TEST REPORT

Reference No......	:	WTS20X08058313W
FCC ID.....	:	2AXWM-FC2520
Applicant	:	FLY CAT ELECTRICAL CO.,LTD.
Address	:	Bldg 28th, Rm. 101-401 and Bldg 30th, Rm. 101,301&401, Longwangmiao Industrial Park, Baishixia East Community, Fuyong Town, Bao'an District, Shenzhen, Guangdong, China
Product Name	:	Oral Irrigator
Test Model.	:	FC2520
Standards	:	FCC Part 15.231
Date of Receipt sample	:	Aug.21, 2020
Date of Test.....	:	Aug.21, 2020 to Dec.16, 2020
Date of Issue	:	Dec.16, 2020
Test Result.....	:	**Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,

Block 70 Bao'an District, Shenzhen, Guangdong, China

Tel.: +86-755-33663308

Fax.: +86-755-33663309

Tested by:	Reviewed By:	Approved & Authorized By:
Jack Huang	Lion Cai	Silin Chen
Jack Huang / Project Engineer	Lion Cai / RF Manager	Silin Chen / Manager

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Report version

Version No.	Date of issue	Description
Rev.00	Dec.16, 2020	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: FLY CAT ELECTRICAL CO.,LTD.

Address of applicant: Bldg 28th, Rm. 101-401 and Bldg 30th, Rm. 101,301&401, Longwangmiao Industrial Park, Baishixia East Community, Fuyong Town, Bao'an District, Shenzhen, Guangdong, China

Manufacturer: FLY CAT ELECTRICAL CO.,LTD.

Address of manufacturer: Bldg 28th, Rm. 101-401 and Bldg 30th, Rm. 101,301&401, Longwangmiao Industrial Park, Baishixia East Community, Fuyong Town, Bao'an District, Shenzhen, Guangdong, China

General Description of EUT	
Product Name:	Oral Irrigator
Trade Name:	/
Model No.:	FC2520
Adding Model(s):	RL900, MH-Zero
Rated Voltage:	DC 1.5V
Power Adaptor :	/
Software Version:	V05
Hardware Version:	V04
Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model FC2520, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	433.925MHz
Max. Field Strength:	433.925MHz: 53.76dBuV/m(3m)
Modulation:	ASK/OOK
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.231: Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013,
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) Co., Ltd. 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. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A
The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Transmitting	433.925MHz

Test Conditions	
Temperature:	24°C
Relative Humidity:	54 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
AC Cable	1.25	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Occupied Bandwidth	Conducted	±1.5%
Conducted Spurious Emission	Conducted	±2.17dB
Transmission Time	Conducted	±5%
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2020-04-28	2021-04-27
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2020-04-28	2021-04-27
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2020-04-28	2021-04-27
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2020-04-28	2021-04-27
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2020-04-28	2021-04-27
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
SEMT-1042	Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-05-05	2021-05-04
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2020-04-28	2021-04-27
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2020-04-28	2021-04-27
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2020-04-28	2021-04-27
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2020-04-28	2021-04-27
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2020-04-28	2021-04-27
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2020-03-17	2021-03-16
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2020-03-17	2021-03-16
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2020-03-17	2021-03-16
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2020-03-17	2021-03-16
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2020-03-17	2021-03-16
SEMT-C006	Cable	Zheng DI	1M0RFC	/	2020-03-17	2021-03-16
SEMT-1087	Anechoic chamber	SAEMC	FSAC318	/	2020-04-28	2021-04-27

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.209	Radiated Spurious Emissions	Compliant
§15.231(a)	Deactivation Testing	Compliant
§15.231(b)	Radiated Emissions	Compliant
§15.231(c)	20dB Bandwidth Testing	Compliant
§ 15.207(a)	Conducted Emission	Compliant

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, 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.

3.2 Test Result

This product has a PCB antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Standard Applicable

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 3,750 **	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

** linear interpolations

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

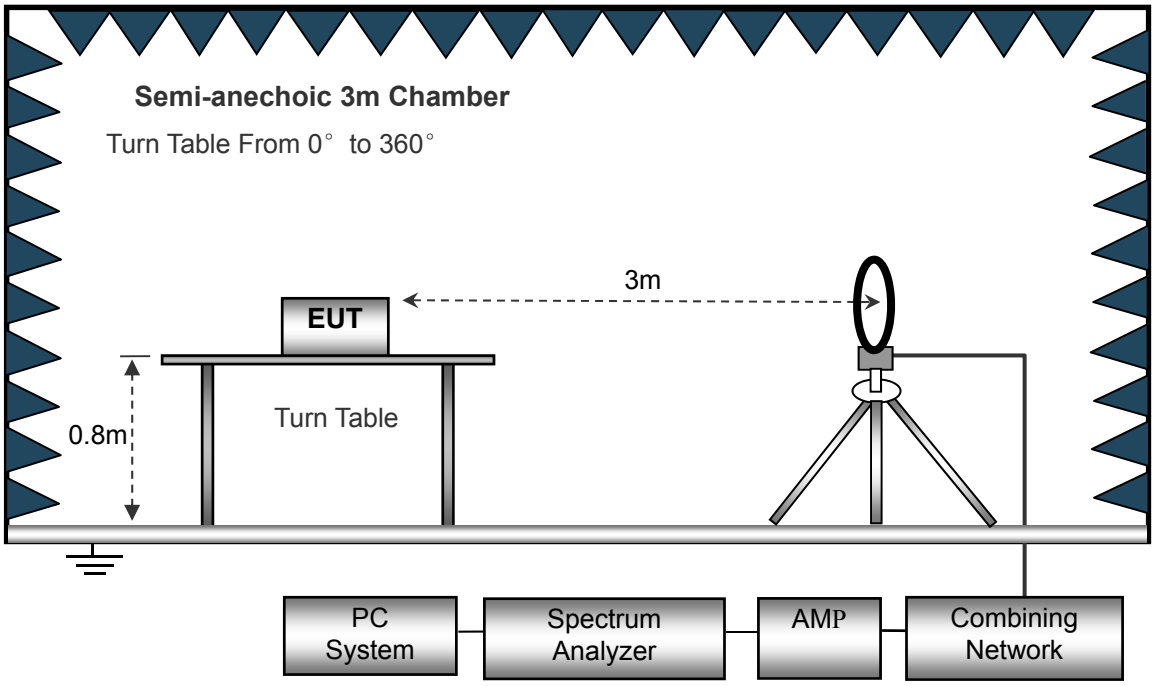
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

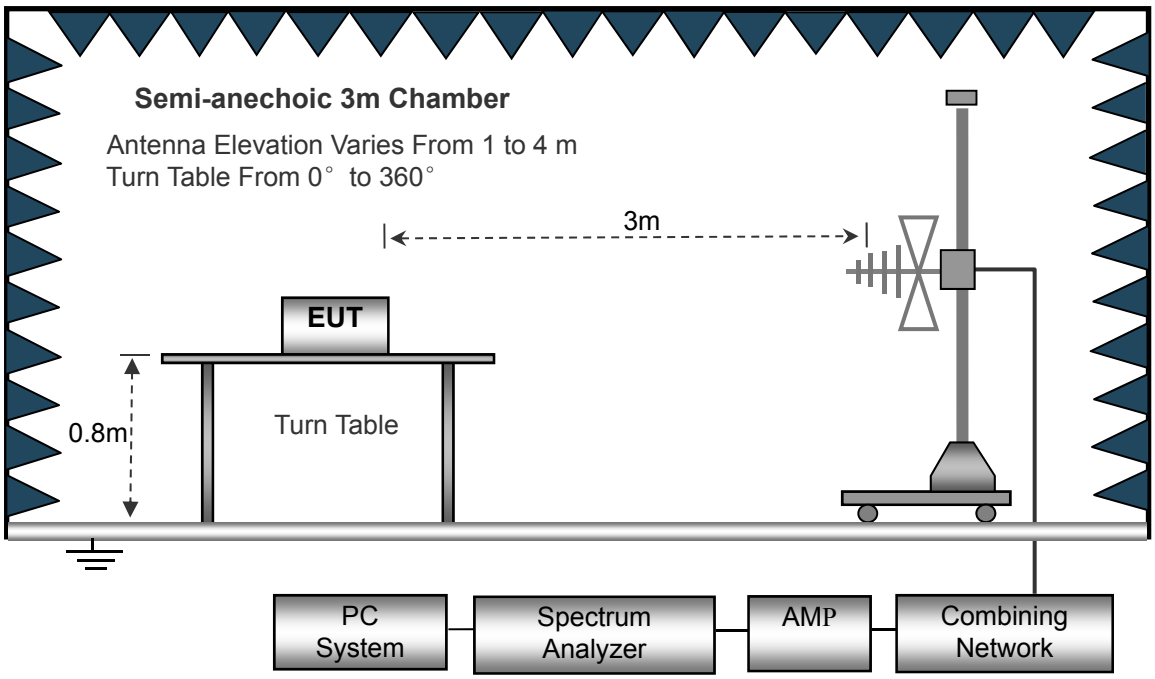
4.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.231(b) and FCC Part 15.209 Limit.

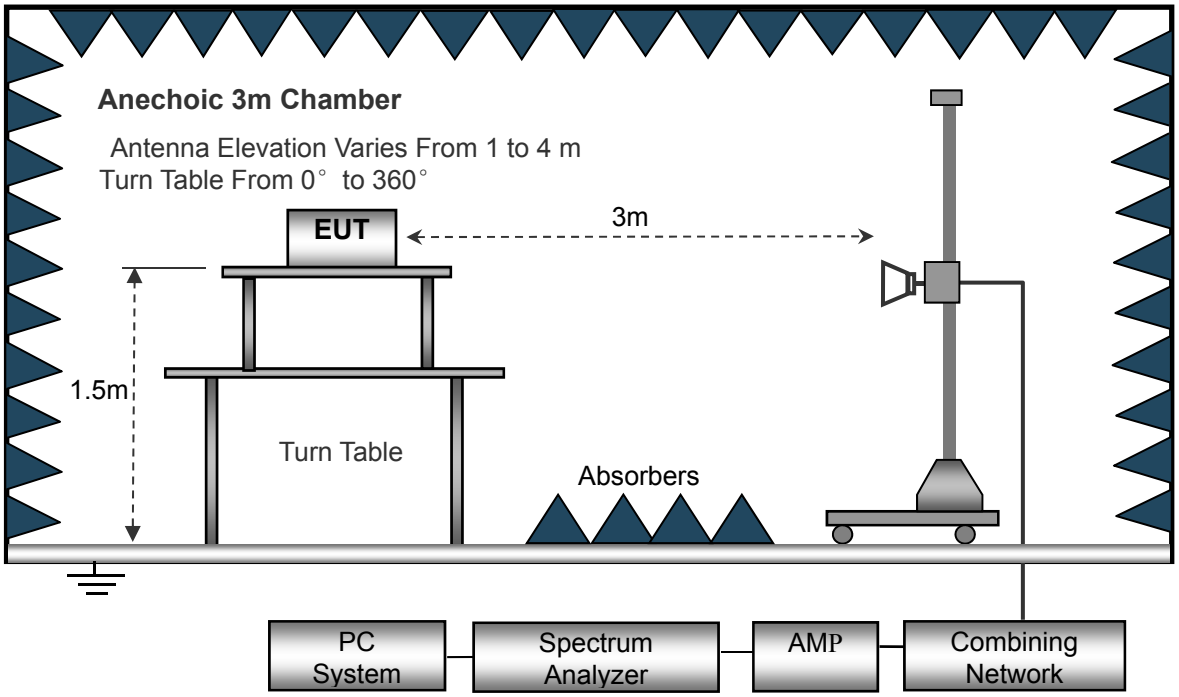
The test setup for emission measurement below 30MHz..



The test setup for emission measurement from 30 MHz to 1 GHz..



The test setup for emission measurement above 1 GHz..



4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading +Ant.Loss +Cab. Loss – Ampl.Gain

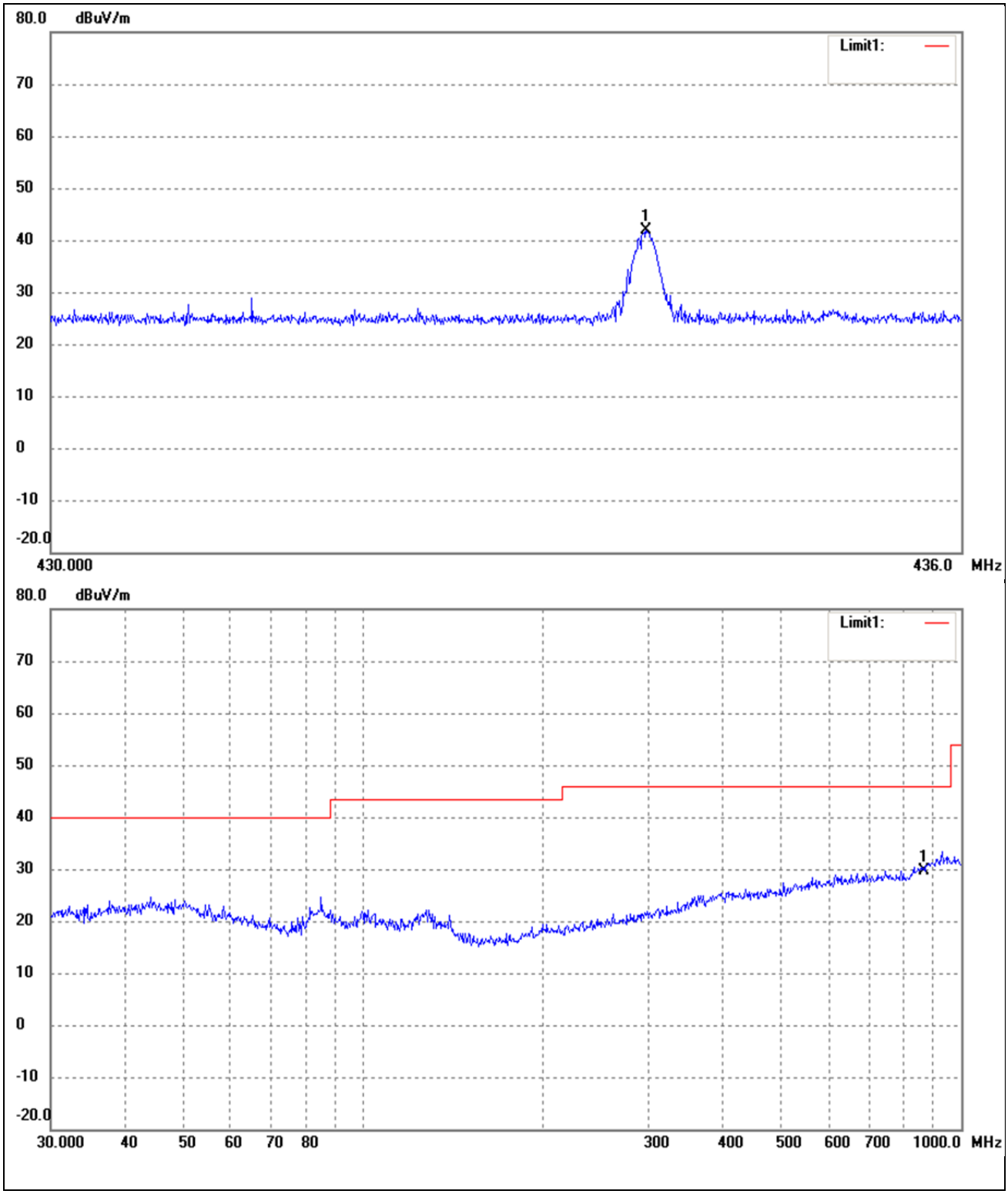
The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15C Limit

4.4 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Test Mode	TM1	Polarity:	Horizontal

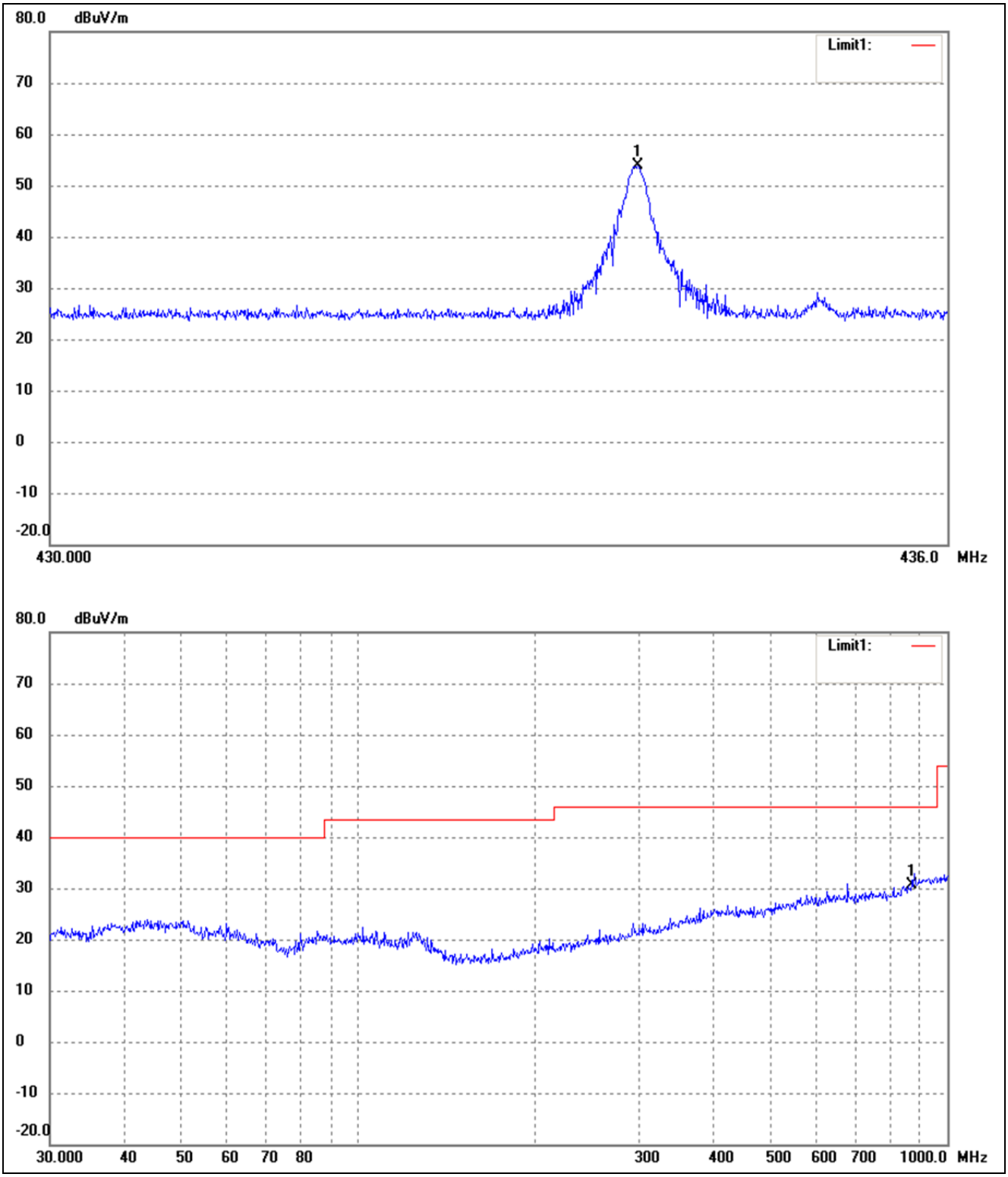


No.	Frequency	Reading	Corr.	Dutycycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor(dB)	Factor (dB)	dBuV/m	dBuV/m	(dB)	(°)	(cm)	
1	433.9146	47.76	-5.78	N/A	41.98	100.83	-58.85	12	100	peak
	433.9146	/	/	-12.85	29.13	80.83	-51.7	214	100	Ave
2	867.8500	29.27	0.48	N/A	29.75	81.94	-52.19	159	100	peak
	867.8500	/	/	-12.85	16.9	61.94	-45.04	306	100	Ave

Above 1GHz

No.	Frequency	Reading	Corr.	Dutycycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor (dB)	Factor (dB)	dBuV/m	dBuV/m	dB	(°)	(cm)	
1	1301.332	62.67	-13.87	N/A	48.8	74	-25.2	147	150	Peak
	1301.332	/	/	-12.85	35.95	54	-18.05	246	150	Ave
2	1868.851	54.92	-8.83	N/A	46.09	81	-34.91	315	150	Peak
	1868.851	/	/	-12.85	33.24	61	-27.76	26	150	Ave
3	3037.063	59.42	-8.53	N/A	50.89	81	-30.11	108	150	Peak
	3037.063	/	/	-12.85	38.04	61	-22.96	46	150	Ave

Test Mode	TM1	Polarity:	Vertical



No.	Frequency	Reading	Corr.	Dutycycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor(dB)	Factor (dB)	dBuV/m	dBuV/m	(dB)	(°)	(cm)	
1	433.9206	59.54	-5.78	N/A	53.76	100.83	-47.07	33	100	peak
	433.9206	/	/	-12.85	40.91	80.83	-39.92	261	100	Ave
2	867.8500	30.04	0.48	N/A	30.52	81.94	-51.42	21	100	peak
	867.8500	/	/	-12.85	17.67	61.94	-44.27	8	100	Ave

Above 1GHz

No.	Frequency	Reading	Corr.	Dutycycle	Result	Limit	Margin	Deg.	Height	Remark
	MHz	dBuV/m	Factor (dB)	Factor (dB)	dBuV/m	dBuV/m	dB	(°)	(cm)	
1	2712.878	62.22	-9.01	N/A	53.21	81	-27.79	47	150	Peak
	2712.878	/	/	-12.85	40.36	61	-20.64	5	150	Ave
2	2914.448	61.17	-8.75	N/A	52.42	81	-28.58	169	150	Peak
	2914.448	/	/	-12.85	39.57	61	-21.43	284	150	Ave
3	3037.063	60.47	-8.53	N/A	51.94	81	-29.06	231	150	Peak
	3037.063	/	/	-12.85	39.09	61	-21.91	305	150	Ave

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The fundamental frequency is 433.925MHz, so the fundamental and spurious emissions radiated limit base on the the operating frequency 433.925MHz.

5. 20dB Bandwidth

5.1 Standard Applicable

According to FCC Part 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.1 Test Procedure

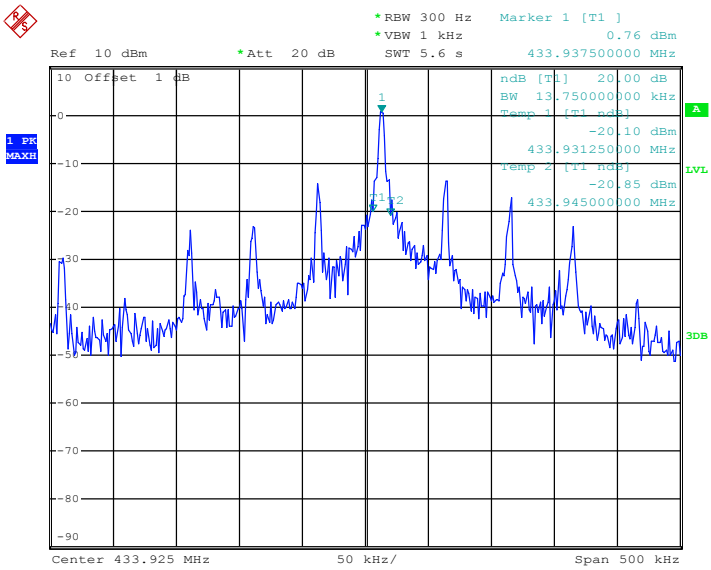
With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

5.2 Summary of Test Results/Plots

Test Frequency MHz	20dB Bandwidth kHz	Limit kHz	Result
433.925	13.75	1084.8	Pass

Limit = Fundamental Frequency X 0.25% = 433.925 MHz X 0.25% = 1084.8 kHz

Please refer to the attached plots.

433.925MHz	 Date: 11.DEC.2020 09:55:18

6. Transmission Time

6.1 Standard Applicable

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.

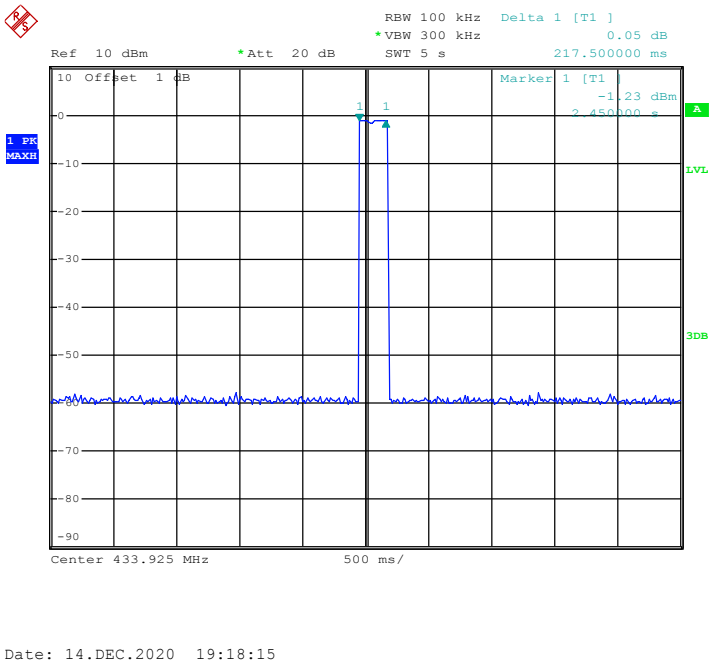
6.2 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

6.3 Summary of Test Results/Plots

Transmission Type	Test Frequency(MHz)	Transmission Time(s)	Limit(s)	Result
Manually	433.925	0.22	5	Pass

Please refer to the attached plots.

433.925MHz	 RBW 100 kHz *VBW 300 kHz SWT 5 s Delta 1 [T1] 0.05 dB 217.500000 ms Ref 10 dBm *Att 20 dB 10 Offset 1 dB Marker 1 [T1] -1.23 dBm 2.450000 s 1 PK MAXH A LVL 3DB 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 Center 433.925 MHz 500 ms/ Date: 14.DEC.2020 19:18:15

7. Duty Cycle

7.1 Standard Applicable

According to FCC Part 15.231 (b)(2) and 15.35 (c), for pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

7.2 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

7.3 Summary of Test Results/Plots

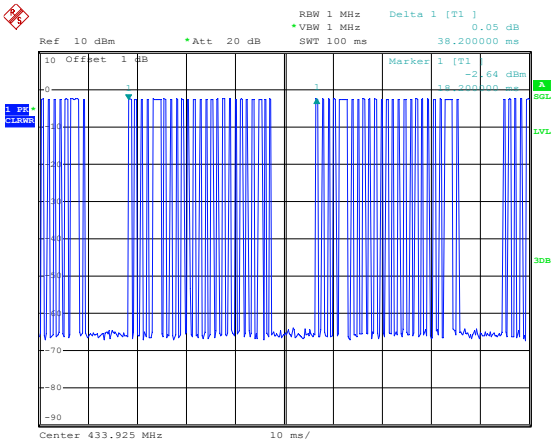
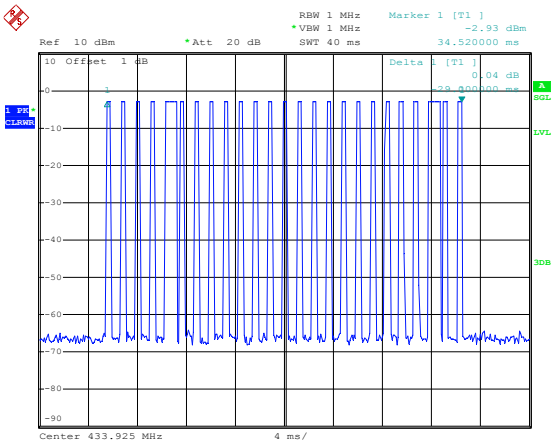
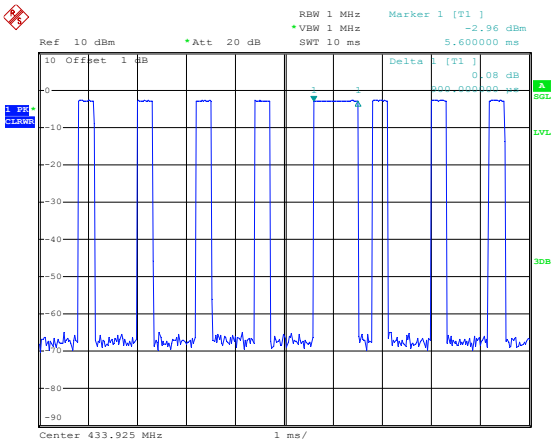
433.925MHz:

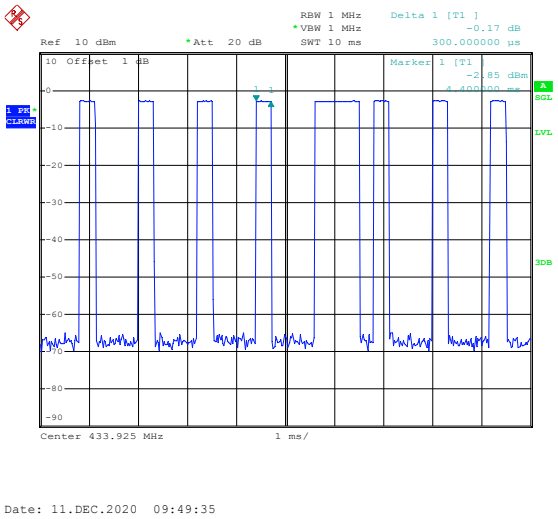
Type of Pulse	Width of Pulse (ms)	Quantity of Pulse	Transmission Time (ms)	Total Time (T_{on}) (ms)
Pulse 1 (Wide)	0.90	2	1.80	8.70
Pulse 2 (Narrow)	0.30	23	6.90	

Test Period (T_p)	Total Time (T_{on})	Duty Cycle	Duty Cycle Factor
ms	ms	%	dB
38.20	8.70	22.77	-12.85

Remark: Duty Cycle Factor=20*log(Duty Cycle)

Please refer to the attached test plots

433.925MHz	
Test Period	 Date: 11.DEC.2020 09:07:09
Pulse Number	 Date: 11.DEC.2020 09:09:12
Pulse 1	 Date: 11.DEC.2020 09:49:58

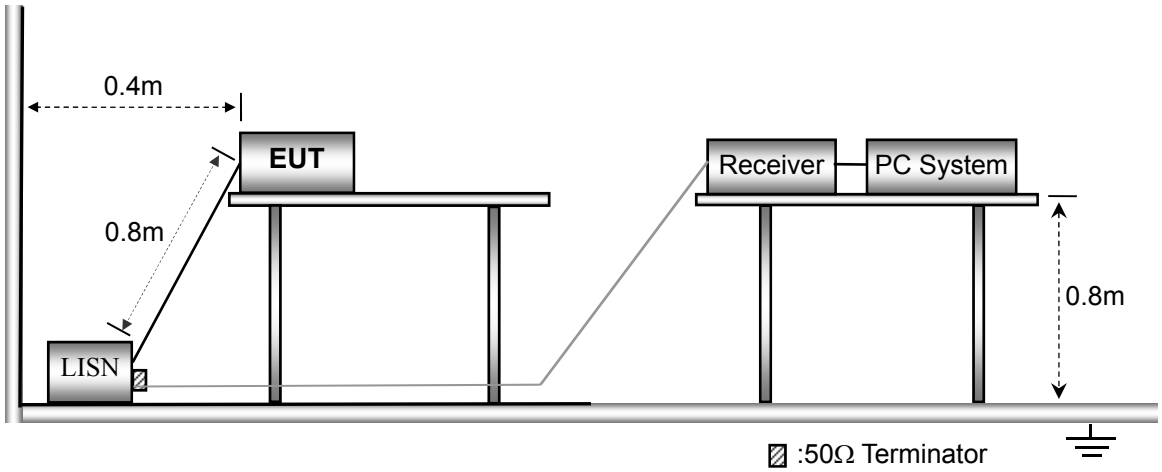
Pulse 2	 RBW 1 MHz VBW 1 MHz SWT 10 ms Delta 1 [T1] -0.17 dB 300.000000 µs Ref 10 dBm Att 20 dB 10 Offset 1 dB Marker 1 [T1] -2.85 dBm 4.400000 ms 1 PK CLRWR A SGL LVL 3DB 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 Center 433.925 MHz 1 ms/ Date: 11.DEC.2020 09:49:35

8. Conducted Emissions

8.1 Test Procedure

The setup of EUT is according with per ANSI C63.10:2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

8.2 Basic Test Setup Block Diagram



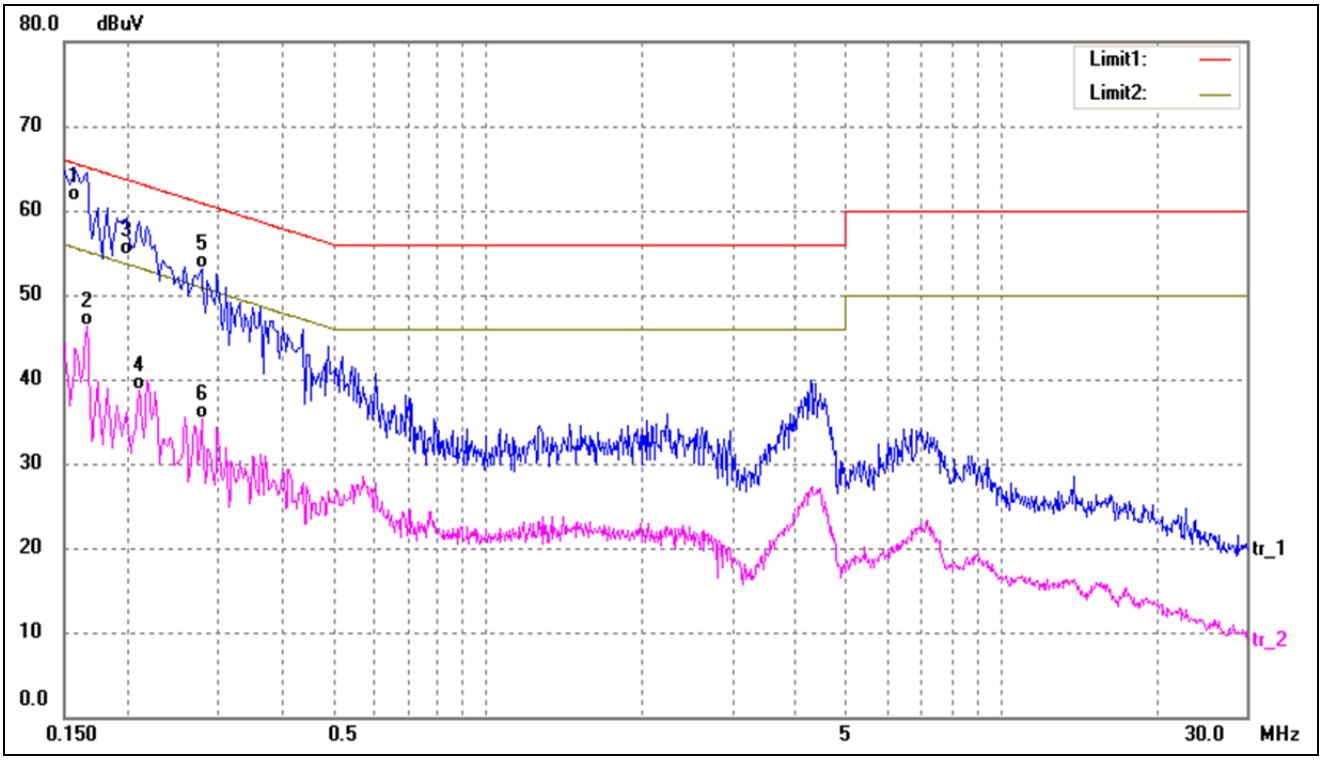
8.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency ..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

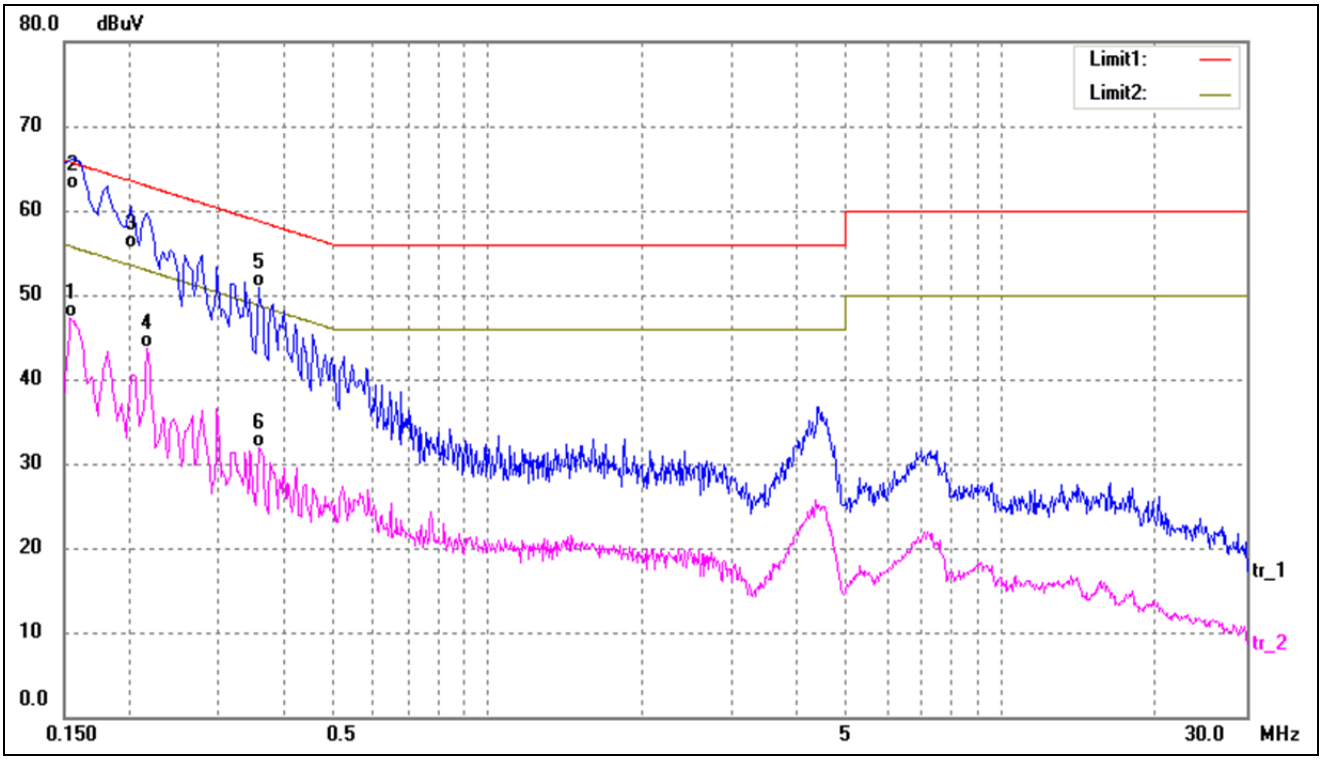
8.4 Summary of Test Results/Plots

Test Mode	TM1(AC120V 60Hz)	Polarity:	Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1580	50.92	10.25	61.17	65.57	-4.40	QP
2	0.1660	36.11	10.26	46.37	55.16	-8.79	AVG
3	0.1980	44.38	10.27	54.65	63.69	-9.04	QP
4	0.2100	28.48	10.27	38.75	53.21	-14.46	AVG
5	0.2780	42.90	10.25	53.15	60.88	-7.73	QP
6	0.2780	25.03	10.25	35.28	50.88	-15.60	AVG

Test Mode	TM1(AC120V 60Hz)	Polarity:	Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1539	36.99	10.25	47.24	55.78	-8.54	AVG
2*	0.1580	52.21	10.25	62.46	65.56	-3.10	QP
3	0.2020	45.29	10.27	55.56	63.52	-7.96	QP
4	0.2180	33.44	10.26	43.70	52.89	-9.19	AVG
5	0.3580	40.71	10.25	50.96	58.77	-7.81	QP
6	0.3580	21.73	10.25	31.98	48.77	-16.79	AVG

APPENDIX PHOTOGRAPHS

Please refer to "ANNEX"

******* END OF REPORT *******