

Report No.: AR/2020/C000203-01

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# **FCC TEST REPORT**

**Application No.:** AR/2020/C0002

Applicant: Xiaomi Communications Co., Ltd.

**Address of Applicant** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China,

100085

Manufacturer: Xiaomi Communications Co., Ltd.

Address of Manufacturer #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China,

100085

**EUT Description:** Mobile Phone Model No.: M2101K9G Trade Mark: **XIAOMI** FCC ID: 2AFZZK9G

Standards: 47 CFR FCC Part 2, Subpart J

47 CFR Part 15, Subpart C

Date of Receipt: 2020/12/21

Date of Test: 2020/12/21 to 2021/1/18

Date of Issue: 2021/4/30

Test Result: PASS \*

In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Derek Yang Wireless Laboratory Manager



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### **Version** 1

Revision Record						
Version	Chapter	Date	Modifier	Remark		
01		2021-01-19		Original		
02		2021/4/30	Kevin.Lan	1.Add test site Information 2.Modify data conversion error of antenna height 3.Update equipment list		

<sup>\*</sup>This report supersedes our previous report AR/2020/C000203, issued on 2021-1-19, which is hereby deemed null and void.

Authorized for issue by:	
Prepared By	Kevin. Lan (Kevin.Lan) /Engineer
Checked By	David Chen (David Chen) /Reviewer



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### **Test Summary** 2

Test Item Test Requirement		Test Method	Test Result	Result	Test Lab*
AC Power Line Conducted Emission	15.207	ANSI C63.10 2013	Clause 4.2	PASS	В
Conducted Output Power	15.247 (b)(3)	ANSI C63.10 2013	Clause 4.3	PASS	А
DTS (6 dB) Bandwidth	15.247 (a)(2)	ANSI C63.10 2013	Clause 4.4	PASS	А
Power Spectral Density	15.247 (e)	ANSI C63.10 2013	Clause 4.5	PASS	Α
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 2013	Clause 4.6	PASS	Α
RF Conducted Spurious Emissions		ANSI C63.10 2013	Clause 4.7	PASS	Α
Radiated Spurious Emissions	15.205/15.209	ANSI C63.10 2013	Clause 4.8	PASS	В
Restricted bands around fundamental frequency (Radiated Emission)	15.205/15.209	ANSI C63.10 2013	Clause 4.9	PASS	В

Remark: All test were performed by Lab A and B.

Parts of test items above were subcontracted to Lab B.

Lab A SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Lab B SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.





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### **General Information** 3

## 3.1 Details of Client

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Address of Applicant	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

## 3.2 Test Location

## Lab A:

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057
Test Engineer	Dee Zheng,Mike Hu

### Lab B:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.		
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China		
Post code:	710086		
Test Engineer	Ben Huang, Leah Chen		





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## 3.3 Test Facility

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

### Lab A:

### • A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA), Certificate No. 3816.01.

### VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

### • FCC -Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

### • Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

### Lab B:

### A2LA (Certificate No. 4854.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

• FCC -Designation Number: CN1271



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## 3.4 General Description of EUT

EUT Description:	Mobile Phone		
Model No.:	M2101K9G		
Trade Mark:	XIAOMI		
Hardware Version:	P2		
Software Version:	MIUI 12		
Operation Frequency:	2400MHz~2483.5MHz fc = 2402 MHz + N * 2 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 39.		
Bluetooth version:	Bluetooth V5.1		
Modulation Type:	GFSK		
Number of Channel:	40		
Sample Type:	⊠ Portable Device, □Module		
Antenna Type:	PIFA Antenna		
Antenna Gain:	-1.8dBi(ANT1);-0.9 dBi(ANT2);		

	Operation Frequency of each 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
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz



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### Remark:

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(CH0)	2402MHz
The Middle channel(CH19)	2440MHz
The Highest channel(CH39)	2480MHz

## 3.5 Test Environment

Operating Environment:		
Temperature:	25.0 °C	
Humidity:	50 % RH	
Atmospheric Pressure:	101.30 KPa	

## 3.6 Description of Support Units

The EUT has been tested independent unit.





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### **Test results and Measurement Data** 4

## 4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

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.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -1.8dBi(ANT1);-0.9dBi(ANT2).



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## 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section	n 15.207	
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Fraguenov rango (MHz)	Limit (d	BuV)
	Frequency range (MHz)	Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the log	arithm of the frequency.	
Test Procedure:	The mains terminal d room.	listurbance voltage test was	conducted in a shielded
	· · · · · · · · · · · · · · · · · · ·		a 50Ω/50μH + 5Ω linear inits of the EUT were in to the ground reference unit being measured. A pultiple power cables to a cot exceeded. It table 0.8m above the rangement, the EUT was better the horizontal ground from the boundary of the erence plane for LISNs is distance was between a the LISN 2. The positions of equipment in the LISN 2.



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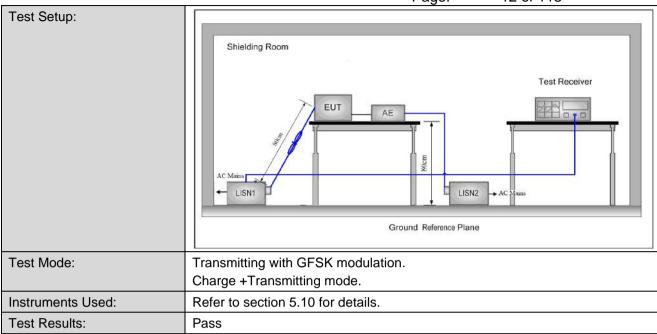
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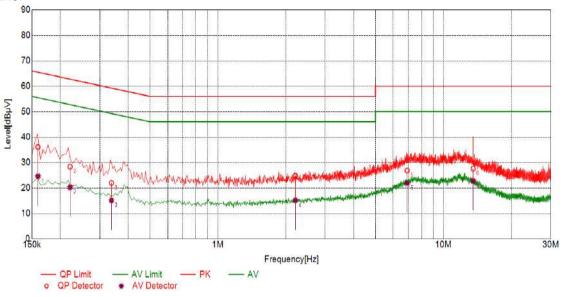
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### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

### Live Line:



## **Test Graph**

Final	Final Data List							
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1596	10.10	36.08	65.49	29.41	24.59	55.49	30.90
2	0.2215	10.10	28.37	62.76	34.39	20.27	52.76	32.49
3	0.3381	10.10	21.96	59.25	37.29	15.14	49.25	34.11
4	2.2081	10.10	24.75	56.00	31.25	15.18	46.00	30.82
5	6.9129	10.10	26.87	60.00	33.13	21.87	50.00	28.13
6	13.5620	10.11	27.59	60.00	32.41	22.81	50.00	27.19



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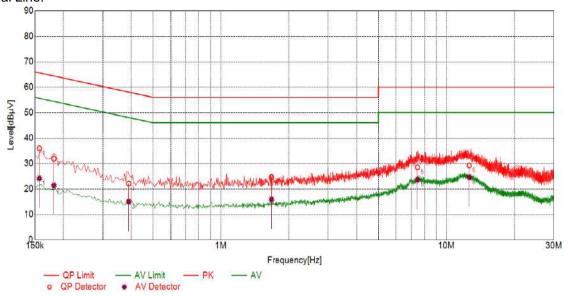
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## Neutral Line:



## **Test Graph**

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	ΑV Limit [dBμV]	AV Margin [dB]
1	0.1571	10.10	35.97	65.61	29.64	24.19	55.61	31.42
2	0.1823	10.10	31.87	64.38	32.51	21.36	54.38	33.02
3	0.3910	10.10	22.10	58.04	35.94	14.99	48.04	33.05
4	1.6787	10.10	24.64	56.00	31.36	15.91	46.00	30.09
5	7.4422	10.10	28.53	60.00	31.47	23.59	50.00	26.41
6	12.6258	10.11	29.22	60.00	30.78	24.59	50.00	25.41

### Remarks:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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# 4.3 Duty Cycle

### 4.3.1 **Test Results**

Test Mode	TX Freq. [MHz]	Duty cycle [%]
BLE_1M	ANT1:CH0, CH19, CH39	61.57
BLE_2M	ANT1:CH0, CH19, CH39	32.41
BLE_1M	ANT2:CH0, CH19, CH39	61.75
BLE_2M	ANT2:CH0, CH19, CH39	32.41





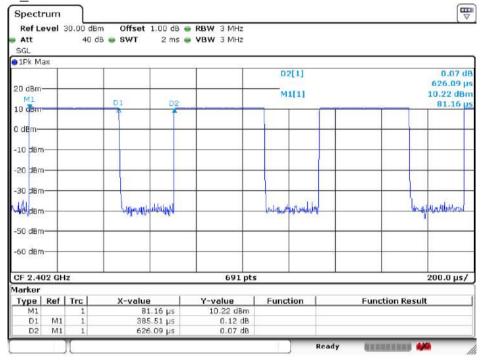
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4.3.2 **Test Plots** 

ANT1 4.3.2.1

## 4.3.2.1.1 BLE 1M



Date: 8.JAN.2021 10:02:31

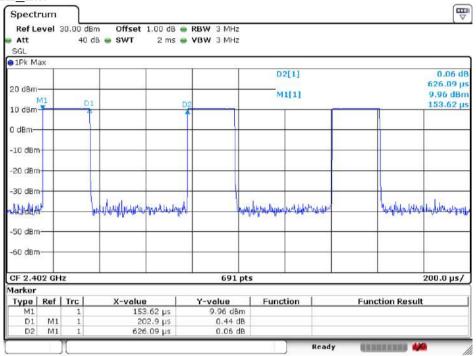




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## 4.3.2.1.2 BLE 2M



Date: 8.JAN.2021 10:02:07



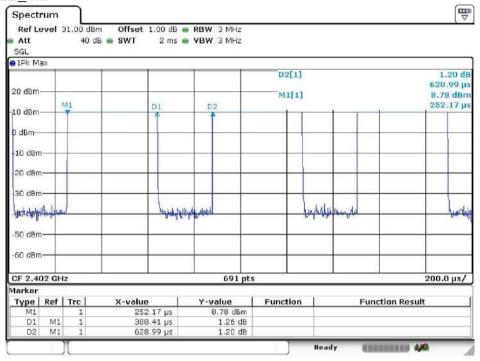


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### ANT2 4.3.2.2

### 4.3.2.2.1 BLE 1M



Date: 14.JAN.2021 11:41:03

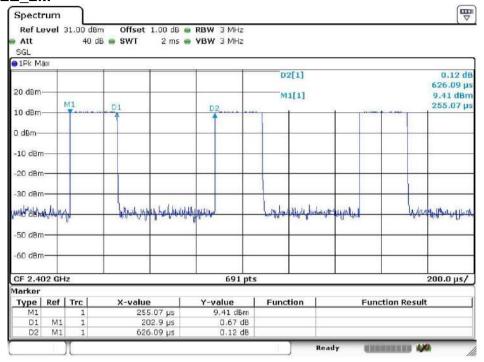




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## 4.3.2.2.2 BLE\_2M



Date: 14.JAN.2021 11:40:42

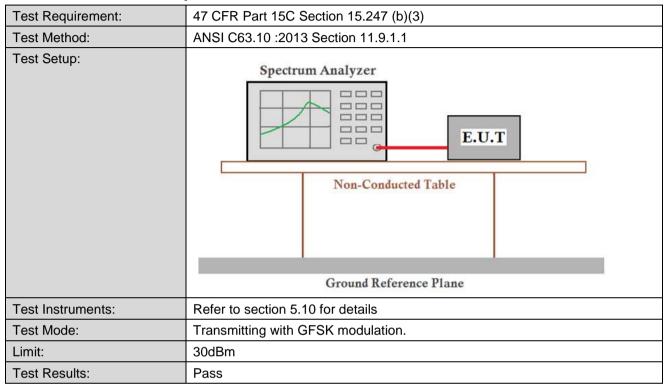




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## 4.4 Conducted Output Power







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#### 4.4.1 **Test Results**

### **Measurement Data of Peak Power:**

### ANT1:

	/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				
	GFSK_1M mode				
	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result	
	Lowest	Lowest 10.44		Pass	
	Middle 11.36		30.00	Pass	
Highest 9.88		30.00	Pass		

	GFSK_2M mode				
	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result	
	Lowest	10.54	30.00	Pass	
	Middle	Middle 11.48		Pass	
Ī	Highest 9.91		30.00	Pass	

### ANTO.

	ANIZ.	VIZ.				
	GFSK_1M mode					
	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest 10.21		30.00	Pass			
Middle 10.83 Highest 8.52		30.00	Pass			
		8.52	30.00	Pass		

GFSK_2M mode				
Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result	
Lowest	10.28	30.00	Pass	
Middle	10.92	30.00	Pass	
Highest 8.58		30.00	Pass	





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#### 4.4.2 **Test Plots**

#### **GFSK 1M ANT1 Lowest Channel** 4.4.2.1



Date: 8 JAN 2021 09:33:12

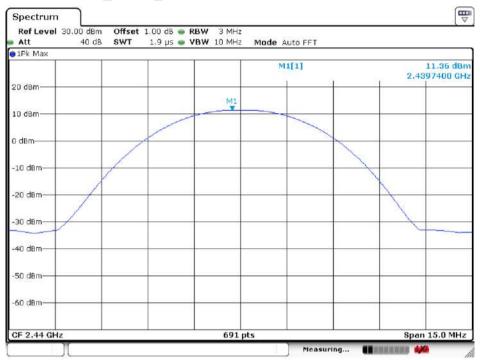




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### **GFSK 1M ANT1 Middle Channel** 4.4.2.2



Date: 8.JAN.2021 09:28:52

### GFSK 1M\_ANT1\_Highest Channel 4.4.2.3



Date: 8.JAN.2021 09:35:55



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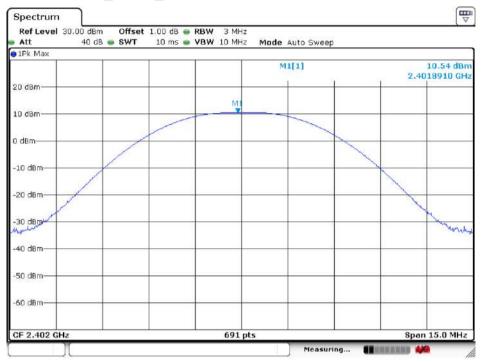
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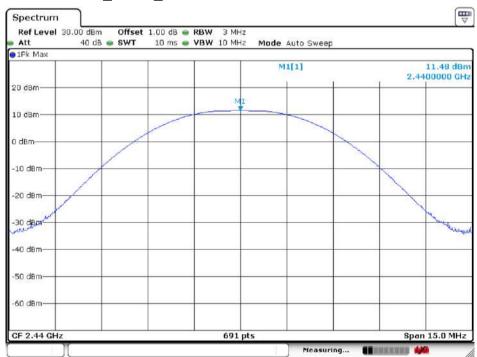
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#### **GFSK 2M ANT1 Lowest Channel** 4.4.2.4



Date: 8.JAN.2021 09:36:32

#### **GFSK 2M ANT1 Middle Channel** 4.4.2.5



Date: 8.JAN.2021 09:36:46



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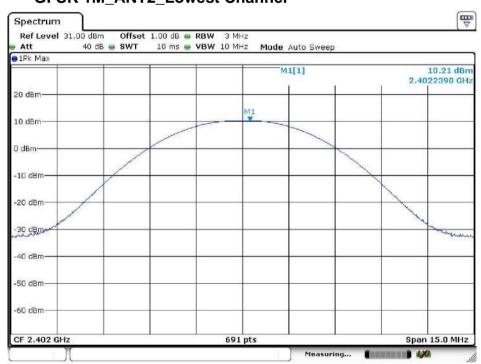
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#### **GFSK 2M ANT1 Highest Channel** 4.4.2.6



Date: 8.JAN.2021 09:37:02

#### **GFSK 1M ANT2 Lowest Channel** 4.4.2.7



Date: 14.JAN.2021 11:25:25



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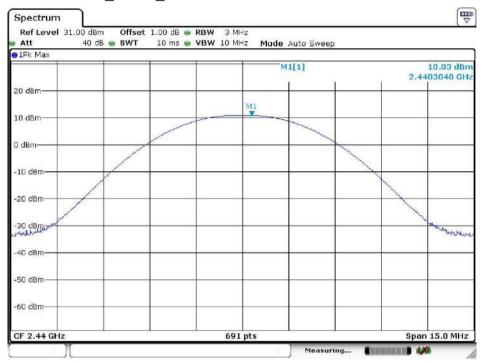
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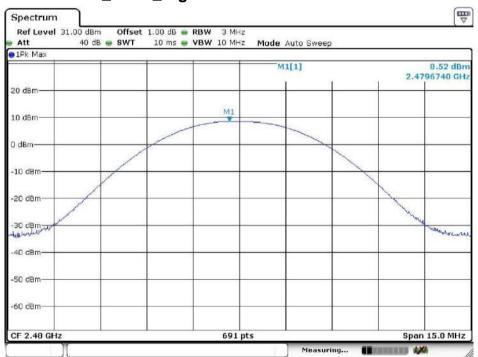
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#### **GFSK 1M ANT2 Middle Channel** 4.4.2.8



Date: 14.JAN.2021 11:26:08

### **GFSK 1M\_ANT2\_Highest Channel** 4.4.2.9



Date: 14.JAN.2021 11:26:31



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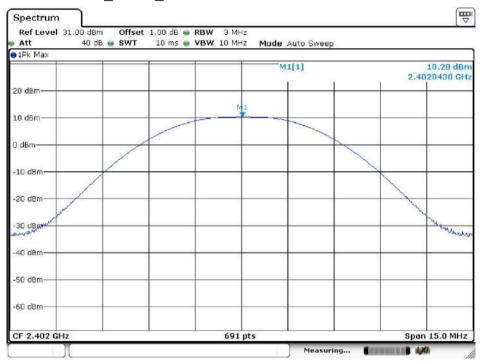
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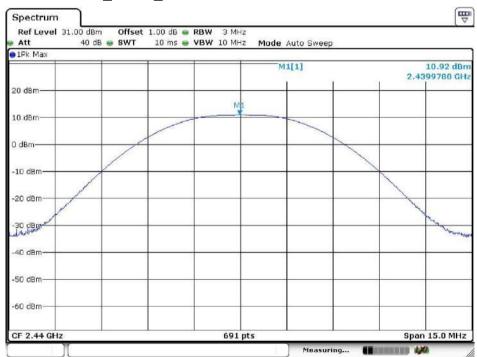
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#### **GFSK 2M ANT2 Lowest Channel** 4.4.2.10



Date: 14.JAN.2021 11:27:06

#### **GFSK 2M ANT2 Middle Channel** 4.4.2.11



Date: 14.JAN.2021 11:27:25



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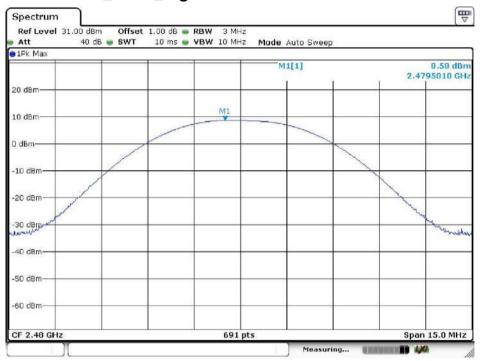
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### **GFSK 2M\_ANT2\_Highest Channel** 4.4.2.12



Date: 14.JAN.2021 11:29:02

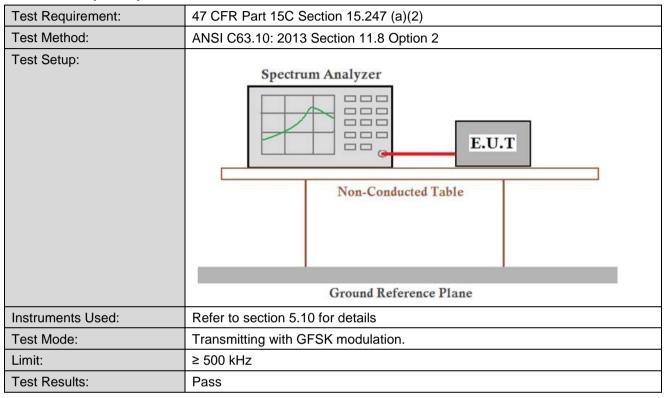




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## 4.5 DTS (6 dB) Bandwidth







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### 4.5.1 **Test Results**

### ANT1:

Mode	Test Channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
	Lowest	0.68	≥500	Pass
GFSK_1M	Middle	0.68	≥500	Pass
	Highest	0.67	≥500	Pass

Mode	Test Channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
	Lowest	1.16	≥500	Pass
GFSK_2M	Middle	1.17	≥500	Pass
	Highest	1.16	≥500	Pass

## ANT2:

Mode	Test Channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
GFSK_1M	Lowest	0.68	≥500	Pass
	Middle	0.67	≥500	Pass
	Highest	0.68	≥500	Pass

Mode	Test Channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
GFSK_2M	Lowest	1.15	≥500	Pass
	Middle	1.17	≥500	Pass
	Highest	1.17	≥500	Pass



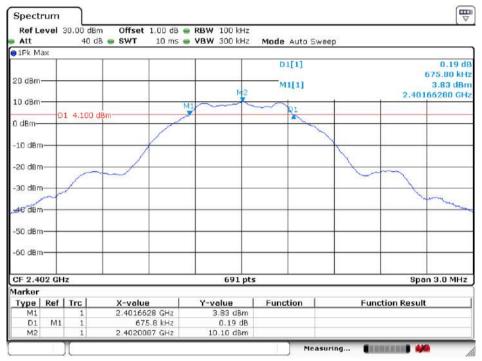


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#### 4.5.2 **Test Plots**

### **GFSK 1M\_ANT1\_Lowest Channel** 4.5.2.1



Date: 8.JAN.2021 09:55:40

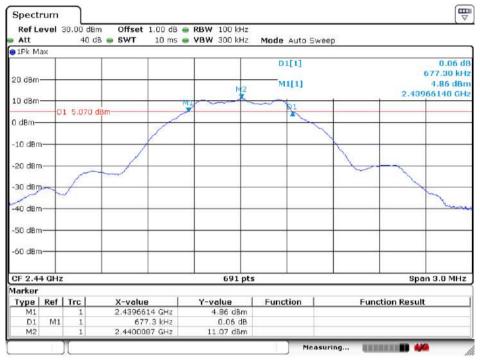




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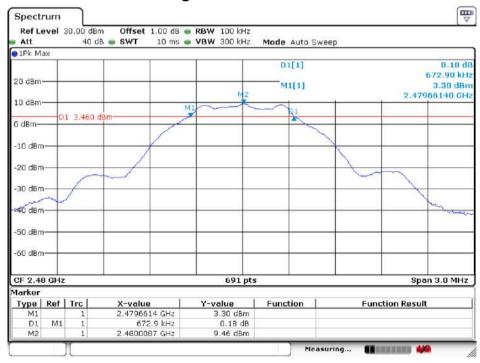
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#### **GFSK 1M ANT1 Middle Channel** 4.5.2.2



Date: 8.JAN.2021 09:56:13

#### GFSK 1M\_ANT1\_Highest Channel 4.5.2.3



Date: 8.JAN.2021 09:56:52



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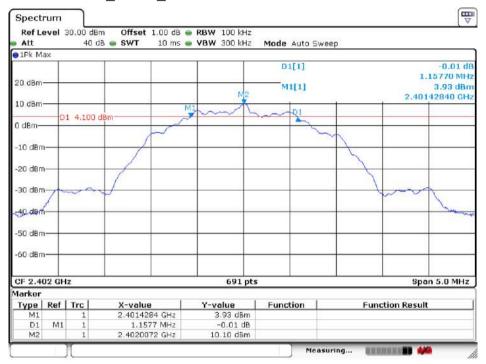
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### **GFSK 2M\_ANT1\_Lowest Channel** 4.5.2.4



Date: 8.JAN.2021 09:55:12

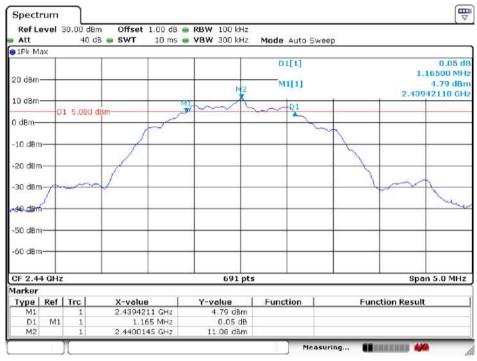




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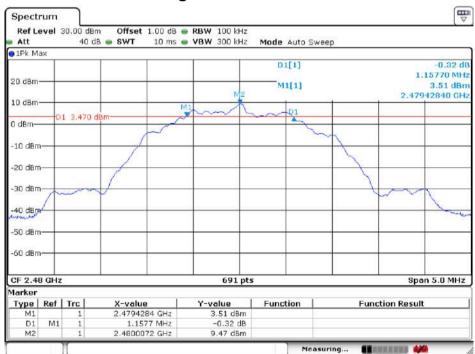
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### **GFSK 2M ANT1 Middle Channel** 4.5.2.5



Date: 8.JAN.2021 09:52:27

#### GFSK 2M\_ANT1\_Highest Channel 4.5.2.6



Date: 8.JAN.2021 09:54:11



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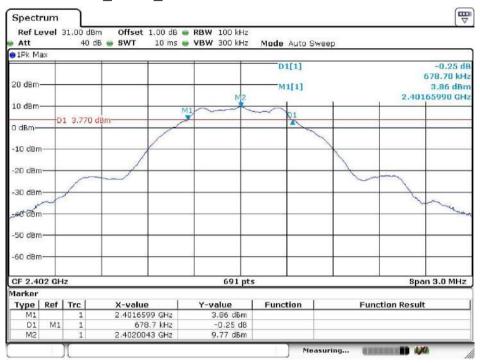
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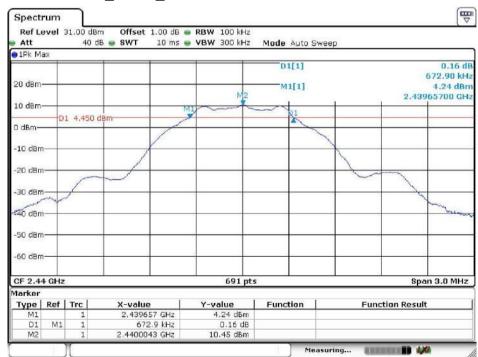
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#### **GFSK 1M ANT2 Lowest Channel** 4.5.2.7



Date: 14.JAN.2021 11:31:00

#### **GFSK 1M ANT2 Middle Channel** 4.5.2.8



Date: 14.JAN.2021 11:31:43



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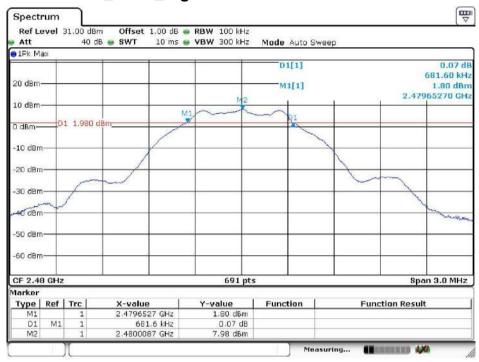
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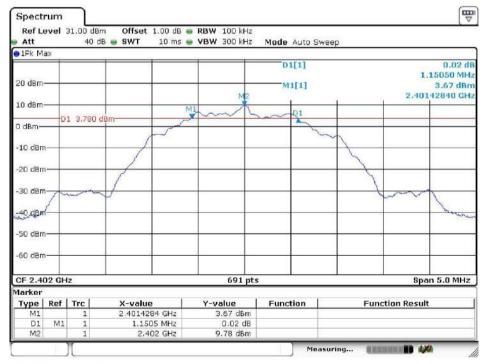
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#### **GFSK 1M ANT2 Highest Channel** 4.5.2.9



Date: 14.JAN.2021 11:32:18

#### **GFSK 2M ANT2 Lowest Channel** 4.5.2.10



Date: 14.JAN.2021 11:32:43



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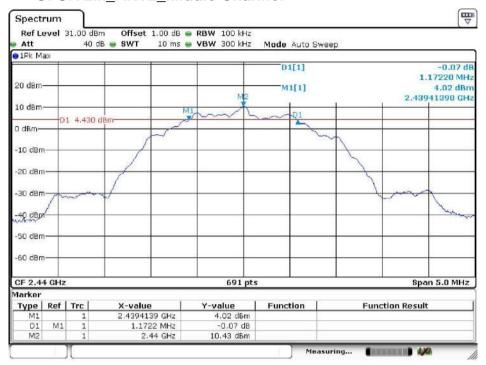
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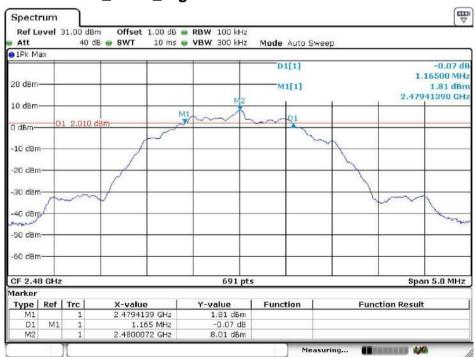
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#### **GFSK 2M ANT2 Middle Channel** 4.5.2.11



Date: 14.JAN.2021 11:33:17

### **GFSK 2M ANT2 Highest Channel** 4.5.2.12



Date: 14.JAN.2021 11:35:25



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## 4.6 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)				
Test Method:	ANSI C63.10 :2013 Section 11.10.2				
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane				
Test Instruments:	Refer to section 5.10 for details				
Test Mode:	Transmitting with GFSK modulation.				
Limit:	≤8.00dBm/3kHz				
Test Results:	Pass				

### **Test Results** 4.6.1

### ANT1:

1111111				
Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
	Lowest	-4.47	≤8.00	Pass
GFSK_1M	Middle	-3.51	≤8.00	Pass
_	Highest	-5.16	≤8.00	Pass

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
GFSK_2M	Lowest	-7.35	≤8.00	Pass
	Middle	-6.40	≤8.00	Pass
	Highest	-8.05	≤8.00	Pass



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### ANT2:

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
	Lowest	-4.70	≤8.00	Pass
GFSK_1M	Middle	-4.11	≤8.00	Pass
	Highest	-6.54	≤8.00	Pass

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
	Lowest	-7.61	≤8.00	Pass
GFSK_2M	Middle	-6.99	≤8.00	Pass
	Highest	-9.43	≤8.00	Pass



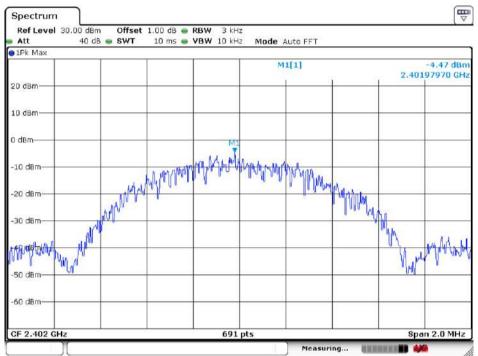


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#### 4.6.2 **Test Plots**

### **GFSK 1M ANT1 Lowest Channel** 4.6.2.1



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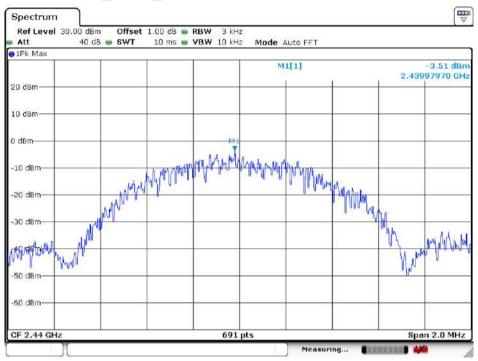




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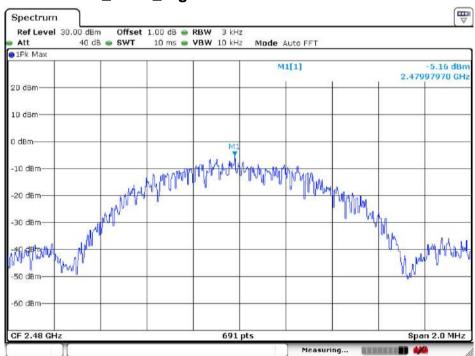
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### **GFSK 1M ANT1 Middle Channel** 4.6.2.2



Date: 8.JAN.2021 09:39:11

#### GFSK 1M\_ANT1\_Highest Channel 4.6.2.3



Date: 8.JAN.2021 09:39:38



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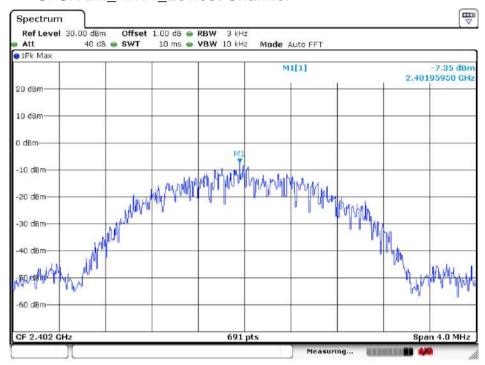
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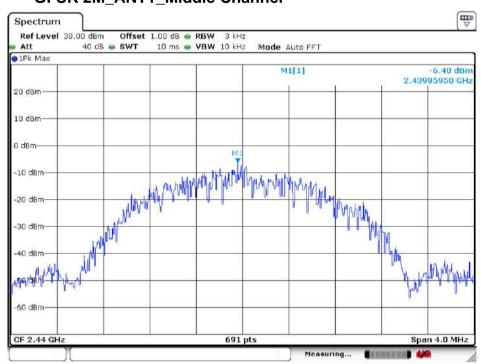
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#### **GFSK 2M ANT1 Lowest Channel** 4.6.2.4



Date: 8.JAN.2021 09:38:46

#### **GFSK 2M ANT1 Middle Channel** 4.6.2.5



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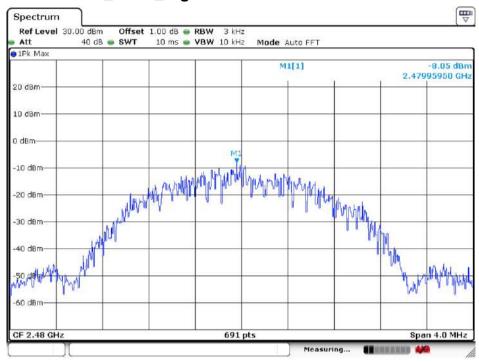
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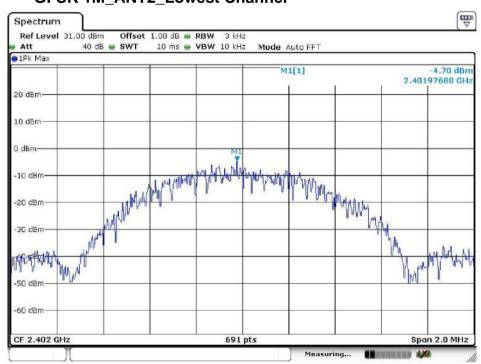
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#### **GFSK 2M ANT1 Highest Channel** 4.6.2.6



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#### **GFSK 1M ANT2 Lowest Channel** 4.6.2.7



Date: 14.JAN.2021 11:30:20



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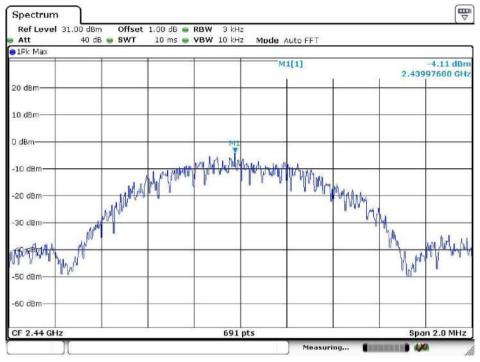
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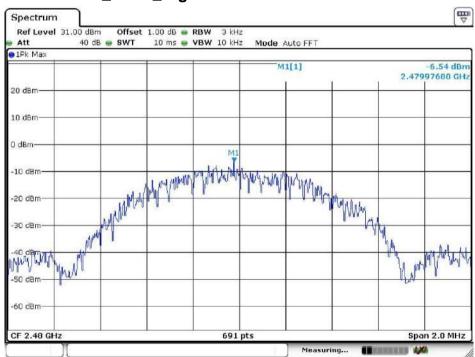
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#### **GFSK 1M ANT2 Middle Channel** 4.6.2.8



Date: 14.JAN.2021 11:30:09

### **GFSK 1M ANT2 Highest Channel** 4.6.2.9



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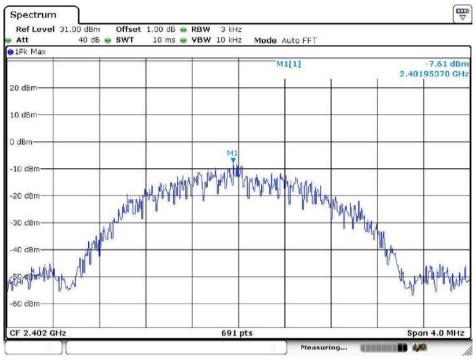
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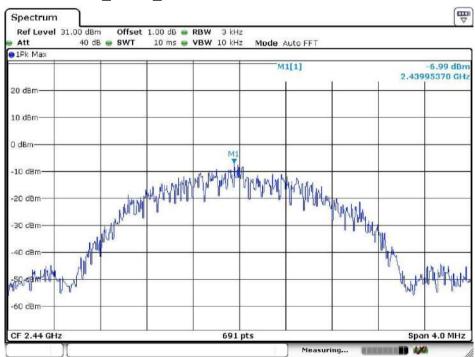
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#### **GFSK 2M ANT2 Lowest Channel** 4.6.2.10



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#### **GFSK 2M ANT2 Middle Channel** 4.6.2.11



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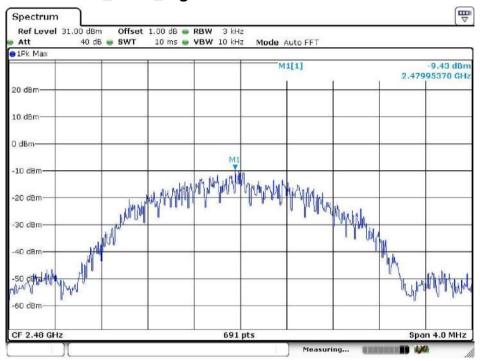
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### **GFSK 2M\_ANT2\_Highest Channel** 4.6.2.12



Date: 14.JAN.2021 11:29:13





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## 4.7 Band-edge for RF Conducted Emissions

	(T. 057) 7		
Test Requirement:	47 CFR Part 15C Section 15.247 (d)		
Test Method:	ANSI C63.10: 2013 Section 11.13		
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table		
	Ground Reference Plane		
Instruments Used:	Refer to section 5.10 for details		
Test Mode:	Transmitting with GFSK modulation.		
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.		
Test Results:	Pass		



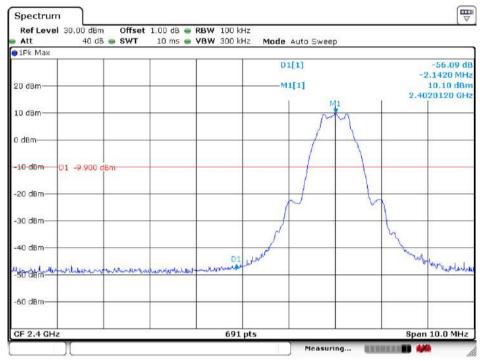


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### 4.7.1 **Test Plots**

### **GFSK 1M ANT1 Lowest Channel** 4.7.1.1



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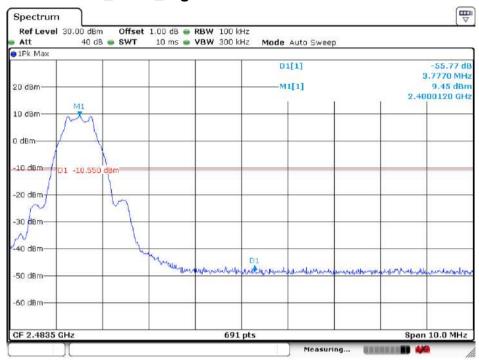




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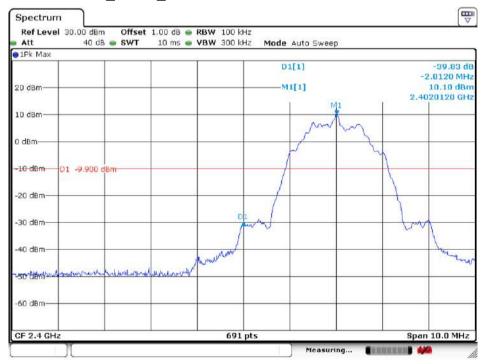
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### **GFSK 1M\_ANT1\_Highest Channel** 4.7.1.2



Date: 8.JAN.2021 09:57:25

#### **GFSK 2M ANT1 Lowest Channel** 4.7.1.3



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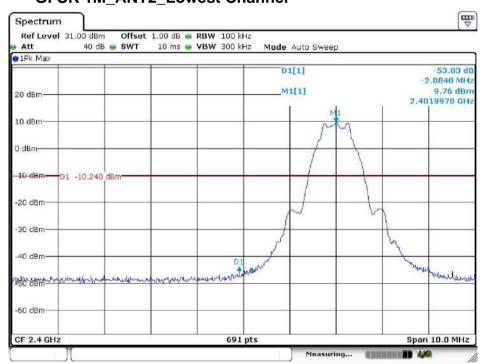
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#### **GFSK 2M ANT1 Highest Channel** 4.7.1.4



Date: 8.JAN.2021 10:00:29

#### **GFSK 1M ANT2 Lowest Channel** 4.7.1.5



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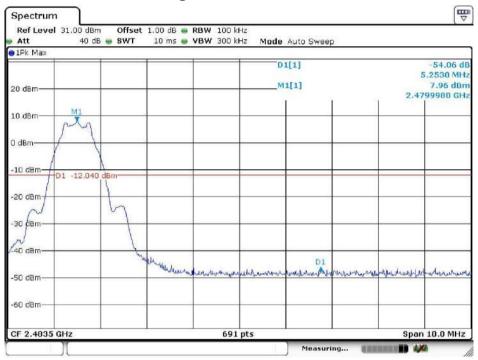
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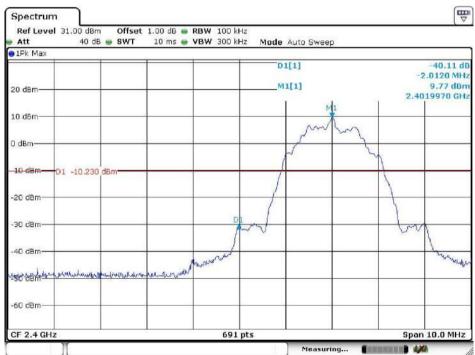
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### **GFSK 1M ANT2 Highest Channel** 4.7.1.6



Date: 14.JAN.2021 11:38:47

#### **GFSK 2M ANT2 Lowest Channel** 4.7.1.7



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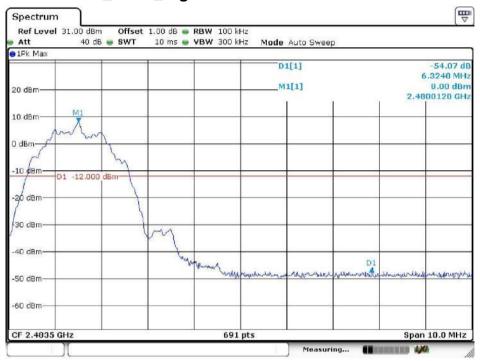
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### **GFSK 2M\_ANT2\_Highest Channel** 4.7.1.8



Date: 14.JAN.2021 11:40:02





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### 4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane
Instruments Used:	Refer to section 5.10 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass



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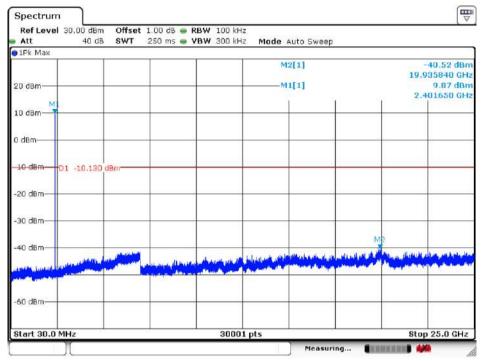


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### 4.8.1 **Test Plots**

### **GFSK 1M ANT1 Lowest Channel** 4.8.1.1



Date: 8.JAN.2021 10:07:58

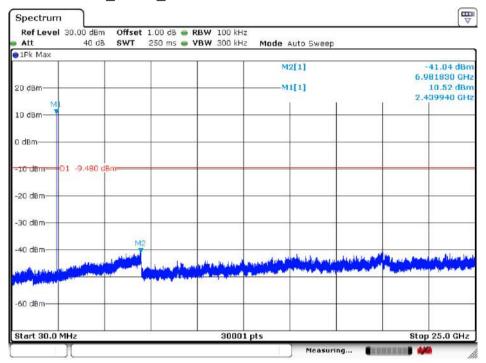




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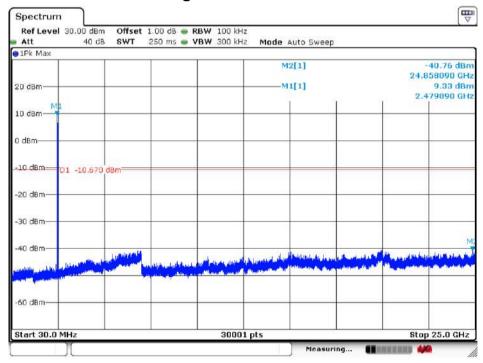
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#### **GFSK 1M ANT1 Middle Channel** 4.8.1.2



Date: 8.JAN.2021 10:08:35

### GFSK 1M\_ANT1\_Highest Channel 4.8.1.3



Date: 8.JAN.2021 10:09:25



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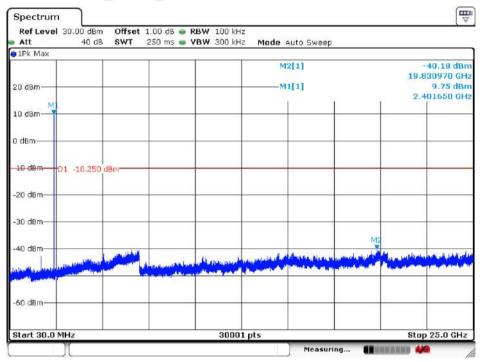
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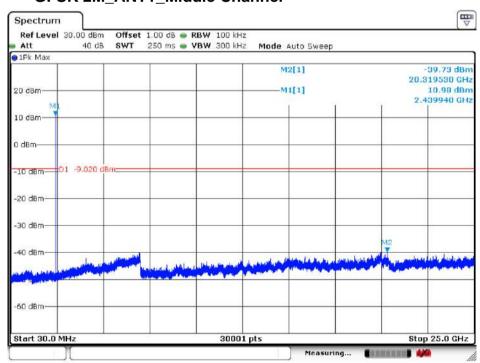
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#### **GFSK 2M ANT1 Lowest Channel** 4.8.1.4



Date: 8.JAN.2021 10:13:17

### **GFSK 2M ANT1 Middle Channel** 4.8.1.5



Date: 8.JAN.2021 10:12:00



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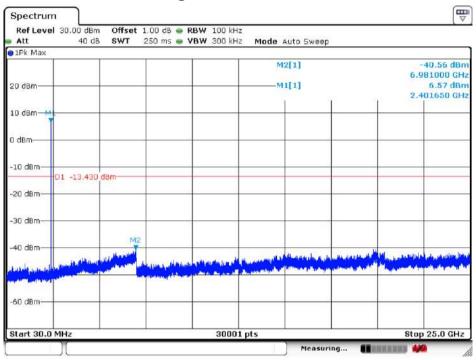
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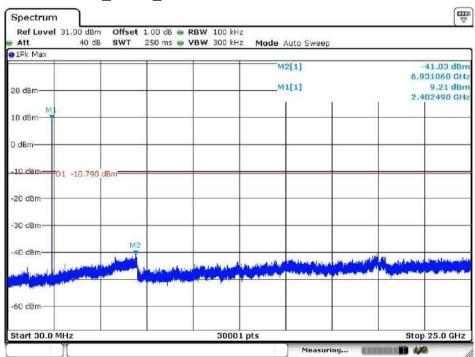
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### **GFSK 2M ANT1 Highest Channel** 4.8.1.6



Date: 8.JAN.2021 10:09:58

#### **GFSK 1M ANT2 Lowest Channel** 4.8.1.7



Date: 14.JAN.2021 11:42:22



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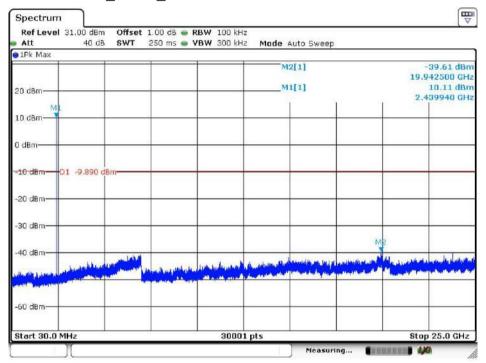
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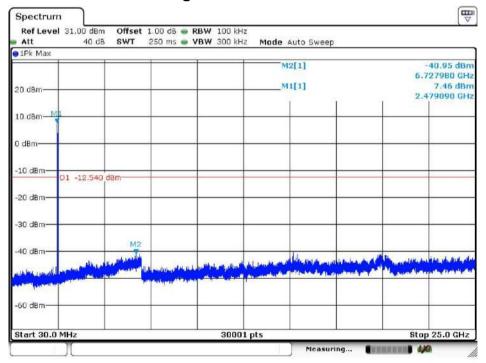
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#### **GFSK 1M ANT2 Middle Channel** 4.8.1.8



Date: 14.JAN 2021 11:43:09

### **GFSK 1M ANT2 Highest Channel** 4.8.1.9



Date: 14.JAN.2021 11:43:36



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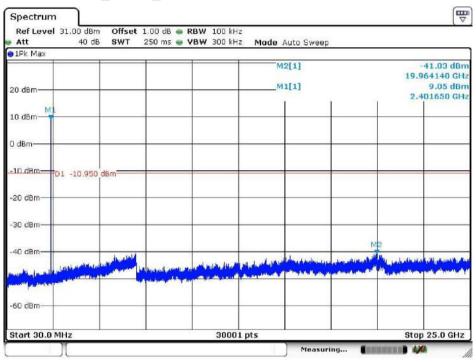
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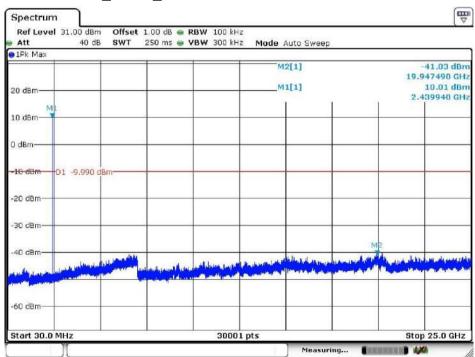
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#### **GFSK 2M ANT2 Lowest Channel** 4.8.1.10



Date: 14.JAN.2021 11:44:36

#### **GFSK 2M ANT2 Middle Channel** 4.8.1.11



Date: 14.JAN.2021 11:45:33



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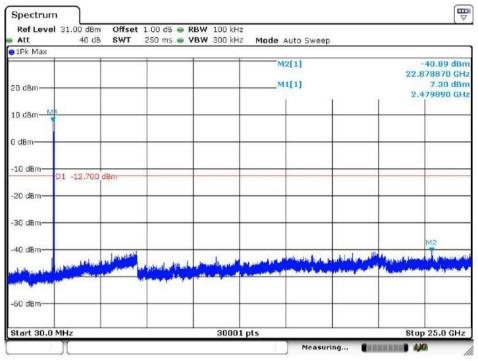
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### **GFSK 2M\_ANT2\_Highest Channel** 4.8.1.12



Date: 14.JAN.2021 11:44:05

### Remark:

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.





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## 4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10 :2013 Section 11.12						
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)						
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark		
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak		
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average		
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak		
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average		
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	30MHz-1GHz	Quasi-peak	100kHz	30kHz	Quasi-peak		
	Above 1GHz	Peak	1MHz	3MHz	Peak		
	Above IGHZ	Peak	1MHz	10Hz	Average		
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)		
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300		
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30		
	1.705MHz-30MHz	30	-	-	30		
	30MHz-88MHz	100	40.0	Quasi-peak	3		
	88MHz-216MHz	150	43.5	Quasi-peak	3		
	216MHz-960MHz	200	46.0	Quasi-peak	3		
	960MHz-1GHz	500	54.0	Quasi-peak	3		
	Above 1GHz	500	54.0	Average	3		
	Remark: 15.35(b),Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.						



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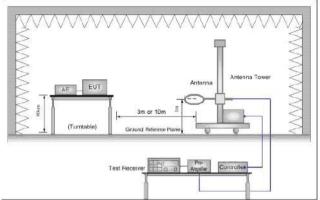
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### Test Setup:



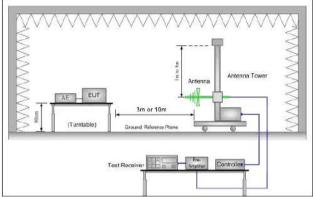


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

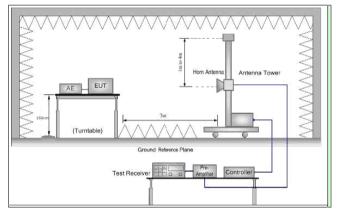


Figure 3. Above 1 GHz

### Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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 the measurement.
- e. Use the following spectrum analyzer settings:
  - Span shall wide enough to fully capture the emission being (1) measured:
  - (2)Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz; VBW ≥ RBW; Sweep = auto;
    - Detector function = peak; Trace = max hold for peak
  - (3)For average measurement: use duty cycle correction factor method per 15.35(c).



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	Fage. 63 01 113
	Duty cycle = On time/100 milliseconds
	On time = N 1 *L 1 +N 2 *L 2 ++N n-1 *LN n-1 +N n *L n
	Where N 1 is number of type 1 pulses, L 1 is length of type 1 pulses, etc.
	Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
	f. 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(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	h. 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.
	<ul> <li>i. Test the EUT in the lowest channel, the middle channel ,the Highest channel.</li> <li>j. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</li> </ul>
	k. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with GFSK modulation.
, ,	Charge + Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation.
	Pretest the EUT at Charge + Transmitting mode,
	For below 1GHz part, through pre-scan, the worst case is the lowest channel.
	Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



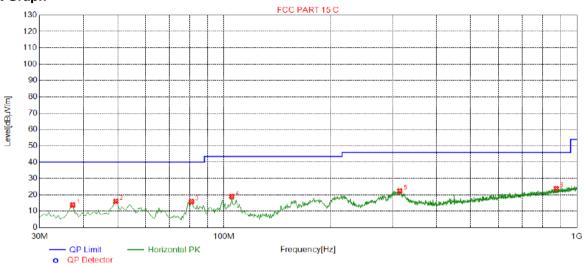


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### **Radiated Emission below 1GHz** 4.9.1 4.9.1.1 Charge + Transmitting

**Test Graph** 



**Suspected List** 

Suspe	Suspected List						
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.2786	13.76	40.00	26.24	245	260	Horizontal
2	49.4097	16.06	40.00	23.94	139	257	Horizontal
3	80.9505	15.91	40.00	24.09	122	260	Horizontal
4	105.2126	18.92	43.50	24.58	226	96	Horizontal
5	314.8374	22.42	46.00	23.58	247	167	Horizontal
6	874.3222	23.86	46.00	22.14	169	96	Horizontal

**Final Data List** 

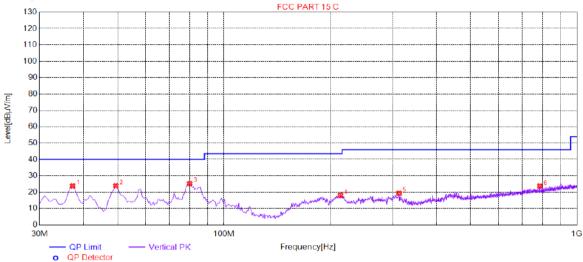




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### **Test Graph**



Suspected List

	tou List							
Suspe	Suspected List							
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	37.2786	23.80	40.00	16.20	167	236	Vertical	
2	49.4097	23.94	40.00	16.06	264	329	Vertical	
3	79.9800	25.29	40.00	14.71	261	239	Vertical	
4	213.9070	18.09	43.50	25.41	183	304	Vertical	
5	313.3817	19.36	46.00	26.64	225	326	Vertical	
6	785.0375	23.72	46.00	22.28	185	155	Vertical	

**Final Data List** 

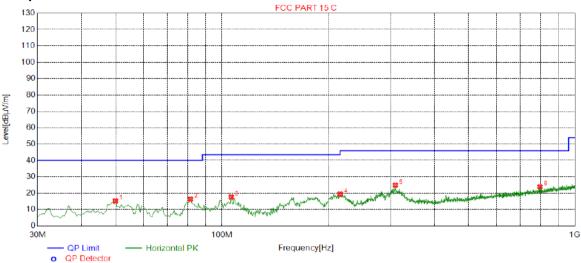




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### **Test Graph**



Suspected List

	tou List							
Suspe	Suspected List							
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	49.8949	15.24	40.00	24.76	133	250	Horizontal	
2	81.4357	16.40	40.00	23.60	212	244	Horizontal	
3	106.1831	17.66	43.50	25.84	135	250	Horizontal	
4	216.3332	19.52	46.00	26.48	223	210	Horizontal	
5	309.9850	24.92	46.00	21.08	233	338	Horizontal	
6	796.1981	23.88	46.00	22.12	107	7	Horizontal	

**Final Data List** 

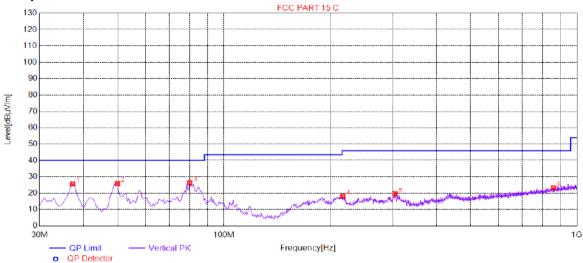




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### **Test Graph**



Suspected List

Outspectica List									
Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	37.2786	25.66	40.00	14.34	297	338	Vertical		
2	49.8949	25.91	40.00	14.09	233	360	Vertical		
3	79.9800	26.47	40.00	13.53	259	226	Vertical		
4	217.3037	18.12	46.00	27.88	205	37	Vertical		
5	305.1326	19.74	46.00	26.26	271	359	Vertical		
6	858.7944	23.36	46.00	22.64	231	121	Vertical		

**Final Data List** 



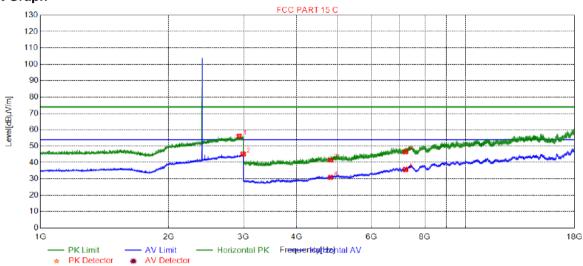


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### 4.9.2 **Transmitter Emission above 1GHz** 4.9.2.1BLE 1M Channel 0 ANT1

### **Test Graph**



### Suspected List

dispected List									
Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2931.983	56.08	74.00	17.92	242	0	Horizontal		
2	2993.998	45.23	54.00	8.77	170	74	Horizontal		
3	4804.000	41.53	74.00	32.47	187	329	Horizontal		
4	4804.000	30.93	54.00	23.07	227	312	Horizontal		
5	7206.000	35.75	54.00	18.25	142	105	Horizontal		
6	7206.000	46.68	74.00	27.32	217	19	Horizontal		

Final Data List



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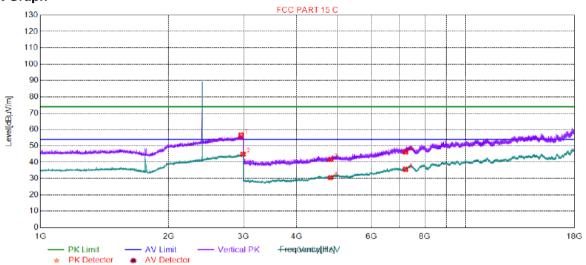


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### 4.9.2.2BLE 1M Channel 0 ANT1

### **Test Graph**



**Suspected List** 

Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2961.490	56.61	74.00	17.39	204	42	Vertical		
2	2991.998	44.91	54.00	9.09	267	266	Vertical		
3	4804.000	41.81	74.00	32.19	273	255	Vertical		
4	4804.000	30.55	54.00	23.45	272	237	Vertical		
5	7206.000	35.66	54.00	18.34	279	203	Vertical		
6	7206.000	46.30	74.00	27.70	274	255	Vertical		

**Final Data List** 



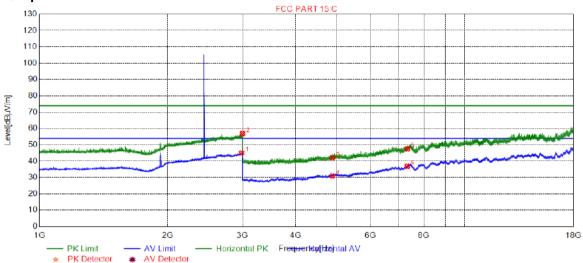


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### 4.9.2.3BLE 1M Channel 19 ANT1

### **Test Graph**



**Suspected List** 

Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2984.496	45.06	54.00	8.94	106	121	Horizontal		
2	3000.000	56.94	74.00	17.06	185	220	Horizontal		
3	4880.000	42.13	74.00	31.87	129	226	Horizontal		
4	4880.000	30.93	54.00	23.07	112	87	Horizontal		
5	7320.000	47.59	74.00	26.41	172	191	Horizontal		
6	7320.000	36.90	54.00	17.10	192	36	Horizontal		

**Final Data List** 



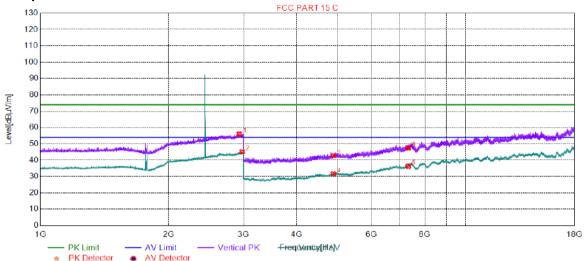


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### 4.9.2.4BLE 1M Channel 19 ANT1

### **Test Graph**



**Suspected List** 

Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2931.983	56.11	74.00	17.89	193	249	Vertical		
2	2978.494	45.24	54.00	8.76	170	4	Vertical		
3	4880.000	42.80	74.00	31.20	265	65	Vertical		
4	4880.000	31.69	54.00	22.31	236	134	Vertical		
5	7320.000	36.29	54.00	17.71	165	82	Vertical		
6	7320.000	47.53	74.00	26.47	186	254	Vertical		

**Final Data List** 



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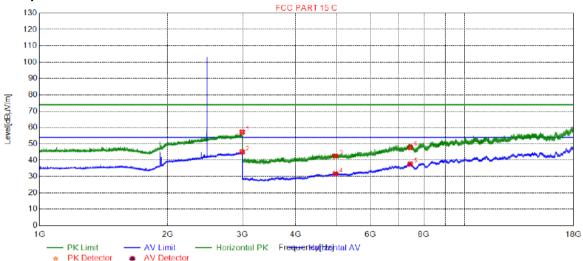


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### 4.9.2.5BLE 1M Channel 39 ANT1

### **Test Graph**



**Suspected List** 

Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2994.498	57.16	74.00	16.84	129	120	Horizontal		
2	2994.498	45.13	54.00	8.87	197	156	Horizontal		
3	4960.000	42.51	74.00	31.49	244	87	Horizontal		
4	4960.000	31.72	54.00	22.28	114	260	Horizontal		
5	7440.000	37.62	54.00	16.38	177	260	Horizontal		
6	7440.000	47.87	74.00	26.13	137	294	Horizontal		

**Final Data List** 



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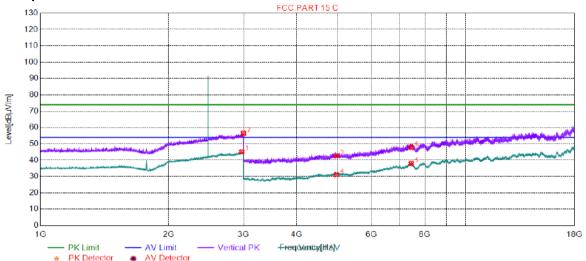


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### 4.9.2.6BLE 1M Channel 39 ANT1

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2972.493	45.20	54.00	8.80	178	316	Vertical				
2	3000.000	56.53	74.00	17.47	221	289	Vertical				
3	4960.000	42.66	74.00	31.34	157	290	Vertical				
4	4960.000	31.14	54.00	22.86	152	31	Vertical				
5	7440.000	38.00	54.00	16.00	226	237	Vertical				
6	7440.000	47.96	74.00	26.04	255	14	Vertical				

**Final Data List** 



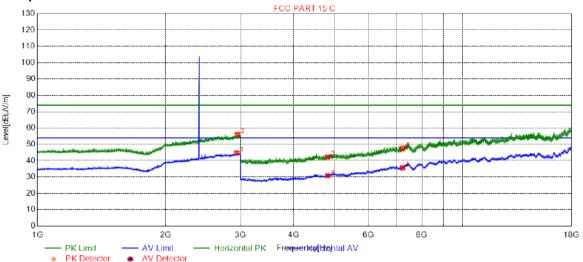


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### **BLE 2M Channel 0 ANT1**

### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2937.484	44.83	54.00	9.17	217	43	Horizontal				
2	2948.487	56.06	74.00	17.94	178	158	Horizontal				
3	4804.000	42.27	74.00	31.73	215	209	Horizontal				
4	4804.000	30.87	54.00	23.13	235	19	Horizontal				
5	7206.000	35.68	54.00	18.32	204	243	Horizontal				
6	7206.000	47.69	74.00	26.31	172	36	Horizontal				

**Final Data List** 



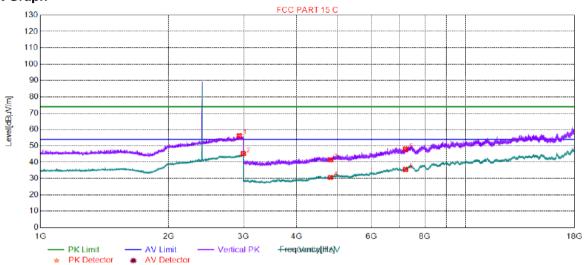


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### 4.9.2.2BLE 2M Channel 0 ANT1

### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2934.483	56.25	74.00	17.75	278	14	Vertical				
2	2996.499	45.34	54.00	8.66	177	304	Vertical				
3	4804.000	41.40	74.00	32.60	277	359	Vertical				
4	4804.000	30.68	54.00	23.32	163	359	Vertical				
5	7206.000	35.58	54.00	18.42	180	152	Vertical				
6	7206.000	48.03	74.00	25.97	184	186	Vertical				

Final Data List



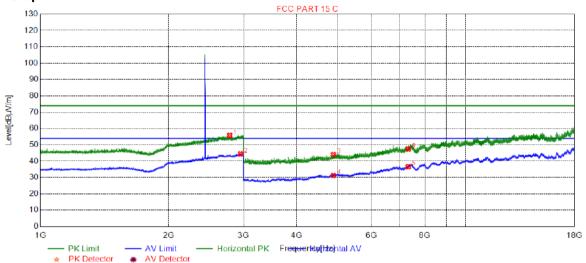


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### 4.9.2.3BLE 2M Channel 19 ANT1

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2784.446	55.80	74.00	18.20	166	326	Horizontal				
2	2951.988	44.50	54.00	9.50	150	300	Horizontal				
3	4880.000	44.14	74.00	29.86	238	34	Horizontal				
4	4880.000	31.25	54.00	22.75	136	121	Horizontal				
5	7320.000	36.65	54.00	17.35	217	52	Horizontal				
6	7320.000	47.45	74.00	26.55	237	69	Horizontal				

**Final Data List** 



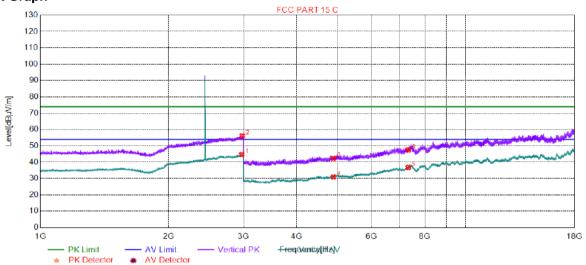


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### 4.9.2.4BLE 2M Channel 19 ANT1

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2972.493	44.75	54.00	9.25	150	45	Vertical				
2	2980.495	56.12	74.00	17.88	284	149	Vertical				
3	4880.000	42.29	74.00	31.71	295	66	Vertical				
4	4880.000	30.94	54.00	23.06	174	83	Vertical				
5	7320.000	36.81	54.00	17.19	237	272	Vertical				
6	7320.000	47.53	74.00	26.47	180	169	Vertical				

**Final Data List** 



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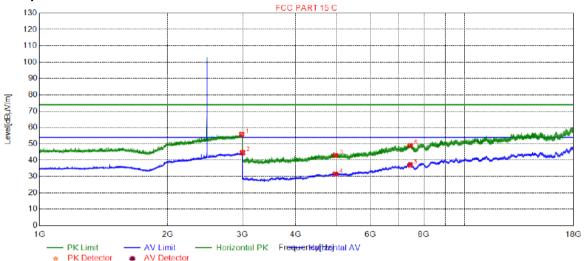


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### 4.9.2.5BLE 2M Channel 39 ANT1

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2985.996	55.77	74.00	18.23	200	105	Horizontal				
2	2999.499	44.63	54.00	9.37	151	225	Horizontal				
3	4960.000	42.97	74.00	31.03	169	137	Horizontal				
4	4960.000	31.49	54.00	22.51	163	311	Horizontal				
5	7440.000	37.13	54.00	16.87	199	155	Horizontal				
6	7440.000	48.90	74.00	25.10	151	346	Horizontal				

**Final Data List** 



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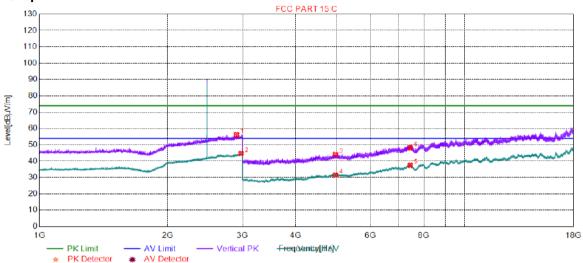


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### 4.9.2.6BLE 2M Channel 39 ANT1

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2904.476	56.27	74.00	17.73	255	93	Vertical			
2	2977.994	44.82	54.00	9.18	158	347	Vertical			
3	4960.000	44.16	74.00	29.84	299	117	Vertical			
4	4960.000	31.52	54.00	22.48	242	82	Vertical			
5	7440.000	37.46	54.00	16.54	298	100	Vertical			
6	7440.000	48.22	74.00	25.78	161	100	Vertical			

**Final Data List** 



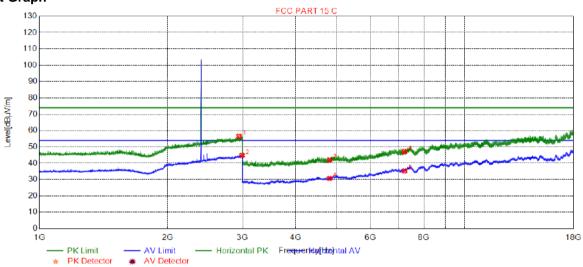


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#### BLE\_1M\_Channel 0 ANT2 4.9.2.1

### **Test Graph**



#### **Suspected List**

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2942.985	56.52	74.00	17.48	210	325	Horizontal				
2	2992.498	44.86	54.00	9.14	234	172	Horizontal				
3	4804.000	42.00	74.00	32.00	236	54	Horizontal				
4	4804.000	30.72	54.00	23.28	137	346	Horizontal				
5	7206.000	35.33	54.00	18.67	218	1	Horizontal				
6	7206.000	47.07	74.00	26.93	132	260	Horizontal				

**Final Data List** 



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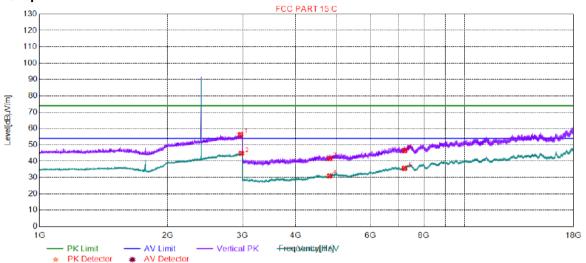


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### 4.9.2.2BLE 1M Channel 0 ANT2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2969.492	56.31	74.00	17.69	267	119	Vertical				
2	2982.495	44.85	54.00	9.15	275	56	Vertical				
3	4804.000	41.64	74.00	32.36	250	117	Vertical				
4	4804.000	30.97	54.00	23.03	249	185	Vertical				
5	7206.000	35.64	54.00	18.36	222	254	Vertical				
6	7206.000	46.53	74.00	27.47	153	31	Vertical				

**Final Data List** 



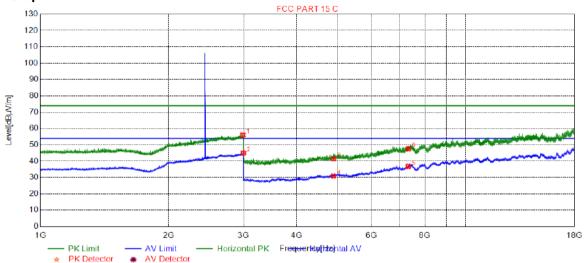


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### 4.9.2.3BLE 1M Channel 19 ANT2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2988.497	56.06	74.00	17.94	208	81	Horizontal			
2	2997.999	45.02	54.00	8.98	210	113	Horizontal			
3	4880.000	41.48	74.00	32.52	194	20	Horizontal			
4	4880.000	30.92	54.00	23.08	187	88	Horizontal			
5	7320.000	36.84	54.00	17.16	135	260	Horizontal			
6	7320.000	47.62	74.00	26.38	181	123	Horizontal			

**Final Data List** 



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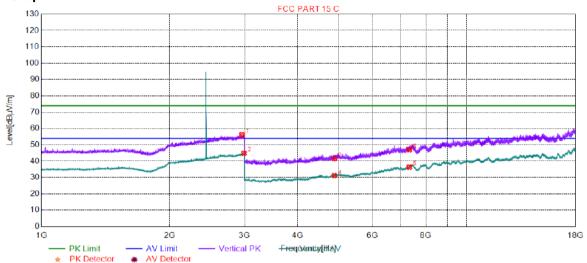


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### 4.9.2.4BLE 1M Channel 19 ANT2

### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2958.489	56.26	74.00	17.74	278	182	Vertical			
2	2990.997	44.90	54.00	9.10	232	95	Vertical			
3	4880.000	41.57	74.00	32.43	252	357	Vertical			
4	4880.000	31.18	54.00	22.82	211	340	Vertical			
5	7320.000	36.35	54.00	17.65	251	168	Vertical			
6	7320.000	47.10	74.00	26.90	235	271	Vertical			

**Final Data List** 



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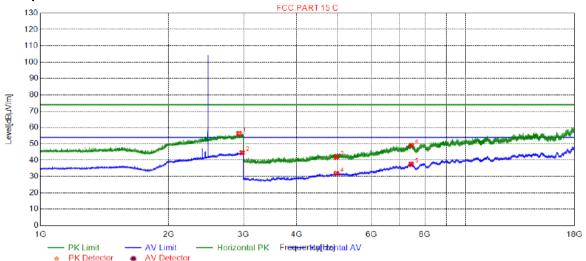


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### 4.9.2.5BLE 1M Channel 39 ANT2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2929.482	56.35	74.00	17.65	191	146	Horizontal				
2	2978.494	44.60	54.00	9.40	148	331	Horizontal				
3	4960.000	41.98	74.00	32.02	167	19	Horizontal				
4	4960.000	31.89	54.00	22.11	246	294	Horizontal				
5	7440.000	37.47	54.00	16.53	106	243	Horizontal				
6	7440.000	49.01	74.00	24.99	248	19	Horizontal				

**Final Data List** 



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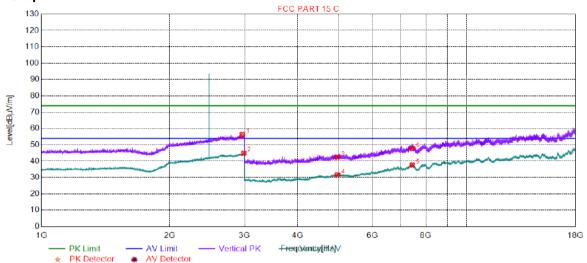


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### 4.9.2.6BLE 1M Channel 39 ANT2

### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2965.491	56.34	74.00	17.66	187	291	Vertical			
2	2988.997	44.92	54.00	9.08	182	204	Vertical			
3	4960.000	42.41	74.00	31.59	179	14	Vertical			
4	4960.000	31.74	54.00	22.26	168	82	Vertical			
5	7440.000	37.62	54.00	16.38	163	117	Vertical			
6	7440.000	47.79	74.00	26.21	283	65	Vertical			

**Final Data List** 



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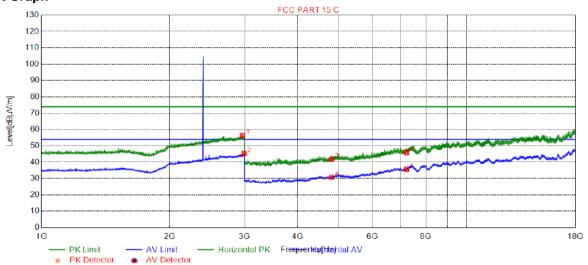


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#### **BLE 2M Channel 0 ANT2** 4.9.2.1

### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2967.992	56.36	74.00	17.64	165	89	Horizontal			
2	2993.498	45.43	54.00	8.57	151	178	Horizontal			
3	4804.000	41.92	74.00	32.08	245	122	Horizontal			
4	4804.000	30.73	54.00	23.27	191	53	Horizontal			
5	7206.000	35.63	54.00	18.37	149	346	Horizontal			
6	7206.000	45.89	74.00	28.11	213	346	Horizontal			

**Final Data List** 



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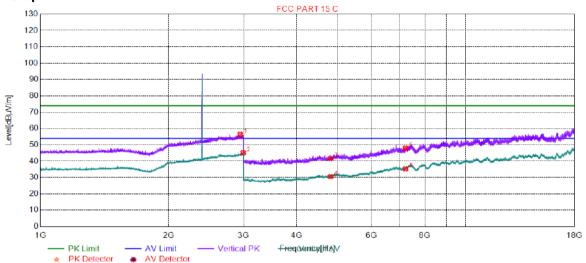


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### 4.9.2.2BLE 2M Channel 0 ANT2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2946.486	56.47	74.00	17.53	230	213	Vertical			
2	2994.998	45.18	54.00	8.82	211	335	Vertical			
3	4804.000	41.72	74.00	32.28	299	324	Vertical			
4	4804.000	30.58	54.00	23.42	258	65	Vertical			
5	7206.000	35.34	54.00	18.66	267	237	Vertical			
6	7206.000	47.98	74.00	26.02	236	168	Vertical			

**Final Data List** 



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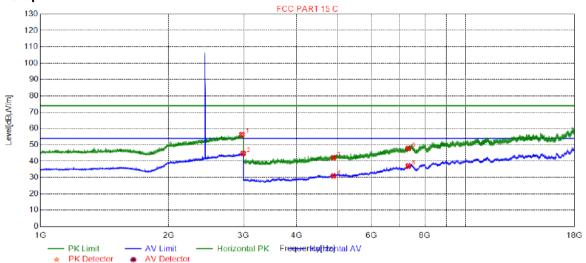


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### 4.9.2.3BLE 2M Channel 19 ANT2

### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2974.993	56.31	74.00	17.69	215	115	Horizontal			
2	2994.998	44.81	54.00	9.19	234	331	Horizontal			
3	4880.000	42.10	74.00	31.90	158	346	Horizontal			
4	4880.000	30.96	54.00	23.04	113	86	Horizontal			
5	7320.000	37.06	54.00	16.94	119	208	Horizontal			
6	7320.000	47.83	74.00	26.17	172	86	Horizontal			

**Final Data List** 



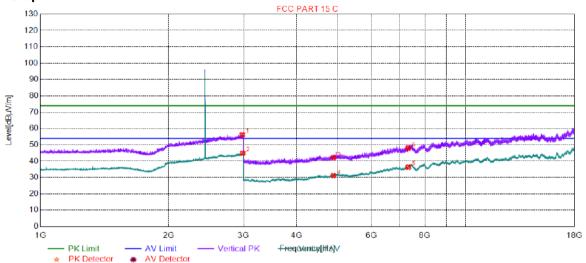


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### 4.9.2.4BLE 2M Channel 19 ANT2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2980.495	56.21	74.00	17.79	217	214	Vertical			
2	2987.496	44.97	54.00	9.03	156	46	Vertical			
3	4880.000	42.19	74.00	31.81	248	240	Vertical			
4	4880.000	31.16	54.00	22.84	270	14	Vertical			
5	7320.000	36.35	54.00	17.65	246	188	Vertical			
6	7320.000	48.09	74.00	25.91	267	309	Vertical			

**Final Data List** 



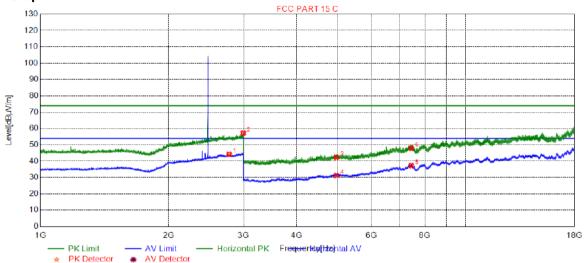


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### 4.9.2.5BLE 2M Channel 39 ANT2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2775.944	44.21	54.00	9.79	177	0	Horizontal			
2	2996.499	57.20	74.00	16.80	134	58	Horizontal			
3	4960.000	42.30	74.00	31.70	116	138	Horizontal			
4	4960.000	31.27	54.00	22.73	167	243	Horizontal			
5	7440.000	37.27	54.00	16.73	191	156	Horizontal			
6	7440.000	47.99	74.00	26.01	205	138	Horizontal			

**Final Data List** 



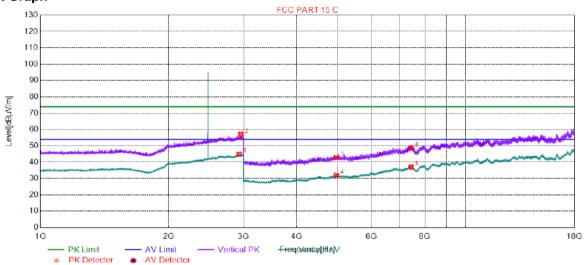


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### 4.9.2.6BLE 2M Channel 39 ANT2

### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2932.483	45.03	54.00	8.97	275	332	Vertical			
2	2956.489	57.05	74.00	16.95	189	25	Vertical			
3	4960.000	42.81	74.00	31.19	185	238	Vertical			
4	4960.000	31.97	54.00	22.03	279	289	Vertical			
5	7440.000	37.01	54.00	16.99	235	341	Vertical			
6	7440.000	48.64	74.00	25.36	215	306	Vertical			

**Final Data List** 

### Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
  - Final Test Level = Receiver Reading + Antenna Factor + Cable Factor Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
- 4) All Modes have been tested, but only the worst case data displayed in this report.





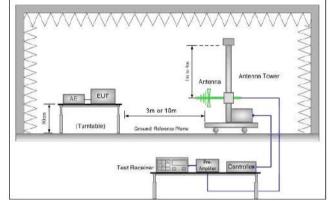
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### 4.10Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section	15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section	n 11.12		
Test Site:	Measurement Distance: 3n	n (Semi-Anechoic Chamb	per)	
Limit:	Frequency	Limit (dBuV/m)	Remark	
	30MHz-88MHz	40.0	Quasi-peak	
	88MHz-216MHz	43.5	Quasi-peak	
	216MHz-960MHz	46.0	Quasi-peak	
	960MHz-1GHz	54.0	Quasi-peak	
	Al- 2012 4 OLL-	54.0	Average Value	
	Above 1GHz	74.0	Peak Value	
Test Setup:		<u>.                                      </u>		





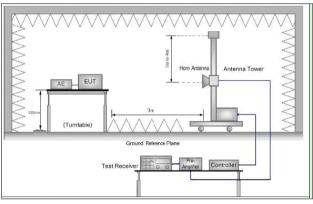


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

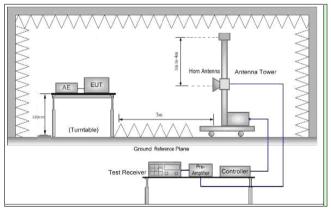


Figure 3. Above 1 GHz



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a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.  b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.  c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.  d. 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 the measurement.  e. 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.  f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.  g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel, the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation.  Charge + Transmitting mode.  Only the worst case is recorded in the report.  Instruments Used:  Refer to section 5.10 for details		Page: 93 of 113
meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.  c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.  d. 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 the measurement.  e. 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.  f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.  g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel , the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation.  Charge + Transmitting mode.  Final Test Mode:  Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.	Test Procedure:	above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
antenna, which was mounted on the top of a variable-height antenna tower.  d. 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 the measurement.  e. 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.  f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.  g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel , the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation.  Charge + Transmitting mode.  Final Test Mode:  Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.		meters above the ground at a 3 meter semi-anechoic camber. The table was
to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.  e. 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.  f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.  g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel, the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation.  Charge + Transmitting mode.  Final Test Mode:  Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.  Instruments Used:  Refer to section 5.10 for details		
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.  f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.  g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel, the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation.  Charge + Transmitting mode.  Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.  Instruments Used:  Refer to section 5.10 for details		to determine the maximum value of the field strength. Both horizontal and
Bandwidth with Maximum Hold Mode.  g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel, the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation. Charge + Transmitting mode.  Final Test Mode:  Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used:  Refer to section 5.10 for details		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
frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel, the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting with GFSK modulation.  Charge + Transmitting mode.  Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.  Instruments Used:  Refer to section 5.10 for details		
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode: Transmitting with GFSK modulation. Charge + Transmitting mode.  Final Test Mode: Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used: Refer to section 5.10 for details		frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode: Transmitting with GFSK modulation. Charge + Transmitting mode.  Final Test Mode: Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used: Refer to section 5.10 for details		h. Test the EUT in the lowest channel, the Highest channel
Exploratory Test Mode:  Transmitting with GFSK modulation. Charge + Transmitting mode.  Final Test Mode:  Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used:  Refer to section 5.10 for details		i. The radiation measurements are performed in X, Y, Z axis positioning for
Charge + Transmitting mode.  Final Test Mode: Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used: Refer to section 5.10 for details		j. Repeat above procedures until all frequencies measured was complete.
Charge + Transmitting mode.  Final Test Mode: Transmitting with GFSK modulation. Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used: Refer to section 5.10 for details	Exploratory Test Mode:	Transmitting with GFSK modulation.
Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.  Instruments Used: Refer to section 5.10 for details		Charge + Transmitting mode.
Only the worst case is recorded in the report.  Instruments Used: Refer to section 5.10 for details	Final Test Mode:	
Instruments Used: Refer to section 5.10 for details		
		Only the worst case is recorded in the report.
Test Results: Pass	Instruments Used:	Refer to section 5.10 for details
	Test Results:	Pass

The detailed test data see: Appendix





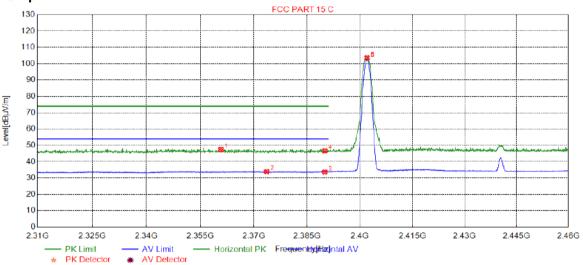
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#### **Test Plots** 4.10.1

#### **BLE 1M Channel 0 ANT1** 4.10.1.1

### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2360.800	47.47	74.00	26.53	120	81	Horizontal			
2	2373.631	33.95	54.00	20.05	104	262	Horizontal			
3	2390.000	33.70	54.00	20.30	249	97	Horizontal			
4	2390.000	46.70	74.00	27.30	189	196	Horizontal			
5	2402.000	103.65	0.00	-103.65	228	64	Horizontal			
6	2402.000	103.17	0.00	-103.17	194	60	Horizontal			

**Final Data List** 



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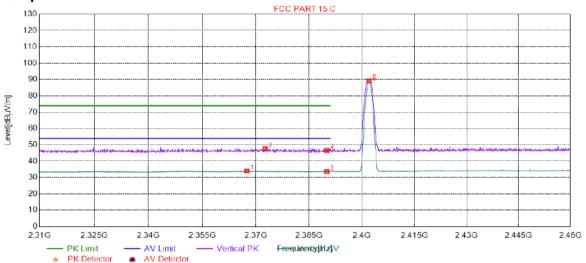


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#### **BLE 1M Channel 0 ANT1** 4.10.1.2

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2367.478	34.02	54.00	19.98	214	24	Vertical			
2	2372.581	47.64	74.00	26.36	153	222	Vertical			
3	2390.000	33.68	54.00	20.32	296	150	Vertical			
4	2390.000	46.58	74.00	27.42	295	145	Vertical			
5	2402.000	89.27	0.00	-89.27	283	230	Vertical			
6	2402.000	88.38	0.00	-88.38	166	140	Vertical			

**Final Data List** 



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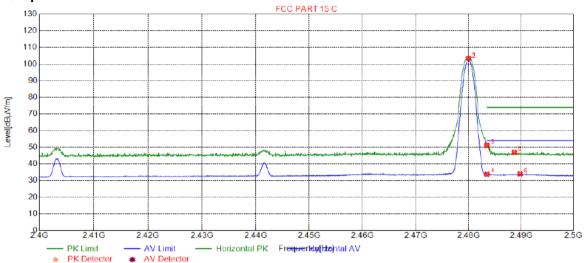


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#### **BLE 1M Channel 39 ANT1** 4.10.1.3

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2480.000	103.35	0.00	-103.35	241	64	Horizontal			
2	2480.000	102.88	0.00	-102.88	154	64	Horizontal			
3	2483.500	51.11	74.00	22.89	114	42	Horizontal			
4	2483.500	33.80	54.00	20.20	229	70	Horizontal			
5	2488.694	46.96	74.00	27.04	108	86	Horizontal			
6	2489.794	33.99	54.00	20.01	179	64	Horizontal			

**Final Data List** 



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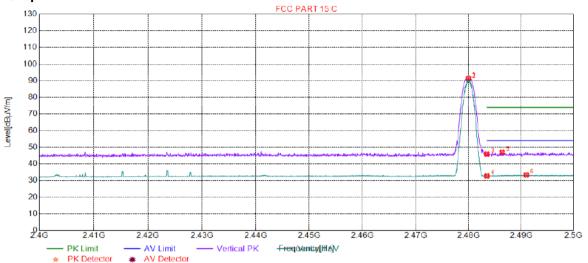


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#### **BLE 1M Channel 39 ANT1** 4.10.1.4

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2480.000	91.51	0.00	-91.51	164	218	Vertical				
2	2480.000	90.93	0.00	-90.93	195	218	Vertical				
3	2483.500	45.91	74.00	28.09	210	174	Vertical				
4	2483.500	32.77	54.00	21.23	154	26	Vertical				
5	2486.393	47.08	74.00	26.92	221	162	Vertical				
6	2490.995	33.39	54.00	20.61	274	144	Vertical				

**Final Data List** 



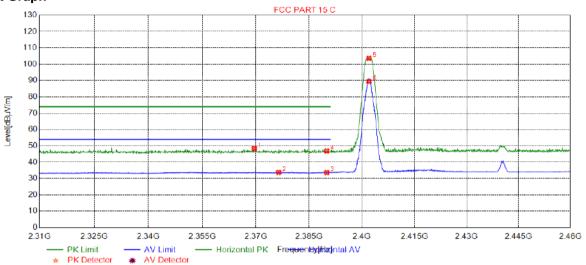


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### 4.10.1.5 BLE 2M Channel 0 ANT1

### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2369.579	48.37	74.00	25.63	131	185	Horizontal				
2	2376.408	33.74	54.00	20.26	163	14	Horizontal				
3	2390.000	33.65	54.00	20.35	203	182	Horizontal				
4	2390.000	46.89	74.00	27.11	208	118	Horizontal				
5	2402.000	103.61	0.00	-103.61	195	49	Horizontal				
6	2402.000	89.49	0.00	-89.49	198	98	Horizontal				

**Final Data List** 



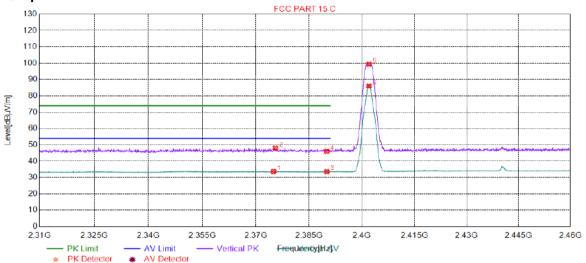


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#### **BLE 2M Channel 0 ANT1** 4.10.1.6

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2374.982	33.71	54.00	20.29	290	342	Vertical				
2	2375.507	48.04	74.00	25.96	257	178	Vertical				
3	2390.000	33.61	54.00	20.39	288	170	Vertical				
4	2390.000	46.04	74.00	27.96	168	220	Vertical				
5	2402.000	99.44	0.00	-99.44	162	167	Vertical				
6	2402.000	86.04	0.00	-86.04	218	151	Vertical				

**Final Data List** 



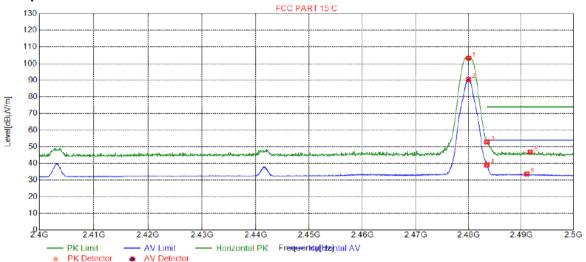


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#### **BLE 2M Channel 39 ANT1** 4.10.1.7

### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2480.000	103.23	0.00	-103.23	187	65	Horizontal				
2	2480.000	90.55	0.00	-90.55	230	45	Horizontal				
3	2483.500	52.90	74.00	21.10	246	65	Horizontal				
4	2483.500	39.08	54.00	14.92	232	45	Horizontal				
5	2491.095	33.62	54.00	20.38	149	68	Horizontal				
6	2491.745	46.88	74.00	27.12	212	115	Horizontal				

**Final Data List** 



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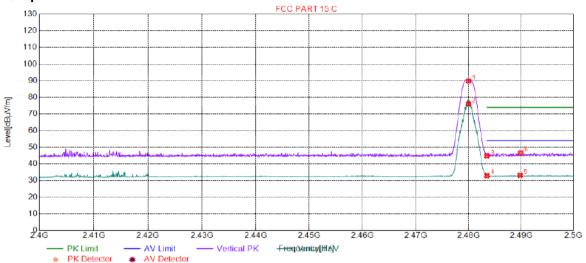


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#### **BLE 2M Channel 39 ANT1** 4.10.1.8

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2480.000	89.85	0.00	-89.85	235	175	Vertical				
2	2480.000	76.11	0.00	-76.11	211	351	Vertical				
3	2483.500	44.86	74.00	29.14	250	332	Vertical				
4	2483.500	32.94	54.00	21.06	270	229	Vertical				
5	2489.794	33.13	54.00	20.87	212	52	Vertical				
6	2489.945	46.66	74.00	27.34	286	217	Vertical				

**Final Data List** 



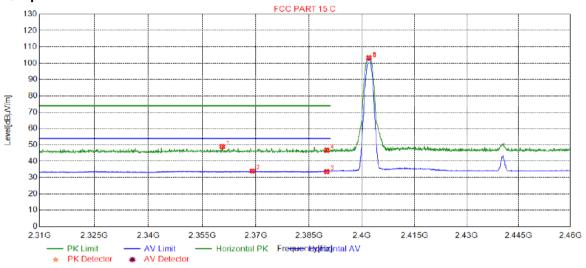


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### 4.10.1.9 **BLE 1M Channel 0 ANT2**

### **Test Graph**



#### Suspected List

ouspect	uspected List										
Suspected List											
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2360.575	48.98	74.00	25.02	164	300	Horizontal				
2	2369.054	34.00	54.00	20.00	133	174	Horizontal				
3	2390.000	33.66	54.00	20.34	127	262	Horizontal				
4	2390.000	46.78	74.00	27.22	132	224	Horizontal				
5	2402.000	103.40	0.00	-103.40	215	208	Horizontal				
6	2402.000	102.58	0.00	-102.58	172	208	Horizontal				

Final Data List



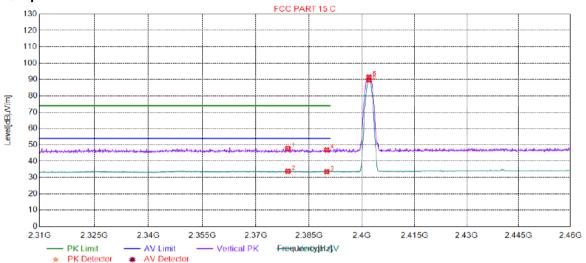


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#### **BLE 1M Channel 0 ANT2** 4.10.1.10

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2379.034	47.80	74.00	26.20	265	303	Vertical				
2	2379.034	33.86	54.00	20.14	190	166	Vertical				
3	2390.000	33.58	54.00	20.42	236	226	Vertical				
4	2390.000	46.92	74.00	27.08	218	140	Vertical				
5	2402.000	91.50	0.00	-91.50	273	230	Vertical				
6	2402.000	89.67	0.00	-89.67	225	181	Vertical				

**Final Data List** 



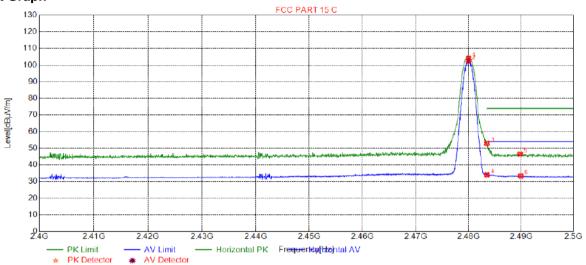


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#### **BLE 1M Channel 39 ANT2** 4.10.1.11

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2480.000	104.15	0.00	-104.15	193	260	Horizontal				
2	2480.000	102.69	0.00	-102.69	145	302	Horizontal				
3	2483.500	52.98	74.00	21.02	147	206	Horizontal				
4	2483.500	34.07	54.00	19.93	154	263	Horizontal				
5	2489.794	46.56	74.00	27.44	137	67	Horizontal				
6	2489.945	33.35	54.00	20.65	194	260	Horizontal				

**Final Data List** 



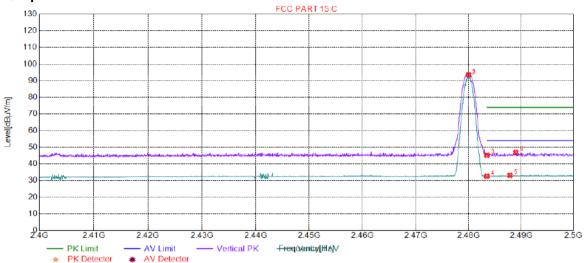


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#### **BLE 1M Channel 39 ANT2** 4.10.1.12

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2480.000	93.57	0.00	-93.57	270	359	Vertical				
2	2480.000	92.93	0.00	-92.93	194	357	Vertical				
3	2483.500	45.28	74.00	28.72	226	196	Vertical				
4	2483.500	32.62	54.00	21.38	230	227	Vertical				
5	2487.893	33.15	54.00	20.85	279	308	Vertical				
6	2488.994	47.01	74.00	26.99	281	157	Vertical				

**Final Data List** 



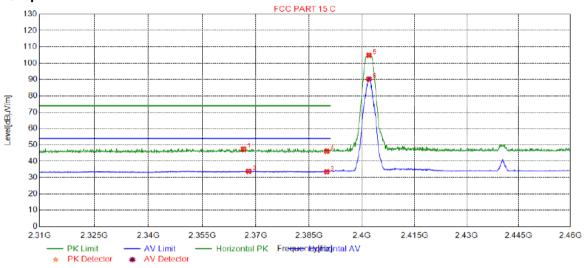


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### 4.10.1.13 BLE\_2M\_Channel 0 ANT2

### **Test Graph**



#### Suspected List

ouspeci	dispected List										
Suspected List											
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2366.578	47.43	74.00	26.57	159	346	Horizontal				
2	2368.004	33.87	54.00	20.13	178	143	Horizontal				
3	2390.000	33.58	54.00	20.42	178	9	Horizontal				
4	2390.000	46.09	74.00	27.91	245	200	Horizontal				
5	2402.000	104.90	0.00	-104.90	172	207	Horizontal				
6	2402.000	90.36	0.00	-90.36	188	301	Horizontal				

Final Data List



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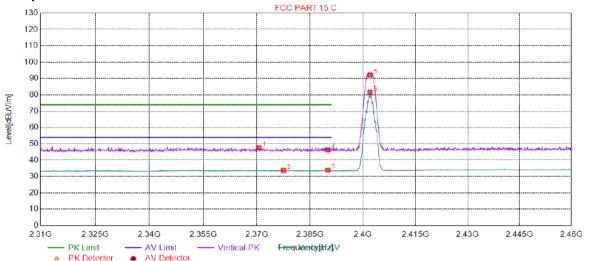


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#### **BLE 2M Channel 0 ANT2** 4.10.1.14

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2370.555	47.67	74.00	26.33	184	145	Vertical				
2	2377.533	33.83	54.00	20.17	229	74	Vertical				
3	2390.000	33.90	54.00	20.10	236	145	Vertical				
4	2390.000	46.35	74.00	27.65	172	228	Vertical				
5	2402.000	92.28	0.00	-92.28	161	91	Vertical				
6	2402.000	81.56	0.00	-81.56	270	221	Vertical				

**Final Data List** 



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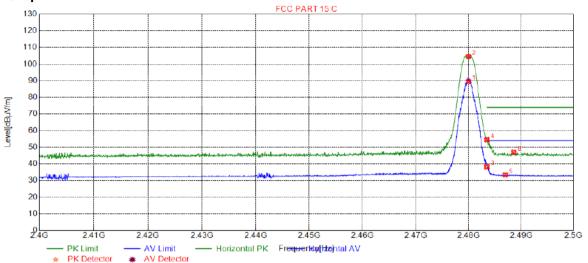


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#### **BLE 2M Channel 39 ANT2** 4.10.1.15

#### **Test Graph**



**Suspected List** 

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	2480.000	89.61	0.00	-89.61	127	197	Horizontal				
2	2480.000	104.53	0.00	-104.53	210	209	Horizontal				
3	2483.500	38.19	54.00	15.81	149	297	Horizontal				
4	2483.500	54.61	74.00	19.39	190	209	Horizontal				
5	2486.993	33.43	54.00	20.57	202	209	Horizontal				
6	2488.594	47.09	74.00	26.91	129	217	Horizontal				

**Final Data List** 



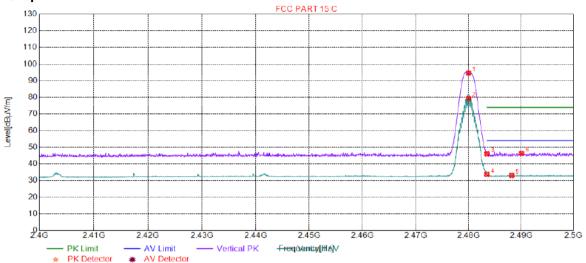


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#### **BLE 2M Channel 39 ANT2** 4.10.1.16

#### **Test Graph**



**Suspected List** 

Suspected List							
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2480.000	94.61	0.00	-94.61	196	159	Vertical
2	2480.000	79.40	0.00	-79.40	192	228	Vertical
3	2483.500	46.13	74.00	27.87	210	159	Vertical
4	2483.500	33.75	54.00	20.25	292	159	Vertical
5	2488.194	33.09	54.00	20.91	223	190	Vertical
6	2490.095	46.36	74.00	27.64	273	174	Vertical

### **Final Data List**

### Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor All Modes have been tested, but only the worst case data displayed in this report.



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#### 5 Measurement Uncertainty (95% confidence levels, k=2)

### Lab A:

No.	Item	Measurement Uncertainty		
1	Total RF power, conducted	±0.75dB		
2	RF power density, conducted	±2.84dB		
3	Spurious emissions, conducted	±0.75dB		
4	Temperature test	±1°C		
5	Humidity test	±3%		
6	DC and low frequency voltages	±0.5%		

### Lab B:

240 21					
No.	Item	Measurement Uncertainty			
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)			
		± 4.8dB (Below 1GHz)			
2	Radiated Emission	± 4.8dB (1GHz to 6GHz)			
2		± 4.5dB (6GHz to 18GHz)			
		± 5.02dB (Above 18GHz)			





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# **Equipment List**

RF conducted test						
Toot Equipment	Manufacturer	Model No.	Inventory No	Cal. date	Cal.Duedate	
Test Equipment	Wanulacturer		Inventory No	(yyyy-mm-dd)	(yyyy-mm-dd)	
DC Power Supply	Agilent Technologie Inc	66311B	W009-09	2020/7/15	2021/7/15	
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2021/1/3	2022/1/2	
Coaxial Cable	SGS	N/A	SEM031-01	2020/6/12	2021/6/11	
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A	
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2020/7/14	2021/7/14	
Temperature Chamber	GIANT FORCE	ICT-150-40-CP AR	W027-03	2020/10/27	2021/10/27	
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2020/7/14	2021/7/14	

CE Test System						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
Shielding Room	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10	
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-05	2020-04-12	2021-04-11	
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2020-08-04	2021-08-03	
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05	
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR	





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RSE Test System						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10	
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020-04-02	2021-04-01	
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10	
Receiving antenna (30MHz-3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2019-10-13	2021-10-12	
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2019-10-13	2021-10-12	
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2019-10-13	2021-10-12	
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR	
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR	
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR	
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR	
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2020-10-26	2021-10-25	
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020-10-26	2021-10-25	
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020-10-27	2021-10-26	
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2020-10-26	2021-10-25	
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05	
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR	



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#### 7 **Photographs - EUT Constructional Details**

Refer to Appendix A PCE Setup Photos.

The End

