

TEST REPORT

Applicant: Shenzhen ZO Video Technology Co., Ltd.

Address of Applicant: 2c, 2 / F, building 6, Longbi Industrial Zone, 27 Dafa Road, Longgang District, Shenzhen

Manufacturer/Factory: Shenzhen ZO Video Technology Co., Ltd.

Address of Manufacturer/Factory: 2c, 2 / F, building 6, Longbi Industrial Zone, 27 Dafa Road, Longgang District, Shenzhen

Equipment Under Test (EUT)

Product Name: ZOLink wireless video system

Model No.: ZO600S TX,ZO500 TX ,Matrix 600s TX,Matrix 600 TX

Trade Mark: Shimbol, Moman

FCC ID: 2AZRJ-ZO600STX

Applicable standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407

Date of sample receipt: July 21,2021

Date of Test: July 25,2021-August 06,2021

Date of report issue: August 08,2021

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Luo


Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	August 08,2021	Original

Prepared By:

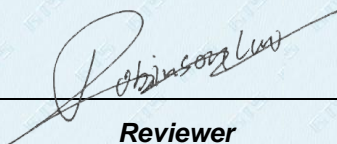


Date:

August 08,2021

Project Engineer

Check By:



Date:

August 08,2021

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
AC Power Line Conducted Emission	15.207	PASS
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Undesirable Emission	15.407(b)(6), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.407(b)(1)	PASS
Frequency Stability	15.407(g)	PASS

Remark:

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	ZOLink wireless video system			
Model No.:	ZO600S TX,ZO500 TX ,Matrix 600s TX,Matrix 600 TX			
Serial No.:	N/A			
Hardware Version:	R1.7			
Software Version:	R1.0			
Test sample(s) ID:	GTSL202108000028-1			
Sample(s) Status:	Engineer sample			
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	U-NII Band I	IEEE 802.11a	5180-5240	4
		IEEE 802.11n/ 20MHz	5180-5240	4
Modulation technology:	OFDM(BPSK/QPSK/16QAM/64QAM) MIMO: 802.11n(HT20) SISO: 802.11a, 802.11n(HT20)			
Antenna Type:	internal Antenna			
Antenna gain:	Antenna number: 2 ANTA:2.5dBi ANTB:2.5dBi MIMO technology Directional gain=5.51dBi			
Power supply:	DC 5V			

Channel list for 802.11a/n (HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation..
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11a (SISI mode)	6 Mbps
802.11n(HT20) (SISI mode)	MCS 0
802.11n(HT20) (MIMO mode)	MCS 8

5.3 Test Facility

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

• **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

• **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-

anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

• **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, sBaoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 24 2021	June. 23 2022
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 24 2021	June. 23 2022
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 24 2021	June. 23 2022
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 24 2021	June. 23 2022
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 24 2021	June. 23 2022
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	July. 09 2021	July. 08 2022

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 24 2021	June. 23 2022
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 24 2021	June. 23 2022
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022

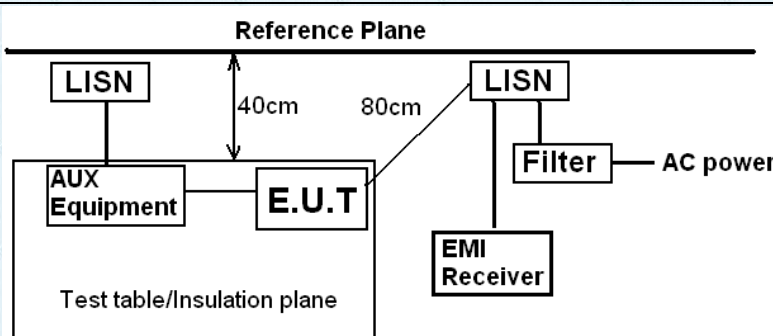
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

7 Test results and Measurement Data

7.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 requirement:</p> <p><i>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.</i></p>	
E.U.T Antenna:	
<p><i>The antennas are internal antenna, the best case gain of the antennas are 2.5dBi, reference to the appendix II for details</i></p>	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz					
Limit:	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 procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.					
Test setup:	<div><p style="text-align: center;">Reference Plane</p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data:

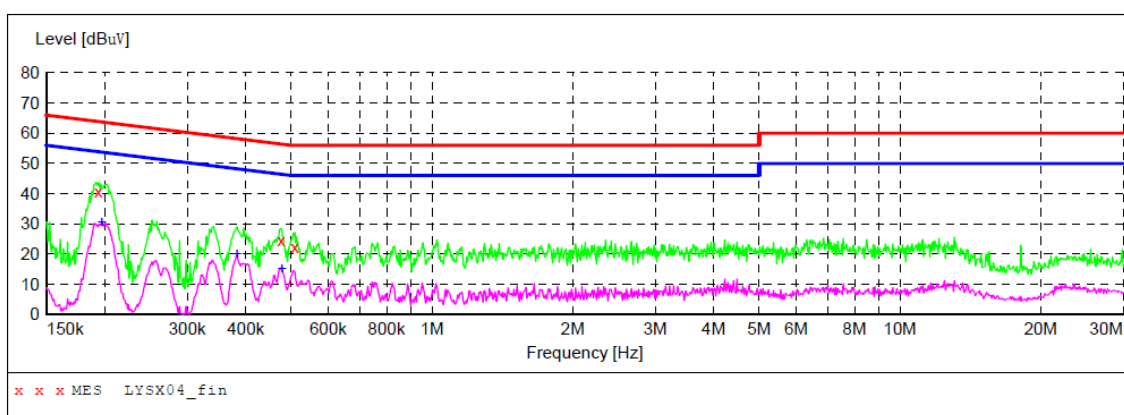
Line:

Voltage Mains Test:FCC PART 15 B

EUT: ZOLink wireless video system M/N:Z0600S TX
 Manufacturer: Shenzhen ZO Video Technology Co.,Ltd
 Operating Condition: ON WITH WIFI
 Test Site: Shielding Room
 Operator: Jason
 Test Specification: DC 5V (Powered by adaptor)
 Comment: L LINE

SCAN TABLE: "Voltage (0.15K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "LYSX04_fin"

2021-8-6 0:38

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.193664	40.50	7.1	64	23.4	QP	L1	GND
0.475482	24.60	7.6	56	31.8	QP	L1	GND
0.508871	22.40	7.6	56	33.6	QP	L1	GND

MEASUREMENT RESULT: "LYSX04_fin2"

2021-8-6 0:38

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.196781	30.50	7.1	54	23.2	AV	L1	GND
0.383278	19.90	7.5	48	28.3	AV	L1	GND
0.477384	15.00	7.6	46	31.4	AV	L1	GND

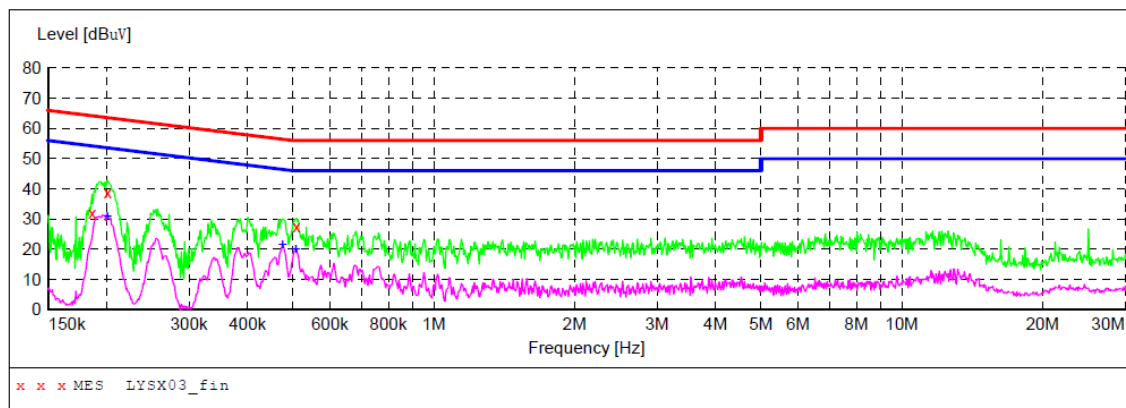
Neutral:

Voltage Mains Test:FCC PART 15 B

EUT: Zolink wireless video system M/N:Z0600S TX
 Manufacturer: Shenzhen ZO Video Technology Co.,Ltd
 Operating Condition: ON WITH WIFI
 Test Site: Shielding Room
 Operator: Jason
 Test Specification: DC 5V(Powered by adaptor)
 Comment: N LINE

SCAN TABLE: "Voltage (0.15K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "LYSX03_fin"

2021-8-6 0:34

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.186085	32.20	7.1	64	32.0	QP	N	GND
0.200748	38.80	7.1	64	24.8	QP	N	GND
0.508871	27.50	7.6	56	28.5	QP	N	GND

MEASUREMENT RESULT: "NYSX03_fin2"

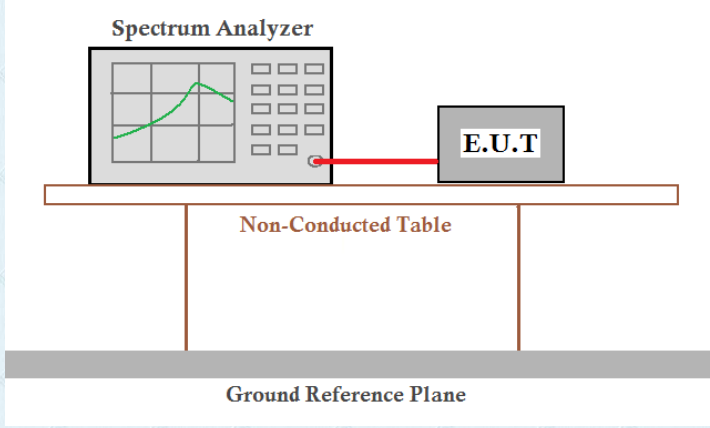
2021-8-6 0:34

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.200748	30.90	7.1	54	22.7	AV	N	GND
0.475482	21.60	7.6	46	24.8	AV	N	GND
0.506843	20.20	7.6	46	25.8	AV	N	GND

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

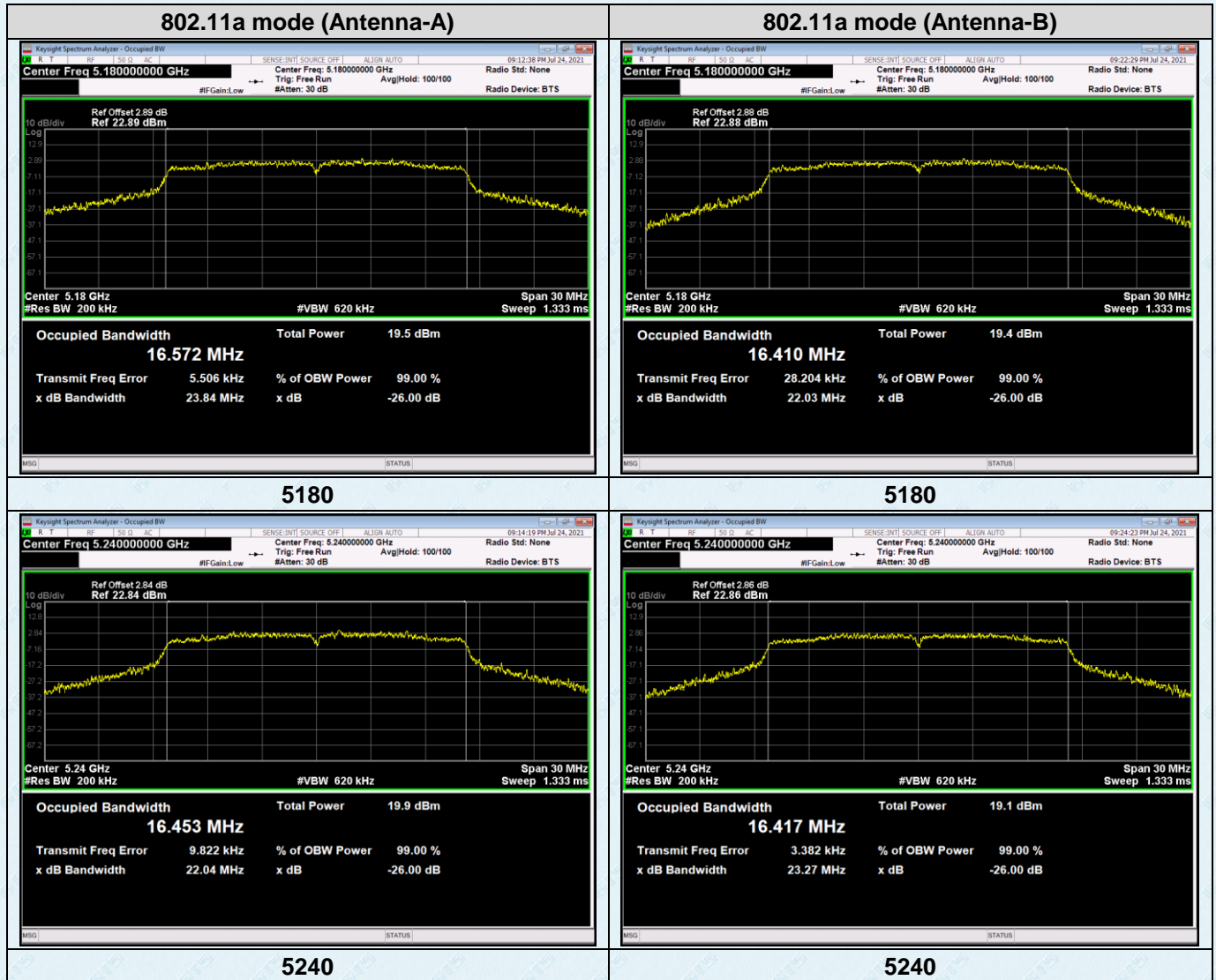
7.3 Emission Bandwidth and 99% Occupied Bandwidth

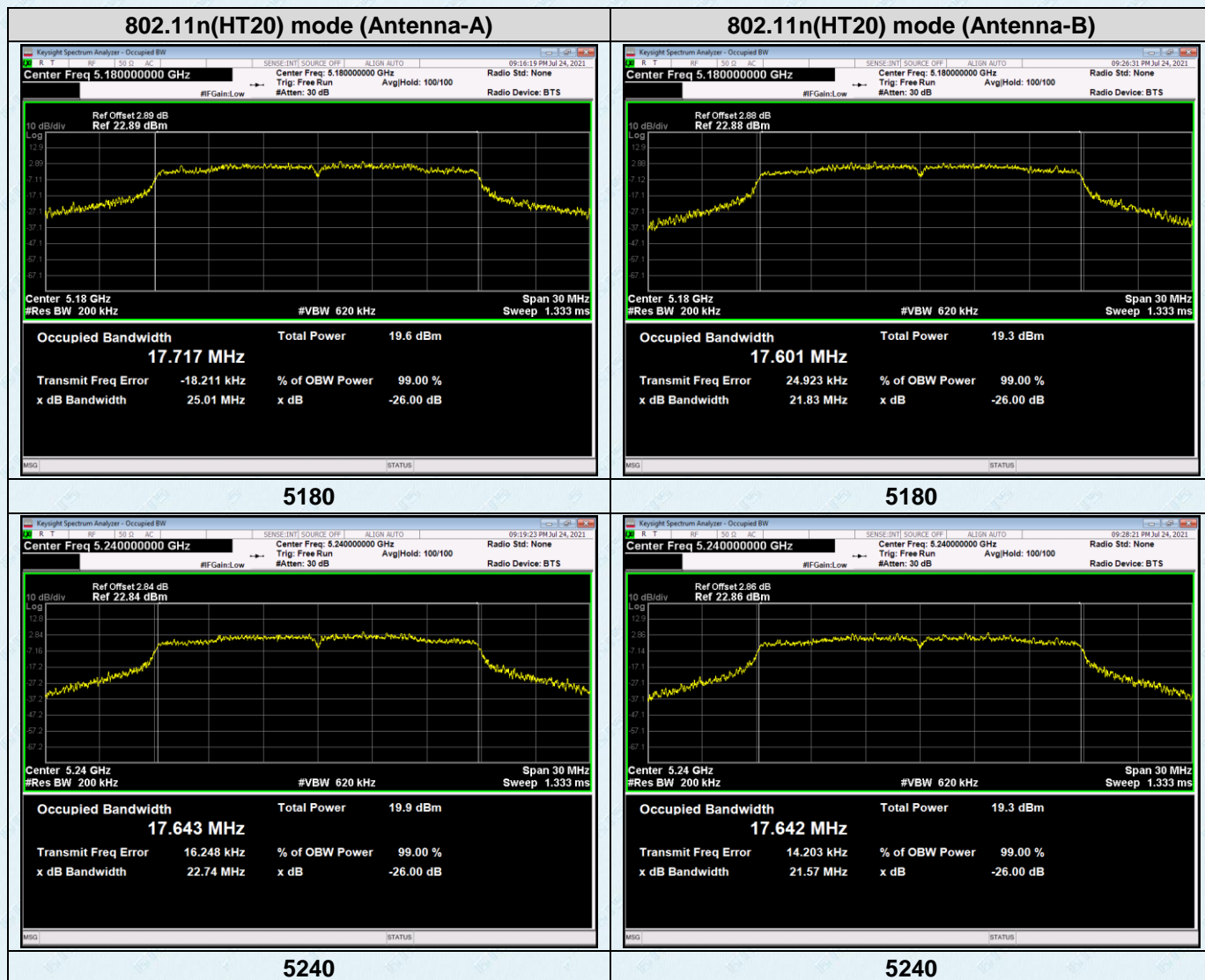
Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	N/A
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test procedure:	According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)				26dB Occupied Bandwidth (MHz)			
		802.11a		802.11n(HT20)		802.11a		802.11n(HT20)	
		ANT-A	ANT-B	ANT-A	ANT-B	ANT-A	ANT-B	ANT-A	ANT-B
36	5180	16.572	16.410	17.717	17.601	23.84	22.03	25.01	21.83
48	5240	16.453	16.417	17.643	17.642	22.04	23.27	22.74	21.57

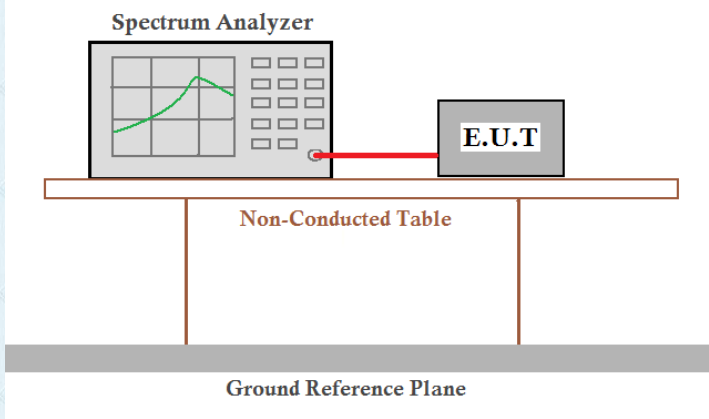
Test plots as followed:





Note: We tested 802.11a/n mode the all data rate and recorded the worst case data for this channel to be 6Mbps for 802.11a mode and MCS0 for 802.11n mode.

7.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407	
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Frequency band (MHz)	Limit
	5150-5250	$\leq 1\text{W}(30\text{dBm})$ for master device
		$\leq 250\text{mW}(23.98\text{dBm})$ for client device
	5250-5350	$\leq 250\text{mW}(23.98\text{dBm})$ for client device or $11\text{dBm}+10\log B^*$
	5470-5725	$\leq 250\text{mW}(23.98\text{dBm})$ for client device or $11\text{dBm}+10\log B^*$
Remark: *Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.		
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>	
Test procedure:	<ol style="list-style-type: none"> 1.Place the EUT on the table and set it in transmitting mode. 2.The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 . 3.Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer. 4.Spectrum Analyzer is used as the auxiliary test equipment to conduct the output power measurement. 5.Set span to encompass the entire emission bandwidth (EBW) of the signal. Set sweep trigger to “free run.” , RBW = 1 MHz, Set VBW $\geq 1/T$, where T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, Sweep time = auto, Detector = peak.. 6.Video filtering shall be applied to power signal (rms), it shall be set to operate on a linear voltage signal. 7.Trace mode = max hold. Allow max hold to run for at least 60 seconds 8.Repeat above procedures until all frequency (low, middle, and high channel) measured were complete. 9.For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01. Total power is the sum of the conducted power levels measured at the various output ports 	
Test Instruments:	Refer to section 6 for details	
Test mode:	Refer to section 5.2 for details	

Test results:	Pass
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Measurement Data

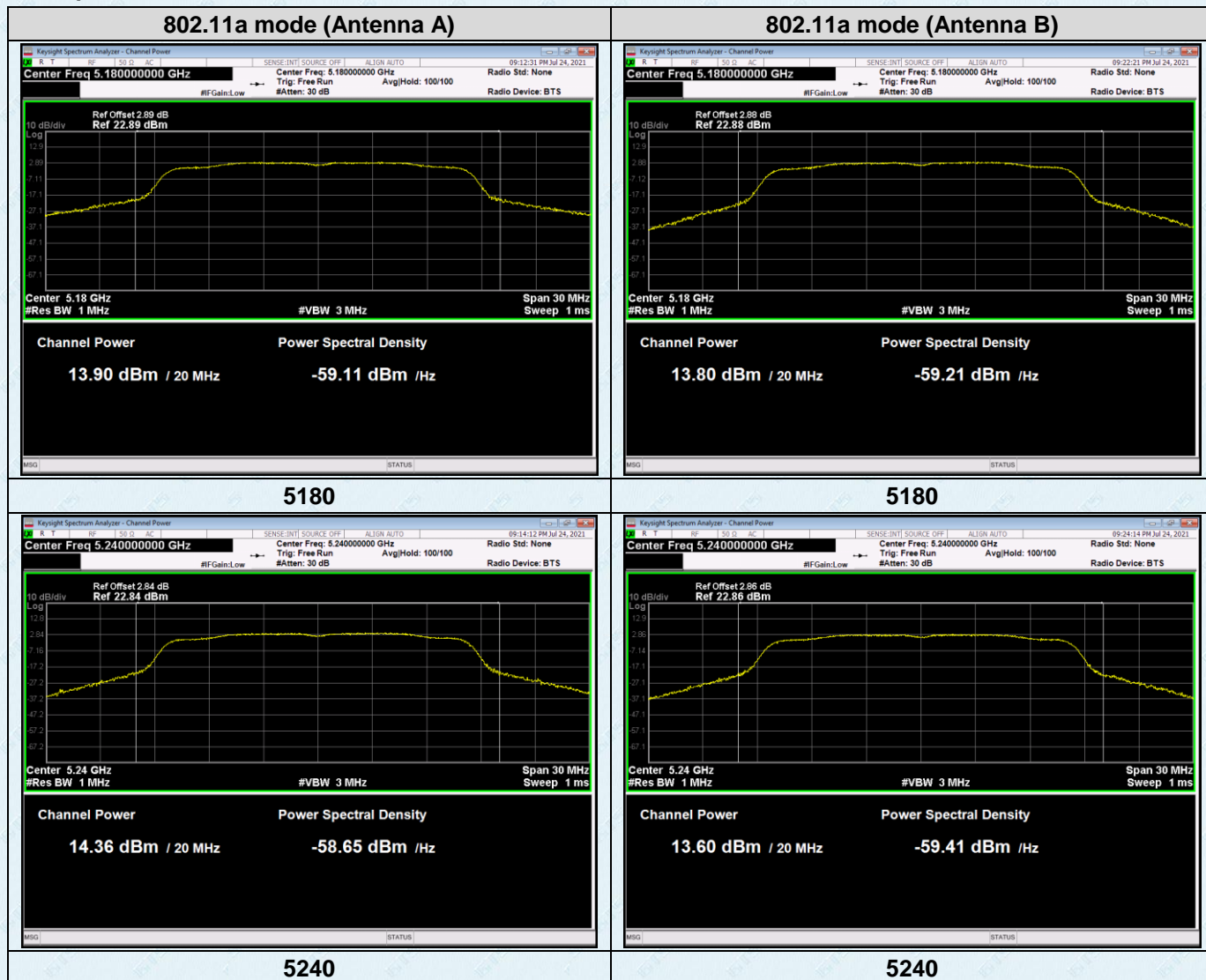
Modulation	Frequency (MHz)	Duty cycle		Duty Factor	
		Antenna-A	Antenna-B	Antenna-A	Antenna-B
802.11a	5180	99.24	99.26	0.03	0.03
	5240	99.23	99.24	0.03	0.03
802.11n(HT20)	5180	99.23	99.24	0.03	0.03
	5240	99.23	99.23	0.03	0.03

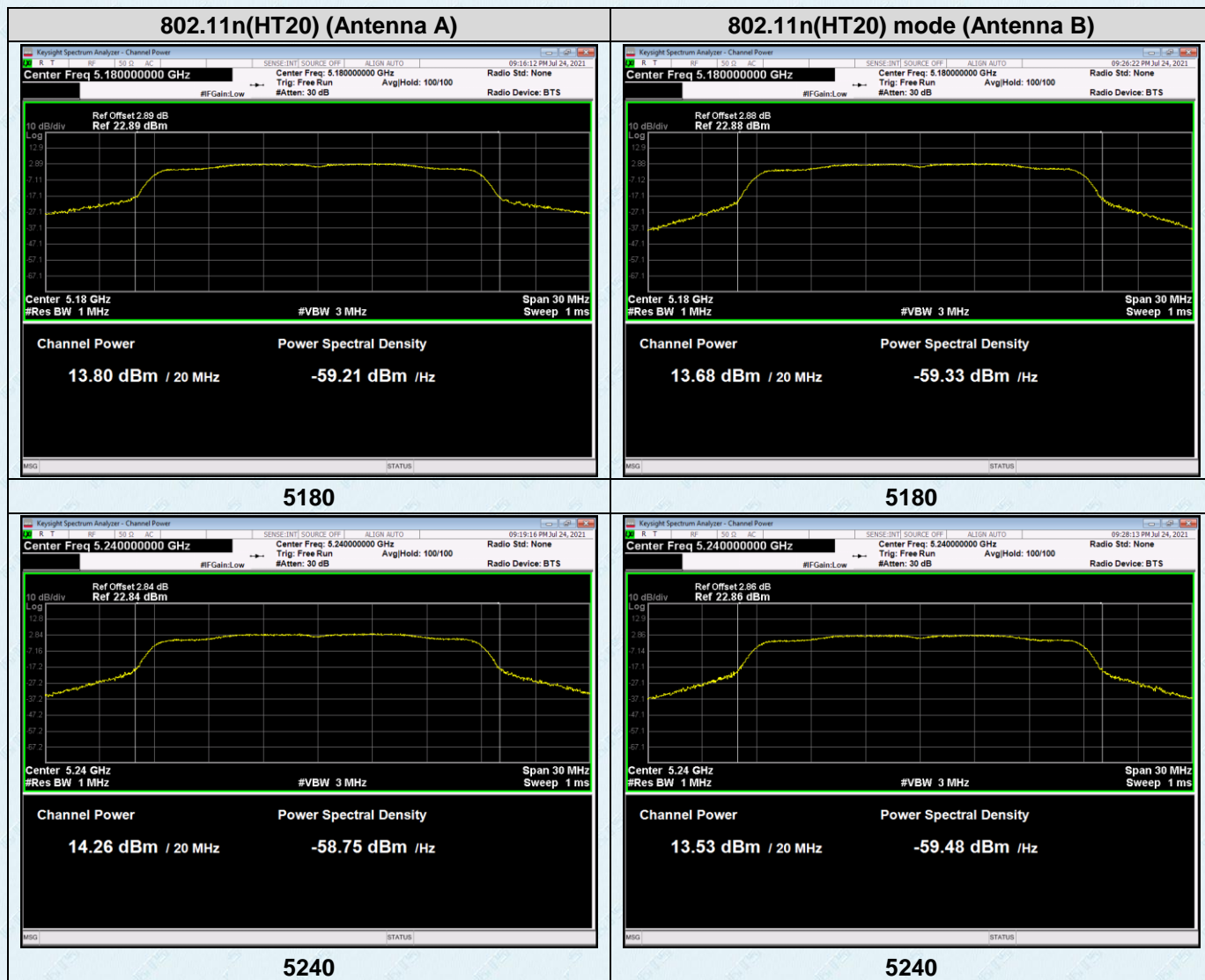
802.11a mode										
CH No.	Frequency (MHz)	Measured Power (dBm)			Duty Factor	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		ANT A	ANT B	ANT A+B		
36	5180	13.90	13.80	--	0.03	13.93	13.83	--	24	Pass
48	5240	14.36	13.60	--	0.03	14.39	13.64	--		
802.11n(HT20) mode										
CH No.	Frequency (MHz)	Measured Power (dBm)			Duty Factor	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		ANT A	ANT B	ANT A+B		
36	5180	13.80	13.68	16.75	0.03	13.83	13.71	16.78	24	Pass
48	5240	14.26	13.53	16.92	0.03	14.29	13.56	16.96		

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

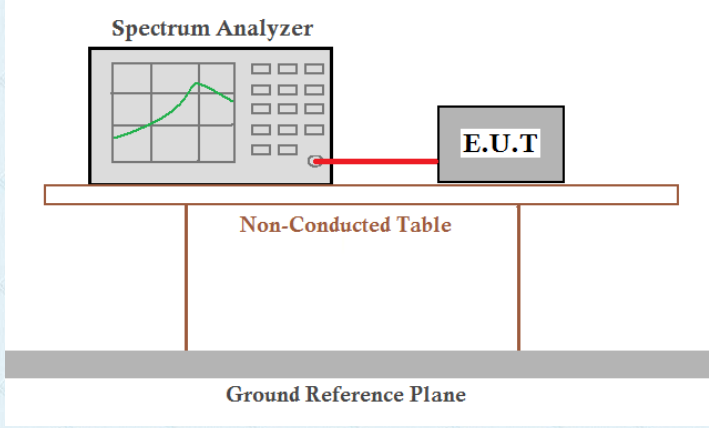
Test plots as followed:





Note: We tested 802.11a/n mode the all data rate and recorded the worst case data for this channel to be 6Mbps for 802.11a mode and MCS0 for 802.11n mode.

7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407	
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Frequency band (MHz)	Limit
	5150-5250	≤17dBm in 1MHz for master device
		≤11dBm in 1MHz for client device
	5250-5350	≤11dBm in 1MHz for client device
	5470-5725	≤11dBm in 1MHz for client device
Remark: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.		
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>	
Test procedure:	<ol style="list-style-type: none"> 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...". 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: <ol style="list-style-type: none"> a) If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PSD. 	
Test Instruments:	Refer to section 6 for details	
Test mode:	Refer to section 5.2 for details	
Test results:	Pass	

Measurement Data

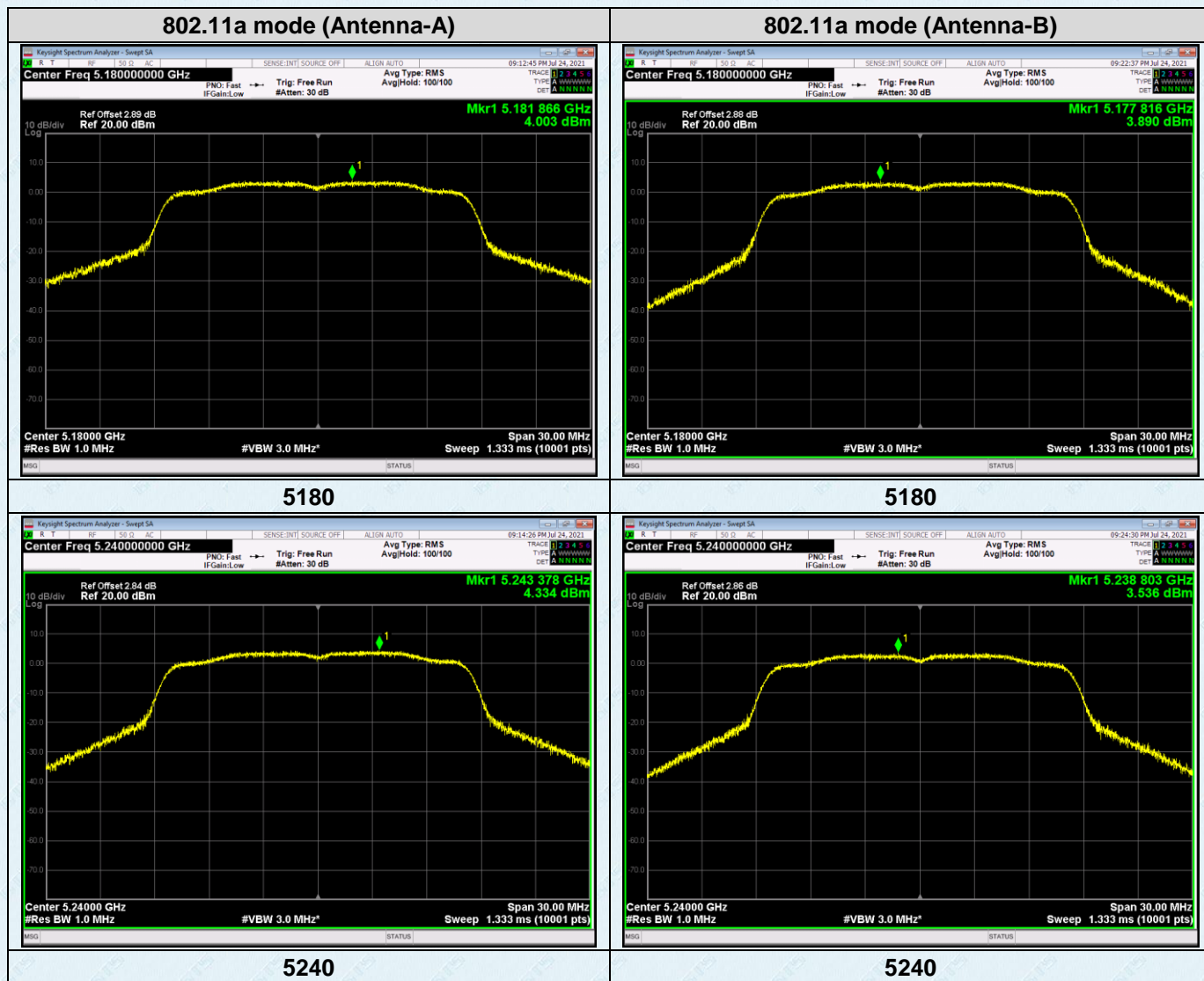
Modulation	Frequency (MHz)	Duty cycle		Duty Factor	
		Antenna-A	Antenna-B	Antenna-A	Antenna-B
802.11a	5180	99.24	99.26	0.03	0.03
	5240	99.23	99.24	0.03	0.03
802.11n(HT20)	5180	99.23	99.24	0.03	0.03
	5240	99.23	99.23	0.03	0.03

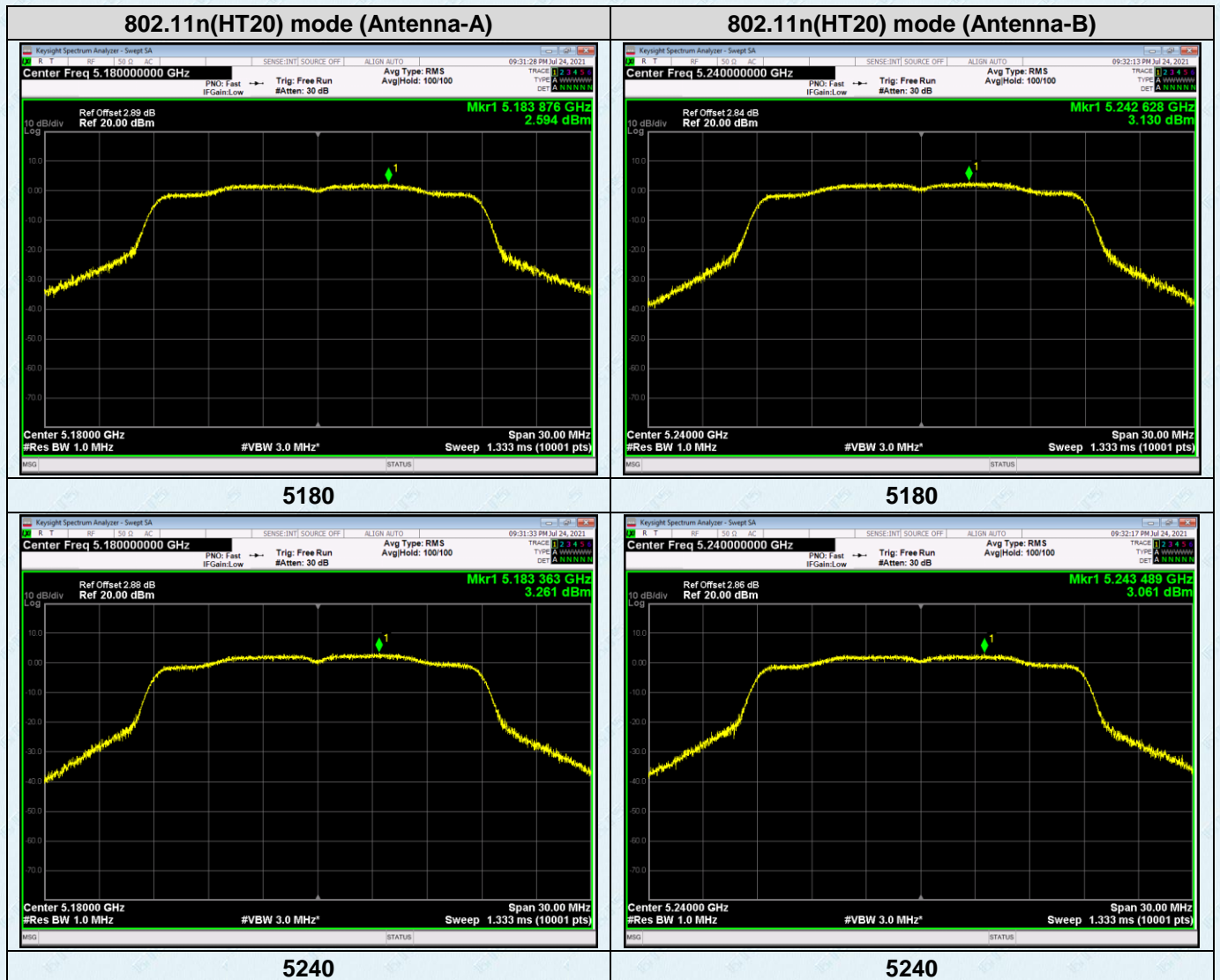
802.11a mode										
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)			Duty Factor	Total PSD Power(dBm/MHz)			Limit (dBm/MHz)	Result
		ANT A	ANT B	ANT A+B		ANT A	ANT B	ANT A+B		
36	5180	4.003	3.89	--	0.03	4.033	3.92	--	11	Pass
48	5240	4.334	3.536	--	0.03	4.364	3.566	--	11	Pass
802.11n(HT20) mode										
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)			Duty Factor	Total PSD Power(dBm/MHz)			Limit (dBm/MHz)	Result
		ANT A	ANT B	ANT A+B		ANT A	ANT B	ANT A+B		
36	5180	2.594	3.13	5.951	0.03	2.624	3.16	5.981	11	Pass
48	5240	3.261	3.061	6.106	0.03	3.291	3.091	6.109	11	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

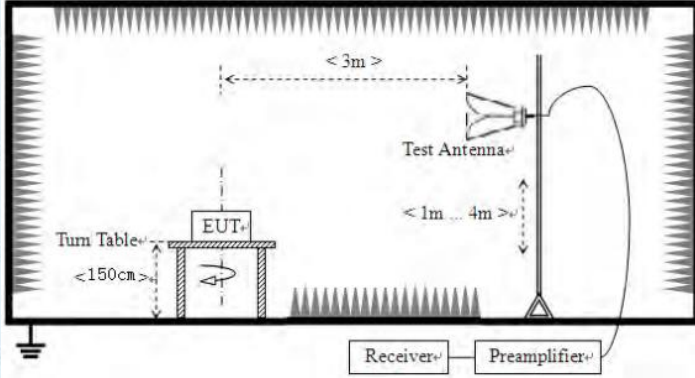
Test plots as followed:





7.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 and 5.205																								
Test Method:	ANSI C63.10:2013																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr></table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	AV	1MHz	3MHz	Average Value	
Frequency	Detector	RBW	VBW	Remark																					
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value																					
Above 1GHz	Peak	1MHz	3MHz	Peak Value																					
	AV	1MHz	3MHz	Average Value																					
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>68.2</td><td>Peak Value</td></tr></table> <p>Undesirable emission limits:</p> <p>(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 EIRP of -27 dBm/MHz.</p> <p>(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 EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.</p> <p>(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 EIRP of -27 dBm/MHz.</p>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value	68.2	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																							
30MHz-88MHz	40.0	Quasi-peak Value																							
88MHz-216MHz	43.5	Quasi-peak Value																							
216MHz-960MHz	46.0	Quasi-peak Value																							
960MHz-1GHz	54.0	Quasi-peak Value																							
Above 1GHz	54.0	Average Value																							
	68.2	Peak Value																							
Test Procedure:	<p>a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>c. 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.</p> <p>d. 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. 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</p>																								

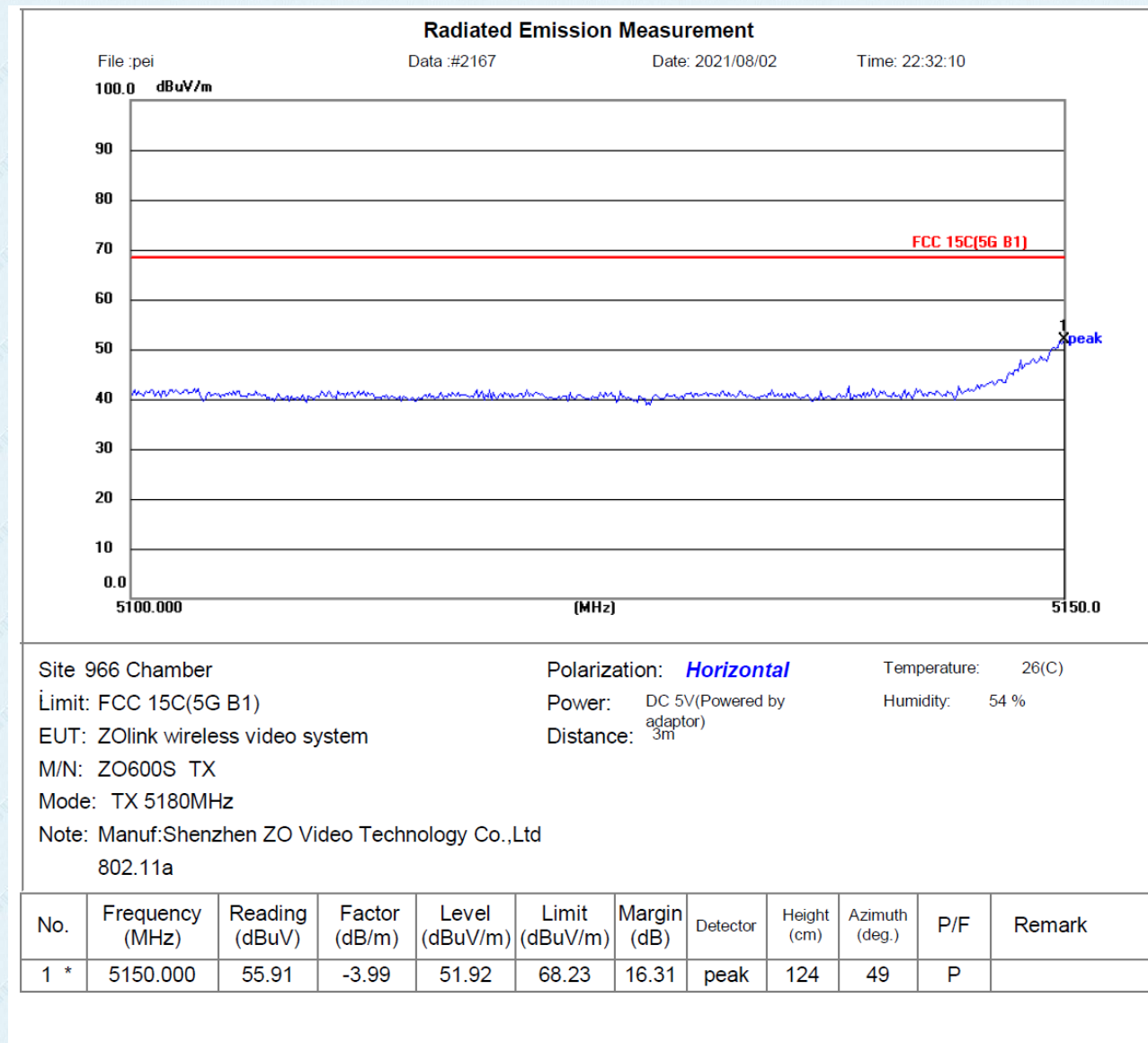
	have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	<p>For radiated emissions above 1GHz</p> 
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remarks:

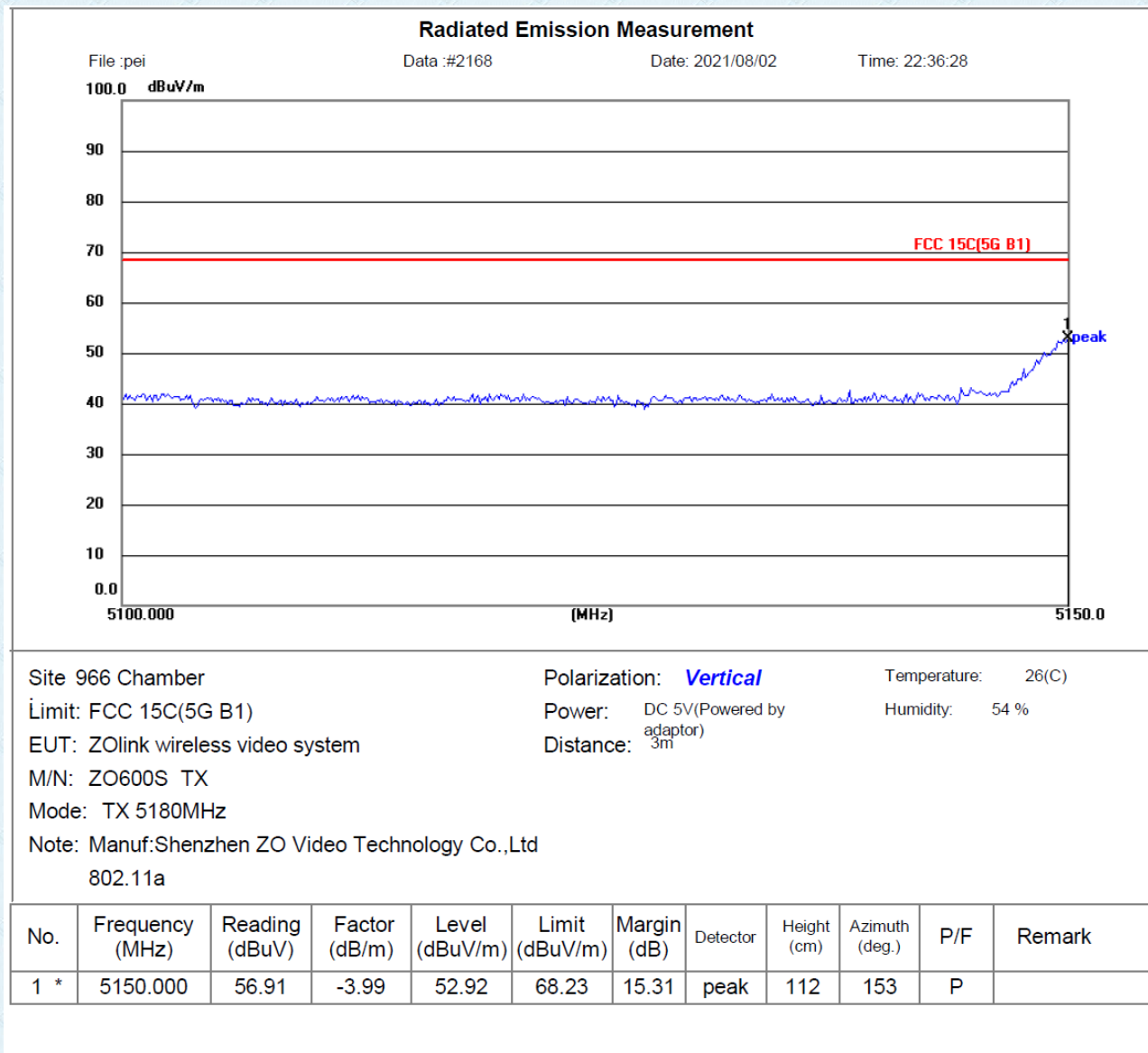
- Only the worst case Main Antenna test data.
- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.
- According to KDB 789033 D02 v02r01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$
 For example, if $\text{EIRP} = -27\text{dBm}$
 $E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$

Measurement Data: Radiated Band Edge Result

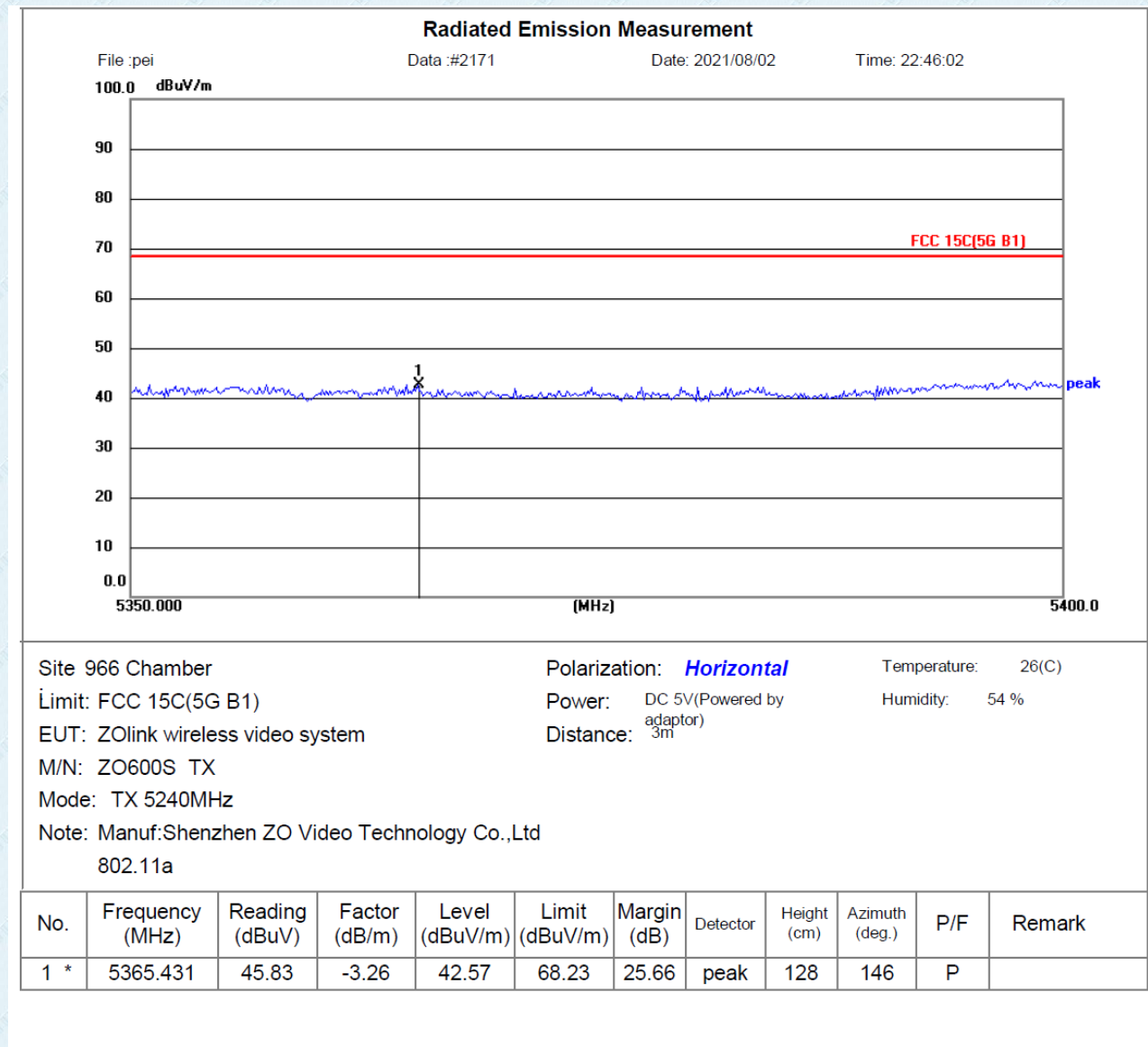
Horizontal: 802.11a (TX 5180MHz)



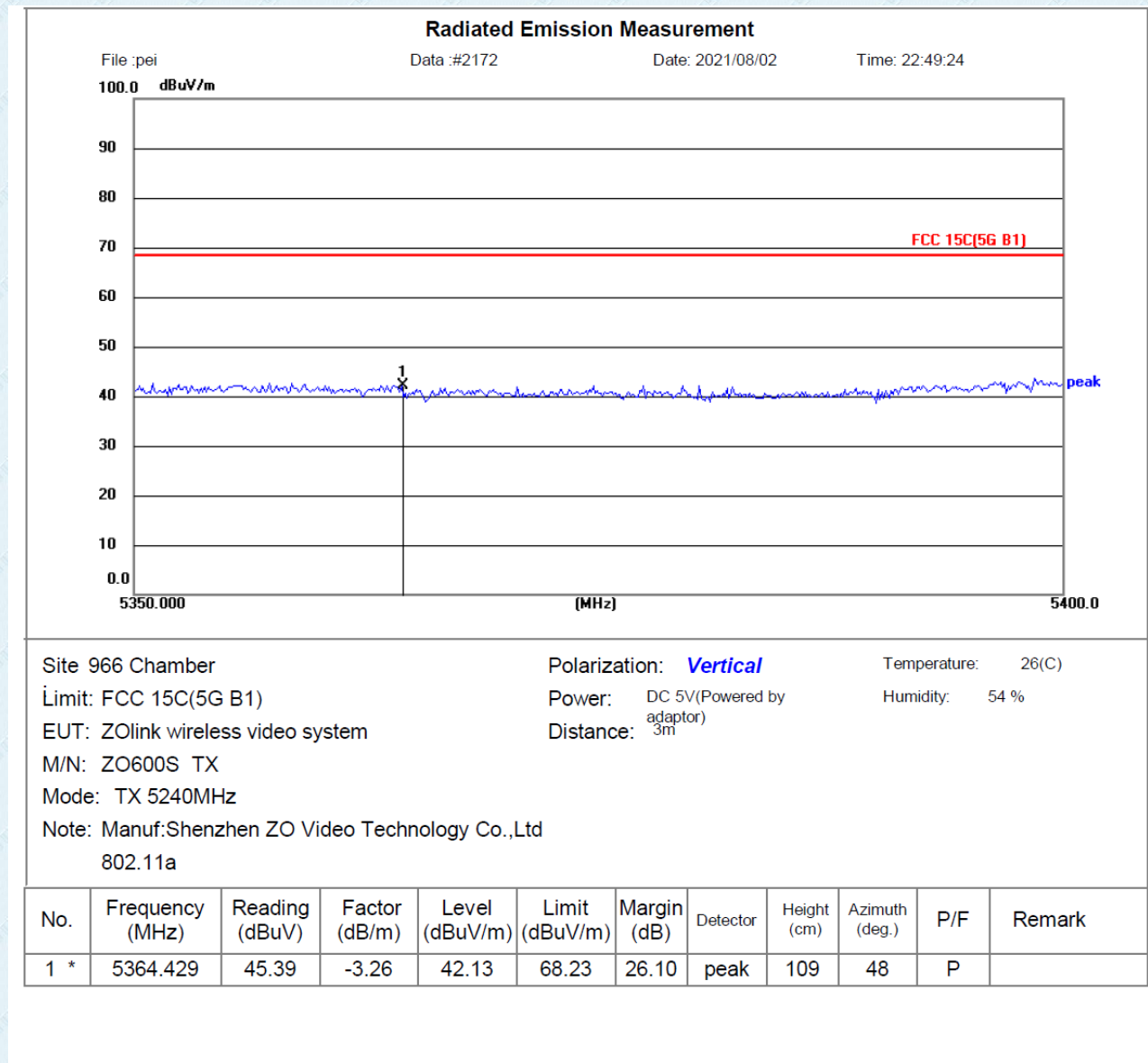
Vertical: 802.11a (TX 5180MHz)



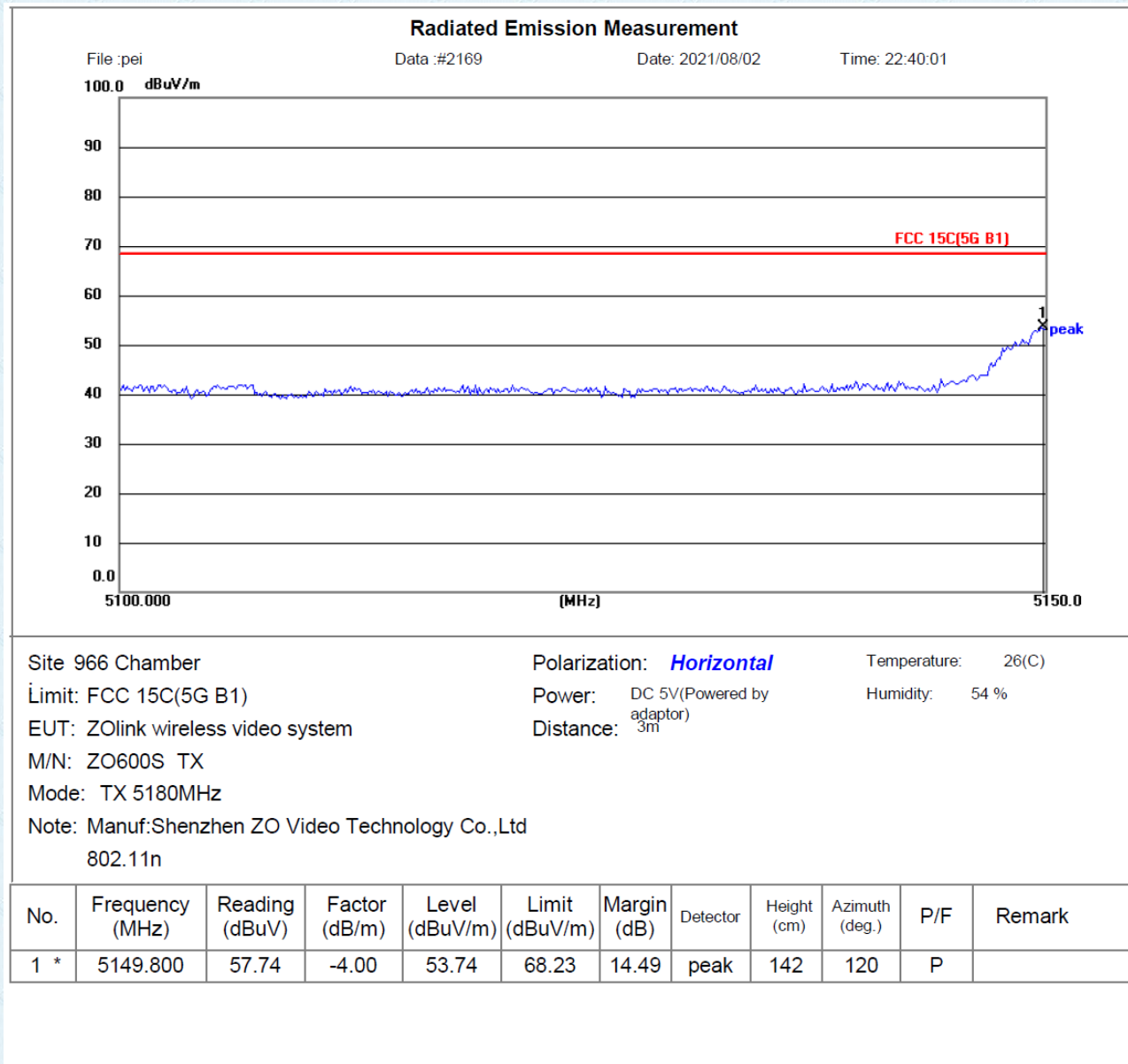
Horizontal: 802.11a (TX 5240MHz)



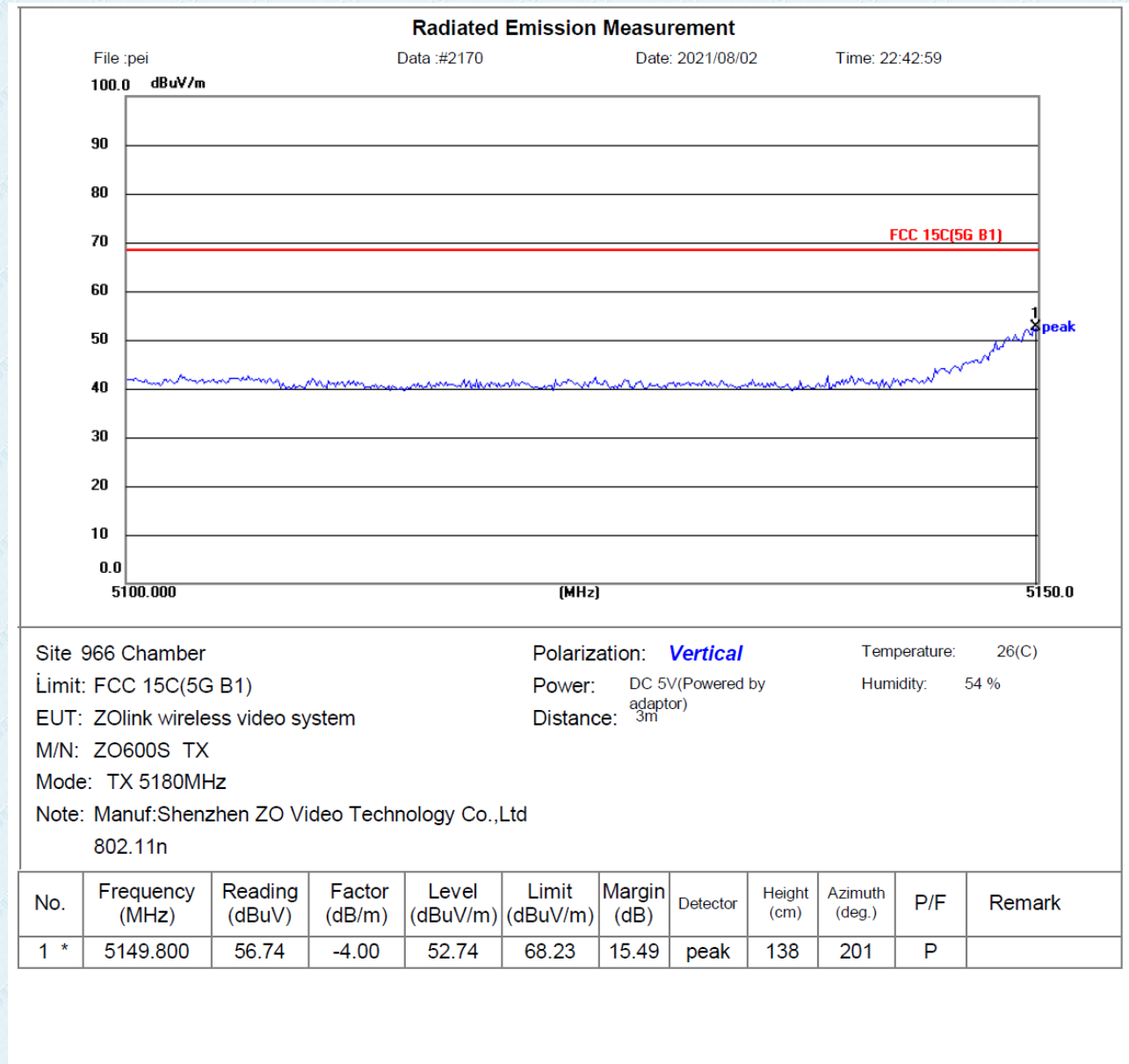
Vertical: 802.11a (TX 5240MHz)



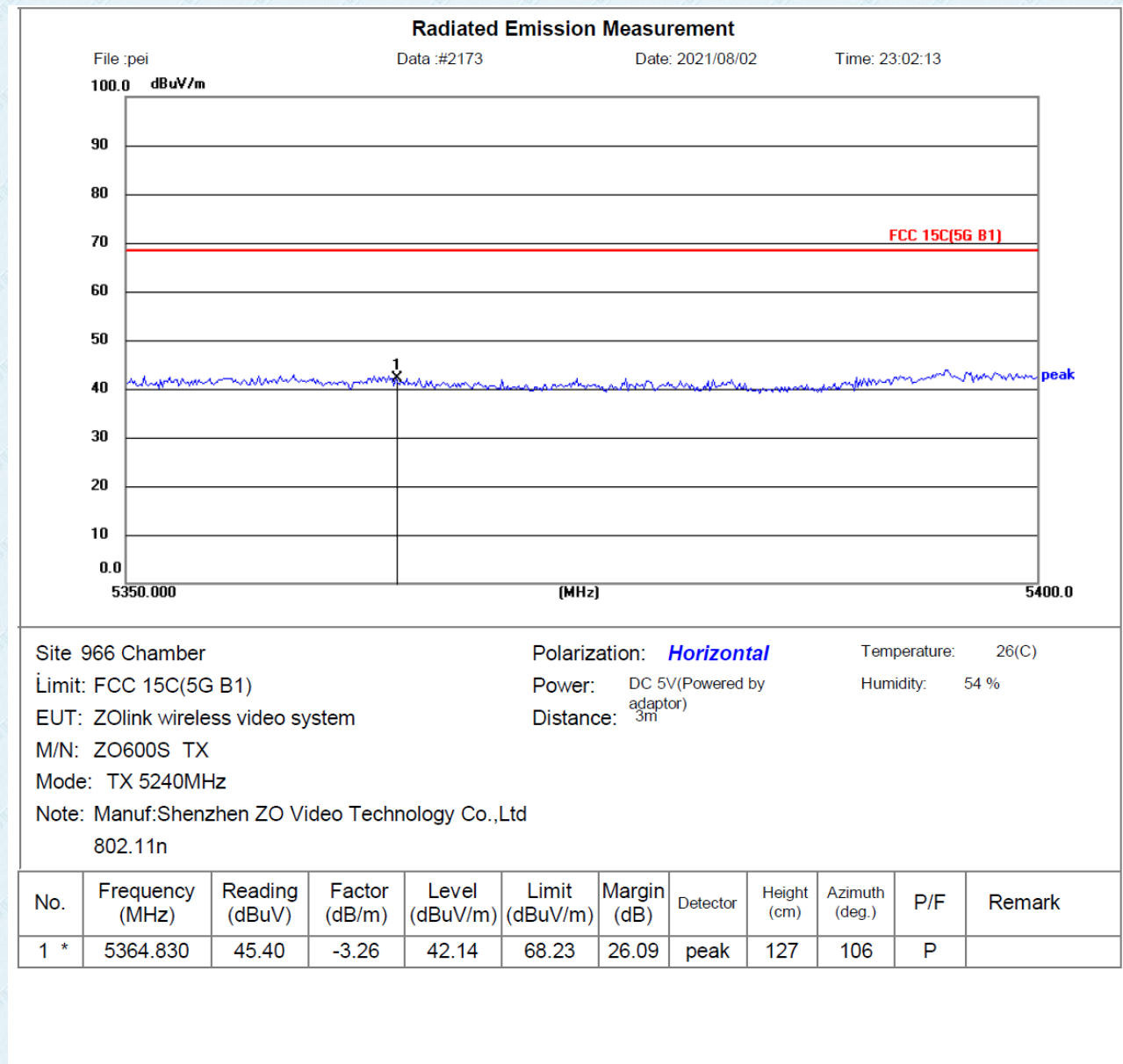
Horizontal: 802.11n-HT20 (TX 5180MHz)

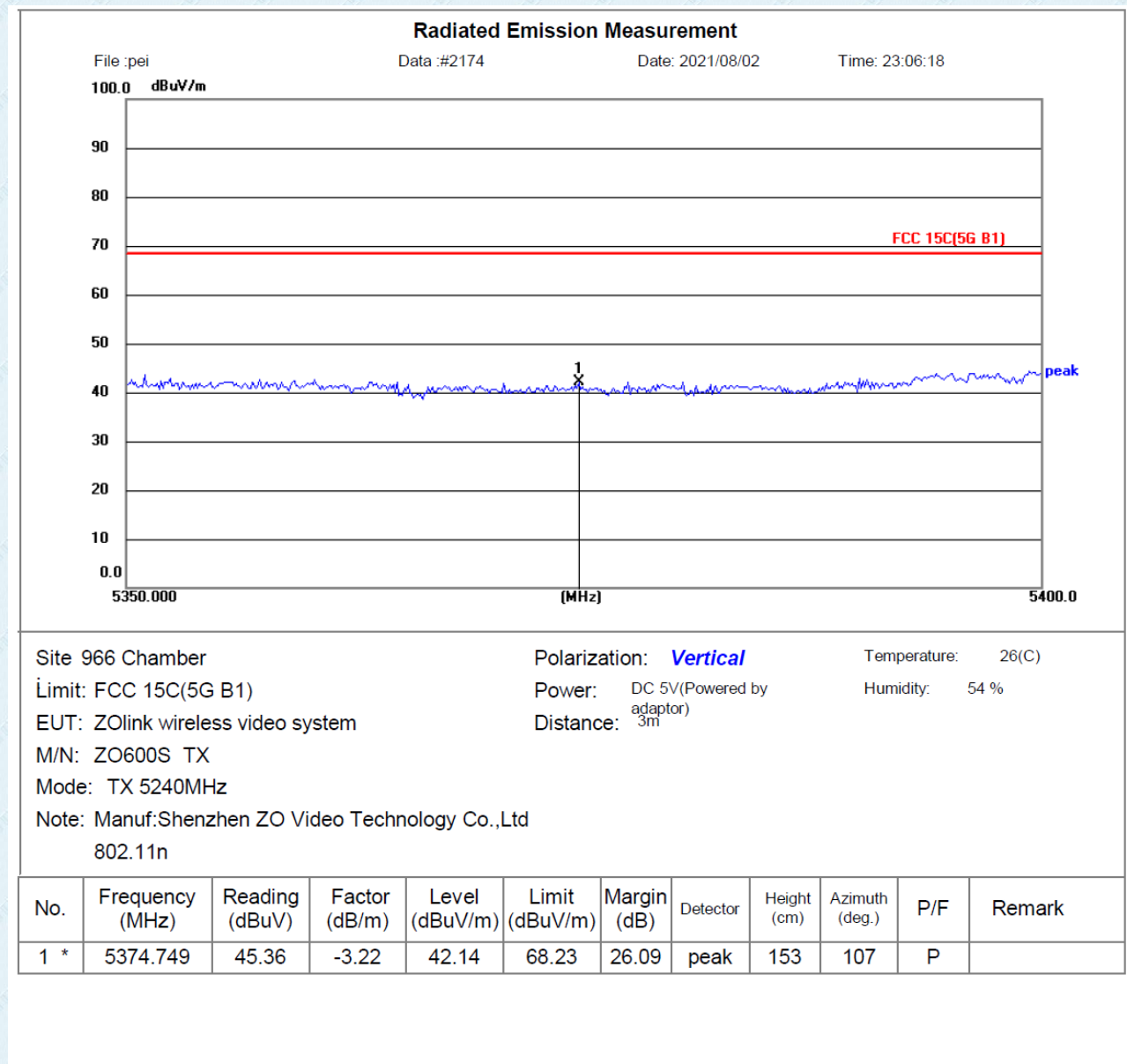


Vertical: 802.11n-HT20 (TX 5180MHz)



Horizontal: 802.11n-HT20 (TX 5240MHz)

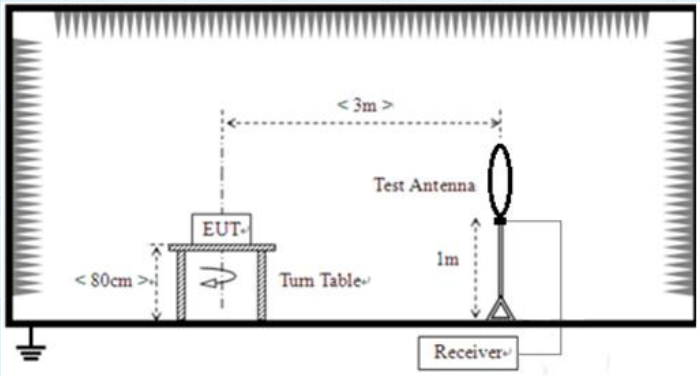


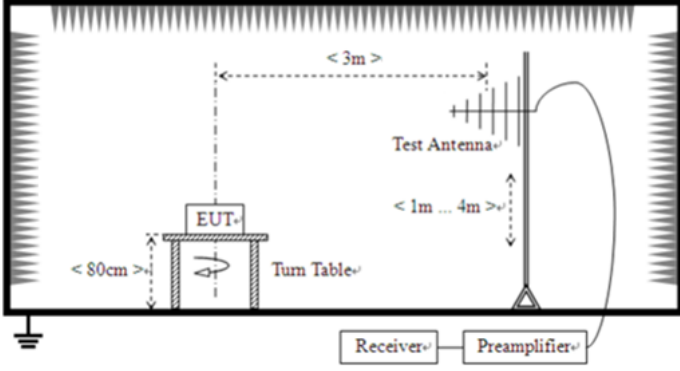
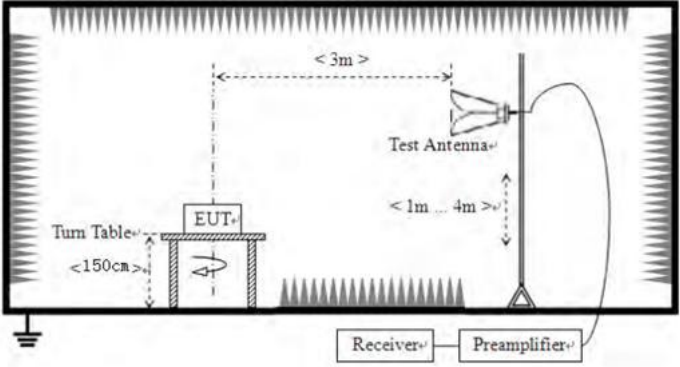
Vertical: 802.11n-HT20 (TX 5240MHz)


Note: We tested 802.11a/n mode the all data rate and recorded the worst case data for this channel to be 6Mbps for 802.11a mode and MCS0 for 802.11n mode.

7.7 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 40GHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	3MHz	Average Value
Limit:					
	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	300m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
5000		Peak			
Test Procedure:	Substitution method was performed to determine the actual ERP emission levels of the EUT. The following test procedure as below: 1>.Below 1GHz test procedure: 1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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. 2>.Above 1GHz test procedure:				

	<ol style="list-style-type: none"> 1. On the test site as test setup graph above, the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter. The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: $\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ where: Pg is the generator output power into the substitution antenna.
<p>Test setup:</p>	<p>For radiated emissions from 9kHz to 30MHz</p>  <p>For radiated emissions from 30MHz to 1GHz</p>

	 <p>For radiated emissions above 1GHz</p> 
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Remarks:

- Only the worst case Main Antenna test data.
- Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement Data:

9 kHz ~ 30 MHz

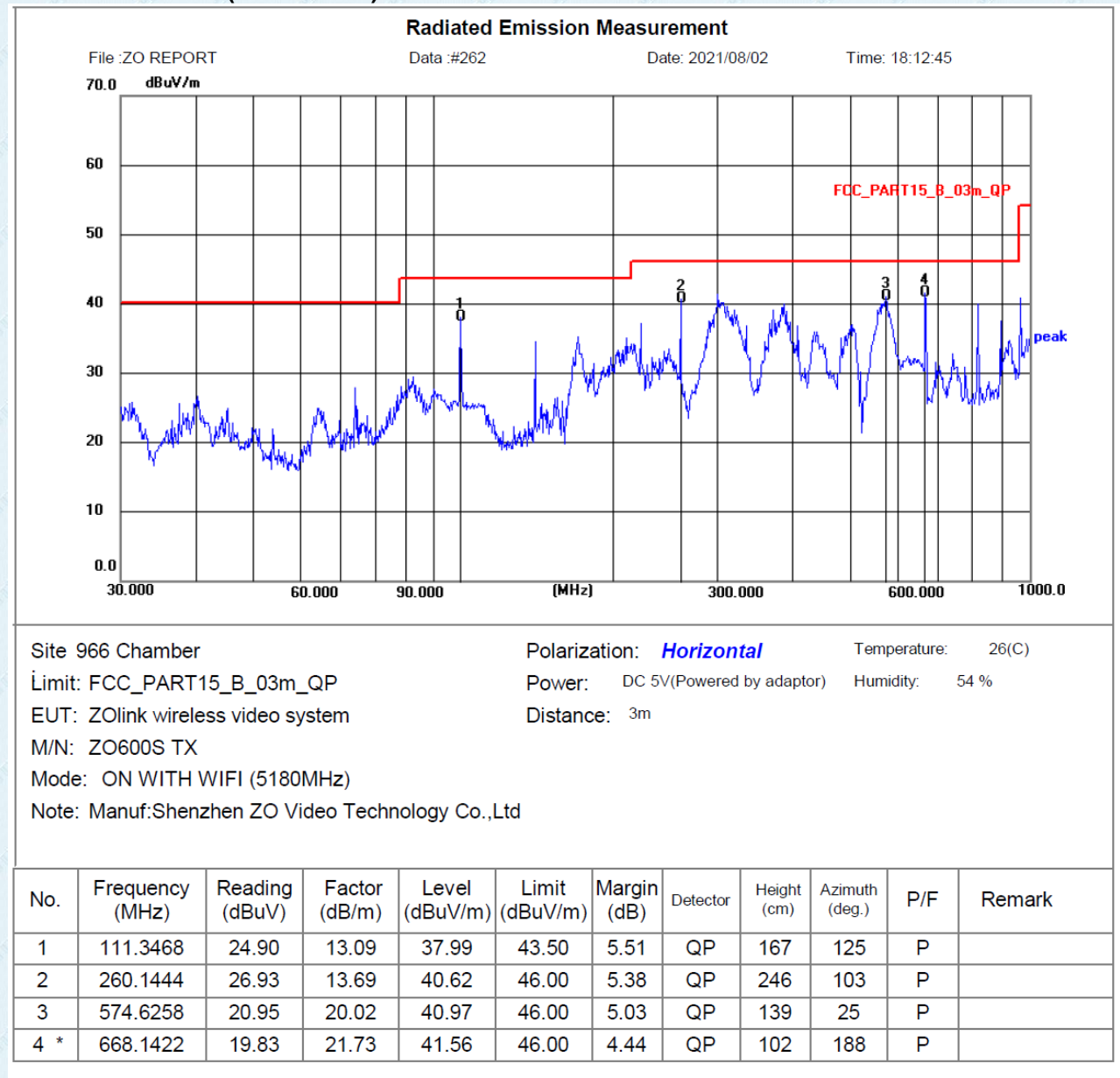
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

30MHz~ 1GHz

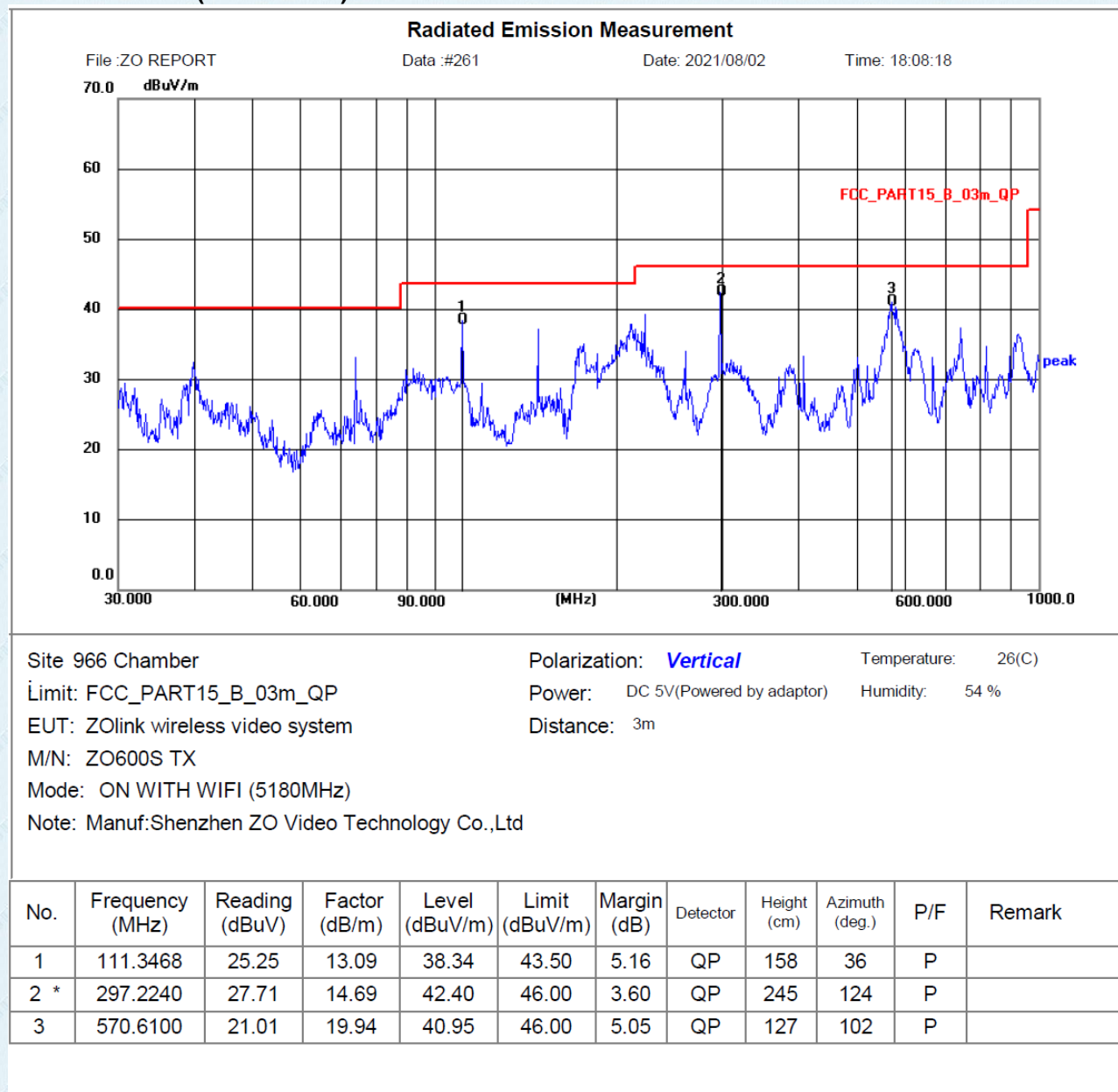
Pre-scan all test modes, found worst case at 802.11a, and so only show the test result of 802.11a

30MHz~ 1GHz

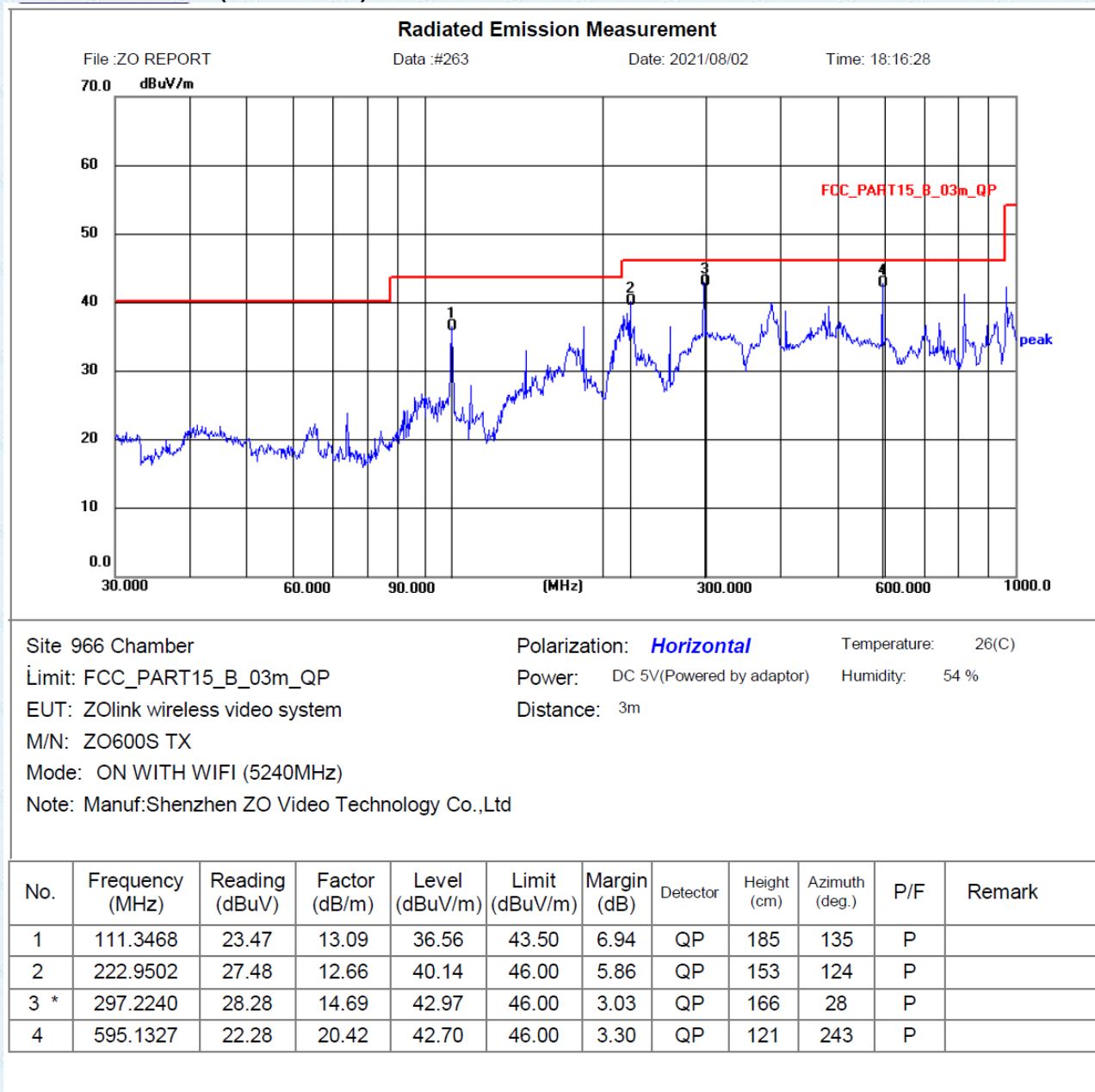
Horizontal: 802.11a (TX 5180MHz)



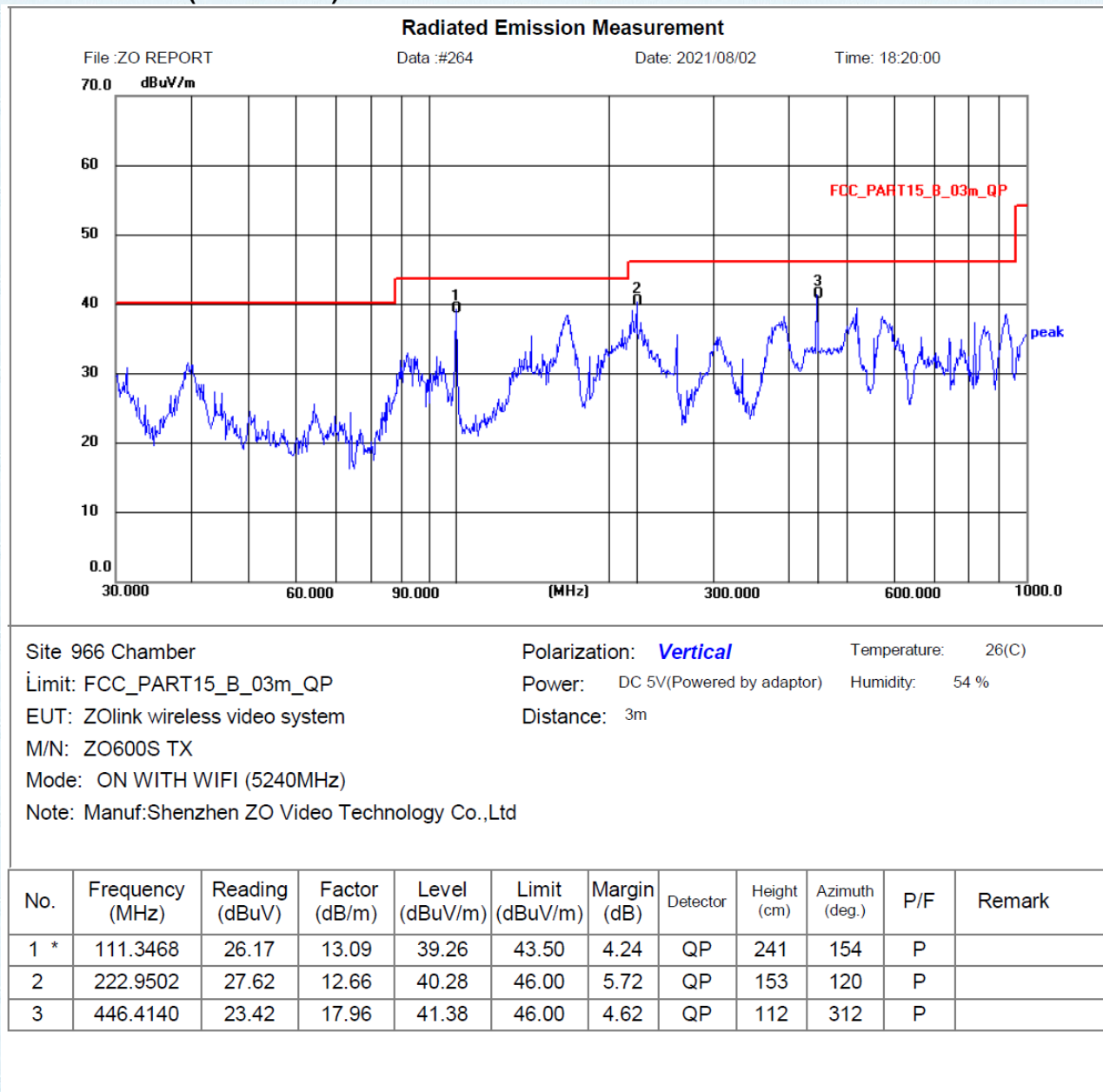
Vertical: 802.11a (TX 5180MHz)



Horizontal: 802.11a (TX 5240MHz)

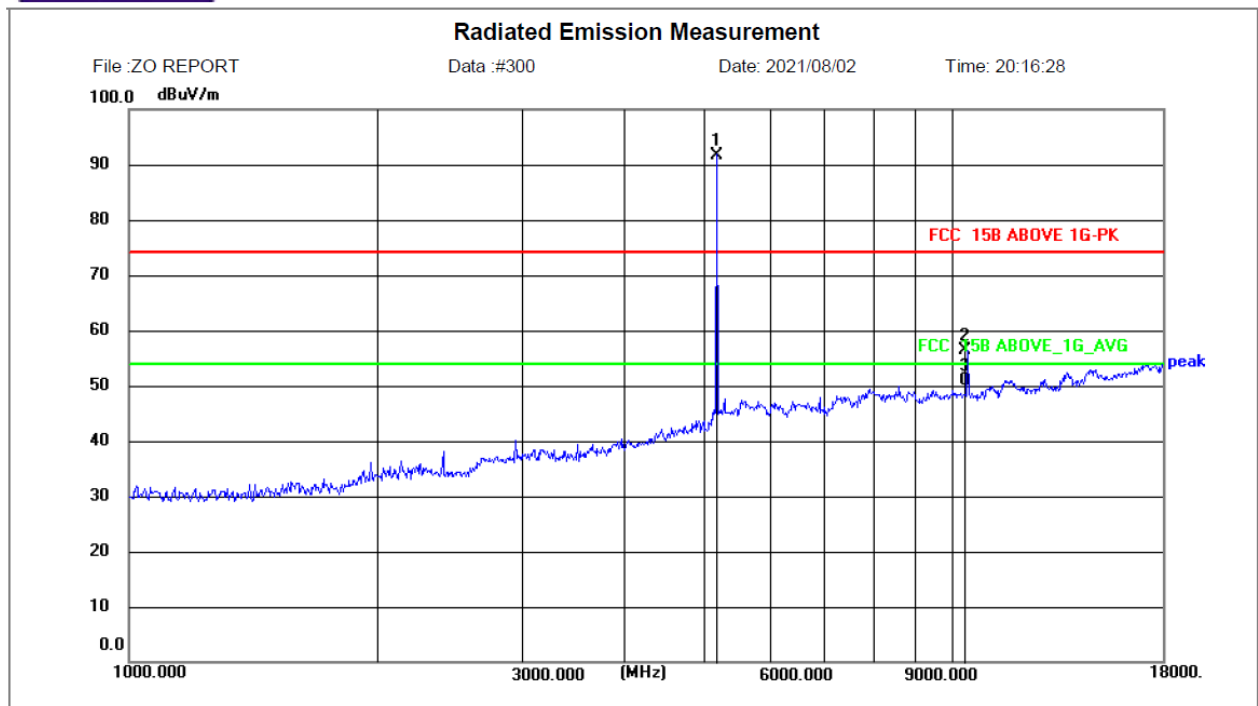


Vertical: 802.11a (TX 5240MHz)



1GHz~ 18GHz

Horizontal: 802.11a (TX 5180MHz)



Site 966 Chamber

Polarization: **Horizontal**

Temperature: 26(C)

Limit: FCC 15B ABOVE 1G-PK

Power: DC 5V(Powered by adaptor)

Humidity: 54 %

EUT: ZOLink wireless video system

Distance: 3m

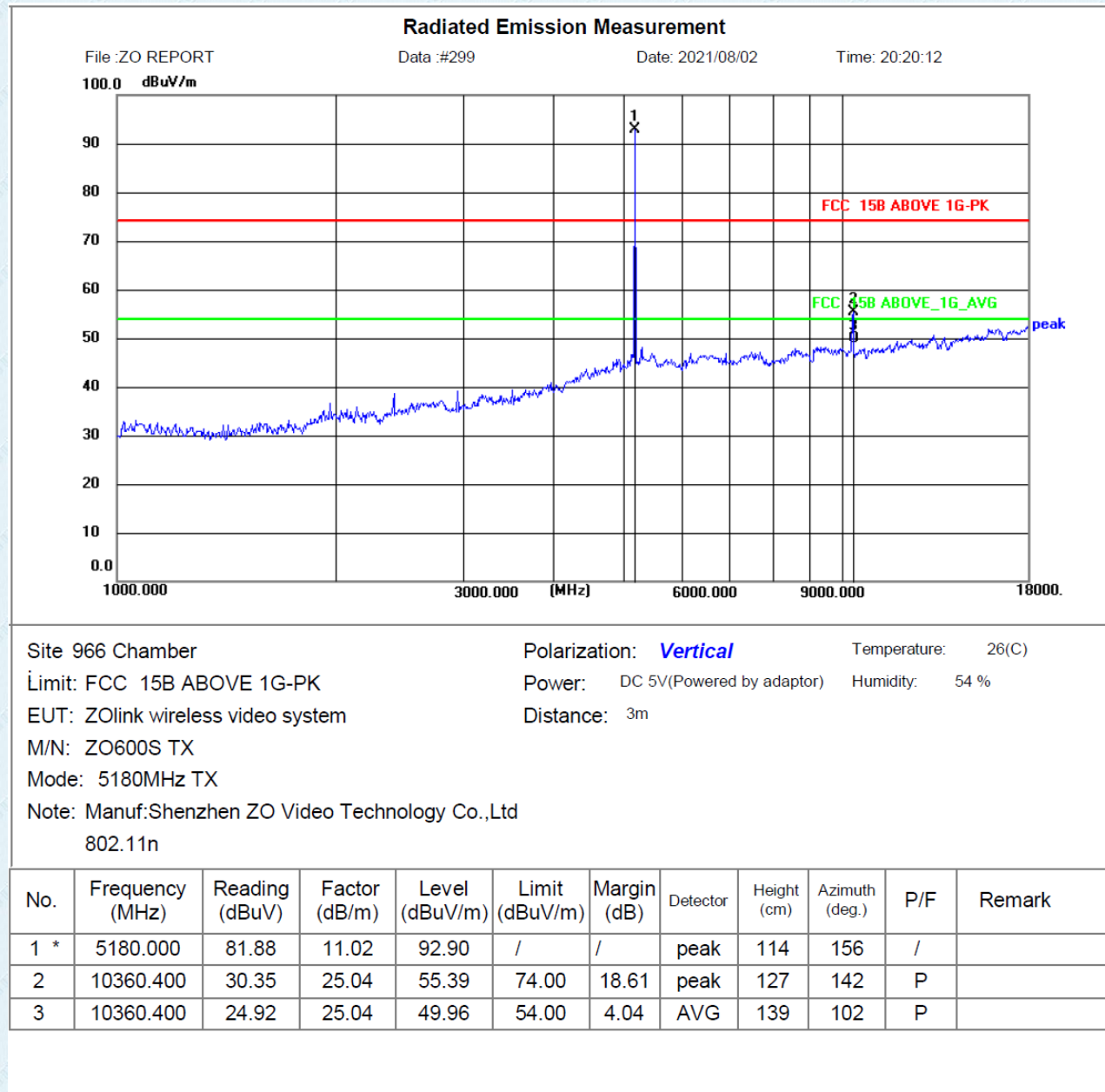
M/N: ZO600S TX

Mode: 5180MHz TX

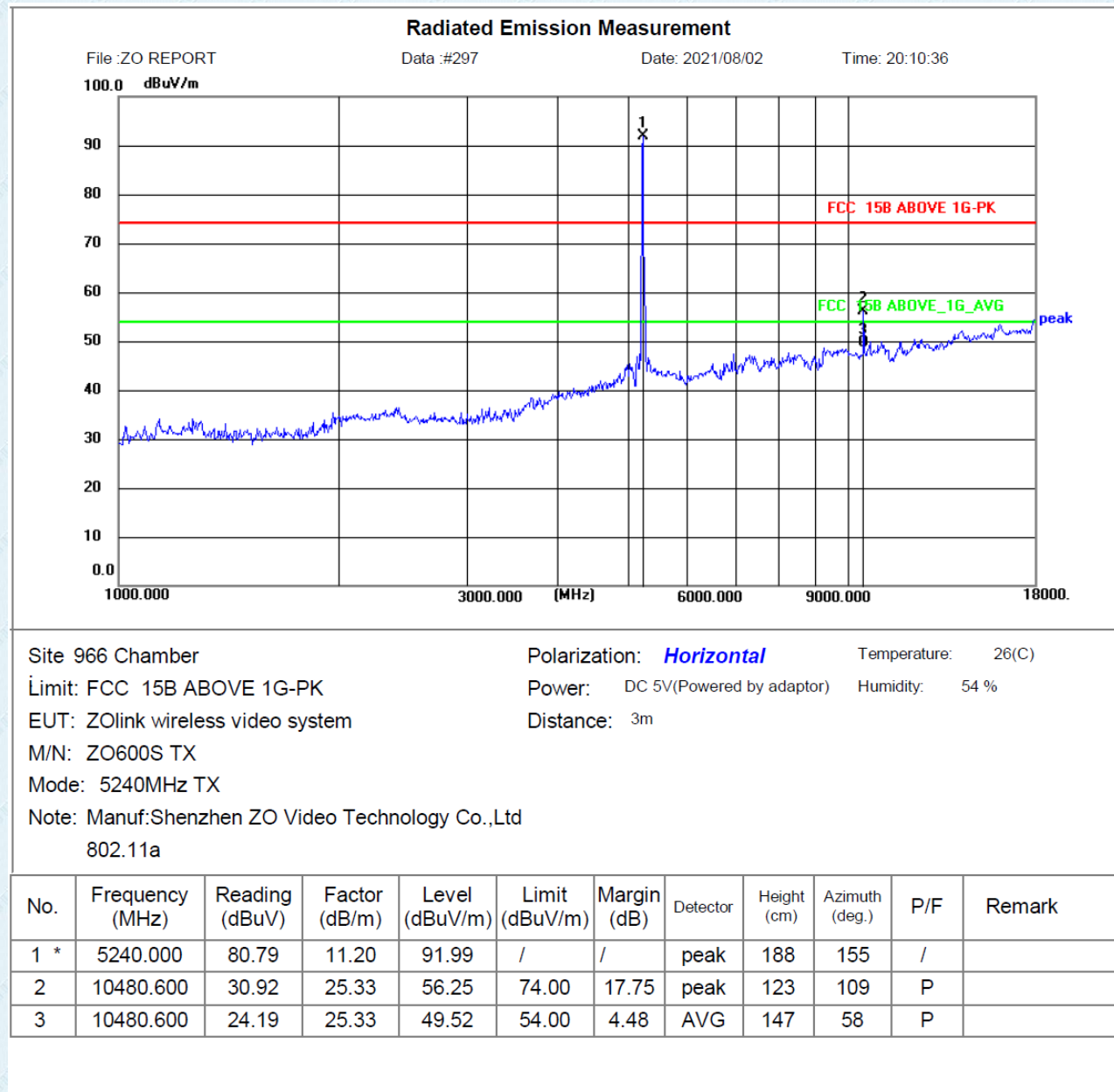
Note: Manuf:Shenzhen ZO Video Technology Co.,Ltd
802.11n

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 *	5180.000	80.72	11.02	91.74	/	/	peak	117	126	/	
2	10360.400	31.32	25.04	56.36	74.00	17.64	peak	120	103	P	
3	10360.400	25.81	25.04	50.85	54.00	3.15	AVG	131	98	P	

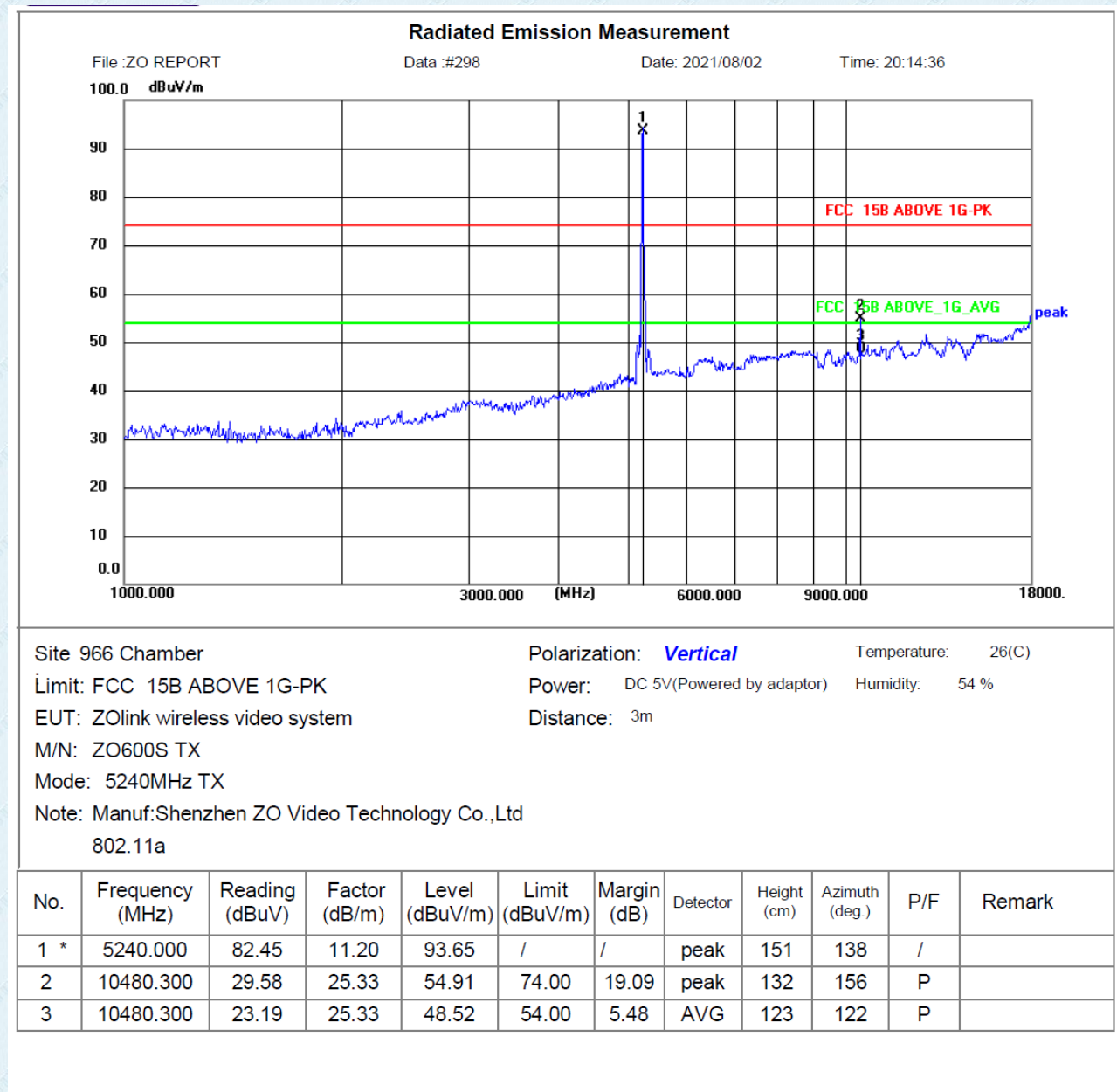
Vertical: 802.11a (TX 5180MHz)



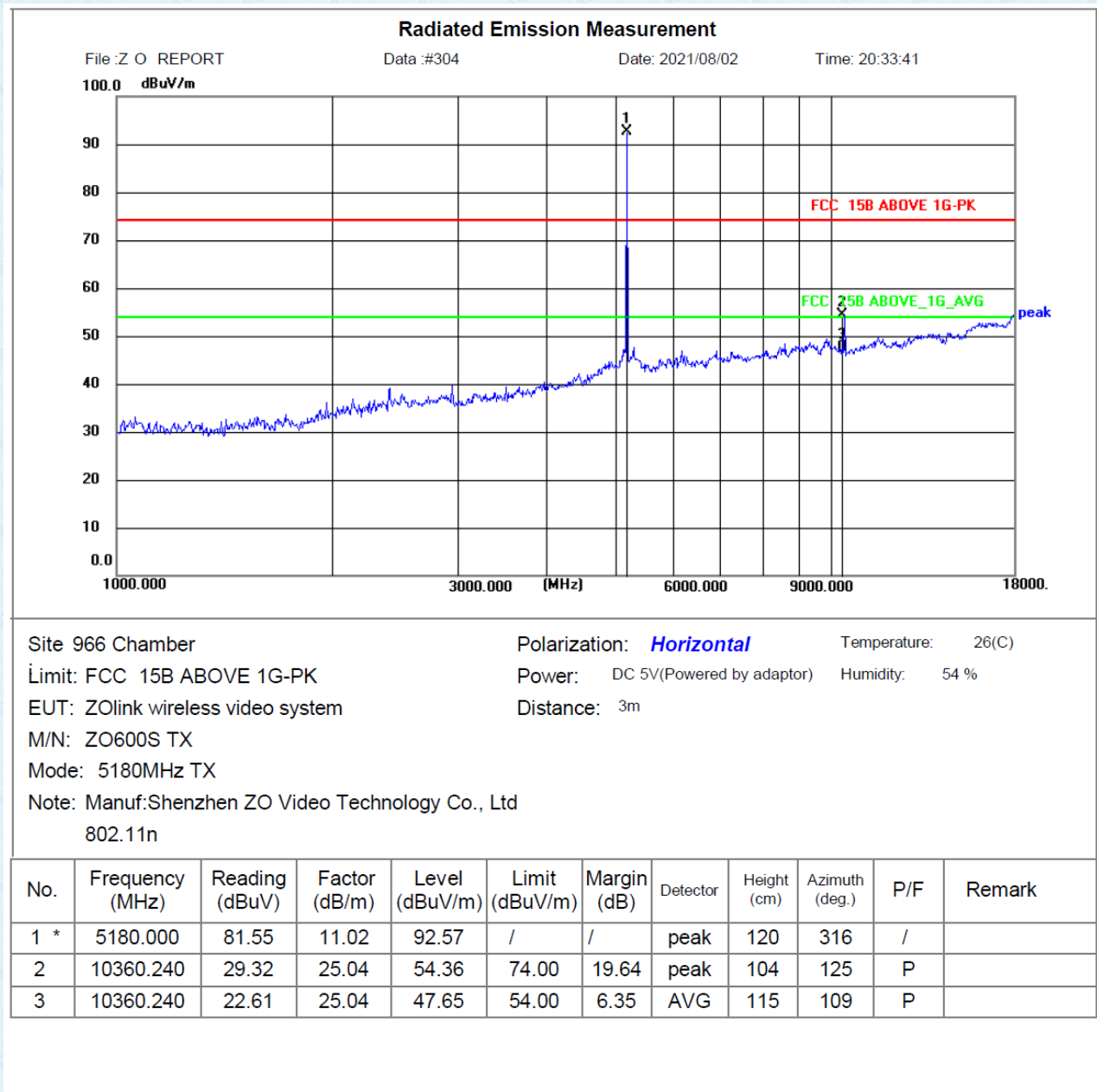
Horizontal: 802.11a (TX 5240MHz)



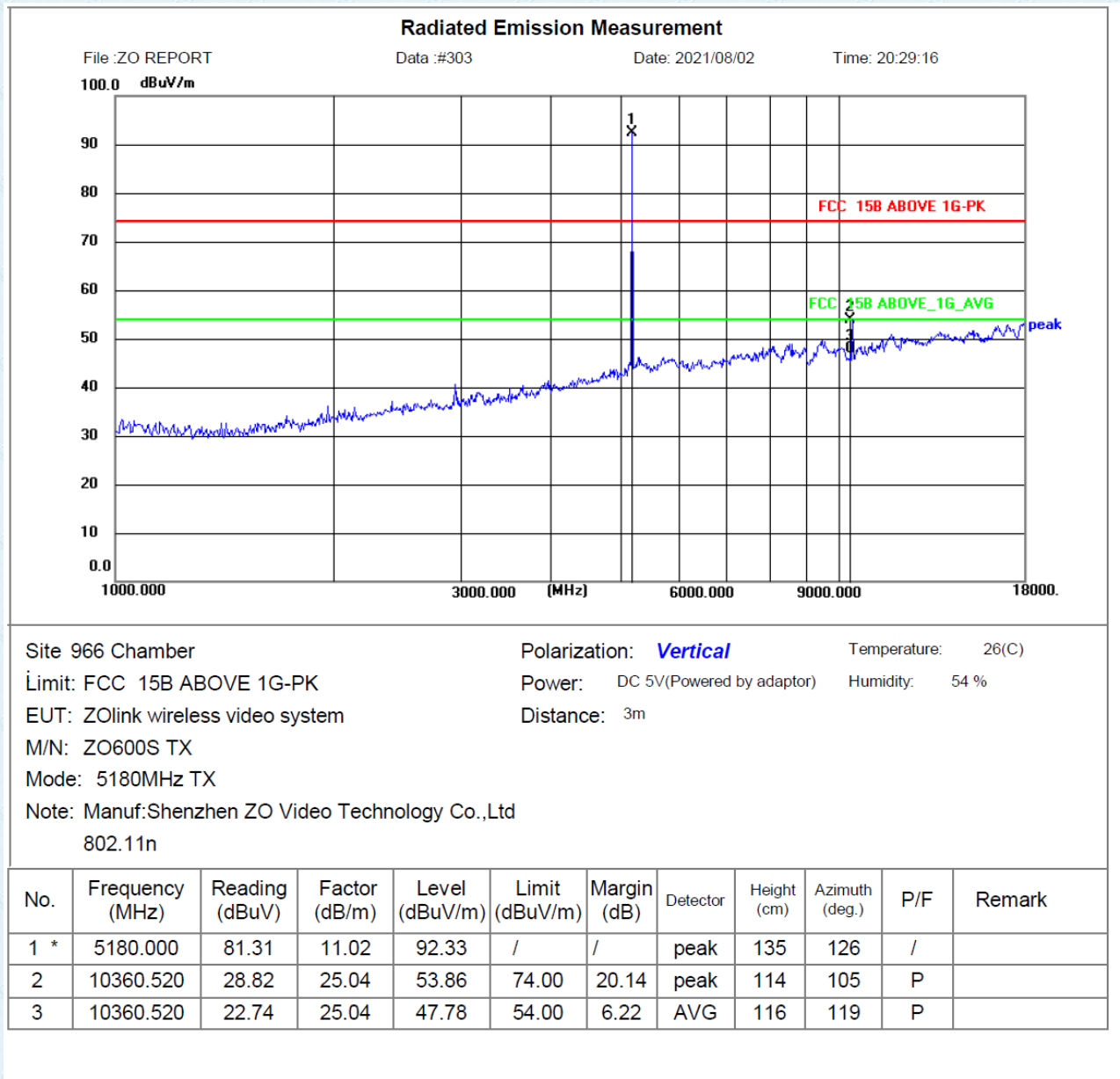
Vertical: 802.11a (TX 5240MHz)



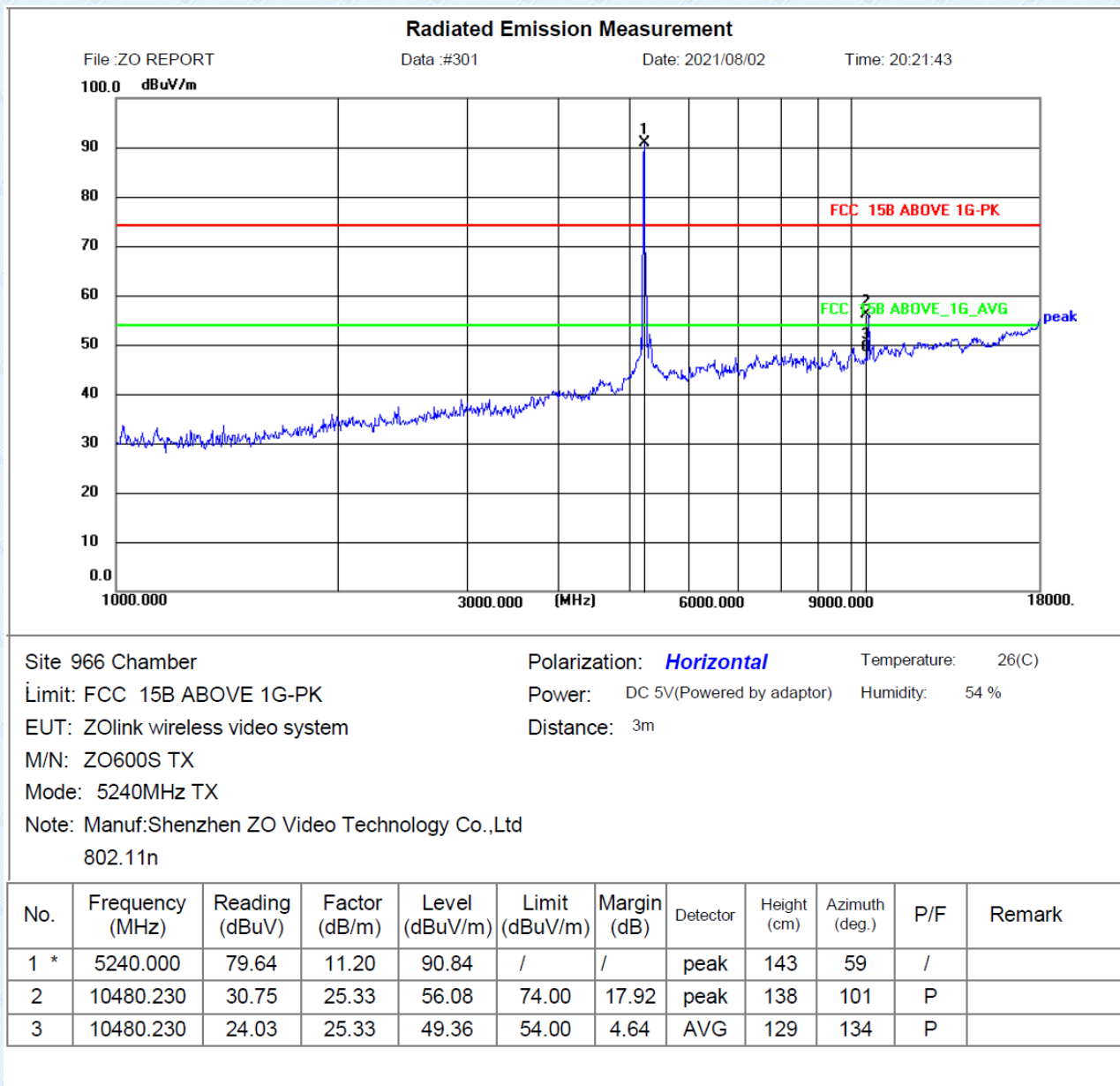
Horizontal: 802.11n-HT20 (TX 5180MHz)



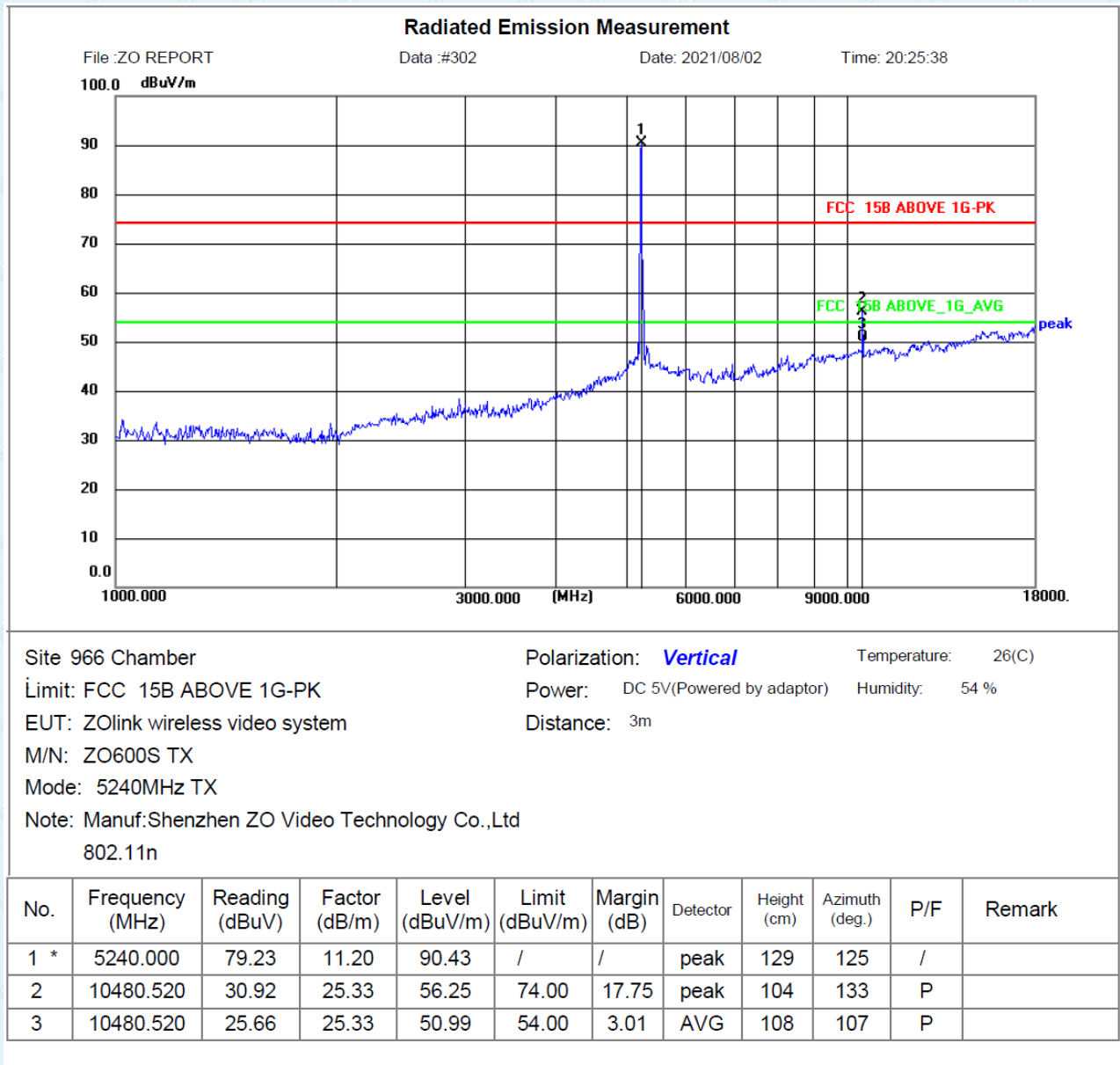
Vertical: 802.11n-HT20 (TX 5180MHz)



Horizontal: 802.11n-HT20 (TX 5240MHz)

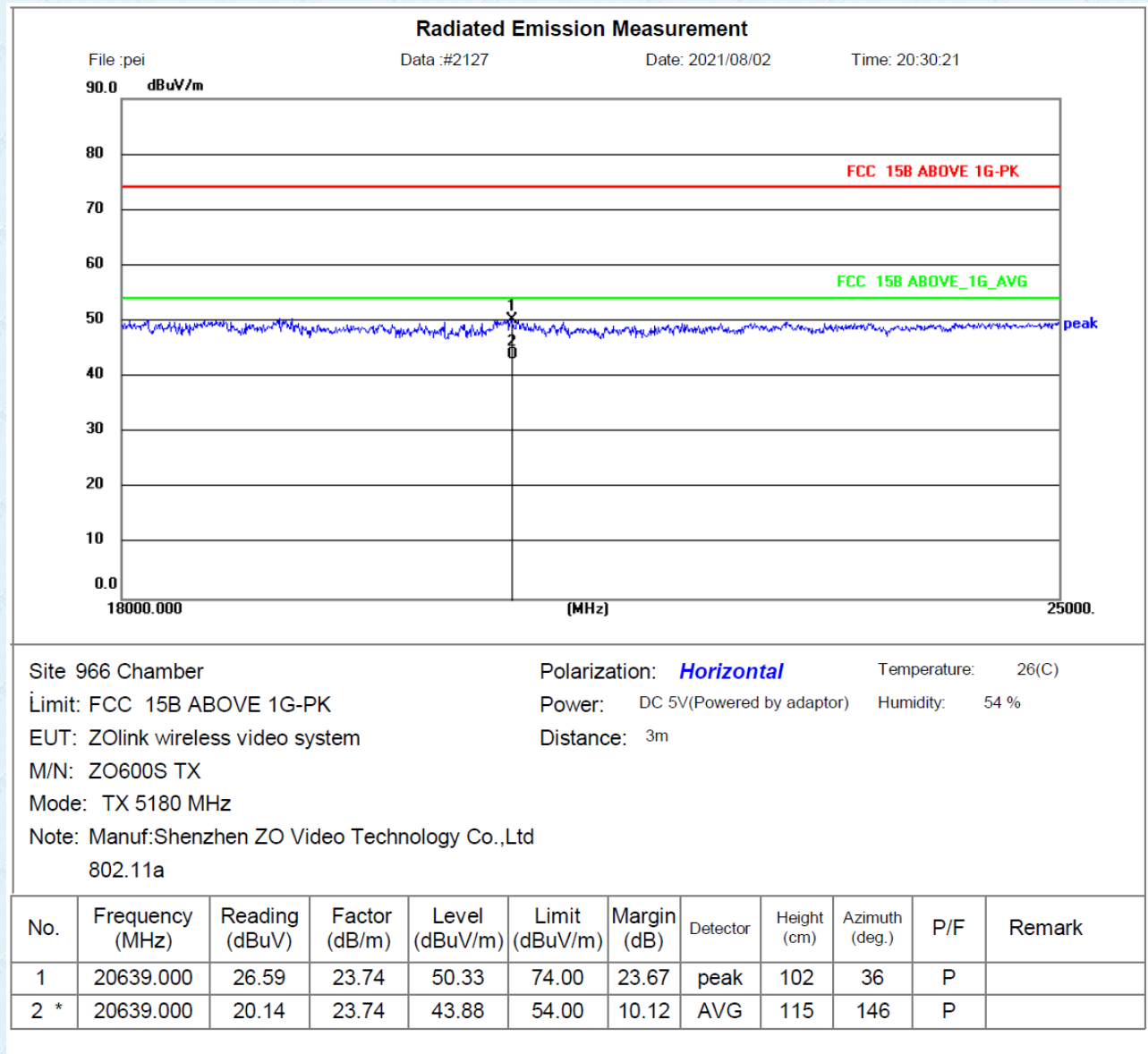


Vertical: 802.11n-HT20 (TX 5240MHz)

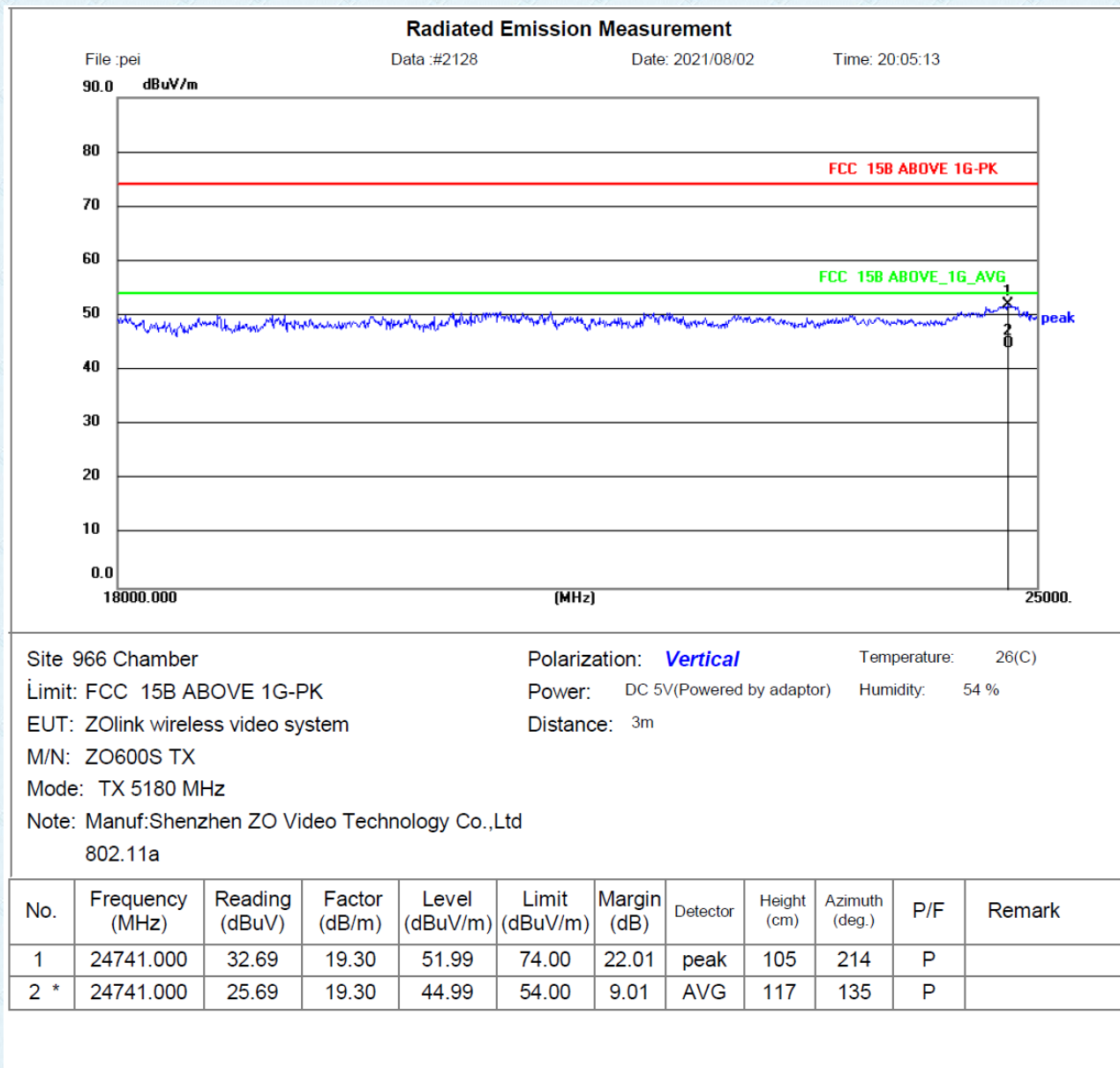


18GHz~ 25GHz

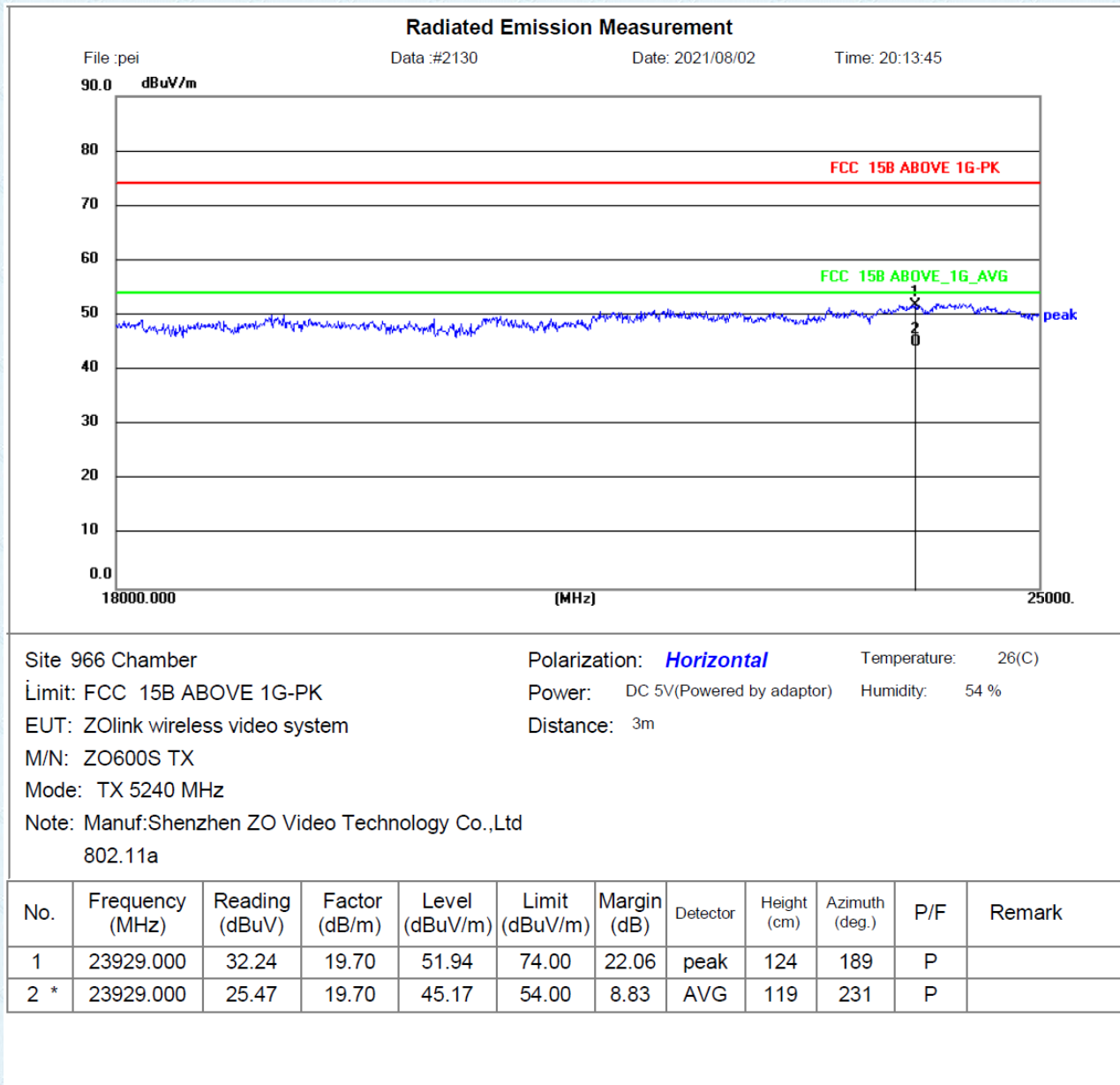
Horizontal: 802.11a (TX 5180MHz)



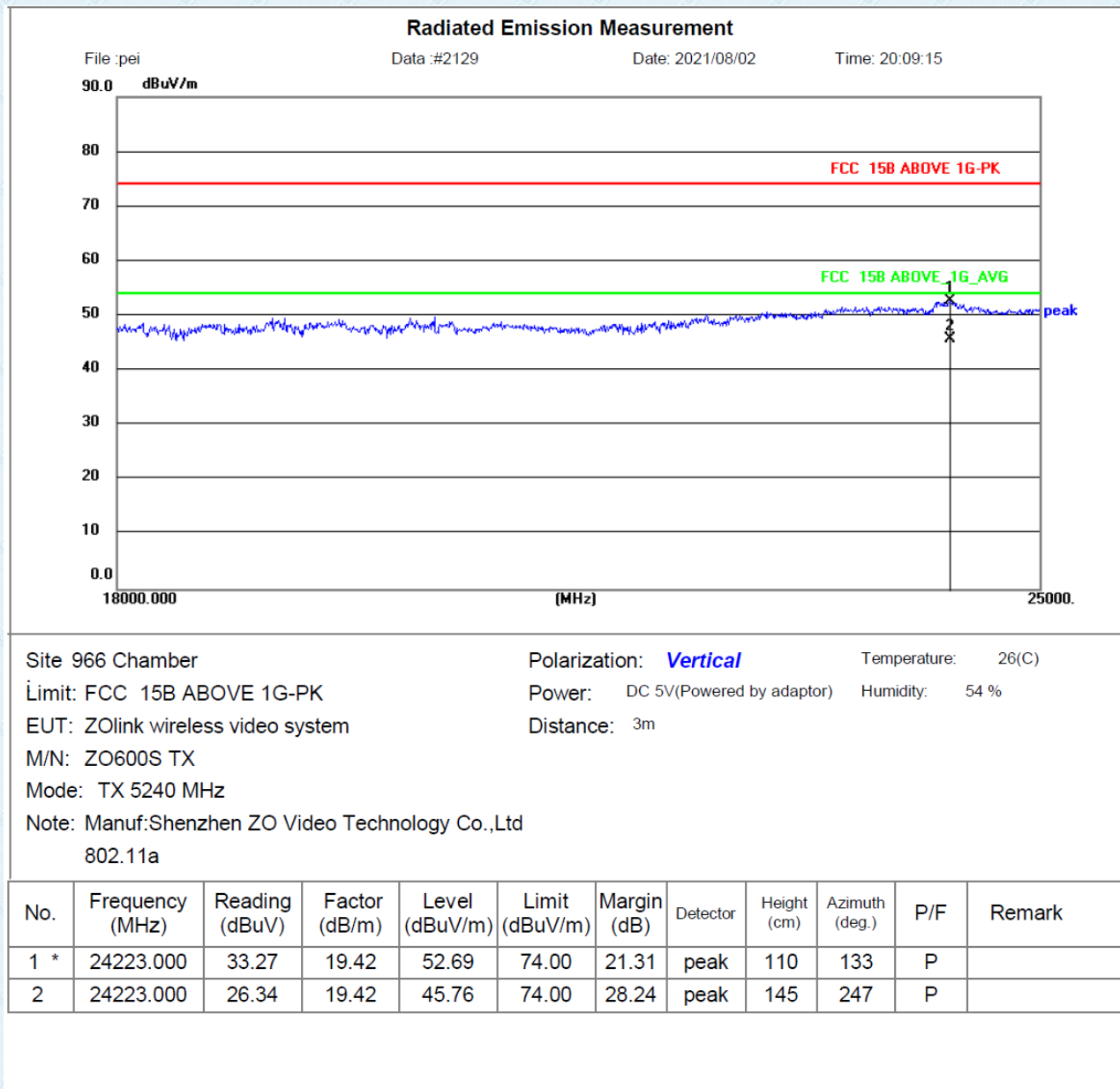
Vertical: 802.11a (TX 5180MHz)



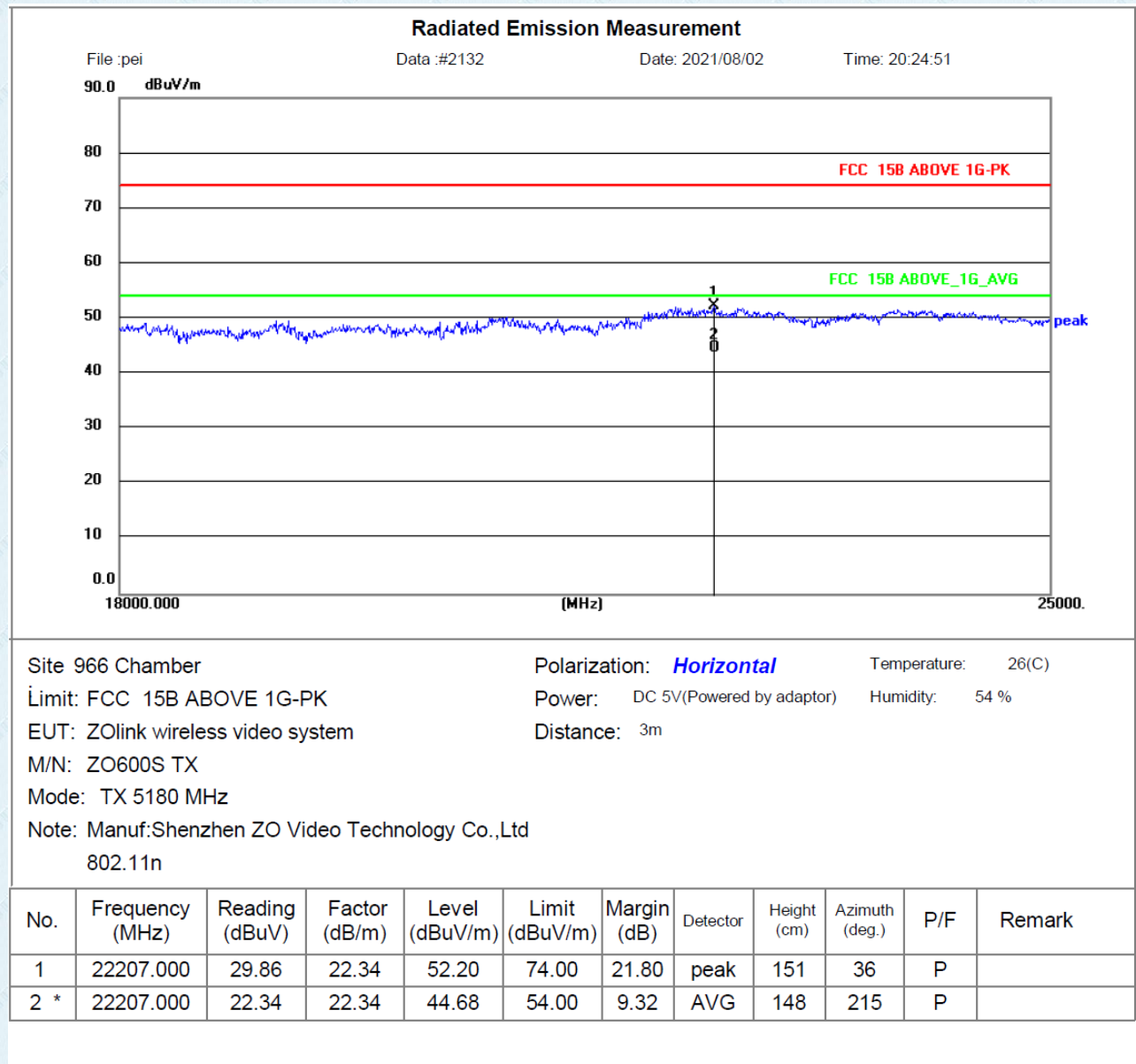
Horizontal: 802.11a (TX 5240MHz)



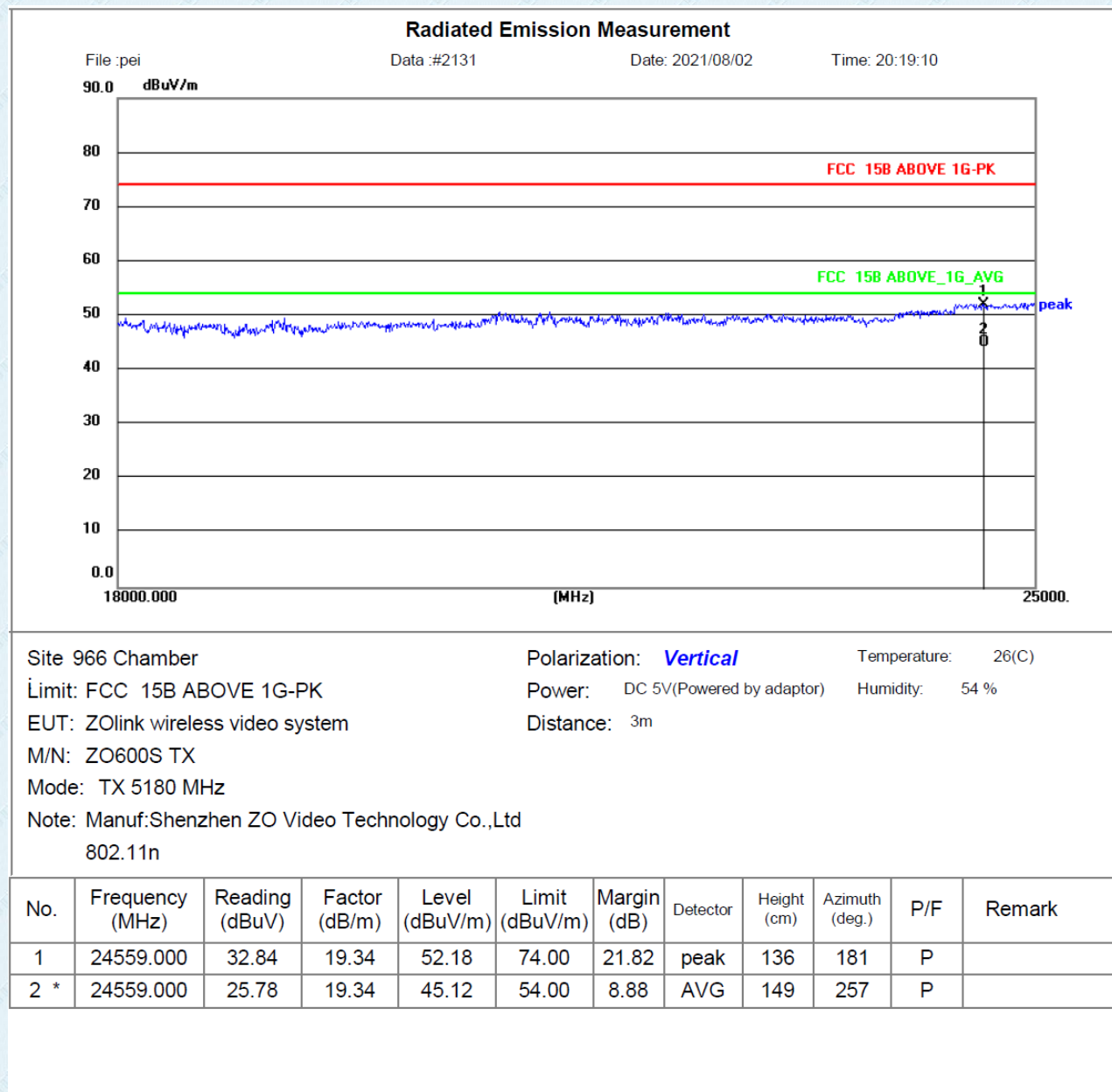
Vertical: 802.11a (TX 5240MHz)



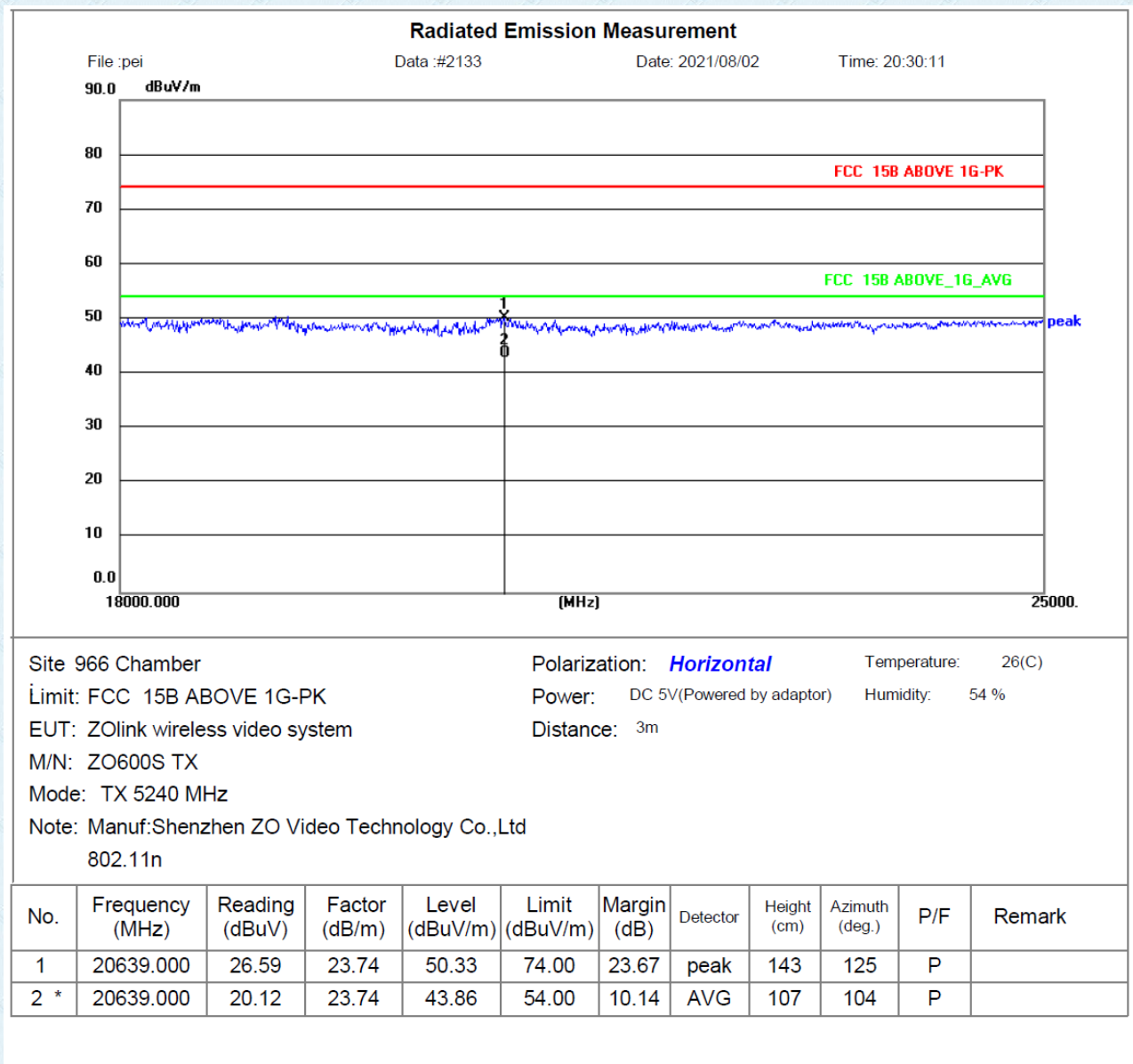
Horizontal: 802.11n-HT20 (TX 5180MHz)



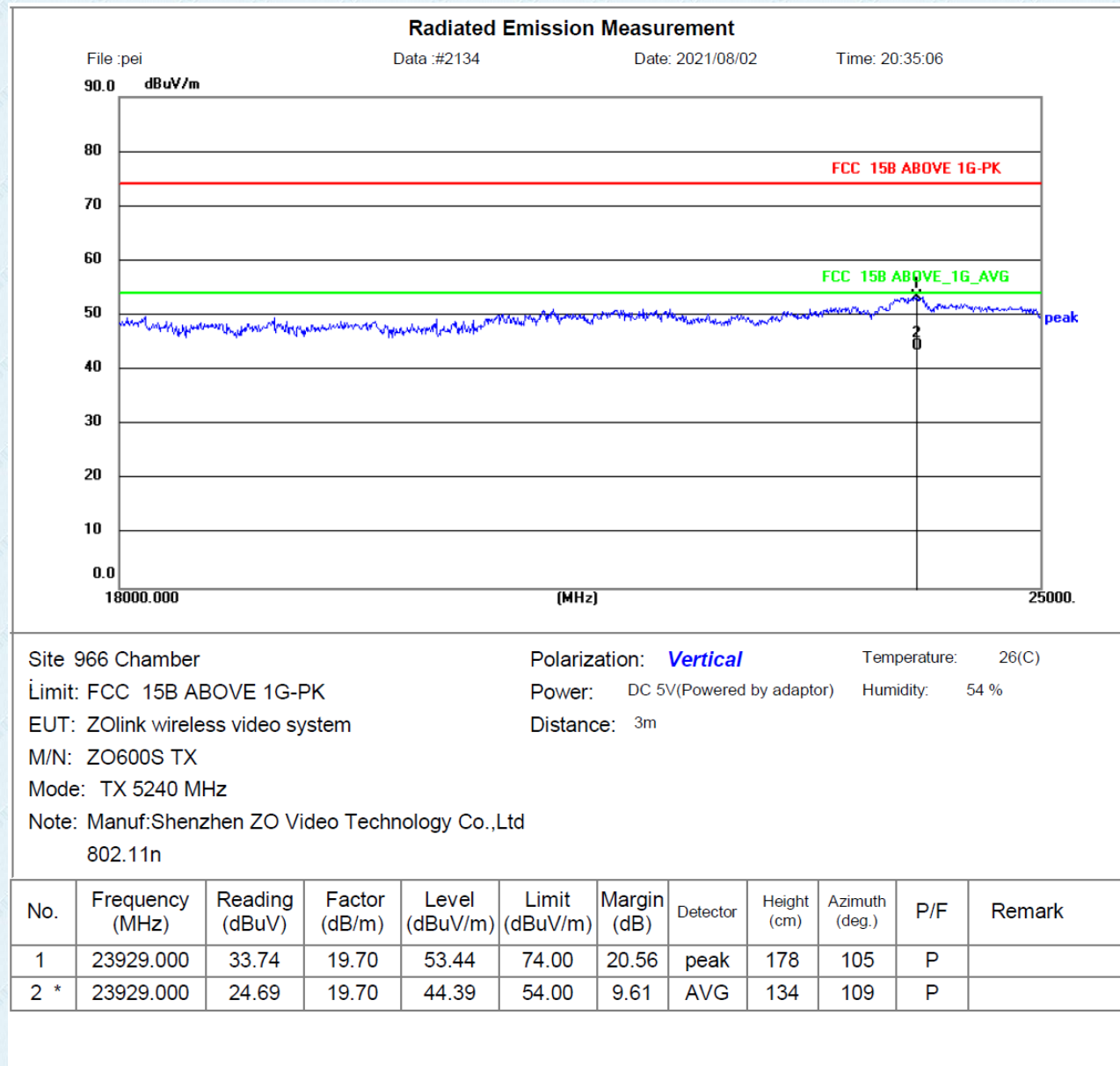
Vertical: 802.11n-HT20 (TX 5180MHz)



Horizontal: 802.11n-HT20 (TX 5240MHz)



Vertical: 802.11n-HT20 (TX 5240MHz)



Notes:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.
2. The test trace is same as the ambient noise (the test frequency range: 25GHz~40GHz), therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. We tested 802.11a/n mode the all data rate and recorded the worst case data for this channel to be 6Mbps for 802.11a mode and MCS0 for 802.11n mode.

26.5GHz~ 40GHz

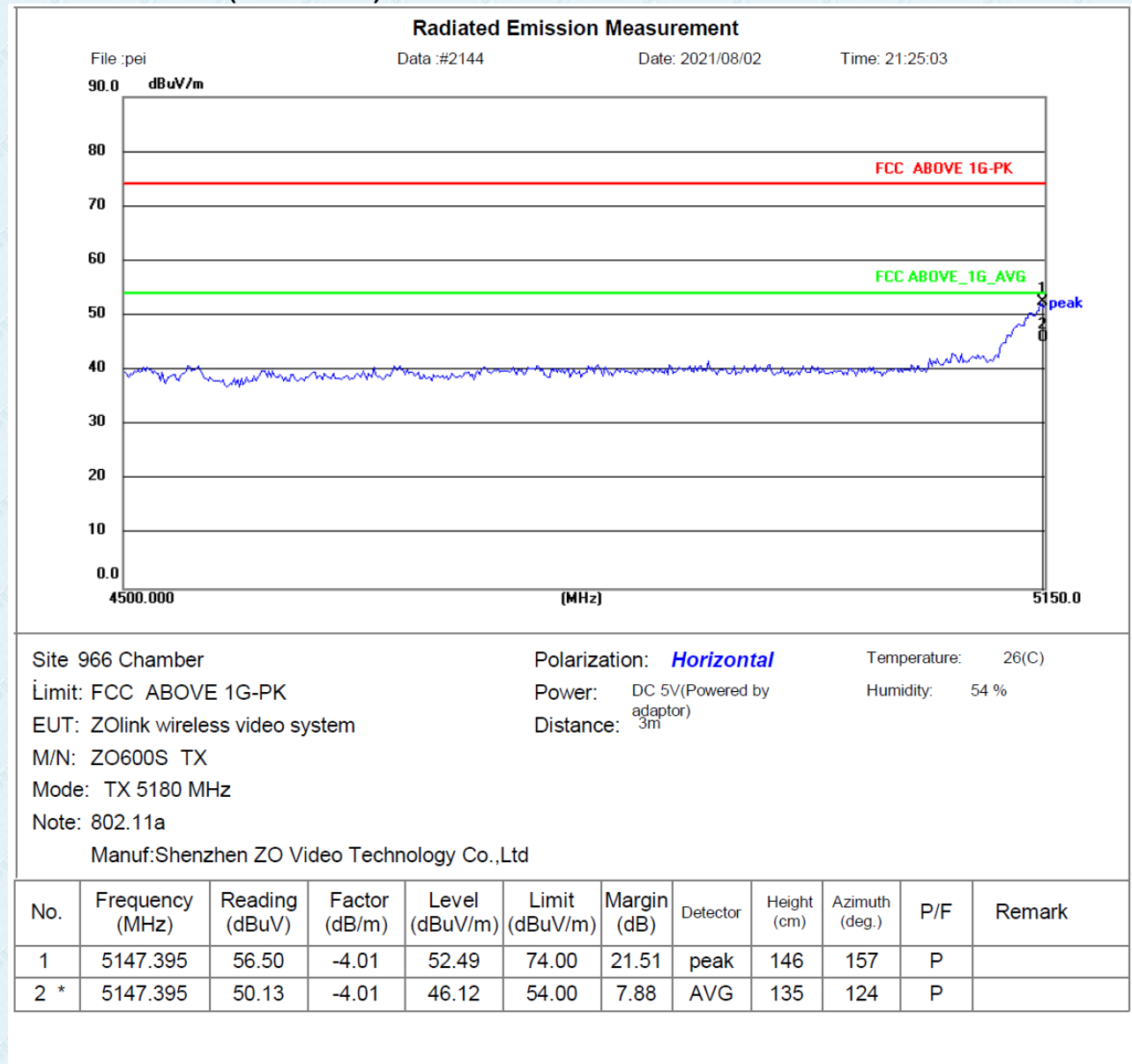
The test trace is same as the ambient noise (the test frequency range: 26.5GHz~40GHz), therefore no data appear in the report.

Notes:

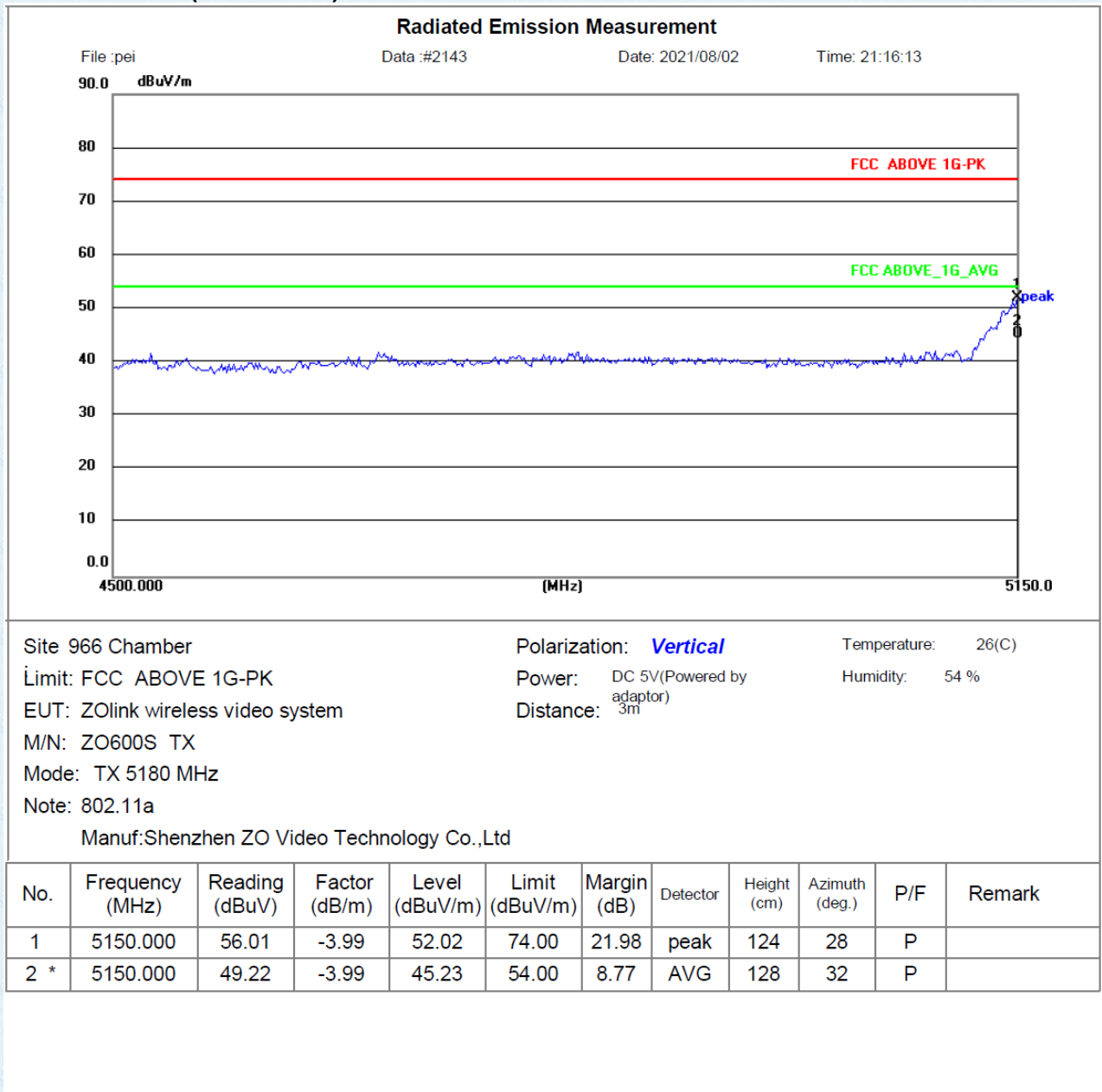
1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.
2. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Spurious Emission in restricted band:

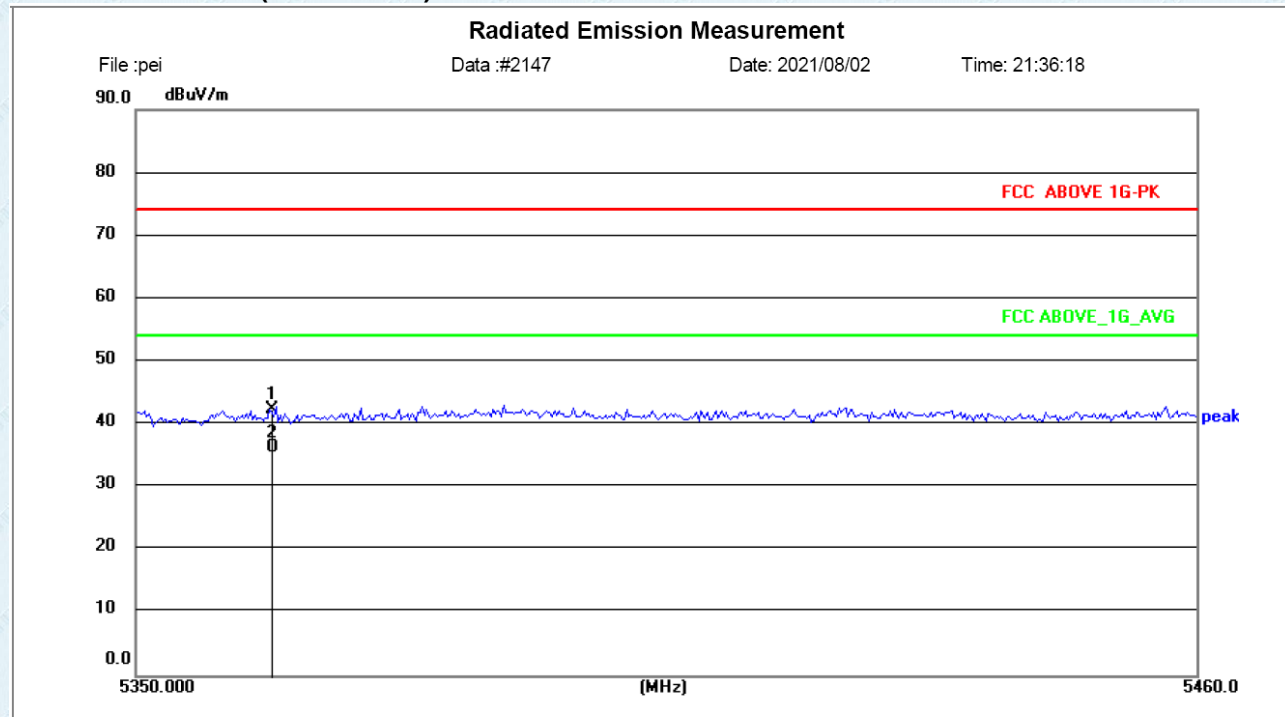
Horizontal: 802.11a (TX 5180MHz)



Vertical: 802.11a (TX 5180MHz)



Horizontal: 802.11a (TX 5240MHz)



Site 966 Chamber

Limit: FCC ABOVE 1G-PK

EUT: Vaxis wireless video system

M/N: ZO600S TX

Mode: TX 5240MHz

Note: Manuf:Shenzhen ZO Video Technology Co.,Ltd

802.11a

Polarization: **Horizontal**

Temperature: 26(C)

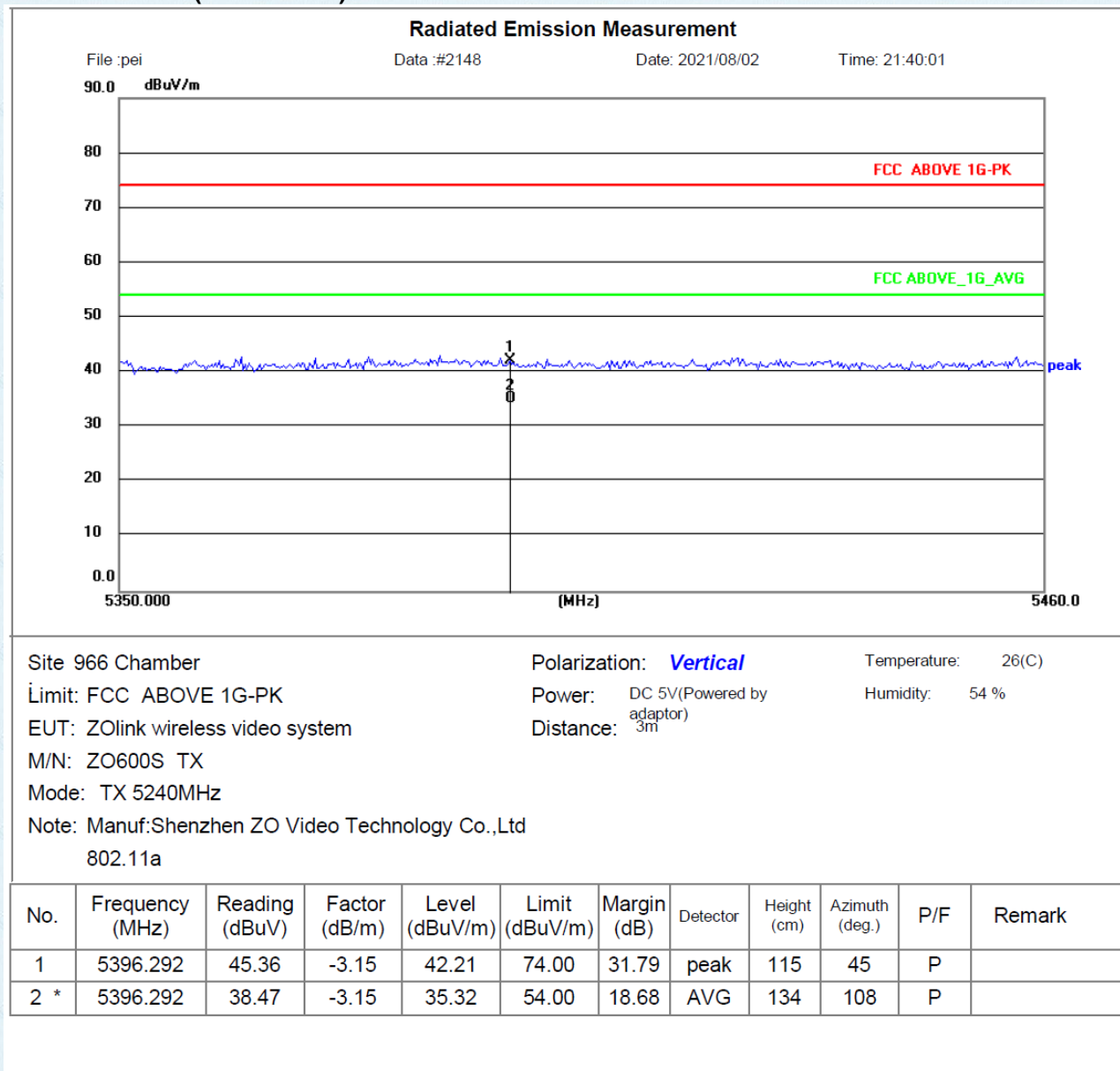
Power: DC 5V(Powered by adaptor)

Humidity: 54 %

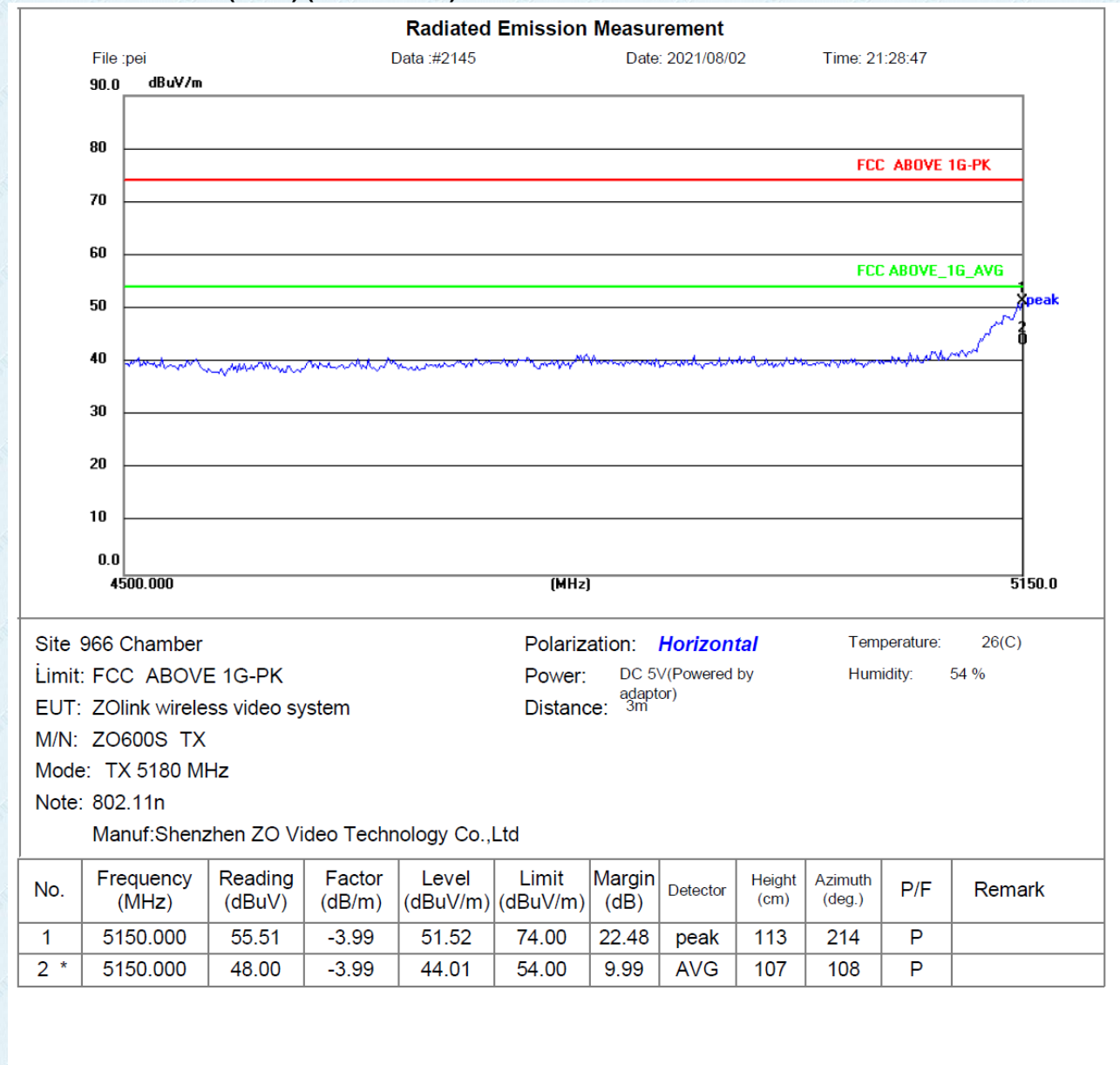
Distance: 3m

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	5363.888	45.74	-3.26	42.48	74.00	31.52	peak	127	144	P	
2 *	5363.888	39.68	-3.26	36.42	54.00	17.58	AVG	135	135	P	

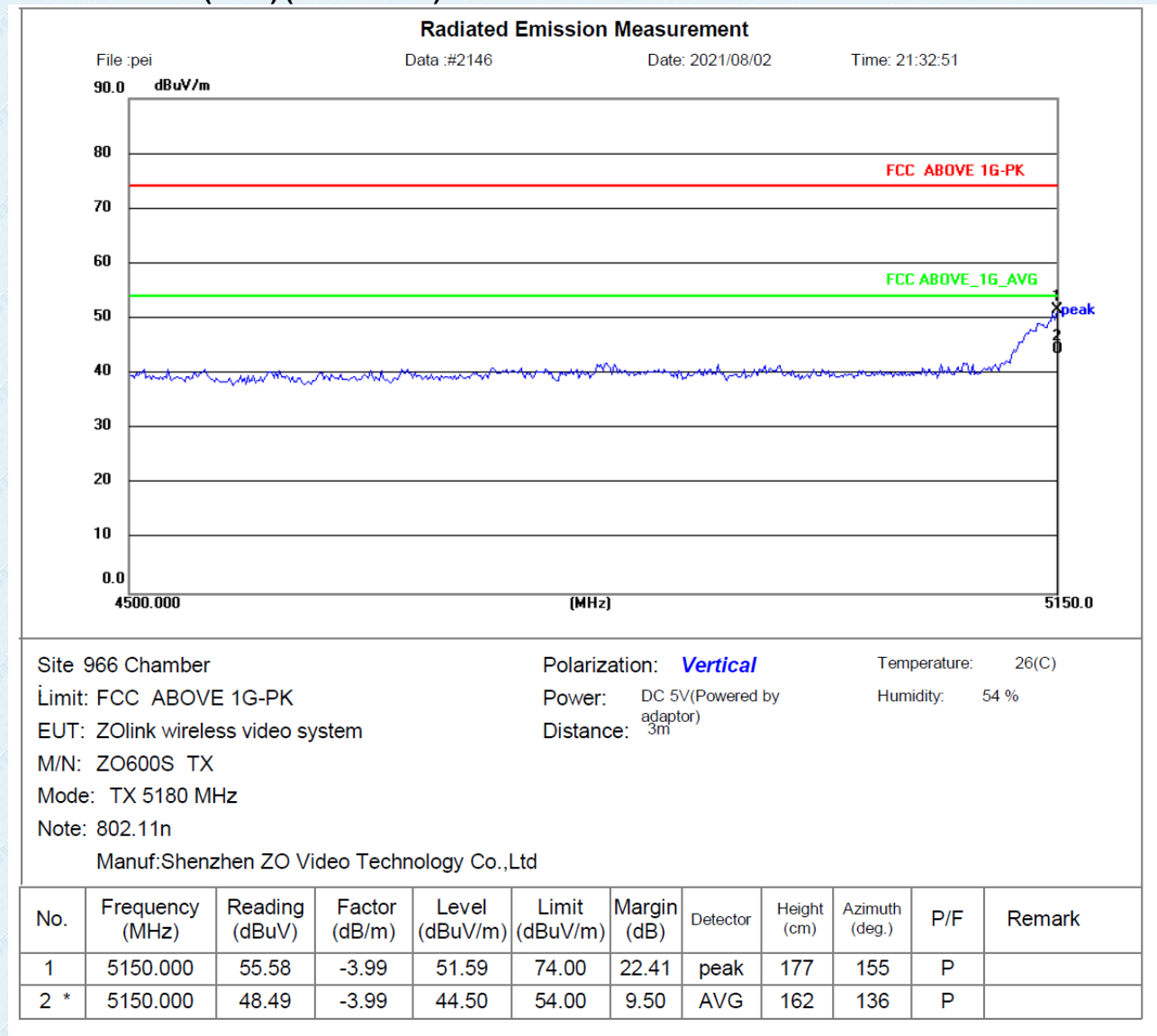
Vertical: 802.11a (TX 5240MHz)



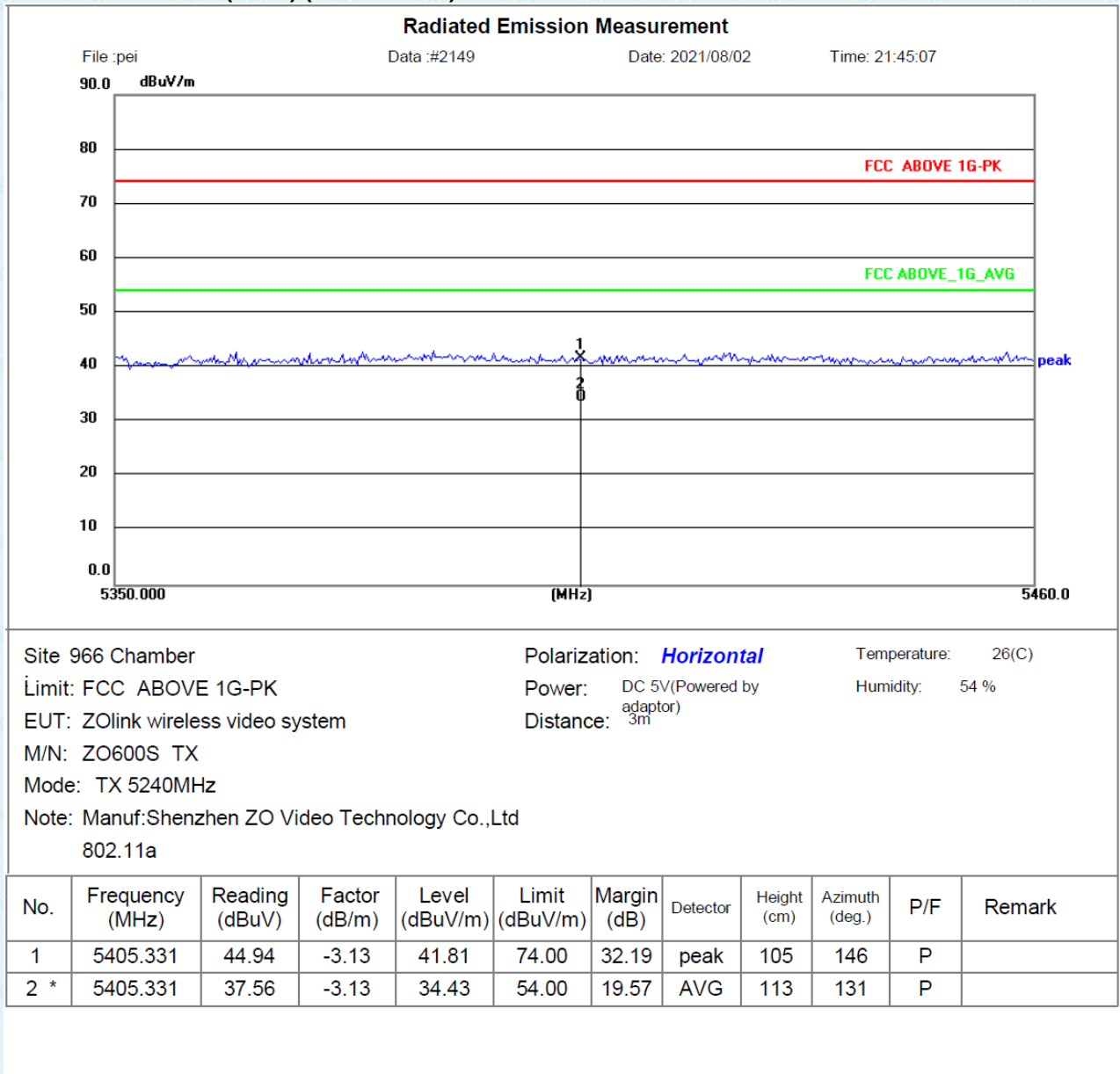
Horizontal: 802.11n (HT20) (TX 5180MHz)



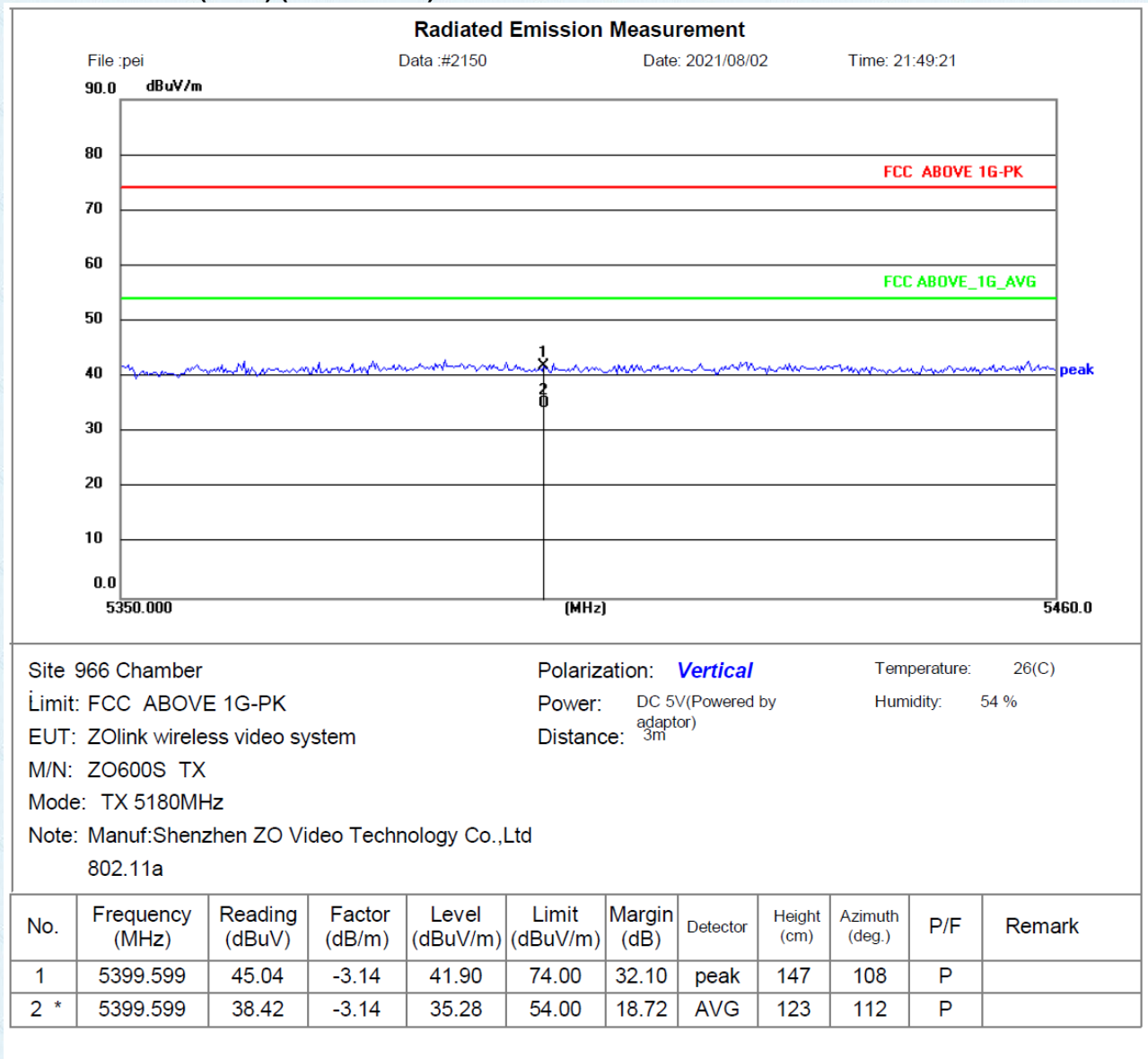
Vertical: 802.11n (HT20) (TX 5180MHz)



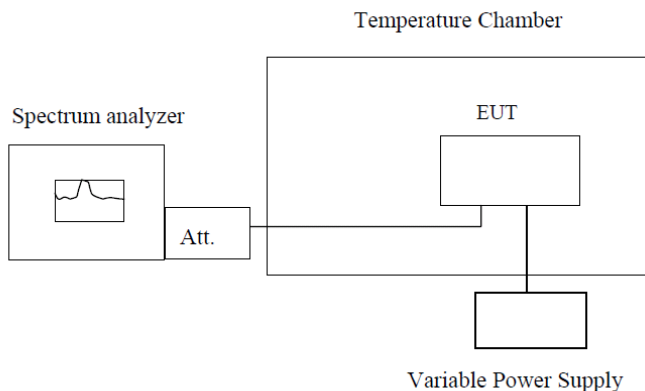
Horizontal: 802.11n (HT20) (TX 5240MHz)



Vertical: 802.11n (HT20) (TX 5240MHz)



7.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures 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
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 <p>Note : Measurement setup for testing on Antenna connector</p>
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Pre-scan all test modes, found worst case at 802.11a, and so only show the test result of 802.11a

Measurement data:

Frequency stability versus Temp.									
Worse Case Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5179.99	Pass	5180.00	Pass	5179.97	Pass	5179.98	Pass
-20	120	5179.97	Pass	5179.99	Pass	5179.99	Pass	5179.98	Pass
-10	120	5179.99	Pass	5179.98	Pass	5180.00	Pass	5179.99	Pass
0	120	5179.98	Pass	5179.99	Pass	5179.99	Pass	5180.01	Pass
10	120	5180.00	Pass	5180.01	Pass	5179.98	Pass	5179.99	Pass
20	120	5180.00	Pass	5179.99	Pass	5179.99	Pass	5179.98	Pass
30	120	5179.99	Pass	5179.98	Pass	5180.00	Pass	5179.98	Pass
40	120	5179.98	Pass	5179.99	Pass	5179.99	Pass	5179.99	Pass
50	120	5179.97	Pass	5179.99	Pass	5179.98	Pass	5180.00	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	120	5179.99	Pass	5180.00	Pass	5180.00	Pass	5179.99	Pass

Frequency stability versus Temp.									
Worse Case Operating Frequency: 5240MHz									
Temp. (°C)	Power Supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5239.98	Pass	5239.99	Pass	5239.99	Pass	5240.00	Pass
-20	120	5239.99	Pass	5239.99	Pass	5239.98	Pass	5239.99	Pass
-10	120	5239.99	Pass	5240.00	Pass	5240.00	Pass	5239.99	Pass
0	120	5240.00	Pass	5239.99	Pass	5239.99	Pass	5240.00	Pass
10	120	5239.99	Pass	5239.98	Pass	5239.99	Pass	5239.99	Pass
20	120	5239.98	Pass	5239.99	Pass	5240.00	Pass	5239.98	Pass
30	120	5239.99	Pass	5239.99	Pass	5239.98	Pass	5239.98	Pass
40	120	5239.98	Pass	5239.99	Pass	5239.99	Pass	5239.99	Pass
50	120	5240.00	Pass	5240.00	Pass	5239.99	Pass	5239.99	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5240MHz									
Temp. (°C)	Power Supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	120	5240.00	Pass	5239.99	Pass	5239.98	Pass	5239.99	Pass

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

---END---