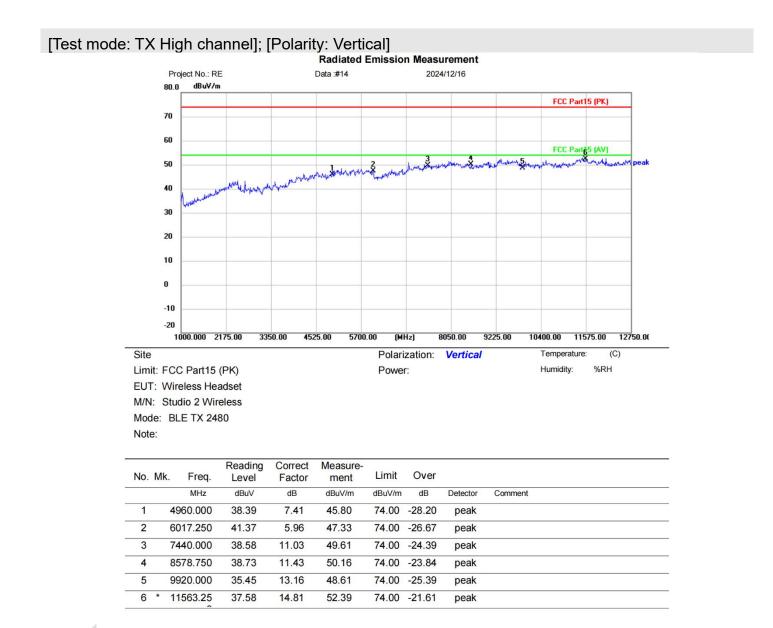


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¥						
*:Maximum	n data	x:Over limit	!:over margin			(Reference Only
Receiver:	ESR	1		Spectrum Analyzer:	ESP40	

Test Result: Pass

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6.9 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

6.9.1 Limit

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.

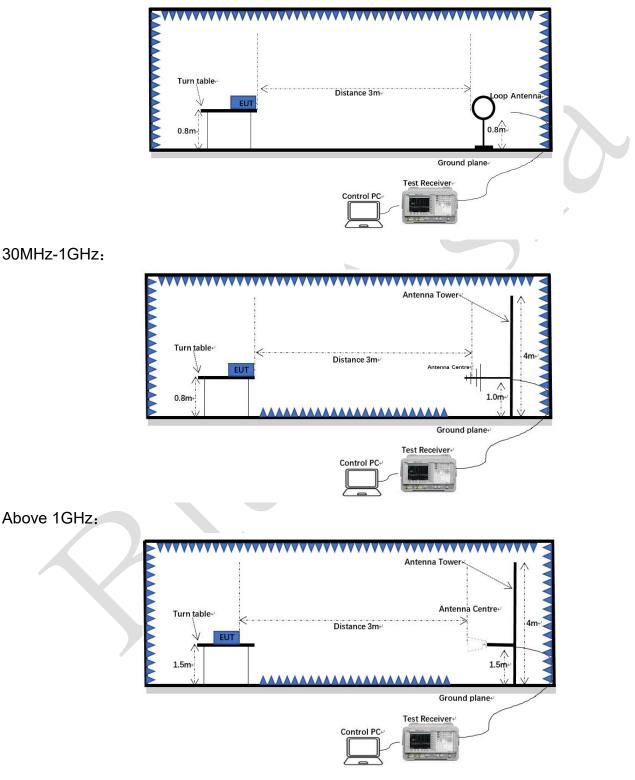
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6.9.2 Test setup

Below 1GHz:



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6.9.3 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.

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)

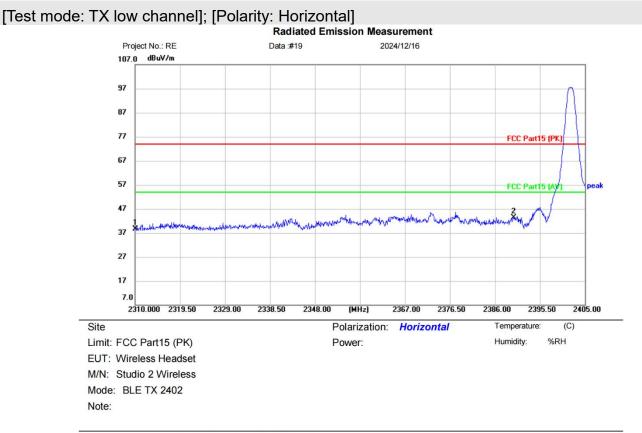
Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is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

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6.9.4 Test data

Remark: During the test, pre-scan the BLE1M/BLE2M mode, and found the BLE1M mode which it is worse case.



No.	M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	41.57	-2.87	38.70	74.00	-35.30	peak	
2	*	2390.000	45.88	-2.44	43.44	74.00	-30.56	peak	

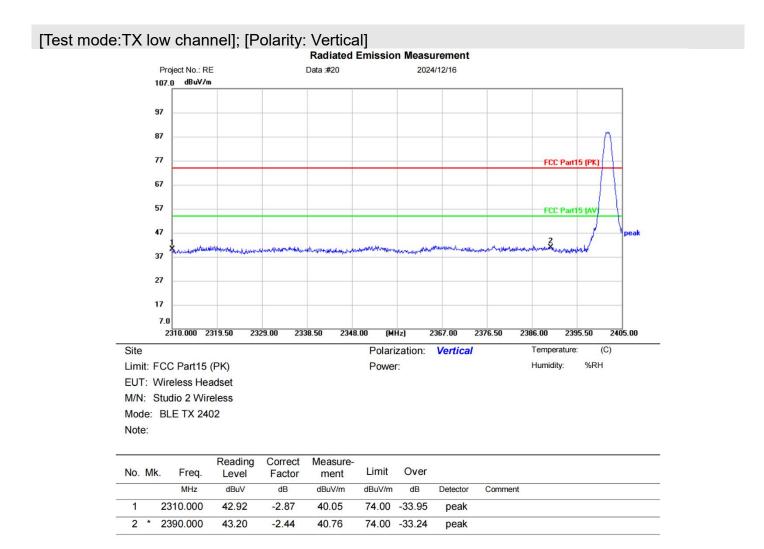
*:Maximum data	x:Over limit	l:over margin			<pre> Reference Only</pre>
Receiver: ESR_	1		Spectrum Analyzer:	FSP40	

Test Result: Pass

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*:Maximum data x:Over limit !:over margin Receiver: ESR_1 Spectrum Analyzer: FSP40

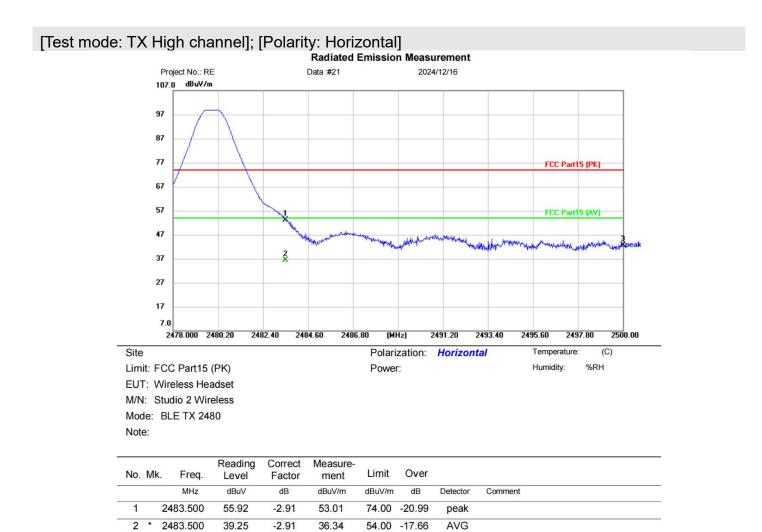
Test Result: Pass

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*:Maximum da	ata	x:Over limit	l:over margin			(Reference Only
Receiver:	ESR	1		Spectrum Analyzer:	FSP40	

74.00 -31.43

peak

Test Result: Pass

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2500.000

3

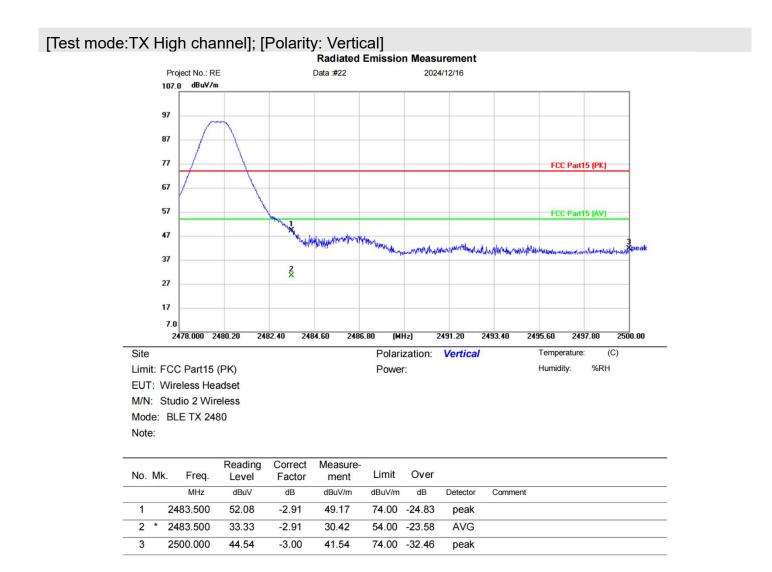
45.57

-3.00

42.57



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*:Maximum	data	x:Over limit	l:over margin			(Reference Only
Receiver:	ESR	1		Spectrum Analyzer:	ESP40	

Test Result: Pass

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7 Appendix A

Maximum Conducted Output Power

Condition	Mode	Frequency	Antenna	Conducted Power	Limit	Verdict
		(MHz)		(dBm)	(dBm)	
NVNT	BLE 1M	2402	Ant1	0.711	30	Pass
NVNT	BLE 1M	2442	Ant1	0.413	30	Pass
NVNT	BLE 1M	2480	Ant1	0.324	30	Pass
NVNT	BLE 2M	2402	Ant1	0.714	30	Pass
NVNT	BLE 2M	2442	Ant1	0.49	30	Pass
NVNT	BLE 2M	2480	Ant1	0.422	30	Pass

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2442MHz Ant1

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Power NVNT BLE 1M 2480MHz Ant1



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-6dB Bandwidth

Condition	Mode	Frequency	Antenna	-6 dB Bandwidth	Limit -6 dB	Verdict
		(MHz)		(MHz)	Bandwidth (MHz)	
NVNT	BLE 1M	2402	Ant1	0.657	0.5	Pass
NVNT	BLE 1M	2442	Ant1	0.65	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.652	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.104	0.5	Pass
NVNT	BLE 2M	2442	Ant1	1.079	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.114	0.5	Pass

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

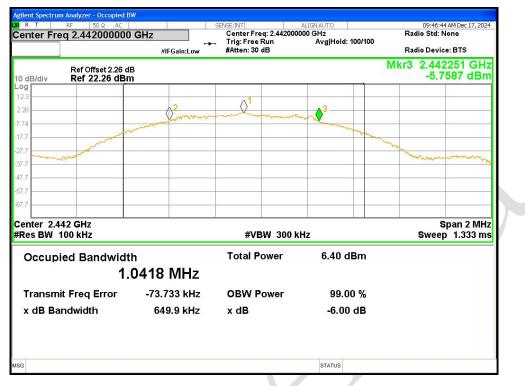
R T RF 50Ω AC Inter Freq 2.402000000	GHz #IFGain:Low	SENSE:INT Center Freq: 2.4020000 Trig: Free Run #Atten: 30 dB	ALIGNAUTO D00 GHz Avg Hold: 100/100	09:42:10 AM Dec 17, 202 Radio Std: None Radio Device: BTS
Ref Offset 2.73 dl dB/div Ref 22.73 dBn	3			Mkr3 2.402255 GH -5.7528 dBr
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7		and a summer	2 million	
3			m	
B				ma
3 man market				and when a sum of
	2			3
3				
3			2 2 2	
nter 2.402 GHz es BW 100 kHz		#VBW 300 k	Hz	Span 2 MH Sweep 1.333 m
Occupied Bandwidt	h	Total Power	6.75 dBm	
1.	0373 MHz			
Fransmit Freq Error	-72.916 kHz	OBW Power	99.00 %	
dB Bandwidth	656.7 kHz	x dB	-6.00 dB	
			STATUS	

-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1

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-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



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-6dB Bandwidth NVNT BLE 2M 2442MHz Ant1



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Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.0160
NVNT	BLE 1M	2442	Ant1	1.0192
NVNT	BLE 1M	2480	Ant1	1.0178
NVNT	BLE 2M	2402	Ant1	2.0120
NVNT	BLE 2M	2442	Ant1	1.9957
NVNT	BLE 2M	2480	Ant1	2.0344

OBW NVNT BLE 1M 2402MHz Ant1



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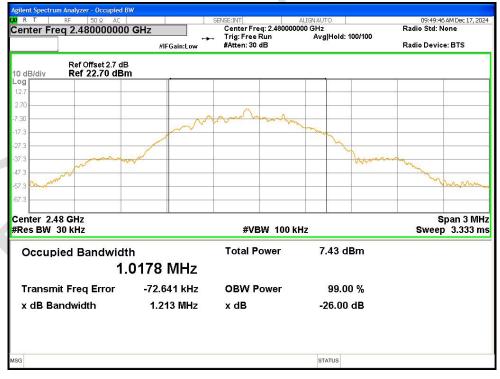
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OBW NVNT BLE 1M 2480MHz Ant1



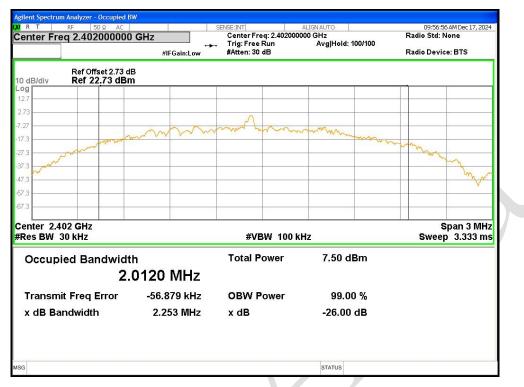
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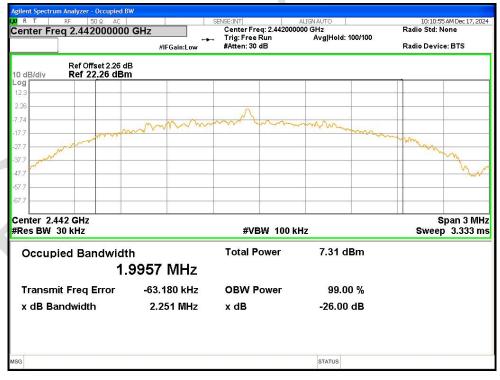
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Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	0.568	8	Pass
NVNT	BLE 1M	2442	Ant1	-0.555	8	Pass
NVNT	BLE 1M	2480	Ant1	0.16	8	Pass
NVNT	BLE 2M	2402	Ant1	0.635	8	Pass
NVNT	BLE 2M	2442	Ant1	0.355	8	Pass
NVNT	BLE 2M	2480	Ant1	0.237	8	Pass

PSD NVNT BLE 1M 2402MHz Ant1



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PSD NVNT BLE 1M 2480MHz Ant1



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PSD NVNT BLE 2M 2442MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1

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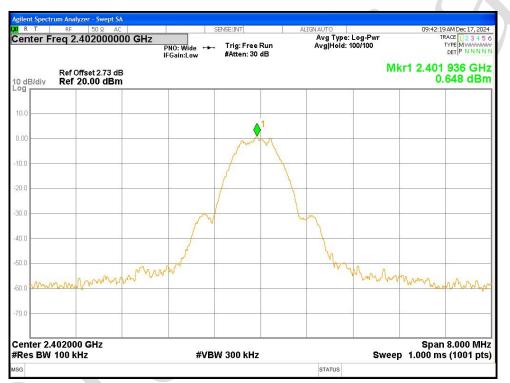


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Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-54.12	-20	Pass
NVNT	BLE 1M	2480	Ant1	-54.84	-20	Pass
NVNT	BLE 2M	2402	Ant1	-55.36	-20	Pass
NVNT	BLE 2M	2480	Ant1	-51.66	-20	Pass

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

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R T RF SOΩ AC SENSE:INT enter Freq 2.356000000 GHz PN0: Fast →→ Trig: Free Run PN0: Fast	ALIGN AUTO 09:42:22 AM Dec 17, 2024 Avg Type: Log-Pwr TRACE 12 3 4 5
DNO East +++ Irig: Free Run	Avg Type. Log-rwr Macc 12345 Avg Hold: 100/100 TYPE Mimm
IFGain:Low #Atten: 30 dB	Avginoid: 100/100 Det P NNN
dB/div Ref 20.00 dBm	Mkr1 2.401 9 GHz 0.722 dBm
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tart 2.30600 GHz Res BW 100 kHz #VBW 300 kHz	Stop 2.40600 GHz Sweep 9.600 ms (1001 pts
R MODE TRC SCL X FUNCTION	FUNCTION WIDTH FUNCTION VALUE
2 N 1 f 2.400 0 GHz -52.053 dBm	
4 N 1 f 2.363 6 GHz -53.478 dBm 5	
7	
9	
1	
al	STATUS

Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



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ent Spect		lyzer - Swept								
	_R ⊧ req 2	50 Ω A .5260000	000 GHz		ig: Free Run	AL	IGNAUTO Avg Type: Avg Hold: '			05 AM Dec 17, 2024 IRACE 1 2 3 4 5 1 TYPE MWWWWW
			IFG	ain:Low #A	tten: 30 dB		1978			DET PNNNN
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	1									
				2	2					-19.81 dBn
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urt 2.47	7600 0	SH7							Stop 2	.57600 GHz
es BW				#VBW 30	00 kHz			Swee	p 9.600 m	s (1001 pts
MODE T	RC SCL		X	Y	FUNCTION	FUNC	TION WIDTH	ł	UNCTION VALUE	
N N	f		2.479 9 GHz 2.483 5 GHz	0.230 dBm -57.736 dBm						
N	f		2.500 0 GHz	-57.479 dBm						
N	1 f		2.490 0 GHz	-54.660 dBm						
										~
							071710			>
0							STATUS			

Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



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		ctrun		/zer - Swept	SA						
en		Fre	RF)00 GHz	SENSE:IN	Т	ALIGN AUTO Avg Type	: Log-Pwr		4 AM Dec 17, 2024
		110	9 2.	0000000	PN		: Free Run en: 30 dB	Avg Hold:	100/100		DET P N N N N
_			D .60	ffset 2.73 d						Mkr1 2.4	01 9 GHz
	B/div			20.00 dB						0	.677 dBm
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tai	+2	306	00 G	47						Stop 2	.40600 GHz
			00 kl			#VBW 300	kHz		Swe		s (1001 pts)
1KR		TRC			X	Y	FUNCTION	FUNCTION WIDTH		FUNCTION VALUE	^
1	N		f		2.401 9 GHz 2.400 0 GHz	0.677 dBm -33.043 dBm					
2 3 4	NN		f		2.390 0 GHz 2.387 8 GHz	-58.526 dBm -54.620 dBm					
5	IN		1		2.367 6 GHZ	-54.620 dBm					i i i i i i i i i i i i i i i i i i i
5 6 7 8 9											
8											
10											
11											<u>×</u>
SG								STATUS			

Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Band Edge NVNT BLE 2M 2480MHz Ant1 Emission



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ilent Spec	trum Analy:	zer - Swept S/	l.							
RT	RF	50 Ω AC		S	ENSE:INT		ALIGN AUTO	vpe: Log-Pwr	10:14:	D4 AM Dec 17, 2024 TRACE 1 2 3 4 5 6
enterr	-req z.:	5260000	Р	NO: Fast 🔸	Trig: Fre #Atten: \$			old: 100/100		TYPE MWWWWW DET P N N N N N
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10 10	1			-		_				
	4									
0										-19.75 dBm
	n									
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0	2		8						2	
	7600 GI V 100 kH			#VBV	V 300 kH	Iz		Sw	Stop 2 eep 9.600 m	2.57600 GHz is (1001 pts)
	TRC SCL		×	Y		UNCTION	FUNCTION WIDTH		FUNCTION VALUE	^
N N N	1 f 1 f 1 f		2.479 9 GHz 2.483 5 GHz 2.500 0 GHz	0.275 0 -56.126 0 -57.569 0	iBm iBm					
N) T		2.485 9 GHz	-51.404 (вm					
										>
i							STATU	IS		

ZF

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Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-36.16	-20	Pass
NVNT	BLE 1M	2442	Ant1	-35.79	-20	Pass
NVNT	BLE 1M	2480	Ant1	-35.62	-20	Pass
NVNT	BLE 2M	2402	Ant1	-36.01	-20	Pass
NVNT	BLE 2M	2442	Ant1	-36.02	-20	Pass
NVNT	BLE 2M	2480	Ant1	-35.56	-20	Pass

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

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