FCC Test Report

Report No.: AGC15463230202FE10

FCC ID	:	2BAE5-SATUOPRO
PRODUCT DESIGNATION	:	Window cleaner robot-Remote control
BRAND NAME	:	N/A
MODEL NAME	:	SATUO Pro
APPLICANT	:	Shanxi Jiashida Robot Technology Co., Ltd
DATE OF ISSUE	:	Mar. 14, 2023
STANDARD(S)	:	FCC Part 15 Subpart C §15.231
REPORT VERSION	:	V 1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar. 14, 2023	Valid	Initial Release

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TABLE OF CONTENTS

1. GENERAL INFORMATION 5
2. PRODUCT INFORMATION 6
2.1 PRODUCT TECHNICAL DESCRIPTION 6
2.2 TEST FREQUENCY LIST 6
2.3 RELATED SUBMITTAL(S) / GRANT (S) 7
2.4 TEST METHODOLOGY 7
2.5 SPECIAL ACCESSORIES 7
2.6 EQUIPMENT MODIFICATIONS 7
2.7 ANTENNA REQUIREMENT 7
3. TEST ENVIRONMENT 8
3.1 ADDRESS OF THE TEST LABORATORY 8
3.2 TEST FACILITY 8
3.3 ENVIRONMENTAL CONDITIONS 9
3.4 MEASUREMENT UNCERTAINTY 9
3.5 LIST OF EQUIPMENTS USED 10
4.SYSTEM TEST CONFIGURATION 11
4.1 EUT CONFIGURATION 11
4.2 EUT EXERCISE 11
4.3 CONFIGURATION OF TESTED SYSTEM 11
4.4 EQUIPMENT USED IN TESTED SYSTEM 11
4.5 SUMMARY OF TEST RESULTS 12
5. DESCRIPTION OF TEST MODES 13
6. PROVISION FOR MOMENTARY OPERATION 14
6.1 PROVISIONS APPLICABLE 14
6.2 MEASUREMENT PROCEDURE 14
6.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION) 14
6.4 MEASUREMENT RESULTS 15
7. DUTY CYCLE CORRECTION FACTOR 16
7.1 PROVISIONS APPLICABLE 16
7.2 MEASUREMENT PROCEDURE 16
7.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION) 16
7.4 MEASUREMENT RESULTS 16
8. 20 dB BANDWIDTH 19
8.1 PROVISIONS APPLICABLE 19
8.2 MEASUREMENT PROCEDURE 19

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8.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)..... 19
8.4 MEASUREMENT RESULTS..... 20
9. RADIATED EMISSION 21
9.1 LIMITS OF RADIATED EMISSION TEST 21
9.2 MEASUREMENT PROCEDURE..... 22
9.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)..... 24
9.4 MEASUREMENT RESULT 25
10. AC LINE CONDUCTED EMISSION TEST..... 29
10.1 LIMITS OF LINE CONDUCTED EMISSION TEST 29
10.2 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)..... 29
10.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST..... 30
10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST 30
10.5 MEASUREMENT RESULTS 30
APPENDIX I: PHOTOGRAPHS OF TEST SETUP..... 31
APPENDIX II: PHOTOGRAPHS OF TEST EUT..... 31

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1. GENERAL INFORMATION

Applicant	Shanxi Jiashida Robot Technology Co., Ltd
Address	17/f, huanneng tech block, no17, Gaoxin St., Zonggai shifan dist., Taiyuan, CHINA
Manufacturer	Shanxi Jiashida Robot Technology Co., Ltd
Address	17/f, huanneng tech block, no17, Gaoxin St., Zonggai shifan dist., Taiyuan, CHINA
Factory	Shanxi Jiashida Robot Technology Co., Ltd
Address	17/f, huanneng tech block, no17, Gaoxin St., Zonggai shifan dist., Taiyuan, CHINA
Product Designation	Window cleaner robot-Remote control
Brand Name	N/A
Test Model	SATUO Pro
Date of receipt of test item	Feb. 28, 2023
Date of Test	Feb. 28, 2023 to Mar. 14, 2023
Deviation from Standard	No any deviation from the test method
Test Result	Pass
Test Report Form No	AGCTR-ER-FCC-SRDV1.0

Prepared By	Alan Duan (Project Engineer)	Mar. 14, 2023
Reviewed By	Calvin Liu (Reviewer)	Mar. 14, 2023
Approved By	Max Zhang (Authorized Officer)	Mar. 14, 2023

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2. PRODUCT INFORMATION

2.1 PRODUCT TECHNICAL DESCRIPTION

Hardware Version	1.0.0
Software Version	1.0.0
Operation Frequency	433.92MHz
Modulation Type	ASK
Number of channels	1
Field Strength of Fundamental	433.92MHz: 79.55dBuV/m(PK)@3m 433.92MHz: 71.78dBuV/m(AV)@3m
Antenna Designation	PCB Antenna
Antenna Gain	2.4dBi
Power Supply	DC 3.0V by battery

2.2 TEST FREQUENCY LIST

Frequency Band	Channel Number	Frequency
--	01	433.92 MHz

Note: According to manufacturer's requirements,periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

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2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: **2BAE5-SATUOPRO,** filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 TEST METHODOLOGY

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.5 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.7 ANTENNA REQUIREMENT

Standard Requirement
15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
EUT Antenna:
The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 2.4 dBi.

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3. TEST ENVIRONMENT

3.1 ADDRESS OF THE TEST LABORATORY

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842 (CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS
Temperature range (℃)	15 - 35	-20 - 50
Relative humidty range	20 % - 75 %	20 % - 75 %
Pressure range (kPa)	86 - 106	86 - 106
Power supply	--	--
Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.		

3.4 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	U_c = ±2.9 dB
Uncertainty of Radiated Emission below 1GHz	U_c = ±3.9 dB
Uncertainty of Radiated Emission above 1GHz	U_c = ±4.9 dB
Uncertainty of total RF power, conducted	U_c = ±0.8 dB
Uncertainty of RF power density, conducted	U_c = ±2.6 dB
Uncertainty of spurious emissions, conducted	U_c = ±2.7 %
Uncertainty of Occupied Channel Bandwidth	U_c = ±2 %

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3.5 LIST OF EQUIPMENTS USED

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESPI	101206	Mar. 28, 2022	Mar. 27, 2023
Artificial power network	R&S	ESH2-Z5	100086	Jun. 08, 2022	Jun. 07, 2023
Test Software	FARA	EZ-EMC	Ver.AGC-CON 03A1	N/A	N/A
Test Receiver	R&S	ESCI	10096	Mar. 28, 2022	Mar. 27, 2023
EXA Signal Analyzer	Agilent	N9010A	MY53470504	Aug. 04, 2022	Aug. 03, 2023
2.4GHz Filter	EM Electronics	N/A	N/A	Mar. 18, 2022	Mar. 19, 2024
Attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Horn Antenna	SCHWARZBEC	BBHA9170	768	Oct. 31, 2021	Oct. 30, 2023
Active Loop Antenna (9K-30Mhz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Double-Ridged Waveguide Horn	ETS	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Double-Ridged Waveguide Horn	ETS	3117	00154520	Sep. 06, 2021	Sep. 05, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 06, 2021	Sep. 05, 2023
Wideband Antenna	SCHWARZBECK	VULB9168	D69250	Apr. 28, 2021	Apr. 27, 2023
Test Software	FARA	EZ-EMC	Ver.RA-03A	N/A	N/A

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4.SYSTEM TEST CONFIGURATION

4.1 EUT CONFIGURATION

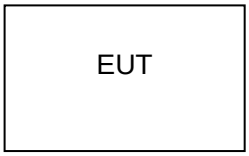
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

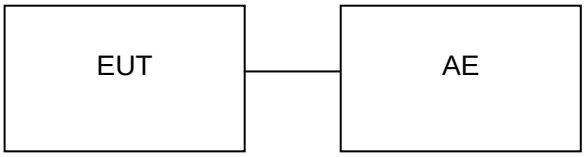
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



4.4 EQUIPMENT USED IN TESTED SYSTEM

The Following Peripheral Devices And Interface Cables Were Connected During The Measurement:
☐ Test Accessories Come From The Laboratory
☒ Test Accessories Come From The Manufacturer

Item	Equipment	Model No.	Identifier	Note
1	Window cleaner robot-Remote control	SATUO Pro	2BAE5-SATUOPRO	EUT

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4.5 SUMMARY OF TEST RESULTS

Item	FCC Rules	Description Of Test	Result
1	§15.203	Antenna Equipment	Pass
2	§15.231(a)	Transmission Time (Activated automatically)	Pass
3	§15.231	Field Strength of Fundamental	Pass
4	§15.209	Radiated Emission	Pass
5	§15.205(a)	Restricted Bands of Operation	Pass
6	§15.231(c)	20dB Bandwidth	Pass
7	§15.207	AC Power Line Conducted Emission	N/A

Note: N/A means not applicable.

The EUT was supplied by battery.

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5. DESCRIPTION OF TEST MODES

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	Short-range equipment / ASK
Radiated&Conducted Test Cases	Mode 1: Tx _433.92 MHz
AC Conducted Emission	--

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

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6. PROVISION FOR MOMENTARY OPERATION

6.1 PROVISIONS APPLICABLE

☒ (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

☐ (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

☐ (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

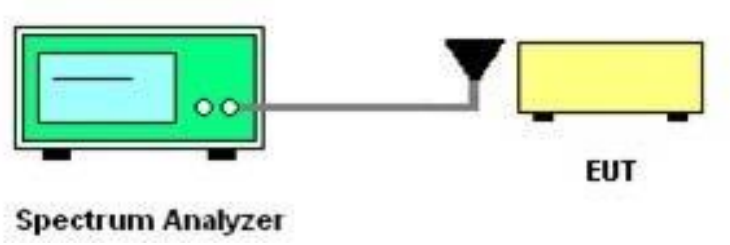
☐ (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

☐ (5) Transmission of set-up information for security systems may exceed the transmission duration limits in (1) and (2) above, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

6.2 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
2. Centre frequency = Operation Frequency
3. RBW=1MHz, VBW=3MHz Span: 0Hz Sweep time: 10S
4. Set the EUT to transmit by manually operated. Use the “View” function of SPA to find the transmission time of being released.
5. Record the data and Reported.

6.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



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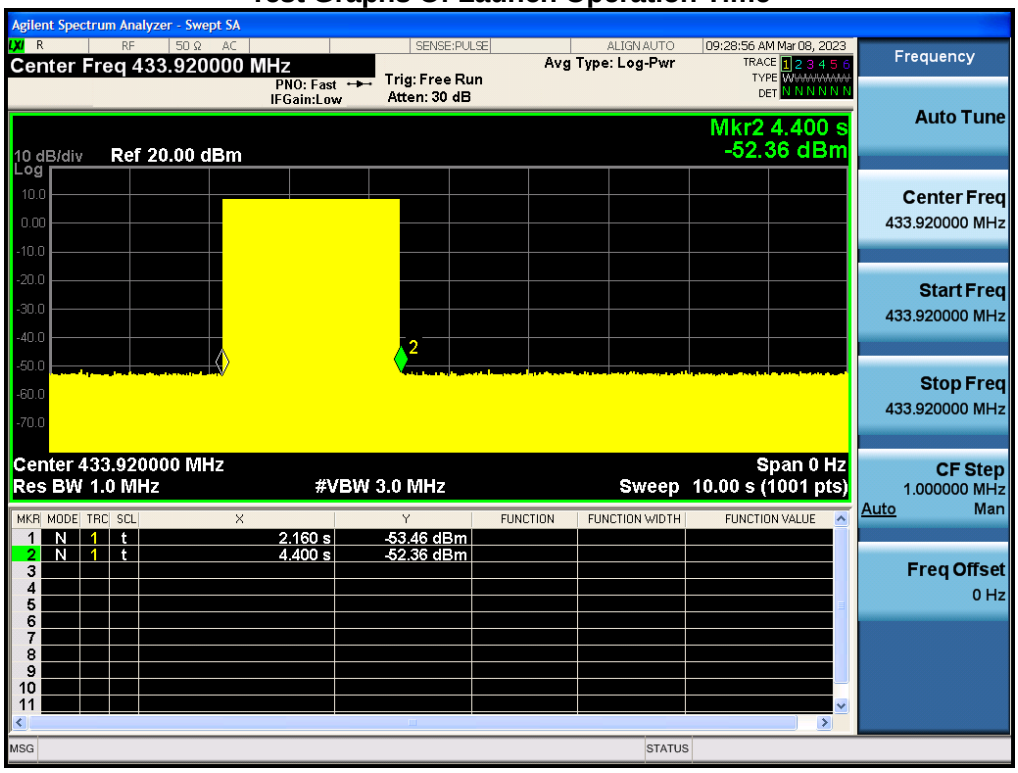
6.4 MEASUREMENT RESULTS

Test Mode	Test Channel (MHz)	The time of stopping transmission after automatically activation by alarm sensor (s)	Limits	Pass or Fail
ASK	433.92	2.24	5s	Pass

Test Graphs Of Launch Operation Time



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7. DUTY CYCLE CORRECTION FACTOR

7.1 PROVISIONS APPLICABLE

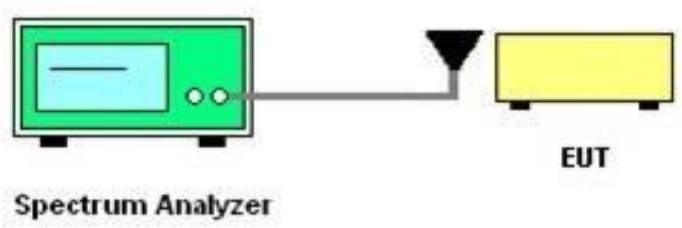
According to FCC Part 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

7.2 MEASUREMENT PROCEDURE

After the antenna of the EUT is connected, the output signal of the EUT is received by the connected test antenna
To the spectrum analyzer. Set the center frequency to the actual working frequency of the EUT, and then set the spectrum analyzer to Zero Span for
Release time reading. During the test, the switch is released and the EUT is automatically closed

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=1MHz, VBW=3MHz
   Span: 0Hz
   Sweep time: more than two pulse trains or more than each type of pulse occupancy time
2. Set the EUT to transmit by manually operated. Use the “Delta mark” function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

7.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



7.4 MEASUREMENT RESULTS

Type of Pules	Width of Pules (ms)	Quantity of Pules (pcs)	Transmission Time (ms)	Total Time (Ton) (ms)
Pules 1	0.444	15	6.66	7.724
Pules 2	0.152	7	1.064	

Test Period (Tp) (ms)	Total Time (Ton) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
18.9	7.724	40.87	-7.77

NOTE 1: Duty Cycle Factor=20 log (Duty Cycle) = -7.77
NOTE 2: The maximum reference value of the test cycle is 100ms.

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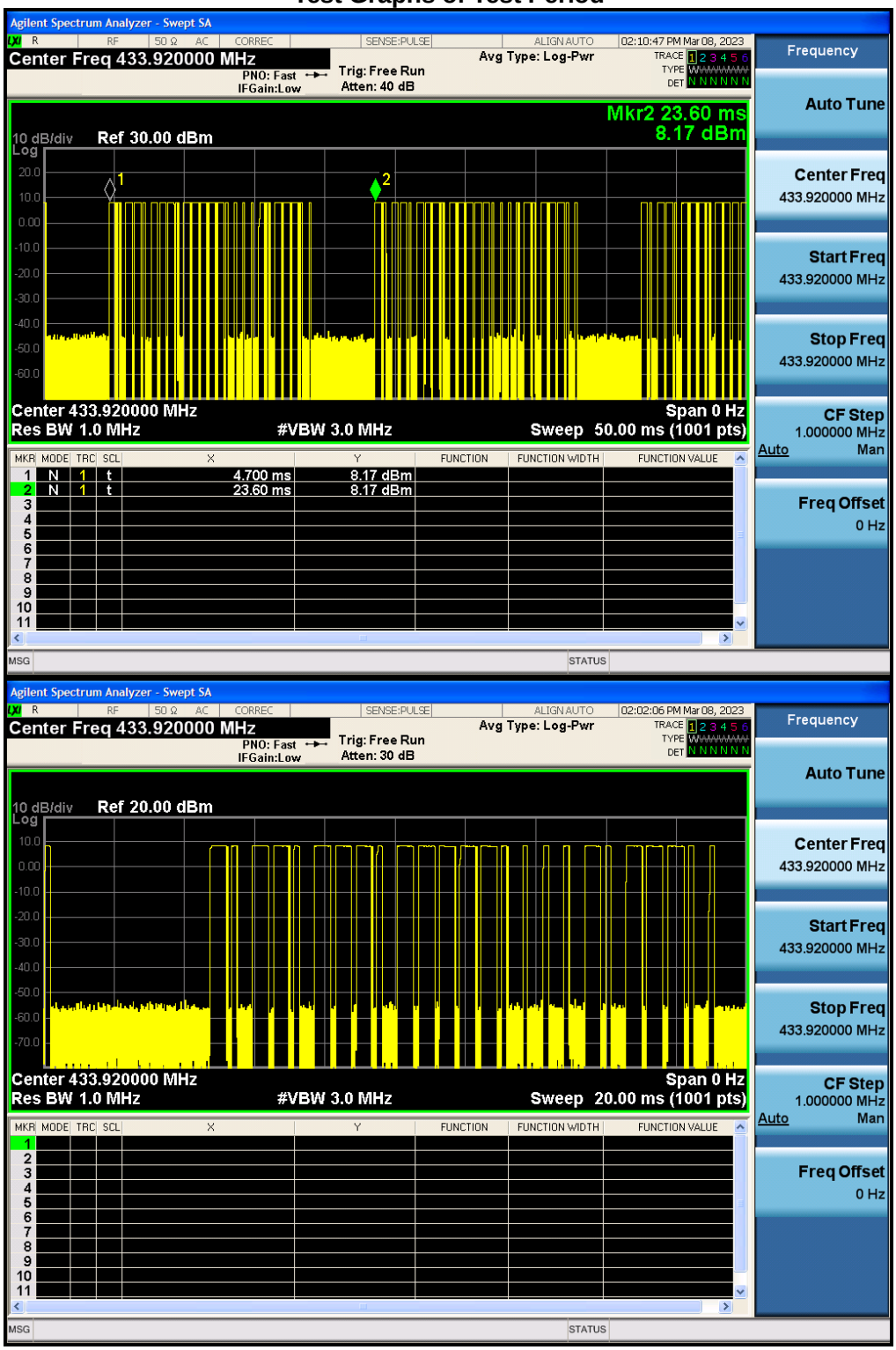
Test Graphs of Test Period



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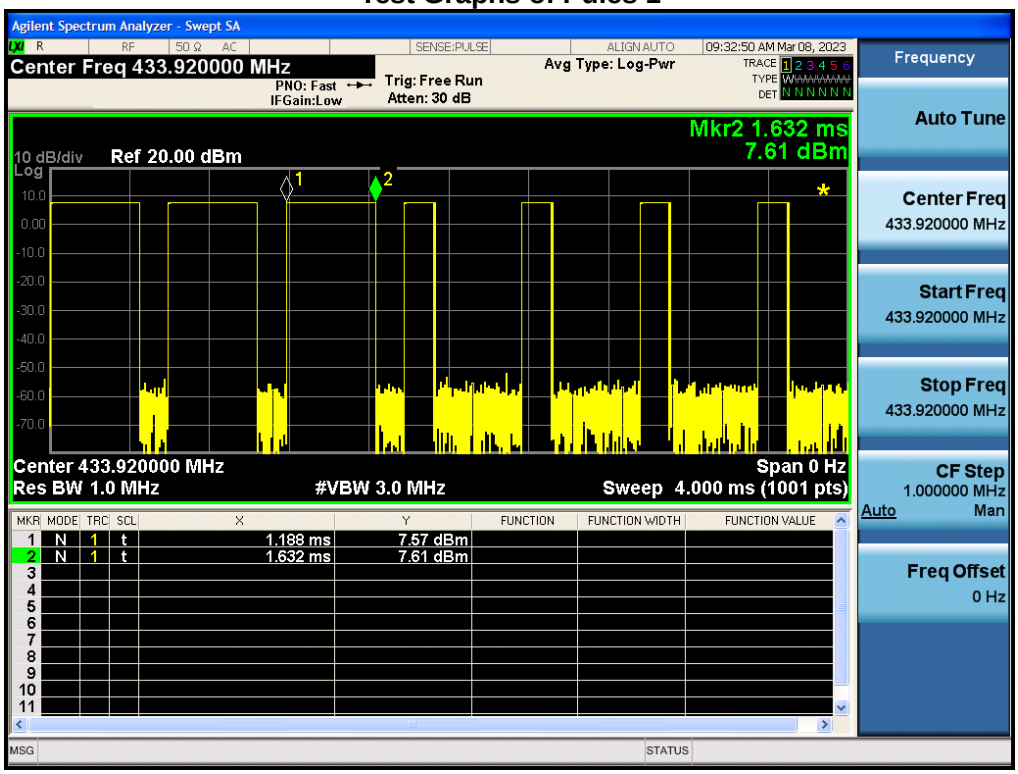
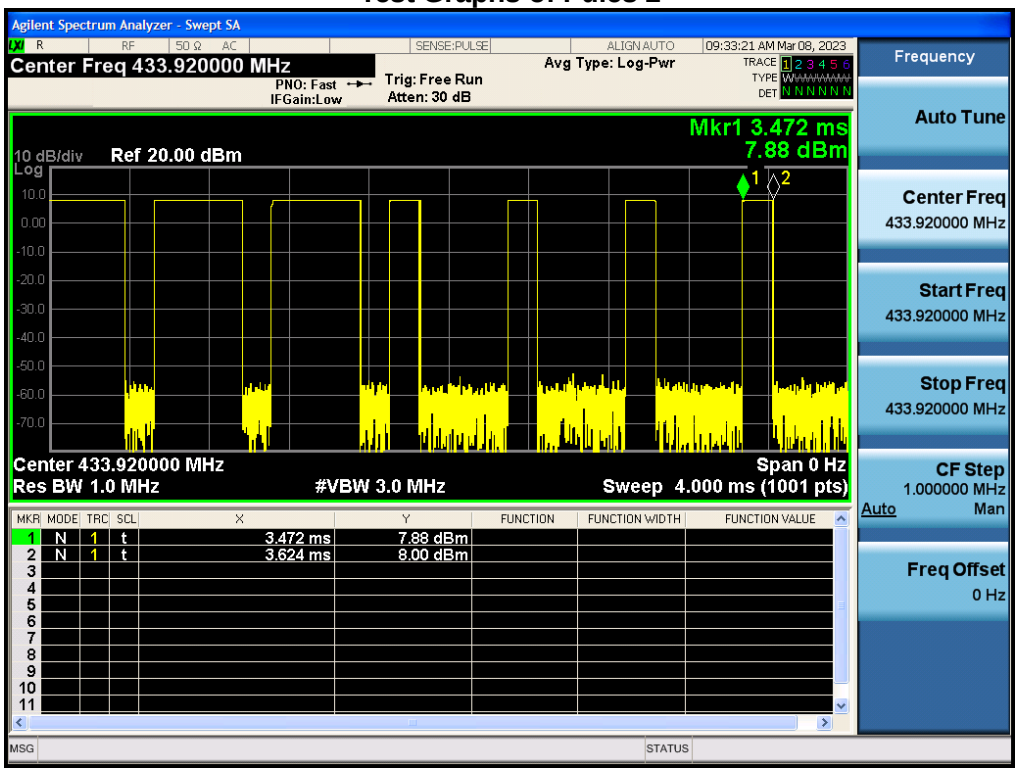
Test Graphs of Pules 1



Test Graphs of Pules 2



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8. 20 dB BANDWIDTH

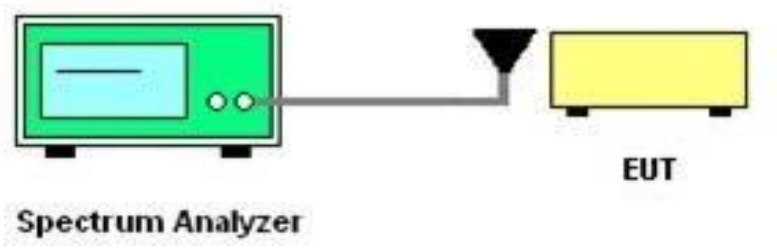
8.1 PROVISIONS APPLICABLE

According to FCC Part 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier

8.2 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=300Hz
   VBW=1kHz
   Span:60kHz
   Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

8.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



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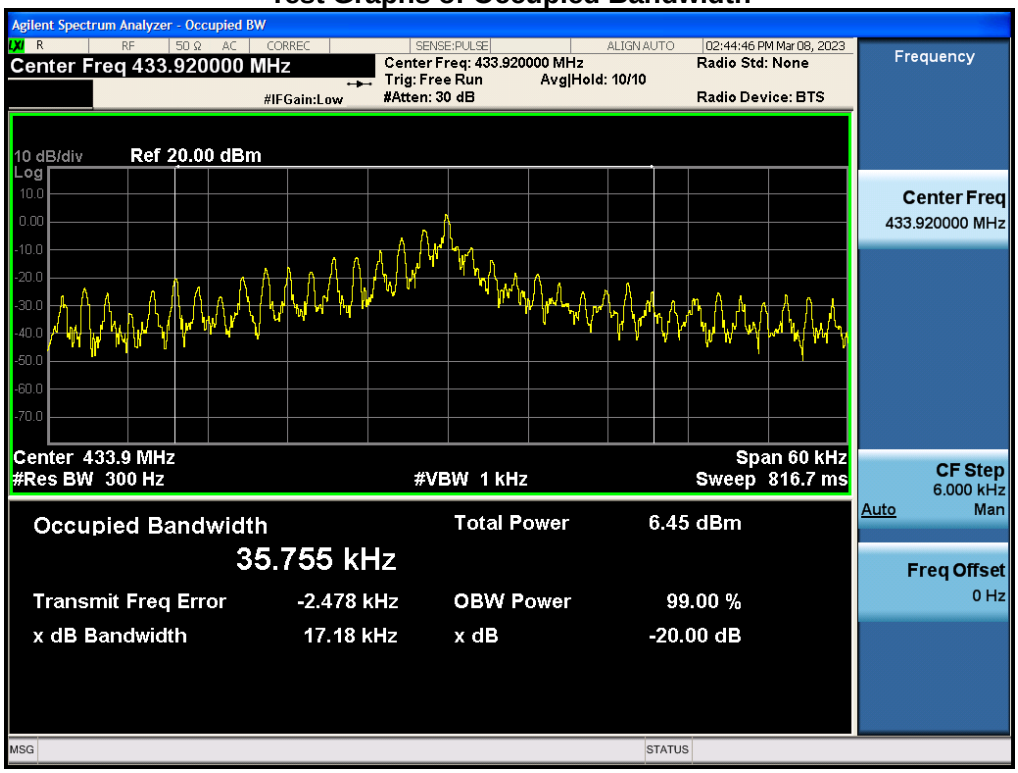
8.4 MEASUREMENT RESULTS

Test Data of Occupied Bandwidth and -20dB Bandwidth					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-20dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail
ASK	433.92	0.035755	0.01718	1.0848	Pass

Test Graphs of Occupied Bandwidth



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9. RADIATED EMISSION

9.1 LIMITS OF RADIATED EMISSION TEST

15.209 Limit in the below table has to be followed:

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Remark: (1) Emission level dB μ V = 20 log Emission level μ V/m (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.			

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

15.231(b) Limit in the below table has to be followed:

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Harmonics (microvolts/meter)
40.66-40.70MHz	2250	225
70-130MHz	1250	125
130-174MHz	1250 to 3750	125 to 375
174-260MHz	3750	375
260-470MHz	3750 to 12500	375 to 1250
Above 470MHz	12500	1250

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15.231(e) Limit in the below table has to be followed:

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Harmonics (microvolts/meter)
40.66-40.70MHz	1000	225
70-130MHz	1250	125
130-174MHz	1250 to 3750	125 to 375
174-260MHz	3750	375
260-470MHz	3750 to 12500	375 to 1250
Above 470MHz	12500	1250

9.2 MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that

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means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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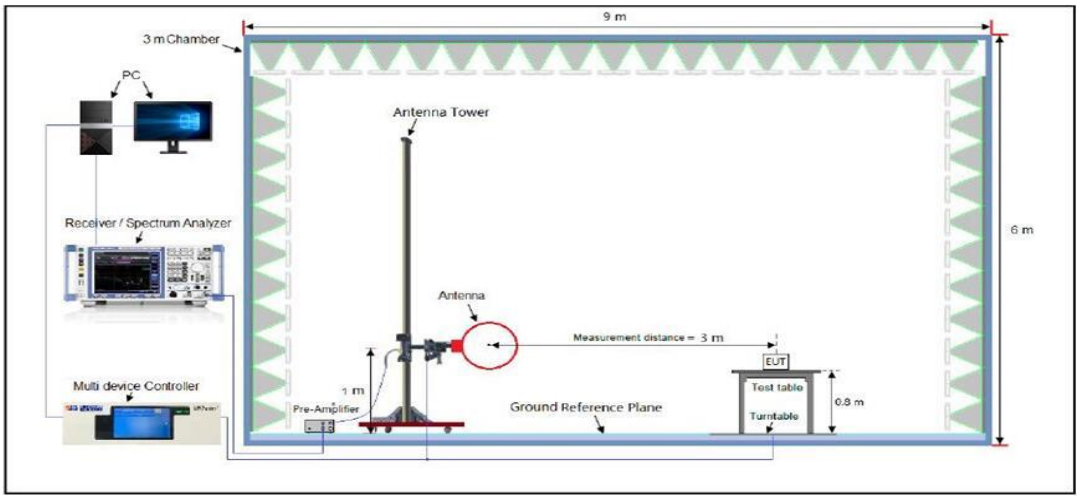
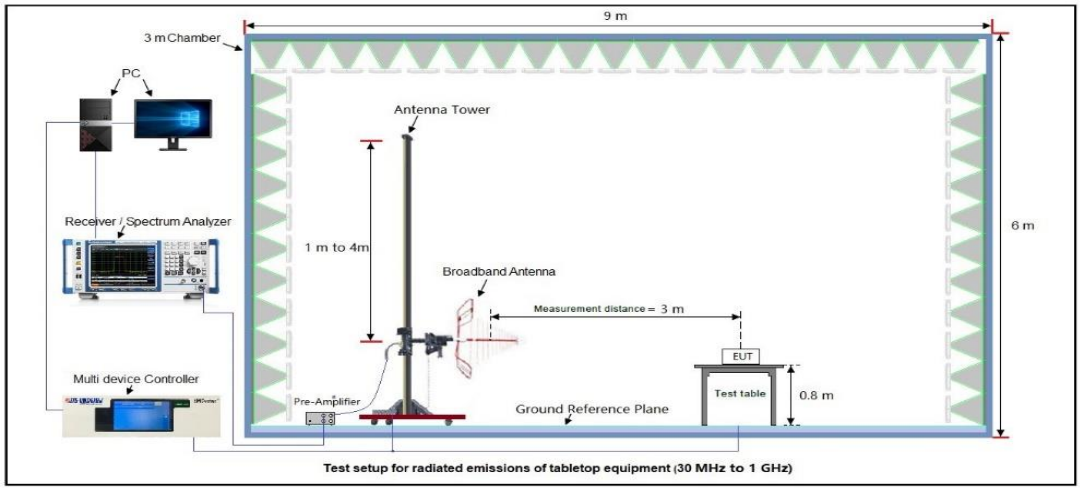
9.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)

RADIATED EMISSION TEST SETUP 9KHz-30MHz

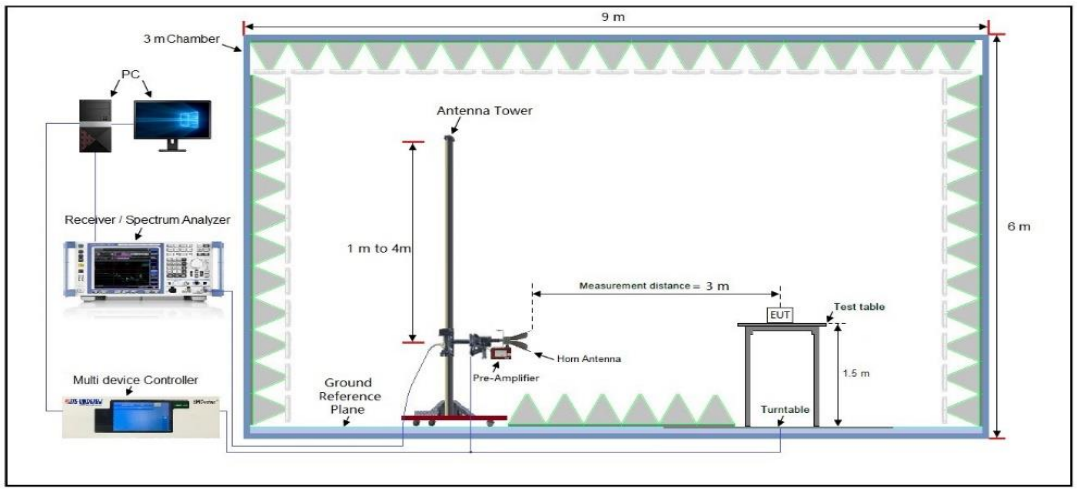


RADIATED EMISSION TEST SETUP 30MHz-1000MHz



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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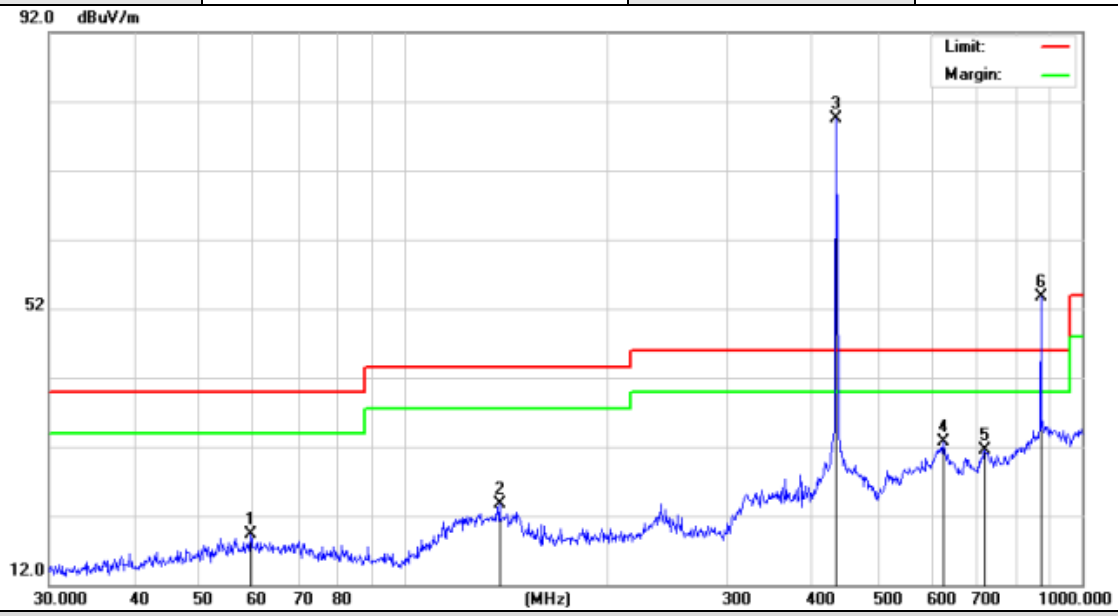
9.4 MEASUREMENT RESULT

RADIATED EMISSION BELOW 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

RADIATED EMISSION FROM 30MHz ~1000MHz

EUT	Window cleaner robot-Remote control	Model Name	SATUO Pro
Temperature	21°C	Relative Humidity	54%
Pressure	985hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal



Suspected Data List_ Peak Detection

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	59.4405	19.24	13.14	40.00	20.76	150	68	Horizontal
2	138.3873	23.69	17.18	43.50	19.81	150	41	Horizontal
3	433.9200	79.55	24.31	100.82	21.27	150	48	Horizontal
4	625.0780	32.67	26.72	46.00	13.33	150	122	Horizontal
5	719.1995	31.49	26.69	46.00	14.51	150	325	Horizontal
6	869.1302	53.70	29.65	80.82	27.12	150	293	Horizontal

Final data result_ Average Detection

NO.	Freq. [MHz]	PK Level [dBµV/m]	Duty cycle factor(dB)	AV Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	433.9200	79.55	-7.77	71.78	80.82	9.04	Horizontal
2	869.1302	53.70	-7.77	45.93	60.82	14.89	Horizontal

RESULT: PASS

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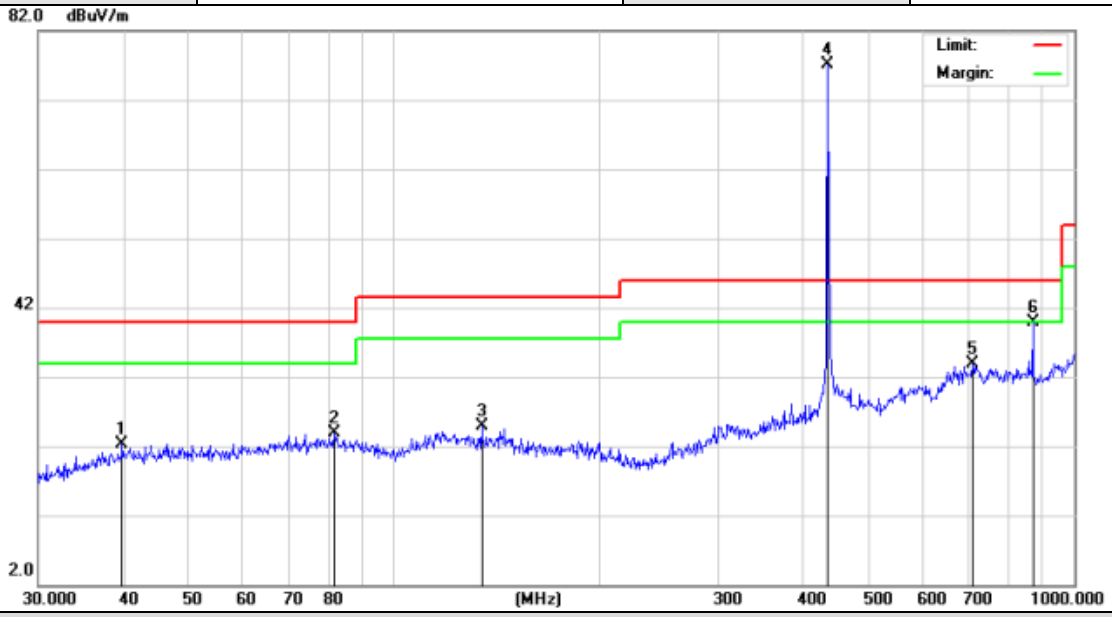
EUT	Window cleaner robot-Remote control	Model Name	SATUO Pro
Temperature	21°C	Relative Humidity	54%
Pressure	985hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



Suspected Data List_ Peak Detection

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.8541	22.30	16.85	40.00	17.70	150	359	Vertical
2	81.7832	23.87	18.75	40.00	16.13	150	105	Vertical
3	134.5592	24.95	18.61	43.50	18.55	150	36	Vertical
4	433.9200	77.02	25.15	100.82	23.80	150	48	Vertical
5	709.1823	33.94	28.42	46.00	12.06	150	267	Vertical
6	869.1302	39.98	27.73	80.82	40.84	150	293	Vertical

Final data result_Average Detection

NO.	Freq. [MHz]	PK Level [dBµV/m]	Duty cycle factor(dB)	AV Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	433.9200	77.02	-7.77	69.25	80.82	11.57	Vertical
2	869.1302	39.98	-7.77	32.21	60.82	28.61	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Level.

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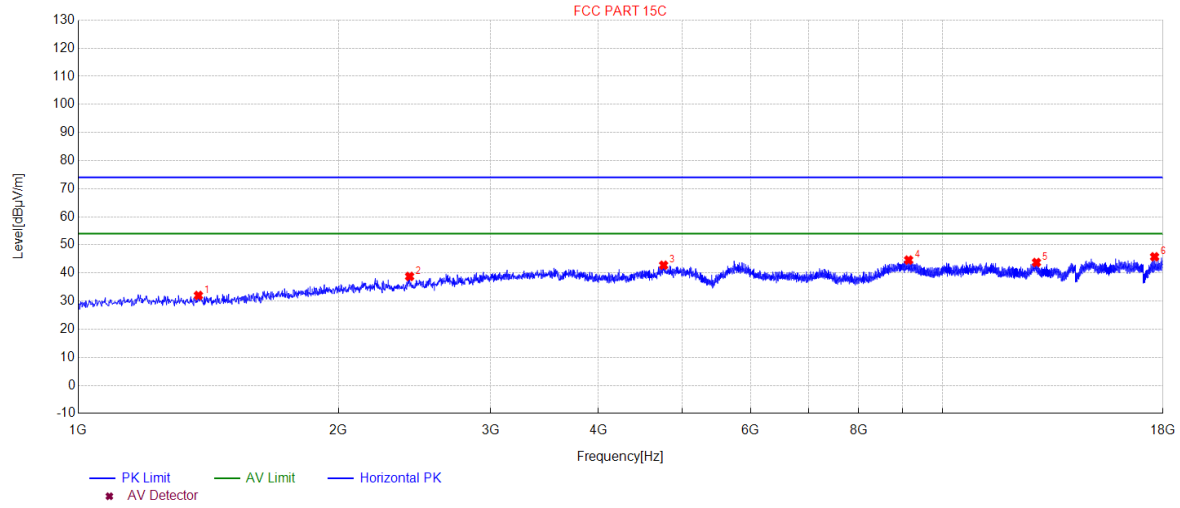
RADIATED EMISSION FROM ABOVE 1GHZ

EUT	Window cleaner robot-Remote control	Model Name	SATUO Pro
Temperature	21°C	Relative Humidity	54%
Pressure	985hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1377.4377	31.99	-19.91	74.00	42.01	150	270	Horizontal
2	2417.9418	38.76	-13.60	74.00	35.24	150	200	Horizontal
3	4757.3757	42.75	-6.89	74.00	31.25	150	330	Horizontal
4	9140.414	44.60	0.20	74.00	29.40	150	280	Horizontal
5	12848.484	43.73	1.02	74.00	30.27	150	120	Horizontal
6	17600.46	45.75	5.32	74.00	28.25	150	100	Horizontal

RESULT: PASS

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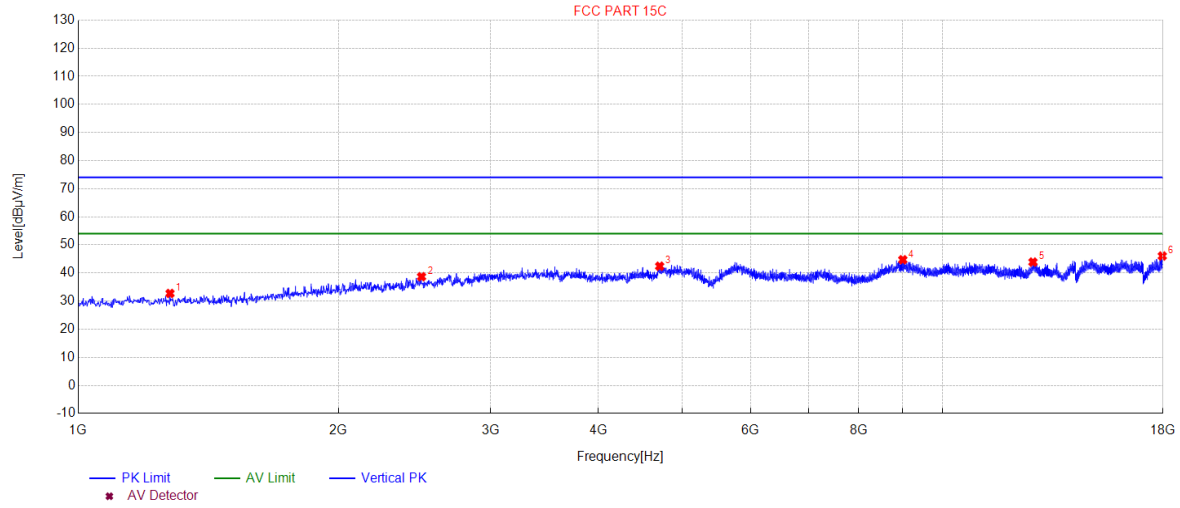
RADIATED EMISSION FROM ABOVE 1GHZ

EUT	Window cleaner robot-Remote control	Model Name	SATUO Pro
Temperature	21°C	Relative Humidity	54%
Pressure	985hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1277.1277	32.72	-19.89	74.00	41.28	150	280	Vertical
2	2496.1496	38.67	-13.14	74.00	35.33	150	280	Vertical
3	4708.0708	42.41	-7.01	74.00	31.59	150	240	Vertical
4	8999.2999	44.70	0.63	74.00	29.30	150	270	Vertical
5	12729.472	43.87	0.91	74.00	30.13	150	10	Vertical
6	17965.996	46.04	5.74	74.00	27.96	150	120	Vertical

RESULT: PASS

Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin=Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

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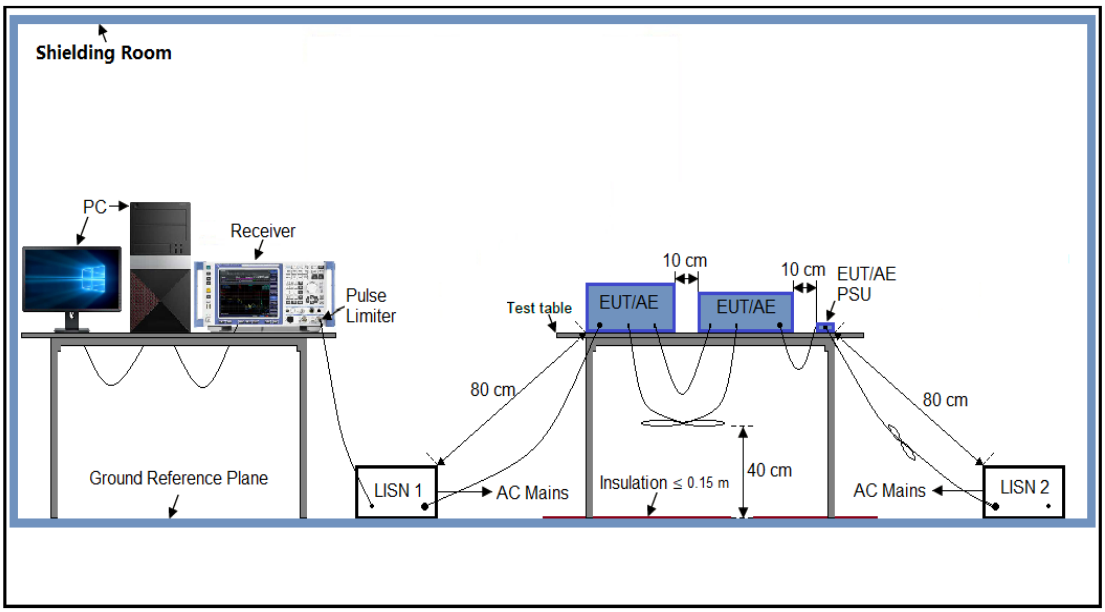
10. AC LINE CONDUCTED EMISSION TEST

10.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P. (dBμV)	Average (dBμV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note: 1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

10.2 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



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10.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

10.5 MEASUREMENT RESULTS

Note: Not Applicable.

The EUT was supplied by battery.

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APPENDIX I: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC15463230202AP01

APPENDIX II: PHOTOGRAPHS OF TEST EUT

Refer to the Report No.: AGC15463230202AP02

-----END OF REPORT-----

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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.