

# **FCC Test Report**

Application No.:	DNT241451R1859-4986
Applicant:	Shenzhen Huitong Botai digital technology Co., LTD.
Address of	6F A, Building 7, Rundongsheng Industrial Park, Longzhu Community, Xixian
Applicant:	Street, Baoan District, Shenzhen
EUT Description:	Gamepad
	Lenovo S01,Lenovo S02,Lenovo S03,Lenovo S04,Lenovo S05,
	Lenovo S06,Lenovo S07,Lenovo S08,Lenovo S09,Lenovo S10,
Model No.:	Lenovo S01 Pro,Lenovo S02 Pro,Lenovo S03 Pro,Lenovo S04 Pro,
	Lenovo S05 Pro,Lenovo S06 Pro,Lenovo S07 Pro,Lenovo S08 Pro,
	Lenovo S09 Pro,Lenovo S10 Pro
FCC ID:	2BHNR-LENOVOS01
Power Supply	DC 3.7V From Battery;DC 5V From Adapter
Trade Mark:	Lenovo
	47 CFR FCC Part 2, Subpart J
Standards:	47 CFR Part 15, Subpart C
	ANSI C63.10: 2020
Date of Receipt:	2024/06/26
Date of Test:	2024/06/26 to 2024/07/09
Date of Issue:	2024/07/10
Test Result:	PASS

Prepared By: Reviewed By: Approved By:

Wayne Penyils (Testing Engineer) (Project Engineer) (Manager)



#### Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com

 Tel:+86-769-88087383

 E-mail: <a href="mailto:service@dn-testing.com">service@dn-testing.com</a>



#### Date: July 10, 2024

Page: 2/48

Note: If there is any objection to the results in this report, please submit a written inquiry to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp, and is issued by the company in accordance with the requirements of the "Conditions of Issuance of Test Reports" printed in the attached page. Unless otherwise stated, the results presented in this report only apply to the samples tested this time. Partial reproduction of this report is not allowed unless approved by the company in writing.

#### **Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V2.0		Jul.10, 2024	Valid	Original Report



1

Report No.:DNT241451R1859-4986

Date: July 10, 2024

Page: 3/48

# **Test Summary**

Test Item	Test Requirement	Test Method	Test Result	Result
Antenna Requirement	15.203/247(b)	<u> </u>	Clause 3.1	PASS
Duty Cycle	, <del>, ,</del> , , , , , , , , , , , , , , , ,	· · · · · · · · · · · · · · · · · · ·	Clause 3.2	PASS
DTS (6 dB) Bandwidth	15.247 (a)(2)	ANSI C63.10: 2020	Clause 3.3	PASS
Conducted Output Power	15.247 (b)(3)	ANSI C63.10: 2020	Clause 3.4	PASS
Power Spectral Density	15.247 (e)	ANSI C63.10: 2020	Clause 3.5	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10: 2020	Clause 3.6	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10: 2020	Clause 3.7	PASS
<b>Radiated Spurious Emissions</b>	15.247(d);15.205/15.209	ANSI C63.10: 2020	Clause 3.8	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d);15.205/15.209	ANSI C63.10: 2020	Clause 3.9	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10: 2020	Clause 3.10	PASS

Note:

1. "N/A" denotes test is not applicable in this test report.



# Contents

1	Test Summary	3
2	General Information	5
	2.1 Test Location	5
	2.2 General Description of EUT	5
	2.3 Channel List	7
	2.4 Test Environment and Mode	7
	2.5 Power Setting of Test Software	7
	2.6 Description of Support Units	7
	2.7 Test Facility	8
	2.8 Measurement Uncertainty (95% confidence levels, k=2)	8
	2.9 Equipment List	9
	2.10 Assistant equipment used for test	10
3	Test results and Measurement Data	11
	3.1 Antenna Requirement	11
	3.2 Duty Cycle	12
	3.3 DTS (6 dB) Bandwidth	13
	3.4 Conducted Output Power	14
	3.5 Power Spectral Density	15
	3.6 Band-edge for RF Conducted Emissions	16
	3.7 RF Conducted Spurious Emissions	17
	3.8 Radiated Spurious Emissions	
	3.9 Restricted bands around fundamental frequency	26
	3.10 AC Power Line Conducted Emissions	31
4	Appendix	35
	Appendix A: Duty Cycle	35
	Appendix B: DTS Bandwidth	
	Appendix C: Maximum conducted output power	39
	Appendix D: Maximum power spectral density	41
	Appendix E: Band edge measurements	
	Appendix F: Conducted Spurious Emission	45



# 2 General Information

# 2.1 Test Location

Company:	Dongguan DN Testing Co., Ltd
Address:	No. 1, West Fourth Street, South Xinfa Road, Wusha Liwu, Chang ' an Town, Dongguan City, Guangdong P.R.China
Test engineer:	Wayne Lin

# 2.2 General Description of EUT

Manufacturer:	Shenzhen Huitong Botai digital technology Co., LTD.
Address of Manufacturer:	6F A, Building 7, Rundongsheng Industrial Park, Longzhu Community,
	Xixiang Street, Baoan District, Shenzhen
EUT Description:	Gamepad
Test Model No.:	Lenovo S01
	Lenovo S02,Lenovo S03,Lenovo S04,Lenovo S05,
	Lenovo S06,Lenovo S07,Lenovo S08,Lenovo S09,Lenovo S10,
Additional Model(s):	Lenovo S01 Pro,Lenovo S02 Pro,Lenovo S03 Pro,Lenovo S04 Pro,
	Lenovo S05 Pro,Lenovo S06 Pro,Lenovo S07 Pro,Lenovo S08 Pro,
	Lenovo S09 Pro,Lenovo S10 Pro
Chip Type:	ZC32RF1M QFN40
Serial Number	PR241451R1859
Power Supply	DC 3.7V From Battery; DC 5V From Adapter
Trade Mark:	Lenovo
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	2402 MHz to 2480 MHz
Type of Modulation:	GFSK
Sample Type:	☐ Portable Device, ☐ Module, ☐ Mobile Device
Antenna Type:	□ External, ⊠ Integrated
Antenna Ports	🛛 Ant 1, 🗌 Ant 2, 🗌 Ant 3
Antonno Cointi	⊠ Provided by applicant
Antenna Gain*:	-2.3dBi
	⊠ Provided by applicant
RF Cable*:	0.5dB(0.6~1GHz); 0.8dB(1.4~2GHz); 1.0dB(2.1~2.7GHz); 1.5dB(3~4GHz); 1.8dB(4.4~6GHz);

Remark:



Date: July 10, 2024

Page: 6/48

\*All models are just name differences, motherboard, PCB circuit board, chip, electronic components, appearance is all the same.

\*Since the above data and/or information is provided by the applicant relevant results or conclusions of this report are only made for these data and/or information , DNT is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.



Date: July 10, 2024

Page: 7/48

### 2.3 Channel List

	Operation Frequency of each channel						
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12 📈	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

## 2.4 Test Environment and Mode

Operating Environment:	
Temperature:	20~25.0 °C
Humidity:	45~56 % RH
Atmospheric Pressure:	101.0~101.30 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

# 2.5 Power Setting of Test Software

Software Name	BT_Tool_v1.1.0		
Frequency(MHz)	2402	2440	2480
BLE 1M Setting	Default	Default	Default

# 2.6 Description of Support Units

The EUT has been tested independent unit.



### 2.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### Lab A:

• FCC, USA

Designation Number: CN1348

### A2LA (Certificate No. 7050.01)

DONGGUAN DN TESTING CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 7050.01.

### Innovation, Science and Economic Development Canada

DONGGUAN DN TESTING CO., LTD. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC#: 31026.

### 2.8 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1 <	DTS Bandwidth	±0.0196%
2	Maximum Conducted Output Power	±0.686 dB
3	Maximum Power Spectral Density Level	±0.743 dB
4	Band-edge Compliance	±1.328 dB
5	Unwanted Emissions In Non-restricted Freq Bands	9KHz-1GHz:±0.746dB 1GHz-26GHz: ±1.328dB

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
		± 4.8dB (Below 1GHz)
2	Radiated Emission	± 4.8dB (1GHz to 6GHz)
2	Radiated Emission	± 4.5dB (6GHz to 18GHz)
		± 5.02dB (Above 18GHz)



# 2.9 Equipment List

Description	Manufacturer	Model	Serial Number	Cal date	Due date
Signal Generator	Keysight	N5181A-6G	MY48180415	2023-10-25	2024-10-24
Signal Generator	Keysight	N5182B	MY57300617	2023-10-25	2024-10-24
Power supply	Keysight	E3640A	ZB2022656	2023-10-25	2024-10-24
Radio Communication Tester	R&S	CMW500	105082	2023-10-25	2024-10-24
Spectrum Analyzer	Aglient	N9010A	MY52221458	2023-10-25	2024-10-24
BT/WIFI Test Software	Tonscend	JS1120 V3.1.83	NA	NA 🤇	NA
RF Control Unit	Tonscend	JS0806-2	22F8060581	NA	NA
Power Sensor	Anritsu	ML2495A	2129005	2023-10-25	2024-10-24
Pulse Power Sensor	Anritsu	MA2411B	1911397	2023-10-25	2024-10-24
temperature and humidity box	SCOTEK	SCD-C40-80PRO	6866682020008	2023-10-25	2024-10-24

Test Equipment for Conducted Emission								
Description Manufacturer Model Serial Number Cal Date								
Receiver R&S		ESCI3	101152	2023-10-24	2024-10-23			
LISN	R&S	ENV216	102874	2023-10-24	2024-10-2			
ISN	R&S	ENY81-CA6	1309.8590.03	2023-10-24	2024-10-2			

Test Ed	quipment for F	Radiated Emis	sion(30MHz-	-1000MHz	<u>z)</u>	
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date	
Receiver	R&S	ESR7	102497	2023-10-24	2024-10-23	
Test Software	ETS-LINDGREN	EN TILE-FULL NA		NA	NA	
RF Cable	ETS-LINDGREN	RFC-NMS-100- NMS-350-IN	NA 2023-10-24		2024-10-23	
Log periodic antenna	ETS-LINDGREN	VULB 9168	01475	2023-10-24	2024-10-23	
Pre-amplifier	Schwarzbeck	BBV9743B	00423	2023-10-24	2024-10-23	



Test E	quipment for I	Radiated Emi	ssion(Above	1000MHz	)	
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date	
Frequency analyser	Keysight	N9010A	MY52221458	2023-10-24	2024-10-23	
RF Cable	ETS-LINDGREN	RFC-NMS-100- NMS-350-IN	NA	NA 2023-10-24 2024		
Horn Antenna	ETS-LINDGREN	3117	00252567	2023-10-24	2024-10-23	
Double ridged waveguide antenna	ETS-LINDGREN	3116C	00251780 2023-10-24 2		2024-10-23	
Test Software	ETS-LINDGREN	TILE-FULL	NA	NA C	NA	
Pre-amplifier	ETS-LINDGREN	3117-PA	252567	2023-10-24	2024-10-23	
Pre-amplifier	ETS-LINDGREN	3116C-PA	251780	2023-10-24	2024-10-23	

# 2.10 Assistant equipment used for test

	Code	Equipment	Manufacturer	Model No.	Equipment No.
Ĭ		Adapter	GaoFanDe	GFDQ3- 0502000U	NA
	2	Computer	acer	N22C8	EMC notebook01



# **3** Test results and Measurement Data

### 3.1 Antenna Requirement

#### Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

#### 15.203 requirement:

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, 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.

#### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -2.3dBi.



Date: July 10, 2024

### 3.2 Duty Cycle

#### Refer to section : Appendix A

Note:

- 1.If duty cycle <98 %, the conducted average output power and average power spectral density should be add duty factor.
- 2.If duty cycle ≥98 %,the EUT is consider to be transmitting continuously,the conducted average output power
  - and average power spectral density no need to add duty factor(consider to be zero).
- 3. The conducted peak output power and peak power spectral density no need to consider duty factor.
- 4. The on-time time is transmission duration(T).



# 3.3 DTS (6 dB) Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)	
Test Method:	ANSI C63.10: 2020 Section 11.8.1 Option 1	~
Test Setup:	Spectrum Analyzer E.U.T	on on
	Non-Conducted Table	
	Ground Reference Plane	5
Instruments Used:	Refer to section 2.9 for details	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	Through Pre-scan, find the the worst case of GFSK	0
Limit:	≥ 500 kHz	
Test Results:	Pass	Å

The detailed test data see: Appendix B



### 3.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10: 2020 Section 11.9.1.3
Test Setup:	POWER METER E.U.T Non-Conducted Table
	Ground Reference Plane
Test Instruments:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the the worst case of GFSK
Limit:	30dBm
Test Results:	Pass

The detailed test data see: Appendix C



# 3.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10: 2020 Section 11.10.2
Test Setup:	Spectrum Analyzer E.U.T
	Non-Conducted Table
	Ground Reference Plane
Test Instruments:	Refer to section 2.9 for details
Exploratory Test Mode	e: Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the the worst case of GFSK
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

The detailed test data see: Appendix D



# 3.6 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2020 Section 11.13
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table
	Ground Reference Plane
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the the worst case of GFSK
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

The detailed test data see: Appendix E



# 3.7 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2020 Section 11.11
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table
	Ground Reference Plane
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the worst case of GFSK;
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

The detailed test data see: Appendix F

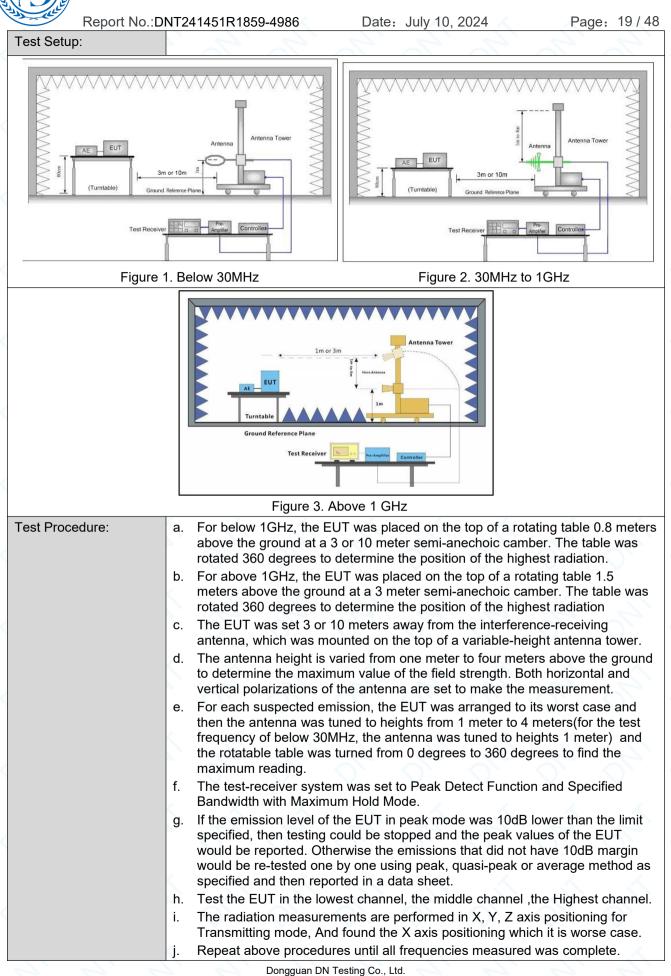


Date: July 10, 2024

# 3.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205								
Test Method:	ANSI C63.10: 2020 Sect	ANSI C63.10: 2020 Section 11.12							
Test Site:	Measurement Distance:	3m or 10m (Semi-A	Anechoic Ch	amber)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark				
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak				
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average				
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak				
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak				
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average				
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak				
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak				
		Peak	1MHz	3MHz	Peak				
	Above 1GHz	Peak	1MHz	10Hz (DC≥0.98)	Average				
	5 A A	$\sim$	2	≥1/T (DC<0.98)					
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measuremen distance (m)				
	0.009MHz-0.490MHz	2400/F(kHz)	<u> </u>	<u> </u>	300				
	0.490MHz-1.705MHz	24000/F(kHz)	<u></u>	2-2	30				
	1.705MHz-30MHz	30	-		30				
	30MHz-88MHz	100	40.0	Quasi-peak	3				
	88MHz-216MHz	150	43.5	Quasi-peak	3				
	216MHz-960MHz	200	46.0	Quasi-peak	3				
	960MHz-1GHz	500	54.0	Quasi-peak	3				
	Above 1GHz	500	54.0	Average	3				

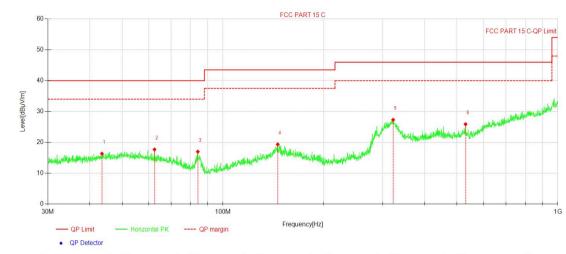




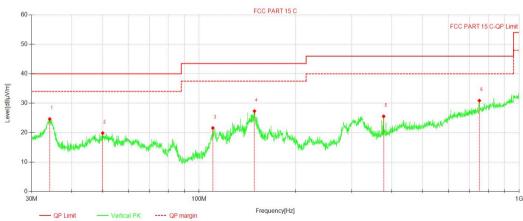
Report No.:D	NT241451R1859-4986 Date: July 10, 2024 Page: 20 / 48
Test Configuration:	Measurements Below 1000MHz • RBW = 120 kHz • VBW = 300 kHz • Detector = Peak • Trace mode = max hold Peak Measurements Above 1000 MHz • RBW = 1 MHz • VBW $\ge$ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold Average Measurements Above 1000MHz • RBW = 1 MHz • VBW $\ge$ 10 Hz, when duty cycle is no less than 98 percent. • VBW $\ge$ 1/T, when duty cycle is less than 98 percent. • VBW $\ge$ 1/T, when duty cycle is less than 98 percent.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Charging+Transmitting mode. Through Pre-scan, find the worst case of GFSK,Only the worst case is recorded in the report.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass



### Test data For 30-1000MHz



NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	43.50	24.70	-8.36	16.34	40.00	23.66	100	237	QP	Horizontal
2	62.43	26.74	-9.04	17.70	40.00	22.30	200	168	QP	Horizontal
3	84.11	30.46	-13.47	16.99	40.00	23.01	200	2	QP	Horizontal
4	145.69	27.47	-8.12	19.35	43.50	24.15	200	27	QP	Horizontal
5	322.18	33.55	-6.22	27.33	46.00	18.67	100	355	QP	Horizontal
6	530.10	27.06	-1.16	25.90	46.00	20.10	200	355	QP	Horizontal



QP Detector

NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	34.15	34.03	-9.39	24.64	40.00	15.36	100	1	QP	Vertical
2	49.99	27.93	-8.07	19.86	40.00	20.14	200	358	QP	Vertical
3	110.43	32.75	-11.17	21.58	43.50	21.92	100	76	QP	Vertical
4	148.96	35.28	-7.94	27.34	43.50	16.16	100	25	QP	Vertical
5	377.25	30.45	-4.90	25.55	46.00	20.45	200	19	QP	Vertical
6	750.98	27.46	3.42	30.88	46.00	15.12	200	92	QP	Vertical

Dongguan DN Testing Co., Ltd.

Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

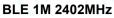
Web: www.dn-testing.com

Tel:+86-769-88087383

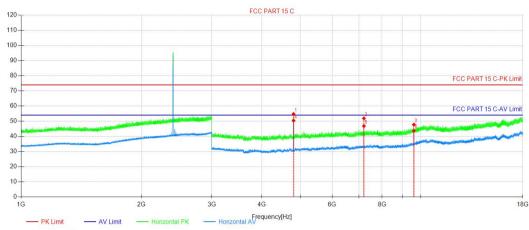
E-mail: service@dn-testing.com



### For above 1GHz

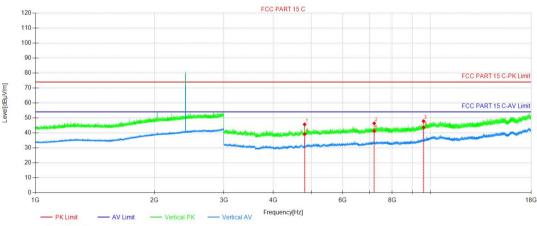


[dBµ/



AV Detector

NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	4804.59	59.35	-4.61	54.74	74.00	19.26	150	316	Peak	Horizontal
2	7205.46	53.66	-1.77	51.89	74.00	22.11	150	92	Peak	Horizontal
3	9607.83	46.90	0.87	47.77	74.00	26.23	150	170	Peak	Horizontal
4	4804.59	55.01	-4.61	50.40	54.00	3.60	150	304	AV	Horizontal
5	7206.21	48.58	-1.76	46.82	54.00	7.18	150	92	AV	Horizontal
6	9608.58	42.86	0.88	43.74	54.00	10.26	150	38	AV	Horizontal

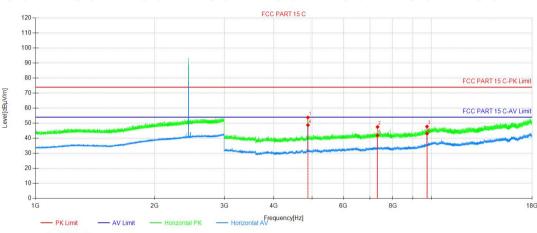


AV Detector

NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	4803.09	50.27	-4.61	45.66	74.00	28.34	150	262	Peak	Vertical
2	7206.96	48.12	-1.76	46.36	74.00	27.64	150	195	Peak	Vertical
3	9607.83	46.94	0.87	47.81	74.00	26.19	150	285	Peak	Vertical
4	4804.59	43.80	-4.61	39.19	54.00	14.81	150	226	AV	Vertical
5	7206.21	43.08	-1.76	41.32	54.00	12.68	150	195	AV	Vertical
6	9608.58	42.74	0.88	43.62	54.00	10.38	150	285	AV	Vertical

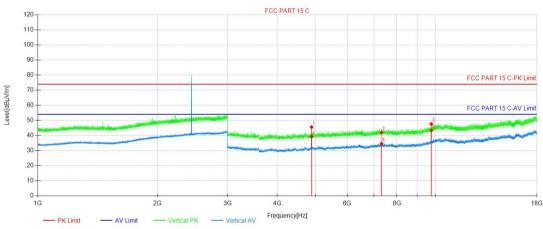


#### **BLE 1M 2440MHz**



AV Detector

NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	4879.59	58.52	-4.70	53.82	74.00	20.18	150	292	Peak	Horizontal
2	7320.21	49.03	-1.49	47.54	74.00	26.46	150	99	Peak	Horizontal
3	9760.08	46.16	1.62	47.78	74.00	26.22	150	153	Peak	Horizontal
4	4881.09	53.47	-4.71	48.76	54.00	5.24	150	314	AV	Horizontal
5	7320.21	43.34	-1.49	41.85	54.00	12.15	150	99	AV	Horizontal
6	9760.83	41.43	1.63	43.06	54.00	10.94	150	43	AV	Horizontal



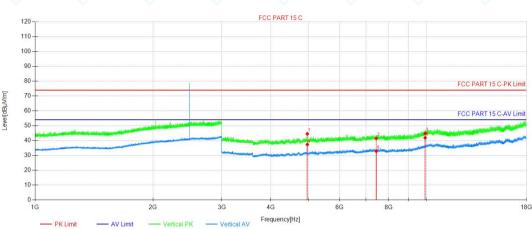
AV Detector

N	10.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
	1	4879.59	50.27	-4.70	45.57	74.00	28.43	150	270	Peak	Vertical
	2	7320.21	43.53	-1.49	42.04	74.00	31.96	150	18	Peak	Vertical
	3	9760.08	46.03	1.62	47.65	74.00	26.35	150	281	Peak	Vertical
	4	4880.34	43.87	-4.71	39.16	54.00	14.84	150	270	AV	Vertical
	5	7320.21	36.08	-1.49	34.59	54.00	19.41	150	171	AV	Vertical
	6	9760.83	41.64	1.63	43.27	54.00	10.73	150	281	AV	Vertical



### BLE 1M 2480MHz

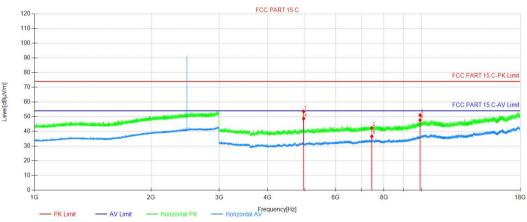




AV Detector

NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4959.09	49.41	-4.86	44.55	74.00	29.45	150	288	Peak
2	7440.22	42.82	-1.34	41.48	74.00	32.52	150	233	Peak
3	9920.59	42.56	2.27	44.83	74.00	29.17	150	114	Peak
4	4960.59	42.23	-4.86	37.37	54.00	16.63	150	299	AV
5	7440.22	34.15	-1.34	32.81	54.00	21.19	150	0	AV
6	9920.59	39.62	2.27	41.89	54.00	12.11	150	199	AV

Horizontal:



AV Detector

	NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
	1	4959.09	58.43	-4.86	53.57	74.00	20.43	150	295	Peak
	2	7440.22	43.63	-1.34	42.29	74.00	31.71	150	295	Peak
	3	9919.84	48.81	2.26	51.07	74.00	22.93	150	90	Peak
	4	4959.84	53.60	-4.86	48.74	54.00	5.26	150	304	AV
	5	7440.97	37.91	-1.34	36.57	54.00	17.43	150	336	AV
	6	9920.59	45.41	2.27	47.68	54.00	6.32	150	90	AV
L	0	0020.00		2.21	1 47.00	04.00	0.02	100		

Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383
 E-mail: <a href="mailto:service@dn-testing.com">service@dn-testing.com</a>



#### Note:

1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including Ant.Factor, Cable Factor etc. )

2. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

3. The amplitude of 18GHz to 25GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be report.

4. All channels had been pre-test, only the worst case was reported.



 Report No.:DNT241451R1859-4986
 Date: July 10, 2024
 Page: 26 / 48

 **3.9 Restricted bands around fundamental frequency** 

 Test Requirement:
 47 CFR Part 15C Section 15.209 and 15.205

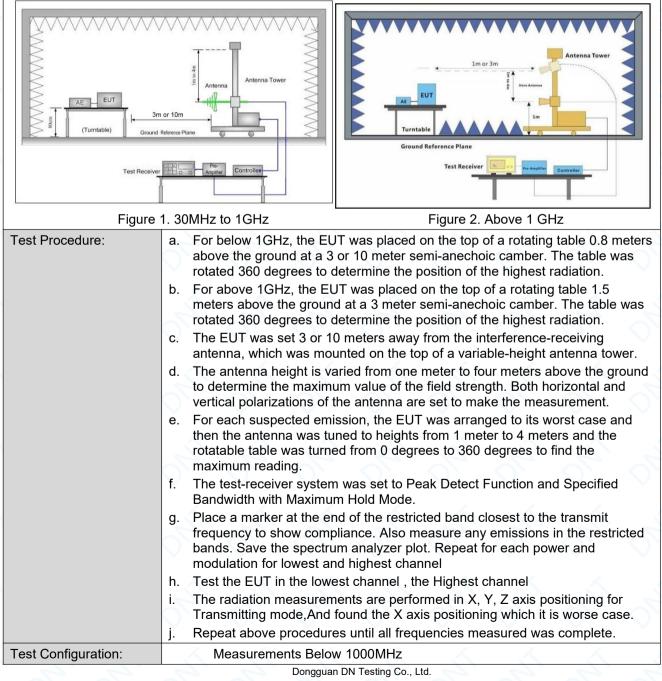
 Test Method:
 ANSI C63.10: 2020 Section 11.12

 Test Site:
 Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)

 Limit:
 Frequency
 Limit (dBuV/m)
 Remark

7
2
-

#### Test Setup:



Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

E-mail: service@dn-testing.com



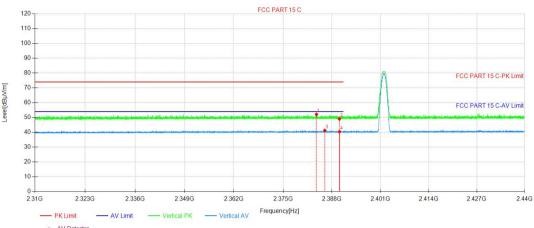
Report I	No.:DNT241451R1859-4986	Date: July 10, 2	2024	Page: 27 / 48
	• RBW = 120 kHz			7. 4.
	• VBW = 300 kHz			
	<ul> <li>Detector = Peak</li> </ul>			
	Trace mode = max hold			人 人
	Peak Measurements Abov	e 1000 MHz		
	• RBW = 1 MHz			
	• VBW $\ge$ 3 MHz			
	Detector = Peak			X X
	Sweep time = auto			
	Trace mode = max hold			
	Average Measurements A	bove 1000MHz		
	• RBW = 1 MHz			X X
	• VBW = 10 Hz, when dut	y cycle is no less than	n 98 percent.	
	• VBW ≥ 1/T, when duty minimum	cycle is less than 98	percent where T i	is the
	transmission duration over which maximum power control level for t			g at its
Exploratory Test Mode:	Transmitting with all kind of modu Transmitting mode.	lations, data rates.	$\bigcirc$ $\bigcirc$	$\sim$
Final Test Mode:	Pretest the EUT at Charge + Trar	nsmitting mode.		
	Through Pre-scan, find the worst	case of GFSK		
	Only the worst case is recorded in	n the report.		
Instruments Used:	Refer to section 2.9 for details	4 4		<u>,                                    </u>
Test Results:	Pass	2 2	2 6	6 6



Date: July 10, 2024

#### **Test Date** BLE 1M 2402MHz

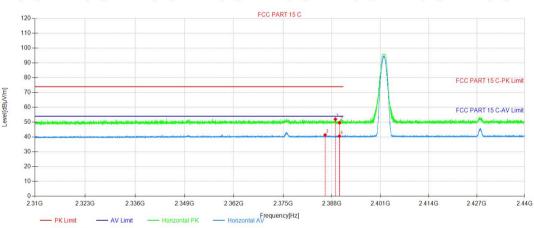
Vertical:



AV Detector

<	NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
	1	2383.88	52.92	-0.82	52.10	74.00	21.90	150	186	Peak
	2	2390.01	49.84	-0.80	49.04	74.00	24.96	150	271	Peak
	3	2386.09	42.04	-0.81	41.23	54.00	12.77	150	347	AV
	4	2390.01	41.16	-0.80	40.36	54.00	13.64	150	44	AV

Horizontal:

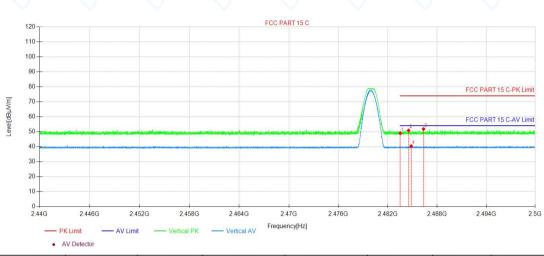


AV Detector

NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2388.94	52.82	-0.80	52.02	74.00	21.98	150	174	Peak
2	2390.01	50.37	-0.80	49.57	74.00	24.43	150	356	Peak
3	2386.18	42.16	-0.81	41.35	54.00	12.65	150	215	AV
4	2390.01	41.36	-0.80	40.56	54.00	13.44	150	73	AV

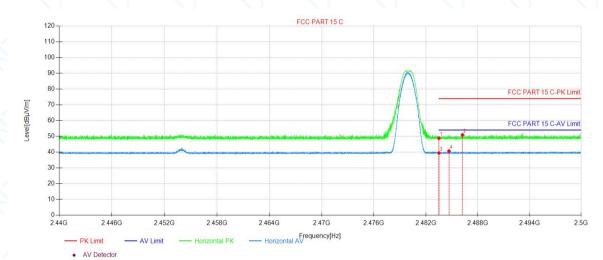


### BLE 2480MHz Vertical:



NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2483.51	49.25	-0.29	48.96	74.00	25.04	150	178	Peak
2	2484.53	51.13	-0.28	50.85	74.00	23.15	150	283	Peak
3	2486.35	52.09	-0.26	51.83	74.00	22.17	150	240	AV
4	2484.85	40.62	-0.27	40.35	54.00	13.65	150	349	AV

#### Horizontal:



NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	AV Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2483.51	49.09	-0.29	48.80	74.00	25.20	150	254	Peak
2	2486.23	51.21	-0.27	50.94	74.00	23.06	150	148	Peak
3	2483.51	39.75	-0.29	39.46	54.00	14.54	150	299	AV
4	2484.67	40.92	-0.27	40.65	54.00	13.35	150	332	AV



Note:

- 1. The BLE 1M is the worse case.
- 2. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe
- including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:
- Result Level= Reading Level + Correct Factor(including Ant.Factor ,Cable Factor etc. )



# 3.10AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15	5.207					
Test Method:	ANSI C63.10: 2020						
Test Frequency Range:	150kHz to 30MHz						
Limit:		Limit (d	dBuV)				
	Frequency range (MHz)	Quasi-peak	Average				
	0.15-0.5	66 to 56*	56 to 46*				
	0.5-5	56	46				
	5-30	60	50				
	* Decreases with the logarith	nm of the frequency.	12 12				
Test Procedure:	<ol> <li>The mains terminal disture room.</li> <li>The EUT was connected Impedance Stabilization Net impedance. The power cable a second LISN 2, which was plane in the same way as the multiple socket outlet strip we single LISN provided the rat 3) The tabletop EUT was pl ground reference plane. And placed on the horizontal group 4) The test was performed we of the EUT shall be 0.4 m from vertical ground reference plane reference plane. The LISN 1 unit under test and bonded to mounted on top of the ground between the closest points of the EUT and associated equilibrium.</li> </ol>	to AC power source thro work) which provides a 5 es of all other units of the bonded to the ground re e LISN 1 for the unit beir vas used to connect multi ing of the LISN was not e aced upon a non-metallie d for floor-standing arrang und reference plane, with a vertical ground reference plane the vertical ground reference plane and was bonded to the he was placed 0.8 m from to a ground reference plane. This of the LISN 1 and the EU upment was at least 0.8 m	bugh a LISN 1 (Line $50\Omega/50\mu$ H + $5\Omega$ linear e EUT were connected to eference ing measured. A ple power cables to a exceeded. c table 0.8m above the gement, the EUT was erence plane. The rear ference plane. The rear ference plane. The orizontal ground the boundary of the ine for LISNs distance was T. All other units of m from the LISN 2.				
	In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 2013 on conducted measurement.						
Test Setup:							
	Shielding Room						
	AC Mains		Test Receiver				

Exploratory Test Mode:

Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383
 E-mail: service@dn-testing.com



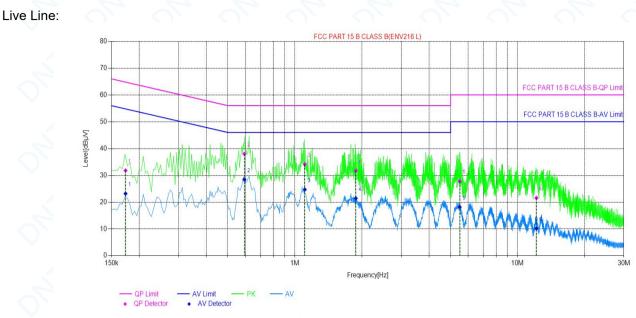
Report No.:DNT2	41451R1859-4986	Date: July 10, 2024	Page: 32/48		
	Charge + Transmitting n	node.	$\langle - \rangle$		
Final Test Mode:	Through Pre-scan, find the the worst case of GFSK				
Instruments Used:	Refer to section 2.9 for o	details			
Test Results:	Pass	12 12 12	$\sim$		



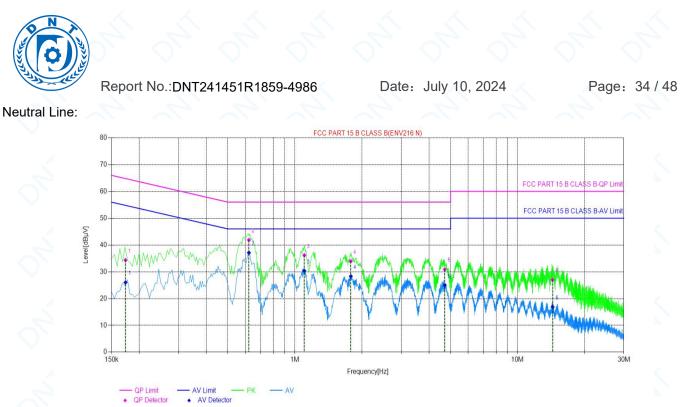
Date: July 10, 2024

#### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



$\leq$	NO.	Freq. [MHz]	Correct Factor [dB]	QP Reading Level [dBµV]	QP Result Level [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading Level [dBµV]	AV Result Level [dBµV]	AV Limit [dBµV]	AV Margin [dB]
	1	0.1734	9.91	21.89	31.80	64.80	33.00	13.27	23.18	54.80	31.62
	2	0.5928	9.82	28.19	38.01	56.00	17.99	18.61	28.43	46.00	17.57
	3	1.1071	9.72	24.41	34.13	56.00	21.87	14.98	24.70	46.00	21.30
$\leq$	4	1.8756	9.73	22	31.73	56.00	24.27	11.68	21.41	46.00	24.59
	5	5.4950	9.81	17.99	27.80	60.00	32.20	8.37	18.18	50.00	31.82
	6	12.146	9.92	11.66	21.58	60.00	38.42	0.25	10.17	50.00	39.83



<	NO.	Freq. [MHz]	Correct Factor [dB]	QP Reading Level [dBµV]	QP Result Level [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading Level [dBµV]	AV Result Level [dBµV]	AV Limit [dBµV]	AV Margin [dB]
	1	0.1734	9.82	24.55	34.37	64.80	30.43	16.22	26.04	54.80	28.76
	2	0.6211	9.80	32.08	41.88	56.00	14.12	27.31	37.11	46.00	8.89
	3	1.1017	9.69	26.49	36.18	56.00	19.82	20.67	30.36	46.00	15.64
$\langle$	4	1.7818	9.75	24.22	33.97	56.00	22.03	18.58	28.33	46.00	17.67
	5	4.7093	9.97	20.95	30.92	56.00	25.08	15.04	25.01	46.00	20.99
	6	14.358	9.92	17.13	27.05	60.00	32.95	6.98	16.90	50.00	33.10

Remark:

1. The BLE 1M is the worse case.

2. The following Quasi-Peak and Average measurements were performed on the EUT:

3. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe

including LISN Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including LISN Factor, Cable Factor etc.)



Date: July 10, 2024

# 4 Appendix

# Appendix A: Duty Cycle

#### Test Result

Test Mode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	DC [%]
BLE_1M	Ant1	2402	0.41	0.63	65.08
		2440	0.40	0.62	64.52
		2480	0.41	0.63	65.08



Page: 36 / 48

### Test Graphs

gilent Spectrum Analyzer	Swept SA			
enter Freg 2.402	2000000 GHz Trig D	NSE:PULSE ALIGN OFF elay-2.000 ms #Avg Type: RMS	04:35:47 AM Jun 27, 2024 TRACE 1 2 3 4 5 6	Frequency
Ref Offse 0 dB/div Ref 22.3	PNO: Fast +++-' Trig: V IFGain:Low #Atten t 12.31 dB	ideo : 20 dB	ΔMkr3 630.0 μs 15.14 dB	Auto Tu
12.3 2.31			+	Center Fr 2.402000000 G
7.69 17.7 27.7 37.7	1	241	TROLV	Start Fre 2.402000000 G
47.7 <b>5454</b> 57.7 57.7	With play the play	New West	gengennann v	Stop Fr 2.402000000 G
enter 2.40200000 es BW 8 MHz	0 GHz #VBW 8.0 MI	Hz Sweep	Span 0 Hz 2.000 ms (1001 pts)	CF St 8.000000 M
KR MODE TRC SCL	730.0 µs -33.73	FUNCTION FUNCTION WIDTH		uto M
2 Δ1 1 t (Δ) 3 Δ1 1 t (Δ) 4 5 6	410.0 μs (Δ) -12.0	12 dB 14 dB		Freq Offs 0
7 8 9 10				
11		1 1		

#### BLE\_1M\_Ant1\_2440

gilent Spectrum Analyzer -					
Center Freq 2.440		SENSE PULSE Trig Delay-2.000 ms	#Avg Type: RMS	04:37:38 AM Jun 27, 2024 TRACE 1 2 3 4 5 6	Frequency
enter Fred 2.440	PNO: Fast ++- IFGain:Low	Trig: Video #Atten: 20 dB	and the range	DET P P P P P	
Ref Offset 0 dB/div Ref 22.3			Δ	Mkr3 620.0 µs -23.28 dB	Auto Tu
2.31				2Δ1	Center Fr 2.440000000 G
7.7			¢1	180 LV	Start Fr 2.440000000 0
7.7 <b>Hrite</b> 7.7 7.7	lading a setting		ina ka	kipyino-shihir i	Stop Fr 2.440000000 0
enter 2.440000000 es BW 8 MHz		8.0 MHz		Span 0 Hz 000 ms (1001 pts)	CF St 8.000000 M
XE MODE TRC SCL 1 N 1 t 2 Δ1 1 t (Δ)	1,360 ms 400.0 μs (Δ)	-22.06 dBm 18.74 dB	TION FUNCTION WIDTH	FUNCTION VALUE	Auto N
3 Δ1 1 t (Δ) 4 6	620.0 μs (Δ)	-23.28 dB			Freq Off
7 8 9 0					
		-		2	
G			STATUS	Align Now, All require	bed

#### BLE\_1M\_Ant1\_2480

nter Freq 2.48	PNO: Fast +	SENSE PULSE Trig Delay-2.000 / Trig: Video #Atten: 20 dB	ALIGN OFF ms #Avg Type: RMS	04:39:18 AM Jun 27, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWWWWWW	Frequency
dB/div Ref 22.	IFGain:Low t 12.31 dB 31 dBm	#Atten: 20 dB		ΔMkr3 630.0 μs 14.40 dB	Auto Tu
3					Center Fr 2.480000000 G
7			3∆1	1802 LV	Start Fr 2.480000000 G
7 7 <b></b> 7	alwaskasur		261	biyiki mbalan magali	Stop Fr
nter 2.4800000	IO GHZ			Span 0 Hz	2.48000000 G
S BW 8 MHZ		W 8.0 MHz	Sweep 2	2.000 ms (1001 pts)	CF St 8.000000 M Auto M
N 1 t Δ1 1 t (Δ) Δ1 1 t (Δ)	730.0 μs 410.0 μs (Δ 630.0 μs (Δ	-36.54 dBm -10.81 dB			Freq Offs
					0
		4		s 🕄 Align Now, All requi	

Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383
 E-mail: <a href="mailto:service@dn-testing.com">service@dn-testing.com</a>



Date: July 10, 2024

Page: 37 / 48

# Appendix B: DTS Bandwidth

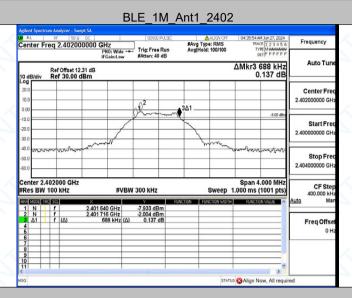
## **Test Result**

Test Mode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
	1	2402	0.688	2401.640	2402.328	0.5	PASS
BLE_1M	Ant1	2440	0.692	2439.636	2440.328	0.5	PASS
		2480	0.688	2479.632	2480.320	0.5	PASS



Page: 38 / 48

## **Test Graphs**



#### BLE\_1M\_Ant1\_2440

		SENSE:PULSE	ALIGN OFF	04:37:45 AM Jun 27, 2024	Frequency
enter Freq 2.44000000	PNO: Wide ++- IFGain:Low	Trig: Free Run #Atten: 40 dB	#Avg Type: RMS Avg Hold: 100/100	TYPE MUMANAN DET P P P P P P	
Ref Offset 12.31 dE 0 dB/div Ref 30.00 dBm	·			ΔMkr3 692 kHz -0.234 dB	Auto Tur
0.0		(1) <sup>2</sup>	τ 3Δ1		Center Fr 2.44000000 G
10 10 10		<u>X</u>		-9.70 dBm	Start Fr 2.438000000 G
			harrow	man free and the	Stop Fr 2.442000000 G
enter 2.440000 GHz tes BW 100 kHz	#VBW	300 kHz	Sweep 1	Span 4.000 MHz 1.000 ms (1001 pts)	CF St 400.000 k Auto M
	39 636 GHz 39 704 GHz 692 kHz (Δ)	-9.539 dBm -3.778 dBm -0.234 dB			Freq Offs 0

#### BLE\_1M\_Ant1\_2480

	um Analyzer - Swe							
Center F	RF 50 Ω req 2.48000	0000 GHz	SENSE P	#Avg	Type: RMS Hold: 100/100	TRAC	E 1 2 3 4 5 6	Frequency
10 dB/div	Ref Offset 12 Ref 30.00 c					ΔMkr3 6	888 kHz 108 dB	Auto Tune
20.0 10.0								Center Freq 2.480000000 GHz
-10.0 -20.0 -30.0			- Phan	3Δ1-	\		-11.00 dBm	Start Freq 2.478000000 GHz
-40.0	m h m m m m m m m m m m m m m m m m m m	mmm			Server Mr.	an war	n Marianan	Stop Freq 2.482000000 GHz
#Res BW	RC SCL	X	BW 300 kHz	FUNCTION	Sweep	1.000 ms (		CF Step 400.000 kHz Auto Man
1 N 1 2 N 3 4 5 6	f f f (Δ)	2.479 632 GHz 2.479 716 GHz 688 kHz i	-10,798 dBn -4,996 dBn Δ) 0,108 dI	n				Freq Offsel 0 Hz
7 8 9 10 11 <			-18					
MSG					STAT	is 🕄 Align Ne	ow, All requi	red



Date: July 10, 2024

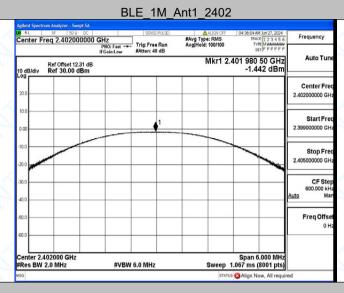
Test Result

Test Mode	Antenna	Freq(MHz)	Power [dBm]	Limit [dBm]	Verdict
		2402	-1.44	≤30	PASS
BLE_1M	Ant1	2440	-2.67	≤30	PASS
		2480	-4.30	≤30	PASS



Page: 40/48

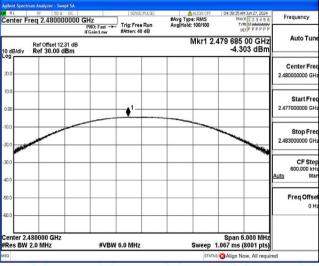
## **Test Graphs**



#### BLE\_1M\_Ant1\_2440

	Analyzer - Swept SA RF 50 Ω DC		SENSE:PULSE	ALIGN OFF	04:37:54 AM Jun 27, 2024	
	2.440000000	GHz PNO: Fast	Trig: Free Run #Atten: 40 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	Frequency
	ef Offset 12.31 dB ef 30.00 dBm			Mkr1 2.	439 898 00 GHz -2.667 dBm	Auto Tun
20.0						Center Fre 2.440000000 GH
0.00			<b>↓</b> 1			Start Fre 2.437000000 GF
-10.0						Stop Fre 2.443000000 GF
-30.0						CF Ste 600.000 ki Auto M
-50.0						Freq Offs 01
-60.0 Center 2.440 #Res BW 2.0		#VBW	6.0 MHz	Sweep	Span 6.000 MHz 1.067 ms (8001 pts)	
MSG					S 🕄 Align Now, All require	ed

### BLE\_1M\_Ant1\_2480



Dongguan DN Testing Co., Ltd.



Date: July 10, 2024

Page: 41/48

Appendix D: Maximum power spectral density

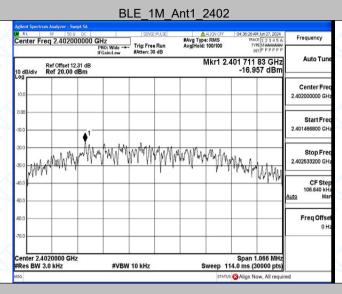
## Test Result

Test Mode	Antenna	Freq(MHz)	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
2 4		2402	-16.96	≤8.00	PASS
BLE_1M	Ant1	2440	-18.12	≤8.00	PASS
· - ·		2480	-19.88	≤8.00	PASS

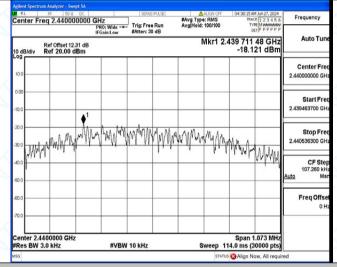


Page: 42/48

#### **Test Graphs**



## BLE\_1M\_Ant1\_2440



#### BLE\_1M\_Ant1\_2480

RL RF 50 Q DC	SENSE:PULSE	ALIGN OFF	04:39:57 AM Jun 27, 2024	
enter Freq 2.480000000 GHz PNO: Wide	Trig: Free Run #Atten: 30 dB	#Avg Type: RMS TRACE T Trig: Free Run Avg Hold: 100/100 TVFE Mi #Atten: 20 dB		
Ref Offset 12.31 dB dB/div Ref 20.00 dBm	States of all	Mkr1 2.	479 710 80 GHz -19.883 dBm	Auto Tu
g .0				Center Fr 2.480000000 G
.0				Start Fr 2.479466800 G
and which have been and a second and a secon	WWWW	MMMMMM	Mitter A. J. J. J.	Stop Fr 2.480533200 G
			TWYM	CF St 106.640 H Auto N
.0				Freq Off: 0
enter 2.4800000 GHz tes BW 3.0 kHz #VB	V 10 kHz	Sweep 1	Span 1.066 MHz 14.0 ms (30000 pts)	

Dongguan DN Testing Co., Ltd.



Date: July 10, 2024

Page: 43/48

Test Result

Test Mode	Antenna	Ch Name	Freq (MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE 1M	Ant1	Low	2402	-1.99	-47.37	≤-21.99	PASS
	Anti	High	2480	-5.14	-46.4	≤-25.14	PASS



10 11 Page: 44/48

## **Test Graphs**

BLE_1M_Ant1_Low_2402	
Adland Spectrum Analyzer - Serget 3A. OF R.L. 9F 500 DC SPECERALE: ▲LUSIONF 01:38:02 AM Xn27,2024 Center Freq 2.352500000 GHz PR0: Fast +++ Floate Xet +++ Floate Xet ++++ Floate Xet ++++	Frequency
Ref Offset 12.31 dB Mkr5 2.329 400 GHz 10 dB/div Ref 20.00 dBm - 47.365 dBm	
	Center Frec 2.352500000 GHz
	Start Free 2.30000000 GHz
600 war diferent en geweine ander versien ander en geweine ander en der en de 	Stop Fred 2.40500000 GHz
Start 2.30000 GHz         Stop 2.40500 GHz           #Res BW 100 KHz         #VBW 300 kHz         Sweep 10.07 ms (1001 pts)           Image word [mc] 563]         x         y         Pancton word [mc] ms (1001 pts)	CF Step 10.500000 MHz Auto Mar
No.         f         2.401746514z         -1.890 dBm         Adductor         A	Freq Offset
10 11 11 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	ad a la construction of the lateral sector o
BLE_1M_Ant1_High_2480	
Aglind Spectrum Analyzer - Swypt SA OF R4 197 50.9 DC 5910EP4.0E ▲AU3010FF 01490034M.hz27,2024 Center Freq 2.510000000 GHz PI00:Fast +++ Frig: Free Run Avg Hold: 100100 DF P P P P	Frequency
Prio: Hall	Auto Tune
	Center Frec 2.51000000 GHz
	Start Free 2.47000000 GHz
500	Stop Fred 2.55000000 GHz
Start 2.47000 GHz         Stop 2.55000 GHz           #Res BW 100 kHz         #VBW 300 kHz         Sweep 7.667 ms (1001 pts)           Image loads (Intel stat)         x         Y         Partition (Partition Works)	CF Step 8.000000 MH2 Auto Man
1         N         f         2479 66 GHz         5.143 dBm           2         N         f         24835 GHz         5.147 dBm           3         N         f         24535 GHz         5.1656 dBm           4         N         f         2526 9F GHz         46.403 dBm           5         f         2.526 9F GHz         46.403 dBm           6	Freq Offset 0 Hz
7	× ×

STATUS 🕄 Align Now, All required



Date: July 10, 2024

Page: 45/48

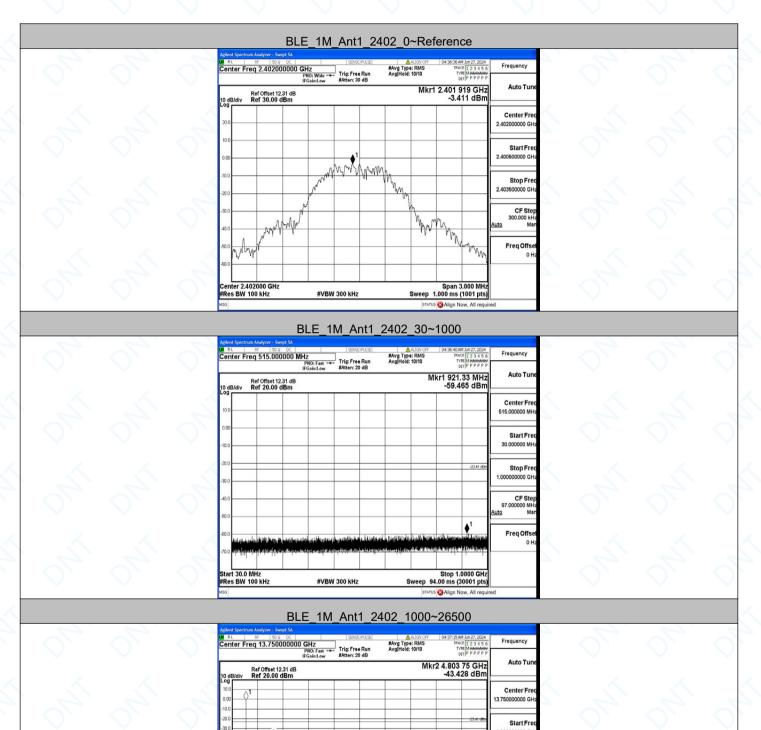
**Appendix F: Conducted Spurious Emission** 

## Test Result

Test Mode	Antenna	Freq(MHz)	Freq Range [Mhz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
			Reference	-3.41	-3.41	<u> </u>	PASS
		2402	30~1000	-3.41	-59.47	≤-23.41	PASS
	~		1000~26500	-3.41	-43.43	≤-23.41	PASS
		2440	Reference	-3.36	-3.36	<u> </u>	PASS
BLE 1M	Ant1		30~1000	-3.36	-58.64	≤-23.36	PASS
$\overline{\mathbf{O}}$	$\bigcirc$		1000~26500	-3.36	-48.81	≤-23.36	PASS
			Reference	-5.04	-5.04		PASS
		2480	30~1000	-5.04	-59.72	≤-25.04	PASS
			1000~26500	-5.04	-48.32	≤-25.04	PASS



**Test Graphs** 



#VBW 300 kHz

-2.026 dBn -43.428 dBn

2.401 65 GHz 4.803 75 GHz

Start 1.00 GHz #Res BW 100 kHz

N

Stop Fre 26.50000000 Gi

CF Ste

Freq Offs

2.5

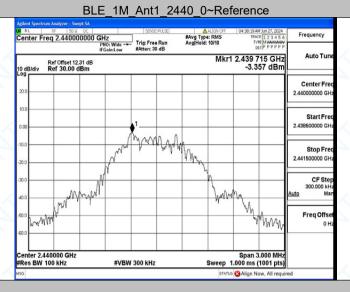
Stop 26.50 GHz Sweep 2.438 s (30001 pts

STATUS SAlign Now, All required



## Date: July 10, 2024

Page: 47 / 48



### BLE\_1M\_Ant1\_2440\_30~1000

Frequency	4:38:23 AM Jun 27, 2024 TRACE 1 2 3 4 5 6		#Avg Type:		SENSE		000 MH	515.000		Cen		
-	DET P P P P P	10	Avg Hold: 1		Trig: Free #Atten: 20	PNO: Fast						
Auto Tu		Mkr1 912.22 MHz -58.638 dBm					Ref Offset 12.31 dB 10 dB/div Ref 20.00 dBm					
Center Fre												
515.000000 M										10.0		
Start Fre										0.00		
30.000000 M		_								-10.0		
Stop Fre	-23.36 dDn									-20.0		
1.000000000 G		_								-30.0		
CF Ste										40.0		
97.000000 Mi Auto M										50.0		
Freq Offs										-50.0		
01	Ung tabled approximates	D. LUST in d	فلفن أساده	الغرافة الريداد	يوفر المؤدي	والمراجع والمراجع	and the later la	ada di cira i	A in out			
	oliterate a pit of a lot of a	in a serie of the life	and a state of the state of the	li di tenti pali si di si	- adaption	s and have belied	- Harrison (Start	<del>strittek</del>	يوللنها	-70.0		
	top 1.0000 GHz				300 kHz				t 30.0 M			
	Align Now, All require		51		JUU KHZ	#VDW		KHZ	8 BW 10	#Re		

#### BLE\_1M\_Ant1\_2440\_1000~26500

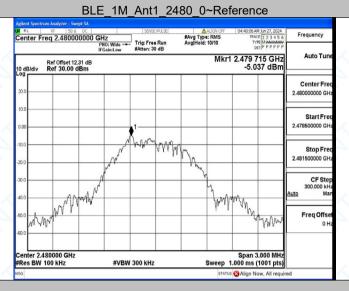
RL	RF	50 R			SENSE #	ULSE		ALIGN OFF		M Jun 27, 2024	
enter F	req 13	.7500	00000 G	Hz 10:Fast ↔ ain:Low	#Atten: 20			Type: RMS Iold: 10/10	TRA Th	CE 123456 FE MWWWWW ET P P P P P P	Frequency
dB/div	Ref 0	ffset 12. 20.00 d	31 dB Bm					Mk		40 GHz 08 dBm	Auto Tu
0	_										Center Fre
	> <b>1</b>							_			13.750000000 G
										-23.36 (27-	
											Start Fr
	$\vdash$	▲ <sup>2</sup> −					-				1.000000000 G
		سعاد	-			والأنام		-	-	-	Stop Fr
											26.50000000 G
rt 1.00 es BW	GHz 100 ki	łz		#VB\	W 300 kHz			Sweep	Stop 2 2.438 s (3	6.50 GHz 0001 pts)	CF St
MODE T	RC SOL		2,439.9		-5.187 dBr	FUNC	TION	FUNCTION WIDTH	FUNCTI	ON WALUE	Auto N
N	7		4.879 4	GHZ	-48.808 dBr	n					
				-							Freq Offs
				-							0
	+										
	++									~	

Dongguan DN Testing Co., Ltd.



## Date: July 10, 2024

Page: 48/48



## BLE\_1M\_Ant1\_2480\_30~1000

Frequency	M Jun 27, 2024 KCE 1 2 3 4 5 6 KPE M WWWWWWW NPT P P P P P P	TRA	/g Type: RMS gHold: 10/10	un	SENSE: Trig: Free	enter Freq 515.000000 MHz				
Auto Tur	IFGainLow #Atten: 20 dB DETPEPTER Ref Offset 12.31 dB Mkr1 537.37 MHz							0 dB/div		
Center Fre									og	
515.000000 MH									10.0	
Start Fre									0.00	
30.000000 M	-	-		_					10.0	
Stop Fre	-25.04 dBm								20.0	
1.00000000 GF		_							30.0	
CF Ste									40.0	
<u>uto</u> Ma				•1					50.0	
Freq Offs	le balturis il alle, s	Las or Auto dates	a ju, Italijas dipetij				بالغالب ريبا	na disa kauta di	60.0	
01	tul a fin aline	and group of	(tageta) (tageta)	fother and the state	Lugladan	a state of the sta		Weiner Street	70.0	
	.0000 GHz	Stop 1. 94.00 ms (3				#VBW :			Start 30.0	

#### BLE\_1M\_Ant1\_2480\_1000~26500

ent Spectrum Analyzer	Swept SA	SENSEPULSE	ALIGN OFF	04:40:45 AM 3un 27, 2024						
nter Freq 13.75		Trig: Free Run #Atten: 20 dB	#AvgType: RMS TRACE 123456 AvgHold: 10/10 DELPPPPP		Frequency Auto Tu					
Ref Offset 12.31 dB Mkr2 2.654 95 GHz dB/div Ref 20.00 dBm -48.324 dBm										
					Center Fi 13.750000000 G					
2				-25.04 dBn	Start F					
					Stop F 26.500000000					
rt 1.00 GHz es BW 100 kHz										
MODE TRC SCL N 1 f N 1 f	2.479 85 GHz 2.654 95 GHz	-5.010 dBm -48.324 dBm	CTION FUNCTION WIDTH	FUNCTION VALUE	Auto N					
					Freq Off 0					
		-	STATU	s 😵 Align Now, All requi	red					

The End Report

Dongguan DN Testing Co., Ltd.