

Report No.: XEWA2302000005RG02  
 Rev.: 01  
 Page: 1 of 91

# TEST REPORT

**Application No.:** XEWA2302000005RG  
**Applicant:** Quectel Wireless Solutions Co., Ltd.  
**Address of Applicant:** Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233  
**Manufacturer:** Quectel Wireless Solutions Co., Ltd.  
**Address of Manufacturer:** Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233  
**EUT Description:** Wi-Fi & Bluetooth Module  
**Model No.:** FC66E-B  
**Trade Mark:** Quectel  
**FCC ID:** XMR2023FC66EB  
**Standards:** FCC 47 CFR Part 2, Subpart J  
 FCC 47 CFR Part 15, Subpart C  
**Date of Receipt:** 2023/03/03  
**Date of Test:** 2023/03/22 to 2023/04/30  
**Date of Issue:** 2023/05/06

<b>Test Result :</b>	<b>PASS *</b>
----------------------	---------------

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

Authorized Signature:

Peter Tan  
 Regulatory Technical Manager



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# 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023/05/06		Original

<b>Prepared By</b>	 <hr/> (Leah Chen) / Test Engineer
<b>Checked By</b>	 <hr/> (Andy Yao) / Reviewer



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## 2 Test Summary

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 C63.10-2020 Section 6.2	Clause 4.2	PASS
Conducted Output Power	15.247 (b)(3)	ANSI C63.10-2020 Section 11.9.1.2	Clause 4.4	PASS
DTS (6 dB) Bandwidth & 99% Occupied Bandwidth	15.247 (a)(2)	ANSI C63.10-2020 Section 11.8 Option 2 / 6.9.3	Clause 4.5	PASS
Power Spectral Density	15.247 (e)	ANSI C63.10-2020 Section 11.10.2	Clause 4.6	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10-2020 Section 11.11	Clause 4.7	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10-2020 Section 11.11	Clause 4.8	PASS
Radiated Spurious Emissions	15.205/15.209	ANSI C63.10-2020 Section 11.12	Clause 4.9	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.205/15.209	ANSI C63.10-2020 Section 11.12	Clause 4.10	PASS



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### 3 General Information

#### 3.1 Details of Client

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address of Applicant:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd.
Address:	1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Keyuan 3rd Road, Fengdong New Town, Xi'an, Shaanxi China
Post code:	710086
Test engineer:	Qiang Zhang, Jacky Xue

#### 3.3 Test Facility

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

- A2LA (Certificate No. 4854.01)**  
 SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.
- Innovation, Science and Economic Development Canada**  
 SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.  
 CAB identifier: CN0095.  
 IC#: 25613.
- FCC –Designation Number: CN1337**  
 SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized as an accredited testing laboratory.  
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 Test Firm Registration Number: 917410



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### 3.4 General Description of EUT

EUT Description:	Wi-Fi & Bluetooth Module	
Model No.:	FC66E-B	
Trade Mark:	Quectel	
Hardware Version:	R1.0	
Software Version:	/	
SN:	RF Conducted	E1N22KU07001113
	RSE & AC power line	E1722KU07000861
Operation Frequency:	2400MHz~2483.5MHz $f_c = 2402 \text{ MHz} + N * 2 \text{ MHz}$ , where: - $f_c$ = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 39.	
Bluetooth version:	Bluetooth V5.2	
Modulation Type:	GFSK	
Number of Channel:	40	
Rates Type*:	<input checked="" type="checkbox"/> Provided by client	
	1M PHY	2M PHY
Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated	
Antenna Gain:	1.17dBi (Ant2)	
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.	
RF Cable:	1.2dB	
<p>Note: *Since the above data and/or information is provided by the client relevant results or conclusions of this 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.</p> <p>Remark: As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.</p>		

Antenna Information				
Antenna	Brand Name	HIGH-TEK HARNESS ENTERPRISE	Peak Gain	1.17dBi
	Model Name	F7G300	Type	PIFA Antenna



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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	96~101 kPa Selected Values During Tests	
Relative Humidity	40-60 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~25	2.0
Remark: NV: Normal Voltage NT: Normal Temperature		

### 3.6 Description of Support Units

Description	Manufacturer	Model No.
Mother board	Quectel	FG50K-PCIE—CARD-EVB
Adapter	Something High Electric (xiamen) Company Inc	P-050B-050200
Remark: all above the information of table are provided by client.		



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## 4 Test results and Measurement Data

### 4.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203 /247(b)
<p>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.</p> <p>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.</p>	
<p>The antenna is External Antenna on the main PCB and no consideration of replacement.          The best case gain of the antenna is 1.17dBi (Ant2). *</p> <p><i>*Note:          The antenna gain are derived from the gain information report provided by the manufacturer.</i></p> <p><i>Remark:          As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.</i></p>	



### 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10-2020 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency range(MHz)	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:	<p>1) The mains terminal disturbance voltage test was conducted in a shielded room.</p> <p>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear 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.</p> <p>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.</p> <p>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 was bonded to the horizontal 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 for LISNs mounted on top of the ground reference plane. This distance was between 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.</p> <p>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10-2020 on conducted measurement.</p>		



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<p>Test Setup:</p>	
<p>Test Mode:</p>	<p>Transmitting with GFSK modulation. Charge + Transmitting mode.</p>
<p>Instruments Used:</p>	<p>Refer to section 6 for details.</p>
<p>Test Results:</p>	<p>Pass</p>



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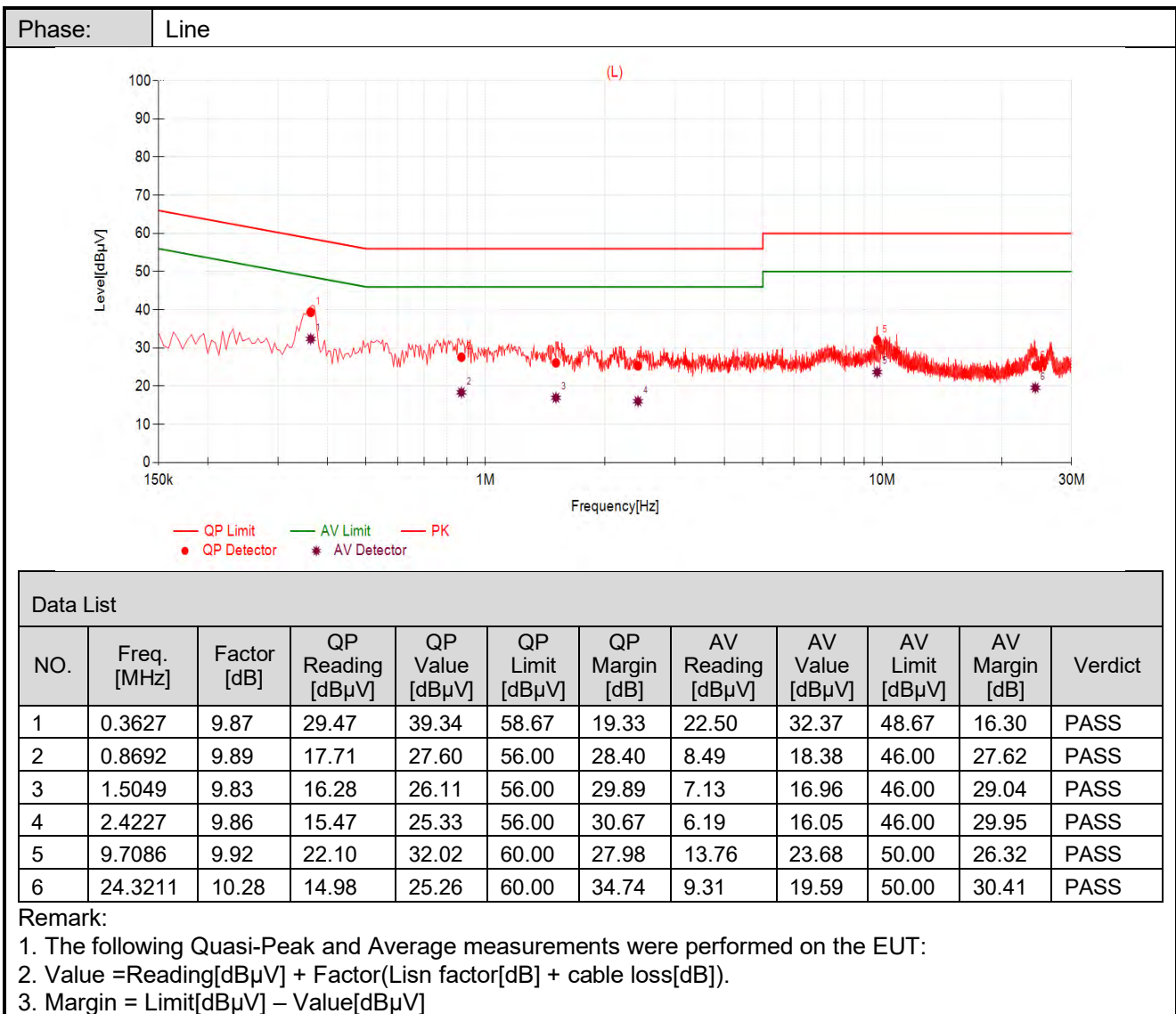
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Measurement Data

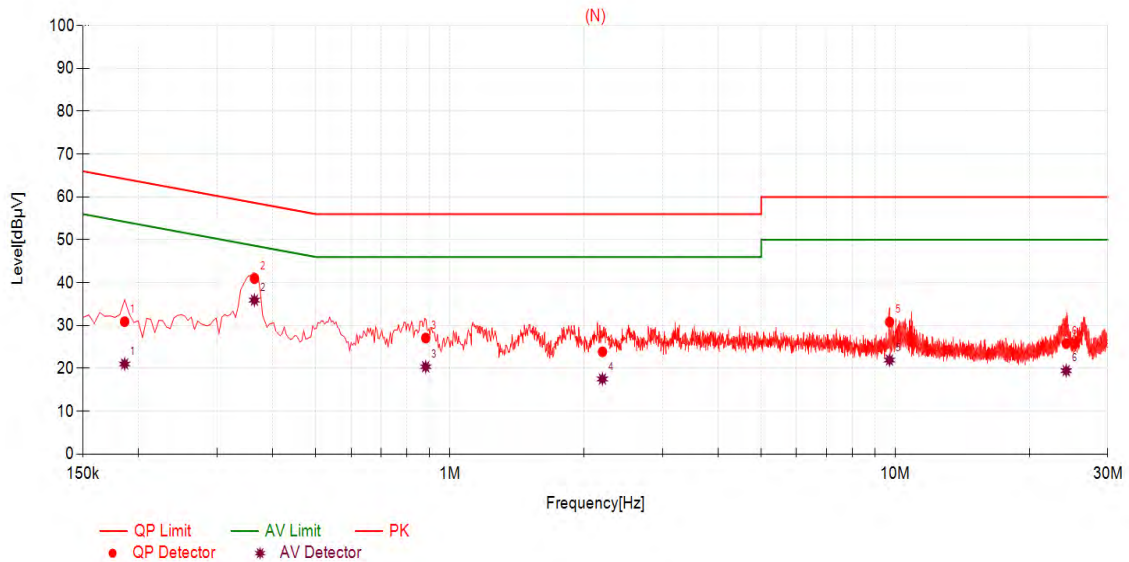
An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

**BLE 1M:**



Phase: Neutral



Data List											
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1860	9.83	21.08	30.91	64.21	33.30	11.20	21.03	54.21	33.18	PASS
2	0.3639	9.80	31.17	40.97	58.64	17.67	26.14	35.94	48.64	12.70	PASS
3	0.8822	9.82	17.27	27.09	56.00	28.91	10.57	20.39	46.00	25.61	PASS
4	2.2003	9.89	13.99	23.88	56.00	32.12	7.64	17.53	46.00	28.47	PASS
5	9.7081	10.06	20.78	30.84	60.00	29.16	11.88	21.94	50.00	28.06	PASS
6	24.1975	10.28	15.51	25.79	60.00	34.21	9.20	19.48	50.00	30.52	PASS

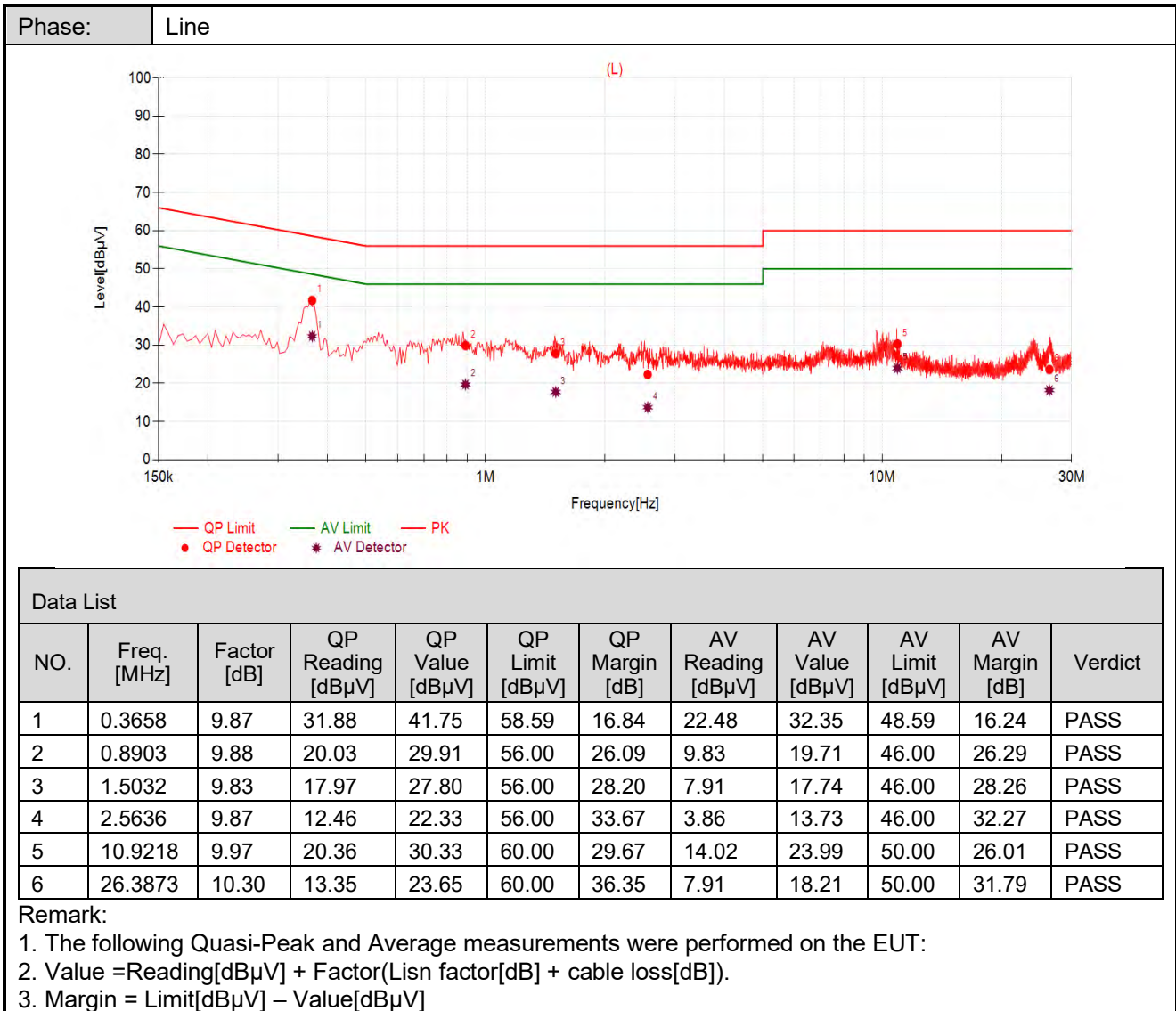
Remark:

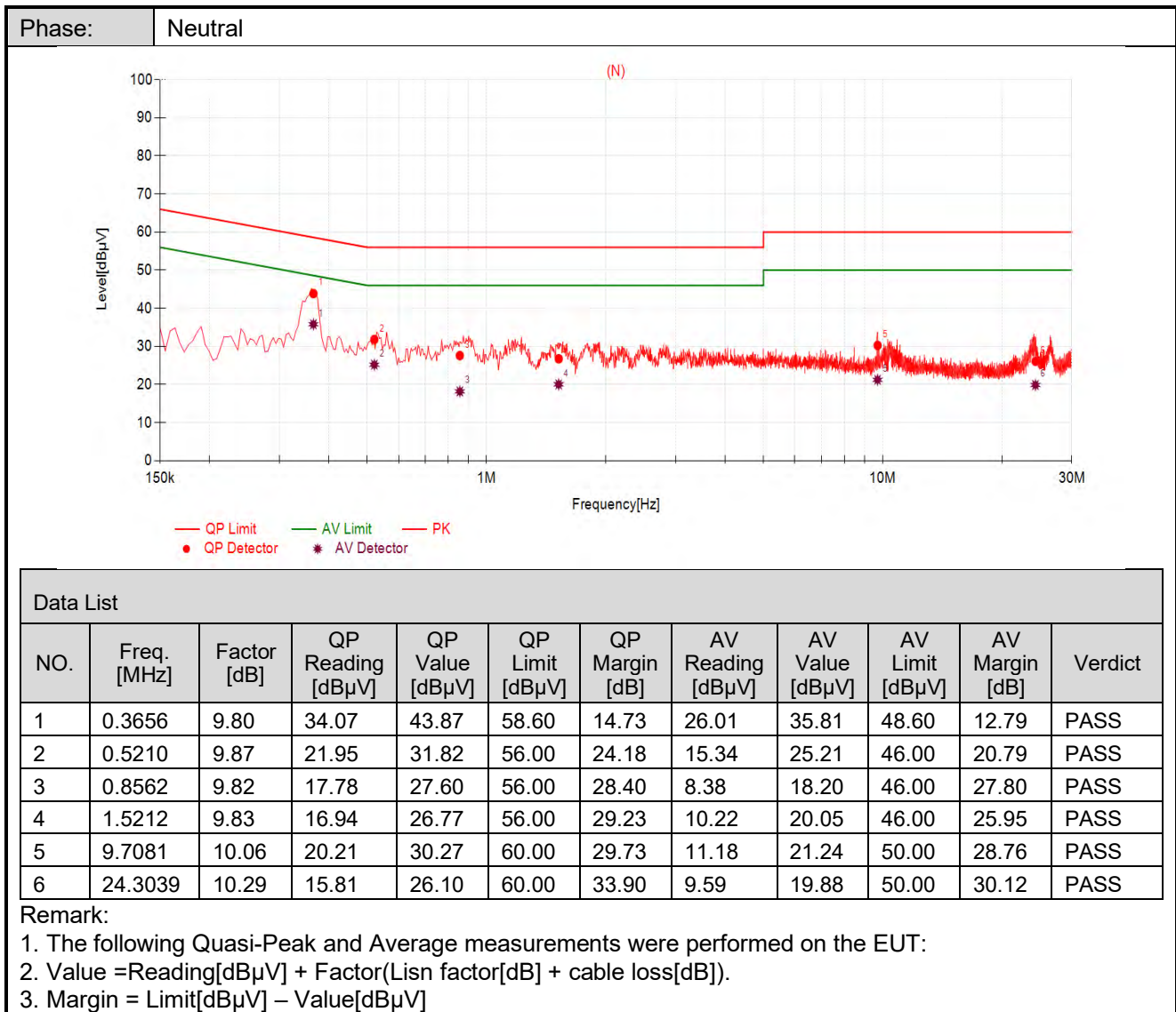
- The following Quasi-Peak and Average measurements were performed on the EUT:
- Value = Reading [dBµV] + Factor (Lisn factor [dB] + cable loss [dB]).
- Marginal = Limit [dBµV] - Value [dBµV]



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**BLE 2M:**





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### 4.3 Duty Cycle

The detailed test data see: **Appendix**



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### 4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10-2020 Section 11.9.1.2
Test Setup:	<p>* Test with power meter (Detector function: Peak)</p>
Test Instruments:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	30dBm
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10-2020 Section 11.8 Option 2 / 6.9.3
Test Setup:	
Instruments Used:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	≥ 500 kHz
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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### 4.6 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10-2020 Section 11.10.2
Test Setup:	
Test Instruments:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	≤8.00dBm/3kHz
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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### 4.7 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10-2020 Section 11.11
Test Setup:	
Instruments Used:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



### 4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10-2020 Section 11.11
Test Setup:	
Instruments Used:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



### 4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10-2020 Section 11.12				
Test Site:	Measurement Distance: 3m (Semi-Anechoic 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	3
	216MHz-960MHz	200	46.0	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 frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					

Test Setup:

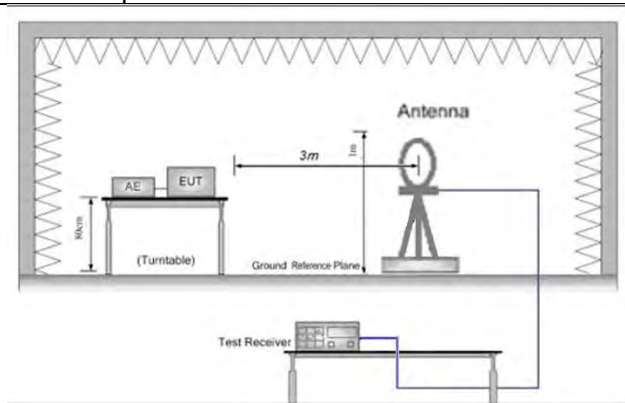


Figure 1. Below 30MHz

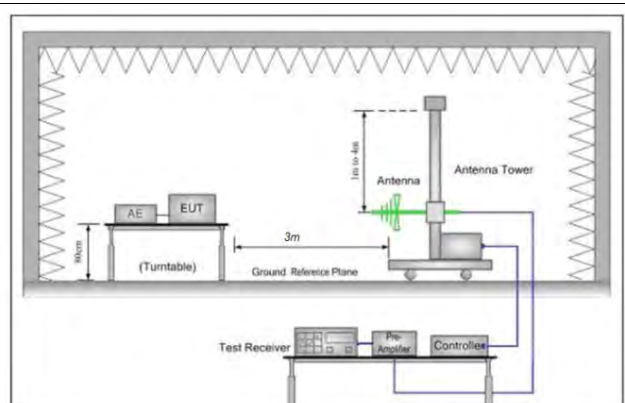


Figure 2. 30MHz to 1GHz



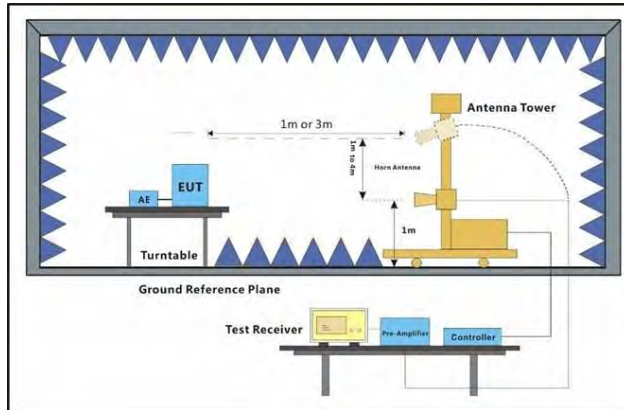


Figure 3. Above 1 GHz

<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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 chamber. 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>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>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>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 (for the test frequency of below 30MHz, 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>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>Test the EUT in the lowest channel, the middle channel, the Highest channel.</li> <li>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>Repeat above procedures until all frequencies measured was complete.</li> <li>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</li> <li>The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.</li> <li>At a measurement distance of 1 meter the limit line was increased by <math>20 \cdot \text{LOG}(3/1) = 9.54 \text{ dB}</math>.</li> </ol>
<p>Test Configuration:</p>	<p>Measurements below 30MHz</p> <ul style="list-style-type: none"> <li>• RBW = 10 kHz</li> <li>• VBW = 30 kHz</li> </ul>



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	<ul style="list-style-type: none"> <li>• Detector = Peak &amp; Average &amp; Quasi-peak</li> <li>• Trace mode = max hold</li> </ul> <p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> <li>• RBW = 120 kHz</li> <li>• VBW = 300 kHz</li> <li>• Detector = Quasi-peak</li> <li>• Trace mode = max hold</li> </ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> <li>• RBW = 1 MHz</li> <li>• VBW ≥ 3 MHz</li> <li>• Detector = Peak</li> <li>• Sweep time = auto</li> <li>• Trace mode = max hold</li> </ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> <li>• RBW = 1 MHz</li> <li>• VBW = 10 Hz, when duty cycle is no less than 98 percent.</li> <li>• 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.</li> </ul>
Exploratory Test Mode:	Transmitting with GFSK modulation. Charge + Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode, For below 1GHz part, through pre-scan, the worst case is the lowest channel. 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: <b>Appendix</b>	



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### 4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10-2020 Section 11.12		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

Test Setup:

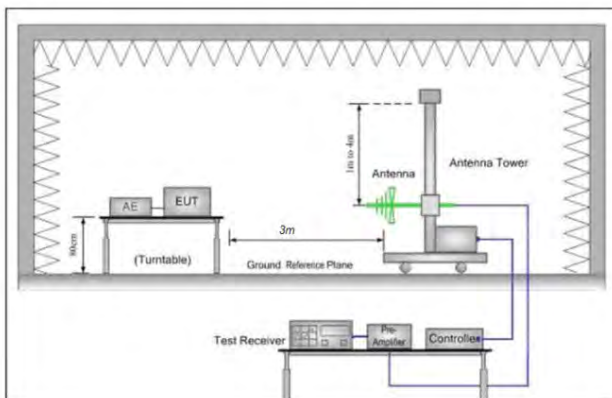


Figure 1. 30MHz to 1GHz

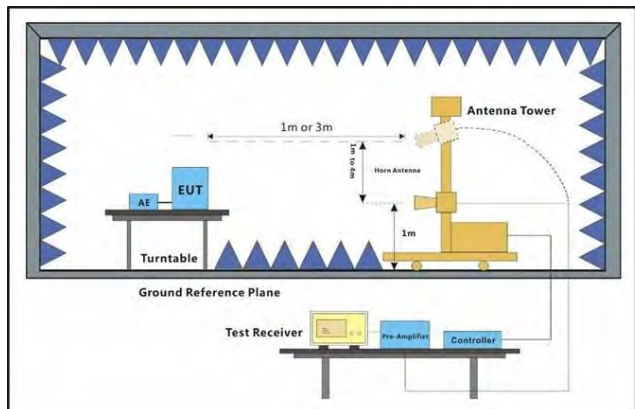


Figure 2. Above 1 GHz

Test Procedure:

- 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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified



	<p>Bandwidth with Maximum Hold Mode.</p> <p>g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</p> <p>h. Test the EUT in the lowest channel , the Highest channel</p> <p>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.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> <li>• RBW = 120 kHz</li> <li>• VBW = 300 kHz</li> <li>• Detector = Quasi-peak</li> <li>• Trace mode = max hold</li> </ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> <li>• RBW = 1 MHz</li> <li>• VBW ≥ 3 MHz</li> <li>• Detector = Peak</li> <li>• Sweep time = auto</li> <li>• Trace mode = max hold</li> </ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> <li>• RBW = 1 MHz</li> <li>• VBW = 10 Hz, when duty cycle is no less than 98 percent.</li> <li>• 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.</li> </ul>
Exploratory Test Mode:	<p>Transmitting with GFSK modulation.          Charge + Transmitting mode.</p>
Final Test Mode:	<p>Transmitting with GFSK modulation.          Pretest the EUT at Charge + Transmitting mode.          Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$ GHz
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 0.2\%$
4	RF conducted power	$\pm 0.21$ dB
5	RF power density	$\pm 2.84$ dB
6	Conducted Spurious emissions	$\pm 0.75$ dB
7	Conduction Emission	$\pm 3.0$ dB (150kHz to 30MHz)
8	Radiated Emission	$\pm 4.6$ dB (9kHz to 30MHz)
		$\pm 4.9$ dB (30MHz to 1GHz)
		$\pm 4.9$ dB (1GHz to 6GHz)
		$\pm 4.7$ dB (6GHz to 18GHz)
		$\pm 5.26$ dB (Above 18GHz)

**Remark:**

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{CISPR/ETSI}$  (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)
MXA signal analyzer	Agilent	N9020A	XAW01-06-07	2023/02/16	2024/02/15
MXG vector signal Generator	Agilent	N5182B	XAW01-07-16	2023/02/16	2024/02/15
Measurement Software	Tonscend	JS1120-3 (3.2.18)	XAW02-14-01	NCR	NCR
RF control unit	Tonscend	JS0806-2	XAW03-37-01	NCR	NCR
Power Meter	Anritsu	ML2495A	XAW01-25-03	2023/02/16	2024/02/15
Power Supply	Agilent	66311B	XAW01-17-01	2023/02/16	2024/02/15
Temperature and humidity meter	MingGao	T809	XAW01-01-16	2022/09/18	2023/09/17

CE Test System					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Shielding Room	Brilliant-emc	N/A	XAW04-03-01	N/A	N/A
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2022/09/08	2023/09/07
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2022/06/30	2023/06/29
Temperature and humidity meter	MingGao	TH101B	XAW01-01-02	2022/09/18	2023/09/17
Measurement Software	Tonscend	TS+ V4.0.0.0	XAW02-07-01	NCR	NCR
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2023/02/16	2024/02/15
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-02	2022/06/30	2023/06/29



RSE Test System					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/d)	Cal. Due date (yyyy/mm/d)
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2021/09/09	2024/09/08
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2023/02/16	2024/02/15
Spectrum Analyzer	ROHDE &SCHWARZ	FSV3044	XAW01-13-05	2022/05/24	2023/05/23
Test receiver	ROHDE &SCHWARZ	ESR	XAW01-08-01	2022/09/08	2023/09/07
Receiving antenna (30MHz-3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2022/07/28	2024/07/27
Receiving antenna(1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2022/07/28	2024/07/27
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2022/07/23	2024/07/22
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR
Amplifier	Tonscend	TAP9K3G32	XAW01-41-01	2022/05/24	2023/05/23
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2022/09/14	2023/09/13
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2022/09/14	2023/09/13
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2022/09/14	2023/09/13
Temperature and humidity meter	MingGao	TH101B	XAW01-01-02	2022/09/18	2023/09/17
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2023/02/16	2024/02/15
Measurement Software	Tonscend	TS+ V4.0.0.0	XAW02-05-01	NCR	NCR
Loop Antenna	Schwarzbeck	FMZB 1519B	XAW01-48-02	2022/05/26	2023/05/25



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## 7 Photographs - Setup Photos

Refer to Appendix A.2 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	Ant2	2402	0.648	2401.680	2402.328	0.5	PASS
		2440	0.660	2439.668	2440.328	0.5	PASS
		2480	0.700	2479.644	2480.344	0.5	PASS
BLE_2M	Ant2	2402	1.124	2401.440	2402.564	0.5	PASS
		2440	1.024	2439.460	2440.484	0.5	PASS
		2480	1.144	2479.444	2480.588	0.5	PASS



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### Occupied Channel Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
BLE_1M	Ant2	2402	1.0336	2401.4929	2402.5265	For Report Purpose
		2440	1.0316	2439.4902	2440.5218	
		2480	1.0372	2479.4897	2480.5269	
BLE_2M	Ant2	2402	2.0282	2401.0078	2403.0360	
		2440	2.0258	2439.0042	2441.0300	
		2480	2.0325	2479.0027	2481.0352	



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Test Graphs



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## Maximum conducted output power Test Result

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant2	2402	8.34	≤30	PASS
		2440	7.96	≤30	PASS
		2480	7.48	≤30	PASS
BLE_2M	Ant2	2402	8.37	≤30	PASS
		2440	8.08	≤30	PASS
		2480	7.61	≤30	PASS



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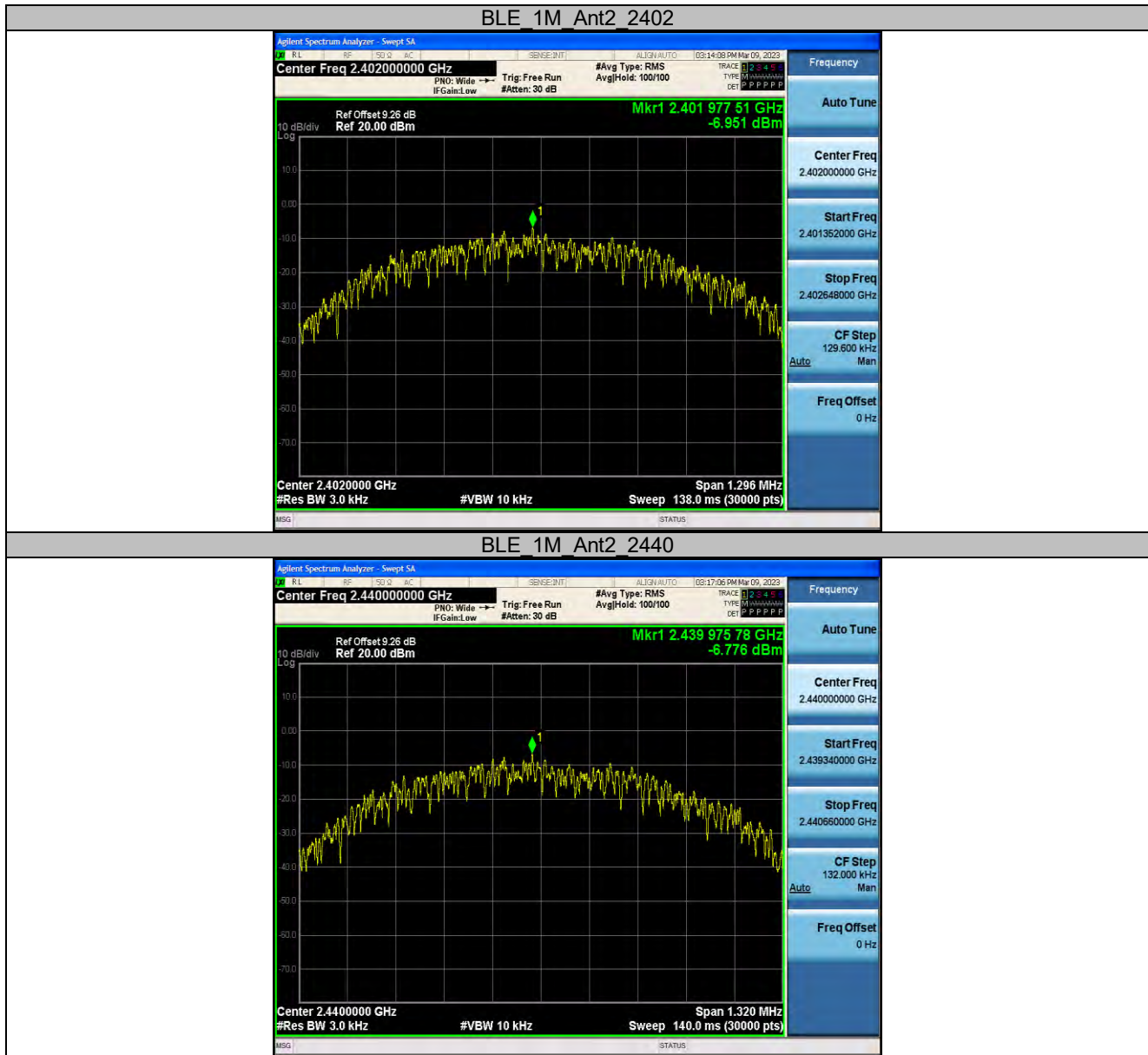
**Maximum power spectral density  
 Test Result**

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant2	2402	-6.95	≤8.00	PASS
		2440	-6.78	≤8.00	PASS
		2480	-6.48	≤8.00	PASS
BLE_2M	Ant2	2402	-9.74	≤8.00	PASS
		2440	-9.61	≤8.00	PASS
		2480	-9.32	≤8.00	PASS



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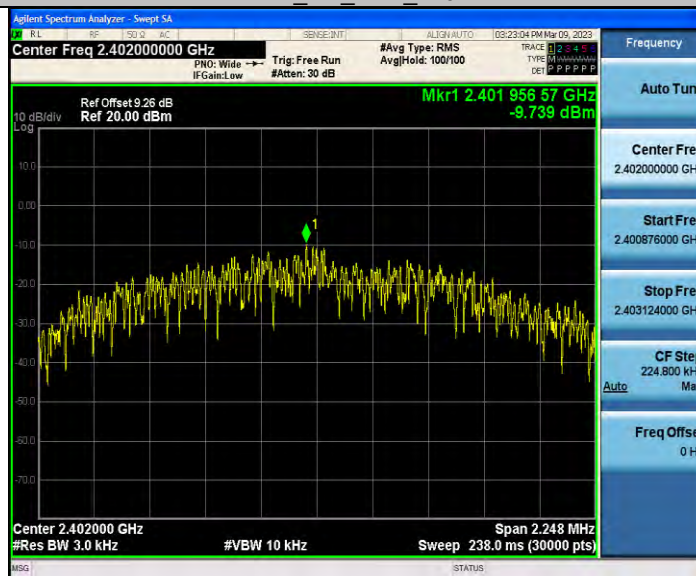
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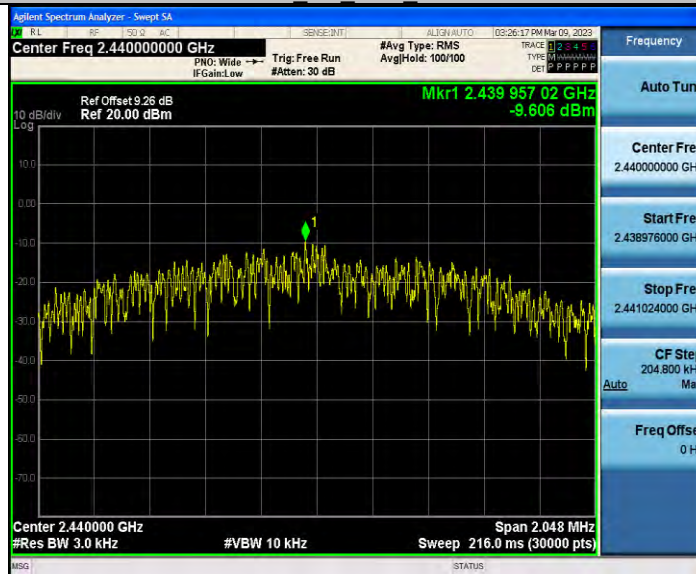
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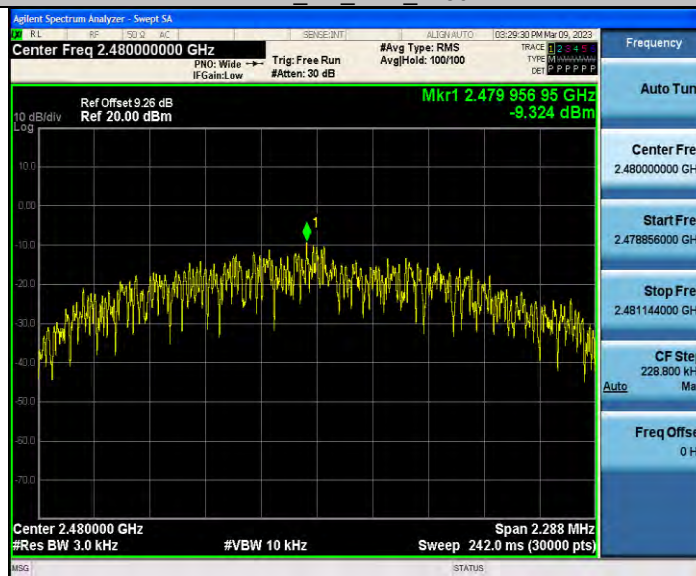
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BLE\_2M\_Ant2\_2440



BLE\_2M\_Ant2\_2480



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Report No.: XEWA2302000005RG02  
 Rev.: 01  
 Page: 45 of 91

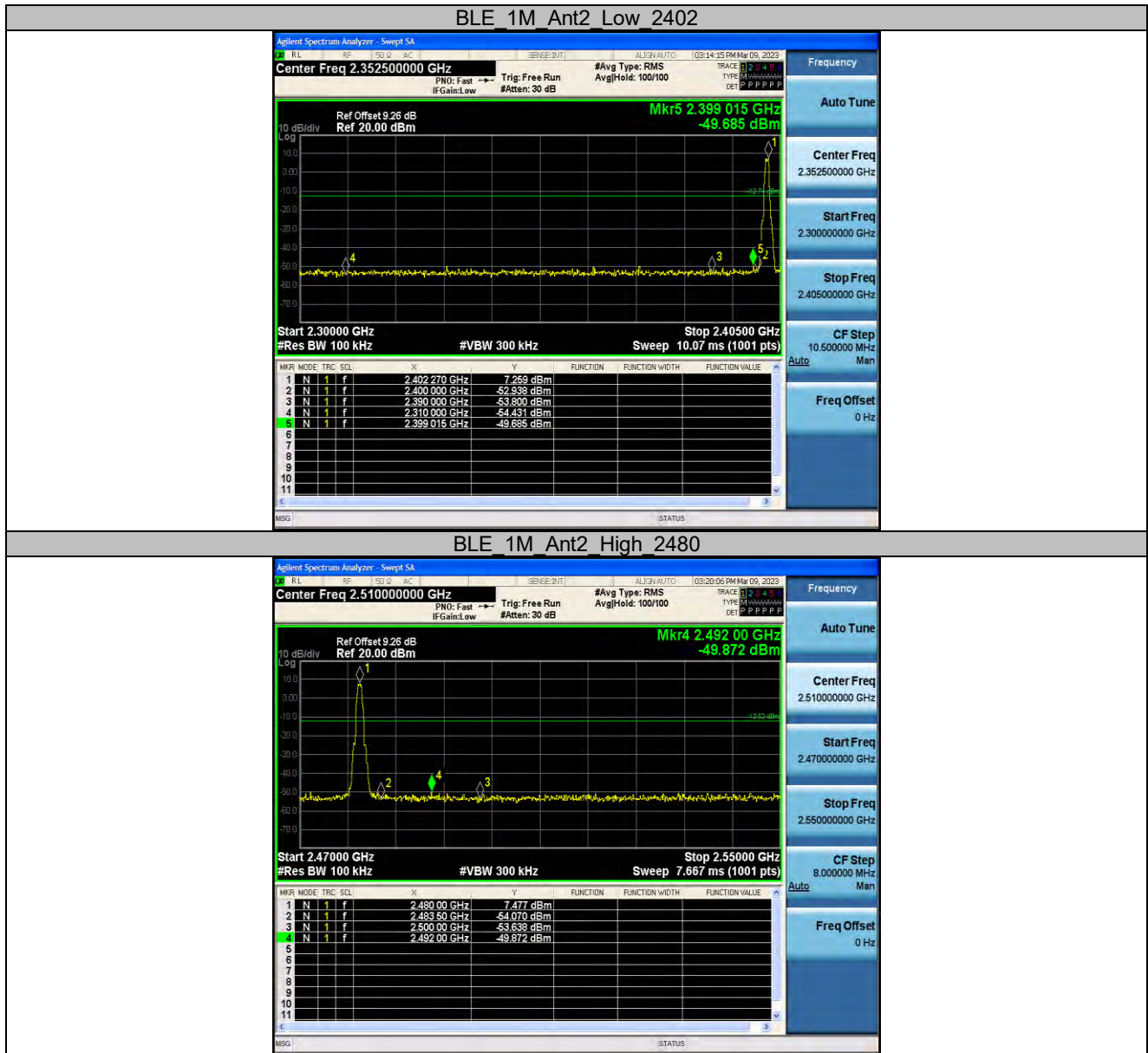
**Band edge measurements  
 Test Result**

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant2	Low	2402	7.26	-49.69	≤-12.74	PASS
		High	2480	7.48	-49.87	≤-12.52	PASS
BLE_2M	Ant2	Low	2402	6.81	-33.63	≤-13.19	PASS
		High	2480	7.41	-49.58	≤-12.59	PASS



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Test Graphs

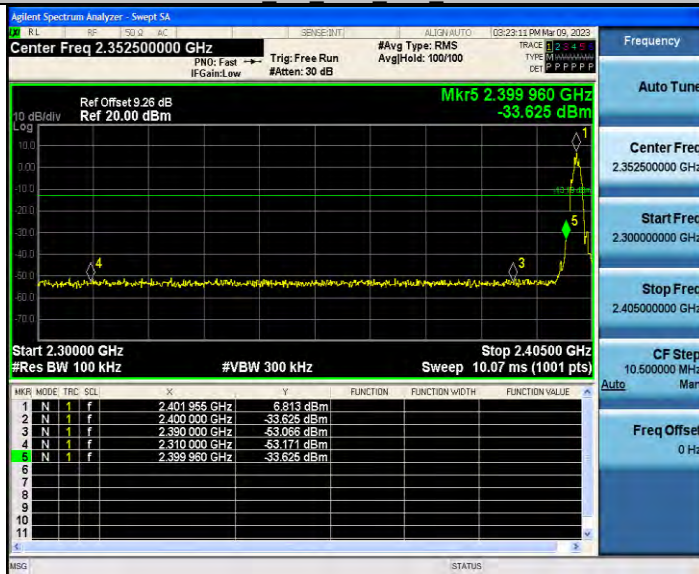


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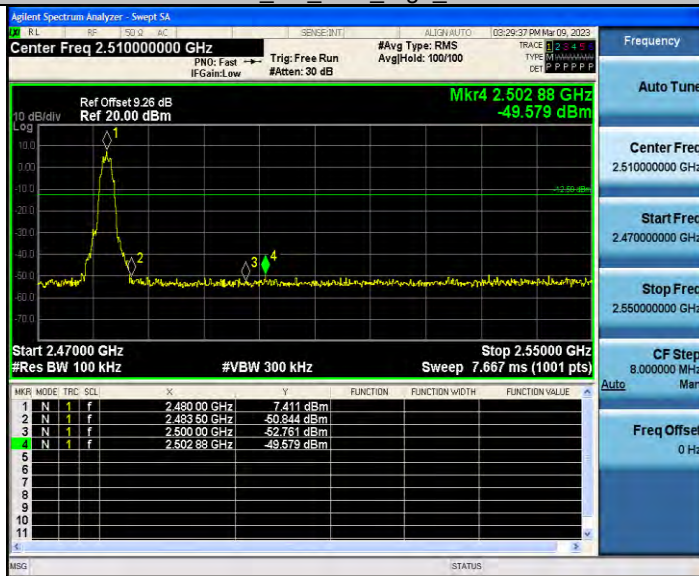
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BLE 2M Ant2 Low 2402



BLE\_2M\_Ant2\_High\_2480



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### Conducted Spurious Emission Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant2	2402	Reference	6.69	6.69	---	PASS
			30~1000	6.69	-49.99	≤-13.31	PASS
			1000~26500	6.69	-29.59	≤-13.31	PASS
		2440	Reference	7.10	7.10	---	PASS
			30~1000	7.10	-52.05	≤-12.9	PASS
			1000~26500	7.10	-29.46	≤-12.9	PASS
		2480	Reference	7.01	7.01	---	PASS
			30~1000	7.01	-49.75	≤-12.99	PASS
			1000~26500	7.01	-31.47	≤-12.99	PASS
BLE_2M	Ant2	2402	Reference	6.65	6.65	---	PASS
			30~1000	6.65	-49.97	≤-13.35	PASS
			1000~26500	6.65	-29.4	≤-13.35	PASS
		2440	Reference	5.80	5.80	---	PASS
			30~1000	5.80	-58.38	≤-14.2	PASS
			1000~26500	5.80	-28.57	≤-14.2	PASS
		2480	Reference	7.40	7.40	---	PASS
			30~1000	7.40	-49.19	≤-12.6	PASS
			1000~26500	7.40	-29.67	≤-12.6	PASS



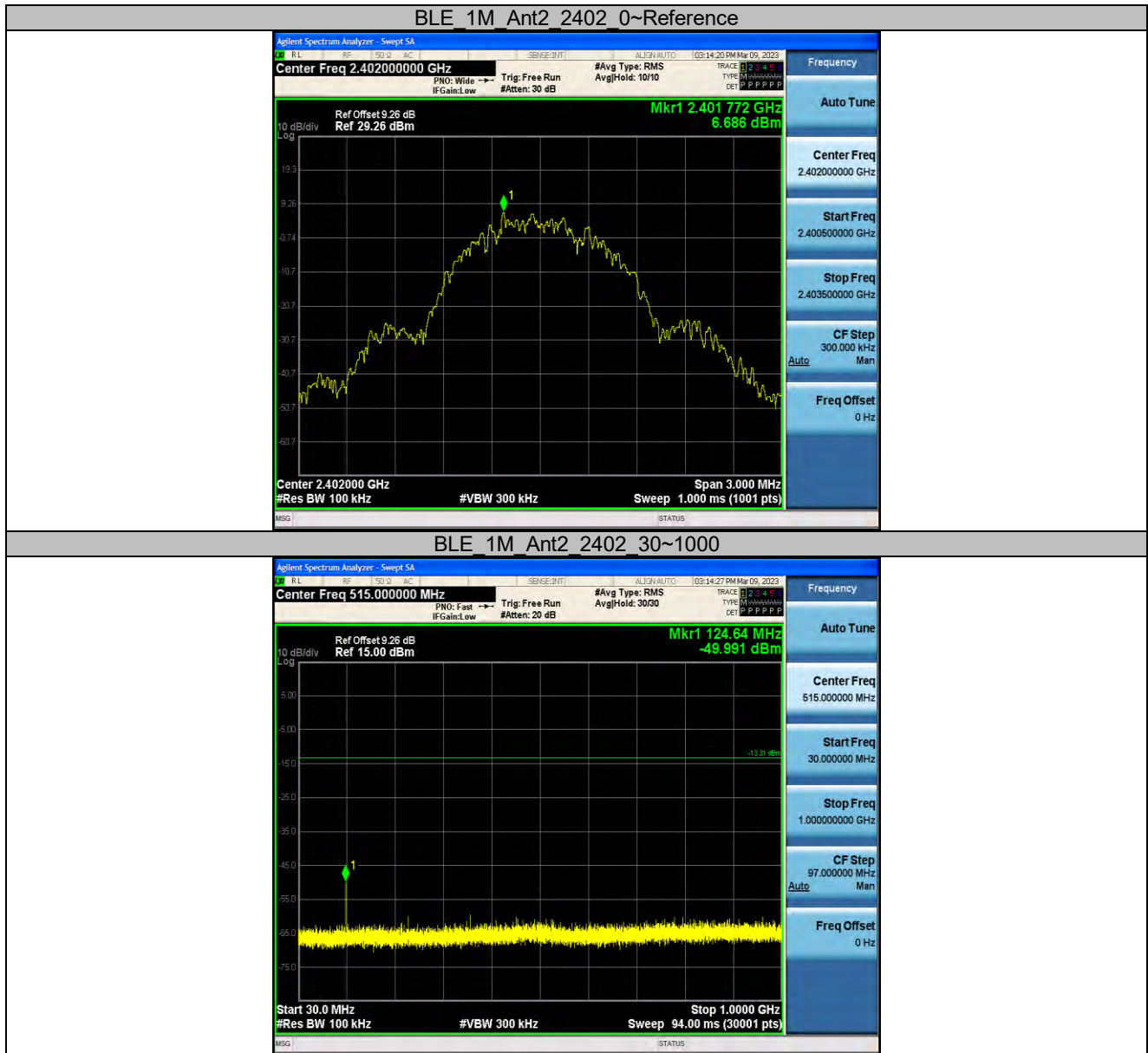
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Test Graphs



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BLE 1M Ant2 2402 1000~26500



BLE 1M Ant2 2440 0~Reference



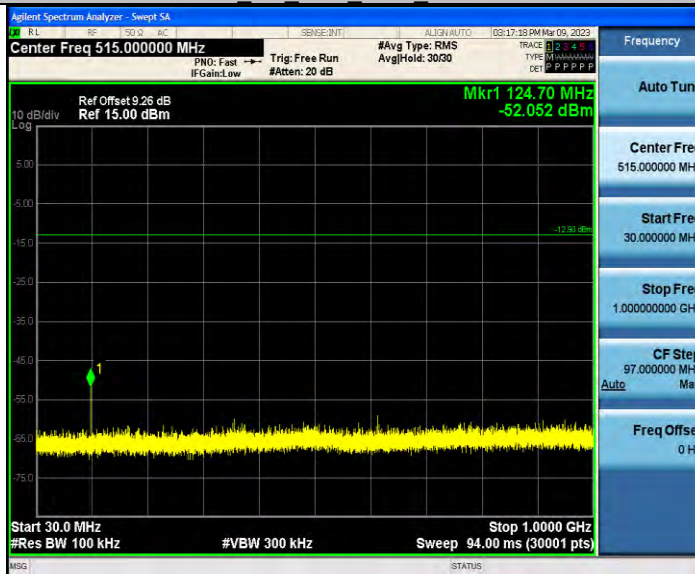
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BLE 1M Ant2 2440 30~1000



BLE 1M Ant2 2440 1000~26500

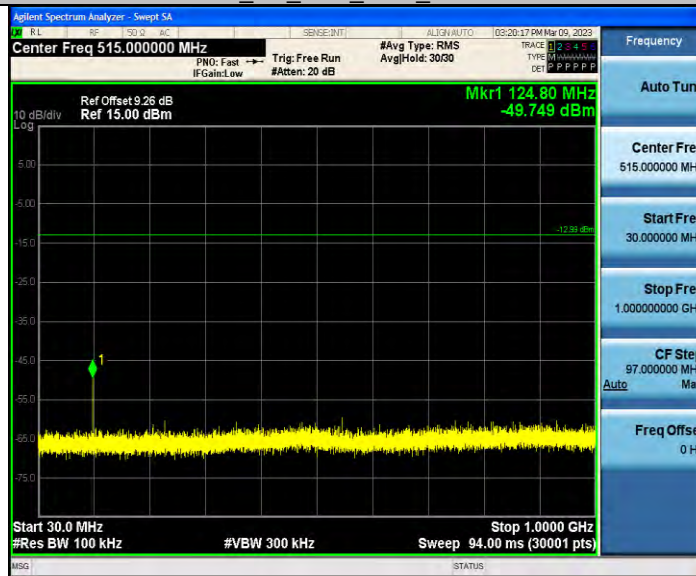


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BLE 1M Ant2 2480 0~Reference



BLE 1M Ant2 2480 30~1000



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BLE 1M Ant2 2480 1000~26500

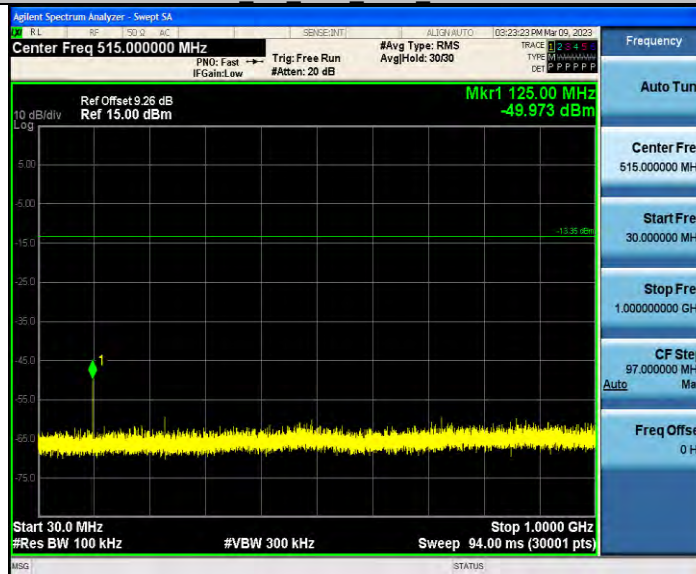


BLE 2M Ant2 2402\_0~Reference



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BLE\_2M\_Ant2\_2402\_30~1000



BLE\_2M\_Ant2\_2402\_1000~26500



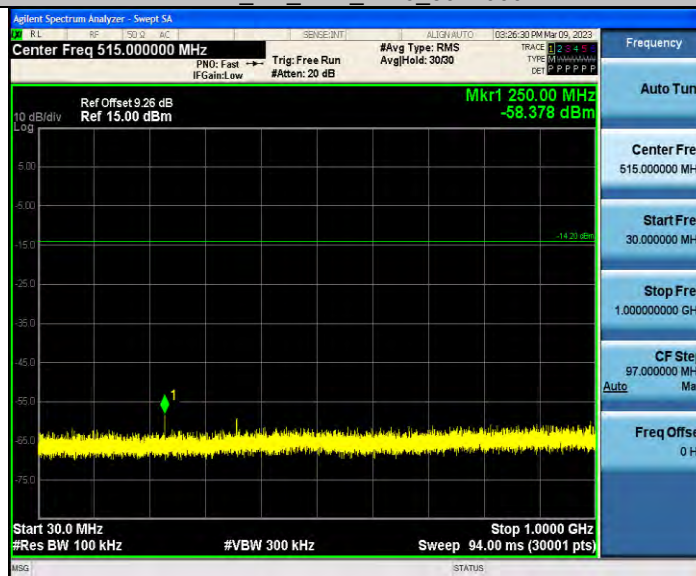
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BLE 2M Ant2 2440 1000~26500



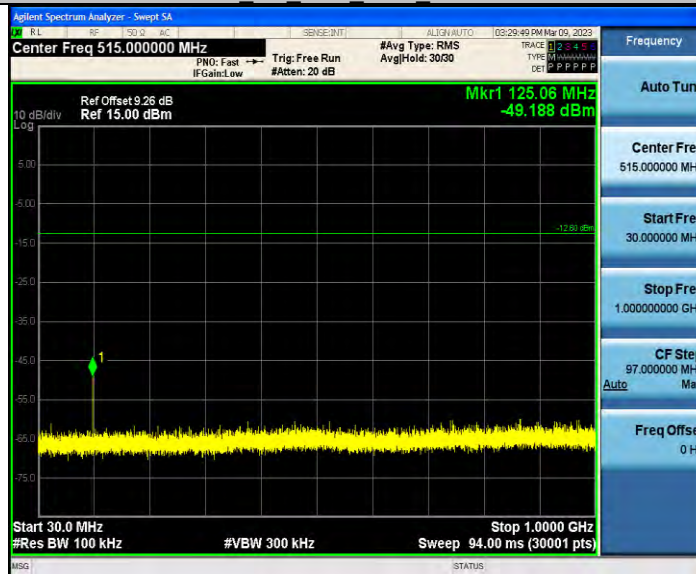
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BLE 2M Ant2 2480 30~1000



BLE 2M Ant2 2480 1000~26500



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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	Ant2	2402	0.39	0.63	61.90	2.08
		2440	0.39	0.63	61.90	2.08
		2480	0.39	0.63	61.90	2.08
BLE_2M	Ant2	2402	0.21	0.63	33.33	4.77
		2440	0.21	0.63	33.33	4.77
		2480	0.21	0.63	33.33	4.77

Note:

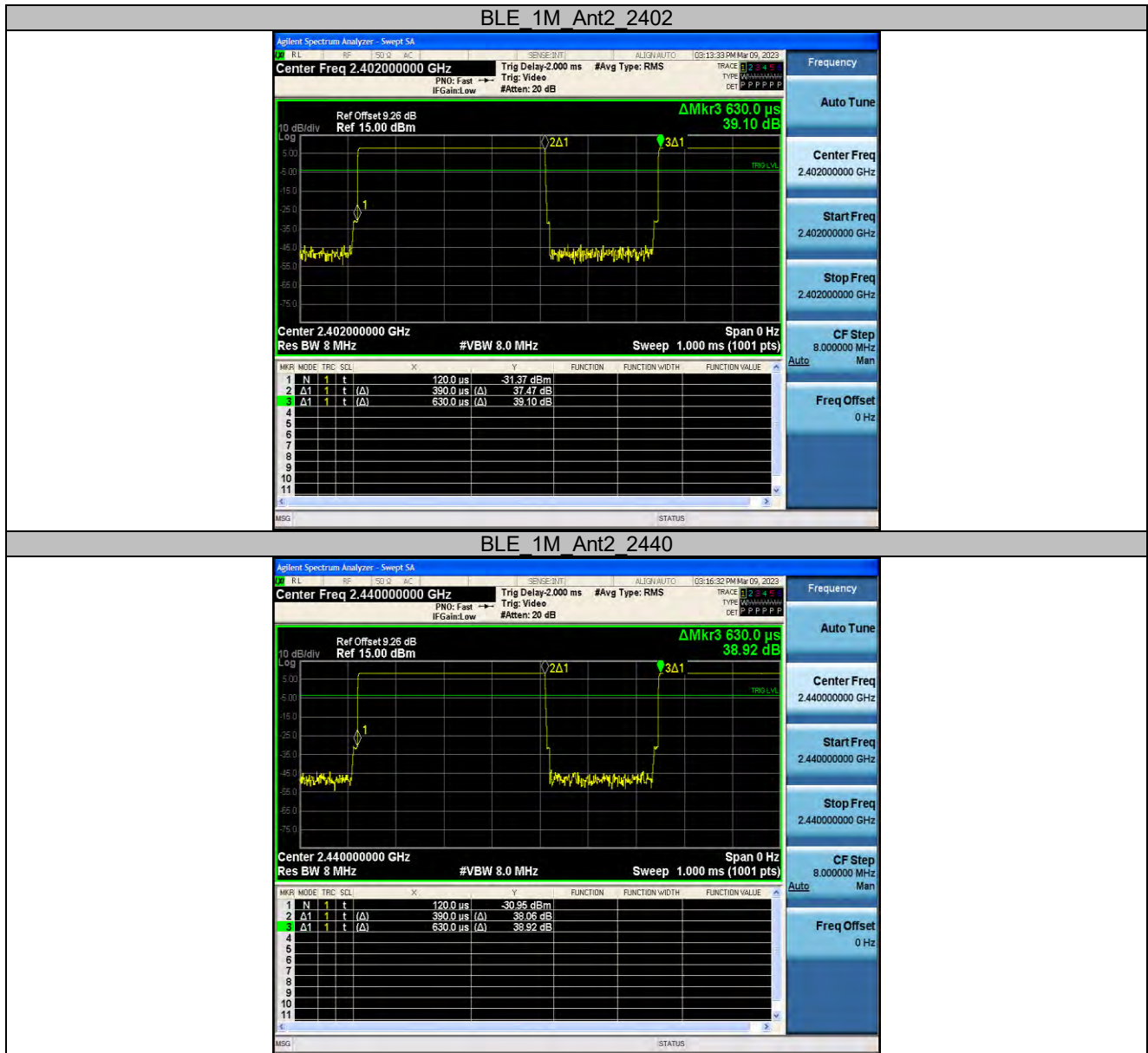
Radiated Emission Average VBW = 1 / T

TestMode	T[ms]	Period[ms]	Duty Cycle[%]	1/T[kHz]	VBW Setting
BLE_1M	0.39	0.63	61.90	2.56410	2.7KHz
BLE_2M	0.21	0.63	33.33	4.76190	5.1KHz



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Test Graphs

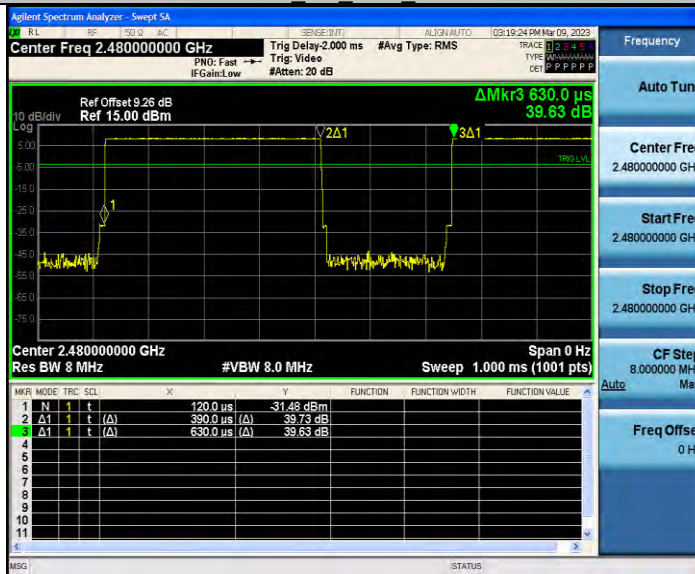


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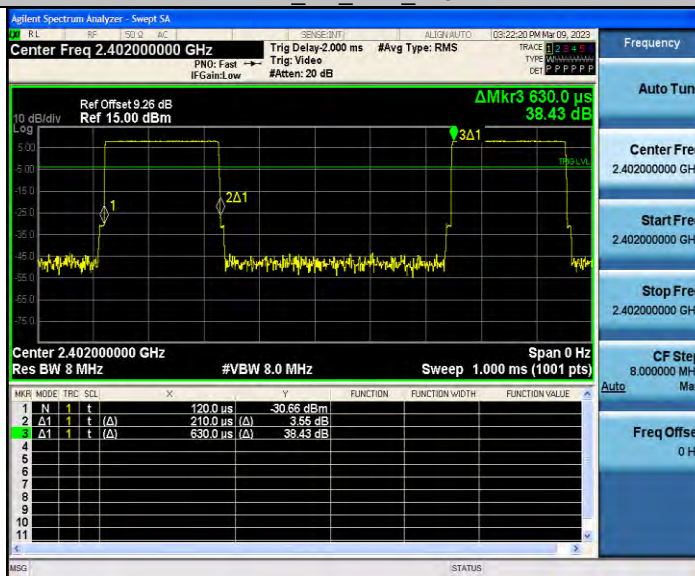
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BLE\_1M\_Ant2\_2480



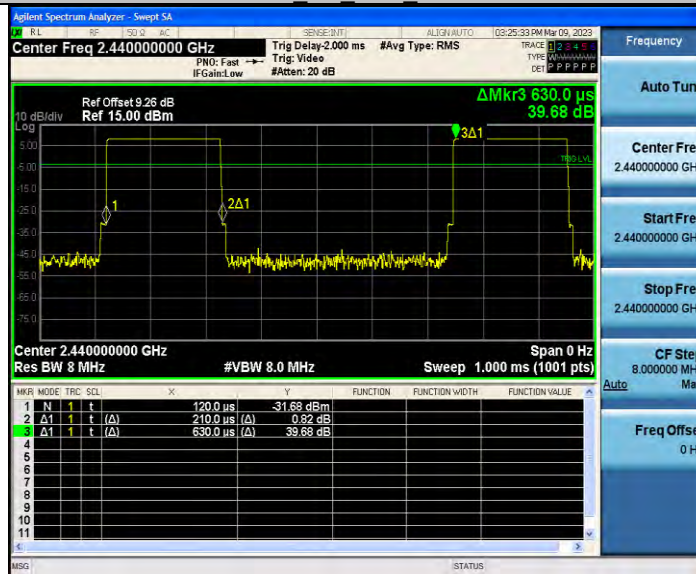
BLE\_2M\_Ant2\_2402



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BLE\_2M\_Ant2\_2440



BLE\_2M\_Ant2\_2480



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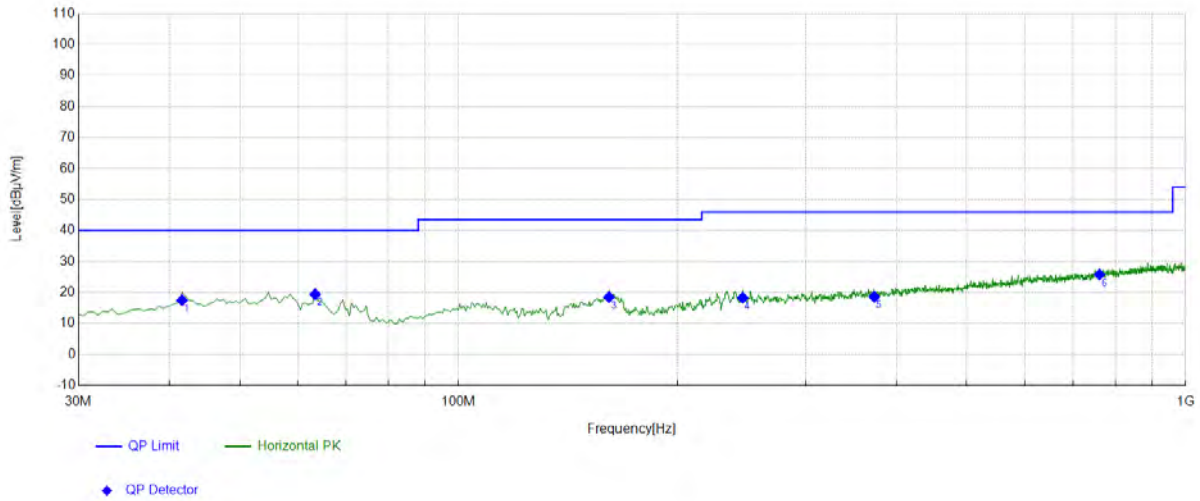
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## Radiated Spurious Emissions

### Radiated emission below 1GHz

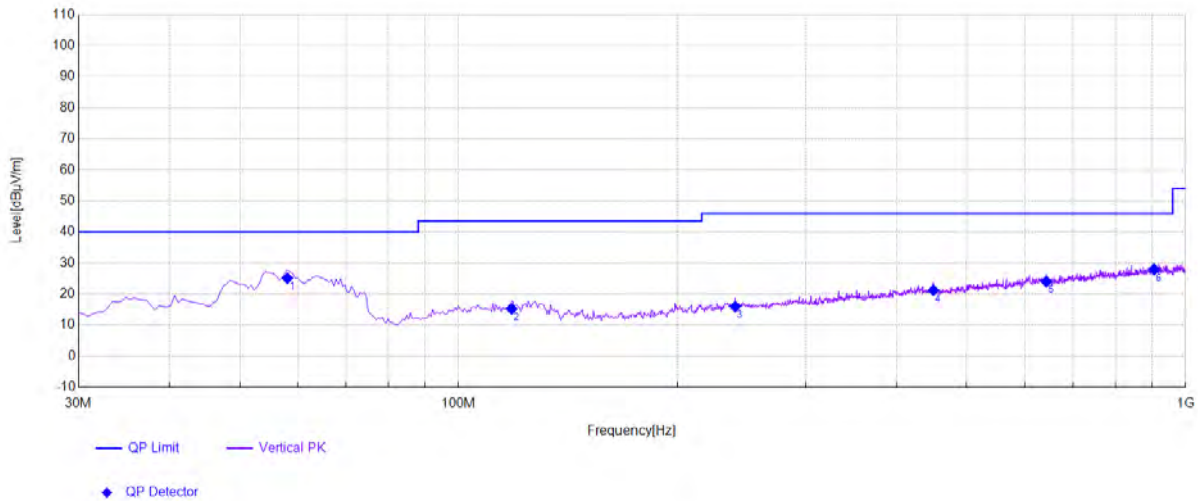
#### Worst case Mode: BLE-1M\_ Channel 0



Data List										
NO.	Freq. [MHz]	AF[dB/m]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	41.6458	13.46	-27.93	31.94	17.47	40.00	22.53	174	63	Horizontal
2	63.4817	12.00	-27.75	35.15	19.40	40.00	20.60	165	93	Horizontal
3	161.0155	8.50	-26.40	36.42	18.52	43.50	24.98	255	111	Horizontal
4	245.933	12.48	-26.25	32.06	18.29	46.00	27.71	136	270	Horizontal
5	373.0665	14.86	-25.61	29.38	18.63	46.00	27.37	256	358	Horizontal
6	761.2606	20.48	-24.18	29.5	25.80	46.00	20.20	325	346	Horizontal



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Data List										
NO.	Freq. [MHz]	AF[dB/m]	Factor [dB]	QP Reading[dBµV]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	58.1441	12.76	-27.92	40.3	25.14	40.00	14.86	252	19	Vertical
2	118.3142	9.97	-27.29	32.55	15.23	43.50	28.27	236	209	Vertical
3	240.1101	12.50	-26.29	29.78	15.99	46.00	30.01	241	34	Vertical
4	449.7349	16.38	-25.28	30.12	21.22	46.00	24.78	239	43	Vertical
5	643.3467	19.27	-24.63	29.39	24.03	46.00	21.97	226	171	Vertical
6	904.8924	22.39	-23.69	29.22	27.92	46.00	18.08	358	236	Vertical

Remark:

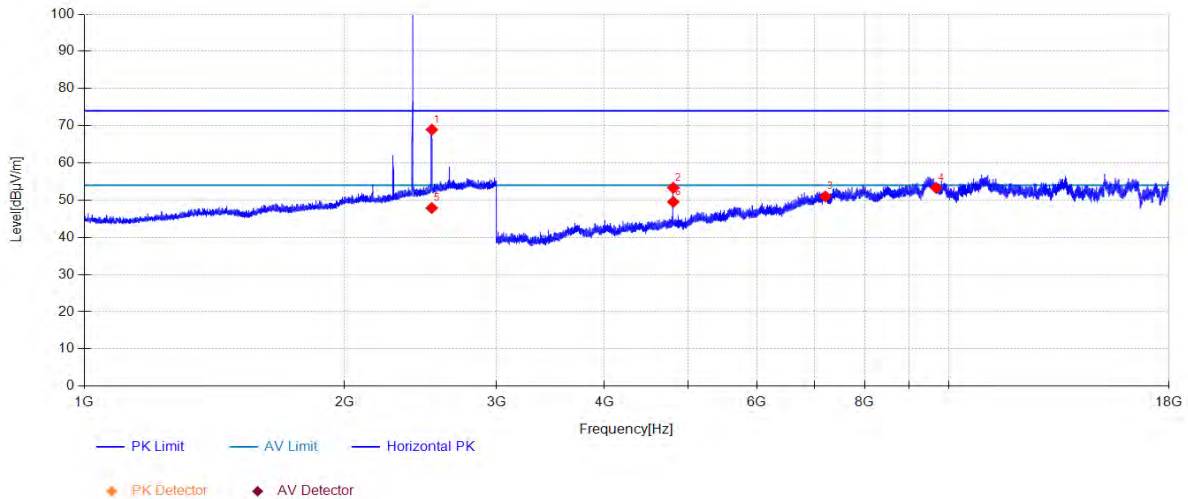
- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:  
 Value = Reading(dBµV) + AF(dB/m) + Factor(dB):  
 AF = Antenna Factor(dB/m)  
 Factor = Cable Factor(dB) - Preamplifier gain(dB)  
 Margin = Limit(dBµV/m) – Value(dBµV/m)
- All channels have been tested, but only the worst case data displayed in this report.



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### Transmitter emission Above 1GHz BLE-1M\_Channel 0



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2524.9208	64.16	27.80	-23.02	68.94	74.00	5.06	241	172	Horizontal
2	4803.6829	65.49	30.79	-42.95	53.33	74.00	20.67	325	71	Horizontal
3	7206	53.14	36.56	-38.71	50.99	74.00	23.01	288	348	Horizontal
4	9680	51.31	38.16	-36.19	53.28	74.00	20.72	195	220	Horizontal
5	2524.5874	43.10	27.80	-23.02	47.88	54.00	6.12	242	168	Horizontal
6	4804.7174	61.69	30.78	-42.95	49.52	54.00	4.48	326	124	Horizontal

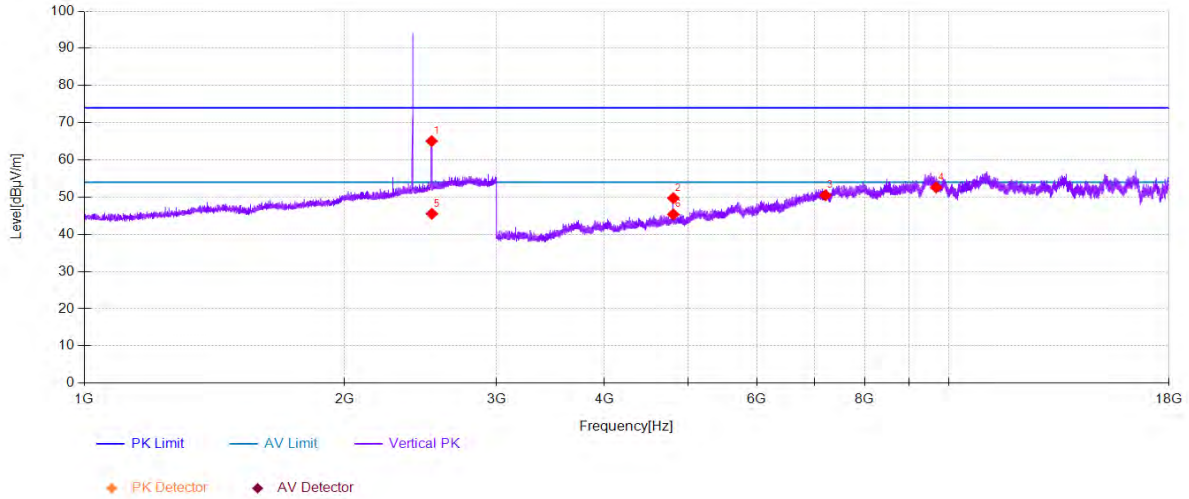


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BLE-1M\_Channel 0

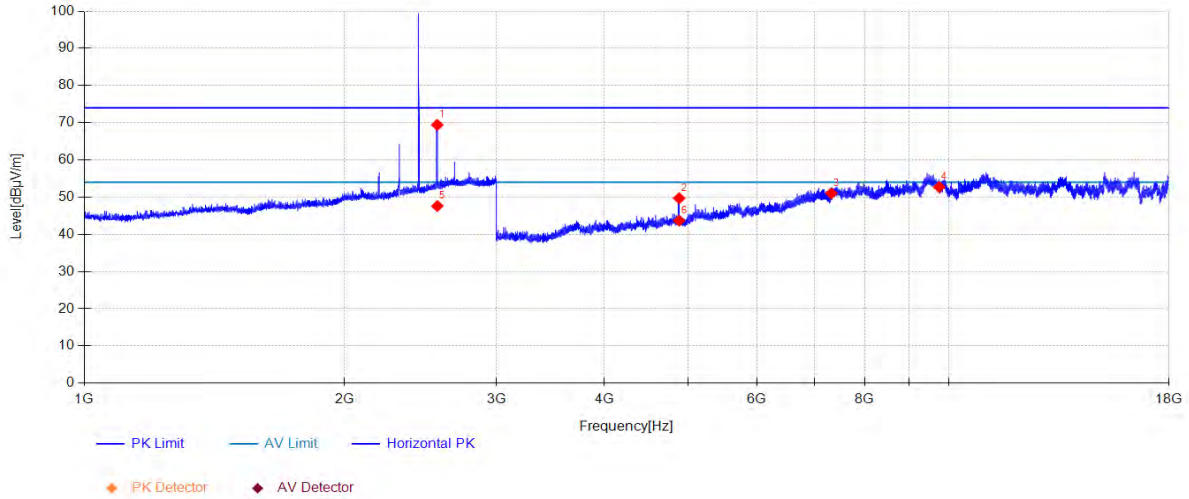


Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2523.9207	60.29	27.80	-23.02	65.07	74.00	8.93	299	211	Vertical
2	4804.2001	61.90	30.78	-42.95	49.73	74.00	24.27	265	252	Vertical
3	7206	52.65	36.56	-38.71	50.50	74.00	23.50	254	348	Vertical
4	9680	50.62	38.16	-36.19	52.59	74.00	21.41	356	111	Vertical
5	2524.9208	40.73	27.80	-23.02	45.51	54.00	8.49	345	202	Vertical
6	4804.2001	57.53	30.78	-42.95	45.36	54.00	8.64	147	252	Vertical



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BLE-1M\_Channel 19



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2561.927	64.45	27.82	-22.84	69.43	74.00	4.57	105	122	Horizontal
2	4880.2372	61.82	30.78	-42.89	49.71	74.00	24.29	254	360	Horizontal
3	7320	53.34	36.44	-38.76	51.02	74.00	22.98	156	76	Horizontal
4	9760	50.34	38.34	-35.97	52.71	74.00	21.29	325	44	Horizontal
5	2562.2604	42.62	27.82	-22.83	47.61	54.00	6.39	159	108	Horizontal
6	4880.2372	55.79	30.78	-42.89	43.68	54.00	10.32	333	65	Horizontal

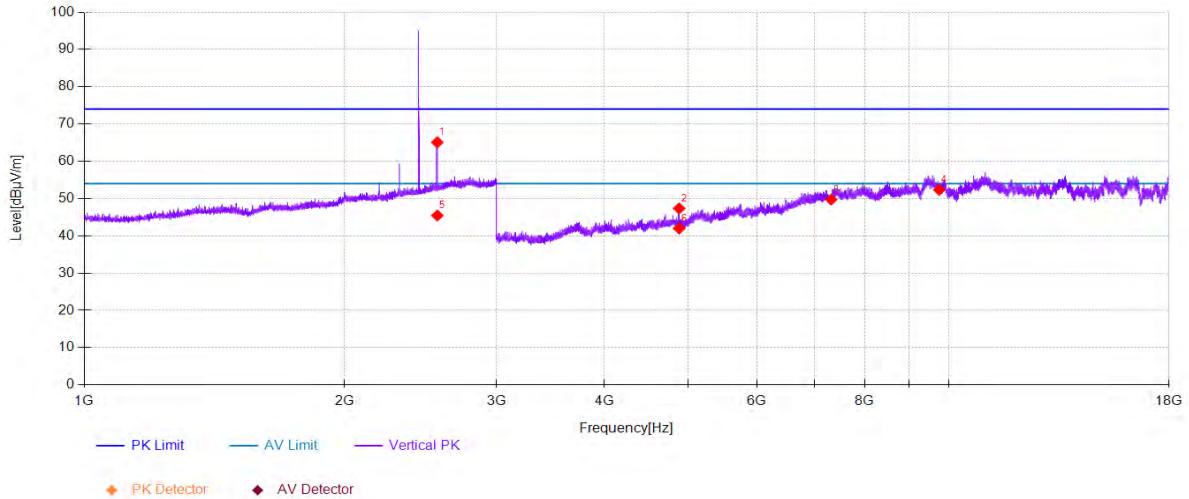


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BLE-1M\_Channel 19



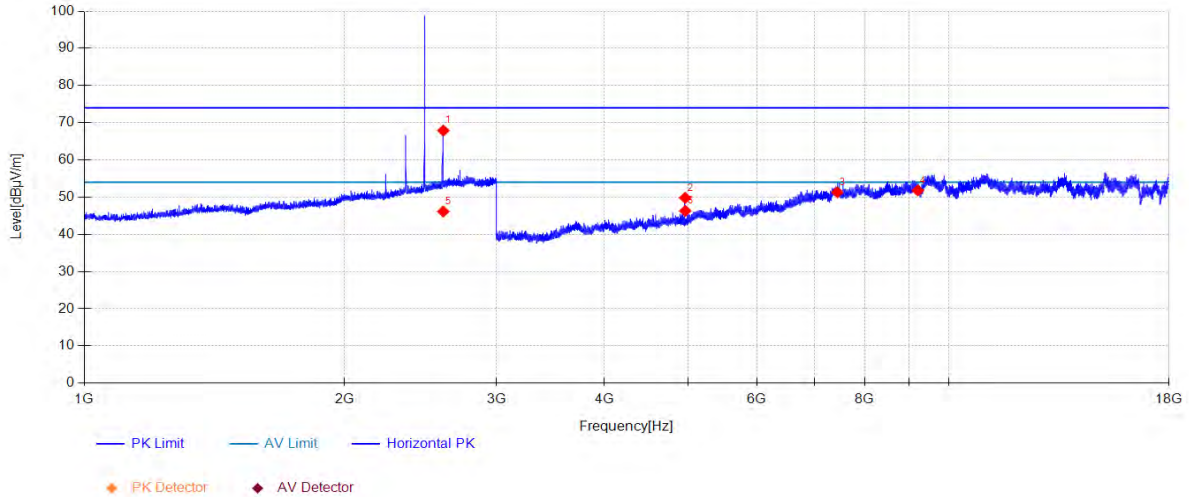
Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2561.927	60.11	27.82	-22.84	65.09	74.00	8.91	254	184	Vertical
2	4880.2372	59.45	30.78	-42.89	47.34	74.00	26.66	387	248	Vertical
3	7320	52.07	36.44	-38.76	49.75	74.00	24.25	334	330	Vertical
4	9760	49.96	38.34	-35.97	52.33	74.00	21.67	335	193	Vertical
5	2562.2604	40.46	27.82	-22.83	45.45	54.00	8.55	256	194	Vertical
6	4880.7545	54.10	30.78	-42.89	41.99	54.00	12.01	225	248	Vertical



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BLE-1M\_Channel 39



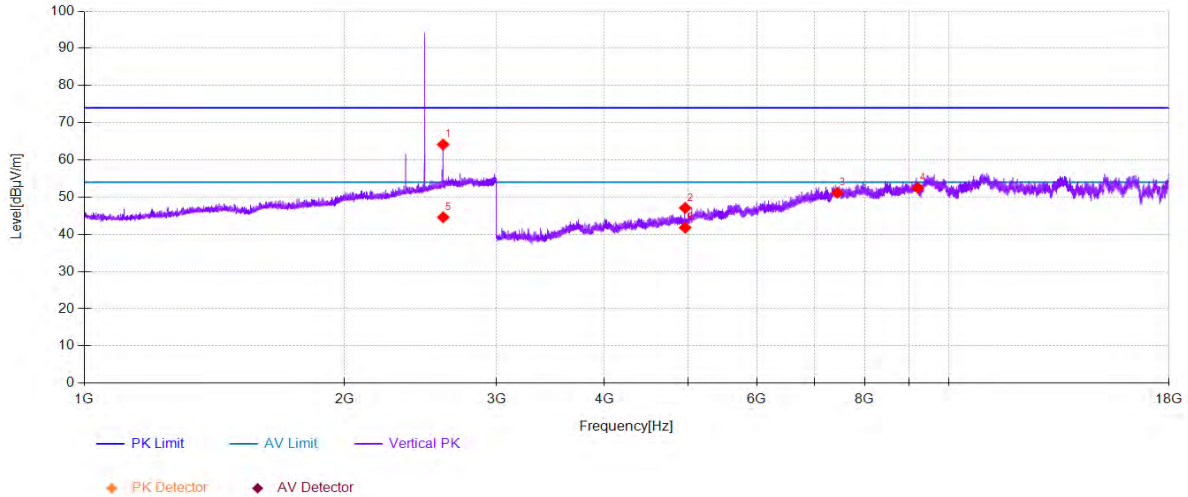
Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2603.2672	62.65	27.90	-22.65	67.90	74.00	6.10	195	127	Horizontal
2	4959.8952	61.55	31.04	-42.78	49.81	74.00	24.19	254	151	Horizontal
3	7440	52.80	36.78	-38.28	51.30	74.00	22.70	145	256	Horizontal
4	9220	50.33	37.50	-36.04	51.79	74.00	22.21	265	302	Horizontal
5	2602.267	40.89	27.90	-22.65	46.14	54.00	7.86	236	172	Horizontal
6	4960.4124	58.04	31.04	-42.78	46.30	54.00	7.70	222	124	Horizontal



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BLE-1M\_Channel 39

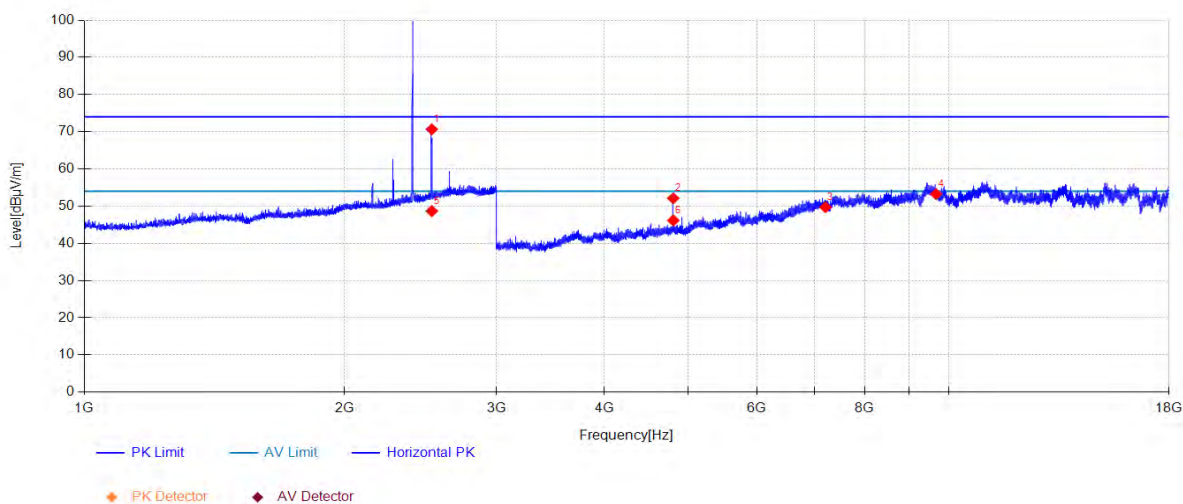


Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF[dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2601.9337	58.89	27.90	-22.65	64.14	74.00	9.86	299	175	Vertical
2	4959.8952	58.84	31.04	-42.78	47.10	74.00	26.90	254	140	Vertical
3	7440	52.67	36.78	-38.28	51.17	74.00	22.83	145	216	Vertical
4	9220	51.03	37.50	-36.04	52.49	74.00	21.51	109	205	Vertical
5	2602.267	39.33	27.90	-22.65	44.58	54.00	9.42	326	185	Vertical
6	4960	53.54	31.04	-42.78	41.80	54.00	12.20	322	249	Vertical



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BLE-2M\_Channel 0



Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF[dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2524.254	65.87	27.80	-23.02	70.65	74.00	3.35	122	164	Horizontal
2	4803.6829	64.29	30.79	-42.95	52.13	74.00	21.87	204	173	Horizontal
3	7206	51.85	36.56	-38.71	49.70	74.00	24.30	314	251	Horizontal
4	9680	51.27	38.16	-36.19	53.24	74.00	20.76	241	262	Horizontal
5	2524.5874	43.90	27.80	-23.02	48.68	54.00	5.32	169	164	Horizontal
6	4804.2001	58.32	30.78	-42.95	46.15	54.00	7.85	244	151	Horizontal

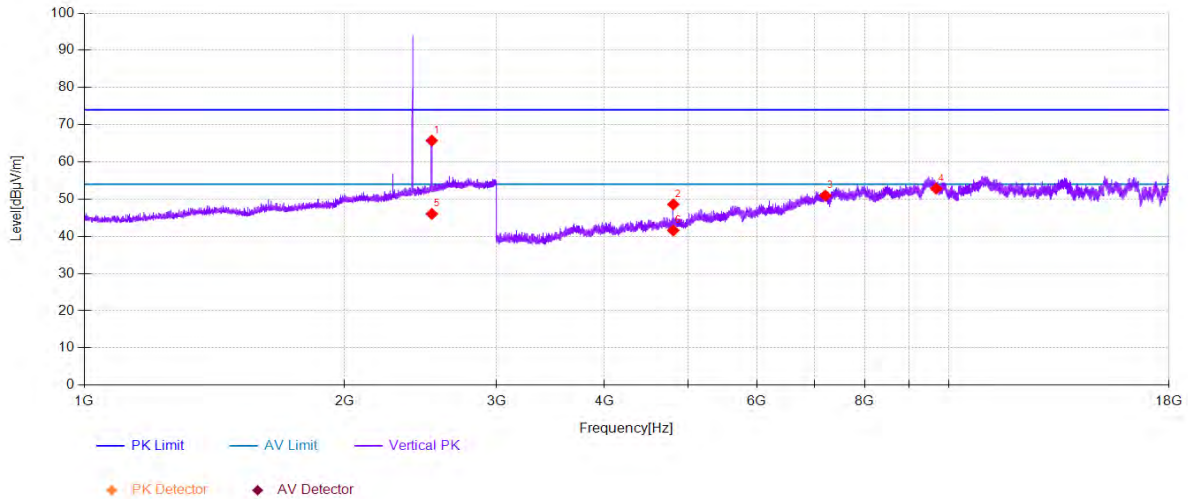


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BLE-2M\_Channel 0



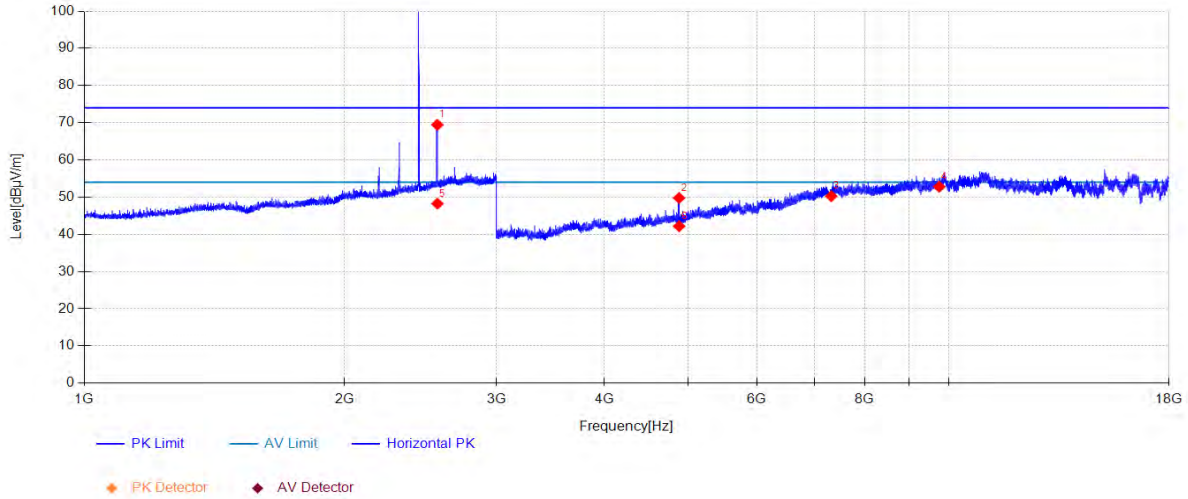
Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF[dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2524.254	60.94	27.80	-23.02	65.72	74.00	8.28	299	194	Vertical
2	4805.2347	60.76	30.78	-42.95	48.59	74.00	25.41	314	151	Vertical
3	7206	53.10	36.56	-38.71	50.95	74.00	23.05	254	195	Vertical
4	9680	50.85	38.16	-36.19	52.82	74.00	21.18	156	322	Vertical
5	2524.5874	41.25	27.80	-23.02	46.03	54.00	7.97	333	208	Vertical
6	4804.7174	53.75	30.78	-42.95	41.58	54.00	12.42	399	258	Vertical



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BLE-2M\_Channel 19



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2562.5938	64.45	27.83	-22.83	69.45	74.00	4.55	112	133	Horizontal
2	4879.2027	61.88	30.78	-42.89	49.77	74.00	24.23	254	358	Horizontal
3	7320	52.60	36.44	-38.76	50.28	74.00	23.72	345	90	Horizontal
4	9760	50.42	38.34	-35.97	52.79	74.00	21.21	235	294	Horizontal
5	2562.9272	43.24	27.83	-22.83	48.24	54.00	5.76	125	133	Horizontal
6	4879.72	54.30	30.78	-42.89	42.19	54.00	11.81	236	129	Horizontal

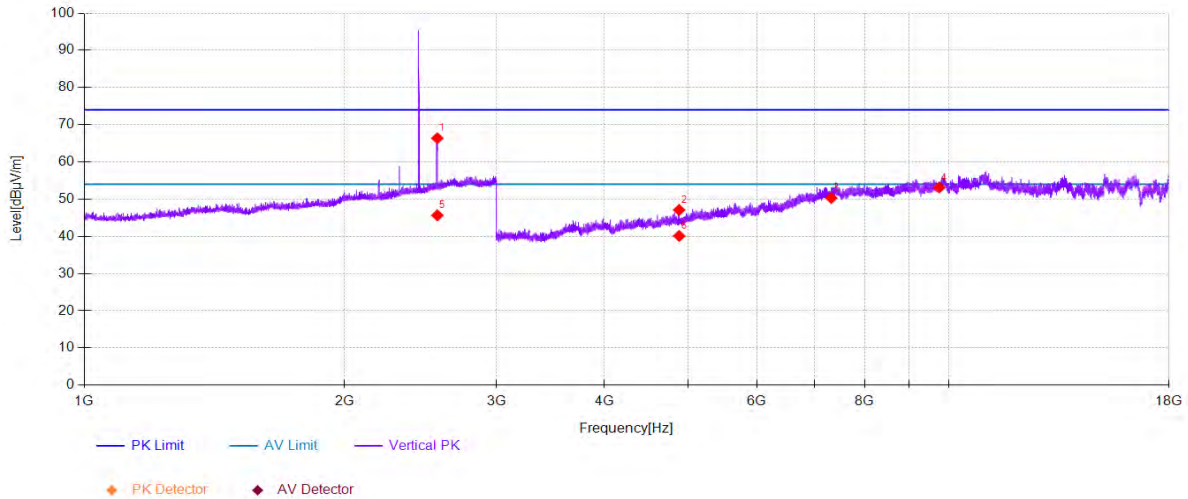


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BLE-2M\_Channel 19



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2562.2604	61.37	27.82	-22.83	66.36	74.00	7.64	333	199	Vertical
2	4879.2027	59.21	30.78	-42.89	47.10	74.00	26.90	387	242	Vertical
3	7320	52.62	36.44	-38.76	50.30	74.00	23.70	245	295	Vertical
4	9760	50.77	38.34	-35.97	53.14	74.00	20.86	265	295	Vertical
5	2562.2604	40.65	27.82	-22.83	45.64	54.00	8.36	352	195	Vertical
6	4880.7545	52.21	30.78	-42.89	40.10	54.00	13.90	166	242	Vertical

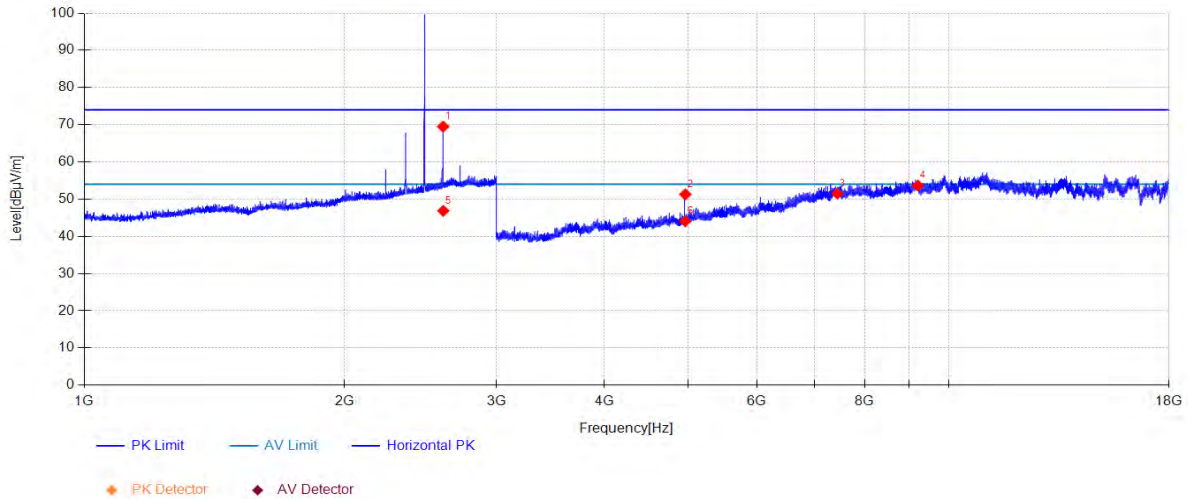


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BLE-2M\_Channel 39



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2601.9337	64.25	27.90	-22.65	69.50	74.00	4.50	144	41	Horizontal
2	4961.4469	63.00	31.05	-42.78	51.27	74.00	22.73	254	178	Horizontal
3	7440	53.00	36.78	-38.28	51.50	74.00	22.50	354	80	Horizontal
4	9220	52.17	37.50	-36.04	53.63	74.00	20.37	235	70	Horizontal
5	2602.9338	41.61	27.90	-22.65	46.86	54.00	7.14	159	24	Horizontal
6	4959.8952	55.81	31.04	-42.78	44.07	54.00	9.93	201	241	Horizontal



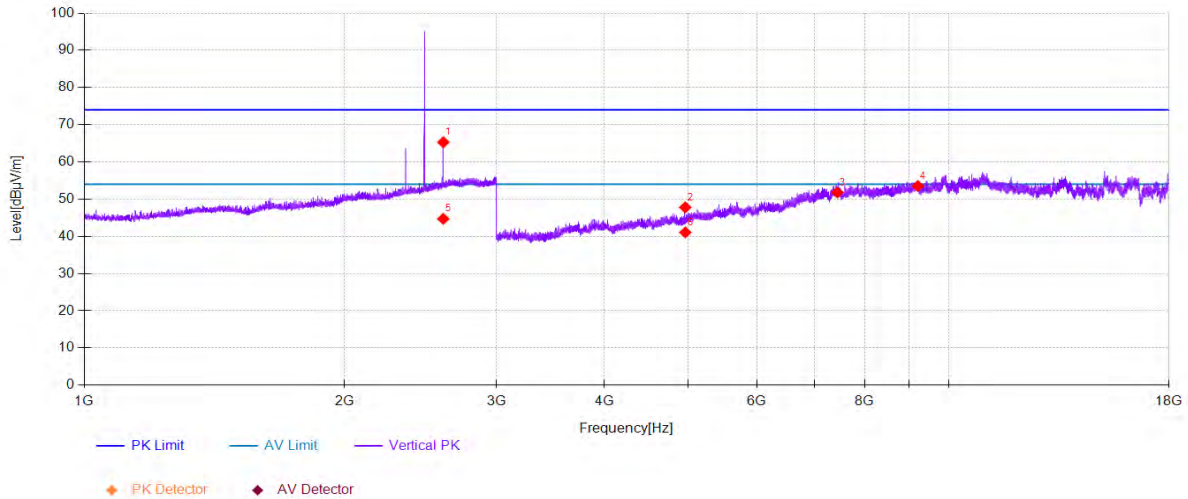
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**BLE-2M\_Channel 39**



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2603.2672	60.05	27.90	-22.65	65.30	74.00	8.70	241	214	Vertical
2	4959.8952	59.53	31.04	-42.78	47.79	74.00	26.21	287	306	Vertical
3	7440	53.29	36.78	-38.28	51.79	74.00	22.21	145	28	Vertical
4	9220	52.07	37.50	-36.04	53.53	74.00	20.47	356	59	Vertical
5	2602.6004	39.45	27.90	-22.65	44.70	54.00	9.30	264	287	Vertical
6	4961.4469	52.79	31.05	-42.78	41.06	54.00	12.94	222	293	Vertical

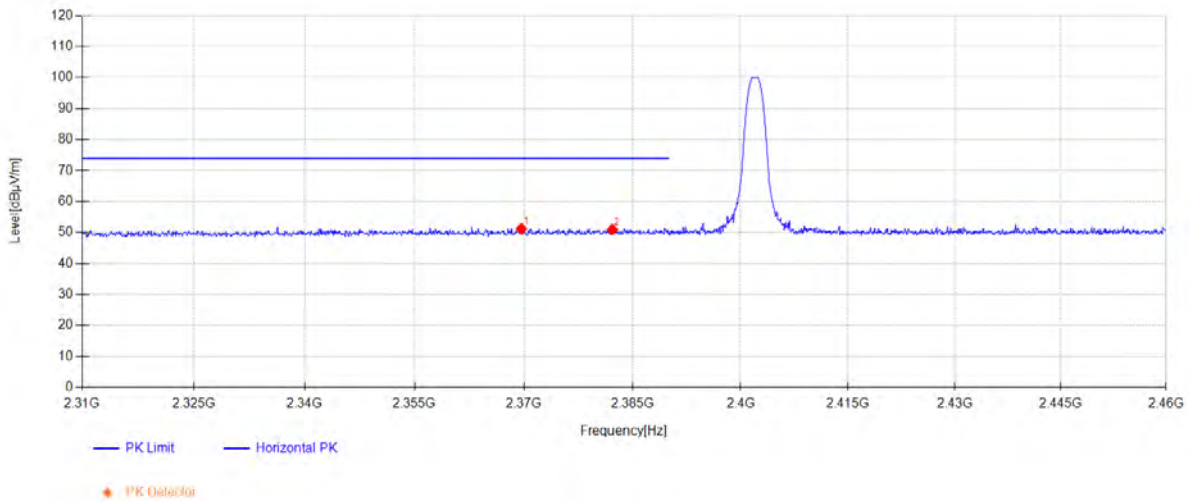
**Remark:**

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier 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) - Pre-amplifier gain(dB)  
 Margin = Limit(dBµV/m) – Level(dBµV/m)
- All channels have been tested, but only the worst case data displayed in this report.
- Both peak and average measured complies with the limit line, so test result is "PASS"



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**Restricted bands around fundamental frequency**  
**BLE-1M\_Channel 0**

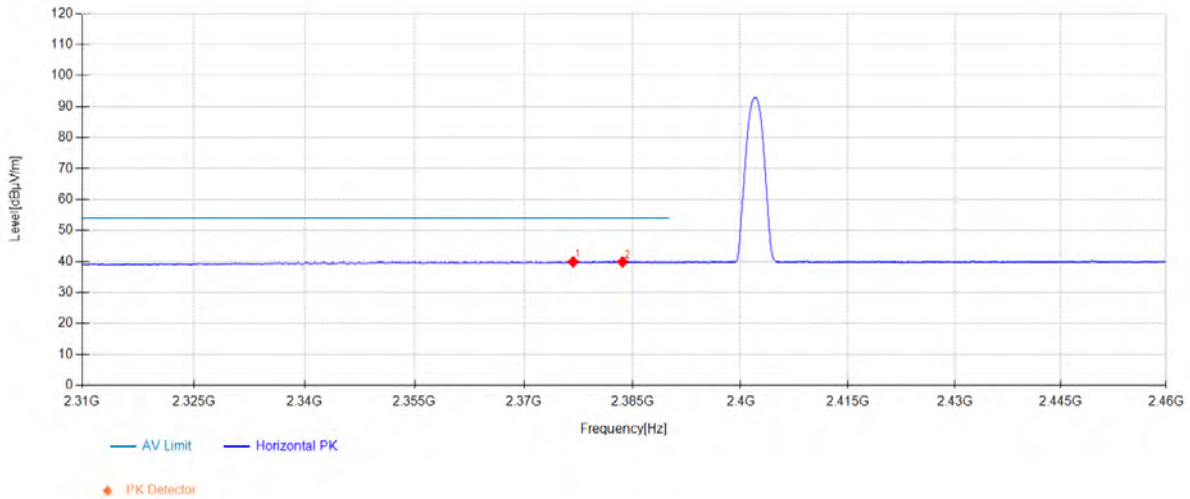


Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2369.6548	46.77	27.52	-23.05	51.24	74.00	22.76	105	310	Horizontal
2	2382.1861	46.52	27.47	-23.03	50.96	74.00	23.04	105	310	Horizontal



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BLE-1M\_Channel 0



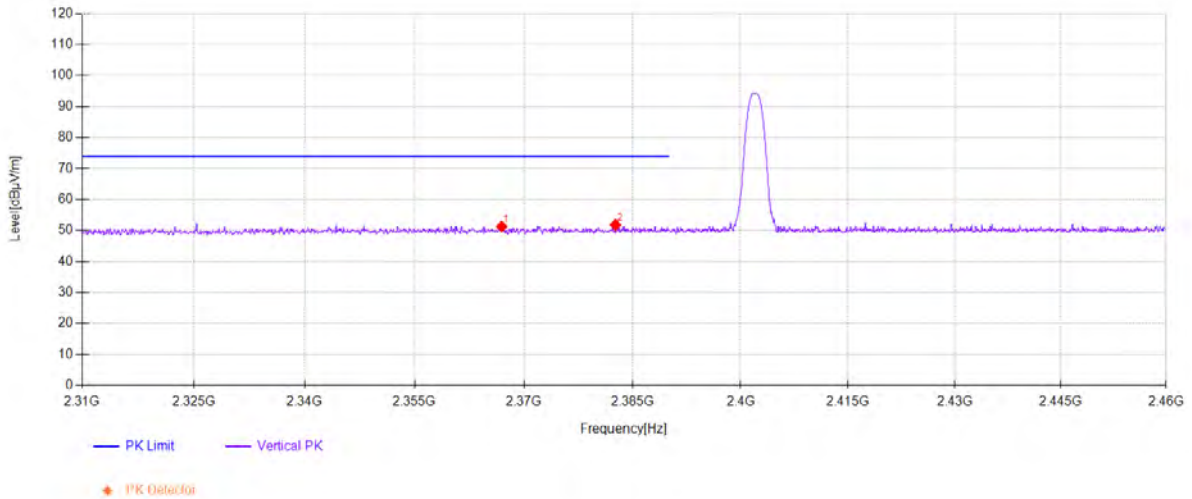
Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2376.7834	35.47	27.49	-23.04	39.92	54.00	14.08	105	310	Horizontal
2	2383.6118	35.43	27.47	-23.03	39.87	54.00	14.13	105	310	Horizontal



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BLE-1M\_Channel 0



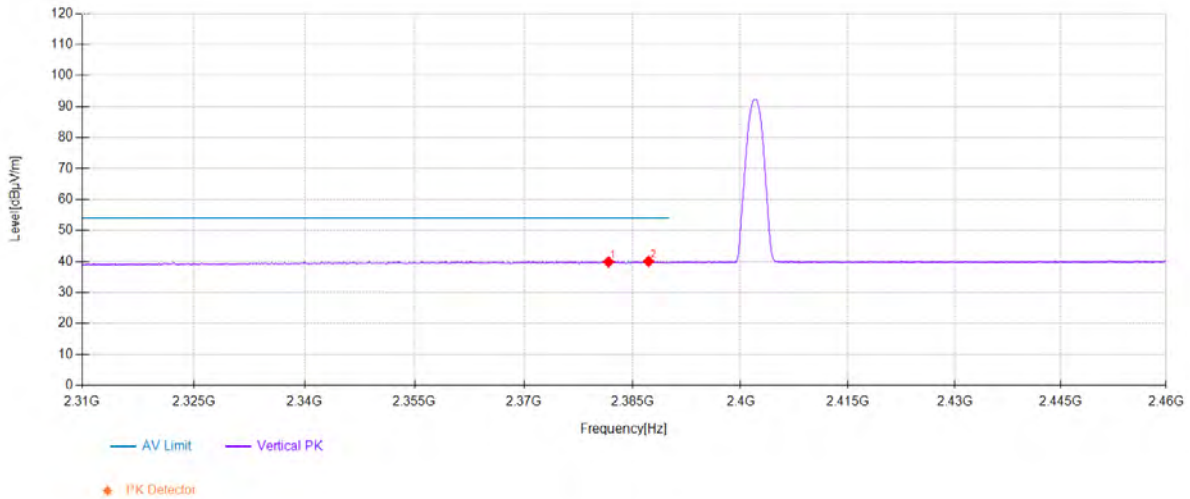
Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2366.9535	46.85	27.53	-23.05	51.33	74.00	22.67	302	198	Vertical
2	2382.6363	47.40	27.47	-23.03	51.84	74.00	22.16	302	198	Vertical



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BLE-1M\_Channel 0



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2381.6608	35.46	27.47	-23.03	39.90	54.00	14.10	302	198	Vertical
2	2387.2136	35.64	27.45	-23.02	40.07	54.00	13.93	302	198	Vertical

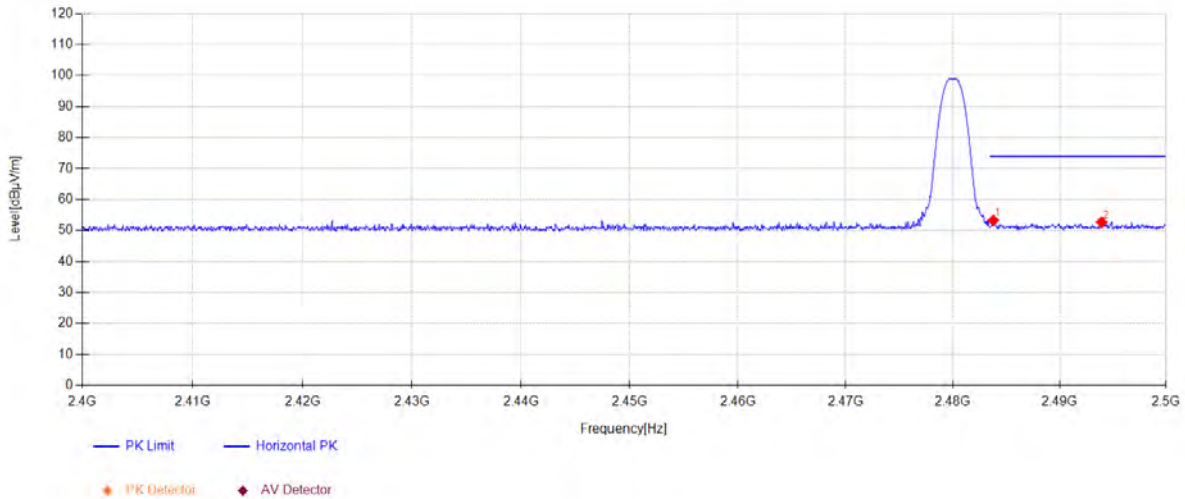


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BLE-1M\_Channel 39



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.7919	48.69	27.74	-23.12	53.31	74.00	20.69	105	158	Horizontal
2	2493.947	48.06	27.78	-23.13	52.71	74.00	21.29	105	158	Horizontal

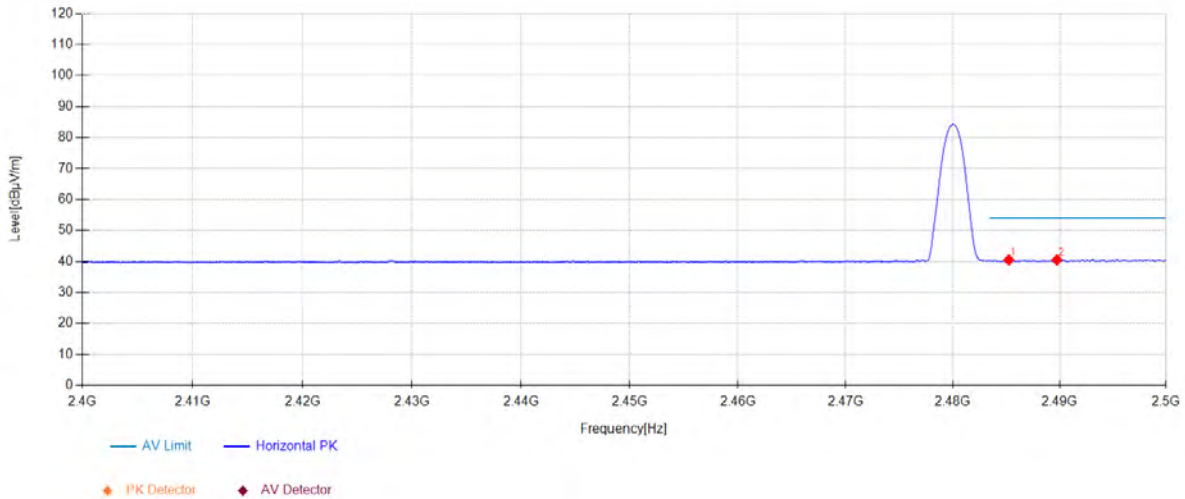


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BLE-1M\_Channel 39



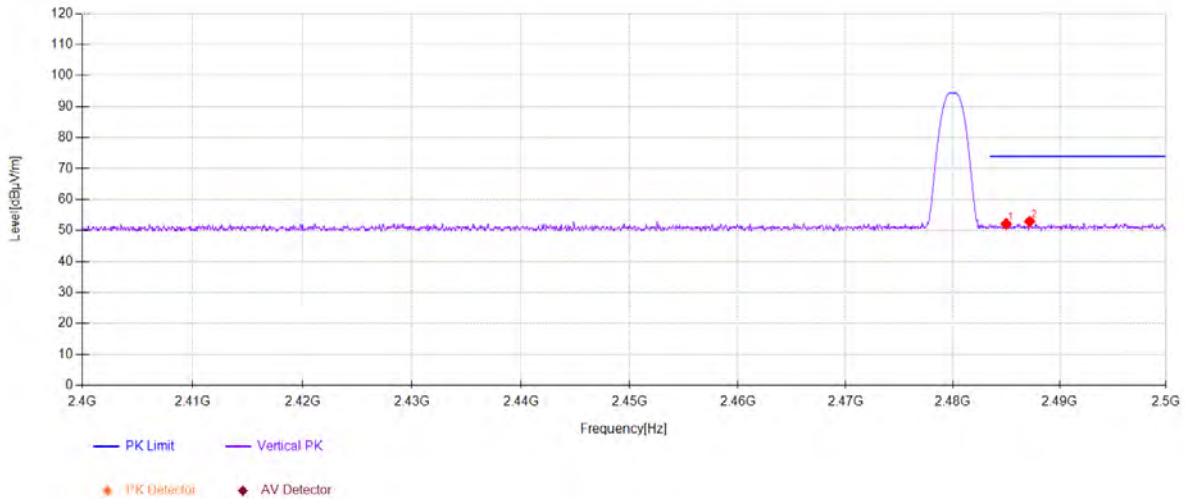
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1	2485.2426	35.89	27.74	-23.12	40.51	54.00	13.49	105	158	Horizontal
2	2489.7449	35.90	27.76	-23.13	40.53	54.00	13.47	105	158	Horizontal



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BLE-1M\_Channel 39



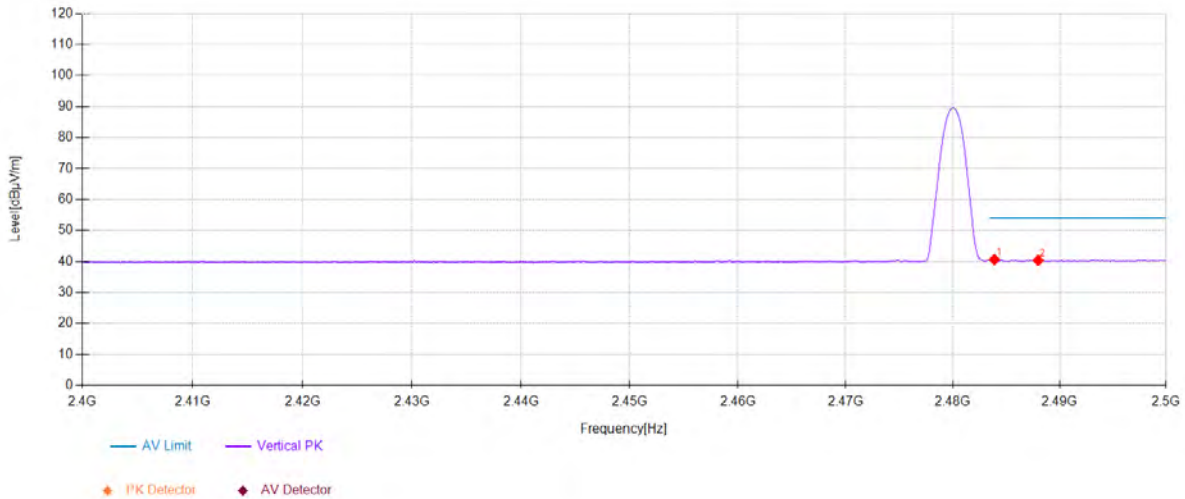
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1	2484.9925	47.54	27.74	-23.12	52.16	74.00	21.84	343	175	Vertical
2	2487.1936	48.28	27.75	-23.12	52.91	74.00	21.09	343	175	Vertical



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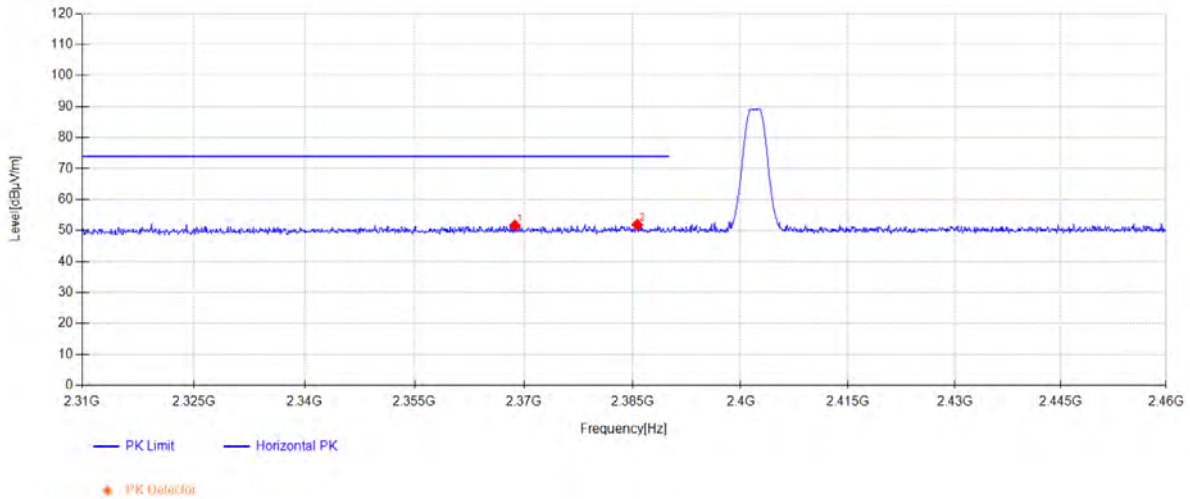
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1	2483.8919	36.03	27.74	-23.12	40.65	54.00	13.35	343	175	Vertical
2	2487.994	35.76	27.75	-23.12	40.39	54.00	13.61	343	175	Vertical



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BLE-2M\_Channel 0



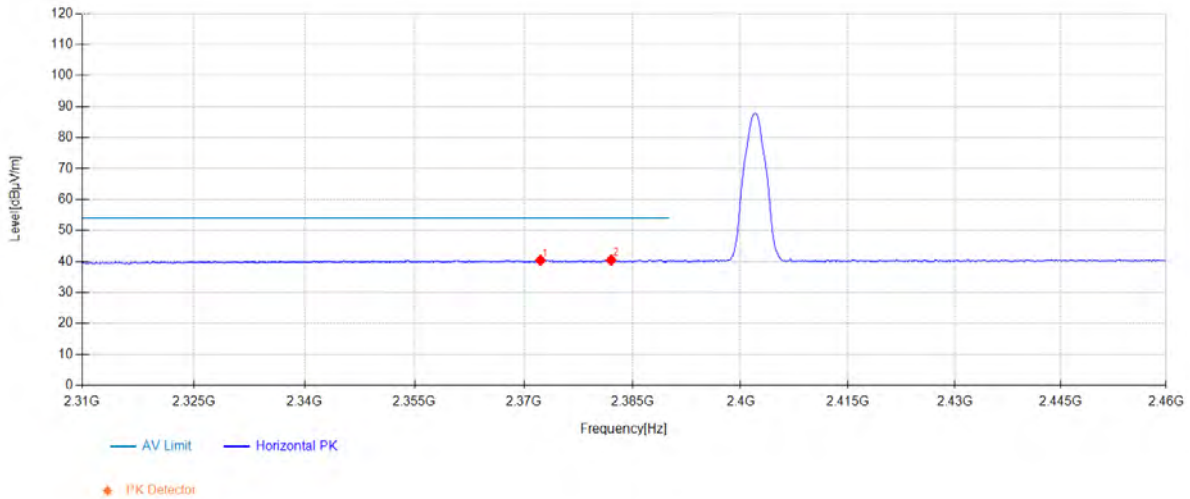
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1	2368.7544	47.16	27.52	-23.05	51.63	74.00	22.37	101	137	Horizontal
2	2385.6378	47.45	27.46	-23.02	51.89	74.00	22.11	101	137	Horizontal



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BLE-2M\_Channel 0



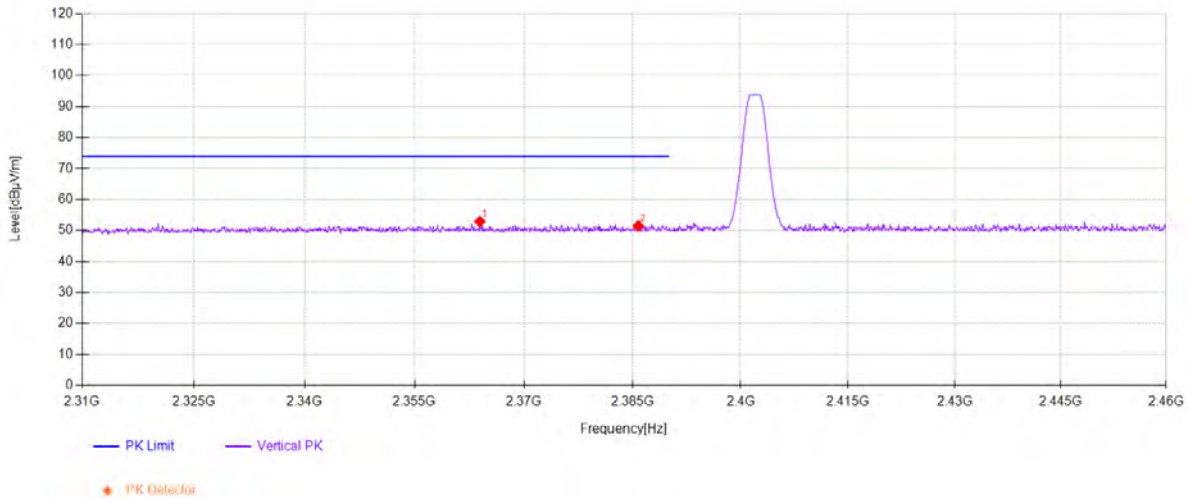
Data List										
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1	2372.2811	35.93	27.51	-23.04	40.40	54.00	13.60	101	137	Horizontal
2	2382.036	36.02	27.47	-23.03	40.46	54.00	13.54	101	137	Horizontal



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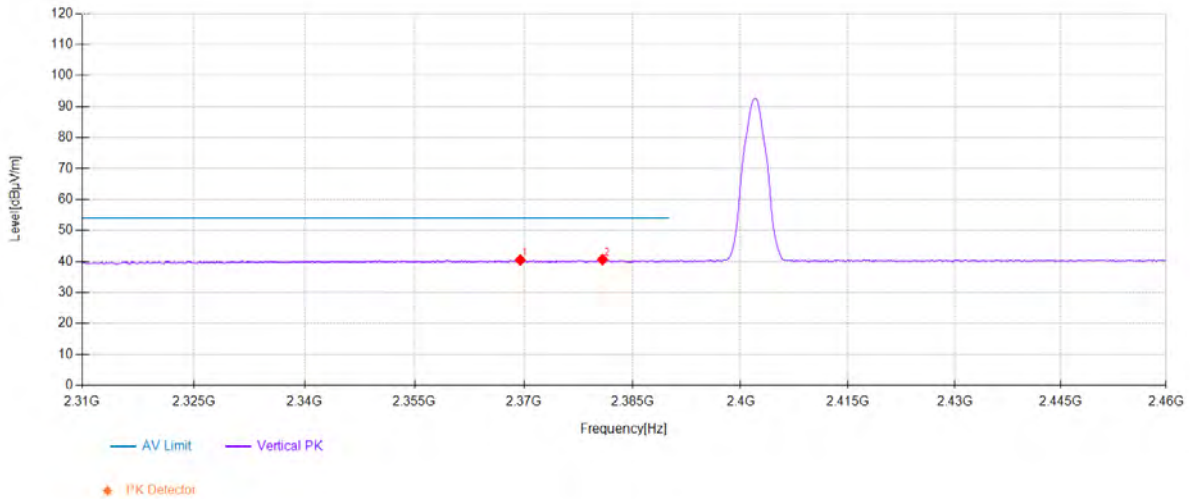
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1	2363.952	48.45	27.54	-23.06	52.93	74.00	21.07	305	198	Vertical
2	2385.7879	47.06	27.46	-23.02	51.50	74.00	22.50	305	198	Vertical



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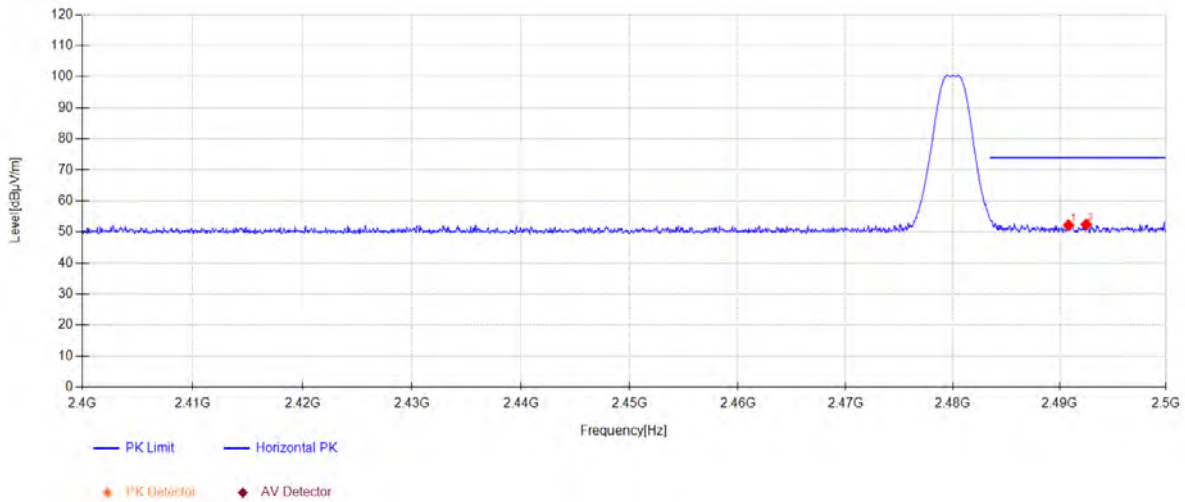
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1	2369.5048	36.01	27.52	-23.05	40.48	54.00	13.52	305	198	Vertical
2	2380.8354	36.17	27.48	-23.03	40.62	54.00	13.38	305	198	Vertical



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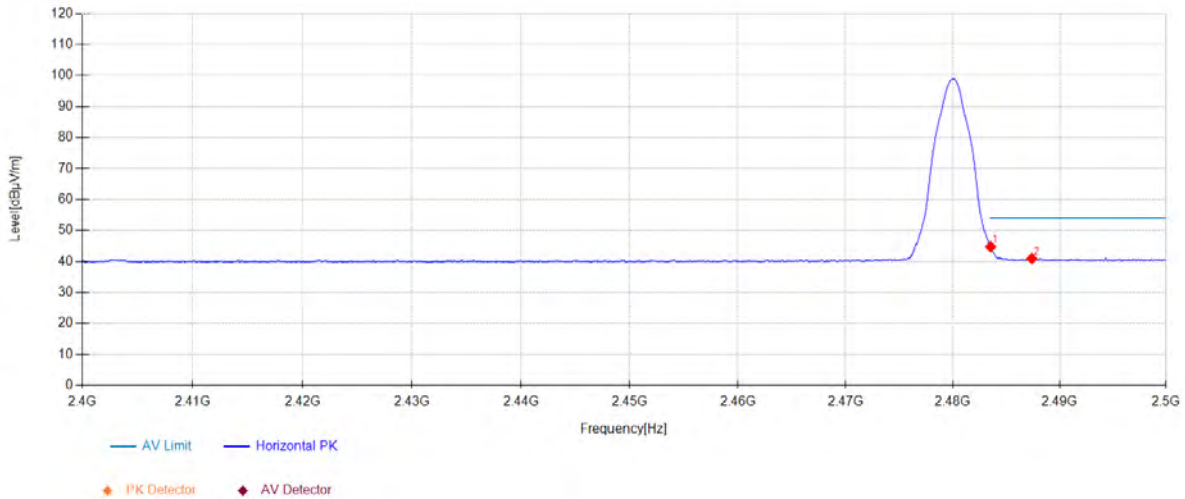
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1	2490.8454	47.55	27.76	-23.13	52.18	74.00	21.82	109	178	Horizontal
2	2492.4962	47.77	27.77	-23.13	52.41	74.00	21.59	109	178	Horizontal



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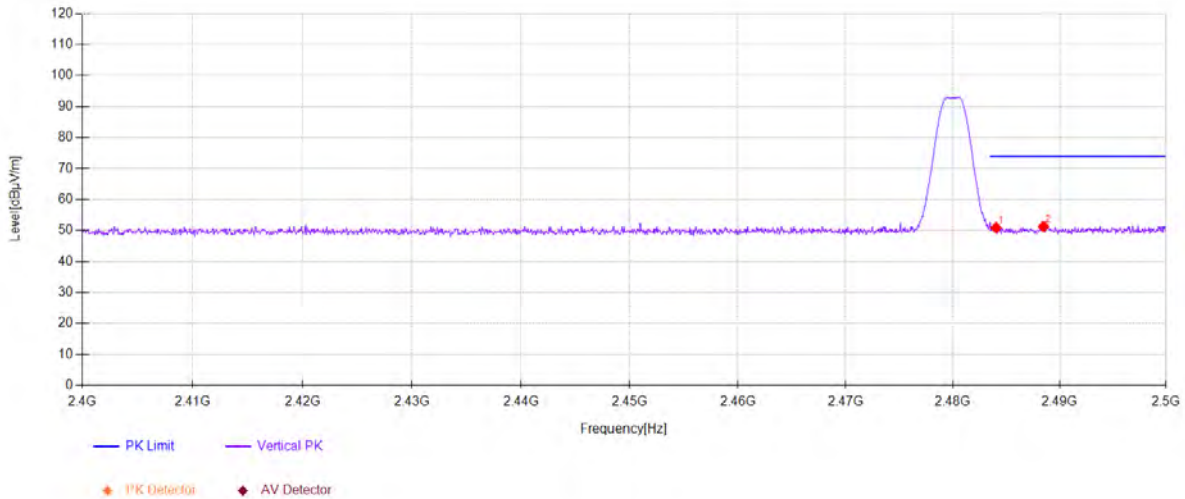
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NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5418	40.16	27.73	-23.12	44.77	54.00	9.23	109	178	Horizontal
2	2487.3937	36.32	27.75	-23.12	40.95	54.00	13.05	109	178	Horizontal



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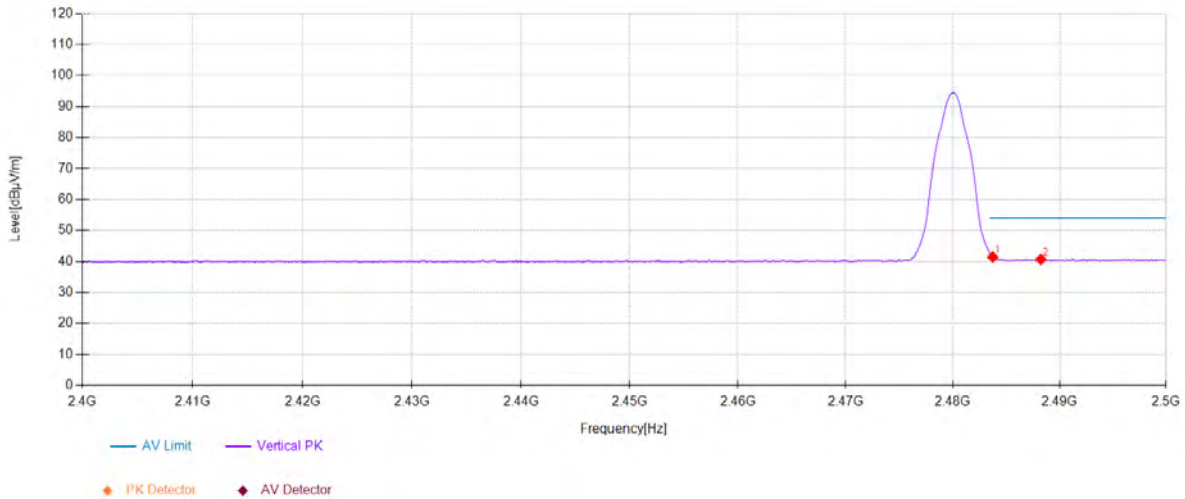
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1	2484.042	46.29	27.74	-23.12	50.91	74.00	23.09	282	223	Vertical
2	2488.4942	46.67	27.75	-23.12	51.30	74.00	22.70	282	223	Vertical



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**BLE-2M\_Channel 39**



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF[dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.7419	36.81	27.73	-23.12	41.42	54.00	12.58	282	223	Vertical
2	2488.2441	36.07	27.75	-23.12	40.70	54.00	13.30	282	223	Vertical

**Remark:**

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:  
 $Level = Reading(dB\mu V) + AF(dB/m) + Factor(dB)$   
 $AF = Antenna\ Factor(dB/m)$   
 $Factor = Cable\ Factor(dB) - Preamplifier\ gain(dB)$   
 $Margin = Limit(dB\mu V/m) - Level(dB\mu V/m)$
- Both peak and average measured complies with the limit line, so test result is "PASS"

---End of Report---

