

FCC ID & IC - TEST REPORT

Report Number	: 709992205006-00	Date of Issue: <u>August 15, 2022</u>
Model	: APF V3.4	
Product Type	: Automatic Press Fixture	
Applicant	: Suzhou Secote Precision Electronic Co.,Ltd.	
Address	: No. 585, Songjia Road, Guoxiang Street, Wuzhong District, 215128 Suzhou, Jiangsu Province, PEOPLE'S REPUBLIC OF CHINA	
Production Facility	: Suzhou Secote Precision Electronic Co.,Ltd.	
Address	: No. 585, Songjia Road, Guoxiang Street, Wuzhong District, 215128 Suzhou, Jiangsu Province, PEOPLE'S REPUBLIC OF CHINA	
Test Result	: ■ Positive <input type="checkbox"/> Negative	
Total pages including Appendices	: <u>26</u>	

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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
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FCC Registration 820234
No.:

FCC Designation CN1183
Number:

ISED#: 25988

CAB identifier CN0101

3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product: Automatic Press Fixture

Model no.: APF V3.4

FCC ID: 2A72V-APF

IC: 28856-APF

Rating: Input: 100-240V, 50/60Hz, 150W

Modulation type: ASK

Hardware version: V3.4

Software version: V2.5

RF Transmission Frequency: 13.56MHz

Antenna Type: PCB loop antenna

Description of the EUT: The EUT was an Automatic Press Fixture which will be used in the factory. This device has RFID function, transmitter operated at 13.56MHz.

Test sample no.: SHA-654455-1

The following statement shall be placed in a prominent location in the text of the user manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5 Amendment 1 March 2019	General Requirements for Compliance of Radio Apparatus
RSS-210 Issue 10 December 2019	Licence-Exempt Radio Apparatus: Category I

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

5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C, RSS-Gen and RSS-210				
Test Condition		Pages	Test Site	Test Result
§15.207 RSS-Gen Section 7.2.4	Conducted emission AC power port	10-12	Test Site 1	Pass
§15.205, §15.209, 15.225 (a, b, c, d) RSS-210 Section A2.6	Radiated Emission, 9KHz to 1000MHz	13-19	Test Site 1	Pass
§15.215 (c) RSS-Gen Section 4.6.1	20dB and 99% Bandwidth Measurement	20-21	Test Site 1	Pass
§15.225(e) RSS-210 Section A2.6	Frequency Stability	22	Test Site 1	Pass
§15.203 RSS-Gen Section 7.1.2	Antenna requirement	--	See Note 1	Pass

Note 1: The EUT uses a PCB Loop Antenna. In accordance to §15.203 and RSS-Gen Section 7.1.2. 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: 2A72V-APF IC: 28856-APF complies with Section 15.205, 15.207, 15.209, 15.225 of the FCC Part 15, Subpart C Rules and RSS-210, RSS-GEN.

SUMMARY:

All tests according to the regulations cited on page 5 were

- Performed

- **Not** Performed

The Equipment Under Test

- **Fulfills** the general approval requirements.

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

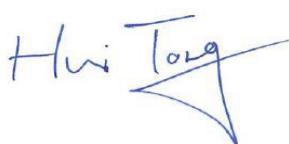
Sample Received Date: June 9, 2022

Testing Start Date: June 10, 2022

Testing End Date: June 18, 2022

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

Reviewed by: _____ Prepared by: _____ Tested by: _____



Hui TONG
EMC Section Manager



Zhining ZHANG
EMC Project Manager



Yiquan WANG
EMC Test Engineer

7 Systems test configuration

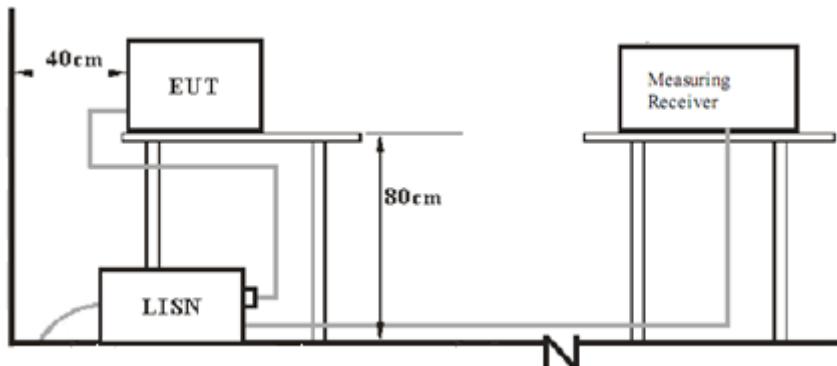
Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	E470	PF-OU5TS7 17/09

Test software: SSCOM V5.13.1 set the RFID continue transmit.

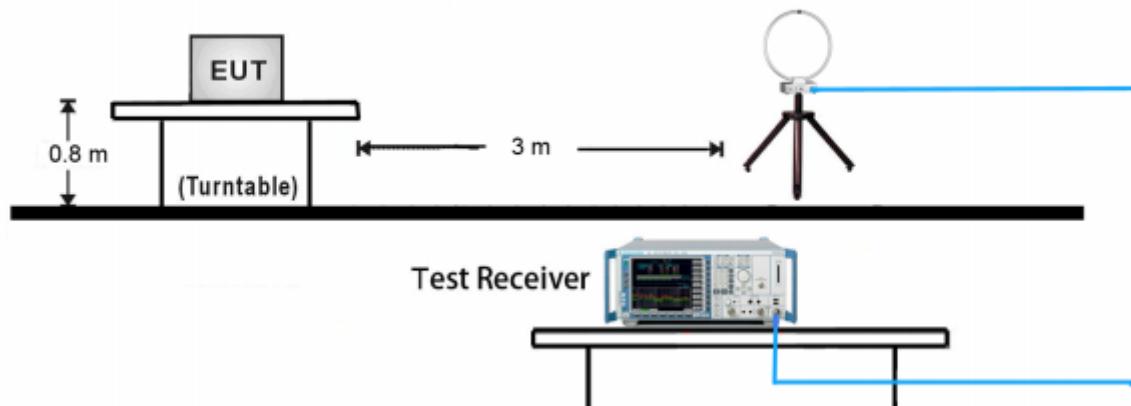
8 Test Setups

8.1 AC Power Line Conducted Emission test setups

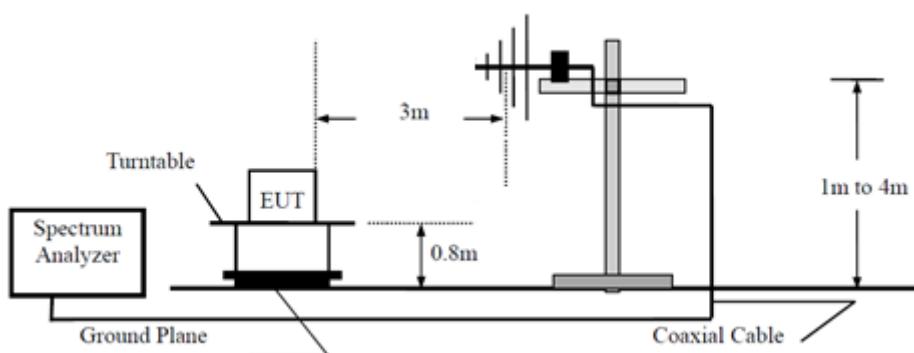


8.2 Radiated test setups

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test- Setup



9 Test Methodology

10 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

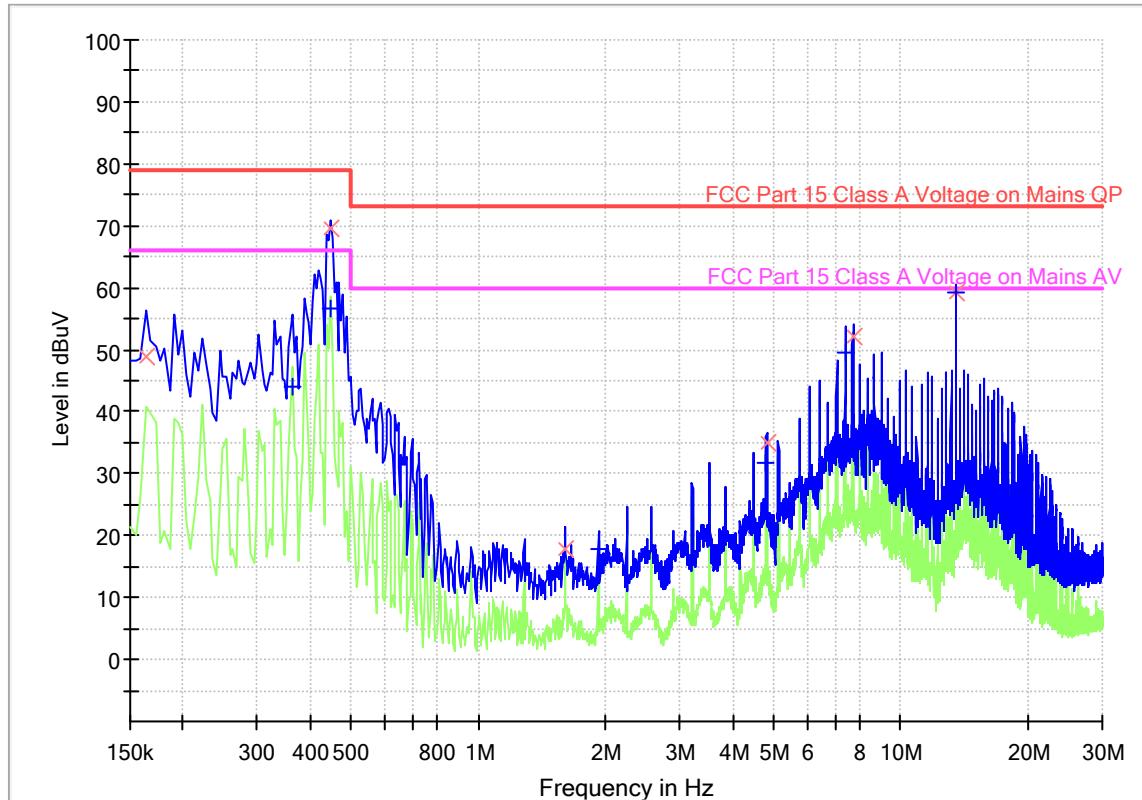
The FCC Class 'A' conducted limits are given below. The lower limit shall apply at the transition frequency.

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	79	66
0.500-5	73	60
5-30	73	60

Decreasing linearly with logarithm of the frequency

Conducted Emission

Product Type : Automatic Press Fixture
 M/N : APF V3.4
 Operating Condition : Mode 1: Transmit at 13.56MHz
 Test Specification : L-line
 Comment : AC 120V/60Hz



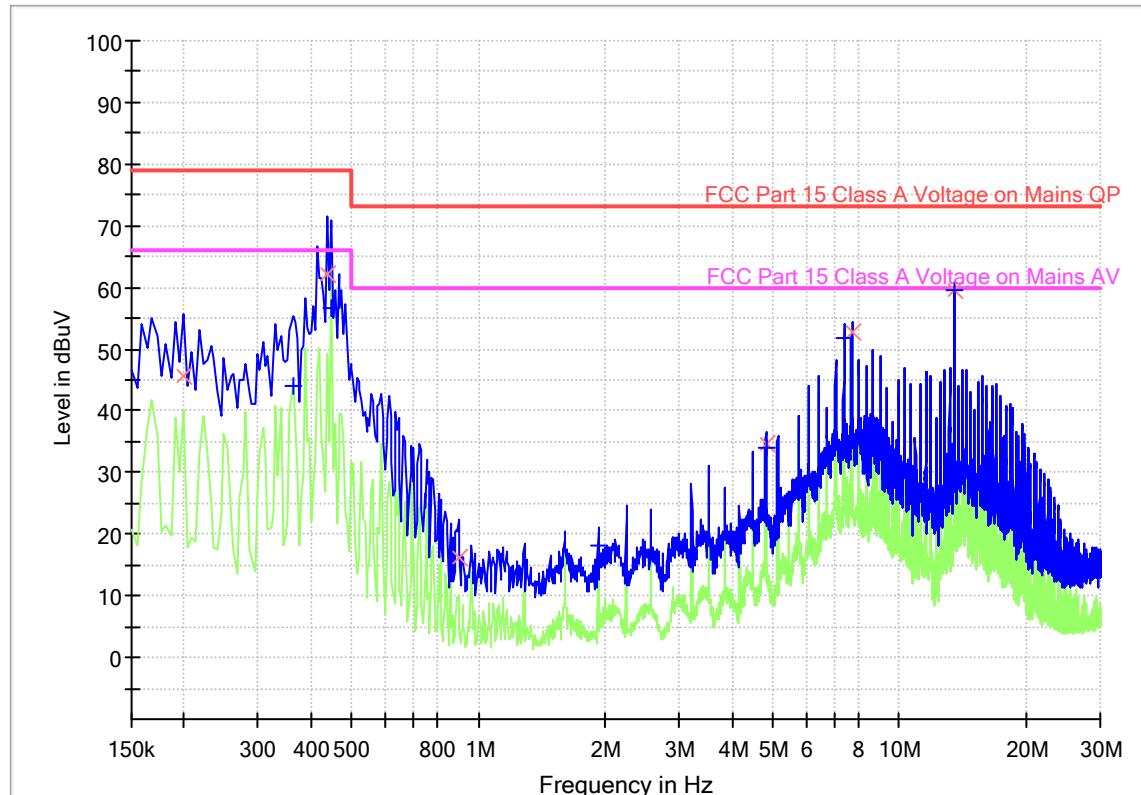
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.163500	48.91	---	79.00	30.09	1000.0	9.000	L1	19.5
0.361500	---	44.11	66.00	21.89	1000.0	9.000	L1	19.5
0.447000	---	56.68	66.00	9.32	1000.0	9.000	L1	19.5
0.447000	69.47	---	79.00	9.53	1000.0	9.000	L1	19.5
1.603500	17.88	---	73.00	55.12	1000.0	9.000	L1	19.5
1.927500	---	17.76	60.00	42.24	1000.0	9.000	L1	19.5
4.812000	---	31.67	60.00	28.33	1000.0	9.000	L1	19.6
4.816500	34.83	---	73.00	38.17	1000.0	9.000	L1	19.6
7.386000	---	49.60	60.00	10.40	1000.0	9.000	L1	19.6
7.710000	52.24	---	73.00	20.76	1000.0	9.000	L1	19.6
13.560000	---	59.34	60.00	0.66	1000.0	9.000	L1	19.7
13.560000	59.39	---	73.00	13.61	1000.0	9.000	L1	19.7

Remark: This device defined as Class A digital device. It will be used in a commercial environment.

Product Type : Automatic Press Fixture
 M/N : APF V3.4
 Operating Condition : Mode 1: Transmit at 13.56MHz
 Test Specification : N-line
 Comment : AC 120V/60Hz



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.199500	45.66	---	79.00	33.34	1000.0	9.000	N	19.5
0.361500	---	44.00	66.00	22.00	1000.0	9.000	N	19.5
0.438000	62.01	---	79.00	16.99	1000.0	9.000	N	19.5
0.447000	---	56.50	66.00	9.50	1000.0	9.000	N	19.5
0.897000	16.24	---	73.00	56.76	1000.0	9.000	N	19.5
1.927500	---	18.05	60.00	41.95	1000.0	9.000	N	19.5
4.816500	34.75	---	73.00	38.25	1000.0	9.000	N	19.5
4.816500	---	34.05	60.00	25.95	1000.0	9.000	N	19.5
7.381500	---	51.72	60.00	8.28	1000.0	9.000	N	19.6
7.705500	52.92	---	73.00	20.08	1000.0	9.000	N	19.6
13.560000	---	59.67	60.00	0.33	1000.0	9.000	N	19.7
13.560000	59.71	---	73.00	13.29	1000.0	9.000	N	19.7

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

Remark: This device defined as Class A digital device, it will be used in a commercial environment.

11 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 be 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:

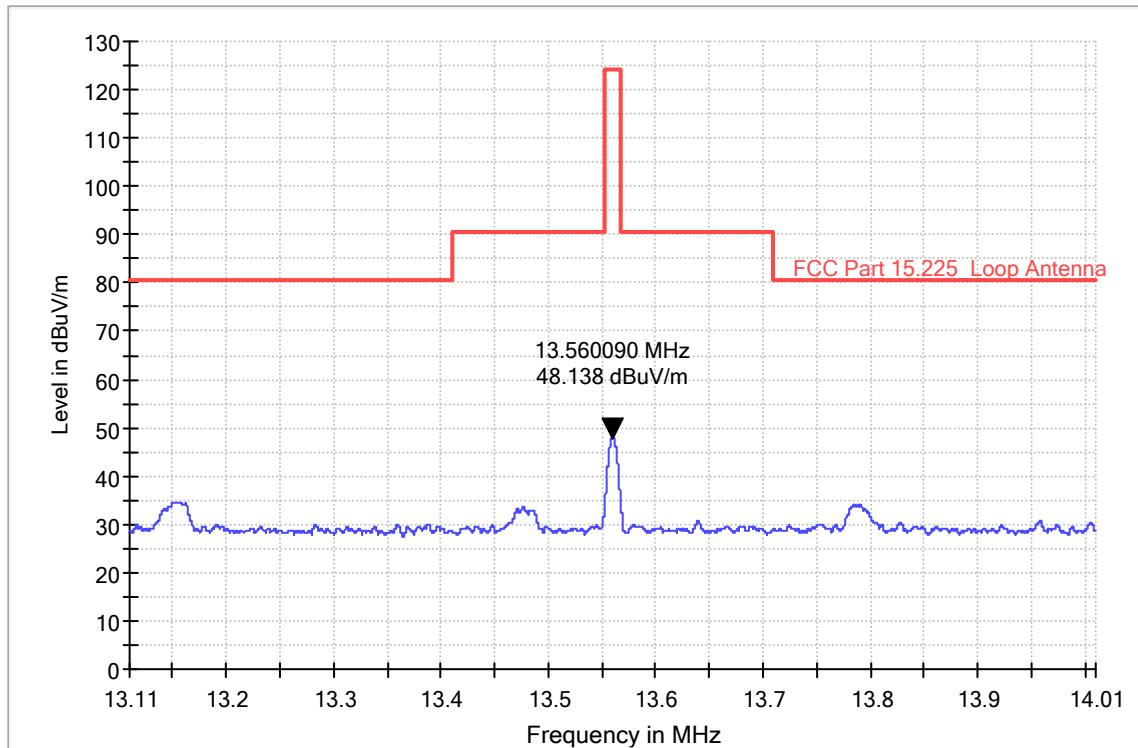
VBW = 10 Hz, when duty cycle is no less than 98 percent.

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 §15.225 (a, b, c), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

FCC 15.225 RE_Loop E_pre



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

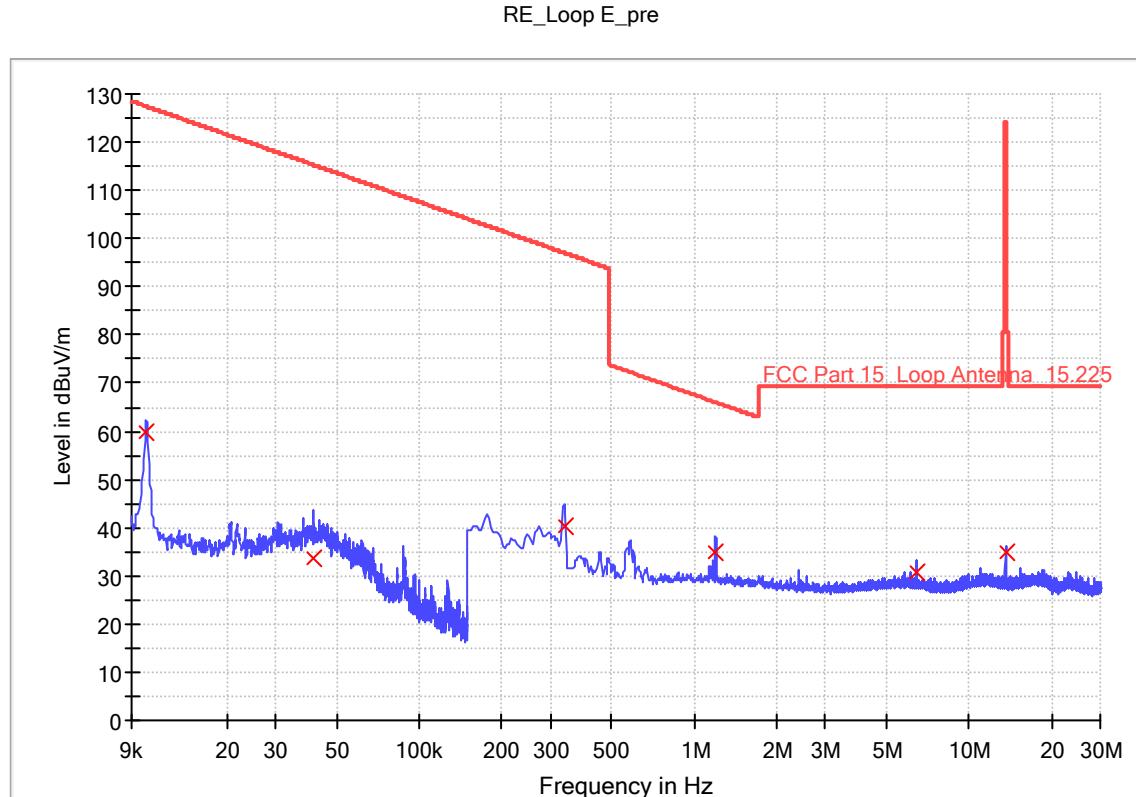
¹Limit is with detector with bandwidths as defined in CISPR-16-1-1 except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz where an Average detector is used.

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

Site: 3 meter chamber	Time: 2022/06/14 - 14:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Wang Yiquan
Probe: HFH2-Z2	Polarity: Horizontal
EUT: Automatic Press Fixture	Power: AC 120V,60Hz
Note: Transmit at 13.56MHz.	

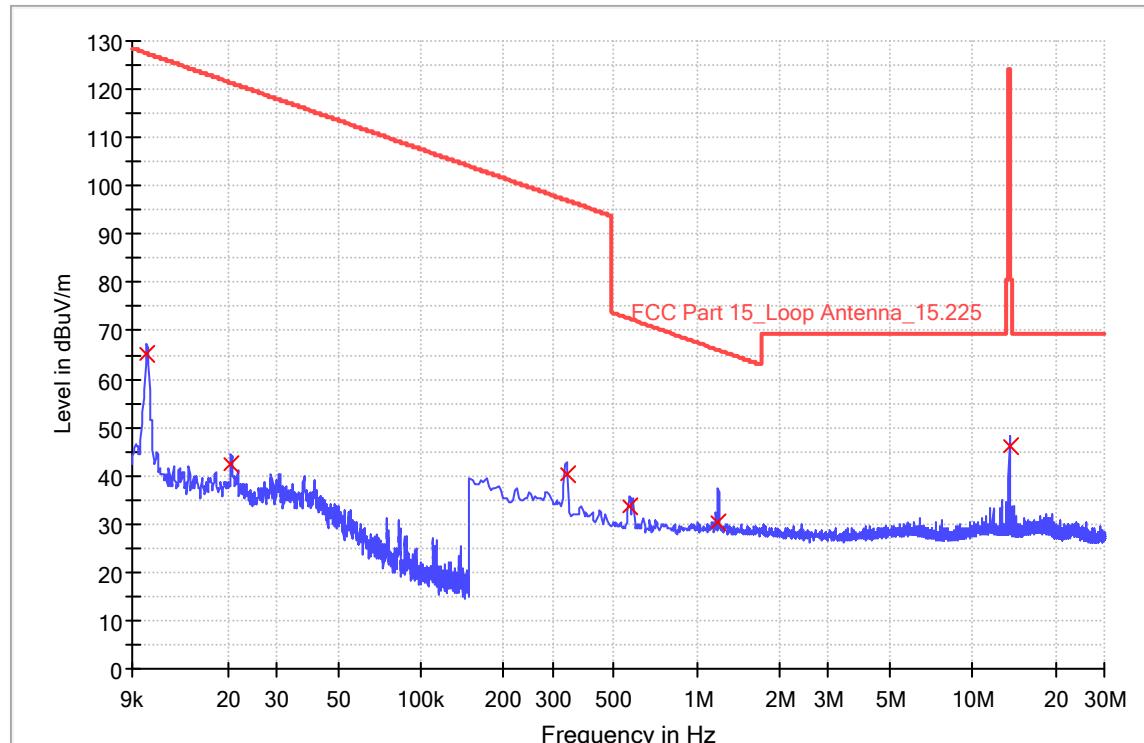


Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
0.010200	59.9	1000.0	0.200	155.0	H	19.0	19.7	67.542
0.041400	33.8	1000.0	0.200	155.0	H	146.0	19.0	81.494
0.338000	40.3	1000.0	9.000	155.0	H	95.0	18.8	56.686
1.198000	35.0	1000.0	9.000	155.0	H	200.0	18.9	31.025
6.414000	30.9	1000.0	9.000	155.0	H	272.0	18.9	38.612
13.562000	35.1	1000.0	9.000	155.0	H	326.0	18.8	88.950

Site: 3 meter chamber	Time: 2022/06/14 - 14:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Wang Yiquan
Probe: HFH2-Z2	Polarity: Vertical
EUT: Automatic Press Fixture	Power: AC 120V,60Hz
Note: Transmit at 13.56MHz.	

RE_Loop E_pre

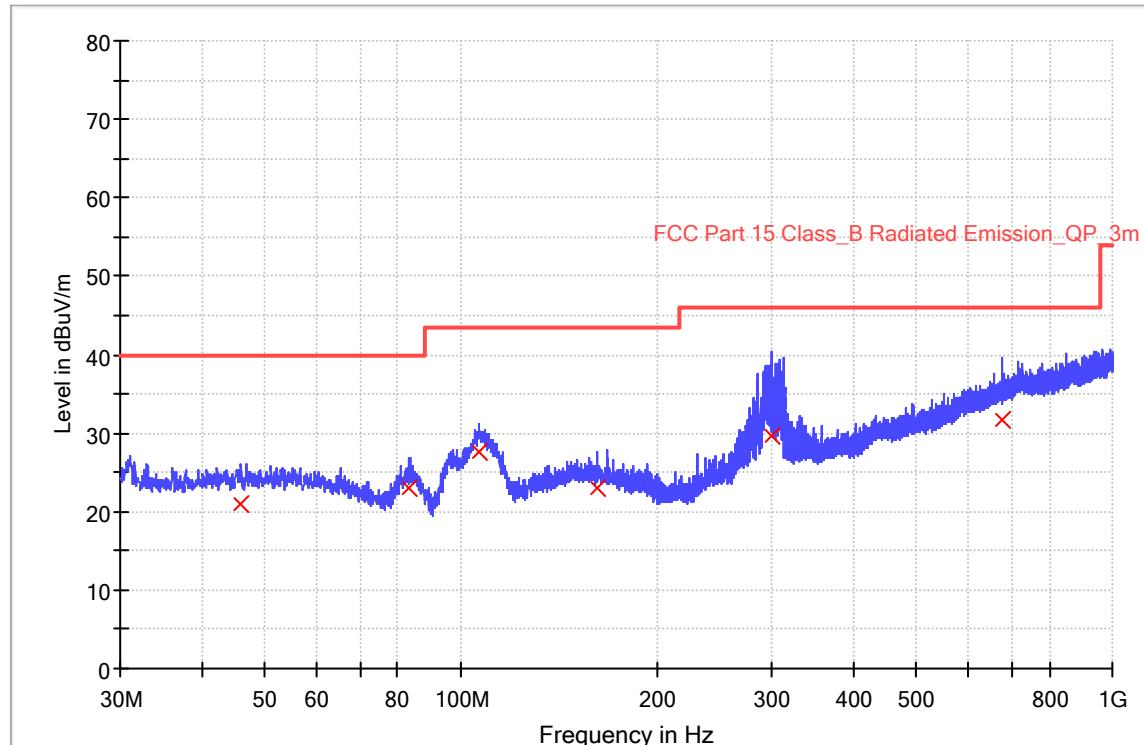


Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
0.010200	65.1	1000.0	0.200	155.0	H	68.0	19.7	62.292
0.020520	42.4	1000.0	0.200	155.0	H	208.0	19.1	79.010
0.338000	40.3	1000.0	9.000	155.0	H	122.0	18.8	56.746
0.570000	33.5	1000.0	9.000	155.0	H	252.0	18.9	38.946
1.198000	30.5	1000.0	9.000	155.0	H	164.0	18.9	35.565
13.562000	46.2	1000.0	9.000	155.0	H	10.0	18.8	77.850

Site: 3 meter chamber	Time: 2022/06/14 - 14:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Wang Yiquan
Probe: VULB 9168	Polarity: Horizontal
EUT: Automatic Press Fixture	Power: AC 120V,60Hz
Note: Transmit at 13.56MHz.	

RE_VULB9168_pre_Cont_30-1000

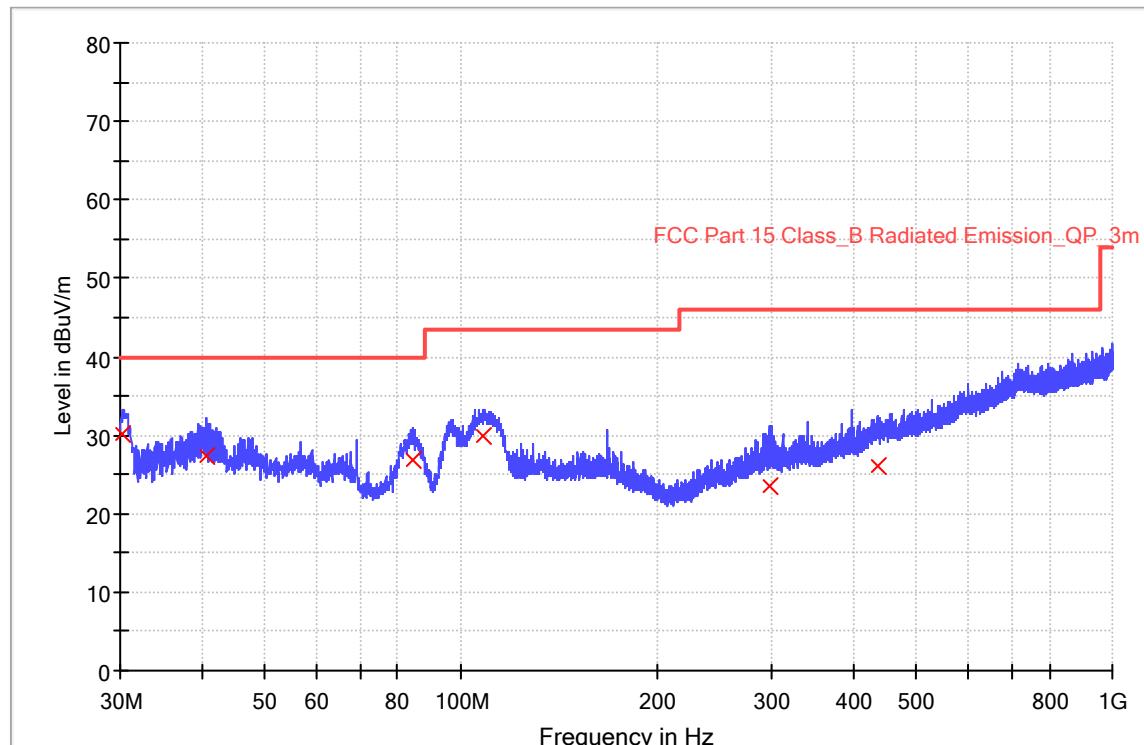


Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
45.960000	21.0	1000.0	120.000	100.0	H	172.0	20.4	19.1
83.480000	22.9	1000.0	120.000	100.0	H	332.0	15.0	17.1
106.680000	27.7	1000.0	120.000	100.0	H	48.0	16.9	15.8
161.480000	23.1	1000.0	120.000	100.0	H	0.0	20.8	20.4
300.760000	29.6	1000.0	120.000	100.0	H	94.0	21.5	16.4
677.800000	31.8	1000.0	120.000	100.0	H	0.0	30.0	14.2

Site: 3 meter chamber	Time: 2022/06/14 - 14:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Wang Yiquan
Probe: VULB 9168	Polarity: Vertical
EUT: Automatic Press Fixture	Power: AC 120V,60Hz
Note: Transmit at 13.56MHz.	

RE_VULB9168_pre_Cont_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
30.320000	30.1	1000.0	120.000	100.0	V	72.0	19.4	9.9
40.760000	27.5	1000.0	120.000	100.0	V	110.0	20.1	12.5
84.400000	26.8	1000.0	120.000	100.0	V	168.0	14.9	13.2
107.920000	29.9	1000.0	120.000	100.0	V	19.0	17.1	13.7
297.480000	23.4	1000.0	120.000	100.0	V	222.0	21.4	22.6
437.120000	26.1	1000.0	120.000	100.0	V	290.0	25.6	19.9

12 20dB and 99% Bandwidth Measurement

Test Method for 20dB Bandwidth

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. 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, $VBW \geq RBW$,
Sweep = auto, Detector function = peak, Trace = max hold
3. 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.
4. Repeat above procedures until all frequencies measured were complete.

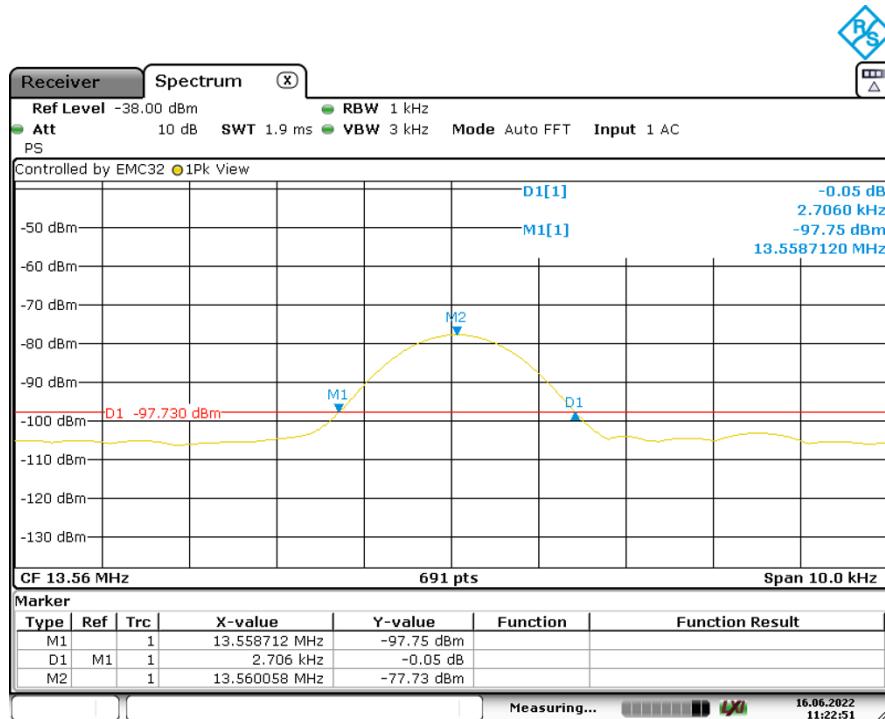
Test Method for 99 % Bandwidth

1. Use the following spectrum analyzer settings:
RBW=1% to 5% of the actual occupied, $VBW \geq 3RBW$, Sweep = auto,
Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Test Result

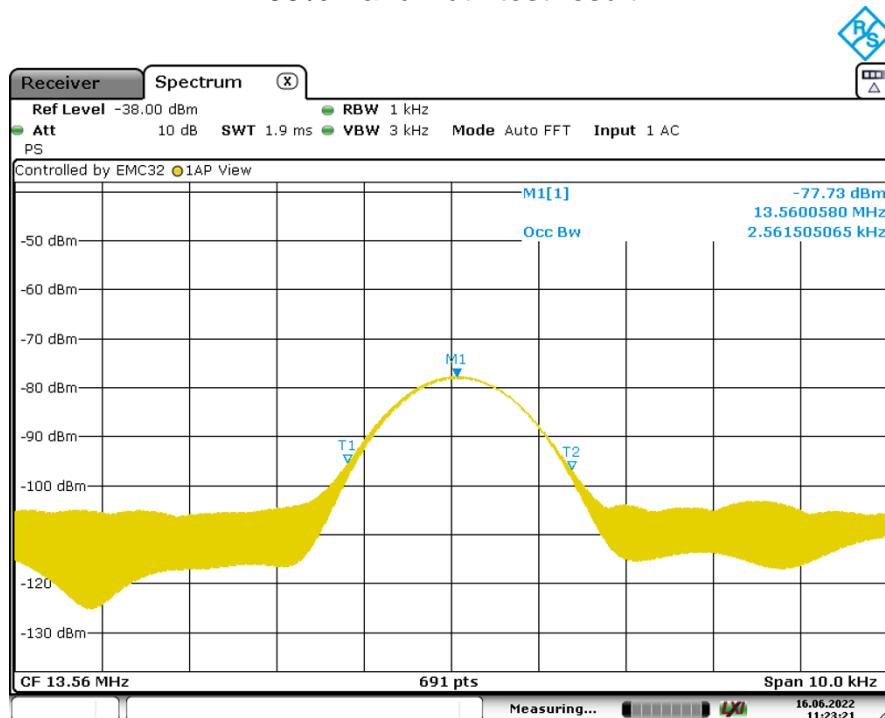
Channel	20dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (KHz)
13.56MHz	2.706 kHz	2.5615 kHz	NA

20dB Bandwidth test result



Date: 16.JUN.2022 11:22:52

99% Bandwidth test result



Date: 16.JUN.2022 11:23:21

13 FREQUENCY STABILITY

Test Method

1. The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber.
2. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.
3. At room temperature ($25\pm 5^{\circ}\text{C}$), an external variable AC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

Limit

The frequency tolerance of the carrier signal shall be maintained within $+\text{-}0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Result

Frequency Stability: Temperature variation					
Temperature ($^{\circ}\text{C}$)	Voltage (AC)	Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)	Result
20	120V	13.5600	NA	NA	Pass
50	120V	13.5601	0.0001	within $+\text{-} 1.356$	Pass
-20	120V	13.5600	0	within $+\text{-} 1.356$	Pass

Frequency Stability: Voltage variation					
Temperature ($^{\circ}\text{C}$)	Voltage (AC)	Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)	Result
20	102V	13.5600	NA	NA	Pass
20	120V	13.5600	0	within $+\text{-} 1.356$	Pass
20	138V	13.5600	0	within $+\text{-} 1.356$	Pass

14 Test Equipment List

List of Test Instruments

USED	Equipment Name	Model	Manufacturer	Equipment ID.	Calibration Date	Calibration Due
<input checked="" type="checkbox"/>	EMI test receiver	ESR3	R&S	S1503109-YQ-EMC	2022.8.1	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"/>	Temperature Chamber	HTT-100AP	Shanghai HUCAN	S2201430b-YQ-EMC	2022-3-08	2023-3-07
<input checked="" type="checkbox"/>	Loop antenna	HFH2-Z2	R&S	S1503013-YQ-EMC	2022-6-13	2022-6-12
<input checked="" type="checkbox"/>	EMI test receiver	R & S	ESR3	S1503001-YQ-EMC	2022.8.1	2023.7.31
<input checked="" type="checkbox"/>	2-Line V-network	R & S	ENV216	S1503103-YQ-EMC	2022.8.1	2023.7.31

15 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, $\pm 5.03\text{dB}$ (Horizontal) $\pm 5.11\text{dB}$ (Vertical) 1GHz to 18GHz, $\pm 5.15\text{dB}$ (Horizontal) $\pm 5.12\text{dB}$ (Vertical)

16 Photographs of Test Set-ups

Refer to the < Test Setup photos >.



17 Photographs of EUT

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

THE END