

# TEST REPORT

**FCC ID: 2AOKB-D0421**

**Product: Nebula Gamepad**

**Model No.: D0421**

**Additional Model No.: M2, C02**

**Trade Mark: NEBULA**

**Report No.: TCT190307E022**

**Issued Date: Mar. 29, 2019**

Issued for:

**Anker Innovations Limited**

**Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon,  
Hong Kong**

Issued By:

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Appendix A: Photographs of Test Setup

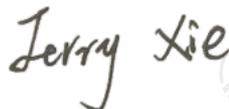
Appendix B: Photographs of EUT

## 1. Test Certification

<b>Product:</b>	Nebula Gamepad
<b>Model No.:</b>	D0421
<b>Additional Model No.:</b>	M2, C02
<b>Trade Mark:</b>	<b>NEBULA</b>
<b>Applicant:</b>	Anker Innovations Limited
<b>Address:</b>	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong
<b>Manufacturer:</b>	Anker Innovations Limited
<b>Address:</b>	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong
<b>Date of Test:</b>	Mar. 08, 2019 – Mar. 28, 2019
<b>Applicable Standards:</b>	FCC CFR Title 47 Part 15 Subpart C Section 15.249

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Jerry Xie

Date:

Mar. 28, 2019

Reviewed By:



Beryl Zhao

Date:

Mar. 29, 2019

Approved By:



Tomsin

Date:

Mar. 29, 2019

## 2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Field Strength of Fundamental	§15.249 (a)	PASS
Spurious Emissions	§2.1053 §15.249 (a) (d)/ §15.209	PASS
Band Edge	§2.1053 §15.249 (d)/ §15.205	PASS
20dB Occupied Bandwidth	§2.1049 §15.215 (c)	PASS

**Note:**

1. Pass: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 3. EUT Description

<b>Product:</b>	Nebula Gamepad
<b>Model No.:</b>	D0421
<b>Additional Model No.:</b>	M2, C02
<b>Trade Mark:</b>	<b>NEBULA</b>
<b>Hardware Version:</b>	V1.0
<b>Software Version:</b>	V1.0
<b>Operation Frequency:</b>	2402MHz - 2480MHz
<b>Number of Channel:</b>	40
<b>Modulation Technology:</b>	GFSK
<b>Antenna Type:</b>	PCB Antenna
<b>Antenna Gain:</b>	0dBi
<b>Power Supply:</b>	Rechargeable Li-ion battery DC 3.7V
<b>Remark:</b>	All models above are identical in interior structure, electrical circuits and components, and just Logo and Button colors are different for the marketing requirement.

**Operation Frequency Each of Channel**

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
...	...	...	...	...	...	...	...
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Remark: Channel 0, 19 & 39 have been tested.

**Note:**

*In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:*

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

## 4. General Information

### 4.1. Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel
<p>The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.</p>	

### 4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

**Note:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 5. Facilities and Accreditations

### 5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098  
Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

### 5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

### 5.3. Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1GHz)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1GHz)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$

## 6. Test Results and Measurement Data

### 6.1. Antenna Requirement

**Standard requirement:**

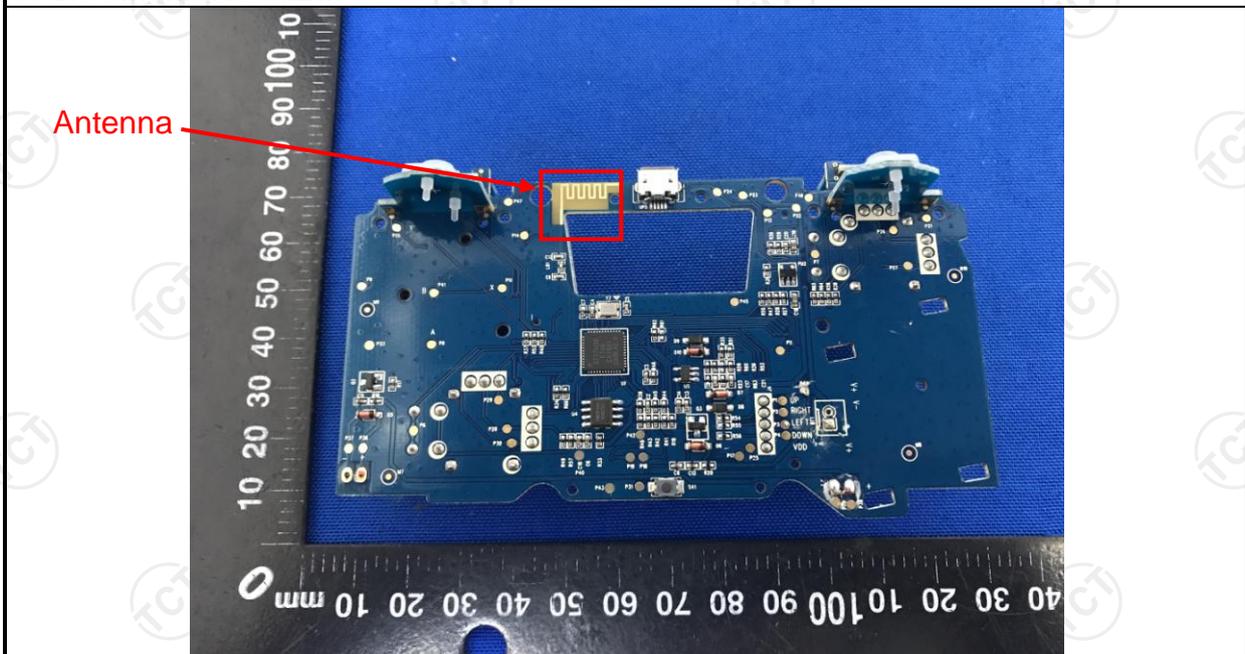
FCC Part15 C Section 15.203

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

**E.U.T Antenna:**

The EUT antenna is PCB antenna which permanently attached, and the best case gain of the antenna is 0dBi.



## 6.2. Conducted Emission

### 6.2.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 C Section 15.207														
<b>Test Method:</b>	ANSI C63.10:2013														
<b>Frequency Range:</b>	150 kHz to 30 MHz														
<b>Receiver setup:</b>	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
<b>Limits:</b>	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
<b>Test Setup:</b>	<p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
<b>Test Mode:</b>	Transmitting mode with modulation														
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</li> </ol>														
<b>Test Result:</b>	PASS														

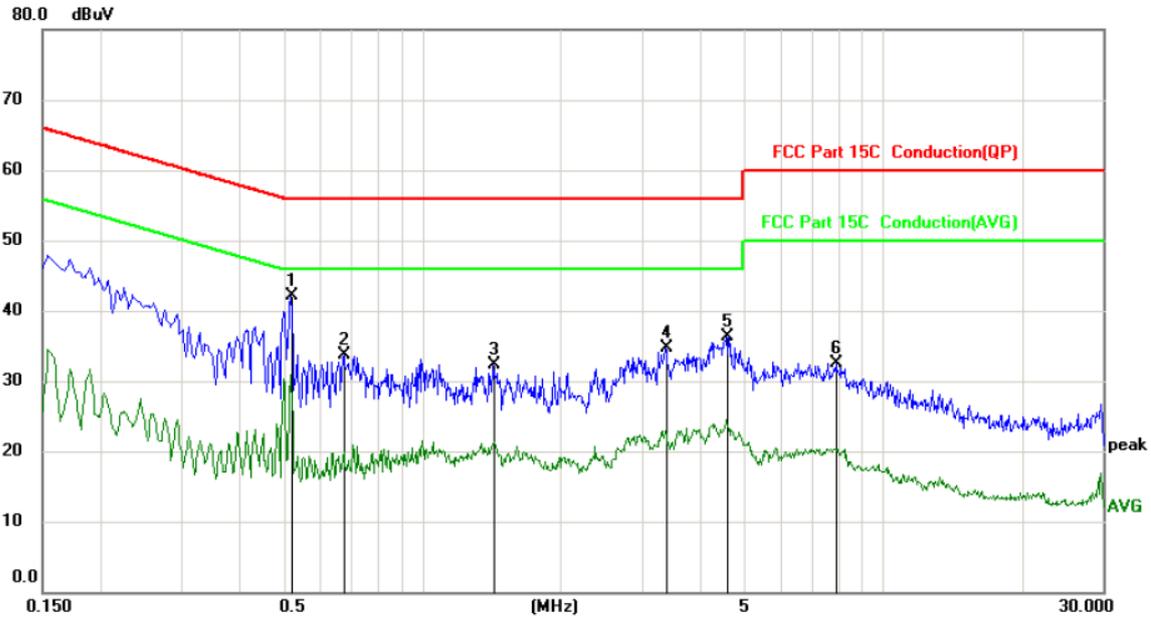
**6.2.2. Test Instruments**

Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	R&S	ESPI	101402	Jul. 17, 2019
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 20, 2019
Coax cable (9KHz-30MHz)	TCT	CE-05	N/A	Sep. 16, 2019
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**6.2.3. Test data**

Please refer to following diagram for individual  
**Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)**



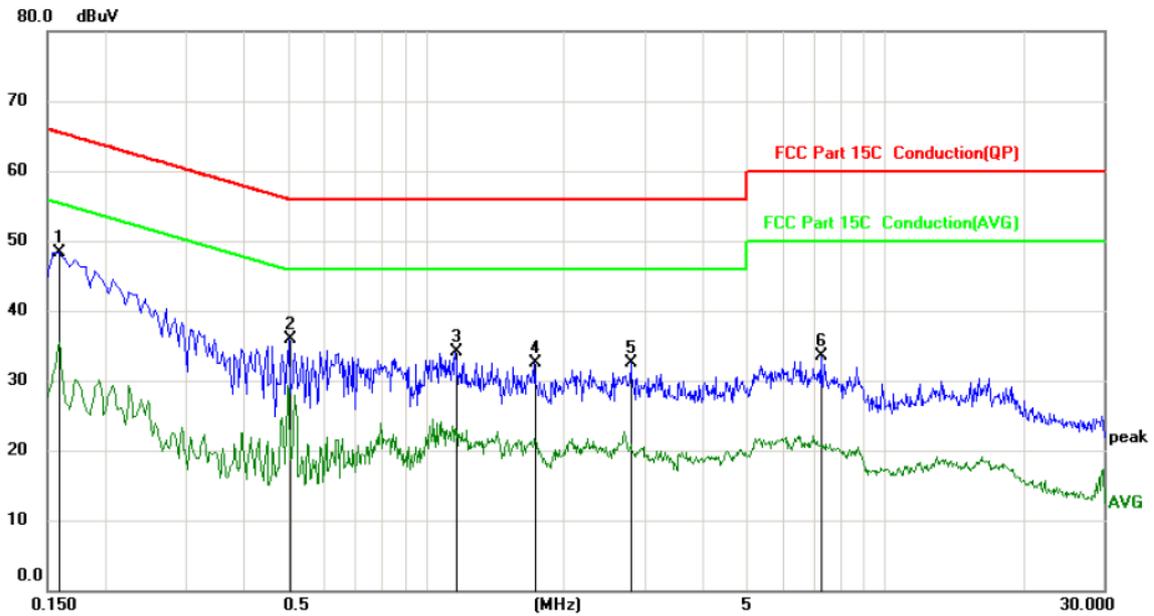
Site: \_\_\_\_\_ Phase: **L1** Temperature: 25  
Limit: FCC Part 15C Conduction(QP) Power: \_\_\_\_\_ Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.5190	31.87	10.22	42.09	56.00	-13.91	peak	
2		0.6765	23.47	10.23	33.70	56.00	-22.30	peak	
3		1.4325	21.94	10.40	32.34	56.00	-23.66	peak	
4		3.3720	24.15	10.47	34.62	56.00	-21.38	peak	
5		4.5780	25.91	10.48	36.39	56.00	-19.61	peak	
6		7.8945	22.06	10.52	32.58	60.00	-27.42	peak	

**Note:**

- Freq. = Emission frequency in MHz
- Reading level (dBuV) = Receiver reading
- Corr. Factor (dB) = Antenna factor + Cable loss
- Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)
- Limit (dBuV) = Limit stated in standard
- Margin (dB) = Measurement (dBuV) – Limits (dBuV)
- Q.P. =Quasi-Peak
- AVG =average
- Any value more than 10dB below limit have not been specifically reported.
- \* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

**Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)**



Site: \_\_\_\_\_ Phase: **N** Temperature: 25  
Limit: FCC Part 15C Conduction(QP) Power: \_\_\_\_\_ Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1590	37.99	10.22	48.21	65.52	-17.31	peak	
2		0.5055	25.77	10.22	35.99	56.00	-20.01	peak	
3		1.1625	23.74	10.37	34.11	56.00	-21.89	peak	
4		1.7340	22.04	10.43	32.47	56.00	-23.53	peak	
5		2.7960	21.96	10.46	32.42	56.00	-23.58	peak	
6		7.2735	22.90	10.51	33.41	60.00	-26.59	peak	

**Note:**

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) – Limits (dBuV)

Q.P. =Quasi-Peak

AVG =average

Any value more than 10dB below limit have not been specifically reported.

\* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

### 6.3. Radiated Emission Measurement

#### 6.3.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 C Section 15.209/ Part 2 J Section 2.1053				
<b>Test Method:</b>	ANSI C63.10:2013				
<b>Frequency Range:</b>	9 kHz to 25 GHz				
<b>Measurement Distance:</b>	3 m				
<b>Antenna Polarization:</b>	Horizontal & Vertical				
<b>Receiver Setup:</b>	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
<b>Limit(Field strength of the fundamental signal):</b>	Frequency	Limit (dBuV/m @3m)		Remark	
	2400MHz-2483.5MHz	94.00		Average Value	
		114.00		Peak Value	
<b>Limit(Spurious Emissions):</b>	Frequency	Limit (dBuV/m @3m)		Remark	
	0.009-0.490	2400/F(KHz)		Quasi-peak Value	
	0.490-1.705	24000/F(KHz)		Quasi-peak Value	
	1.705-30	30		Quasi-peak Value	
	30MHz-88MHz	40.0		Quasi-peak Value	
	88MHz-216MHz	43.5		Quasi-peak Value	
	216MHz-960MHz	46.0		Quasi-peak Value	
	960MHz-1GHz	54.0		Quasi-peak Value	
	Above 1GHz	54.0		Average Value	
74.0		Peak Value			
<b>Limit (band edge) :</b>	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 Section 15.209, whichever is the lesser attenuation.				
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber in below 1GHz, 1.5m above the ground in above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make</li> </ol>				



- the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
  5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
  6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

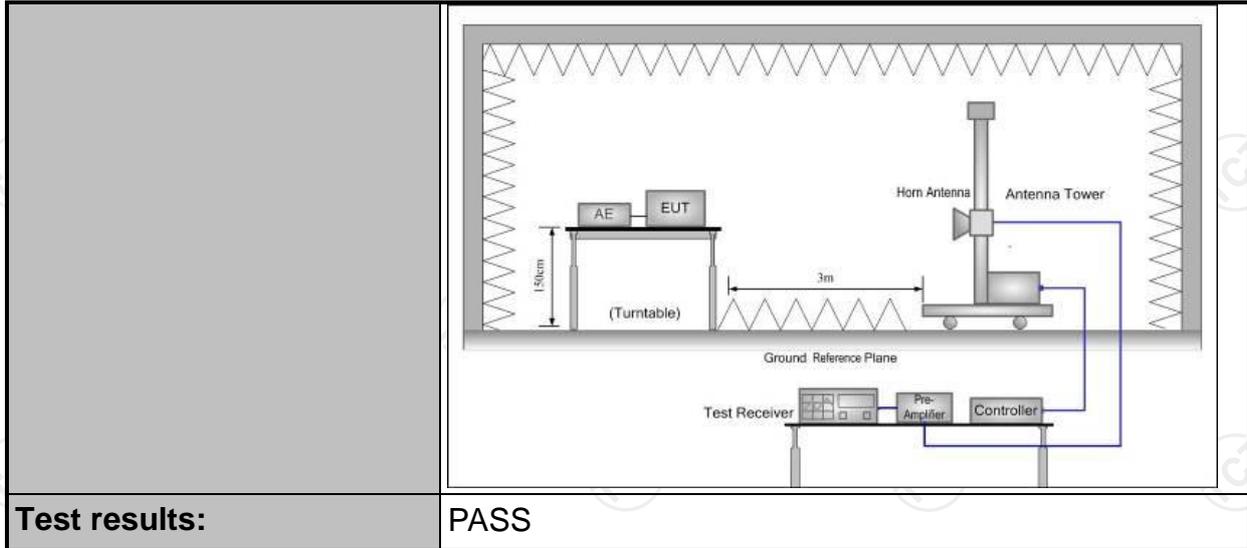
**Test setup:**

For radiated emissions below 30MHz

30MHz to 1GHz

Above 1GHz

(The diagram below shows the test setup that is utilized to make the measurements for emission from 1GHz to the tenth harmonic of the highest fundamental frequency or to 40GHz emissions, whichever is lower.)



**Test results:**

**PASS**



### 6.3.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESIB7	100197	Jul. 17, 2019
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ40	200061	Sep. 20, 2019
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 16, 2019
Pre-amplifier	HP	8447D	2727A05017	Sep. 16, 2019
Loop antenna	ZHINAN	ZN30900A	12024	Oct. 20, 2019
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 02, 2019
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Oct. 20, 2019
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 16, 2019
Antenna Mast	Keleto	RE-AM	N/A	N/A
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 16, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 16, 2019
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.3.3. Test Data

#### Field Strength of Fundamental

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
2402	76.60(PK)	H	114/94	-37.40
2402	62.75(AV)	H	114/94	-31.25
2440	75.10(PK)	H	114/94	-38.90
2440	60.61(AV)	H	114/94	-33.39
2480	75.81(PK)	H	114/94	-38.19
2480	58.98(AV)	H	114/94	-35.02
2402	72.64(PK)	V	114/94	-41.36
2402	56.70(AV)	V	114/94	-37.30
2440	76.52(PK)	V	114/94	-37.48
2440	56.80(AV)	V	114/94	-37.20
2480	77.76(PK)	V	114/94	-36.24
2480	61.09(AV)	V	114/94	-32.91

#### Spurious Emissions

##### Frequency Range (9 kHz-30MHz)

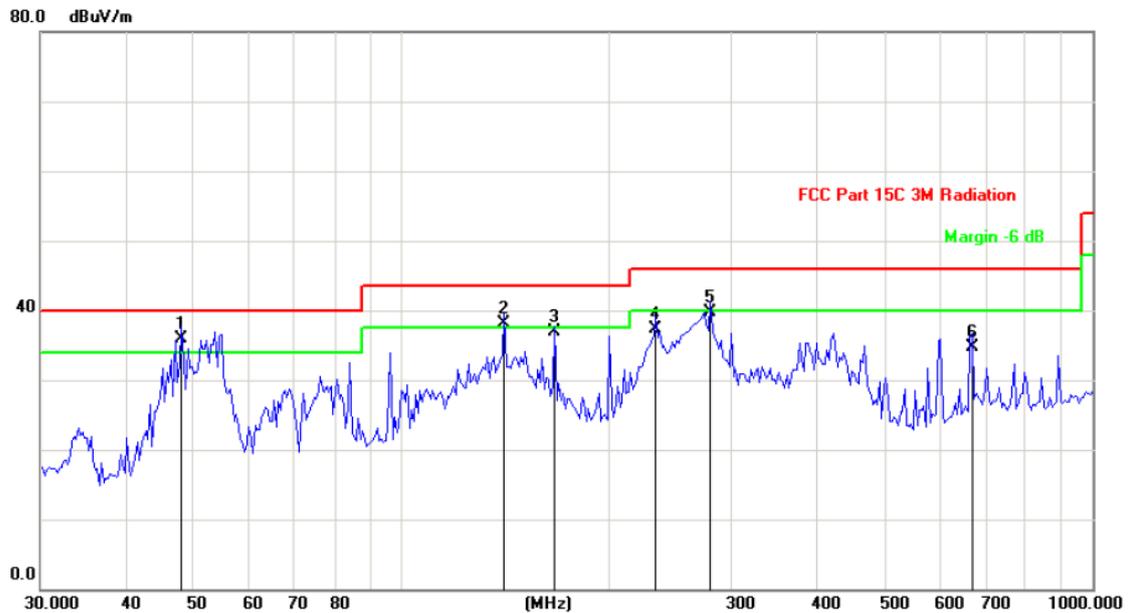
Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

**Note:** 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

## Frequency Range (30MHz-1GHz)

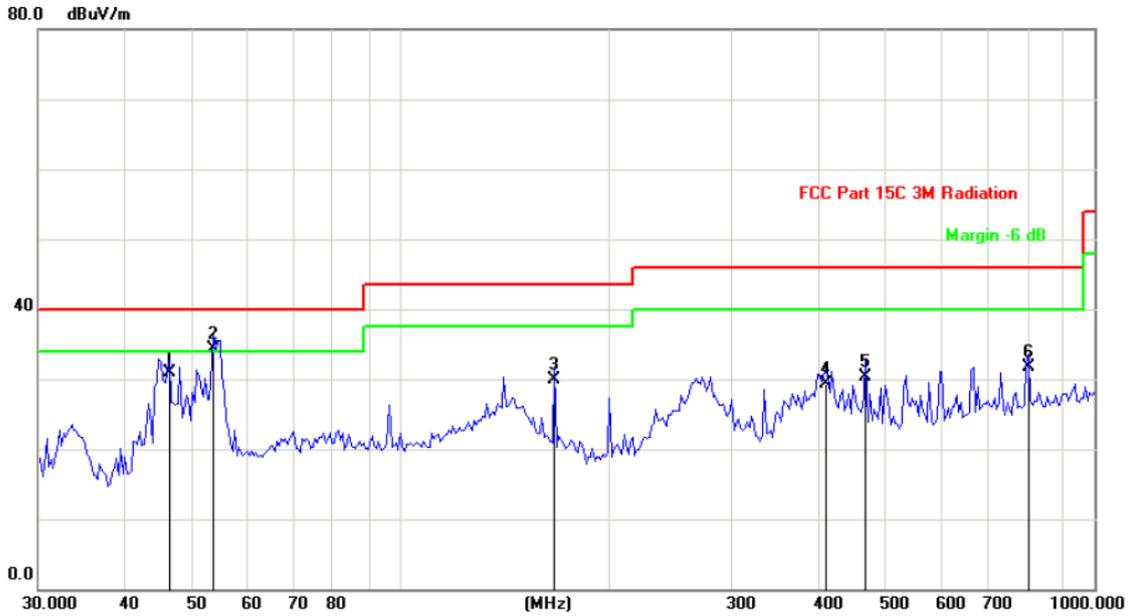
Horizontal:



Site: Polarization: **Horizontal** Temperature: 25  
 Limit: FCC Part 15C 3M Radiation Power: DC 3.7V Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree	Comment
1	*	48.0392	46.22	-10.22	36.00	40.00	-4.00	200	261	
2	!	140.7767	54.22	-16.10	38.12	43.50	-5.38	200	261	
3		166.6385	52.33	-15.50	36.83	43.50	-6.67	200	261	
4		233.4881	50.33	-13.04	37.29	46.00	-8.71	200	261	
5		280.2936	51.22	-11.57	39.65	46.00	-6.35	200	261	
6		669.9523	40.33	-5.54	34.79	46.00	-11.21	200	261	

Vertical:



Site: Polarization: *Vertical* Temperature: 25  
Limit: FCC Part 15C 3M Radiation Power: DC 3.7V Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree
1		46.3806	41.23	-10.39	30.84	40.00	-9.16	100	183
2	*	53.7559	45.22	-10.90	34.32	40.00	-5.68	100	183
3		166.6385	45.33	-15.50	29.83	43.50	-13.67	100	183
4		409.6506	38.22	-8.83	29.39	46.00	-16.61	100	183
5		468.1650	38.23	-7.99	30.24	46.00	-15.76	100	183
6		804.2523	36.22	-4.60	31.62	46.00	-14.38	100	183

**Note:** Measurements were conducted in all channels (high, middle, low), and the worst case (Lowest channel) was submitted only.

### Above 1GHz

Low channel: 2402 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
4804.00	H	52.48	---	-3.94	48.54	---	74.00	54.00	-5.46
7206.00	H	47.65	---	0.52	48.17	---	74.00	54.00	-5.83
---	---	---	---	---	---	---	---	---	---
2387.50	V	51.36	---	-4.20	47.16	---	74.00	54.00	-6.84
2387.50	V	---	49.43	-4.20	---	45.23	74.00	54.00	-8.77
4804.00	V	48.62	---	-3.94	44.68	---	74.00	54.00	-9.32
7206.00	V	45.27	---	0.52	45.79	---	74.00	54.00	-8.21
---	---	---	---	---	---	---	---	---	---

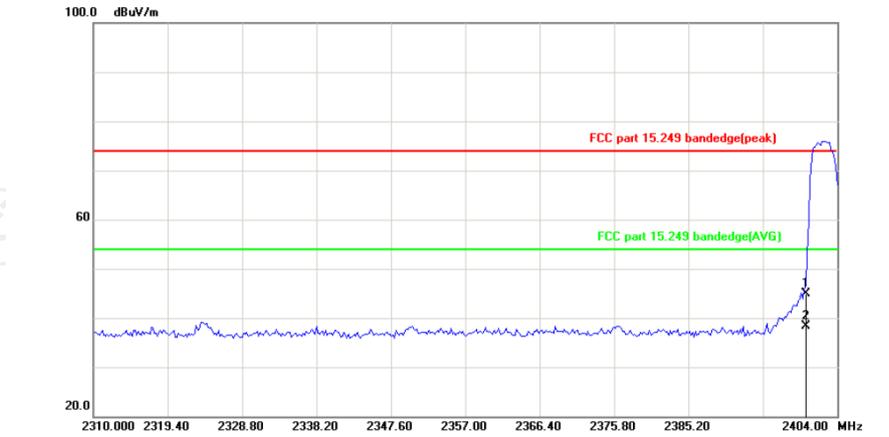
Middle channel: 2440 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
4880.00	H	53.27	---	-3.98	49.29	---	74.00	54.00	-4.71
7320.00	H	48.82	---	0.57	49.39	---	74.00	54.00	-4.61
---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---
4880.00	V	51.09	---	-3.98	47.11	---	74.00	54.00	-6.89
7320.00	V	50.35	---	0.57	50.92	---	74.00	54.00	-3.08
---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---

High channel: 2480 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
4960.00	H	50.62	---	-3.98	46.64	---	74.00	54.00	-7.36
7440.00	H	49.57	---	0.57	50.14	---	74.00	54.00	-3.86
---	---	---	---	---	---	---	---	---	---
4960.00	V	51.83	---	-3.98	47.85	---	74.00	54.00	-6.15
7440.00	V	48.24	---	0.57	48.81	---	74.00	54.00	-5.19
---	---	---	---	---	---	---	---	---	---

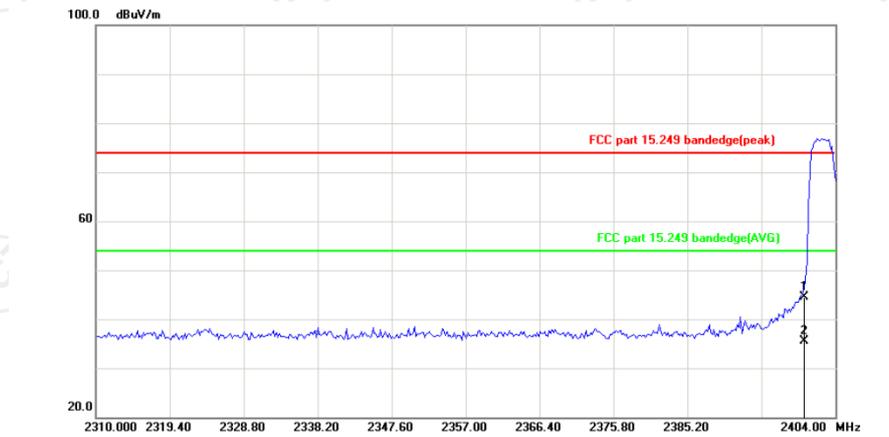
**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB $\mu$ V/m)-Average limit (dB $\mu$ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

**Band Edge Requirement**



Site: Limit: FCC part 15.249 bandedge(peak) Polarization: **Horizontal** Temperature: 25  
Power: DC 3.7V Humidity: 55 %

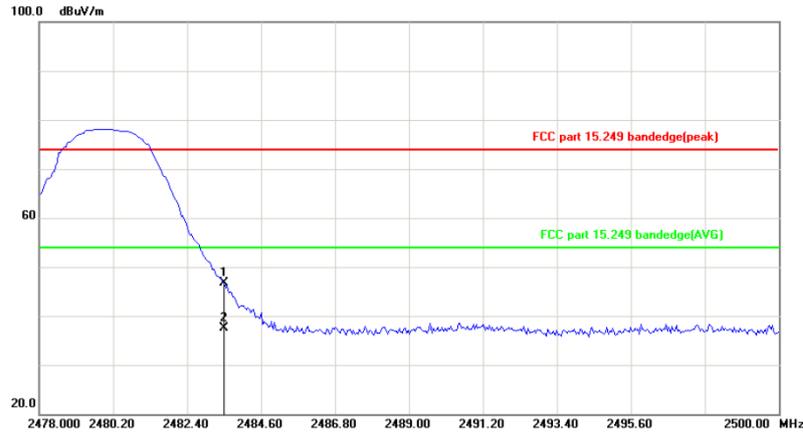


Site: Limit: FCC part 15.249 bandedge(peak) Polarization: **Vertical** Temperature: 25  
Power: DC 3.7V Humidity: 55 %

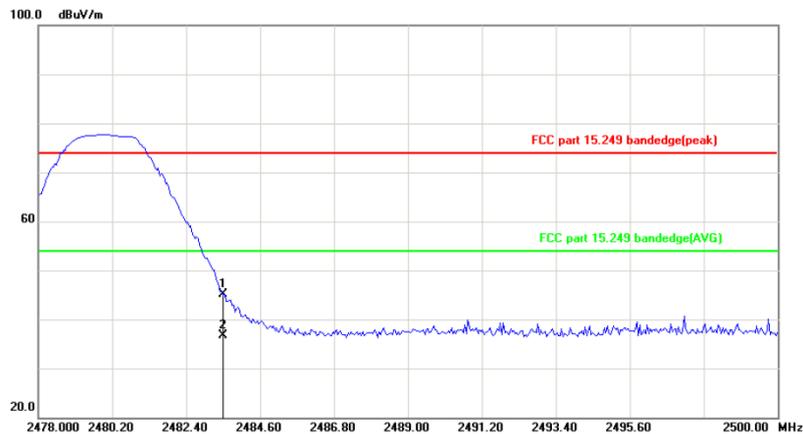
Low channel: 2402 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2400	H	49.13	---	-4.2	44.93	---	74.00	---	-29.07
2400	H	---	42.56	-4.2	---	38.36	---	54.00	-15.64
---	---	---	---	---	---	---	---	---	---
2400	V	48.61	---	-4.2	44.41	---	74.00	---	-29.59
2400	V	---	39.78	-4.2	---	35.58	---	54.00	-18.42
---	---	---	---	---	---	---	---	---	---

**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak/Average)(dBμV/m)-(Peak/Average) limit (dBμV/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.



Site: Limit: FCC part 15.249 bandedge(peak) Polarization: **Horizontal** Temperature: 25 Power: DC 3.7V Humidity: 55 %



Site: Limit: FCC part 15.249 bandedge(peak) Polarization: **Vertical** Temperature: 25 Power: DC 3.7V Humidity: 55 %

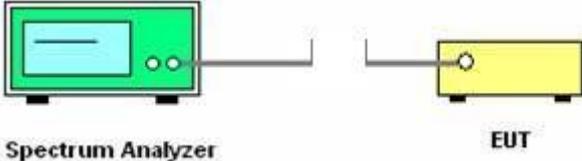
High channel: 2480 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
2483.5	H	50.84	---	-4.2	46.64	---	74.00	---	-27.36
2483.5	H	---	41.63	-4.2	---	37.43	---	54.00	-16.57
---	---	---	---	---	---	---	---	---	---
2483.5	V	49.39	---	-4.2	45.19	---	74.00	---	-28.81
2483.5	V	---	40.82	-4.2	---	36.62	---	54.00	-17.38
---	---	---	---	---	---	---	---	---	---

**Note:**

6. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
7. Margin (dB) = Emission Level (Peak/Average)(dBuV/m)-(Peak/Average) limit (dBuV/m)
8. The emission levels of other frequencies are very lower than the limit and not show in test report.
9. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
10. Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

## 6.4.20dB Occupied Bandwidth

### 6.4.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 C Section 15.215(c)/ Part 2 J Section 2.1049
<b>Test Method:</b>	ANSI C63.10: 2013
<b>Limit:</b>	N/A
	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW<math>\geq</math>1% of the 20 dB bandwidth; VBW<math>\geq</math>RBW; Sweep = auto; Detector function = peak; Trace = max hold.</li> <li>4. Measure and record the results in the test report.</li> </ol>
<b>Test setup:</b>	 <p>The diagram illustrates the test setup. On the left is a green Spectrum Analyzer with a screen and two knobs. A cable connects it to a yellow rectangular box on the right labeled 'EUT'.</p>
<b>Test Mode:</b>	Transmitting mode with modulation
<b>Test results:</b>	PASS

### 6.4.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	200054	Sep. 20, 2019

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

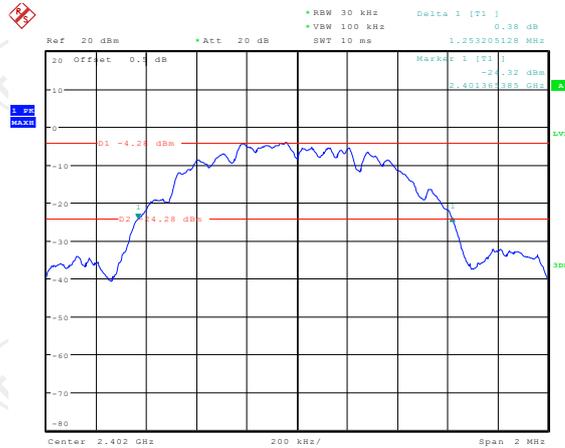
**6.4.3. Test data**

Test Channel	20dB Occupy Bandwidth (kHz)	Limit	Conclusion
Lowest	1253.21	---	PASS
Middle	1266.03	---	PASS
Highest	1275.64	---	PASS

Test plots as follows:

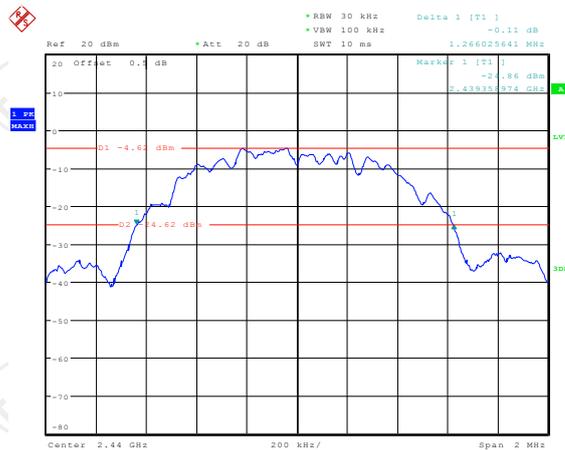


### Lowest channel



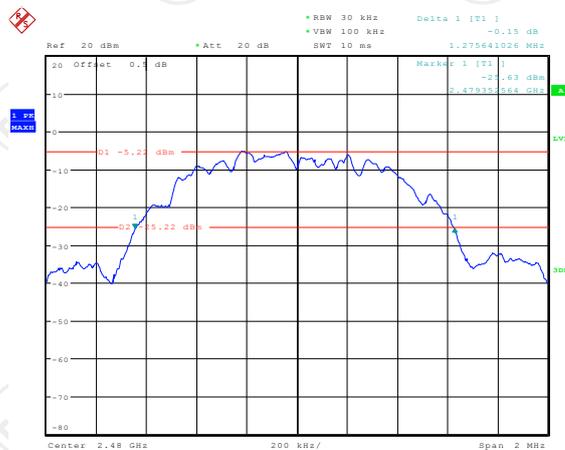
Date: 15.MAR.2019 09:43:17

### Middle channel



Date: 15.MAR.2019 09:44:16

### Highest channel



Date: 15.MAR.2019 09:45:57

## Appendix A: Photographs of Test Setup

Refer to test report TCT190307E002

## Appendix B: Photographs of EUT

Refer to test report TCT190307E002

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