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TEST REPORT

47 CFR Part 15, Subpart E 15.407

Report Reference No.: CTL2505272071-WF04

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Product Name: Heavy Duty Vehicles Diagnostic Tool

Model/Type reference: HDY9S

List Model(s): N/A

Trade Mark: THINKCAR, MUCAR

FCC ID: 2AUARHDY9S

Applicant's name: THINKCAR TECH CO., LTD.

Address of applicant: 2606, building 4, phase II, TiananYungu, Gangtou community, Bantian, Longgang District, Shenzhen, China

Test Firm: Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Test specification:

Standard: 47 CFR Part 15, Subpart E 15.407: General technical requirements.

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

Date of receipt of test item: May 28, 2025

Date of Test Date: May 29, 2025 - Jun. 19, 2025

Date of Issue: Jun. 27, 2025

Result: Pass

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TEST REPORT

Test Report No. :	CTL2505272071-WF04	Jun. 27, 2025
		Date of issue

Equipment under Test : Heavy Duty Vehicles Diagnostic Tool

Sample No : CTL2505272071

Model /Type : HDY9S

Listed Models : N/A

Applicant : **THINKCAR TECH CO., LTD.**

Address : 2606, building 4, phase II, TiananYungu, Gangtou community, Bantian, Longgang District, Shenzhen, China

Manufacturer : **THINKCAR TECH CO., LTD.**

Address : 2606, building 4, phase II, TiananYungu, Gangtou community, Bantian, Longgang District, Shenzhen, China

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[47 CFR Part 15, Subpart E](#)—Unlicensed National Information Infrastructure Devices

[ANSI C63.10: 2013](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB789033 D02](#): General UNII Test Procedures New Rules v02r01

1.2. Test Description

FCC Requirement		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.407(a)	Emission Bandwidth(26dB Bandwidth)	PASS _{Note1}
FCC Part 15.407(e)	Minimum Emission Bandwidth(6dB Bandwidth)	PASS _{Note2}
FCC Part 15.407(a)	Maximum Conducted Output Power	PASS
FCC Part 15.407(a)	Peak Power Spectral Density	PASS
FCC Part 15.407(g)	Frequency Stability	PASS
FCC Part 15.407(b)	Undesirable emission	PASS
FCC Part 15.407(b)/15.205/15.209	Radiated Emissions	PASS
FCC Part 15.203	Antenna Requirement	PASS

Note 1: Apply to Band1, Band2A, Band2C only.

Note 2: Apply to BAND3 only.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co.,Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832.

1.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	SuperCharge	Manufacturer :	Huawei Technologies Co Ltd
		Model No. :	HW-100225C00

1.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole

responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power Radiated	±2.20 dB	(1)
Radiated Emission 9KHz~30MHz	±3.66dB	(1)
Radiated Emission 30~1000MHz	±4.08dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Emission Bandwidth	±1.9%	(1)
Maximum Conduct Output Power	± 1.18 dB	(1)
Power Spectral Density	±0.98 dB	(1)
Band Edge	±1.21dB	(1)
Unwanted Emissions	9kHz-7GHz:±1.09dB 7GHz-26.5GHz: ±3.27dB	(1)
Frequency Stability	±1.9%	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Heavy Duty Vehicles Diagnostic Tool			
Model/Type reference:	HDY9S			
Power supply:	DC 3.8V from battery			
Working voltage:	Input: 5V == 2.5A Battery: 3.8V, 3150mAh, 11.97Wh			
5G Wi-Fi :				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n 802.11ac	802.11n 802.11ac	802.11ac	N/A
Operation frequency:	5170-5240MHz 5745-5825MHz	5190-5230MHz 5755MHz-5795MHz	5210MHz 5775MHz	N/A
Modulation:	OFDM	OFDM	OFDM	N/A
Channel number:	9	4	2	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
TPC:	Not support			
MIMO	Not support			
Antenna type:	FPC Antenna			
Antenna gain:	Band 1: 0.84dBi Band 3: 0.88dBi			

Note1: For more details, please refer to the user's manual of the EUT.

Note2: Antenna gain provided by the applicant.

Note3: This report is only for 5G Wi-Fi.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.

All test performed at the low, middle and high of operational frequency range of each mode.

Operation Frequency List Wi-Fi on 5G Band:

Operating band	20MHz		40MHz		80MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
U-NII 1 (5180MHz-5240MHz)	36	5180	38	5190	42	5210
	40	5200		5230		
	44	5220	149	5745	155	5775
	48	5240		5755		
U-NII 3 (5725MHz-5850MHz)	149	5745	151	5785		
	153	5765		5795		
	157	5785	161	5805		
	161	5805		5825		
	165	5825	--	--	--	--

Note:

- "Means no channel(s) available any more.
- The line display in grey is those Channels/Frequencies select to test in this report for each operation mode.

Data Rate Used:

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate
	11a/OFDM	6 Mbps
Maximum Conducted Output Power Power Spectral Density Emission Bandwidth(26dBm Bandwidth) Minimum Emission Bandwidth(6dBm Bandwidth) Undesirable emission Frequency Stability	11n(20MHz), 11ac(20MHz)/OFDM, 11ax(20MHz)/OFDM	MCS0
	11n(40MHz), 11ac(40MHz)/OFDM, 11ax(40MHz)/OFDM	MCS0
	11n(80MHz), 11ac(80MHz)/OFDM, 11ax(80MHz)/OFDM	MCS0

2.4. Equipments Used during the Test

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2025/04/29	2026/04/28
	LISN	R&S	ESH2-Z5	860014/010	2025/04/29	2026/04/28
	Limitator	ROHDE & SCHWARZ	ESH3-Z2	100408	2025/04/29	2026/04/28

Software:						
Name of Software:			Version:			
ES-K1			V1.71			

Radiated Emissions and Band Edge					
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Active Loop Antenna	Da Ze	ZN30900A	/	2024/04/30	2027/04/29
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2023/02/13	2026/02/12
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2024/11/25	2027/11/24
Horn Antenna	Ocean Microwave	OBH1004 00	26999002	2024/12/21	2027/12/20
Amplifier	Agilent	8449B	3008A02306	2025/05/01	2026/04/30
Amplifier	Brief&Smart	LNA-4018	2104197	2024/04/30	2026/04/29
EMI Test Receiver	R&S	ESCI	1166.5950.03	2025/04/29	2026/04/28
Spectrum Analyzer	Keysight	N9020A	MY53420874	2025/04/29	2026/04/28

Test software					
Name of Software			Version		
EZ_EMC(Below 1GHz)			V1.1.4.2		
EZ_EMC(Above 1GHz)			V1.1.4.2		

Maximum Peak Output Power & 20dB Bandwidth & Frequency Separation & Number of hopping frequency & Dwell Time & Out-of-band Emissions					
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Spectrum Analyzer	Keysight	N9020A	MY53420874	2025/04/29	2026/04/28
Temperature/Humidity Meter	Ji Yu	MC501	/	2025/05/06	2026/05/05

Test Software					
Name of Software			Version		
TST-PASS			V2.0		

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

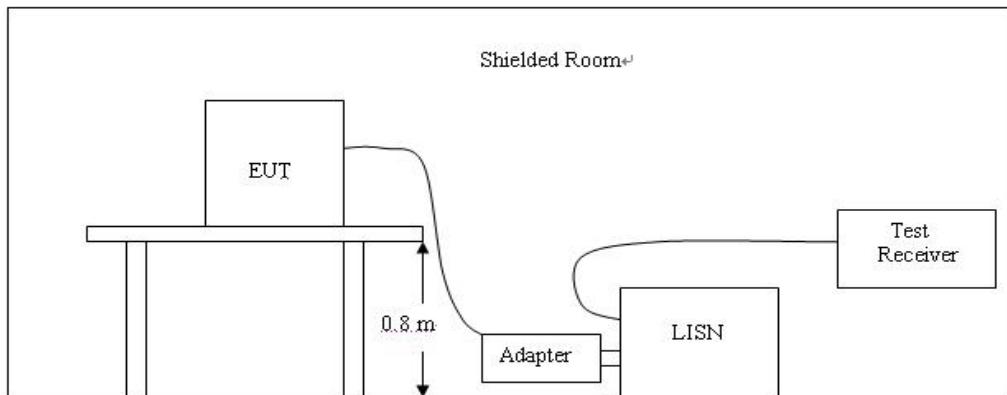
LIMIT

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION

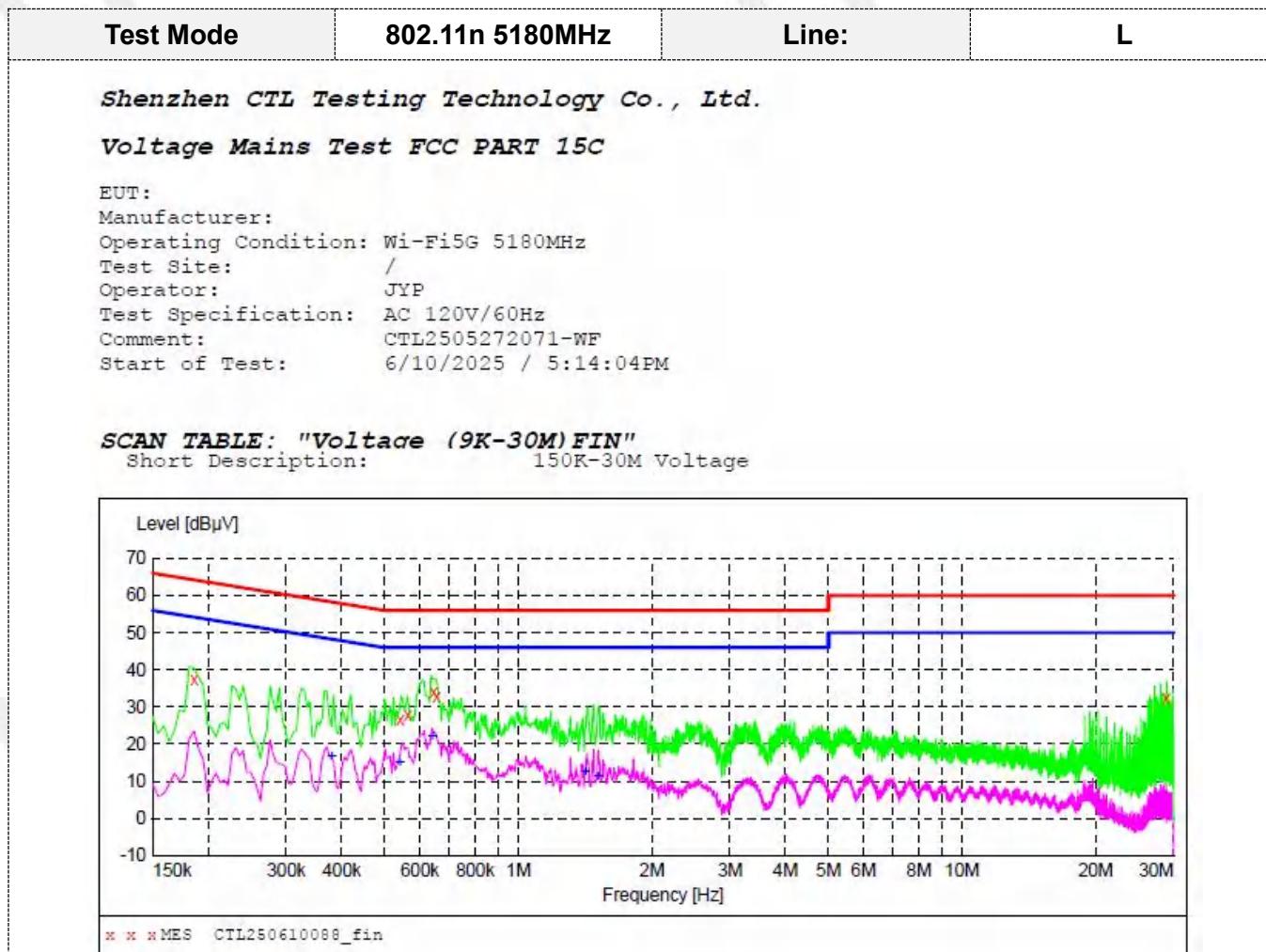


TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a Laser Projector op system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Remark: Pre-scan all modes of IEEE802.11a/n(HT20)/ac(VHT20)/n (HT40)/ac(VHT40)/ac(VHT80)/at Low, Middle, and High channel ;only the worst result of was reported as below:

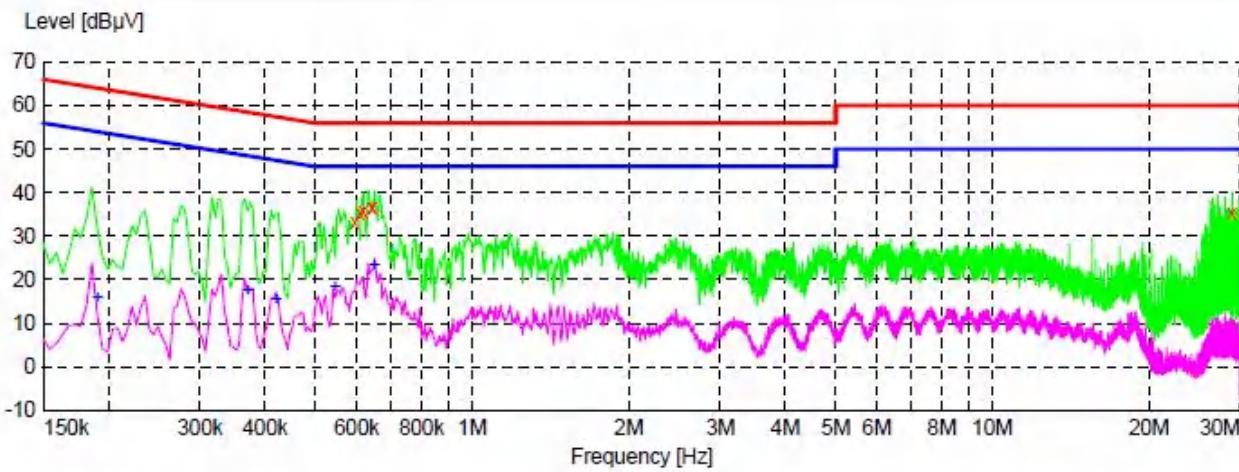


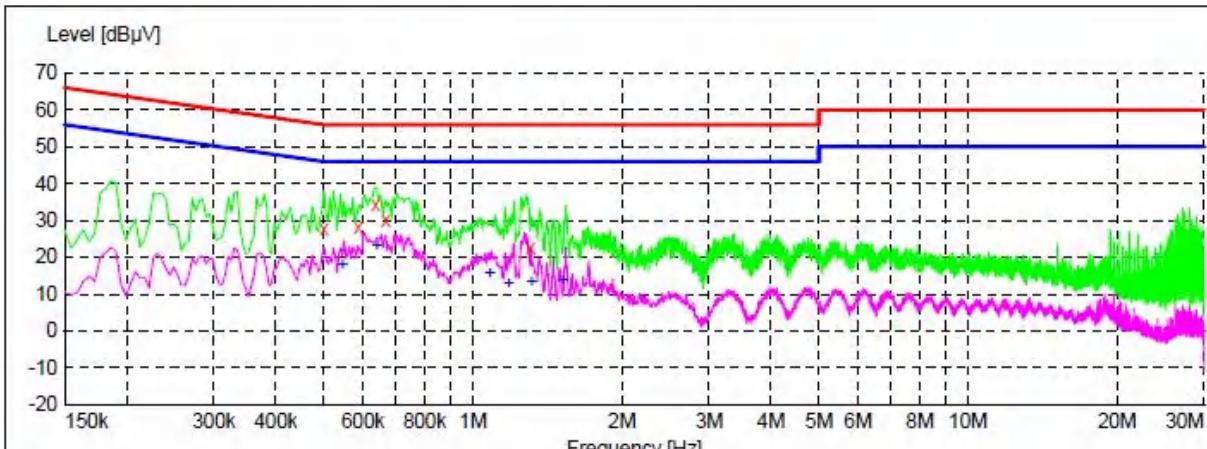
MEASUREMENT RESULT: "CTL250610088_fin"

6/10/2025 5:16PM	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.186000	37.50	10.0	64	26.7	QP	L1	GND
	0.541500	26.70	10.0	56	29.3	QP	L1	GND
	0.564000	27.90	10.0	56	28.1	QP	L1	GND
	0.645000	34.00	10.0	56	22.0	QP	L1	GND
	0.654000	32.80	10.0	56	23.2	QP	L1	GND
	28.914000	32.30	10.2	60	27.7	QP	L1	GND

MEASUREMENT RESULT: "CTL250610088_fin2"

6/10/2025 5:16PM	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.379500	16.60	10.0	48	31.7	AV	L1	GND
	0.541500	14.90	10.0	46	31.1	AV	L1	GND
	0.640500	22.10	10.0	46	23.9	AV	L1	GND
	1.414500	12.30	10.1	46	33.7	AV	L1	GND
	1.513500	11.10	10.1	46	34.9	AV	L1	GND

Test Mode	802.11n 5180MHz	Line:	N				
<i>Shenzhen CTL Testing Technology Co., Ltd.</i>							
<i>Voltage Mains Test FCC PART 15C</i>							
EUT:							
Manufacturer:							
Operating Condition: Wi-Fi5G 5180MHz							
Test Site: /							
Operator: JYP							
Test Specification: AC 120V/60Hz							
Comment: CTL2505272071-WF							
Start of Test: 6/10/2025 / 5:01:26PM							
SCAN TABLE: "Voltage (9K-30M) FIN"							
Short Description: 150K-30M Voltage							
							
*** MES CTL250610083_fin							
MEASUREMENT RESULT: "CTL250610083_fin"							
6/10/2025 5:03PM							
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.595500	33.40	10.0	56	22.6	QP	N	GND
0.609000	35.50	10.0	56	20.5	QP	N	GND
0.618000	35.80	10.0	56	20.2	QP	N	GND
0.640500	36.50	10.0	56	19.5	QP	N	GND
0.645000	36.60	10.0	56	19.4	QP	N	GND
28.914000	35.30	10.2	60	24.7	QP	N	GND
MEASUREMENT RESULT: "CTL250610083_fin2"							
6/10/2025 5:03PM							
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.190500	16.00	10.0	54	38.0	AV	N	GND
0.370500	17.50	10.0	49	31.0	AV	N	GND
0.420000	15.20	10.0	47	32.2	AV	N	GND
0.546000	18.30	10.0	46	27.7	AV	N	GND
0.649500	23.30	10.0	46	22.7	AV	N	GND

Test Mode	802.11n 5745MHz	Line:	L				
<i>Shenzhen CTL Testing Technology Co., Ltd.</i>							
<i>Voltage Mains Test FCC PART 15C</i>							
EUT: Manufacturer: Operating Condition: Wi-Fi5G 5745MHz Test Site: / Operator: JYP Test Specification: AC 120V/60Hz Comment: CTL2505272071-WF Start of Test: 6/10/2025 / 5:11:21PM							
SCAN TABLE: "Voltage (9K-30M) FIN" Short Description: 150K-30M Voltage							
 <p>Level [dBμV]</p> <p>Frequency [Hz]</p> <p>xx MES CTL250610087_fin</p>							
MEASUREMENT RESULT: "CTL250610087_fin"							
6/10/2025 5:13PM							
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.501000	27.70	10.0	56	28.3	QP	L1	GND
0.586500	28.30	10.0	56	27.7	QP	L1	GND
0.636000	34.20	10.0	56	21.8	QP	L1	GND
0.667500	29.90	10.0	56	26.1	QP	L1	GND
1.311000	22.70	10.1	56	33.3	QP	L1	GND
MEASUREMENT RESULT: "CTL250610087_fin2"							
6/10/2025 5:13PM							
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.546000	18.10	10.0	46	27.9	AV	L1	GND
0.640500	23.10	10.0	46	22.9	AV	L1	GND
1.081500	15.60	10.1	46	30.4	AV	L1	GND
1.180500	12.60	10.1	46	33.4	AV	L1	GND
1.315500	13.00	10.1	46	33.0	AV	L1	GND
1.518000	13.80	10.1	46	32.2	AV	L1	GND

Test Mode	802.11n 5745MHz	Line:	N				
<i>Shenzhen CTL Testing Technology Co., Ltd.</i>							
<i>Voltage Mains Test FCC PART 15C</i>							
EUT: Manufacturer: Operating Condition: Wi-Fi5G 5745MHz Test Site: / Operator: JYP Test Specification: AC 120V/60Hz Comment: CTL2505272071-WF Start of Test: 6/10/2025 / 5:08:38PM							
<i>SCAN TABLE: "Voltage (9K-30M) FIN"</i> Short Description: 150K-30M Voltage							
<i>MEASUREMENT RESULT: "CTL250610086_fin"</i>							
6/10/2025 5:10PM							
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.366000	33.80	10.0	59	24.8	QP	N	GND
0.379500	33.10	10.0	58	25.2	QP	N	GND
0.550500	32.00	10.0	56	24.0	QP	N	GND
0.631500	35.20	10.0	56	20.8	QP	N	GND
0.645000	36.30	10.0	56	19.7	QP	N	GND
28.914000	33.50	10.2	60	26.5	QP	N	GND
<i>MEASUREMENT RESULT: "CTL250610086_fin2"</i>							
6/10/2025 5:10PM							
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.330000	17.20	10.0	50	32.3	AV	N	GND
0.415500	15.50	10.0	48	32.0	AV	N	GND
0.505500	15.90	10.0	46	30.1	AV	N	GND
0.564000	18.40	10.0	46	27.6	AV	N	GND
0.613500	21.30	10.0	46	24.7	AV	N	GND
1.428000	13.00	10.1	46	33.0	AV	N	GND

Remark: Level(dBuV)=Reading(dBuV) + Transd.(dB)

Margin=Limit(dBuV)- Level(dBuV)

3.2. Radiated Emissions

Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Undesirable emission limits

Requirement	Limit(EIRP)	Limit (Field strength at 3m) <small>Note1</small>
15.407(b)(1)	PK:-27(dBm/MHz)	PK:68.2(dB μ V/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)		

Note1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m}, \text{ where } P \text{ is the eirp (Watts)}$$

(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209

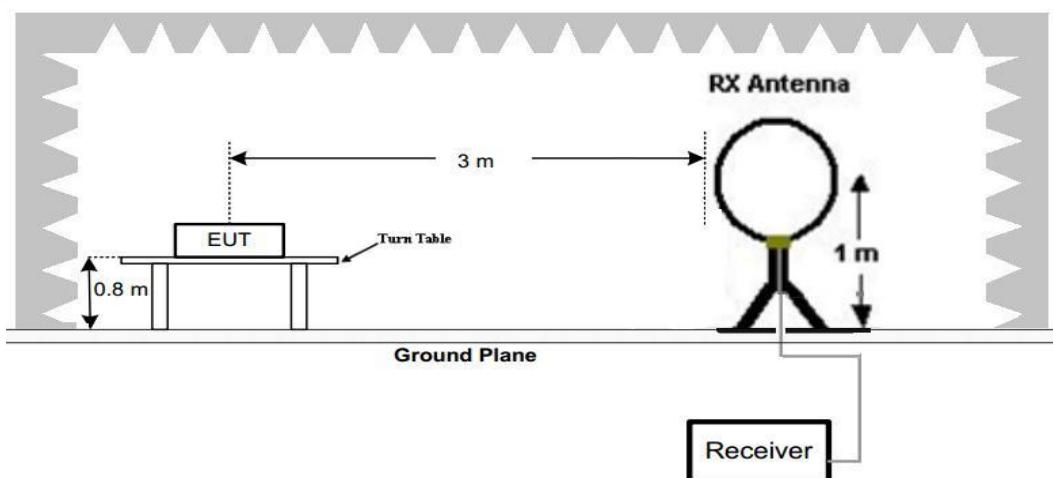
(6) In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

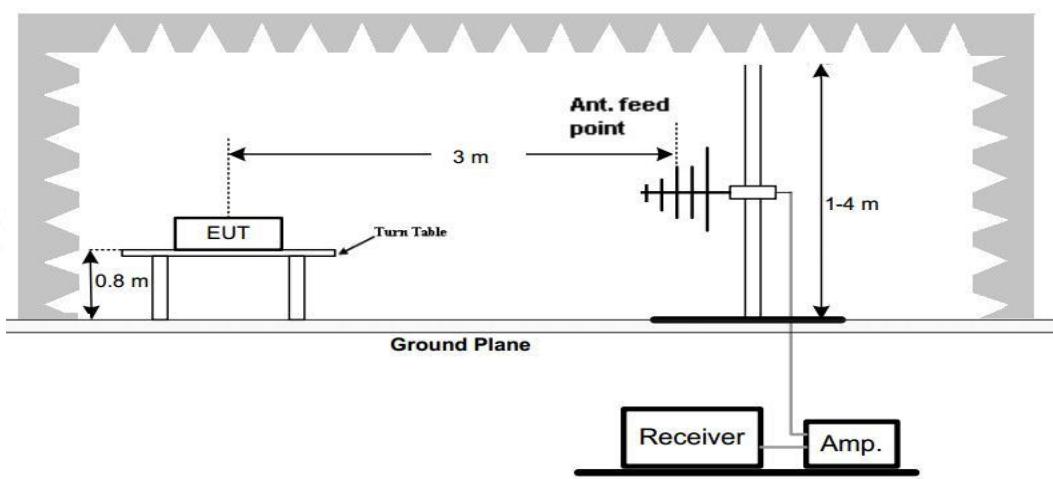
Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

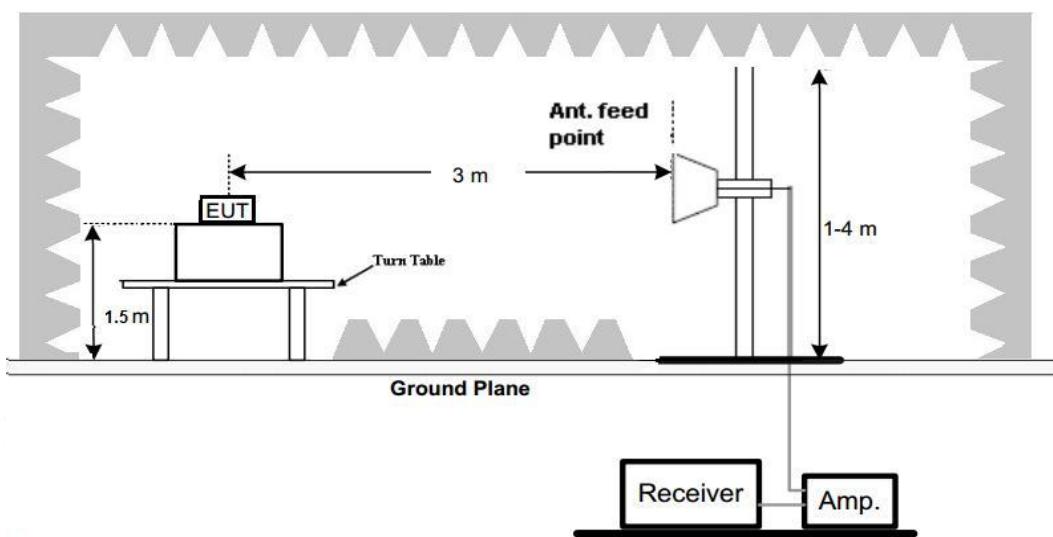
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

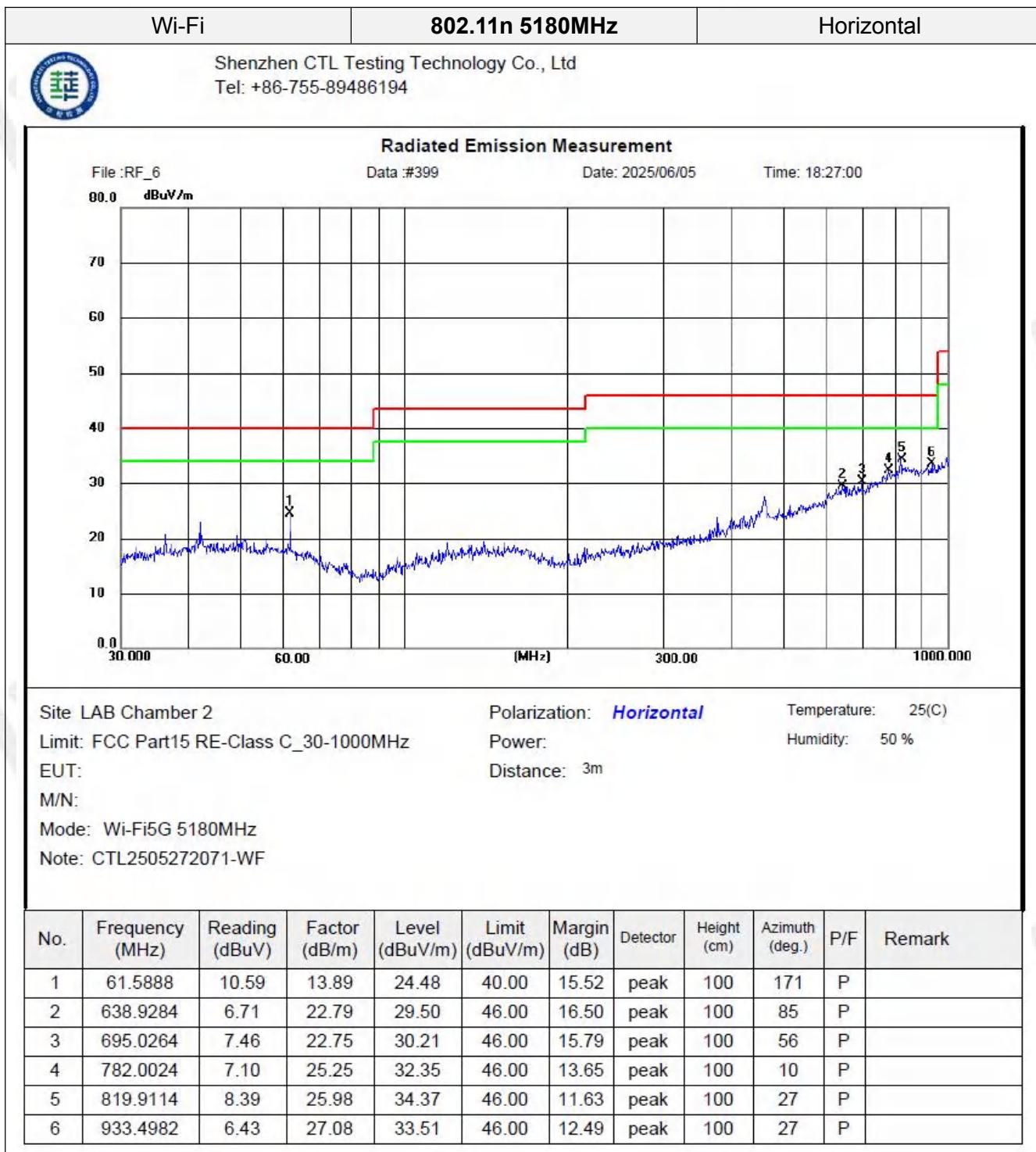
Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

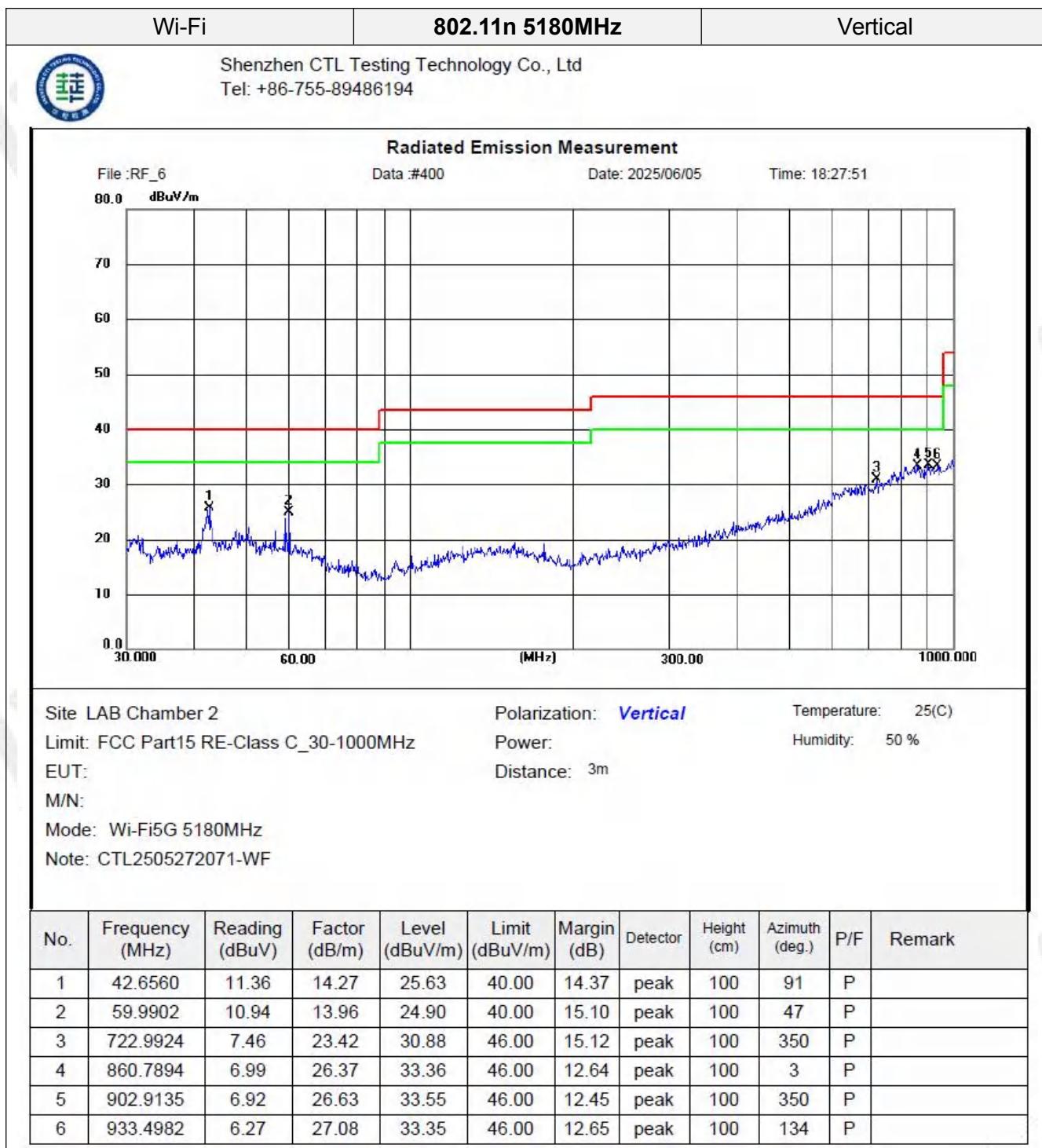
TEST RESULTS

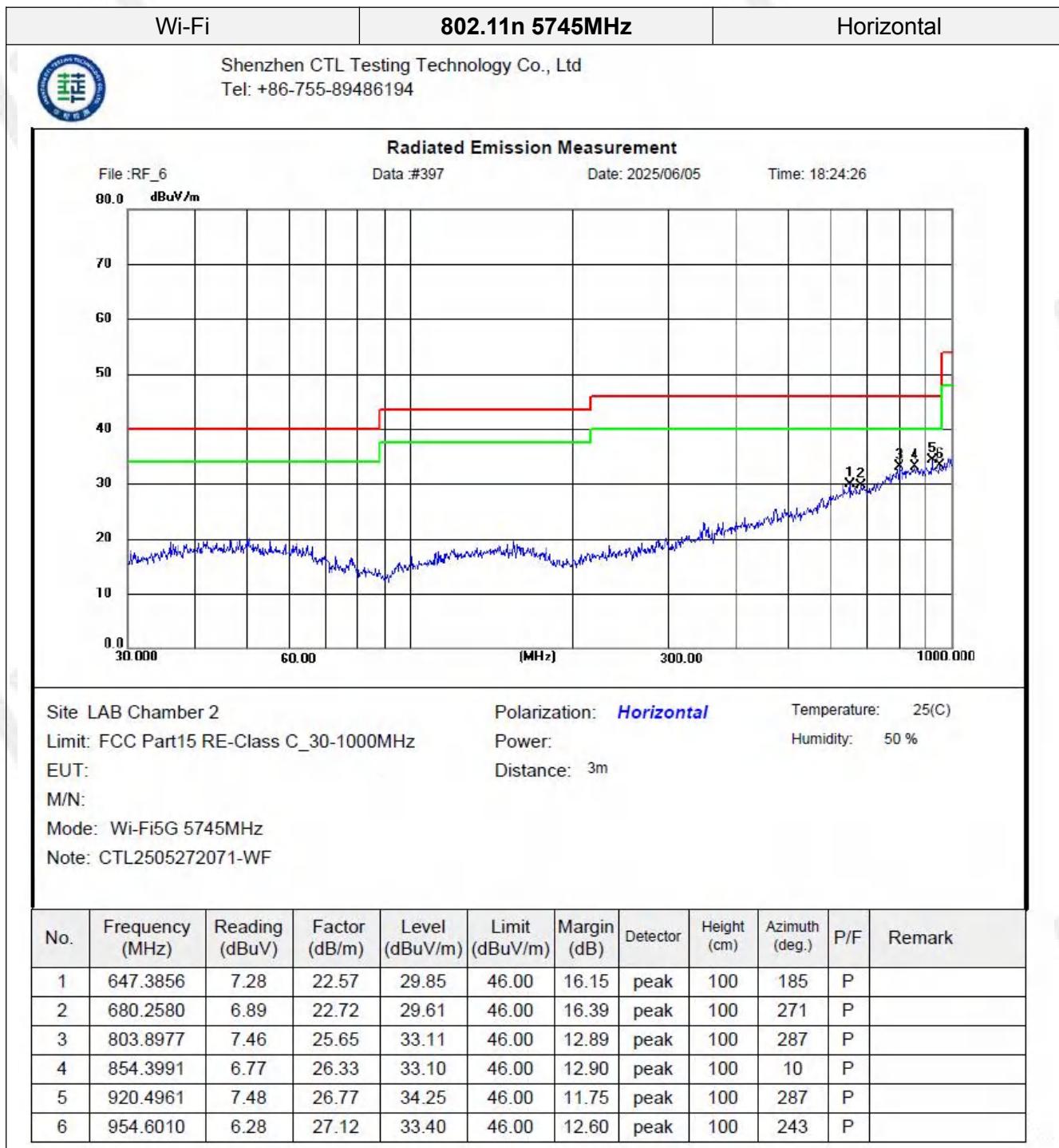
Remark:

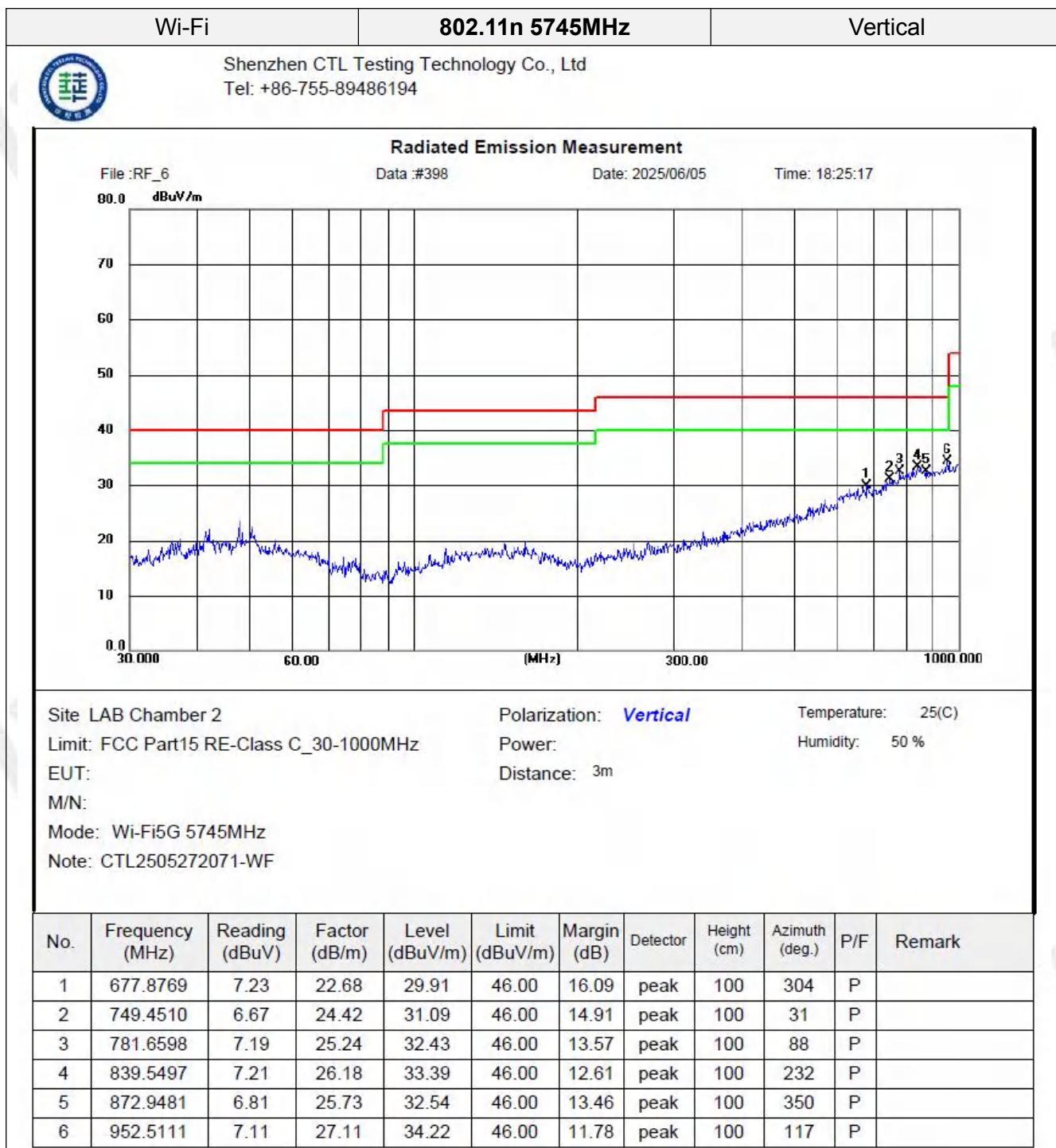
1. All IEEE802.11a/n(HT20)/ac(VHT20)/ax(HEW20)/n(HT40)/ac(VHT40)/ax(HEW40)/ac(VHT80)/ax(HEW80) modes have been tested for below 1GHz test, only the worst case 802.11n(HT20)low channel of U-NII 1 band was recorded.
2. All IEEE802.11a/n(HT20)/ac(VHT20)/n(HT40)/ac(VHT40)/ac(VHT80)/modes have been tested for above 1GHz test, only the worst case IEEE 802.11(HT20) was recorded.
3. All WIFI operation modes have been tested for U-NII 3 bandedge test, only the worst case of 802.11ac20 mode was recorded.
4. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noisefloor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz



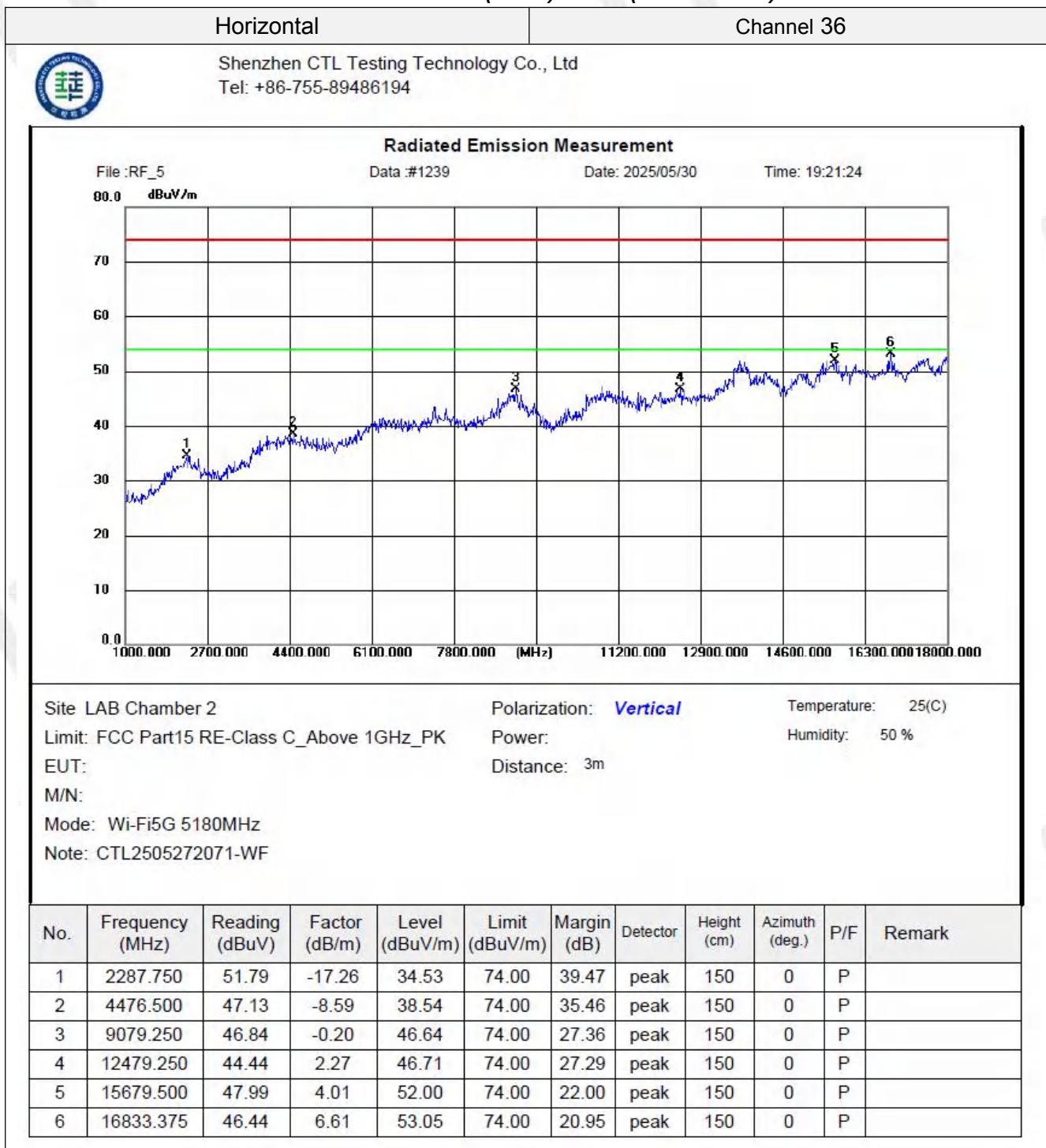


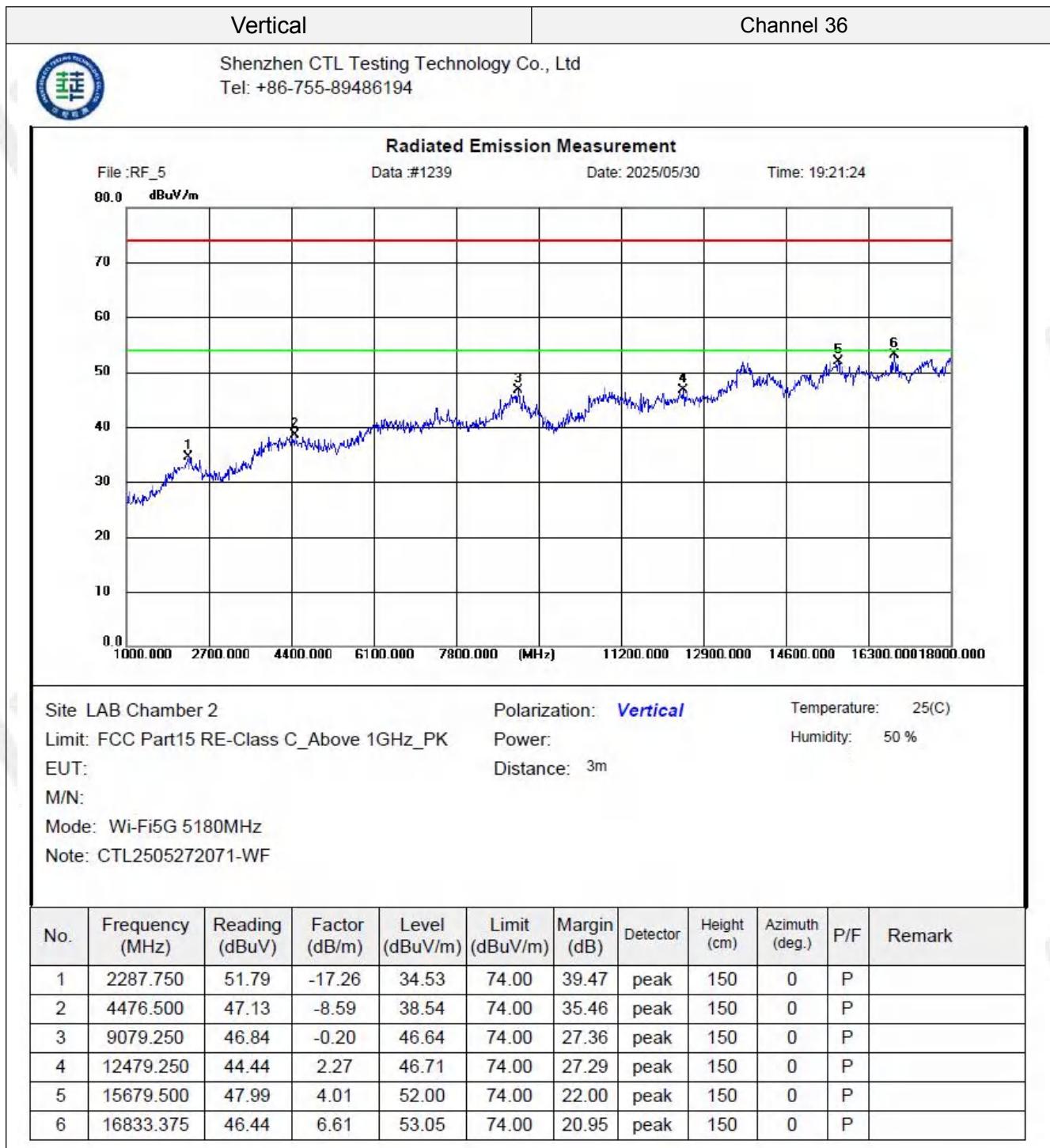


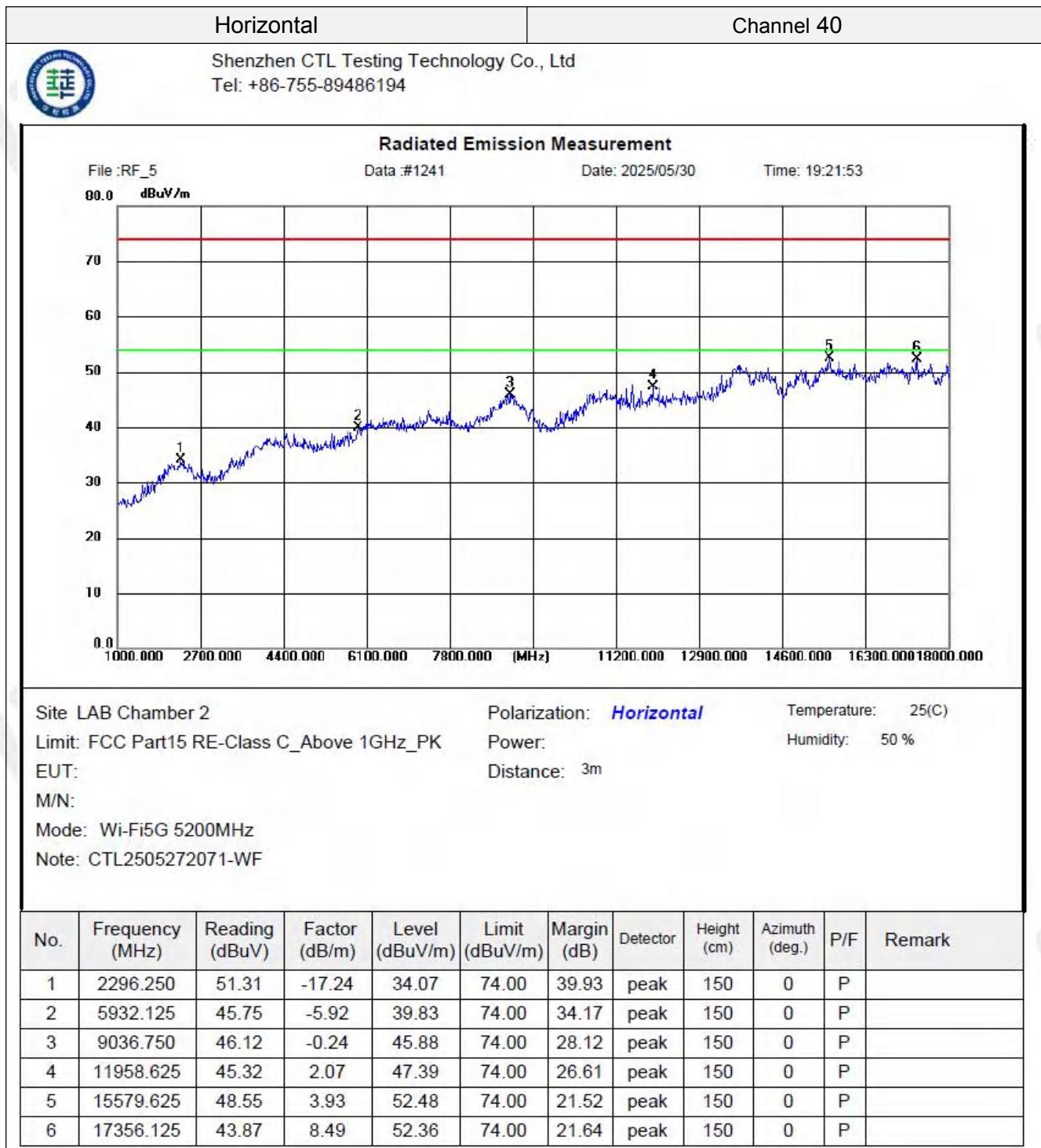


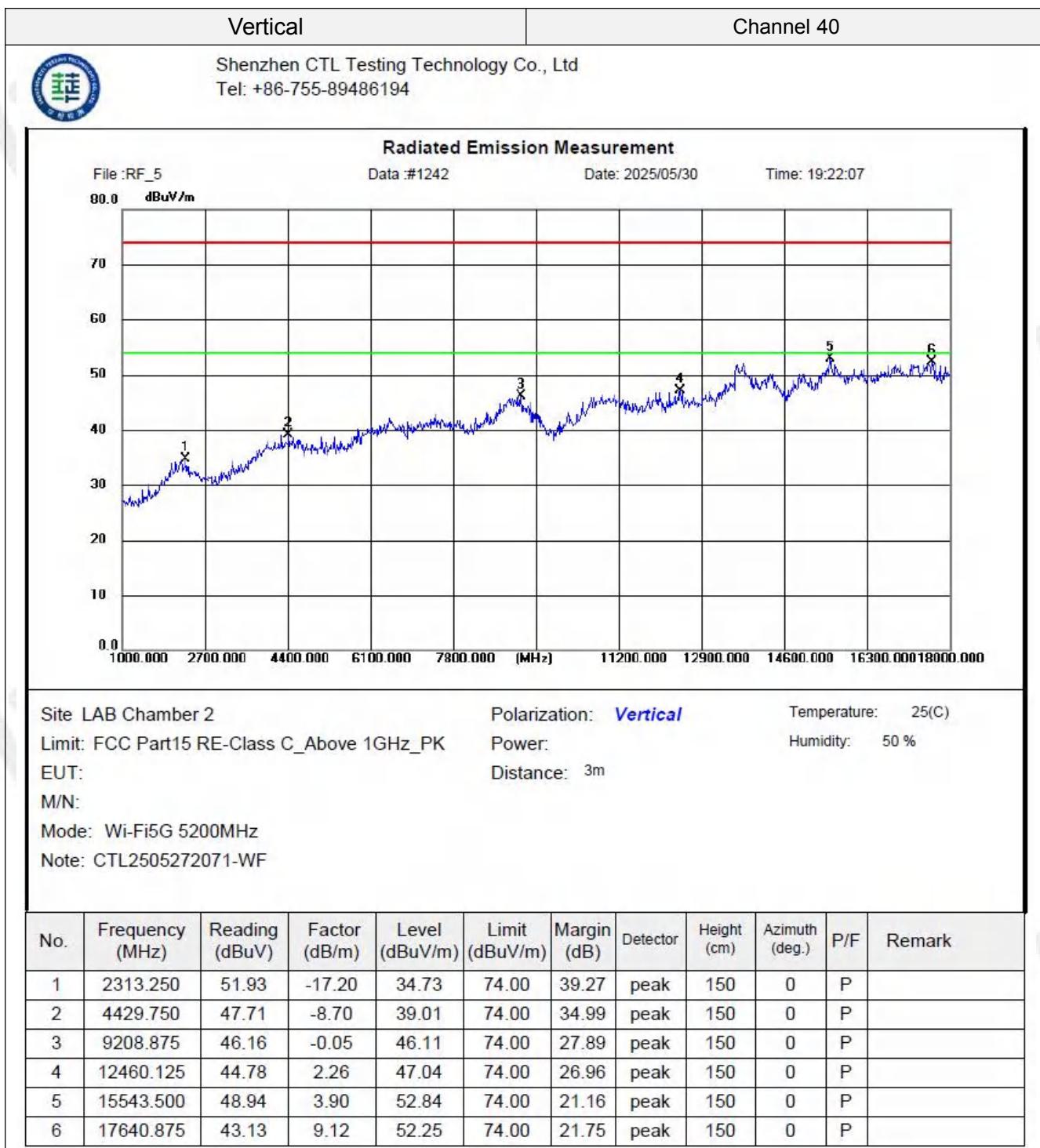
For 1GHz to 40GHz

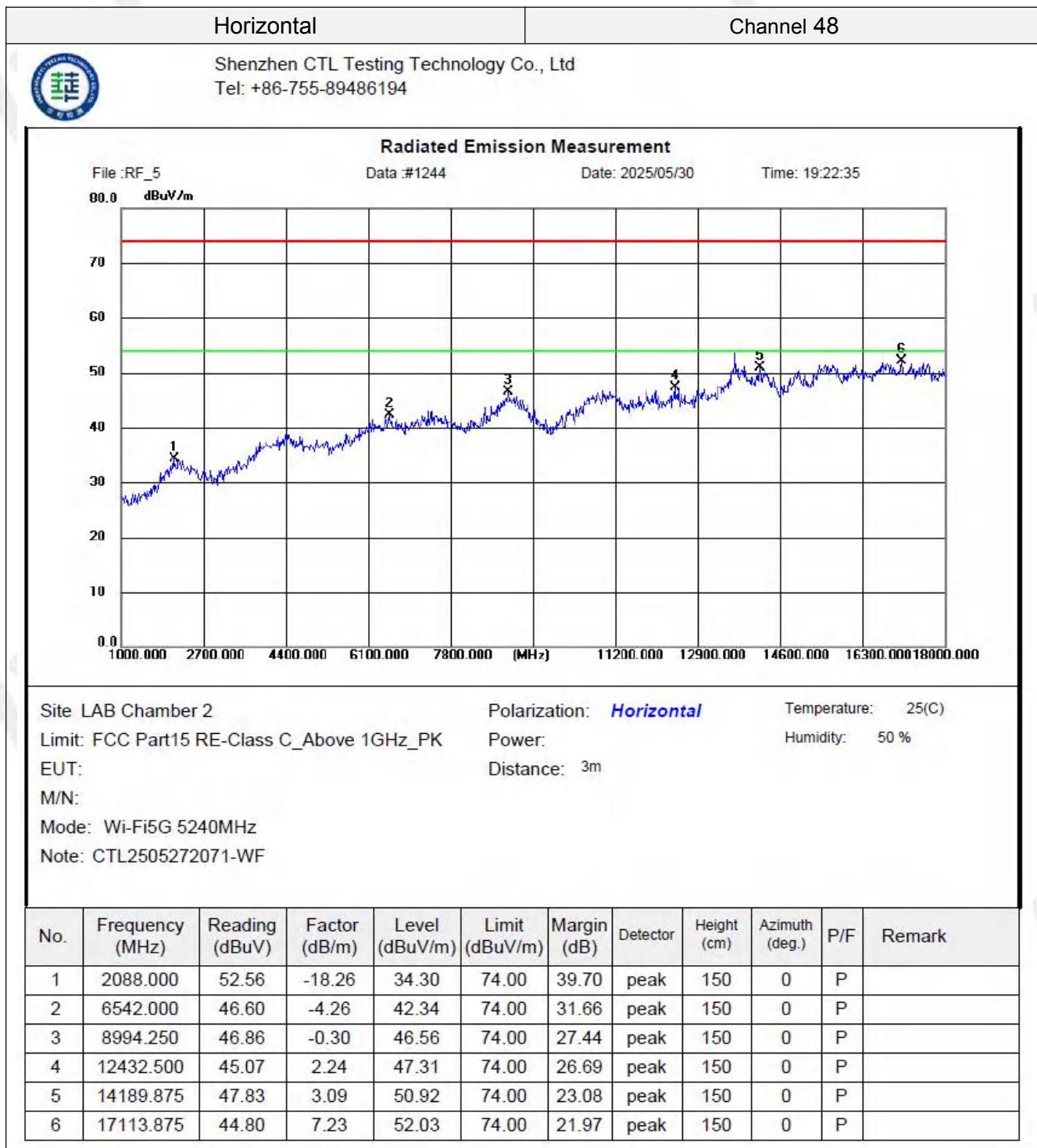
Note: All 802.11a / 802.11n (HT20) / 802.11ac (HT20) / 802.11n (HT40) / 802.11ac (HT40) / 802.11ac (HT80) modes have been tested for above 1GHz test, only the worst case 802.11n (HT20) was recorded.

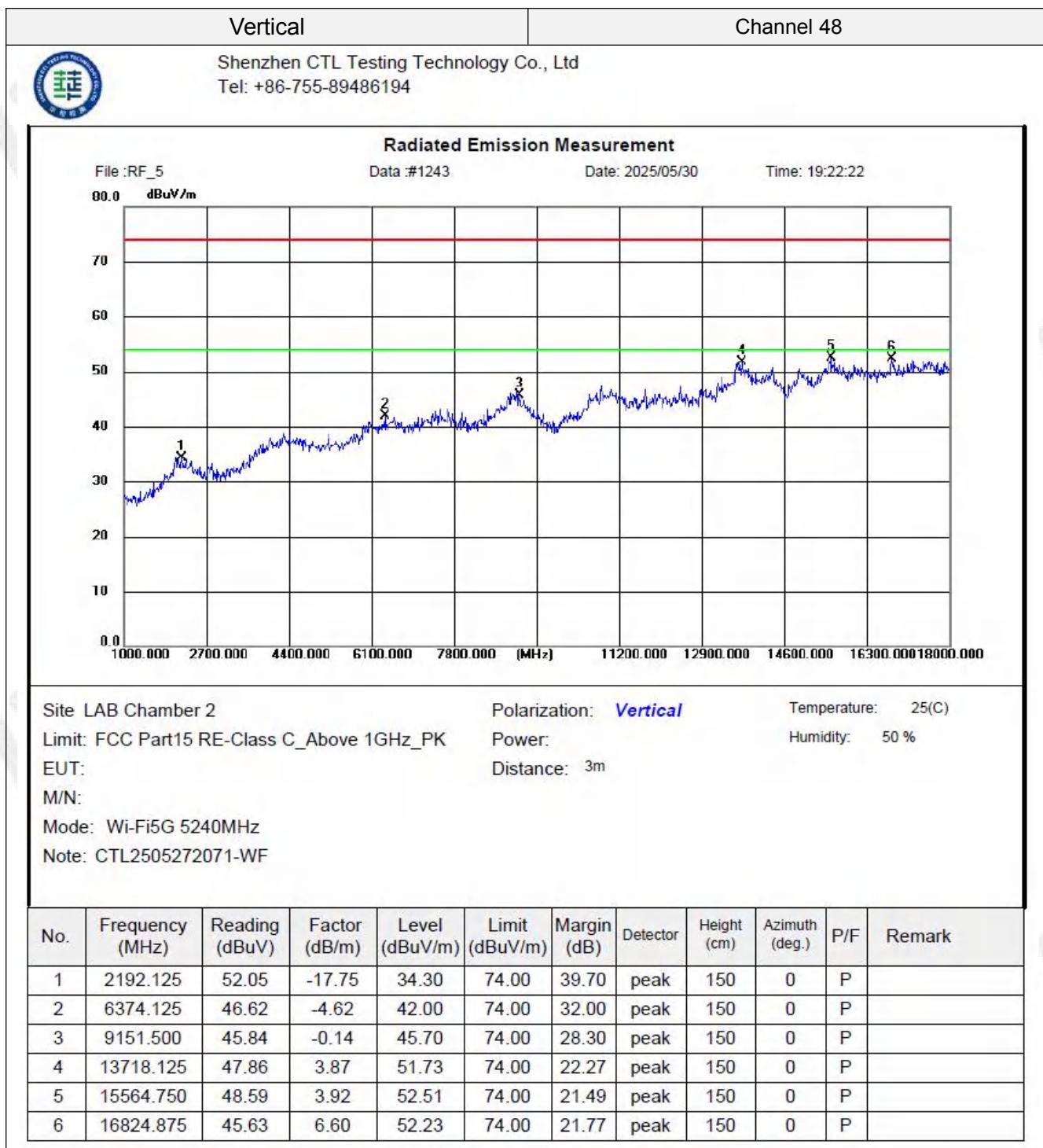
UNII 1 & 802.11n (HT20) Mode (above 1GHz)











U-NII 3 & 802.11n (HT20) Mode (above 1GHz)

Horizontal

Channel 149



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Radiated Emission Measurement

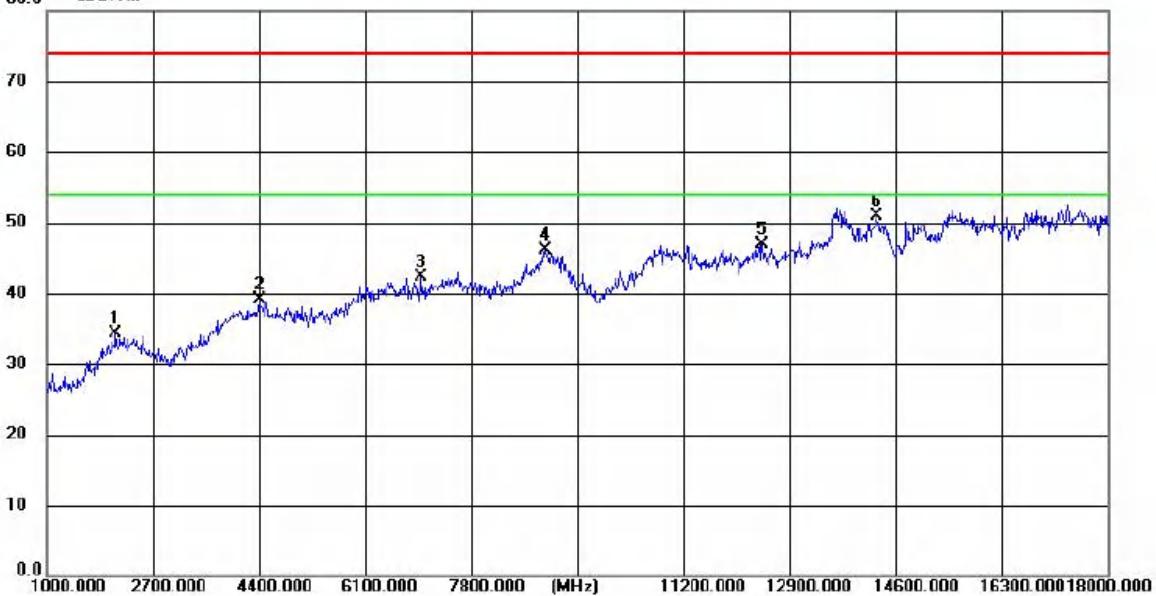
File :RF_5

Data #:1245

Date: 2025/05/30

Time: 19:22:54

00.0 dBuV/m



Site LAB Chamber 2

Polarization: *Horizontal*

Temperature: 25(C)

Limit: FCC Part15 RE-Class C_Above 1GHz_PK

Power:

Humidity: 50 %

EUT:

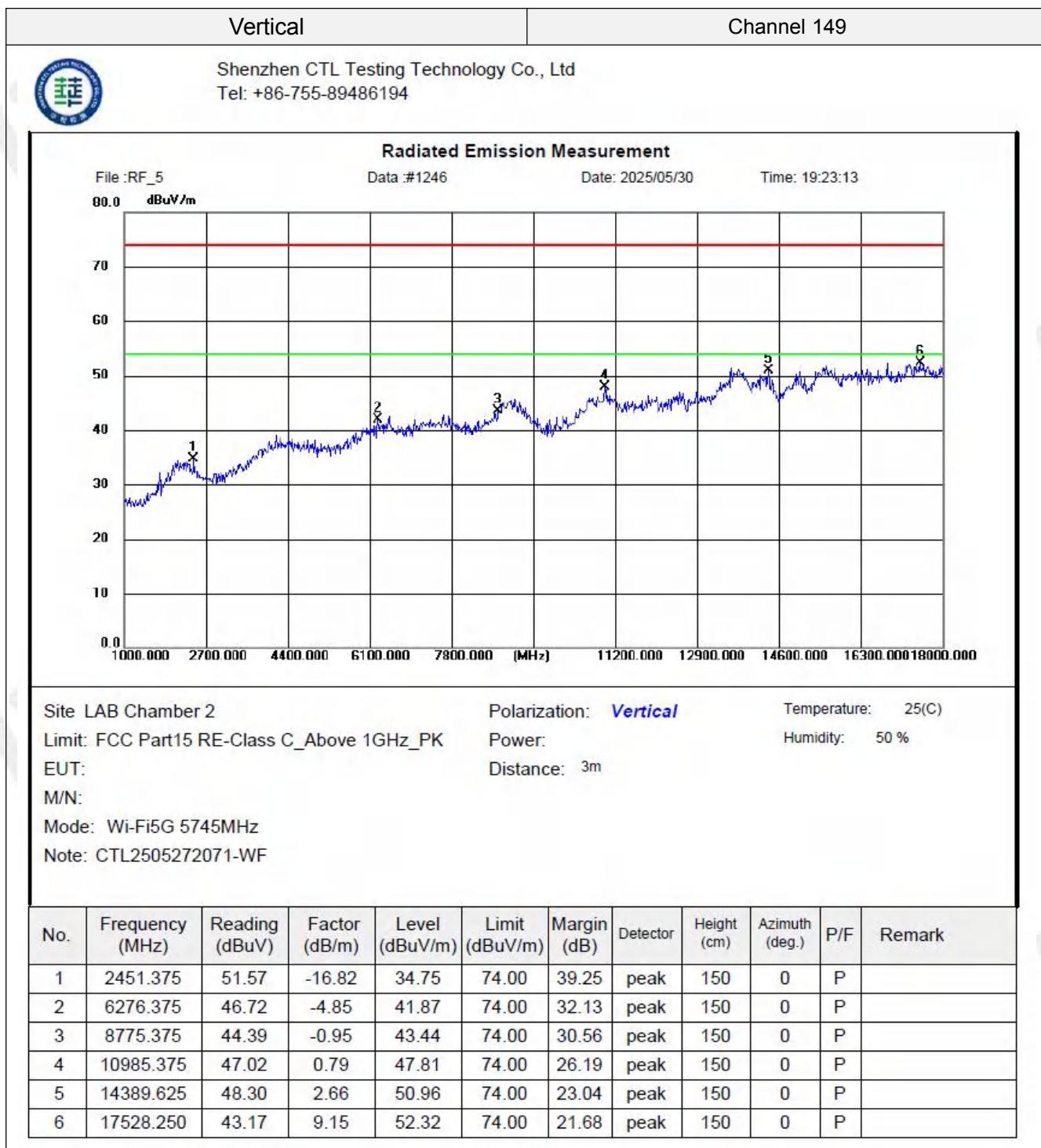
Distance: 3m

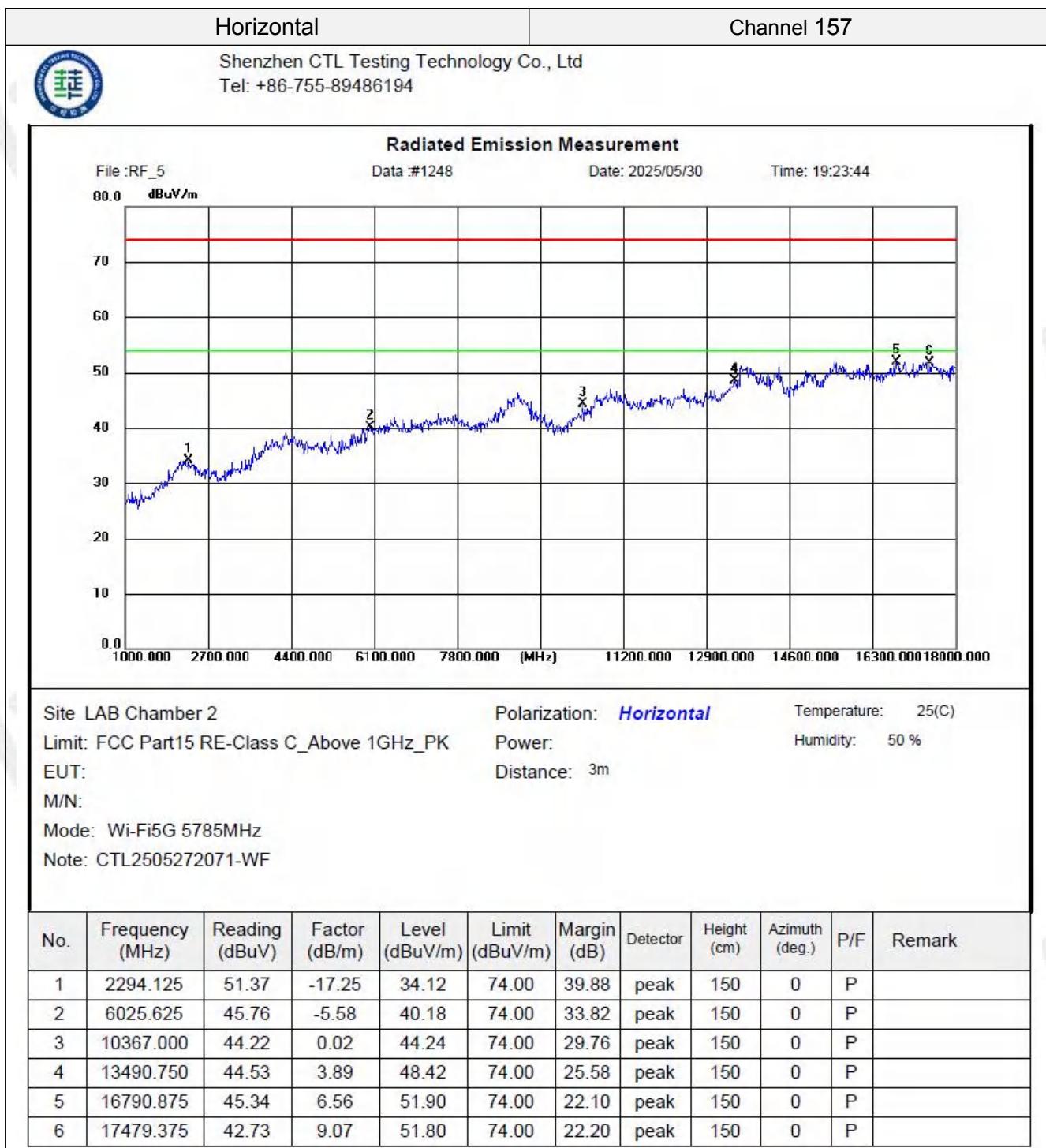
M/N:

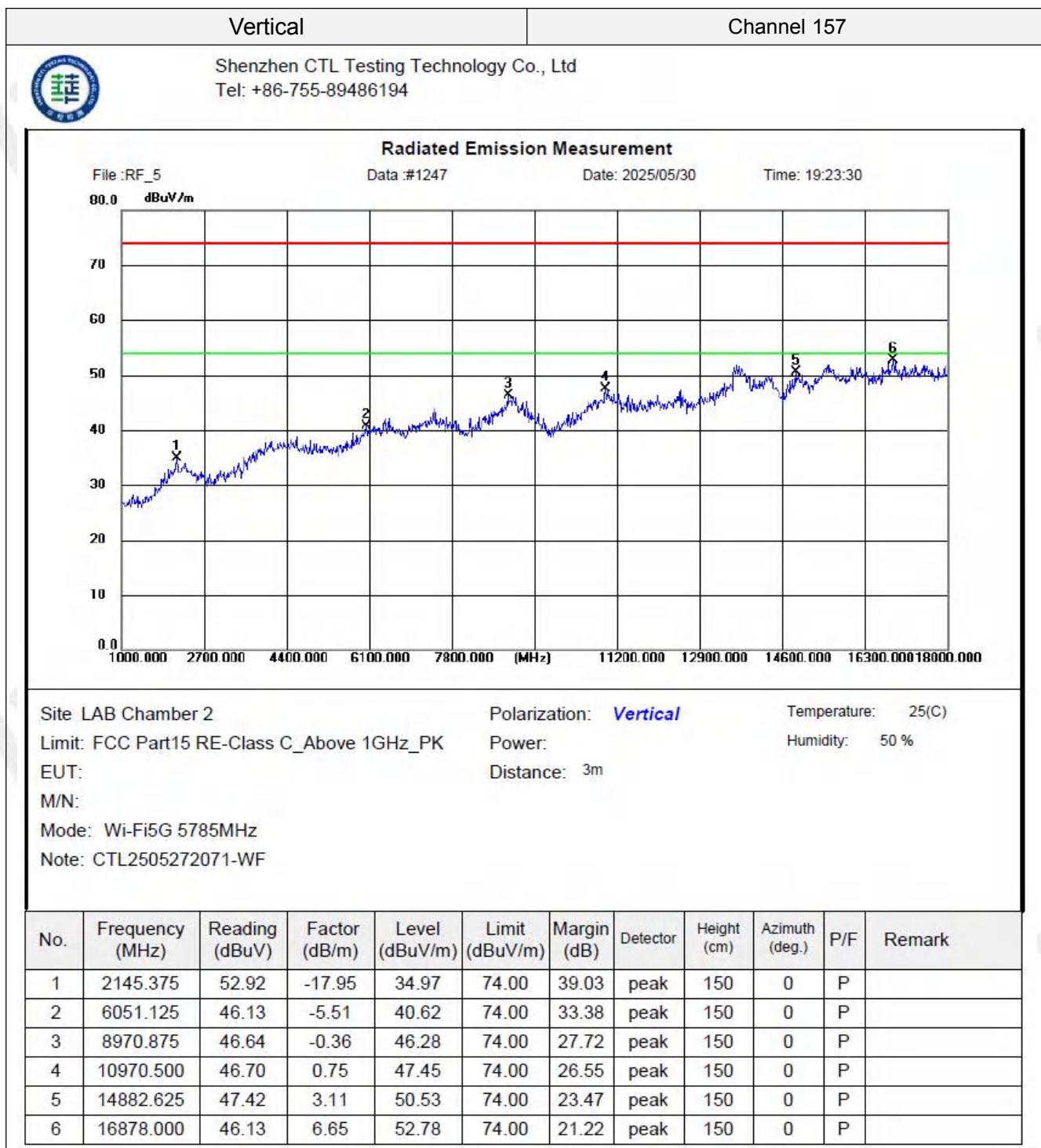
Mode: Wi-Fi5G 5745MHz

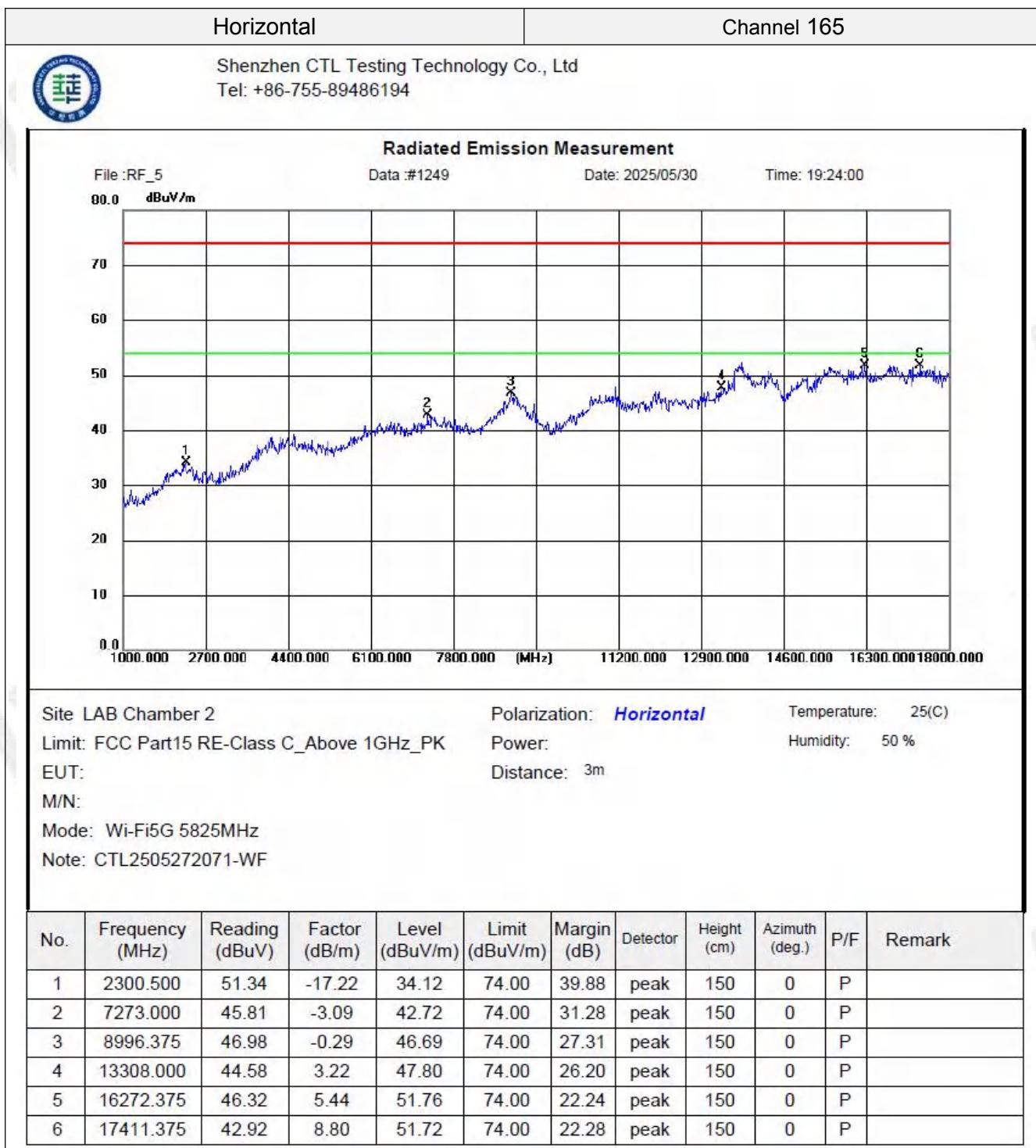
Note: CTL2505272071-WF

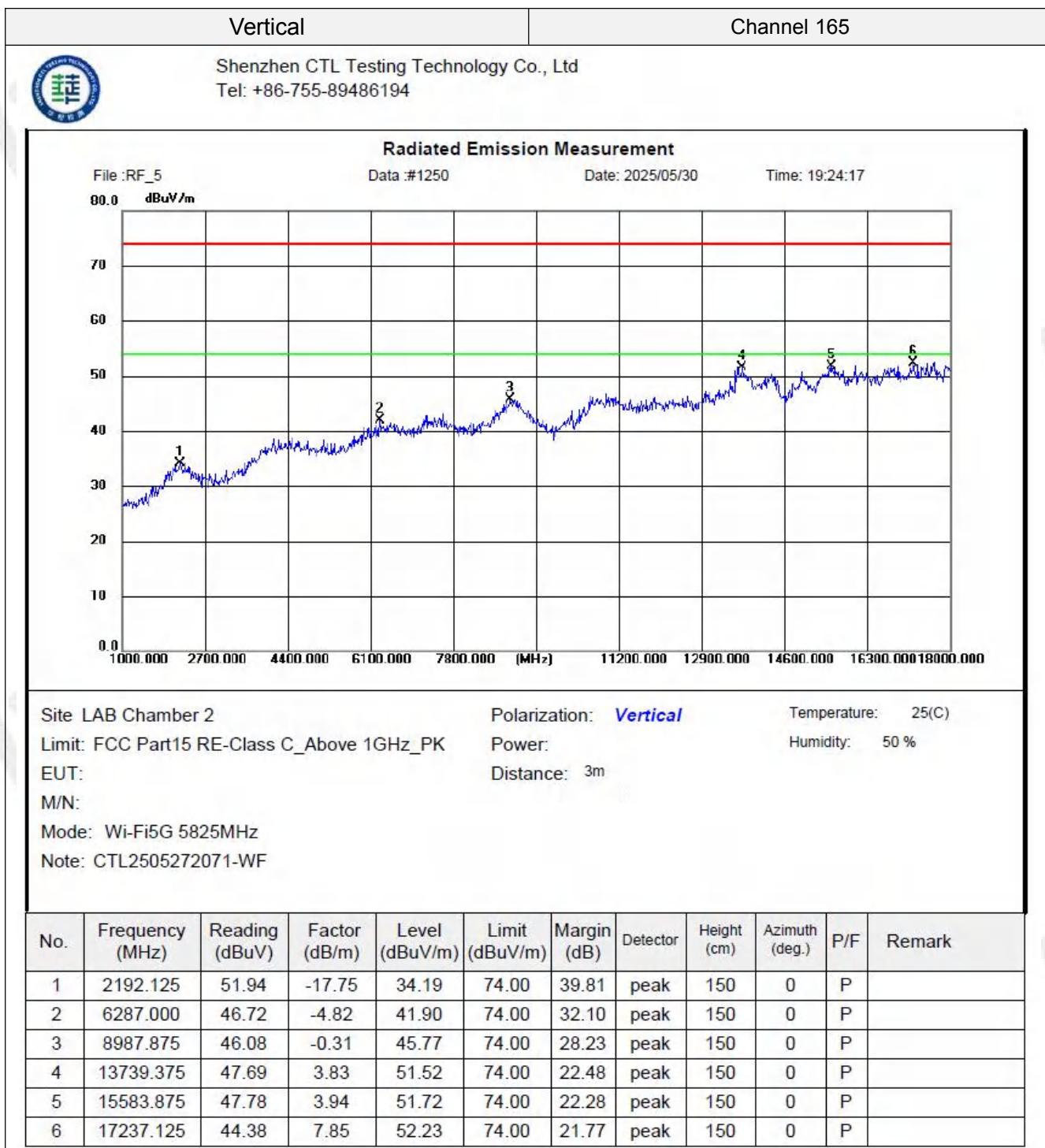
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2119.875	52.38	-18.10	34.28	74.00	39.72	peak	150	0	P	
2	4400.000	47.78	-8.70	39.08	74.00	34.92	peak	150	0	P	
3	7015.875	46.15	-3.91	42.24	74.00	31.76	peak	150	0	P	
4	8990.000	46.37	-0.31	46.06	74.00	27.94	peak	150	0	P	
5	12464.375	44.59	2.25	46.84	74.00	27.16	peak	150	0	P	
6	14302.500	48.19	2.80	50.99	74.00	23.01	peak	150	0	P	











REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
5. Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20,;
6. 18GHz-40GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

Band Edge Test Plots

5180MHz 802.11n (HT20)



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Radiated Emission Measurement

File :RF_6

Data #135

Date: 2025/06/03

Time: 18:24:47

120.0

dBuV/m

110

100

90

80

70

60

50

40.0

5130.000

5154.000

5178.000

5202.000

5226.000

5274.000

5298.000

5322.000

5346.000

5370.000

(MHz)

peak

AVG

Site LAB Chamber 2

Polarization: *Horizontal*

Temperature: 25(C)

Limit: FCC Part15 Band edge (UNII) PK

Power:

Humidity: 50 %

EUT:

Distance: 3m

M/N:

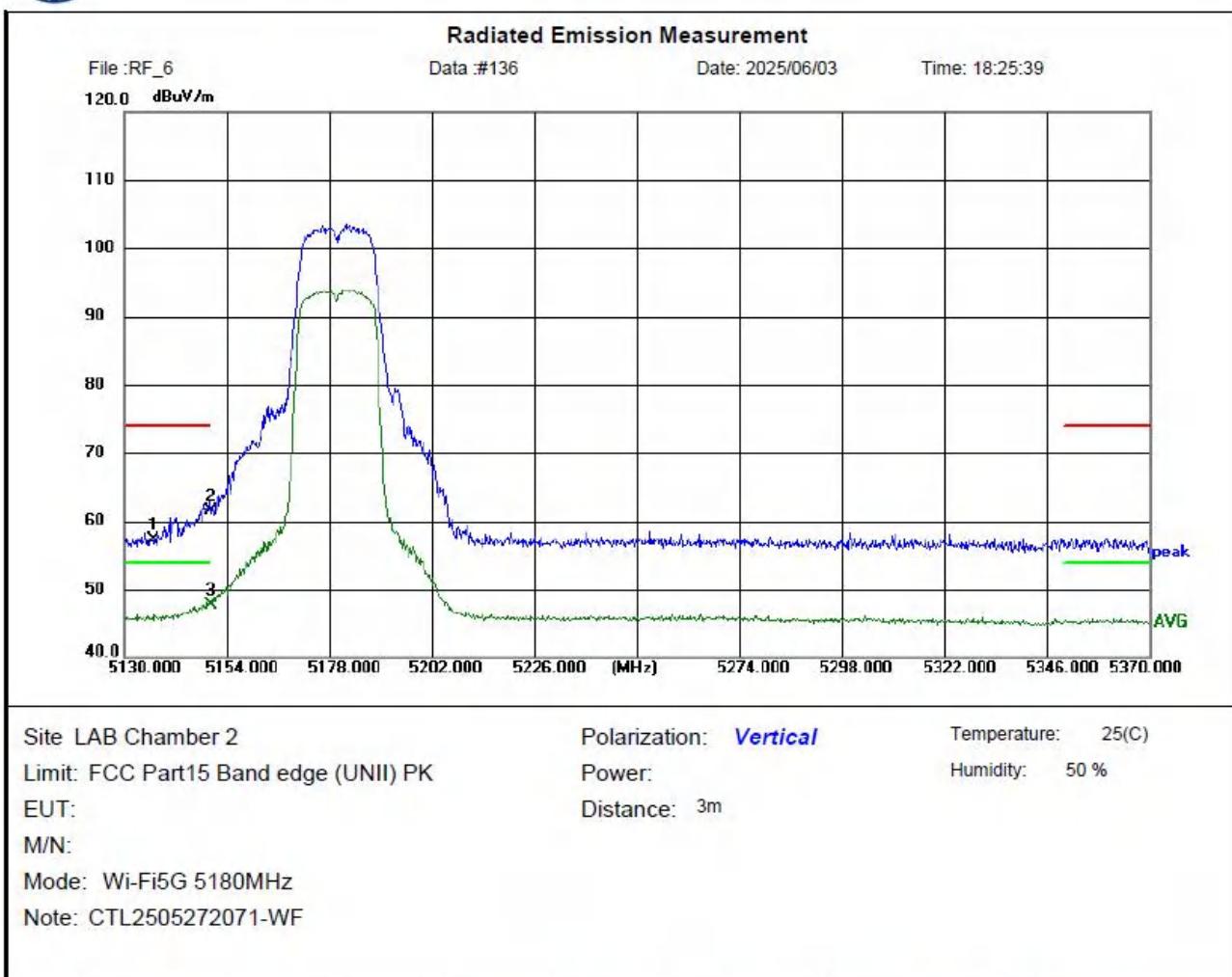
Mode: Wi-Fi5G 5180MHz

Note: CTL2505272071-WF

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5136.120	42.34	18.97	61.31	74.00	12.69	peak	150	313	P	
2	5150.000	49.16	18.99	68.15	74.00	5.85	peak	150	360	P	
3	5150.000	33.21	18.99	52.20	54.00	1.80	AVG	150	360	P	



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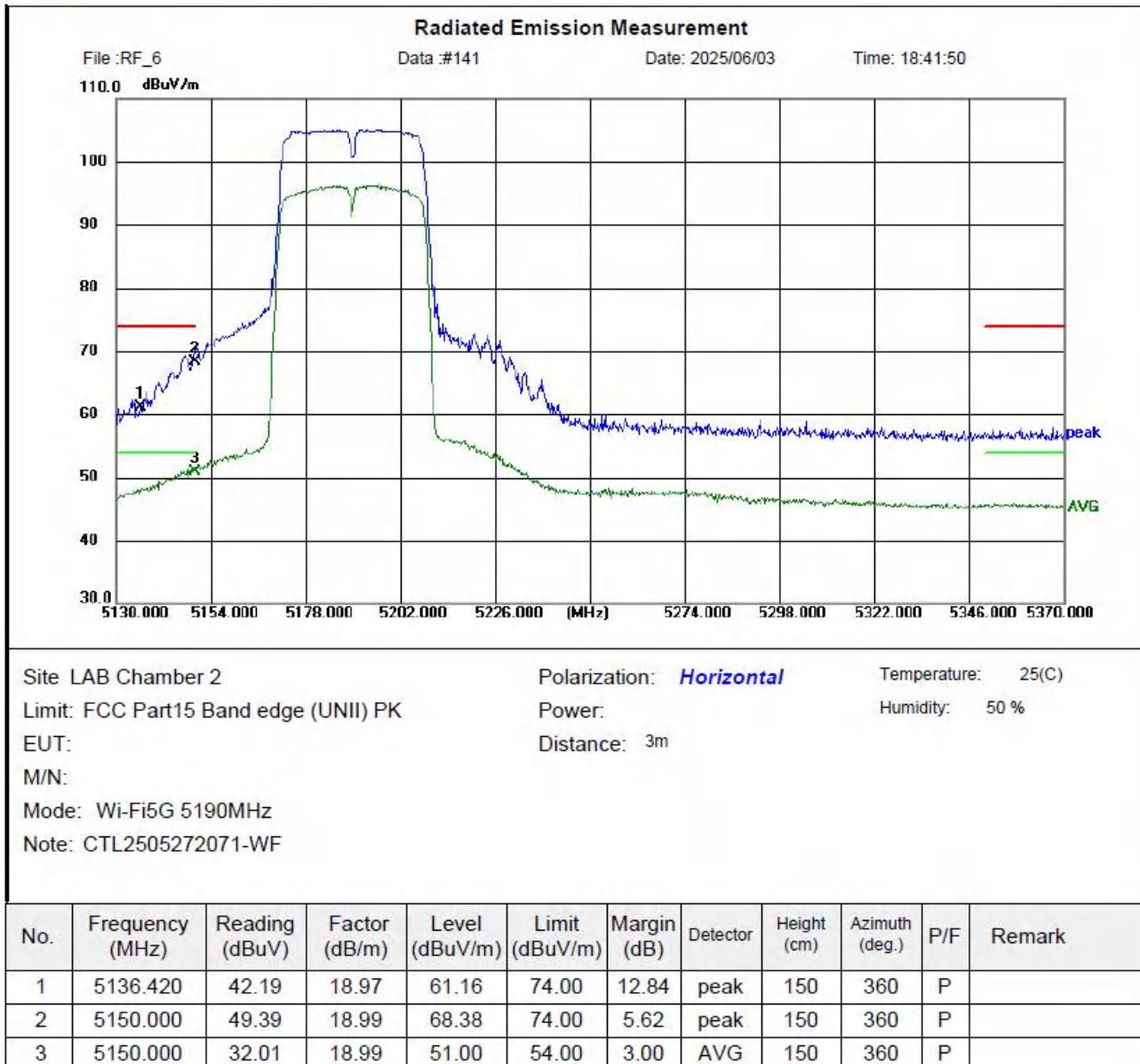
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5136.510	38.43	18.97	57.40	74.00	16.60	peak	150	49	P	
2	5150.000	42.60	18.99	61.59	74.00	12.41	peak	150	49	P	
3	5150.000	28.81	18.99	47.80	54.00	6.20	AVG	150	49	P	

Band Edge Test Plots

5190MHz 802.11n (HT40)

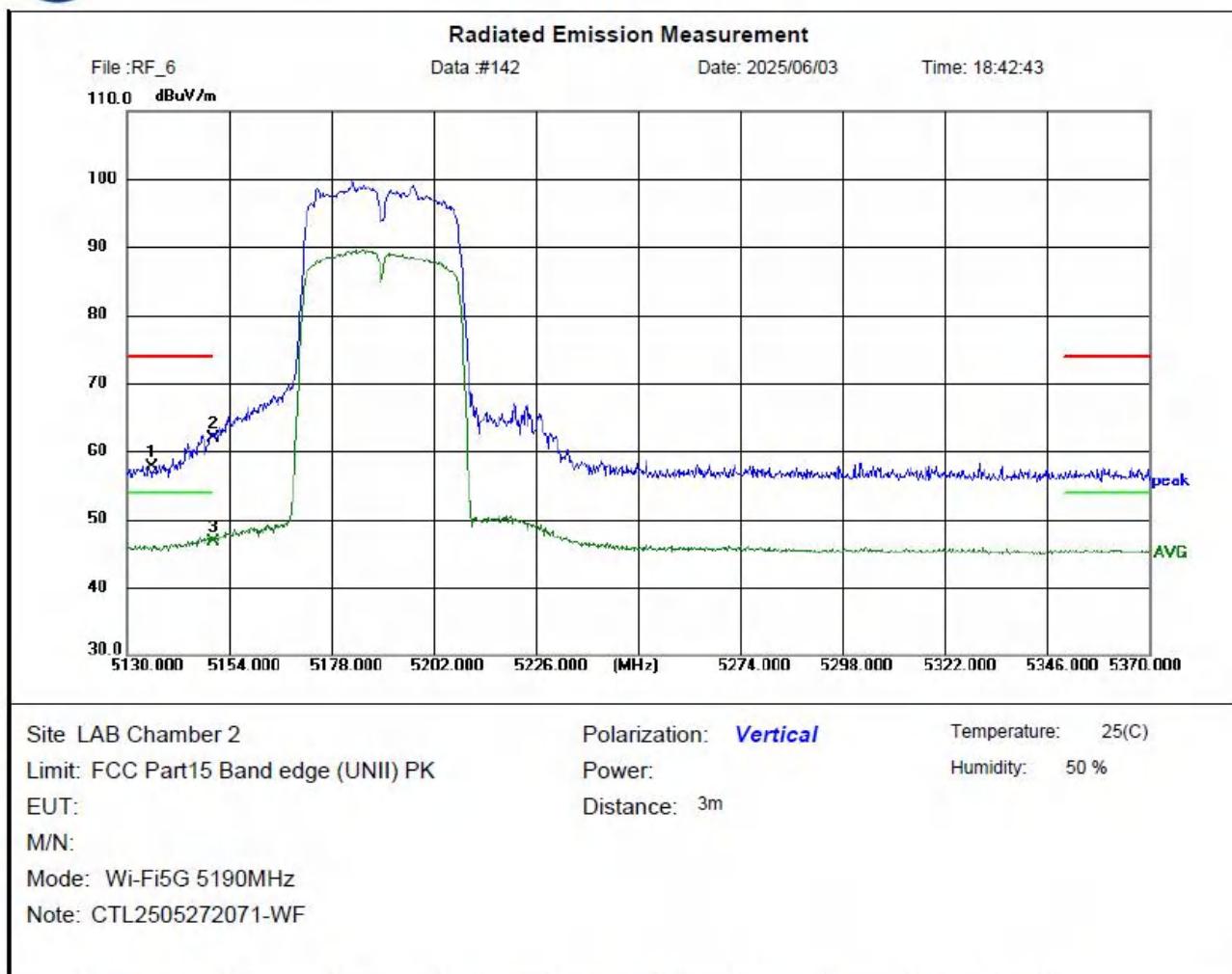


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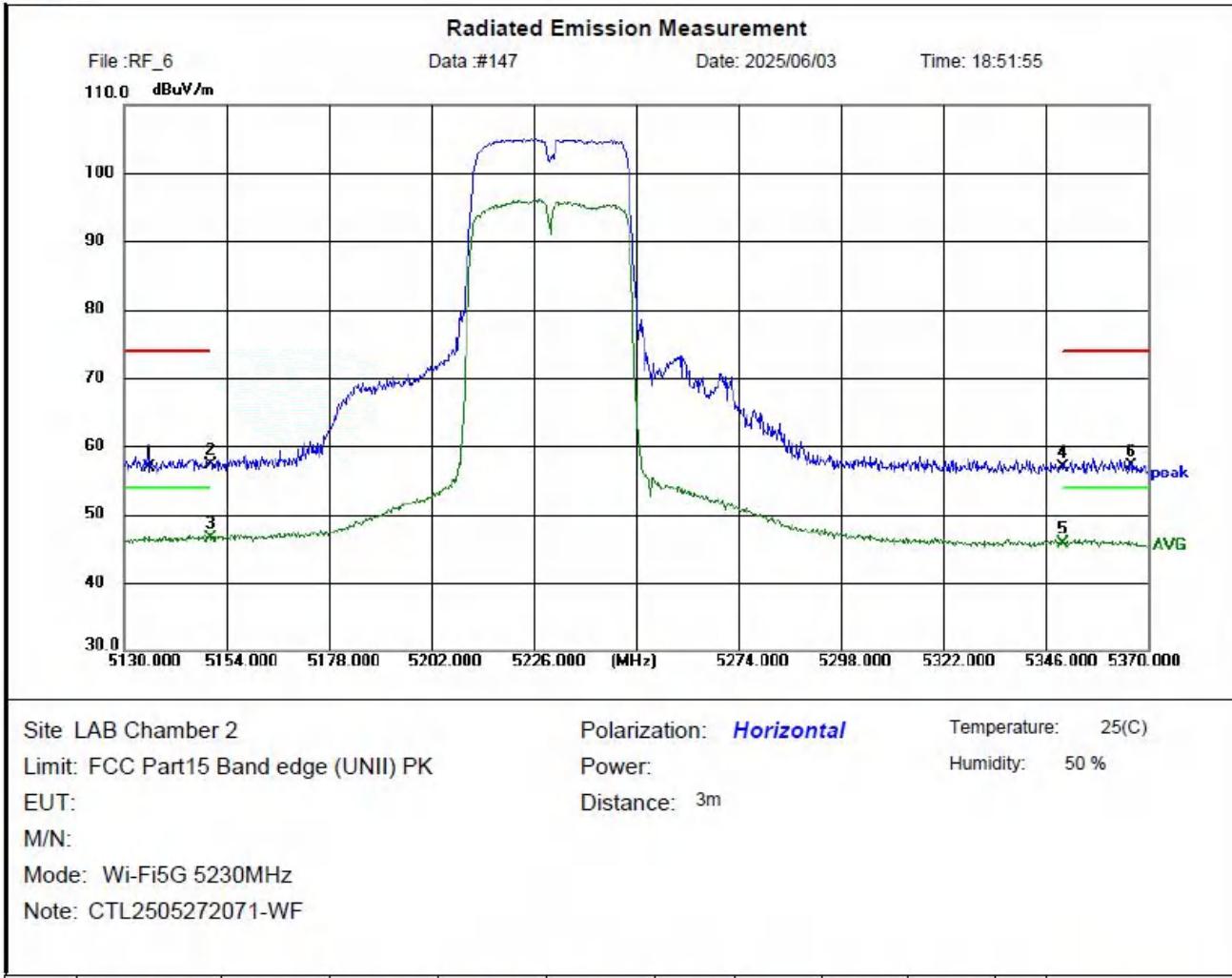
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5135.550	38.82	18.98	57.80	74.00	16.20	peak	150	50	P	
2	5150.000	42.86	18.99	61.85	74.00	12.15	peak	150	50	P	
3	5150.000	27.79	18.99	46.78	54.00	7.22	AVG	150	50	P	

Band Edge Test Plots

5230MHz 802.11n (HT40)



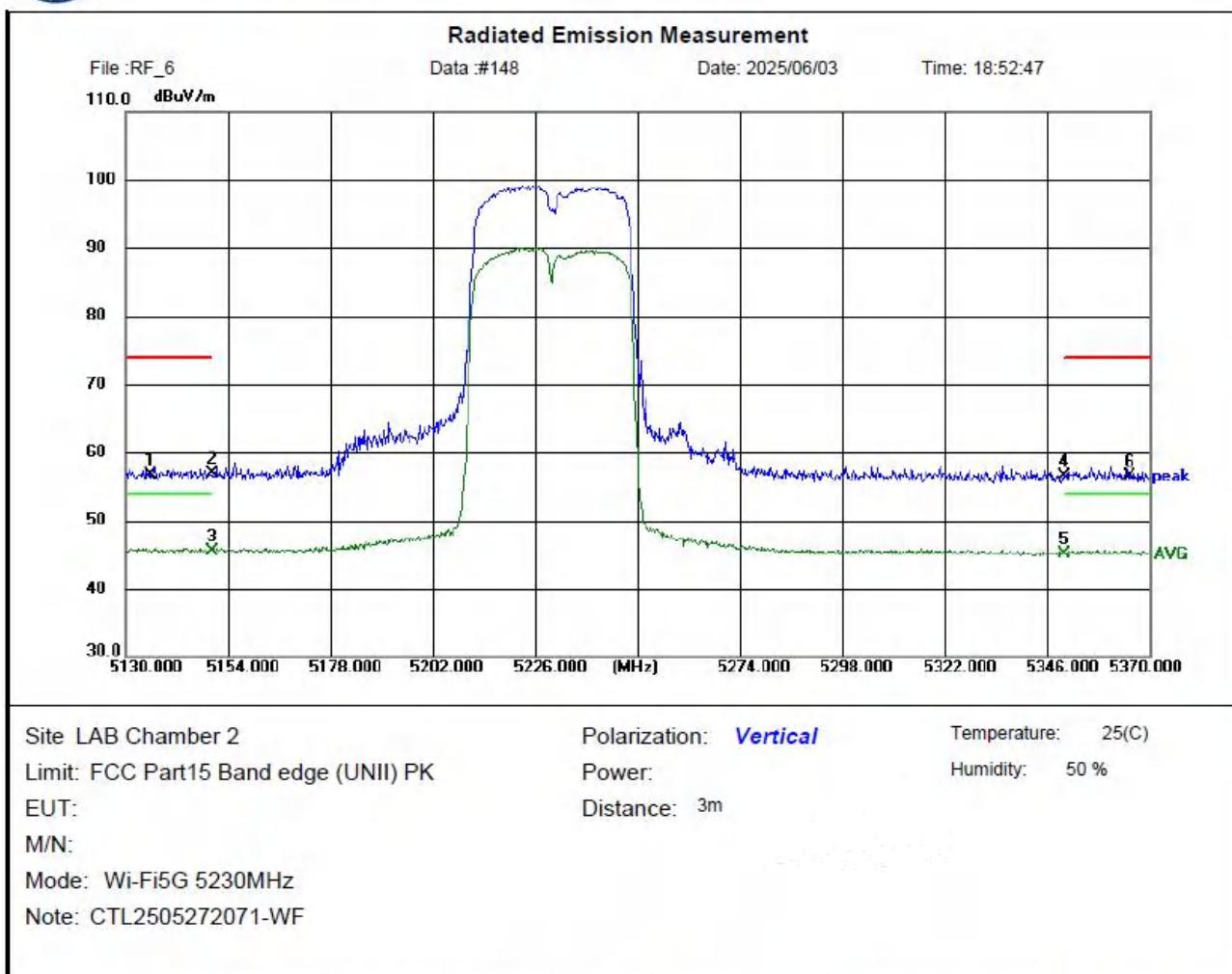
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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5135.610	37.97	18.98	56.95	74.00	17.05	peak	150	1	P	
2	5150.000	38.41	18.99	57.40	74.00	16.60	peak	150	360	P	
3	5150.000	27.53	18.99	46.52	54.00	7.48	AVG	150	360	P	
4	5350.000	37.88	18.99	56.87	74.00	17.13	peak	150	104	P	
5	5350.000	26.63	18.99	45.62	54.00	8.38	AVG	150	104	P	
6	5365.950	38.09	18.97	57.06	74.00	16.94	peak	150	351	P	



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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5135.790	37.77	18.98	56.75	74.00	17.25	peak	150	91	P	
2	5150.000	37.92	18.99	56.91	74.00	17.09	peak	150	256	P	
3	5150.000	26.54	18.99	45.53	54.00	8.47	AVG	150	256	P	
4	5350.000	37.54	18.99	56.53	74.00	17.47	peak	150	49	P	
5	5350.000	26.14	18.99	45.13	54.00	8.87	AVG	150	49	P	
6	5365.320	37.63	18.97	56.60	74.00	17.40	peak	150	91	P	

Band Edge Test Plots

5240MHz 802.11n (HT20)



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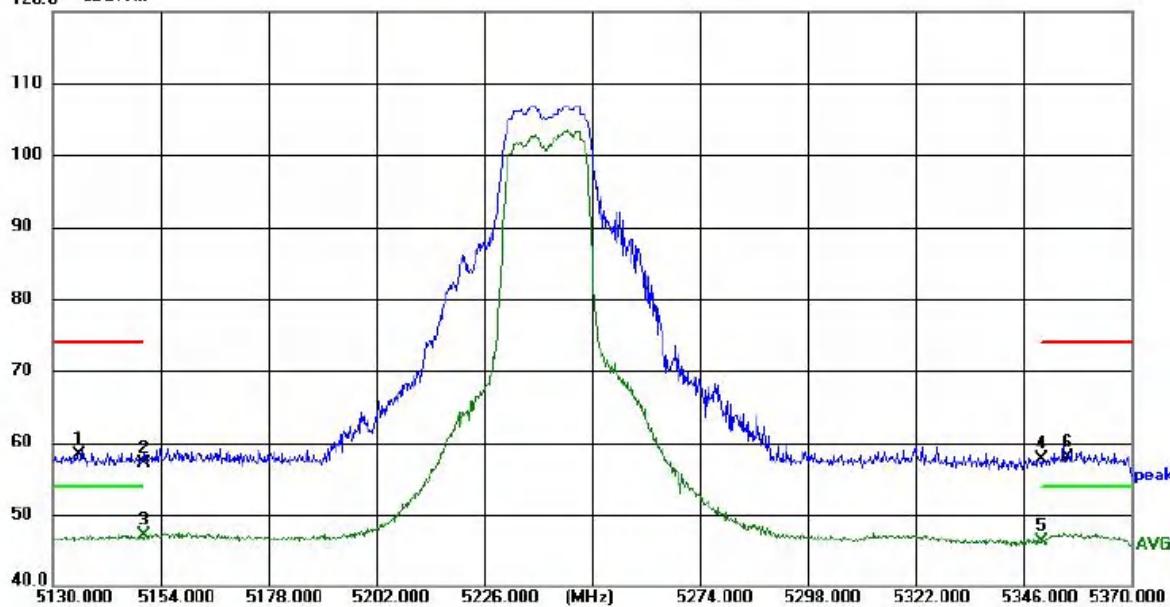
Radiated Emission Measurement

File :RF_6
120.0 dBuV/m

Data #:129

Date: 2025/06/03

Time: 17:58:31



Site: LAB Chamber 2

Limit: FCC Part15 Band edge (UNII) PK

Polarization: **Horizontal**

Temperature: 25(C)

EUT:

Power:

Humidity: 50 %

M/N:

Distance: 3m

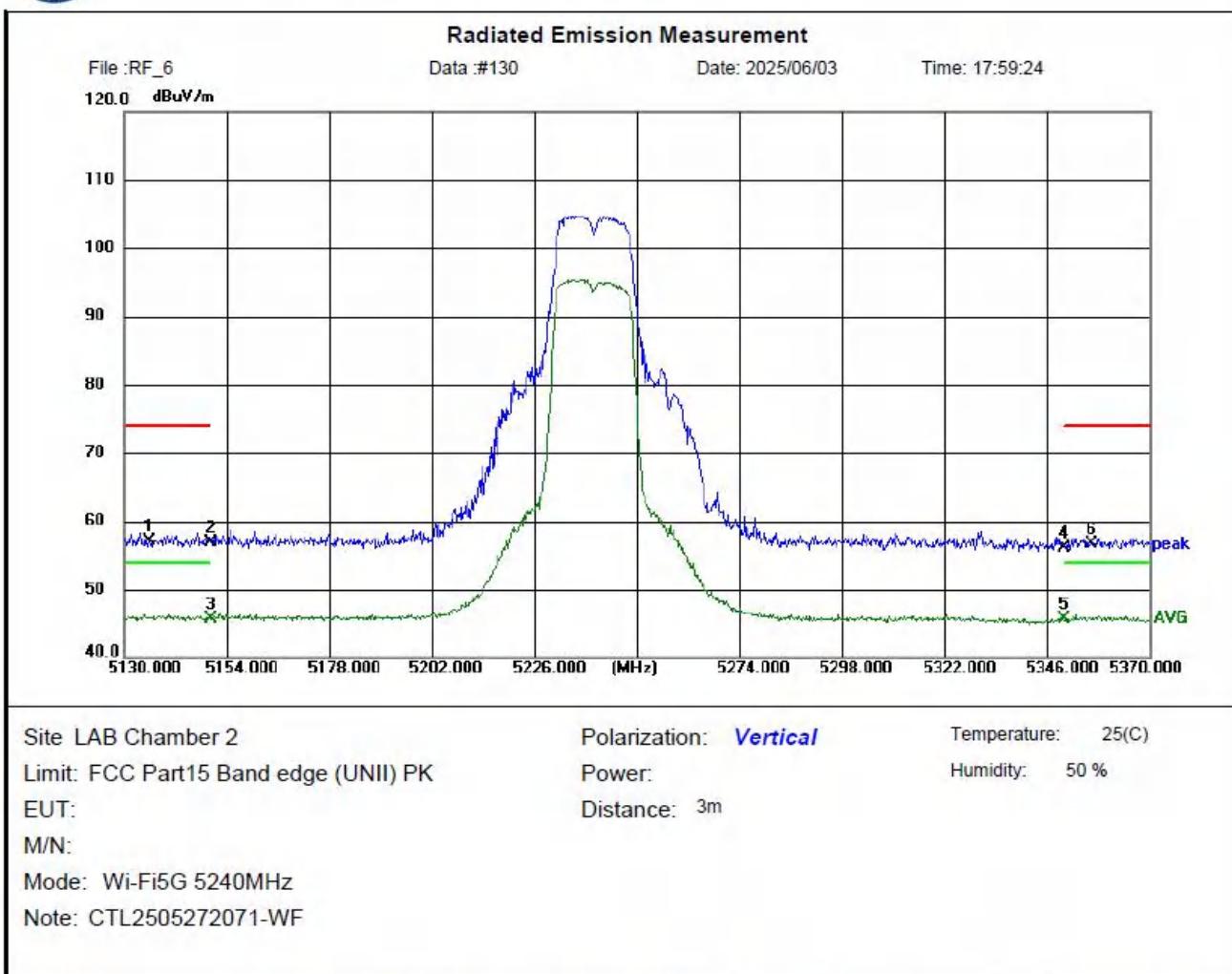
Mode: Wi-Fi5G 5240MHz

Note: CTL2505272071-WF

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5135.880	39.22	18.98	58.20	74.00	15.80	peak	150	63	P	
2	5150.000	38.16	18.99	57.15	74.00	16.85	peak	150	360	P	
3	5150.000	28.08	18.99	47.07	54.00	6.93	AVG	150	360	P	
4	5350.000	38.67	18.99	57.66	74.00	16.34	peak	150	311	P	
5	5350.000	27.39	18.99	46.38	54.00	7.62	AVG	150	311	P	
6	5355.930	38.99	18.98	57.97	74.00	16.03	peak	150	1	P	



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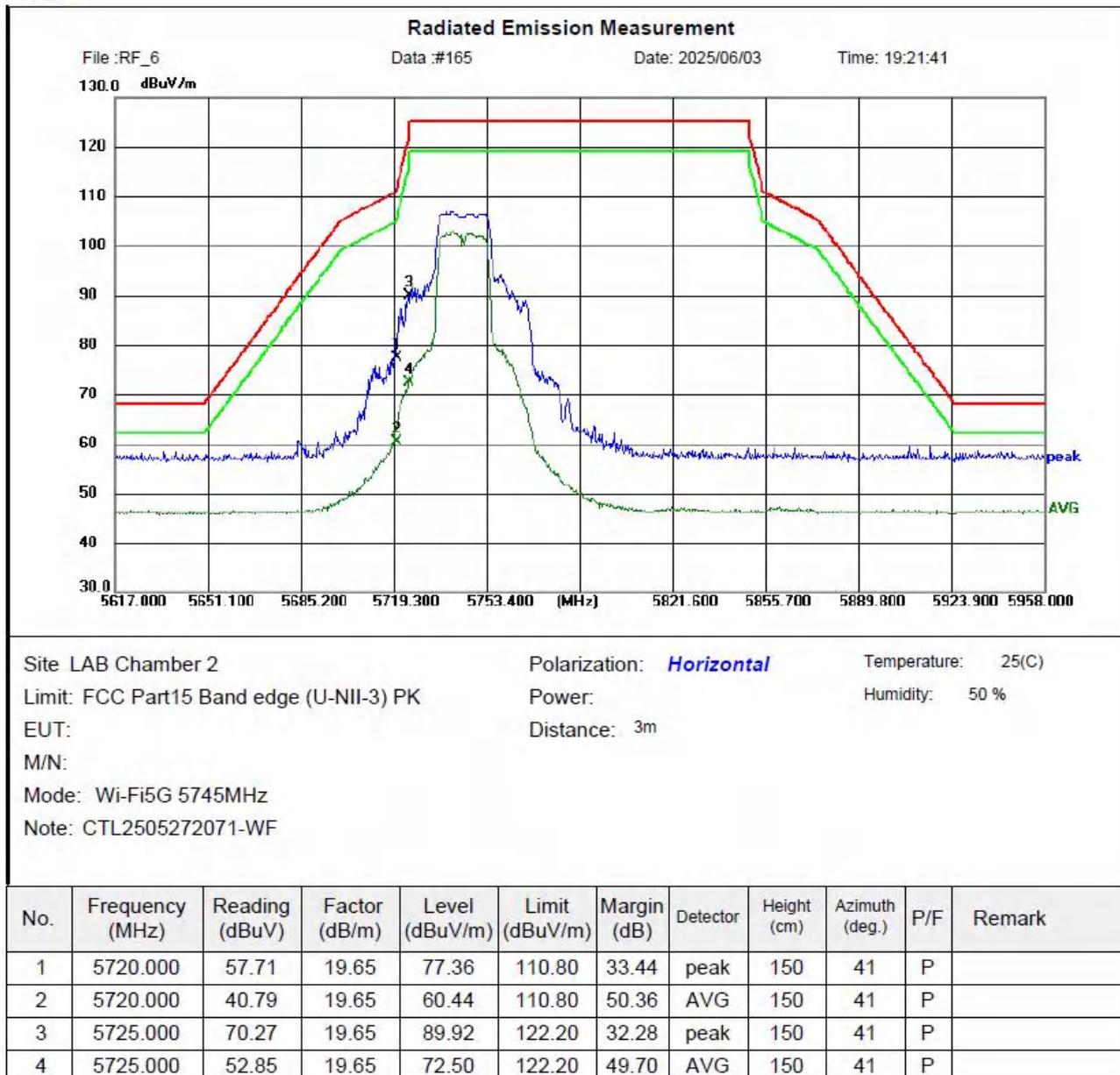
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5136.150	38.04	18.97	57.01	74.00	16.99	peak	150	298	P	
2	5150.000	37.99	18.99	56.98	74.00	17.02	peak	150	90	P	
3	5150.000	26.77	18.99	45.76	54.00	8.24	AVG	150	90	P	
4	5350.000	37.10	18.99	56.09	74.00	17.91	peak	150	90	P	
5	5350.000	26.71	18.99	45.70	54.00	8.30	AVG	150	90	P	
6	5356.440	37.64	18.98	56.62	74.00	17.38	peak	150	48	P	

Band Edge Test Plots

5745MHz 802.11n (HT20)

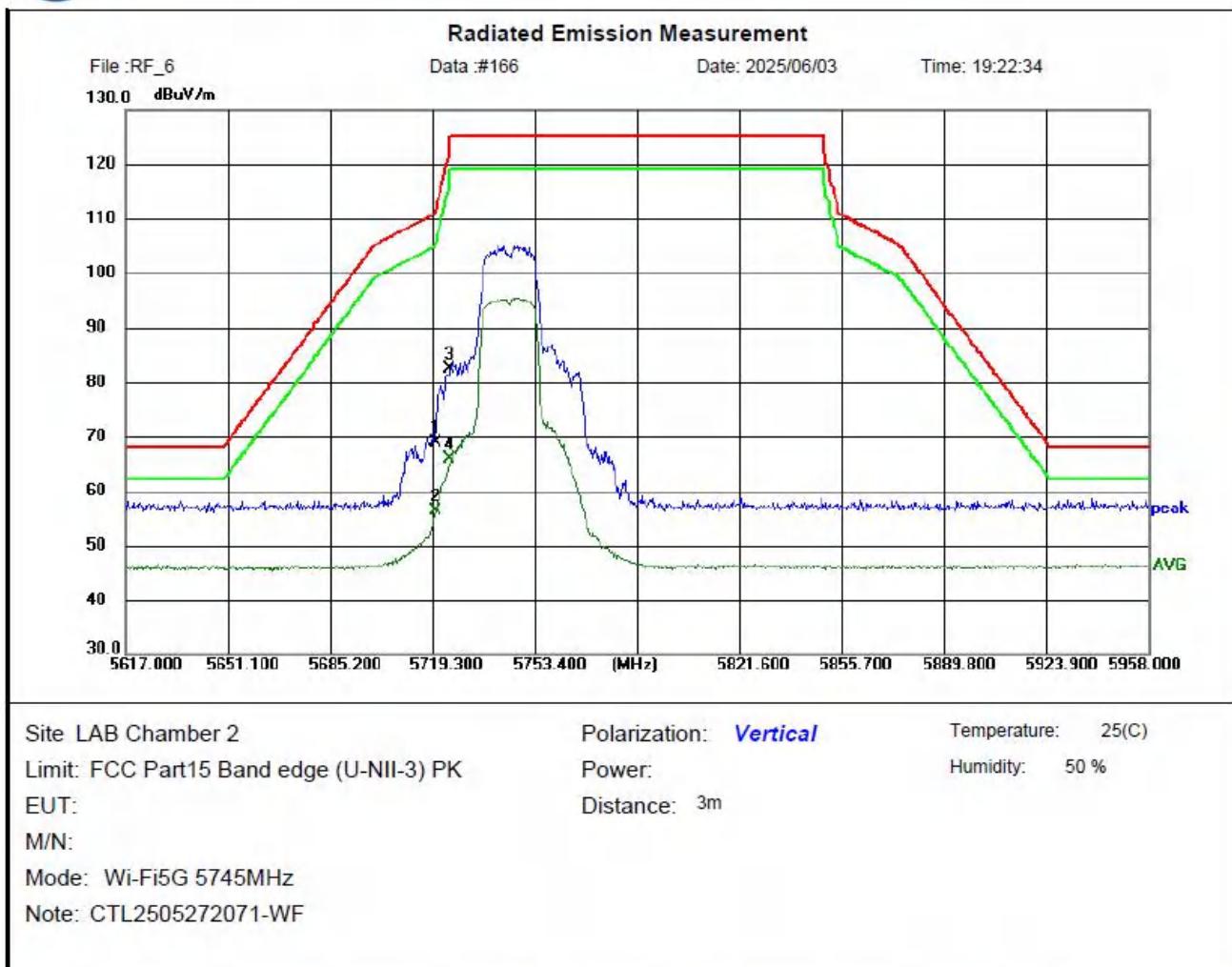


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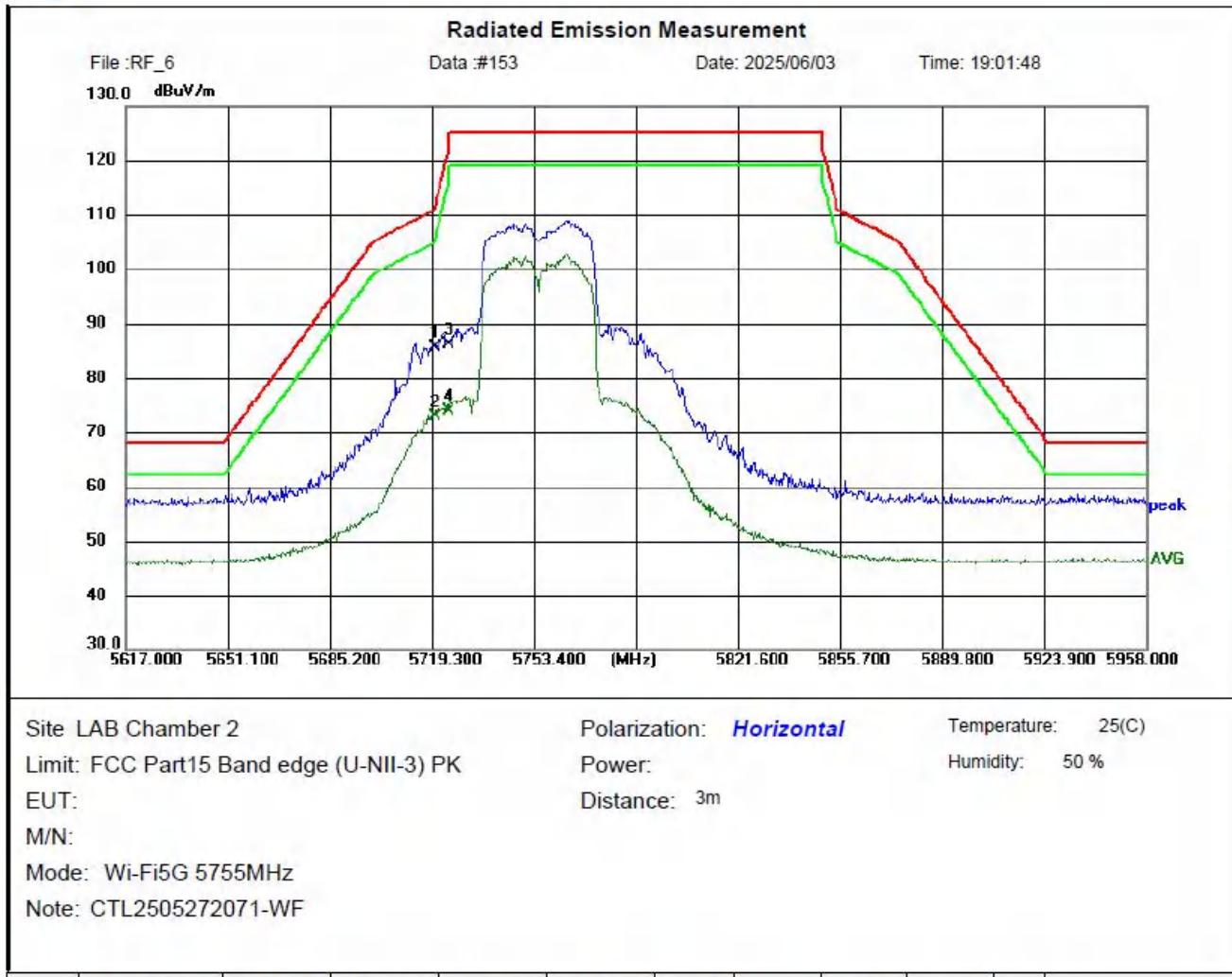
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5720.000	49.33	19.65	68.98	110.80	41.82	peak	150	23	P	
2	5720.000	36.61	19.65	56.26	110.80	54.54	AVG	150	23	P	
3	5725.000	62.76	19.65	82.41	122.20	39.79	peak	150	23	P	
4	5725.000	46.27	19.65	65.92	122.20	56.28	AVG	150	23	P	

Band Edge Test Plots

5755MHz 802.11n (HT40)



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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5720.000	66.03	19.65	85.68	110.80	25.12	peak	150	42	P	
2	5720.000	53.27	19.65	72.92	110.80	37.88	AVG	150	42	P	
3	5725.000	66.55	19.65	86.20	122.20	36.00	peak	150	42	P	
4	5725.000	54.16	19.65	73.81	122.20	48.39	AVG	150	42	P	



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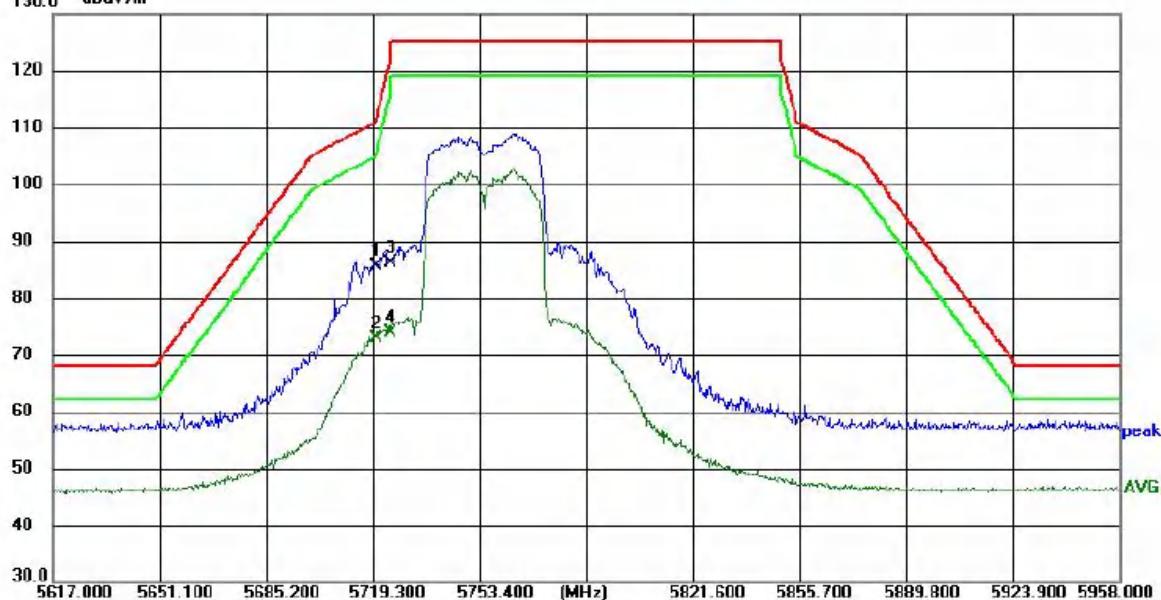
Radiated Emission Measurement

File :RF_6
130.0 dBuV/m

Data #:153

Date: 2025/06/03

Time: 19:01:48



Site: LAB Chamber 2

Polarization: **Horizontal**

Temperature: 25(C)

Limit: FCC Part15 Band edge (U-NII-3) PK

Power:

Humidity: 50 %

EUT:

Distance: 3m

M/N:

Mode: Wi-Fi5G 5755MHz

Note: CTL2505272071-WF

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5720.000	66.03	19.65	85.68	110.80	25.12	peak	150	42	P	
2	5720.000	53.27	19.65	72.92	110.80	37.88	AVG	150	42	P	
3	5725.000	66.55	19.65	86.20	122.20	36.00	peak	150	42	P	
4	5725.000	54.16	19.65	73.81	122.20	48.39	AVG	150	42	P	

Band Edge Test Plots

5795MHz 802.11n (HT40)



Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194

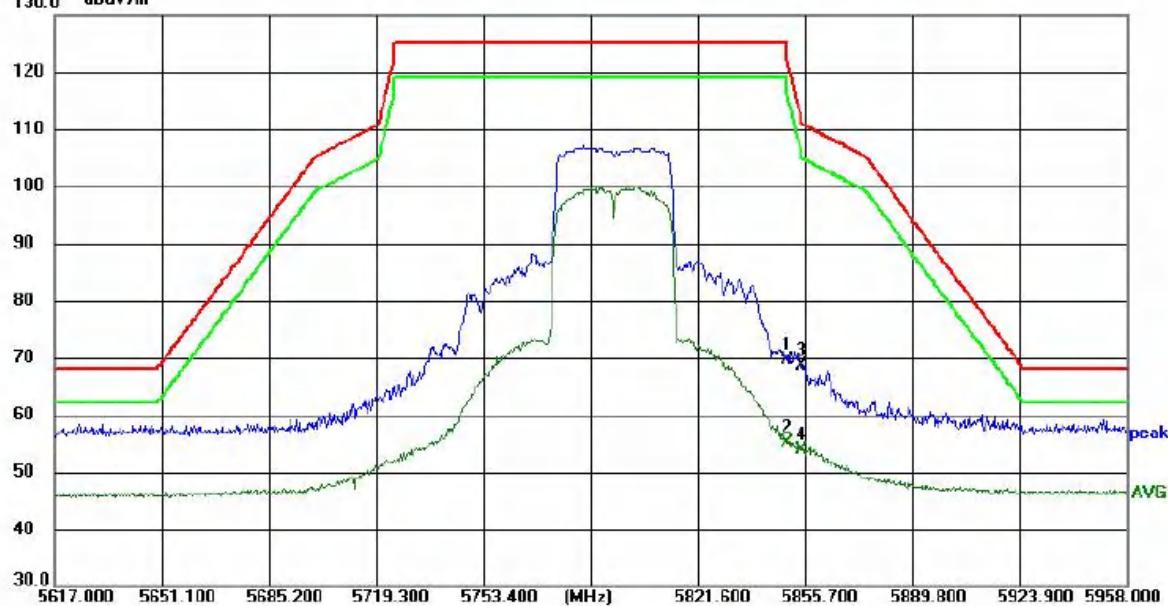
Radiated Emission Measurement

File :RF_6
130.0 dBuV/m

Data #:159

Date: 2025/06/03

Time: 19:11:35



Site: LAB Chamber 2

Polarization: **Horizontal**

Temperature: 25(C)

Limit: FCC Part15 Band edge (U-NII-3) PK

Power:

Humidity: 50 %

EUT:

Distance: 3m

M/N:

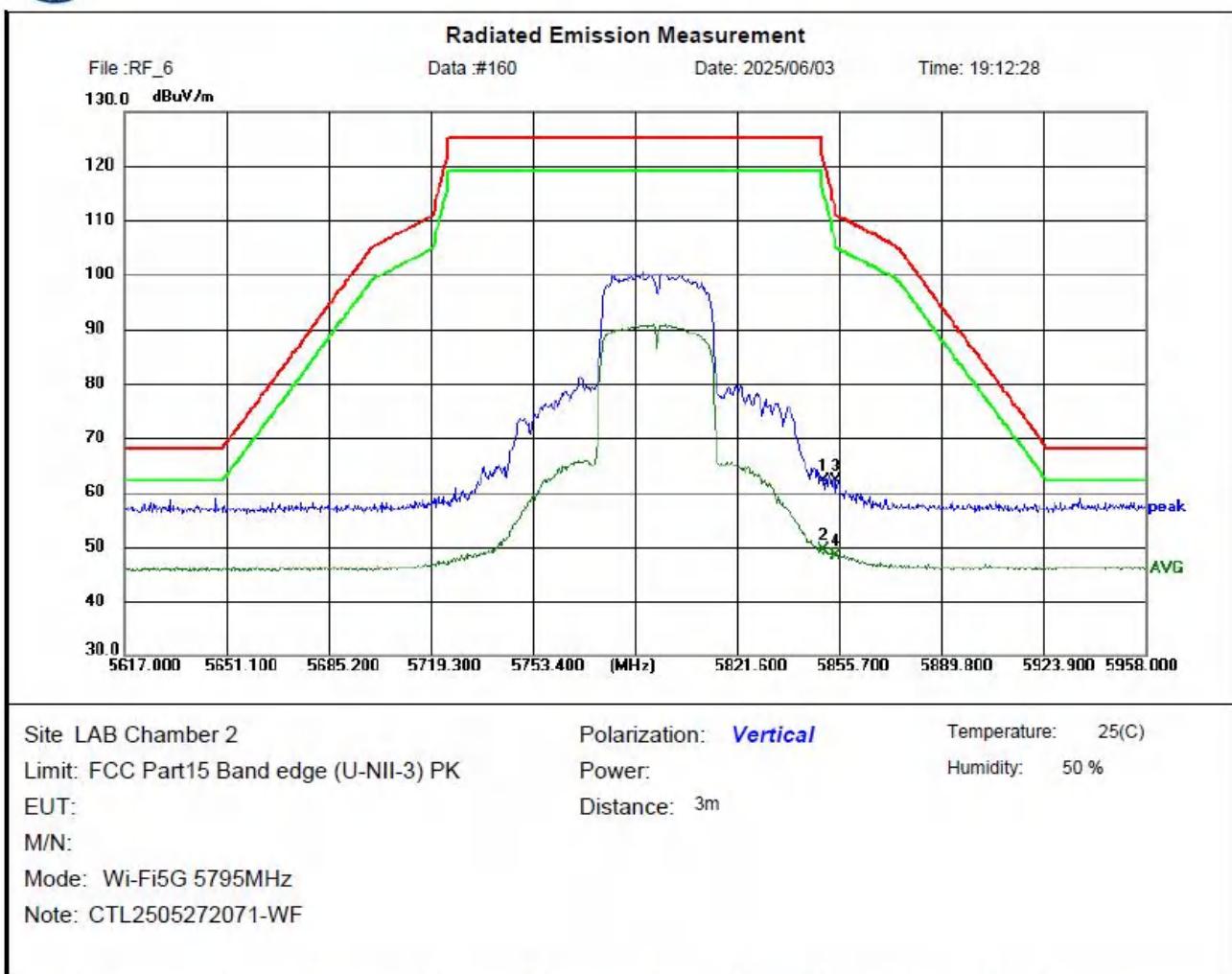
Mode: Wi-Fi5G 5795MHz

Note: CTL2505272071-WF

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5850.000	49.88	19.80	69.68	122.20	52.52	peak	150	210	P	
2	5850.000	35.37	19.80	55.17	122.20	67.03	AVG	150	210	P	
3	5855.000	48.85	19.84	68.69	110.80	42.11	peak	150	42	P	
4	5855.000	33.98	19.84	53.82	110.80	56.98	AVG	150	42	P	



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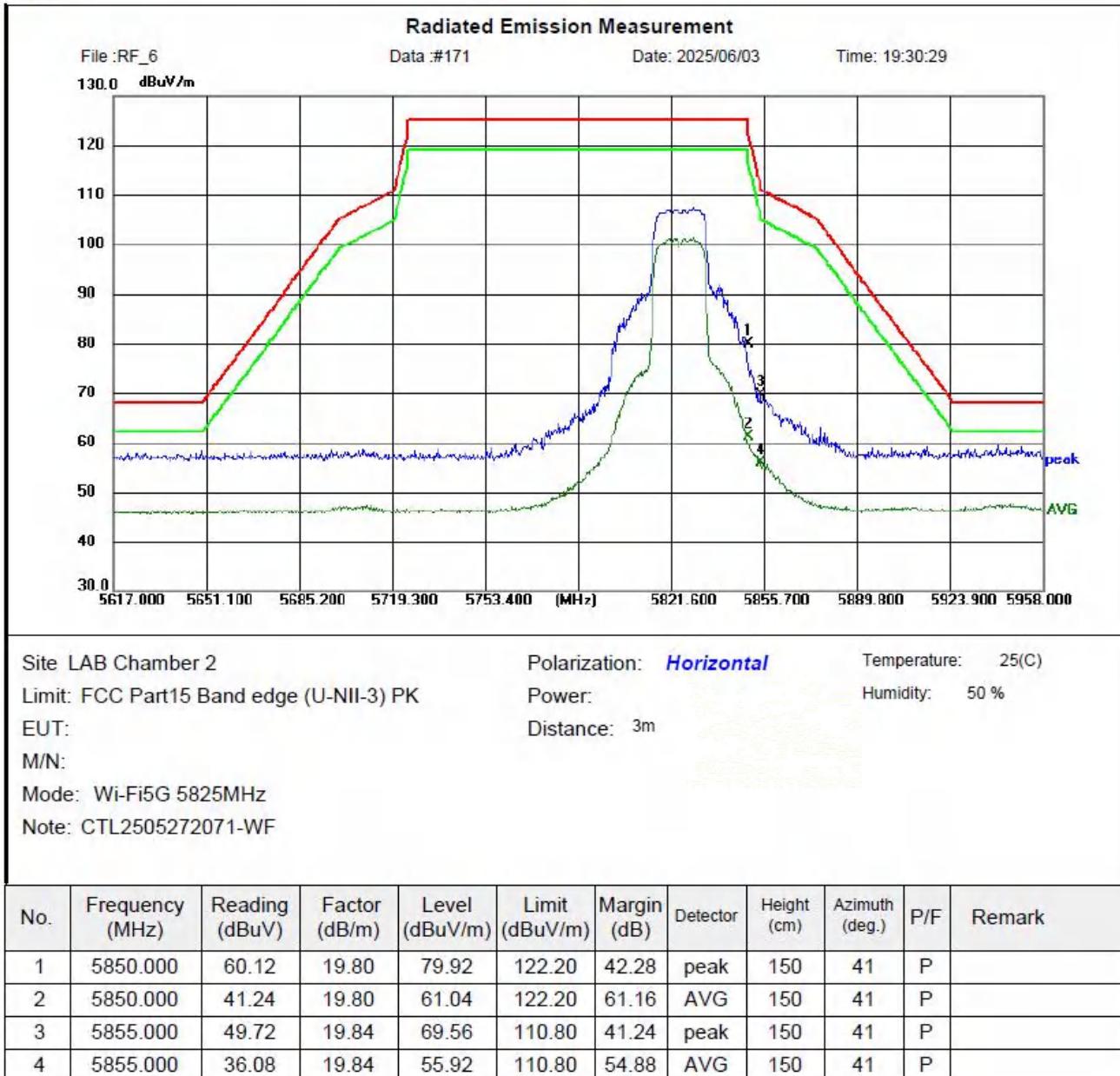
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5850.000	42.28	19.80	62.08	122.20	60.12	peak	150	67	P	
2	5850.000	29.58	19.80	49.38	122.20	72.82	AVG	150	67	P	
3	5855.000	42.38	19.84	62.22	110.80	48.58	peak	150	3	P	
4	5855.000	28.49	19.84	48.33	110.80	62.47	AVG	150	3	P	

Band Edge Test Plots

5825MHz 802.11n (HT20)

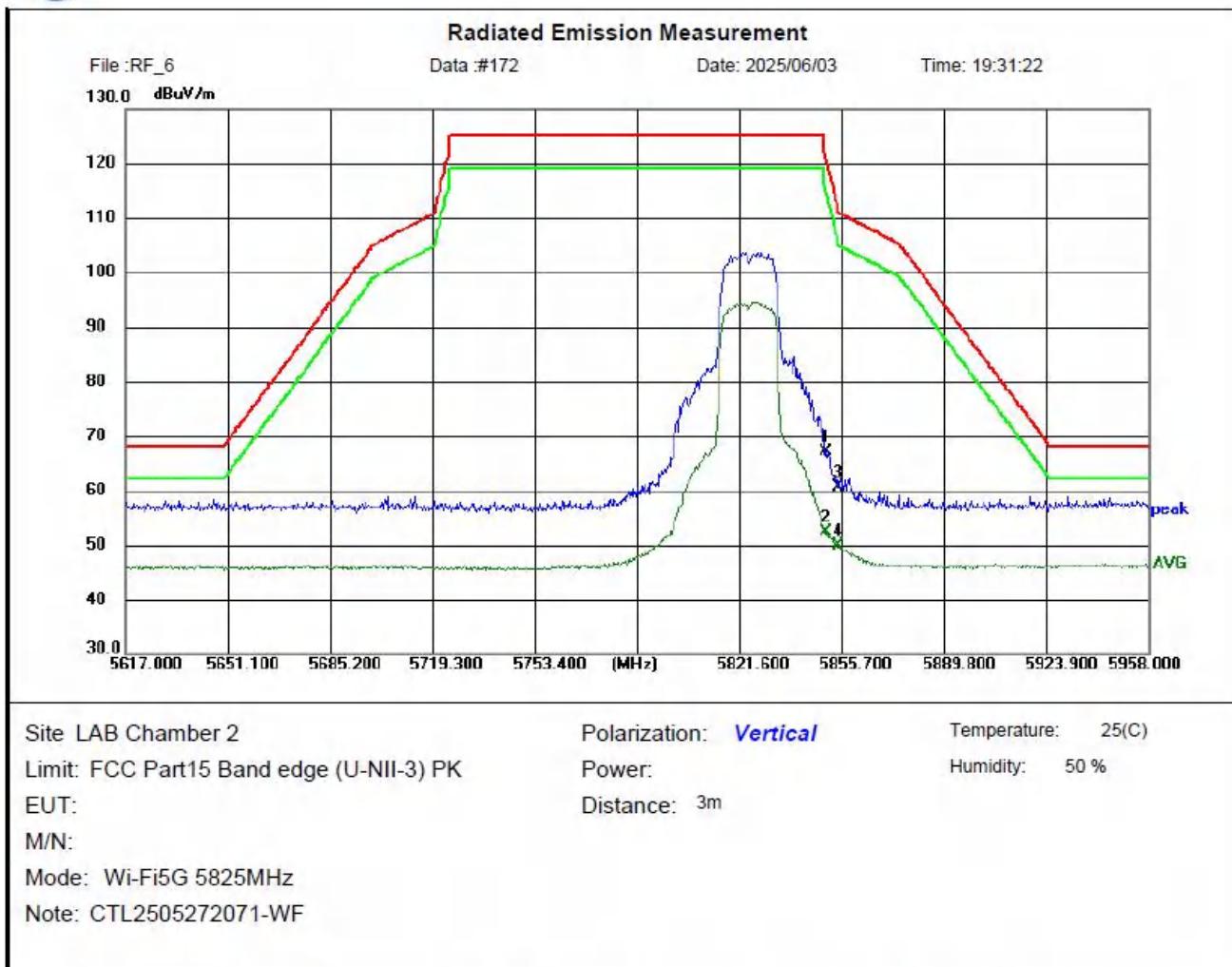


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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5850.000	47.42	19.80	67.22	122.20	54.98	peak	150	256	P	
2	5850.000	32.65	19.80	52.45	122.20	69.75	AVG	150	256	P	
3	5855.000	40.85	19.84	60.69	110.80	50.11	peak	150	256	P	
4	5855.000	29.92	19.84	49.76	110.80	61.04	AVG	150	256	P	

3.3. Maximum Conducted Average Output Power

Limit

FCC requirement:

For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or $11\text{dBm} + 10\log B$, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.

Test Configuration



Test Results

Raw data reference to Section 2 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND1_Appendix.
Raw data reference to Section 2 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND3_Appendix.

3.4. Power Spectral Density

Limit

FCC requirement:

For the band 5.15-5.25 GHz.

- (i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17dBm in any 1 MHz band.^{note1}
- (ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17dBm in any 1 MHz band.^{note1}
- (iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, transmitters that employ a directional antenna gain greater than 23dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23dBi.
- (iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 MHz band. ^{note1}

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands

The maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

IC requirement:

For the band 5.15-5.25 GHz.

The e.i.r.p. spectral density shall not exceed 10dBm in any 1.0 MHz band.

Frequency band 5250-5350 MHz

The power spectral density shall not exceed 11dBm in any 1.0 MHz band

Frequency bands 5470-5600 MHz and 5650-5725 MHz

The power spectral density shall not exceed 11dBm in any 1.0 MHz band.

For the band 5.725 - 5.85 GHz

The maximum power spectral density shall not exceed 30dBm in any 500 kHz band. ^{note1, note2}

Note1: If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Note2: Fixed point - to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 1MHz for U-NII 1, U-NII 2A, U-NII C band and 510KHz for U-NII 3 band.
3. Set the VBW $\geq 3 \times$ RBW.
4. Set the span to encompass the entire EBW.
5. Detector = Average.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.

Test Configuration



Test Results

Raw data reference to Section 3 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND1_Appendix.
Raw data reference to Section 3 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND3_Appendix.

3.5. Emission Bandwidth (26dBm Bandwidth)

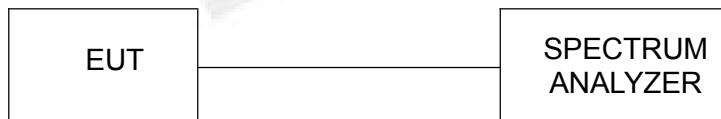
Limit

N/A

Test Procedure

1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1 %.

Test Configuration



Test Results

Raw data reference to Section 1 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND1_Appendix.
Raw data reference to Section 1 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND3_Appendix.

3.6. Minimum Emission Bandwidth (6dBm Bandwidth)

Limit

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725-5.85 GHz

Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration



Test Results

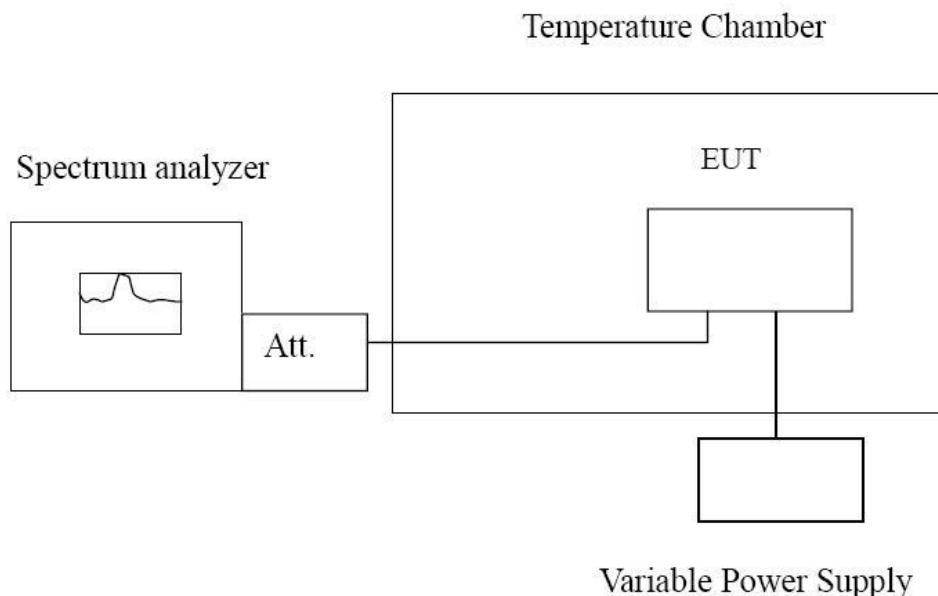
Raw data reference to Section 1 of document No. CTL2505272071-WF04_5GWi-Fi_BAND1_Appendix.
Raw data reference to Section 1 of document No. CTL2505272071-WF04_5GWi-Fi_BAND3_Appendix.

3.7. Frequency Stability

LIMIT

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +85°C reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Raw data reference to Section 4 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND1_Appendix.
Raw data reference to Section 4 of document No.
CTL2505272071-WF04_5GWi-Fi_BAND3_Appendix.

3.8. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The maximum gain of 5G_WIFI_BAND_1 Antenna was 0.84dBi
The maximum gain of 5G_WIFI_BAND_3 Antenna was 0.88dBi



4. Test Setup Photos of the EUT

Reference to the test report No. CTL2505272071-WF01

5. Photos of the EUT

Reference to the test report No. CTL2505272071-WF01

***** End of Report *****