

TEST REPORT

Product Name : Security Cam P1 Lite
Brand Mark : AOSU
Model No. : C4L2CA11
DC4L2CA11, DC4L2CA12, C4L2CA12,
C4L1CA11, DC4L1CA11, C4L1CA12,
Extension model : DC4L1CA12, C4L1CA13, DC4L1CA13,
C4L2CA13, DC4L2CA13, C4L3CA11,
DC4L3CA11, C4L3CA12, DC4L3CA12,
C4L3CA13, DC4L3CA13
Report Number : BLA-EMC-202302-A4103
FCC ID : 2A2VW-C4L
Date of Sample Receipt : 2023/2/22
Date of Test : 2023/2/22 to 2023/3/20
Date of Issue : 2023/3/20
Test Standard : 47 CFR Part 15, Subpart E 15.407
Test Result : Pass

Prepared for:

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Room 201, Building A, No.1 Qianwan Road, Qianhai Shenzhen-Hong Kong
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Date:



REPORT REVISE RECORD

Version No.	Date	Description
00	2023/3/20	Original

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TABLE OF CONTENTS

1	TEST SUMMARY	5
2	GENERAL INFORMATION	6
3	GENERAL DESCRIPTION OF E.U.T.	6
4	TEST ENVIRONMENT	8
5	TEST MODE	8
6	MEASUREMENT UNCERTAINTY	8
7	DESCRIPTION OF SUPPORT UNIT	9
8	LABORATORY LOCATION	9
9	TEST INSTRUMENTS LIST	10
10	FREQUENCY STABILITY	12
10.1	LIMITS	12
10.2	BLOCK DIAGRAM OF TEST SETUP	12
10.3	TEST DATA	12
11	RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	13
11.1	LIMITS	13
11.2	BLOCK DIAGRAM OF TEST SETUP	14
11.3	PROCEDURE	14
11.4	TEST DATA	16
12	RADIATED EMISSIONS	24
12.1	BLOCK DIAGRAM OF TEST SETUP	24
12.2	PROCEDURE	24
12.3	TEST DATA	26
13	PEAK POWER SPECTRUM DENSITY	40
13.1	LIMITS	40
13.2	BLOCK DIAGRAM OF TEST SETUP	40
13.3	TEST DATA	41
14	MAXIMUM CONDUCTED OUTPUT POWER	42
14.1	LIMITS	42
14.2	BLOCK DIAGRAM OF TEST SETUP	42
14.3	TEST DATA	43

15	MINIMUM 6 DB BANDWIDTH (5.725-5.85 GHZ BAND)	44
15.1	LIMITS	44
15.2	BLOCK DIAGRAM OF TEST SETUP	44
15.3	TEST DATA	44
16	26DB EMISSION BANDWIDTH	45
16.1	BLOCK DIAGRAM OF TEST SETUP	45
16.2	TEST DATA	45
17	99% BANDWIDTH	46
17.1	BLOCK DIAGRAM OF TEST SETUP	46
17.2	TEST DATA	46
18	DUTY CYCLE	47
18.1	BLOCK DIAGRAM OF TEST SETUP	47
18.2	TEST DATA	47
19	CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)	48
19.1	LIMITS	48
19.2	BLOCK DIAGRAM OF TEST SETUP	48
19.3	PROCEDURE	48
19.4	TEST DATA	50
20	ANTENNA REQUIREMENT	52
20.1	CONCLUSION	52
21	APPENDIX	53
21.1	5.1G	53
21.2	5.8G	87
APPENDIX A: PHOTOGRAPHS OF TEST SETUP		121
APPENDIX B: PHOTOGRAPHS OF EUT		123

1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Frequency Stability	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.407 (g)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
Radiated Emissions	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
DFS: Channel Closing Transmission Time	47 CFR Part 15, Subpart E 15.407	KDB 905462 D02 Section 7.8.3	KDB 905462 D02 Section 5.1	N/A
DFS: Non-occupancy period	47 CFR Part 15, Subpart E 15.407	KDB 905462 D02 Section 7.8.3	KDB 905462 D02 Section 5.1	N/A
Peak Power spectrum density	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II F	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Transmitter Power Control	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart C 15.407 (h)(1)	N/A
Maximum Conducted output power	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Minimum 6 dB bandwidth (5.725-5.85 GHz band)	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 2	47 CFR Part 15, Subpart C 15.407 (e)	Pass
26dB Emission bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 1	47 CFR Part 15, Subpart C 15.407 (a)	Pass
99% Bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 II D	N/A	Pass
Duty Cycle	47 CFR Part 15, Subpart E 15.407	KDB 789033 II B 1	KDB 789033 D02 II B 1	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 & 15.407 b(6)	Pass
Antenna Requirement	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Remark:

N/A: Indicates that the test was not applicable

2 GENERAL INFORMATION

Applicant	Shenzhen Zhiling Technology Co., Ltd
Address	Room 201, Building A, No.1 Qianwan Road, Qianhai Shenzhen-Hong Kong Cooperation Zone Shenzhen
Manufacturer	Shenzhen Zhiling Technology Co., Ltd
Address	Room 201, Building A, No.1 Qianwan Road, Qianhai Shenzhen-Hong Kong Cooperation Zone Shenzhen
Factory	Shenzhen Zhiling Technology Co., Ltd
Address	Room 201, Building A, No.1 Qianwan Road, Qianhai Shenzhen-Hong Kong Cooperation Zone Shenzhen
Product Name	Security Cam P1 Lite
Test Model No.	C4L2CA11
Extension model	DC4L2CA11, DC4L2CA12, C4L2CA12, C4L1CA11, DC4L1CA11, C4L1CA12, DC4L1CA12, C4L1CA13, DC4L1CA13, C4L2CA13, DC4L2CA13, C4L3CA11, DC4L3CA11, C4L3CA12, DC4L3CA12, C4L3CA13, DC4L3CA13
Note	All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are model name for commercial purpose.

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V3.0
Software Version	N/A
Operation Frequency:	Band 1 : 5180MHz-5240MHz; Band 4 : 5745MHz-5825MHz
Channel numbers:	Band 1: 802.11a/802.11n(HT20): 4; 802.11n(HT40):2
Channel separation:	802.11a/n: 20MHz, 802.11n: 40MHz
Modulation technology: (IEEE 802.11a/n)	BPSK, QPSK, 16-QAM, 64-QAM
Data speed(IEEE 802.11a)	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
Data speed (IEEE 802.11n):	Up to 433Mbps
Antenna Type:	External antenna
Antenna gain:	5.47dBi
Remark: The Antenna Gain is supplied by the customer. BlueAsia is not responsible for this data	

Operation Frequency each of channel

Band 1: 5150-5250MHz			
802.11a/802.11n20		802.11n40	
Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz
40	5200MHz	46	5230MHz
44	5220MHz		
48	5240MHz		

Band 4: 5745-5825MHz			
802.11a/802.11n20		802.11n40	
Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz
153	5765MHz	159	5795MHz
157	5785MHz		
161	5805MHz		
165	5825MHz		

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25℃	DC5V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation.
Remark: Only the data of the worst mode would be recorded in this report.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
Mobile phone	N/A	N/A	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province,
China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber 1	SKET	966	N/A	2020/11/10	2023/11/9
Chamber 2	SKET	966	N/A	2021/07/20	2024/07/19
Spectrum	R&S	FSP40	100817	2022/09/15	2023/09/14
Receiver	R&S	ESR7	101199	2022/09/15	2023/09/14
Receiver	R&S	ESPI7	101477	2022/07/16	2023/07/15
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2022/09/15	2023/09/14
Horn Antenna	Schwarzbeck	BBHA9120D	01892 P:00331	2022/09/13	2025/09/12
Amplifier	SKET	LNPA_30M01G-30	SK2021060801	2022/07/16	2023/07/15
Amplifier	SKET	PA-000318G-45	N/A	2022/09/13	2023/09/12
Amplifier	SKET	LNPA_18G40G-50	SK2022071301	2022/07/14	2023/07/13
Filter group	SKET	2.4G/5G Filter group r	N/A	2022/07/16	2023/07/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2022/9/14	2025/9/13
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	2020/11/25	2023/11/24
Receiver	R&S	ESPI3	101082	2022/09/14	2023/09/13
LISN	R&S	ENV216	3560.6550.15	2022/09/14	2023/09/13
LISN	AT	AT166-2	AKK1806000003	2022/09/14	2023/09/13
ISN	TESEQ	ISNT8-cat6	53580	2022/09/14	2023/09/13
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01045	2022/08/17	2023/08/16
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01075	2022/08/17	2023/08/16
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

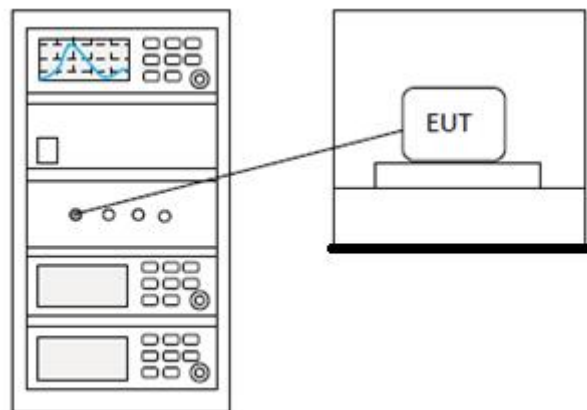
10 FREQUENCY STABILITY

Test Standard	47 CFR Part 15, Subpart E 15.407
Test Method	ANSI C63.10 (2013) Section 6.8
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

10.1 LIMITS

Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
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10.2 BLOCK DIAGRAM OF TEST SETUP



10.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

11 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

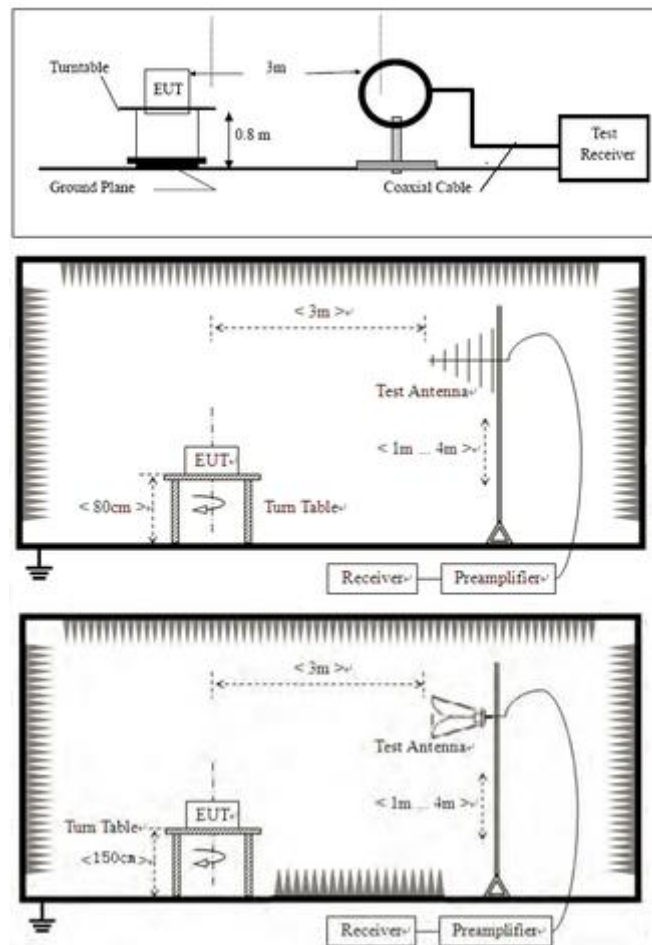
Test Standard	47 CFR Part 15, Subpart E 15.407
Test Method	KDB 789033 D02 II G
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

11.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

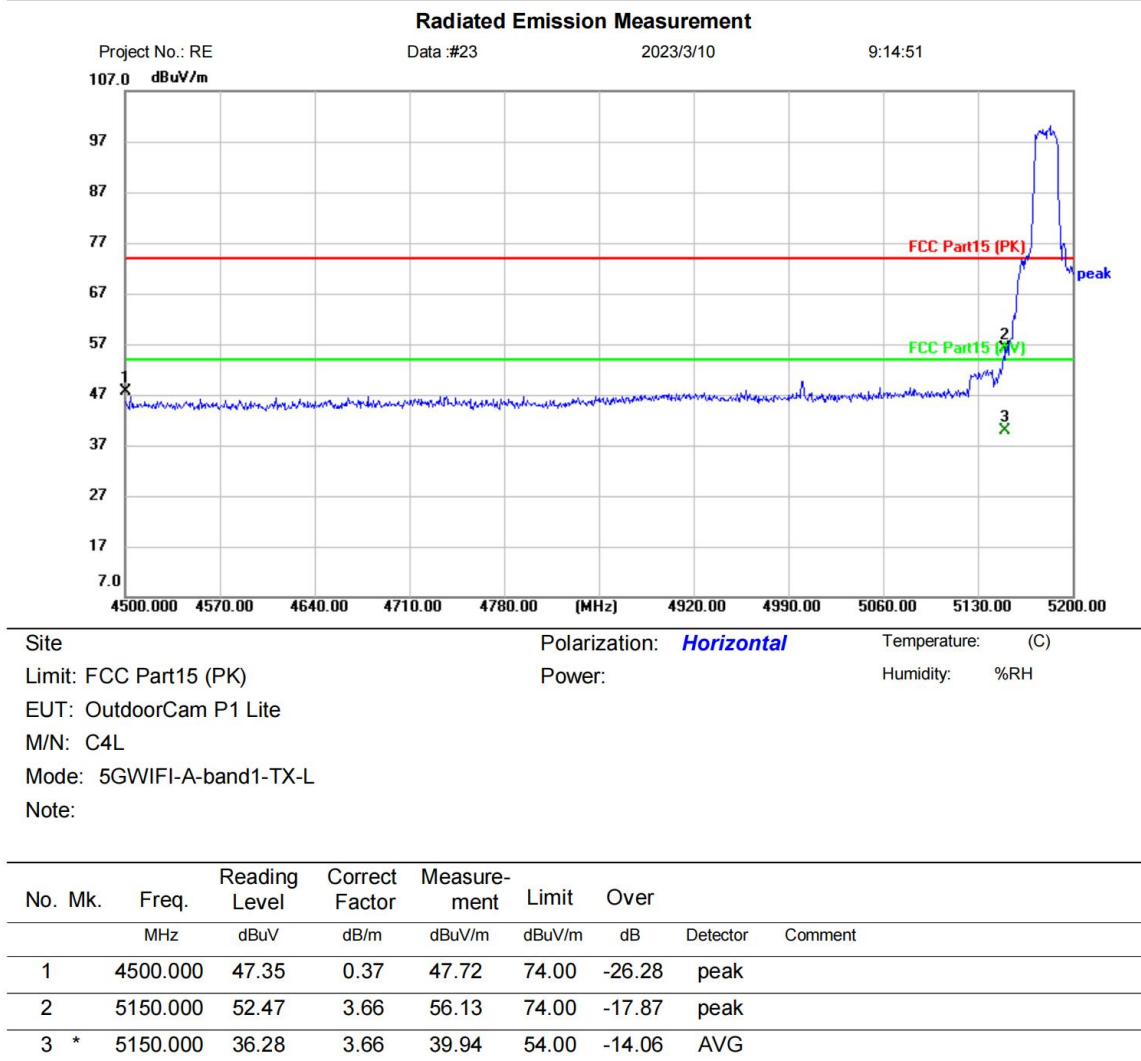
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
 - i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
 - j. Repeat above procedures until all frequencies measured was complete.
- Remark: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

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11.4 TEST DATA

Remark: During the test, pre-scan the 802.11a/n mode, and found the 802.11a mode which it is worse case.

[TestMode: TX band 1 11a 5180 channel]; [Polarity: Horizontal]

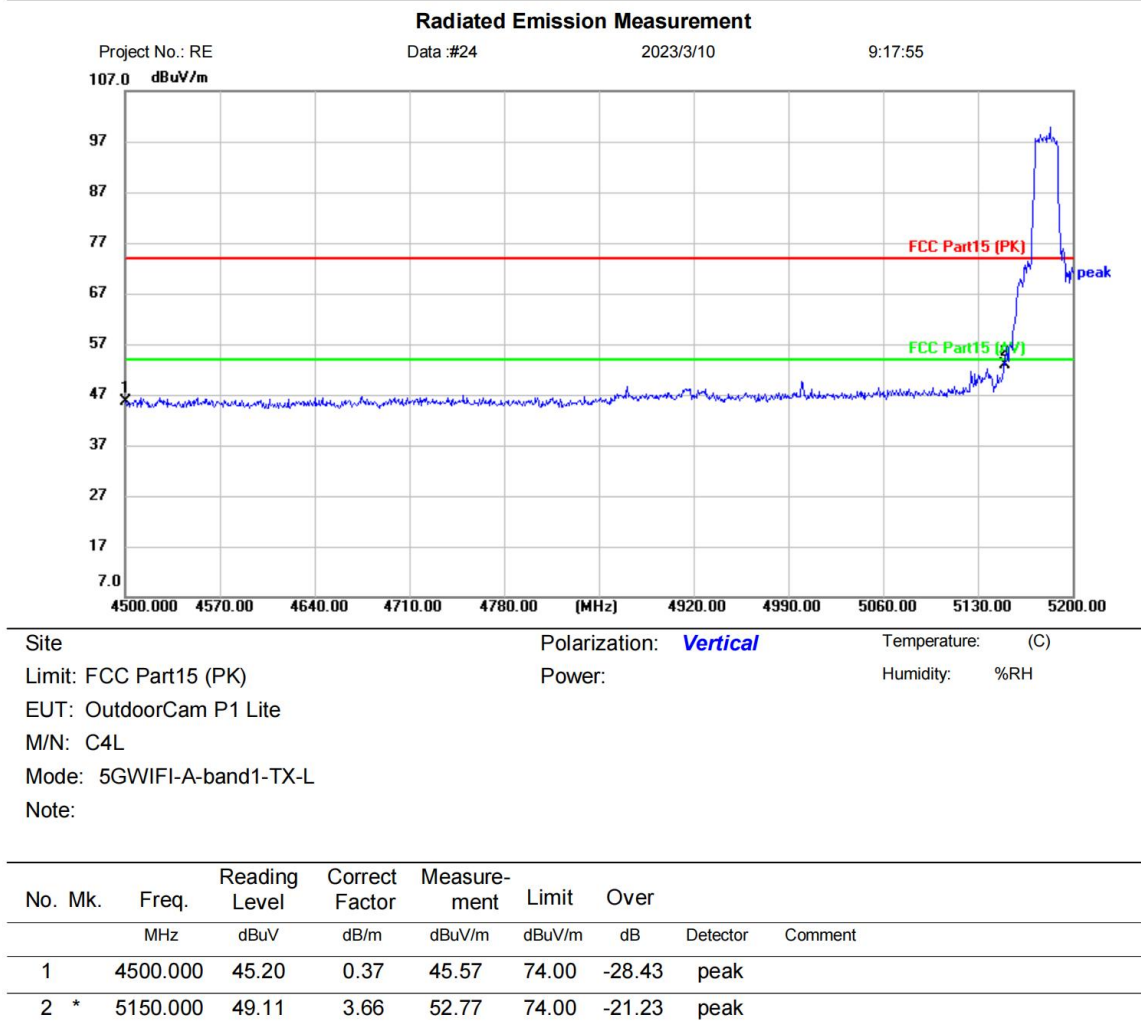


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band 1 11a 5180 channel]; [Polarity: Vertical]

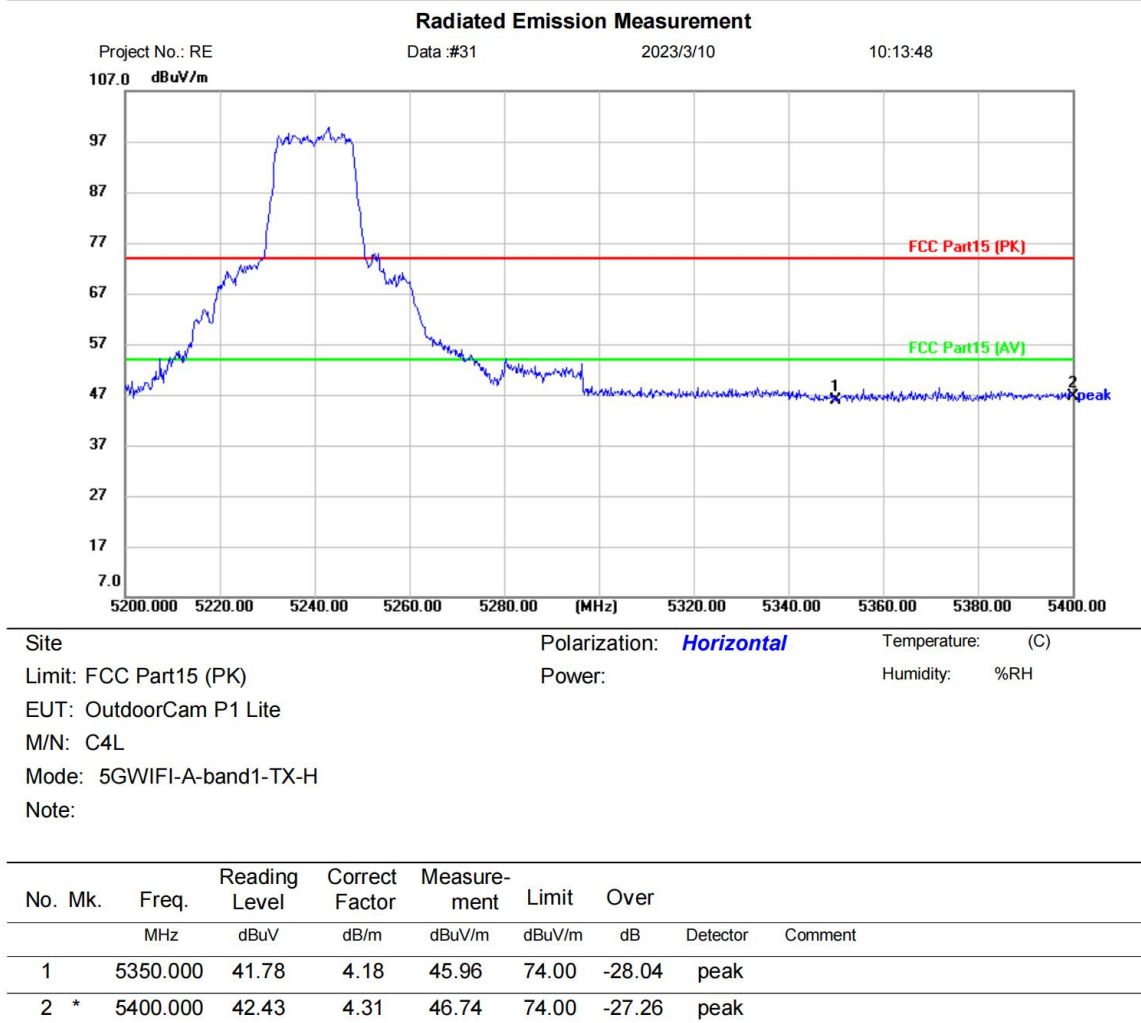


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band1 11a 5240 channel]; [Polarity: Horizontal]

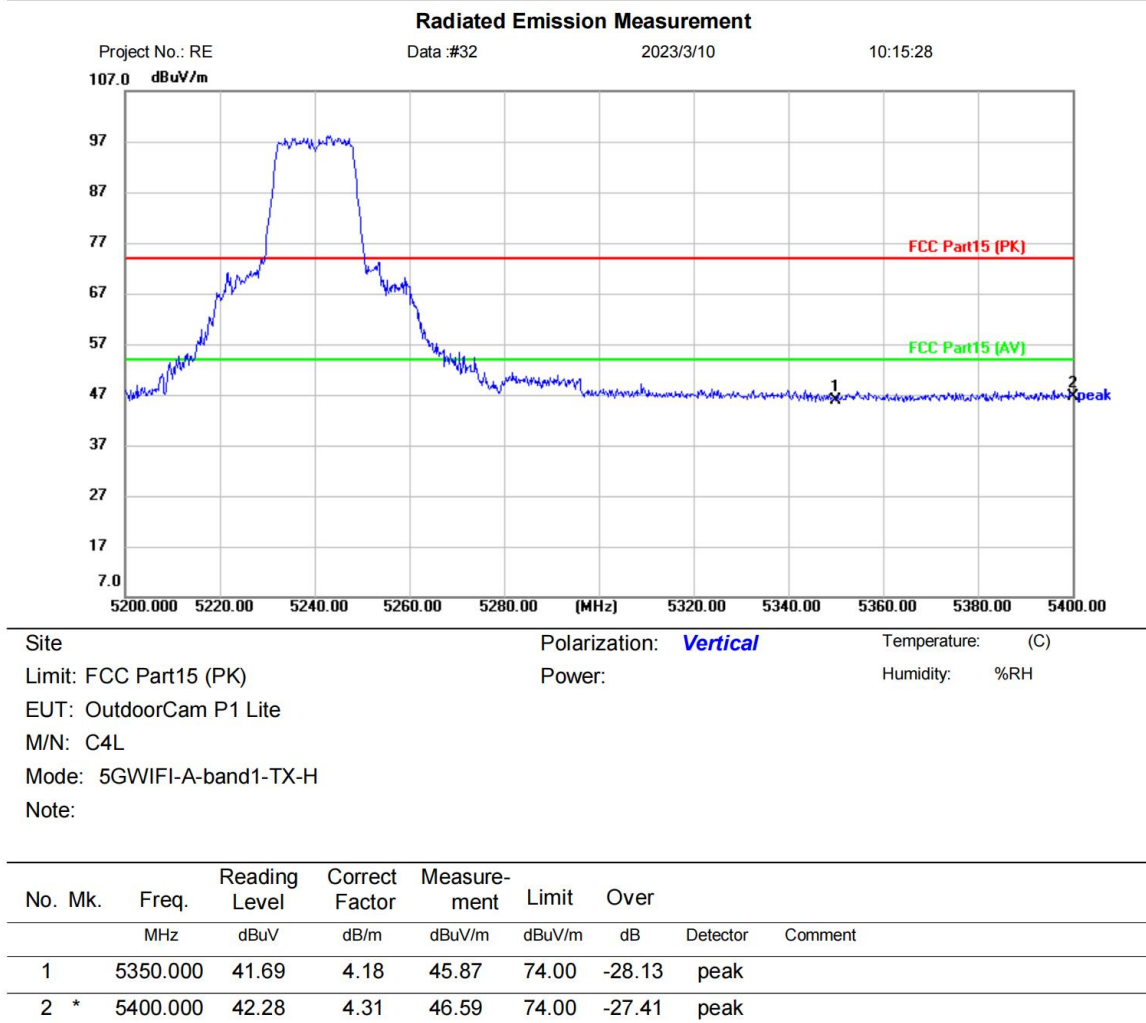


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band1 11a 5240 channel]; [Polarity: Vertical]

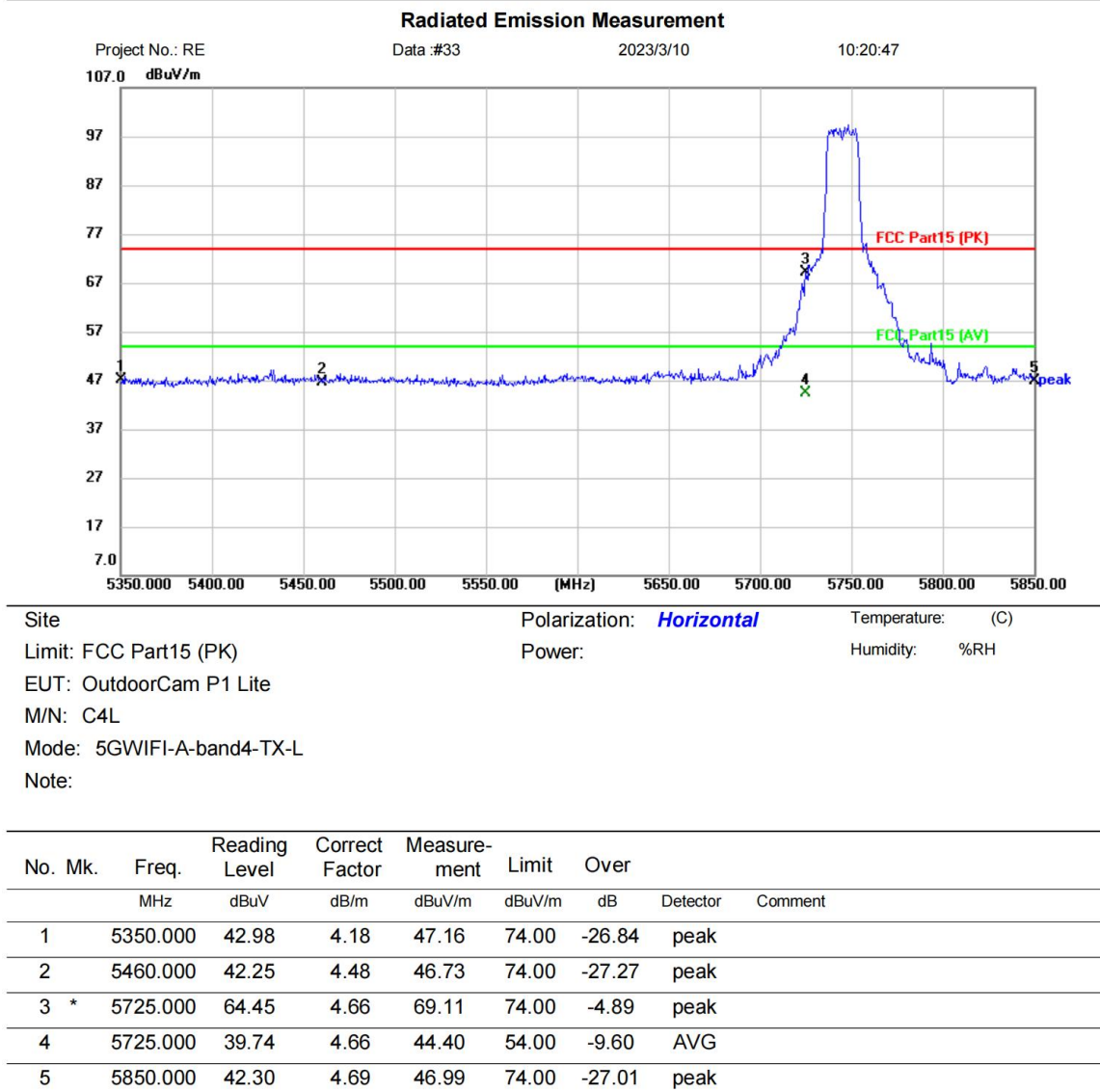


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band4 11a 5745 channel]; [Polarity: Horizontal]

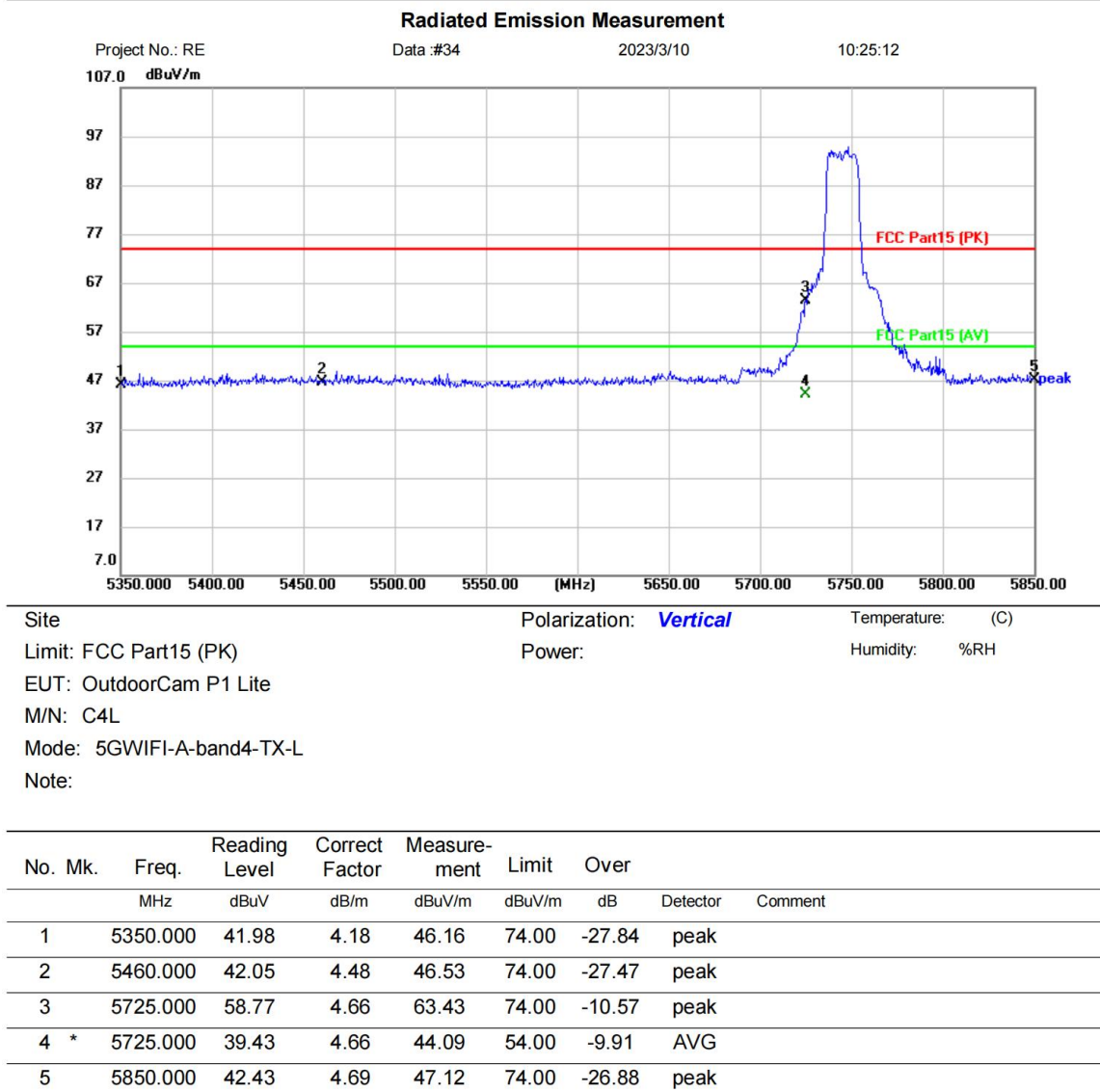


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band4 11a 5745 channel]; [Polarity: Vertical]

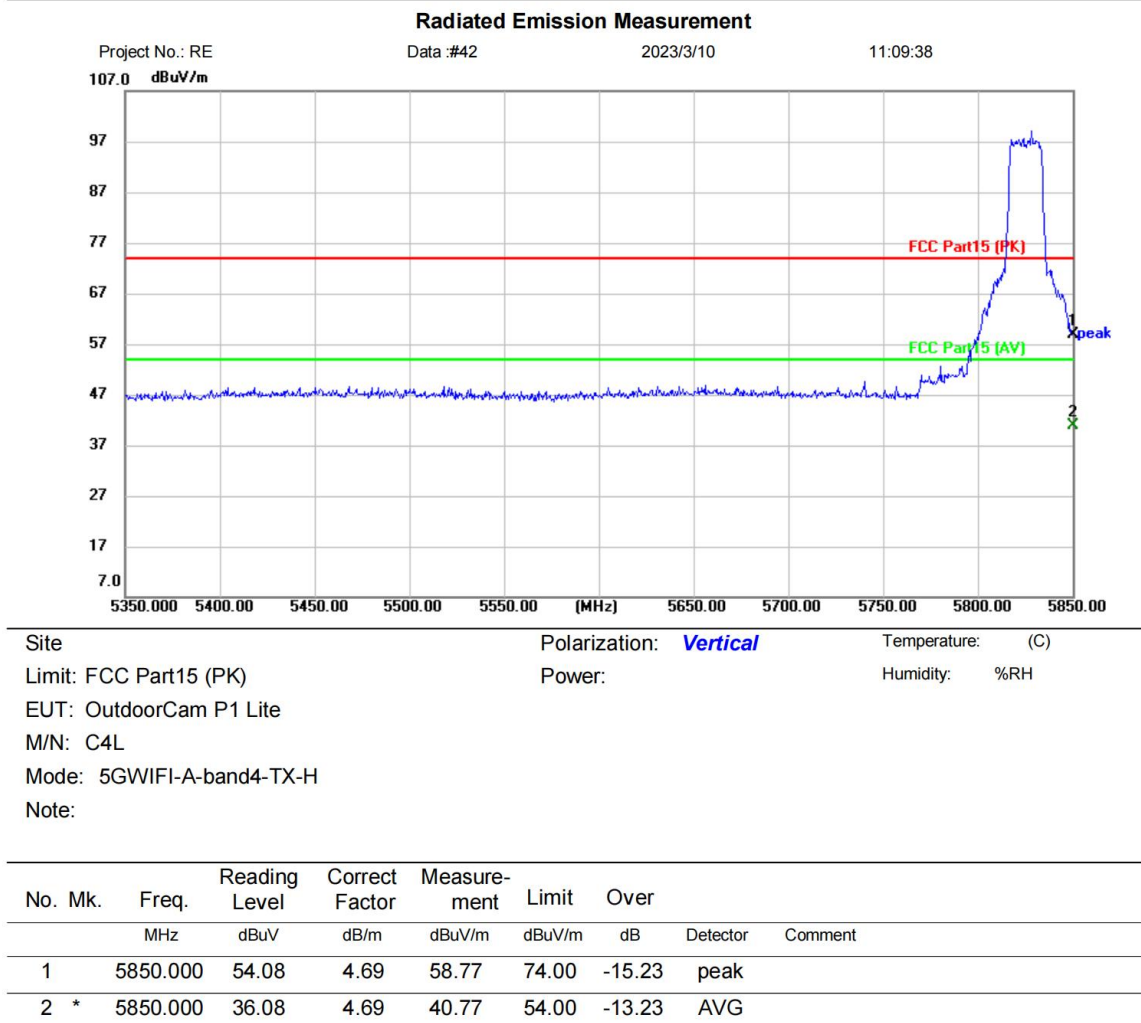


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band4 11a 5825 channel]; [Polarity: Vertical]

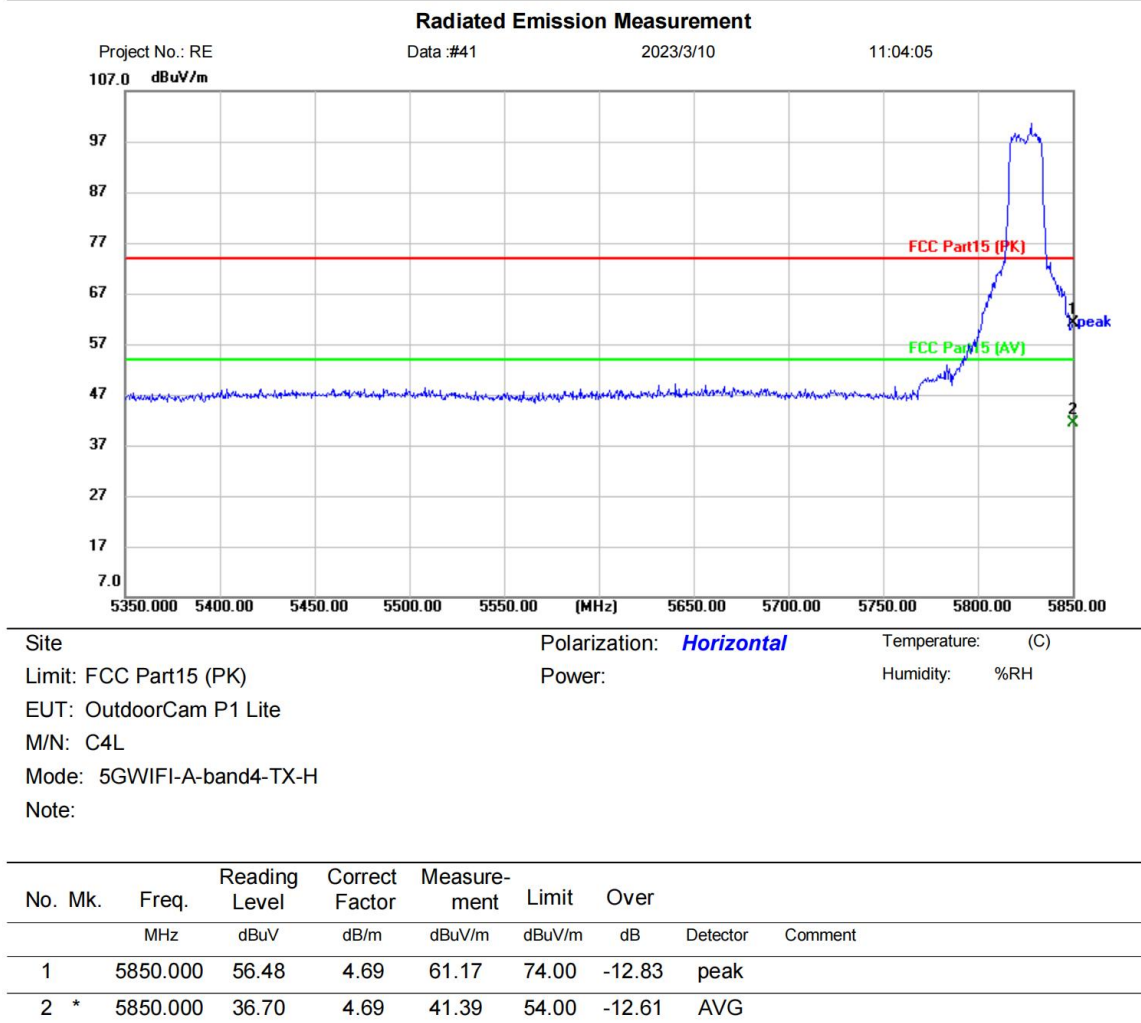


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX band4 11a 5825 channel]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

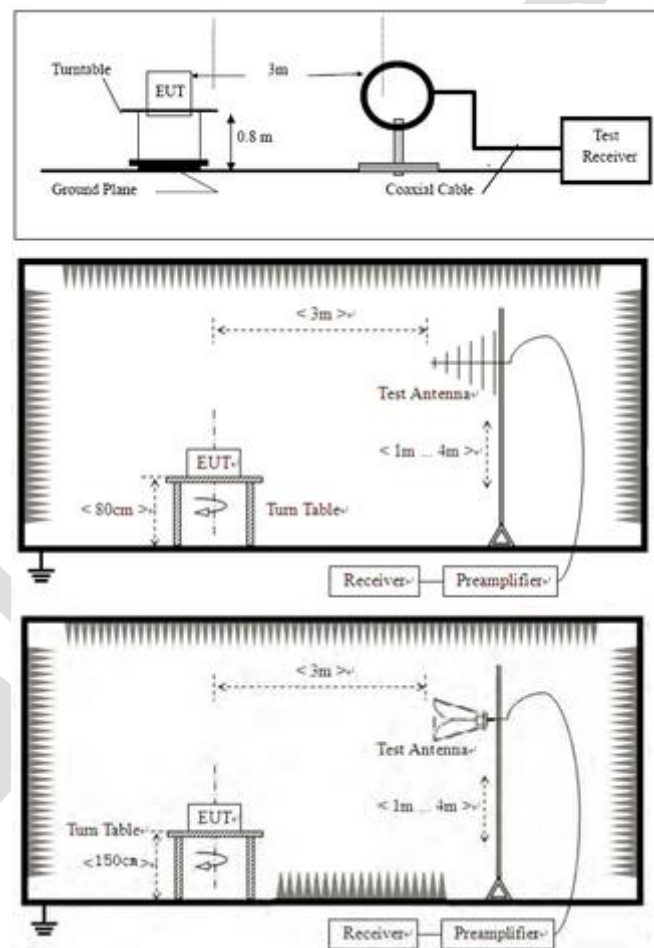
⟨Reference Only

Test Result: Pass

12 RADIATED EMISSIONS

Test Standard	47 CFR Part 15, Subpart E 15.407
Test Method	KDB 789033 D02 II G
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

12.1 BLOCK DIAGRAM OF TEST SETUP



12.2 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest

radiation.

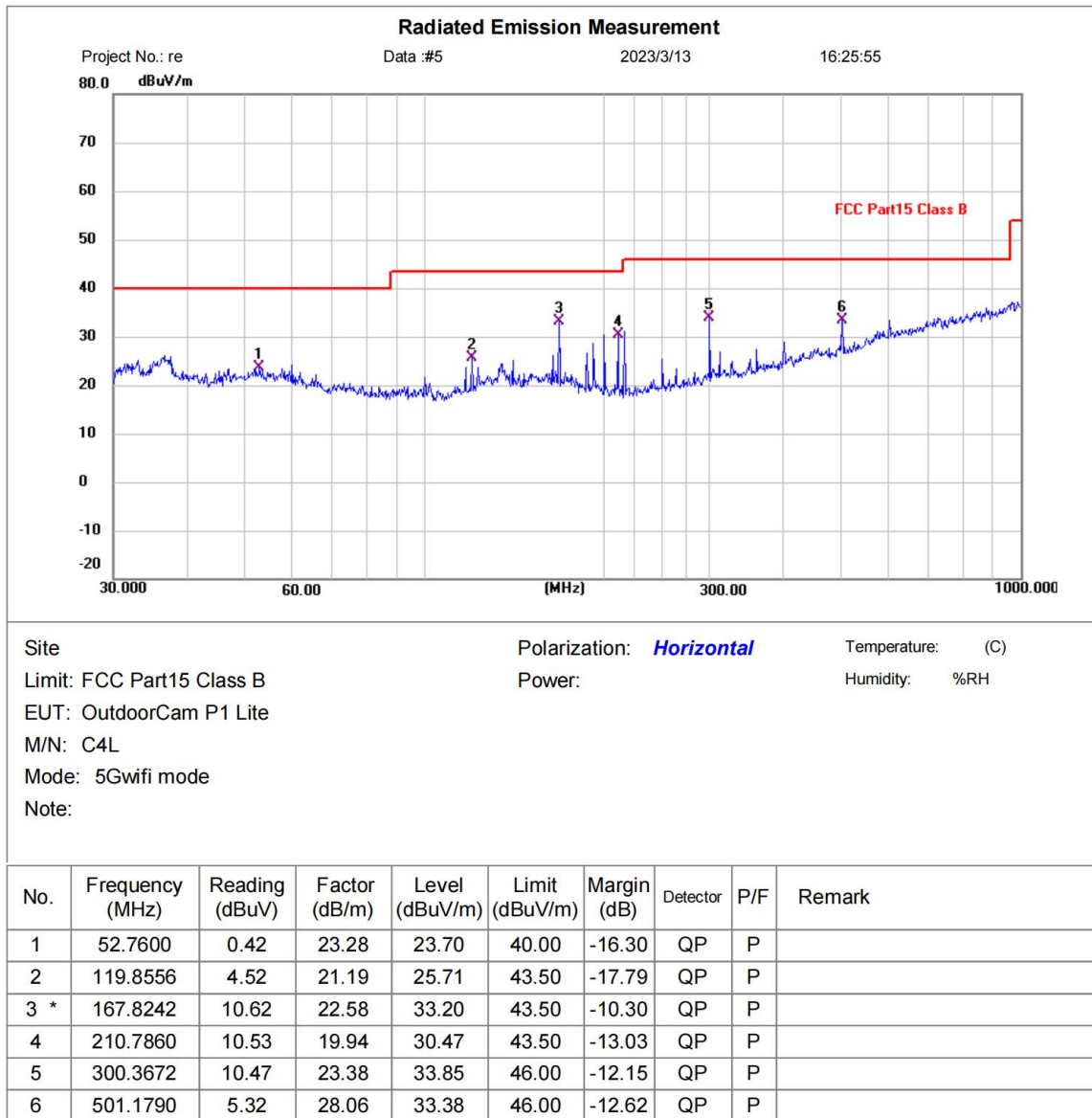
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1. $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamplifier Factor}$
- 2. For emission below 1GHz, through the pre-scan found the worst case is the lowest channel of 802.11a. Only the worst case is recorded in the report.
- 3. Scan from 9kHz to 40GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

12.3 TEST DATA

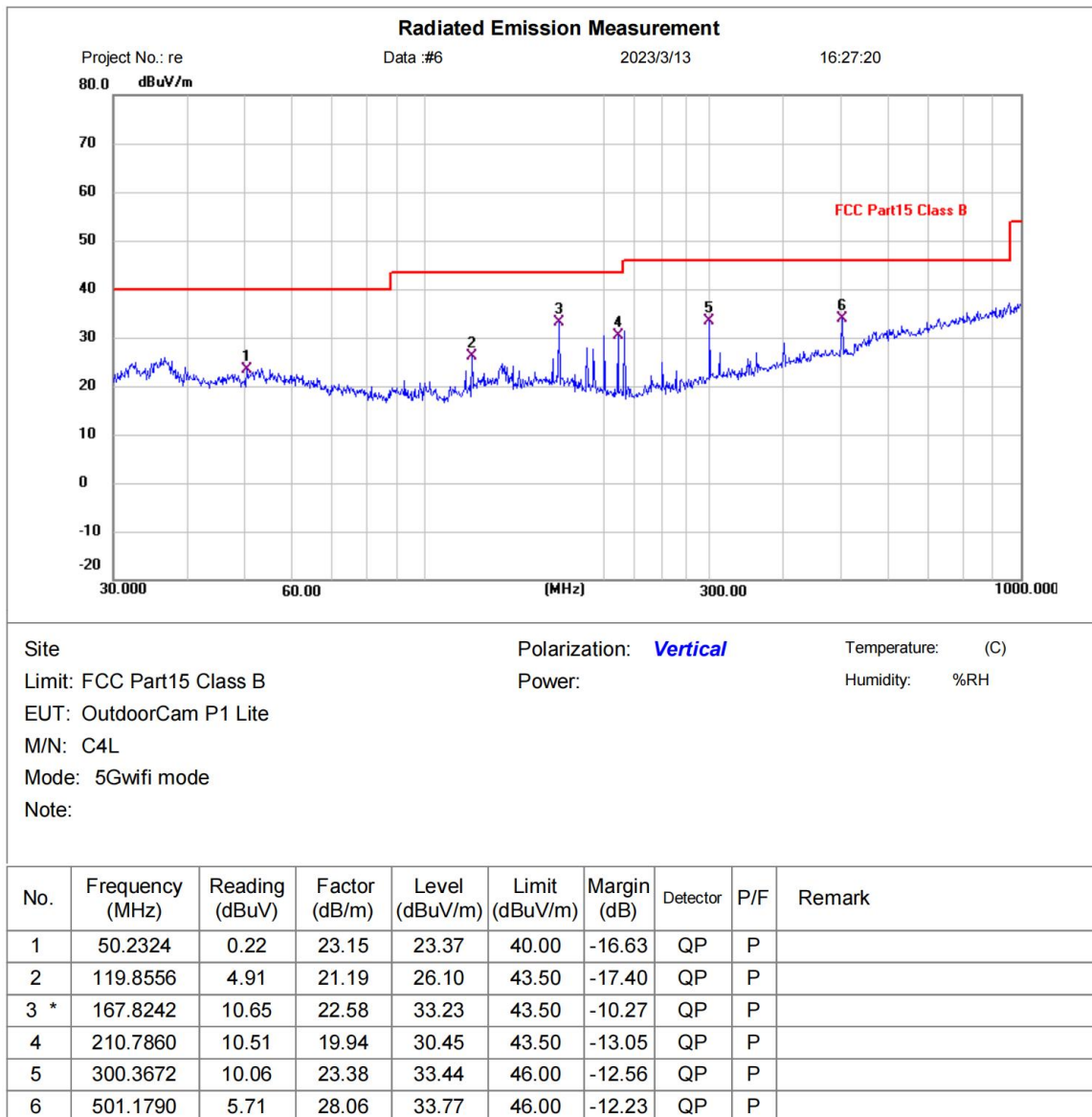
[TestMode: TX below 1G]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

[TestMode: TX below 1G]; [Polarity: Vertical]

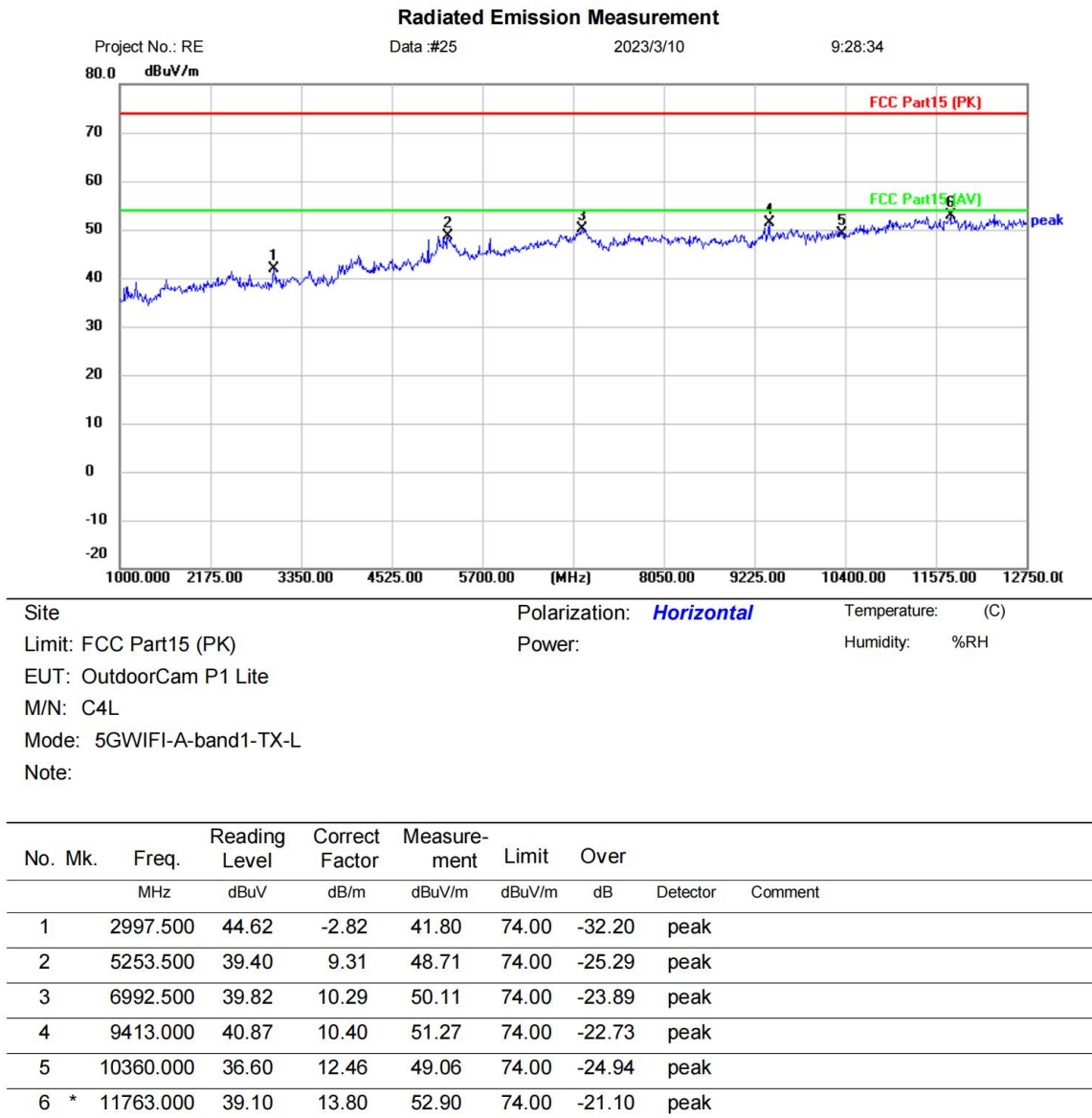


*:Maximum data x:Over limit !:over margin

Test Result: Pass

Remark: During the test, pre-scan the 802.11a/n mode, and found the 802.11a mode which it is worse case.

[TestMode: TX 11a 5180 channel]; [Polarity: Vertical]

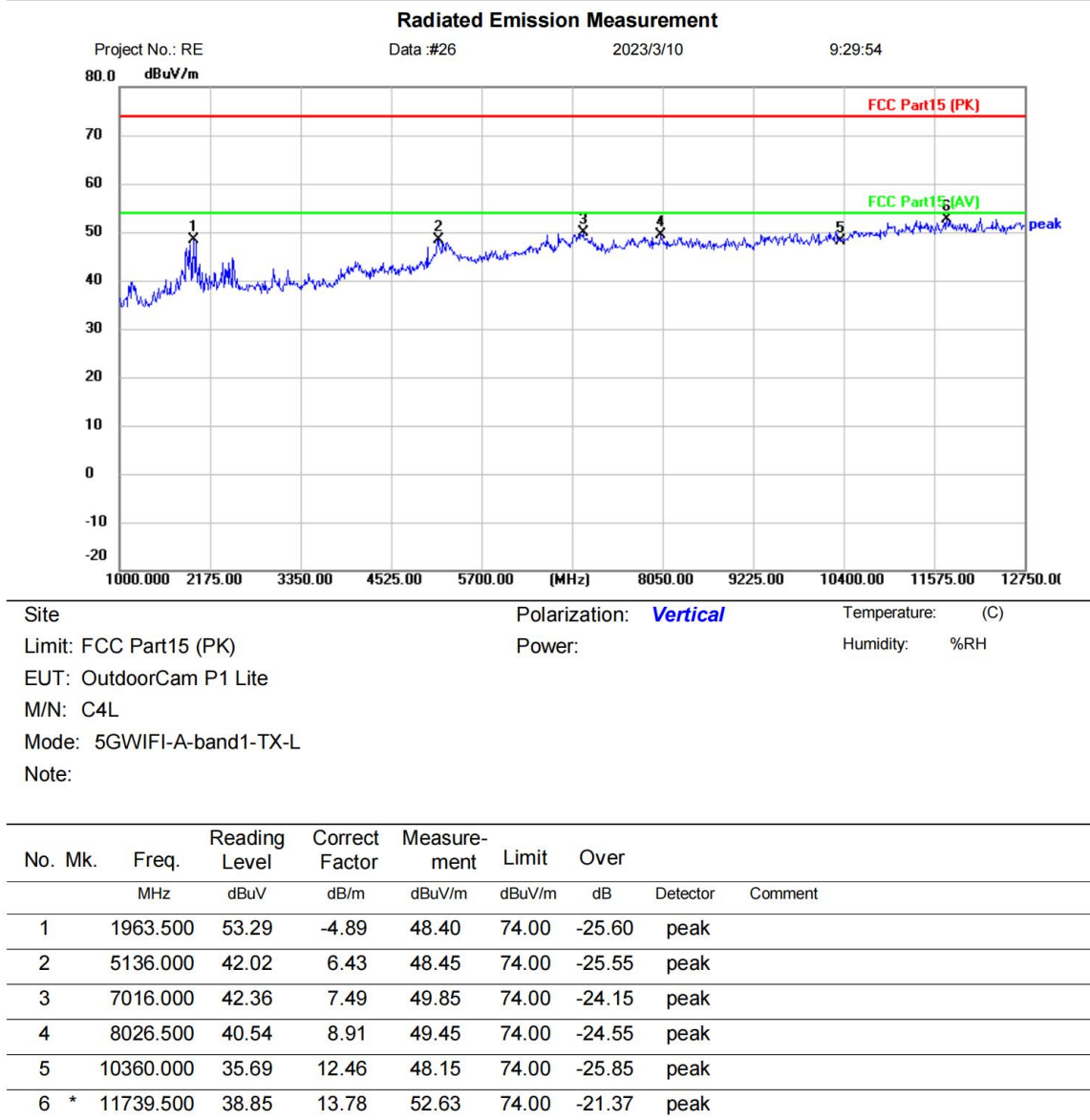


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[TestMode: TX 11a 5180 channel]; [Polarity: Horizontal]

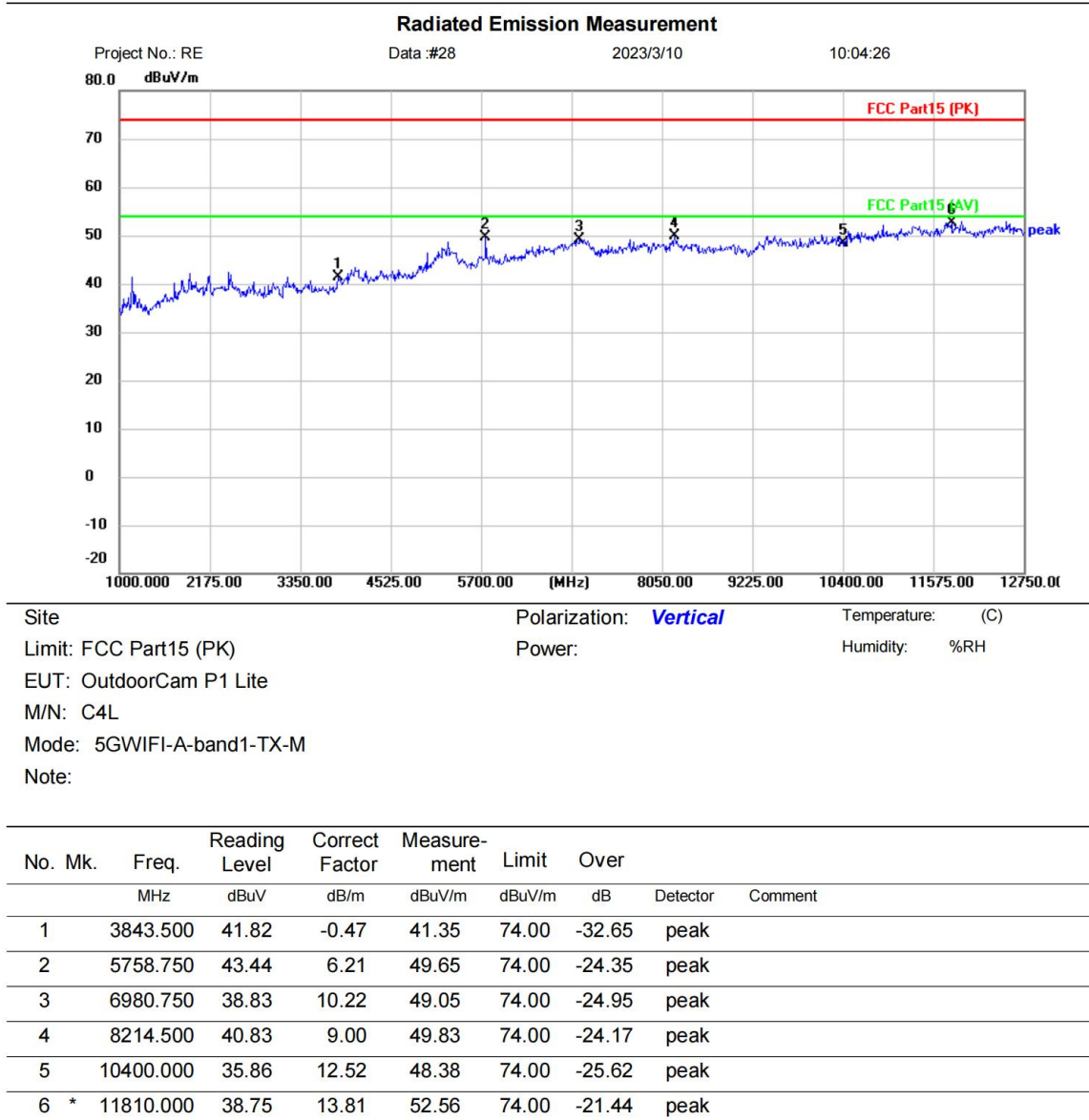


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[TestMode: TX 11a 5200 channel]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass