

7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

7.5.2. Test Procedure Used

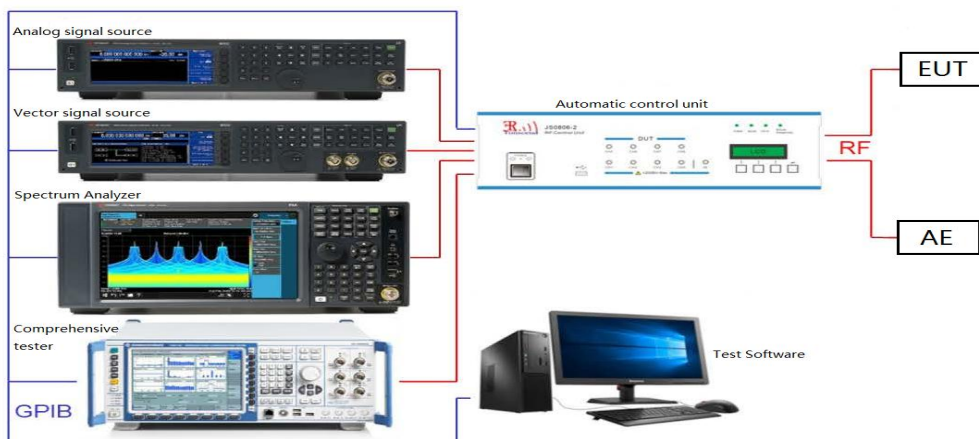
KDB 558074 D01 v05r02 - Section 8.5 & Section 8.6

ANSI C63.10 – Section 11.11&11.12

7.5.3. Test Setting

- (a) Set the center frequency and span to encompass frequency range to be measured
- (b) RBW = 100kHz
- (c) VBW = 300kHz
- (d) Detector = Peak
- (e) Trace mode = max hold
- (f) Sweep time = auto couple
- (g) The trace was allowed to stabilize

7.5.4. Test Setup



7.5.5. Test Result

Temperature:	25.8 °C
Relative Humidity:	50 %
ATM Pressure:	100.5 kPa
Test Data:	2025-05-08
Test Engineer:	Stone Zhang

Band edge

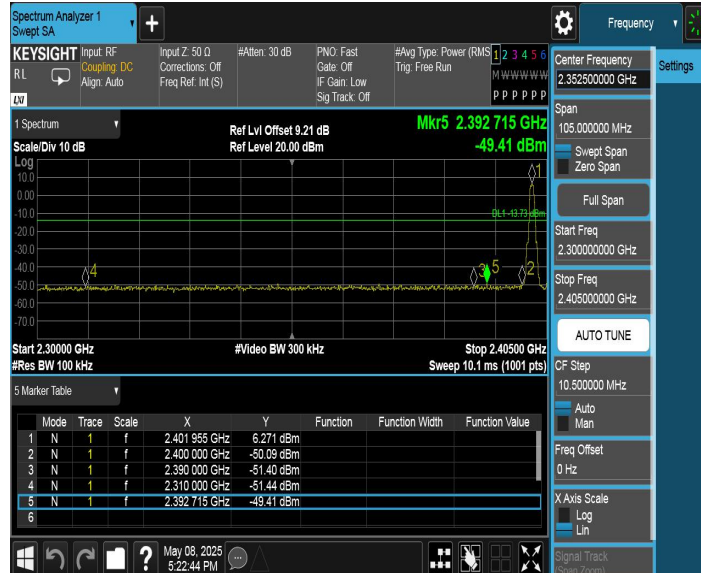
Test Mode	Antenna	ChName	Frequency (MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	Low	2402	6.27	-49.41	≤-13.73	PASS
		High	2480	6.56	-49.03	≤-13.44	PASS

Conducted Spurious Emission

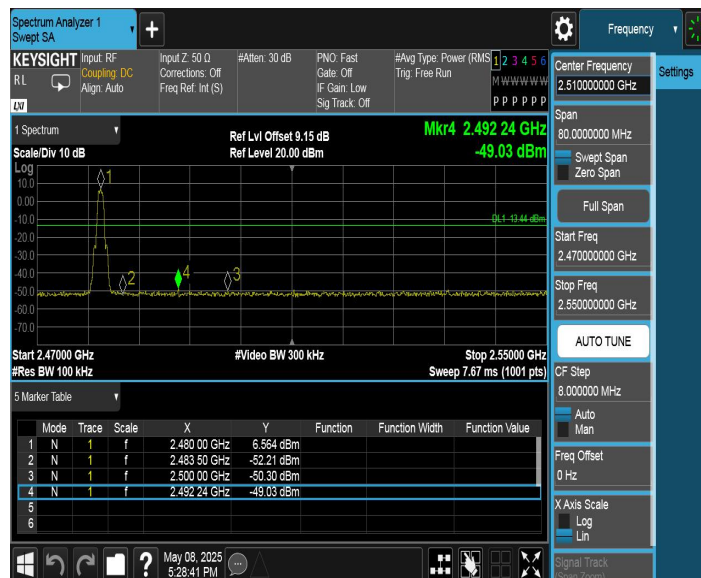
Test Mode	Antenna	Frequency (MHz)	Frequency Range [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	2402	Reference	6.08	6.08	---	PASS
			30~1000	6.08	-60.26	≤-13.92	PASS
			1000~26500	6.08	-44.97	≤-13.92	PASS
		2440	Reference	6.09	6.09	---	PASS
			30~1000	6.09	-60.35	≤-13.91	PASS
			1000~26500	6.09	-50.02	≤-13.91	PASS
		2480	Reference	6.51	6.51	---	PASS
			30~1000	6.51	-60.49	≤-13.49	PASS
			1000~26500	6.51	-44.99	≤-13.49	PASS

Test Graphs of Band Edge

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480

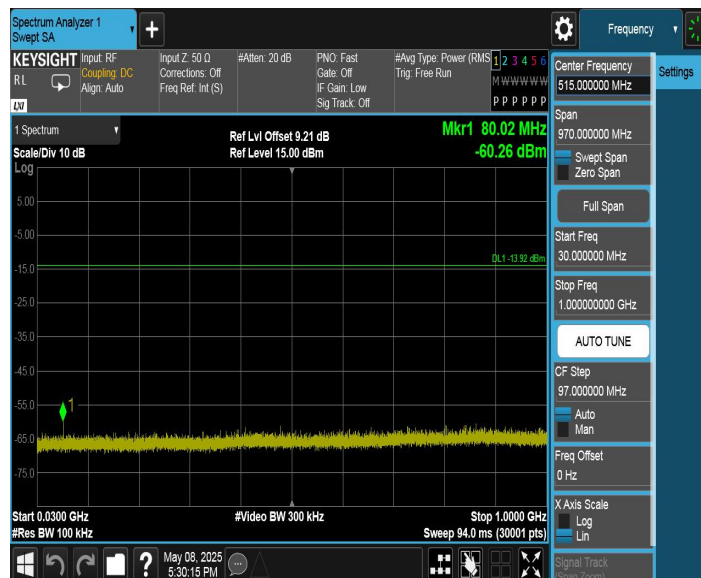


Test Graphs of Out-of-Band Emissions

BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



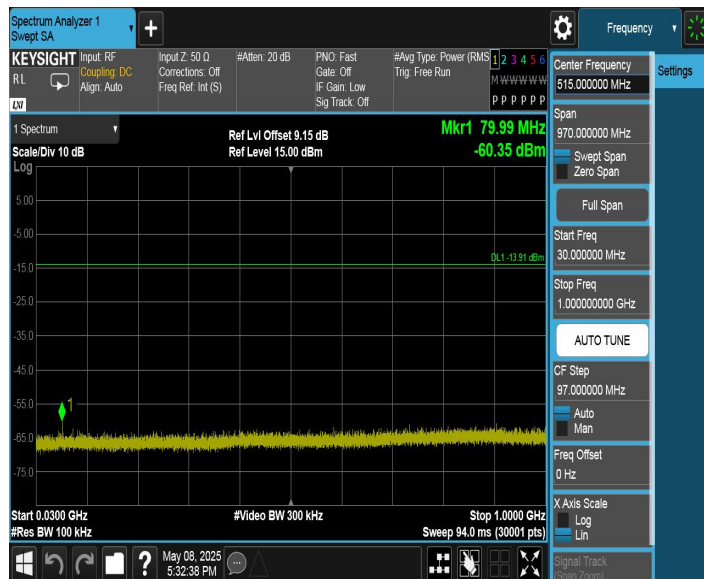
BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



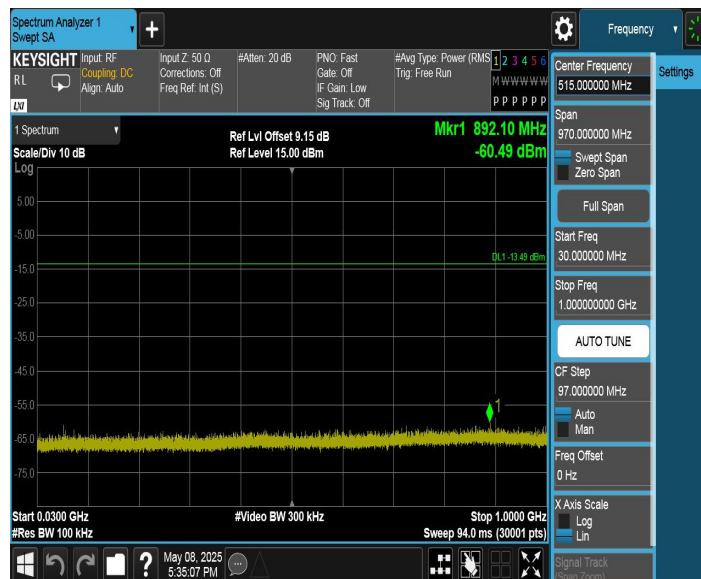
BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2. Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3

7.6.3. Test Setting

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold

- Trace was allowed to stabilize

Table 1 - RBW as a function of frequency

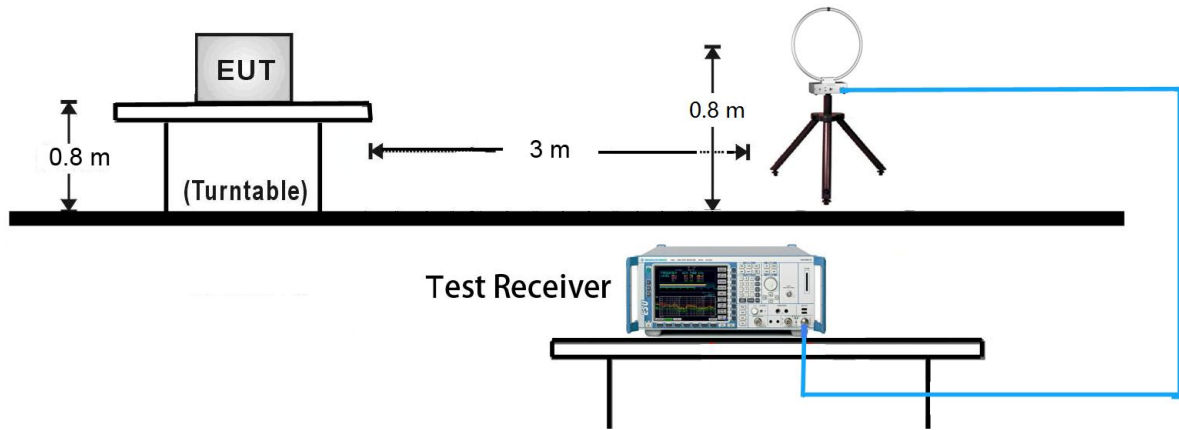
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements

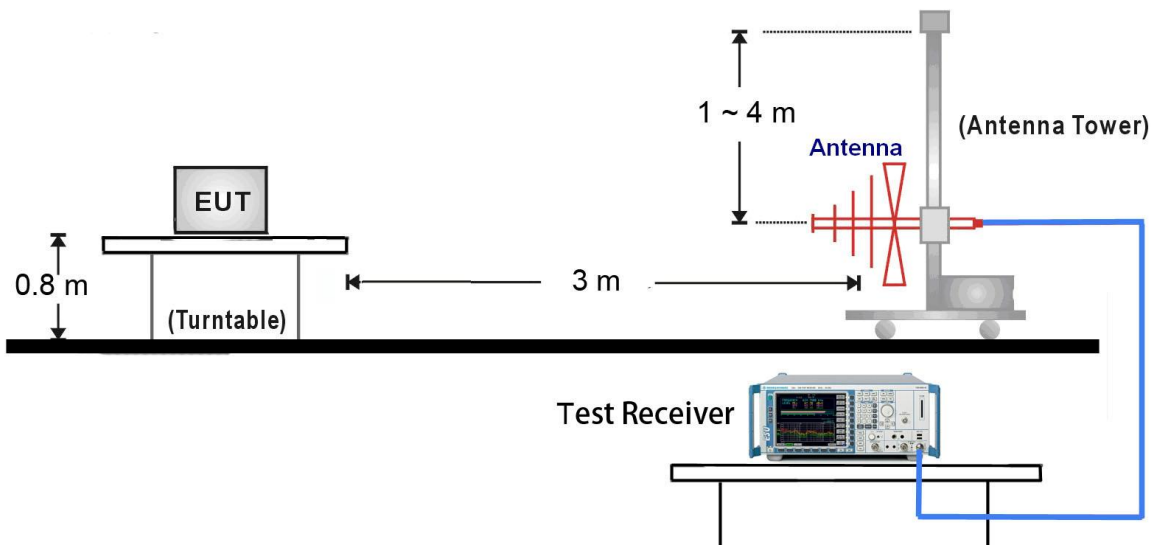
- Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- RBW = 1MHz
- VBW = 3MHz
- Detector = Power Average (RMS)
- Number of sweep point = 2001 (Number of sweep points must be $\geq 2 \times \text{span} / \text{RBW}$)
- Sweep time = auto
- Trace (RMS) averaging was performed over at least 100 traces.

7.6.4. Test Setup

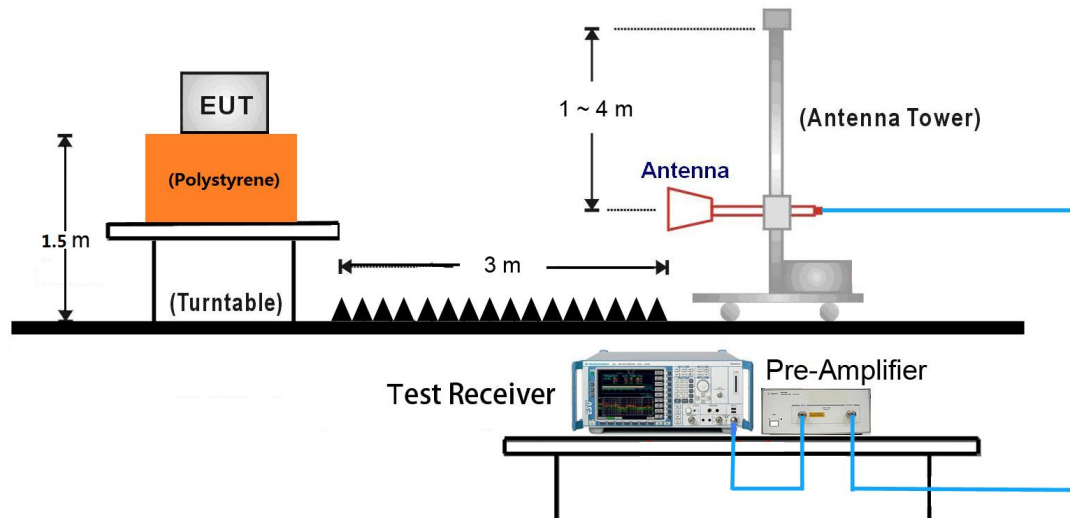
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



1GHz ~ 26.5GHz Test Setup:

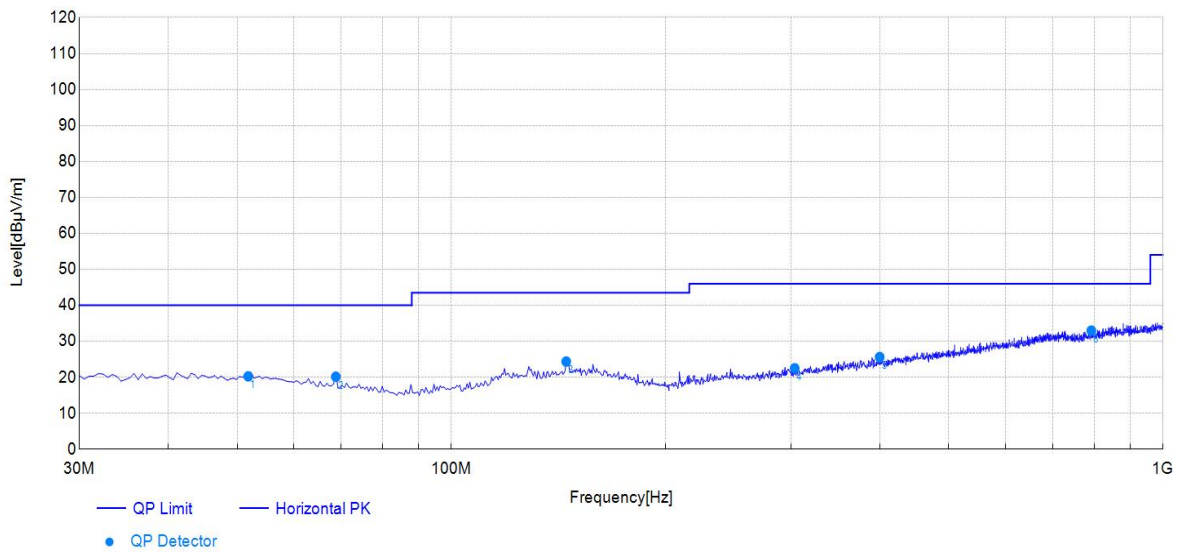


7.6.5. Test Result

The worst case of Radiated Emission below 1GHz:

30MHz – 1GHz Test Data

EUT:	Embedded Wi-Fi/BLE Module	Polarity:	Horizontal
Model:	EMC3186-E	Test Date:	2025-05-13
Mode:	Transmit at BLE Channel 00	Voltage:	DC 3.3V
Environment:	Temp: 23.6°C; Humi:34%	Engineer:	Stone Zhang



Final Data List										
NO.	Frequency [MHz]	Factor [dB/m]	QP Reading [dBμV]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pol	Verdict
1	51.84	14.40	5.86	20.26	40.00	19.74	100	113	Horizontal	PASS
2	68.82	12.29	7.88	20.17	40.00	19.83	100	0	Horizontal	PASS
3	145.00	15.33	9.05	24.38	43.50	19.12	100	0	Horizontal	PASS
4	303.68	15.30	7.22	22.52	46.00	23.48	100	117	Horizontal	PASS
5	399.75	17.40	8.24	25.64	46.00	20.36	100	195	Horizontal	PASS
6	792.80	24.37	8.62	32.99	46.00	13.01	100	299	Horizontal	PASS

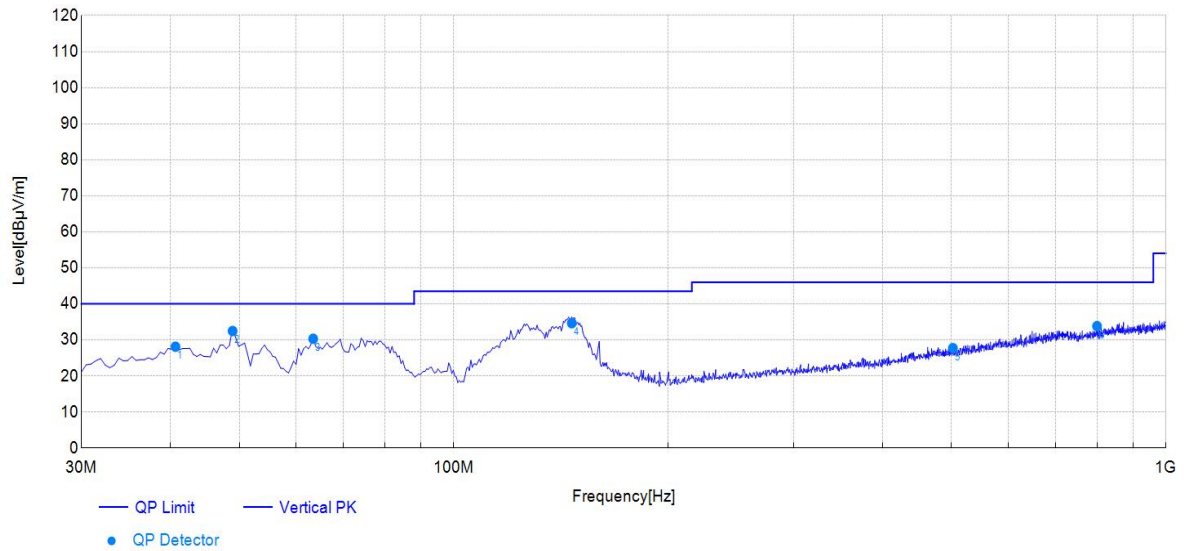
Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level

(3) The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

EUT:	Embedded Wi-Fi/BLE Module	Polarity:	Vertical
Model:	EMC3186-E	Test Date:	2025-05-13
Mode:	Transmit at BLE Channel 00	Voltage:	DC 3.3V
Environment:	Temp: 23.6°C; Humi:34%	Engineer:	Stone Zhang



Final Data List										
NO.	Frequency [MHz]	Factor [dB/m]	QP Reading [dBμV]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pol	Verdict
1	40.68	14.88	13.25	28.13	40.00	11.87	100	355	Vertical	PASS
2	48.92	14.54	17.95	32.49	40.00	7.51	100	280	Vertical	PASS
3	63.48	13.23	17.11	30.34	40.00	9.66	100	312	Vertical	PASS
4	146.46	15.37	19.27	34.64	43.50	8.86	100	303	Vertical	PASS
5	502.14	19.56	8.17	27.73	46.00	18.27	100	296	Vertical	PASS
6	800.08	24.51	9.33	33.84	46.00	12.16	100	23	Vertical	PASS

Note:

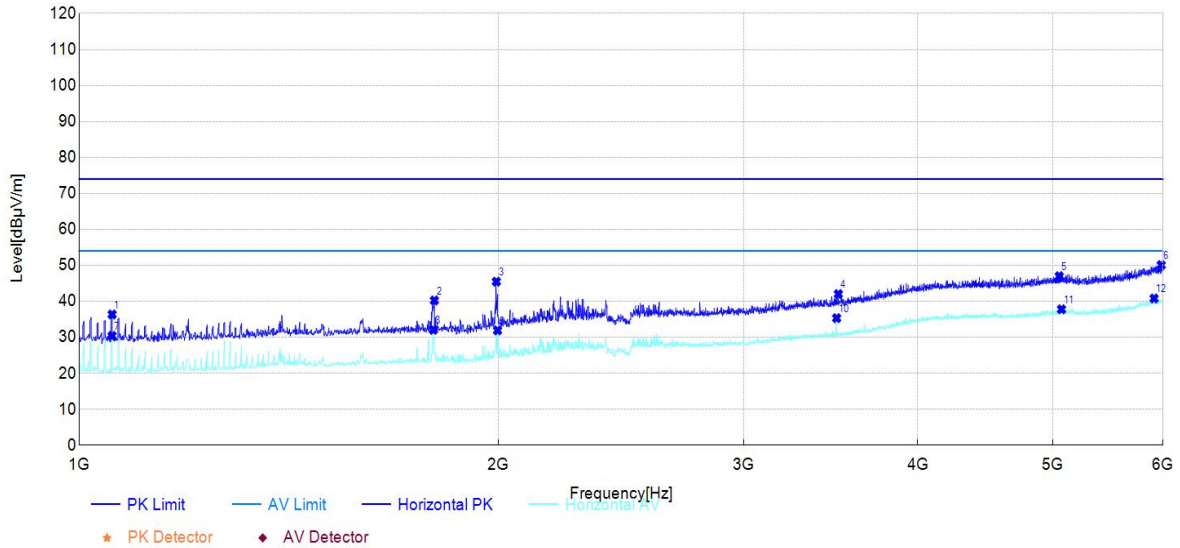
(1) Level=Reading + Factor

(2) Margin=Limit-Level

(3) The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

1GHz-6GHz

Test Mode:	BLE	Test Date:	2025-05-13
Test Channel:	00	Test Engineer:	Stone Zhang



Suspected Data List

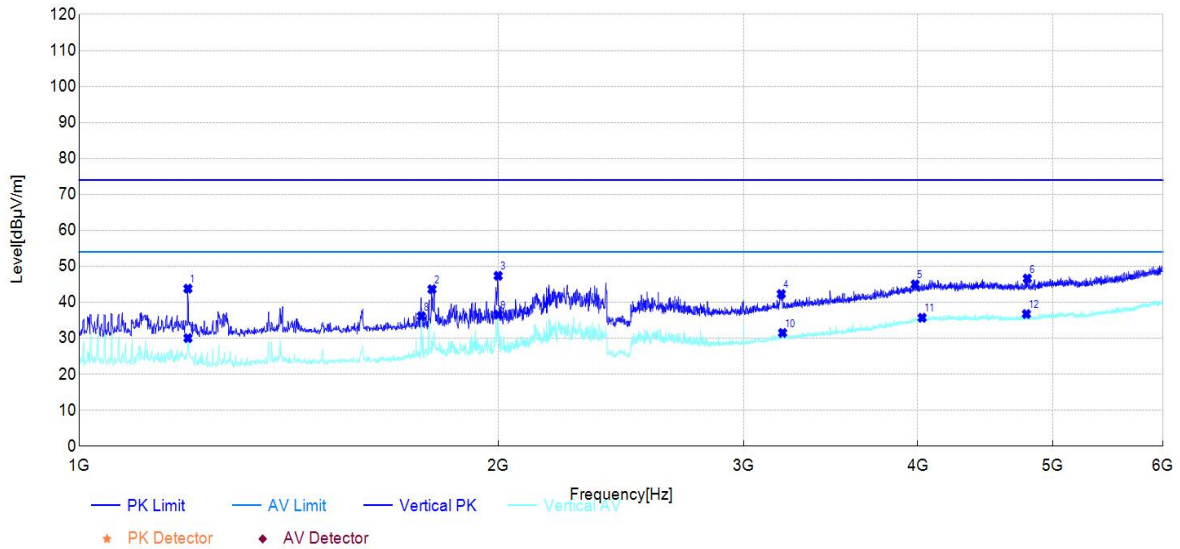
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	1056.00	60.37	36.35	-24.02	74.00	37.65	150	40	PK	Horizontal	PASS
2	1799.00	59.75	40.26	-19.49	74.00	33.74	150	66	PK	Horizontal	PASS
3	1993.00	63.69	45.47	-18.22	74.00	28.53	150	149	PK	Horizontal	PASS
4	3508.00	54.32	42.02	-12.30	74.00	31.98	150	237	PK	Horizontal	PASS
5	5054.00	53.04	46.99	-6.05	74.00	27.01	150	14	PK	Horizontal	PASS
6	5982.00	55.00	50.07	-4.93	74.00	23.93	150	270	PK	Horizontal	PASS
7	1056.00	54.42	30.40	-24.02	54.00	23.60	150	40	AV	Horizontal	PASS
8	1796.00	51.59	32.08	-19.51	54.00	21.92	150	66	AV	Horizontal	PASS
9	1997.00	50.11	31.92	-18.19	54.00	22.08	150	62	AV	Horizontal	PASS
10	3498.00	47.70	35.33	-12.37	54.00	18.67	150	288	AV	Horizontal	PASS
11	5073.00	43.85	37.79	-6.06	54.00	16.21	150	5	AV	Horizontal	PASS
12	5912.00	45.84	40.79	-5.05	54.00	13.21	150	207	AV	Horizontal	PASS

Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level

Test Mode:	BLE	Test Date:	2025-05-13
Test Channel:	00	Test Engineer:	Stone Zhang



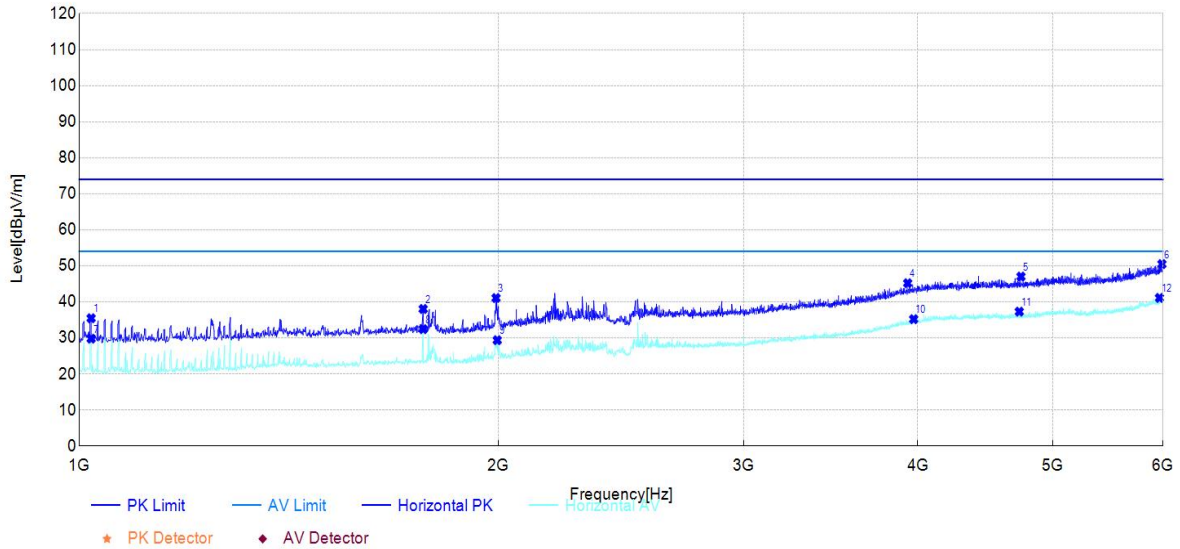
Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	1197.00	66.30	43.82	-22.48	74.00	30.18	150	243	PK	Vertical	PASS
2	1792.00	62.62	43.64	-18.98	74.00	30.36	150	57	PK	Vertical	PASS
3	1999.00	65.14	47.37	-17.77	74.00	26.63	150	69	PK	Vertical	PASS
4	3192.00	55.53	42.32	-13.21	74.00	31.68	150	50	PK	Vertical	PASS
5	3983.00	53.37	45.00	-8.37	74.00	29.00	150	98	PK	Vertical	PASS
6	4794.00	53.96	46.62	-7.34	74.00	27.38	150	280	PK	Vertical	PASS
7	1197.00	52.53	30.05	-22.48	54.00	23.95	150	243	AV	Vertical	PASS
8	1761.00	55.37	36.15	-19.22	54.00	17.85	150	338	AV	Vertical	PASS
9	1999.00	54.35	36.58	-17.77	54.00	17.42	150	69	AV	Vertical	PASS
10	3199.00	44.66	31.50	-13.16	54.00	22.50	150	50	AV	Vertical	PASS
11	4029.00	43.89	35.71	-8.18	54.00	18.29	150	294	AV	Vertical	PASS
12	4787.00	44.10	36.75	-7.35	54.00	17.25	150	246	AV	Vertical	PASS

Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level

Test Mode:	BLE	Test Date:	2025-05-13
Test Channel:	19	Test Engineer:	Stone Zhang



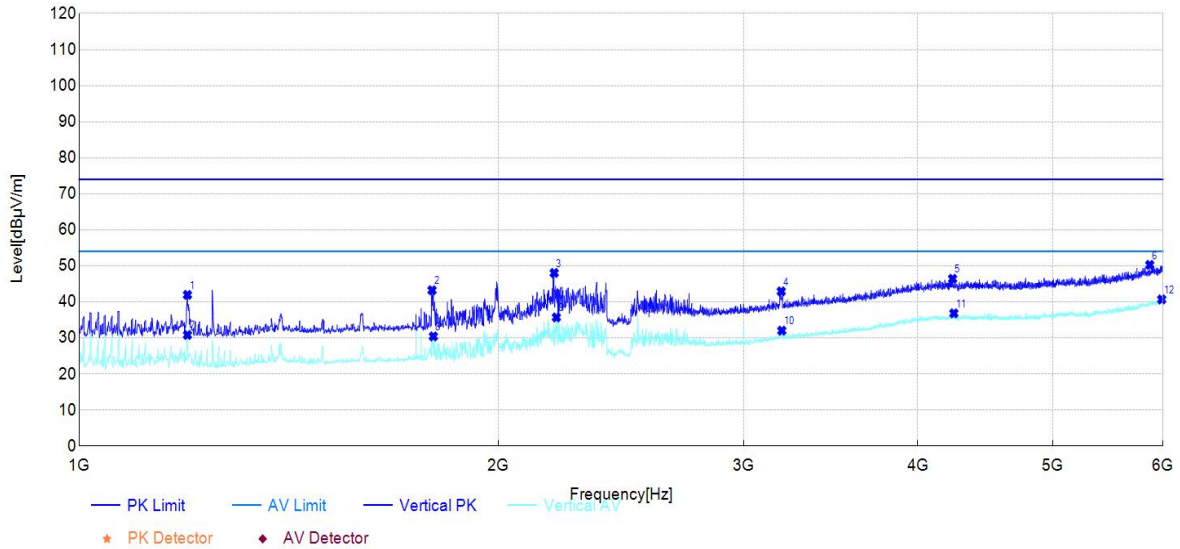
Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	1020.00	59.64	35.46	-24.18	74.00	38.54	150	51	PK	Horizontal	PASS
2	1766.00	57.80	38.03	-19.77	74.00	35.97	150	151	PK	Horizontal	PASS
3	1992.00	59.31	41.08	-18.23	74.00	32.92	150	87	PK	Horizontal	PASS
4	3934.00	54.22	45.19	-9.03	74.00	28.81	150	1	PK	Horizontal	PASS
5	4744.00	53.94	47.02	-6.92	74.00	26.98	150	132	PK	Horizontal	PASS
6	5989.00	55.42	50.49	-4.93	74.00	23.51	150	338	PK	Horizontal	PASS
7	1020.00	53.97	29.79	-24.18	54.00	24.21	150	51	AV	Horizontal	PASS
8	1766.00	52.20	32.43	-19.77	54.00	21.57	150	151	AV	Horizontal	PASS
9	1996.00	47.56	29.37	-18.19	54.00	24.63	150	91	AV	Horizontal	PASS
10	3973.00	43.97	35.20	-8.77	54.00	18.80	150	198	AV	Horizontal	PASS
11	4731.00	44.24	37.29	-6.95	54.00	16.71	150	161	AV	Horizontal	PASS
12	5965.00	46.08	41.11	-4.97	54.00	12.89	150	183	AV	Horizontal	PASS

Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level

Test Mode:	BLE	Test Date:	2025-05-13
Test Channel:	19	Test Engineer:	Stone Zhang



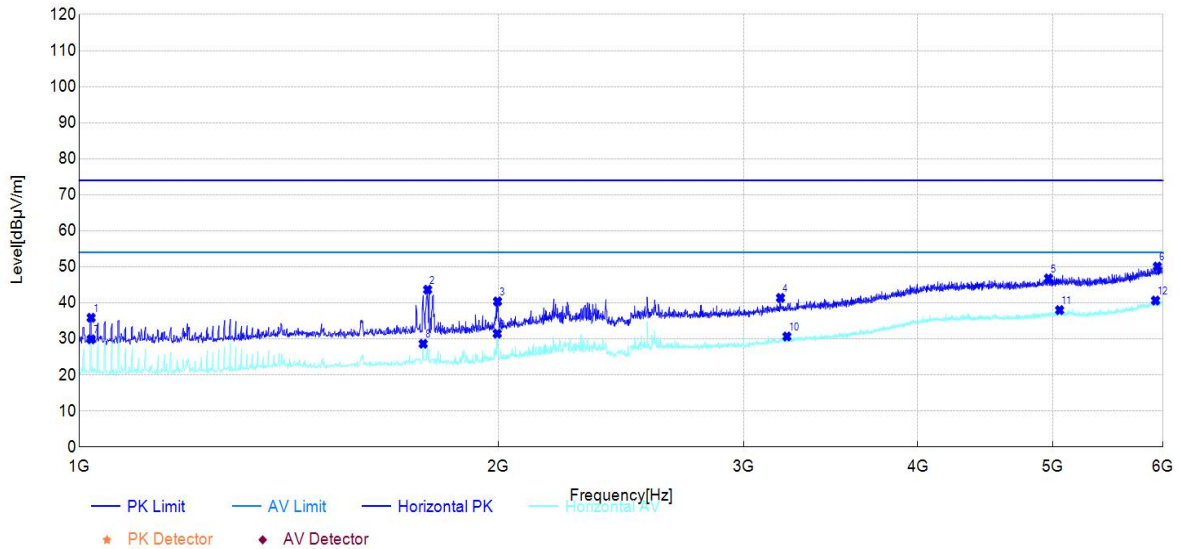
Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	1196.00	64.44	41.95	-22.49	74.00	32.05	150	116	PK	Vertical	PASS
2	1792.00	62.21	43.23	-18.98	74.00	30.77	150	90	PK	Vertical	PASS
3	2193.00	65.13	48.02	-17.11	74.00	25.98	150	101	PK	Vertical	PASS
4	3192.00	56.13	42.92	-13.21	74.00	31.08	150	90	PK	Vertical	PASS
5	4237.00	54.25	46.41	-7.84	74.00	27.59	150	72	PK	Vertical	PASS
6	5870.00	55.48	50.27	-5.21	74.00	23.73	150	192	PK	Vertical	PASS
7	1196.00	53.31	30.82	-22.49	54.00	23.18	150	236	AV	Vertical	PASS
8	1796.00	49.37	30.42	-18.95	54.00	23.58	150	101	AV	Vertical	PASS
9	2201.00	52.79	35.70	-17.09	54.00	18.30	150	98	AV	Vertical	PASS
10	3195.00	45.21	32.02	-13.19	54.00	21.98	150	75	AV	Vertical	PASS
11	4246.00	44.64	36.83	-7.81	54.00	17.17	150	286	AV	Vertical	PASS
12	5987.00	45.71	40.68	-5.03	54.00	13.32	150	10	AV	Vertical	PASS

Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level

Test Mode:	BLE	Test Date:	2025-05-13
Test Channel:	39	Test Engineer:	Stone Zhang



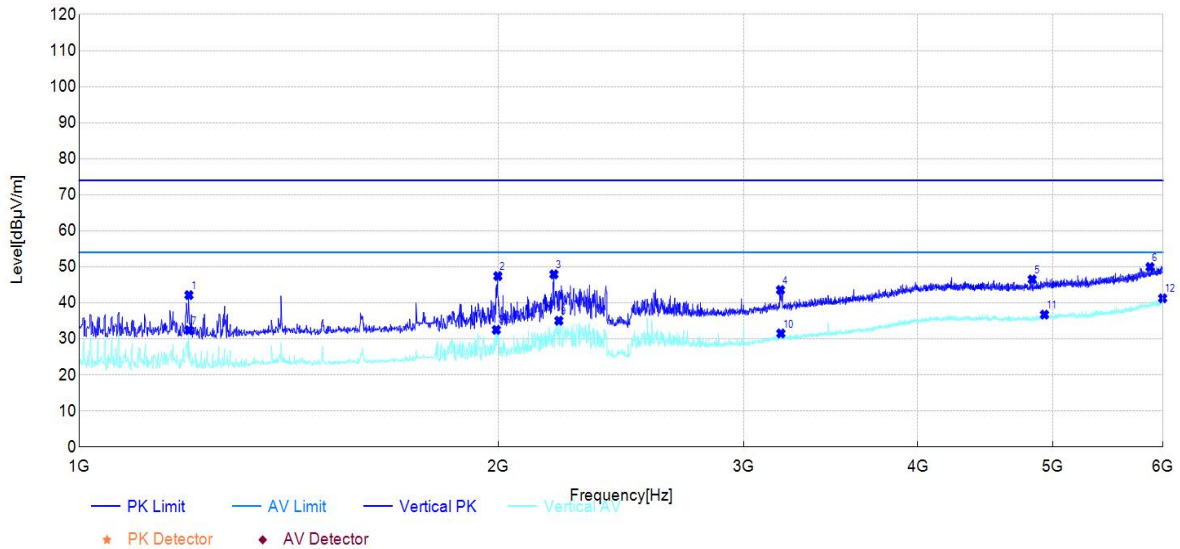
Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	1020.00	60.05	35.87	-24.18	74.00	38.13	150	50	PK	Horizontal	PASS
2	1779.00	63.32	43.66	-19.66	74.00	30.34	150	112	PK	Horizontal	PASS
3	1997.00	58.60	40.41	-18.19	74.00	33.59	150	1	PK	Horizontal	PASS
4	3188.00	55.04	41.38	-13.66	74.00	32.62	150	0	PK	Horizontal	PASS
5	4965.00	53.00	46.81	-6.19	74.00	27.19	150	249	PK	Horizontal	PASS
6	5944.00	55.07	50.08	-4.99	74.00	23.92	150	82	PK	Horizontal	PASS
7	1020.00	54.07	29.89	-24.18	54.00	24.11	150	50	AV	Horizontal	PASS
8	1766.00	48.42	28.65	-19.77	54.00	25.35	150	116	AV	Horizontal	PASS
9	1996.00	49.66	31.47	-18.19	54.00	22.53	150	138	AV	Horizontal	PASS
10	3222.00	44.17	30.67	-13.50	54.00	23.33	150	181	AV	Horizontal	PASS
11	5057.00	44.04	37.99	-6.05	54.00	16.01	150	271	AV	Horizontal	PASS
12	5926.00	45.68	40.65	-5.03	54.00	13.35	150	360	AV	Horizontal	PASS

Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level

Test Mode:	BLE	Test Date:	2025-05-13
Test Channel:	39	Test Engineer:	Stone Zhang



Suspected Data List											
NO.	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	1199.00	64.63	42.16	-22.47	74.00	31.84	150	243	PK	Vertical	PASS
2	1998.00	65.21	47.43	-17.78	74.00	26.57	150	87	PK	Vertical	PASS
3	2192.00	65.04	47.92	-17.12	74.00	26.08	150	91	PK	Vertical	PASS
4	3188.00	56.81	43.58	-13.23	74.00	30.42	150	84	PK	Vertical	PASS
5	4833.00	53.78	46.52	-7.26	74.00	27.48	150	0	PK	Vertical	PASS
6	5872.00	55.15	49.94	-5.21	74.00	24.06	150	141	PK	Vertical	PASS
7	1199.00	54.90	32.43	-22.47	54.00	21.57	150	123	AV	Vertical	PASS
8	1993.00	50.34	32.52	-17.82	54.00	21.48	150	109	AV	Vertical	PASS
9	2210.00	52.12	35.05	-17.07	54.00	18.95	150	282	AV	Vertical	PASS
10	3190.00	44.75	31.52	-13.23	54.00	22.48	150	69	AV	Vertical	PASS
11	4932.00	43.73	36.74	-6.99	54.00	17.26	150	308	AV	Vertical	PASS
12	5996.00	46.28	41.27	-5.01	54.00	12.73	150	282	AV	Vertical	PASS

Note:

(1) Level=Reading + Factor

(2) Margin=Limit-Level