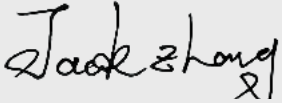


Test report No:
21C0881R-RF-US-P06V01

FCC TEST REPORT

Product Name	Arella 400
TradeMark	N/A
Model and /or type reference	JY-1305ATXG
FCC ID	QH67115952RV3
Applicant's name / address	Bell Sports Inc. 555 SCOTTS VALLEY DRIVE,SCOTTS VALLEY,CA 95066.
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10: 2013 KDB558074 D01v05r02
Verdict Summary	IN COMPLIANCE
Documented By (name / position & signature)	Tim Cao/ Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2022-08-28
Report Version	V1.1
Report template No	Template_FCC Part 15C-RF-V1.0

INDEX

page

INDEX	2
COMPETENCES AND GUARANTEES	4
GENERAL CONDITIONS	4
ENVIRONMENTAL CONDITIONS	4
POSSIBLE TEST CASE VERDICTS	5
ABBREVIATIONS	5
DOCUMENT HISTORY	6
REMARKS AND COMMENTS	6
USED EQUIPMENT	7
UNCERTAINTY	9
1 GENERAL INFORMATION	10
1.1 General Description of the Item(s)	10
1.2 Antenna Information	11
1.3 Channel List	12
2 DESCRIPTION OF TEST SETUP	13
2.1 Operating mode(s) used for tests	13
2.2 Support / Auxiliary equipment / unit / Test software for the EUT	13
2.3 Test Configuration / Block diagram used for tests	14
2.4 Testing process	15
3 VERDICT SUMMARY SECTION	16
3.1 Standards	16
3.2 Deviation(s) from the Standard(s) / Test Specification(s)	16
3.3 Overview of results	17
3.4 Test Facility	18
4 TEST RESULTS	19
4.1 Emissions in restricted frequency bands	18
4.2 Emissions in non-restricted frequency band	31
4.3 Radiated Emission Band Edge	33
4.4 DTS Bandwidth	44
4.5 Fundamental emission output power	46
4.6 Power Density Antenna Requirement	49
4.7 Antenna Requirement	51



5	TEST SETUP PHOTO AND EUT PHOTO	52
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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 PEUT: Handheld Thermal Binoculars Suzhou, 215006, P.R. China
Date(receive sample)	May. 23, 2022
Date (start test)	May. 25, 2022
Date (finish test)	Jun. 23, 2022

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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
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
Tx	: Transmitter
Rx	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
21C0881R-RF-US-P06V01	V1.0	Initial issue of report.	2022-08-18
21C0881R-RF-US-P06V01	V1.1	Modify the error section in the report, V1.0 is outdated.	2022-08-28

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 Part 15 Subpart C Paragraph 15.247, RSS-Gen Issue 5, RSS-247 Issue 2.
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 Information;
 - Chapter 1.3 Data Rate;
 - Chapter 1.4 Channel List.

USED EQUIPMENT

Emissions in non-restricted frequency bands/ Occupied Bandwidth/ Fundamental emission output power Power Spectral Density / TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2021.07.11	2022.07.10
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2022.03.19	2023.03.18
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2021.07.11	2022.07.10
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2022.03.30	2023.03.29
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2021.07.09	2022.07.08

Radiated Emission(30MHz-1GHz) / AC3

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100176	2021.08.15	2022.08.14
Loop Antenna	R&S	HFH2-Z2	100548	2021.12.13	2022.12.12
Bilog Antenna	Teseq GmbH	CBL6112D	27613	2021.08.23	2022.08.22
Coaxial Cable	Huber+Suhner	RG 214	AC3-C	2022.03.30	2023.03.29
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2021.11.23	2022.11.22
Dekra test software	Dekra	-	-	-	-

Radiated Emission / AC5(1GHz-40GHz)

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2022.03.19	2023.03.18
Amplifier	Keleto	LNPA	SK20190225	2021.09.26	2022.09.25
Pre-Amplifier	EMCI	EMC184045SE	980263	2022.05.21	2023.05.20
DRG Horn Antenna	ETS-Lindgren	3117	167055	2021.08.06	2022.08.05
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2022.04.18	2023.04.17
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2022.03.30	2023.03.29
Coaxial Cable	ROSENBERGER	LA1-C011-2000/3000	AC5-40G	2022.03.19	2023.03.18

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: 2.80dB 150kHz~30MHz: 2.40dB
Peak Power Output	± 1.27 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 3.50 dB 300MHz~1GHz: 3.60 dB Vertical: 30MHz~200MHz: 3.60 dB 300MHz~1GHz: 3.50 dB
Radiated Emission(1GHz~26.5GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB
RF antenna conducted test	± 1.27 dB
Radiated Emission Band Edge	± 3.9 dB
DTS Bandwidth	± 150 Hz
Occupied Bandwidth	± 1 kHz
Power Density	± 1.27 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name.....:	Arella 400
Model No.....:	JY-1305ATXG
FCC ID	QH67115952RV3
Hardware Version	V1.0
Software Version	V1.0
Manufacturer.....:	Jiashan Shengguang Electronics Co., LTD.
Manufacturer address.....:	No.1919 Jiashan Dadao, Jiashan, Zhejiang, China 314113

Operating frequency range(s).....:	2400~2483.5MHz
Type of modulation	ACK
Number of channel	3
Operating Temperature Range	0℃~40℃

Rated power supply	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☐	AC: 100 - 240 V, 50/60 Hz
	☐	DC: 3 Vdc
	☒	Battery: 3.0 V
	☐	Adapter: 5 V

1.2 Antenna Information

Antenna model / type number.....:	N/A			
Antenna serial number.....:	N/A			
Antenna Delivery	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others:.....		
Antenna technology	☒	SISO		
	☐	MIMO	☐	Basic
			☐	CDD
			☐	Sectorized
			☐	Beam-forming
Antenna Type	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	PIFA
			☒	PCB
			☐	Ceramic Chip
			☐	Metal Antenna
Antenna Gain.....:	0 dBi			

1.3 Channel List

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
001	2402 MHz	002	2440 MHz	003	2478 MHz	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Note: The General Description of the Item(s), antenna information, Data Rate and Channel List 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.

	Mode 1: Transmit by ACK
--	-------------------------

2.2 Support / Auxiliary equipment / unit / Test software for the EUT

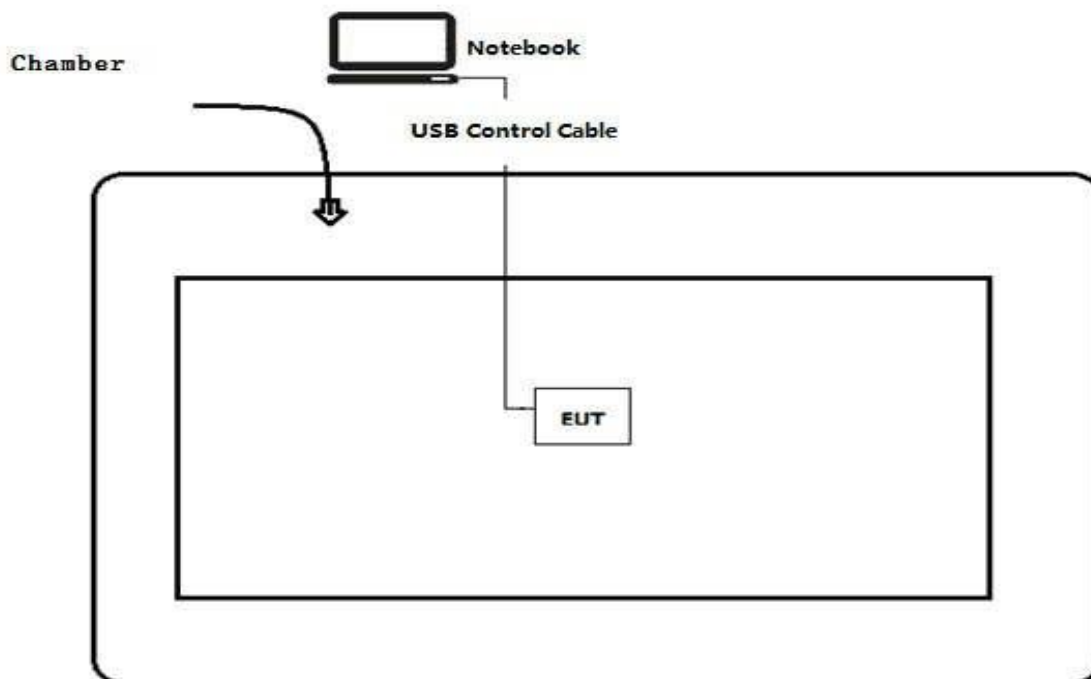
The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
Notebook	Think pad x220	Lenovo	Adapter
Software	Type / Version	Manufacturer	Supplied by
IPOP	4.1	N/A	N/A

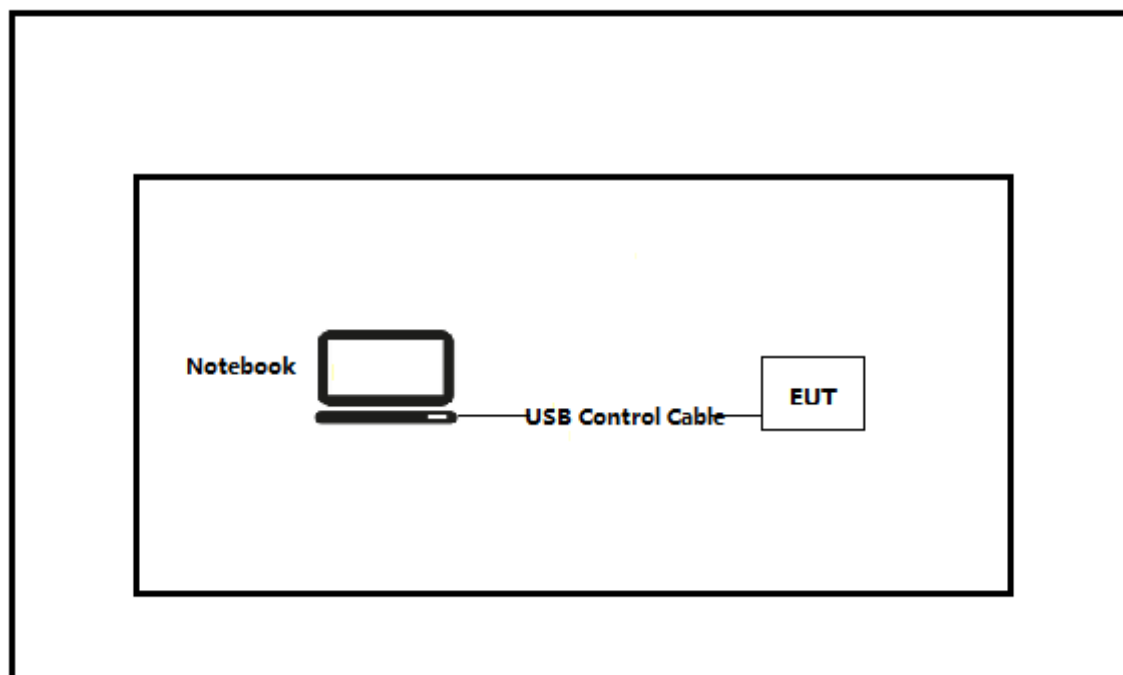
2.3 Test Configuration / Block diagram used for tests

The following test setup / configuration / block diagram has been used during the tests:

Test setup Diagram- Radiated Test



Test setup Diagram- Conducted test



2.4 Testing process

1	Setup the EUT as shown in Section 2.3.
2	Execute the [IPOP] 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
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2021	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
KDB 558074 D01V05r02	2019	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247

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 case	Basic standard(s)	Verdict	ReMark
Emissions in restricted frequency bands	FCC 15.247(d), 15.209	PASS	---
Emissions in non-restricted frequency bands	FCC 15.247(d)	PASS	---
Radiated Emission Band Edge	FCC 15.247(d), 15.209	PASS	---
Fundamental emission output power	FCC 15.247(b)(3)	PASS	---
DTS Bandwidth	FCC 15.247(a)(2)	PASS	---
Power Spectral Density	FCC 15.247(e)	PASS	---
Antenna Requirement	FCC 15.203	PASS	---

3.4 Test Facility

USA : FCC Designation Number: CN1199

4 TEST RESULTS

4.1 Emissions in restricted frequency bands	VERDICT: PASS
--	----------------------

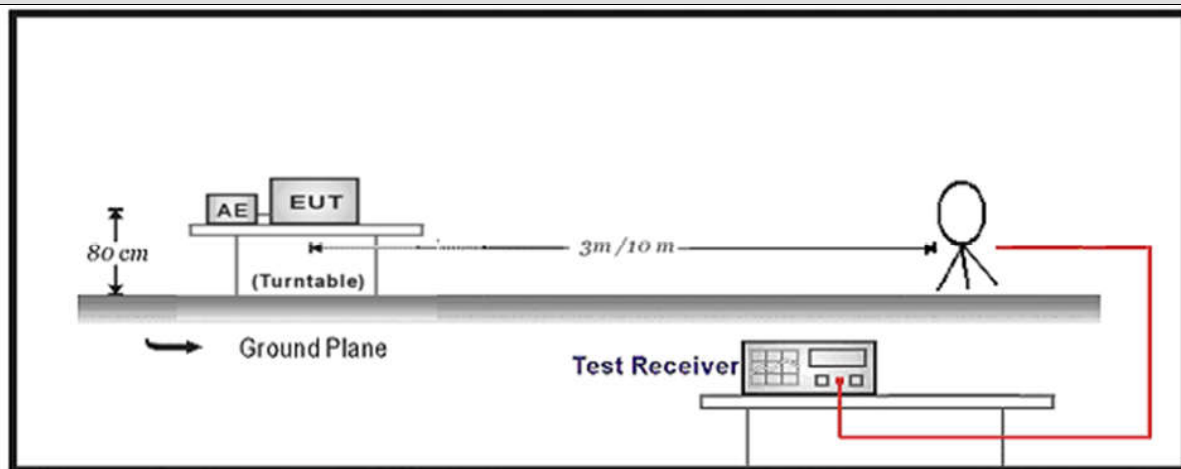
4.1.1 Limit			
Standard		FCC Part 15 Subpart C Paragraph 15.205; 15.209	
Restricted Bands of operation for FCC			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	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	Above 38.6
13.36 – 13.41	--	--	--
Restricted Band Emissions Limit			
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)

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).

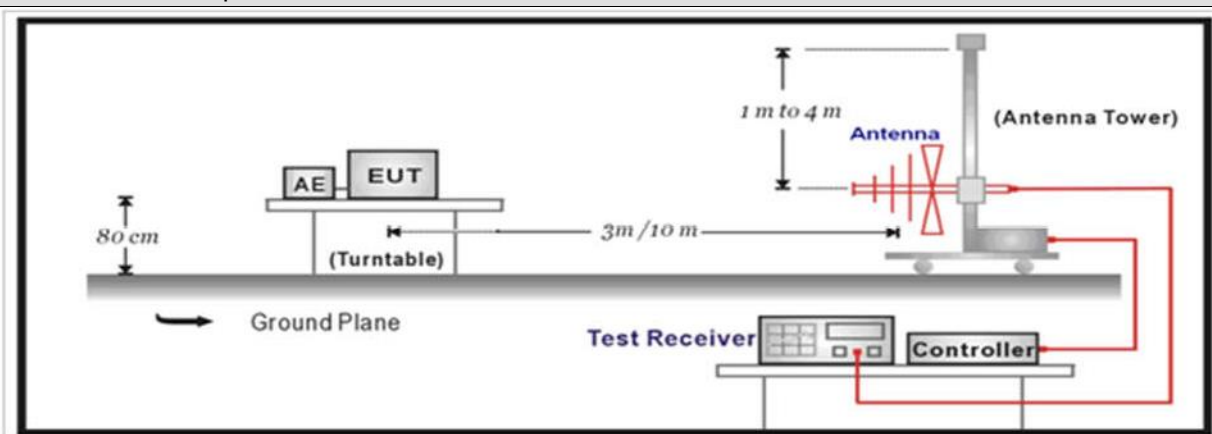
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated 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).

4.1.2 Test Setup

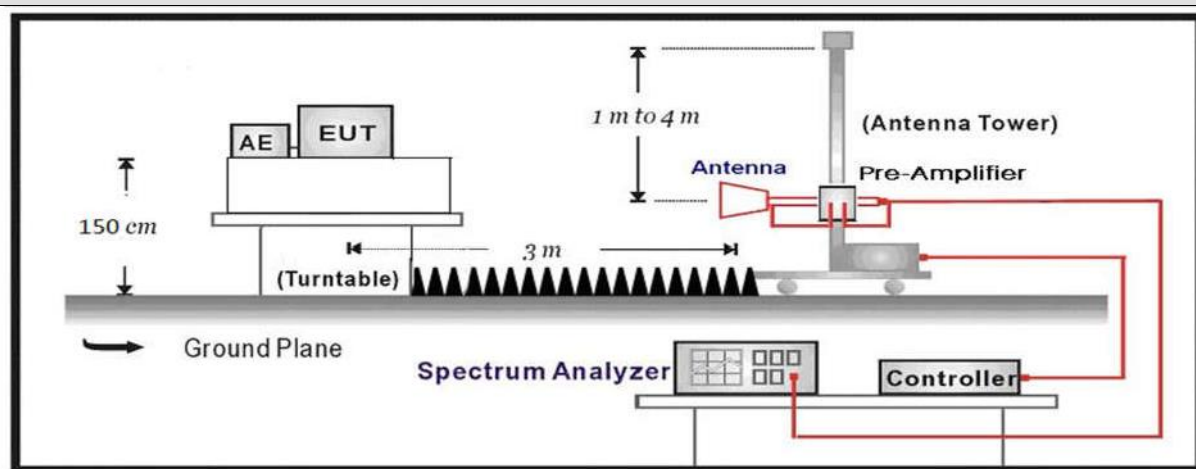
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:

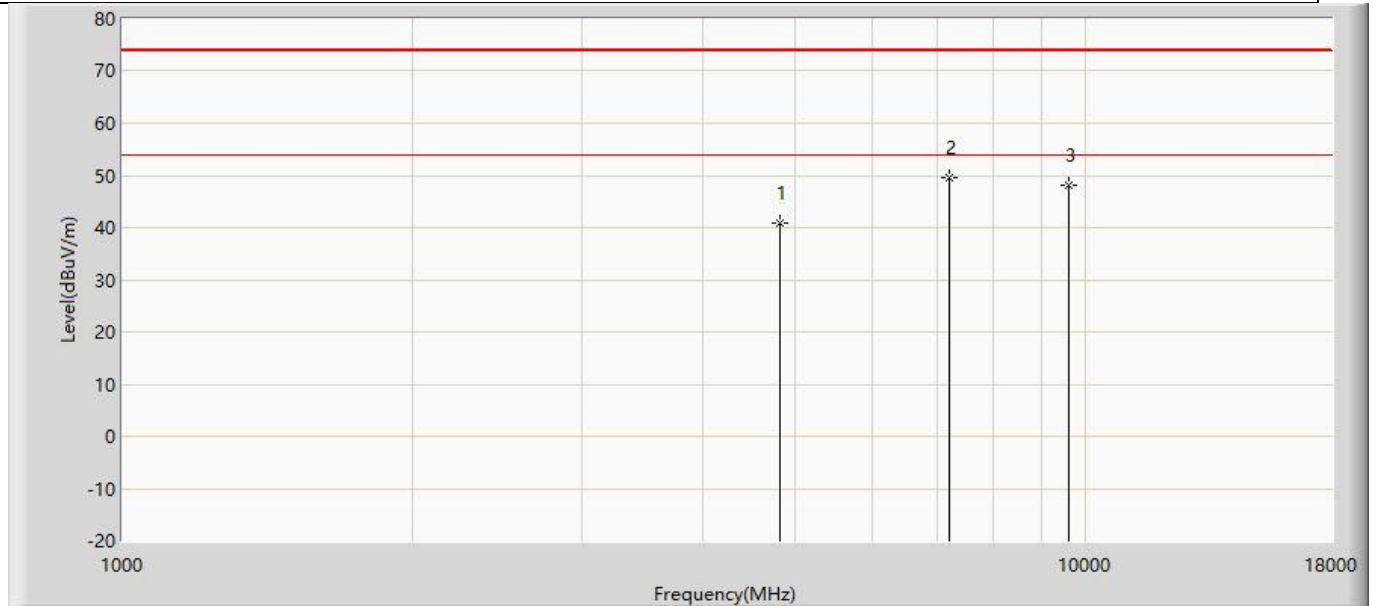


4.1.3 Test Procedure

	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	6.3	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
	☐	ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
		ANSI C63.10	11.12.2.4	Peak power measurement procedure
		ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
		ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
		ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

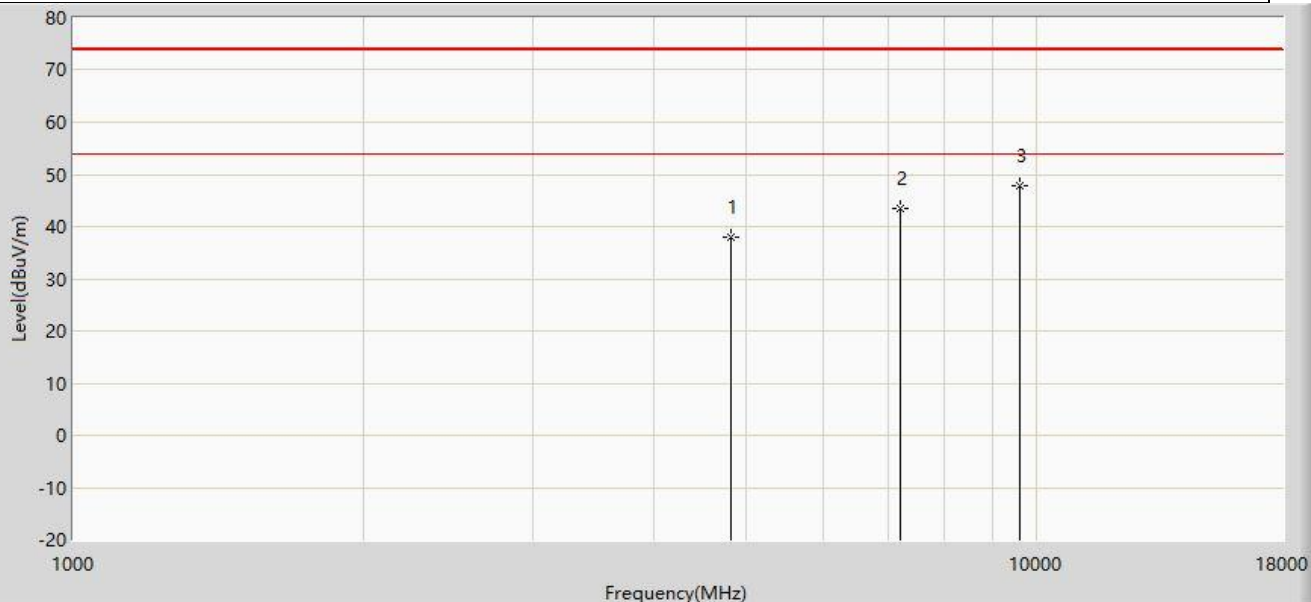
4.1.4 Test Data

Profile: 21C0881R	Page No.: 7
Engineer: Pengchengyang	
Site: AC5	Time: 2022/06/17 - 21:14
Limit: 15.209-1	Margin: 0
Probe: FCC_ANT-1-18G	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2402MHz	



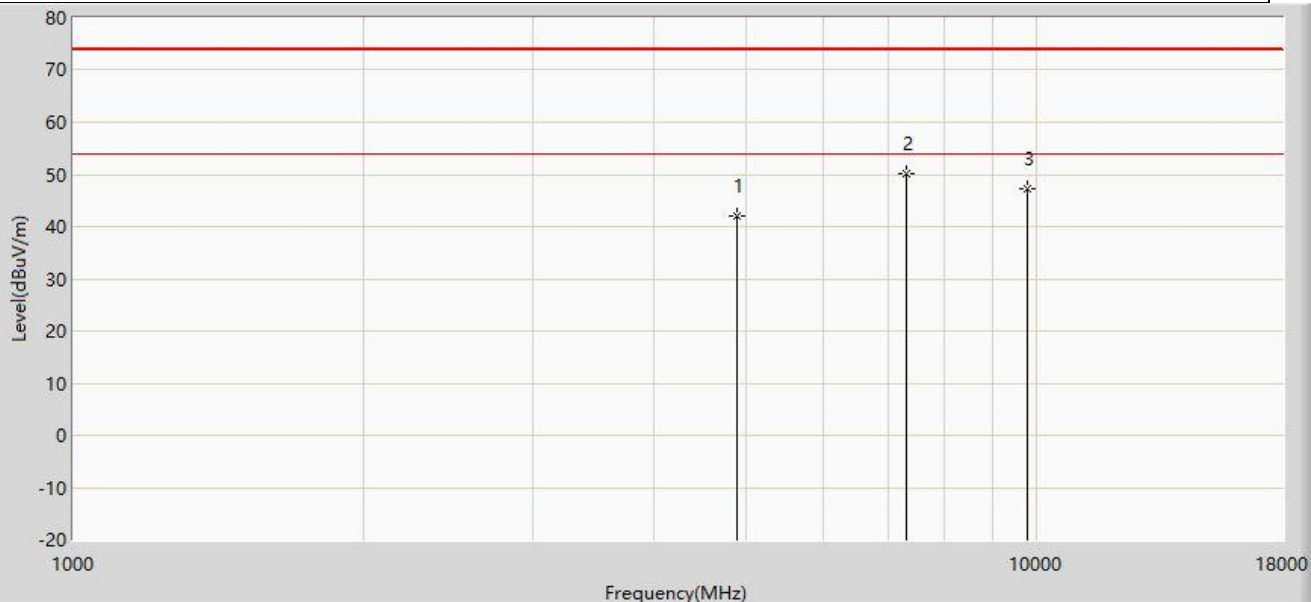
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	40.763	55.419	-33.237	74.000	-14.656	PK
2	*	7206.000	49.625	58.365	-24.375	74.000	-8.740	PK
3		9608.000	48.199	53.038	-25.801	74.000	-4.839	PK

Profile: 21C0881R	Page No.: 8
Engineer: Pengchengyang	
Site: AC5	Time: 2022/06/17 - 21:14
Limit: 15.209-1	Margin: 0
Probe: FCC_ANT-1-18G	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2402MHz	



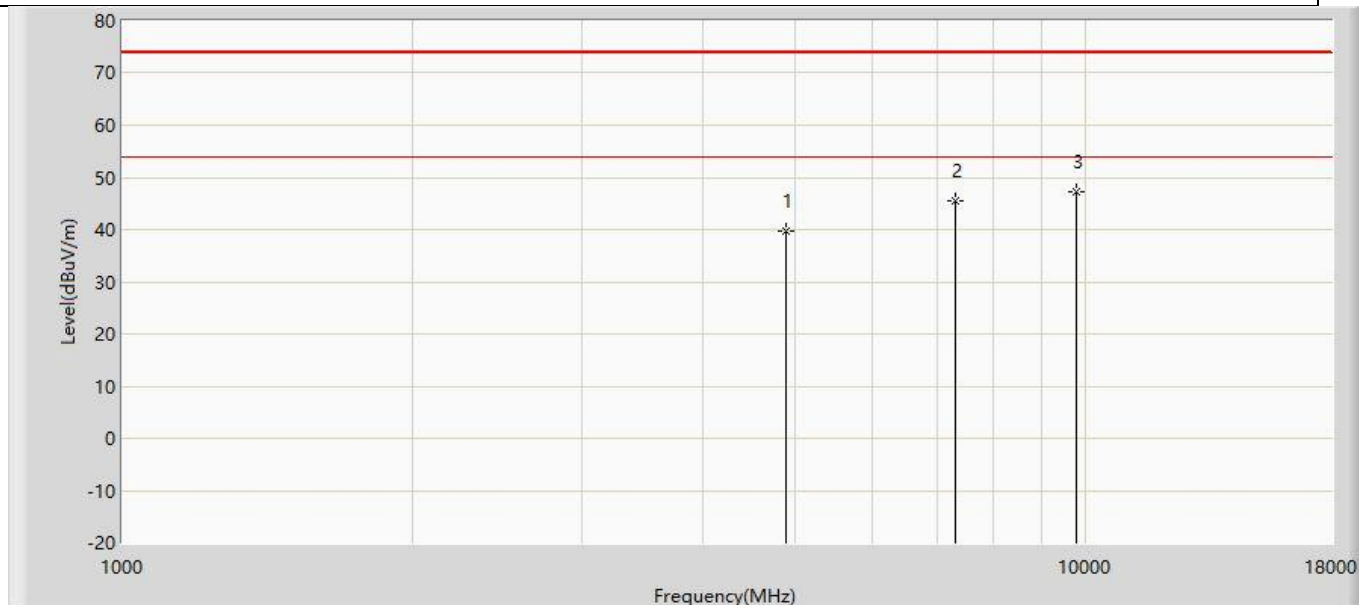
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	37.910	52.566	-36.090	74.000	-14.656	PK
2		7206.000	43.449	52.154	-30.551	74.000	-8.705	PK
3	*	9608.000	47.908	52.747	-26.092	74.000	-4.839	PK

Profile: 21C0881R	Page No.: 9
Engineer: Pengchengyang	
Site: AC5	Time: 2022/06/17 - 21:15
Limit: 15.209-1	Margin: 0
Probe: FCC_ANT-1-18G	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2440MHz	



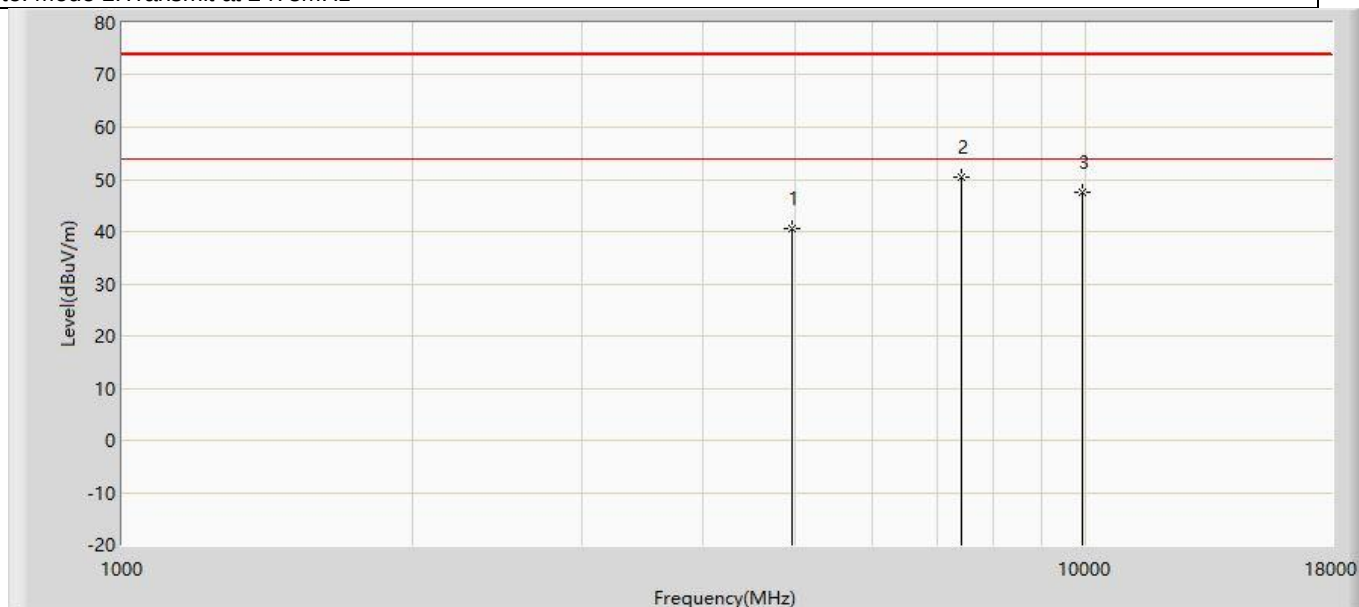
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4876.000	41.990	56.420	-32.010	74.000	-14.430	PK
2	*	7324.000	50.196	58.525	-23.804	74.000	-8.329	PK
3		9760.000	47.319	51.993	-26.681	74.000	-4.673	PK

Profile: 21C0881R	Page No.: 10
Engineer: Pengchengyang	
Site: AC5	Time: 2022/06/17 - 21:15
Limit: 15.209-1	Margin: 0
Probe: FCC_ANT-1-18G	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2440MHz	



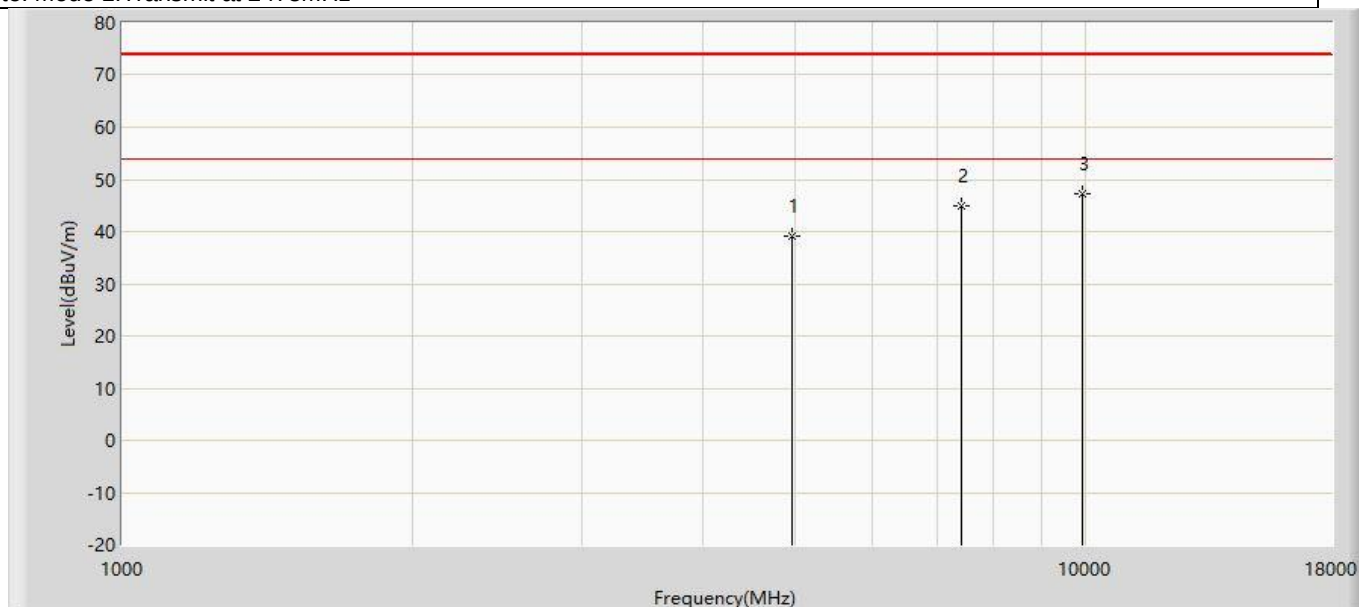
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	39.662	54.050	-34.338	74.000	-14.388	PK
2		7320.000	45.446	53.766	-28.554	74.000	-8.320	PK
3	*	9760.000	47.282	51.956	-26.718	74.000	-4.673	PK

Profile: 21C0881R	Page No.: 11
Engineer: Pengchengyang	
Site: AC5	Time: 2022/06/17 - 21:15
Limit: 15.209-1	Margin: 0
Probe: FCC_ANT-1-18G	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2478MHz	



N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4956.000	40.633	54.762	-33.367	74.000	-14.129	PK
2	*	7426.000	50.442	58.452	-23.558	74.000	-8.010	PK
3		9912.000	47.539	51.680	-26.461	74.000	-4.141	PK

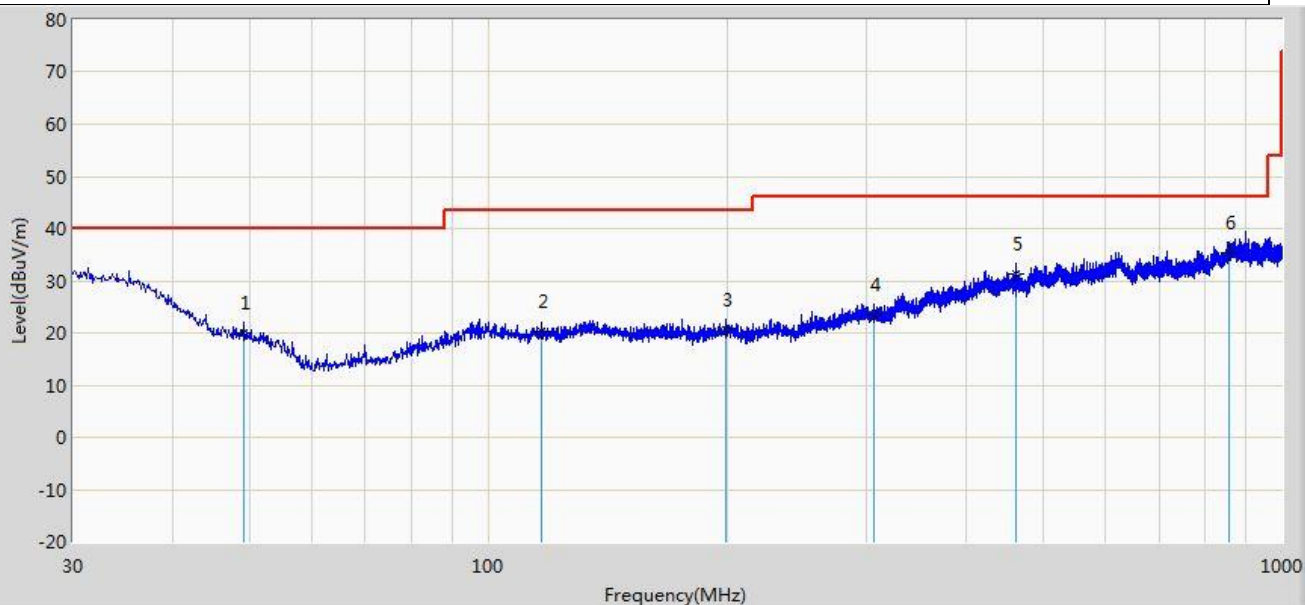
Profile: 21C0881R	Page No.: 12
Engineer: Pengchengyang	
Site: AC5	Time: 2022/06/17 - 21:15
Limit: 15.209-1	Margin: 0
Probe: FCC_ANT-1-18G	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2478MHz	



N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4956.000	39.030	53.159	-34.970	74.000	-14.129	PK
2		7434.000	44.895	52.810	-29.105	74.000	-7.915	PK
3	*	9912.000	47.328	51.469	-26.672	74.000	-4.141	PK

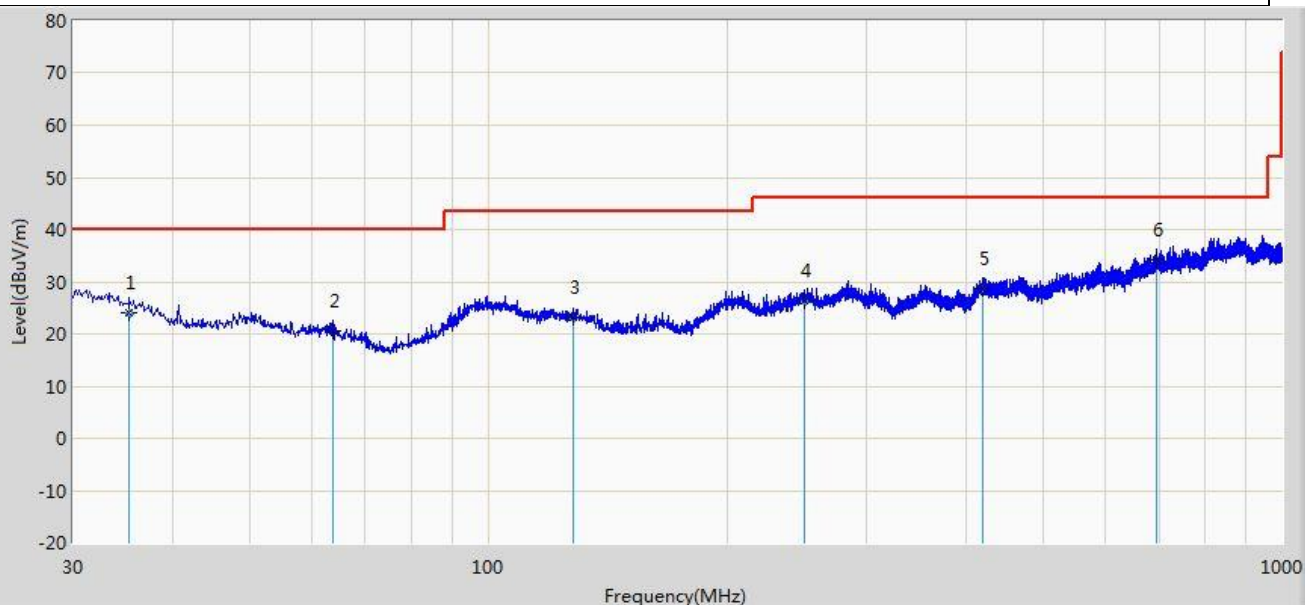
The worst case of Radiated Emission below 1GHz:

Profile: 21C0881R	Page No.: 43
Engineer:	
Site: AC2	Time: 2022/06/20 - 20:50
Limit: FCC Part15.109 RE(3m)_ClassB	Margin: 0
Probe: AC2 3M(30-1000M)	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		49.158	19.905	3.875	-20.095	40.000	16.030	QP
2		116.573	20.145	3.580	-23.355	43.500	16.565	QP
3		199.386	20.477	2.702	-23.023	43.500	17.774	QP
4		305.723	23.593	2.612	-22.407	46.000	20.981	QP
5		461.529	31.197	4.221	-14.803	46.000	26.976	QP
6	*	857.046	35.438	3.036	-10.562	46.000	32.401	QP

Profile: 21C0881R	Page No.: 44
Engineer:	
Site: AC2	Time: 2022/06/20 - 20:51
Limit: FCC Part15.109 RE(3m)_ClassB	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1:	



N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		35.335	24.185	1.839	-15.815	40.000	22.345	QP
2		63.708	20.546	4.585	-19.454	40.000	15.961	QP
3		127.728	23.048	2.689	-20.452	43.500	20.358	QP
4		250.432	26.314	1.796	-19.686	46.000	24.519	QP
5		420.304	28.652	1.904	-17.348	46.000	26.748	QP
6	*	695.177	34.276	3.610	-11.724	46.000	30.666	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, 9kHz~30MHz and Above 18GHz worst case are at least 6dB below the limits, therefore no data appear in the report.
4. This limit applies for using average detector, if the test result of peak is lower than average limit, then average measurement needn't be performed.

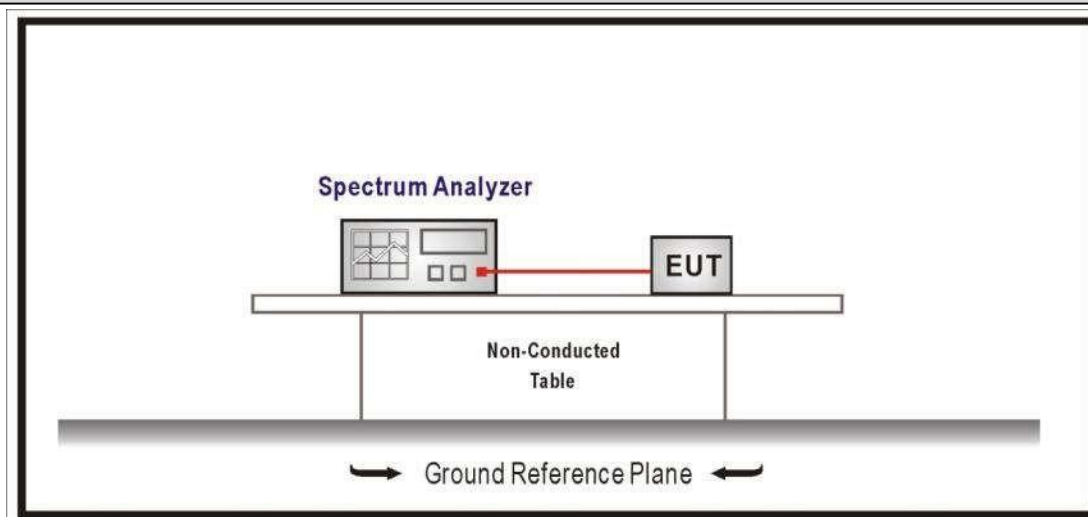
4.2 Emissions in non-restricted frequency band	VERDICT: PASS
---	----------------------

4.2.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d)
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).

4.2.2 Test Setup**4.3.3 Test Procedure**

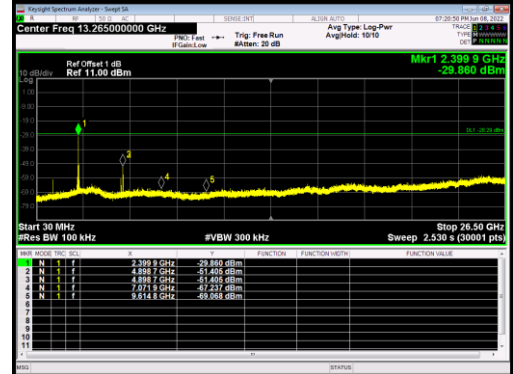
References Rule	Chapter	Description
☒ ANSI C63.10	11.11	Emissions in non-restricted frequency bands
☒ ANSI C63.10	11.11.1	General
☒ ANSI C63.10	11.11.2	Reference level measurement
☒ ANSI C63.10	11.11.3	Emission level measurement

4.2.4 Test Data

Mode 1 2402MHz



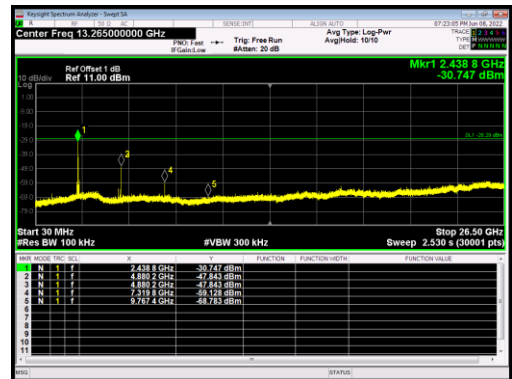
Mode 1 2402MHz



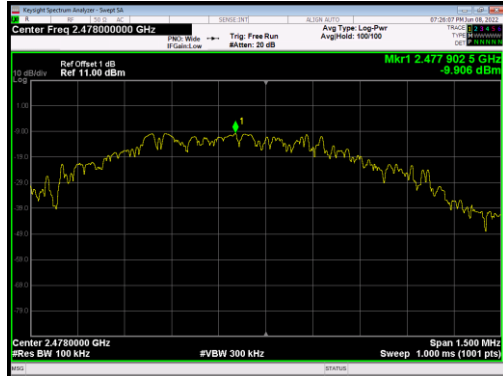
Mode 1 2440MHz



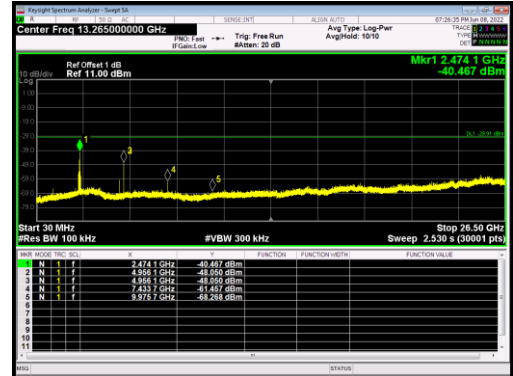
Mode 1 2440MHz



Mode 1 2478MHz



Mode 1 2478MHz



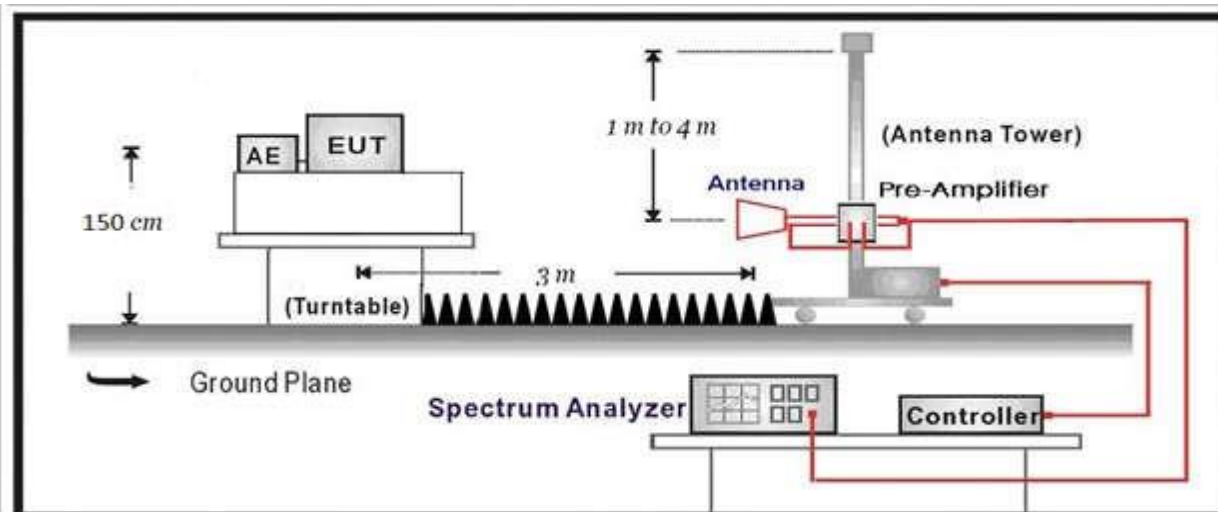
4.3 Radiated Emission Band Edge**VERDICT: PASS****4.3.1 Limit**

Standard		FCC Part 15 Subpart C Paragraph 15.247(d) , 15.205, 15.209		
Frequency bands (MHz)	Detector	Limit (dB μ V/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.

4.3.2 Test Setup

Above 1GHz Test Setup:



4.3.3 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	6.3	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
	☐	ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
		ANSI C63.10	11.12.2.4	Peak power measurement procedure
		ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
		ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
		ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

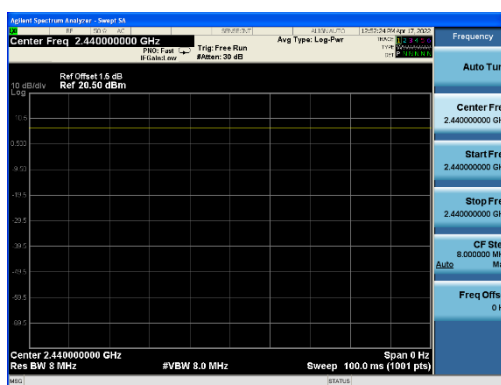
4.3.4 Test Data

Test Mode	Tx On (ms)	VBW (kHz)	Tx On + Tx Off (ms)	Duty Cycle (%)
1	-	-	-	100

Note 1: T means the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

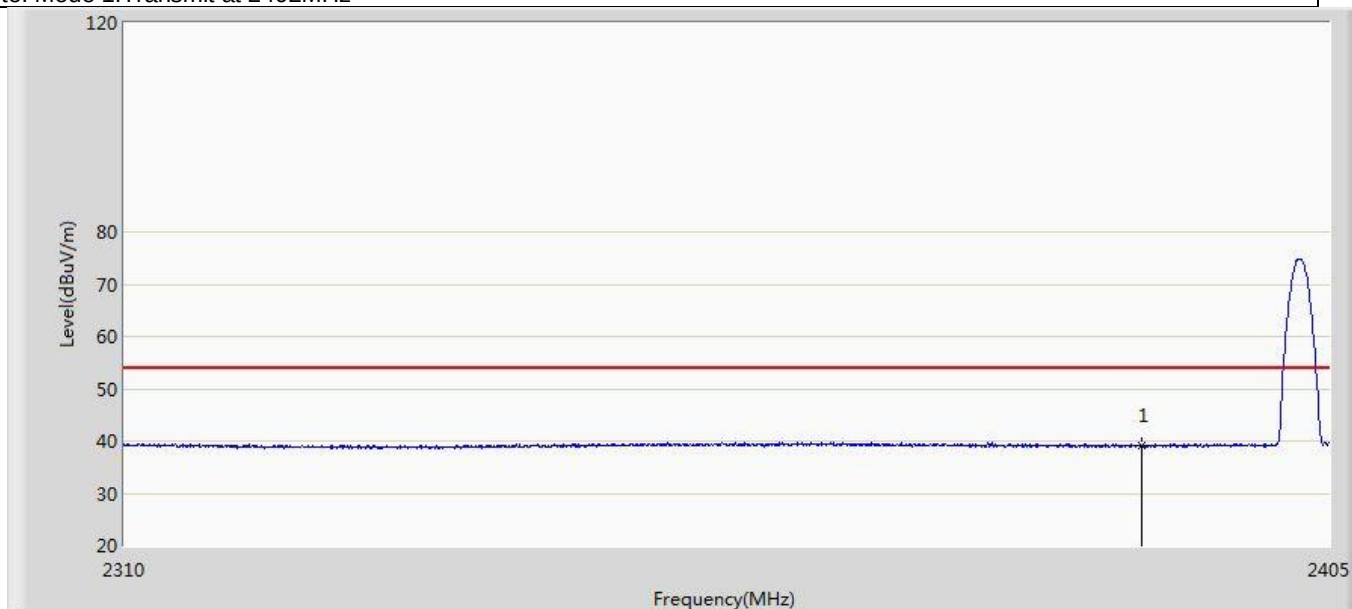
Note 2: According to KDB 558074, when test for Radiated Emission Band Edge and Radiated Emission, for average detector set: $VBW \geq 1/T$ will be used.

Mode 1: 2440MHz



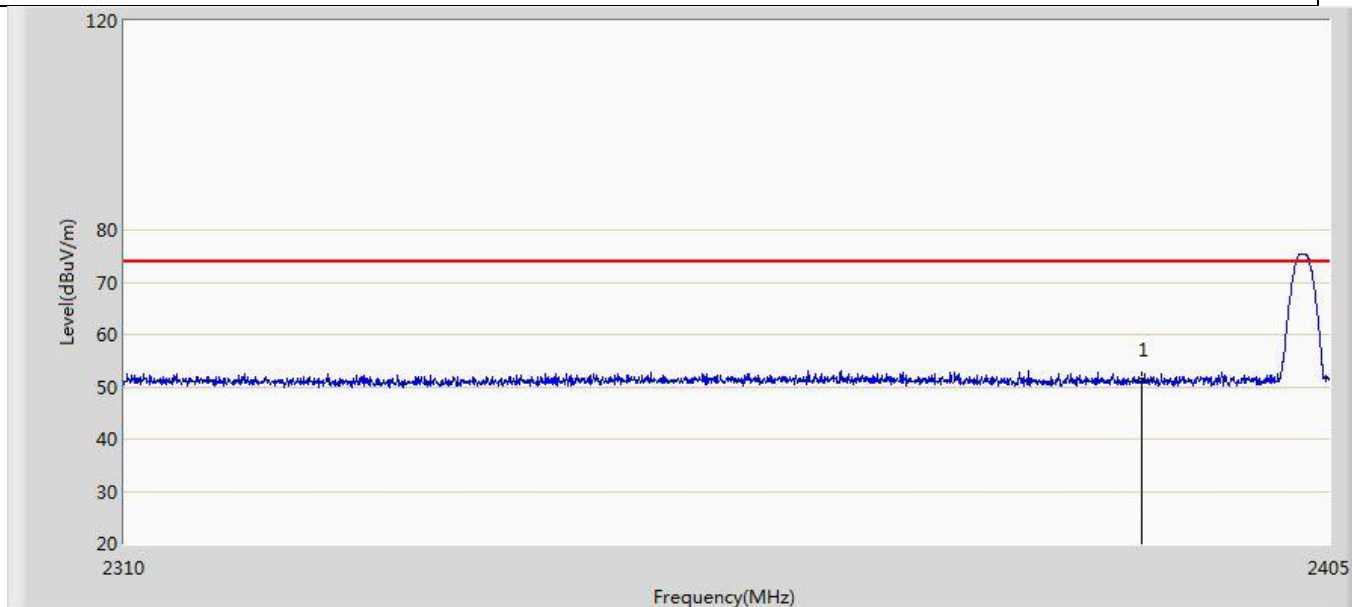
Bandedge test data:

Profile: 21C0881R	Page No.: 1
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/14 - 22:31
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1:Transmit at 2402MHz	



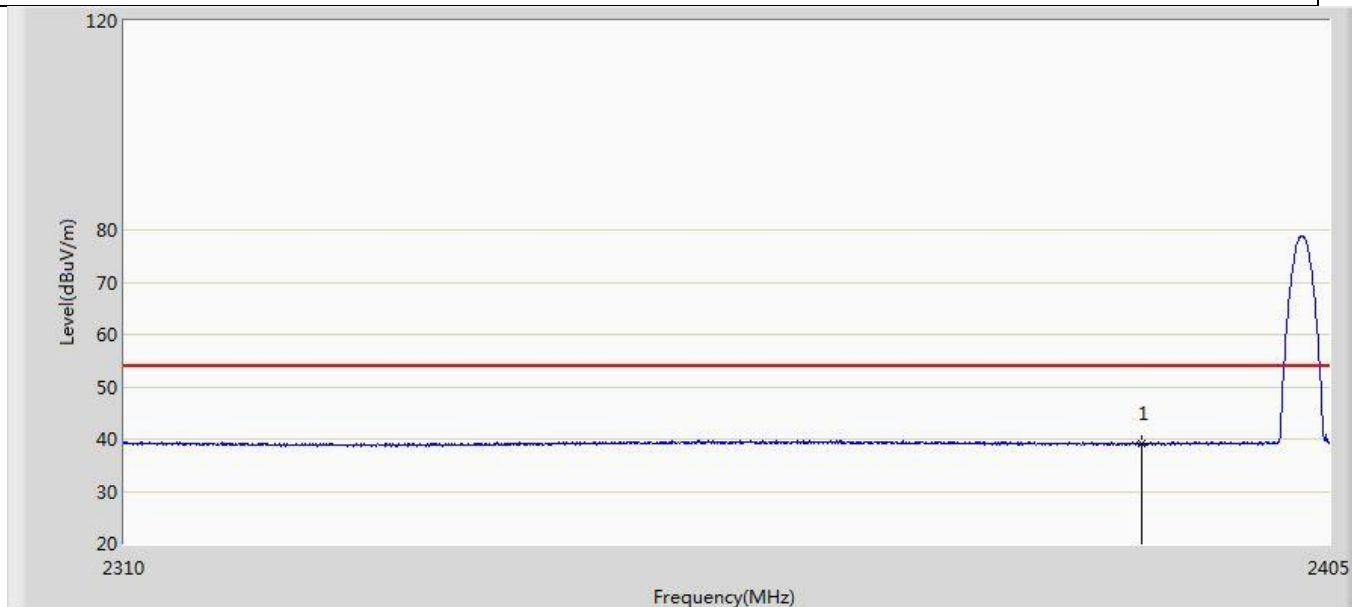
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	39.055	2.957	-14.945	54.000	36.098	AV

Profile: 21C0881R	Page No.: 2
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/14 - 23:02
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2402MHz	



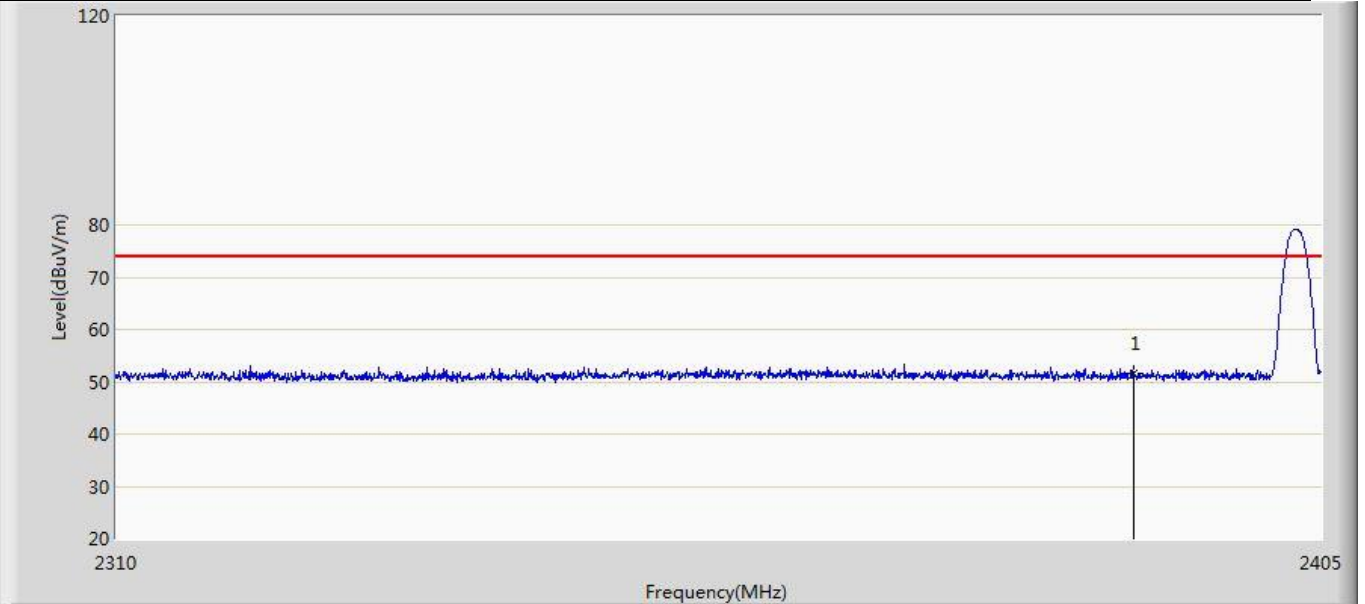
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	51.211	15.113	-22.789	74.000	36.098	PK

Profile: 21C0881R	Page No.: 3
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/14 - 23:03
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2402MHz	



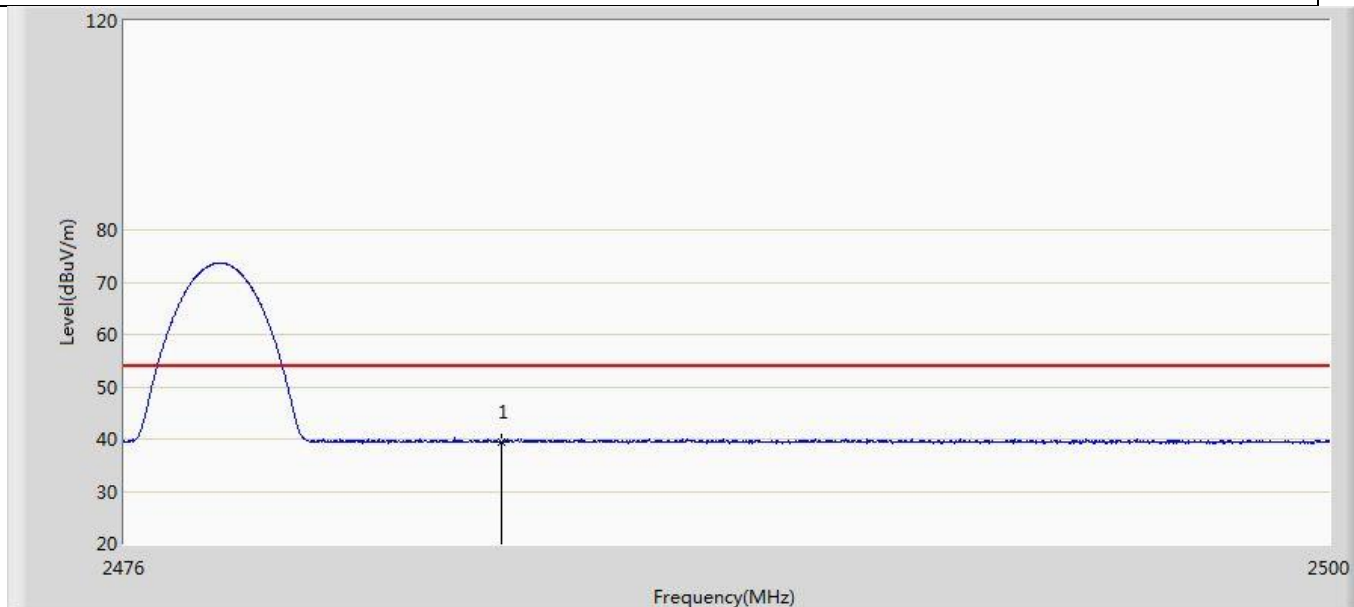
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	39.126	3.028	-14.874	54.000	36.098	AV

Profile: 21C0881R	Page No.: 4
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/14 - 23:04
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2402MHz	



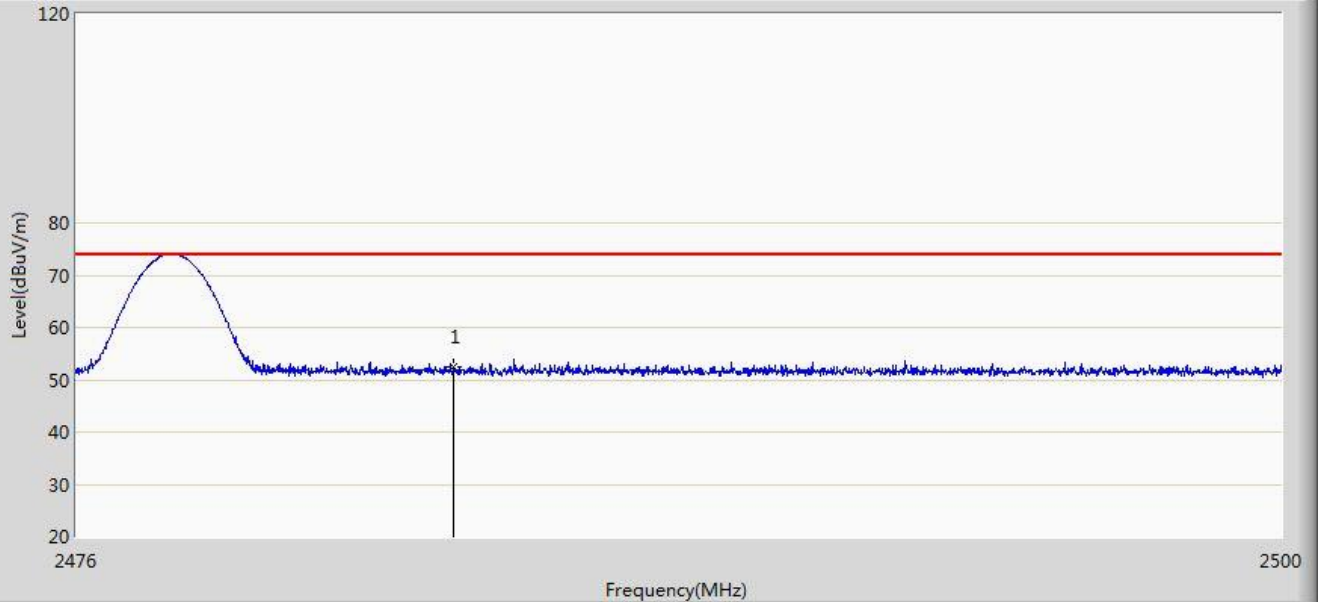
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	51.480	15.382	-22.520	74.000	36.098	PK

Profile: 21C0881R	Page No.: 5
Engineer: Carlosshen	
Site: AC5	Time: 2022/06/15 - 04:30
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2478MHz	



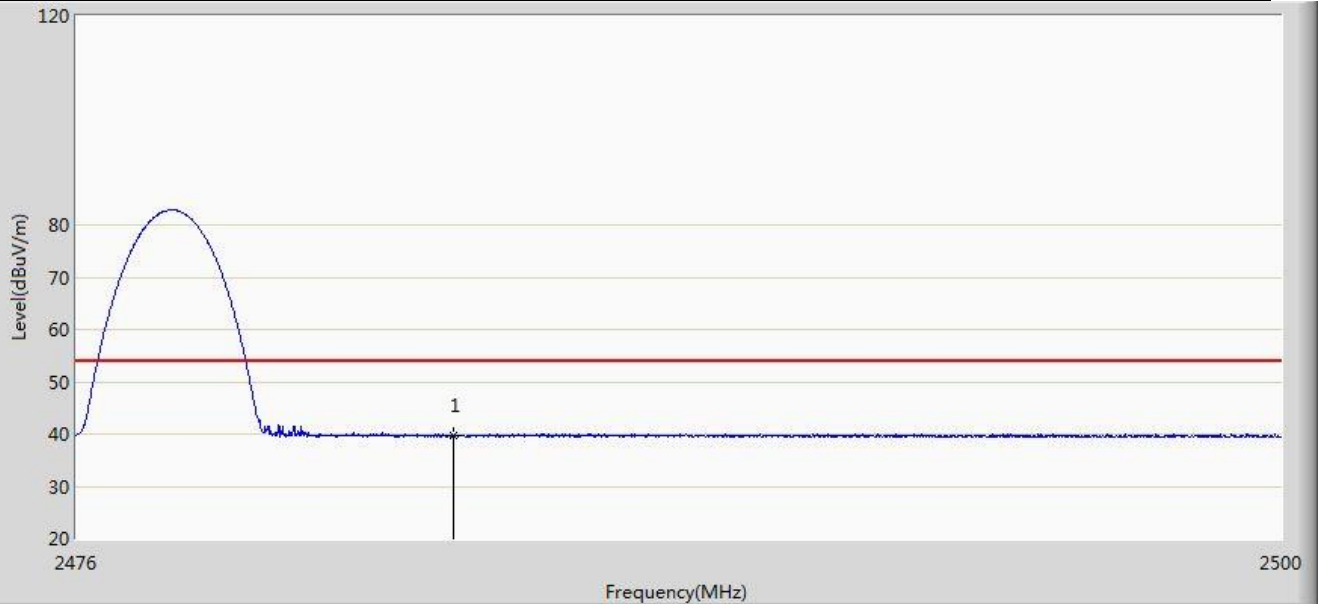
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	39.563	3.342	-14.437	54.000	36.220	AV

Profile: 21C0881R	Page No.: 6
Engineer: Carlosshen	
Site: AC5	Time: 2022/06/15 - 21:30
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Horizontal
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2478MHz	



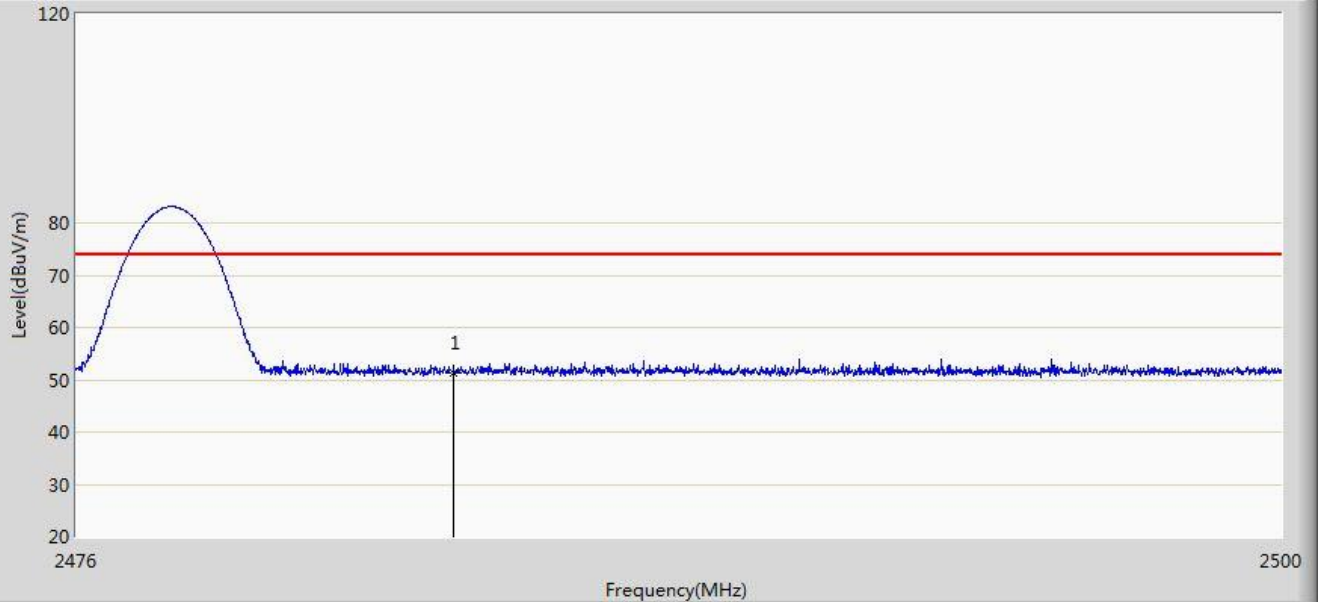
N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	52.442	16.221	-21.558	74.000	36.220	PK

Profile: 21C0881R	Page No.: 7
Engineer: Carlosshen	
Site: AC5	Time: 2022/06/15 - 21:30
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2478MHz	



N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	39.608	3.387	-14.392	54.000	36.220	AV

Profile: 21C0881R	Page No.: 8
Engineer: Carlosshen	
Site: AC5	Time: 2022/06/15 - 21:30
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: Horn 3117 00167055(1-18GHz)	Polarity: Vertical
EUT: Bicycle Light	Power: DC 3V
Note: Mode 1: Transmit at 2478MHz	



N o	Mar k	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	51.449	15.228	-22.551	74.000	36.220	PK

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

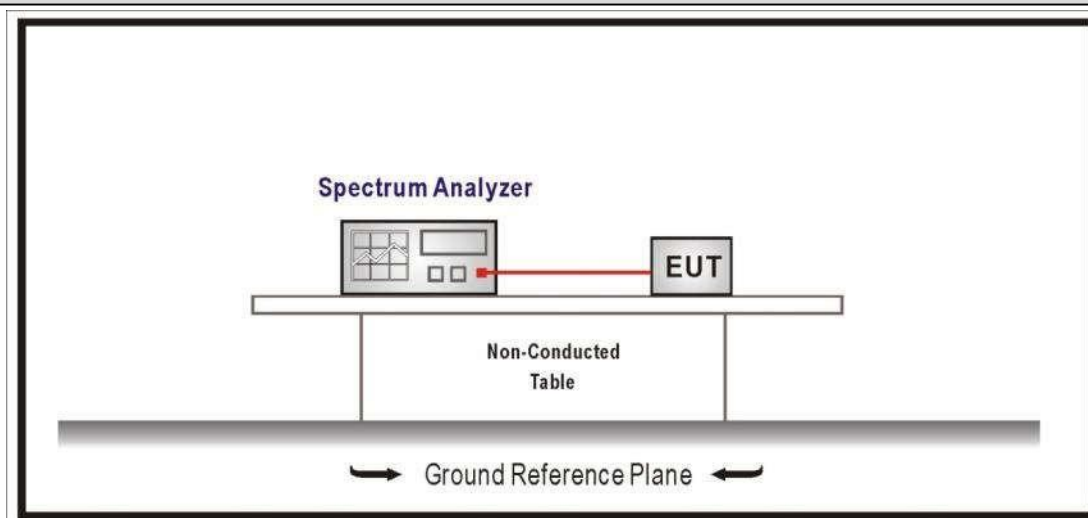
4.4 DTS Bandwidth**VERDICT: PASS****4.4.1 Limit**

Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(2)
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Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz

Standard	ANSI C63.10 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. The occupied bandwidth should be within the required frequency range.

4.4.2 Test Setup**4.4.3 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
☒	ANSI C63.10	6.9	Occupied bandwidth
☐	ANSI C63.10	6.9.2	relative measurement procedure
☒	ANSI C63.10	6.9.3	power bandwidth (99%) measurement procedure

4.4.4 Test Data

Mode	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)	6dB Occupied Bandwidth (MHz)	Limit (kHz)	Result
1	2402	1.03	0.615	≥500	Pass
	2440	1.031	0.642	≥500	Pass
	2478	1.058	0.561	≥500	Pass

Note: The worst case of Occupied Bandwidth as below:

6dB Occupied Bandwidth Mode 1 2440MHz	99% Occupied Bandwidth Mode 1 2478MHz
 Center Freq 2.44 GHz #Res BW 100 kHz #VBW 300 kHz Span 2 MHz Sweep 1.333 ms Occupied Bandwidth 1.1103 MHz Transmit Freq Error -95.650 kHz % of OBW Power 99.00 % x dB Bandwidth 641.8 kHz x dB -6.00 dB	 Center Freq 2.478 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.333 ms Occupied Bandwidth 1.0582 MHz Transmit Freq Error -84.117 kHz % of OBW Power 99.00 % x dB Bandwidth 1.286 MHz x dB -26.00 dB

4.5 Fundamental emission output power

VERDICT: PASS

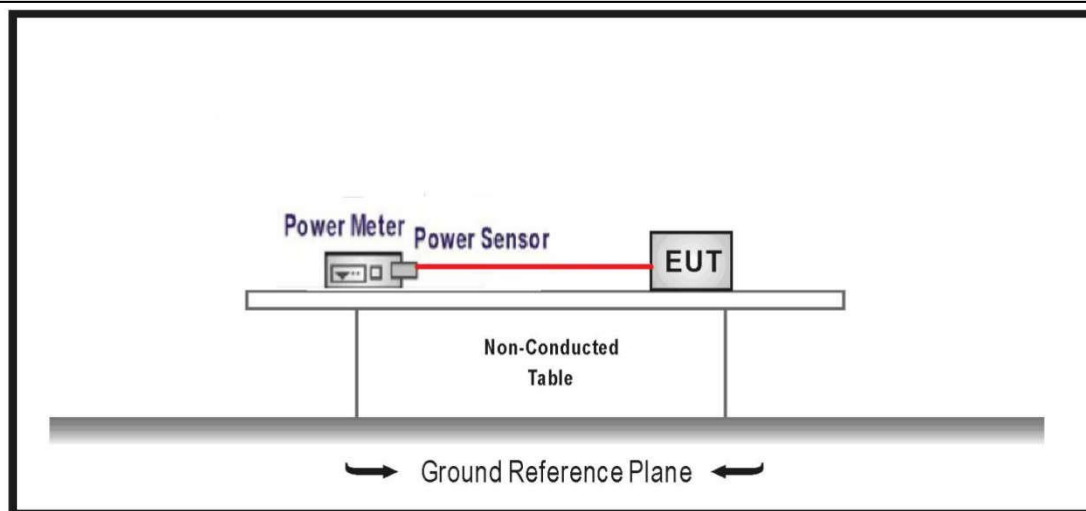
4.5.1 Limit

Standard		FCC Part 15 Subpart C Paragraph 15.247 (b)(3)
☒	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 .

4.5.2 Test Setup



4.5.3 Test Procedure

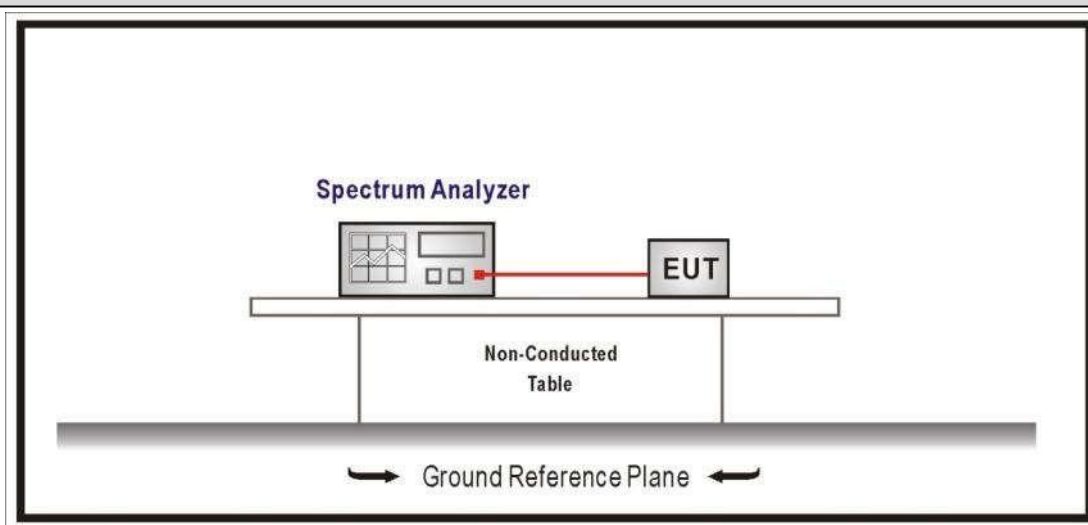
	References Rule		Chapter	Description
☒	ANSI C63.10		11.9	Fundamental emission output power
	☒	ANSI C63.10	11.9.1	Maximum peak conducted output power
	☐	ANSI C63.10	11.9.1.1	RBW $\geq$ DTS bandwidth
		ANSI C63.10	11.9.1.2	Integrated band power method
		☒ ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method
	☐	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 $\geq$ 98%)
		☐ ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle $\geq$ 98%)
		☐ ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle $\leq$ 98%)
		☐ ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle $\leq$ 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

4.5.4 Test Data

Mode	Test Frequency (MHz)	Conducted Power (dBm)	EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
Mode 1	2402	-7.62	-7.62	≤30	≤36	Pass
	2440	-7.98	-7.98	≤30	≤36	Pass
	2478	-8.77	-8.77	≤30	≤36	Pass

4.6 Power Density**VERDICT: PASS****4.6.1 Limit:****Standard**

FCC Part 15 Subpart C Paragraph 15.247 (e)

Power Spectral Density $\leq 8\text{dBm}/3\text{kHz}$ **4.6.2 Test Setup****4.6.3 Test Procedure**

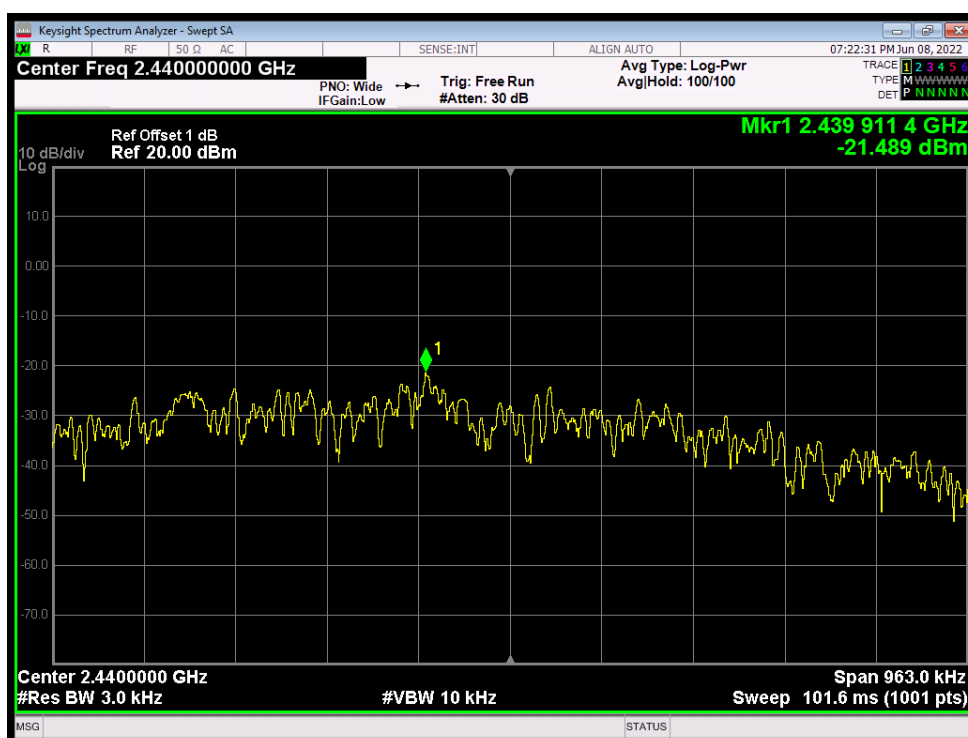
	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPDS-1(Duty cycle $\geq 98\%$)
	☐	ANSI C63.10	11.10.4	Method AVGPDS-1A(Duty cycle $\geq 98\%$)
	☐	ANSI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

4.6.4 Test Data

Mode	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
1	2402	-21.74	≤8	Pass
	2440	-21.49	≤8	Pass
	2478	-22.3	≤8	Pass

Note: The worst case of PSD as below:

Mode 1 2440MHz



4.7 Antenna Requirement**VERDICT: PASS****4.7.1 Limit:****Standard**

FCC Part 15 Subpart C Paragraph 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 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.

4.7.2 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.

_____ The End _____