

Appendix A1

BLE Test Data

"Shanghai ATBL Technology Co., Ltd." hereby certifies that according to actual testing conditions. The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards, or regulations, ATBL shall not assume any responsibility. The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material. This report will be void without authorized signature or special seal for testing report. Do not copied without authorization.

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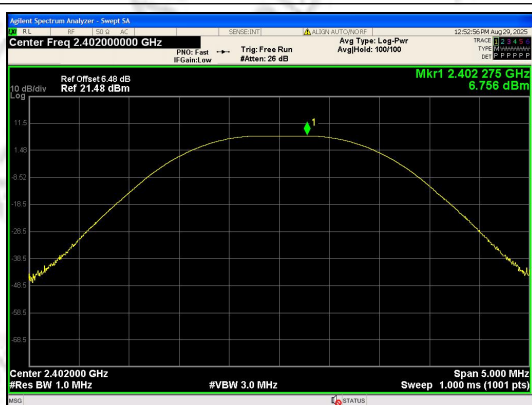
Conducted Test Data

Conducted Output Power

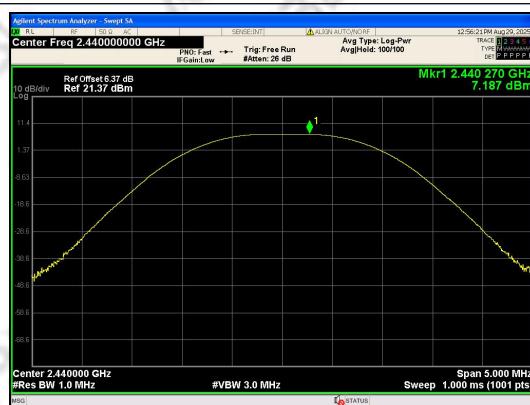
Test Result

Mode	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
BLE 1M	0	6.76	4.74	≤30	PASS
	19	7.19	5.24	≤30	PASS
	39	7.17	5.21	≤30	PASS

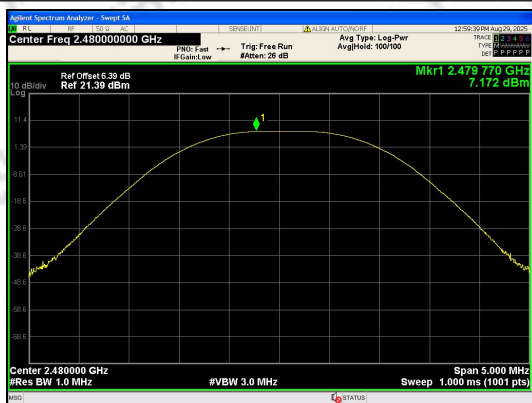
Test Graphs



Peak Output Power
BLE 1M_Channel 0



Peak Output Power
BLE 1M_Channel 19



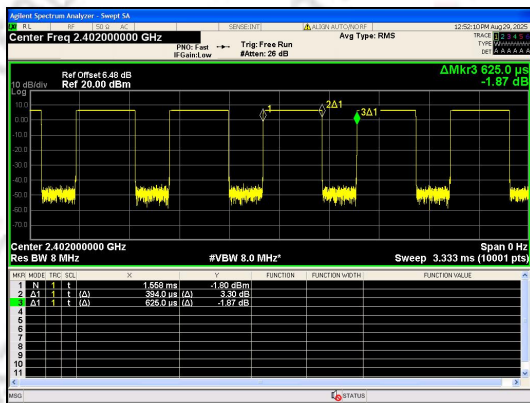
Peak Output Power
BLE 1M_Channel 39

Duty Cycle

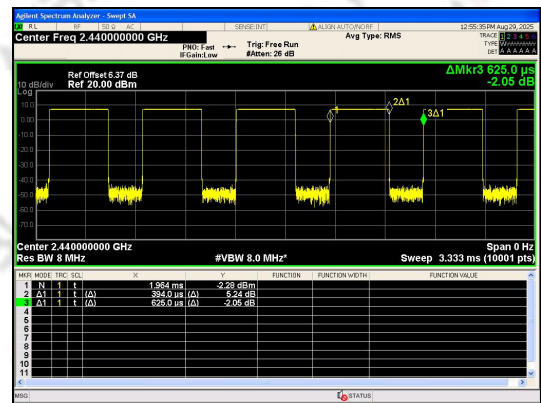
Test Result

Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
BLE 1M	0	0.394	0.625	63.04	0.6304	2.0038	2.5381
	19	0.394	0.625	63.04	0.6304	2.0038	2.5381
	39	0.394	0.625	63.07	0.6307	2.0018	2.5381

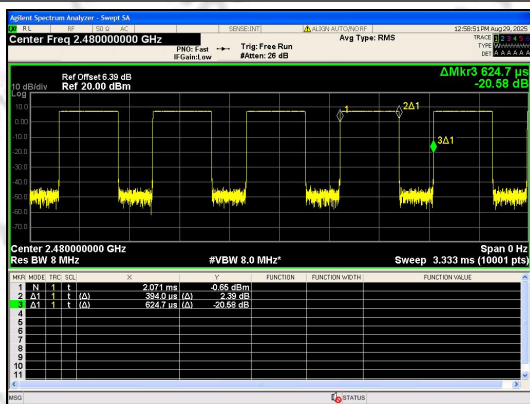
Test Graphs



BLE 1M_Channel 0



BLE 1M_Channel 19



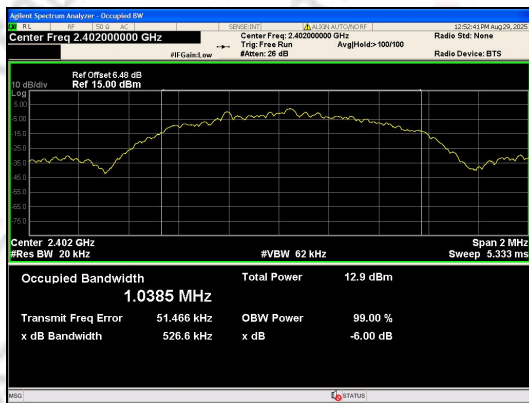
BLE 1M_Channel 39

6dB Bandwidth

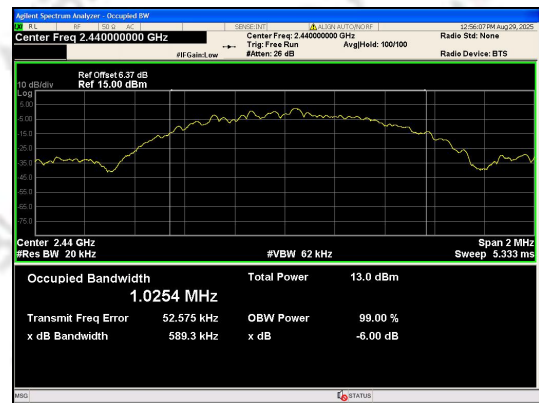
Test Result

Mode	Channel	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
BLE 1M	0	2402	0.5300	≥0.5	PASS
	19	2440	0.5900		PASS
	39	2480	0.5900		PASS

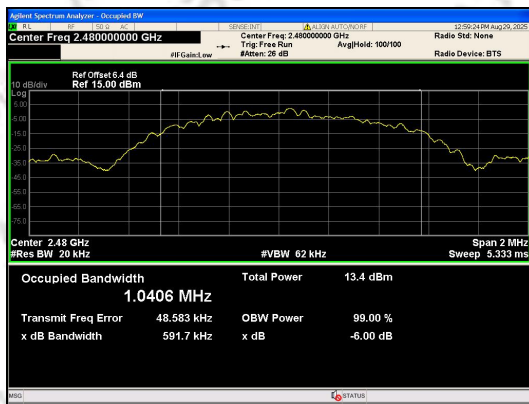
Test Graphs



BLE 1M_Channel 0



BLE 1M_Channel 19



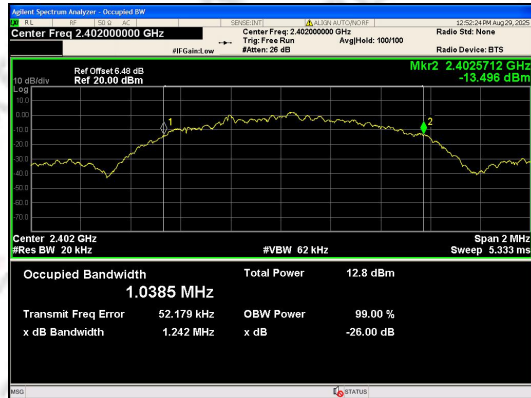
BLE 1M_Channel 39

99% Bandwidth

Test Result

Mode	Channel	Center Frequency (MHz)	99% BW (MHz)
BLE 1M	0	2402	1.0385
BLE 1M	19	2440	1.0246
BLE 1M	39	2480	1.0395

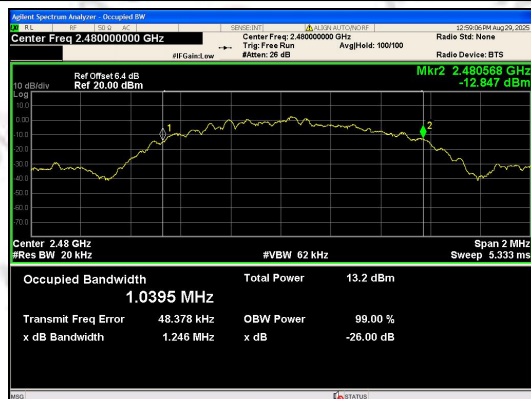
Test Graphs



BLE 1M_Channel 0



BLE 1M_Channel 19



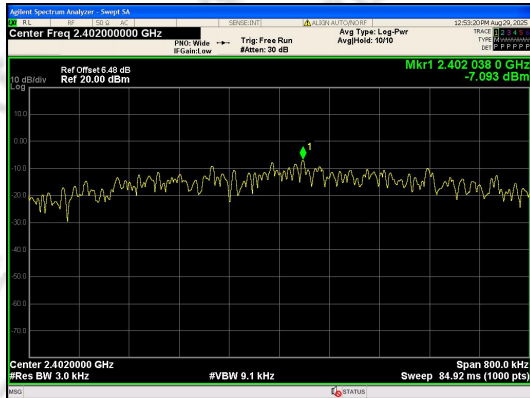
BLE 1M_Channel 39

Power Spectral Density

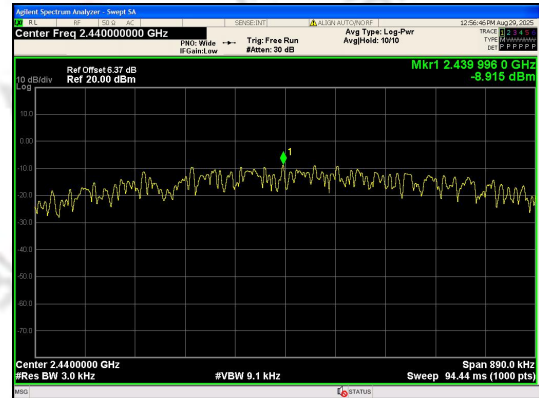
Test Result

Mode	Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
BLE 1M	0	-7.090	≤8	PASS
BLE 1M	19	-8.910	≤8	PASS
BLE 1M	39	-8.110	≤8	PASS

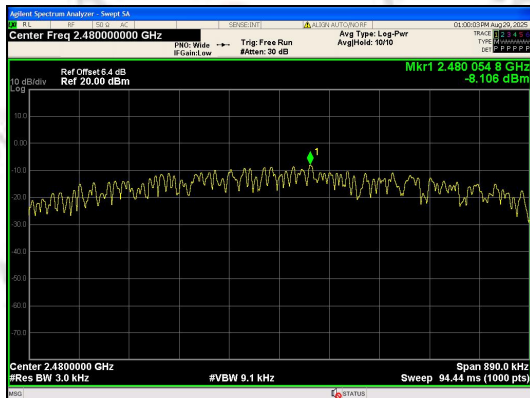
Test Graphs



BLE 1M_Channel 0



BLE 1M_Channel 19



BLE 1M_Channel 39

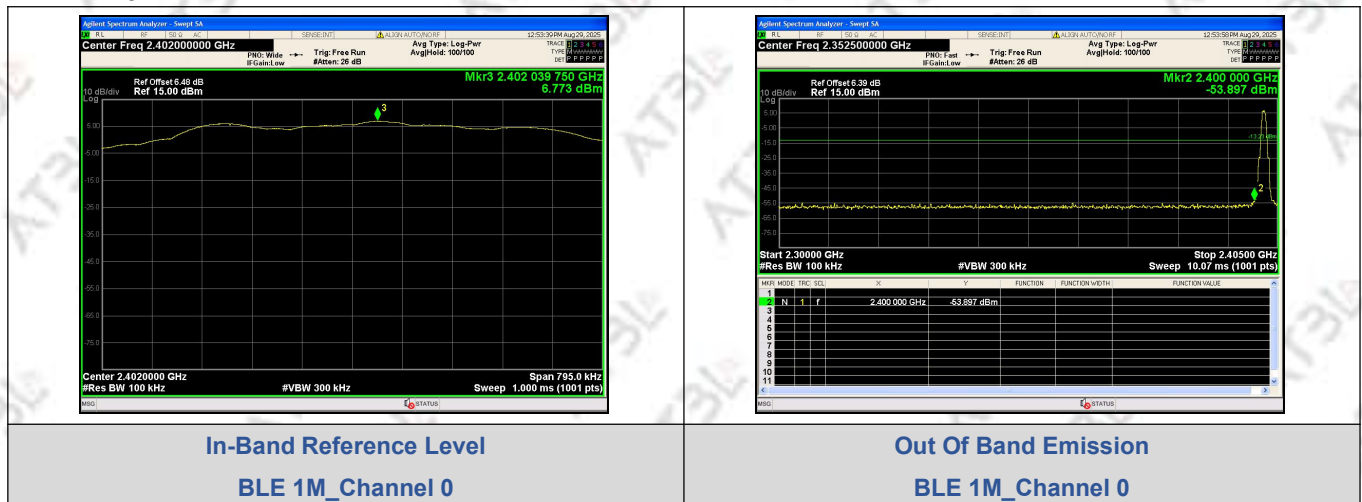
Conducted Out Of Band Emission

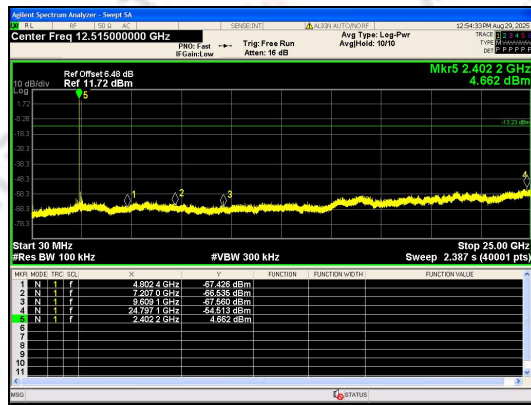
Note:The maximum loss of the test system for testing at 30MHz-26.5GHz is 17.2dB. The offset on the test chart is the offset of the main frequency, and the margin is sufficient to offset the difference between the maximum loss of the system and the offset of the main frequency.

Test Result

Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
BLE 1M	0	2400.00	-53.900	-13.23	-40.670	PASS
		4802.39	-67.426	-13.23	-54.196	PASS
		7207.00	-66.535	-13.23	-53.305	PASS
		9609.12	-67.560	-13.23	-54.330	PASS
		24797.1	-54.513	-13.23	-41.283	PASS
	19	4879.17	-66.581	-13.04	-53.541	PASS
		7319.99	-67.715	-13.04	-54.675	PASS
		9760.18	-68.947	-13.04	-55.907	PASS
		24775.9	-54.197	-13.04	-41.157	PASS
	39	2483.50	-56.350	-13.02	-43.330	PASS
		4959.70	-66.504	-13.02	-53.484	PASS
		7441.72	-67.617	-13.02	-54.597	PASS
		9918.74	-68.531	-13.02	-55.511	PASS
		24845.2	-55.271	-13.02	-42.251	PASS

Test Graphs

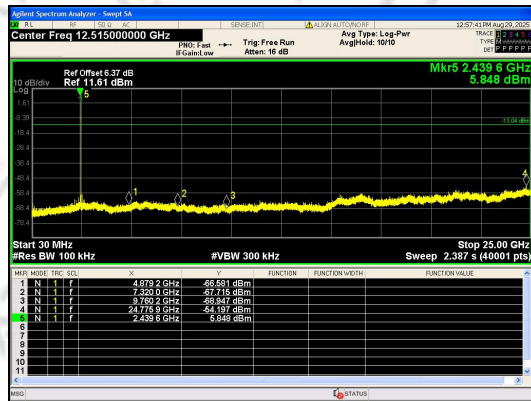




30.0 MHz - 25000.0 MHz
BLE 1M_Channel 0



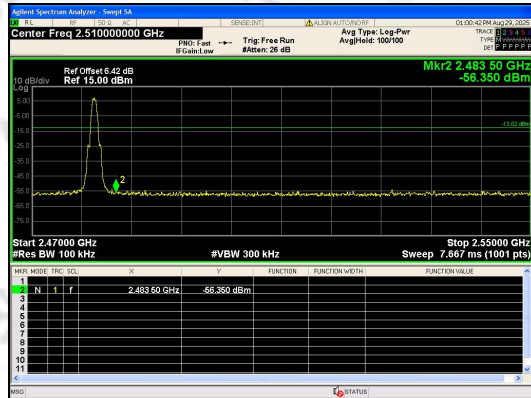
In-Band Reference Level
BLE 1M_Channel 19



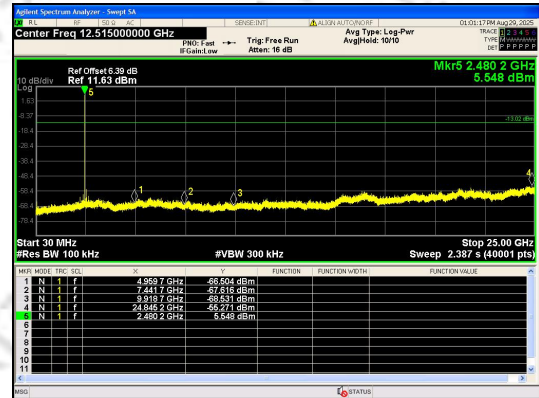
30.0 MHz - 25000.0 MHz
BLE 1M_Channel 19



In-Band Reference Level
BLE 1M_Channel 39



Out Of Band Emission
BLE 1M_Channel 39



30.0 MHz - 25000.0 MHz
BLE 1M_Channel 39

Radiated Test Data

Radiated Spurious Emission

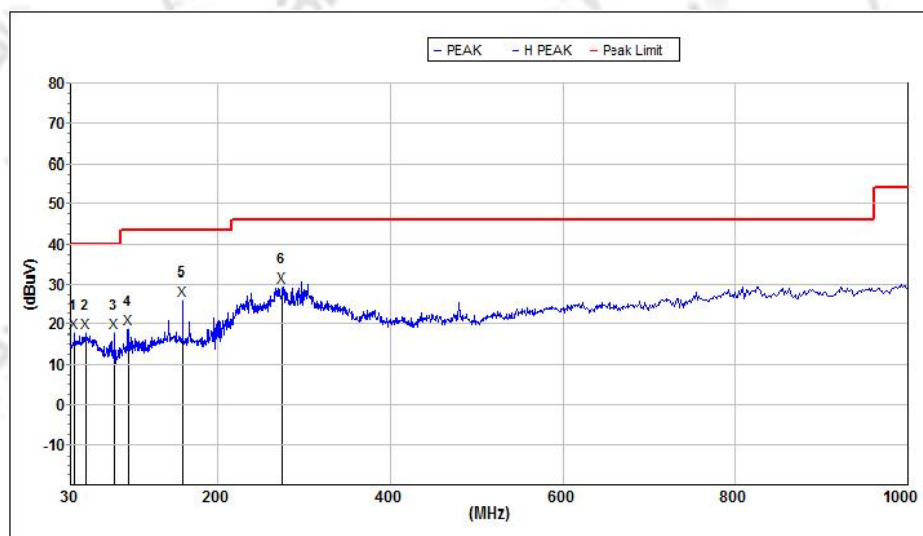
Radiated Emission (9KHz-30MHz)

Note:The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Radiated Emission (30MHz-1GHz)

Note:All modes have been tested, only worst case mode(BLE 1M) was recorded in the test report.

Temperature:	27℃	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Horizontal
Test Mode:	BLE 1M-2402MHz	Comment:	30MHz-1GHz



Test Summary Result

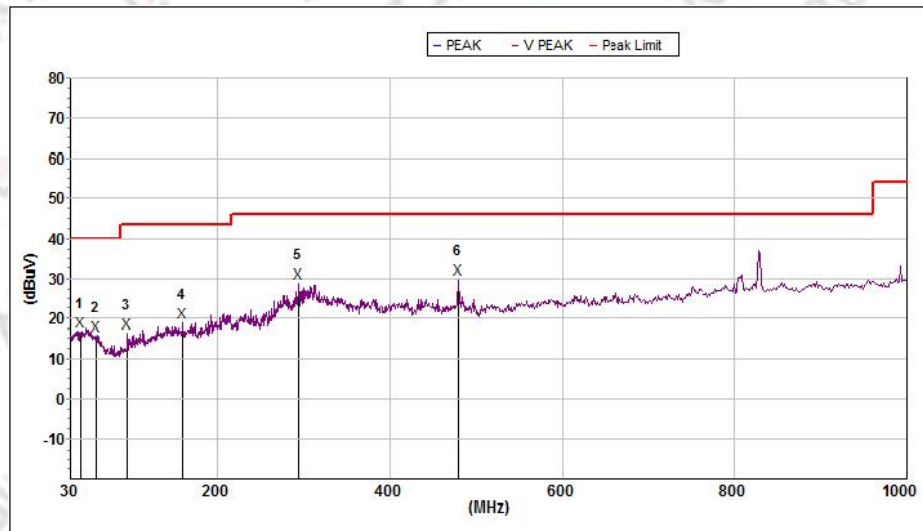
Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	34.336	17.8	40.0	22.2	18.7	31.8	H
2	47.910	17.7	40.0	22.3	19.5	31.1	H
3	79.940	17.8	40.0	22.2	14.8	32.1	H
4	95.930	18.7	43.5	24.8	14.8	31.1	H
5	159.784	25.9	43.5	17.6	18.5	31.4	H
6	275.157	29.5	46.0	16.5	18.4	32.2	H

Note:

1.Margin = Result (Result =Reading + Factor)-Limit

2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Vertical
Test Mode:	BLE 1M-2402MHz	Comment:	30MHz-1GHz



Test Summary Result

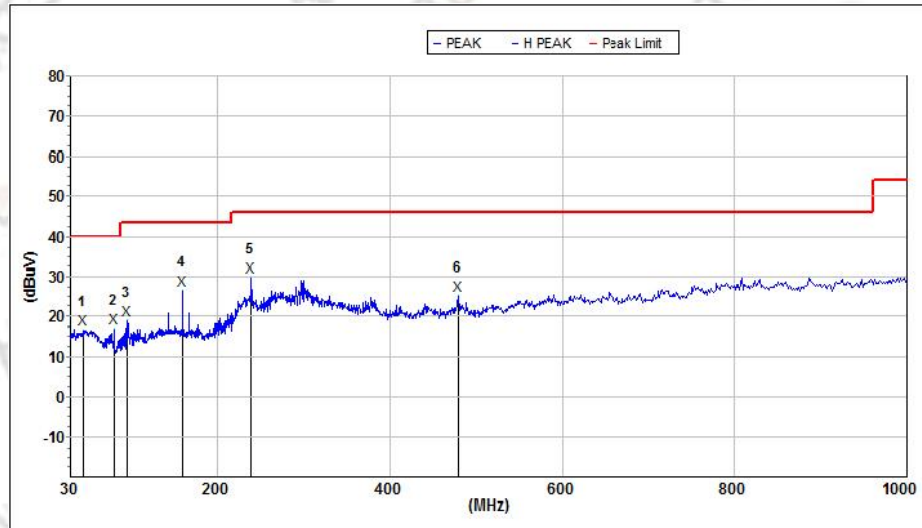
Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	41.640	16.8	40.0	23.2	19.1	31.7	V
2	59.545	15.9	40.0	24.1	18.1	31.2	V
3	95.427	16.4	43.5	27.1	14.8	31.1	V
4	159.784	19.0	43.5	24.5	18.5	31.4	V
5	294.114	29.0	46.0	17.0	19.0	32.3	V
6	479.686	29.9	46.0	16.1	23.2	31.8	V

Note:

1.Margin = Result (Result =Reading + Factor)-Limit

2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Horizontal
Test Mode:	BLE 1M-2480MHz	Comment:	30MHz-1GHz



Test Summary Result

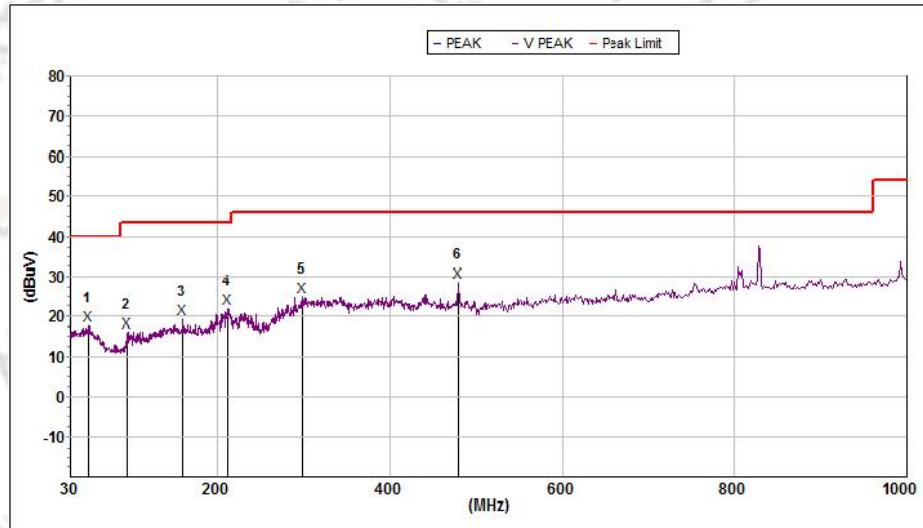
Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	44.979	17.0	40.0	23.0	19.3	31.4	H
2	79.940	17.1	40.0	22.9	14.8	32.1	H
3	95.427	19.2	43.5	24.3	14.8	31.1	H
4	159.784	26.6	43.5	16.9	18.5	31.4	H
5	239.987	30.0	46.0	16.0	17.2	32.0	H
6	479.686	25.4	46.0	20.6	23.2	31.8	H

Note:

1.Margin = Result (Result =Reading + Factor)-Limit

2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Vertical
Test Mode:	BLE 1M-2480MHz	Comment:	30MHz-1GHz



Test Summary Result

Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	50.321	17.8	40.0	22.2	19.5	30.9	V
2	95.427	16.3	43.5	27.2	14.8	31.1	V
3	159.784	19.5	43.5	24.0	18.5	31.4	V
4	211.156	22.0	43.5	21.5	16.1	31.9	V
5	298.792	25.1	46.0	20.9	19.2	32.3	V
6	479.686	28.8	46.0	17.2	23.2	31.8	V

Note:

1.Margin = Result (Result =Reading + Factor)-Limit

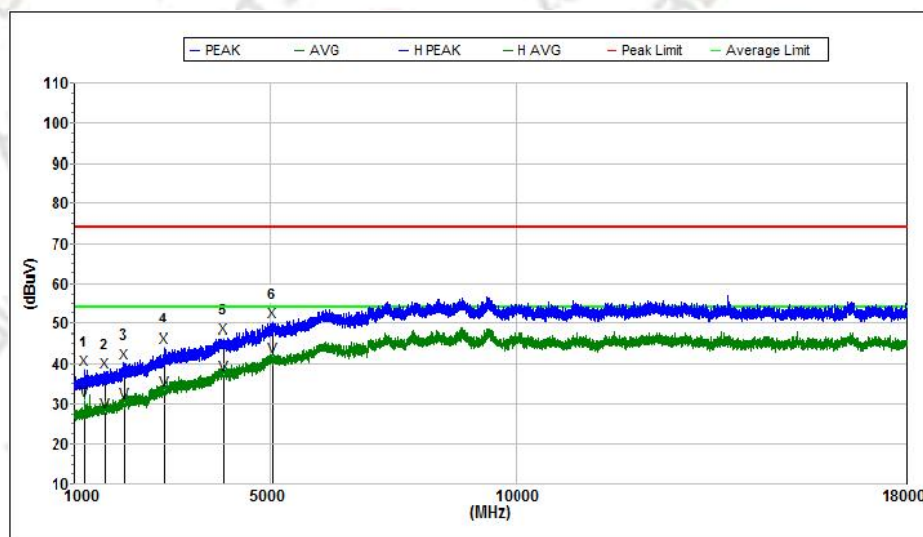
2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Radiated Emission (Above 1GHz)

Note:

- 1.All modes have been tested, only worst case mode(BLE 1M) was recorded in the test report.
- 2.We used the filter to test and the main frequency was filtered out.
- 3.Other 18G-25G Emission detected are more than 20dB below the limit.

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Horizontal
Test Mode:	BLE 1M-2402MHz	Comment:	1GHz-18GHz



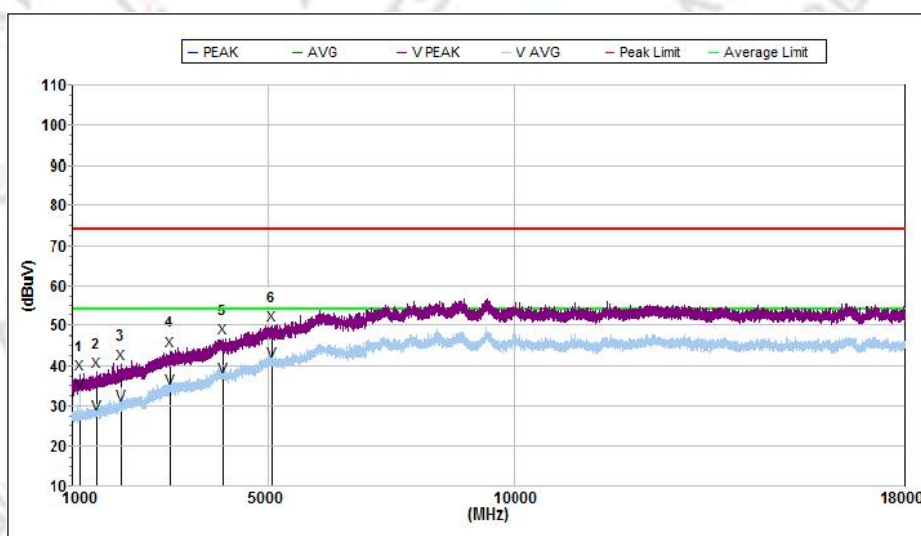
Test Summary Result

Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	1211.200	38.7	74.0	35.3	25.7	53.6	H
2	1624.600	38.1	74.0	35.9	25.3	53.5	H
3	2018.500	40.4	74.0	33.6	26.5	53.9	H
4	2830.000	44.3	74.0	29.7	28.8	54.1	H
5	4039.600	46.6	74.0	27.4	31.0	53.2	H
6	5042.500	50.4	74.0	23.6	33.1	52.4	H
Avg:							
1	1211.200	31.2	54.0	22.8	25.7	53.6	H
2	1624.600	28.2	54.0	25.8	25.3	53.5	H
3	2018.500	30.3	54.0	23.7	26.5	53.9	H
4	2830.000	33.5	54.0	20.5	28.8	54.1	H
5	4039.600	37.3	54.0	16.7	31.0	53.2	H
6	5042.500	41.8	54.0	12.2	33.1	52.4	H

Note:

- 1.Margin = Result (Result =Reading + Factor)-Limit
- 2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Vertical
Test Mode:	BLE 1M-2402MHz	Comment:	1GHz-18GHz



Test Summary Result

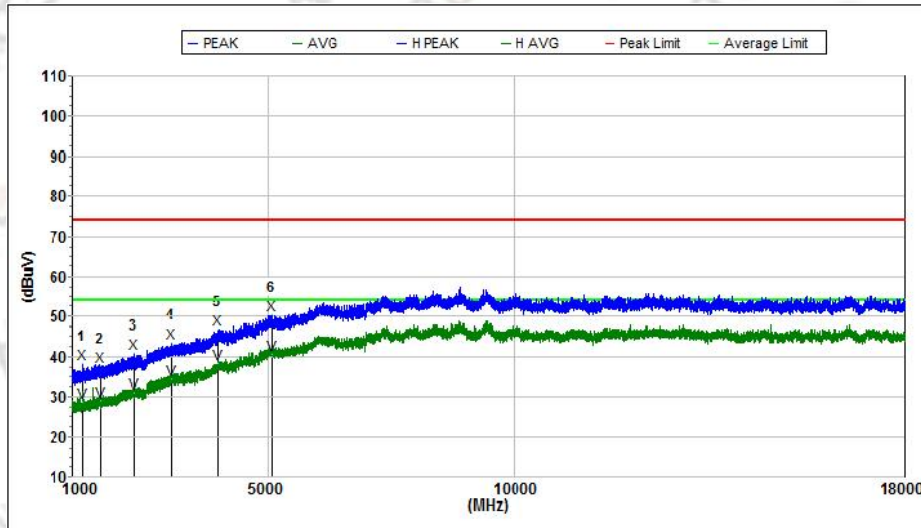
Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	1159.900	38.1	74.0	35.9	25.5	53.6	V
2	1495.600	38.6	74.0	35.4	25.4	53.4	V
3	1995.100	40.5	74.0	33.5	26.5	53.9	V
4	3000.700	43.8	74.0	30.2	29.4	54.1	V
5	4064.800	46.7	74.0	27.3	31.0	53.2	V
6	5070.100	50.0	74.0	24.0	33.1	52.4	V
Avg:							
1	1159.900	33.3	54.0	20.7	25.5	53.6	V
2	1495.600	28.0	54.0	26.0	25.4	53.4	V
3	1995.100	30.4	54.0	23.6	26.5	53.9	V
4	3000.700	34.4	54.0	19.6	29.4	54.1	V
5	4064.800	37.2	54.0	16.8	31.0	53.2	V
6	5070.100	41.3	54.0	12.7	33.1	52.4	V

Note:

1.Margin = Result (Result =Reading + Factor)-Limit

2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Horizontal
Test Mode:	BLE 1M-2480MHz	Comment:	1GHz-18GHz



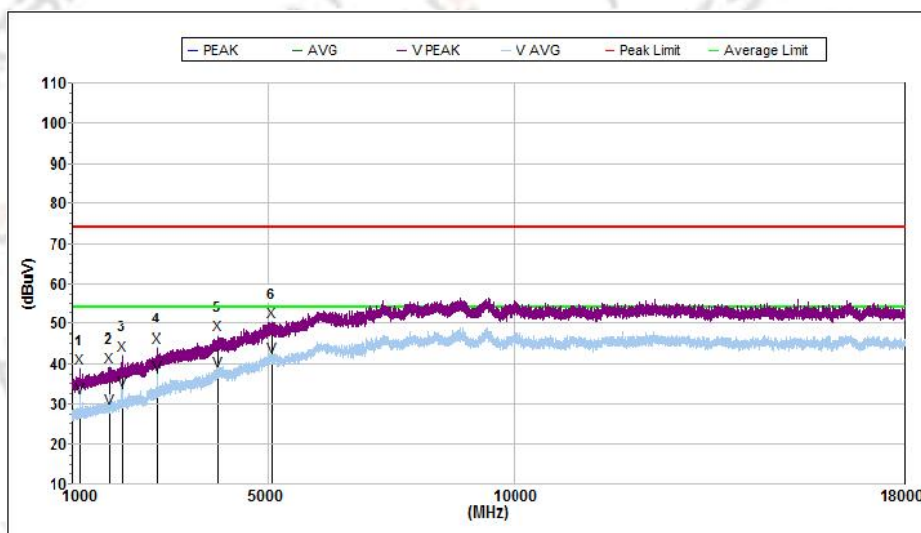
Test Summary Result

Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	1211.500	38.4	74.0	35.6	25.7	53.6	H
2	1567.000	37.6	74.0	36.4	25.3	53.5	H
3	2242.900	40.8	74.0	33.2	27.0	54.0	H
4	3024.100	43.5	74.0	30.5	29.4	54.1	H
5	3947.500	46.8	74.0	27.2	30.8	53.3	H
6	5073.400	50.6	74.0	23.4	33.1	52.4	H
Avg:							
1	1211.500	28.8	54.0	25.2	25.7	53.6	H
2	1567.000	29.2	54.0	24.8	25.3	53.5	H
3	2242.900	31.0	54.0	23.0	27.0	54.0	H
4	3024.100	34.5	54.0	19.5	29.4	54.1	H
5	3947.500	38.3	54.0	15.7	30.8	53.3	H
6	5073.400	40.7	54.0	13.3	33.1	52.4	H

Note:

- 1.Margin = Result (Result =Reading + Factor)-Limit
- 2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	27°C	Relative Humidity:	42%
Test Voltage:	AC 24V	Phase:	Vertical
Test Mode:	BLE 1M-2480MHz	Comment:	1GHz-18GHz



Test Summary Result

Mk.	Freq. (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB)	Amp.G. (dB)	Pol.
Peak:							
1	1159.600	39.1	74.0	34.9	25.5	53.6	V
2	1748.800	39.4	74.0	34.6	25.2	53.6	V
3	2024.800	42.1	74.0	31.9	26.6	53.9	V
4	2747.500	44.3	74.0	29.7	28.5	54.1	V
5	3948.400	47.1	74.0	26.9	30.8	53.3	V
6	5077.000	50.4	74.0	23.6	33.1	52.4	V
Avg:							
1	1159.600	31.6	54.0	22.4	25.5	53.6	V
2	1748.800	29.1	54.0	24.9	25.2	53.6	V
3	2024.800	33.5	54.0	20.5	26.6	53.9	V
4	2747.500	37.4	54.0	16.6	28.5	54.1	V
5	3948.400	38.2	54.0	15.8	30.8	53.3	V
6	5077.000	41.9	54.0	12.1	33.1	52.4	V

Note:

1.Margin = Result (Result =Reading + Factor)-Limit

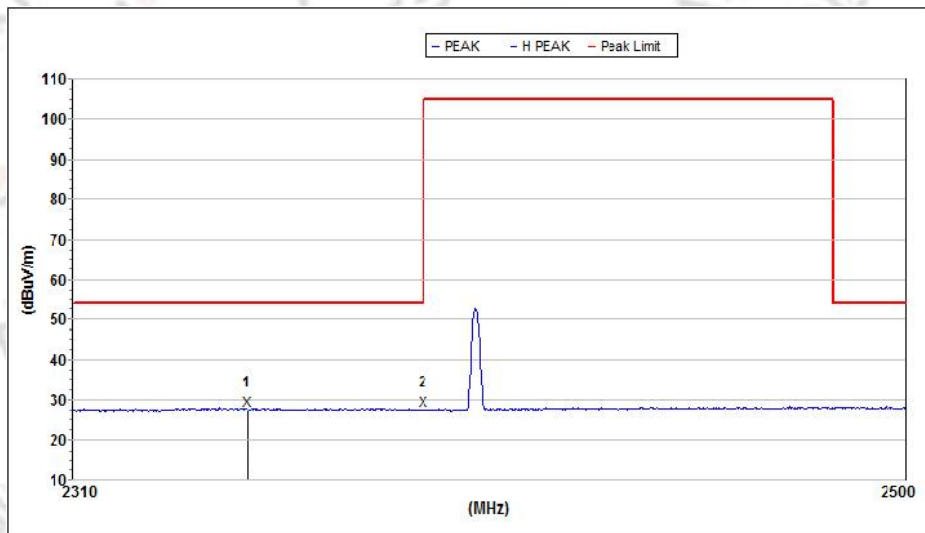
2.Factor= Cable Loss +Antenna Factor-Amplifier Gain

Restricted Band

Note: During the test, pre-scan All mode, the report only reflects the test data of worst mode(BLE 1M).

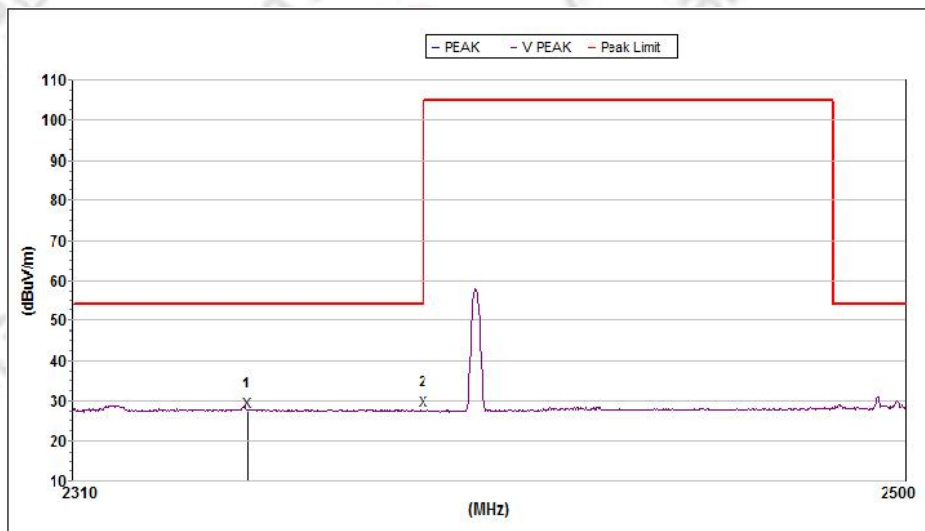
Test Mode: BLE 1M

Test Channel: Lowest channel, Test Polarization: Horizontal



Mk.	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB/m)	Amp.G. (dB)	Pol.
AVG							
1	2350.000	27.4	54.0	26.6	27.3	54.0	H
2	2390.000	27.4	54.0	26.6	27.4	54.1	H

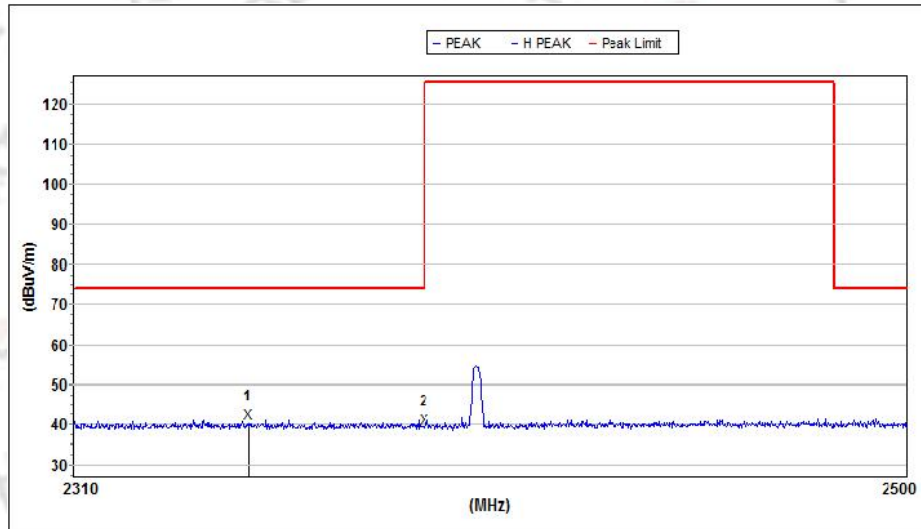
Test Channel: Lowest channel, Test Polarization: Vertical



Mk.	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB/m)	Amp.G. (dB)	Pol.
AVG							
1	2350.000	27.5	54.0	26.5	27.3	54.0	V
2	2390.000	27.6	54.0	26.4	27.4	54.1	V

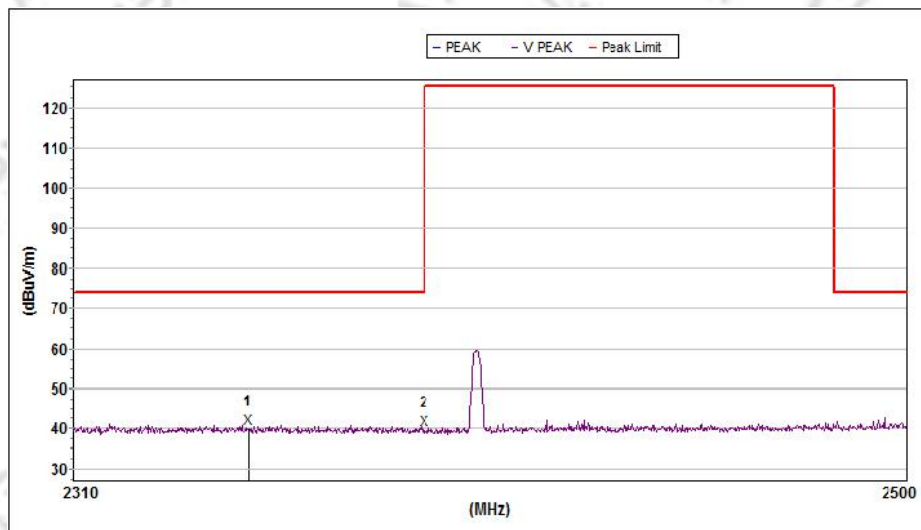
Test Mode: BLE 1M

Test Channel: Lowest channel, Test Polarization: Horizontal



Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Pol.
	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(dB)	
PEAK							
1	2350.000	40.4	74.0	33.6	27.3	54.0	H
2	2390.000	39.3	74.0	34.7	27.4	54.1	H

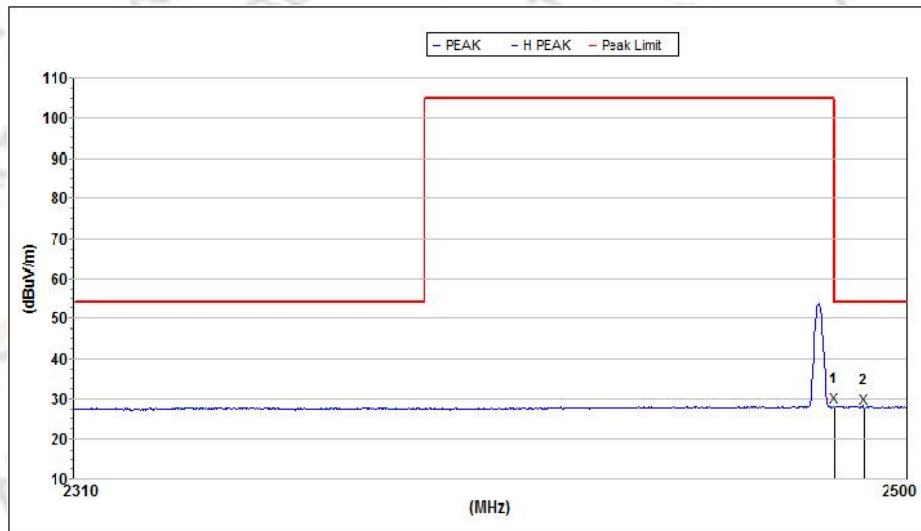
Test Channel: Lowest channel, Test Polarization: Vertical



Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Pol.
	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(dB)	
PEAK							
1	2350.000	40.2	74.0	33.8	27.3	54.0	V
2	2390.000	39.7	74.0	34.3	27.4	54.1	V

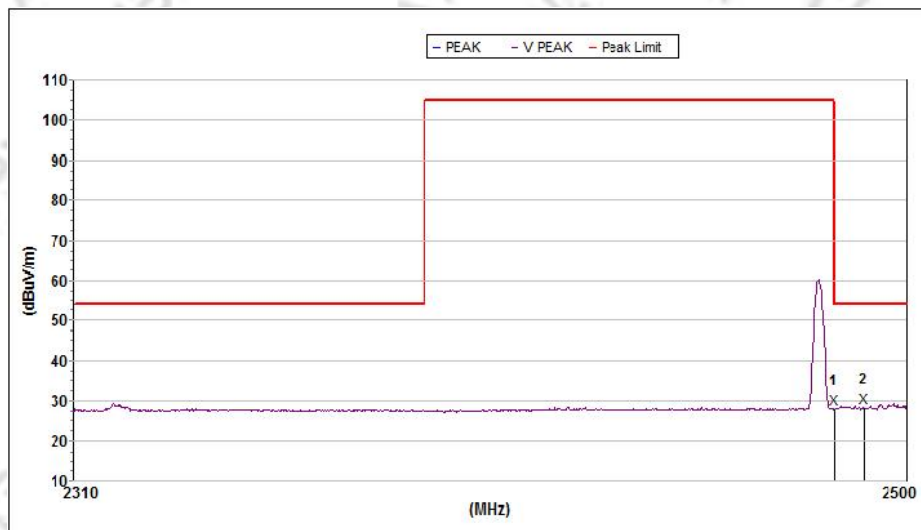
Test Mode: BLE 1M

Test Channel: Highest channel, Test Polarization: Horizontal



Mk.	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB/m)	Amp.G. (dB)	Pol.
AVG							
1	2483.600	28.0	54.0	26.0	27.6	54.1	H
2	2490.000	27.9	54.0	26.1	27.6	54.1	H

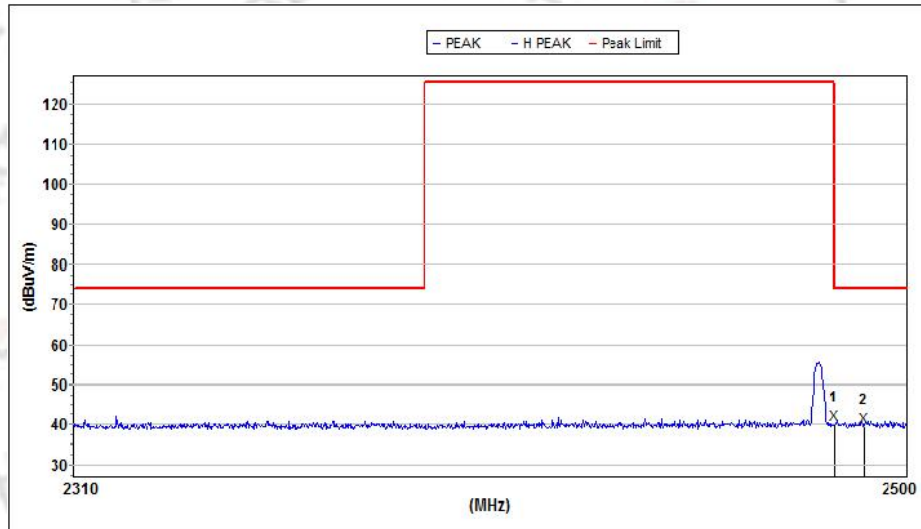
Test Channel: Highest channel, Test Polarization: Vertical



Mk.	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB/m)	Amp.G. (dB)	Pol.
AVG							
1	2483.600	28.2	54.0	25.8	27.6	54.1	V
2	2490.000	28.3	54.0	25.7	27.6	54.1	V

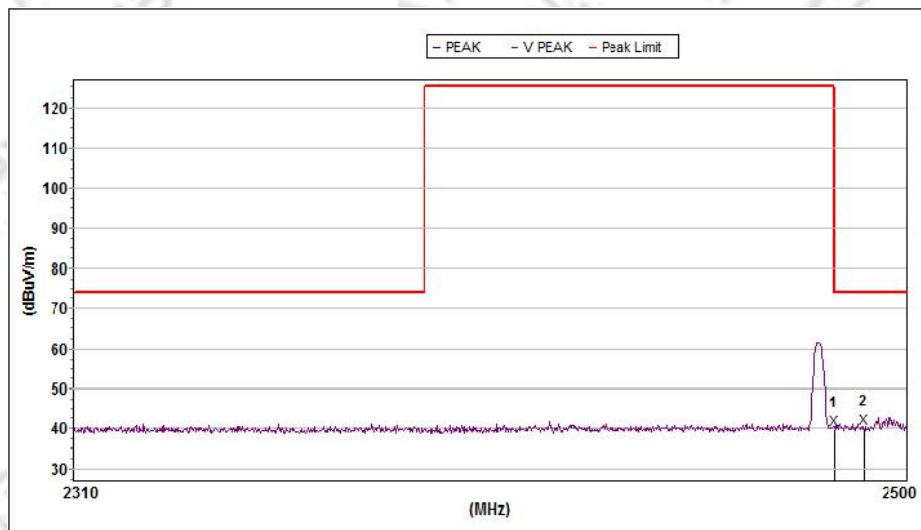
Test Mode: BLE 1M

Test Channel: Highest channel, Test Polarization: Horizontal



Mk.	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB/m)	Amp.G. (dB)	Pol.
PEAK							
1	2483.600	40.0	74.0	34.0	27.6	54.1	H
2	2490.000	39.5	74.0	34.5	27.6	54.1	H

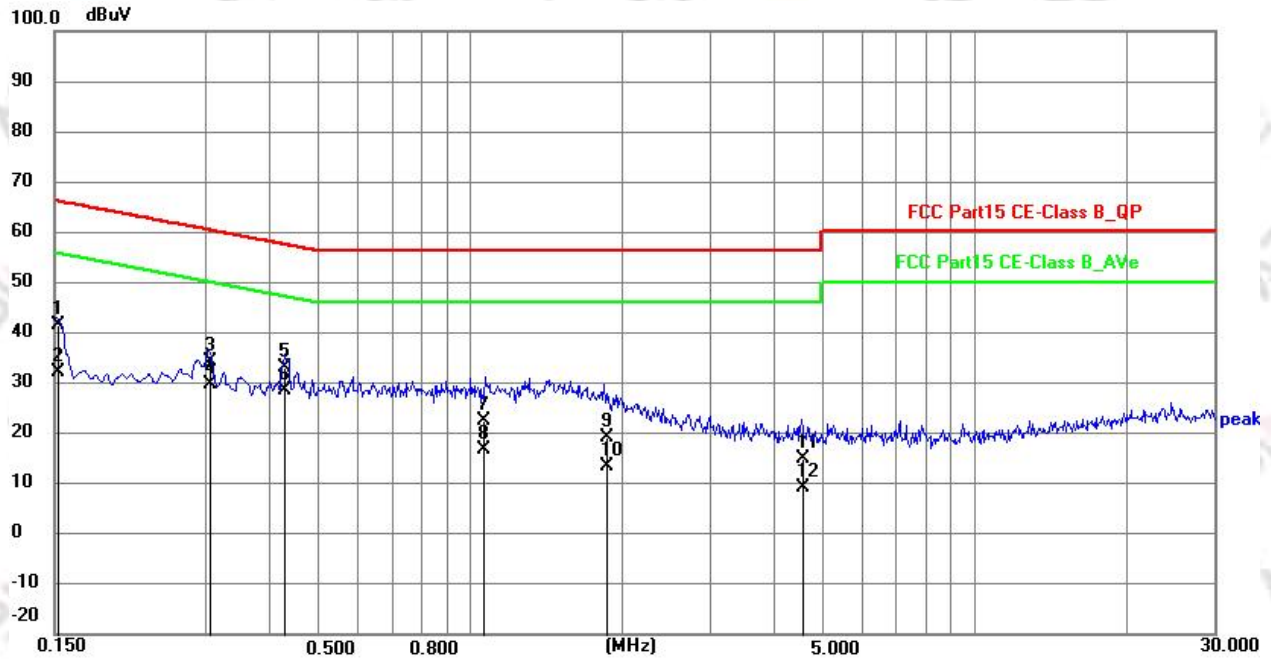
Test Channel: Highest channel, Test Polarization: Vertical



Mk.	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Ant.F/G. (dB/m)	Amp.G. (dB)	Pol.
PEAK							
1	2483.600	39.7	74.0	34.3	27.6	54.1	V
2	2490.000	40.1	74.0	33.9	27.6	54.1	V

AC Power-Line Conducted Emission Test Data

Temperature:	25℃	Relative Humidity:	44%
Phase:	L	Test Mode:	Mode7
Test Voltage:	AC 24V	Test Date:	2025.09.09

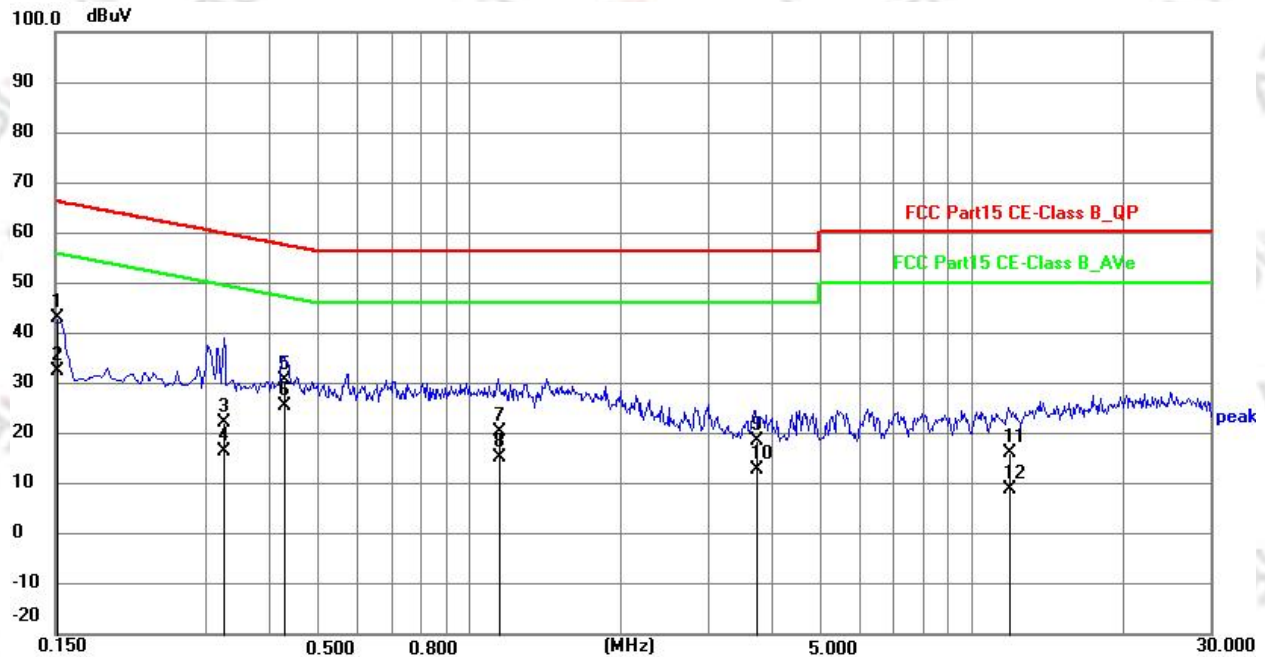


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1520	30.93	10.66	41.59	65.89	-24.30	QP
2	0.1520	21.53	10.66	32.19	55.89	-23.70	AVG
3	0.3040	23.61	10.52	34.13	60.13	-26.00	QP
4	0.3040	19.21	10.52	29.73	50.13	-20.40	AVG
5	0.4300	22.52	10.43	32.95	57.25	-24.30	QP
6	0.4300	17.98	10.43	28.41	47.25	-18.84	AVG
7	1.0620	12.00	10.41	22.41	56.00	-33.59	QP
8	1.0620	6.28	10.41	16.69	46.00	-29.31	AVG
9	1.8650	8.57	10.47	19.04	56.00	-36.96	QP
10	1.8650	2.84	10.47	13.31	46.00	-32.69	AVG
11	4.5560	4.30	10.54	14.84	56.00	-41.16	QP
12	4.5560	-1.52	10.54	9.02	46.00	-36.98	AVG

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Cable Loss +Antenna Factor–Amplifier Gain

Temperature:	25°C	Relative Humidity:	44%
Phase:	N	Test Mode:	Mode7
Test Voltage:	AC 24V	Test Date:	2025.09.09



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1510	32.43	10.64	43.07	65.94	-22.87	QP
2	0.1510	21.70	10.64	32.34	55.94	-23.60	AVG
3	0.3250	11.61	10.49	22.10	59.58	-37.48	QP
4	0.3250	6.08	10.49	16.57	49.58	-33.01	AVG
5	0.4270	20.12	10.42	30.54	57.31	-26.77	QP
6	0.4270	15.11	10.42	25.53	47.31	-21.78	AVG
7	1.1500	9.86	10.41	20.27	56.00	-35.73	QP
8	1.1500	4.90	10.41	15.31	46.00	-30.69	AVG
9	3.7250	7.90	10.58	18.48	56.00	-37.52	QP
10	3.7250	2.15	10.58	12.73	46.00	-33.27	AVG
11	11.8780	4.68	11.54	16.22	60.00	-43.78	QP
12	11.8780	-2.56	11.54	8.98	50.00	-41.02	AVG

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Cable Loss +Antenna Factor–Amplifier Gain

.*****END OF THE Appendix A1*****