

# TEST REPORT

For FCC Part15B



Report No. ....: **CHTW24080028** Report verification:


Project No. ....: **SHT2403050101W**

FCC ID.....: **TV7WAPGR52AX**

Applicant's name.....: **Mikrotiks SIA**

Address.....: Unijas 2, Riga, LV-1039, Latvia

Product Name .....: **wAP ax**

Trade Mark .....: 

Model No. ....: wAPG-5HaxD2HaxD-US

Listed Model(s) .....: -

Standard .....: **FCC CFR Title 47 Part 15 Subpart B**

Date of receipt of test sample.....: Mar.14, 2024

Date of testing.....: Mar.14, 2024 - Aug.13, 2024

Date of issue.....: Aug.14, 2024

Result.....: **Pass**

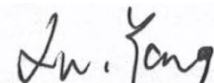
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Testing Laboratory Name .....: **Shenzhen Huatongwei International Inspection Co., Ltd.**

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*The test report merely corresponds to the test sample.*

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# **1. TEST STANDARDS AND REPORT VERSION**

## **1.1. Test Standards**

The tests were performed according to following standards:

[FCC CFR Title 47 Part 15 Subpart B](#) - Unintentional Radiators

[ANSI C63.4: 2014](#) – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

## **1.2. Report version information**

Revision No.	Date of issue	Description
N/A	2024-08-14	Original

## 2. TEST DESCRIPTION

Section	Test Item	Section in CFR 47	Result #1	Test Engineer
5.1	Conducted Emissions	15.107(a)	PASS	JUNMAN.WANG
5.2	Radiated Emissions	15.109(a)	PASS	Yifan Wang

Note:

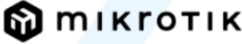
#1: The test result does not include measurement uncertainty value

### 3. SUMMARY

#### 3.1. Client Information

Applicant:	Mikrotikls SIA
Address:	Unijas 2, Riga, LV-1039, Latvia
Manufacturer:	Mikrotikls SIA
Address:	Unijas 2, Riga, LV-1039, Latvia

#### 3.2. Product Description

Main unit information:	
Product Name:	wAP ax
Trade Mark:	
Model No.:	wAPG-5HaxD2HaxD-US
Listed Model(s):	-
Power supply:	DC 24V from adapter or DC 24V from POE
Hardware version:	r2
Software version:	ROS v7
Accessory unit information:	
Adapter information:	Model:SAW30-240-0800U Input:100-240Va.c., 50/60Hz 0.8A Output:24Vd.c., 800mA

#### 3.3. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China	
Connect information:	Tel: 86-755-26715499 E-mail: <a href="mailto:cs@szhtw.com.cn">cs@szhtw.com.cn</a> <a href="http://www.szhtw.com.cn">http://www.szhtw.com.cn</a>	
Qualifications	Type	Accreditation Number
	FCC Registration Number	762235
	FCC Designation Number	CN1181

## 4. TEST CONFIGURATION

### 4.1. Descriptions of test mode

Test mode	Description
Test mode O1	The EUT powered by adaptor, and the Ethernet port was connected to Laptop with a router, the EUT was connected to WLAN of router with wifi modulation signal
Test mode O2	The EUT powered by POE, and the Ethernet port was connected to Laptop with a router, the EUT was connected to WLAN of router with wifi modulation signal

Pre-scan above all test mode, found below test mode which it was worse case mode, so only show the test data for worse case mode on the test report

Test Item	Test mode for worse case
Conducted Emissions	Test mode O2
Radiated Emissions	Test mode O2

### 4.2. Support unit used in test configuration

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

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

Whether support unit is used?			
✓ No			
Item	Equipment	Trade Name	Model No.
1			
2			

### 4.3. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

### 4.4. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	3.21dB
2	Radiated Emission	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz

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

#### 4.5. Equipments Used during the Test

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2023/8/22	2024/8/21
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2023/8/18	2024/8/17
●	Protection Network	SCHWARZBECK	HTWE0567	VTSD9561FN	00899	2023/8/18	2024/8/17
●	ISN	FCC	HTWE0148	FCC-TLISN-T2-02	20371	2023/8/18	2024/8/17
●	ISN	FCC	HTWE0150	FCC-TLISN-T8-02	20375	2023/8/18	2024/8/17
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Radiated Emission - 30MHz~1GHz							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2023/4/6	2026/4/5
●	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0119	VULB9163	546	2023/2/22	2026/2/21
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	/	2023/5/25	2024/5/24
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	/	2024/5/24	2025/5/23
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Radiated emission-Above 1GHz							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2023/4/17	2026/4/16
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2023/8/22	2024/8/21
●	Horn Antenna	SCHWARZBECK	HTWE0126	BBHA 9120D	1011	2023/2/14	2026/2/13
●	Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2023/2/20	2026/2/19
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0551	SCU18F	100855	2023/06/10	2024/06/09
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0551	SCU18F	100855	2024/6/6	2025/6/5
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Conducted Emissions

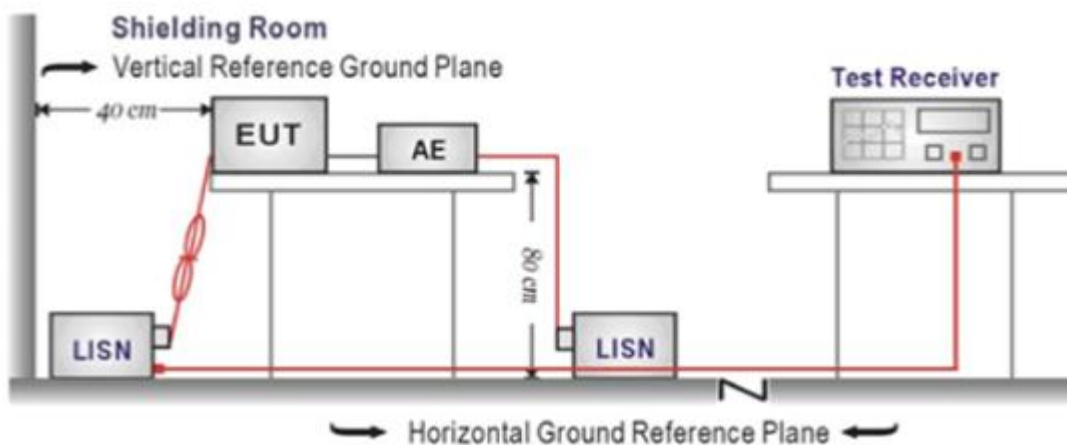
#### LIMIT

FCC CFR Title 47 Part 15 Subpart B Section 15.107:

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 EUT was setup according to ANSI C63.4:2014
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50ohm / 50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

#### TEST MODE:

Please refer to the clause 3.3

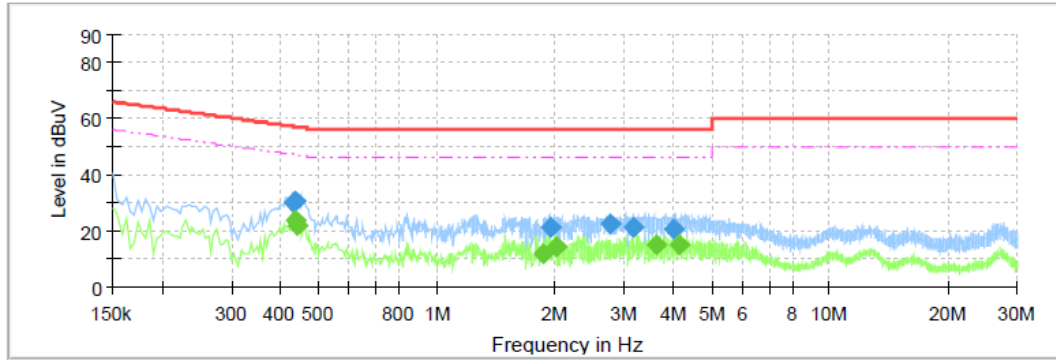
#### TEST RESULTS

Passed       Not Applicable



Test Line:

L

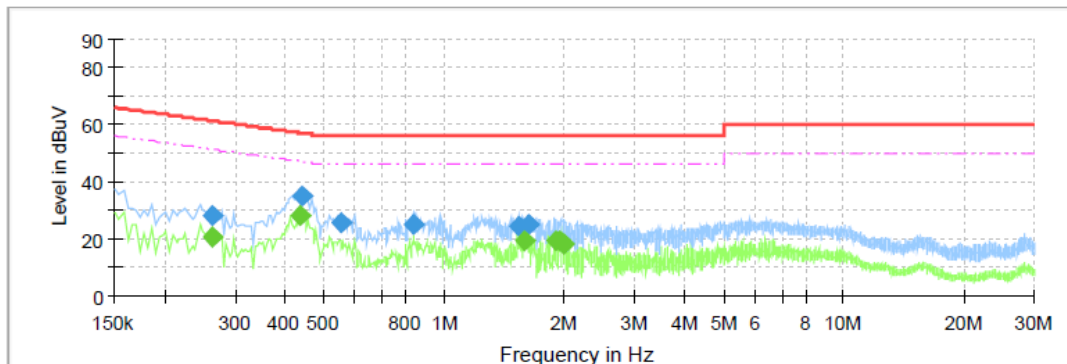


**Final Result**

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.4315	30.22	---	57.22	27.01	L1	10.9
0.4355	30.50	---	57.15	26.65	L1	10.9
0.4355	---	23.67	47.15	23.47	L1	10.9
0.4435	---	21.60	47.00	25.40	L1	10.9
1.8675	---	12.03	46.00	33.97	L1	11.0
1.9555	21.05	---	56.00	34.95	L1	11.0
2.0075	---	14.17	46.00	31.83	L1	11.0
2.7635	22.26	---	56.00	33.74	L1	11.0
3.1675	21.52	---	56.00	34.48	L1	11.0
3.6035	---	15.21	46.00	30.79	L1	11.0
4.0155	20.45	---	56.00	35.55	L1	11.1
4.1595	---	14.86	46.00	31.14	L1	11.1

Test Line:

N



**Final Result**

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.2635	---	20.34	51.32	30.98	N	10.7
0.2635	28.12	---	61.32	33.20	N	10.7
0.4355	---	28.29	47.15	18.86	N	10.7
0.4435	35.26	---	57.00	21.73	N	10.7
0.5555	25.79	---	56.00	30.21	N	10.7
0.8395	25.06	---	56.00	30.94	N	10.8
1.5395	24.19	---	56.00	31.81	N	10.8
1.5835	---	19.52	46.00	26.48	N	10.8
1.6275	24.93	---	56.00	31.07	N	10.8
1.9045	---	19.64	46.00	26.36	N	10.8
1.9555	---	19.51	46.00	26.49	N	10.8
1.9835	---	18.37	46.00	27.63	N	10.8

## 5.2. Radiated Emissions

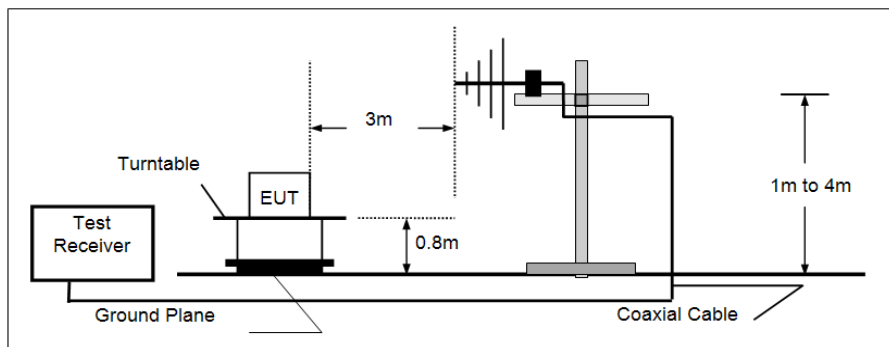
### LIMIT

#### FCC CFR Title 47 Part 15 Subpart B Section 15.109

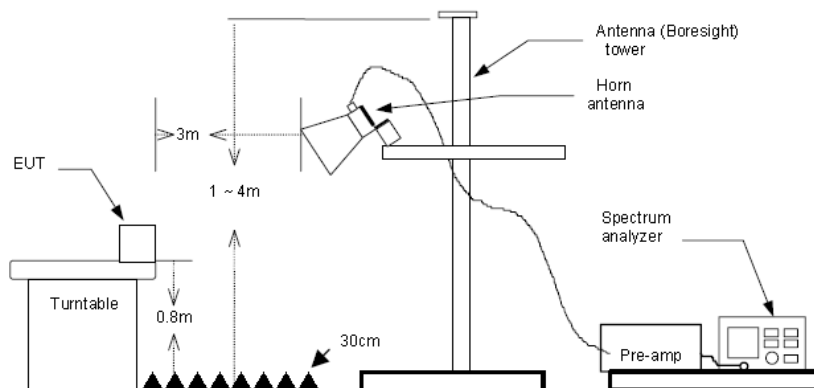
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

### TEST CONFIGURATION

#### ➤ 30MHz ~ 1GHz



#### ➤ Above 1GHz



### TEST PROCEDURE

1. The EUT was tested according to ANSI C63.4:2014.
2. The EUT is placed on a turn table which is 0.8 meter above ground.
3. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
4. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
5. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
6. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1GHz,  
RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold;  
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
  - (3) From 1GHz to 5th harmonic, RBW=1MHz, VBW=3MHz

**TEST MODE:**

Please refer to the clause 3.3

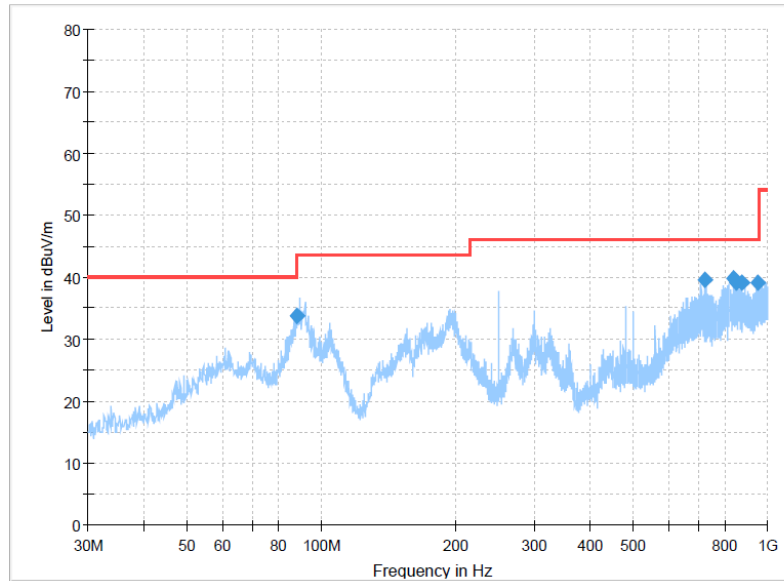
**TEST RESULTS**

**Passed**       **Not Applicable**

Note: Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor  
The emission levels of frequency above 6GHz are very lower than limit and not show in test report.

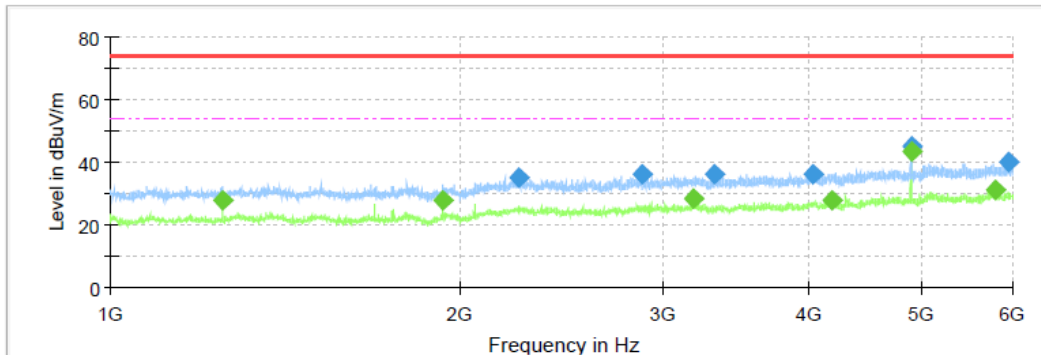
Polarization:

Horizontal



**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
87.8363	33.84	40.00	6.16	300.0	H	246.0	-13.6
720.1550	39.65	46.00	6.35	100.0	H	246.0	2.9
840.4350	39.74	46.00	6.26	100.0	H	209.0	5.2
849.2863	39.21	46.00	6.79	100.0	H	209.0	5.4
877.7800	39.12	46.00	6.88	100.0	H	209.0	5.9
948.4688	39.21	46.00	6.79	100.0	H	0.0	7.1

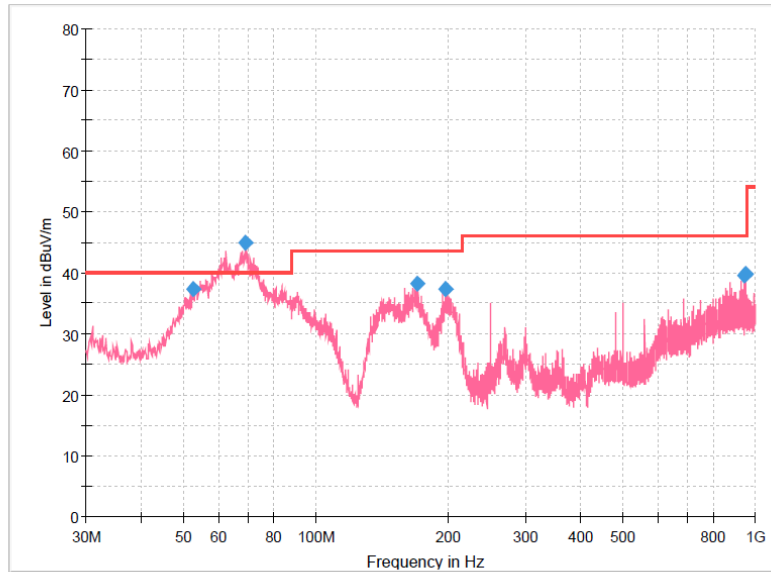


**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1250.0000	---	27.79	54.00	26.21	150.0	H	210.0	-13.5
1937.5000	---	27.96	54.00	26.04	150.0	H	156.0	-12.5
2250.0000	35.19	---	74.00	38.81	150.0	H	0.0	-9.7
2880.0000	36.32	---	74.00	37.68	150.0	H	93.0	-8.7
3188.1250	---	28.54	54.00	25.46	150.0	H	210.0	-7.9
3314.3750	36.38	---	74.00	37.62	150.0	H	219.0	-8.5
4041.2500	36.35	---	74.00	37.65	150.0	H	210.0	-6.0
4192.5000	---	27.82	54.00	26.18	150.0	H	102.0	-5.9
4904.3750	45.10	---	74.00	28.90	150.0	H	72.0	-3.9
4904.3750	---	43.36	54.00	10.64	150.0	H	72.0	-3.9
5794.3750	---	30.94	54.00	23.06	150.0	H	156.0	-2.0
5955.0000	39.82	---	74.00	34.18	150.0	H	165.0	-1.5

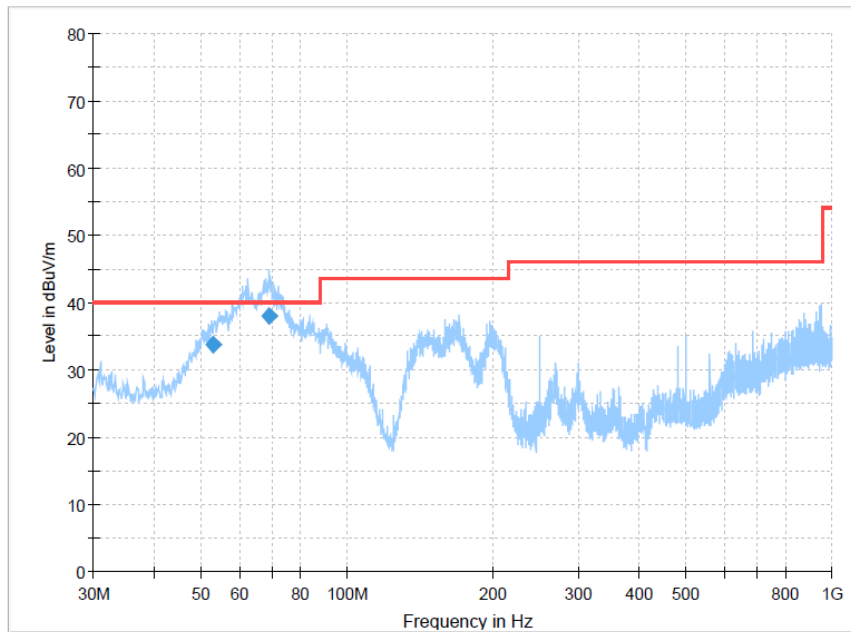
Polarization:

Vertical



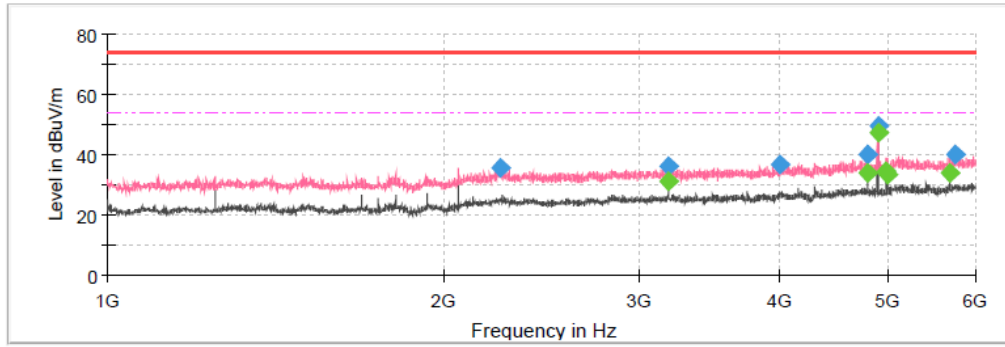
**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.6738	37.42	40.00	2.58	100.0	V	198.0	-8.9
69.0425	44.88	40.00	-4.88	100.0	V	221.0	-12.8
169.5588	38.21	43.50	5.29	100.0	V	229.0	-13.4
196.5975	37.31	43.50	6.19	100.0	V	349.0	-10.2
945.3163	39.48	46.00	6.52	100.0	V	293.0	7.1
948.4688	39.79	46.00	6.21	100.0	V	210.0	7.1



**Final Result**

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.9738	33.75	40.00	6.25	100.0	V	17.0	-8.9
69.2225	37.91	40.00	2.09	113.0	V	229.0	-12.9



### Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2249.3750	35.58	---	74.00	38.42	150.0	V	26.0	-9.7
3187.5000	---	30.89	54.00	23.11	150.0	V	180.0	-7.9
3187.5000	36.18	---	74.00	37.82	150.0	V	180.0	-7.9
4012.5000	36.85	---	74.00	37.15	150.0	V	8.0	-6.0
4800.6250	---	33.94	54.00	20.06	150.0	V	26.0	-3.9
4800.6250	40.16	---	74.00	33.84	150.0	V	26.0	-3.9
4904.3750	---	47.36	54.00	6.64	150.0	V	35.0	-3.9
4904.3750	49.19	---	74.00	24.81	150.0	V	35.0	-3.9
4992.5000	---	34.25	54.00	19.75	150.0	V	0.0	-3.6
5000.6250	---	33.13	54.00	20.87	150.0	V	17.0	-3.6
5688.1250	---	33.72	54.00	20.28	150.0	V	334.0	-2.4
5746.2500	39.82	---	74.00	34.18	150.0	V	35.0	-2.1

-----End of Report-----