

TECHNICAL REPORT



Report No.: TW2106151E
File Reference No.: 2021-07-27

Applicant: Shiji (US) Inc.

Product: POS COMPUTER

Model No.: HK560M

Trademark: Shiji

Test Standards: FCC Part 15.225

Test Result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15.225, for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: July 27, 2021

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

**Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West,
Tong Le Village, Nanshan District, Shenzhen, China**

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.
Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China
Telephone: +86 755 83448688
Fax: +86 755 83442996
Site on File with the Federal Communications Commission – United States
Registration Number: 744189
For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Shiji (US) Inc.
Address: 730 Peachtree Street NE, Suite 375, Atlanta, Georgia, 30319, USA
Telephone: --
Fax: --

1.3 Description of EUT

Product: POS COMPUTER
Manufacturer: Shiji (US) Inc.
Address: 730 Peachtree Street NE, Suite 375, Atlanta, Georgia, 30319, USA
Brand Name: Shiji
Model Number: HK560M
Additional Model Name N/A
Additional Trade Name N/A
Rating: Input: DC24.0V, 2.5A or 5A
Power Supply: Model: FSP060-DAAN3;
Input: 100-240V~, 1.8A, 50-60Hz; Output: DC24V, 2.5A, 60W
Alternative Power Model: FSP120-AAAN3;
Supply Input: 100-240V~, 1.8A, 50-60Hz; Output: DC24V, 5.0A, 120W
Remark: Two power supplies were tested and only the worst case was recorded in the test report.

Operation Frequency: 13.56MHz
Modulation Type: ASK
Antenna Designation PCB Antenna with Gain 0dBi

1.4 Submitted Sample: 2 Samples

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1.5 Test Duration

2021-06-11 to 2021-07-27

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions below 9kHz-30MHz Uncertainty =4.3dB

Radiated Emissions below 30MHz-1GHz Uncertainty =4.7dB

Occupied Channel Bandwidth Uncertainty =5%

1.7 Test Engineer

The sample tested by



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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2021-06-18	2022-06-17
LISN	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17
LISN	R&S	EZH3-Z5	100253	2021-06-18	2022-06-17
Ultra Broadband ANT	R&S	HL562	100157	2021-06-18	2022-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2021-06-18	2022-06-17
Loop Antenna	EMCO	6507	00078608	2021-06-18	2024-06-17
Spectrum	R&S	FSIQ26	100292	2021-06-18	2022-06-17
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2021-06-18	2022-06-17
Horn Antenna	R&S	BBHA 9120D	9120D-631	2021-06-18	2022-06-17
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2021-06-18	2022-06-17
9*6*6 Anechoic	--	--	N/A	2020-07-06 2021-07-02	2021-07-05 2022-07-01
EMI Test Receiver	RS	ESVB	826156/011	2021-06-18	2022-06-17
EMI Test Receiver	RS	ESH3	860904/006	2021-06-18	2022-06-17
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2021-06-18	2022-06-17
Spectrum	HP/Agilent	E4407B	MY50441392	2021-06-18	2022-06-17
Spectrum	RS	FSP	1164.4391.38	2021-01-15	2022-01-14
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2021-06-18	2022-06-17
RF Cable	Zhengdi	7m	--	2021-06-18	2022-06-17
RF Switch	EM	EMSW18	060391	2021-06-18	2022-06-17
Pre-Amplifier	Schwarebeck	BBV9743	#218	2021-06-18	2022-06-17
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2021-06-18	2022-06-17
LISN	SCHAFFNER	NNB42	00012	2021-01-06	2022-01-05

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3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna requirements	Pass	Compliant
FCC Part 15, Paragraph 15.207	Conducted Emission Test	Pass	Compliant
FCC Part 15, Paragraph 15.209 (a) (f); FCC Part 15, Paragraph 15.225 (a)	Radiated Emissions	Pass	Compliant
FCC Part 15, Paragraph 15.225 (e)	Frequency Tolerance	Pass	Compliant
FCC Part 15, Paragraph 15.215	20dB Bandwidth Testing	Pass	Compliant

3.2 Test Standards

FCC Part 15 Subpart C , ANSI C63.4 :2014 and ANSI C63.10 :2013

4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

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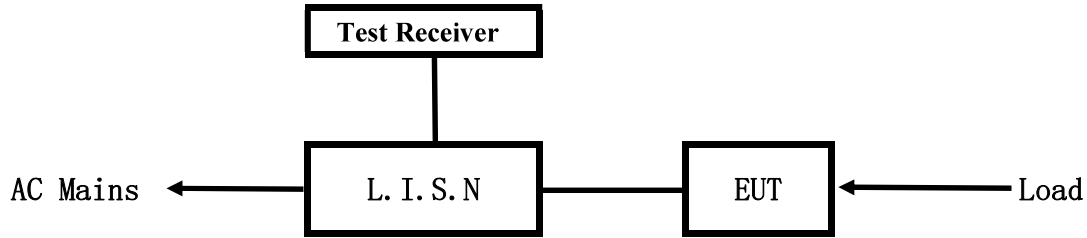
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5. Power Line Conducted Emission Test

5.1 Schematics of the test

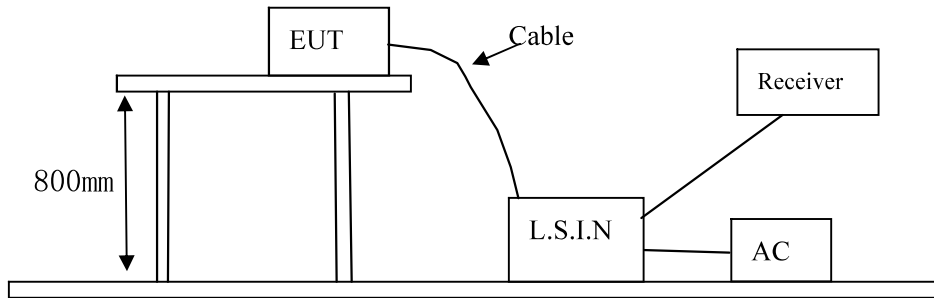


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2013.

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
POS COMPUTER	Shiji (US) Inc.	HK560M	2ATYP-HK560M

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	Rating
Switching Power Supply	FSP	FSP060-DAAN3	Input: 100-240V~, 1.8A, 50-60Hz; Output: DC24V, 2.5A, 60W

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Switching Power Supply	FSP	FSP120-AAAN3	Input: 100-240V~, 1.8A, 50-60Hz; Output: DC24V, 5A, 1200W
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5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2013.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.0	60.0	50.0

- Notes:
1. *Decreasing linearly with logarithm of frequency.
 2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz. (The average detector is necessary when the Quasi-peak emission level beyond the average Limit.)

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A: Conducted Emission on Live Terminal (150kHz to 30MHz)

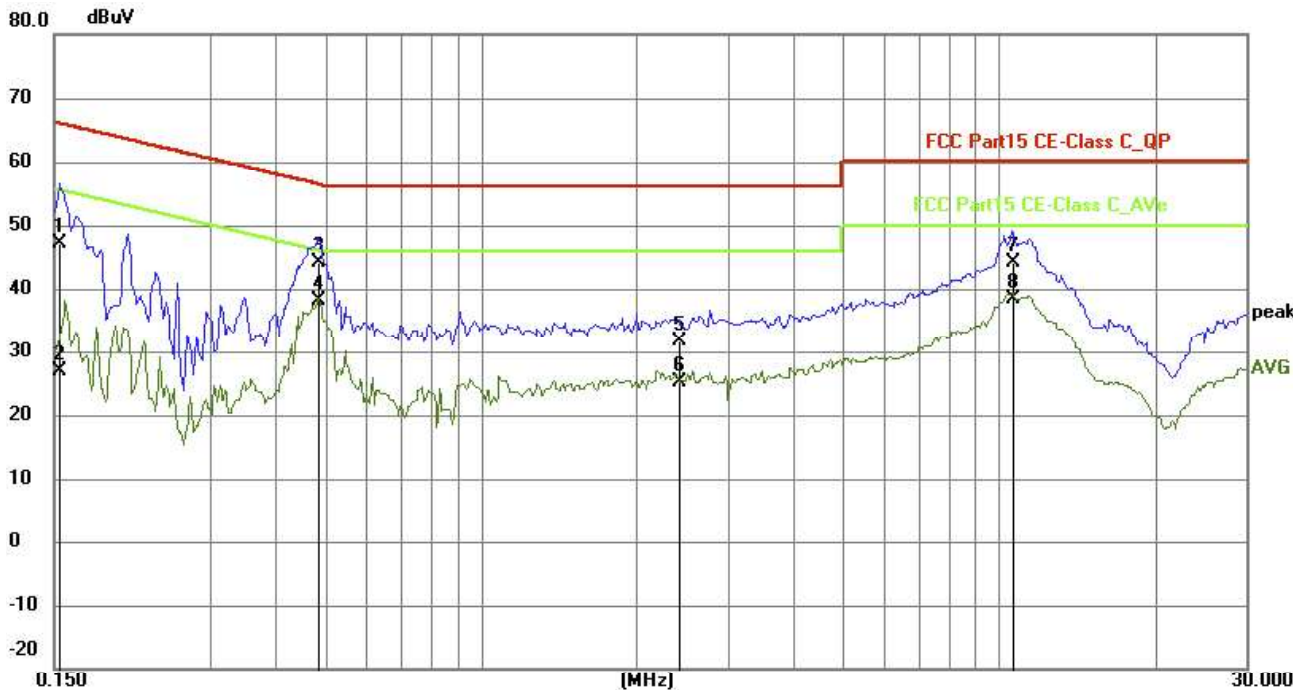
EUT Operating Environment

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keep Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1539	37.46	9.78	47.24	65.79	-18.55	QP	P
2	0.1539	17.19	9.78	26.97	55.79	-28.82	AVG	P
3	0.4854	34.37	9.77	44.14	56.25	-12.11	QP	P
4	0.4854	28.47	9.77	38.24	46.25	-8.01	AVG	P
5	2.4119	21.86	9.82	31.68	56.00	-24.32	QP	P
6	2.4119	15.25	9.82	25.07	46.00	-20.93	AVG	P
7	10.6167	33.91	10.19	44.10	60.00	-15.90	QP	P
8	10.6167	28.26	10.19	38.45	50.00	-11.55	AVG	P

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

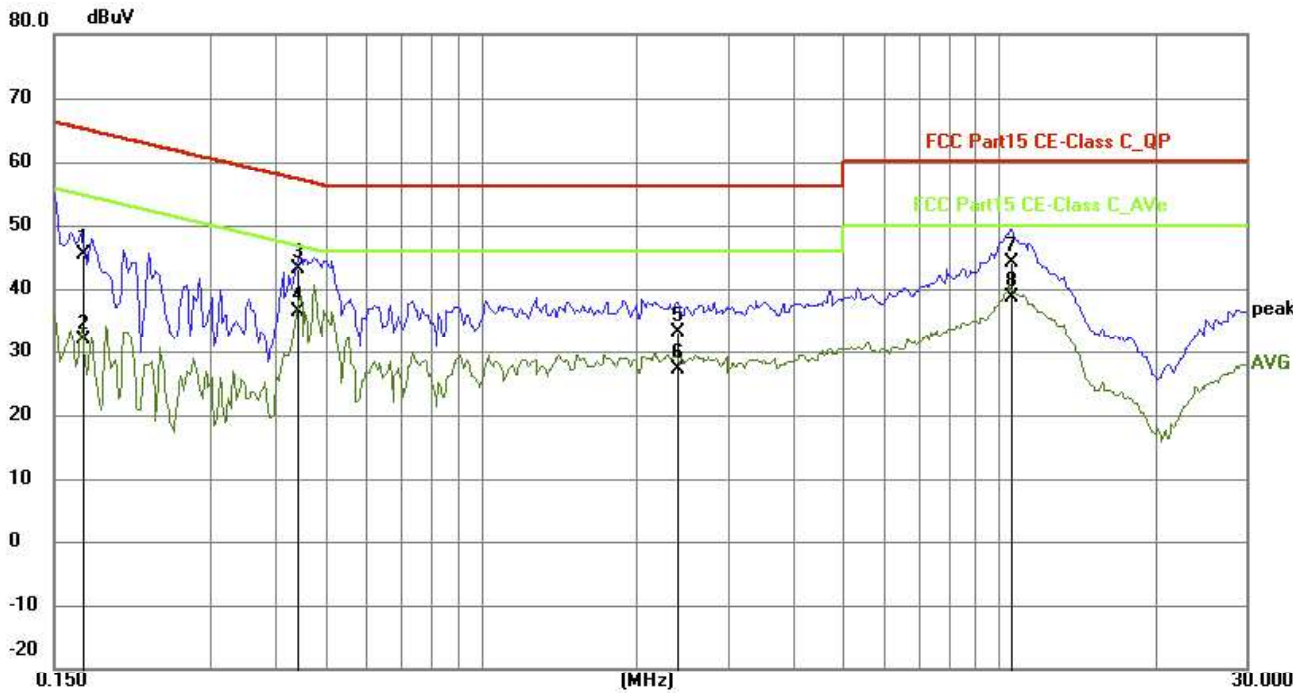
EUT Operating Environment

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keep Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1695	35.65	9.77	45.42	64.98	-19.56	QP	P
2	0.1695	22.21	9.77	31.98	54.98	-23.00	AVG	P
3	0.4425	33.37	9.77	43.14	57.01	-13.87	QP	P
4	0.4425	26.60	9.77	36.37	47.01	-10.64	AVG	P
5	2.3885	23.33	9.82	33.15	56.00	-22.85	QP	P
6	2.3885	17.43	9.82	27.25	46.00	-18.75	AVG	P
7	10.5582	33.86	10.18	44.04	60.00	-15.96	QP	P
8	10.5582	28.47	10.18	38.65	50.00	-11.35	AVG	P

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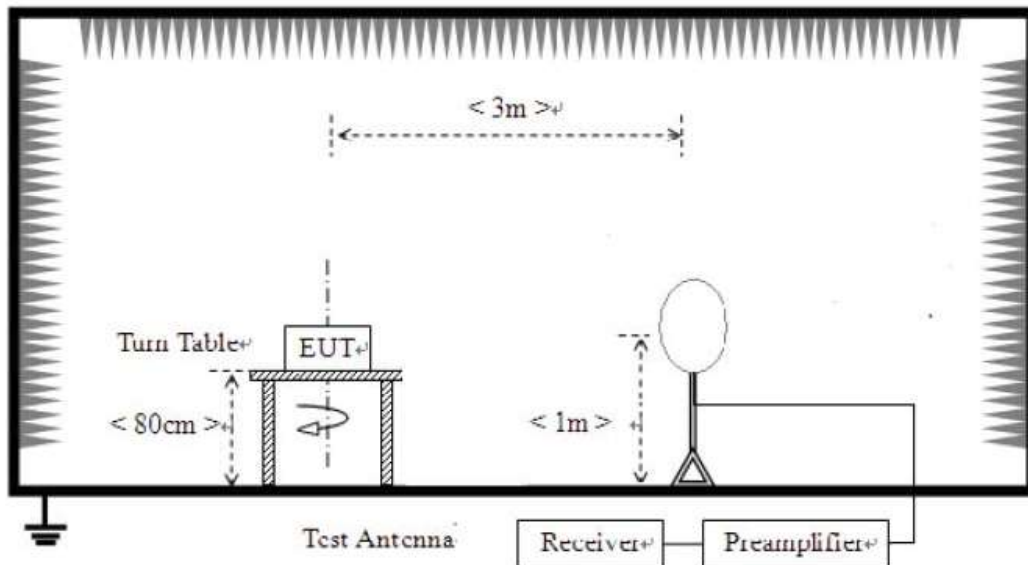
6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at TIMEWAY EMC Laboratory. This site is on file with the FCC laboratory division, Registration No.744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 9 kHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with RBW=120 kHz/VBW=300 kHz; All readings from 9 kHz to 30 MHz are quasi-peak values with RBW=10 kHz/VBW=30 kHz. For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission test in these three bands are based on measurements employing an average detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup

9kHz-30MHz



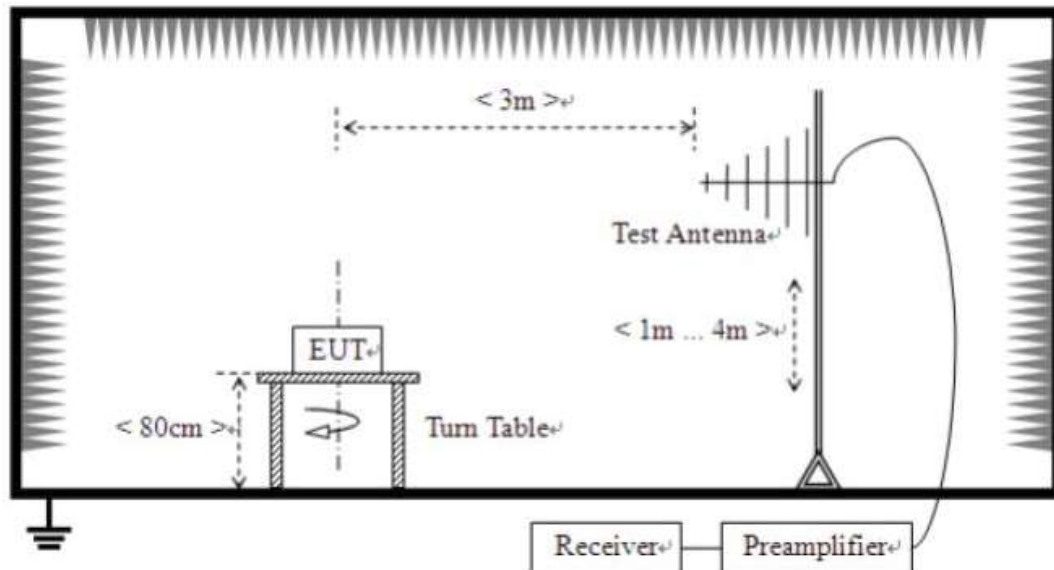
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30MHz-1000MHz



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

A. **Fundamental frequency are compiled to limit on Paragraph 15.225.**

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

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B. Frequencies in restricted band are compiled to limit on Paragraph 15.209.

Limits for frequency below 30MHz

Frequency Range (MHz)	Distance (m)	Field strength (V/m)
0.009-0.490	300	2400/F(kHz)
0.490-1.705	30	24000/F(kHz)
1.705-30	30	30

Limits for frequency above 30MHz

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (μ V)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
 4. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6.5 Test result

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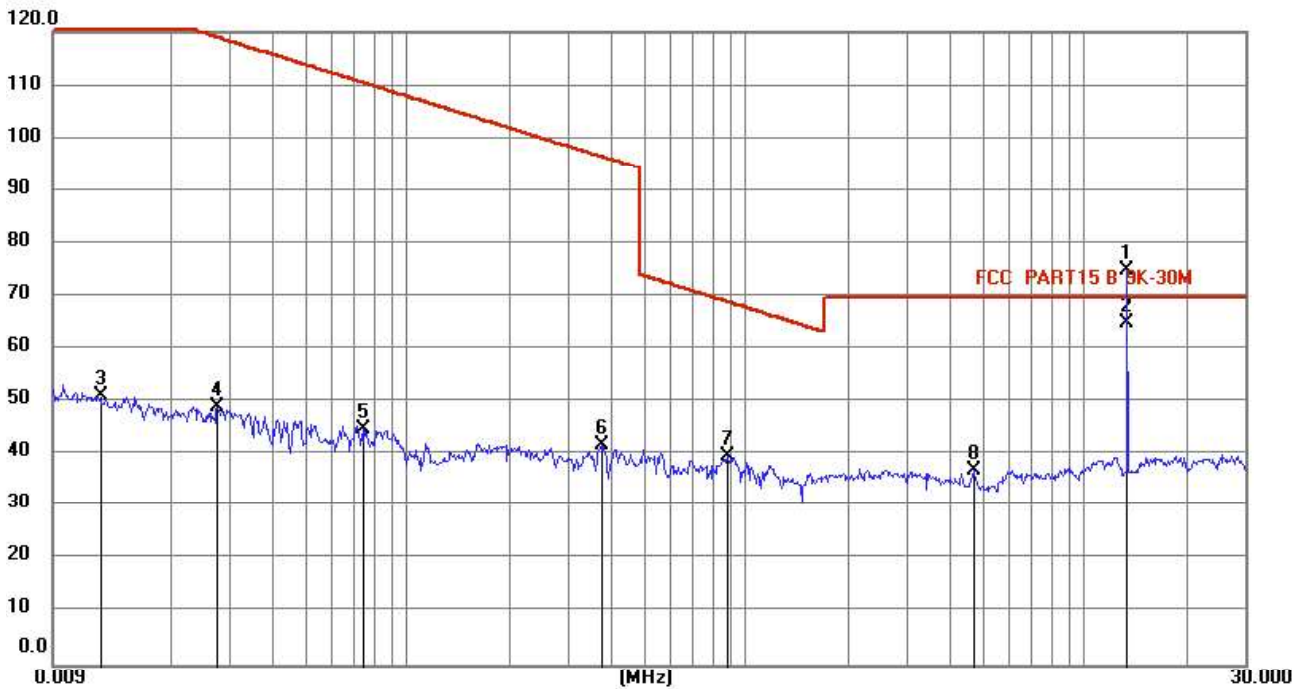
Measurement data:

Note: Limit dBuV/m @3m = Limit dBμV/m @300m+ 80

Limit dBuV/m @3m = Limit dBμV/m @30m + 40

For 13.56MHz, the limit is 104 dBμV/m@3m

9 kHz~30 MHz



No.	Frequency (MHz)	Reading ()	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	13.5650	64.57	10.31	74.88	69.57	/	peak	/
2	13.5650	54.67	10.31	64.98	69.57	-4.59	AVG	P
3	0.0125	41.13	10.09	51.22	125.49	-74.27	peak	P
4	0.0275	38.85	10.22	49.07	118.68	-69.61	peak	P
5	0.0742	34.99	9.77	44.76	110.10	-65.34	peak	P
6	0.3748	32.06	9.76	41.82	96.11	-54.29	peak	P
7	0.8820	29.85	9.79	39.64	68.71	-29.07	peak	P
8	4.7187	27.08	9.92	37.00	69.54	-32.54	peak	P

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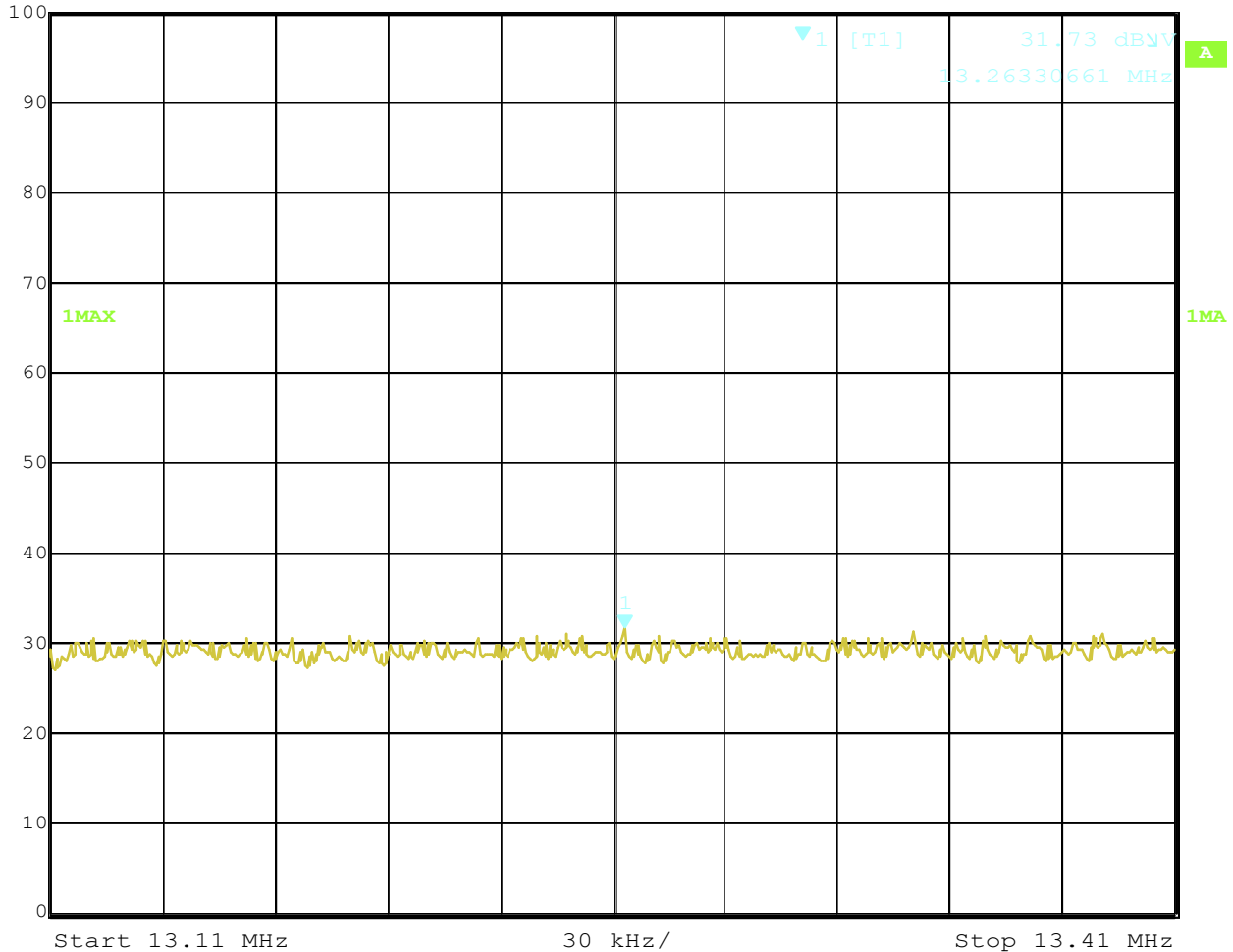
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13.11MHz-13.41MHz

	Marker 1 [T1]	RBW	10 kHz	RF Att	30 dB
	Ref Lvl	31.73 dB μ V	VBW	30 kHz	
	100 dB μ V	13.26330661 MHz	SWT	15 ms	Unit dB μ V



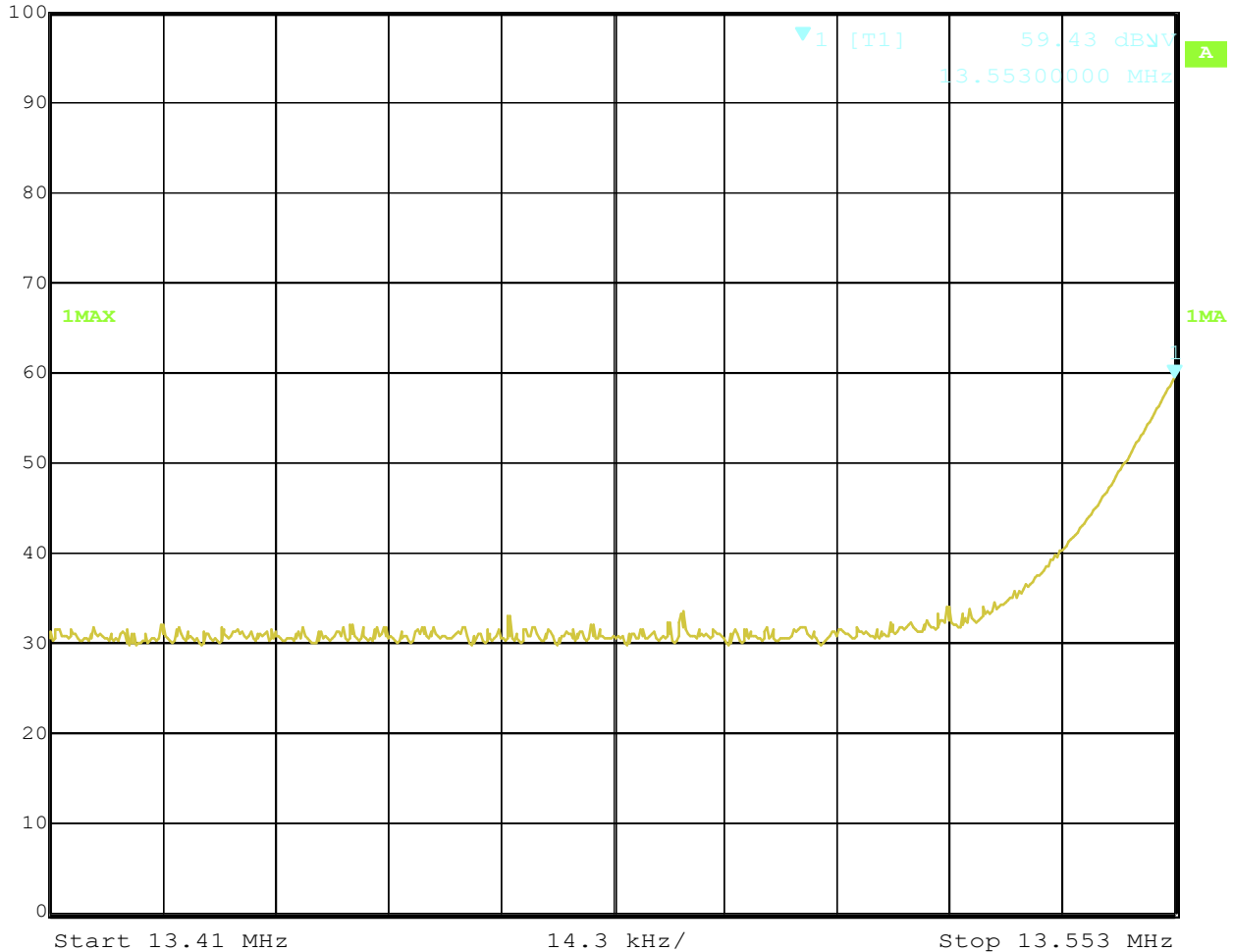
Date: 27.JUL.2021 10:24:18

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13.41MHz-13.553MHz

	Marker 1 [T1]	RBW	10 kHz	RF Att	30 dB
	Ref Lvl	59.43 dB μ V	VBW	30 kHz	
	100 dB μ V	13.55300000 MHz	SWT	15 ms	Unit dB μ V



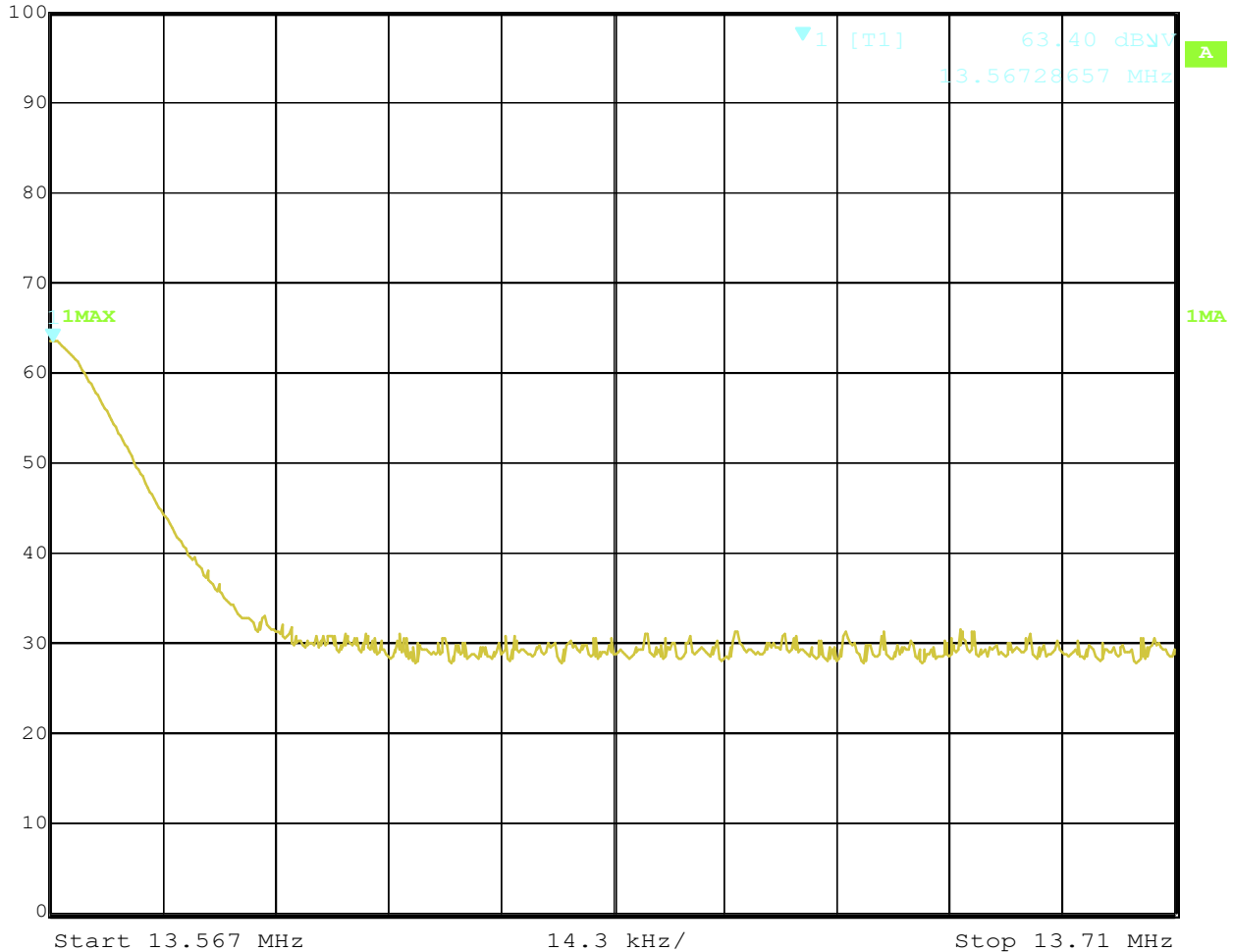
Date: 27.JUL.2021 10:22:56

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13.567MHz-13.71MHz

	Marker 1 [T1]	RBW	10 kHz	RF Att	30 dB
	Ref Lvl	63.40 dB μ V	VBW	30 kHz	
	100 dB μ V	13.56728657 MHz	SWT	15 ms	Unit dB μ V



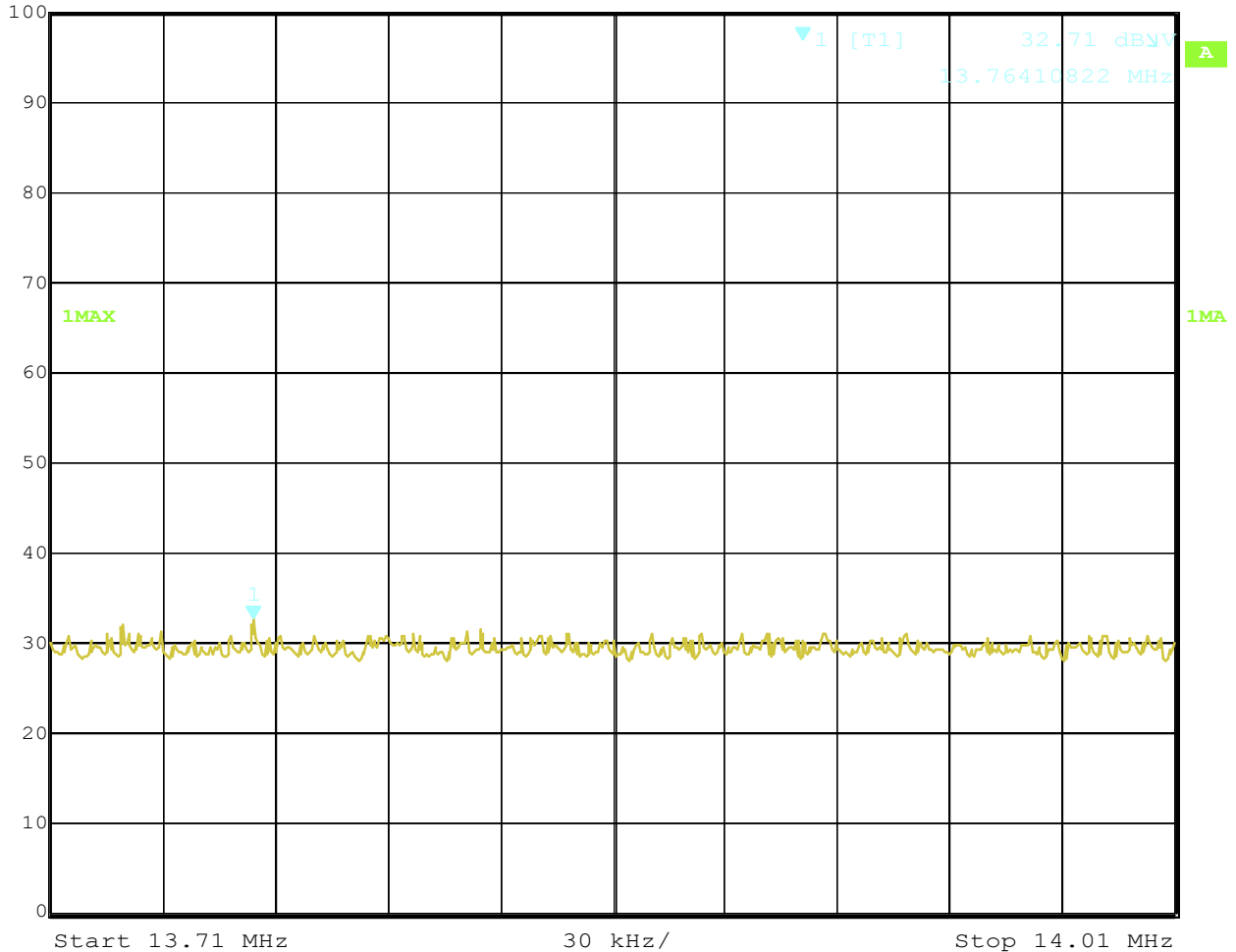
Date: 27.JUL.2021 10:25:45

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13.71MHz-14.01MHz

	Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	30 dB
	100 dBμV	32.71 dBμV	VBW	30 kHz		
		13.76410822 MHz	SWT	15 ms	Unit	dBμV



Date: 27.JUL.2021 10:26:27

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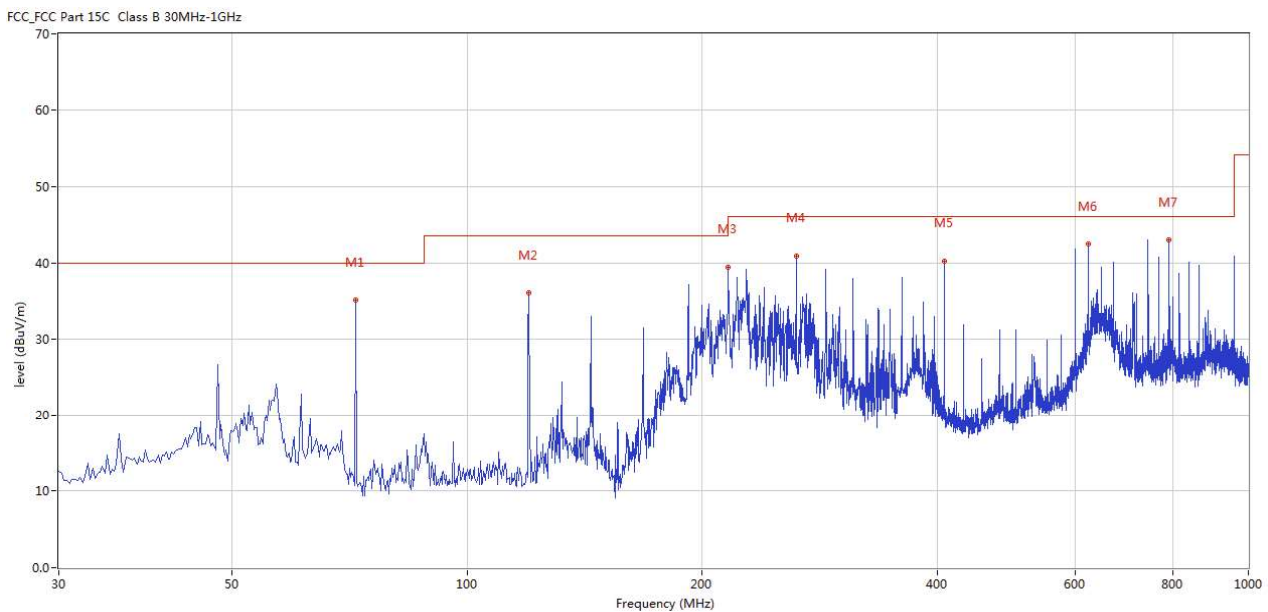


A. General Radiated Emission Data
Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	71.942	35.00	-16.53	40.0	-5.00	Peak	360.00	100	Horizontal	Pass
2	119.945	35.93	-15.32	43.5	-7.57	Peak	360.00	100	Horizontal	Pass
3	215.951	39.87	-13.60	43.5	-3.63	Peak	296.00	100	Horizontal	Pass
4	263.954	41.84	-11.79	46.0	-5.84	Peak	186.00	100	Horizontal	Pass
5	407.963	40.16	-8.47	46.0	-5.84	Peak	210.00	100	Horizontal	Pass
6	623.977	42.40	-4.89	46.0	-3.60	Peak	330.00	100	Horizontal	Pass
7	791.987	42.96	-3.10	46.0	-3.04	Peak	174.00	100	Horizontal	Pass

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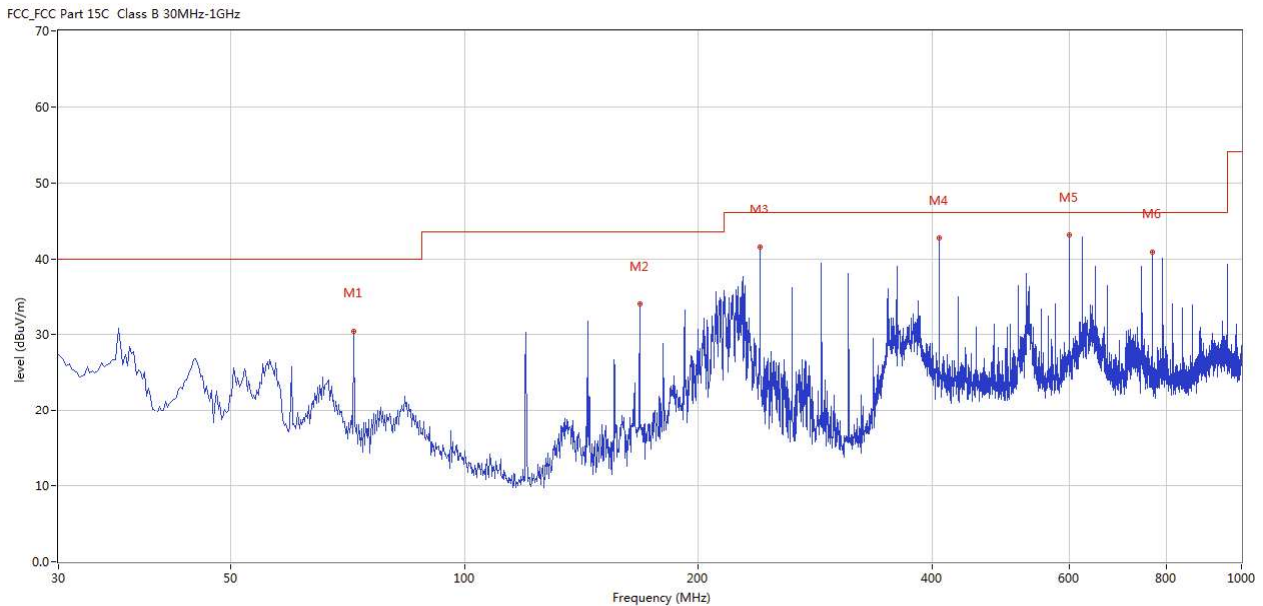
B. General Radiated Emission Data

Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	71.942	30.49	-16.53	40.0	-9.51	Peak	0.00	100	Vertical	Pass
2	167.948	34.05	-16.14	43.5	-9.45	Peak	24.00	100	Vertical	Pass
3	239.953	41.59	-12.33	46.0	-4.41	Peak	165.00	100	Vertical	Pass
4	407.963	42.70	-8.47	46.0	-3.30	Peak	165.00	100	Vertical	Pass
5	599.975	42.17	-4.95	46.0	-3.83	Peak	1.00	100	Vertical	Pass
6	767.986	40.92	-3.20	46.0	-5.08	Peak	150.00	100	Vertical	Pass

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7.0 Frequency Stability

7.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 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

7.2 Test Procedure

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

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7.3 Test Result

Voltage vs. Frequency Stability

Voltage	Measurement Frequency
138V	13.5599076MHz
120V	13.5599108MHz
102V	13.5599038MHz
Nominal Frequency:	13.56MHz
Max. Deviation	-96.135Hz
Limit	± 1356Hz (Note: ±0.01% of operated frequency)

Rated working voltage: 120V~

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency
-20	13.559908 MHz
-10	13.559905 MHz
0	13.559912 MHz
10	13.559907 MHz
20	13.559906 MHz
30	13.559916 MHz
40	13.559911 MHz
50	13.559905 MHz
Nominal Frequency:	13.56 MHz
Max. Deviation	95Hz
Limit	± 1356Hz (Note: ±0.01% of operated frequency)

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8.0 20dB Bandwidth Testing

8.1 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

8.3 Test Data

Frequency	20dB Bandwidth Emission (kHz)	Limit (kHz)	Result
13.56MHz	0.371	--	Pass

Refer to attached plots:

The report refers only to the sample tested and does not apply to the bulk.

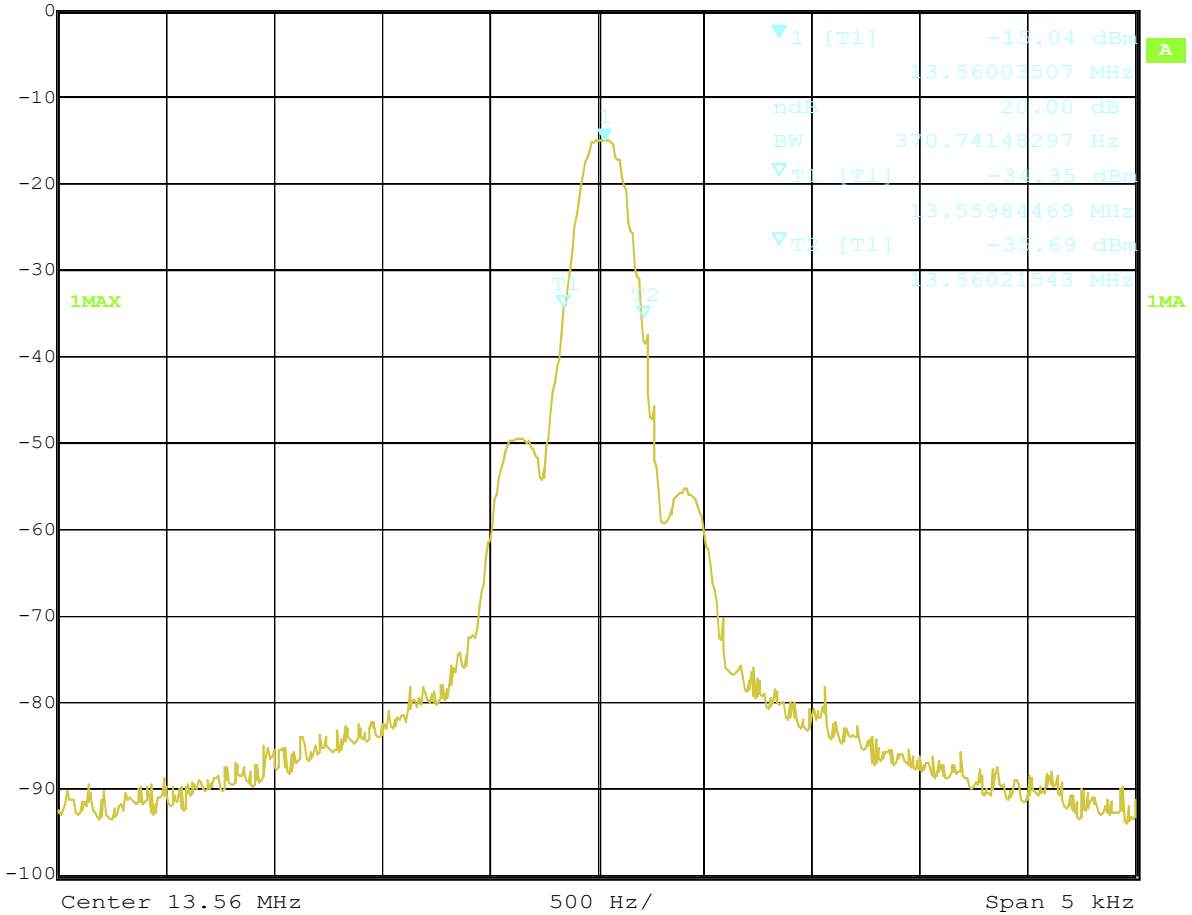
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20dB Bandwidth

	Ref Lvl	Marker 1 [T1 ndB]	RBW	100 Hz	RF Att	20 dB
	0 dBm	ndB 20.00 dB	VBW	300 Hz		
		BW 370.74148297 Hz	SWT	3 s	Unit	dBm



Date: 2.JUL.2021 17:19:12

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