

TEST REPORT

Report No.: SHE22030040-02DE

Date: 2022-12-30

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Applicant : Handheld Group AB
Address of Applicant : Strandgatan 40, 531 60, Lidköping, Sweden
Product Name : Rugged Android Tablet ALGIZ RT10
Brand Name : Handheld
Model No. : ALGIZ RT10
FCC ID : YY3-ART10
IC ID : 11695A-ART10
Standards : FCC CFR47 Part 15, Subpart C
RSS-Gen(Issue 5, Feb. 2021)
RSS-210(Issue 10, Dec. 2019)
Date of Receipt : 2022-07-01
Date of Test : 2022-12-29
Date of Issue : 2022-12-30

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by:

Chris Chen
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Reviewed by:

Oliver Xiang
(Oliver Xiang)

Approved by:

Guoyou Chi
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1 General Information

1.1 Testing Laboratory Information

Company Name	ICAS Testing Technology Service (Shanghai) Co., Ltd.
Address	No.1298 Pingan Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Applicant Information

Applicant Company Name	Handheld Group AB
Address	Strandgatan 40, 531 60, Lidkoping, Sweden
Contact Person	Johan Hed
Telephone	+46510547170
Email	regulatory@handheldgroup.com
Manufacturer	Handheld Group AB
Manufacturer Address	Strandgatan 40, 531 60, Lidkoping, Sweden

1.3 EUT Description

Product Name	Rugged Android Tablet ALGIZ RT10
Under Test Model Name	ALGIZ RT10
Series Model Name	/
Description of Model name differentiation	/
Hardware version	N/A
Software version	ALGIZ_RT10_V1.0
Operating Frequency	13.56MHz
Operating Temperature Range	-10~+55℃
Operating Voltage Range	3.4~4.35V
Modulation Type	ASK
Receiver Categorization	3
Number of channel	1
Tested Channel	1
Antenna Type	inductance coil Antenna
Antenna Gain	0dBi

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2 Summary of Test Result

2.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-16 Edition)	Miscellaneous Wireless Communications Services
2	RSS-Gen (Issue 5, Feb. 2021)	General Requirements for Compliance of Radio Apparatus
3	RSS-210 (Issue 10, Dec. 2019)	Licence-Exempt Radio Apparatus: Category I Equipment
4	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 40 GHz
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Remark: All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

2.2 Test Result

No.	Description	FCC Rule	IC Rule	Test Result	Verdict
1	Antenna Requirement	15.203	RSS-Gen 6.8	Clause 4.1.1	PASS
2	Frequency Tolerance of carrier signal	15.225 (e)	RSS-210 B.6 (b)	Clause 4.1.2	PASS
3	Emissions Bandwidth	15.215	RSS-Gen 6.7	Clause 4.1.3	PASS
4	Emission within band	15.225 (a), (b), (c)	RSS-210 B.6 (a) (i) (ii) (iii)	Clause 4.1.4	PASS
5	Spurious Emission outside band	15.225 (d) 15.209	RSS-210 B.6 (a) (iv)	Clause 4.1.5	PASS
6	Conducted Emissions	15.207	RSS-Gen 8.8	Clause 4.1.6	PASS

2.3 Measurement Uncertainty

Measurement	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5dB
	> 1GHz	± 1.5dB
Radiated Emission	9kHz - 30MHz	± 4.24dB
	30MHz - 1GHz	± 5.00dB
	> 1GHz	± 4.88dB
Conducted Emission on AC Mains	9kHz to 30MHz	± 2.68dB

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in TR 100 028-1[3] and TR 100 028-2[4]. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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3 General Test Configurations

3.1 Test Environments

During the measurement, the environmental conditions complied with the range listed as below.

Relative Humidity	30% to 60%	
Atmospheric Pressure	100kPa to 102kPa	
Temperature	NT (Normal Temperature)	+20°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	DC12V

3.2 Test Equipment List

Instrument	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Test Receiver	ROHDE & SCHWARZ	ESPI3	100173	2022-06-10	2023-06-09
V-network	SCHWARZBECK	NSLK 8127	8127-902	2022-06-10	2023-06-09
Attenuator	SCHWARZBECK	VTSD 9561-F N	/	2022-06-10	2023-06-09
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2023-06-07
EMI Test Receiver	ROHDE & SCHWARZ	ESR 7	101911	2022-06-10	2023-06-09
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2022-06-10	2023-06-09
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2022-06-10	2023-06-09
Shielded Enclosure 7*4*3 (L*W*H)	CHANGNING	743	N/A	2022-06-10	2023-06-09
Test Software	BL	BL410_E	N/A	N/A	N/A

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4 Test Set-up and Operation Modes

4.1 Independent Operation Modes

The basic operation modes are:

A. NFC mode(13.56MHz)

B. Off

4.2 Independent Operation Modes

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

4.3 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Power Adapter	/	/	/

4.4 Support Software

Description	Manufacturer	Software Name
/	/	/

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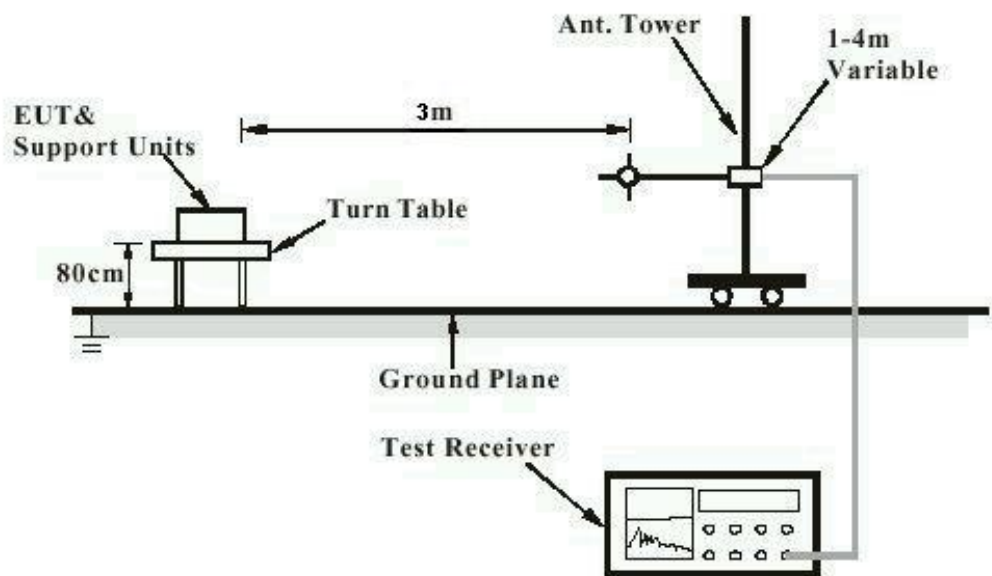
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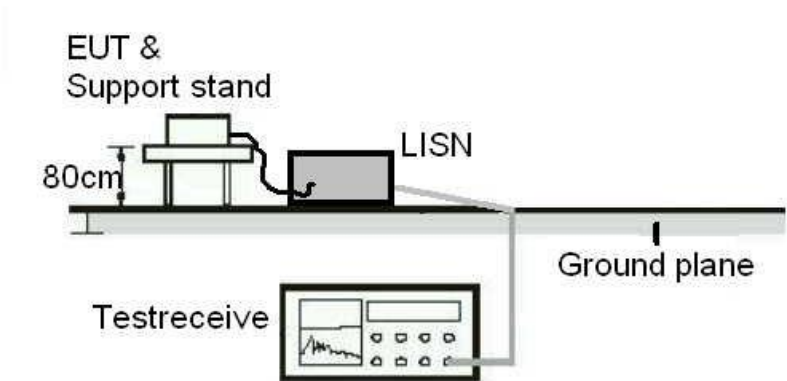
4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 30MHz are done with a table height of 0.8m.

Diagram of Measurement Equipment Configuration for Conduction Measurement



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5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard	:	FCC Part 15.203
	:	RSS-Gen 6.8
Limit	:	the use of antennas with directional gains that do not exceed 6dBi

According to the manufacturer declared, the EUT has one external antenna, the directional gain of antenna is 2dBi, and the antenna connector is designed with permanent attachment and non consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

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5.1.2 Frequency tolerance of carrier signal

RESULT:

Pass

Test Specification

Test standard : FCC part 15.225 (e)
RSS-210 B6 (b)
Basic standard : ANSI C63.10: 2013
Limit : $\pm 0.01\%$
Kind of test site : EMC chamber

Test Setup

Date of testing : 2022-12-28
Input voltage : DC3.8V
Operation mode : A
Ambient temperature : 20°C
Relative humidity : 50%
Atmospheric pressure : 102kPa

Refer to following test plots for details of test result

Table 1: Test result of Frequency tolerance of carrier signal

Temperature(°C)	Voltage (V _{DC})	Test result (MHz)	Deviation Frequency (kHz)	Test result (ppm)	Limit(ppm)
-40	3.8	13.5599588	0.0412	3.038348083	100
-30		13.5599589	0.0411	3.030973451	
-20		13.5599589	0.0411	3.030973451	
-10		13.5599597	0.0403	2.971976401	
0		13.5599594	0.0406	2.994100295	
+10		13.5599587	0.0413	3.045722714	
+20		13.5599600	0.0400	2.949852507	
+30		13.5599596	0.0404	2.979351033	
+40		13.5599598	0.0402	2.96460177	
+50		13.5599596	0.0404	2.979351033	
+60		13.5599597	0.0403	2.971976401	
+85		13.5599602	0.0398	2.935103245	
+20	3.4	13.5599598	0.0402	2.96460177	
+20	4.35	13.5599597	0.0403	2.971976401	

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5.1.3 Emissions Bandwidth

RESULT:

Pass

Test Specification

Test standard : FCC part 15.215
RSS-Gen 6.7
Basic standard : ANSI C63.10: 2013
Kind of test site : EMC chamber

Test Setup

Date of testing : 2022-12-29
Input voltage : DC3.8V
Operation mode : A
Ambient temperature : 20°C
Relative humidity : 50%
Atmospheric pressure : 102kPa

Refer to following test plots for details of test result

Table 2: Test result of Emissions Bandwidth

Test Channel (MHz)	99% Bandwidth (Hz)	20dB Bandwidth (Hz)
13.56	20.997	25.660

Remark: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

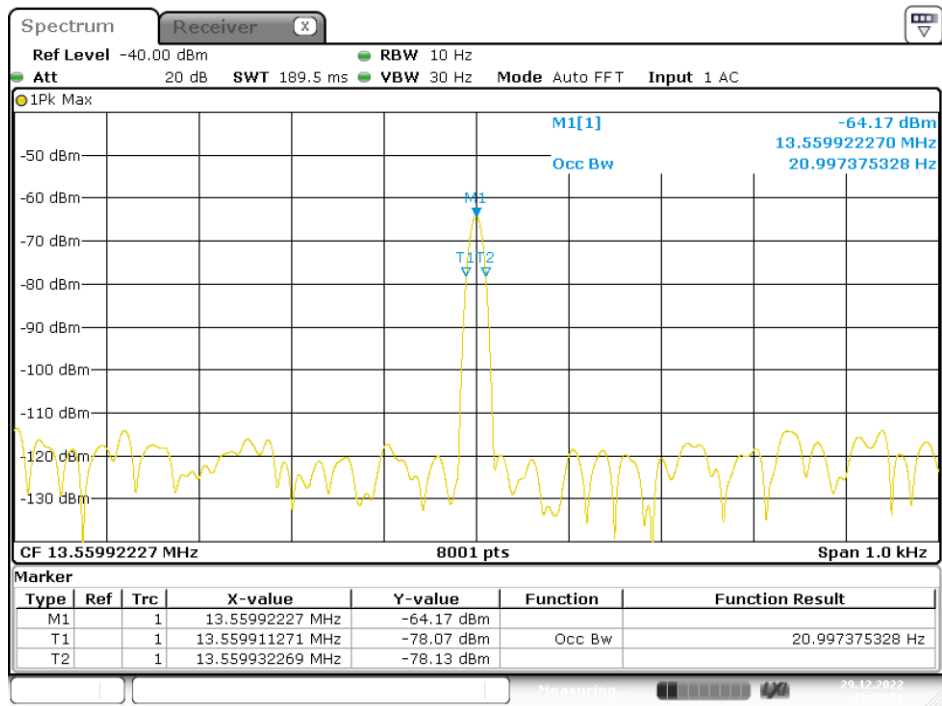
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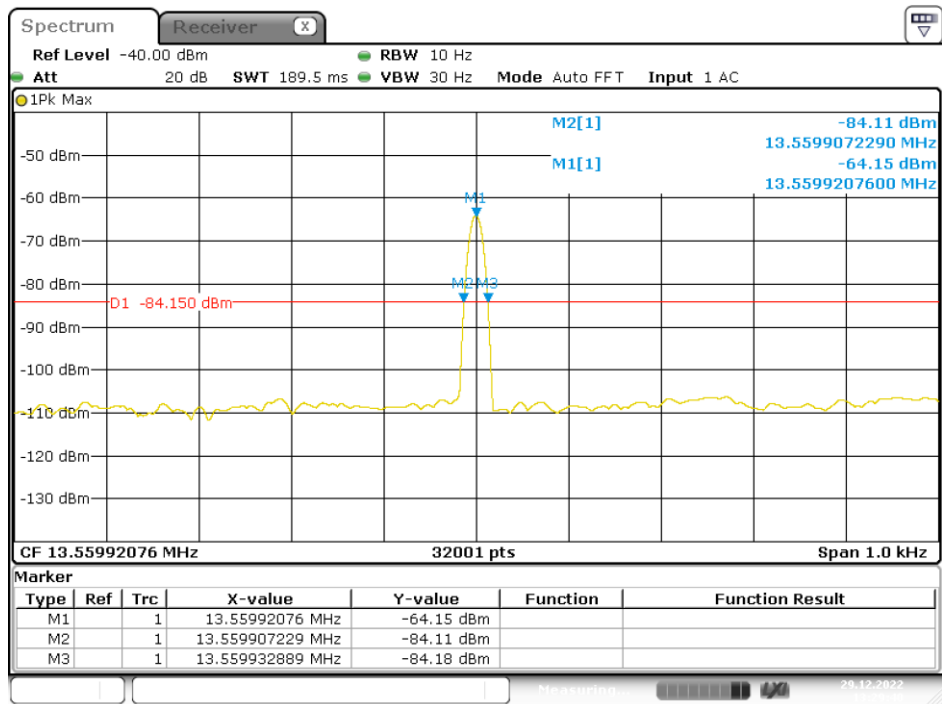
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99% Bandwidth



Date: 29.DEC.2022 13:23:51

20dB Bandwidth



Date: 29.DEC.2022 13:29:40

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5.1.4 Emission within band

RESULT:

Pass

Test Specification

Test standard : FCC part 15.225 (a), (b), (c)
RSS-210 B.6 (a) (i) (ii) (iii)
Basic standard : ANSI C63.10: 2013
Limit : FCC part 15.225 (a), (b), (c)
Kind of test site : EMC chamber

Test Setup

Date of testing : 2022-12-29
Input voltage : DC3.8V
Operation mode : A
Ambient temperature : 20°C
Relative humidity : 50%
Atmospheric pressure : 102kPa

Refer to following test plots for details of test result

Table 3: Test result of Emission within band

Test Channel (MHz)	Test Polarization	Field Strength (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)
13.56	X	59.03	124.0	-64.97

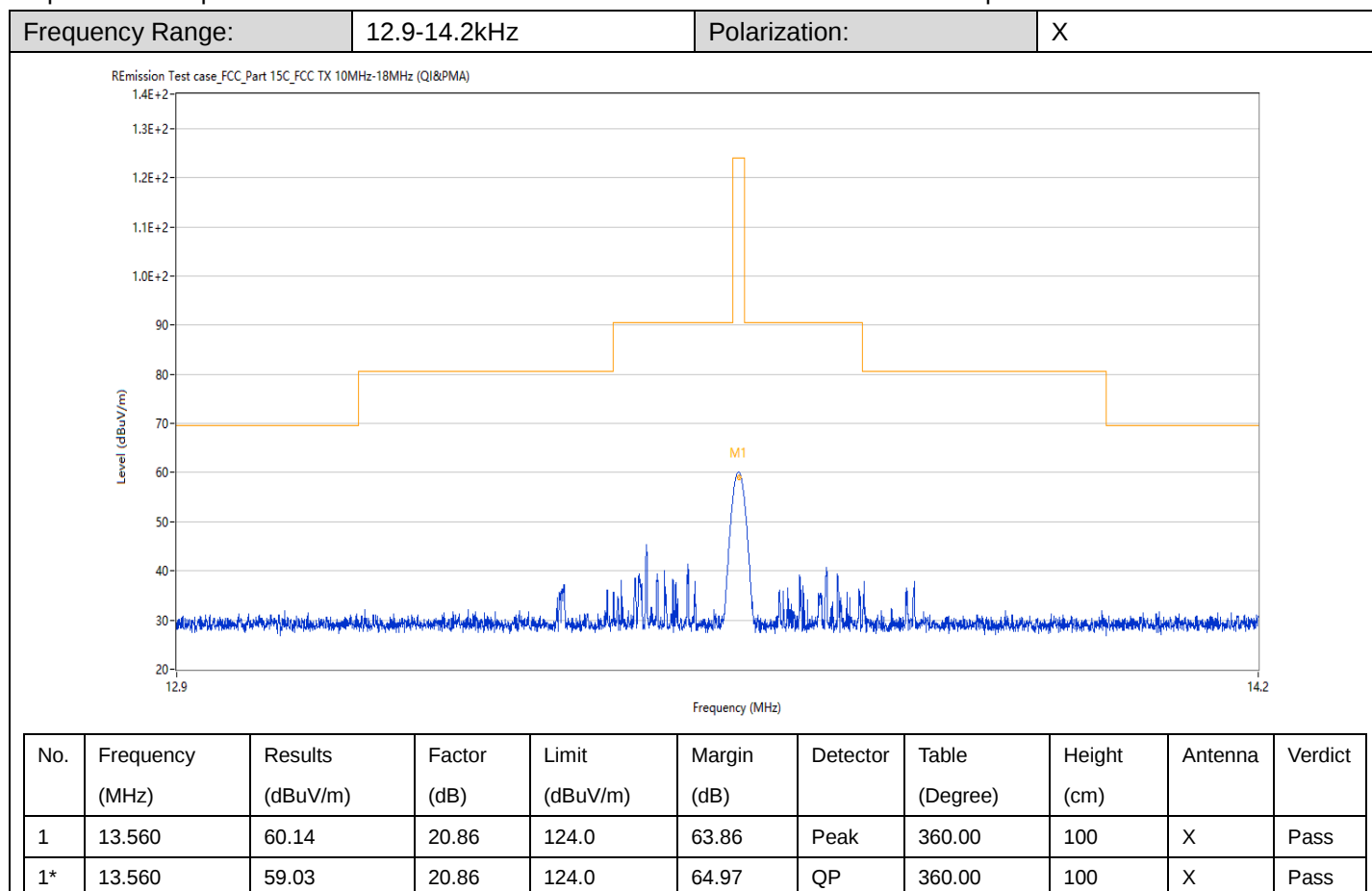
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Note: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.



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5.1.5 Spurious Emission outside band

RESULT:

Pass

Test Specification

Test standard	:	FCC part 15.225 (d) RSS-210 B.6 (a) (iv)
Basic standard	:	ANSI C63.10: 2013
Limit	:	FCC part 15.209 (a)
Kind of test site	:	EMC chamber

Test Setup

Date of testing	:	2022-12-29
Input voltage	:	DC3.8V
Operation mode	:	A
Ambient temperature	:	20°C
Relative humidity	:	50%
Atmospheric pressure	:	102kPa

Refer to following test plots for details of test result

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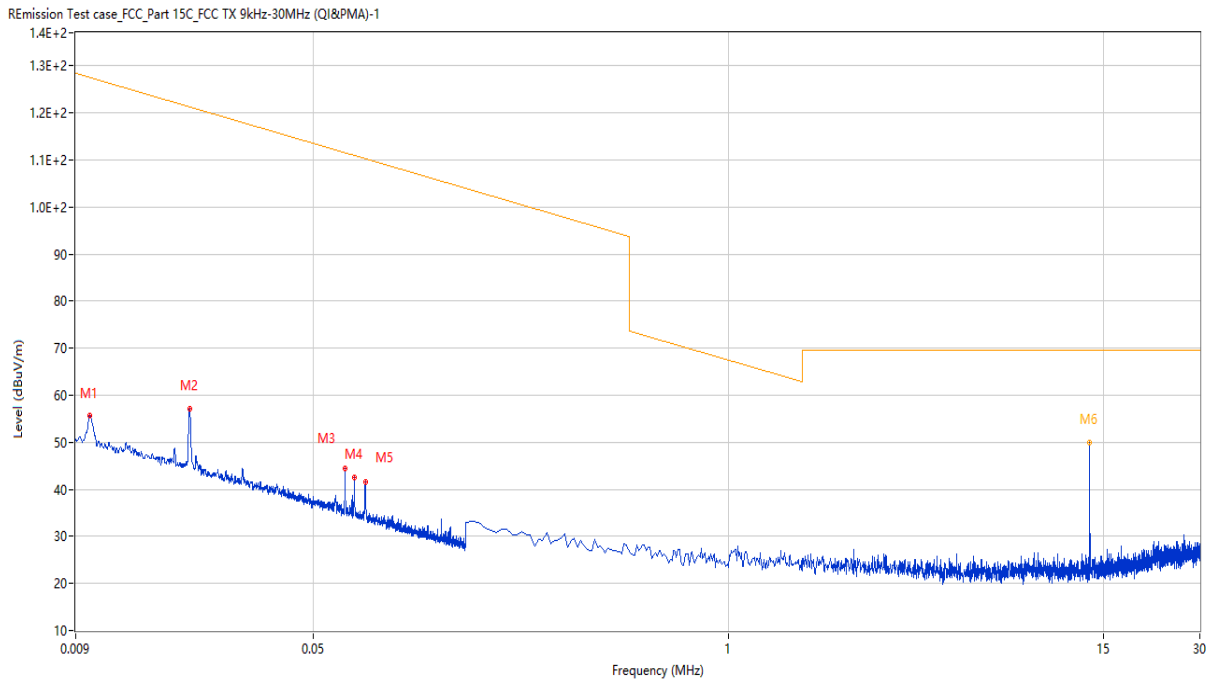
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Note: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

Frequency Range:	9k-30MHz	Polarization:	X
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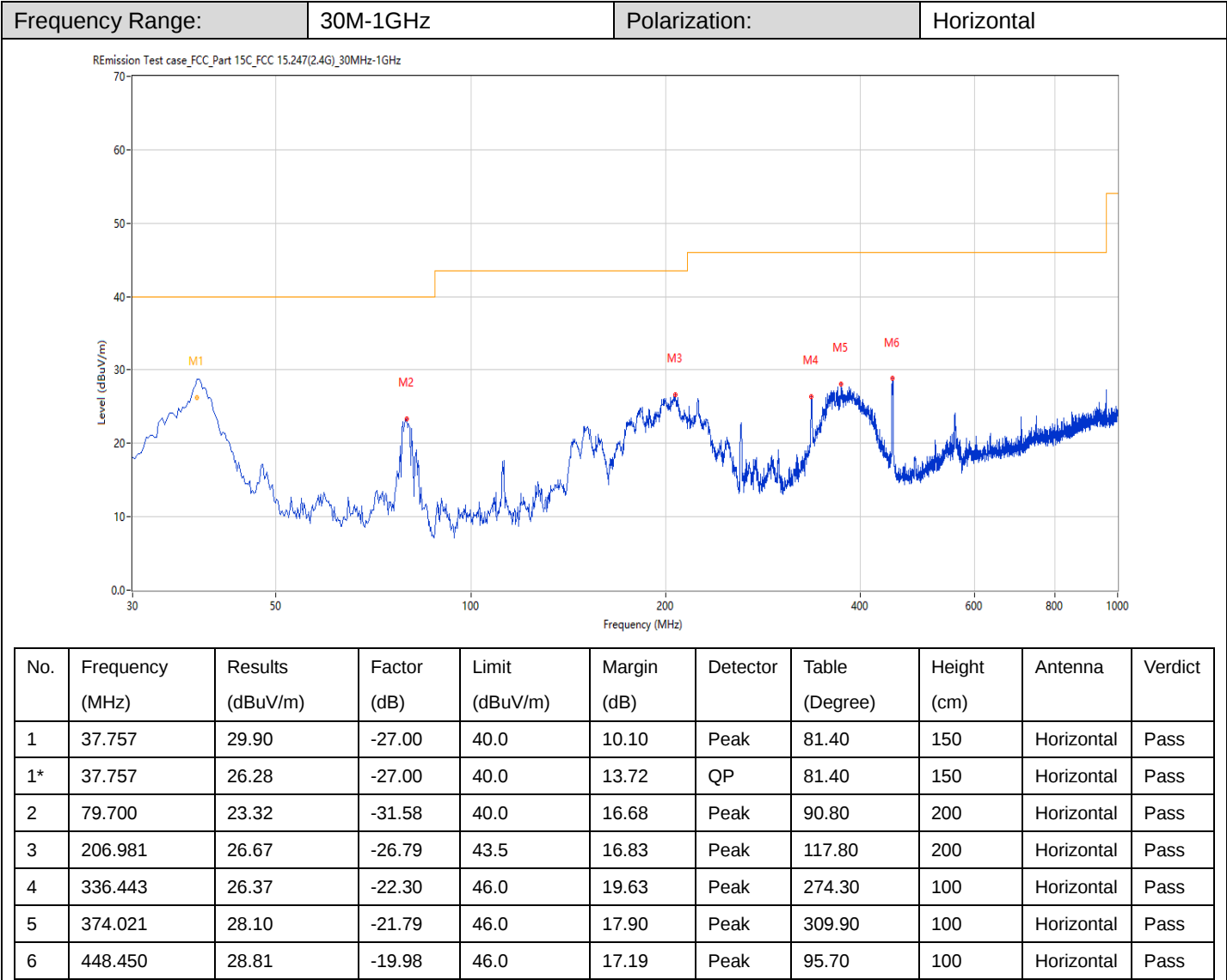
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	0.010	55.57	19.30	127.6	72.03	Peak	359.50	100	X	Pass
2	0.020	57.08	20.20	121.3	64.22	Peak	187.20	100	X	Pass
3	0.063	44.41	20.50	111.6	67.19	Peak	128.70	100	X	Pass
4	0.067	42.50	20.50	111.0	68.50	Peak	275.90	100	X	Pass
5	0.073	41.68	20.49	110.3	68.62	Peak	15.00	100	X	Pass
6	13.560	50.00	20.86	69.5	19.50	Peak	1.00	100	X	Pass
6*	13.560	49.96	20.86	69.5	19.54	QP	1.00	100	X	Pass

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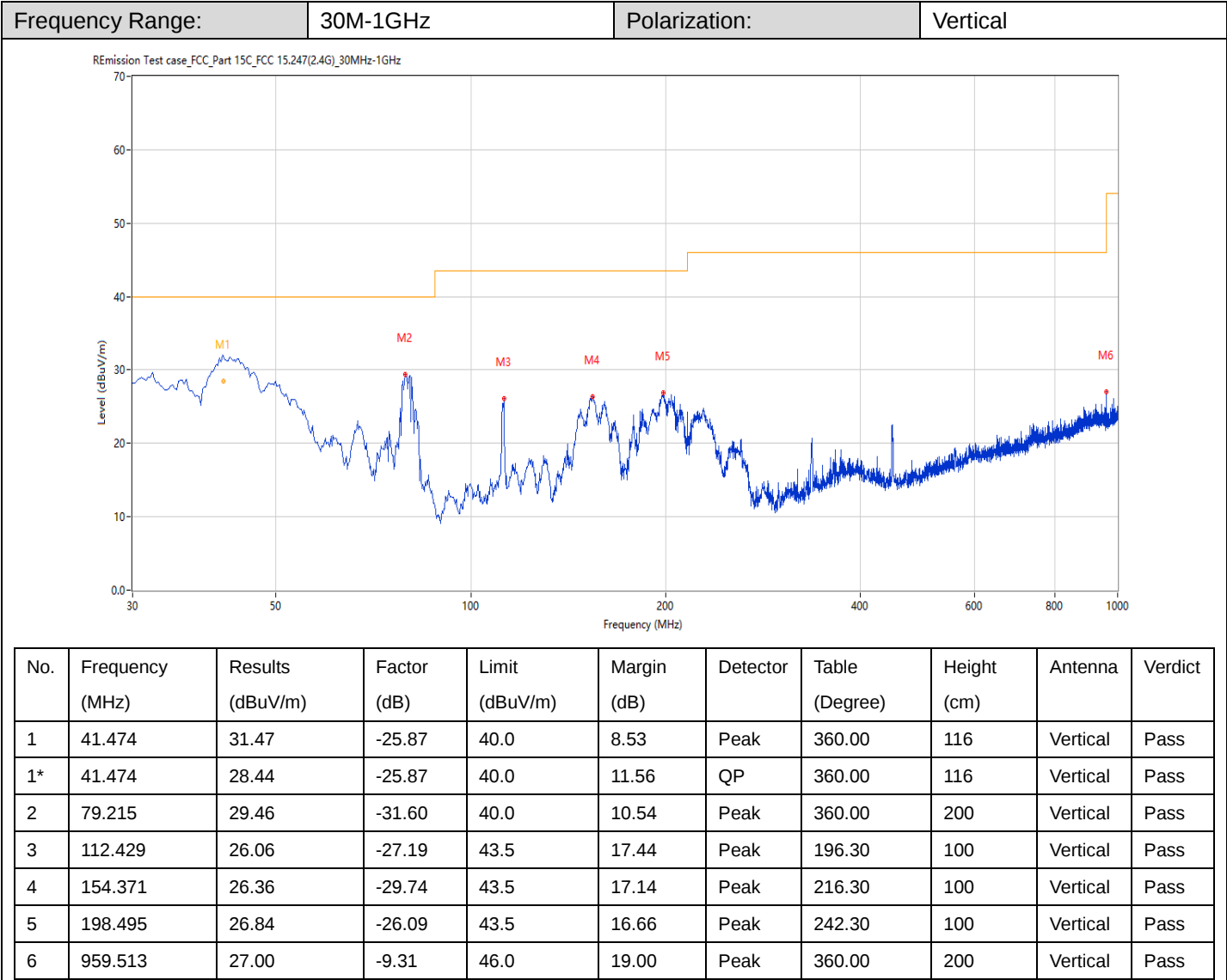


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5.1.6 Conducted Emissions

RESULT:

Pass

Test Specification

Test standard	:	FCC part 15.207
	:	RSS-Gen
Basic standard	:	ANSI C63.4: 2014
Limit	:	FCC part 15.207
	:	RSS-Gen 8.8
Kind of test site	:	Shielded Enclosure

Test Setup

Date of testing	:	2022-12-29
Input voltage	:	AC120V
Operation mode	:	A
Ambient temperature	:	20°C
Relative humidity	:	50%
Atmospheric pressure	:	102kPa

Refer to following test plots for details of test result

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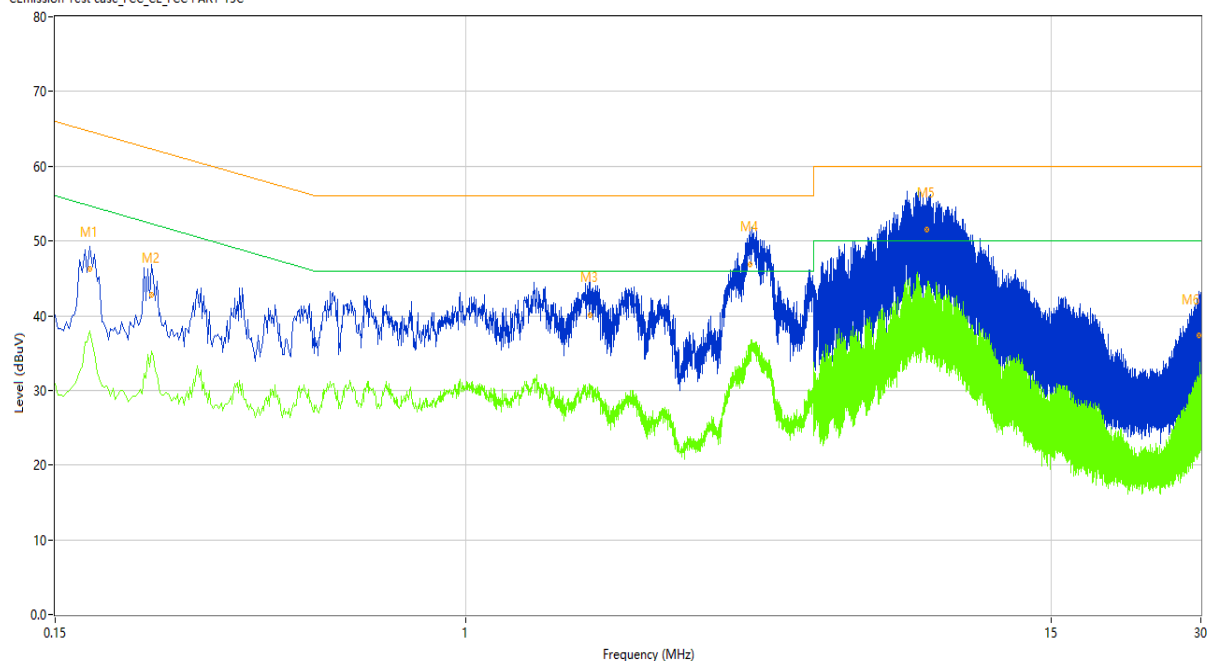
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Frequency Range:	150k-30MHz	Phase:	Line
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CEmission Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.176	50.06	10.28	64.67	14.61	Peak	L	Pass
1*	0.176	46.24	10.28	64.67	18.43	QP	L	Pass
1**	0.176	37.97	10.28	54.67	16.70	AV	L	Pass
2	0.234	46.24	10.27	62.31	16.07	Peak	L	Pass
2*	0.234	42.78	10.27	62.31	19.53	QP	L	Pass
2**	0.234	35.25	10.27	52.31	17.06	AV	L	Pass
3	1.780	46.13	10.19	56.00	9.87	Peak	L	Pass
3*	1.780	40.03	10.19	56.00	15.97	QP	L	Pass
3**	1.780	30.71	10.19	46.00	15.29	AV	L	Pass
4	3.732	53.29	10.21	56.00	2.71	Peak	L	Pass
4*	3.732	46.84	10.21	56.00	9.16	QP	L	Pass
4**	3.732	36.09	10.21	46.00	9.91	AV	L	Pass
5	8.454	59.26	10.37	60.00	0.74	Peak	L	Pass
5*	8.454	51.55	10.37	60.00	8.45	QP	L	Pass
5**	8.454	43.74	10.37	50.00	6.26	AV	L	Pass
6	29.734	45.16	11.05	60.00	14.84	Peak	L	Pass
6*	29.734	37.37	11.05	60.00	22.63	QP	L	Pass
6**	29.734	29.53	11.05	50.00	20.47	AV	L	Pass

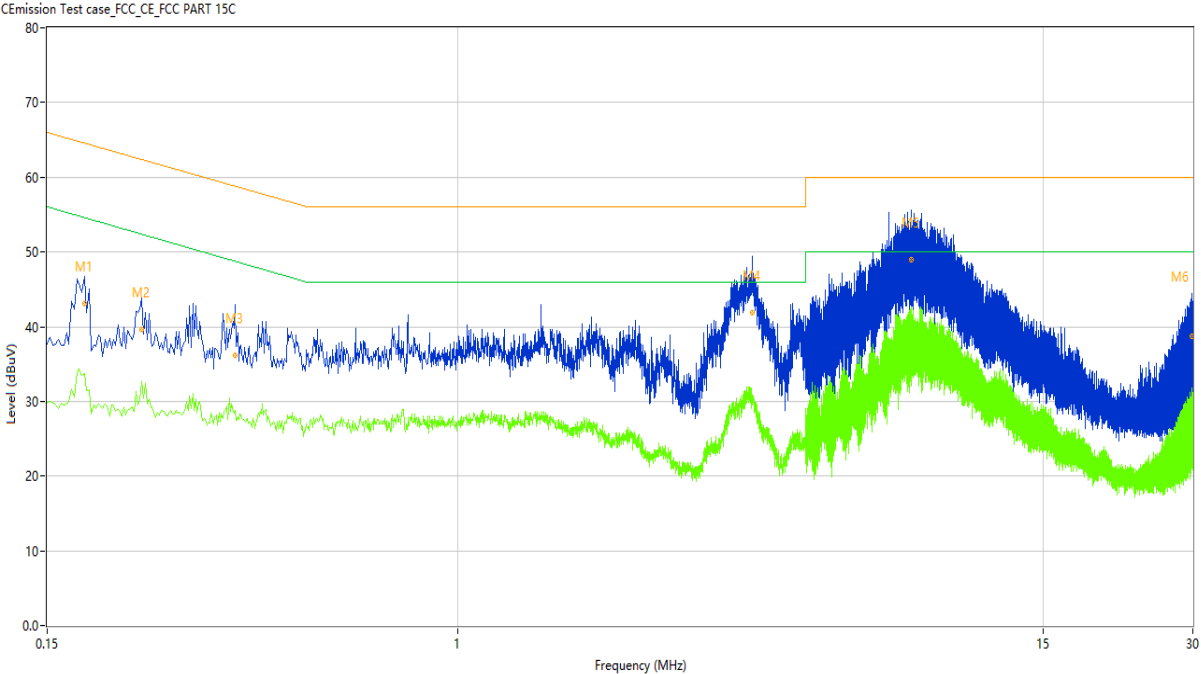
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Frequency Range:	150k-30MHz	Phase:	Neutral
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No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.178	47.09	10.19	64.58	17.49	Peak	N	Pass
1*	0.178	43.09	10.19	64.58	21.49	QP	N	Pass
1**	0.178	33.68	10.19	54.58	20.90	AV	N	Pass
2	0.232	43.58	10.21	62.38	18.80	Peak	N	Pass
2*	0.232	39.63	10.21	62.38	22.75	QP	N	Pass
2**	0.232	32.66	10.21	52.38	19.72	AV	N	Pass
3	0.358	41.46	10.23	58.77	17.31	Peak	N	Pass
3*	0.358	36.10	10.23	58.77	22.67	QP	N	Pass
3**	0.358	28.73	10.23	48.77	20.04	AV	N	Pass
4	3.914	48.78	10.26	56.00	7.22	Peak	N	Pass
4*	3.914	41.84	10.26	56.00	14.16	QP	N	Pass
4**	3.914	30.56	10.26	46.00	15.44	AV	N	Pass
5	8.162	56.28	10.47	60.00	3.72	Peak	N	Pass
5*	8.162	49.01	10.47	60.00	10.99	QP	N	Pass
5**	8.162	40.90	10.47	50.00	9.10	AV	N	Pass
6	29.926	45.49	11.13	60.00	14.51	Peak	N	Pass
6*	29.926	38.70	11.13	60.00	21.30	QP	N	Pass
6**	29.926	29.81	11.13	50.00	20.19	AV	N	Pass

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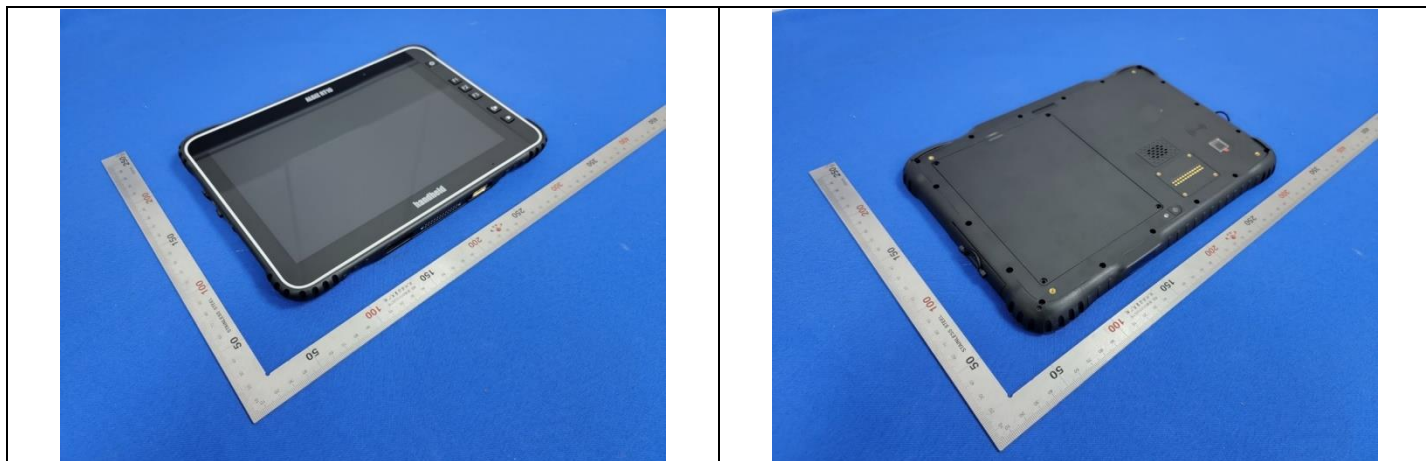
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6 Photographs of the EUT and Test Set-Up

6.1 Photographs of the EUT



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6.2 Photographs of the Test Set-up

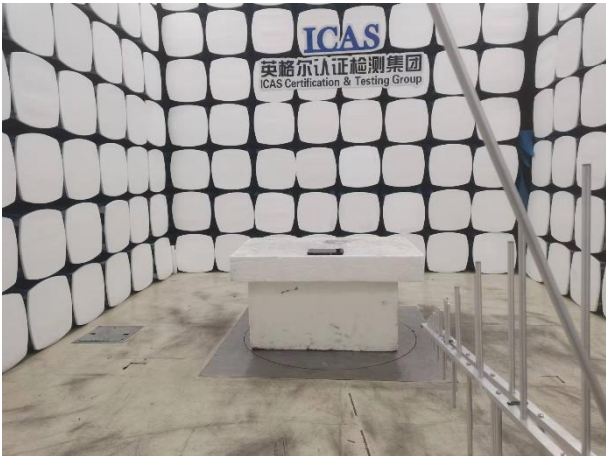
Conducted Emission Test Set-up



Radiated Emission Test Set-up for Below 30MHz



Radiated Emission Test Set-up for 30M-1GHz



End of the report