

FCC ID – TEST REPORT

Report Number : **709502229107-00A** Date of Issue: November 28, 2022

Model : JCHR35W3C1, JCHR35W3C2,
JCHR35W3C3, JCHR35W3C4, JCHR35W3C5

Product Type : Remote controller

Applicant : ZHEJIANG JIECANG LINEAR MOTION TECHNOLOGY CO., LTD.

Address : No.19 XinTao Road, Provincial High Tech Park XinChang county,ZheJiang
ProvinceP.O. Box 312500, XINCHANG COUNTY, 312500 China

Production Facility : ZHEJIANG JIECANG LINEAR MOTION TECHNOLOGY CO., LTD.

Address : No.19 XinTao Road, Provincial High Tech Park XinChang county,ZheJiang
ProvinceP.O. Box 312500, XINCHANG COUNTY, 312500 China

Test Result : **n Positive** ☐ Negative

Total pages including
Appendices : 22

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2 Details about the Test Laboratory

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

FCC Registration Number: 820234
Designation Number: CN1183
IC Company Number: 25988
CAB identifier: CN0101
Telephone: +86 21 6141 0123
Fax: +86 21 6140 8600

3 Description of the Equipment Under Test

| | |
|-------------------------------|--|
| Product: | Remote controller |
| Model no.: | JCHR35W3C1, JCHR35W3C2, JCHR35W3C3, JCHR35W3C4, JCHR35W3C5 |
| FCC ID: | 2ANKDJCHR35W3C |
| Rating: | 3VDC (AAA Battery*2) |
| RF Transmission Frequency: | 433.925MHz |
| Modulation: | ASK |
| Antenna Type: | PCB antenna |
| Antenna Gain: | -11.77 dBi max (Declared by manufacturer) |
| Description of the EUT: | The Equipment Under Test (EUT) is a transmitter operated at 433.925MHz. |
| Test sample no.: | SHA-688675-2 |

4 Summary of Test Standards

| Test Standards | |
|-----------------------|--|
| FCC Part 15 Subpart C | PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators |

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

5 Summary of Test Results

| Technical Requirements | | | | |
|---------------------------------------|--|-------|----------------|----------------|
| FCC Part 15 Subpart C | | | | |
| Test Condition | | Pages | Test Site | Test Result |
| §15.207 | Conducted emission AC power port | N/A | N/A | Not Applicable |
| §15.205, §15.209, 15.35 (c)§15.231(b) | Radiated Emission, 30MHz to 4.5GHz | 10-15 | 3m chamber | Pass |
| §15.231(c) | Bandwidth Measurement & 99% Occupied Bandwidth | 16-17 | Shielding room | Pass |
| §15.231(a)(1) | Deactivation Time | 18 | Shielding room | Pass |
| §15.203 | Antenna requirement | -- | See Note 2 | Pass |

Note 1: N/A=Not Applicable. Conducted emission is not apply for battery operated device.

Note 2: The EUT uses an PCB Antenna, which gain is -11.77dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ANKDJCHR35W3C complies with Section 15.205, 15.209, 15.231 of the FCC Part 15, Subpart C Rules.

According to the client's declaration, all models are identical and share the same technology, schematics, PCB trace layout except model name and appearance.

So all the tests were applied on JCHR35W3C5, other models are deemed to fulfill all the requirement without further testing.

SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment Under Test

n - **Fulfills** the general approval requirements.

o - **Does not** fulfill the general approval requirements.

Sample Received Date: October 28, 2022

Testing Start Date: October 31, 2022

Testing End Date: November 11, 2022

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

Reviewed by:

Prepared by:

Tested by:



Hui TONG
EMC Section Manager



Wenqiang LU
EMC Project Engineer



Yiquan WANG
EMC Test Engineer

7 Systems test configuration

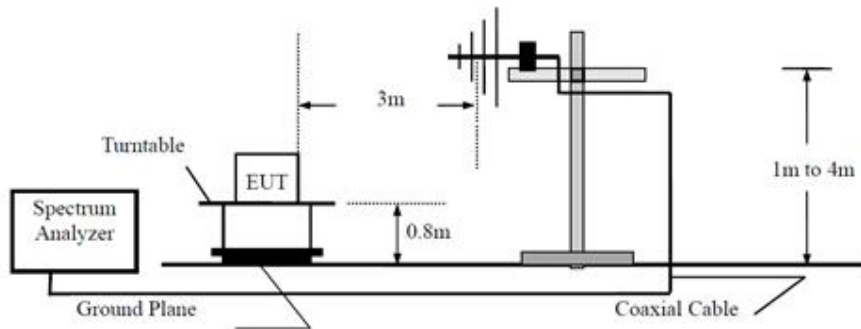
Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|-------------|--------------|-------------------|-------------|
| -- | -- | -- | -- |

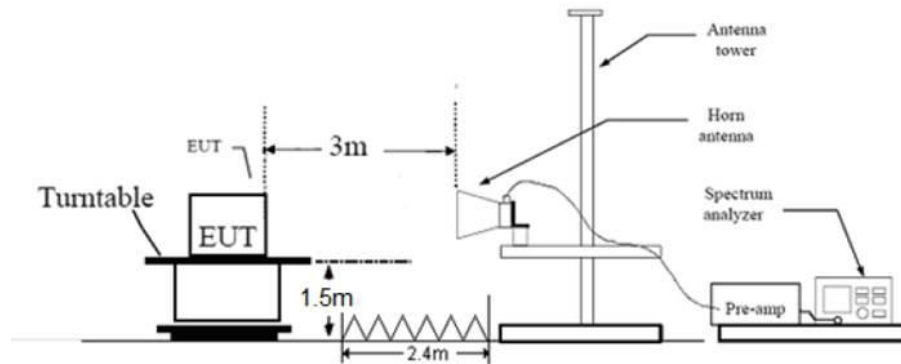
8 Test Setups

8.1 Radiated test setups

Below 1GHz



Above 1GHz



9 Test Methodology

9.1 Radiated Emission

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
4. 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.
5. 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.
6. Use the following spectrum analyzer settings According to C63.10:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
 For average measurement:
 VBW = 10 Hz, when duty cycle is no less than 98 percent.
 VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
7. Repeat above procedures until all frequencies measured were complete.

Limit

According to §15.231 (b), the 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 |

Limits for 15.209 Radiated emission limits; general requirements

| 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 |

| 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 |

¹Limit 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.

²Limit is with 1 MHz measurement bandwidth and using an Average detector

³Limit is with 1 MHz measurement bandwidth and using a Peak detector

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.

| Antenna polarization | Frequency (MHz) | Duty Cycle Factor(dB) | Corrected Reading (dBuV/m) | Emission Type | Limit (dBuV/m) | Margin | Detector |
|----------------------|-----------------|-----------------------|----------------------------|---------------|----------------|--------|----------|
| H | 433.92 | N/A | 83.55 | Fundamental | 100.8 | 17.25 | PK |
| H | 433.92 | -12.96 | 70.59 | AV | 80.8 | 10.21 | AV |
| V | 433.92 | N/A | 69.85 | Fundamental | 100.8 | 30.95 | PK |
| V | 433.92 | -12.96 | 56.89 | AV | 80.8 | 23.91 | AV |
| H | 867.78 | N/A | 59.49 | Harmonics | 80.8 | 21.31 | PK |
| V | 867.79 | N/A | 49.26 | Harmonics | 80.8 | 31.54 | PK |
| H | 1735.43 | N/A | 54.71 | Harmonics | 80.8 | 26.09 | PK |
| V | 2169.54 | N/A | 54.54 | Harmonics | 80.8 | 26.26 | PK |
| H | 2169.54 | N/A | 65.85 | Harmonics | 80.8 | 14.95 | PK |
| H | 2169.54 | -12.96 | 52.89 | Harmonics | 60.8 | 7.91 | AV |
| V | 2603.32 | N/A | 50.58 | Harmonics | 80.8 | 30.22 | PK |
| H | 3037.21 | N/A | 57.79 | Harmonics | 80.8 | 23.01 | PK |
| V | 3037.21 | N/A | 51.98 | Harmonics | 80.8 | 28.82 | PK |

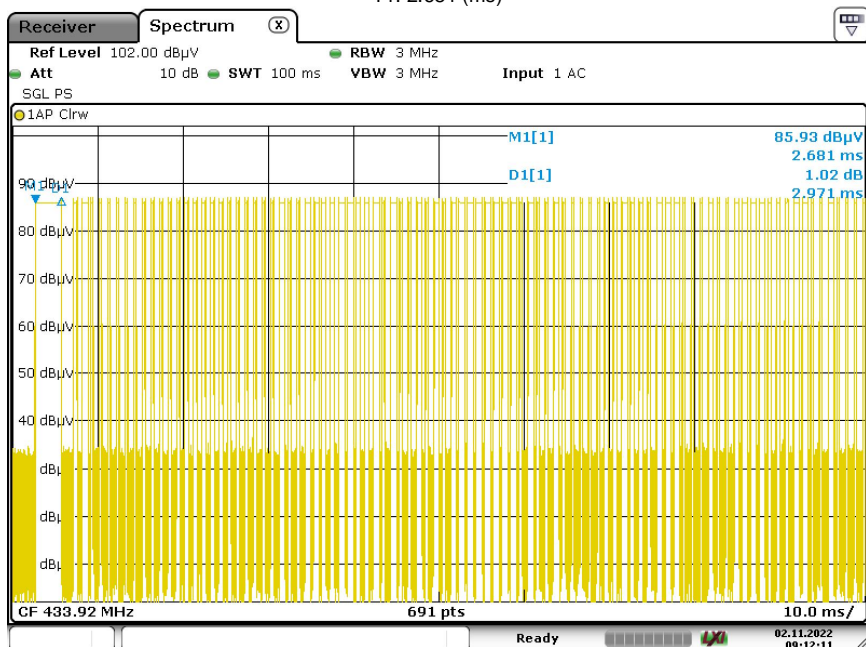
Remark:

- 1: AV Emission Level= PK Emission Level+20log (duty cycle)
- 2: If PK reading is less than AV limit, the AV test can be elided.
- 3: Other than listed in the table are attenuated more than 20dB below the permissible limit of the field strength, therefore no data appear in the report.
- 4: “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 5: Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
6. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
7. Corrected Reading = Original Receiver Reading + Correct Factor
8. Only the worst data listed in this report

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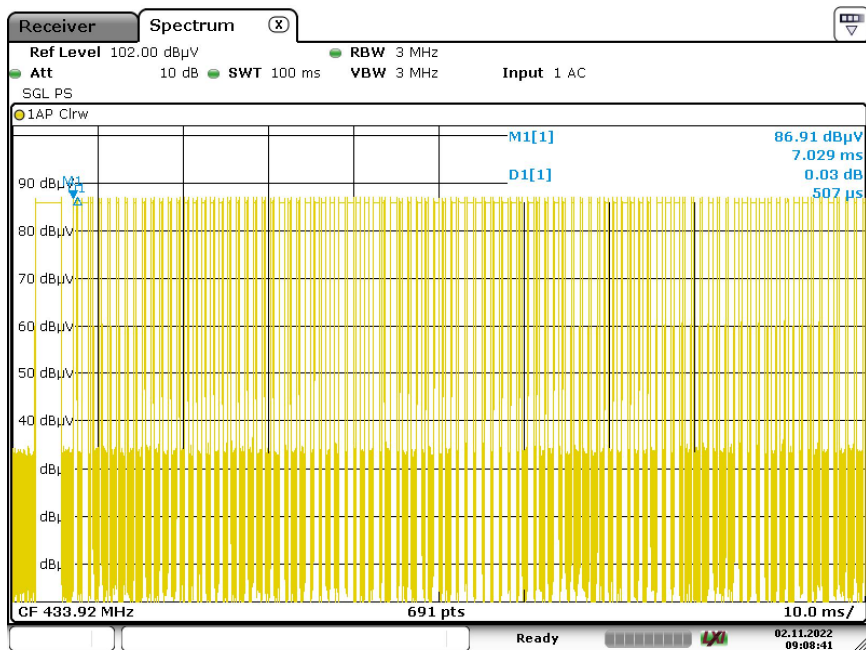
Duty Cycle = $T1 \cdot 1 + T2 \cdot 28 + T3 \cdot 64$ (ms)/100 (ms) = 22.48%
Duty Cycle Factor = $20 \log$ (Duty Cycle) = -12.96

T1: 2.681 (ms)

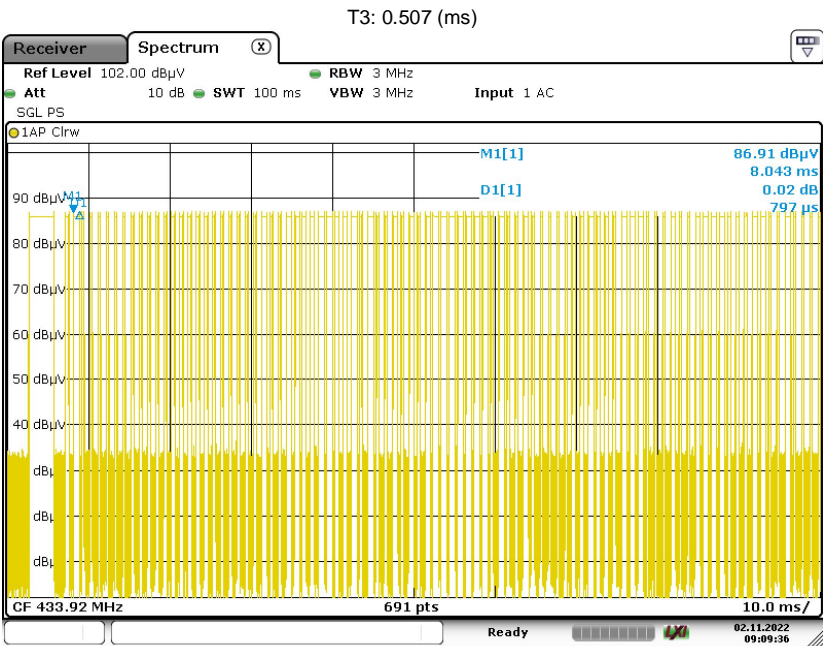


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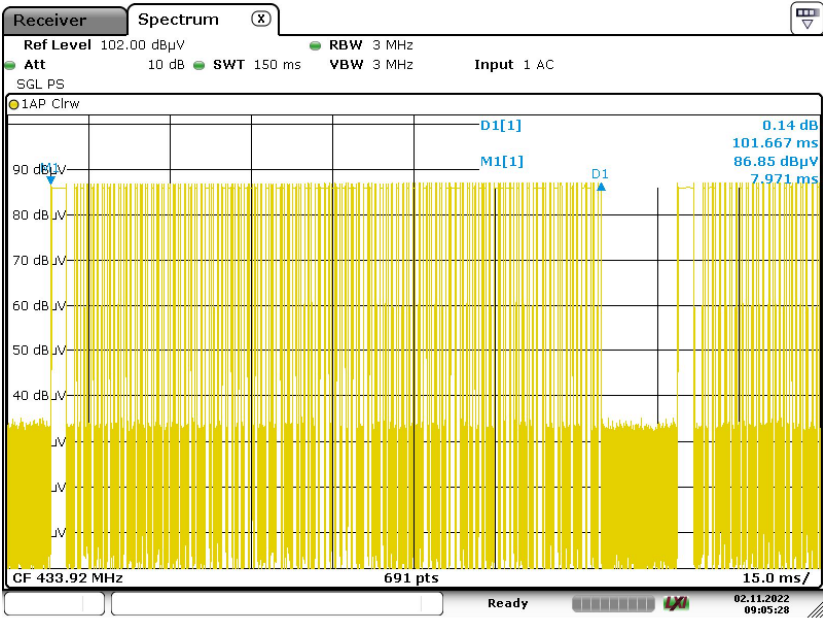
T2: 0.707 (ms)



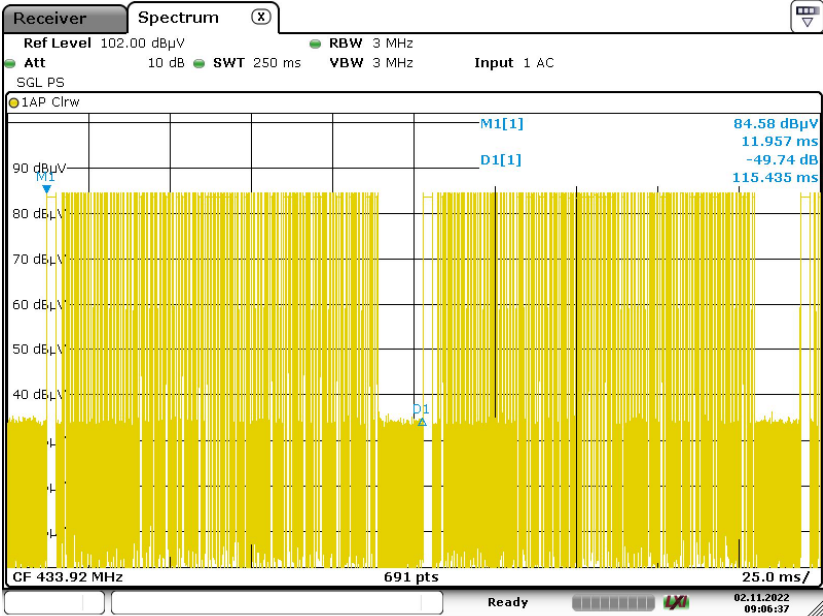
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Date: 2.NOV.2022 09:05:28



Date: 2.NOV.2022 09:06:37

9.2 Bandwidth Measurement & 99% Occupied Bandwidth

Test Method

1. 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 = 1% to 5% of 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 = 1085 kHz

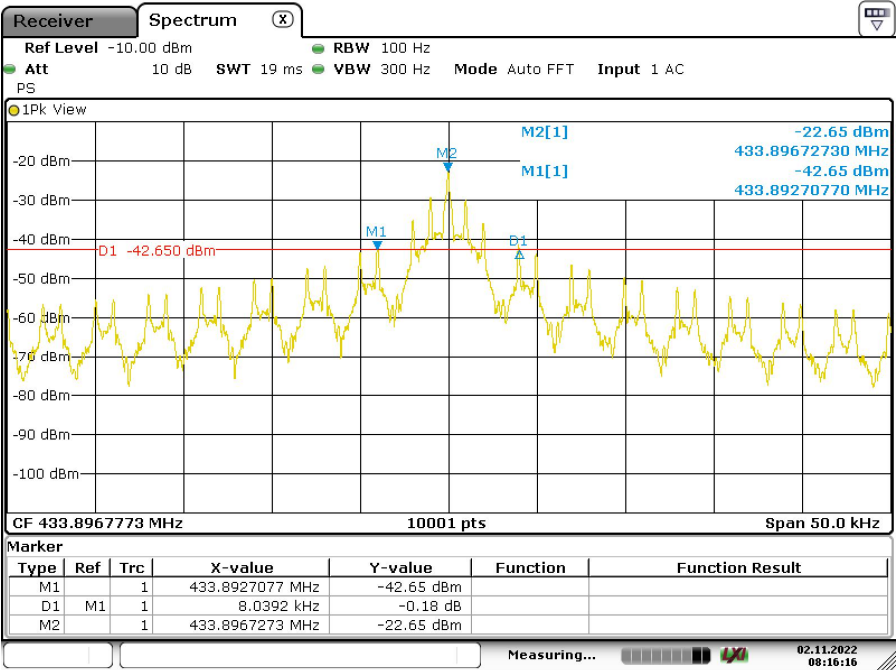
Test Result

| Channel | 20dB Bandwidth (KHz) | Limit (KHz) |
|---------|----------------------|-------------|
| 1 | 8.03 | 1085 |

| Channel | 99% bandwidth (KHz) | Limit (KHz) |
|---------|---------------------|-------------|
| 1 | 21.30 | N/A |

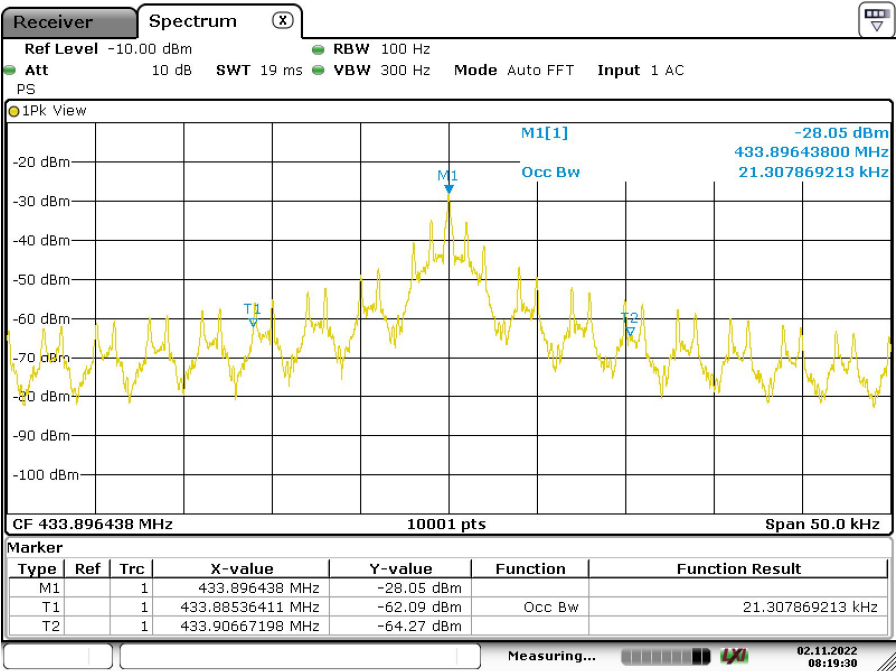


20dB bandwidth test result



Date: 2.NOV.2022 08:16:16

99% bandwidth test result



Date: 2.NOV.2022 08:19:30

9.3 Deactivation Time

Test Method

1. 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=120 KHz, VBW=1MHz, Span=0Hz.
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:

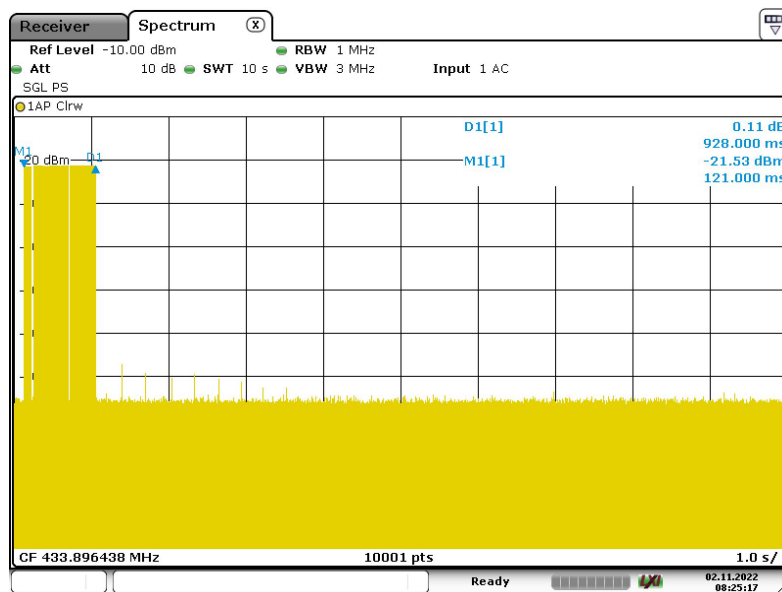
(√) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(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 | Result |
|---------|-----------|--------|
| 1 | 433.92MHz | Pass |



Date: 2.NOV.2022 08:25:17

10 Test Equipment List

List of Test Instruments

RF Test

| Description | Manufacturer | Model no. | Serial no. | Calibration Date | Calibration Due |
|------------------------------|--------------|-----------|-----------------|------------------|-----------------|
| Signal and spectrum analyzer | R&S | FSV40 | S1503003-YQ-EMC | 2022-8-01 | 2023-7-31 |

Radiated Emission Test

| USED | Equipment Name | Model | Manufacturer | Equipment ID. | Calibration Date | Calibration Due |
|-------------------------------------|--------------------------------------|-------------|--------------|-----------------|------------------|-----------------|
| <input checked="" type="checkbox"/> | EMI test receiver | ESR3 | R&S | S1503109-YQ-EMC | 2022-8-01 | 2023-7-31 |
| <input checked="" type="checkbox"/> | Trilog super broadband test antenna | SCHWARZBECK | VULB9168 | S1808296-YQ-EMC | 2021-9-23 | 2024-9-22 |
| <input checked="" type="checkbox"/> | Double-ridged waveguide horn antenna | HF907 | R&S | S1503009-YQ-EMC | 2021-4-13 | 2024-4-12 |
| <input checked="" type="checkbox"/> | Signal conditioning unit | SCU-18D | R&S | S1503012-YQ-EMC | 2022-8-01 | 2023-7-31 |
| <input checked="" type="checkbox"/> | Signal and spectrum analyzer | FSV40 | R&S | S1503003-YQ-EMC | 2022-8-01 | 2023-7-31 |
| <input checked="" type="checkbox"/> | Loop antenna | HFH2-Z2 | R&S | S1503013-YQ-EMC | 2022-6-13 | 2023-6-12 |

11 System Measurement Uncertainty

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

| Items | Extended Uncertainty |
|----------------------|------------------------------------|
| Radiated Disturbance | 30MHz to 1GHz, 5.03dB (Horizontal) |
| | 5.11dB (Vertical) |
| | 1GHz to 18GHz, 5.15dB (Horizontal) |
| | 5.12dB (Vertical) |
| | 18GHz to 25GHz, 4.76dB |

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2011, clause 4.4.3 and 4.5.1.

12 Photographs of Test Set-ups

Refer to the < Test Setup photos >.

13 Photographs of EUT

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

THE END