EMC MEASUREMENT REPORT

FCC ID:	2A82LSPOT-V1
Applicant:	Nova Labs, Inc.
Product:	Spot Mapper
Model No:	Spot-US
Brand Name:	Helium
FCC Classification:	Part 15B Digital Device (JAB)
FCC Rule Part(s):	FCC Part 15 Subpart B: 2020
Test Procedure(s):	ANSI C63.4: 2014
Result:	Complies
Test Date:	2022-09-27 ~ 2023-01-11

Reviewed By: Sunny Sun

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2209RSU059-U12	Rev. 01	Initial Report	2023-01-04	Invalid
2209RSU059-U12	Rev. 02	Modify the Product Name	2023-01-12	Valid

CONTENTS

1. General Information

1.1. Applicant

Nova Labs, Inc.

2202 South Figueroa #408, Los Angeles, California, United States

1.2. Manufacturer

Nova Labs, Inc.

2202 South Figueroa #408, Los Angeles, California, United States

1.3. Testing Facility

☒	**Test Site - MRT Suzhou Laboratory**	
	Laboratory Location (Suzhou - Wuzhong)	
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China	
	Laboratory Location (Suzhou - SIP)	
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China	
	Laboratory Accreditations	
	A2LA: 3628.01	CNAS: L10551
	FCC: CN1166	ISED: CN0001
	VCCI: R-20025, G-20034, C-20020, T-20020	
☐	**Test Site - MRT Shenzhen Laboratory**	
	Laboratory Location (Shenzhen)	
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China	
	Laboratory Accreditations	
	A2LA: 3628.02	CNAS: L10551
	FCC: CN1284	ISED: CN0105
☐	**Test Site - MRT Taiwan Laboratory**	
	Laboratory Location (Taiwan)	
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)	
	Laboratory Accreditations	
	TAF: L3261-190725	
	FCC: 291082, TW3261	ISED: TW3261

1.4. Product Information

Product Name	Spot Mapper
Model No.	Spot-US
Brand Name	Helium
IMEI	868692050098980
E-UTRA Band	FDD Band: 2, 4, 5, 66, 71 TDD Band: 48
NR SA Band	TDD Band: n41, n48
NR SA UL MIMO Band	n41
NR NSA Band	n41
Supply Voltage	battery
Operating Temperature:	-20 ~ 55 °C
Accessories	
Rechargeable Li-ion Battery	Model No.: QDM044 Rated Voltage: 3.8V Rated Capacity: 4000mAh/15.2Wh Limited Charge Voltage: 4.35V
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

2. Test Configuration

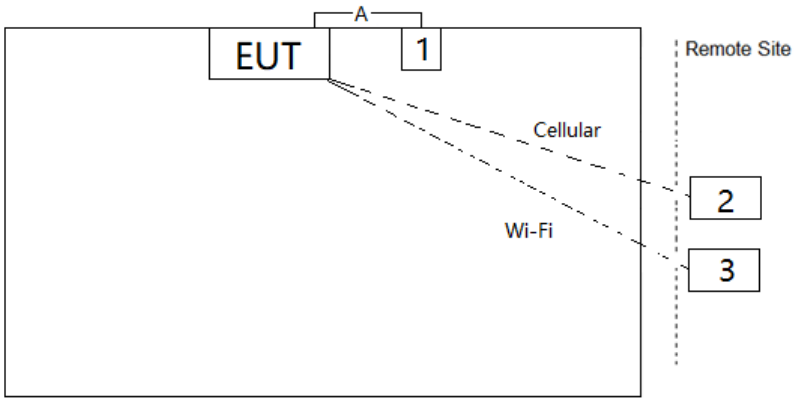
2.1. Test Mode

Mode 1: LTE Band 48 traffic + WiFi connected + Bluetooth transmitted + Lora transmitted + Charging by adapter Mode 2: LTE Band 5 received + WiFi received at channel 2412MHz & 5180MHz + Bluetooth received at channel 2402MHz + Lora received at channel 915MHz + Charging by adapter Mode 3: LTE Band 71 received + WiFi received at channel 2412MHz & 5180MHz + Bluetooth received at channel 2402MHz + Lora received at channel 915MHz + Charging by adapter

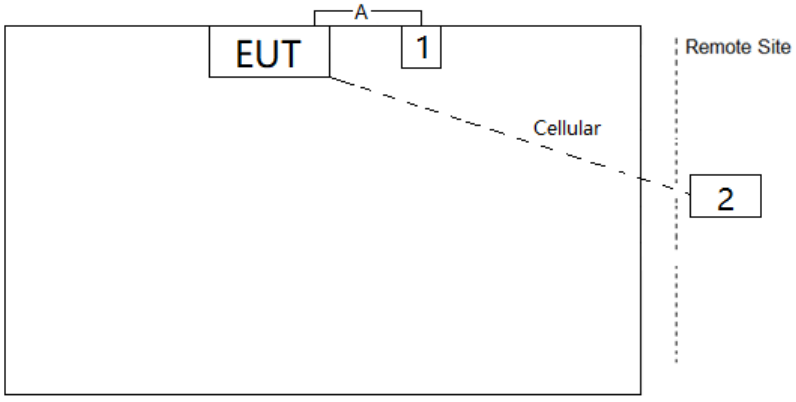
2.2. Test System Connection Diagram

The EUT was tested per the guidance FCC Part 15 Subpart B: 2020 and ANSI C63.4: 2014 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram (Mode 1)



Connection Diagram (Mode 2~3)



Cable Type		Signal Cable Description
A	Power Cable	Shielding, 1m

2.3. Test System Details

Product		Manufacturer	Model No.
1	Adapter	Apple	Apple 20W USB-C
2	Radio Communication Analyzer	Anritsu	8821C
3	Phone	Apple	iPhone 13

2.4. Test procedure

1	Setup the EUT and simulators as shown on above.
2	Power on all equipment and make the EUT work on the test mode as section 2.2.
3	Begin to test.

2.5. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

3. Description of Test

3.1. Evaluation Procedure

The measurement procedures described in the document titled “American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical Equipment in the Range of 9kHz to 40GHz” (ANSI C63.4-2014) was used in the measurement.

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150 kHz to 30 MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or resolution, clock or data exchange speed, scrolling H pattern to the EUT and/or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30 MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30 MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

According to 3dB beam-width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Radio Communication Analyzer	Anritsu	MT8821C	MRTSUE06960	1 year	2023-07-08	WZ
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2023-05-08	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2023-04-21	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-11-28	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-05-20	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2023-06-04	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2023-05-08	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2023-04-21	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
CDN	Teseq	ISN PLT-A	MRTSUE06007	1 year	2023-03-28	WZ-SR2
Absorbing Clamp	R&S	MDS-21	MRTSUE06008	1 year	2023-04-24	WZ-SR2
Symmetrical Attenuator	Schwarzbeck	SYMAT 40	MRTSUE06117	1 year	2023-04-10	WZ-SR2
Passive Voltage Probe	R&S	ESH2-Z3	MRTSUE06189	1 year	2023-04-06	WZ-SR2
Triple-Loop Antenna	R&S	HM020	MRTSUE06191	3 years	2024-04-13	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2023-06-06	WZ-SR2
Current Probe	FCC	F-52	MRTSUE06494	1 year	2023-05-04	WZ-SR2
Four-Line V-Network	R&S	ENV432	MRTSUE06615	1 year	2023-10-08	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2023-10-27	WZ-SR2

Software	Version	Manufacturer	Function	Date	Location
EMI V3	V 3.0.0	QuieTek	EMI Test Software	2010.01	EMC-WZ
Controller_MF 7802	1.02	MF	RE Antenna & Turntable	2015-07-05	EMC-WZ-AC2
Controller_MF 7802	2.03C	MF	RE Antenna & Turntable	2012-07-09	EMC-WZ-AC1

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.84dB 150kHz~30MHz: 3.46dB
Radiated Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 9kHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 9kHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB

6. Test Result

6.1. Summary

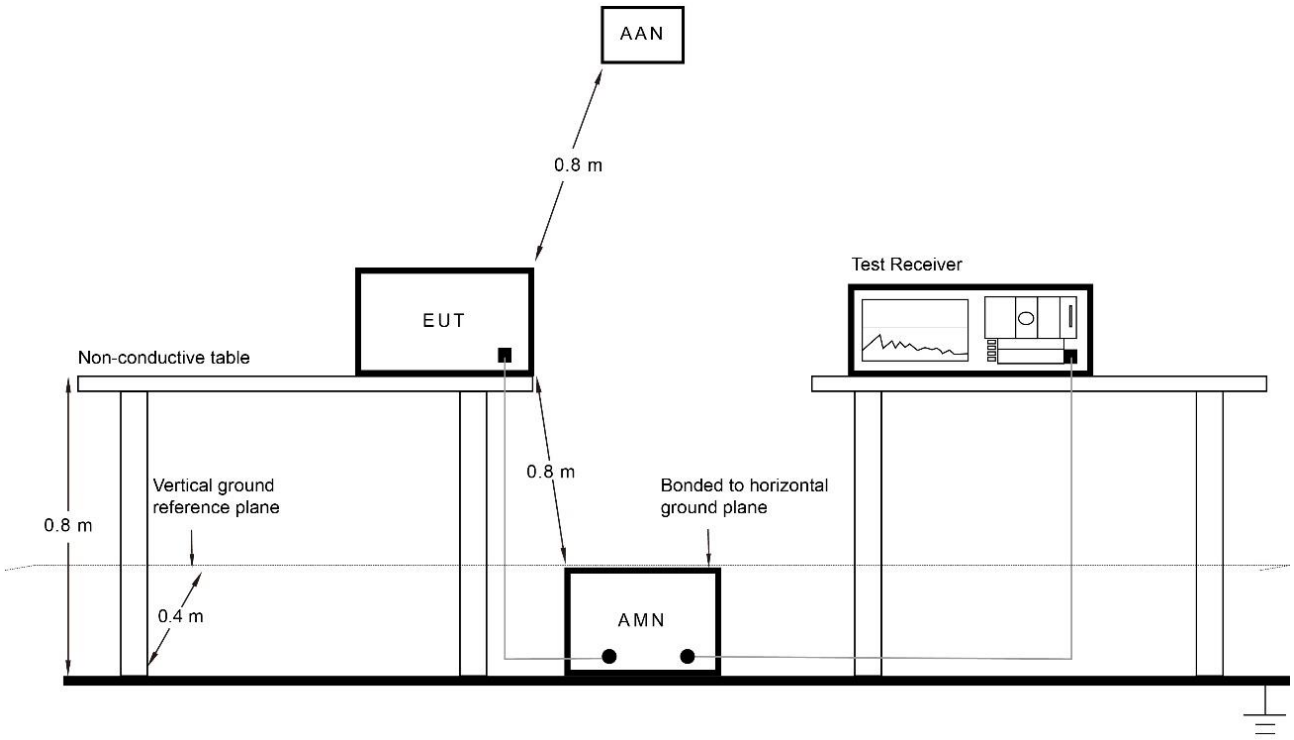
FCC Part Section(s)	Test Description	Test Result
15.107_Class B	Conducted Emissions	Pass
15.109_Class B	Radiated Emissions	Pass

6.2. Conducted Emission Measurement

6.2.1. Test Limit

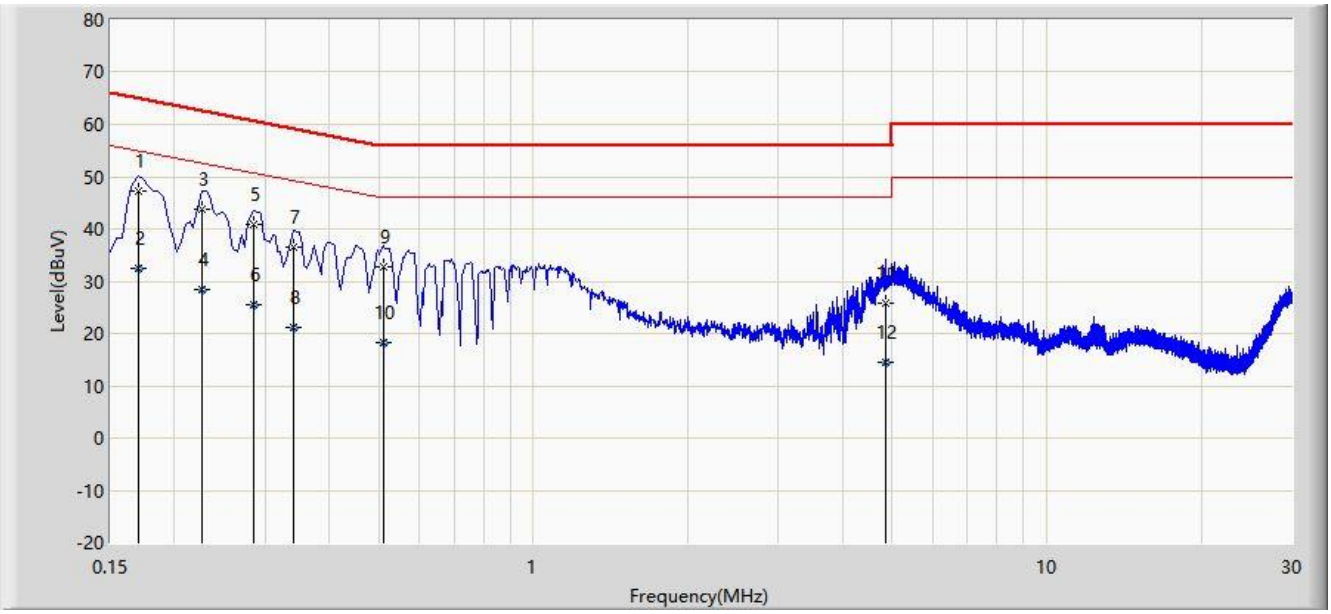
FCC Part 15.107 Limits		
Frequency (MHz)	QP (dBμV)	AV (dBμV)
0.15 ~ 0.50	66 ~ 56	56 ~ 46
0.50 ~ 5.0	56	46
5.0 ~ 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.2.2. Test Setup



6.2.3. Test Result

Site: WZ-SR2	Time: 2022/10/28 - 14:43
Temperature: 24.9°C	Humidity: 49.5%
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Charles Zhang
Probe: ENV216_101683_Filter Off_E	Polarity: Line
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 1	



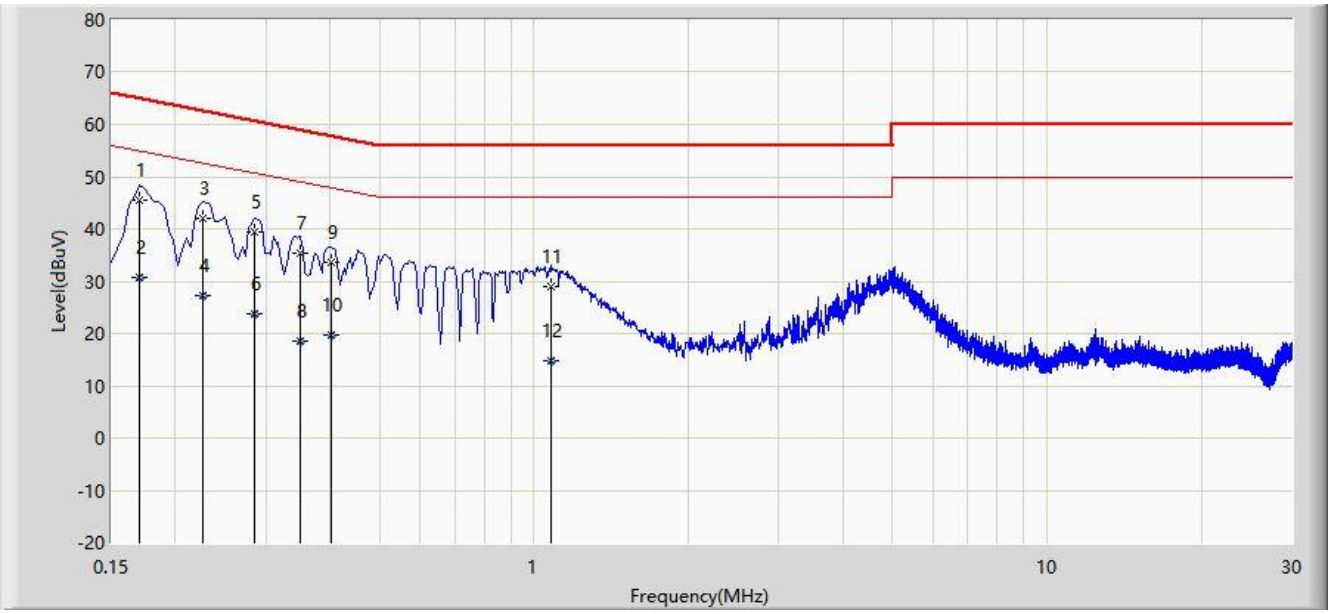
No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1	*	0.170	47.267	37.387	-17.694	64.960	9.880	QP
2		0.170	32.337	22.457	-22.624	54.960	9.880	AV
3		0.226	43.790	33.905	-18.805	62.595	9.885	QP
4		0.226	28.516	18.631	-24.079	52.595	9.885	AV
5		0.286	40.736	30.836	-19.904	60.640	9.899	QP
6		0.286	25.407	15.507	-25.233	50.640	9.899	AV
7		0.342	36.508	26.596	-22.646	59.155	9.913	QP
8		0.342	21.259	11.346	-27.895	49.155	9.913	AV
9		0.510	32.814	22.865	-23.186	56.000	9.949	QP
10		0.510	18.391	8.442	-27.609	46.000	9.949	AV
11		4.850	25.708	15.166	-30.292	56.000	10.542	QP
12		4.850	14.423	3.881	-31.577	46.000	10.542	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Time: 2022/10/28 - 14:48
Temperature: 24.9°C	Humidity: 49.5%
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Charles Zhang
Probe: ENV216_101683_Filter Off_E	Polarity: Neutral
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 1	



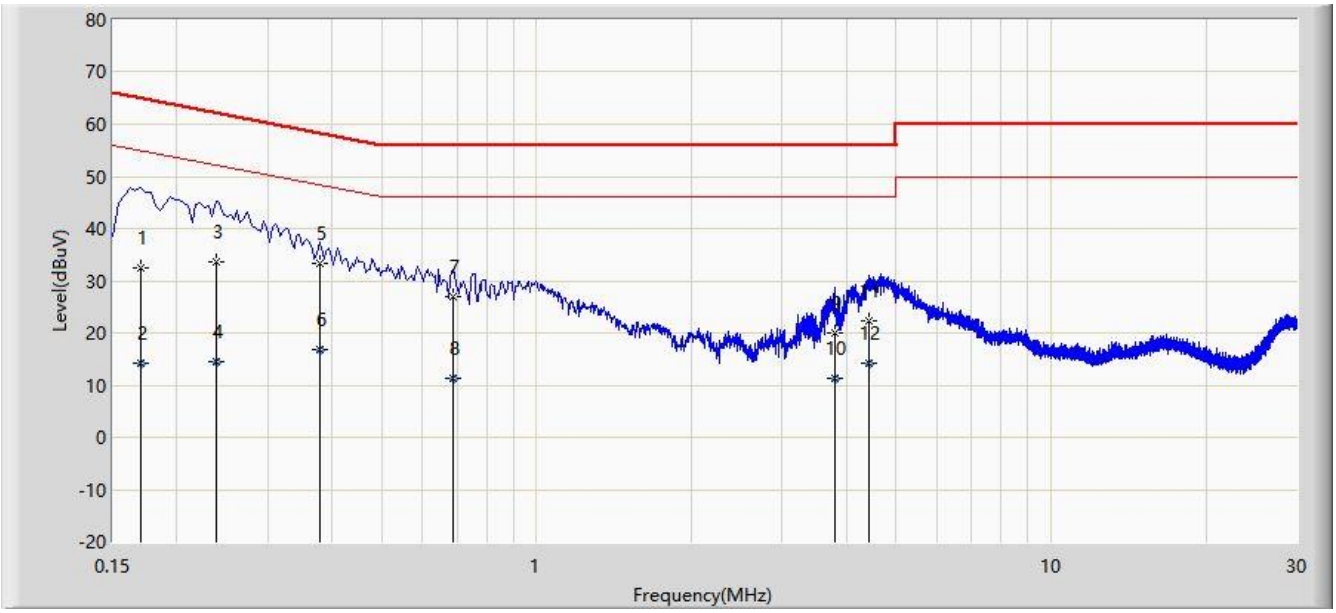
No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1	*	0.170	45.649	35.744	-19.312	64.960	9.904	QP
2		0.170	30.818	20.914	-24.142	54.960	9.904	AV
3		0.226	42.036	32.122	-20.559	62.595	9.914	QP
4		0.226	27.249	17.335	-25.347	52.595	9.914	AV
5		0.286	39.500	29.576	-21.139	60.640	9.924	QP
6		0.286	23.858	13.934	-26.781	50.640	9.924	AV
7		0.350	35.317	25.383	-23.645	58.962	9.935	QP
8		0.350	18.573	8.638	-30.390	48.962	9.935	AV
9		0.402	33.660	23.716	-24.152	57.812	9.943	QP
10		0.402	19.801	9.858	-28.011	47.812	9.943	AV
11		1.082	29.014	19.013	-26.986	56.000	10.002	QP
12		1.082	14.867	4.865	-31.133	46.000	10.002	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Time: 2023/01/06 - 18:02
Temperature: 20.3°C	Humidity: 38.2%
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Helen Han
Probe: ENV216_101683_Filter Off_E	Polarity: Line
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 2	



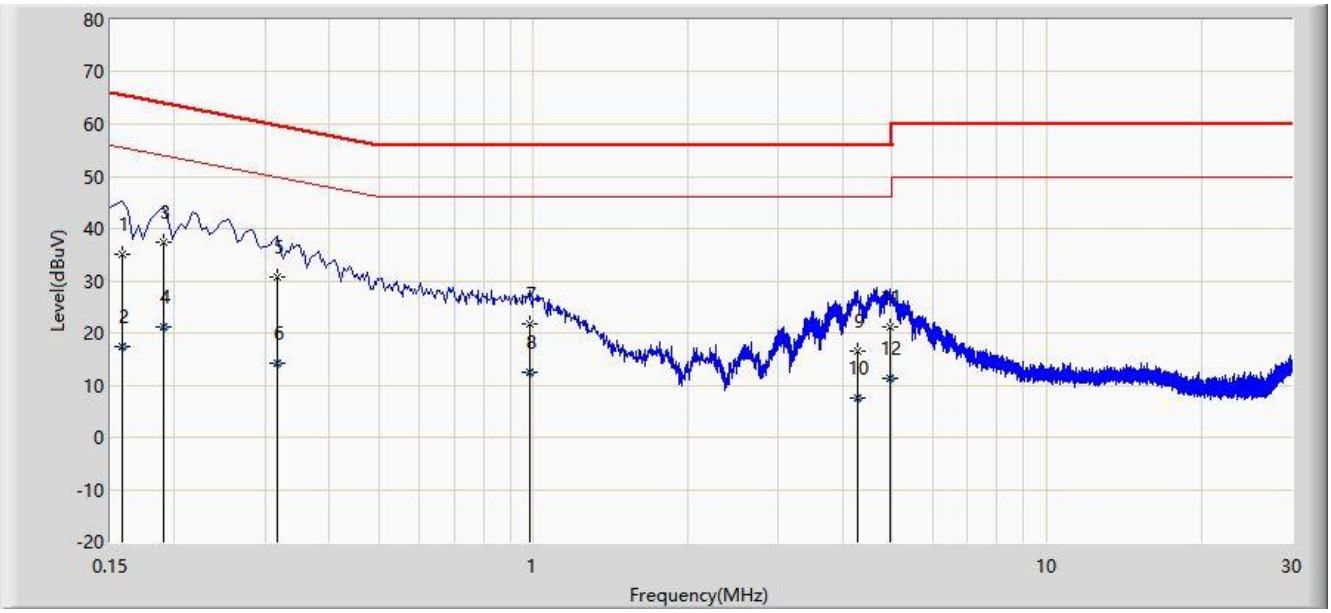
No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1		0.170	32.605	22.725	-32.356	64.960	9.880	QP
2		0.170	14.223	4.343	-40.737	54.960	9.880	AV
3		0.238	33.748	23.860	-28.417	62.166	9.888	QP
4		0.238	14.593	4.704	-37.573	52.166	9.888	AV
5	*	0.378	33.200	23.279	-25.123	58.323	9.922	QP
6		0.378	16.822	6.901	-31.501	48.323	9.922	AV
7		0.686	27.091	17.142	-28.909	56.000	9.949	QP
8		0.686	11.353	1.405	-34.647	46.000	9.949	AV
9		3.806	19.951	9.607	-36.049	56.000	10.344	QP
10		3.806	11.408	1.064	-34.592	46.000	10.344	AV
11		4.418	22.246	11.786	-33.754	56.000	10.460	QP
12		4.418	14.288	3.828	-31.712	46.000	10.460	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Time: 2023/01/06 - 18:12
Temperature: 20.3°C	Humidity: 38.2%
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Helen Han
Probe: ENV216_101683_Filter Off_E	Polarity: Neutral
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 2	



No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1		0.158	34.957	25.055	-30.612	65.568	9.902	QP
2		0.158	17.490	7.588	-38.078	55.568	9.902	AV
3	*	0.190	37.329	27.420	-26.708	64.037	9.908	QP
4		0.190	21.108	11.200	-32.929	54.037	9.908	AV
5		0.318	30.668	20.739	-29.090	59.759	9.930	QP
6		0.318	14.236	4.306	-35.523	49.759	9.930	AV
7		0.982	21.645	11.647	-34.355	56.000	9.998	QP
8		0.982	12.536	2.538	-33.464	46.000	9.998	AV
9		4.282	16.560	6.091	-39.440	56.000	10.468	QP
10		4.282	7.432	-3.037	-38.568	46.000	10.468	AV
11		4.938	21.152	10.554	-34.848	56.000	10.598	QP
12		4.938	11.296	0.698	-34.704	46.000	10.598	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

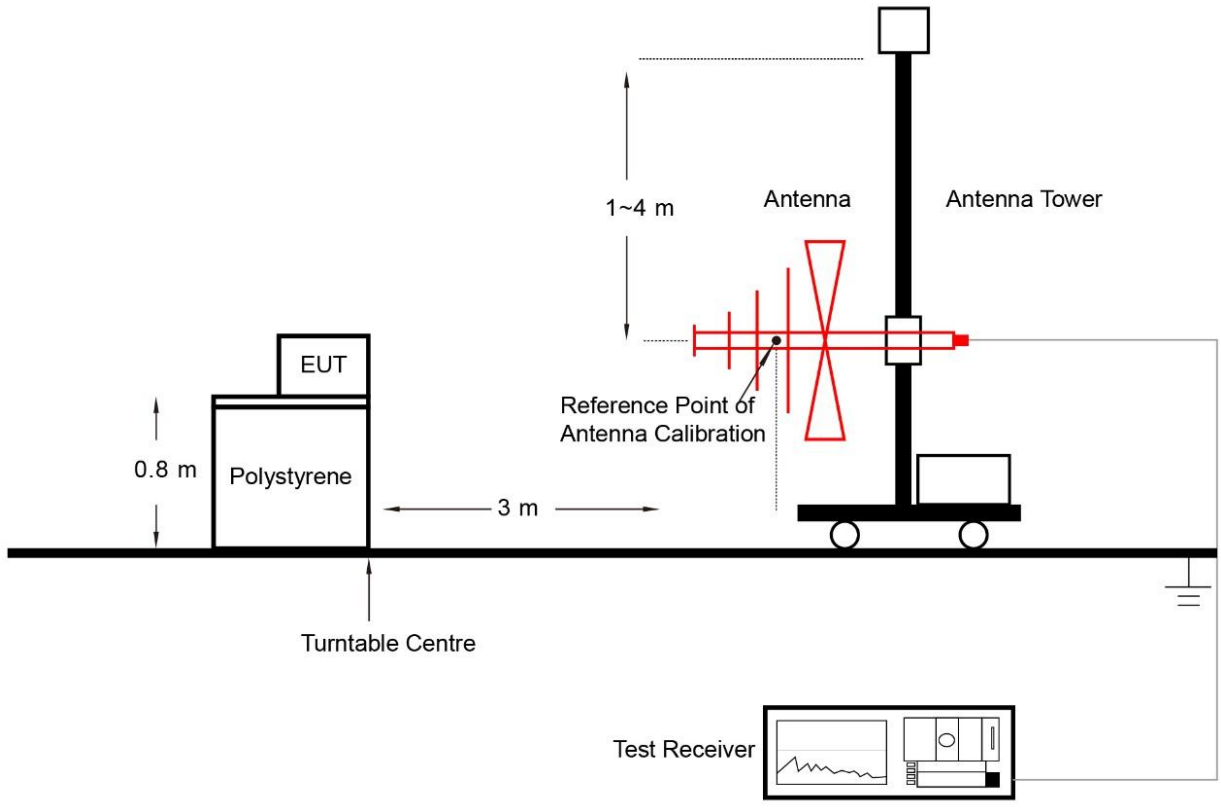
6.3. Radiated Emission Measurement

6.3.1. Test Limit

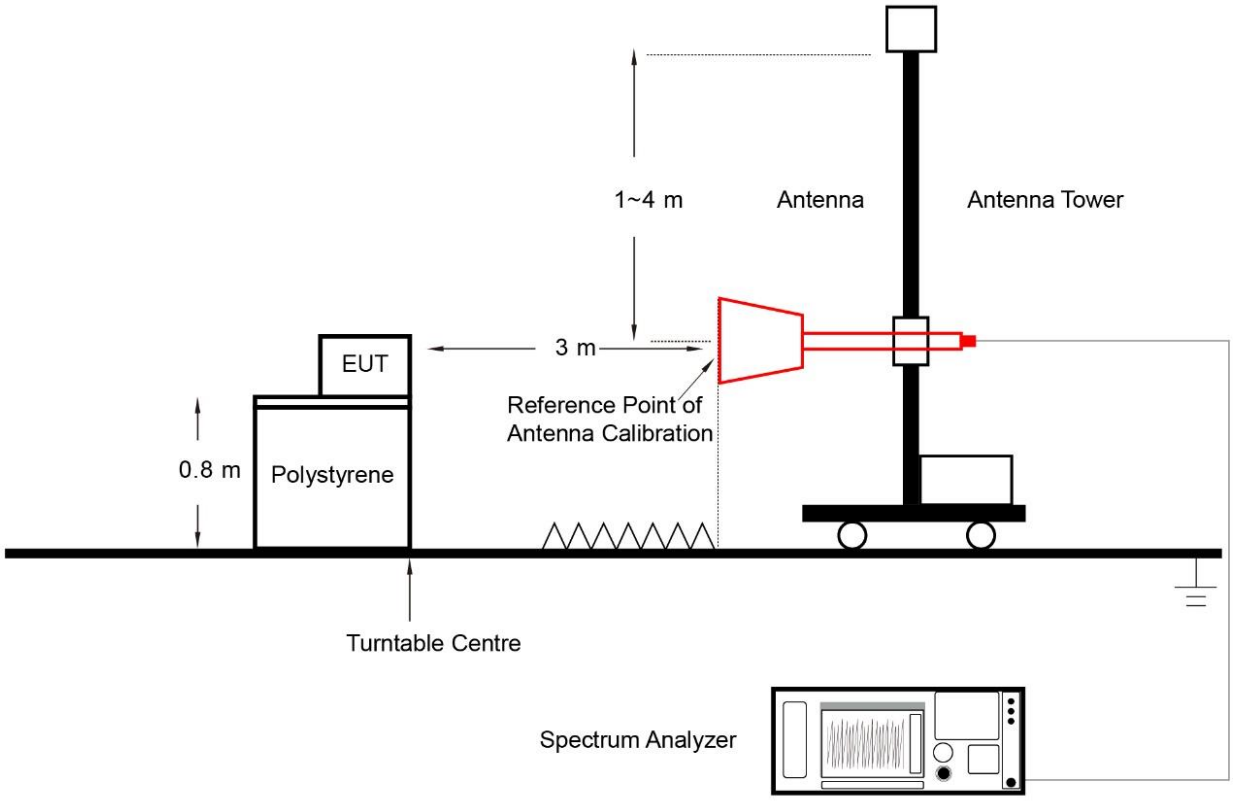
FCC Part 15.109		
Frequency (MHz)	Distance (m)	Level (dBμV/m)
30 ~ 88	3	40
88 ~ 216	3	43.5
216 ~ 960	3	46
Above 960	3	54
Note 1: The lower limit shall apply at the transition frequency. Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system. Note 3: E field strength (dBμV/m) = 20 log E field strength (uV/m)		

6.3.2. Test Setup

Below 1GHz Test Setup:

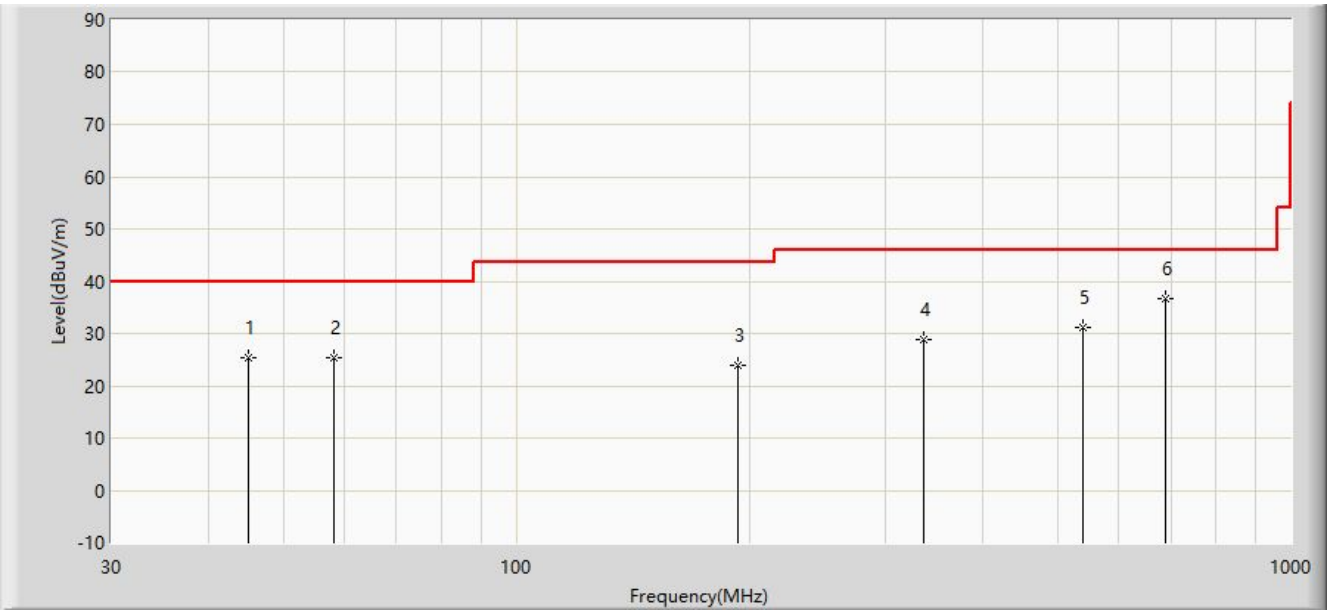


Above 1GHz Test Setup:



6.3.3. Test Result

Site: WZ-AC2	Time: 2022/11/21 - 21:28
Temperature: 22.1°C	Humidity: 48%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Horizontal
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		45.035	25.270	5.303	-14.730	40.000	19.968	PK
2		58.130	25.351	5.463	-14.649	40.000	19.888	PK
3		192.960	24.053	5.617	-19.447	43.500	18.436	PK
4		335.065	28.903	6.982	-17.097	46.000	21.921	PK
5		539.735	31.108	5.405	-14.892	46.000	25.702	PK
6	*	687.660	36.604	8.263	-9.396	46.000	28.341	PK

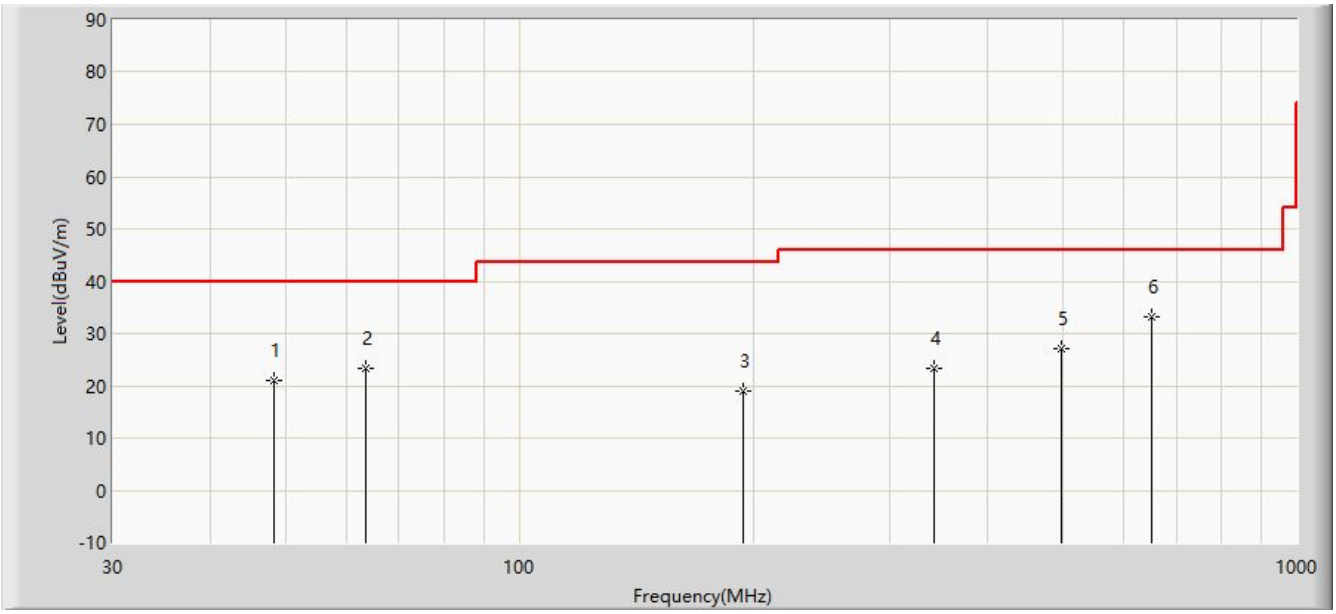
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Site: WZ-AC2	Time: 2022/11/21 - 21:31
Temperature: 22.1°C	Humidity: 48%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Vertical
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		48.430	20.934	0.589	-19.066	40.000	20.345	PK
2		63.465	23.263	4.478	-16.737	40.000	18.785	PK
3		194.415	18.972	0.360	-24.528	43.500	18.612	PK
4		341.855	23.268	0.953	-22.732	46.000	22.315	PK
5		498.995	27.156	2.110	-18.844	46.000	25.046	PK
6	*	650.800	33.273	5.583	-12.727	46.000	27.690	PK

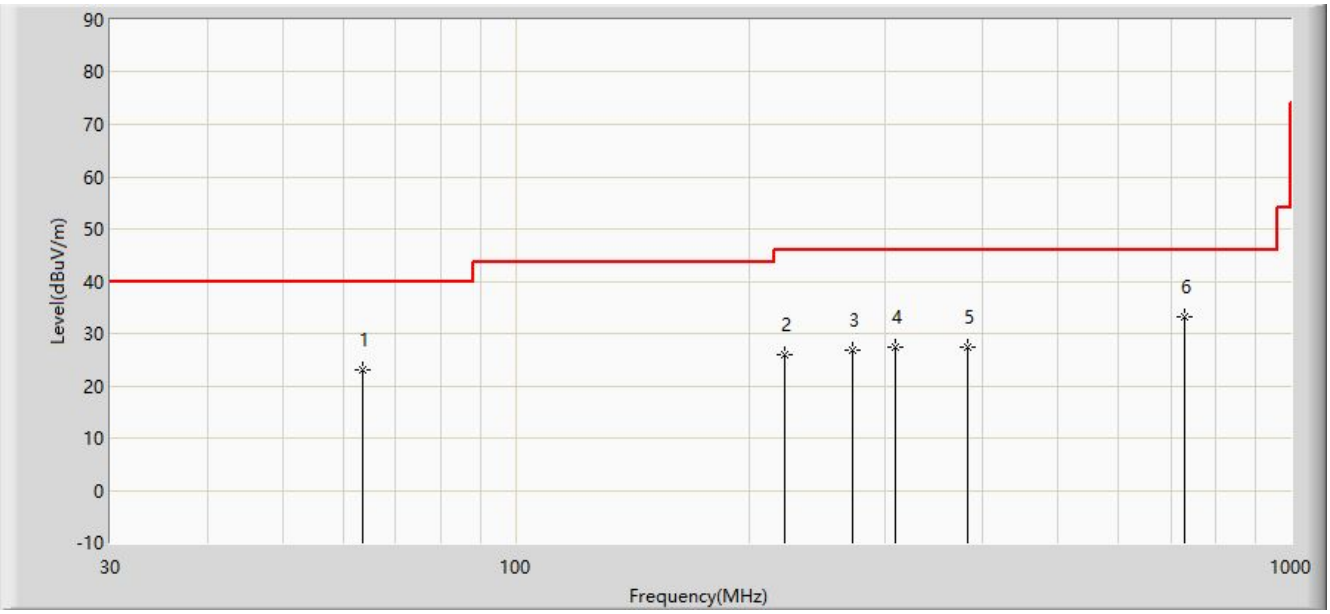
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Site: WZ-AC2	Time: 2023/01/06 - 20:32
Temperature: 25.4°C	Humidity: 24.6%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Bob Zhang
Probe: VULB9162_30-7000MHz	Polarity: Horizontal
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 2	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		63.465	23.183	4.398	-16.817	40.000	18.785	PK
2		222.060	25.806	7.303	-20.194	46.000	18.503	PK
3		271.530	26.748	6.481	-19.252	46.000	20.267	PK
4		308.390	27.302	6.398	-18.698	46.000	20.904	PK
5		382.595	27.470	4.579	-18.530	46.000	22.891	PK
6	*	729.855	33.062	4.129	-12.938	46.000	28.933	PK

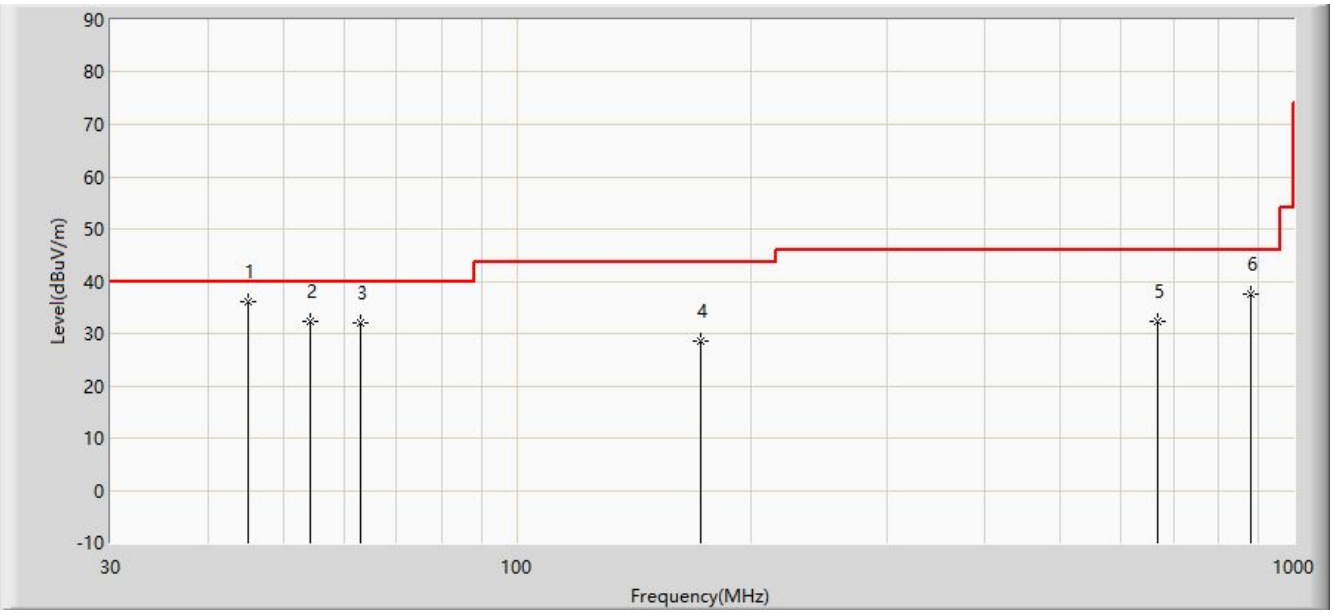
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Site: WZ-AC2	Time: 2023/01/06 - 21:09
Temperature: 25.4°C	Humidity: 24.6%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Bob Zhang
Probe: VULB9162_30-7000MHz	Polarity: Vertical
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 2	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	45.035	36.019	16.052	-3.981	40.000	19.968	PK
2		54.250	32.289	11.963	-7.711	40.000	20.326	PK
3		62.980	31.945	13.037	-8.055	40.000	18.908	PK
4		172.590	28.417	12.337	-15.083	43.500	16.080	PK
5		667.775	32.435	4.503	-13.565	46.000	27.932	PK
6		881.175	37.494	6.657	-8.506	46.000	30.836	PK

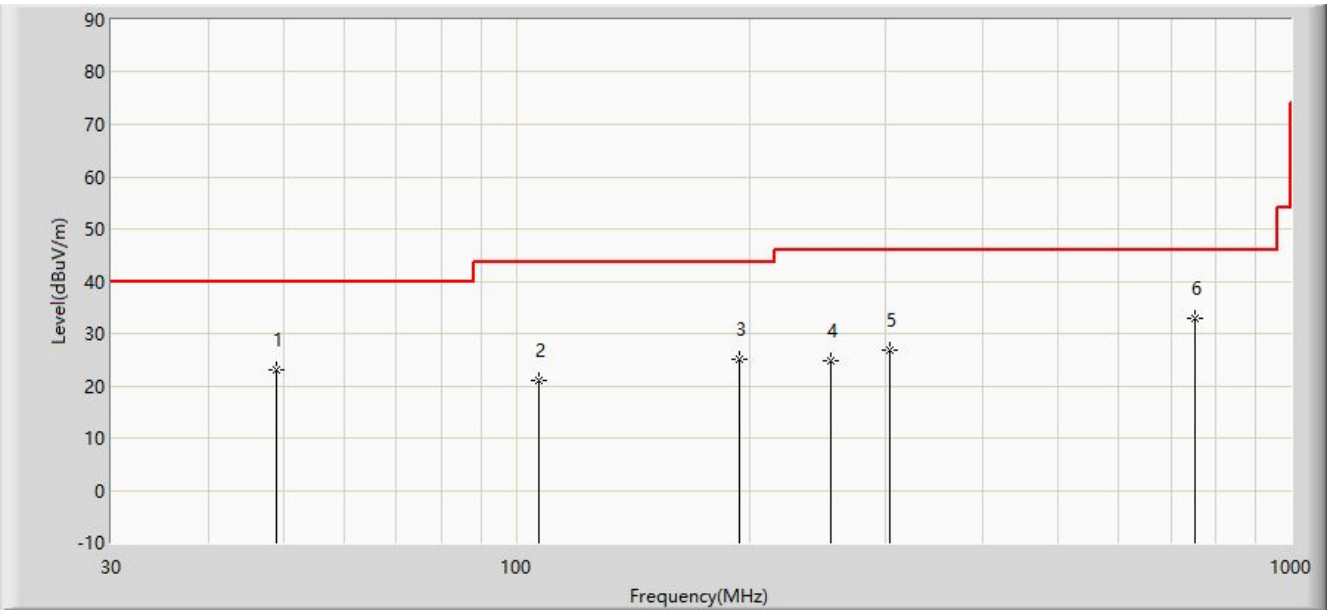
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Site: WZ-AC1	Time: 2023/01/11 - 14:59
Temperature: 21.8°C	Humidity: 43.2%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Ajin Fan
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 3	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		48.915	23.014	4.732	-16.986	40.000	18.282	PK
2		107.115	20.956	6.620	-22.544	43.500	14.336	PK
3		193.930	25.149	10.038	-18.351	43.500	15.111	PK
4		254.555	24.888	8.100	-21.112	46.000	16.788	PK
5		303.540	26.851	8.374	-19.149	46.000	18.477	PK
6	*	753.135	32.793	4.553	-13.207	46.000	28.240	PK

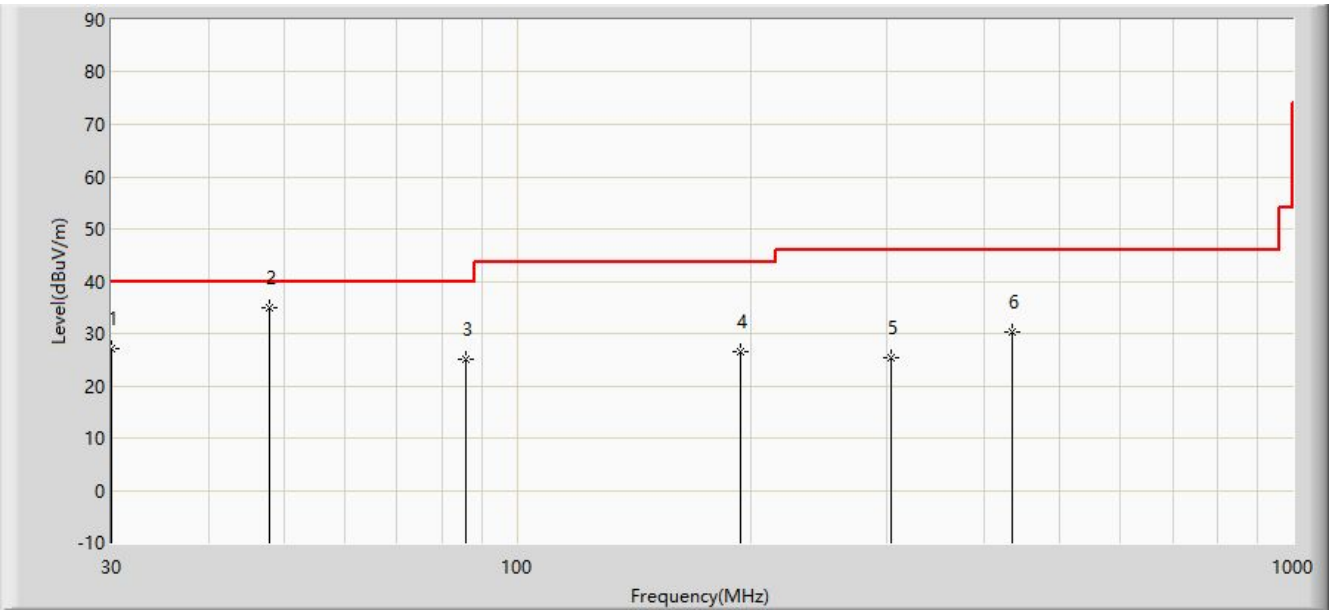
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Site: WZ-AC1	Time: 2023/01/11 - 15:01
Temperature: 21.8°C	Humidity: 43.2%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Ajin Fan
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 3	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		30.000	27.092	9.846	-12.908	40.000	17.246	PK
2	*	47.945	35.049	16.729	-4.951	40.000	18.319	PK
3		85.775	24.932	12.303	-15.068	40.000	12.629	PK
4		194.415	26.615	11.530	-16.885	43.500	15.085	PK
5		303.540	25.389	6.912	-20.611	46.000	18.477	PK
6		434.005	30.288	8.414	-15.712	46.000	21.873	PK

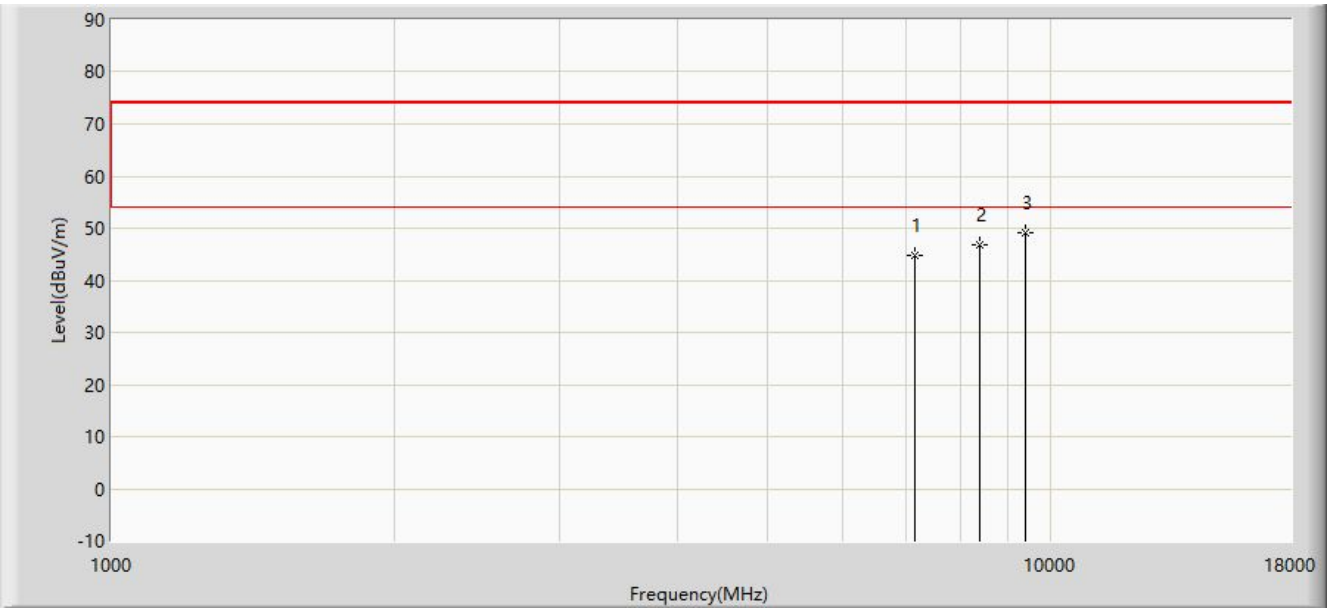
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Site: WZ-AC2	Time: 2022/11/21 - 21:34
Temperature: 22.1°C	Humidity: 48%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Dick Shen
Probe: BBHA9120D_1457_1-18GHz	Polarity: Horizontal
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		7171.000	44.834	33.697	-29.166	74.000	11.137	PK
2		8403.500	46.811	35.126	-27.189	74.000	11.685	PK
3	*	9389.500	49.206	34.863	-24.794	74.000	14.343	PK

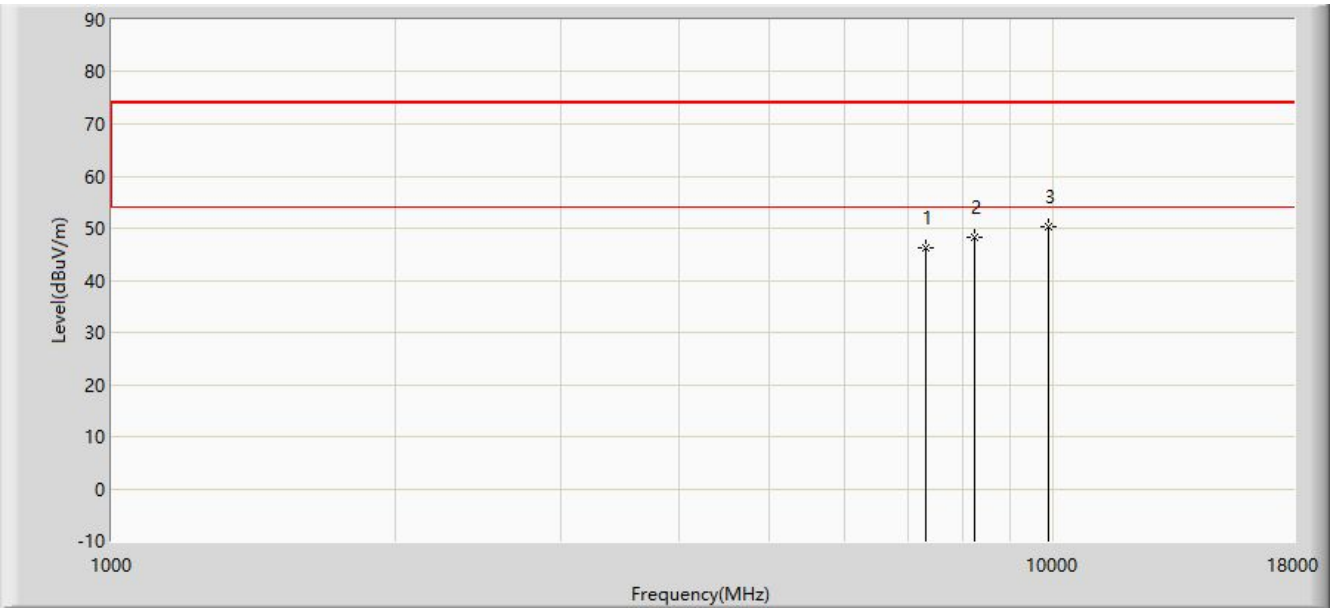
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Site: WZ-AC2	Time: 2022/11/21 - 21:53
Temperature: 22.1°C	Humidity: 48%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Dick Shen
Probe: BBHA9120D_1457_1-18GHz	Polarity: Vertical
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		7324.000	46.146	34.920	-27.854	74.000	11.227	PK
2		8233.500	48.211	36.595	-25.789	74.000	11.616	PK
3	*	9874.000	50.192	35.893	-23.808	74.000	14.300	PK

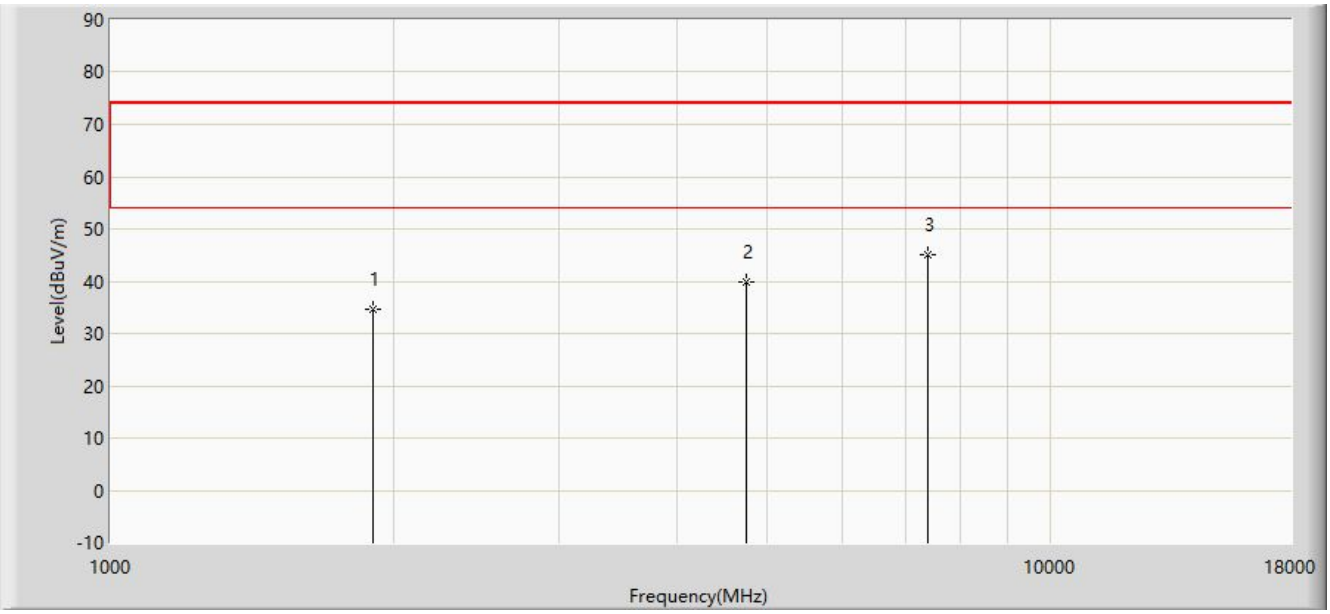
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Site: WZ-AC2	Time: 2023/01/06 - 20:27
Temperature: 25.4°C	Humidity: 24.6%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Bob Zhang
Probe: BBHA9120D_1457_1-18GHz	Polarity: Horizontal
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 2	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		1901.000	34.623	39.429	-39.377	74.000	-4.806	PK
2		4740.000	39.905	36.133	-34.095	74.000	3.772	PK
3	*	7400.500	45.047	33.483	-28.953	74.000	11.564	PK

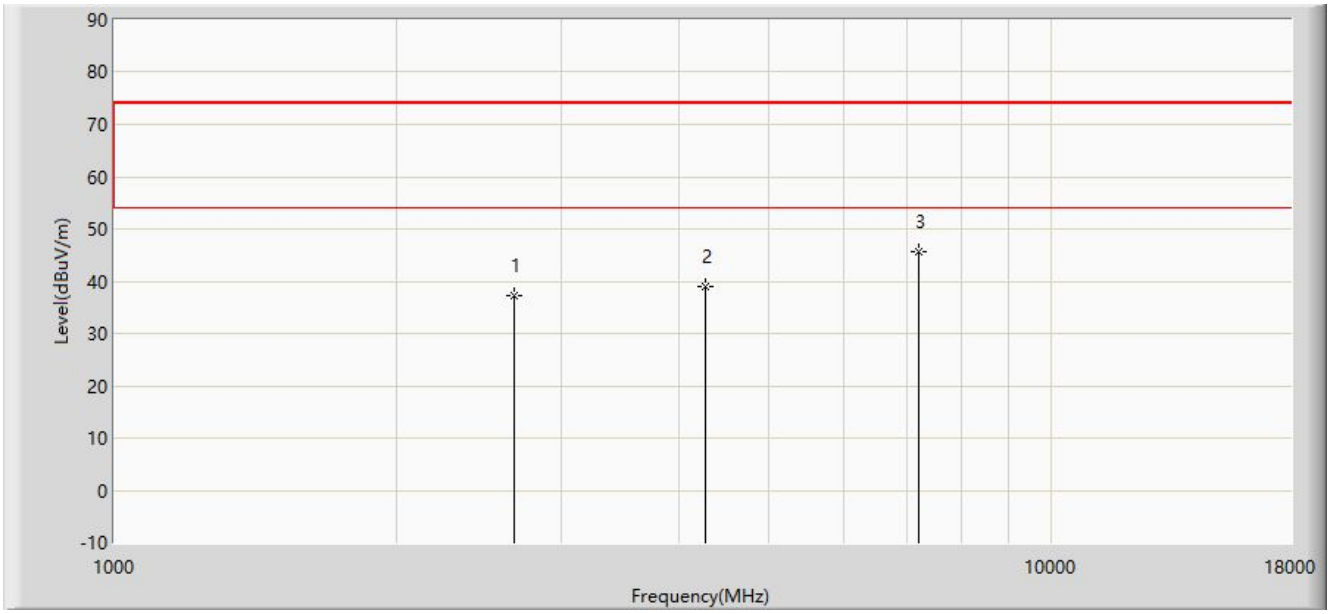
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Site: WZ-AC2	Time: 2023/01/06 - 20:31
Temperature: 25.4°C	Humidity: 24.6%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Bob Zhang
Probe: BBHA9120D_1457_1-18GHz	Polarity: Vertical
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 2	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		2674.500	37.159	39.490	-36.841	74.000	-2.331	PK
2		4272.500	39.008	37.283	-34.992	74.000	1.725	PK
3	*	7205.000	45.529	34.122	-28.471	74.000	11.407	PK

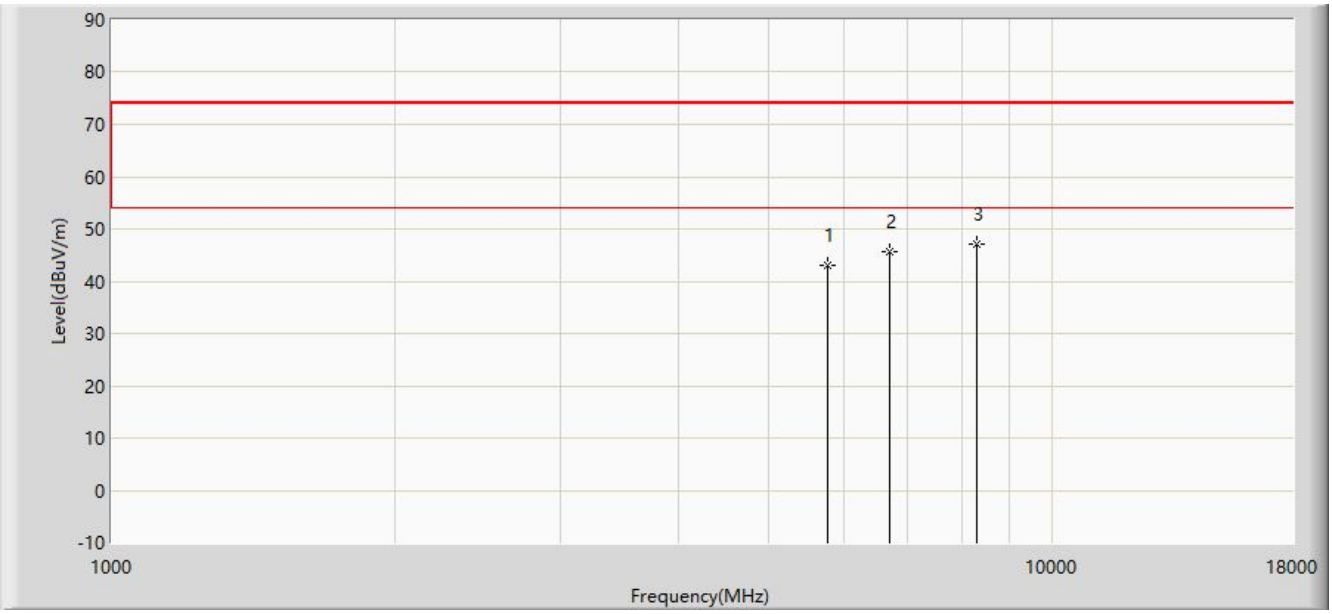
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Site: WZ-AC1	Time: 2023/01/11 - 15:11
Temperature: 21.8°C	Humidity: 43.2%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Ajin Fan
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 3	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		5760.000	43.055	38.819	-30.945	74.000	4.236	PK
2		6703.500	45.760	39.356	-28.240	74.000	6.405	PK
3	*	8310.000	47.000	38.574	-27.000	74.000	8.426	PK

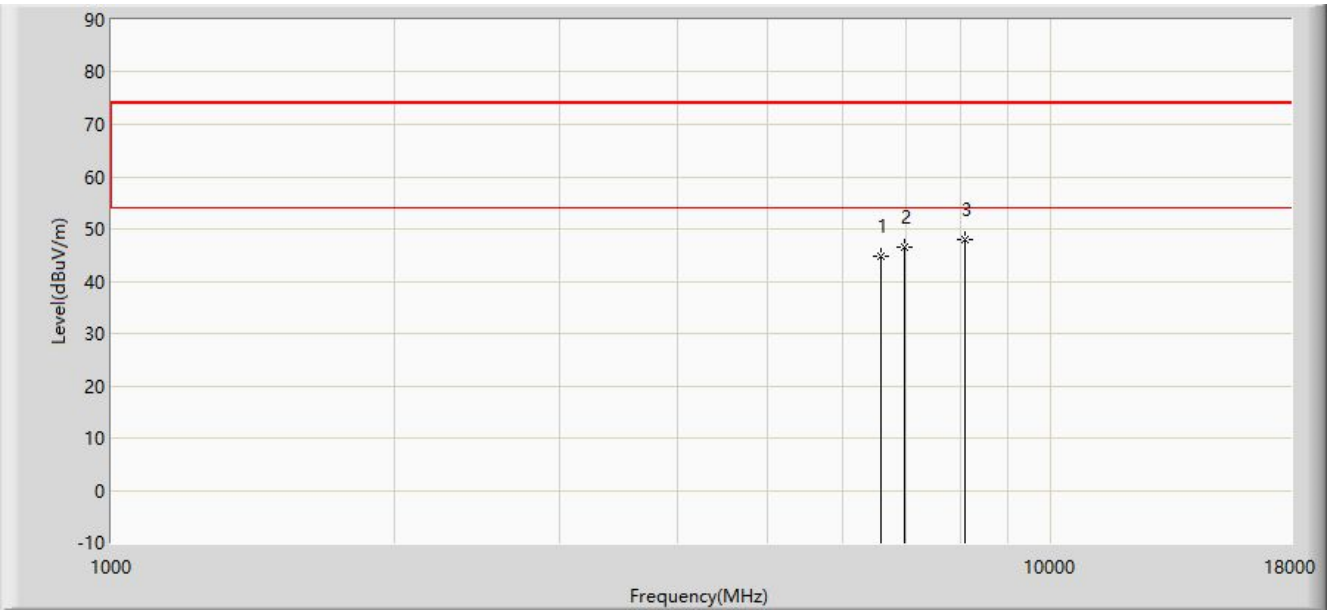
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Site: WZ-AC1	Time: 2023/01/11 - 15:15
Temperature: 21.8°C	Humidity: 43.2%
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Ajin Fan
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Spot Mapper	Power: AC 120V/60Hz
Test Mode 3	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		6601.500	44.683	38.312	-29.317	74.000	6.371	PK
2		6992.500	46.456	39.405	-27.544	74.000	7.051	PK
3	*	8114.500	47.948	39.166	-26.052	74.000	8.782	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Appendix A - Test Setup Photograph

Refer to “2209RSU059-UT” file.

Appendix B - EUT Photograph

Refer to “2209RSU059-UE” file.

The End