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# **TEST REPORT**

Product Name	:	Gimbal
Brand Mark	:	N/A
Model No.	:	SPRX8
Extension Model	:	L9pro
FCC ID	:	2APQ9SPRX8
Report Number	:	BLA-EMC-202303-A10003
Date of Sample Receipt	:	2023/3/27
Date of Test	:	2023/3/28 to 2023/4/12
Date of Issue	:	2023/4/14
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

Shenzhen JX ROBOT Technology Co., Ltd Area B, Floor 9th, Building 1, Yulv seventh Industrial Zone, Gongming Street, Guangming District, Shenzhen, Guangdong, China

Prepared by:

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#### **REPORT REVISE RECORD**

Version No. Date		Description	
00	2023/4/14	Original	



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## 1 TEST SUMMARY

Test item	Test item Test Requirement		Class/Severity	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247 ANSI C63.10 (2013) Sectio 6.10.5		47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass



## 2 GENERAL INFORMATION

Applicant	Shenzhen JX ROBOT Technology Co., Ltd		
Address	Area B, Floor 9th, Building 1, Yulv seventh Industrial Zone, Gongming Street, Guangming District, Shenzhen, Guangdong, China		
Manufacturer	Shenzhen JX ROBOT Technology Co., Ltd		
Address	Area B, Floor 9th, Building 1, Yulv seventh Industrial Zone, Gongming Street, Guangming District, Shenzhen, Guangdong, China		
Factory	Shenzhen JX ROBOT Technology Co., Ltd		
Address	Area B, Floor 9th, Building 1, Yulv seventh Industrial Zone, Gongming Street, Guangming District, Shenzhen, Guangdong, China		
Product Name	Gimbal		
Test Model No.	SPRX8		
Extension Model	L9pro		
Remark	All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are model name for commercial purpose.		

## **3 GENERAL DESCRIPTION OF E.U.T.**

Hardware Version	V02
Software Version	V01
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Data Rata	1Mbps; 2Mbps
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	PCB Antenna
Antenna Gain:	-1.37dBi(Provided by the customer)



## **4 TEST ENVIRONMENT**

Environment	Temperature	Voltage
Normal	25°C	DC3.6V

## 5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION		
TX Keep the EUT in transmitting mode with modulation			
Remark:Only the data of the worst mode would be recorded in this report.For Radiated emission,			
1Mbps and 2Mbps mode all have been tested, only worse case 1Mbps mode is reported.			

### **6 MEASUREMENT UNCERTAINTY**

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB



## 7 DESCRIPTION OF SUPPORT UNIT

Device Type Manufacturer		Model Name	Serial No.	Remark	
	PC HASEE		K610D	N/A	N/A

## 8 LABORATORY LOCATION

All tests were performed at:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673 No tests were sub-contracted.



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## 9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions						
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due	
Chamber 1	SKET	966	N/A	2020/11/10	2023/11/9	
Chamber 2	SKET	966	N/A	2021/07/20	2024/07/19	
Spectrum	R&S	FSP40	100817	2022/09/15	2023/09/14	
Receiver	R&S	ESR7	101199	2022/09/15	2023/09/14	
Receiver	R&S	ESPI7	101477	2022/07/16	2023/07/15	
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2022/09/15	2023/09/14	
Horn Antenna	Schwarzbeck	BBHA9120D	01892 P:00331	2022/09/13	2025/09/12	
Amplifier	SKET	LNPA_30M01G-30	SK2021060801	2022/07/16	2023/07/15	
Amplifier	SKET	PA-000318G-45	N/A	2022/09/13	2023/09/12	
Amplifier         SKET         LNPA_18G40G-50           Filter group         SKET         2.4G/5G Filter group r		SK2022071301	2022/07/14	2023/07/13		
		N/A	2022/07/16	2023/07/15		
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A	
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2022/9/14	2025/9/13	
ControllerSKETN/ACoaxial CableBlueAsiaBLA-XC-02Coaxial CableBlueAsiaBLA-XC-03Coaxial CableBlueAsiaBLA-XC-01		N/A	N/A	N/A		
		N/A	N/A	N/A		
		BLA-XC-03	N/A	N/A	N/A	
		BLA-XC-01	N/A	N/A	N/A	



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Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)									
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due				
Shield room	SKET	833	N/A	2020/11/25	2023/11/24				
Receiver	R&S	ESPI3	101082	2022/09/14	2023/09/13				
LISN	R&S	ENV216	3560.6550.15	2022/09/14	2023/09/13				
LISN	AT	AT166-2	AKK1806000003	2022/09/14	2023/09/13				
ISN	TESEQ	ISNT8-cat6	53580	2022/09/14	2023/09/13				
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01045	2022/08/17	2023/08/16				
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01075	2022/08/17	2023/08/16				
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A				

Test Equipment	Test Equipment Of RF Conducted Test									
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due					
Spectrum	R&S	FSP40	100817	2022/09/15	2023/09/14					
Spectrum	Agilent	N9020A	MY49100060	2022/09/07	2023/09/06					
Spectrum	KEYSIGHT	N9030A	MY52350152	2022/07/01	2023/06/30					
Spectrum	KEYSIGHT	N9010A	MY54330814	2022/07/01	2023/06/30					
Signal Generator	Agilent	N5182A	MY47420955	2022/09/07	2023/09/06					
Signal Generator	Agilent	E8257D	MY44320250	2022/07/01	2023/06/30					
Signal Generator	Agilent	N5181A	MY46240904	2022/08/02	2023/08/01					
Signal Generator	R&S	CMW500	132429	2022/09/07	2023/09/06					
BluetoothTester	Anritsu	MT8852B	06262047872	2022/09/07	2023/09/06					
Power probe	DARE	RPR3006W	14100889SN042	2022/09/07	2023/09/06					
DCPowersupply	zhaoxin	KXN-305D	20K305D1221363	2022/09/14	2023/09/13					
DCPowersupply	zhaoxin	RXN-1505D	19R1505D050168	2022/09/14	2023/09/13					
Audio Analyzer	Audioprecision	N/A	ATSI-41094	2022/7/1	2023/6/30					
2.4GHz/5GHz RF Test software	MTS	MTS 8310	Version 2.0.0.0	N/A	N/A					



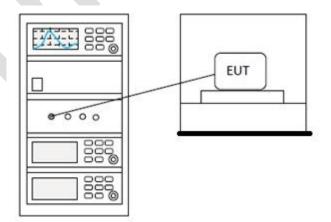
Test Standard	47 CFR Part 15, Subpart C 15.247						
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2						
Test Mode (Pre-Scan)	ТХ						
Test Mode (Final Test)	ТХ						
Tester	Charlie						
Temperature	25°C						
Humidity	60%						

## **10 CONDUCTED BAND EDGES MEASUREMENT**

#### 10.1 LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.209(a) (see §15.205(c)).

#### 10.2 BLOCK DIAGRAM OF TEST SETUP





### 10.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



## 11 RADIATED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247						
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6						
Test Mode (Pre-Scan)	ТХ						
Test Mode (Final Test)	ТХ						
Tester	Charlie						
Temperature	25°C						
Humidity	60%						

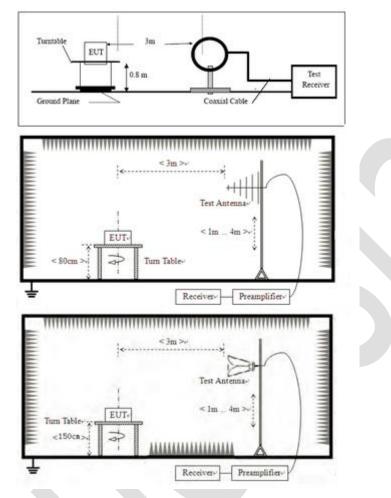
#### 11.1 LIMITS

Frequency(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



#### 11.2 BLOCK DIAGRAM OF TEST SETUP



#### 11.3 PROCEDURE

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

#### Remark:

1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

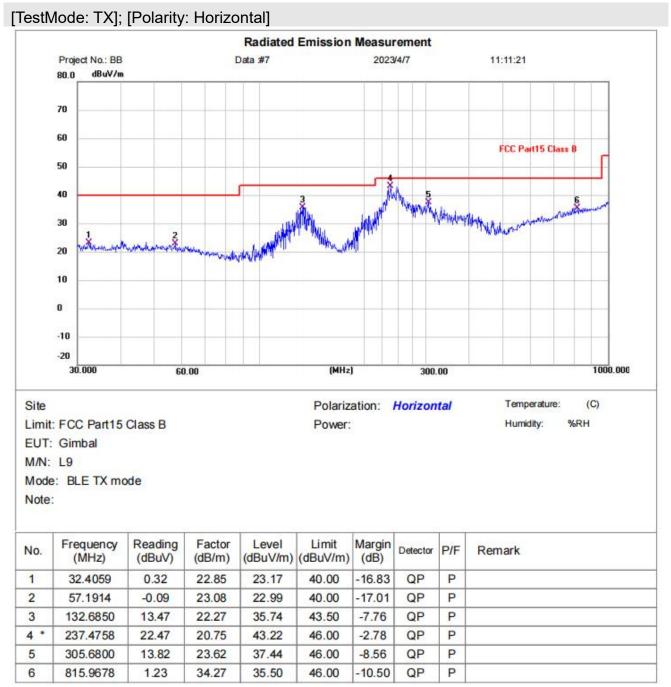
3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.fundamental frequency is blocked by filter, and only spurious emission is shown.

4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



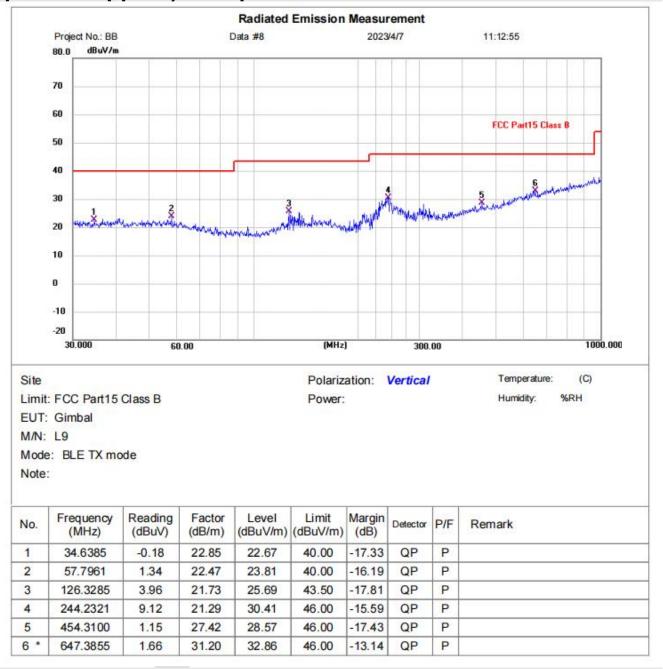
#### 11.4 TEST DATA

#### Below 1GHz



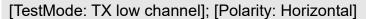


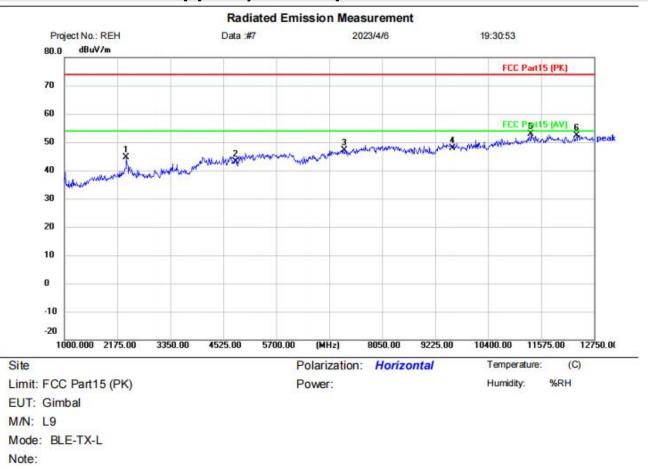
#### [TestMode: TX]; [Polarity: Vertical]





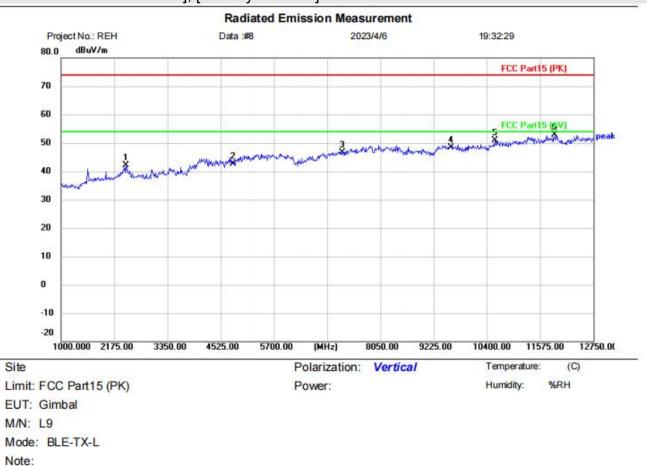
## Above 1GHz:





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2374.750	45.79	- <mark>1.18</mark>	44.61	74.00	-29.39	peak		
2		4804.000	39.16	4.05	43.21	74.00	- <mark>30</mark> .79	peak		
3		7206.000	39.09	7.93	47.02	74.00	-26.98	peak		
4		9608.000	37.05	10.90	47.95	74.00	-26.05	peak		
5	*	11351.750	39.25	13.61	52.86	74.00	-21.14	peak		
6	1	12362.250	38.44	13.89	52.33	74.00	-21.67	peak		

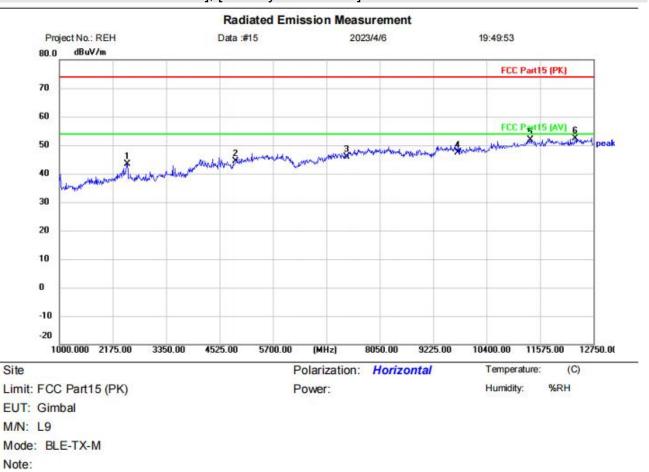




## [TestMode: TX low channel]; [Polarity: Vertical]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2433.500	43.69	-1.52	42.17	74.00	-31.83	peak	
2		4804.000	38.59	4.05	42.64	74.00	-31.36	peak	
3		7206.000	38.63	7.93	46.56	74.00	-27.44	peak	
4		9608.000	37.49	10.90	48.39	74.00	-25.61	peak	
5		10576.250	38.15	12.80	50.95	74.00	-23.05	peak	
6	*	11892.250	38.93	13.85	52.78	74.00	-21.22	peak	

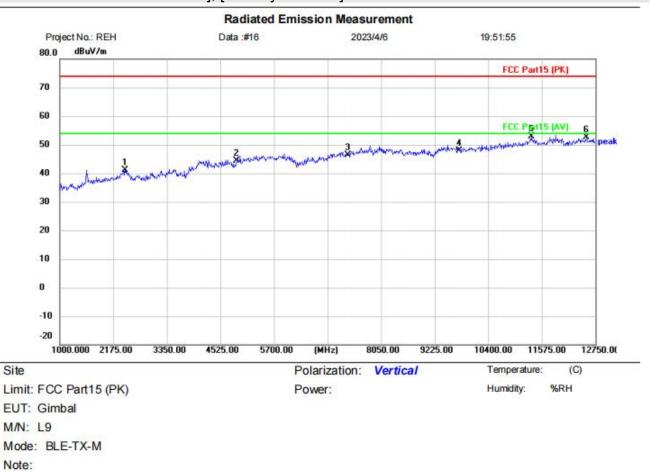




## [TestMode: TX middle channel]; [Polarity: Horizontal]

Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
	2492.250	45.58	-2.17	43.41	74.00	-30.59	peak		
	4884.000	40.03	4.37	44.40	74.00	-29.60	peak		
	7326.000	37.75	8.21	45.96	74.00	-28.04	peak		
	9768.000	36.13	11.31	47.44	74.00	-26.56	peak		
	11363.500	38.16	13.62	51.78	74.00	-22.22	peak		
*	12350.500	38.49	13.88	52.37	74.00	-21.63	peak		
		MHz 2492.250 4884.000 7326.000	Mk.         Freq.         Level           MHz         dBuV           2492.250         45.58           4884.000         40.03           7326.000         37.75           9768.000         36.13           11363.500         38.16	Mk.         Freq.         Level         Factor           MHz         dBuV         dB/m           2492.250         45.58         -2.17           4884.000         40.03         4.37           7326.000         37.75         8.21           9768.000         36.13         11.31           11363.500         38.16         13.62	Mk.         Freq.         Level         Factor         ment           MHz         dBuV         dB/m         dBuV/m           2492.250         45.58         -2.17         43.41           4884.000         40.03         4.37         44.40           7326.000         37.75         8.21         45.96           9768.000         36.13         11.31         47.44           11363.500         38.16         13.62         51.78	Mk.         Freq.         Level         Factor         ment         Limit           MHz         dBuV         dB/m         dBuV/m         dBuV/m           2492.250         45.58         -2.17         43.41         74.00           4884.000         40.03         4.37         44.40         74.00           7326.000         37.75         8.21         45.96         74.00           9768.000         36.13         11.31         47.44         74.00           11363.500         38.16         13.62         51.78         74.00	Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB/m         dBuV/m         dBuV/m         dBuV/m         dB           2492.250         45.58         -2.17         43.41         74.00         -30.59           4884.000         40.03         4.37         44.40         74.00         -29.60           7326.000         37.75         8.21         45.96         74.00         -28.04           9768.000         36.13         11.31         47.44         74.00         -26.56           11363.500         38.16         13.62         51.78         74.00         -22.22	Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB/m         dBuV/m         dBuV/m         dB         Detector           2492.250         45.58         -2.17         43.41         74.00         -30.59         peak           4884.000         40.03         4.37         44.40         74.00         -29.60         peak           7326.000         37.75         8.21         45.96         74.00         -28.04         peak           9768.000         36.13         11.31         47.44         74.00         -26.56         peak           11363.500         38.16         13.62         51.78         74.00         -22.22         peak	Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB/m         dBuV/m         dB         Detector         Comment           2492.250         45.58         -2.17         43.41         74.00         -30.59         peak           4884.000         40.03         4.37         44.40         74.00         -29.60         peak           7326.000         37.75         8.21         45.96         74.00         -28.04         peak           9768.000         36.13         11.31         47.44         74.00         -26.56         peak           11363.500         38.16         13.62         51.78         74.00         -22.22         peak

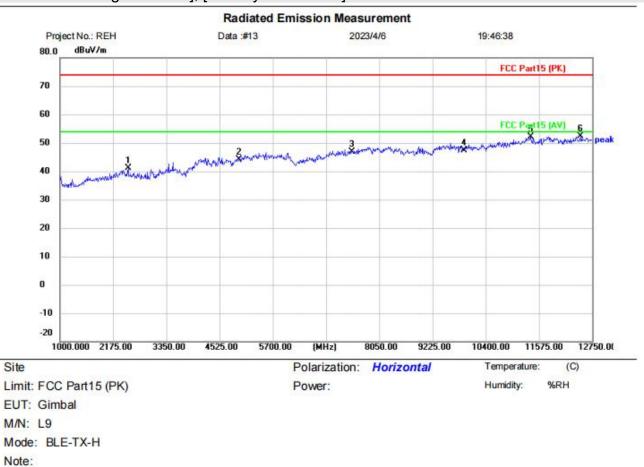




## [TestMode: TX middle channel]; [Polarity: Vertical]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2433.500	42.69	- <mark>1.52</mark>	41.17	74.00	-32.83	peak		
2		4884.000	39.98	4.37	44.35	74.00	-29.65	peak		
3		7326.000	38.17	8.21	46.38	74.00	-27.62	peak		
4		9768.000	36.63	11.31	47.94	74.00	-26.06	peak		
5	*	11340.000	39.37	13.60	52.97	74.00	-21.03	peak		
6	1	12550.250	38.65	13.87	52.52	74.00	-21.48	peak		

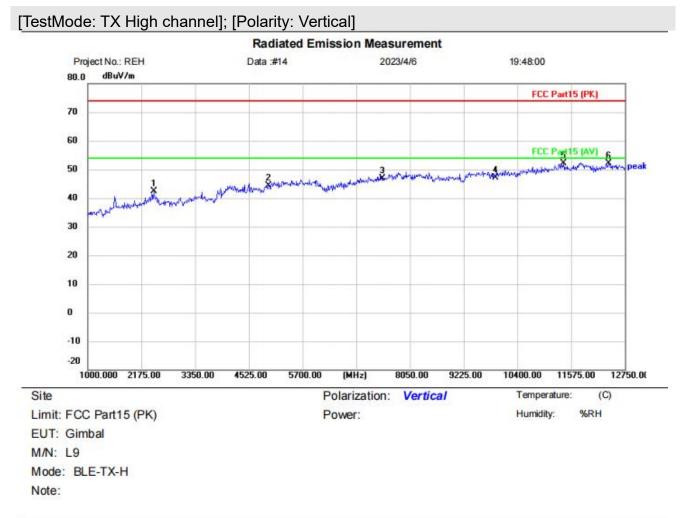




## [TestMode: TX High channel]; [Polarity: Horizontal]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2504.000	43.48	-2.28	41.20	74.00	-32.80	peak		
2		4960.000	38.76	5.42	44.18	74.00	-29.82	peak		
3		7440.000	38.44	8.48	46.92	74.00	- <mark>27.0</mark> 8	peak		
4		9920.000	35.69	11.69	47.38	74.00	-26.62	peak		
5		11387.000	38.54	13.63	52.17	74.00	-21.83	peak		
6	*	12491.500	38.50	13.87	52.37	74.00	-21.63	peak		





No. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1	2445.250	43.99	-1.65	42.34	74.00	-31.66	peak		
2	4960.000	38.95	5.42	44.37	74.00	-29.63	peak		
3	7440.000	38.45	8.48	46.93	74.00	-27.07	peak		
4	9920.000	35.53	11.69	47.22	74.00	-26.78	peak		
5	11410.500	38.44	13.63	52.07	74.00	-21.93	peak		
6 *	12397.500	38.32	13.88	52.20	74.00	-21.80	peak		



## 12 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

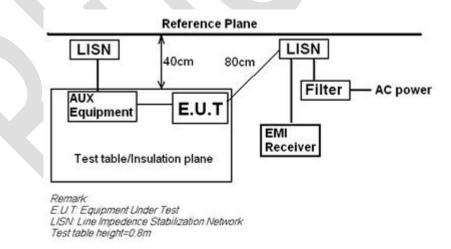
Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 6.2					
Test Mode (Pre-Scan)	ТХ					
Test Mode (Final Test)	ТХ					
Tester	Charlie					
Temperature	25°C					
Humidity	60%					

#### 12.1 LIMITS

Frequency of	Conducted limit(dBµV)						
emission(MHz)	Quasi-peak	Average					
0.15-0.5	66 to 56*	56 to 46*					
0.5-5	56	46					
5-30	60	50					

\*Decreases with the logarithm of the frequency.

#### 12.2 BLOCK DIAGRAM OF TEST SETUP



#### 12.3 PROCEDURE

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.



3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

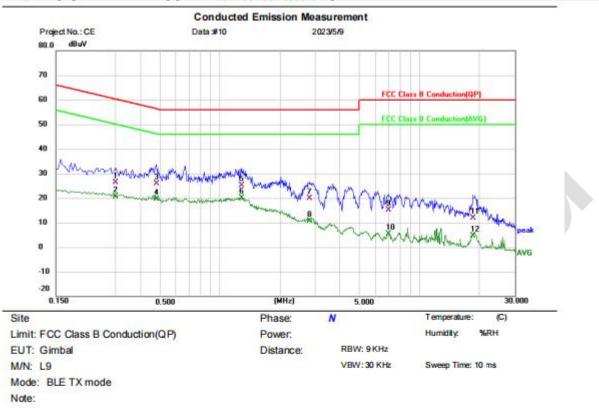
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



### 12.4 TEST DATA

## [TestMode: TX]; [Line: Neutral];[Power:AC120V/60Hz]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	đB	Detector	cm	degree	Comment
1		0.2980	16.22	10.07	26.29	60.30	-34.01	QP			
2		0.2980	10.54	10.07	20.61	50.30	-29.69	AVG	(		
3		0.4780	15.77	10.05	25.82	56.37	-30.55	QP			
4		0.4780	9.56	10.05	19.61	46.37	-26.76	AVG			
5		1.2780	15.17	10.04	25.21	56.00	-30.79	QP			
6	•	1.2780	10.06	10.04	20.10	46.00	-25.90	AVG			
7		2.7980	9.86	10.04	19.90	56.00	-36.10	QP			
8		2.7980	0.66	10.04	10.70	46.00	-35.30	AVG			
9		6.9580	5.14	9.87	15.01	60.00	-44.99	QP			
10		6.9580	-4.39	9.87	5.48	50.00	-44.52	AVG			
11		18.5060	1.91	10.03	11.94	60.00	-48.06	QP			
12	-	18.5060	-5.47	10.03	4.56	50.00	-45.44	AVG			



#### **Conducted Emission Measurement** Project No.: CE Data #9 2023/5/9 80.08 dBuV 70 FCC Class B Conduction[QP] 60 FCC Claim B C 50 40 30 20 10 0 AVE -10 -20 0.150 (MHz) 30.000 0.500 5.000 Site Phase: L1 Temperature: (C) Limit: FCC Class B Conduction(QP) Power. Humidity. %RH EUT: Gimbal Distance: RBW: 9KHz VBW: 30 KHz Sweep Time: 10 ms M/N: L9 Mode: BLE TX mode Note:

## [TestMode: TX]; [Line: Line]; [Power: AC120V/60Hz]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	k
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.2700	16.27	10.63	26.90	61.12	-34.22	QP			
2		0.2700	11.13	10.63	21.76	51.12	-29.36	AVG			
3		0.5820	17.71	10.08	27.79	56.00	-28.21	QP			
4	•	0.5820	10.23	10.08	20.31	46.00	-25.69	AVG			
5		1.1019	17.28	10.13	27.41	56.00	-28.59	QP			
6		1.1019	10.06	10.13	20.19	46.00	-25.81	AVG			
7		2.8179	12.61	10.24	22.85	56.00	-33.15	QP			
8		2.8179	1.71	10.24	11.95	46.00	-34.05	AVG			
9		7.8500	7.30	10.08	17.38	60.00	-42.62	QP			
10		7.8500	-4.70	10.08	5.38	50.00	-44.62	AVG			
11		18.8540	6.18	10.00	16.18	60.00	-43.82	QP			
12		18.8540	0.42	10.00	10.42	50.00	-39.58	AVG			
	-	Sector Street Press	Distance of P	<ul> <li>Arry should be</li> </ul>				42 WORKS (			



## 13 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

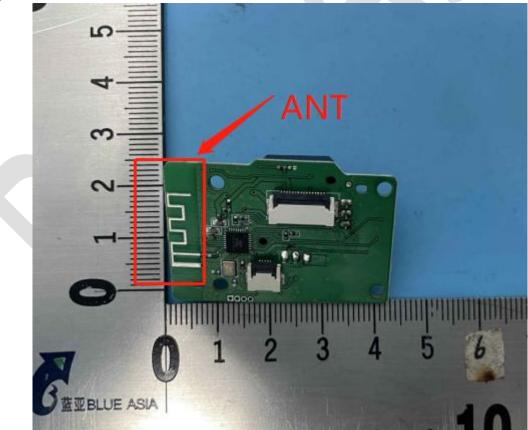
#### 13.1 CONCLUSION

Standard Requirement:

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. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

## EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -1.37dBi.





## 14 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 6.10.5					
Test Mode (Pre-Scan)	ТХ					
Test Mode (Final Test)	ТХ					
Tester	Charlie					
Temperature	<b>25</b> ℃					
Humidity	60%					

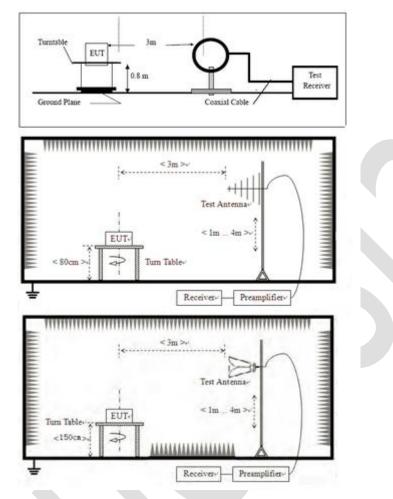
#### 14.1 LIMITS

Frequency(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



#### 14.2 BLOCK DIAGRAM OF TEST SETUP



#### 14.3 PROCEDURE

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

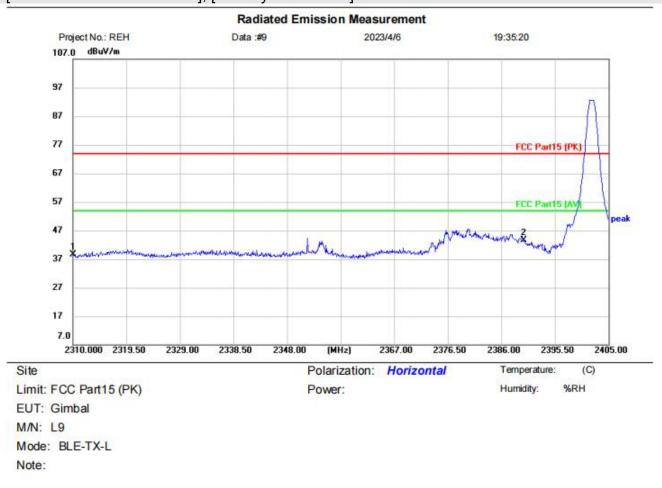
j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



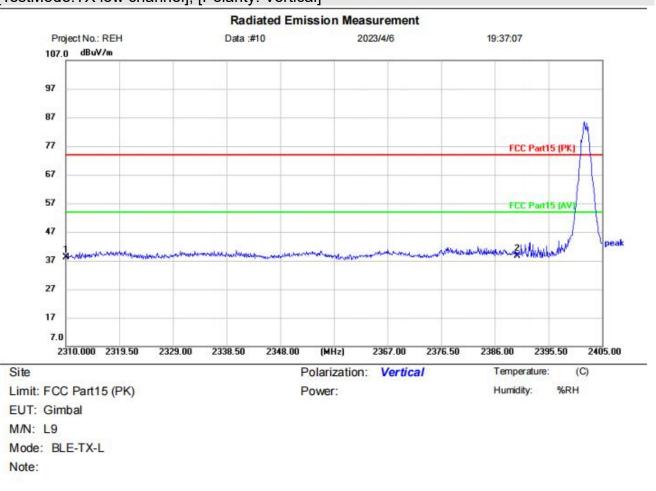
#### 14.4 TEST DATA



## [TestMode: TX low channel]; [Polarity: Horizontal]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2310.000	42.79	-4.27	38.52	74.00	-35.48	peak		
2	*	2390.000	47.34	-3.82	43.52	74.00	-30.48	peak		

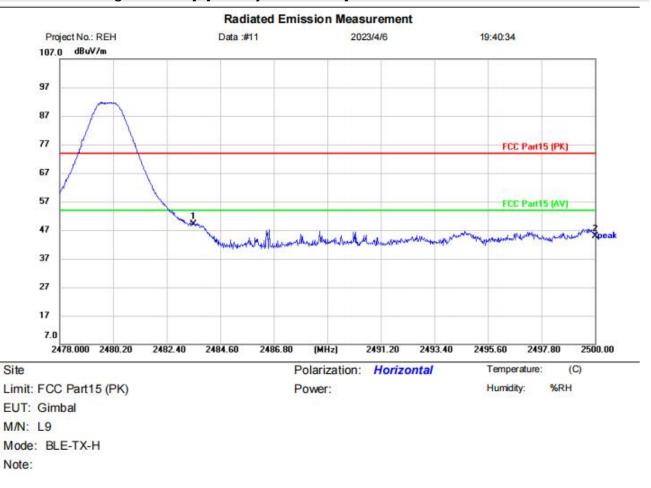




## [TestMode:TX low channel]; [Polarity: Vertical]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment		Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2310.000	42.34	-4.27	38.07	74.00	-35.93	peak		
2	*	2390.000	42.55	-3.82	38.73	74.00	-35.27	peak		

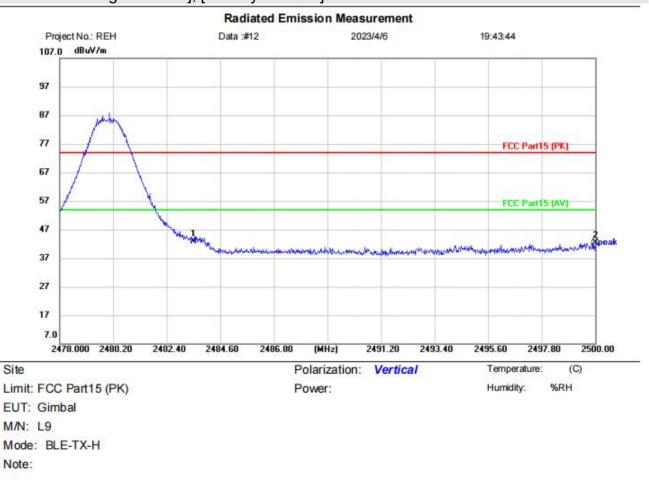




## [TestMode: TX High channel]; [Polarity: Horizontal]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment		Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2483.500	53.14	-3.96	49.18	74.00	-24.82	peak		
2		2500.000	48.90	-4.00	44.90	74.00	-29.10	peak		





## [TestMode:TX High channel]; [Polarity: Vertical]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2483.500	46.78	-3.96	42.82	74.00	-31.18	peak		
2		2500.000	46.46	-4.00	42.46	74.00	-31.54	peak		



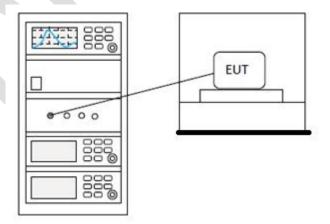
## **15 CONDUCTED SPURIOUS EMISSIONS**

Test Standard	47 CFR Part 15, Subpart C 15.247				
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11				
Test Mode (Pre-Scan)	ТХ				
Test Mode (Final Test)	ТХ				
Tester	Charlie				
Temperature	25°C				
Humidity	60%				

#### 15.1 LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.209(a) (see §15.205(c)).

## 15.2 BLOCK DIAGRAM OF TEST SETUP





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#### 15.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



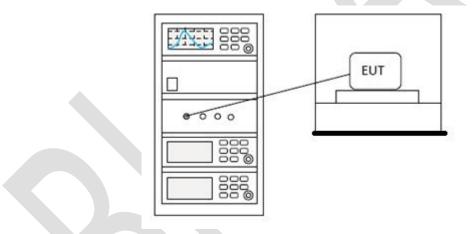
## **16 POWER SPECTRUM DENSITY**

Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 11.10.2					
Test Mode (Pre-Scan)	ТХ					
Test Mode (Final Test)	ТХ					
Tester	Charlie					
Temperature	<b>25</b> ℃					
Humidity	60%					

#### 16.1 LIMITS

**Limit:**  $\leq$ 8dBm in any 3 kHz band during any time interval of continuous transmission

### 16.2 BLOCK DIAGRAM OF TEST SETUP



16.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



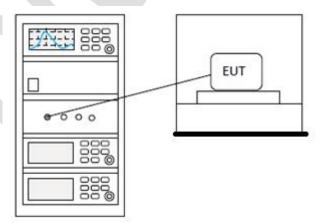
## 17 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	ТХ
Test Mode (Final Test)	ТХ
Tester	Charlie
Temperature	25°C
Humidity	60%

#### 17.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)		
	1 for ≥50 hopping channels		
902-928	0.25 for 25≤ hopping channels <50		
	1 for digital modulation		
	1 for $\geq$ 75 non-overlapping hopping channels		
2400-2483.5	0.125 for all other frequency hopping systems		
	1 for digital modulation		
5705 5050	1 for frequency hopping systems and digital		
5725-5850	modulation		

## 17.2 BLOCK DIAGRAM OF TEST SETUP





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### 17.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



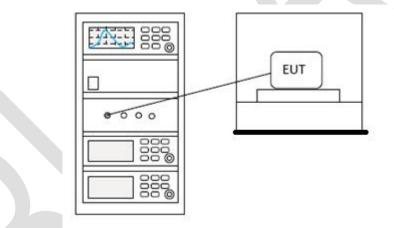
### 18 MINIMUM 6DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 11.8.1					
Test Mode (Pre-Scan)	ТХ					
Test Mode (Final Test)	ТХ					
Tester	Charlie					
Temperature	<b>25</b> ℃					
Humidity	60%					

#### 18.1 LIMITS

Limit:  $\geq 500 \text{ kHz}$ 

#### 18.2 BLOCK DIAGRAM OF TEST SETUP



18.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



## **19 APPENDIX**

### Appendix1

### **19.1 MAXIMUM CONDUCTED OUTPUT POWER**

Condition	Mode	Frequency	Antenna	Conducted Power	Limit	Verdict
		(MHz)		(dBm)	(dBm)	
NVNT	BLE 1M	2402	Ant1	-4.773	30	Pass
NVNT	BLE 1M	2442	Ant1	-5.567	30	Pass
NVNT	BLE 1M	2480	Ant1	-5.242	30	Pass
NVNT	BLE 2M	2402	Ant1	-4.787	30	Pass
NVNT	BLE 2M	2442	Ant1	-5.619	30	Pass
NVNT	BLE 2M	2480	Ant1	-5.261	30	Pass

## Power NVNT BLE 1M 2402MHz Ant1



#### Power NVNT BLE 1M 2442MHz Ant1





### Power NVNT BLE 1M 2480MHz Ant1



#### Power NVNT BLE 2M 2402MHz Ant1





### Power NVNT BLE 2M 2442MHz Ant1



#### Power NVNT BLE 2M 2480MHz Ant1





.



Condition	Mode	Frequency	Antenna	-6 dB Bandwidth	Limit -6 dB	Verdict
		(MHz)		(MHz)	Bandwidth (MHz)	
NVNT	BLE	2402	Ant1	0.697	0.5	Pass
	1M					
NVNT	BLE	2442	Ant1	0.702	0.5	Pass
	1M					
NVNT	BLE	2480	Ant1	0.718	0.5	Pass
	1M					
NVNT	BLE	2402	Ant1	1.21	0.5	Pass
	2M					
NVNT	BLE	2442	Ant1	1.228	0.5	Pass
	2M					
NVNT	BLE	2480	Ant1	1.229	0.5	Pass
	2M					

#### 19.2 -6DB BANDWIDTH

## -6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

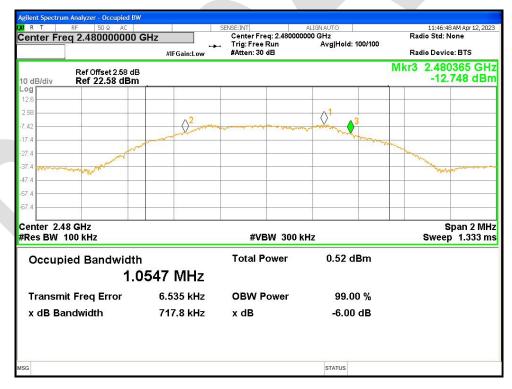


-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



R T         RF         50 Ω         AC           Center Freq 2.442000000         Δ	GHz #IFGain:Low	Center Freq: 2.4420000	ALIGN AUTO 00 GHz Avg Hold: 100/100		11:45:08 AM Ap dio Std: None dio Device: BTS	
Ref Offset 2.53 dB 0 dB/div Ref 22.53 dBm				Mkr3	2.442358	
og 2.5						
2.53		1				
.47			mm m A3			
7.5	Martin and and and and and and and and and an		a stranger and	m		
7.5				The	~	
7.5 mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm					manne	
7.5						
7.5						
					-	
Center 2.442 GHz Res BW 100 kHz		#VBW 300 ki	Hz		Span Sweep 1.3	2 MHz 33 ms
Occupied Bandwidth	1	Total Power	0.19 dBm			
	0490 MHz					
Transmit Freq Error	7.441 kHz	<b>OBW Power</b>	99.00 %			
x dB Bandwidth	701.6 kHz	x dB	-6.00 dB			
SG			STATUS			

### -6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



R T   RF   50 Ω AC   enter Freq 2.402000000	GHz #IEGain:Low	SENSE:INT Center Freq: 2.4020000 , Trig: Free Run #Atten: 30 dB	ALIGNAUTO 000 GHz Avg Hold: 100/100		11:52:45 AM Ap dio Std: None dio Device: BT:	
Ref Offset 2.51 dE	3	watten. 30 dB			2.402621 -17.725	GHz
g						
51		1			_	
49	mon	Anna mana and and and and and and and and and	3		-	
.5	- And Shares In		A New	man	Warman	
7.5 mm					www	w.
.5 patrix 4				8		M
7.5						
7.5						
enter 2.402 GHz Res BW 100 kHz		#VBW 300 k	Hz		Span Sweep 1.3	3 MHz 133 ms
Occupied Bandwidtl	h	Total Power	0.96 dBm			
2.0	0681 MHz					
Transmit Freq Error	16.239 kHz	<b>OBW Power</b>	99.00 %			
x dB Bandwidth	1.210 MHz	x dB	-6.00 dB			
G			STATUS			

#### -6dB Bandwidth NVNT BLE 2M 2442MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



gilent Spectrum Analyzer - Occupied BW						
enter Freq 2.480000000	GHz #IFGain:Low	SENSE:INT Center Freq: 2.4800000 → Trig: Free Run #Atten: 30 dB	ALIGN AUTO 000 GHz Avg Hold: 100/100		12:24:39 PM Ap lio Std: None lio Device: BT	
Ref Offset 2.58 dB dB/div Ref 22.58 dBm				Mkr3	2.480627 -13.555	
2.6						
42	2	1	3			
4	- with the second	and the second se	and the second second	m-mann	m	-
4 mm				20 20 21		A WY A
enter 2.48 GHz Res BW 100 kHz		#VBW 300 k	Hz		Span Sweep 1.3	3 MHz 333 ms
Occupied Bandwidth	ľ	Total Power	0.39 dBm			
2.0	0560 MHz					
Transmit Freq Error	12.287 kHz	<b>OBW Power</b>	99.00 %			
x dB Bandwidth	1.229 MHz	x dB	-6.00 dB			
G			STATUS			



Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.0418
NVNT	BLE 1M	2442	Ant1	1.0426
NVNT	BLE 1M	2480	Ant1	1.0411
NVNT	BLE 2M	2402	Ant1	2.0584
NVNT	BLE 2M	2442	Ant1	2.0580
NVNT	BLE 2M	2480	Ant1	2.0592

### **19.3 OCCUPIED CHANNEL BANDWIDTH**

### OBW NVNT BLE 1M 2402MHz Ant1

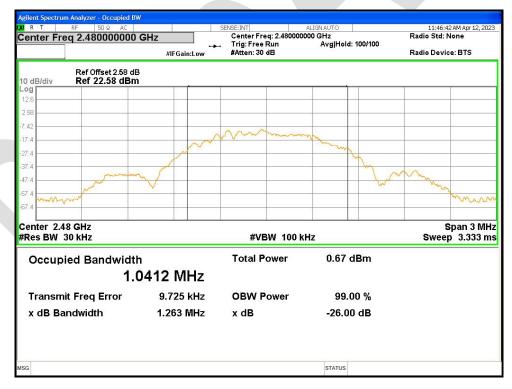


OBW NVNT BLE 1M 2442MHz Ant1





## OBW NVNT BLE 1M 2480MHz Ant1



OBW NVNT BLE 2M 2402MHz Ant1





## OBW NVNT BLE 2M 2442MHz Ant1



#### OBW NVNT BLE 2M 2480MHz Ant1



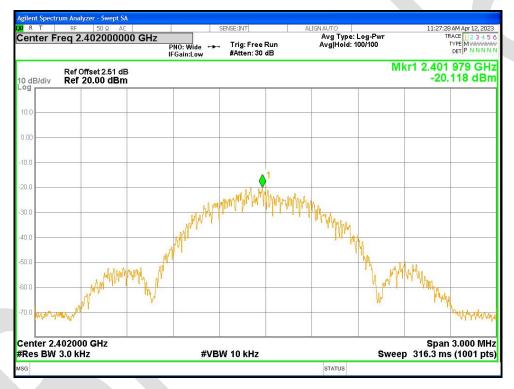
gilent Spectrum Analyzer - Occupied BV	V			
R T         RF         50 Ω         AC           Senter Freq 2.480000000         C <thc< th="">         C         C         <th< th=""><th>GHz #IFGain:Low</th><th>SENSE:INT Center Freq: 2.4800000 , Trig: Free Run #Atten: 30 dB</th><th>ALIGNAUTO D00 GHz Avg Hold: 100/100</th><th>12:24:33 PM Apr 12, 2023 Radio Std: None Radio Device: BTS</th></th<></thc<>	GHz #IFGain:Low	SENSE:INT Center Freq: 2.4800000 , Trig: Free Run #Atten: 30 dB	ALIGNAUTO D00 GHz Avg Hold: 100/100	12:24:33 PM Apr 12, 2023 Radio Std: None Radio Device: BTS
Ref Offset 2.58 dB 0 dB/div Ref 22.58 dBm				
2.6				
42				
7.4	marian	have when the second se		man
4				holy
7.4	2. 			
enter 2.48 GHz Res BW 30 kHz		#VBW 100 k	Hz	Span 3 MHz Sweep   3.333 ms
Occupied Bandwidth	ı	Total Power	-0.13 dBm	
2.0	0593 MHz			
Transmit Freq Error	23.416 kHz	<b>OBW Power</b>	99.00 %	
x dB Bandwidth	2.504 MHz	x dB	-26.00 dB	
G			STATUS	



Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-20.118	8	Pass
NVNT	BLE 1M	2442	Ant1	-20.962	8	Pass
NVNT	BLE 1M	2480	Ant1	-20.605	8	Pass
NVNT	BLE 2M	2402	Ant1	-22.24	8	Pass
NVNT	BLE 2M	2442	Ant1	-23.077	8	Pass
NVNT	BLE 2M	2480	Ant1	-22.831	8	Pass

#### **19.4 MAXIMUM POWER SPECTRAL DENSITY LEVEL**

#### PSD NVNT BLE 1M 2402MHz Ant1

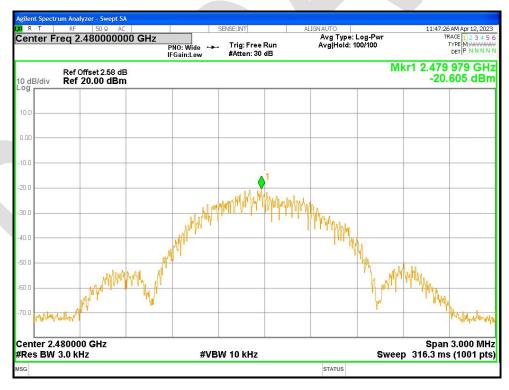


### PSD NVNT BLE 1M 2442MHz Ant1



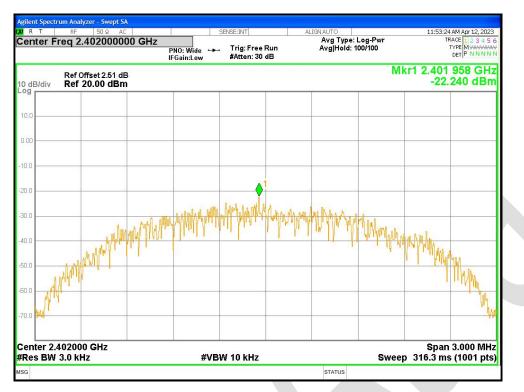


## PSD NVNT BLE 1M 2480MHz Ant1

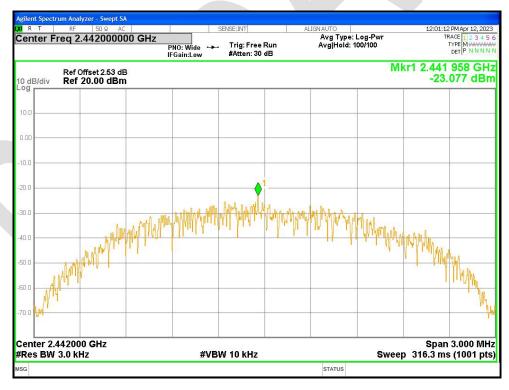


#### PSD NVNT BLE 2M 2402MHz Ant1



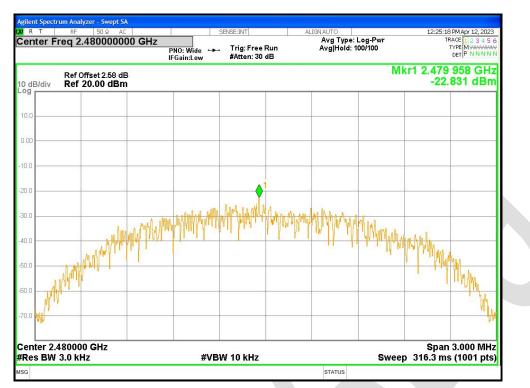


## PSD NVNT BLE 2M 2442MHz Ant1



#### PSD NVNT BLE 2M 2480MHz Ant1



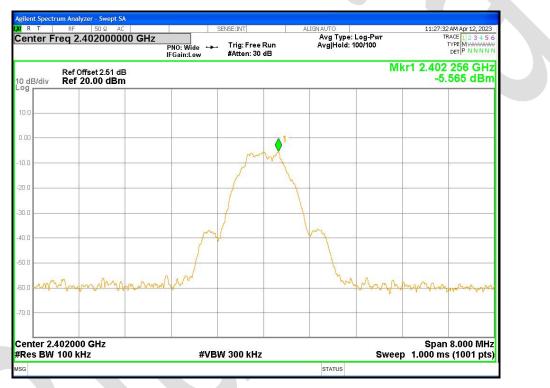




#### 19.5 BAND EDGE

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-49.87	-30	Pass
NVNT	BLE 1M	2480	Ant1	-49.4	-30	Pass
NVNT	BLE 2M	2402	Ant1	-49.51	-30	Pass
NVNT	BLE 2M	2480	Ant1	-48.5	-30	Pass

## Band Edge NVNT BLE 1M 2402MHz Ant1 Ref

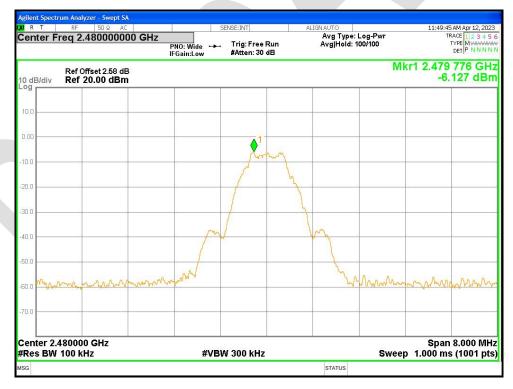


## Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



				yzer - Swept !								
a R Cen	т ter	Fre	RF	50 Ω A .3560000	000 GHz		SENSE:INT			e: Log-Pwr		35 AM Apr 12, 2023 TRACE 1 2 3 4 5 6
					F	NO: Fast ++ Gain:Low	. Trig: Fr #Atten:		Avg Hold	: 100/100		DET P N N N N N
	3/div			offset 2.51 o 20.00 dB							Mkr1 2.4 -5	02 0 GHz .503 dBm
<u>og</u> 10.0							8					
0.00	_					-						<b>≬</b> 1
-10.0	_		_				-				0	- Î
-20.0	-					5					-	
-30.0			_									-35.57 dBm
-40.0 -50.0					2					4	13	2
-60.0	willips"	LANNA.	1mm	mariant	Wednesday	the tite of the	mount	more any the	manushanahanah	upple marches	an man	enout has
70.0	2						8			3	2	
			00 G 00 k			#VB	W 300 k	Hz		Swee	Stop 2 p 9.600 m	.40600 GHz s (1001 pts)
MKR	MODE	TRC	SCL f		× 2.402 0 GHz	-5.503		FUNCTION	FUNCTION WIDTH		UNCTION VALUE	^
23	NN		f		2.402 0 GHz 2.400 0 GHz 2.390 0 GHz	-57.358	dBm					
4	N		f		2.382 0 GHz	-55.432						
5 6 7 8 9												
8												
10												
11 <												×
ISG									STATUS			

# Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



## Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



		ectru		lyzer - Swept S/									
XI R	T	Ere	RF	50 Ω AC			SENSE:INT		ALIGN AU		Log-Pwr		48 AM Apr 12, 2023 TRACE 1 2 3 4 5 6
Jei	iter	FI	eq z	.5200000	Р	NO: Fast 🔸	Trig: Fi #Atten:	ree Run 30 dB	Av	g Hold:	100/100		TYPE M WAAAAAAA DET P N N N N N
10 d	B/di	v		Offset 2.58 di 20.00 dBm									479 8 GHz 5.973 dBm
_og		¥	itei	20.00 001									
10.0	1	A1											
10.00		R											
-20.0		11											
-30.0	1	11					-						
-40.0		H											-36.13 dBm
-50.0			1 <sup>2</sup>	Ċ	4 0 <sup>3</sup>								_
-60.0	wye	ľ	- Sha	withhrought	anophilisterrano	mmulup	Mandalah	- handwargen	tomanthe	maliphian	monthlap	level a population	also and a second and a second as
-70.0	⊢		2		Q		8					2	
			00 0										2.57600 GHz
			100 H	(Hz		#VB	W 300 k				Swee		ns (1001 pts)
MKR 1	MODE	TRC	f		2.479 8 GHz	-5.973		FUNCTION	FUNCTION W	/IDTH		FUNCTION VALUE	<u>^</u>
23	NN		f		2.483 5 GHz 2.500 0 GHz	-58.539	dBm						
4	N		f f		2.500 0 GHz 2.495 1 GHz	-57.503							
5 6 7 8 9													
7													
9													
10													
¢													
ISG									s	TATUS			

## Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



## Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



		ctrur		lyzer - Swept									
(R Ten	T ter	Fre	RF	50 Ω /			SENSE:INT		ALIO	AVG Type	: Log-Pwr		B1 AM Apr 12, 2023
	lei	110	<u>'</u> 4 2		F	PNO: Fast +++ Gain:Low	Trig: Fr #Atten:			Avg Hold:	100/100		DET P N N N N
0 4	3/div			Offset 2.51 20.00 dB									02 0 GHz .111 dBm
.og			nor	20.00 00									
10.0 0.00													
10.00													
20.0													1
30.0	_												/\v2.02.dBm
40.0	-		-		2		8						A M
50.0	-		81		-		1		$-\Diamond^4$				
50.0	Sp./m	1 mile	- aluto	the manager	monorally	uning manager and	m. Anderson	wheneve	without	hower he light the	a har and a second	hour and a soft	human like
70.0					0		8						
			00 0 00 1	GHz (Hz		#VB	W 300 ki	Hz			Swee		.40600 GHz s (1001 pts)
_	MODE	TRC			X	Y		UNCTION	FUNCTI	ON WIDTH		FUNCTION VALUE	<u> </u>
1 2 3	N N N		f f f		2.402 0 GHz 2.400 0 GHz 2.390 0 GHz	-7.111 -40.624 -59.082	dBm						
4	N		f		2.363 8 GHz	-55.536							
6													
5 6 7 8 9													
10													
11													×
SG										STATUS			

## Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



# Band Edge NVNT BLE 2M 2480MHz Ant1 Emission



1         3           1         3           1         4	
3/div         Ref 20.00 dBm           1         1           1	-6.365 dB
Model         Till         Y         Function         Function         Width         Function         F	
1         2         4         3           1         2         4         3           1         2         4         3           1         2         4         3           1         2         4         3           1         2         4         3           1         2         4         3           1         2         4         3           1         2         4         3           1         1         2         4           1         1         2         4           1         1         2         4           1         1         2         4           1         1         2         480 0 GHz           2         483 5 GHz         -5.365 dBm         5           1         1         2         483 5 GHz         -5.79.30 dBm	-36.95 d
Image: Inclusion of the second seco	-36.95 d
Image: Inclusion of the second seco	-36.95 0
Image: Inclusion of the second seco	-36.95 d
Image: Second	
Image: Second	
S BW 100 kHz         #VBW 300 kHz           X006 FRC SGL         X         Y         FUNCTION         FUNC	anningtone town the children over
S BW 100 kHz         #VBW 300 kHz           X006 FRC SGL         X         Y         FUNCTION         FUNC	
N 1 f 2.480 0 GHz -6.365 dBm N 1 f 2.483 5 GHz -57.930 dBm	Stop 2.57600 GI Sweep 9.600 ms (1001 pt
N 1 f 2.483 5 GHz -57.930 dBm	FUNCTION VALUE
N 1 f 2,500 0 GHz -56,778 dBm	
N 1 f 2.500 0 GHz 56.778 dBm N 1 f 2.493 9 GHz 55.457 dBm	
	>



Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-38.61	-30	Pass
NVNT	BLE 1M	2442	Ant1	-38.17	-30	Pass
NVNT	BLE 1M	2480	Ant1	-39.03	-30	Pass
NVNT	BLE 2M	2402	Ant1	-37.99	-30	Pass
NVNT	BLE 2M	2442	Ant1	-36.46	-30	Pass
NVNT	BLE 2M	2480	Ant1	-38.13	-30	Pass

### **19.6 CONDUCTED RF SPURIOUS EMISSION**

## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



#### Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



			zer - Swept S								
RT		RF	50 Q AC			SENSE:INT		ALIGN AUTO	be: Log-Pwr		19 AM Apr 12, 2023
enter	Fre	eq 13	6.265000	F	PNO: Fast 🔸	. Trig: Fr #Atten:		Avg Hol			TYPE MWWWW DET P N N N N
dB/div			ffset 2.51 di 20.00 dBn								.412 GHz .878 dBm
<sup>pg</sup>	-										
0.0			1								
.00											
).0											
).0						5					
0.0											25.72 dBm
			Δ	3 \1	5					and a share a	manuter
).0		- all	harman	merendur	and and and	www.man	monthing	when the server	about the start of a sold		
0.0 <b></b>	Plants	-									
0.0				5		2				2	
tart 30 Res BV			47		#\/B	W 300 ki			Cia	Stop reep 2.530	26.50 GHz
	_				#¥U				34	-	s (1001 pts
R MODE	TRC	SCL		× 2.412 GHz	-5.878		UNCTION	FUNCTION WIDTH		FUNCTION VALUE	^
2 N		f		24.700 GHz	-44.337	dBm					
3 N 4 N		f		4.953 GHz 7.336 GHz	-55.276 -53.834						
4 N 5 N 6 7 8		f		9.559 GHz	-55.111						
5											
3											
9											
1											
											>
3								STATUS			

# Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Ref



#### Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Emission



						er - Swept SA				
11:46:20 AM Apr 12, 20 TRACE 1 2 3 4	Type: Log-Pwr	ALIGN AUTO		SENSE:IN		50 Ω AC .2650000	RF	E.u.e	T	R
TYPE MWWWW DET P N N N	lold: 10/10		Free Run n: 30 dB	ast -		.200000	q 13	Fre	ter	en
Mkr1 2.439 GH -6.380 dBi						fset 2.53 dB 0.00 dBm			B/div	d
										9 0.0
							A1			.00
							<b>9</b>			0.0
										0.0 0.0
										0.0
										0.0
	and a state			<u>5</u>	3 \/4	A3				D.O
	dentra and a set	the state of the second des	an in some	wellingerstau	maronen	why marent	mortere	hron	marce	0.0
										0.0
Stop 26.50 GH Sweep 2.530 s (1001 pt	Sw		kHz	#VBW 300		z	iz 00 ki		t 30 s B1	
FUNCTION VALUE	н	FUNCTION WIDTH	FUNCTION	Y		×		TRC	MODE	_
				-6.380 dBm -44.705 dBm	2.439 GHz 24.885 GHz		f		N	1 2 3
				-55.841 dBm -55.157 dBm	4.980 GHz 7.150 GHz		f f		N N	3 4
				-56.811 dBm	9.586 GHz		f		N	+ 5
										5
										5 6 7 8 9
										0
>										1
	us	STATUS								G

# Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



#### Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission