FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Changsha Benlei Technology Co., Ltd.

Smart Cutting Machine

Model Number: S301

Addition Model: S31

FCC ID: 2BEVY-S301

Applicant :	Changsha Benlei Technology Co., Ltd.
Address:	Room 3002-621, Comprehensive Building, Sifang Community,
	No.168 Shuangyong Road, Sifangping Street, Kaifu District
	Changsha City, Hunan Province, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
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Report Number:	ESTE-R2506220
Date of Test:	Jun. 20, 2024 ~ Jun. 10, 2025
Date of Report:	Jun. 19, 2025

TABLE OF CONTENTS

Description Page

TEST REPORT VERIFICATION 3
1. GENERAL INFORMATION 4
1.1. Description of Device (EUT) 4
1.2. Information of RF Cable 4
2. SUMMARY OF TEST 5
2.1. Summary of test result 5
2.2. Test Facilities 6
2.3. Measurement uncertainty 7
2.6. Test mode 8
2.7. Channel List 8
2.8. Test Equipment 9
3. AC POWER LINE CONDUCTED EMISSIONS 10
3.1. Limit 10
3.2. Test Setup 10
3.3. Spectrum Analyzer Setting 10
3.4. Test Procedure 10
3.5. Test Result 11
4. RADIATED EMISSION 13
4.1. Limit 13
4.2. Test Setup 14
4.3. Spectrum Analyzer Setting 15
4.4. Test Procedure 15
4.5. Test Result 16
5. FREQUENCY TOLERANCE 24
5.1. Limit 24
5.2. Test Setup 24
5.3. Spectrum Analyzer Setting 24
5.4. Test Procedure 25
5.5. Test Result 26
6. 20DB BANDWIDTH&99% OCCUPIED BANDWIDTH 28
6.1. Limit 28
6.2. Test Setup 28
6.3. Spectrum Analyzer Setting 28
6.4. Test Procedure 29
6.5. Test Result 30
7. ANTENNA REQUIREMENTS 31
7.1. Limit 31
7.2. Test Result 31
8. TEST SETUP PHOTO 32
9. EUT PHOTO 34

Applicant: **Address:**	Changsha Benlei Technology Co., Ltd. Room 3002-621, Comprehensive Building, Sifang Community, No.168 Shuangyong Road, Sifangping Street, Kaifu District Changsha City, Hunan Province, China		
Manufacturer: **Address:**	Changsha Benlei Technology Co., Ltd. Room 3002-621, Comprehensive Building, Sifang Community, No.168 Shuangyong Road, Sifangping Street, Kaifu District Changsha City, Hunan Province, China		
E.U.T:	Smart Cutting Machine		
Model Number:	S301		
Addition Model:	S31 Note: They are identical to each other, only except for model name.		
Power Supply:	DC 24V From Adapter Input AC 120V/60Hz		
Trade Name:	------	Serial No.:	------
Date of Receipt:	Jun. 20, 2024	Date of Test:	Jun. 20, 2024 ~ Jun. 10, 2025
Test Specification:	FCC Part 15 Subpart C (15.225) ANSI C63.10:2013		
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. **Date:** Jun. 19, 2025		

Prepared by:	Reviewed by:	Approved by:
Zephyr Zhu		
Zephyr Zhu / Assistant	Seven Wang / Engineer	Iceman Hu / Manager

Other Aspects:
None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.

1.GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	Smart Cutting Machine
Model Number	:	S301
Software Version	:	N/A
Hardware Version		N/A
Operation frequency	:	13.56MHz
Number of channel	:	1
Modulation Type	:	ASK
Sample Type	:	Prototype production

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. Information of RF Cable

Cable Loss(dB)	Provided by
1.0	Changsha Benlei Technology Co., Ltd.

Note:
1.The customer declared the loss value of the RF Cable. and the test results of this report only apply to the sample as received.
2.The laboratory is not responsible for the accuracy of the cable loss.

2.SUMMARY OF TEST

2.1. Summary of test result

No.	Description of Test Item	FCC Standard Section	Results
1	AC Power Line Conducted Emissions	15.207	PASS
2	Radiated Emission	15.225(a)(b)(c)(d)	PASS
3	Frequency Tolerance	15.225(e)	PASS
4	20dB Bandwidth&99% Occupied Bandwidth	15.215	PASS
5	Antenna Requirement	15.203	PASS

Note: “N/A” denotes test is not applicable in this test report.

2.2. Test Facilities

EMC Lab	:	Accredited by CNAS, CHINA Registration No.: L5288 This Accreditation is valid until: November 12, 2029 Recognized by FCC, USA Designation Number: CN1215 This Recognition is valid until: January 31, 2026 Accredited by A2LA, USA Registration No.: 4366.01 This Accreditation is valid until: January 31, 2026 Recognized by Industry Canada CAB identifier No.: CN0035 This Recognition is valid until: January 31, 2026 Recognized by VCCI, Japan Registration No.:C-14103; T-20073; R-13663; R-20103; G-20097 Date of registration: Apr. 20, 2020 This Recognition is valid until: Apr. 19, 2026 Recognized by TUV Rheinland, Germany Registration No.: UA 50413872 0001 Date of registration: July 31, 2018 Recognized by Intertek Registration No.: 2011-RTL-L2-64 Date of registration: November 08, 2018
Name of Firm	:	EST Technology Co., Ltd.
Site Location	:	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	±3.48dB
Uncertainty for spurious emissions test (Below 30MHz)	±1.62 dB
Uncertainty for spurious emissions test (30MHz-1GHz)	±4.60 dB(Polarize: H)
	±4.68 dB(Polarize: V)
Uncertainty for spurious emissions test (1GHz to 18GHz)	±4.96dB
Uncertainty for radio frequency	7×10-8
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB

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

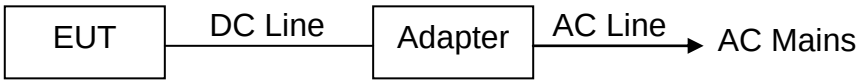
2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
A	Adapter	-	J651-2403000D	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.5m	AC Cable
2	NO	NO	1.0m	DC Cable

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground.



(EUT: Smart Cutting Machine)

2.6. Test mode

The final test as listed below.

Test Item	Modulation Type	Operating Mode
AC Power Line Conducted Emissions	ASK	TX Mode
Radiated Emission	ASK	TX Mode
Frequency Tolerance	ASK	TX Mode
20dB Bandwidth&99% Occupied Bandwidth	ASK	TX Mode

Note: In radiated measurement, the EUT had been pre-scan on the positioned of each 3 axis(X,Y, Z), the worst case was found when positioned on **X-plane.**

2.7. Channel List

Channel No.	Frequency (MHz)
1	13.56

2.8. Test Equipment

For conducted emission test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESRP3	EST-E070	LISAI	June 11,24	June 10,25
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E048	LISAI	June 11,24	June 10,25
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emission test(9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 11,24	June 10,25
Active Loop Antenna	SCHWAREBECK	FMZB 1519B	EST-E054	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 11,24	June 10,25
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

For connect EUT antenna terminal test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
TS 1120	Tonscend	/	/	/	/	/
Test Software	Tonscend	TS1120-3	3.3.38	/	/	/
RF Control Unit	Tonscend	JS0806-2	EST-E134	LISAI	June 11,24	June 10,25
Signal and Spectrum Analyzer	Rohde &Schwarz	FSV 40	EST-E136	LISAI	June 11,24	June 10,25

3.AC POWER LINE CONDUCTED EMISSIONS

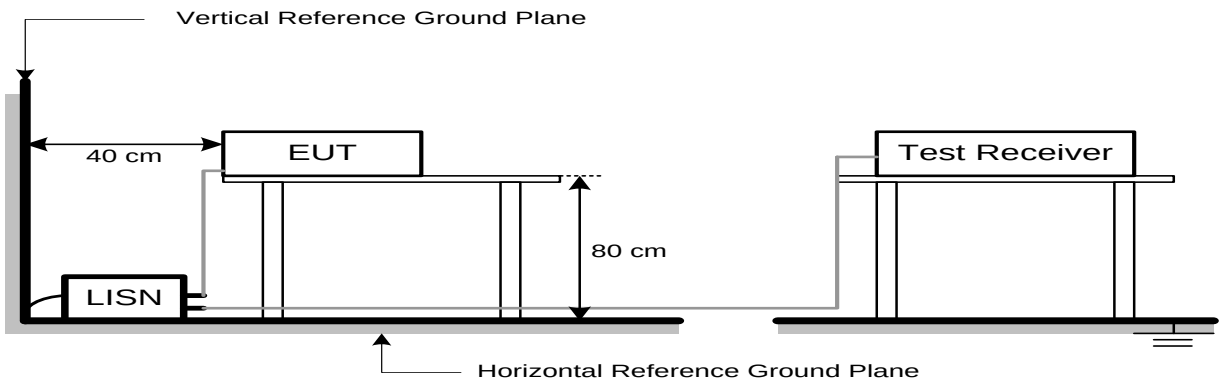
3.1. Limit

Frequency			Maximum RF Line Voltage	
			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.2. Test Setup



3.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

3.4. Test Procedure

a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
b. The EUT Power connected to the power mains through a line impedance stabilization network.
c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
d. Set the EUT transmit continuously with maximum output power.
e. Spectrum analyzer setting parameters in accordance with section 3.3.
f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.

g. Record the results in the test report.

3.5. Test Result

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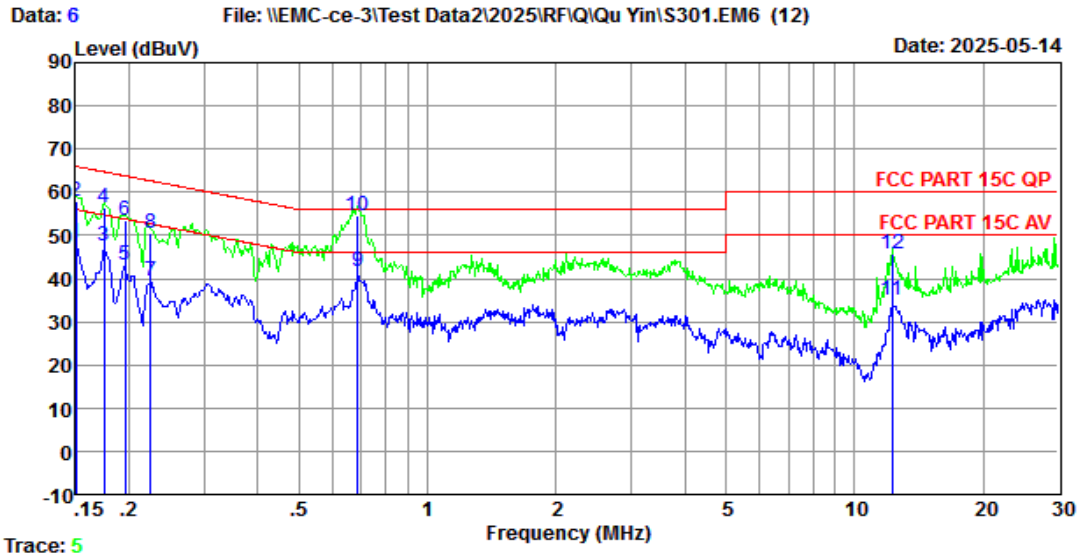

Site no : 3#CE Shield Room Data no. : 6
Env. / Ins. : Temp:25.5℃;Humi:57%;Press:101.1kPa LINE Phase : NEUTRAL
Limit : FCC PART 15C QP
Engineer : Edison Chen
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.15	9.99	9.82	28.61	48.42	56.00	7.58	Average
2	0.15	9.99	9.82	38.27	58.08	66.00	7.92	QP
3	0.17	10.22	9.82	27.36	47.40	54.72	7.32	Average
4	0.17	10.22	9.82	36.55	56.59	64.72	8.13	QP
5	0.20	10.22	9.82	23.21	43.25	53.80	10.55	Average
6	0.20	10.22	9.82	33.51	53.55	63.80	10.25	QP
7	0.22	10.22	9.82	19.57	39.61	52.66	13.05	Average
8	0.22	10.22	9.82	30.59	50.63	62.66	12.03	QP
9	0.69	10.09	9.83	21.68	41.60	46.00	4.40	Average
10	0.69	10.09	9.83	34.53	54.45	56.00	1.55	QP
11	12.25	10.16	9.95	15.05	35.16	50.00	14.84	Average
12	12.25	10.16	9.95	25.45	45.56	60.00	14.44	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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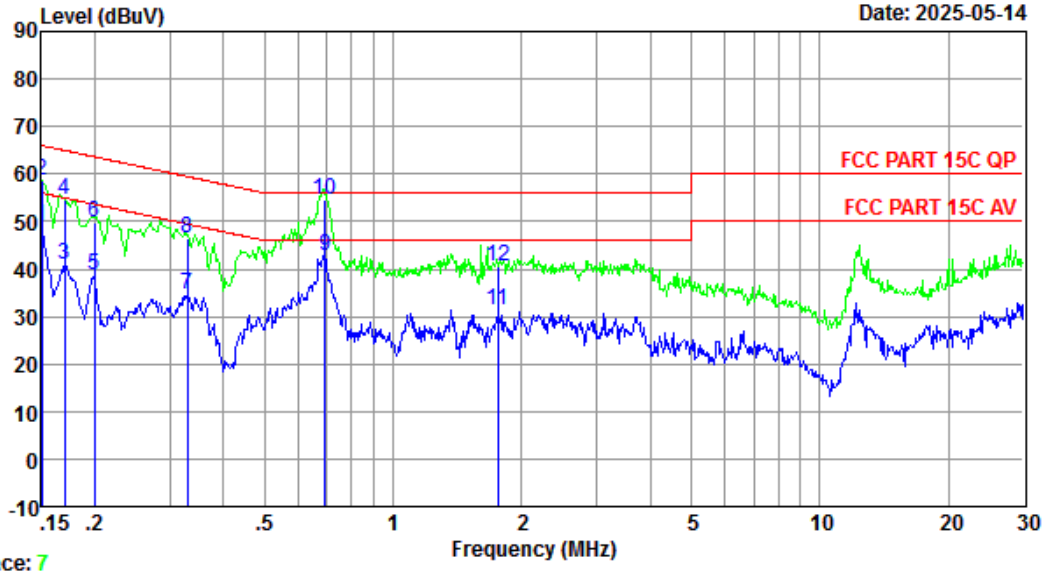


Site no : 3#CE Shield Room Data no. : 8
Env. / Ins. : Temp:25.5℃;Humi:57%;Press:101.1kPa LINE Phase : LINE
Limit : FCC PART 15C QP
Engineer : Edison Chen
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.15	10.19	9.82	28.91	48.92	56.00	7.08	Average
2	0.15	10.19	9.82	38.57	58.58	66.00	7.42	QP
3	0.17	10.19	9.82	20.95	40.96	54.94	13.98	Average
4	0.17	10.19	9.82	34.54	54.55	64.94	10.39	QP
5	0.20	10.00	9.82	18.74	38.56	53.62	15.06	Average
6	0.20	10.00	9.82	30.13	49.95	63.62	13.67	QP
7	0.33	10.09	9.82	14.59	34.50	49.44	14.94	Average
8	0.33	10.09	9.82	26.64	46.55	59.44	12.89	QP
9	0.69	10.13	9.83	22.88	42.84	46.00	3.16	Average
10	0.69	10.13	9.83	34.64	54.60	56.00	1.40	QP
11	1.76	10.16	9.85	11.33	31.34	46.00	14.66	Average
12	1.76	10.16	9.85	20.57	40.58	56.00	15.42	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4.RADIATED EMISSION

4.1. Limit

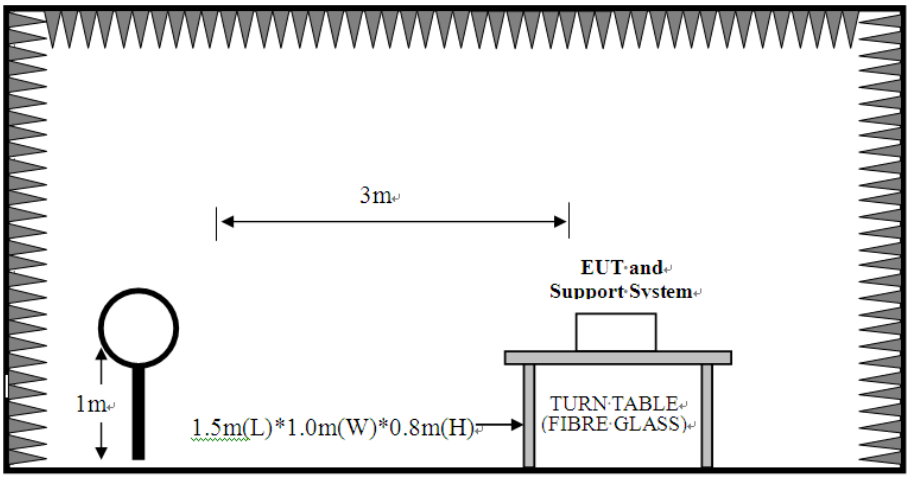
Frequency (MHz)	Field Strength(μV/m)	Distance(m)
0.009~ 0.490	2400/F(KHz)	300
0.490~ 1.705	24000/F(KHz)	30
1.705~ 13.110	30	30
13.110 ~ 13.410	106	30
13.410 ~ 13.553	334	30
13.553 ~13.567	15.848	30
13.567 ~ 13.710	334	30
13.710 ~14.010	106	30
14.010~30	30	30
30~ 88	100	3
88~ 216	150	3
216~ 960	200	3
Above 960	500	3

Note:

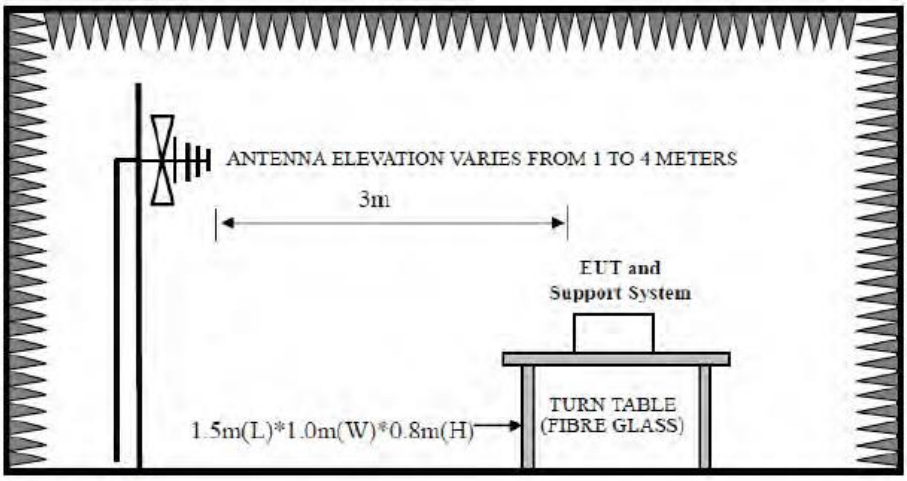
1. Field Strength (dBμV/m) = 20×log[Field Strength (μV/m)].
2. At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
   For example:When measurement the frequencies form 13.553MHz to 13.567Mhz at 3m distance,the Limit show in below:
   Limit(dBμV/m)@3m = 20×log(15,848)dBμV/m +40×log(30/3)dB =124dBμV/m

4.2. Test Setup

9kHz~30MHz



30~1000MHz



4.3. Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For 30MHz-1GHz

Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

4.4. Test Procedure

a. EUT was placed on a turn table, which is 0.8 meter high above ground.
b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
c. Set the EUT transmit continuously with maximum output power.
d. Spectrum analyzer setting parameters in accordance with section 4.3.
e. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
f. For below 30MHz test, the center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates both horizontal and vertical polarization to find out the maximum emission level.
g. For above 30MHz test, the antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
h. Record the results in the test report.

4.5. Test Result

Field strength of fundamental

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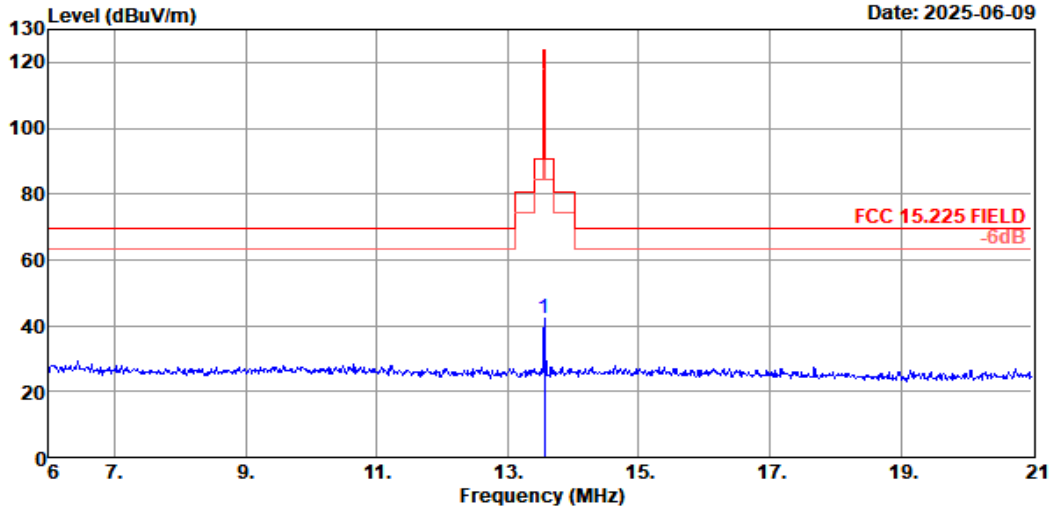

Site no. : 2# 966 chamber Data no. : 5
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COPLANAR
Limit : FCC 15.225 FIELD
Env. / Ins. : Temp:20.6°C;Humi:48%;Press:101.52kPa
Engineer : JBR
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	13.5600	20.33	0.43	21.45	42.21	124.00	81.79	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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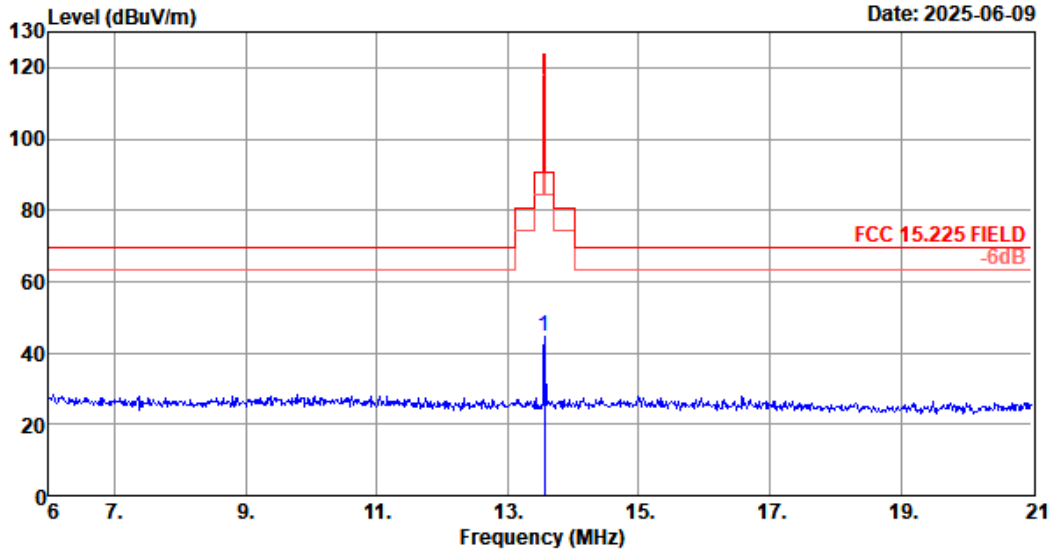
Data: 6 File: \\EMC-966-2\test data\2025\RF\Q\Qu Ying\S301(FCC ID).EM6 (6)



Site no. : 2# 966 chamber Data no. : 6
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COAXIAL
Limit : FCC 15.225 FIELD
Env. / Ins. : Temp:20.6℃;Humi:48%;Press:101.52kPa
Engineer : JBR
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	13.5600	20.33	0.43	23.73	44.49	124.00	79.51	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Below 30MHz Spurious Emission

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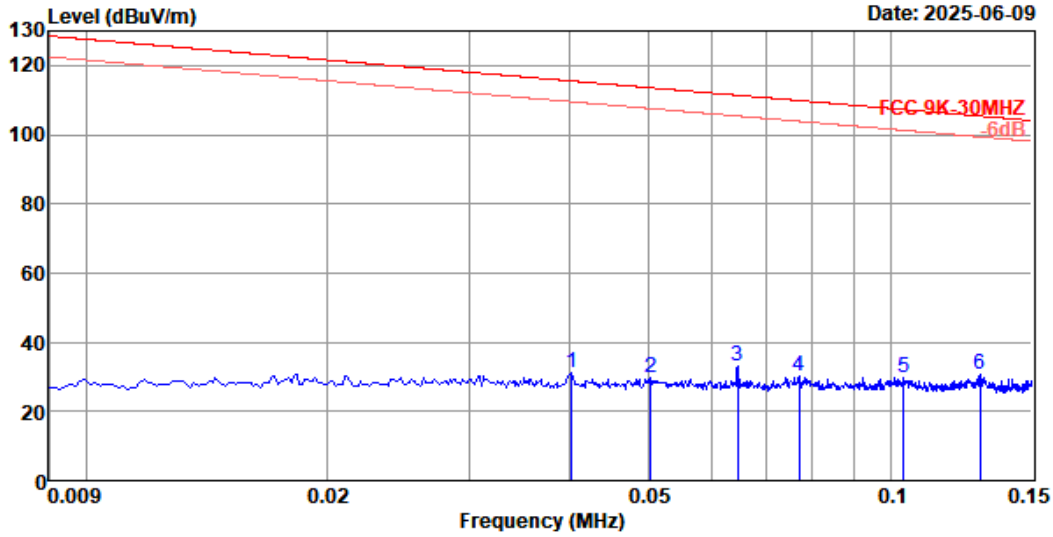

Site no. : 2# 966 chamber Data no. : 1
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COAXIAL
Limit : FCC 9K-30MHZ
Env. / Ins. : Temp:20.6°C;Humi:48%;Press:101.52kPa
Engineer : JBR
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0402	19.80	0.03	11.35	31.18	115.53	84.35	Peak
2	0.0503	19.80	0.03	9.82	29.65	113.57	83.92	Peak
3	0.0646	19.80	0.03	13.27	33.10	111.41	78.31	Peak
4	0.0770	19.80	0.03	10.27	30.10	109.88	79.78	Peak
5	0.1039	19.90	0.03	9.83	29.76	107.27	77.51	Peak
6	0.1291	20.10	0.03	10.42	30.55	105.38	74.83	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

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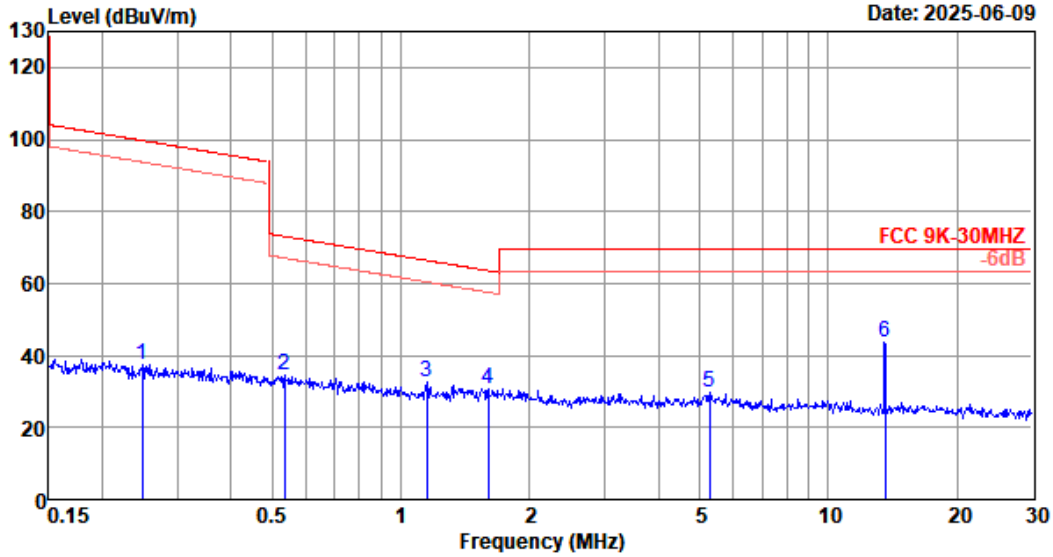
Data: 2 File: \\EMC-966-2\test data\2025\RF\Q\Qu Ying\S301(FCC ID).EM6 (6)



Site no. : 2# 966 chamber Data no. : 2
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COAXIAL
Limit : FCC 9K-30MHZ
Env. / Ins. : Temp:20.6℃;Humi:48%;Press:101.52kPa
Engineer : JBR
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.2481	19.97	0.03	17.45	37.45	99.71	62.26	Peak
2	0.5350	19.89	0.07	14.59	34.55	73.04	38.49	Peak
3	1.1473	19.81	0.07	12.63	32.51	66.41	33.90	Peak
4	1.6020	19.86	0.10	10.72	30.68	63.51	32.83	Peak
5	5.2770	20.11	0.20	9.49	29.80	69.54	39.74	Peak
6	13.5600	20.33	0.43	22.87	43.63	69.54	25.91	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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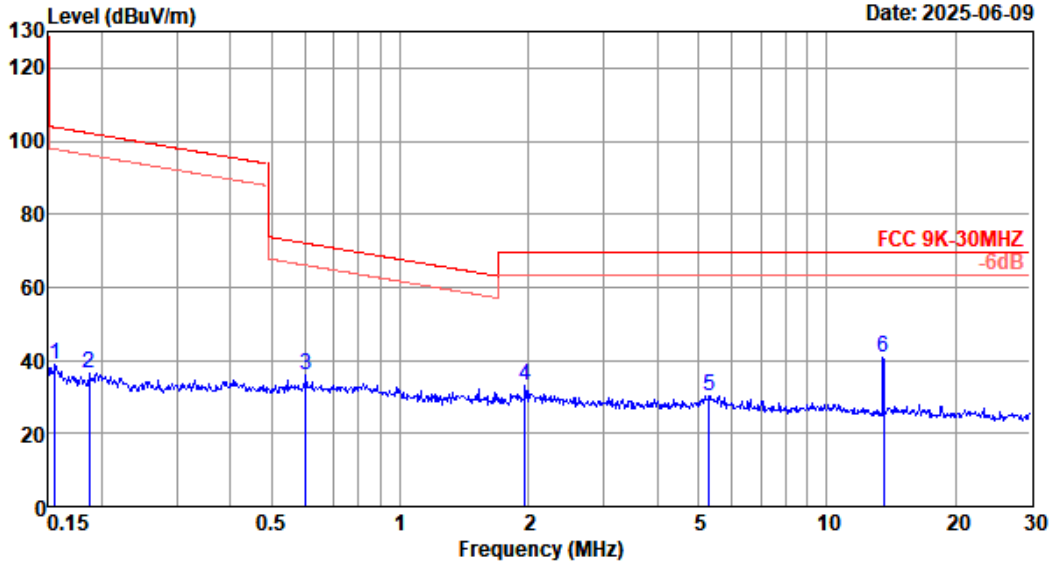
Data: 3 File: \\EMC-966-2\test data\2025\RF\Q\Qu Ying\S301(FCC ID).EM6 (6)



Site no. : 2# 966 chamber Data no. : 3
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COPLANAR
Limit : FCC 9K-30MHZ
Env. / Ins. : Temp:20.6℃;Humi:48%;Press:101.52kPa
Engineer : JBR
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1557	20.00	0.03	18.83	38.86	103.76	64.90	Peak
2	0.1864	19.99	0.03	16.56	36.58	102.20	65.62	Peak
3	0.6011	19.88	0.07	16.01	35.96	72.02	36.06	Peak
4	1.9593	19.90	0.10	12.89	32.89	69.54	36.65	Peak
5	5.3050	20.12	0.20	10.13	30.45	69.54	39.09	Peak
6	13.5600	20.33	0.43	20.20	40.96	69.54	28.58	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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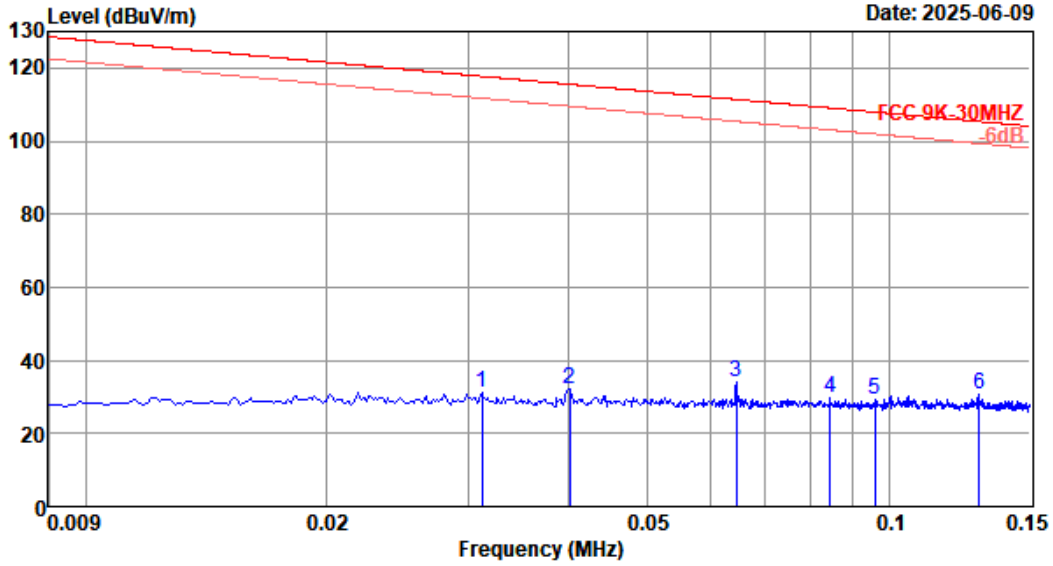
Data: 4 File: \\EMC-966-2\test data\2025\RF\Q\Qu Ying\S301(FCC ID).EM6 (6)



Site no. : 2# 966 chamber Data no. : 4
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COPLANAR
Limit : FCC 9K-30MHZ
Env. / Ins. : Temp:20.6℃;Humi:48%;Press:101.52kPa
Engineer : JBR
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0311	19.80	0.03	11.42	31.25	117.74	86.49	Peak
2	0.0400	19.80	0.03	12.20	32.03	115.56	83.53	Peak
3	0.0646	19.80	0.03	14.43	34.26	111.41	77.15	Peak
4	0.0844	19.90	0.03	9.77	29.70	109.07	79.37	Peak
5	0.0960	19.90	0.03	9.54	29.47	107.96	78.49	Peak
6	0.1294	20.10	0.03	10.58	30.71	105.36	74.65	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Above 30MHz Spurious Emission

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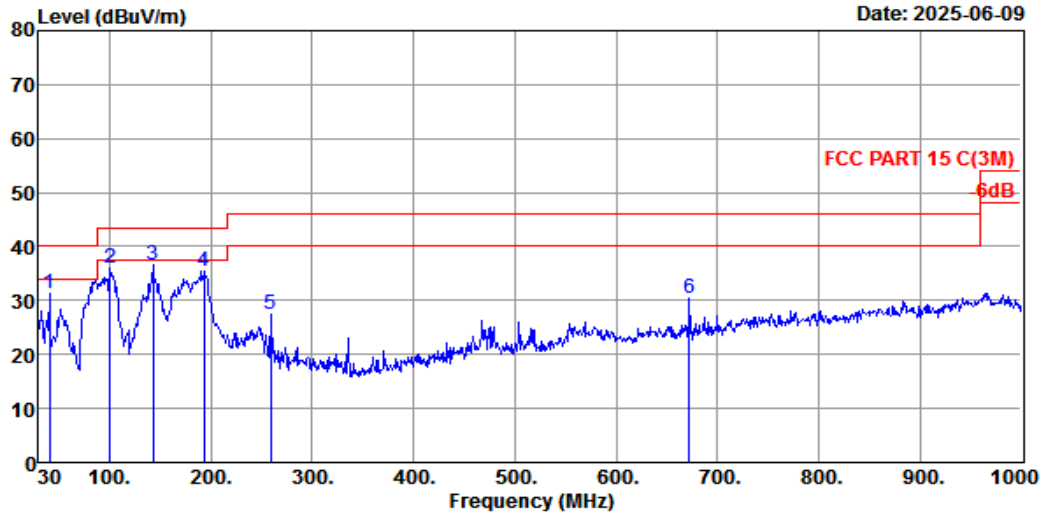
Data: 115 File: \\EMC-966-5\Test Data2\2025\RF\Q\Qu yin\S301.EM6 (118)



Site no. : 5# 966 Chamber Data no. : 115
Dis. / Ant. : 3m 54681 Ant. pol. : VERTICAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp:22.6℃;Humi:51.5%;Press:101.55kPa
Engineer : Wind Li
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	40.67	13.20	1.06	16.98	31.24	40.00	8.76	QP
2	100.81	10.40	1.18	24.45	36.03	43.50	7.47	QP
3	142.52	12.10	1.72	22.71	36.53	43.50	6.97	QP
4	192.96	8.90	2.36	24.03	35.29	43.50	8.21	QP
5	258.92	14.26	2.79	10.45	27.50	46.00	18.50	QP
6	672.14	20.28	4.66	5.52	30.46	46.00	15.54	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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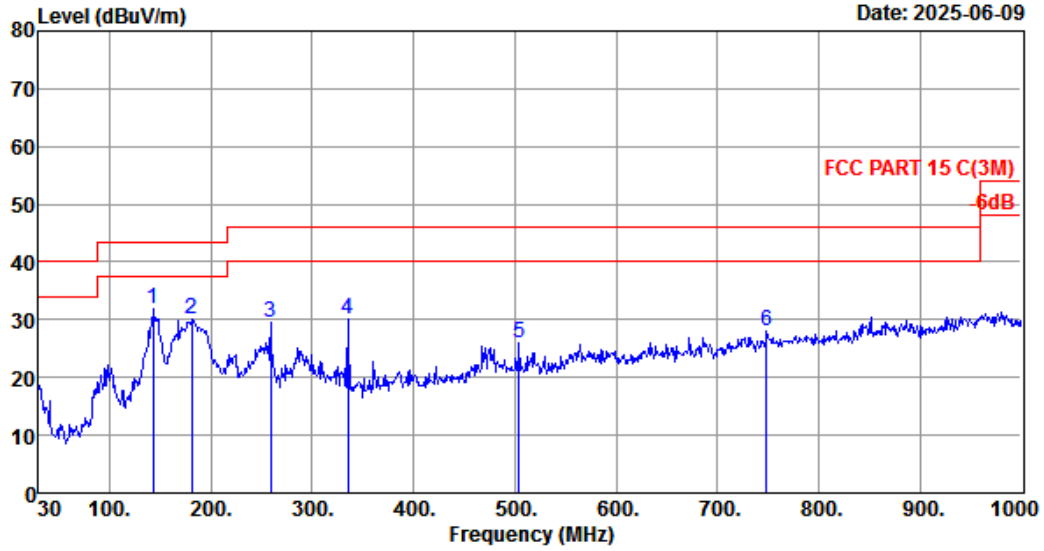
Data: 116 File: \\EMC-966-5\Test Data2\2025\RF\Q\Qu yin\S301.EM6 (118)



Site no. : 5# 966 Chamber Data no. : 116
Dis. / Ant. : 3m 54681 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp:22.6℃;Humi:51.5%;Press:101.55kPa
Engineer : Wind Li
EUT : Smart Cutting Machine
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : S301
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	142.52	12.10	1.72	18.01	31.83	43.50	11.67	QP
2	181.32	9.20	2.21	18.55	29.96	43.50	13.54	QP
3	258.92	14.26	2.79	12.51	29.56	46.00	16.44	QP
4	335.55	13.93	3.21	12.86	30.00	46.00	16.00	QP
5	504.33	18.06	4.01	3.79	25.86	46.00	20.14	QP
6	748.77	22.00	4.95	1.03	27.98	46.00	18.02	QP

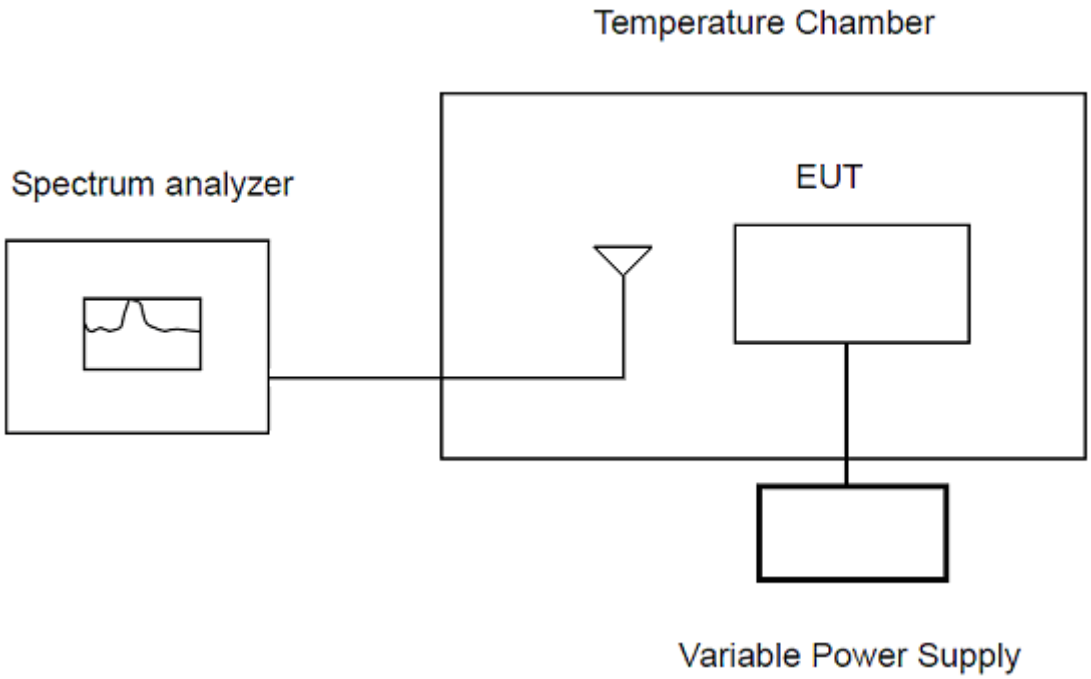
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

5.FREQUENCY TOLERANCE

5.1. Limit

The devices operating in the 13.553-13.567 MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20°C to +50°C using an environmental chamber. The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

5.2. Test Setup



5.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	10KHz
VBW	10KHz
Span	50KHz
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

5.4. Test Procedure

For measurement frequency stability under temperature variation :

a. Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.
b. Turn the EUT OFF and place it inside the environmental temperature chamber.
c. The spectrum analyzer connected a recevie antena and place near the EUT.
d. Spectrum analyzer setting parameters in accordance with section 5.3.
e. Set the temperature control on the chamber to the Specified temperature and allow the oscillator heater and the chamber temperature to stabilize.
f. Turn the EUT ON with the rated voltage, and the EUT transmit continuously with maximum output power.
g. Record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.
h. Repeat step d through step g to measured the temperature form -20℃ to +50℃ in 10℃ steps.

For frequency stability under voltage variation:

a. Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.
b. Turn the EUT OFF and place it inside the environmental temperature chamber.
c. The spectrum analyzer connected a recevie antena and place near the EUT.
d. Spectrum analyzer setting parameters in accordance with section 5.3.
e. Unless otherwise specified, set the temperature control on the chamber to the ambient room temperature (+15℃ to +25℃) and allow the oscillator heater and the chamber temperature to stabilize.
f. Turn the EUT ON with the rated voltage, and the EUT transmit continuously with maximum output power.
g. Record the operating frequency.
h. Repeat step d through step g to measured the varied from 85% to 115% of the rated voltage.

5.5. Test Result

Frequency Stability Under Temperature Variation							
Declared Frequency (MHz)	Voltage (V)	Temperature (℃)	Time (minutes)	Measurement Value (MHz)	Frequency Deviation (%)	Limit (%)	Test Result
13.56	24	50	0	13.5603374	0.0024883	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603374	0.0024883	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		40	0	13.5603374	0.0024883	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603373	0.0024875	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		30	0	13.5603374	0.0024884	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603374	0.0024883	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		20	0	13.5603374	0.0024883	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603374	0.0024883	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		10	0	13.5603374	0.0024884	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603374	0.0024883	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		0	0	13.5603374	0.0024884	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603374	0.0024881	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		-10	0	13.5603374	0.0024883	±0.01	PASS
			2	13.5603374	0.0024881	±0.01	PASS
			5	13.5603374	0.0024884	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS
		-20	0	13.5603374	0.0024882	±0.01	PASS
			2	13.5603374	0.0024883	±0.01	PASS
			5	13.5603374	0.0024883	±0.01	PASS
			10	13.5603374	0.0024883	±0.01	PASS

Note:

Frequency Deviation(%)=[(Measurement Value- Declared Frequency)/ Declared Frequency]*100%.

Frequency Stability Under Voltage Variation						
Frequency (MHz)	Temperature (℃)	Voltage (V)	Measurement Value (MHz)	Frequency Error (%)	Limit (%)	Test Result
13.56	24.6	24.00	13.5603374	0.0024883	±0.01	PASS
		27.60	13.5603374	0.0024883	±0.01	PASS
		20.40	13.5603374	0.0024883	±0.01	PASS

Note:

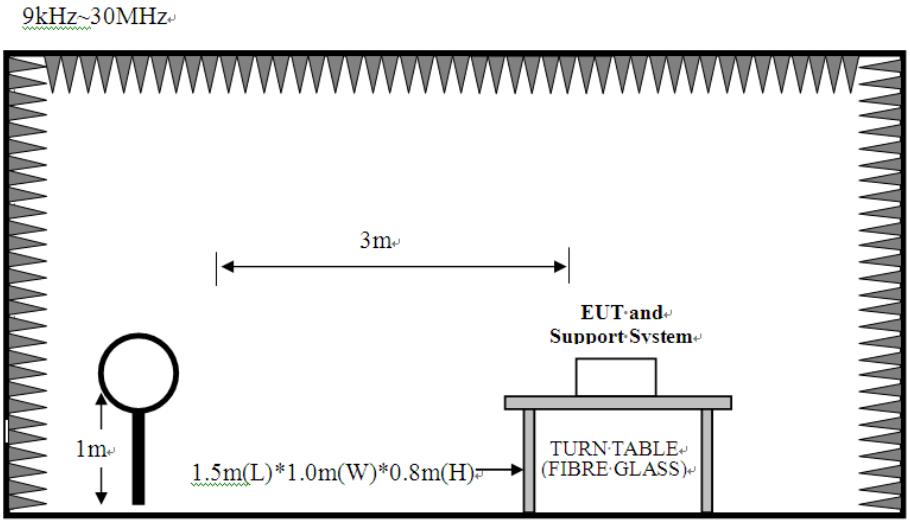
Frequency Deviation(%)=[(Measurement Value- Declared Frequency)/ Declared Frequency]*100%.

6.20dB Bandwidth&99% Occupied Bandwidth

6.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §13.553-13.567 MHz and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2. Test Setup



6.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	10KHz
VBW	30KHz
Span	two times and five times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.4. Test Procedure

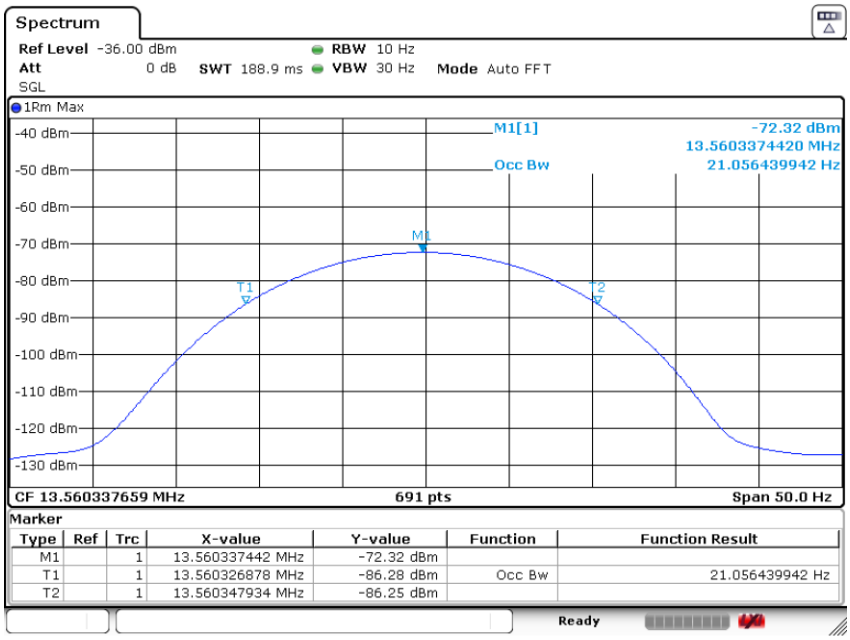
a. EUT was placed on a turn table, which is 0.8 meter high above ground
b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
c. Set the EUT transmit continuously with maximum output power.
d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
e. Spectrum analyzer setting parameters in accordance with section 6.3.
f. Allow the trace to stabilize, Set the spectrum analyzer marker to thehighest level of the displayed trace, use the 99% power bandwidth function to measure 99% occupied bandwidth,and use mark-dettle function measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.
g. Record the the value of 99% occupied bandwidth and 20 dB bandwidth.

6.5. Test Result

Temperature	24.6℃	Relative Humidity	55%	
Test Voltage	120V/60Hz			
Frequency (MHz)	20dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	20 dB Bandwidth Limit (KHz)	Test Result
13.56	0.024747	0.021564	≤11.2	PASS

Note :

For NFC devices,the permitted band is 13.553MHz-13.567MHz,the bandwidth is 14KHz,so the Limit=14KHz×80%=11.2KHz.



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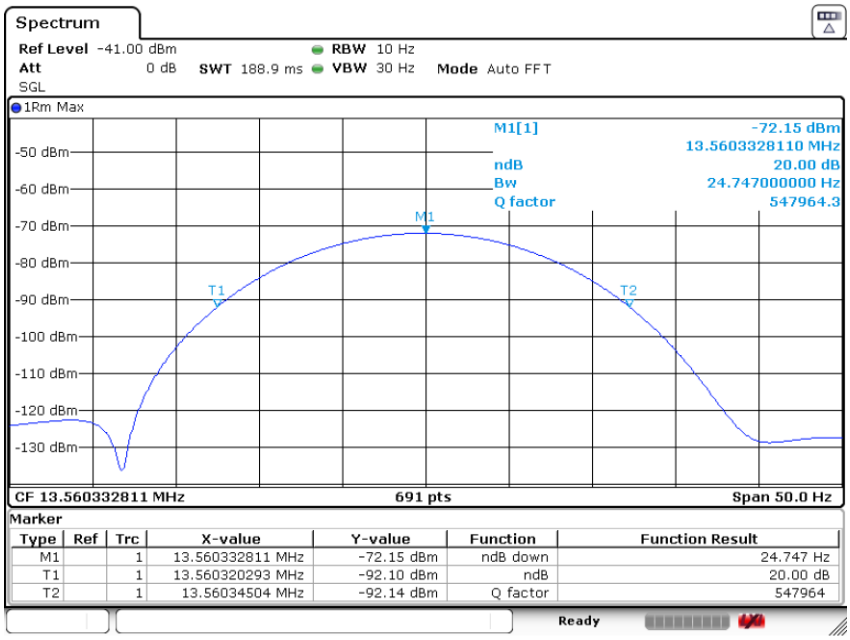


Date: 12.JUN.2025 09:13:57

7.ANTENNA REQUIREMENTS

7.1. Limit

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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

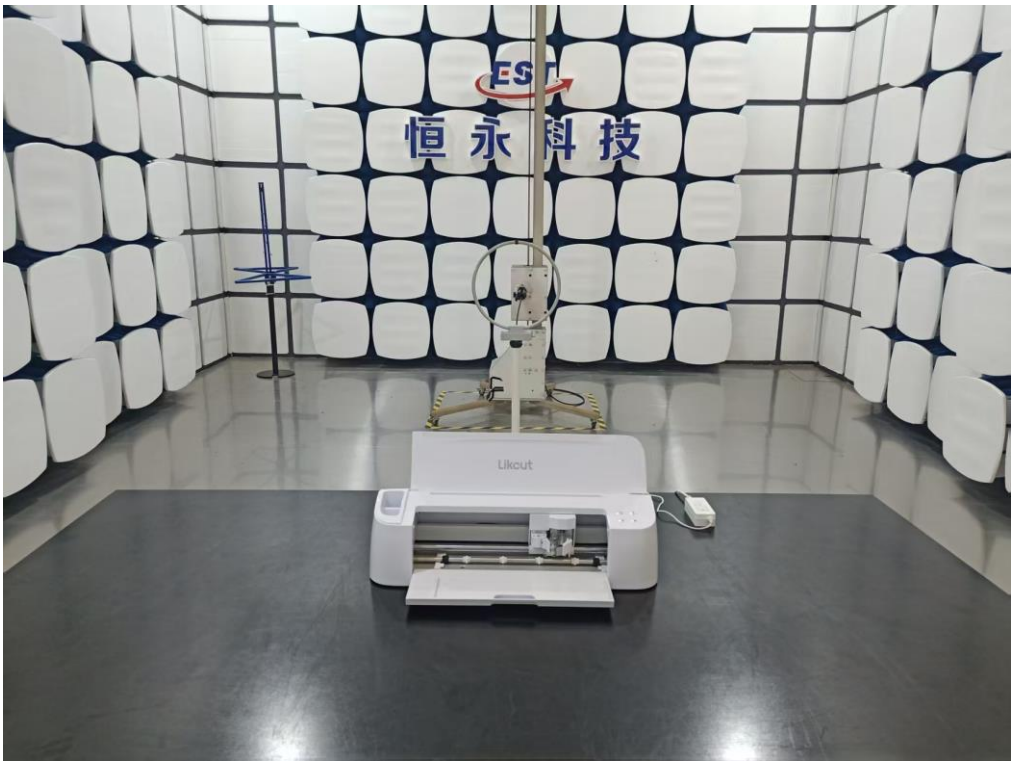
7.2. Test Result

The antennas used for this product is internal antenna, so compliance with antenna requirements. (Please refer to the EUT photo for details)

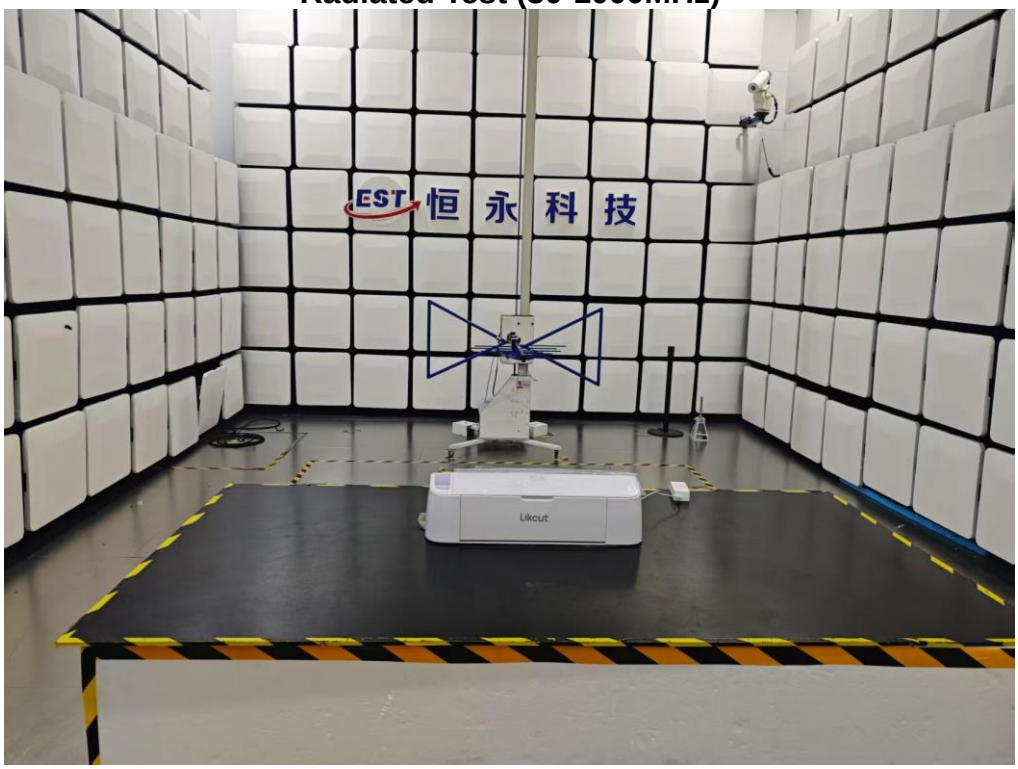
8. TEST SETUP PHOTO

Conducted Emissions Test (Below 30MHz)

Radiated Test(Below 30MHz)



Radiated Test (30-1000MHz)



9.EUT PHOTO

Refer to report no. ESTE-R2505181

End of Test Report