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### **TEST REPORT**

Test Result :	PASS *
Date of Issue:	2024/03/11
Date of Test:	2024/01/28 to 2024/03/11
Date of Receipt:	2024/01/19
Standards:	FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C
FCC ID:	O57KB331U
Trade Mark:	Lenovo
Model No.:	KB331U
EUT Description:	Wireless Keyboard
Address of Manufacturer:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China
Manufacturer:	Lenovo PC HK Limited
Address of Applicant:	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone
Applicant:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Application No.:	SZCR2401000270AT

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Keny. Ku

Keny Xu Laboratory Manager



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### 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024/03/11		Original

Prepared By	Jack Huang) / Test Engineer
Checked By	Flora Wang (Flora Wang) / Reviewer



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#### **Test Summary** 2

Test Item	FCC Rule No.	Test Method	Test Result	Result
Antenna Requirement	15.203/15.247(b)		Clause 4.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10 2013 Section 6.2	Clause 4.2	PASS
Duty cycle		ANSI C63.10 2013 Section 11.6	Clause 4.3	For Report Purpose
Conducted Output Power	15.247 (b)(3)	ANSI C63.10 2013 Section11.9.1.3	Clause 4.4	PASS
DTS (6 dB) Bandwidth & 99% Occupied Bandwidth	15.247 (a)(2)	ANSI C63.10 2013 Section 11.8 Option 2 / 6.9.3	Clause 4.5	PASS
Power Spectral Density	15.247 (e)	ANSI C63.10 2013 Section 11.10.2	Clause 4.6	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 2013 Section 11.11	Clause 4.7	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 2013 Section 11.11	Clause 4.8	PASS
Radiated Spurious Emissions	15.205/15.209	ANSI C63.10 2013 Section 11.12	Clause 4.9	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.205/15.209	ANSI C63.10 2013 Section 11.12	Clause 4.10	PASS



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### **3** General Information

#### 3.1 Details of Client

Applicant:	Lenovo (Shanghai) Electronics Technology Co., Ltd.		
Address of Applicant:	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone		
Manufacturer:	Lenovo PC HK Limited		
Address of Manufacturer:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China		

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch		
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nans District, Shenzhen, Guangdong, China		
Post code:	518057		
Test engineer:	Jinhua Wei, Xing Guo		

#### 3.3 Test Facility

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

#### • A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

#### • VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

#### Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

#### • FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch has been recognized as an accredited testing laboratory.

Designation Number: CN1336.

Test Firm Registration Number: 787754



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#### 3.4 General Description of EUT

EUT Description:	Wireless Keyboard
Model No.:	KB331U
Trade Mark:	Lenovo
Hardware Version:	KA024_MB_V0.20
Software Version:	KA024-A-0.09
Power Supply:	DC 3.8V from internal rechargeable battery which can be charge by AC/DC adapter.
Operation Frequency:	2400MHz~2483.5MHz fc = 2402 MHz + N * 2 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 39.
Bluetooth version:	Bluetooth V5.3
Modulation Type:	GFSK
Number of Channel:	40
	Provided by client
Rates Type*:	1M PHY 2M PHY
Antenna Type:	PIFA Antenna
	2.5dBi
Antenna Gain:	Note: The antenna gain are derived from the gain information report provided by the manufacturer.
RF Cable:	2000MHz ~ 3000MHz(1.1dB)
	ata and/or information is provided by the client relevant results or conclusions of this hese data and/or information. SGS is not responsible for the authenticity, integrity

report are only made for these data and/or information, SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion. Remark:

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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

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH0)	2402MHz
The Middle channel(CH19)	2440MHz
The Highest channel(CH39)	2480MHz



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#### 3.5 Test Environment

Environment Parameter	101.0 kPa Selected Values During Tests			
Relative Humidity	44-46 % RH Ambient			
Value	Temperature(°C) Voltage(V)			
NTNV	22~23 3.8			
Remark: NV: Normal Voltage NT: Normal Temperature				

#### 3.6 Description of Support Units

The EUT has been tested as an independent unit.



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### 4 Test results and Measurement Data

#### 4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(b) 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 PIFA Antenna and no consideration of replacement. The best case gain of the antenna is 2.5dBi. \* \*Note: The antenna gain are derived from the gain information report provided by the manufacturer.

The antenna gain are Remark:

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#### 4.2 AC Power Line Conducted Emissions

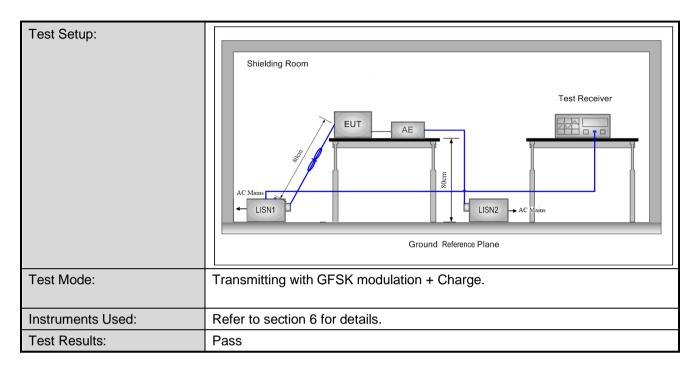
Test Requirement:	47 CFR Part 15C Section	n 15.207			
Test Method:	ANSI C63.10: 2013 Section 6.2				
Test Frequency Range:	150kHz to 30MHz				
Receiver Setup:	RBW = 9kHz, VBW = 30kHz				
Limit:		Limit (d	BuV)		
	Frequency range(MHz)	Quasi-peak	Average		
	0.15-0.5	66 to 56*	56 to 46*		
	0.5-5	56	46		
	5-30	60	50		
	* Decreases with the log	arithm of the frequency.			
Test Procedure:	<ul> <li>5-30 60 50</li> <li>* Decreases with the logarithm of the frequency.</li> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω lineal impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was betwee the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipmen and all of the interface cables must be changed according to</li> </ul>				



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#### 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

nase:	Line								
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	Condi Job N	tion: Li o. : 00 mode: 00	ne 270AT Cable	LISN	Level		Line	Limit	Remark
	Condi Job N	tion: Li o. : 00 mode: 00 Freq	ne 270AT Cable Loss	LISN Factor		Level dBuV			Remark
	Condi Job N Test -	tion: Li o. : 00 mode: 00 Freq MHz 0.1516	ne 270AT Cable Loss	LISN Factor	Level dBuV 16.44	dBuV 26.34	Line dBuV 65.91	Limit dB -39.57	Remark
	Condi Job N Test - 1 2	tion: Li o. : 00 mode: 00 Freq MHz 0.1516 0.1516	ne 270AT Cable Loss dB 0.02 0.02	LISN Factor dB 9.88 9.88	Level dBuV 16.44 -6.22	dBuV 26.34 3.68	Line dBuV 65.91 55.91	Limit dB -39.57 -52.23	Remark  QP Average
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	Condi Job N Test 1 2 3 4 5	tion: Li o. : 00 mode: 00 Freq MHz 0.1516 0.1516 0.2151 0.2151 0.3251	ne 270AT Cable Loss dB 0.02 0.02 0.03 0.03 0.03 0.03	LISN Factor dB 9.88 9.88 9.94 9.94 10.02	Level dBuV 16.44 -6.22 11.92 -7.52 12.20	dBuV 26.34 3.68 21.89 2.45 22.25	Line dBuV 65.91 55.91 63.01 53.01 59.57	Limit dB -39.57 -52.23 -41.12 -50.56 -37.32	QP Average QP Average QP
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	Condi Job N Test 1 2 3 4 5 6 7 *	tion: Li o. : 00 mode: 00 Freq 0.1516 0.1516 0.2151 0.2151 0.3251 0.3251 0.6973	ne 270AT Cable Loss dB 0.02 0.03 0.03 0.03 0.03 0.03 0.03 0.05	LISN Factor dB 9.88 9.88 9.94 9.94 10.02 10.02 9.97	Level dBuV 16.44 -6.22 11.92 -7.52 12.20 -4.19 12.94	dBuV 26.34 3.68 21.89 2.45 22.25 5.86 22.96	Line dBuV 65.91 55.91 63.01 53.01 59.57 49.57 56.00	Limit dB -39.57 -52.23 -41.12 -50.56 -37.32 -43.71 -33.04	QP Average QP Average QP Average QP
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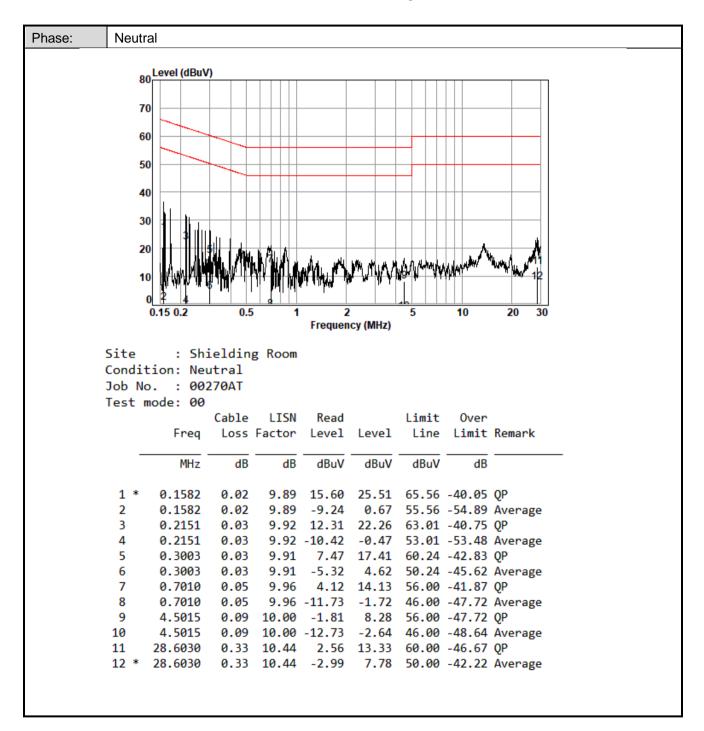


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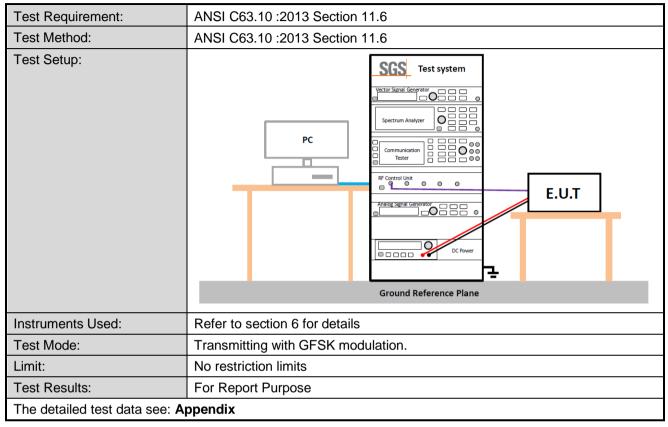
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#### 4.3 Duty Cycle





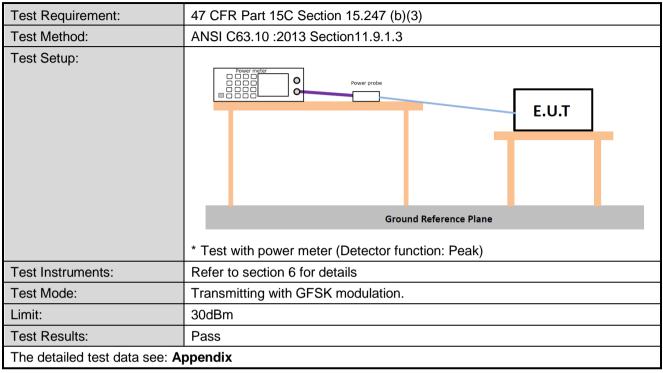
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#### 4.4 Conducted Output Power





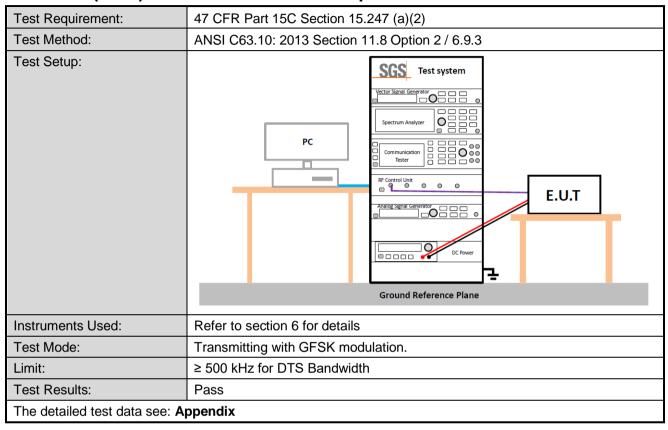
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http://www.analog.mino.mouse-ecology.com/comment/comme

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### 4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth





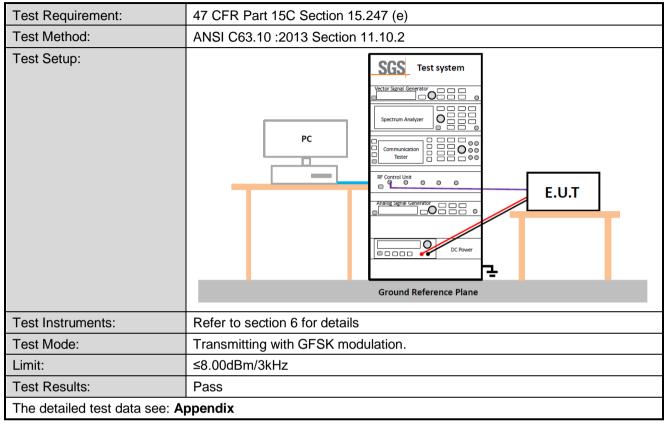
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#### 4.6 Power Spectral Density





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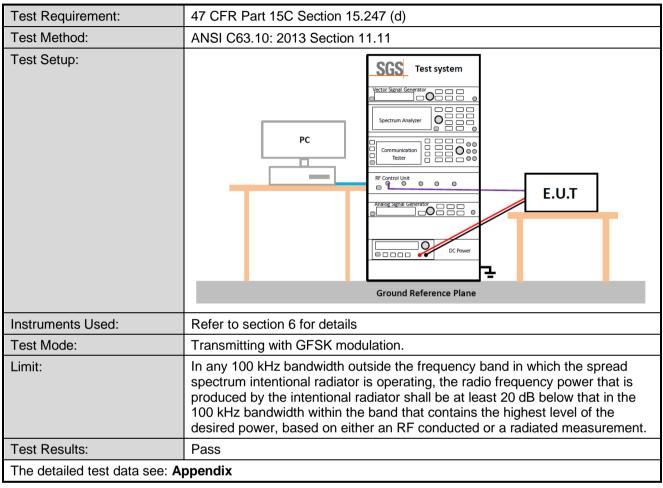
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#### 4.7 Band-edge for RF Conducted Emissions



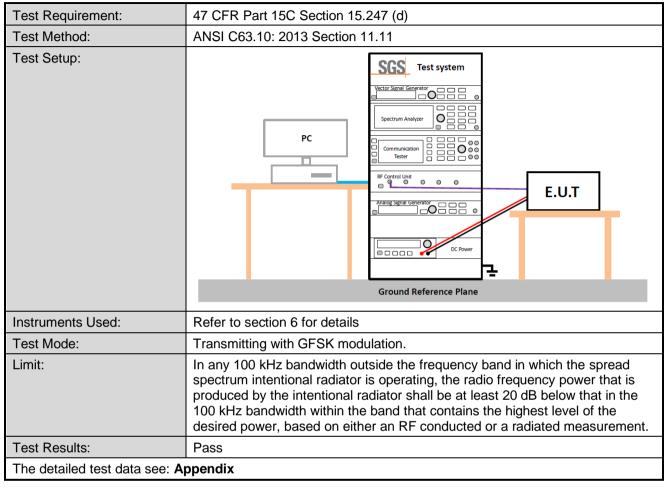


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#### 4.8 **RF Conducted Spurious Emissions**





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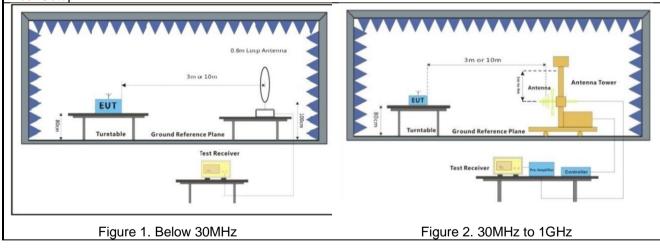
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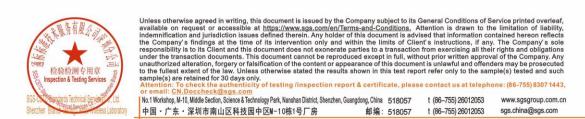
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### 4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10 :2013 Section 11.12						
Test Site:	Measurement Distance:	3m (Semi-Anecho	ic Chamber)				
Test Frequency:	9kHz ~ 25GHz						
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)		
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300		
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30		
	1.705MHz-30MHz	30	-	-	30		
	30MHz-88MHz	100	40.0	Quasi-peak	3		
	88MHz-216MHz 150 43.5 Quasi-peak						
	216MHz-960MHz	Quasi-peak	3				
	960MHz-1GHz         500         54.0         Quasi-peak         3           Above 1GHz         500         54.0         Average         3						
Remark: 15.35(b),Unless otherwise specified, the limit on peak radio frequer emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total pe emission level radiated by the device.							
Test Setup:							





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	Figure 3. Above 1 GHz
Test Procedure:	<ul> <li>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation (Distance from antenna to EUT is 1m for measurements &gt;18GHz).</li> <li>c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>g. Test the EUT in the lowest channel, the middle channel ,the Highest channel.</li> <li>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</li> <li>i. Repeat above procedures until all frequencies measured was complete.</li> <li>j. 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 increased by 20t1 OC(2(1) = 0.54 dP.</li> </ul>
Test Configuration:	20*LOG(3/1) = 9.54 dB. Measurements below 30MHz • RBW = 10 kHz • VBW = 30 kHz • Detector = Peak & Average & Quasi-peak



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	<ul> <li>Trace mode = max hold</li> </ul>
	Measurements Below 1000MHz
	• RBW = 120 kHz
	• VBW = 300 kHz
	<ul> <li>Detector = Quasi-peak</li> </ul>
	<ul> <li>Trace mode = max hold</li> </ul>
	Peak Measurements Above 1000 MHz
	• RBW = 1 MHz
	• VBW ≥ 3 MHz
	• Detector = Peak
	Sweep time = auto
	<ul> <li>Trace mode = max hold</li> </ul>
	Average Measurements Above 1000MHz
	• RBW = 1 MHz
	<ul> <li>VBW = 10 Hz, when duty cycle is no less than 98 percent.</li> </ul>
	<ul> <li>VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum</li> </ul>
	transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test	Transmitting with GFSK modulation.
Mode:	Charge + Transmitting mode.
	Transmitting with GFSK modulation.
Final Test Meder	Pretest the EUT at Charge + Transmitting mode,
Final Test Mode:	For below 1GHz part, through pre-scan all channels, but only the worst case is
	recorded in the report.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data	see: Appendix



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#### 4.10Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205					
Test Method:	ANSI C63.10: 2013 Section 11.12					
Test Site:	Measurement Distance: 3m	(Semi-Anechoic Cham	ber)			
Limit:	Frequency	Frequency Limit (dBuV/m) Remark				
	30MHz-88MHz	Quasi-peak				
	88MHz-216MHz         43.5         Quasi-peak           216MHz-960MHz         46.0         Quasi-peak					
	960MHz-1GHz 54.0 Quasi-peak					
		54.0	Average Value			
	Above 1GHz 74.0 Peak Value					

Test Setup:

	eference Plane	Im or 3m Im or 3m Functional actions of the maximum of the maxim			
Figure <sup>-</sup>	1. 30MHz to 1GHz	Figure 2. Above 1 GHz			
Test Procedure:	above the ground at a rotated 360 degrees to b. For above 1GHz, the I meters above the grou	EUT was placed on the top of a rotating table 0.8 meters 3 or 10 meter semi-anechoic camber. The table was o determine the position of the highest radiation. EUT was placed on the top of a rotating table 1.5 and at a 3 meter semi-anechoic camber. The table was o determine the position of the highest radiation.			
		10 meters away from the interference-receiving ounted on the top of a variable-height antenna tower.			
<ul> <li>d. The antenna height is varied from one meter to four meters above the grout to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> </ul>					
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.					
	f. The test-receiver syste Bandwidth with Maxim	em was set to Peak Detect Function and Specified num Hold Mode.			



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<ul> <li>frequency to show compliance. Also measure any emissions in the restrict bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li> <li>h. Test the EUT in the lowest channel , the Highest channel</li> <li>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case</li> <li>j. Repeat above procedures until all frequencies measured was complete.</li> </ul>	
Test Configuration:       Measurements Below 1000MHz         • RBW = 120 kHz       • VBW = 300 kHz         • VBW = 300 kHz       • Detector = Quasi-peak         • Trace mode = max hold       Peak Measurements Above 1000 MHz         • RBW = 1 MHz       • VBW ≥ 3 MHz         • Detector = Peak       • Sweep time = auto         • Trace mode = max hold         Average Measurements Above 1000MHz         • RBW = 1 MHz         • VBW ≥ 3 MHz         • Detector = Peak         • Sweep time = auto         • Trace mode = max hold         Average Measurements Above 1000MHz         • RBW = 1 MHz         • VBW = 10 Hz, when duty cycle is no less than 98 percent.         • VBW ≥ 1/T, when duty cycle is less than 98 percent where T is 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.	
Exploratory Test Mode:       Transmitting with GFSK modulation.         Charge + Transmitting mode.	
Final Test Mode:       Transmitting with GFSK modulation.         Pretest the EUT at Charge + Transmitting mode.         Only the worst case is recorded in the report.	
Instruments Used: Refer to section 6 for details	
Test Results: Pass	
The detailed test data see: Appendix	



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

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.41dB
2	RF power density, conducted	±1.96dB
3	Spurious emissions, conducted	±0.41dB
4	Radio Frequency	±7.10 x 10 <sup>-8</sup> GHz
5	Duty Cycle	±0.49%
6	Occupied Bandwidth	±0.2%
7	Conducted Emissions at Mains Terminals (150kHz-30MHz)	± 3.0dB
		±4.8dB (30MHz-1GHz)
8	Dedicted Sourious omission test(UE)	±4.68dB (1GHz-6GHz)
o	Radiated Spurious emission test(UE)	±4.52dB (6GHz-18GHz)
		±5.26dB (18GHz-40GHz)

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispr/ETSI</sub> (CISPR/ETSI Uncertainty), so the test results

– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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### 6 Equipment List

RF Test System						
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)	
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	HTC-1	SZ-WRG-M-077	2023/05/25	2024/05/24	
Spectrum Applyzer	Rohde & Schwarz	FSV		2023/02/16	2024/02/15	
Spectrum Analyzer	Ronue & Schwarz	FOV	SZ-WRG-M-012	2024/01/30	2025/01/29	
DC power supply	HYELEC	HY3005B	SZ-WRG-M-044	2023/09/14	2024/09/13	
INSULATION TESTER	FLUKE	1508	SZ-WRG-M-060	2023/12/22	2024/12/21	
Wideband Radio	Dobdo 8 Sobuerz			2023/02/16	2024/02/15	
Communication Tester	Ronue & Schwarz	de & Schwarz CMW500 SZ-WRG-M-033	52-WRG-IVI-033	2024/01/30	2025/01/29	
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SZ-WRG-M-017	2023/12/21	2024/12/20	
Signal Concretor		N5182A	SZ-WRG-M-041	2023/02/16	2024/02/15	
Signal Generator	KEYSIGHT		32-WKG-W-041	2024/01/30	2025/01/29	

Conducted Emissions at Mains Terminals (150kHz-30MHz)						
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)	
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2022/05/14	2025/05/13	
EMI Test Receiver	Rohde&Schwarz	ESCI	SEM004-02	2023/03/20	2024/03/19	
Measurement Software	AUDIX	e3 V8.2014-6- 27a	N/A	NCR	NCR	
Coaxial Cable	SGS	N/A	SEM024-01	2023/07/07	2024/07/06	
LISN	Rohde&Schwarz	ENV216	SEM007-01	2023/09/19	2024/09/18	
LISN	ETS-LINDGREN	3816/2	SEM007-02	2023/03/20	2024/03/19	

Remark: NCR=No Calibration Requirement



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Radiated spurious emissions								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
EMI TEST	Rohde & Schwarz	ESR	SZ-WRG-M-047	2023/02/16	2024/02/15			
RECEIVER				2024/01/30	2025/01/29			
Signal &Spectrum	Rohde &	FSV	SZ-WRG-M-048	2023/02/16	2024/02/15			
Analyzer	Schwarz	130	32-11110-10-040	2024/01/30	2025/01/29			
Low Noise Amplifier 9K- 3GHz*	Tonscend	TAP9K3G32	SEM005-23	2024/03/05	2025/03/04			
Low Noise				2023/02/16	2024/02/15			
Amplifier 30M-8GHz	Tonscend	TAP30M8G30	SZ-WRG-M-050	2024/01/30	2025/01/29			
Low Noise	Teresend	TA D01010050	SZ-WRG-M-051	2023/02/16	2024/02/15			
Amplifier 1G-18GHz	Tonscend	TAP01018050	52-WRG-M-051	2024/01/30	2025/01/29			
Low Noise	Tanaaaad	TA D40040040		2023/02/16	2024/02/15			
Amplifier 18G-40GHz	Tonscend	TAP18040048	SZ-WRG-M-052	2024/01/30	2025/01/29			
Active Loop Antenna 9kHz-30MHz	SCHWARZBECK	FMZB 1519B	SZ-WRG-M-053	2023/12/25	2024/12/24			
TRILOG Breitband Antenne 30MHz-1GHz	SCHWARZBECK	VULB 9168	SZ-WRG-M-054	2023/12/25	2024/12/24			
Double Ridge Horn Antenna 1GHz-18GHz	SCHWARZBECK	BBHA 9120 D	SZ-WRG-M-055	2023/12/21	2024/12/20			
SHF-EHF Horn 15GHz-40GHz	SCHWARZBECK	BBHA 9170	SZ-WRG-M-056	2023/12/25	2024/12/24			
RSE Test Software	Tonscend	JS32-RSE V4.0.0	SZ-WRG-S-058	NCR	NCR			
RE Test Software	Tonscend	JS32-RE V4.0.0	SZ-WRG-S-059	NCR	NCR			
Chamber	CRTSGSSAC966	N/A	SZ-WRG-C-063	2022/01/05	2025/01/04			
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	HTC-1	SZ-WRG-M-078	2023/05/25	2024/05/24			
Spectrum Analyzer	Keysight	N9020A	SZ-WRG-M-002	2023/09/14	2024/09/13			

Remark: NCR=No Calibration Requirement

Note\*: The RSE data were tested in 2024/03/06 to 2024/03/11, so this equipment is not used for testing before 2024/03/05.



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### 7 Photographs - Setup Photos

Refer to Appendix A.1 WLAN Setup Photos.



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### Appendix



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**DTS Bandwidth Test Result** 

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.68	2401.63	2402.32	≥0.5	PASS
		2440	0.68	2439.63	2440.31	≥0.5	PASS
		2480	0.69	2479.63	2480.32	≥0.5	PASS
BLE_2M	Ant1	2402	1.14	2401.41	2402.54	≥0.5	PASS
		2440	1.13	2439.41	2440.54	≥0.5	PASS
		2480	1.14	2479.41	2480.55	≥0.5	PASS

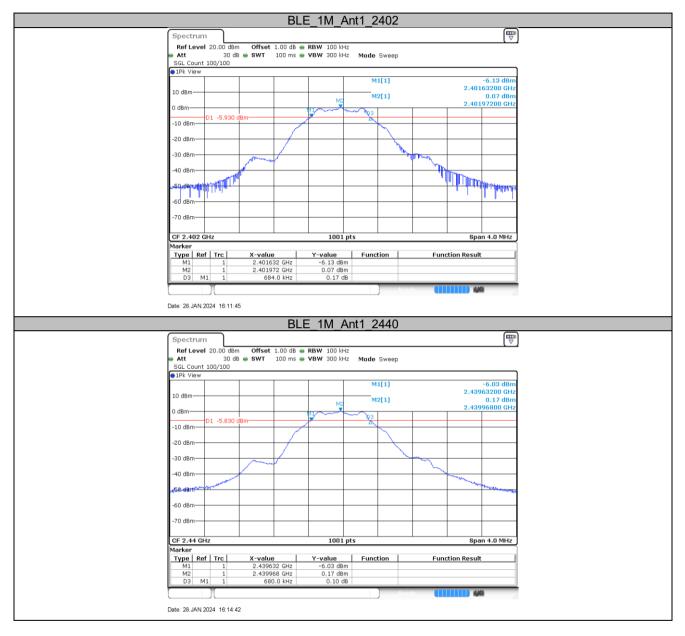


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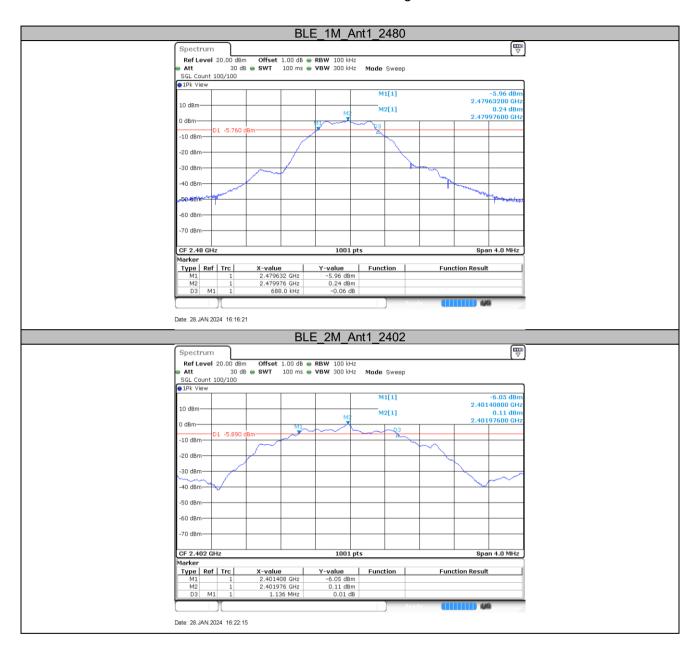
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#### **Test Graphs**





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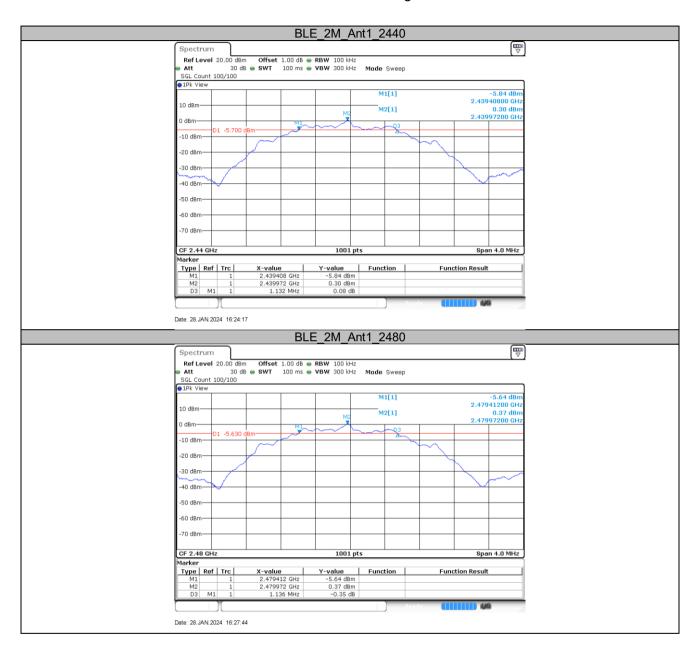


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#### **Occupied Channel Bandwidth** Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
BLE_1M	Ant1	2402	1.031	2401.4565	2402.4875	
		2440	1.035	2439.4565	2440.4915	
		2480	1.031	2479.4605	2480.4915	For Report
BLE_2M	Ant1	2402	2.054	2400.9491	2403.0030	Purpose
		2440	2.058	2438.9491	2441.0070	
		2480	2.054	2478.9491	2481.0030	

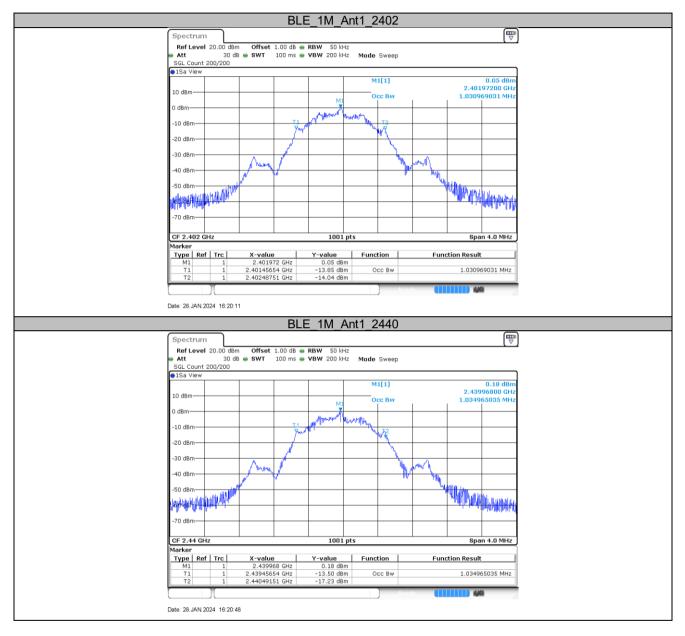


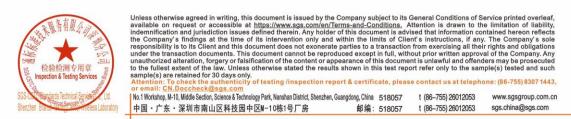
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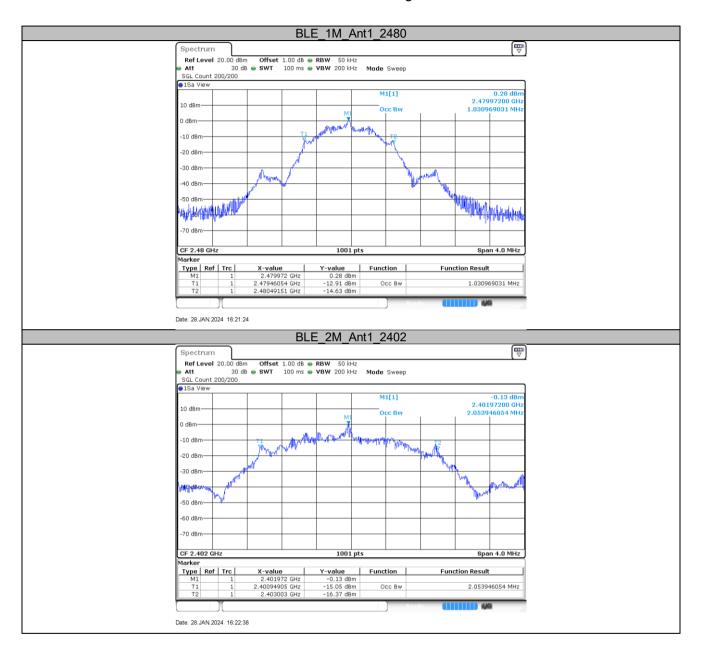
#### **Test Graphs**





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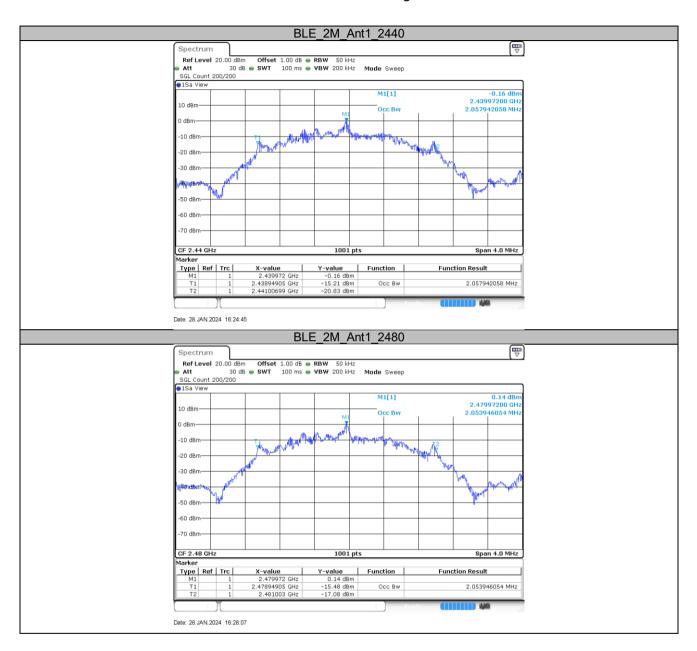


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#### Maximum conducted output power Test Result Peak

TestMode	Antenna	Frequency[MHz]	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
		2402	0.55	≤30	PASS
BLE_1M	Ant1	2440	0.66	≤30	PASS
		2480	0.72	≤30	PASS
		2402	0.62	≤30	PASS
BLE_2M	Ant1	2440	0.78	≤30	PASS
		2480	0.84	≤30	PASS



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#### Maximum power spectral density **Test Result**

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
		2402	-12.68	≤8.00	PASS
BLE_1M	Ant1	2440	-12.11	≤8.00	PASS
		2480	-12.02	≤8.00	PASS
		2402	-16.35	≤8.00	PASS
BLE_2M	Ant1	2440	-16.14	≤8.00	PASS
		2480	-16.10	≤8.00	PASS



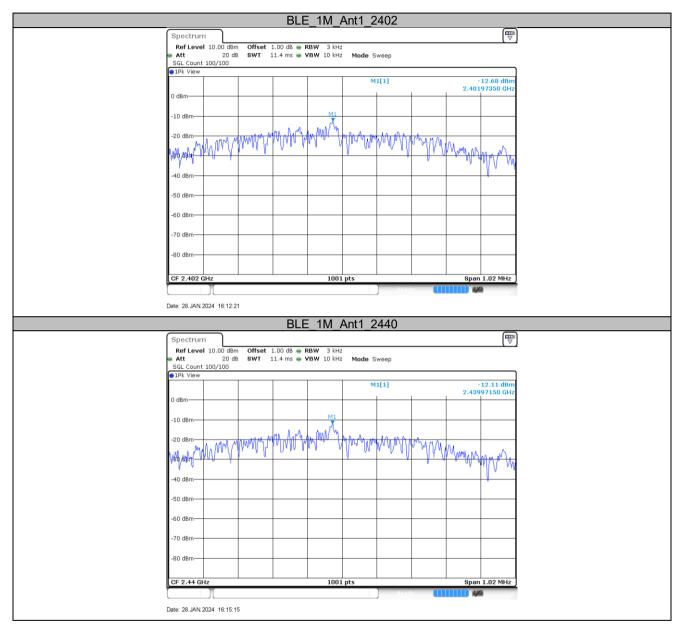
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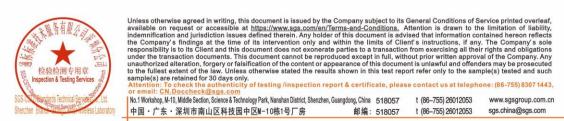
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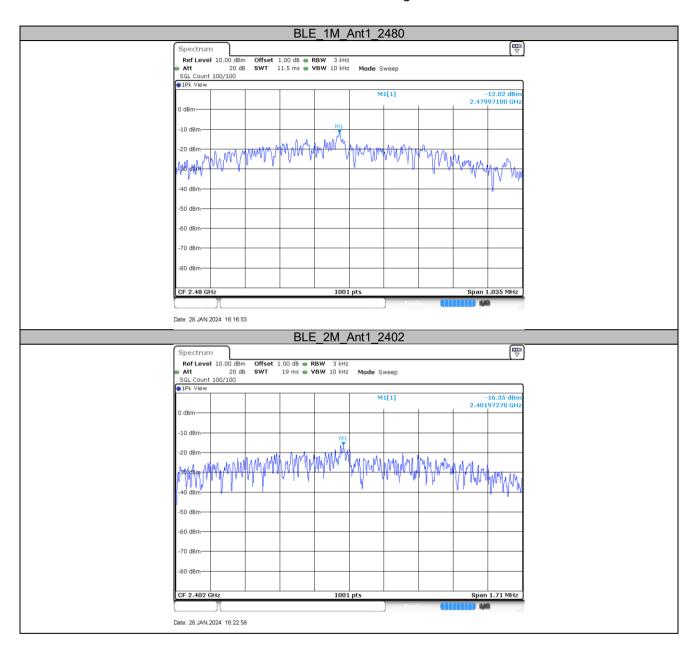
#### **Test Graphs**





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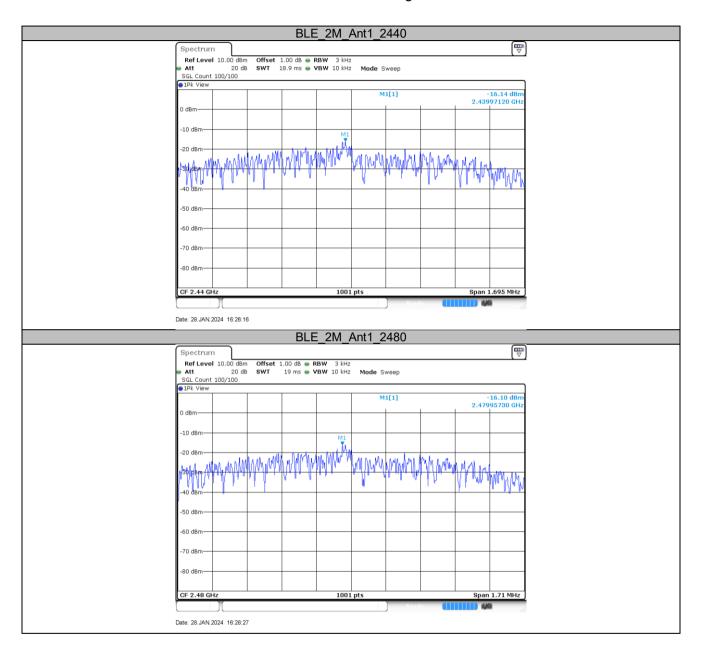
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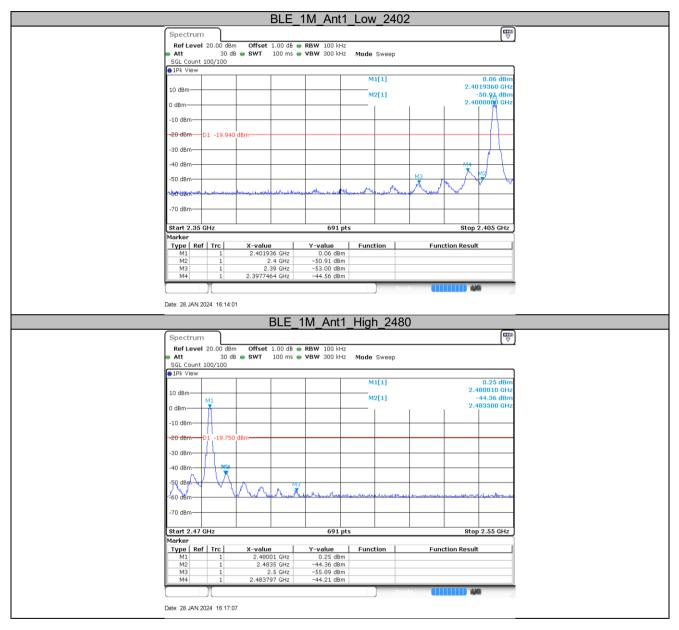
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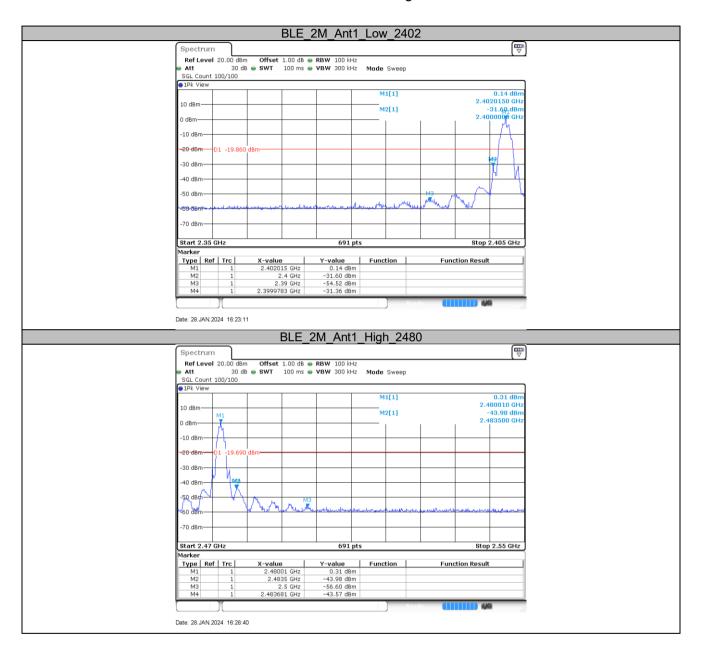
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#### Band edge measurements Test Graphs





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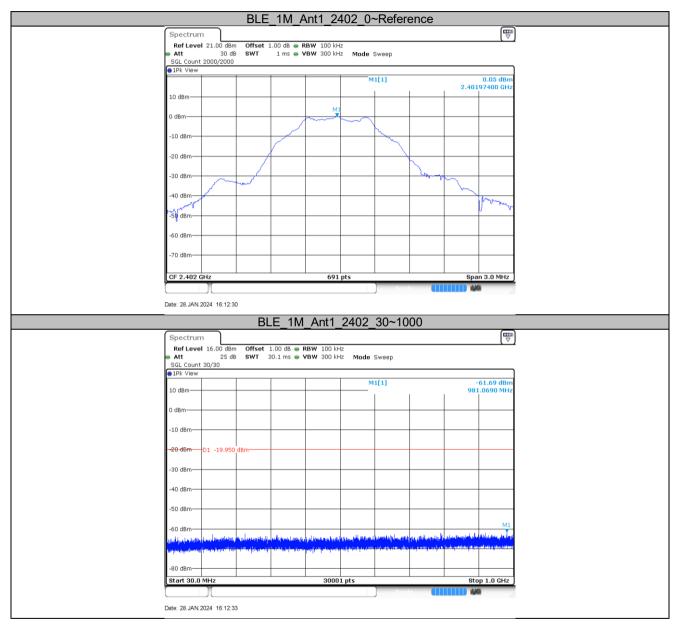
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#### Conducted Spurious Emission Test Graphs



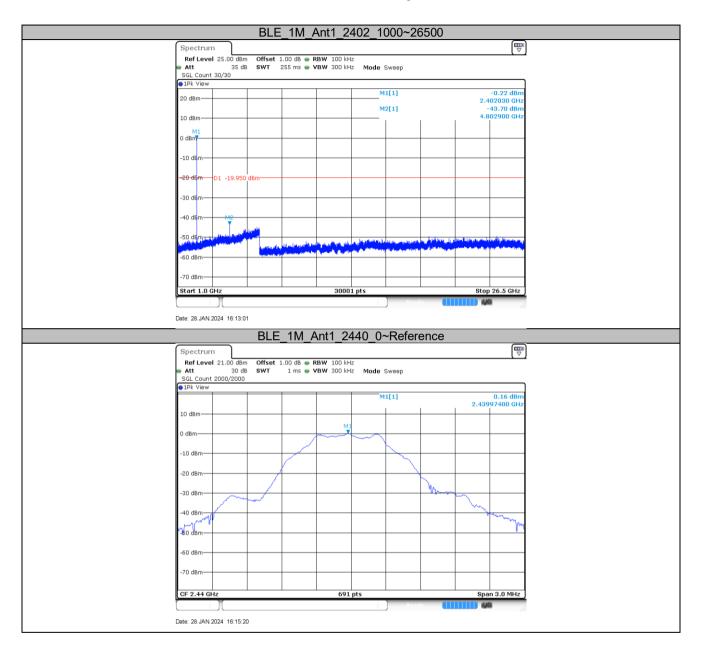


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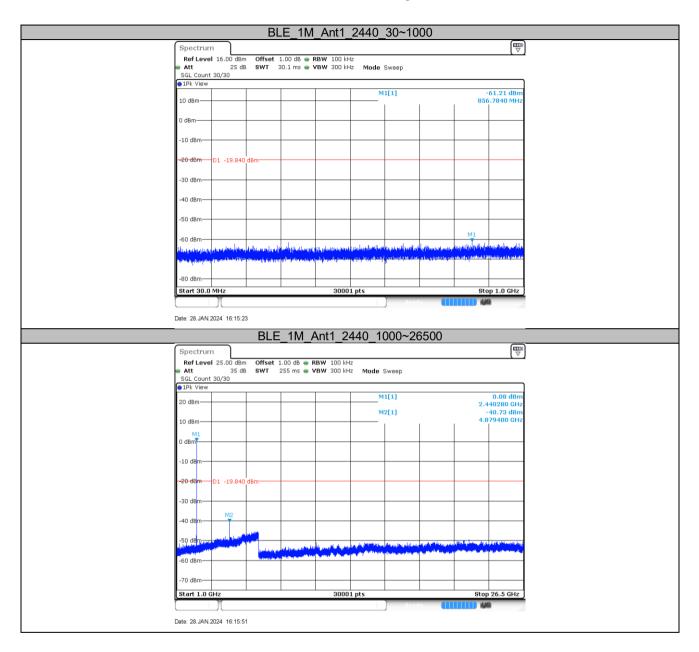
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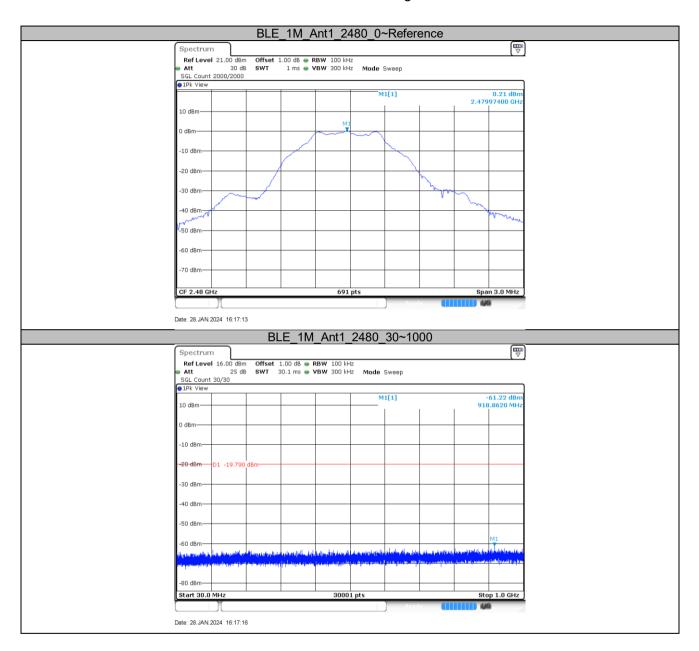


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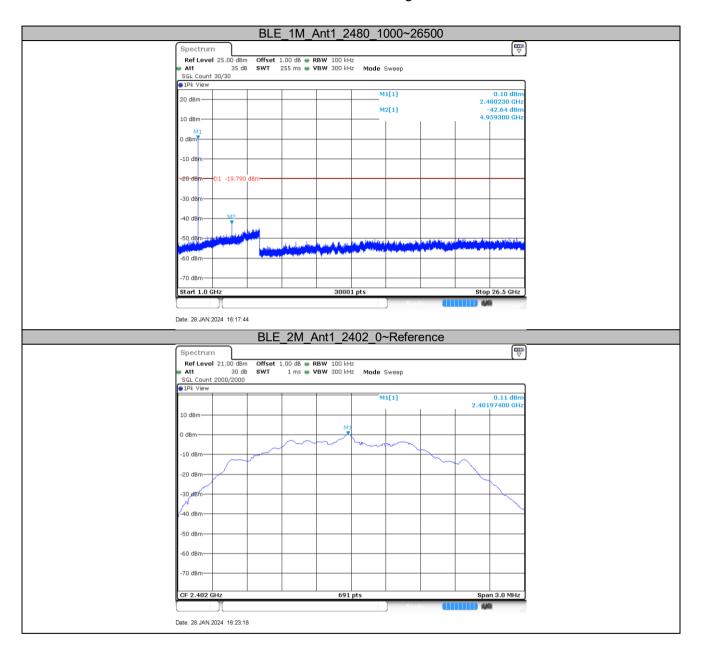




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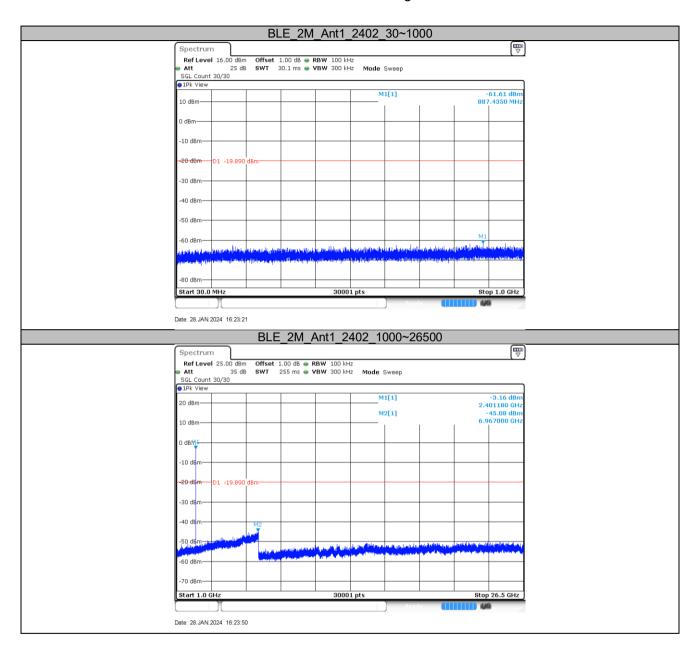


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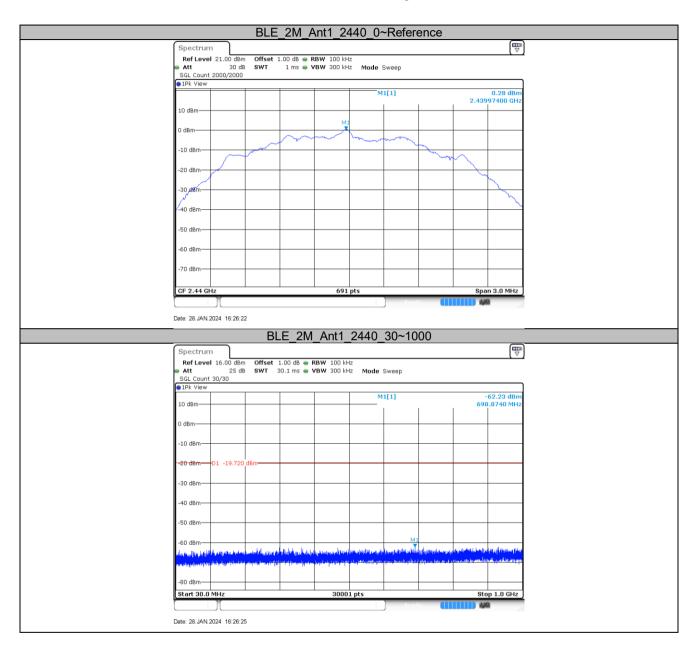


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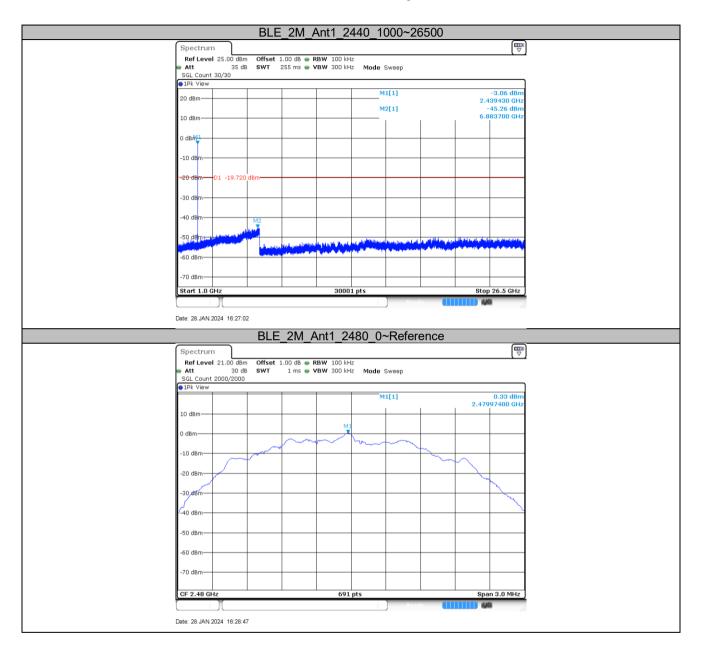


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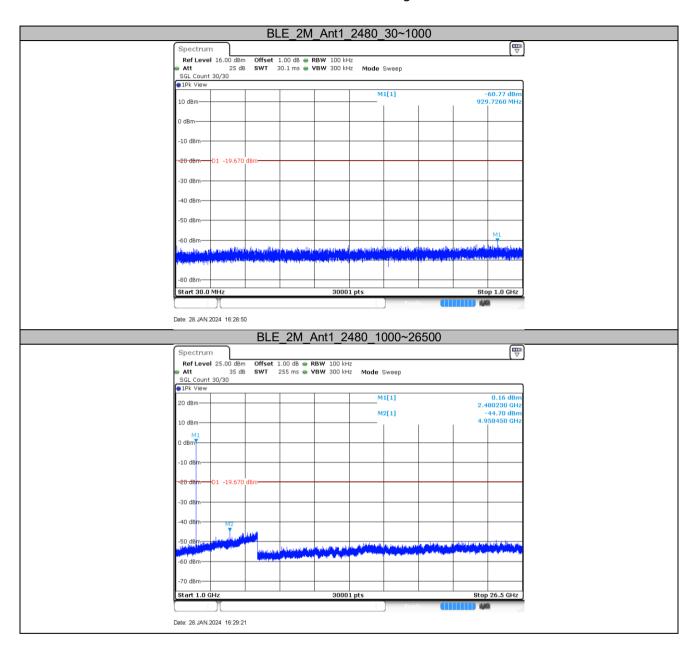


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#### Duty Cycle Test Result

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	0.41	2.78	14.75	8.31
BLE_2M	Ant1	2402	0.21	2.57	8.17	10.88

Note:

#### Radiated Emission Average VBW = 1 / T

TestMode	T[ms]	Period[ms]	Duty Cycle[%]	1/T[kHz]	VBW Setting
BLE_1M	0.41	2.78	14.75	2.43902	2.5KHz
BLE_2M	0.21	2.57	8.17	4.76190	5KHz

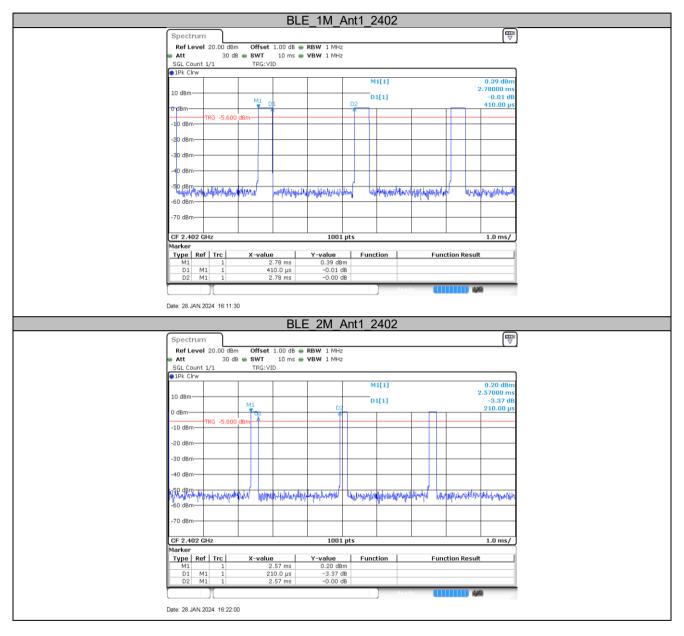


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#### **Test Graphs**





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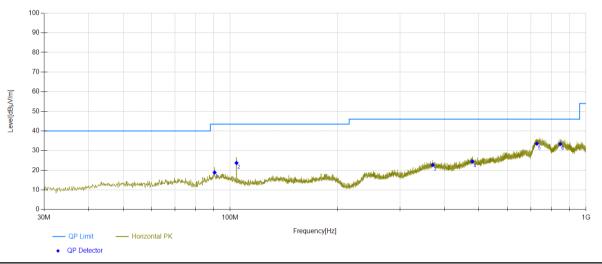
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#### **Radiated Spurious Emissions**

#### Radiated emission below 1GHz

#### Worst case Mode: BLE\_1M\_Channel 39



Dat	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity				
1	90.437	28.96	-24.46	14.36	18.86	43.50	24.64	Horizontal				
2	104.2124	35.85	-24.51	12.38	23.72	43.50	19.78	Horizontal				
3	370.8921	26.39	-22.65	18.98	22.72	46.00	23.28	Horizontal				
4	479.4459	26.22	-21.47	19.66	24.41	46.00	21.59	Horizontal				
5	727.4997	25.33	-20.79	28.99	33.53	46.00	12.47	Horizontal				
6	846.4336	26.73	-20.90	27.51	33.34	46.00	12.66	Horizontal				



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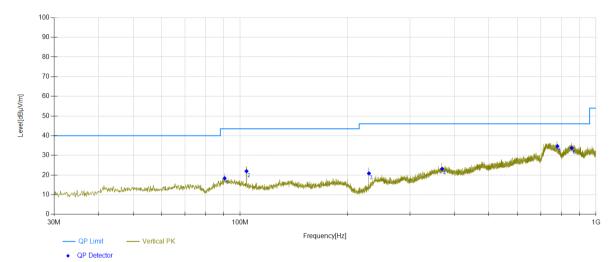
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Dat	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity				
1	90.437	28.47	-24.46	14.36	18.37	43.50	25.13	Vertical				
2	104.2124	34.09	-24.51	12.38	21.96	43.50	21.54	Vertical				
3	230.131	33.71	-23.49	10.61	20.83	46.00	25.17	Vertical				
4	369.4369	26.91	-22.66	18.88	23.13	46.00	22.87	Vertical				
5	778.8179	28.27	-20.50	26.90	34.67	46.00	11.33	Vertical				
6	854.5825	27.06	-20.81	27.52	33.77	46.00	12.23	Vertical				

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Value = Reading(dBµV) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Value( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



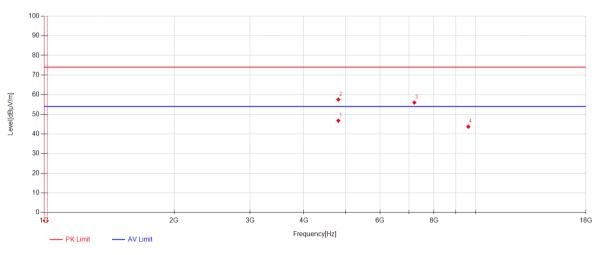
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#### **Transmitter emission Above 1GHz**

#### 802.BLE\_1M\_Channel 0



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity				
1	4803.75	62.93	30.93	-47.11	46.75	54.00	7.25	Horizontal				
2	4804.0000	73.69	30.93	-47.10	57.52	74.00	16.48	Horizontal				
3	7205.25	65.29	36.05	-45.37	55.97	74.00	18.03	Horizontal				
4	9608.0000	48.18	37.50	-41.97	43.71	74.00	30.29	Horizontal				



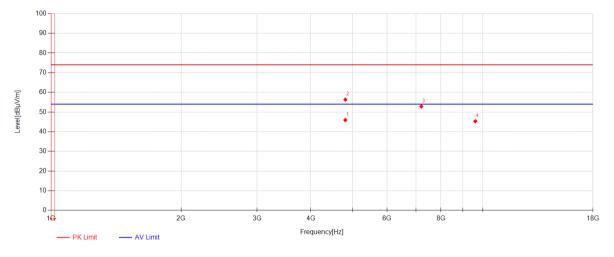
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#### 802.BLE\_1M\_Channel 0



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity				
1	4803.75	62.08	30.93	-47.11	45.90	54.00	8.10	Vertical				
2	4804.0000	72.47	30.93	-47.10	56.30	74.00	17.70	Vertical				
3	7205.25	62.15	36.05	-45.37	52.83	74.00	21.17	Vertical				
4	9608.0000	49.82	37.50	-41.97	45.35	74.00	28.65	Vertical				



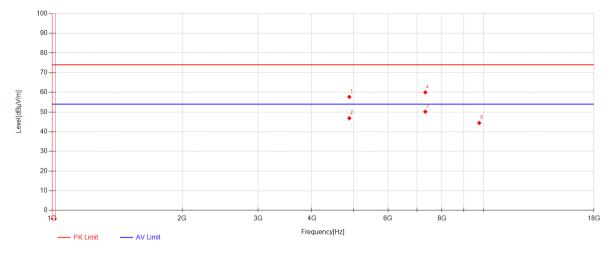
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#### 802.BLE\_1M\_Channel 19



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity				
1	4880.0000	73.58	31.11	-47.01	57.68	74.00	16.32	Horizontal				
2	4880.25	62.76	31.11	-47.01	46.86	54.00	7.14	Horizontal				
3	7319.25	59.39	36.18	-45.42	50.15	54.00	3.85	Horizontal				
4	7320.0000	69.23	36.18	-45.41	60.00	74.00	14.00	Horizontal				
5	9760.0000	47.93	37.85	-41.36	44.42	74.00	29.58	Horizontal				



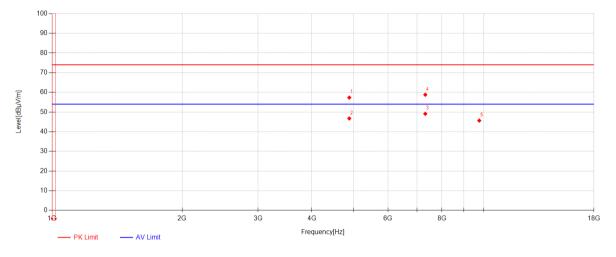
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#### 802.BLE\_1M\_Channel 19



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity				
1	4880.0000	73.21	31.11	-47.01	57.31	74.00	16.69	Vertical				
2	4880.25	62.63	31.11	-47.01	46.73	54.00	7.27	Vertical				
3	7319.25	58.32	36.18	-45.42	49.08	54.00	4.92	Vertical				
4	7320.0000	68.01	36.18	-45.41	58.78	74.00	15.22	Vertical				
5	9760.0000	49.15	37.85	-41.36	45.64	74.00	28.36	Vertical				



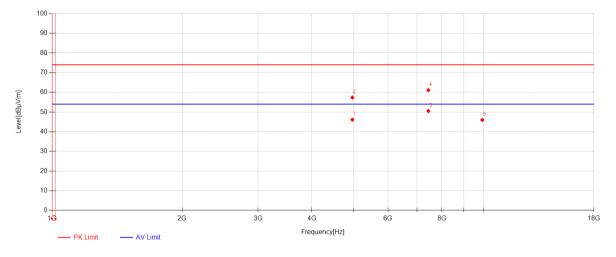
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#### 802.BLE\_1M\_Channel 39



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity				
1	4959	61.94	31.30	-47.11	46.13	54.00	7.87	Horizontal				
2	4960.0000	73.16	31.31	-47.11	57.36	74.00	16.64	Horizontal				
3	7439.25	59.24	36.33	-45.08	50.49	54.00	3.51	Horizontal				
4	7440.0000	69.87	36.33	-45.08	61.12	74.00	12.88	Horizontal				
5	9920.0000	48.54	38.22	-40.79	45.97	74.00	28.03	Horizontal				



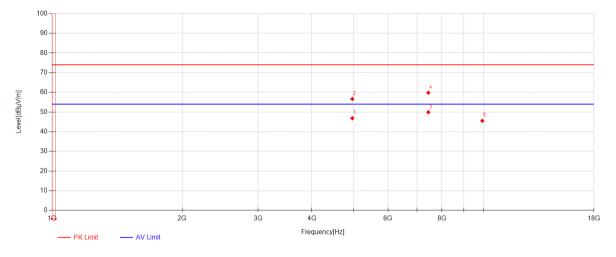
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#### 802.BLE\_1M\_Channel 39



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity				
1	4959	62.65	31.30	-47.11	46.84	54.00	7.16	Vertical				
2	4960.0000	72.43	31.31	-47.11	56.63	74.00	19.87	Vertical				
3	7439.25	58.66	36.33	-45.08	49.91	54.00	4.09	Vertical				
4	7440.0000	68.58	36.33	-45.08	59.83	74.00	14.17	Vertical				
5	9920.0000	48.12	38.22	-40.79	45.55	74.00	28.45	Vertical				



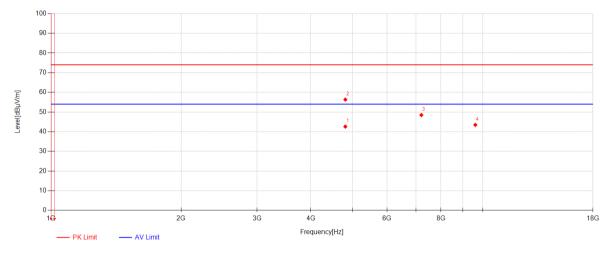
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#### 802.BLE\_2M\_Channel 0



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	4803.75	58.77	30.93	-47.11	42.59	54.00	11.41	Horizontal		
2	4804.0000	72.50	30.93	-47.10	56.33	74.00	17.67	Horizontal		
3	7206.0000	57.79	36.05	-45.37	48.47	74.00	25.53	Horizontal		
4	9608.0000	47.91	37.50	-41.97	43.44	74.00	30.56	Horizontal		



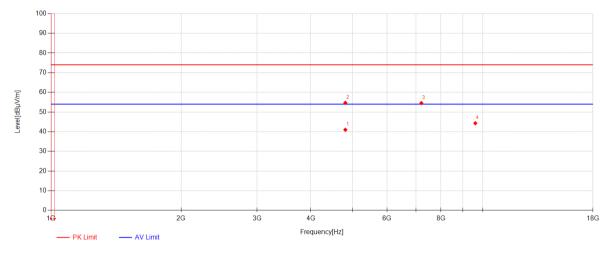
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#### 802.BLE\_2M\_Channel 0



Data	Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity			
1	4803.75	57.16	30.93	-47.11	40.98	54.00	13.02	Vertical			
2	4804.0000	70.82	30.93	-47.10	54.65	74.00	19.35	Vertical			
3	7206.0000	63.85	36.05	-45.37	54.53	74.00	19.47	Vertical			
4	9608.0000	48.77	37.50	-41.97	44.30	74.00	29.70	Vertical			



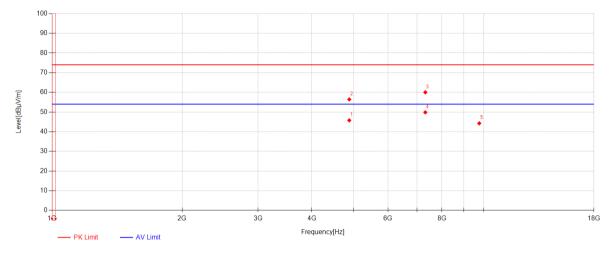
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#### 802.BLE\_2M\_Channel 19



Data	Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity			
1	4879.5	61.65	31.11	-47.01	45.75	54.00	8.25	Horizontal			
2	4880.0000	72.31	31.11	-47.01	56.41	74.00	17.59	Horizontal			
3	7320.0000	69.24	36.18	-45.41	60.01	74.00	13.99	Horizontal			
4	7320	59.07	36.18	-45.41	49.84	54.00	4.16	Horizontal			
5	9760.0000	47.75	37.85	-41.36	44.24	74.00	29.76	Horizontal			



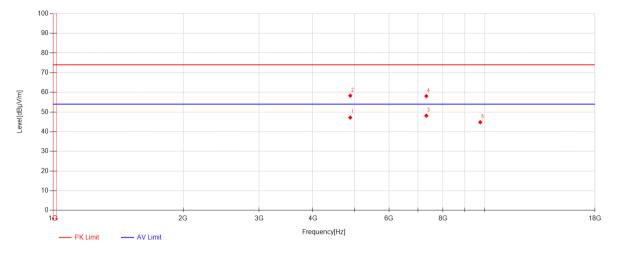
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#### 802.BLE\_2M\_Channel 19



Data	Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity			
1	4879.5	63.08	31.11	-47.01	47.18	54.00	6.82	Vertical			
2	4880.0000	74.19	31.11	-47.01	58.29	74.00	15.71	Vertical			
3	7320	57.36	36.18	-45.41	48.13	54.00	5.87	Vertical			
4	7320.0000	67.32	36.18	-45.41	58.09	74.00	15.91	Vertical			
5	9760.0000	48.33	37.85	-41.36	44.82	74.00	29.18	Vertical			



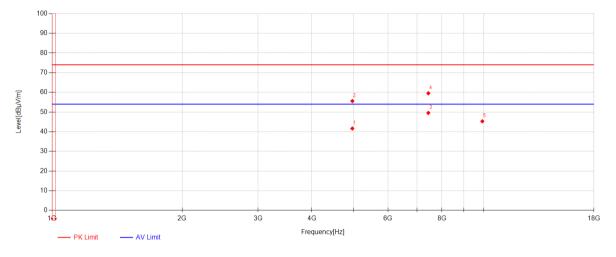
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#### 802.BLE\_2M\_Channel 39



Data	Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity			
1	4959	57.43	31.30	-47.11	41.62	54.00	12.38	Horizontal			
2	4960.0000	71.38	31.31	-47.11	55.58	74.00	18.42	Horizontal			
3	7438.5	58.29	36.33	-45.08	49.54	54.00	4.46	Horizontal			
4	7440.0000	68.27	36.33	-45.08	59.52	74.00	14.48	Horizontal			
5	9920.0000	47.86	38.22	-40.79	45.29	74.00	28.71	Horizontal			



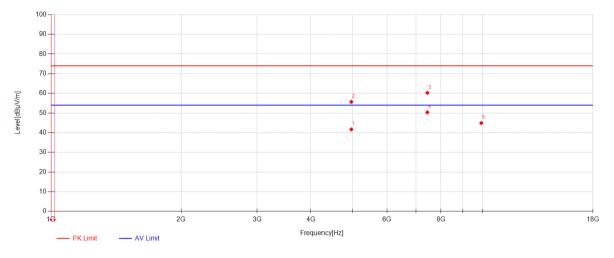
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#### 802.BLE\_2M\_Channel 39



Data	Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity			
1	4959.75	57.50	31.30	-47.11	41.69	54.00	12.31	Vertical			
2	4960.0000	71.46	31.31	-47.11	55.66	74.00	18.34	Vertical			
3	7440.0000	68.98	36.33	-45.08	60.23	74.00	13.77	Vertical			
4	7440.75	59.11	36.33	-45.08	50.36	54.00	3.64	Vertical			
5	9920.0000	47.47	38.22	-40.79	44.90	74.00	29.10	Vertical			

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Level = Reading(dBµV) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Level( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



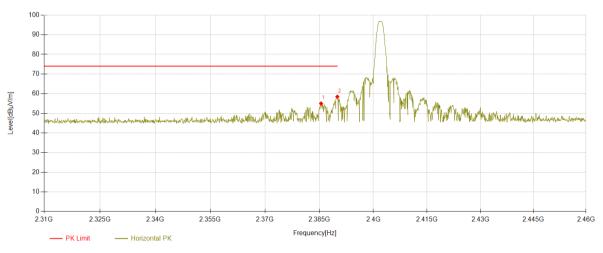
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#### **Restricted bands around fundamental frequency**

#### 802.BLE\_1M\_Channel 00



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2385.4877	53.58	27.13	-25.71	55.00	74.00	19.00	Horizontal		
2	2389.99	57.01	27.14	-25.70	58.45	74.00	15.55	Horizontal		



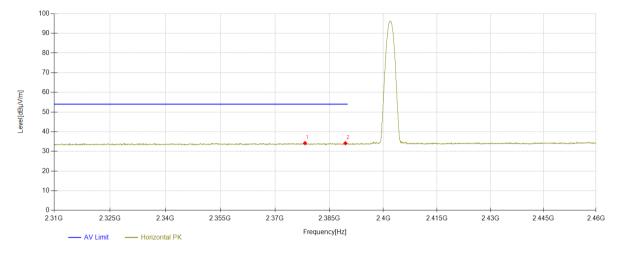
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#### 802.BLE\_1M\_Channel 00



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2378.2841	32.82	27.11	-25.73	34.20	54.00	19.80	Horizontal		
2	2389.4647	32.71	27.13	-25.70	34.14	54.00	19.86	Horizontal		



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#### 100 90 80 70 60 \_evel[dBµV/m] 50 40 30 20 10 0 2.31G 2.325G 2.34G 2.355G 2.37G 2.385G 2.4G 2.415G 2.43G 2.445G 2.46G Frequency[Hz] – PK Limit - Vertical PK

Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2381.8859	50.29	27.12	-25.72	51.69	74.00	22.31	Vertical		
2	2389.99	53.98	27.14	-25.70	55.42	74.00	18.58	Vertical		

#### 802.BLE\_1M\_Channel 00



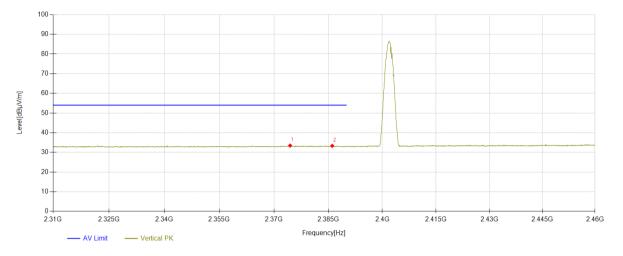
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#### 802.BLE\_1M\_Channel 00



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2374.4572	32.08	27.10	-25.73	33.45	54.00	20.55	Vertical		
2	2386.088	31.91	27.13	-25.71	33.33	54.00	20.67	Vertical		

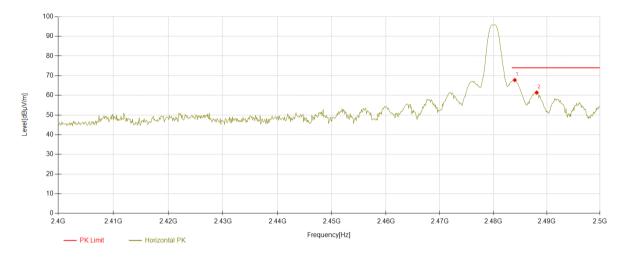


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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2484	65.55	27.36	-25.14	67.77	74.00	6.23	Horizontal		
2	2488.1	59.18	27.37	-25.12	61.43	74.00	12.57	Horizontal		

#### 802.BLE\_1M\_Channel 39



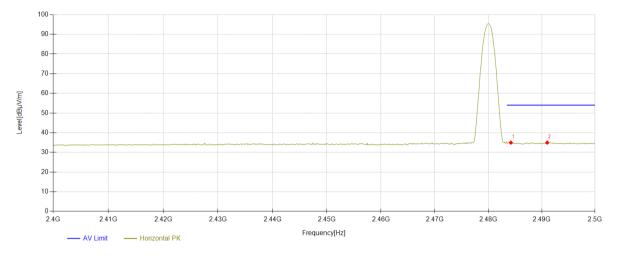
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#### 802.BLE\_1M\_Channel 39



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2484.2	32.72	27.36	-25.14	34.94	54.00	19.06	Horizontal		
2	2491	32.68	27.38	-25.10	34.96	54.00	19.04	Horizontal		



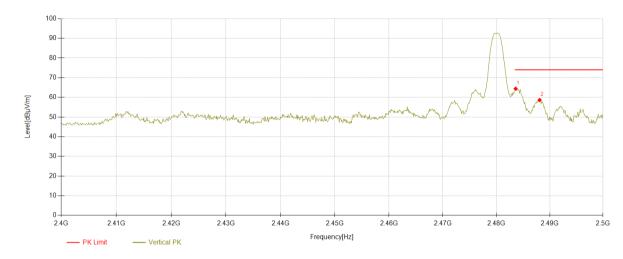
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#### **Data List** AF Factor Frequency Reading Level Limit Margin NO Polarity [MHz] [dBµV] [dB/m] [dB] [dBµV/m] [dBµV/m] [dB] 27.36 -25.14 74.00 1 2483.6 62.17 64.39 9.61 Vertical 2 27.37 -25.12 74.00 15.34 2488.1 56.41 58.66 Vertical



802.BLE\_1M\_Channel 39

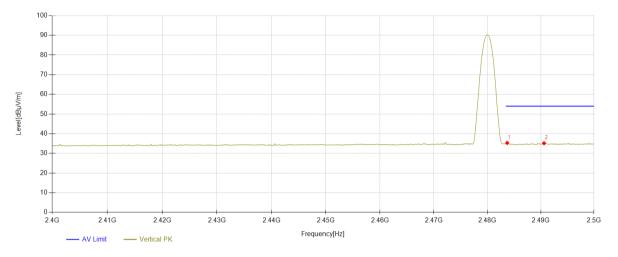
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#### 802.BLE\_1M\_Channel 39



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2483.7	33.09	27.36	-25.14	35.31	54.00	18.69	Vertical		
2	2490.6	32.87	27.38	-25.10	35.15	54.00	18.85	Vertical		

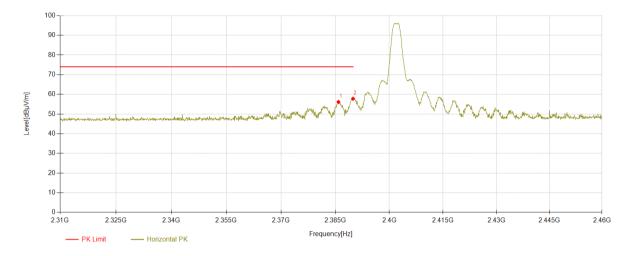


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#### 802.BLE\_2M\_Channel 00

Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2385.8629	54.71	27.13	-25.71	56.13	74.00	17.87	Horizontal		
2	2389.915	56.35	27.14	-25.70	57.79	74.00	16.21	Horizontal		



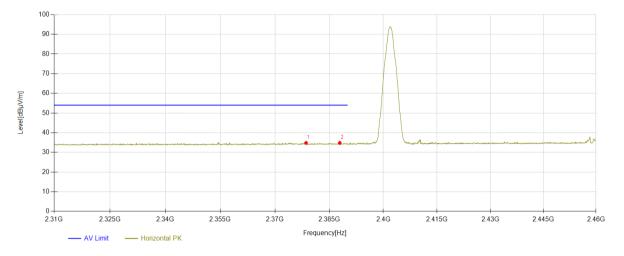
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#### 802.BLE\_2M\_Channel 00



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2378.5843	33.44	27.11	-25.72	34.83	54.00	19.17	Horizontal		
2	2387.8889	33.42	27.13	-25.71	34.84	54.00	19.16	Horizontal		



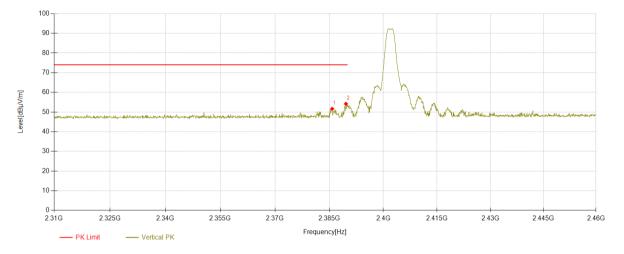
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#### 802.BLE\_2M\_Channel 00



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2385.7879	50.20	27.13	-25.71	51.62	74.00	22.38	Vertical		
2	2389.6148	52.71	27.14	-25.70	54.15	74.00	19.85	Vertical		



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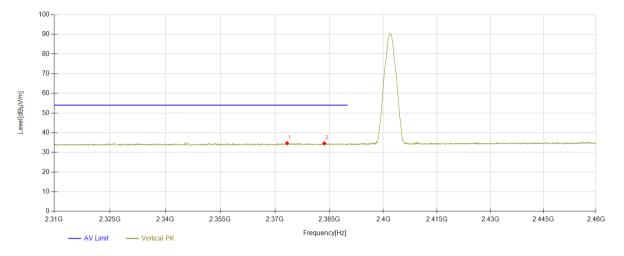
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#### 802.BLE\_2M\_Channel 00



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2373.3317	33.28	27.10	-25.74	34.64	54.00	19.36	Vertical		
2	2383.6118	33.16	27.12	-25.71	34.57	54.00	19.43	Vertical		



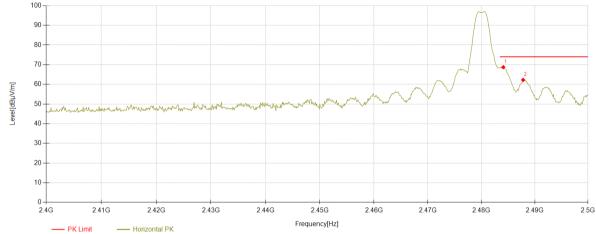
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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2484.1	66.49	27.36	-25.14	68.71	74.00	5.29	Horizontal		
2	2487.8	60.00	27.37	-25.12	62.25	74.00	11.75	Horizontal		

#### 100

802.BLE\_2M\_Channel 39



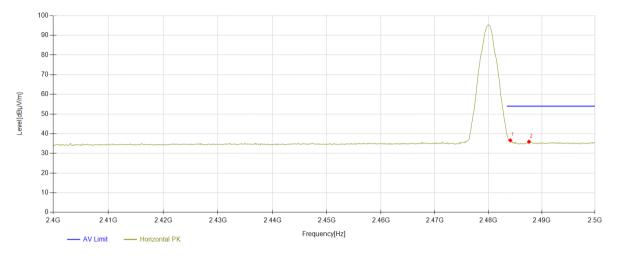
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#### 802.BLE\_2M\_Channel 39



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2484.1	34.41	27.36	-25.14	36.63	54.00	17.37	Horizontal		
2	2487.6	33.66	27.37	-25.12	35.91	54.00	18.09	Horizontal		



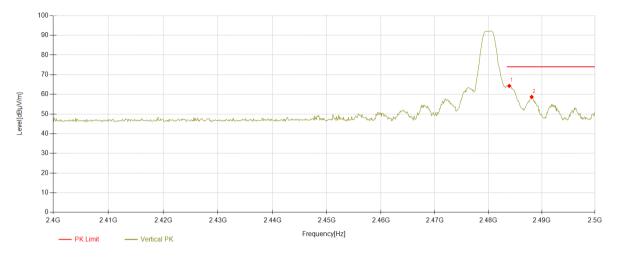
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#### 802.BLE\_2M\_Channel 39



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2483.9	62.06	27.36	-25.14	64.28	74.00	9.72	Vertical		
2	2488.1	56.45	27.37	-25.12	58.70	74.00	15.30	Vertical		



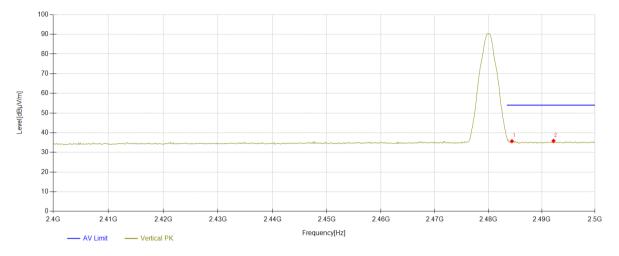
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#### 802.BLE\_2M\_Channel 39



Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity		
1	2484.4	33.45	27.36	-25.14	35.67	54.00	18.33	Vertical		
2	2492.2	33.54	27.38	-25.09	35.83	54.00	18.17	Vertical		

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Level = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit(dB $\mu$ V/m) – Level(dB $\mu$ V/m)

---End of Report---



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