

APPENDIX REPORT

Project No.	SHT2311064901EW	Radio Specification	Bluetooth BLE
Test sample No.	YPHT23110649001	Model No.	ATMET2K
Start test date	2024-03-18	Finish date	2024-03-18
Temperature	25℃	Humidity	51%
Test Engineer	Xiangyu Wei	Auditor	Xiaodong Zheo

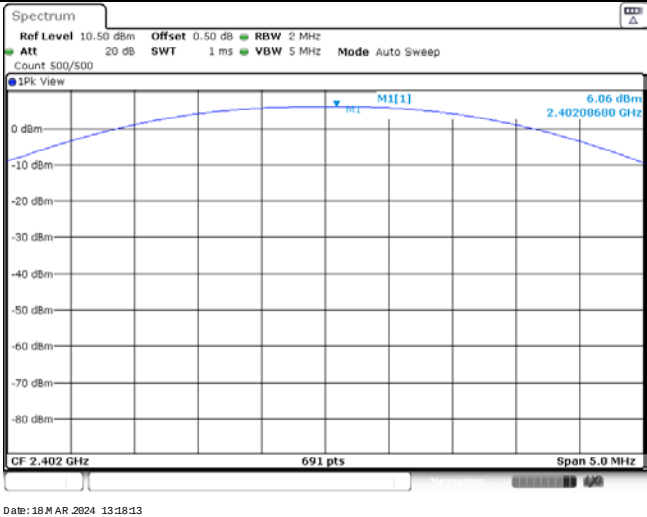
Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	Power Spectral Density	PASS
C	6 dB Bandwidth	PASS
D	99% Occupied Bandwidth	PASS
E	Duty cycle	PASS
F	Band edge and Spurious Emissions (conducted)	PASS

Appendix A: Peak Output Power

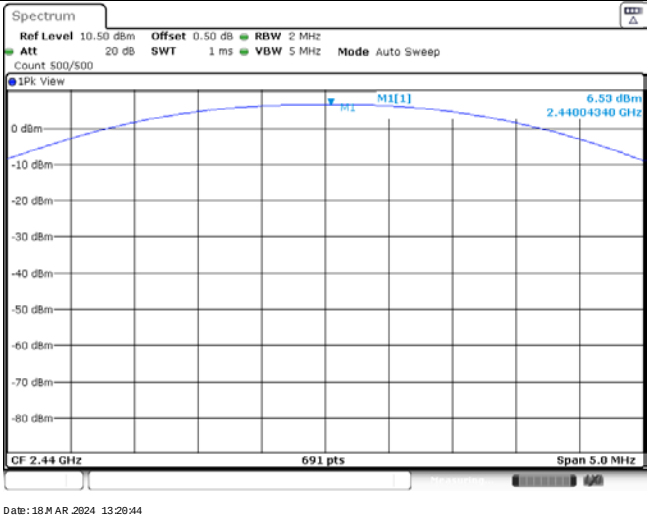
Test rate	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
1Mbps	00	6.06	6.02	≤ 30.00	Pass
	19	6.53	6.45		
	39	7.26	7.21		
2Mbps	00	6.28	6.24	≤ 30.00	Pass
	19	6.75	6.69		
	39	7.98	7.94		

Test rate: 1Mbps

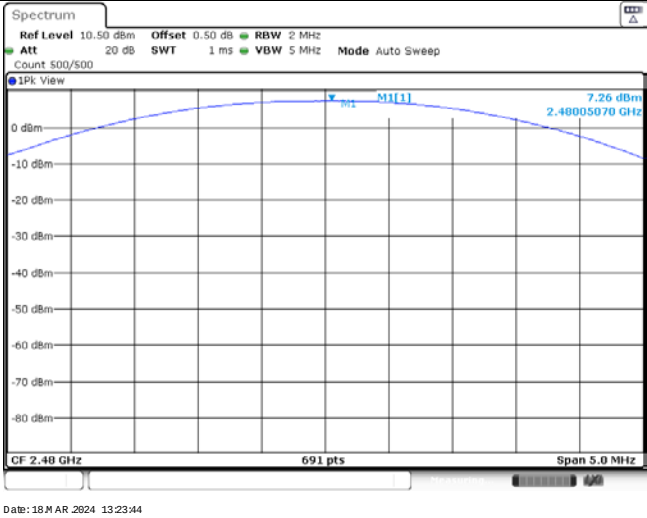
CH00

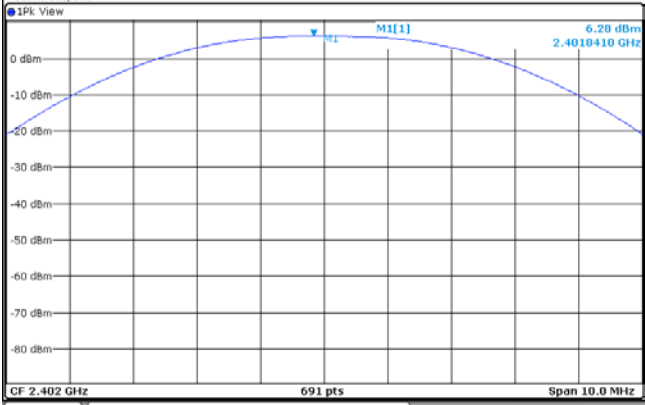
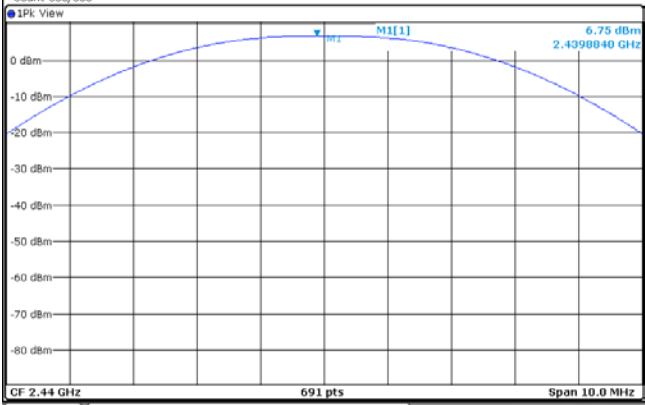
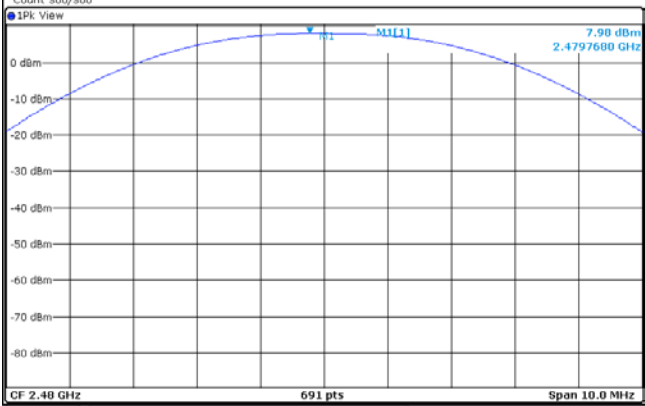


CH19



CH39

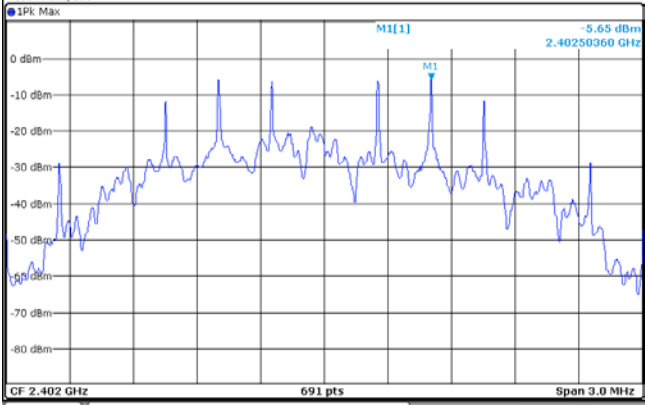
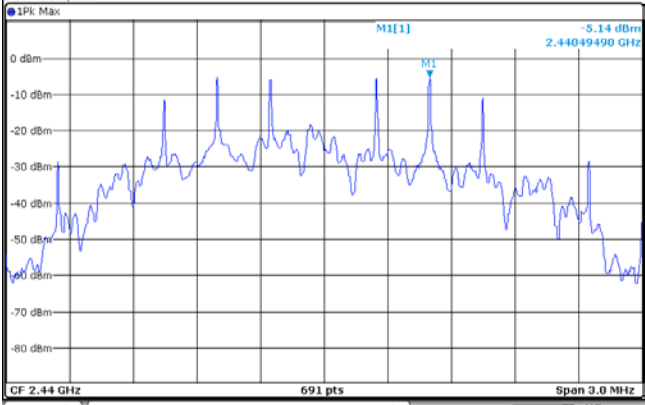
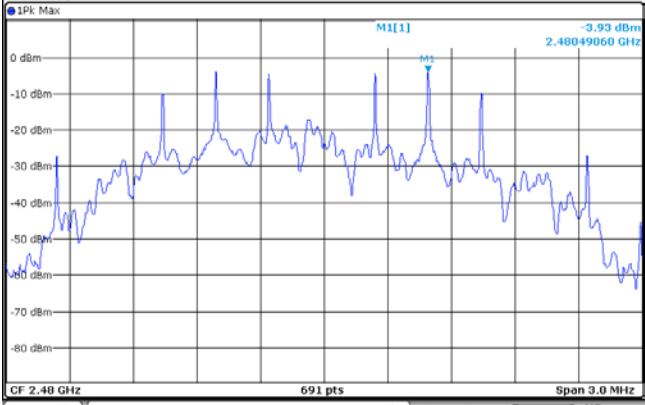


Test rate:		2Mbps
CH00	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 MHz Att 20 dB SWT 1 ms VBW 10 MHz Mode Auto Sweep Count 500/500 IPk View MI[1] 6.28 dBm 2.4018410 GHz  CF 2.402 GHz 691 pts Span 10.0 MHz Date: 18 MAR 2024 13:25:42	
CH19	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 MHz Att 20 dB SWT 1 ms VBW 10 MHz Mode Auto Sweep Count 500/500 IPk View MI[1] 6.75 dBm 2.4398840 GHz  CF 2.44 GHz 691 pts Span 10.0 MHz Date: 18 MAR 2024 13:27:51	
CH39	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 MHz Att 20 dB SWT 1 ms VBW 10 MHz Mode Auto Sweep Count 500/500 IPk View MI[1] 7.98 dBm 2.4797680 GHz  CF 2.48 GHz 691 pts Span 10.0 MHz Date: 18 MAR 2024 16:18:48	

Appendix B: Power Spectral Density

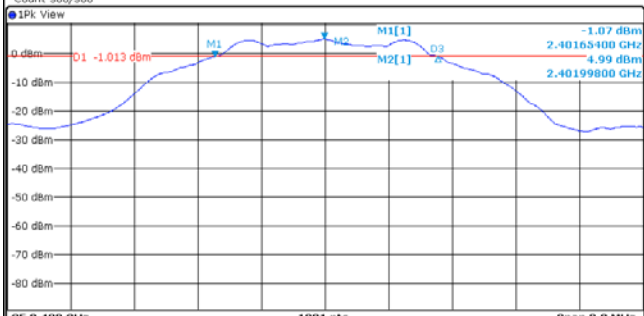
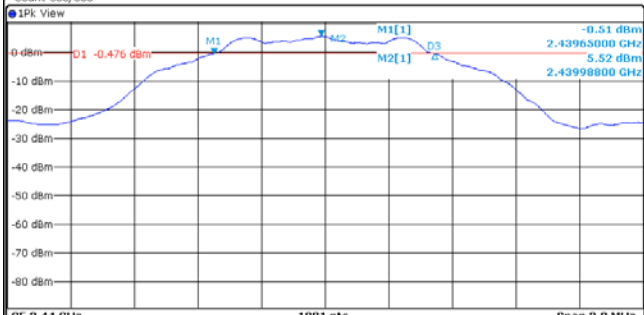
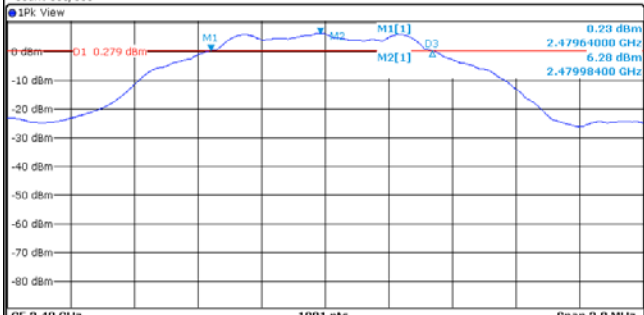
Test rate	Channel	Power Spectral Density(dBm/3KHz)	Limit (dBm/3KHz)	Result
1Mbps	00	-10.55	≤8.00	Pass
	19	-10.01		
	39	-9.20		
2Mbps	00	-5.65	≤8.00	Pass
	19	-5.14		
	39	-3.93		

Test rate:		1Mbps
CH00	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz Att 20 dB SWT 632.3 μs VBW 10 kHz Mode Auto FFT Count 100/100 IPk Max CF 2.402 GHz691 ptsSpan 1.0 MHz Date: 18 MAR 2024 13:18:28	
CH19	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz Att 20 dB SWT 632.3 μs VBW 10 kHz Mode Auto FFT Count 100/100 IPk Max CF 2.44 GHz691 ptsSpan 1.0 MHz Date: 18 MAR 2024 13:20:58	
CH39	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz Att 20 dB SWT 632.3 μs VBW 10 kHz Mode Auto FFT Count 100/100 IPk Max CF 2.48 GHz691 ptsSpan 1.0 MHz Date: 18 MAR 2024 13:23:58	

Test rate:		2Mbps
CH00	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz Att 20 dB SWT 632.1 μs VBW 10 kHz Mode Auto FFT Count 100/100 IPk Max  CF 2.402 GHz691 ptsSpan 3.0 MHz Date: 18 MAR 2024 13:25:56	
CH19	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz Att 20 dB SWT 632.1 μs VBW 10 kHz Mode Auto FFT Count 100/100 IPk Max  CF 2.44 GHz691 ptsSpan 3.0 MHz Date: 18 MAR 2024 13:28:05	
CH39	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz Att 20 dB SWT 632.1 μs VBW 10 kHz Mode Auto FFT Count 100/100 IPk Max  CF 2.48 GHz691 ptsSpan 3.0 MHz Date: 18 MAR 2024 16:18:55	

Appendix C: 6dB bandwidth

Type	Channel	6dB Bandwidth(kHz)	Limit (kHz)	Result
1Mbps	00	700.00	≥500	Pass
	19	694.00		
	39	696.00		
2Mbps	00	1070.00	≥500	Pass
	19	1070.00		
	39	1072.00		

Test rate:		1Mbps																																
CH00	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 19.1 μs VBW 300 kHz Mode Auto FFT Count 500/500 IPk View  CF 2.402 GHz1001 ptsSpan 2.0 MHz <table><tr><th>Marker</th><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td></td><td>1</td><td>2.401654 GHz</td><td>-1.07 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td></td><td>1</td><td>2.401998 GHz</td><td>-4.99 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td></td><td>1</td><td>700.0 kHz</td><td>0.05 dB</td><td></td><td></td></tr></table> Date: 18 MAR 2024 13:17:58		Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1			1	2.401654 GHz	-1.07 dBm			M2			1	2.401998 GHz	-4.99 dBm			D3	M1		1	700.0 kHz	0.05 dB		
Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result																											
M1			1	2.401654 GHz	-1.07 dBm																													
M2			1	2.401998 GHz	-4.99 dBm																													
D3	M1		1	700.0 kHz	0.05 dB																													
CH19	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 19.1 μs VBW 300 kHz Mode Auto FFT Count 500/500 IPk View  CF 2.44 GHz1001 ptsSpan 2.0 MHz <table><tr><th>Marker</th><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td></td><td>1</td><td>2.43965 GHz</td><td>-0.51 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td></td><td>1</td><td>2.439988 GHz</td><td>-5.52 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td></td><td>1</td><td>694.0 kHz</td><td>0.01 dB</td><td></td><td></td></tr></table> Date: 18 MAR 2024 13:20:28		Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1			1	2.43965 GHz	-0.51 dBm			M2			1	2.439988 GHz	-5.52 dBm			D3	M1		1	694.0 kHz	0.01 dB		
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Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result																											
M1			1	2.47964 GHz	0.23 dBm																													
M2			1	2.479984 GHz	-6.28 dBm																													
D3	M1		1	696.0 kHz	0.04 dB																													

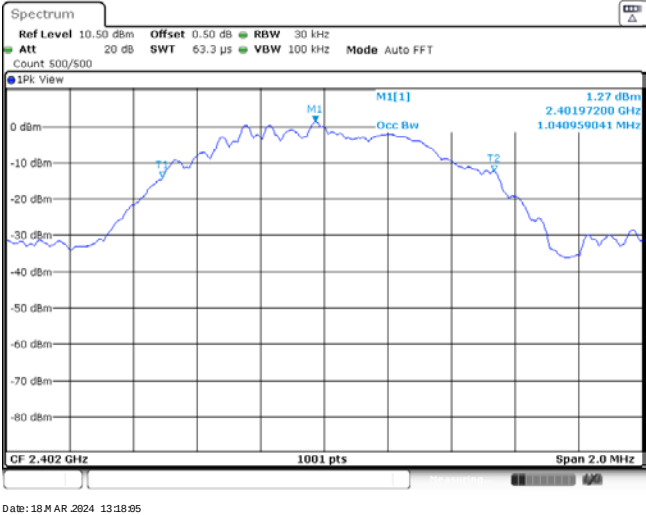
Test rate:		2Mbps																																
CH00	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Count 500/500 IPk View CF 2.402 GHz 1001 pts Span 5.0 MHz <table><tr><th>Marker</th><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td></td><td>1</td><td>2.401465 GHz</td><td>-1.78 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td></td><td>1</td><td>2.40199 GHz</td><td>-4.49 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td></td><td>1</td><td>1.07 MHz</td><td>0.22 dB</td><td></td><td></td></tr></table> Date: 18 MAR 2024 13:25:26		Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1			1	2.401465 GHz	-1.78 dBm			M2			1	2.40199 GHz	-4.49 dBm			D3	M1		1	1.07 MHz	0.22 dB		
Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result																											
M1			1	2.401465 GHz	-1.78 dBm																													
M2			1	2.40199 GHz	-4.49 dBm																													
D3	M1		1	1.07 MHz	0.22 dB																													
CH19	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Count 500/500 IPk View CF 2.44 GHz 1001 pts Span 5.0 MHz <table><tr><th>Marker</th><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td></td><td>1</td><td>2.43946 GHz</td><td>-1.11 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td></td><td>1</td><td>2.43998 GHz</td><td>-4.98 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td></td><td>1</td><td>1.07 MHz</td><td>-0.06 dB</td><td></td><td></td></tr></table> Date: 18 MAR 2024 13:27:35		Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1			1	2.43946 GHz	-1.11 dBm			M2			1	2.43998 GHz	-4.98 dBm			D3	M1		1	1.07 MHz	-0.06 dB		
Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result																											
M1			1	2.43946 GHz	-1.11 dBm																													
M2			1	2.43998 GHz	-4.98 dBm																													
D3	M1		1	1.07 MHz	-0.06 dB																													
CH39	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 18.9 µs VBW 300 kHz Mode Auto FFT Count 500/500 IPk View CF 2.48 GHz 1001 pts Span 4.0 MHz <table><tr><th>Marker</th><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td></td><td>1</td><td>2.47945 GHz</td><td>0.11 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td></td><td>1</td><td>2.47997 GHz</td><td>6.26 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td></td><td>1</td><td>1.072 MHz</td><td>-0.08 dB</td><td></td><td></td></tr></table> Date: 18 MAR 2024 16:18:19		Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1			1	2.47945 GHz	0.11 dBm			M2			1	2.47997 GHz	6.26 dBm			D3	M1		1	1.072 MHz	-0.08 dB		
Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result																											
M1			1	2.47945 GHz	0.11 dBm																													
M2			1	2.47997 GHz	6.26 dBm																													
D3	M1		1	1.072 MHz	-0.08 dB																													

Appendix D: 99% Occupied Bandwidth

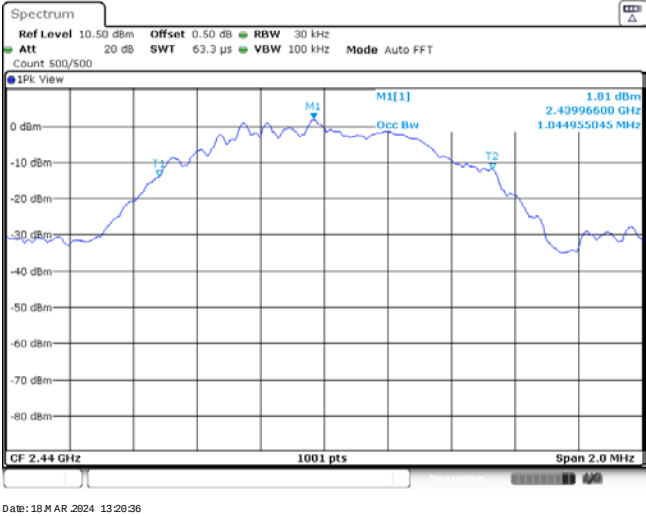
Test rate	Channel	99% Occupied Bandwidth(MHz)	Limit (kHz)	Result
1Mbps	00	1.04	-	Pass
	19	1.05		
	39	1.04		
2Mbps	00	2.04	-	Pass
	19	2.03		
	39	2.03		

Test rate: 1Mbps

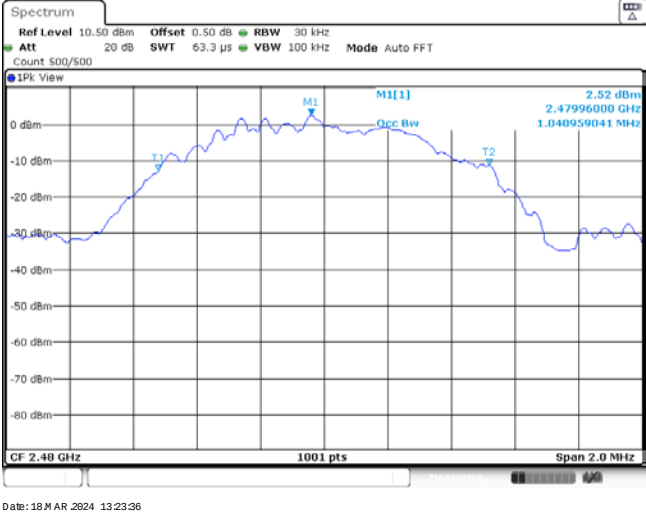
CH00



CH19

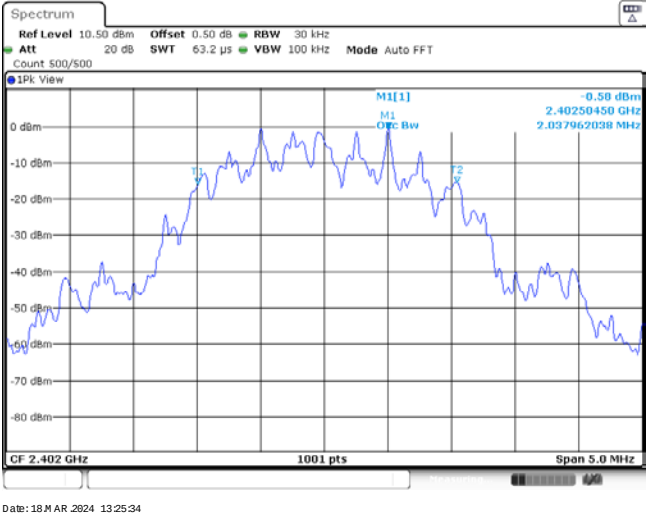


CH39

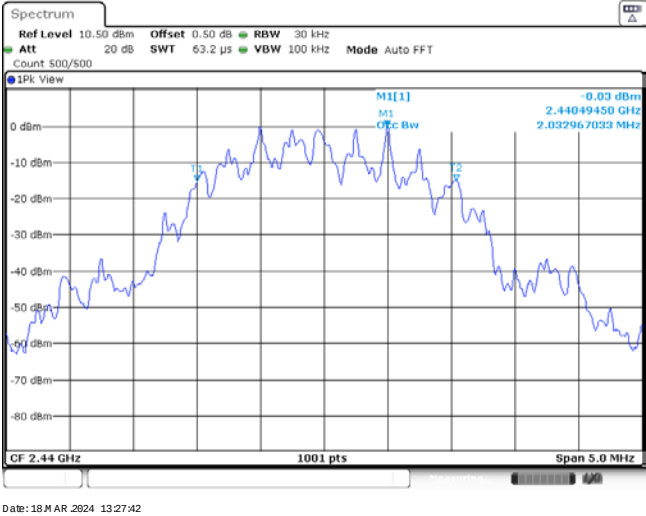


Test rate: 2Mbps

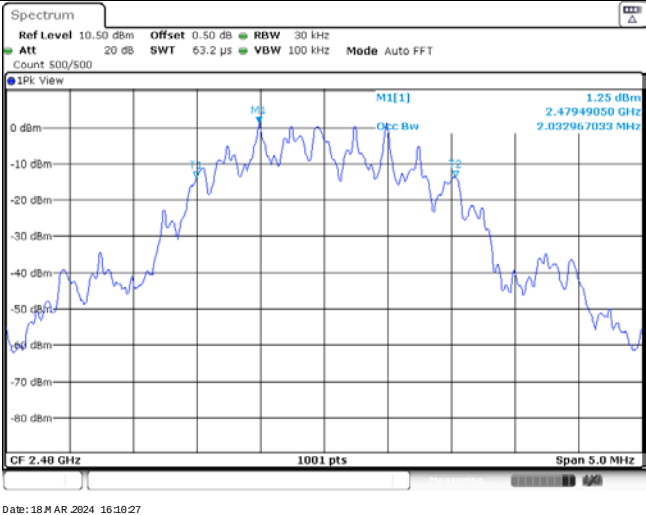
CH00



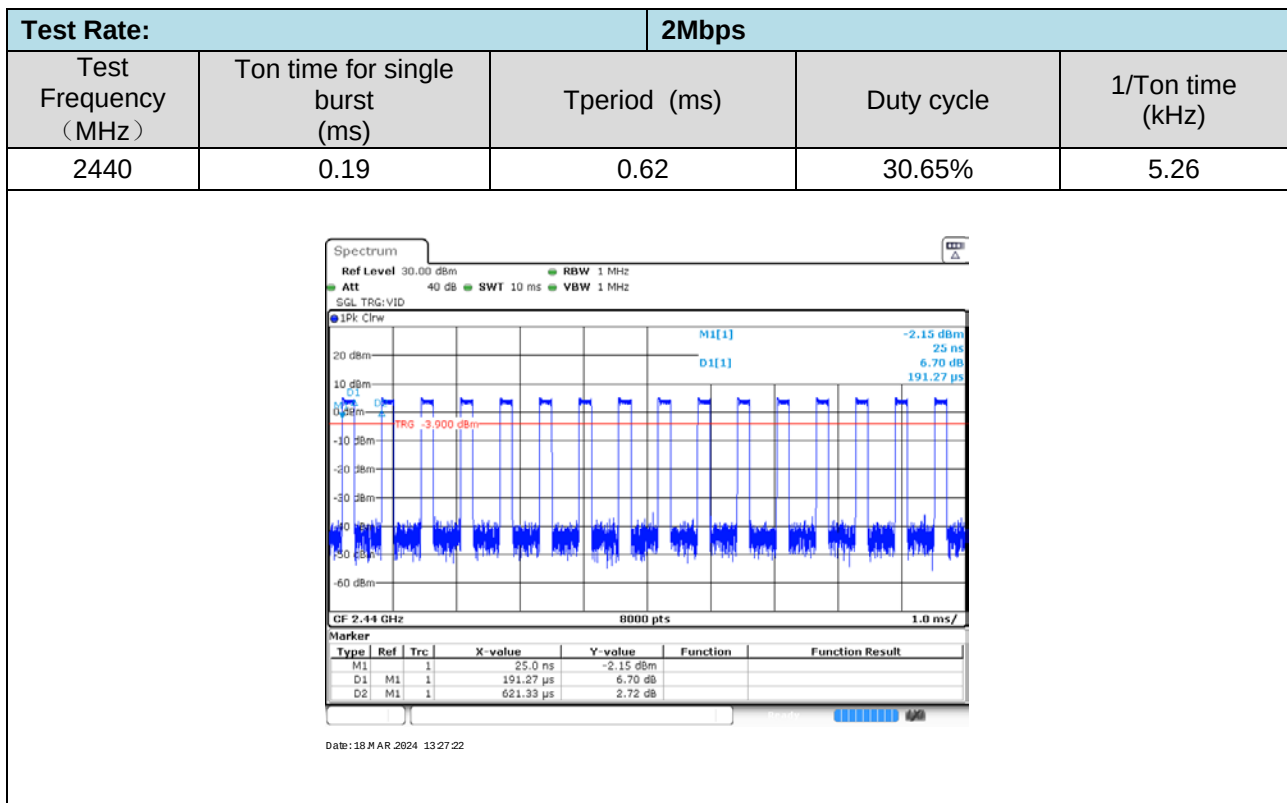
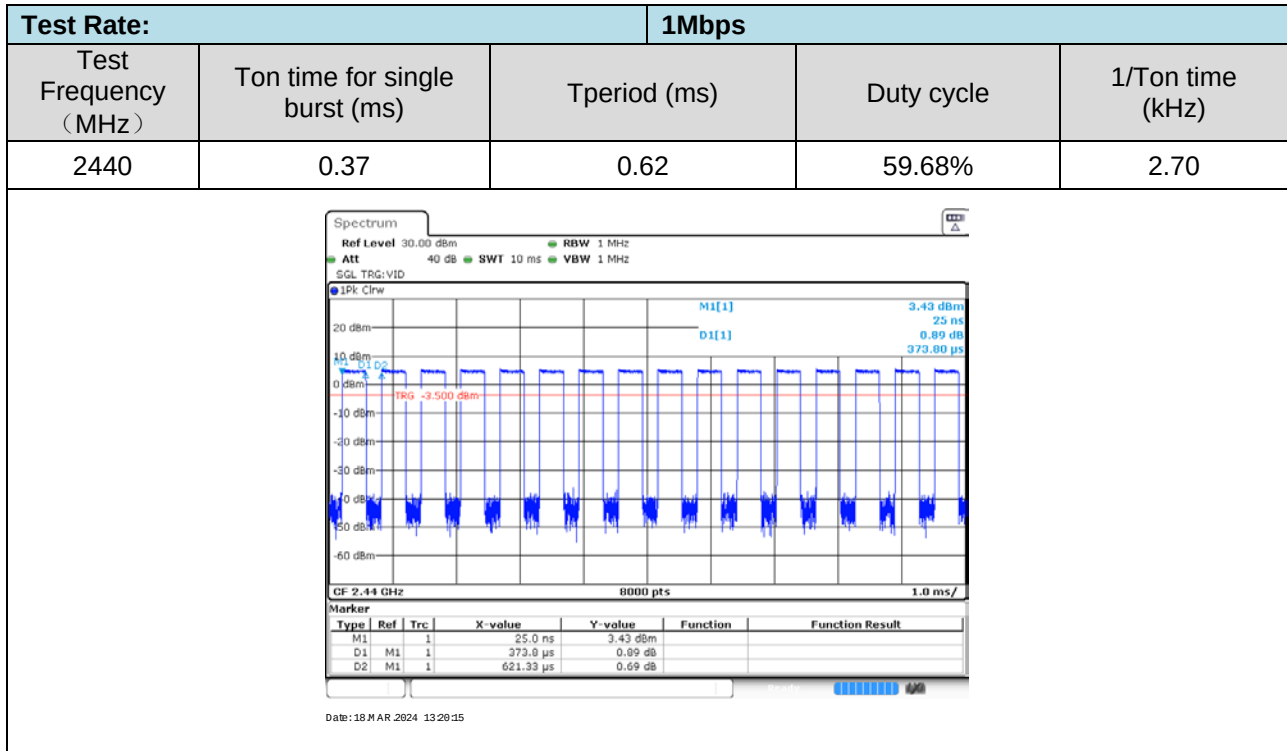
CH19



CH39



Appendix E: Duty cycle



Appendix F: Band edge and Spurious Emissions (conducted)

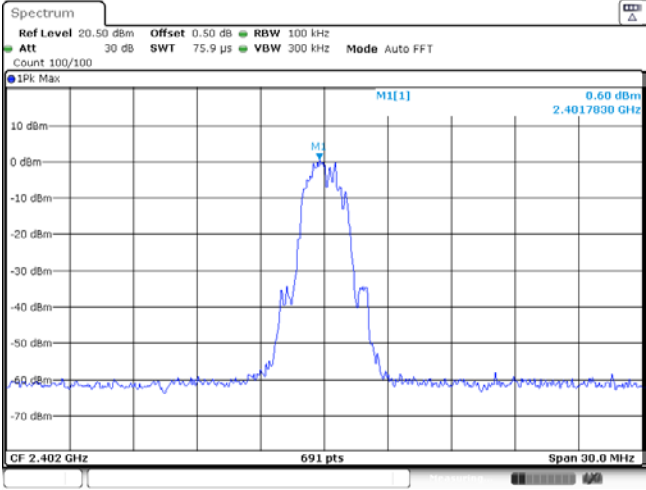
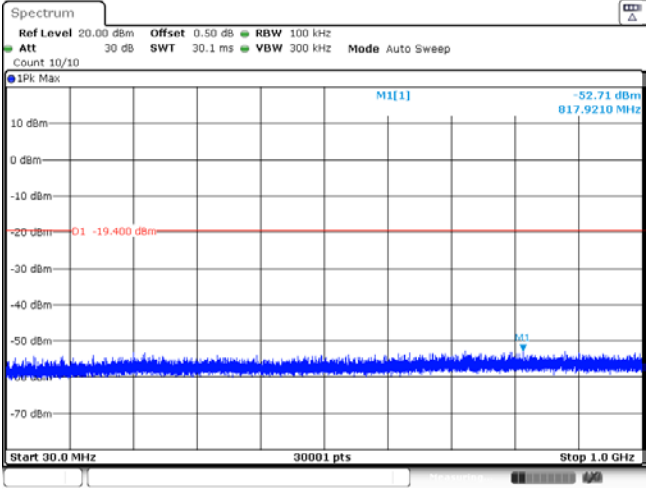
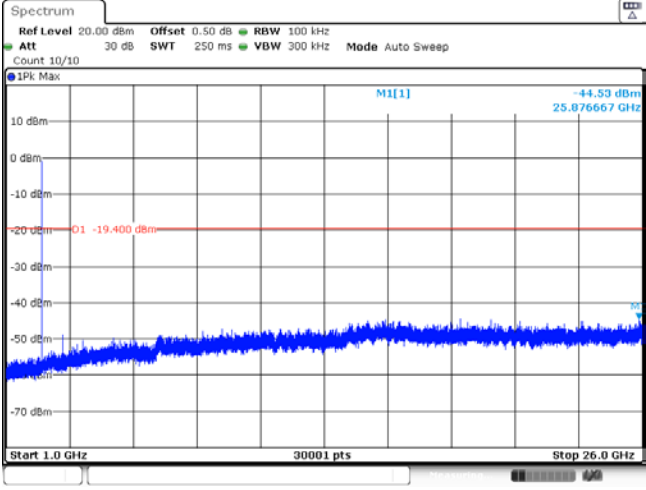
Test Item:	Band edge	Test Rate:	1Mbps																																								
CH00	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 1.1 ms VBW 300 kHz Mode Auto Sweep Count 300/300 1Pk Max M1[1] 4.61 dBm 2.402040 GHz M2[1] -56.86 dBm 2.400000 GHz D1 -15.290 dBm Start 2.31 GHz 691 pts Stop 2.405 GHz Marker <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td></td><td>2.40204 GHz</td><td>4.61 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-56.86 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-65.38 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-65.68 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.39963 GHz</td><td>-55.27 dBm</td><td></td><td></td></tr></tbody></table> Date: 18 MAR 2024 13:18:37	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.40204 GHz	4.61 dBm			M2	1		2.4 GHz	-56.86 dBm			M3	1		2.39 GHz	-65.38 dBm			M4	1		2.31 GHz	-65.68 dBm			M5	1		2.39963 GHz	-55.27 dBm		
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M1	1		2.40204 GHz	4.61 dBm																																							
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M5	1		2.39963 GHz	-55.27 dBm																																							
CH39	Spectrum Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz Att 20 dB SWT 56.9 μs VBW 300 kHz Mode Auto FFT Count 100/100 1Pk Max M1 6.22 dBm 2.4799900 GHz M2[1] -62.90 dBm 2.4835000 GHz D1 -13.780 dBm Start 2.478 GHz 691 pts Stop 2.5 GHz Marker <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td></td><td>2.47999 GHz</td><td>6.22 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-62.90 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-68.00 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.484058 GHz</td><td>-62.13 dBm</td><td></td><td></td></tr></tbody></table> Date: 18 MAR 2024 13:24:57	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.47999 GHz	6.22 dBm			M2	1		2.4835 GHz	-62.90 dBm			M3	1		2.5 GHz	-68.00 dBm			M4	1		2.484058 GHz	-62.13 dBm									
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Type	Ref	Trc	X-value	Y-value	Function	Function Result																																					
M1	1		2.40204 GHz	4.27 dBm																																							
M2	1		2.4 GHz	-35.87 dBm																																							
M3	1		2.39 GHz	-65.04 dBm																																							
M4	1		2.31 GHz	-66.12 dBm																																							
M5	1		2.399906 GHz	-45.36 dBm																																							

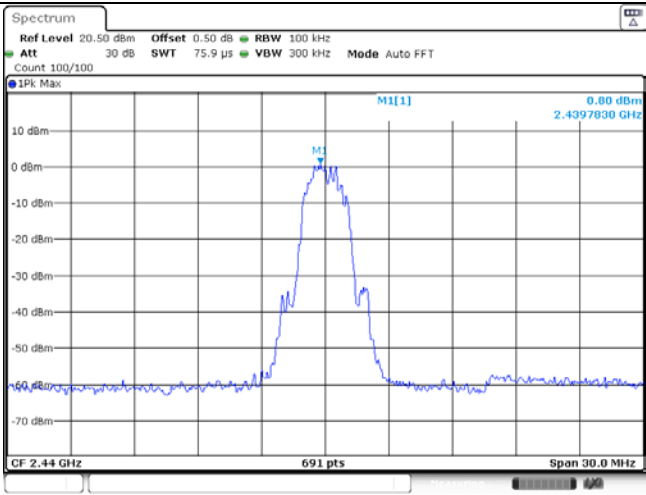
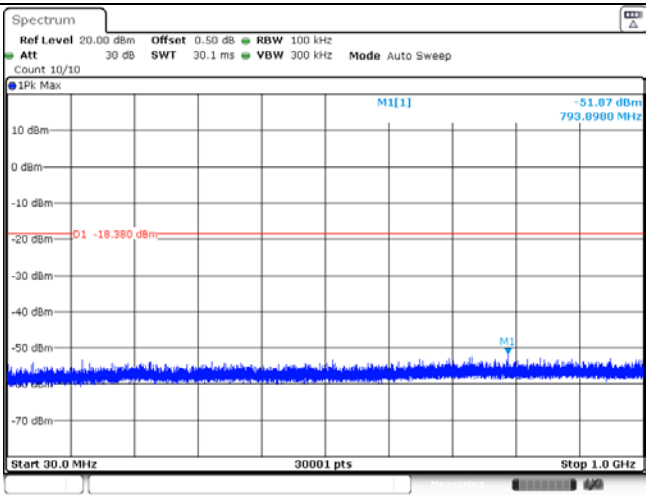
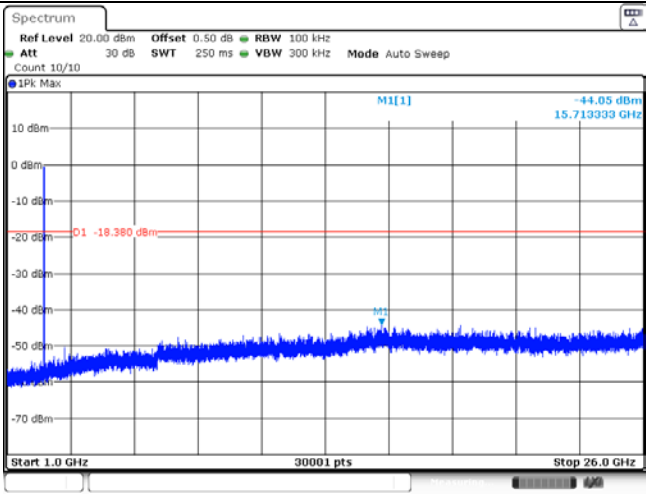


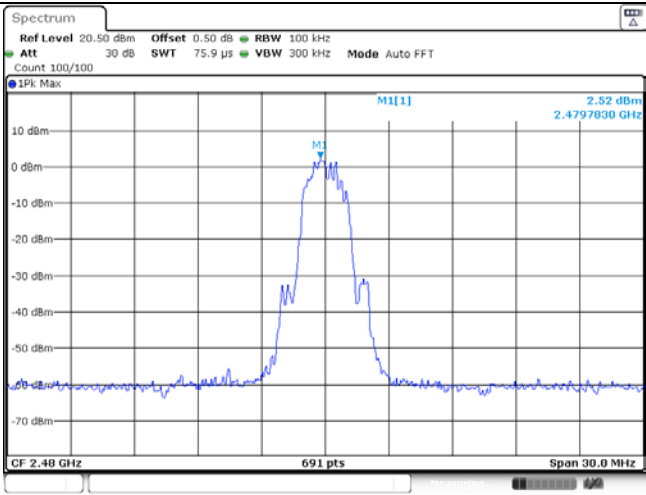
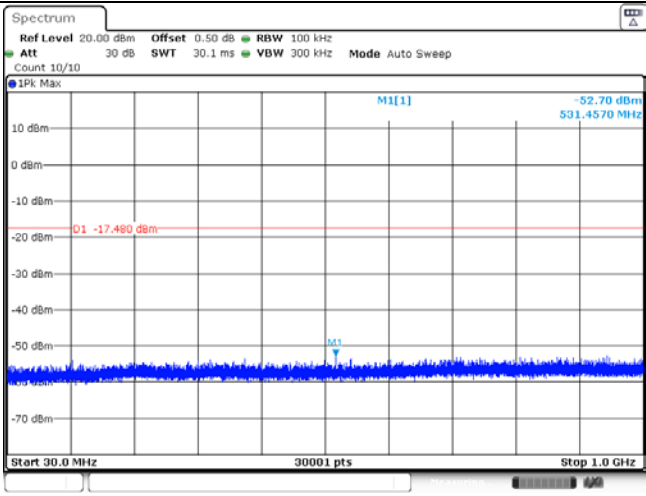
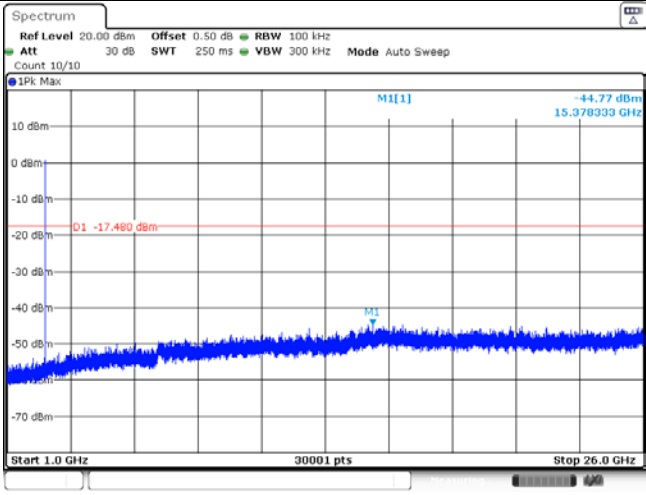
Test Item:	SE	Test Rate:	1Mbps
CH00 Reference level	Spectrum Ref Level 20.50 dBm Att 30 dB Count 100/100 Offset 0.50 dB SWT 75.9 μs RBW 100 kHz VBW 300 kHz Mode Auto FFT 1Pk Max M1 M1[1] 4.02 dBm 2.402000 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.402 GHz 691 pts Span 30.0 MHz Date: 18 MAR 2024 13:18:42		
CH00 30MHz~1000MHz	Spectrum Ref Level 20.00 dBm Att 30 dB Count 10/10 Offset 0.50 dB SWT 30.1 ms RBW 100 kHz VBW 300 kHz Mode Auto Sweep 1Pk Max M1 M1[1] -52.30 dBm 652.1210 MHz D1 -15.980 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz Date: 18 MAR 2024 13:18:57		
CH00 1GHz~26GHz	Spectrum Ref Level 20.00 dBm Att 30 dB Count 10/10 Offset 0.50 dB SWT 250 ms RBW 100 kHz VBW 300 kHz Mode Auto Sweep 1Pk Max M1 M1[1] -44.90 dBm 18.12667 GHz D1 -15.980 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz Date: 18 MAR 2024 13:19:13		

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Test Item:	SE	Test Rate:	2Mbps
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CH00 Reference level	 Date: 18 MAR 2024 13:26:11
CH00 30MHz~1000MHz	 Date: 18 MAR 2024 13:26:26
CH00 1GHz~26GHz	 Date: 18 MAR 2024 13:26:42

CH19 Reference level	 Date: 18 MAR 2024 13:28:11
CH19 30MHz~1000MHz	 Date: 18 MAR 2024 13:28:26
CH19 1GHz~26GHz	 Date: 18 MAR 2024 13:28:41

CH39 Reference level	 Date: 18 MAR 2024 16:11:09
CH39 30MHz~1000MHz	 Date: 18 MAR 2024 16:11:25
CH39 1GHz~26GHz	 Date: 18 MAR 2024 16:11:40

-----End of Report-----