

Guangdong Meijiixin Innovative Technology Co., Ltd.

RF TEST REPORT

Report Type:

FCC Part 15.249 RF report

Model:

MEW4-1

REPORT NUMBER:

191201777SHA-001

ISSUE DATE:

December 30, 2019

DOCUMENT CONTROL NUMBER:

TTRF15.249_V1 © 2018 Intertek



Applicant: Guangdong Meijiixin Innovative Technology Co., Ltd.
Address of Applicant: Xingye South Road, Laimei Industrial Park, Chenghai, Shantou, Guangdong, China
Manufacturer: Guangdong Meijiixin Innovative Technology Co., Ltd.
Address of Manufacturer: Xingye South Road, Laimei Industrial Park, Chenghai, Shantou, Guangdong, China
FCC ID: 2AHV3KK20

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2017): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:



Project Engineer
Wade Zhang

REVIEWED BY:



Reviewer
Daniel Zhao

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT

Content

REVISION HISTORY..... 4

MEASUREMENT RESULT SUMMARY 5

1 GENERAL INFORMATION 6

1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) 6

1.2 TECHNICAL SPECIFICATION 6

1.3 DESCRIPTION OF TEST FACILITY 7

2 TEST SPECIFICATIONS..... 8

2.1 STANDARDS OR SPECIFICATION 8

2.2 MODE OF OPERATION DURING THE TEST..... 8

2.3 TEST PERIPHERALS LIST 9

2.4 TEST ENVIRONMENT CONDITION:..... 9

2.5 INSTRUMENT LIST 9

2.6 MEASUREMENT UNCERTAINTY 11

3 RADIATED EMISSION 12

3.1 LIMIT 12

3.2 MEASUREMENT PROCEDURE 12

3.3 TEST CONFIGURATION 14

3.4 TEST RESULTS OF RADIATED EMISSIONS 16

4 POWER LINE CONDUCTED EMISSION..... 20

4.1 LIMIT 20

4.2 TEST CONFIGURATION 20

4.3 MEASUREMENT PROCEDURE 21

4.4 TEST RESULTS OF POWER LINE CONDUCTED EMISSION..... 21

5 ASSIGNED BANDWIDTH (20DB BANDWIDTH) 22

5.1 LIMIT 22

5.2 MEASUREMENT PROCEDURE 22

5.3 TEST CONFIGURATION 22

5.4 THE RESULTS..... 23

6 ANTENNA REQUIREMENT..... 25

APPENDIX I: PHOTOGRAPH OF TEST SETUP 26

APPENDIX II: PHOTOGRAPH OF EQUIPMENT UNDER TEST..... 26

Revision History

Report No.	Version	Description	Issued Date
191201777SHA-001	Rev. 01	Initial issue of report	December 30, 2019

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Radiated emission	15.249 & 15.209	Pass
Power line conducted emission	15.207	NA (Note 1,2)
Assigned bandwidth (20dB bandwidth)	15.215(c)	Pass)
Antenna requirement	15.203	Pass

Notes: 1: NA =Not Applicable


2: The battery needs to be removed from the EUT when charging, so there is no transmitting when charging

3. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

4. Additions, Deviations and Exclusions from Standards: None.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	R/C drone
Type/Model:	MEW4-1
Trade Mark	
Add Model:	B3, B3pro, B7, B9, B10, BX, B12, B14, B16, B18, B19, B20, B22, B23, B25, B2M, B2Pro, B2SE, B3P, B4W, B5W, X103W, X104G, MEW4-1, MEW4-2, MEW4-3, MEW4-4, V6, V7, V8, V9, M2, M3, M4, NY-BG57, V-6, E32HW, HS700D, HS720, DRC-LSX10, SP700 (Refer to Declaration of Difference for more details.)
Description of EUT:	The EUT is an aircraft with general 2.4G and 5G WiFi (11a/11n) technology.
Rating:	DC 7.6V (Powered by a 7.6V Battery)
Category of EUT:	Class B
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Sample received date:	December 10, 2019
Date of test:	December 10, 2019 ~ December 21, 2019

1.2 Technical Specification

Frequency Range:	2420MHz ~ 2467MHz
Support Standards:	General 2.4GHz Technique
Channel Number:	48
Channel Separation:	1 MHz
Antenna Information:	Internal antenna, 2dBi Peak gain

TEST REPORT

1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN1175
	IC Registration Lab Registration code No.: 2042B-1
	VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252
	A2LA Accreditation Lab Certificate Number: 3309.02

Tests were sub-contracted.

Name:	Shenzhen UnionTrust Quality and Technology Co., Ltd.
Address:	16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China
Telephone:	+86 (0) 755 2823 0888
Telefax:	+86 (0) 755 2823 0886

The test facility is recognized, certified, or accredited by these organizations:	Shenzhen UnionTrust Quality and Technology Co., Ltd. CNAS Accreditation Lab
	Registration No. CNAS L9069

TEST REPORT

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2017)

ANSI C63.10 (2013)

2.2 Mode of operation during the test

The EUT is a handheld device, so three axes (X, Y, Z) were observed while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded.

The lowest, middle and highest channel were tested as representatives.

Frequency Band (MHz)				2420 ~ 2467			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2420	13	2433	26	2446	39	2459
1	2421	14	2434	27	2447	40	2460
2	2422	15	2435	28	2448	41	2461
3	2423	16	2436	29	2449	42	2462
4	2424	17	2437	30	2450	43	2463
5	2425	18	2438	31	2451	44	2464
6	2426	19	2439	32	2452	45	2465
7	2427	20	2440	33	2453	46	2466
8	2428	21	2441	34	2454	47	2467
9	2429	22	2442	35	2455	--	--
10	2430	23	2443	36	2456	--	--
11	2431	24	2444	37	2457	--	--
12	2432	25	2445	38	2458	--	--

The test setting software is offered by the manufactory. The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases.

Test software and Power Setting parameter			
Test Software	None		
Working Mode	Continue TX Mode		
Test Channel	2420MHz	2443MHz	2467MHz
Power Setting	not applicable, test used default power level.		

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

- 1) Radiated test mode: EUT transmitted signal with antenna;
- 2) Conducted test mode: EUT transmitted signal from RF port connected to SPA directly;

TEST REPORT

2.3 Test peripherals list

Item No.	Name	Band and Model	Description
1	NoteBook	Lenovo, E450	AC 120V 60Hz
Note: The NoteBook only used for control RF setting, not used during the test.			

2.4 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	22°C	53% RH
Assigned bandwidth (20dB bandwidth)	21°C	53% RH

2.5 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2021
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	UTTL – E026	Nov. 23, 2020
<input type="checkbox"/>	Loop Antenna	ETS-LINDGREN	6502	UTTL – E013	Nov. 15, 2020
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	UTTL – E014	Nov. 15, 2020
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	UTTL – E057	Nov. 23, 2020
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	UTTL – E043	Nov. 23, 2020
<input checked="" type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3117	UTTL – E016	Nov. 15, 2020
<input checked="" type="checkbox"/>	Multi device Controller	ETS-LINDGREN	7006-001	N/A	N/A

Test software	Manufacturer	Version
e3	Audix	Software Version:

TEST REPORT

RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	UTTL – E054	June 05, 2020
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	UTTL-E032	Nov. 23, 2020
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	UTTL – E005	Nov. 23, 2020
<input checked="" type="checkbox"/>	USB Wideband Power Sensor	KEYSIGHT	U2021XA	UTTL-E033	Nov. 23, 2020
<input type="checkbox"/>	EXG-B RF Analog Signal Generator	KEYSIGHT	N5171B	UTTL-E030	Nov. 23, 2020
<input type="checkbox"/>	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	UTTL-E031	Nov. 23, 2020
<input type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	UTTL – E049	July 19, 2020

TEST REPORT

2.6 Measurement uncertainty

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

Test item	Measurement uncertainty
Conducted emission 9KHz-150KHz	±3.8 dB
Conducted emission 150KHz-30MHz	±3.4 dB
Radiated emission 9KHz-30MHz	±4.9 dB
Radiated emission 30MHz-1GHz	±4.7 dB
Radiated emission 1GHz-18GHz	±5.1 dB
Radiated emission 18GHz-26GHz	±5.2 dB
Radiated emission 26GHz-40GHz	±5.2 dB

TEST REPORT

3 Radiated emission

Test result: Pass

3.1 Limit

Fundamental Frequency (MHz)	Fundamental limit (dBuV/m)	Harmonic limit (dBuV/m)
<input type="checkbox"/> 902 - 928	94	54
<input checked="" type="checkbox"/> 2400 - 2483.5	94	54
<input type="checkbox"/> 5725 - 5875	94	54
<input type="checkbox"/> 24000 - 24250	108	68

The radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits:

Frequencies (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

3.2 Measurement Procedure

For Radiated emission below 30MHz:

- a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) Both X and Y axes of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

TEST REPORT**For Radiated emission above 30MHz:**

- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) 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.
- d) 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.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

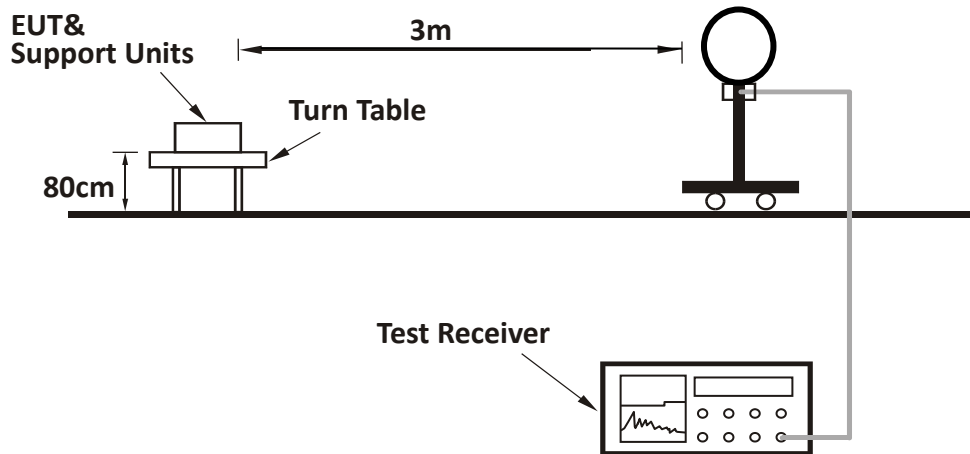
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or $3 \times \text{RBW}$ (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported

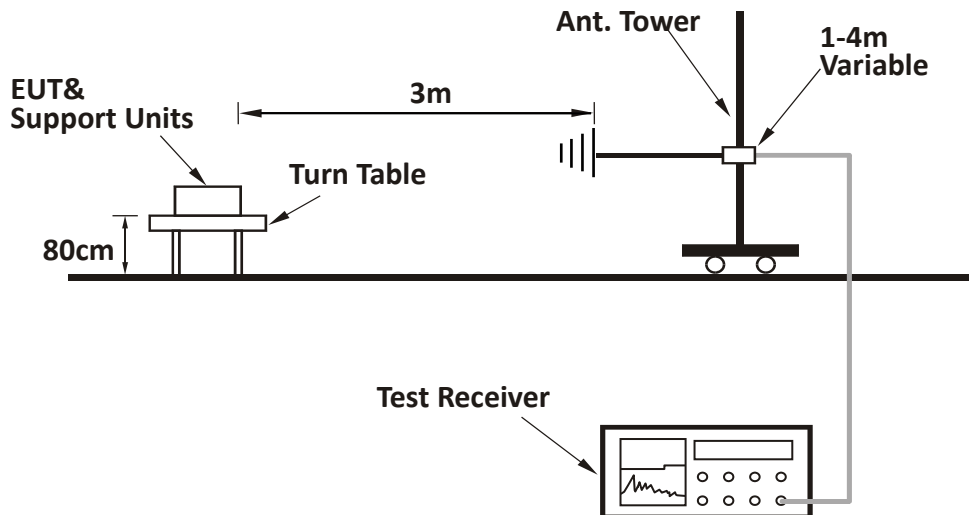
TEST REPORT

3.3 Test Configuration

For Radiated emission below 30MHz:

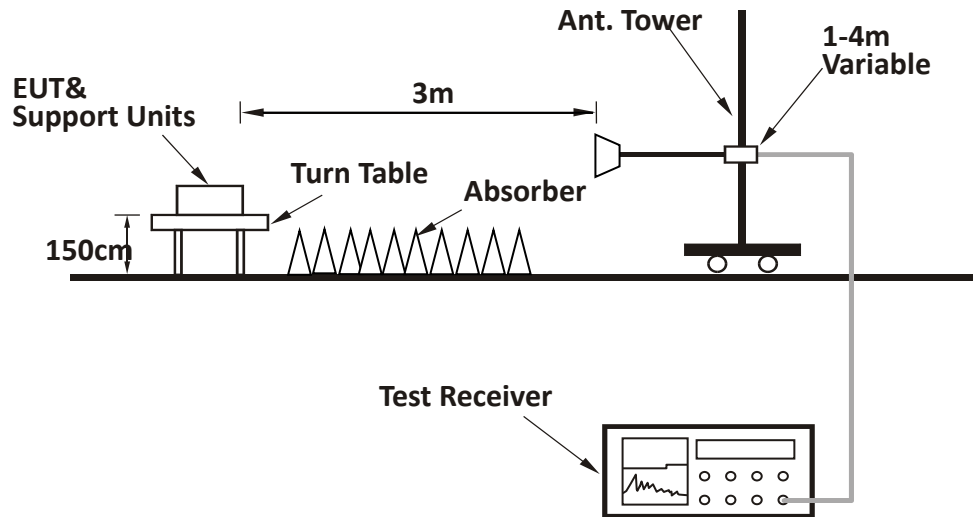


For Radiated emission 30MHz to 1GHz:



TEST REPORT

For Radiated emission above 1GHz:

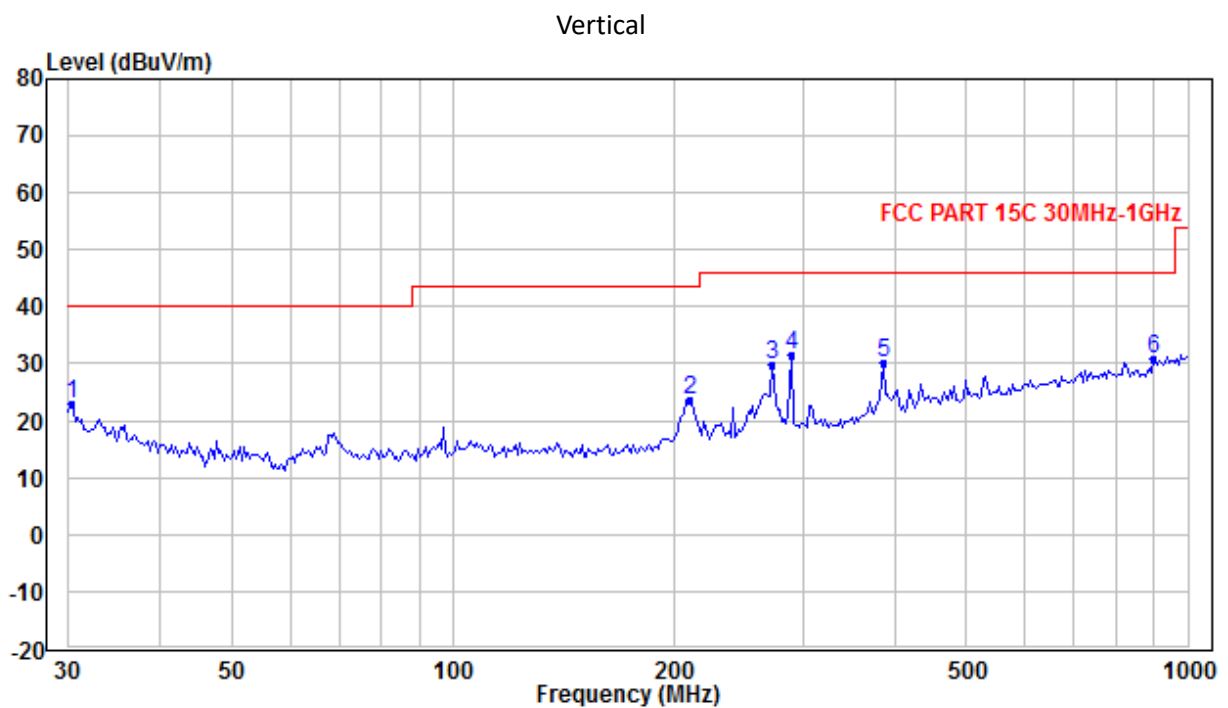
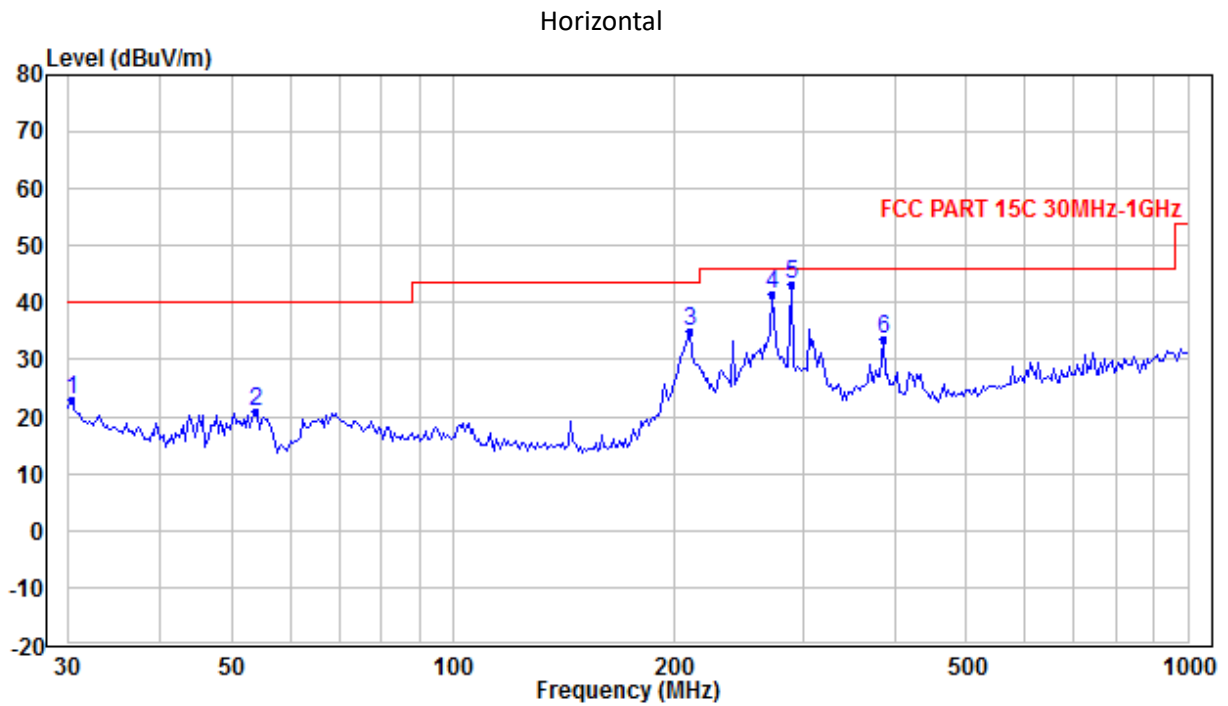


TEST REPORT

3.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:



TEST REPORT

Test data below 1GHz

Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	30.212	23.09	-5.13	40.00	16.91	PK
	53.756	20.76	-15.38	40.00	19.24	PK
	210.129	35.06	-10.58	43.50	8.44	PK
	272.525	41.50	-6.91	46.00	4.50	PK
	288.284	43.13	-6.57	46.00	2.87	PK
	384.545	33.45	-4.60	46.00	12.55	PK
V	30.212	22.79	-5.13	40.00	17.21	PK
	210.129	23.59	-10.58	43.50	19.91	PK
	272.525	29.83	-6.91	46.00	16.17	PK
	288.284	31.56	-6.57	46.00	14.44	PK
	384.545	30.13	-4.60	46.00	15.87	PK
	899.958	30.84	4.12	46.00	15.16	PK

TEST REPORT

Test result above 1GHz:

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2400.00	46.16	-2.64	74.00	27.84	PK
	V	2400.00	48.68	-0.22	74.00	25.32	PK
	H	2420.00	86.90	-2.36	114.00	27.10	PK
	V	2420.00	90.07	-0.23	114.00	23.93	PK
	H	4840.00	45.12	3.96	74.00	28.88	PK
	V	4840.00	56.59	4.96	74.00	17.41	PK
	V	4840.00	32.28	4.96	54.00	21.72	AV
	H	7260.00	49.73	6.87	74.00	24.27	PK
	V	7260.00	47.14	6.41	74.00	26.86	PK
M	H	2443.00	81.26	-2.62	114.00	32.74	PK
	V	2443.00	86.68	-0.25	114.00	27.32	PK
	H	4886.00	47.62	4.00	74.00	26.38	PK
	V	4886.00	46.99	5.00	74.00	27.01	PK
	H	7329.00	48.97	6.99	74.00	25.03	PK
	V	7329.00	46.60	6.50	74.00	27.40	PK
H	H	2467.00	77.99	-2.62	114.00	36.01	PK
	V	2467.00	80.64	-0.28	114.00	33.36	PK
	H	2483.500	46.72	-2.61	74.00	27.28	PK
	V	2483.500	48.98	-0.29	74.00	25.02	PK
	H	4934.00	48.67	4.03	74.00	25.33	PK
	V	4934.00	41.52	5.04	74.00	32.48	PK
	H	7401.00	48.57	7.12	74.00	25.43	PK
	V	7401.00	48.00	6.58	74.00	26.00	PK

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.
 5. AV Reading = PK Reading + Duty cycle factor.

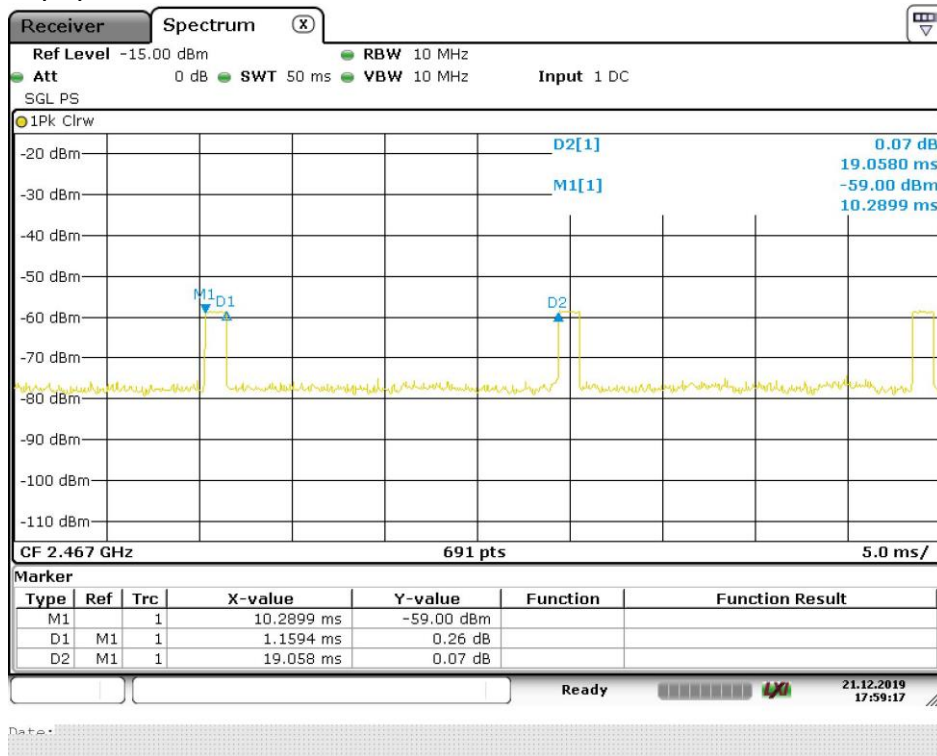
Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
 Limit = 40.00dBuV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
 Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
 Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

TEST REPORT

Duty Cycle:

The test data with maximum duty cycle was listed below.

The worst Duty cycle = $1.16 / 19.06 = 0.0609$



Calculating the AV value according to the duty cycle

Antenna	Frequency (MHz)	PK Reading (dBuV/m)	Correct Factor (dB)	AV Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
H	2420.00	86.90	-24.31	62.59	94.00	31.41
V	2420.00	90.07		65.76	94.00	28.24
H	2443.00	81.26		56.95	94.00	37.05
V	2443.00	86.68		62.37	94.00	31.63
H	2467.00	77.99		53.68	94.00	40.32
V	2467.00	80.64		56.33	94.00	37.67

Remark:

1. Correct Factor = $20\lg(\text{duty cycle}) = 20\lg(1.16 / 19.06) = -24.31$;
2. AV Reading = PK Reading + Correct Factor;
3. Margin = limit - AV Reading.

4 Power line conducted emission

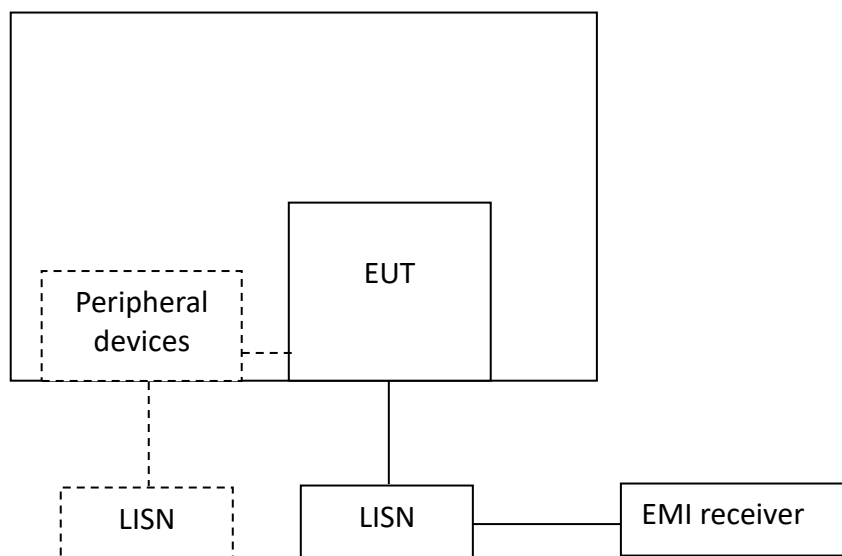
Test result: Not applicable.

4.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.2 Test Configuration



TEST REPORT**4.3 Measurement Procedure**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

4.4 Test Results of Power line conducted emission

Not applicable.

5 Assigned bandwidth (20dB bandwidth)

Test result: Pass

5.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the allocated frequency band.

5.2 Measurement Procedure

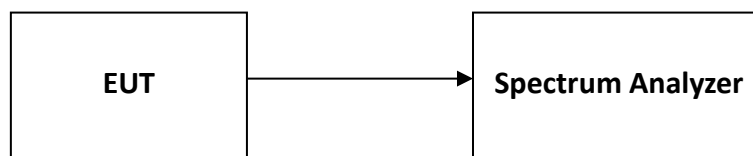
The 20dB Bandwidth is measured using the Spectrum Analyzer.

Set Span = 2 to 3 times the 20 dB bandwidth, $RBW \geq 1\%$ of the 20 dB bandwidth, $VBW > RBW$,

Sweep = auto, Detector = peak, Trace = max hold.

The test was performed at 3 channels (lowest, middle and highest channel).

5.3 Test Configuration

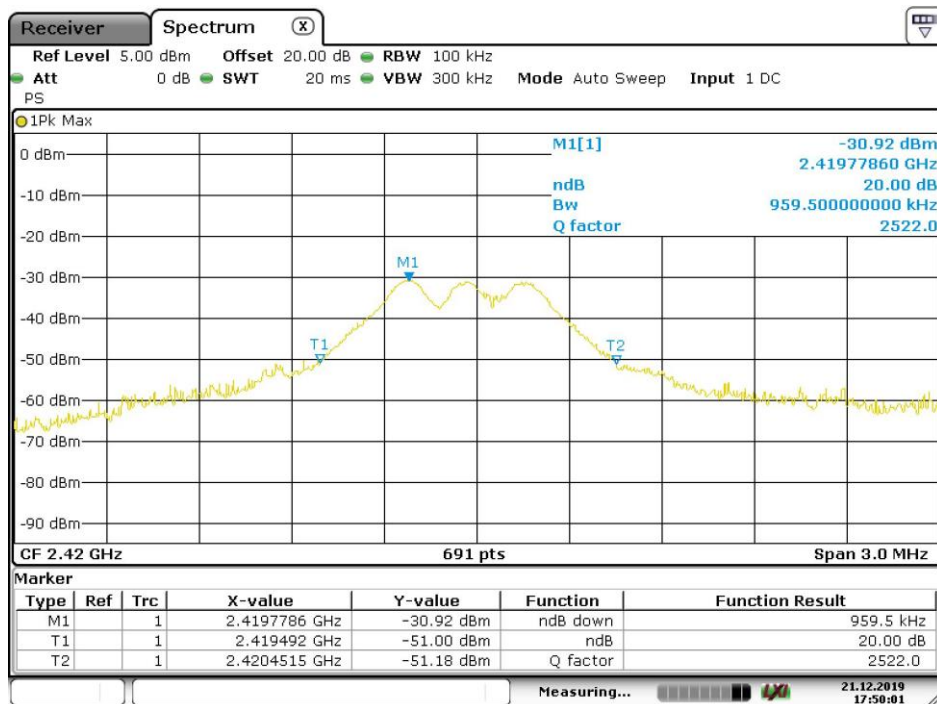


TEST REPORT

5.4 The results

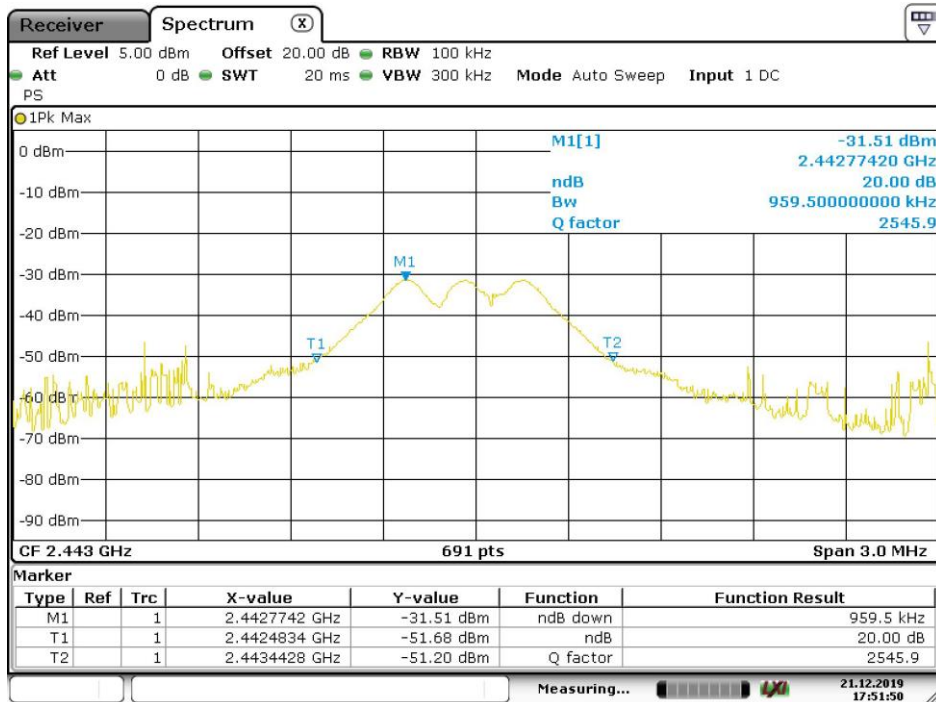
Test Mode	Frequency (MHz)	20dB Bandwidth (kHz)		F _L at 20dB BW (MHz)	F _H at 20dB BW (MHz)
TX	2420	959.5		2419.492	/
	2443	959.5		/	/
	2467	859.7		/	2467.412
Limit		N/A	N/A	F _L > 2400	F _H < 2483.5
Result		Complied			

Channel L



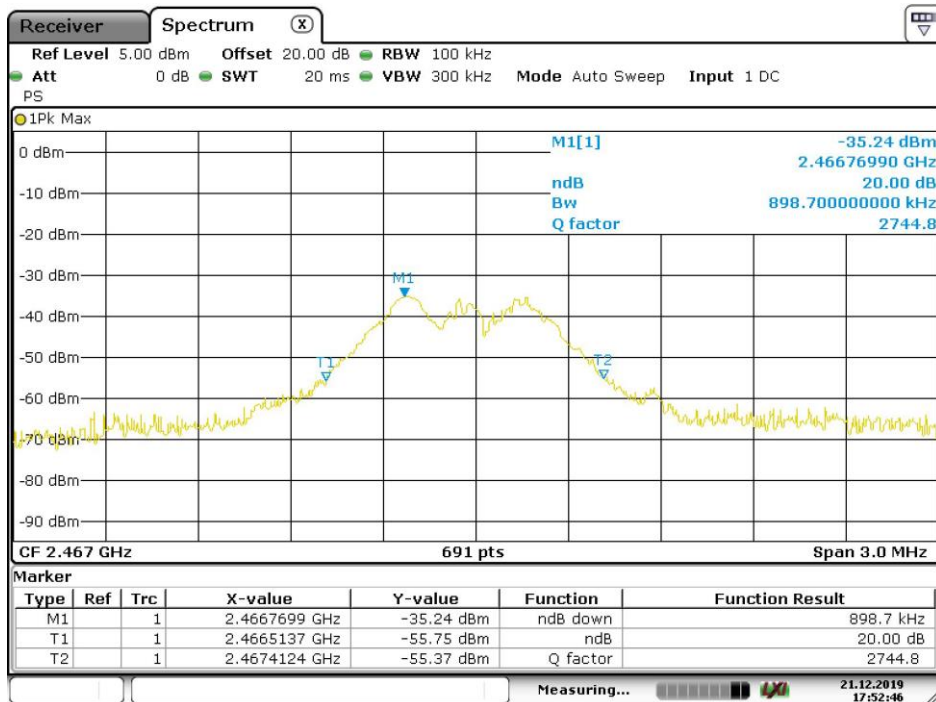
Date: 21.DEC.2019 17:50:00

Channel M



Date: 21.DEC.2019 17:51:49

Channel H



Date: 21.DEC.2019 17:52:45

6 Antenna requirement

Requirement:

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.

Result:

EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

Appendix I: Photograph of test setup

Refer to Appendix for Photograph of test setup

Appendix II: Photograph of equipment under test

Refer to Appendix for EUT external and internal photographs.

***** END *****