FCC REPORT

Report No: CCISE171210301

(Bluetooth)

Applicant: Grand Electronics INC.

Address of Applicant: 11650 Brentcross Dr Tomball Texas United States 77377

Equipment Under Test (EUT)

Product Name: Tablet PC

Model No.: i7, i7s

Trade mark: neutab.

FCC ID: 2AGNK-I7

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

Date of sample receipt: 27 Dec., 2017

Date of Test: 27 Dec., 2017 to 22 Feb., 2018

Date of report issued: 26 Feb., 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.

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Report No: CCISE171210301

2 Version

Version No.	Date	Description	
00	26 Feb., 2018	6 Feb., 2018 Original	

Tested by: Mike 0U **Date:** 26 Feb., 2018

Test Engineer

Reviewed by: 26 Feb., 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: N/A: Not Applicable.



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5 General Information

5.1 Client Information

Applicant:	Grand Electronics INC.
Address: 11650 Brentcross Dr Tomball Texas United States 77377	
Manufacturer/Factory:	Dongguan Digi-in Digital Technology Co.,Ltd
Address:	Jiatian Industrial Park, Wulian, Fenggang Town, Dongguan City, Guangdong, China

5.2 General Description of E.U.T.

Product Name:	Tablet PC
Model No.:	i7, i7s
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:	1.3 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-2500mAh
AC adapter:	Model: UF22P1501 Input: AC100-240V 50/60Hz 500mA Output: DC 5.0V, 2.1A/ DC 9.0V, 1.67A/ DC 12.0V, 1.25A
Remark:	The Model No.: i7, I7s were identical inside, the electrical circuit design, layout, components and internal wiring, with only difference being model name.

Operation	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: Cl	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.			

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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)	2.14 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 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

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China
Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366

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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 Antonno	SCHWARZBECK	FMZB1519B	00044	02-25-2017	02-24-2018
Loop Antenna	SCHWARZBECK	FINIZETST9E	00044	02-20-2018	02-19-2019
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	02-25-2017	02-24-2018
biconilog Antenna	SCHWARZBECK	VULD9103	497	02-20-2018	02-19-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	916	02-25-2017	02-24-2018
Hom Antenna	SCHWARZBECK	BBHA9120D	910	02-20-2018	02-19-2019
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A
Pre-amplifier	HP	8447D	2944A09358	02-25-2017	02-24-2018
Fre-ampliller	ПР	0447D		02-20-2018	02-19-2019
Pre-amplifier	CD	PAP-1G18	11804	02-25-2017	02-24-2018
rie-ampililei	СВ			02-20-2018	02-19-2019
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	02-25-2017	02-24-2018
Spectrum analyzer	Ronde & Schwarz	F3F30		02-20-2018	02-19-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	02-25-2017	02-24-2018
LIVII TEST NECEIVEI	Ronde & Schwarz	ESKF1		02-20-2018	02-19-2019
Cable	ZDECL	Z108-NJ-NJ-81	1608458	02-25-2017	02-24-2018
Cable	ZDECL	2100-113-113-01	1000430	02-20-2018	02-19-2019
Cable	MICRO-COAX	MFR64639	K10742-5	02-25-2017	02-24-2018
Cable	WICKU-CUAX	WFK04039	K10742-0	02-20-2018	02-19-2019
Cable	SUHNER	SUCOFLEX100	58193/4PE	02-25-2017	02-24-2018
Cable	SOLINEIX	SOCOI LEXTOO	J0195/41 E	02-20-2018	02-19-2019

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	02-25-2017	02-24-2018
Livii Test Neceivei	Ronde & Schwarz	ESCI	101169	02-20-2018	02-19-2019
Dulgo Limitor	ulse Limiter SCHWARZBECK OSRAM 2306 9731 -	02-25-2017	02-24-2018		
Puise Limitei		USRAWI 2306	9731	02-20-2018	02-19-2019
LISN	CHASE	MN2050D	1447	02-25-2017	02-24-2018
LION	CHASE			02-20-2018	02-19-2019
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2017	07-20-2018
Cable	HP	10503A	N/A	02-25-2017	02-24-2018
Cable				02-20-2018	02-19-2019
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

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 Internal antenna which permanently attached, and the best case gain of the antenna is 1.3 dBi.





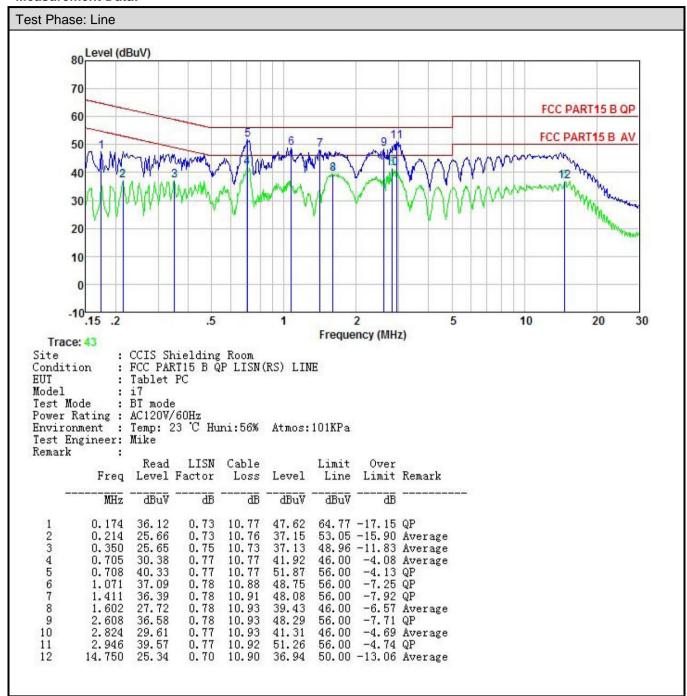


6.2 Conducted Emissions

 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 k	Hz, Sweep time=auto		
Limit:	Frequency range	Limit (dBuV)	
	(MHz)	Quasi-peak	Average	
	0.15-0.5	66 to 56*	56 to 46*	
	0.5-5	56	46	
	5-30	60	50	
	* Decreases with the log	arithm of the frequency.		
Test setup:	Reference	e Plane		
	AUX Equipment Test table/Insulation plane Remark E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Net Test table height=0.8m	EMI Receiver		
Test procedure:	 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. 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). 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. 			
Test Instruments:	Refer to section 5.8 for details			
Test mode:	Hopping mode			
Test results:	Pass			
	ı			



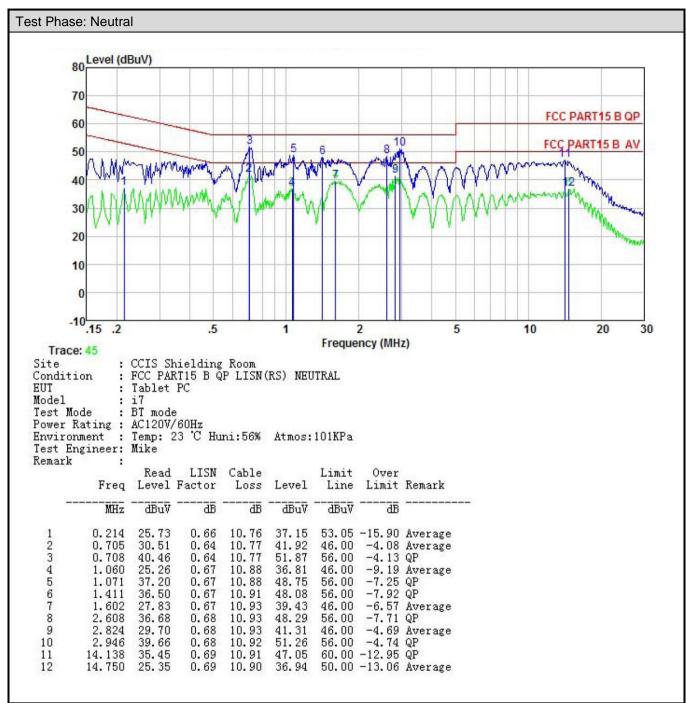
Measurement Data:



Notes

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





Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. 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, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency		
Test setup:	hopping systems in the 2400-2483.5 MHz band: 0.125 watts. Spectrum Analyzer Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Non-hopping mode		
Test results:	Pass		

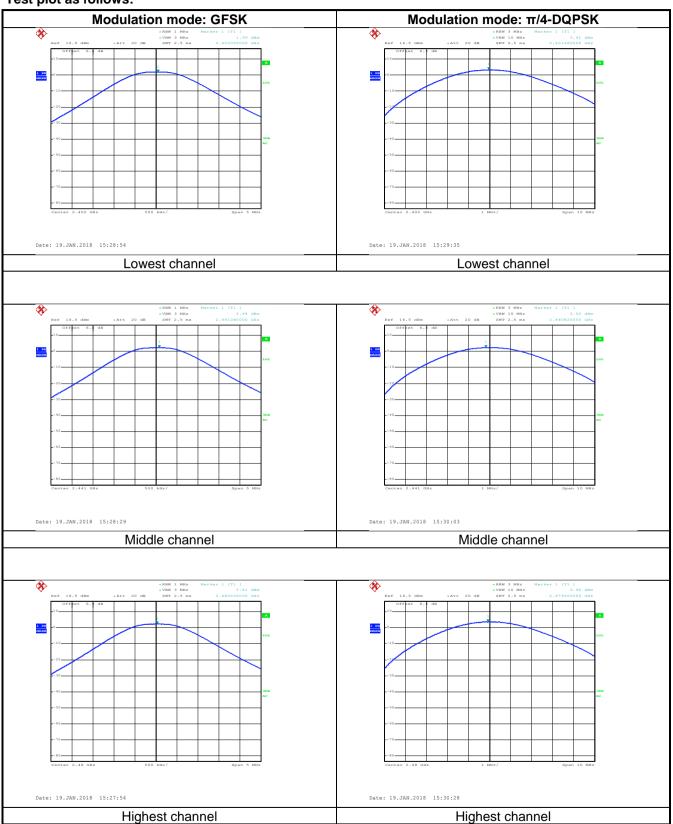
Measurement Data:

Test channel	Peak Output Power (dBm) Limit (dBm)		Result			
	GFSK mode					
Lowest channel	1.99	30.00	Pass			
Middle channel	2.44	30.00	Pass			
Highest channel	2.41	30.00	Pass			
	π/4-DQPSK mode					
Lowest channel	Lowest channel 3.41 21.00					
Middle channel	Middle channel 2.52		Pass			
Highest channel	Highest channel 3.90		Pass			
	8DPSK mode					
Lowest channel	3.96	21.00	Pass			
Middle channel	4.35	21.00	Pass			
Highest channel	4.29	21.00	Pass			

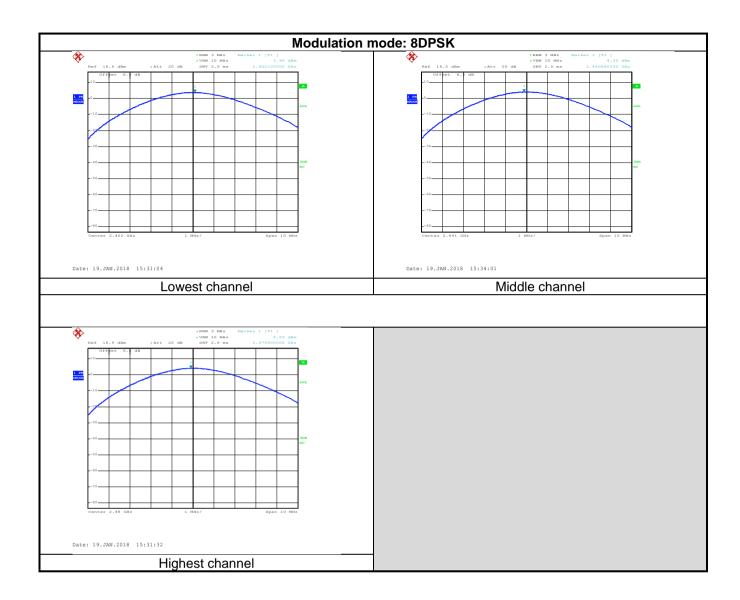




Test plot as follows:











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:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Non-hopping mode		
Test results:	Pass		

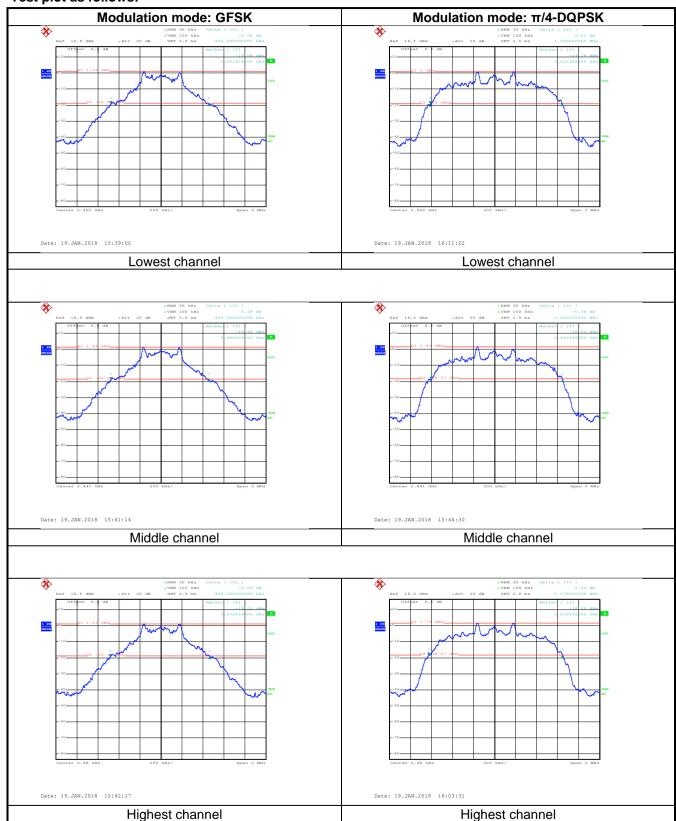
Measurement Data:

Toot channel	20dB Occupy Bandwidth (kHz)				
Test channel	GFSK	π/4-DQPSK	8DPSK		
Lowest	932	1264			
Middle	932	932 1252 1292			
Highest	948 1276 1284				

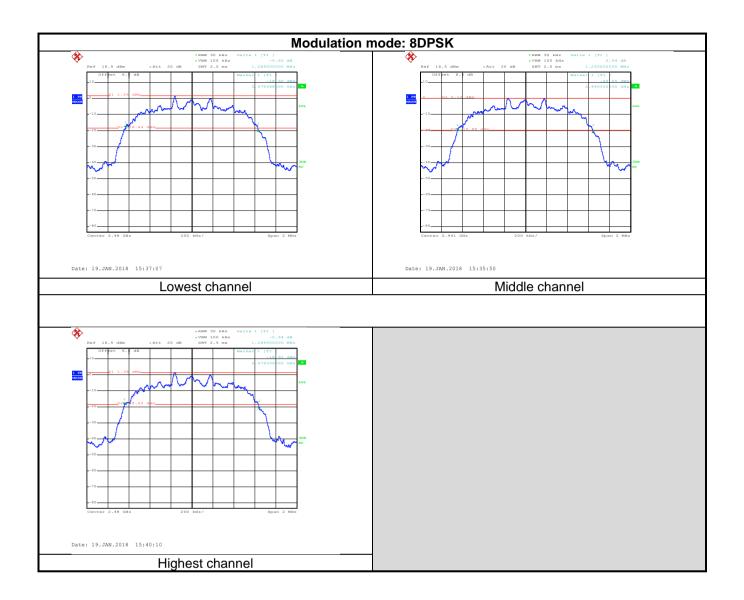




Test plot as follows:











6.5 Carrier Frequencies Separation

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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:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
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	1012	948.00	Pass		
Middle	1004	948.00	Pass		
Highest	1004	948.00	Pass		
	π/4-DQPSK mode				
Lowest	1004	850.67	Pass		
Middle	1004	850.67	Pass		
Highest	1004	850.67	Pass		
8DPSK mode					
Lowest	1004	861.33	Pass		
Middle	1004	861.33	Pass		
Highest	1004	861.33	Pass		

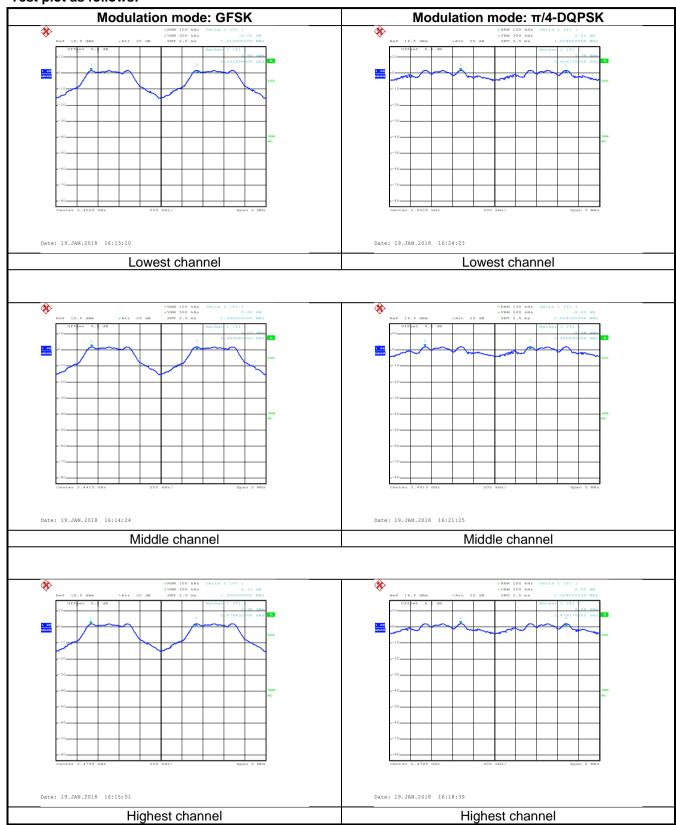
Note: According to section 6.4

Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GFSK	948	948.00
π/4-DQPSK	1276	850.67
8DPSK	1292	861.33

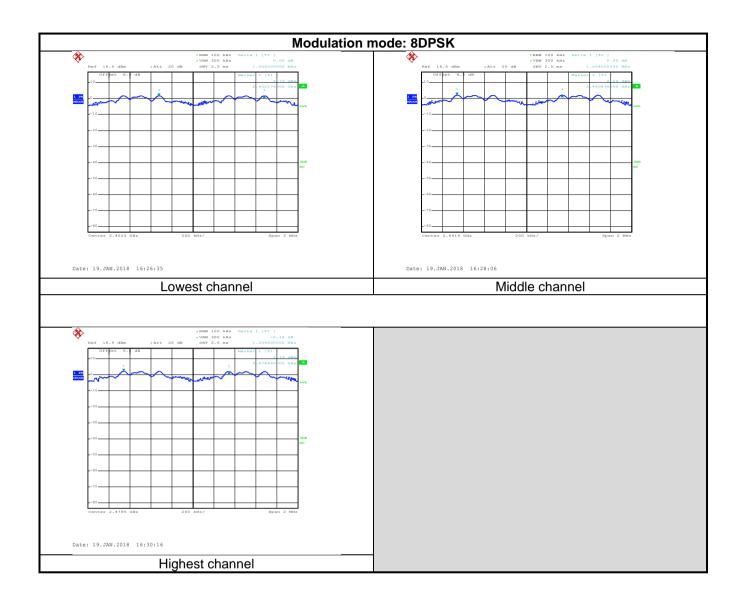




Test plot as follows:











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:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Hopping mode		
Test results:	Pass		

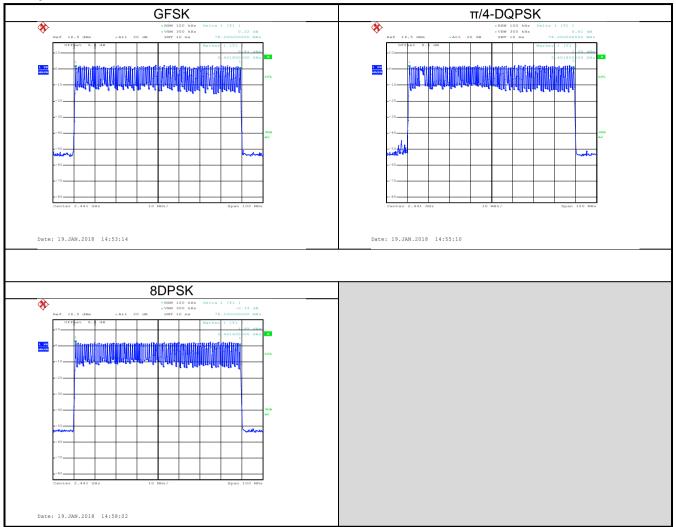
Measurement Data:

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:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
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	
	DH1	0.12928			
GFSK	DH3	0.26976	0.4	Pass	
	DH5	0.31296			
π/4-DQPSK	2-DH1	0.13184			
	2-DH3	0.27008	0.4	Pass	
	2-DH5	0.31381			
	3-DH1	0.13120			
8DPSK	3-DH3	0.27104	0.4	Pass	
	3-DH5	0.31467			

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

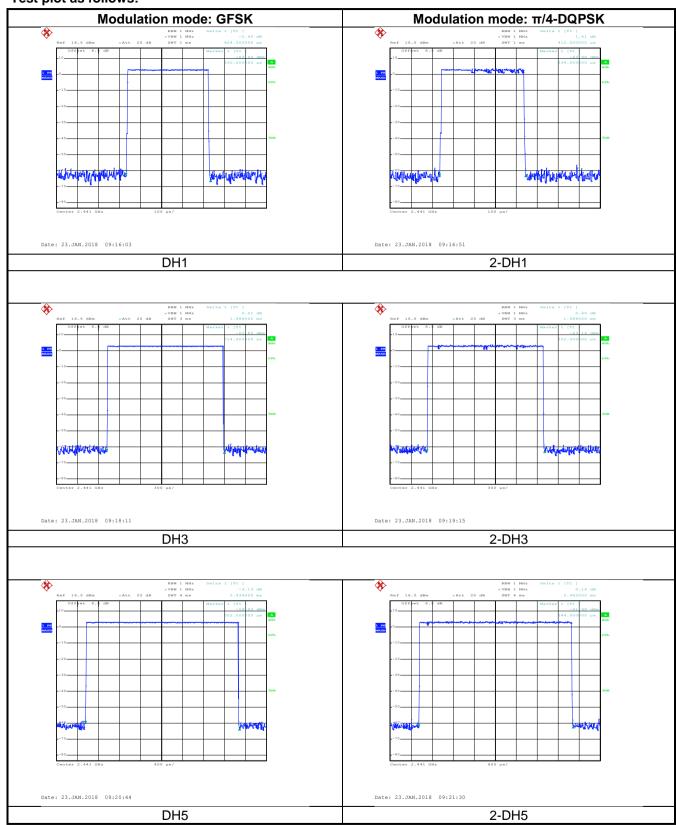
For example:

DH1 time slot=0.404*(1600/(2*79))*31.6=129.28ms DH3 time slot=1.686*(1600/(4*79))*31.6=269.76ms DH5 time slot=2.934*(1600/(6*79))*31.6=312.96ms

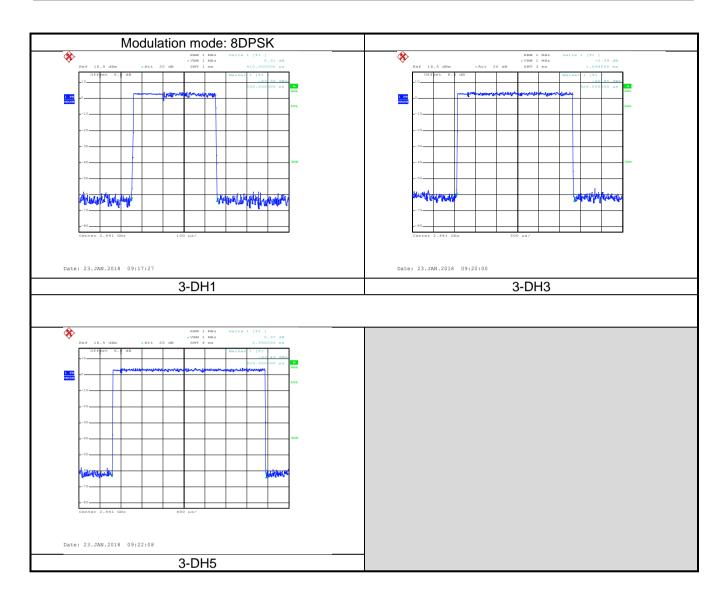




Test plot as follows:







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6.8 Pseudorandom Frequency Hopping Sequence

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

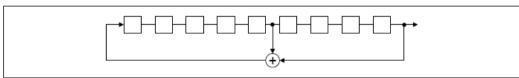
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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

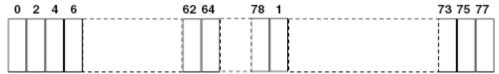
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized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

- · Number of shift register stages: 9
- Length of pseudo-random sequence: 29-1 = 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

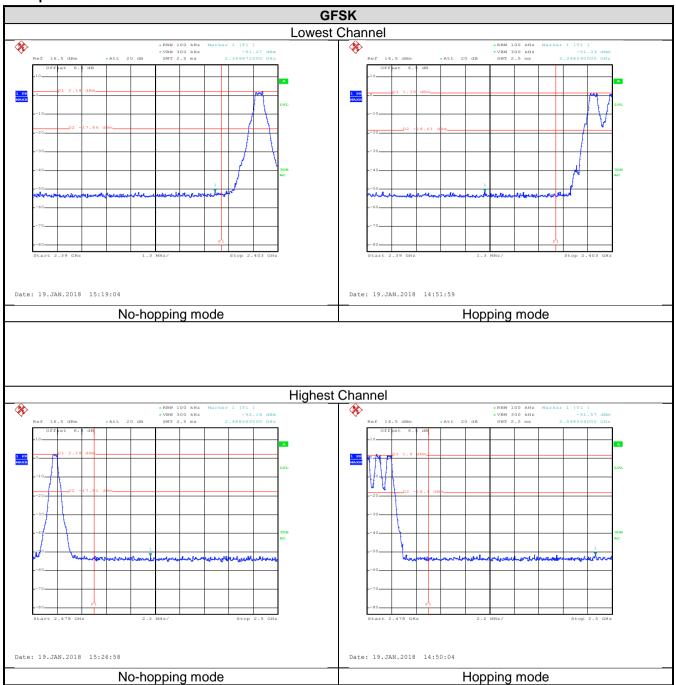
6.9.1 Conducted Emission Method

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:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane			
Test Instruments:	Refer to section 5.8 for details			
Test mode:	Non-hopping mode and hopping mode			
Test results:	Pass			

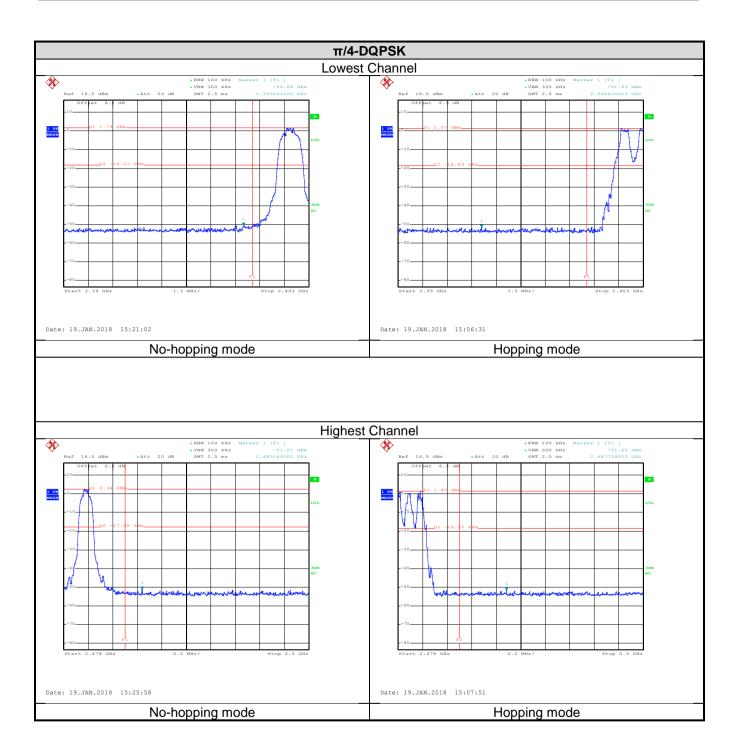




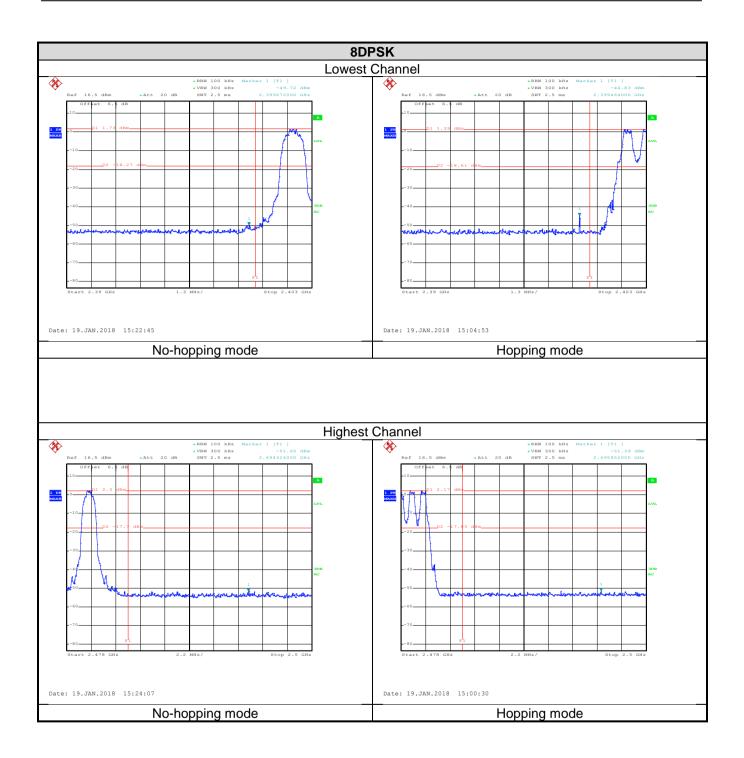
Test plot as follows:











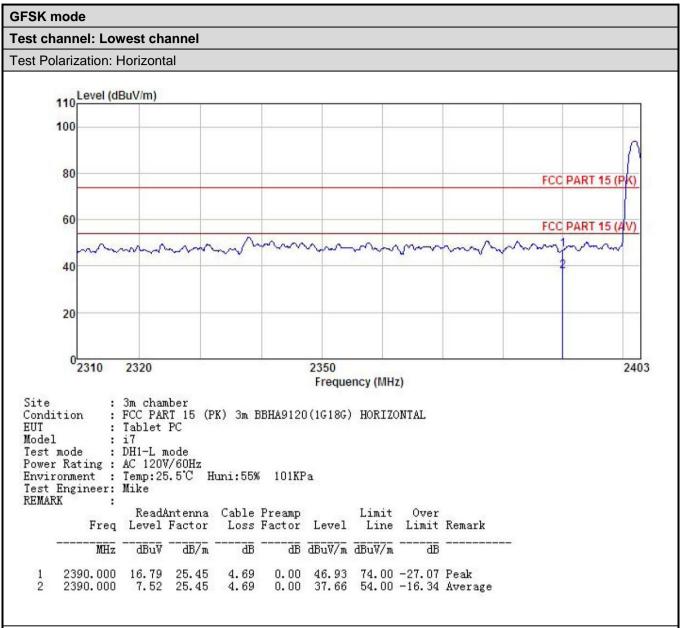


6.9.2 Radiated Emission Method

Test Requirement:	Test Pervirons anti-						
Test Method:	FCC Part 15 C Section 15.209 and 15.205						
Test Frequency Range:	ANSI C63.10: 2013						
Test Distance:	2.3GHz to 2.5GHz						
Receiver setup:	3m Frequency Detector RBW VBW Remark						
Receiver setup.				1MHz	3MHz		Peak Value
	Above 1GHz	Peak					Average Value
Limit:	RMS 1MHz 3MHz Average Frequency Limit (dBuV/m @3m) Remark						
Liniit.	rrequeri	Су	LIII	54.00)111)	Average Value	
	Above 1G	SHz		74.00	+		Peak Value
Test Procedure:	Horn Antenna Tower AE EUT Ground Reference Plane Test Receiver Test Receiver Controller						
Test Procedure:	 The EUT was placed on the top of a rotating table 1.5meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 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. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 						
Test Instruments:	Refer to section 5.8 for details						
Test mode:	Non-hopping mode						
Test results:	Passed						





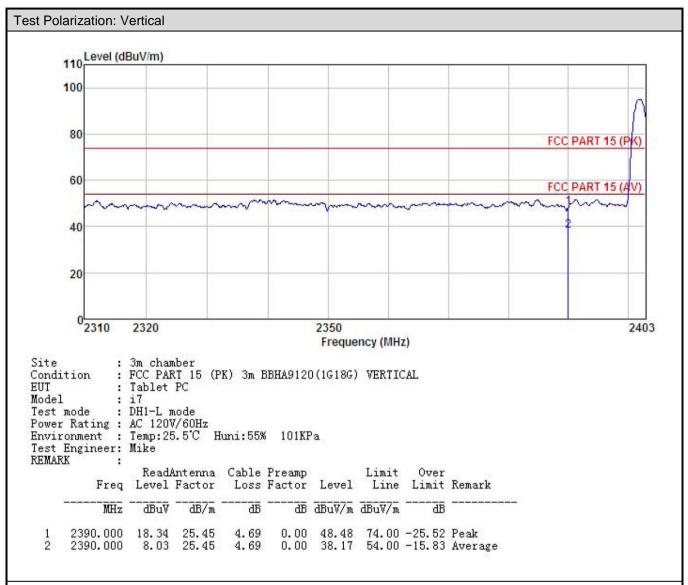


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



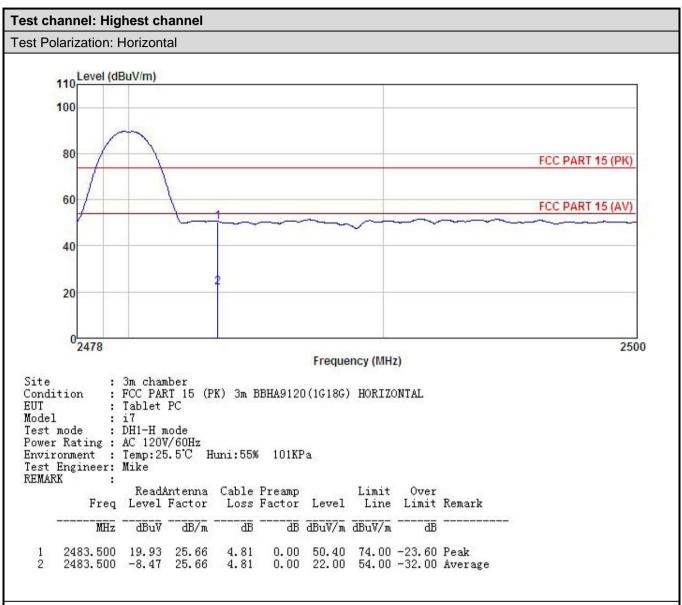




- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor.
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





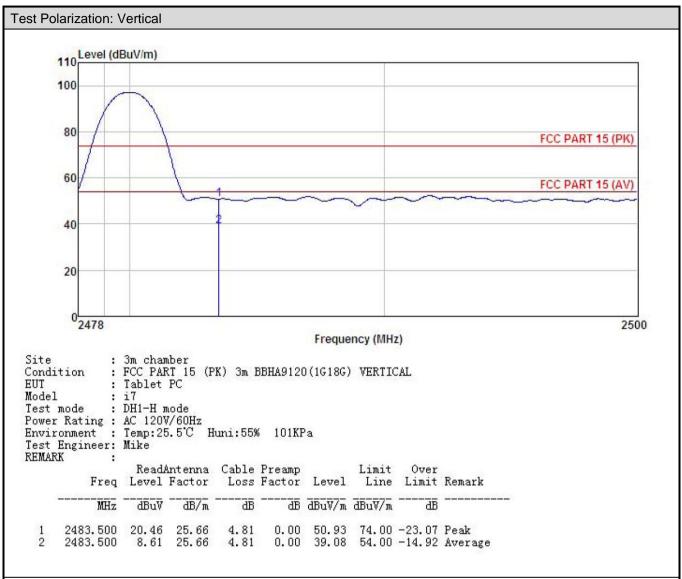


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.





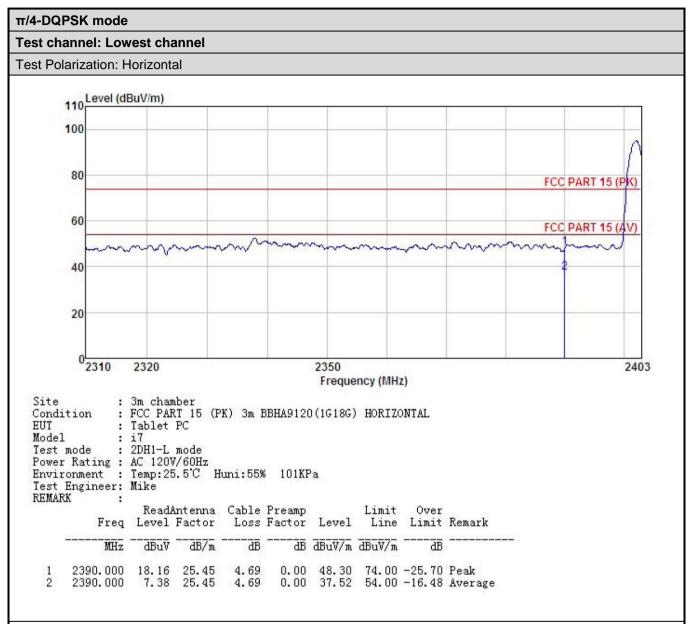


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.





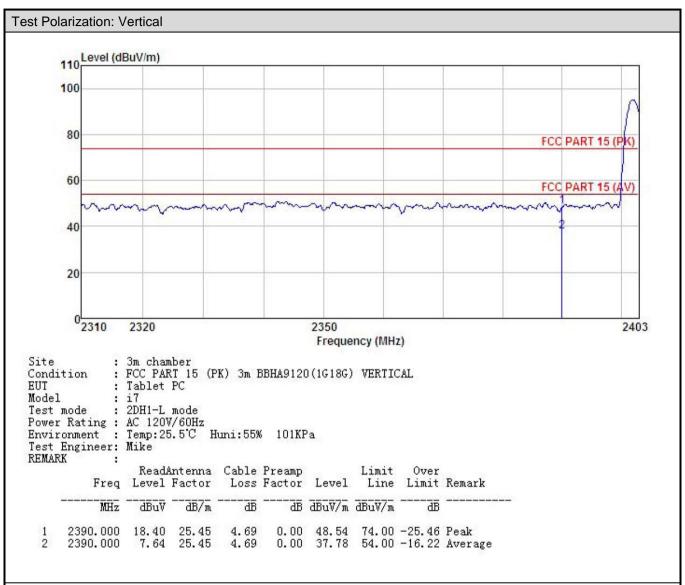


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.





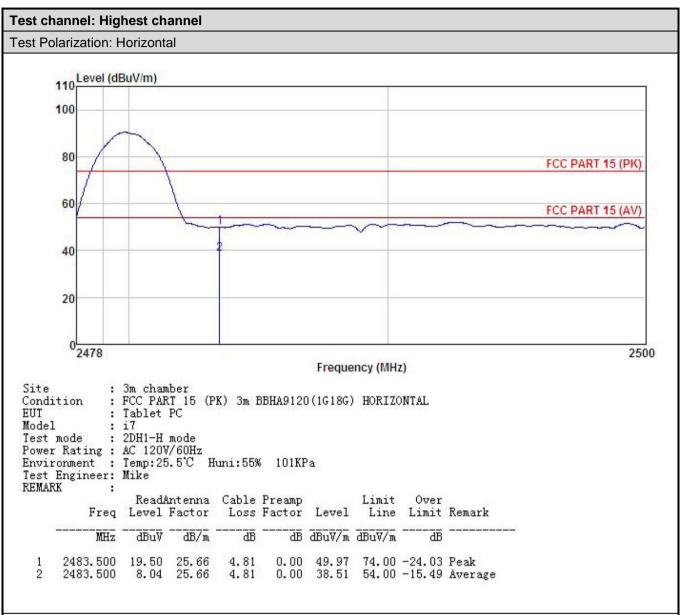


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



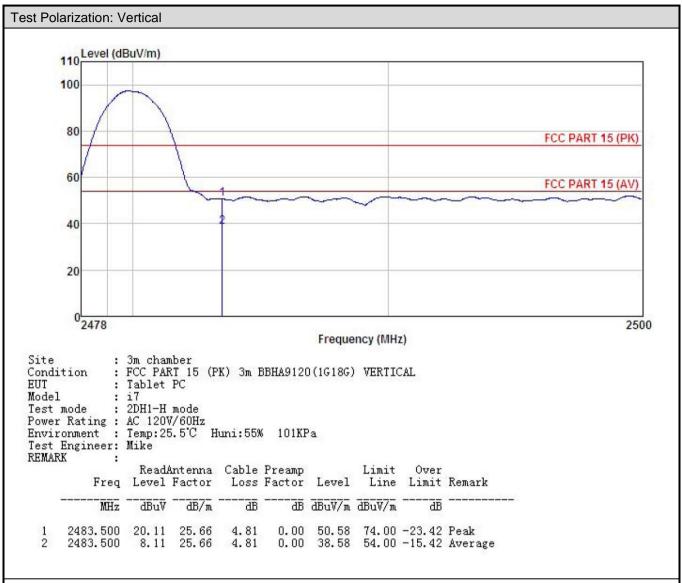




1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

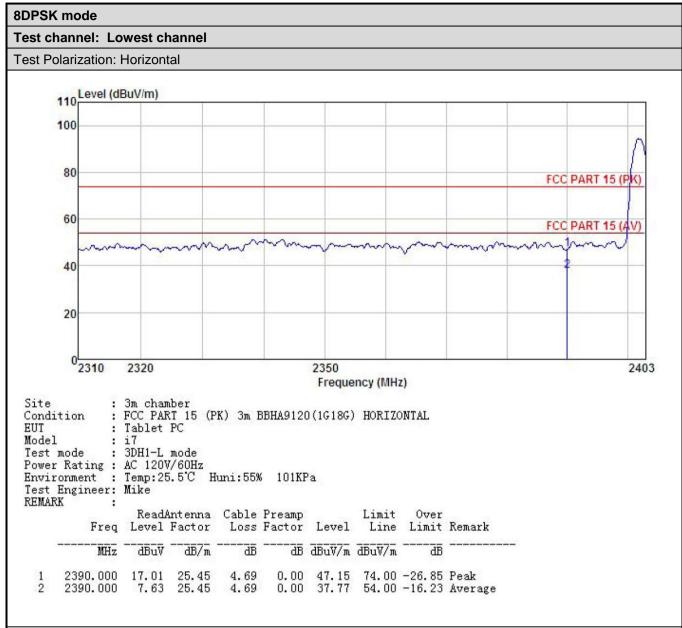




- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor.
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





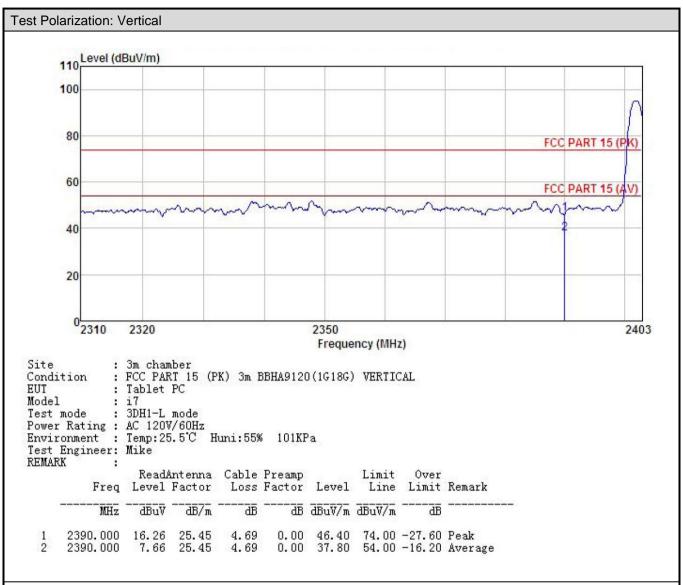


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



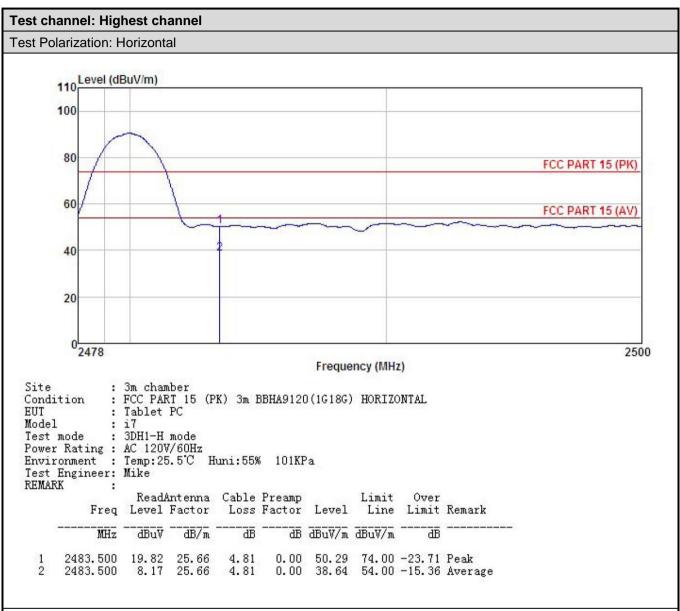




- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor.
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





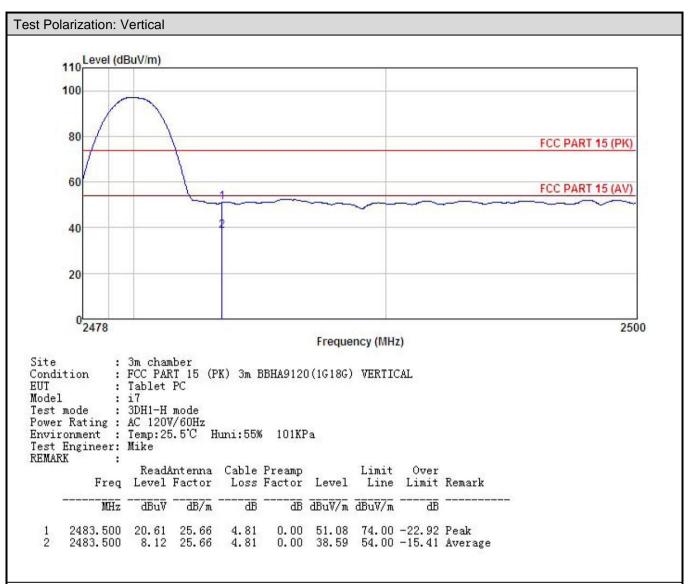


1. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.







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

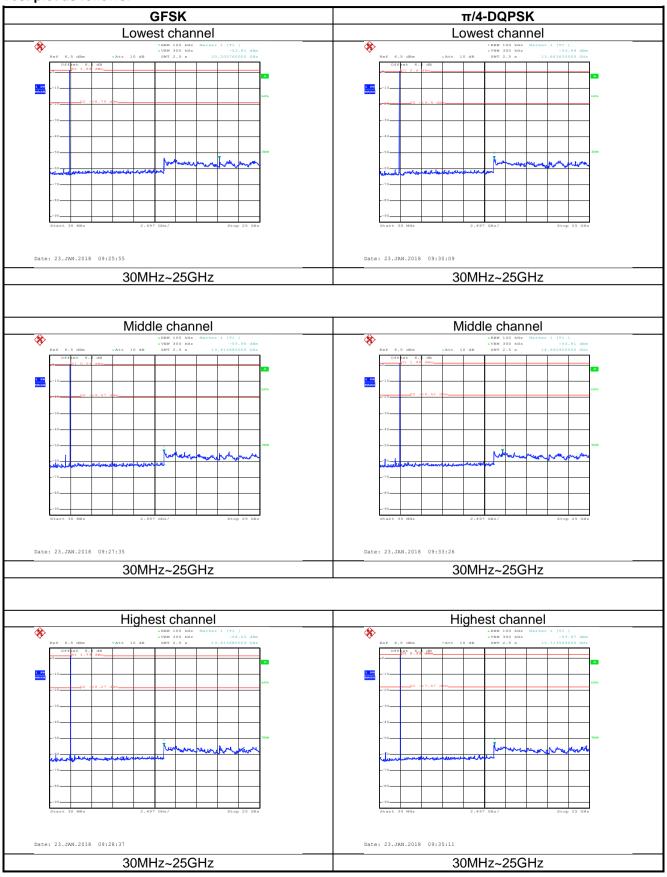
6.10.1 Conducted Emission Method

Test Requirement:	ECC Part 15 C Section 15 247 (d)				
•	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:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 5.8 for details				
Test mode:	Non-hopping mode				
Test results:	Pass				

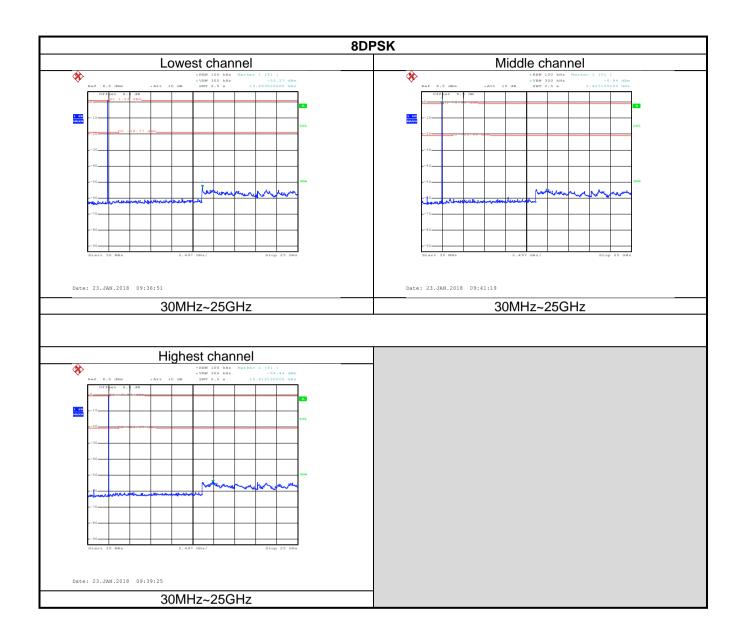




Test plot as follows:











6.10.2 Radiated Emission Method

	6.10.2 Radiated Emission Method								
Test Requirement:	FCC Part 15 C		5.209						
Test Method:	ANSI C63.10: 2013								
Test Frequency Range:	9 kHz to 25 GHz								
Test Distance:	3m								
Receiver setup:	Frequency	Frequency Detector RBW V			VBV	VBW Remark			
	30MHz-1GHz	Quasi-pe	eak	ak 120kHz 300kH		Hz	Iz Quasi-peak Value		
	Above 1GHz	Peak		1MHz	3MHz		Peak Value		
	Above Toriz	RMS		1MHz	IHz 3MF		Iz Average Value		
Limit:	Frequenc	y	Lim	it (dBuV/m @	93m)	Remark			
	30MHz-88N	ИHz	40.0			Quasi-peak Value			
	88MHz-216	MHz	43.5			Quasi-peak Value			
	216MHz-960	MHz	46.0			Quasi-peak Value			
	960MHz-10	GHz	54.0			Quasi-peak Value			
			54.0			Average Value			
	Above 1GI	ĦΖ	74.0			Peak Value			
	Antenna Tower Search Antenna RF Test Receiver Ground Plane Above 1GHz								
	Antenna Tower Ground Reference Plane Test Receiver Test Receiver Controller						na Tower		
Test Procedure:	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								





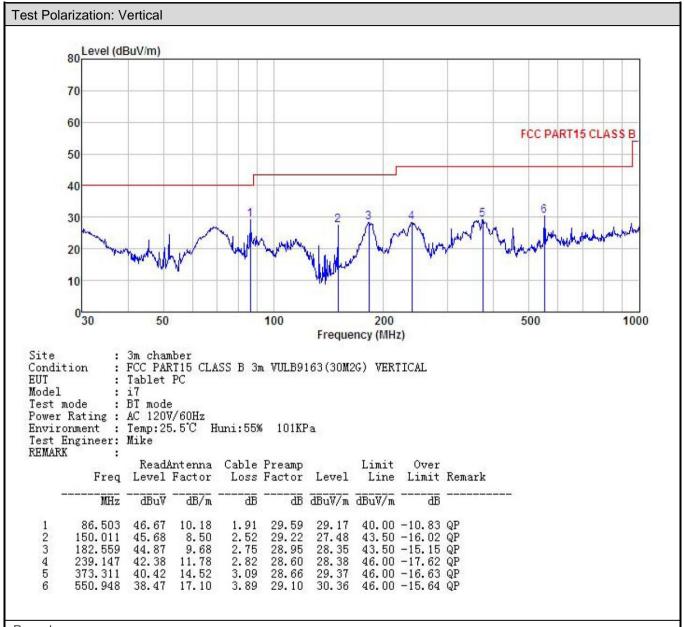
	was rotated 360 degrees to determine the position of the highest radiation.		
	The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.		
	 The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 		
	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.		
	The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.		
	6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Non-hopping mode		
Test results:	Pass		
Remark:	 Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report. 		





Measurement Data (worst case):

Below 1GHz:



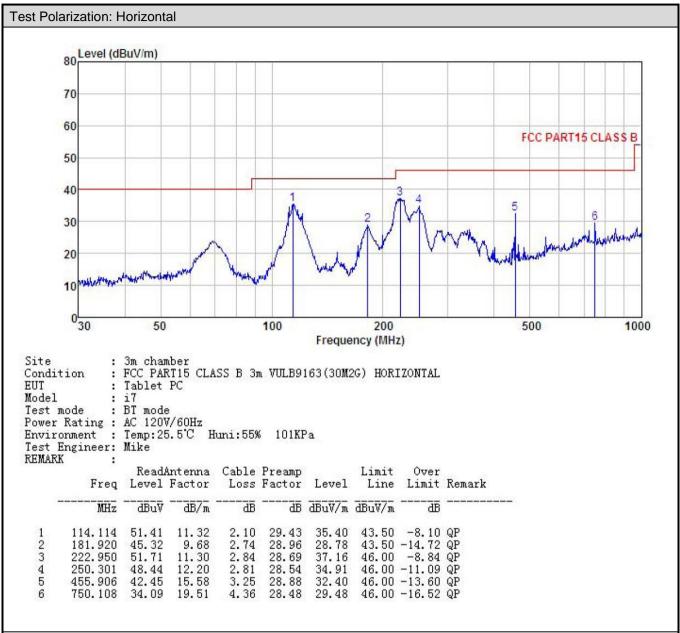
Remark:

^{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.







^{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:

Above 1GHz	<u> </u>									
				annel: Lowe						
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	46.52	30.85	6.80	41.81	42.36	74.00	-31.64	Vertical		
4804.00	46.35	30.85	6.80	41.81	42.19	74.00	-31.81	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	35.96	30.85	6.80	41.81	31.80	54.00	-22.20	Vertical		
4804.00	36.60	30.85	6.80	41.81	32.44	54.00	-21.56	Horizontal		
				annel: Midd						
		_		tector: Peak	Value		I			
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	46.18	31.20	6.86	41.84	42.40	74.00	-31.60	Vertical		
4882.00	46.06	31.20	6.86	41.84	42.28	74.00	-31.72	Horizontal		
			Dete	ctor: Averag	ge 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	37.11	31.20	6.86	41.84	33.33	54.00	-20.67	Vertical		
4882.00	37.14	31.20	6.86	41.84	33.36	54.00	-20.64	Horizontal		
			Test ch	annel: Highe	est channel					
			De	tector: 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	46.74	31.63	6.91	41.87	43.41	74.00	-30.59	Vertical		
4960.00	46.33	31.63	6.91	41.87	43.00	74.00	-31.00	Horizontal		
			Dete	ctor: Averaç	ge 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	37.05	31.63	6.91	41.87	33.72	54.00	-20.28	Vertical		
4960.00	36.91	31.63	6.91	41.87	33.58	54.00	-20.42	Horizontal		

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.