



# FCC TEST REPORT

<b>Application No.:</b>	ZR/2019/90020
<b>Applicant:</b>	Qualcomm Atheros, Inc.
<b>Address of Applicant</b>	1700 Technology Drive, San Jose, CA 95110
<b>Manufacturer:</b>	Qualcomm Atheros, Inc.
<b>Address of Manufacturer</b>	1700 Technology Drive, San Jose, CA 95110
<b>EUT Description:</b>	2x2 802.11A/B/G/N/AC WiFi + Bluetooth Module
<b>Model No.:</b>	QCNFA324
<b>Trade Mark:</b>	Qualcomm
<b>FCC ID:</b>	PPD-QCNFA324
<b>Standards:</b>	47 CFR FCC Part 2, Subpart J 47 CFR Part 15, Subpart C
<b>Test Method</b>	ANSI C63.10 (2013) KDB558074 D01 15.247 Meas Guidance v05r02
<b>Date of Receipt:</b>	2019/11/30
<b>Date of Test:</b>	2019/12/1 to 2019/12/16
<b>Date of Issue:</b>	2020/1/6

<b>Test Result:</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang

Wireless Laboratory Manager



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## 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2019/12/16		Original
01		2020/1/6		Modified limit for Unwanted Emissions in the Restricted Bands (Radiated)

Authorized for issue by:				
Tested By		 (Mike Hu) /Project Engineer	2020/1/6	
Checked By		 (David Chen) /Reviewer	2020/1/6	

**Remark:**

This is to request a Class II permissive change for 2x2 802.11a/b/g/n/ac + Bluetooth Module, Model Name: QCNFA324, FCC ID: PPD-QCNFA324.

The major change filed under this application is:

- The subject approved module is being used in a specific host (portable category configuration, brand name/model: Lenovo/Lenovo CT-X636F).
- Power reduction in order to comply with SAR and RSE requirements.

So only conducted output power and unwanted emissions that fall Out of the Restricted Bands (Radiated), unwanted emissions in the Restricted Bands (Radiated) spot checked, and the data displayed in this report, other data can refer to the original report (Report No.: RF140808E04-2) .

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## 2 Test Summary

Test Item	Test Requirement	Test method	Test Result	Result
Conducted Output Power	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.1	PASS
Radiated Spurious emissions	15.247(d); 15.205/15.209	ANSI C63.10 (2013)	Clause 4.2	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d); 15.205/15.209	ANSI C63.10 (2013)	Clause 4.3	PASS

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## 3 General Information

### 3.1 Client Information

Applicant:	Qualcomm Atheros, Inc.
Address of Applicant:	1700 Technology Drive, San Jose, CA 95110
Manufacturer:	Qualcomm Atheros, Inc.
Address of Manufacturer:	1700 Technology Drive, San Jose, CA 95110

### 3.2 Test Location

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
Telephone:	+86 (0) 755 2601 2053
Fax:	+86 (0) 755 2671 0594
E-mail:	ee.shenzhen@sgs.com

### 3.3 Test Facility

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

#### • CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### • 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.

#### • Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

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### 3.4 General Description of EUT

EUT Description:		2x2 802.11A/B/G/N/AC WiFi + Bluetooth Module
Model No.:		QCNFA324
Trade Mark:		Qualcomm
Product Description of Host		Portable Tablet Computer
Model No. of Host:		Lenovo CT-X636F
Trade Mark of Host:		Lenovo
Host	Hardware Version:	Google Chrome 79.0.3940.0 (Platform 12601.0.0-19.10.16)
	Software Version:	Lenovo Tablet CT-X636F
Operation Frequency:		2400MHz~2483.5MHz fc = 2402 MHz + N * 1 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 78.
Bluetooth Version:		BT-EDR
Modulation Technique:		Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:		GFSK, π/4DQPSK, 8DPSK
Number of Channel:		79
Hopping Channel Type:		Adaptive Frequency Hopping systems
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:		-0.8dBi
Power Supply		<input type="checkbox"/> AC/DC Adapter; <input checked="" type="checkbox"/> Battery <input type="checkbox"/> PoE;; <input type="checkbox"/> Other:

#### Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz

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15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

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	2402MHz
The Middle channel	2441MHz
The Highest channel	2480MHz

### 3.5 Test Environment

Operating Environment	
Temperature:	24.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	101.30 KPa

### 3.6 Description of Support Units

The EUT has been tested independent unit.

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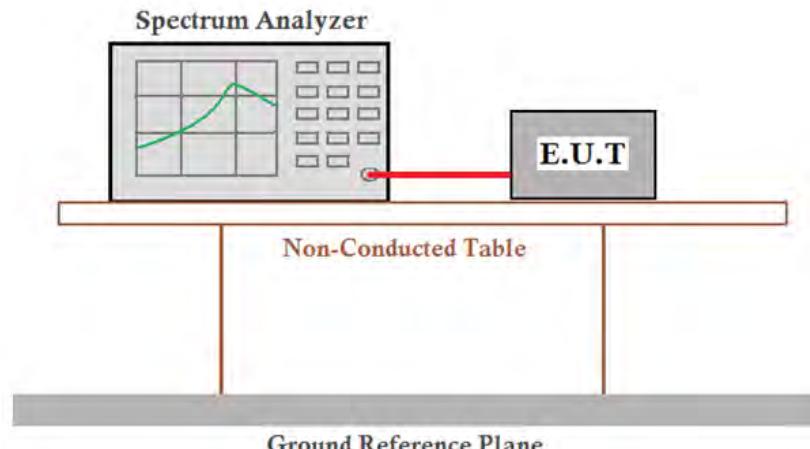
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## 4 Test results and Measurement Data

### 4.1 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 Section 7.8.5
Test Setup:	
Limit:	(20.97dBm) 125mW
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of $\pi/4$ DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

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#### 4.1.1 Test Results

**Measurement Data of Average power:**

<b>GFSK mode</b>		
<b>Test channel</b>	<b>Average Output Power (dBm)</b>	<b>Result</b>
Lowest	5.58	Pass
Middle	5.54	Pass
Highest	5.86	Pass

<b><math>\pi/4</math>DQPSK mode</b>		
<b>Test channel</b>	<b>Average Output Power (dBm)</b>	<b>Result</b>
Lowest	1.35	Pass
Middle	2.12	Pass
Highest	2.05	Pass

<b>8DPSK mode</b>		
<b>Test channel</b>	<b>Average Output Power (dBm)</b>	<b>Result</b>
Lowest	1.48	Pass
Middle	2.46	Pass
Highest	3.25	Pass

**Measurement Data of Peak power:**

<b>GFSK mode</b>		
<b>Test channel</b>	<b>Peak Output Power (dBm)</b>	<b>Result</b>
Lowest	9.42	Pass
Middle	9.48	Pass
Highest	9.59	Pass

<b><math>\pi/4</math>DQPSK mode</b>		
<b>Test channel</b>	<b>Peak Output Power (dBm)</b>	<b>Result</b>
Lowest	8.51	Pass
Middle	8.70	Pass
Highest	8.62	Pass

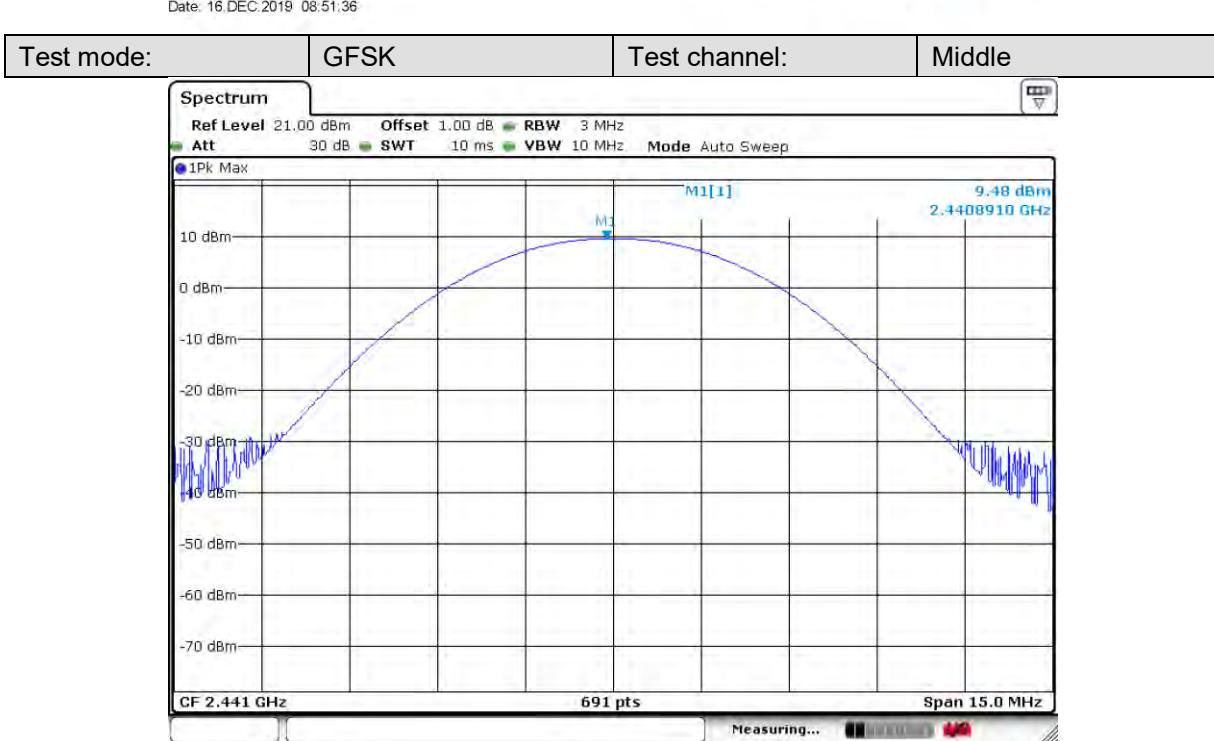
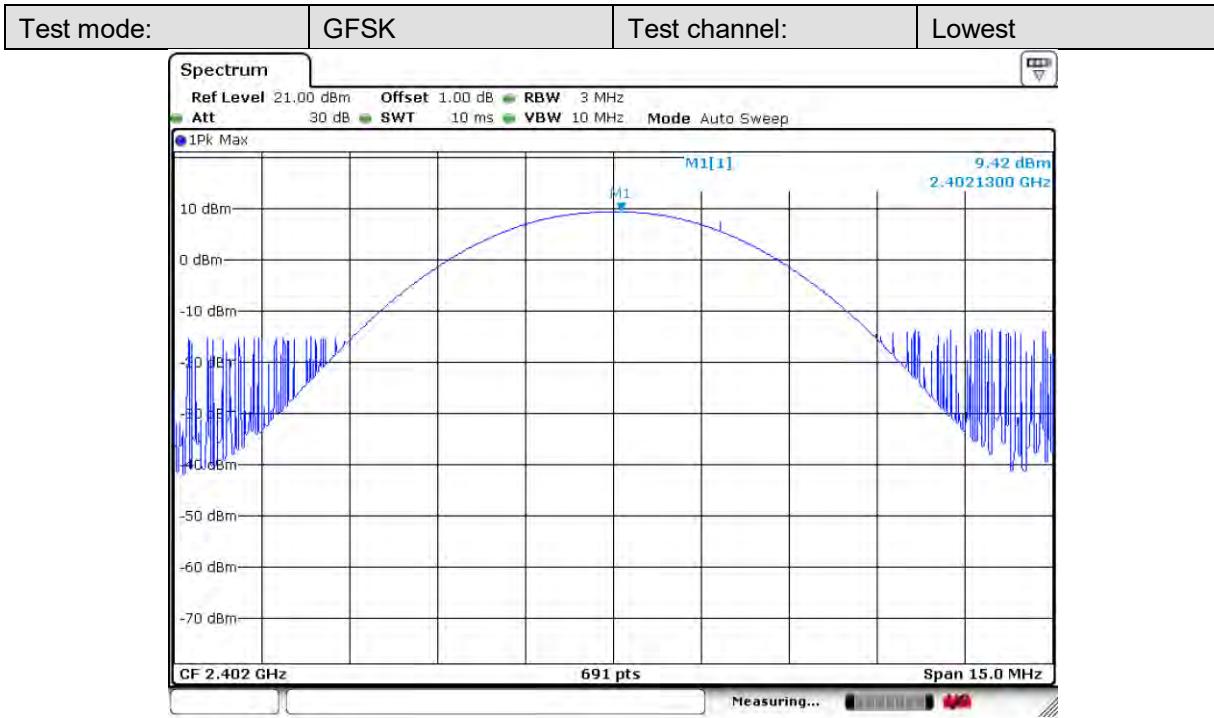
<b>8DPSK mode</b>		
<b>Test channel</b>	<b>Peak Output Power (dBm)</b>	<b>Result</b>
Lowest	8.72	Pass
Middle	9.08	Pass
Highest	8.96	Pass

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**4.1.2 Test plots**

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Test mode:	GFSK	Test channel:	Highest
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Test mode:	$\pi/4$ DQPSK	Test channel:	Lowest
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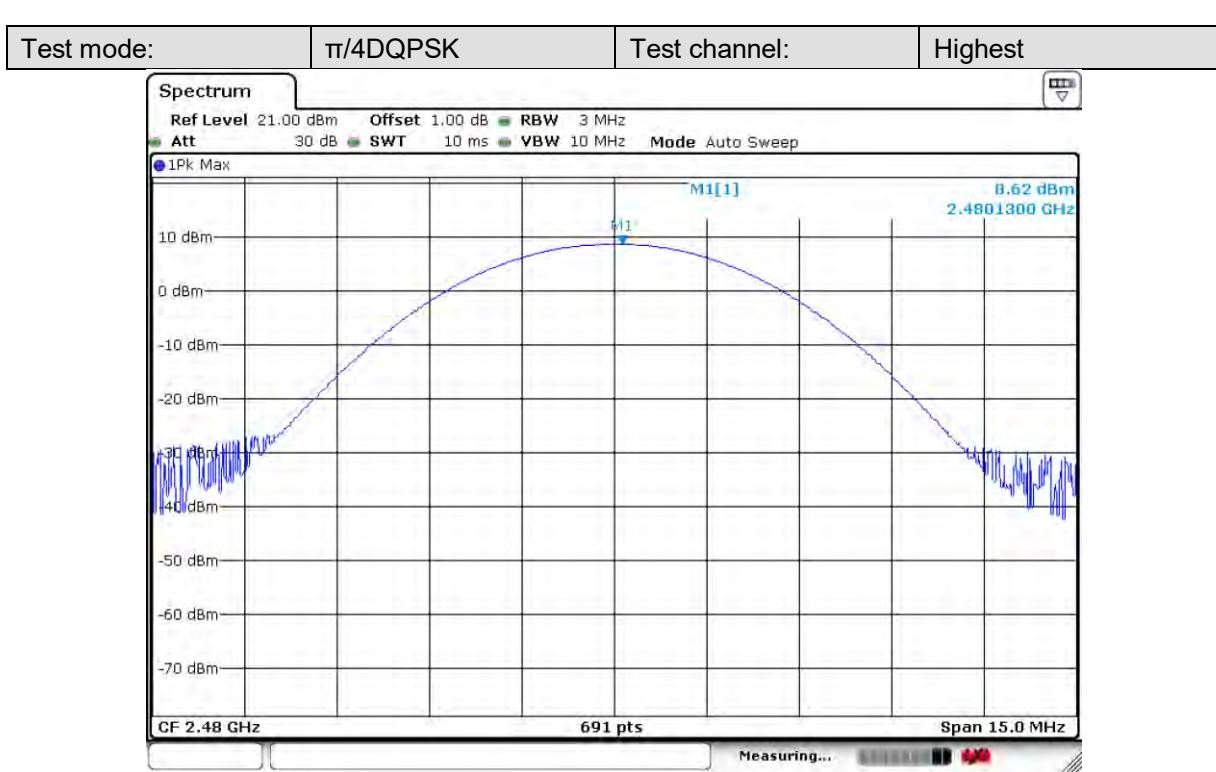
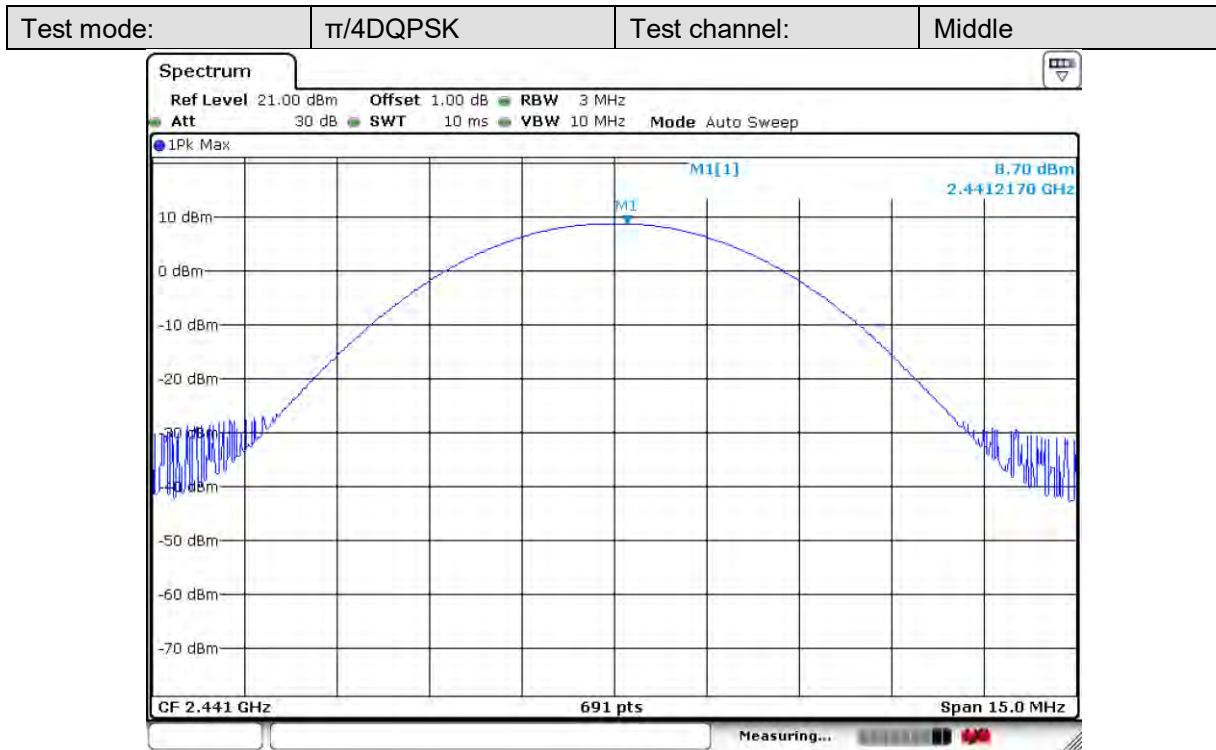
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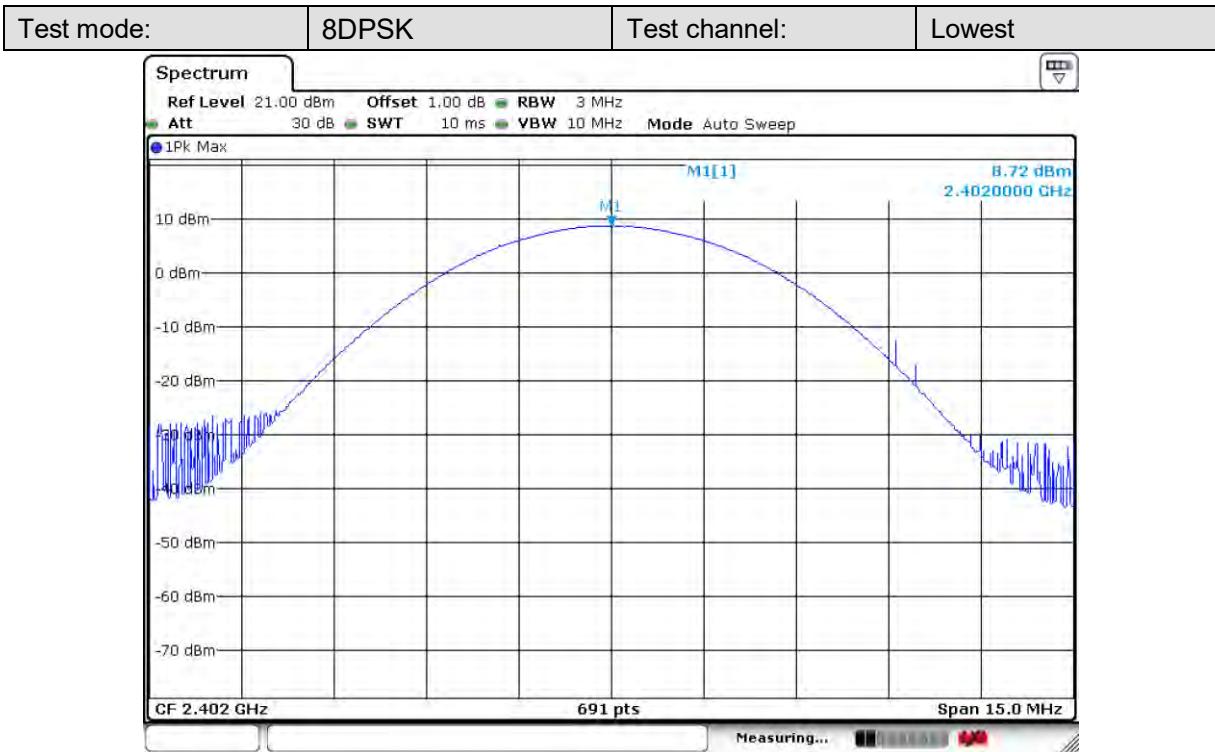
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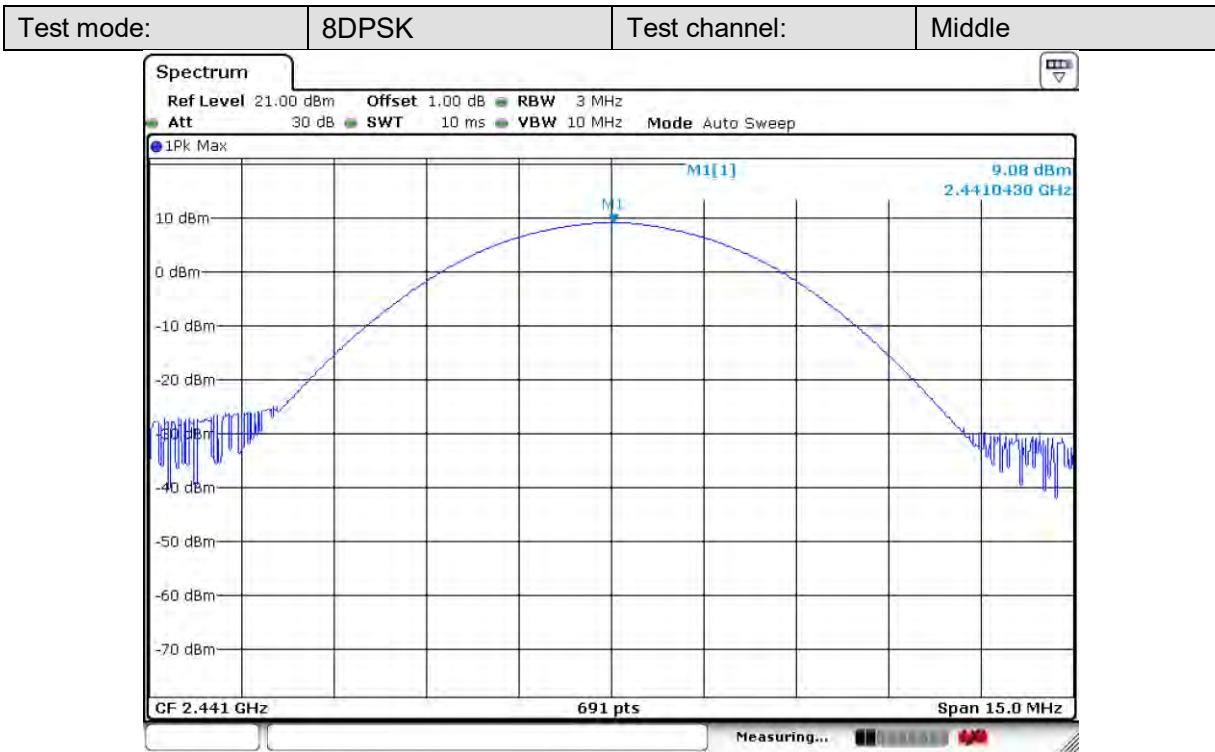
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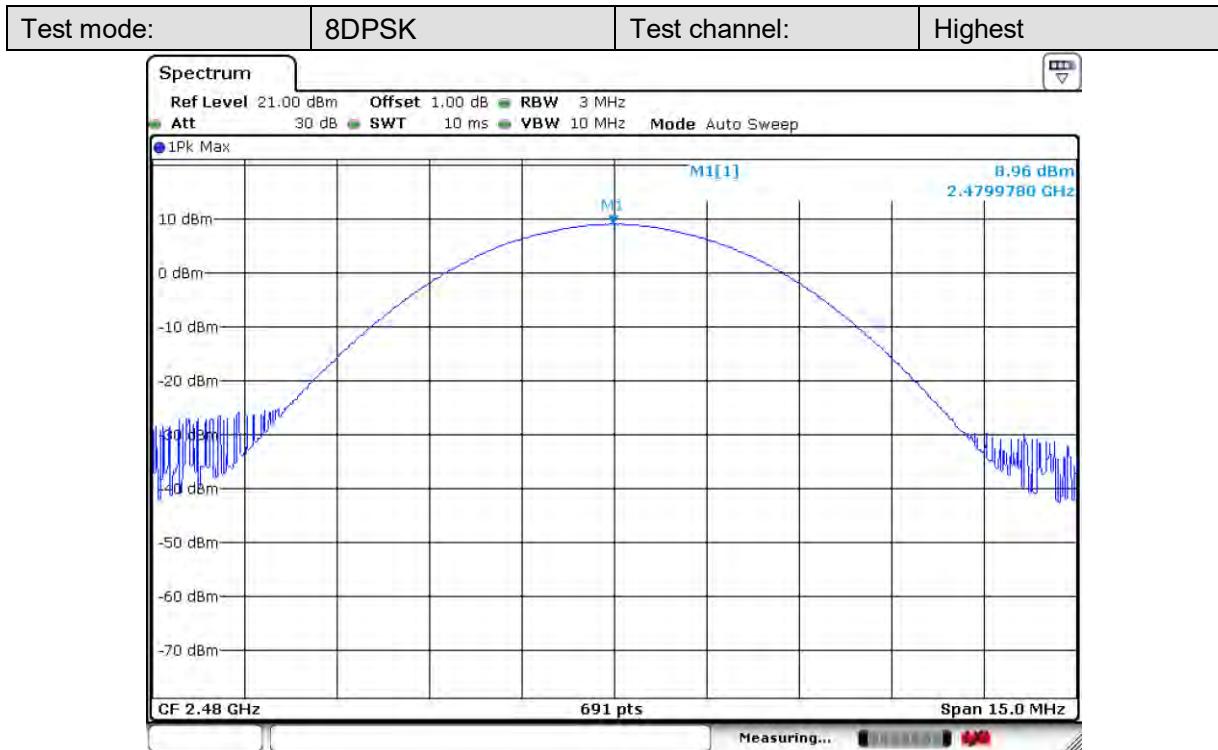
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## 4.2 Radiated Spurious Emission

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013				
Test Site:	Measurement Distance: 3m or 10m (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	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Field strength (microvolt/meter )	Limit (dBuV/m )	Remark	Measuremen t 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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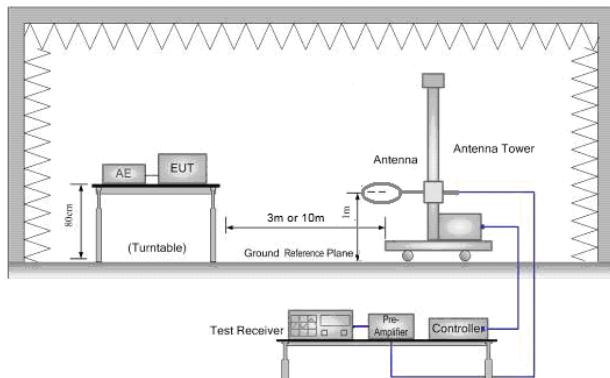
**Test Setup:**

Figure 1. Below 30MHz

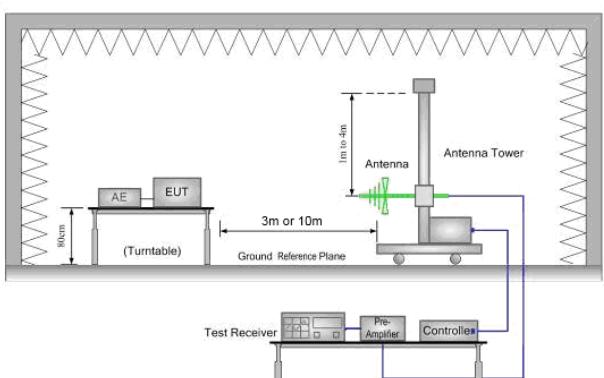


Figure 2. 30MHz to 1GHz

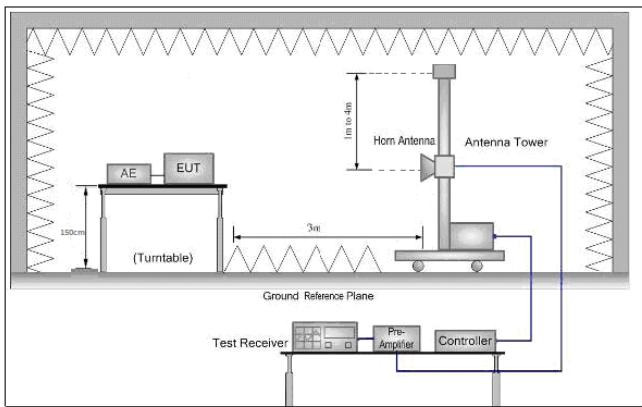


Figure 3. Above 1 GHz

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Test Procedure:	<ul style="list-style-type: none"> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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.</li> <li>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.</li> <li>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 (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.</li> <li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>g. 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.</li> <li>h. Test the EUT in the lowest channel (2402MHz), the middle channel (2441MHz), the Highest channel (2480MHz)</li> <li>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</li> <li>j. Repeat above procedures until all frequencies measured was complete.</li> </ul>
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. 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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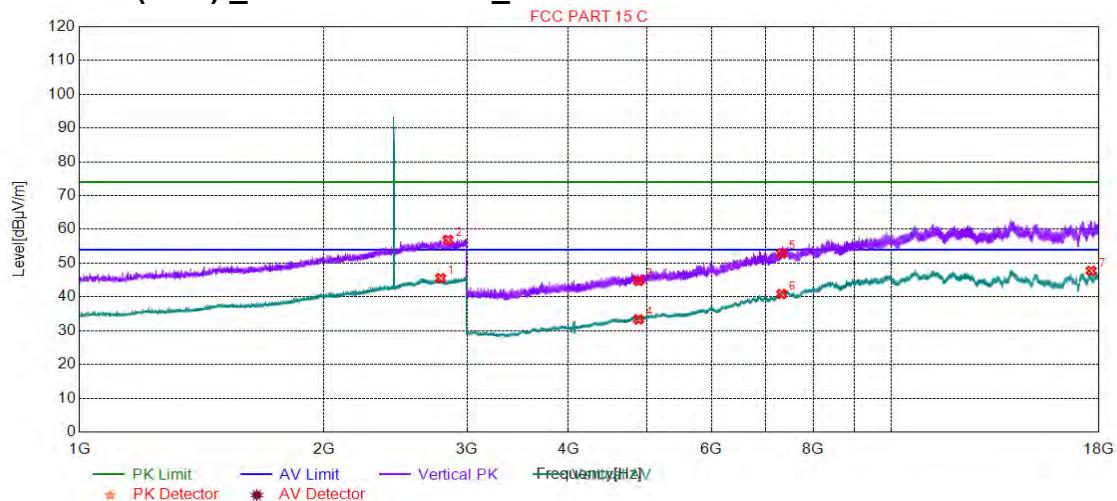
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#### 4.2.1 Radiated Emission below 1GHz

#### 4.2.2 Transmitter Emission above 1GHz

##### 4.2.2.1 GFSK(DH5) \_Middle Channel \_Vertical



NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2784.4461	45.55	11.14	54.00	8.45	150	190	AV	Vertical
2	2841.9605	56.90	11.41	74.00	17.10	150	135	PK	Vertical
3	4880.0000	44.71	-14.65	74.00	29.29	150	46	PK	Vertical
4	4880.0000	33.37	-14.65	54.00	20.63	150	102	AV	Vertical
5	7320.0000	52.88	-6.17	74.00	21.12	150	350	PK	Vertical
6	7320.0000	40.86	-6.17	54.00	13.14	150	350	AV	Vertical
7	17602.9801	47.73	4.25	54.00	6.27	150	91	AV	Vertical

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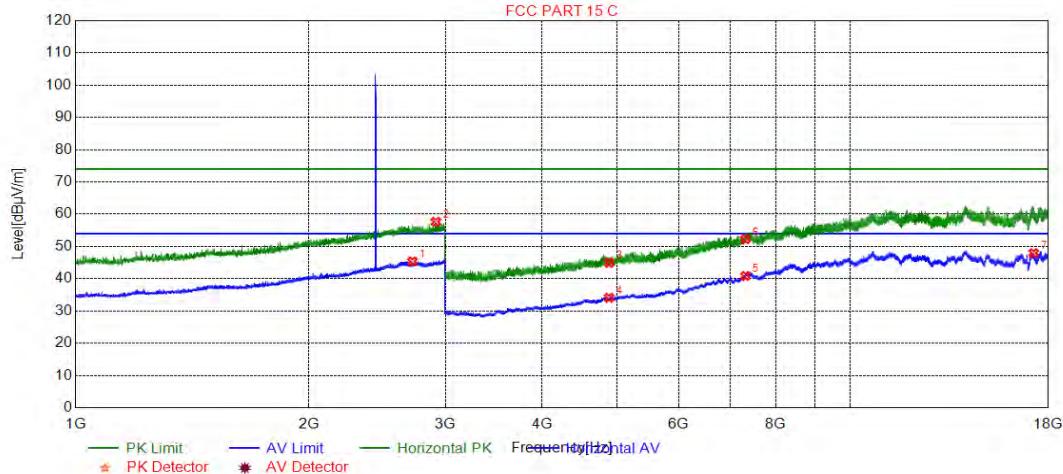
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## 4.2.2.2 GFSK(DH5) \_ Middle Channel \_ Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2720.4301	45.36	10.98	54.00	8.64	150	279	AV	Horizontal
2	2916.9792	57.64	11.49	74.00	16.36	150	195	PK	Horizontal
3	4880.0000	44.95	-14.65	74.00	29.05	150	46	PK	Horizontal
4	4880.0000	34.10	-14.65	54.00	19.90	150	155	AV	Horizontal
5	7320.0000	40.85	-6.17	54.00	13.15	150	128	PK	Horizontal
6	7320.0000	52.27	-6.17	74.00	21.73	150	298	AV	Horizontal
7	17227.4614	47.94	2.50	54.00	6.06	150	291	AV	Horizontal

## Remark:

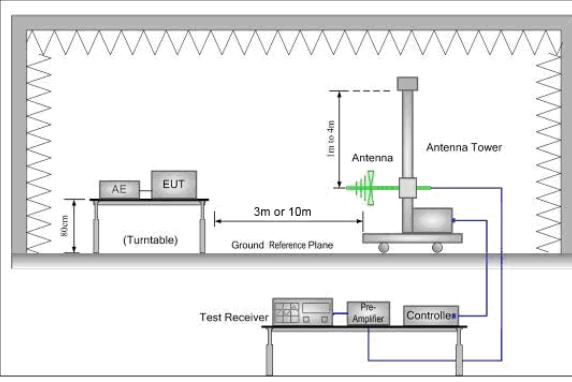
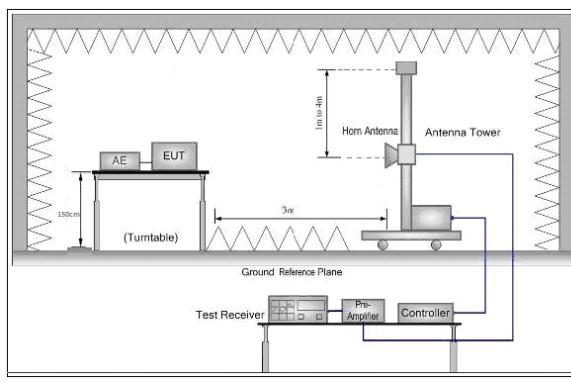
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz 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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### 4.3 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205					
Test Method:	ANSI C63.10: 2013					
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)					
Limit:	Frequency	Limit (dBuV/m @3m)	Remark			
	30MHz-88MHz	40.0	Quasi-peak Value			
	88MHz-216MHz	43.5	Quasi-peak Value			
	216MHz-960MHz	46.0	Quasi-peak Value			
	960MHz-1GHz	54.0	Quasi-peak Value			
	Above 1GHz	54.0	Average Value			
		74.0	Peak Value			
Test Setup:						
						
						
Figure 1. 30MHz to 1GHz		Figure 2. Above 1 GHz				

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Test Procedure:	<ol style="list-style-type: none"> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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</li> <li>h. Test the EUT in the lowest channel , the Highest channel</li> <li>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</li> <li>j. Repeat above procedures until all frequencies measured was complete.</li> </ol>
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. 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
Test Results:	Pass

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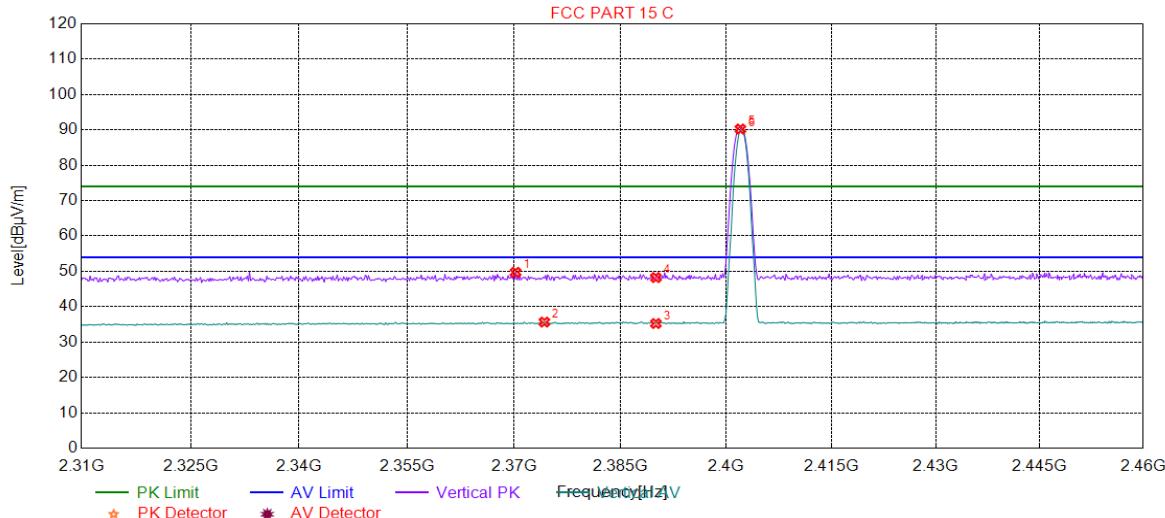


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**4.3.1 Test plots****4.3.1.1 Worst Case Mode (GFSK(DH5)) \_Lowest Channel \_Vertical**

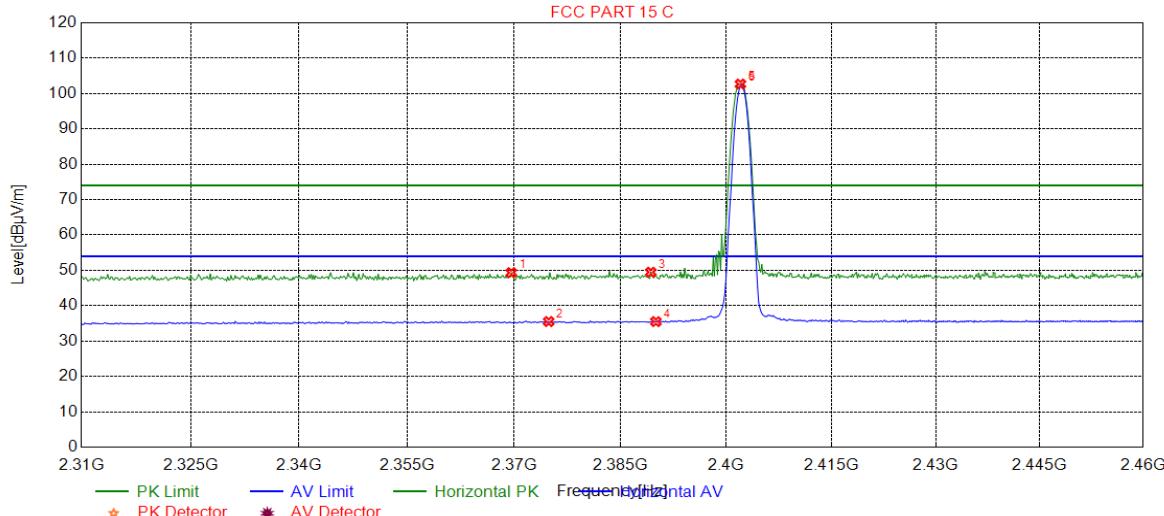
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2370.2102	49.72	9.62	74.00	24.28	150	331	PK	Vertical
2	2374.2643	35.66	9.62	54.00	18.34	150	346	AV	Vertical
3	2390.0000	35.26	9.65	54.00	18.74	150	285	AV	Vertical
4	2390.0000	48.25	9.65	74.00	25.75	150	310	PK	Vertical
5	2402.0000	90.25	9.67	---	---	150	334	PK	Vertical
6	2402.0000	89.90	9.67	---	---	150	334	AV	Vertical

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**4.3.1.2 Worst Case Mode (GFSK(DH5)) \_ Lowest Channel \_ Horizontal**

NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2369.6096	49.34	9.62	74.00	24.66	150	296	PK	Horizontal
2	2374.8649	35.53	9.62	54.00	18.47	150	81	AV	Horizontal
3	2389.2793	49.48	9.64	74.00	24.52	150	81	PK	Horizontal
4	2390.0000	35.51	9.65	54.00	18.49	150	246	AV	Horizontal
5	2402.0000	102.69	9.67	---	---	150	242	PK	Horizontal
6	2402.0000	102.31	9.67	---	---	150	242	AV	Horizontal

**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)

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	Radiated Spurious emission test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-25GHz)
5	Conduct emission test	±3.12 dB(9KHz- 30MHz)
6	Temperature test	±1°C
7	Humidity test	±3%
8	DC and low frequency voltages	±0.5%

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## 6 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019/7/14	2020/7/14
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2019/4/1	2020/3/31
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2019/6/12	2020/6/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019/3/2	2020/3/1
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	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2019/1/13	2020/1/12
Coaxial Cable	SGS	N/A	SEM031-01	2019/6/12	2020/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2019/10/27	2020/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/14
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017/8/5	2020/8/4
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019/6/12	2020/6/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2019/7/14	2020/7/14
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/6/27	2020/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2019/3/2	2020/3/1
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Measurement Software	AUDIX	e3V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019/6/12	2020/6/11
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2019/3/12	2020/3/11
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
Horn Antenna (0.8-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Pre-amplifier(0.1-1.3GHz)	HP	8447D	SEM005-02	2019/7/14	2020/7/14
Low Noise Amplifier(100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2019/9/3	2020/9/2
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019/3/2	2020/3/1
Band filter	N/A	N/A	SEM023-01	N/A	N/A

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RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018/3/31	2021/3/30
EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019/3/2	2020/3/1
Trilog-Broadband Antenna(25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2018/3/15	2020/3/14
Pre-amplifier (9k-1GHz)	Sonoma	310N	SEM005-03	2019/3/12	2020/3/11
Loop Antenna (9kHz-30MHz)	ETS-Lindgren	6502	SEM003-08	2017/8/22	2020/8/21
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2019/6/12	2020/6/11

## 7 Photographs - EUT Test Setup Details

Refer to Appendix A - Photographs of Set-Up for ZR/2019/90020.

The End

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