Prüfbericht-Nr.: *Test report no.*:	**CN23RBSX 001**	**Auftrags-Nr.:** *Order no.*:	**168437561**	Seite 1 von 22 *Page 1 of 22*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2023-08-01	
Auftraggeber: *Client*:	**IKEA of Sweden AB** Box 702, SE-343 81, Älmhult, Sweden			
Prüfgegenstand: *Test item*:	Self-Ballasted LED Lamp			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	LED2201G8			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification*:	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 15: Subpart C Section 15.207 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 March 2019			
Wareneingangsdatum: *Date of sample receipt*:	2023-08-25	Please refer to Photo Document		
Prüfmuster-Nr.: *Test sample no:*	A003547840-001~002			
Prüfzeitraum: *Testing period*:	2023-08-25 - 2023-08-29			
Ort der Prüfung: *Place of testing*:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: *Test result**:	Pass			

geprüft von: tested by:	X Hardy Suo	**genehmigt von:** *authorized by*:	X Lin Lin
Datum: *Date:* 2023-08-30		**Ausstellungsdatum:** *Issue date:* 2023-08-30	
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other*:	FCC ID: FHO-LED2201G8 IC: 10912A-LED2201G8, HVIN: LED2201G8
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*:	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Prüfbericht-Nr.: CN23RBSX 001
Test report no.:

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. *The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the “Zero Guard Band Rule” and “Simple Acceptance” in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY
RESULT: Pass

5.1.4 6DB BANDWIDTH
RESULT: Pass

5.1.5 99% BANDWIDTH
RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION
RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results.

Appendix B: Photographs of the Test Set-up.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen 518110, Guangdong, China

FCC Registration No.: 694916

ISED Wireless Device Testing Laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (SRD-Tonscend)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	10.10.2023
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	10.10.2023
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	10.10.2023
DC power supply	Keysight	E3642A	MY61276100	10.10.2023
Power Control Unit	Tonscend	JS0806-4ADC	N/A	10.10.2023
Automation Control Unit	Tonscend	JS0806-2	21C8060396	10.10.2023
Test Software	Tonscend	JS1120-3	N/A	10.10.2023
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2024-06-22
Unwanted Emission Testing (TS9975)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	25.07.2024
Signal Analyzer	R&S	FSV 40	101439	25.07.2024
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	25.07.2024
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	25.07.2024
Amplifier	R&S	SCU-18F	180070	25.07.2024
Amplifier	R&S	SCU40A	100475	25.07.2024
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	06.08.2024
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	06.08.2024
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	27.08.2024
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	06.08.2024
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A

Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	22.06.2024
Conducted Emission				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR3	102680	23.02.2024
Artificial Mains Network	R&S	ENV216	101445	23.02.2024
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Table 2: Measurement Uncertainty

Parameter	Uncertainty (k=2)
Occupied Channel Bandwidth	± 2.08 %
RF output power, conducted	± 0.99 dB
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	± 4.17 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen 518110, Guangdong, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Self-Ballasted LED Lamp which supports 2.4GHz ZigBee wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment:	Self-Ballasted LED Lamp
Type Designation:	LED2201G8
Trademark:	IKEA
FCC ID:	FHO-LED2201G8
IC:	10912A-LED2201G8
HVIN:	LED2201G8
Operating Voltage:	AC 120V, 60Hz
Testing Voltage:	AC 120V, 60Hz
Technical Specification of ZigBee	
Frequency Range:	2405 MHz to 2480 MHz
Type of Modulation:	DSSS(OQPSK)
Channel Number:	16 channels
Data Rate:	250kbps
Channel Separation:	5 MHz
Antenna Type:	Integral antenna
Antenna Gain:	-0.77 dBi (provided by client)

Table 4: RF Channel and Frequency of 2.4GHz ZigBee

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
01	**2405.0**	05	2425.0	**09**	**2445.0**	13	2465.0
02	2410.0	06	2430.0	10	2450.0	14	2470.0
03	2415.0	07	2435.0	11	2455.0	15	2475.0
04	2420.0	08	2440.0	12	2460.0	**16**	**2480.0**

3.3 Independent Operation Modes

The basic operation modes are:

A. On, ZigBee transmitting mode

1) Low Channel
2) Middle Channel
3) High Channel

B. On, ZigBee communication

C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.

According to clause 3.1, all tests were performed on model LED2201G8 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8
ZigBee remote control	IKEA	E1810	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 30MHz)

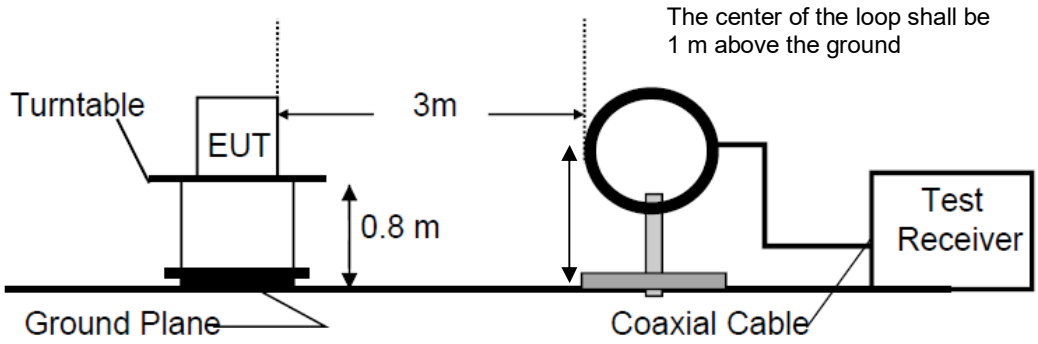


Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

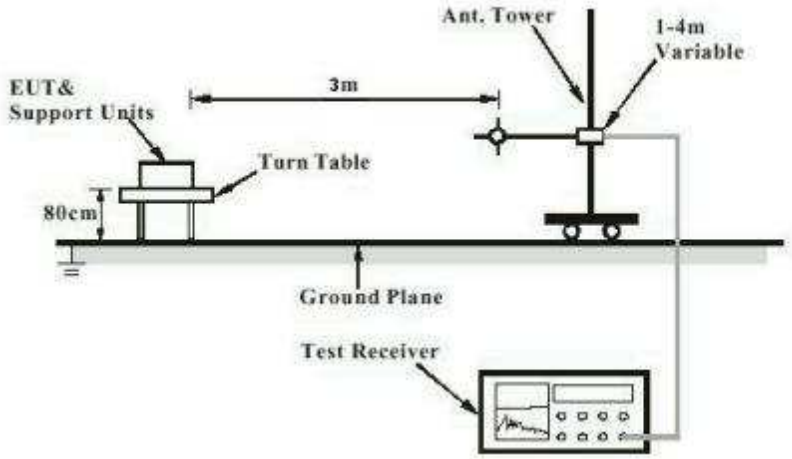


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

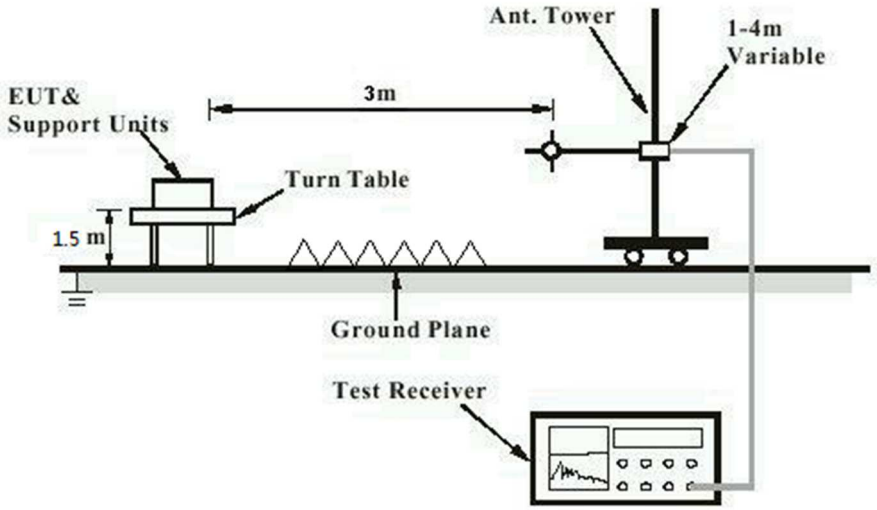


Diagram of Measurement Configuration for Mains Conduction Measurement

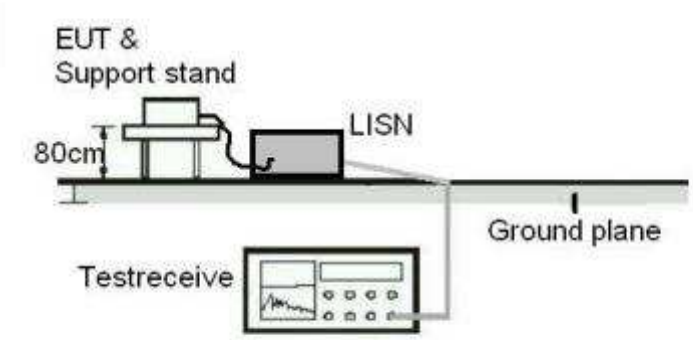
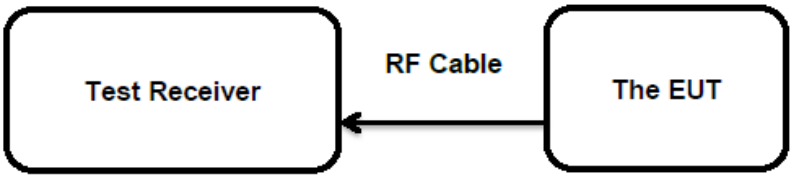


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203
RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT has an integral antenna, the maximum directional gain of antenna is -0.77 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement.
Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(2)&(3) RSS-247 Clause 5.4(a)&(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 1.0 W (30 dBm) for antenna gain less than 6dBi
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.1 ℃
Relative humidity	:	43 %
Atmospheric pressure	:	101 kPa

Table 6: Test Result of Maximum Conducted Output Power, 2.4GHz ZigBee DTS

Test Mode	Test Channel (MHz)	Measured Conducted Power (PEAK)		Limit
		(dBm)	(W)	
2.4GHz ZigBee DTS	2405	11.32	0.0136	< 1.0 W
	2445	11.08	0.0128	
	2480	10.84	0.0121	
Max. Measured Value		**11.32**	**0.0136**	

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G) : -0.77 dBi,
Maximum e.i.r.p.=11.32 + (-0.77) =10.55dBm = 0.0114W, which is far below the 4 W

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e), FCC Part 15.247(f) RSS-247 Clause 5.2(b), RSS-247 Clause 5.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 8 dBm / 3kHz for antenna gain less than 6dBi
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.1 ℃
Relative humidity	:	43 %
Atmospheric pressure	:	101 kPa

Table 7: Test Result of Maximum Power Spectral Density, 2.4GHz ZigBee DTS

Test Mode	Test Channel (MHz)	Measured Power Spectral Density (dBm/3KHz)
2.4GHz ZigBee DTS	2405	0.93
	2445	0.69
	2480	0.42
Maximum Measured Value		**0.93**

5.1.4 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2) RSS-247 Clause 5.2(a)
Basic standard	:	ANSI C63.10: 2013
Limits	:	At least 500kHz for bandwidth(DTS)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.1 ℃
Relative humidity	:	43 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

Table 8: Test Result of 6dB Bandwidth, 2.4GHz ZigBee DTS

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
2.4GHz ZigBee DTS	2405	1.140	>500KHz
	2445	1.610	
	2480	1.190	
Minimum Measured Value		**1.610**	

5.1.5 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	RSS-Gen Clause 6.7
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.1 ℃
Relative humidity	:	43 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

Table 9: Test Result of 99% Bandwidth, 2.4GHz ZigBee DTS

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit (MHz)
2.4GHz ZigBee DTS	2405	2.2458	/
	2445	2.2847	
	2480	2.2517	
Minimum Measured Value		**2.2847**	

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.1 ℃
Relative humidity	:	43 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

5.1.7 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test results
Relative humidity	:	Refer to test results
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix A.

5.1.8 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a) RSS-Gen Table 3
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-08-25 - 2023-08-29
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Earthing	:	Not connected
Ambient temperature	:	24.6 ℃
Relative humidity	:	50.6 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix B.

7 List of Tables

Appendix A: Test Results

Appendix A.1: Test Results of Conducted Power Spectral Density

Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
ZIGB	Ant1	2405	0.93	≤8.00	PASS
		2445	0.69	≤8.00	PASS
		2480	0.42	≤8.00	PASS

Test Graphs

ZIGB_Ant1_2405

ZIGB_Ant1_2445

ZIGB_Ant1_2480

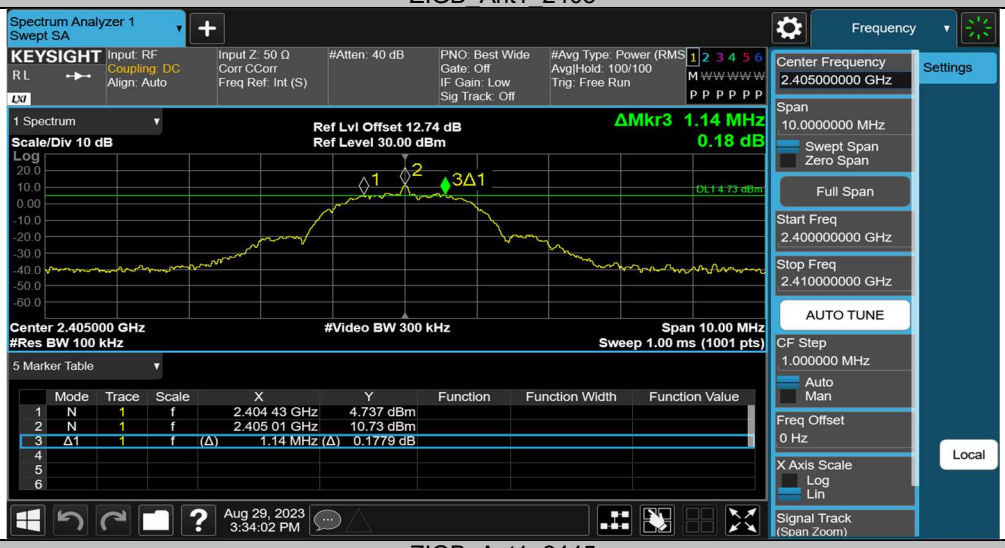
Appendix A.2: Test Results of 6dB Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
ZIGB	Ant1	2405	1.140	2404.430	2405.570	0.5	PASS
		2445	1.610	2444.230	2445.840	0.5	PASS
		2480	1.190	2479.470	2480.660	0.5	PASS

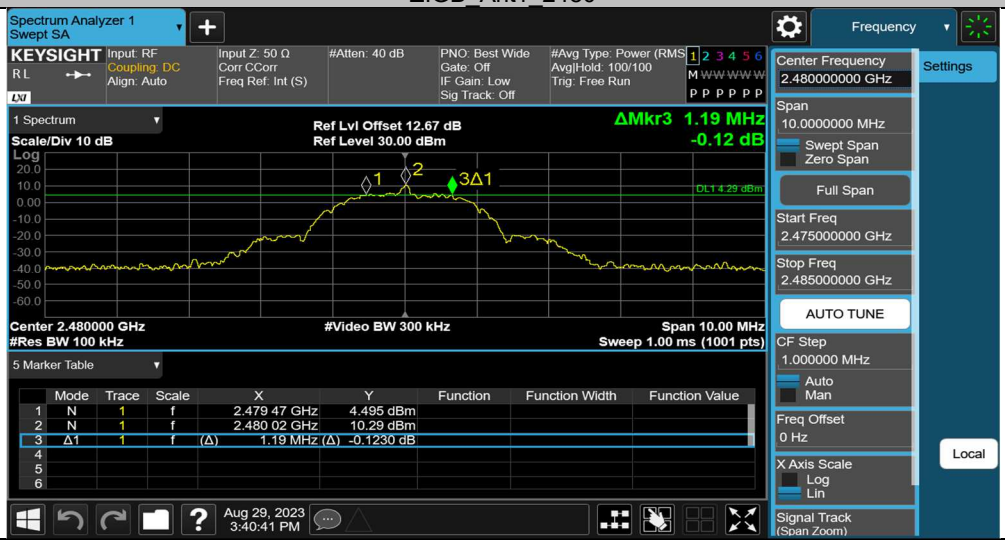
Test Graphs

ZIGB_Ant1_2405



ZIGB_Ant1_2445

ZIGB_Ant1_2480



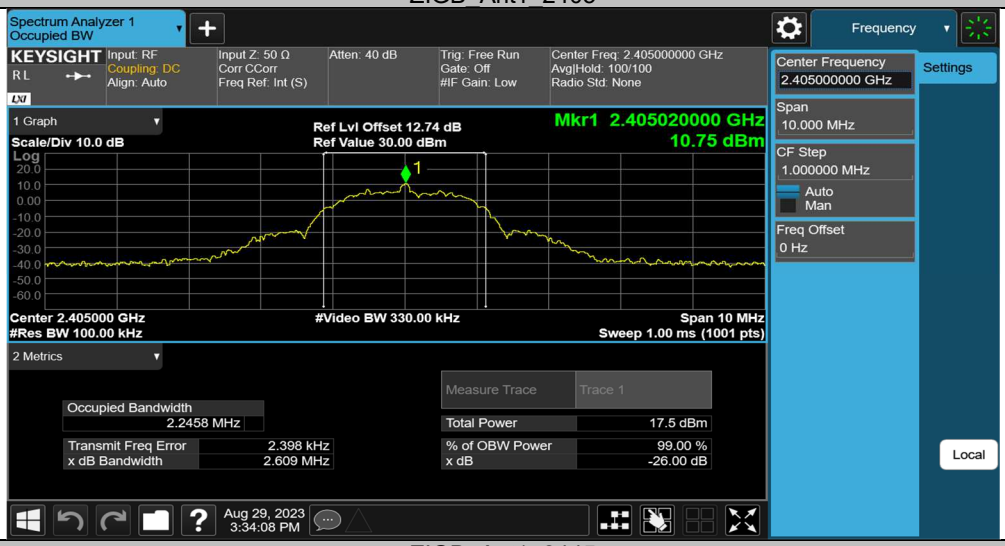
Appendix A.3: Test Results of 99% Bandwidth

Test Result

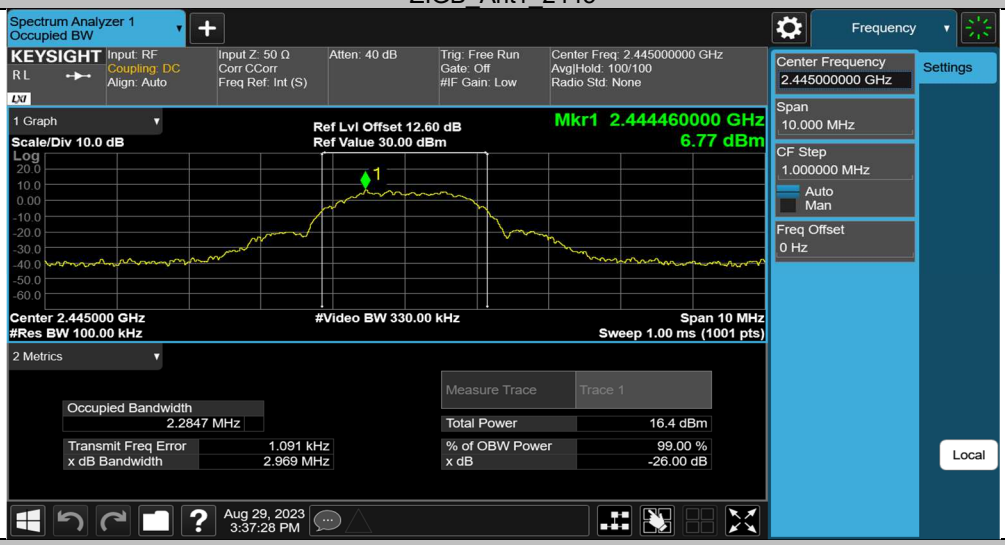
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
ZIGB	Ant1	2405	2.2458	2403.8795	2406.1253	---	---
		2445	2.2847	2443.8587	2446.1434	---	---
		2480	2.2517	2478.8764	2481.1281	---	---

Test Graphs

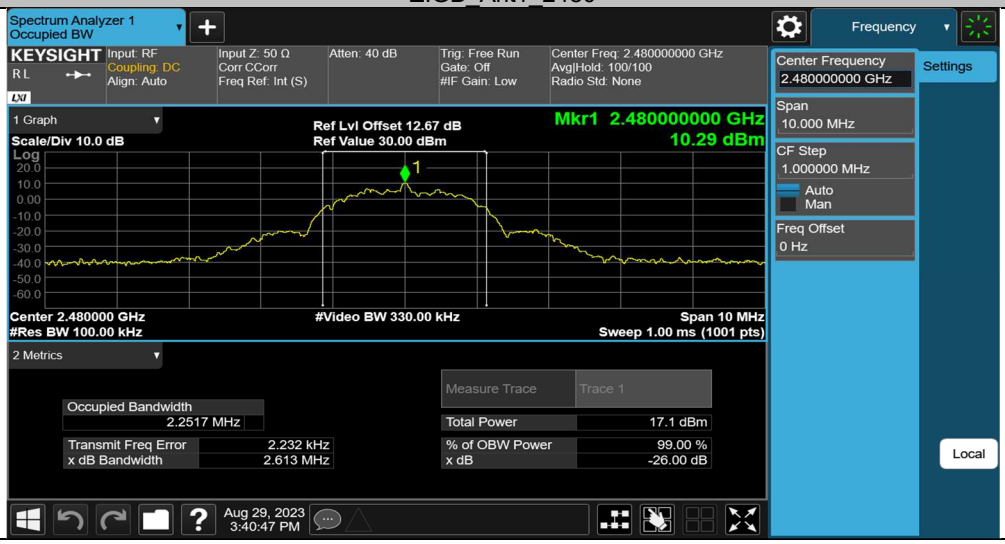
ZIGB_Ant1_2405



ZIGB_Ant1_2445



ZIGB_Ant1_2480



Appendix A.4: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Test Result

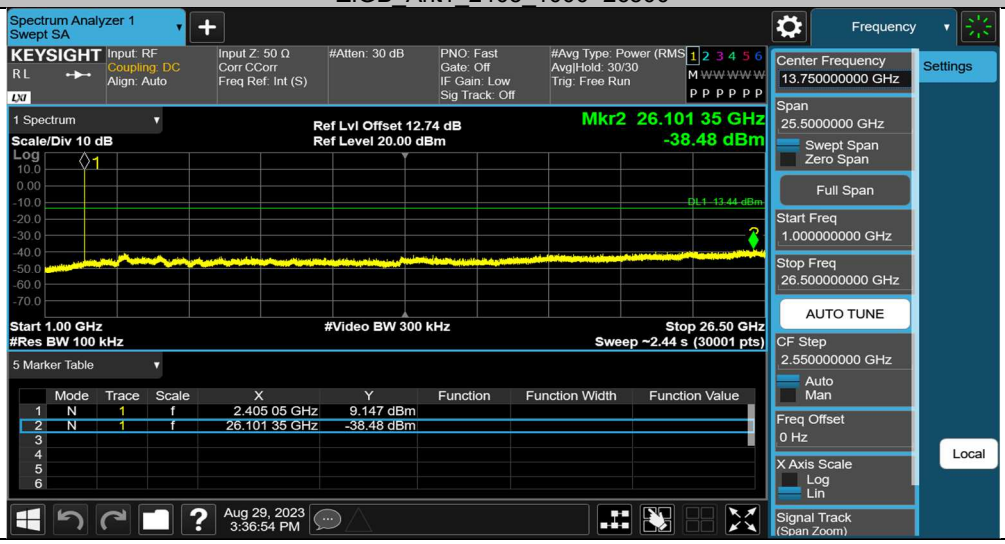
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
ZIGB	Ant1	2405	Reference	6.56	6.56	---	PASS
			30~1000	6.56	-46.35	≤-13.44	PASS
			1000~26500	6.56	-38.48	≤-13.44	PASS
		2445	Reference	5.08	5.08	---	PASS
			30~1000	5.08	-47.13	≤-14.92	PASS
			1000~26500	5.08	-38.89	≤-14.92	PASS
		2480	Reference	4.81	4.81	---	PASS
			30~1000	4.81	-46.66	≤-15.19	PASS
			1000~26500	4.81	-38.64	≤-15.19	PASS

Test Graphs

ZIGB_Ant1_2405_0~Reference

ZIGB_Ant1_2405_30~1000

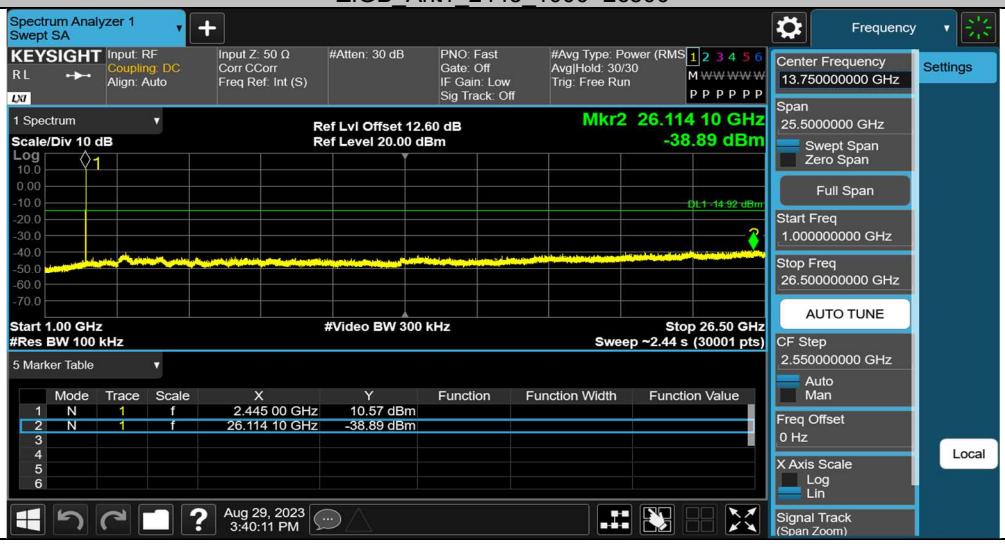
ZIGB_Ant1_2405_1000~26500



ZIGB_Ant1_2445_0~Reference

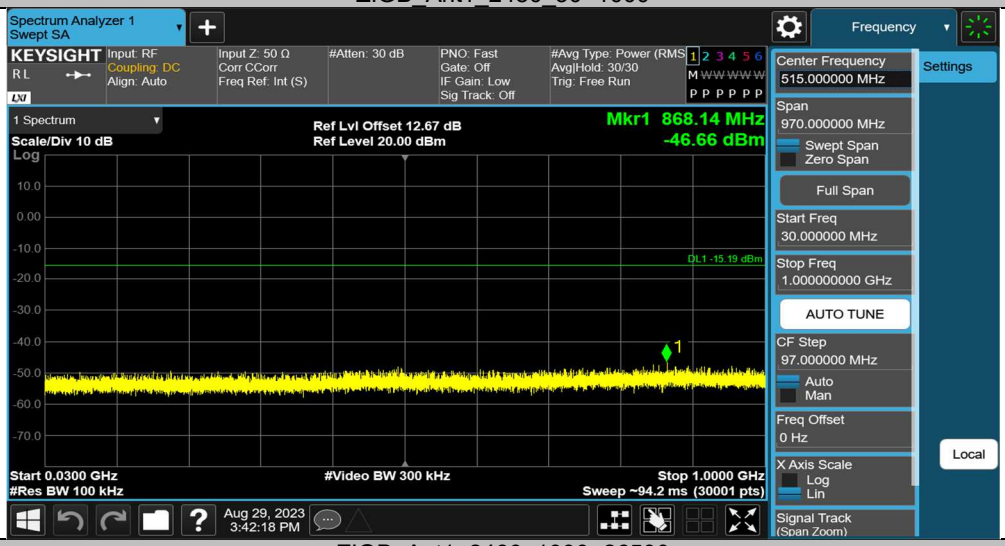
ZIGB_Ant1_2445_30~1000

ZIGB_Ant1_2445_1000~26500



ZIGB_Ant1_2480_0~Reference

ZIGB_Ant1_2480_30~1000



ZIGB_Ant1_2480_1000~26500

Band Edge

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
ZIGB	Ant1	Low	2405	10.76	-49.15	≤-9.24	PASS
		High	2480	7.767	-43.5	≤-12.23	PASS

Test Graphs

ZIGB_Ant1_Low_2405

ZIGB_Ant1_High_2480

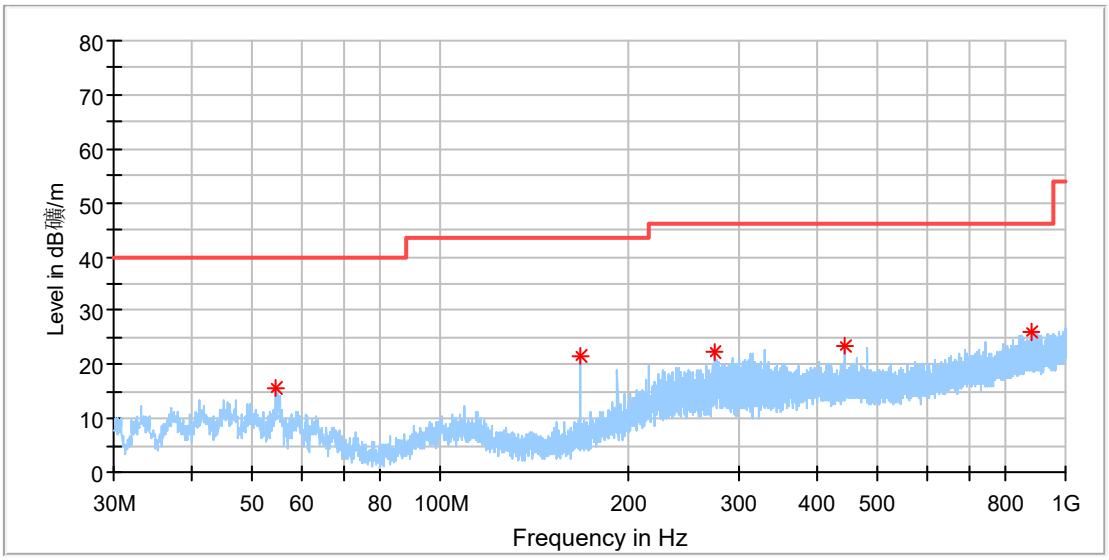
Appendix A.5: Test Results of Radiated Spurious Emissions

Note:
1) This testing was carried out on different modulations, but only the worst case was presented in this report.
2) Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

30 MHz to 1GHz

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

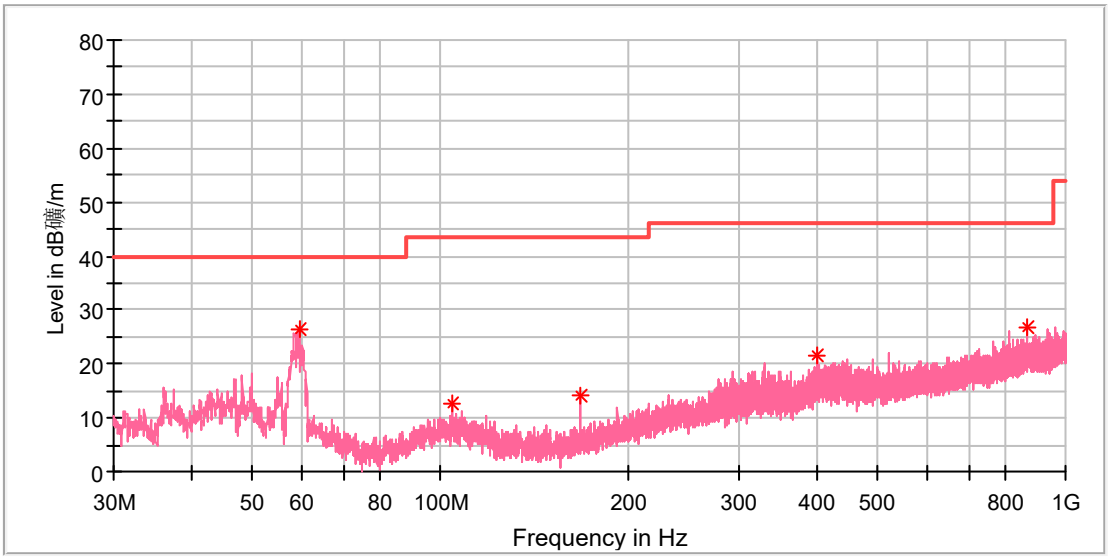
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.623077	15.45	40.00	24.55	100.0	H	35.0	-18.7
168.001154	21.42	43.50	22.08	100.0	H	196.0	-21.7
274.999615	22.32	46.00	23.68	100.0	H	321.0	-17.2
445.309231	23.35	46.00	22.65	100.0	H	108.0	-13.4
879.160385	26.17	46.00	19.83	100.0	H	2.0	-5.6

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
59.398462	26.59	40.00	13.41	100.0	V	145.0	-19.2
104.167692	12.82	43.50	30.68	100.0	V	244.0	-19.1
168.001154	14.02	43.50	29.48	100.0	V	235.0	-21.7
399.719231	21.68	46.00	24.32	100.0	V	47.0	-14.1
869.609615	26.61	46.00	19.39	100.0	V	275.0	-5.7

Final_Result

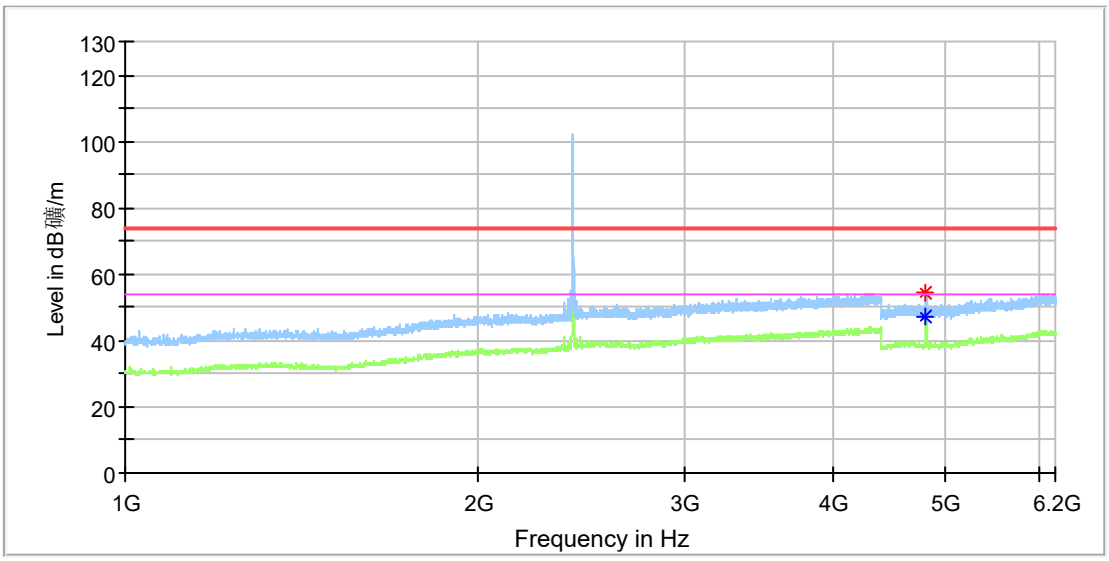
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1GHz-18GHz

Note: The highest waveform in the figure is 2.4G Zigbee Fundamental.

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

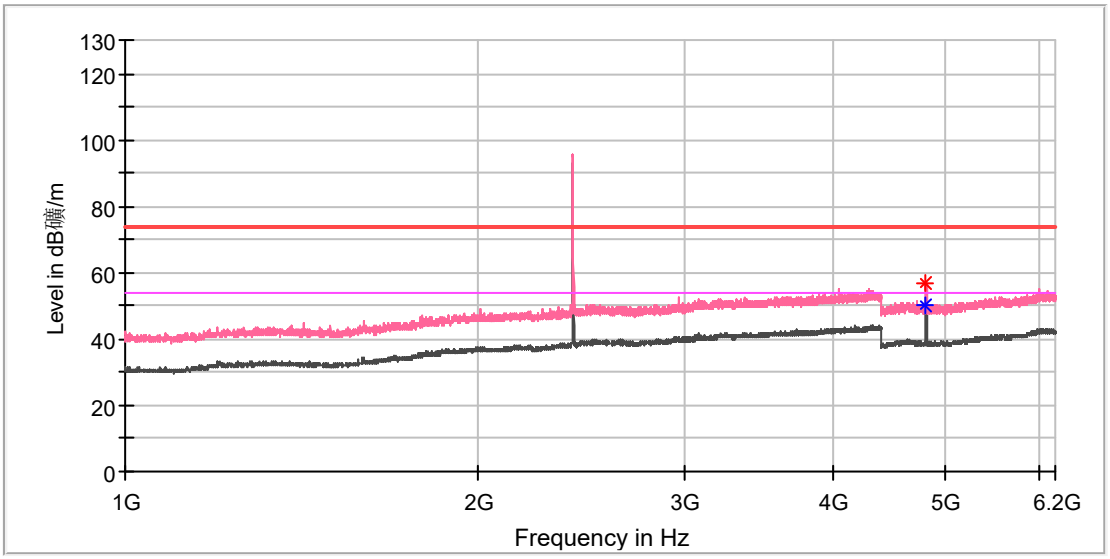
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4811.000000	54.39	---	74.00	19.61	100.0	H	315.0	11.8
4811.000000	---	47.38	54.00	6.62	100.0	H	315.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

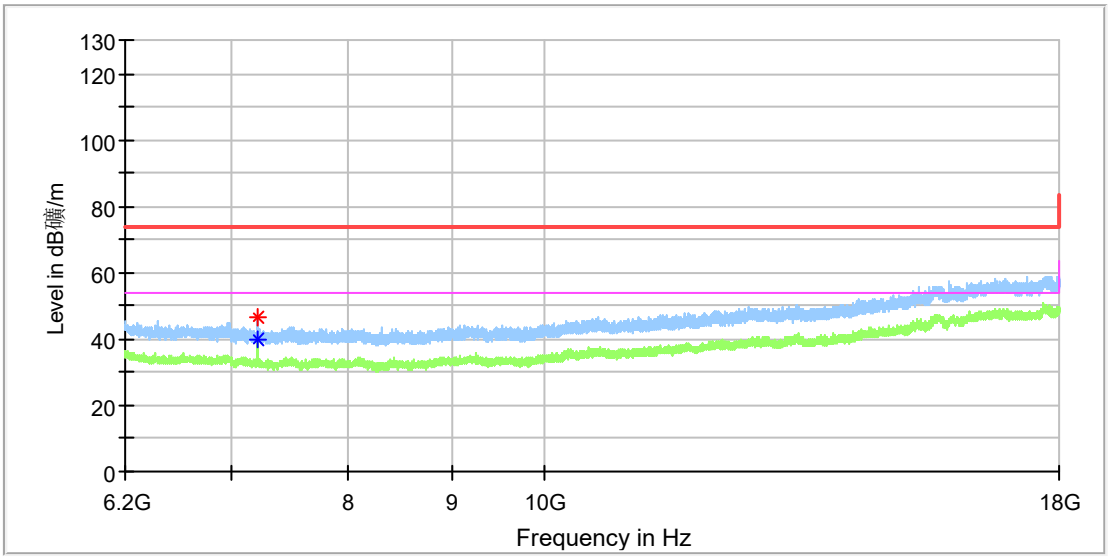
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4811.000000	---	50.41	54.00	3.59	100.0	V	288.0	11.8
4811.000000	56.89	---	74.00	17.11	100.0	V	288.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

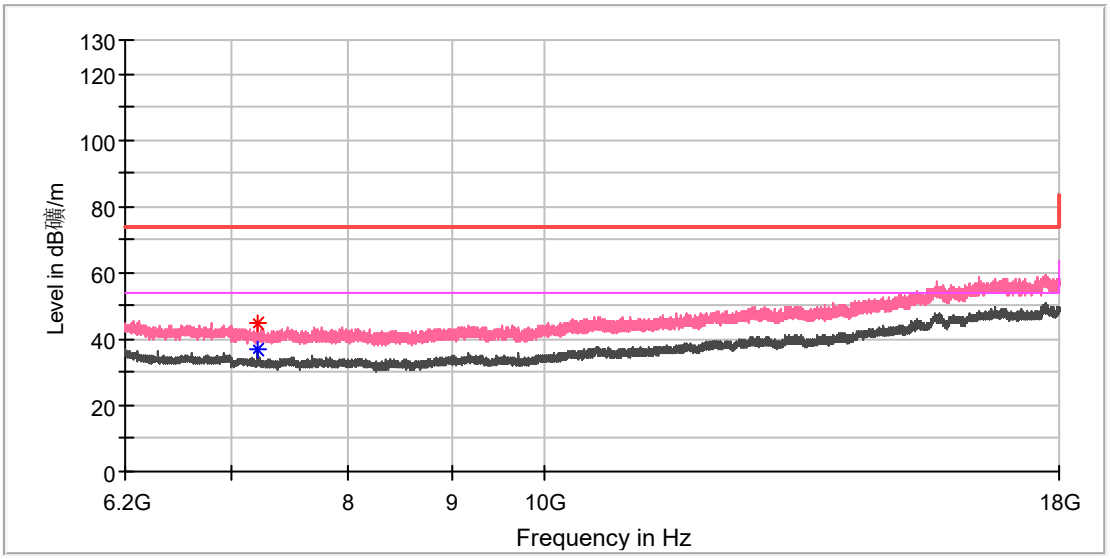
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7214.800000	---	39.65	54.00	14.35	100.0	H	235.0	8.7
7216.766667	46.73	---	74.00	27.27	100.0	H	259.0	8.7

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

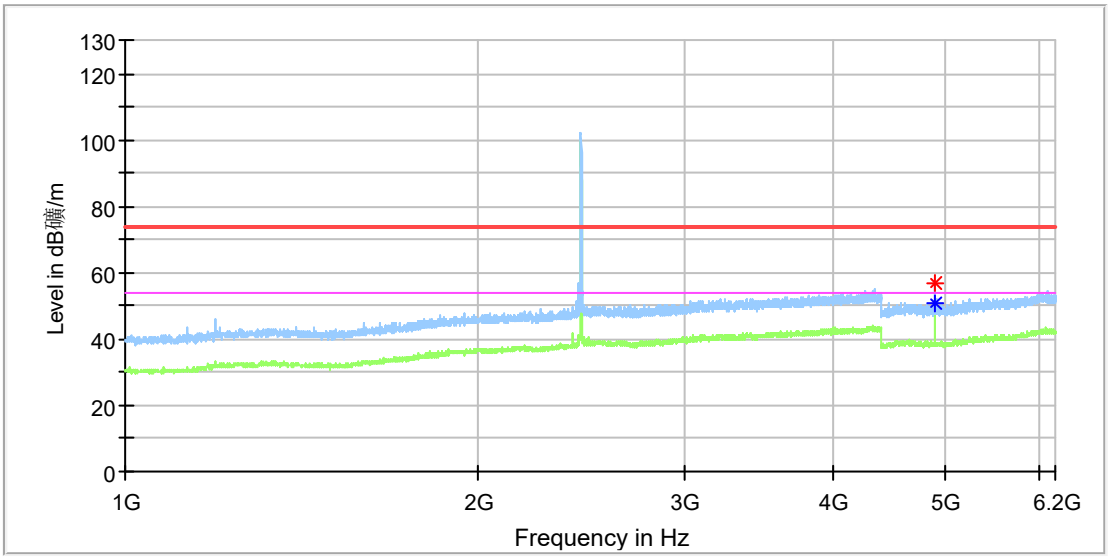
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7216.275000	44.78	---	74.00	29.22	100.0	V	35.0	8.7
7216.275000	---	37.05	54.00	16.95	100.0	V	35.0	8.7

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

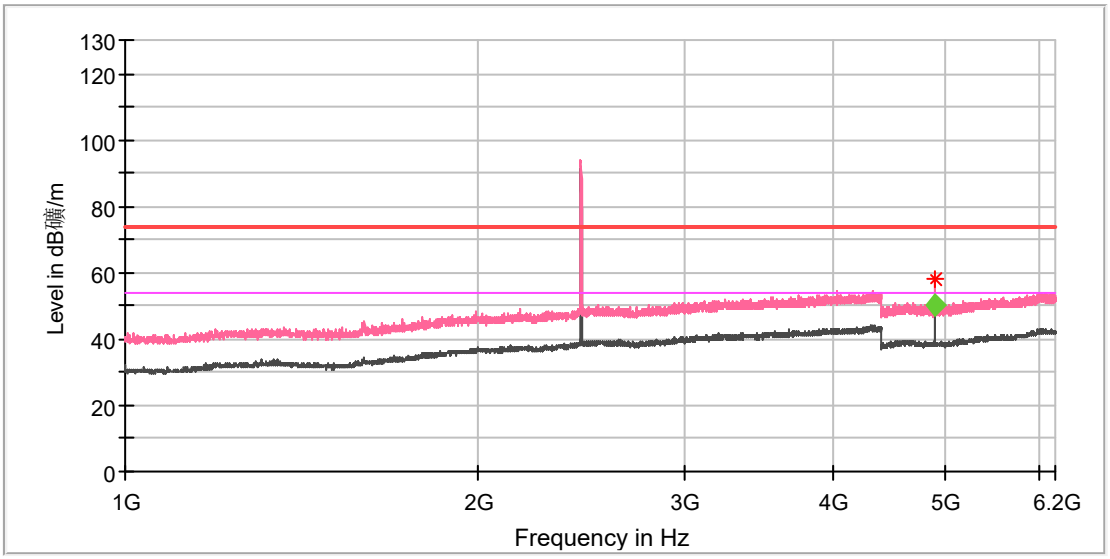
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4891.000000	---	50.76	54.00	3.24	100.0	H	315.0	11.8
4891.000000	56.71	---	74.00	17.29	100.0	H	315.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

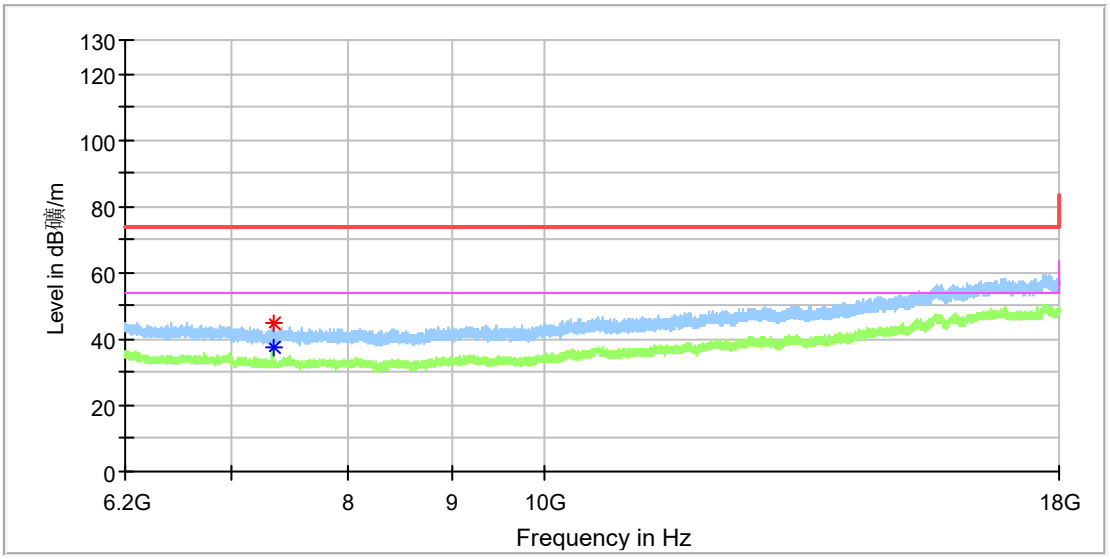
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4891.000000	57.78	---	74.00	16.22	100.0	V	307.0	11.8

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4891.000000	50.31	54.00	3.69	100.0	V	302.0	11.8

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

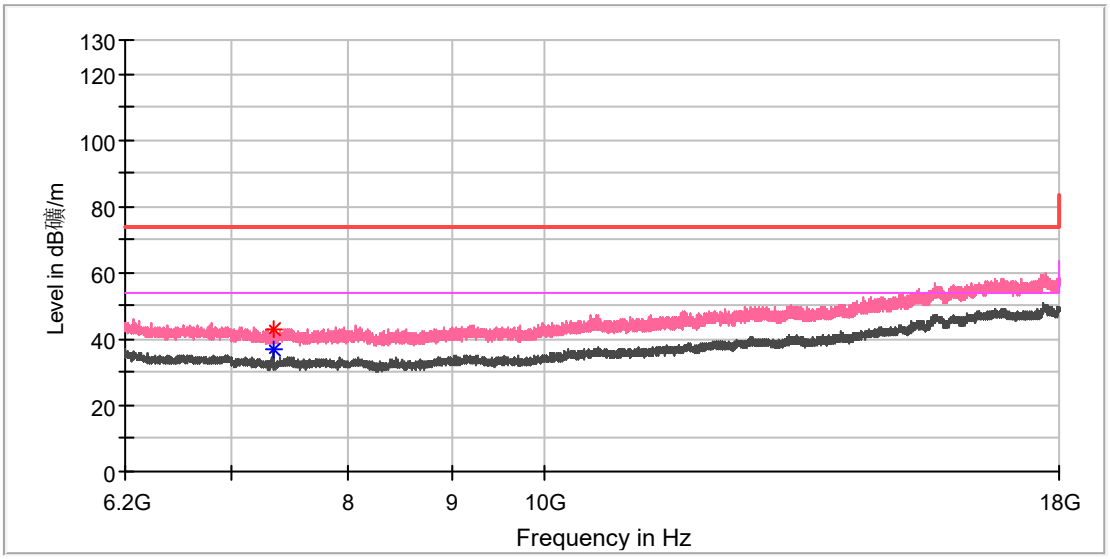
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7336.241667	44.78	---	74.00	29.22	100.0	H	232.0	8.1
7336.241667	---	37.73	54.00	16.27	100.0	H	232.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

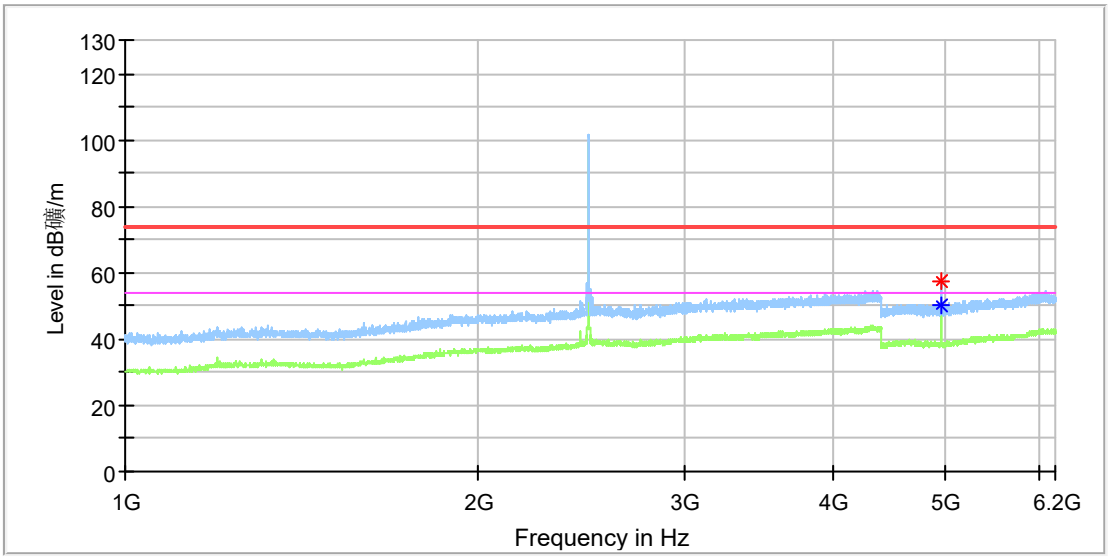
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7335.258333	42.94	---	74.00	31.06	100.0	V	19.0	8.1
7335.258333	---	36.97	54.00	17.03	100.0	V	19.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

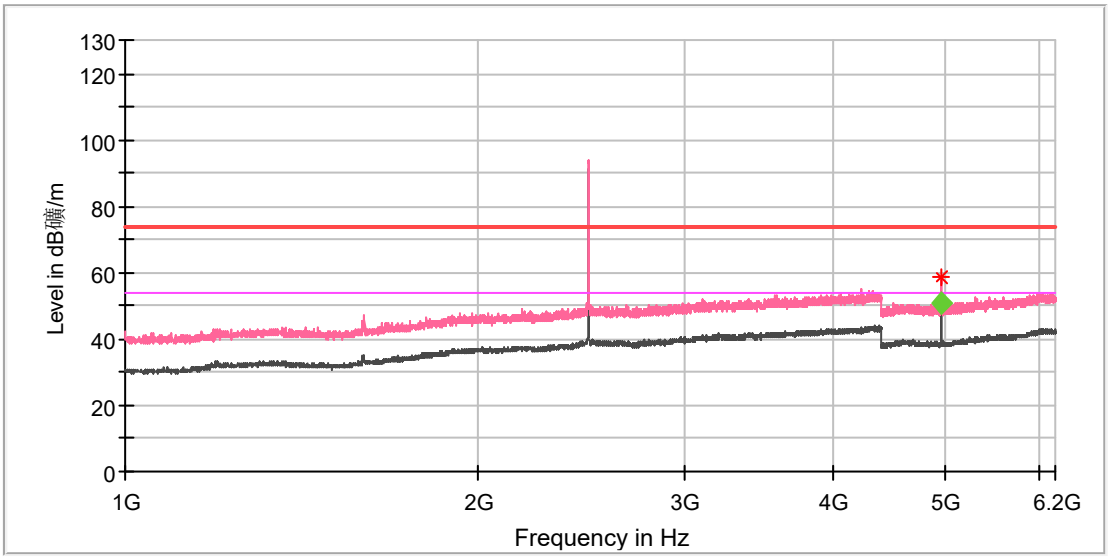
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4961.000000	---	50.11	54.00	3.89	100.0	H	317.0	11.8
4961.000000	57.34	---	74.00	16.66	100.0	H	317.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

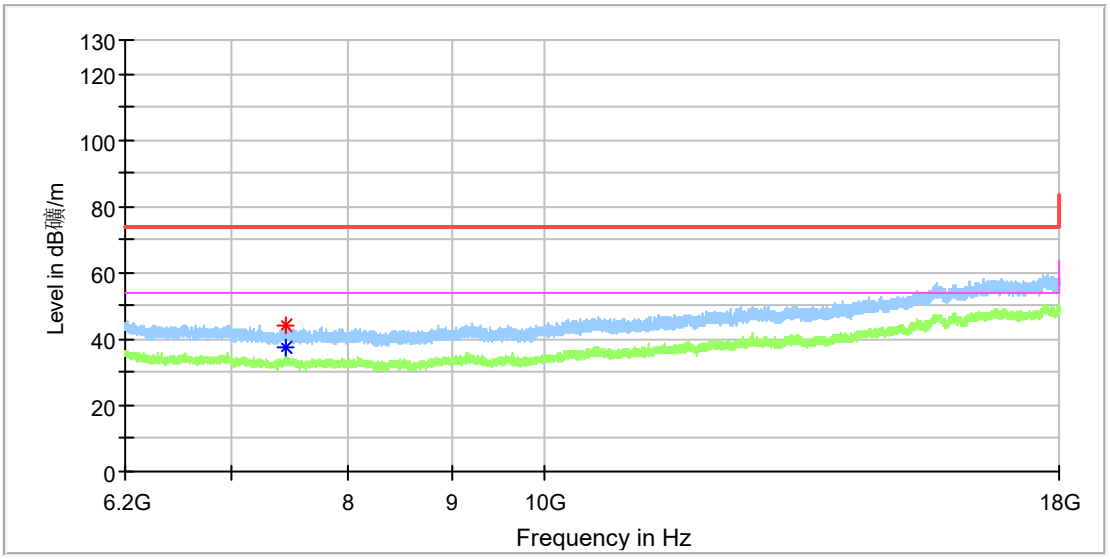
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.000000	58.55	---	74.00	15.45	100.0	V	303.0	11.8

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4958.919444	50.87	54.00	3.13	100.0	V	307.0	11.8

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

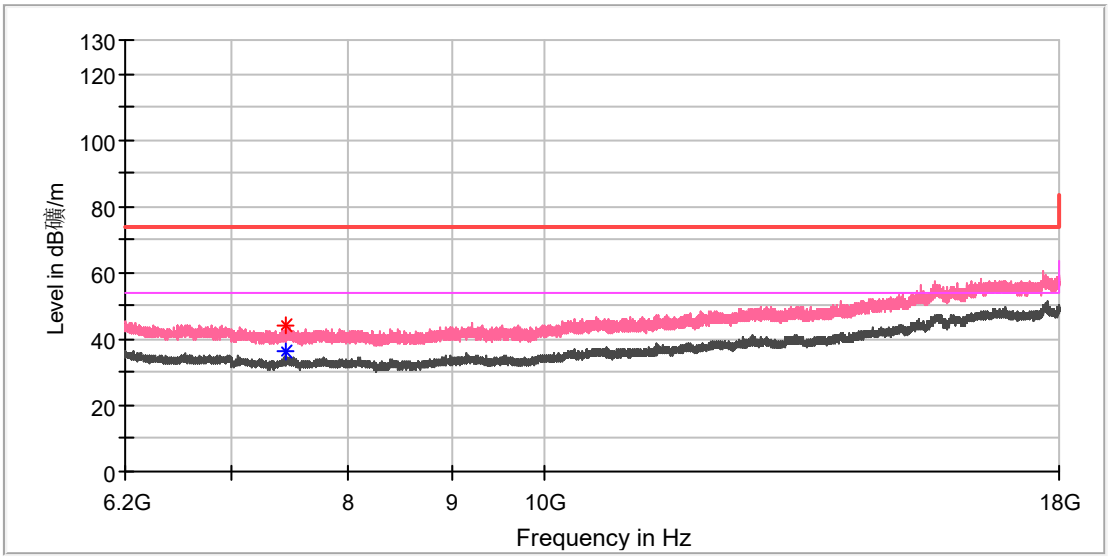
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7438.016667	44.03	---	74.00	29.97	100.0	H	249.0	8.4
7438.508333	---	37.29	54.00	16.71	100.0	H	249.0	8.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7438.508333	44.38	---	74.00	29.62	100.0	V	299.0	8.4
7441.458333	---	36.19	54.00	17.81	100.0	V	262.0	8.4

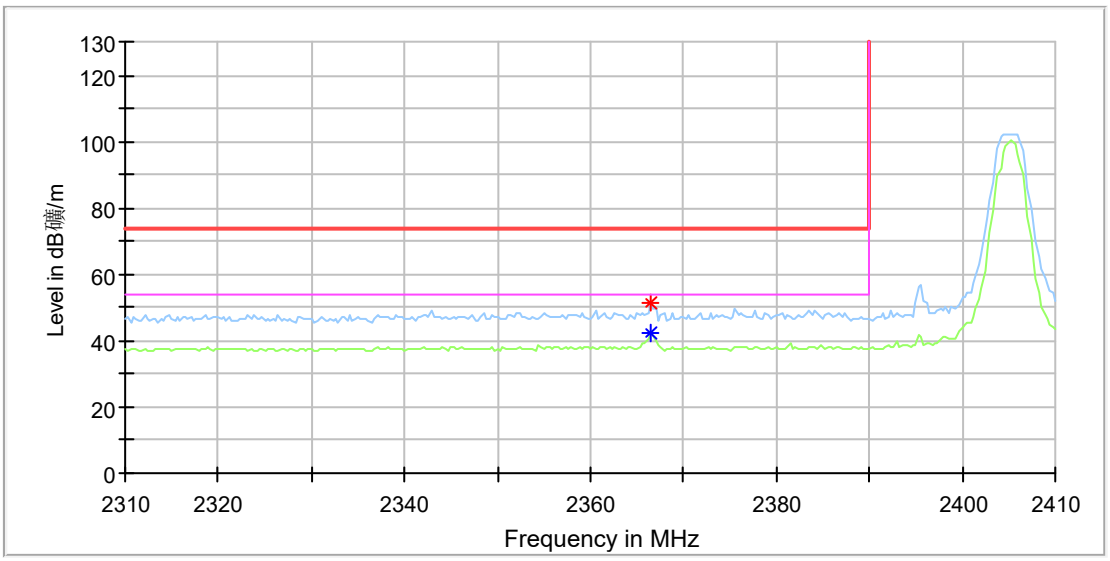
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Appendix A.6: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

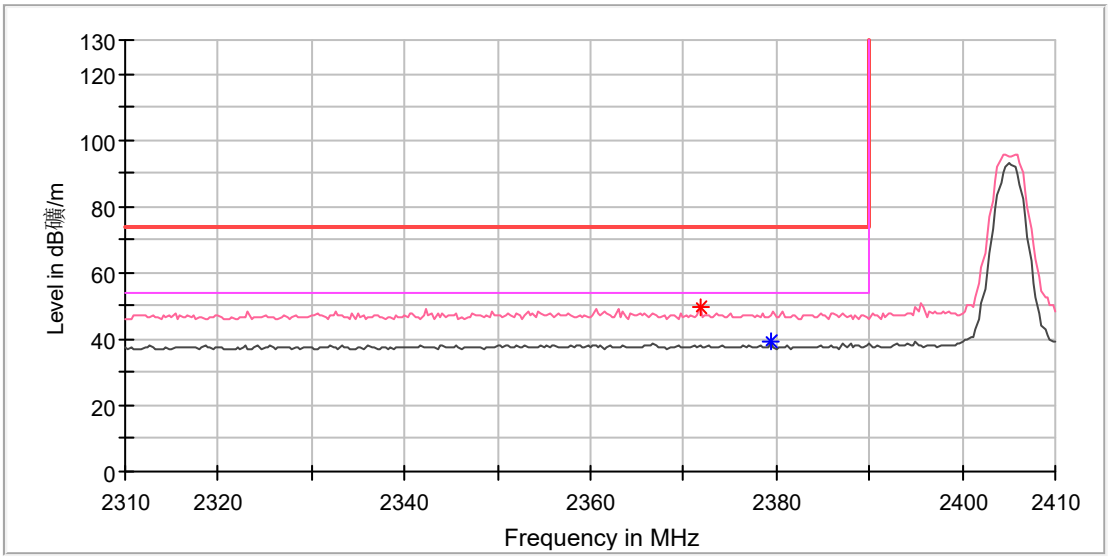
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2366.470588	---	42.13	54.00	11.87	100.0	H	233.0	6.9
2366.470588	51.35	---	74.00	22.65	100.0	H	233.0	6.9

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

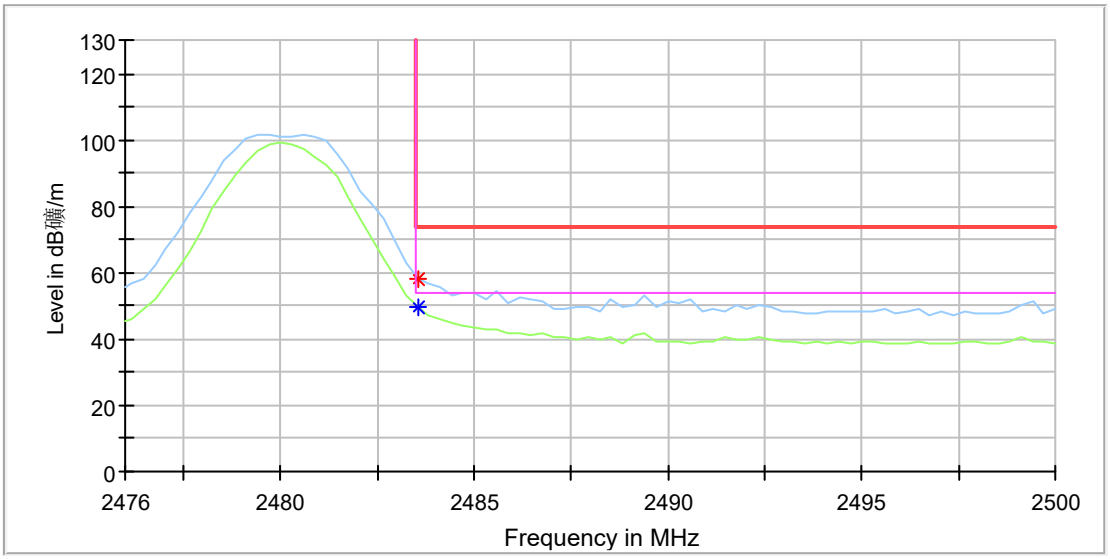
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2371.764706	49.36	---	74.00	24.64	100.0	V	272.0	6.9
2379.411765	---	39.09	54.00	14.91	100.0	V	24.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

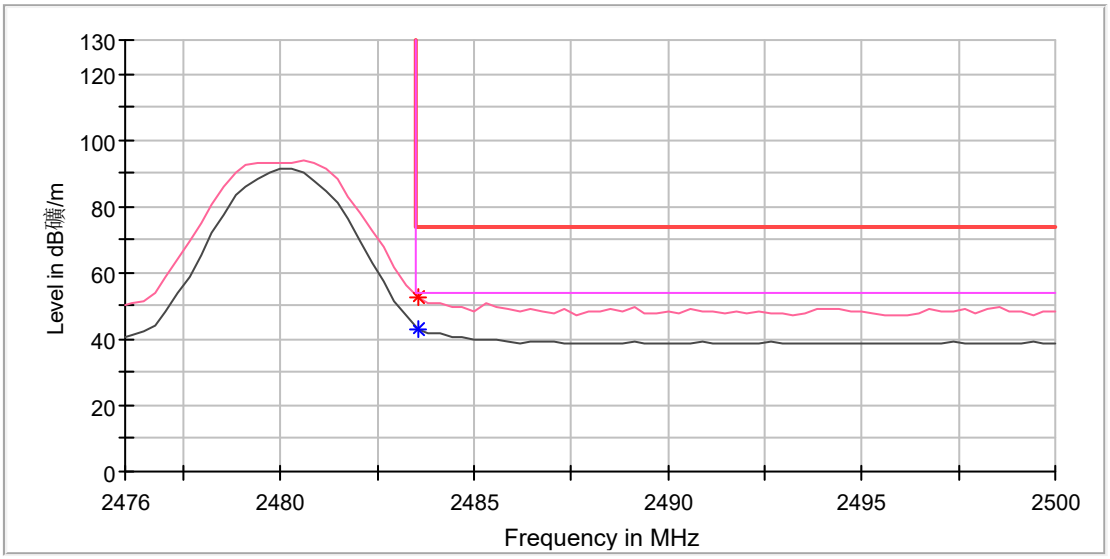
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.529412	58.30	---	74.00	15.70	100.0	H	234.0	7.4
2483.529412	---	49.74	54.00	4.26	100.0	H	234.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003547840-001
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.529412	---	43.00	54.00	11.00	100.0	V	250.0	7.4
2483.529412	52.72	---	74.00	21.28	100.0	V	250.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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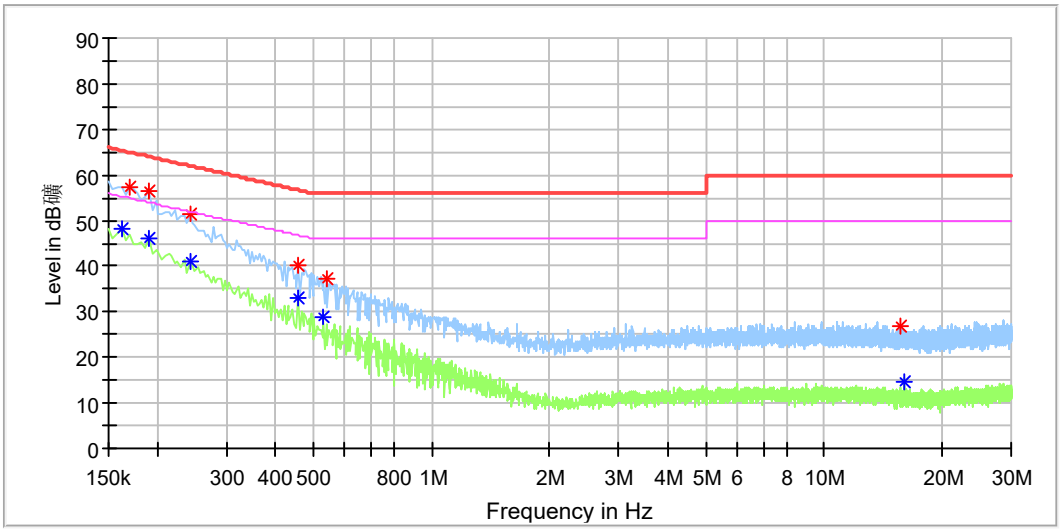
Appendix A.7: Test Results of Conducted Emission on AC Mains

EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003357603-002
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.162000	---	48.20	55.36	7.16	L1	9.9
0.170000	57.23	---	64.96	7.73	L1	9.9
0.190000	---	46.02	54.04	8.01	L1	9.9
0.190000	56.49	---	64.04	7.54	L1	9.9
0.242000	51.67	---	62.03	10.36	L1	9.9
0.242000	---	41.11	52.03	10.91	L1	9.9
0.458000	---	32.89	46.73	13.83	L1	10.0
0.458000	40.16	---	56.73	16.57	L1	10.0
0.530000	---	28.83	46.00	17.17	L1	10.0
0.538000	37.30	---	56.00	18.70	L1	10.0
15.582000	26.73	---	60.00	33.27	L1	10.4
16.002000	---	14.75	50.00	35.25	L1	10.4

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
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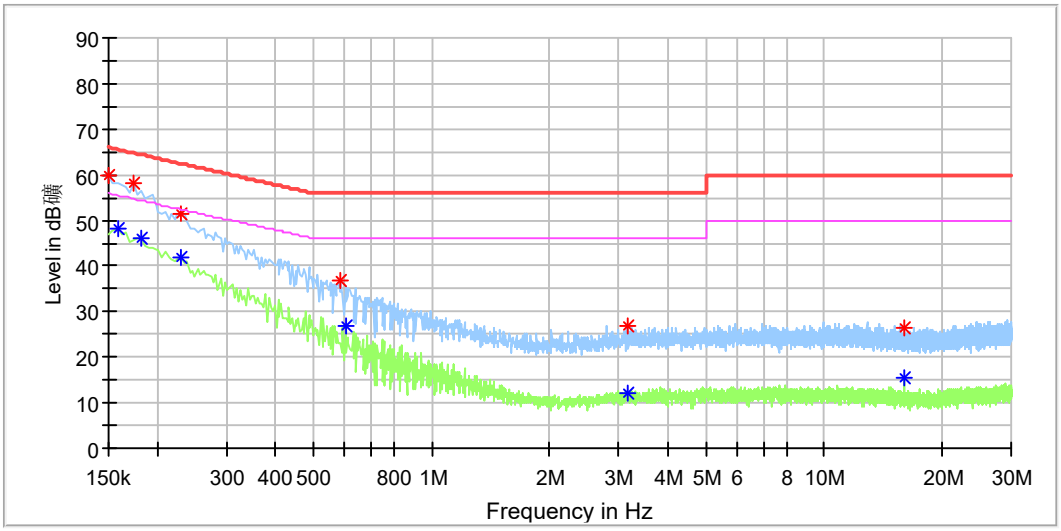
EUT Information

EUT Name:	Self-Ballasted LED Lamp
Model:	LED2201G8
Test Mode:	Zigbee
Order No/Sample No:	168437561/A003357603-002
Test Voltage::	DC 5V From USB
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.150000	59.99	---	66.00	6.01	N	9.8
0.158000	---	48.12	55.57	7.45	N	9.8
0.174000	57.98	---	64.77	6.79	N	9.8
0.182000	---	46.02	54.39	8.38	N	9.8
0.230000	---	41.92	52.45	10.53	N	9.8
0.230000	51.38	---	62.45	11.07	N	9.8
0.586000	36.74	---	56.00	19.26	N	9.8
0.602000	---	26.80	46.00	19.20	N	9.8
3.146000	26.67	---	56.00	29.33	N	9.9
3.174000	---	12.03	46.00	33.97	N	9.9
15.998000	26.17	---	60.00	33.83	N	10.2
16.002000	---	15.35	50.00	34.65	N	10.2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
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