

Test Report

Product: LED COLORFUL SOUND
ATMOSPHERE CLOCK

Trade Mark: -

Model Number: S528

FCC ID: 2BDRX-S528

Prepared for

Dongguan Shuangjun Electronics Co., Ltd

No. 18 Zongdui Road, Dalingshan Town, Dongguan, Guangdong, China

Prepared by

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Table of Contents

1	GENERAL DESCRIPTION	5
1.1	DESCRIPTION OF EUT.....	5
1.2	TEST MODE.....	5
1.3	TEST SETUP	6
1.4	ANCILLARY EQUIPMENT	6
2	SUMMARY OF TEST RESULT	7
3	TEST FACILITIES AND ACCREDITATIONS	8
3.1	TEST LABORATORY	8
3.2	ENVIRONMENTAL CONDITIONS	8
3.3	MEASUREMENT UNCERTAINTY	8
3.4	TEST SOFTWARE	8
4	LIST OF TEST EQUIPMENT	9
5	TEST ITEM AND RESULTS.....	11
5.1	ANTENNA REQUIREMENT	11
5.2	CONDUCTED EMISSION.....	12
5.3	RADIATED EMISSION	16
5.4	OCCUPIED BANDWIDTH	21
6	PHOTOGRAPHS OF THE TEST SETUP.....	22
7	PHOTOGRAPHS OF THE EUT.....	23

TEST RESULT CERTIFICATION

Applicant's Name..... : Dongguan Shuangjun Electronics Co., Ltd
Address : No. 18 Zongdui Road, Dalingshan Town, Dongguan,
Guangdong, China
Manufacturer's Name : Dongguan Shuangjun Electronics Co., Ltd
Address : No. 18 Zongdui Road, Dalingshan Town, Dongguan,
Guangdong, China

Product description

Product name : LED COLORFUL SOUND ATMOSPHERE CLOCK
Model Number : S528

Standards..... : FCC Part 15C
Test procedure..... : ANSI C63.4: 2014

This device described above has been tested by Shenzhen HongBiao Certification& Testing Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

Date of Test..... :
Date (s) of performance of tests..... : October 08, 2023~November 23, 2023
Test Result..... : **Pass**

Testing Engineer :

Zoe su
(Z o e S u)

Technical Manager :

Gary Lu
(G a r y L u)

Authorized Signatory :

Leo Su
(L e o S u)



[illegible]

1 General Description

1.1 Description of EUT

Product name:	LED COLORFUL SOUND ATMOSPHERE CLOCK
Model name:	S528
Series Model:	-
Different of series model:	-
Operation frequency:	110kHz-205kHz
Operational mode:	Wireless charging
Modulation type:	ASK
Antenna type:	Coil Antenna
Hardware version:	V1.0
Software version:	V1.0
Power supply:	DC 12V by adapter
Adapter information:	Model: QL024-1202000U Input: AC 100-240V~50/60Hz, 0.8A Output: DC 12V/2A Model: XY24U30-QC2 Input: AC 100-240V~50/60Hz, 0.6A Output: DC 5V/3A, DC 9V/2.66A, DC 12V/2A

1.2 Test Mode

Pretest Test Mode	Description of Mode
TM1	Wireless charging 15W
TM2	Wireless charging 10W
TM3	Wireless charging 5W

Test Item	Final Test Mode
Conducted Emissions	TM1
Radiated Emissions	TM1
20dB bandwidth	TM1

Note: All test modes were pre-tested, but we only recorded the worst case in this report.

1.3 Test Setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

1.4 Ancillary Equipment

Equipment	Model	S/N	Manufacturer
5W/10W/15W Dummy load	DL01	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Equipment	Length (cm)	Shielded/Unshielded	With/Without Ferrite
/	/	/	/
/	/	/	/

2 Summary of Test Result

Test procedures according to the technical standards:

FCC Part 15C				
No.	Standard Section	Test Item	Result	Remark
1	FCC Part 15.203	Antenna Requirement	Pass	
2	FCC Part 15.207	Conducted Emission	Pass	
3	FCC Part 15.209	Radiated Emission	Pass	
4	FCC Part 15.215	20dB Bandwidth	Pass	
Note: 1. "N/A" means the test case does not apply to the test object.				

3 Test Facilities and Accreditations

3.1 Test Laboratory

Test Site	Shenzhen HongBiao Certification& Testing Co., Ltd
Test Site Location	Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen, China
Telephone:	(86-755) 2998 9321
Fax:	(86-755) 2998 5110
FCC Registration No.:	CN1341
A2LA Certificate No.:	6765.01

3.2 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C~35°C
Relative Humidity:	20%~75%
Air Pressure:	98kPa~101kPa

3.3 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 %.

Measurement Frequency Range	U, (dB)	Note
RF frequency	2×10^{-5}	
RF power, conducted	± 0.57 dB	
Conducted emission(150kHz~30MHz)	± 2.5 dB	
Radiated emission(30MHz~1GHz)	± 4.2 dB	
Radiated emission (above 1GHz)	± 4.7 dB	
Temperature	± 1 degree	
Humidity	± 5 %	

3.4 Test Software

Software name	Manufacturer	Model	Version
EMI Measurement	Farad	EZ-EMC	V1.1.4.2
Conducted test system	MWRF-test	MTS 8310	V2.0.0

4 List of Test Equipment

Radiation emission							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E001	Horn Antenna	Schwarzbeck	BBHA 9120D	02592	2022-04-02	2024-04-01
2	HB-E002	Biconical log-periodic composite antenna	Schwarzbeck	VULB 9168	01340	2022-04-06	2024-04-05
3	HB-E003	SHF-EHF Horn	Schwarzbeck	BBHA 91270	01193	2022-04-02	2024-04-01
4	HB-E004	Preamplifier	Noyetec	LAN-0910	NYCM1420101	2023-05-11	2024-05-10
5	HB-E005	Preamplifier	Noyetec	LAN-0118	NYCM1420102	2023-05-12	2024-05-11
6	HB-E006	Preamplifier	Noyetec	LAN-1840	NYCM1420103	2023-06-11	2024-06-10
7	HB-E007	EMI TEST RECEIVER	R&S	ESR7	102520	2023-05-12	2024-05-11
8	HB-E009	POSITINAL COTROLLE R	Noyetec	N/A	N/A	/	/
9	HB-E013	RF switch	Noyetec	NY-RF4	NY0CM1420204	/	/
10	HB-E066	Illuminance Tester	TASI	TA8121	N/A	2023-05-11	2024-05-10
11	HB-E075	Active loop antenna	Schwarzbeck	FMZB 1519B	1519B-245	2022-07-24	2024-07-23
Conduction emission							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E014	4 Path V-LISN	Schwarzbeck	NNLK 8121	00770	2023-05-12	2024-05-11
2	HB-E015	Pulse Limiter	Schwarzbeck	VTSD 9561-F	00949	2023-05-12	2024-05-11
3	HB-E016	ZN23201	Noyetec	ZN23201	N/A	2023-05-11	2024-05-10
4	HB-E059	Attenuator	Xianghua	TS2-6-1	220215166	2023-05-12	2024-05-11
5	HB-E069	EMI TEST RECEIVER	R&S	ESCI	N/A	2023-05-12	2024-05-11
RF							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E041	MXG Anaio Signal Generator	Agilent	N5181A	MY47070421	2023-05-11	2024-05-10
2	HB-E042	WIDEBAND RADIO COMMUNICA	R&S	CMW500	132108	2023-05-11	2024-05-10

		TION TESTER					
3	HB-E043	MXG Anaio Signal Generator	Agilent	N5182A	US46240335	2023-05-11	2024-05-10
4	HB-E044	Signal& spectrum Analyzer	R&S	FSV3044	101264	2023-05-11	2024-05-10
5	HB-E045	RF Control Box	Noyetec	NY100-R FCB	N/A	/	/
6	HB-E058	Thermometer Clock Humidity Monitor	N/A	HTC-1	N/A	/	/
7	HB-E077	PXA Signal Analyzer	Agilent	N9030A	N/A	2023-05-11	2024-05-10

Note: the calibration interval of the above test instruments is 12&24 months and the calibrations are traceable to international system unit (SI).

5 Test Item And Results

5.1 Antenna Requirement

5.1.1 Standard Requirement

15.203 requirement: For intentional device, 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

5.1.2 Test Result

The EUT antenna is Coil Antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

5.2 Conducted Emission

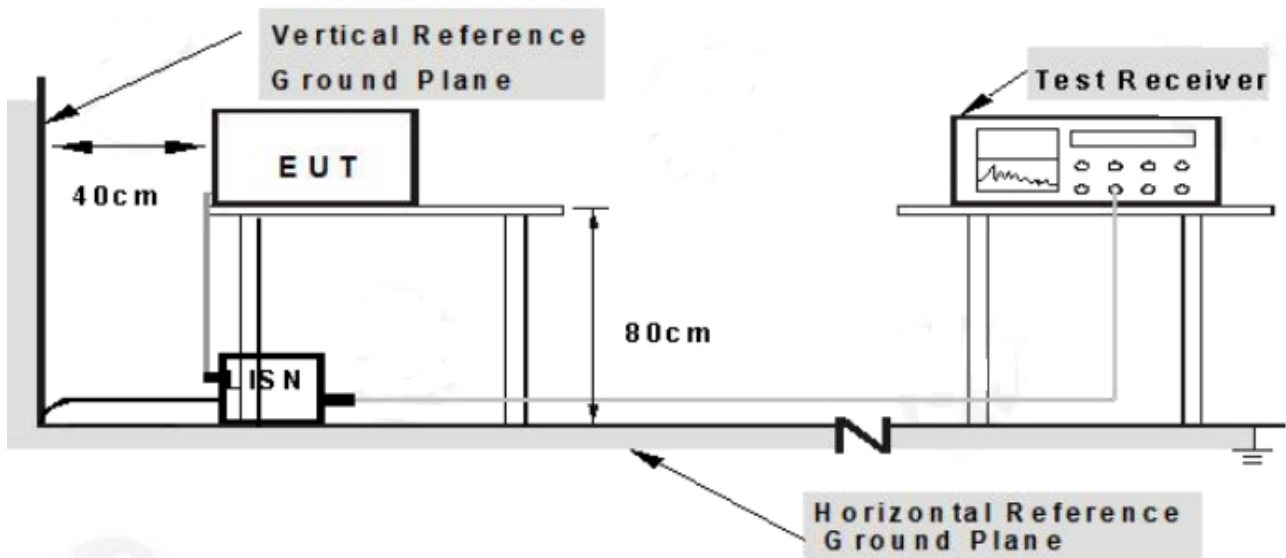
5.2.1 Limits

Limits – Class A		
Frequency (MHz)	Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	79	66
0.5 to 30	73	60
Limits – Class B		
Frequency (MHz)	Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50
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.		

5.2.2 Test Procedures

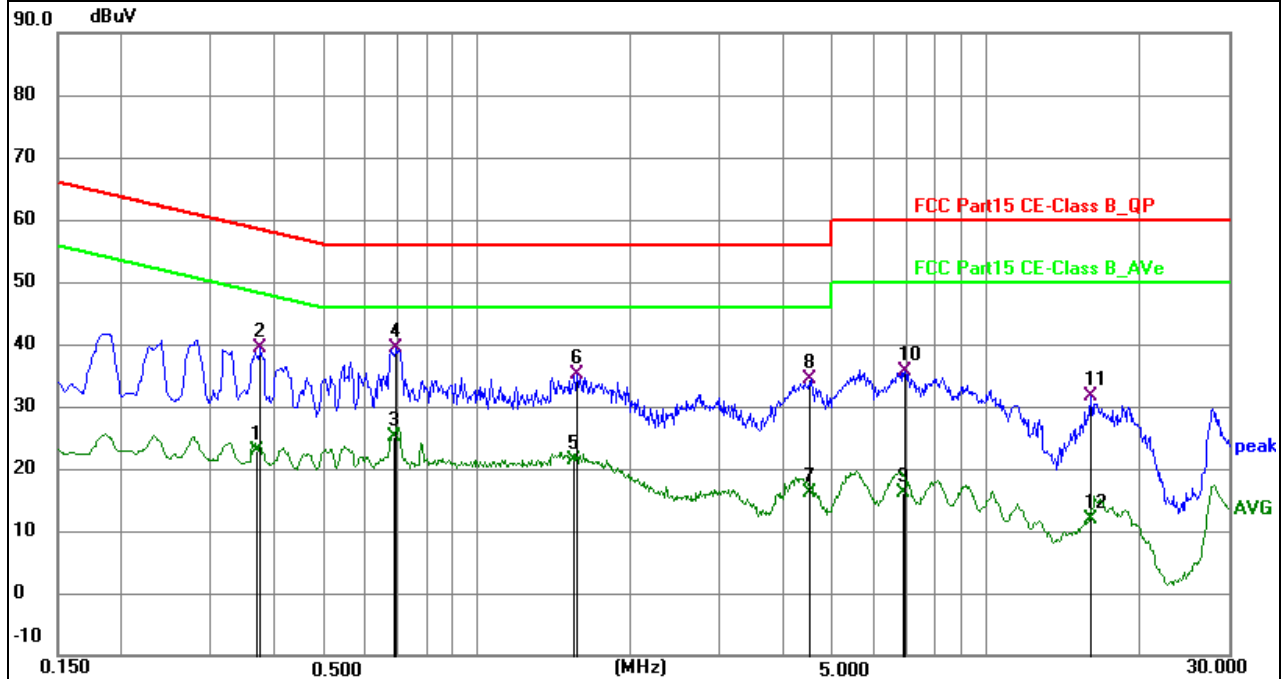
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.
- 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.
- LISN is at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item – photographs of the test setup.

5.2.3 Test setup



5.2.4 Test Result

EUT:	LED COLORFUL SOUND ATMOSPHERE CLOCK	Model Name:	S528
Test Mode:	TM1	Phase :	L
Test Voltage:	AC 120V/60Hz		

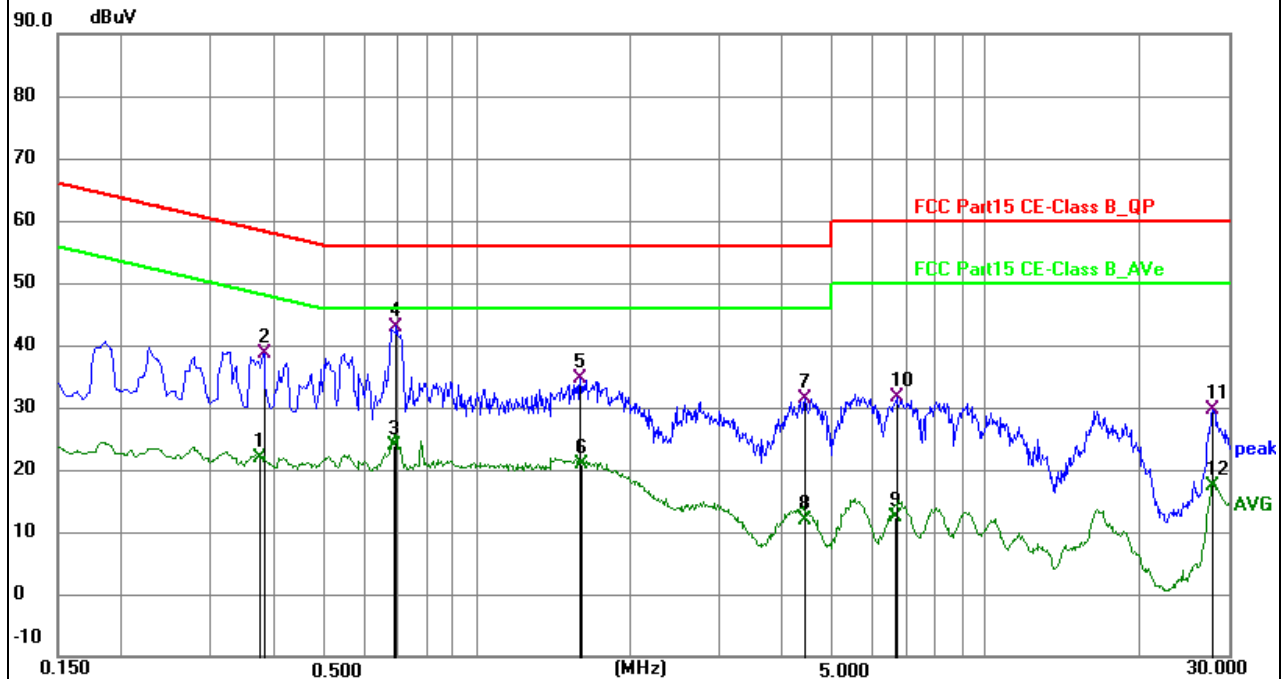


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3693	11.96	11.00	22.96	48.52	-25.56	AVG	P	
2	0.3750	28.29	11.00	39.29	58.39	-19.10	QP	P	m
3	0.6886	14.21	11.00	25.21	46.00	-20.79	AVG	P	
4 *	0.6945	28.43	11.00	39.43	56.00	-16.57	QP	P	m
5	1.5578	10.38	11.00	21.38	46.00	-24.62	AVG	P	
6	1.5765	24.14	11.00	35.14	56.00	-20.86	QP	P	m
7	4.5324	5.04	11.00	16.04	46.00	-29.96	AVG	P	
8	4.5329	23.28	11.00	34.28	56.00	-21.72	QP	P	m
9	6.9145	5.01	11.00	16.01	50.00	-33.99	AVG	P	
10	6.9315	24.61	11.00	35.61	60.00	-24.39	QP	P	m
11	16.1295	20.51	11.00	31.51	60.00	-28.49	QP	P	m
12	16.1446	0.92	11.00	11.92	50.00	-38.08	AVG	P	

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. Measurement Level = Reading level + Correct Factor
4. All test modes were pre-tested, but we only recorded the worst case in this report.

EUT:	LED COLORFUL SOUND ATMOSPHERE CLOCK	Model Name:	S528
Test Mode:	TM1	Phase :	N
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3758	10.84	11.00	21.84	48.37	-26.53	AVG	P	
2	0.3795	27.72	11.00	38.72	58.29	-19.57	QP	P	m
3	0.6885	12.95	11.00	23.95	46.00	-22.05	AVG	P	
4 *	0.6945	32.00	11.00	43.00	56.00	-13.00	QP	P	m
5	1.5990	23.62	11.00	34.62	56.00	-21.38	QP	P	m
6	1.6088	9.88	11.00	20.88	46.00	-25.12	AVG	P	
7	4.4205	20.29	11.00	31.29	56.00	-24.71	QP	P	m
8	4.4288	0.79	11.00	11.79	46.00	-34.21	AVG	P	
9	6.6937	1.38	11.00	12.38	50.00	-37.62	AVG	P	
10	6.6975	20.69	11.00	31.69	60.00	-28.31	QP	P	m
11	27.9330	18.69	11.00	29.69	60.00	-30.31	QP	P	m
12	27.9430	6.34	11.00	17.34	50.00	-32.66	AVG	P	

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. Measurement Level = Reading level + Correct Factor
4. All test modes were pre-tested, but we only recorded the worst case in this report.

5.3 Radiated Emission

5.3.1 Limits

Frequencies (MHz)	Field Strength (micровolts/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

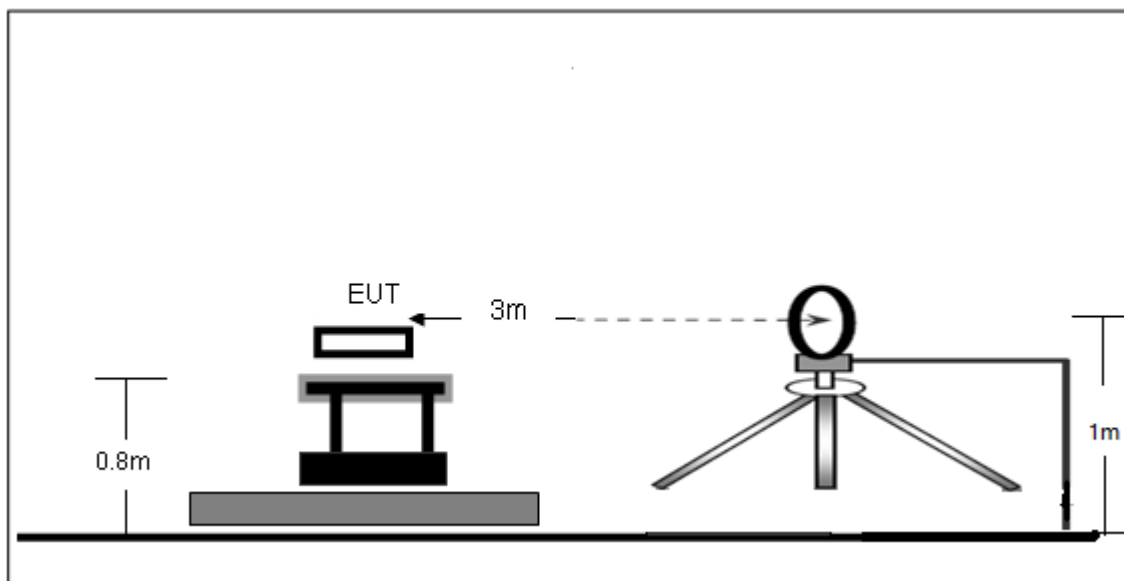
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.3.2 Test Procedures

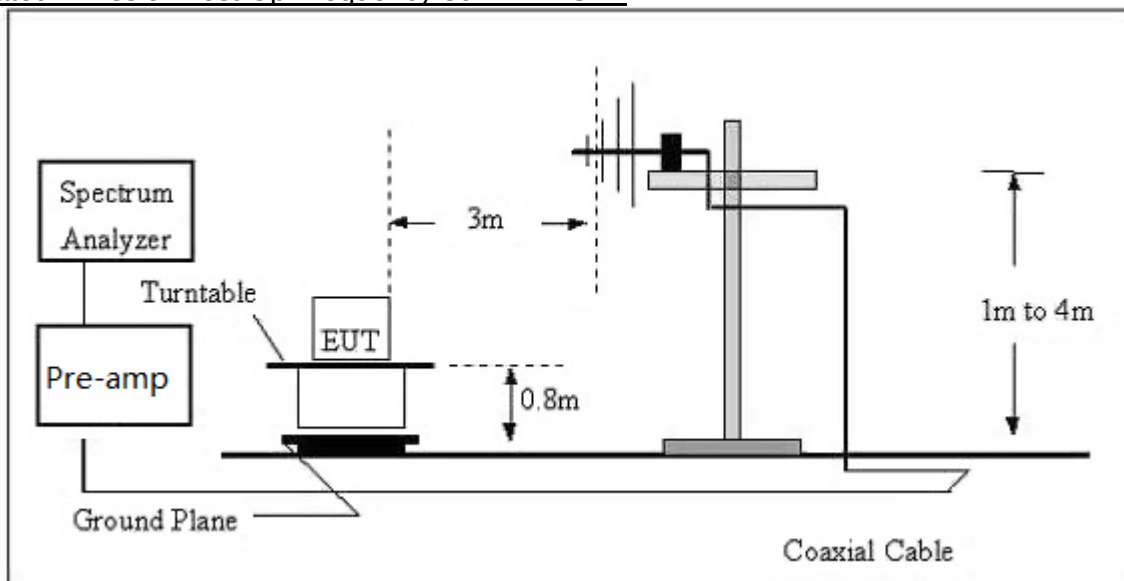
- The radiated emission tests were performed in the 3 meters.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.
- If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.
- For the actual test configuration, please refer to the related item – EUT test photos.

5.3.3 Test Setup

Radiated Emission Test-Up Frequency Below 30MHz



Radiated Emission Test-Up Frequency 30MHz~1GHz



5.3.4 Test Result

Frequency range (9kHz – 30MHz)

EUT:	LED COLORFUL SOUND ATMOSPHERE CLOCK	Model Name:	S528
Test Mode:	TM1	Phase :	Coplaner
Test Voltage:	DC 12V		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
0.0441	48.83	134.42	-85.59	Pass
0.0584	38.77	121.09	-82.32	Pass
0.0923	39.62	106.00	-66.38	Pass
0.1440	62.64	96.66	-34.02	Pass
0.3832	53.86	86.26	-32.4	Pass
0.6581	47.22	83.64	-36.42	Pass

EUT:	LED COLORFUL SOUND ATMOSPHERE CLOCK	Model Name:	S528
Test Mode:	TM1	Phase :	coaxial
Test Voltage:	DC 12V		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
0.0424	45.26	136.60	-91.34	Pass
0.0566	36.72	122.40	-85.68	Pass
0.1023	38.22	103.46	-65.24	Pass
0.1440	68.34	96.66	-28.32	Pass
0.4629	56.27	85.18	-28.91	Pass
0.7382	44.19	83.25	-39.06	Pass

Note:

Pre-scan in the all of mode, the worst case in of was recorded.

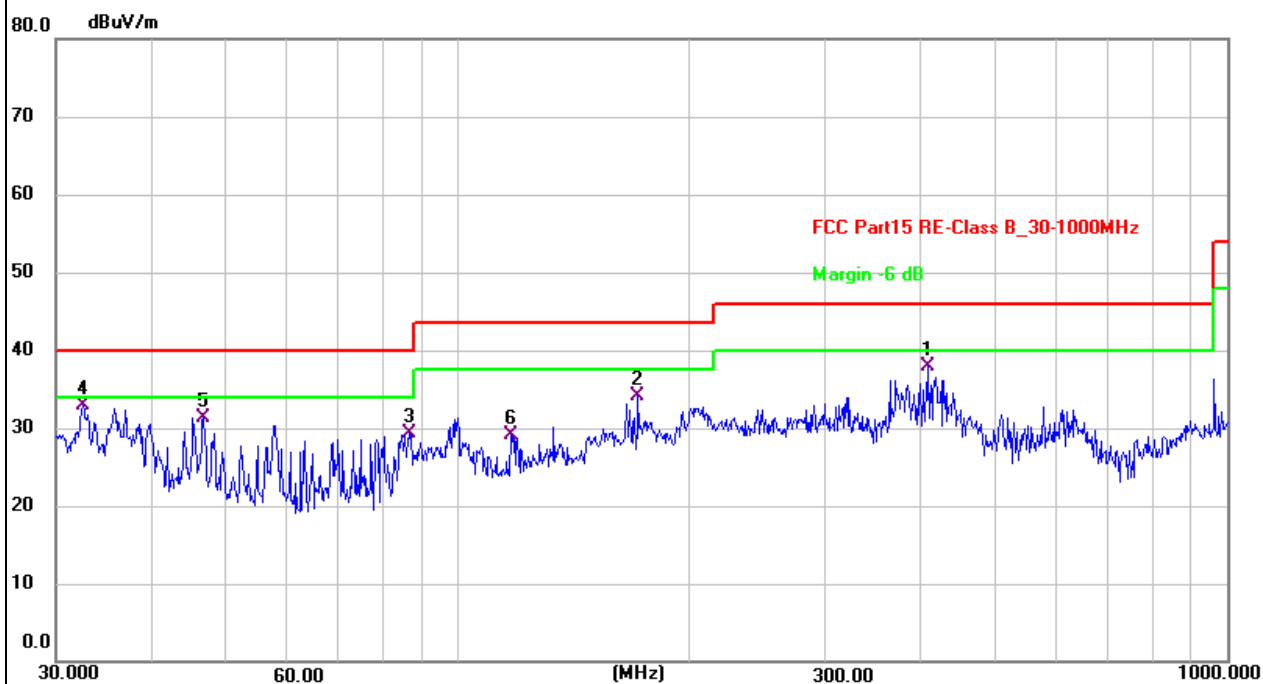
Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

Margin = Reading - Limit.

Frequency range (30MHz – 1GHz)

EUT:	LED COLORFUL SOUND ATMOSPHERE CLOCK	Model Name:	S528
Test Mode:	TM1	Phase :	Horizontal
Test Voltage:	DC 12V		

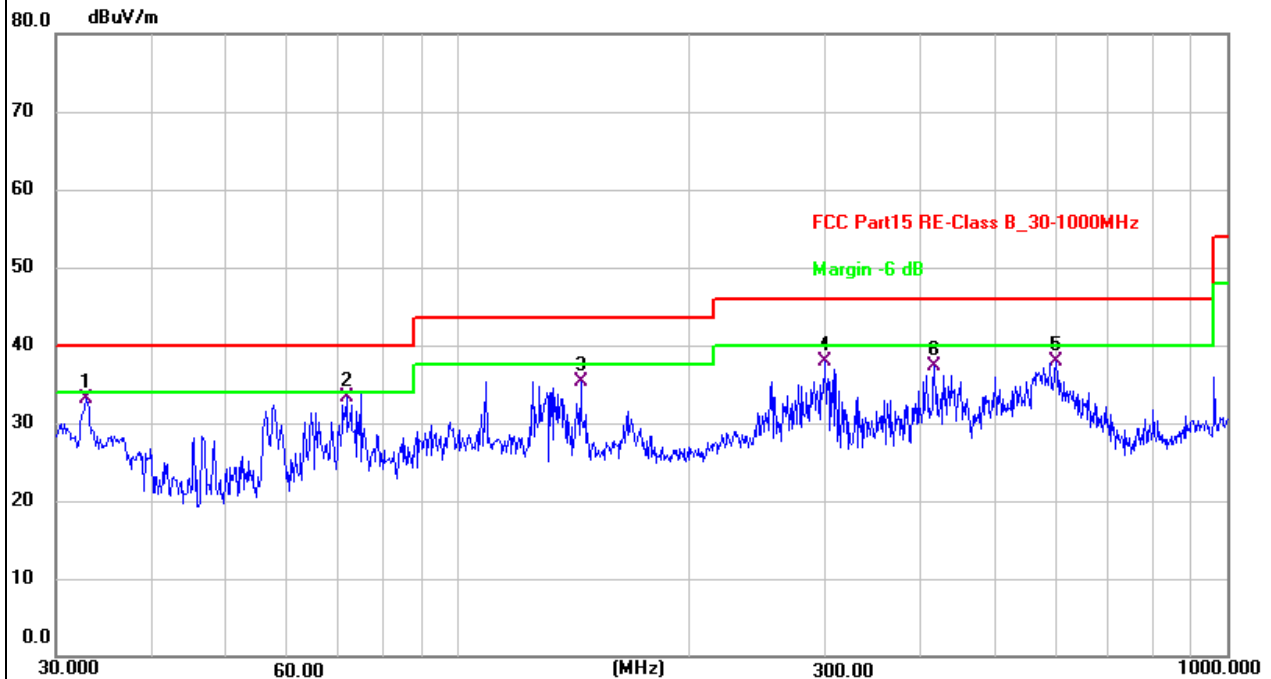


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	408.9460	43.70	-5.77	37.93	46.00	-8.07	QP			P	
2	171.3925	43.83	-9.80	34.03	43.50	-9.47	QP			P	
3	86.5027	42.71	-13.43	29.28	40.00	-10.72	QP			P	
4 *	32.5197	41.85	-9.00	32.85	40.00	-7.15	QP			P	
5	46.6662	40.43	-9.19	31.24	40.00	-8.76	QP			P	
6	116.9492	40.10	-11.01	29.09	43.50	-14.41	QP			P	

Remarks:

1. Measurement Level = Reading level + Correct Factor, Margin = Measurement Level – Limit.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. All test modes were pre-tested, but we only recorded the worst case in this report.

EUT:	LED COLORFUL SOUND ATMOSPHERE CLOCK	Model Name:	S528
Test Mode:	TM1	Phase :	Vertical
Test Voltage:	DC 12V		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	32.8635	42.15	-8.99	33.16	40.00	-6.84	QP			P	
2 *	71.5805	44.60	-11.33	33.27	40.00	-6.73	QP			P	
3	144.3345	44.36	-9.09	35.27	43.50	-8.23	QP			P	
4	300.3672	46.23	-8.33	37.90	46.00	-8.10	QP			P	
5	599.3211	39.03	-1.04	37.99	46.00	-8.01	QP			P	
6	416.1791	42.96	-5.71	37.25	46.00	-8.75	QP			P	

Remarks:

1. Measurement Level = Reading level + Correct Factor, Margin = Measurement Level – Limit.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. All test modes were pre-tested, but we only recorded the worst case in this report.

5.4 Occupied Bandwidth

5.4.1 Test method

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW $\geq 1\%$ of the 20 dB bandwidth

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

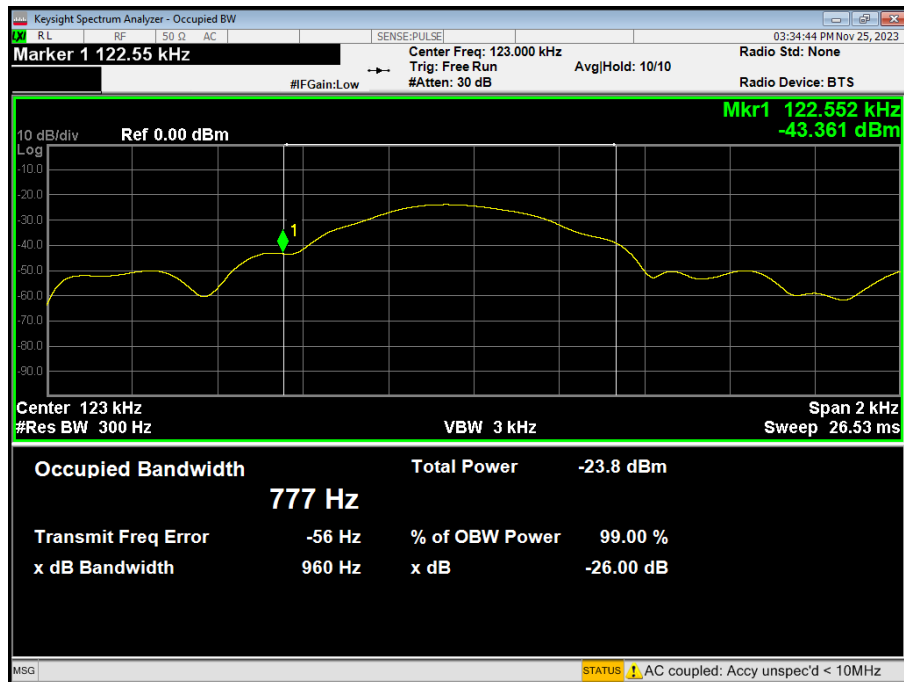
Trace = max hold

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 and 99% occupied bandwidth of the emission.

5.4.2 Test result

Frequency (kHz)	20dB emission bandwidth (Hz)	99% occupied bandwidth (Hz)
123	960	777

Test plots as below:



6 Photographs of the Test Setup

Reference to the appendix Test Setup Photos for details.

7 Photographs of the EUT

Reference to the appendix External Photos and Internal Photos for details.

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