MHz	$\pm 1.60\text{dB}$	(1)

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

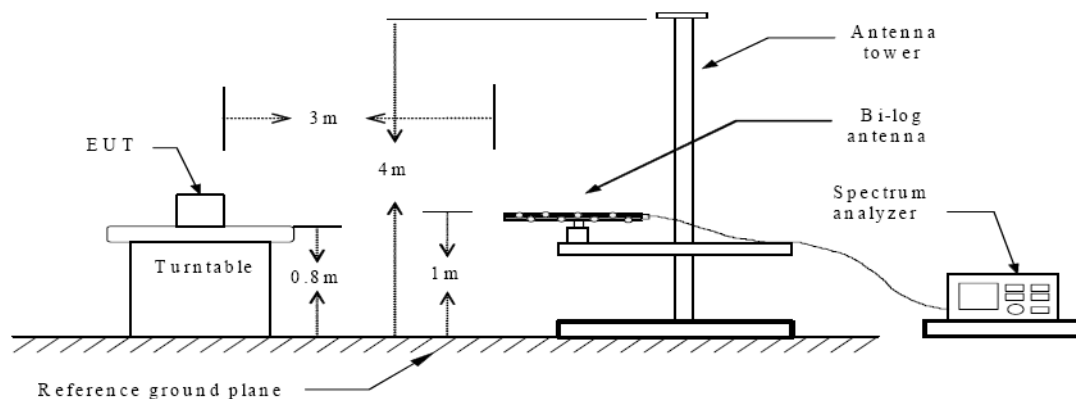
3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

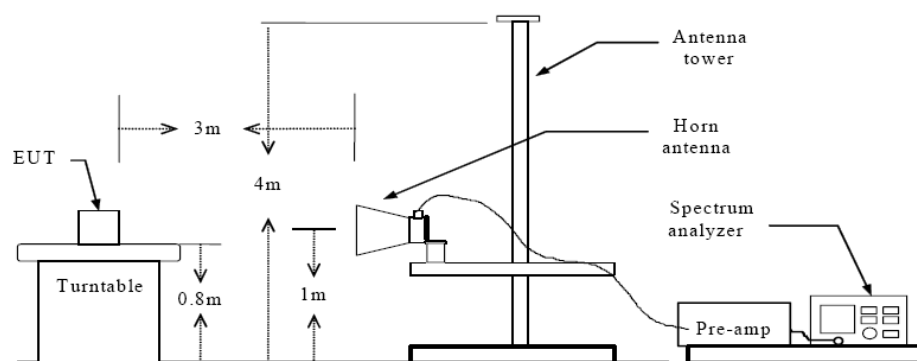
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2013-06-18	2014-06-17
2	Amplifier	SCHAFFNER	COA9231A	18667	2013-06-18	2014-06-17
3	Amplifier	Agilent	8449B	3008A02120	2013-06-16	2014-06-15
4	Amplifier	MITEQ	AMF-6F-260400	9121372	2013-06-16	2014-06-15
5	Spectrum Analyzer	Agilent	E4407B	MY41440292	2013-06-16	2014-06-15
6	Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	2013-06-16	2014-06-15
7	Loop Antenna	R&S	HFH2-Z2	860004/001	2013-06-18	2014-06-17
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2013-06-10	2014-06-09
9	Horn Antenna	EMCO	3115	6741	2013-06-10	2014-06-09
10	Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	2013-06-10	2014-06-09
11	RF Cable-R03m	Jye Bao	RG142	CB021	2013-06-18	2014-06-17
12	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2013-06-18	2014-06-17

3.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz

3.3.Radiated Emission Limit (Class B)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0

Remark: (1) Emission level $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$

(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

Limits for radiated disturbance Above 1GHz			
Frequency (MHz)	Distance (Meters)	Field Strengths Limit	
		Average Limit ($\text{dB}\mu\text{V/m}$)	Peak Limit ($\text{dB}\mu\text{V/m}$)
1000-10 Harmonics	3	54	74

Note: The lower limit applies at the transition frequency.

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

(1) Setup the EUT as shown in Section 3.2.

(2) Let the EUT work in test mode (On Mode: Received DC 12V power by lead-acid battery) and measure it.

3.6.Test Procedure

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz

RBW and 10Hz VBW for average reading in spectrum analyzer.

7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.

9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

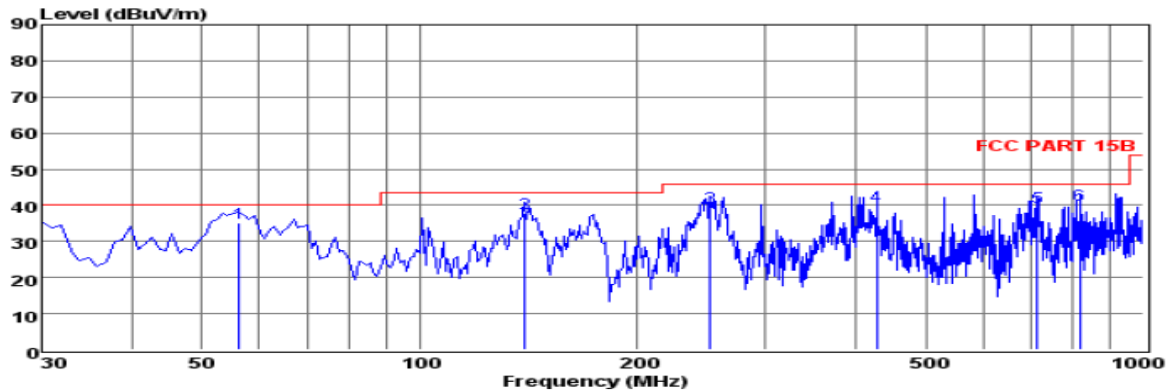
EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up 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.

3.7. Test Results

PASS.

The test data please refer to following page.

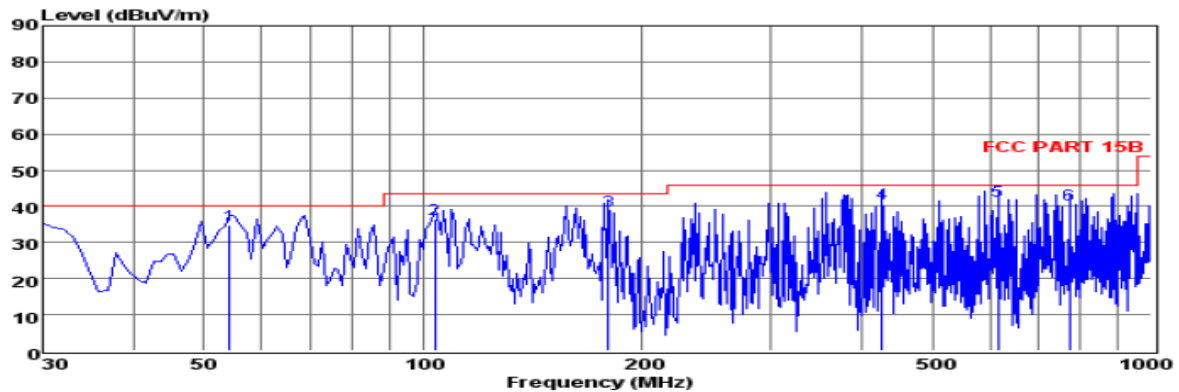
Below 1GHz:



Env./Ins: 24°C/56%
 EUT: Wireless remote work light
 M/N: SM2009
 Power Rating: DC 12V
 Test Mode: On
 Operator: Tree
 Memo:
 pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Linit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	56.19	21.73	0.47	12.94	35.14	40.00	-4.86	QP
2	139.61	28.97	0.75	8.22	37.94	43.50	-5.56	QP
3	252.13	26.46	0.90	12.07	39.43	46.00	-6.57	QP
4	428.67	22.94	1.39	15.51	39.84	46.00	-6.16	QP
5	712.88	18.92	1.63	18.97	39.52	46.00	-6.48	QP
6	816.67	18.23	1.79	20.23	40.25	46.00	-5.75	QP

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

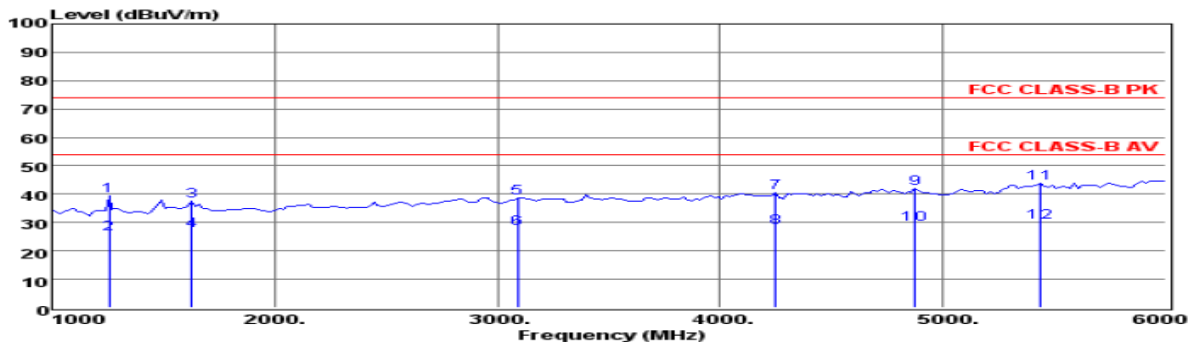


Env./Ins: 24°C/56%
 EUT: Wireless remote work light
 M/N: SM2009
 Power Rating: DC 12V
 Test Mode: On
 Operator: Tree
 Memo:
 pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Linit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	54.25	21.40	0.46	13.05	34.91	40.00	-5.09	QP
2	103.72	23.17	0.61	12.82	36.60	43.50	-6.90	QP
3	179.38	28.19	0.89	9.64	38.72	43.50	-4.78	QP
4	426.73	23.93	1.39	15.50	40.82	46.00	-5.18	QP
5	616.85	21.37	1.51	18.51	41.39	46.00	-4.61	QP
6	771.08	19.12	1.63	19.70	40.45	46.00	-5.55	QP

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

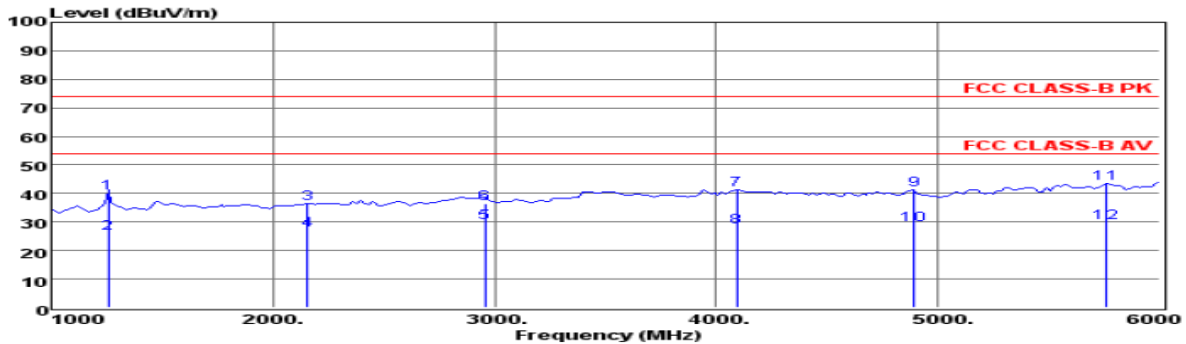
Above 1GHz:



Env./Ins: 24°C/56%
 EUT: Wireless remote work light
 M/N: SM2009
 Power Rating: DC 12V
 Test Mode: On
 Operator: Tree
 Memo:
 pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Linit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1255.00	45.64	4.35	26.05	39.29	74.00	-34.71	Peak
2	1255.00	32.41	4.35	26.05	26.06	54.00	-27.94	Average
3	1629.00	43.78	4.43	26.36	37.61	74.00	-36.39	Peak
4	1629.00	33.43	4.43	26.36	27.26	54.00	-26.74	Average
5	3091.00	40.21	6.02	29.57	38.80	74.00	-35.20	Peak
6	3091.00	29.37	6.02	29.57	27.96	54.00	-26.04	Average
7	4247.00	37.45	7.35	32.41	40.49	74.00	-33.51	Peak
8	4247.00	25.29	7.35	32.41	28.33	54.00	-25.67	Average
9	4876.00	37.10	7.73	33.49	41.90	74.00	-32.10	Peak
10	4876.00	24.43	7.73	33.49	29.23	54.00	-24.77	Average
11	5437.00	37.29	8.28	34.89	43.82	74.00	-30.18	Peak
12	5437.00	23.45	8.28	34.89	29.98	54.00	-24.02	Average

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



Env./Ins: 24°C/56%
 EUT: Wireless remote work light
 M/N: SM2009
 Power Rating: DC 12V
 Test Mode: On
 Operator: Tree
 Memo:
 pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Linit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1255.00	46.64	4.35	26.05	40.29	74.00	-33.71	Peak
2	1255.00	32.53	4.35	26.05	26.18	54.00	-27.82	Average
3	2156.00	40.07	4.72	28.63	36.35	74.00	-37.65	Peak
4	2156.00	30.87	4.72	28.63	27.15	54.00	-26.85	Average
5	2955.00	31.84	5.84	29.12	29.77	74.00	-44.23	Peak
6	2955.00	38.41	5.84	29.12	36.34	54.00	-17.66	Average
7	4094.00	38.17	7.26	32.53	41.12	74.00	-32.88	Peak
8	4094.00	25.29	7.26	32.53	28.24	54.00	-25.76	Average
9	4893.00	36.40	7.74	33.53	41.25	74.00	-32.75	Peak
10	4893.00	24.31	7.74	33.53	29.16	54.00	-24.84	Average
11	5760.00	36.09	8.64	35.70	43.65	74.00	-30.35	Peak
12	5760.00	22.34	8.64	35.70	29.90	54.00	-24.10	Average

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

4. MANUFACTURER/ APPROVAL HOLDER DECLARATION

The following Series model(s):

SM2019	SM2029	SM2039	SM2109
SM2209	--	--	--

Belong to the tested device:

Product description : Wireless remote work light

Model name : SM2009

Remark: PCB board, structure and internal of these model(s) are the same,

So no additional models were tested.

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