

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	CN23HVZN (P15C-BLE) 001	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	48223335	Seite 1 von 25 Page 1 of 25
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2023-08-31	
<b>Auftraggeber:</b> <i>Client:</i>	HP Inc. 3390 East Harmony Road, Fort Collins, CO 80528, USA			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Wireless Mouse			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	HXMS231			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC Part 15C Test report (BLE)			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.249			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2023-08-25			
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	A003548427-002 A003548427-005			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2023-09-04 - 2023-09-05			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	Taipei Testing Laboratories			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>überprüft von:</b> <i>compiled by:</i>		<b>genehmigt von:</b> <i>authorized by:</i>		
<b>Datum:</b> <i>Date:</i>	2023-09-11	<b>Ausstellungsdatum:</b> <i>Issue date:</i>	2023-09-11	
<b>Stellung / Position:</b>	Senior Project Manager	<b>Stellung / Position:</b>	Senior Project Manager	
<b>Sonstiges / Other:</b>				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
<p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b>  <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

## TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.203	Antenna Requirement	Pass
5.1.2	15.249 (a)	Field Strength of Fundamental Emissions	Pass
5.1.3	15.249 (d)	Radiated Spurious Emissions	Pass
5.1.4	15.215 (c)	20 dB Bandwidth	Pass
5.1.5	2.1049	99% Occupied Bandwidth	Pass
-	15.207	Mains Conducted Emission	N/A

**Note:** Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

## Contents

<b>HISTORY OF THIS TEST REPORT .....</b>	<b>4</b>
<b>1. GENERAL REMARKS .....</b>	<b>5</b>
<b>1.1 COMPLEMENTARY MATERIALS.....</b>	<b>5</b>
<b>1.2 DECISION RULE OF CONFORMITY .....</b>	<b>5</b>
<b>2. TEST SITES .....</b>	<b>6</b>
<b>2.1 TEST LABORATORY .....</b>	<b>6</b>
<b>2.2 TEST FACILITY.....</b>	<b>6</b>
<b>2.3 TRACEABILITY .....</b>	<b>7</b>
<b>2.4 CALIBRATION .....</b>	<b>7</b>
<b>2.5 MEASUREMENT UNCERTAINTY .....</b>	<b>7</b>
<b>3. GENERAL PRODUCT INFORMATION.....</b>	<b>8</b>
<b>3.1 PRODUCT FUNCTION AND INTENDED USE .....</b>	<b>8</b>
<b>3.2 SYSTEM DETAILS AND RATINGS.....</b>	<b>8</b>
<b>3.3 NOISE GENERATING AND NOISE SUPPRESSING PARTS .....</b>	<b>9</b>
<b>3.4 SUBMITTED DOCUMENTS.....</b>	<b>9</b>
<b>4. TEST SET-UP AND OPERATION MODES.....</b>	<b>10</b>
<b>4.1 PRINCIPLE OF CONFIGURATION SELECTION .....</b>	<b>10</b>
<b>4.2 CARRIER FREQUENCY AND CHANNEL.....</b>	<b>10</b>
<b>4.3 TEST OPERATION AND TEST SOFTWARE.....</b>	<b>11</b>
<b>4.4 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT .....</b>	<b>12</b>
<b>4.5 TEST SETUP DIAGRAM .....</b>	<b>12</b>
<b>4.6 DUTY CYCLE OF TEST SIGNAL .....</b>	<b>13</b>
<b>5. TEST RESULTS .....</b>	<b>14</b>
<b>5.1 TRANSMITTER REQUIREMENT &amp; TEST SUITES .....</b>	<b>14</b>
5.1.1 <i>Antenna Requirement .....</i>	<i>14</i>
5.1.2 <i>Field Strength of Fundamental Emissions .....</i>	<i>15</i>
5.1.3 <i>Radiated Spurious Emissions .....</i>	<i>18</i>
5.1.4 <i>20 dB Bandwidth .....</i>	<i>22</i>
5.1.5 <i>99% Occupied Bandwidth .....</i>	<i>24</i>

**APPENDIX A - TEST RESULT OF RADIATED EMISSIONS**

**APPENDIX SP - PHOTOGRAPHS OF TEST SETUP**

**APPENDIX EP - PHOTOGRAPHS OF EUT**

**Prüfbericht - Nr.:** CN23HVZN (P15C-BLE) 001  
*Test Report No.*

**Seite 4 von 25**  
*Page 4 of 25*

### HISTORY OF THIS TEST REPORT

Revision	Description	Date Issued
R01	Original Release	2023-09-11

## 1. General Remarks

### 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

**Appendix A - Test Result of Radiated Emissions**

**Appendix SP - Photographs of Test Setup**

**Appendix EP - Photographs of EUT**

### Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.249
ANSI C63.10:2013

### 1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

## 2. Test Sites

### 2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.  
Taipei City 105  
Taiwan (R.O.C.)

### 2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,  
New Taipei City 244  
Taiwan (R.O.C.)  
FCC Registration No.: 180491  
ISED Registration No.: 25563

## 2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicate a 95% level of confidence.

### Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	$\pm 1.15$ dB
Radiated Emission (30 MHz ~ 200 MHz)	$\pm 1.32$ dB
Radiated Emission (200 MHz ~ 1 GHz)	$\pm 1.31$ dB
Radiated Emission (1 GHz ~ 18 GHz)	$\pm 1.53$ dB
Radiated Emission (18 GHz ~ 40 GHz)	$\pm 2.50$ dB
Mains Conducted Emission	$\pm 1.65$ dB

### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a Wireless Mouse. It contains a Bluetooth compatible module enabling the user to communicate data through a Wireless interface.

For details refer to the User Guide, Data Sheet and Circuit Diagram.

#### 3.2 System Details and Ratings

##### Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Wireless Mouse
Type Identification	HXMS231
FCC ID	B94-HXMS231

##### Technical Specification of EUT

Item	EUT information
Operating Frequency	2402 ~ 2480 MHz
Operation Voltage	1.5 Vdc
Modulation	GFSK
Maximum Output Power	98.10 dBuV/m (2.87 dBm)
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.4



### **3.3 Noise Generating and Noise Suppressing Parts**

Refer to the Circuit Diagram.

### **3.4 Submitted Documents**

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

## 4. Test Set-up and Operation Modes

### 4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Carrier Frequency and Channel

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

### 4.3 Test Operation and Test Software

Setup for testing: It was used to enable the operation modes through pressing button listed as below.

The samples were used as follows:

A003548427-002

A003548427-005

Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To				Description
	Field Strength of Fundamental Emissions	Radiated Spurious Emissions	20 dB Bandwidth & Occupied Bandwidth	Mains Conducted Emission	
-	√	√	√	-	-

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on **Z-plane**.
2. "-" means no effect.

#### Field Strength of Fundamental Emissions

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	2402 ~ 2480	2402, 2440, 2480

#### Radiated Spurious Emission above 1 GHz

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	2402 ~ 2480	2402, 2440, 2480

#### Radiated Spurious Emission below 1 GHz

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	2402 ~ 2480	2480

#### 20 dB Bandwidth & Occupied Bandwidth

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	2402 ~ 2480	2402, 2440, 2480

**Test Condition**

Test Item	Ambient Temperature	Relative Humidity	Tested by
Field Strength of Fundamental Emissions	23.7-24.8 °C	54-56 %	Roger Liao
Radiated Spurious Emissions	23.7-24.8 °C	54-56 %	Roger Liao
20 dB Bandwidth & Occupied Bandwidth	21.2-24.5 °C	58-66 %	Nick Guan & Andy Chen

## 4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

**Accessory of EUT**

No.	Product	Brand	Model	Description
-	Alkaline Zn-MnO2 Battery	Duracell China Ltd	LR6	--

**Support Unit**

None

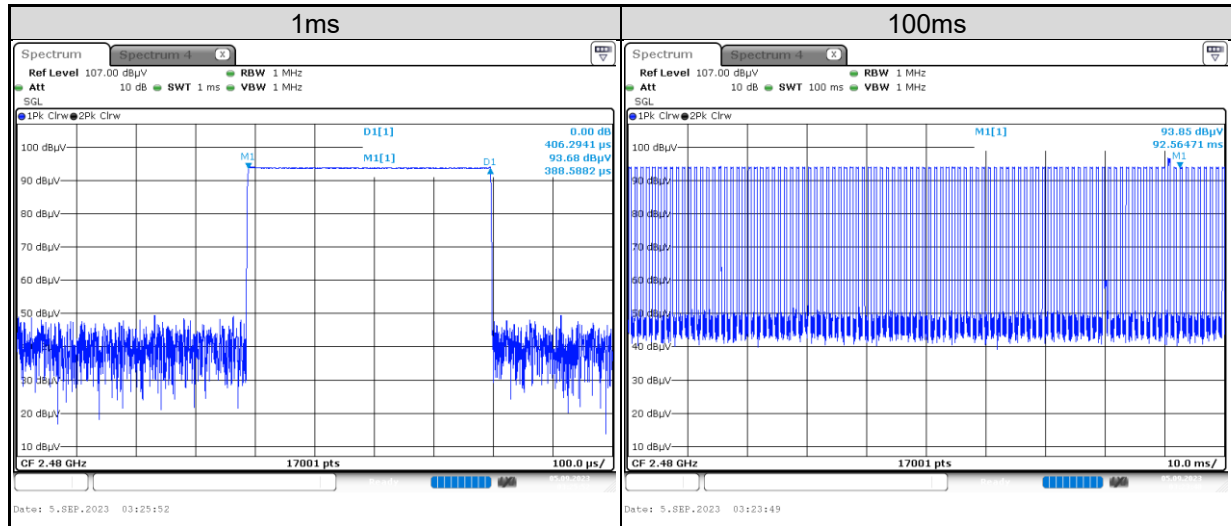
## 4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



## 4.6 Duty Cycle of Test Signal

Duty cycle correction factor =  $20 \log(\text{Duty cycle}) = 20 \log(40.629/100) = -7.82$



Date: 5.SEP.2023 03:25:52

Date: 5.SEP.2023 03:23:49

## 5. Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

**Requirement** Use of approved antennas only

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 4.02 dBi. The antenna is a PCB antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

## 5.1.2 Field Strength of Fundamental Emissions

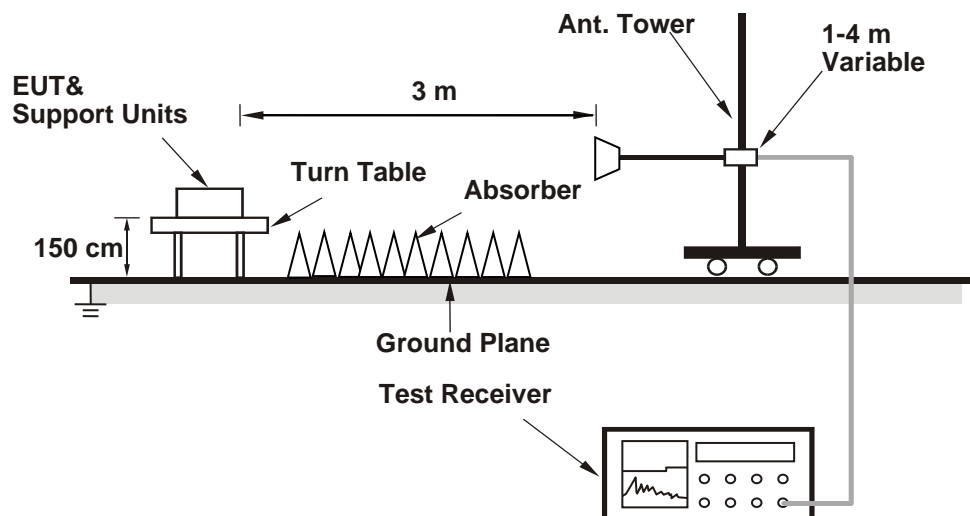
### Limit

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meters)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

**Kind of Test Site** 3m Semi-Anechoic Chamber

### Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

**Test Instruments**

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
<b>Above 1 GHz</b>					
Signal Analyzer	R&S	FSV40	101509	2023/4/26	2024/4/25
Horn Antenna	ETS-Lindgren	3117	00218929	2022/11/17	2023/11/16
HF-AMP + AC source	EMCI	EM01G18GA	980635	2023/2/16	2024/2/15
HF-AMP + AC source	EMCI	EMC184045SE	980656	2023/1/6	2024/1/5
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2023/5/4	2024/5/3
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
<b>30 MHz ~ 1 GHz</b>					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2023/3/31	2024/3/30
LF-AMP	Agilent	8447D	2727A05146	2023/2/16	2024/2/15
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
<b>Below 30 MHz</b>					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2023/1/4	2024/1/3
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A



**Test Procedures**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) or 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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.
- d. 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.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.
4. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.
5. The calculation formula is explained as follows:  
 Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)  
 Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

**Test Results**

Fundamental Frequency	Antenna Orientation	Detector Mode	Peak Power Level (dBuV/m)	Limit (dBuV/m)	Result
2402	Horizontal	Average	88.40	94.00	Pass
		Peak	96.22	114.00	Pass
	Vertical	Average	87.22	94.00	Pass
		Peak	95.04	114.00	Pass
2440	Horizontal	Average	90.07	94.00	Pass
		Peak	97.89	114.00	Pass
	Vertical	Average	83.16	94.00	Pass
		Peak	90.98	114.00	Pass
2480	Horizontal	Average	90.28	94.00	Pass
		Peak	98.10	114.00	Pass
	Vertical	Average	84.74	94.00	Pass
		Peak	92.56	114.00	Pass

Please refer to Appendix A.

### 5.1.3 Radiated Spurious Emissions

#### Limit

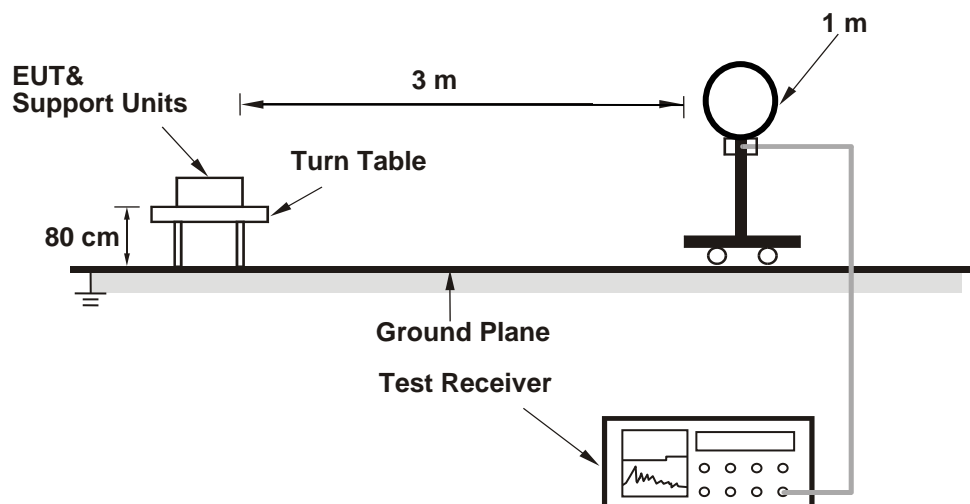
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation.

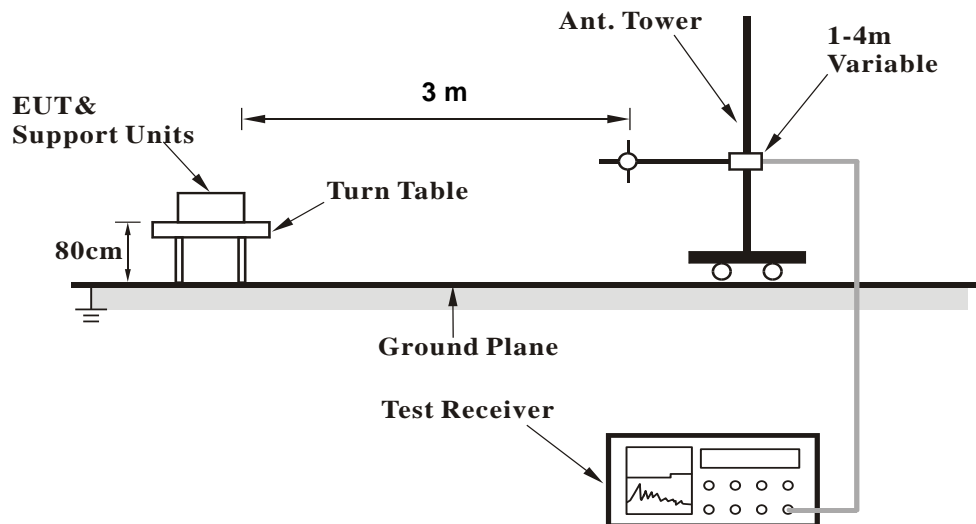
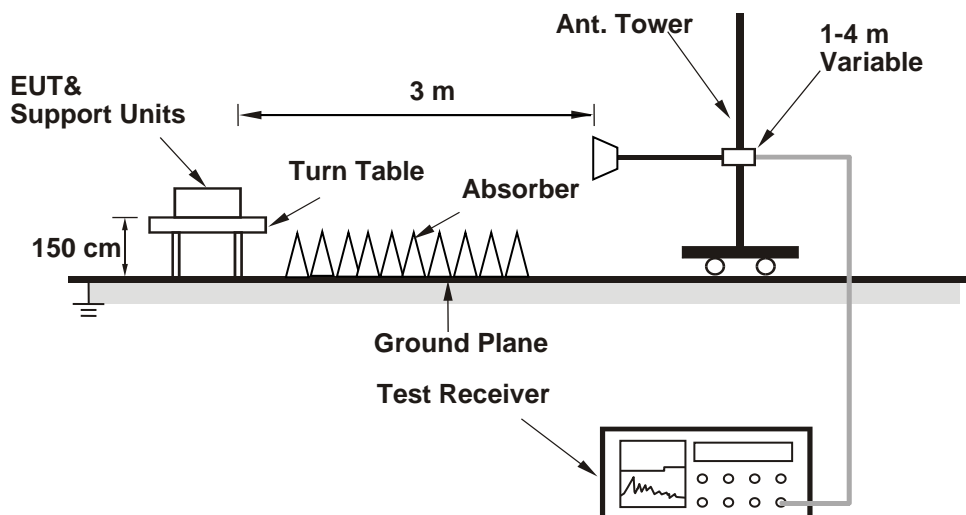
Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**Kind of Test Site** 3m Semi-Anechoic Chamber

#### Test Setup

<Radiated Emissions below 30 MHz>



**<Radiated Emissions 30 MHz to 1 GHz>**

**<Radiated Emission above 1 GHz>**


For the actual test configuration, please refer to the attached file (Test Setup Photo).

**Test Instruments**

Please refer to 5.1.2 Instruments

**Test Procedures****For Radiated Emissions below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

## Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

**For Radiated Emissions above 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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.
- d. 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.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

## Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.
4. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.
5. The emission levels of other frequencies (including the 10th harmonic of the highest fundamental frequency) are very lower than the limit and are not shown in the test report.

**Prüfbericht - Nr.:**      **CN23HVZN (P15C-BLE) 001**  
*Test Report No.*

**Seite 21 von 25**  
*Page 21 of 25*

**Test Results**

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

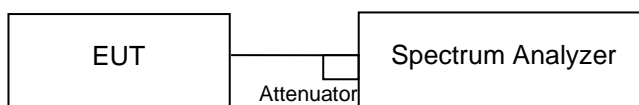
Please refer to Appendix A.

### 5.1.4 20 dB Bandwidth

**Limit**

The 20 dB bandwidth shall be specified in operating frequency band.

**Kind of Test Site**                                3m Semi-Anechoic Chamber

**Test Setup**

**Test Instruments**

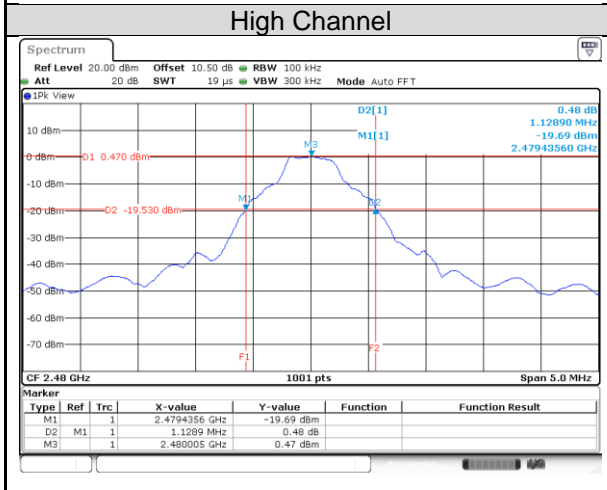
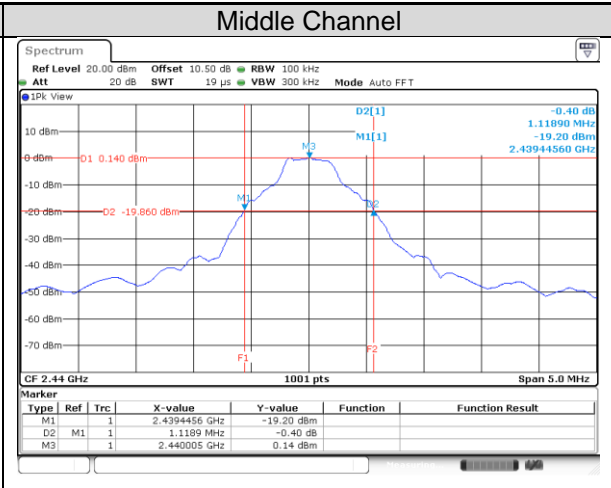
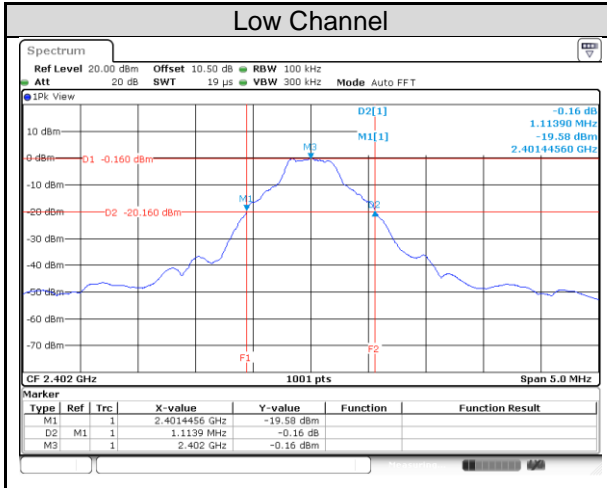
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/02/23	2024/02/22	2023/9/4	2023/9/4

**Test Procedure**

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

**Test Results**

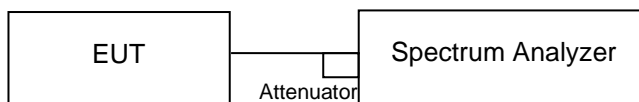
Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)
Low Channel	2402	1.11
Middle Channel	2440	1.12
High Channel	2480	1.13



### 5.1.5 99% Occupied Bandwidth

**Kind of Test Site**                      Shielded room

**Test Setup**



**Test Instruments**

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/02/23	2024/02/22	2023/9/4	2023/9/4

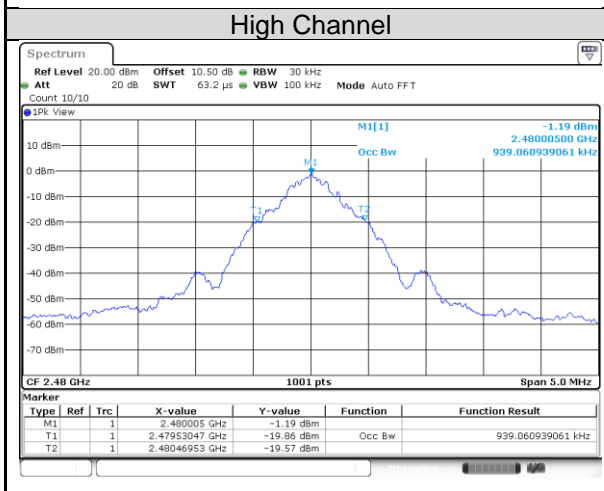
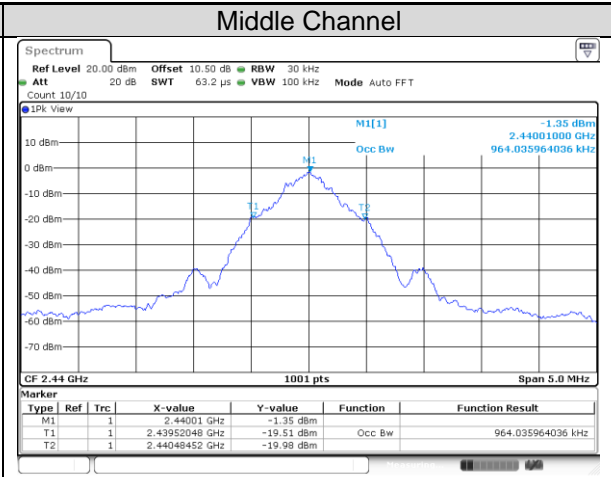
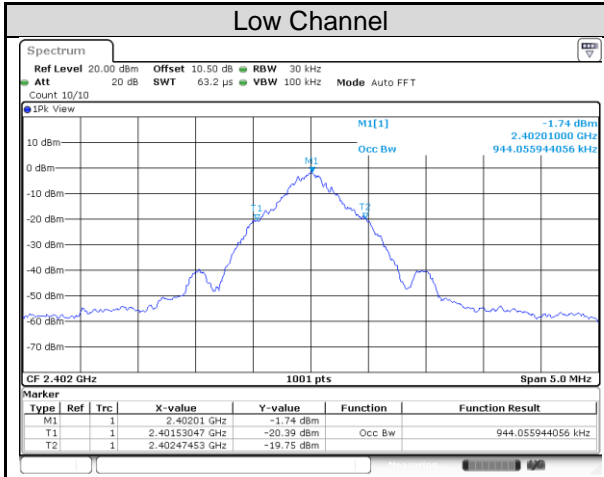
**Test Procedure**

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to Sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.



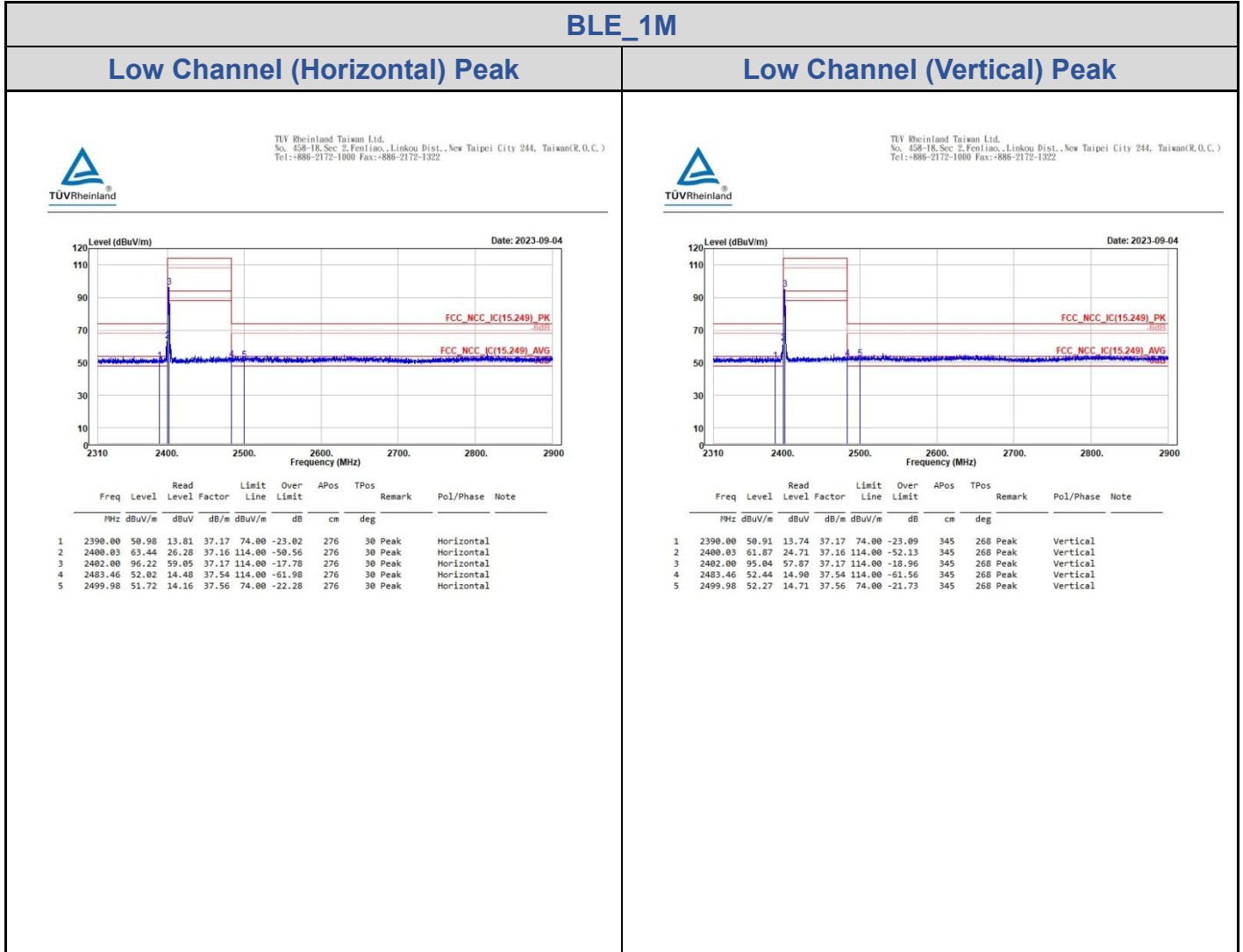
**Test Results**

Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)
Low Channel	2402	944.06
Middle Channel	2440	964.04
High Channel	2480	939.06



# Appendix A: Test Results of Radiated Spurious Emissions

## Fundamental & Bandedge



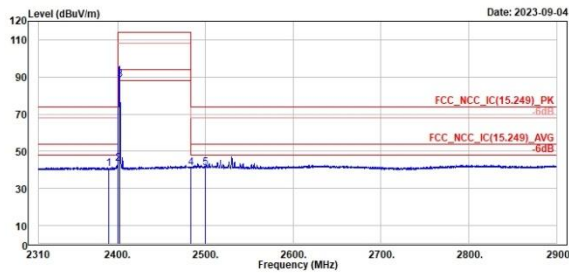
BLE\_1M

Low Channel (Horizontal) Average

Low Channel (Vertical) Average



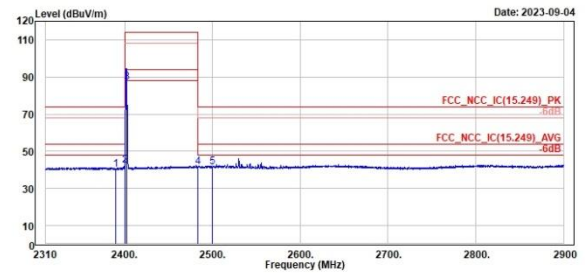
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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	40.49	3.32	37.17	54.00	-13.51	276	30 Average	Horizontal
2	2400.03	43.12	5.96	37.16	94.00	-50.88	276	30 Average	Horizontal
3	2402.00	88.40	51.23	37.17	94.00	-5.60	276	30 Average	Horizontal CF
4	2483.46	41.28	3.74	37.54	94.00	-52.72	276	30 Average	Horizontal
5	2499.98	41.15	3.59	37.56	54.00	-12.85	276	30 Average	Horizontal

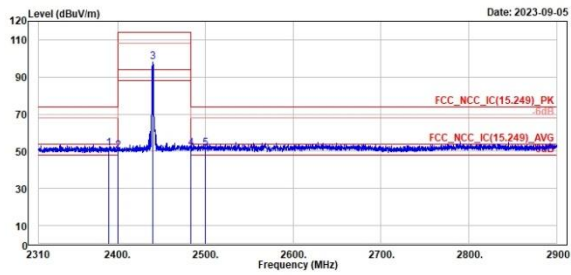


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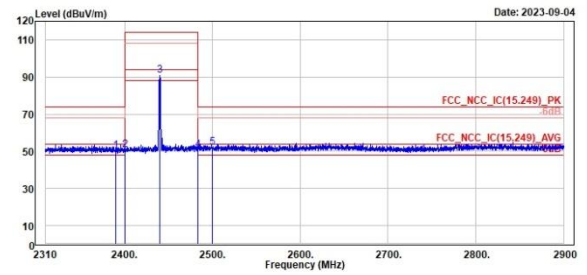


Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	40.34	3.17	37.17	54.00	-13.66	345	268 Average	Vertical
2	2400.03	42.21	5.05	37.16	94.00	-51.79	345	268 Average	Vertical
3	2402.00	87.22	50.05	37.17	94.00	-6.78	345	268 Average	Vertical CF
4	2483.46	41.46	3.92	37.54	94.00	-52.54	345	268 Average	Vertical
5	2499.98	41.70	4.14	37.56	54.00	-12.30	345	268 Average	Vertical

**BLE\_1M**
**Middle Channel (Horizontal) Peak**
**Middle Channel (Vertical) Peak**

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Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2398.00	51.57	14.40	37.17	74.00	-22.43	340	198 Peak	Horizontal	
2	2400.03	50.09	12.93	37.16	114.00	-63.91	340	198 Peak	Horizontal	
3	2440.00	97.89	60.45	37.44	114.00	-16.11	340	198 Peak	Horizontal	
4	2483.46	51.44	13.90	37.54	114.00	-62.56	340	198 Peak	Horizontal	
5	2499.98	51.57	14.01	37.56	74.00	-22.43	340	198 Peak	Horizontal	


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Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2398.00	50.00	12.83	37.17	74.00	-24.00	331	124 Peak	Vertical	
2	2400.03	50.42	13.26	37.16	114.00	-63.58	331	124 Peak	Vertical	
3	2440.00	90.98	53.54	37.44	114.00	-23.02	331	124 Peak	Vertical	
4	2483.46	50.63	13.09	37.54	114.00	-63.37	331	124 Peak	Vertical	
5	2499.98	51.79	14.23	37.56	74.00	-22.21	331	124 Peak	Vertical	

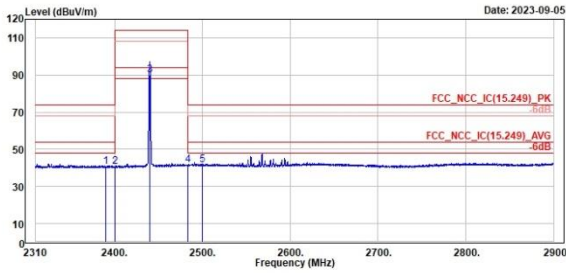
BLE\_1M

Middle Channel (Horizontal) Average

Middle Channel (Vertical) Average



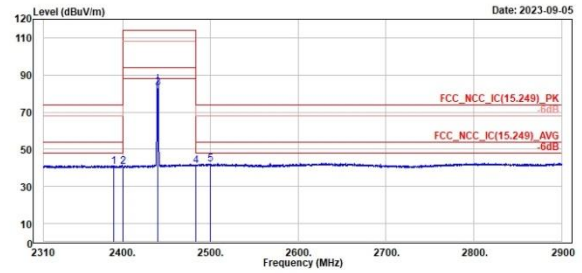
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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	40.42	3.25	37.17	54.00	-13.58	340	198 Average	Horizontal
2	2400.03	40.39	3.23	37.16	94.00	-53.61	340	198 Average	Horizontal
3	2440.00	90.07	52.63	37.44	94.00	-3.93	340	198 Average	Horizontal CF
4	2483.46	41.41	3.87	37.54	94.00	-52.59	340	198 Average	Horizontal
5	2499.98	41.42	3.86	37.56	54.00	-12.58	340	198 Average	Horizontal



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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	40.44	3.27	37.17	54.00	-13.56	331	124 Average	Vertical
2	2400.03	40.54	3.38	37.16	94.00	-53.46	331	124 Average	Vertical
3	2440.00	83.16	45.72	37.44	94.00	-10.84	331	124 Average	Vertical CF
4	2483.46	41.12	3.58	37.54	94.00	-52.88	331	124 Average	Vertical
5	2499.98	41.98	4.42	37.56	54.00	-12.02	331	124 Average	Vertical

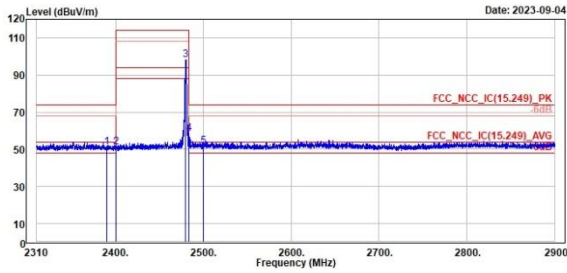
BLE\_1M

High Channel (Horizontal) Peak

High Channel (Vertical) Peak



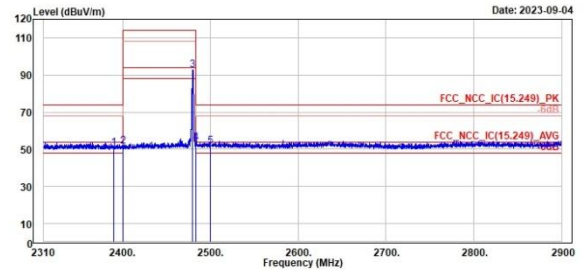
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1	2	3	4	5
2390.00	2400.03	2480.00	2483.46	2499.98
51.28	50.91	98.10	58.34	51.38
14.11	13.75	60.56	20.80	13.82
37.17	37.16	37.54	37.54	37.56
74.00	114.00	114.00	114.00	74.00
-22.72	-63.09	-15.90	-55.66	-22.62
367	367	367	367	367
183	183	183	183	183
Peak	Peak	Peak	Peak	Peak
Horizontal	Horizontal	Horizontal	Horizontal	Horizontal



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1	2	3	4	5
2390.00	2400.03	2480.00	2483.46	2499.98
50.71	51.44	92.56	53.58	51.48
13.54	14.28	55.02	16.04	13.92
37.17	37.16	37.54	37.54	37.56
74.00	114.00	114.00	114.00	74.00
-23.29	-62.56	-21.44	-60.42	-22.52
375	375	375	375	375
222	222	222	222	222
Peak	Peak	Peak	Peak	Peak
Vertical	Vertical	Vertical	Vertical	Vertical

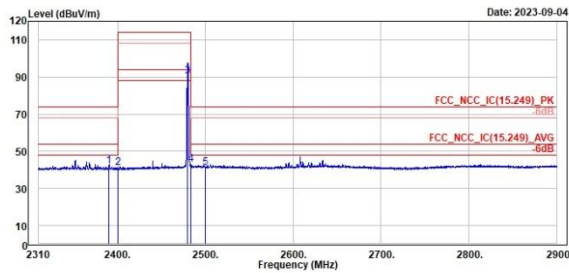
BLE\_1M

High Channel (Horizontal) Average

High Channel (Vertical) Average



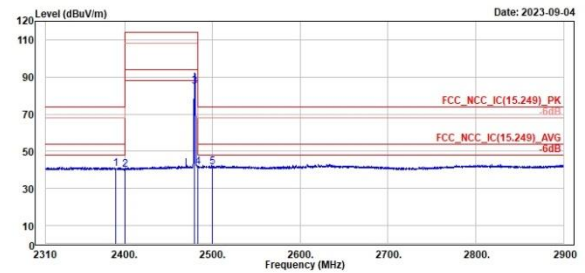
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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	41.08	4.71	37.17	54.00	-12.12	367	183	Average Horizontal
2	2490.03	41.00	3.84	37.16	94.00	-53.00	367	183	Average Horizontal
3	2480.00	90.28	52.74	37.54	94.00	-3.72	367	183	Average Horizontal CF
4	2483.46	42.75	5.21	37.54	94.00	-51.25	367	183	Average Horizontal
5	2499.98	41.25	3.69	37.56	54.00	-12.75	367	183	Average Horizontal



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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	40.50	3.33	37.17	54.00	-13.50	375	222	Average Vertical
2	2490.03	40.31	3.15	37.16	94.00	-53.69	375	222	Average Vertical
3	2480.00	84.74	47.20	37.54	94.00	-9.26	375	222	Average Vertical CF
4	2483.46	41.62	4.08	37.54	94.00	-52.38	375	222	Average Vertical
5	2499.98	41.59	4.03	37.56	54.00	-12.41	375	222	Average Vertical

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

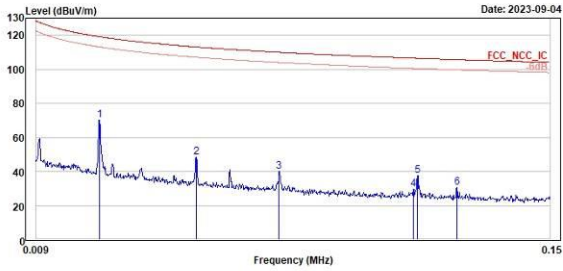
BLE\_1M

High Channel (Open) 9kHz~150kHz

High Channel (Open) 150kHz~30MHz



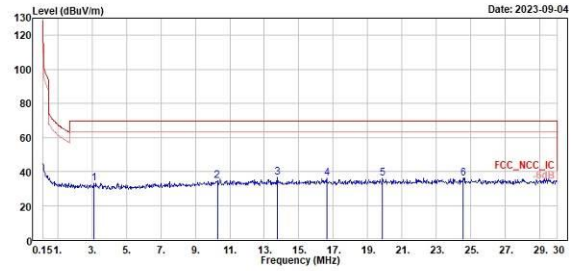
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Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	PoI/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.03	70.35	51.49	18.95	119.13	-48.78	100	147	Peak	Open
2	0.05	48.48	29.43	19.05	113.11	-64.63	100	87	Peak	Open
3	0.08	40.16	21.66	18.50	110.01	-69.85	100	249	Peak	Open
4	0.11	29.88	11.91	17.97	106.57	-76.69	100	43	Peak	Open
5	0.11	37.81	19.84	17.97	106.49	-66.68	100	222	Peak	Open
6	0.12	30.44	12.42	18.02	105.70	-75.26	100	334	Peak	Open



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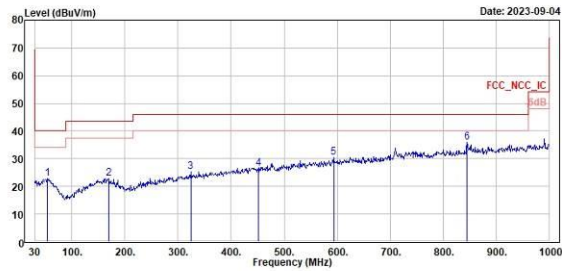


Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	PoI/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	3.11	33.31	13.71	19.60	69.50	-36.19	100	57	Peak	Open
2	10.27	34.50	12.99	21.51	69.50	-35.00	100	107	Peak	Open
3	13.76	36.64	14.89	21.75	69.50	-32.86	100	135	Peak	Open
4	16.63	35.91	13.97	21.94	69.50	-33.59	100	295	Peak	Open
5	19.88	35.96	13.80	22.16	69.50	-33.54	100	230	Peak	Open
6	24.57	36.29	14.09	22.20	69.50	-33.21	100	292	Peak	Open



**Spurious Emissions, Tx Mode, 30MHz ~ 1GHz**
**BLE\_1M**
**High Channel (Horizontal)**
**High Channel (Vertical)**

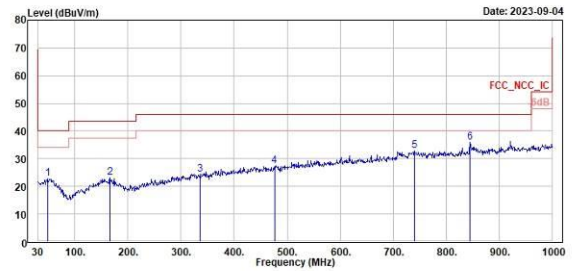

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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	53.28	22.89	28.55	-5.66	40.00	-17.11	200	360	Peak	Horizontal	
2	169.68	22.77	28.67	-5.90	43.50	-20.73	200	233	Peak	Horizontal	
3	323.91	25.26	29.36	-4.10	46.00	-20.74	100	45	Peak	Horizontal	
4	458.98	26.52	28.54	-2.02	46.00	-19.48	300	240	Peak	Horizontal	
5	593.57	30.40	30.06	0.34	46.00	-15.60	200	31	Peak	Horizontal	
6	844.80	35.96	31.84	4.12	46.00	-10.04	300	266	Peak	Horizontal	



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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	48.43	22.95	28.61	-5.66	40.00	-17.05	100	69	Peak	Vertical	
2	165.80	23.03	28.70	-5.67	43.50	-20.47	200	360	Peak	Vertical	
3	335.55	24.43	28.16	-3.73	46.00	-21.57	200	68	Peak	Vertical	
4	476.20	27.30	26.92	-1.62	46.00	-18.70	300	244	Peak	Vertical	
5	741.01	32.09	30.08	2.01	46.00	-13.11	145	360	Peak	Vertical	
6	844.80	35.83	31.71	4.12	46.00	-10.17	200	360	Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

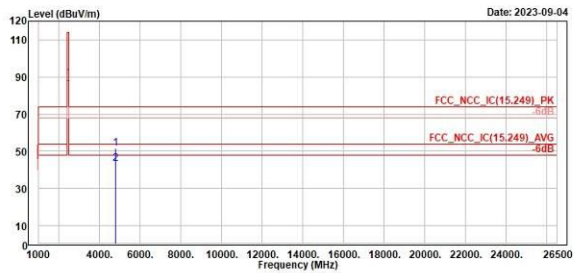
BLE\_1M

Low Channel (Horizontal)

Low Channel (Vertical)



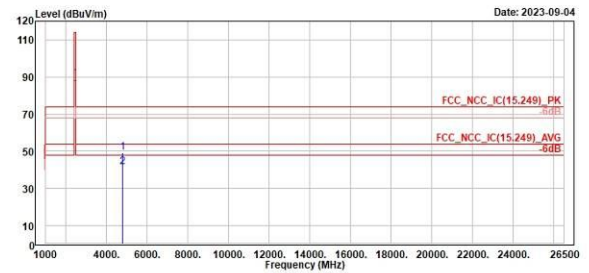
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1	4884.00	51.39	68.42	-9.03	74.00	-22.61	180	67	Peak	Horizontal	
2	4884.00	43.57	52.60	-9.03	54.00	-10.43	180	67	Average	Horizontal	CF



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1	4884.00	49.18	58.21	-9.03	74.00	-24.82	295	88	Peak	Vertical	
2	4884.00	41.36	50.39	-9.03	54.00	-12.64	295	88	Average	Vertical	CF

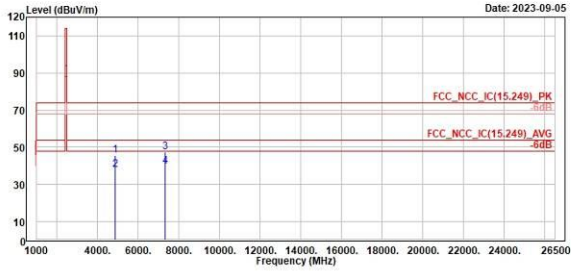
BLE\_1M

Middle Channel (Horizontal)

Middle Channel (Vertical)



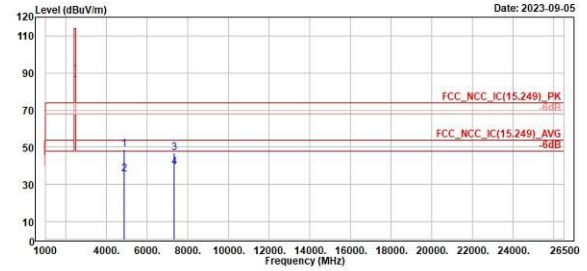
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Line	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4880.00	45.78	54.74	-9.04	74.00	-28.30	100	295	Peak	Horizontal	
2	4880.00	37.88	46.92	-9.04	54.00	-16.12	100	295	Average	Horizontal	CF
3	7320.00	47.34	54.42	-7.08	74.00	-26.66	315	43	Peak	Horizontal	
4	7320.00	39.52	46.60	-7.08	54.00	-14.48	315	43	Average	Horizontal	CF



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Line	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4880.00	48.86	57.90	-9.04	74.00	-25.14	257	96	Peak	Vertical	
2	4880.00	35.67	44.71	-9.04	54.00	-18.33	257	96	Average	Vertical	CF
3	7320.00	46.88	53.96	-7.08	74.00	-27.12	300	298	Peak	Vertical	
4	7320.00	39.06	46.14	-7.08	54.00	-14.94	300	298	Average	Vertical	CF

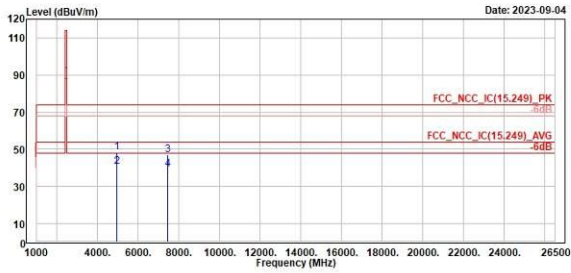
BLE\_1M

High Channel (Horizontal)

High Channel (Vertical)



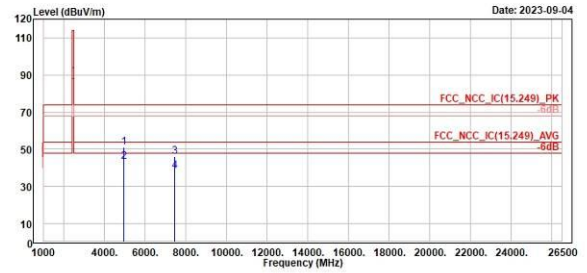
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Line	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4960.00	48.57	57.41	-8.84	74.00	-25.43	100	90	Peak	Horizontal	
2	4960.00	48.75	49.59	-8.84	54.00	-13.25	100	90	Average	Horizontal	CF
3	7440.00	47.07	54.25	-7.18	74.00	-26.93	389	7	Peak	Horizontal	
4	7440.00	39.25	46.43	-7.18	54.00	-14.75	389	7	Average	Horizontal	CF



TUV Rheinland Taiwan Ltd.  
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Line	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4960.00	51.08	59.92	-8.84	74.00	-22.92	300	240	Peak	Vertical	
2	4960.00	43.26	52.10	-8.84	54.00	-10.74	300	240	Average	Vertical	CF
3	7440.00	46.28	53.46	-7.18	74.00	-27.72	100	298	Peak	Vertical	
4	7440.00	38.46	45.64	-7.18	54.00	-15.54	100	298	Average	Vertical	CF