


# TEST REPORT

For FCC Part15B

**Report No.** .....: **CHTEW23080063** Report verification: 


**Project No.** .....: **SHT2307060501EW**

**FCC ID**.....: **2BAQ4HAL2**

**Applicant's name** .....: **GF Corp sp. z o.o. sp.k.**

**Address**.....: **ul. Jana Dlugosza 42-46, 51-162 Wroclaw, Poland**

**Product Name** .....: **Specna Arms HAL<sup>2</sup> Electronic unit for Airsoft replica**

**Trade Mark** .....: 

**Model No.** .....: **Specna Arms HAL<sup>2</sup>**

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

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

**Date of receipt of test sample**.....: **Jul.21, 2023**

**Date of testing**.....: **Jul.21, 2023- Aug.24, 2023**

**Date of issue**.....: **Aug.25, 2023**

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

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

**Address**.....: **1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China**

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

## Contents

<b><u>1.</u></b>	<b><u>TEST STANDARDS AND REPORT VERSION .....</u></b>	<b><u>3</u></b>
1.1.	Test Standards	3
1.2.	Report version information	3
<b><u>2.</u></b>	<b><u>TEST DESCRIPTION .....</u></b>	<b><u>4</u></b>
<b><u>3.</u></b>	<b><u>SUMMARY.....</u></b>	<b><u>5</u></b>
3.1.	Client Information	5
3.2.	Product Description	5
3.3.	Testing Laboratory Information	5
<b><u>4.</u></b>	<b><u>TEST CONFIGURATION.....</u></b>	<b><u>6</u></b>
4.1.	Descriptions of test mode	6
4.2.	Support unit used in test configuration	6
4.3.	Environmental conditions	6
4.4.	Statement of the measurement uncertainty	6
4.5.	Equipments Used during the Test	7
<b><u>5.</u></b>	<b><u>TEST CONDITIONS AND RESULTS .....</u></b>	<b><u>8</u></b>
5.1.	Conducted Emissions	8
5.2.	Radiated Emissions	9
<b><u>6.</u></b>	<b><u>TEST SETUP PHOTOS OF THE EUT .....</u></b>	<b><u>13</u></b>
<b><u>7.</u></b>	<b><u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT .....</u></b>	<b><u>15</u></b>

## 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	2023-08-25	Original

## 2. TEST DESCRIPTION

Section	Test Item	Section in CFR 47	Result <sup>#1</sup>	Test Engineer
5.1	Conducted Emissions	15.107(a)	N/A	N/A
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:	GF Corp sp. z o.o. sp.k.
Address:	ul. Jana Dlugosza 42-46, 51-162 Wroclaw, Poland
Manufacturer:	GF Corp sp. z o.o. sp.k.
Address:	ul. Jana Dlugosza 42-46, 51-162 Wroclaw, Poland

#### 3.2. Product Description

Main unit information:	
Product Name:	Specna Arms HAL <sup>2</sup> Electronic unit for Airsoft replica
Trade Mark:	
Model No.:	Specna Arms HAL <sup>2</sup>
Listed Model(s):	-
Power supply:	DC 7.4V – 14.8V
Test voltage:	DC 12V
Hardware version:	2
Software version:	01.3x

#### 3.3. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Contact 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	762235

## 4. TEST CONFIGURATION

### 4.1. Descriptions of test mode

Test mode	Description
Working mode	Keep the EUT in BT working and Motor control status.

### 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?			
✓ Yes			
Item	Equipment	Trade Name	Model No.
1	Equipment: DC Motor	Advanced Motor for AR15 Specna Arms EDGE™ Replicas	SPE-08-027543

### 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	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

● Radiated Spurious Emission							
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	2018/09/27	2023/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2022/08/25	2023/08/24
●	Loop Antenna	R&S	HTWE0546	HFH2-Z2E	101073	2021/05/25	2024/05/24
●	Horn Antenna	ETS	HTWE0548	3117	240120	2022/05/20	2025/05/19
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0547	VULB9163	945	2022/05/23	2025/05/22
○	Horn Antenna	STEATITE	HTWE0549	QMS-00880	25661	2022/05/20	2025/05/19
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2022/11/04	2023/11/03
●	Broadband Preamplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2023/02/27	2024/02/26
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2023/02/24	2024/02/23
●	EMI Test Software	Audix	N/A	E3	N/A	N/A	N/A

● Auxiliary Equipment							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
○	Radio communication tester	R&S	HTWE0287	CMW500	137688-Lv	2022/08/25	2023/08/24
●	Notch Filter	BOST	HTWE0390-03	BOST-DZA61	200615-1-10	2022/08/25	2023/08/24
○	RF Communication Test Set	HP	HTWE0038	8920A	3813A10206	2022/08/25	2023/08/24
○	Digital intercom communication tester	Aeroflex	HTWE0255	3920B	1001682041	2022/08/25	2023/08/24

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Conducted Emissions

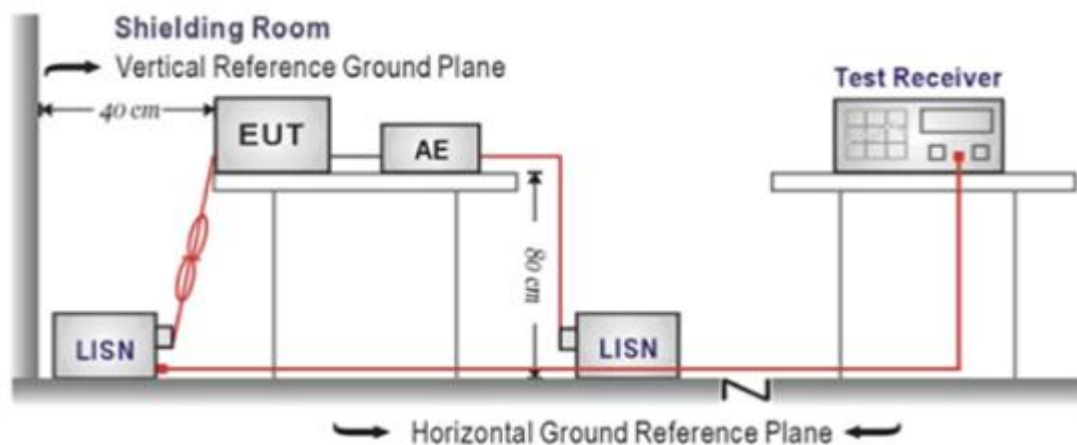
#### LIMIT

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 plat form 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 4.1

#### TEST RESULTS

☐ Passed ☒ Not Applicable

## 5.2. Radiated Emissions

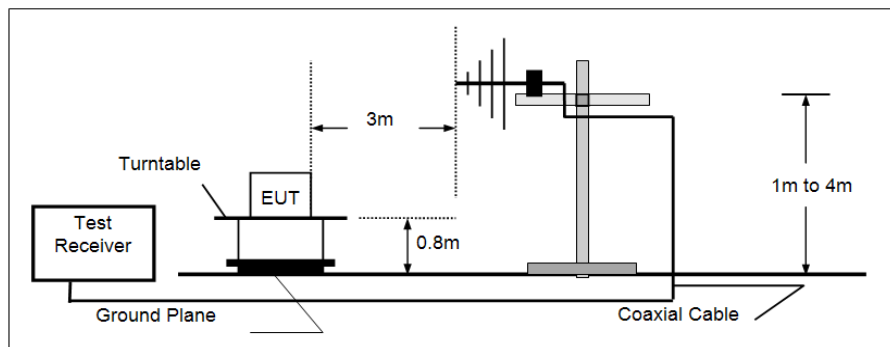
### LIMIT

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

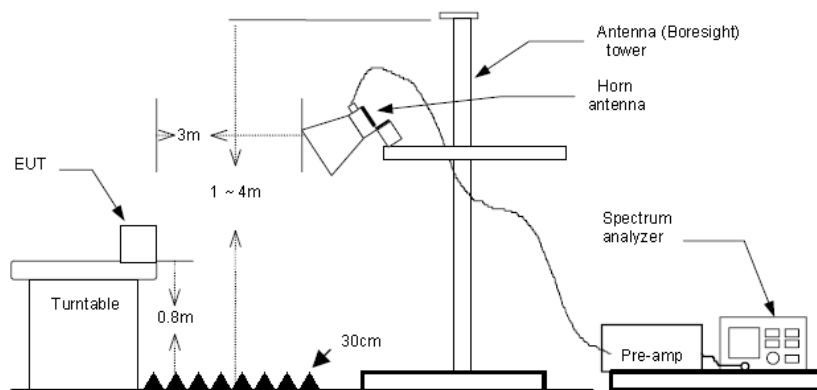
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

### TEST CONFIGURATION

#### ➤ 30MHz ~ 1GHz



#### ➤ Above 1GHz



### TEST PROCEDURE

- The EUT was tested according to ANSI C63.4:2014.
- The EUT is placed on a turn table which is 0.8 meter above ground.
- The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
- 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.
- Use the following spectrum analyzer settings
  - Span shall wide enough to fully capture the emission being measured;
  - 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.
  - From 1GHz to 5th harmonic, RBW=1MHz, VBW=3MHz

**TEST MODE:**

Please refer to the clause 4.1

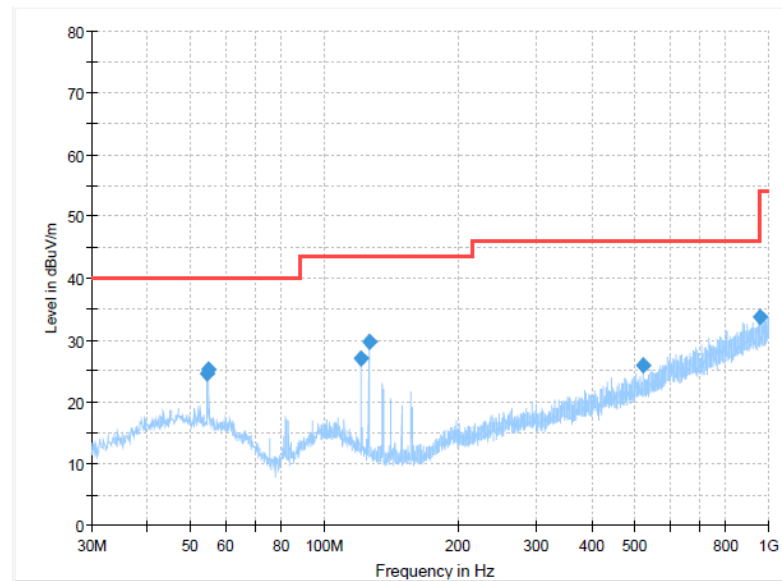
**TEST RESULTS**

☒ **Passed**      ☐ **Not Applicable**

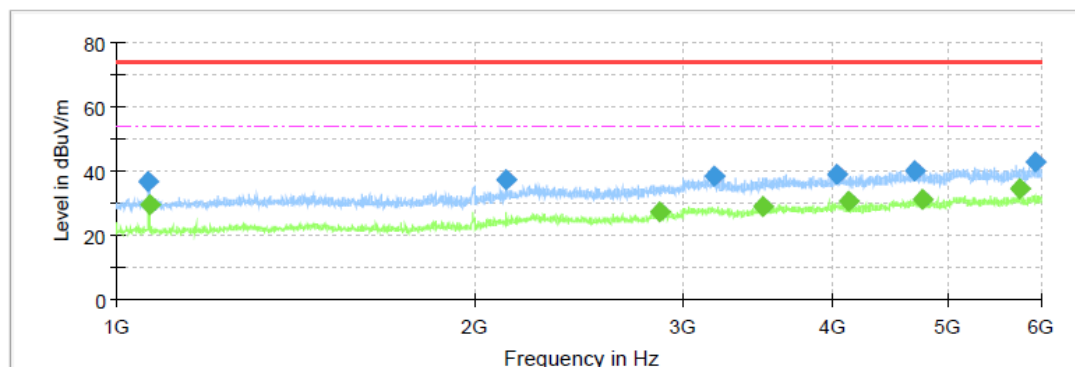
Note: Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor  
The emission levels of frequency above 6GHz are very lower than limit and not show in test report.

Polarization:

Horizontal

**Final Result**

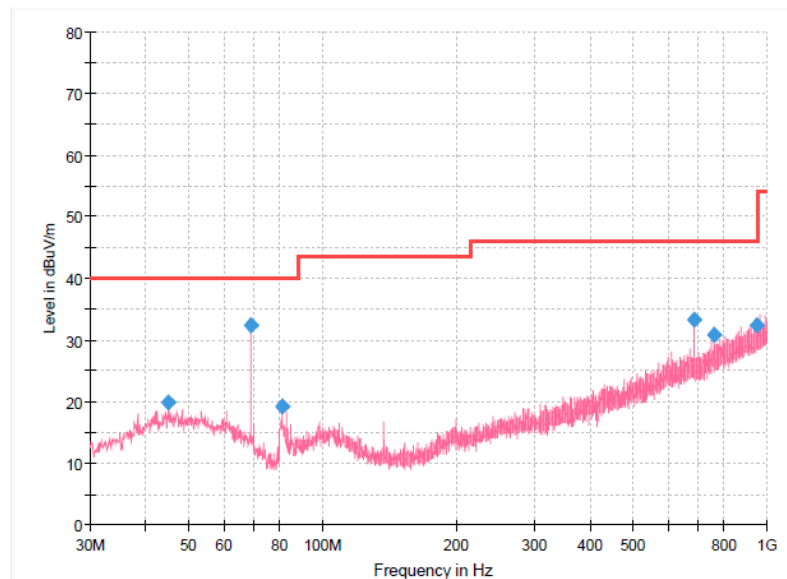
Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.492500	24.61	40.00	15.39	300.0	H	0.0	-9.1
54.977500	25.18	40.00	14.82	300.0	H	340.0	-9.1
121.180000	27.05	43.50	16.45	100.0	H	290.0	-13.0
126.151250	29.69	43.50	13.81	300.0	H	128.0	-13.6
523.730000	25.93	46.00	20.07	100.0	H	143.0	-1.7
958.532500	33.73	46.00	12.27	300.0	H	193.0	7.4

**Final Result**

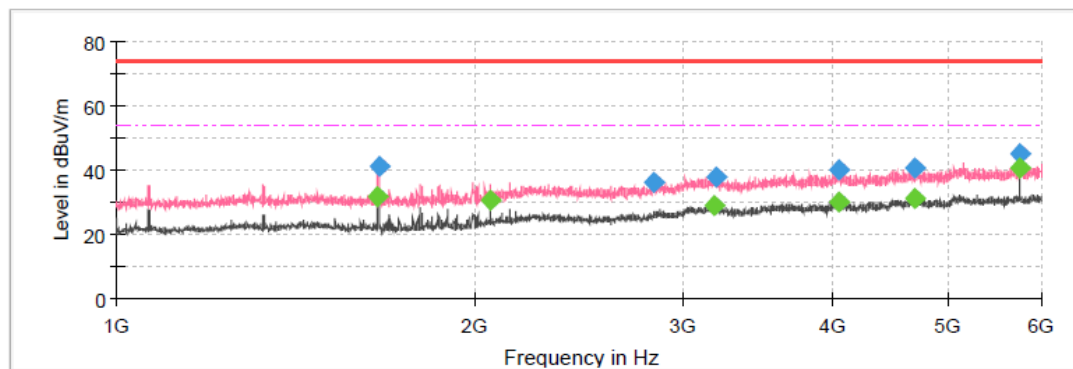
Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1063.750000	36.42	---	74.00	37.58	150.0	H	353.0	-10.0
1065.625000	---	29.49	54.00	24.51	150.0	H	353.0	-10.1
2128.125000	37.31	---	74.00	36.69	150.0	H	81.0	-6.5
2867.500000	---	27.45	54.00	26.55	150.0	H	90.0	-4.5
3186.250000	38.30	---	74.00	35.70	150.0	H	305.0	-3.7
3500.625000	---	28.92	54.00	25.08	150.0	H	155.0	-3.4
4038.125000	39.00	---	74.00	35.00	150.0	H	183.0	-1.6
4126.875000	---	30.29	54.00	23.71	150.0	H	257.0	-1.3
4695.625000	40.06	---	74.00	33.94	150.0	H	62.0	0.9
4765.625000	---	31.23	54.00	22.77	150.0	H	257.0	1.2
5760.625000	---	34.36	54.00	19.64	150.0	H	127.0	3.4
5925.000000	42.76	---	74.00	31.24	150.0	H	62.0	4.0

Polarization:

Vertical

**Final Result**

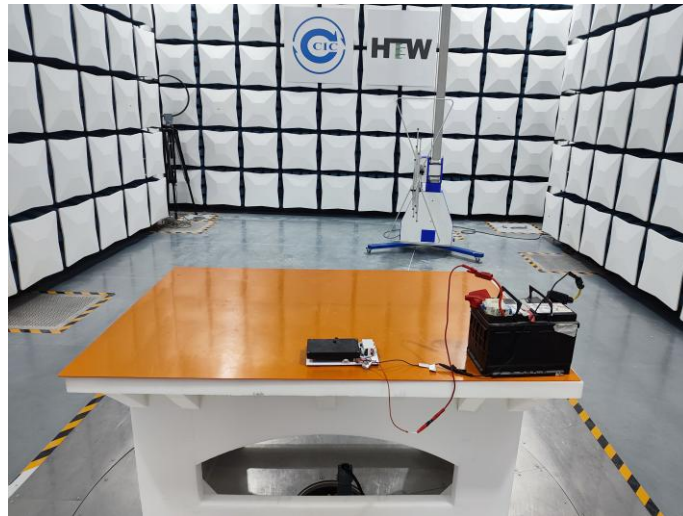
Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.156250	19.81	40.00	20.19	100.0	V	54.0	-9.0
69.163750	32.50	40.00	7.50	100.0	V	11.0	-12.9
81.288750	19.30	40.00	20.70	100.0	V	0.0	-15.5
687.538750	33.35	46.00	12.65	100.0	V	339.0	2.1
760.773750	30.87	46.00	15.13	100.0	V	180.0	3.9
952.348750	32.50	46.00	13.50	100.0	V	131.0	7.2

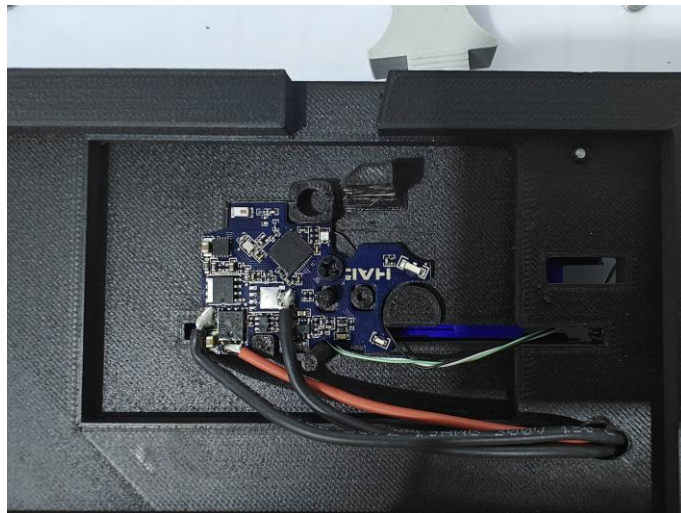
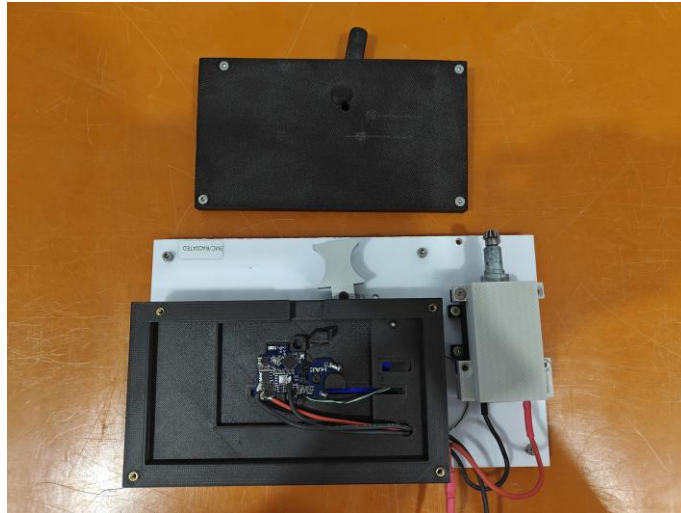
**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1660.625000	---	31.63	54.00	22.37	150.0	V	92.0	-9.3
1661.250000	41.05	---	74.00	32.95	150.0	V	92.0	-9.3
2062.500000	---	30.29	54.00	23.71	150.0	V	249.0	-7.5
2827.500000	36.35	---	74.00	37.65	150.0	V	184.0	-4.9
3179.375000	---	29.13	54.00	24.87	150.0	V	212.0	-3.6
3200.625000	37.98	---	74.00	36.02	150.0	V	193.0	-3.8
4051.250000	---	29.84	54.00	24.16	150.0	V	249.0	-1.5
4055.625000	39.75	---	74.00	34.25	150.0	V	288.0	-1.5
4688.125000	40.61	---	74.00	33.39	150.0	V	184.0	0.9
4690.000000	---	31.25	54.00	22.75	150.0	V	120.0	0.9
5760.000000	---	40.52	54.00	13.48	150.0	V	193.0	3.3
5760.625000	45.05	---	74.00	28.95	150.0	V	193.0	3.4

## 6. TEST SETUP PHOTOS OF THE EUT

### Radiated Emissions





## **7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT**

Refer to the test report No.: CHTEW23080062

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