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# TEST REPORT

## FCC PART 15 SUBPART C 15.247

Report Reference No. .... : CTL2205072101-WF

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Product Name ..... : UHF RFID Reader

Model/Type reference ..... : UR-008

List Model(s)..... : N/A

Trade Mark..... : SID

FCC ID ..... : 2AIUA-UR-008

Applicant's name ..... : SID Global Sdn Bhd

Address of applicant ..... : 11 BK 5A / 2 Bandar Kinrara, 47100 Puchong, Selangor, Malaysia

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 FCC Part 15 Subpart C 15.247

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

Master TRF ..... : Dated 2011-01

Date of receipt of test item ..... : Jun. 16, 2022

Date of sampling ..... : Jun. 16, 2022

Date of Test Date..... : Jun. 16, 2022- Jul. 27, 2022

Date of Issue ..... : Jul. 28, 2022

Result ..... : Pass

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# TEST REPORT

<b>Test Report No.:</b>	<b>CTL2205072101-WF</b>	Jul. 28, 2022
		Date of issue

Equipment under Test : UHF RFID Reader

Sample No. : CTL220507210-1-S001(Normal sample)  
CTL220507210-1-S002(Engineer sample)

Model /Type : UR-008

Listed Models : N/A

**Applicant** : **SID Global Sdn Bhd**

Address : 11 BK 5A / 2 Bandar Kinrara, 47100 Puchong,  
Selangor, Malaysia

**Manufacturer** : **SHENZHEN SID Co.,LTD**

Address : Block A, 4th Floor, Zhong Jin Industrial Park, NO.3  
PuSha South Road. ShaHu Village, TangXia Town,  
DongGuan City, GuangDong Province, China

<b>Test result</b>	<b>Pass *</b>
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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:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

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

[558074 D01 15.247 Meas Guidance v05r02](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules

## 1.2. Test Description

FCC PART 15 Subpart C		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious Emission and Band Edge	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency	PASS
FCC Part 15.247(a)(1)(iii)	Time of Occupancy	PASS

Remark: The measurement uncertainty is not included in the test result.

### 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, Shaheji Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

#### 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: 2005 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: 2005 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 on Jan. 22, 2019.

##### **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, December 08, 2017.

### 1.4. 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 conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 9KHz~30MHz	±3.40dB	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)

Radiated Emission Above 1GHz	$\pm 4.32\text{dB}$	(1)
Conducted Disturbance 0.15~30MHz	$\pm 3.20\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

## 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:	UHF RFID Reader
Model/Type reference:	UR-008
Power supply:	AC 120V/60Hz
Hardware version:	V1.0
Software version:	V1.0
<b>UHF RFID</b>	
Operation frequency	902.5-927.5 MHz
Modulation Type	GFSK
Channel number:	51
Channel separation:	0.5MHz
Antenna type:	External Antenna
Antenna amount:	8
MIMO:	Not support
Antenna gain:	8dBi

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

### 2.3. Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. There are 51 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel.

Test Mode	Test Channel	Test Frequency
1	Low Channel	902.5 MHz
2	Middle Channel	915.0 MHz
3	High Channel	927.5 MHz

#### Operation Frequency :

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	902.5	21	912.5	41	922.5
02	903.0	22	913.0	42	923.0
03	903.5	23	913.5	43	923.5
04	904.0	24	914.0	44	924.0
05	904.5	25	914.5	45	924.5
06	905.0	26	915.0	46	925.0
07	905.5	27	915.5	47	925.5
08	906.0	28	916.0	48	926.0

09	906.5	29	916.5	49	926.5
10	907.0	30	917.0	50	927.0
11	907.5	31	917.5	51	927.5
12	908.0	32	918.0	--	--
13	908.5	33	918.5	--	--
14	909.0	34	919.0	--	--
15	909.5	35	919.5	--	--
16	910.0	36	920.0	--	--
17	910.5	37	920.5	--	--
18	911.0	38	921.0	--	--
19	911.5	39	921.5	--	--
20	912.0	40	922.0	--	--

Note: The line display in grey were the channel selected for testing

#### Power setting during the test:

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Test Software Version	RRU2889 Demo V2.2		
Channel	Low channel	Mid channel	High channel
Power Level	21	21	21

## 2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2022/05/07	2023/05/06
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2020/04/07	2023/04/06
Horn Antenna	Ocean Microwave	OBH100400	26999002	2019/11/28	2022/11/27
EMI Test Receiver	R&S	ESCI	1166.5950.0 3	2022/05/07	2023/05/06
Spectrum Analyzer	Agilent	E4407B	MY41440676	2022/05/07	2023/05/06
Spectrum Analyzer	Agilent	N9020A	US46220290	2022/05/07	2023/05/06
Spectrum Analyzer	Keysight	N9020A	MY53420874	2022/05/07	2023/05/06
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/12/23	2024/12/22
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/05/12
Amplifier	Agilent	8449B	3008A02306	2022/05/07	2023/05/06
Amplifier	Agilent	8447D	2944A10176	2022/05/06	2023/05/05
Amplifier	Brief&Smart	LNA-4018	2104197	2022/05/07	2023/05/06
Temperature/Humi	Ji Yu	MC501	/	2022/05/07	2023/05/06

dity Meter					
Power Sensor	Agilent	U2021XA	MY55130004	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130006	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY54510008	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55060003	2022/05/07	2023/05/06
Spectrum Analyzer	RS	FSP	1164.4391.3 8	2022/05/07	2023/05/06
RF Cable	Megalon	RF-A303	N/A	2021/06/15	2022/06/14
RF Control Unit	Tonsecnd	JS0806-2	20J8060323	2022/05/07	2023/05/06
Test Software					
Name of Software			Version		
JS1120-3			2.6.880341		
EZ_EMG(Below 1GHz)			V1.1.4.2		
EZ_EMG((Above 1GHz)			V1.1.4.2		

The calibration interval was one year

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

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

## 2.6. Modifications

No modifications were implemented to meet testing criteria.

### 3. TEST CONDITIONS AND RESULTS

#### 3.1. Conducted Emissions Test

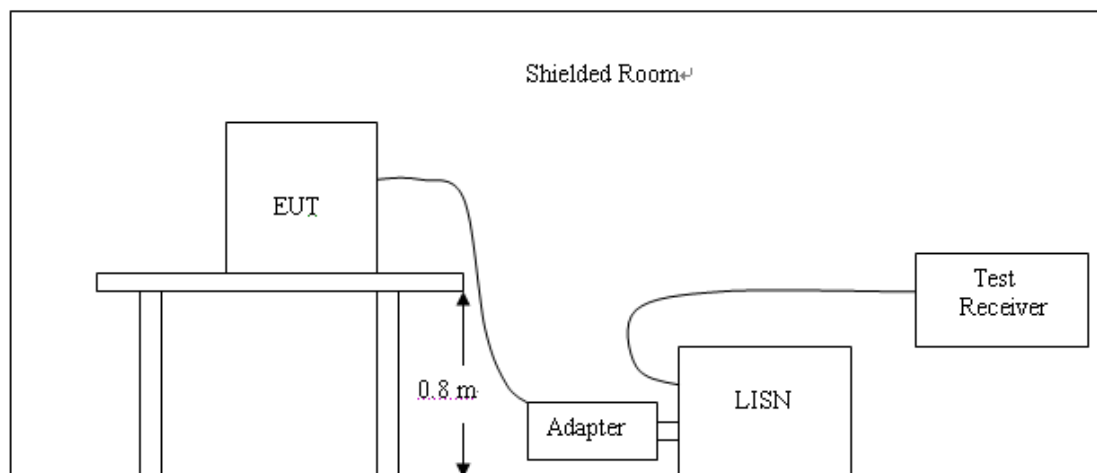
##### LIMIT

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207 and RSS Gen 8.8, 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



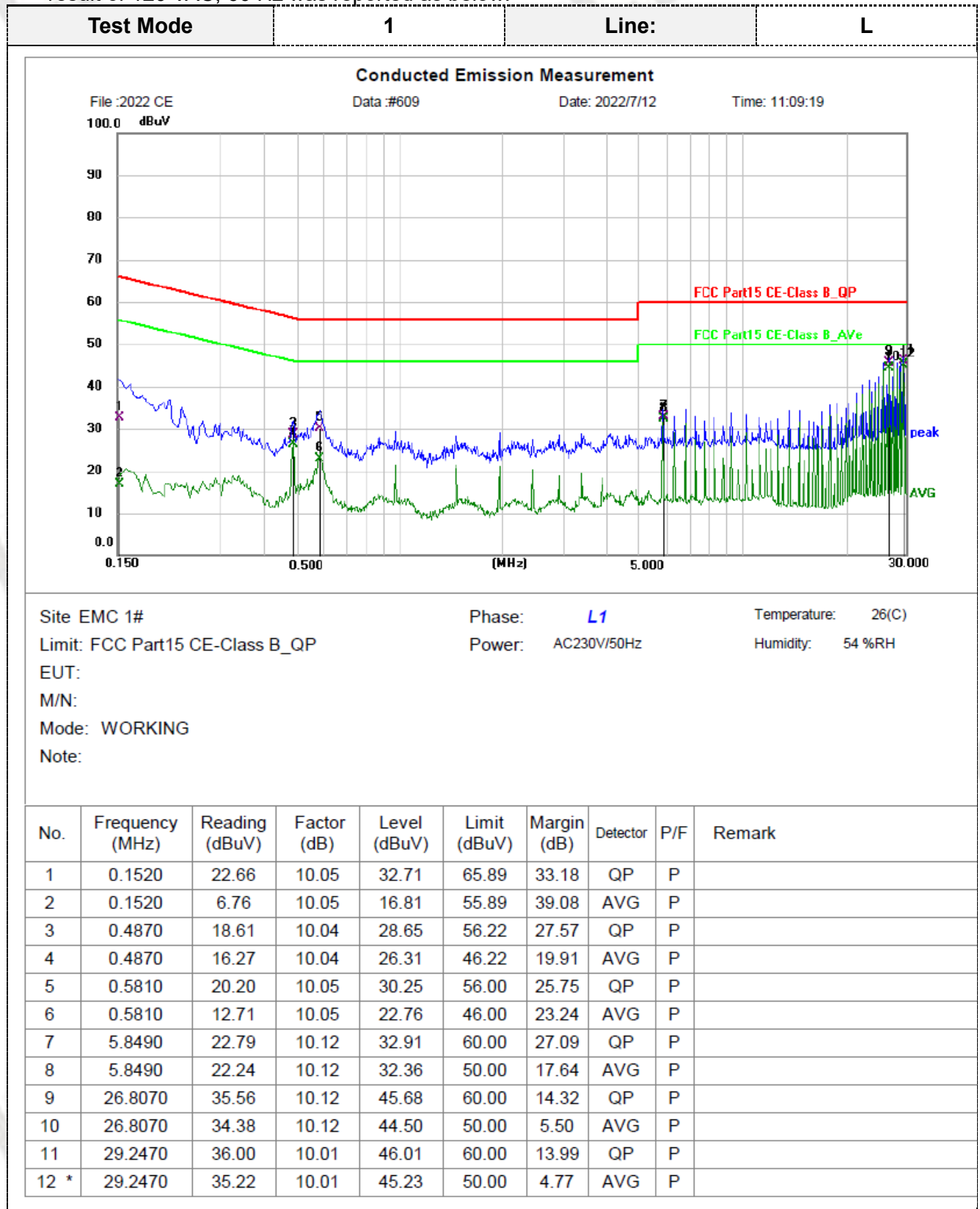
##### TEST PROCEDURE

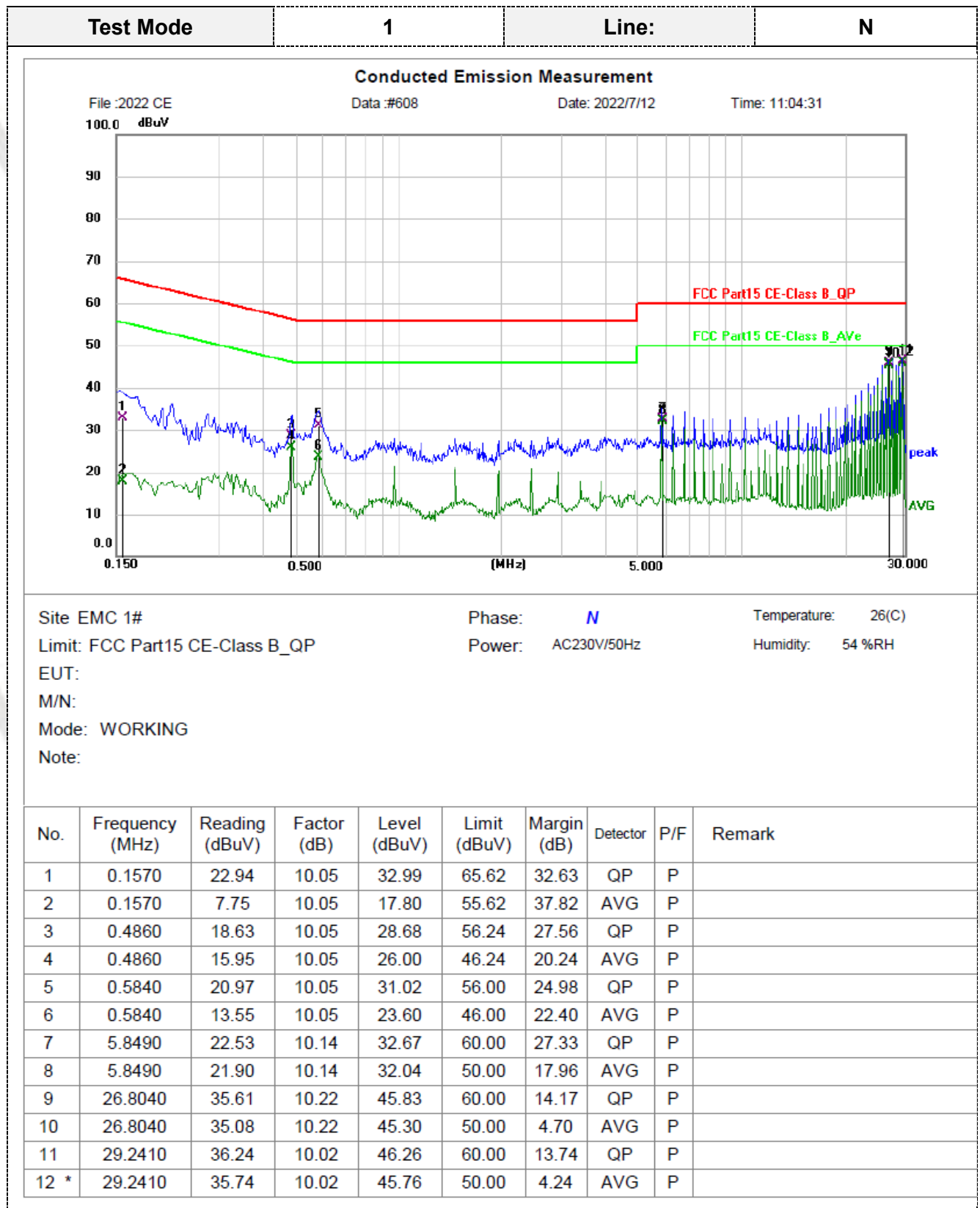
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as 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:

1. All modes were tested; only the worst result of antenna 4 test mode 1 was reported as below:
2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:





Remark: Level(dBuV)=Reading(dBuV) + Factor(dB)

Margin=Limit(dBuV/m)- Level(dBuV/m)

### 3.2. Radiated Emissions and Band Edge

#### Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

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)

For intentional device, according to RSS-Gen section 8.9, the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

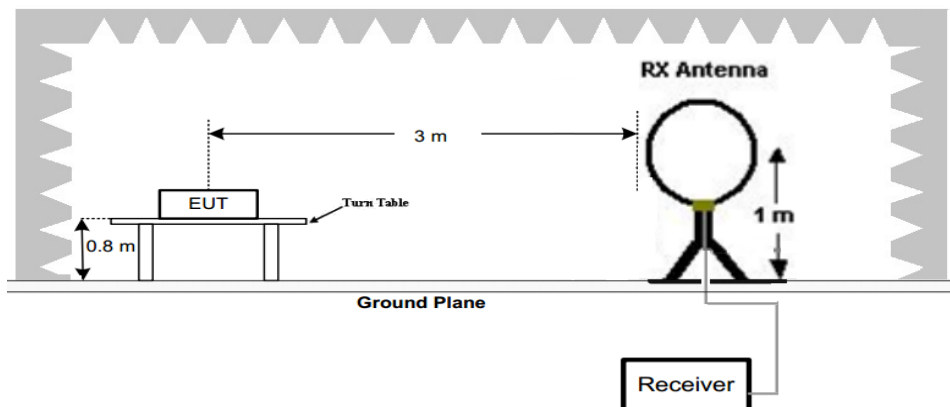
In addition, radiated emissions which fall in the restricted bands, as defined in RSS-Gen section 8.10, must also comply with the radiated emission limits specified in RSS-Gen section 8.9

Radiated emission limits

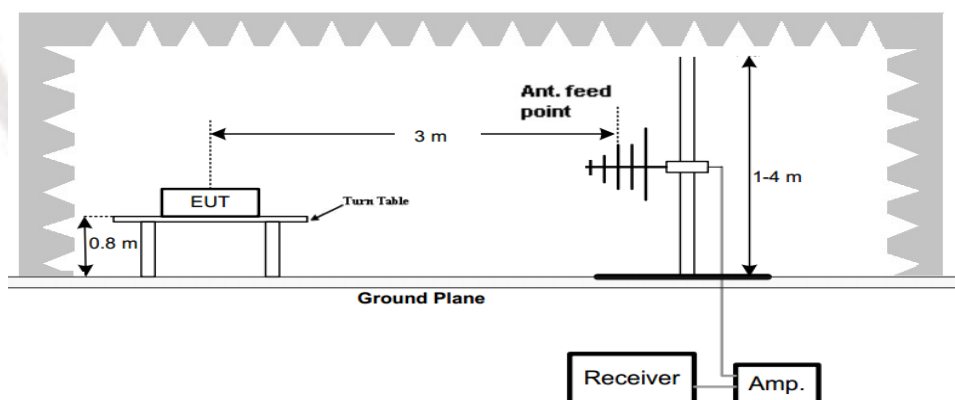
Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3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

#### TEST CONFIGURATION

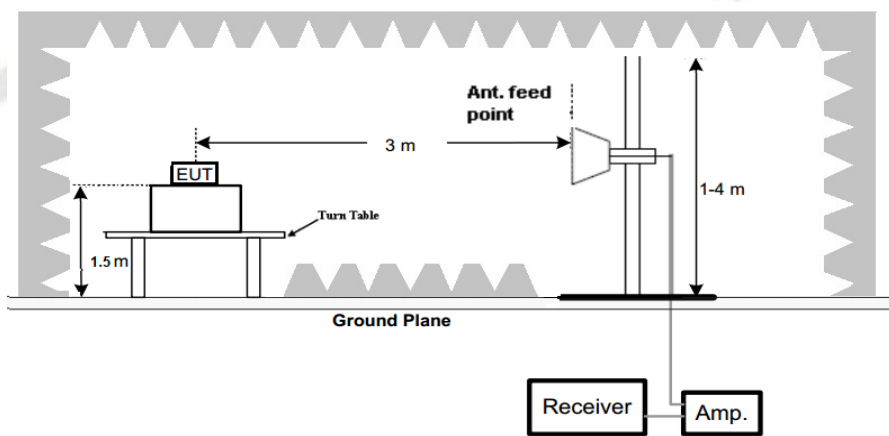
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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

**Test Procedure**

- 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.
- 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
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- Radiated emission test frequency band from 9KHz to 25GHz.
- 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

- Setting test receiver/spectrum as following table states:

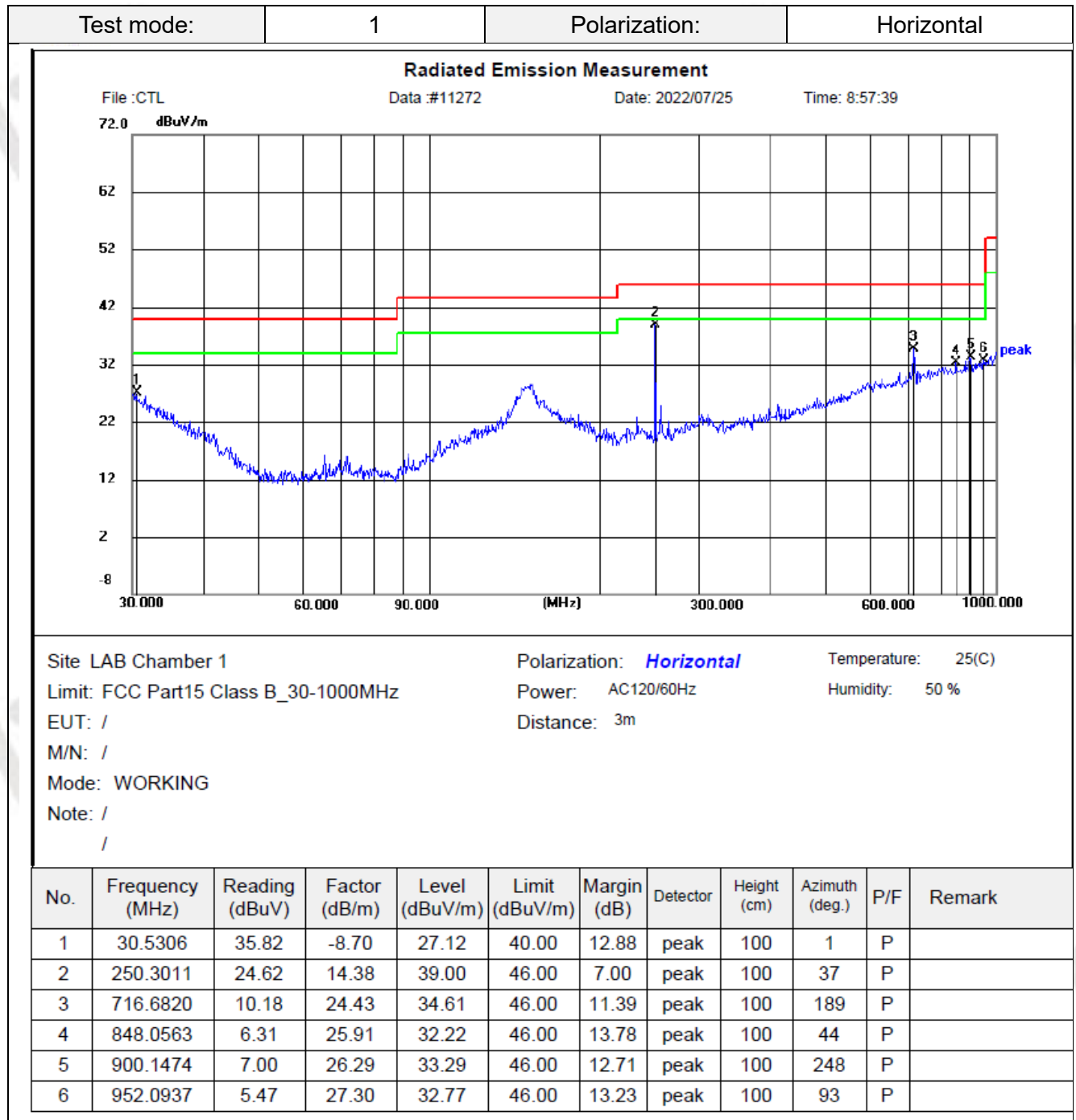
Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz,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

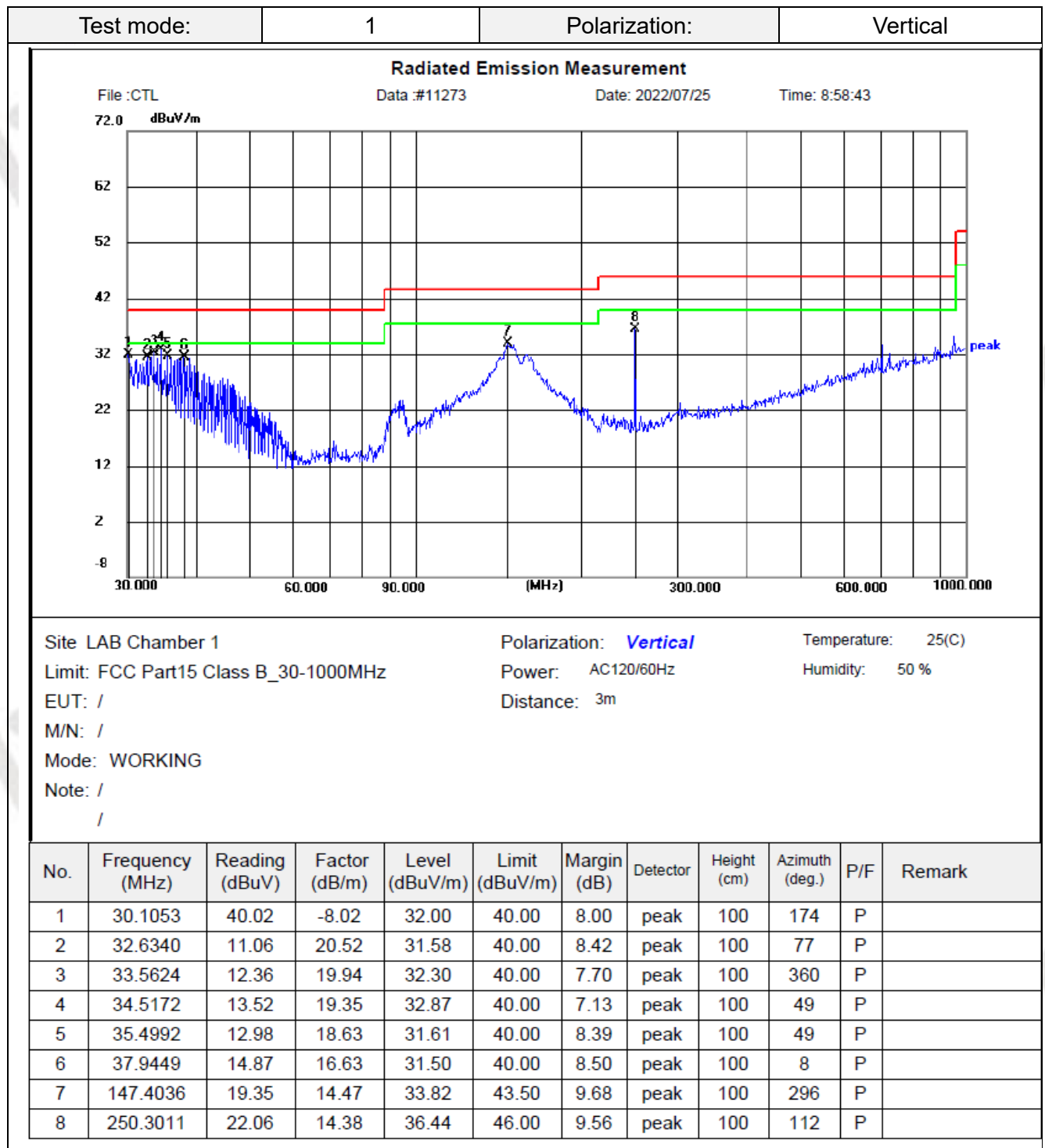
**TEST RESULTS**

Remark:

- Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and The emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.
- For 30MHz to 1GHz measurement all modes were tested; only the worst result of antenna 4 test mode 1 was reported as below.

## For 30MHz-1GHz

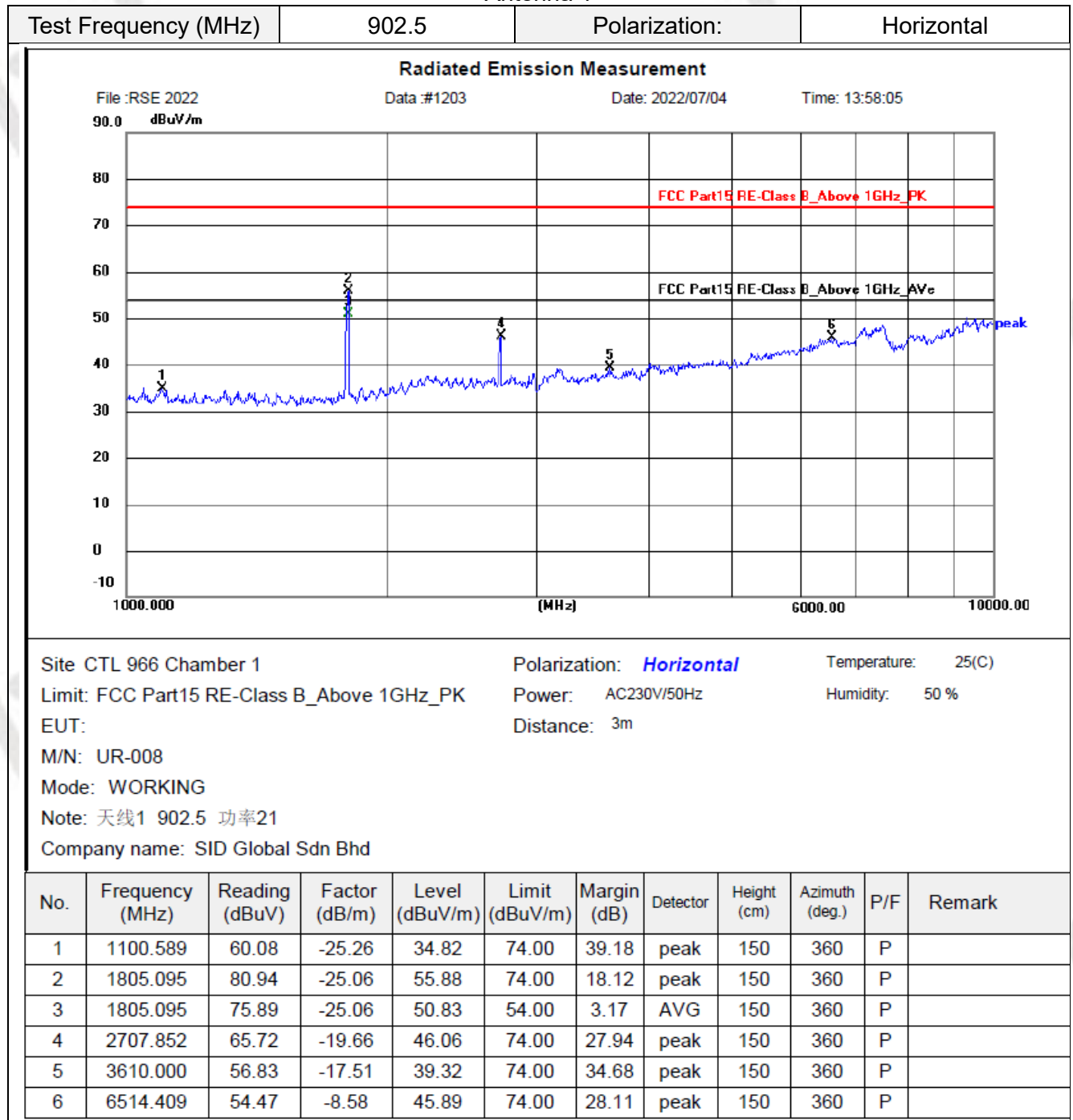


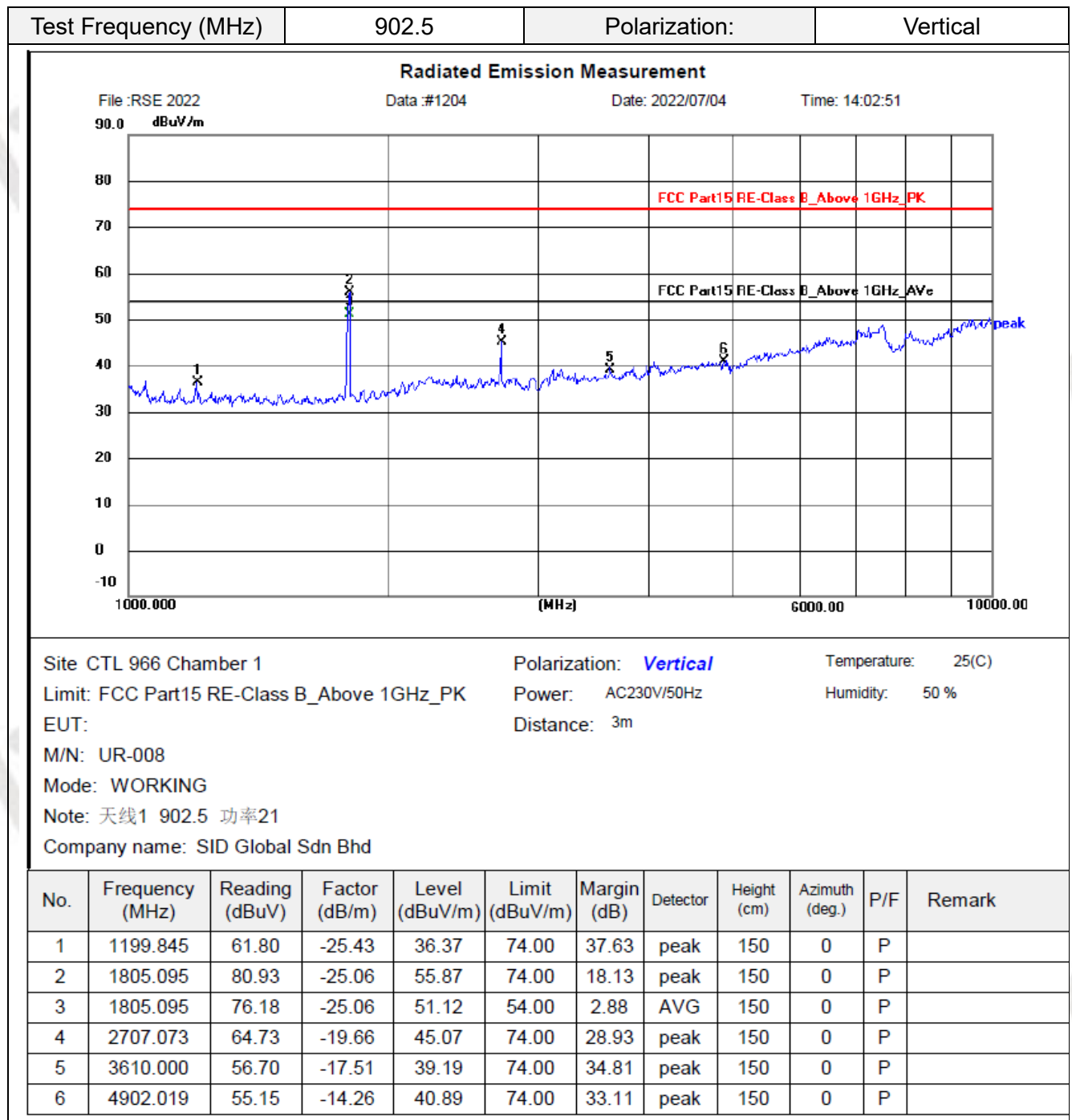


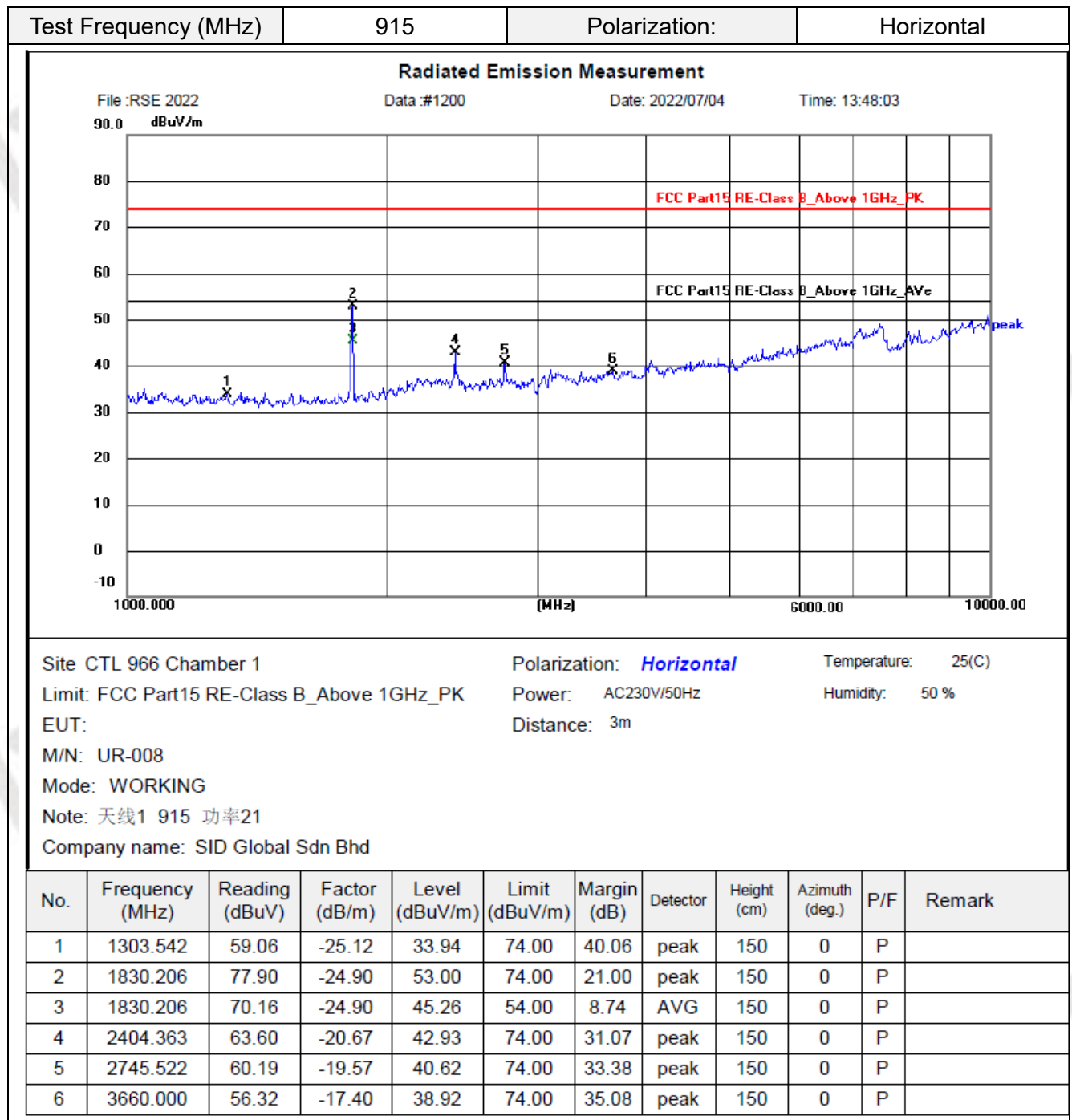
Remark: Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)  
 Margin= Limit(dBuV/m)- Level(dBuV/m)

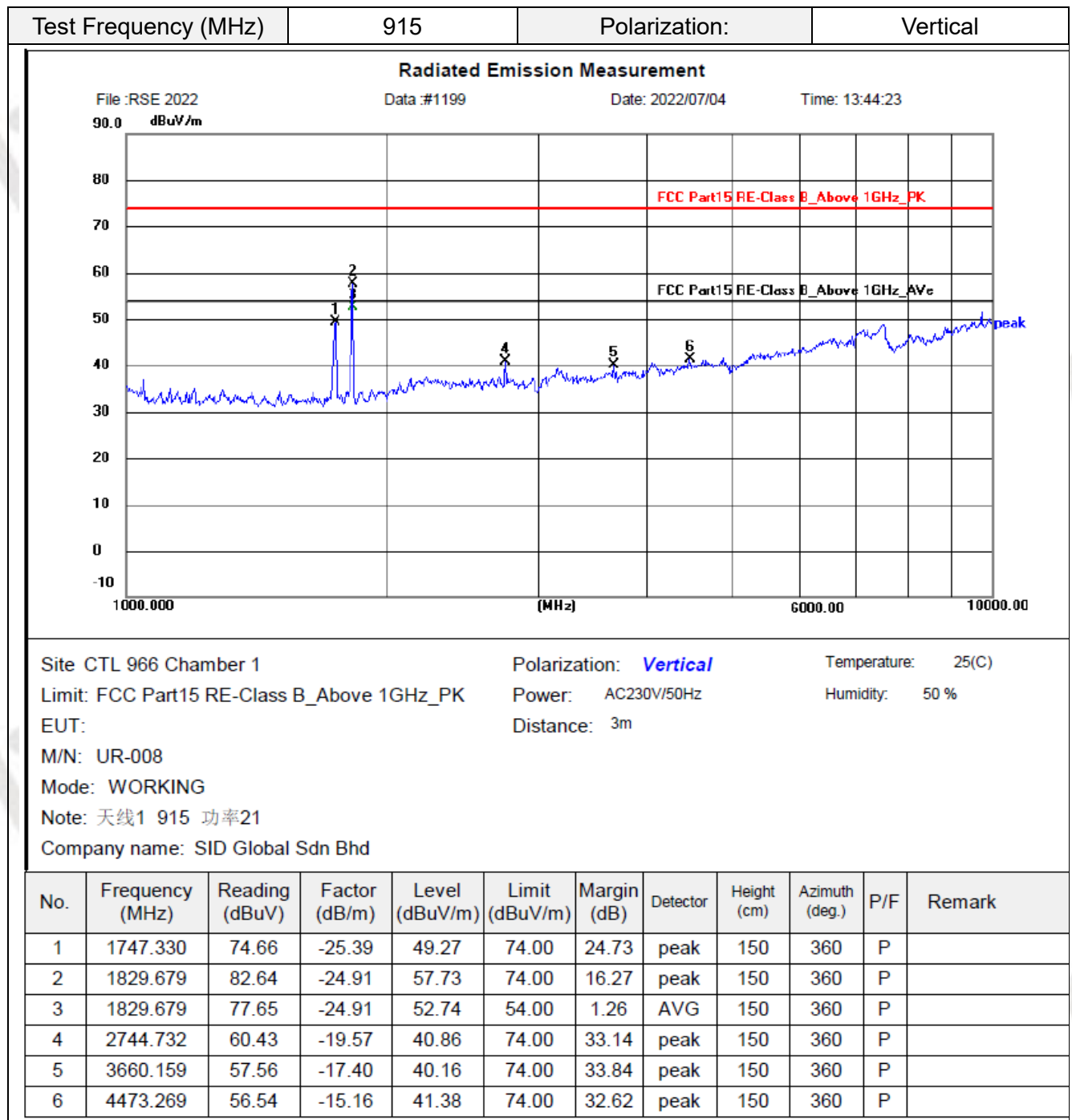
**For 1GHz to 10GHz**

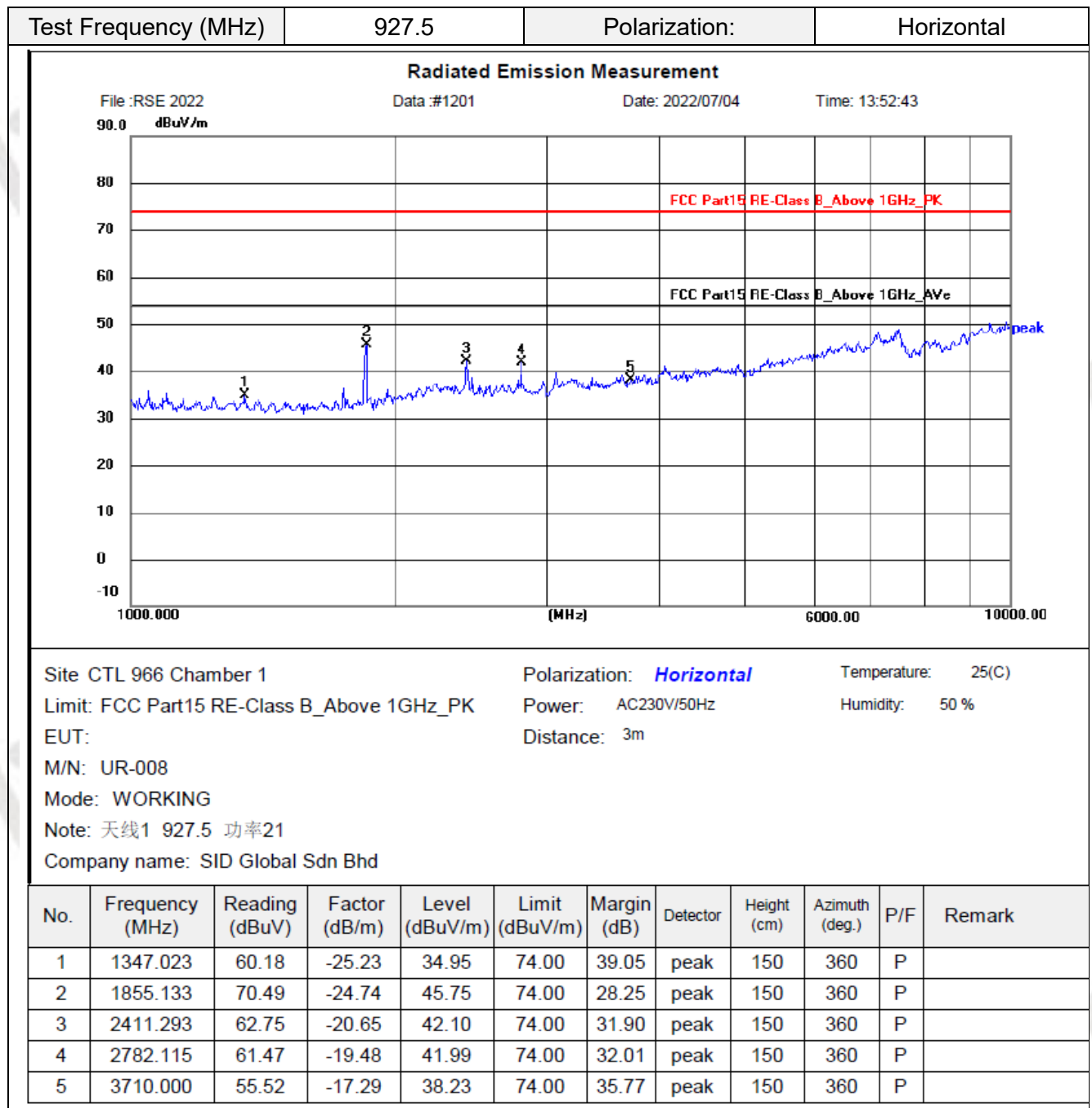
Antenna 1

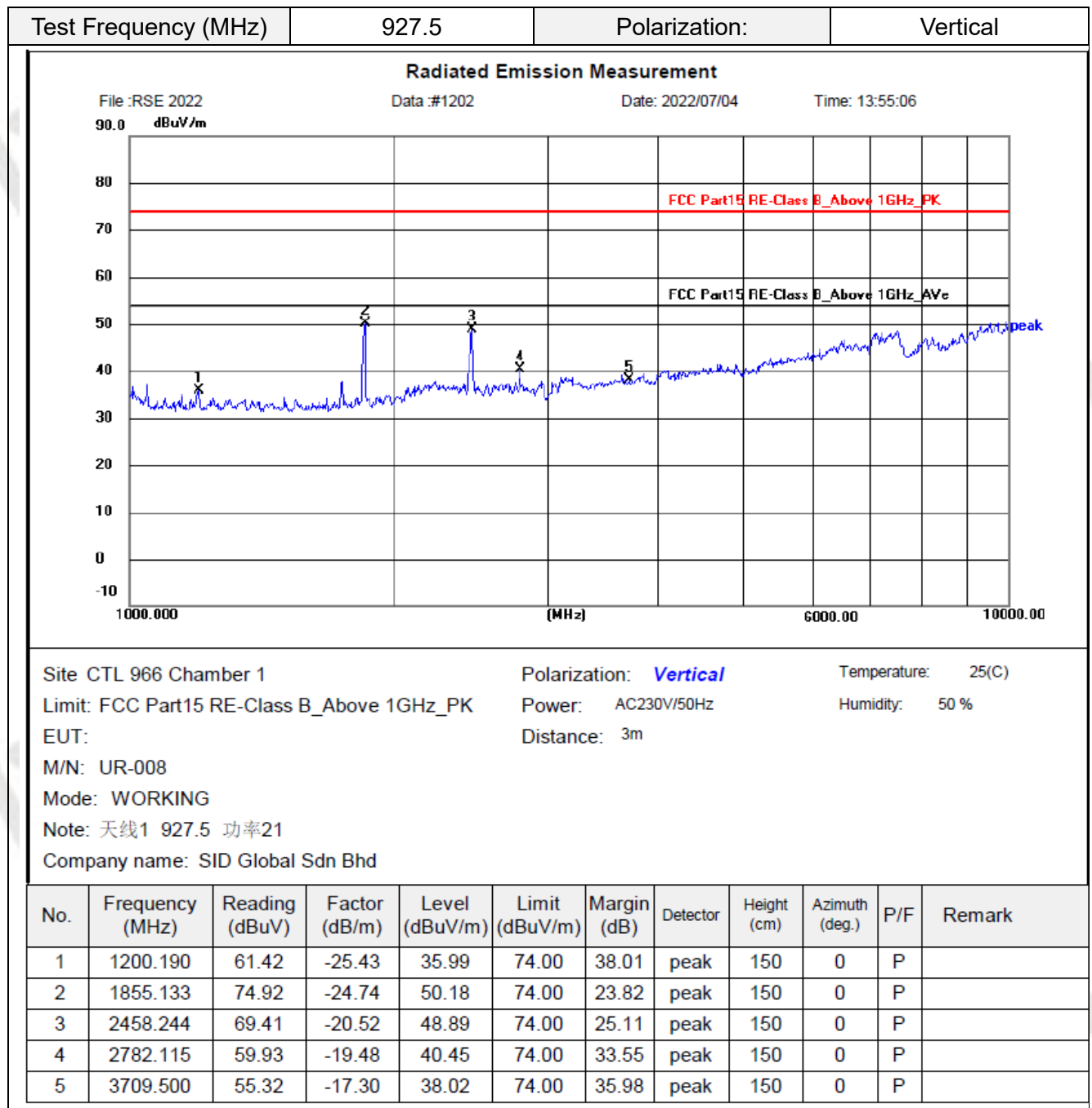




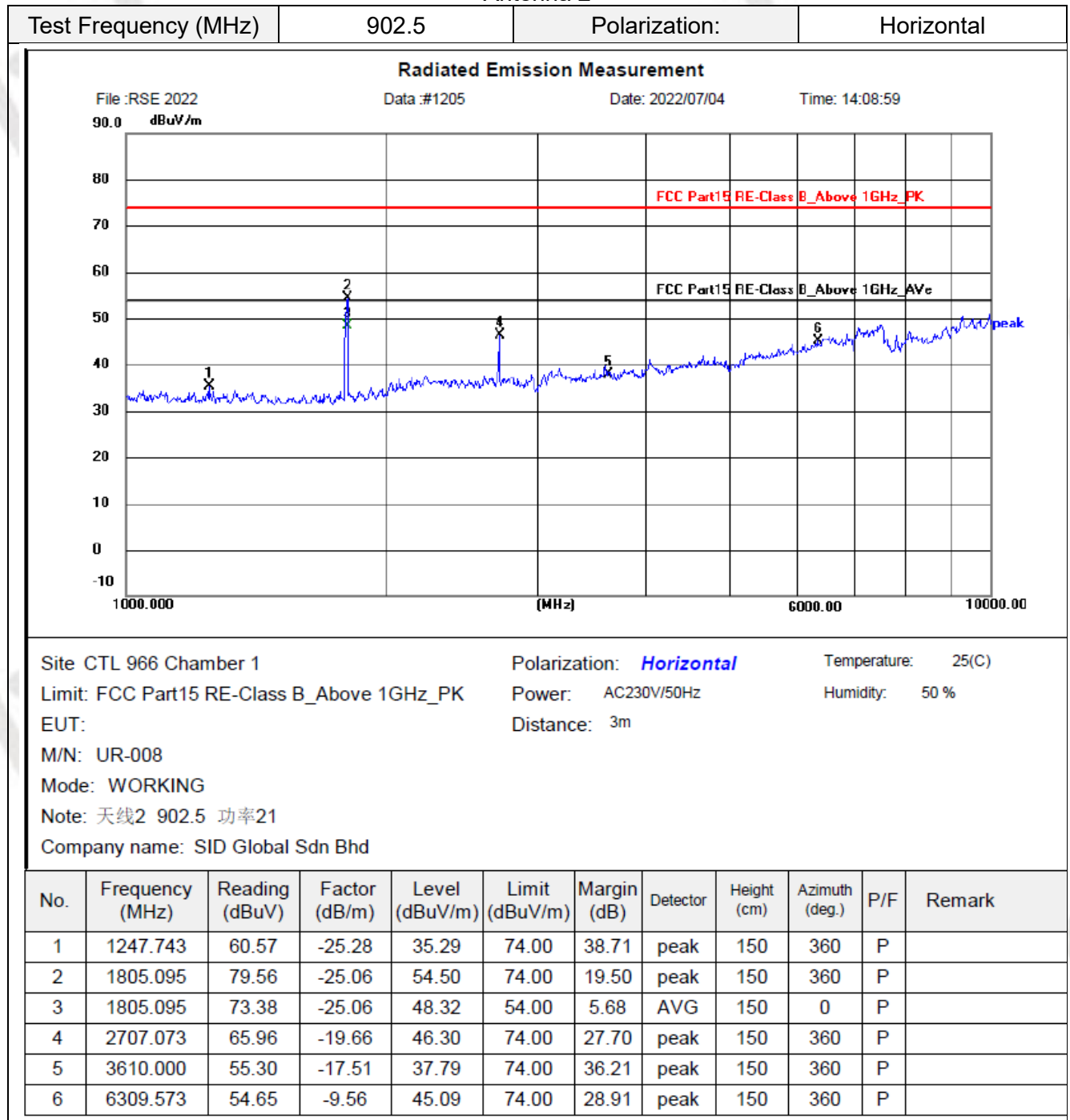


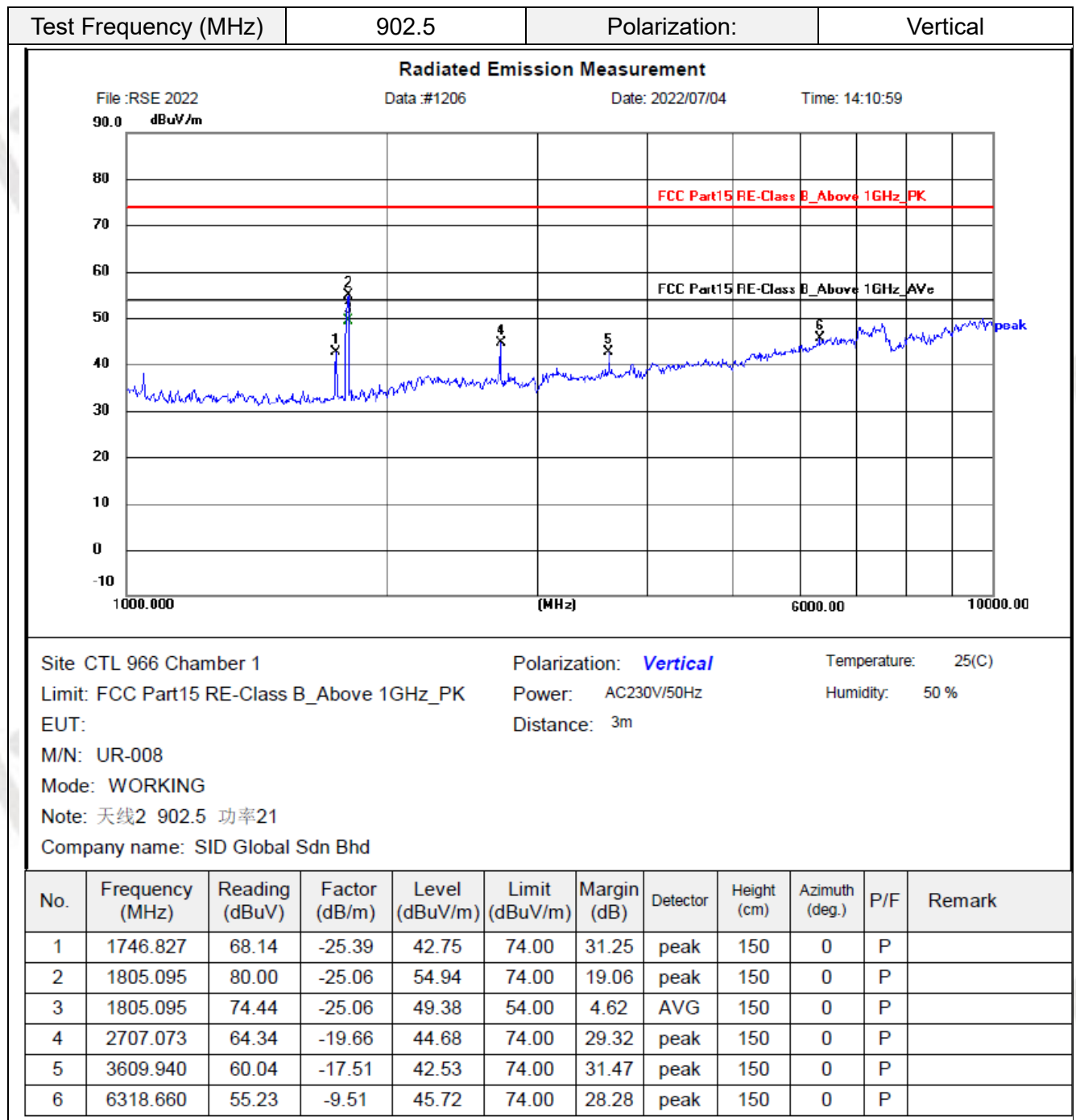


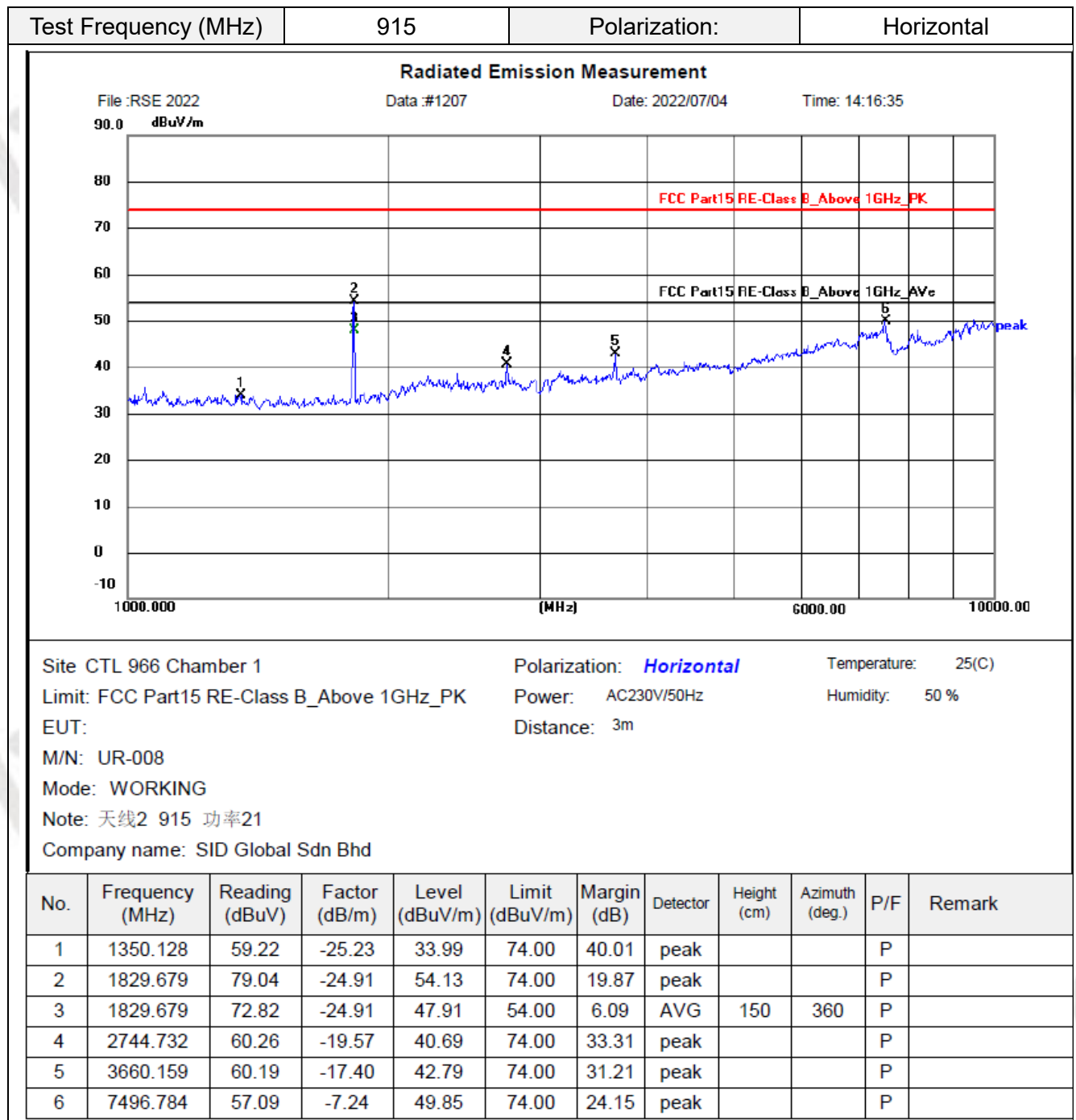


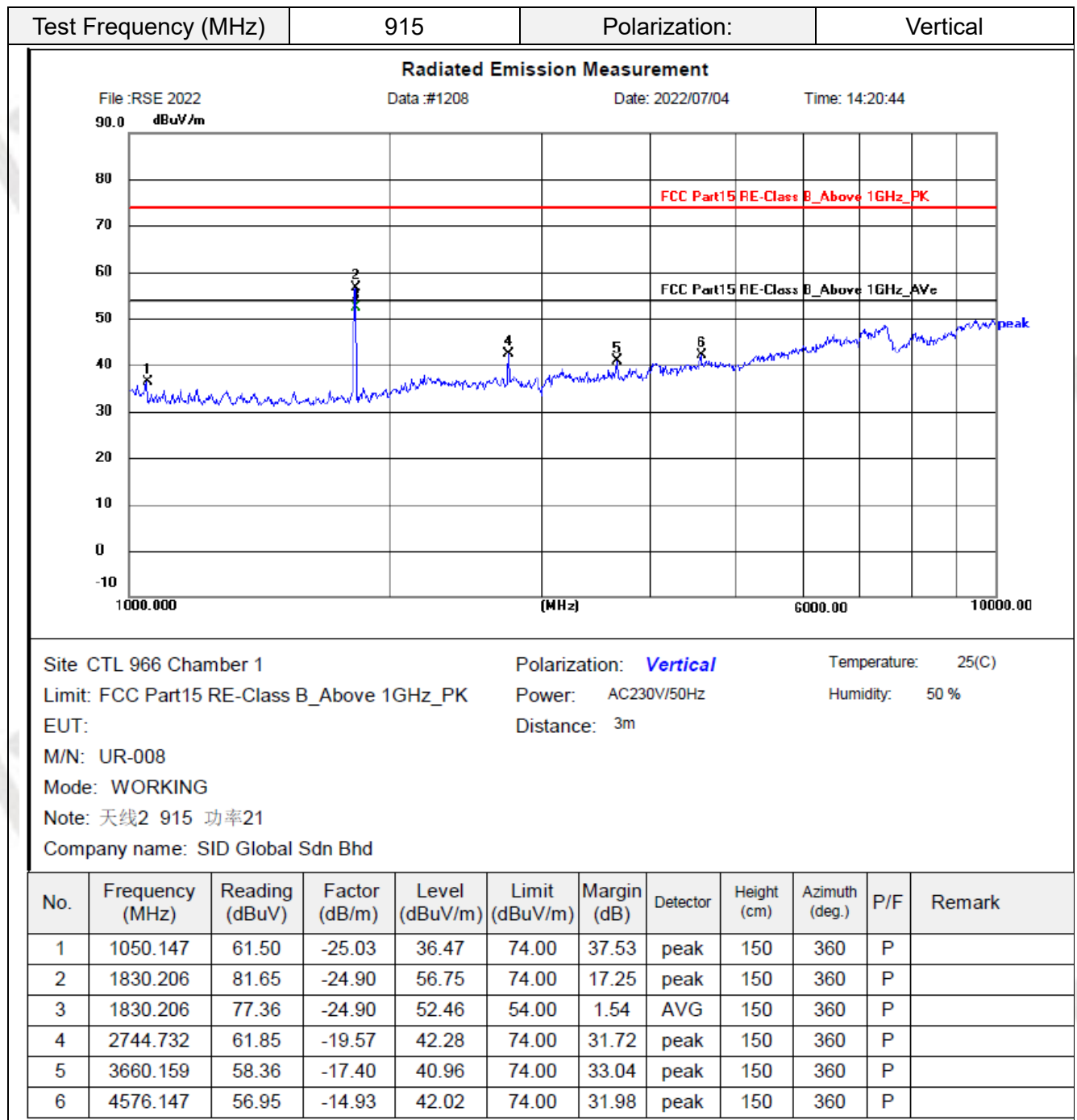


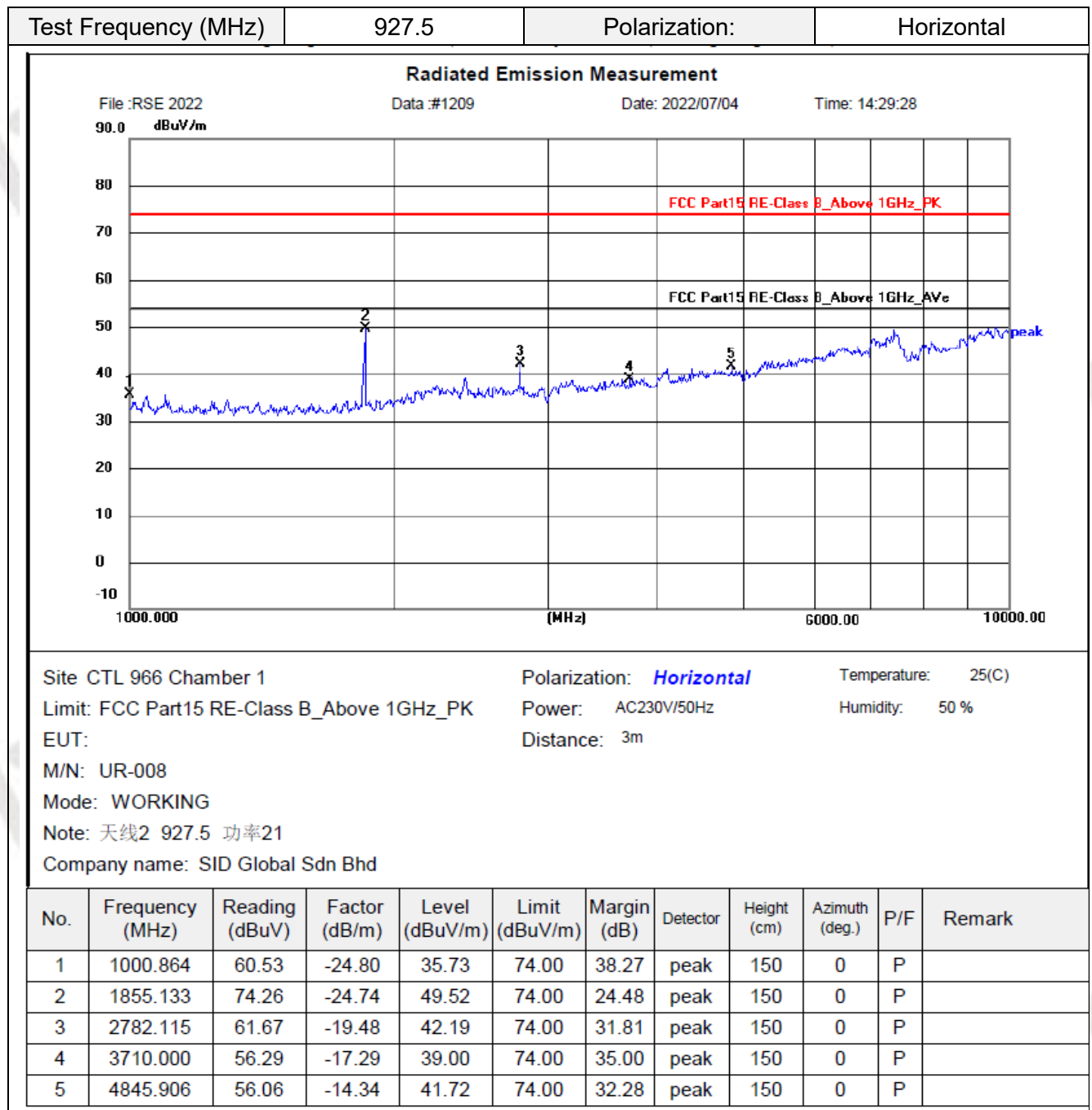
## Antenna 2

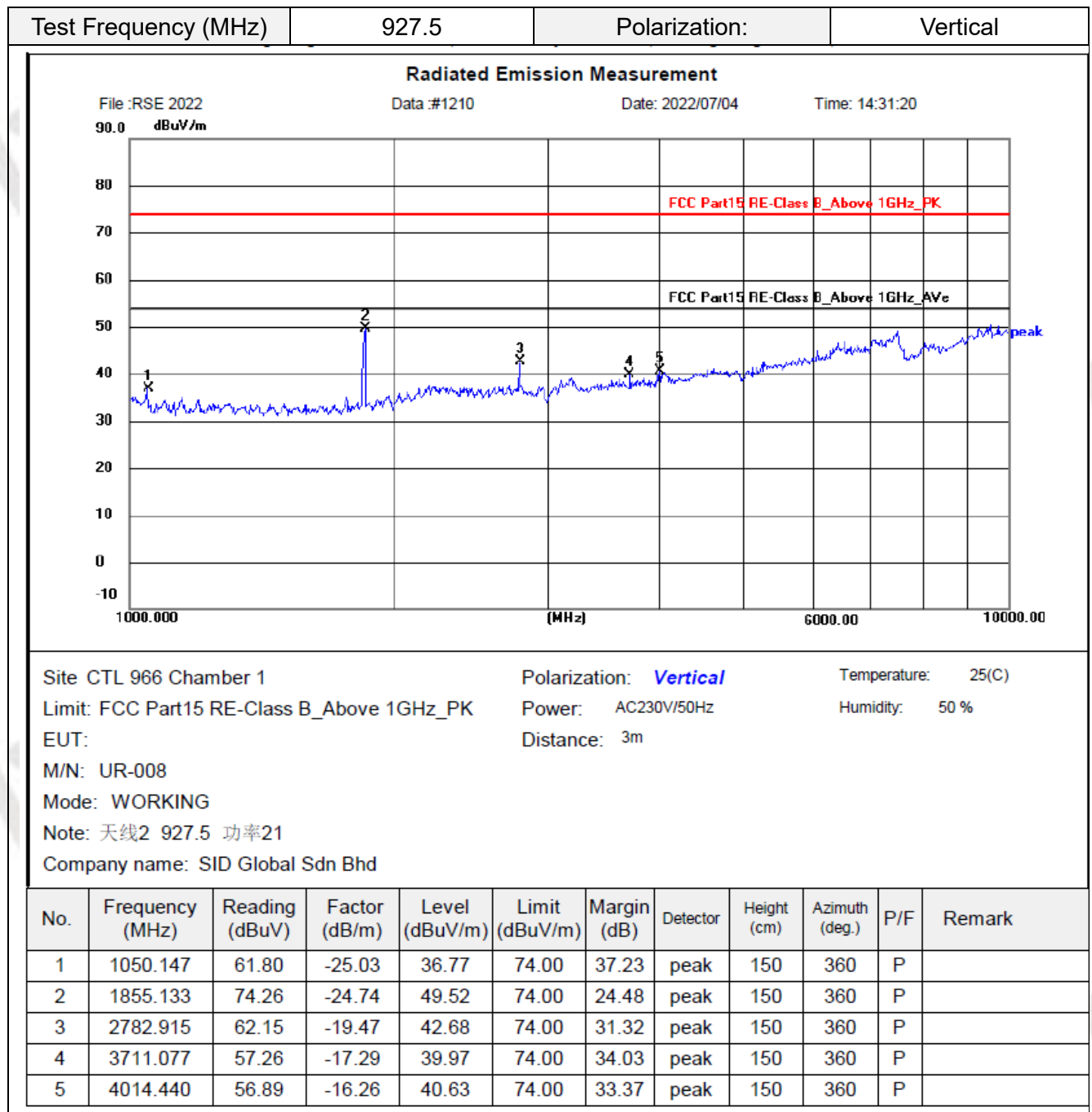




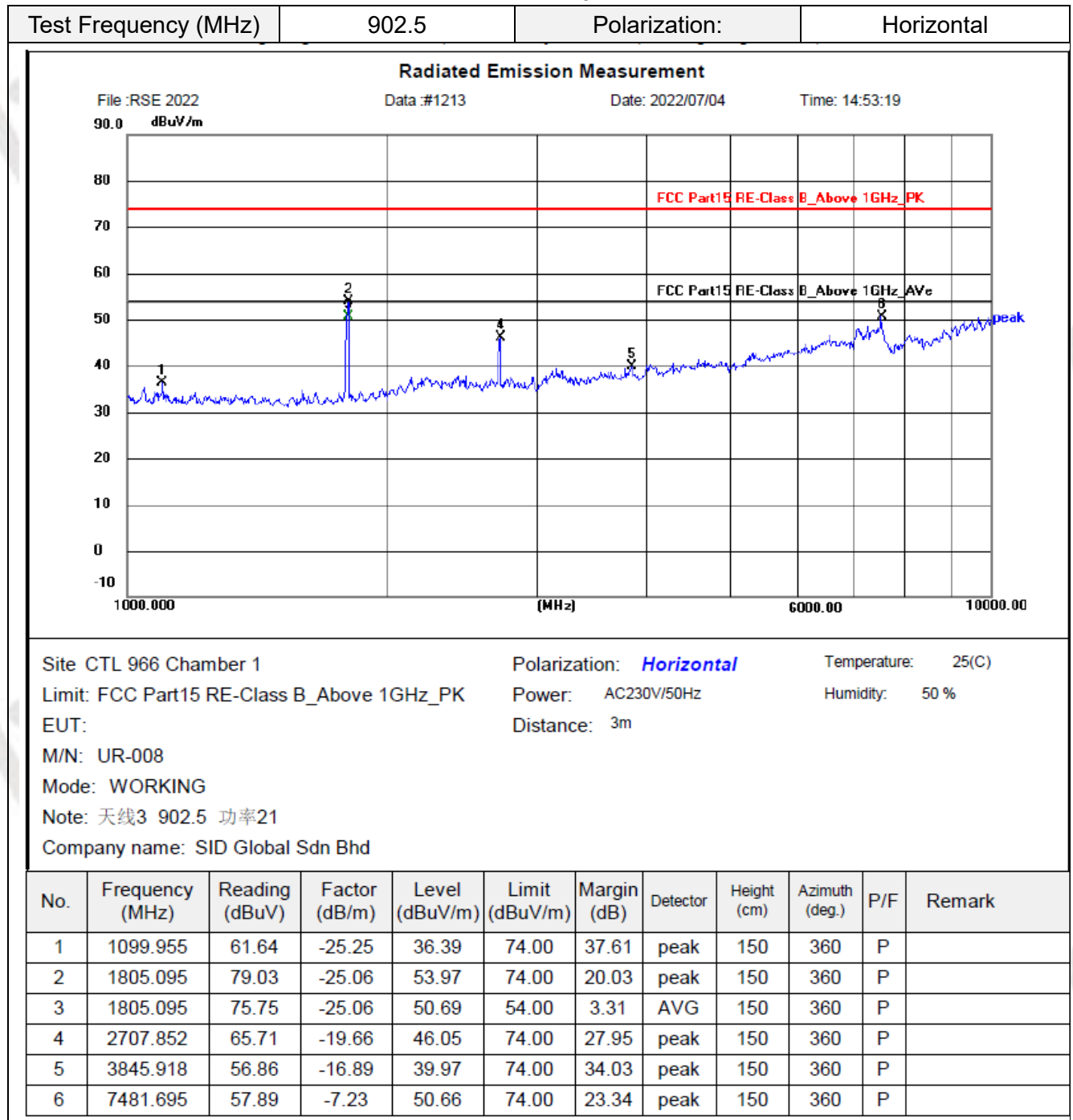


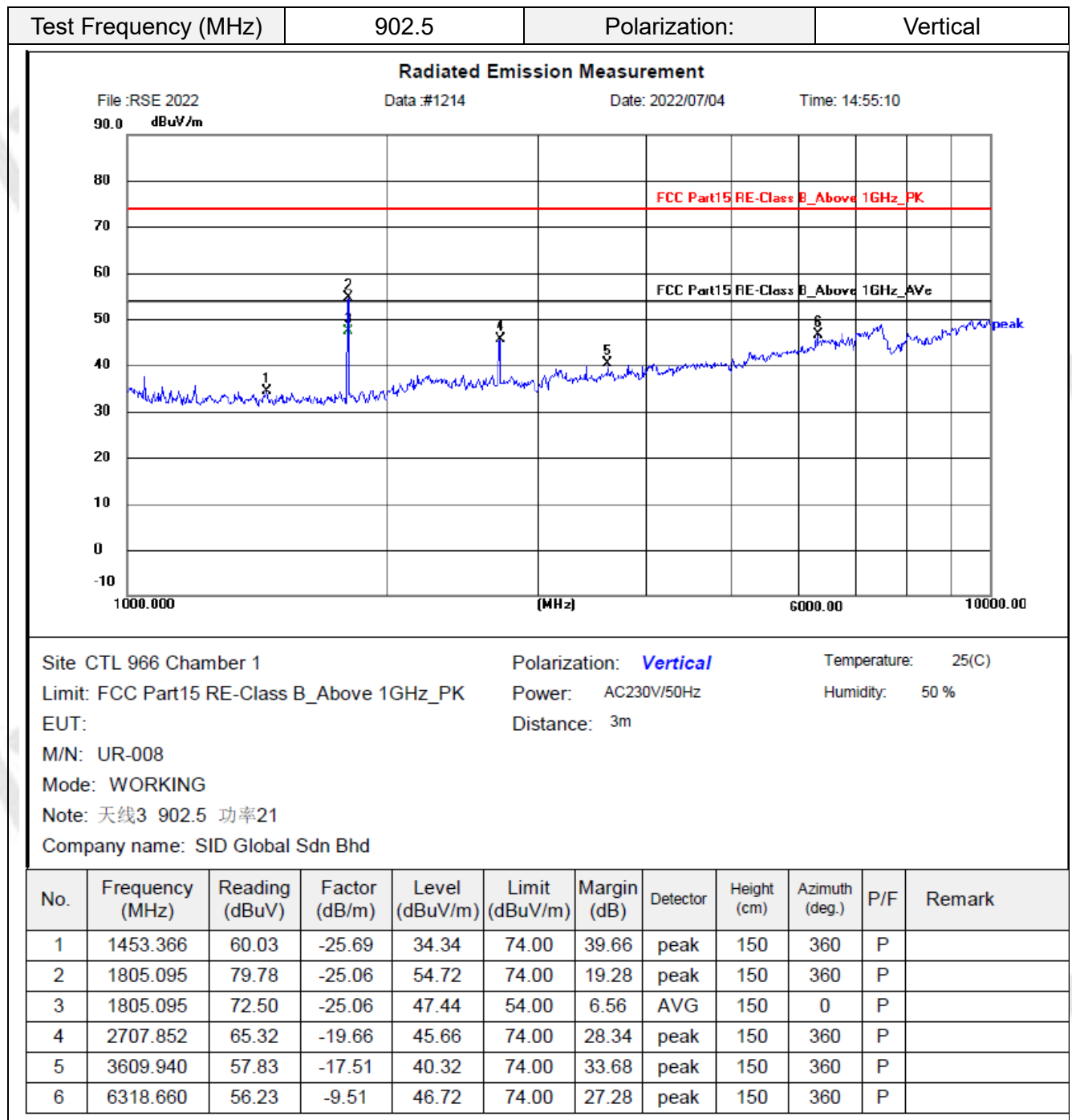


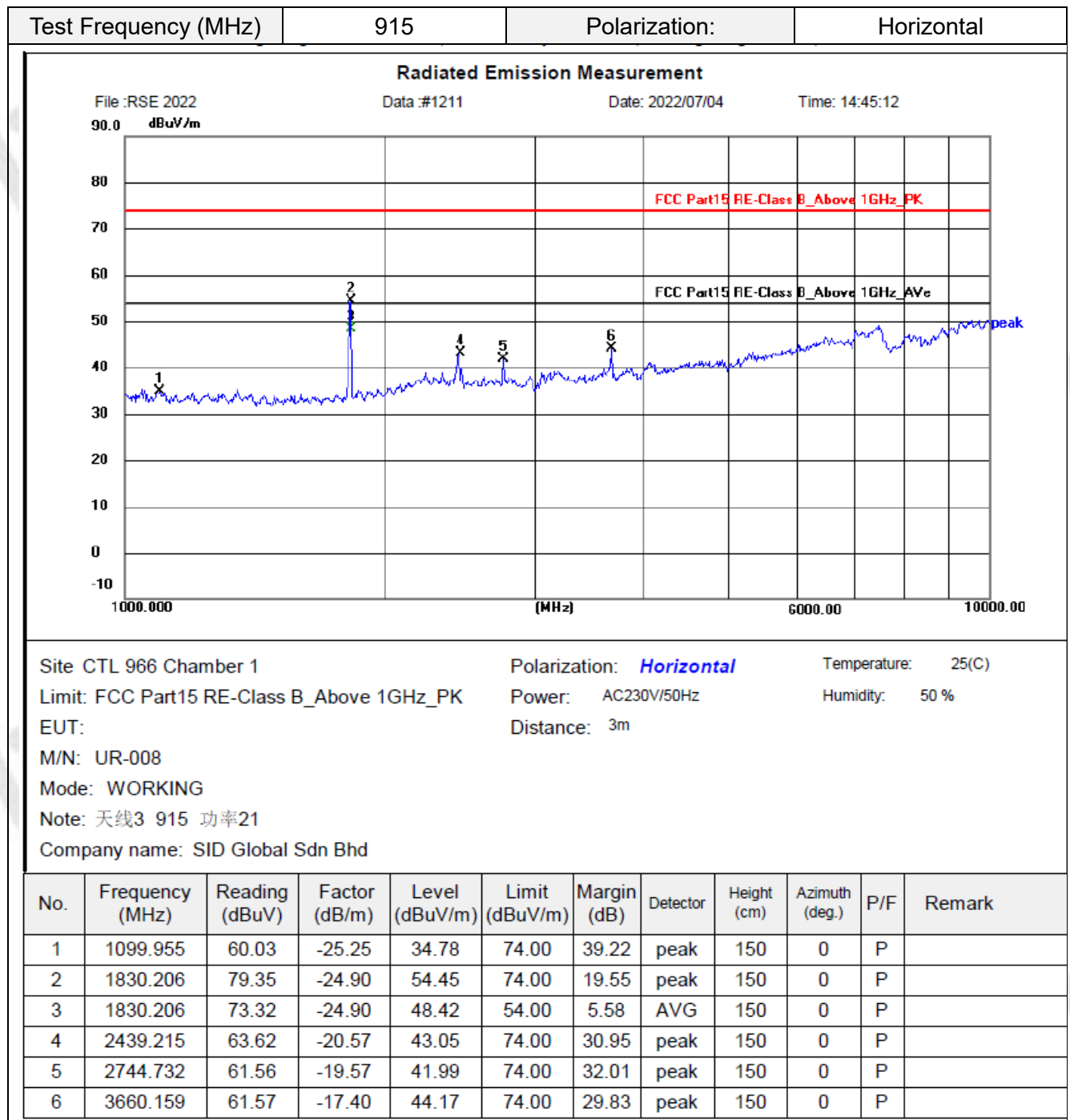


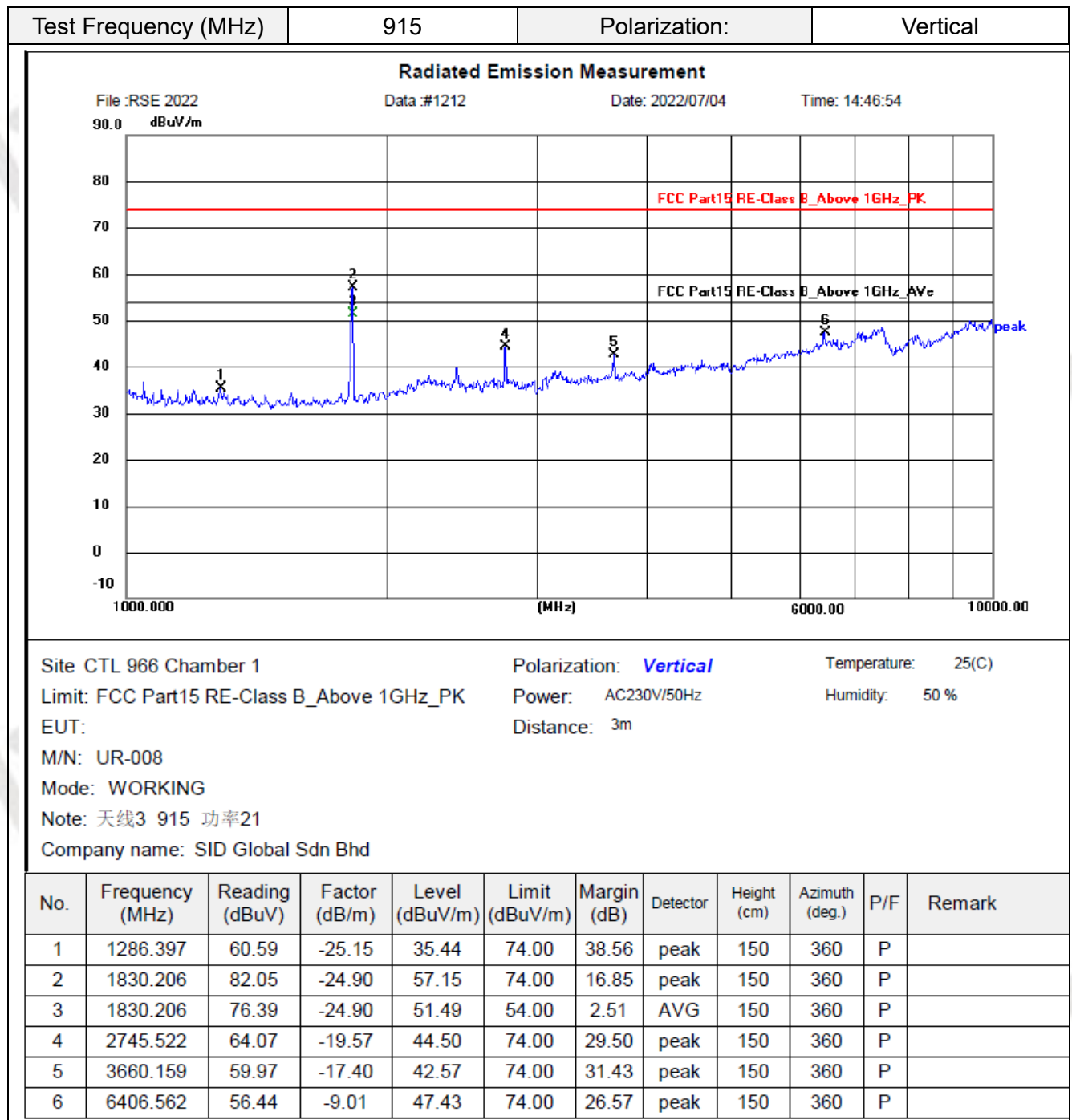


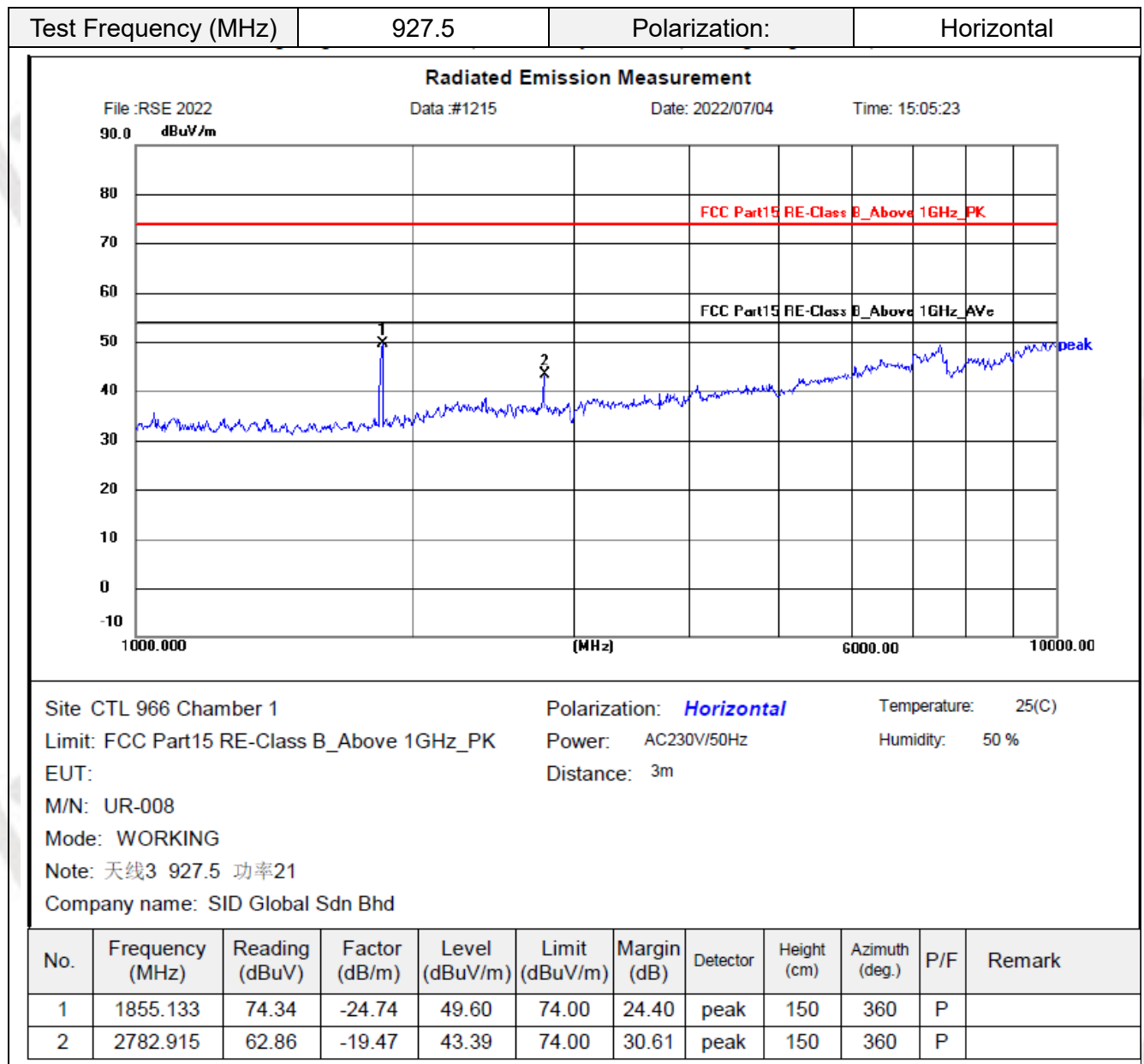
## Antenna 3

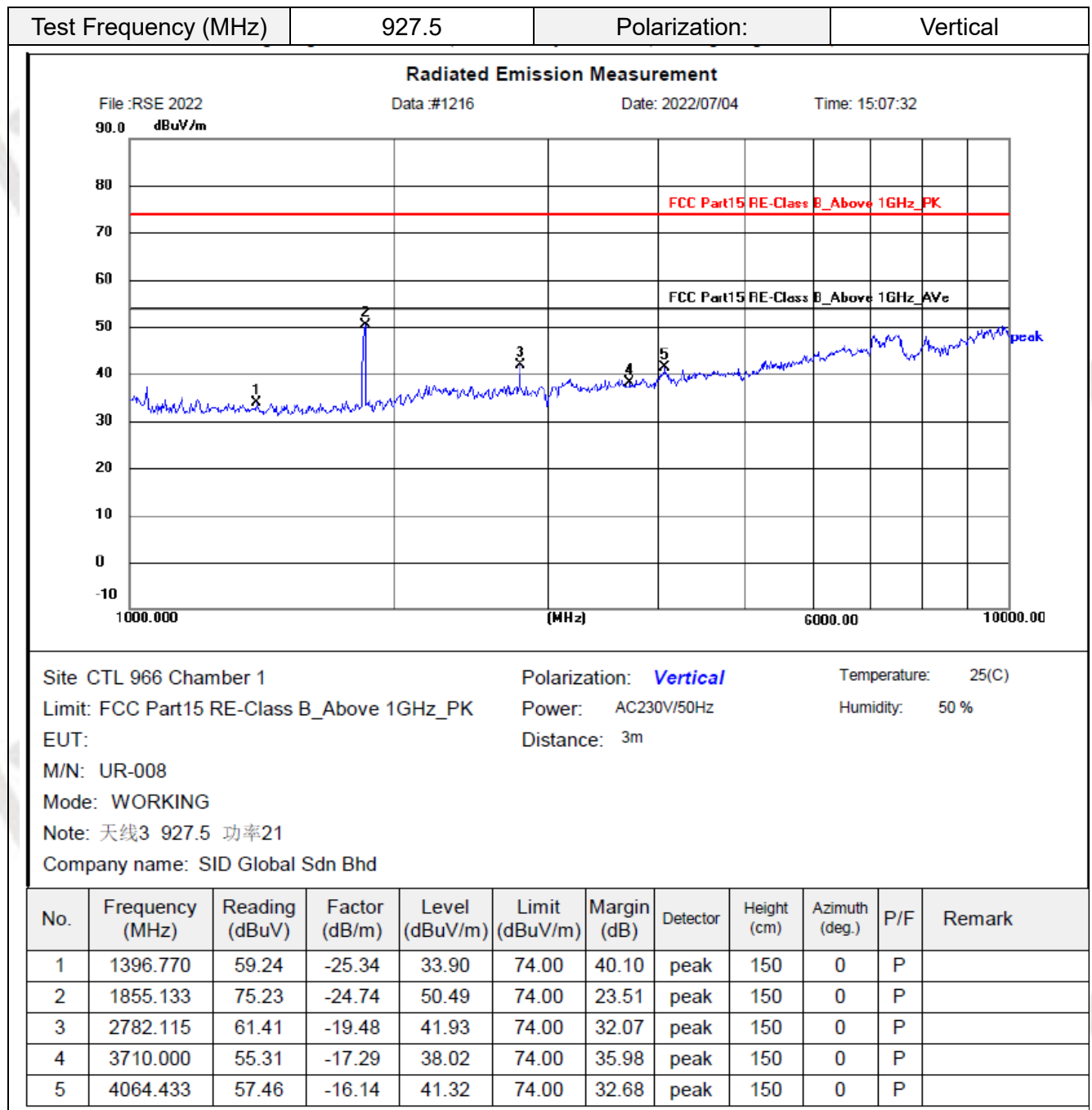




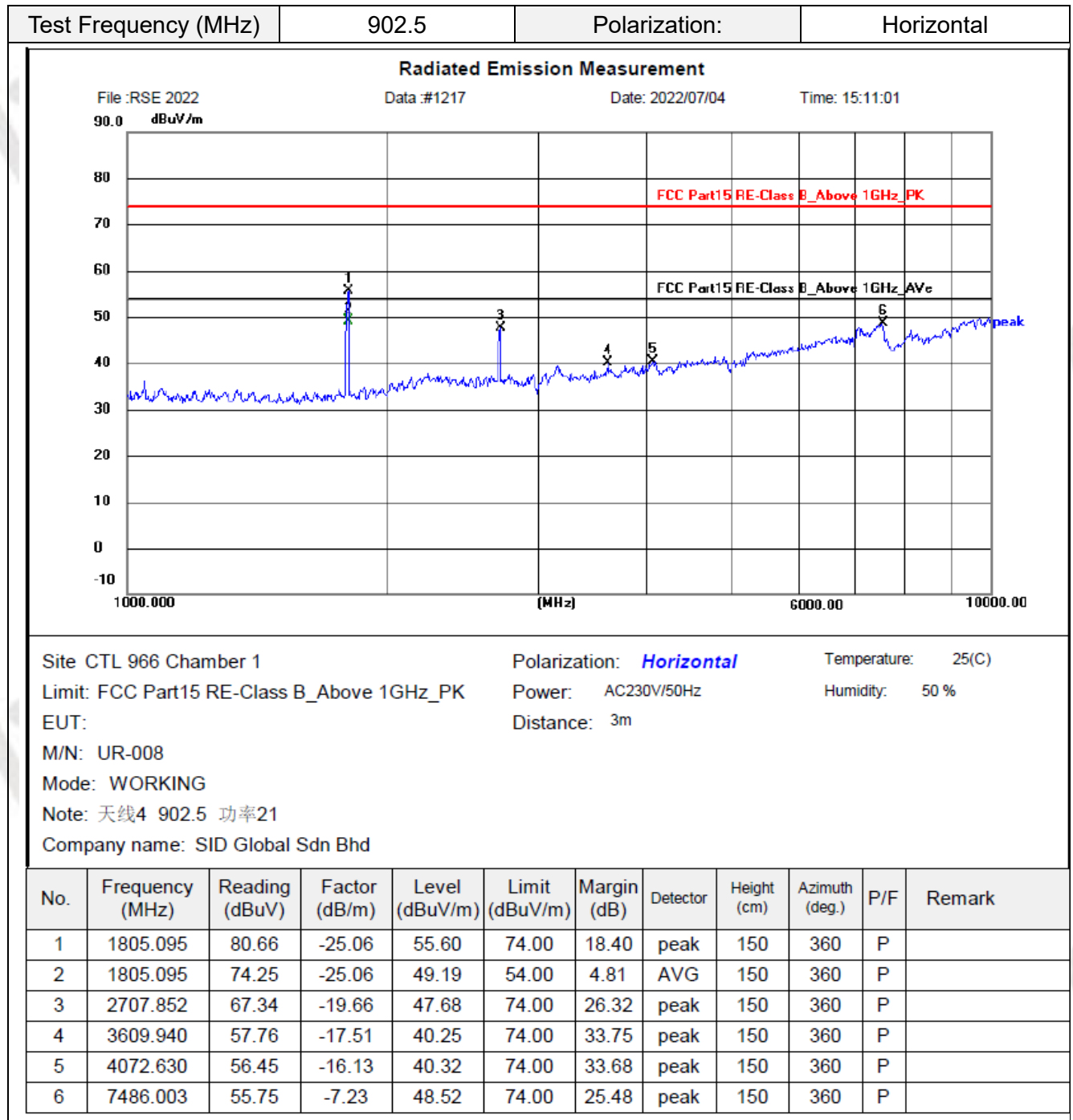


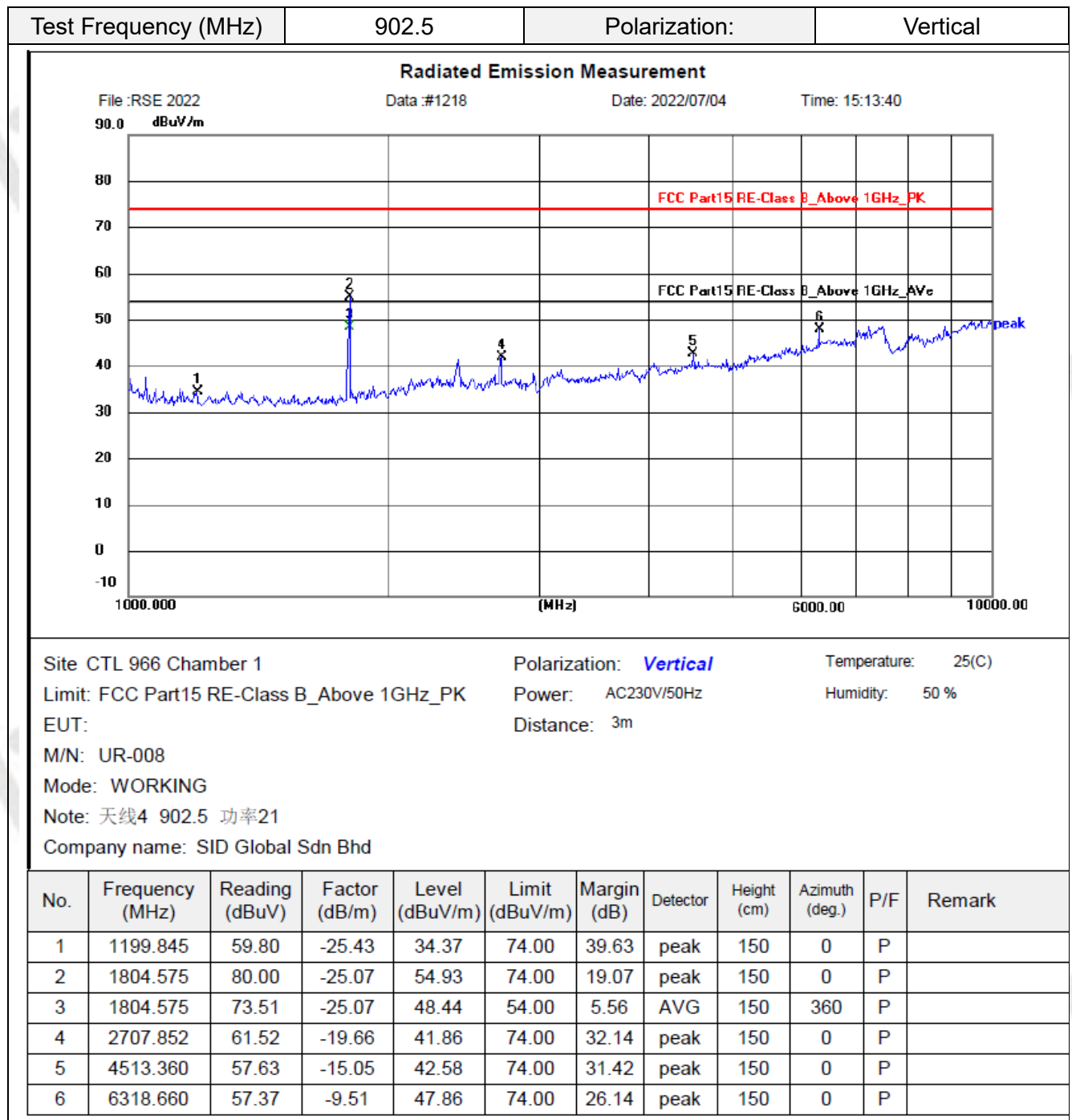


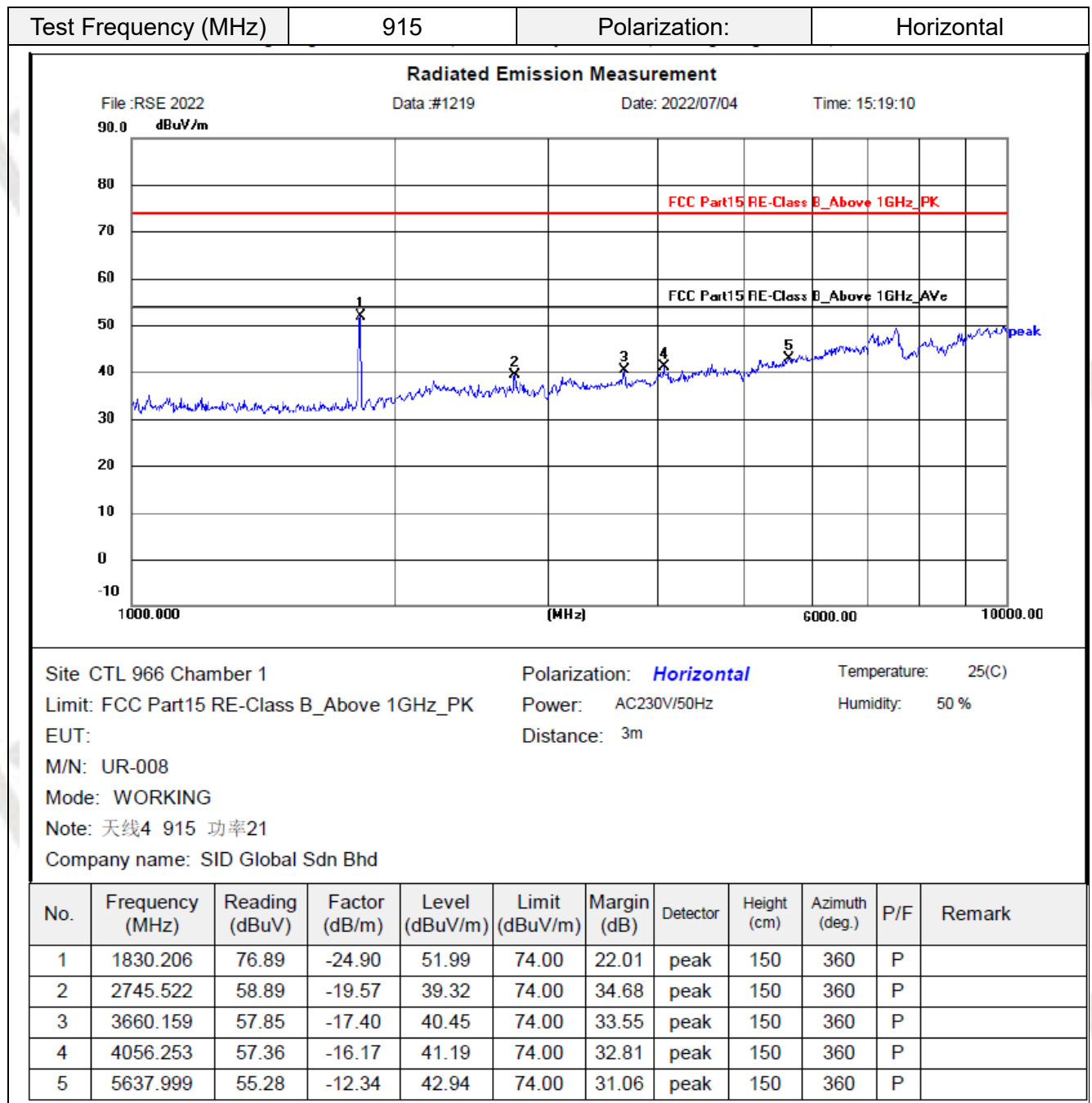


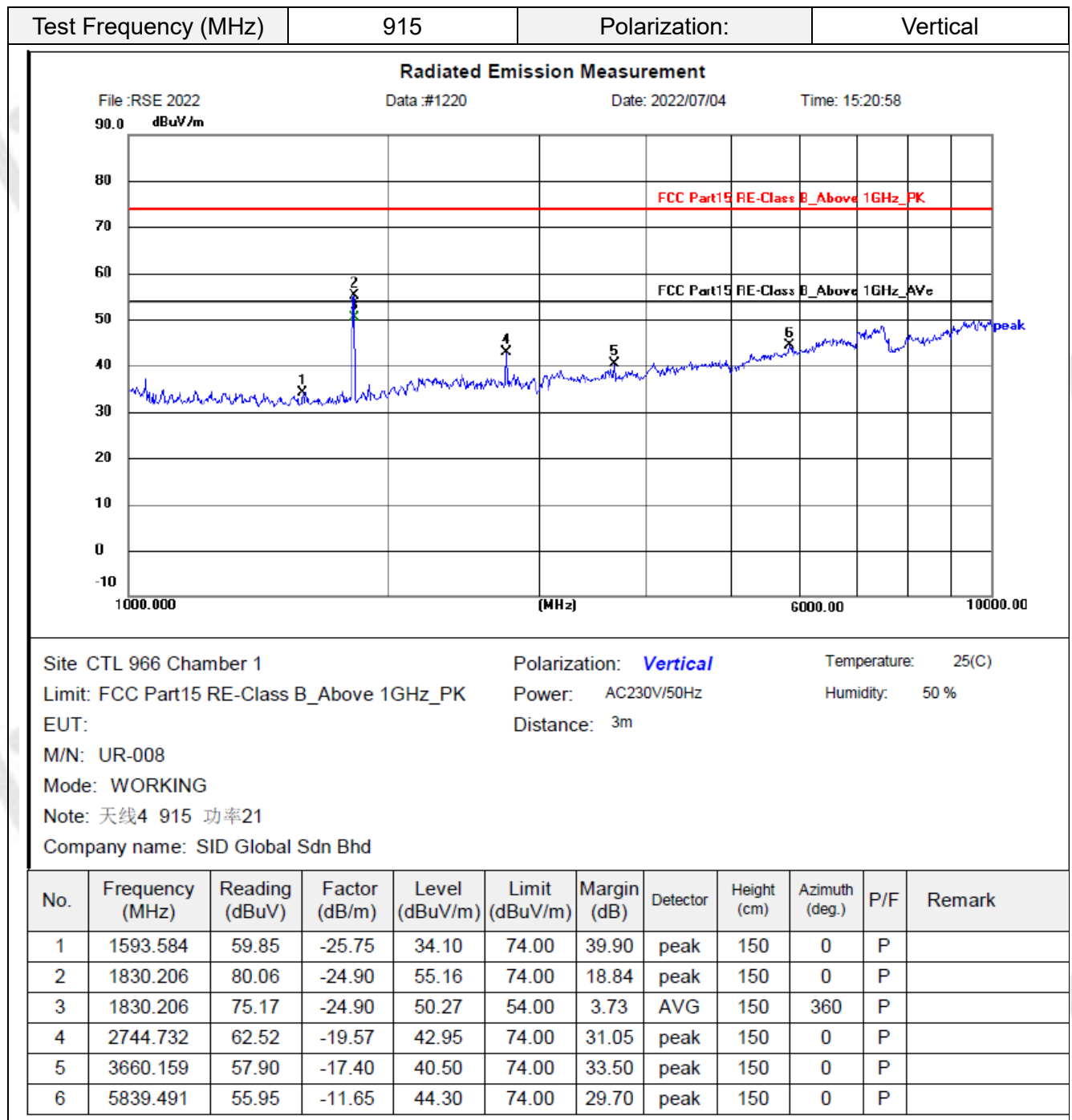


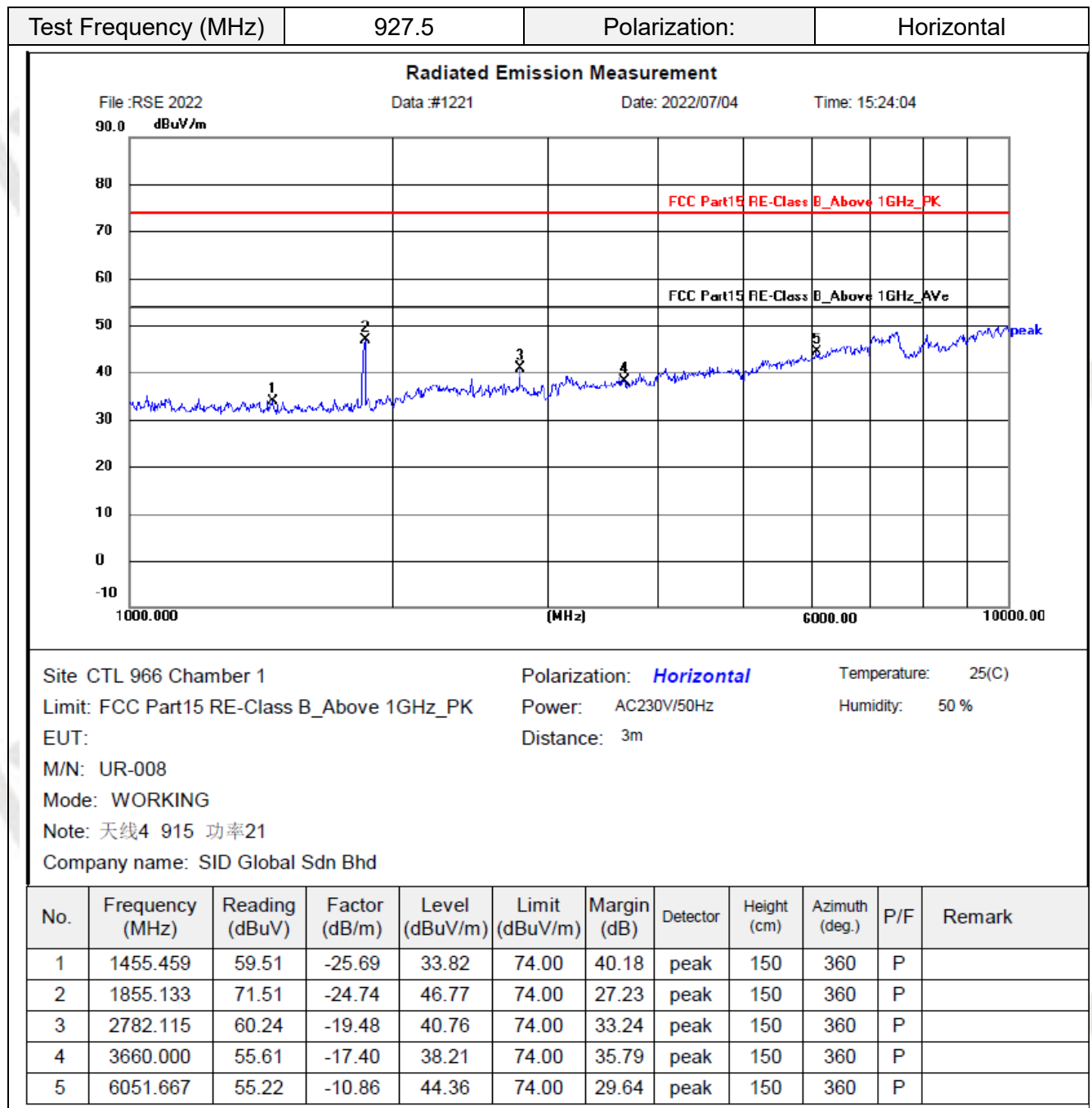
## Antenna 4

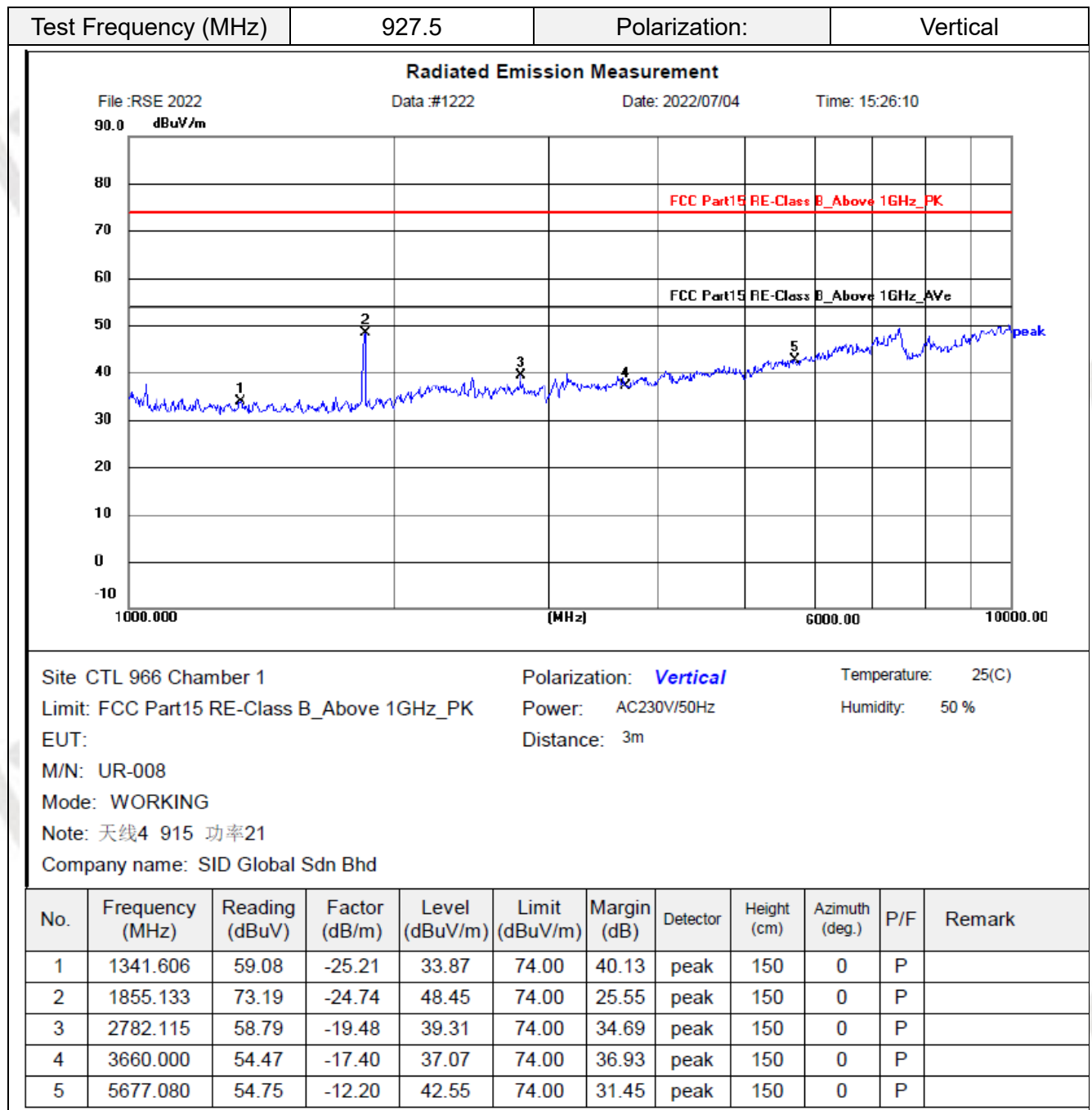




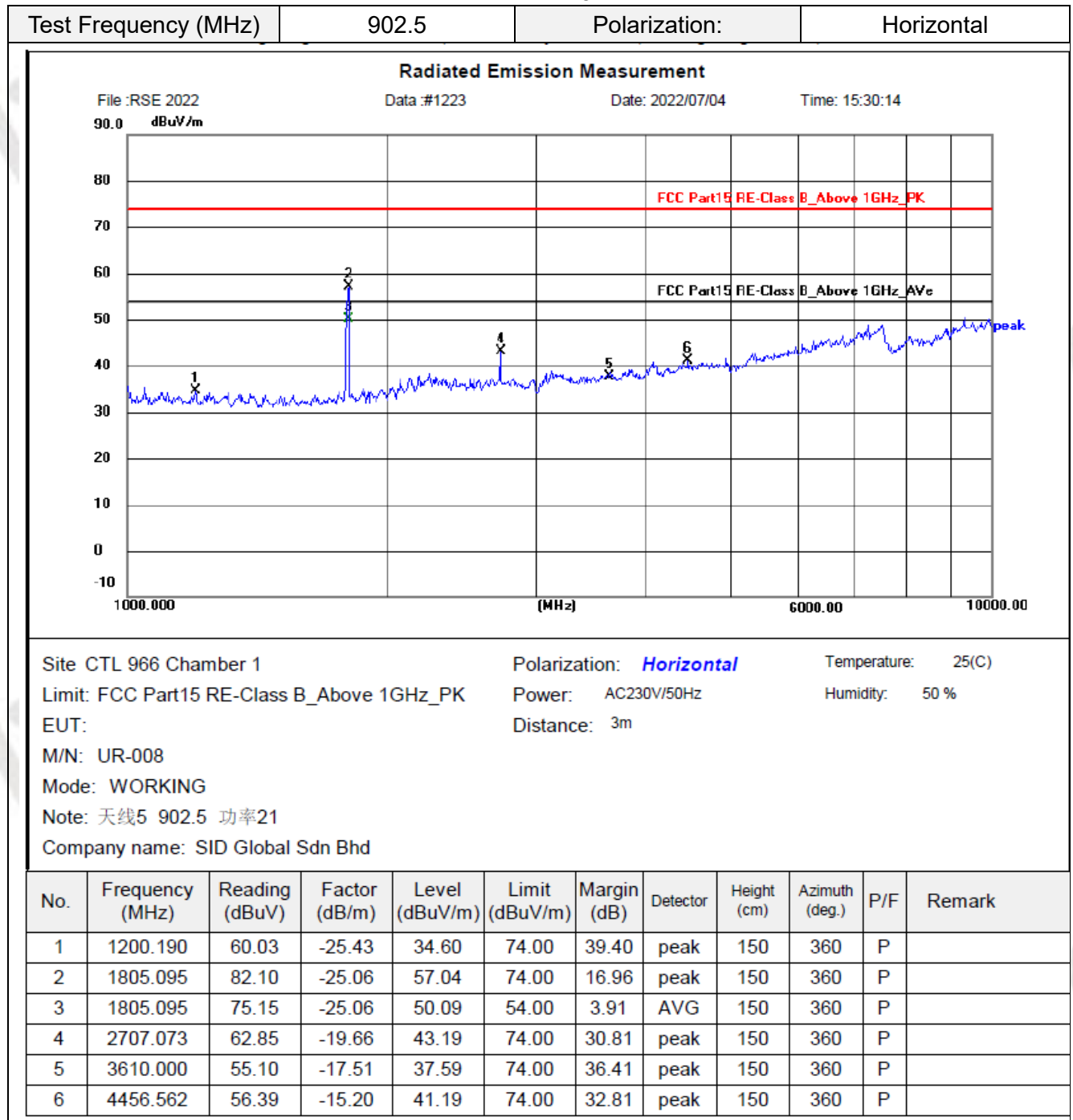


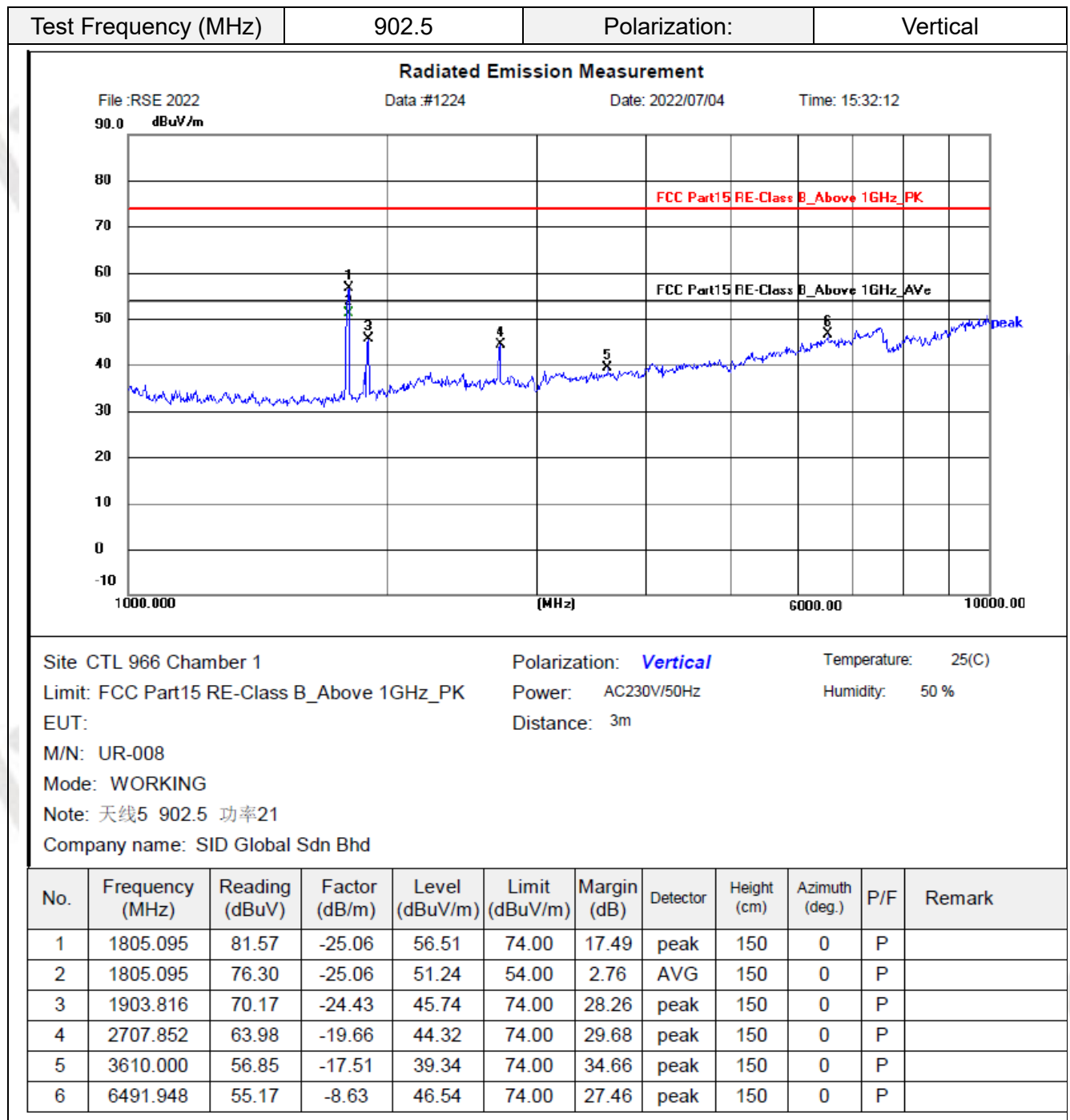


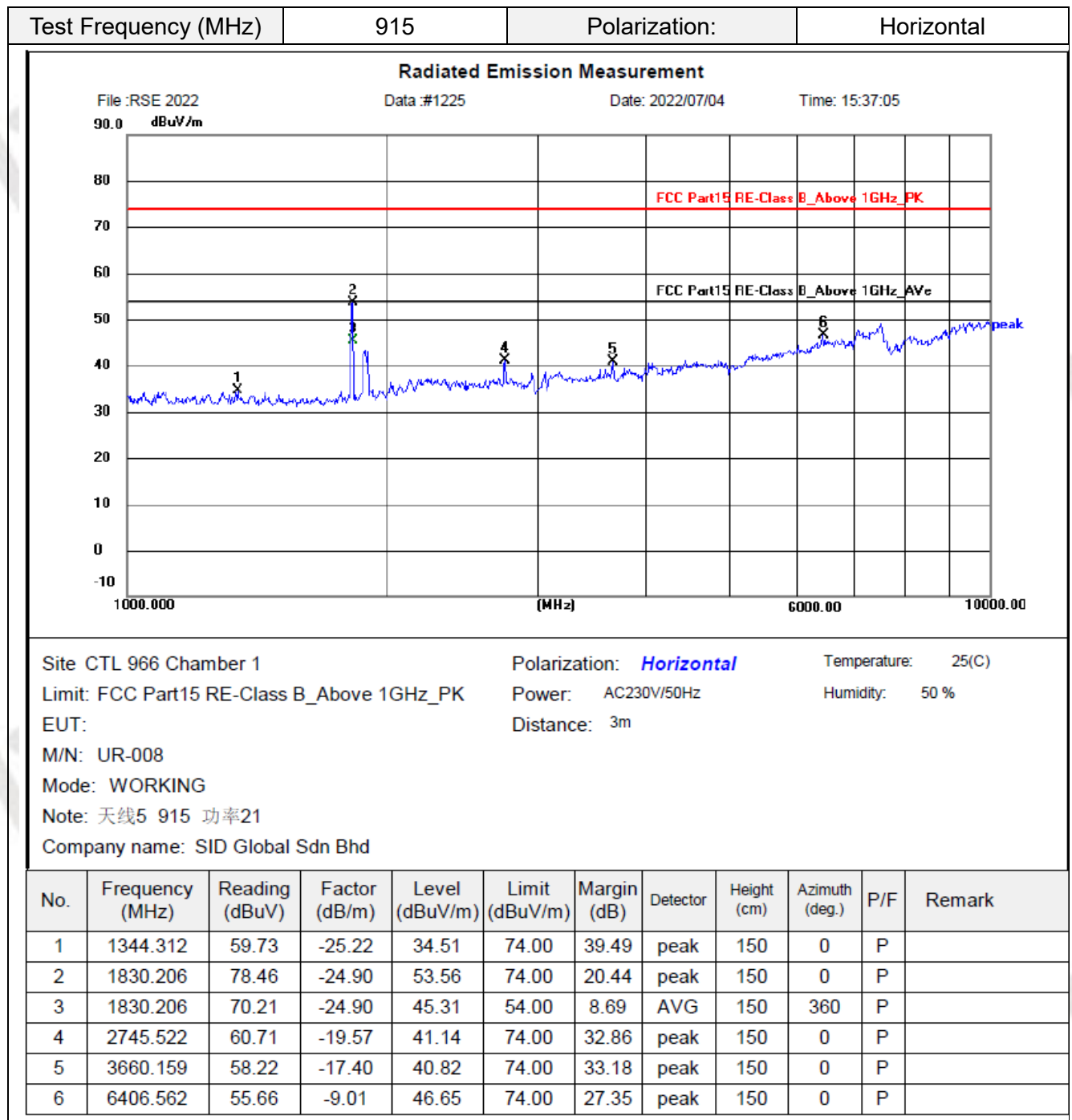


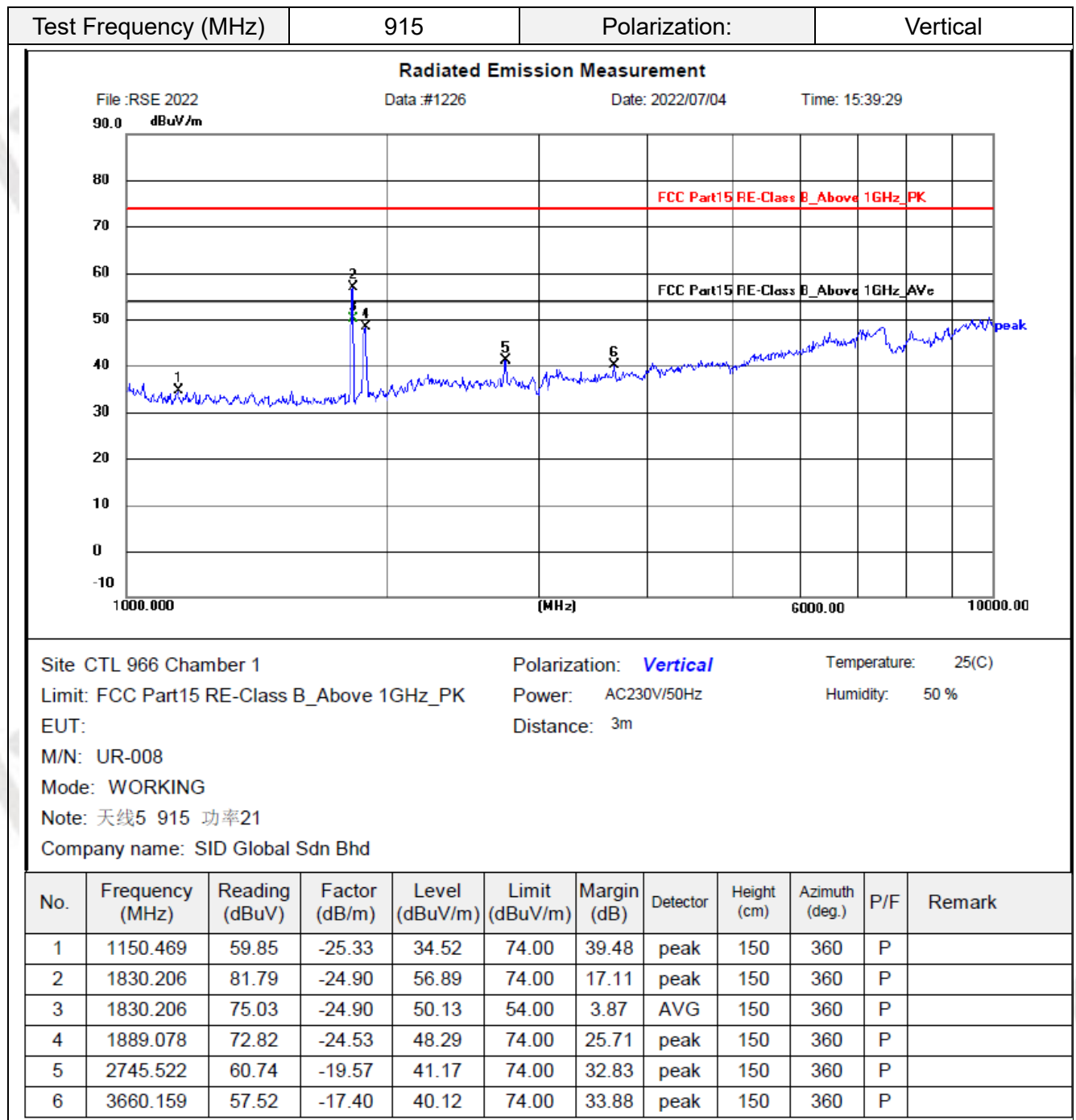


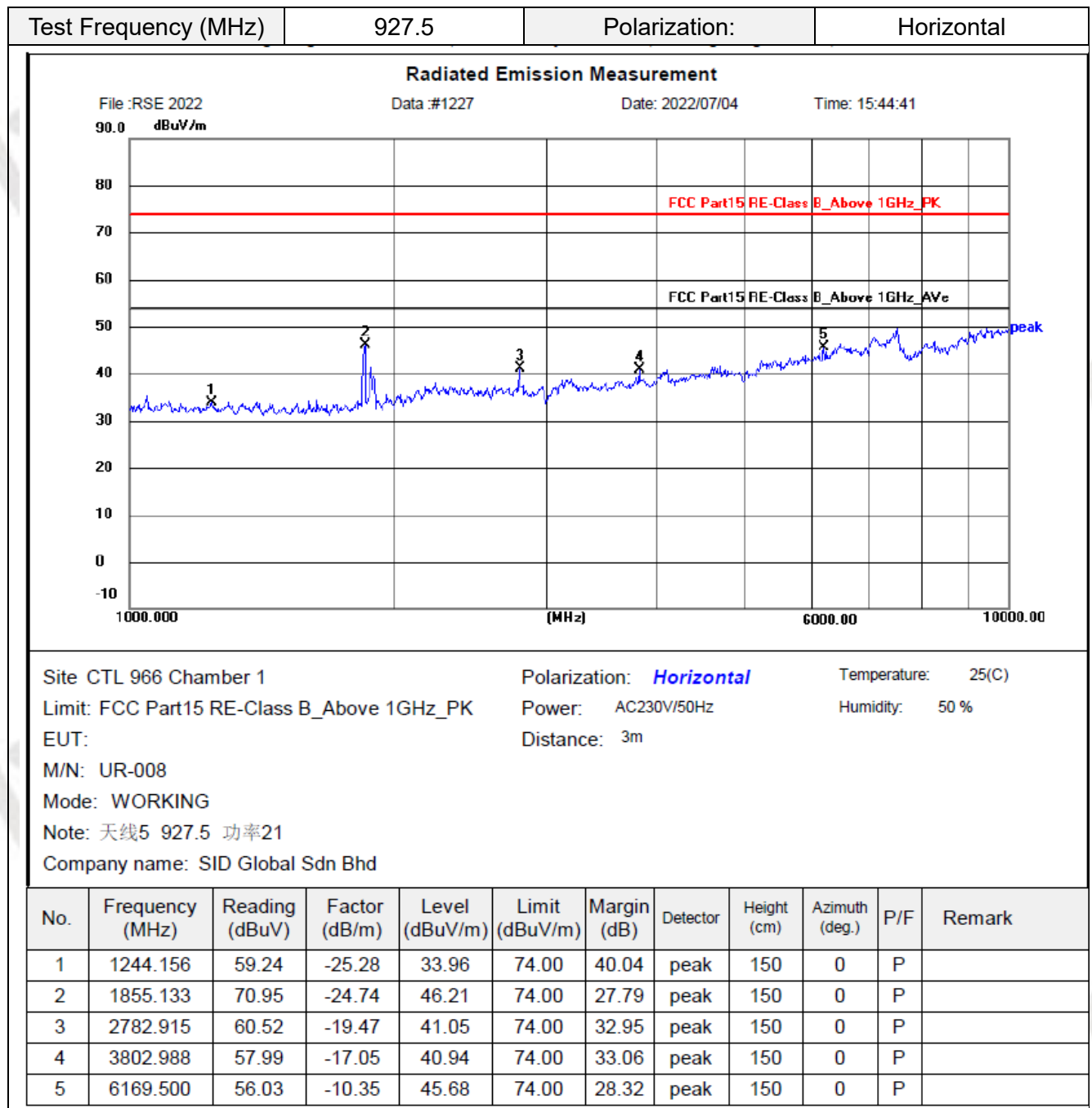
## Antenna 5

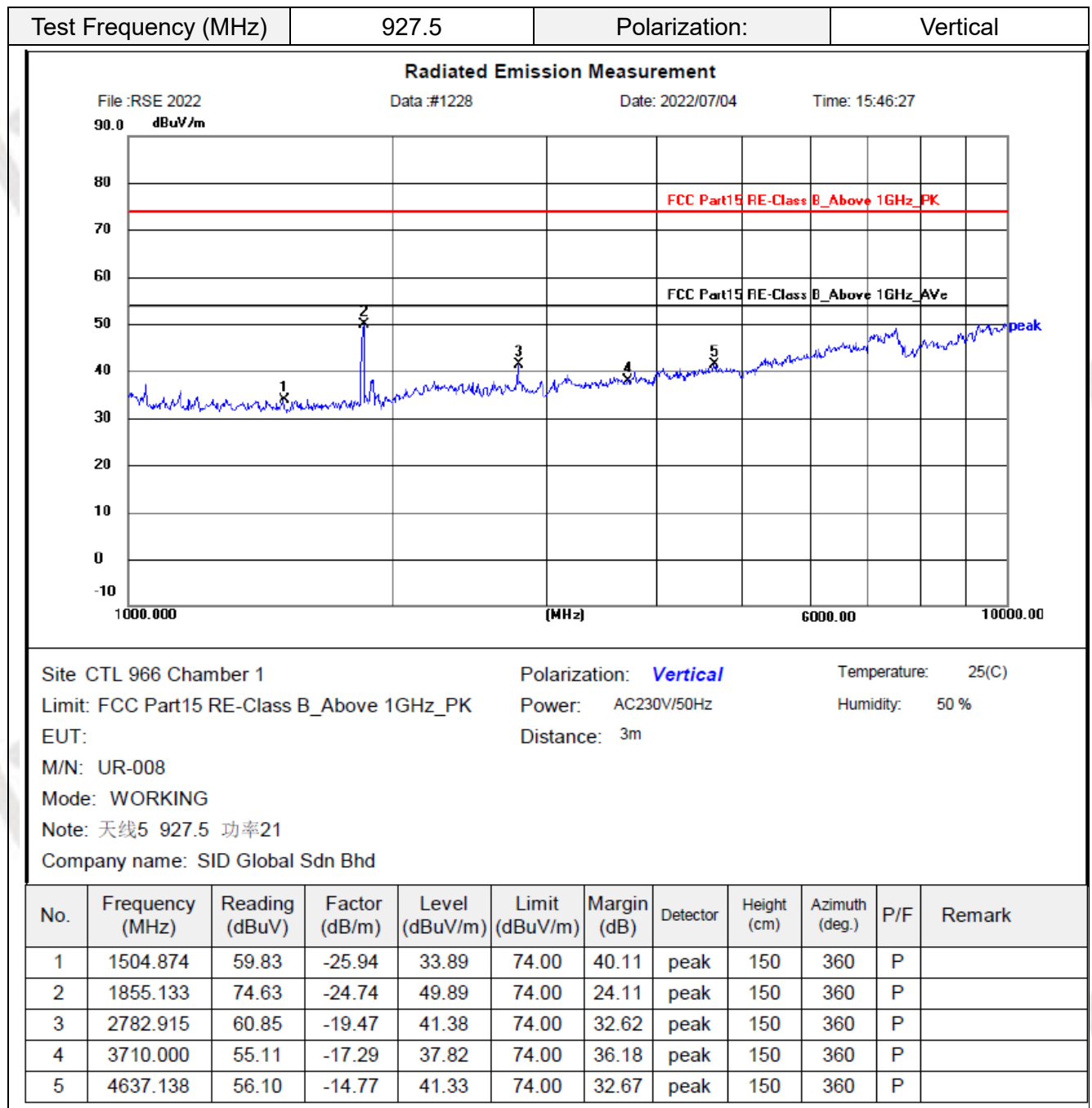




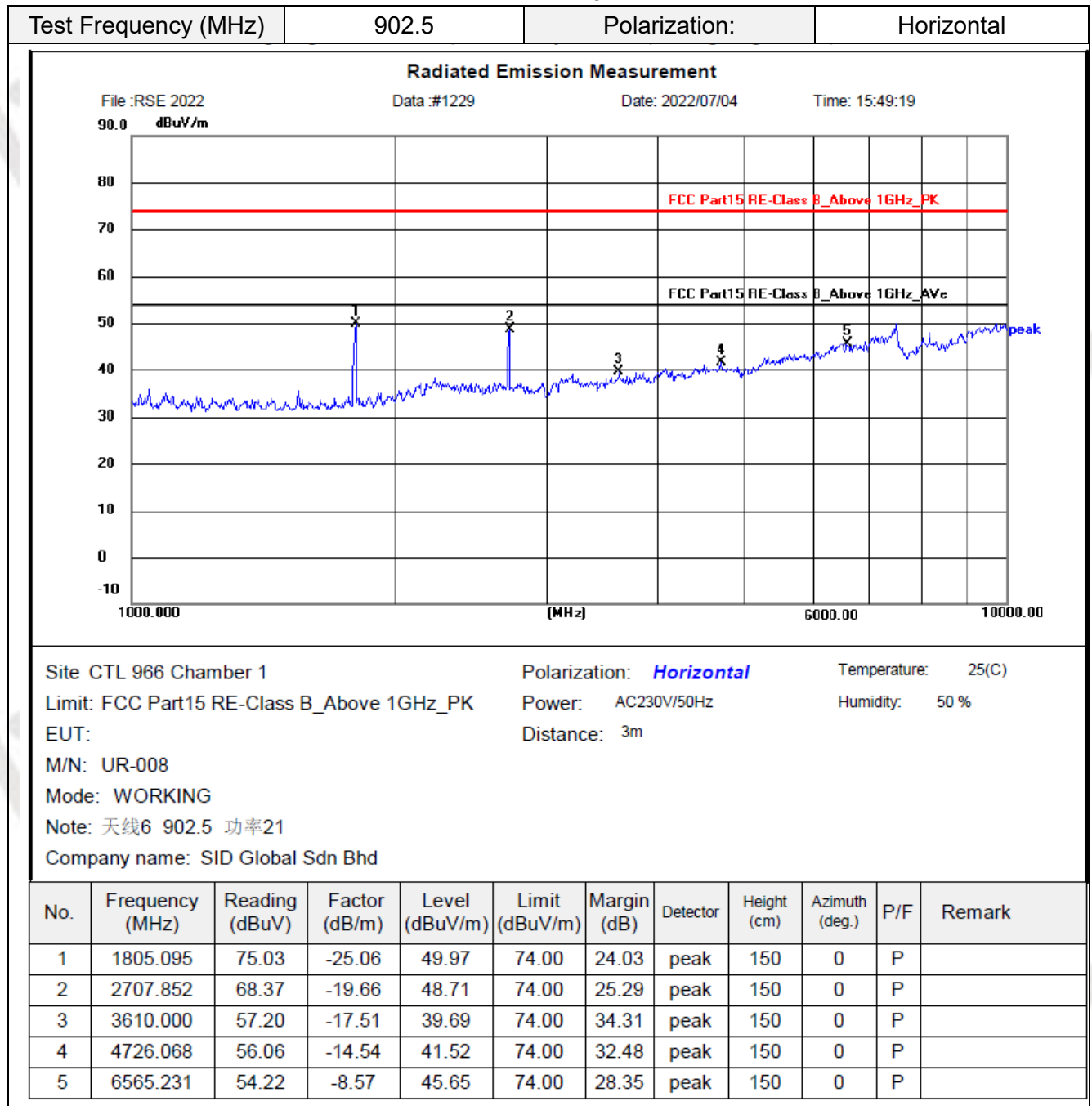


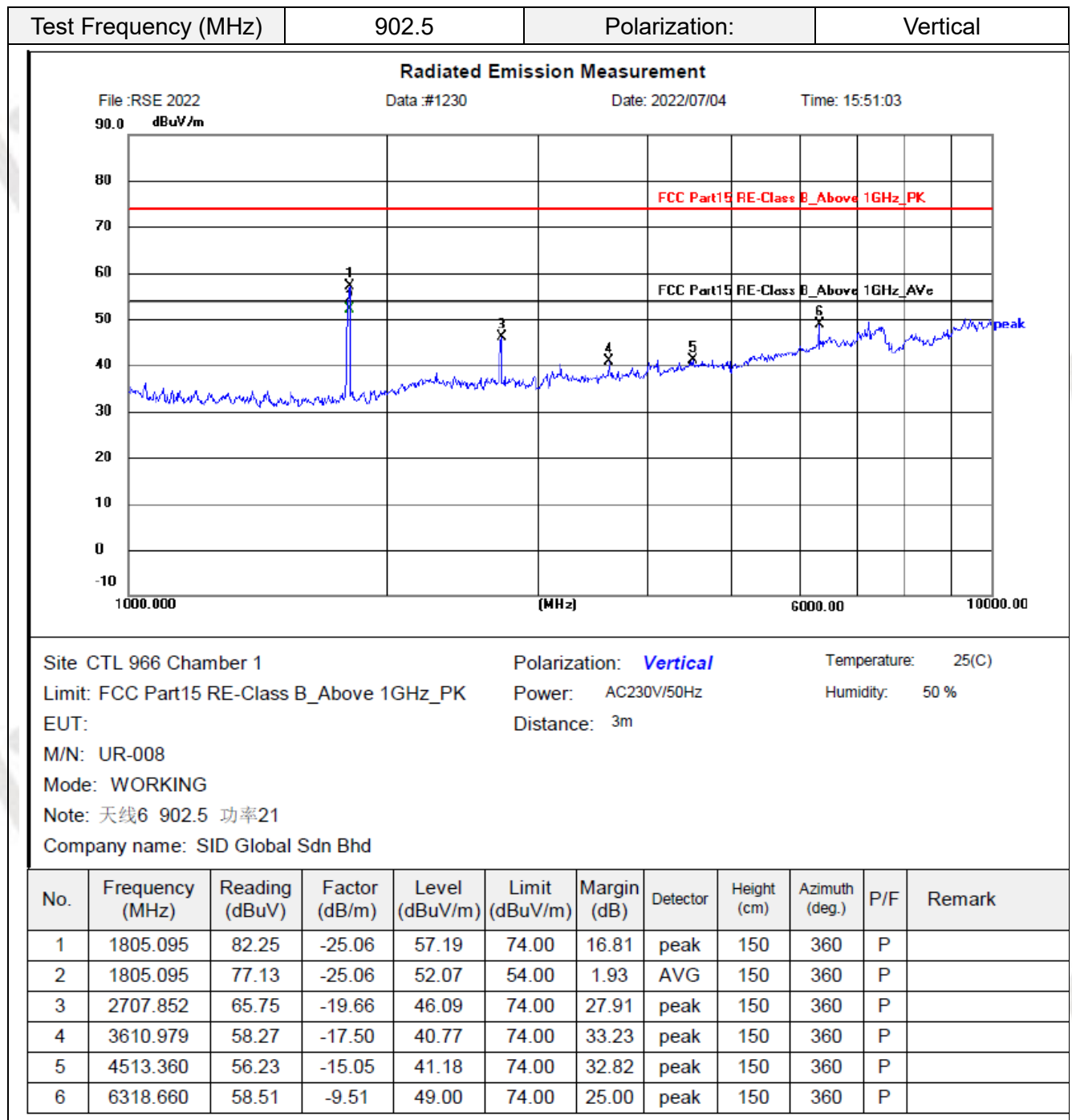


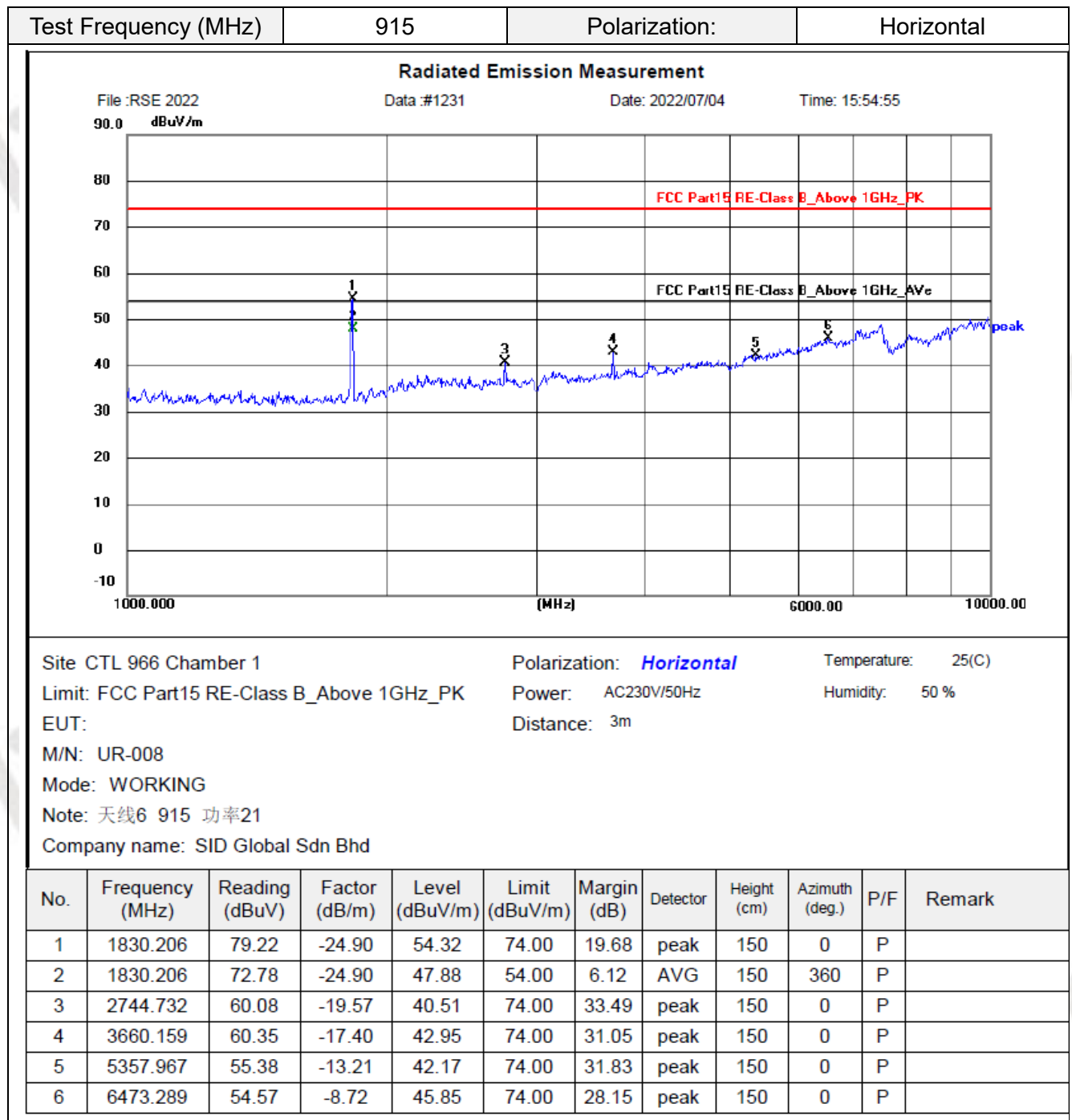


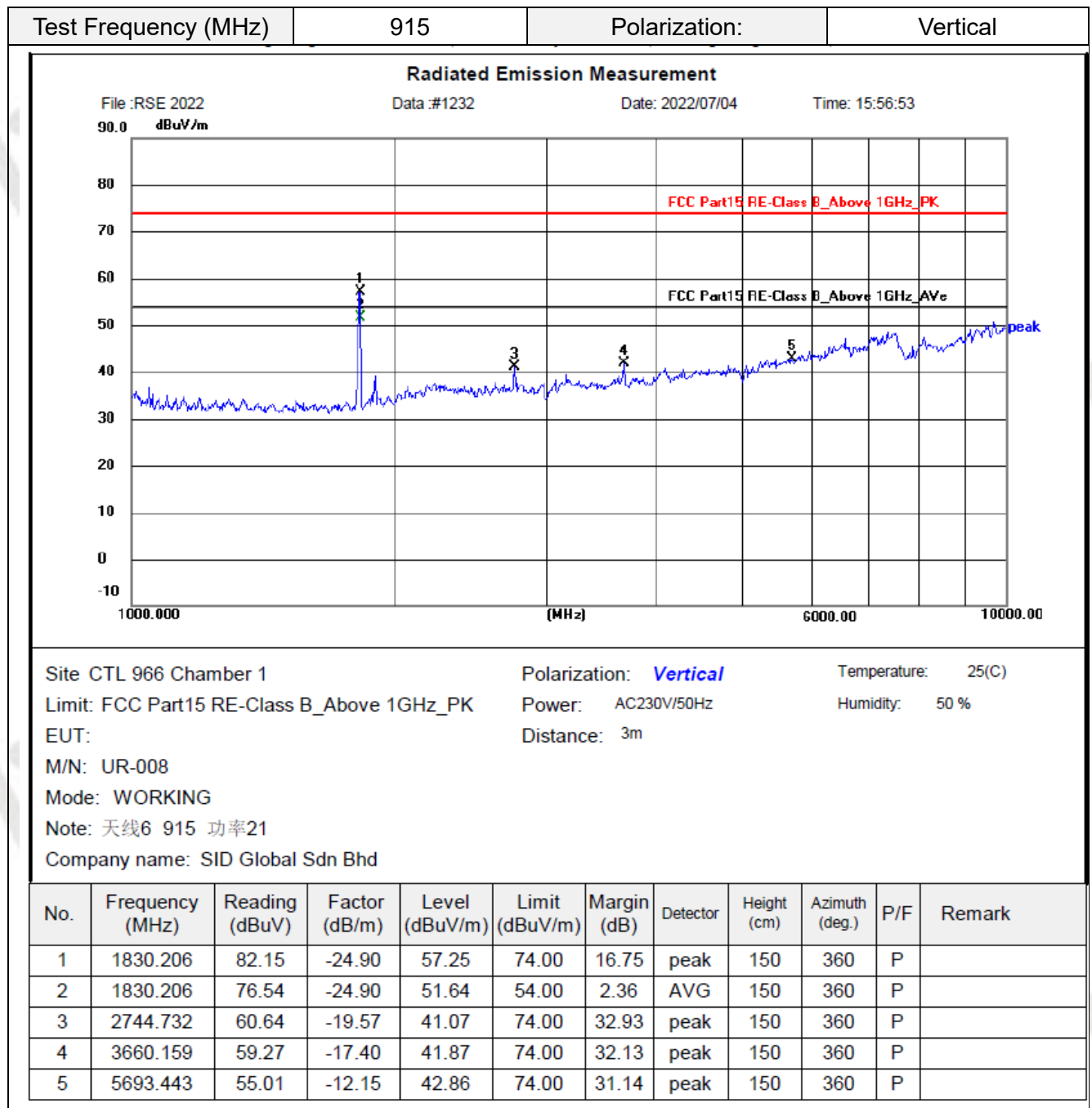


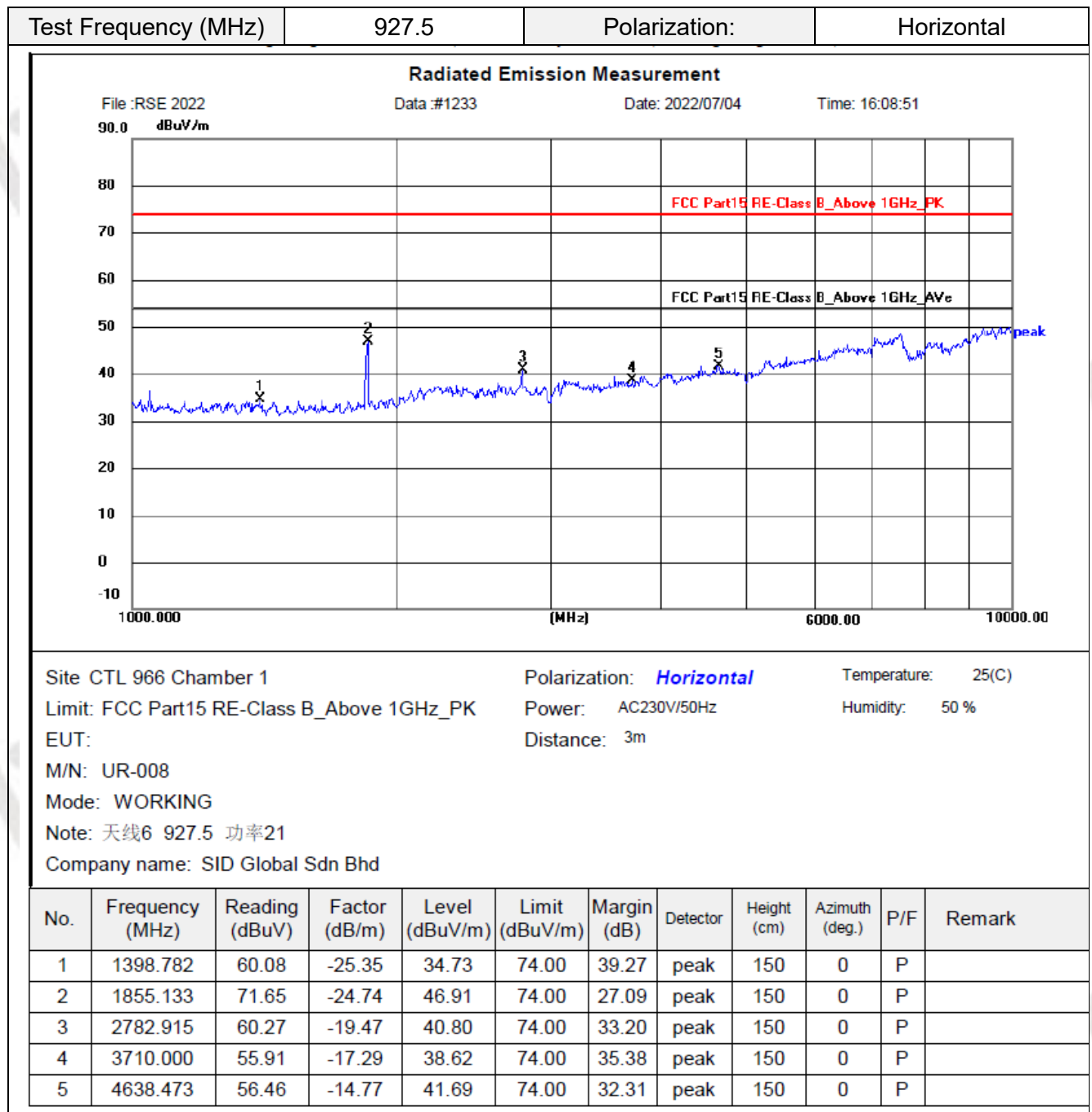
## Antenna 6

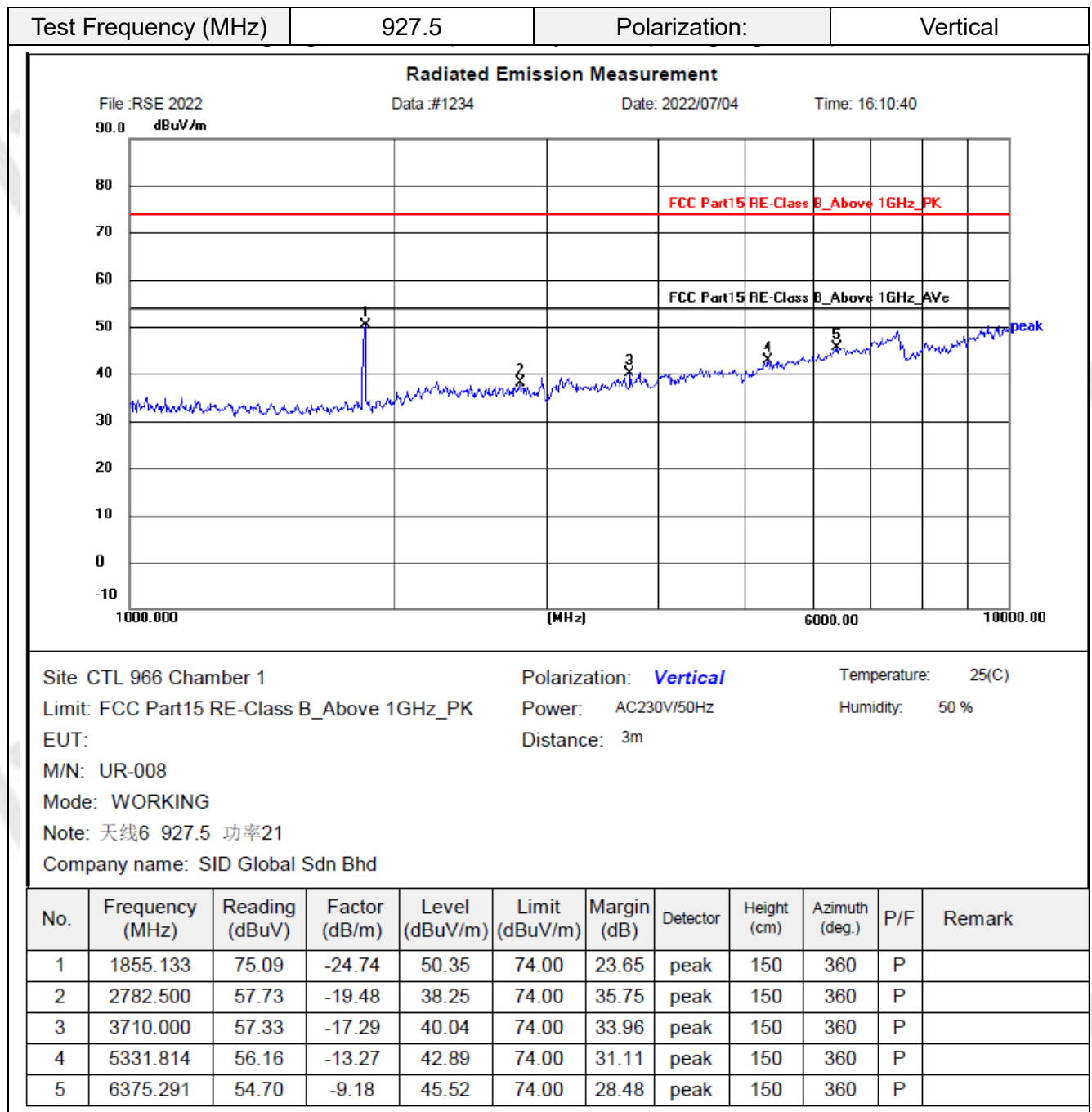




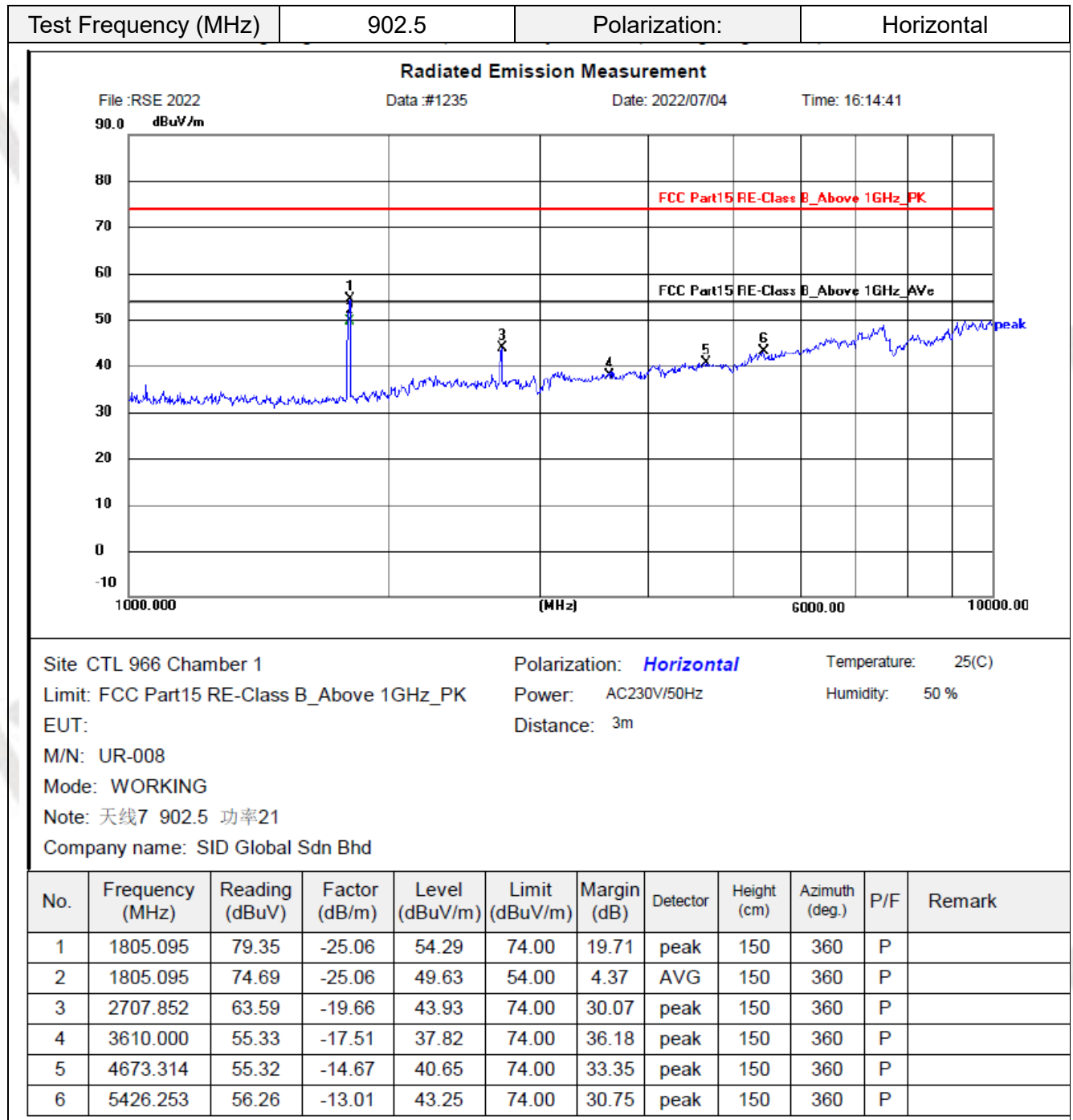


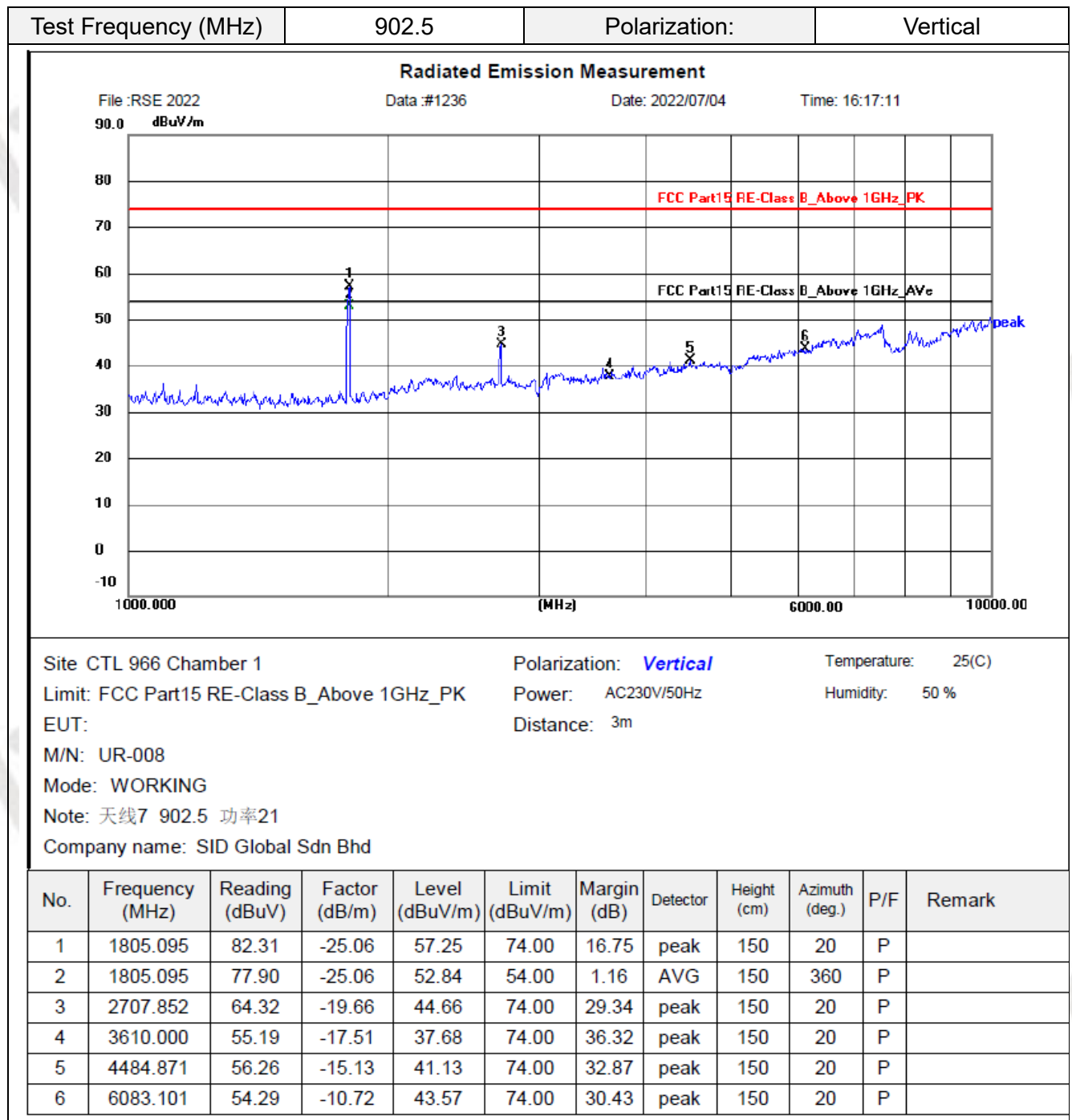


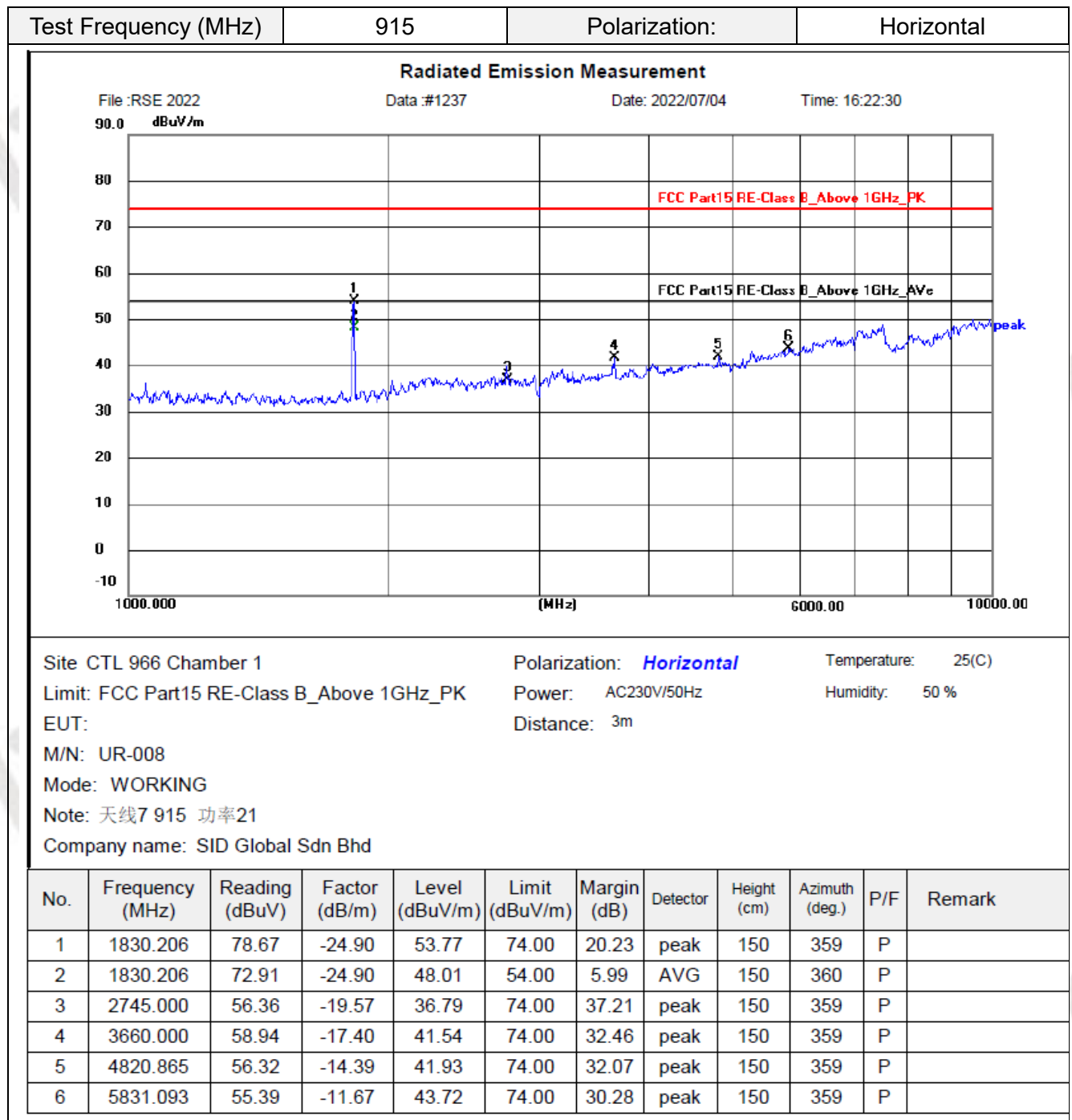


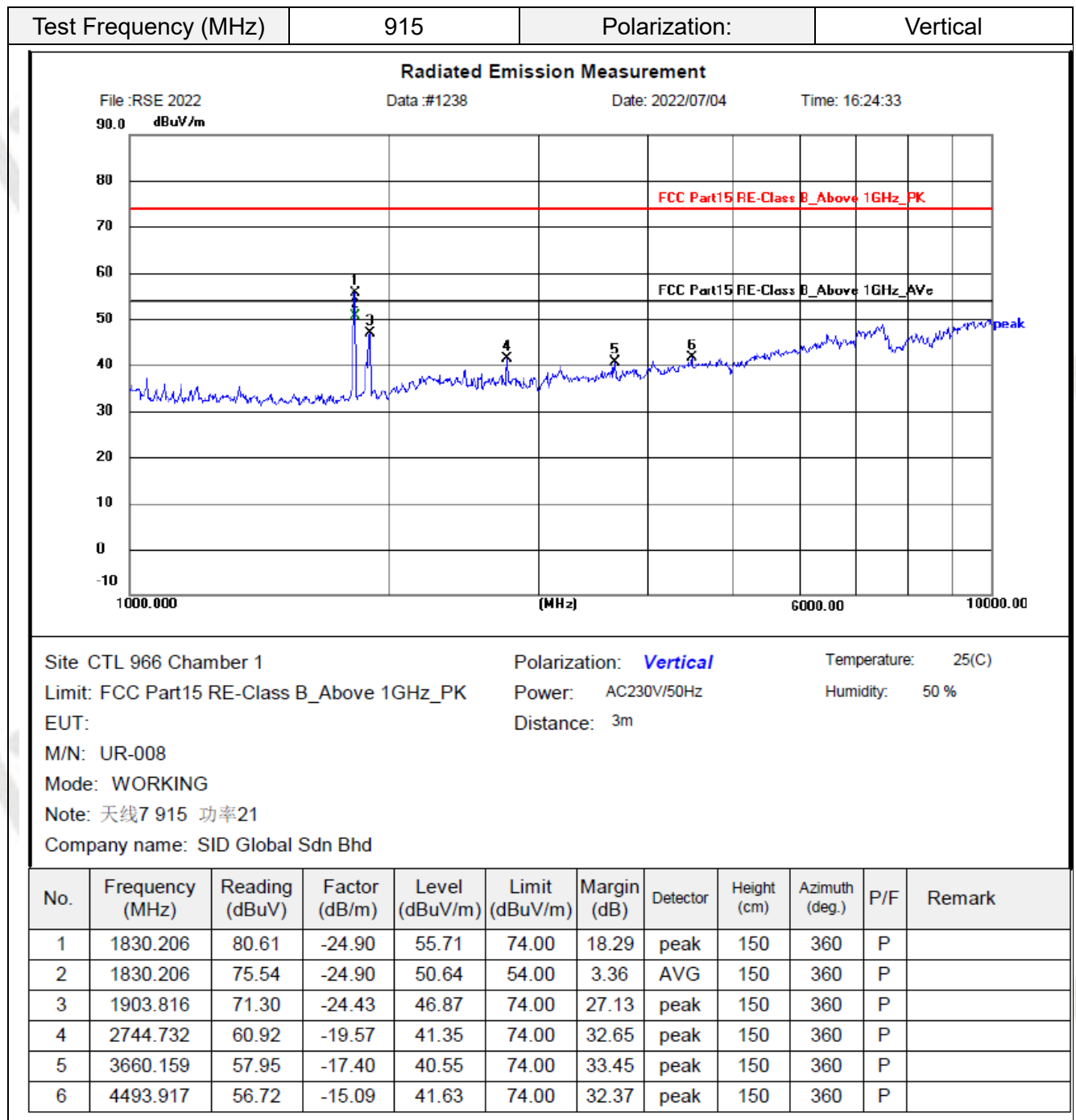


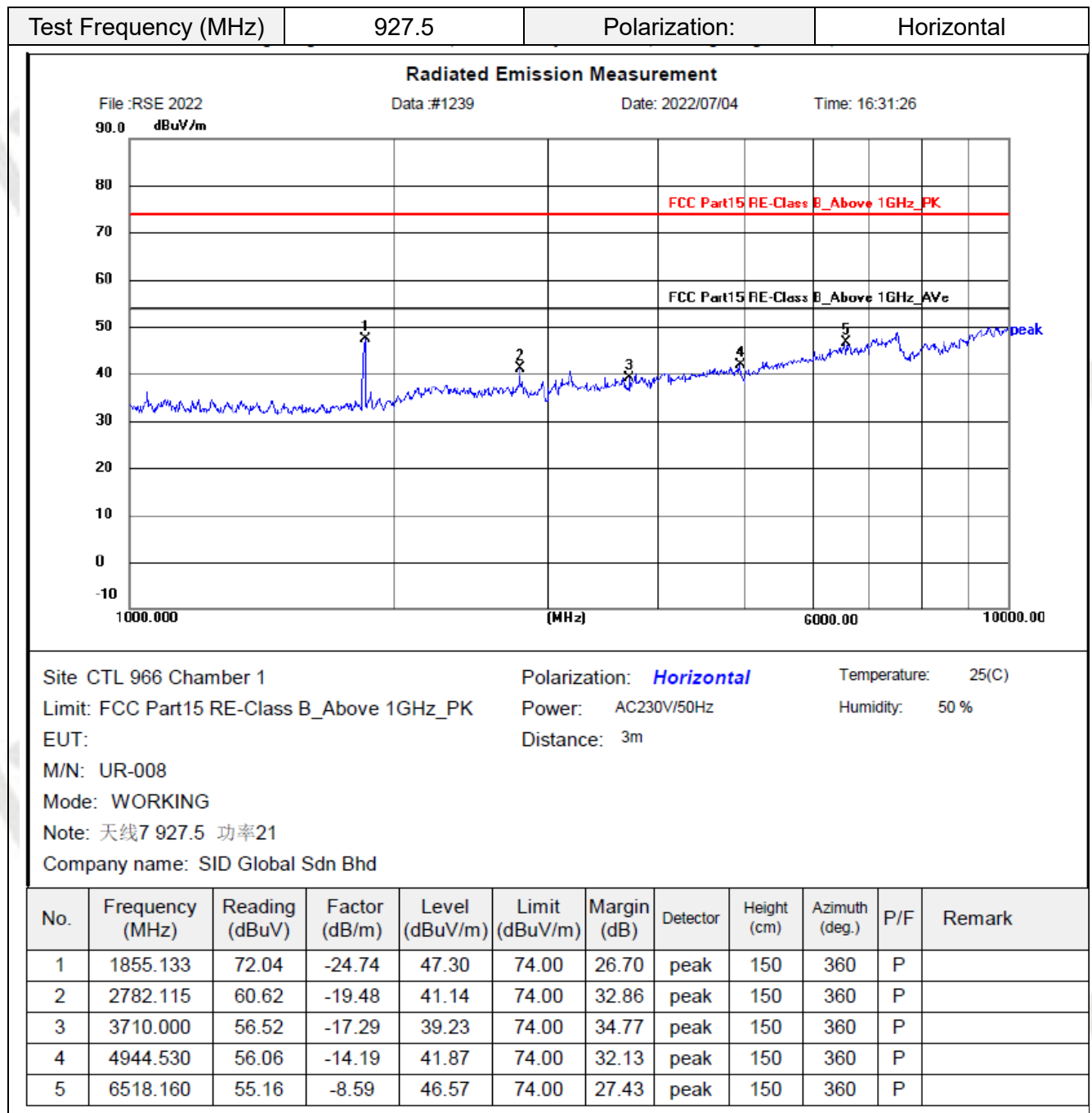
## Antenna 7

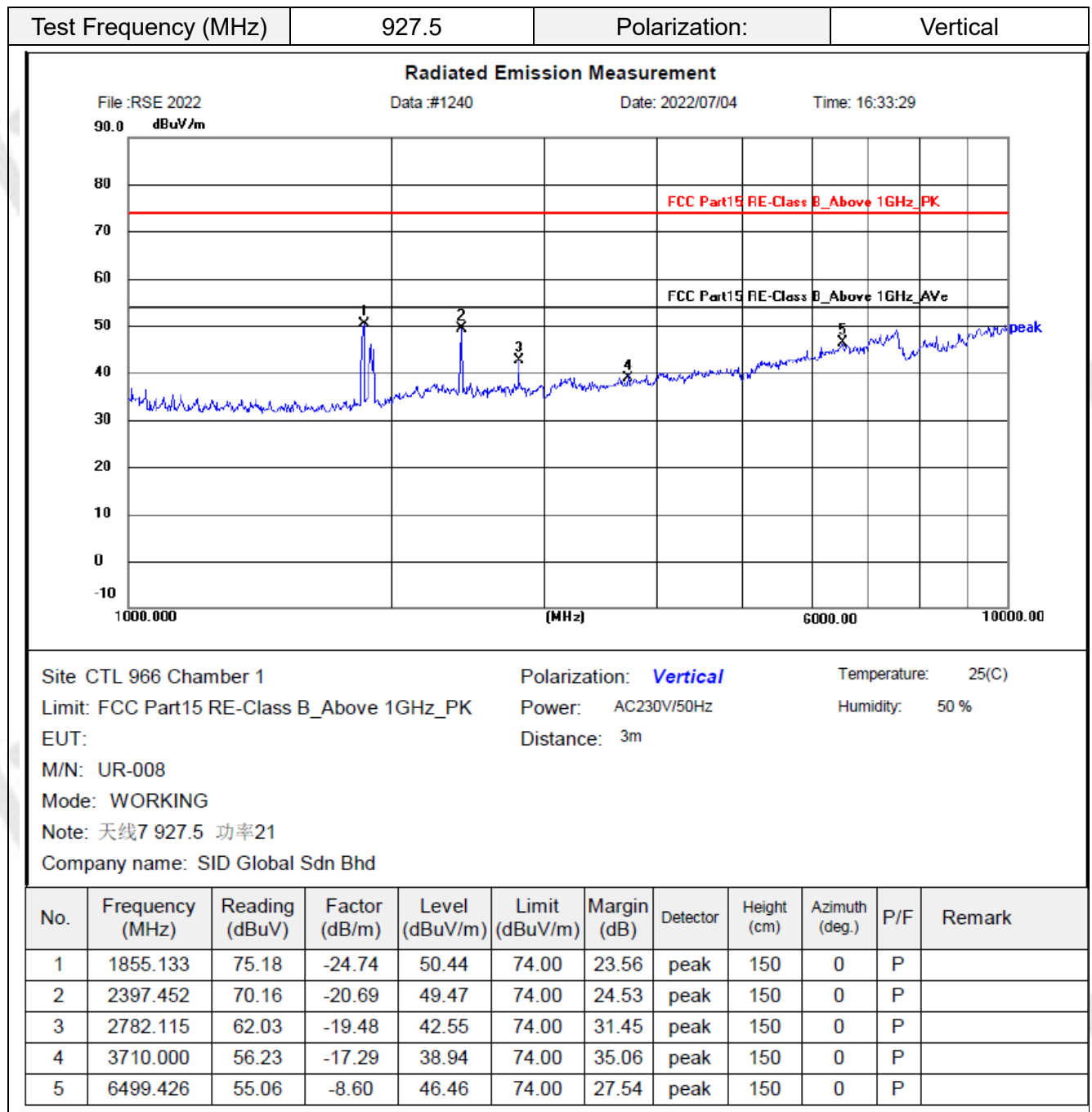




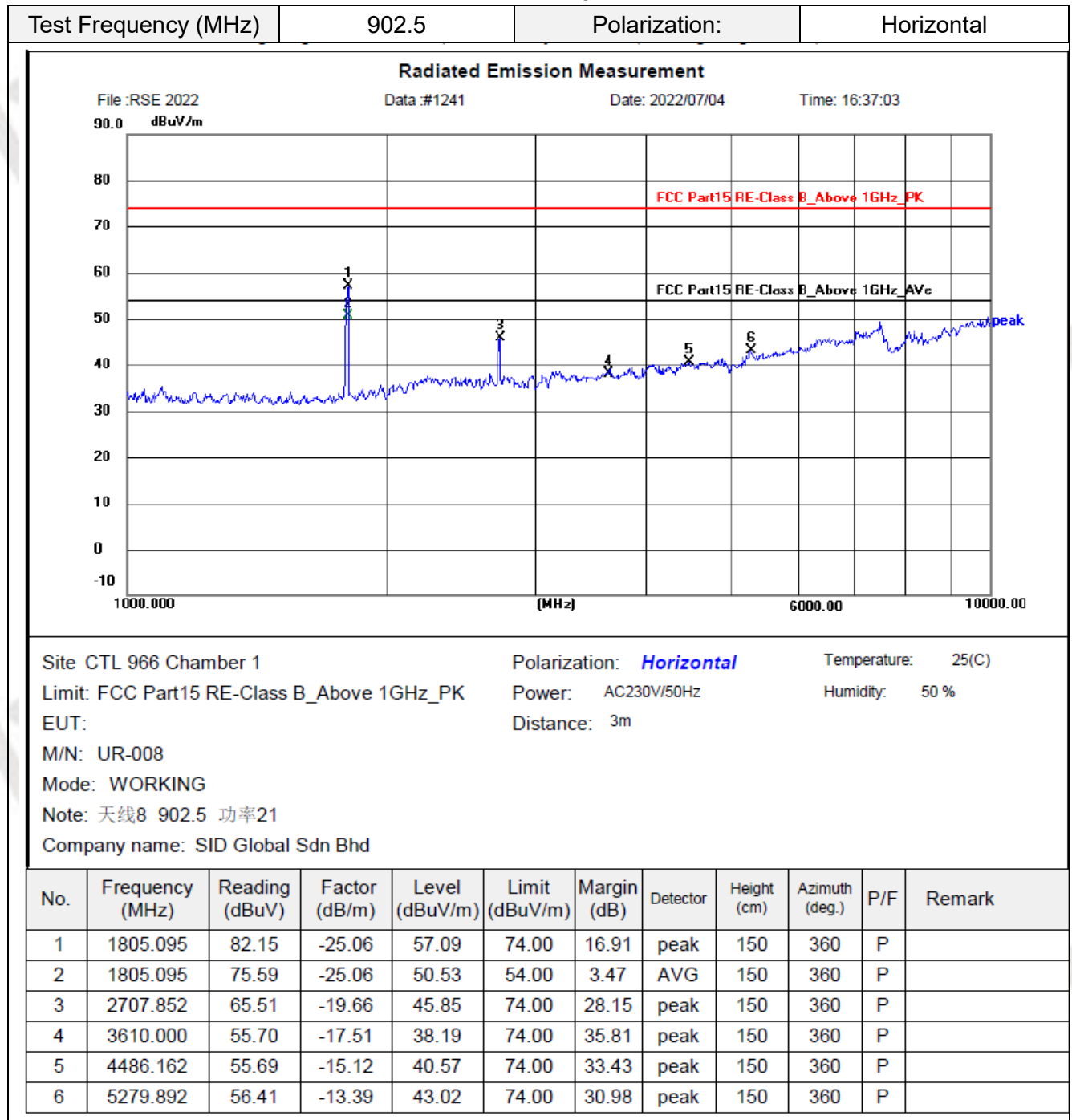


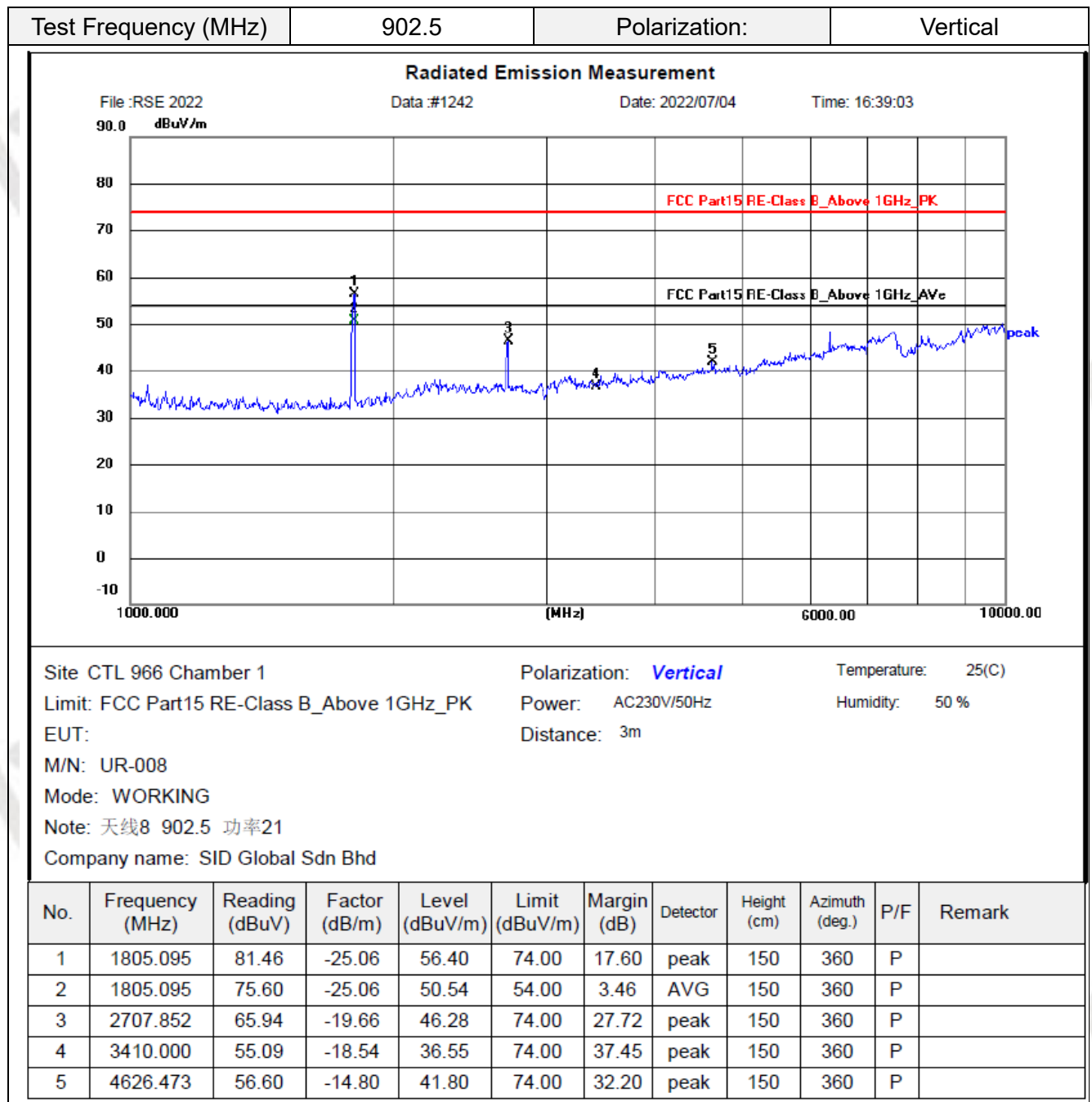


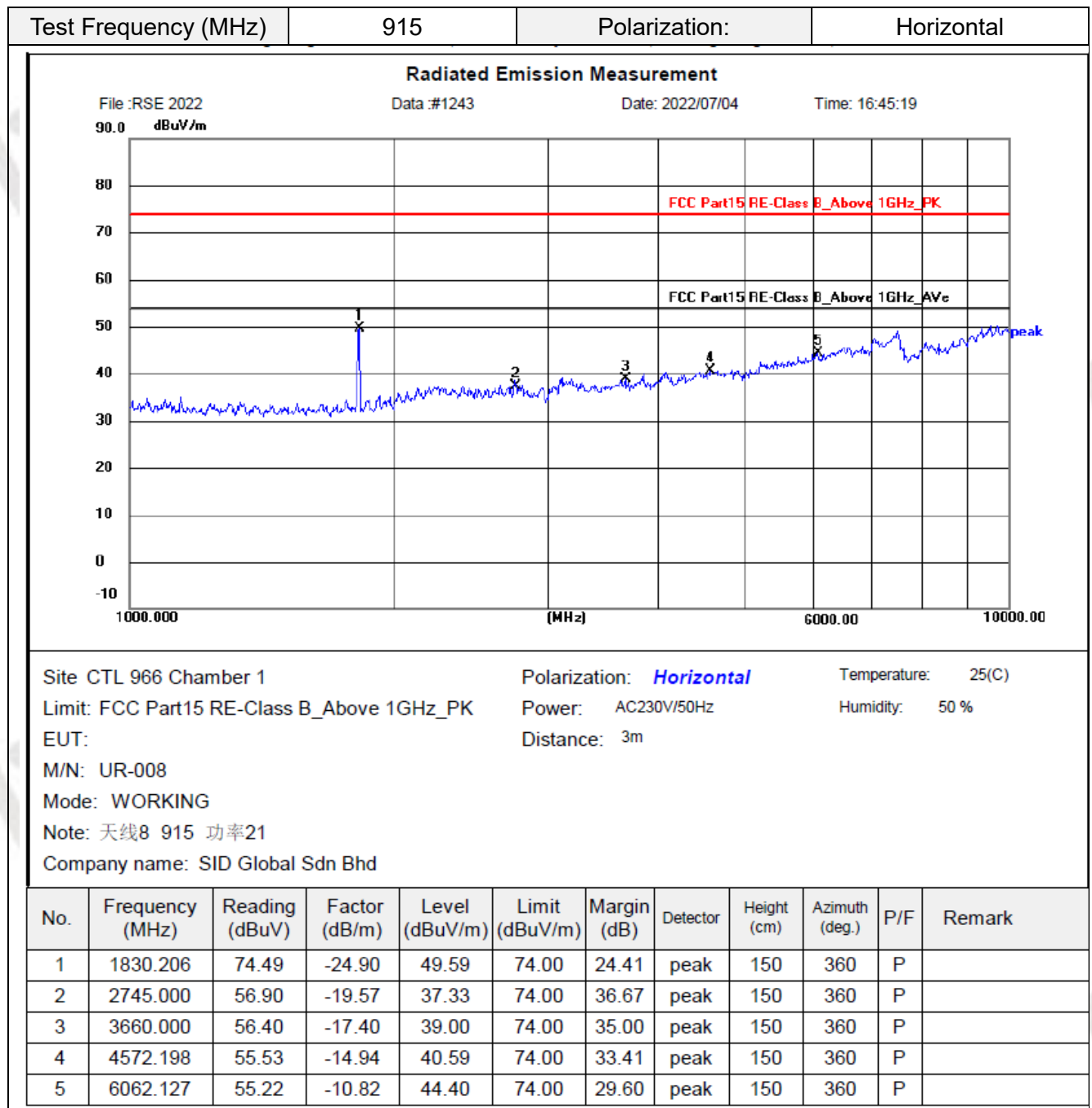


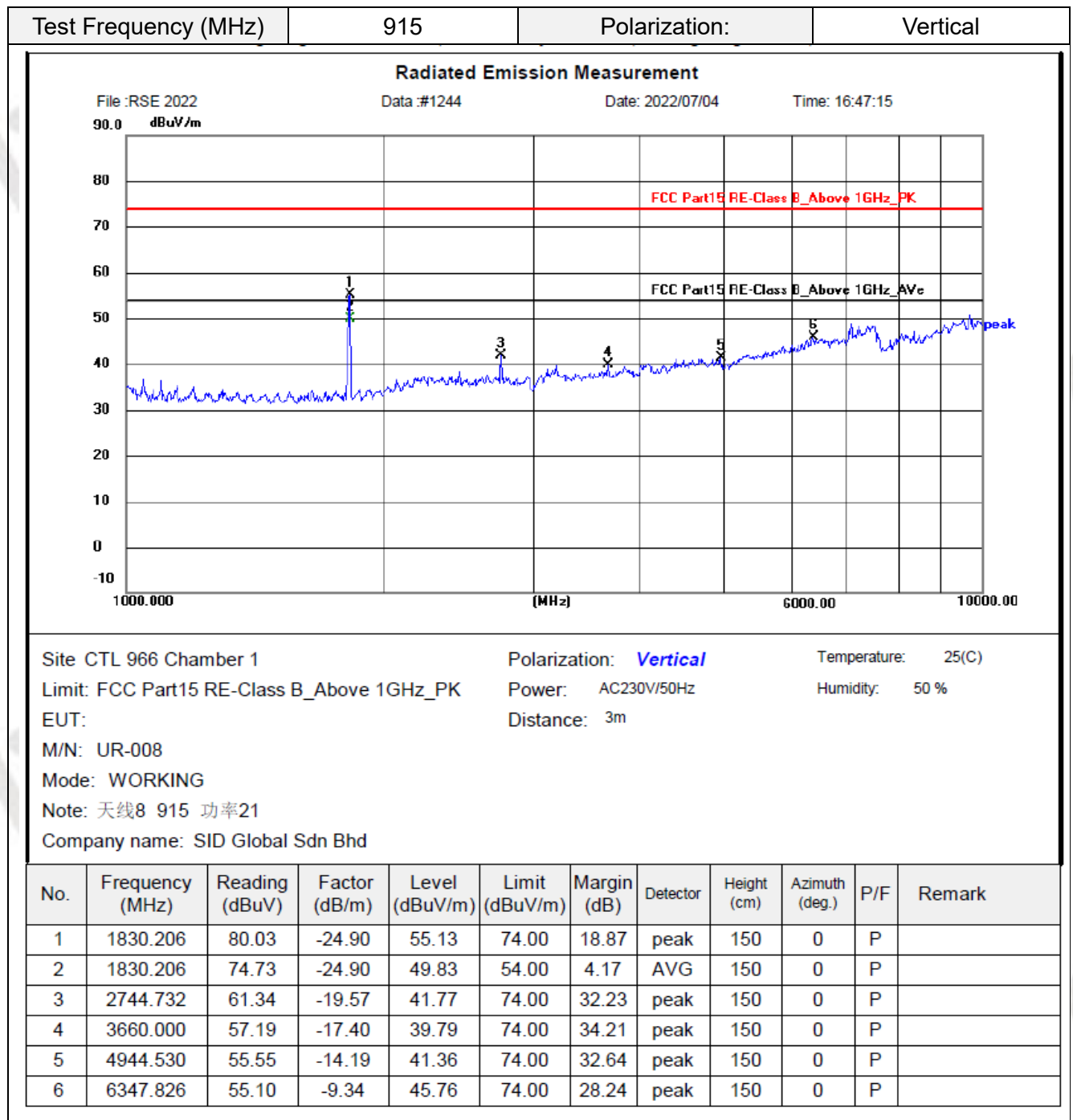


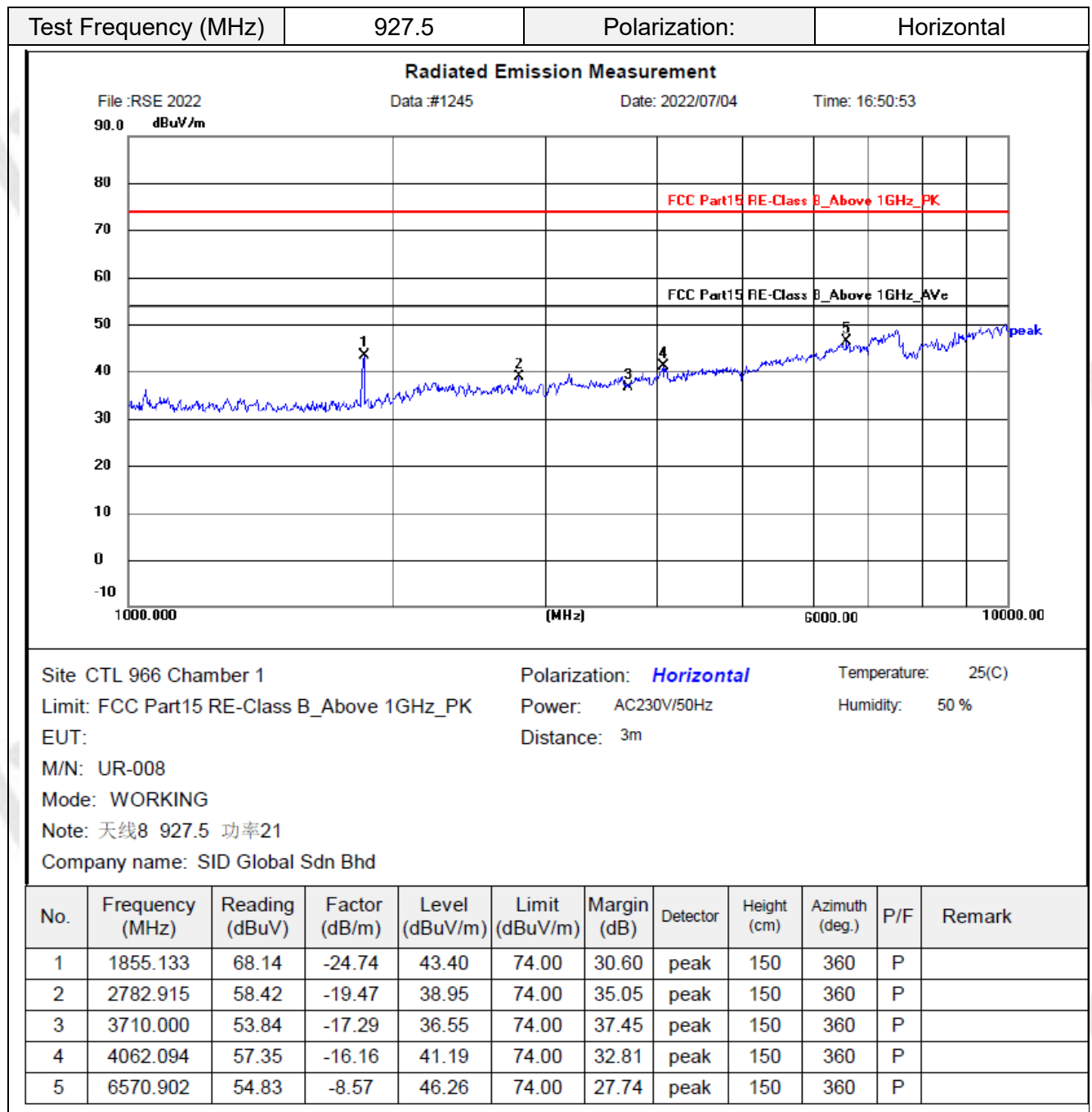
## Antenna 8

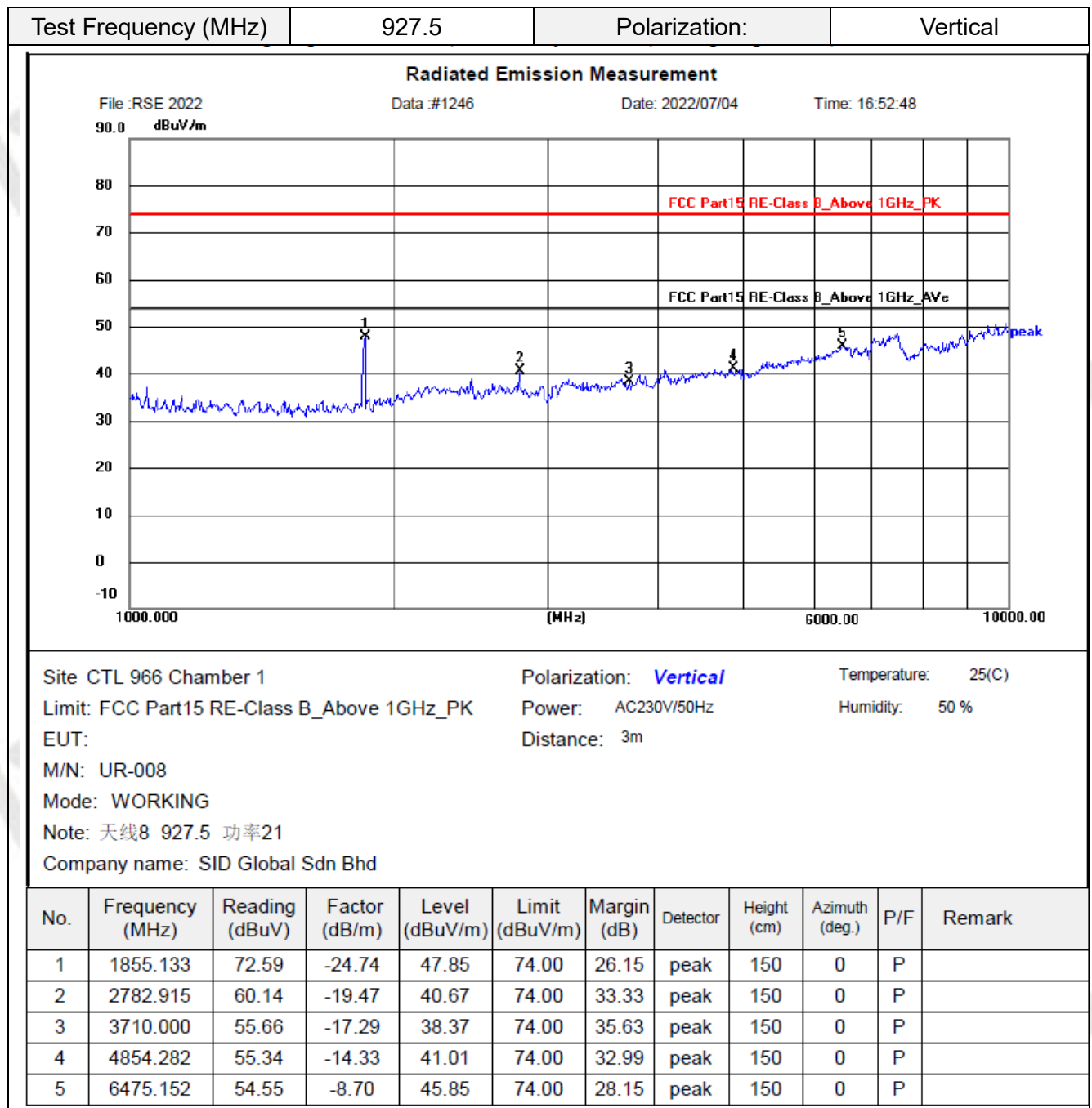












## REMARKS:

1. Margin value = Limit value- Emission level.
2. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

### 3.3. Maximum Conducted Output Power

#### Limit

The Maximum Peak Output Power limit is 28 dBm.

#### Test Procedure

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

#### Test Configuration



#### Test Results

Antenna 1

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.257	28	PASS
915.0	20.836	28	PASS
927.5	19.484	28	PASS

Antenna 2

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.386	28	PASS
915.0	21.085	28	PASS
927.5	19.710	28	PASS

Antenna 3

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.492	28	PASS
915.0	21.179	28	PASS
927.5	19.907	28	PASS

Antenna 4

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.569	28	PASS
915.0	21.186	28	PASS
927.5	19.967	28	PASS

Antenna 5

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.464	28	PASS
915.0	21.142	28	PASS
927.5	19.996	28	PASS

Antenna 6

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.403	28	PASS
915.0	20.963	28	PASS
927.5	19.823	28	PASS

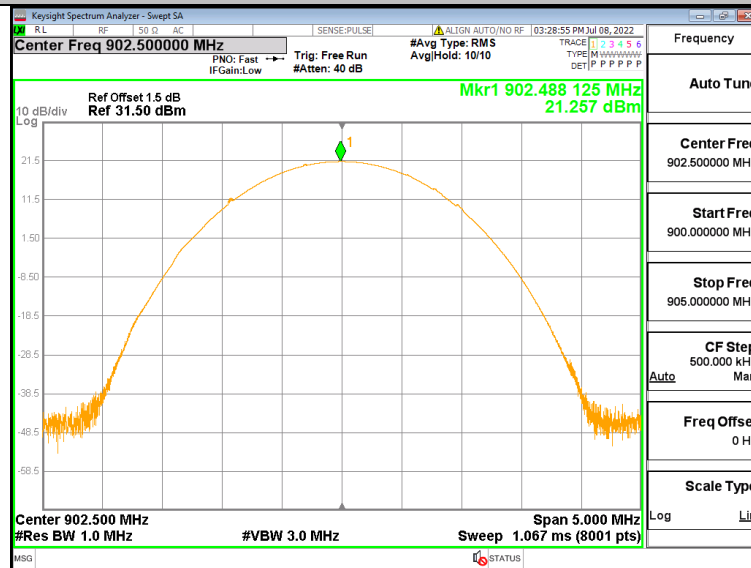
Antenna 7

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.491	28	PASS
915.0	20.936	28	PASS
927.5	19.637	28	PASS

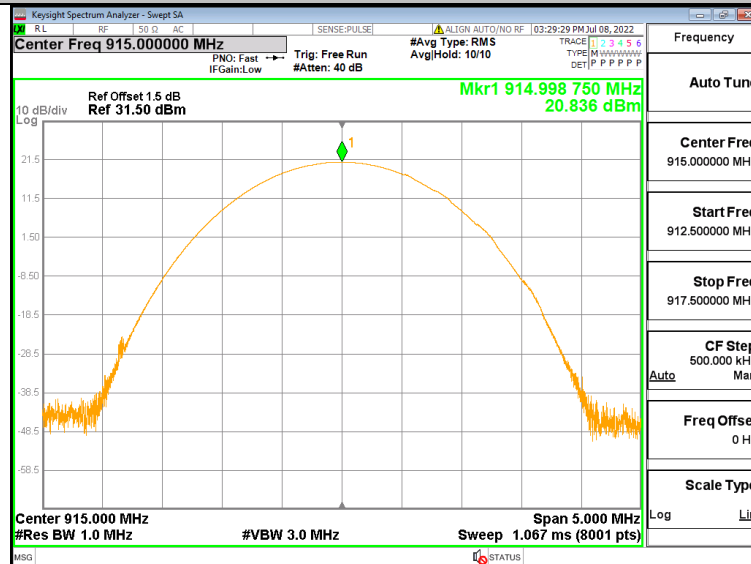
Antenna 8

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.5	21.255	28	PASS
915.0	20.690	28	PASS
927.5	19.385	28	PASS

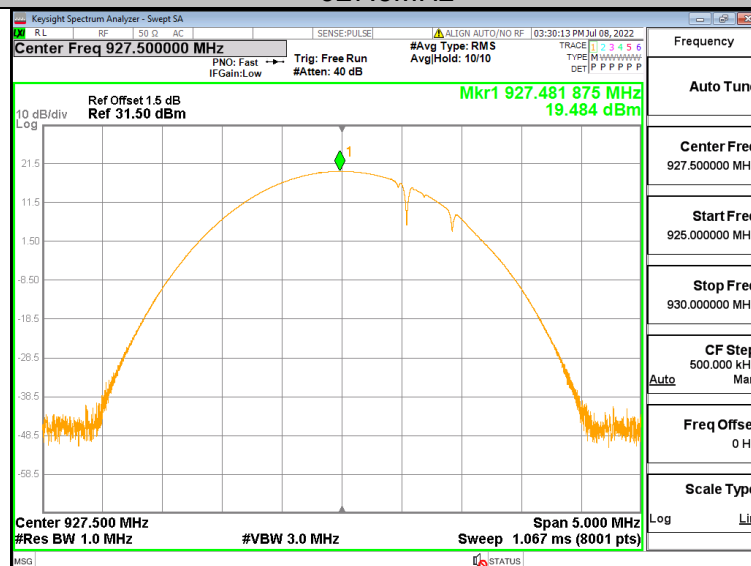
## Test Graphs

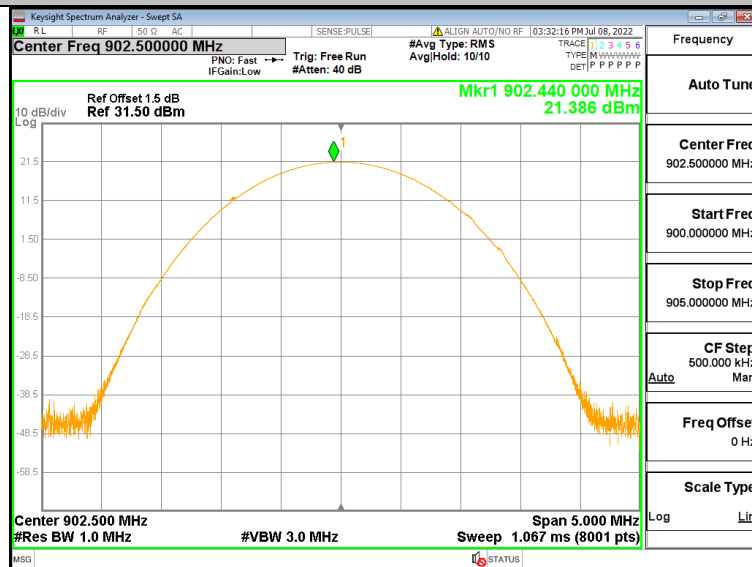
Antenna 1  
902.5MHz

## 915MHz

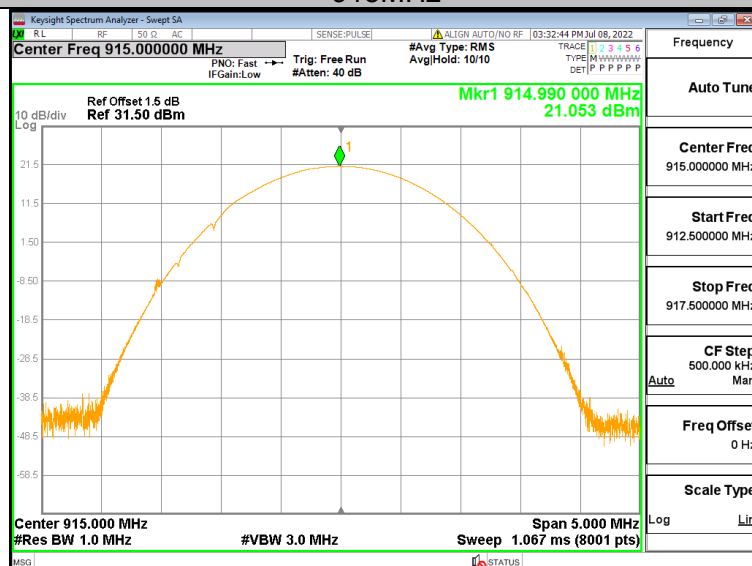


## 927.5MHz

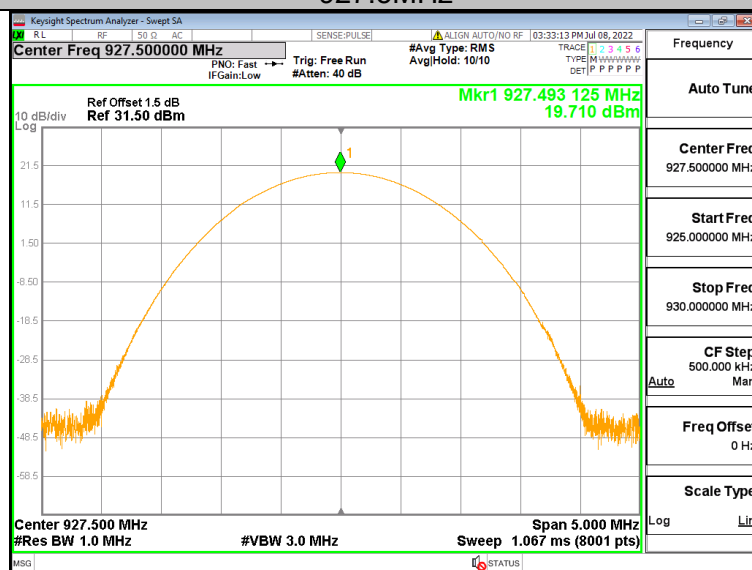


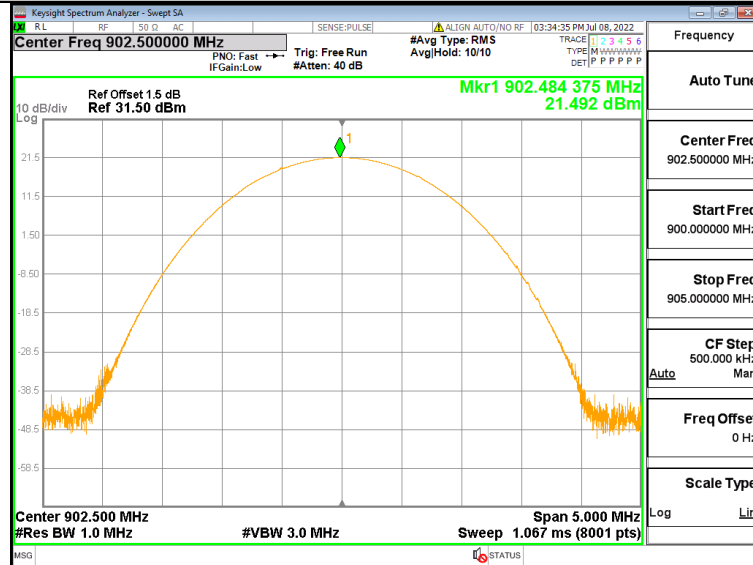
Antenna 2  
902.5MHz

## 915MHz

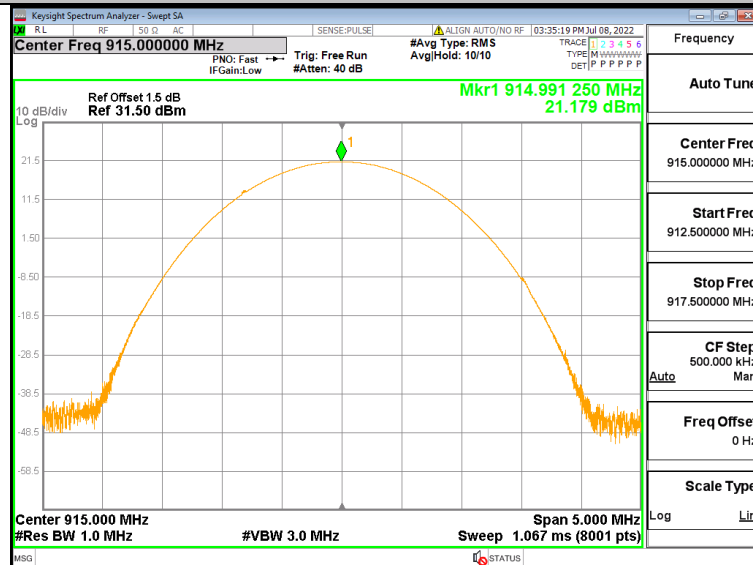


## 927.5MHz



Antenna 3  
902.5MHz

## 915MHz



## 927.5MHz

