

TEST REPORT

Applicant Name : Shantou juhong Toy Technology Co. , Ltd.
Address : 7th floor building 2, Yutan Road, Guangyi street, Chenghai District,
Shoutou, Guangdong, China
Report Number: XMTN3220617-27077E-RF
FCC ID: 2A7SY-R52666888

Test Standard (s)

FCC PART 15.249

Sample Description

Product Type: Building block model
Model No.: 22006, 11001, 11002, 11003, 11004, 11005, 11024, 11025, 22001,
22002, 22003, 22004, 22005, 22007, 22008, 22009, 22010, 22011,
22012, 22013, 22014, 22015, 22016, 22017, 22018, 22019, 22020,
33001, 33002, 33003, 33004, 33005, 55026, 55027, 55028, 55029,
55030, 77023, 77024, 77025, 99001, 99002, 99003, 99004, 99005,
99006, 99007, 99008, 99009, 99010, 11006, 11007, 11008, 66003,
66004, 66005, 66006, 66007, 66008, 66026, 66027, 66028
Trade Name: Building block model
Date Received: 2022-06-17
Date of Test: 2022-07-06
Report Date: 2022-07-11

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Roger.Ling

Roger.Ling
EMC Engineer

Approved By

Robert Li

Robert 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.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Building block model
Tested Model	22006
Multiple Models	11001, 11002, 11003, 11004, 11005, 11024, 11025, 22001, 22002, 22003, 22004, 22005, 22007, 22008, 22009, 22010, 22011, 22012, 22013, 22014, 22015, 22016, 22017, 22018, 22019, 22020, 33001, 33002, 33003, 33004, 33005, 55026, 55027, 55028, 55029, 55030, 77023, 77024, 77025, 99001, 99002, 99003, 99004, 99005, 99006, 99007, 99008, 99009, 99010, 11006, 11007, 11008, 66003, 66004, 66005, 66006, 66007, 66008, 66026, 66027, 66028
Model Differences	Please reply the DOS letter.
Trademark	Building block model
Frequency Range	2411-2475MHz
Maximum E-Field Strength (Peak)	98.75dBuV/m@3m
Modulation Technique	GFSK
Antenna Specification	0dBi (It is provided by the applicant)
Voltage Range	DC 3V (2*AAA batteries)
Sample serial number	XMTN3220617-27077E--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	2411	23	2433	45	2455
2	2412	24	2434	46	2456
3	2413	25	2435	47	2457
4	2414	26	2436	48	2458
5	2415	27	2437	49	2459
6	2416	28	2438	50	2460
7	2417	29	2439	51	2461
8	2418	30	2440	52	2462
9	2419	31	2441	53	2463
10	2420	32	2442	54	2464
11	2421	33	2443	55	2465
12	2422	34	2444	56	2466
13	2423	35	2445	57	2467
14	2424	36	2446	58	2468
15	2425	37	2447	59	2469
16	2426	38	2448	60	2470
17	2427	39	2449	61	2471
18	2428	40	2450	62	2472
19	2429	41	2451	63	2473
20	2430	42	2452	64	2474
21	2431	43	2453	65	2475
22	2432	44	2454	66	/

Channel 1, Channel 32 and Channel 65 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

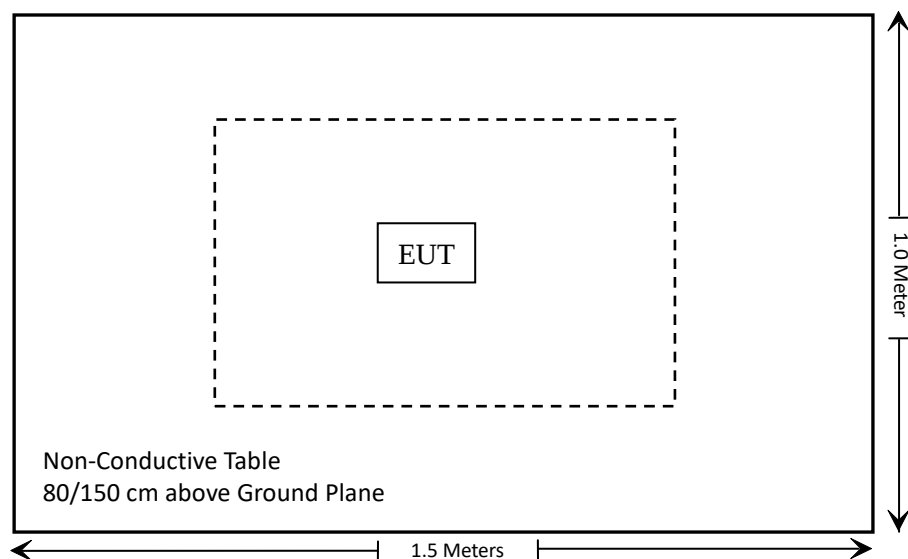
Manufacturer	Description	Model	Serial Number
/	/	/	/

Support Cable Descriptions

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

Block Diagram of Test Setup

For Radiated Emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) & §2.1093	RF EXPOSURE	Compliant
§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 2*AAA batteries 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)					
RFConducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101495	2021/12/13	2022/12/12
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 §1.1307 (b) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.2 – 1-mW test Exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Test Result:

For worst case:

Mode	Frequency	Maximum Tune-up Average Conducted Power		Ant. Gain	EIRP		1-mW test Exemption
	(MHz)	(dBm)	(mW)	(dBi)	(dBm)	(mW)	
2.4G SRD	2411-2475	-9.0	0.13	0	-9.0	0.13	Yes

Note 1: The maximum EIRP for 2411-2475MHz is $85.74-95.2(\text{dBm}) = -9.46\text{dBm}$, and antenna gain is 0dBi, so the maximum conducted power is -9.46dBm.

Note 2: The maximum tune-up Average Conducted power was declared by the applicant.

Result: Compliant.

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:

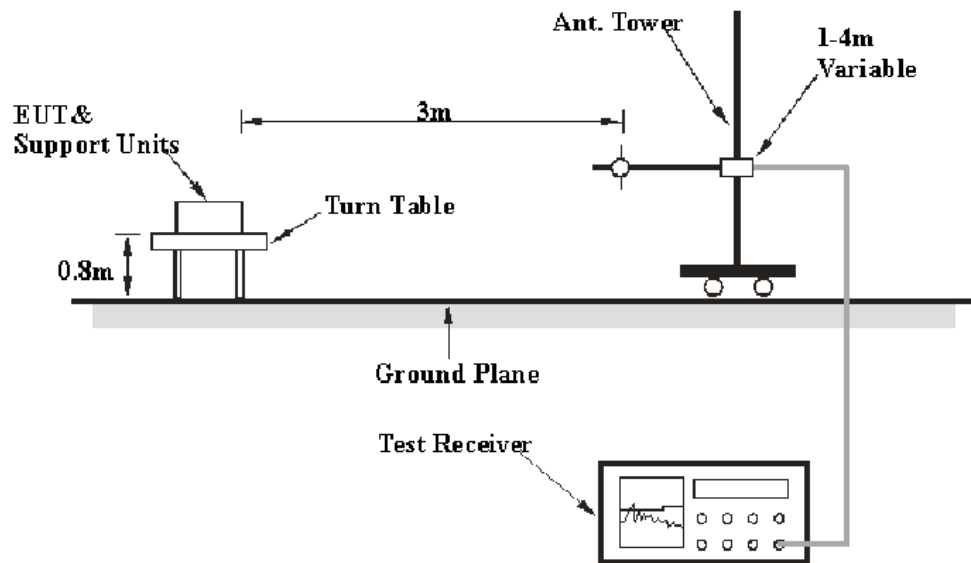
Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto

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

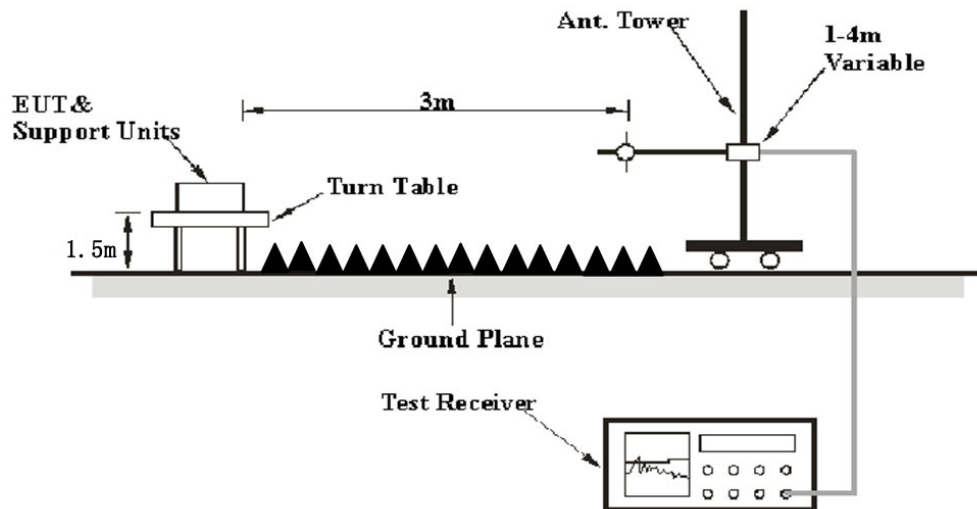
If the maximized peak measured value complies with the limit, then it is unnecessary to perform QP/Average measurement.

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

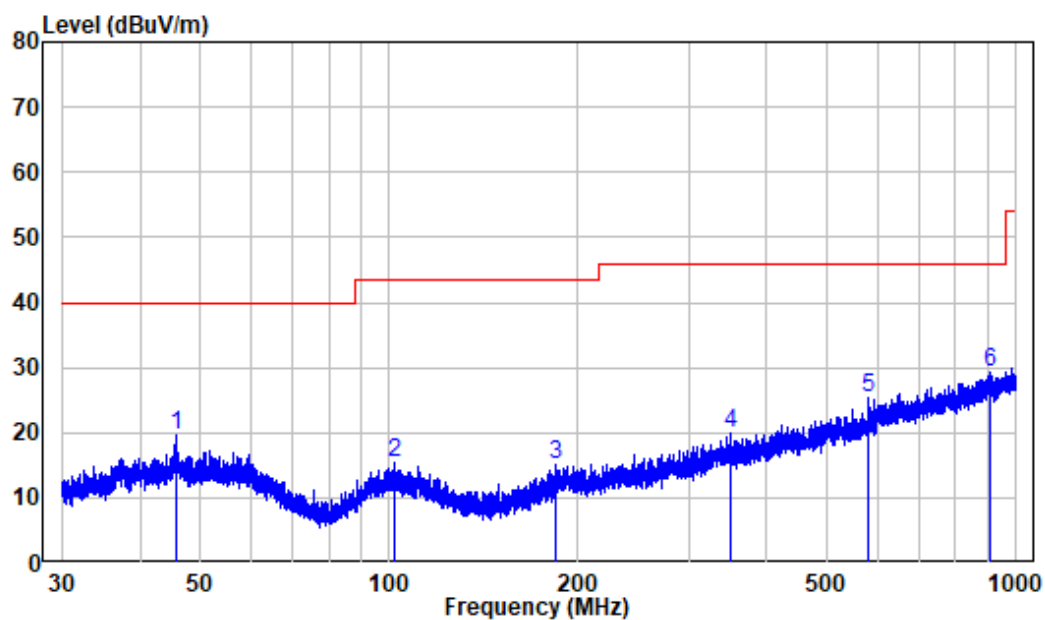
Test Data

Environmental Conditions

Temperature:	27°C
Relative Humidity:	60%
ATM Pressure:	108.0kPa

The testing was performed by Level Li on 2022-07-08.

Test Mode: Transmitting

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

Site : chamber

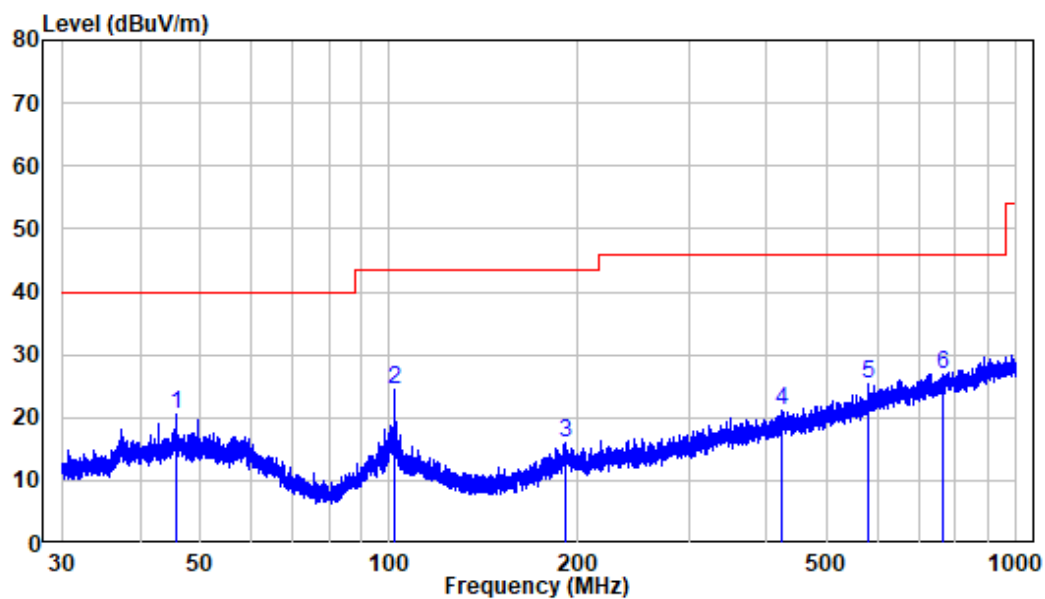
Condition: 3m HORIZONTAL

Job No. : XMTN3220617-27077E-RF

Test Mode: Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	45.795	-9.98	29.63	19.65	40.00	-20.35	Peak
2	101.912	-11.58	27.04	15.46	43.50	-28.04	Peak
3	184.490	-12.24	27.42	15.18	43.50	-28.32	Peak
4	350.630	-7.34	27.34	20.00	46.00	-26.00	Peak
5	581.722	-3.24	28.65	25.41	46.00	-20.59	Peak
6	906.085	1.69	27.67	29.36	46.00	-16.64	Peak

Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : XMTN3220617-27077E-RF

Test Mode: Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	45.755	-9.98	30.55	20.57	40.00	-19.43	Peak
2	101.912	-11.58	35.96	24.38	43.50	-19.12	Peak
3	190.322	-11.52	27.48	15.96	43.50	-27.54	Peak
4	421.688	-6.04	27.08	21.04	46.00	-24.96	Peak
5	581.722	-3.24	28.65	25.41	46.00	-20.59	Peak
6	762.039	-0.50	27.46	26.96	46.00	-19.04	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	45.09	PK	16	1.2	H	-7.23	37.86	74	-36.14
2310	44.68	PK	240	1.2	V	-7.23	37.45	74	-36.55
2390	55.63	PK	210	1.0	H	-7.21	48.42	74	-25.58
2390	47.83	PK	215	1.1	V	-7.21	40.62	74	-33.38
2400	59.76	PK	16	1.2	H	-7.23	52.53	74	-21.47
2400	57.1	PK	240	1.2	V	-7.23	49.87	74	-24.13
2411	105.2	PK	155	1.4	H	-7.23	97.97	114	-16.03
2411	90.6	AV	155	1.4	H	-7.23	83.37	94	-10.63
2411	88.64	PK	282	1.5	V	-7.23	81.41	114	-32.59
2411	75.62	AV	282	1.5	V	-7.23	68.39	94	-25.61
4822	53.12	PK	282	1.5	H	-3.52	49.6	74	-24.4
4822	51	PK	83	2.1	V	-3.52	47.48	74	-26.52
Middle Channel									
2442	104.68	PK	238	1.6	H	-7.24	97.44	114	-16.56
2442	91.01	AV	238	1.6	H	-7.24	83.77	94	-10.23
2442	89.25	PK	57	1.6	V	-7.24	82.01	114	-31.99
2442	76.75	AV	57	1.6	V	-7.24	69.51	94	-24.49
4884	55.17	PK	270	1.7	H	-3.35	51.82	74	-22.18
4884	52.12	PK	317	2.1	V	-3.35	48.77	74	-25.23
High Channel									
2483.5	58.53	PK	218	1.6	H	-7.2	51.33	74	-22.67
2483.5	55.92	PK	213	1.6	V	-7.2	48.72	74	-25.28
2500	48.01	PK	218	1.6	H	-7.18	40.83	74	-33.17
2500	47.07	PK	213	1.6	V	-7.18	39.89	74	-34.11
2475	105.96	PK	267	1.6	H	-7.21	98.75	114	-15.25
2475	92.95	AV	267	1.6	H	-7.21	85.74	94	-8.26
2475	89.17	PK	6	1.1	V	-7.21	81.96	114	-32.04
2475	75.54	AV	6	1.1	V	-7.21	68.33	94	-25.67
4950	56.48	PK	267	1.6	H	-3.04	53.44	74	-20.56
4950	52.89	PK	35	1.2	V	-3.04	49.85	74	-24.15

Note:

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

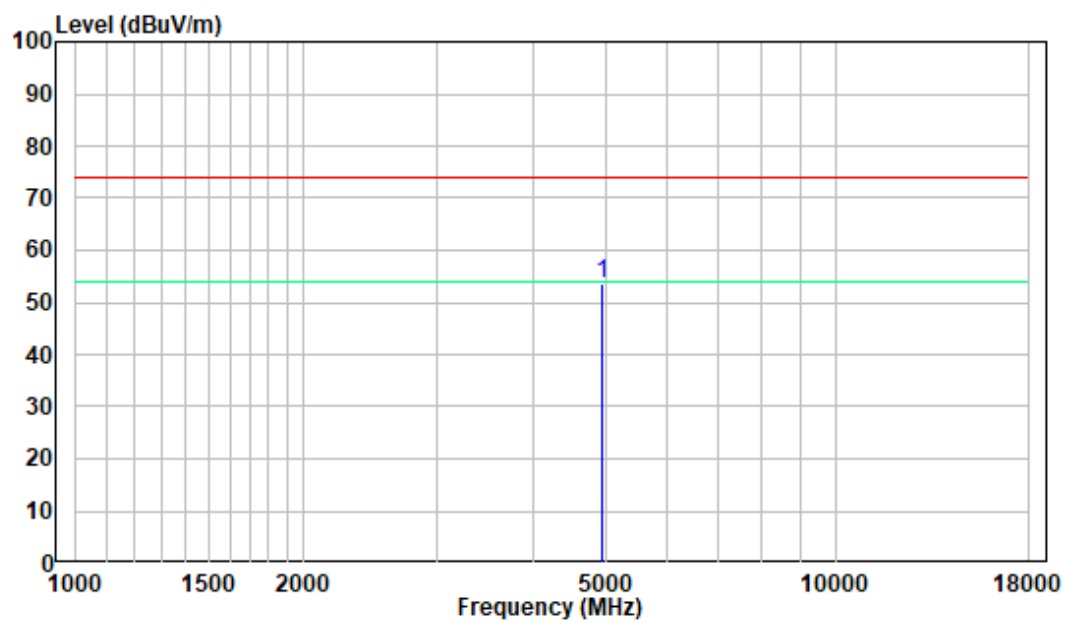
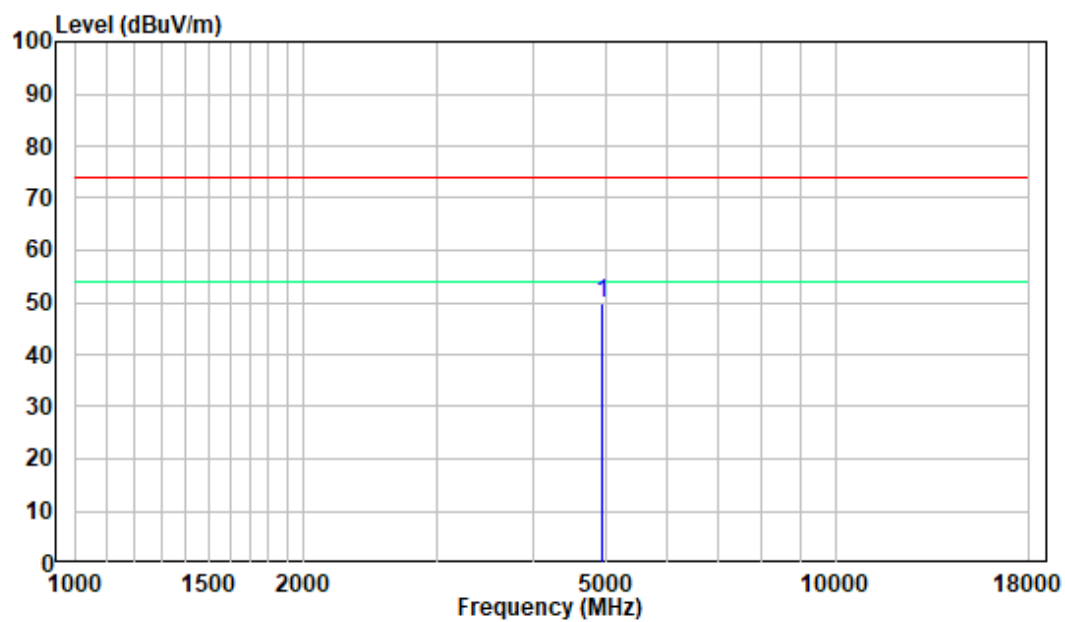
Absolute Level (Corrected Amplitude)= Factor + Reading

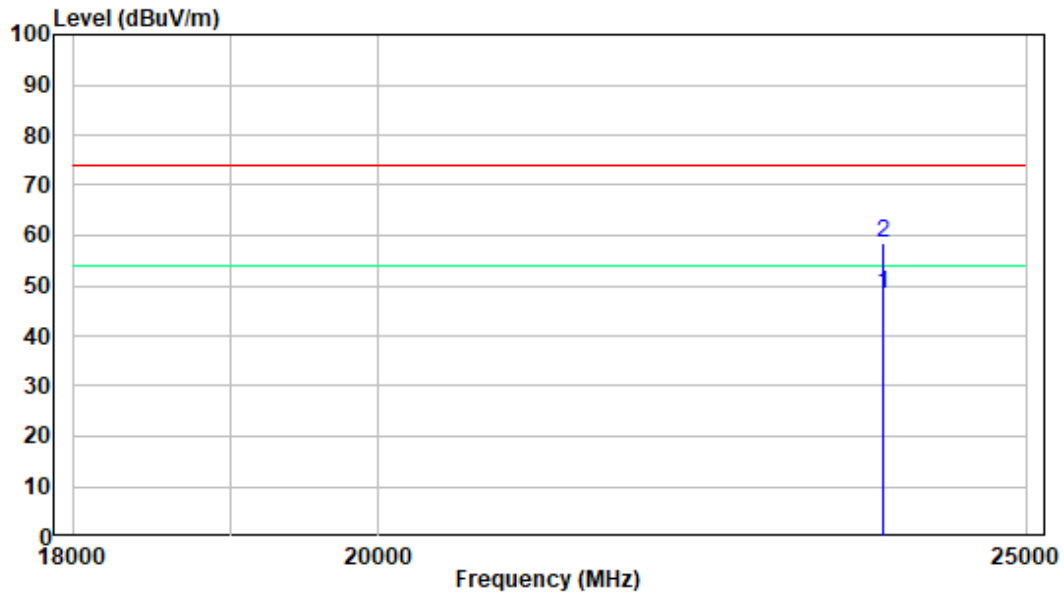
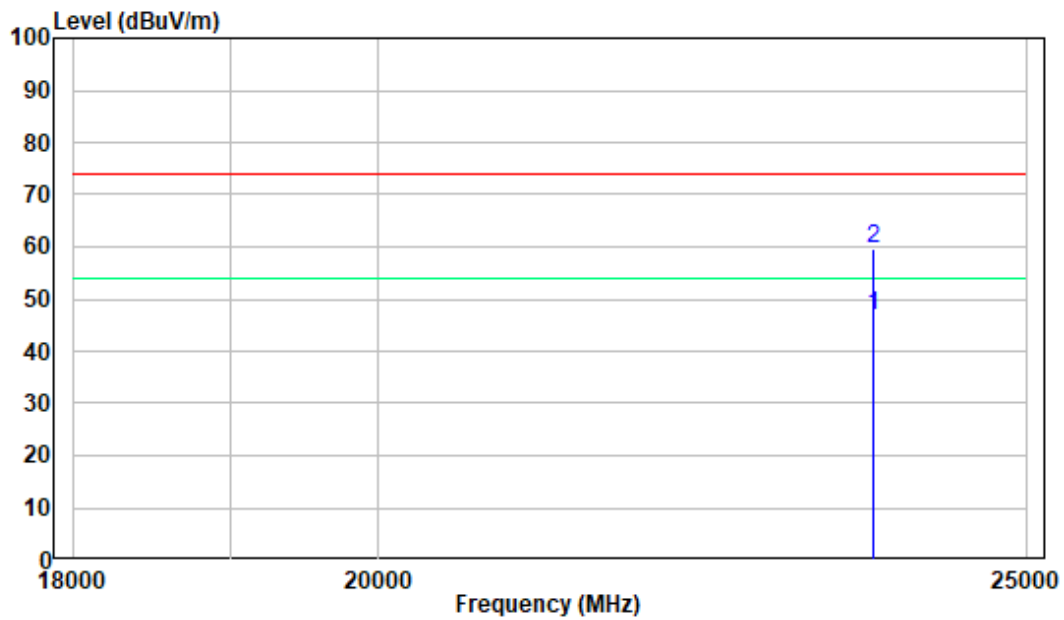
Margin = Absolute Level (Corrected Amplitude) –Limit

RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

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:	27 °C
Relative Humidity:	60%
ATM Pressure:	108.0kPa

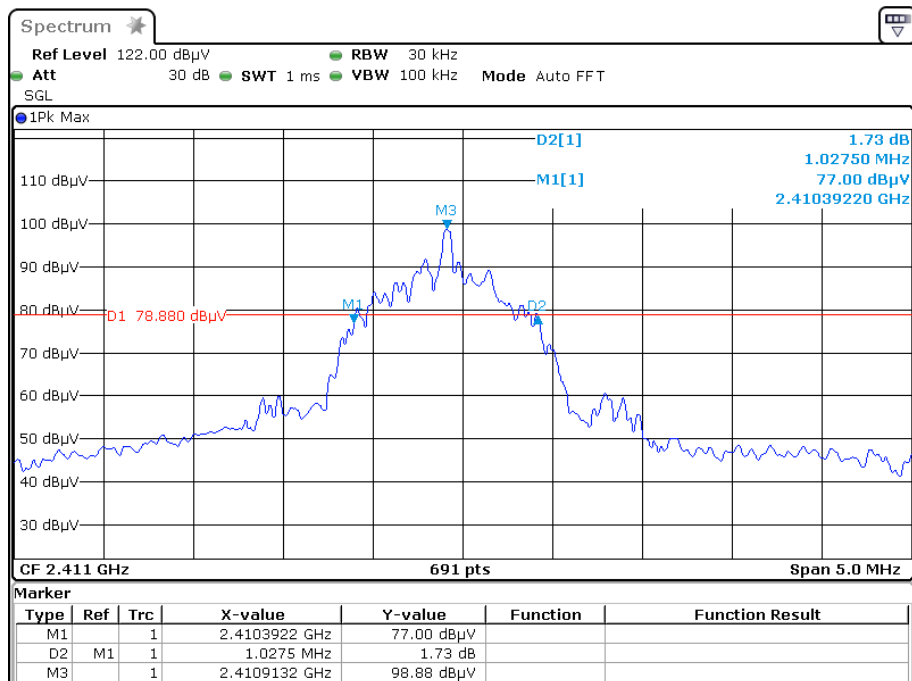
The testing was performed by Cat Kang on 2022-07-08.

Test Mode: Transmitting

Please refer to the following table and plots.

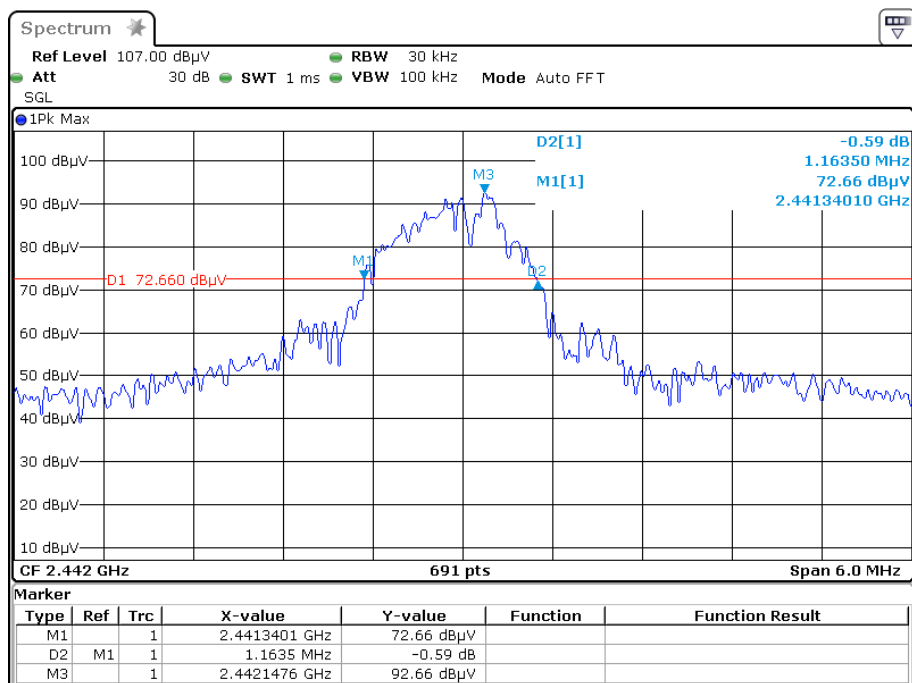
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2411	1.028
Middle	2442	1.164
High	2475	1.042

Low Channel



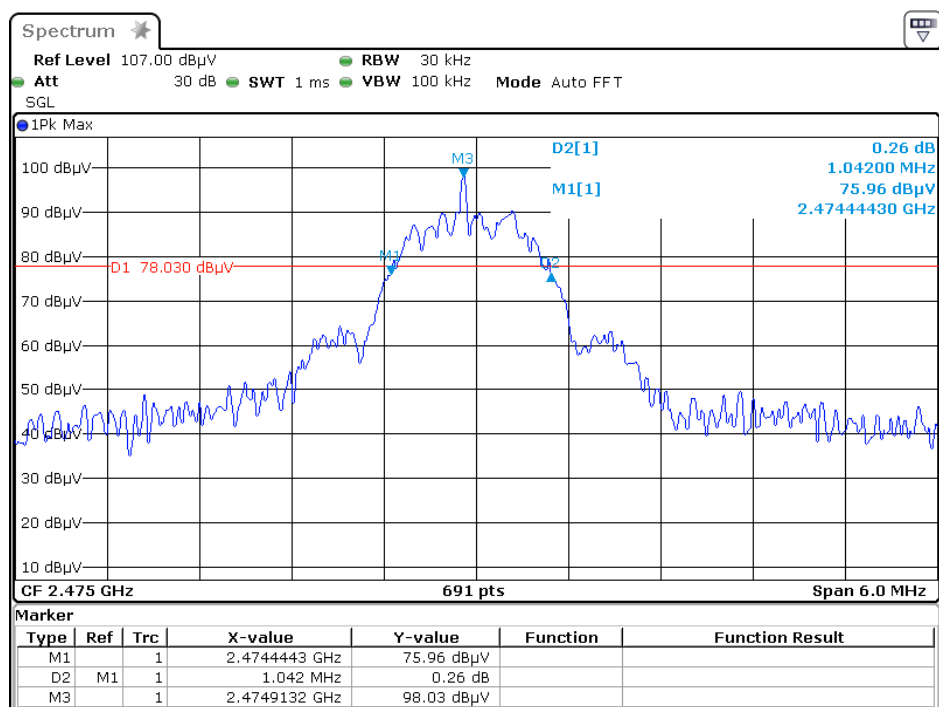
Date: 8.JUL.2022 10:36:42

Middle Channel



Date: 8.JUL.2022 10:45:47

High Channel



Date: 8.JUL.2022 10:47:39

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