

Report No.: HR/2021/1001403  
Page: 1 of 56

# FCC TEST REPORT

**Application No.:** HR/2021/10014  
**Applicant:** Honor Device Co., Ltd.  
**Address of Applicant** Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's Republic of China  
**Manufacturer:** Honor Device Co., Ltd.  
**Address of Manufacturer** Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's Republic of China  
**EUT Description:** Smart Phone  
**Model No.:** NTN-LX3  
**Trade Mark:** HONOR  
**FCC ID:** 2AYGCNTN-LX3  
**Standards:** 47 CFR FCC Part 2, Subpart J  
47 CFR Part 15, Subpart C  
**Date of Receipt:** 2021/1/28  
**Date of Test:** 2021/1/28 to 2021/2/19  
**Date of Issue:** 2021/2/19

<b>Test Result :</b>	<b>PASS *</b>
----------------------	---------------

\* 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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## 1 Version

<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2021-02-19		Original

Authorized for issue by:			
Tested By		 (Dee Zheng) /Project Engineer	
Checked By		 (David Chen) /Reviewer	

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## 2 Test Summary

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	B
Conducted Output Power	15.247 (b)(3)	ANSI C63.10 2013	Clause 4.3	PASS	A
DTS (6 dB) Bandwidth	15.247 (a)(2)	ANSI C63.10 2013	Clause 4.4	PASS	A
Power Spectral Density	15.247 (e)	ANSI C63.10 2013	Clause 4.5	PASS	A
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 2013	Clause 4.6	PASS	A
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 2013	Clause 4.7	PASS	B
Radiated Spurious Emissions	15.205/15.209	ANSI C63.10 2013	Clause 4.8	PASS	B
Restricted bands around fundamental frequency (Radiated Emission)	15.205/15.209	ANSI C63.10 2013	Clause 4.9	PASS	B

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### 3 General Information

#### 3.1 Details of Client

Applicant:	Honor Device Co., Ltd.
Address of Applicant	Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's Republic of China
Manufacturer:	Honor Device Co., Ltd.
Address of Manufacturer	Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's Republic of China

#### 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

**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

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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.

Designation Number: CN1271.

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### 3.4 General Description of EUT

EUT Description:	Smart Phone
Model No.:	NTN-LX3
Trade Mark:	HONOR
Hardware Version:	HL1NTNM
Software Version:	5.0.0.74(C900E74R1P2)
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 V5.0
Modulation Type:	GFSK
Number of Channel:	40
Sample Type:	<input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated
Antenna Gain:	-2.2dBi

Remark: According to the client, the EUT doesn't support the rates of 2Mbps.

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

### 4.1 Antenna Requirement

<b>Standard requirement:</b>	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 -2.2dBi.	

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## 4.2 AC Power Line Conducted Emissions

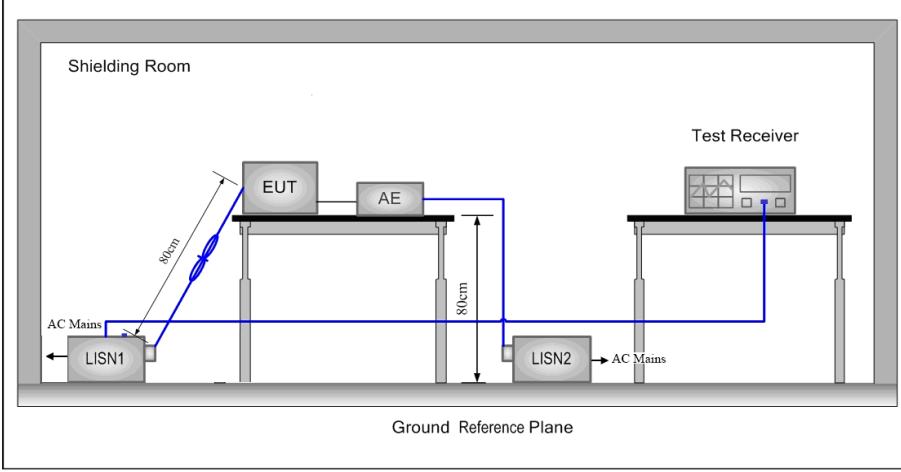
Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)		Limit (dBuV)
			Quasi-peak
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a <math>50\Omega/50\mu\text{H} + 5\Omega</math> linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li> </ol>		

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Test Setup:	
Test Mode:	Transmitting with GFSK modulation. Charge +Transmitting mode.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass
Remark:	The Emission Test data were reused from the report no:XHR/2021/1001401

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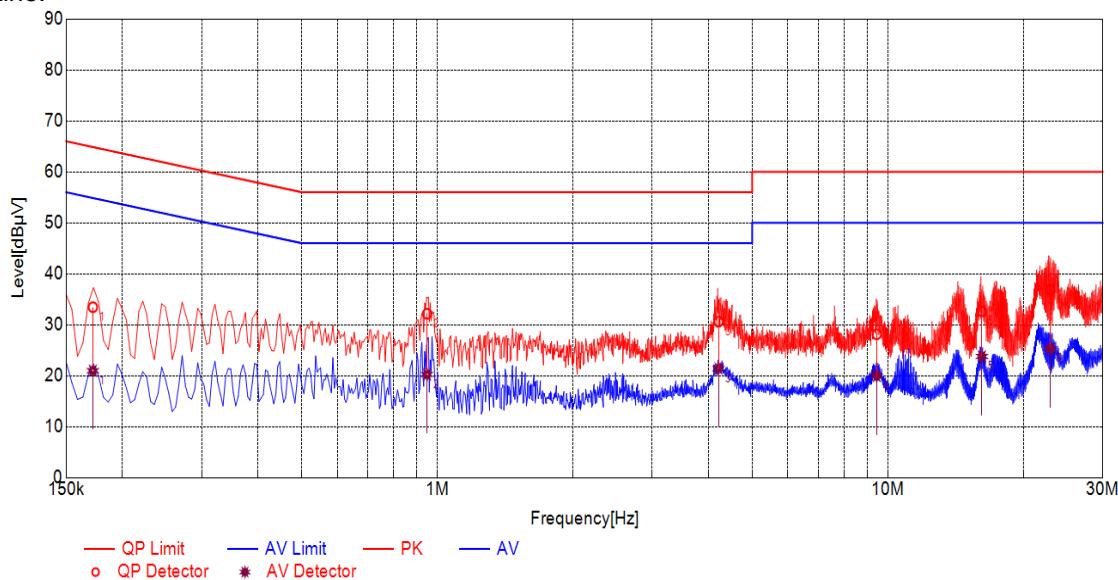
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## Measurement Data

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 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	0.1720	10.10	33.45	64.86	31.41	20.98	54.86	33.88
2	0.9489	10.10	32.16	56.00	23.84	20.24	46.00	25.76
3	4.2093	10.10	30.60	56.00	25.40	21.39	46.00	24.61
4	9.4478	10.10	28.13	60.00	31.87	19.93	50.00	30.07
5	16.1749	10.11	32.63	60.00	27.37	23.79	50.00	26.21
6	22.9449	10.11	36.88	60.00	23.12	25.31	50.00	24.69

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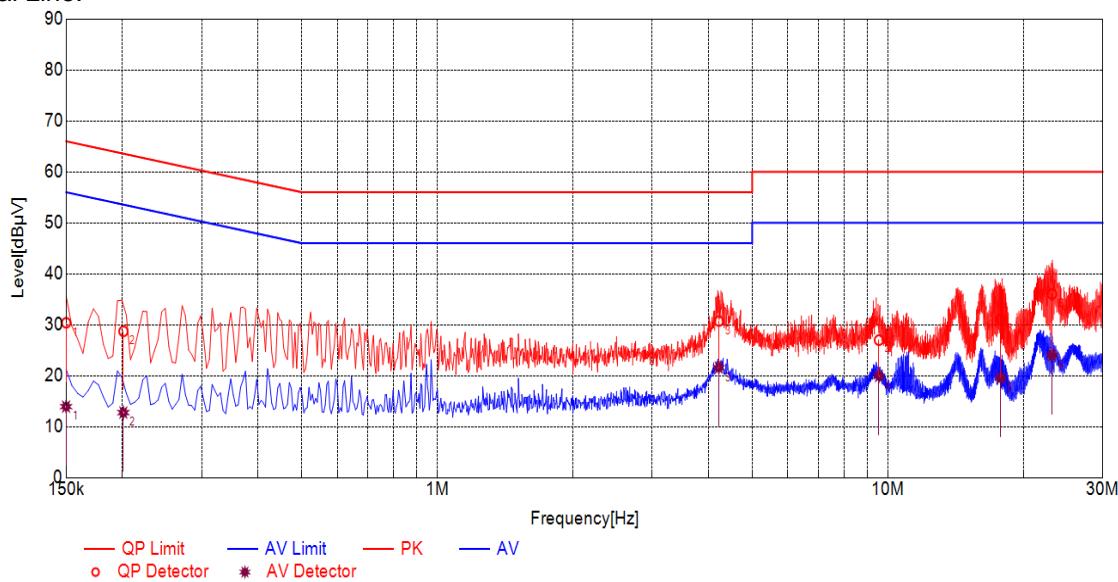
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Neutral Line:



## Test Graph

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1500	10.10	30.38	66.00	35.62	13.94	56.00	42.06
2	0.2010	10.10	28.72	63.57	34.85	12.76	53.57	40.81
3	4.2161	10.10	30.73	56.00	25.27	21.59	46.00	24.41
4	9.5545	10.10	26.98	60.00	33.02	19.94	50.00	30.06
5	17.8020	10.11	31.05	60.00	28.95	19.55	50.00	30.45
6	23.1441	10.11	36.03	60.00	23.97	24.03	50.00	25.97

## 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	CH0, CH19, CH39	62.50



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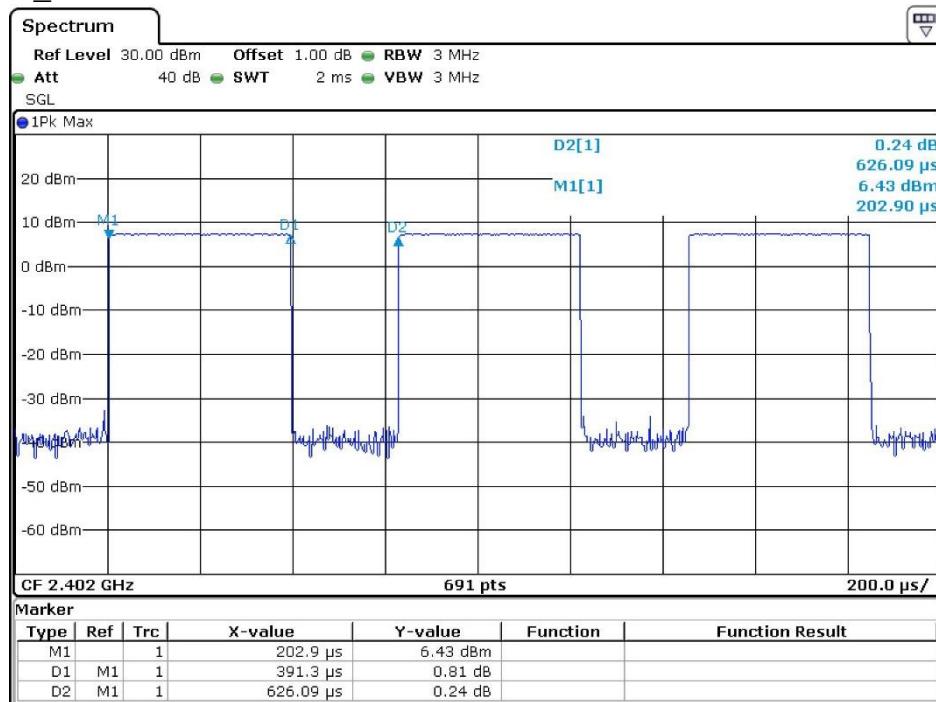
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## 4.3.2 Test Plots

## 4.3.2.1 ANT1

## 4.3.2.1.1 BLE\_1M

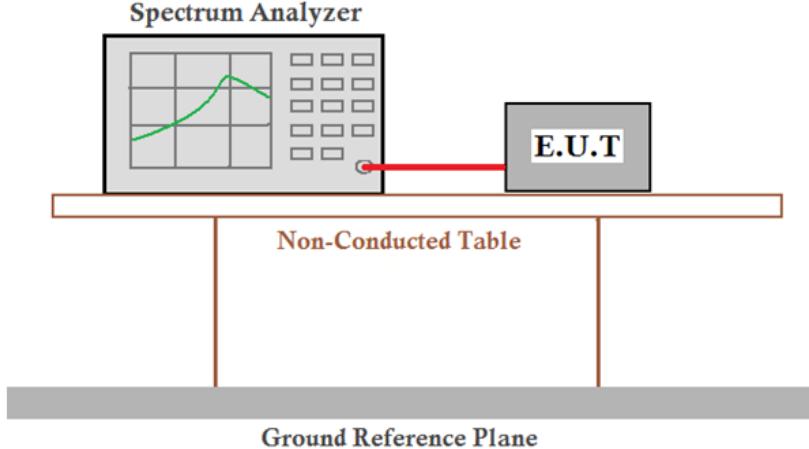


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#### 4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 :2013 Section 11.9.1.1
Test Setup:	
Test Instruments:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	30dBm
Test Results:	Pass

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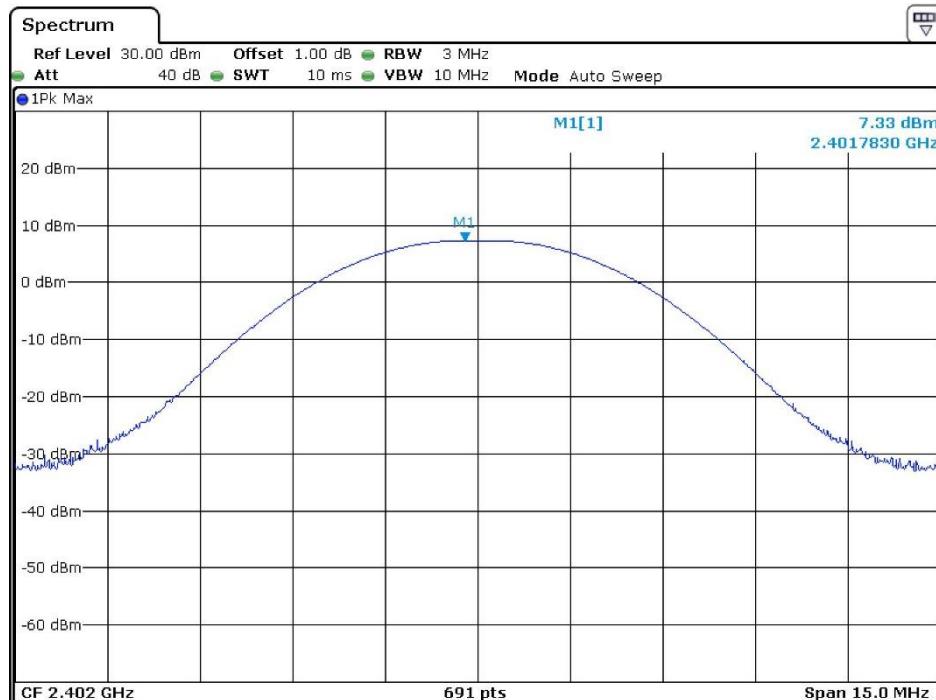
## 4.4.1 Test Results

## Measurement Data of Peak Power:

GFSK_1M mode			
Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	7.33	30.00	Pass
Middle	9.46	30.00	Pass
Highest	8.80	30.00	Pass

## 4.4.2 Test Plots

## 4.4.2.1 GFSK 1M\_Lowest Channel



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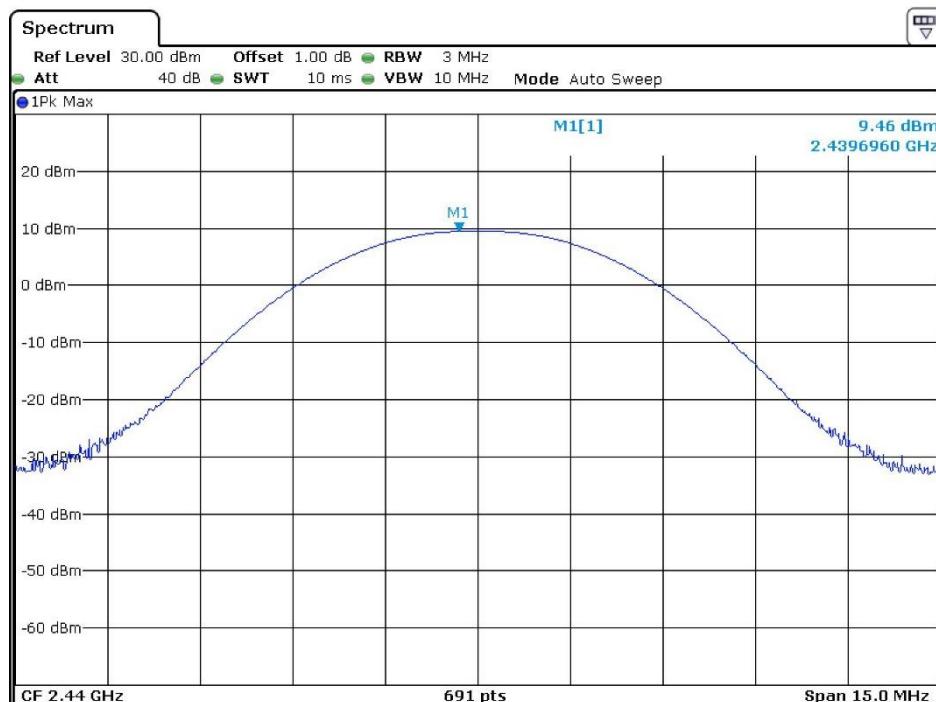
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## 4.4.2.2

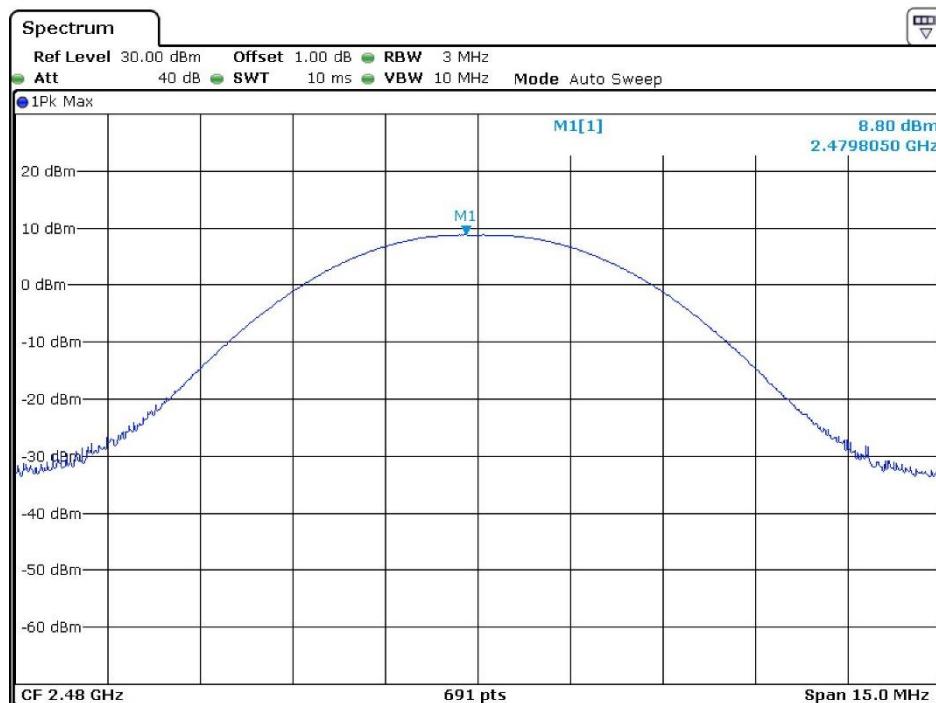
## GFSK 1M\_Middle Channel



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## 4.4.2.3

## GFSK 1M\_Highest Channel



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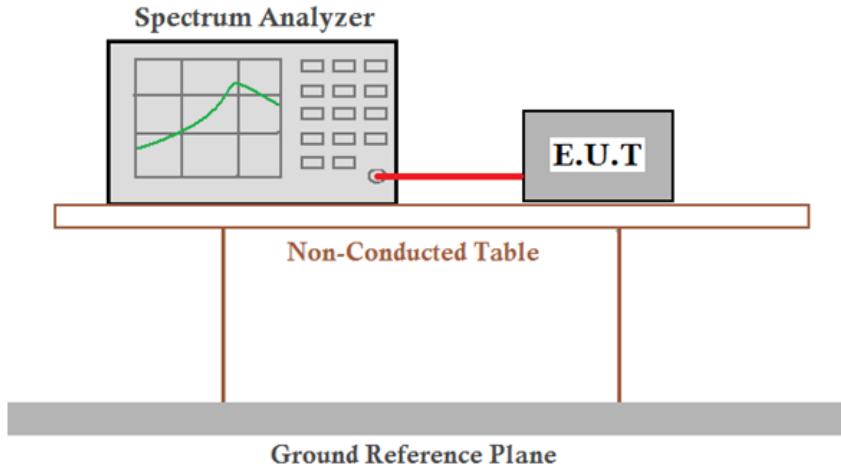


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## 4.5 DTS (6 dB) Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013 Section 11.8 Option 2
Test Setup:	
Instruments Used:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	$\geq 500$ kHz
Test Results:	Pass

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Report No.: HR/2021/1001403  
Page: 21 of 56**4.5.1 Test Results**

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

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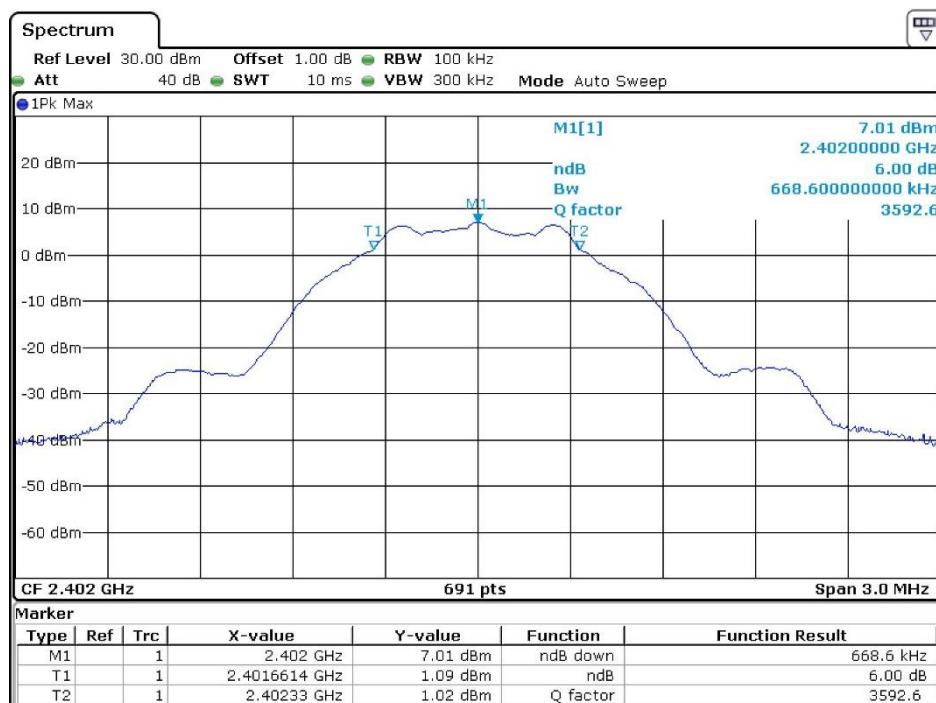
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## 4.5.2

## Test Plots

## 4.5.2.1

## GFSK 1M\_Lowest Channel



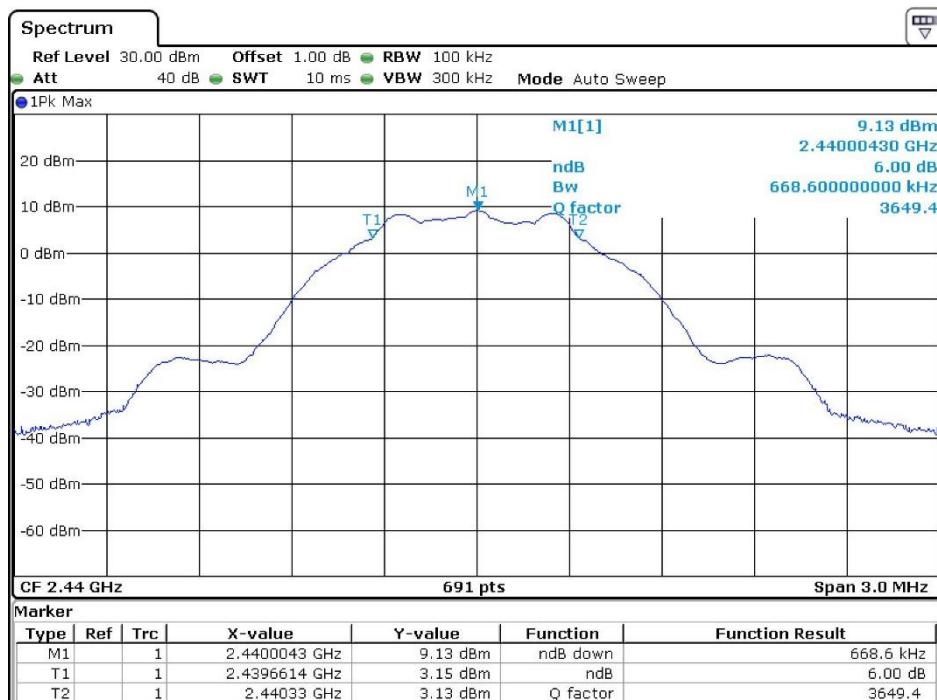
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## 4.5.2.2

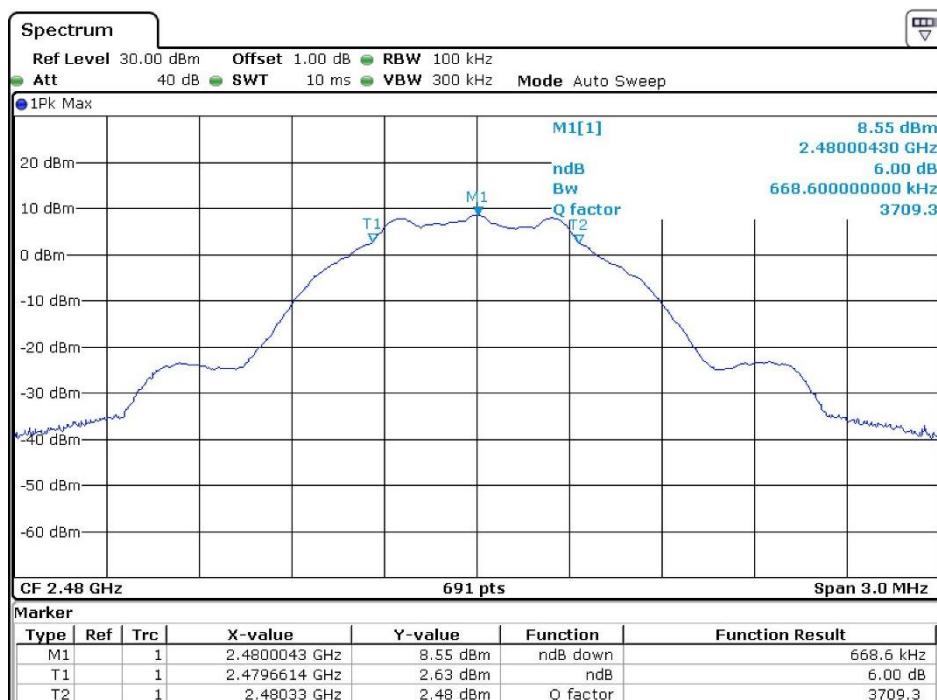
## GFSK 1M Middle Channel



Date: 31.JAN.2021 16:19:54

### 4.5.2.3

## GFSK 1M Highest Channel

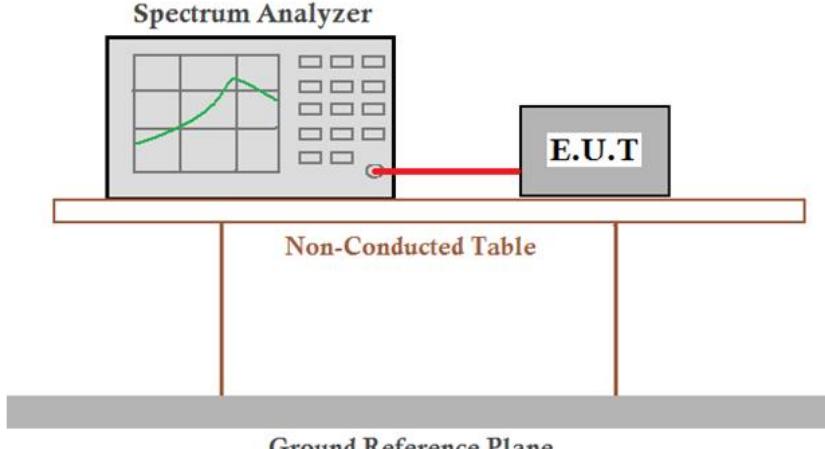


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## 4.6 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 :2013 Section 11.10.2
Test Setup:	
Test Instruments:	Refer to section 6 for details
Test Mode:	Transmitting with GFSK modulation.
Limit:	$\leq 8.00 \text{dBm}/3\text{kHz}$
Test Results:	Pass

### 4.6.1 Test Results

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
GFSK_1M	Lowest	-7.67	$\leq 8.00$	Pass
	Middle	-5.59	$\leq 8.00$	Pass
	Highest	-6.18	$\leq 8.00$	Pass

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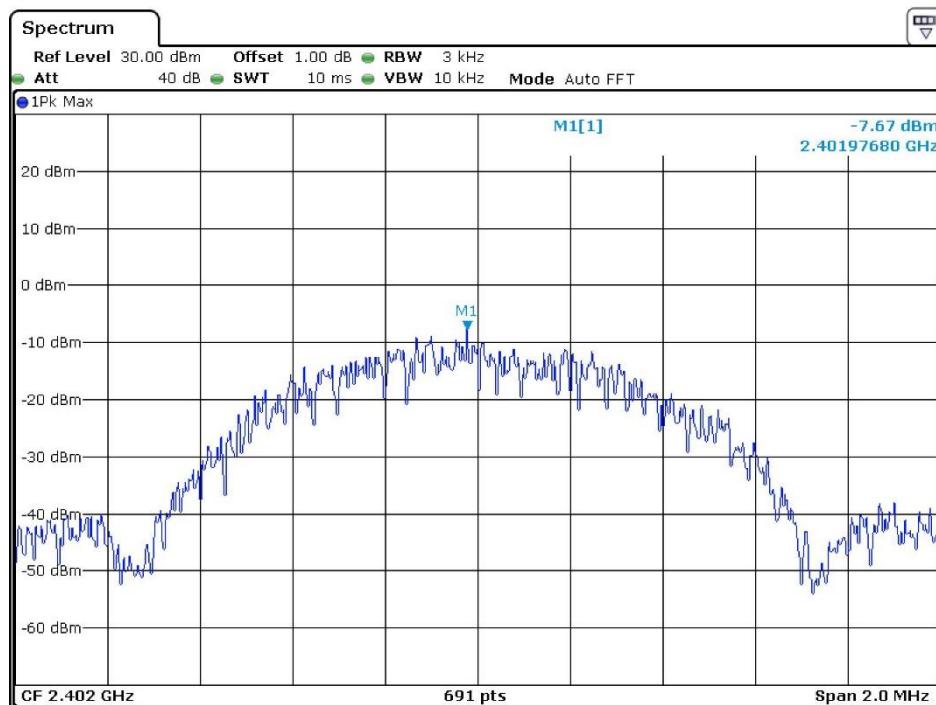
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## 4.6.2

## Test Plots

## 4.6.2.1

## GFSK 1M\_Lowest Channel



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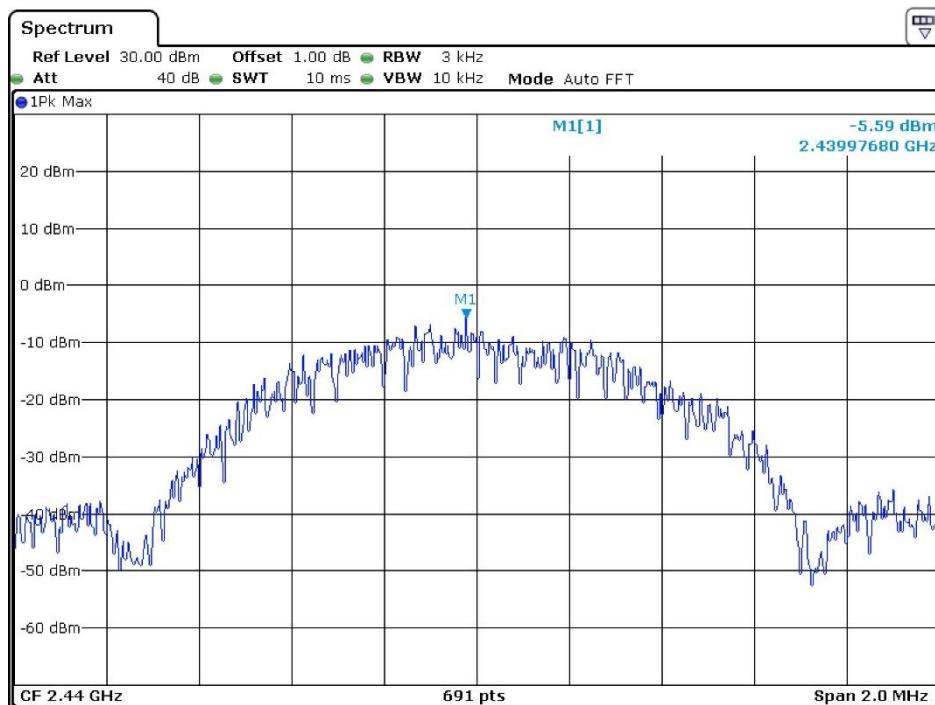
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## 4.6.2.2

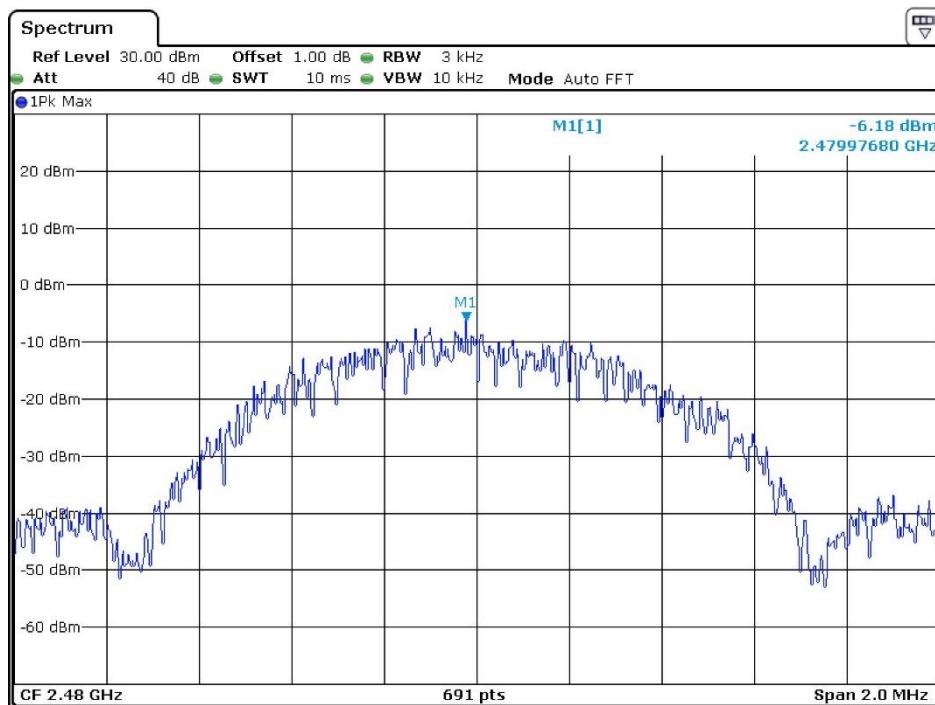
## GFSK 1M\_Middle Channel



Date: 31.JAN.2021 16:18:17

## 4.6.2.3

## GFSK 1M\_Highest Channel

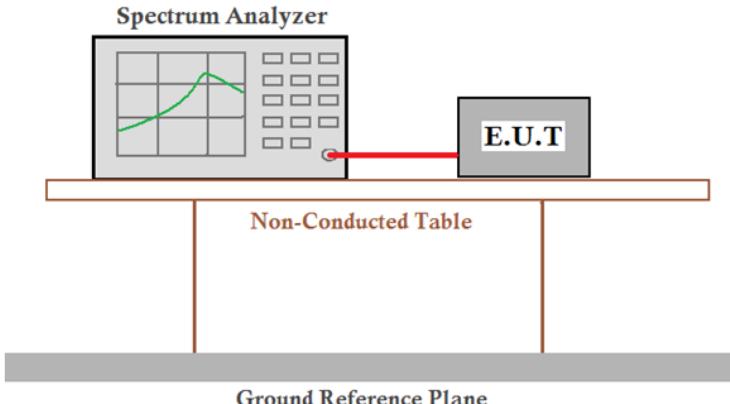


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## 4.7 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	
Instruments Used:	Refer to section 6 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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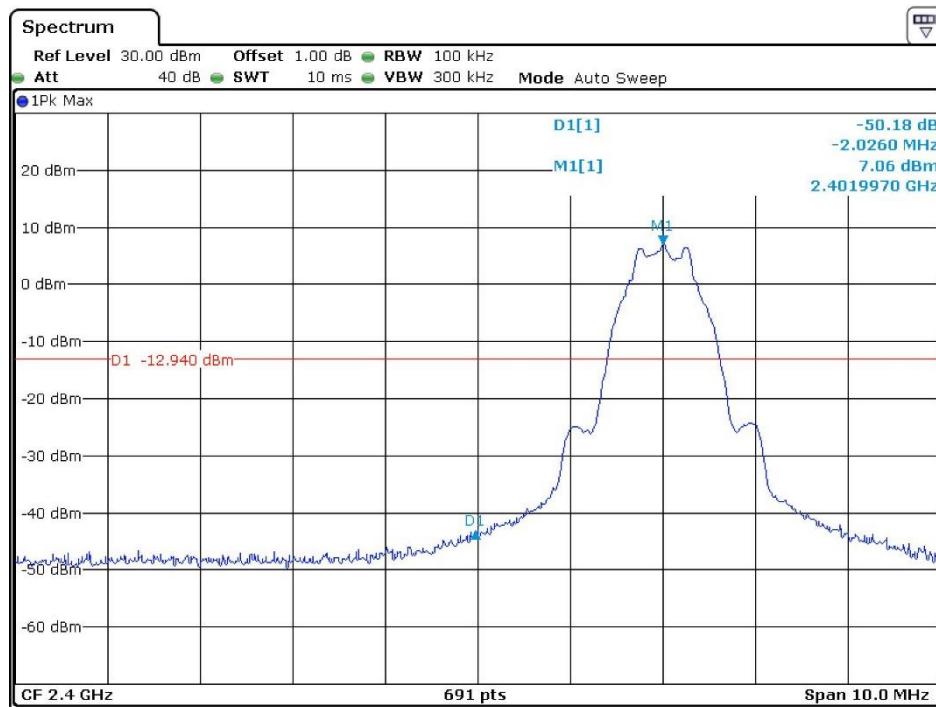
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## 4.7.1

## Test Plots

## 4.7.1.1

## GFSK 1M\_Lowest Channel



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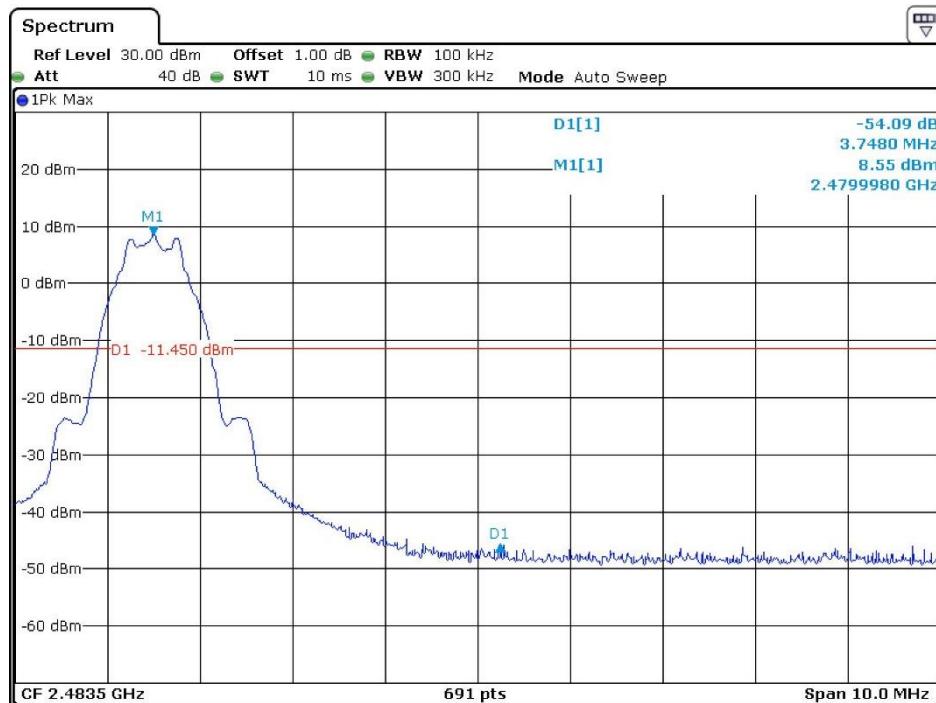
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## 4.7.1.2

## GFSK 1M\_Highest Channel



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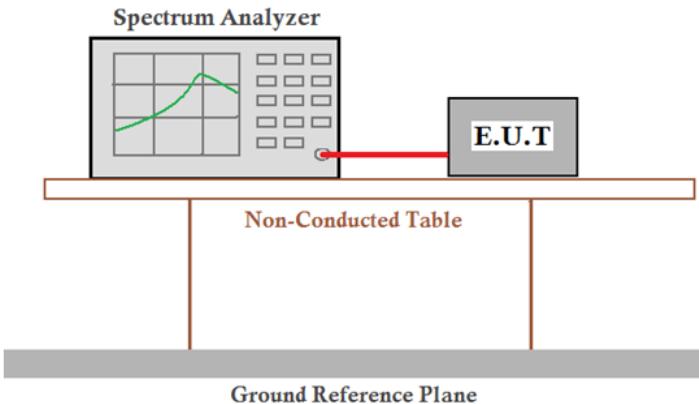


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## 4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	
Instruments Used:	Refer to section 6 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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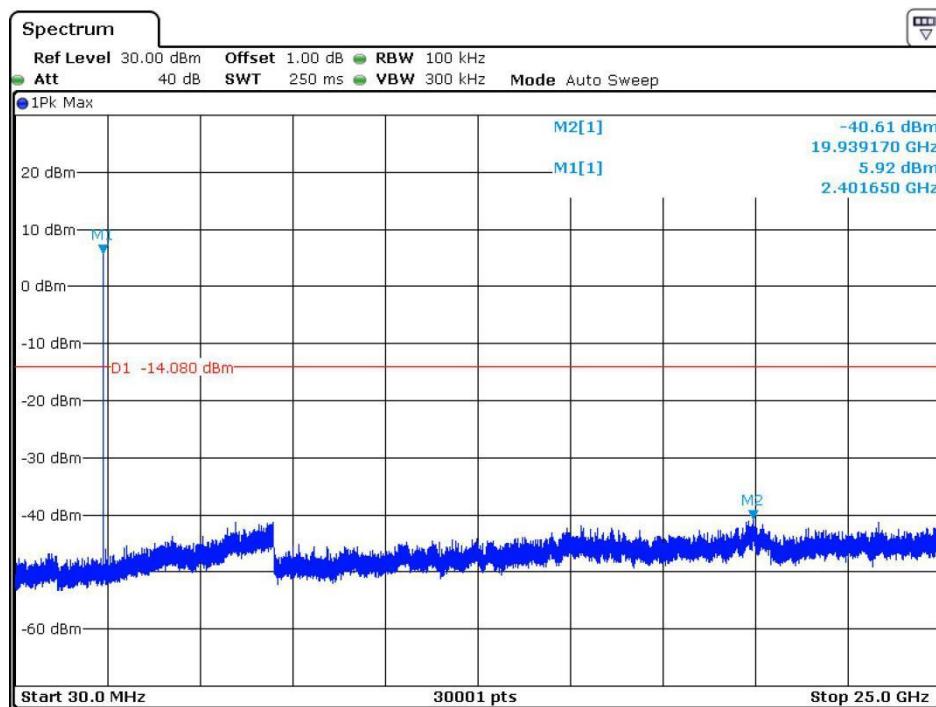
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## 4.8.1 Test Plots

## 4.8.1.1

## GFSK 1M\_Lowest Channel



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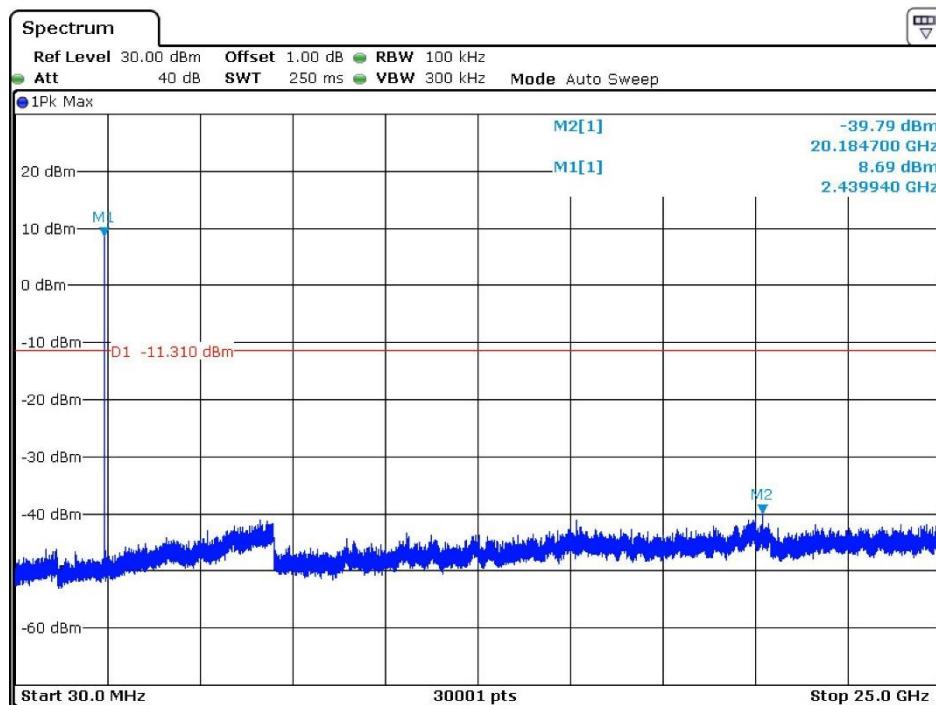
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## 4.8.1.2

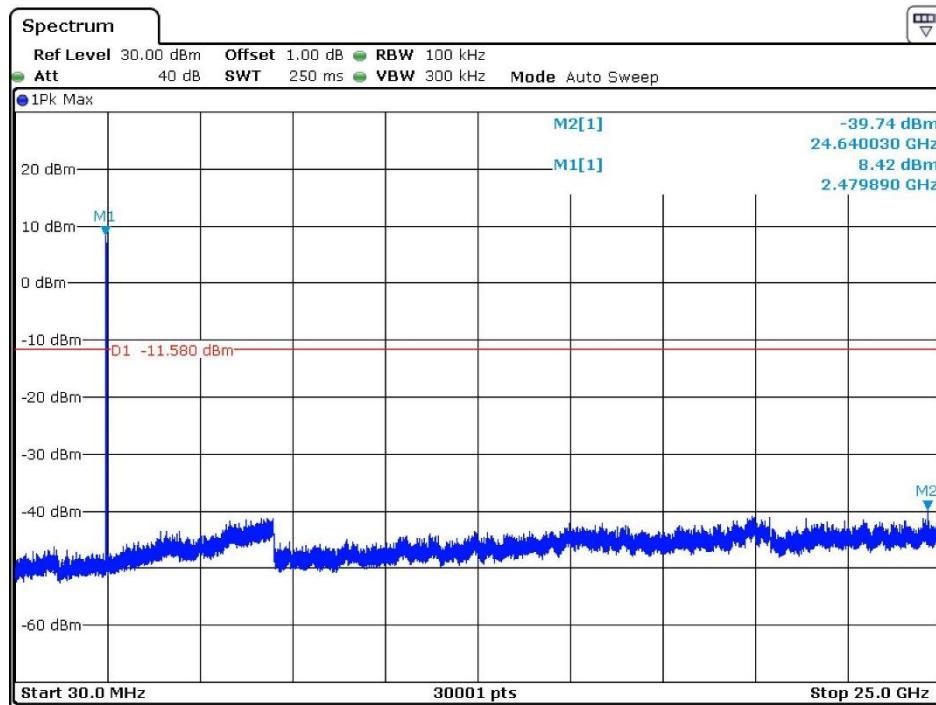
## GFSK 1M\_Middle Channel



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## 4.8.1.3

## GFSK 1M\_Highest Channel



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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	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		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.				

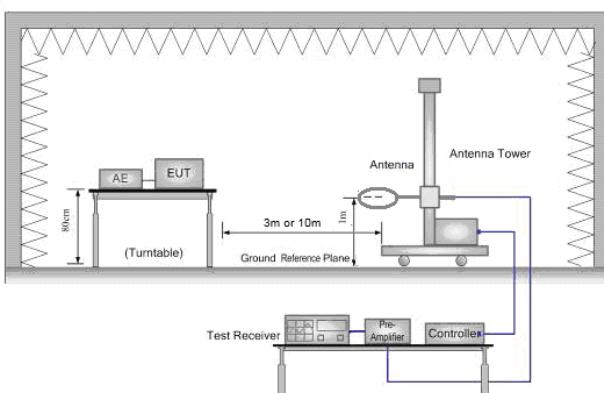
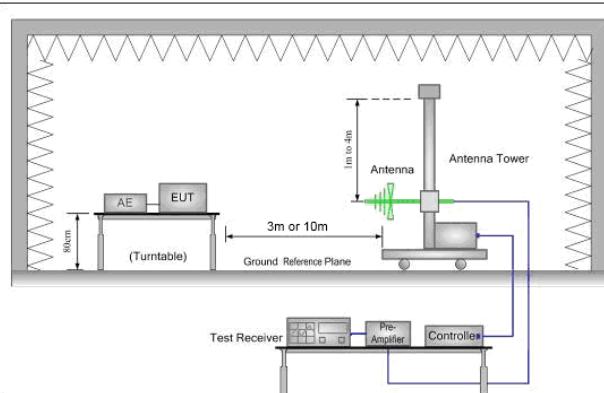
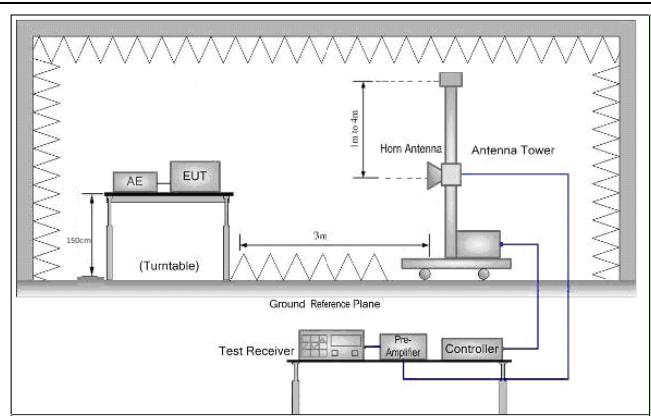
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Test Setup:	Figure 1. Below 30MHz	Figure 2. 30MHz to 1GHz
		
	Figure 1. Below 30MHz	Figure 2. 30MHz to 1GHz
		
	Figure 3. Above 1 GHz	
Test Procedure:	<ol style="list-style-type: none"> <li>For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation</li> <li>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.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>Use the following spectrum analyzer settings:           <ol style="list-style-type: none"> <li>Span shall wide enough to fully capture the emission being measured;</li> <li>Set RBW=100 kHz for <math>f &lt; 1</math> GHz, RBW=1MHz for <math>f &gt; 1</math> GHz ;  <math>VBW \geq RBW</math>; Sweep = auto;            Detector function = peak; Trace = max hold for peak</li> <li>For average measurement: use duty cycle correction factor method per 15.35(c).</li> </ol> </li> </ol>	

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	<p>Duty cycle = On time/100 milliseconds      On time = <math>N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n</math>      Where <math>N_1</math> is number of type 1 pulses, <math>L_1</math> is length of type 1 pulses, etc.      Average Emission Level = Peak Emission Level + <math>20 * \log(\text{Duty cycle})</math></p> <p>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.</p> <p>g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p> <p>i. Test the EUT in the lowest channel, the middle channel ,the Highest channel.</p> <p>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.</p> <p>k. Repeat above procedures until all frequencies measured was complete.</p>
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.
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> <li>RBW = 120 kHz</li> <li>VBW = 300 kHz</li> <li>Detector = Peak</li> <li>Trace mode = max hold</li> </ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> <li>RBW = 1 MHz</li> <li>VBW <math>\geq 3</math> MHz</li> <li>Detector = Peak</li> <li>Sweep time = auto</li> <li>Trace mode = max hold</li> </ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> <li>RBW = 1 MHz</li> <li>VBW = 10 Hz, when duty cycle is no less than 98 percent.</li> <li>VBW <math>\geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li> </ul>
Instruments Used:	Refer to section 6 for details

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Test Results:	Pass
Remark:	The Emission Test data were reused from the report no: XHR/2021/1001401



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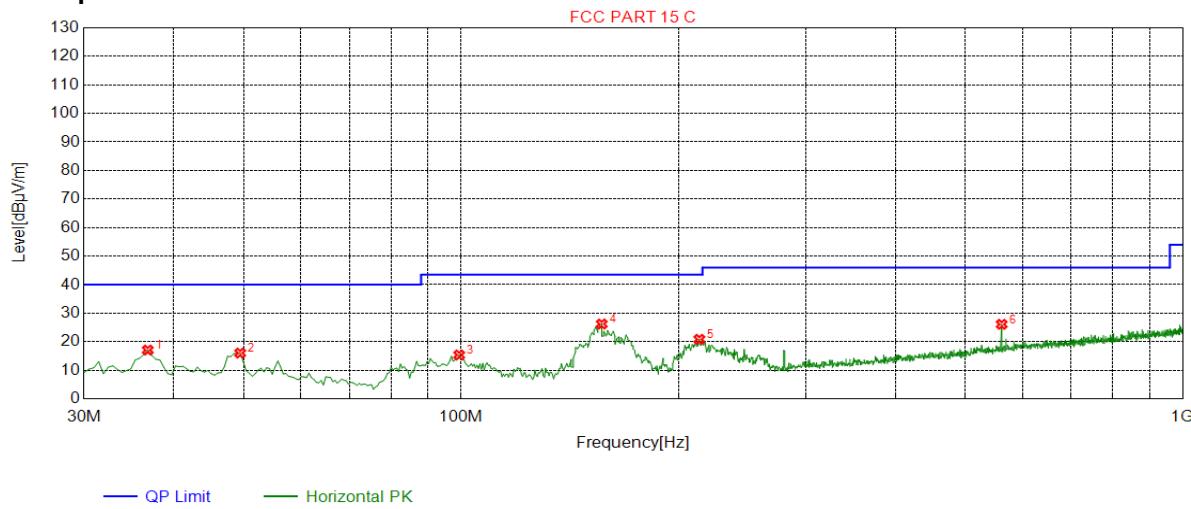
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## 4.9.1 Radiated emission below 1GHz

## 4.9.1.1 Charge + Transmitting

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7934	17.11	-32.19	40.00	22.89	100	250	Horizontal
2	49.4097	16.06	-30.18	40.00	23.94	200	259	Horizontal
3	99.3897	15.38	-31.79	43.50	28.12	300	121	Horizontal
4	156.648	26.24	-34.46	43.50	17.26	100	216	Horizontal
5	213.907	20.87	-30.50	43.50	22.63	100	65	Horizontal
6	561.340	26.13	-21.14	46.00	19.87	200	53	Horizontal

## Final Data List



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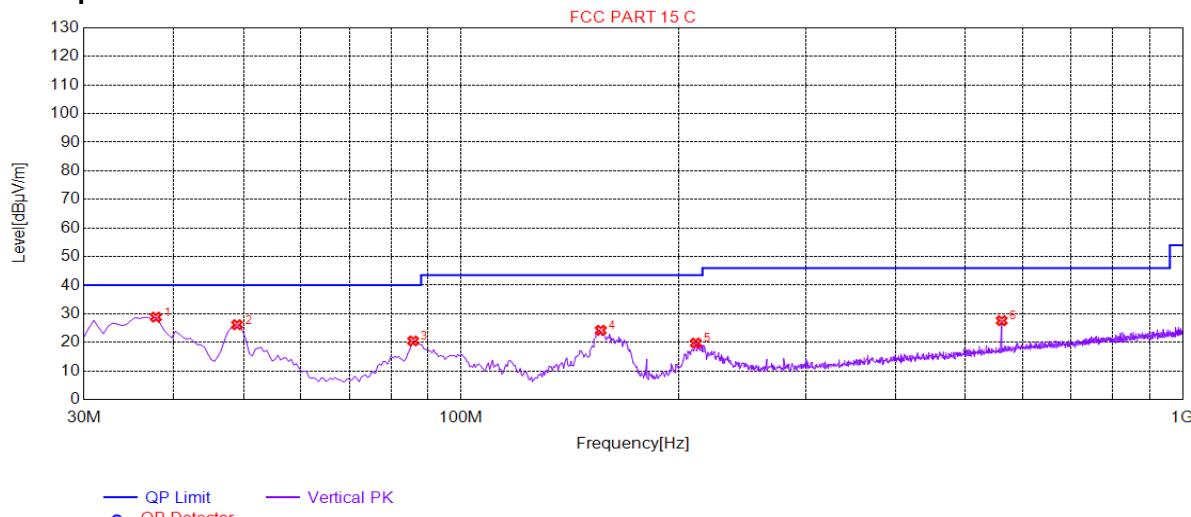
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## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7639	28.84	-31.88	40.00	11.16	200	344	Vertical
2	48.9245	26.20	-30.19	40.00	13.80	200	316	Vertical
3	85.8029	20.53	-34.44	40.00	19.47	100	110	Vertical
4	156.163	24.24	-34.48	43.50	19.26	300	182	Vertical
5	211.480	19.79	-30.58	43.50	23.71	100	332	Vertical
6	561.340	27.62	-21.14	46.00	18.38	100	142	Vertical

## Final Data List



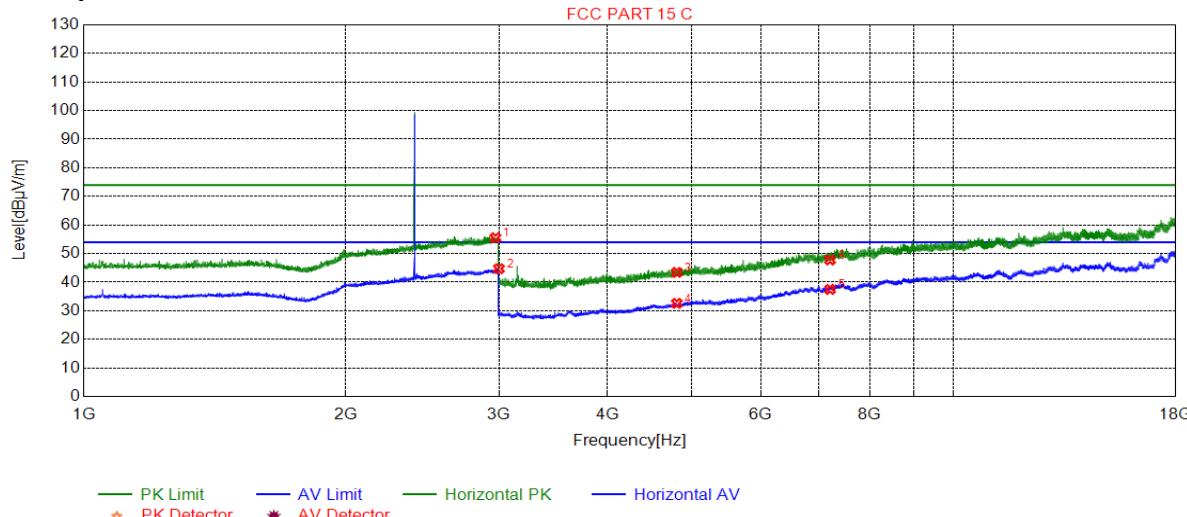
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## 4.9.2 Transmitter Emission above 1GHz

## 4.9.2.1 BLE 1M\_Channel 0

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2972.49	55.55	10.60	74.00	18.45	100	241	Horizontal
2	3000.00	44.73	10.78	54.00	9.27	100	247	Horizontal
3	4804.00	43.45	-17.18	74.00	30.55	200	150	Horizontal
4	4804.00	32.62	-17.18	54.00	21.38	300	241	Horizontal
5	7206.00	37.49	-9.48	54.00	16.51	400	12	Horizontal
6	7206.00	47.79	-9.48	74.00	26.21	100	328	Horizontal

## Final Data List

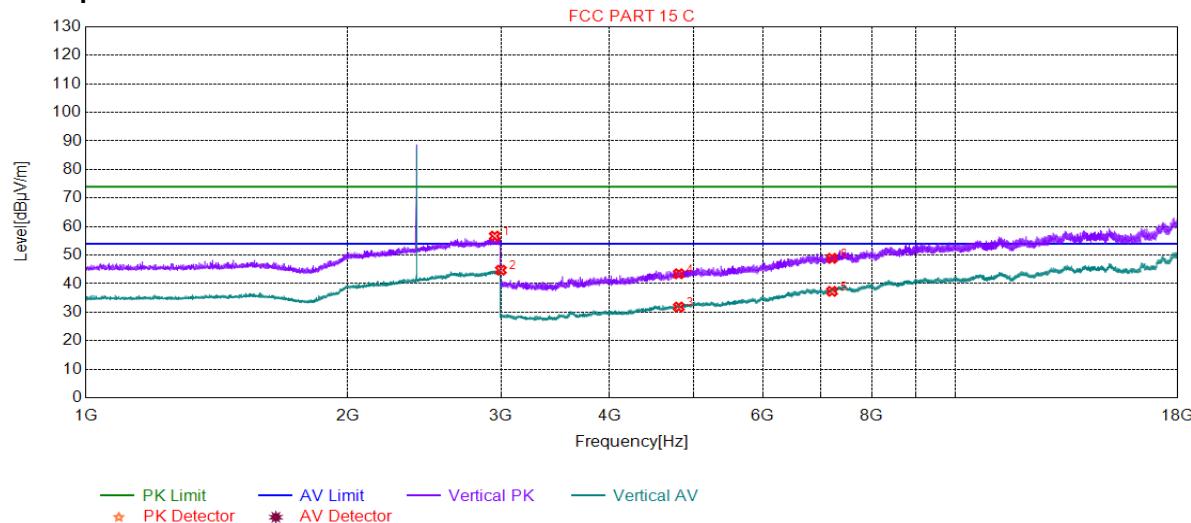


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## 4.9.2.2 BLE 1M\_Channel 0

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.48	56.67	10.69	74.00	17.33	100	242	Vertical
2	2999.49	44.75	10.77	54.00	9.25	200	309	Vertical
3	4804.00	31.82	-17.18	54.00	22.18	300	32	Vertical
4	4804.00	43.49	-17.18	74.00	30.51	400	160	Vertical
5	7206.00	37.33	-9.48	54.00	16.67	100	160	Vertical
6	7206.00	48.89	-9.48	74.00	25.11	200	137	Vertical

## Final Data List



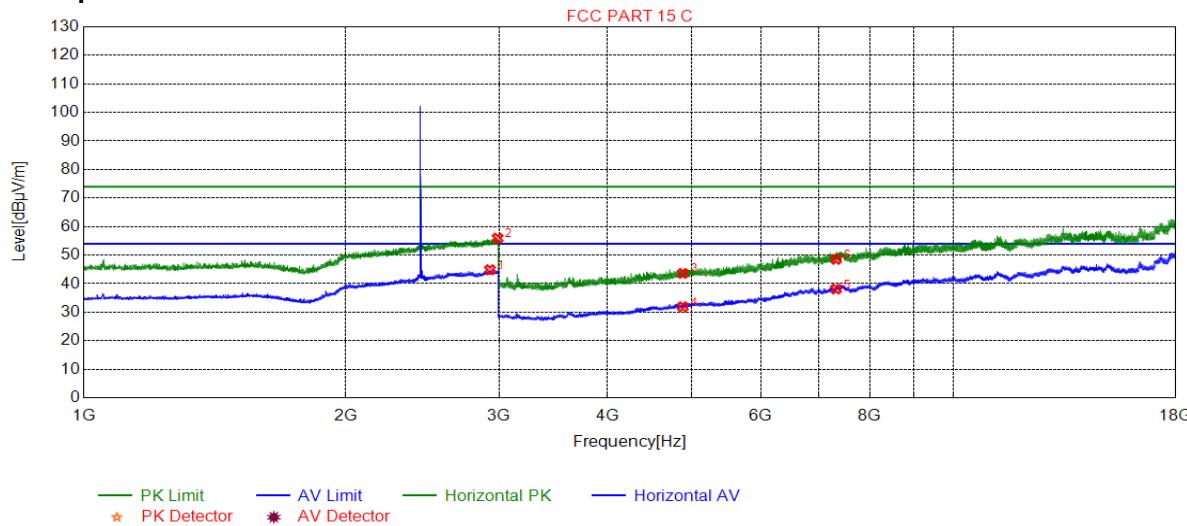
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## 4.9.2.3 BLE 1M\_Channel 19

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2929.48	44.88	10.72	54.00	9.12	100	76	Horizontal
2	2989.49	55.96	10.57	74.00	18.04	200	235	Horizontal
3	4880.00	43.62	-16.81	74.00	30.38	200	77	Horizontal
4	4880.00	31.92	-16.81	54.00	22.08	100	226	Horizontal
5	7320.00	38.13	-9.28	54.00	15.87	300	340	Horizontal
6	7320.00	48.55	-9.28	74.00	25.45	100	22	Horizontal

## Final Data List



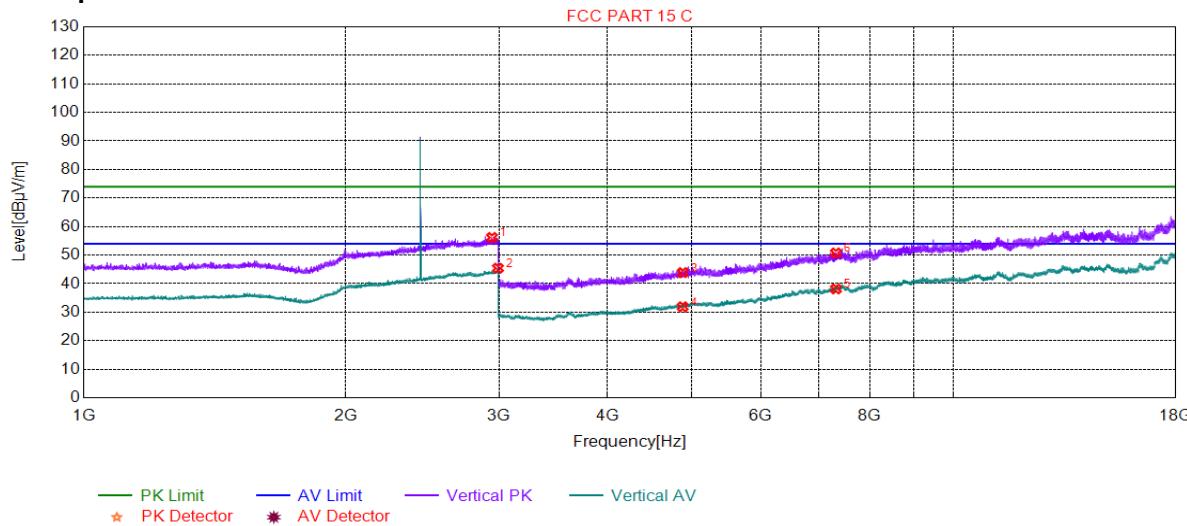
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## 4.9.2.4 BLE 1M\_Channel 19

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2945.48	56.19	10.64	74.00	17.81	300	203	Vertical
2	2992.49	45.43	10.63	54.00	8.57	300	86	Vertical
3	4880.00	43.88	-16.81	74.00	30.12	100	269	Vertical
4	4880.00	31.92	-16.81	54.00	22.08	100	359	Vertical
5	7320.00	38.16	-9.28	54.00	15.84	400	52	Vertical
6	7320.00	50.77	-9.28	74.00	23.23	200	87	Vertical

## Final Data List

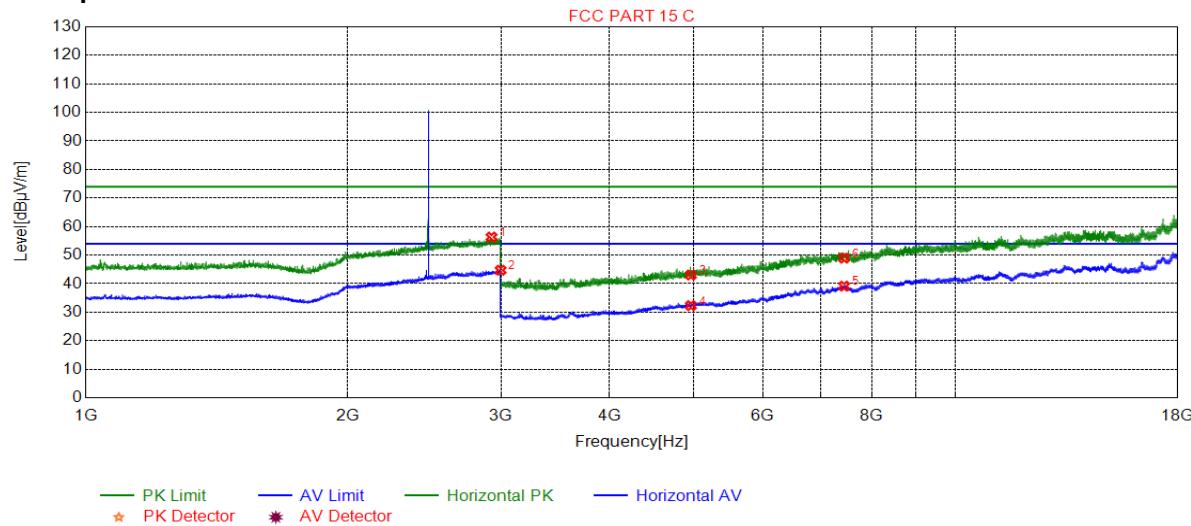


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## 4.9.2.5 BLE 1M\_Channel 39

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2926.48	56.33	10.68	74.00	17.67	100	324	Horizontal
2	2997.49	44.72	10.74	54.00	9.28	100	38	Horizontal
3	4960.00	43.04	-16.28	74.00	30.96	200	337	Horizontal
4	4960.00	32.33	-16.28	54.00	21.67	100	97	Horizontal
5	7440.00	39.16	-8.83	54.00	14.84	300	337	Horizontal
6	7440.00	48.96	-8.83	74.00	25.04	100	3	Horizontal

## Final Data List

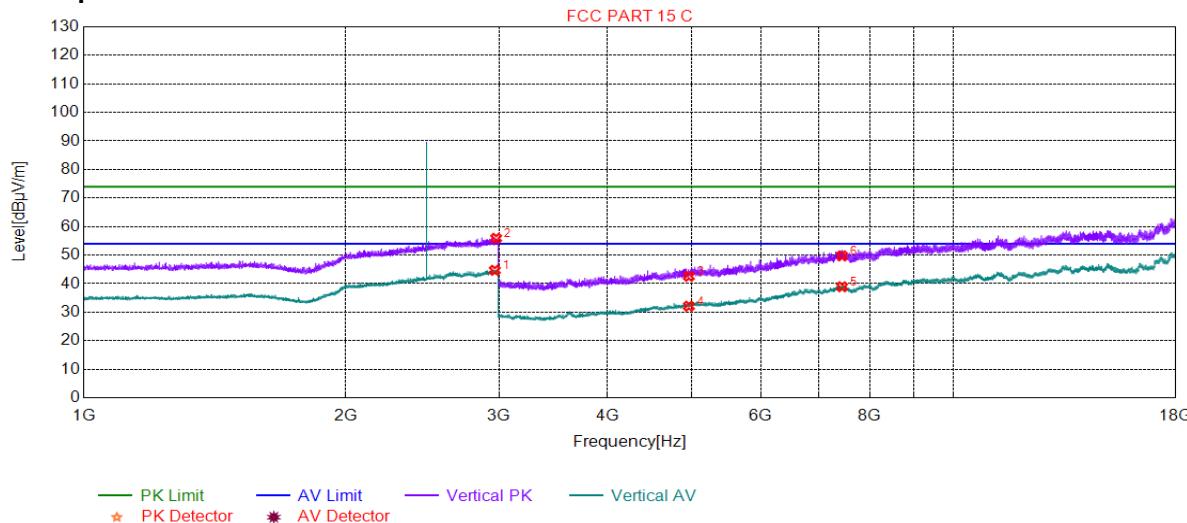


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## 4.9.2.6 BLE 1M\_Channel 39

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2967.49	44.69	10.59	54.00	9.31	300	325	Vertical
2	2977.99	55.92	10.60	74.00	18.08	200	55	Vertical
3	4960.00	42.58	-16.28	74.00	31.42	100	175	Vertical
4	4960.00	32.13	-16.28	54.00	21.87	300	59	Vertical
5	7440.00	38.93	-8.83	54.00	15.07	200	232	Vertical
6	7440.00	49.77	-8.83	74.00	24.23	100	354	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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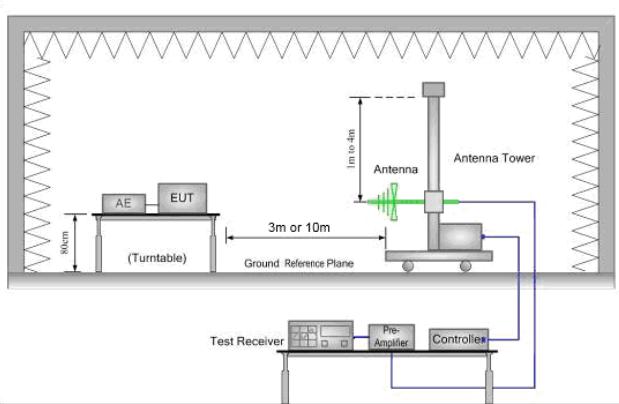
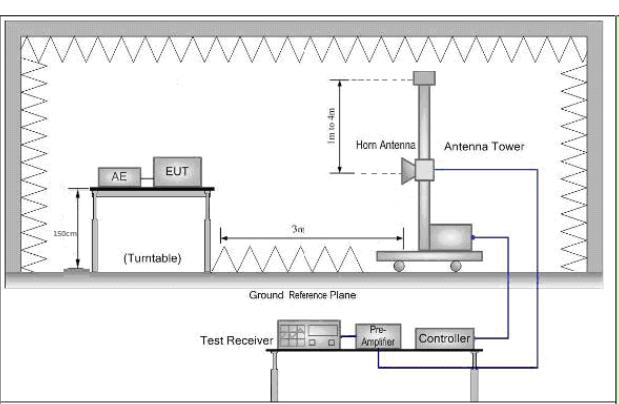
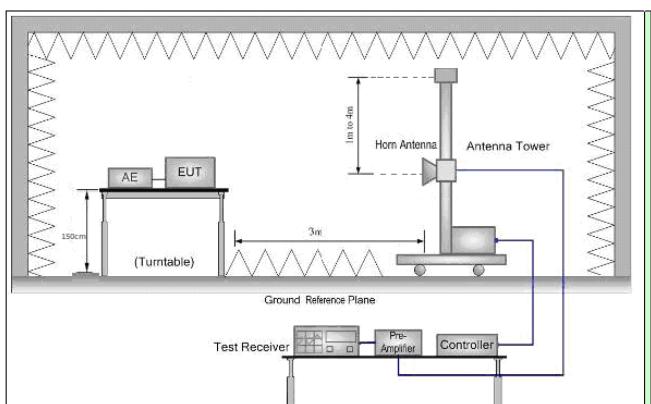
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## 4.10 Restricted bands around fundamental frequency

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)					
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			
	Above 1GHz	54.0	Average Value			
		74.0	Peak Value			
Test Setup:						
						
						
Figure 1. 30MHz to 1GHz		Figure 2. Above 1 GHz				
						
Figure 3. Above 1 GHz						

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Test Procedure:	<ol style="list-style-type: none"> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>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.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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</li> <li>Test the EUT in the lowest channel, the Highest channel</li> <li>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> <li>Repeat above procedures until all frequencies measured was complete.</li> </ol>
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 Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> <li>RBW = 120 kHz</li> <li>VBW = 300 kHz</li> <li>Detector = Peak</li> <li>Trace mode = max hold</li> </ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> <li>RBW = 1 MHz</li> <li>VBW <math>\geq</math> 3 MHz</li> <li>Detector = Peak</li> <li>Sweep time = auto</li> <li>Trace mode = max hold</li> </ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> <li>RBW = 1 MHz</li> <li>VBW = 10 Hz, when duty cycle is no less than 98 percent.</li> </ul>

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	<ul style="list-style-type: none"><li>• <math>VBW \geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li></ul>
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
Remark:	The Emission Test data were reused from the report no: XHR/2021/1001401

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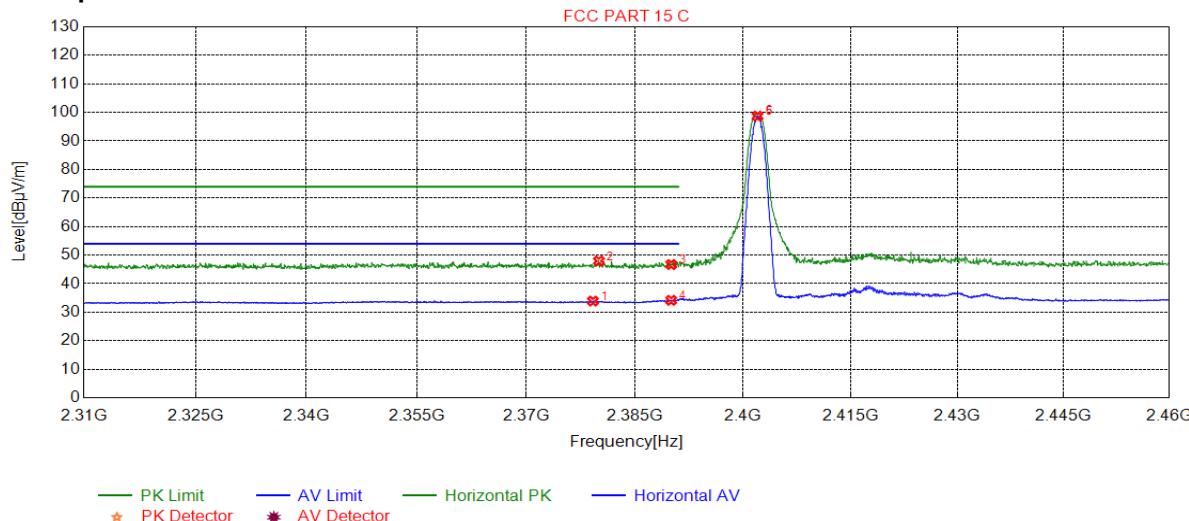
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### 4.10.1 Test Plots

#### 4.10.1.1 BLE 1M\_Channel 0

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2379.18	33.92	7.99	54.00	20.08	100	210	Horizontal
2	2380.01	47.96	8.00	74.00	26.04	300	273	Horizontal
3	2390.00	46.72	7.98	74.00	27.28	100	295	Horizontal
4	2390.00	34.19	7.98	54.00	19.81	300	310	Horizontal
5	2402.00	98.71	8.06	0.00	-98.71	100	310	Horizontal
6	2402.00	99.28	8.06	0.00	-99.28	200	295	Horizontal

## Final Data List

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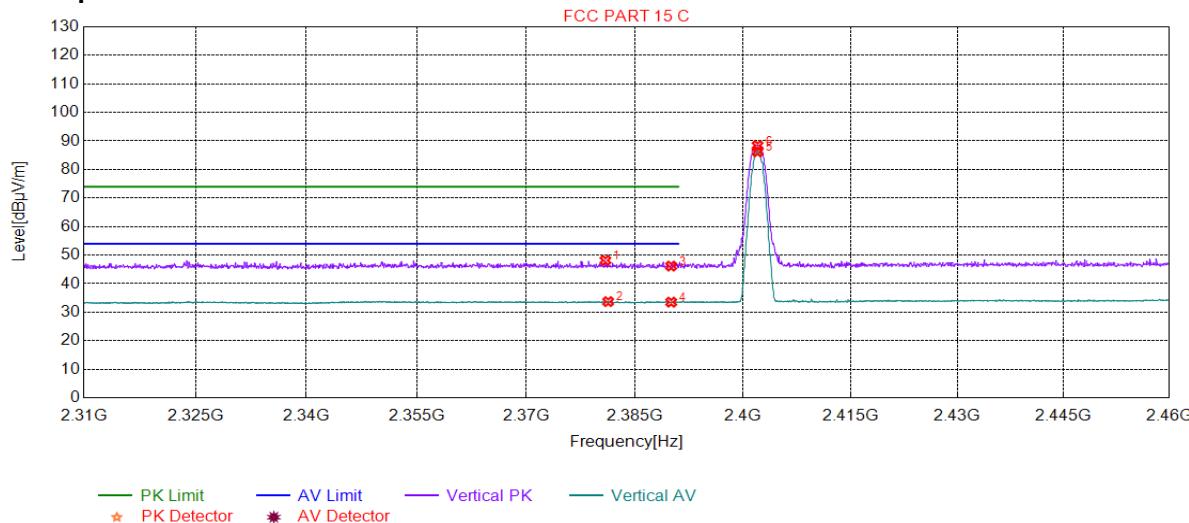
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## 4.10.1.2 BLE 1M\_Channel 0

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2380.91	48.17	7.97	74.00	25.83	200	117	Vertical
2	2381.28	33.73	7.95	54.00	20.27	200	260	Vertical
3	2390.00	46.18	7.98	74.00	27.82	200	345	Vertical
4	2390.00	33.54	7.98	54.00	20.46	300	324	Vertical
5	2402.00	86.21	8.06	0.00	-86.21	100	274	Vertical
6	2402.00	88.41	8.06	0.00	-88.41	200	274	Vertical

## Final Data List



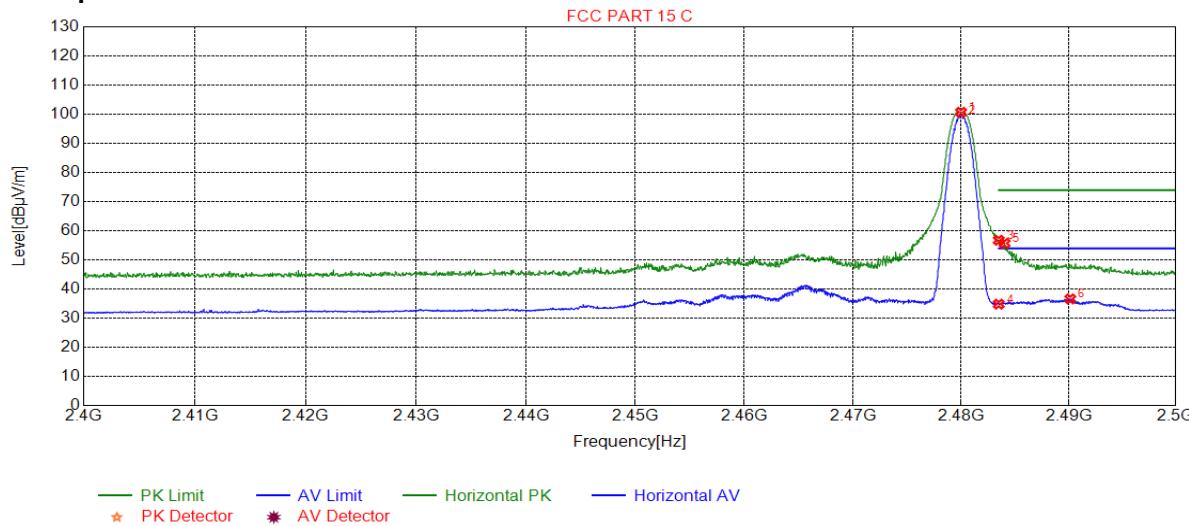
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## 4.10.1.3 BLE 1M\_Channel 39

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2480.00	100.68	8.54	0.00	-100.68	100	299	Horizontal
2	2480.00	99.71	8.54	0.00	-99.71	100	259	Horizontal
3	2483.50	56.80	8.50	74.00	17.20	200	299	Horizontal
4	2483.50	34.87	8.50	54.00	19.13	300	299	Horizontal
5	2484.04	55.72	8.50	74.00	18.28	100	259	Horizontal
6	2490.14	36.66	8.62	54.00	17.34	100	259	Horizontal

## Final Data List



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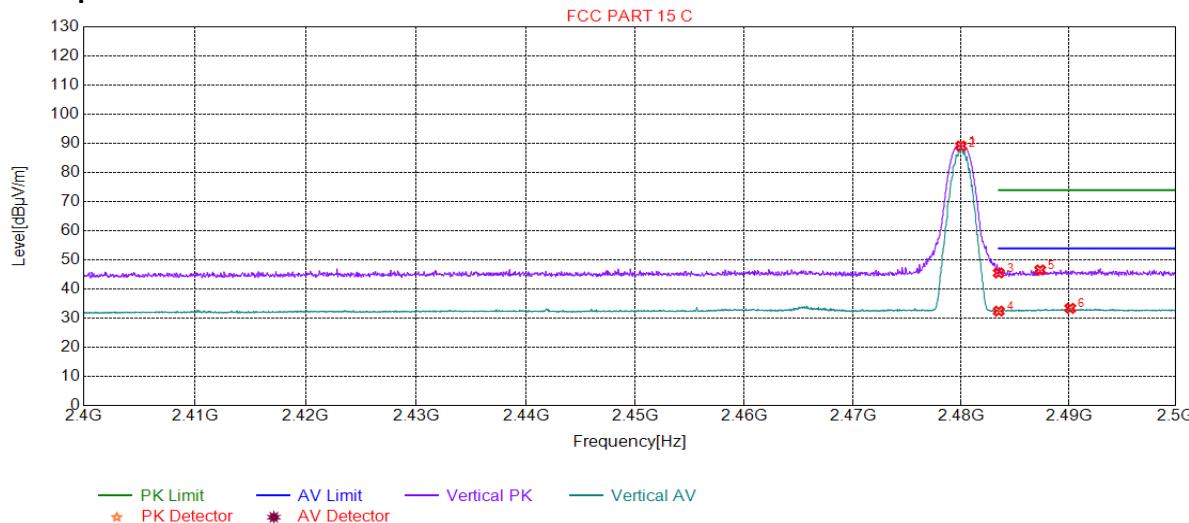
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## 4.10.1.4 BLE 1M\_Channel 39

## Test Graph



## Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2480.00	89.12	8.54	0.00	-89.12	200	218	Vertical
2	2480.00	88.52	8.54	0.00	-88.52	300	218	Vertical
3	2483.50	45.56	8.50	74.00	28.44	200	178	Vertical
4	2483.50	32.49	8.50	54.00	21.51	100	48	Vertical
5	2487.34	46.60	8.55	74.00	27.40	200	84	Vertical
6	2490.14	33.45	8.62	54.00	20.55	100	218	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:

No.	Item	Measurement Uncertainty
1	Radiated Spurious emission test	±4.8dB (30MHz-1GHz)
		±5.2dB (1GHz-6GHz)
		±5.5dB (6GHz-18GHz)
		±5.02dB (18GHz-40GHz)
2	Conduct emission test	±3.4 dB (9KHz- 30MHz)

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## 6 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2020/7/15	2021/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2021/1/3	2022/1/2
				2020/1/4	2021/1/3
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

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Shenzhen Branch Inspection & Testing Services Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn  
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

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## RSE&amp;RE&amp;CE Test System

Equipment	Manufacturer	Model No.	Cal Date	Cal Due Date	Inventory No.
Semi-Anechoic Chamber	Brilliant-emc	966	NCR	NCR	XAW03-35-01
MXA signal analyzer	Keysight	N9020A	2020-04-02	2021-04-02	XAW01-06-01
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	2020-04-02	2021-04-02	XAW01-03-02
Test receiver	ROHDE&SCHWARZ	ESR	2020-09-11	2021-09-10	XAW01-08-01
Receiving antenna	Rosenberger	VULB 9163	2019-10-13	2021-10-12	XAW01-09-01
Receiving antenna	Rosenberger	BBHA 9120D	2019-10-13	2021-10-12	XAW01-09-02
Receiving antenna	Rosenberger	BBHA 9170	2019-10-13	2021-10-12	XAW01-09-03
Directional antenna rack controller	Max-Full	MF-7802BS	NCR	NCR	XAW03-03-01
High-speed antenna rack controller	Max-Full	MF-7802	NCR	NCR	XAW03-04-01
Filter bank	Tonscend	JS0806-F	NCR	NCR	XAW03-05-01
Filter bank	Tonscend	JS0806s	NCR	NCR	XAW03-05-02
Amplifier	Tonscend	TAP00903040	2020-10-26	2021-10-25	XAW01-41-01
Amplifier	Tonscend	TAP01018048	2020-10-26	2021-10-25	XAW01-41-02
Amplifier	Tonscend	TAP18040048	2020-10-26	2021-10-25	XAW01-41-03
Amplifier	Shanghai Steed	YX28980930	2020-10-26	2021-10-25	XAW01-41-06
Artificial network	ROHDE&SCHWARZ	ENV216	2020-08-04	2021-08-03	XAW01-19-02
Temperature and humidity meter	MingGao	TH101B	2020-06-11	2021-05-11	XAW01-01-01
Measurement Software	Tonscend	TS+ RSE&RE	NCR	NCR	XAW02-05-01
Measurement Software	Tonscend	TS+ CE	NCR	NCR	XAW02-05-02

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## 7 Photographs - EUT Constructional Details

Refer to Appendix A PCE Setup Photos.

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The End



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