

TEST REPORT

Applicant Name : JM Manufacturing (HK) Ltd.
Address : Unit G, 4/F Kaiser Estate, Phase 2,
No. 47-53 Man Yue Street, Hung Hom, Kowloon, Hong Kong
Report Number: SZ3220525-22736E-RF
FCC ID: 2AHGJJMS039-27-1

Test Standard (s)

FCC PART 15.249

Sample Description

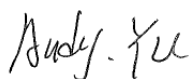
Product Type: PREPACK HIGH SPEED 1:12 RC MIST CAR
Model No.: JMS-BJSHY039
Date Received: 2022-05-25
Date of Test: 2022-06-10 to 2022-06-11
Report Date: 2022-06-20

Test Result:	Pass*
--------------	-------

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:



Audy.Yu
EMC Engineer



Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk "★". Customer model name, addresses, names, trademarks etc. are not considered data.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

Shenzhen Accurate Technology Co., Ltd.

1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: +86 755-26503290 Fax: +86 755-26503396 Web: www.atc-lab.com

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
TEST METHODOLOGY	3
MEASUREMENT UNCERTAINTY	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
SUPPORT EQUIPMENT LIST AND DETAILS	5
SUPPORT CABLE DESCRIPTIONS.....	5
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
TEST EQUIPMENT LIST	8
FCC§15.203 – ANTENNA REQUIREMENT	9
APPLICABLE STANDARD	9
ANTENNA CONNECTOR CONSTRUCTION	9
FCC§15.205, §15.209 & §15.249(D) – RADIATED EMISSIONS	10
APPLICABLE STANDARD	10
TEST EQUIPMENT SETUP	10
EUT SETUP	11
TEST PROCEDURE	12
CORRECTED AMPLITUDE & MARGIN CALCULATION	12
TEST RESULTS SUMMARY	12
TEST DATA	12
FCC§15.215(C) - 20DB EMISSION BANDWIDTH	18
APPLICABLE STANDARD	18
TEST PROCEDURE	18
TEST DATA	18

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	PREPACK HIGH SPEED 1:12 RC MIST CAR
Tested Model	JMS-BJSHY039
Trademark	N/A
Frequency Range	2410-2473MHz
Maximum E-Field Strength (Peak)	97.27dBuV/m@3m
Modulation Technique	GFSK
Antenna Specification	0dBi (It is provided by the applicant)
Voltage Range	DC 3V from battery
Sample serial number	SZ3220525-22736E-RF-S1(Assigned by ATC, Shenzhen)
Sample/EUT Status	Good condition

Objective

This type approval report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.249 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189.

Accredited by American Association for Laboratory Accreditation (A2LA). The Certificate Number is 4297.01

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing by manufacturer.

Frequency list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2410	12	2430	23	2454
2	2414	13	2431	24	2456
3	2415	14	2433	25	2458
4	2416	15	2434	26	2462
5	2417	16	2439	27	2464
6	2418	17	2441	28	2465
7	2419	18	2442	29	2466
8	2421	19	2444	30	2467
9	2426	20	2446	31	2469
10	2428	21	2450	32	2473
11	2429	22	2452	/	/

Channel 1, Channel 18 and Channel 32 were selected for testing.

EUT Exercise Software

No software, test in manual button set frequency which switch channel by button and power level is default*.

Equipment Modifications

No modifications were made to the unit tested.

Support Equipment List and Details

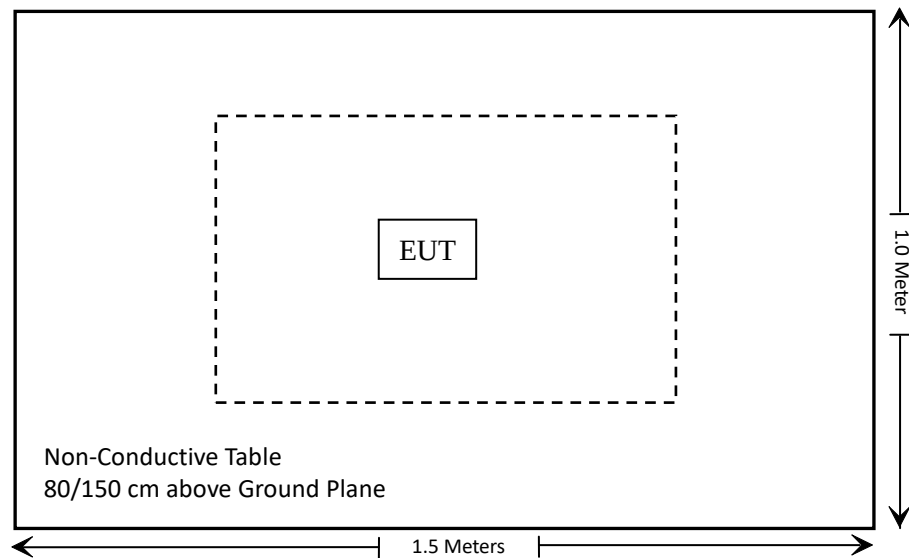
Manufacturer	Description	Model	Serial Number
/	/	/	/

Support Cable Descriptions

Cable Description	Length (m)	From/Port	To
/	/	/	/

Block Diagram of Test Setup

For Radiated Emmision



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Not Applicable
15.205, §15.209, §15.249(d)	Radiated Emissions& Outside of Band Emission	Compliant
§15.215 (c)	20dB Bandwidth	Compliant

Note: The device is powered by battery only.

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Wainwright	High Pass Filter	WHKX3.6/18G-10SS	5	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Radiated Emission Test Software: e3 19821b (V9)					
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2021/12/13	2022/12/12
HP	6dB Attenuator	8493B 6dB Attenuator	2708A 04769	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.33	RF-03	Each time	

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. Attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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. 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.

Antenna Connector Construction

The EUT has one internal antenna which was permanently attached and the antenna gain is 0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant.

FCC§15.205, §15.209 & §15.249(d) – RADIATED EMISSIONS**Applicable Standard**

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 ©, Field strength limits are specified at a distance of 3 meters.

As per FCC§15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

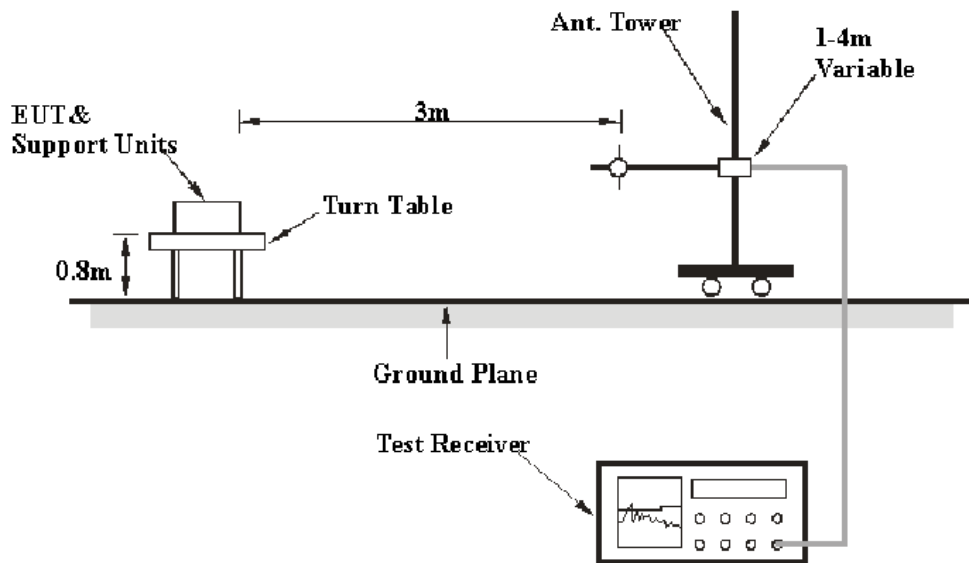
Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto

Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

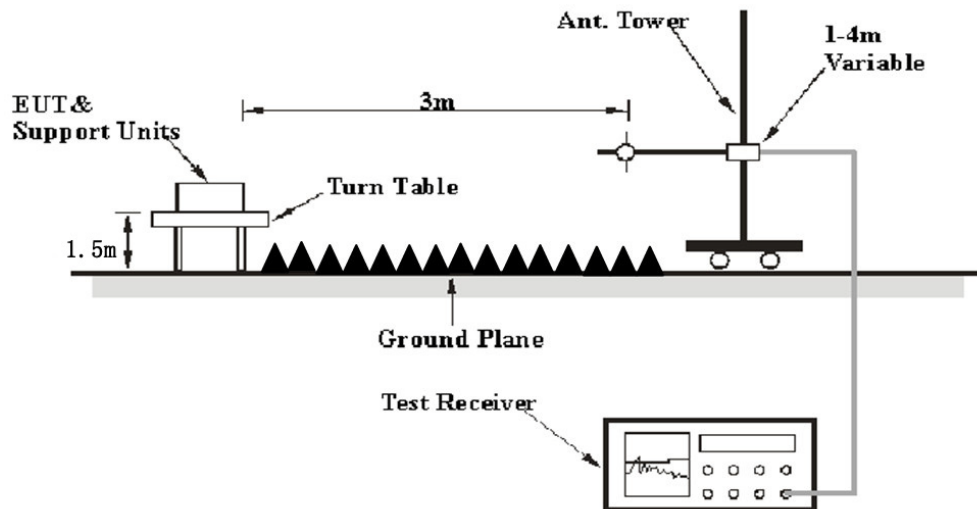
If the maximized peak measured value complies with the limit, then it is unnecessary to perform QP/Average measurement.

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission and out of band emission tests were performed in the 3meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane for below 1GHz or 1.5 meter for above 1GHz, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

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

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned}\text{Over Limit/Margin} &= \text{Level} / \text{Corrected Amplitude} - \text{Limit} \\ \text{Level} / \text{Corrected Amplitude} &= \text{Read Level} + \text{Factor}\end{aligned}$$

Test Results Summary

According to the EUT complied with the FCC Part 15.205, 15.209 & §15.249

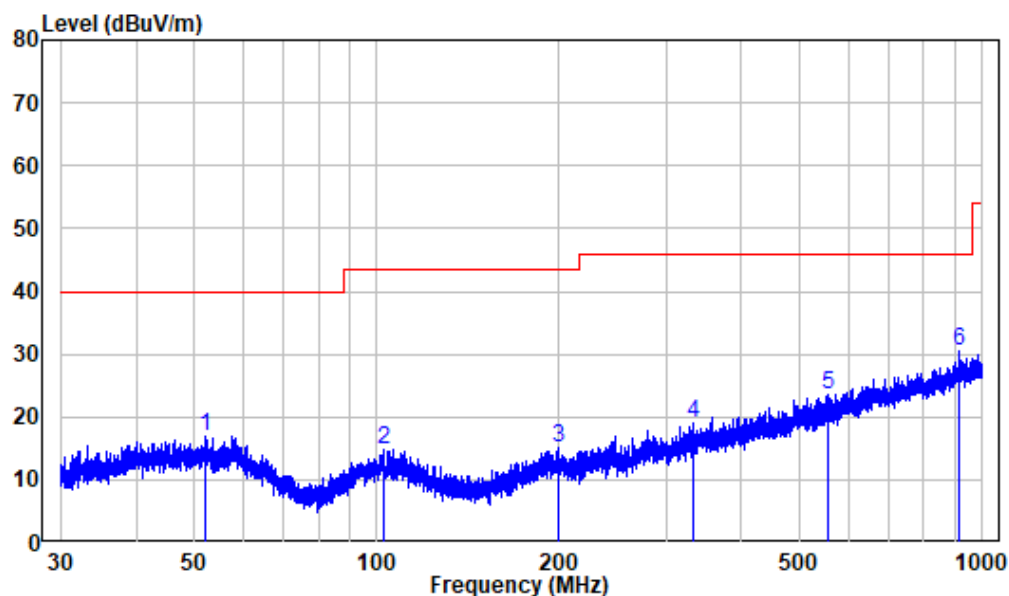
Test Data

Environmental Conditions

Temperature:	27~28°C
Relative Humidity:	62~65%
ATM Pressure:	108.0~101.0kPa

The testing was performed by Level Li on 2022-06-11.

Test Mode: Transmitting

30MHz-1GHz: (Worst case)**High Channel****Horizontal**

Site : chamber

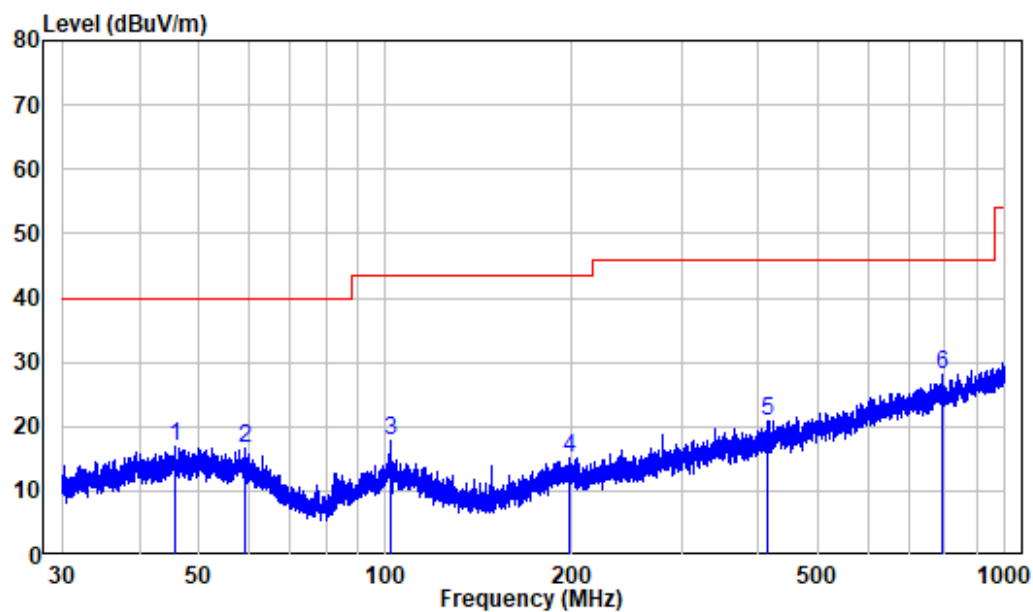
Condition: 3m HORIZONTAL

Job No. : SZ3220525-22736E-RF

Test Mode: Transmitting

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	52.002	-9.97	26.92	16.95	40.00	-23.05	Peak
2	102.449	-11.60	26.32	14.72	43.50	-28.78	Peak
3	198.762	-11.48	26.61	15.13	43.50	-28.37	Peak
4	332.956	-7.77	26.66	18.89	46.00	-27.11	Peak
5	556.530	-4.10	27.65	23.55	46.00	-22.45	Peak
6	916.872	1.52	28.94	30.46	46.00	-15.54	Peak

Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : SZ3220525-22736E-RF

Test Mode: Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	45.655	-9.97	26.78	16.81	40.00	-23.19	Peak
2	59.467	-10.43	27.08	16.65	40.00	-23.35	Peak
3	101.867	-11.58	29.51	17.93	43.50	-25.57	Peak
4	197.719	-11.55	26.66	15.11	43.50	-28.39	Peak
5	413.996	-6.25	27.16	20.91	46.00	-25.09	Peak
6	794.092	-0.22	28.22	28.00	46.00	-18.00	Peak

Above 1 GHz:

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/AV		Height (m)	Polar (H/V)				
Low Channel									
2310	44.72	PK	118	1.9	H	-7.23	37.49	74	-36.51
2310	45.32	PK	115	1.8	V	-7.23	38.09	74	-35.91
2390	45.29	PK	349	1.4	H	-7.21	38.08	74	-35.92
2390	44.79	PK	16	1.1	V	-7.21	37.58	74	-36.42
2400	51.51	PK	118	1.9	H	-7.23	44.28	74	-29.72
2400	44.25	PK	115	1.8	V	-7.23	37.02	74	-36.98
2410	104.5	PK	86	1.4	H	-7.23	97.27	114	-16.73
2410	87.02	AV	86	1.4	H	-7.23	79.79	94	-14.21
2410	98.11	PK	281	1.8	V	-7.23	90.88	114	-23.12
4820	50.47	PK	281	1.8	H	-3.52	46.95	74	-27.05
4820	47.26	PK	160	1.1	V	-3.52	43.74	74	-30.26
Middle Channel									
2442	103.42	PK	162	1.3	H	-7.24	96.18	114	-17.82
2442	86	AV	162	1.3	H	-7.24	78.76	94	-15.24
2442	96.58	PK	334	1.4	V	-7.24	89.34	114	-24.66
4884	52.86	PK	327	2.1	H	-3.35	49.51	74	-24.49
4884	48.85	PK	85	2.1	V	-3.35	45.5	74	-28.5
High Channel									
2483.5	51.11	PK	100	1.5	H	-7.2	43.91	74	-30.09
2483.5	48.97	PK	183	2.2	V	-7.2	41.77	74	-32.23
2500	48.2	PK	100	1.5	H	-7.18	41.02	74	-32.98
2500	44.97	PK	183	2.2	V	-7.18	37.79	74	-36.21
2473	101.37	PK	189	1.1	H	-7.22	94.15	114	-19.85
2473	84.68	AV	189	1.1	H	-7.22	77.46	94	-16.54
2473	96.1	PK	142	1.9	V	-7.22	88.88	114	-25.12
4946	53.64	PK	142	1.9	H	-3.05	50.59	74	-23.41
4946	50.13	PK	83	1.1	V	-3.05	47.08	74	-26.92

Note:

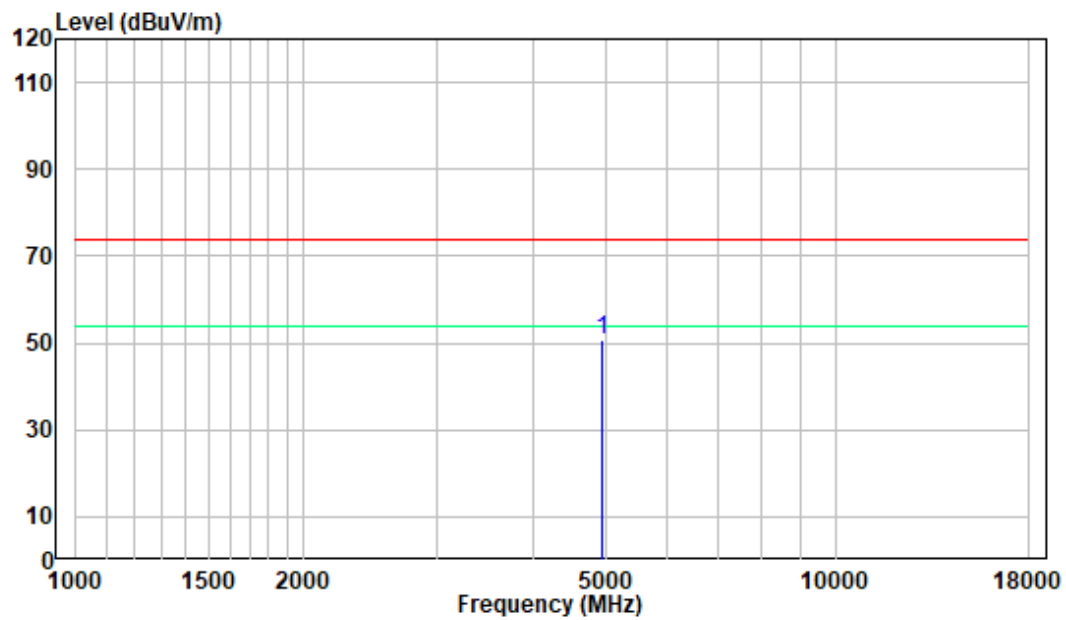
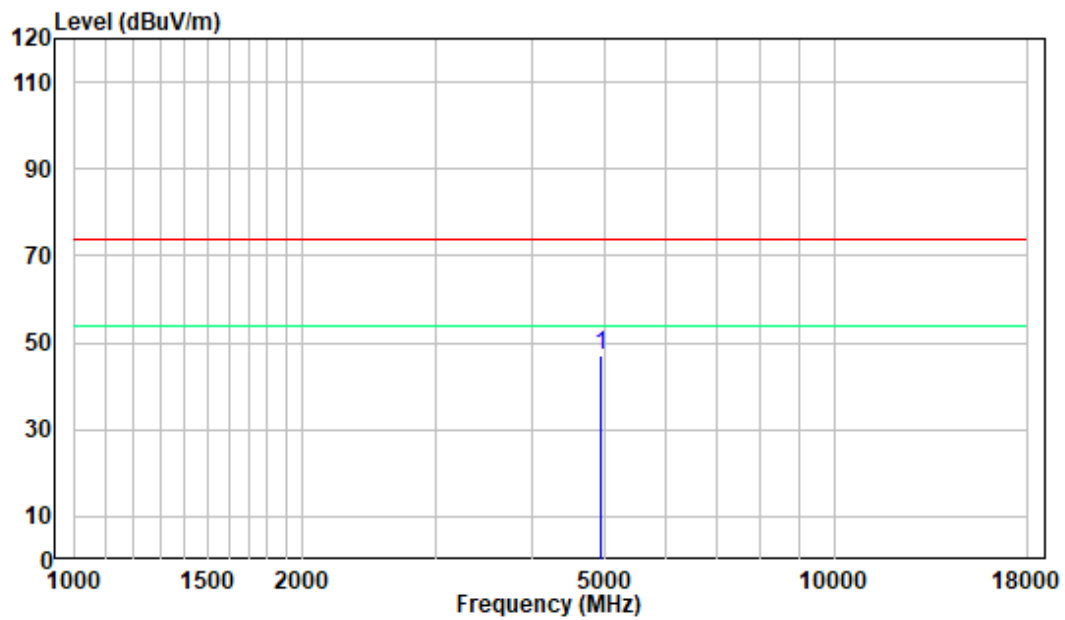
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

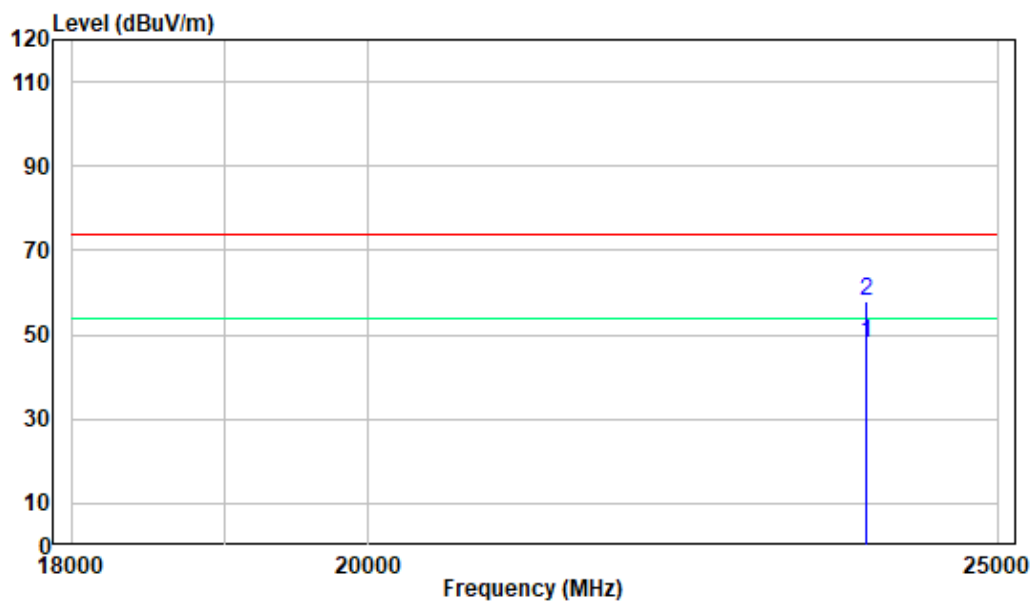
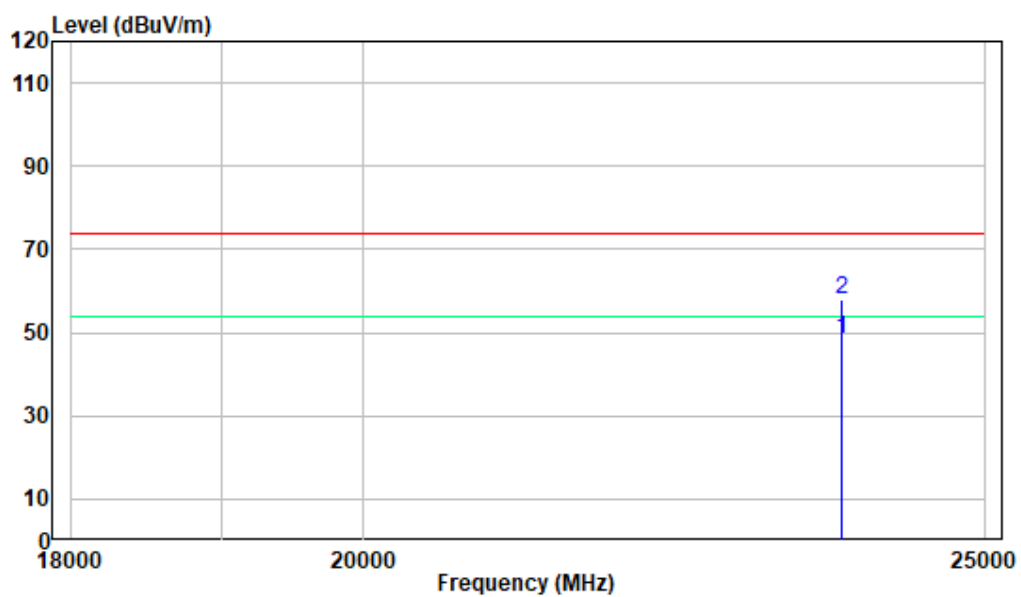
Absolute Level (Corrected Amplitude) = Factor + Reading

Margin = Absolute Level (Corrected Amplitude) – Limit

The other spurious emission which is in the noise floor level was not recorded.

For above 1GHz, the test result of peak was 20dB below to the limit of peak, which can be compliant to the average limit, so just peak value was recorded.

Pre-scan plots:**1-18GHz: High Channel****Horizontal****Vertical**

18-25GHz: High Channel**Horizontal****Vertical**

FCC§15.215(c) - 20dB EMISSION BANDWIDTH**Applicable Standard**

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

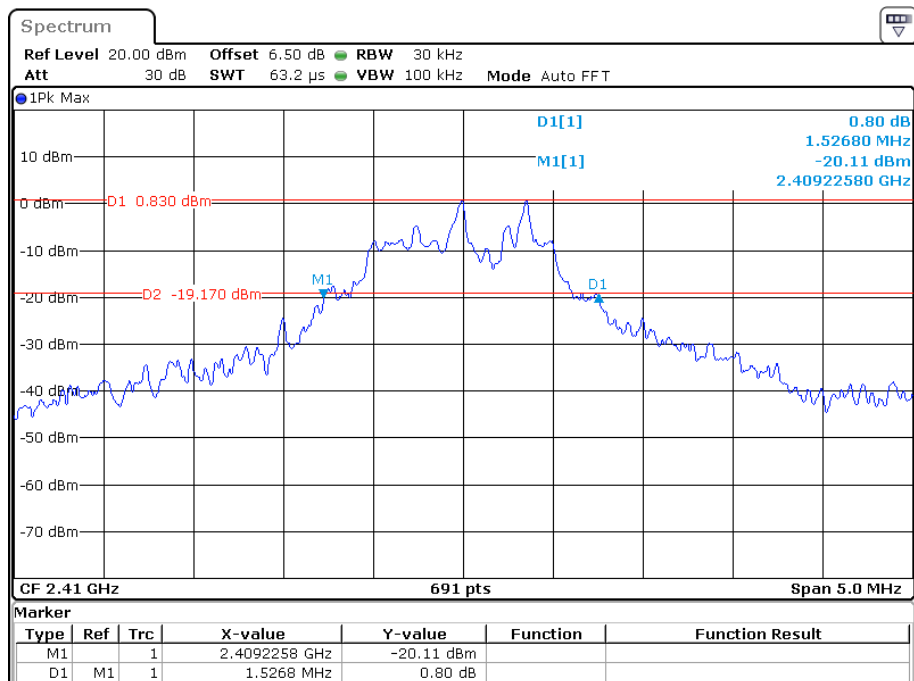
The testing was performed by Cat Kang on 2022-06-10.

Test Mode: Transmitting

Please refer to the following table and plots.

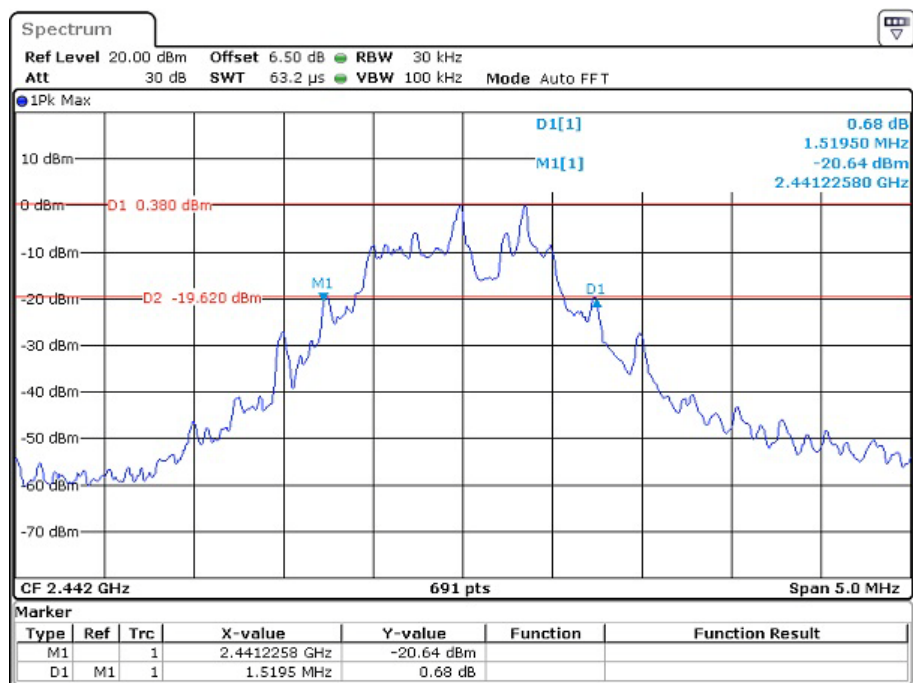
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2410	1.527
Middle	2442	1.520
High	2473	1.534

Low Channel



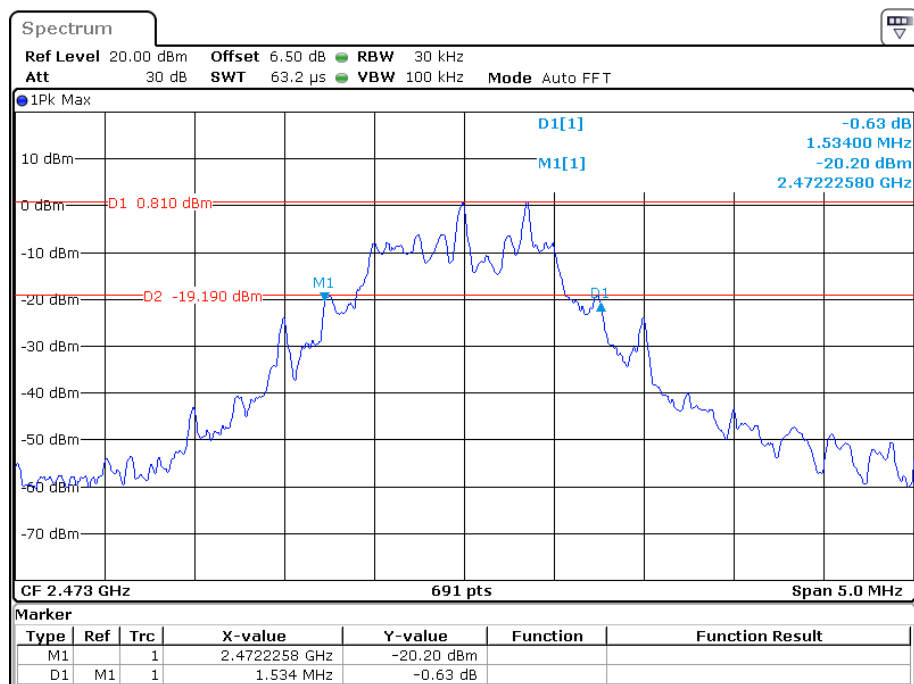
Date: 10.JUN.2022 19:19:20

Middle Channel



Date: 10.JUN.2022 19:47:31

High Channel



Date: 10. JUN. 2022 19:29:35

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