




# TEST REPORT

For FCC Part15B

**Report No.** .....: **CHTEW22120059** Report verification: 

**Project No.** .....: **SHT2208214102EW**

**FCC ID**.....: **SS4SF650**

**Applicant's name** .....: **BLUEBIRD INC.**

**Address**.....: **3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea**

**Product Name** .....: **Smart Full Touch Handheld Computer**

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

**Model No.** .....: **SF650**

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

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

**Date of receipt of test sample**.....: **Nov.15, 2022**

**Date of testing**.....: **Nov.16, 2022-Dec.07, 2022**

**Date of issue**.....: **Dec.08, 2022**

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

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*Xiaodong Zhao*

Approved by

( position+printed name+signature)....: RF Manager Hans Hu

*Hans Hu*

**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.*

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## 1. TEST STANDARDS AND REPORT VERSION

### 1.1. Test Standards

The tests were performed according to following standards:

[47 CFR FCC 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	2022-12-08	Original

## 2. TEST DESCRIPTION

Section	Test Item	Section in CFR 47	Result <sup>#1</sup>	Test Engineer
5.1	Conducted Emissions	15.107(a)	PASS	Dongyang Wu
5.2	Radiated Emissions	15.109(a)	PASS	Quanhai Deng

Note:

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

### 3. SUMMARY

#### 3.1. Client Information

Applicant:	BLUEBIRD INC.
Address:	3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea
Manufacturer:	BLUEBIRD INC.
Address:	3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea
Factory1:	Bluebird Inc.
Address:	SSang-young IT Twin tower-B 7~8F), 531, Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea
Factory2:	TOP INTERCUBE ELECTRONICS VINA CO., LTD
Address:	Lo C1,Ba thien II Industrial park, Thien Ke Ward, Binh Xuyen District,Vinh Phuc Province, Vietnam

#### 3.2. Product Description

Main unit information:	
Product Name:	Smart Full Touch Handheld Computer
Trade Mark:	BLUEBIRD
Model No.:	SF650
Listed Model(s):	-
Power supply:	DC 3.85V from Battery
Hardware version:	V01
Software version:	SF650-AND12-EN-20221119_R1.00-user
Accessory unit information:	
Battery information:	Model: BAT-500001 Type: LI-ION POLYMER BATTERY Rated/Min: 4850mAh, 18.67Wh Typical Capacity: 5000mAh, 19.25Wh Limited Charge Voltage: 4.4V Nominal Voltage: 3.85V
Adapter information:	Model: KSA29B0500200D5 Input: 100-240Va.c., 50/60Hz 0.5A Output: 5.0Vd.c., 2.0A 10.0W

### 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	
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	762235

## 4. TEST CONFIGURATION

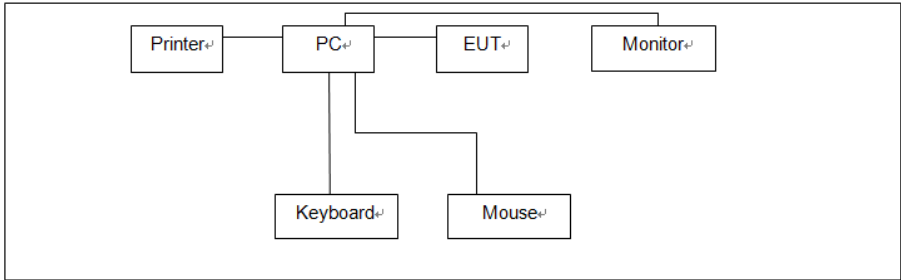
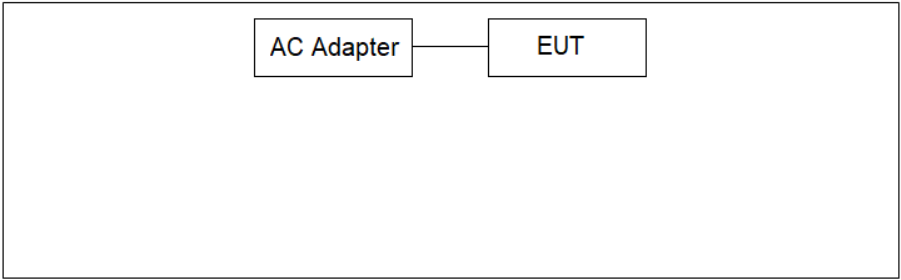
### 4.1. Descriptions of test mode

Test mode	Description
Camera recording mode	Keep the EUT in Camera recording status
Video Playing mode	Keep the EUT in Video Playing status
Data exchange mode	Keep the EUT in Data exchange with PC status

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	Camera recording mode
Radiated Emissions	Data exchange mode

### 4.2. Configuration of Tested System

Test mode	Configuration
Data exchange mode	
Other modes	

### 4.3. Support unit used in test configuration and system

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

Item	Equipment	Manufacturer	Model No.	FCC ID / FCC SDoC	Data Cable	Power Cord
1	PC	DELL	OptiPlex 3020 MT	FCC SDoC	N/A	Unshielded 1.8m
2	Monitor	DELL	E1912Hf	FCC SDoC	N/A	Unshielded 1.8m
3	Keyboard	DELL	SK8115	FCC SDoC	Unshielded, 1.5m	N/A
4	Mouse	DELL	MS111-T	FCC SDoC	Unshielded, 1.5m	N/A
5	Printer	EPSON	L101	FCC SDoC	N/A	Unshielded 1.8m

### 4.4. 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

### 4.5. 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.



#### 4.6. 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)
●	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2022/08/30	2023/08/29
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2022/08/29	2023/08/28
●	Pulse Limiter	R&S	HTWE0193	ESH3-Z2	101447	2022/08/29	2023/08/28
●	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLEX 142	EF-NM-BNCM-2M	2022/09/17	2023/09/16
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated Emission-6th test site							
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	2018/09/30	2023/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2022/08/30	2023/08/29
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0119	VULB9163	546	2020/04/28	2023/04/27
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2022/11/04	2023/11/03
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2022/02/25	2023/02/24
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-7th test site							
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
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2022/02/28	2023/02/27
●	RF Connection Cable	HUBER+SUHNER	HTWE0126-01	RE-7-FH	N/A	2022/03/04	2023/03/03
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Conducted Emissions

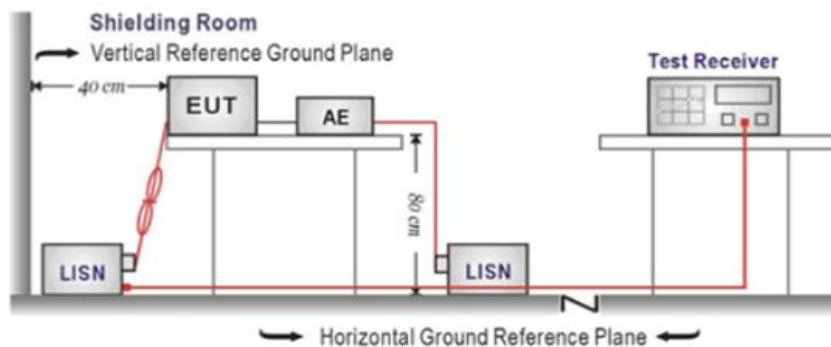
#### LIMIT

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 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:

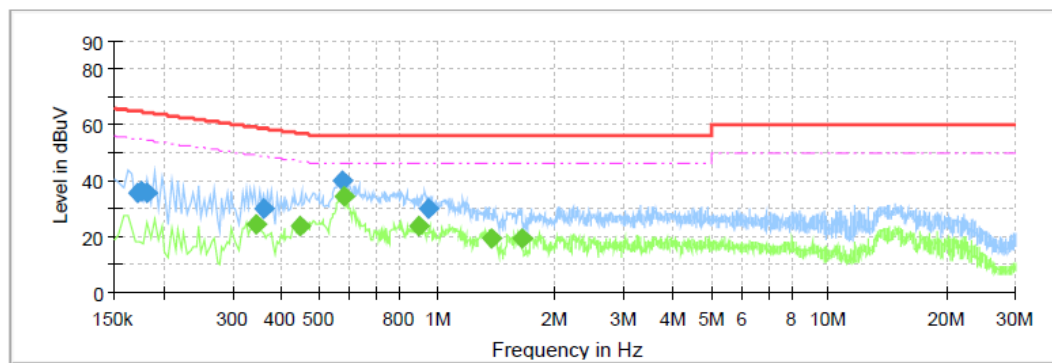
Please refer to the clause 3.3

#### TEST RESULTS

☒ Passed ☐ Not Applicable

Test Line:

L

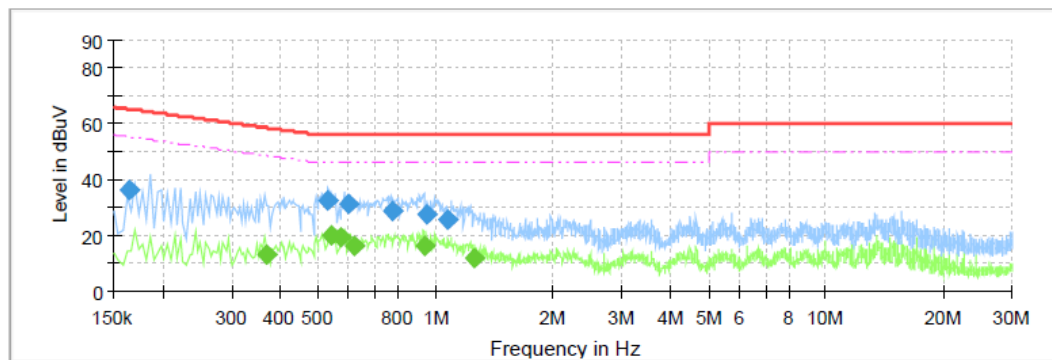


### Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.171500	35.63	---	64.89	29.26	L1	10.0
0.175500	36.42	---	64.70	28.27	L1	10.0
0.182000	35.82	---	64.39	28.57	L1	10.0
0.343500	---	24.62	49.12	24.50	L1	10.0
0.359500	30.29	---	58.74	28.45	L1	10.0
0.447500	---	23.51	46.92	23.41	L1	10.0
0.571500	39.70	---	56.00	16.30	L1	10.0
0.575500	---	34.48	46.00	11.52	L1	10.0
0.899500	---	23.64	46.00	22.36	L1	10.0
0.952500	30.02	---	56.00	25.98	L1	10.0
1.371500	---	19.49	46.00	26.51	L1	10.0
1.640500	---	19.12	46.00	26.88	L1	10.0

Test Line:

N



### Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.163500	36.06	---	65.28	29.22	N	10.0
0.367500	---	13.10	48.56	35.46	N	10.0
0.531500	32.24	---	56.00	23.76	N	10.0
0.543500	---	19.89	46.00	26.11	N	10.0
0.571500	---	19.16	46.00	26.84	N	10.0
0.599500	31.24	---	56.00	24.76	N	10.0
0.615500	---	16.22	46.00	29.78	N	10.0
0.771500	28.79	---	56.00	27.21	N	10.0
0.939500	---	16.35	46.00	29.65	N	10.0
0.947500	27.23	---	56.00	28.77	N	10.0
1.075500	25.82	---	56.00	30.18	N	10.0
1.259500	---	12.07	46.00	33.93	N	10.0

## 5.2. Radiated Emissions

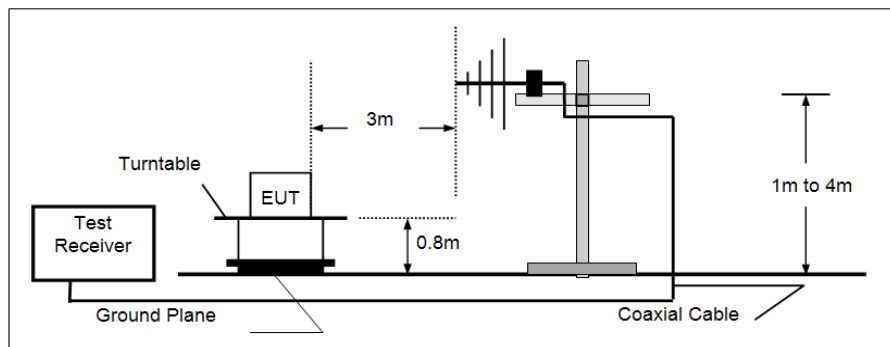
### LIMIT

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

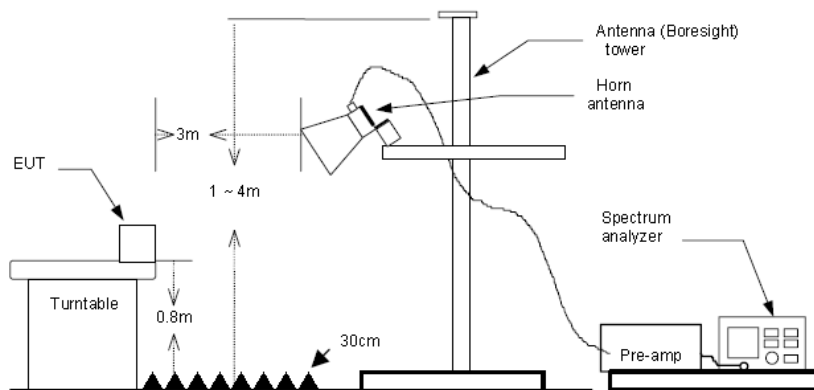
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

### 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

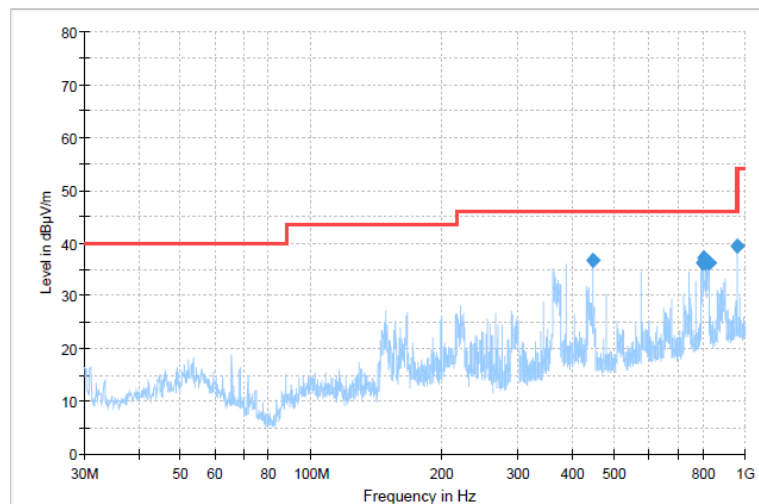
**TEST RESULTS**

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

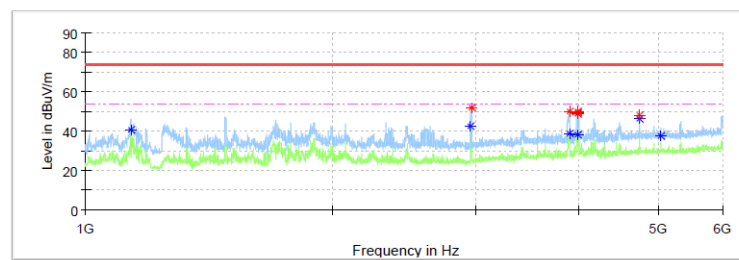
Note: Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor  
The emission levels of frequency above 6GHz are very lower than limit and not show in test report.

Polarization:

Horizontal

**Final Result**

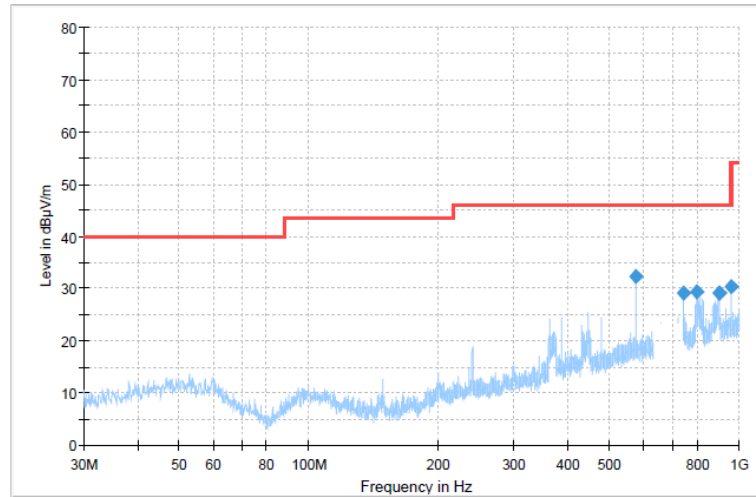
Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
445.523750	36.74	46.00	9.26	100.0	H	108.0	-2.3
795.208750	36.13	46.00	9.87	100.0	H	80.0	3.0
803.090000	37.30	46.00	8.70	100.0	H	68.0	3.1
808.303750	36.26	46.00	9.74	100.0	H	75.0	3.2
824.672500	36.24	46.00	9.76	100.0	H	329.0	3.4
959.987500	39.37	46.00	6.63	100.0	H	211.0	4.6

**Critical Freqs**

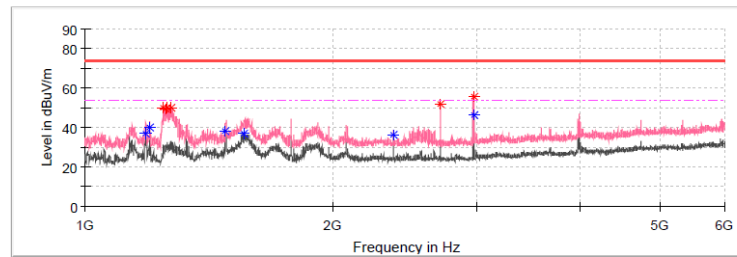
Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2955.625000	---	42.60	54.00	11.40	150.0	H	56.0	-5.4
2959.375000	51.97	---	74.00	22.03	150.0	H	56.0	-5.4
3995.625000	49.93	---	74.00	24.07	150.0	H	56.0	-1.7
4747.500000	48.24	---	74.00	25.76	150.0	H	56.0	1.8
4747.500000	---	46.45	54.00	7.55	150.0	H	56.0	1.8
3985.000000	48.72	---	74.00	25.28	150.0	H	97.0	-1.8
1135.000000	---	40.44	54.00	13.56	150.0	H	167.0	-9.5
3897.500000	---	38.89	54.00	15.11	150.0	H	181.0	-2.1
3899.375000	49.91	---	74.00	24.09	150.0	H	181.0	-2.1
3998.750000	---	38.40	54.00	15.60	150.0	H	264.0	-1.7
3992.500000	49.39	---	74.00	24.61	150.0	H	347.0	-1.8
5044.375000	---	37.54	54.00	16.46	150.0	H	347.0	3.0

Polarization:

Vertical

**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
575.988750	32.33	46.00	13.67	100.0	V	49.0	0.4
742.586250	29.05	46.00	16.95	100.0	V	164.0	2.3
795.087500	29.36	46.00	16.64	100.0	V	0.0	3.0
899.483750	29.19	46.00	16.81	100.0	V	35.0	4.2
900.696250	29.03	46.00	16.97	100.0	V	0.0	4.2
959.987500	30.45	46.00	15.55	100.0	V	49.0	4.6

**Critical Freqs**

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1186.250000	---	37.13	54.00	16.87	150.0	V	0.0	-9.2
1483.125000	---	37.96	54.00	16.04	150.0	V	0.0	-8.7
2373.750000	---	36.36	54.00	17.64	150.0	V	0.0	-6.7
2708.125000	51.80	---	74.00	22.20	150.0	V	179.0	-5.9
2970.000000	---	46.13	54.00	7.87	150.0	V	309.0	-5.3
2975.625000	55.56	---	74.00	18.44	150.0	V	309.0	-5.2
1200.000000	---	39.96	54.00	14.04	150.0	V	323.0	-9.1
1561.250000	---	36.80	54.00	17.20	150.0	V	323.0	-9.2
1246.250000	50.30	---	74.00	23.70	150.0	V	337.0	-8.8
1252.500000	49.65	---	74.00	24.35	150.0	V	352.0	-8.7
1257.500000	50.13	---	74.00	23.87	150.0	V	352.0	-8.7
1275.000000	50.10	---	74.00	23.90	150.0	V	352.0	-8.6



## 6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions (30MHz-1GHz)



Radiated Emissions (Above 1GHz)





## **7. EXTERNAL AND INTERNAL PHOTOS**

Refer to the test report No.: CHTEW22120050

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