FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

G.Tech Technology Ltd.

2.4GHz Wireless Keyboard

Model No.: GK381-BK

Serial No.: 28036

FCC ID: OO9GK381-BK

Prepared for : G.Tech Technology Ltd.
No.8, Jinyuan 1st Road, High-Tech Zone, Zhuhai City, Guangdong, China, 519085

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

Tel: (0755) 26639496

Report Number	:	ACS-F20171
Date of Test	:	Aug.10~Sep.26,2020
Date of Report	:	Sep.27,2020

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TEST REPORT CERTIFICATION

Applicant : G.Tech Technology Ltd.

Product : 2.4GHz Wireless Keyboard

FCC ID : OO9GK381-BK

(A)Model No. : GK381-BK
(B) Serial No. : 28036
(C) Power Supply : DC 1.5V
(D) Test Voltage : DC 1.5V

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 : Aug.10~Sep.26,2020 Report of date: Sep.27,2020

Prepared by : Brave Zhang / Assistant

Reviewed by : Sunny Lu / Deputy Manager

AUDIX® 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 / Deputy General 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	PASS
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 Equipment Under Test

Applicant	G.Tech Technology Ltd.
Applicant Address	No.8, Jinyuan 1st Road, High-Tech Zone, Zhuhai City, Guangdong, China, 519085
Manufacturer	G.Tech Technology Ltd.
Manufacturer Address	No.8, Jinyuan 1st Road, High-Tech Zone, Zhuhai City, Guangdong, China, 519085
Factory	G.Tech Technology Ltd.
Factory Address	No.8, Jinyuan 1st Road, High-Tech Zone, Zhuhai City, Guangdong, China, 519085
Product	2.4GHz Wireless Keyboard
Model No.	GK381-BK
Serial No.	28036
FCC ID	OO9GK381-BK
Radio	General 2.4GHz wireless
Operation frequency	2403MHz-2479MHz
Modulation	GFSK
Antenna Information	PCB Antenna, Peak Gain: -2.268dBi
Sample Type	Prototype production
Date of Receipt	Aug.04,2020
Date of Test	Aug.10~Sep.26,2020

2.2.Channel list of EUT

Channel list	Frequency	Channel list	Frequency
1	2403MHz	9	2441MHz
2	2407MHz	10	2445MHz
3	2414MHz	11	2453MHz
4	2419MHz	12	2459MHz
5	2422MHz	13	2463MHz
6	2426MHz	14	2466MHz
7	2436MHz	15	2473MHz
8	2439MHz	16	2479MHz

2.3.EUT Configuration and operation conditions for test

EUT

(EUT: 2.4GHz Wireless Keyboard)

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. : Accredited 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, 2021

Certificated by FCC, USA
Designation No: CN5022
Valid Date: Mar.31, 2021

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)

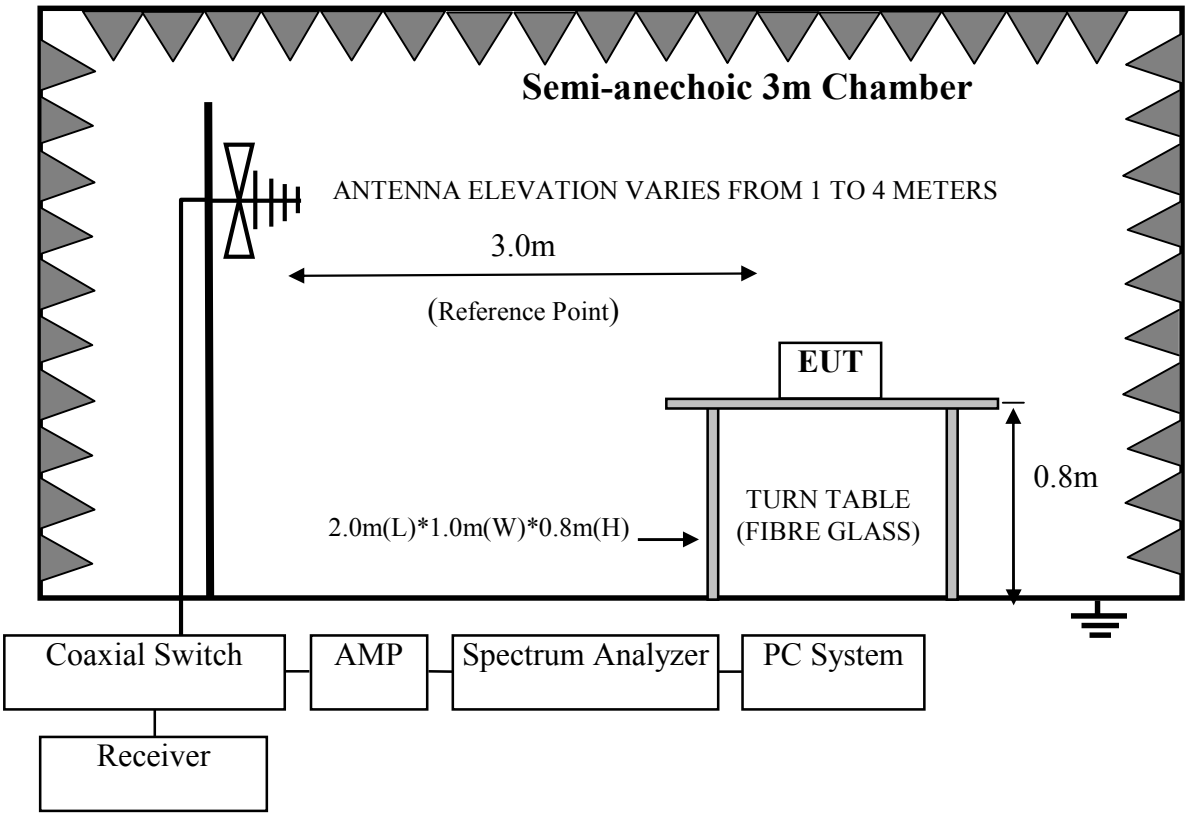
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(NSA)	AUDIX	N/A	N/A	May.03,20	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.11,20	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR7	101547	Apr.12,20	1 Year
5.	Amplifier	HP	8447D	2648A04738	Apr.11,20	1 Year
6.	Bi log Antenna	TESEQ	CBL6112D	25237	Nov.26,19	1 Year
7.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Oct.13,19	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397222	Apr.11,20	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)

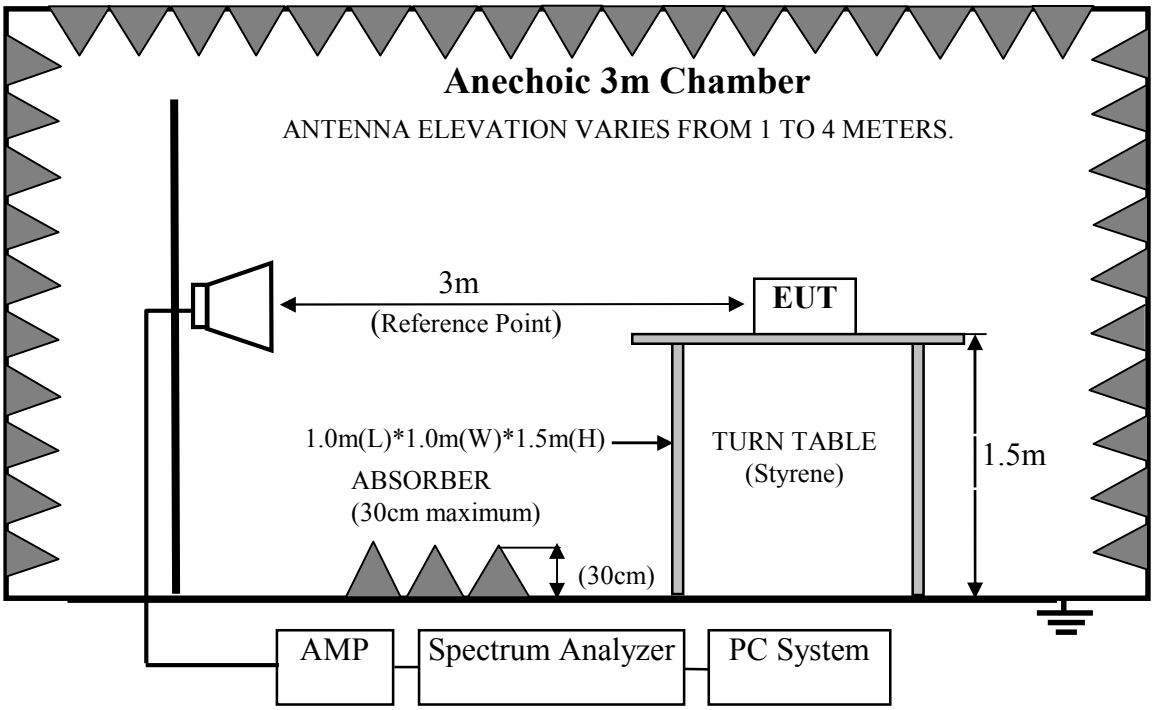
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(Svswr)	AUDIX	N/A	N/A	Apr.15,20	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.11,20	1 Year
4.	PXA Signal Analyzer	Agilent	N9030A	MY53311015	Oct.12,19	1 Year
5.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Jul.30,20	1 Year
6.	Amplifier	Agilent	83017A	MY53270084	Oct.13,19	1 Year
7.	RF Cable	Hubersuhner	SUCOFLEX-106	505238/6	Apr.11,20	1 Year
8.	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

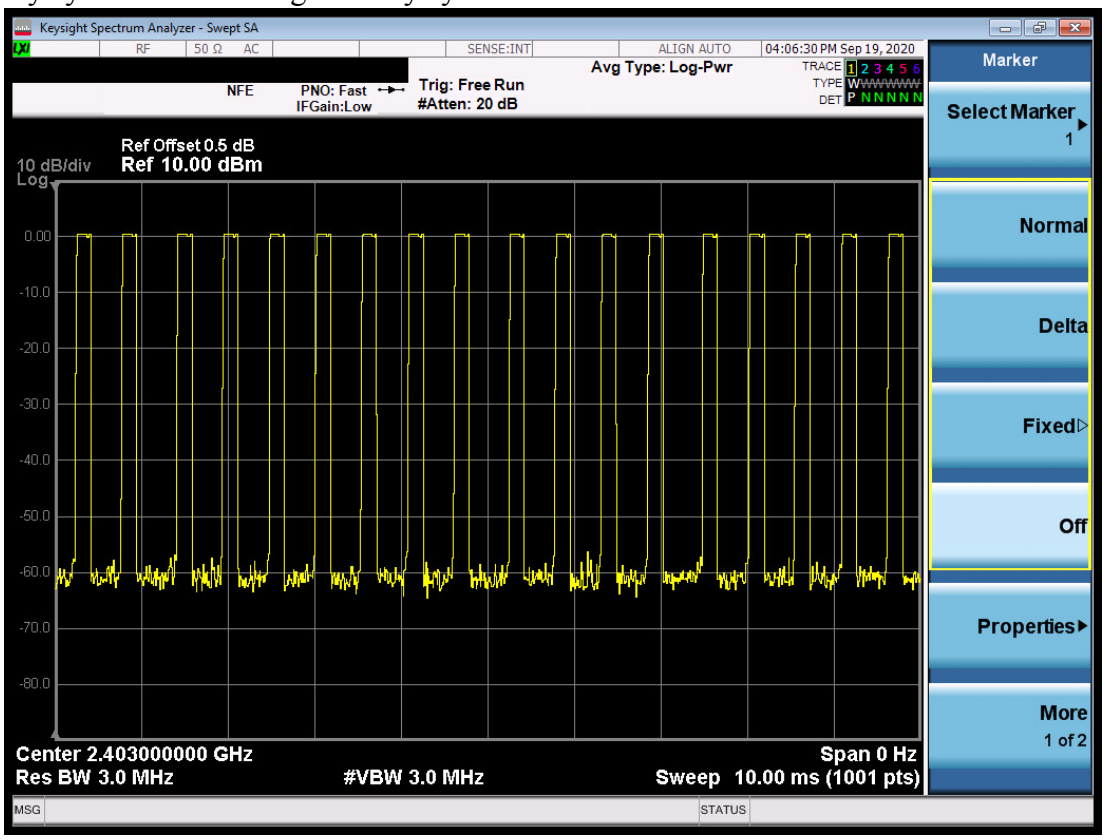
PASS.

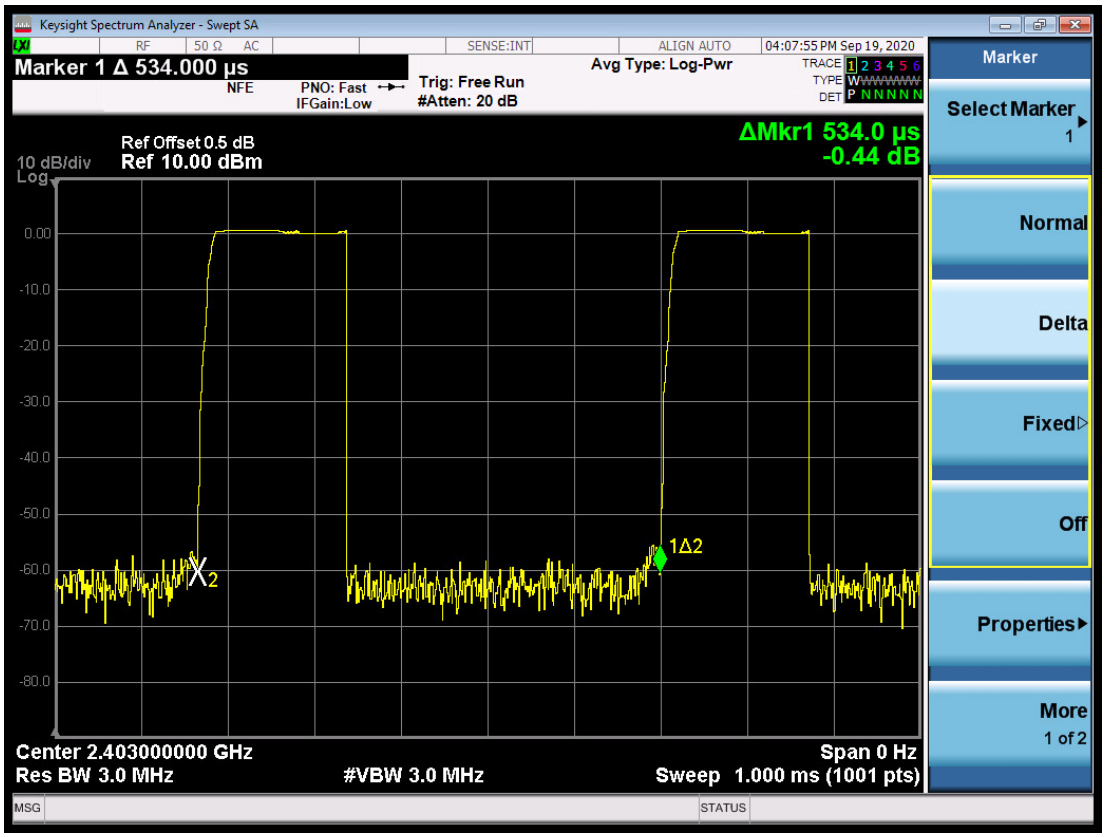
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

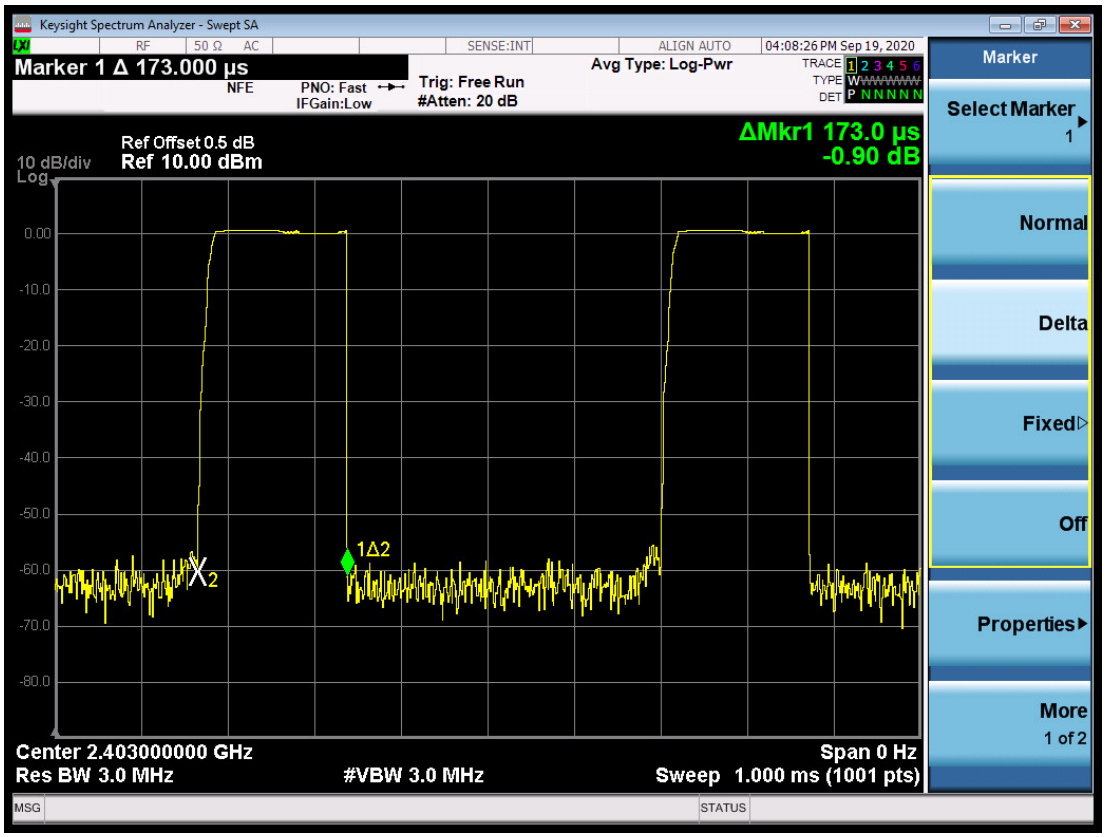
Note 1: The duty cycle factor for calculate average level is -9.790dB, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

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

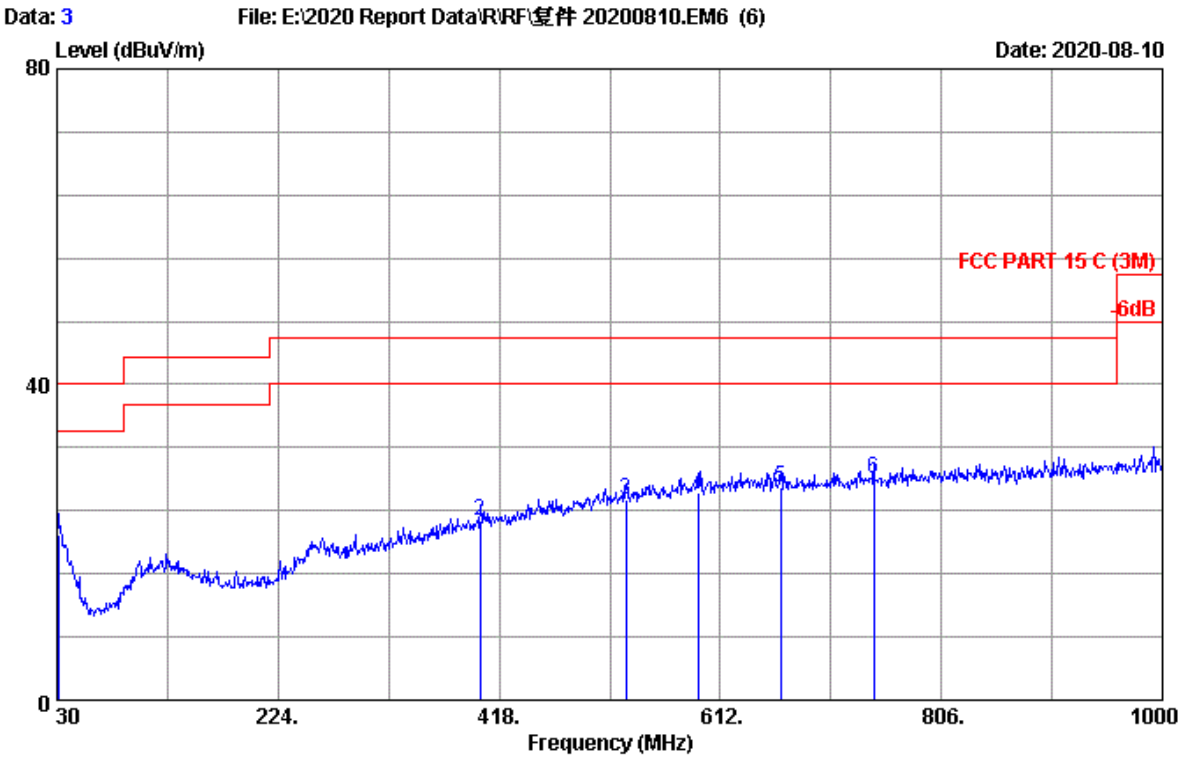
Duty cycle factor = 20log（1/duty cycle）= -9.790dB






Keysight Spectrum Analyzer - Swept SA
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
04:08:26 PM Sep 19, 2020
Marker 1 Δ 173.000 µs
NFE
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE W
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Log
Ref 10.00 dBm
ΔMkr1 173.0 µs
-0.90 dB
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
X2
Center 2.403000000 GHz
Res BW 3.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
MSG
STATUS
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

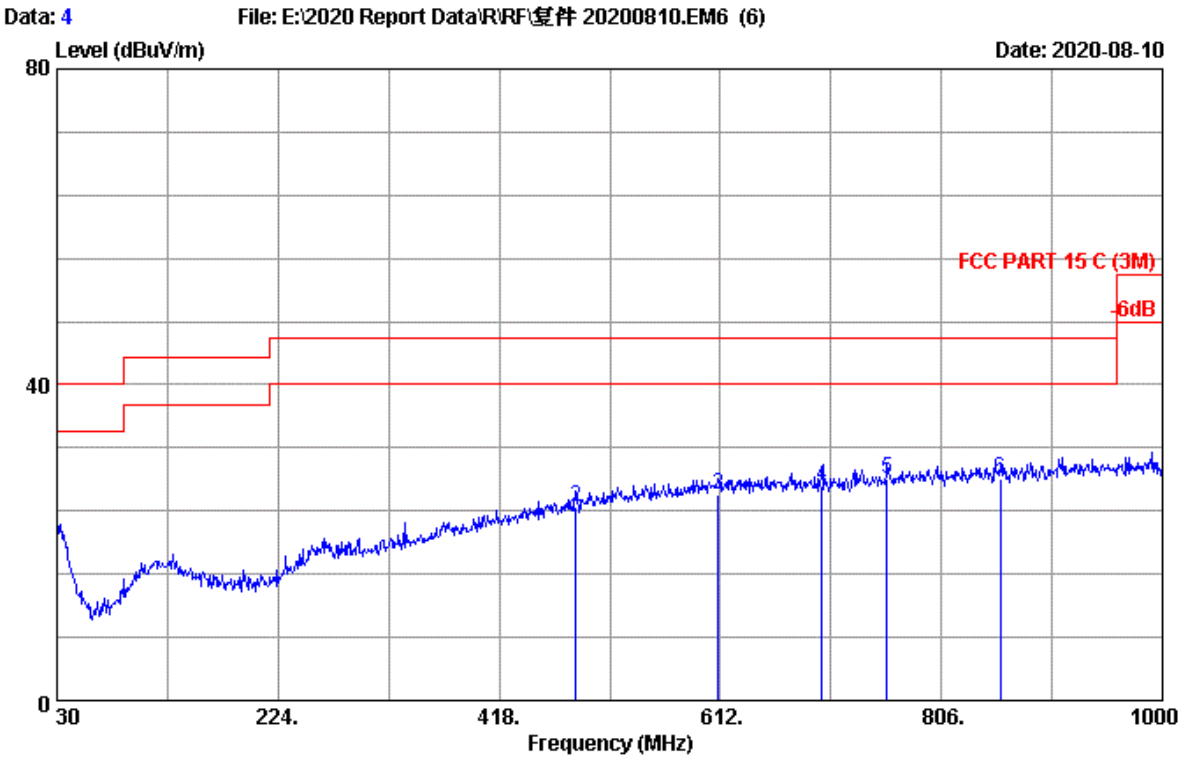
Frequency: 30MHz~1GHz



Site no. : 3m Chamber
Data no. : 3
Dis. / Ant. : 3m 2019 CBL6112D-25237
Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.4*C/54%
Engineer : Cote
EUT :
Power rating : DC 1.5V
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	31.940	23.18	0.54	-2.81	20.91	40.00	19.09	QP
2	401.510	21.34	2.06	-0.71	22.69	46.00	23.31	QP
3	529.550	23.91	2.43	-1.03	25.31	46.00	20.69	QP
4	593.570	24.80	2.64	-1.12	26.32	46.00	19.68	QP
5	665.350	24.97	2.80	-0.86	26.91	46.00	19.09	QP
6	746.830	25.28	3.02	-0.23	28.07	46.00	17.93	QP

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

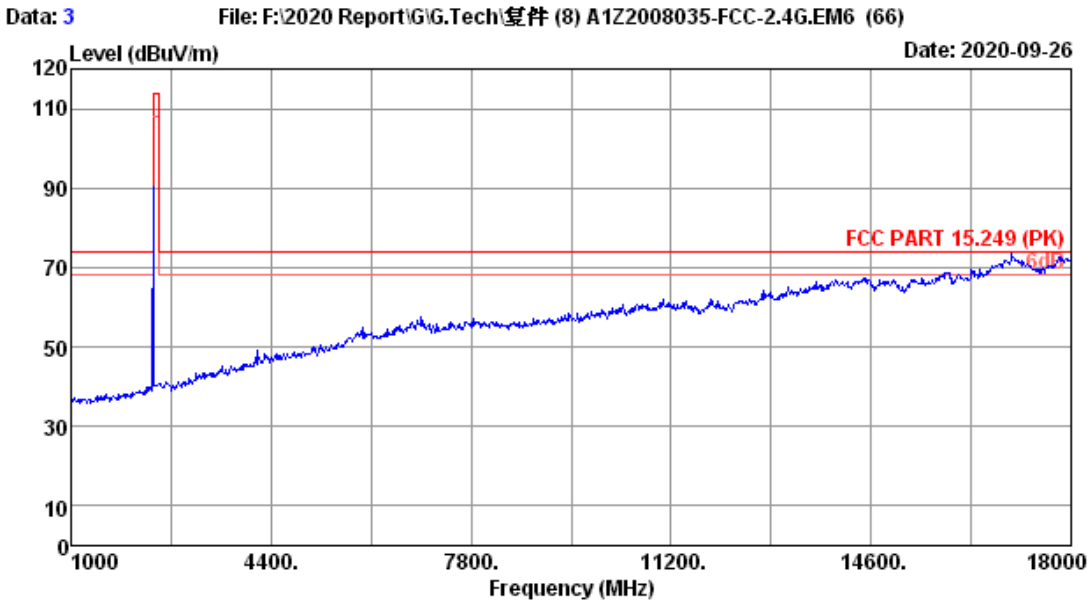


Site no. : 3m Chamber
Data no. : 4
Dis. / Ant. : 3m 2019 CBL6112D-25237
Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.4*C/54%
Engineer : Cote
EUT :
Power rating : DC 1.5V
Test Mode : 2.4G TX

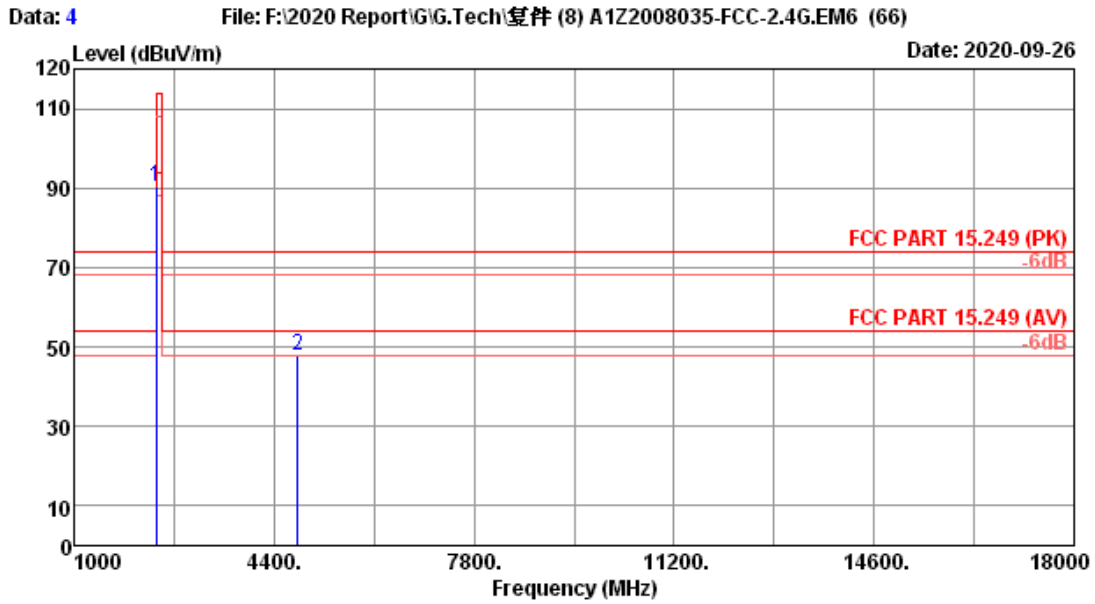
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	30.000	24.20	0.53	-4.27	20.46	40.00	19.54	QP
2	484.930	23.16	2.30	-0.92	24.54	46.00	21.46	QP
3	610.060	24.91	2.68	-1.41	26.18	46.00	19.82	QP
4	701.240	25.01	2.87	-0.75	27.13	46.00	18.87	QP
5	758.470	25.35	3.06	-0.37	28.04	46.00	17.96	QP
6	857.410	25.94	3.28	-1.17	28.05	46.00	17.95	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



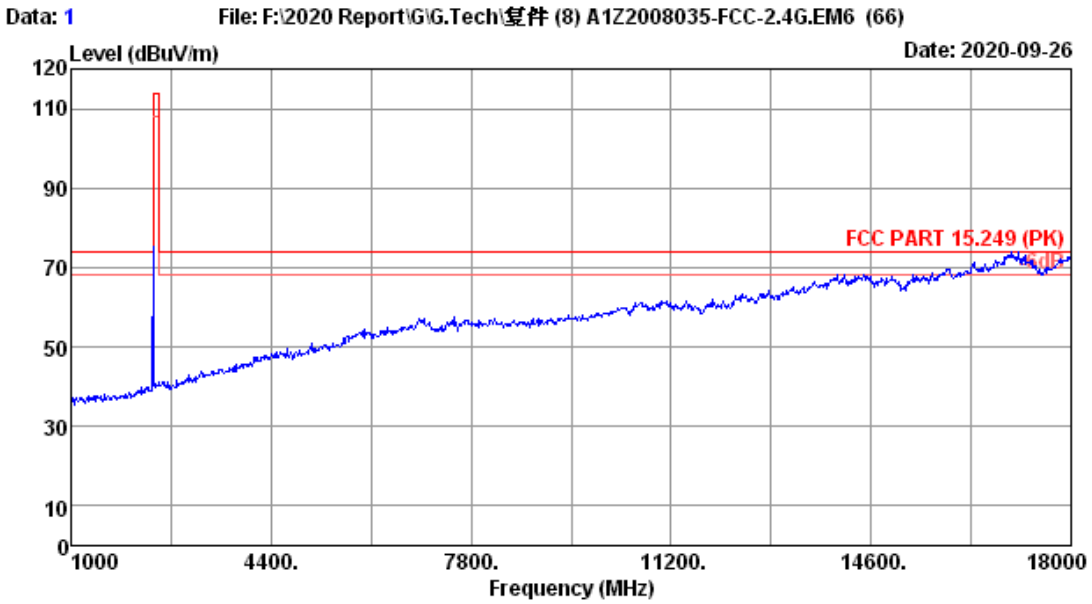
Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2020 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15.249 (PK)		
Env. / Ins.	: 23.6*C/55%	Engineer	: Allen
Power rating	: DC 1.5V		
Test Mode	: 2403MHz Tx Mode		



Site no. : 3m Chamber
Data no. : 4
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2403MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2403.000	28.04	5.99	89.63	33.48	90.18	114.00	23.82	Peak
2	4806.000	32.61	7.40	40.98	33.18	47.81	74.00	26.19	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.

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Site no.      : 3m Chamber                    Data no.   : 1
Dis. / Ant.   : 3m   2020 MCTD1209-3006       Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2403MHz  Tx  Mode
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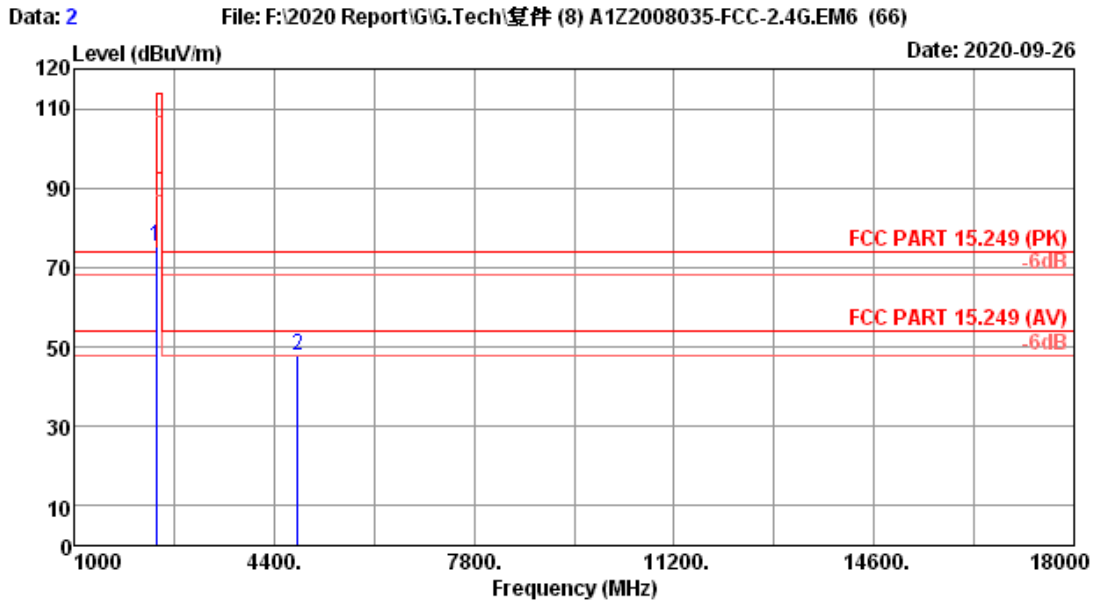
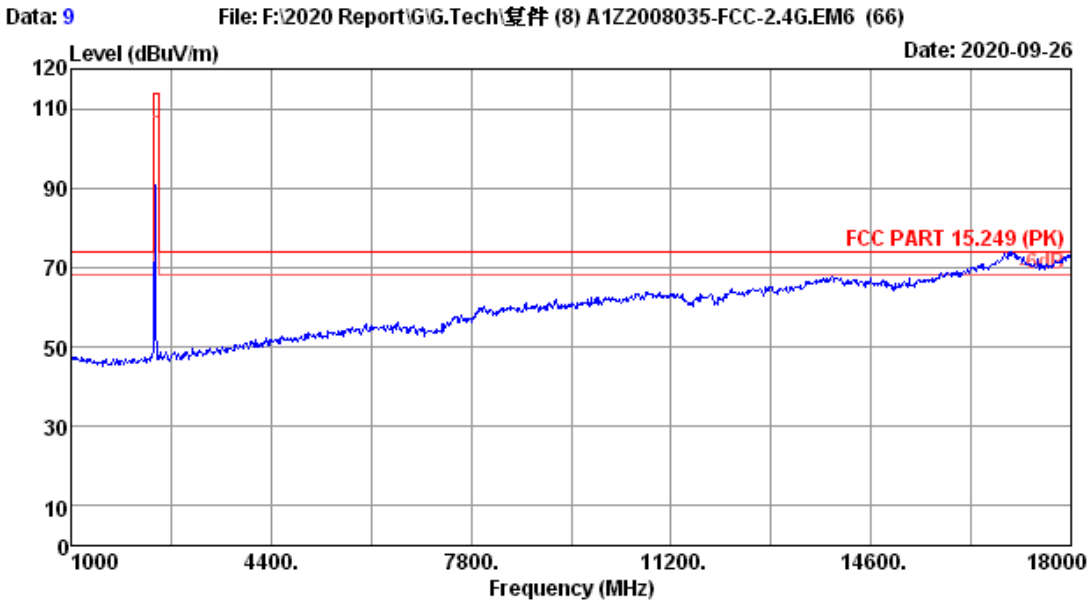


Site no. : 3m Chamber
Data no. : 2
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2403MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2403.000	28.04	5.99	74.92	33.48	75.47	114.00	38.53	Peak
2	4806.000	32.61	7.40	41.07	33.18	47.90	74.00	26.10	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.

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Dis. / Ant.   : 3m   2020 MCTD1209-3006       Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2439MHz  Tx  Mode
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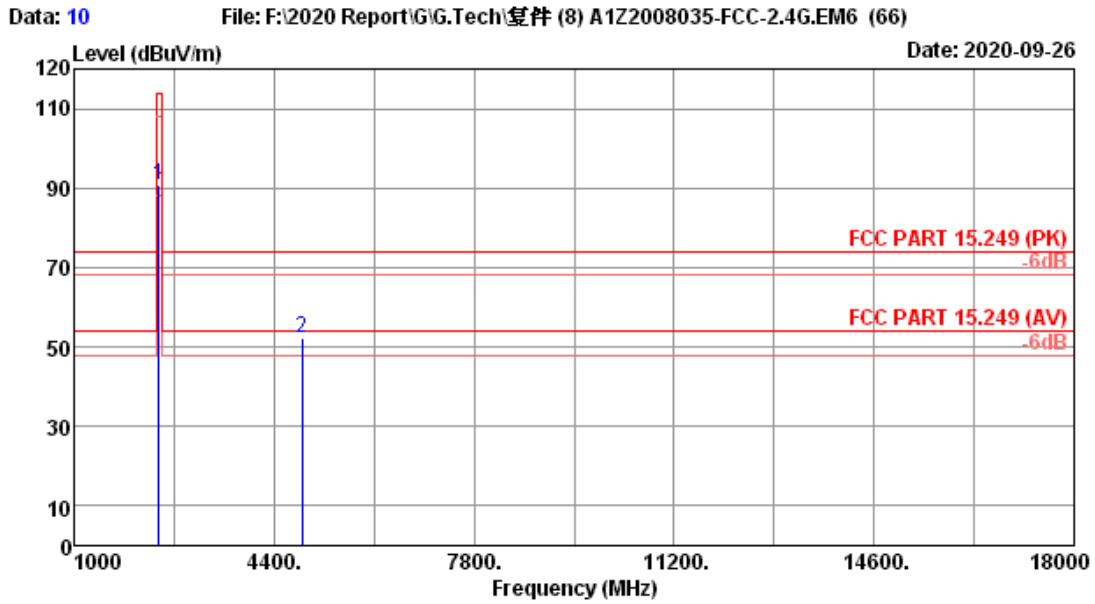
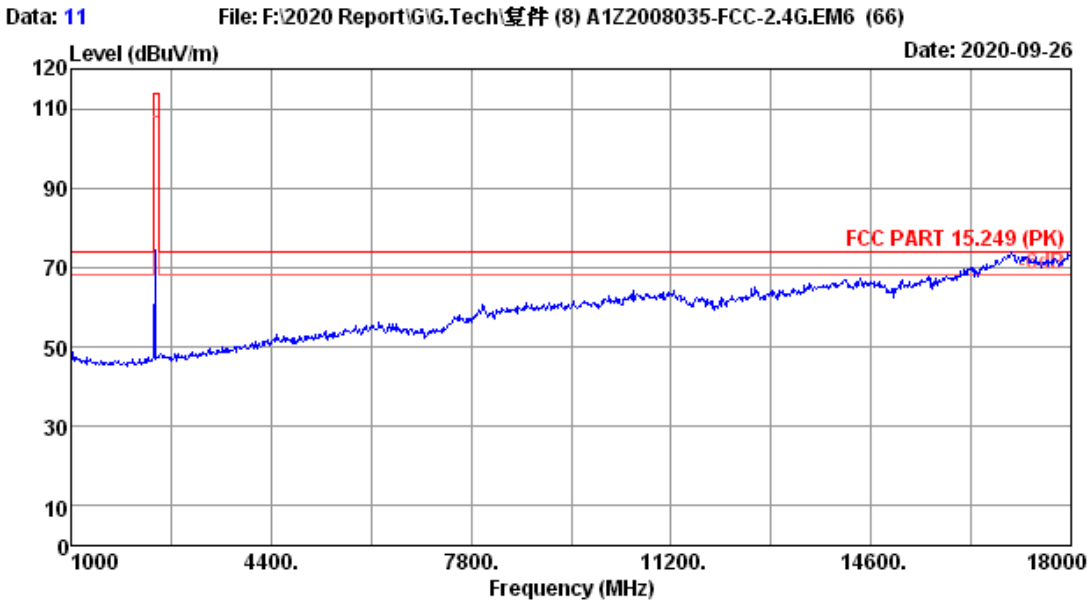


Site no. : 3m Chamber
Data no. : 10
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2439MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2439.000	28.11	6.01	90.03	33.47	90.68	114.00	23.32	Peak
2	4878.000	32.68	7.44	45.39	33.19	52.32	74.00	21.68	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.

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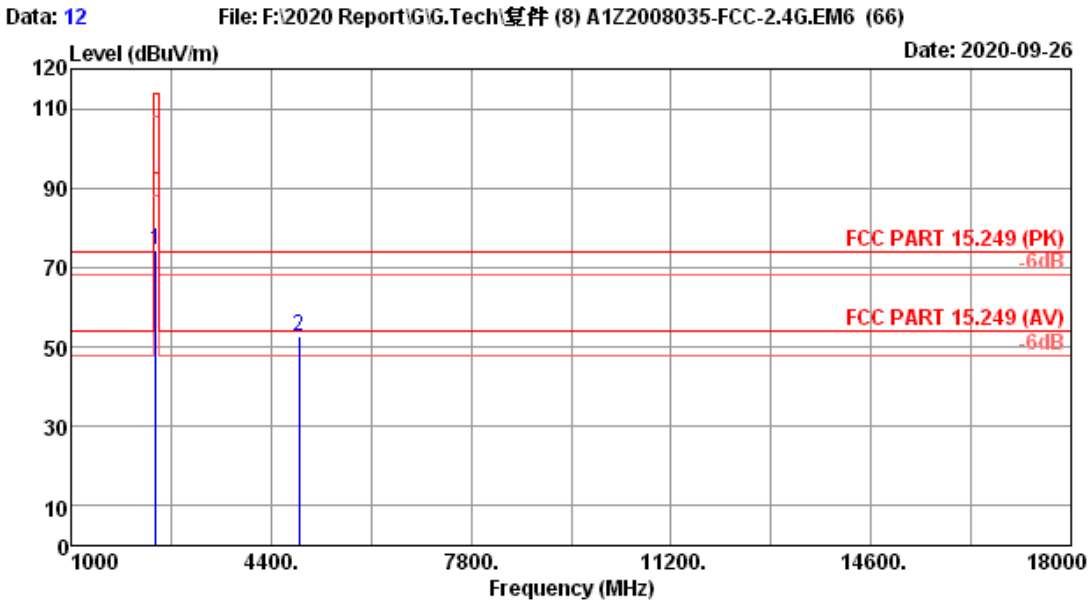
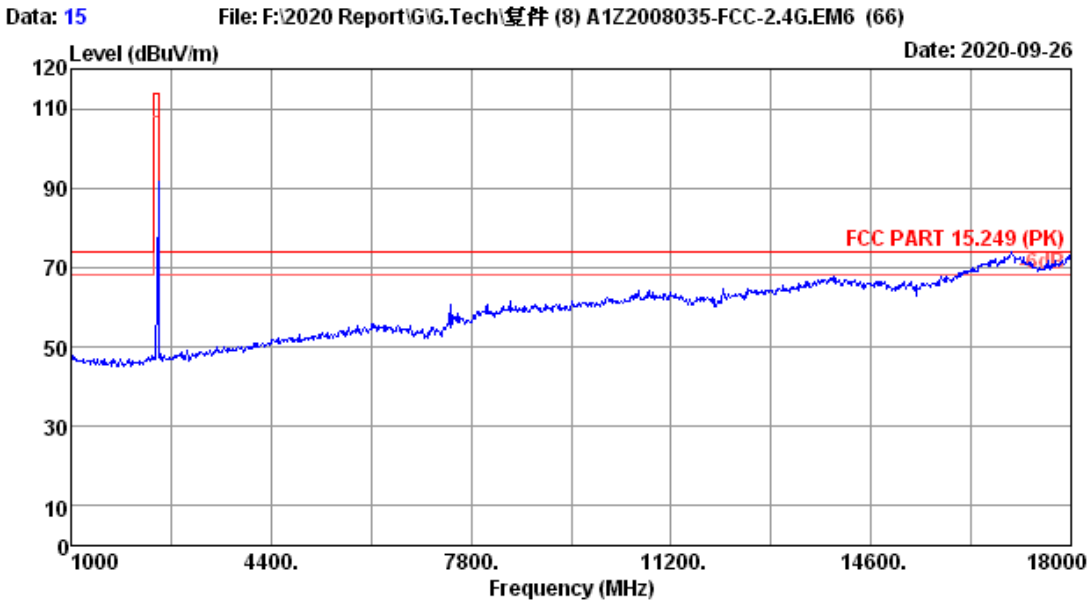
Site no.      : 3m Chamber                    Data no.   : 11
Dis. / Ant.   : 3m   2020 MCTD1209-3006       Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2439MHz  Tx  Mode
```



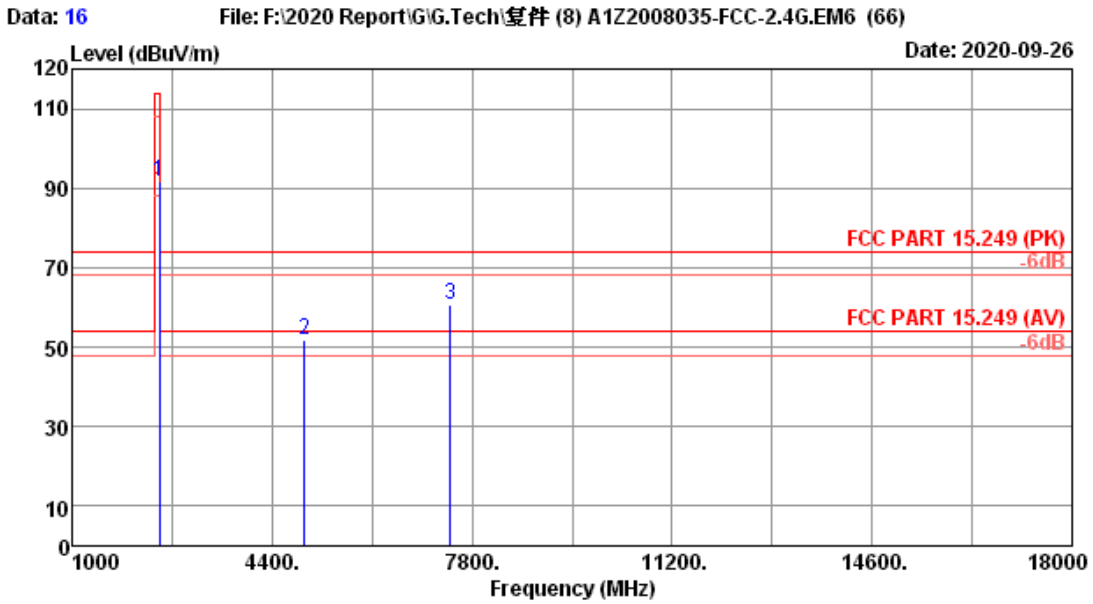
Site no. : 3m Chamber
Data no. : 12
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2439MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2439.000	28.11	6.01	73.67	33.47	74.32	114.00	39.68	Peak
2	4878.000	32.68	7.44	45.93	33.19	52.86	74.00	21.14	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   2020 MCTD1209-3006       Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2479MHz  Tx  Mode
```

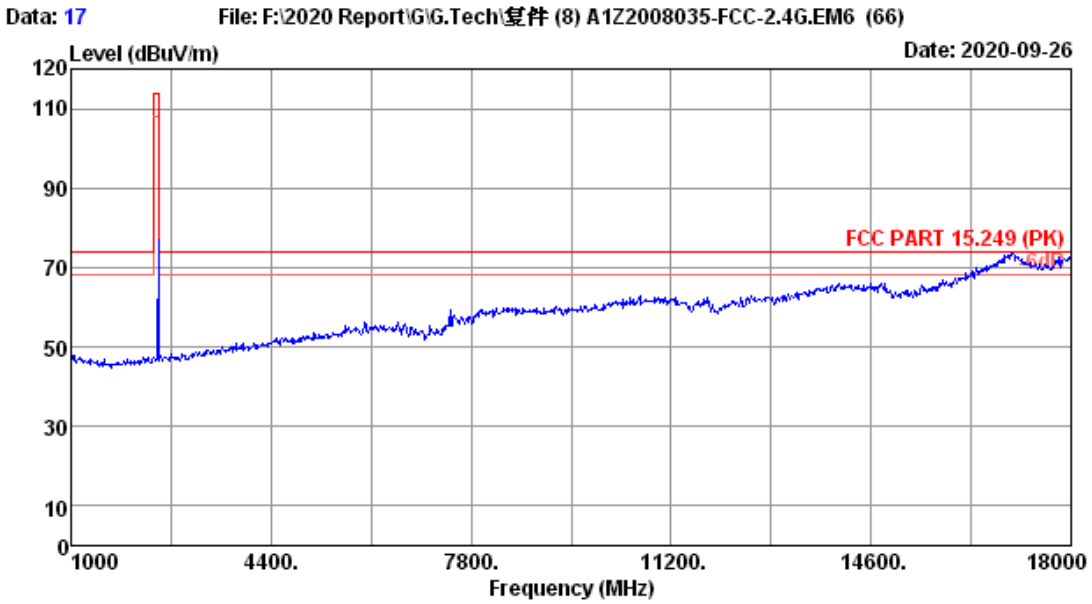


Site no. : 3m Chamber Data no. : 16
Dis. / Ant. : 3m 2020 MCTD1209-3006 Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55% Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2479MHz Tx Mode

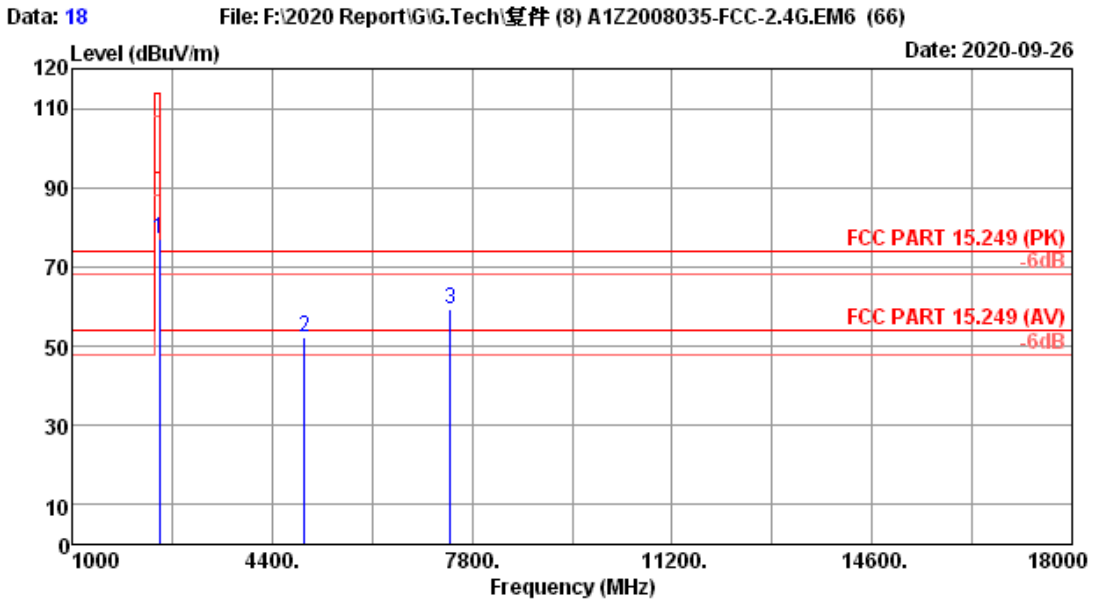
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.000	28.17	6.03	90.99	33.46	91.73	114.00	22.27	Peak
2	4958.000	32.77	7.49	44.58	33.20	51.64	74.00	22.36	Peak
3	7437.000	36.50	8.93	48.44	33.04	60.83	74.00	13.17	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
7437.000	60.83	-9.790	51.04	54	Pass




```
Site no.      : 3m Chamber                    Data no.   : 17
Dis. / Ant.   : 3m   2020 MCTD1209-3006       Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2479MHz  Tx  Mode
```




```
Site no.      : 3m Chamber                    Data no.   : 18
Dis. / Ant.   : 3m   2020 MCTD1209-3006       Ant. pol.  : VERTICAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2479MHz  Tx  Mode
```

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.000	28.17	6.03	76.52	33.46	77.26	114.00	36.74	Peak
2	4958.000	32.77	7.49	45.08	33.20	52.14	74.00	21.86	Peak
3	7437.000	36.50	8.93	46.75	33.04	59.14	74.00	14.86	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
7437.000	59.14	-9.790	49.35	54	Pass

5. 20 DB BANDWIDTH TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.12,20	1 Year
2.	Attenuator	Agilent	8491B	MY39269201	Oct.13,19	1 Year
3.	RF Cable	EMCI	EMC102-K M-KM 3500	170702	Apr.12,20	1 Year

5.2. Limit

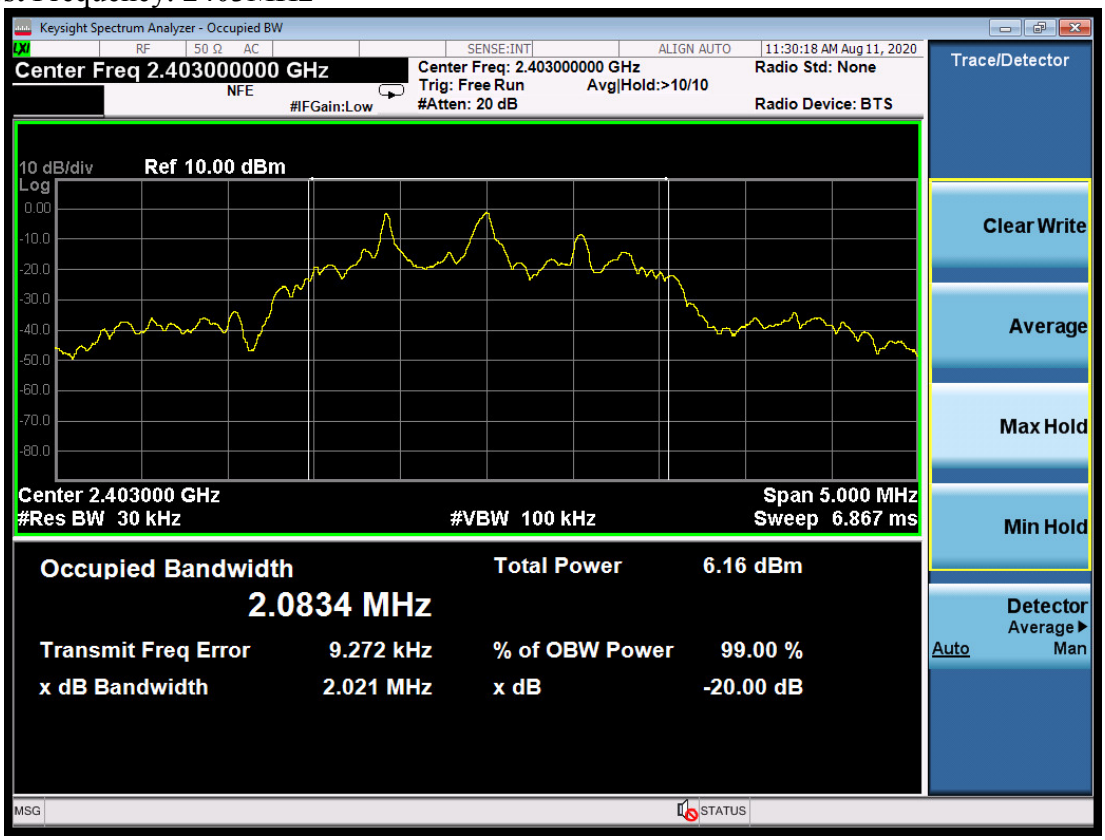
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific 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

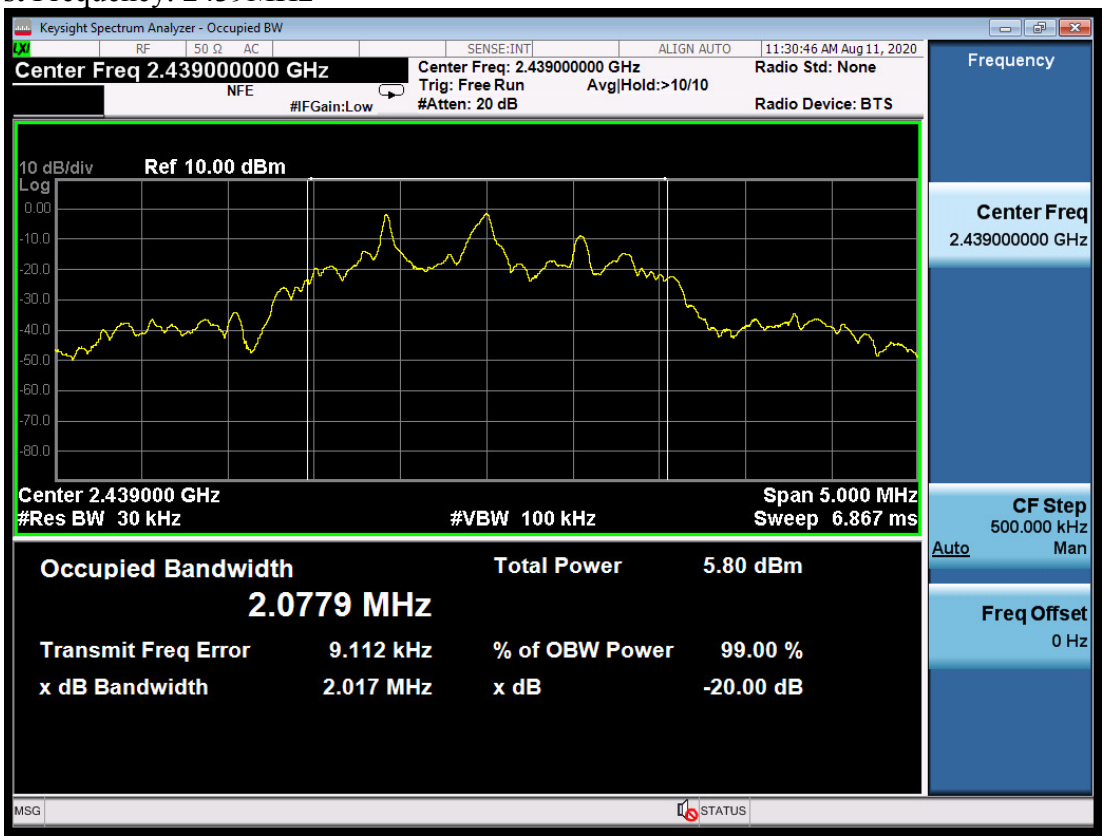
EUT: 2.4GHz Wireless Keyboard		
M/N: GK381-BK		
Test date: 2020-08-11	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Allen	Test site: RF site	Temperature:22.8±0.6 ℃

Test Mode	Frequency (MHz)	-20dB bandwidth (MHz)	Limit (KHz)
GFSK	2403	2.021	N/A
	2439	2.017	N/A
	2479	2.018	N/A
Conclusion：PASS			

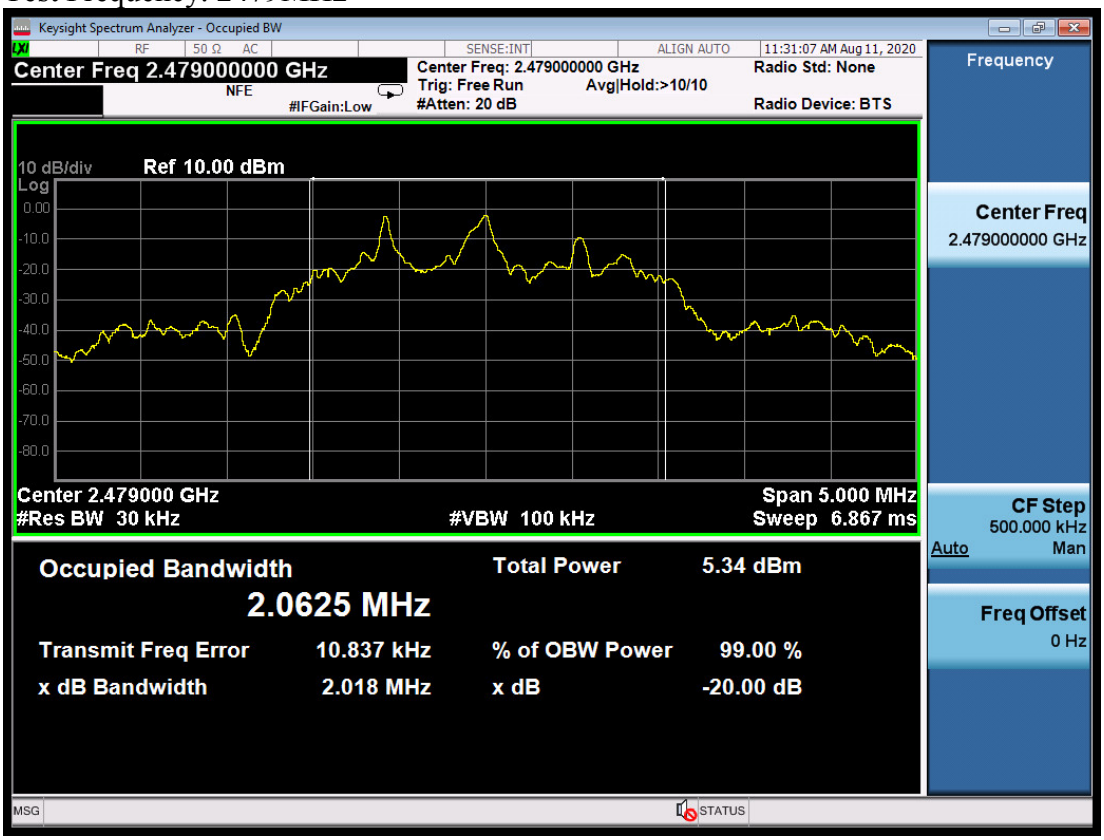
Test Frequency: 2403MHz



Test Frequency: 2439MHz



Test Frequency: 2479MHz



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	Apr.12,20	1 Year
2.	Amplifier	Agilent	8449B	3008A02495	Apr.11,20	1 Year
3.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Jul.30,20	1 Year
4.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	Apr.12,20	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

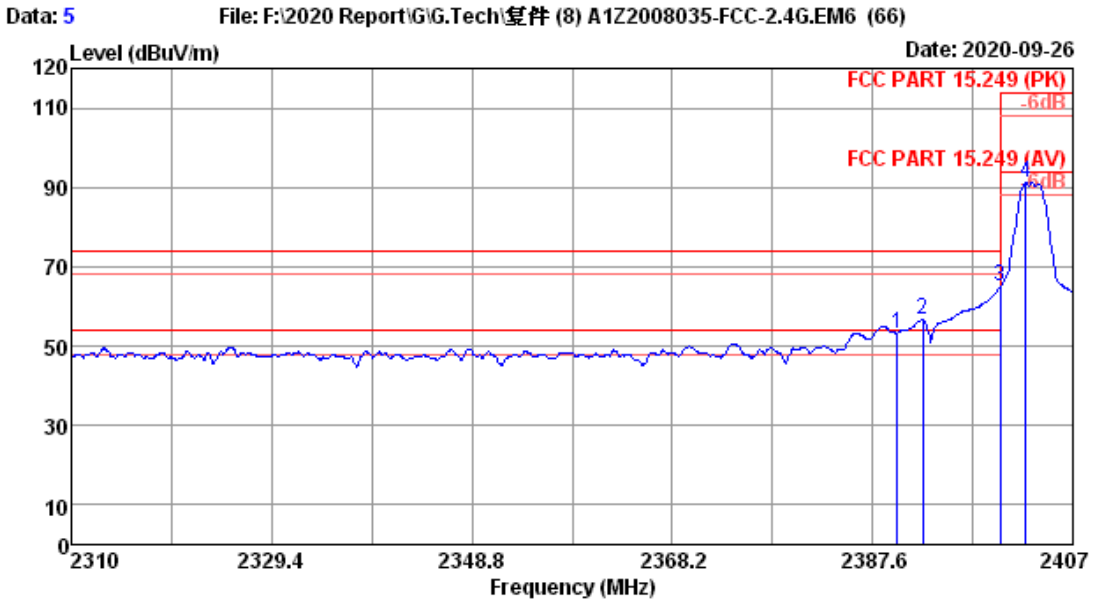
1. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out 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.

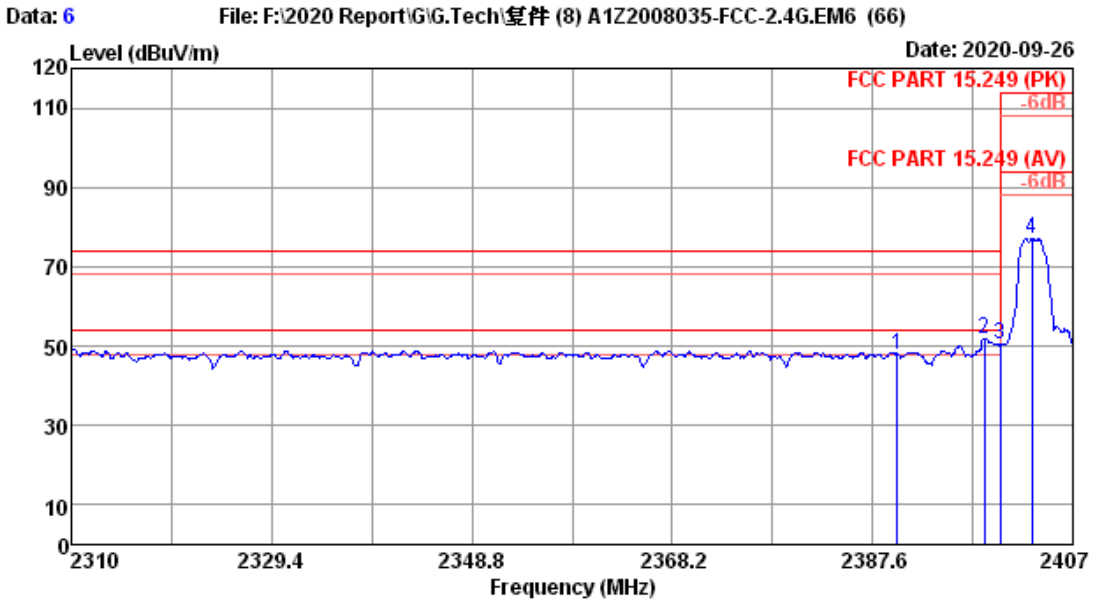
Note: The duty cycle factor for calculate average level is -9.790dB, and average limit is 50dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.



Site no. : 3m Chamber
Data no. : 5
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2403MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.01	5.98	52.71	33.48	53.22	74.00	20.78	Peak
2	2392.450	28.01	5.98	56.30	33.48	56.81	74.00	17.19	Peak
3	2400.000	28.01	5.98	64.71	33.48	65.22	74.00	8.78	Peak
4	2402.441	28.01	5.98	90.65	33.48	91.16	114.00	22.84	Peak

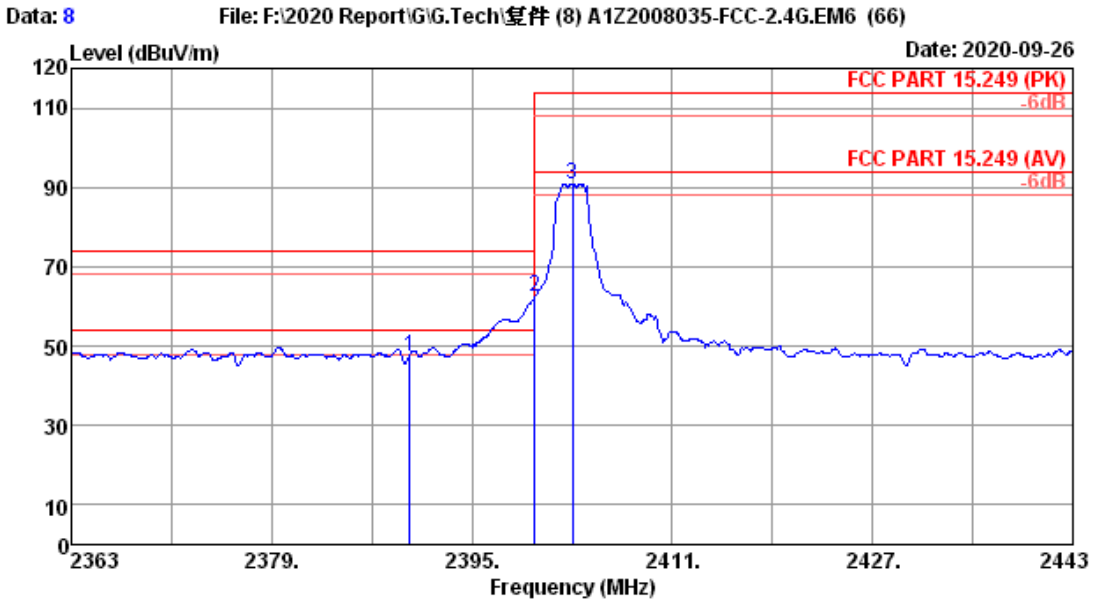
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Data no. : 6
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2403MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.01	5.98	47.47	33.48	47.98	74.00	26.02	Peak
2	2398.464	28.01	5.98	51.41	33.48	51.92	74.00	22.08	Peak
3	2400.000	28.01	5.98	49.83	33.48	50.34	74.00	23.66	Peak
4	2403.023	28.04	5.99	76.63	33.48	77.18	114.00	36.82	Peak

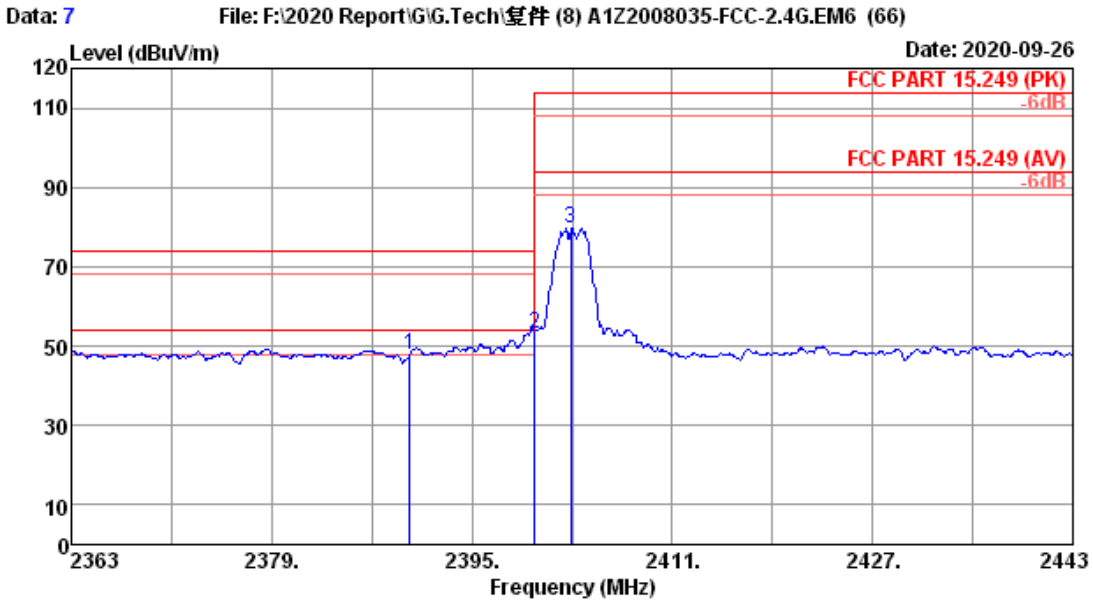
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Data no. : 8
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2403MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.01	5.98	47.09	33.48	47.60	74.00	26.40	Peak
2	2400.000	28.01	5.98	61.87	33.48	62.38	74.00	11.62	Peak
3	2403.000	28.04	5.99	90.35	33.48	90.90	114.00	23.10	Peak

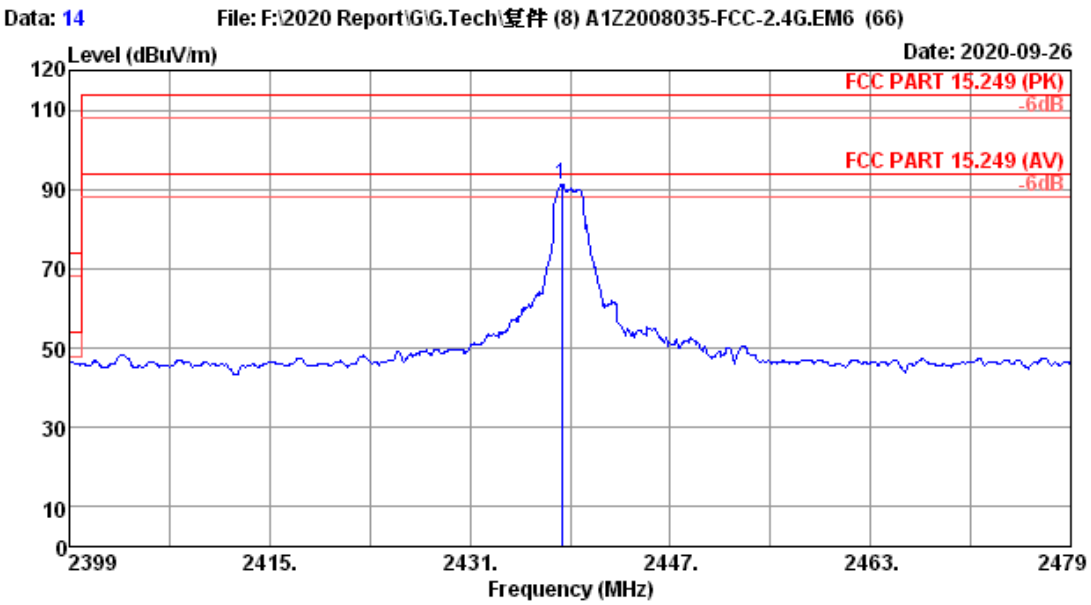
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Data no. : 7
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2403MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.01	5.98	47.33	33.48	47.84	74.00	26.16	Peak
2	2400.000	28.01	5.98	52.84	33.48	53.35	74.00	20.65	Peak
3	2402.920	28.04	5.99	79.14	33.48	79.69	114.00	34.31	Peak

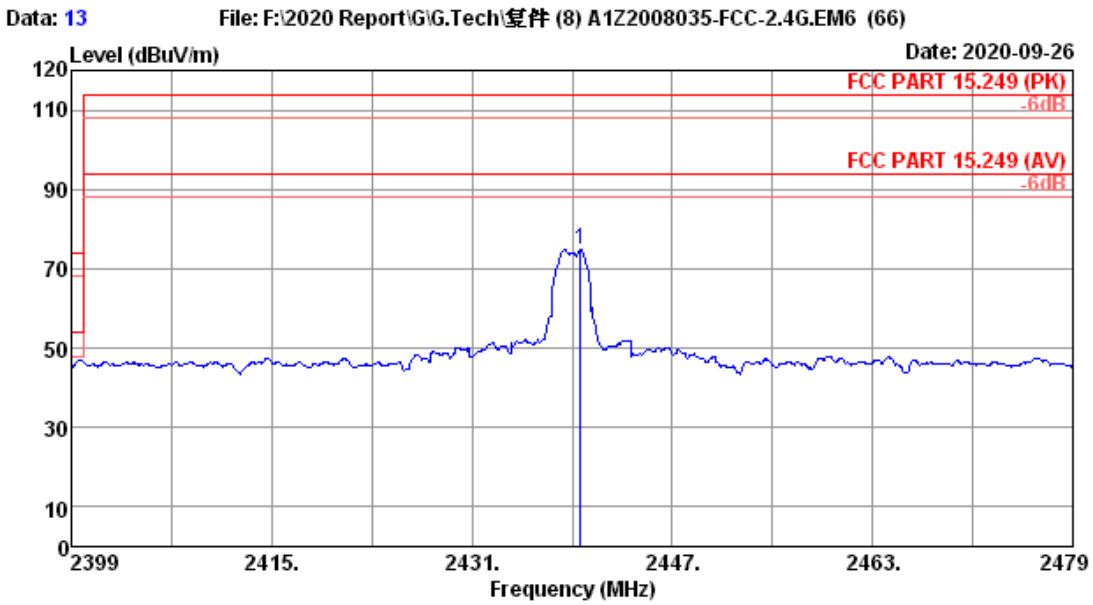
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Data no. : 14
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2439MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2438.360	28.11	6.01	90.50	33.47	91.15	114.00	22.85	Peak

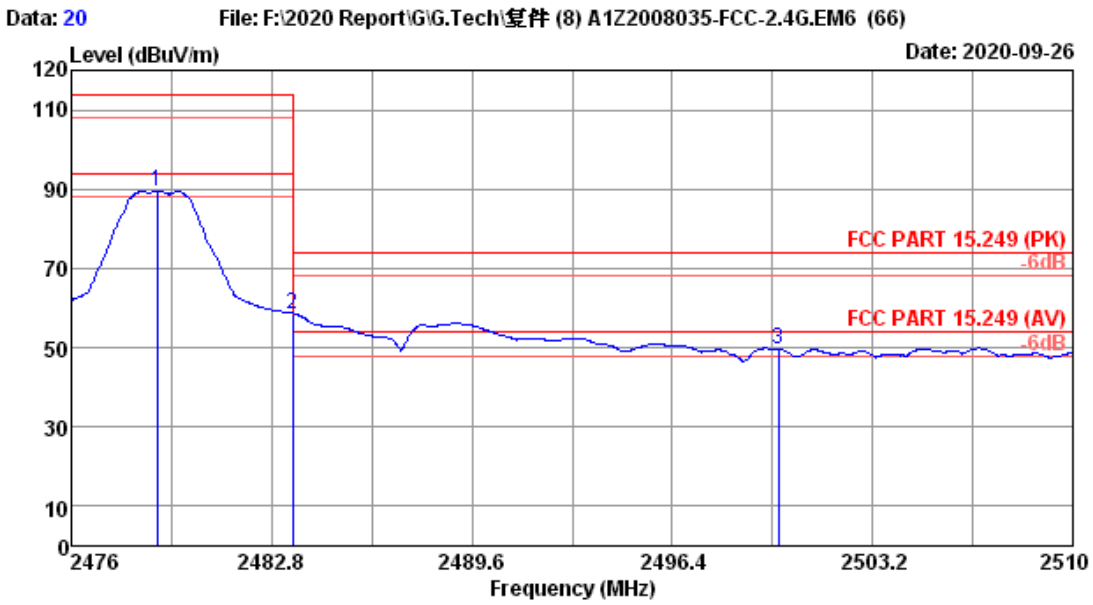
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Data no. : 13
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2439MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2439.640	28.11	6.01	74.11	33.47	74.76	114.00	39.24	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.

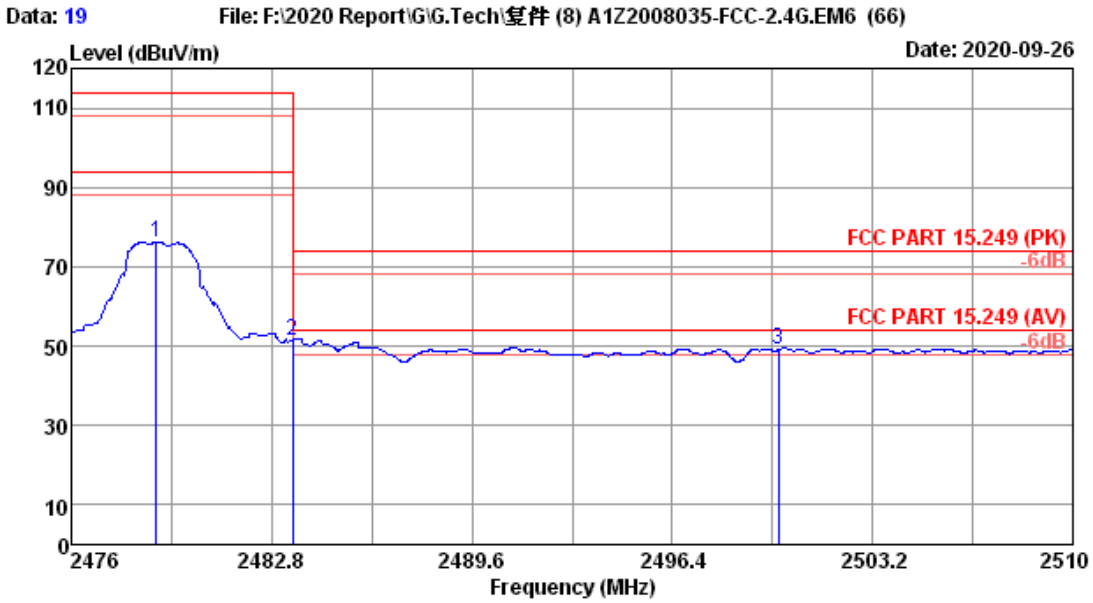


Site no. : 3m Chamber
Data no. : 20
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : HORIZONTAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2479MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2478.924	28.17	6.03	88.66	33.46	89.40	114.00	24.60	Peak
2	2483.500	28.17	6.03	57.87	33.46	58.61	74.00	15.39	Peak
3	2500.000	28.20	6.04	48.73	33.45	49.52	74.00	24.48	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.

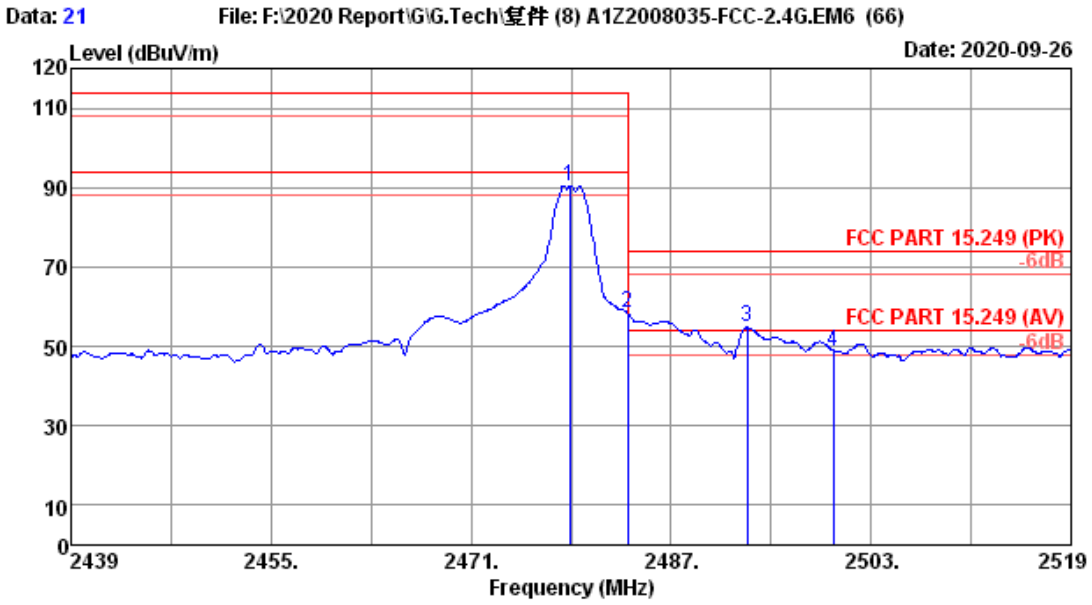
Frequency（MHz）	Peak level（dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
2483.500	58.61	-9.790	48.82	54	Pass



Site no. : 3m Chamber
Data no. : 19
Dis. / Ant. : 3m 2020 MCTD1209-3006
Ant. pol. : VERTICAL
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Engineer : Allen
Power rating : DC 1.5V
Test Mode : 2479MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2478.890	28.17	6.03	75.50	33.46	76.24	114.00	37.76	Peak
2	2483.500	28.17	6.03	50.83	33.46	51.57	74.00	22.43	Peak
3	2500.000	28.20	6.04	48.36	33.45	49.15	74.00	24.85	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.

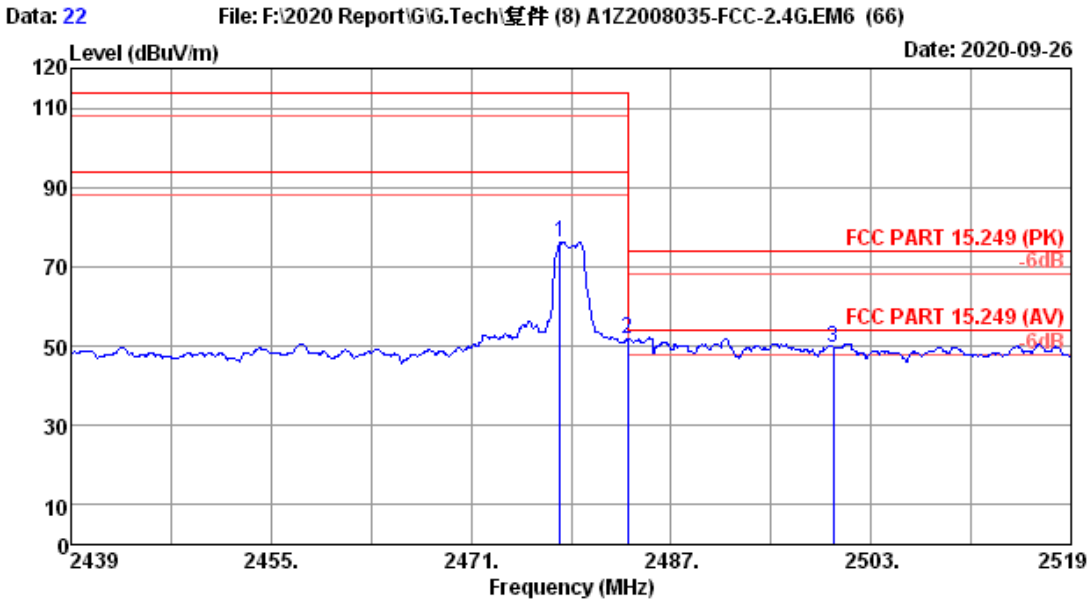



```
Site no.      : 3m Chamber                    Data no.   : 21
Dis. / Ant.   : 3m   2020 MCTD1209-3006       Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15.249 (PK)
Env. / Ins.   : 23.6*C/55%                    Engineer   : Allen
Power rating  : DC 1.5V
Test Mode     : 2479MHz  Tx  Mode
```

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2478.920	28.17	6.03	89.57	33.46	90.31	114.00	23.69	Peak
2	2483.500	28.17	6.03	57.70	33.46	58.44	74.00	15.56	Peak
3	2493.080	28.20	6.04	54.01	33.45	54.80	74.00	19.20	Peak
4	2500.000	28.20	6.04	48.06	33.45	48.85	74.00	25.15	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
2483.500	58.44	-9.790	48.65	54	Pass
2493.080	54.80	-9.790	45.01	54	Pass



Site no. : 3m Chamber
Dis. / Ant. : 3m 2020 MCTD1209-3006
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23.6*C/55%
Power rating : DC 1.5V
Test Mode : 2479MHz Tx Mode

Data no. : 22
Ant. pol. : VERTICAL
Engineer : Allen

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2478.120	28.17	6.03	75.52	33.46	76.26	114.00	37.74	Peak
2	2483.500	28.17	6.03	50.93	33.46	51.67	74.00	22.33	Peak
3	2500.000	28.20	6.04	48.87	33.45	49.66	74.00	24.34	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 : Aug.11,2020

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 -2.268dBi, 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. DEVIATION TO TEST SPECIFICATIONS

[NONE]