

Report No.: TW2304219-01E

Applicant: SHENZHEN JINGWEIXIAN TECHNOLOGY CO., LTD

Product: Cutting Plotter

Model No.: MINI XR, MAGIC FROG, MINI 13, MINI ZV1, MINI

ZV2, MINI ZV3, MINI ZV1-B, MINI ZV2-B, MINI ZV3-B, DC MINI 1, DC MINI 2, DC MINI 3, DCM 1,

DCM 2, DCM 3

Trademark: SKYCUT

Test Standards: FCC Part 15.247

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10, FCC Part 15.247 for

the evaluation of electromagnetic compatibility

Approved By

Terry Tang

Manager

Dated: October 13, 2023

Results appearing herein relate only to the sample tested The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



Date: 2023-10-13



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# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

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

### **CNAL-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

# Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

### **A2LA (Certification Number:5013.01)**

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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# **Test Report Conclusion**

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### 1.0 General Details

### 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688 Fax: (755) 83442996

Site Listed with Federal Communications commission (FCC)

Registration Number: 744189 For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A

For 3m Anechoic Chamber

## 1.2 Applicant Details

Applicant: SHENZHEN JINGWEIXIAN TECHNOLOGY CO., LTD

Address: Building C, XinHang Technology Park, No.229, Qingshui Road, WulianCommunity,

Longgang Street, Longgang District, Shenzhen, 518116, China

Telephone: -Fax: --

### 1.3 Description of EUT

Product: Cutting Plotter

Manufacturer: SHENZHEN JINGWEIXIAN TECHNOLOGY CO., LTD

Address: Building C, XinHang Technology Park, No.229, Qingshui Road,

WulianCommunity, Longgang Street, Longgang District, Shenzhen, 518116,

China

Trademark: SKYCUT

Additional Trademark: N/A

Model Number: MINI XR

Additional Model Number: MAGIC FROG, MINI 13, MINI ZV1, MINI ZV2, MINI ZV3, MINI ZV1-B,

MINI ZV2-B, MINI ZV3-B, DC MINI 1, DC MINI 2, DC MINI 3, DCM 1,

DCM 2, DCM 3

Hardware Version: VF22.0301 Software Version: V23.0821

 Serial No.:
 DX13490032020088F

 Rating:
 Input: DC24V, 1.5A

Power Supply: Model: FJ-SW7292401500N

Input: 100-240V~, 50/60Hz, 1.5A MAX; Output: DC24V, 1.5A, 36W

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Type of Modulation IEEE 802.11b: DSSS (CCK, QPSK, DBPSK)

IEEE 802.11g/n (HT20, HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)

Frequency range IEEE 802.11b/g/n (HT20): 2412-2462MHz;

IEEE 802.11n HT40: 2422-2452MHz

Channel Spacing 5MHz for IEEE 802.11b/g/n (HT20, HT40)

Air Data Rate IEEE 802.11b: 11, 5.5, 2, 1 Mbps

IEEE 802.11g: 54, 48,36, 24, 18, 12, 9, 6 Mbps

IEEE 802.11n HT20/HT40: mcs0-mcs7

Frequency Selection By software

Channel Number IEEE 802.11b/g/n (HT20): 11 Channels;

IEEE 802.11n (HT40): 7 Channels;

Antenna: PFC antenna with gain 2.0dBi Max (Get from the antenna specification)

1.4 Submitted Sample: 6 Samples

1.5 Test Duration

2023-09-14 to 2023-10-13

1.6 Test Uncertainty

Conducted Emissions Uncertainty = 3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty = 6.0dB

Occupied Channel Bandwidth Uncertainty =5%

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by

Print Name: Andy Xing

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2.0 Test Equipment								
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date			
ESPI Test Receiver	ESPI Test Receiver R&S ESPI 3  LISN R&S EZH3-Z5		100379	2023-07-14	2024-07-13			
LISN			100294	2023-07-14	2024-07-13			
LISN	R&S	EZH3-Z5	100253	2023-07-14	2024-07-13			
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2023-07-14	2024-07-13			
Loop Antenna	EMCO	6507	00078608	2022-07-18	2025-07-17			
Spectrum	R&S	FSIQ26	100292	2023-07-14	2024-07-13			
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2022-07-18	2025-07-17			
Horn Antenna	R&S	BBHA 9120D	9120D-631	2022-07-18	2024-07-17			
Power meter	Anritsu	ML2487A	6K00003613	2023-07-14	2024-07-13			
Power sensor	Power sensor Anritsu		32263	2023-07-14	2024-07-13			
Bilog Antenna Schwareb		VULB9163	9163/340	2022-07-18	2025-07-17			
9*6*6 Anechoic			N/A	2022-07-26	2025-07-25			
EMI Test Receiver	RS	ESVB	826156/011	2023-07-14	2024-07-13			
EMI Test Receiver	RS	ESCS 30	834115/006	2023-07-14	2024-07-13			
Spectrum	HP/Agilent	E4407B	MY50441392	2023-07-14	2024-07-13			
Spectrum	RS	FSP	1164.4391.38	2023-07-14	2024-07-13			
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/FA	1	2023-07-14	2024-07-13			
RF Cable	Zhengdi	7m		2023-07-14	2024-07-13			
Pre-Amplifier Schwarebeck BBV9743  Pre-Amplifier HP/Agilent 8449B		#218	2023-07-14	2024-07-13				
		3008A00160	2023-07-14	2024-07-13				
LISN	SCHAFFNER	NNB42	00012	2023-07-14	2024-07-13			
ESPI Test Receiver	R&S	ESPI 3	100379	2023-07-14	2024-07-13			
LISN	R&S	EZH3-Z5	100294	2023-07-14	2024-07-13			

# 2.2 Automation Test Software

### For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

# For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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### 3. DESCRIPTION OF TEST MODES

### IEEE 802.11b, 802.11g, 802.11n (HT20) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps data rate (worst case) was chosen for full testing. IEEE 802.11g mode: 6Mbps data rate (worst case) was chosen for full testing. IEEE 802.11n (HT20) mode: mcs0 (worst case) were chosen for full testing;

### IEEE 802.11n (HT40) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11n (HT40) mode: mcs0 data rate (worst case) were chosen for full testing

Note: During the test, the duty cycle was set up to >98%

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#### 3.0 **Technical Details**

#### 3.1 **Summary of test results**

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph15.203	Antenna Requirement	Pass	Complies
FCC Part 15, Paragraph15.207	<b>Conducted Emission Test</b>	Pass	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	Pass	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	Pass	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	Pass	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm/3kHz	Pass	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	Pass	Complies

#### 3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

#### 4.0 **EUT Modification**

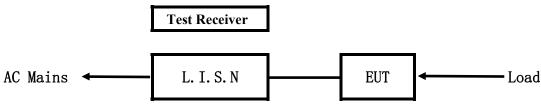
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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### 5.0 Power Line Conducted Emission Test

### 5.1 Schematics of the test

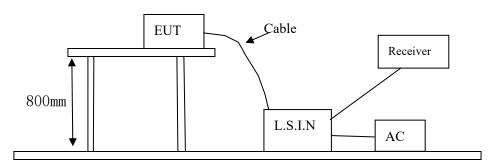


**EUT: Equipment Under Test** 

### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum from 0.15 MHz to 30MHz was investigated. The LISN used was 50 ohm/50 uH as specified by section 5.1 of ANSI C63.10 -2013.

Test Voltage: 120V~, 60Hz Block diagram of Test setup



### 5.3 Configuration of the EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

### A. EUT

Device	Manufacturer	Model	FCC ID
Cutting Plotter	SHENZHEN JINGWEIXIAN TECHNOLOGY CO., LTD	MINI XR, MAGIC FROG, MINI 13, MINI ZV1, MINI ZV2, MINI ZV3, MINI ZV1-B, MINI ZV2-B, MINI ZV3-B, DC MINI 1, DC MINI 2, DC MINI 3, DCM 1, DCM 2, DCM 3	2AVGR-MINIXR

### B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

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# C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition
- 5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (dB $\mu$ V)			
(MHz)	Quasi-peak Level	Average Level		
$0.15 \sim 0.50$	66.0~56.0*	56.0~46.0*		
$0.50 \sim 5.00$	56.0	46.0		
$5.00 \sim 30.00$	60.0	50.0		

Notes:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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#### Conducted Emission on Live Terminal (150kHz to 30MHz) A:

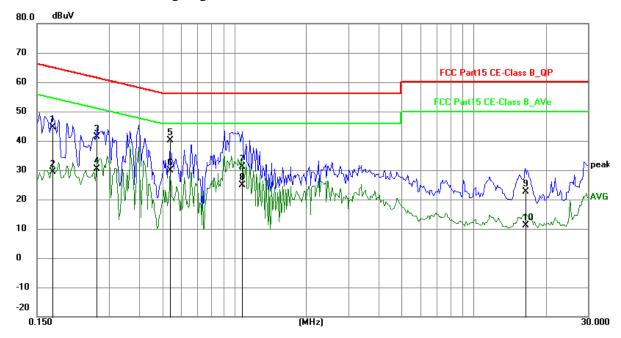
# **EUT Operating Environment**

Humidity: 65%RH Atmospheric Pressure: 101 kPa Temperature: 26°C

**EUT set Condition: Keep WIFI Transmitting** 

**Results: Pass** 

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1734	34.79	9.77	44.56	64.80	-20.24	QP	Р
2	0.1734	19.69	9.77	29.46	54.80	-25.34	AVG	Р
3	0.2670	31.73	9.75	41.48	61.21	-19.73	QP	Р
4	0.2670	20.55	9.75	30.30	51.21	-20.91	AVG	Р
5	0.5400	30.42	9.77	40.19	56.00	-15.81	QP	Р
6	0.5400	20.22	9.77	29.99	46.00	-16.01	AVG	Р
7	1.0821	21.42	9.79	31.21	56.00	-24.79	QP	Р
8	1.0821	15.02	9.79	24.81	46.00	-21.19	AVG	Р
9	16.4433	12.22	10.47	22.69	60.00	-37.31	QP	Р
10	16.4433	0.73	10.47	11.20	50.00	-38.80	AVG	Р

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#### B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

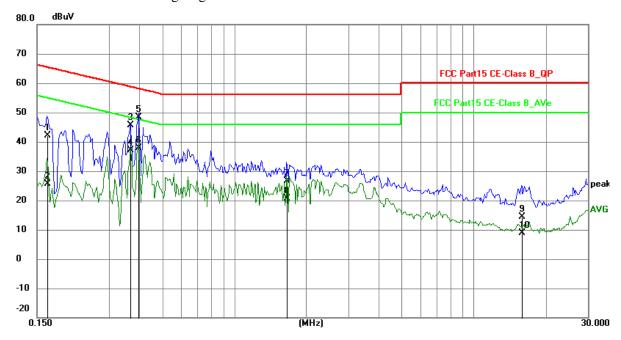
# **EUT Operating Environment**

Humidity: 65%RH Atmospheric Pressure: 101 kPa Temperature: 26°C

**EUT set Condition: Keep WIFI Transmitting** 

**Results: Pass** 

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1655	32.28	9.77	42.05	65.18	-23.13	QP	Р
2	0.1655	15.82	9.77	25.59	55.18	-29.59	AVG	Р
3	0.3684	35.86	9.76	45.62	58.54	-12.92	QP	Р
4	0.3684	27.49	9.76	37.25	48.54	-11.29	AVG	Р
5	0.3996	38.52	9.76	48.28	57.86	-9.58	QP	Р
6	0.3996	28.20	9.76	37.96	47.86	-9.90	AVG	Р
7	1.6593	16.71	9.80	26.51	56.00	-29.49	QP Q	Р
8	1.6593	10.82	9.80	20.62	46.00	-25.38	AVG	Р
9	15.8739	4.01	10.43	14.44	60.00	-45.56	QP	Р
10	15.8739	-1.62	10.43	8.81	50.00	-41.19	AVG	Р

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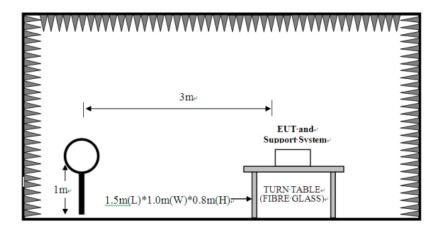


### **6** Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. F For measurement above 1GHz, peak values with RBW=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

### **Block diagram of Test setup**

For radiated emissions from 9kHz to 30MHz



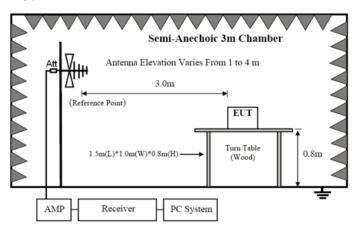
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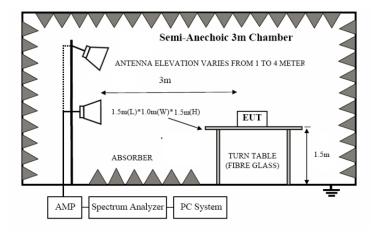
Date: 2023-10-13



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



- 6.2 Configuration of The EUT
  Same as section 5.3 of this report
- 6.3 EUT Operating Condition

  Same as section 5.4 of this report.
- 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

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# Frequencies in restricted band are complied to limit on Paragraph 15.209

	<u> </u>	8 1
Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
0.009-0.049	3	20log(2400/F(kHz)) +40log (300/3)
0.490-1.705	3	20log(24000/F(kHz)) +40log (30/3)
1.705-30	3	69.5
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage  $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK. For fundamental measurement, PK detector used.
- 5. For radiated emissions from 9kHz to 30MHz, the emission level is much less than the limit for more than 20dB. No necessary to take down the record.
- 6. Worse case were recorded in the test report. 802.11g was the worst case.

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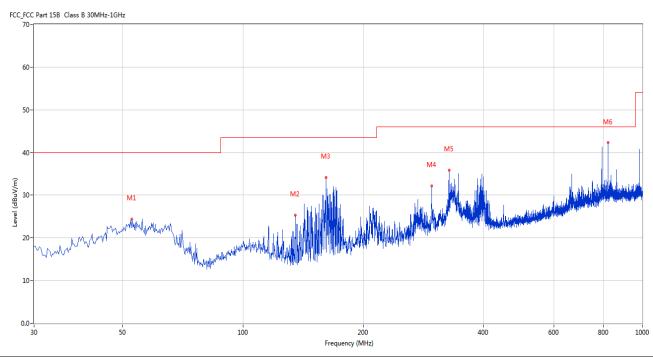


# Test result General Radiated Emission Data and Harmonics Radiated Emission Data

# Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

**Results:** Pass



No.	Frequency	Results	Factor	Limit	Margin	Detector	Table	Height	Antenna	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(Degree)	(cm)		
1	52.789	24.41	-11.48	40.0	15.59	Peak	229.00	100	Horizontal	Pass
2	135.219	25.32	-17.16	43.5	18.18	Peak	145.00	100	Horizontal	Pass
3	161.645	34.20	-16.39	43.5	9.30	Peak	202.00	100	Horizontal	Pass
4	296.926	32.19	-11.07	46.0	13.81	Peak	350.00	100	Horizontal	Pass
5	327.958	35.84	-10.32	46.0	10.16	Peak	155.00	100	Horizontal	Pass
6	819.868	42.26	-2.94	46.0	3.74	Peak	191.00	100	Horizontal	Pass

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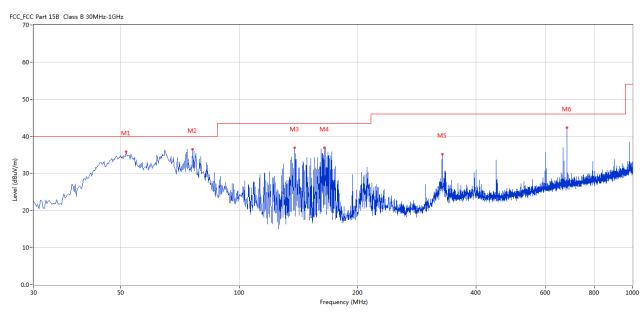


# Test result General Radiated Emission Data and Harmonics Radiated Emission Data

# Radiated Emission In Vertical (30MHz----1000MHz)

**EUT set Condition: Keep Transmitting** 

**Results: Pass** 



No.	Frequency	Results	Factor	Limit	Margin	Detector	Table	Height	Antenna	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(Degree)	(cm)		
1	51.577	35.88	-11.41	40.0	4.12	Peak	143.00	100	Vertical	Pass
2	76.063	36.58	-17.57	40.0	3.42	Peak	269.00	100	Vertical	Pass
3	138.370	36.89	-17.27	43.5	6.61	Peak	217.00	100	Vertical	Pass
4	164.796	36.87	-16.23	43.5	6.63	Peak	235.00	100	Vertical	Pass
5	327.958	35.22	-10.32	46.0	10.78	Peak	206.00	100	Vertical	Pass
6	680.950	42.34	-4.45	46.0	3.66	Peak	319.00	100	Vertical	Pass

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# Operation Mode: Transmitting under CH01 for 802.11b mode

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4824.00	61.8 (PK) / 45.9 (AV)	Н	74(Peak)/ 54(AV)
4824.00	57.3 (PK) / 41.6 (AV)	V	74(Peak)/ 54(AV)
7236.00		H/V	74(Peak)/ 54(AV)
9648.00		H/V	74(Peak)/ 54(AV)
12060		H/V	74(Peak)/ 54(AV)
14472		H/V	74(Peak)/ 54(AV)
16884		H/V	74(Peak)/ 54(AV)
19296		H/V	74(Peak)/ 54(AV)
21708		H/V	74(Peak)/ 54(AV)
24120		H/V	74(Peak)/ 54(AV)

# Operation Mode: Transmitting under CH06 for 802.11b mode

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
4874.00	60.9 (PK)/ 45.1 (AV)	Н	74(Peak)/ 54(AV)
4874.00	56.7 (PK)/ 41.3 (AV)	V	74(Peak)/ 54(AV)
7311.00		H/V	74(Peak)/ 54(AV)
9748.00		H/V	74(Peak)/ 54(AV)
12185		H/V	74(Peak)/ 54(AV)
14622		H/V	74(Peak)/ 54(AV)
17059		H/V	74(Peak)/ 54(AV)
19496	-	H/V	74(Peak)/ 54(AV)
21933		H/V	74(Peak)/ 54(AV)
24370		H/V	74(Peak)/ 54(AV)

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# Operation Mode: Transmitting under CH11 for 802.11b mode

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4924	60.6 (PK)/ 45.3 (AV)	Н	74(Peak)/ 54(AV)
4924	57.1 (PK)/ 41.8 (AV)	V	74(Peak)/ 54(AV)
7368		H/V	74(Peak)/ 54(AV)
9848		H/V	74(Peak)/ 54(AV)
12310		H/V	74(Peak)/ 54(AV)
14772		H/V	74(Peak)/ 54(AV)
17234		H/V	74(Peak)/ 54(AV)
19696		H/V	74(Peak)/ 54(AV)
22158		H/V	74(Peak)/ 54(AV)
24620		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

- 2. Remark "---" means that the emissions level is too low to be measured
- 3. For 802.11b mode at 1Mbps
- 4. For radiated Emissions from 18-25GHz and below 30MHz, it is only the floor noise and less than the limit for more than 20dB. No necessary to take down.
- 5. Note: the final peak measurement results less than the AV limit. No necessary to take down the final AV measurement result

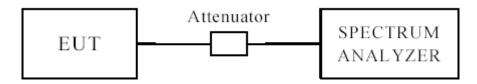
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# 7.0 6dB Bandwidth Measurement

# 7.1 Test Setup



# 7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

# 7.3 Test Procedure

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth (VBW)  $\geq$  3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

# 7.4 Test Result

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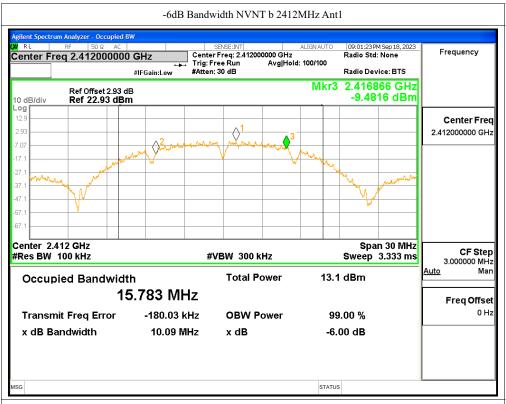
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# 6dB Occupied Bandwidth

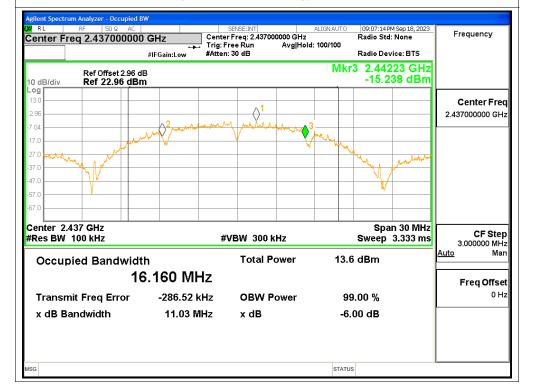
Mada	TX	Frequency	ANIT	6dB Bandv	vidth (MHz)	Verdict
Mode	Туре	(MHz)	ANT	Result	Result Limit	
		2412	1	10.092	>=0.5	Pass
802.11b	SISO	2437	1	11.032	>=0.5	Pass
		2462	1	11.021	>=0.5	Pass
802.11g	SISO	2412	1	16.303	>=0.5	Pass
		2437	1	15.947	>=0.5	Pass
		2462	1	16.469	>=0.5	Pass
902 11n		2412	1	17.064	>=0.5	Pass
802.11n	SISO	2437	1	17.704	>=0.5	Pass
(HT20)		2462	1	17.702	>=0.5	Pass
000.44		2422	1	36.389	>=0.5	Pass
802.11n	SISO	2437	1	36.41	>=0.5	Pass
(HT40)		2452	1	36.361	>=0.5	Pass

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-6dB Bandwidth NVNT b 2437MHz Ant1



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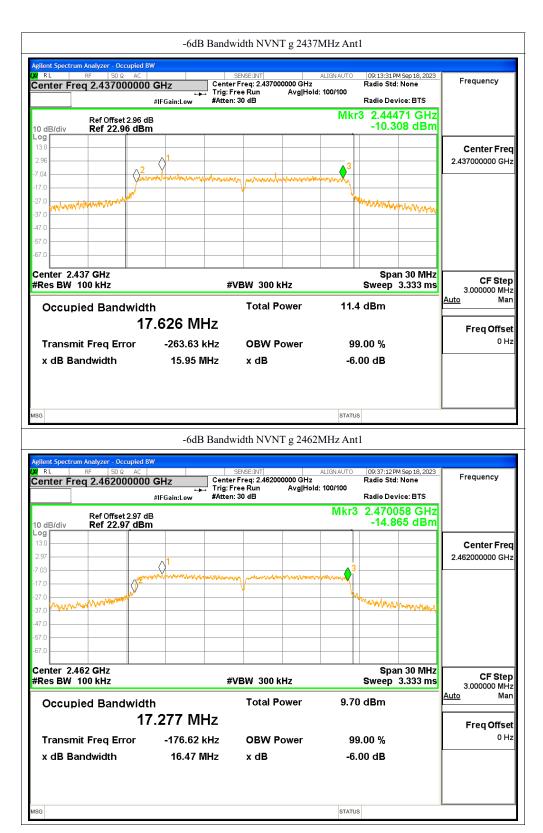
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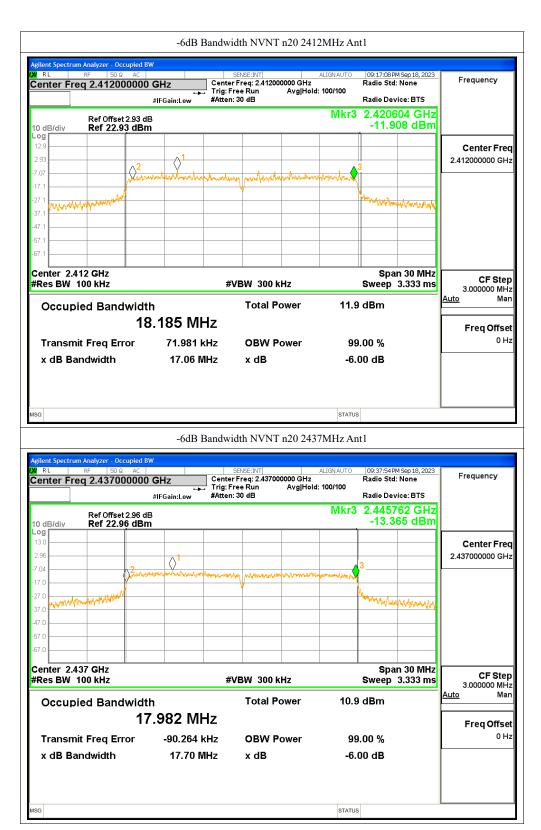
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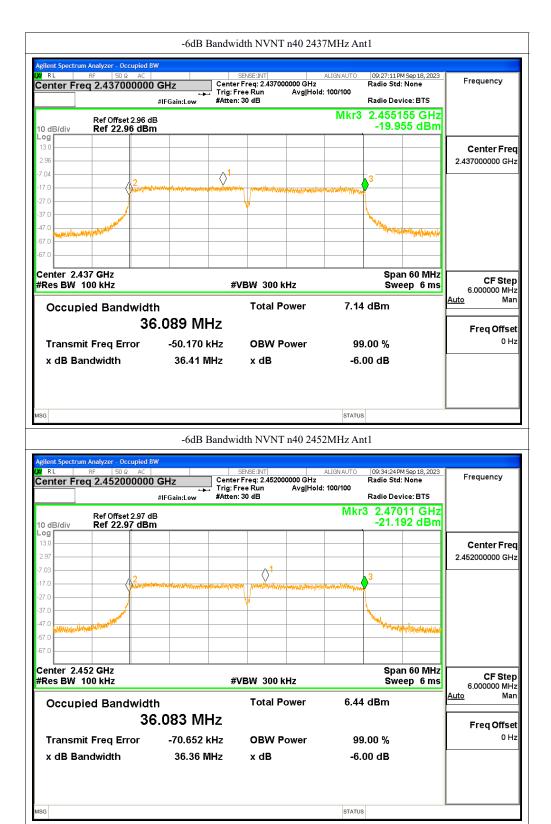
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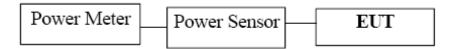
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# 8. Maximum Output Power

# 8.1 Test Setup



### 8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

### **8.3 Test Procedure**

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: The PK power was measured

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### **8.4Test Results**

Mode	TX	Frequency	Maximum Peak Conduc	Maximum Peak Conducted Output Power (dBm)	
Mode	Туре	(MHz)	ANT1	Limit	- Verdict
		2412	8.04	<=30	Pass
802.11b	SISO	2437	6.92	<=30	Pass
		2462	5.08	<=30	Pass
	SISO	2412	6.06	<=30	Pass
802.11g		2437	5.22	<=30	Pass
		2462	5.64	<=30	Pass
900 11n		2412	5.99	<=30	Pass
802.11n (HT20)	SISO	2437	7.23	<=30	Pass
(П120)		2462	5.57	<=30	Pass
902 11n		2422	7.86	<=30	Pass
802.11n (HT40)	SISO	2437	7.43	<=30	Pass
(11140)		2452	6.51	<=30	Pass

Note: 1. At finial test to get the worst-case emission at msc0 of 11n HT40 for CH03, CH06 and CH09

2. The result basic equation calculation as follow: Power Output = Power Reading + Cable loss + Attenuator

3. The worse case was recorded

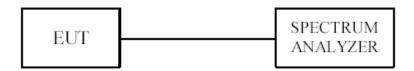
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# 9. Power Spectral Density Measurement

# 9.1 Test Setup



### 9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3kHz.

### 9.3 Test Procedure

- 1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
- 2. Set the RBW = 100 kHz.
- 3. Set the VBW  $\geq$  300 kHz.
- 4. Set the span to 1.5 times the DTS channel bandwidth.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
- 11. The resulting peak PSD level must be  $\leq 8 \text{ dBm/3kHz}$ .

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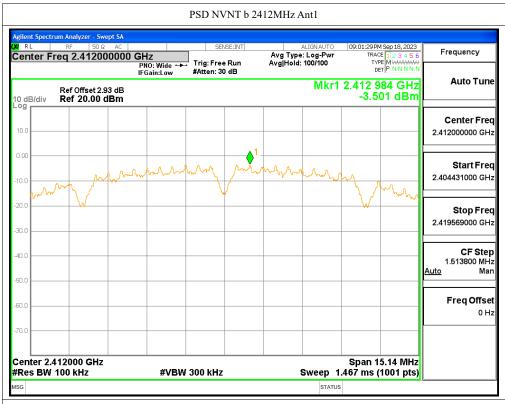
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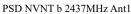
# 9.4Test Result

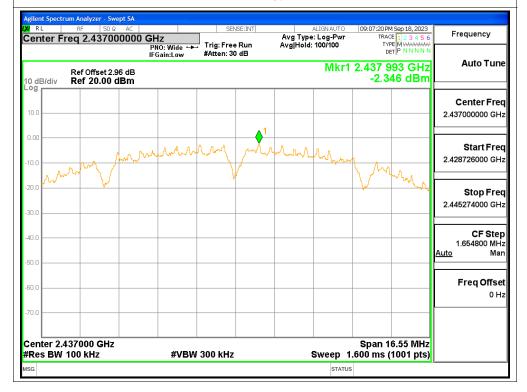
Mada	TX	Frequency	Maximum PSD	Vardiat	
Mode	Туре	(MHz)	ANT1	Limit	Verdict
		2412	-3.5	<=8	Pass
802.11b	SISO	2437	-2.35	<=8	Pass
		2462	-3.78	<=8	Pass
802.11g	SISO	2412	-5.12	<=8	Pass
		2437	-4.86	<=8	Pass
		2462	-3.91	<=8	Pass
902 11n		2412	-4.67	<=8	Pass
802.11n	SISO	2437	-2.03	<=8	Pass
(HT20)		2462	-3.61	<=8	Pass
000.44		2422	-5.96	<=8	Pass
802.11n	SISO	2437	-15.34	<=8	Pass
(HT40)		2452	-6.18	<=8	Pass

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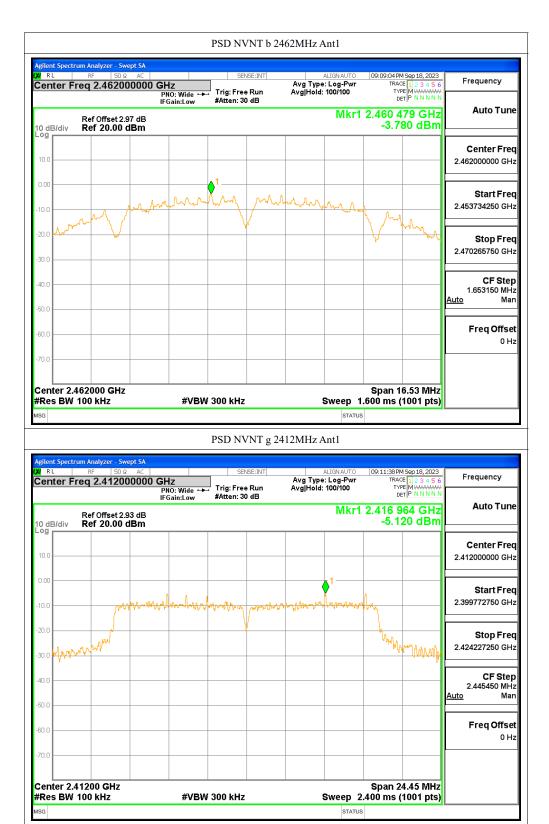
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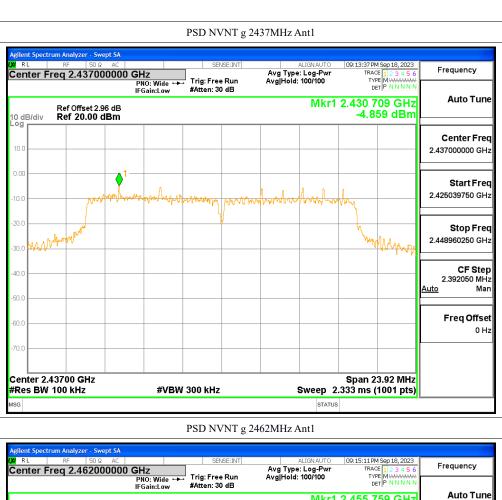
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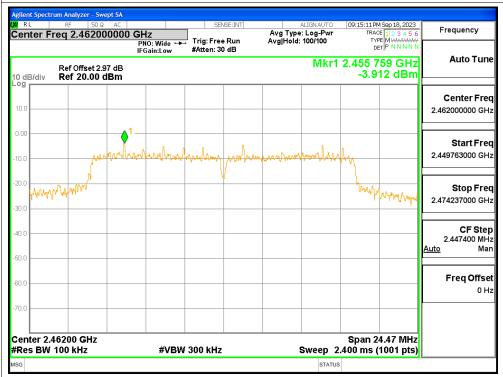
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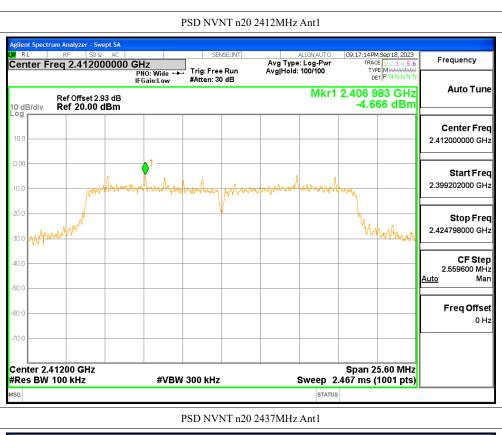
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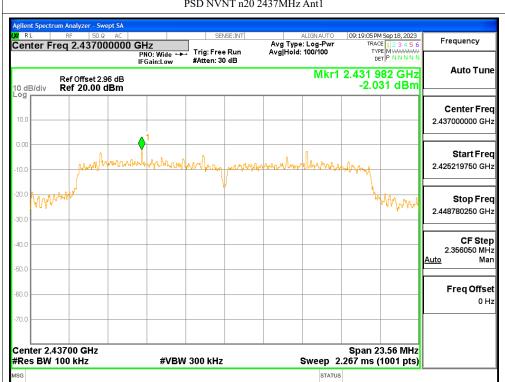
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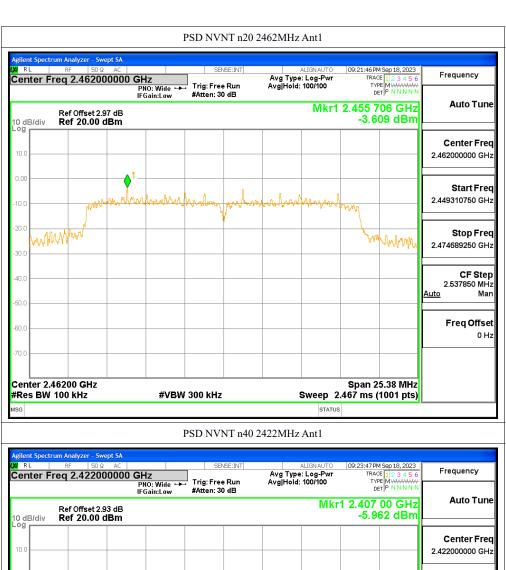
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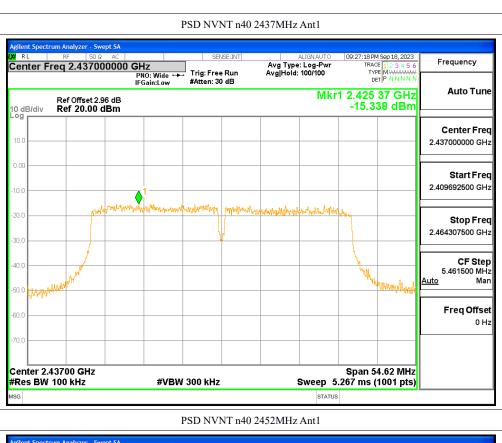
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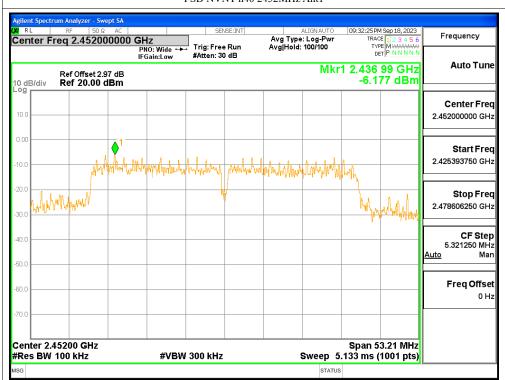
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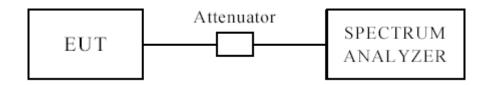
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## **10 Out of Band Measurement**

## 10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

## 10.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

## **10.3 Test Procedure**

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=100, VBW=300 kHz. A conducted measurement used

## 10.4 Test Result

Please see next pages

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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## **Band Edge**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
	L-	2412		-25.21	-20	Pass
	b -	2462		-41.09	-20	Pass
	2412		-22.44	-20	Pass	
ND ALT	g	2462	A 4.4	-30.73	-20	Pass
NVNT	00	2412	Ant1	-22.32	-20	Pass
	n20	2462		-27.33	-20	Pass
	40	2422		-32.42	-20	Pass
	n40	2452	1	-34.62	-20	Pass

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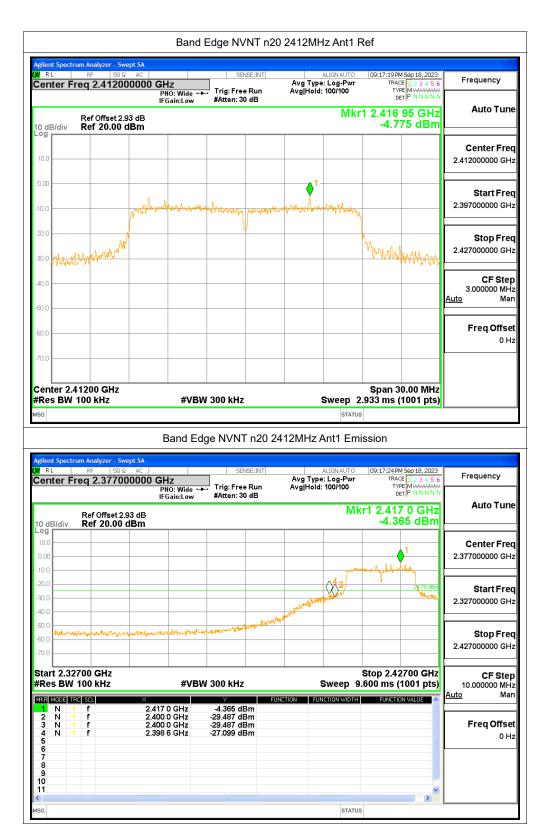
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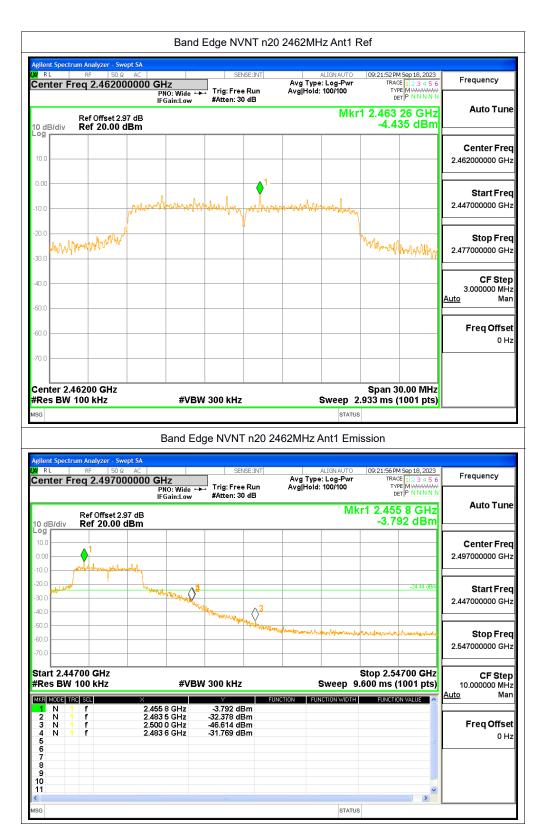
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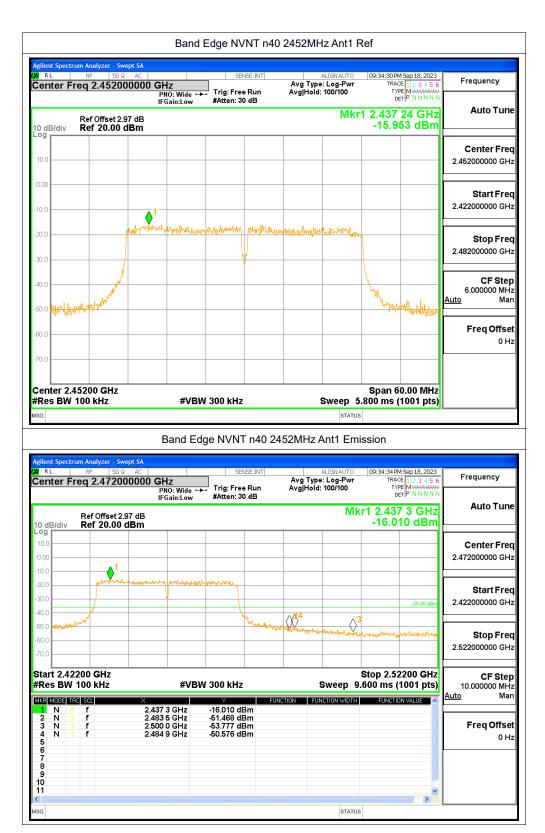
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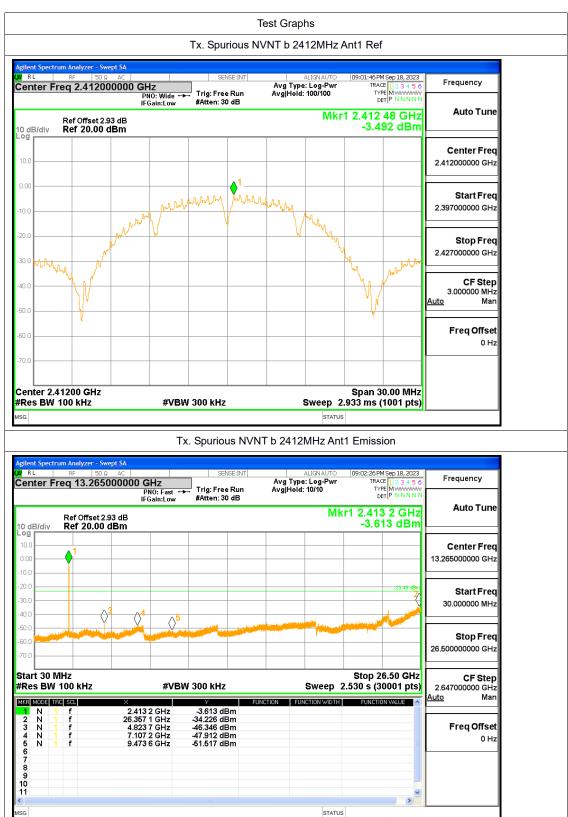


## Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
		2412		-30.73	-20	Pass
	b	2437		-31.92	-20	Pass
		2462		-30.71	-20	Pass
		2412		-29.27	-20	Pass
	g	2437		-29.04	-20	Pass
NVNT		2462	A mt 1	-28.56	-20	Pass
INVINI		2412	- Ant1	-29.26	-20	Pass
	n20	2437		-31.52	-20	Pass
		2462		-29.58	-20	Pass
		2422		-28.28	-20	Pass
	n40	2437		-28.67	-20	Pass
		2452		-28.21	-20	Pass

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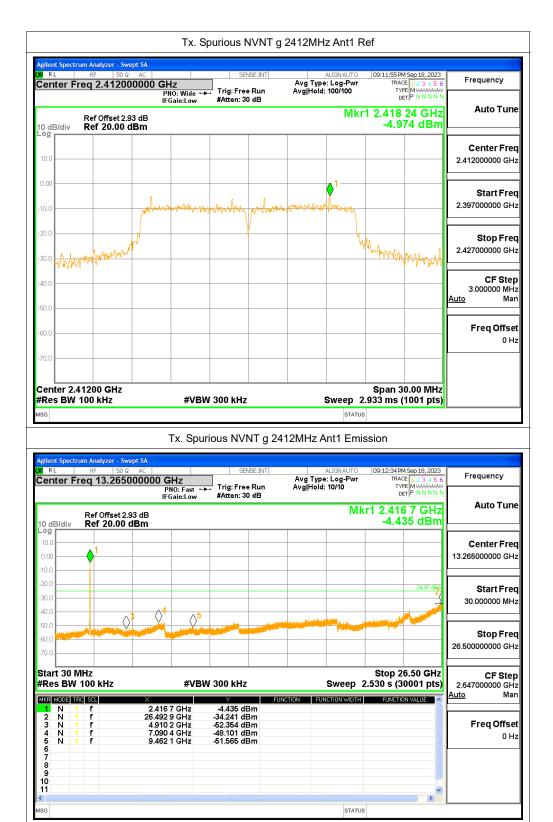
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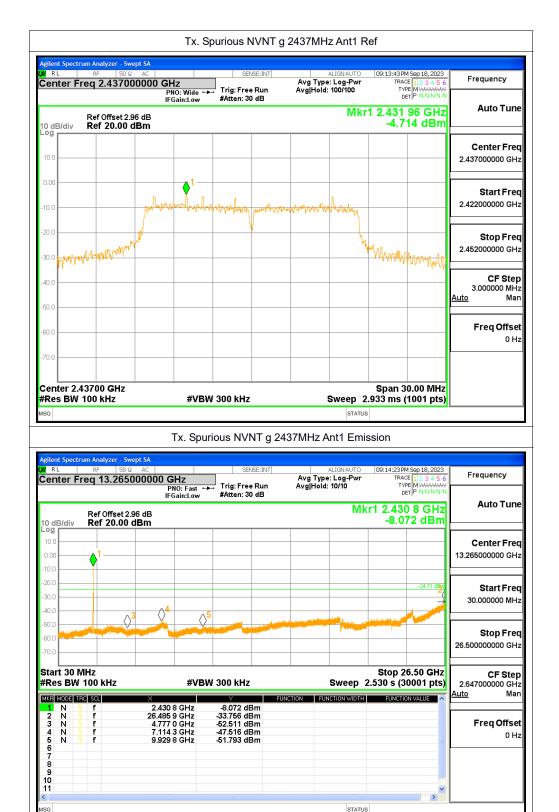
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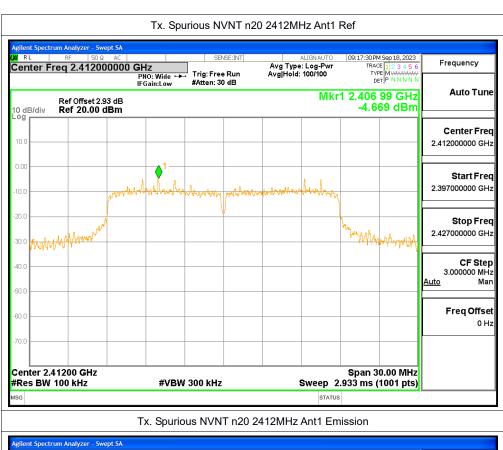
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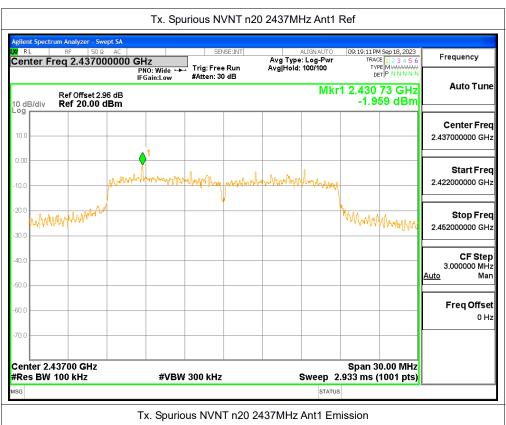
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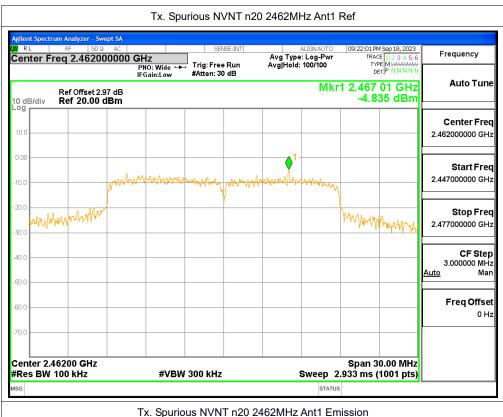
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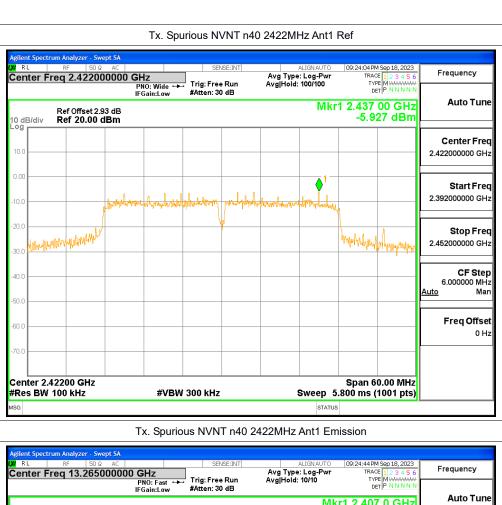
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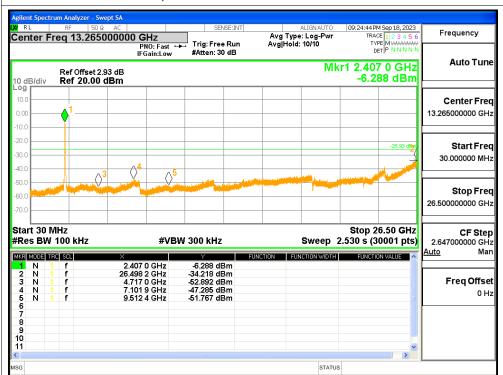
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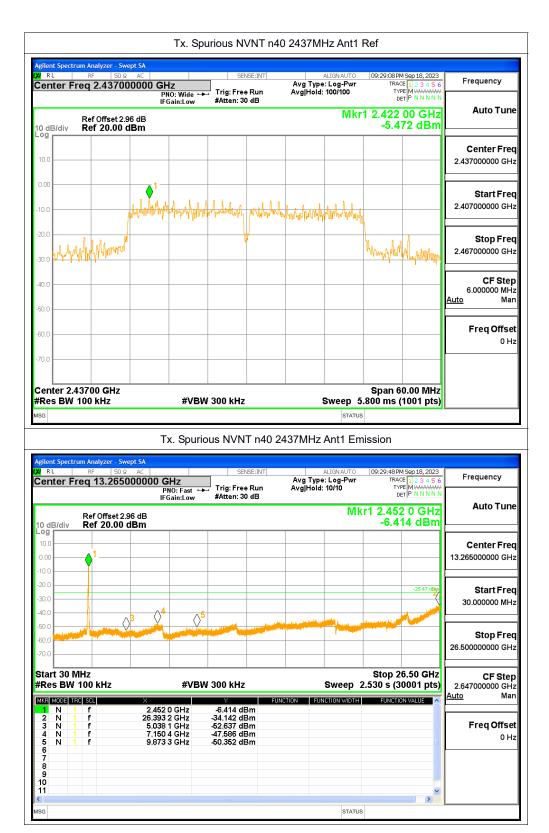
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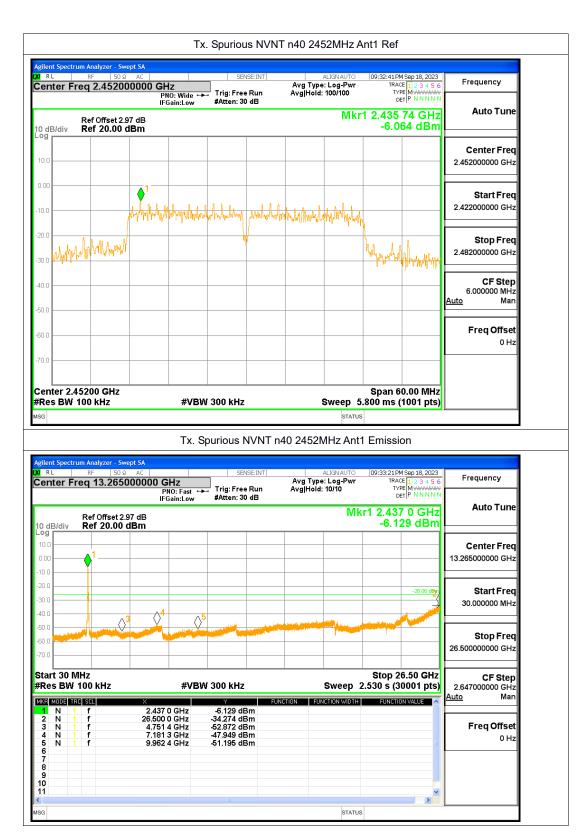
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#### 10.5 Restricted band Measurement

EUT	Cutting Plotter				lel	MINI XR			
Mode	Keepin	g Transmitting		Test Vo	ltage	120V~			
Temperature	2	4 deg. C,		Humio	dity	56% RH			
Test Result:		Pass		Detec	etor	PK			
	802.11b mode, Low Channel, Horizontal								
2390	PK (dBµV/m)	40.86	т:.			$74 (dB\mu V/m)$			
	AV (dBμV/m)		Limit		54(dBμV/m)				
	802.11b mode, Low Channel, Vertical								
2390	PK (dBμV/m)	38.76	Limit			74(dBμV/m)			
	AV (dBμV/m)					54(dBμV/m)			

#### 10.5 Restricted band Measurement

EUT	Cutting Plotter			M	odel	MINI XR		
Mode	Ke	eping Transmitting		Test Voltage		120V~		
Temperature		24 deg. C,		Humidity		56% RH		
Test Result:	Pass			De	tector	PK		
802.11b mode, High Channel, Horizontal								
2483.5	PK (dBµV/m)	40.92	т::			$74(dB\mu V/m)$		
	AV (dBμV/m)		Limi	Ιt	$54(dB\mu V/m)$			
	802.11b mode, High Channel, Vertical							
2483.5	PK (dBµV/m)	38.71	Limit			74(dBμV/m)		
	AV (dBμV/m)					$54(dB\mu V/m)$		

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#### 10.5 Restricted band Measurement

EUT	Cutting Plotter			M	odel	MINI XR		
Mode	Kee	eping Transmitting		Test Voltage		120V~		
Temperature		24 deg. C,		Humidity		56% RH		
Test Result:	Pass			Det	tector	PK		
802.11g mode, Low Channel, Horizontal								
2390	PK (dBµV/m)	43.91	т.			$74(dB\mu V/m)$		
	AV (dBμV/m)		Lii	mit	$54(dB\mu V/m)$			
802.11g mode, Low Channel Vertical								
2390	PK (dBµV/m)	42.44	Limit			74(dBμV/m)		
	AV (dBμV/m)				$54(dB\mu V/m)$			

#### Restricted band Measurement 10.5

EUT	Cutting Plotter			N	1odel	MINI XR			
Mode	Ke	eeping Transmitting		Test	Voltage	120V~			
Temperature		24 deg. C,		Hu	midity	56% RH			
Test Result:		Pass		De	etector	PK			
802.11g mode, High Channel, Horizontal									
2483.5	PK (dBµV/m)	45.70	т.	٠,	$74(dB\mu V/m)$				
	AV (dBμV/m)		Lim	IT	$54(dB\mu V/m)$				
	802.11g mode, High Channel, Vertical								
2483.5	PK (dBμV/m)	43.15	Limit		74(dBμV/m)				
	AV (dBμV/m)		Limi	ll		54(dBµV/m)			

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#### 10.5 Restricted band Measurement

EUT	Cutting Plotter			M	odel	MINI XR	
Mode	Kee	eping Transmitting		Test Voltage		120V~	
Temperature		24 deg. C,		Hur	nidity	56% RH	
Test Result:	Pass			Det	tector	PK	
802.11n HT20 mode, Low Channel, Horizontal							
2390	PK (dBµV/m)	44.56	т.			$74(dB\mu V/m)$	
	AV (dBμV/m)		Lii	mit	$54(dB\mu V/m)$		
802.11n HT20 mode, Low Channel Vertical							
2390	PK (dBµV/m)	42.72	Limit			74(dBμV/m)	
	AV (dBμV/m)					$54(dB\mu V/m)$	

#### Restricted band Measurement 10.5

EUT	Cutting Plotter			N	Iodel	MINI XR		
Mode	Ke	eeping Transmitting		Test Voltage		120V~		
Temperature		24 deg. C,		Hu	midity	56% RH		
Test Result:	Pass			De	etector	PK		
	802.11n HT20 mode, High Channel, Horizontal							
2483.5	PK (dBµV/m)	45.89	Lim	:1		$74(dB\mu V/m)$		
	AV (dBμV/m)		Lim	IT	$54(dB\mu V/m)$			
	802.11n HT20 mode, High Channel, Vertical							
2483.5	PK (dBμV/m)	44.06	Limit		74(dBµV/m)			
	AV (dBμV/m)		Lim	lt	_	$54(dB\mu V/m)$		

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#### 10.5 Restricted band Measurement

EUT	Cutting Plotter			M	odel	MINI XR
Mode	Kee	eping Transmitting		Test	Voltage	120V~
Temperature		24 deg. C,		Huı	midity	56% RH
Test Result:		Pass		De	tector	PK
802.11n HT40 mode, Low Channel, Horizontal						
2390	PK (dBµV/m)	47.20	т:.	Limit		$74(dB\mu V/m)$
	AV (dBμV/m)		LII	mıı	$54(dB\mu V/m)$	
		802.11n HT40 mode, L	ow Chani	nel Vertic	al	
2390	PK (dBμV/m)	44.47	Lin	nit		74(dBμV/m)
	AV (dBμV/m)					
					54(dBμV/m)	

#### 10.5 Restricted band Measurement

EUT	Cutting Plotter			N	/lodel	MINI XR		
Mode	Ke	eeping Transmitting		Test	Voltage	120V~		
Temperature		24 deg. C,		Hu	ımidity	56% RH		
Test Result:	Pass			De	etector	PK		
802.11n HT40 mode, High Channel, Horizontal								
2483.5	PK (dBμV/m)	50.52	т.	•,		$74(dB\mu V/m)$		
	AV (dBμV/m)		Lim	ΙŢ	54(dBμV/m)			
	802.11n HT40 mode, High Channel, Vertical							
2483.5	PK (dBμV/m)	47.78	т:	T * */		74(dBμV/m)		
	AV (dBμV/m)		Limit			$54(dB\mu V/m)$		

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## 11.0 Antenna Requirement

## 11.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

## 11.2 Antenna Connected construction

FPC antenna with gain 2.0dBi Max (Get from the antenna specification)

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## 12.0 FCC ID Label

## **FCC ID: 2AVGR-MINIXR**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

## **Mark Location:**



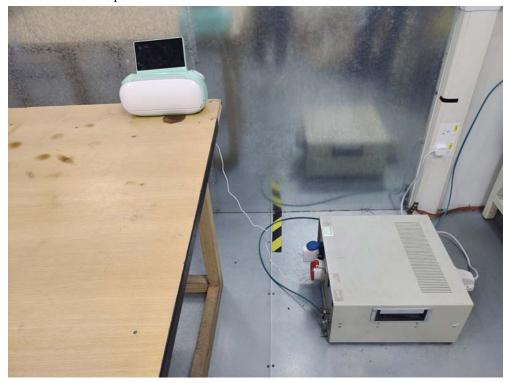
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#### 13.0 **Photo of testing**

Conducted Emission Test Setup:



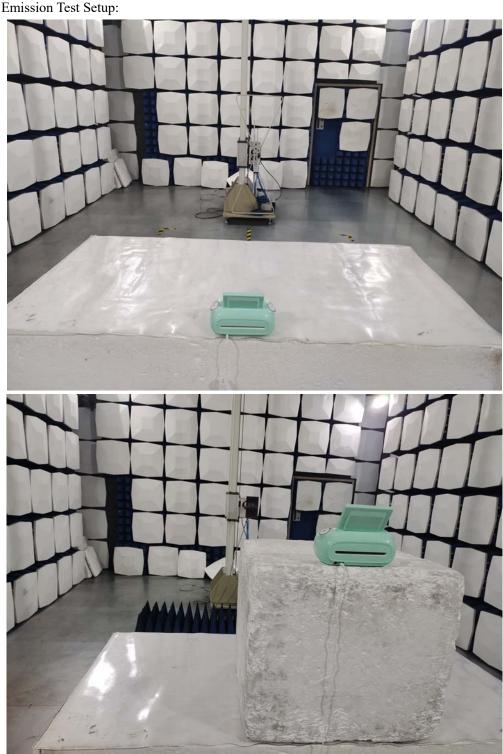
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## Radiated Emission Test Setup:



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Outside View





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Outside View





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Outside View



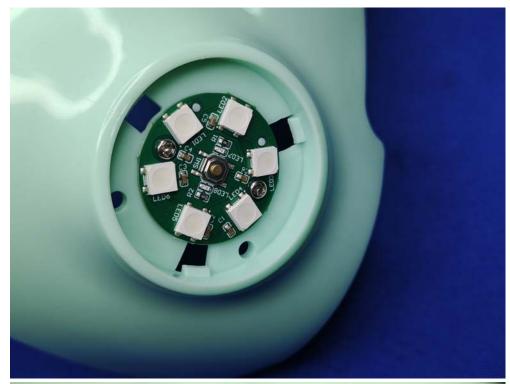
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Inside view





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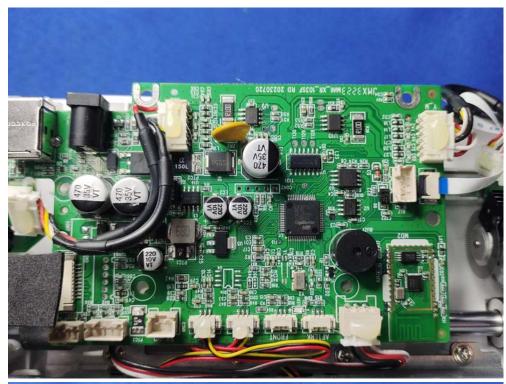
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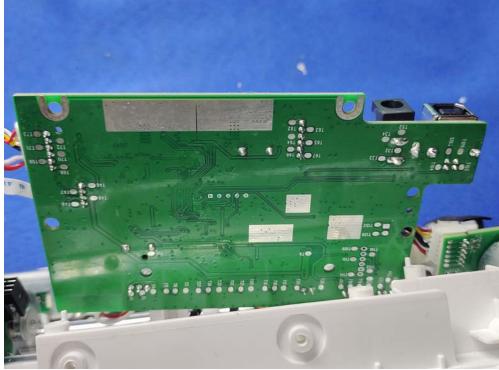
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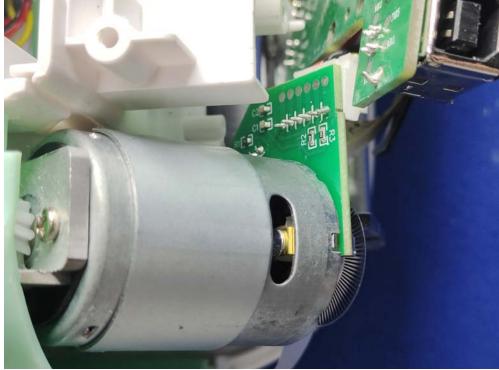
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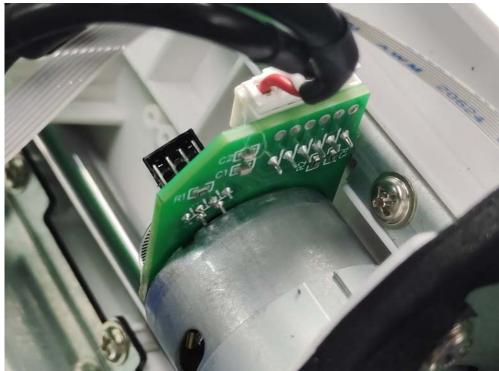
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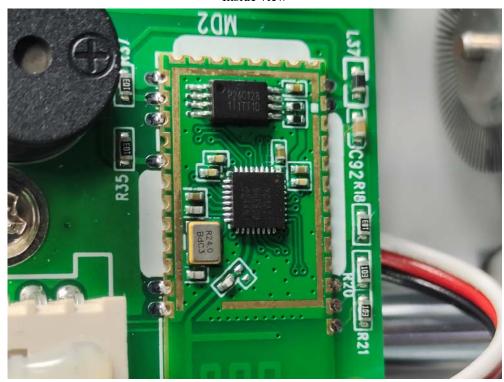
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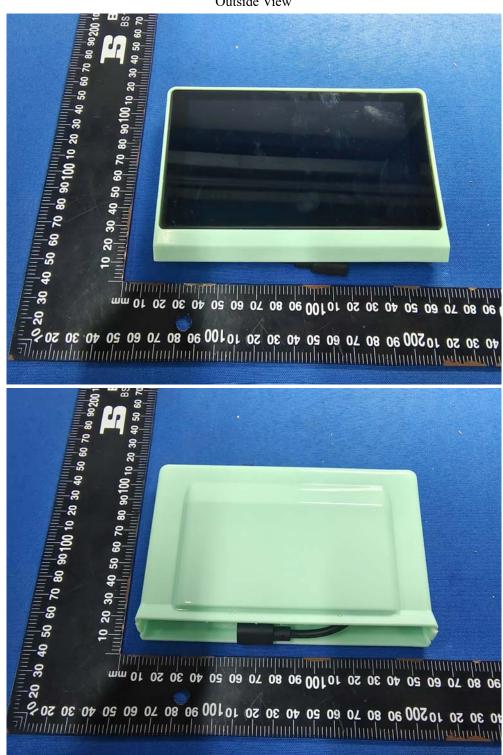
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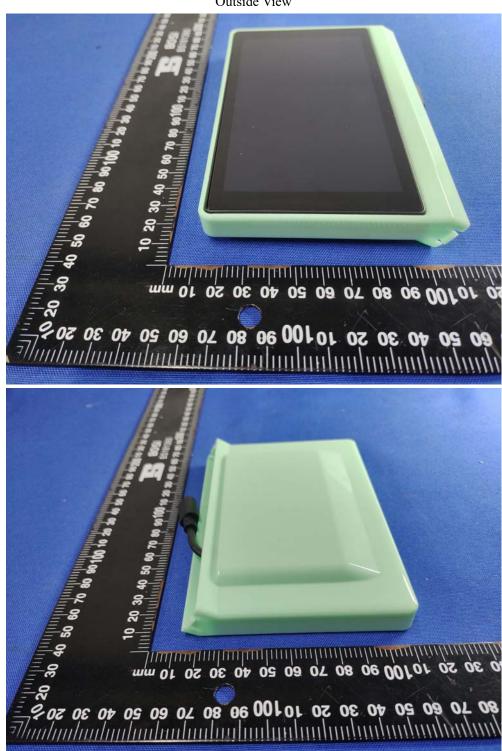
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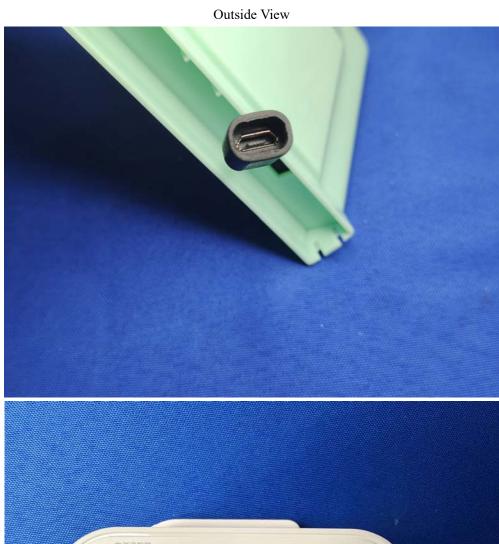
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