

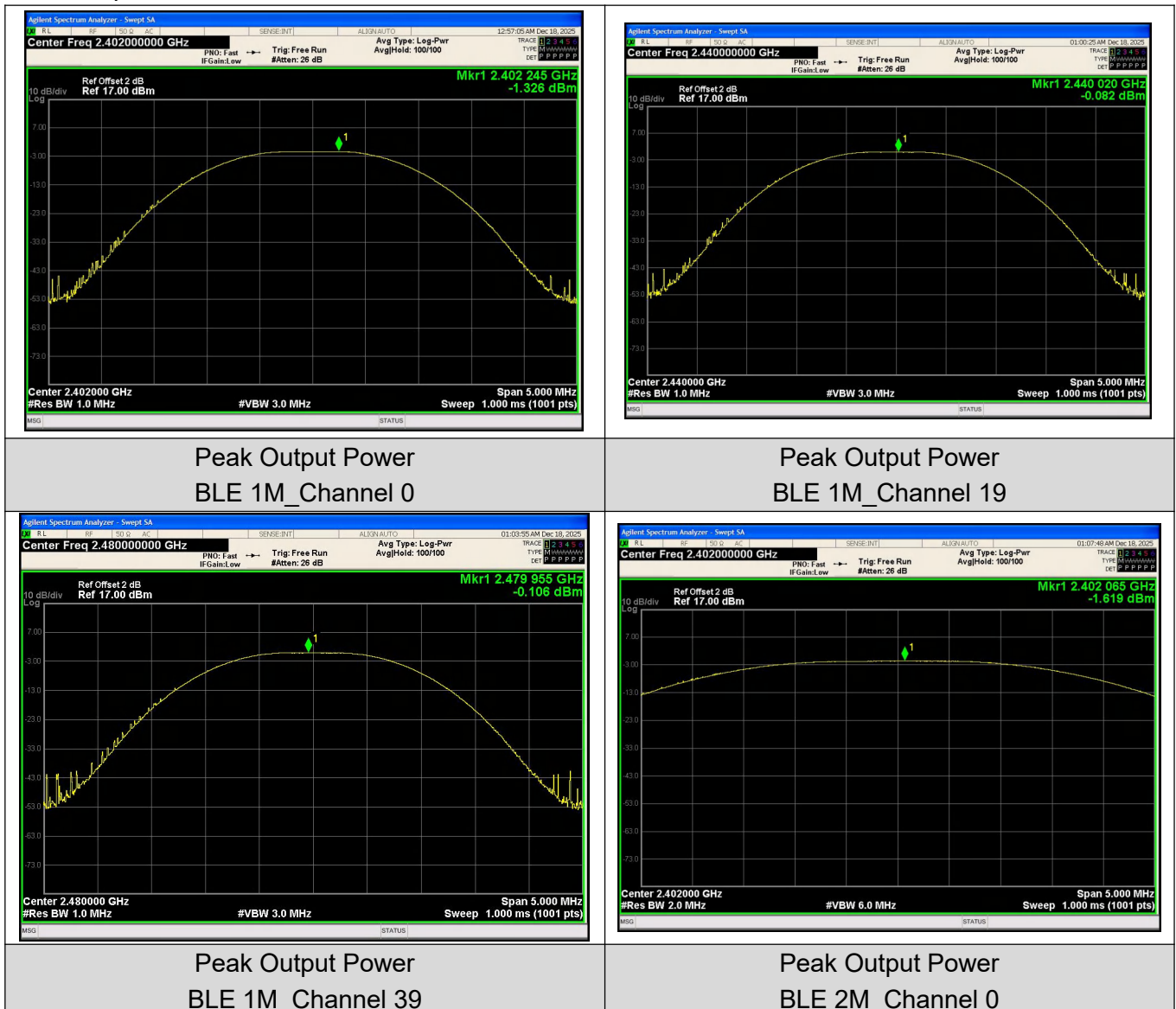
Appendix B of data

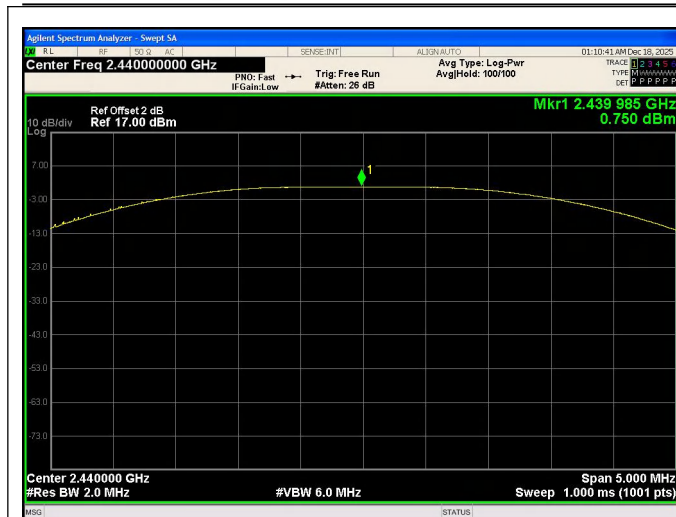
B1.Maximum Peak Conducted Output Power

Test Result

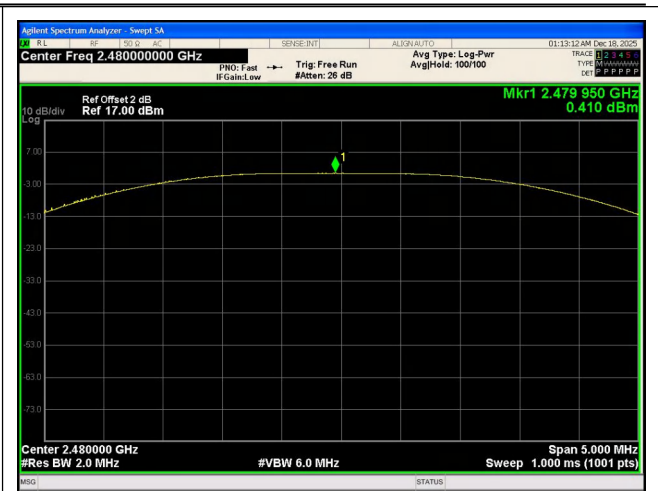
Mode	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
BLE 1M	0	-1.33	0.74	≤30	PASS
	19	-0.08	0.98	≤30	PASS
	39	-0.11	0.98	≤30	PASS
BLE 2M	0	-1.62	0.69	≤30	PASS
	19	0.75	1.19	≤30	PASS
	39	0.41	1.1	≤30	PASS

Test Graphs





Peak Output Power
BLE 2M_Channel 19



Peak Output Power
BLE 2M_Channel 39

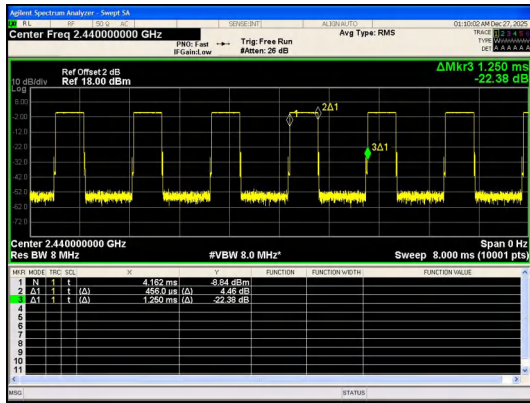
B2.Duty Cycle

Test Result

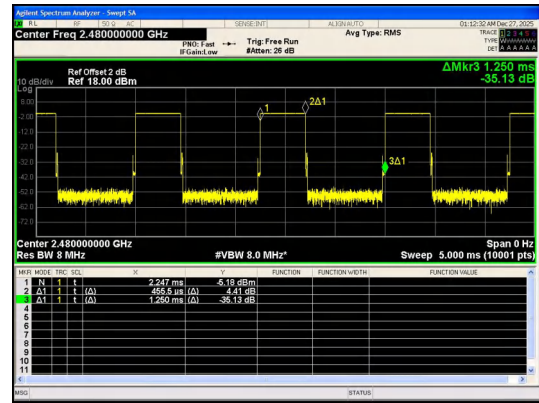
Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
BLE 1M	0	0.901	1.249	72.13	0.7213	1.4188
	19	0.901	1.249	72.13	0.7213	1.4188
	39	0.901	1.250	72.12	0.7212	1.4194
BLE 2M	0	0.455	1.249	36.45	0.3645	4.383
	19	0.456	1.250	36.49	0.3649	4.3783
	39	0.456	1.250	36.45	0.3645	4.383

Test Graphs





BLE 2M_Channel 19



BLE 2M_Channel 39

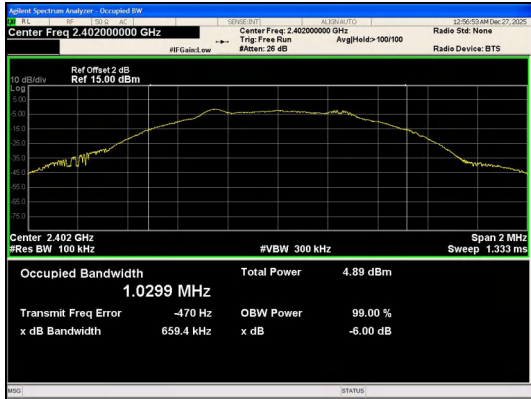
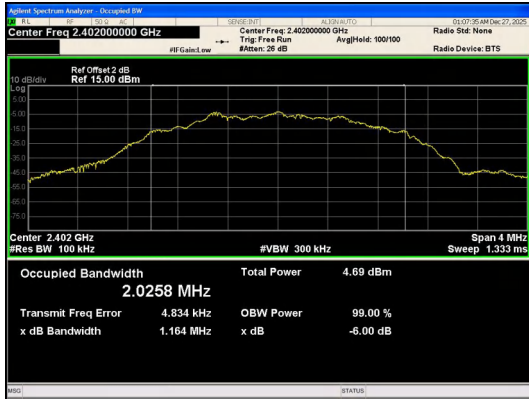
B3.6dB Bandwidth and 99% Bandwidth

6dB Bandwidth

Test Result

Mode	Channel	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
BLE 1M	0	2402	0.65940	≥0.5	PASS
	19	2440	0.65820		PASS
	39	2480	0.65960		PASS
BLE 2M	0	2402	1.1640		PASS
	19	2440	1.1770		PASS
	39	2480	1.1740		PASS

Test Graphs

	
BLE 1M_Channel 0	BLE 2M_Channel 0
	
BLE 1M_Channel 19	BLE 2M_Channel 19



BLE 1M_Channel 39

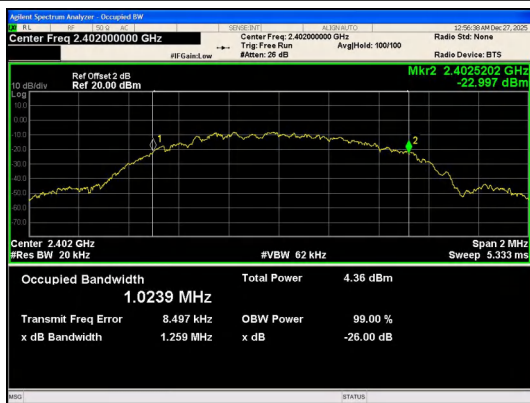


BLE 2M_Channel 39

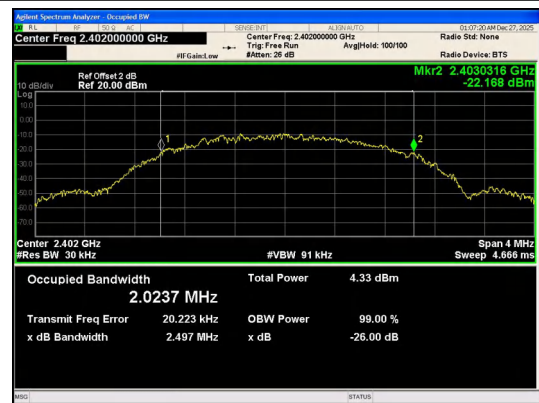
99dB Bandwidth Test Result

Mode	Channel	Center Frequency (MHz)	99% BW (MHz)
BLE 1M	0	2402	1.023900
	19	2440	1.025000
	39	2480	1.027100
BLE 2M	0	2402	2.023700
	19	2440	2.023100
	39	2480	2.032600

Test Graphs



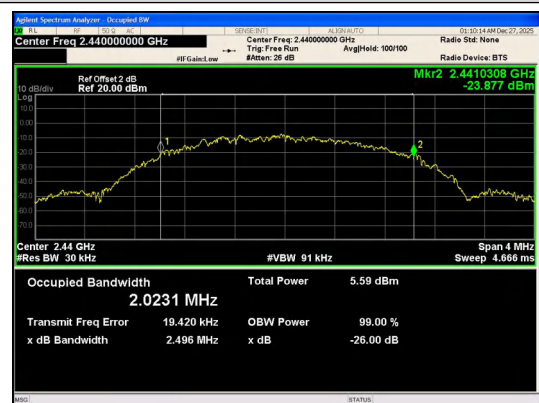
BLE 1M_Channel 0



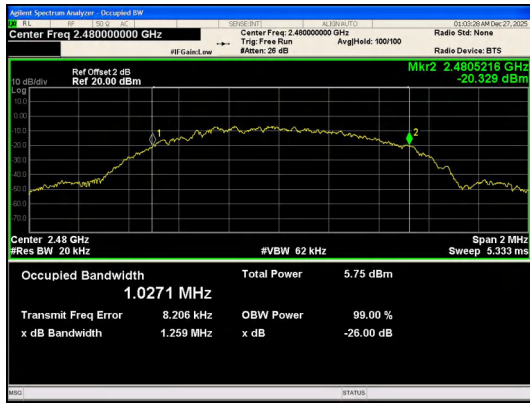
BLE 2M_Channel 0



BLE 1M_Channel 19



BLE 2M_Channel 19



BLE 1M_Channel 39



BLE 2M_Channel 39

B4.Power Spectral Density

Test Result

Mode	Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
BLE 1M	0	-16.780	≤8	PASS
	19	-14.410	≤8	PASS
	39	-15.010	≤8	PASS
BLE 2M	0	-20.220	≤8	PASS
	19	-18.050	≤8	PASS
	39	-18.060	≤8	PASS

Test Graphs



BLE 1M_Channel 0



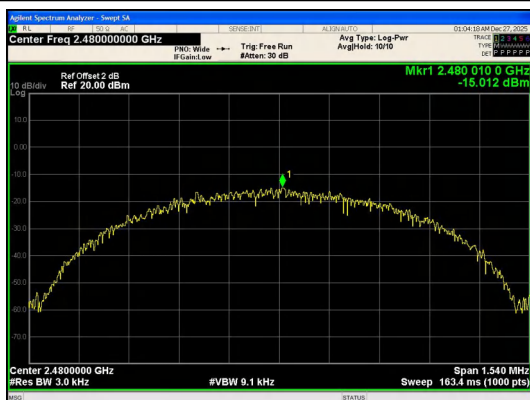
BLE 2M_Channel 0



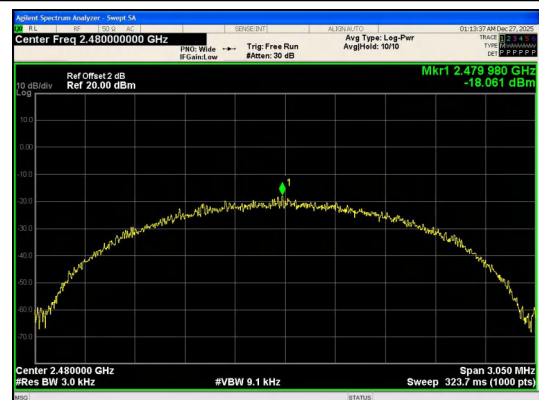
BLE 1M_Channel 19



BLE 2M_Channel 19



BLE 1M_Channel 39



BLE 2M_Channel 39

B5. Conducted Band Edge and Conducted Spurious Emission

Test Result

Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
BLE 1M	0	2400.00	-57.808	-21.58	-36.228	PASS
		4803.64	-64.842	-21.58	-43.262	PASS
		7205.13	-64.358	-21.58	-42.778	PASS
		9607.87	-64.758	-21.58	-43.178	PASS
		24782.8	-50.126	-21.58	-28.546	PASS
	19	4879.80	-64.722	-20.31	-44.412	PASS
		7321.86	-63.601	-20.31	-43.291	PASS
		9759.56	-66.441	-20.31	-46.131	PASS
		24905.7	-49.676	-20.31	-29.366	PASS
	39	2483.50	-62.021	-20.3	-41.721	PASS
		4960.33	-64.171	-20.3	-43.871	PASS
		7438.60	-64.206	-20.3	-43.906	PASS
		9919.37	-63.903	-20.3	-43.603	PASS
		24906.4	-49.740	-20.3	-29.440	PASS
BLE 2M	0	2400.00	-50.387	-23.27	-27.117	PASS
		4805.51	-66.498	-23.27	-43.228	PASS
		7206.38	-65.439	-23.27	-42.169	PASS
		9608.49	-66.105	-23.27	-42.835	PASS
		24916.3	-49.905	-23.27	-26.635	PASS
	19	4881.05	-65.402	-20.91	-44.492	PASS
		7319.37	-65.108	-20.91	-44.198	PASS
		9761.43	-65.902	-20.91	-44.992	PASS
		24834.0	-50.044	-20.91	-29.134	PASS
	39	2483.50	-61.900	-21.13	-40.770	PASS
		4959.70	-63.866	-21.13	-42.736	PASS
		7439.85	-62.643	-21.13	-41.513	PASS
		9921.87	-64.305	-21.13	-43.175	PASS
		24894.5	-50.148	-21.13	-29.018	PASS
Note: input compensation coefficient (dB)= Cable Loss (dB)						

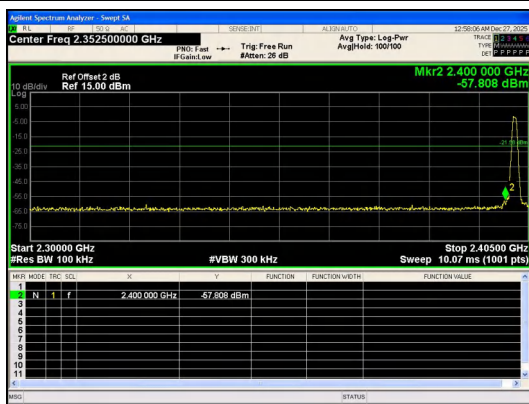
Test Graphs



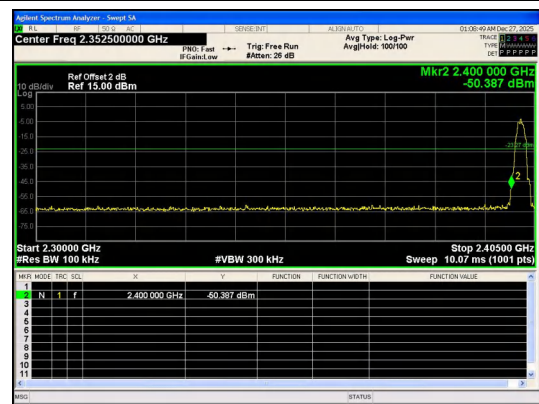
In-Band Reference Level
BLE 1M_Channel 0



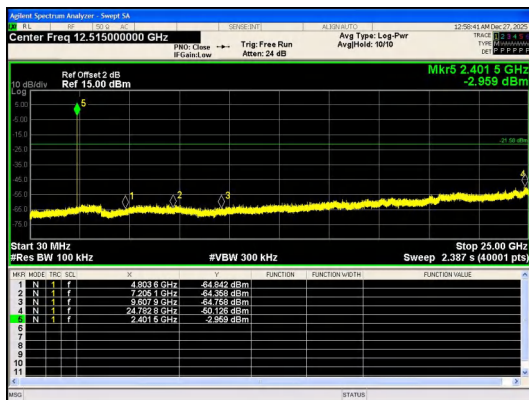
In-Band Reference Level
BLE 2M_Channel 0



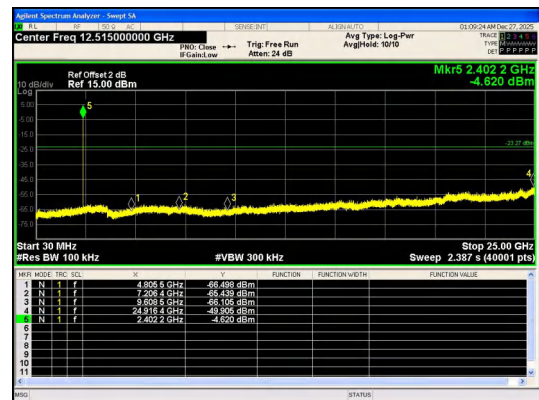
Out Of Band Emission
BLE 1M_Channel 0



Out Of Band Emission
BLE 2M_Channel 0



30.0 MHz - 25000.0 MHz
BLE 1M_Channel 0



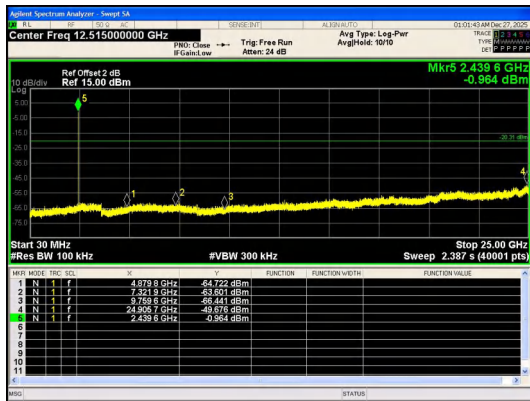
30.0 MHz - 25000.0 MHz
BLE 2M_Channel 0



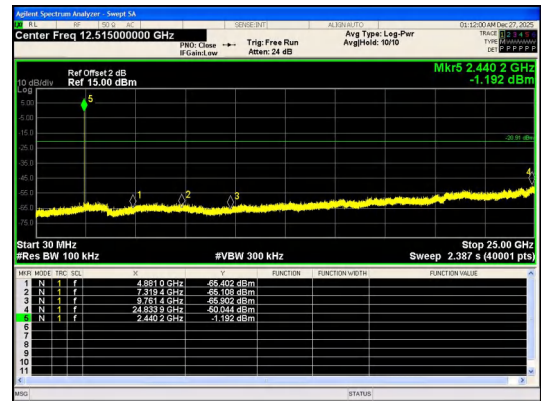
In-Band Reference Level
BLE 1M_Channel 19



In-Band Reference Level
BLE 2M_Channel 19



30.0 MHz - 25000.0 MHz
BLE 1M_Channel 19



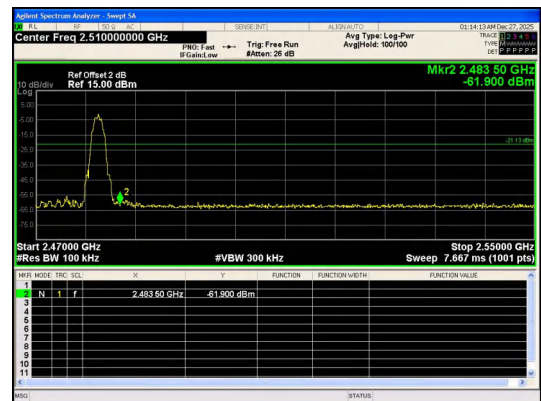
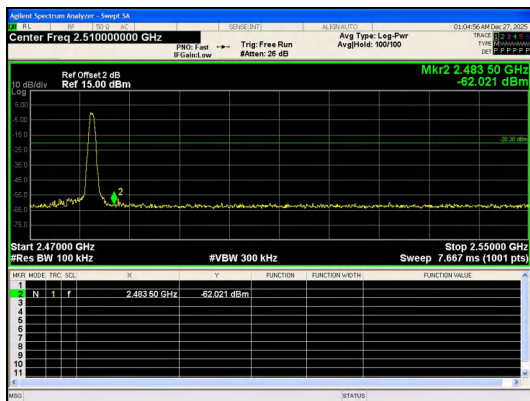
30.0 MHz - 25000.0 MHz
BLE 2M_Channel 19



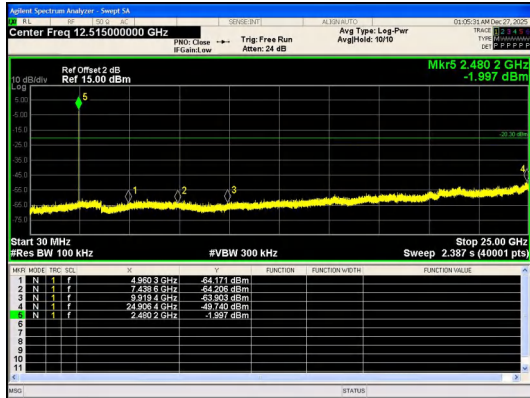
In-Band Reference Level
BLE 1M_Channel 39



In-Band Reference Level
BLE 2M_Channel 39

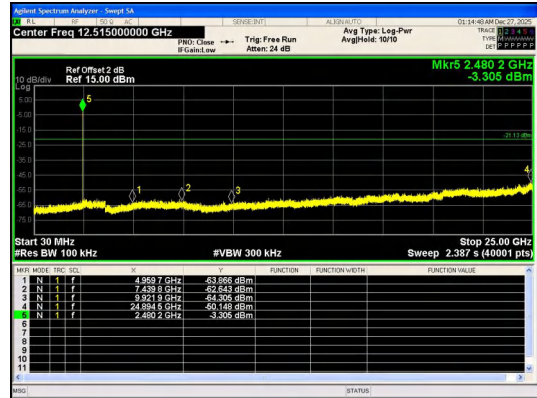


Out Of Band Emission BLE 1M_Channel 39



30.0 MHz - 25000.0 MHz
BLE 1M_Channel 39

Out Of Band Emission BLE 2M_Channel 39



30.0 MHz - 25000.0 MHz
BLE 2M_Channel 39

B6.Radiated Spurious Emission and Restricted Band

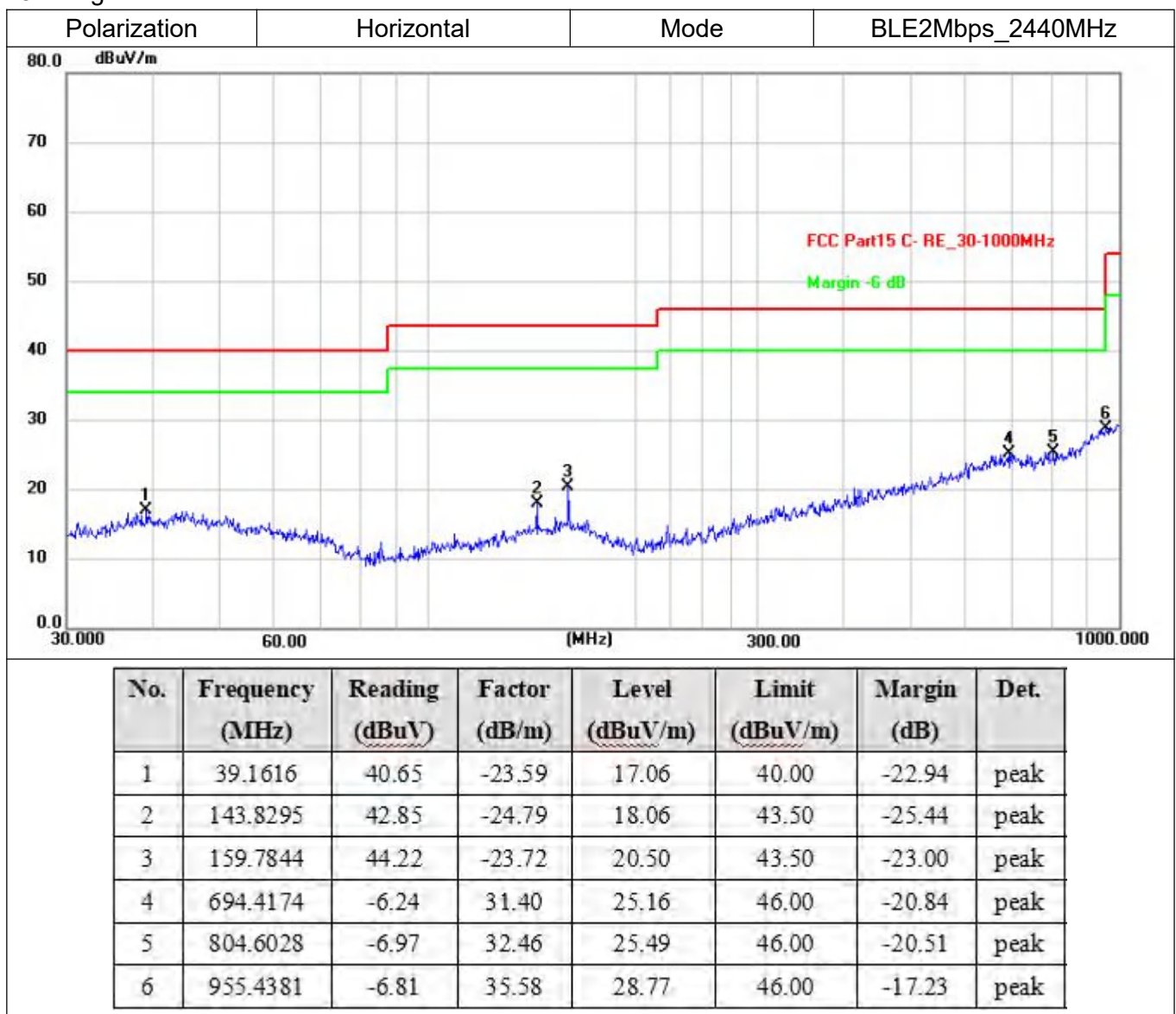
For 9 kHz ~ 30 MHz

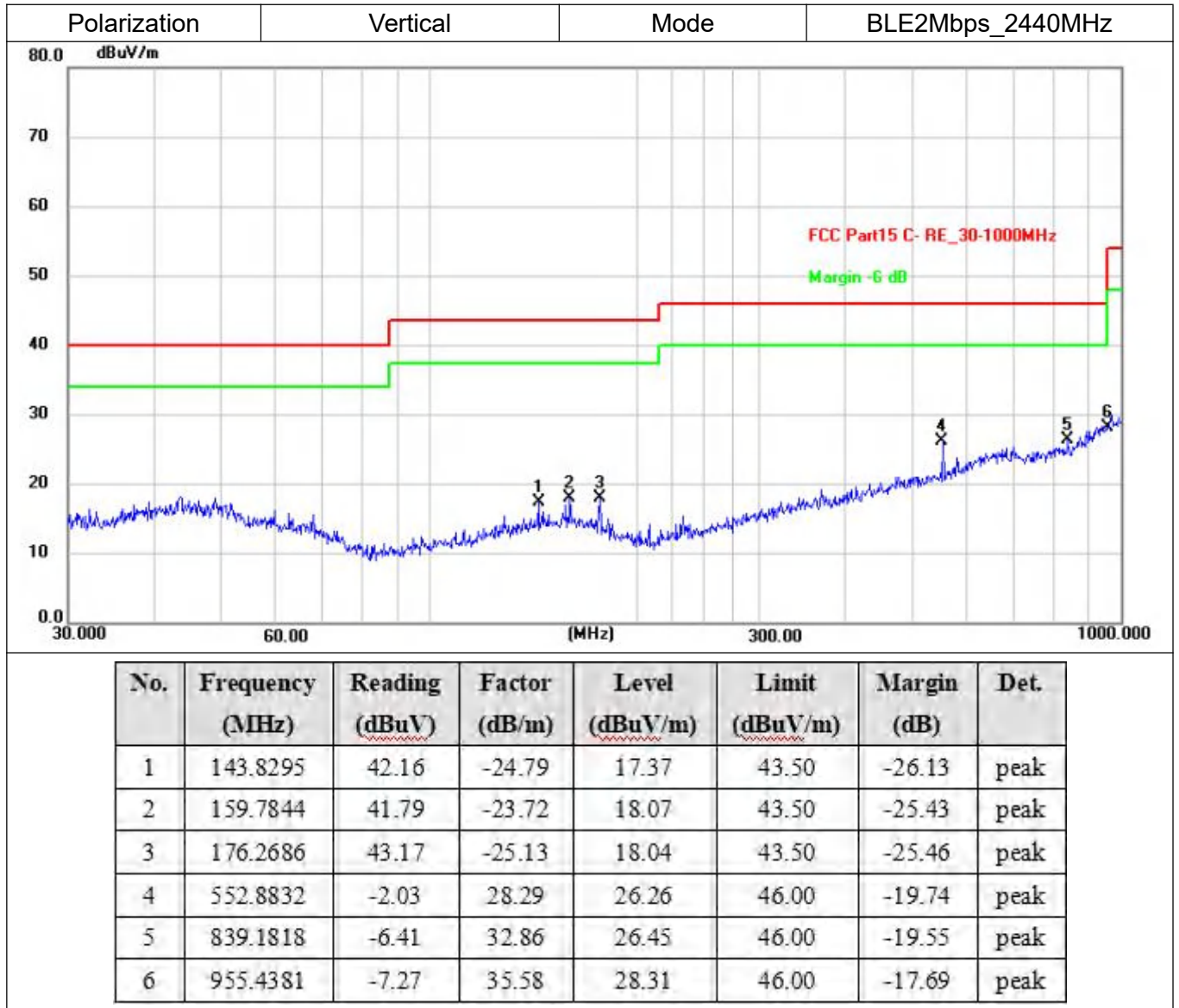
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

For 30 MHz ~ 1 GHz:

Note:

- 1.All modes have been tested, only worst (BLE2Mbps_2440MHz)mode was recorded in the test report.
- 2.Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Amplifier Gain.
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level-Limit value.





For 1 GHz ~ 18GHz:

Note:

1. In frequency ranges 18 ~25GHz no any other harmonic emissions detected which are tested to compliance with the limit. No recording in the test report. No any other emissions level which are attenuated less than 20dB below the limit. No recording in the test report.
2. We used the filter to test and the main frequency was filtered out.
3. Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
4. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Amplifier Gain.
5. The emission levels of other frequencies were less than 20dB margin against the limit.
6. Margin value = Emission level-Limit value.
7. All modes have been tested, only worst mode(BLE1Mbps and BLE2Mbps) was recorded in the test report.

Test Mode: BLE1Mbps							
Test Channel:Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	49.29	-1.34	47.95	74	-26.05	peak	Pass
4804.000	38.32	-1.34	36.98	54	-17.02	AV	Pass
7206.000	47.18	5.26	52.44	74	-21.56	peak	Pass
7206.000	35.50	5.26	40.76	54	-13.24	AV	Pass
Test Channel:Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	49.62	-1.34	48.28	74	-25.72	peak	Pass
4804.000	38.99	-1.34	37.65	54	-16.35	AV	Pass
7206.000	47.25	5.26	52.51	74	-21.49	peak	Pass
7206.000	36.42	5.26	41.68	54	-12.32	AV	Pass
Test Channel:Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4880.000	48.45	-1.12	47.33	74	-26.67	peak	Pass
4880.000	37.90	-1.12	36.78	54	-17.22	AV	Pass
7320.000	45.73	5.65	51.38	74	-22.62	peak	Pass
7320.000	35.97	5.65	41.62	54	-12.38	AV	Pass
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4880.000	48.76	-1.12	47.64	74	-26.36	peak	Pass
4880.000	38.67	-1.12	37.55	54	-16.45	AV	Pass
7320.000	46.53	5.65	52.18	74	-21.82	peak	Pass
7320.000	36.31	5.65	41.96	54	-12.04	AV	Pass
Test Channel:Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	48.81	-0.7	48.11	74	-25.89	peak	Pass

4960.000	37.93	-0.61	37.32	54	-16.68	AV	Pass
7440.000	46.41	5.97	52.38	74	-21.62	peak	Pass
7440.000	35.31	5.97	41.28	54	-12.72	AV	Pass
Test Channel:Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	49.41	-0.7	48.71	74	-25.29	peak	Pass
4960.000	38.34	-0.61	37.73	54	-16.27	AV	Pass
7440.000	47.19	5.97	53.16	74	-20.84	peak	Pass
7440.000	35.42	5.97	41.39	54	-12.61	AV	Pass

Test Mode: BLE2Mbps							
Test Channel:Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	48.19	-1.34	46.85	74	-27.15	peak	Pass
4804.000	37.08	-1.34	35.74	54	-18.26	AV	Pass
7206.000	46.14	5.26	51.40	74	-22.60	peak	Pass
7206.000	35.82	5.26	41.08	54	-12.92	AV	Pass
Test Channel:Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	48.95	-1.34	47.61	74	-26.39	peak	Pass
4804.000	37.59	-1.34	36.25	54	-17.75	AV	Pass
7206.000	46.58	5.26	51.84	74	-22.16	peak	Pass
7206.000	35.87	5.26	41.13	54	-12.87	AV	Pass
Test Channel:Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4880.000	48.19	-1.12	47.07	74	-26.93	peak	Pass
4880.000	36.35	-1.12	35.23	54	-18.77	AV	Pass
7320.000	45.21	5.65	50.86	74	-23.14	peak	Pass
7320.000	34.61	5.65	40.26	54	-13.74	AV	Pass
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4880.000	48.77	-1.12	47.65	74	-26.35	peak	Pass
4880.000	36.85	-1.12	35.73	54	-18.27	AV	Pass
7320.000	45.71	5.65	51.36	74	-22.64	peak	Pass
7320.000	35.06	5.65	40.71	54	-13.29	AV	Pass
Test Channel:Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	47.82	-0.7	47.12	74	-26.88	peak	Pass
4960.000	36.00	-0.61	35.39	54	-18.61	AV	Pass
7440.000	44.79	5.97	50.76	74	-23.24	peak	Pass
7440.000	34.71	5.97	40.68	54	-13.32	AV	Pass
Test Channel:Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	48.31	-0.7	47.61	74	-26.39	peak	Pass
4960.000	36.74	-0.61	36.13	54	-17.87	AV	Pass
7440.000	45.60	5.97	51.57	74	-22.43	peak	Pass
7440.000	35.51	5.97	41.48	54	-12.52	AV	Pass

Test Result of Restricted Band

Note:

All modes have been tested, only worst case(BLE1Mbps and BLE2Mbps)mode was recorded in the test report.

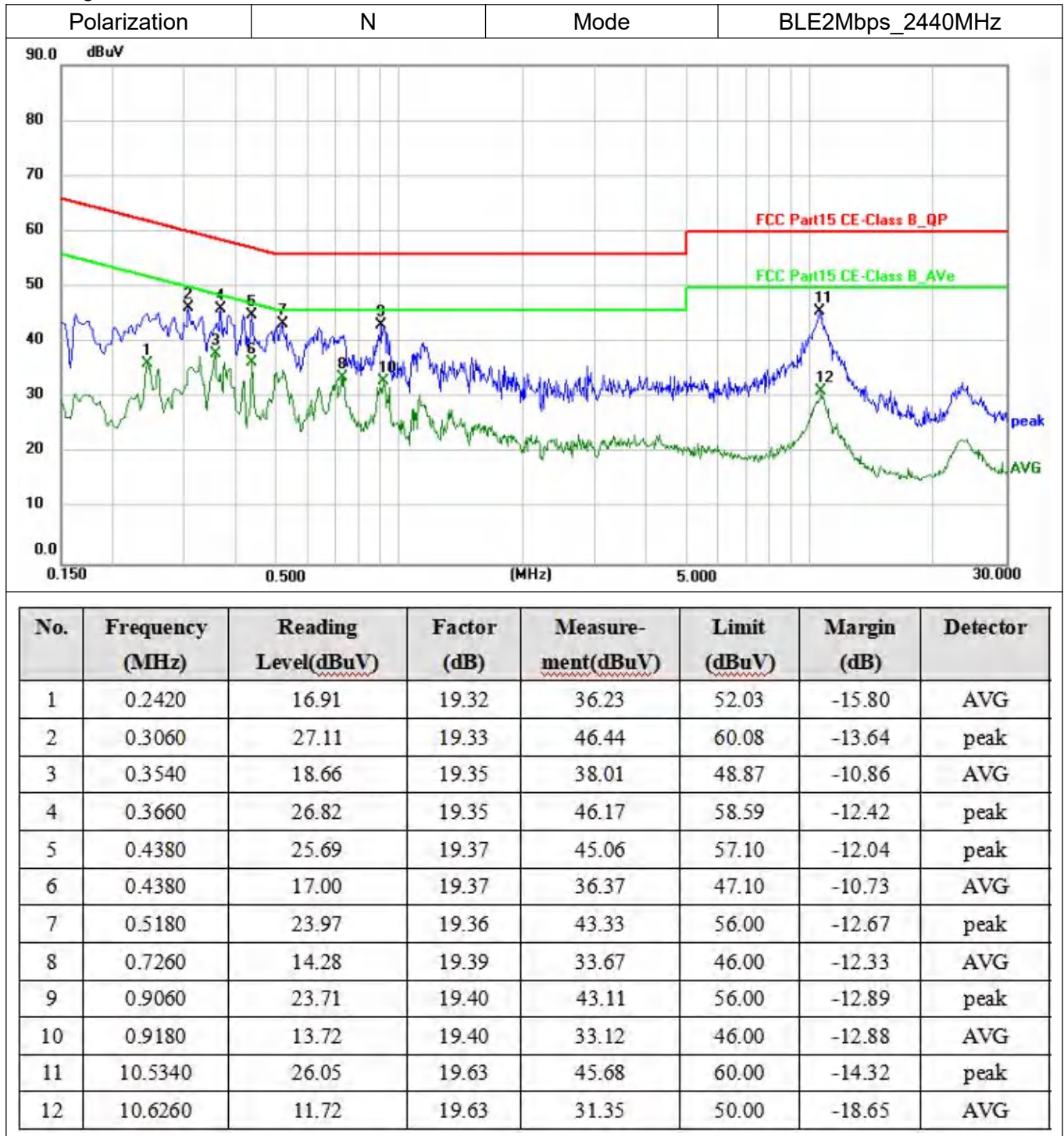
Test Mode: BLE1Mbps							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	47.66	-10.95	36.71	74	-37.29	peak	Pass
2310.000	38.43	-10.95	27.48	54	-26.52	AV	Pass
2390.000	52.35	-10.86	41.49	74	-32.51	peak	Pass
2390.000	40.53	-10.86	29.67	54	-24.33	AV	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	48.56	-10.95	37.61	74	-36.39	peak	Pass
2310.000	38.79	-10.95	27.84	54	-26.16	AV	Pass
2390.000	52.36	-10.86	41.5	74	-32.5	peak	Pass
2390.000	41.28	-10.86	30.42	54	-23.58	AV	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	47.54	-10.34	37.20	74	-36.80	peak	Pass
2483.500	37.80	-10.34	27.46	54	-26.54	AV	Pass
2500.000	51.69	-10.24	41.45	74	-32.55	peak	Pass
2500.000	39.33	-10.24	29.09	54	-24.91	AV	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	48.44	-10.34	38.10	74	-35.90	peak	Pass
2483.500	37.84	-10.34	27.50	54	-26.50	AV	Pass
2500.000	52.02	-10.24	41.78	74	-32.22	peak	Pass
2500.000	40.29	-10.24	30.05	54	-23.95	AV	Pass

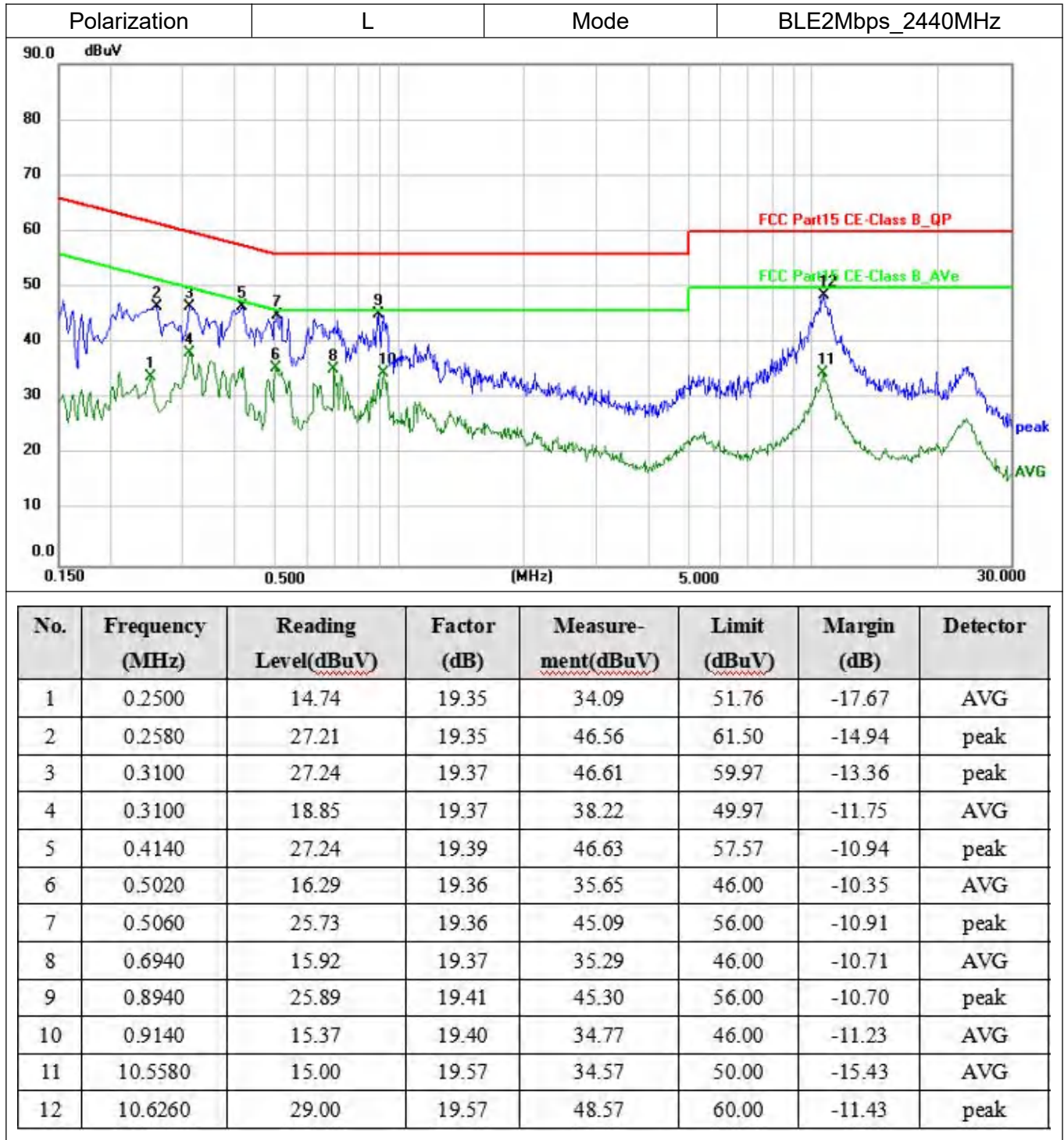
Test Mode: BLE2Mbps							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	47.03	-10.95	36.08	74	-37.92	peak	Pass
2310.000	36.79	-10.95	25.84	54	-28.16	AV	Pass
2390.000	51.41	-10.86	40.55	74	-33.45	peak	Pass
2390.000	39.54	-10.86	28.68	54	-25.32	AV	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	47.69	-10.95	36.74	74	-37.26	peak	Pass
2310.000	37.56	-10.95	26.61	54	-27.39	AV	Pass
2390.000	51.98	-10.86	41.12	74	-32.88	peak	Pass
2390.000	40.49	-10.86	29.63	54	-24.37	AV	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	47.07	-10.34	36.73	74	-37.27	peak	Pass
2483.500	36.85	-10.34	26.51	54	-27.49	AV	Pass
2500.000	50.62	-10.24	40.38	74	-33.62	peak	Pass
2500.000	39.64	-10.24	29.40	54	-24.60	AV	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	47.15	-10.34	36.81	74	-37.19	peak	Pass
2483.500	37.14	-10.34	26.80	54	-27.20	AV	Pass
2500.000	51.42	-10.24	41.18	74	-32.82	peak	Pass
2500.000	40.09	-10.24	29.85	54	-24.15	AV	Pass

B7.AC Power-Line Conducted Emission

Note:

- 1.All modes have been tested, only worst mode(BLE2Mbps_2440MHz) was recorded in the test report.
- 2.Emission Level (dBUV/m) = Reading Value (dBUV) + Correction Factor (dB/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level-Limit value.





*****END*****