RF TEST REPORT

Applicant :	Zhuhai Miansleep Technology Co, Ltd.
Address:	Office 828, No.108 Xiang'ao Road, Hengqin New Area, Zhuhai City, China
Manufacturer:	Zhuhai Miansleep Technology Co, Ltd.
Address:	Office 828, No.108 Xiang'ao Road, Hengqin New Area, Zhuhai City, China
EUT Name:	Bluetooth Speaker
Trade mark:	MianSleep
Model:	A1
FCC ID:	2BV98-A1
Rating:	Type-C Input : DC 5V 3.7V by battery
Sample Received Date:	May 19, 2026
Test Date:	May 19, 2026~May 23, 2026
Applicable Standards:	CFR 47, FCC Part 15.247
Test Result	Pass

Prepared by: Evan Fang

Evan Fang/Project Engineer

Approved by: Bruce zhang

Bruce Zhang/Technical Manager

HD Testing Technology (GuangDong) Co., Ltd.

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Dongguan, Guangdong, China

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Revision History

Version	Date of Issue	Description
V00	May 23, 2026	Original Version

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1. TEST SUMMARY

FCC Part 15C	Description of Test	Result
15.247(b)(4),15.203	Antenna Requirement	Pass
15.247(b)(1)	Maximum Peak Conducted Output Power	Pass
15.247(a)	99% Bandwidth	Pass
15.247(a)(1)	20dB Bandwidth	Pass
15.247(a)(1)	Carrier Frequency Separation	Pass
15.247(a)(1)(iii)	Number of Hopping Frequency	Pass
15.247(a)(1)(iii)	Time of Occupancy(Dwell Time)	Pass
15.247(d)	Out of Band Conducted Emissions	Pass
15.247(d)	Band Edge	Pass
15.247(d)&15.205	Radiated Spurious Emissions	Pass
15.207(a)	Conducted Emission on AC Mains	Pass

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2. TEST SITE

2.1. Test Facility

HD Testing Technology (GuangDong) Co., Ltd.

Address: Building 1, No.18, Shihuan Road, Dongcheng Subdistrict, Dongguan, Guangdong, China

A2LA Certificate Number.:7547.01

FCC Designation Number:CN1419

FCC Test Firm Registration Number:361541

ISED Company Number:34332

ISED CAB identifier Number:CN0189

2.2. Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission(150KHz-30MHz)	±3.2dB
Radiated Emission(30MHz-1GHz)	±4.7dB
Radiated Emission (1GHz-6GHz)	±5.1dB
Radiated Emission (6GHz-18GHz)	±5.1dB

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.3. Test Environment Condition

Ambient Temperature:	24~25°C
Ambient Relative Humidity:	55~60 %

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3. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	Equipment No.	Cal. Date	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI	HDT-EM-003	Mar. 02, 2026	1 Year
Pulse limiter	Rohde&Schwarz	ESH3-Z2	HDT-EM-001	Mar. 02, 2026	1 Year
LISN	Rohde&Schwarz	ENV216	HDT-EM-002	Mar. 02, 2026	1 Year
Shielding Room	Taihe Mao Rui Electronic Equipment Co., Ltd.	8m*4m*4m	HDT-EM-030	Oct. 12, 2024	5 Year
EMI Test Receiver	Rohde&Schwarz	ESCI7	HDT-EM-005	Mar. 02, 2026	1 Year
Logarithmic Periodic Broadband Antenna	SCHWARZBECK	VULB9168	HDT-EM-009	Mar. 06, 2025	3 Year
Preamplifier	HP	8447F	HDT-EM-010	Mar. 02, 2026	1 Year
Horn Antenna	SCHWARZBECK	BBHA 9120D	HDT-EM-039	Mar. 06, 2025	3 Year
Preamplifier	/	1-18-53G22	HDT-EM-040	Mar. 02, 2026	1 Year
Anechoic Chamber	Taihe Mao Rui Electronic Equipment Co., Ltd.	9m*6m*6m	HDT-EM-030	Oct. 12, 2024	5 Year
Signal Analyzer	Keysight	N9020A	HDT-EM-038	Mar. 02, 2026	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40N	HDT-EM-069	Mar. 02, 2026	1 Year
18-40GHz Antenna	COM-MW	ZLB7-18-40G-777	HDT-EM-076	May 19, 2025	1 Year

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18-40GHz Preamplifier	QUANJUDA	LNA-18004000-50G35	HDT-EM-077	May 17, 2025	1 Year
Loop Antenna	Da Ze	ZN30900C	HDT-EM-053	May 16, 2025	3 Year
Filter	WCS Technology	ZBSF6-C2400-2483.5-294	HDT-EM-070	May 17, 2025	1 Year
RF Cable	Rosenberger	/	HDT-EM-078	May 17, 2025	3 Year
RF Cable	COM-MW	DCA9-2.92M80002.92M3.6-1304	HDT-EM-079	May 17, 2025	3 Year
DC Power	Agilent	E3632A	HDT-EM-043	Mar. 02, 2026	1Year
Power switching box	WCS Technology	SMU-3002	HDT-EM-047	Apr. 16, 2025	1 Year
RF Test Software	WCS Technology	WCN-Regulatory	Version 25.03.2901		
EMI Test Software	Tonscend	JS32-CE	Version 5.0.0		
EMI Test Software	Tonscend	JS32-RE	Version 5.0.0		

Note:The attenuator is integrated into the Power Switch Box and taken into consideration during testing.

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4. EUT DESCRIPTION

Product:	Bluetooth Speaker
Test Model:	A1
Additional Model:	N/A
Rating:	Type-C Input : DC 5V 3.7V by battery
FCC ID:	2BV98-A1
Antenna Type:	Chip Antenna
Antenna Gain:	1.7dBi
Operation Frequency:	2402-2480MHz
Number of Channels:	79
Modulation Type:	GFSK, π /4-DQPSK, 8DPSK
Hardware Version:	N/A
Software Version:	N/A

Note:
1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2) Antenna gain was provided by the applicant/ manufacturer, and the applicant/ manufacturer is responsible for its validity.
3) The test results in the report only apply to the tested sample.

4.1. Description of Test Configuration

Channel List for Bluetooth:

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471

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Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-

Test Channel

- Low Channel:2402MHz
- Middle Channel: 2441MHz
- High Channel:2480MHz

4.2. Equipment Modifications

Any modifications installed previous to testing by Zhuhai Miansleep Technology Co, Ltd..will be incorporated in each production model sold / leased in the United States.

No modifications were installed by HD Testing Technology (GuangDong) Co., Ltd..

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5. TEST METHODOLOGY

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10-2020 and KDB 558074 D01 DTS Meas Guidance v04.

5.1. EUT System Operation

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by DC 5V from adapter and DC 3.7 by battery during the test.

On GFSK/π/4-DQPSK,/8DPSK mode, only one antenna is used, and all modes were tested and only the worst case data is shown in the report.

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6. SETUP OF EQUIPMENT UNDER TEST

6.1. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment

No.	Equipment	Model	Serial No.	Manufacturer
1	Notebook	Lenovo Rescuer 15ISK	PF0GS9S1	Lenovo
2	Adapter	MDY-14-EE	/	MI

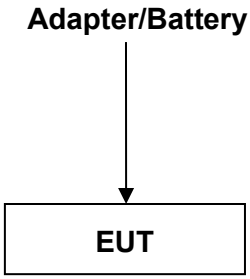
Support Cable

No.	Description	Shield	Length	Manufacturer
1	/	/	/	/
2	/	/	/	/

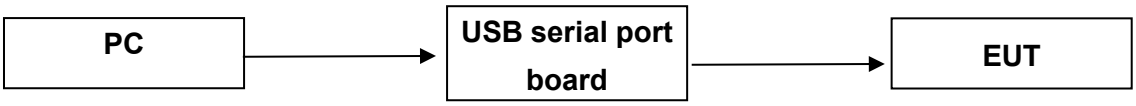
Note:
1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.2. Block Diagram of EUT Configuration

Conducted and radiated emission configuration



RF Conducted configuration



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6.3. EUT Exercise Software

Test software:FCC_assist_1.0.2.2

Mode	Power setting
GFSK	2
4-DQPSK	2
8PSK	2

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7. TEST RESULTS AND MEASUREMENT DATA

7.1. Antenna Requirement

Test Requirement:	FCC Part Part 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. FCC Part 15.247(b)(4) 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.if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.
Test Result:	According to the manufacturer declared, the EUT has a Chip antenna, the Maximum directional gain of antenna is 1.7dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision. Refer to EUT Photo for further details.

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7.2. Maximum Conducted Output Power

Test Requirement:	FCC Part 15.247 (b)(1)
Test Mode:	Transmitting mode with modulation
Limit:	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test Procedure:	This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test: a) Use the following spectrum analyzer settings: 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel. 2) RBW > 20 dB bandwidth of the emission being measured. 3) VBW >= RBW. 4) Sweep: Auto. 5) Detector function: Peak. 6) Trace: Max hold. b) Allow trace to stabilize. c) Use the marker-to-peak function to set the marker to the peak of the emission. d) The indicated level is the peak output power, after any corrections for external attenuators and cables. e) A plot of the test results and setup description shall be included in the test report. NOTE:A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.
Test Result:	PASS

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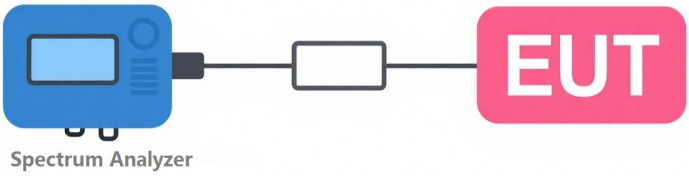
7.2.1. Test Setup:



7.2.2. Test Result

Please refer to Appendix A:Test Results of Bluetooth BR & EDR

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7.3. 99% Bandwidth

Test Requirement:	FCC Part15.247 (a)
Test Mode:	Transmitting mode with modulation
Limit:	/
Test Procedure:	a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
Test Result:	PASS

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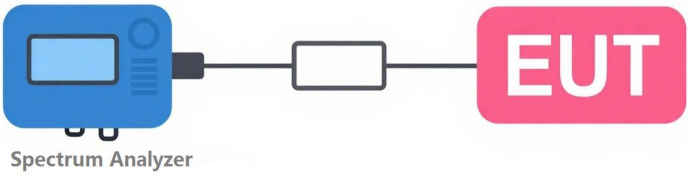
7.3.1. Test Setup:



7.3.2. Test Result

Please refer to Appendix A:Test Results of Bluetooth BR & EDR

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7.4. 20dB Bandwidth

Test Requirement:	FCC Part15.247 (a)(1)
Test Mode:	Transmitting mode with modulation
Limit:	/
Test Procedure:	a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the

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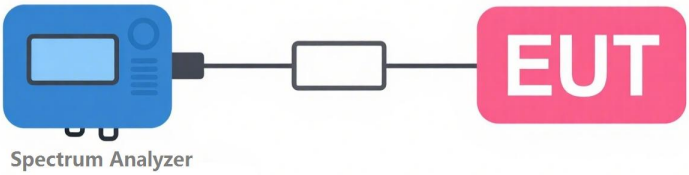
	trace from step g) shall be used for step j). j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “−xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth. k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).
Test Result:	PASS

7.4.1. Test Setup



7.4.2. Test Result

Please refer to Appendix A:Test Results of Bluetooth BR & EDR

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7.5. Carrier Frequency Separation

Test Requirement:	FCC Part15.247 (a)(1)
Test Mode:	Transmitting mode with modulation
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Test Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.
Test Result:	PASS

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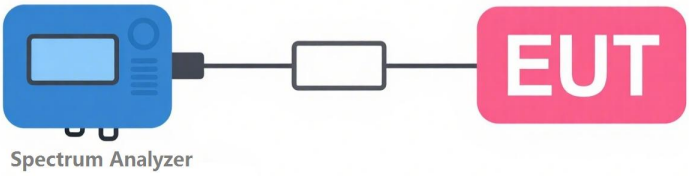
7.5.1. Test Setup



7.5.2. Test Result

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7.6. Number of Hopping Frequency

Test Requirement:	FCC Part15.247 (a)(1)(iii)
Test Mode:	Transmitting mode with modulation
Limit:	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen. b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. c) VBW ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.
Test Result:	PASS

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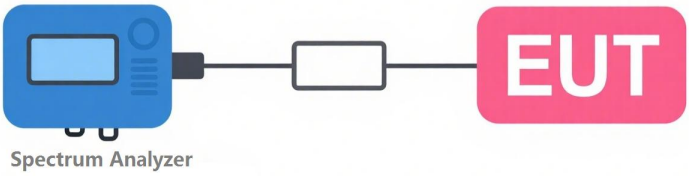
7.6.1. Test Setup



7.6.2. Test Result

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7.7. Time of Occupancy(Dewell Time)

Test Requirement:	FCC Part15.247 (a)(1)(iii)
Test Mode:	Transmitting mode with modulation
Limit:	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Zero span, centered on a hopping channel. b) RBW shall be <= channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel. c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel. d) Detector function: Peak. e) Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

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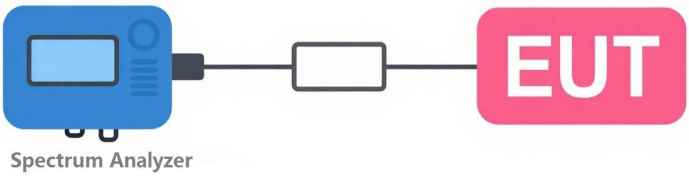
	(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time) The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation. The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.
Test Result:	PASS

7.7.1. Test Setup



7.7.2. Test Result

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7.8. Out of Band Conducted Emission

Test Requirement:	FCC Part15.247 (d)
Test Mode:	Transmitting mode with modulation
Limit:	At least 20 dB below the highest level of the desired power in the pass band.

Frequency Range (MHz)	Field Strength (microvolts/meter)	Measurement Distance(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Procedure:

Measurement Procedure -Reference Level

Set the RBW = 100 kHz.

Set the VBW ≥ 300 kHz.

Detector = peak.

Sweep time = auto couple

Trace mode = max hold.。

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure -Unwanted Emission Level

Set RBW = 100 kHz.

Set VBW ≥ 300 kHz.

Set span to encompass the spectrum to be examined.

Detector = peak.

Trace Mode = max hold.

Sweep = auto couple.

Test Result: PASS

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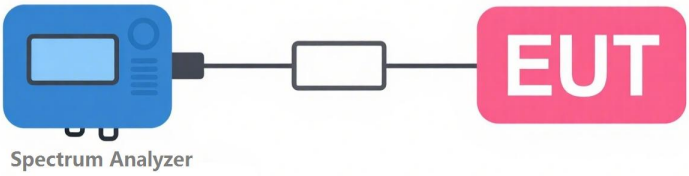
7.8.1. Test Setup:



7.8.2. Test Result

Please refer to Appendix A:Test Results of Bluetooth BR & EDR

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7.9. Band Edge

Test Requirement:	FCC Part15.247 (d)
Test Mode:	Transmitting mode with modulation
Limit:	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 – provided that the transmitter demonstrates compliance with the peak conducted power limits.

Frequency Range (MHz)	Field Strength (microvolts/meter)	Measurement Distance(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Procedure:	1. The EUT was placed on a turntable with 1.5 meter for frequency above 1GHz respectively above ground. 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. 3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines. Set to the maximum power setting and enable the EUT transmit continuously. Note:Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis(X, Y, Z,). The worst case emissions were reported
Test Result:	Pass

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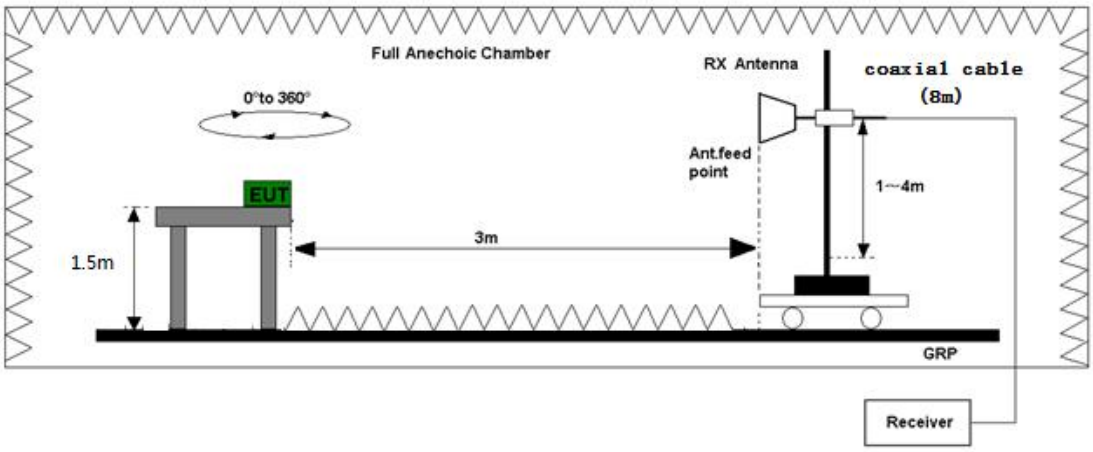
7.9.1. Test Setup:



Test set-up of radiated disturbance (30MHz to 1GHz)

7.9.2. Test Result

Test Voltage	DC 3.7V by battery

Only worse case π/4-DQPSK is reported.

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π /4-DQPSK-2402MHz:

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	2390.05	60.65	37.21	-23.44	74.00	36.79	150	10	PK	Horizontal	PASS
2	2390.05	50.78	27.34	-23.44	54.00	26.66	150	10	AV	Horizontal	PASS

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	2390.05	62.36	38.92	-23.44	74.00	35.08	150	10	PK	Vertical	PASS
2	2390.05	51.52	28.08	-23.44	54.00	25.92	150	10	AV	Vertical	PASS

Note:(1)Emission Level=Reading-Factor

(2)Factor=Antenna Factor+ Cable Loss - Amplifier Factor

(3)Margin=limit-Level

π /4-DQPSK-2480MHz:

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	2483.52	59.84	36.39	-23.45	74.00	37.61	150	20	PK	Horizontal	2483.57
2	2483.52	51.36	27.91	-23.45	54.00	26.09	150	10	AV	Horizontal	PASS

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	2483.52	62.27	38.82	-23.45	74.00	35.18	150	10	PK	Vertical	PASS
2	2483.52	51.53	28.08	-23.45	54.00	25.92	150	10	AV	Vertical	PASS

Note:(1)Emission Level=Reading-Factor

(2)Factor=Antenna Factor+ Cable Loss - Amplifier Factor

(3)Margin=limit-Level

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7.10. Radiated Spurious Emissions

Test Requirement:	FCC Part 15.247(d), 15.205
Test Mode:	Transmitting mode with modulation
Limit:	

Frequency Range (MHz)	Field Strength (microvolts/meter)	Measurement Distance(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Procedure:	Radiated emission measurements were performed from 9kHz to tenth harmonic or 40GHz. The EUT for testing is arranged on a styrene turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter. Note:Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis(X, Y, Z,). The worst case emissions were reported
Test Result:	Pass

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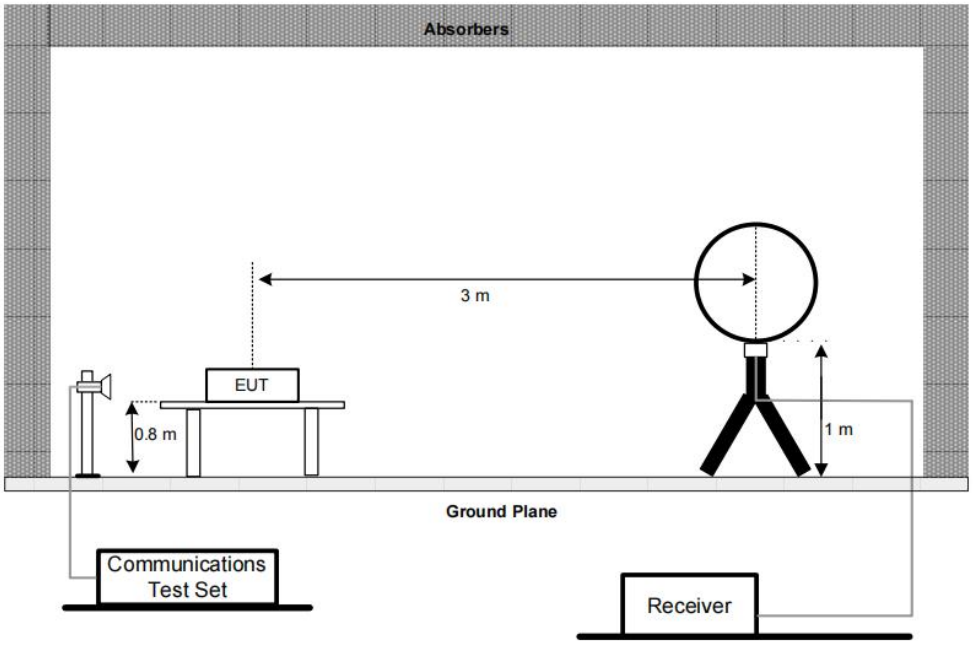
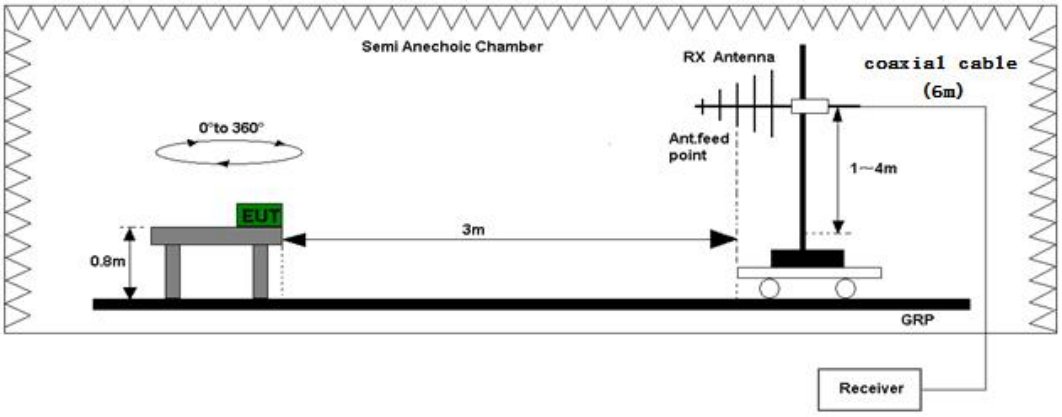
7.10.1. Test Setup:



Test set-up of radiated disturbance (Up to 30MHz)



Test set-up of radiated disturbance (30MHz to 1GHz)

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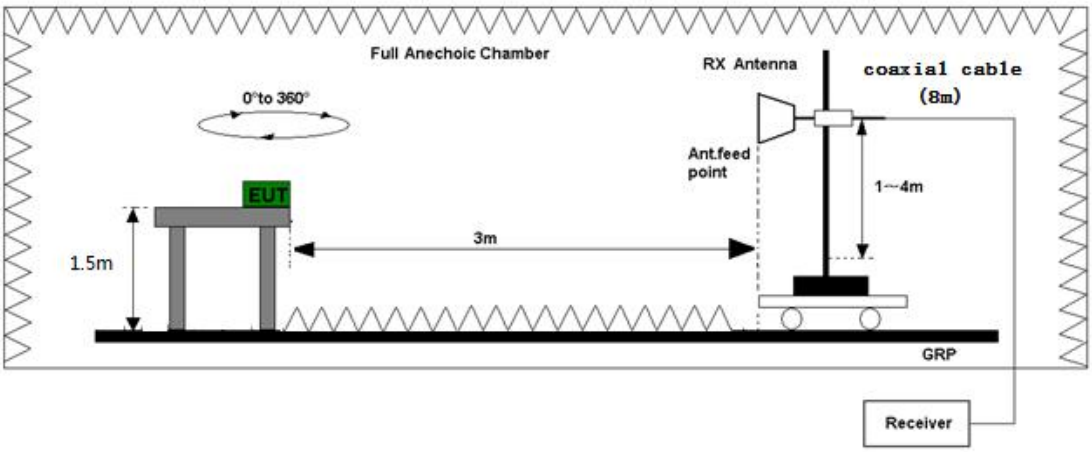

Test set-up of radiated disturbance (Above 1GHz)

7.10.2. Test Result

Test Voltage	DC 3.7V by battery

Note:

1.The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

2.Only worse case π/4-DQPSK is reported.

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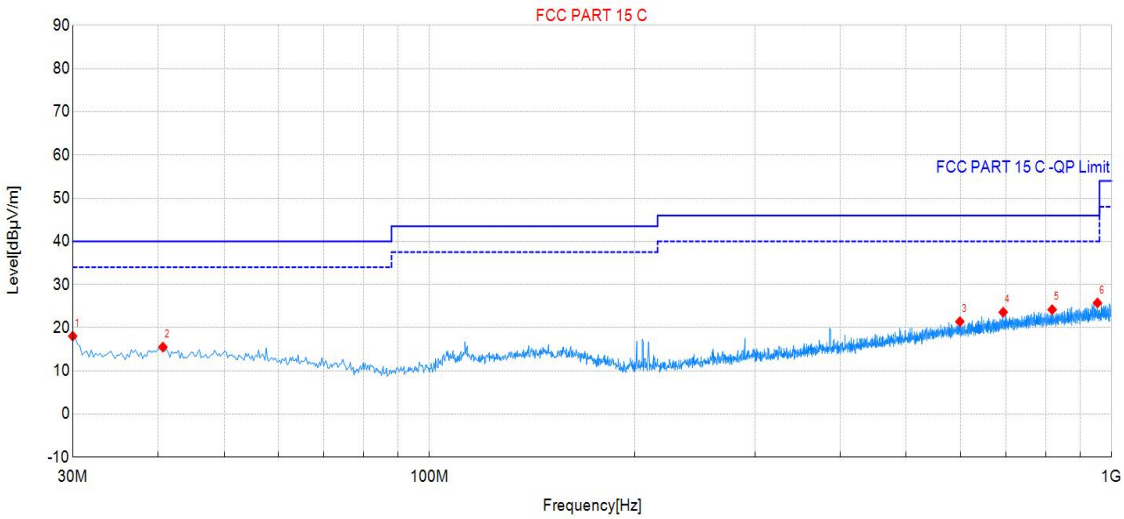
Worst-case Spurious Emission below 1GHz

π /4-DQPSK-2402MHz

Please refer to the following diagram:

Vertical:



Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	30.00	35.84	18.05	-17.79	40.00	21.95	100	212	PK	Vertical	PASS
2	40.67	32.54	15.52	-17.02	40.00	24.48	100	15	PK	Vertical	PASS
3	599.15	31.52	21.40	-10.12	46.00	24.60	100	109	PK	Vertical	PASS
4	693.48	32.48	23.60	-8.88	46.00	22.40	100	360	PK	Vertical	PASS
5	818.13	31.98	24.19	-7.79	46.00	21.81	100	194	PK	Vertical	PASS
6	953.20	32.54	25.75	-6.79	46.00	20.25	100	324	PK	Vertical	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

(3)Factor=Antenna Factor+ Cable Loss - Amplifier Factor

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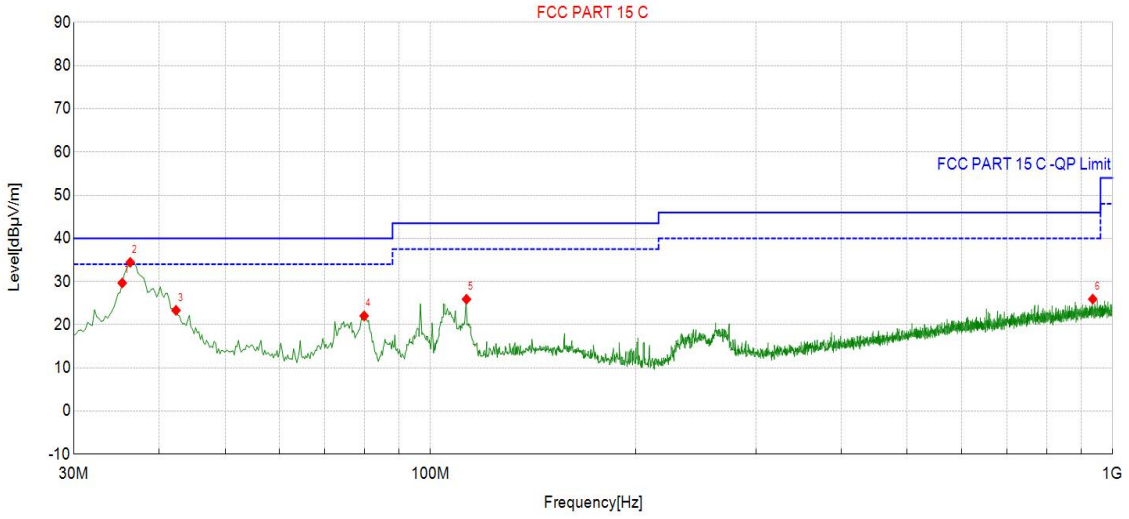
Horizontal:



Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	35.34	47.13	29.67	-17.46	40.00	10.33	100	296	PK	Horizontal	PASS
2	36.31	51.82	34.45	-17.37	40.00	5.55	100	288	PK	Horizontal	PASS
3	42.37	40.38	23.33	-17.05	40.00	16.67	100	359	PK	Horizontal	PASS
4	79.96	42.70	22.04	-20.66	40.00	17.96	100	296	PK	Horizontal	PASS
5	112.94	44.45	25.91	-18.54	43.50	17.59	100	127	PK	Horizontal	PASS
6	935.01	32.87	25.94	-6.93	46.00	20.06	100	137	PK	Horizontal	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

(3)Factor=Antenna Factor+ Cable Loss - Amplifier Factor

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Worst-case Radiated Emissions (Above 1GHz）

π /4-DQPSK-2402MHz:

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	4804.03	68.32	49.36	-18.96	74.00	24.64	150	190	PK	Horizontal	PASS
2	4804.03	57.28	38.32	-18.96	54.00	15.68	150	310	AV	Horizontal	PASS

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	4804.03	70.27	51.31	-18.96	74.00	22.69	150	170	PK	Vertical	PASS
2	4804.03	59.19	40.23	-18.96	54.00	13.77	150	136	AV	Vertical	PASS

π /4-DQPSK-2441MHz:

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	4882.08	71.68	52.80	-18.88	74.00	21.20	150	149	PK	Horizontal	PASS
2	4882.08	60.37	41.49	-18.88	54.00	12.51	150	186	AV	Horizontal	PASS

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	4882.08	67.53	48.65	-18.88	74.00	25.35	150	196	PK	Vertical	PASS
2	4882.08	57.37	38.49	-18.88	54.00	15.51	150	186	AV	Vertical	PASS

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π /4-DQPSK-2480MHz:

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	4960.09	68.51	49.77	-18.74	74.00	24.23	150	157	PK	Horizontal	PASS
2	4960.09	56.27	37.53	-18.74	54.00	16.47	150	220	AV	Horizontal	PASS

Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	4960.09	65.39	46.65	-18.74	74.00	27.35	150	250	PK	Vertical	PASS
2	4960.09	54.64	35.90	-18.74	54.00	18.10	150	190	AV	Vertical	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

(3)Factor=Antenna Factor+ Cable Loss - Amplifier Factor

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7.11. Conducted Emission

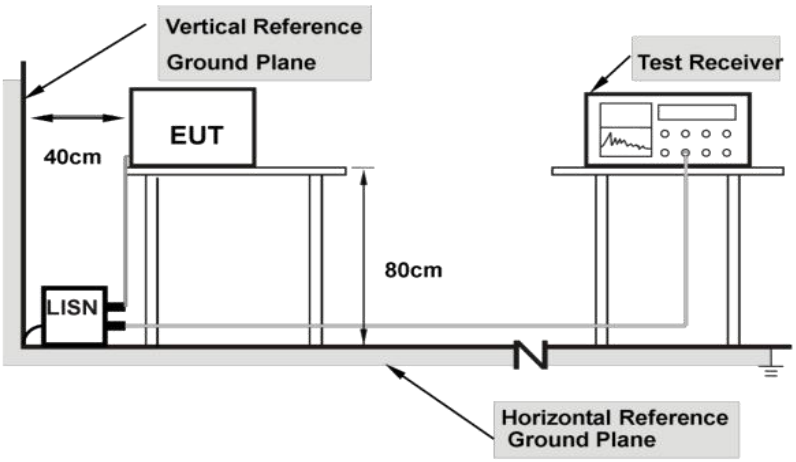
Test Requirement:	FCC Part 15.207(a)
Test Mode:	Transmitting mode with modulation
Limit:	

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	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 logarithm of the frequency.

Test Procedure:	For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. The EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.
Test Result:	Pass

7.11.1. Test Setup



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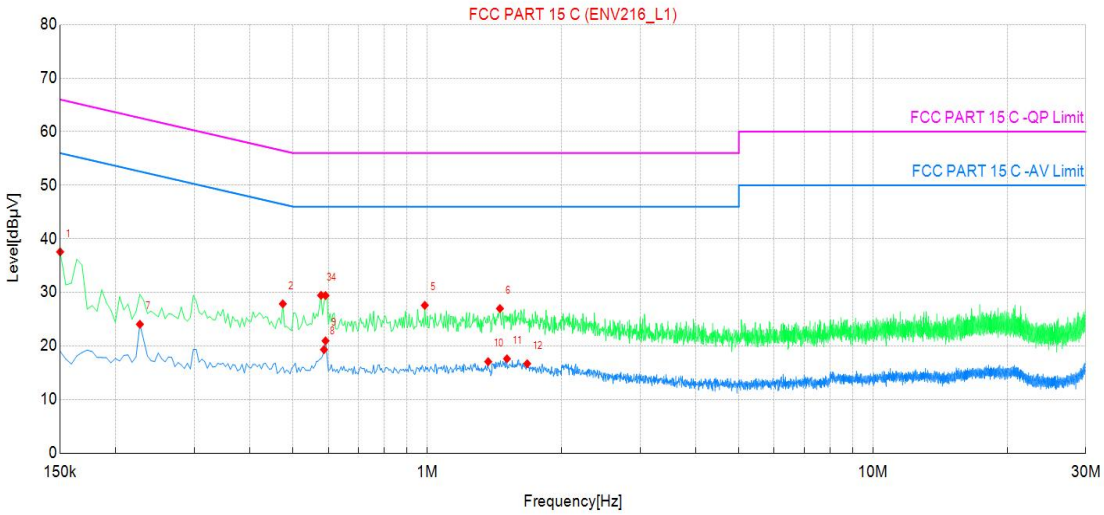
7.11.2. Test Result

Test Voltage	DC 5V from adapter(120V/60Hz)

Worst-case: π /4-DQPSK-2402MHz

Please refer to the following diagram:

Line:



Suspected Data List									
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Phase	Detector	Verdict
1	0.150000	18.28	37.57	19.29	66.00	28.43	L1	PK	PASS
2	0.474000	8.76	27.86	19.10	56.44	28.58	L1	PK	PASS
3	0.577500	10.28	29.45	19.17	56.00	26.55	L1	PK	PASS
4	0.591000	10.23	29.41	19.18	56.00	26.59	L1	PK	PASS
5	0.987000	8.38	27.58	19.20	56.00	28.42	L1	PK	PASS
6	1.455000	7.78	26.98	19.20	56.00	29.02	L1	PK	PASS
7	0.226500	4.87	24.05	19.18	52.58	28.53	L1	AV	PASS
8	0.586500	0.14	19.32	19.18	46.00	26.68	L1	AV	PASS
9	0.591000	1.78	20.96	19.18	46.00	25.04	L1	AV	PASS
10	1.369500	-2.13	17.07	19.20	46.00	28.93	L1	AV	PASS
11	1.509000	-1.59	17.61	19.20	46.00	28.39	L1	AV	PASS
12	1.675500	-2.51	16.69	19.20	46.00	29.31	L1	AV	PASS

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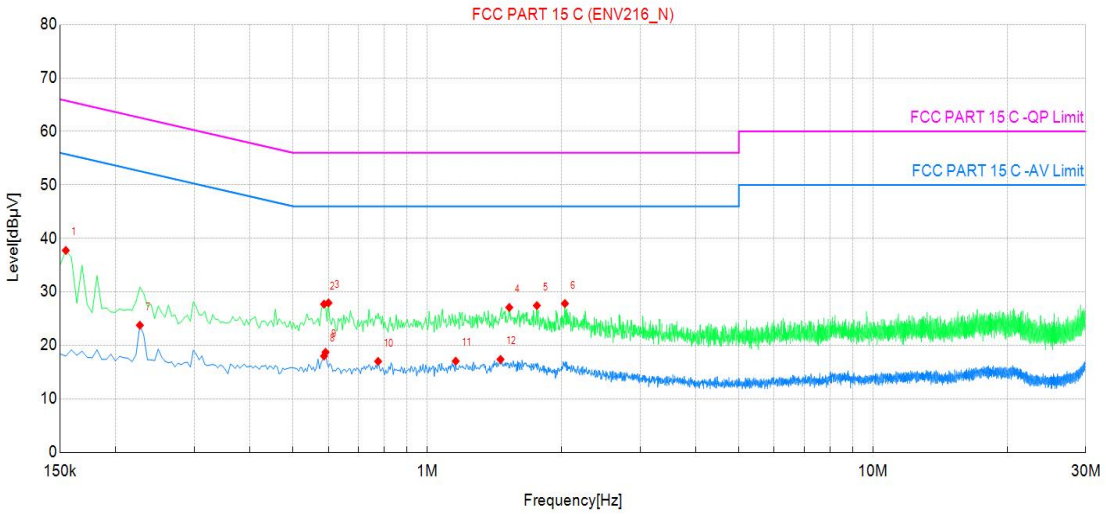
Neutral:



Suspected Data List									
NO.	Frequency [MHz]	Reading [dBµV]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Phase	Detector	Verdict
1	0.154500	18.56	37.75	19.19	65.75	28.00	N	PK	PASS
2	0.586500	8.47	27.70	19.23	56.00	28.30	N	PK	PASS
3	0.600000	8.70	27.94	19.24	56.00	28.06	N	PK	PASS
4	1.527000	7.89	27.09	19.20	56.00	28.91	N	PK	PASS
5	1.761000	8.24	27.44	19.20	56.00	28.56	N	PK	PASS
6	2.035500	8.62	27.82	19.20	56.00	28.18	N	PK	PASS
7	0.226500	4.57	23.76	19.19	52.58	28.82	N	AV	PASS
8	0.586500	-1.23	18.00	19.23	46.00	28.00	N	AV	PASS
9	0.591000	-0.53	18.71	19.24	46.00	27.29	N	AV	PASS
10	0.775500	-2.27	17.00	19.27	46.00	29.00	N	AV	PASS
11	1.158000	-2.15	17.05	19.20	46.00	28.95	N	AV	PASS
12	1.459500	-1.83	17.37	19.20	46.00	28.63	N	AV	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

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8. PHOTOGRAPHS OF TEST SET-UP

For photographs of the test set-up, refer to the appendix file.(Test Setup Photo)

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9. PHOTOGRAPHS OF EUT

For photographs of the EUT, refer to the appendix file(EUT External Photos and EUT Internal Photos).

*** End of Report ***

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