DEKRA Testing and Certification (Suzhou) Co., Ltd.
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TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098

Test report No:
24B0863R-RF-US-P06V02

FCC & ISED TEST REPORT

Product Name	LED Lamp
Trademark	PHILIPS; hue; Signify
Model and /or type reference	9290038538, 9290038537, 9290038551, 9290038552
FCC ID	2AGBW9290038538X, 2AGBW9290038537X, 2AGBW9290038551X, 2AGBW9290038552X
IC	20812-38538X, 20812-38537X, 20812-38551X, 20812-38552X
Applicant´s name / address	Signify (China) Investment Co., Ltd No.9, Lane 888, Tian Lin Road, 200233, Shanghai, China
Test method requested, standard	47 CFR FCC Part 15 (Section 15.247) ANSI C63.10: 2013 RSS-Gen Issue 5 RSS-247 Issue 3
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Tim Cao / Project Manager
Approved by (name / position & signature)	Jack Zhang / Manager
Date of issue	2025-01-16
Report Version	V1.0
Report template No	Template_FCC Part 15C-RF-V1.0

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page

COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Nov. 26, 2024
Date (start test)	Dec. 05, 2024
Date (finish test)	Dec. 10, 2024

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
U_N : Nominal voltage
*T*x : Transmitter
*R*x : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
24B0863R-RF-US-P06V01	V1.0	Initial issue of report.	2025-01-16

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with 47 CFR FCC Part 15 (Section 15.247),RSS-247 Issue 3, RSS-Gen Issue 5.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:

- Chapter 1.1 General Description of the Item(s);
- Chapter 1.2 Antenna Informaion;
- Chapter 1.3 Channel List.

USED EQUIPMENT

Conducted Test/ TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
Wireless Connectivity Tester	R&S	CMW 270	102593	2024.05.15	2025.05.14	V 4.0.60	N/A
Coaxial Cable	N/A	N/A	2477	2024.06.11	2025.06.10	N/A	N/A
Coaxial Cable	N/A	N/A	2478	2024.06.11	2025.06.10	N/A	N/A
High and low temperature and fast temperature change test box	ASTUOD	ASTD-FBT-225K	N/A	2024.04.21	2025.04.20	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2024.07.11	2025.07.10	N/A	N/A
Test system							
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
MAX Signal Analyzer	Keysight	N9010A	MY48030494	2024.10.26	2025.10.25	A.14.03	N/A
RF Control Unit	Tonscend	JS0806-2	22G8060594	2024.02.06	2025.02.05	N/A	N/A
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY61252529	2024.05.12	2025.05.11	B.01.96	N/A
Frequency extender for EXG or MXG	Keysight	N5182BX07	MY59362500	2024.05.12	2025.05.11	N/A	N/A
EXG-B MW Analog Signal Generator	Keysight	N5173B	MY61252566	2024.07.06	2025.07.05	B.01.95	N/A
Test Software	Tonscend	TS1120	JS1120-3	N/A	N/A	N/A	V3.0.22

AC Power Line Conducted Emission / TR1

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EMI Test Receiver	R&S	ESCI	100726	2024.07.06	2025.07.05	4.42 SP1	N/A
Two-Line V-Network	R&S	ENV 216	101044	2024.10.26	2025.10.25	N/A	N/A
Two-Line V-Network	R&S	ENV 216	101189	2024.07.06	2025.07.05	N/A	N/A
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2024.04.20	2025.04.19	N/A	N/A
Coaxial Cable	Huber+Suhner	RG 223	TR1-C1	2024.04.27	2025.04.26	N/A	N/A
Impedance Stabilization Network	Teseq GmbH	ISN T800	57318	2024.01.20	2025.01.19	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	EMC01	2024.07.04	2025.07.03	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

Radiated Emission(9KHz-1GHz) / AC2

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EMI Test Receiver	R&S	ESCI	100573	2024.02.06	2025.02.05	4.42 SP3	N/A
Loop Antenna	R&S	HFH2-Z2E	101149	2024.03.27	2025.03.26	N/A	N/A
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2024.03.20	2025.03.19	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2024.05.17	2025.05.16	N/A	N/A
Coaxial Cable	Huber+Suhner	RTS-1909	THM-021	2024.04.27	2025.04.26	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

Radiated Emission (1GHz-40GHz) / AC5

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EXA Spectrum Analyzer	Keysight	N9020B	MY60112218	2024.11.02	2025.11.01	A.31.05	N/A
Pre-Amplifier	SKET	LNPA_0118G-45	SK2021090101	2024.04.27	2025.04.26	N/A	N/A
Preamplifier	CHENGYI	EMC184045SE	980263	2024.07.06	2025.07.05	N/A	N/A
DRG Horn	ETS-Lindgren	3117	123988	2024.08.29	2025.08.28	N/A	N/A
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2024.05.30	2025.05.29	N/A	N/A
Filter Switch Box	MVE	MSW-F196	C070001S	2024.04.20	2025.04.19	N/A	N/A
Temperature/ Humidity Meter	RTS	RTS-1909	THM-024	2024.05.17	2025.05.16	N/A	N/A
Coaxial Cable	TIMES	ROSENBERGER	LA1-C011-2000/3000	2024.01.25	2025.01.24	N/A	N/A
Cable	Rosenberger	LA1-C011-1000	0523	2024.05.26	2025.05.25	N/A	N/A
Cable	Rosenberger	LA1-C011-1000	0623	2024.05.26	2025.05.25	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% .

Test item	Uncertainty
AC Power Line Conducted Emission	9kHz~150kHz: 2.60dB 150kHz~30MHz: 2.90dB
Peak Power Output	± 1.27 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 3.50 dB 200MHz~1GHz: 3.60 dB Vertical: 30MHz~200MHz: 3.60 dB 200MHz~1GHz: 3.80 dB
Radiated Emission(1GHz~26.5GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB Horizontal: 18GHz~26.5GHz: 5.30 dB Vertical: 18GHz~26.5GHz: 4.90 dB
RF antenna conducted test	± 1.27dB
Radiated Emission Band Edge	± 3.9 dB
DTS Bandwidth	±1kHz
Occupied Bandwidth	±1kHz
Power Density	±1.27dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name ..... :	LED Lamp
Model No. ..... :	9290038538, 9290038537, 9290038551, 9290038552
Trademark. ..... :	PHILIPS; hue; Signify
FCC ID ..... :	2AGBW9290038538X, 2AGBW9290038537X, 2AGBW9290038551X, 2AGBW9290038552X
IC ..... :	20812-38538X, 20812-38537X, 20812-38551X, 20812-38552X
Manufacturer ..... :	Signify (China) Investment Co., Ltd
Manufacturer Address ..... :	No.9, Lane 888, Tian Lin Road, 200233, Shanghai, China
Operating temperature ..... :	-20 ~ +45 ℃
Model difference ..... :	All models have the same mechanical construction, circuit diagram and PCB layout except rated power, software and model name. There are two capacitors in the driver board. So all test was done on model 9290038552. Additional Band Edge and RSE test was done on model 9290038552 with alternative capacitor.

Wireless specifiction ..... :	Zigbee
Operating frequency range(s)	2405~2480MHz
Type of Modulation ..... :	O-QPSK
Data Rate ..... :	250kbps
Number of channel ..... :	16

Rated power supply ..... :	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☒	AC: 110 - 130 V, 50/60 Hz 7.2 W, 9.5 W
	☐	DC: 24 Vdc
	☐	Poe:
	☐	Adapter:
Mounting position ..... :	☒	Tabletop equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held/Portable equipment
	☐	Other:

1.2 Antenna Information

Antenna Delivery ..... :	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others: ……		
Antenna technology ..... :	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type ..... :	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	Ceramic Chip
			☐	PIFA
			☒	Slot Antenna
			☐	Others……..
Antenna Gain ..... :	0.5 dBi			

1.3 Channel List

Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405 MHz	12	2410 MHz	13	2415 MHz	14	2420 MHz
15	2425 MHz	16	2430 MHz	17	2435 MHz	18	2440 MHz
19	2445 MHz	20	2450 MHz	21	2455 MHz	22	2460 MHz
23	2465 MHz	24	2470 MHz	25	2475 MHz	26	2480 MHz

Note: The General Description of the Item , antenna information and Channel List for the EUT in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode	Mode 1: Transmit by Zigbee

Note : Regards to the frequency band operation: the lowest, middle and highest frequency channel were selected to perform the test, then shown on this report.

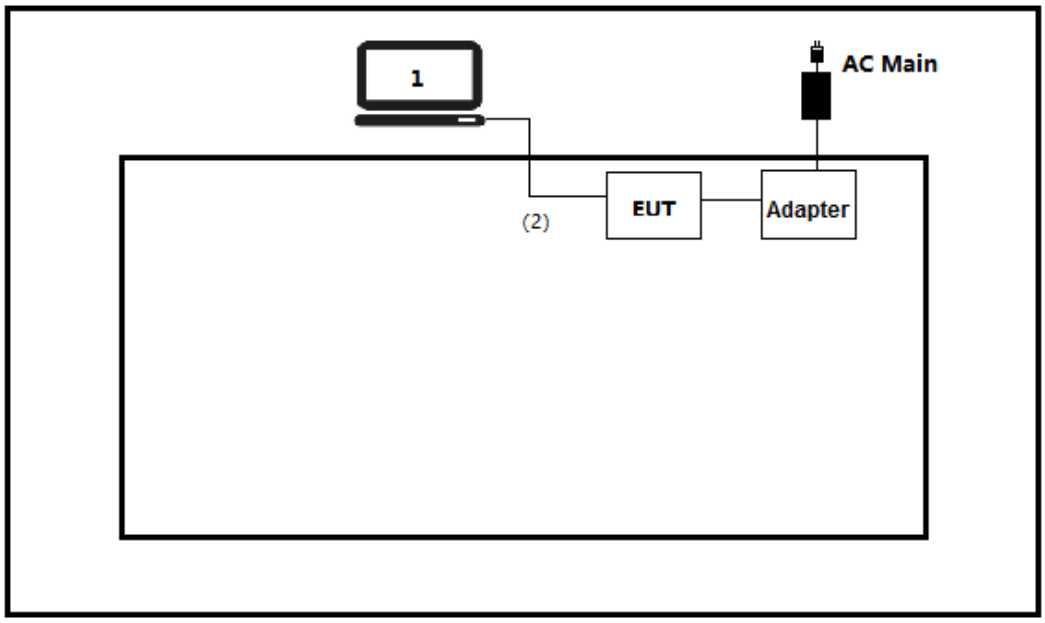
2.2 Auxiliary equipment / Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
(1) Notebook	Think pad x220	Lenovo	Adapter
(2) USB Control Cable	N/A	N/A	N/A
(3) USB Control Cable	N/A	N/A	N/A
software	Type / Version	Manufacturer	Supplied by
HueApprobationTool	N/A	N/A	N/A

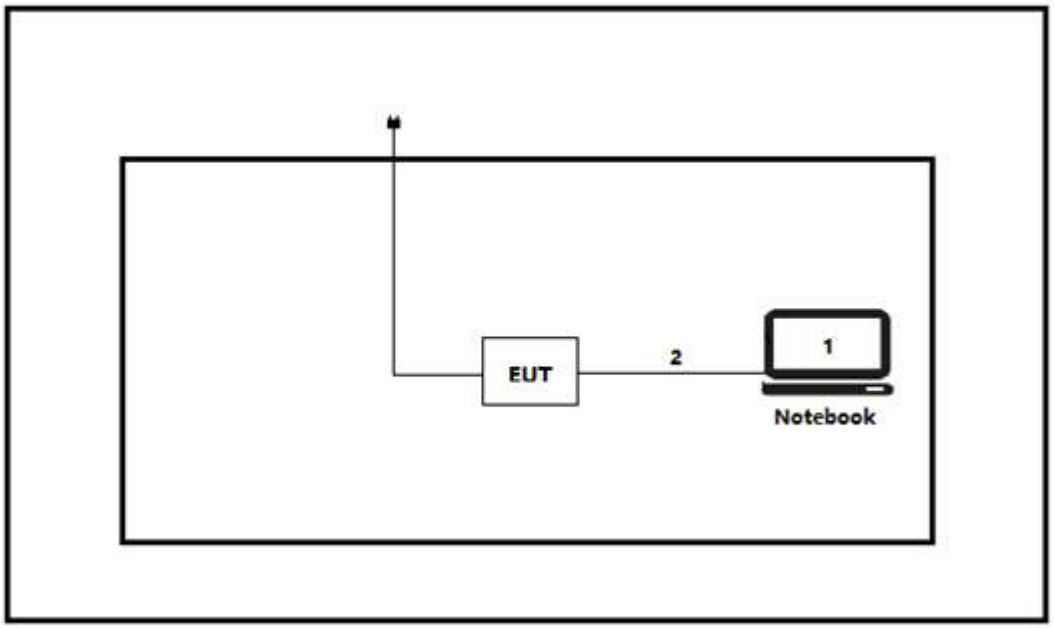
Accessories Information	Cable		
	Length used during test [m]	Attached during test	Shielded
(2)USB Control Cable	1	☒	☒
(3)USB Control Cable	8	☒	☒

2.3 Test Configuration / Block diagram used for tests

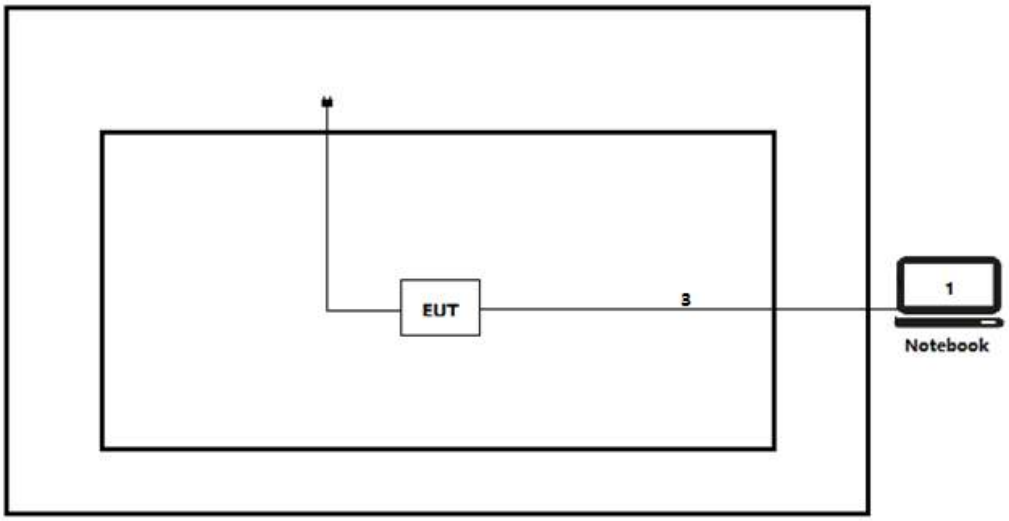
Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Conducted test



Test setup Diagram- Radiated Emission



2.4 Testing process

1	Setup the EUT shown in Section 2.3.
2	Execute the [HueApprobationTool]on the notebook.
3	Configure the test mode, the test channel, and the data rate.
4	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
CFR 47, FCC Part 15 C	2024	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-Gen Issue 5 Amendment 2	2021	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 3	2023	Digital Transmission Systems (DTSs),Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

Requirement – Test Item of FCC	Standard(s)	Verdict	Remark
20dB Emission Bandwidth	FCC 15.247(a)(2)	PASS	Test data please refer to **Appendix A**
Maximum conducted output power	15.247 (b)(3)	PASS	Test data please refer to **Appendix C**
Maximum power spectral density	FCC 15.247(e)	PASS	Test data please refer to **Appendix D**
Band edge measurements	FCC 15.247(d) FCC 15.205 FCC 15.209	PASS	Test data please refer to **Appendix E**
Conducted Spurious Emission	FCC 15.247(d), FCC 15.209	PASS	Test data please refer to **Appendix F**
Duty cycle	ANSI C63.10:2013	PASS	Test data please refer to **Appendix G**
Emissions in Restricted Bands	FCC 15.205 FCC 15.209	PASS	Test data please refer to **Appendix H**
AC Power Line Conducted Emission	FCC 15.207	PASS	Test data please refer to **Appendix I**
Antenna Requirement	FCC 15.203	PASS	---

Requirement – Test case of ISED	Standard(s)	Verdict	Remark
DTS Bandwidth	RSS-Gen Issue 5 Paragraph 6.7 RSS-247 Issue 3 Paragraph 5.2	PASS	Test data please refer to **Appendix A**
Occupied Channel Bandwidth	RSS-Gen Issue 5 Paragraph 6.7 RSS-247 Issue 3 Paragraph 5.2	PASS	Test data please refer to **Appendix B**
Maximum conducted output power	RSS-247 Issue 3 Paragraph 5.4(d)	PASS	Test data please refer to **Appendix C**
Maximum power spectral density	RSS-247 Issue 3 Paragraph 5.2(b)	PASS	Test data please refer to **Appendix D**
Band edge measurements	RSS-Gen Issue 5 Paragraph 8.10	PASS	Test data please refer to **Appendix E**
Conducted Spurious Emission	RSS-247 Issue 3 Paragraph 5.5	PASS	Test data please refer to **Appendix F**
Duty cycle	ANSI C63.10:2013	PASS	Test data please refer to **Appendix G**
Emissions in Restricted Bands	RSS-Gen Issue 5 Paragraph 8.9	PASS	Test data please refer to **Appendix H**
AC Power Line Conducted Emission	RSS-Gen Issue 5 Paragraph 8.8	N/A	Test data please refer to **Appendix I**
Antenna Requirement	RSS-Gen Issue 5 Paragraph 6.8	PASS	---

3.4 Power setting in test

Mode	Channel	Frequency (MHz)	Power setting
Mode1	11	2405	10
	18	2440	10
	26	2480	10

3.5 Test Matrix

Test item	Model: 9290038552	
	(#1)	(#2)
DTS Bandwidth	☒	☐
Occupied Channel Bandwidth	☒	☐
Maximum conducted output power	☒	☐
Maximum power spectral density	☒	☐
Band edge measurements	☐	☒
Conducted Spurious Emission	☒	☐
Duty cycle	☒	☐
Emissions in Restricted Bands	☐	☒
AC Power Line Conducted Emission	☐	☒
Note1: The only difference between sample #1 and sample #2 is whether to keep the original antenna, sample #1 is a conduction test product that removes the original antenna and is equipped with SMA wires, and sample #2 is a complete product that retains the original antenna.		

3.6 Test Facility

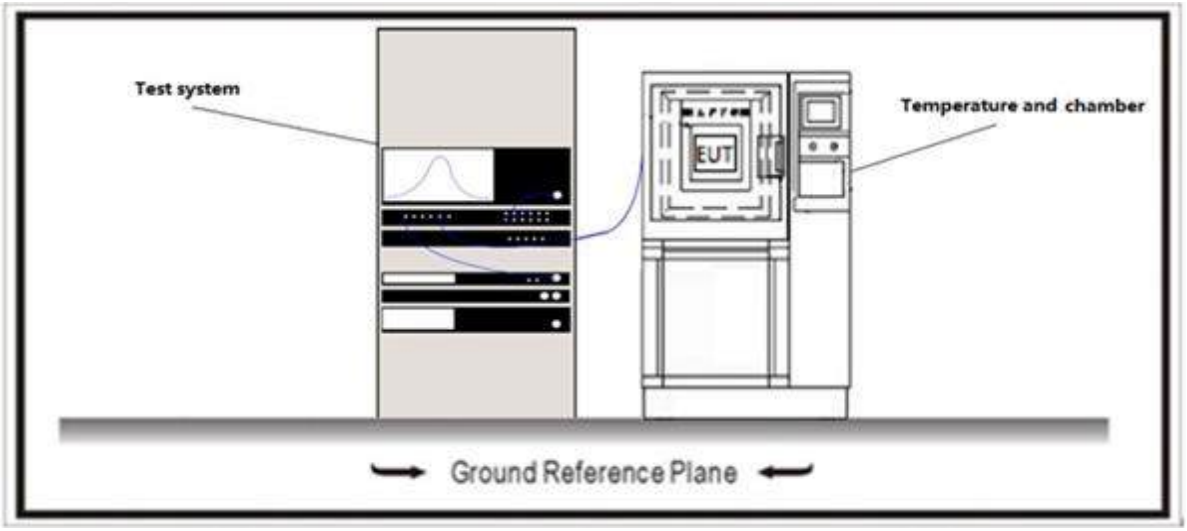
USA	:	**FCC Designation Number: CN1199**
CA	:	**ISED CAB identifier: CN0040**

4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE

4.1 DTS Bandwidth	VERDICT: PASS

4.1.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(2); RSS-247 Issue 3 Paragraph 5.2.
Systems using digital modulation techniques operate in the2400-2483.5 MHz .The minimum 6 dB bandwidth shall be at least 500 kHz	

4.1.2 Test Setup



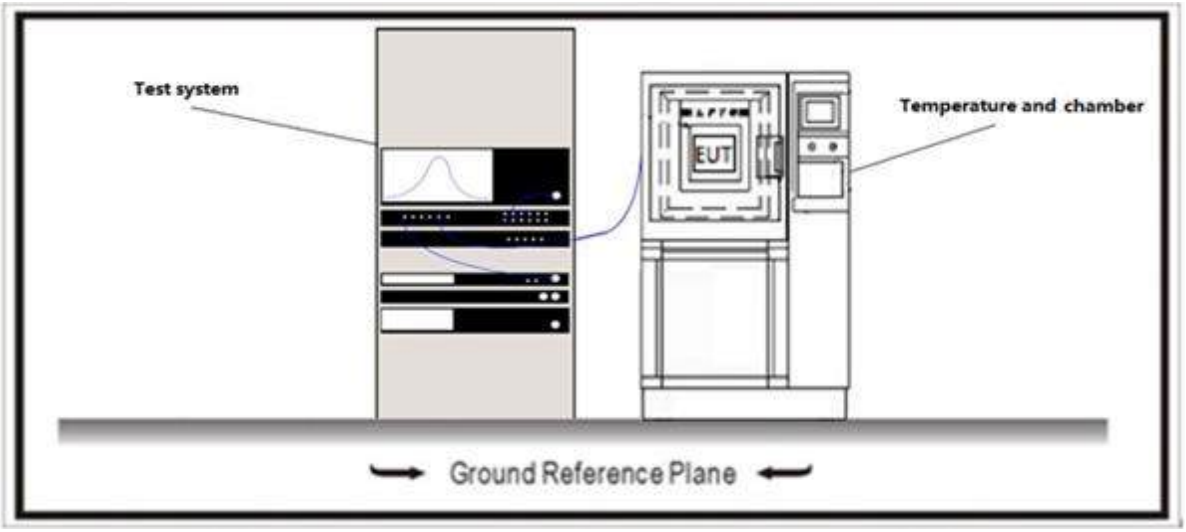
4.1.3 Test Procedure

	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☒	ANSI C63.10	11.8.1	Option 1
	☐	ANSI C63.10	11.8.2	Option 2

4.2 Occupied Channel Bandwidth	VERDICT: PASS

4.2.1 Limit	
Standard	RSS-Gen Issue 5 Paragraph 6.7
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. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs	

4.2.2 Test Setup



4.2.3 Test Procedure

	Reference Rule		Chapter	Description
☒	ANSI C63.10		6.9	Occupied bandwidth tests
	☐	ANSI C63.10	6.9.2	Option 1
	☒	ANSI C63.10	6.9.3	Option 2

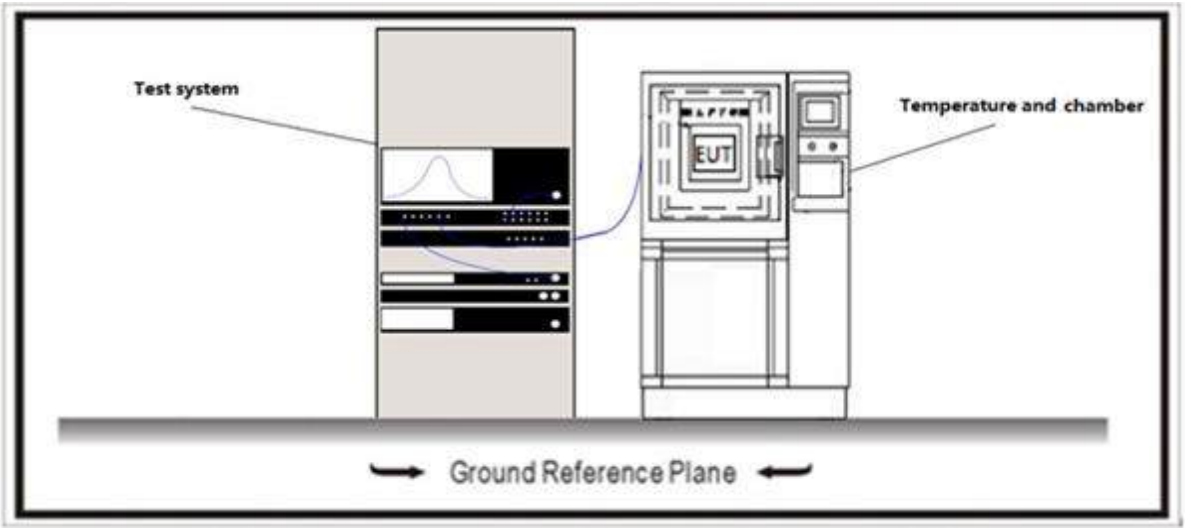
4.3 Maximum Conducted Output Power	VERDICT: PASS

4.3.1 Limit

Standard			FCC Part 15 Subpart C Paragraph 15.247 (b)(3); RSS-247 Issue 3 Paragraph 5.4(d).
☒	GTX ＜6dBi		Pout≤30dBm
☐	GTX ＞6dBi		
	☐	Non-Fix point-point	Pout≤30-(GTX -6)
	☐	Fix point-point	Pout≤30-[(GTX-6)]/3
	☐	Point-to-multipoint	Pout≤30-(GTX-6)
	☐	Overlap Beams	Pout≤30-[(GTX-6)]/3
	☐	Aggregate power transmitted simultaneously on all beams	Pout≤30-[(GTX-6)]/3
	☐	single directional beam	Pout≤30-[(GTX-6)]/3+8dB

Note 1 : GTX directional gain of transmitting antennas.
Note 2 : Pout is maximum peak conducted output power .

4.3.2 Test Setup

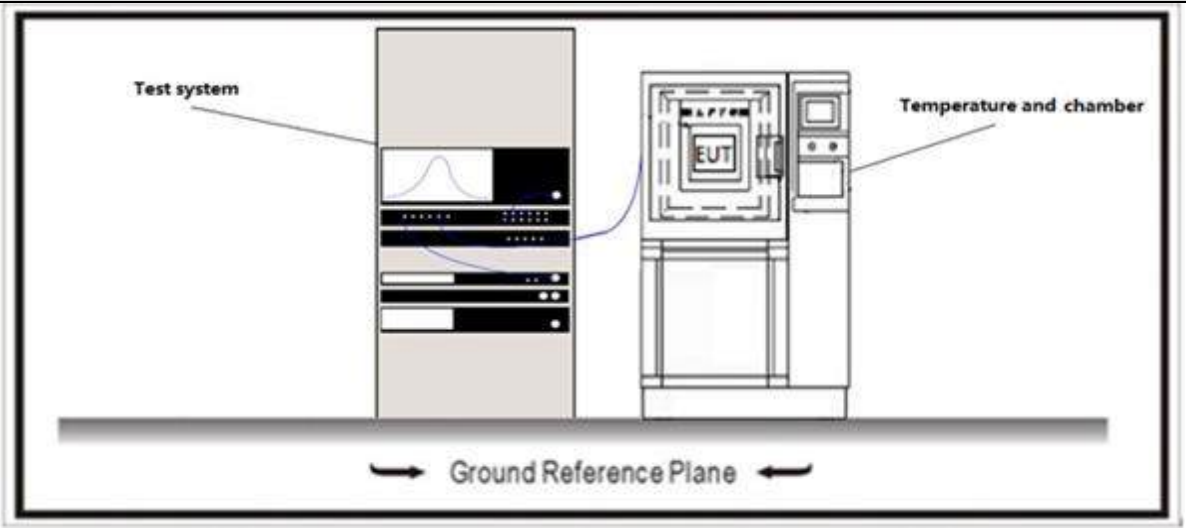


4.3.3 Test Procedure						
	References Rule				Chapter	Description
☒	ANSI C63.10				11.9	Fundamental emission output power
	☒	ANSI C63.10			11.9.1	Maximum peak conducted output power
		☐	ANSI C63.10		11.9.1.1	RBW ≥ DTS bandwidth
		☐	ANSI C63.10		11.9.1.2	Integrated band power method
		☒	ANSI C63.10		11.9.1.3	PKPM1 Peak power meter method
	☐	ANSI C63.10			11.9.2	Maximum conducted (average) output power
		☐	ANSI C63.10		11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle ≥98%)
			☐	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle ≥98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle ≤98%)
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle ≤98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
		☐	ANSI C63.10		11.9.2.3	Measurement using a power meter (PM)
			☐	ANSI C63.10	11.9.2.3.1	Method AVGPM
			☐	ANSI C63.10	11.9.2.3.2	Method AVGPM-G

4.4 Maximum Power Spectral Density	VERDICT: PASS

4.4.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (b)(3); RSS-247 Issue 3 Paragraph 5.2(b).
Power Spectral Density≤8dBm/3kHz	

4.4.2 Test Setup



4.4.3 Test Procedure

	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☐	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle＜98%)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle＜98%)
	☒	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	ANSI C63.10	11.10.8	Method AVGPSD-3A

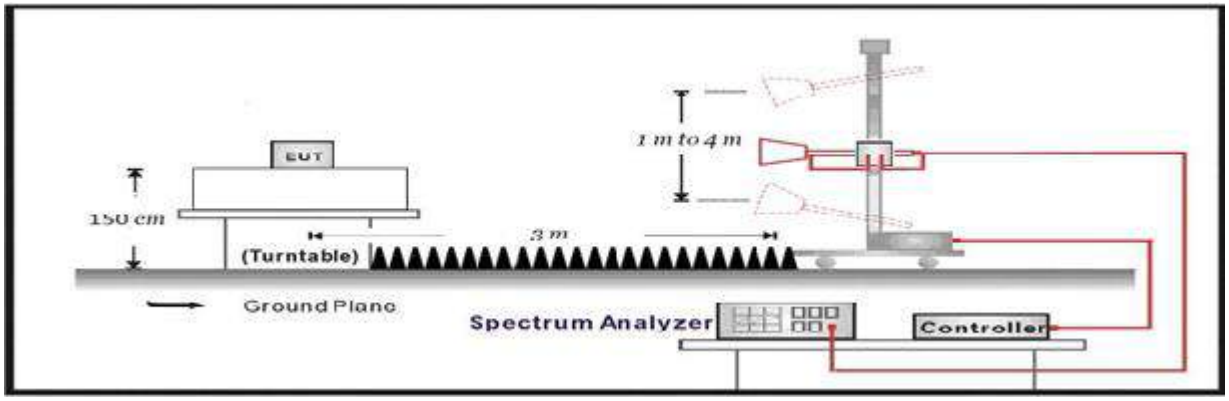
4.5 Band Edge Measurements	VERDICT: PASS

4.5.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d) , 15.209; RSS-Gen Issue 5 Paragraph 8.10.			
Frequency bands (MHz)	Detector	Limit (dBμV/m)	RBW (MHz)	Distance (m)
2310-2390 2483.5-2500	PK	74	1	3
	AV	54	1	3
Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.				

4.5.2 Test Setup

Above 1GHz Test Setup:



4.5.3 Test Procedure

	References Rule	Chapter	Description
☒	ANSI C63.10	6.10	Band-edge testing
	☒ ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	☐ ANSI C63.10	6.10.6	Marker-delta method
☒	ANSI C63.10	11.12	Emissions in restricted frequency bands
	☒ ANSI C63.10	11.12.1	Radiated emission measurements
	☒ ANSI C63.10	11.12.2.7	Radiated spurious emission test
☐	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency rangeof 30 MHz to 1000 MHz
☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.6 Conducted Spurious Emission	VERDICT: PASS

4.6.1 Limit

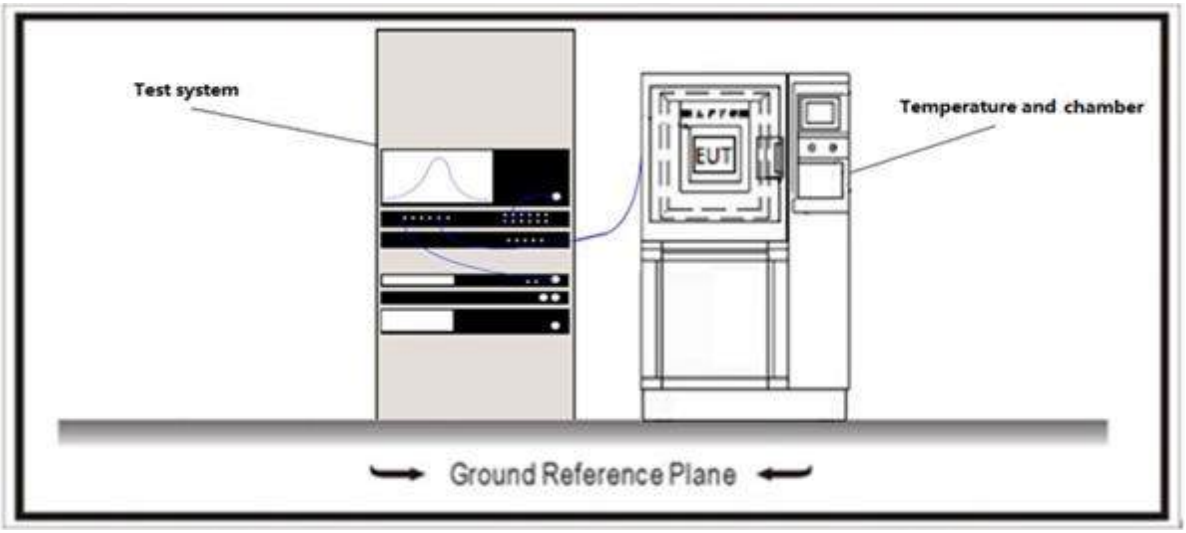
Standard	FCC Part 15 Subpart C Paragraph 15.247(d); RSS-247 Issue 3 Paragraph 5.5.

RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

4.6.2 Test Setup



4.6.3 Test Procedure

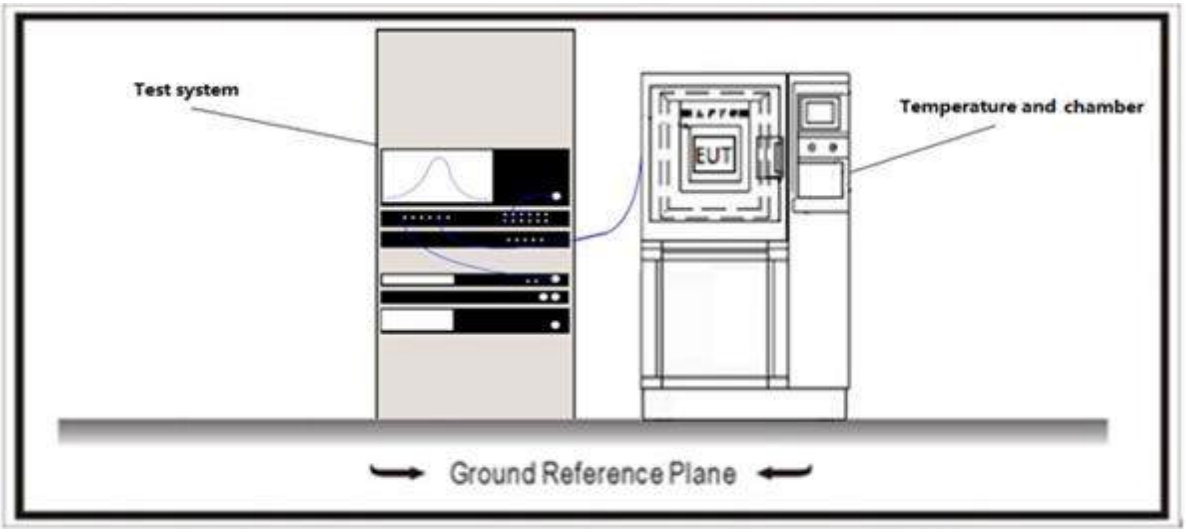
References Rule			Chapter	Description
☒	ANSI C63.10		11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10	11.11.1	General
	☒	ANSI C63.10	11.11.2	Reference level measurement
	☒	ANSI C63.10	11.11.3	Emission level measurement

4.7 Duty cycle	VERDICT: PASS

4.7.1 Limit

N/A

4.7.2 Test Setup



4.7.3 Test Procedure

References Rule		Chapter	Description
☒	ANSI C63.10	11.6	Duty cycle (D), transmission duration (T), and maximum power control level

4.8 Emissions in Restricted Bands — VERDICT: PASS

4.8.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.205		
Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			
Standard	RSS-Gen Issue 5 Paragraph 8.10		
Restricted Bands of operation for IC			
0.090 - 0.110	13.36 - 13.41	960 - 1427	9.0 - 9.2
0.495 - 0.505	16.42 - 16.423	1435 - 1626.5	9.3 - 9.5
2.1735 - 2.1905	16.69475 - 16.69525	1645.5 - 1646.5	10.6 - 12.7
3.020 - 3.026	16.80425 - 16.80475	1660 - 1710	13.25 - 13.4
4.125 - 4.128	25.5 - 25.67	1718.8 - 1722.2	14.47 - 14.5
4.17725 - 4.17775	37.5 - 38.25	2200 - 2300	15.35 - 16.2
4.20725 - 4.20775	73 - 74.6	2310 - 2390	17.7 - 21.4
5.677 - 5.683	74.8 - 75.2	2483.5 - 2500	22.01 - 23.12
6.215 - 6.218	108 - 138	2655 - 2900	23.6 - 24.0
6.26775 - 6.26825	149.9 - 150.05	3260 - 3267	31.2 - 31.8
6.31175 - 6.31225	156.52475 - 156.52525	3332 - 3339	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3345.8 - 3358	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3500 - 4400	
8.37625 - 8.38675	167.72 - 173.2	4500 - 5150	
8.41425 - 8.41475	240 - 285	5350 - 5460	
12.29 - 12.293	322 - 335.4	7250 - 7750	
12.51975 - 12.52025	399.9 - 410	8025 - 8500	
12.57675 - 12.57725	608 - 614	--	

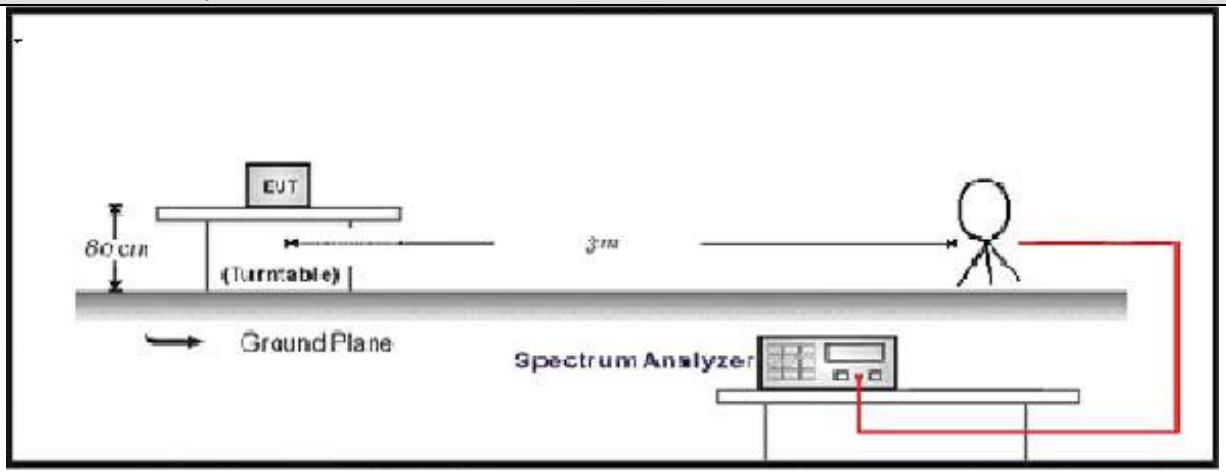
Restricted Band Emissions Limit			
FCC Part 15 Subpart C Paragraph 15.209			
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)
RSS-Gen Issue 5 Paragraph 8.9.			
Frequency (MHz)	Field strength	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	6.37/F(kHz) μA/m	48.5 – 13.8	300(Note 1)
0.49 - 1.705	63.7/F(kHz) μA/m	33.8 - 23	30(Note 1)
1.705 - 30	30 μV/m	29.5	30(Note 1)
30 - 88	100 μV/m	40	3(Note 2)
88 - 216	150 μV/m	43.5	3(Note 2)
216 - 960	200 μV/m	46	3(Note 2)
Above 960	500 μV/m	54	3(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

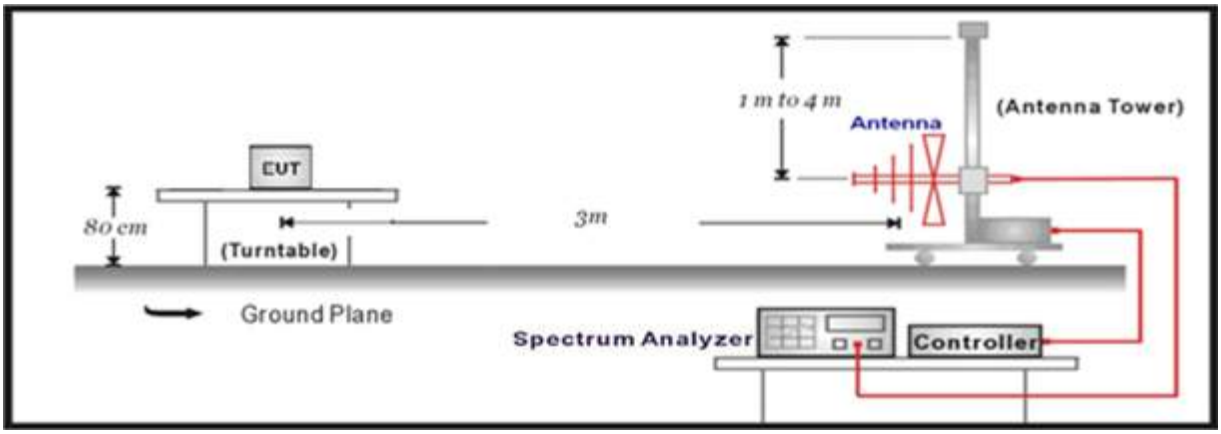
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.8.2 Test Setup

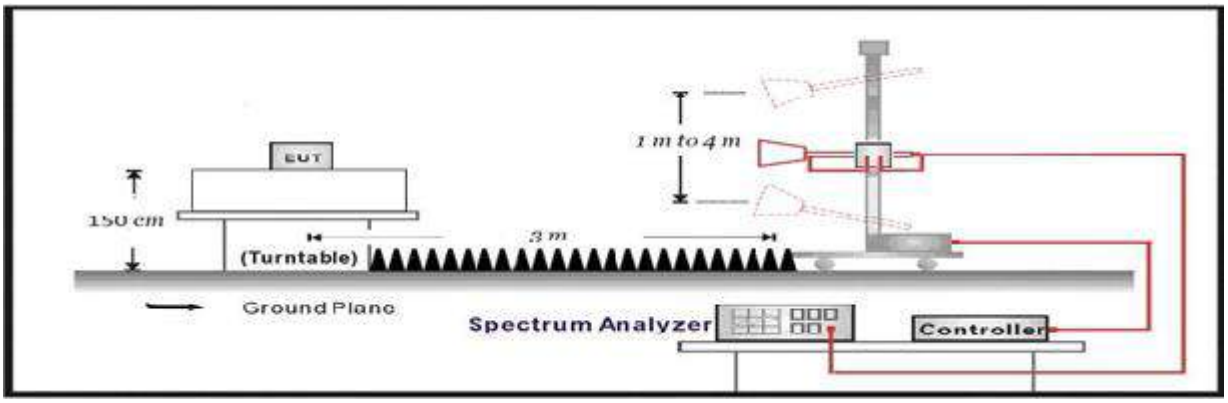
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.8.3 Test Procedure					
	References Rule			Chapter	Description
☒	ANSI C63.10			11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10		11.12.1	Radiated emission measurements
	☒	ANSI C63.10		11.12.2.7	Radiated spurious emission test
		☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
		☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
		☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

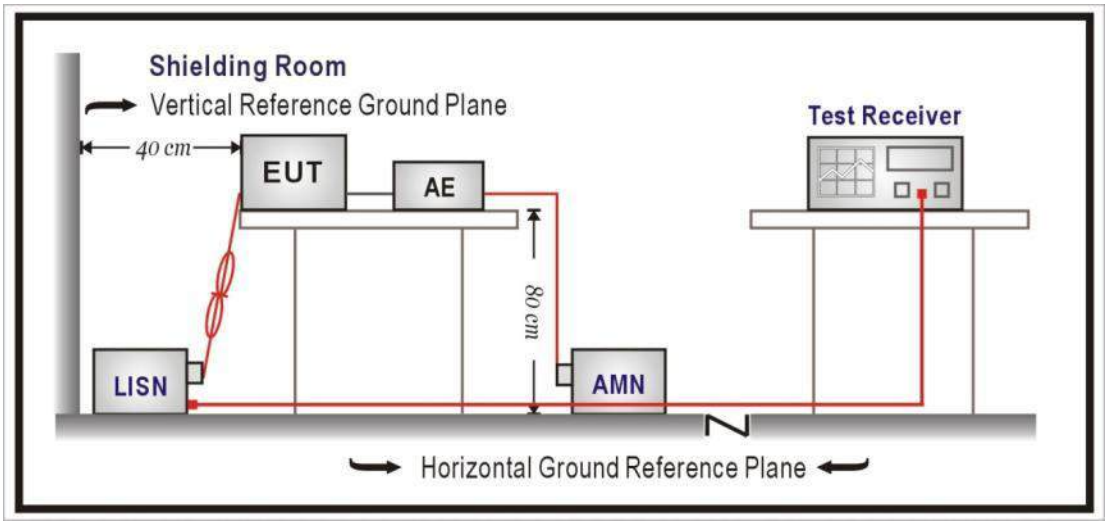
4.9 AC Power Line Conducted Emission — VERDICT: PASS

4.9.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.207; RSS-Gen Issue 5 Paragraph 8.8.	
Frequency range [MHz]	Limit: QP [dB(μV)[1)]]	Limit: AV [dB(μV)[1)]]
0,15 - 0,50	66 – 56 [2)]	56 - 46 [2)]
0,50 - 5,0	56	46
5,0 - 30	60	50

[1)] At the transition frequency, the lower limit applies.
[2)] The limit decreases linearly with the logarithm of the frequency.
NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.
NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.9.2 Test Setup



4.9.3 Test Procedure

	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.10 Antenna Requirement	VERDICT: PASS

4.10.1 Limit:	
Standard	FCC Part 15 Subpart C Paragraph 15.203; RSS-Gen Issue 5 Paragraph 6.8.
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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.	

4.10.2 Antenna Connector Construction:	
☒	The use of a permanently attached antenna
☐	The antenna use of a unique coupling to the intentional radiator
☐	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document “Internal Photograph” to show the antenna connector.	

5 TEST SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

6 TEST RESULT

Appendix A: DTS Bandwidth

TestMode	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
ZIGB	2405	1.700	2404.290	2405.990	0.5	PASS
	2440	1.630	2439.320	2440.950	0.5	PASS
	2480	1.660	2479.300	2480.960	0.5	PASS

Test Graphs

ZIGB_Ant1_2405

ZIGB_Ant1_2440

ZIGB_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 11.49 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 1.66 MHz
-0.558 dB
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 10.00 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 2.479 30 GHz 0.920 dBm
2 N 1 f 2.480 39 GHz 6.330 dBm
3 Δ1 1 f (Δ) 1.66 MHz (Δ) -0.558 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.475000000 GHz
Stop Freq
2.485000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

Appendix B: Occupied Channel Bandwidth

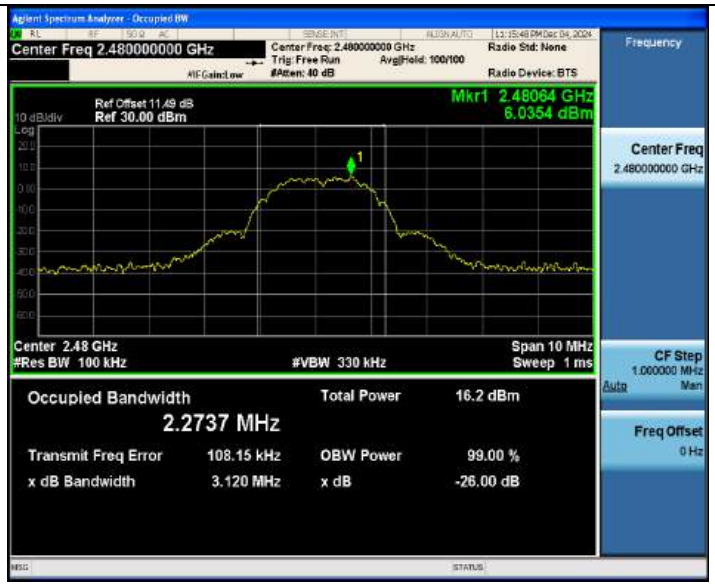
TestMode	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
ZIGB	2405	2.2533	2403.9767	2406.2300	N/A	Pass
ZIGB	2440	2.2664	2438.9702	2441.2366	N/A	Pass
ZIGB	2480	2.2737	2478.9713	2481.2450	N/A	Pass

Test Graphs

ZIGB_Ant1_2405

ZIGB_Ant1_2440

ZIGB_Ant1_2480


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 11.49 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.48064 GHz
6.0354 dBm
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 100 kHz
#VBW 330 kHz
Span 10 MHz
Sweep 1 ms
CF Step
1.000000 MHz
Auto
Man
Occupied Bandwidth
2.2737 MHz
Total Power
16.2 dBm
Freq Offset
0 Hz
Transmit Freq Error
108.15 kHz
OBW Power
99.00 %
x dB Bandwidth
3.120 MHz
x dB
-26.00 dB
MSG
STATUS

Appendix C: Maximum conducted output power

Test Mode	Frequency (MHz)	Measured Power (dBm)	EIRP (dBm)	Conducted Limit(dBm)	EIRP Limit (dBm)
ZIGB	2405	11.36	11.86	≦30	≦36
	2440	11.13	11.63	≦30	≦36
	2480	10.51	11.01	≦30	≦36
Note 1: EIRP=Measured power+Antenna gain Note 2: The antenna gain please refer to clause 1.2					

Appendix D: Maximum power spectral density

TestMode	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
ZIGB	2405	-3.91	≤8.00	PASS
ZIGB	2440	-4.12	≤8.00	PASS
ZIGB	2480	-4.88	≤8.00	PASS

Test Graphs

ZIGB_Ant1_2405

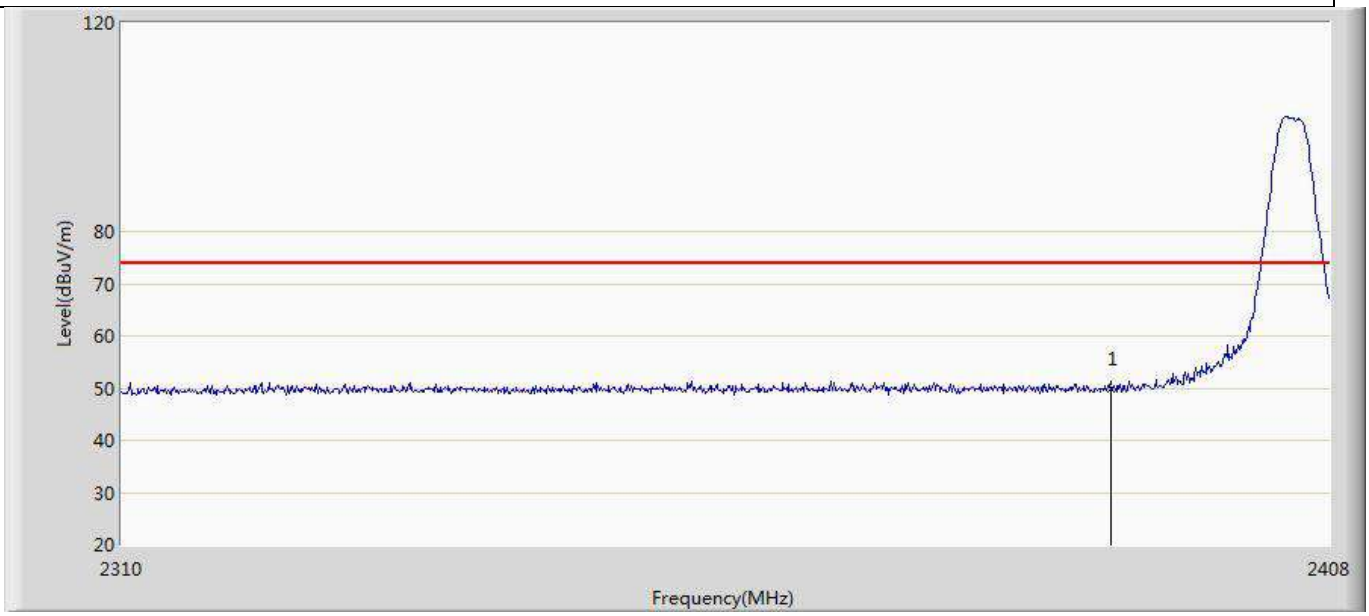
ZIGB_Ant1_2440

ZIGB_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 11.49 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.480 546 55 GHz
-4.876 dBm
Center 2.480000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.320 MHz
Sweep 352.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.478340000 GHz
Stop Freq
2.481660000 GHz
CF Step
332.000 kHz
Auto
Man
Freq Offset
0 Hz

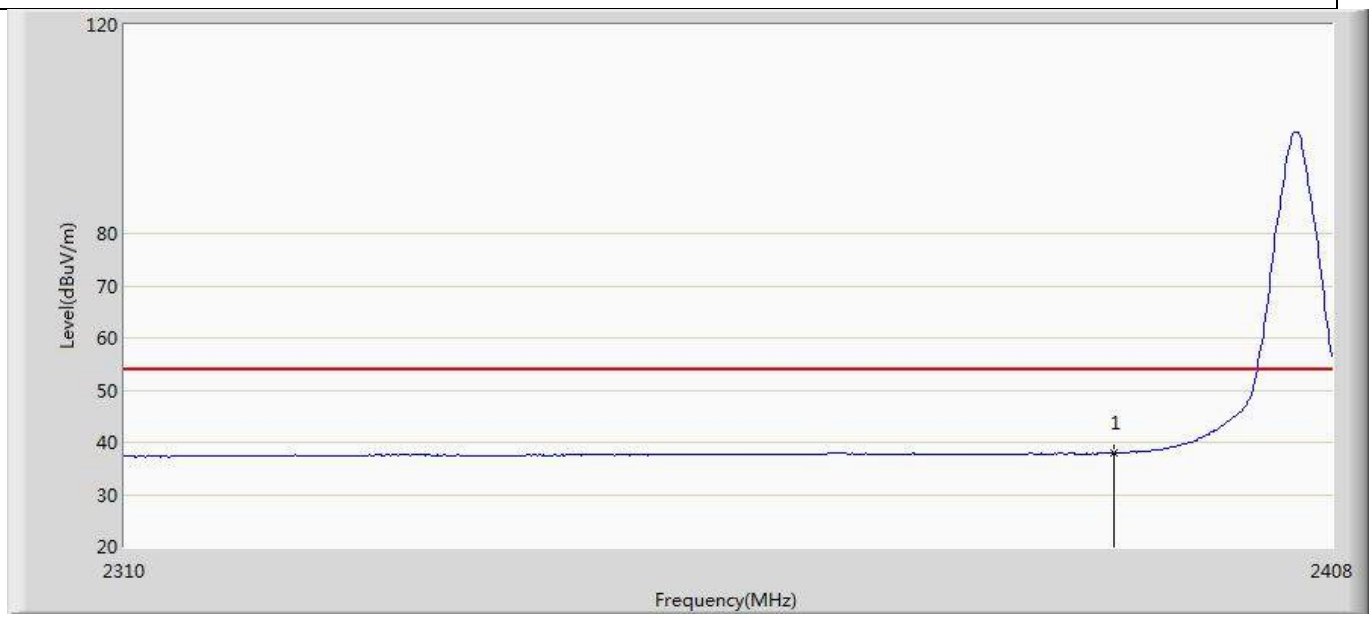
Appendix E: Band edge measurements

Profile: 24B0863R	Page No.: 33
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 01:53
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2405MHz by Zigbee	



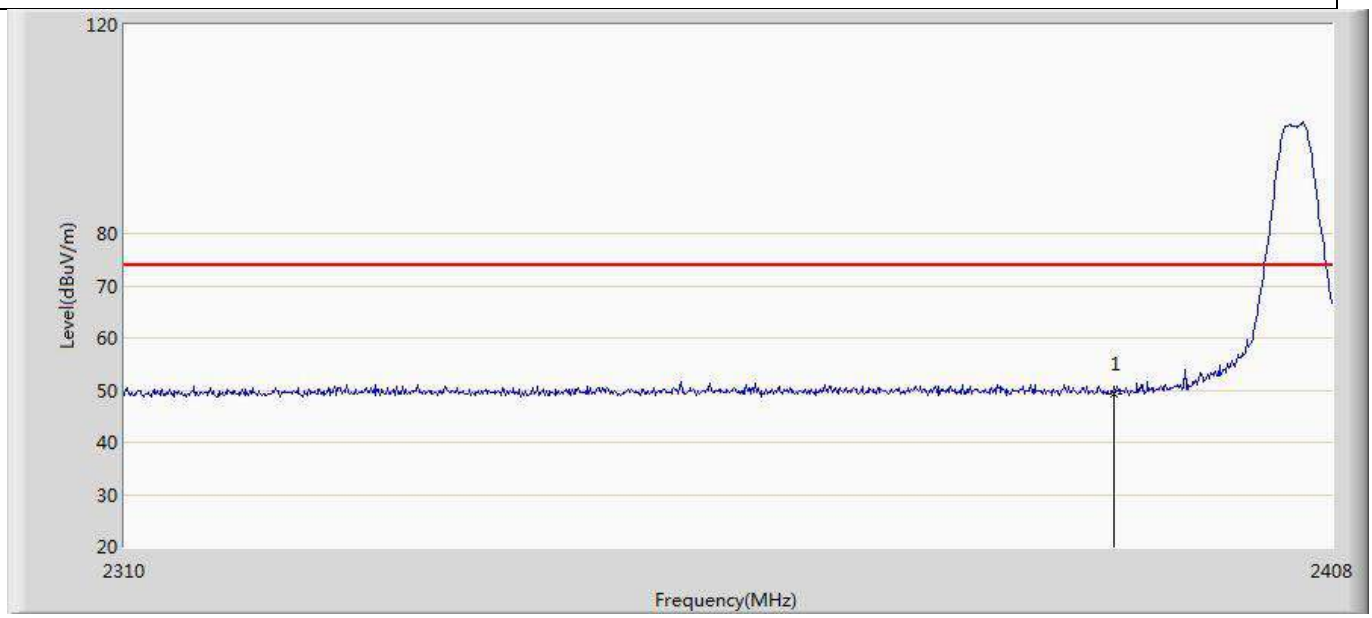
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	49.881	15.780	-24.119	74.000	34.102	PK

Profile: 24B0863R	Page No.: 34
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 01:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2405MHz by Zigbee	



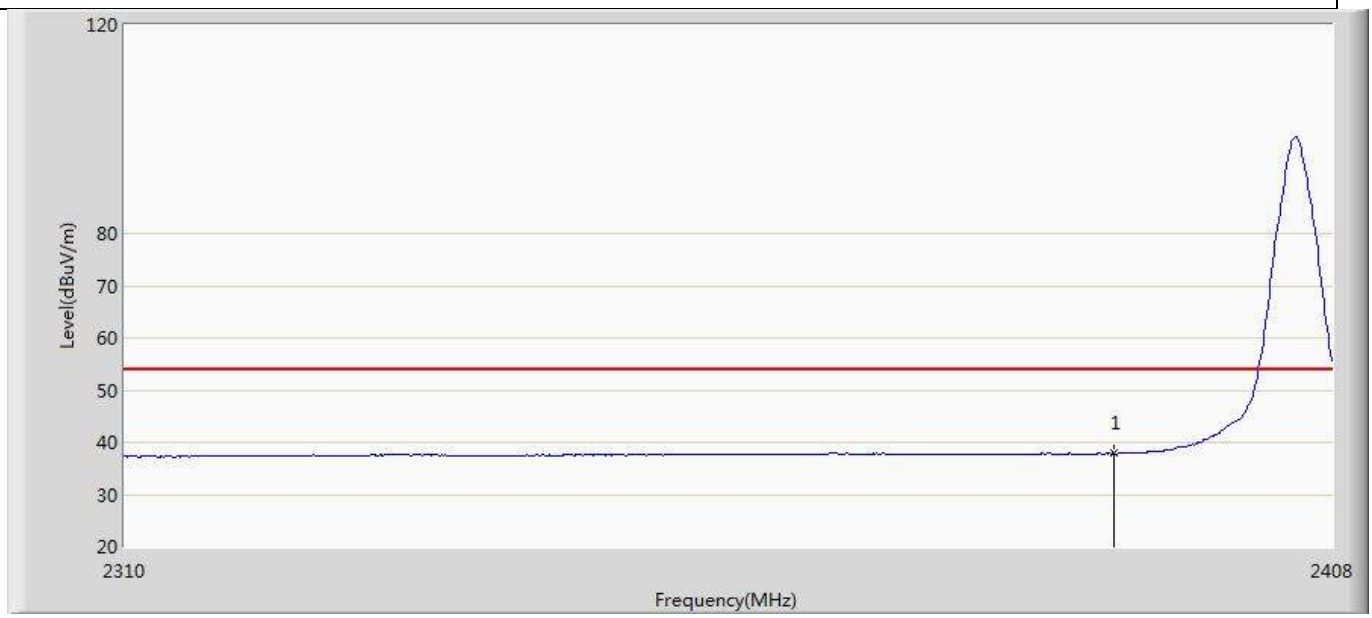
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	37.982	3.881	-16.018	54.000	34.102	AV

Profile: 24B0863R	Page No.: 35
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 01:56
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2405MHz by Zigbee	



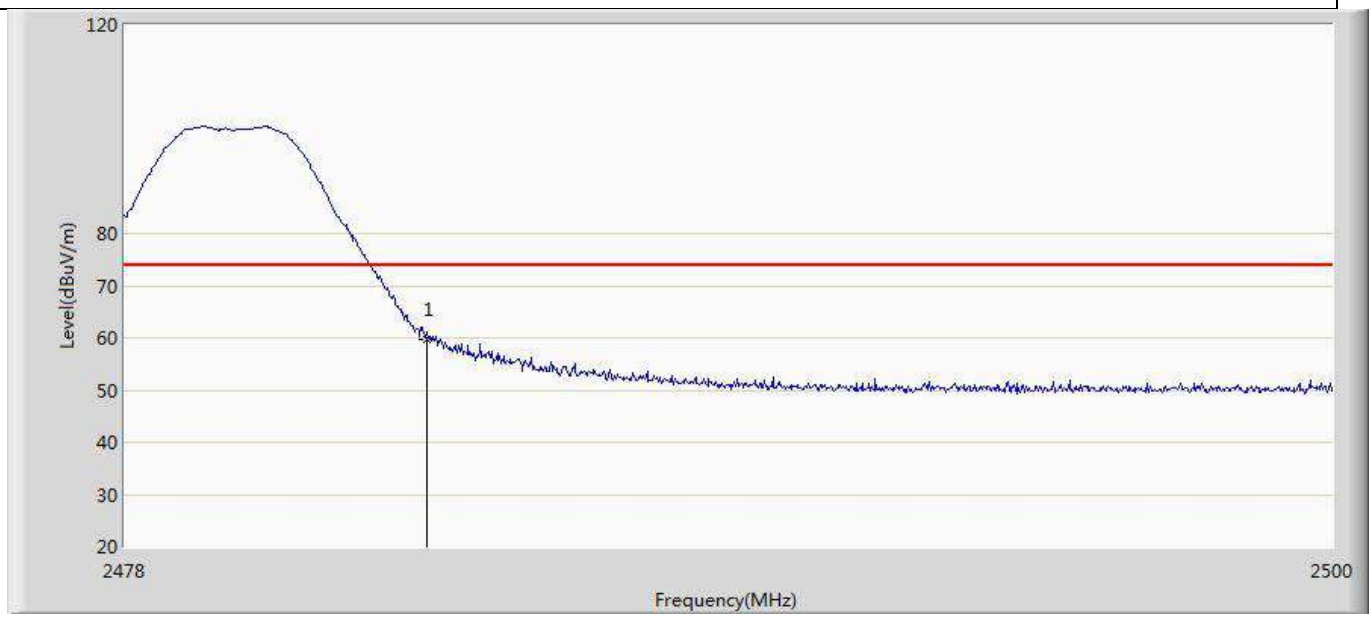
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	49.419	15.318	-24.581	74.000	34.102	PK

Profile: 24B0863R	Page No.: 36
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 01:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2405MHz by Zigbee	



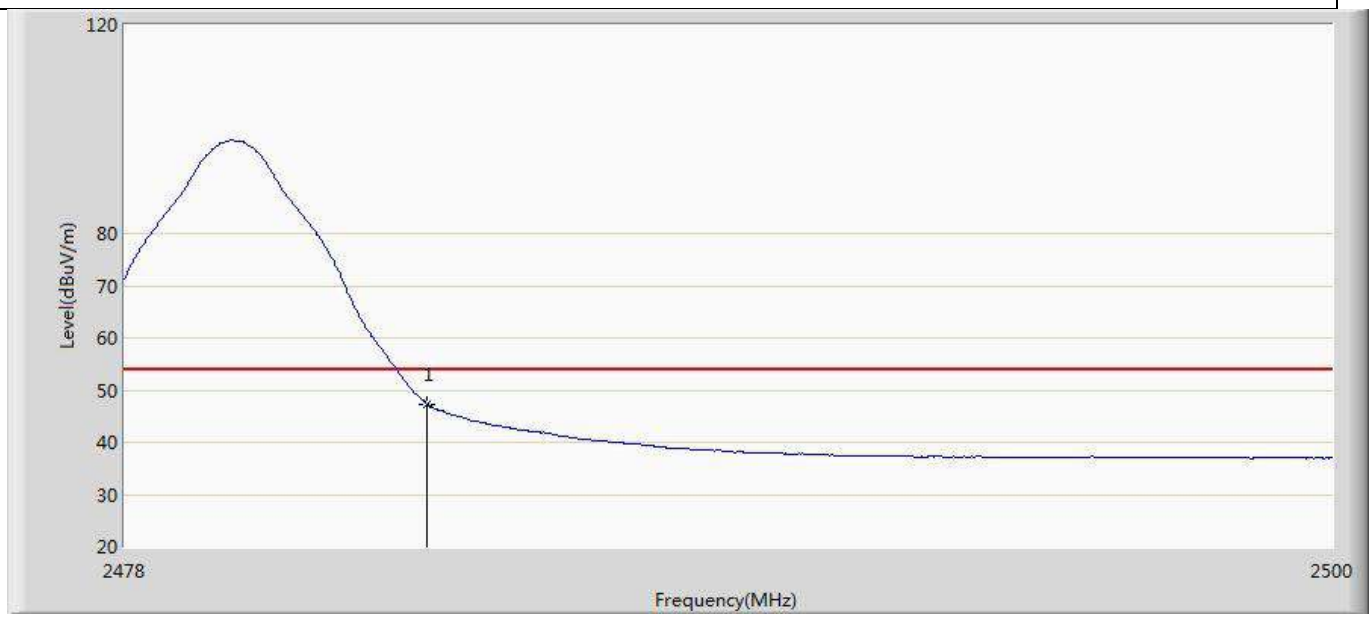
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	37.841	3.740	-16.159	54.000	34.102	AV

Profile: 24B0863R	Page No.: 37
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 01:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



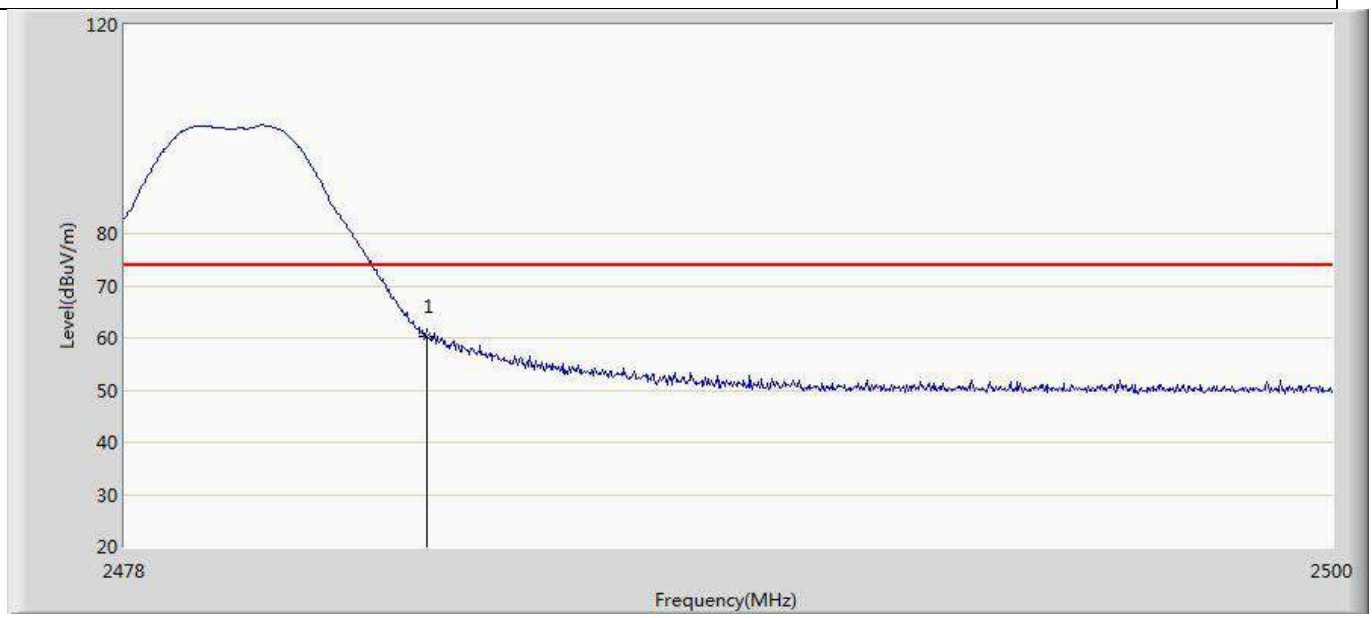
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	59.716	25.603	-14.284	74.000	34.114	PK

Profile: 24B0863R	Page No.: 38
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 02:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



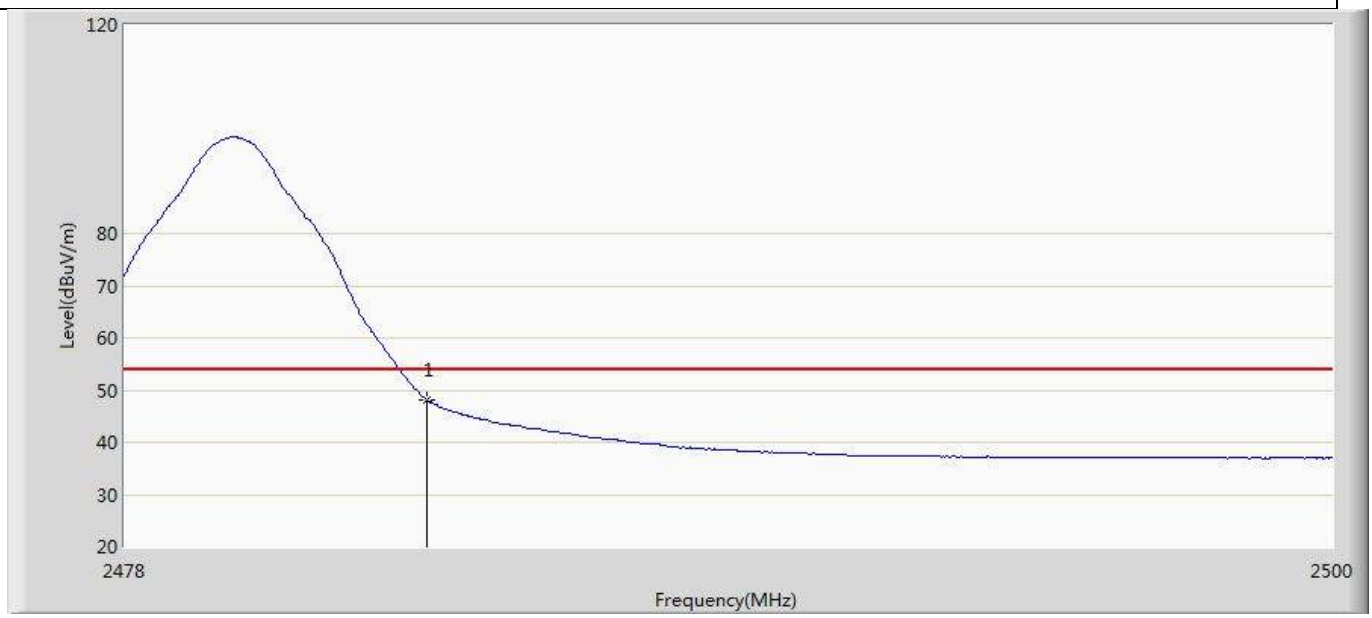
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	47.356	13.243	-6.644	54.000	34.114	AV

Profile: 24B0863R	Page No.: 39
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 02:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	60.184	26.071	-13.816	74.000	34.114	PK

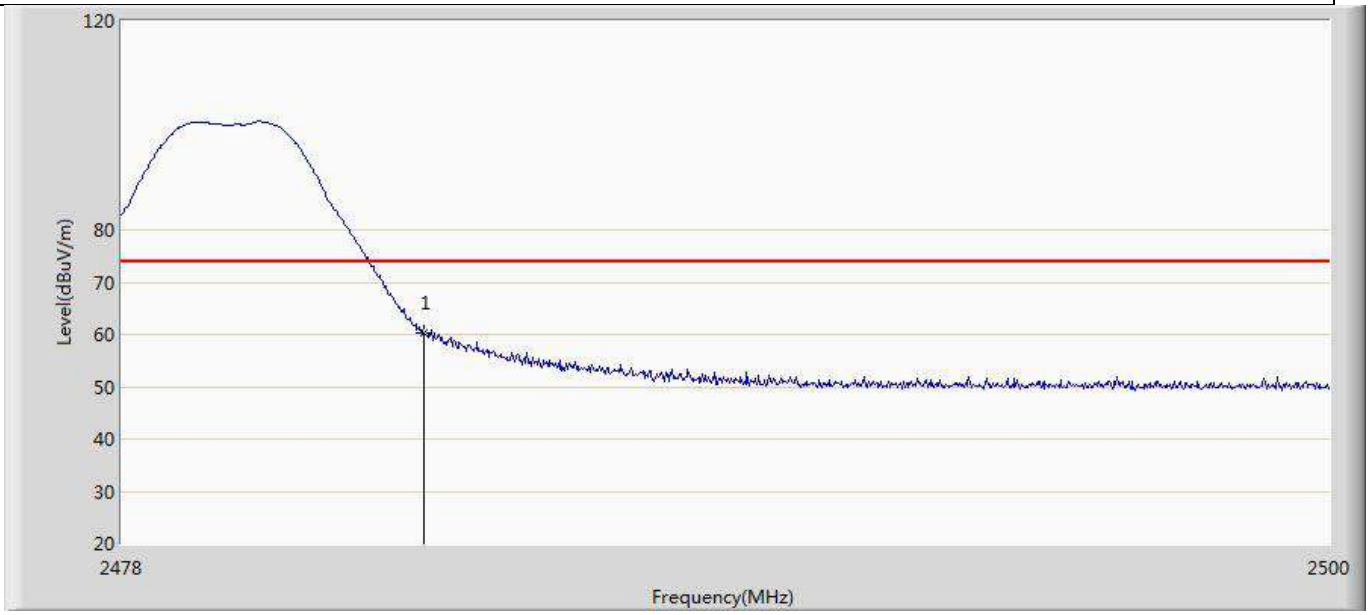
Profile: 24B0863R	Page No.: 40
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 02:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	48.095	13.982	-5.905	54.000	34.114	AV

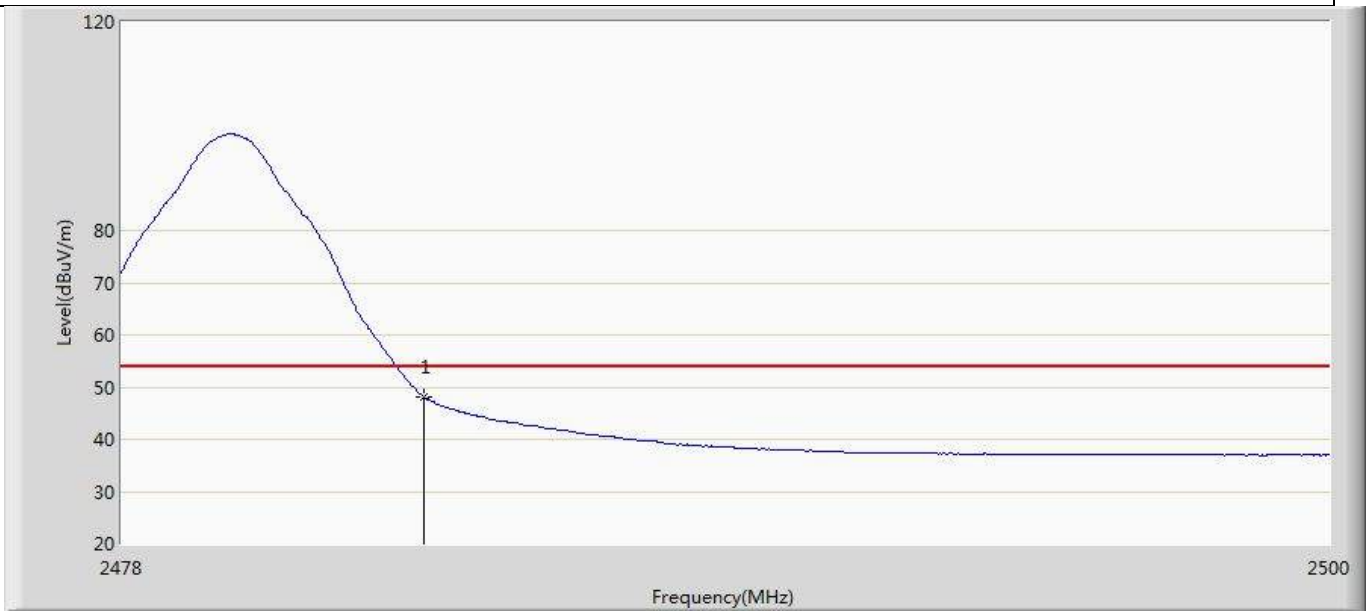
Alternative Capacitor:

Profile: 24B0863R	Page No.: 65
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 04:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	60.164	26.050	-13.836	74.000	34.114	PK

Profile: 24B0863R	Page No.: 66
Engineer: Yuliu	
Site: AC5	Time: 2024/12/10 - 04:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	47.966	13.852	-6.034	54.000	34.114	AV

Note:
1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp)
3. The test frequency range, 18GHz~40GHz test result on peak is lower than average limit, all is the noise base, therefore no data appear in the report.

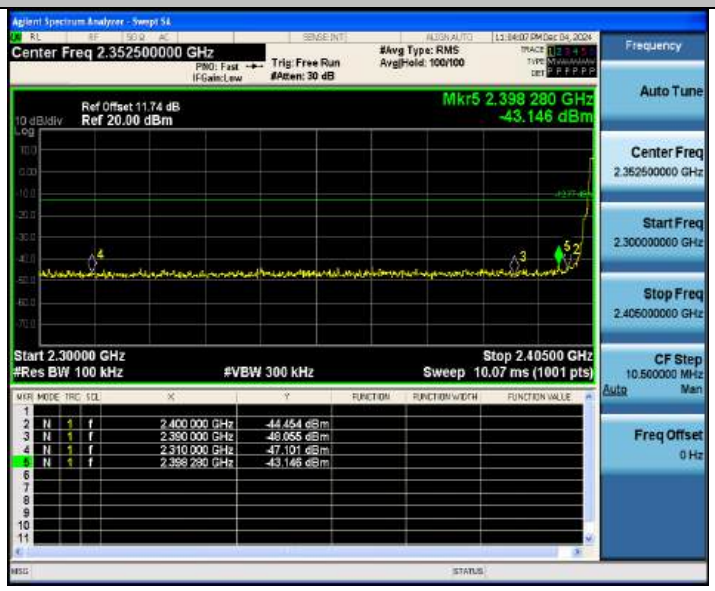
Appendix F Conducted Spurious Emission

Band edge measurements:

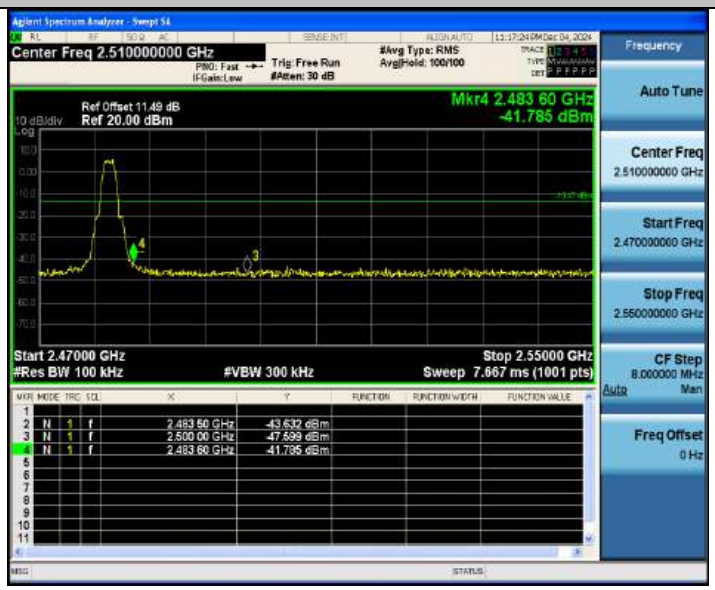
TestMode	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
ZIGB	Low	2405	7.23	-43.15	≤-12.77	PASS
	High	2480	6.53	-41.79	≤-13.47	PASS

Test Graphs

ZIGB_Ant1_Low_2405



ZIGB_Ant1_High_2480

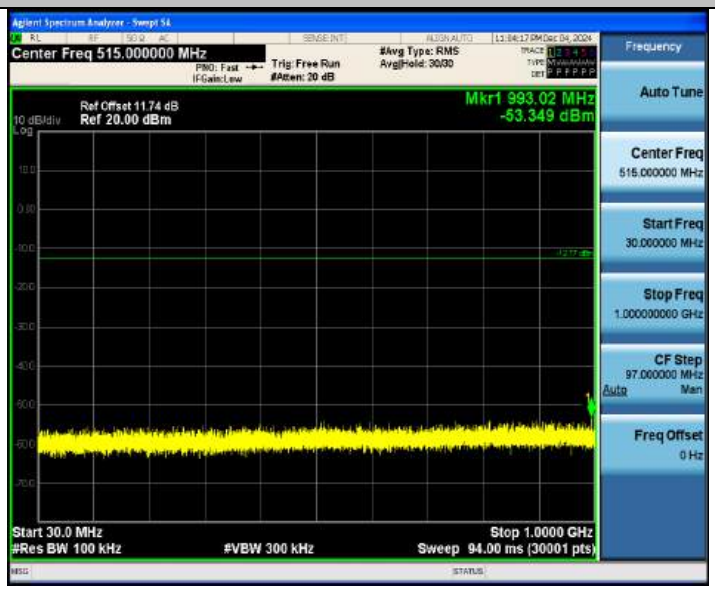


Conducted Spurious Emission:

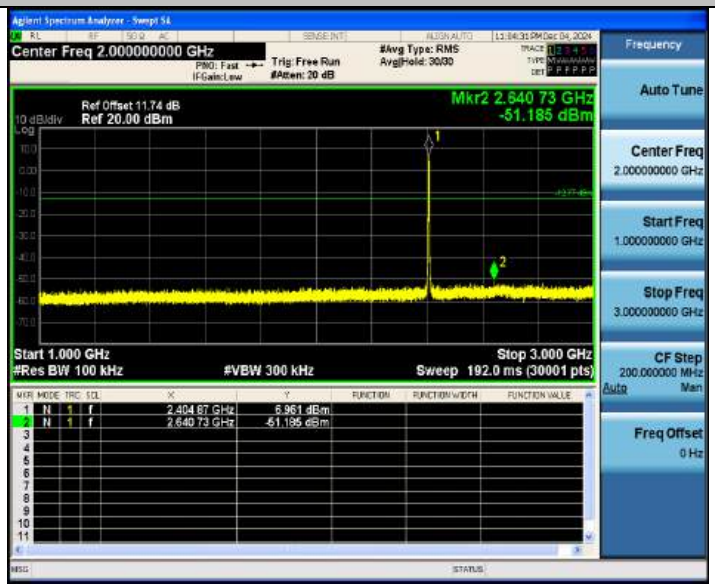
TestMode	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
ZIGB	2405	30~1000	7.23	-53.35	≤-12.77	PASS
		1000~3000	7.23	-51.19	≤-12.77	PASS
		3000~5000	7.23	-46	≤-12.77	PASS
		5000~7000	7.23	-51.11	≤-12.77	PASS
		7000~9000	7.23	-51.63	≤-12.77	PASS
		9000~11000	7.23	-51.14	≤-12.77	PASS
		11000~13000	7.23	-49.24	≤-12.77	PASS
		13000~15000	7.23	-46.49	≤-12.77	PASS
		15000~17000	7.23	-44.67	≤-12.77	PASS
		17000~19000	7.23	-44.53	≤-12.77	PASS
		19000~21000	7.23	-43.25	≤-12.77	PASS
		21000~23000	7.23	-42.71	≤-12.77	PASS
		23000~25000	7.23	-41.68	≤-12.77	PASS
	2440	30~1000	6.90	-52.77	≤-13.1	PASS
		1000~3000	6.90	-51.78	≤-13.1	PASS
		3000~5000	6.90	-46.11	≤-13.1	PASS
		5000~7000	6.90	-50.34	≤-13.1	PASS
		7000~9000	6.90	-51.74	≤-13.1	PASS
		9000~11000	6.90	-51.04	≤-13.1	PASS
		11000~13000	6.90	-49.22	≤-13.1	PASS
		13000~15000	6.90	-46.76	≤-13.1	PASS
		15000~17000	6.90	-45.43	≤-13.1	PASS
		17000~19000	6.90	-44.48	≤-13.1	PASS
		19000~21000	6.90	-43.11	≤-13.1	PASS
		21000~23000	6.90	-43.11	≤-13.1	PASS
		23000~25000	6.90	-41.5	≤-13.1	PASS
	2480	30~1000	6.53	-53.69	≤-13.47	PASS
		1000~3000	6.53	-51.83	≤-13.47	PASS
		3000~5000	6.53	-48.37	≤-13.47	PASS
		5000~7000	6.53	-51.22	≤-13.47	PASS
		7000~9000	6.53	-52.57	≤-13.47	PASS
		9000~11000	6.53	-51.76	≤-13.47	PASS
		11000~13000	6.53	-48.27	≤-13.47	PASS
		13000~15000	6.53	-47.69	≤-13.47	PASS
		15000~17000	6.53	-45.24	≤-13.47	PASS
		17000~19000	6.53	-45.03	≤-13.47	PASS
		19000~21000	6.53	-43.82	≤-13.47	PASS
		21000~23000	6.53	-43.34	≤-13.47	PASS
		23000~25000	6.53	-41.58	≤-13.47	PASS

Test Graphs

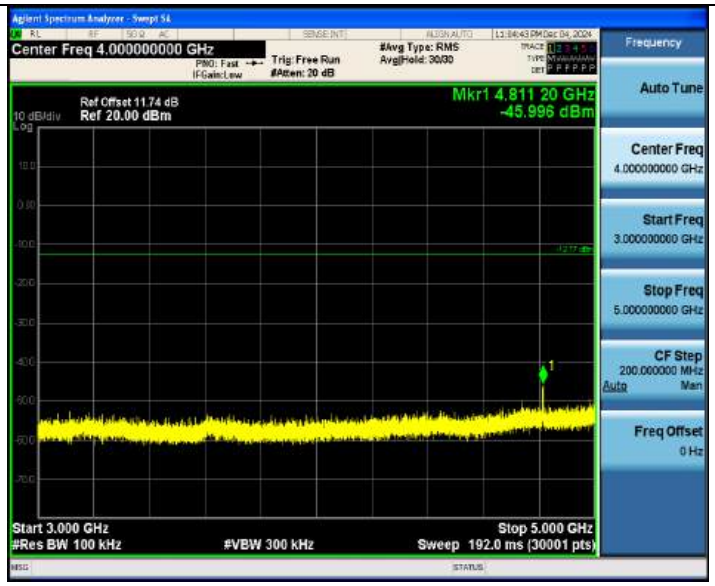
ZIGB_Ant1_2405_30~1000



ZIGB_Ant1_2405_1000~3000

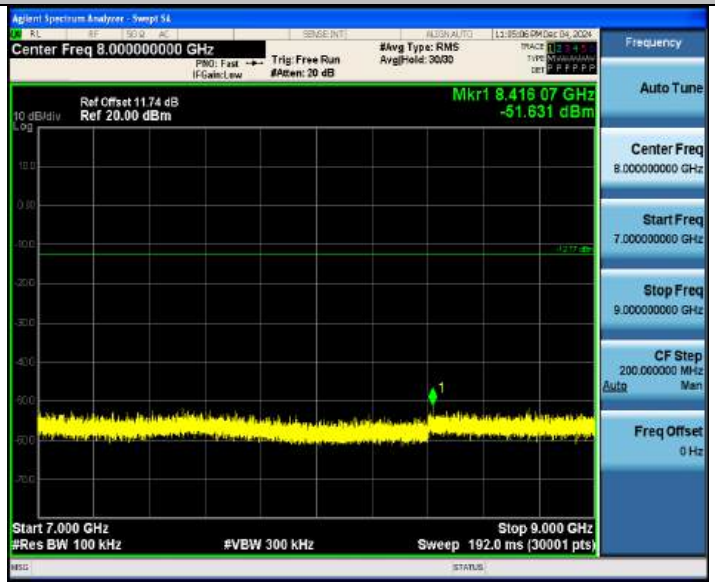


ZIGB_Ant1_2405_3000~5000



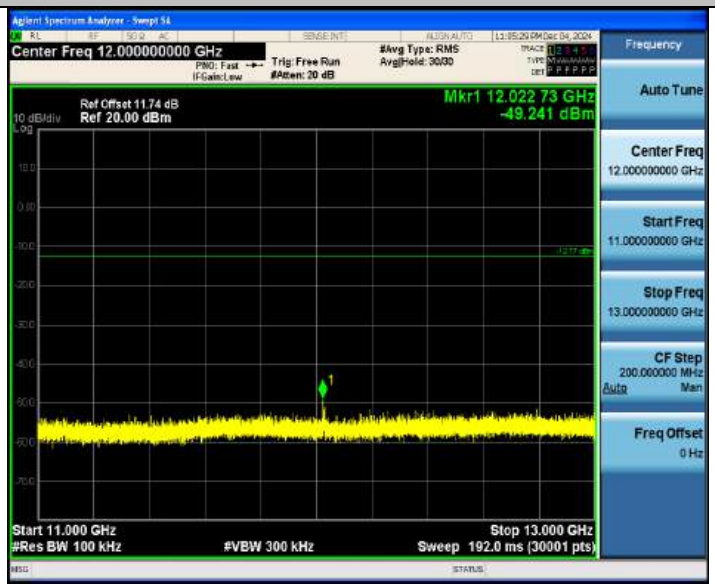
ZIGB_Ant1_2405_5000~7000

ZIGB_Ant1_2405_7000~9000



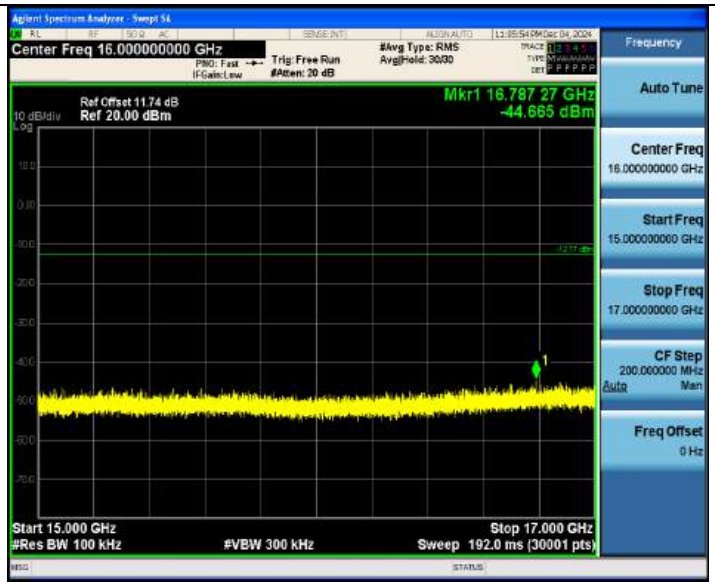
ZIGB_Ant1_2405_9000~11000

ZIGB_Ant1_2405_11000~13000

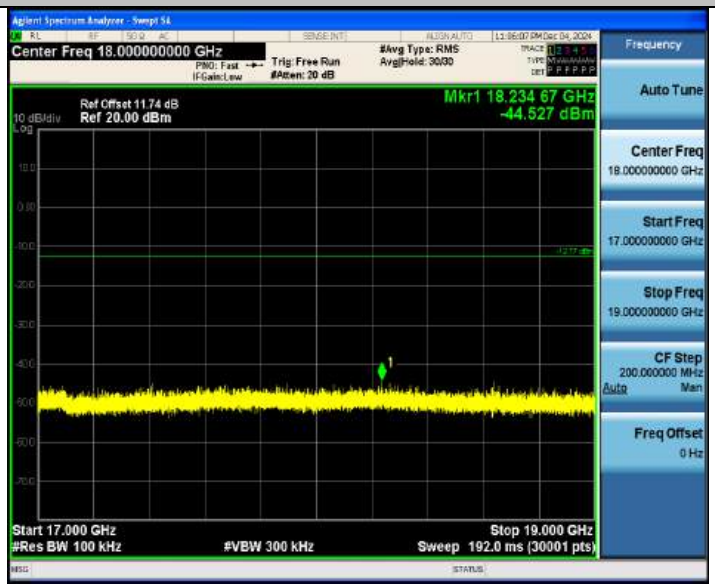


ZIGB_Ant1_2405_13000~15000

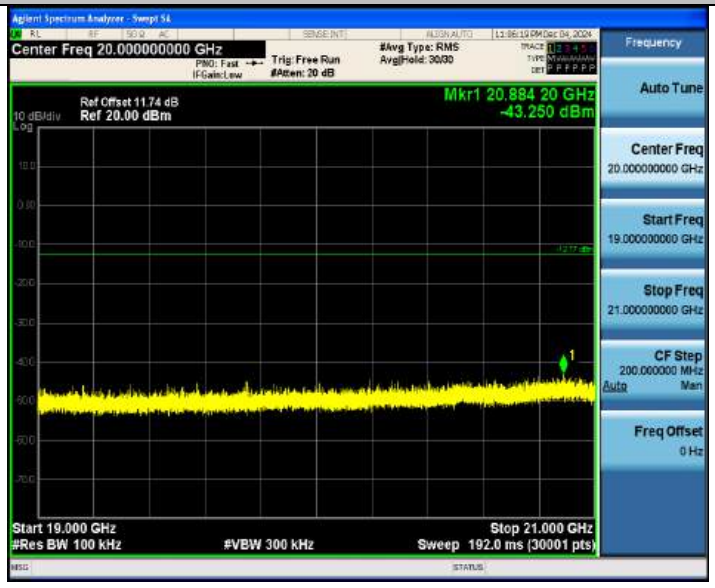
ZIGB_Ant1_2405_15000~17000



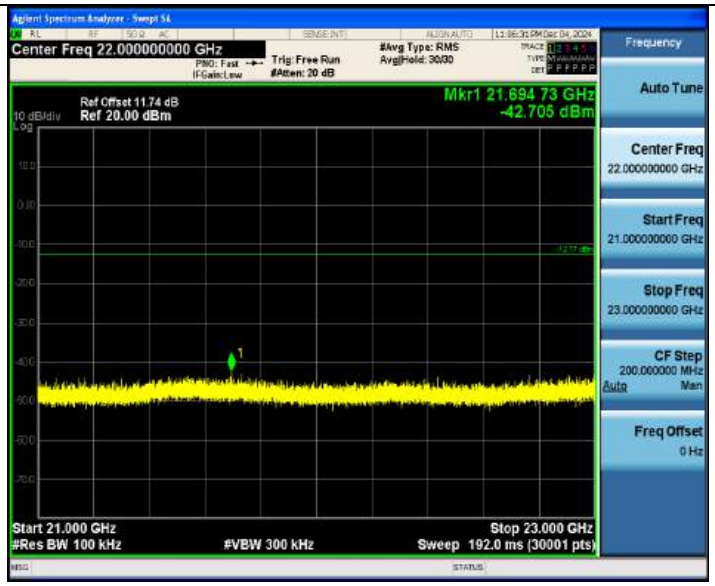
ZIGB_Ant1_2405_17000~19000



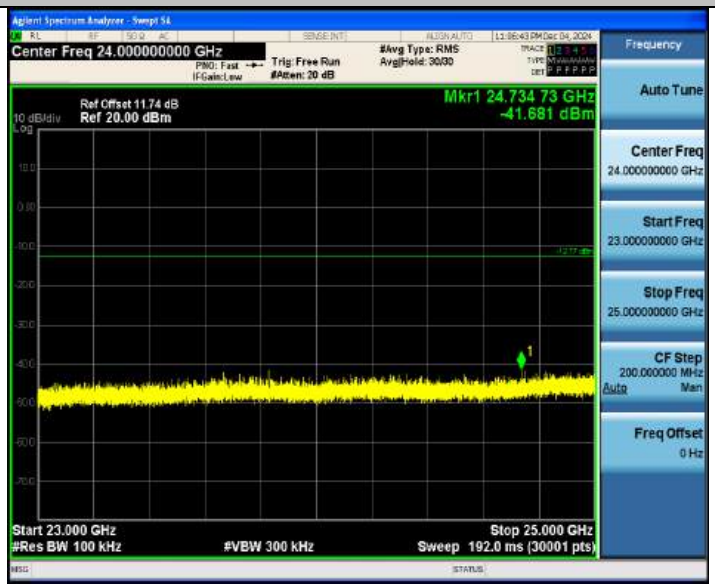
ZIGB_Ant1_2405_19000~21000



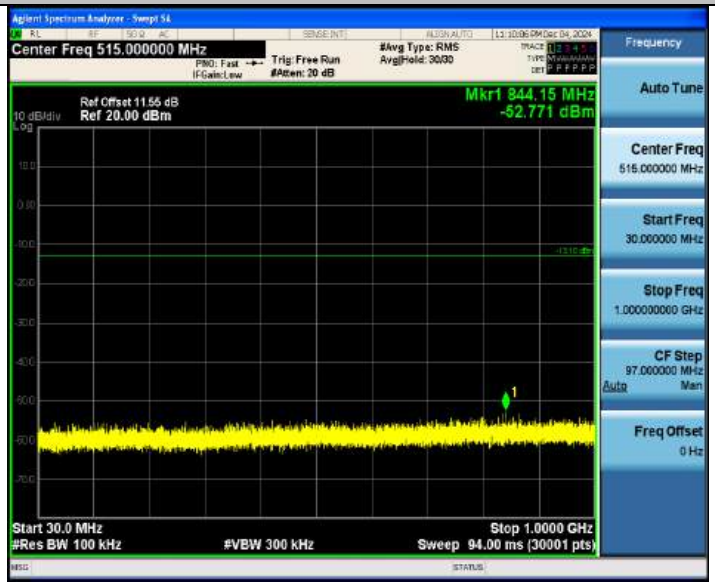
ZIGB_Ant1_2405_21000~23000



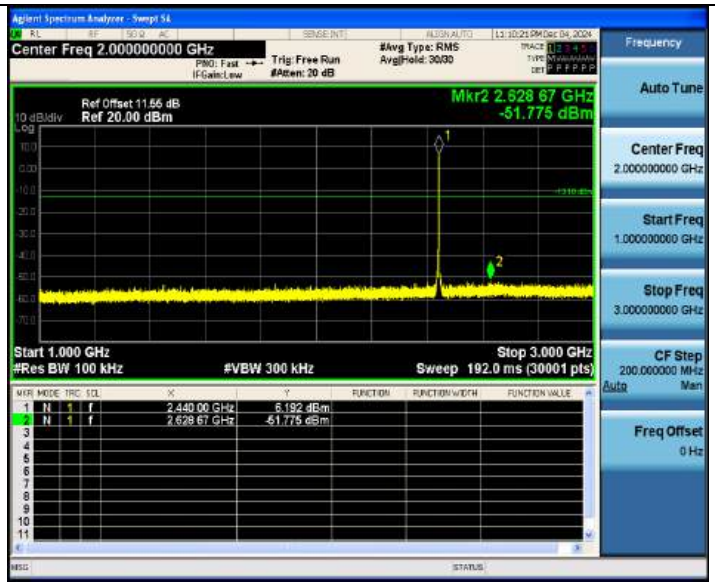
ZIGB_Ant1_2405_23000~25000



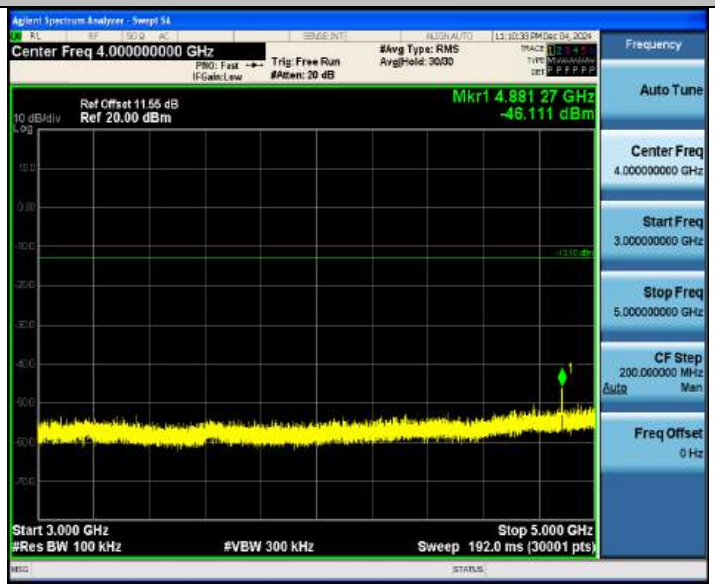
ZIGB_Ant1_2440_30~1000



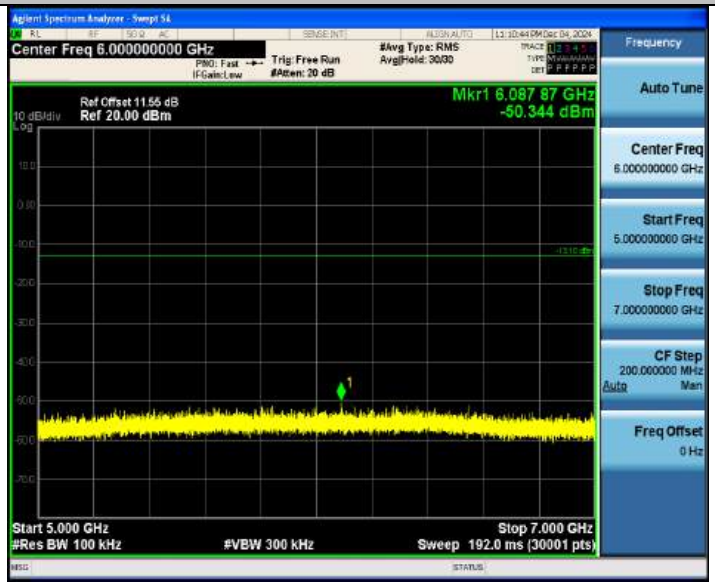
ZIGB_Ant1_2440_1000~3000



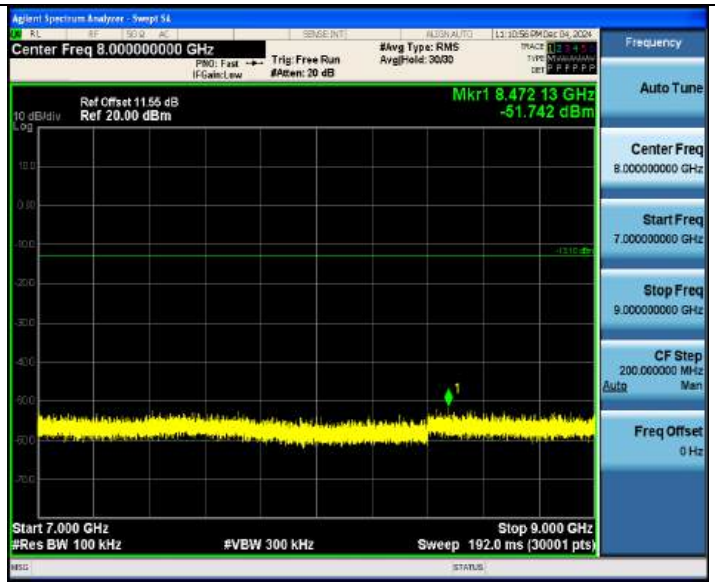
ZIGB_Ant1_2440_3000~5000



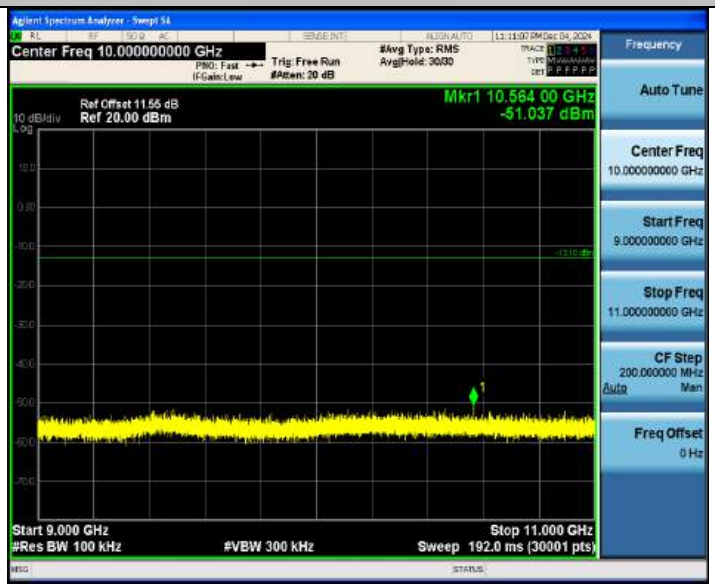
ZIGB_Ant1_2440_5000~7000



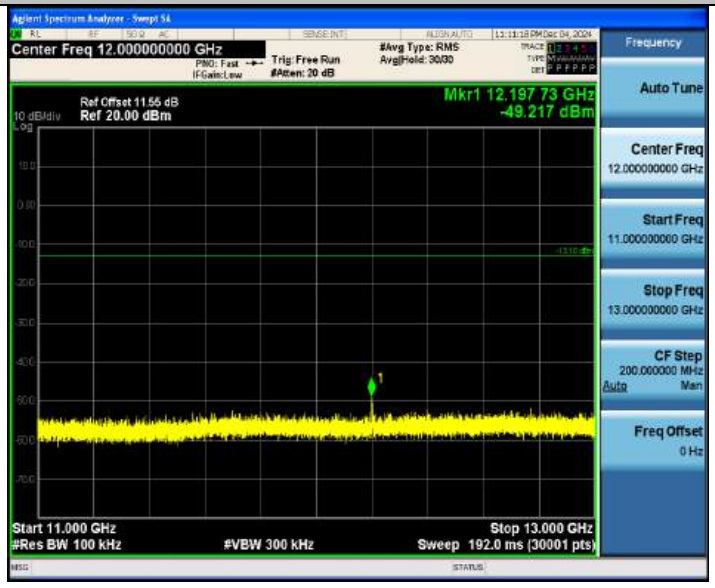
ZIGB_Ant1_2440_7000~9000



ZIGB_Ant1_2440_9000~11000

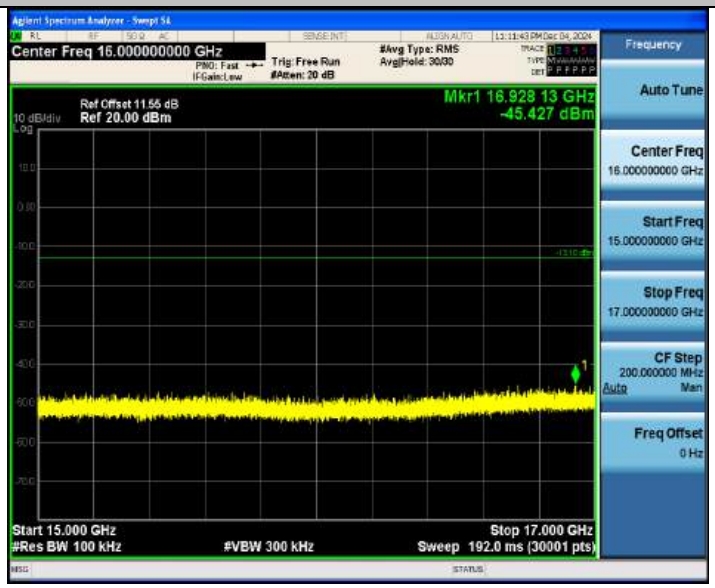


ZIGB_Ant1_2440_11000~13000

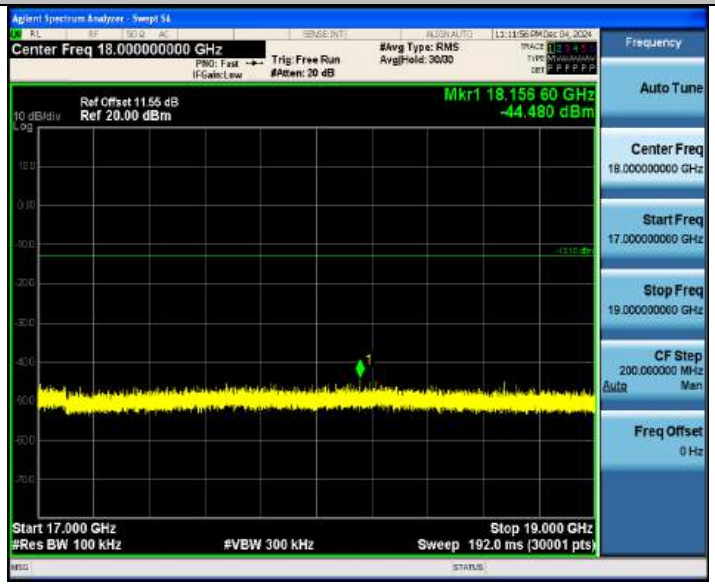


ZIGB_Ant1_2440_13000~15000

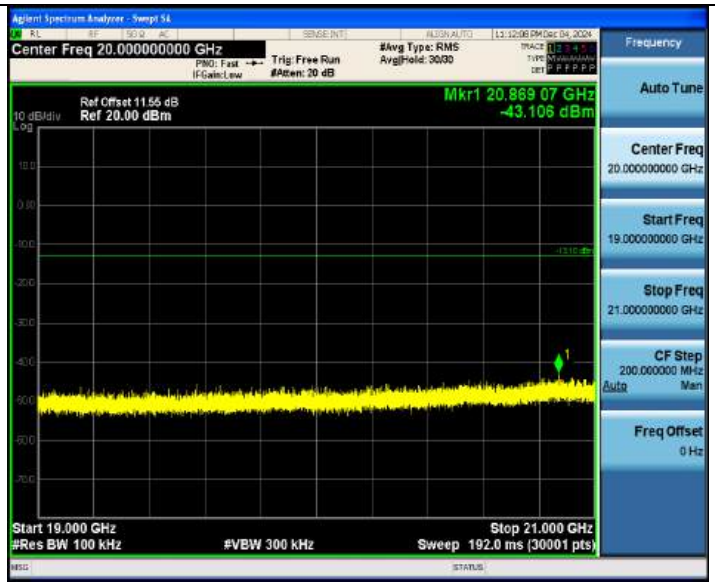
ZIGB_Ant1_2440_15000~17000



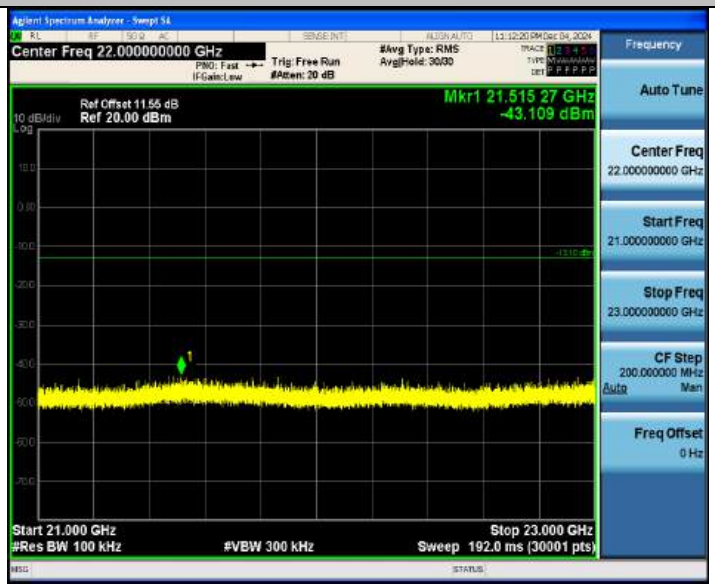
ZIGB_Ant1_2440_17000~19000



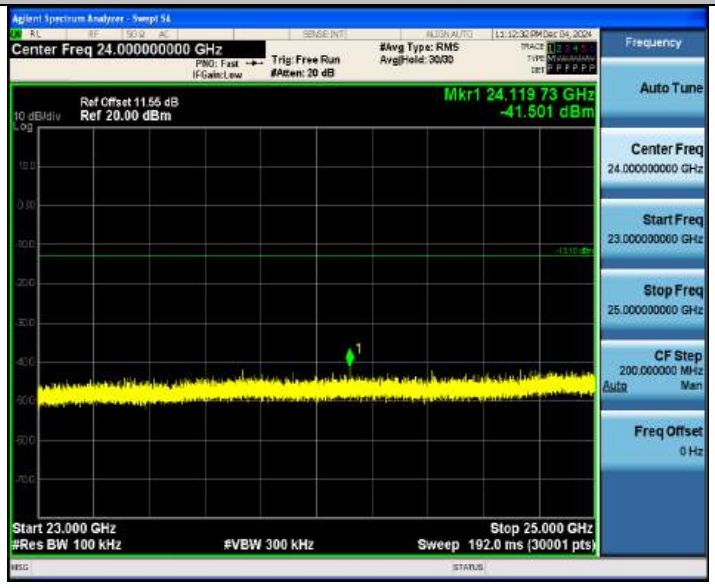
ZIGB_Ant1_2440_19000~21000



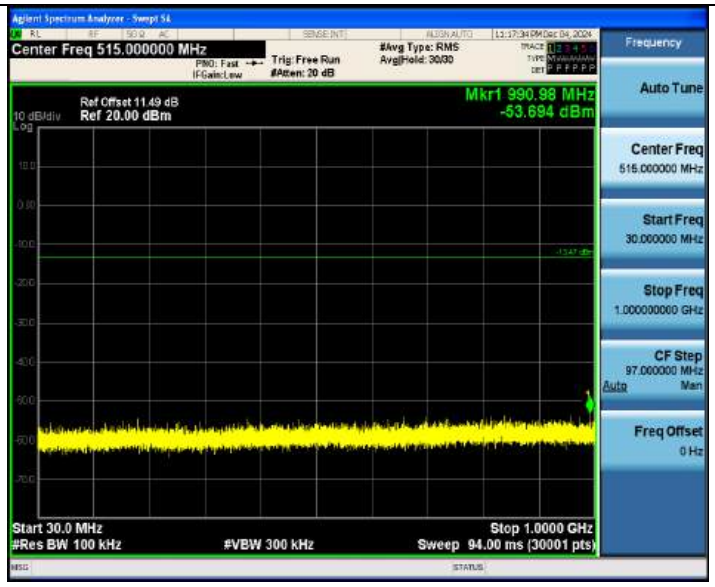
ZIGB_Ant1_2440_21000~23000



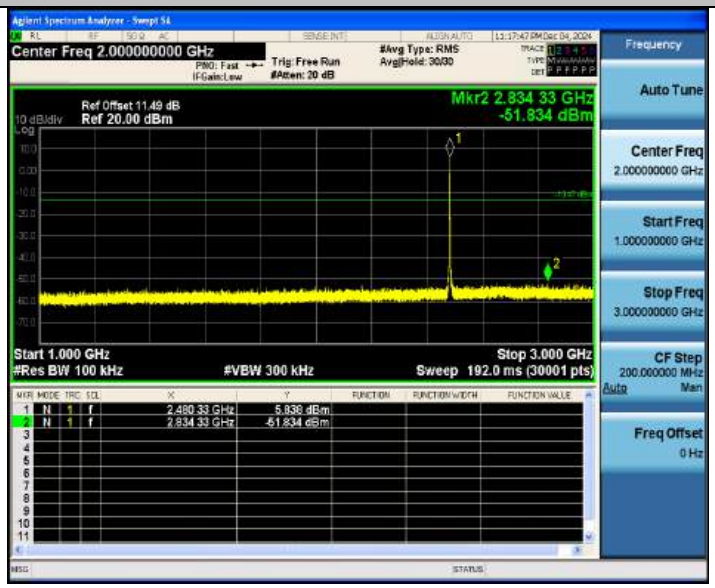
ZIGB_Ant1_2440_23000~25000



ZIGB_Ant1_2480_30~1000

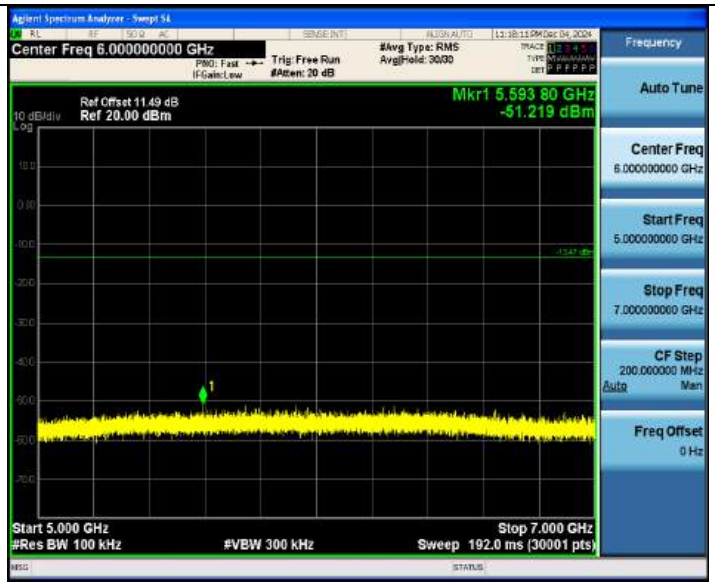


ZIGB_Ant1_2480_1000~3000

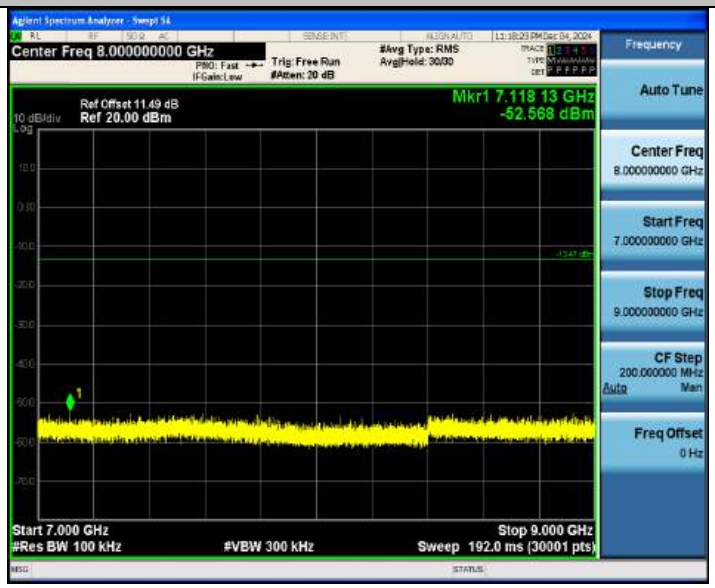


ZIGB_Ant1_2480_3000~5000

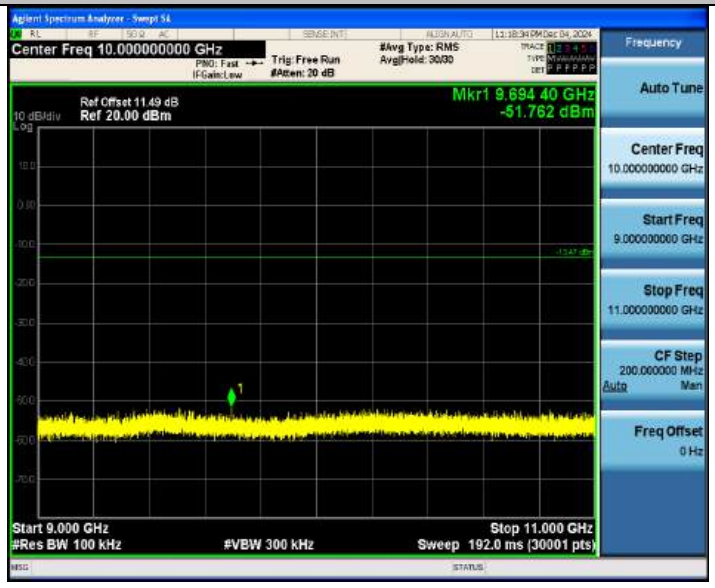
ZIGB_Ant1_2480_5000~7000



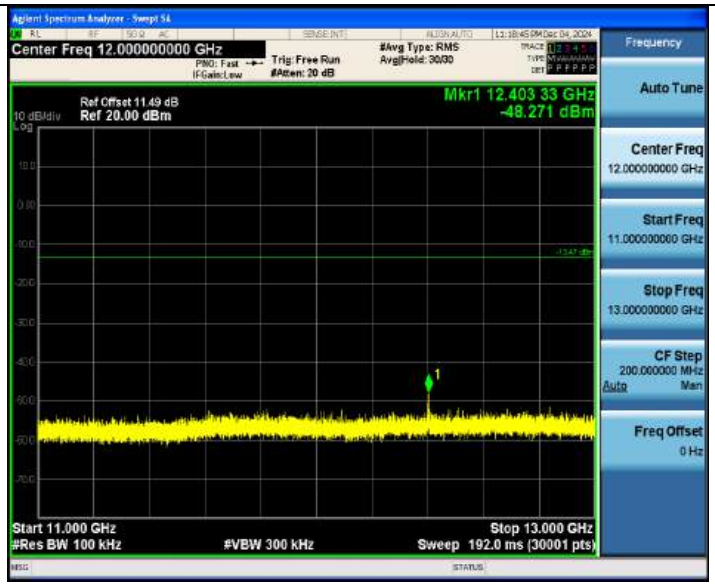
ZIGB_Ant1_2480_7000~9000



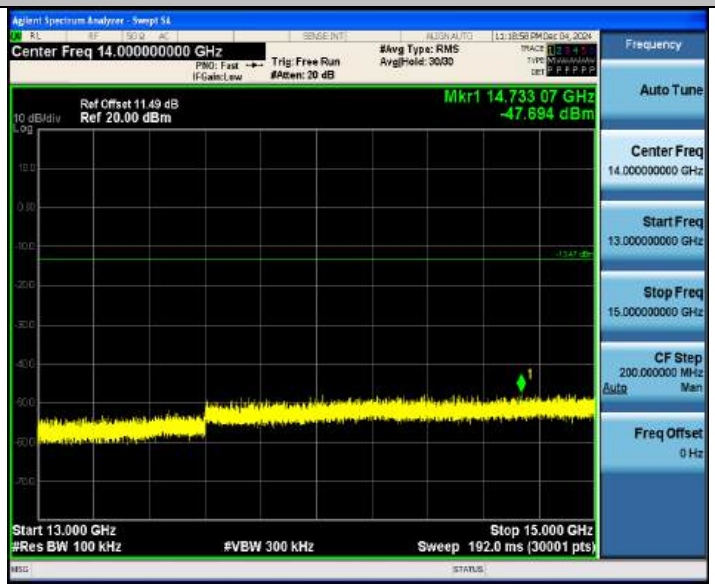
ZIGB_Ant1_2480_9000~11000



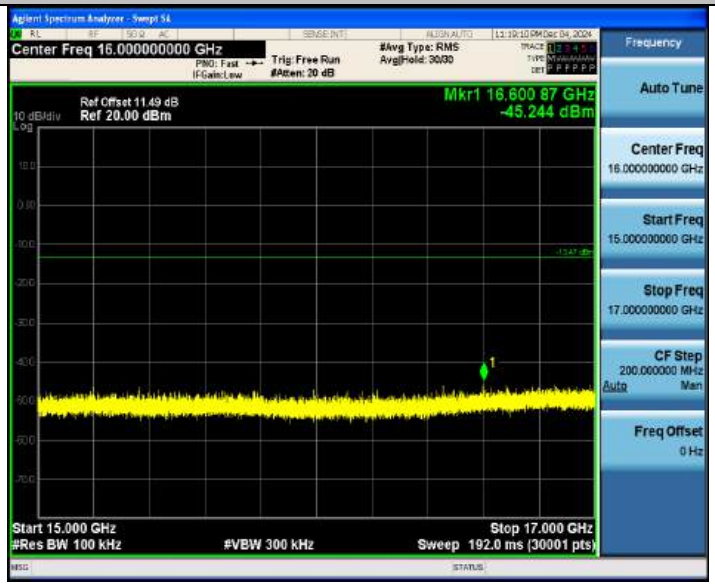
ZIGB_Ant1_2480_11000~13000



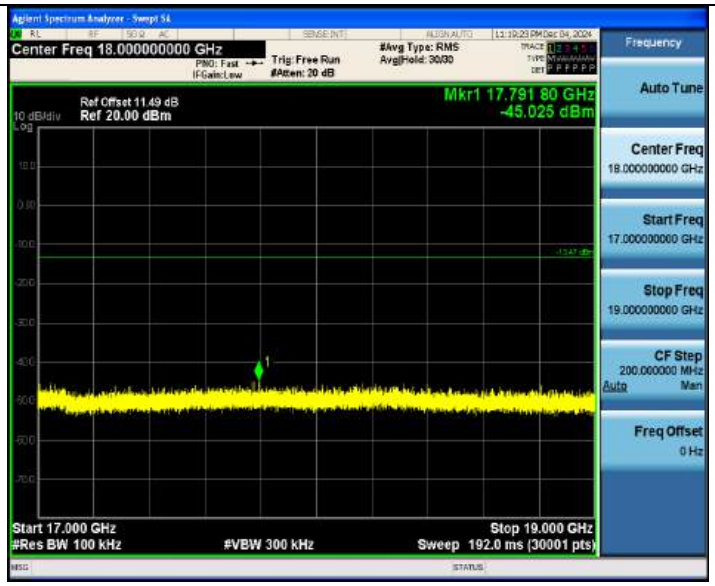
ZIGB_Ant1_2480_13000~15000



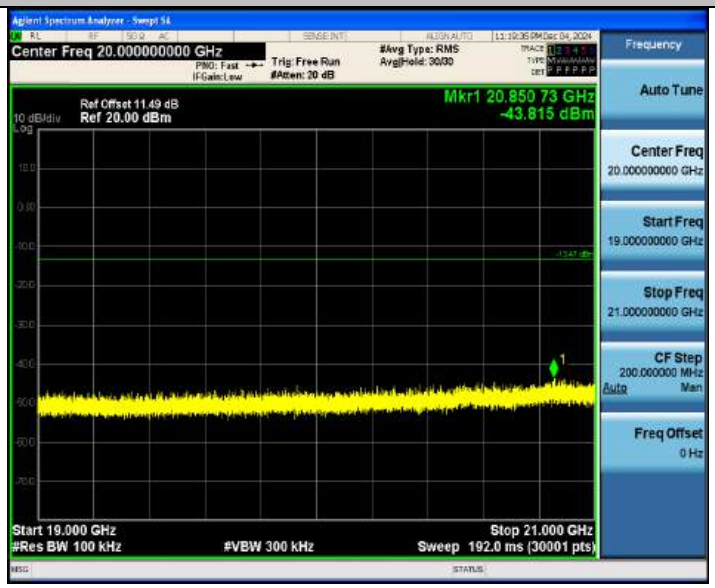
ZIGB_Ant1_2480_15000~17000



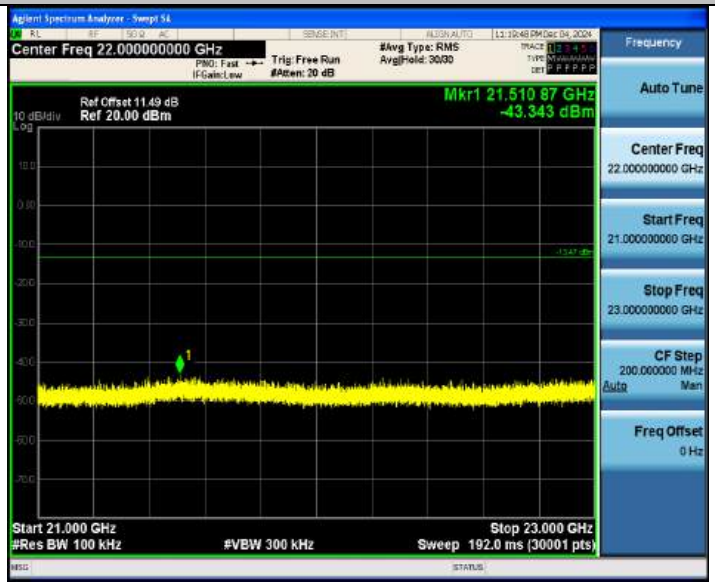
ZIGB_Ant1_2480_17000~19000



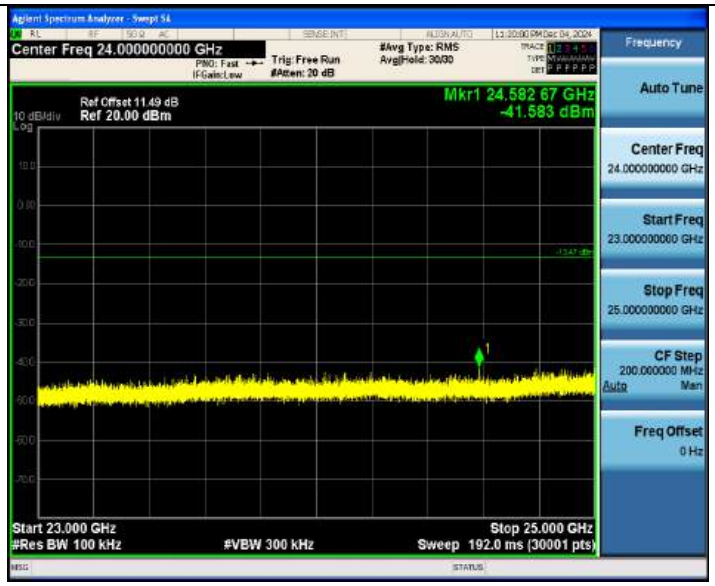
ZIGB_Ant1_2480_19000~21000



ZIGB_Ant1_2480_21000~23000



ZIGB_Ant1_2480_23000~25000


Agilent Spectrum Analyzer - Swept SA
Center Freq 24.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 30/30
Ref Offset 11.49 dB
10 dB/div
Ref 20.00 dBm
Mkr1 24.582 67 GHz
-41.583 dBm
Start 23.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 192.0 ms (30001 pts)
Frequency
Auto Tune
Center Freq
24.000000000 GHz
Start Freq
23.000000000 GHz
Stop Freq
25.000000000 GHz
CF Step
200.000000 MHz
Auto
Man
Freq Offset
0 Hz

Appendix G: Duty Cycle

TestMode	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit
ZIGB	2405	0.00	0.00	100	N/A
	2440	0.00	0.00	100	N/A
	2480	0.00	0.00	100	N/A

Test Graphs

ZIGB_Ant1_2405

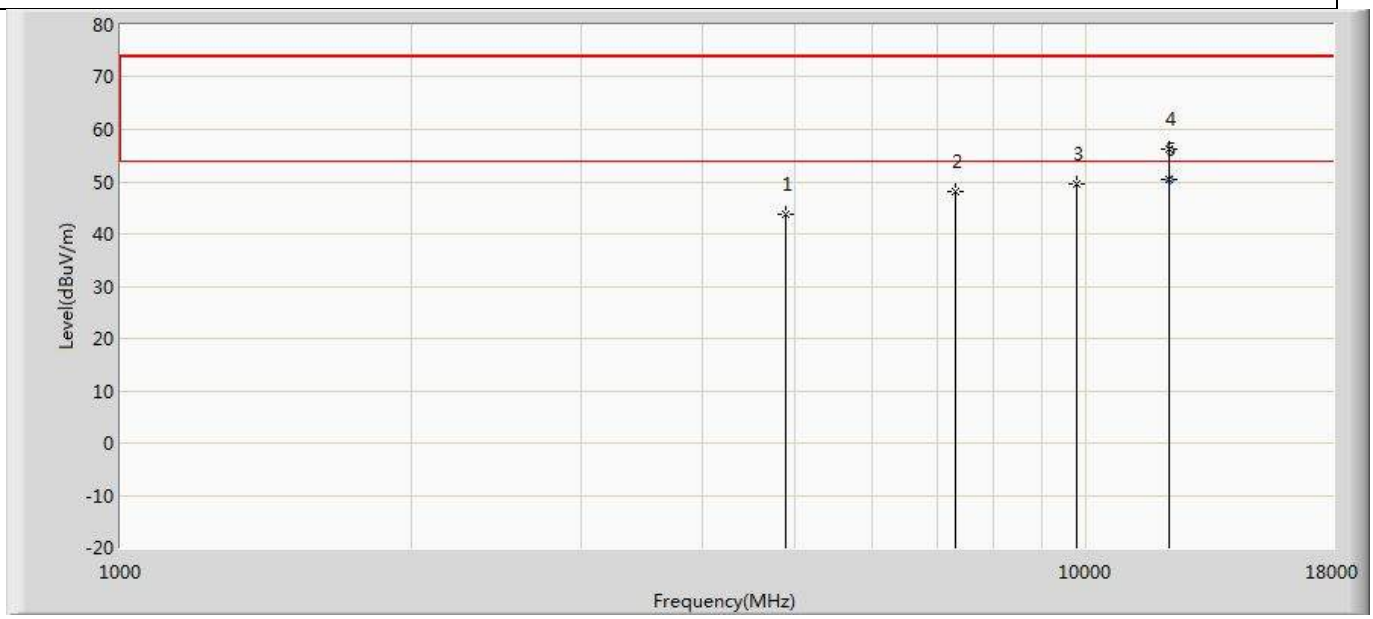
ZIGB_Ant1_2440

ZIGB_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Ref Offset 11.49 dB
10 dB/div
Ref 15.00 dBm
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 30.00 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz

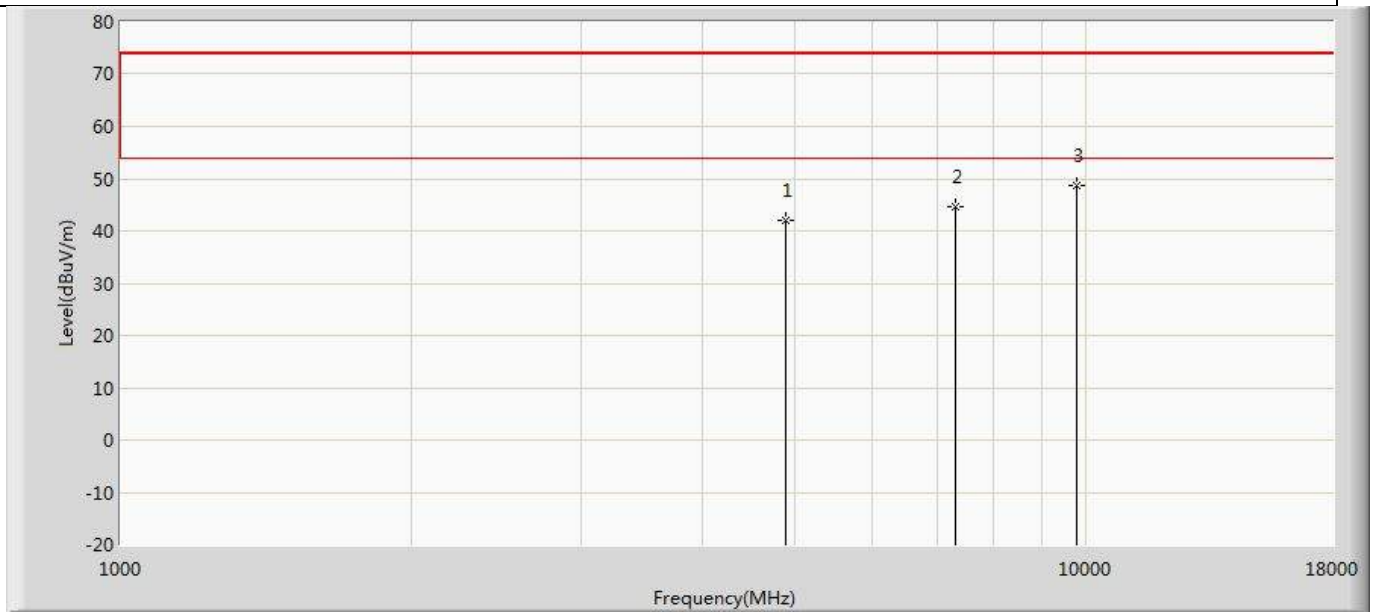
Appendix H: Emissions in Restricted Bands

Profile: 24B0863R	Page No.: 57
Engineer: Yu Liu	
Site: AC5	Time: 2024/12/10 - 22:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2440MHz by Zigbee	



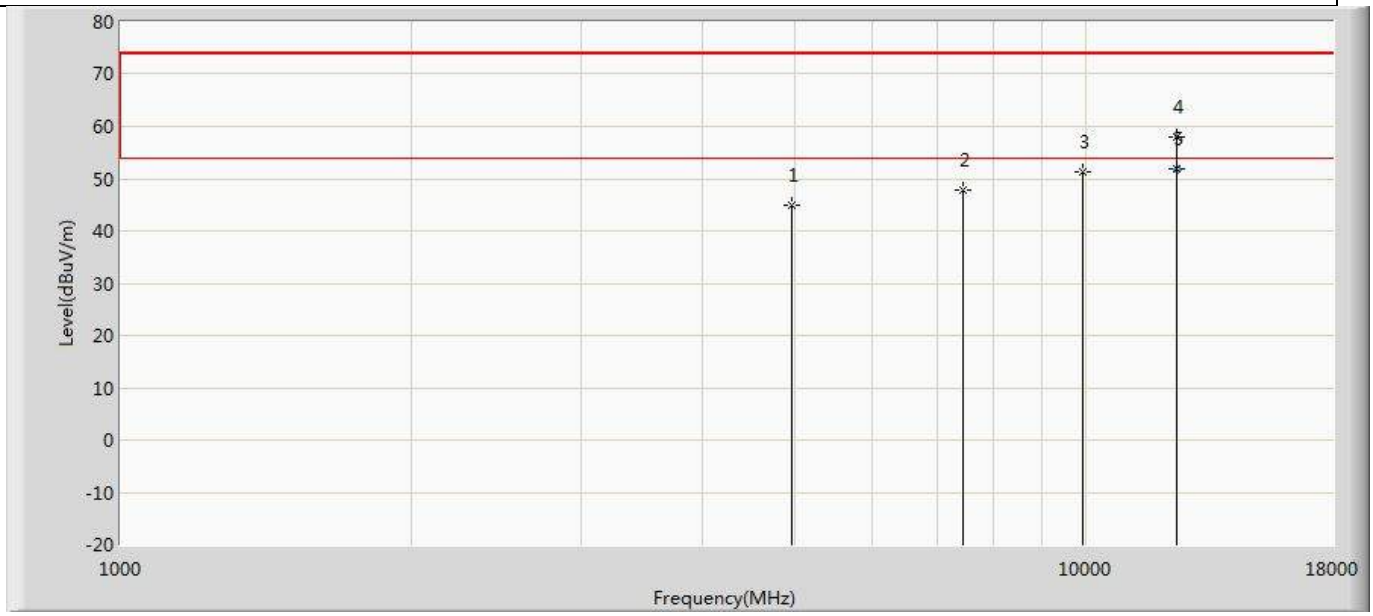
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	43.710	54.487	-30.290	74.000	-10.777	PK
2		7324.000	48.002	55.200	-25.998	74.000	-7.198	PK
3		9760.000	49.490	52.357	-24.510	74.000	-2.867	PK
4		12203.000	56.119	55.378	-17.881	74.000	0.741	PK
5	*	12203.000	50.392	49.651	-3.608	54.000	0.741	AV

Profile: 24B0863R	Page No.: 58
Engineer: Yu Liu	
Site: AC5	Time: 2024/12/10 - 22:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2440MHz by Zigbee	



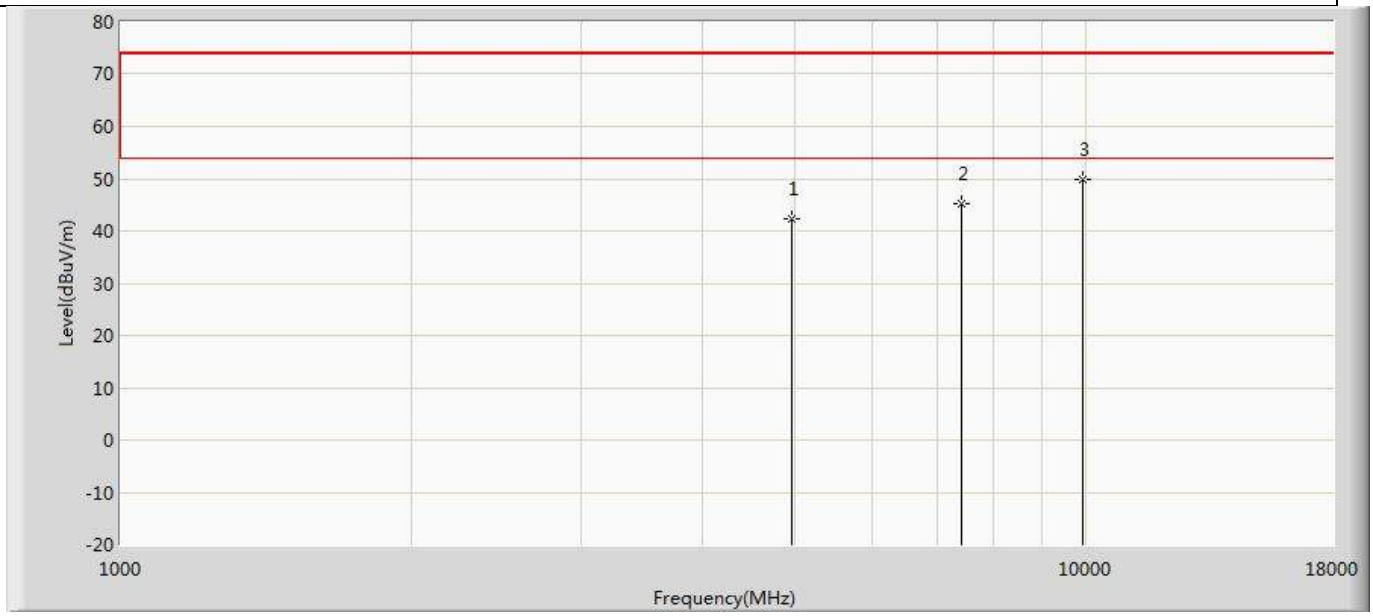
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	42.166	52.943	-31.834	74.000	-10.777	PK
2		7320.000	44.774	52.065	-29.226	74.000	-7.291	PK
3	*	9760.000	48.628	51.495	-25.372	74.000	-2.867	PK

Profile: 24B0863R	Page No.: 59
Engineer: Yu Liu	
Site: AC5	Time: 2024/12/10 - 22:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	44.849	55.736	-29.151	74.000	-10.888	PK
2		7443.000	47.957	55.045	-26.043	74.000	-7.088	PK
3		9920.000	51.382	53.247	-22.618	74.000	-1.865	PK
4		12407.000	57.867	55.005	-16.133	74.000	2.862	PK
5	*	12407.000	51.843	48.981	-2.157	54.000	2.862	AV

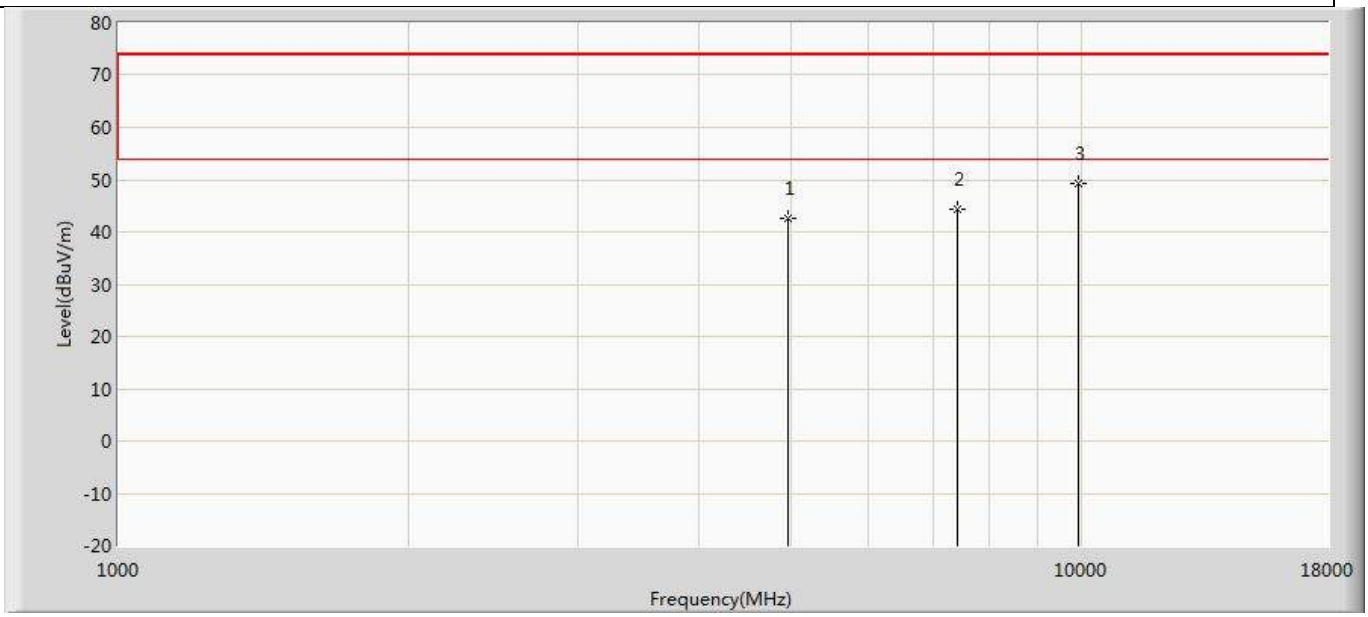
Profile: 24B0863R	Page No.: 60
Engineer: Yu Liu	
Site: AC5	Time: 2024/12/10 - 22:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055_(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	42.177	53.064	-31.823	74.000	-10.888	PK
2		7440.000	45.210	52.320	-28.790	74.000	-7.110	PK
3	*	9920.000	49.919	51.784	-24.081	74.000	-1.865	PK

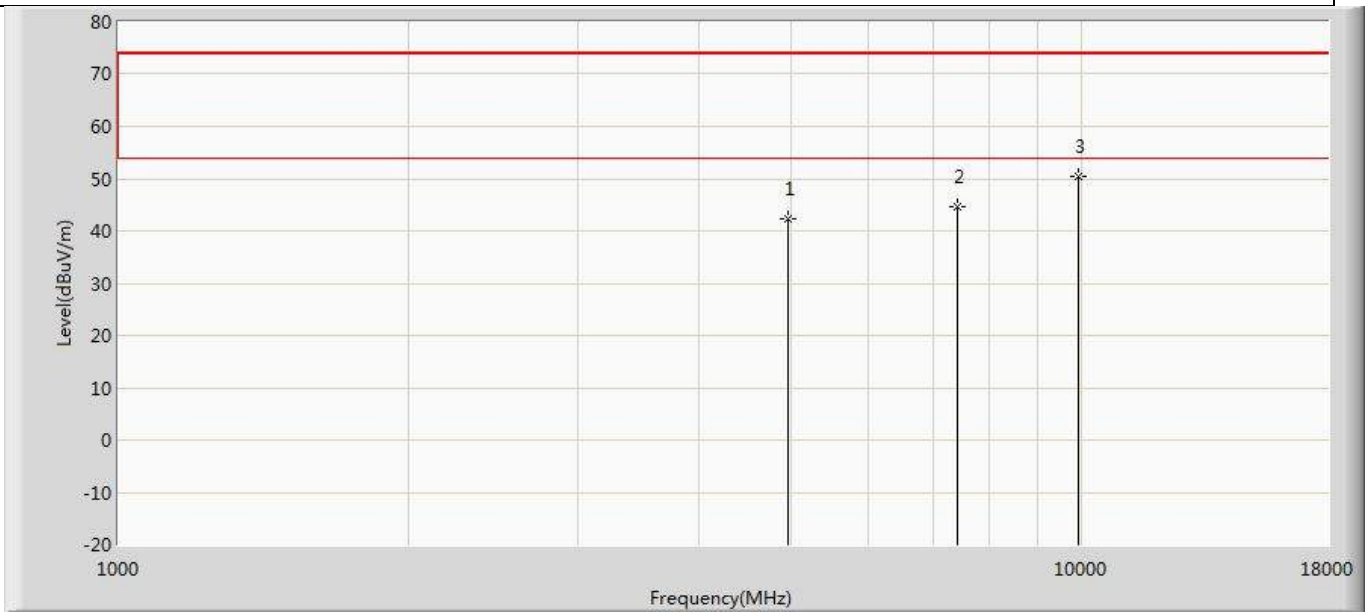
Alternative Capacitor:

Profile: 24B0863R	Page No.: 71
Engineer: Yu Liu	
Site: AC5	Time: 2024/12/10 - 15:57
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	42.723	53.429	-31.277	74.000	-10.707	PK
2		7440.000	44.265	51.044	-29.735	74.000	-6.779	PK
3	*	9920.000	49.376	51.198	-24.624	74.000	-1.821	PK

Profile: 24B0863R	Page No.: 72
Engineer: Yu Liu	
Site: AC5	Time: 2024/12/10 - 15:57
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1：Transmit at 2480MHz by Zigbee	

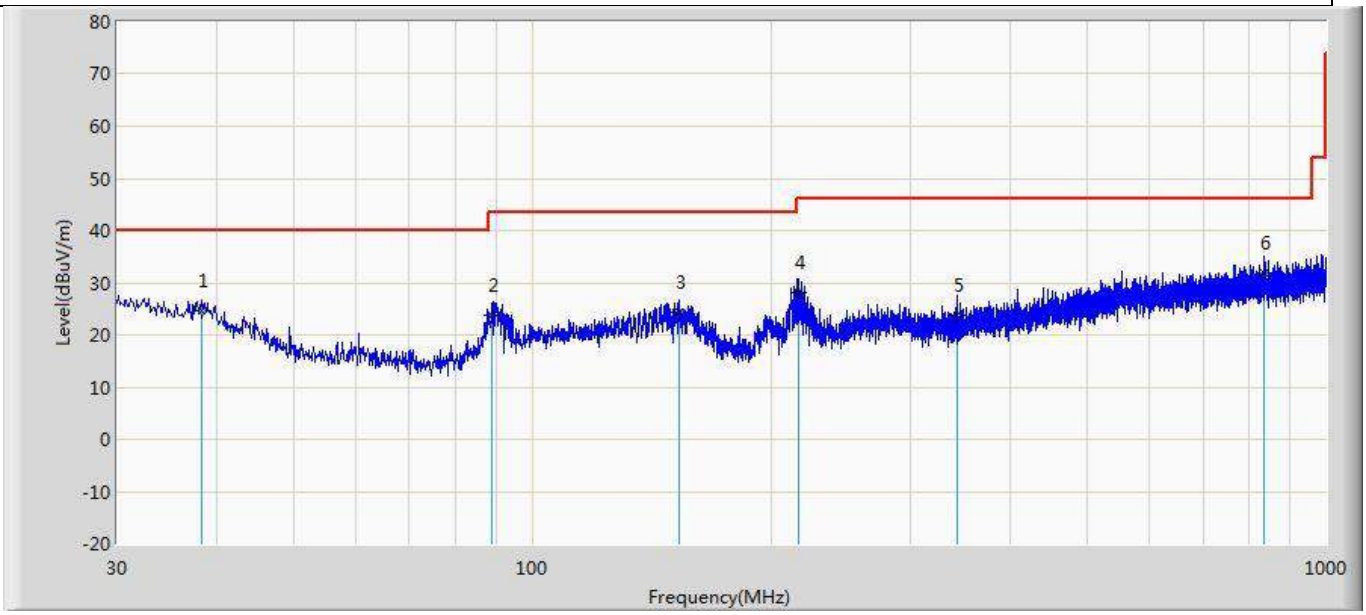


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	42.354	53.060	-31.646	74.000	-10.707	PK
2		7440.000	44.582	51.361	-29.418	74.000	-6.779	PK
3	*	9920.000	50.429	52.251	-23.571	74.000	-1.821	PK

Note:
1. Measured Level = Reading Level + Factor.
2. The test frequency range, 9kHz~30MHz, worst case are at least 20dB below the limits, therefore no data appear in the report.
3. The test frequency range, 18GHz~26GHz test result on peak is lower than average limit, all is the noise base, therefore no data appear in the report.
4. If the test result on peak is lower than average limit, then average measurement needn’t be performed.

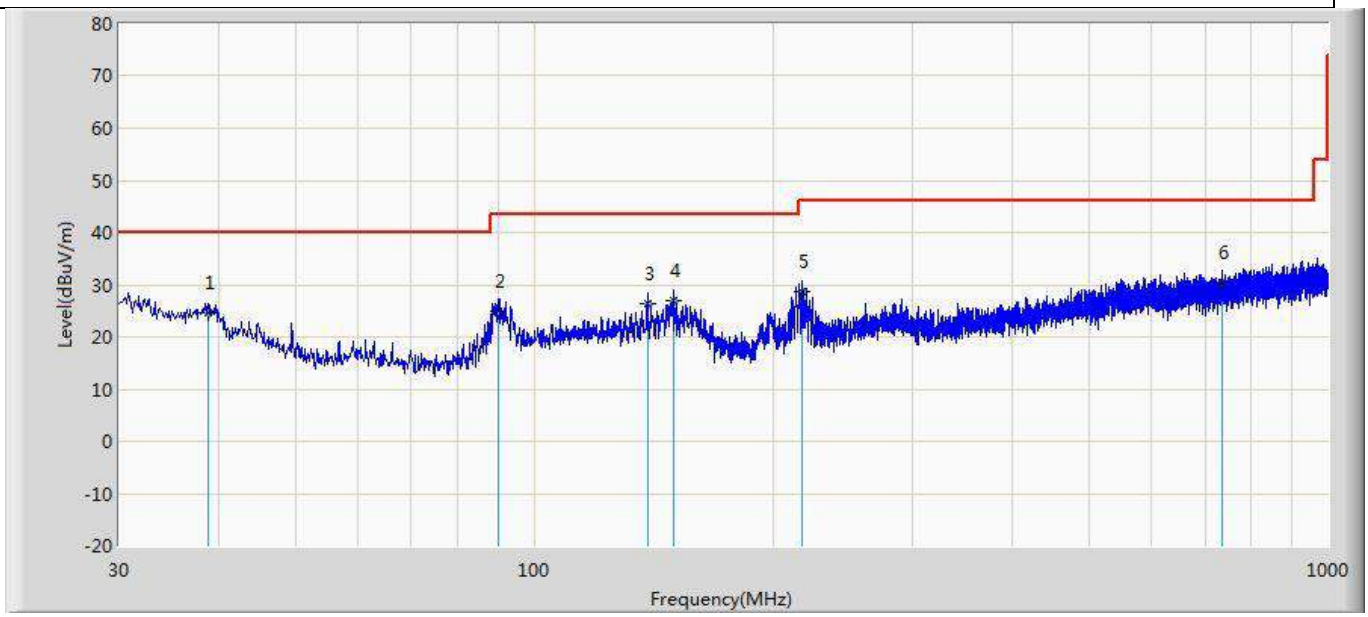
The worst case of Radiated Emission below 1GHz :

Profile: 24B0863R	Page No.: 15
Engineer: Yu Liu	
Site: AC2	Time: 2024/12/10 - 21:34
Limit: FCC_Part 15.209_RE (3m)_Class B	Margin: 0
Probe: CBL6112D_27613(30-1000MHz)	Polarity: Vertical
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1: :Transmit at 2405MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		38.366	24.530	4.068	-15.470	40.000	20.462	QP
2		89.049	23.658	7.992	-19.842	43.500	15.666	QP
3		153.432	24.322	7.056	-19.178	43.500	17.265	QP
4		216.119	28.125	11.654	-17.875	46.000	16.472	QP
5		342.582	23.877	2.116	-22.123	46.000	21.761	QP
6	*	835.464	31.978	2.643	-14.022	46.000	29.335	QP

Profile: 24B0863R	Page No.: 16
Engineer: Yu Liu	
Site: AC2	Time: 2024/12/10 - 21:36
Limit: FCC_Part 15.209_RE (3m)_Class B	Margin: 0
Probe: CBL6112D_27613(30-1000MHz)	Polarity: Horizontal
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1: :Transmit at 2405MHz by Zigbee	

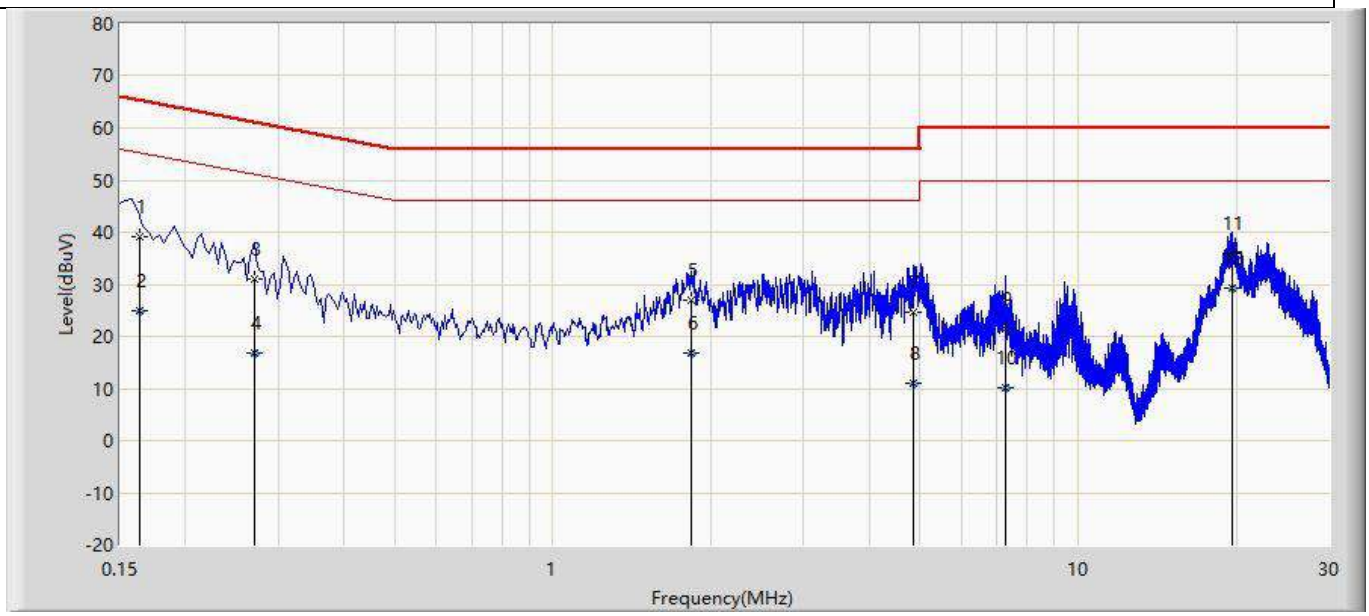


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	38.851	24.632	4.441	-15.368	40.000	20.192	QP
2		90.261	25.012	9.063	-18.488	43.500	15.950	QP
3		138.883	26.353	7.992	-17.147	43.500	18.361	QP
4		149.553	27.018	9.561	-16.482	43.500	17.457	QP
5		217.937	28.560	12.065	-17.440	46.000	16.495	QP
6		736.888	30.387	2.113	-15.613	46.000	28.274	QP

Note:
1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp)
3. The test frequency range, 18GHz~40GHz test result on peak is lower than average limit, all is the noise base, therefore no data appear in the report.

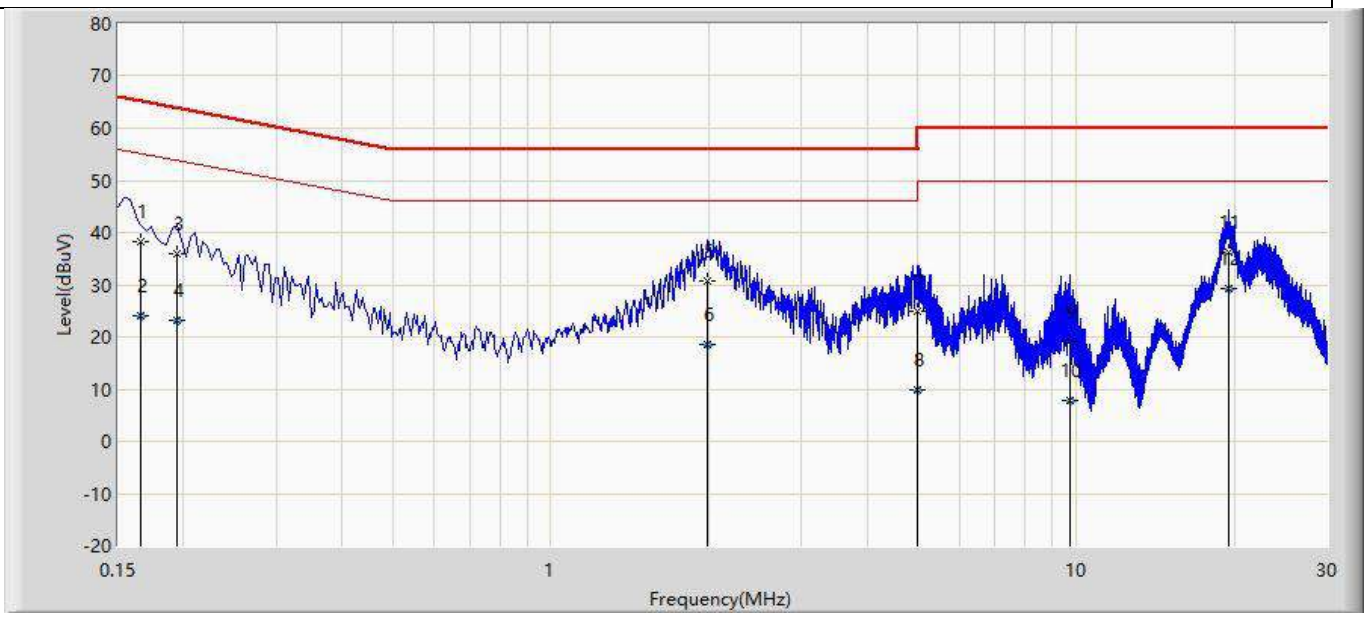
Appendix I: AC Power Line Conducted Emission

Profile: 24B0863R	Page No.: 1
Engineer: Yu Liu	
Site: TR1	Time: 2024/12/10 - 23:09
Limit: FCC_Part 15.207	Margin: 0
Probe: ENV216_101189(0.009-30MHz)	Polarity: Line
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1: Transmit at 2405MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.164	39.113	29.489	-26.130	65.242	9.623	QP
2		0.164	24.952	15.328	-30.291	55.242	9.623	AV
3		0.270	30.944	21.318	-30.174	61.118	9.626	QP
4		0.270	16.758	7.132	-34.359	51.118	9.626	AV
5		1.834	26.970	17.279	-29.030	56.000	9.691	QP
6		1.834	16.703	7.012	-29.297	46.000	9.691	AV
7		4.862	24.765	15.008	-31.235	56.000	9.757	QP
8		4.862	11.073	1.316	-34.927	46.000	9.757	AV
9		7.274	21.401	11.580	-38.599	60.000	9.821	QP
10		7.274	10.087	0.266	-39.913	50.000	9.821	AV
11		19.634	36.042	25.843	-23.958	60.000	10.199	QP
12	*	19.634	29.140	18.941	-20.860	50.000	10.199	AV

Profile: 24B0863R	Page No.: 2
Engineer: Yu Liu	
Site: TR1	Time: 2024/12/10 - 23:13
Limit: FCC_Part 15.207	Margin: 0
Probe: ENV216_101189(0.009-30MHz)	Polarity: Neutral
EUT: LED Lamp	Power: 120 Vac / 60 Hz
Note: Mode 1: Transmit at 2405MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.166	38.159	28.529	-27.014	65.174	9.631	QP
2		0.166	24.170	14.539	-31.004	55.174	9.631	AV
3		0.194	35.972	26.340	-27.891	63.864	9.632	QP
4		0.194	23.068	13.436	-30.796	53.864	9.632	AV
5		1.990	30.828	21.134	-25.172	56.000	9.695	QP
6		1.990	18.663	8.968	-27.337	46.000	9.695	AV
7		4.982	24.951	15.181	-31.049	56.000	9.770	QP
8		4.982	9.767	-0.003	-36.233	46.000	9.770	AV
9		9.702	19.235	9.352	-40.765	60.000	9.883	QP
10		9.702	7.820	-2.063	-42.180	50.000	9.883	AV
11		19.542	36.324	26.273	-23.676	60.000	10.051	QP
12	*	19.542	29.342	19.291	-20.658	50.000	10.051	AV

Note:
1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp)
3. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.

The End