FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Zhejiang Tejieer Intelligent Sanitary Ware Co.,Ltd.

2.4G Wireless Module

Model No.: A7105

FCC ID: 2AT2Y-A7105

Prepared for : Zhejiang Tejieer Intelligent Sanitary Ware Co.,Ltd.
128 Hailiang Road Jiaojiang District, Taizhou City, Zhejiang Province

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park, Nanshan District , Shenzhen, Guangdong, China

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Report Number : ACS-F19120
Date of Test : Jul.16,2019
Date of Report : Aug.08,2019

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TEST REPORT CERTIFICATION

Applicant	:	Zhejiang Tejieer Intelligent Sanitary Ware Co.,Ltd.
Product	:	2.4G Wireless Module
FCC ID	:	2AT2Y-A7105

(A)Model No. : A7105
(B) Serial No. : N/A
(C) Power Supply : DC 3V
(D) Test Voltage : DC 3V

Tested for comply with:
FCC CFR 47 Part 15 Subpart C

Test procedure used:
ANSI C63.10:2013

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Jul.16,2019 Report of date: Aug.08,2019

Prepared by : Brave Zhang / Assistant

Reviewed by : Sunny Lu / Deputy Manager

信華科技（深圳）有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature:

Approved & Authorized Signer : David Jin / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Power Line Conducted Emission Test	FCC Part 15C: 15.207 ANSI C63.10-2013	N/A
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.10-2013	PASS
Band Edge Compliance Test	FCC Part 15: 15.249 ANSI C63.10-2013	PASS
20dB Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10-2013	PASS
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

Product	:	2.4G Wireless Module
Model No.	:	A7105
FCC ID	:	2AT2Y-A7105
Radio	:	General 2.4GHz wireless
Operation frequency	:	2405MHz-2475MHz
Antenna	:	Integrated PCB Antenna, 4.63dBi (Max)
Modulation	:	GFSK
Applicant	:	Zhejiang Tejieer Intelligent Sanitary Ware Co.,Ltd. 128 Hailiang Road Jiaojiang District, Taizhou City, Zhejiang Province
Manufacturer	:	Zhejiang Tejieer Intelligent Sanitary Ware Co.,Ltd. 128 Hailiang Road Jiaojiang District, Taizhou City, Zhejiang Province
Factory	:	Zhejiang Tejieer Intelligent Sanitary Ware Co.,Ltd. 128 Hailiang Road Jiaojiang District, Taizhou City, Zhejiang Province
Date of Test	:	Jul.16,2019
Date of Receipt	:	Jul.14,2019
Sample Type	:	Prototype production

2.2.Channel list of EUT

Channel list	Frequency	Channel list	Frequency	Channel list	Frequency
1	2405MHz	48	2428.5MHz	95	2452MHz
2	2405.5MHz	49	2429MHz	96	2452.5MHz
3	2406MHz	50	2429.5MHz	97	2453MHz
4	2406.5MHz	51	2430MHz	98	2453.5MHz
5	2407MHz	52	2430.5MHz	99	2454MHz
6	2407.5MHz	53	2431MHz	100	2454.5MHz
7	2408MHz	54	2431.5MHz	101	2455MHz
8	2408.5MHz	55	2432MHz	102	2455.5MHz
9	2409MHz	56	2432.5MHz	103	2456MHz
10	2409.5MHz	57	2433MHz	104	2456.5MHz
11	2410MHz	58	2433.5MHz	105	2457MHz
12	2410.5MHz	59	2434MHz	106	2457.5MHz
13	2411MHz	60	2434.5MHz	107	2458MHz
14	2411.5MHz	61	2435MHz	108	2458.5MHz
15	2412MHz	62	2435.5MHz	109	2459MHz
16	2412.5MHz	63	2436MHz	110	2459.5MHz
17	2413MHz	64	2436.5MHz	111	2460MHz
18	2413.5MHz	65	2437MHz	112	2460.5MHz
19	2414MHz	66	2437.5MHz	113	2461MHz
20	2414.5MHz	67	2438MHz	114	2461.5MHz
21	2415MHz	68	2438.5MHz	115	2462MHz
22	2415.5MHz	69	2439MHz	116	2462.5MHz
23	2416MHz	70	2439.5MHz	117	2463MHz
24	2416.5MHz	71	2440MHz	118	2463.5MHz
25	2417MHz	72	2440.5MHz	119	2464MHz
26	2417.5MHz	73	2441MHz	120	2464.5MHz
27	2418MHz	74	2441.5MHz	121	2465MHz
28	2418.5MHz	75	2442MHz	122	2465.5MHz
29	2419MHz	76	2442.5MHz	123	2466MHz
30	2419.5MHz	77	2443MHz	124	2466.5MHz
31	2420MHz	78	2443.5MHz	125	2467MHz
32	2420.5MHz	79	2444MHz	126	2467.5MHz
33	2421MHz	80	2444.5MHz	127	2468MHz
34	2421.5MHz	81	2445MHz	128	2468.5MHz
35	2422MHz	82	2445.5MHz	129	2469MHz
36	2422.5MHz	83	2446MHz	130	2469.5MHz
37	2423MHz	84	2446.5MHz	131	2470MHz
38	2423.5MHz	85	2447MHz	132	2470.5MHz
39	2424MHz	86	2447.5MHz	133	2471MHz
40	2424.5MHz	87	2448MHz	134	2471.5MHz
41	2425MHz	88	2448.5MHz	135	2472MHz
42	2425.5MHz	89	2449MHz	136	2472.5MHz
43	2426MHz	90	2449.5MHz	137	2473MHz
44	2426.5MHz	91	2450MHz	138	2473.5MHz
45	2427MHz	92	2450.5MHz	139	2474MHz
46	2427.5MHz	93	2451MHz	140	2474.5MHz
47	2428MHz	94	2451.5MHz	141	2475MHz

2.3.EUT Configuration and operation conditions for test

(EUT: 2.4G Wireless Module)

2.4.Test Facility

Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Kefeng Road, Science & Technology Park, Nanshan District , Shenzhen, Guangdong, China
RF Anechoic Chamber	:	Dimensions are: [L]10m × [W]5.5m × [H]5m
EMC Lab.	:	Certificated by DAkkS, Germany Registration No: D-PL-12151-01-00 Valid Date: Dec.07, 2021
	:	Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2020
		Certificated by FCC, USA Designation No: CN5022 Valid Date: Mar.31, 2020

2.5.Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Radiation Emission test in 3m chamber	3.6dB(30~200MHz, Polarization: H)
	4.0dB(30~200MHz, Polarization: V)
	3.6dB(200M~1GHz, Polarization: H)
	3.8dB(200M~1GHz, Polarization: V)
Uncertainty for Radiation Emission test in 3m chamber (1GHz-18GHz)	4.6dB (1~6GHz, Distance: 3m)
	4.6dB (6~18GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.7dB(30-1000MHz)
	3.3dB(1-26.5GHz)
Uncertainty for Conduction Spurious emission test	2.0dB
Uncertainty for Output power test	0.8dB
Uncertainty for Bandwidth test	83kHz
Uncertainty for DC power test	0.1%
Uncertainty for test site temperature and humidity	0.6℃
	3%

Note: EMI uncertainty is evaluated by CISPR16-4-2.
The value of measurement uncertainty of EMI is less than U_{CISPR}.
The value is not calculated in the test results.

3. POWER LINE CONDUCTED EMISSION TEST

According to Paragraph (c) of FCC Part 15 section 15.207, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

4. RADIATED EMISSION TEST

4.1.Test Equipment

4.1.1.For frequency range 30 MHz ~1000MHz (In 3m Anechoic Chamber)

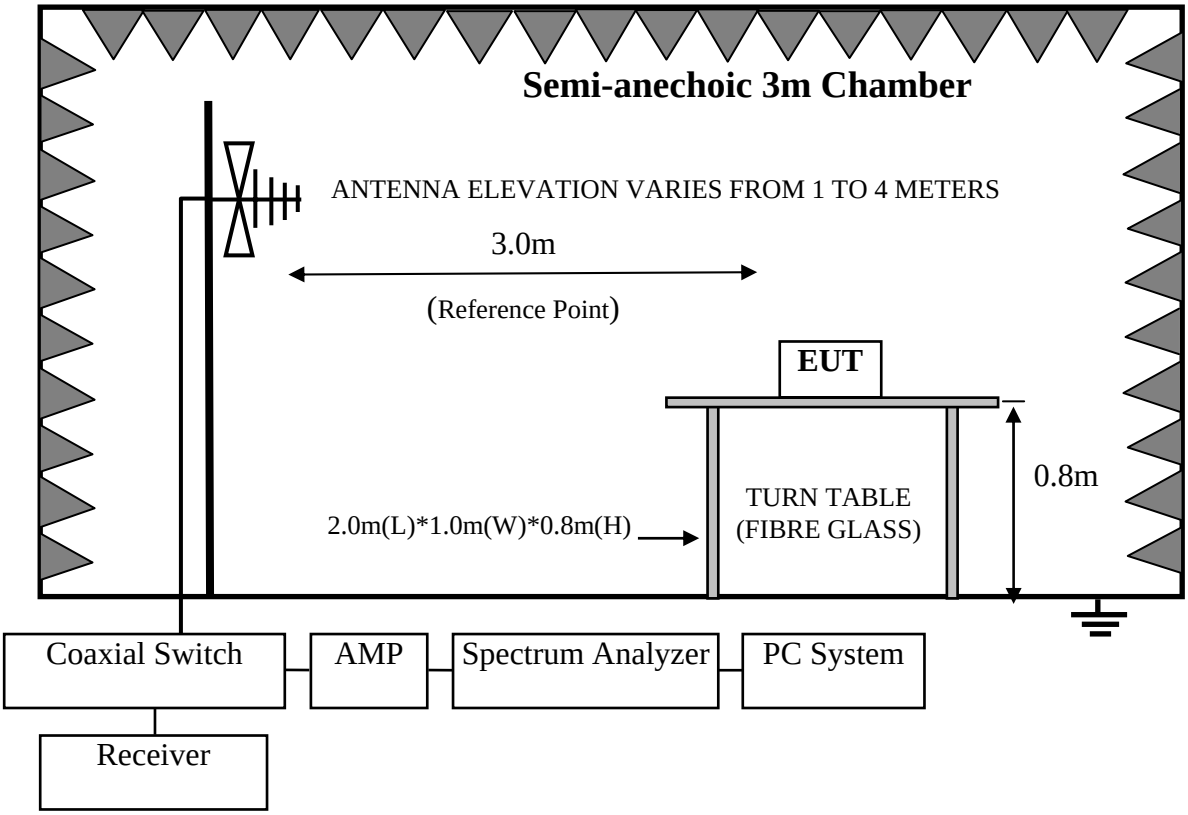
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber	AUDIX	N/A	N/A	May.10,19	1 Year
2.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.14,19	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR7	101547	Apr.14,19	1 Year
4.	Amplifier	HP	8447D	2648A04738	Apr.14,19	1 Year
5.	Bi-log Antenna	TESEQ	CBL6112D	35375	Nov.21,18	1 Year
6.	Loop Antenna	Chase	HLA6120	1062	Apr.18,19	1 Year
7.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Dec.01,18	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397222	Apr.14,19	1 Year
9.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

4.1.2.For frequency range above 1GHz (In 3m Anechoic Chamber)

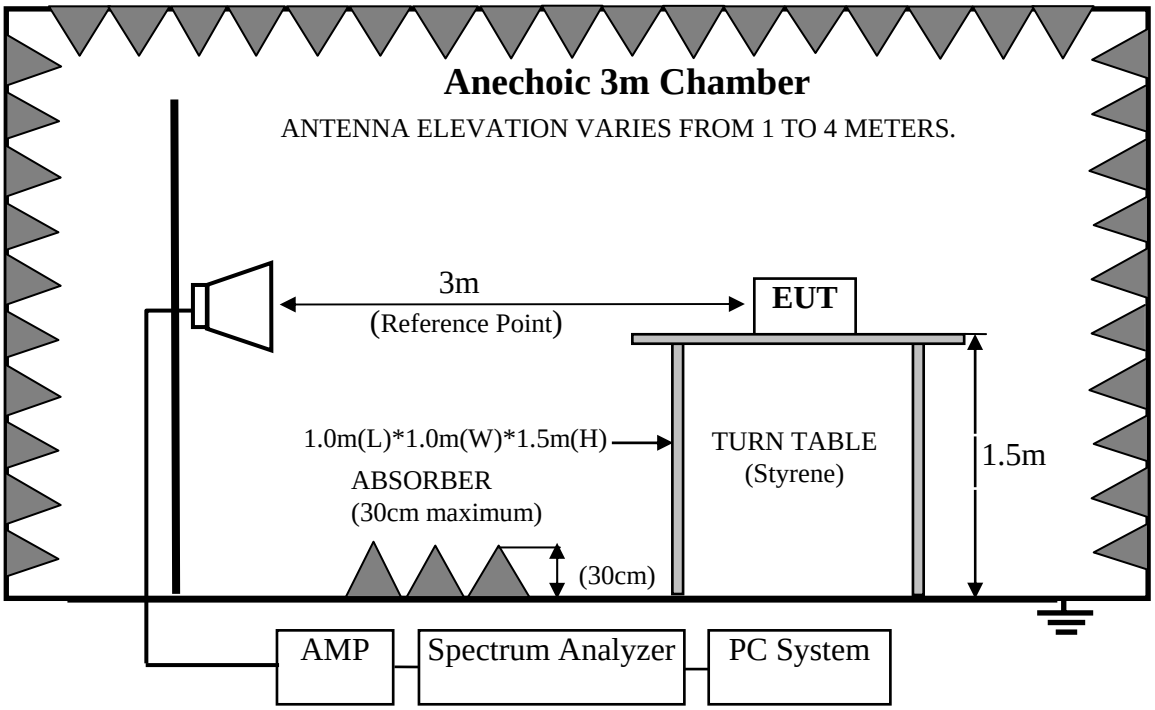
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Chamber	AUDIX	N/A	N/A	Apr.19,19	1 Year
2.	Signal Analyzer	Rohde & Schwarz	FSV30	104051	Apr.13,19	1 Year
3.	EMC Analyzer	Agilent	N9030A	MY51380221	Sep.08,18	1 Year
4.	Horn Antenna	ETS	3115	9510-4580	Dec.13,18	1 Year
5.	Horn Antenna	ETS	3116	00060089	Dec.13,18	1 Year
6.	Amplifier	Agilent	8449B	3008A00863	Apr.23,19	1 Year
7.	Amplifier	EMCI	EMC184040SE	980507	May.13,19	1 Year
8.	RF Cable	EMCI	EMC102-KM-KM-3500	170702	Oct.14,18	1 Year
9.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range above 1GHz



4.3. Radiated Emission Limit Standard: FCC 15.209 and 15.249

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Field Strength of fundamental emissions for 2.4GHz-2.4835GHz	3	114.0 dB(μV)/m (Peak) 94.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instruments, antenna and the closest point of any part of the device or system.

(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 and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.5. Operating Condition of EUT

4.5.1.Setup the EUT and simulator as shown as Section 4.2.
4.5.2.Turn on the power of all equipments.
4.5.3.Let EUT work in Tx mode.

4.6. Test Procedure

Frequency below 30MHz:
The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground for frequency 30MHz~1000MHz, 1.5 meter high above ground for frequency above 1GHz and put the absorbing with 2.4m(L)*2.4m(W)*0.3m(H) on the ground . The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it.EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna for frequency 30MHz~1000MHz, and the Horm antenna is used as receiving antenna for frequency above 1GHz. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2013 on radiated emission Test.

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions.

After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation show in the test setup photos.

The bandwidth of the EMI test receiver (R&S ESR7) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz

This device is pulse modulated, a duty cycle factor was used to calculate average level based measured peak level.

The frequency range from 30MHz to 10th harmonic (25GHz) is checked. And no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

4.7. Radiated Emission Test Results

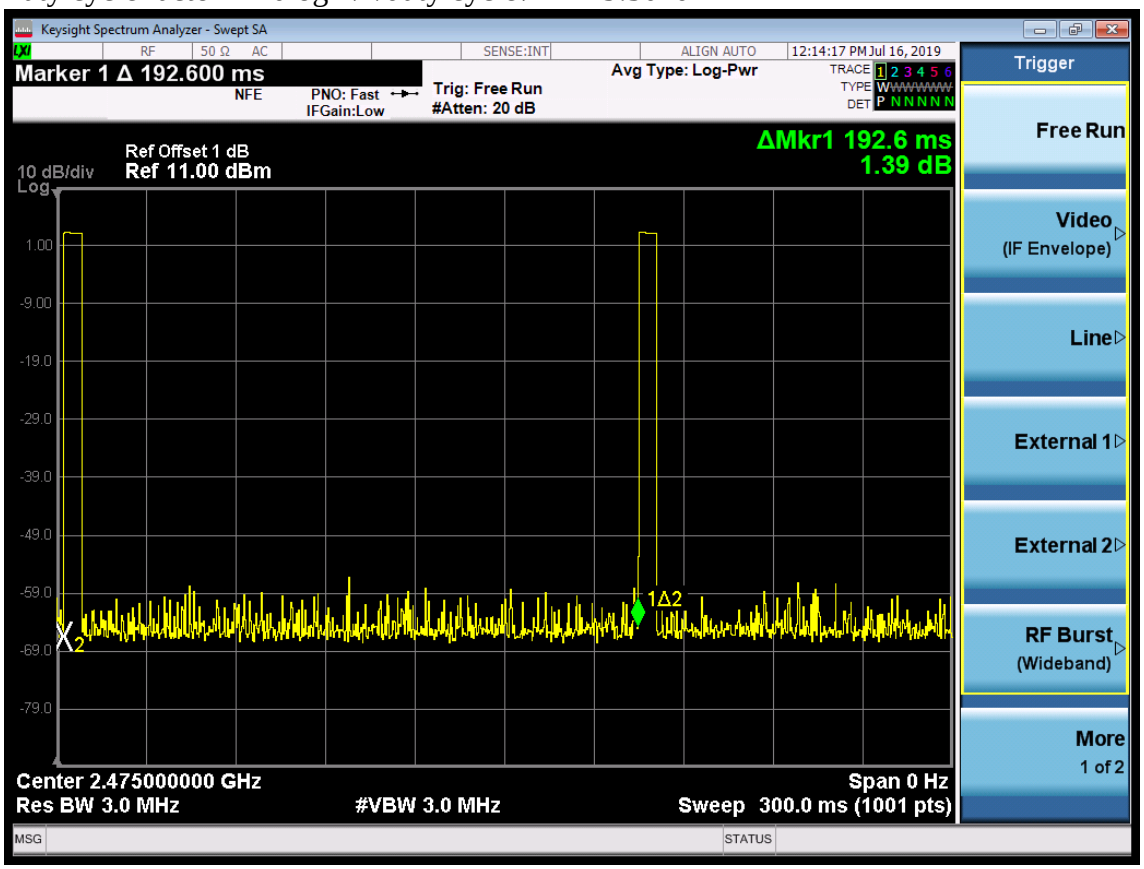
PASS.

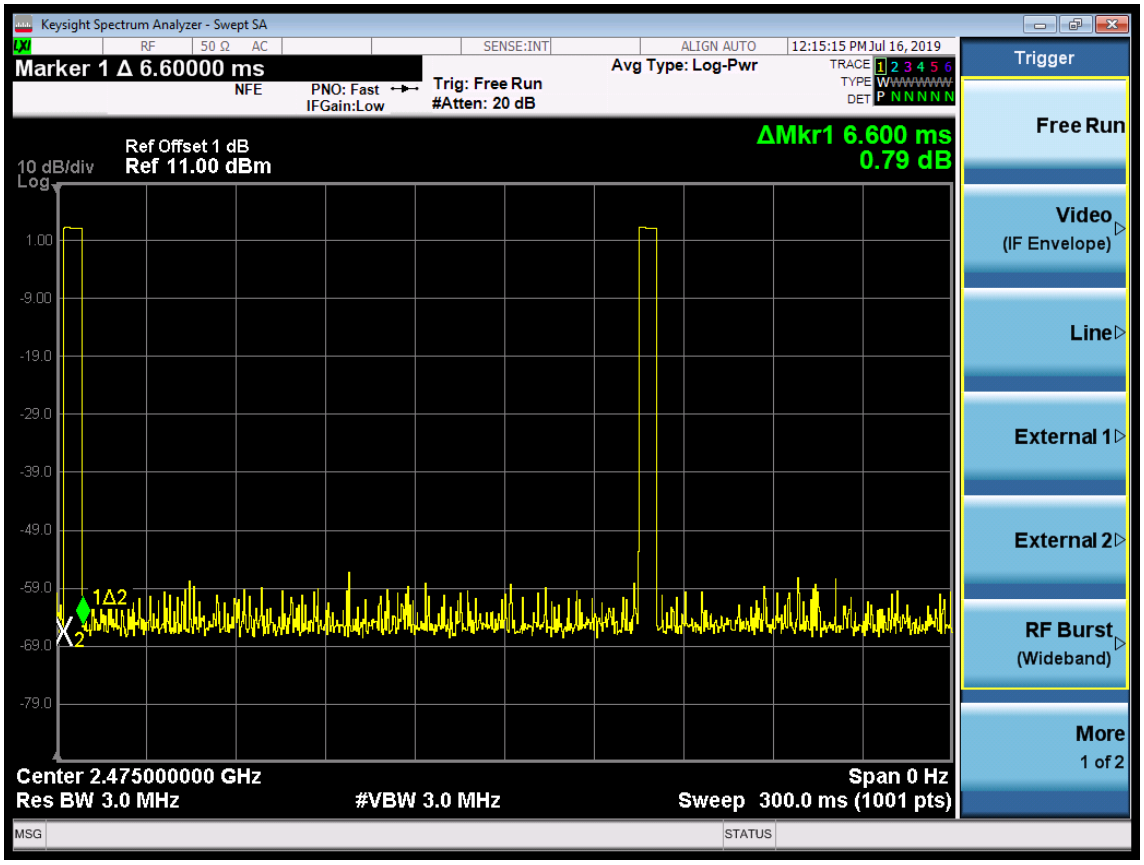
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note 1: The duty cycle factor for calculate average level is -29.302dB, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

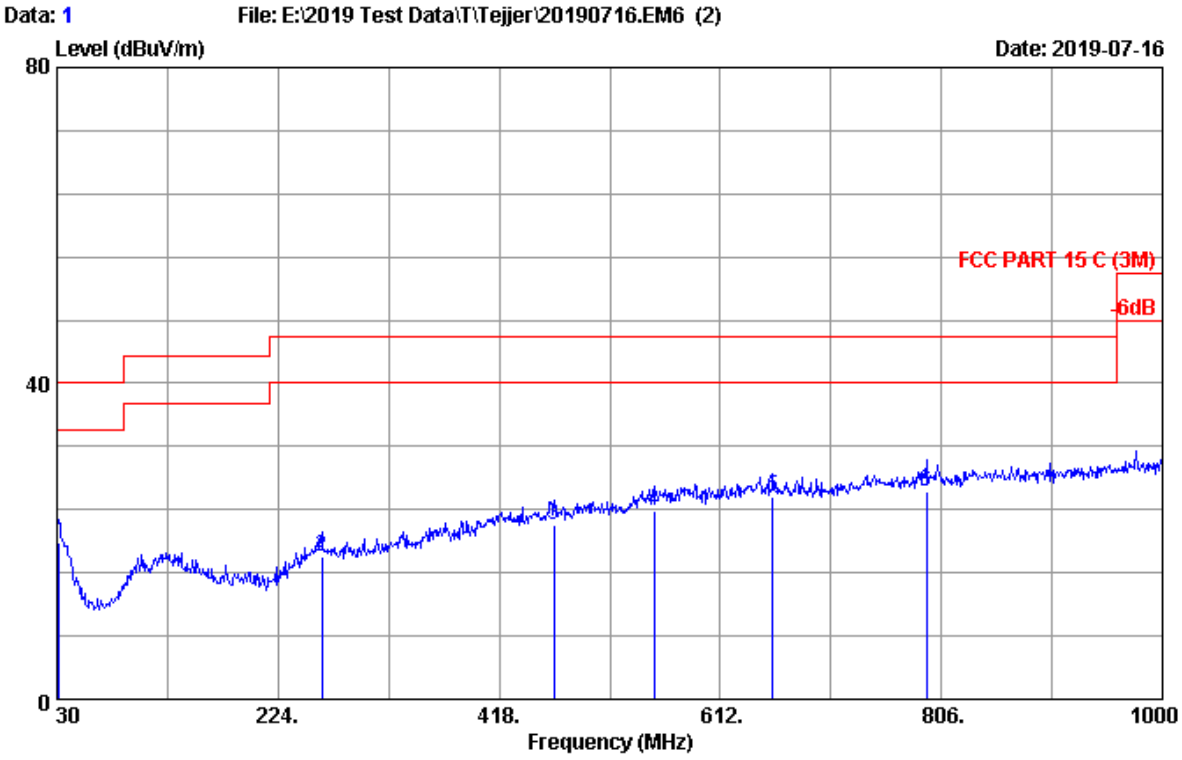
Note 2: The emissions (9kHz~30MHz) not reported for there is no emission be found.

Duty cycle factor = 20log（1/duty cycle）= -29.302dB





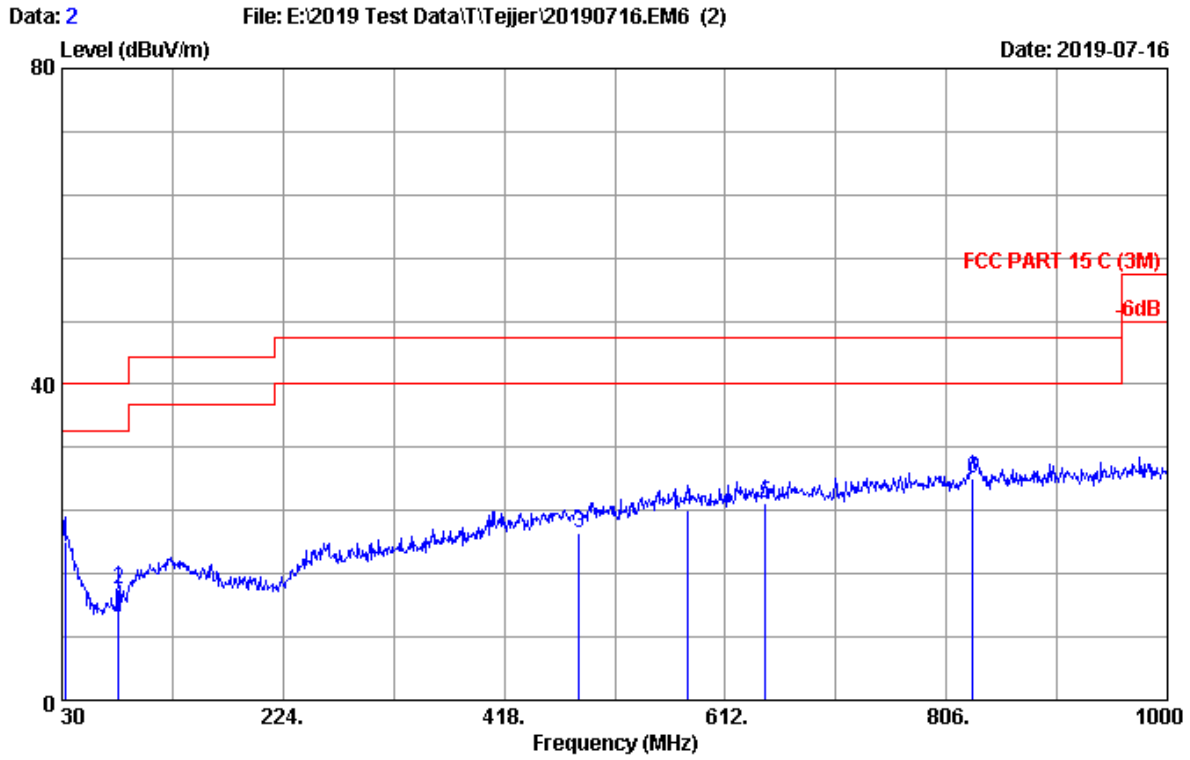
Frequency: 30MHz~1GHz



Site no. : 3m Chamber Data no. : 1
Dis. / Ant. : 3m 2018 CBL6112D-35375 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 22.9*C/58% Engineer : Hogen
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2.4G TX

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	30.916	24.20	0.54	-4.96	19.78	40.00	20.22	QP
2	262.252	19.88	1.61	-3.37	18.12	46.00	27.88	QP
3	466.372	23.40	2.22	-3.50	22.12	46.00	23.88	QP
4	553.852	25.06	2.47	-3.66	23.87	46.00	22.13	QP
5	657.856	25.30	2.75	-2.48	25.57	46.00	20.43	QP
6	792.964	26.32	3.10	-3.20	26.22	46.00	19.78	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

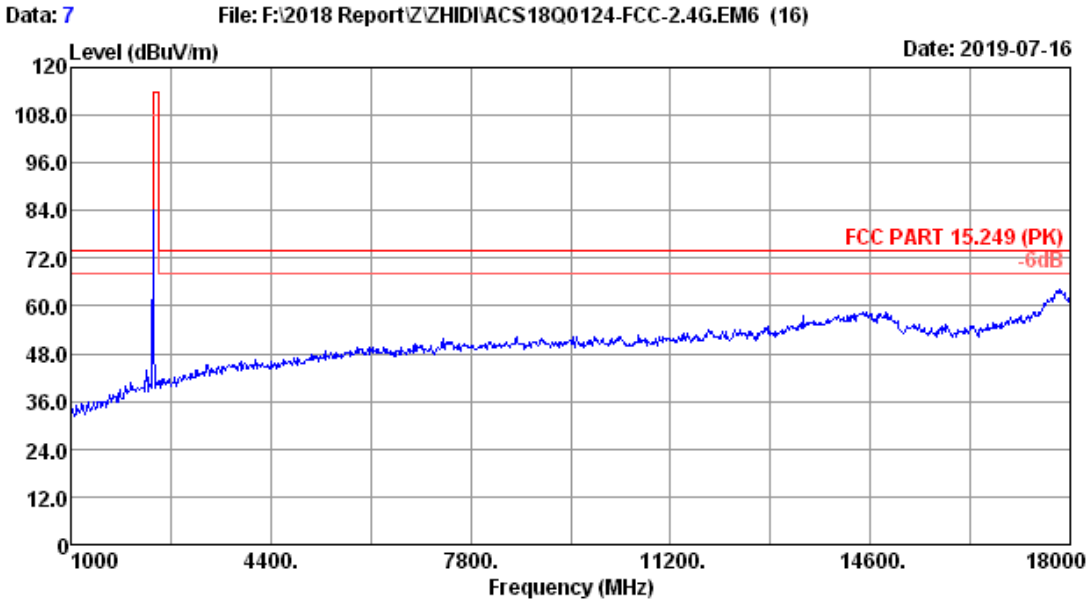


Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 2018 CBL6112D-35375 Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 22.9*C/58% Engineer : Hogen
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2.4G TX

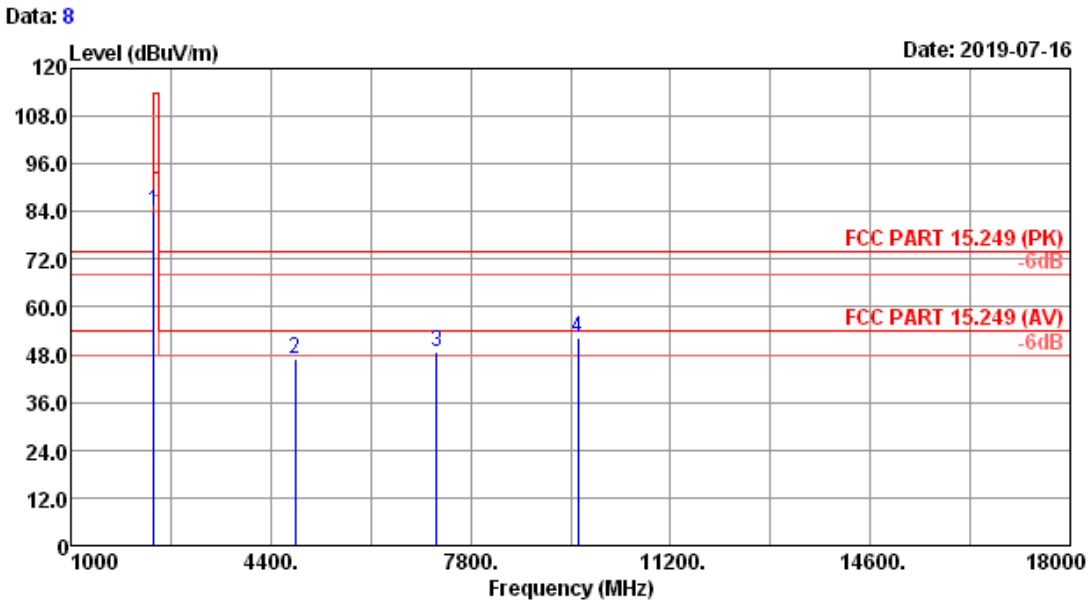
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	32.860	22.90	0.55	-3.32	20.13	40.00	19.87	QP
2	79.516	13.20	0.87	-0.04	14.03	40.00	25.97	QP
3	483.868	23.46	2.27	-4.57	21.16	46.00	24.84	QP
4	579.124	24.98	2.55	-3.43	24.10	46.00	21.90	QP
5	647.164	25.24	2.73	-3.01	24.96	46.00	21.04	QP
6	828.928	25.92	3.18	-1.10	28.00	46.00	18.00	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz



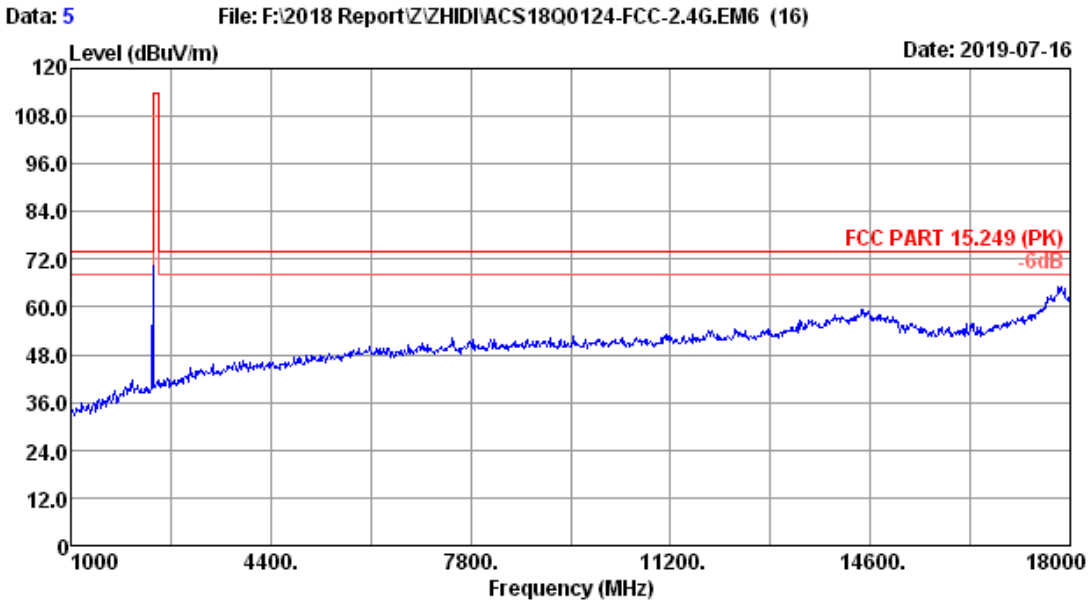

```
Site no.      : 3m Chamber                    Data no.   : 7
Dis. / Ant.   : 3m   2018 3115-4580            Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)           Pre        :
Env. / Ins.   : 22.6*C/57%                     Engineer   : kayle
EUT           : 2.4G Wireless Module    M/N:A7105
Power rating  : DC 3V
Test Mode     : 2405MHz  Tx  Mode
```



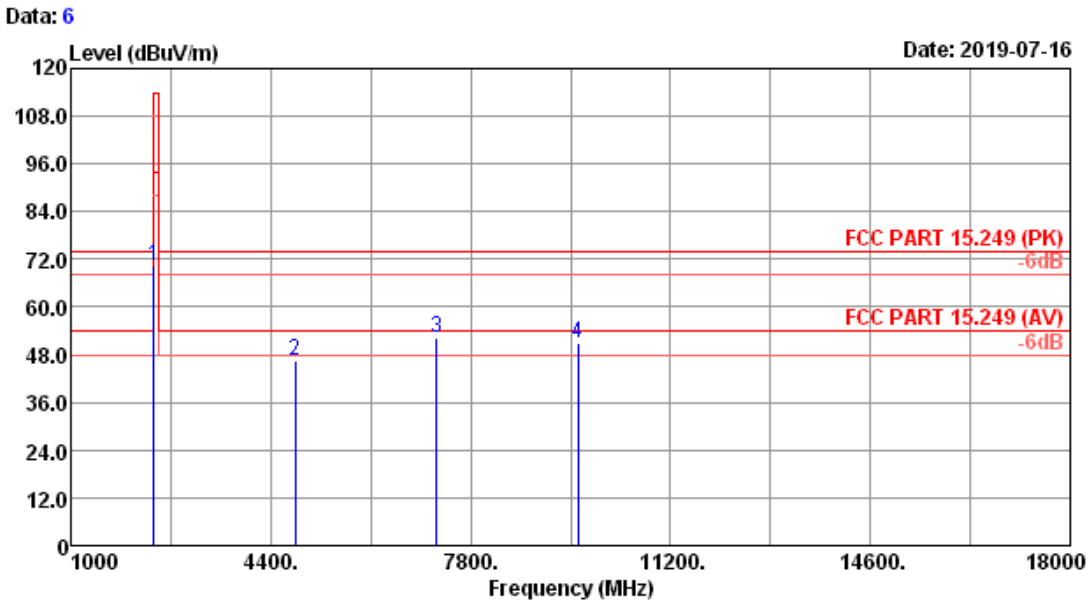
Site no. : 3m Chamber Data no. : 8
Dis. / Ant. : 3m 2018 3115-4580 Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK) Pre :
Env. / Ins. : 22.6*C/57% Engineer : kayle
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2405MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2405.00	27.77	0.87	35.04	90.67	84.27	114.00	29.73	Peak
2	4810.00	32.10	1.24	34.36	48.05	47.03	74.00	26.97	Peak
3	7215.00	34.90	1.48	34.54	46.87	48.71	74.00	25.29	Peak
4	9620.00	36.69	1.70	34.76	48.78	52.41	74.00	21.59	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



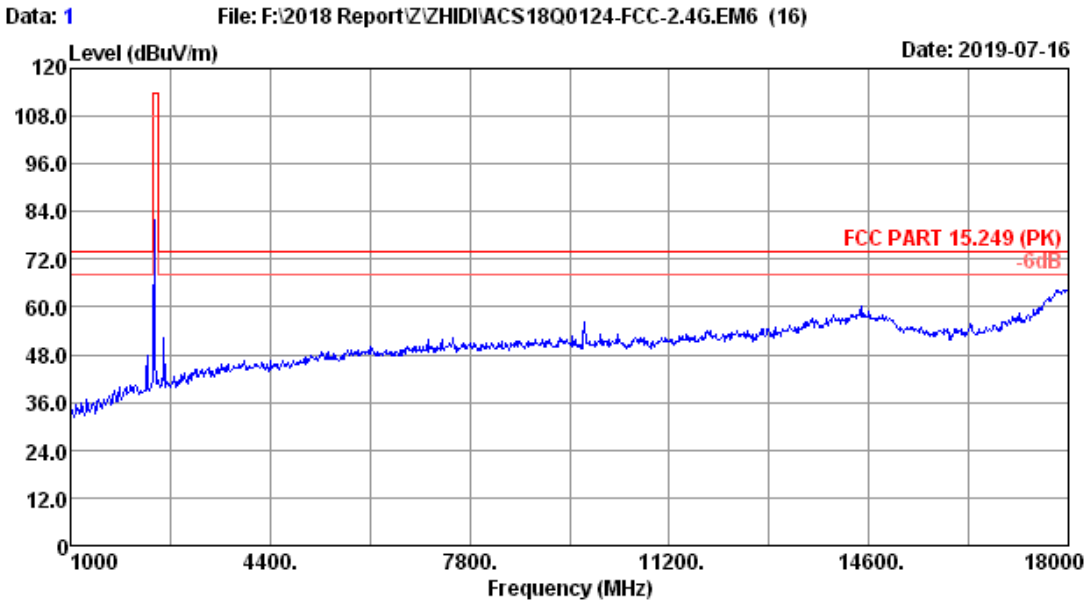

```
Site no.      : 3m Chamber                    Data no.   : 5
Dis. / Ant.   : 3m   2018 3115-4580            Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)           Pre        :
Env. / Ins.   : 22.6*C/57%                     Engineer   : kayle
EUT           : 2.4G Wireless Module    M/N:A7105
Power rating  : DC 3V
Test Mode     : 2405MHz  Tx  Mode
```



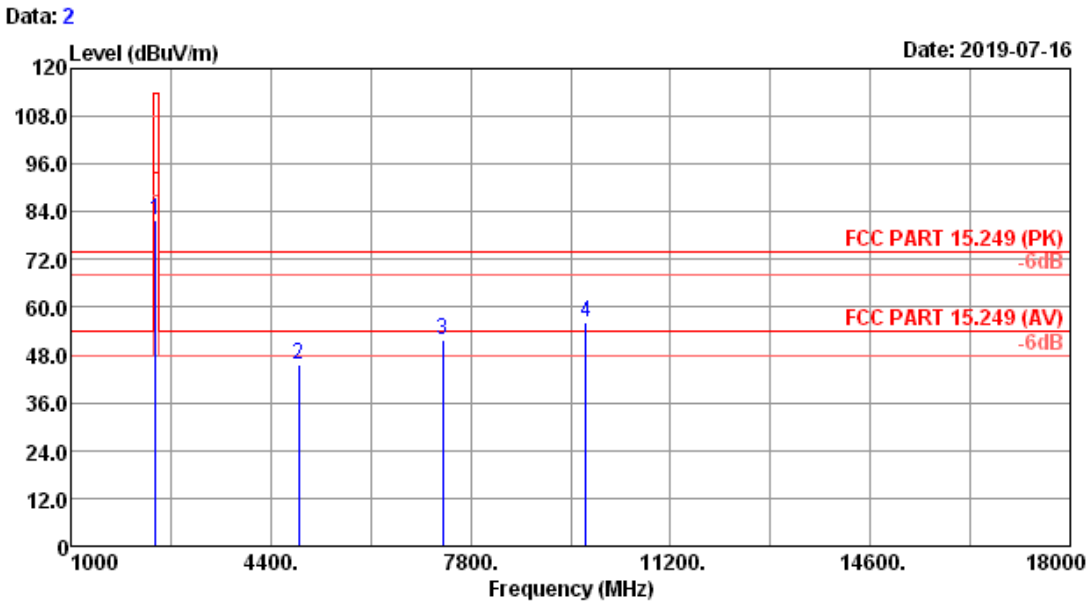
Site no. : 3m Chamber Data no. : 6
Dis. / Ant. : 3m 2018 3115-4580 Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK) Pre :
Env. / Ins. : 22.6*C/57% Engineer : kayle
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2405MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2405.00	27.77	0.87	35.04	76.79	70.39	114.00	43.61	Peak
2	4810.00	32.10	1.24	34.36	47.41	46.39	74.00	27.61	Peak
3	7215.00	34.90	1.48	34.54	50.19	52.03	74.00	21.97	Peak
4	9620.00	36.69	1.70	34.76	47.48	51.11	74.00	22.89	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.




```
Site no.      : 3m Chamber                    Data no.   : 1
Dis. / Ant.   : 3m   2018 3115-4580            Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)           Pre        :
Env. / Ins.   : 22.6*C/57%                     Engineer   : kayle
EUT           : 2.4G Wireless Module    M/N:A7105
Power rating  : DC 3V
Test Mode     : 2440MHz  Tx  Mode
```

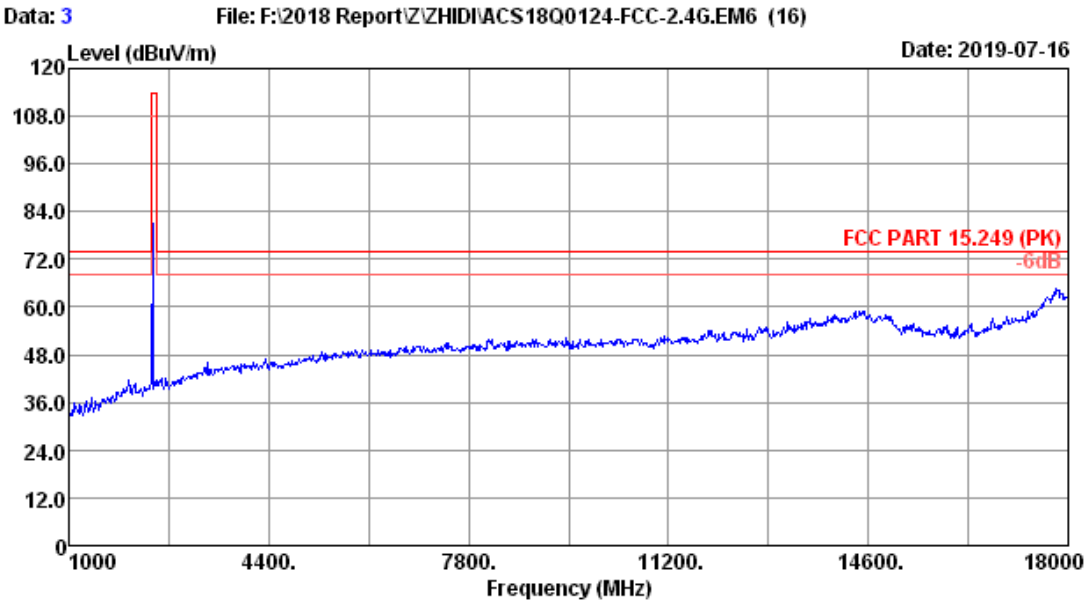



```
Site no.      : 3m Chamber                    Data no.   : 2
Dis. / Ant.   : 3m   2018 3115-4580            Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)           Pre        :
Env. / Ins.   : 22.6*C/57%                     Engineer   : kayle
EUT           : 2.4G Wireless Module    M/N:A7105
Power rating  : DC 3V
Test Mode     : 2440MHz  Tx  Mode
```

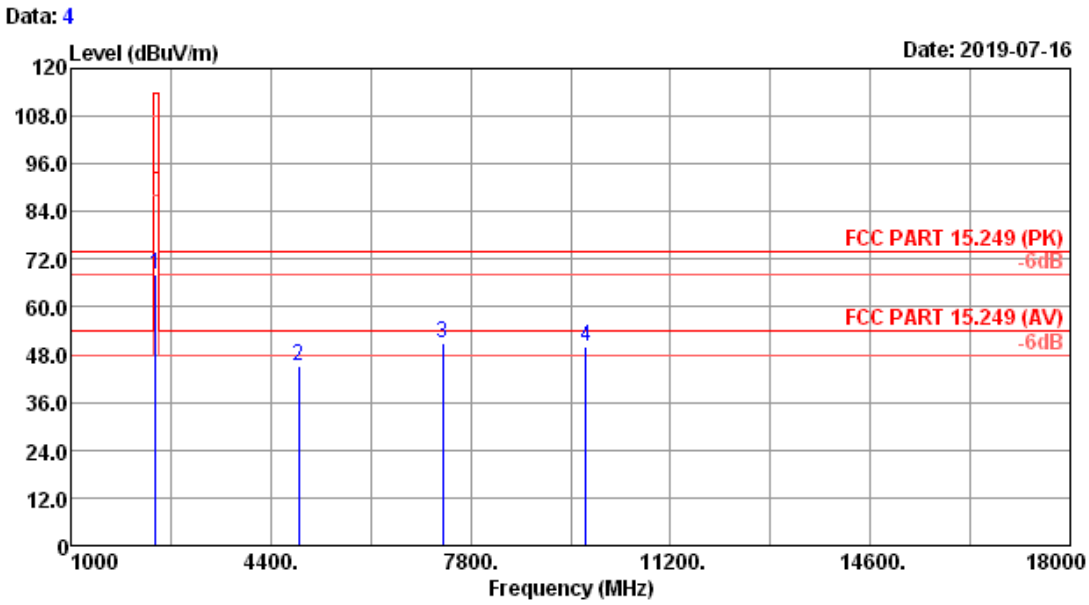
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.00	27.87	0.88	35.02	88.01	81.74	114.00	32.26	Peak
2	4880.00	32.25	1.25	34.38	46.65	45.77	74.00	28.23	Peak
3	7320.00	35.38	1.49	34.56	49.41	51.72	74.00	22.28	Peak
4	9760.00	36.80	1.71	34.78	52.66	56.39	74.00	17.61	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

Frequency（MHz）	Peak level（dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
9760	56.39	-29.302	27.088	54	Pass



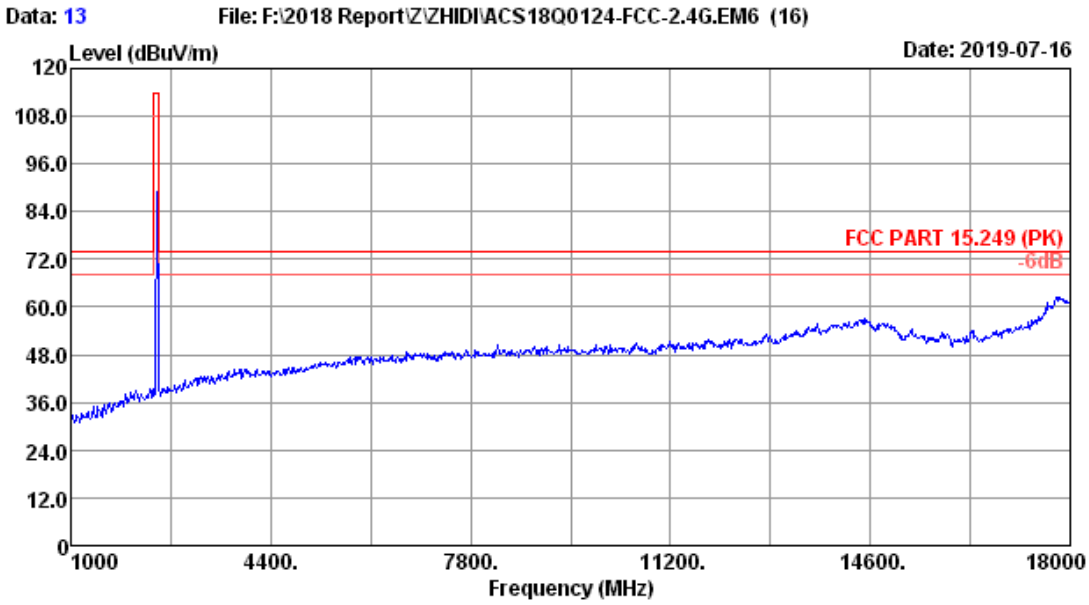

```
Site no.      : 3m Chamber                  Data no.   : 3
Dis. / Ant.   : 3m   2018 3115-4580          Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)         Pre        :
Env. / Ins.   : 22.6*C/57%                   Engineer   : kayle
EUT           : 2.4G Wireless Module   M/N:A7105
Power rating  : DC 3V
Test Mode     : 2440MHz  Tx  Mode
```



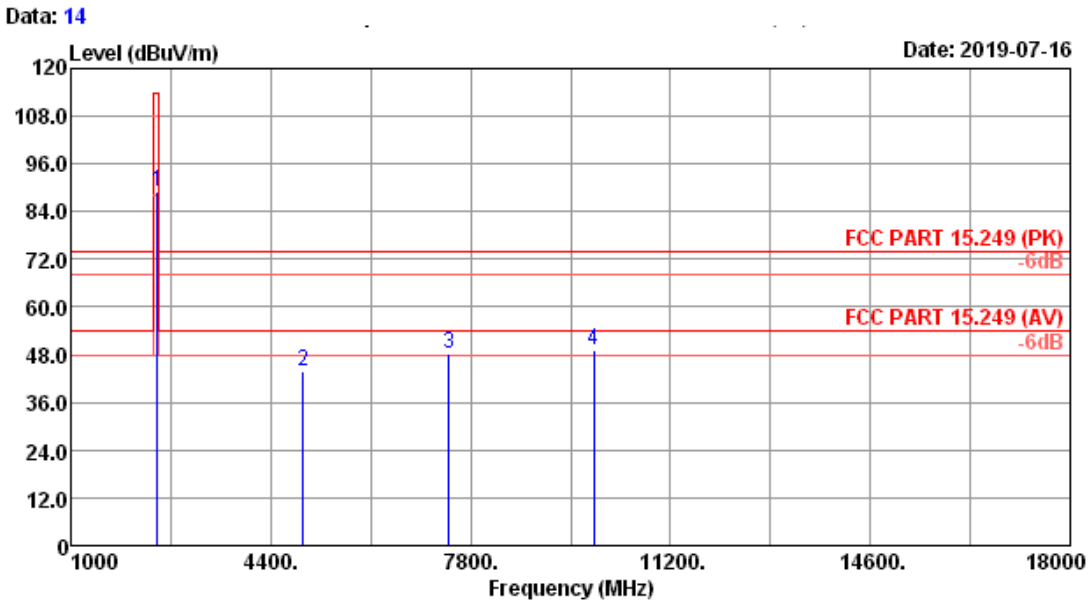
Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2018 3115-4580 Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK) Pre :
Env. / Ins. : 22.6*C/57% Engineer : kayle
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.00	27.87	0.88	35.02	74.45	68.18	114.00	45.82	Peak
2	4880.00	32.25	1.25	34.38	46.24	45.36	74.00	28.64	Peak
3	7320.00	35.38	1.49	34.56	48.75	51.06	74.00	22.94	Peak
4	9760.00	36.80	1.71	34.78	46.26	49.99	74.00	24.01	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.




```
Site no.      : 3m Chamber                    Data no.   : 13
Dis. / Ant.   : 3m   2018 3115-4580            Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)           Pre        :
Env. / Ins.   : 22.6*C/57%                     Engineer   : kayle
EUT           : 2.4G Wireless Module    M/N:A7105
Power rating  : DC 3V
Test Mode     : 2475MHz  Tx  Mode
```

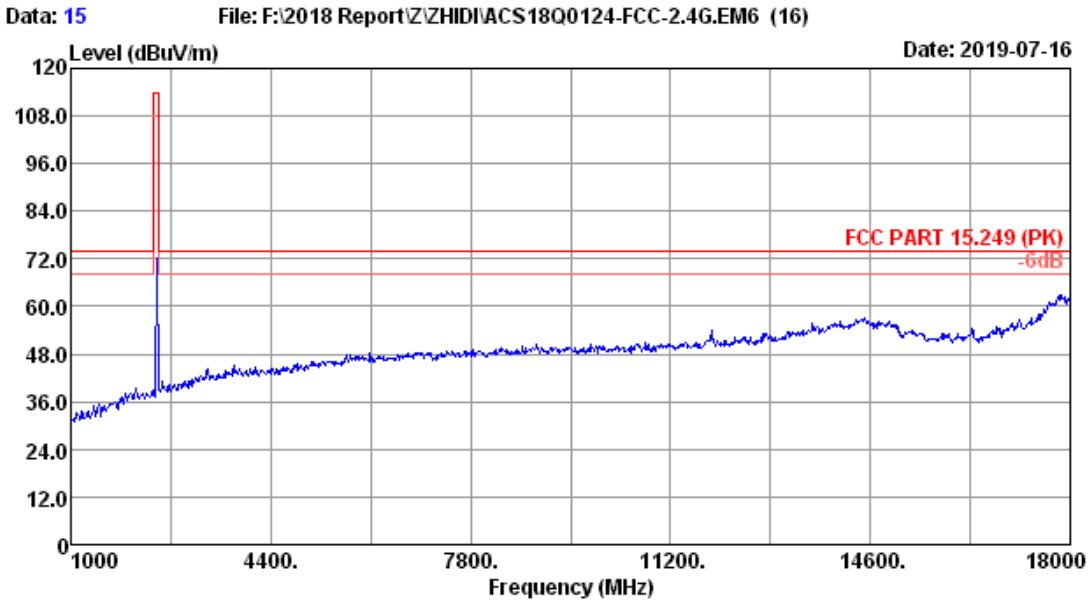


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 22.6*C/57%
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2475MHz Tx Mode

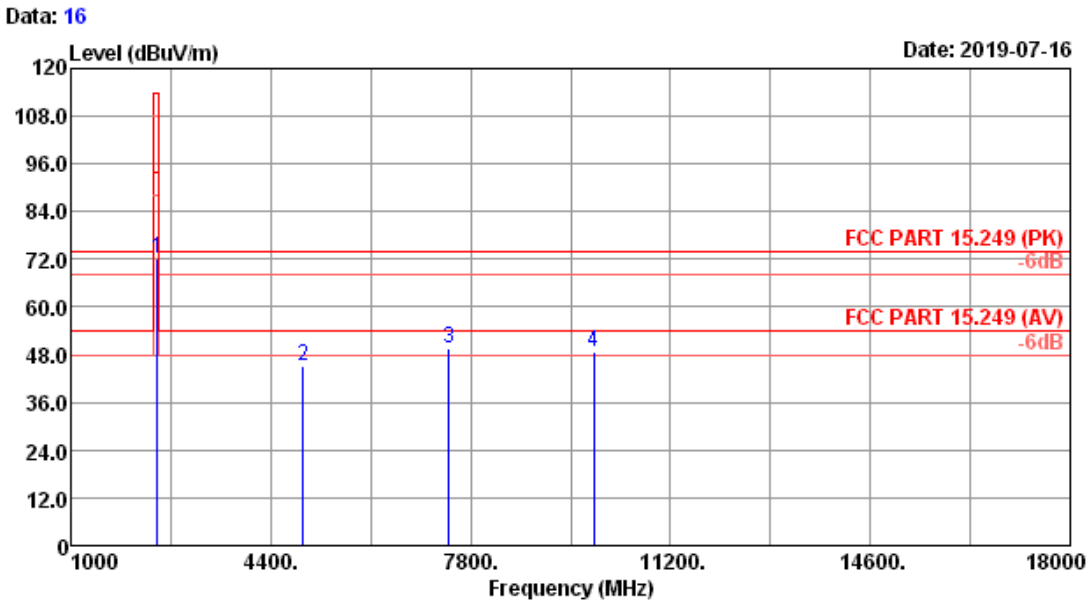
Data no. : 14
Ant. pol. : HORIZONTAL
Pre :
Engineer : kayle

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2475.00	27.98	0.89	35.01	95.28	89.14	114.00	24.86	Peak
2	4950.00	32.39	1.26	34.39	44.79	44.05	74.00	29.95	Peak
3	7425.00	35.52	1.50	34.58	45.78	48.22	74.00	25.78	Peak
4	9900.00	37.03	1.71	34.79	45.27	49.22	74.00	24.78	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.




```
Site no.      : 3m Chamber                    Data no.   : 15
Dis. / Ant.   : 3m   2018 3115-4580            Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)           Pre        :
Env. / Ins.   : 22.6*C/57%                     Engineer   : kayle
EUT           : 2.4G Wireless Module    M/N:A7105
Power rating  : DC 3V
Test Mode     : 2475MHz  Tx  Mode
```



Site no. : 3m Chamber Data no. : 16
Dis. / Ant. : 3m 2018 3115-4580 Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK) Pre :
Env. / Ins. : 22.6*C/57% Engineer : kayle
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2475MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2475.00	27.98	0.89	35.01	78.40	72.26	114.00	41.74	Peak
2	4950.00	32.39	1.26	34.39	46.10	45.36	74.00	28.64	Peak
3	7425.00	35.52	1.50	34.58	47.12	49.56	74.00	24.44	Peak
4	9900.00	37.03	1.71	34.79	44.84	48.79	74.00	25.21	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

5. 20 DB BANDWIDTH TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52220804	Oct.13,18	1 Year
2.	Attenuator	Agilent	8491B	MY39262165	Oct.14,18	1 Year
3.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	Oct.14,18	1 Year

5.2. Limit

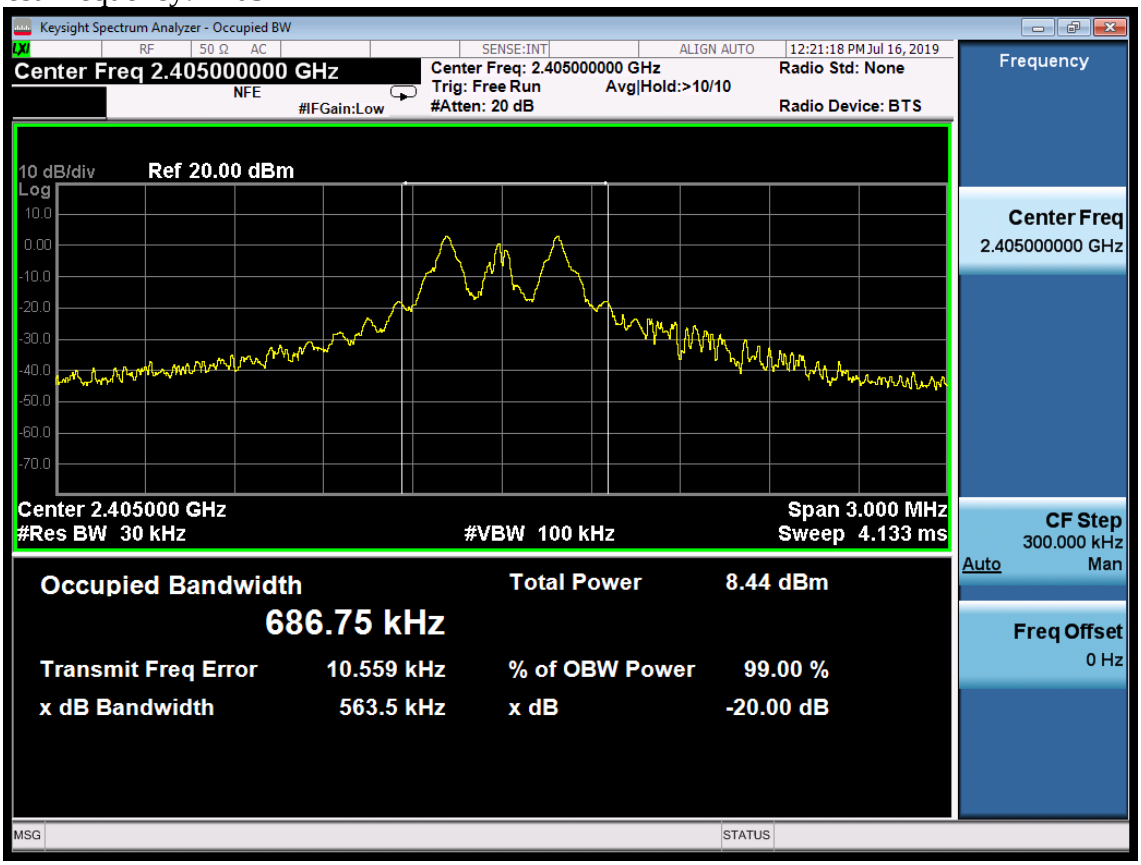
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.3. Test Results

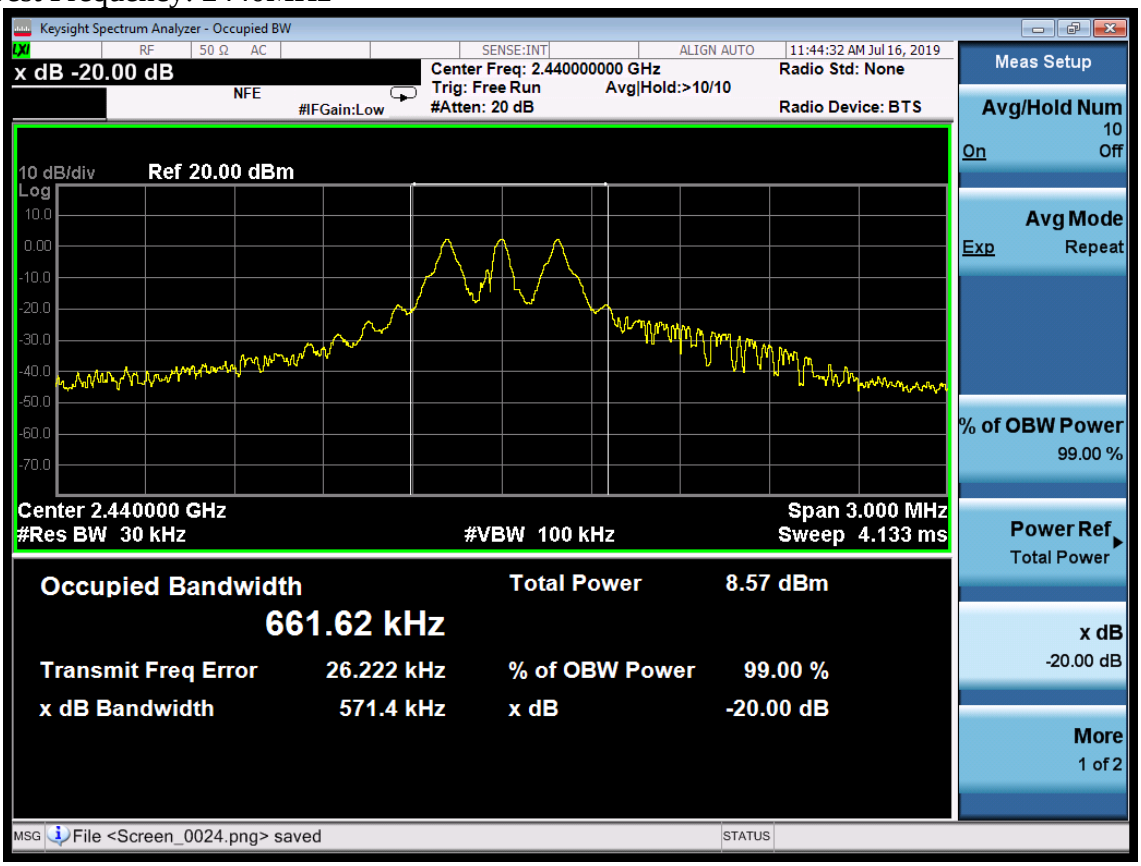
EUT: 2.4G Wireless Module		
M/N:A7105		
Test date:2019-07-16	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Garry	Test site: RF site	Temperature:22.8±0.6 ℃

Test Mode	Frequency (MHz)	-20dB bandwidth (KHz)	Limit (KHz)
GFSK	2405	563.5	N/A
	2440	571.4	N/A
	2475	572.5	N/A
Conclusion：PASS			

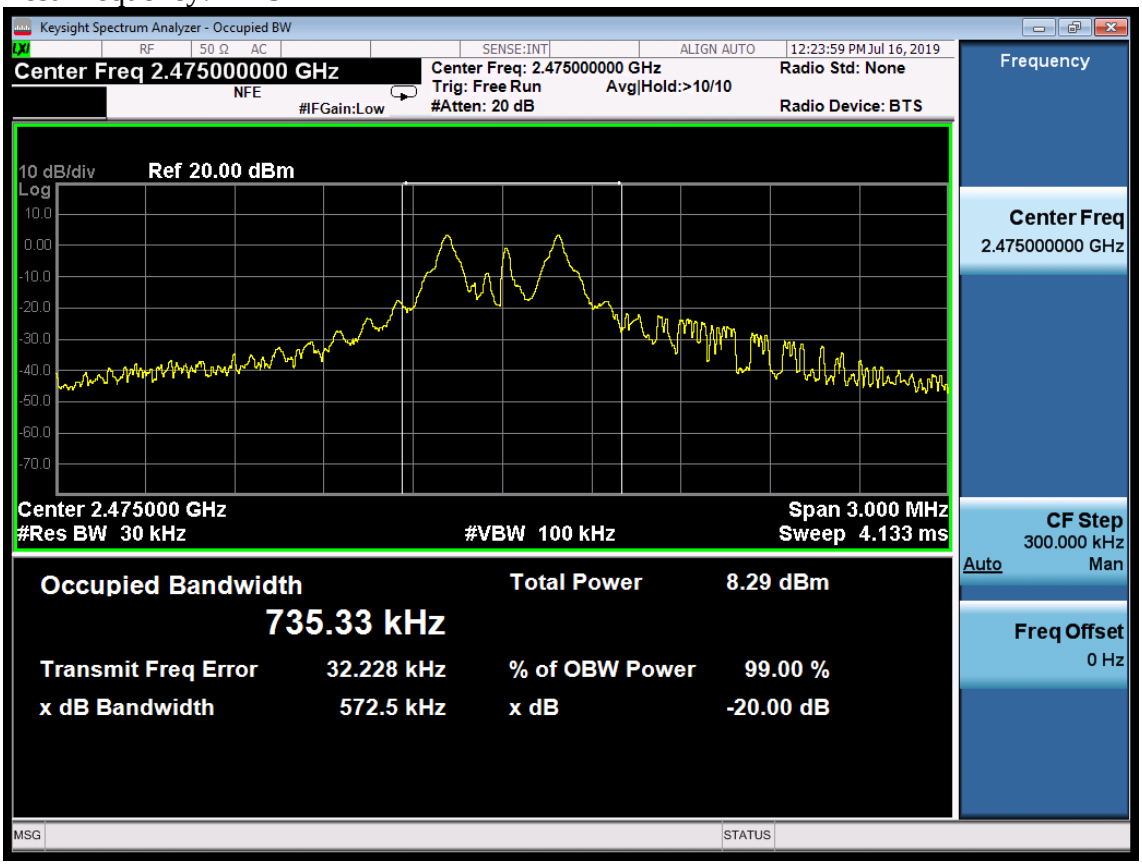
Test Frequency: 2405MHz



Test Frequency: 2440MHz



Test Frequency: 2475MHz



6. BAND EDGE COMPLIANCE TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Sep.08,18	1 Year
2.	Amplifier	HP	8449B	3008A02495	Apr.23,19	1 Year
3.	Horn Antenna	ETS	3115	9510-4580	Dec.13,18	1 Year
4.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

6.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 50dB below the fundamental emissions, or comply with 15.209 limits.

6.3. Test Produce

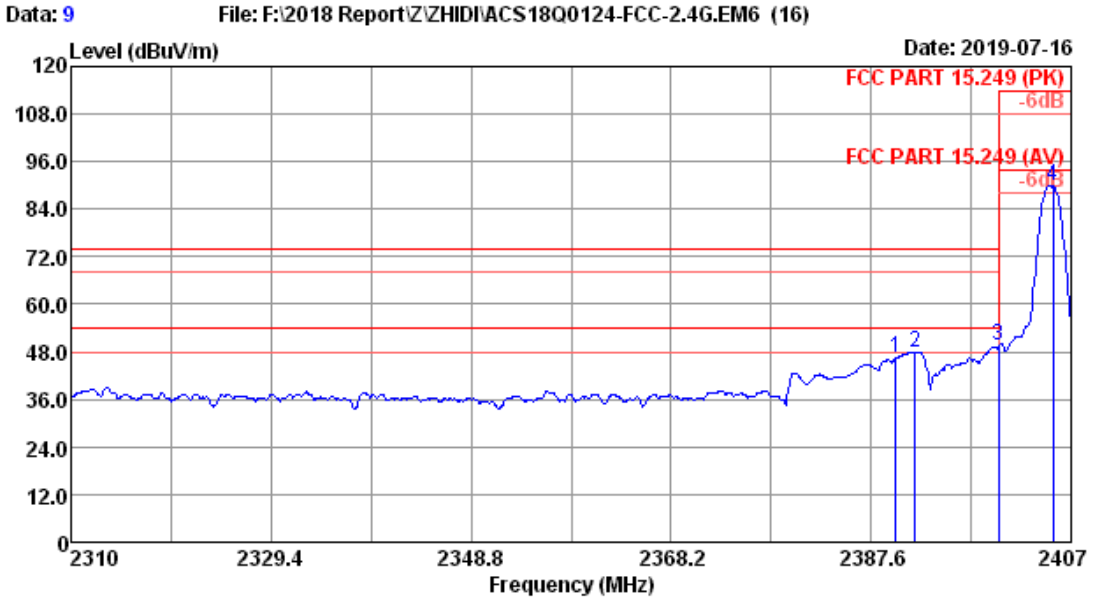
1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1MHz ; VBW=3MHz, PK detector, Sweep=AUTO
   (b)This device is pulse modulated, a duty cycle factor was used to calculate average level based measured peak level

6.4. Test Results

Pass (The testing data was attached in the next pages.)

Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

Note: The duty cycle factor for calculate average level is --29.302dB, and average limit is 50dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

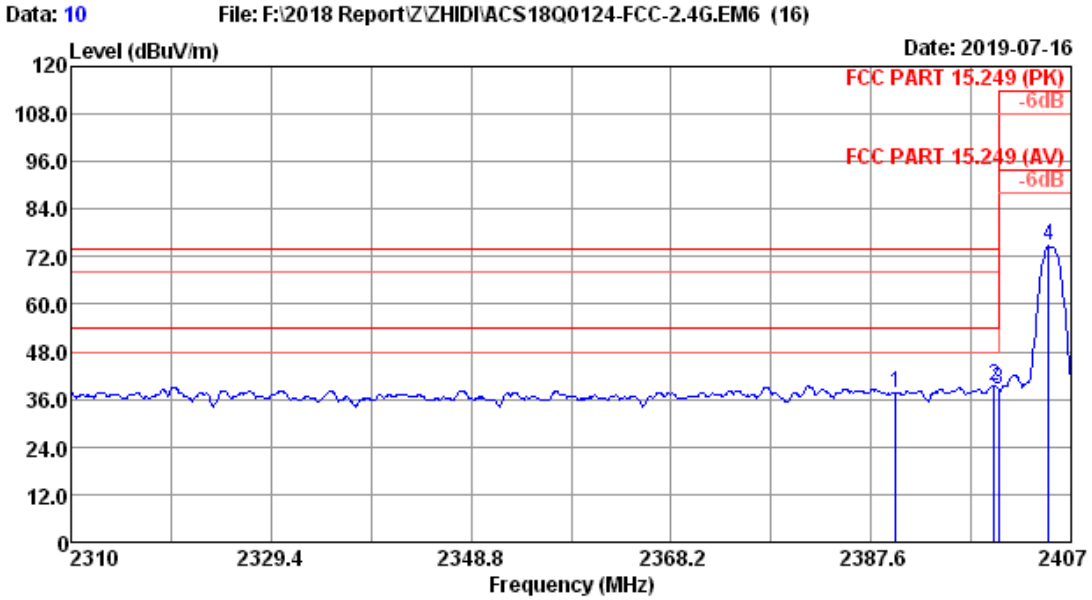


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 22.6*C/57%
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2405MHz Tx Mode

Data no. : 9
Ant. pol. : HORIZONTAL
Pre :
Engineer : kayle

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.71	0.87	35.04	52.83	46.37	74.00	27.63	Peak
2	2391.87	27.71	0.87	35.04	54.25	47.79	74.00	26.21	Peak
3	2400.00	27.71	0.87	35.04	55.89	49.43	74.00	24.57	Peak
4	2405.25	27.77	0.87	35.04	96.36	89.96	114.00	24.04	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

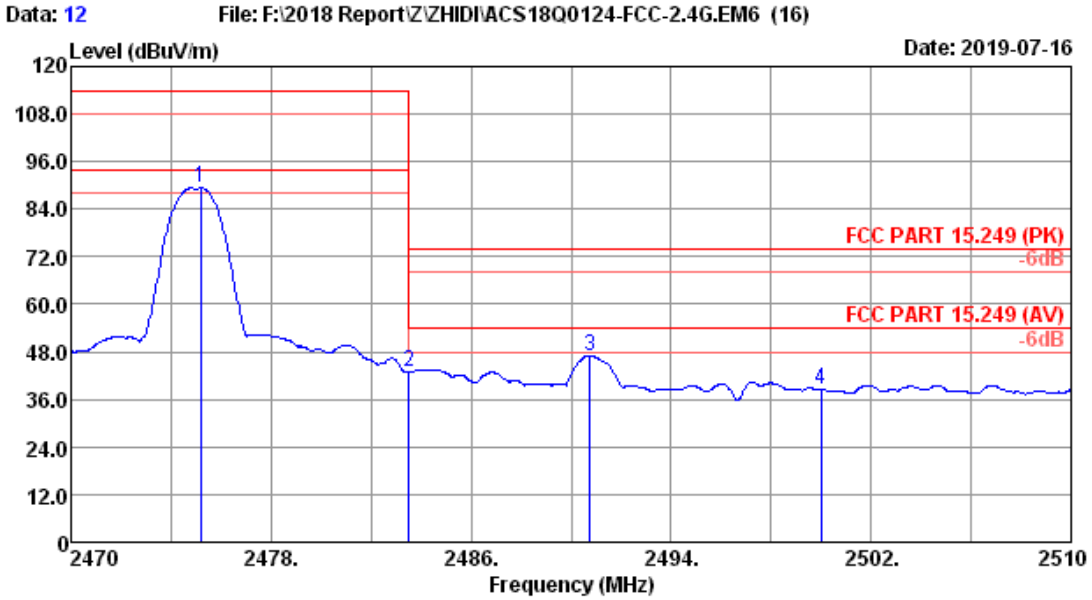


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 22.6*C/57%
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2405MHz Tx Mode

Data no. : 10
Ant. pol. : VERTICAL
Pre :
Engineer : kayle

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.71	0.87	35.04	44.13	37.67	74.00	36.33	Peak
2	2399.53	27.71	0.87	35.04	45.80	39.34	74.00	34.66	Peak
3	2400.00	27.71	0.87	35.04	44.95	38.49	74.00	35.51	Peak
4	2404.87	27.77	0.87	35.04	81.05	74.65	114.00	39.35	Peak

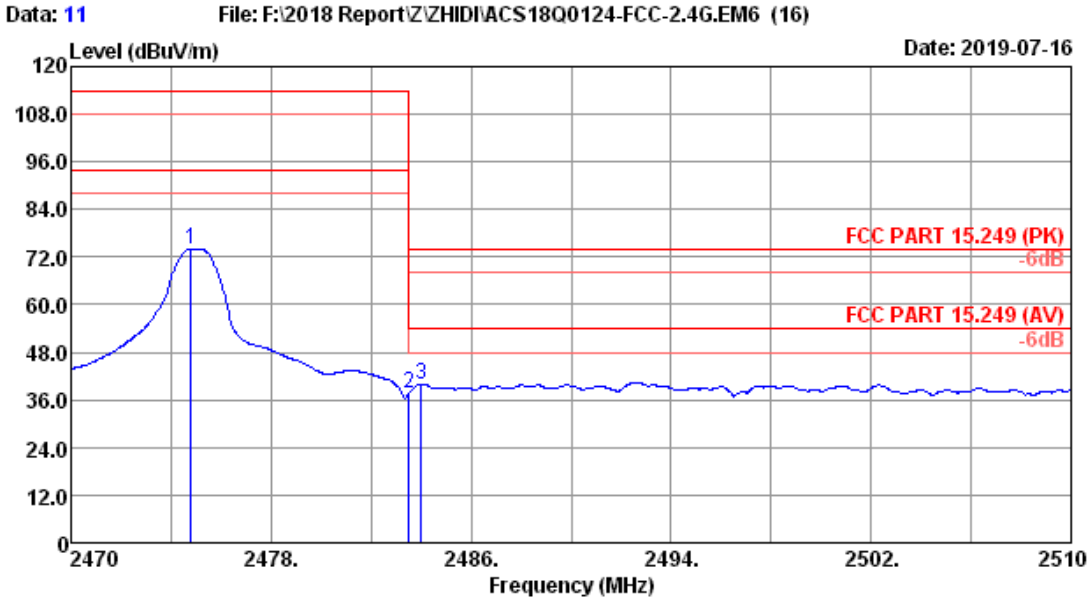
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 12
Dis. / Ant. : 3m 2018 3115-4580 Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK) Pre :
Env. / Ins. : 22.6*C/57% Engineer : kayle
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2475MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2475.20	27.98	0.89	35.01	95.50	89.36	114.00	24.64	Peak
2	2483.50	27.98	0.89	35.01	49.08	42.94	74.00	31.06	Peak
3	2490.76	28.03	0.89	35.00	53.13	47.05	74.00	26.95	Peak
4	2500.00	28.03	0.89	35.00	44.69	38.61	74.00	35.39	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 11
Dis. / Ant. : 3m 2018 3115-4580 Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK) Pre :
Env. / Ins. : 22.6*C/57% Engineer : kayle
EUT : 2.4G Wireless Module M/N:A7105
Power rating : DC 3V
Test Mode : 2475MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2474.80	27.98	0.89	35.01	80.22	74.08	114.00	39.92	Peak
2	2483.50	27.98	0.89	35.01	43.79	37.65	74.00	36.35	Peak
3	2484.00	27.98	0.89	35.01	46.17	40.03	74.00	33.97	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

7. ANTENNA REQUIREMENT

RESULT : PASS

Test Date : Jul.16,2019

Test standard : FCC Part 15.203

Limit : 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

According to the manufacturer declared, the EUT has an Integrated PCB Antenna, the directional gain of antenna is 4.63dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply the provision.

8. RADIO FRREQUENCY EXPOSURE COMPLIANCE

RESULT : PASS

Test standard : FCC KDB Publication 447498 D01 V06

Since maximum peak output power of the transmitter is<10mW, i.e.0.29923mW<10mW, hence the EUT is excluded from SAR evaluation according to FCC KDB Publication 447498 D01: General RF Exposure Guidance V05.

9. DEVIATION TO TEST SPECIFICATIONS

[NONE]