FCC/IC - TEST REPORT

Report Number	:	**709502407445-00B**	Date of Issue:	Dec.05, 2024
Model	:	MT02-0302-067003		
Product Type	:	Internal Sun Sensor		
Applicant	:	Rollease Acmeda Inc		
Address	:	750 East Main Street, 7th Floor Stamford CT 06902 USA		
Production Facility	:	Ningbo Dooya Mechanic & Electronic Technology Co., Ltd.		
Address	:	No.168 Shengguang Road, Luotuo, Zhenhai 315202 Ningbo, Zhejiang Province, P. R. C		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	21		

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

This revised report replaced all the version issued before.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

1 Table of Contents

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

2 Details about the Test Laboratory & Report Modification Record

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No.16 Lane, 1951 Du Hui Road, Shanghai 201108, P.R. China
Telephone:	+86 21 6141 0123
Fax:	+86 21 6140 8600
FCC Registration No.:	820234
FCC Designation Number:	CN1183
ISED CAB identifier	CN0101
IC Registration No.:	31668

3 Description of the Equipment Under Test

Product:	Internal Sun Sensor
Model no.:	MT02-0302-067003
HVIN:	MT02-0302-067003
PMN:	MT02-0302-067003
FCC ID:	2AGGZ003B9ACA58
IC ID:	21769-003B9ACA58
Options and accessories:	NA
Rating:	1.5 Vdc, 1 x AAA battery
RF Transmission Frequency:	433.92MHz;
No. of Operated Channel:	1
Modulation:	FSK
Channel list:	433.92MHz
Antenna Type:	Chip Antenna
Description of the EUT:	The Equipment Under Test (EUT) is an Internal Sun Sensor with SRD function (transceiver). We tested it and listed the worst data in this report.
Test sample no.:	SHA-845884-1

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain or any information supplied.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2023 Edition	RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5, April 2018 Amendment 1, March 2019 + Amendment 2, February 2021	General Requirements and Information for the Certification of Radio Apparatus
RSS-210 Issue 11 June 25, 2024	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

All the test methods were according to ANSI C63.10-2013.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

5 Summary of Test Results

Technical Requirements					
FCC Part 15.231 Subpart C, RSS-210 Issue 11					
Test Condition			Pages	Test Site	Test Result
§15.207	RSS-GEN A8.8	Conducted emission AC power port	/	Shield room	Not Applicable
§15.205, §15.209, 15.35 (c)§15.231(b)	RSS-210 A.1.2	Radiated Emission, 30MHz to 4.5GHz	8-13	3m chamber	Pass
§15.231(c)	RSS-210 A.1.3	20dB and 99% Bandwidth Measurement	14-15	Shield room	Pass
§15.231(a)(1)	RSS-210 A.1.1(a)	Deactivation Time	16	Shield room	Pass
§15.203	RSS-Gen 6.8	Antenna requirement	See note 1		Pass

Remark 1: N/A – Not Applicable. Conducted emission is not apply for battery operated device.
Note 1: The EUT uses a Chip Antenna, which is SRD transceiver. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AGGZ003B9ACA58,
IC ID: 21769-003B9ACA58 complies with Section 15.207, 15.205, 15.209, 15.231 of the FCC Part 15, Subpart C Rules and RSS-Gen Issue 5 A1:2019+ A2:2021 and RSS-210 issue 11 June 25, 2024.

We tested it and listed the worst data in this report.

SUMMARY:

All tests according to the regulations cited on page 6 were

■ - Performed
☐ - **Not** Performed
The Equipment Under Test
■ - **Fulfills** the general approval requirements.
☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	September 20, 2024
Testing Start Date:	September 20, 2024
Testing End Date:	September 20, 2024

-TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

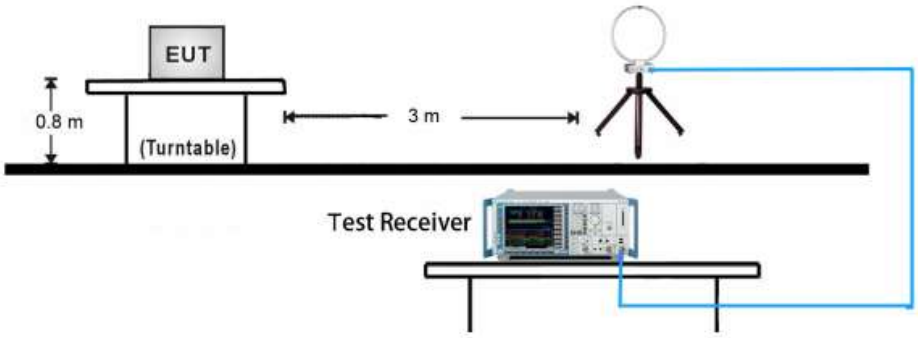
Reviewed by:	Prepared by:	Tested by:
Hui TONG	Dengqing TANG	Tianji XU
EMC Manager	EMC Project Engineer	EMC Test Engineer

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

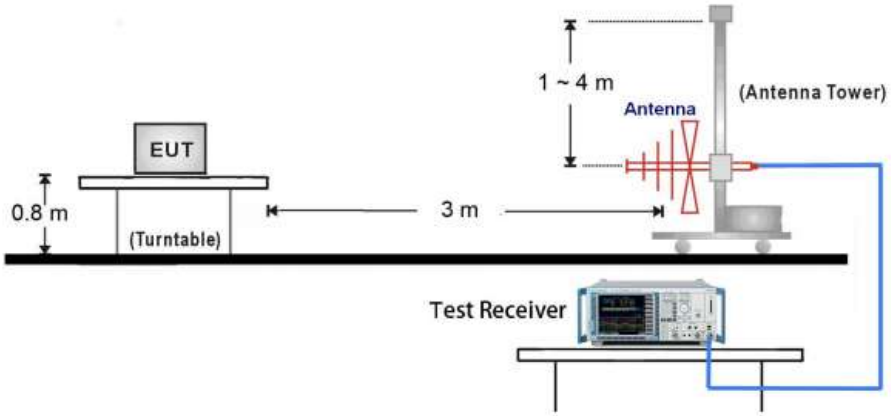
7 Test Setups

8.1 Radiated test setups

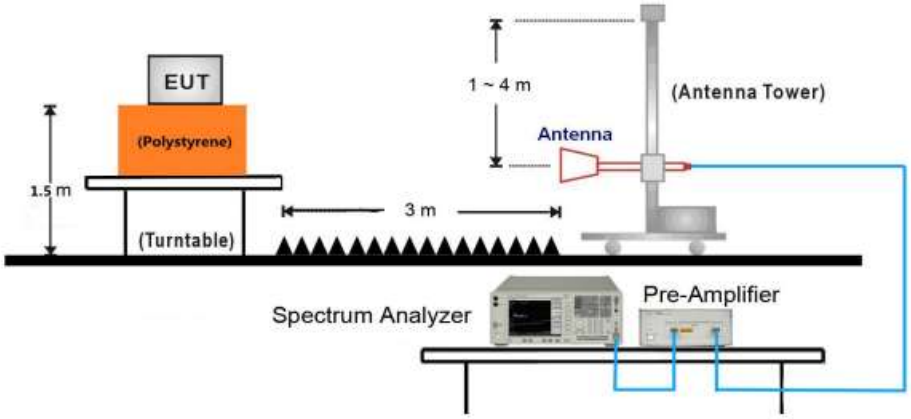
9kHz ~ 30MHz Test Setup:



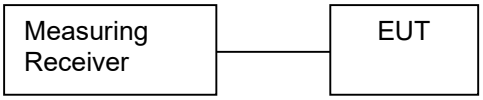
30MHz ~ 1GHz Test Setup:



Above 1GHz Test Setup:



8.2 Conducted RF test setups



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

8 Test Methodology

8.1 Radiated Emission

Test Method

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3: The height of antenna 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.
4: 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5: Use the following spectrum analyzer settings According to C63.10:
For Above 1GHz
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW≥3RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
For Below 1GHz
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 KHz, VBW≥3RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (duty cycle ≥98%) for peak detection at frequency above 1GHz
4:If the emission is pulsed (duty cycle <98%), modify the unit for continuous operation: use the settings shown above, then correct the reading by subcontracting the peak to average duty cycle correction factor 20log (duty cycle)., derived from the appropriate duty cycle calculation.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

Limit

According to §15.231 (b), and RSS-210 A.1.2 field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field Strength of Fundamental (Microvolts /meter)	Field Strength of spurious emissions ((Microvolts /meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,370 *	125 to 375 *
174-260	3,750	375
260-470 √	3,750 to 12, 500*	375 to 1,250*
Above 470	12,500	1,250

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

Limits for 15.209 & RSS-GEN Radiated emission limits; general requirements

Frequency	Limit at 3m (dBuV/m)
0.009 MHz – 0.490 MHz	128.5 to 93.8[1]
0.490 MHz – 1.705 MHz	73.8 to 63[1]
1.705 MHz – 30 MHz	69.5[1]
30 MHz – 88 MHz	40.0[1]
88 MHz – 216 MHz	43.5[1]
216 MHz – 960 MHz	46.0[1]
Above 960 MHz	54.0[1]
Above 1000 MHz	54.0[2]
Above 1000 MHz	74.0[3]

[1]Limit is with detector with bandwidths as defined in CISPR-16-1-1 except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz where an Average detector is used.
[2]Limit is with 1 MHz measurement bandwidth and using an Average detector
[3]Limit is with 1 MHz measurement bandwidth and using a Peak detector

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

Limit

According to RSS-210 A.1.2, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

a. The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits in table A1, based on the average value of the measured emissions. The requirements of the “Pulsed Operation” section of RSS-Gen apply for averaging pulsed emissions and limiting peak emissions.
Alternatively, compliance with the limits in table A1 may be based on the use of a CISPR quasi-peak detector.

b. Unwanted emissions shall be 10 times below the fundamental emissions field strength limits in table A1 or comply with the limits specified in RSS-Gen, whichever is less stringent.

After technical evaluation, table A1 was used which is less stringent.

Table A1

Fundamental frequency (MHz)	Field Strength of Fundamental (Microvolts /meter @ 3m)	Field Strength of spurious emissions ((Microvolts /meter @ 3m)
70-130	1,250	125
130-174	1,250 to 3,370 *	125 to 3750 *
174-260	3,750	375
260-470 √	3,750 to 12, 500*	375 to 1,250*
Above 470	12,500	1,250

Limits for Radiated emission limits; RSS-Gen

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

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

Spurious radiated emissions for transmitter

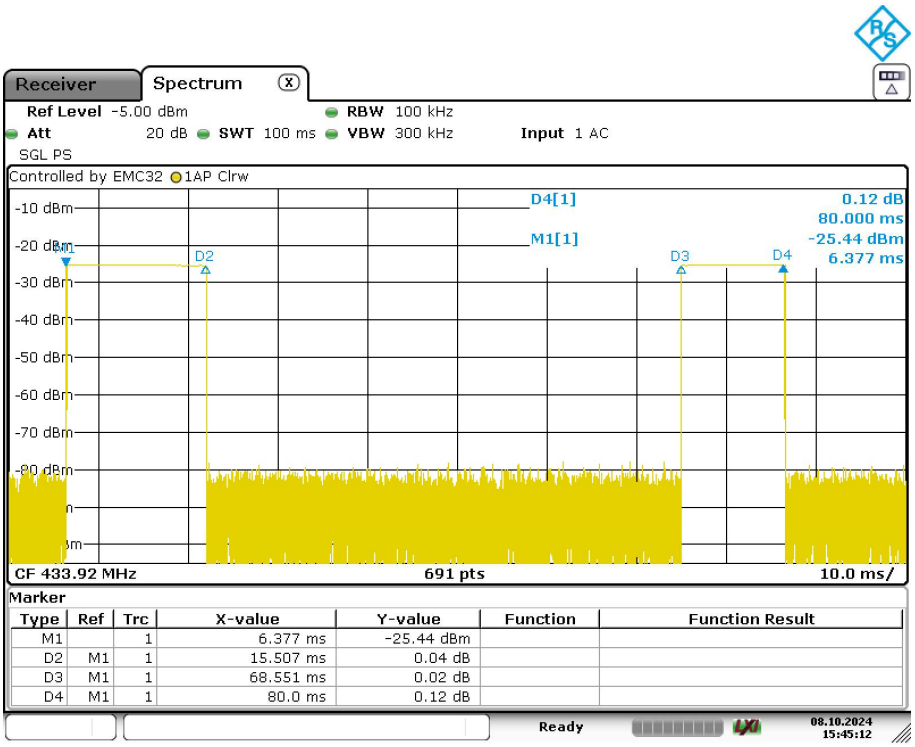
According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Radiated Emission								
Value	Emissions Frequency **MHz**	E-Field Polarity	PK Emission **dBµV/m**	Average Factor **dB**	AV Emission **dBµV/m**	Limit **dBµV/m**	Margin	Emission Type
Below 1GHz								
PK	433.908	H	89.32	/	/	100.83	11.51	Fundamental
AV	433.908	H	89.32	-11.37	77.95	80.83	2.88	Fundamental
PK	433.908	V	78.90	/	/	100.83	21.93	Fundamental
AV	433.908	V	78.90	-11.37	67.53	80.83	13.30	Fundamental
PK	867.401	H	37.29	/	/	80.83	43.54	Spurious
AV	867.401	H	37.29	-11.37	25.92	60.83	34.91	Spurious
PK	870.893	V	39.72	/	/	80.83	41.11	Spurious
AV	870.893	V	39.72	-11.37	28.35	60.83	32.48	Spurious
Above 1GHz								
PK	1301.350	H	38.71	/	/	74	35.29	Spurious
AV	1301.350	H	38.71	-11.37	27.34	54	26.66	Spurious
PK	3037.700	H	41.42	/	/	74	32.58	Spurious
AV	3037.700	H	41.42	-11.37	30.05	54	23.95	Spurious
PK	3905.000	H	41.35	/	/	74	32.65	Spurious
AV	3905.000	H	41.35	-11.37	29.98	54	24.02	Spurious
PK	1301.700	V	34.27	/	/	74	39.73	Spurious
AV	1301.700	V	34.27	-11.37	22.90	54	31.10	Spurious
PK	1720.650	V	34.97	/	/	74	39.03	Spurious
AV	1720.650	V	34.97	-11.37	23.60	54	30.40	Spurious
PK	3905.350	V	42.24	/	/	74	31.76	Spurious
AV	3905.350	V	42.24	-11.37	30.87	54	23.13	Spurious

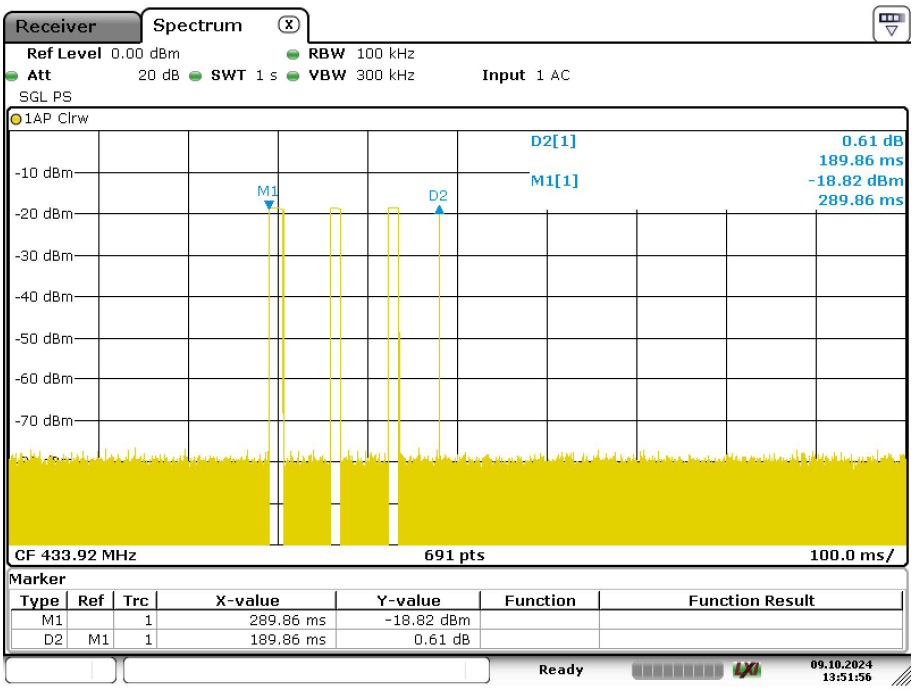
Remark:
1: AV Emission Level= PK Emission Level+20log (duty cycle)
2: Data of measurement within this frequency range shown "/" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
3: "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
4: Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
5. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
6. Corrected Reading = Original Receiver Reading + Correct Factor
7. Only the worst data listed in this report

Duty Cycle = 27ms/100 (ms) =27%
Duty Cycle Factor =20log (Duty Cycle) =-11.37

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600



Date: 8.OCT.2024 15:45:13



Date: 9.OCT.2024 13:51:55

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

8.2 Bandwidth Measurement

Test Method

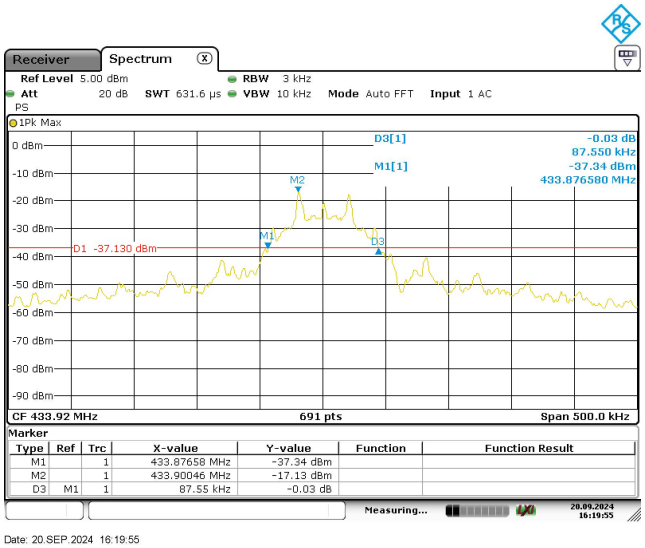
1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
   Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
   RBW > the 20dB bandwidth of the emission being measured, VBW≥RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.
The limit for the EUT = 0.25% * 433.92 MHz = 1084.8 kHz

Test Result

Channel	20dB Bandwidth (KHz)	Limit (KHz)
1	87.55	1084.8



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

8.3 99% Bandwidth Measurement

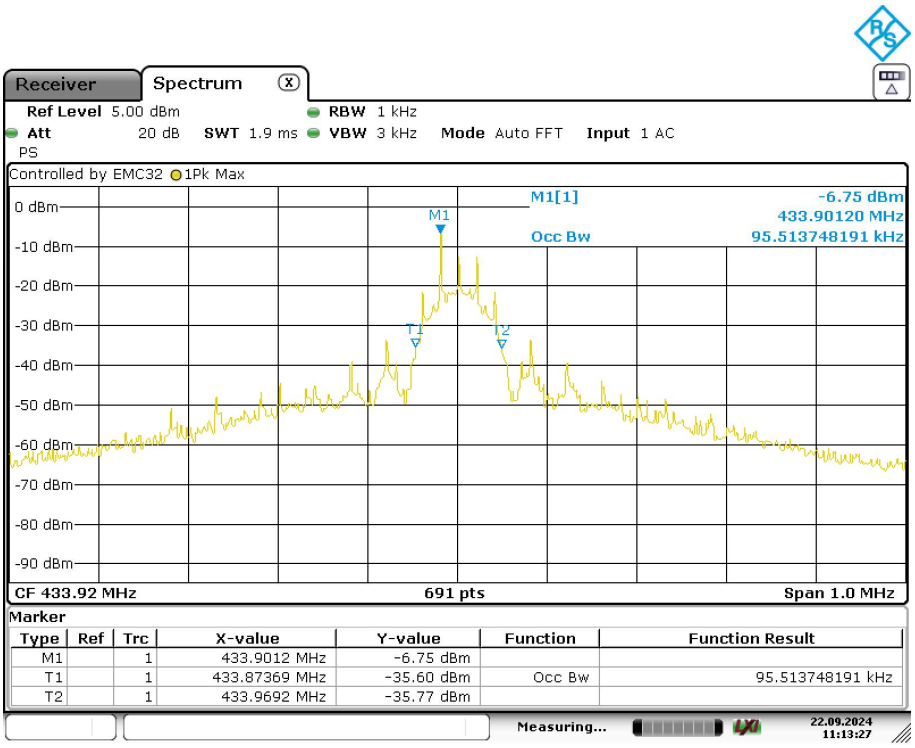
Test Method

1. Connect EUT test port to spectrum analyzer.
   Use the following spectrum analyzer settings:
   RBW=1% to 5% of the actual occupied, VBW≥3RBW, Sweep = auto,
   Detector function = peak, Trace = max hold
2. Use the occupied bandwidth measurement capability of test receiver.
3. Allow the trace to stabilize, record the occupied bandwidth value.

Test Result

Channel	99% bandwidth (KHz)	Limit (KHz)
1	95.51	N/A

99% bandwidth



Date: 22.SEP.2024 11:13:27

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

8.4 Deactivation Time

Test Method

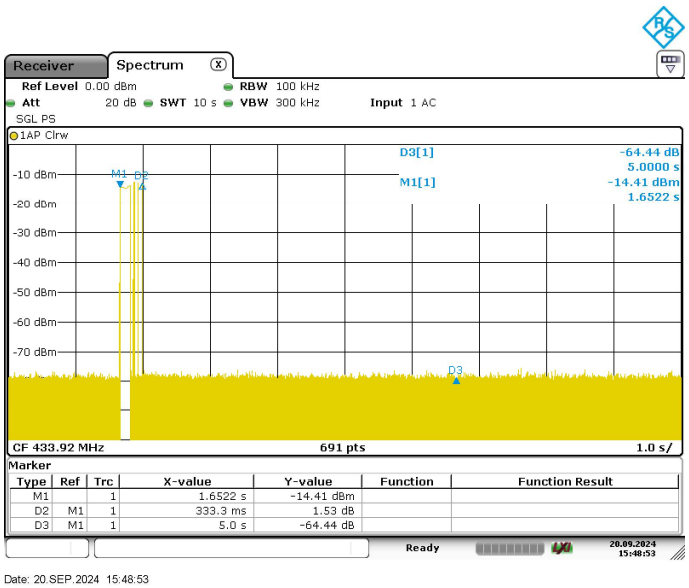
1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT in transmitting mode.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW≥OBW, VBW≥RBW, Span=0Hz, detector=peak.
5. Repeat above procedures until all frequency measured was complete.

Limit

According to FCC Part 15.231 (a), the transmitter shall be complied the following requirements:
(√) (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.

Test Result

Channel	Frequency	Deactivation Time	Result
1	433.92MHz	333.3ms	Pass



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
TUBULAR MOTOR	ROLLEASE ACMEDA INC	--	--

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

10 Test Equipment List

List of Test Instruments

Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2024-8-1	2025-7-31
	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2024-8-1	2025-7-31
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	961	2024-8-30	2025-8-29
	Double-ridged waveguide horn antenna	Rohde & Schwarz	HF907	102868	2024-4-14	2025-4-13
	Pre-amplifier	Shenzhen HzEMC	HPA-081843	HYPA23026	2024-4-16	2025-4-15
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2024-6-15	2025-6-14
	3m Semi-anechoic chamber	TDK	9X6X6	----	2024-5-8	2027-5-7
Measurement Software Information						
Test Item	Software	Manufacturer	Version			
RE	EMC 32	Rohde & Schwarz	V10.50.40			
CE	EMC 32	Rohde & Schwarz	V9.15.03			

11 System Measurement Uncertainty

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, 3.16dB
Radiated Disturbance	30MHz to 1GHz, 5.03dB (Horizontal) 5.12dB (Vertical) 1GHz to 18GHz, 5.49dB 18GHz to 40GHz, 5.63dB
Carrier power conducted measurement	50MHz~18GHz, 1.238dB
Spurious Emission Conducted Measurement	9kHz ~40GHz, 1.224dB

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

12 Photographs of Test Set-ups

Refer to the < Test Setup photos >.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

13 Photographs of EUT

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

THE END

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600