

TEST REPORT

Reference No...... : WTX22X11222793W002
FCC ID : 2ATT5-S213KS
Applicant : Dnake (Xiamen) Intelligent Technology Co., Ltd.
Address..... : North Gate, No.1, Haijing Road, Haicang District, Xiamen, 361026, Fujian,
China
Manufacturer : The same as Applicant
Address..... : The same as Applicant
Product Name : Door Station
Model No...... : S213K/S
Standards : FCC Part 15C
Date of Receipt sample : 2022-11-07
Date of Test..... : 2022-11-07 to 2022-11-22
Date of Issue : 2022-11-22
Test Report Form No. : WTX_Part 15CW
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

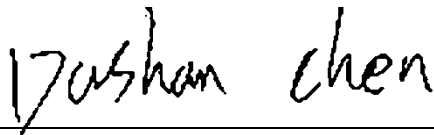
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Silin Chen

ABLE OF CONTENTS

1. GENERAL INFORMATION.....4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....4
1.2 TEST STANDARDS.....5
1.3 TEST METHODOLOGY5
1.4 TEST FACILITY5
1.5 EUT SETUP AND OPERATION MODE6
1.6 MEASUREMENT UNCERTAINTY7
1.7 TEST EQUIPMENT LIST AND DETAILS8

2. SUMMARY OF TEST RESULTS9

3. ANTENNA REQUIREMENT10
3.1 STANDARD APPLICABLE.....10
3.2 EVALUATION INFORMATION.....10

4. CONDUCTED EMISSIONS11
4.1 TEST PROCEDURE.....11
4.2 BASIC TEST SETUP BLOCK DIAGRAM.....11
4.3 ENVIRONMENTAL CONDITIONS11
4.4 TEST RECEIVER SETUP12
4.5 SUMMARY OF TEST RESULTS/PLOTS12

5. FIELD STRENGTH OF SPURIOUS EMISSIONS15
5.1 STANDARD APPLICABLE.....15
5.2 TEST PROCEDURE.....15
5.3 CORRECTED AMPLITUDE & MARGIN CALCULATION.....16
5.4 ENVIRONMENTAL CONDITIONS17
5. REFERENCE MEASUREMENT AT OPEN FIELD SITE17
5.5 SUMMARY OF TEST RESULTS/PLOTS17

6. 20DB EMISSION BANDWIDTH.21
6.1 STANDARD APPLICABLE.....21
6.2 TEST PROCEDURE.....21
6.3 ENVIRONMENTAL CONDITIONS21
6.4 SUMMARY OF TEST RESULTS/PLOTS21

APPENDIX PHOTOGRAPHS.....23

Report version

Version No.	Date of issue	Description
Rev.00	2022-11-22	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Door Station
Trade Name:	DNAKE
Model No.:	S213K/S
Adding Model:	S213K, S213K/F
Battery Capacity	/
<p><i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model S213K/S, but the circuit and the electronic construction do not change, declared by the manufacturer.</i></p>	

Technical Characteristics of EUT	
Frequency Range:	125KHz
Power adapter	/
Antenna Type:	Coil Antenna
Modulation Type:	BPSK
Rated Voltage:	DC12V/POE
Antenna Gain:	0dBi

1.2 Test Standards

FCC Part 15 Subpart C: Intentional Radiators.

FCC Rules Part 15.207: Conducted limits.

FCC Rules Part 15.209: Radiated emission limits; general requirements.

FCC Rules Part 15.215: Additional provisions to the general radiated emission limitations.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, 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.

1.4 Test Facility

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark	Power Supply Mode
TM1	Transmit/ Receiving	125KHz	DC12V

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Wireless Router	MERCURY	MS08CP	12163K0000869
Notebook	Lenovo	TianYi 100-14IBD	PF0F4ABV
Adapter	KELI	SW-1960	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Network Cable	1.0	Unshielded	Without Ferrite
DC Cable	1.0	Unshielded	Without Ferrite

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-21	2023-03-20
Amplifier	Agilent	8447F	3113A06717	2022-01-07	2023-01-06
Amplifier	C&D	PAP-1G18	2002	2022-03-21	2023-03-20
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19
Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
Amplifier	Agilent	8447D	2944A10179	2022-03-21	2023-03-20
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-25	2023-03-24

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.207(a) Conducted Emission	Compliant
§15.209(a) Radiated Emission	Compliant
§15.215 20dB Emission Bandwidth	Compliant

N/A: not applicable

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Evaluation Information

This product has a Coil antenna, fulfill the requirement of this section.

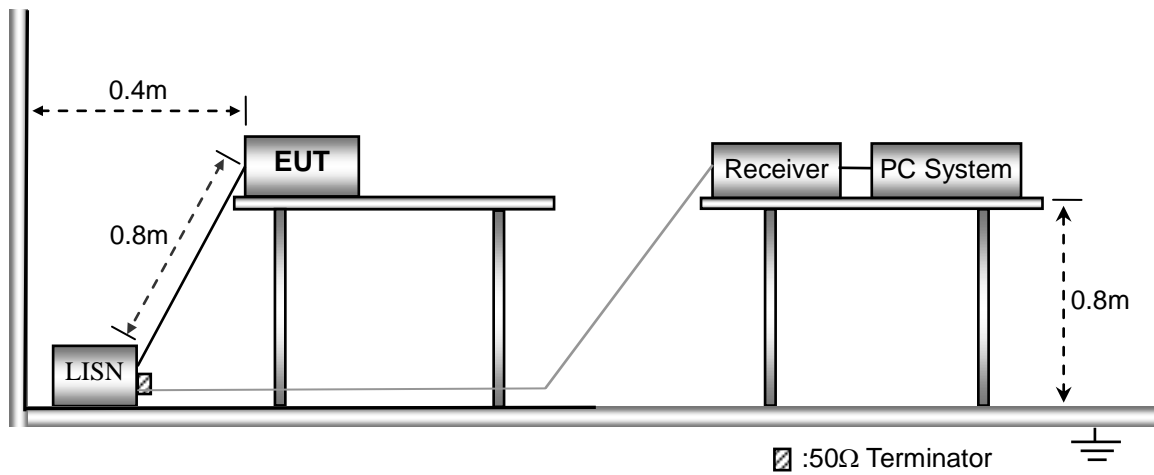
4. Conducted Emissions

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

4.2 Basic Test Setup Block Diagram



4.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

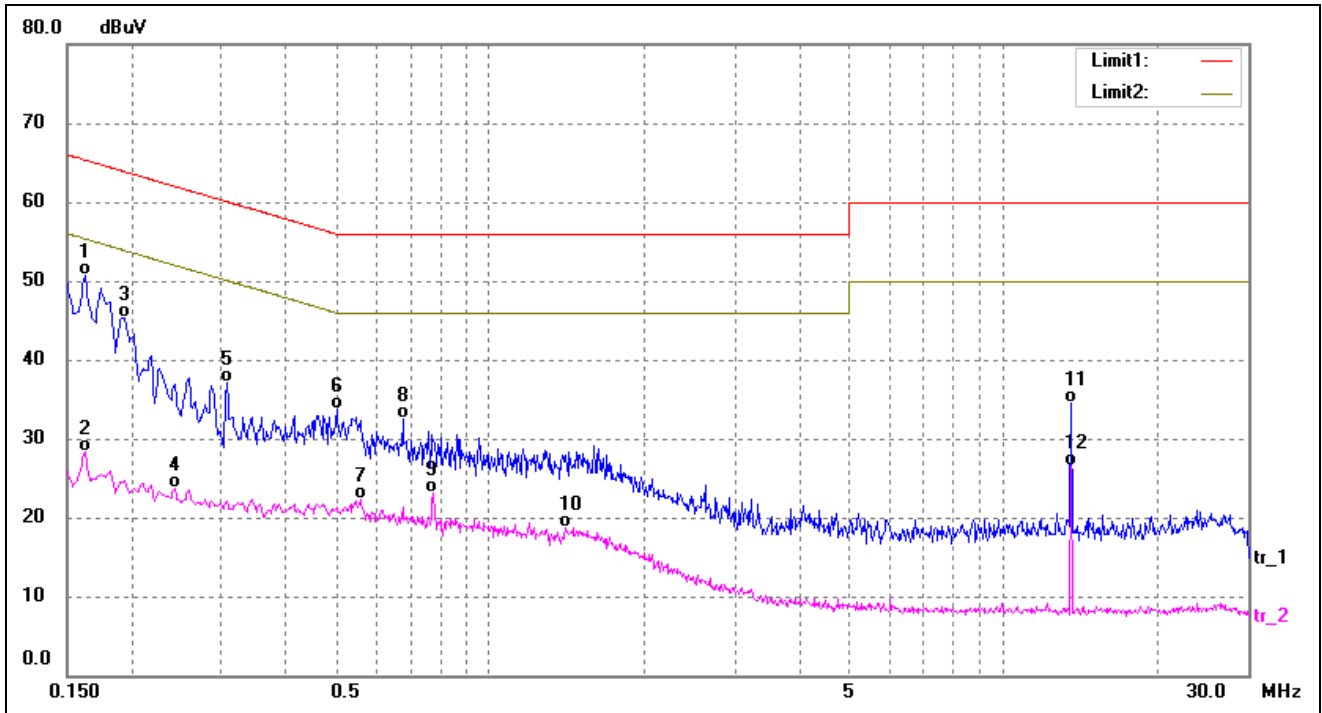
4.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth.....	10 kHz
Quasi-Peak Adapter Bandwidth.....	9 kHz
Quasi-Peak Adapter Mode	Normal

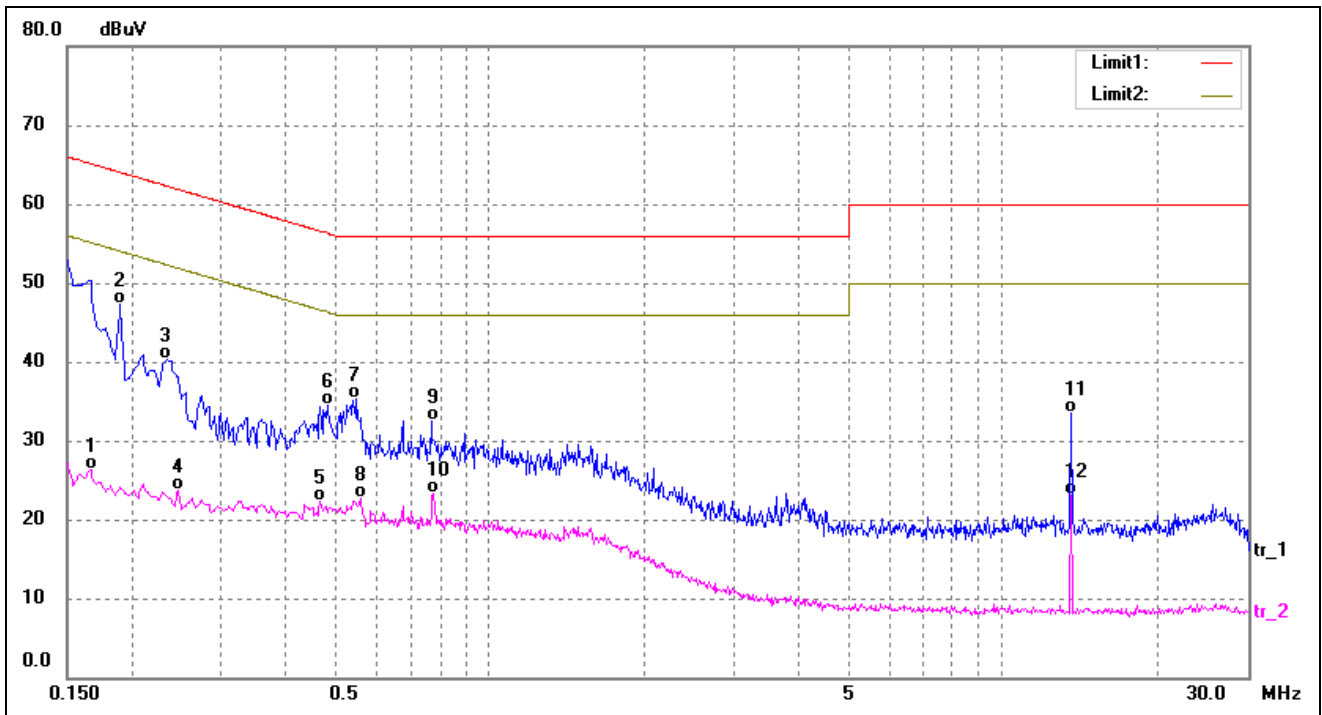
4.5 Summary of Test Results/Plots

Test mode:	TM1	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1620	40.39	10.31	50.70	65.36	-14.66	QP
2	0.1620	18.09	10.31	28.40	55.36	-26.96	AVG
3	0.1940	35.08	10.30	45.38	63.86	-18.48	QP
4	0.2420	13.44	10.27	23.71	52.03	-28.32	AVG
5	0.3060	26.86	10.24	37.10	60.08	-22.98	QP
6	0.5020	23.46	10.22	33.68	56.00	-22.32	QP
7	0.5580	12.04	10.21	22.25	46.00	-23.75	AVG
8	0.6780	22.40	10.20	32.60	56.00	-23.40	QP
9	0.7780	12.95	10.17	23.12	46.00	-22.88	AVG
10	1.4100	8.59	10.18	18.77	46.00	-27.23	AVG
11	13.5620	24.31	10.27	34.58	60.00	-25.42	QP
12	13.5620	16.25	10.27	26.52	50.00	-23.48	AVG

Test mode:	TM1	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	15.95	10.31	26.26	55.16	-28.90	AVG
2*	0.1900	37.10	10.30	47.40	64.04	-16.64	QP
3	0.2340	30.11	10.27	40.38	62.31	-21.93	QP
4	0.2460	13.45	10.27	23.72	51.89	-28.17	AVG
5	0.4660	12.16	10.23	22.39	46.58	-24.19	AVG
6	0.4820	24.26	10.22	34.48	56.30	-21.82	QP
7	0.5500	25.18	10.21	35.39	56.00	-20.61	QP
8	0.5580	12.58	10.21	22.79	46.00	-23.21	AVG
9	0.7700	22.28	10.17	32.45	56.00	-23.55	QP
10	0.7780	13.14	10.17	23.31	46.00	-22.69	AVG
11	13.5660	23.31	10.27	33.58	60.00	-26.42	QP
12	13.5660	12.85	10.27	23.12	50.00	-26.88	AVG

5. Field Strength of Spurious Emissions

5.1 Standard Applicable

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

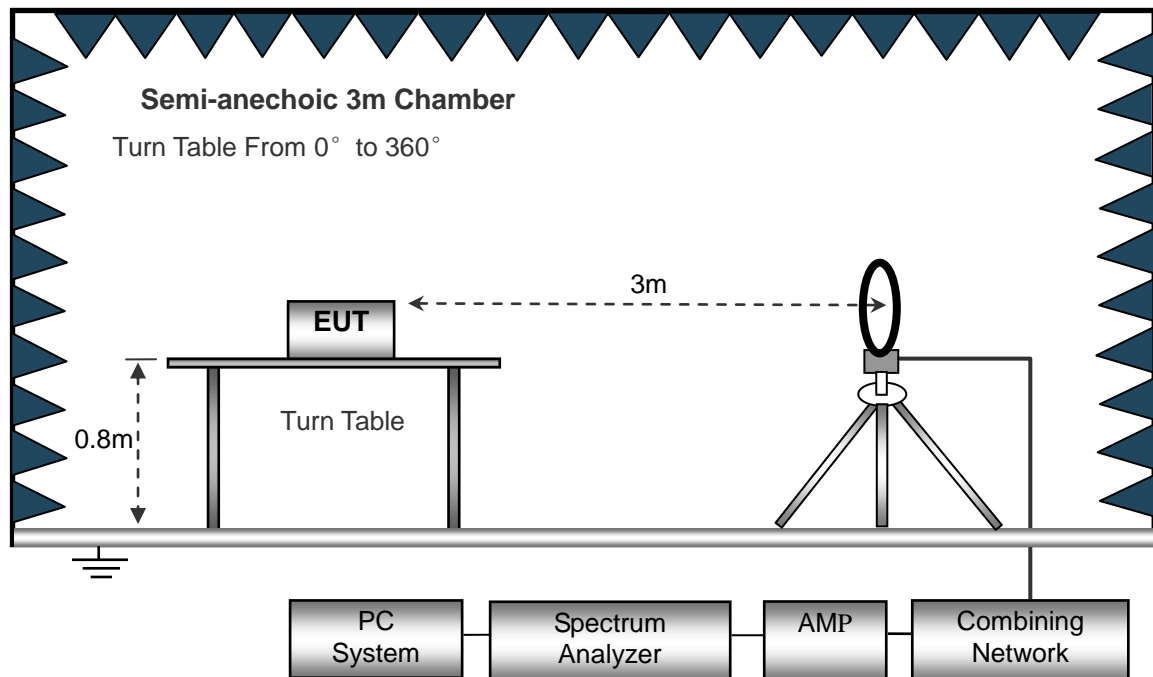
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

5.2 Test Procedure

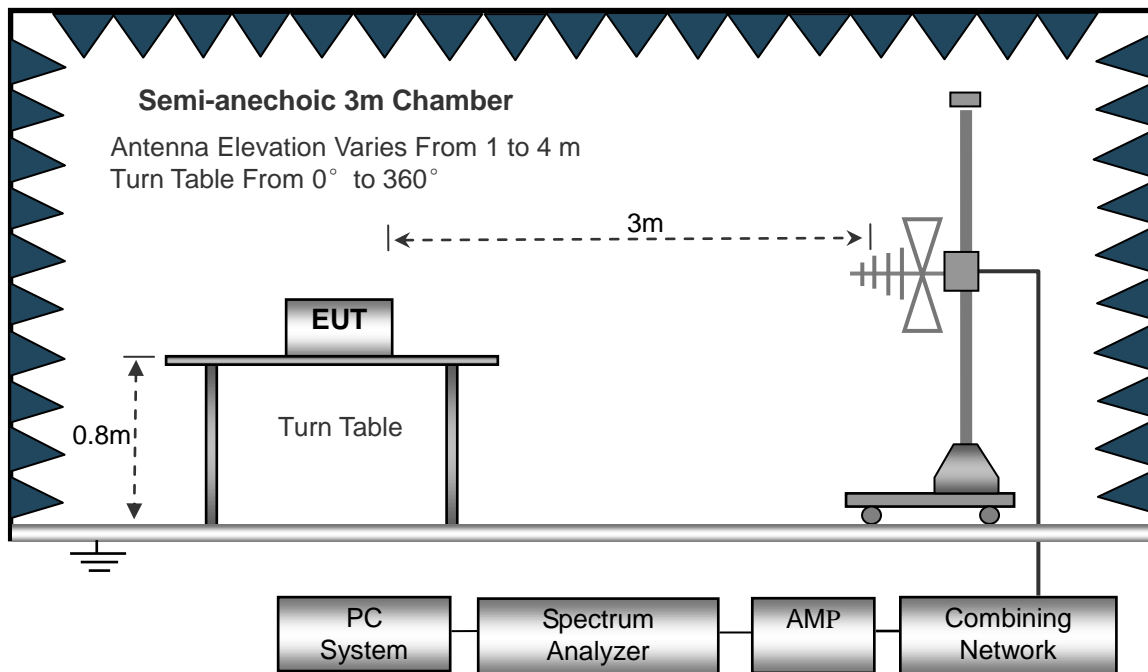
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

The test setup for emission measurement below 30MHz..



The test setup for emission measurement from 30 MHz to 1 GHz..



Frequency :9kHz-30MHz

RBW=10KHz

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

5.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

5.4 Environmental Conditions

Temperature:	22.5 °C
Relative Humidity:	54%
ATM Pressure:	1012 mbar

5. Reference Measurement at open field site

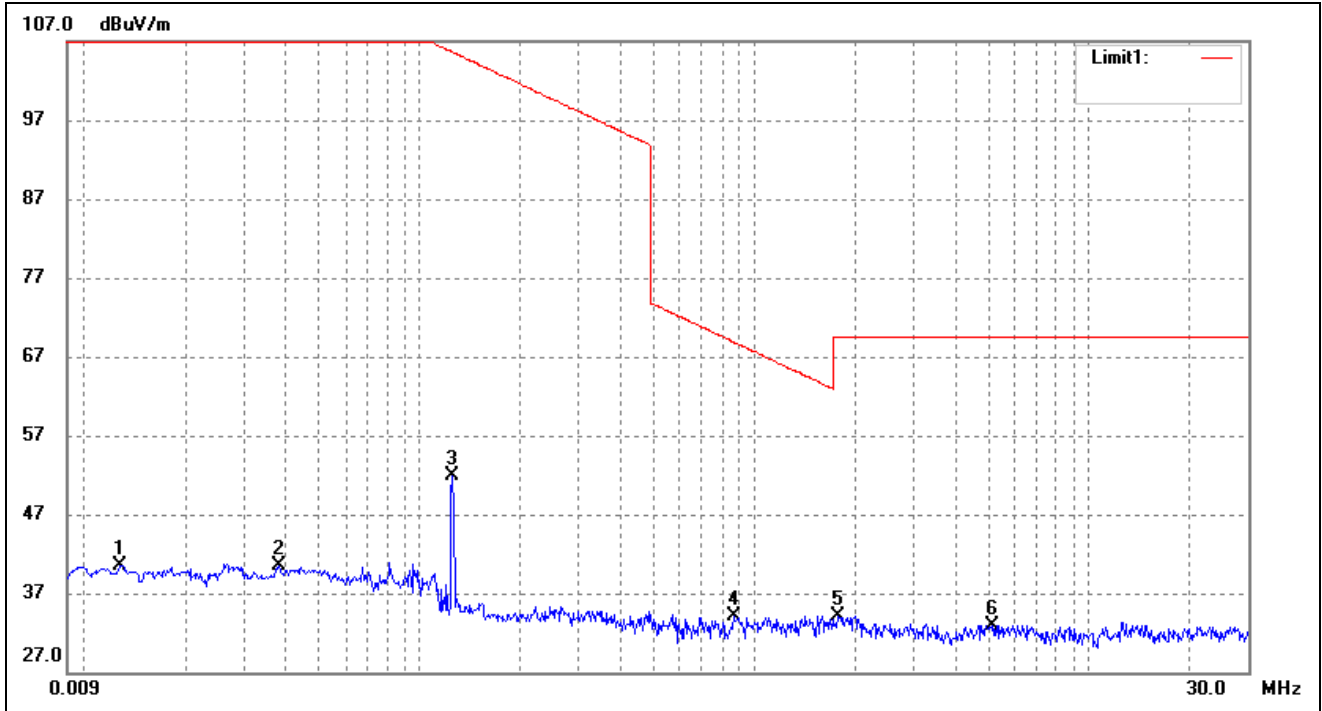
The measurement was performed with set-up consisting of a single turn loop antenna with a diameter of 0.15 m, fed by a signal generator. The loop dimension was chosen to simulate the EUT as far as possible. The signal generator was set to a fixed output level with an unmodulated 10 kHz and 14 kHz sinusoidal signal. The radiated H fieldstrength at 10 kHz and 14 kHz generated by this set-up was measured with the same test setup as used in the SAC in 3 m distance first, and then repeated at the open field site in 3 m and 10 m distance

5.5 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Radiated Emissions Test Data (Below 30MHz)(Worst case EUT X axis)

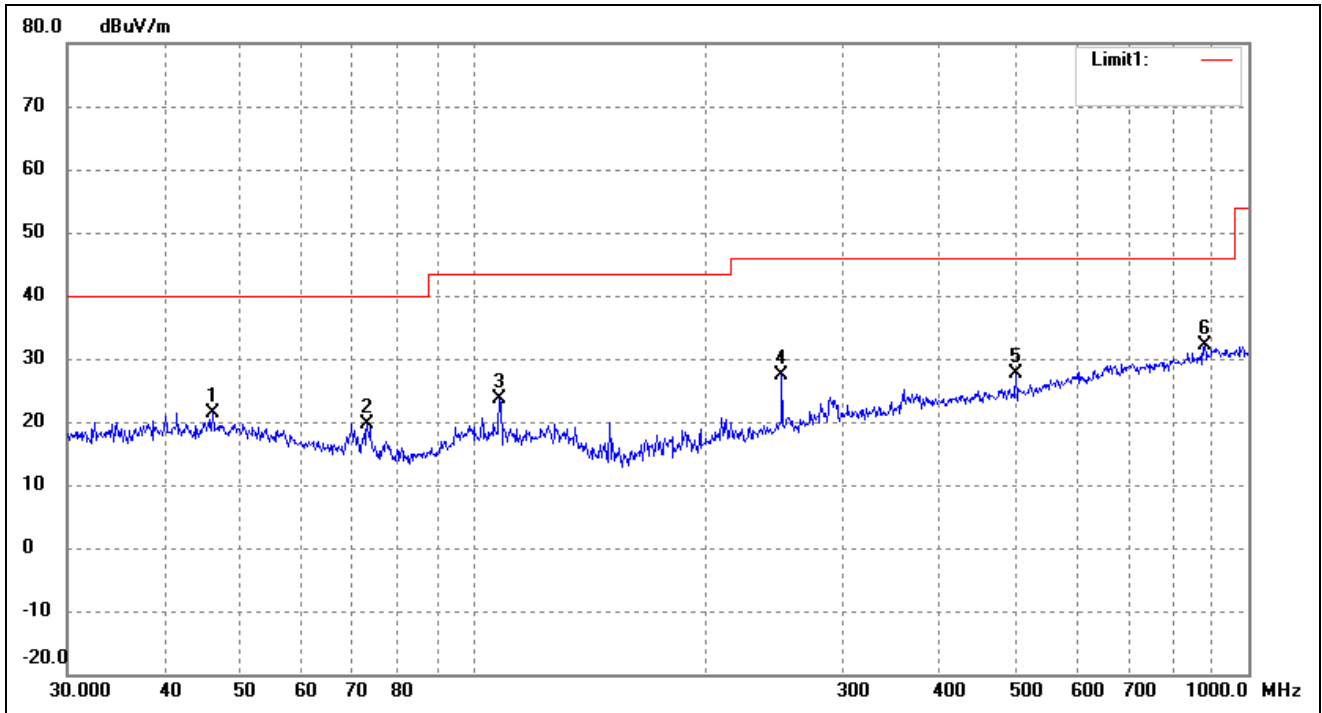
Test mode:	TM1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	0.0128	47.52	-7.02	40.50	125.44	-84.94	-	-	peak
2	0.0381	46.65	-6.07	40.58	115.97	-75.39	-	-	peak
3	0.1253	58.44	-6.47	51.97	105.64	-53.67	-	-	peak
4	0.8664	40.39	-6.33	34.06	68.86	-34.80	-	-	peak
5	1.7623	40.23	-6.06	34.17	69.50	-35.33	-	-	peak
6	5.1118	38.45	-5.51	32.94	69.50	-36.56	-	-	peak

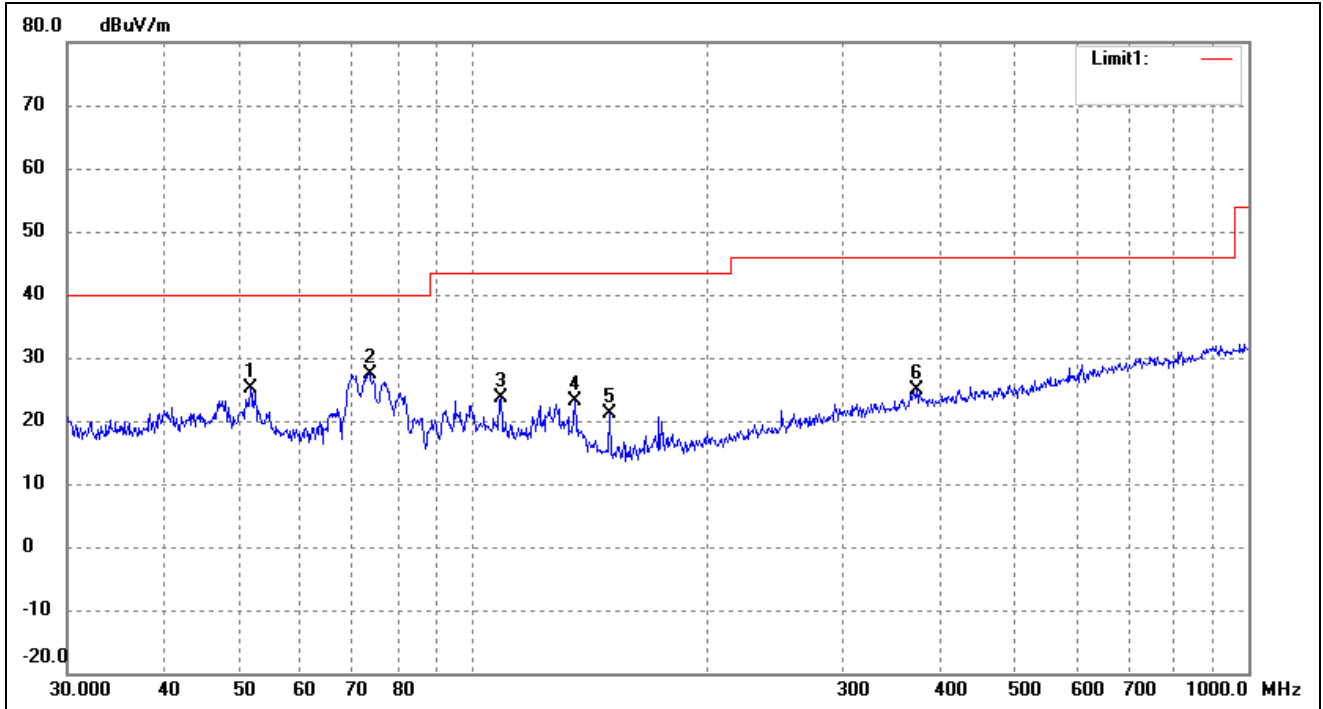
Plot of Radiated Emissions Test Data (Above 30MHz)

Test mode:	TM1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	46.1780	28.51	-7.25	21.26	40.00	-18.74	-	-	peak
2	73.1025	30.91	-11.35	19.56	40.00	-20.44	-	-	peak
3	108.2667	31.79	-8.13	23.66	43.50	-19.84	-	-	peak
4	250.3012	34.20	-6.70	27.50	46.00	-18.50	-	-	peak
5	501.1790	29.72	-2.16	27.56	46.00	-18.44	-	-	peak
6	878.3214	28.42	3.68	32.10	46.00	-13.90	-	-	peak

Test mode:	TM1	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	51.6616	32.83	-7.61	25.22	40.00	-14.78	-	-	peak
2	73.6170	38.77	-11.39	27.38	40.00	-12.62	-	-	peak
3	108.6470	31.71	-8.13	23.58	43.50	-19.92	-	-	peak
4	135.5062	34.25	-11.04	23.21	43.50	-20.29	-	-	peak
5	150.0108	32.92	-11.67	21.25	43.50	-22.25	-	-	peak
6	373.3112	28.53	-3.75	24.78	46.00	-21.22	-	-	peak

Remark: '- Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

6. 20dB Emission bandwidth.

6.1 Standard Applicable

According to 15.215, 20dB emission bandwidth.

6.2 Test Procedure

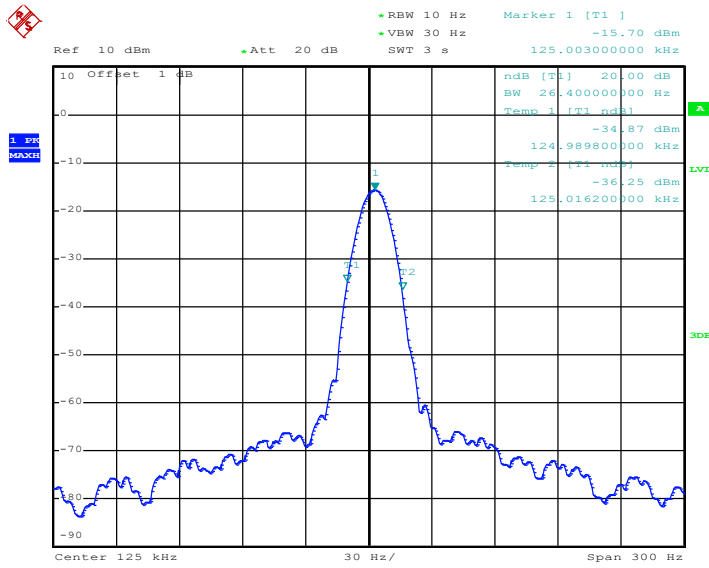
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

6.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

Test Channel(kHz)	20dB Emission Bandwidth(Hz)
125.003	26.40



Date: 18.NOV.2022 16:07:45

Note: The RBW of the analyzer measuring Bandwidth cannot be adjusted to 1%-5% occupied bandwidth, the RBW of the test setting is the closest value.

APPENDIX PHOTOGRAPHS

Please refer to "ANNEX"

***** END OF REPORT *****