

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	CN21K3OV (P15C-2.4G) 001	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	238511635	Seite 1 von 28 Page 1 of 28
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2021-02-25	
<b>Auftraggeber:</b> <i>Client:</i>	Kingston Technology Company 17600 Newhope Street, Fountain Valley, California 92708, United States			
<b>Prüfgegenstand:</b> <i>Test item:</i>	HyperX Pulsefire Haste Wireless Mouse			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	PF002			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC Part 15C Test report			
<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>	2021-03-03			
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	A003009307-005 A003009307-002			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2021-03-05 - 2021-03-23			
<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>reviewed by:</i>			<b>genehmigt von:</b> <i>authorized by:</i>	
<b>Datum:</b> <i>Date:</i>	2021-03-24		<b>Ausstellungsdatum:</b> <i>Issue date:</i>	2021-03-24
<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>		
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>* Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>				
<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>				

V05

## 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
5.2.1	15.207	Mains Conducted Emission	Pass

**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 & MAINS CONDUCTED EMISSION**

**APPENDIX SP - PHOTOGRAPHS OF TEST SETUP**

**APPENDIX EP - PHOTOGRAPHS OF EUT**

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## HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN21K3OV (P15C-2.4G) 001	Original Release	2021-03-24

## 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 & Mains Conducted Emission**

**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.: 226631  
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)	$\pm 1.30$ dB
Radiated Emission (200 MHz ~ 1 GHz)	$\pm 1.30$ dB
Radiated Emission (1 GHz ~ 18 GHz)	$\pm 1.54$ dB
Radiated Emission (18 GHz ~ 40 GHz)	$\pm 2.52$ dB
Mains Conducted Emission	$\pm 1.65$ dB



### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a HyperX Pulsefire Haste Wireless Mouse. It contains 2.4GHz compatible chip 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	HyperX Pulsefire Haste Wireless Mouse
Type Identification	PF002
FCC ID	JIC-PF002

##### Technical Specification of EUT

Item	EUT information
Operating Frequency	2402 ~ 2479 MHz
Operation Voltage	3.7 Vdc
Modulation	FSK
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)
1	2402	11	2422	21	2443	31	2463
2	2404	12	2424	22	2445	32	2465
3	2406	13	2426	23	2447	33	2467
4	2408	14	2428	24	2449	34	2469
5	2410	15	2430	25	2451	35	2471
6	2412	16	2432	26	2453	36	2473
7	2414	17	2434	27	2455	37	2475
8	2416	18	2436	28	2457	38	2477
9	2418	19	2438	29	2459	39	2479
10	2420	20	2441	30	2461		

### 4.3 Test Operation and Test Software

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

The samples were used as follows:

A003009307-005

A003009307-002

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 ~ 2479	2402, 2441, 2479

#### 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 ~ 2479	2402, 2441, 2479

#### 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 ~ 2479	2479

#### 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 ~ 2479	2402, 2441, 2479

#### Mains Conducted Emission

- ☒ 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 ~ 2479	2479

**Test Condition**

Test Item	Ambient Temperature	Relative Humidity	Tested by
Radiated Spurious Emissions	18-22 °C	53.3-60.5 %	Simon Tsai
Field Strength of Fundamental Emissions	18-22 °C	53.3-60.5 %	Simon Tsai
20 dB Bandwidth	18-22 °C	53.3-60.5 %	Simon Tsai
Occupied Bandwidth	22.5 °C	66.5 %	Stanislas Charles
Mains Conducted Emission	26 °C	65 %	Johnson Chen

## 4.4 Special Accessories and Auxiliary Equipment

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

**Accessory of EUT**

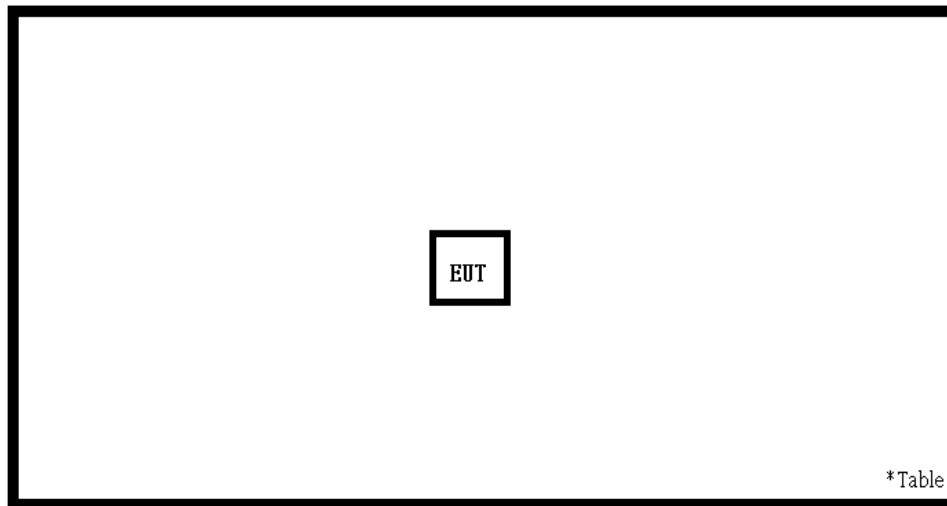
No.	Product	Brand	Model	Description
3	USB Cable	YUE-YNAG	YY-023-384B/YY-023-383C	190cm non-shielded cable

**Support Unit**

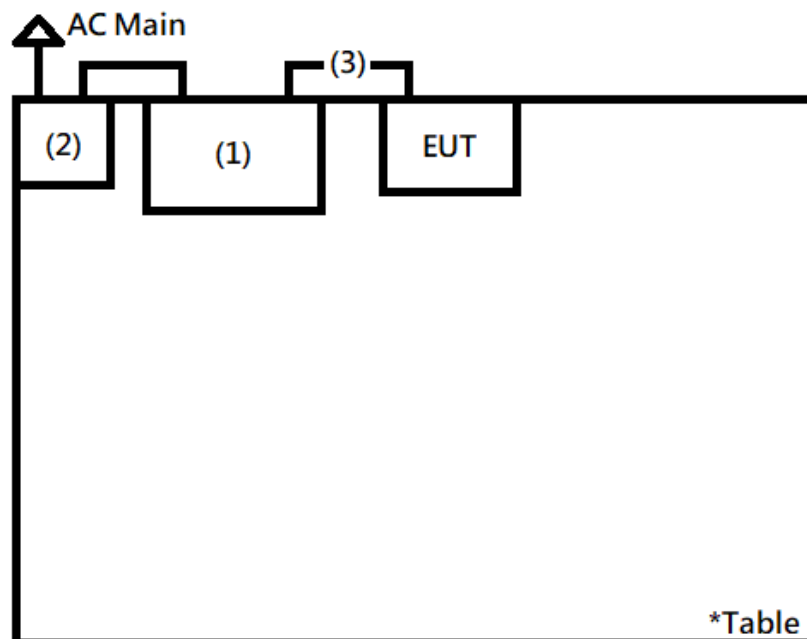
Support Unit							
No.	Description	Brand	Model	S/N	Shielded	Ferrite Core (Qty)	Length (cm)
1	Notebook	HP	15s-du0007TX	CND93662VF	N/A	-	-
2	Adapter	HP	TPN-DA17	N/A	YES	NO	180

## 4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



<Mains Conducted Emission mode>



## 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 1.05 dBi. The antenna is a printed PCB trace 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

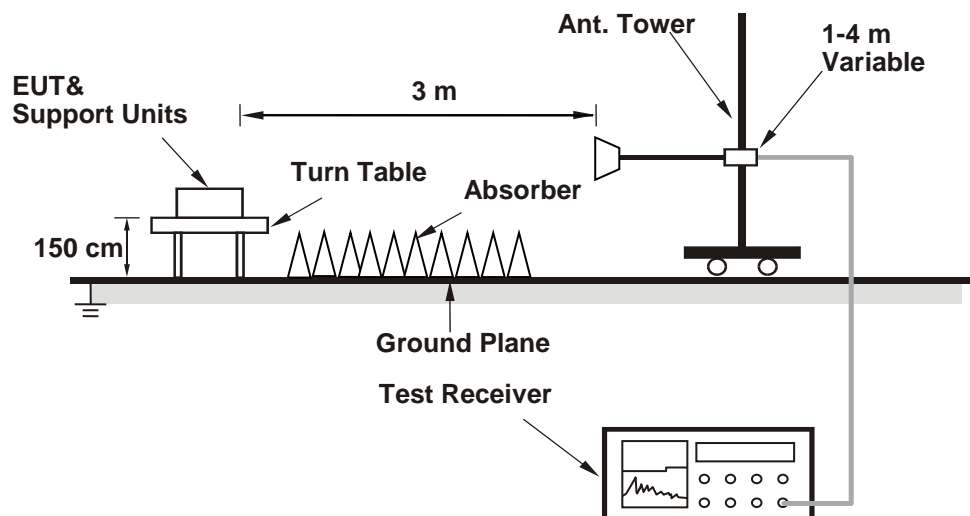
### Limit

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

Fundamental Frequency	Field Strength of Fundamental (microvolts/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
Signal Analyzer	R&S	FSV40	101508	2020/3/16	2021/3/15
Receiver	R&S	ESR7	102108	2020/4/22	2021/4/21
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2021/2/18	2022/2/17
Horn Antenna	ETS-Lindgren	3117	00218930	2020/12/1	2021/11/30
LF-AMP	Agilent	8447D	2944A10772	2021/2/18	2022/2/17
HF-AMP + AC source	EMCI	EMC051845SE	980633	2021/2/9	2022/2/8
HF-AMP + AC source	EMCI	EMC184045SE	980657	2021/2/1	2022/1/31
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2020/4/10	2021/4/9
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104EA	800056/4EA	2020/3/25	2021/3/24
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	804680/4	2020/3/25	2021/3/24
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	MY37202/4	2020/3/25	2021/3/24
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	800898/2EA	2020/4/22	2021/4/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	800901/2EA	2020/4/22	2021/4/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	801027/2EA	2020/4/22	2021/4/21
Loop Antenna	Chance Most	EMCILPA600 +calibration	287	2020/6/17	2021/6/16

**Test Procedures**

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- 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:**

- 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.
- 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.
- All modes of operation were investigated and the worst-case emissions are reported.
- The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.
- 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	Peak	93.52	114.00	Pass
		Average	93.15	94.00	Pass
	Vertical	Peak	91.16	114.00	Pass
		Average	90.73	94.00	Pass
2441	Horizontal	Peak	92.68	114.00	Pass
		Average	92.39	94.00	Pass
	Vertical	Peak	89.97	114.00	Pass
		Average	89.59	94.00	Pass
2479	Horizontal	Peak	93.64	114.00	Pass
		Average	93.34	94.00	Pass
	Vertical	Peak	90.47	114.00	Pass
		Average	90.04	94.00	Pass

Please refer to Appendix A for the details.

### 5.1.3 Radiated Spurious Emissions

#### Limit

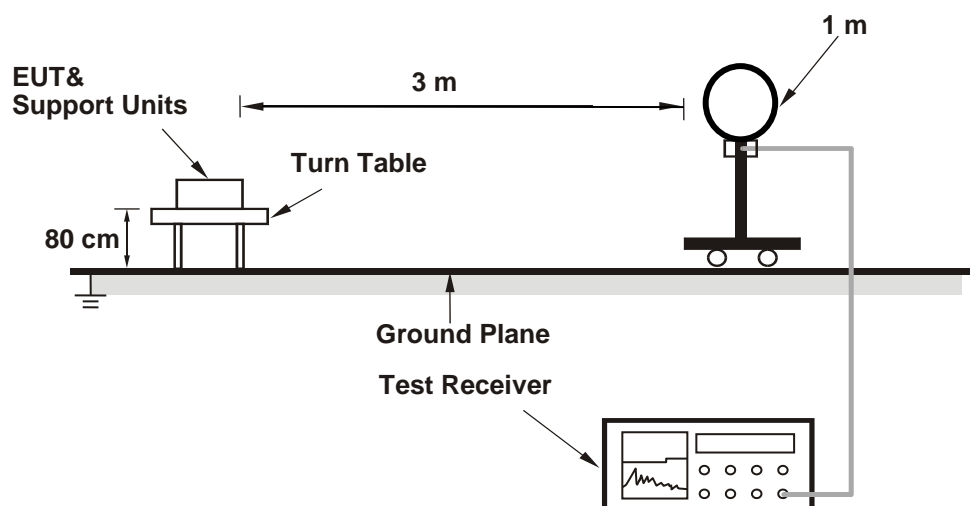
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation.

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

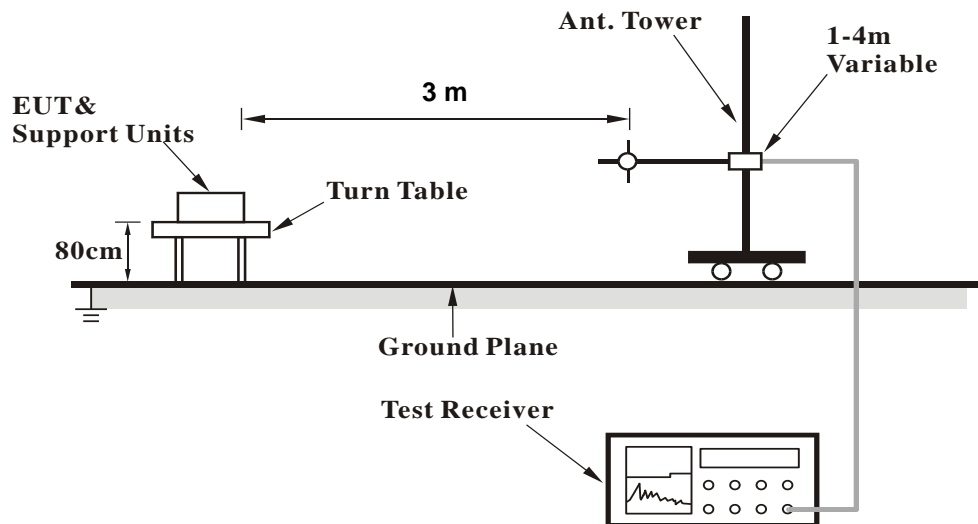
**Kind of Test Site** 3m Semi-Anechoic Chamber

#### Test Setup

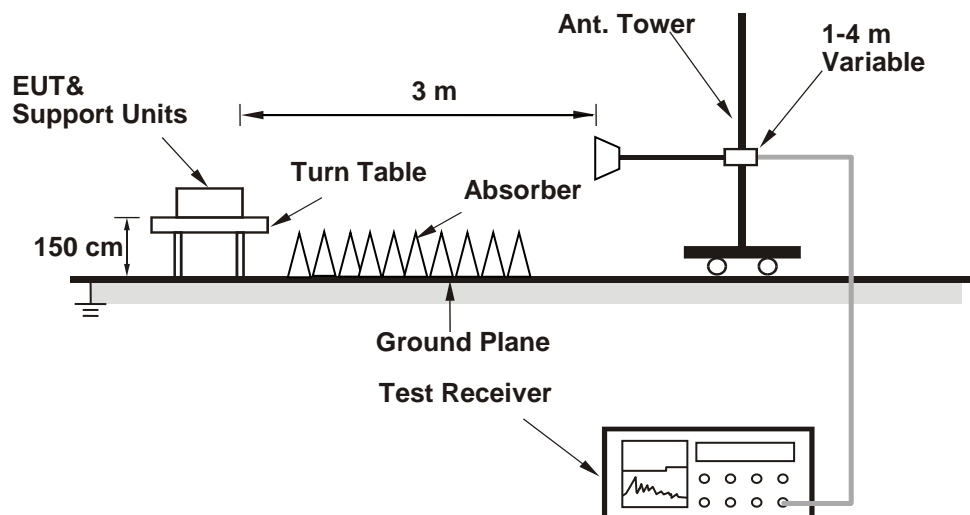
<Radiated Emissions below 30 MHz>



<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, Y and Z 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)

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**Test Results**

Please refer to Appendix A.

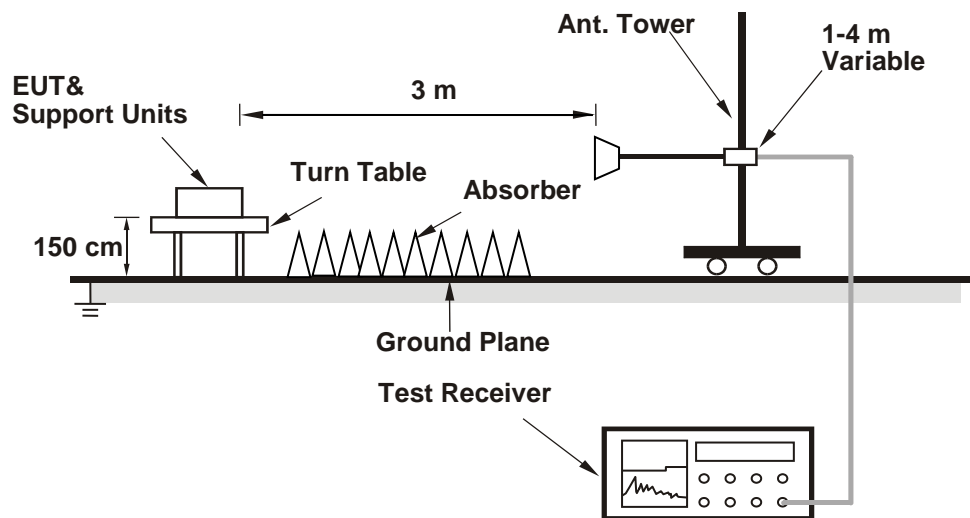
### 5.1.4 20 dB Bandwidth

#### Limit

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

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

#### Test Setup



#### Test Instruments

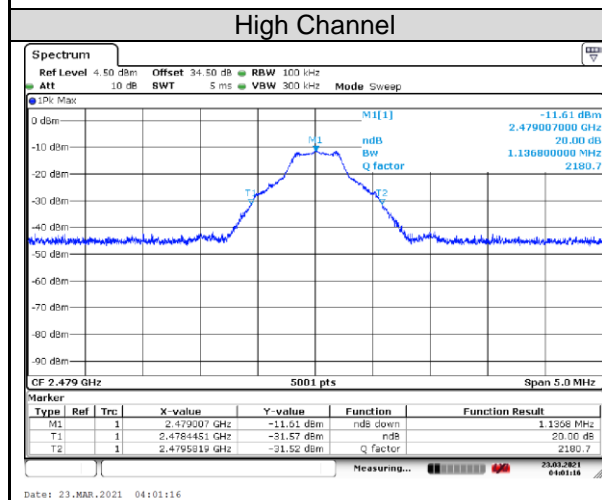
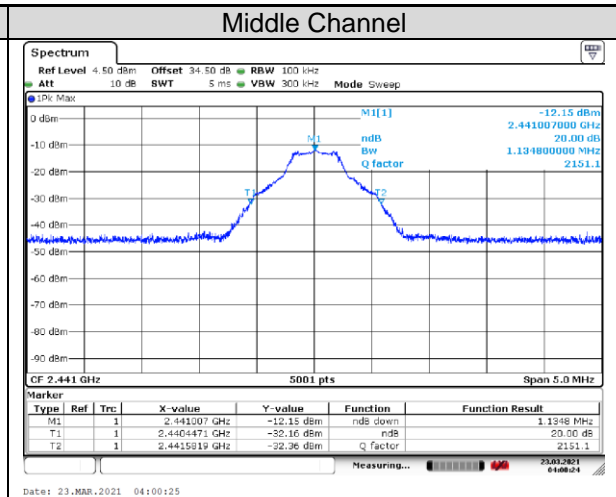
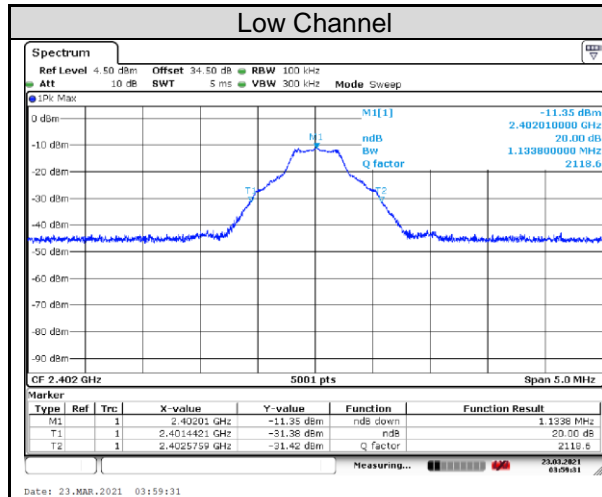
Please refer to 5.1.2 Instruments

#### Test Procedure

Please refer to 5.1.3 Test Procedure

**Test Results**

Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)
Low Channel	2402	1.134
Middle Channel	2441	1.135
High Channel	2479	1.137

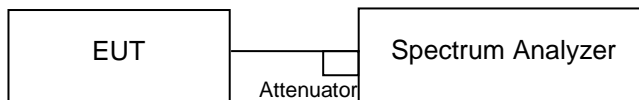




### 5.1.5 99% Occupied Bandwidth

**Kind of Test Site**                      Shielded room

**Test Setup**



**Test Instruments**

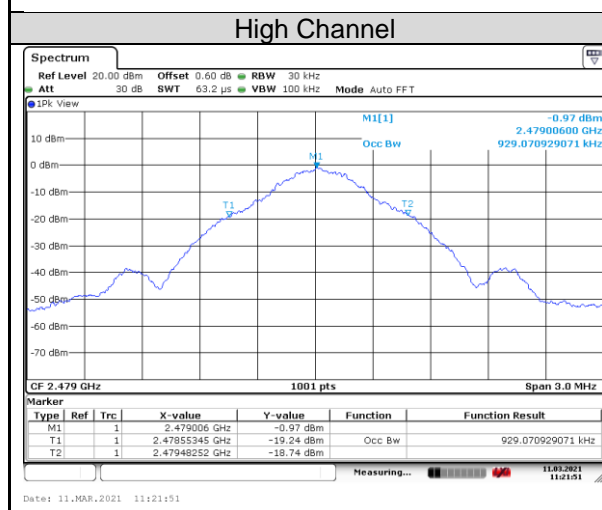
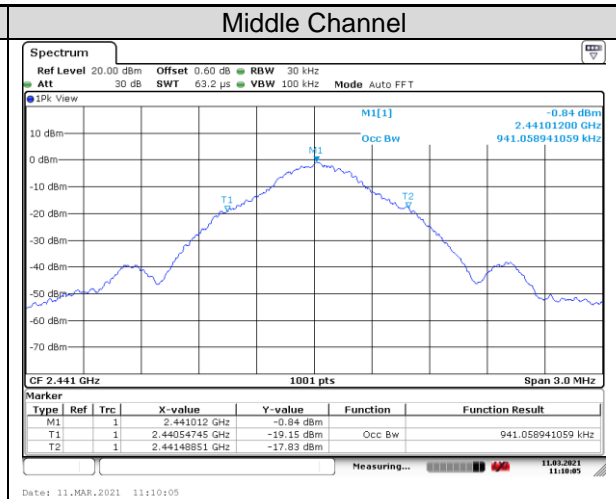
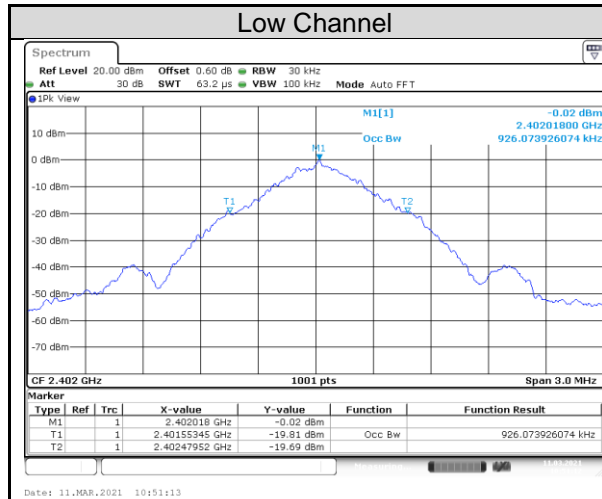
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV40	101512	2021/1/29	2022/1/28	2021/3/11	2021/3/11

**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	926.07
Middle Channel	2441	941.06
High Channel	2479	929.07



## 5.2 Mains Emission

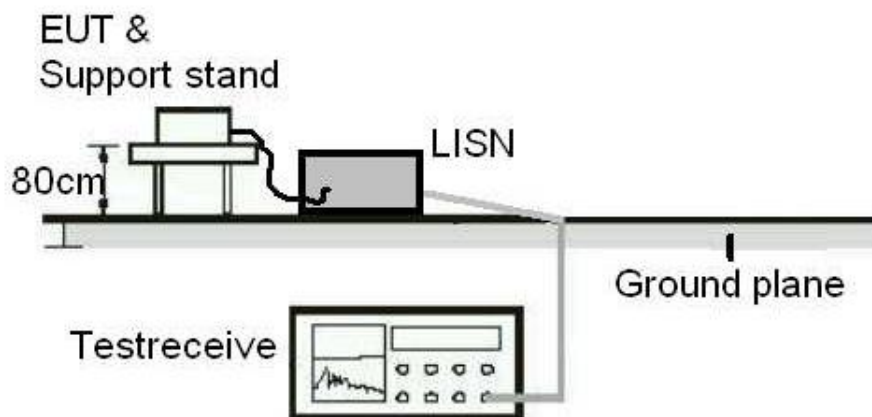
### 5.2.1 Mains Conducted Emission

#### Limit

Mains Conducted emissions as defined in §15.207 must comply with the mains conducted emission limits.

**Kind of Test Site**                      Shielded room

#### Test Setup



#### Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
EMI Test Receiver	Rohde & Schwarz	ESR 7	102114	2020/04/13	2021/04/13
Two-Line V-Network (for EUT)	Rohde & Schwarz	ENV216	1816064	2020/09/10	2021/09/10
Test Software	Audix	e3	Ver. 9	N/A	N/A

#### Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

#### Test Results

Please refer to Appendix A.

# Appendix A: Test Results of Radiated Spurious Emissions & Mains

## Conducted Emission Test

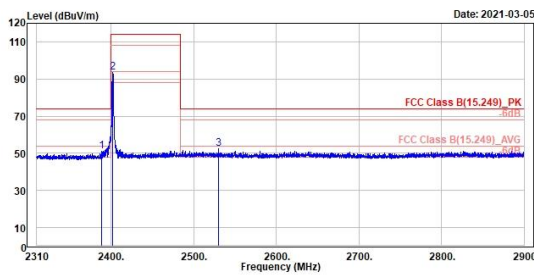
### Band Edges, 2.31GHz ~ 2.9GHz

#### SRD 2.4 GHz

##### Low Channel (Horizontal) Peak



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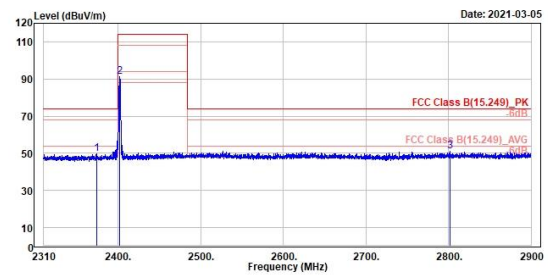


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	2388.33	50.91	16.93	33.98	74.00	-23.09	352	180	Peak	Horizontal	
2	2402.00	93.52	59.46	34.06	114.00	-20.48	352	180	Peak	Horizontal	
3	2529.91	52.47	17.99	34.48	74.00	-21.53	352	180	Peak	Horizontal	

##### Low Channel (Vertical) Peak



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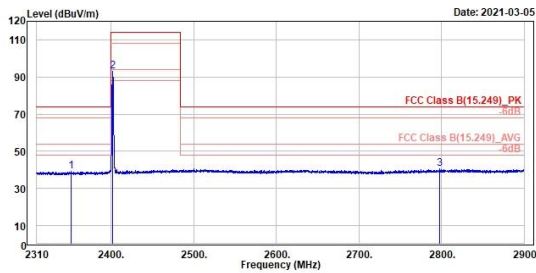
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	2374.43	49.67	15.78	33.89	74.00	-24.33	392	247	Peak	Vertical	
2	2402.00	91.16	57.10	34.06	114.00	-22.04	392	247	Peak	Vertical	
3	2802.12	50.92	16.52	34.40	74.00	-23.08	392	247	Peak	Vertical	

**SRD 2.4 GHz**

**Low Channel (Horizontal) Average**



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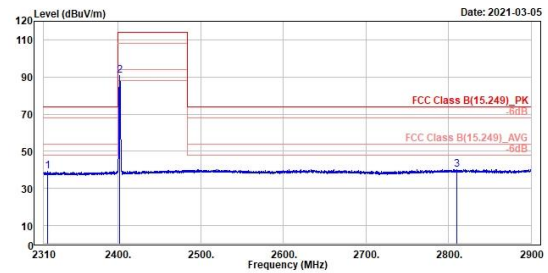


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2351.70	39.30	5.56	33.74	54.00	-14.70	352	180	Average	Horizontal		
2	2402.00	93.15	59.09	34.06	94.00	-0.85	352	180	Average	Horizontal		
3	2797.52	40.51	6.11	34.40	54.00	-13.49	352	180	Average	Horizontal		

**Low Channel (Vertical) Average**



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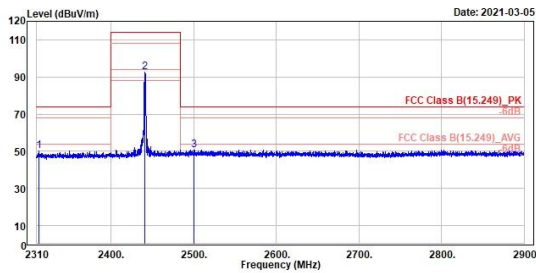
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2314.59	39.33	5.68	33.65	54.00	-14.67	392	247	Average	Vertical		
2	2402.00	90.73	56.67	34.06	94.00	-3.27	392	247	Average	Vertical		
3	2810.60	40.29	5.89	34.40	54.00	-13.71	392	247	Average	Vertical		

**SRD 2.4 GHz**

**Middle Channel (Horizontal) Peak**



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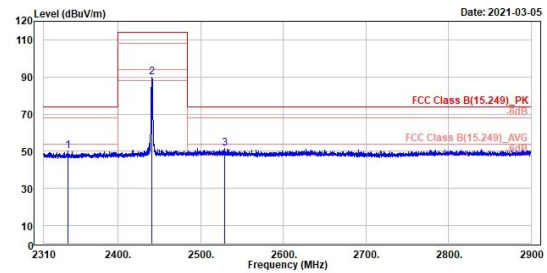


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2312.95	50.35	16.70	33.65	74.00	-23.65		384	181	Peak	Horizontal	
2	2441.00	92.68	50.36	34.32	114.00	-21.32		384	181	Peak	Horizontal	
3	2500.35	50.68	16.09	34.59	74.00	-23.32		384	181	Peak	Horizontal	

**Middle Channel (Vertical) Peak**



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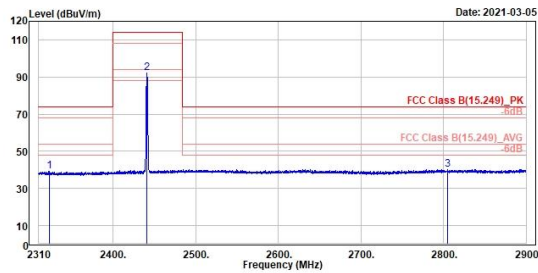
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	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2339.45	50.30	16.59	33.71	74.00	-23.70		336	232	Peak	Vertical	
2	2441.00	89.97	55.65	34.32	114.00	-24.03		336	232	Peak	Vertical	
3	2528.97	51.45	16.97	34.48	74.00	-22.55		336	232	Peak	Vertical	

**SRD 2.4 GHz**

**Middle Channel (Horizontal) Average**



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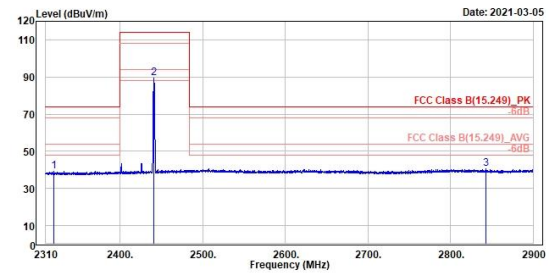


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2322.72	39.28	5.53	33.67	54.00	-14.80		384	181	Average	Horizontal	
2	2441.00	92.39	58.07	34.32	94.00	-1.61		384	181	Average	Horizontal	
3	2804.95	40.28	5.88	34.40	54.00	-13.72		384	181	Average	Horizontal	

**Middle Channel (Vertical) Average**



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2320.25	39.23	5.57	33.66	54.00	-14.77		336	232	Average	Vertical	
2	2441.00	89.59	55.27	34.32	94.00	-4.41		336	232	Average	Vertical	
3	2843.23	40.74	6.33	34.41	54.00	-13.26		336	232	Average	Vertical	

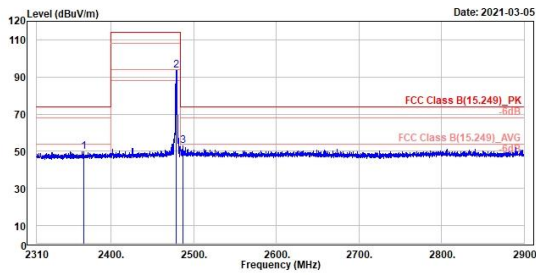


**SRD 2.4 GHz**

**High Channel (Horizontal) Peak**



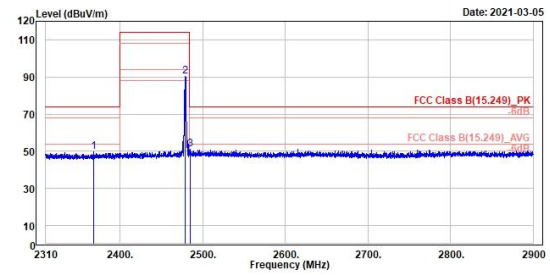
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2366.66	49.77	15.93	33.84	74.00	-24.23	329	184	Peak	Horizontal	
2	2479.00	93.64	59.14	34.50	114.00	-20.36	329	184	Peak	Horizontal	
3	2486.68	52.88	18.35	34.53	74.00	-21.12	329	184	Peak	Horizontal	



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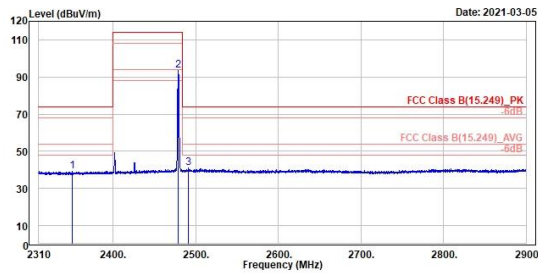
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2368.07	49.78	15.93	33.85	74.00	-24.22	399	247	Peak	Vertical	
2	2479.00	90.47	55.97	34.50	114.00	-23.53	399	247	Peak	Vertical	
3	2484.56	51.09	16.57	34.52	74.00	-22.91	399	247	Peak	Vertical	

**SRD 2.4 GHz**

**High Channel (Horizontal) Average**



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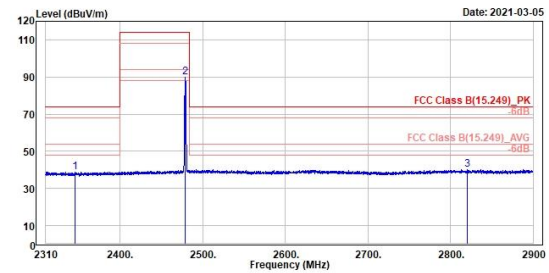


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2350.99	39.08	5.34	33.74	54.00	-14.92	329	184	Average	Horizontal	
2	2479.00	93.34	58.64	34.50	94.00	-0.66	329	184	Average	Horizontal	
3	2491.16	40.85	6.30	34.55	54.00	-13.15	329	184	Average	Horizontal	

**High Channel (Vertical) Average**



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2345.57	38.94	5.22	33.72	54.00	-15.06	399	247	Average	Vertical	
2	2479.00	90.04	55.54	34.50	94.00	-3.96	399	247	Average	Vertical	
3	2820.61	40.24	5.83	34.41	54.00	-13.76	399	247	Average	Vertical	

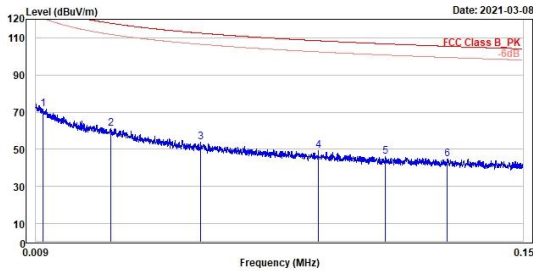
## Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

### SRD 2.4 GHz

#### Low Channel (Open) 9kHz~150kHz



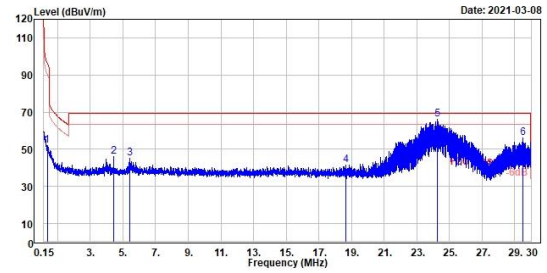
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Tel: +886-2172-1000 Fax: +886-2172-1322



Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.01	71.64	-6.52	78.16	126.69	-55.05	100	203	QP	Open	
2	0.03	61.03	-9.47	70.50	117.82	-56.79	100	15	QP	Open	
3	0.06	54.04	-10.07	64.11	112.52	-58.48	100	287	QP	Open	
4	0.09	49.48	-10.89	60.37	108.44	-58.96	100	217	QP	Open	
5	0.11	46.23	-12.44	58.67	106.76	-60.53	100	36	QP	Open	
6	0.13	44.89	-12.74	57.63	105.44	-60.55	100	205	QP	Open	



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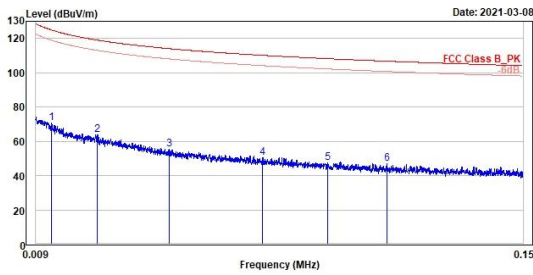
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.36	51.88	-2.65	49.23	96.50	-44.62	100	0	QP	Open	
2	4.43	46.17	-7.81	38.36	69.50	-23.33	100	176	QP	Open	
3	5.42	45.08	-6.71	38.37	69.50	-24.42	100	45	QP	Open	
4	18.64	41.34	-4.73	36.61	69.50	-28.16	100	178	QP	Open	
5	24.24	66.10	31.41	34.69	69.50	-3.40	100	0	QP	Open	
6	29.51	55.95	17.37	38.58	69.50	-13.55	100	21	QP	Open	

**SRD 2.4 GHz**

**Low Channel (Close) 9kHz~150kHz**



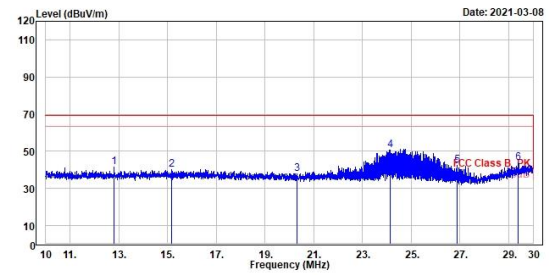
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.01	70.55	-6.02	76.57	124.91	-54.36	100	336	Q°	Close		
2	0.03	63.95	-7.35	71.30	119.00	-55.05	100	209	Q°	Close		
3	0.05	55.42	-10.24	65.66	114.05	-58.63	100	25	Q°	Close		
4	0.07	50.65	-11.18	61.83	110.13	-59.48	100	88	Q°	Close		
5	0.09	47.44	-12.61	60.05	108.19	-60.75	100	202	Q°	Close		
6	0.11	46.72	-11.92	58.64	106.72	-60.00	100	308	Q°	Close		



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	12.00	41.69	4.28	37.41	69.50	-27.81	100	145	Q°	Close		
2	15.17	40.32	2.60	37.72	69.50	-29.18	100	175	Q°	Close		
3	20.31	38.07	1.85	36.22	69.50	-31.43	100	305	Q°	Close		
4	24.13	50.81	16.02	34.79	69.50	-18.69	100	300	Q°	Close		
5	26.89	42.62	8.29	34.33	69.50	-26.88	100	15	Q°	Close		
6	29.40	43.73	5.45	38.28	69.50	-25.77	100	350	Q°	Close		

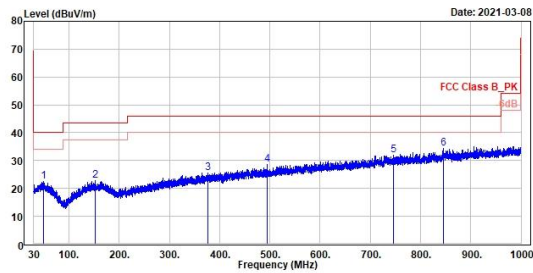
## Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

### SRD 2.4 GHz

#### Low Channel (Horizontal)



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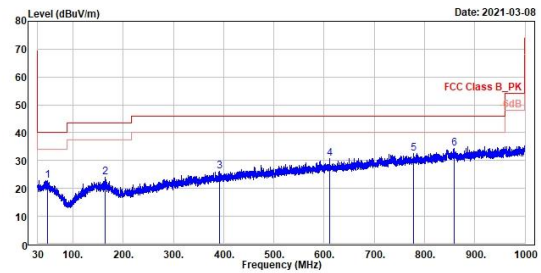


	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	50.08	22.51	28.50	-5.99	40.00	-17.49	300	6 QP	horizontal		
2	151.74	22.78	28.69	-5.91	43.50	-20.72	200	79 QP	horizontal		
3	377.07	25.66	28.96	-3.30	46.00	-20.34	200	72 QP	horizontal		
4	494.05	28.68	30.41	-1.73	46.00	-17.32	100	260 QP	horizontal		
5	746.54	31.89	29.41	2.48	46.00	-14.11	237	0 QP	horizontal		
6	845.38	34.35	30.38	3.97	46.00	-11.65	200	75 QP	horizontal		

#### Low Channel (Vertical)



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	49.50	22.90	28.08	-6.08	40.00	-17.10	203	89 QP	vertical		
2	164.25	23.92	29.78	-5.86	43.50	-19.58	300	202 QP	vertical		
3	392.49	26.13	29.20	-3.07	46.00	-19.87	229	0 QP	vertical		
4	611.81	30.59	30.17	0.42	46.00	-15.41	200	352 QP	vertical		
5	778.45	32.66	29.66	3.00	46.00	-13.34	100	32 QP	vertical		
6	858.77	34.32	30.21	4.11	46.00	-11.68	300	248 QP	vertical		

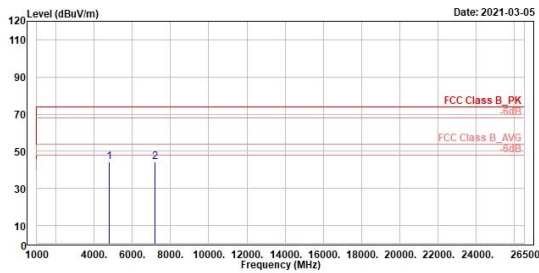
## Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

### SRD 2.4 GHz

#### Low Channel (Horizontal)



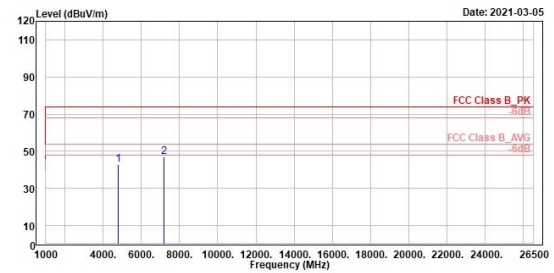
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#### Low Channel (Vertical)



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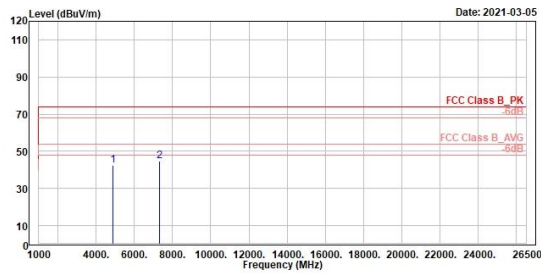


**SRD 2.4 GHz**

**Middle Channel (Horizontal)**



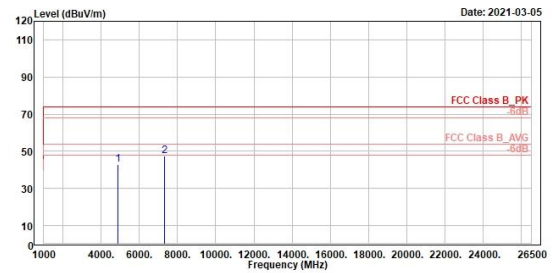
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**Middle Channel (Vertical)**



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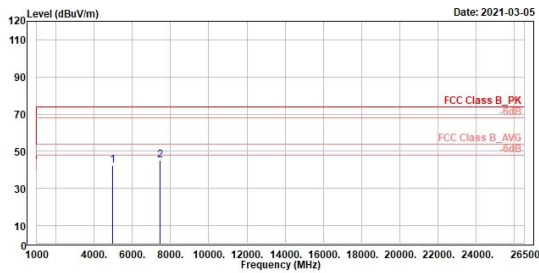
**SRD 2.4 GHz**

**High Channel (Horizontal)**

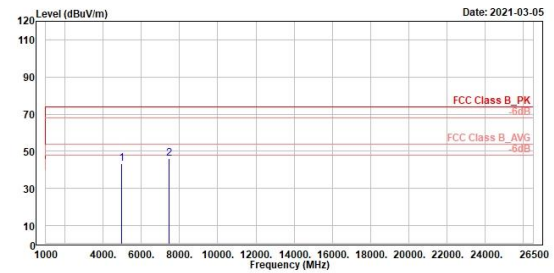
**High Channel (Vertical)**



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## Mains Conducted Emission, 150kHz ~ 30MHz

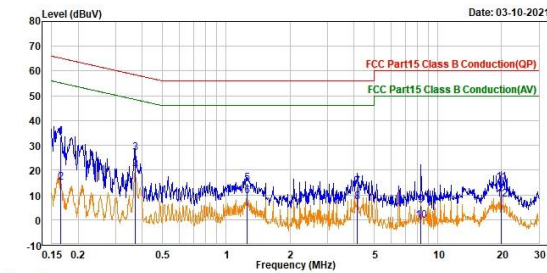
### Worst Band

#### (Line)

#### (Neutral)



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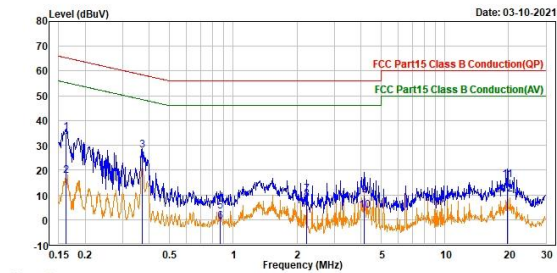


Trace: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dB	dBuV	dBuV	dB			
1	0.165	33.27	0.05	33.32	65.21	-31.89	QP	line1	
2	0.165	14.92	0.05	14.97	55.21	-40.24	Average	line1	
3	0.372	26.90	0.06	26.96	58.47	-31.51	QP	line1	
4	0.372	19.76	0.06	19.82	48.47	-28.65	Average	line1	
5	1.254	14.69	0.09	14.78	56.00	-41.22	QP	line1	
6	1.254	9.44	0.09	9.53	46.00	-36.47	Average	line1	
7	4.168	13.15	0.15	13.30	56.00	-42.70	QP	line1	
8	4.168	7.13	0.15	7.28	46.00	-38.72	Average	line1	
9	8.333	5.58	0.26	5.84	60.00	-54.16	QP	line1	
10	8.333	-0.83	0.26	-0.57	50.00	-50.57	Average	line1	
11	19.836	14.56	0.48	15.04	60.00	-44.96	QP	line1	
12	19.836	7.76	0.48	8.24	50.00	-41.76	Average	line1	



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Trace: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dB	dBuV	dBuV	dB			
1	0.162	35.17	0.05	35.22	65.34	-30.12	QP	neutral	
2	0.162	17.59	0.05	17.64	55.34	-37.70	Average	neutral	
3	0.372	27.80	0.05	27.85	58.47	-30.62	QP	neutral	
4	0.372	22.99	0.05	23.04	48.47	-25.43	Average	neutral	
5	0.871	3.23	0.08	3.31	56.00	-52.69	QP	neutral	
6	0.871	-0.89	0.08	-0.81	46.00	-46.81	Average	neutral	
7	2.224	10.04	0.10	10.14	56.00	-45.86	QP	neutral	
8	2.224	8.18	0.10	8.28	46.00	-37.72	Average	neutral	
9	4.168	9.77	0.15	9.92	56.00	-46.08	QP	neutral	
10	4.168	3.70	0.15	3.85	46.00	-42.15	Average	neutral	
11	19.639	15.48	0.50	15.98	60.00	-44.02	QP	neutral	
12	19.639	9.72	0.50	10.22	50.00	-39.78	Average	neutral	