

# FCC REPORT

## (Bluetooth)

**Applicant:** One Diamond Electronics INC.

**Address of Applicant:** 1450 Frazee Road, Suite 303 San Diego, CA 92108

### Equipment Under Test (EUT)

**Product Name:** Mobile Phone

**Model No.:** PSPTD21NA

**Trade mark:** Polaroid

**FCC ID:** 2ADWUPSPTD21NA

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247

**Date of sample receipt:** 05 Jun., 2018

**Date of Test:** 05 Jun., to 28 Jun., 2018

**Date of report issued:** 28 Jun., 2018

**Test Result:** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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**2 Version**

Version No.	Date	Description
00	28 Jun., 2018	Original

**Tested by:***Zora Lee***Date:**

28 Jun., 2018

**Test Engineer****Reviewed by:***Wimer Wang***Date:**

28 Jun., 2018

**Project Engineer**

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## 4 Test Summary

Test Items	Section in CFR 47	Result
Antenna Requirement	15.203 & 15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Spurious Emission	15.205 & 15.209	Pass
Band Edge	15.247(d)	Pass

Pass: The EUT complies with the essential requirements in the standard.

N/A: Not Applicable.

## 5 General Information

### 5.1 Client Information

Applicant:	One Diamond Electronics INC.
Address:	1450 Frazee Road, Suite 303 San Diego, CA 92108
Manufacturer:	Mobot Technology CO., Ltd.
Address:	3/F, Building 14A, Taihua Wutong Island Industrial Zone, Shunchang Road, Gushu, Xixiang Street

### 5.2 General Description of E.U.T.

Product Name:	Mobile Phone
Model No.:	PSPTD21NA
Operation Frequency:	2402MHz~2480MHz
Transfer rate:	1/2/3 Mbits/s
Number of channel:	79
Modulation type:	GFSK, π/4-DQPSK, 8DPSK
Modulation technology:	FHSS
Antenna Type:	Internal Antenna
Antenna gain:	-0.5 dBi
Power supply:	Rechargeable Li-ion Battery DC3.8V-2500mAh
AC adapter:	Model: PSP10A Input: AC100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1000mA

Operation Frequency each of channel for GFSK, π/4-DQPSK, 8DPSK							
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
...	...	...	...	...	...	...	...
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: Channel 0, 39 &78 selected for GFSK, π/4-DQPSK and 8DPSK.

### 5.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode with worst case data rate.
Hopping mode:	Keep the EUT in hopping mode.
Remark	GFSK (1 Mbps) is the worst case mode.

The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber\*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working with a fresh battery, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

### 5.4 Description of Support Units

The EUT has been tested as an independent unit.

### 5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±2.22 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±2.88 dB (k=2)

### 5.6 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

### 5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,

Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

## 5.8 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-16-2018	03-15-2019
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-16-2018	03-15-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-16-2018	03-15-2019
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A
Pre-amplifier	HP	8447D	2944A09358	03-07-2018	03-06-2019
Pre-amplifier	CD	PAP-1G18	11804	03-07-2018	03-06-2019
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-07-2018	03-06-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-07-2018	03-06-2019
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2018	03-06-2019
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2018	03-06-2019
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2018	03-06-2019

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-07-2018	03-06-2019
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-07-2018	03-06-2019
LISN	CHASE	MN2050D	1447	03-19-2018	03-18-2019
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2017	07-20-2018
Cable	HP	10503A	N/A	03-07-2018	03-06-2019
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A

## 6 Test results and measurement data

### 6.1 Antenna Requirement

Standard requirement:	FCC Part 15 C 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(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	The Bluetooth antenna is an External antenna which permanently attached, and the best case gain of the antenna is -0.5 dBi.

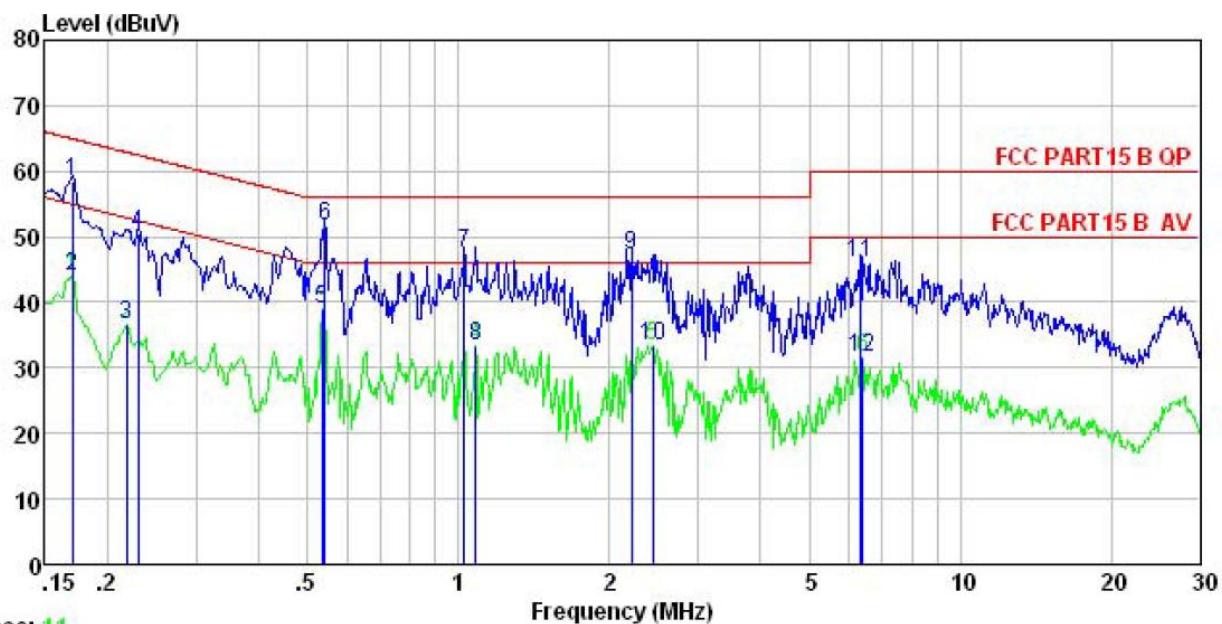


## 6.2 Conducted Emissions

Test Requirement:	FCC Part 15 C Section 15.207		
Test Method:	ANSI C63.10:2013		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	<p>Reference Plane</p> <p>LISN</p> <p>40cm</p> <p>80cm</p> <p>E.U.T</p> <p>AUX Equipment</p> <p>EMI Receiver</p> <p>Filter</p> <p>AC power</p> <p>Test table/Insulation plane</p> <p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>		
Test procedure:	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.</li> </ol>		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Hopping mode		
Test results:	Pass		

**Measurement Data:**

Test Phase: Line



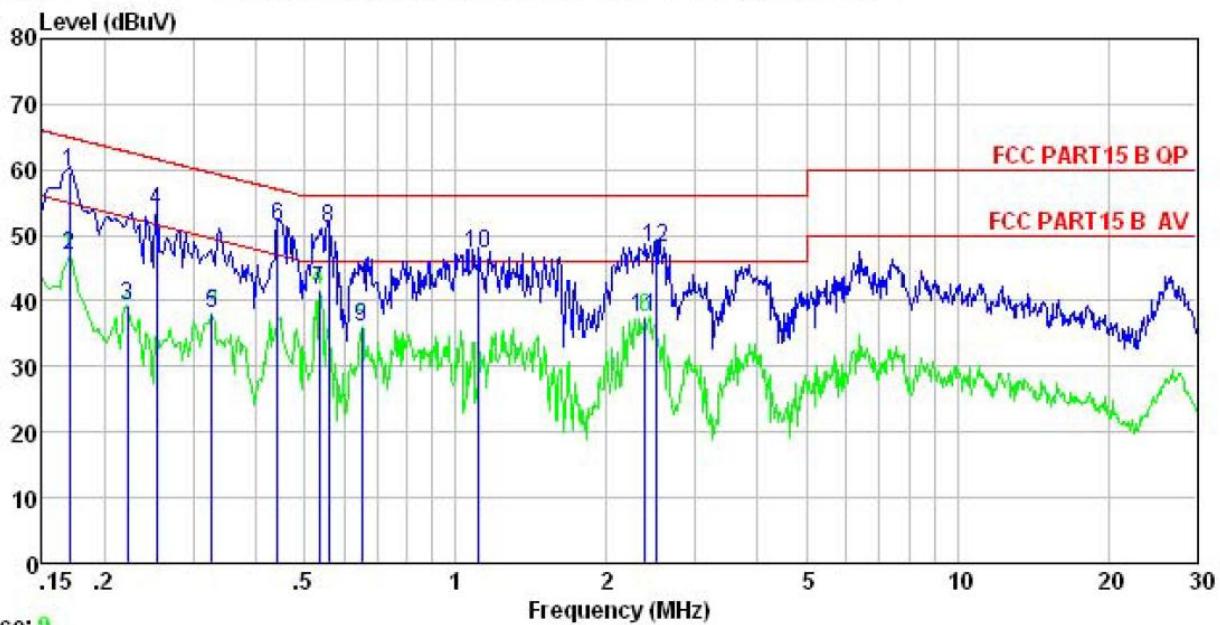
Site : CCIS Shielding Room  
 Condition : FCC PART15 B QP LISN LINE  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test Mode : BT mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp: 23 °C Huni:56% Atmos:101KPa  
 Test Engineer: Zora  
 Remark :

Freq	Read	LISN	Cable	Limit	Over	Remark
	Level	Factor	Loss	Level	Line	
MHz	dBuV		dB	dB	dBuV	dB
1	0.170	47.49	0.17	10.77	58.43	64.94 -6.51 QP
2	0.170	33.17	0.17	10.77	44.11	54.94 -10.83 Average
3	0.219	25.62	0.15	10.76	36.53	52.88 -16.35 Average
4	0.230	39.44	0.14	10.75	50.33	62.44 -12.11 QP
5	0.535	27.96	0.12	10.76	38.84	46.00 -7.16 Average
6	0.541	40.77	0.12	10.76	51.65	56.00 -4.35 QP
7	1.027	36.54	0.13	10.87	47.54	56.00 -8.46 QP
8	1.082	22.49	0.13	10.88	33.50	46.00 -12.50 Average
9	2.213	36.19	0.15	10.95	47.29	56.00 -8.71 QP
10	2.435	22.41	0.15	10.94	33.50	46.00 -12.50 Average
11	6.319	35.12	0.24	10.81	46.17	60.00 -13.83 QP
12	6.386	20.41	0.24	10.81	31.46	50.00 -18.54 Average

**Notes:**

- An initial pre-scan was performed on the line and neutral lines with peak detector.
- Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- Final Level = Receiver Read level + LISN Factor + Cable Loss.

Test Phase: Neutral



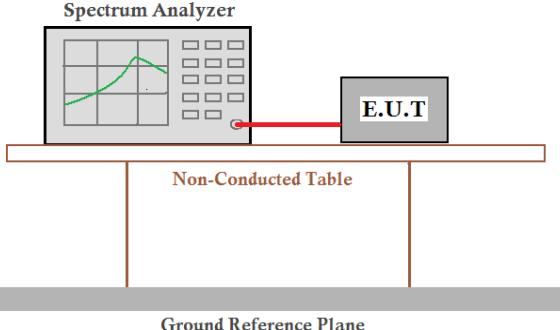
Site : CCIS Shielding Room  
 Condition : FCC PART15 B QP LISN NEUTRAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test Mode : BT mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp: 23 °C Huni:56% Atmos:101KPa  
 Test Engineer: Zora  
 Remark :

	Read Freq	LISN Level	Cable Factor	Limit Loss	Line Level	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.170	47.79	0.96	10.77	59.52	64.94	-5.42 QP
2	0.170	35.09	0.96	10.77	46.82	54.94	-8.12 Average
3	0.222	27.63	0.93	10.76	39.32	52.74	-13.42 Average
4	0.253	42.11	0.95	10.75	53.81	61.64	-7.83 QP
5	0.327	26.47	0.97	10.73	38.17	49.53	-11.36 Average
6	0.442	39.59	0.97	10.74	51.30	57.02	-5.72 QP
7	0.535	29.93	0.97	10.76	41.66	46.00	-4.34 Average
8	0.558	39.48	0.97	10.76	51.21	56.00	-4.79 QP
9	0.651	24.32	0.97	10.77	36.06	46.00	-9.94 Average
10	1.111	35.32	0.97	10.88	47.17	56.00	-8.83 QP
11	2.384	25.60	0.99	10.94	37.53	46.00	-8.47 Average
12	2.500	36.33	0.99	10.94	48.26	56.00	-7.74 QP

## Notes:

- An initial pre-scan was performed on the line and neutral lines with peak detector.
- Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- Final Level = Receiver Read level + LISN Factor + Cable Loss.

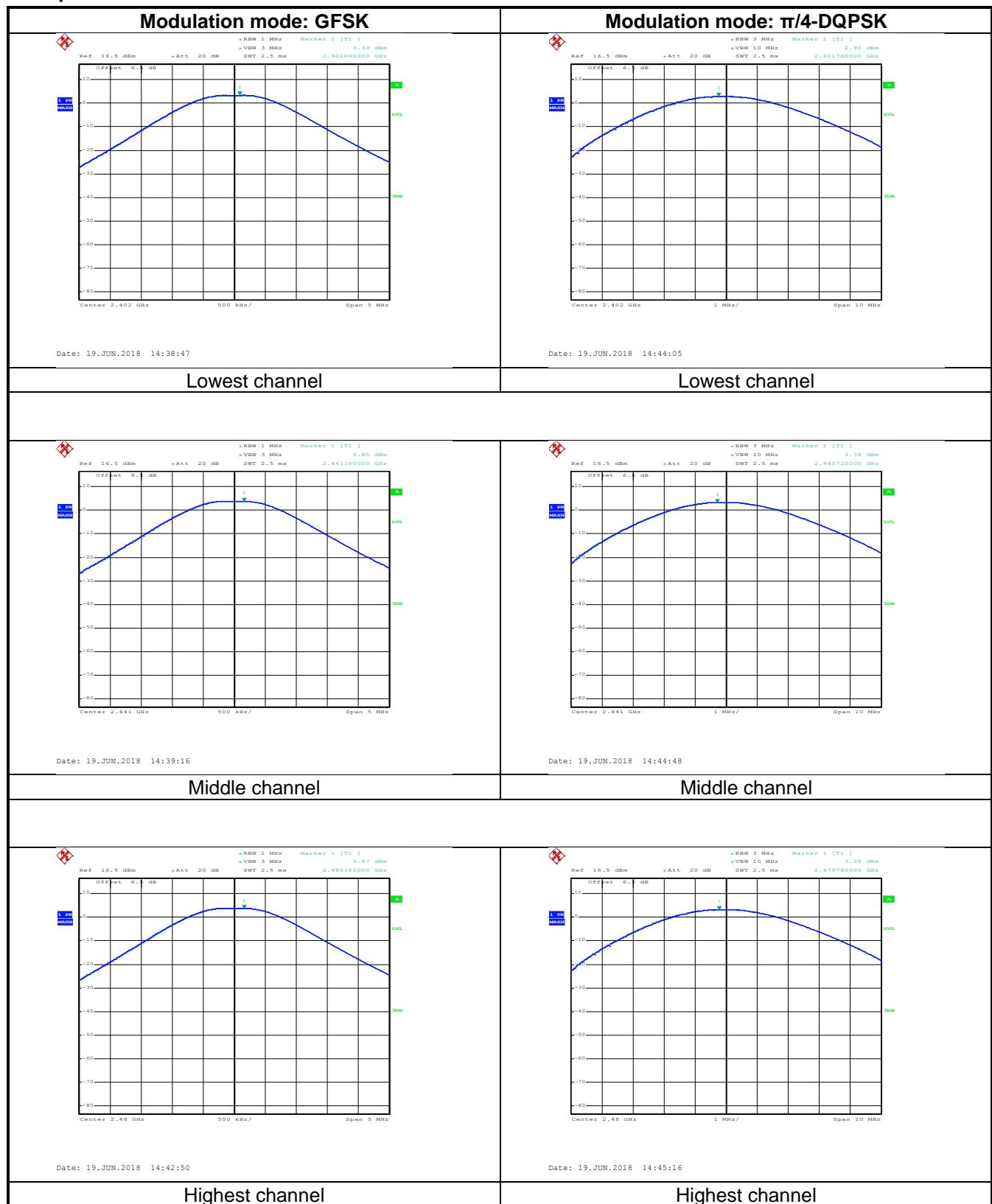
### 6.3 Conducted Output Power

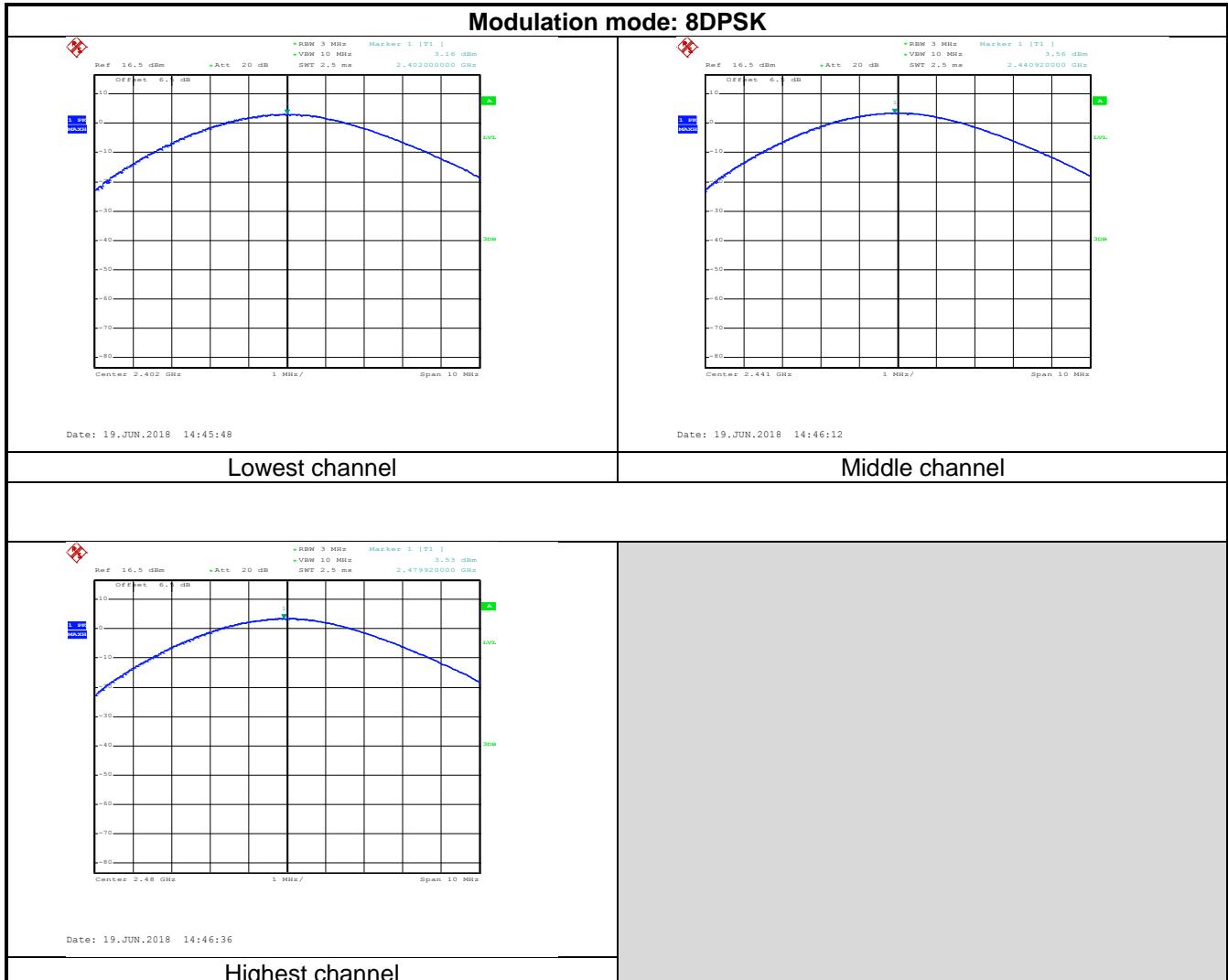
Test Requirement:	FCC Part 15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤ 1 MHz) RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz and < 3MHz)
Limit:	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is positioned above a Non-Conducted Table. The table is supported by a Ground Reference Plane. A red cable connects the Spectrum Analyzer to the Equipment Under Test (E.U.T), which is represented by a gray rectangular box.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass

#### Measurement Data:

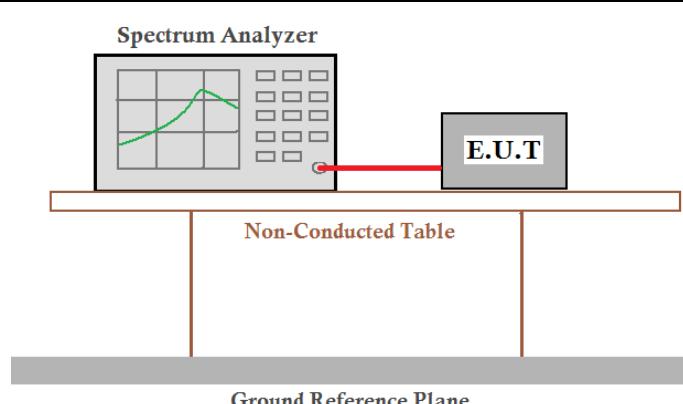
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
GFSK mode			
Lowest channel	3.39	30.00	Pass
Middle channel	3.85	30.00	Pass
Highest channel	3.87	30.00	Pass
π/4-DQPSK mode			
Lowest channel	2.92	21.00	Pass
Middle channel	3.38	21.00	Pass
Highest channel	3.38	21.00	Pass
8DPSK mode			
Lowest channel	3.16	21.00	Pass
Middle channel	3.56	21.00	Pass
Highest channel	3.53	21.00	Pass

Test plot as follows:





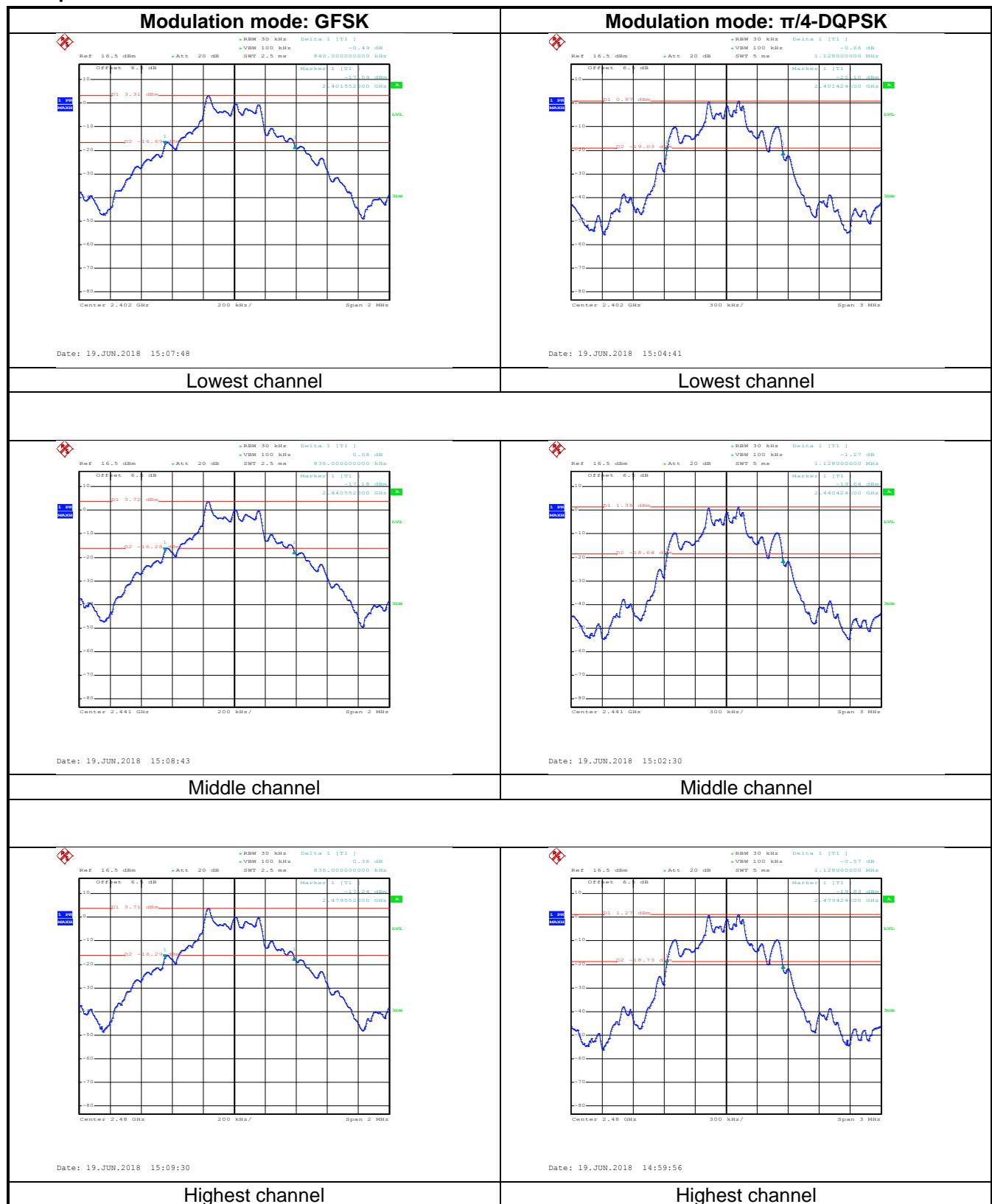
## 6.4 20dB Occupy Bandwidth

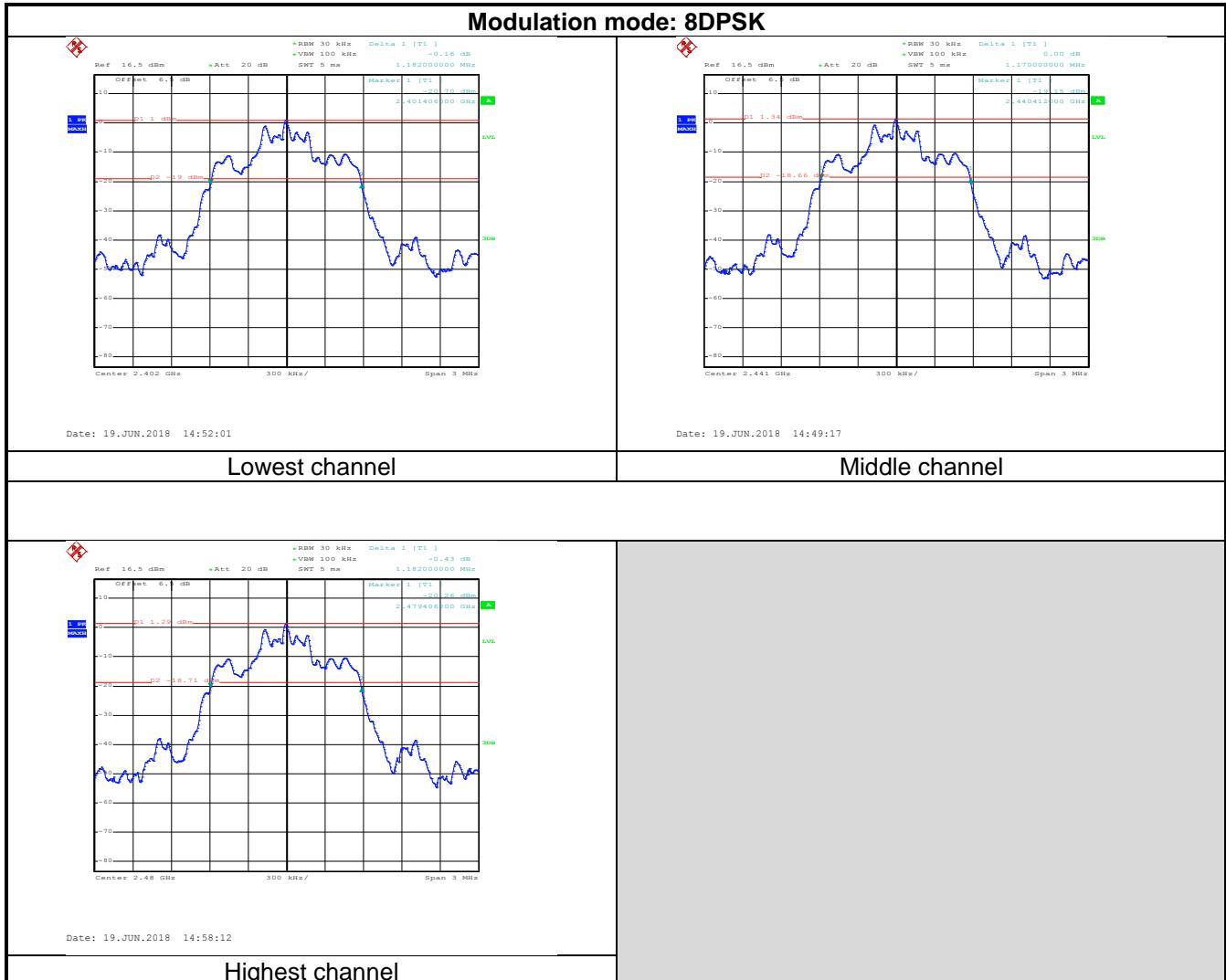
Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
Limit:	NA
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to the E.U.T (Equipment Under Test) via a cable. The E.U.T is placed on a Non-Conducted Table. The entire assembly sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass

### Measurement Data:

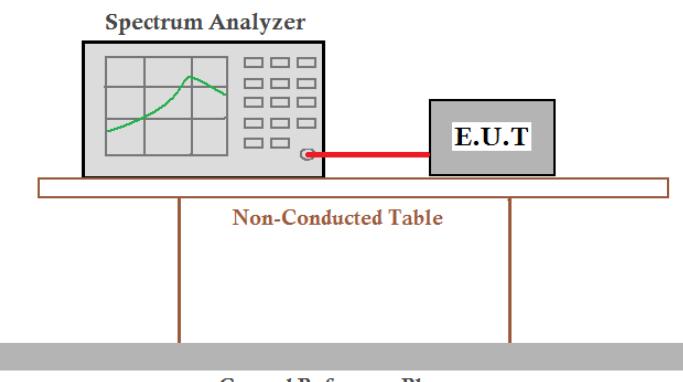
Test channel	20dB Occupy Bandwidth (kHz)		
	GFSK	$\pi/4$ -DQPSK	8DPSK
Lowest	840	1128	1182
Middle	836	1128	1170
Highest	836	1128	1182

Test plot as follows:





## 6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=100 kHz, VBW=300 kHz, detector=Peak
Limit:	a) 0.025MHz or the 20dB bandwidth (whichever is greater) b) 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Hopping mode
Test results:	Pass

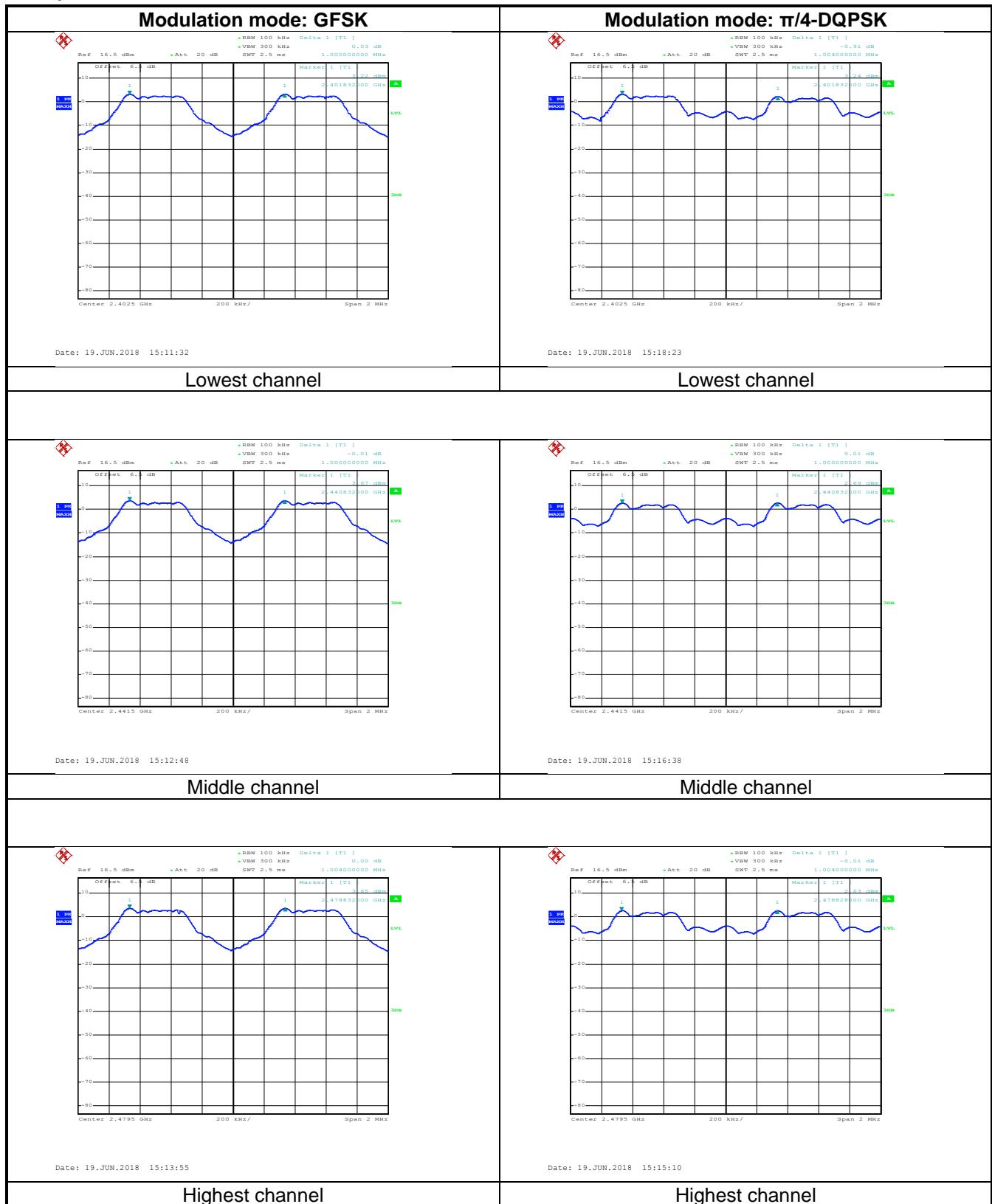
**Measurement Data:**

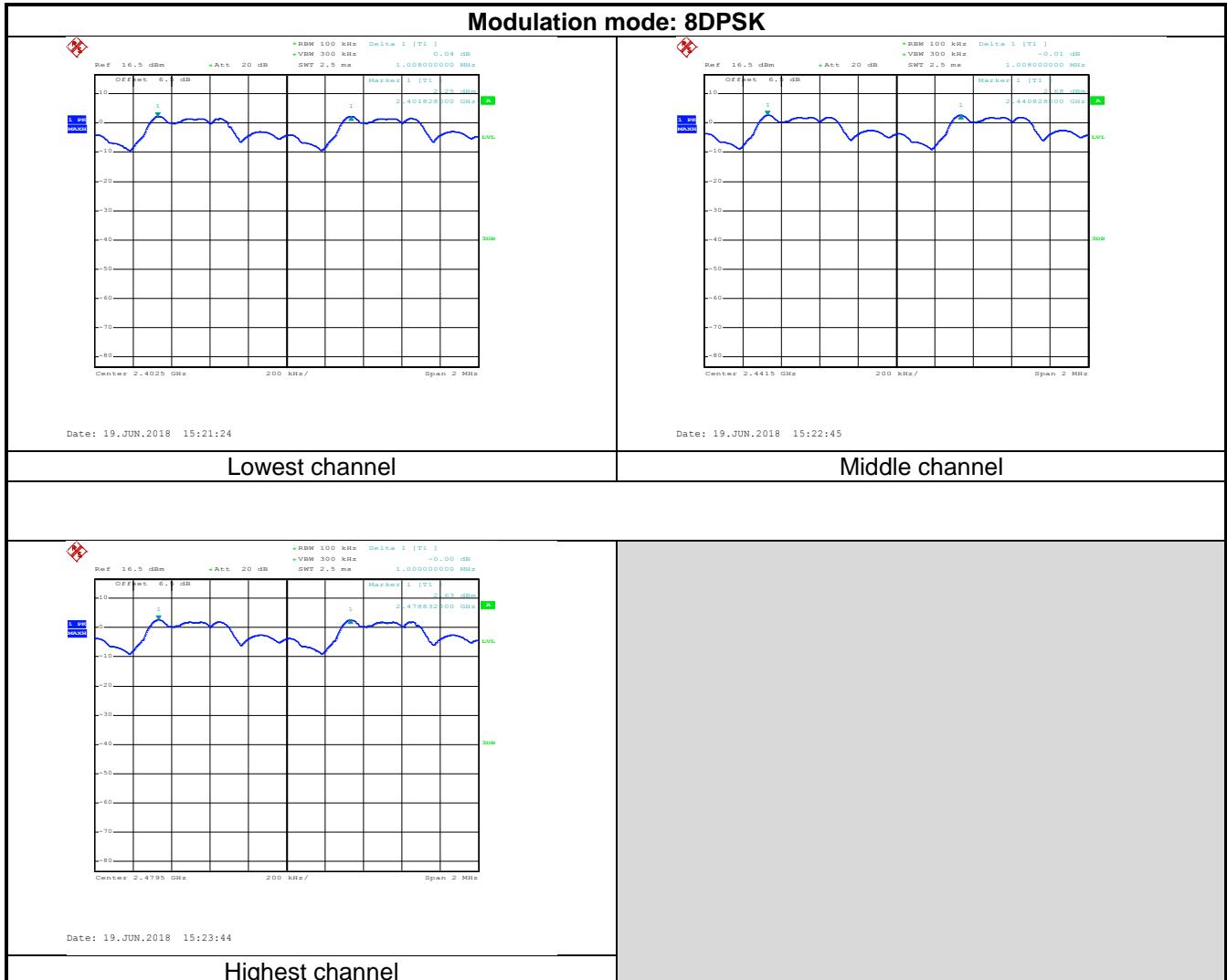
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
GFSK			
Lowest	1000	840.00	Pass
Middle	1000	840.00	Pass
Highest	1004	840.00	Pass
$\pi/4$ -DQPSK mode			
Lowest	1004	752.00	Pass
Middle	1000	752.00	Pass
Highest	1004	752.00	Pass
8DPSK mode			
Lowest	1008	788.00	Pass
Middle	1008	788.00	Pass
Highest	1000	788.00	Pass

Note: According to section 6.4

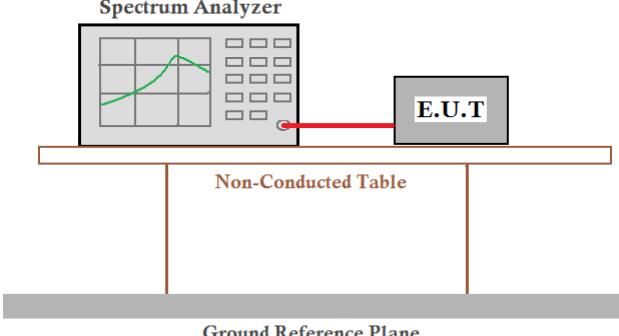
Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GFSK	840	840.00
$\pi/4$ -DQPSK	1128	752.00
8DPSK	1182	788.00

Test plot as follows:





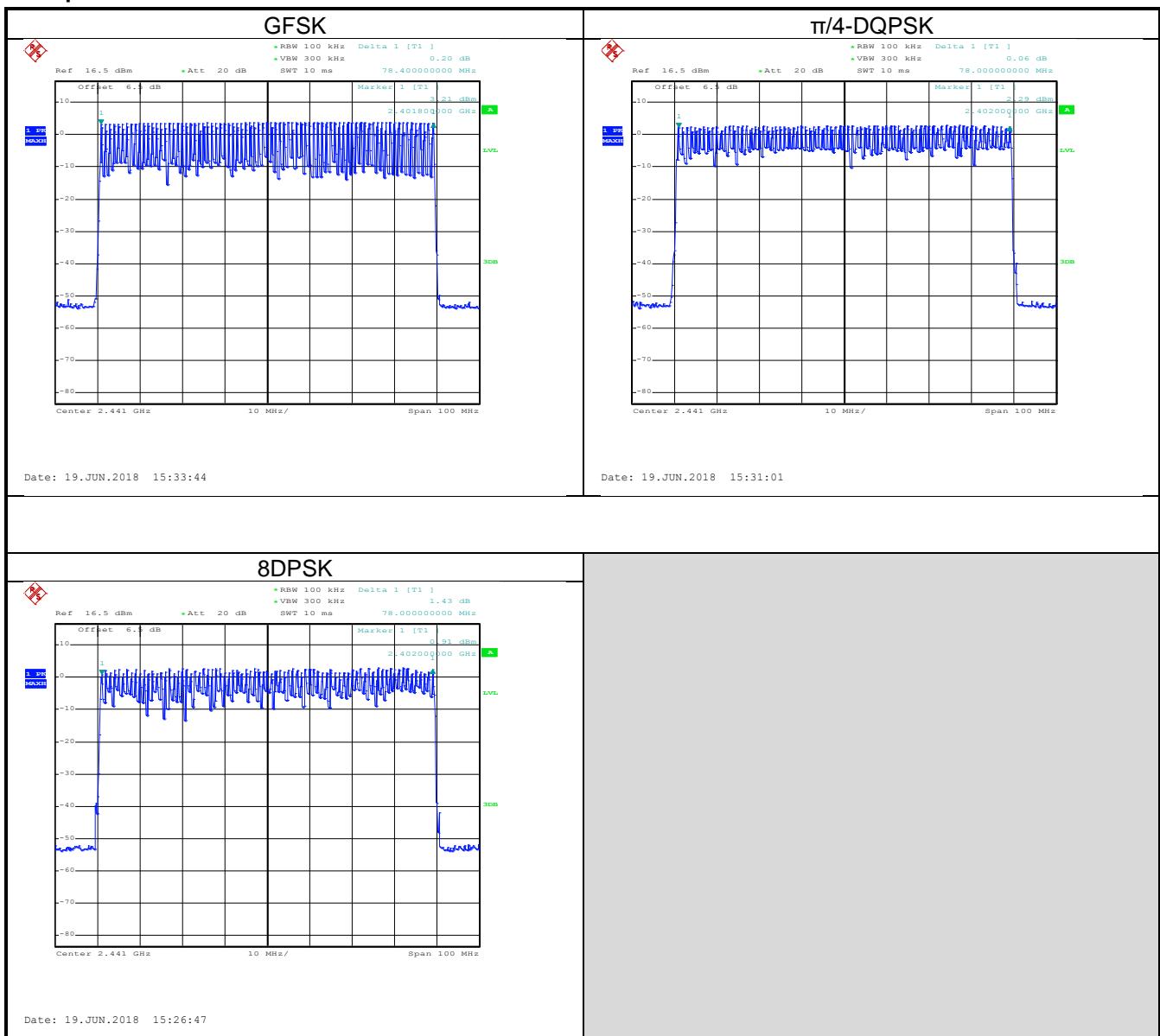
## 6.6 Hopping Channel Number

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Hopping mode
Test results:	Pass

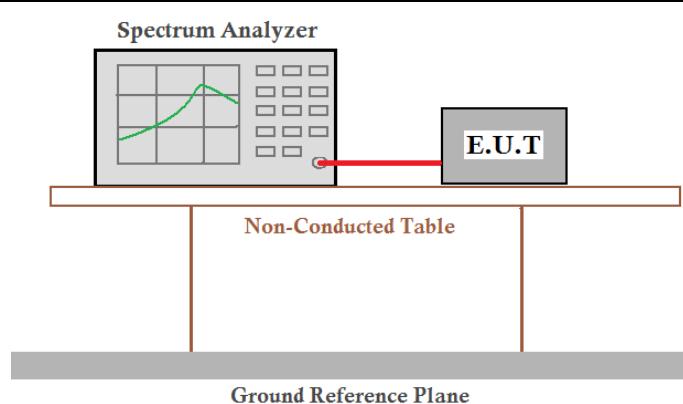
**Measurement Data:**

Mode	Hopping channel numbers	Limit	Result
GFSK, π/4-DQPSK, 8DPSK	79	15	Pass

Test plot as follows:



## 6.7 Dwell Time

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and KDB DA00-705
Receiver setup:	RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is positioned at the top left, displaying a green waveform on its screen. A red line extends from the analyzer's output port to a grey rectangular box labeled 'E.U.T' (Equipment Under Test). This 'E.U.T' box rests on a light-colored rectangular platform labeled 'Non-Conducted Table'. Below the table is a thick grey horizontal bar labeled 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Hopping mode
Test results:	Pass

### Measurement Data (Worse case):

Mode	Packet	Dwell time (second)	Limit (second)	Result
GFSK	DH1	0.12544	0.4	Pass
	DH3	0.26688		
	DH5	0.31147		
$\pi/4$ -DQPSK	2-DH1	0.12928	0.4	Pass
	2-DH3	0.26880		
	2-DH5	0.31147		
8DPSK	3-DH1	0.12736	0.4	Pass
	3-DH3	0.26592		
	3-DH5	0.31232		

#### Note:

The test period = 0.4 Second/Channel x 79 Channel = 31.6 s

Calculation Formula: Dwell time = Ton time per hop \* Hopping numbers \* Period

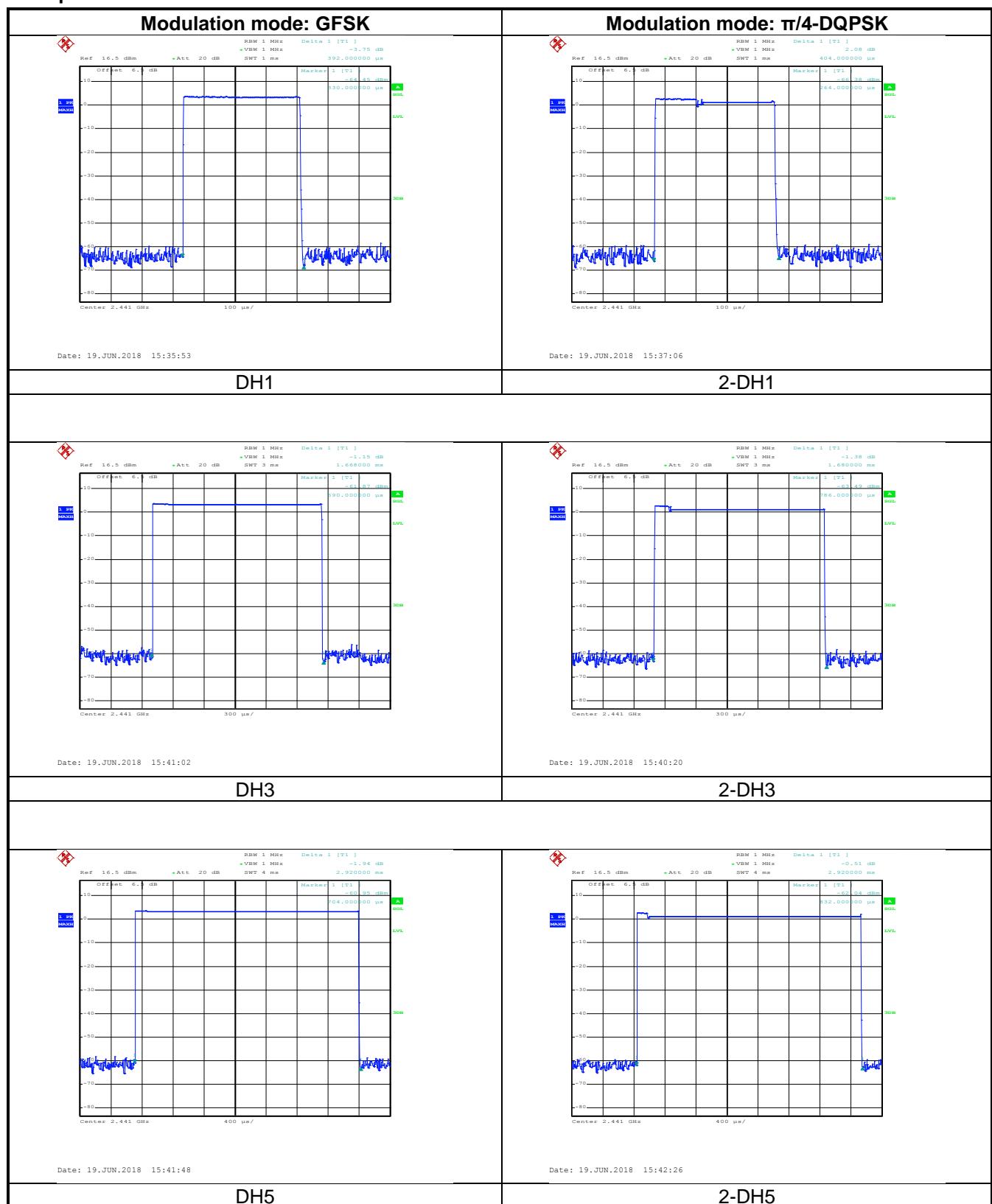
For example:

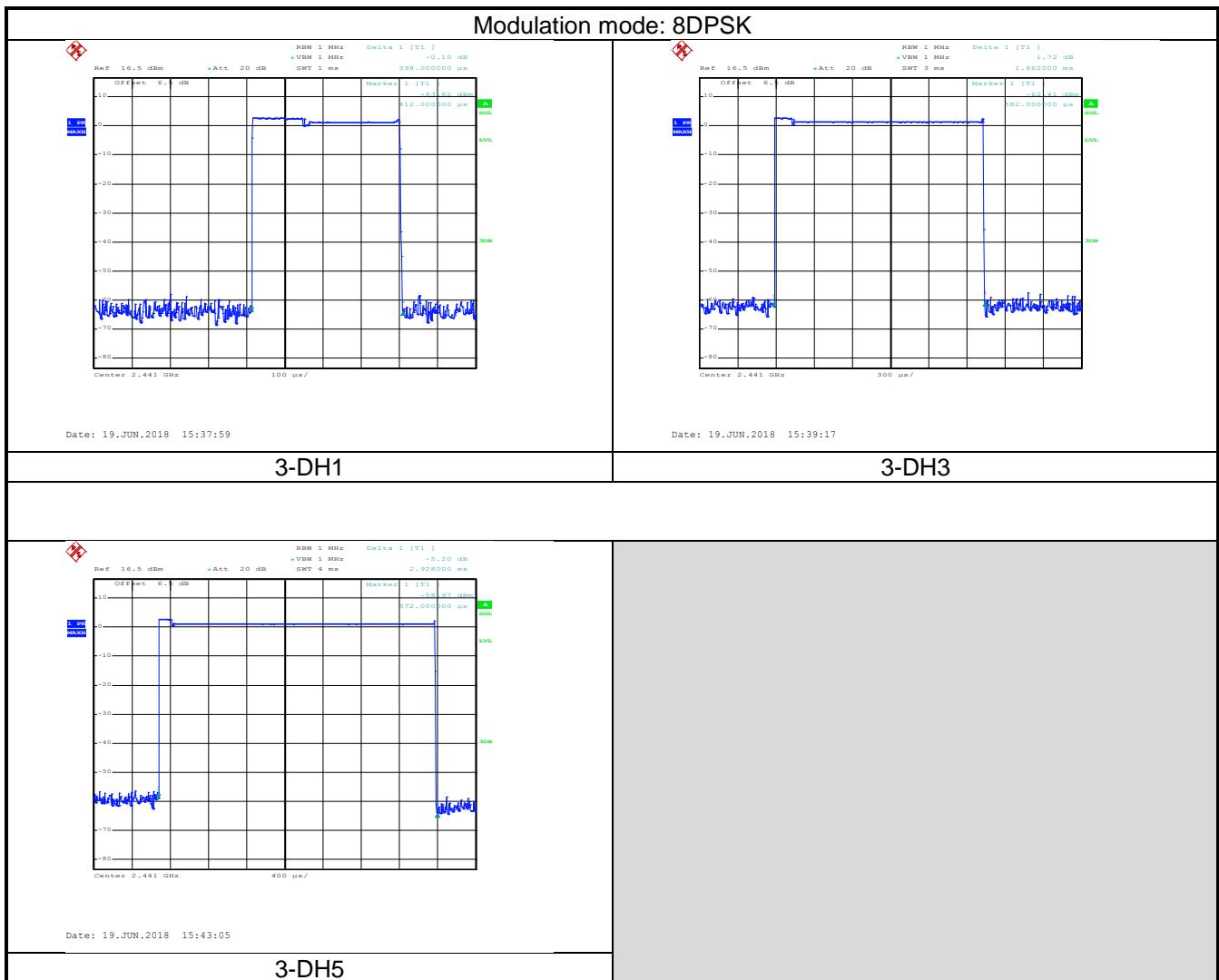
DH1 time slot=0.392\*(1600/ (2\*79)) \* 31.6=125.44ms

DH3 time slot=1.668\*(1600/ (4\*79)) \* 31.6=266.88ms

DH5 time slot=2.920\*(1600/ (6\*79)) \* 31.6=311.47ms

Test plot as follows:





## 6.8 Pseudorandom Frequency Hopping Sequence

**Test Requirement:** FCC Part 15 C Section 15.247 (a)(1) requirement:

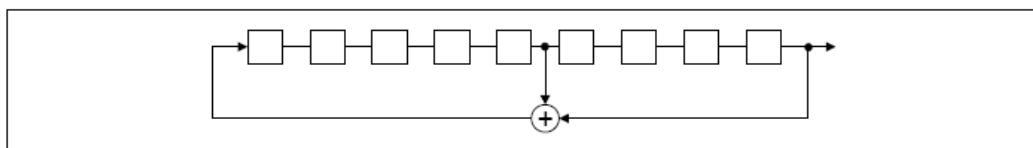
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### EUT Pseudorandom Frequency Hopping Sequence

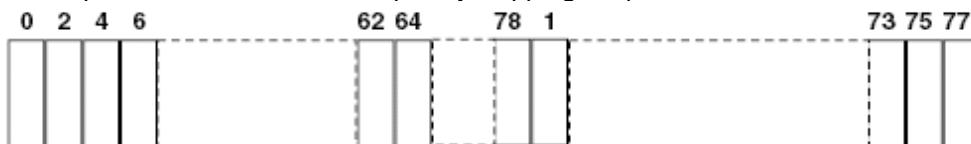
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:  $2^9 - 1 = 511$  bits
- Longest sequence of zeros: 8 (non-inverted signal)



*Linear Feedback Shift Register for Generation of the PRBS sequence*

An example of Pseudorandom Frequency Hopping Sequence as follow:

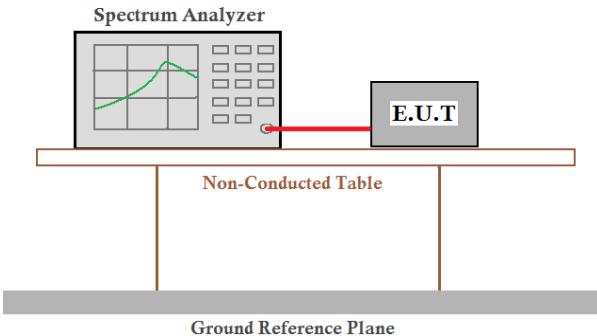


Each frequency used equally on the average by each transmitter.

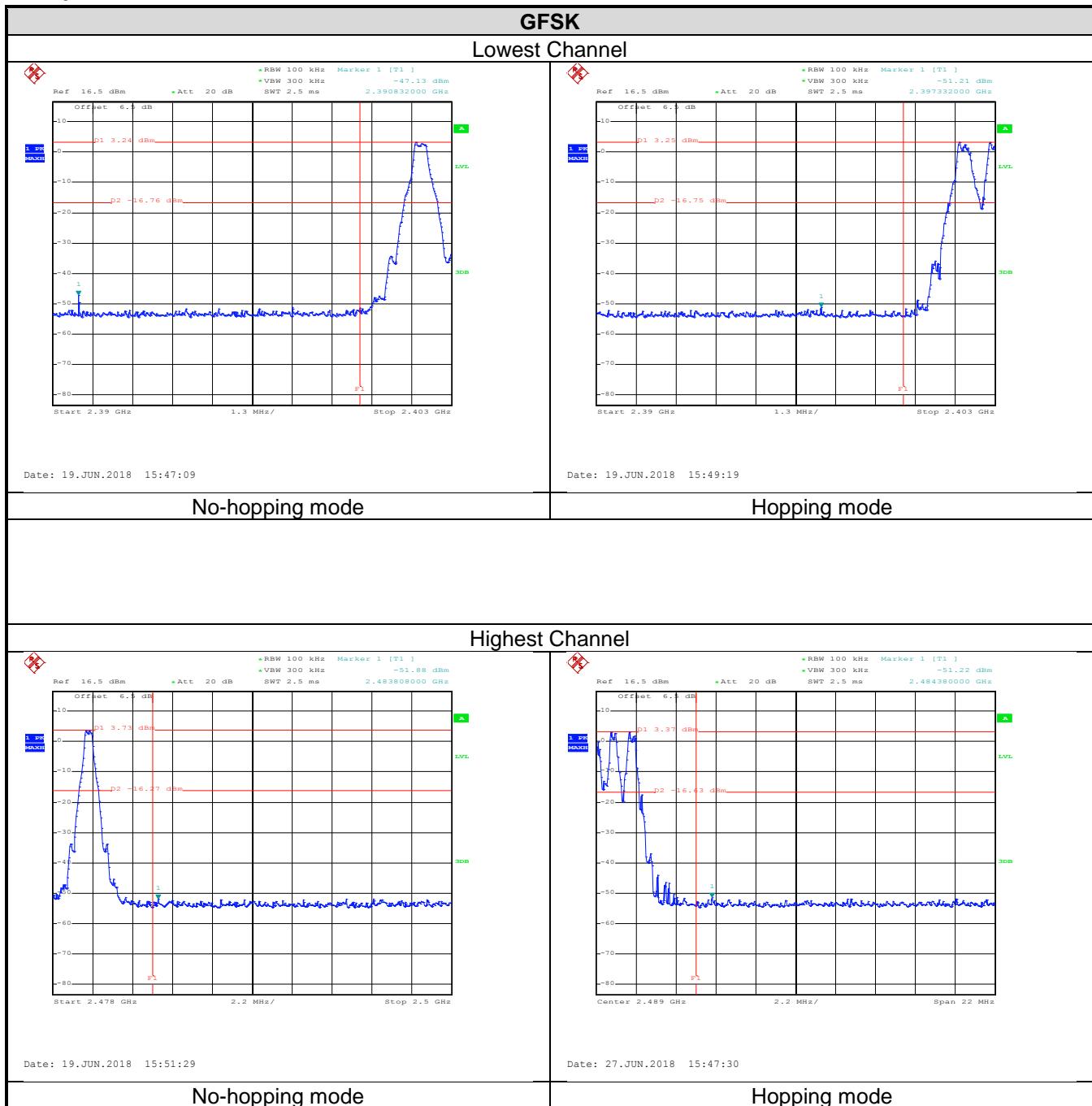
The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

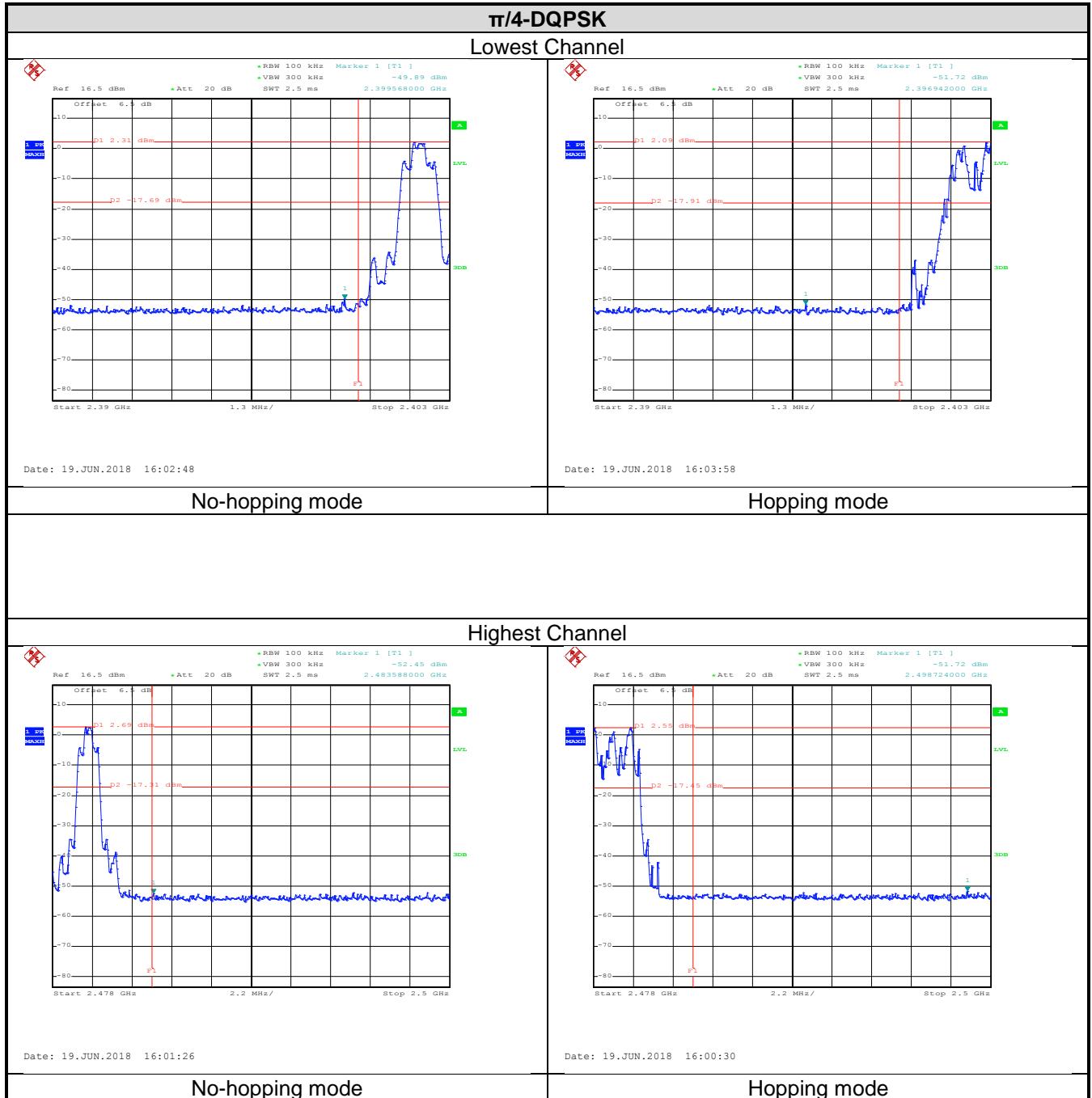
## 6.9 Band Edge

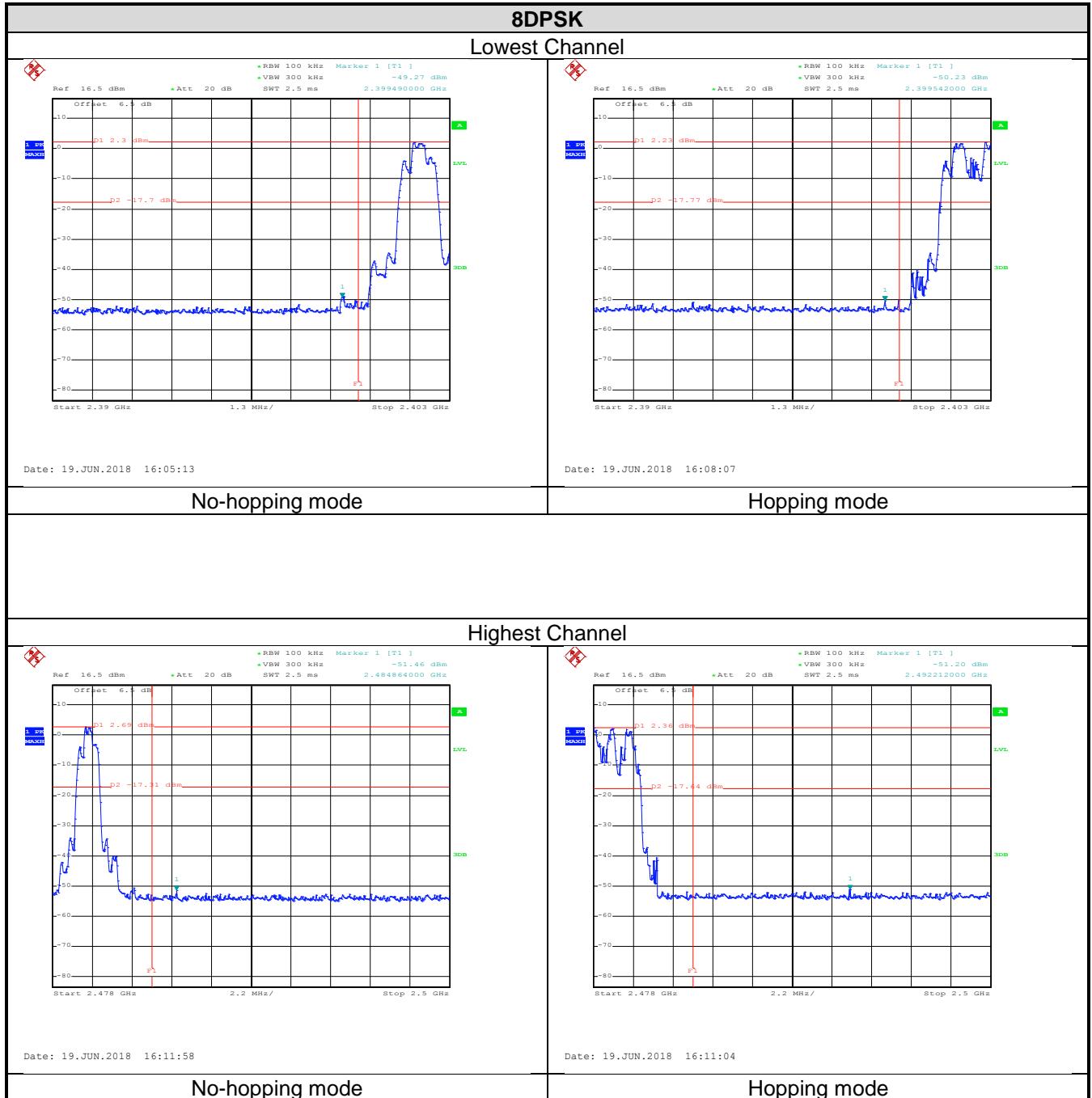
### 6.9.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
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 setup:	 <p>The diagram illustrates the test setup for conducted emission. A Spectrum Analyzer is connected to the E.U.T (Equipment Under Test) via a coaxial cable. The E.U.T is placed on a Non-Conducted Table. The entire setup is positioned above a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode and hopping mode
Test results:	Pass

Test plot as follows:





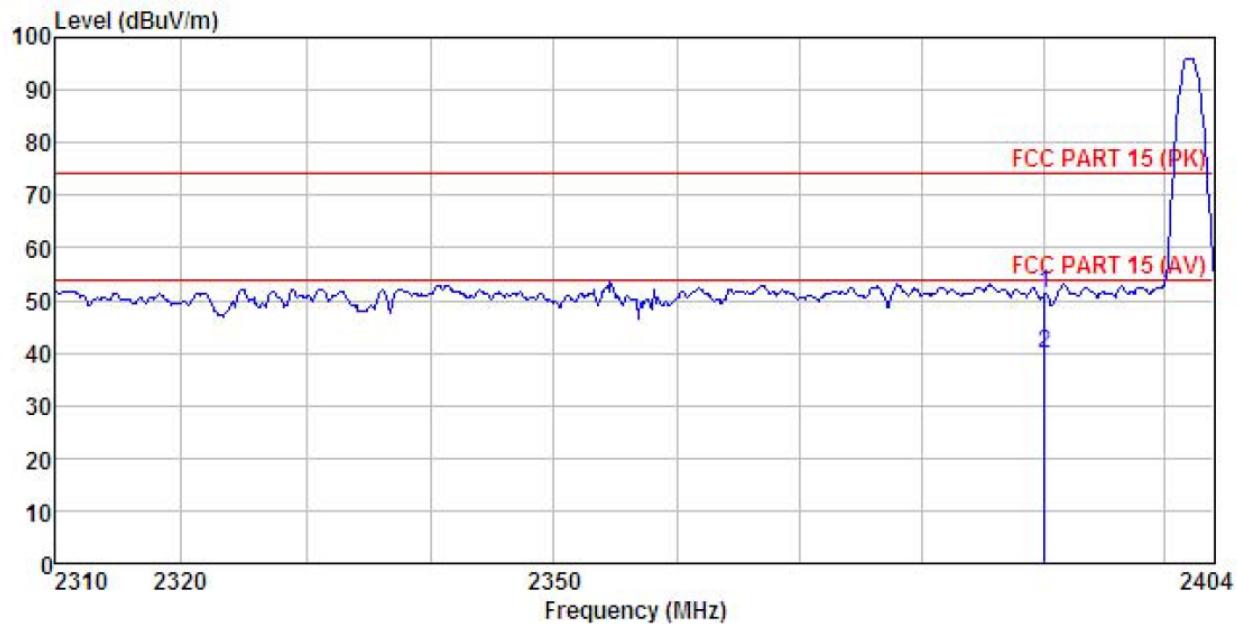


### 6.9.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205										
Test Method:	ANSI C63.10: 2013										
Test Frequency Range:	2.3GHz to 2.5GHz										
Test Distance:	3m										
Receiver setup:	Frequency	Detector	RBW	VBW	Remark						
	Above 1GHz	Peak	1MHz	3MHz	Peak Value						
Limit:	Frequency	Limit (dBuV/m @3m)		Remark							
	Above 1GHz	54.00		Average Value							
Test setup:											
Test Procedure:	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make 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 rota 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>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> </ol>										
Test Instruments:	Refer to section 5.8 for details										
Test mode:	Non-hopping mode										
Test results:	Passed										

**GFSK mode****Test channel: Lowest channel**

Test Polarization: Horizontal



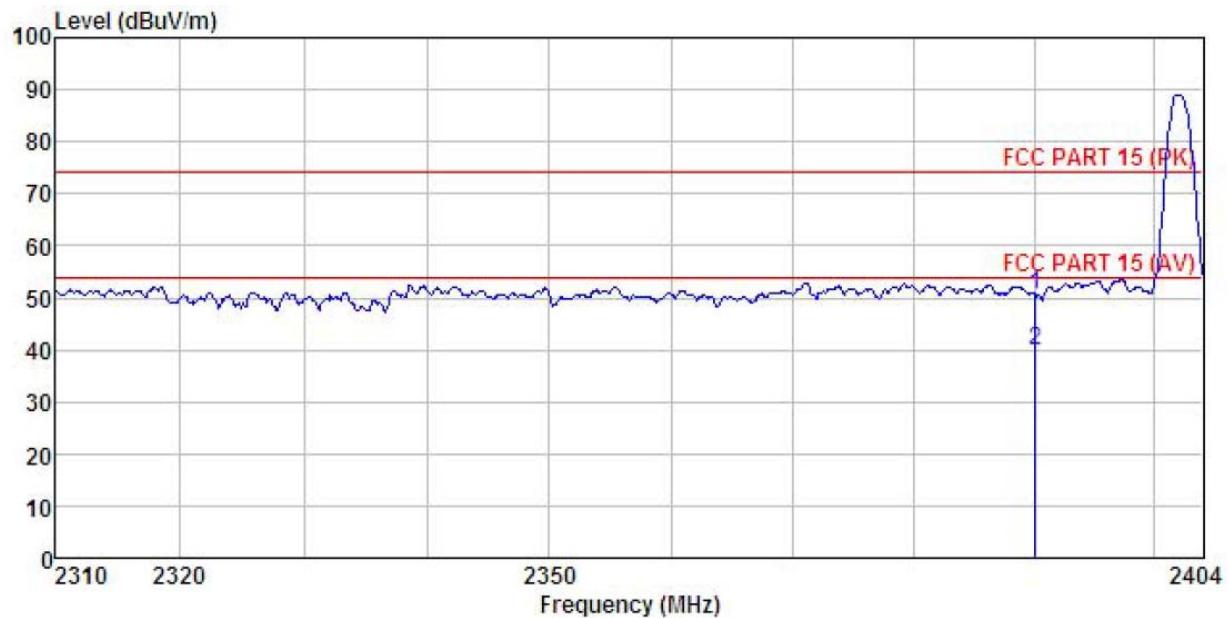
Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test mode : DH1-L mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Hurni:55%  
 Test Engineer: Zora  
 REMARK :

	ReadAntenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	19.06	27.37	4.69	0.00	51.12	74.00 -22.88 Peak
2	2390.000	7.86	27.37	4.69	0.00	39.92	54.00 -14.08 Average

**Remark:**

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
EUT : Mobile Phone  
Model : PSPTD21NA  
Test mode : DH1-L mode  
Power Rating : AC 120V/60Hz  
Environment : Temp:25.5°C Humi:55%  
Test Engineer: Zora  
REMARK :

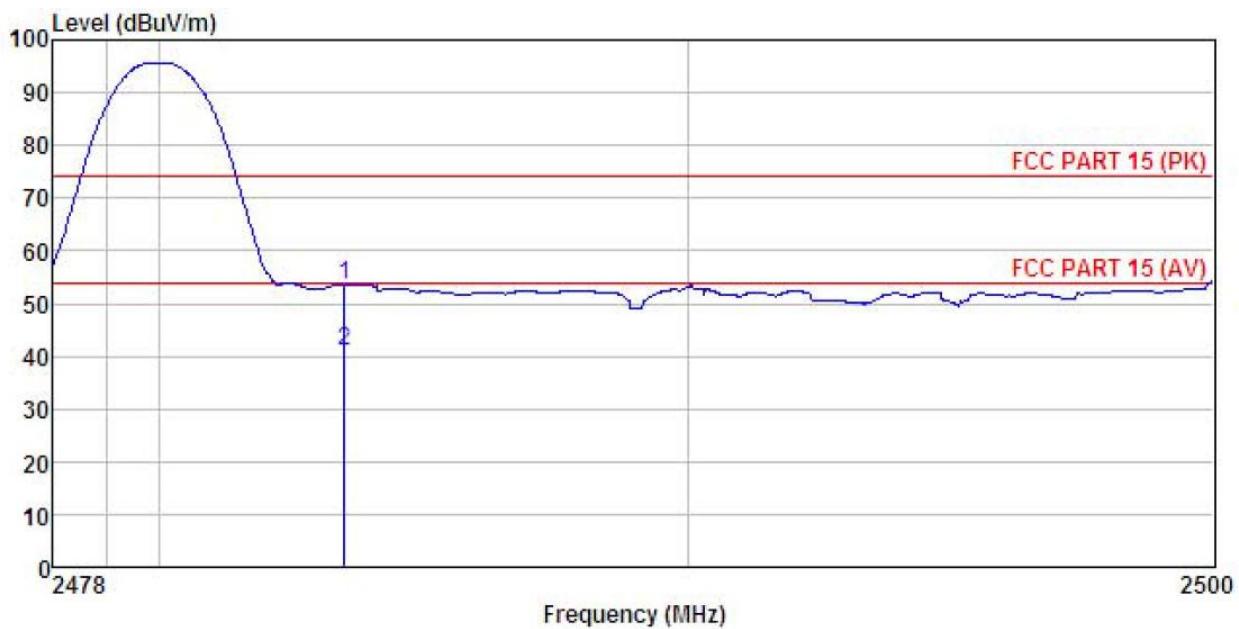
	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	18.62	27.37	4.69	0.00	50.68	74.00 -23.32 Peak
2	2390.000	7.90	27.37	4.69	0.00	39.96	54.00 -14.04 Average

## Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

**Test channel: Highest channel**

Test Polarization: Horizontal



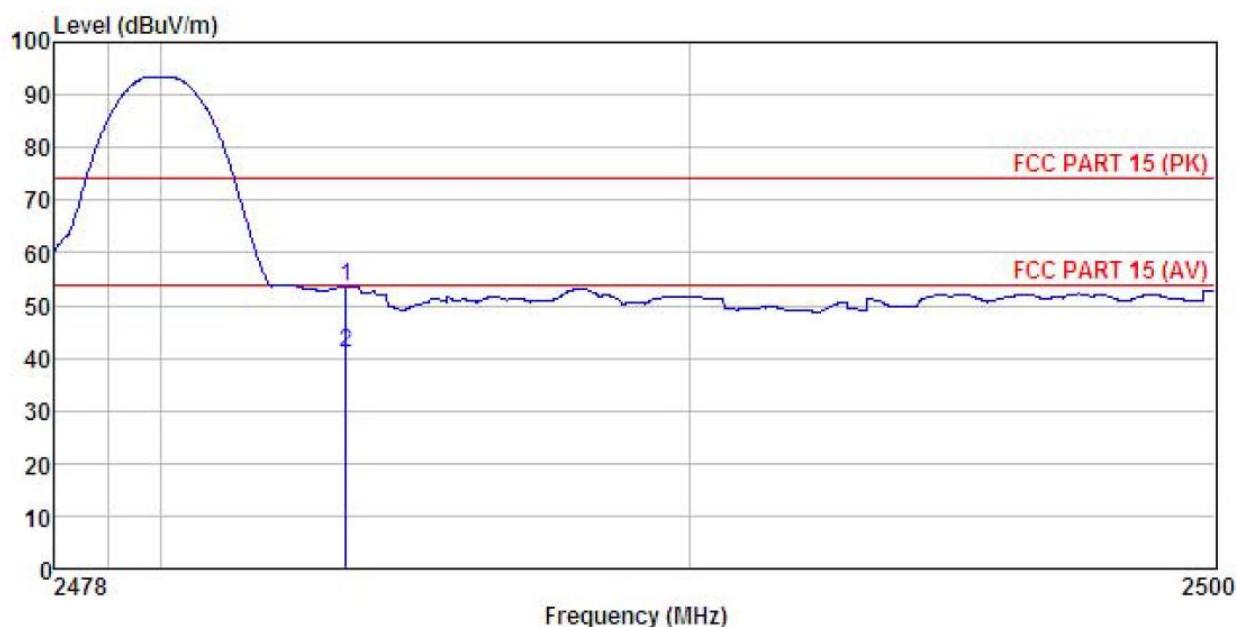
Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
EUT : Mobile Phone  
Model : PSPTD21NA  
Test mode : DH1-H mode  
Power Rating : AC 120V/60Hz  
Environment : Temp:25.5°C Huni:55%  
Test Engineer: Zora  
REMARK :

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor	Level	Line	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2483.500	21.24	27.57	4.81	0.00	53.62	74.00 -20.38 Peak
2	2483.500	8.58	27.57	4.81	0.00	40.96	54.00 -13.04 Average

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
EUT : Mobile Phone  
Model : PSPTD21NA  
Test mode : DH1-H mode  
Power Rating : AC 120V/60Hz  
Environment : Temp:25.5°C Huni:55%  
Test Engineer: Zora  
REMARK :

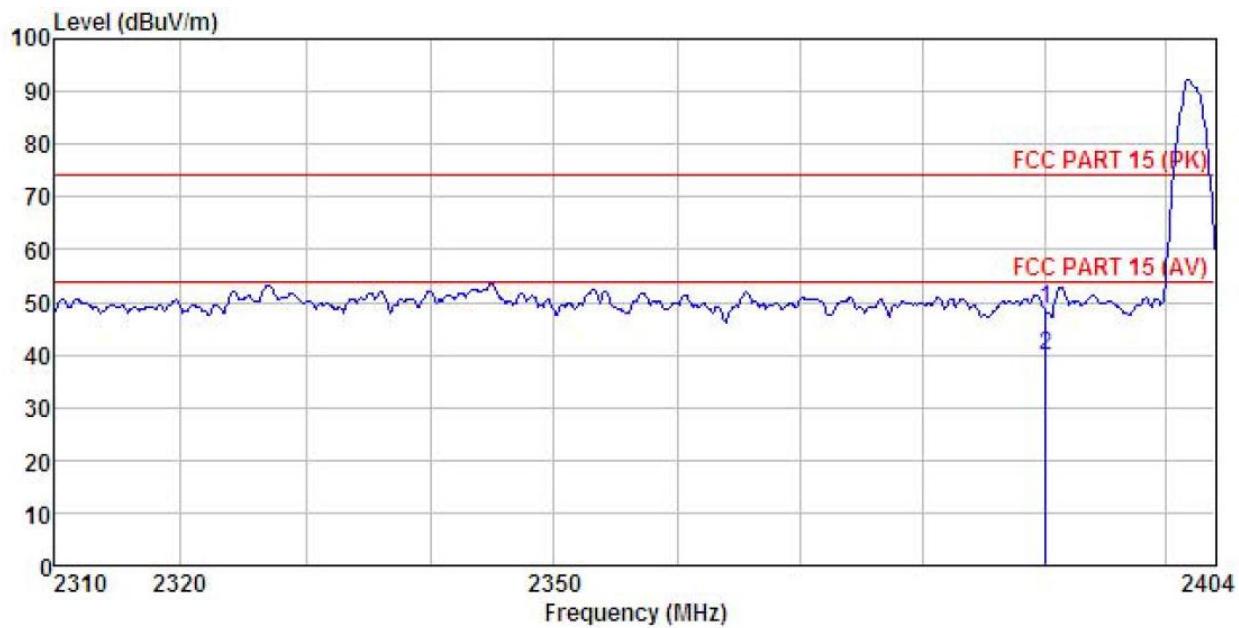
	ReadAntenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2483.500	21.16	27.57	4.81	0.00	53.54
2	2483.500	8.55	27.57	4.81	0.00	40.93
					74.00	-20.46
					54.00	-13.07
						Peak Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

**$\pi/4$ -DQPSK mode****Test channel: Lowest channel**

Test Polarization: Horizontal



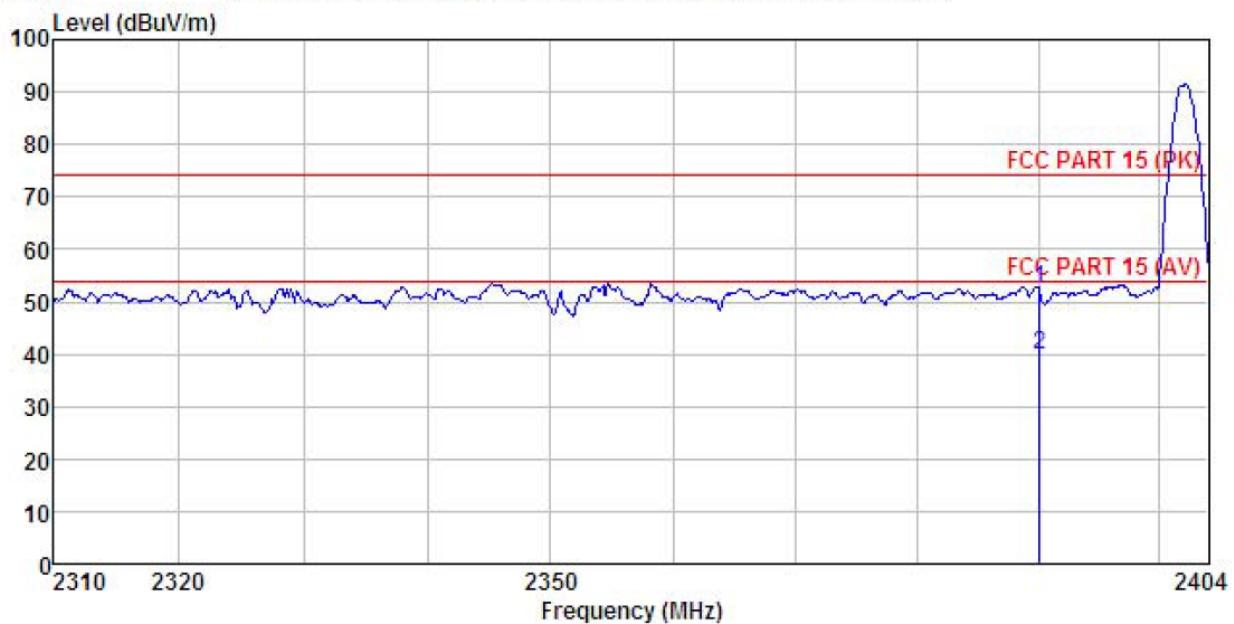
Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test mode : 2DH1-L mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark	
	Level	Factor	Loss	Level	Line		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	16.59	27.37	4.69	0.00	48.65	74.00 -25.35 Peak
2	2390.000	7.90	27.37	4.69	0.00	39.96	54.00 -14.04 Average

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
EUT : Mobile Phone  
Model : PSPTD21NA  
Test mode : 2DH1-L mode  
Power Rating : AC 120W/60Hz  
Environment : Temp:25.5°C Huni:55%  
Test Engineer: Zora  
REMARK :

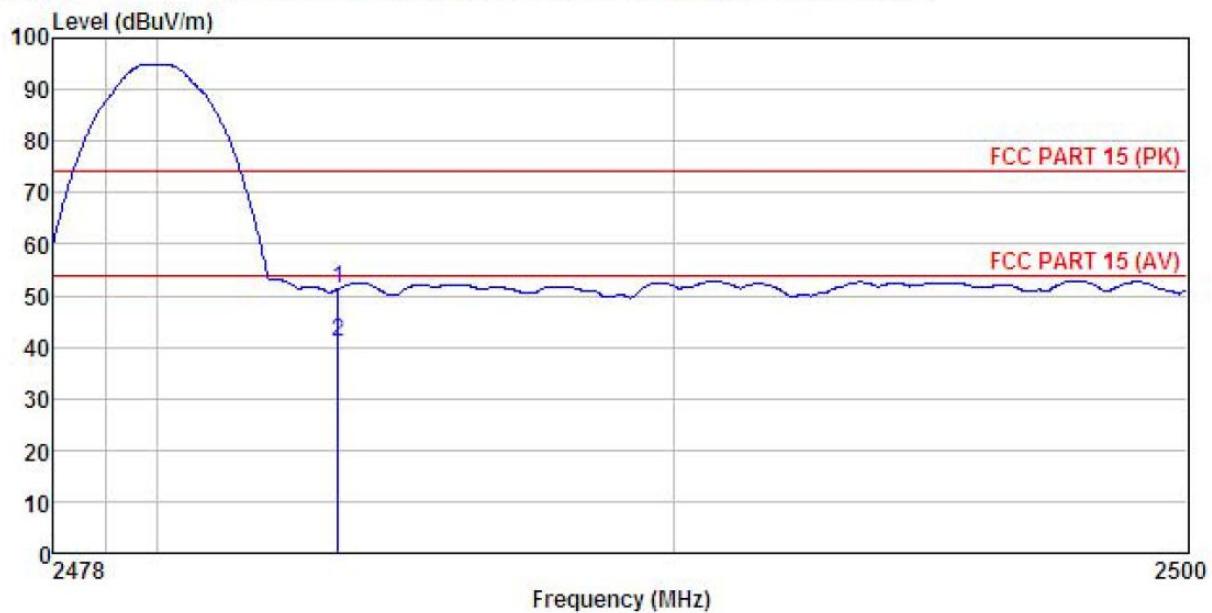
	ReadAntenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2390.000	20.21	27.37	4.69	0.00	52.27
2	2390.000	7.87	27.37	4.69	0.00	39.93
					74.00	-21.73
					54.00	-14.07
						Peak Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

**Test channel: Highest channel**

Test Polarization: Horizontal



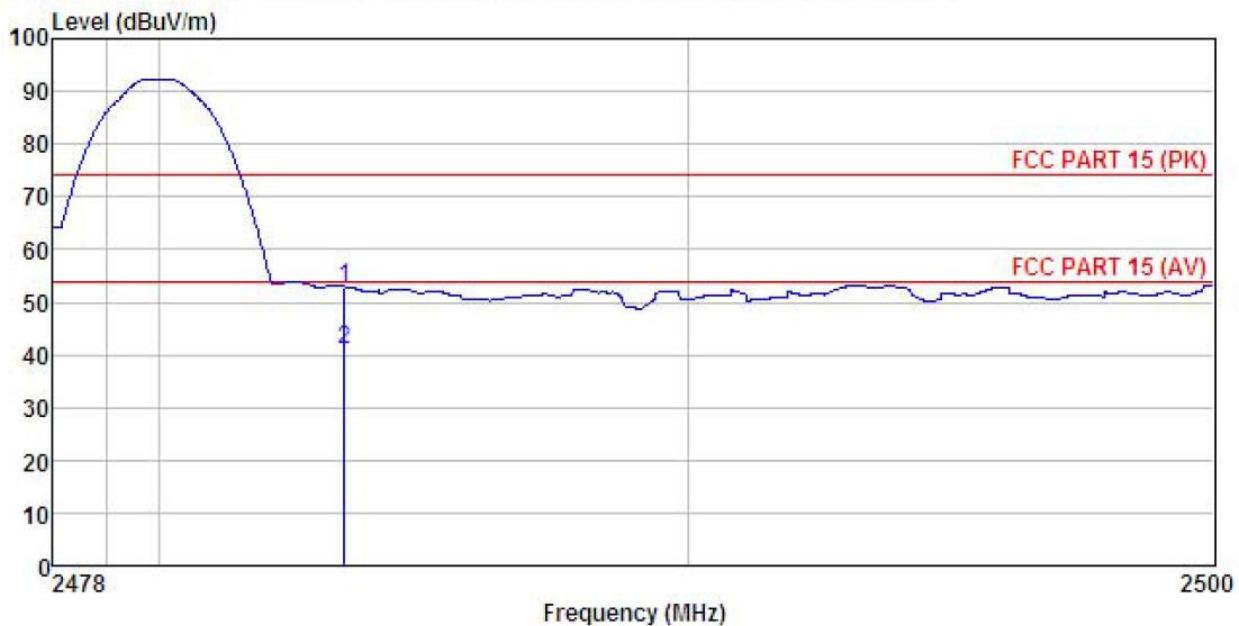
Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test mode : 2DH1-H mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Huni:55%  
 Test Engineer: Zora  
 REMARK :

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Level	Line	
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	2483.500	19.06	27.57	4.81	0.00	51.44 74.00 -22.56 Peak
2	2483.500	8.55	27.57	4.81	0.00	40.93 54.00 -13.07 Average

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
EUT : Mobile Phone  
Model : PSPTD21NA  
Test mode : 2DH1-H mode  
Power Rating : AC 120V/60Hz  
Environment : Temp:25.5°C Humi:55%  
Test Engineer: Zora  
REMARK :

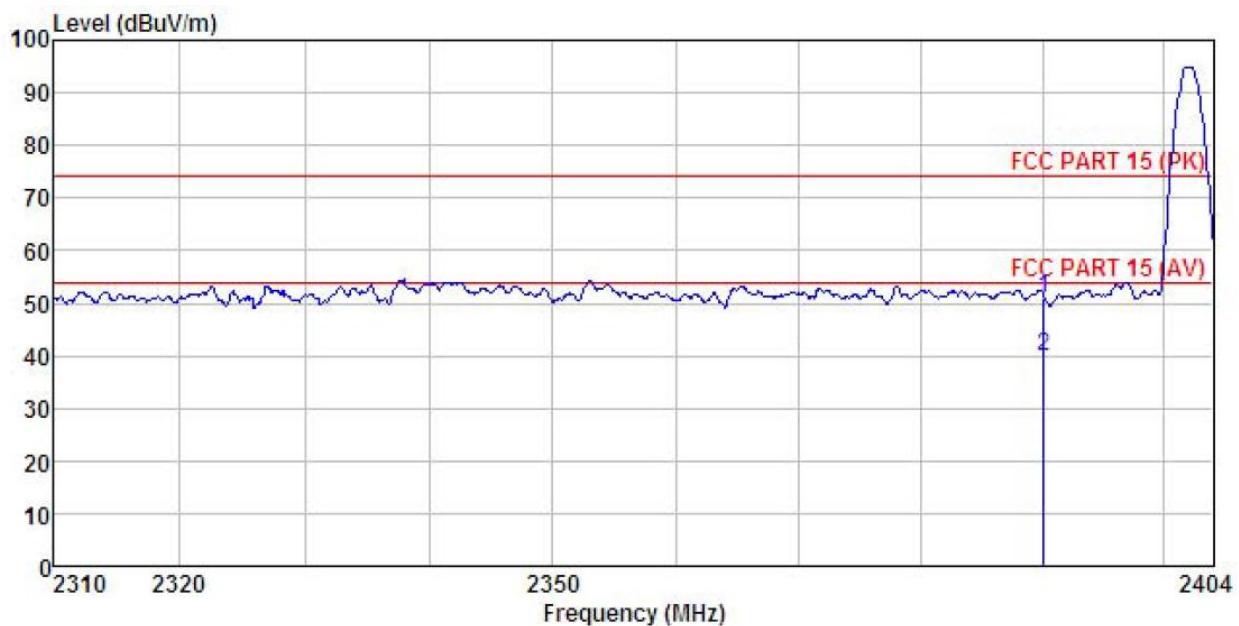
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Preamp Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	20.56	27.57	4.81	0.00	52.94	74.00	-21.06 Peak
2	2483.500	8.56	27.57	4.81	0.00	40.94	54.00	-13.06 Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

**8DPSK mode****Test channel: Lowest channel**

Test Polarization: Horizontal



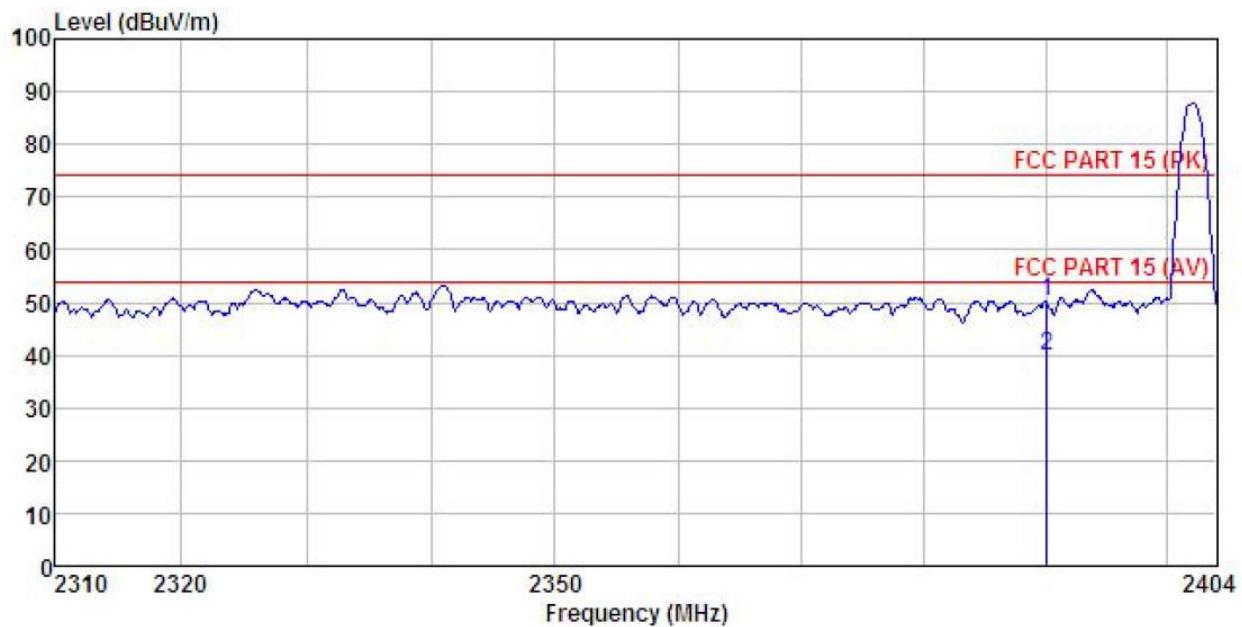
Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test mode : 3DH1-L mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

	ReadAntenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	18.93	27.37	4.69	0.00	50.99	74.00 -23.01 Peak
2	2390.000	7.89	27.37	4.69	0.00	39.95	54.00 -14.05 Average

**Remark:**

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
EUT : Mobile Phone  
Model : PSPTD21NA  
Test mode : 3DH1-L mode  
Power Rating : AC 120V/60Hz  
Environment : Temp:25.5°C Humi:55%  
Test Engineer: Zora  
REMARK :

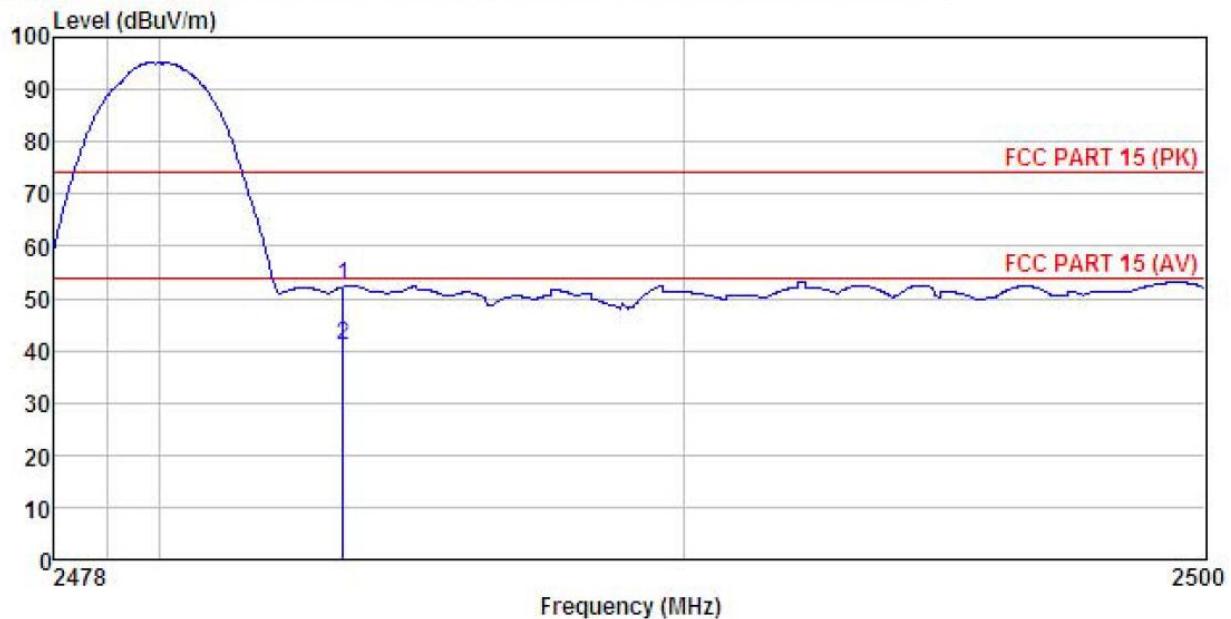
Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor	Level	Line	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	18.07	27.37	4.69	0.00	50.13	74.00 -23.87 Peak
2	2390.000	7.88	27.37	4.69	0.00	39.94	54.00 -14.06 Average

## Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

**Test channel: Highest channel**

Test Polarization: Horizontal

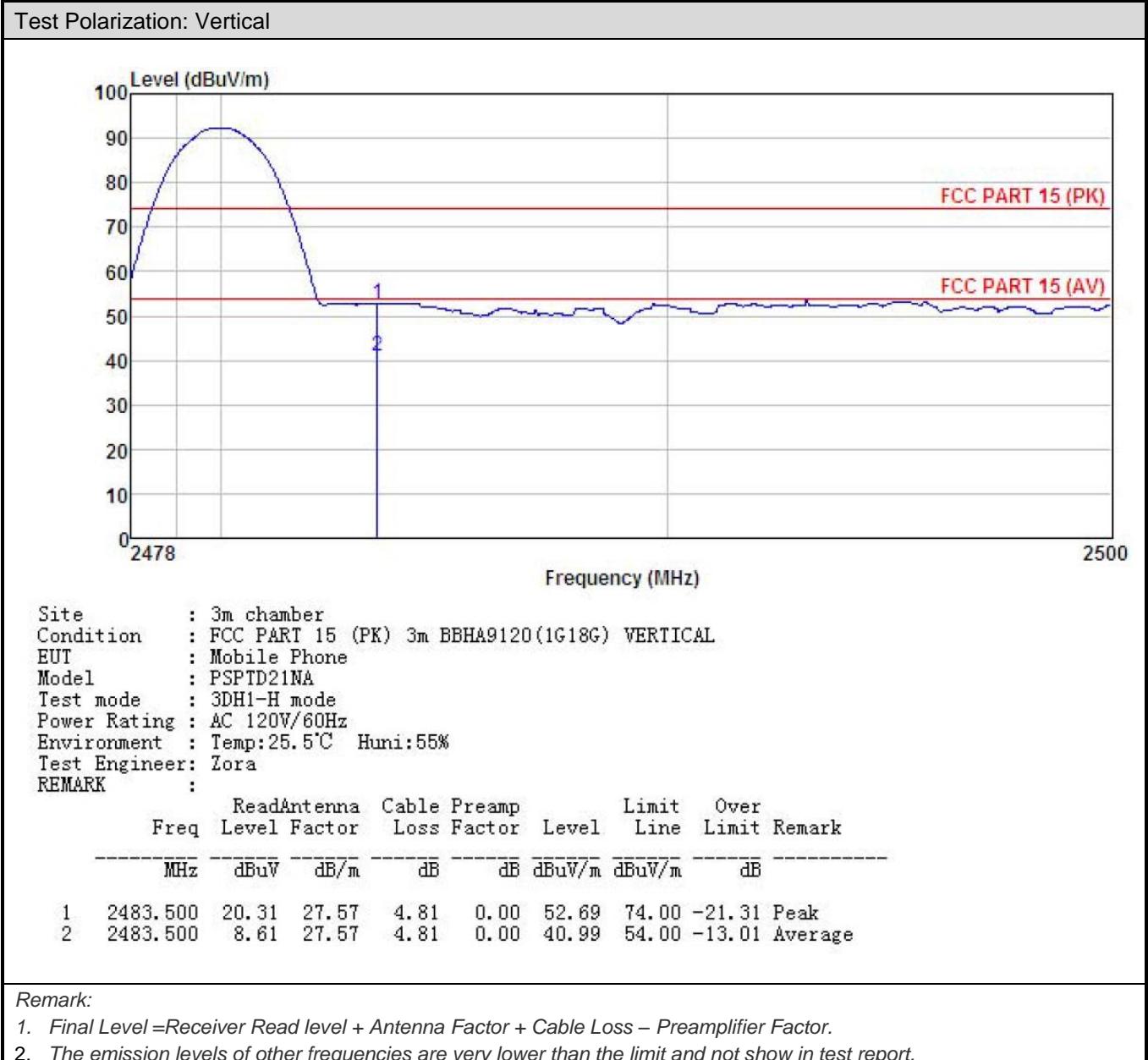


Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test mode : 3DH1-H mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Huni:55%  
 Test Engineer: Zora  
 REMARK :

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	
1	2483.500	19.88	27.57	4.81	0.00	52.26	74.00 -21.74 Peak
2	2483.500	8.58	27.57	4.81	0.00	40.96	54.00 -13.04 Average

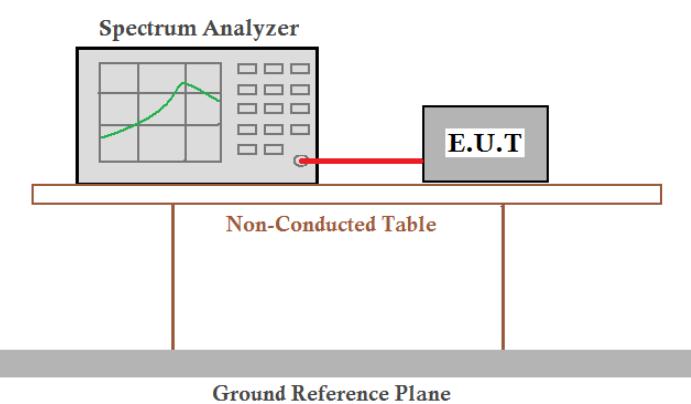
## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

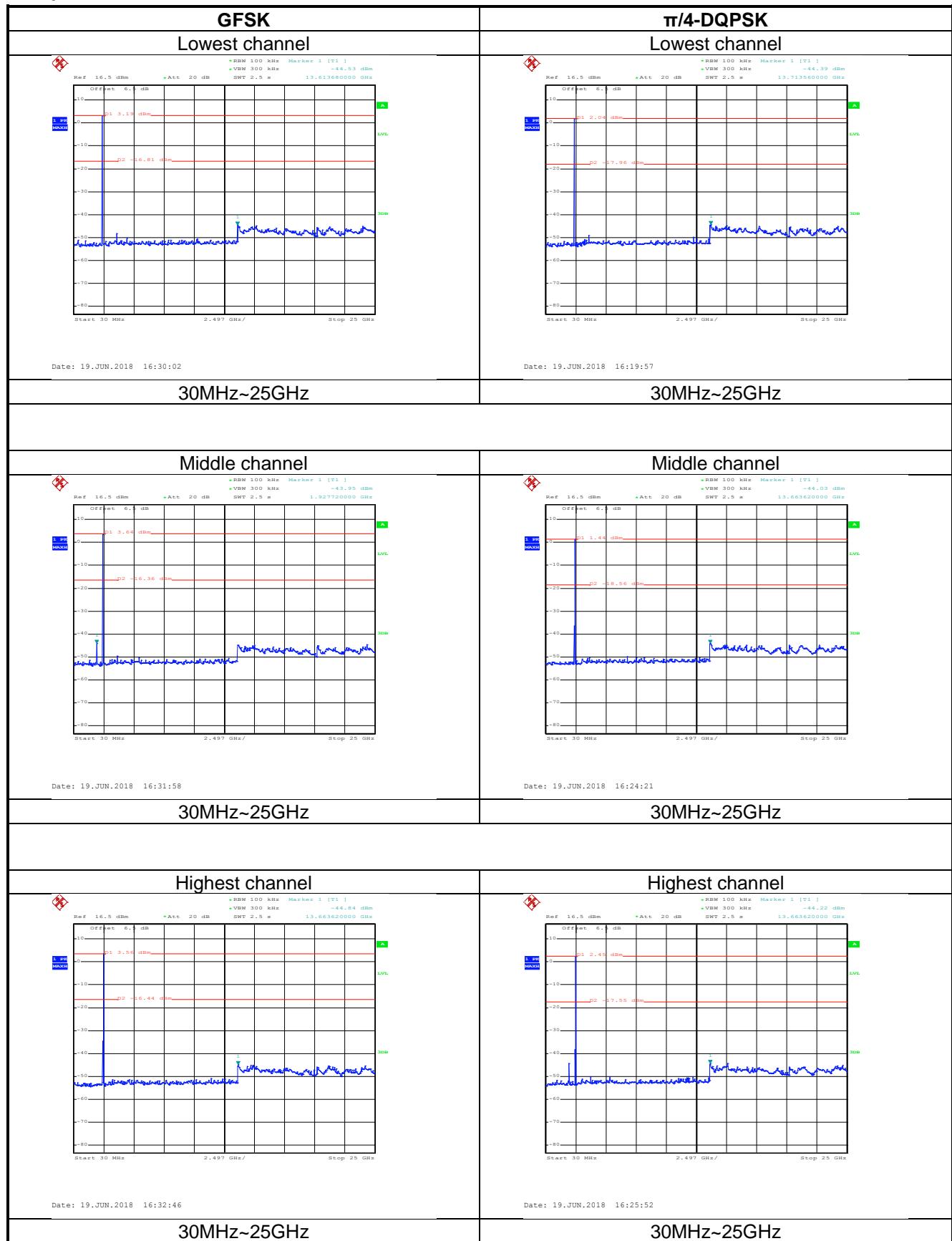


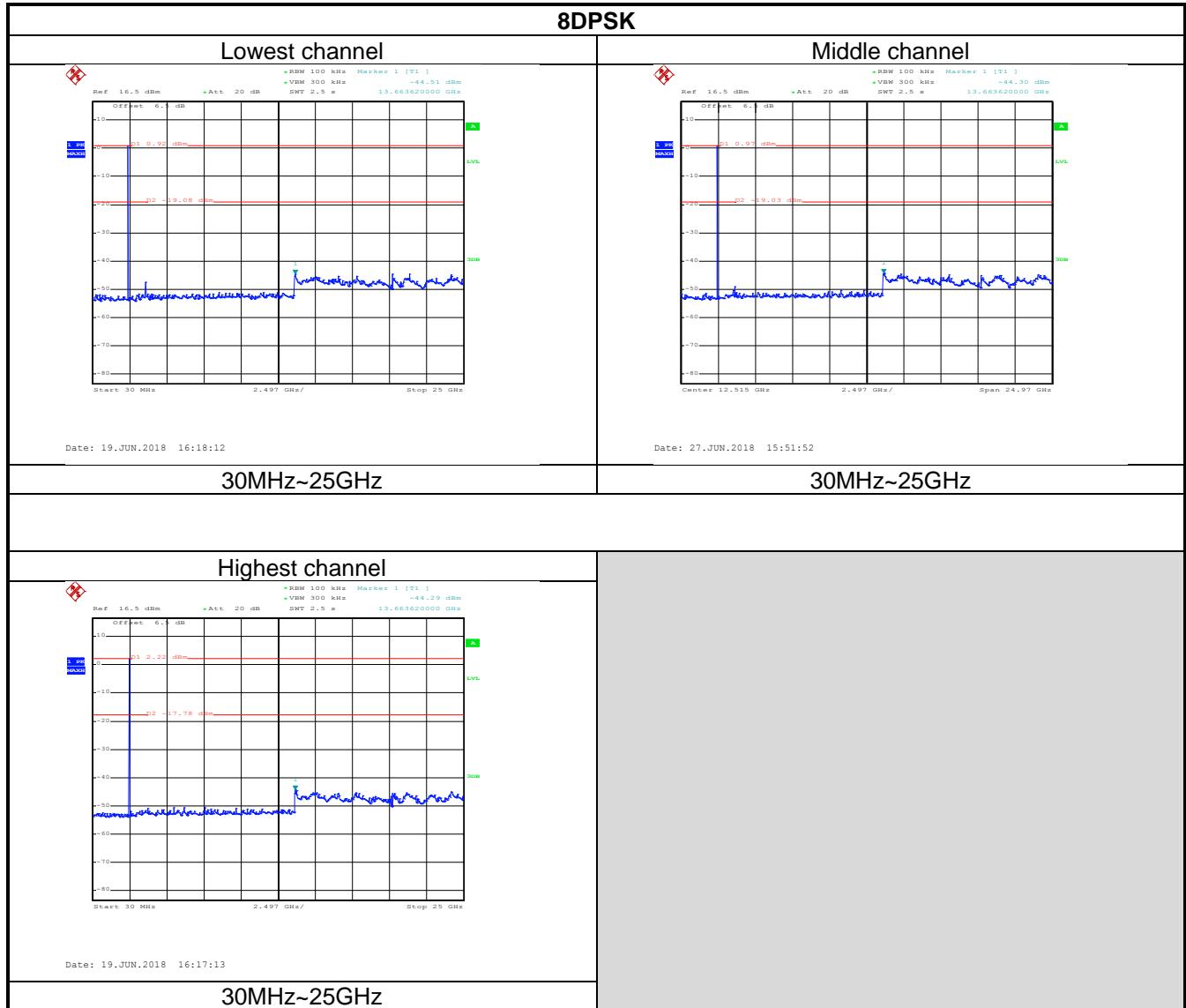
## 6.10 Spurious Emission

### 6.10.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and DA00-705
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 setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass

Test plot as follows:

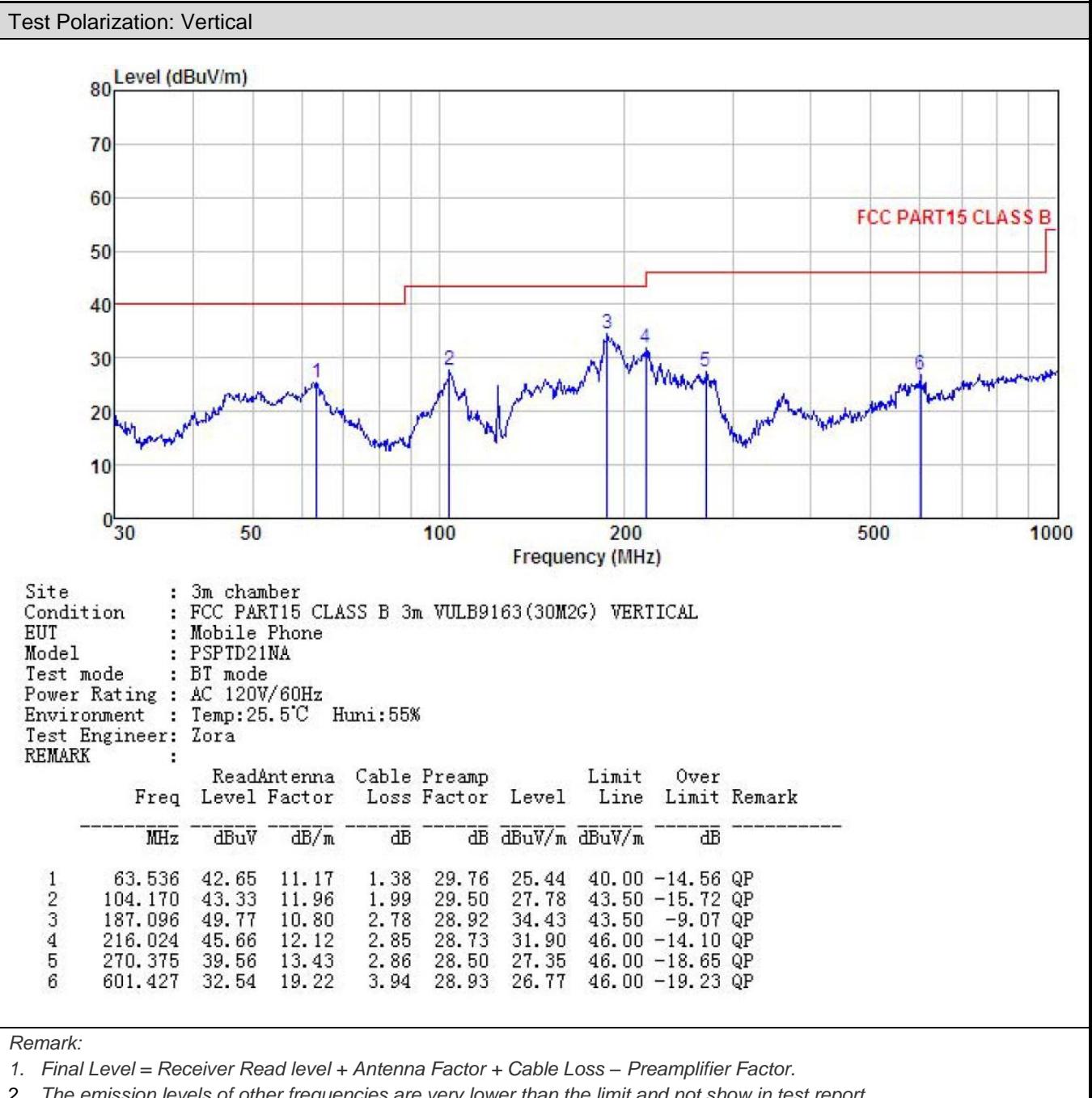




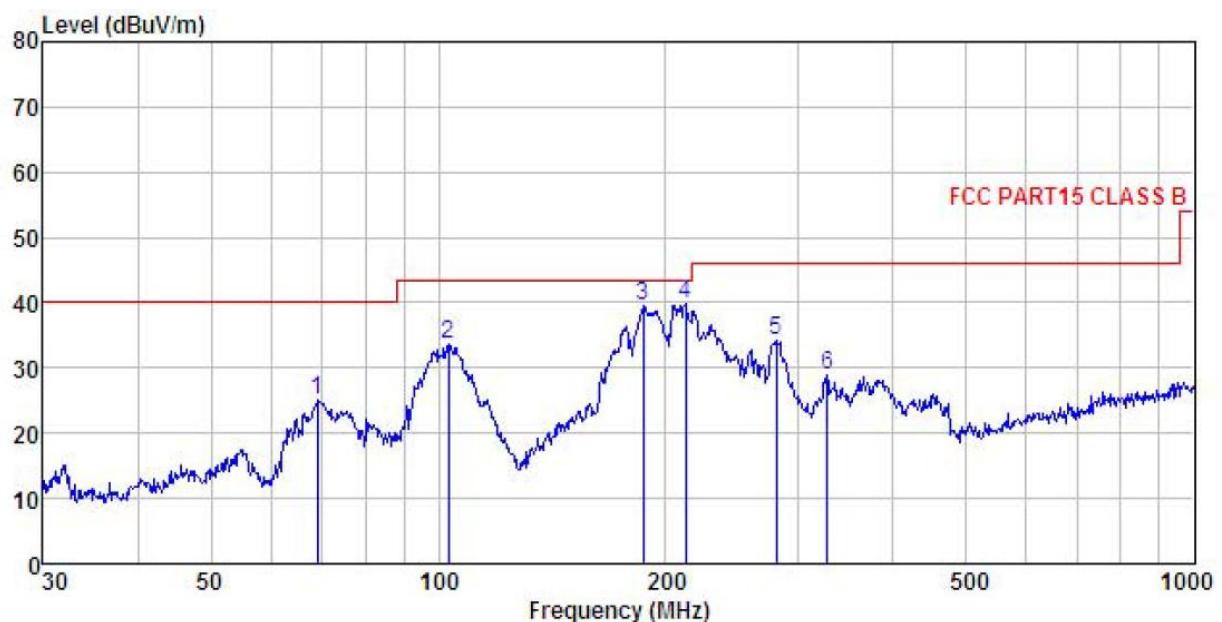
### 6.10.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209								
Test Method:	ANSI C63.10: 2013								
Test Frequency Range:	9 kHz to 25 GHz								
Test Distance:	3m								
Receiver setup:	Frequency	Detector	RBW	VBW	Remark				
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value				
	Above 1GHz	Peak	1MHz	3MHz	Peak Value				
		RMS	1MHz	3MHz	Average Value				
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:	<p>Below 1GHz</p> <p>Above 1GHz</p>								
Test Procedure:	<p>1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table</p>								

	<p>was rotated 360 degrees to determine the position of the highest radiation.</p> <p>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>3. 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.</p> <p>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	<ol style="list-style-type: none"><li>Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case.</li><li>9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report.</li></ol>

**Measurement Data (worst case):****Below 1GHz:**

Test Polarization: Horizontal



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163 (30M2G) HORIZONTAL  
 EUT : Mobile Phone  
 Model : PSPTD21NA  
 Test mode : BT mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

	ReadAntenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	69.114	43.82	9.37	1.49	29.73	24.95	40.00 -15.05 QP
2	103.080	49.40	11.89	1.97	29.51	33.75	43.50 -9.75 QP
3	186.441	55.14	10.71	2.77	28.93	39.69	43.50 -3.81 QP
4	212.270	53.68	11.98	2.86	28.75	39.77	43.50 -3.73 QP
5	280.024	46.27	13.49	2.89	28.48	34.17	46.00 -11.83 QP
6	326.740	40.23	14.15	3.02	28.51	28.89	46.00 -17.11 QP

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

**Above 1GHz:**

Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	46.90	30.85	6.80	41.81	42.74	74.00	-31.26	Vertical
4804.00	46.94	30.85	6.80	41.81	42.78	74.00	-31.22	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	36.52	30.85	6.80	41.81	32.36	54.00	-21.64	Vertical
4804.00	36.78	30.85	6.80	41.81	32.62	54.00	-21.38	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	47.18	31.20	6.86	41.84	43.40	74.00	-30.60	Vertical
4882.00	46.84	31.20	6.86	41.84	43.06	74.00	-30.94	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	37.26	31.20	6.86	41.84	33.48	54.00	-20.52	Vertical
4882.00	36.52	31.20	6.86	41.84	32.74	54.00	-21.26	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	46.80	31.63	6.91	41.87	43.47	74.00	-30.53	Vertical
4960.00	46.28	31.63	6.91	41.87	42.95	74.00	-31.05	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	36.09	31.63	6.91	41.87	32.76	54.00	-21.24	Vertical
4960.00	36.41	31.63	6.91	41.87	33.08	54.00	-20.92	Horizontal
<i>Remark:</i>								
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.								
2. The emission levels of other frequencies are very lower than the limit and not show in test report.								