

Prüfbericht-Nr.: <i>Test report no.:</i>	CN23HVZN (P15C-SRD) 001	Auftrags-Nr.: <i>Order no.:</i>	48223335	Seite 1 von 25 Page 1 of 25
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-08-31	
Auftraggeber: <i>Client:</i>	HP Inc. 3390 East Harmony Road, Fort Collins, CO 80528, USA			
Prüfgegenstand: <i>Test item:</i>	Wireless Mouse			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	HXMS231			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report (2.4GHz)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.249			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2023-08-25			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003548427-002 A003548427-005			
Prüfzeitraum: <i>Testing period:</i>	2023-09-04			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing Laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>compiled by:</i>		genehmigt von: <i>authorized by:</i>		
Datum: <i>Date:</i>	2023-09-11	Ausstellungsdatum: <i>Issue date:</i>	2023-09-11	
Stellung / Position:	Senior Project Manager	Stellung / Position:	Senior Project Manager	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <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>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. <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.

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APPENDIX A - TEST RESULT OF RADIATED EMISSIONS

APPENDIX SP - PHOTOGRAPHS OF TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

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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)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.32 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.31 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.53 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.50 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Wireless Mouse. It contains a 2.4GHz 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	97.57 dBuV/m (2.34 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

Freq. (MHz)	Freq. (MHz)	Freq. (MHz)	Freq. (MHz)
2402	2422	2442	2462
2403	2423	2443	2463
2404	2424	2444	2464
2405	2425	2445	2465
2406	2426	2446	2466
2407	2427	2447	2467
2408	2428	2448	2468
2409	2429	2449	2469
2410	2430	2450	2470
2411	2431	2451	2471
2412	2432	2452	2472
2413	2433	2453	2473
2414	2434	2454	2474
2415	2435	2455	2475
2416	2436	2456	2476
2417	2437	2457	2477
2418	2438	2458	2478
2419	2439	2459	2479
2420	2440	2460	2480
2421	2441	2461	

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, 2441, 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, 2441, 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, 2441, 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-MnO ₂ Battery	Duracell China Ltd	LR6	--

Support Unit

None

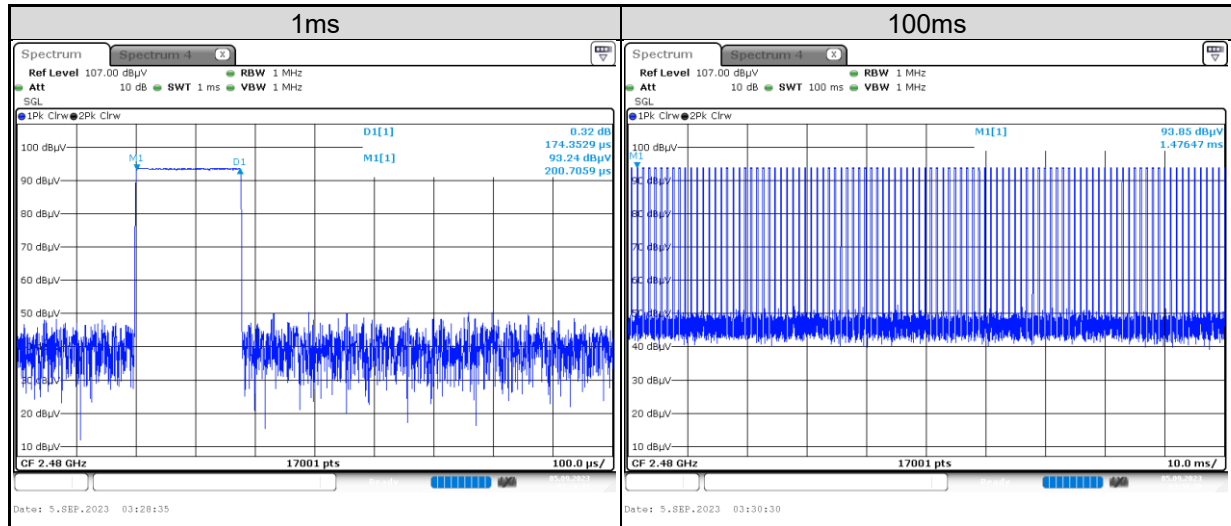
4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



4.6 Duty Cycle of Test Signal

Duty cycle correction factor = $20 \log(\text{Duty cycle}) = 20 \log(17.435/100) = -15.17$



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

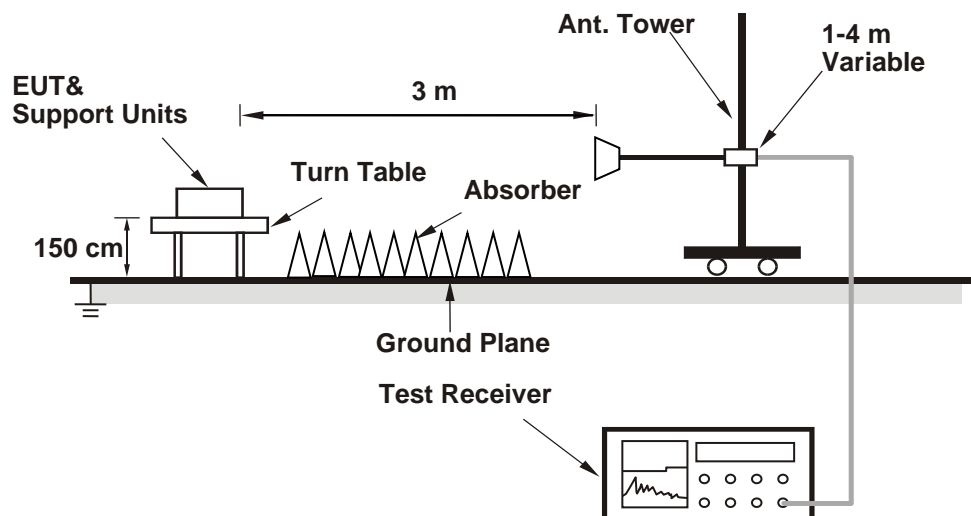
Limit

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
Above 1 GHz					
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
30 MHz ~ 1 GHz					
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
Below 30 MHz					
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	79.01	94.00	Pass
		Peak	94.18	114.00	Pass
	Vertical	Average	81.12	94.00	Pass
		Peak	96.29	114.00	Pass
2441	Horizontal	Average	80.78	94.00	Pass
		Peak	95.95	114.00	Pass
	Vertical	Average	73.21	94.00	Pass
		Peak	88.38	114.00	Pass
2480	Horizontal	Average	82.40	94.00	Pass
		Peak	97.57	114.00	Pass
	Vertical	Average	78.66	94.00	Pass
		Peak	93.83	114.00	Pass

Please refer to Appendix A.

5.1.3 Radiated Spurious Emissions

Limit

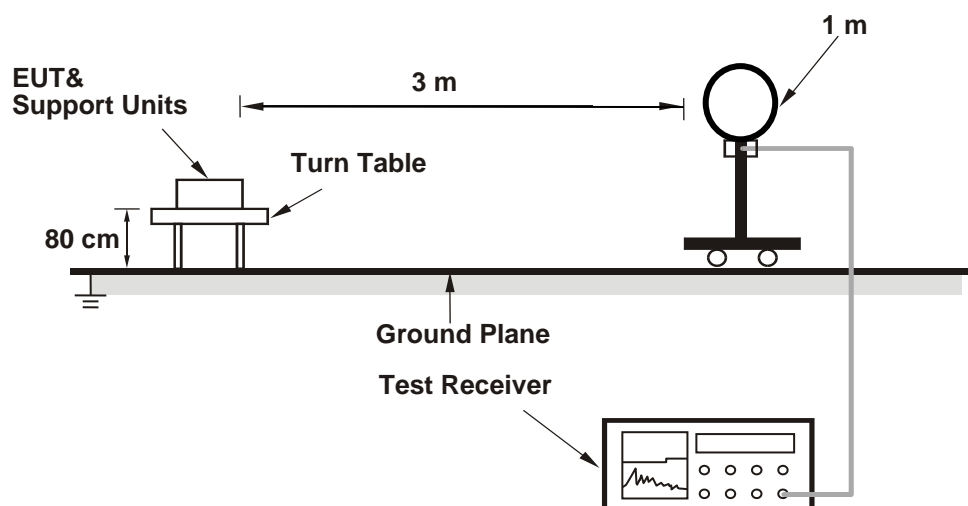
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation.

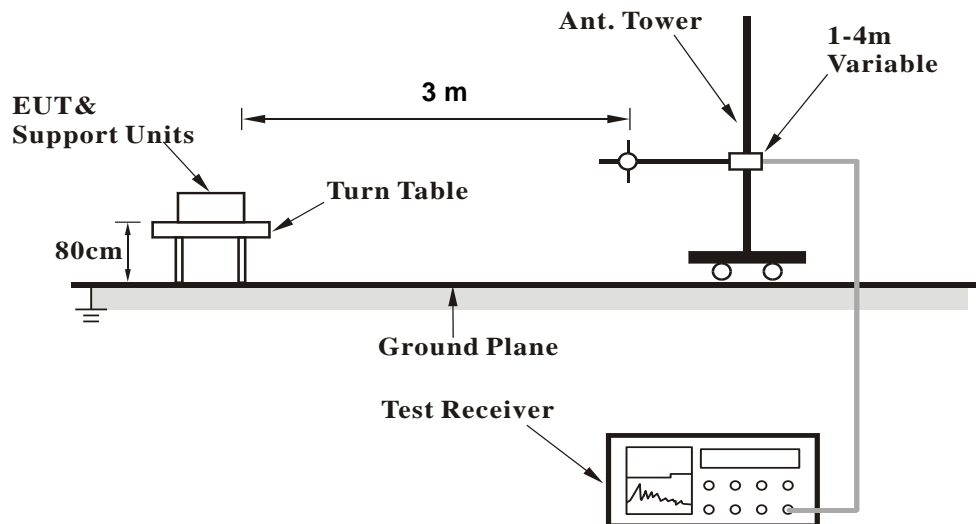
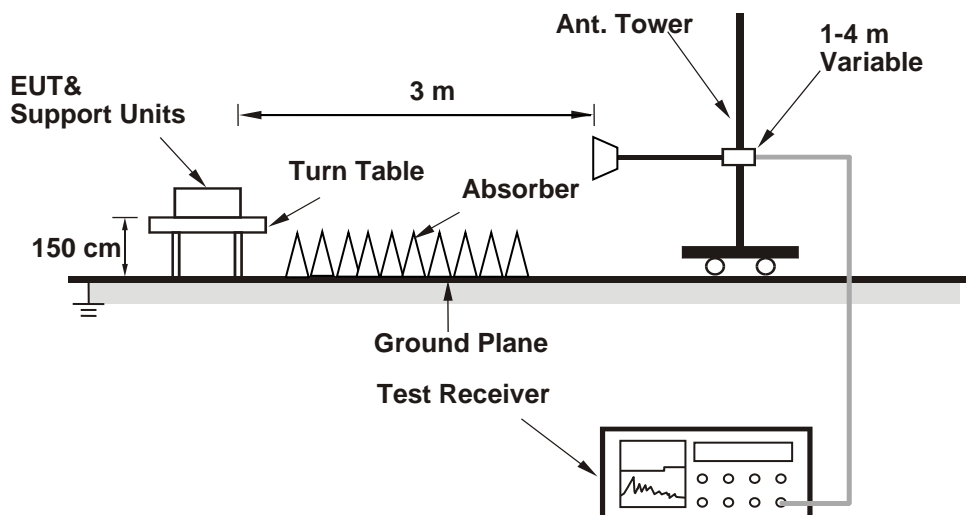
Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

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.

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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.

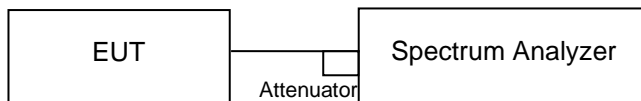
5.1.4 20 dB Bandwidth

Limit

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

Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup



Test Instruments

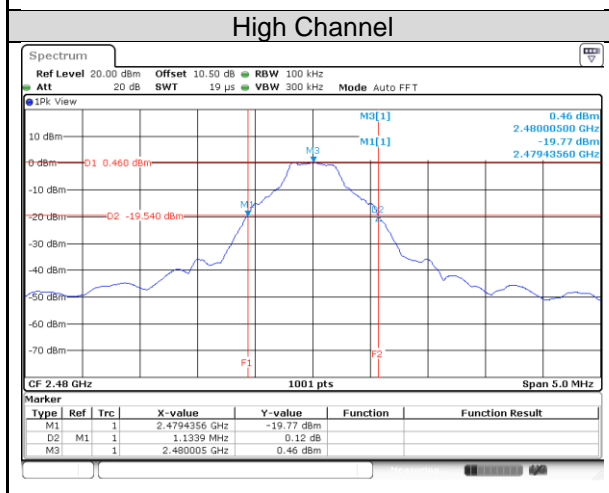
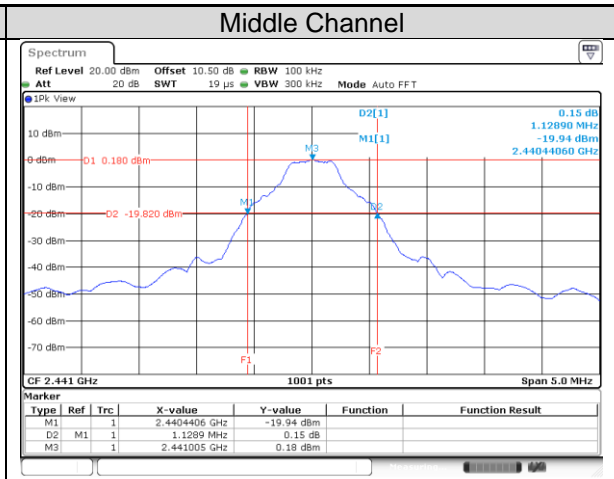
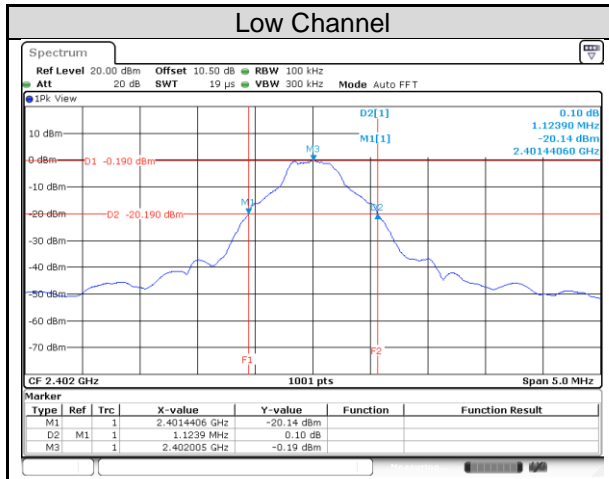
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/02/23	2024/02/22	2023/9/4	2023/9/4

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

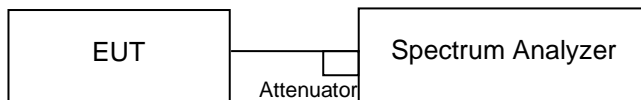
Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)
Low Channel	2402	1.12
Middle Channel	2441	1.13
High Channel	2480	1.13



5.1.5 99% Occupied Bandwidth

Kind of Test Site Shielded room

Test Setup



Test Instruments

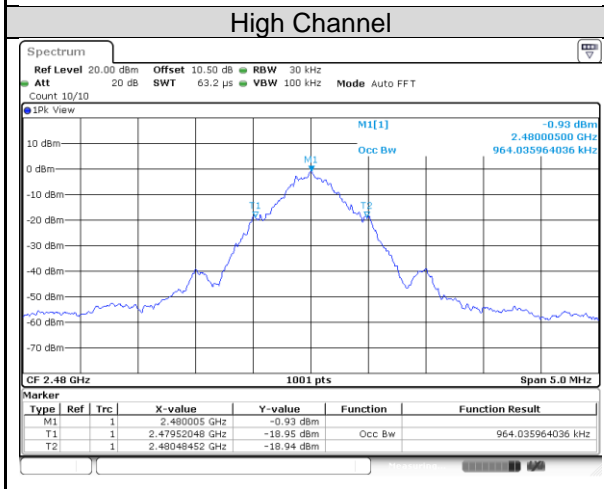
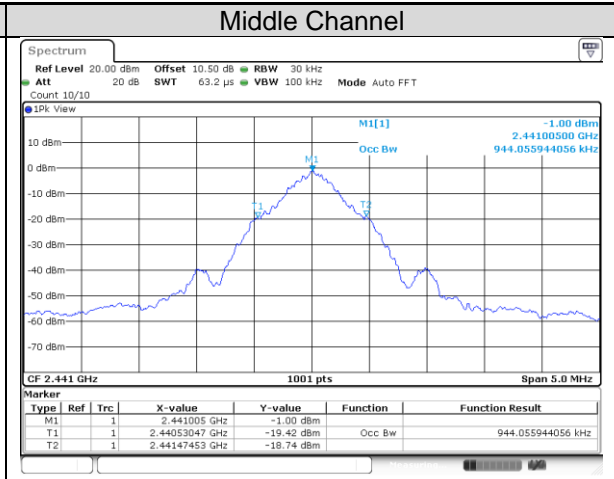
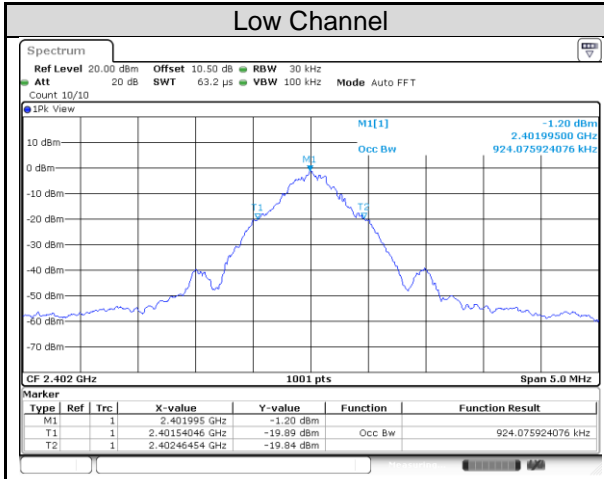
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/02/23	2024/02/22	2023/9/4	2023/9/4

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	924.08
Middle Channel	2441	944.06
High Channel	2480	964.04



Appendix A: Test Results of Radiated Spurious Emissions

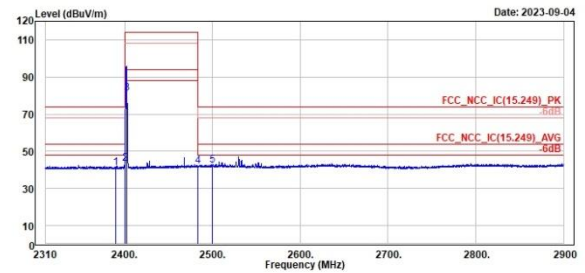
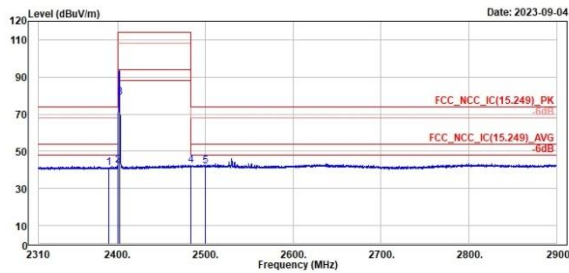
Fundamental & Bandedge

SRD																																																																																																																																													
Low Channel (Horizontal) Peak	Low Channel (Vertical) Peak																																																																																																																																												
<div style="text-align: right; font-size: small;"> TÜV Rheinland Taiwan Ltd. No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.) Tel: +886-2172-1000 Fax: +886-2172-1322 </div> <p style="text-align: right; font-size: x-small;">Date: 2023-09-04</p> <table border="1" style="width: 100%; font-size: x-small;"> <thead> <tr> <th>Freq</th> <th>Level</th> <th>Read</th> <th>Limit</th> <th>Over</th> <th>APos</th> <th>TPos</th> <th>Remark</th> <th>Pol/Phase</th> <th>Note</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV</th> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>cm</th> <th>deg</th> <th></th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>2398.00</td><td>51.95</td><td>14.70</td><td>37.17</td><td>74.00</td><td>-22.05</td><td>386</td><td>227 Peak</td><td>Horizontal</td></tr> <tr><td>2</td><td>2400.83</td><td>62.14</td><td>24.98</td><td>37.16</td><td>114.00</td><td>-51.86</td><td>386</td><td>227 Peak</td><td>Horizontal</td></tr> <tr><td>3</td><td>2402.00</td><td>94.18</td><td>57.01</td><td>37.17</td><td>114.00</td><td>-19.82</td><td>386</td><td>227 Peak</td><td>Horizontal</td></tr> <tr><td>4</td><td>2483.46</td><td>52.84</td><td>15.30</td><td>37.54</td><td>114.00</td><td>-61.16</td><td>386</td><td>227 Peak</td><td>Horizontal</td></tr> <tr><td>5</td><td>2499.98</td><td>52.37</td><td>14.81</td><td>37.56</td><td>74.00</td><td>-21.63</td><td>386</td><td>227 Peak</td><td>Horizontal</td></tr> </tbody> </table>	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	51.95	14.70	37.17	74.00	-22.05	386	227 Peak	Horizontal	2	2400.83	62.14	24.98	37.16	114.00	-51.86	386	227 Peak	Horizontal	3	2402.00	94.18	57.01	37.17	114.00	-19.82	386	227 Peak	Horizontal	4	2483.46	52.84	15.30	37.54	114.00	-61.16	386	227 Peak	Horizontal	5	2499.98	52.37	14.81	37.56	74.00	-21.63	386	227 Peak	Horizontal	<div style="text-align: right; font-size: small;"> TÜV Rheinland Taiwan Ltd. No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.) Tel: +886-2172-1000 Fax: +886-2172-1322 </div> <p style="text-align: right; font-size: x-small;">Date: 2023-09-04</p> <table border="1" style="width: 100%; font-size: x-small;"> <thead> <tr> <th>Freq</th> <th>Level</th> <th>Read</th> <th>Limit</th> <th>Over</th> <th>APos</th> <th>TPos</th> <th>Remark</th> <th>Pol/Phase</th> <th>Note</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV</th> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>cm</th> <th>deg</th> <th></th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>2398.00</td><td>51.10</td><td>13.93</td><td>37.17</td><td>74.00</td><td>-22.90</td><td>347</td><td>270 Peak</td><td>Vertical</td></tr> <tr><td>2</td><td>2400.83</td><td>63.17</td><td>26.01</td><td>37.16</td><td>114.00</td><td>-50.83</td><td>347</td><td>270 Peak</td><td>Vertical</td></tr> <tr><td>3</td><td>2402.00</td><td>96.29</td><td>59.12</td><td>37.17</td><td>114.00</td><td>-17.71</td><td>347</td><td>270 Peak</td><td>Vertical</td></tr> <tr><td>4</td><td>2483.46</td><td>51.68</td><td>14.14</td><td>37.54</td><td>114.00</td><td>-62.32</td><td>347</td><td>270 Peak</td><td>Vertical</td></tr> <tr><td>5</td><td>2499.98</td><td>52.20</td><td>14.64</td><td>37.56</td><td>74.00</td><td>-21.80</td><td>347</td><td>270 Peak</td><td>Vertical</td></tr> </tbody> </table>	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	51.10	13.93	37.17	74.00	-22.90	347	270 Peak	Vertical	2	2400.83	63.17	26.01	37.16	114.00	-50.83	347	270 Peak	Vertical	3	2402.00	96.29	59.12	37.17	114.00	-17.71	347	270 Peak	Vertical	4	2483.46	51.68	14.14	37.54	114.00	-62.32	347	270 Peak	Vertical	5	2499.98	52.20	14.64	37.56	74.00	-21.80	347	270 Peak	Vertical
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	51.95	14.70	37.17	74.00	-22.05	386	227 Peak	Horizontal																																																																																																																																				
2	2400.83	62.14	24.98	37.16	114.00	-51.86	386	227 Peak	Horizontal																																																																																																																																				
3	2402.00	94.18	57.01	37.17	114.00	-19.82	386	227 Peak	Horizontal																																																																																																																																				
4	2483.46	52.84	15.30	37.54	114.00	-61.16	386	227 Peak	Horizontal																																																																																																																																				
5	2499.98	52.37	14.81	37.56	74.00	-21.63	386	227 Peak	Horizontal																																																																																																																																				
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1	2398.00	51.10	13.93	37.17	74.00	-22.90	347	270 Peak	Vertical																																																																																																																																				
2	2400.83	63.17	26.01	37.16	114.00	-50.83	347	270 Peak	Vertical																																																																																																																																				
3	2402.00	96.29	59.12	37.17	114.00	-17.71	347	270 Peak	Vertical																																																																																																																																				
4	2483.46	51.68	14.14	37.54	114.00	-62.32	347	270 Peak	Vertical																																																																																																																																				
5	2499.98	52.20	14.64	37.56	74.00	-21.80	347	270 Peak	Vertical																																																																																																																																				

SRD

Low Channel (Horizontal) Average

Low Channel (Vertical) Average



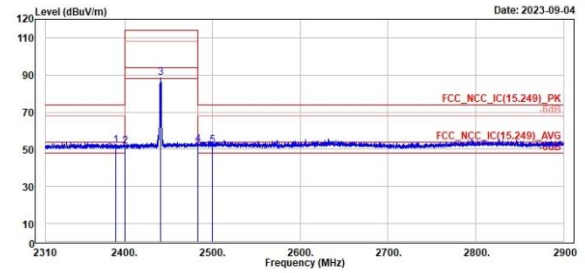
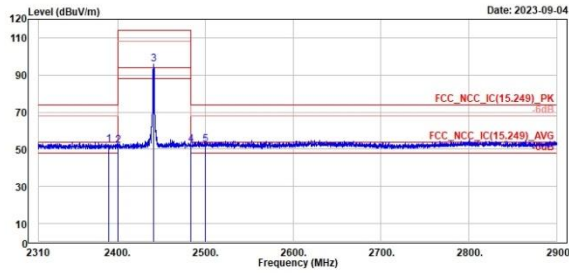
1	2	3	4	5						
Freq	Level	Read	Limit	Over						
MHz	dBuV/m	Level	Line	Limit						
		Factor								
		dB/m	dBuV/m	dB						
2398.00	41.09	3.92	37.17	54.00	-12.91	386	227	Average	Horizontal	
2400.83	42.57	5.41	37.16	94.00	-51.43	386	227	Average	Horizontal	
2402.00	79.01	41.84	37.17	94.00	-14.99	386	227	Average	Horizontal	CF
2483.46	42.32	4.78	37.54	94.00	-51.68	386	227	Average	Horizontal	
2499.98	42.06	4.50	37.56	54.00	-11.94	386	227	Average	Horizontal	

1	2	3	4	5						
Freq	Level	Read	Limit	Over						
MHz	dBuV/m	Level	Line	Limit						
		Factor								
		dB/m	dBuV/m	dB						
2398.00	41.19	4.02	37.17	54.00	-12.81	347	270	Average	Vertical	
2400.83	43.16	6.00	37.16	94.00	-50.84	347	270	Average	Vertical	
2402.00	81.12	43.95	37.17	94.00	-12.88	347	270	Average	Vertical	CF
2483.46	41.76	4.22	37.54	94.00	-52.24	347	270	Average	Vertical	
2499.98	42.51	4.95	37.56	54.00	-11.49	347	270	Average	Vertical	

SRD

Middle Channel (Horizontal) Peak

Middle Channel (Vertical) Peak



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	2398.00	52.63	15.46	37.17	74.00	-21.37	376	29	Peak	Horizontal	
2	2400.83	51.98	14.74	37.16	114.00	-62.10	376	29	Peak	Horizontal	
3	2441.00	95.95	58.50	37.45	114.00	-18.05	376	29	Peak	Horizontal	
4	2483.46	52.47	14.93	37.54	114.00	-61.53	376	29	Peak	Horizontal	
5	2499.98	52.25	14.69	37.56	74.00	-21.75	376	29	Peak	Horizontal	

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	2398.00	51.95	14.78	37.17	74.00	-22.05	183	143	Peak	Vertical	
2	2400.83	51.62	14.46	37.16	114.00	-62.38	183	143	Peak	Vertical	
3	2441.00	88.38	50.93	37.45	114.00	-25.62	183	143	Peak	Vertical	
4	2483.46	52.49	14.95	37.54	114.00	-61.51	183	143	Peak	Vertical	
5	2499.98	52.24	14.68	37.56	74.00	-21.76	183	143	Peak	Vertical	

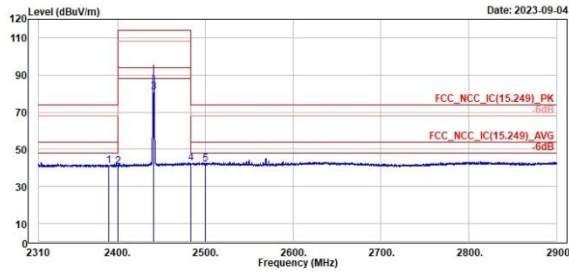
SRD

Middle Channel (Horizontal) Average

Middle Channel (Vertical) Average



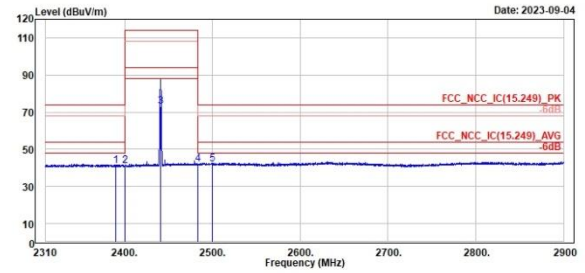
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Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2390.00	41.11	3.94	37.17	54.00	-12.89	376	29 Average	Horizontal
2	2400.03	40.83	3.67	37.16	94.00	-53.17	376	29 Average	Horizontal
3	2441.00	80.78	43.33	37.45	94.00	-13.22	376	29 Average	Horizontal CF
4	2483.46	42.29	4.75	37.54	94.00	-51.71	376	29 Average	Horizontal
5	2499.98	42.20	4.64	37.56	54.00	-11.80	376	29 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	41.19	4.02	37.17	54.00	-12.81	103	143 Average	Vertical
2	2400.03	40.86	3.78	37.16	94.00	-53.14	103	143 Average	Vertical
3	2441.00	73.21	35.76	37.45	94.00	-20.79	103	143 Average	Vertical CF
4	2483.46	41.99	4.45	37.54	94.00	-52.01	103	143 Average	Vertical
5	2499.98	42.08	4.52	37.56	54.00	-11.92	103	143 Average	Vertical

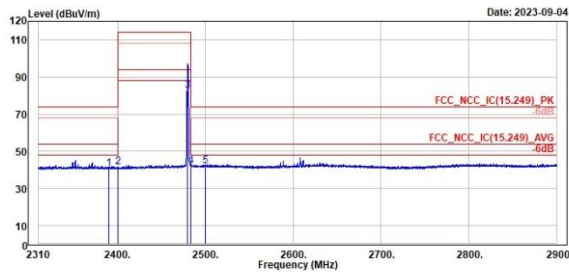
SRD

High Channel (Horizontal) Average

High Channel (Vertical) Average



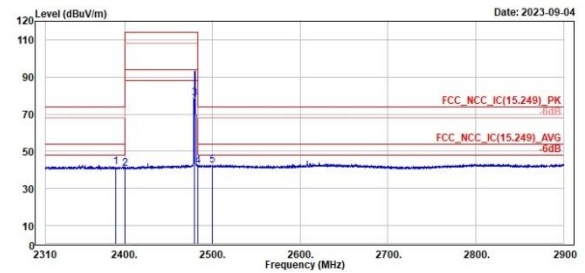
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Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2398.00	48.69	3.52	37.17	54.00	-13.31	370	181 Average	Horizontal
2	2498.03	41.33	4.17	37.16	94.00	-52.67	370	181 Average	Horizontal
3	2498.00	82.40	44.86	37.54	94.00	-11.60	370	181 Average	Horizontal CF
4	2483.46	42.13	4.59	37.54	94.00	-51.87	370	181 Average	Horizontal
5	2499.98	41.89	4.33	37.56	54.00	-12.11	370	181 Average	Horizontal



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Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2398.00	41.47	4.30	37.17	54.00	-12.53	334	221 Average	Vertical
2	2498.03	40.80	3.64	37.16	94.00	-53.20	334	221 Average	Vertical
3	2498.00	78.66	41.12	37.54	94.00	-15.34	334	221 Average	Vertical CF
4	2483.46	42.04	4.50	37.54	94.00	-51.96	334	221 Average	Vertical
5	2499.98	42.24	4.68	37.56	54.00	-11.76	334	221 Average	Vertical

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

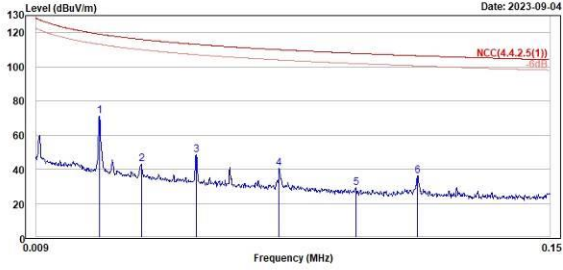
SRD

High Channel (Open) 9kHz~150kHz

High Channel (Open) 150kHz~30MHz



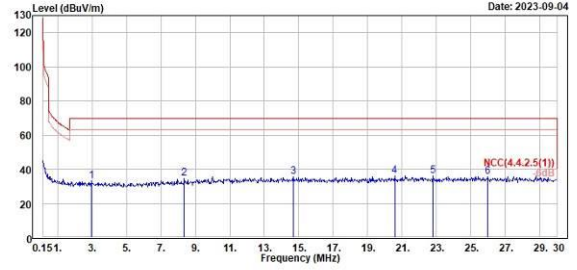
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Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	PoI/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.03	70.95	52.00	18.95	119.13	-48.18	100	32 Peak	Open	
2	0.04	42.93	23.76	19.17	116.02	-73.09	100	250 Peak	Open	
3	0.05	48.37	29.32	19.05	113.11	-64.74	100	160 Peak	Open	
4	0.08	40.35	21.85	18.50	110.01	-69.66	100	77 Peak	Open	
5	0.10	29.10	11.10	18.00	107.89	-78.79	100	318 Peak	Open	
6	0.11	35.07	18.10	17.97	106.49	-70.42	100	44 Peak	Open	



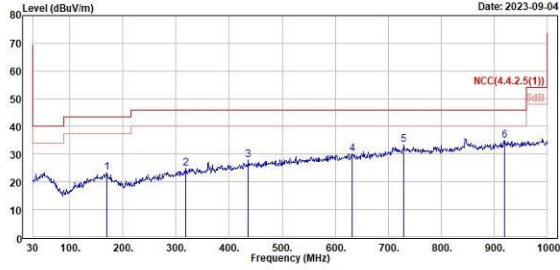
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Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	PoI/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2.96	33.08	13.40	19.60	69.50	-36.50	100	126 Peak	Open	
2	8.36	34.47	13.66	20.81	69.50	-35.03	100	216 Peak	Open	
3	14.69	35.59	13.78	21.81	69.50	-33.91	100	121 Peak	Open	
4	20.57	35.87	13.70	22.17	69.50	-33.63	100	46 Peak	Open	
5	22.81	36.05	13.86	22.19	69.50	-33.45	100	317 Peak	Open	
6	25.94	35.69	13.48	22.21	69.50	-33.81	100	265 Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz
SRD
High Channel (Horizontal)
High Channel (Vertical)

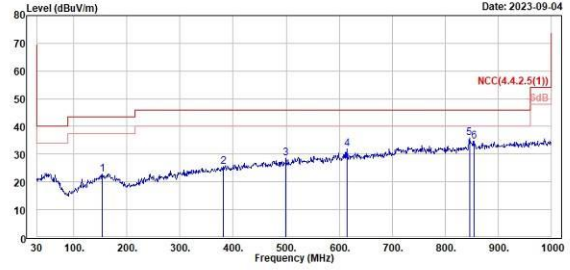

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Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	169.68	23.33	29.23	-5.90	43.50	-20.17	100	342 Peak	Horizontal	
2	319.06	24.98	29.26	-4.28	46.00	-21.02	100	43 Peak	Horizontal	
3	436.43	28.03	30.17	-2.14	46.00	-17.97	300	304 Peak	Horizontal	
4	632.37	30.23	29.20	1.03	46.00	-15.77	100	185 Peak	Horizontal	
5	729.37	33.45	31.31	2.14	46.00	-12.55	100	144 Peak	Horizontal	
6	919.49	34.87	29.72	5.15	46.00	-11.13	200	182 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	153.19	22.91	28.96	-6.05	43.50	-20.59	100	134 Peak	Vertical	
2	381.14	25.45	28.65	-3.20	46.00	-20.55	100	295 Peak	Vertical	
3	499.48	28.69	30.24	-1.55	46.00	-17.31	100	179 Peak	Vertical	
4	614.91	31.82	31.22	0.60	46.00	-14.18	200	296 Peak	Vertical	
5	845.77	35.82	31.72	4.10	46.00	-10.18	300	270 Peak	Vertical	
6	854.50	34.61	30.55	4.06	46.00	-11.39	200	31 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

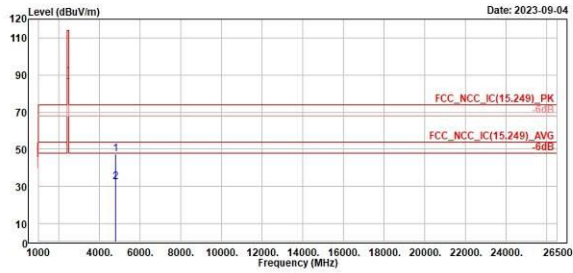
SRD

Low Channel (Horizontal)

Low Channel (Vertical)



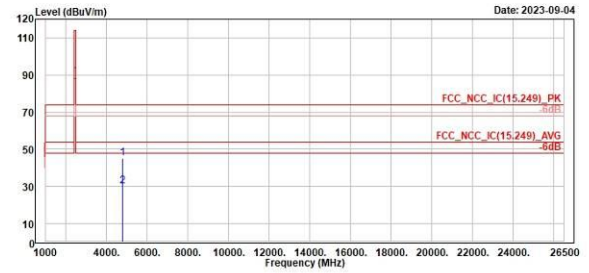
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note								
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg												
4804.00	47.63	55.66	-9.03	74.00	-26.37	100	68	Peak	Horizontal										
4804.00	32.46	41.49	-9.03	54.00	-21.54	100	68	Average	Horizontal	CF									



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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note								
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg												
4804.00	45.31	54.34	-9.03	74.00	-28.69	224	77	Peak	Vertical										
4804.00	30.14	39.17	-9.03	54.00	-23.86	224	77	Average	Vertical	CF									

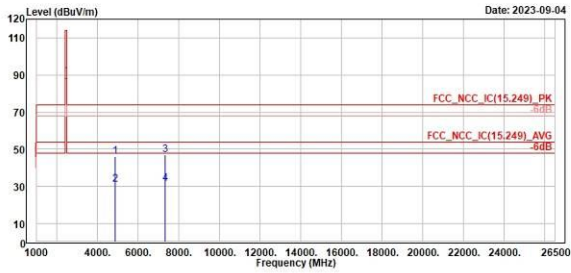
SRD

Middle Channel (Horizontal)

Middle Channel (Vertical)



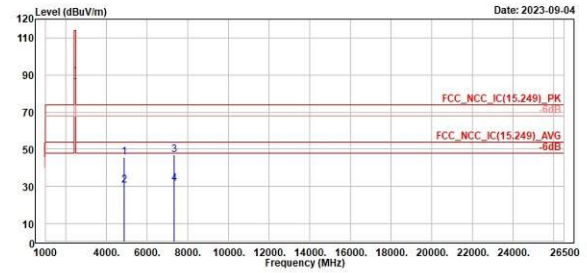
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No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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Line	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4882.00	46.07	55.10	-9.03	74.00	-27.93	100		84 Peak	Horizontal	
2	4882.00	30.90	39.93	-9.03	54.00	-23.10	100		84 Average	Horizontal	CF
3	7323.00	46.82	53.92	-7.10	74.00	-27.18	300		38 Peak	Horizontal	
4	7323.00	31.65	38.75	-7.10	54.00	-22.35	300		38 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	4882.00	45.78	54.81	-9.03	74.00	-28.22	300		232 Peak	Vertical	
2	4882.00	30.61	39.64	-9.03	54.00	-23.39	300		232 Average	Vertical	CF
3	7323.00	46.80	53.90	-7.10	74.00	-27.20	300		288 Peak	Vertical	
4	7323.00	31.63	38.73	-7.10	54.00	-22.37	300		288 Average	Vertical	CF

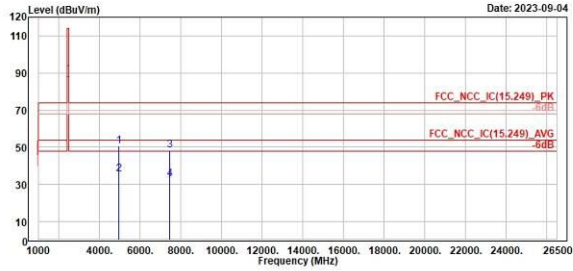
SRD

High Channel (Horizontal)

High Channel (Vertical)



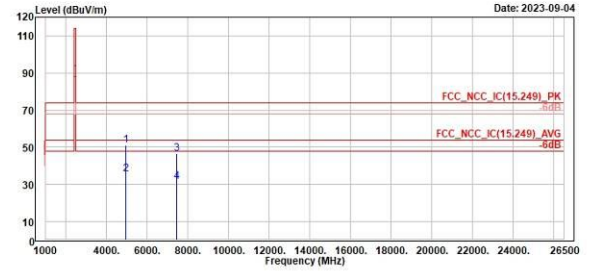
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Line	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
1	50.57	59.41	-8.84	74.00	-23.43	300	213 Peak	Horizontal	
2	4960.00	35.40	44.24	-8.84	54.00	-18.60	300	213 Average	Horizontal CF
3	7440.00	48.23	55.41	-7.18	74.00	-25.77	316	290 Peak	Horizontal
4	7440.00	33.06	40.24	-7.18	54.00	-20.94	316	290 Average	Horizontal CF



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Line	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
1	50.98	59.82	-8.84	74.00	-23.02	300	236 Peak	Vertical	
2	4960.00	35.81	44.65	-8.84	54.00	-18.19	300	236 Average	Vertical CF
3	7440.00	46.67	53.85	-7.18	74.00	-27.33	300	288 Peak	Vertical
4	7440.00	31.50	38.68	-7.18	54.00	-22.50	300	288 Average	Vertical CF