

TEST REPORT

Application No.: SHCR2211002496AT
FCC ID: 2A9IAST-15-01
Applicant: Changzhou Yooksmart Innovation Co., Ltd
Address of Applicant: 1F, Building 6C, No. 8 Xihu Road Jintong Industrial Park Changzhou China
Manufacturer: Changzhou Yooksmart Innovation Co., Ltd
Address of Manufacturer: 1F, Building 6C, No. 8 Xihu Road Jintong Industrial Park Changzhou China
Factory: Changzhou Yooksmart Innovation Co., Ltd
Address of Factory: 1F, Building 6C, No. 8 Xihu Road Jintong Industrial Park Changzhou China
Equipment Under Test (EUT):
EUT Name: Universal Remote Control
Model No.: ST-15-01
Trade Mark: Yooksmart
Standard(s) : 47 CFR Part 15, Subpart C 15.231
Date of Receipt: 2022-11-23
Date of Test: 2022-11-24 to 2022-11-28
Date of Issue: 2022-12-01

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan

Parlam Zhan
Laboratory Manager



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EEC EMC Lab

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Revision Record			
Version	Description	Date	Remark
00	Original	2022-12-01	/

Authorized for issue by:			
		Wade Zhang	
		Wade Zhang/Project Engineer	
		Parlam Zhan	
		Parlam Zhan/Reviewer	



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2 Test Summary

Test Item	FCC Requirement	Test method	Result
Antenna Requirement	Part 15.203	/	PASS
Conducted Emission	Part 15.207	ANSI C63.10 (2013) Section 6.2	N/A
Field Strength of the Fundamental	Part 15.231 (b)	ANSI C63.10 (2013) Section 6.4	PASS
Radiated Spurious emissions	Part 15.209 15.231(b)	ANSI C63.10 (2013) Section 6.4&6.5&6.6	PASS
20dB Bandwidth	Part 15.231 (c)	ANSI C63.10 (2013) Section 6.9.2	PASS
Dwell Time	Part 15.231 (a)	ANSI C63.10 (2013) Section 7.8.4	PASS

N/A: Not applicable.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3V (CR2450 Battery)
Test voltage:	DC 3V

4.2 Technical Specifications:

Modulation Type	ASK
Number of Channels	1
Operation Frequency	433.92MHz
Antenna Type	PCB Antenna
Transmitter type	Manually

4.3 Description of Support Units

The EUT has been tested as an independent unit.

4.4 Measurement Uncertainty & Decision Rule

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty cycle	0.4%
4	Occupied Bandwidth	3%
5	RF conducted power	0.6dB
6	RF power density	2.9dB
7	Conducted Spurious emissions	0.75dB
8	RF Radiated power	5.2dB (Below 1GHz) 5.9dB (Above 1GHz)
9	Radiated Spurious emission test	4.2dB (Below 30MHz) 4.5dB (30MHz-1GHz) 5.1dB (1GHz-6GHz) 5.4dB (6GHz-18GHz)
10	Temperature test	1°C
11	Humidity test	3%
12	Supply voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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4.5 Test Location

All tests were performed at:

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No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

4.6 Test Facility

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

• **A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.
Company Number: 8617A

• **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2021-12-20	2022-12-19
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2021-12-20	2022-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2021-12-20	2022-12-19
Communication Tester	R&S	CMW500	SHEM268-1	2022-07-25	2023-07-24
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2021-12-20	2022-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2021-05-07	2023-05-06
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022/8/11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2022-08-02	2023-08-01
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2021-12-20	2022-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2020-05-25	2023-05-24
RE test Cable	/	RE01, RE02, RE06	/	2022-01-07	2023-01-06
Test software	ESE	E3	Version: 6.111221a	/	/



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

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 antenna is Integral antenna and no consideration of replacement.

Antenna location: Refer to Appendix (Internal Photos)



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6.2 Spurious Emissions

Test frequency range: 9KHz – 5GHz

Test Site: Measurement Distance: 3m

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.015MHz	Quasi-peak	200Hz	1KHz	Quasi-peak
0.015MHz-30MHz	Quasi-peak	9kHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

**Limit:
(Spurious Emissions)**

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	Quasi-peak	300
0.490MHz-1.705MHz	24000/F(kHz)	-	Quasi-peak	30
1.705MHz-30MHz	30	-	Quasi-peak	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3
		74.0	Peak	3

**Limit:
(Field strength of the
fundamental signal)**

Frequency	Limit (dBuV/m @3m)	Remark
433.09 - 434.61MHz	80.83	Average Value
	100.83	Peak Value

Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



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- g. The radiation measurements are performed in X, Y, Z axis positioning. And found the Z axis positioning which it is worse case, only the test worst case mode is recorded in the report.

E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode 00: TX mode_Keep the EUT in transmitting with modulation mode.

Test Setup:

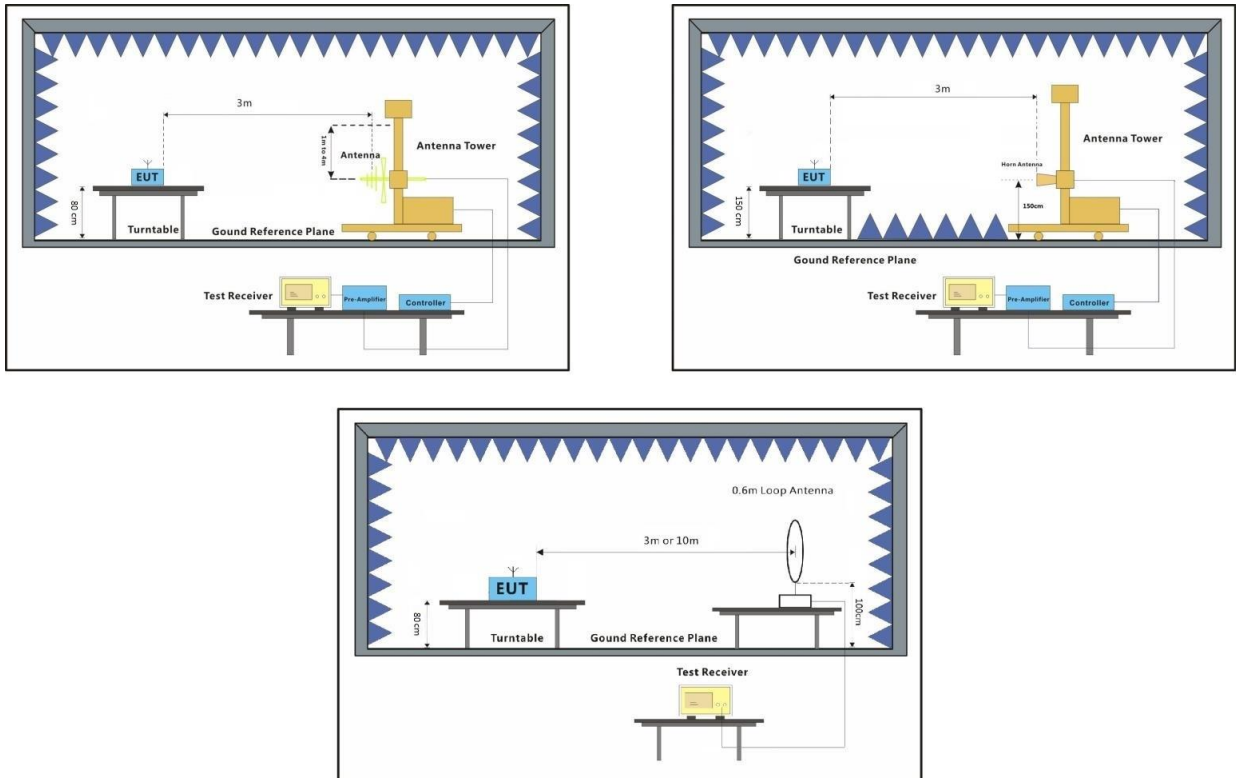


Figure1. radiated emissions test configuration

Test Results: Pass



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6.2.1 Field Strength of the Fundamental Signal

Test channel	Freq. (MHz)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
Channel 1	433.92	70.33	80.83	-10.5	Peak	Vertical
		70.80	80.83	-10.03	Peak	Horizontal

Remark: If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

Remark: Average level=Peak level-Duty Cycle Factor

Duty Cycle Factor= $20\log(1/\text{Duty Cycle}) = 5.75\text{dB}$



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t (86-21) 61915666
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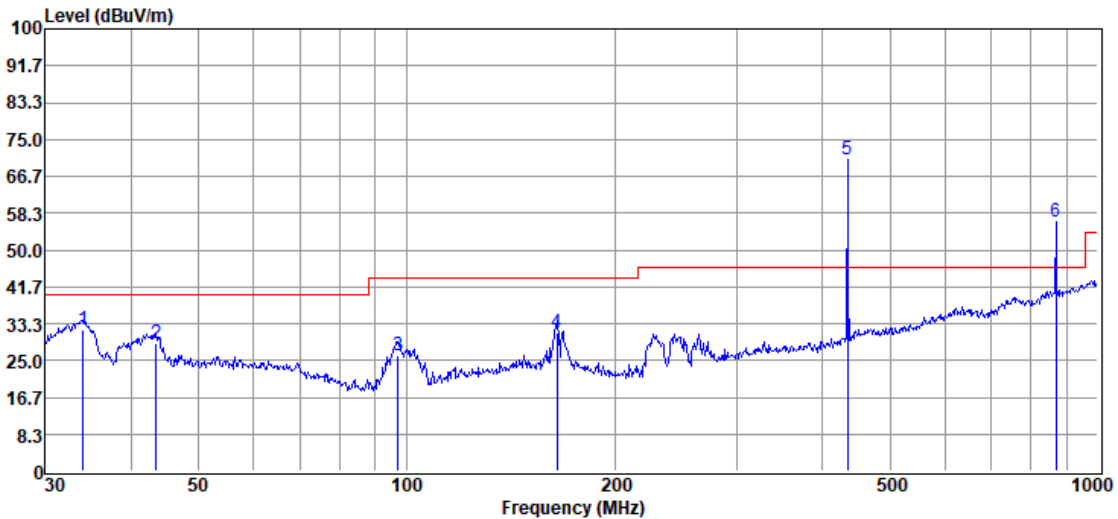
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6.2.2 Spurious Emissions

Below 1GHz

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dBμA/μV/m)	(dB)	(dB)	(dBμA/m)	(dBμA/m)	(dB)	
1	34.036	44.52	12.78	26.20	1.01	32.11	40.00	-7.89	QP
2	43.353	40.37	13.64	26.20	1.13	28.94	40.00	-11.06	QP
3	97.115	42.87	8.50	26.89	1.70	26.18	43.50	-17.32	QP
4	164.907	42.69	13.19	27.01	2.28	31.15	43.50	-12.35	QP
5	434.065	76.61	16.78	26.70	3.64	70.33	Fundamental Signal		
6	869.130	54.89	23.48	27.17	5.17	56.37	60.83	-4.46	PK

Remark: Result Level= Read Level + Antenna Factor + Cable Loss- Preamplifier Factor

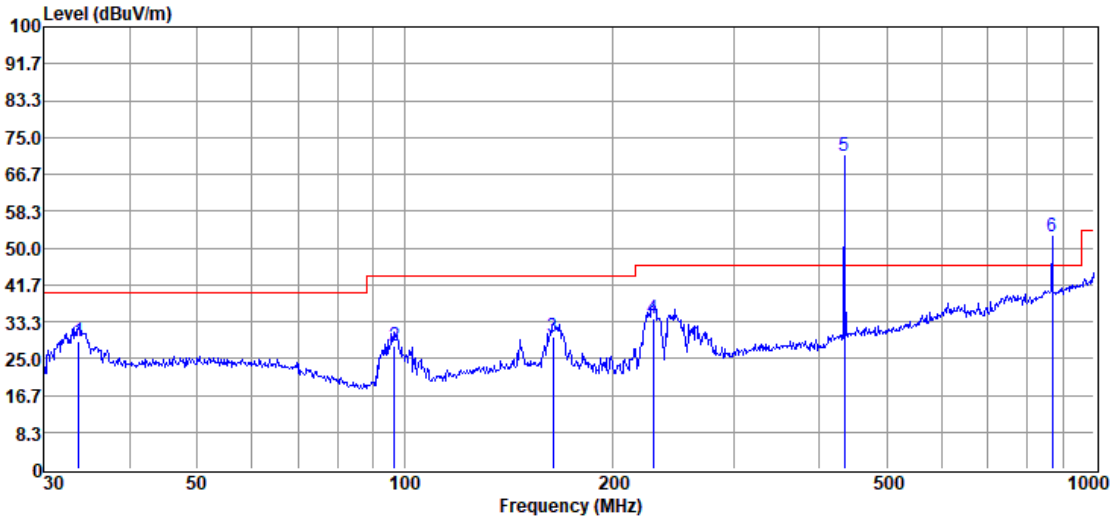


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Horizontal:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dBμA/μV/m)	(dB)	(dB)	(dBμA/m)	(dBμA/m)	(dB)	
1	33.680	41.43	12.72	26.20	1.01	28.96	40.00	-11.04	QP
2	96.775	44.54	8.44	26.86	1.70	27.82	43.50	-15.68	QP
3	164.330	41.38	13.19	27.01	2.27	29.83	43.50	-13.67	QP
4	229.293	48.01	10.35	26.84	2.66	34.18	46.00	-11.82	QP
5	434.065	77.08	16.78	26.70	3.64	70.80	Fundamental Signal		
6	869.130	50.94	23.48	27.17	5.17	52.42	60.83	-8.41	PK

Remark: Result Level= Read Level + Antenna Factor + Cable Loss- Preamplifier Factor



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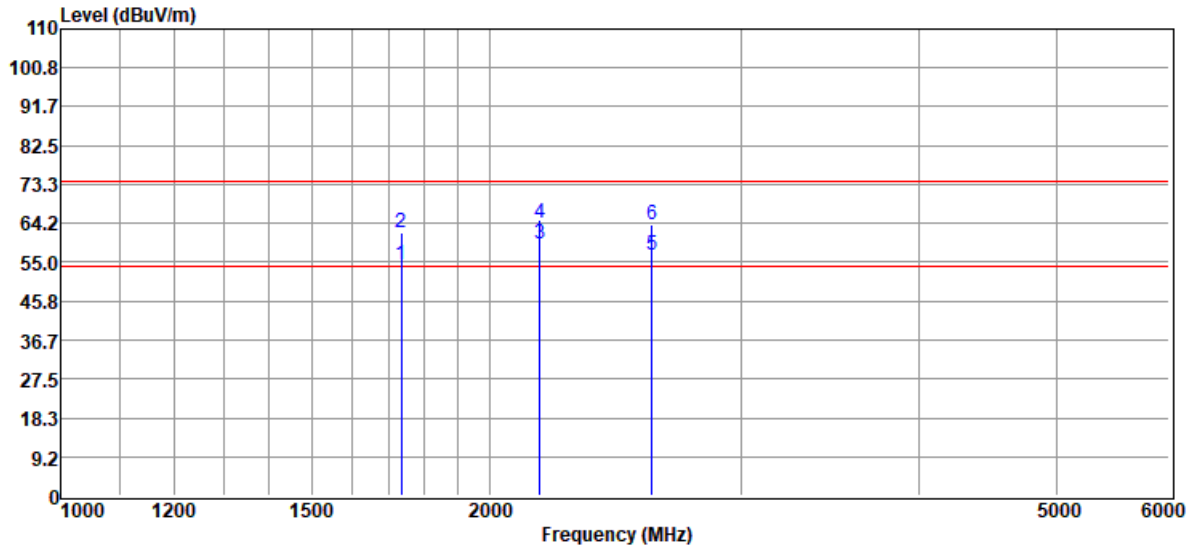
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Above 1GHz

Horizontal



Item	Freq	Read Level	Air Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBm)	(dB)	(dB m)	(dB m)	(dB)		
1	1733.804	62.46	25.45	56.13	60.83	-4.70	Average	Horizontal
2	1733.804	69.90	25.45	61.88	80.83	-18.95	Peak	Horizontal
3	2167.704	65.83	26.45	59.17	60.83	-1.66	Average	Horizontal
4	2167.704	73.27	26.45	64.92	80.83	-15.91	Peak	Horizontal
5	2600.160	61.27	27.82	58.21	60.83	-2.62	Average	Horizontal
6	2600.160	68.71	27.82	63.96	80.83	-16.87	Peak	Horizontal

Remark: Average level=Peak level-Duty Cycle Factor

Duty Cycle Factor= $20\log(1/\text{Duty Cycle}) = 5.75\text{dB}$



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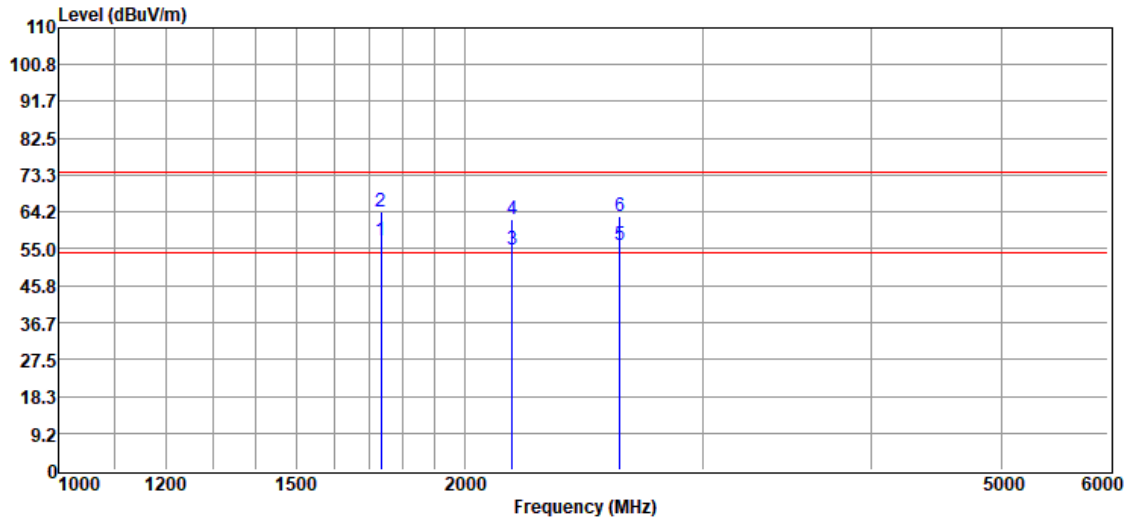
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Vertical



Item	Freq	Read Level	Air Loss	Result Level	Limit Line	Over Limit	Detecto r	Polarization
(Mark)	(MHz)	(dBm)	(dB)	(dB m)	(dB m)	(dB)		
1	1733.804	64.94	25.45	58.61	60.83	-2.22	Average	Vertical
2	1733.804	72.38	25.45	64.36	80.83	-16.47	Peak	Vertical
3	2167.704	61.42	26.45	56.56	60.83	-4.27	Average	Vertical
4	2167.704	68.86	26.45	62.31	80.83	-18.52	Peak	Vertical
5	2606.154	60.52	27.82	57.47	60.83	-3.36	Average	Vertical
6	2606.154	67.97	27.82	63.22	80.83	-17.61	Peak	Vertical

Remark: Average level=Peak level-Duty Cycle Factor
Duty Cycle Factor= 20log (1/Duty Cycle) = 5.75dB



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6.3 20dB Bandwidth

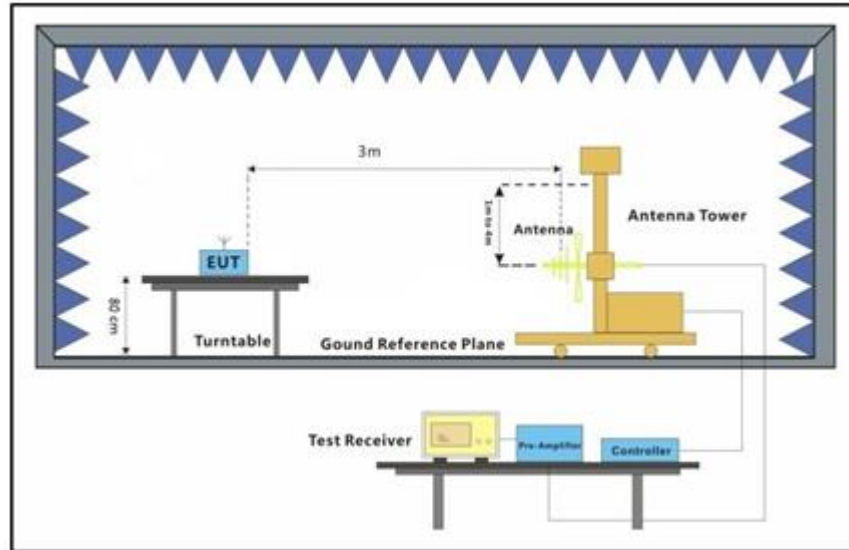
E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode 00: TX mode_Keep the EUT in transmitting with modulation mode.

Test Setup:



Limit:

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. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Results:

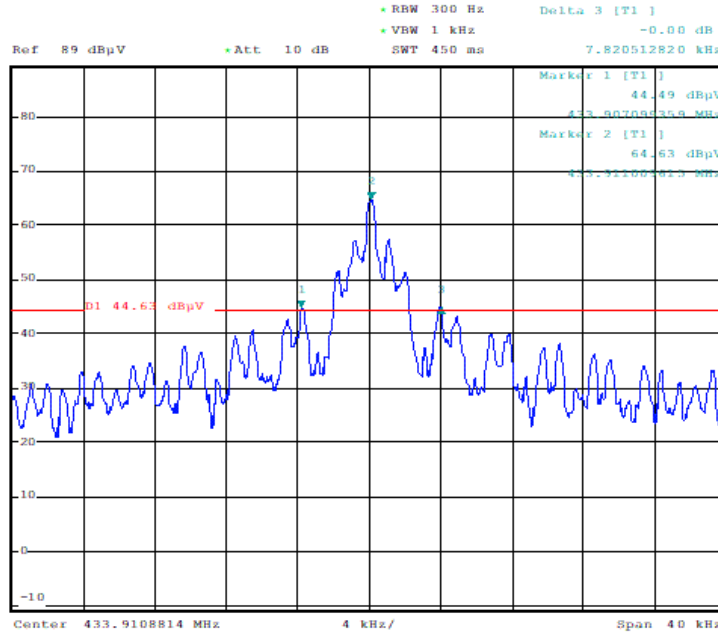
Pass



Frequency (MHz)	20dB bandwidth (kHz)	Limit (kHz)	Results
433.92	7.82	1084.8	Pass

Note: Limit=433.92MHz*0.25%=1.0848MHz=1084.8kHz

Test plot as follows:



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6.4 Dwell Time

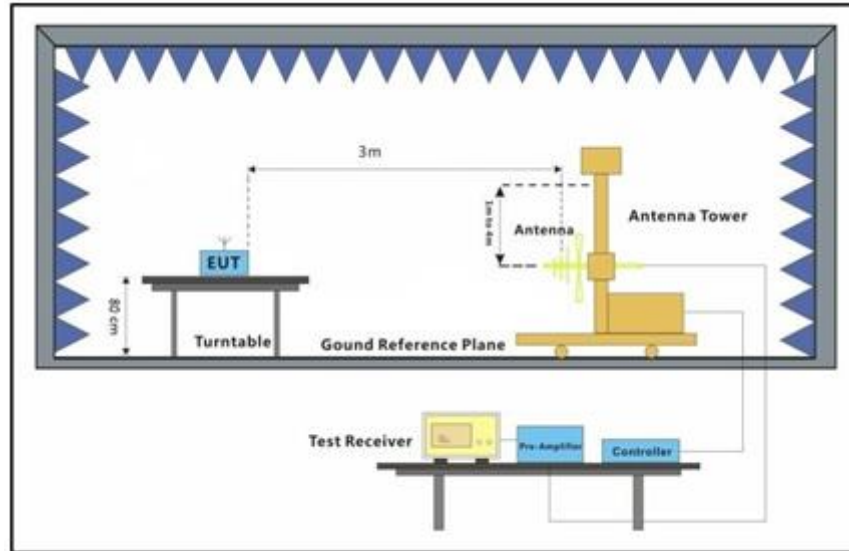
E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode 00: TX mode_Keep the EUT in transmitting with modulation mode.

Test Setup:



Limit: 15.231 (a): Not more than 5 seconds

Test Results: Pass

Measurement Data:

Test item	Limit (s)	Results
Transmission Duration	≤5s	Pass



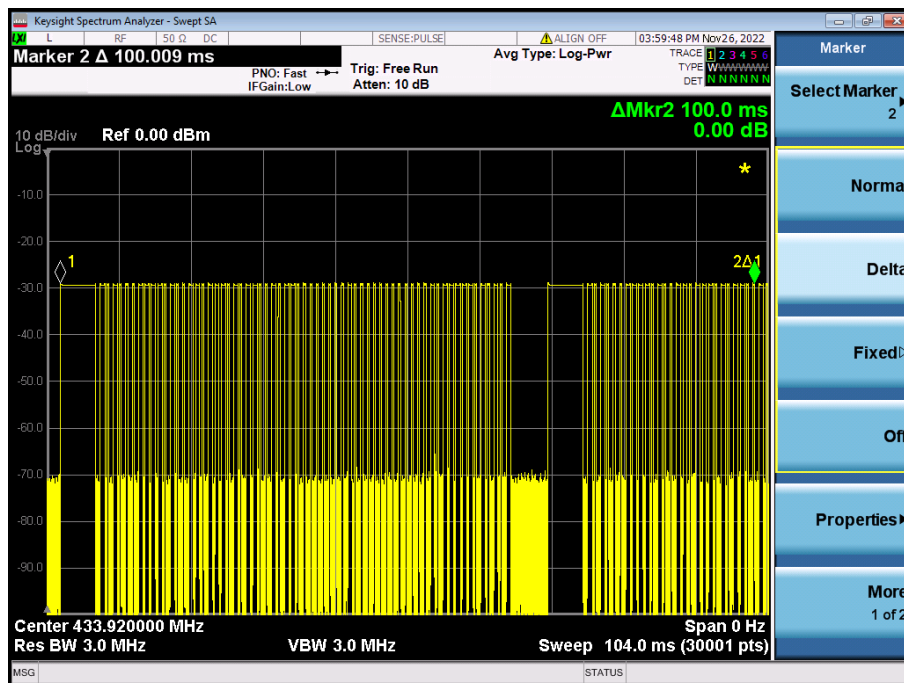
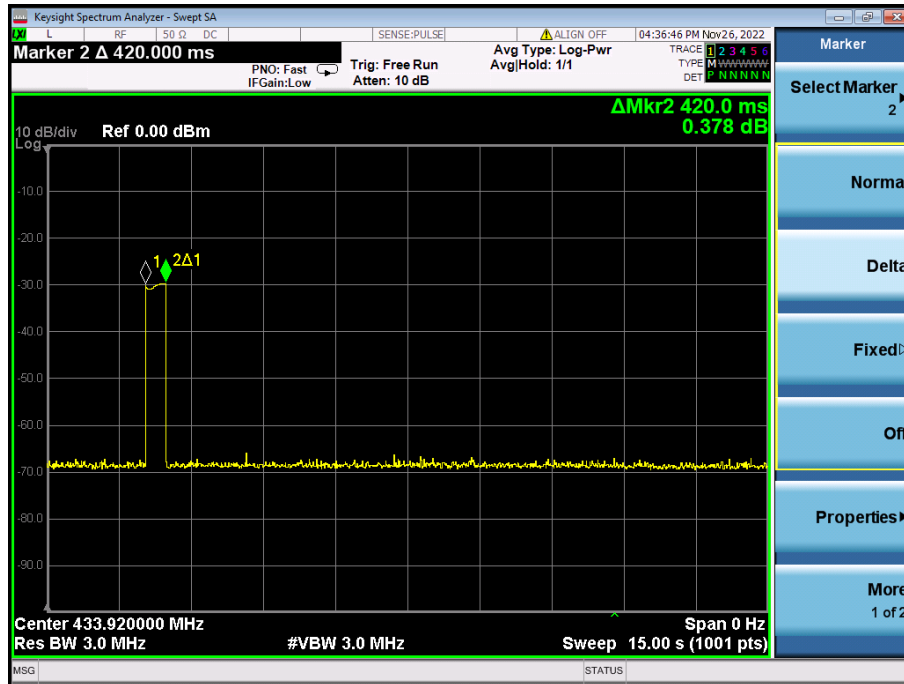
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Test plot as follows:



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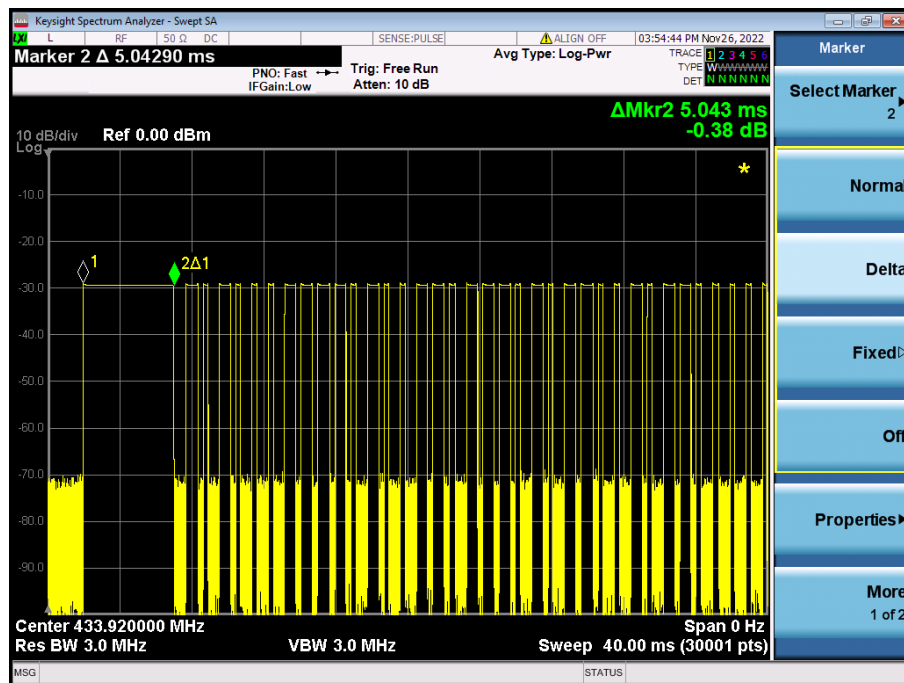
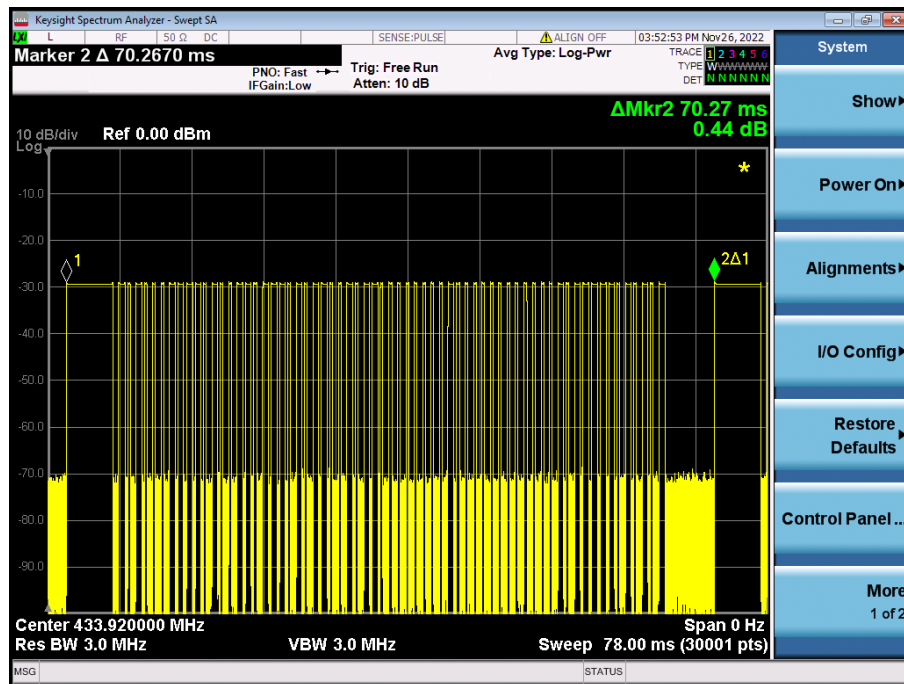
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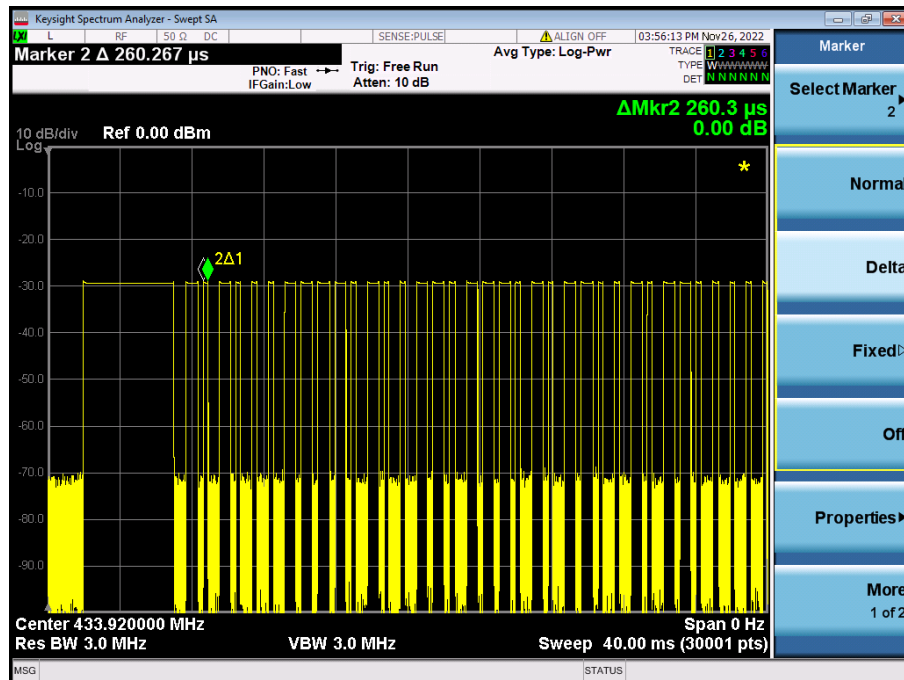
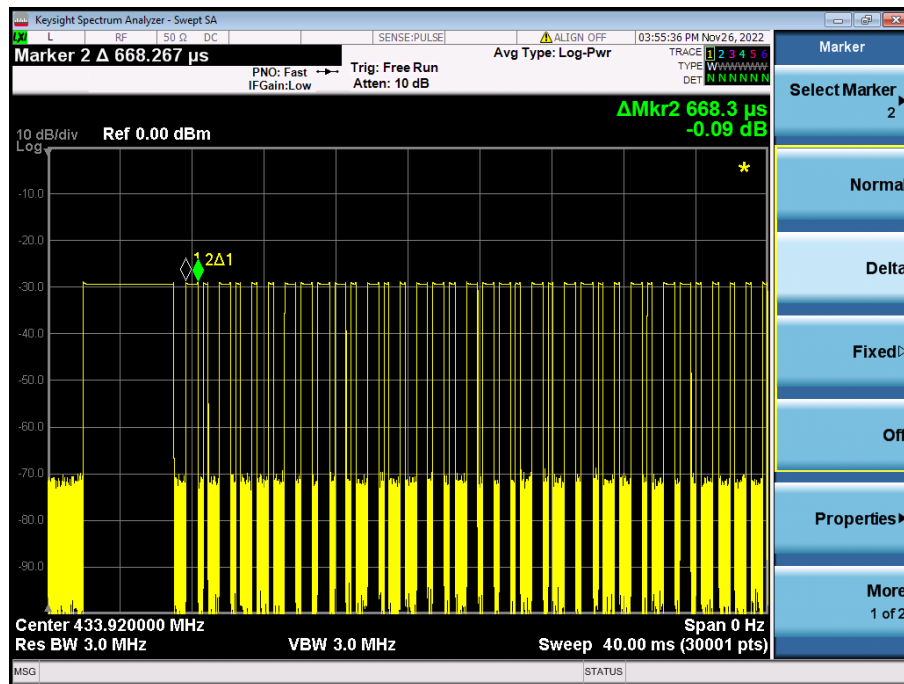
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$$\text{Duty Cycle} = (5.043\text{ms} \times 2 + 668.3\mu\text{s} \times 43 + 260.3\mu\text{s} \times 49) / 100\text{ms} = 0.515776.$$



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7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

8 EUT Constructional Details

Refer to the < External Photos > & <Internal Photos >.

-- End of the Report --



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