THE STING LARGE RA	
Report No.:	TW2309162-02E
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 Termy Tang	
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



# **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 CNAS. This approval result is accepted by MRA of APLAC.

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

# CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 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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#### 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

#### 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

Desemption of Lo I	
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 Numb	ber: MAGIC FROG, MINI 13, MINI ZV1, MINI ZV2, MINI ZV3, MINI ZV1-B,
MINI ZV2-B, MINI ZV3	3-B, DC MINI 1, DC MINI 2, DC MINI 3, DCM 1, DCM 2, DCM 3
Hardware Version: VF22	.0301
Software Version: V23.0	821
Type of Modulation	GFSK (Bluetooth BLE)
Frequency range	2402-2480MHz
Frequency Selection	By software
Channel Number	40
Input Voltage:	DC24V, 1.5A
Power Supply:	Model: FJ-SW7292401500N
	Input: 100-240V~, 50/60Hz, 1.5A MAX; Output: DC24V, 1.5A36W

- 1.4 Submitted Sample: 6 Samples
- 1.5 Test Duration

2023-09-14 to 2023-10-13

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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

Andy - Xing

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	R&S	ESPI 3	100379	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	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	Anritsu	MA2491A	32263	2023-07-14	2024-07-13
Bilog Antenna	Schwarebeck	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		2023-07-14	2024-07-13
RF Cable	Zhengdi	7m		2023-07-14	2024-07-13
Pre-Amplifier	Schwarebeck	BBV9743	#218	2023-07-14	2024-07-13
Pre-Amplifier	HP/Agilent	8449B	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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#### **3.0** Technical Details

#### 3.1 Summary of test results

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	<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 15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	Pass	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm	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

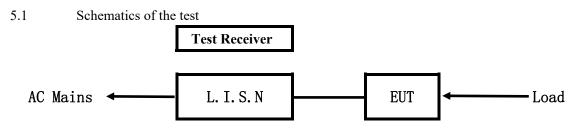
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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#### 5.0 Power Line Conducted Emission Test



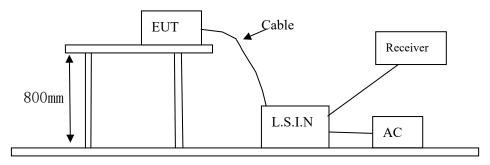
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum from 0.15MHz to 30MHz was investigated. The LISN used was 500hm/50uH 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.

А.	EUT			
	Device	Manufacturer	Model	FCC ID

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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
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#### B. Internal Device

Device	Manufacturer	Model	Rating

#### C. Peripherals

Device	Manufacturer	Model	Rating
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 (d	lΒ μ 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

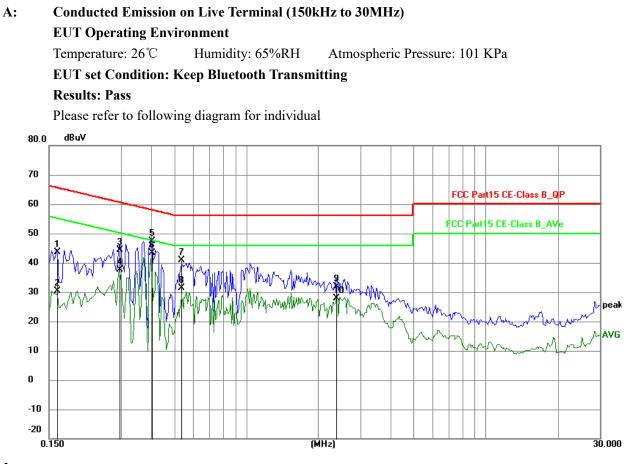
The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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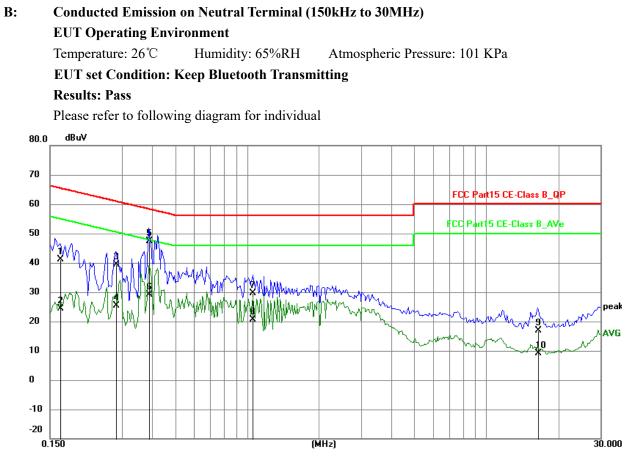


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1617	33.76	9.78	43.54	65.38	-21.84	QP	Ρ
2	0.1617	20.54	9.78	30.32	55.38	-25.06	AVG	Ρ
3	0.2943	34.66	9.76	44.42	60.40	-15.98	QP	Ρ
4	0.2943	27.80	9.76	37.56	50.40	-12.84	AVG	Ρ
5	0.4035	37.61	9.76	47.37	57.78	-10.41	QP	Ρ
6	0.4035	33.63	9.76	43.39	47.78	-4.39	AVG	Ρ
7	0.5361	31.01	9.77	40.78	56.00	-15.22	QP	Ρ
8	0.5361	21.61	9.77	31.38	46.00	-14.62	AVG	Ρ
9	2.3769	22.18	9.82	32.00	56.00	-24.00	QP	Ρ
10	2.37 <mark>6</mark> 9	18.11	9.82	27.93	46.00	-18.07	AVG	Ρ

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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1655	31.34	9.77	41.11	65.18	-24.07	QP	Р
2	0.1655	14.52	9.77	24.29	55.18	-30.89	AVG	Р
3	0.2826	29.65	9.76	39.41	60.74	-21.33	QP	Р
4	0.2826	15.69	9.76	25.45	50.74	-25.29	AVG	Ρ
5	0.3879	37.58	9.76	47.34	58.11	-10.77	QP	Р
6	0.3879	19.43	9.76	29.19	48.11	-18.92	AVG	Р
7	1.0587	19.86	9.79	29.65	56.00	-26.35	QP	Р
8	1.0587	10.74	9.79	20.53	46.00	-25.47	AVG	Р
9	16.4433	<mark>6.34</mark>	10.47	16.81	60.00	-43.19	QP	Р
10	16.4433	-1.38	10.47	9.09	50.00	-40.91	AVG	Ρ

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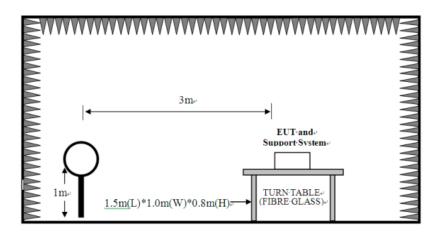


#### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- 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. 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

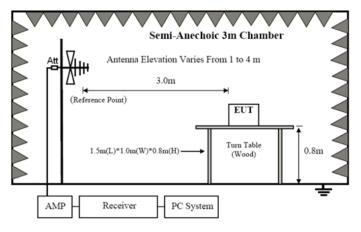


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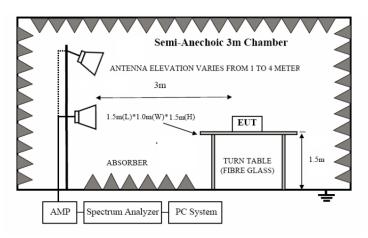
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For radiated emissions from 30MHz to1GHz



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

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

#### 1. RF Voltage $(dBuV) = 20 \log RF$ Voltage (uV)

2. In the Above Table, the higher limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

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

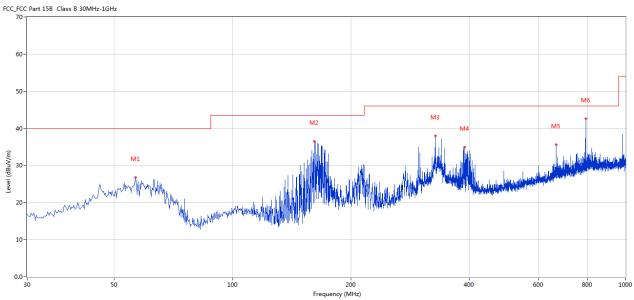
# Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Bluetooth Transmitting

**Results:** 

Pass

Test Figure:



No.	Frequency	Results	Factor	Limit	Margin	Detector	Table	Height	Antenna	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(Degree)	(cm)		
1	56.668	26.74	-12.22	40.0	13.26	Peak	274.00	100	Horizontal	Pass
2	161.645	36.46	-16.39	43.5	7.04	Peak	200.00	100	Horizontal	Pass
3	327.958	38.02	-10.32	46.0	7.98	Peak	121.00	100	Horizontal	Pass
4	390.265	34.98	-8.87	46.0	11.02	Peak	176.00	100	Horizontal	Pass
5	665.919	35.58	-4.51	46.0	10.42	Peak	332.00	100	Horizontal	Pass
6	791.987	42.60	-3.10	46.0	3.40	Peak	150.00	100	Horizontal	Pass

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

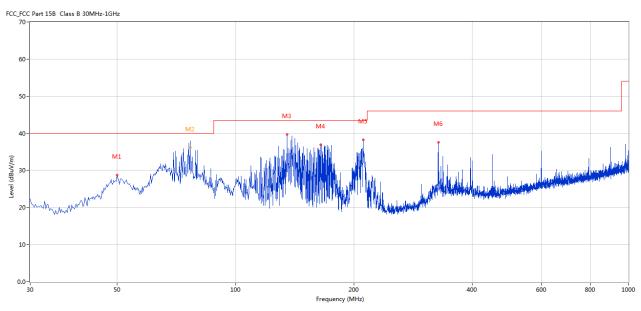
# Radiated Emission In Vertical (30MHz----1000MHz)

Pass

EUT set Condition: Keep Transmitting

**Results:** 

Test Figure:



No.	Frequency	Results	Factor	Limit	Margin	Detector	Table	Height	Antenna	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(Degree)	(cm)		
1	49.880	28.69	-11.36	40.0	11.31	Peak	305.00	100	Vertical	Pass
2	76.791	37.96	-17.62	40.0	2.04	Peak	359.00	100	Vertical	Pass
2*	76.791	36.06	-17.62	40.0	3.94	QP	359.00	100	Vertical	Pass
3	135.219	39.64	-17.16	43.5	3.86	Peak	50.00	100	Vertical	Pass
4	164.796	36.96	-16.23	43.5	6.54	Peak	187.00	100	Vertical	Pass
5	211.102	38.23	-13.66	43.5	5.27	Peak	187.00	100	Vertical	Pass
6	327.958	37.61	-10.32	46.0	8.39	Peak	125.00	100	Vertical	Pass

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1	0		
Frequency (MHz)	Level@3m (dBµV/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4804	50.9 (PK)	Н	74(Peak)/ 54(AV)
4804	46.1 (PK)	V	74(Peak)/ 54(AV)
7206		H/V	74(Peak)/ 54(AV)
9608		H/V	74(Peak)/ 54(AV)
12010		H/V	74(Peak)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814		H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020		H/V	74(Peak)/ 54(AV)

#### **Operation Mode: Transmitting under Low Channel (2402MHz)**

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. The PK measurement level less than the AV limit

#### **Operation Mode: Transmitting g under Middle Channel (2440MHz)**

- I	55	(	/
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4880	50.5 (PK)	Н	74(Peak)/ 54(AV)
4880	45.7 (PK)	V	74(Peak)/ 54(AV)
7320		H/V	74(Peak)/ 54(AV)
9760		H/V	74(Peak)/ 54(AV)
12200		H/V	74(Peak)/ 54(AV)
14640		H/V	74(Peak)/ 54(AV)
71080		H/V	74(Peak)/ 54(AV)
19520		H/V	74(Peak)/ 54(AV)
21960		H/V	74(Peak)/ 54(AV)
24400		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. The PK measurement level less than the AV limit

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operation model	Transmitting under High C		
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4960	49.7 (PK)	Н	74(Peak)/ 54(AV)
4960	45.3 (PK)	V	74(Peak)/ 54(AV)
7440		H/V	74(Peak)/ 54(AV)
9920		H/V	74(Peak)/ 54(AV)
12400		H/V	74(Peak)/ 54(AV)
14880		H/V	74(Peak)/ 54(AV)
17360		H/V	74(Peak)/ 54(AV)
19840		H/V	74(Peak)/ 54(AV)
22320		H/V	74(Peak)/ 54(AV)
24800		H/V	74(Peak)/ 54(AV)

#### **Operation Mode: Transmitting under High Channel (2480MHz)**

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

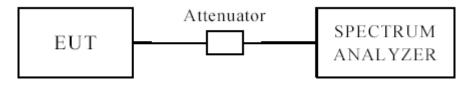
3. The PK measurement level less than the AV limit

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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)  $\ge$  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

The report refers only to the sample tested and does not apply to the bulk.

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#### 6dB BW

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
		2402		0.655	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.645	0.5	Pass
		2480		0.646	0.5	Pass

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gilent Spectrum Analyzer - Oc	cupied BW									
RL RF 50Ω	AC		SI Center I	ENSE:INT Freq: 2.402000	0000 GHz	ALIGN AUTO	05:23:20	M Sep 24, 2023	Frequency	
enter Freq 2.40200			Trig: Fre	e Run	Avg Hold:	: 100/100		vice: BTS		
	#	IFGain:Low	#Atten: 、	30 ab		Mkr2		296 GHz	1	
0 dB/div Ref Offset						IVINI S		35 dBm		
.og										
2.92		1							Center Free 2.402000000 GH	
7.08					Am. 3				2.40200000 011	
17.1						mon				
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37.1								and have to be		
57.1										
67.1										
							0	an O Mila		
Center 2.402 GHz Res BW 100 kHz			#V	BW 300 ki	Hz			an 2 MHz 1.333 ms		
Occurried De	h : . : 4 !			Total Pr	wor	3 3 3	dBm		<u>Auto</u> Mai	
Occupied Band		400 841	ı_	Total Po	JWei	3.33	ubili			
	1.0	422 MH	1Z						Freq Offse	
Transmit Freq Er	or	-32.085 k	Hz	OBW Po	ower	99	.00 %		0 H	
x dB Bandwidth		655.2 k	Hz	x dB		-6.	00 dB			
		-6dB Ban	dwidth	NVNT BI	LE 1M 24	status 440MHz .				
z <mark>ilent Spectrum Analyzer - Ος</mark> RL RF 50 Ω	AC		SI	NVNT BI			Ant1	M Sep 24, 2023 1: None	Frequency	
z <mark>ilent Spectrum Analyzer - Oc</mark> R L RF 50 Ω	AC   00000 (		SI	ENSE:INT Freq: 2.440000		440MHz . Align auto	Ant1 05:25:24/ Radio Sto		Frequency	
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cilent Spectrum Analyzer - Oc RL RF 50 Ω center Freq 2.44000 Ref Offset 0 dB/div Ref 22.9 °g 13.0	AC 00000 0 # 2.96 dB	SHz IFGain:Low	Si Center I Trig: Fre	ENSE:INT Freq: 2.440000	0000 GHz Avg Hold	440MHz /	Ant1 05:25:24/ Radio Sto Radio De 2.4402	l: None vice: BTS 288 GHZ	Frequency	
cilent.Spectrum Analyzer - Oc RL RF 50 Ω center Freq 2.44000 Ref Offset 0 dB/div Ref 22.9 0 g 13.0 2.96	AC 00000 0 # 2.96 dB	GHz	Si Center I Trig: Fre	ENSE:INT Freq: 2.440000	0000 GHz	440MHz /	Ant1 05:25:24/ Radio Sto Radio De 2.4402	l: None vice: BTS 288 GHZ	Center Frequency	
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glient Spectrum Analyzer - Oc           RL         RF         50 Q           center Freq 2.44000         Ref Offset           og         Ref Offset           og         Ref 22.9           og	AC 00000 0 # 2.96 dB	SHz IFGain:Low	Si Center I Trig: Fre	ENSE:INT Freq: 2.440000	0000 GHz Avg Hold	440MHz / Align Auto : 100/100	Ant1 05:25:24 Radio Sto Radio De 2.440: -11.1	l: None vice: BTS 288 GHZ	Center Frequency	
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glient Spectrum Analyzer – Oc           RL         RF         S0 ©           Ref Offset           Ref Offset           O dB/div         Ref Offset           0 dB/div         Ref Offset           2.96	AC 00000 C # 2.96 dB 6 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	Hz IFGain:Low 454 MH -34.136 k	S Center I Trig: Fr #Atten: : #V	BW 300 k	D000 GHz Avg Hold:	440MHz . ALIGNAUTO : 100/100 Mkr3 	Antl OS:25:24 Radio De 2.440: -11.1 Munum Sp Sweep dBm .00 %	i: None vice: BTS 288 GHz 28 dBm	Center Fre 2.440000000 GH 2.00.000 KH Auto Mai	
RL RF 50 @           Ref Offset           0 dB/div         Ref Offset           0 dB/div         Ref Offset           29         9           30         9           29         9           7.0         9           7.0         9           7.0         9           7.0         9           7.0         9           7.0         9           9         9 <td>AC 00000 C # 2.96 dB 6 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4</td> <td>Hz IFGain:Low 454 MH -34.136 k</td> <td>S Center I Trig: Fr #Atten: : #V</td> <td>BW 300 k</td> <td>D000 GHz Avg Hold:</td> <td>440MHz . ALIGNAUTO : 100/100 Mkr3 </td> <td>Antl OS:25:24 Radio De 2.440: -11.1 Munum Sp Sweep dBm .00 %</td> <td>i: None vice: BTS 288 GHz 28 dBm</td> <td>Center Fre 2.440000000 GH 2.00.000 KH Auto Mai</td>	AC 00000 C # 2.96 dB 6 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	Hz IFGain:Low 454 MH -34.136 k	S Center I Trig: Fr #Atten: : #V	BW 300 k	D000 GHz Avg Hold:	440MHz . ALIGNAUTO : 100/100 Mkr3 	Antl OS:25:24 Radio De 2.440: -11.1 Munum Sp Sweep dBm .00 %	i: None vice: BTS 288 GHz 28 dBm	Center Fre 2.440000000 GH 2.00.000 KH Auto Mai	

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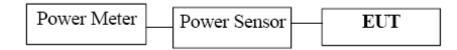


Frequency	05:27:17 AM Sep 24, 2023 Radio Std: None Radio Device: BTS	ALIGN AUTO	000000 GHz Avg Hold	SENSE:INT Center Freq: 2.48 Trig: Free Run #Atten: 30 dB	GHz #IFGain:Low	RF 50Ω AC eq 2.480000000 C	enter F
	2.480287 GHz -9.9299 dBm	Mkr3				Ref Offset 2.98 dB Ref 22.98 dBm	0 dB/div
Center Free 2.480000000 GH:			3				. <b>og</b> 13.0 2.98 7.02
	Market Market market					Anna - Agent water and a second	17.0 27.0 37.0 47.0
	Span 2 MHz						57.0 57.0 center 2
CF Step 200.000 kH	Sweep 1.333 ms		kHz	#VBW 30		100 kHz	
<u>Auto</u> Mar	dBm	1.81	Power			ied Bandwidth	Occu
Freq Offse					0464 MI		
0 H:	.00 % 00 dB		Power		-35.758   646.1	nit Freq Error Andwidth	

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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 Peak power were measured.

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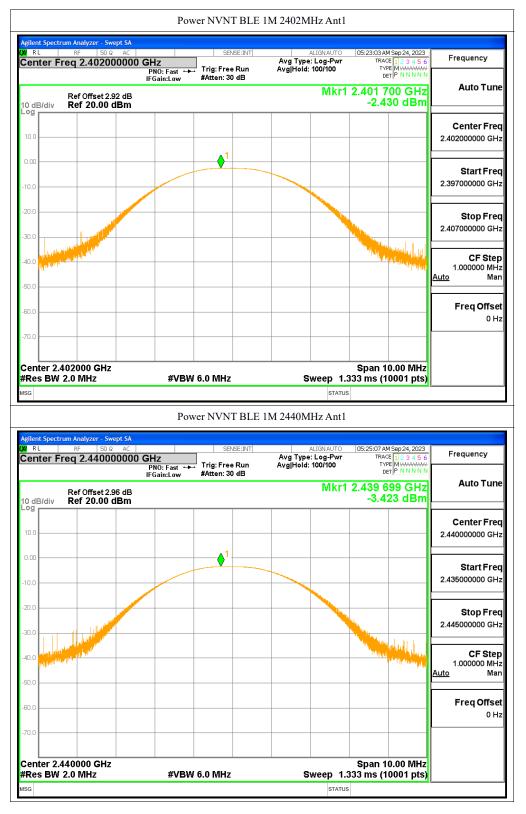
#### **8.4Test Results**

Condition	Mode	Frequency	Antenna	Conducted Power	Duty Factor	Total Power	Limit	Verdict
		(MHz)		(dBm)	(dB)	(dBm)	(dBm)	
	BLE	2402		-2.43	0	-2.43	30	Pass
NVNT	1M	2440	Ant1	-3.42	0	-3.42	30	Pass
	TIVI	2480		-3.93	0	-3.93	30	Pass

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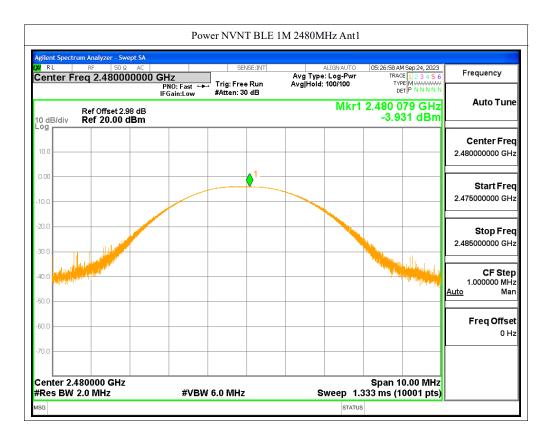




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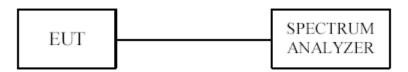
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# 9. Power Spectral Density Measurement

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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#### 9.4Test Result

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/100kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
	BLE	2402		-2.89	0	-2.89	8	Pass
NVNT		2440	Ant1	-3.88	0	-3.88	8	Pass
	1M	2480		-4.41	0	-4.41	8	Pass

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	trum Analyzer - Sw RF 50 Ω		1	CEAR	SE:INT	011	IGN AUTO	105-22-26 M	M Sep 24, 2023	1
	Freq 2.40200	0000 G	Hz NO: Wide ↔ Gain:Low		Run	Avg Type: L Avg Hold: 10	og-Pwr	TRAI TY	CE 1 2 3 4 5 6 PE MWWWW ET P N N N N N	Frequency
0 dB/div	Ref Offset 2.9 Ref 20.00 (	2 dB				Ν	/kr1 2.		4 1 GHz 91 dBm	
. <b>og</b> 10.0										Center Fre 2.402000000 GH
0.00	m	1	nu na	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www.	muran	mm	الكريمينيوني		<b>Start Fre</b> 2.401508750 GH
20.0								- V	Manana	<b>Stop Fre</b> 2.402491250 GH
40.0										CF Ste 98.250 kH <u>Auto</u> Ma
60.0										Freq Offse 0 H
Res BW	.4020000 GH: / 100 kHz	2	#VBW	/ 300 kHz		SI	weep 1.	Span 9 000 ms (	982.5 kHz (1001 pts)	
Res BW	f 100 kHz	-			BLE 11	<b>S</b> i M 2440MH2	STATUS	Span 9 000 ms (	982.5 kHz (1001 pts)	
Res BW		ept SA AC   10000 G	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MH;	STATUS Z Ant1 IGN AUTO	000 ms ( 05:25:30 A TRAM	(1001 pts) M Sep24, 2023 26 1 2 3 4 5 6 M M M M M M M M M M M M M M M M M M M	Frequency
Res BW sg gilent Spect RL center F 0 dB/div	<b>100 kHz</b> trum Analyzer - Sw RF 50 Ω	ept SA AC   DOOOO G   IF  F  F	PS	SD NVNT	SE:INT	M 2440MHz Aug Type: L Avg Type: L Avg Hold: 10	STATUS Z Ant1 IGNAUTO -og-Pwr p0/100	000 ms ( 05:25:30 A TRAI TY D 439 71	( <b>1001 pts)</b>	Frequency Auto Tun
Res BW sg gilent Spect ( RL Center F	f 100 kHz trum Analyzer - Sw RF 50 Ω Freq 2.44000 Ref Offset 2.5	ept SA AC   DOOOO G   IF  F  F	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MHz Aug Type: L Avg Type: L Avg Hold: 10	STATUS Z Ant1 IGNAUTO -og-Pwr p0/100	000 ms ( 05:25:30 A TRAI TY D 439 71	(1001 pts) MSep24, 2023 E 1 2 3 4 5 6 PE M W W W W ET P N N N N 3 6 GHz	Frequency Auto Tun
Res BW	f 100 kHz trum Analyzer - Sw RF 50 Ω Freq 2.44000 Ref Offset 2.5	ept SA AC   DOOOO G   IF  F  F	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MHz Avg Type: L Avg Hold: 10	STATUS Z Ant1 IGNAUTO -og-Pwr p0/100	000 ms ( 05:25:30 A TRAI TY D 439 71	(1001 pts) MSep24, 2023 E 1 2 3 4 5 6 PE M W W W W ET P N N N N 3 6 GHz	Auto Tun Center Fre
Res BW gilent Spect RL GOdB/div	f 100 kHz trum Analyzer - Sw RF 50 Ω Freq 2.44000 Ref Offset 2.5	ept SA AC   DOOOO G   IF  F  F	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MHz Avg Type: L Avg Hold: 10	z Antl consulto .og-Pwr poortoo	000 ms ( 05:25:30 A TRAI TY D 439 71	(1001 pts) MSep24, 2023 E 1 2 3 4 5 6 PE M W W W W ET P N N N N 3 6 GHz	Frequency       Auto Tun       Center Fre       2.440000000 GH       Start Fre
Res BW           glent Spect           RL           center F           0 dB/div           9           10.0           0.00           10.0           0.00           40.0	f 100 kHz trum Analyzer - Sw RF 50 Ω Freq 2.44000 Ref Offset 2.5	ept SA AC   DOOOO G   IF  F  F	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MHz Avg Type: L Avg Hold: 10	z Antl consulto .og-Pwr poortoo	000 ms ( 05:25:30 A TRAI TY D 439 71	(1001 pts) MSep24, 2023 E 1 2 3 4 5 6 PE MWWWWW ET P N N N N 3 6 GHz	Frequency Auto Tun Center Fre 2.44000000 GH Start Fre 2.439516250 GH
Res BW           glent Spect           RL           CodB/div           0.00           10.0           0.00           10.0           0.00           10.0           0.00           10.0           0.00           10.0           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00	f 100 kHz trum Analyzer - Sw RF 50 Ω Freq 2.44000 Ref Offset 2.5	ept SA AC   DOOOO G   IF  F  F	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MHz Avg Type: L Avg Hold: 10	z Antl consulto .og-Pwr poortoo	000 ms ( 05:25:30 A TRAI TY D 439 71	(1001 pts) MSep24, 2023 E 1 2 3 4 5 6 PE MWWWWW ET P N N N N 3 6 GHz	Frequency           Auto Tun           Center Fre           2.440000000 GH           Start Fre           2.439516250 GH           Stop Fre           2.440483750 GH           CF Ste           96.750 kH
#Res BW ISG Agilent Spect	f 100 kHz trum Analyzer - Sw RF 50 Ω Freq 2.44000 Ref Offset 2.5	ept SA AC   DOOOO G   IF  F  F	PS Hz NO: Wide →	SD NVNT	SE:INT	M 2440MHz Avg Type: L Avg Hold: 10	z Antl consulto .og-Pwr poortoo	000 ms ( 05:25:30 A TRAI TY D 439 71	(1001 pts) MSep24, 2023 E 1 2 3 4 5 6 PE MWWWWW ET P N N N N 3 6 GHz	Frequency Auto Tun Center Fre 2.440000000 GH Start Fre 2.439516250 GH Stop Fre 2.440483750 GH CF Ste 96.750 kH Auto Ma

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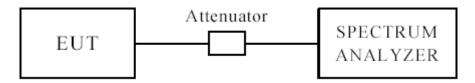


enter F	RF 50 Ω AC req 2.48000000	D GHz PNO: Wide ↔ IFGain:Low	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGNA Avg Type: Log- Avg Hold: 100/10	Pwr TRACE 1 2 3 4 5	Frequency
0 dB/div	Ref Offset 2.98 dB Ref 20.00 dBm			Mkr1 :	2.479 717 052 GH -4.410 dBr	
10.0						Center Fred 2.480000000 GH
10.00	Nurray Market	Manahananananananananananananananananana	www.	M. M. Marine Marine	hon	Start Free 2.479515500 GH
20.0						<b>Stop Fred</b> 2.480484500 GH
40.0						CF Step 96.900 kH <u>Auto</u> Mar
60.0						Freq Offse 0 H
70.0						

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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=1MHz, VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector)

For bandage test, the spectrum set as follows: RBW=100 kHz, 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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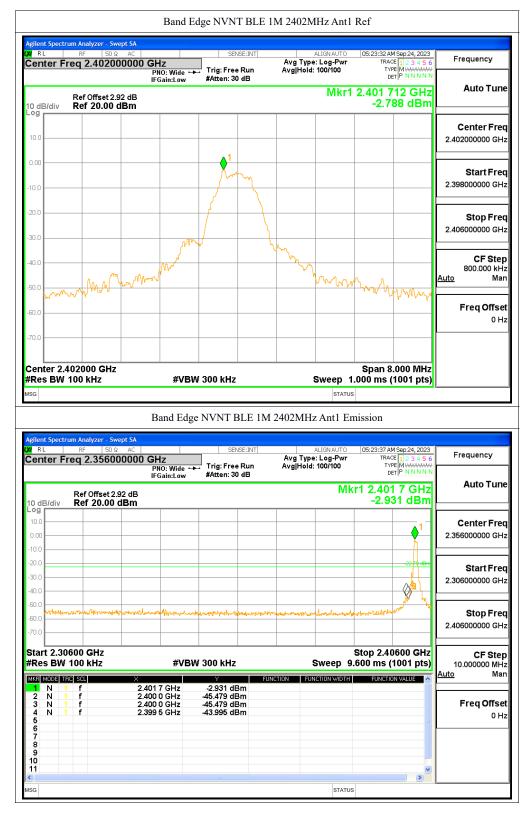


#### 10.4 Band-edge Measurement

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-41.2	-20	Pass
	DLE IIVI	2480	AIILI	-46.91	-20	Pass

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#### **Conducted Emissions at antenna Port**

#### **Test Figures above 1GHz:**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
		2402		-33.2	-20	Pass
NVNT	BLE 1M	2440	Ant1	-34.01	-20	Pass
		2480		-32.97	-20	Pass

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Agilent Spectrum Analyzer	- Swept SA 50 Ω AC	SENSE:INT	ALIGN AUTO	05:23:42 AM Sep 24, 2023	<b></b>
Center Freq 2.40	2000000 GHz PNO: Wide		Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 123456 TYPE MWWWW DET P N N N N N	Frequency
Ref Offse		#Atten: 20 dB	Mkr1 2.	401 715 0 GHz -2.917 dBm	Auto Tun
2.92					<b>Center Fre</b> 2.402000000 GH
7.08 17.1	man h		- Mary more	market and the second s	<b>Start Fre</b> 2.401250000 GH
27.1				Www.	<b>Stop Fre</b> 2.402750000 GH
47.1					CF Ste 150.000 k⊢ <u>Auto</u> Ma
67.1					Freq Offse 0 ⊢
Center 2.4020000					
Res BW 100 kHz		BW 300 kHz	Sweep 1. status	Span 1.500 MHz 000 ms (1001 pts)	
Res BW 100 kHz	#VI		•	000 ms (1001 pts)	
sg glent Spectrum Analyzer	#VI		STATUS M 2402MHz Ant1 Er alignauto	000 ms (1001 pts) mission	Fraguanau
Res BW 100 kHz	#VI Tx. Spuri - Swept SA 50 Q AC 65000000 GHz PN0: Fast	OUS NVNT BLE 1	STATUS	<b>000 ms (1001 pts)</b> mission	Frequency
Res BW 100 kHz sc glient Spectrum Analyzer RL RF Center Freq 13.2 Ref Offse 10 dB/div Ref 12.	#VI Tx. Spuri	ous NVNT BLE 1 SENSE:INT → Trig: Free Run	STATUS M 2402MHz Ant1 Er ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 10/10	000 ms (1001 pts) mission 05:24:22 AM Sep 24, 2023 TRACE [] 2:3 4 5 6 TYPE MWWWWW	
Res BW 100 kHz sc glient Spectrum Analyzer RL RF Center Freq 13.2 Ref Offse 0 dB/div Ref 12. 2.92 7.08	#VI Tx. Spuri - Swept SA 50 0 AC B5000000 GHz PN0: Fast IFGain:Low at 2.92 dB	ous NVNT BLE 1 SENSE:INT → Trig: Free Run	STATUS M 2402MHz Ant1 Er ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 10/10	000 ms (1001 pts) mission 05:24:22 AM Sep 24, 2023 TRACE 12:3 4 5 6 TYPE MAXMANN N r1 2.401 7 GHz -2.886 dBm	Auto Tun Center Fre
Res BW 100 kHz s glient Spectrum Analyzer RL RF Center Freq 13.2	#VI	ous NVNT BLE 1 SENSE:INT Trig: Free Run #Atten: 20 dB	STATUS M 2402MHz Ant1 Er ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 10/10	000 ms (1001 pts) mission 105:24:22 AM Sep 24, 2023 TRACE 12:3 4 5 6 TYPE MAXWAW DET P NNNN r1 2.401 7 GHz	Auto Tun Center Fre 13.26500000 GH Start Fre
Res         BW         100 kHz           sg         glient Spectrum Analyzer           RL<	#VI	ous NVNT BLE 1 SENSE:INT Trig: Free Run #Atten: 20 dB	STATUS M 2402MHz Ant1 Er ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 10/10	000 ms (1001 pts) mission 05:24:22 AM Sep 24, 2023 TRACE 12:3 4 5 6 TYPE MAXMANN N r1 2.401 7 GHz -2.886 dBm	Auto Tun Center Fre 13.26500000 GH Start Fre 30.00000 MH Stop Fre
Res BW 100 kHz         sc         glient Spectrum Analyzer         RL<	#VI	ous NVNT BLE 1	ALIGNAUTO Avg Type: Log Pwr Avg hold: 10/10 Mkr	000 ms (1001 pts) mission 05:24:22 AM Sep 24, 2023 TRACE 12:3 4 5 6 TYPE MAXMANN N r1 2.401 7 GHz -2.886 dBm	Frequency Auto Tun Center Fre 13.265000000 GH Start Fre 30.000000 MH Stop Fre 26.50000000 GH 2.647000000 GH Auto Ma
Res         BW 100 kHz           isis         isis           Isis         R           Isis         RF           Center Freq 13.2         Ref Offse           Og         1           Og         1           Isis         1           Isis         1           Isis         1	#VI	ous NVNT BLE 1	Augnauto Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	000 ms (1001 pts) mission 05:24:22 AM Sep 24, 2023 TRACE 12:23 45:6 TRACE 12:33 5:30 5:30 5:30 5:30 5:30 5:30 5:30 5	Auto Tun Center Fre 13.26500000 GH Start Fre 30.000000 MH Stop Fre 26.50000000 GH CF Ste 2.64700000 GH

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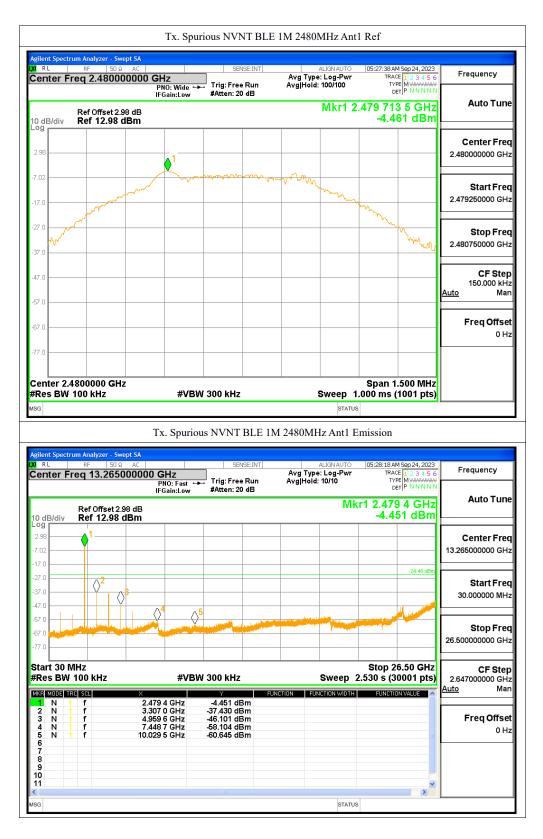




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#### 10.5 Restricted band Measurement

EUT		Cutting Plotter		Model	MINI XR
Mode	Keeping Transmitting			Test Voltage	120V~
Temperature		24 deg. C,		Humidity	56% RH
Test Result:		Pass		Detector	РК
		Low Channel,	Horizon	tal	
2390	PK (dBµV/m)	41.25		Limit	74(dBµV/m)
	AV ( $dB\mu V/m$ )			Limit	54(dBµV/m)
		Low Channe	el Vertical	1	
2390	PK (dBµV/m)	PK (dBµV/m) 39.83			74(dBµV/m)
	AV ( $dB\mu V/m$ )			Limit	54(dBµV/m)

#### 10.5 Restricted band Measurement

EUT		Cutting Plotter		Ν	Iodel	MINI XR
Mode	Ke	eping Transmitting	Test Voltage		120V~	
Temperature		24 deg. C,		Hu	midity	56% RH
Test Result:		Pass		De	etector	РК
		High Channel,	Horizontal			
2483.5	PK (dBµV/m)	40.63	т.	•,		74(dBµV/m)
	AV ( $dB\mu V/m$ )		Lim	IT		54(dBµV/m)
		High Channel	l, Vertical			
2483.5	PK (dBµV/m) 39.22 Limit					74(dBµV/m)
	AV ( $dB\mu V/m$ )		Lim	IL		54(dBµV/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

PCB antenna used. The gain of the antennas is -0.1dBi (Get from the antenna specification provided the manufacturer)

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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:



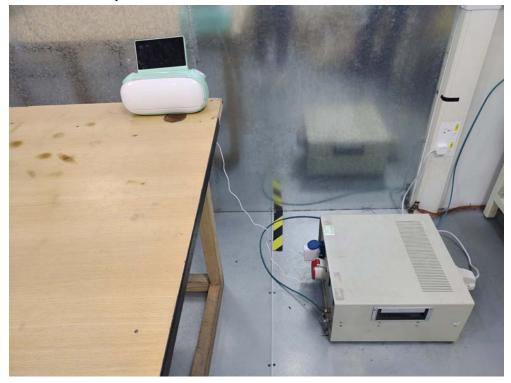
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#### 13.0 Photo of testing

Conducted Emission Test Setup:



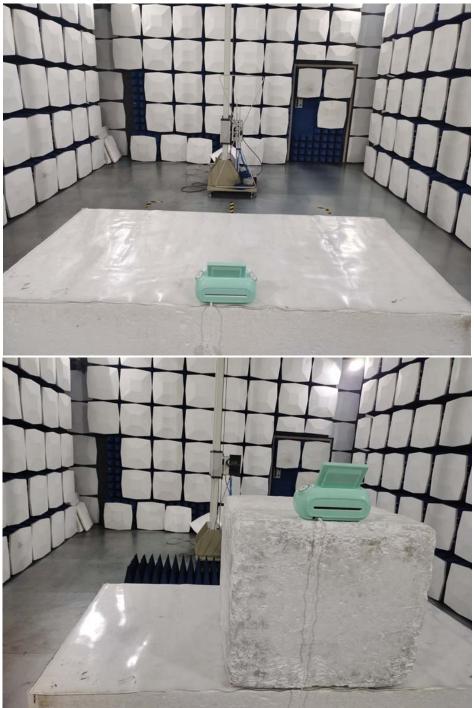
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Radiated Emission Test Setup:



# Photographs – EUT

Please refer test report TW2309162-01E

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