

Appendix A: DTS Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.672	2401.660	2402.332	0.5	PASS
		2440	0.708	2439.632	2440.340	0.5	PASS
		2480	0.736	2479.612	2480.348	0.5	PASS

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Input Z: 50 Ω #Atten: 40 dB PNO: Best Wide #Avg Type: Power (RMS) 1 2 3 4 5 6
 R/L Coupling DC Corrections: Off Gate: Off Trig: Free Run M WWWWWW
 Align: Auto Freq Ref: Int (S) IF Gain: Low Sig Track: Off P P P P P P

Center Frequency: 2.480000000 GHz
 Span: 4.000000000 MHz
 Start Freq: 2.476000000 GHz
 Stop Freq: 2.482000000 GHz
 AUTO TUNE
 CF Step: 400.000 kHz
 Auto Man
 Freq Offset: 0 Hz
 X Axis Scale: Log Lin
 Signal Track: Span Zoom

1 Spectrum Ref Lvl Offset 11.66 dB ΔMkr3 736 kHz
 Scale/Div 10 dB Ref Level 30.00 dBm 0.14 dB

Center 2.480000 GHz #Video BW 300 kHz Span 4.000 MHz
 #Res BW 100 kHz Sweep 1.00 ms (1001 pts)

5 Marker Table

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.479 612 GHz	-2.728 dBm		
2	N	1	f	2.479 992 GHz	3.066 dBm		
3	Δ1	1	f (Δ)	736 kHz (Δ)	0.1445 dB		
4							
5							
6							

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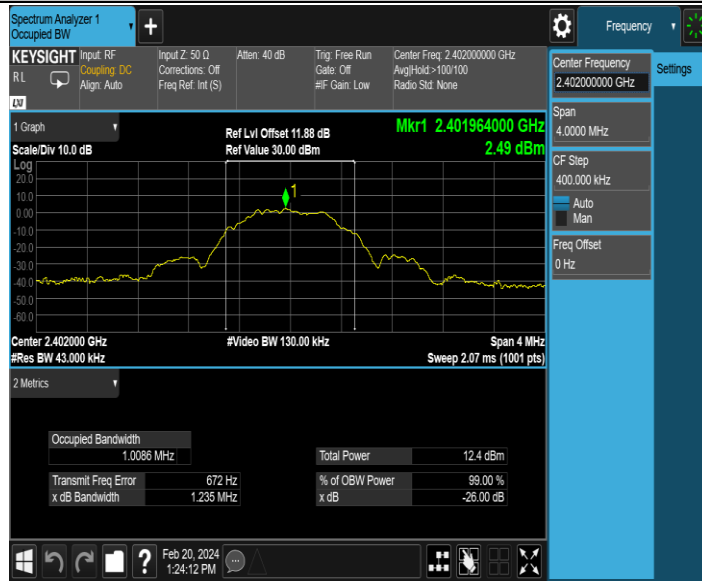
Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0086	2401.4966	2402.5048	---	---
		2440	1.0210	2439.4940	2440.5144	---	---
		2480	1.0567	2479.4772	2480.5327	---	---

Test Graphs

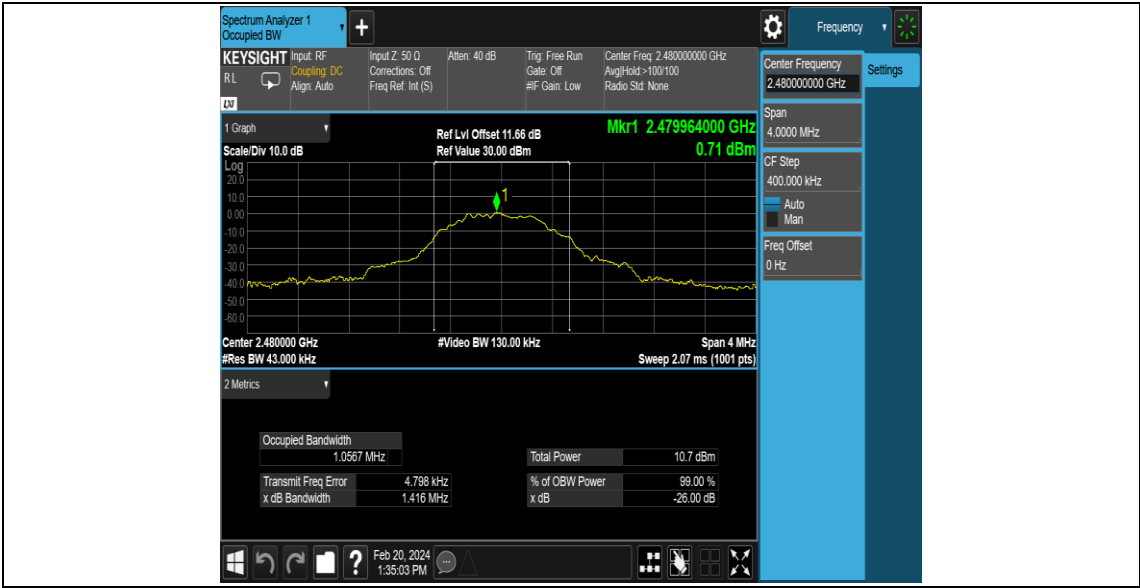
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



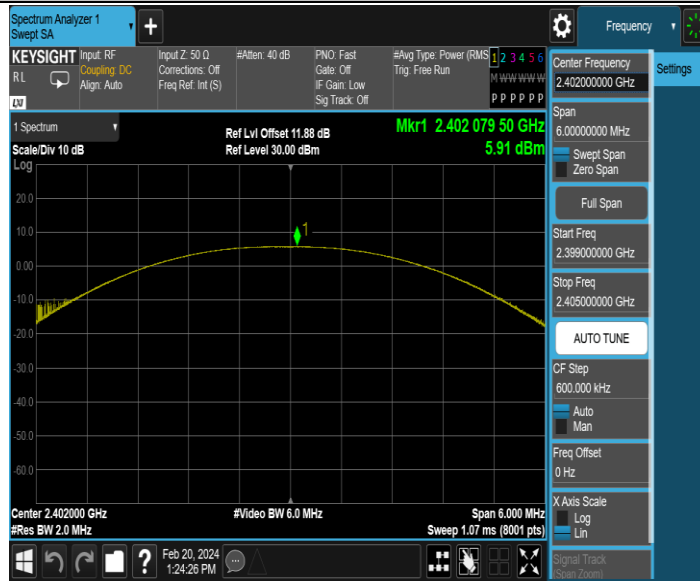
Appendix C: Maximum conducted output power

Test Result Peak

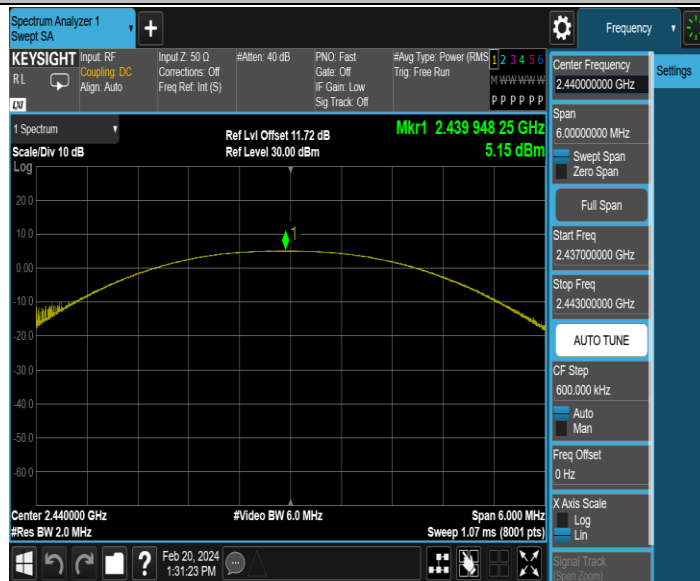
TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	5.91	≤30	3.53	≤36	PASS
		2440	5.15	≤30	2.77	≤36	PASS
		2480	4.45	≤30	2.07	≤36	PASS

Test Graphs Peak

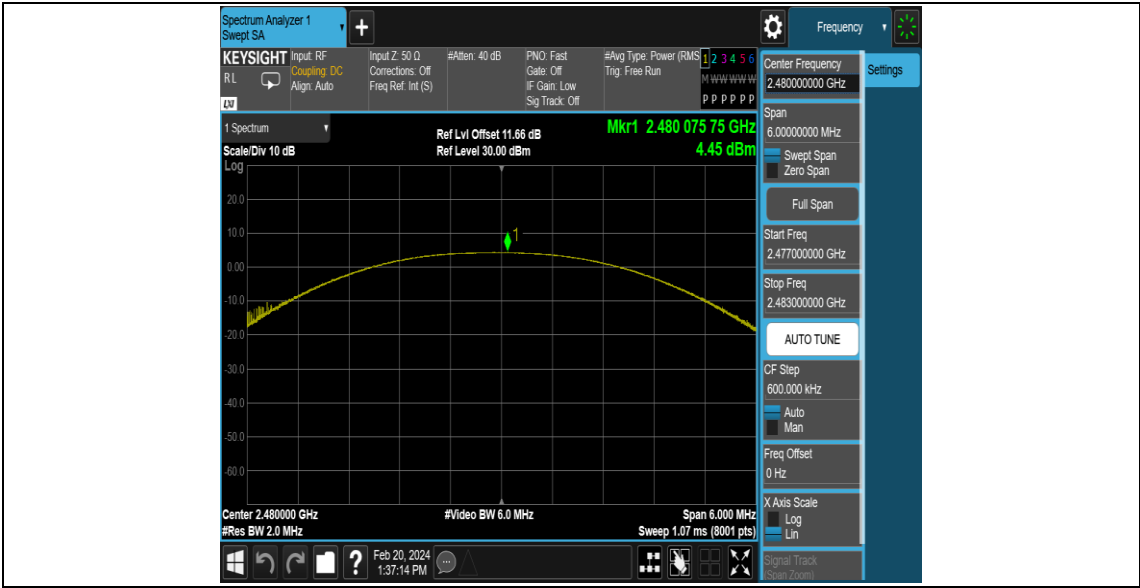
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



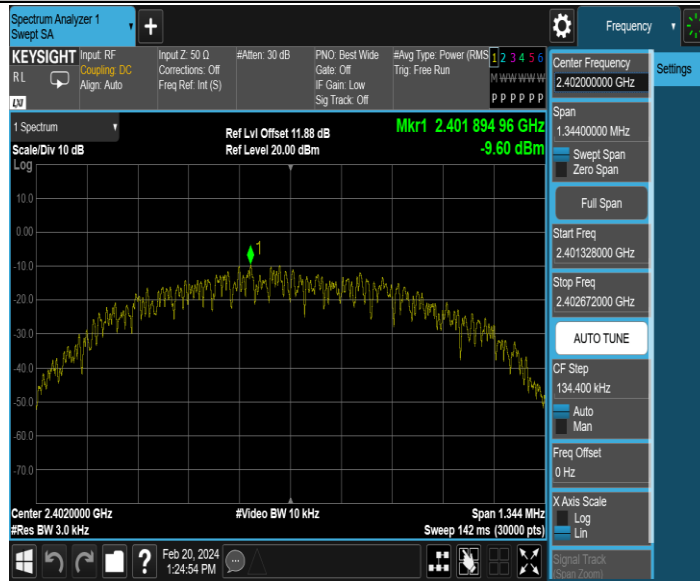
Appendix D: Maximum power spectral density

Test Result

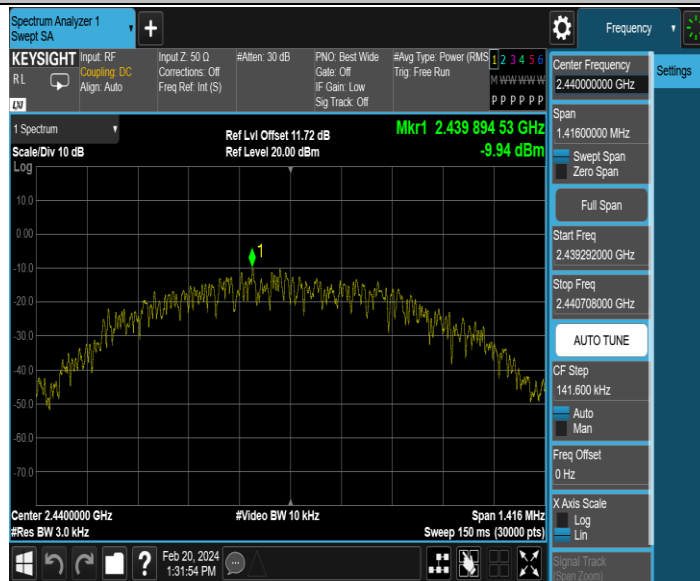
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.60	≤8.00	PASS
		2440	-9.94	≤8.00	PASS
		2480	-10.90	≤8.00	PASS

Test Graphs

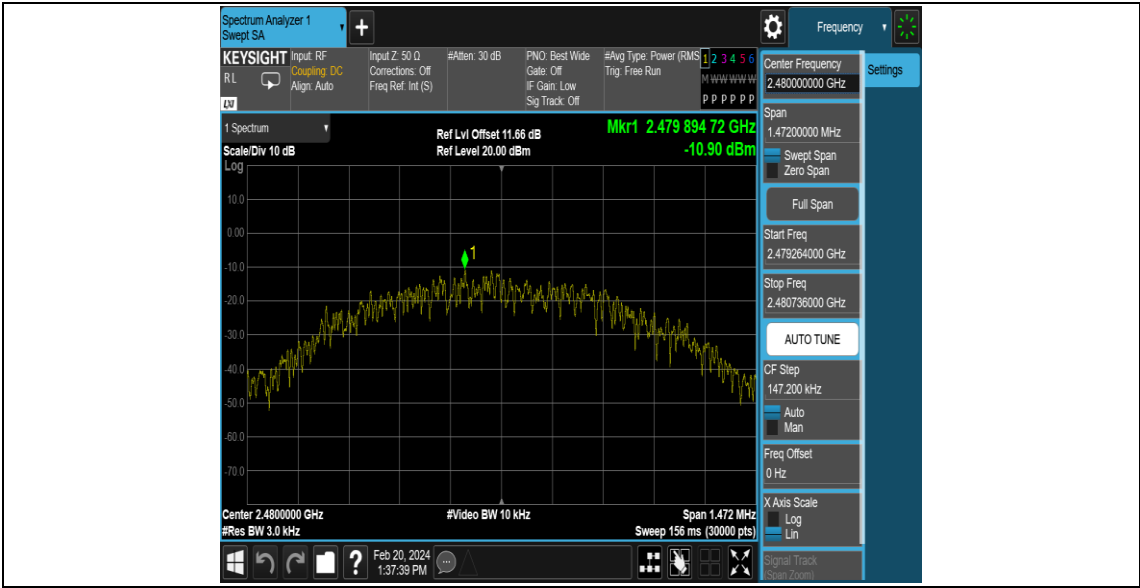
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



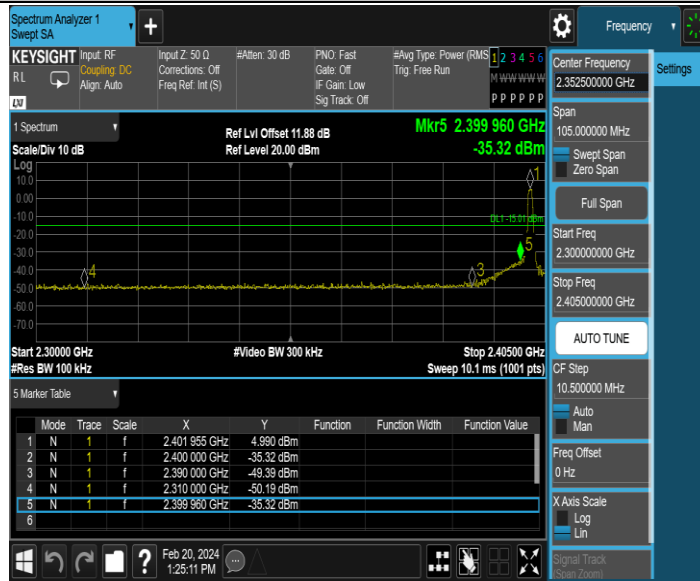
Appendix E: Band edge measurements

Test Result

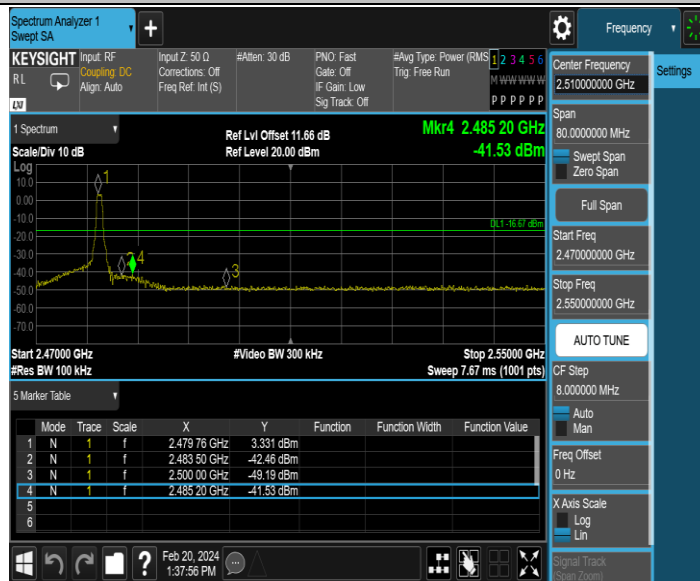
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	4.99	-35.32	≤-15.01	PASS
		High	2480	3.33	-41.53	≤-16.67	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Appendix F: Conducted Spurious Emission

Test Result

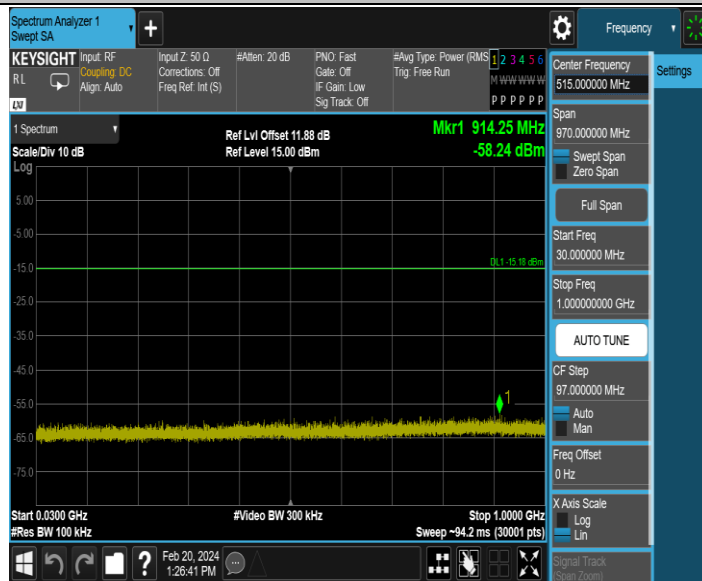
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	4.82	4.82	---	PASS
			30~1000	4.82	-58.24	≤-15.18	PASS
			1000~26500	4.82	-47.14	≤-15.18	PASS
		2440	Reference	4.00	4.00	---	PASS
			30~1000	4.00	-58.02	≤-16	PASS
			1000~26500	4.00	-47.01	≤-16	PASS
		2480	Reference	3.04	3.04	---	PASS
			30~1000	3.04	-58.69	≤-16.96	PASS
			1000~26500	3.04	-47.52	≤-16.96	PASS

Test Graphs

BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



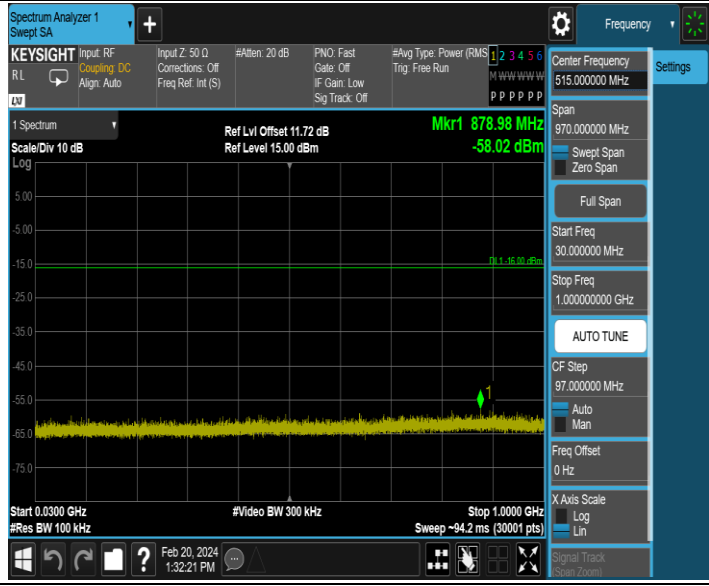
BLE_1M_Ant1_2402_1000~26500



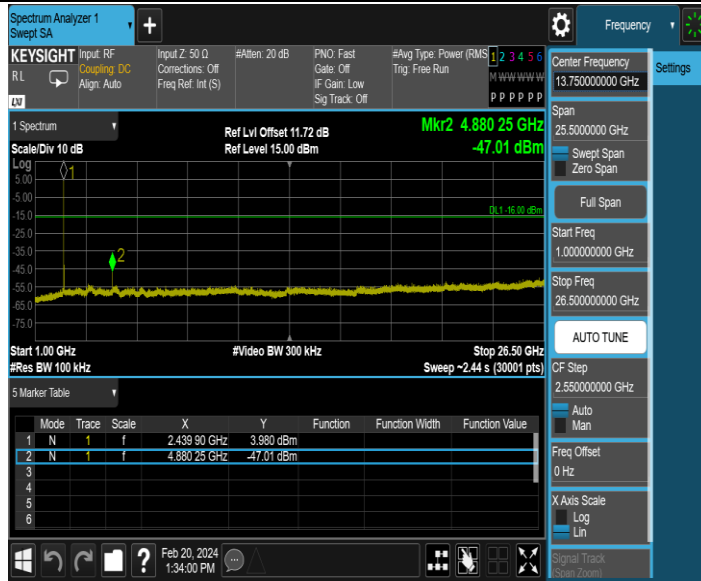
BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~100



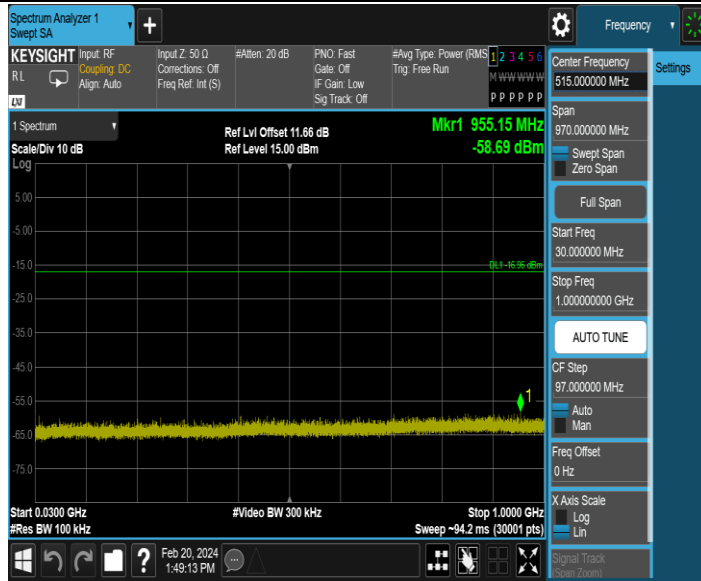
BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



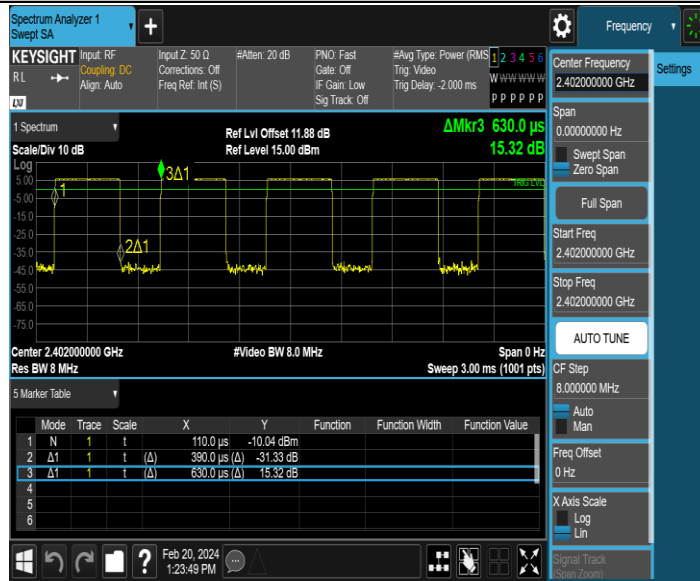
Appendix G: Duty Cycle

Test Result

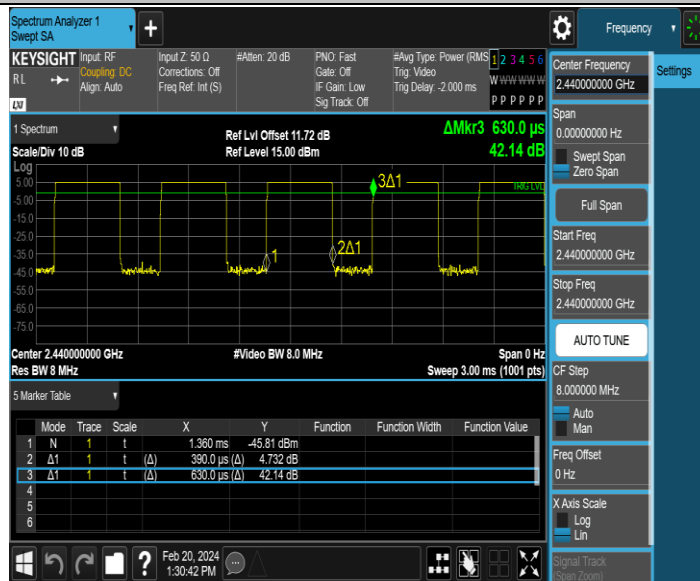
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]
BLE_1M	Ant1	2402	0.39	0.63	61.90
		2440	0.39	0.63	61.90
		2480	0.39	0.63	61.90

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Input Z: 50 Ω #Atten: 20 dB PNO: Fast #Avg Type: Power (RMS) 1 2 3 4 5 6
 R/L Coupling: DC Corrections: Off Gate: Off Trig: Video W W W W W W W W
 Align: Auto Freq Ref: Int (S) IF Gain: Low Trig Delay: -2.000 ms P P P P P P P P
 Sig Track: Off

Center Frequency: 2.480000000 GHz
 Span: 0.000000000 Hz
 Swept Span: Zero Span
 Full Span
 Start Freq: 2.480000000 GHz
 Stop Freq: 2.480000000 GHz
AUTO TUNE
 CF Step: 8.000000 MHz
 Auto Man
 Freq Offset: 0 Hz
 X Axis Scale: Log Lin
 Signal Track (Span Zoom)

Scale/Div 10 dB Ref Lvl Offset 11.66 dB **ΔMkr3 630.0 μs**
 Ref Level 15.00 dBm **38.58 dB**

Center 2.480000000 GHz #Video BW 8.0 MHz Span 0 Hz
 Res BW 8 MHz Sweep 3.00 ms (1001 pts)

5 Marker Table

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	t	1.360 ms	-43.68 dBm		
2	Δ1	1	t (Δ)	390.0 μs (Δ)	2.899 dB		
3	Δ1	1	t (Δ)	630.0 μs (Δ)	38.58 dB		
4							
5							
6							

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Appendix H: Emissions in Restricted Bands

Test Result

Mode:	BLE 2402
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Final Data List												
NO.	Freq. [MHz]	Factor [dB/m]	PK Value [dB μ V/m]	PK Limit [dB μ V/m]	PK Margin [dB]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	2310	9.07	46.33	74.00	27.67	42.94	54.00	11.06	150	44	Horizontal	PASS
2	2378.56	9.85	52.33	74.00	21.67	48.58	54.00	5.42	150	308	Horizontal	PASS
3	2380.08	9.88	51.71	74.00	22.29	47.01	54.00	6.99	150	260	Horizontal	PASS
4	2384.96	10.13	52.97	74.00	21.03	47.60	54.00	6.40	150	308	Horizontal	PASS
5	2388.08	10.22	54.35	74.00	19.65	48.84	54.00	5.16	150	251	Horizontal	PASS
6	2390	10.38	55.09	74.00	18.91	50.52	54.00	3.48	150	251	Horizontal	PASS

Final Data List												
NO.	Freq. [MHz]	Factor [dB/m]	PK Value [dB μ V/m]	PK Limit [dB μ V/m]	PK Margin [dB]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	2310	9.07	44.93	74.00	29.07	43.30	54.00	10.70	150	134	Vertical	PASS
2	2346.4	9.29	48.36	74.00	25.64	44.88	54.00	9.12	150	142	Vertical	PASS
3	2360.08	9.35	48.34	74.00	25.66	45.80	54.00	8.20	150	354	Vertical	PASS
4	2371.92	9.56	48.14	74.00	25.86	44.07	54.00	9.93	150	317	Vertical	PASS
5	2385.92	10.22	49.47	74.00	24.53	44.81	54.00	9.19	150	204	Vertical	PASS
6	2390	10.38	47.71	74.00	26.29	45.51	54.00	8.49	150	107	Vertical	PASS

Mode:	BLE 2480
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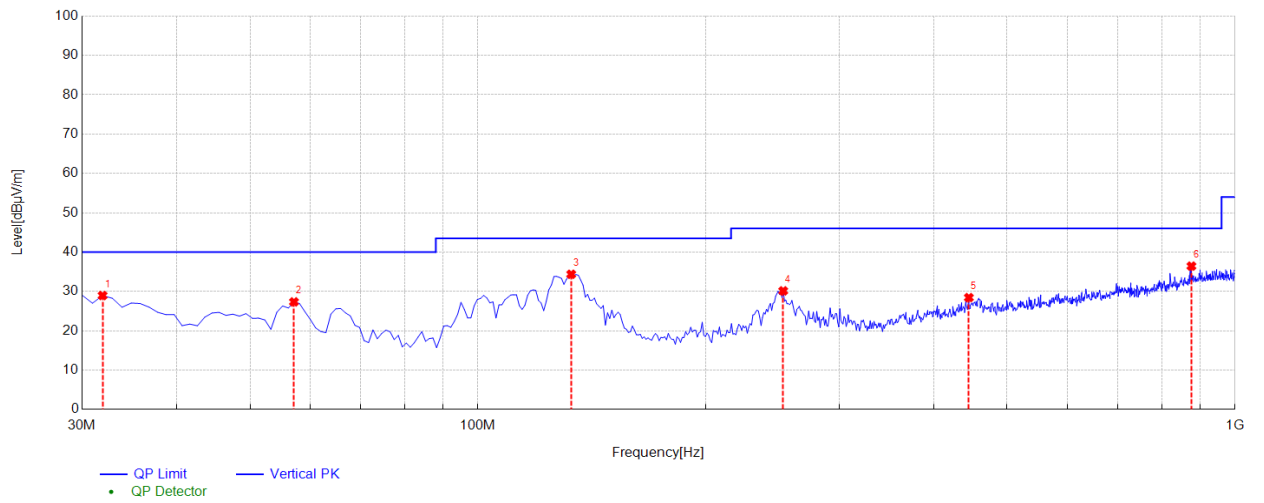
Final Data List												
NO.	Freq. [MHz]	Factor [dB/m]	PK Value [dB μ V/m]	PK Limit [dB μ V/m]	PK Margin [dB]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	2483.5	10.62	48.55	74.00	25.45	45.10	54.00	8.90	150	304	Horizontal	PASS
2	2484.7375	10.51	49.28	74.00	24.72	46.91	54.00	7.09	150	28	Horizontal	PASS
3	2487.526	10.27	49.65	74.00	24.35	45.04	54.00	8.96	150	83	Horizontal	PASS
4	2489.011	10.25	49.12	74.00	24.88	46.02	54.00	7.98	150	324	Horizontal	PASS
5	2493.169	10.44	49.26	74.00	24.74	45.69	54.00	8.31	150	48	Horizontal	PASS
6	2500	10.10	47.98	74.00	26.02	44.83	54.00	9.17	150	77	Horizontal	PASS

Final Data List												
NO.	Freq. [MHz]	Factor [dB/m]	PK Value [dB μ V/m]	PK Limit [dB μ V/m]	PK Margin [dB]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	2483.5	10.62	48.30	74.00	25.70	45.83	54.00	8.17	150	297	Vertical	PASS
2	2486.536	10.36	49.27	74.00	24.73	46.35	54.00	7.65	150	243	Vertical	PASS
3	2487.955	10.22	49.00	74.00	25.00	46.41	54.00	7.59	150	162	Vertical	PASS
4	2491.024	10.35	49.62	74.00	24.38	47.23	54.00	6.77	150	270	Vertical	PASS
5	2496.3205	10.35	49.29	74.00	24.71	44.86	54.00	9.14	150	118	Vertical	PASS
6	2500	10.10	46.13	74.00	27.87	43.99	54.00	10.01	150	351	Vertical	PASS

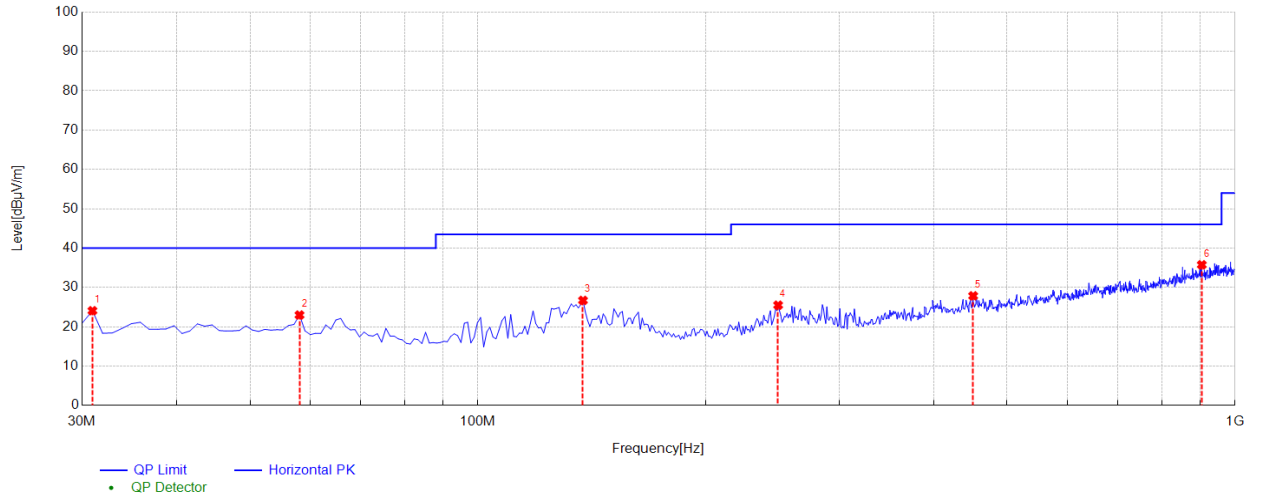
Note:

1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Appendix I: Spurious emissions



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	31.9400	39.53	28.97	-10.56	40.00	11.03	100	250	Vertical	PASS
2	57.1600	37.10	27.35	-9.75	40.00	12.65	100	230	Vertical	PASS
3	132.8200	44.62	34.37	-10.25	43.50	9.13	100	240	Vertical	PASS
4	253.1000	40.66	30.15	-10.51	46.00	15.85	100	120	Vertical	PASS
5	445.1600	33.63	28.44	-5.19	46.00	17.56	100	330	Vertical	PASS
6	875.8400	33.27	36.45	3.18	46.00	9.55	100	150	Vertical	PASS



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	30.9700	34.84	24.09	-10.75	40.00	15.91	100	350	Horizontal	PASS
2	58.1300	32.81	22.99	-9.82	40.00	17.01	100	340	Horizontal	PASS
3	137.6700	36.72	26.71	-10.01	43.50	16.79	100	350	Horizontal	PASS
4	249.2200	35.96	25.50	-10.46	46.00	20.50	100	280	Horizontal	PASS
5	450.9800	32.82	27.87	-4.95	46.00	18.13	100	350	Horizontal	PASS
6	903.9700	32.15	35.76	3.61	46.00	10.24	100	80	Horizontal	PASS

Mode:	BLE 2402
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NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	1292	41.45	1.16	74.00	32.55	150	233	Horizontal	PASS
2	1898	45.23	5.24	74.00	28.77	150	221	Horizontal	PASS
3	4230	45.03	-16.58	74.00	28.97	150	121	Horizontal	PASS
4	4803	50.61	-14.85	74.00	23.39	150	10	Horizontal	PASS
5	8058	45.13	-11.24	74.00	28.87	150	254	Horizontal	PASS
6	15339	49.90	-0.28	74.00	24.10	150	146	Horizontal	PASS

NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	1248	42.60	1.03	74.00	31.40	150	142	Vertical	PASS
2	1988	46.20	5.98	74.00	27.80	150	299	Vertical	PASS
3	3942	45.16	-17.22	74.00	28.84	150	190	Vertical	PASS
4	4803	51.16	-14.85	74.00	22.84	150	178	Vertical	PASS
5	5271	47.21	-14.03	74.00	26.79	150	118	Vertical	PASS
6	13947	49.90	-2.17	74.00	24.10	150	333	Vertical	PASS

Mode:	BLE 2440
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NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	1194	41.42	1.10	74.00	32.58	150	211	Horizontal	PASS
2	2110	46.66	6.51	74.00	27.34	150	105	Horizontal	PASS
3	4881	51.40	-14.67	74.00	22.60	150	224	Horizontal	PASS
4	6405	44.75	-12.21	74.00	29.25	150	137	Horizontal	PASS
5	9213	45.98	-8.80	74.00	28.02	150	116	Horizontal	PASS
6	13440	49.36	-3.09	74.00	24.64	150	189	Horizontal	PASS

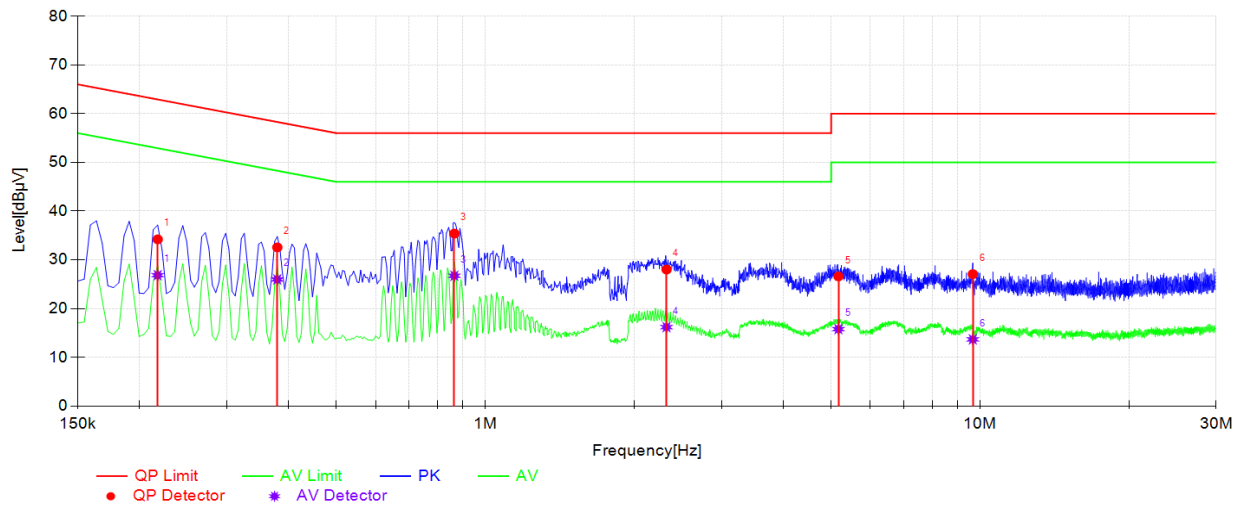
NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	1314	42.72	1.15	74.00	31.28	150	196	Vertical	PASS
2	2204	46.06	6.81	74.00	27.94	150	84	Vertical	PASS
3	3948	46.71	-17.32	74.00	27.29	150	229	Vertical	PASS
4	4881	51.20	-14.67	74.00	22.80	150	197	Vertical	PASS
5	6585	45.96	-12.36	74.00	28.04	150	105	Vertical	PASS
6	14364	49.82	-1.25	74.00	24.18	150	305	Vertical	PASS

Mode:	BLE 2480
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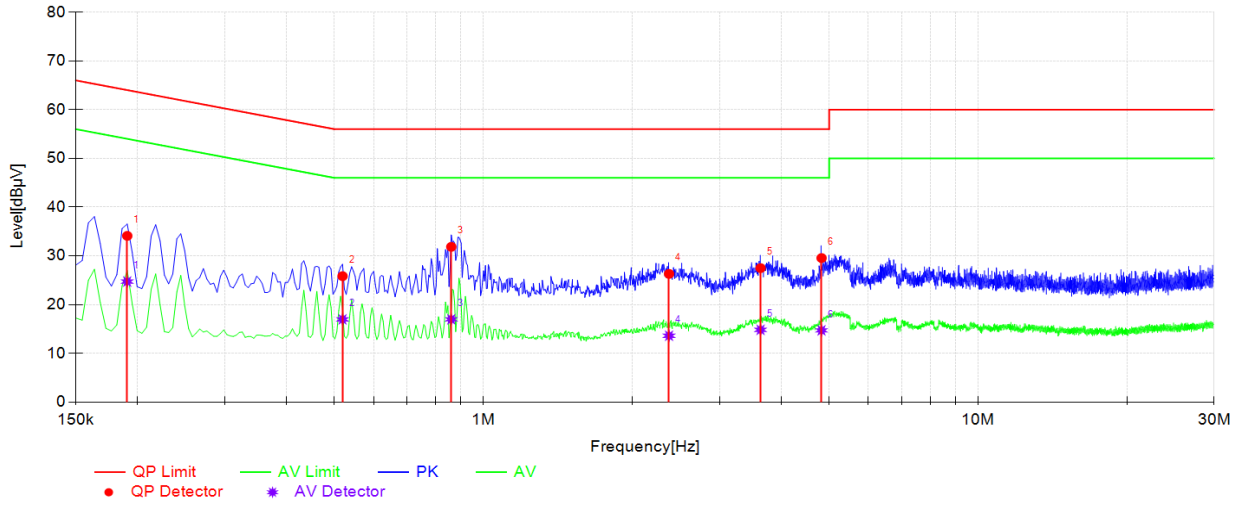
NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	1450	42.08	1.35	74.00	31.92	150	84	Horizontal	PASS
2	2236	46.69	6.91	74.00	27.31	150	319	Horizontal	PASS
3	4959	50.85	-15.18	74.00	23.15	150	226	Horizontal	PASS
4	6795	44.46	-11.74	74.00	29.54	150	87	Horizontal	PASS
5	8922	46.30	-9.90	74.00	27.70	150	130	Horizontal	PASS
6	13296	49.40	-3.23	74.00	24.60	150	249	Horizontal	PASS

NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	1316	44.49	1.15	74.00	29.51	150	222	Vertical	PASS
2	1988	45.41	5.98	74.00	28.59	150	222	Vertical	PASS
3	3945	48.98	-17.27	74.00	25.02	150	115	Vertical	PASS
4	4959	51.13	-15.18	74.00	22.87	150	194	Vertical	PASS
5	6564	45.60	-12.22	74.00	28.40	150	107	Vertical	PASS
6	10152	46.20	-7.28	74.00	27.80	150	168	Vertical	PASS

Appendix J: Conducted emission AC power port



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type	Verdict
1	0.2175	10.26	34.22	62.91	28.69	26.85	52.91	26.06	L1	PASS
2	0.3795	10.26	32.57	58.29	25.72	25.98	48.29	22.31	L1	PASS
3	0.8655	10.28	35.41	56.00	20.59	26.74	46.00	19.26	L1	PASS
4	2.3235	10.29	28.02	56.00	27.98	16.20	46.00	29.80	L1	PASS
5	5.172	10.35	26.62	60.00	33.38	15.79	50.00	34.21	L1	PASS
6	9.6675	10.44	27.09	60.00	32.91	13.69	50.00	36.31	L1	PASS



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1905	10.26	34.11	64.01	29.90	24.73	54.01	29.28	N	PASS
2	0.519	10.28	25.85	56.00	30.15	16.97	46.00	29.03	N	PASS
3	0.861	10.28	31.86	56.00	24.14	16.98	46.00	29.02	N	PASS
4	2.373	10.31	26.31	56.00	29.69	13.61	46.00	32.39	N	PASS
5	3.633	10.39	27.50	56.00	28.50	14.83	46.00	31.17	N	PASS
6	4.8255	10.41	29.56	56.00	26.44	14.72	46.00	31.28	N	PASS