

FCC REPORT

(WIFI)

Applicant: Grand Electronics INC.

Address of Applicant: Grand Electronics Inc 7617 Standish PlaceDerwood, MD 20855
USA

Equipment Under Test (EUT)

Product Name: Tablet

Model No.: X7, X7s

Trade mark: neutab.

FCC ID: 2AGNKK71

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

Date of sample receipt: 29 Jun., 2017

Date of Test: 30 Jun., to 10 Jul., 2017

Date of report issued: 11 Jul., 2017

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.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Version No.	Date	Description
00	11 Jul., 2017	Original

Tested by:

YT Yang

Test Engineer

Date:

11 Jul., 2017

Reviewed by:

Wimer Zhang

Project Engineer

Date:

11 Jul., 2017

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION	2
3 CONTENTS	3
4 TEST SUMMARY.....	4
5 GENERAL INFORMATION.....	5
5.1 CLIENT INFORMATION.....	5
5.2 GENERAL DESCRIPTION OF E.U.T.....	5
5.3 TEST ENVIRONMENT AND MODE	7
5.4 MEASUREMENT UNCERTAINTY.....	7
5.5 LABORATORY FACILITY.....	7
5.6 LABORATORY LOCATION	8
5.7 TEST INSTRUMENTS LIST.....	8
6 TEST RESULTS AND MEASUREMENT DATA	9
6.1 ANTENNA REQUIREMENT	9
6.2 CONDUCTED EMISSION	10
6.3 CONDUCTED OUTPUT POWER	13
6.4 OCCUPY BANDWIDTH	18
6.5 POWER SPECTRAL DENSITY	27
6.6 BAND EDGE	32
6.6.1 Conducted Emission Method.....	32
6.6.2 Radiated Emission Method.....	35
6.7 SPURIOUS EMISSION.....	52
6.7.1 Conducted Emission Method.....	52
6.7.2 Radiated Emission Method.....	57
7 TEST SETUP PHOTO	65
8 EUT CONSTRUCTIONAL DETAILS	66

4 Test Summary

Test Item	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)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Conducted and Radiated Spurious Emission	15.205/15.209	Pass

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

5 General Information

5.1 Client Information

Applicant:	Grand Electronics INC.
Address of Applicant:	Grand Electronics Inc 7617 Standish PlaceDerwood, MD 20855 USA
Manufacturer/Factory:	SHENZHEN SUNGORLD ELECTRONICS CO., LTD
Address of Manufacturer//Factory:	4#,Shangxue Technology Industrial Park(North), Bantian, Buji Town, Longgang District, Shenzhen, China

5.2 General Description of E.U.T.

Product Name:	Tablet
Model No.:	X7, X7s
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel numbers:	11 for 802.11b/802.11g/802.11(H20) 7 for 802.11n(H40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Internal Antenna
Antenna gain:	-0.14 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-2000mAh
AC adapter:	Model: Y633-20 Input: AC100-240V 50/60Hz 0.3A Output: DC 5.0V, 2A
Remark:	The No.: X7,X7s advanced were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name for different customer

Operation Frequency each of channel For 802.11b/g/n(H20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel For 802.11n(H40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
		4	2427MHz	7	2442MHz		
		5	2432MHz	8	2447MHz		
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

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:

802.11b/802.11g/802.11n (H20)

Channel	Frequency
The lowest channel	2412MHz
The middle channel	2437MHz
The Highest channel	2462MHz

802.11n (H40)

Channel	Frequency
The lowest channel	2422MHz
The middle channel	2437MHz
The Highest channel	2452MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Operation mode	Keep the EUT in continuous transmitting with modulation
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, 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. We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps
Final Test Mode:	
According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20) and 13.5 Mbps for 802.11n(H40). Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.	

5.4 Measurement Uncertainty

Items	Expanded Uncertainty (Confidence of 95%)
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)

5.5 Laboratory Facility

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

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 817957, February 27, 2012.

● **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.

5.6 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
Website: <http://www.ccis-cb.com>
Tel: +86-755-23118282
Fax: +86-755-23116366
Email: info@ccis-cb.com

5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	07-22-2017	07-22-2020
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	02-25-2017	02-24-2018
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	02-25-2017	02-24-2018
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2017	02-24-2018
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2017	02-24-2018
6	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	02-25-2017	02-24-2018
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	02-25-2017	02-24-2018
8	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	02-25-2017	02-24-2018
9	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	02-25-2017	02-24-2018
10	Loop antenna	Laplace instrument	RF300	EMC0701	02-25-2017	02-24-2018
11	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
12	Coaxial Cable	N/A	N/A	CCIS0018	02-25-2017	02-24-2018
13	Coaxial Cable	N/A	N/A	CCIS0020	02-25-2017	02-24-2018

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	07-22-2017	07-22-2020
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	02-25-2017	02-24-2018
3	LISN	CHASE	MN2050D	CCIS0074	02-25-2017	02-24-2018
4	Coaxial Cable	CCIS	N/A	CCIS0086	02-25-2017	02-24-2018
5	EMI Test Software	AUDIX	E3	N/A	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:

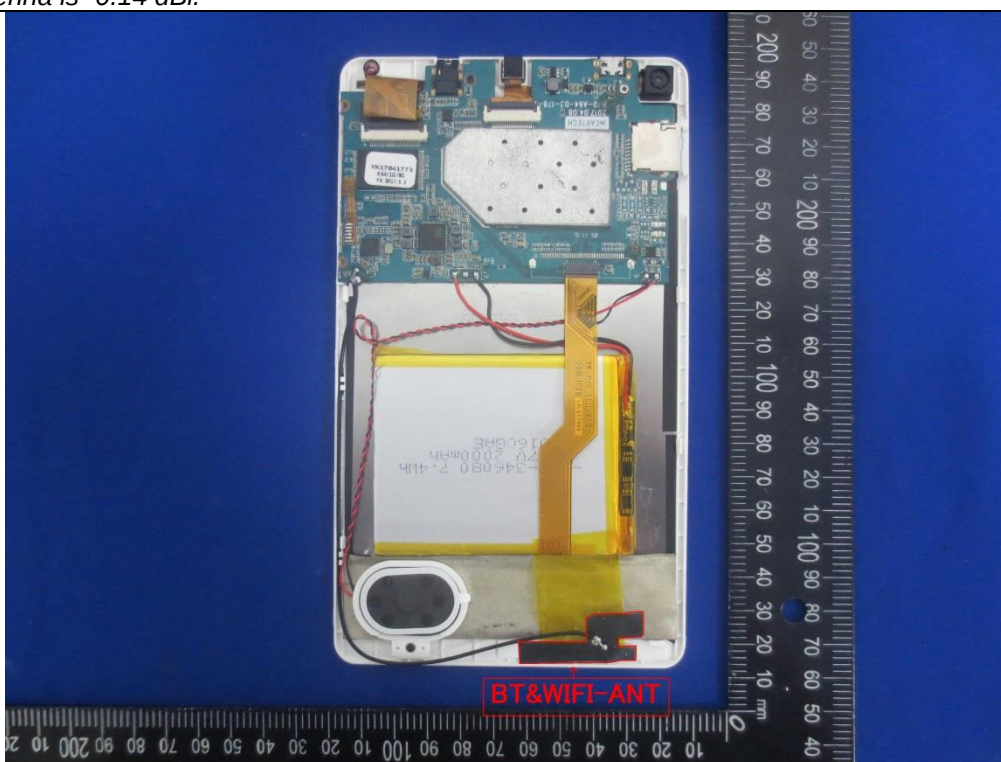
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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:

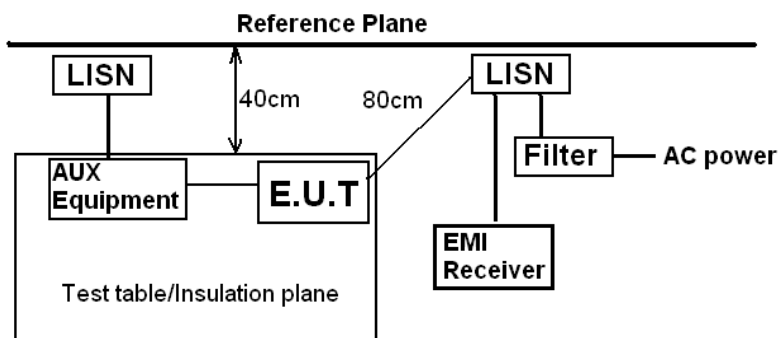
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The WiFi antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is -0.14 dBi.

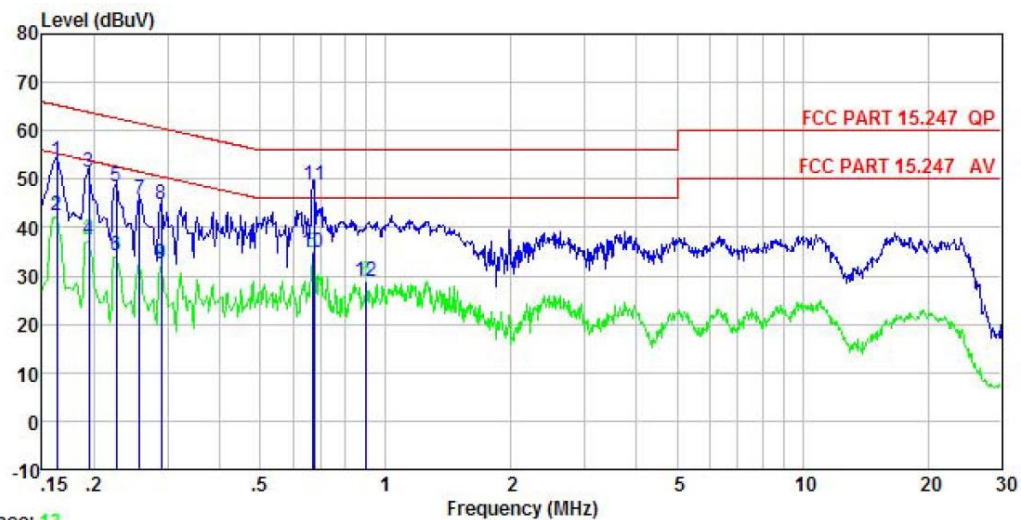


6.2 Conducted Emission

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		
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 procedure	- The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which 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 setup:	 <i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test Instruments:	Refer to section 5.6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

Measurement Data:

Test Polarization: Neutral



Trace: 13

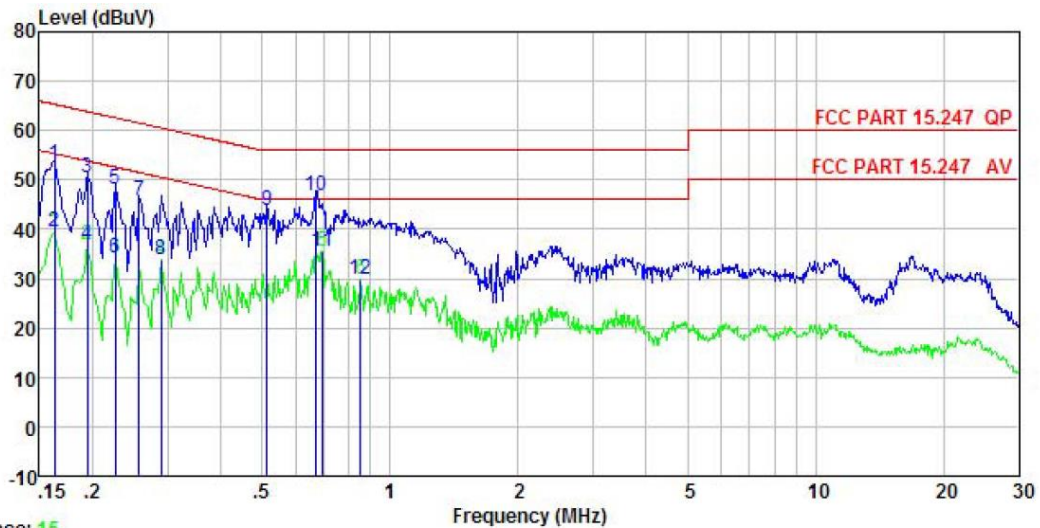
Site : CCIS Shielding Room
 Condition : FCC PART 15.247 QP LISN NEUTRAL
 EUT : X7
 Model : X7
 Test Mode : WIFI mode
 Power Rating : AC120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: YT
 Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	43.27	-0.37	10.77	53.67	65.34	-11.67	QP
2	0.162	31.97	-0.37	10.77	42.37	55.34	-12.97	Average
3	0.194	40.92	-0.34	10.76	51.34	63.84	-12.50	QP
4	0.194	26.95	-0.34	10.76	37.37	53.84	-16.47	Average
5	0.226	37.90	-0.33	10.75	48.32	62.61	-14.29	QP
6	0.226	23.64	-0.33	10.75	34.06	52.61	-18.55	Average
7	0.258	35.34	-0.33	10.75	45.76	61.51	-15.75	QP
8	0.289	34.35	-0.32	10.74	44.77	60.54	-15.77	QP
9	0.289	22.25	-0.32	10.74	32.67	50.54	-17.87	Average
10	0.668	24.21	-0.30	10.77	34.68	46.00	-11.32	Average
11	0.675	38.27	-0.30	10.77	48.74	56.00	-7.26	QP
12	0.899	18.34	-0.29	10.84	28.89	46.00	-17.11	Average

Notes:

1. An initial pre-scan was performed on the live 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.

Test Polarization: Line



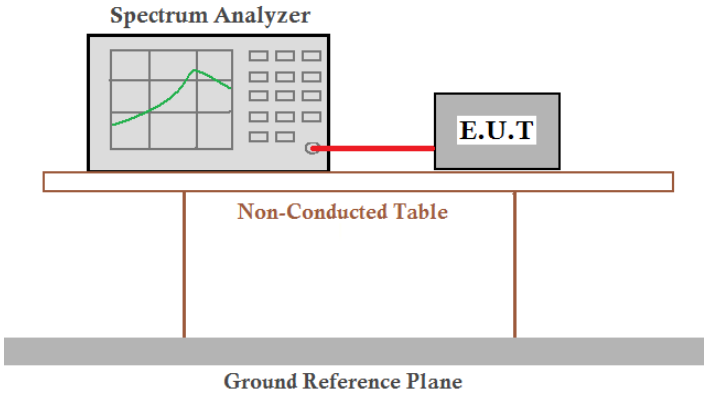
Trace: 15
 Site : CCIS Shielding Room
 Condition : FCC PART 15.247 QP LISN LINE
 EUT : X7
 Model : X7
 Test Mode : WIFI mode
 Power Rating : AC120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: YT
 Remark :

	Freq	Read	LISN	Cable	Level	Limit	Over	
	MHz	Level Factor	dB	Loss	dBuV	Line	Limit	Remark
		dBuV		dB		dBuV	dB	
1	0.162	42.75	-0.55	10.77	52.97	65.34	-12.37	QP
2	0.162	29.27	-0.55	10.77	39.49	55.34	-15.85	Average
3	0.194	40.23	-0.52	10.76	50.47	63.84	-13.37	QP
4	0.194	26.42	-0.52	10.76	36.66	53.84	-17.18	Average
5	0.226	37.74	-0.52	10.75	47.97	62.61	-14.64	QP
6	0.226	24.09	-0.52	10.75	34.32	52.61	-18.29	Average
7	0.258	35.71	-0.51	10.75	45.95	61.51	-15.56	QP
8	0.289	23.60	-0.51	10.74	33.83	50.54	-16.71	Average
9	0.513	33.63	-0.49	10.76	43.90	56.00	-12.10	QP
10	0.668	36.41	-0.48	10.77	46.70	56.00	-9.30	QP
11	0.694	25.31	-0.48	10.77	35.60	46.00	-10.40	Average
12	0.853	19.35	-0.49	10.83	29.69	46.00	-16.31	Average

Notes:

1. An initial pre-scan was performed on the live 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.

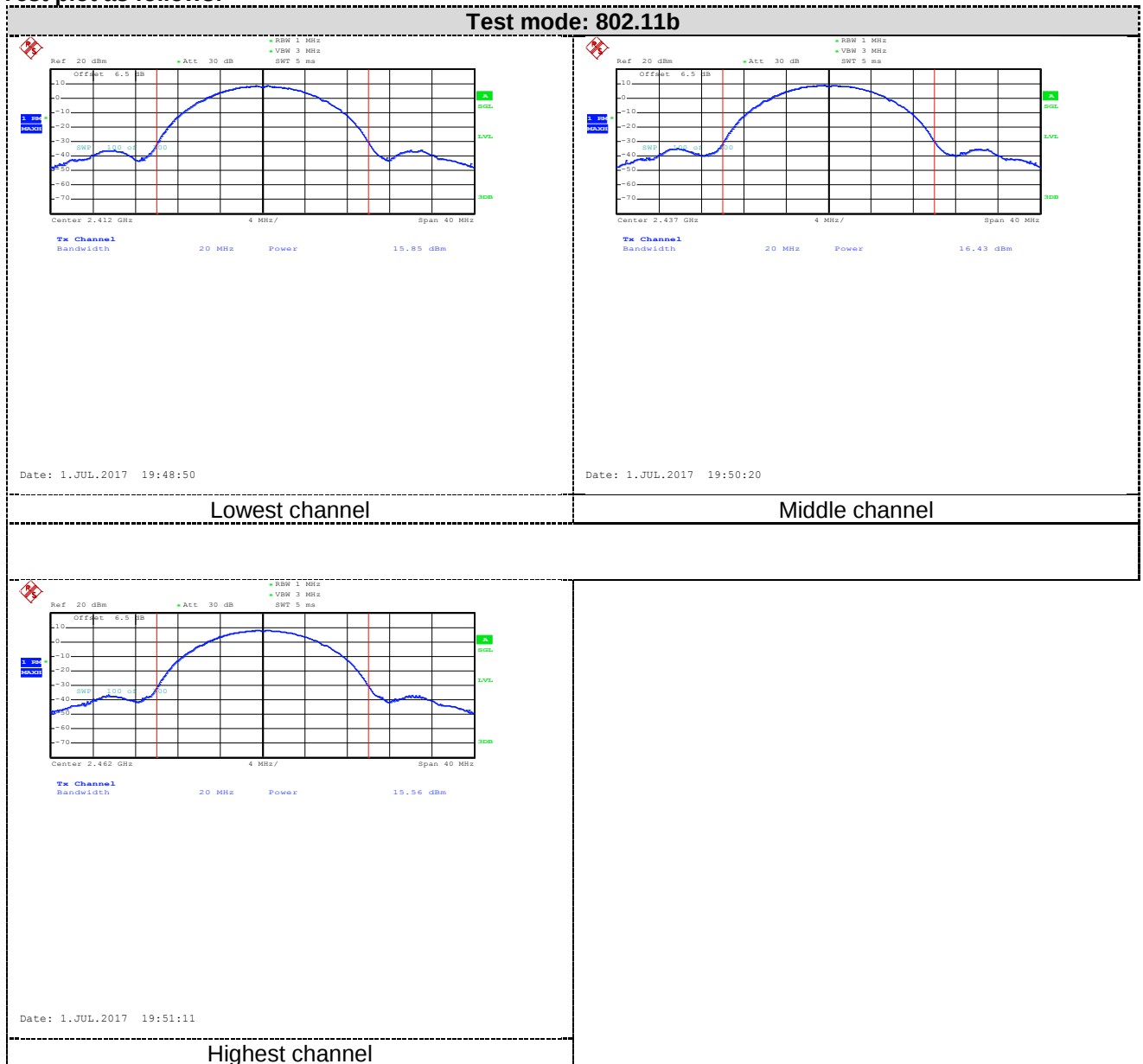
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10: 2013 and KDB558074 D01 DTS Meas Guidance v04 section 9.2.2.2
Limit:	30dBm
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

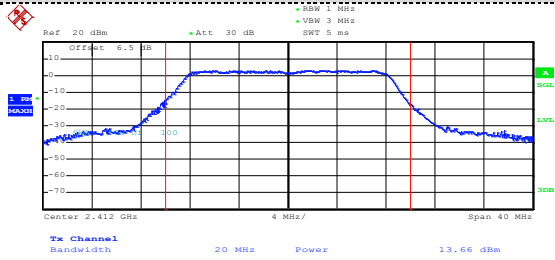
Measurement Data:

Test CH	Maximum Conducted Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	15.85	13.66	13.10	11.44	30.00	Pass
Middle	16.43	13.64	13.68	11.37		
Highest	15.56	13.40	13.26	11.40		

Test plot as follows:

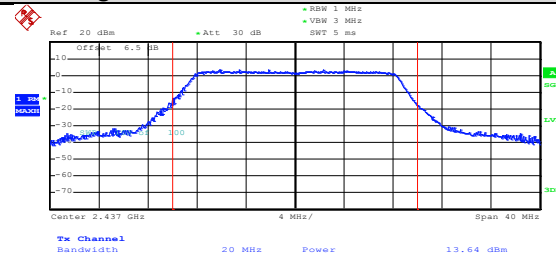


Test mode: 802.11g



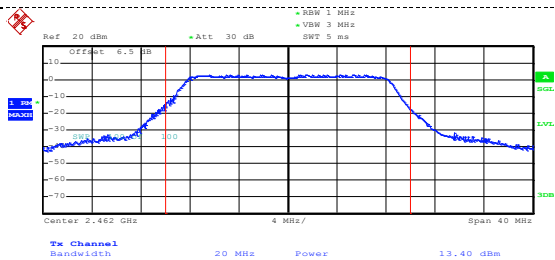
Date: 1.JUL.2017 19:54:10

Lowest channel



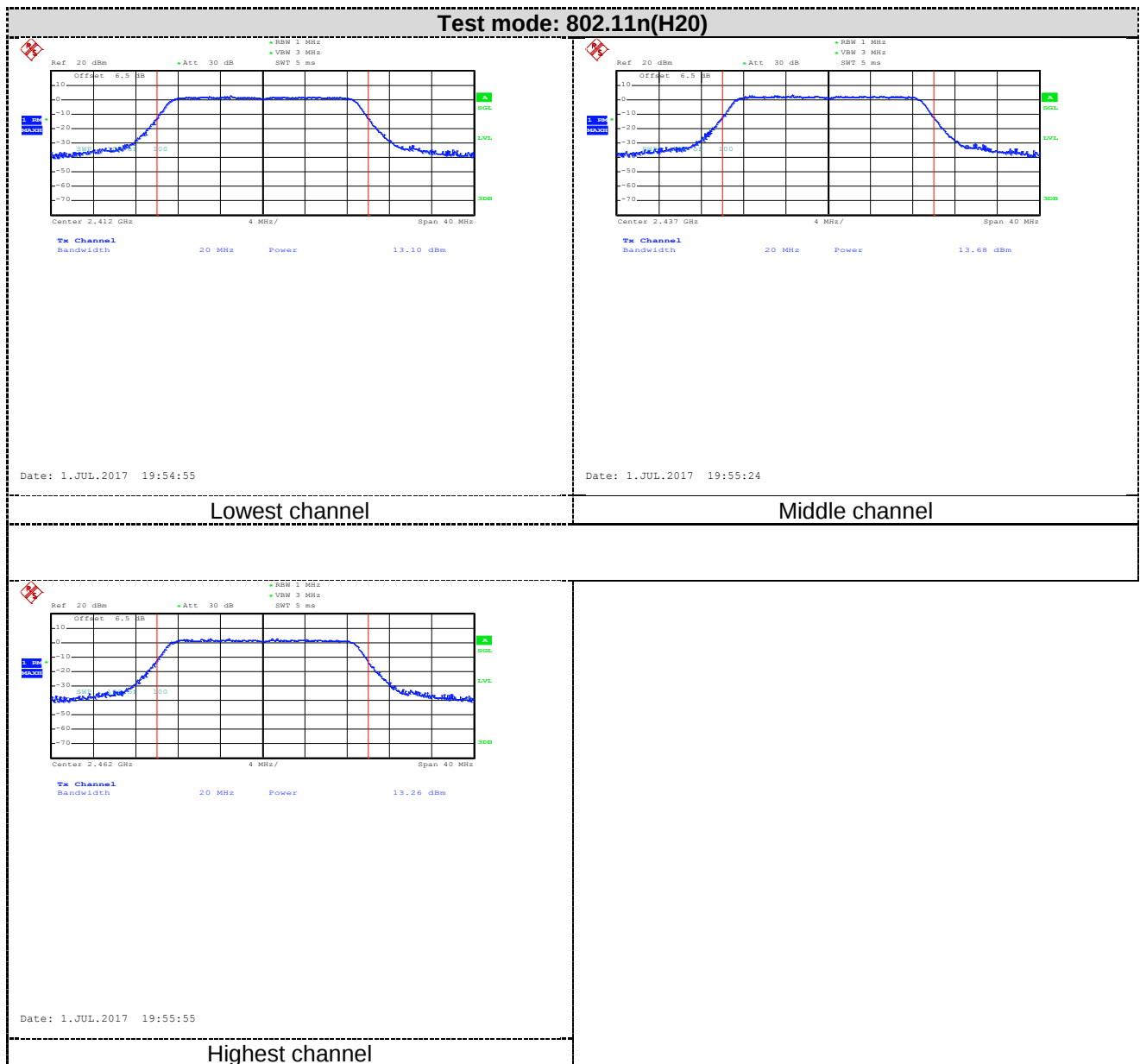
Date: 1.JUL.2017 19:53:28

Middle channel

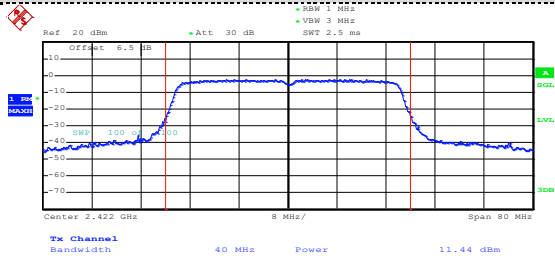


Date: 1.JUL.2017 19:52:43

Highest channel

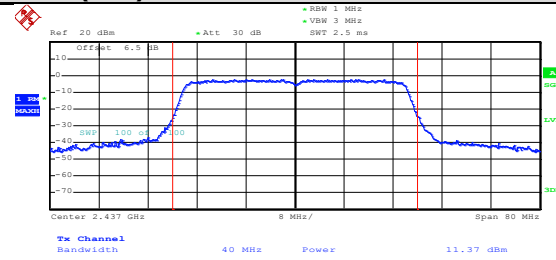


Test mode: 802.11n(H40)



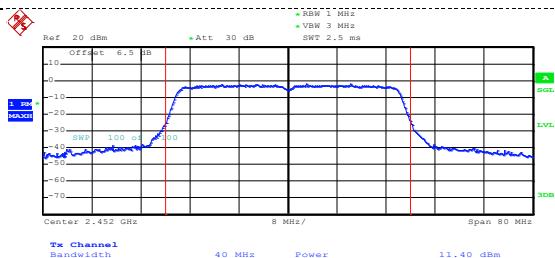
Date: 1.JUL.2017 19:57:16

Lowest channel



Date: 1.JUL.2017 19:58:21

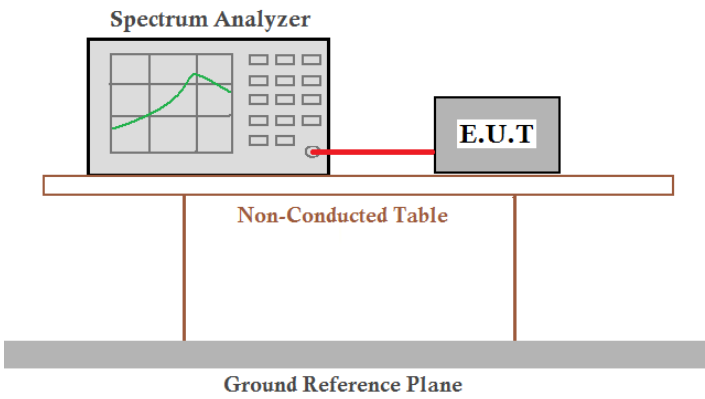
Middle channel



Date: 1.JUL.2017 19:58:58

Highest channel

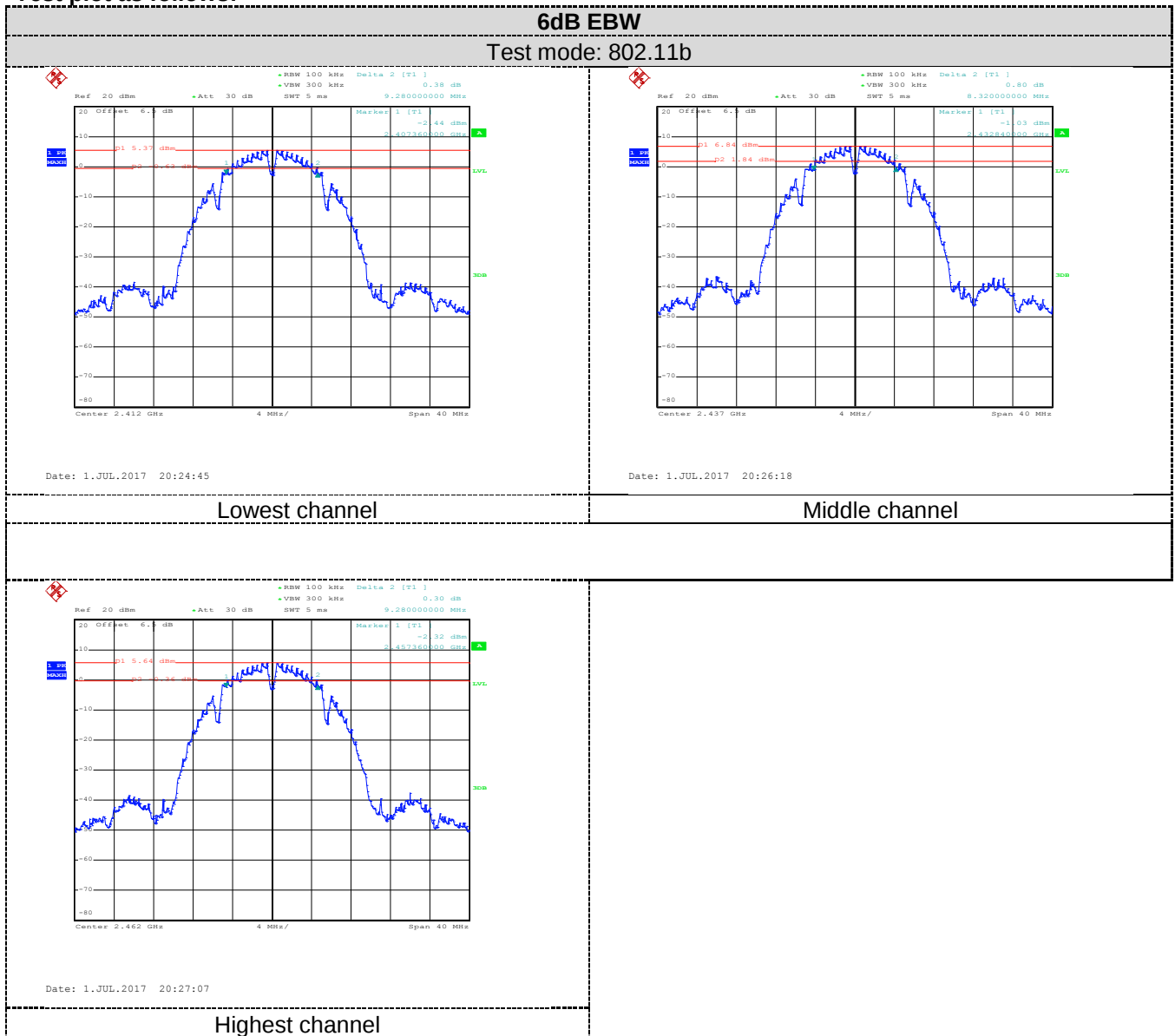
6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v04 section 8.1
Limit:	>500kHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

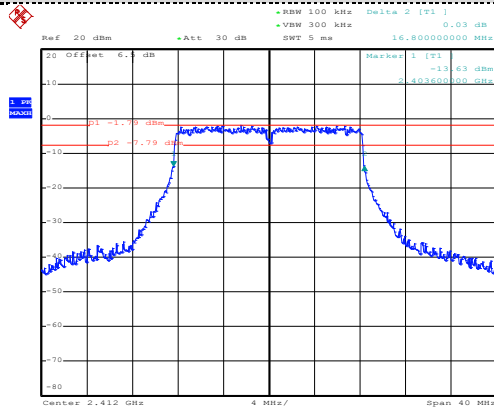
Measurement Data:

Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	9.28	16.80	18.00	36.80	>500	Pass
Middle	8.32	16.80	18.00	36.80		
Highest	9.28	16.80	18.00	36.80		
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	13.12	16.56	17.76	36.16	N/A	N/A
Middle	13.12	16.48	17.68	36.16		
Highest	13.12	16.56	17.76	36.16		

Test plot as follows:

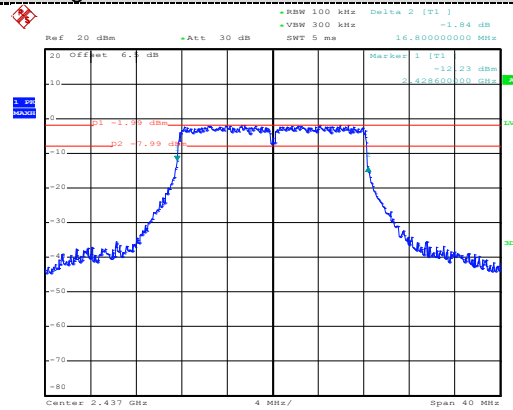


Test mode: 802.11g



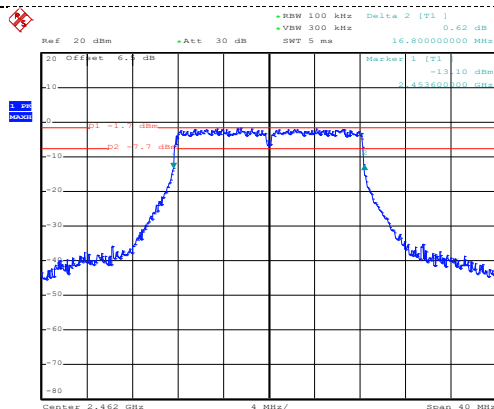
Date: 1.JUL.2017 20:28:21

Lowest channel



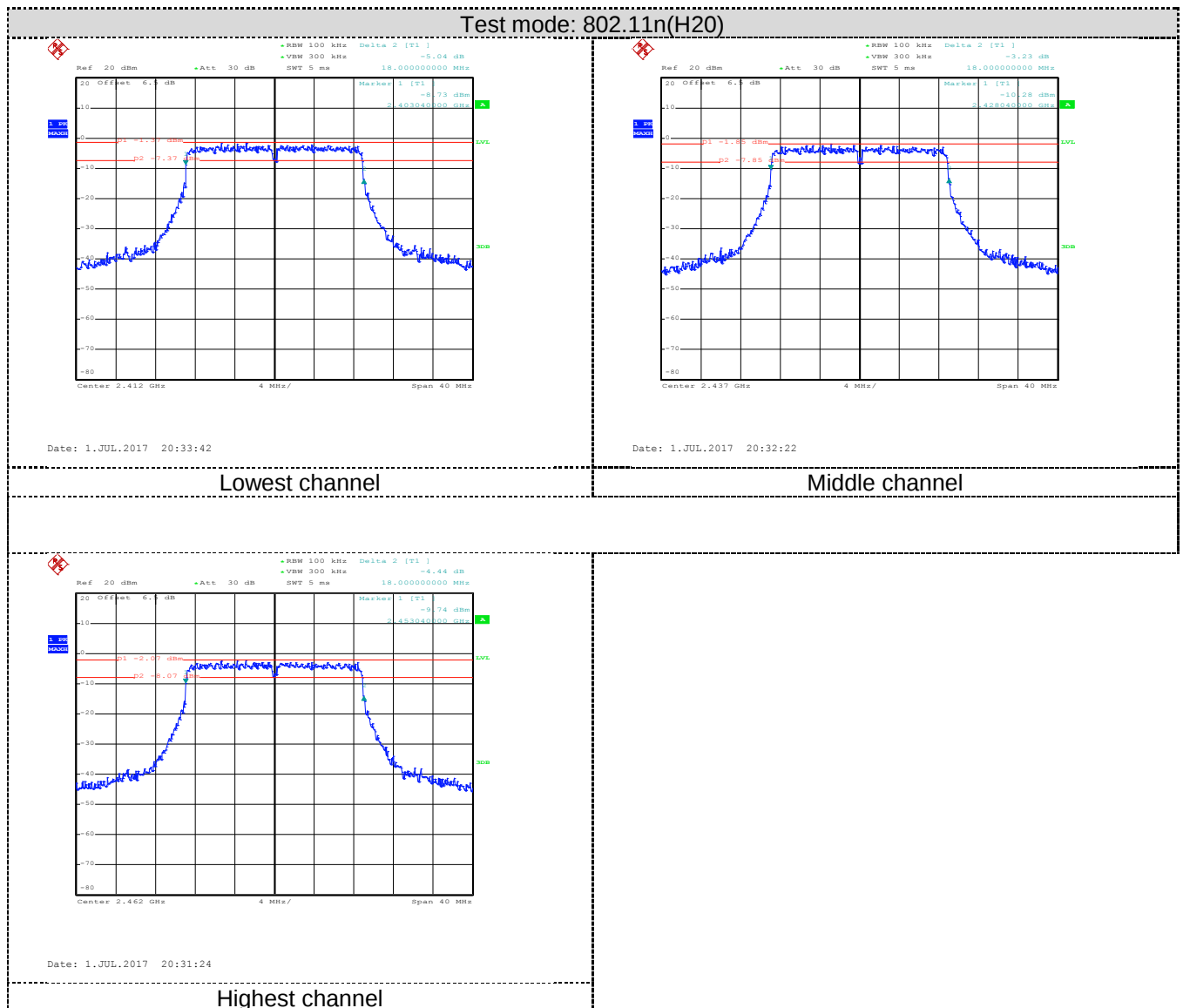
Date: 1.JUL.2017 20:29:19

Middle channel

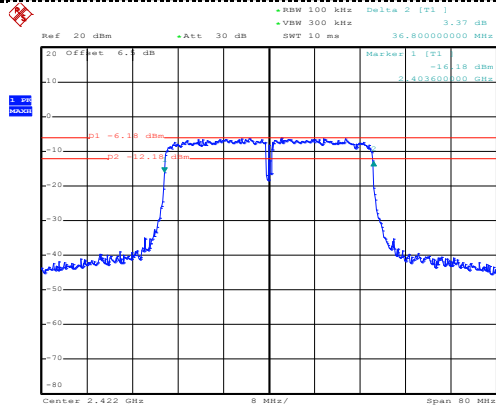


Date: 1.JUL.2017 20:30:19

Highest channel

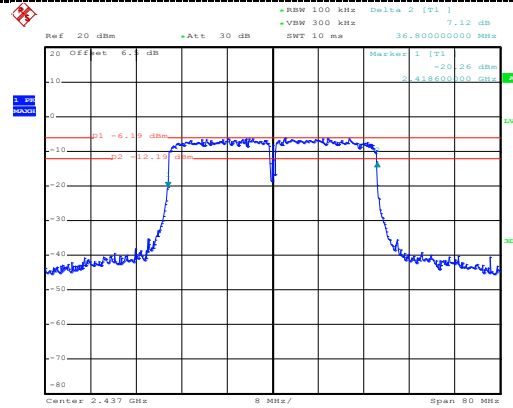


Test mode: 802.11n(H40)



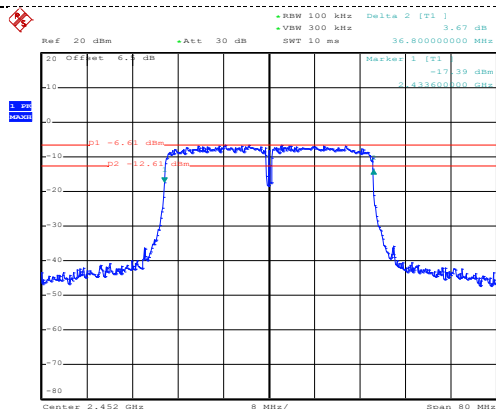
Date: 1.JUL.2017 20:35:29

Lowest channel



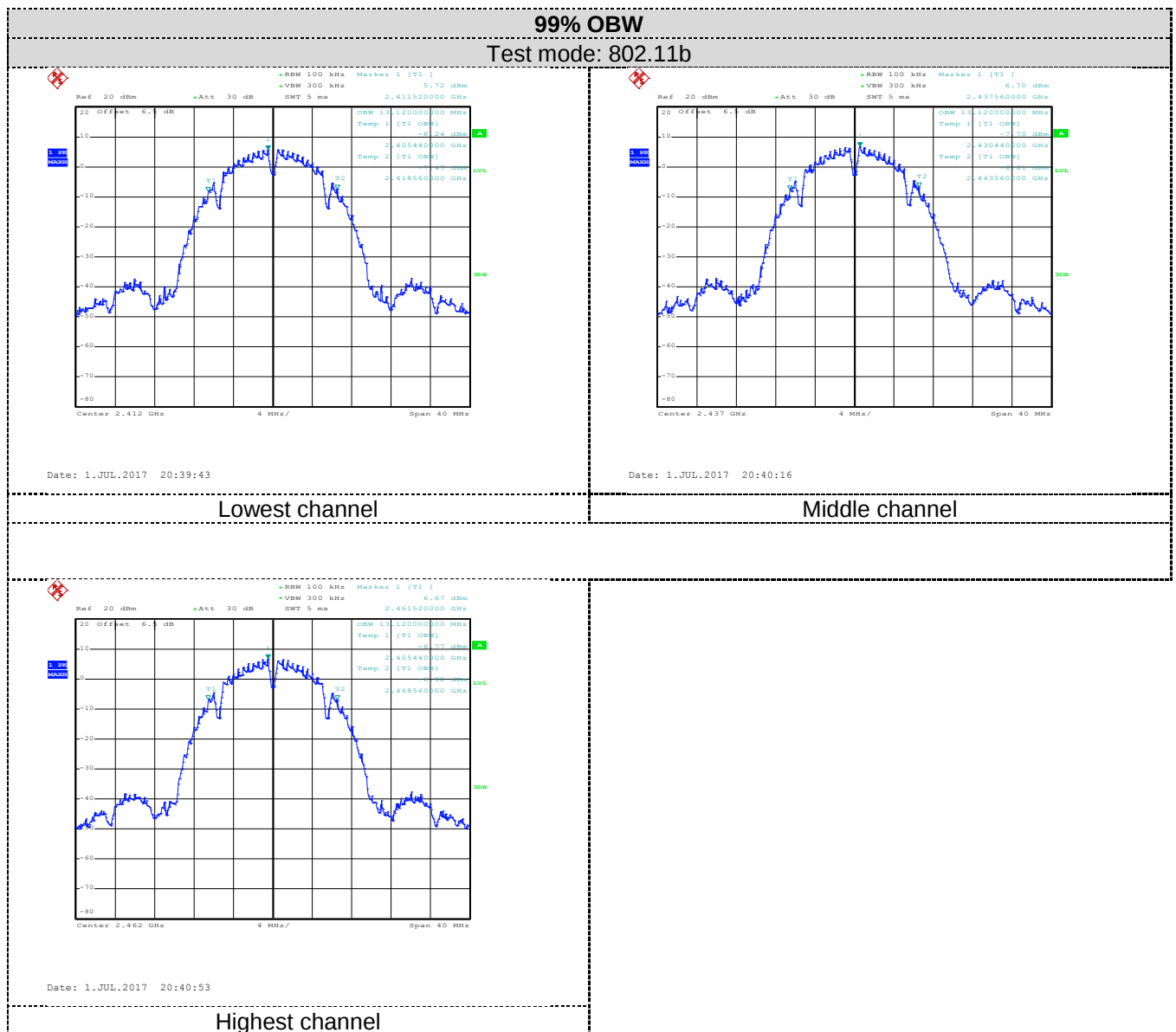
Date: 1.JUL.2017 20:37:33

Middle channel

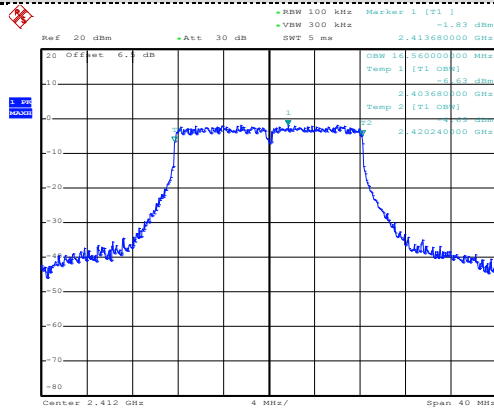


Date: 1.JUL.2017 20:38:41

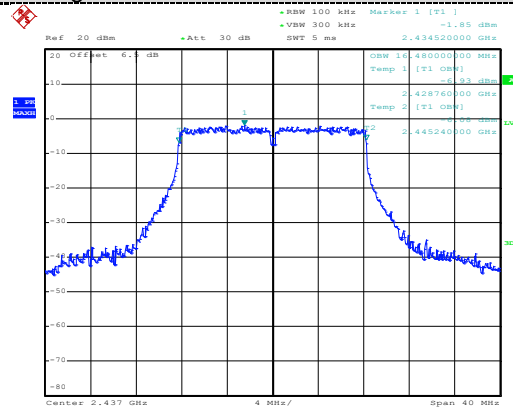
Highest channel



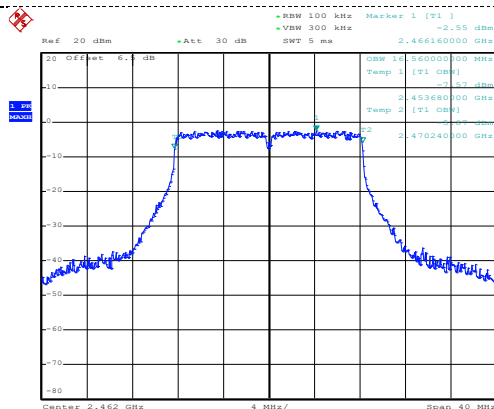
Test mode: 802.11g



Lowest channel

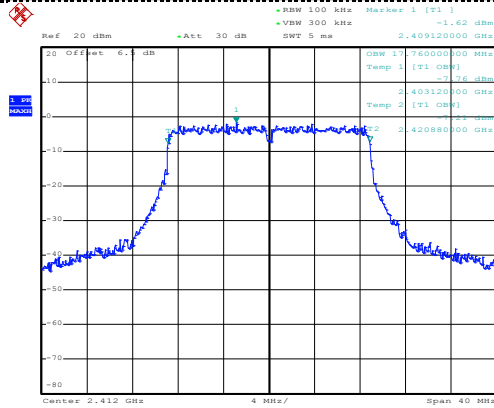


Middle channel



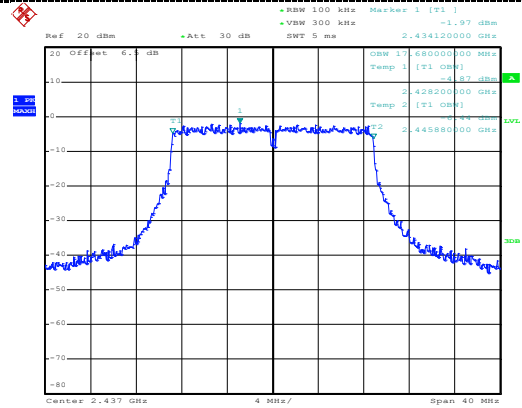
Highest channel

Test mode: 802.11n(H20)



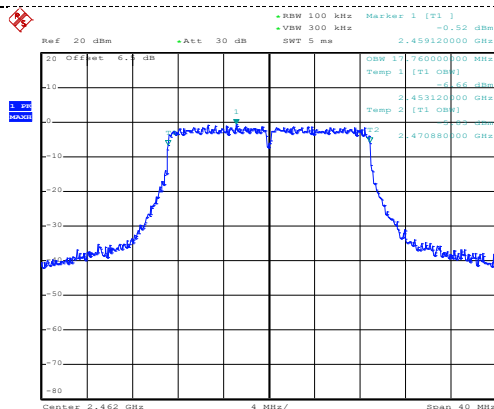
Date: 1.JUL.2017 20:43:09

Lowest channel



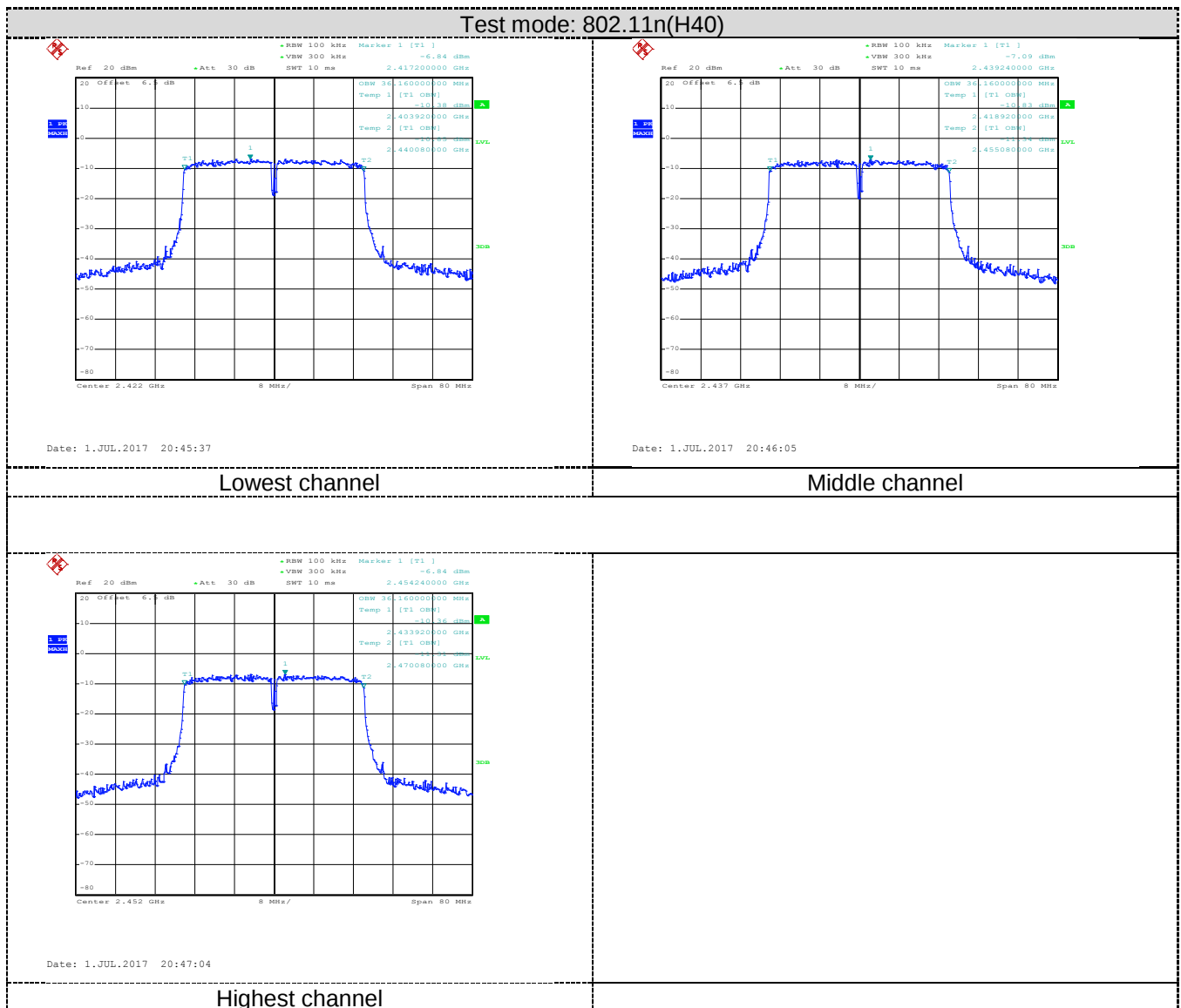
Date: 1.JUL.2017 20:43:34

Middle channel

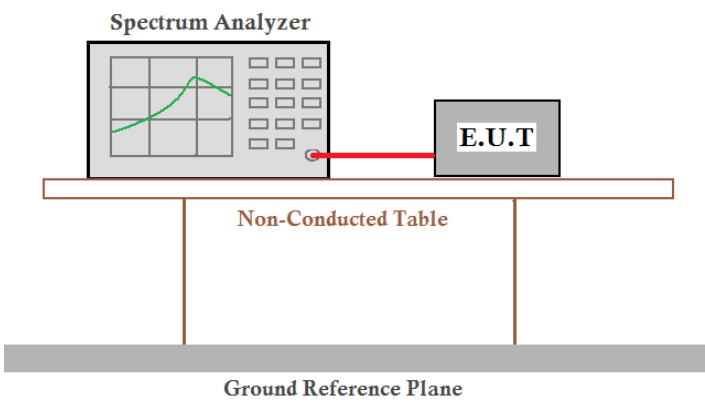


Date: 1.JUL.2017 20:44:53

Highest channel



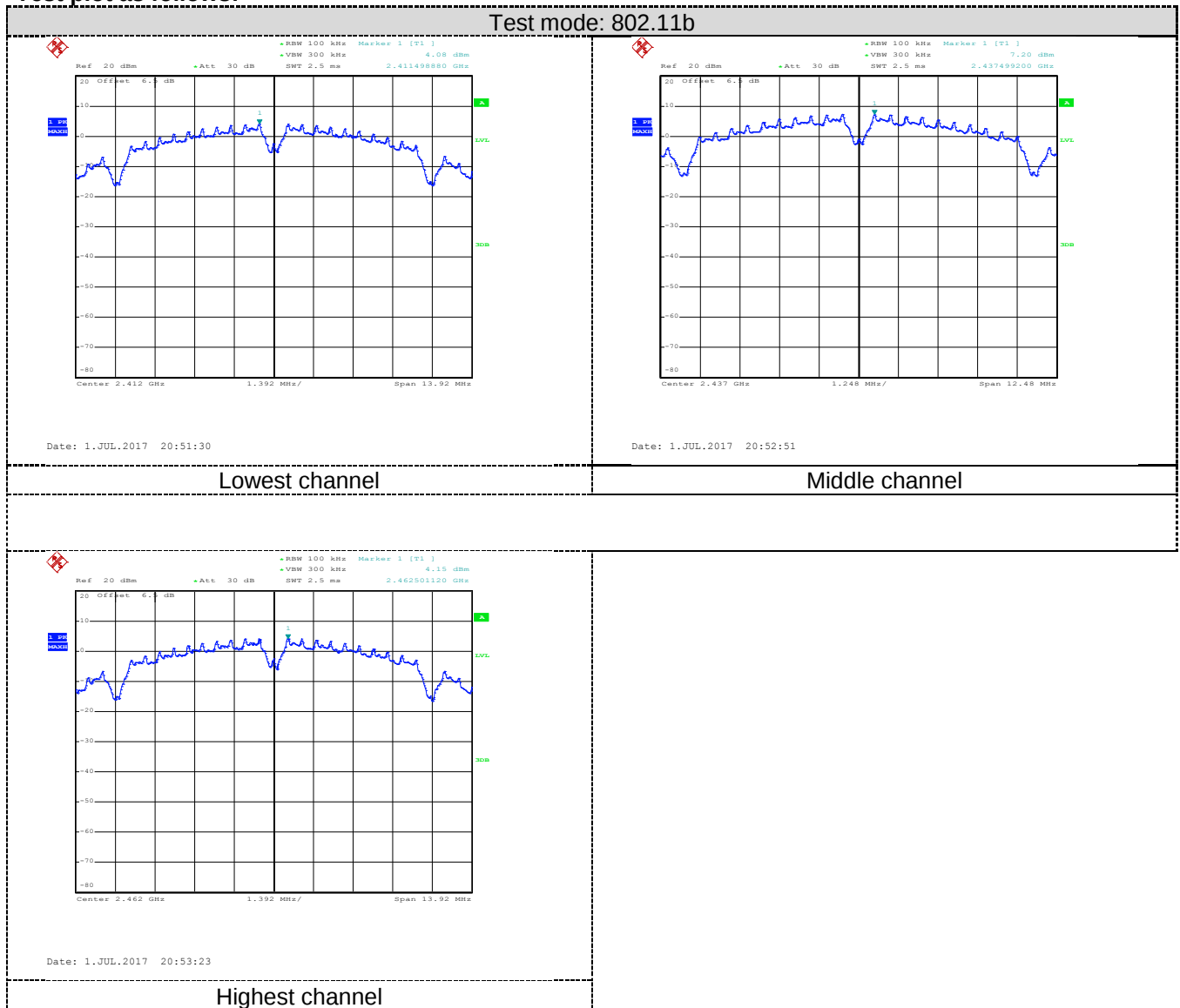
6.5 Power Spectral Density

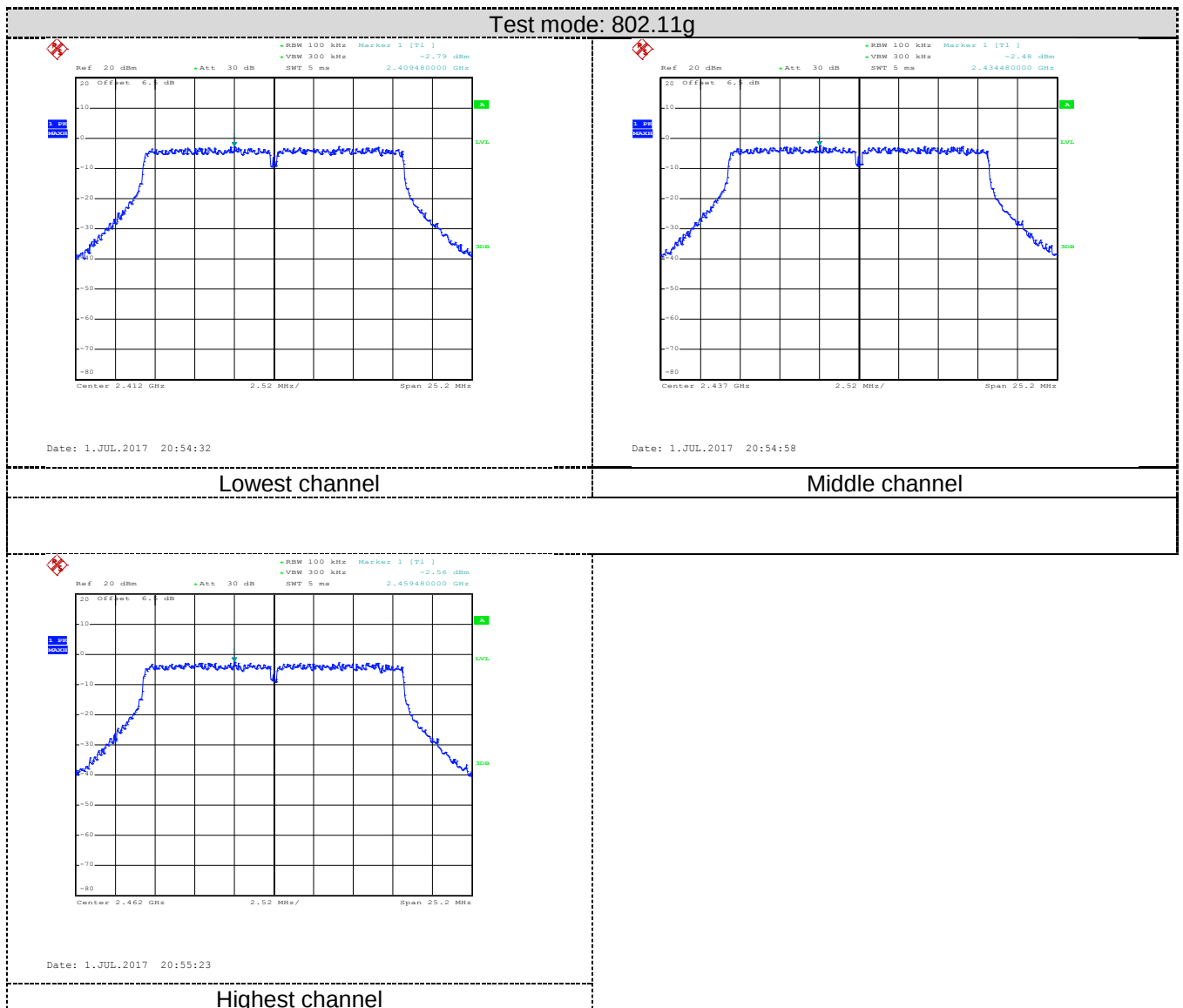
Test Requirement:	FCC Part 15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v04 section 10.2
Limit:	8dBm
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

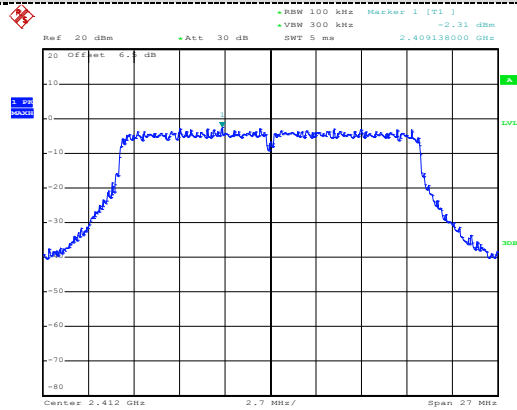
Test CH	Power Spectral Density (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	4.08	-2.79	-2.31	-7.62	8.00	Pass
Middle	7.20	-2.48	-2.05	-7.53		
Highest	4.15	-2.56	-2.42	-7.63		

Test plot as follows:



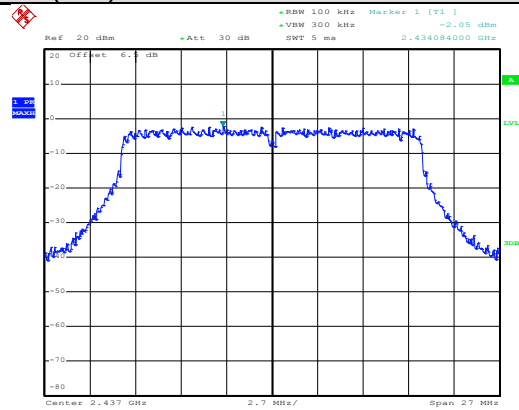


Test mode: 802.11n(H20)



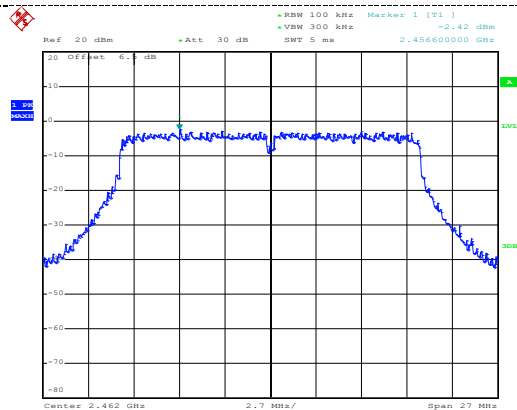
Date: 1.JUL.2017 20:56:01

Lowest channel



Date: 1.JUL.2017 20:56:39

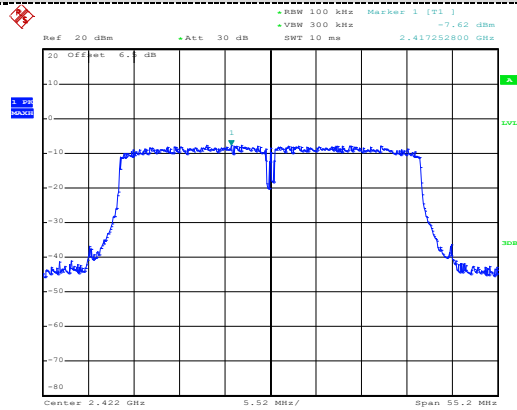
Middle channel



Date: 1.JUL.2017 20:57:03

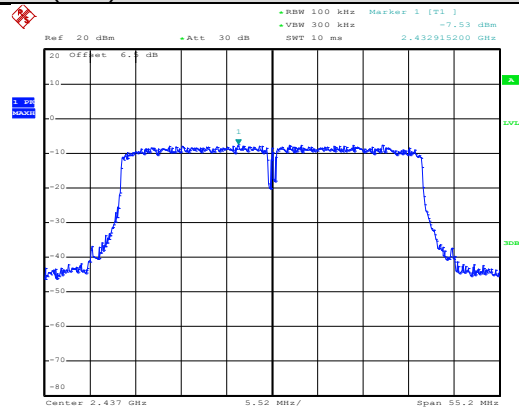
Highest channel

Test mode: 802.11n(H40)



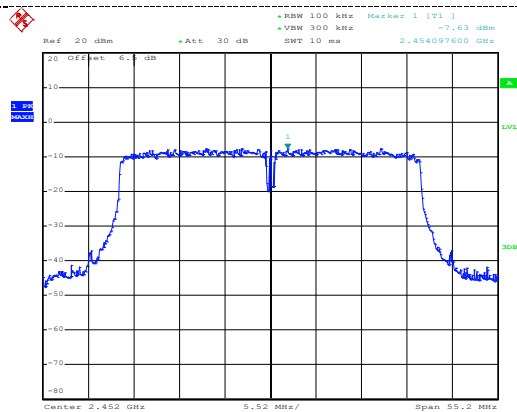
Date: 1.JUL.2017 20:57:39

Lowest channel



Date: 1.JUL.2017 20:58:06

Middle channel

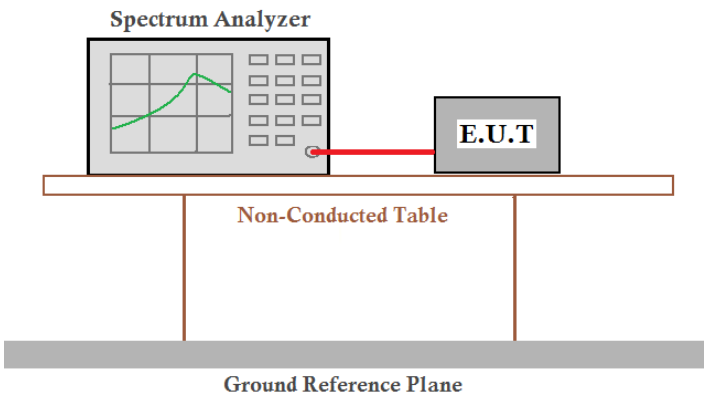


Date: 1.JUL.2017 20:58:35

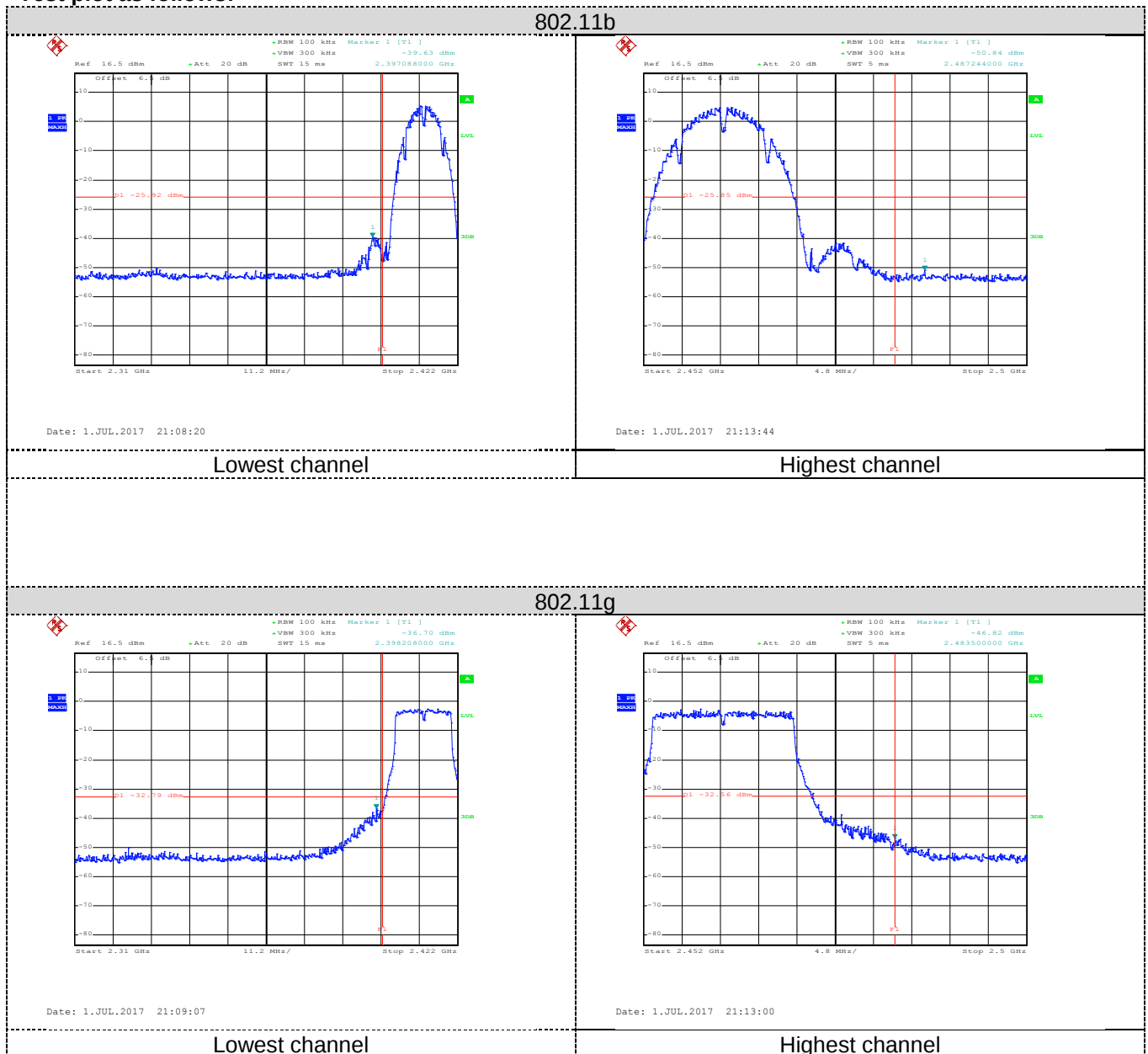
Highest channel

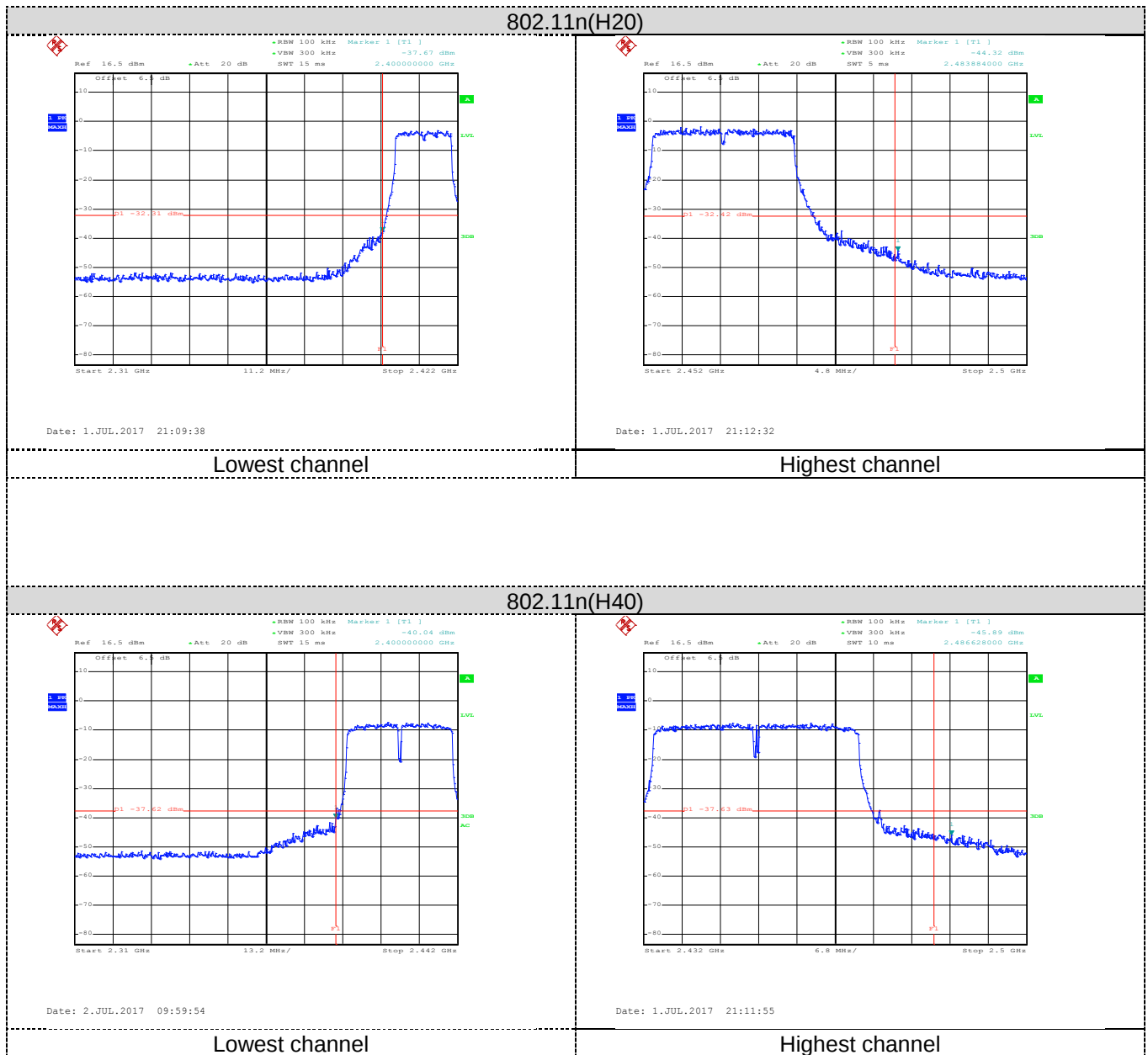
6.6 Band Edge

6.6.1 Conducted Emission Method

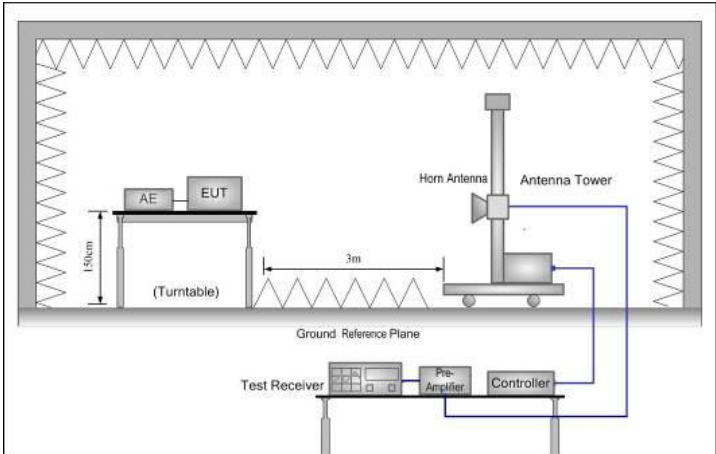
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v04 section 13
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 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:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T (Equipment Under Test). Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:





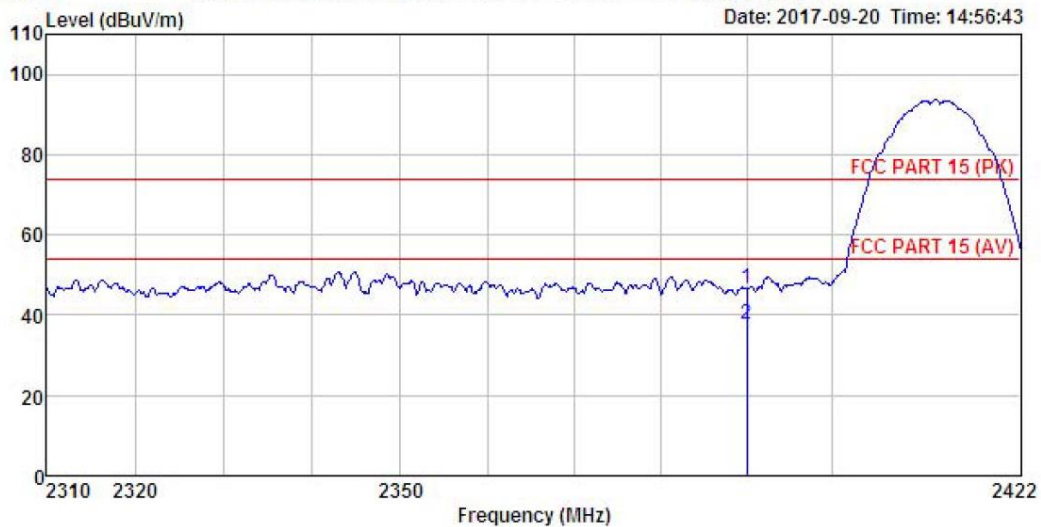
6.6.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013 and KDB558074 D01 DTS Meas Guidance v04 section 12.1				
Test Frequency Range:	2.3GHz to 2.5GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test Procedure:	1. 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. 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. 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. 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. 5. 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 setup:					
Test Instruments:	Refer to section 5.6 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

802.11b

Test channel: Lowest channel

Test Polarization: Horizontal



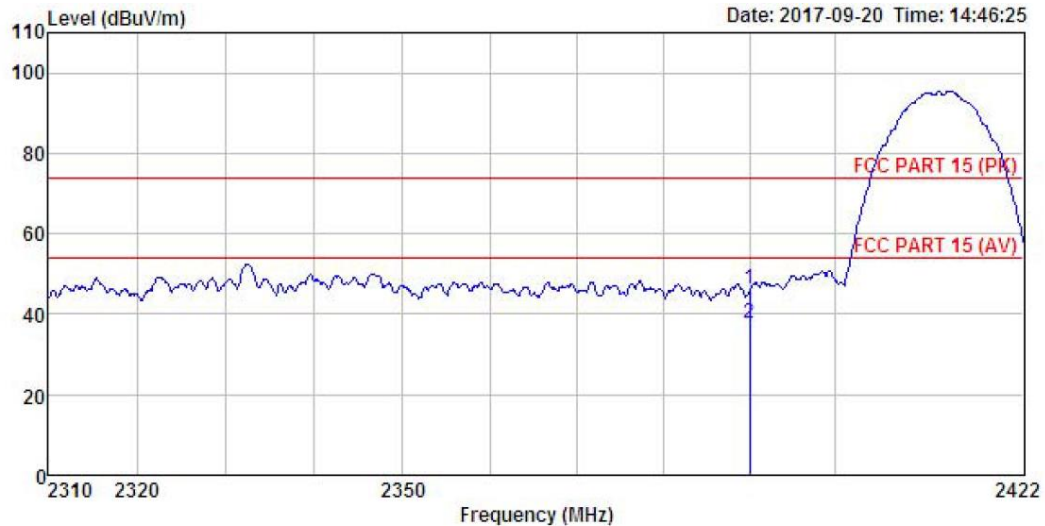
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11b-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Limit	Over	
	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	16.60	25.45	4.69	0.00	46.74	74.00	-27.26 Peak
2	2390.000	7.46	25.45	4.69	0.00	37.60	54.00	-16.40 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 : X7
 Model : X7
 Test mode : 802.11b-L mode
 Power Rating : AC 120W/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

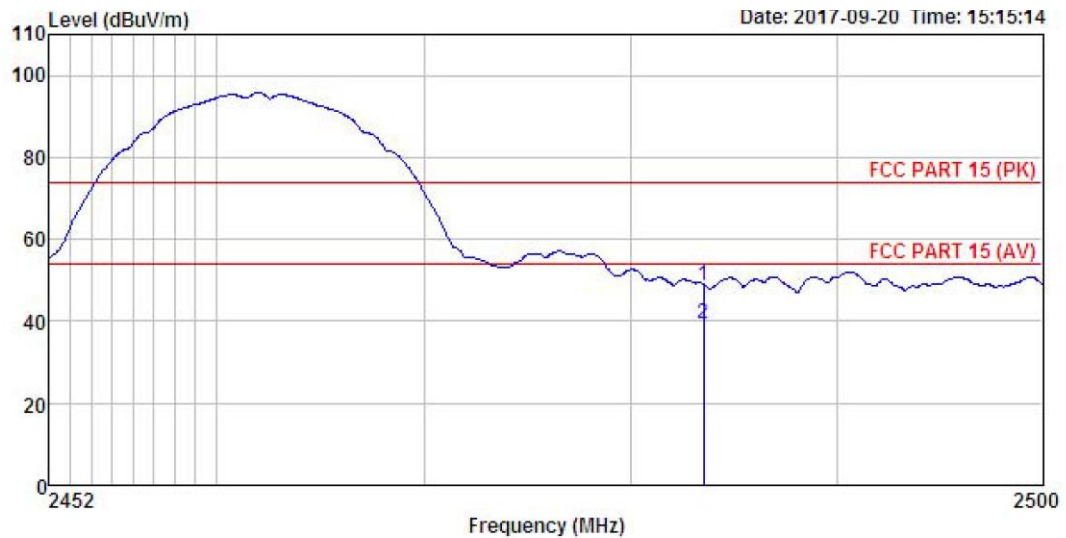
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	16.24	25.45	4.69	0.00	46.38	74.00	-27.62	Peak
2	2390.000	7.55	25.45	4.69	0.00	37.69	54.00	-16.31	Average

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



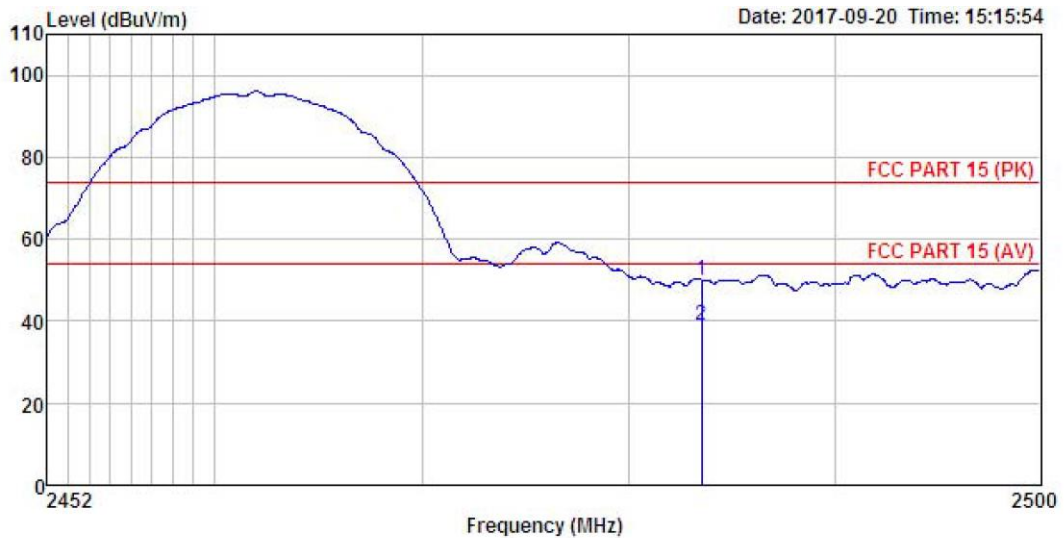
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11b-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	18.31	25.66	4.81	0.00	48.78	74.00	-25.22	Peak
2	2483.500	8.75	25.66	4.81	0.00	39.22	54.00	-14.78	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 : X7
 Model : X7
 Test mode : 802.11b-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2483.500	19.48	25.66	4.81	0.00	49.95	74.00	-24.05 Peak
2	2483.500	8.48	25.66	4.81	0.00	38.95	54.00	-15.05 Average

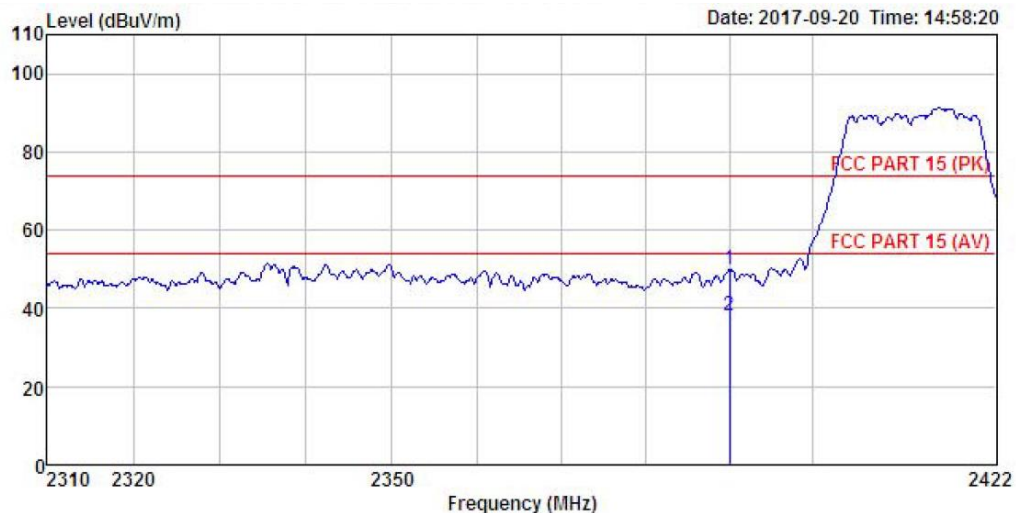
Remark:

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.

802.11g

Test channel: Lowest channel

Test Polarization: Horizontal



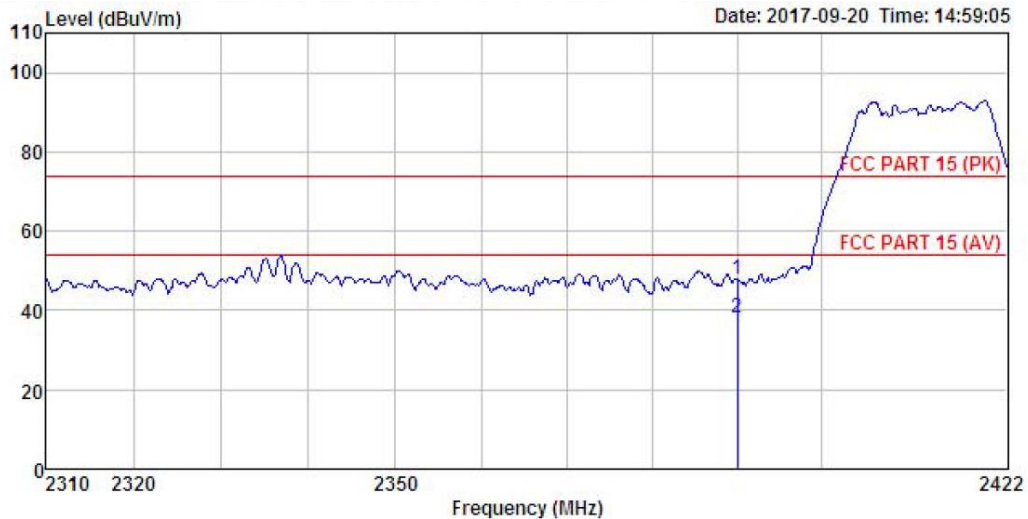
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11g-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
		Level	Factor	Loss	Factor	Line	Limit
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2390.000	19.80	25.45	4.69	0.00	49.94	74.00 -24.06 Peak
2	2390.000	7.85	25.45	4.69	0.00	37.99	54.00 -16.01 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 : X7
 Model : X7
 Test mode : 802.11g-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

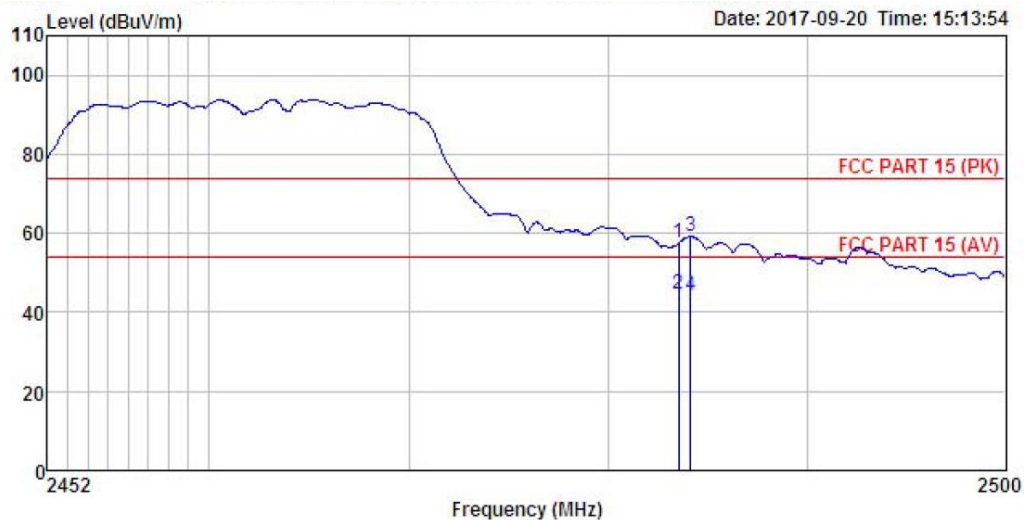
	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 2390.000	17.76	25.45	4.69	0.00	47.90	74.00	-26.10 Peak
2 2390.000	7.85	25.45	4.69	0.00	37.99	54.00	-16.01 Average

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



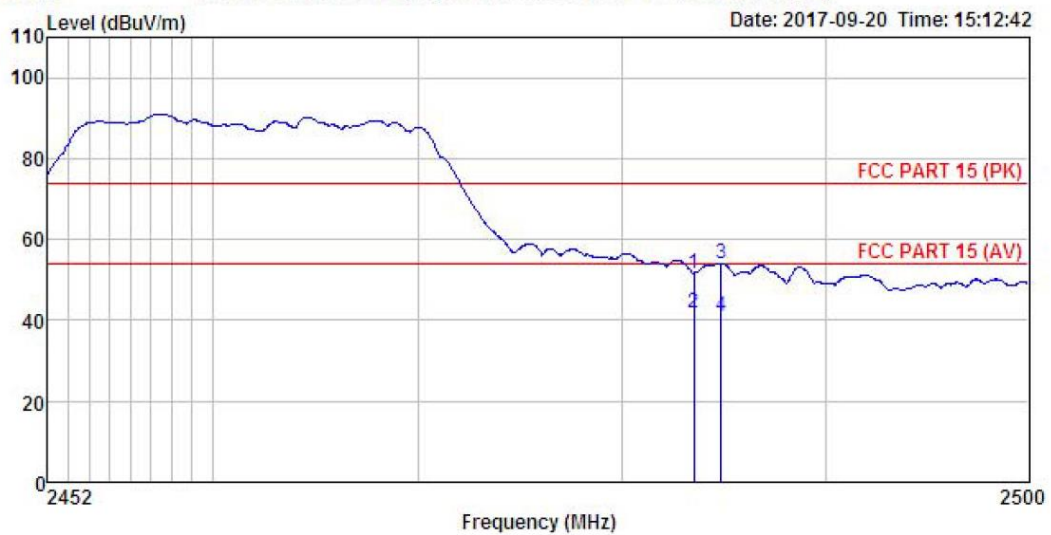
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11g-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	27.29	25.66	4.81	0.00	57.76	74.00	-16.24	Peak
2	2483.500	14.29	25.66	4.81	0.00	44.76	54.00	-9.24	Average
3	2484.105	28.69	25.66	4.81	0.00	59.16	74.00	-14.84	Peak
4	2484.105	13.79	25.66	4.81	0.00	44.26	54.00	-9.74	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 : X7
 Model : X7
 Test mode : 802.11g-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	ReadAntenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2483.500	21.18	25.66	4.81	0.00	51.65	74.00
2	2483.500	11.24	25.66	4.81	0.00	41.71	54.00
3	2484.828	23.59	25.66	4.81	0.00	54.06	74.00
4	2484.828	10.60	25.66	4.81	0.00	41.07	54.00

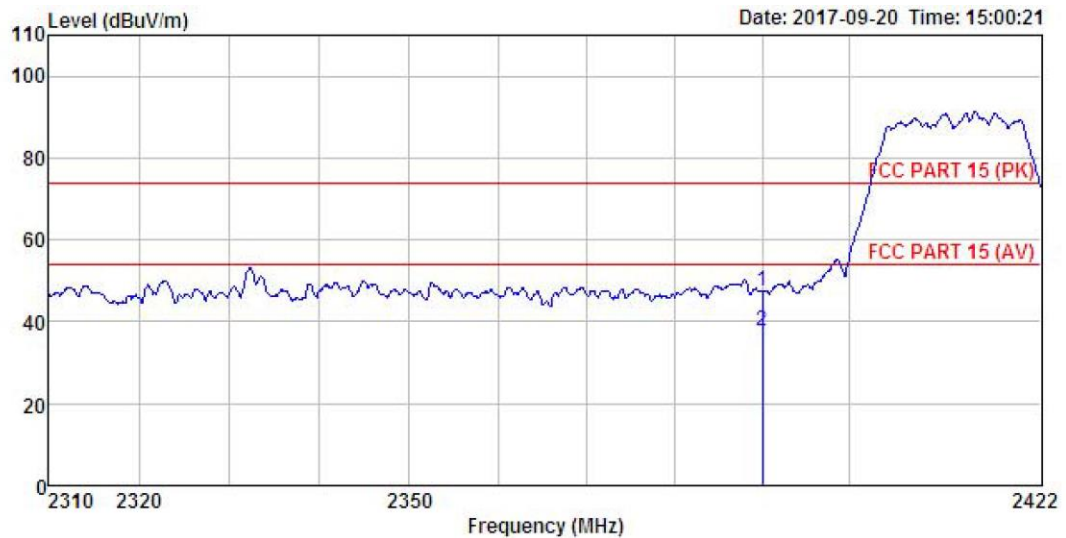
Remark:

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.

802.11n (H20)

Test channel: Lowest channel

Test Polarization: Horizontal



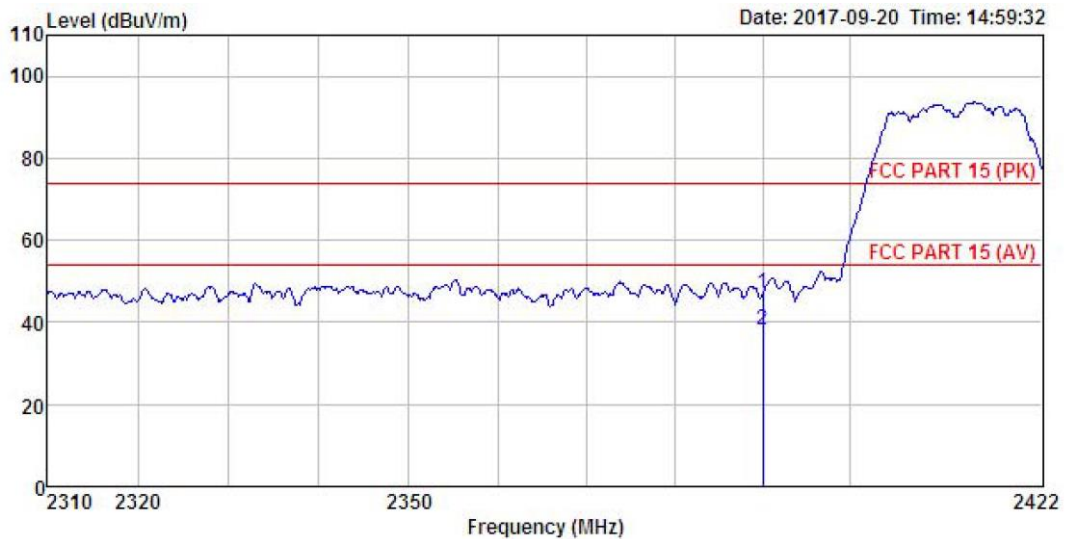
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11n20-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Limit	Over	
		Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	17.15	25.45	4.69	0.00	47.29	74.00	-26.71 Peak
2	2390.000	7.43	25.45	4.69	0.00	37.57	54.00	-16.43 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 : X7
 Model : X7
 Test mode : 802.11n20-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YI
 REMARK :

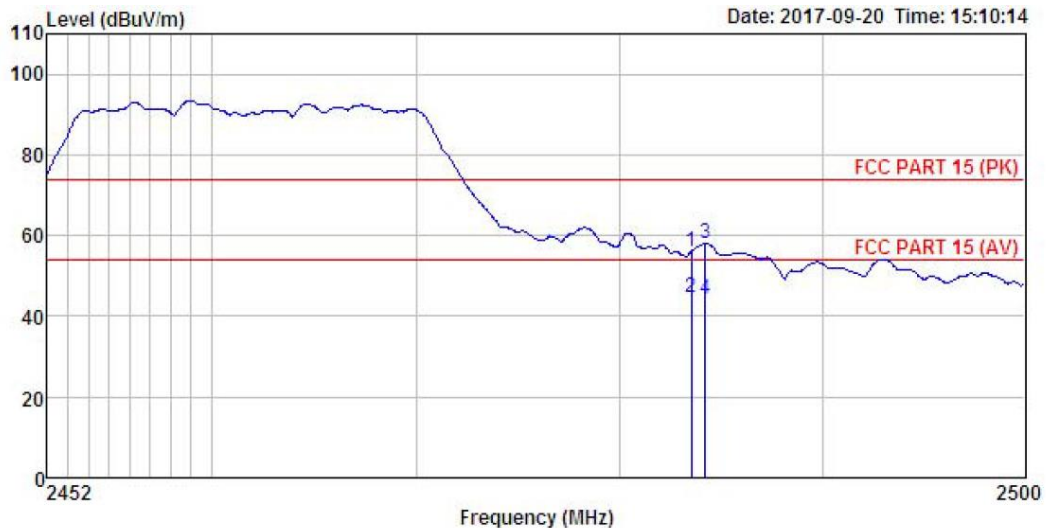
	Freq	ReadLevel	AntennaFactor	CableLoss	PreampFactor	Level	LimitLine	OverLimit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	16.99	25.45	4.69	0.00	47.13	74.00	-26.87	Peak
2	2390.000	7.86	25.45	4.69	0.00	38.00	54.00	-16.00	Average

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



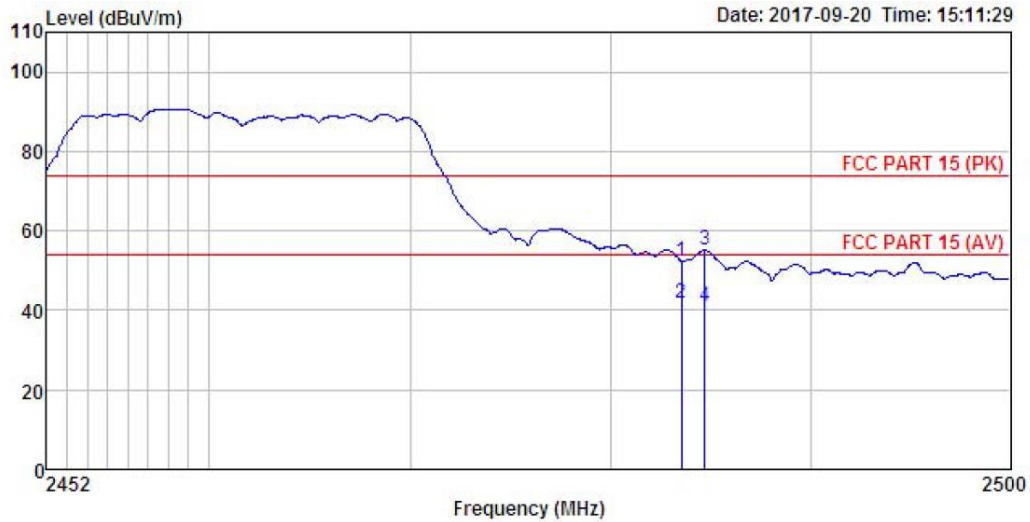
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11n20-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	ReadAntenna	Cable Preamp	Limit	Over	
	Level	Factor	Loss Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m
1	2483.500	25.53	25.66	4.81	0.00	56.00
2	2483.500	14.31	25.66	4.81	0.00	44.78
3	2484.201	27.46	25.66	4.81	0.00	57.93
4	2484.201	13.96	25.66	4.81	0.00	44.43

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 : X7
 Model : X7
 Test mode : 802.11n20-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Limit	Over	
		Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2483.500	22.05	25.66	4.81	0.00	52.52	74.00	-21.48 Peak
2	2483.500	11.31	25.66	4.81	0.00	41.78	54.00	-12.22 Average
3	2484.683	24.63	25.66	4.81	0.00	55.10	74.00	-18.90 Peak
4	2484.683	10.69	25.66	4.81	0.00	41.16	54.00	-12.84 Average

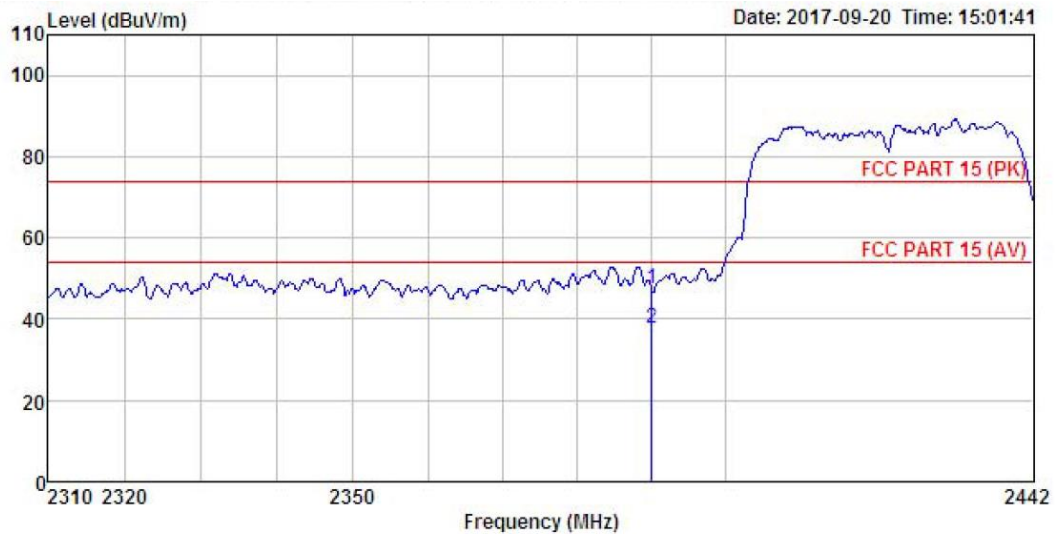
Remark:

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.

802.11n (H40)

Test channel: Lowest channel

Test Polarization: Horizontal



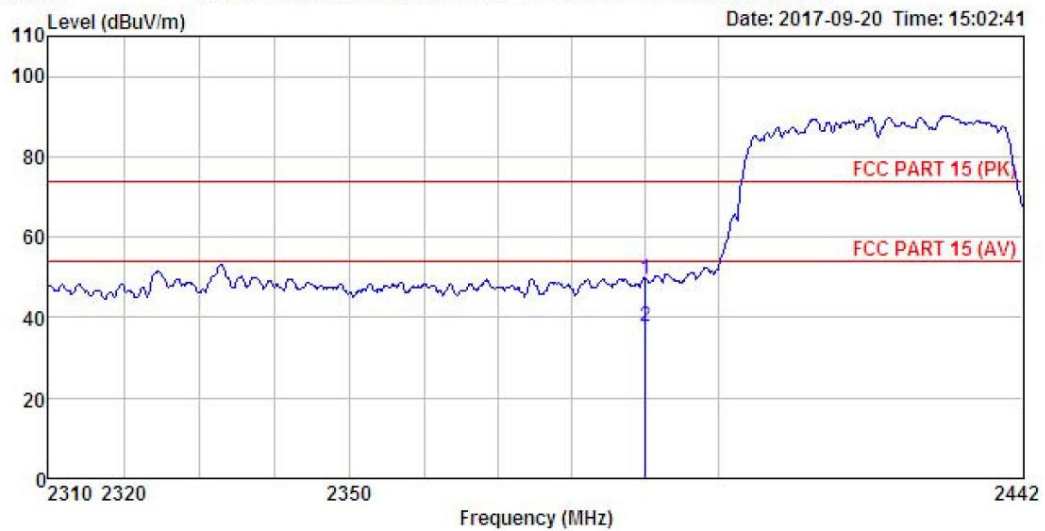
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11n40-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YI
 REMARK :

	Freq	ReadLevel	AntennaFactor	CableLoss	PreampFactor	Level	LimitLine	OverLimit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	17.17	25.45	4.69	0.00	47.31	74.00	-26.69	Peak
2	2390.000	7.46	25.45	4.69	0.00	37.60	54.00	-16.40	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 : X7
 Model : X7
 Test mode : 802.11n40-L mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

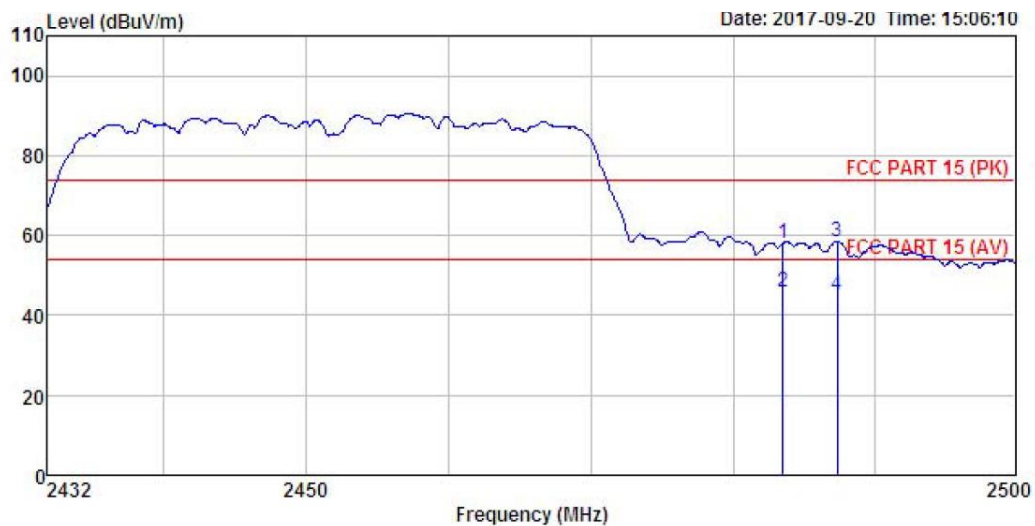
	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dB	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.57	25.45	4.69	0.00	49.71	74.00	-24.29	Peak
2	2390.000	7.56	25.45	4.69	0.00	37.70	54.00	-16.30	Average

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



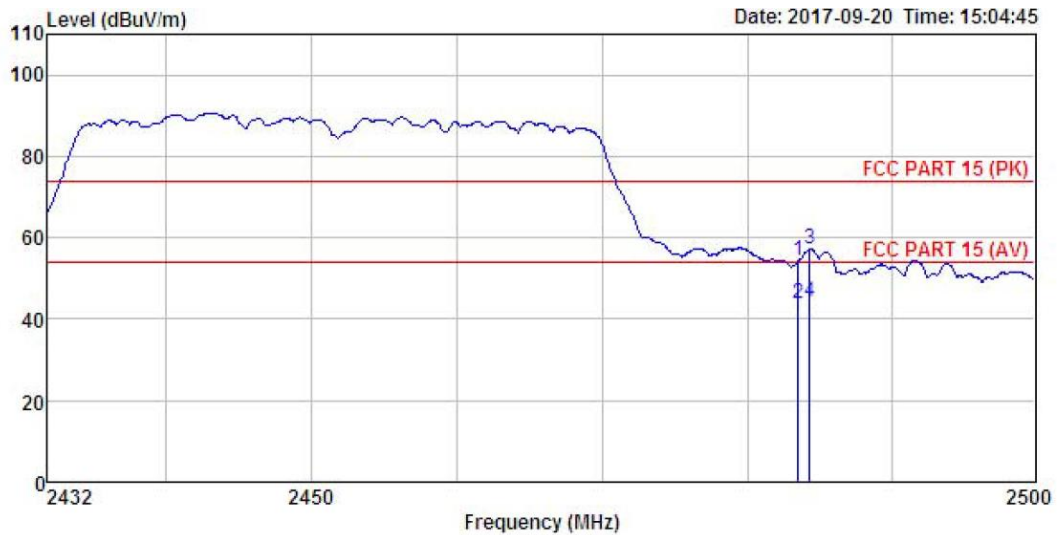
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : 802.11n40-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	ReadAntenna	Cable Preamp		Limit	Over		
	Level	Factor	Loss	Factor	Level	Line	Limit Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2483.500	27.55	25.66	4.81	0.00	58.02	74.00	-15.98 Peak
2	2483.500	15.45	25.66	4.81	0.00	45.92	54.00	-8.08 Average
3	2487.347	28.09	25.66	4.81	0.00	58.56	74.00	-15.44 Peak
4	2487.347	14.64	25.66	4.81	0.00	45.11	54.00	-8.89 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 : X7
 Model : X7
 Test mode : 802.11n40-H mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

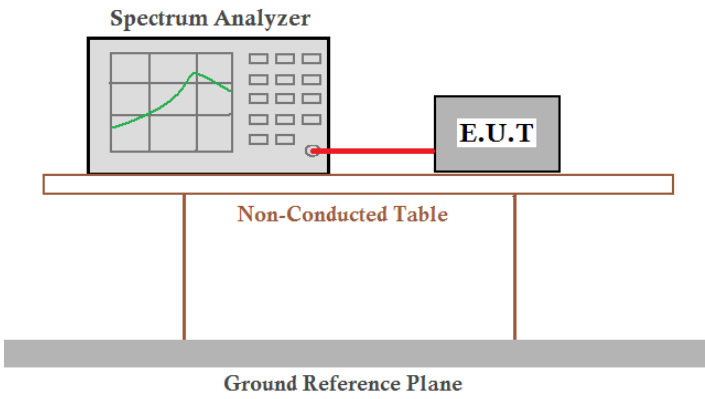
	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dB	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	24.07	25.66	4.81	0.00	54.54	74.00	-19.46	Peak
2	2483.500	13.39	25.66	4.81	0.00	43.86	54.00	-10.14	Average
3	2484.331	26.70	25.66	4.81	0.00	57.17	74.00	-16.83	Peak
4	2484.331	13.62	25.66	4.81	0.00	44.09	54.00	-9.91	Average

Remark:

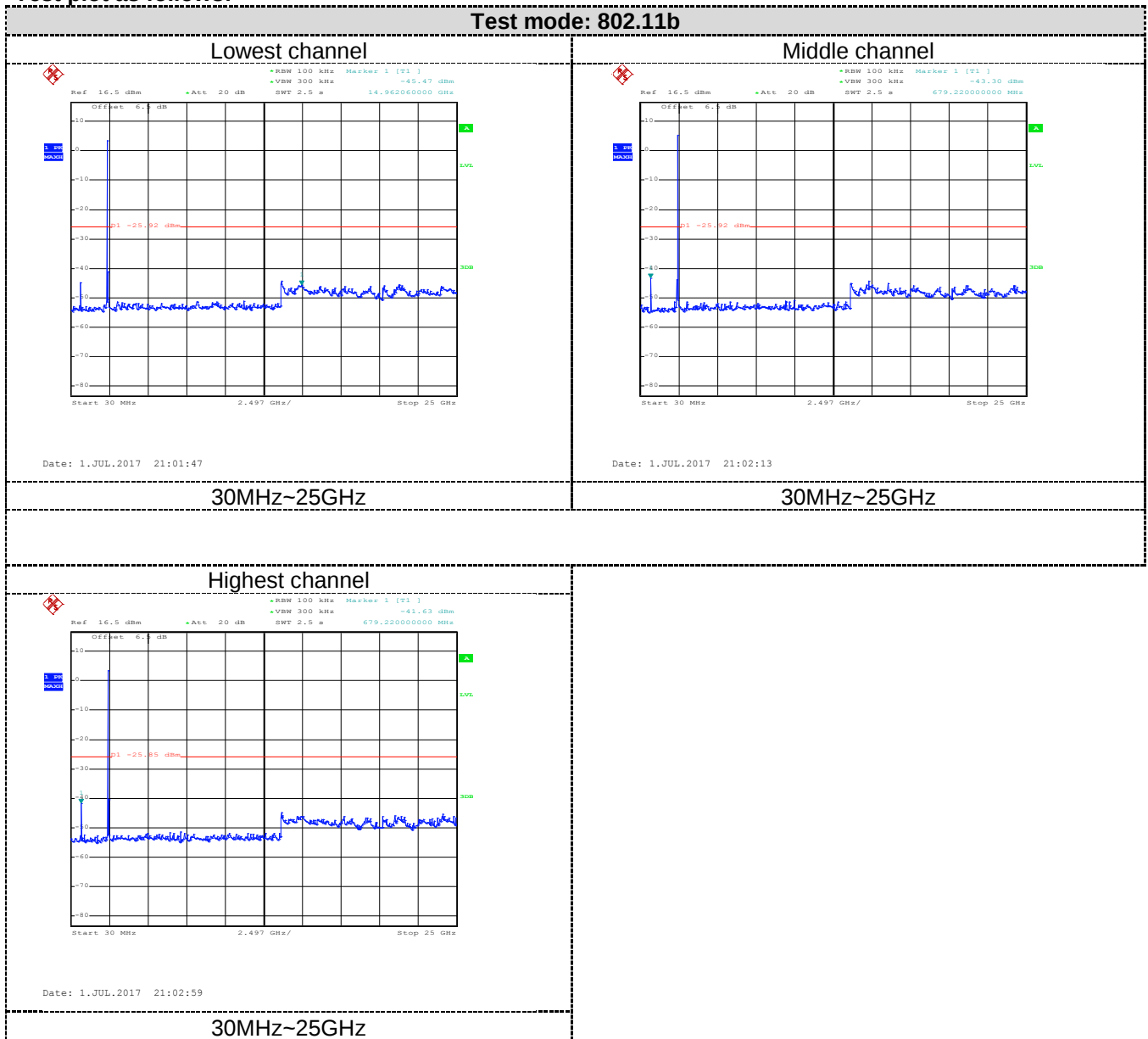
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

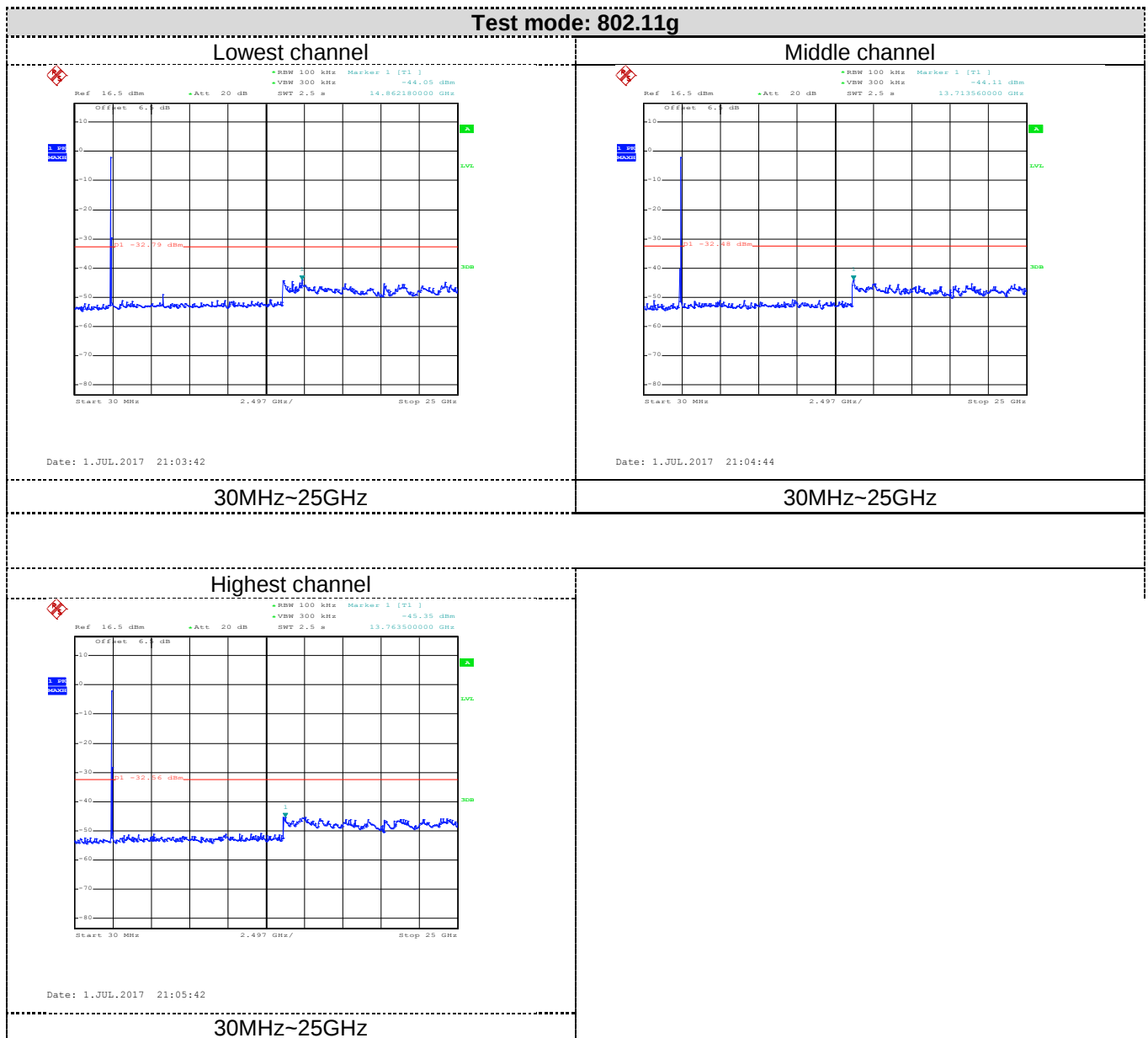
6.7 Spurious Emission

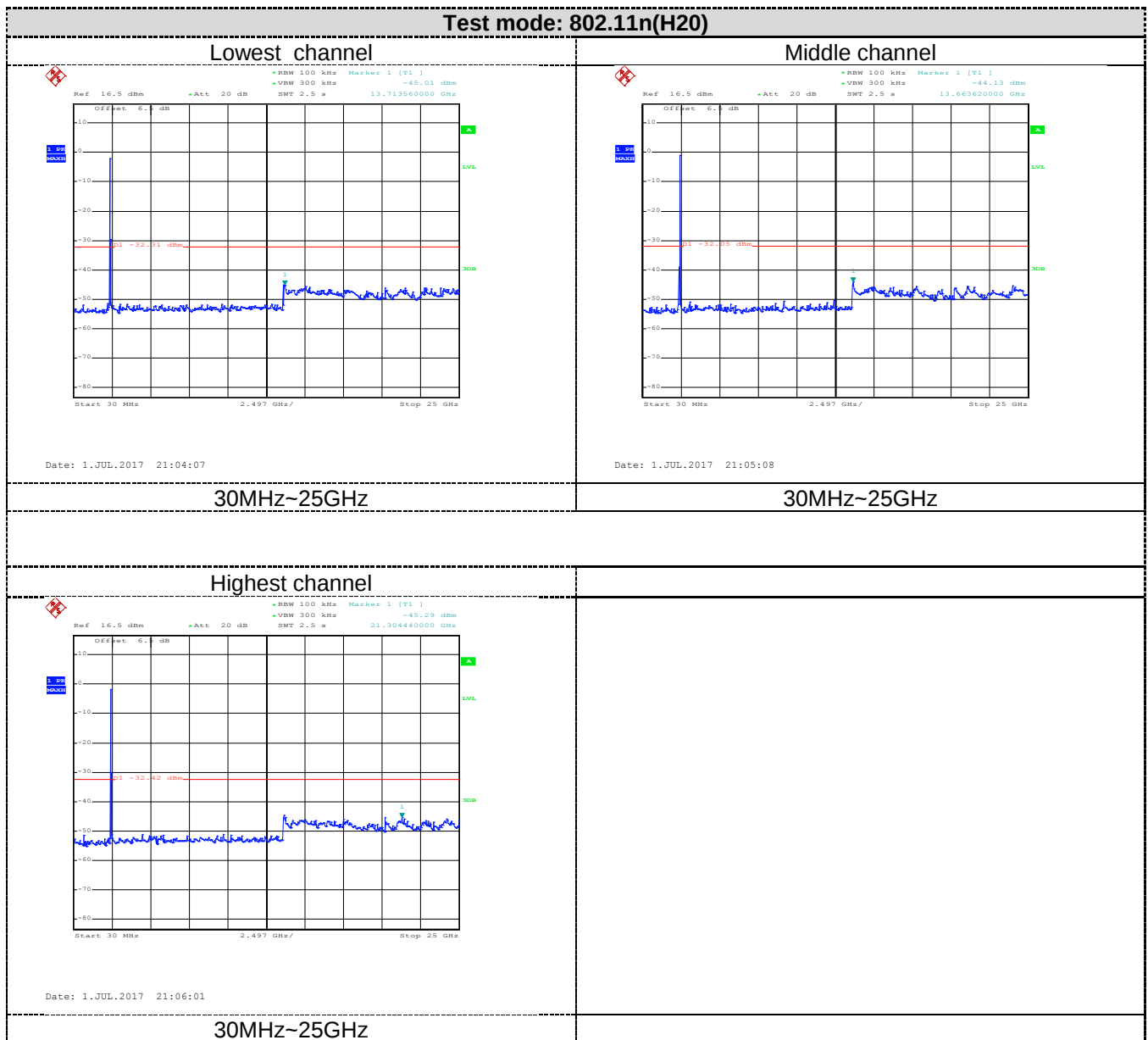
6.7.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v04 section 11
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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

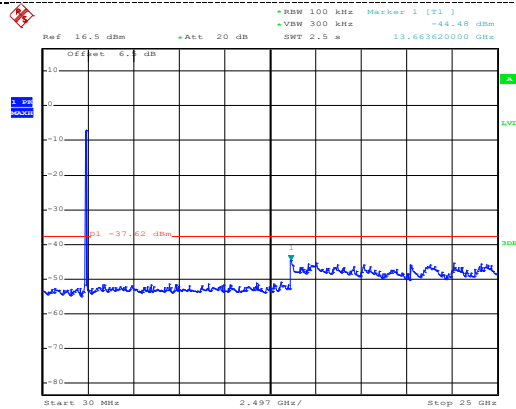






Test mode: 802.11n(H40)

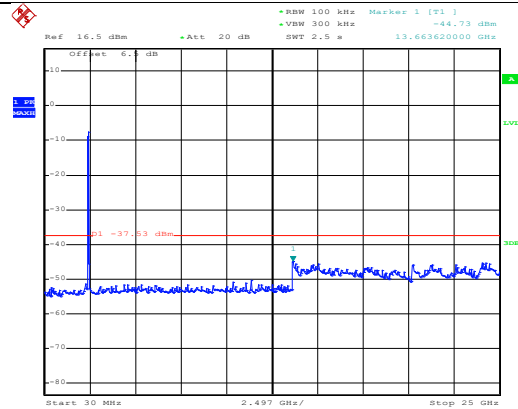
Lowest channel



Date: 1.JUL.2017 21:06:32

30MHz~25GHz

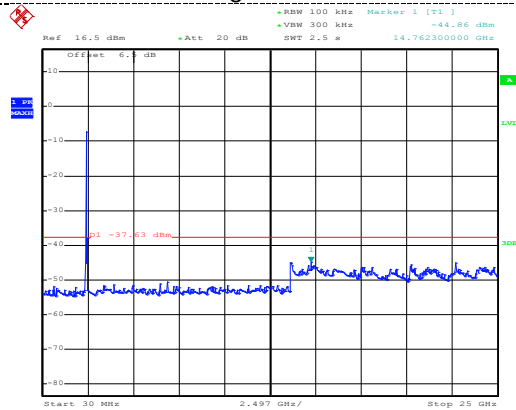
Middle channel



Date: 1.JUL.2017 21:06:59

30MHz~25GHz

Highest channel

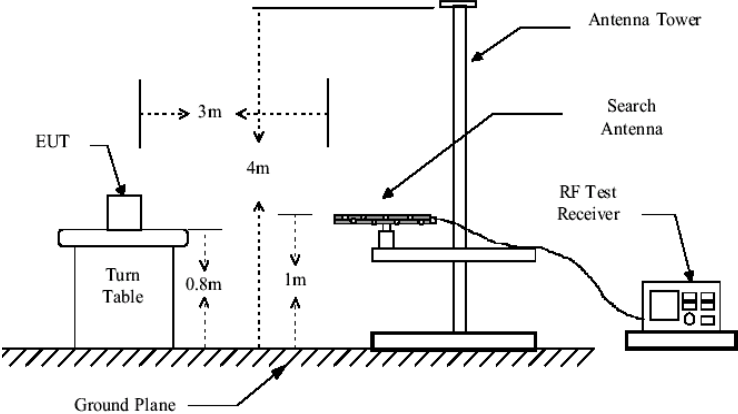
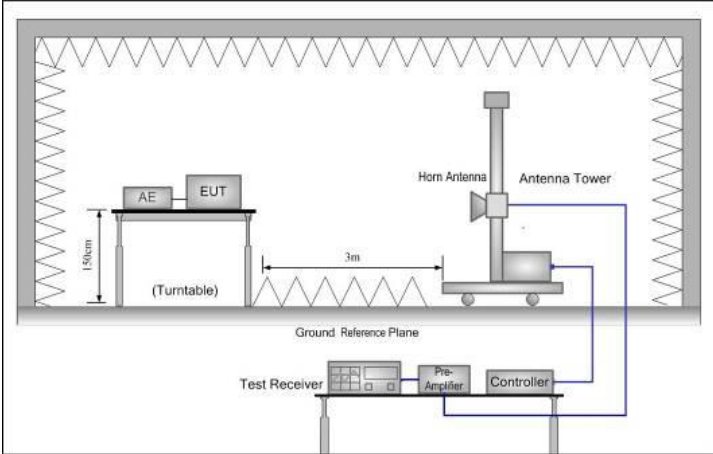


Date: 1.JUL.2017 21:07:22

30MHz~25GHz

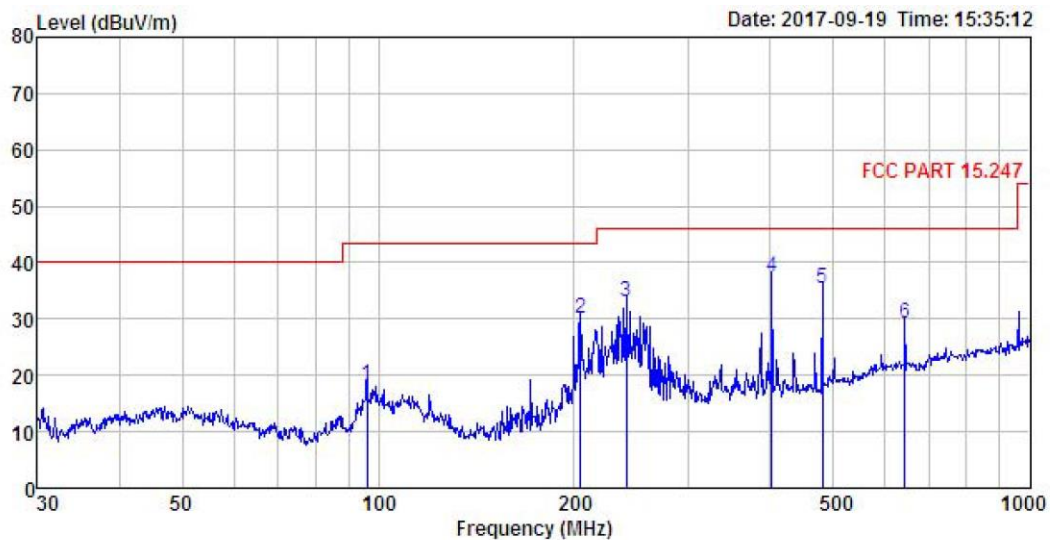
6.7.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement 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 Procedure:	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 was rotated 360 degrees to determine the position of the highest radiation. 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. 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. 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. 5. 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 setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.

Below 1GHz

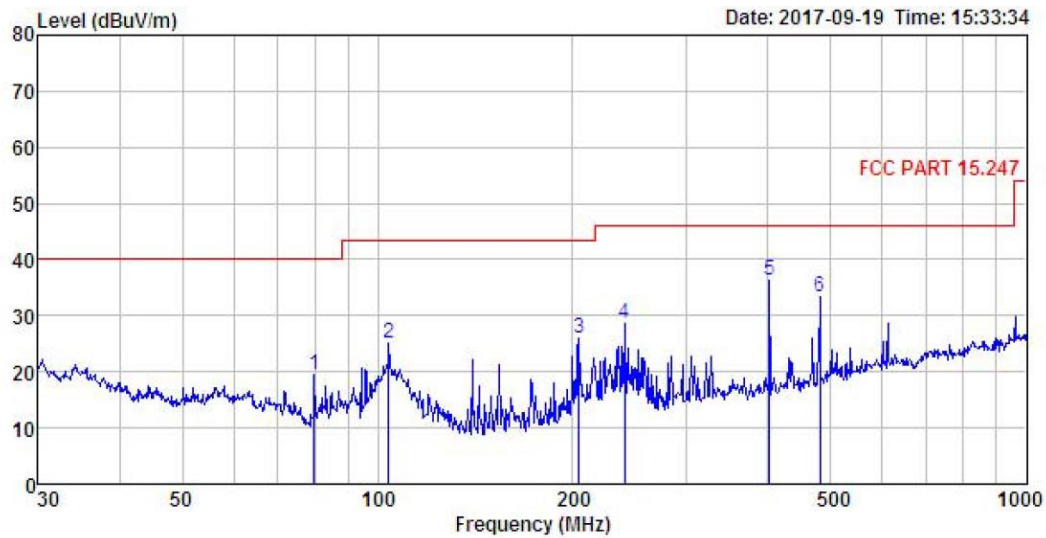
Test Polarization: Horizontal



Site : 3m chamber
 Condition : FCC PART 15.247 3m VULB9163(30M2G) HORIZONTAL
 EUT : X7
 Model : X7
 Test mode : WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	ReadAntenna	Cable	Preamp		Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	96.099	34.25	11.67	2.00	29.55	18.37	43.50	-25.13 QP
2	204.238	44.80	11.30	2.87	28.80	30.17	43.50	-13.33 QP
3	239.987	46.87	11.85	2.82	28.59	32.95	46.00	-13.05 QP
4	401.839	48.29	14.86	3.08	28.78	37.45	46.00	-8.55 QP
5	480.528	45.08	15.78	3.46	28.92	35.40	46.00	-10.60 QP
6	642.861	35.54	18.53	3.87	28.80	29.14	46.00	-16.86 QP

Test Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART 15.247 3m VULB9163(30M2G) VERTICAL
 EUT : X7
 Model : X7
 Test mode : WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: YT
 REMARK :

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
		Level Factor	Loss Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	79.800	39.06	8.50	1.65	29.64	19.57	40.00 -20.43 QP
2	104.170	40.57	12.12	1.99	29.50	25.18	43.50 -18.32 QP
3	204.238	40.58	11.30	2.87	28.80	25.95	43.50 -17.55 QP
4	239.987	42.55	11.85	2.82	28.59	28.63	46.00 -17.37 QP
5	401.839	47.13	14.86	3.08	28.78	36.29	46.00 -9.71 QP
6	480.528	43.11	15.78	3.46	28.92	33.43	46.00 -12.57 QP

Above 1GHz

Test mode: 802.11b								
Test channel: Lowest channel								
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)	Polar.
4824.00	49.20	36.06	6.81	41.82	50.25	74.00	-23.75	Vertical
4824.00	49.56	36.06	6.81	41.82	50.61	74.00	-23.39	Horizontal
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)	Polar.
4824.00	39.26	36.06	6.81	41.82	40.31	54.00	-13.69	Vertical
4824.00	38.47	36.06	6.81	41.82	39.52	54.00	-14.48	Horizontal
Test channel: Middle channel								
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)	Polar.
4874.00	49.56	36.32	6.85	41.84	50.89	74.00	-23.11	Vertical
4874.00	48.26	36.32	6.85	41.84	49.59	74.00	-24.41	Horizontal
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)	Polar.
4874.00	39.25	36.32	6.85	41.84	40.58	54.00	-13.42	Vertical
4874.00	38.75	36.32	6.85	41.84	40.08	54.00	-13.92	Horizontal
Test channel: Highest channel								
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)	Polar.
4924.00	49.85	36.58	6.89	41.86	51.46	74.00	-22.54	Vertical
4924.00	50.22	36.58	6.89	41.86	51.83	74.00	-22.17	Horizontal
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)	Polar.
4924.00	39.64	36.58	6.89	41.86	41.25	54.00	-12.75	Vertical
4924.00	39.11	36.58	6.89	41.86	40.72	54.00	-13.28	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.

Test mode: 802.11g								
Test channel: Lowest channel								
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)	Polar.
4824.00	49.56	36.06	6.81	41.82	50.61	74.00	-23.39	Vertical
4824.00	49.56	36.06	6.81	41.82	50.61	74.00	-23.39	Horizontal
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)	Polar.
4824.00	39.56	36.06	6.81	41.82	40.61	54.00	-13.39	Vertical
4824.00	38.77	36.06	6.81	41.82	39.82	54.00	-14.18	Horizontal
Test channel: Middle channel								
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)	Polar.
4874.00	49.58	36.32	6.85	41.84	50.91	74.00	-23.09	Vertical
4874.00	49.77	36.32	6.85	41.84	51.10	74.00	-22.90	Horizontal
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)	Polar.
4874.00	39.56	36.32	6.85	41.84	40.89	54.00	-13.11	Vertical
4874.00	38.21	36.32	6.85	41.84	39.54	54.00	-14.46	Horizontal
Test channel: Highest channel								
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)	Polar.
4924.00	49.58	36.58	6.89	41.86	51.19	74.00	-22.81	Vertical
4924.00	48.26	36.58	6.89	41.86	49.87	74.00	-24.13	Horizontal
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)	Polar.
4924.00	39.26	36.58	6.89	41.86	40.87	54.00	-13.13	Vertical
4924.00	38.71	36.58	6.89	41.86	40.32	54.00	-13.68	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.

Test mode: 802.11n(H20)								
Test channel: Lowest channel								
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)	Polar.
4824.00	49.58	36.06	6.81	41.82	50.63	74.00	-23.37	Vertical
4824.00	48.17	36.06	6.81	41.82	49.22	74.00	-24.78	Horizontal
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)	Polar.
4824.00	39.26	36.06	6.81	41.82	40.31	54.00	-13.69	Vertical
4824.00	38.55	36.06	6.81	41.82	39.60	54.00	-14.40	Horizontal
Test channel: Middle channel								
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)	Polar.
4874.00	49.25	36.32	6.85	41.84	50.58	74.00	-23.42	Vertical
4874.00	48.10	36.32	6.85	41.84	49.43	74.00	-24.57	Horizontal
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)	Polar.
4874.00	39.26	36.32	6.85	41.84	40.59	54.00	-13.41	Vertical
4874.00	40.01	36.32	6.85	41.84	41.34	54.00	-12.66	Horizontal
Test channel: Highest channel								
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)	Polar.
4924.00	49.68	36.58	6.89	41.86	51.29	74.00	-22.71	Vertical
4924.00	48.75	36.58	6.89	41.86	50.36	74.00	-23.64	Horizontal
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)	Polar.
4924.00	39.23	36.58	6.89	41.86	40.84	54.00	-13.16	Vertical
4924.00	38.24	36.58	6.89	41.86	39.85	54.00	-14.15	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.

Test mode: 802.11n(H40)								
Test channel: Lowest channel								
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)	Polar.
4844.00	49.58	36.06	6.81	41.82	50.63	74.00	-23.37	Vertical
4844.00	48.27	36.06	6.81	41.82	49.32	74.00	-24.68	Horizontal
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)	Polar.
4844.00	39.56	36.06	6.81	41.82	40.61	54.00	-13.39	Vertical
4844.00	38.25	36.06	6.81	41.82	39.30	54.00	-14.70	Horizontal
Test channel: Middle channel								
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)	Polar.
4874.00	49.57	36.32	6.85	41.84	50.90	74.00	-23.10	Vertical
4874.00	48.17	36.32	6.85	41.84	49.50	74.00	-24.50	Horizontal
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)	Polar.
4874.00	39.62	36.32	6.85	41.84	40.95	54.00	-13.05	Vertical
4874.00	38.55	36.32	6.85	41.84	39.88	54.00	-14.12	Horizontal
Test channel: Highest channel								
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)	Polar.
4904.00	49.58	36.45	6.87	41.85	51.05	74.00	-22.95	Vertical
4904.00	48.71	36.45	6.87	41.85	50.18	74.00	-23.82	Horizontal
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)	Polar.
4904.00	39.56	36.45	6.87	41.85	41.03	54.00	-12.97	Vertical
4904.00	38.25	36.45	6.87	41.85	39.72	54.00	-14.28	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.