

FCC REPORT

(WIFI)

Applicant: LigoWave LLC

Address of Applicant: 138 Mountain Brook Dr Canton, GA 30115 United States

Equipment Under Test (EUT)

Product Name: Broadband Digital Transmission System

Model No.: NFT Blizzard 2ac-90 Lite

FCC ID: V2V-NFTBLZ

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

Date of sample receipt: 11 Jan., 2018

Date of Test: 11 Jan., to 03 Aug., 2018

Date of report issued: 06 Aug., 2018

Test Result: PASS*

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

Authorized Signature:



Bruce Zhang
Laboratory Manager

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

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

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2 Version

Version No.	Date	Description
00	06 Aug., 2018	Original

Tested by:

Mike.Ou

Date:

06 Aug., 2018

Test Engineer

Reviewed by:

Wimer Zhang

Date:

06 Aug., 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)(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
Spurious Emission	15.205 & 15.209	Pass
<i>Pass: The EUT complies with the essential requirements in the standard.</i> <i>N/A: N/A: Not Applicable.</i>		

5 General Information

5.1 Client Information

Applicant:	LigoWave LLC
Address:	138 Mountain Brook Dr Canton, GA 30115 United States
Manufacturer/ Factory:	LigoWave LLC
Address:	138 Mountain Brook Dr Canton, GA 30115 United States

5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	NFT Blizzard 2ac-90 Lite
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20)) 2422MHz~2452MHz (802.11n(HT40))
Channel numbers:	11 for 802.11b/802.11g/802.11(HT20) 7 for 802.11n(HT40)
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 300 Mbps
Antenna Type:	Panel Antenna
Antenna gain:	Antenna 0: 9dBi, Antenna 1: 9dBi
AC adapter :	Adapter(1) Model: G0720-480-050 Input: AC100-240V, 50/60Hz, 0.75A Output: DC 48.0V, 0.5A Adapter(2) Model: GRT-POE20-480050A Input: AC100-240V, 50/60Hz, 0.5A Output: DC 48.0V, 0.5A

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		
Note: 1. For 802.11n-HT40 mode, the channel number is from 3 to 9; 2. Channel 1, 6 & 11 selected for 802.11b/g/n-HT20 as Lowest, Middle and Highest channel, Channel; 3, 6 & 9 selected for 802.11n-HT40 as Lowest, Middle and Highest channel, Channel.							

5.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting 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, the follow list were the worst case.	
Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(HT20)	6.5Mbps
802.11n(HT40)	13.5Mbps

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

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

5.6 Laboratory Facility

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

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

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

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

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

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

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

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

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

5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
 Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
 Bao'an District, Shenzhen, Guangdong, China
 Tel: +86-755-23118282, Fax: +86-755-23116366
 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

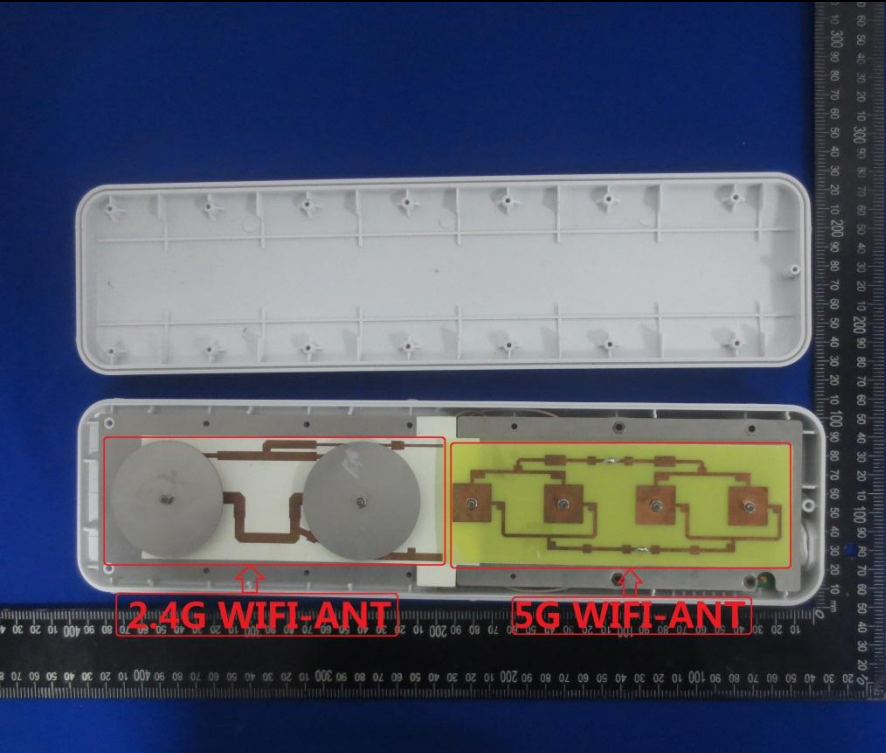
5.8 Test Instruments list

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

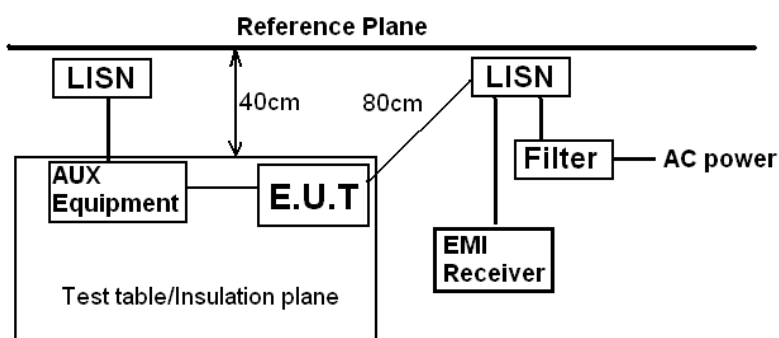
Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-07-2018	03-06-2019
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-07-2018	03-06-2019
LISN	CHASE	MN2050D	1447	03-19-2018	03-18-2019
LISN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

6 Test results and Measurement Data

6.1 Antenna requirement

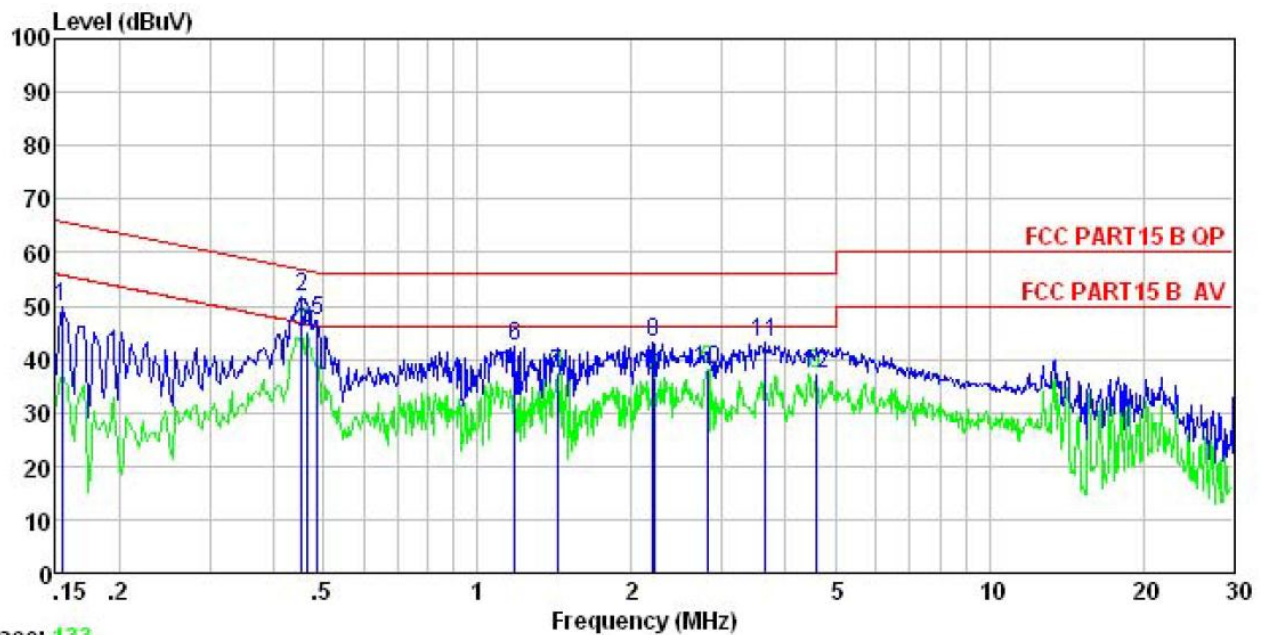
Standard requirement:	FCC Part 15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
The WiFi antenna is Panel Antenna which cannot replace by end-user, the best case gain of the antenna is Antenna 0: 9dBi, Antenna 1: 9dBi	
	

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:	 Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

Measurement Data:

Test Phase: Neutral



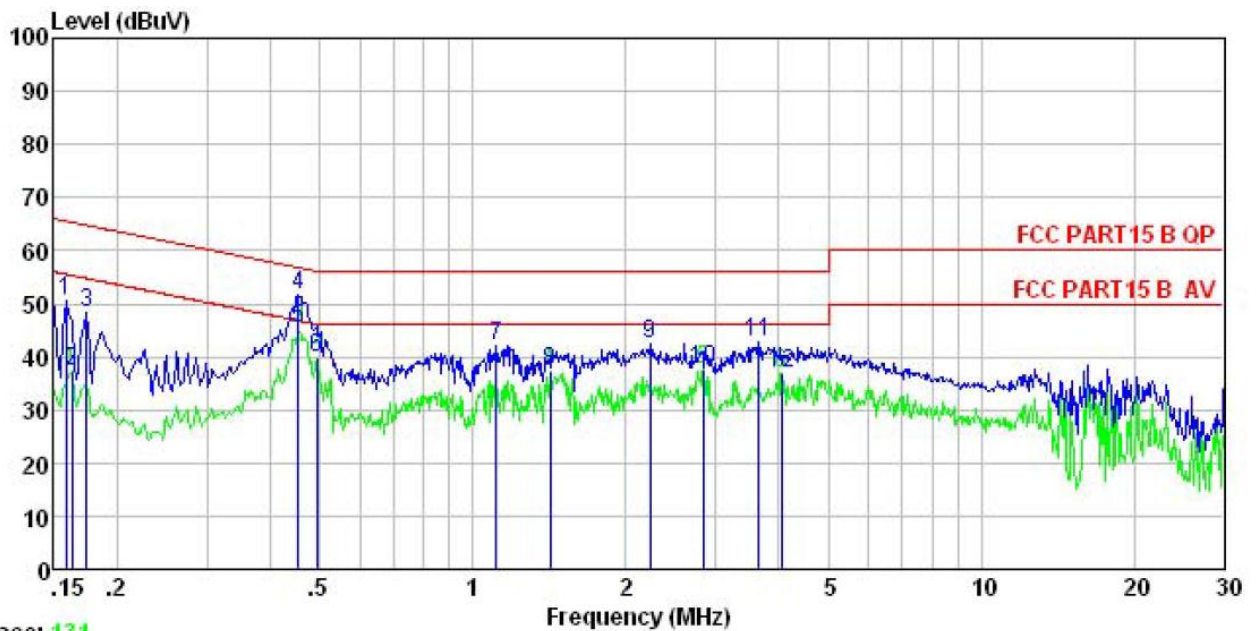
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test Mode : 2.4G WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23.5°C Humi:57% Atmos:101KPa
 Test Engineer: Mike
 Remark : GRT

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBUV	dB	dB	dBUV	dBUV	dB	
1	0.154	38.20	0.98	10.78	49.96	65.78	-15.82	QP
2	0.454	39.78	0.97	10.74	51.49	56.80	-5.31	QP
3	0.454	33.45	0.97	10.74	45.16	46.80	-1.64	Average
4	0.466	33.25	0.97	10.75	44.97	46.58	-1.61	Average
5	0.486	35.52	0.97	10.76	47.25	56.23	-8.98	QP
6	1.184	30.53	0.97	10.89	42.39	56.00	-13.61	QP
7	1.433	25.38	0.98	10.92	37.28	46.00	-8.72	Average
8	2.201	31.07	0.98	10.95	43.00	56.00	-13.00	QP
9	2.225	24.76	0.98	10.95	36.69	46.00	-9.31	Average
10	2.809	26.13	0.99	10.93	38.05	46.00	-7.95	Average
11	3.642	31.20	1.00	10.90	43.10	56.00	-12.90	QP
12	4.574	25.35	1.00	10.87	37.22	46.00	-8.78	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 Phase: **Line**



Trace: **131**

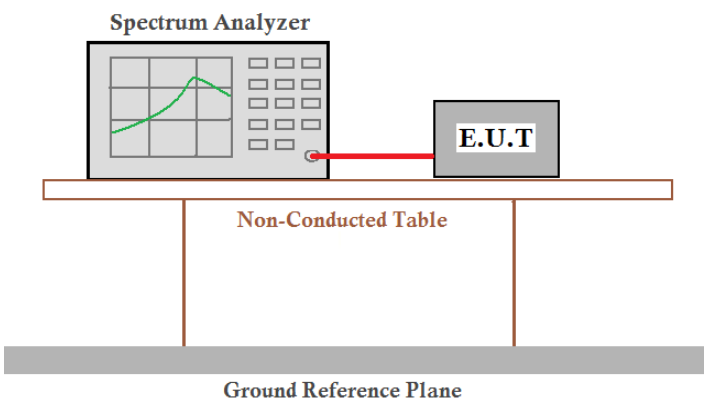
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test Mode : 2.4G WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23.5°C Humi:57% Atmos:101KPa
 Test Engineer: Mike
 Remark : GRT

	Read	LISN	Cable		Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	39.57	0.17	10.77	50.51	65.56	-15.05 QP
2	0.162	26.50	0.17	10.77	37.44	55.34	-17.90 Average
3	0.174	37.43	0.16	10.77	48.36	64.77	-16.41 QP
4	0.454	40.63	0.12	10.74	51.49	56.80	-5.31 QP
5	0.454	34.52	0.12	10.74	45.38	46.80	-1.42 Average
6	0.494	28.84	0.12	10.76	39.72	46.10	-6.38 Average
7	1.111	31.09	0.13	10.88	42.10	56.00	-13.90 QP
8	1.418	26.23	0.14	10.92	37.29	46.00	-8.71 Average
9	2.237	31.35	0.15	10.95	42.45	56.00	-13.55 QP
10	2.839	26.41	0.16	10.93	37.50	46.00	-8.50 Average
11	3.661	31.56	0.17	10.90	42.63	56.00	-13.37 QP
12	4.049	25.89	0.18	10.89	36.96	46.00	-9.04 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.

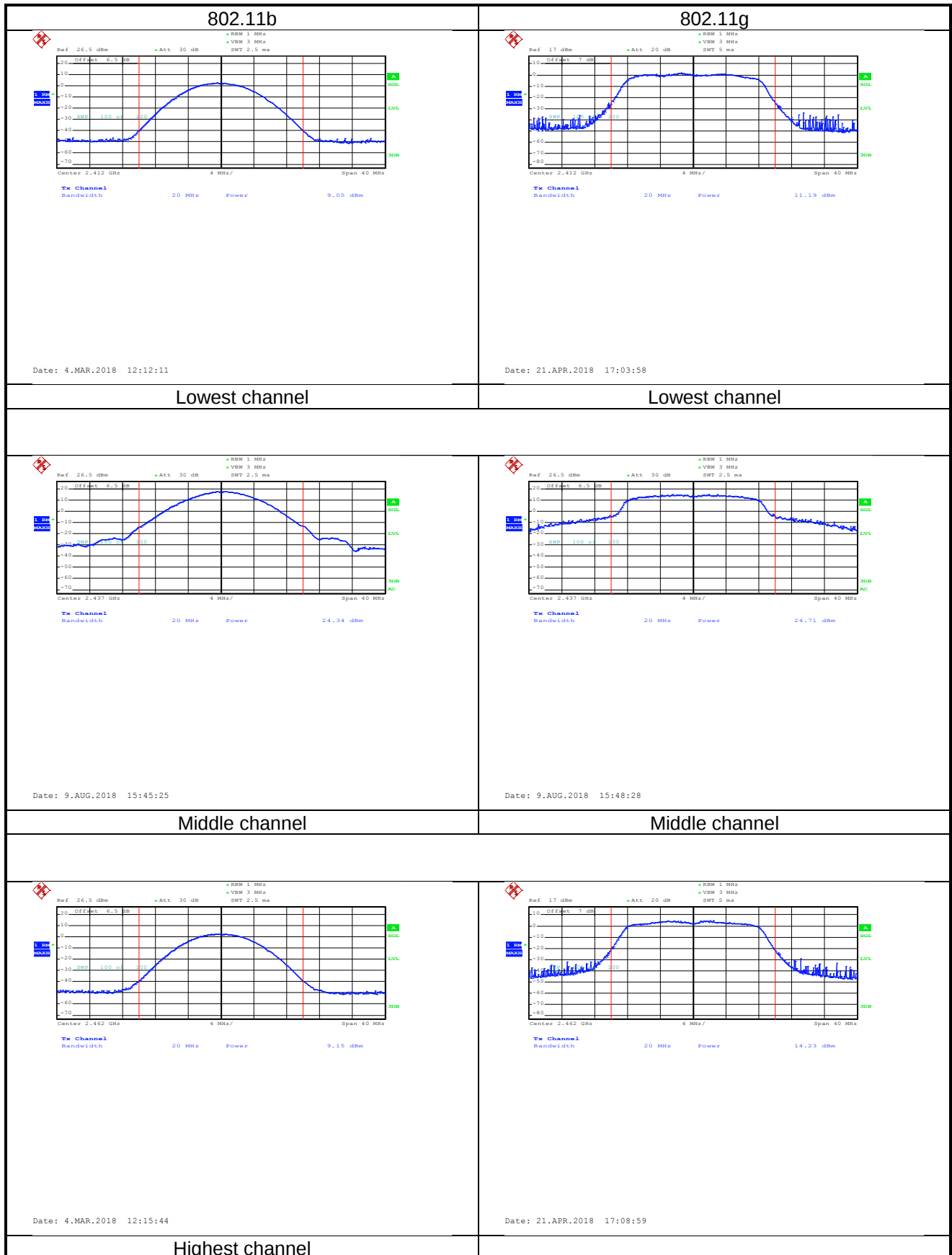
6.3 Conducted Output Power

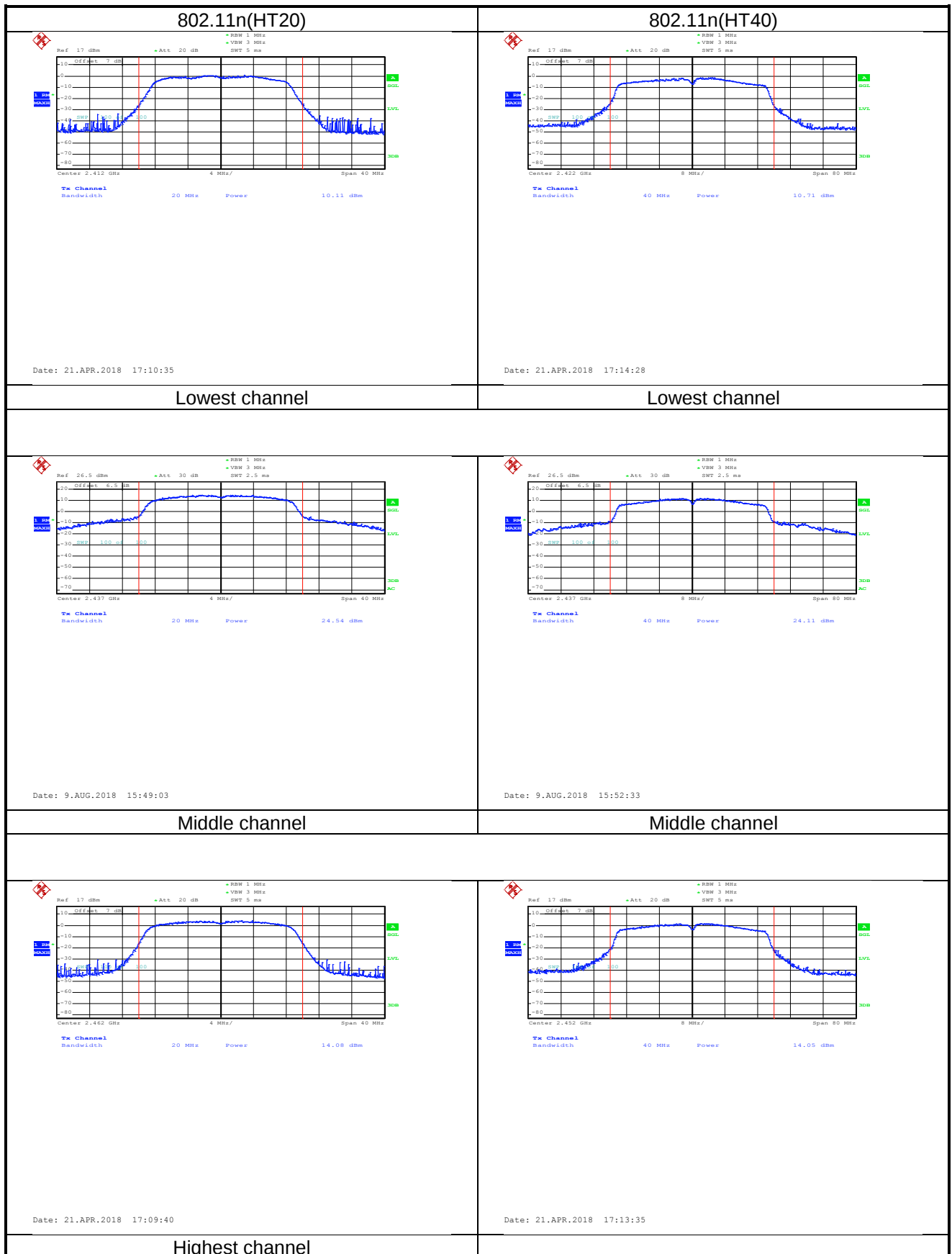
Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB 558074
Limit:	30dBm (Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided 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 6 dBi.)
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

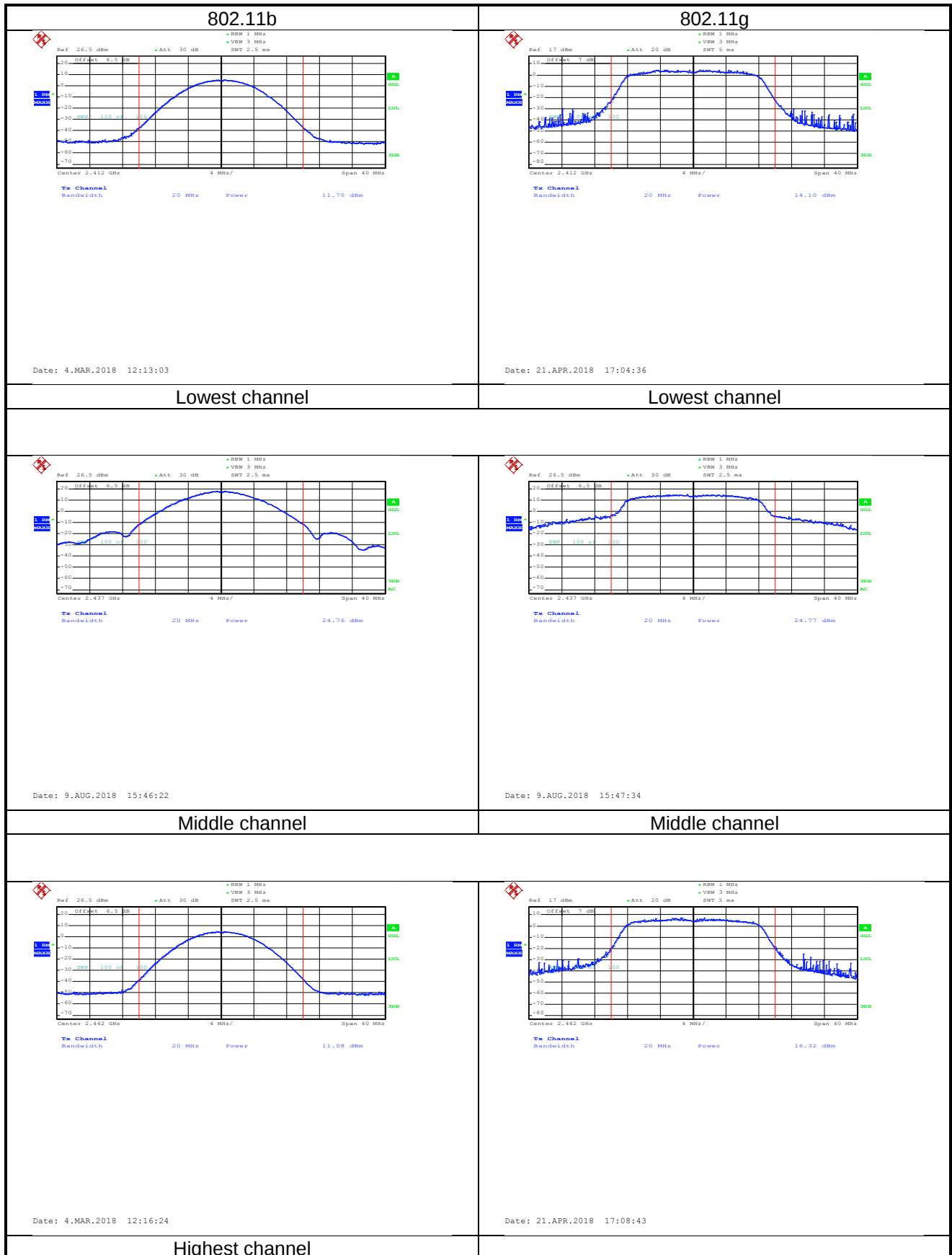
Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11b	Lowest	TX0	9.05	13.62	28	Pass
		TX1	11.75			
	Middle	TX0	24.34	27.57	28	Pass
		TX1	24.76			
	Highest	TX0	9.15	13.23	28	Pass
		TX1	11.08			
802.11g	Lowest	TX0	11.19	15.89	28	Pass
		TX1	14.10			
	Middle	TX0	24.71	27.75	28	Pass
		TX1	24.77			
	Highest	TX0	14.23	18.41	28	Pass
		TX1	16.32			
802.11n(HT20)	Lowest	TX0	10.11	14.69	28	Pass
		TX1	12.83			
	Middle	TX0	24.54	27.64	28	Pass
		TX1	24.71			
	Highest	TX0	14.08	18.02	28	Pass
		TX1	15.78			
802.11n(HT40)	Lowest	TX0	10.71	15.10	28	Pass
		TX1	13.14			
	Middle	TX0	24.11	27.30	28	Pass
		TX1	24.46			
	Highest	TX0	14.05	17.74	28	Pass
		TX1	15.31			
Remark: 1. Because transmit signals are correlated, Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi ,So the Directional gain=9 + 10 log(2)=12 dBi 2. The directional Gain of antenna is greater than 6 dBi, . so the limit of power is 28 dBm.						

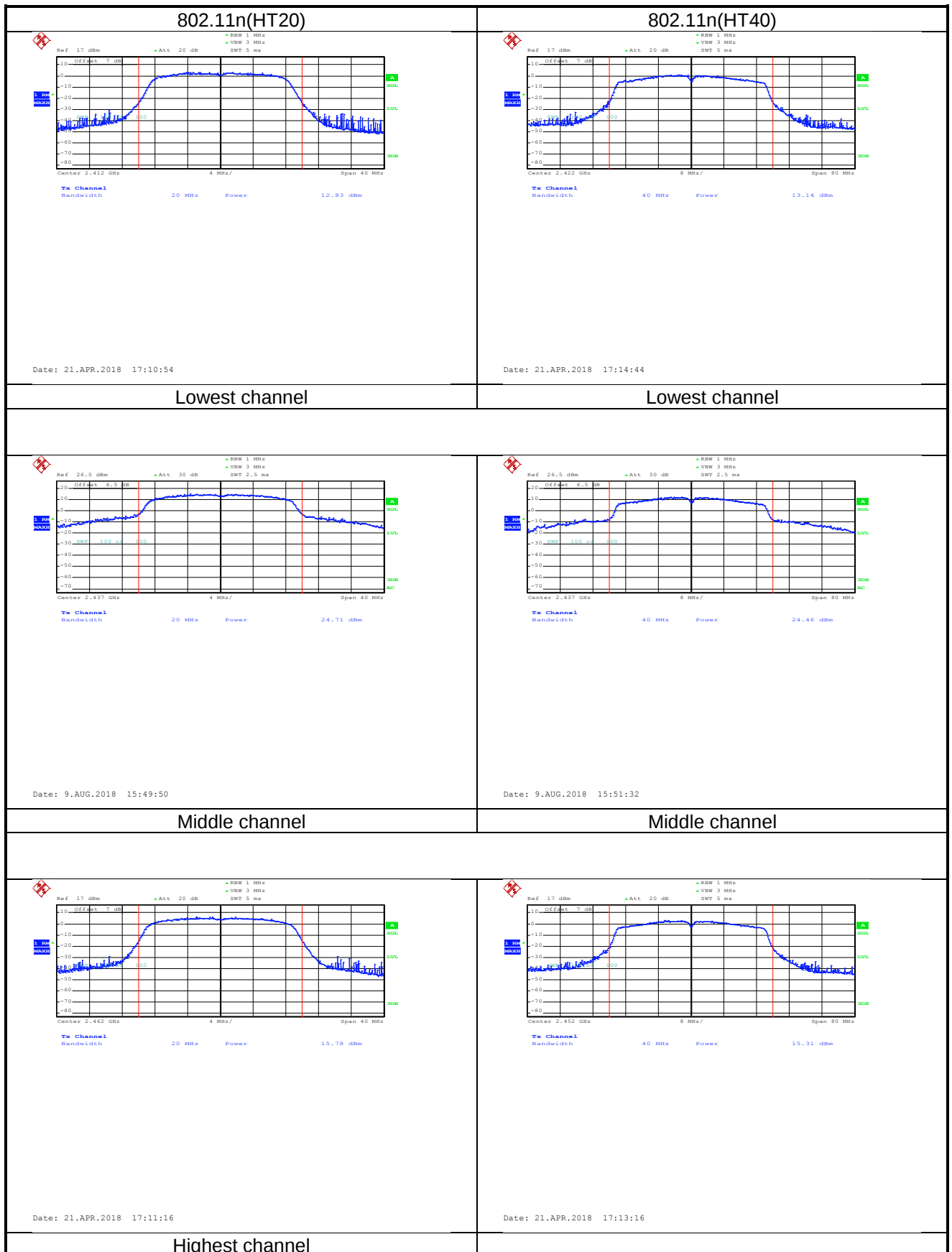
Test plot as follows: TX0



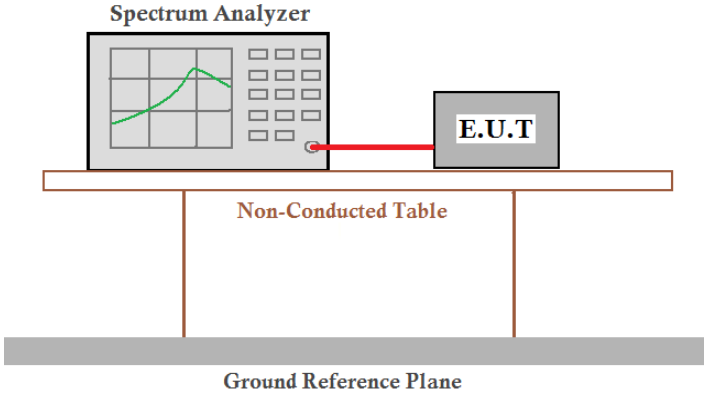


Test plot as follows:TX1





6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB 558074
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

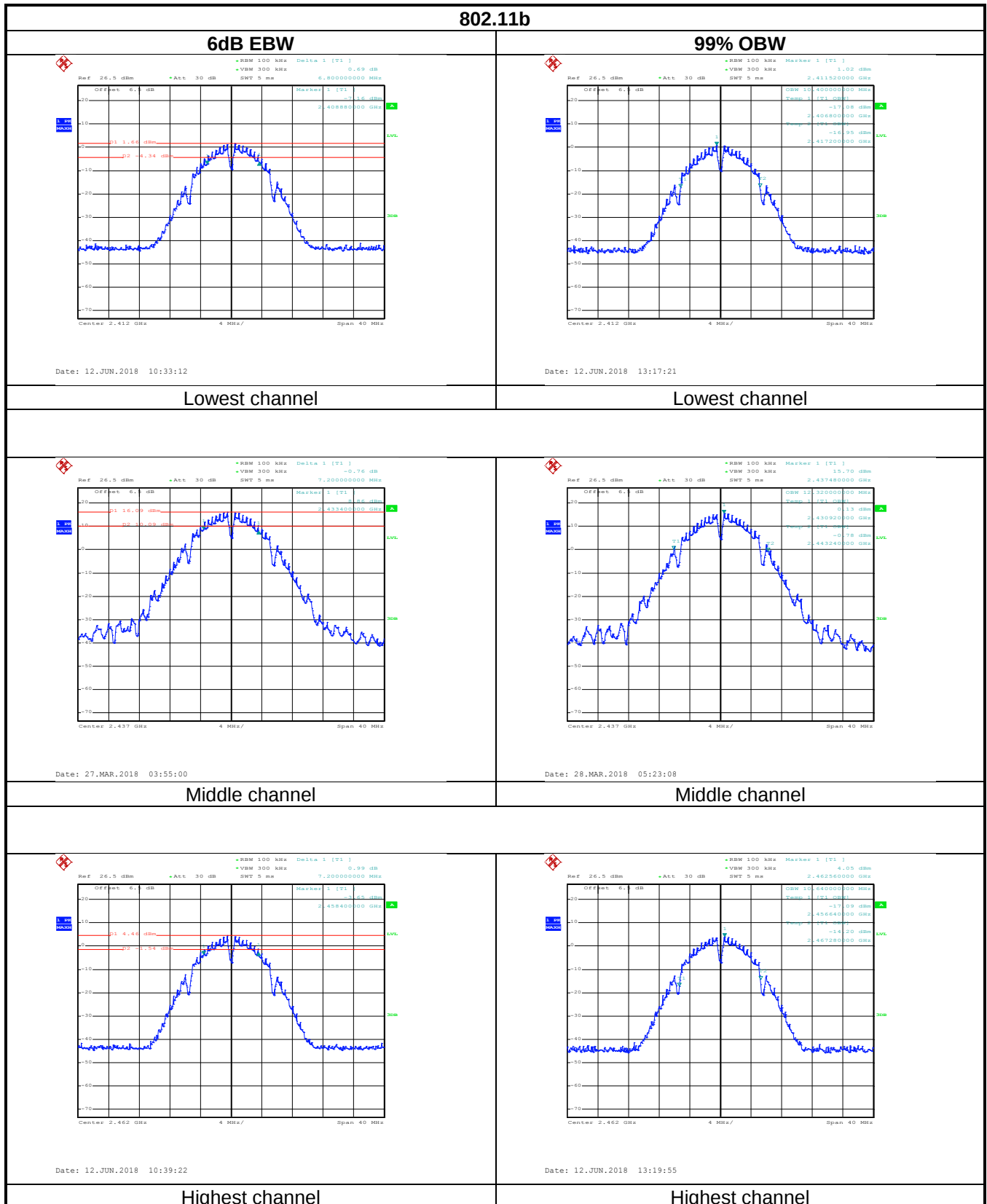
Measurement Data:TX0

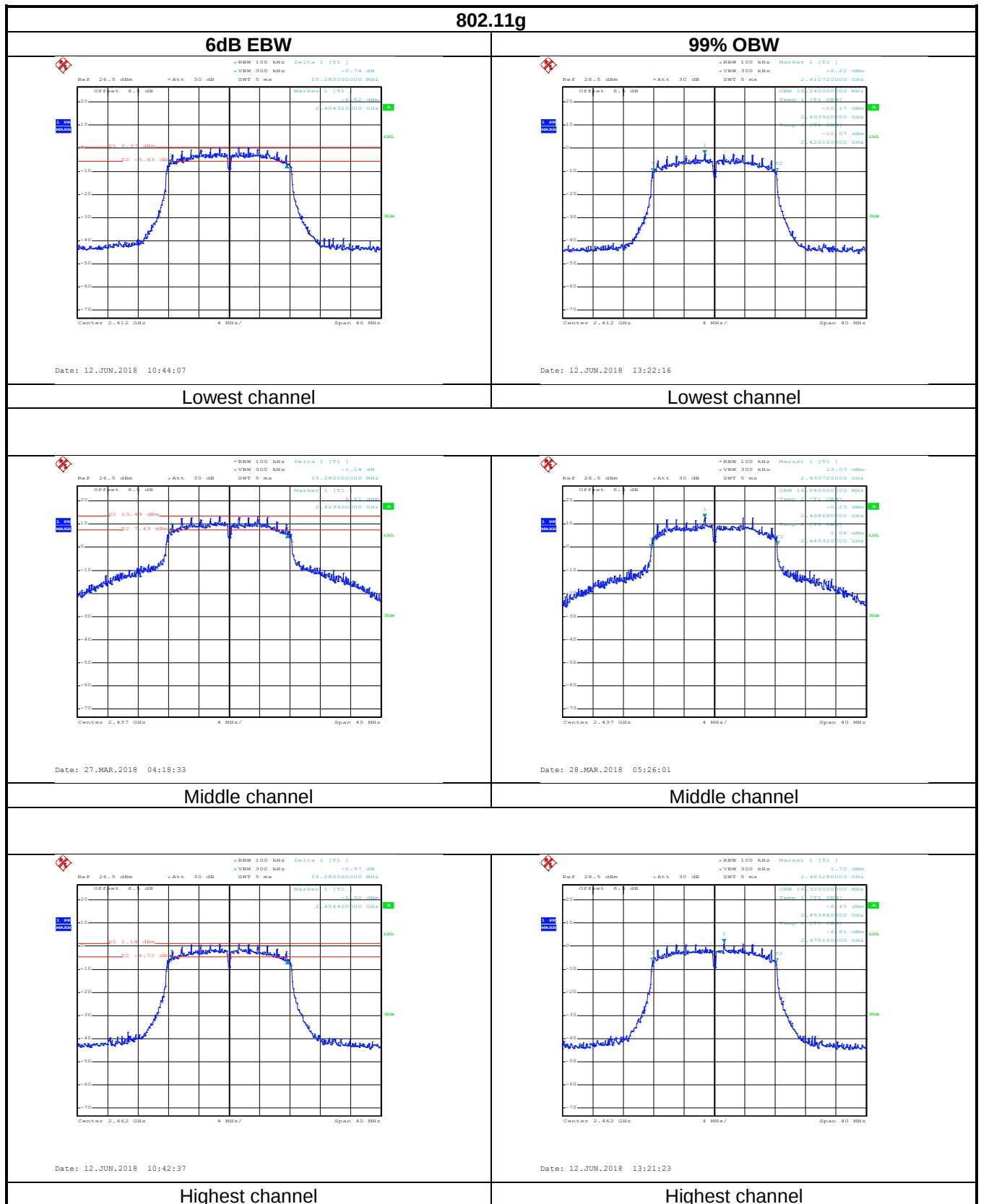
Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	6.80	15.28	15.28	35.36	>500	Pass
Middle	7.20	15.28	15.28	31.68		
Highest	7.20	15.28	15.28	35.52		
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	10.40	16.24	17.44	35.84	N/A	N/A
Middle	12.32	16.64	17.68	36.48		
Highest	10.64	16.32	17.28	35.68		

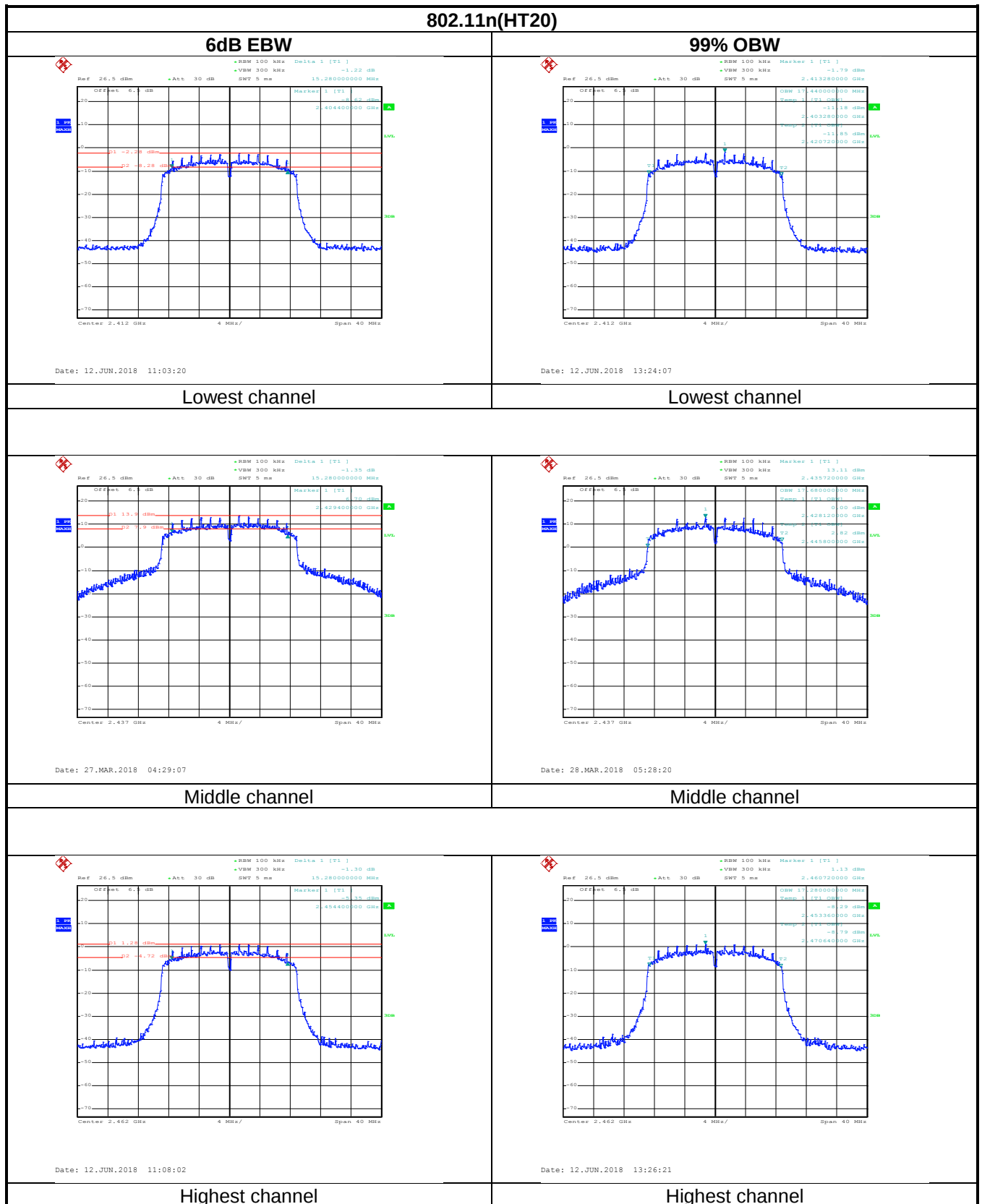
TX1

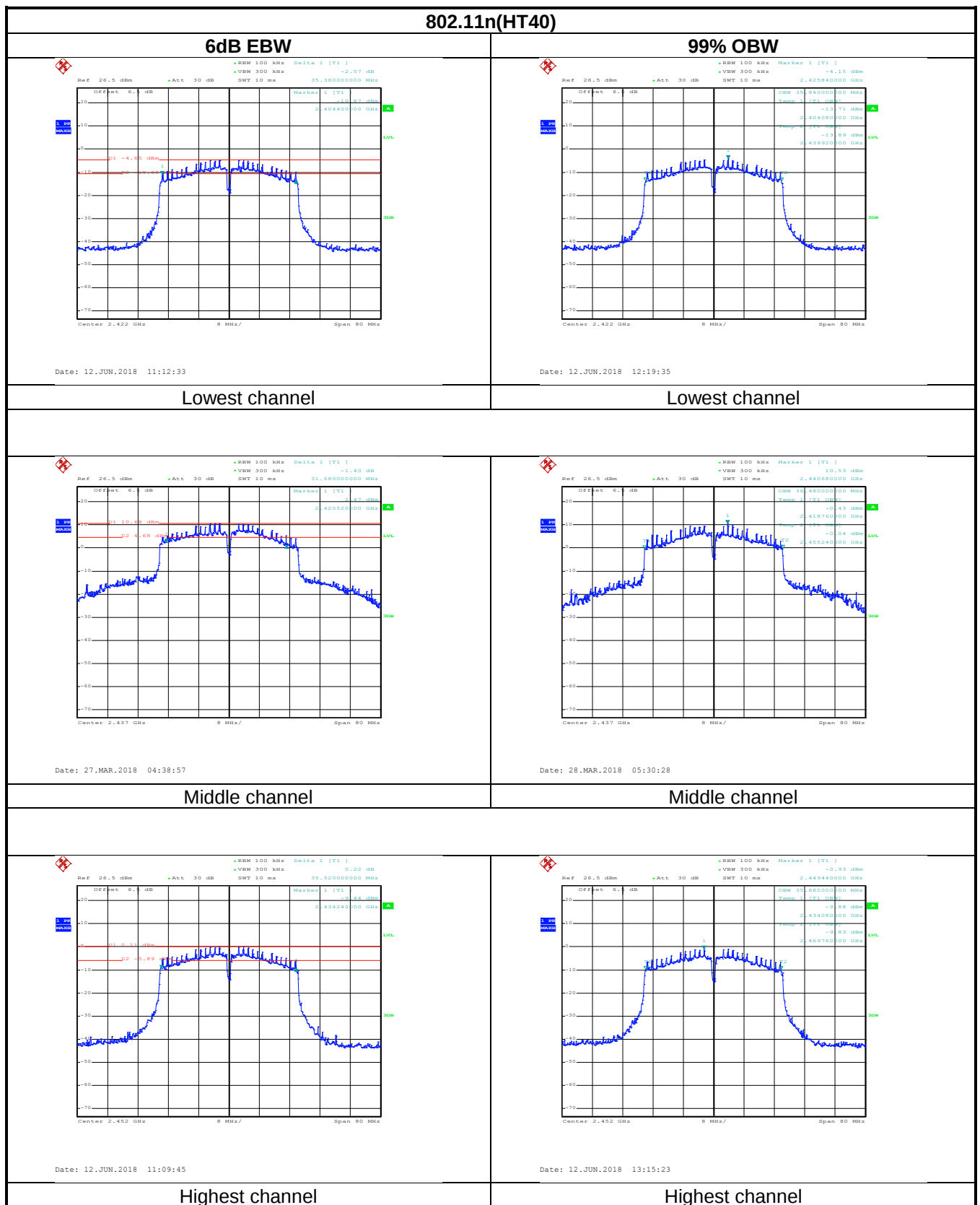
Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	7.20	15.36	15.28	32.80	>500	Pass
Middle	7.20	15.28	15.28	31.68		
Highest	7.20	15.52	15.28	34.08		
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	10.56	16.32	17.36	35.52	N/A	N/A
Middle	12.96	19.60	19.36	39.36		
Highest	10.64	16.24	17.36	35.68		

Test plot as follows:TX0

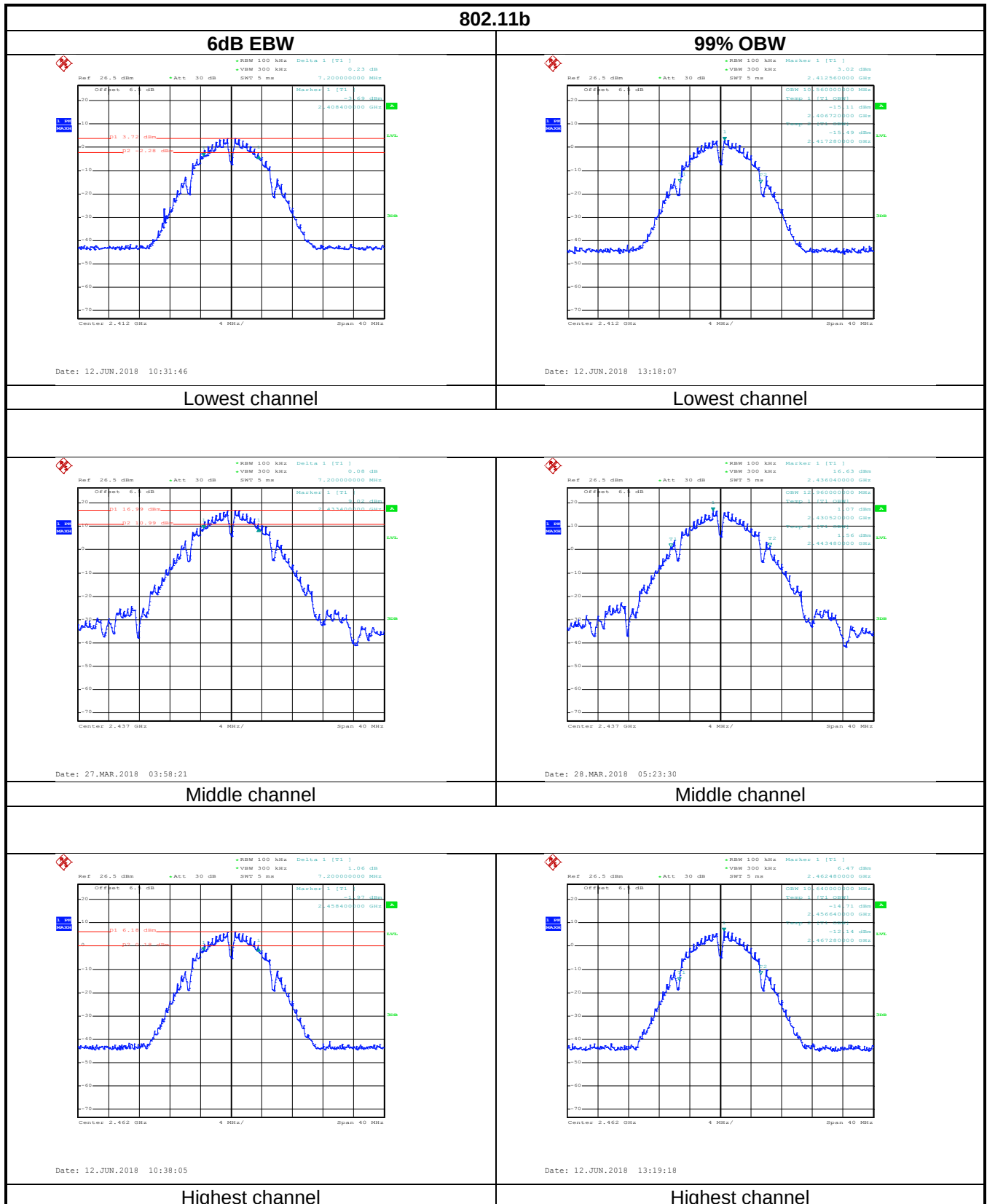


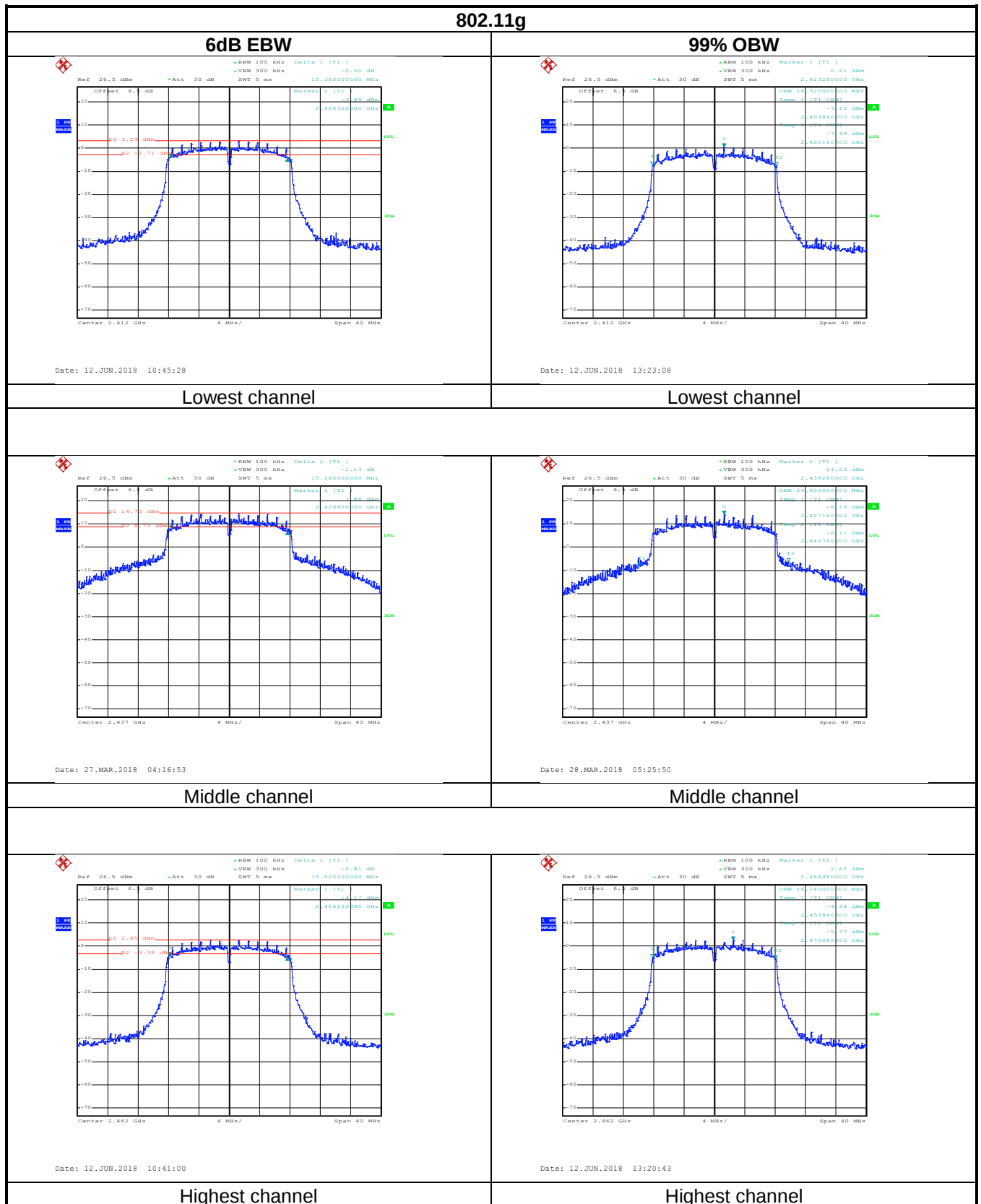


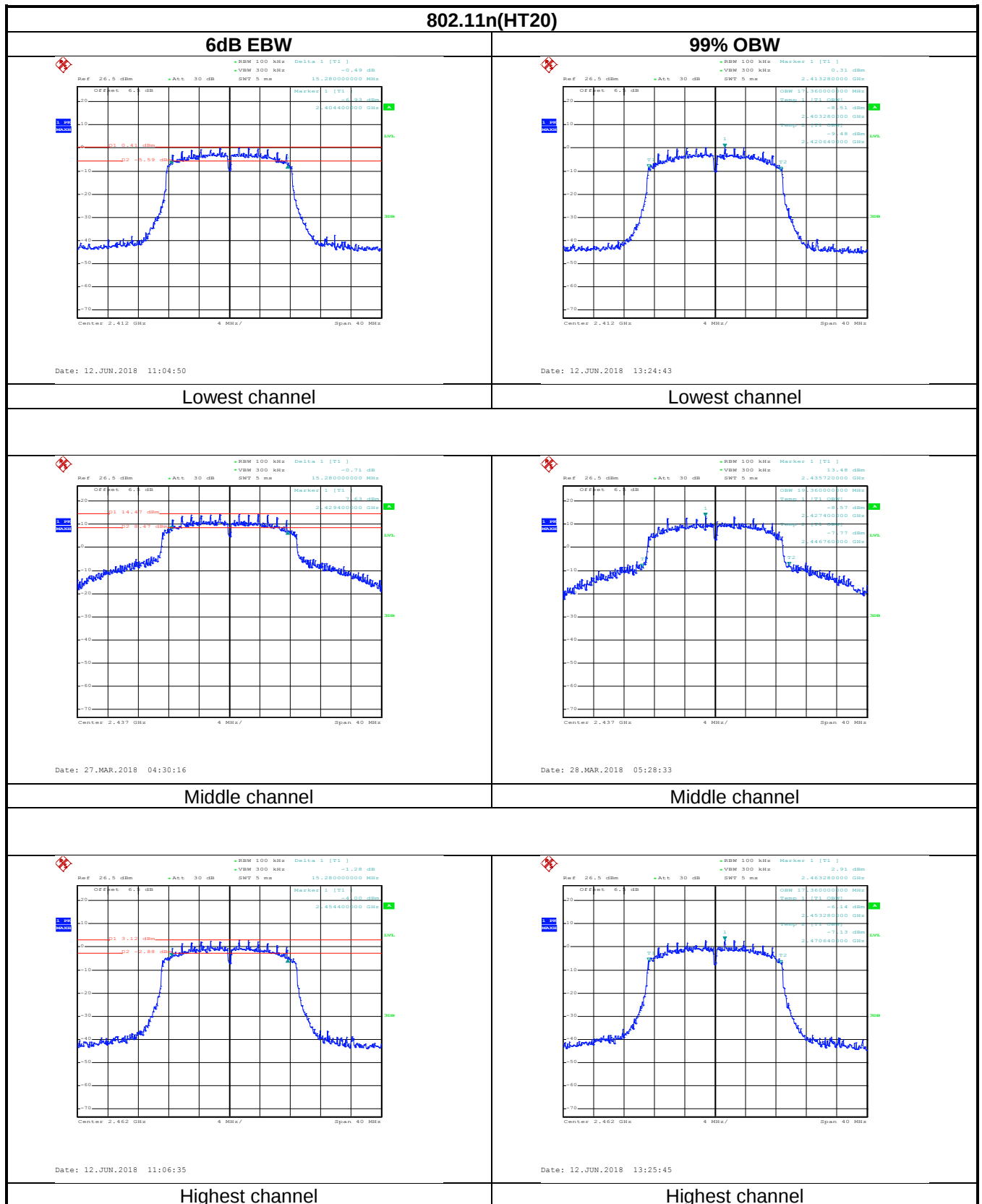


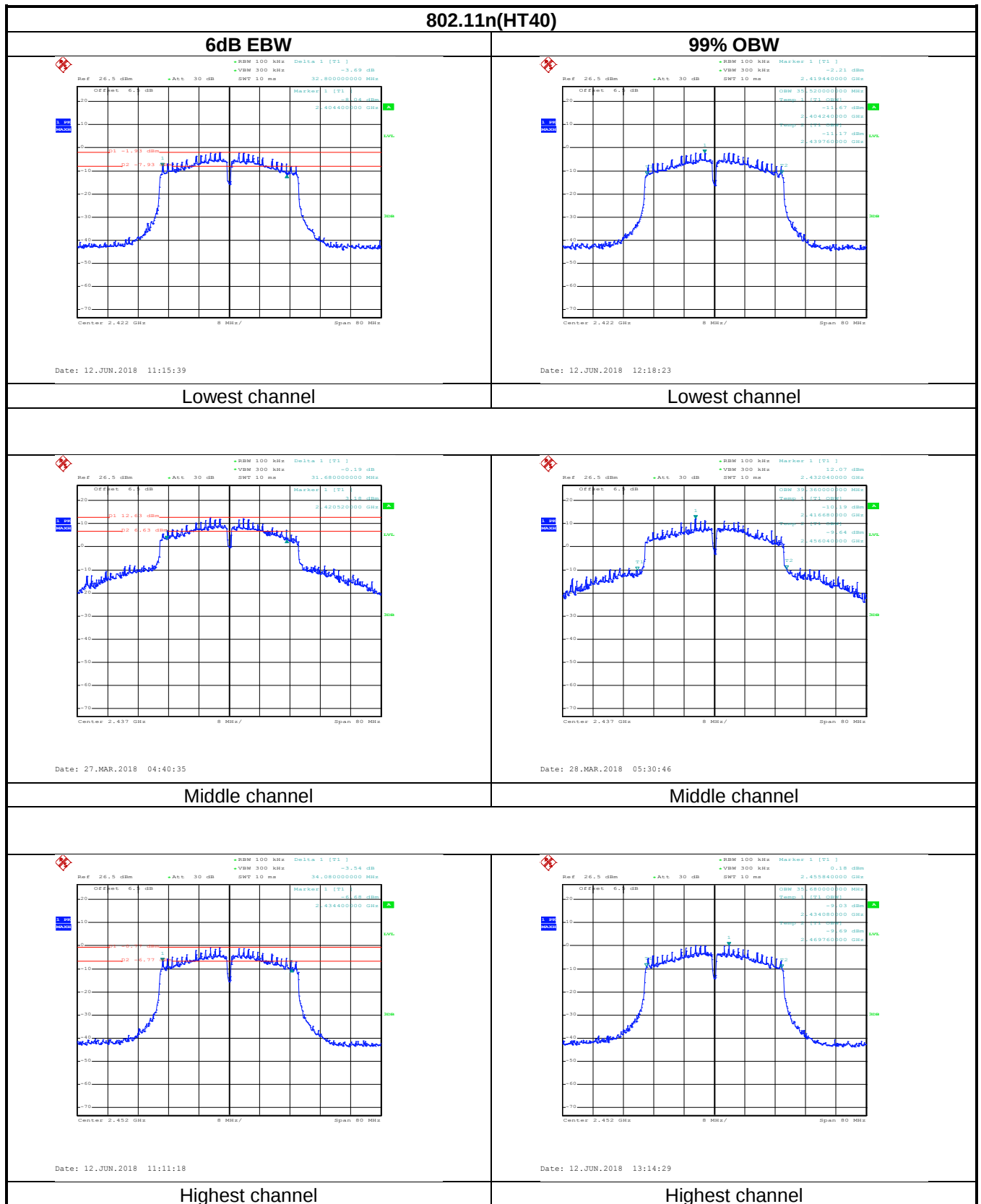


TX1

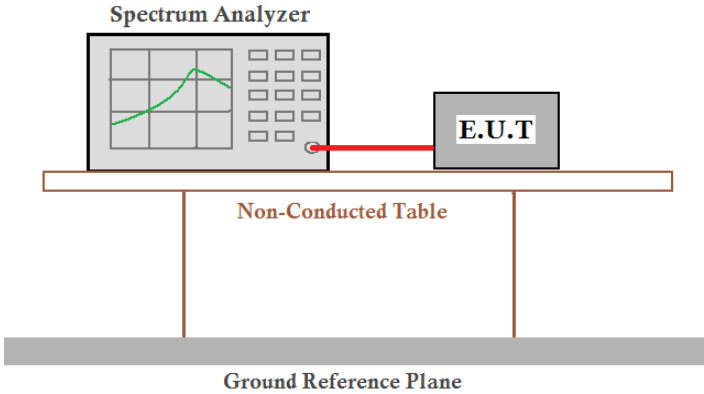








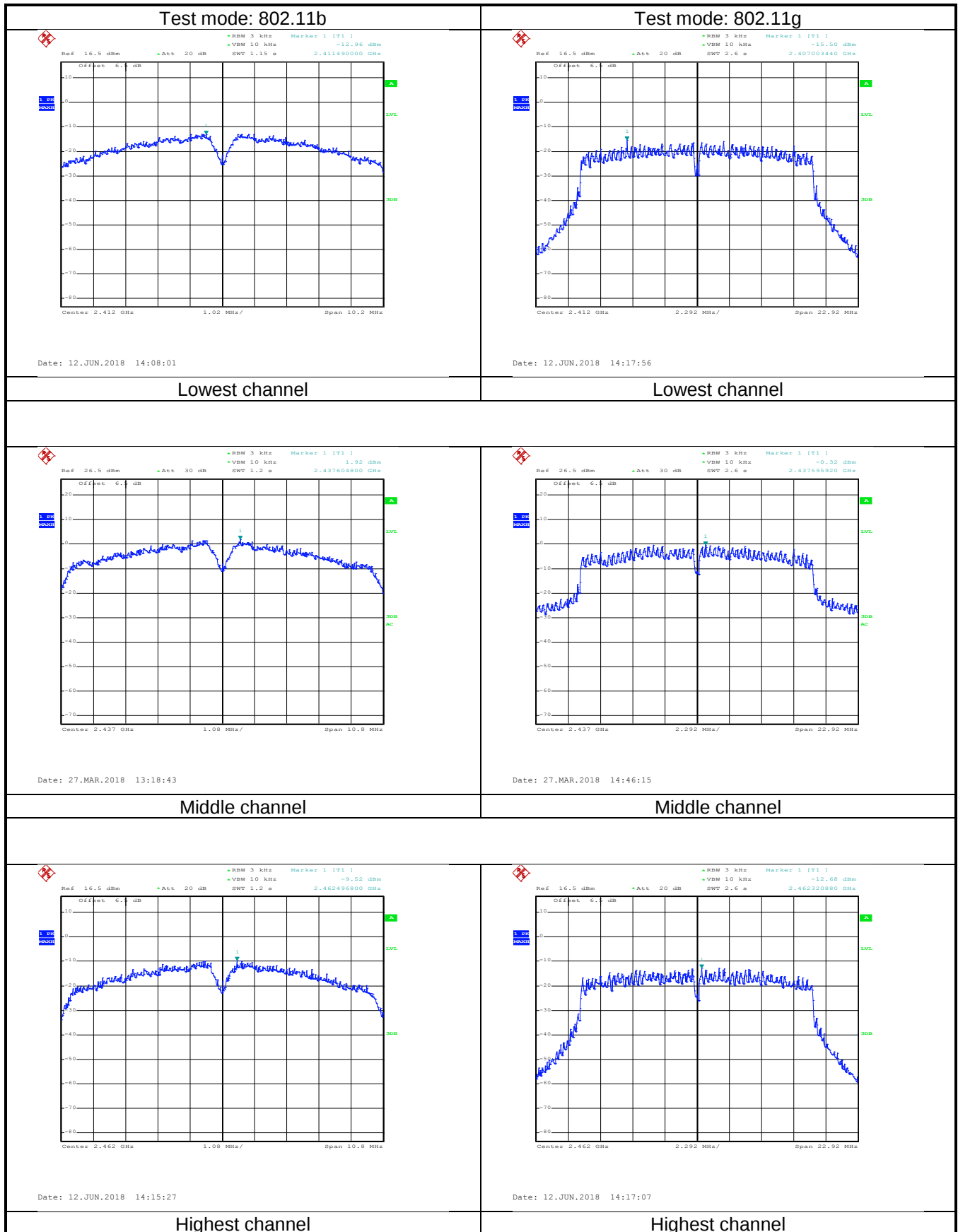
6.5 Power Spectral Density

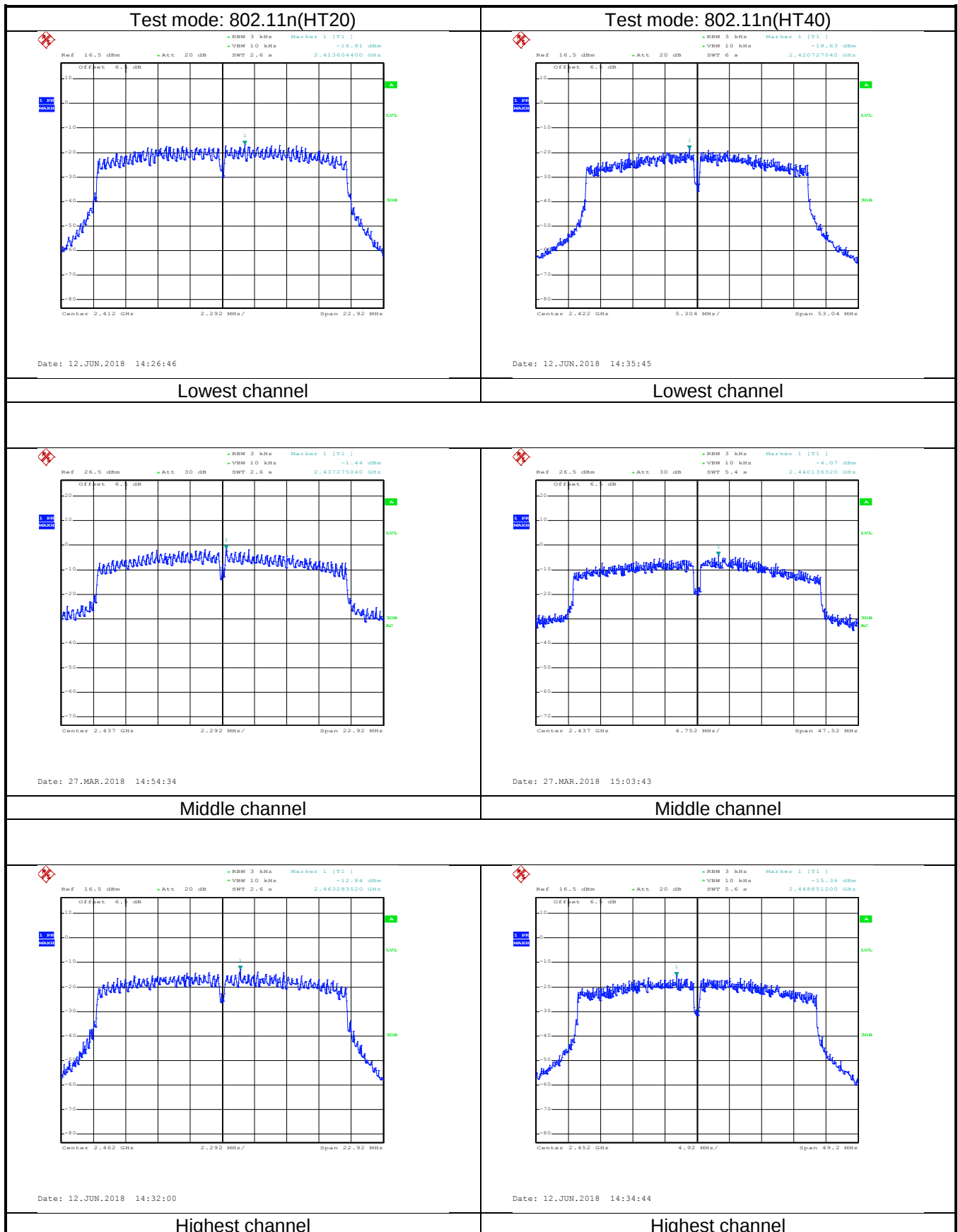
Test Requirement:	FCC Part 15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB 558074
Limit:	8dBm(For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.)
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

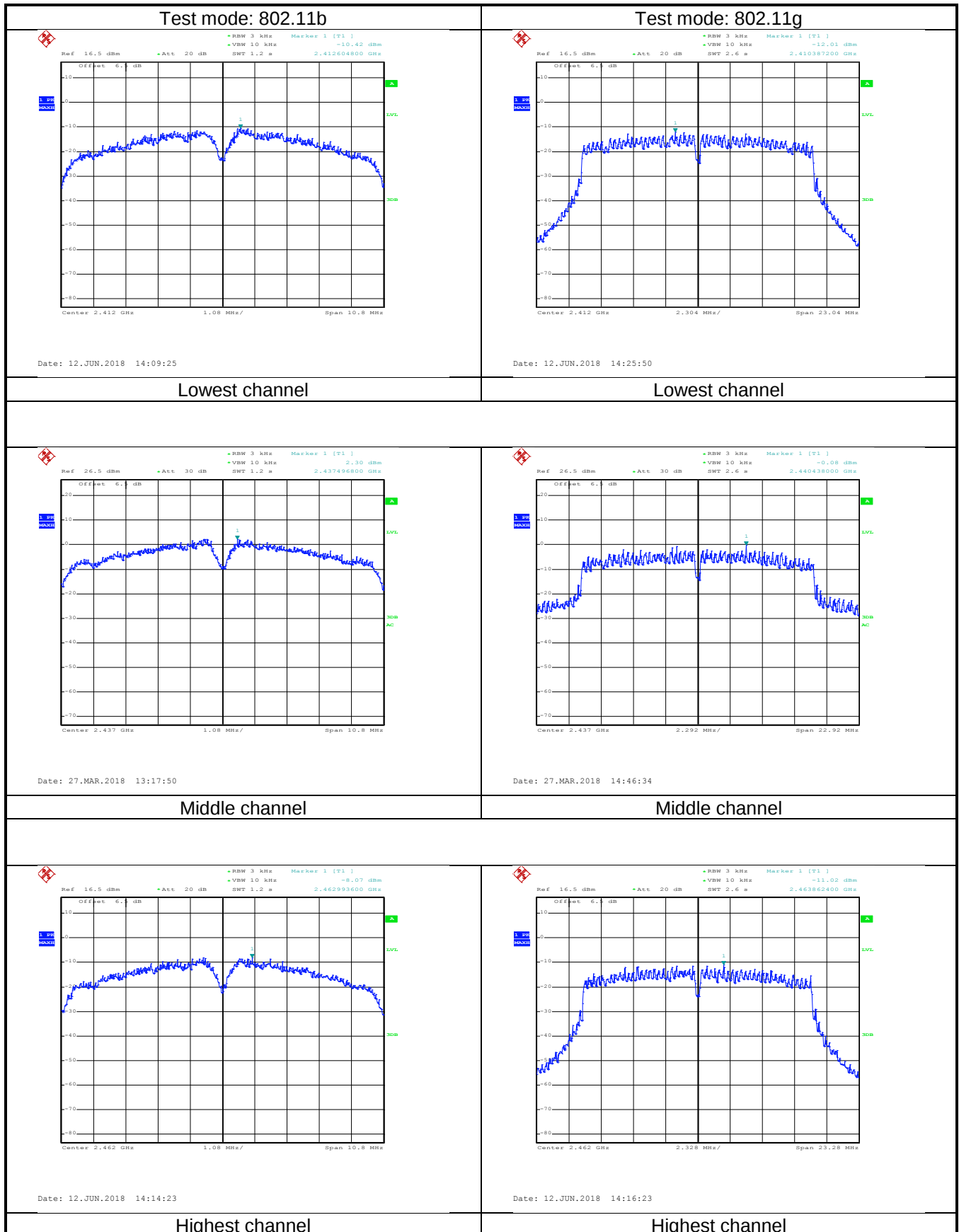
Mode	Test Channel	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11b	Lowest	TX0	-12.96	-8.50	6	Pass
		TX1	-10.42			
	Middle	TX0	1.92	5.12	6	Pass
		TX1	2.30			
	Highest	TX0	-9.52	-5.72	6	Pass
		TX1	-8.07			
802.11g	Lowest	TX0	-15.50	-10.40	6	Pass
		TX1	-12.01			
	Middle	TX0	-0.32	2.81	6	Pass
		TX1	-0.08			
	Highest	TX0	-12.68	-8.76	6	Pass
		TX1	-11.02			
802.11n(HT20)	Lowest	TX0	-16.81	-12.48	6	Pass
		TX1	-14.48			
	Middle	TX0	-1.44	2.25	6	Pass
		TX1	-0.17			
	Highest	TX0	-12.84	-9.22	6	Pass
		TX1	-11.70			
802.11n(HT40)	Lowest	TX0	-18.63	-14.21	6	Pass
		TX1	-16.15			
	Middle	TX0	-4.07	0.69	6	Pass
		TX1	-1.07			
	Highest	TX0	-15.36	-11.68	6	Pass
		TX1	-14.11			
Remark:						
1. Because transmit signals are correlated, Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi ,So the Directional gain= $9 + 10 \log(2)$ =12 dBi						
2. The directional Gain of antenna is greater than 6 dBi , , so the limit of power is 6 dBm.						

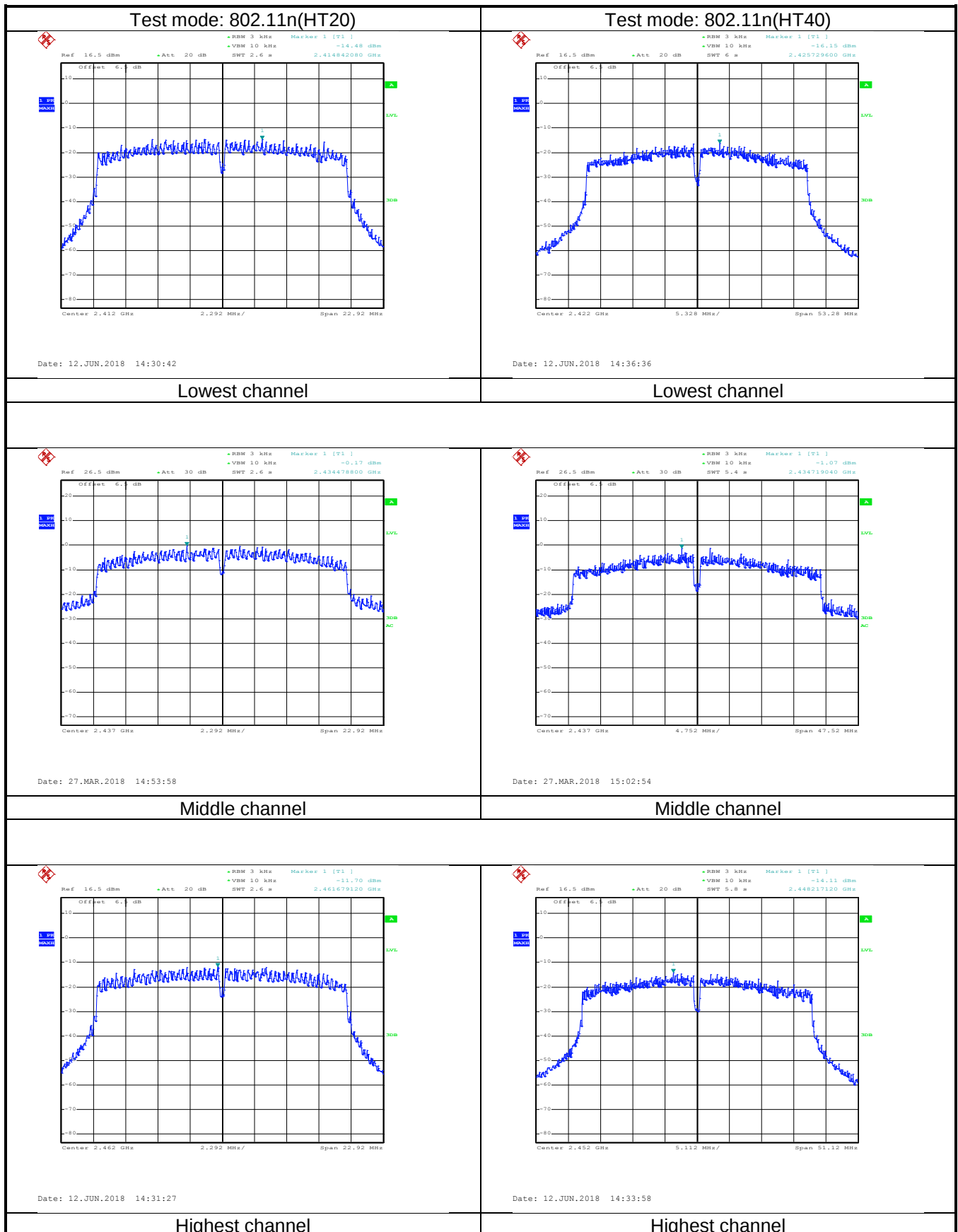
Test plot as follows:TX0





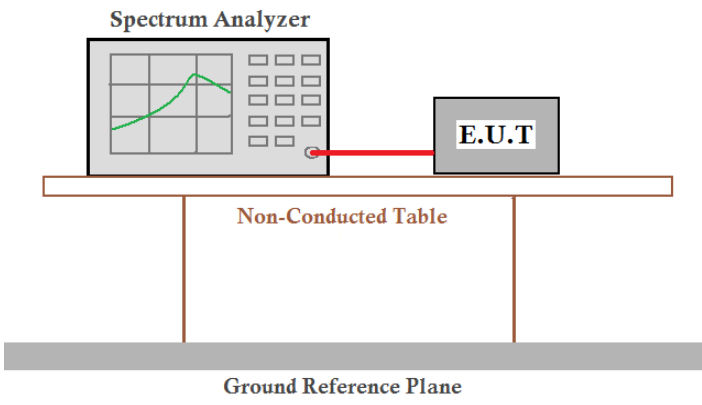
Test plot as follows:TX1





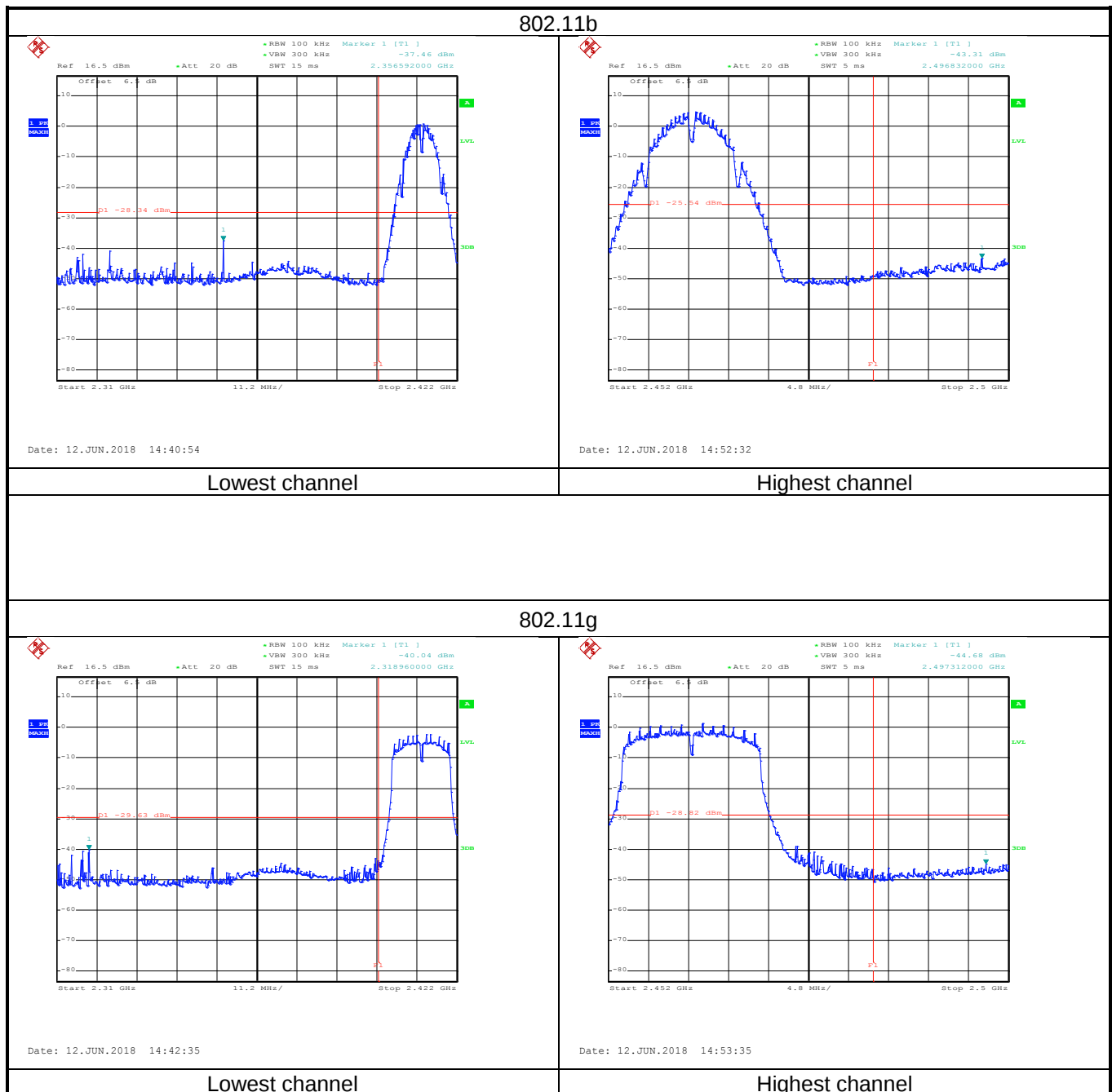
6.6 Band Edge

6.6.1 Conducted Emission Method

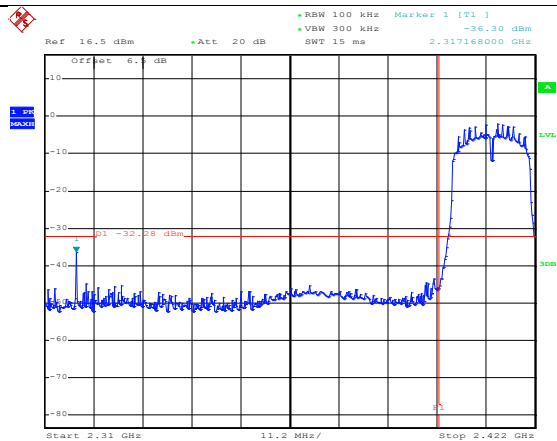
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB 558074
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at 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. A Spectrum Analyzer, shown with a grid and a green curve, is connected to an E.U.T. (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a table labeled 'Non-Conducted Table'. This table is supported by two vertical legs and sits on a thick grey horizontal bar labeled 'Ground Reference Plane'.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

TX0

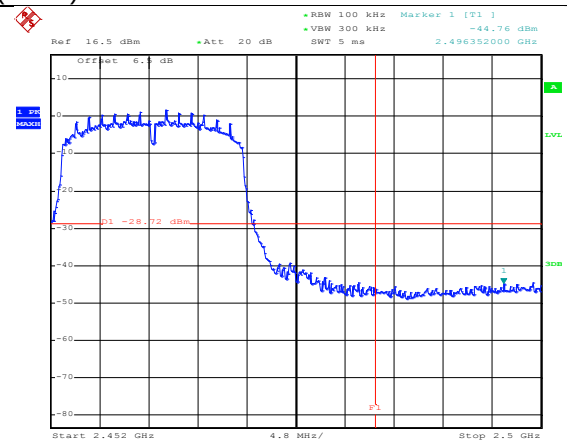


802.11n(HT20)



Date: 12.JUN.2018 14:44:43

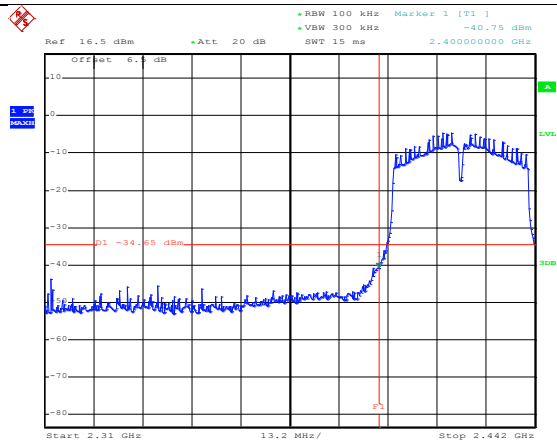
Lowest channel



Date: 12.JUN.2018 14:56:57

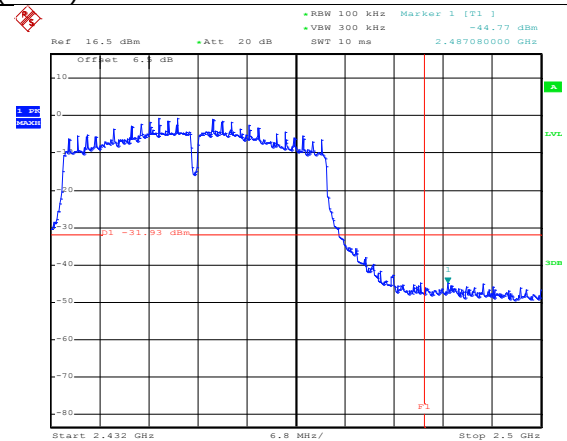
Highest channel

802.11n(HT40)



Date: 12.JUN.2018 14:45:44

Lowest channel

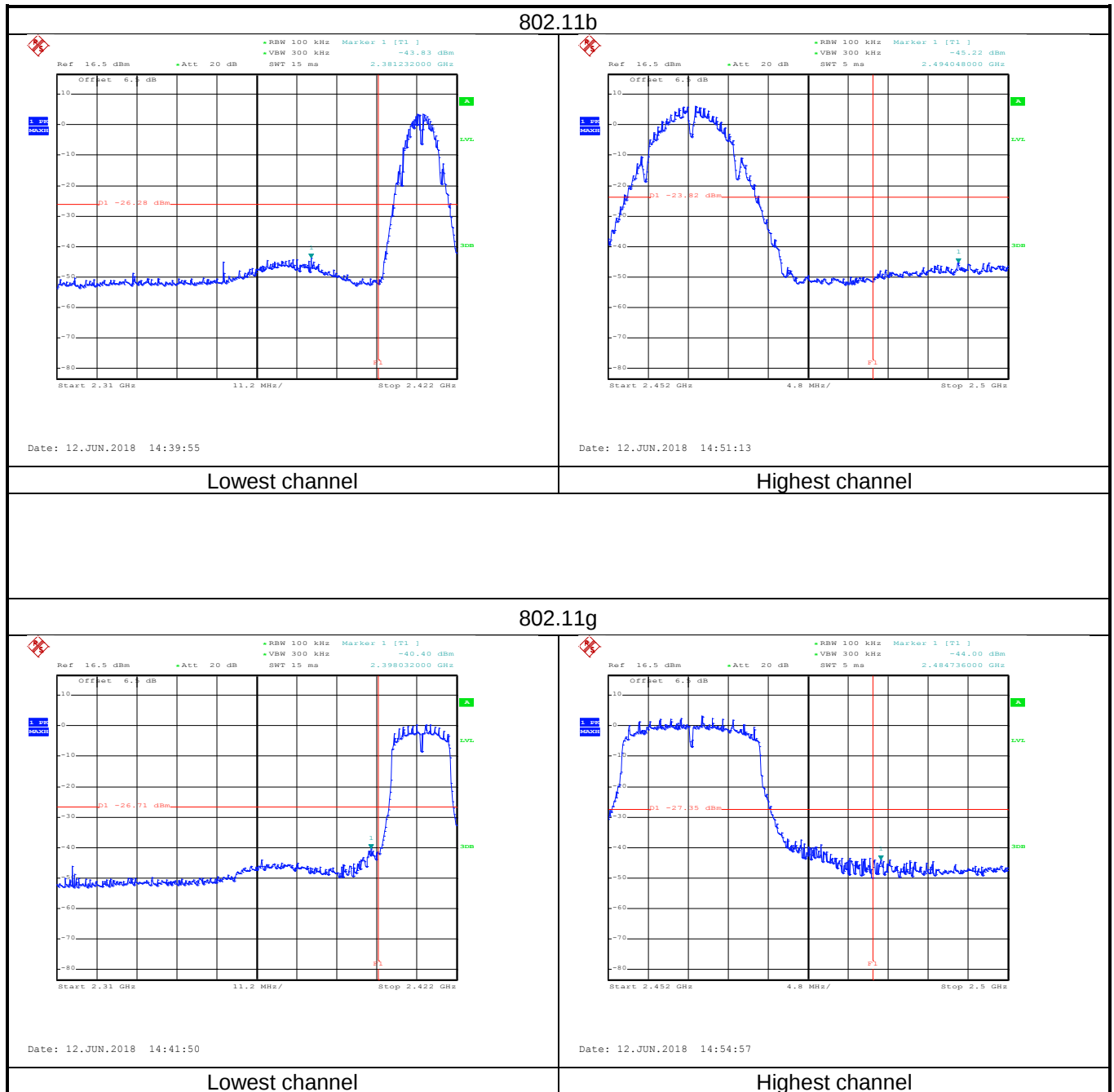


Date: 12.JUN.2018 14:48:42

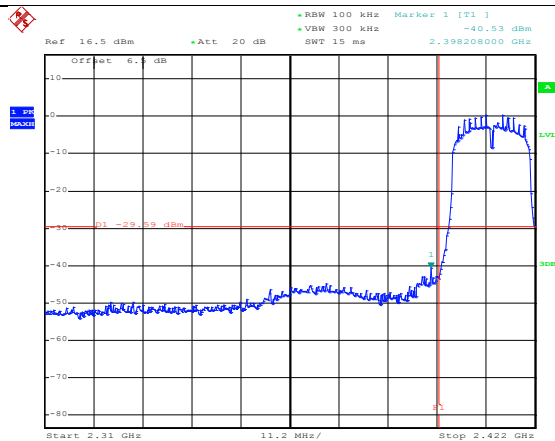
Highest channel

Test plot as follows:

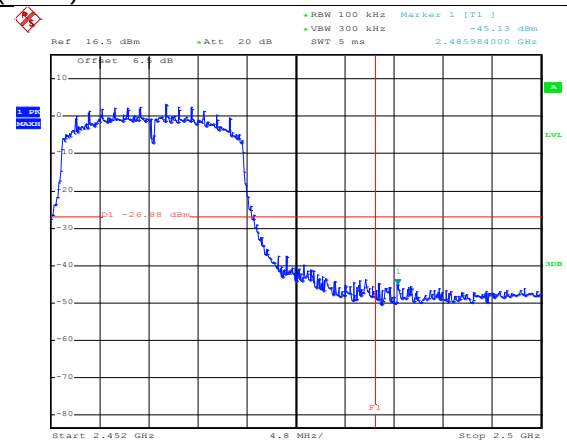
TX1



802.11n(HT20)

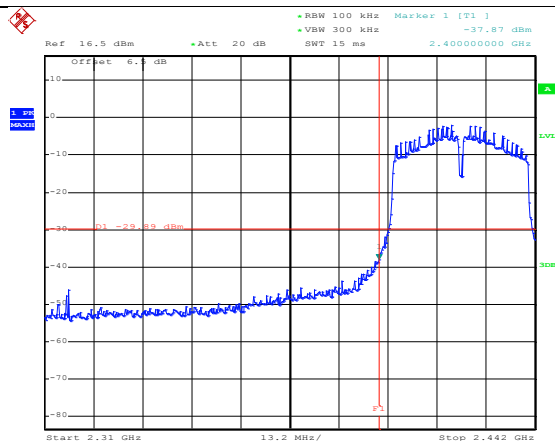


Lowest channel

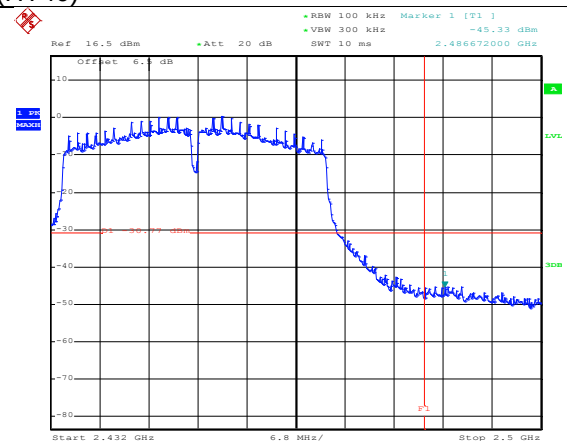


Highest channel

802.11n(HT40)



Lowest channel



Highest channel

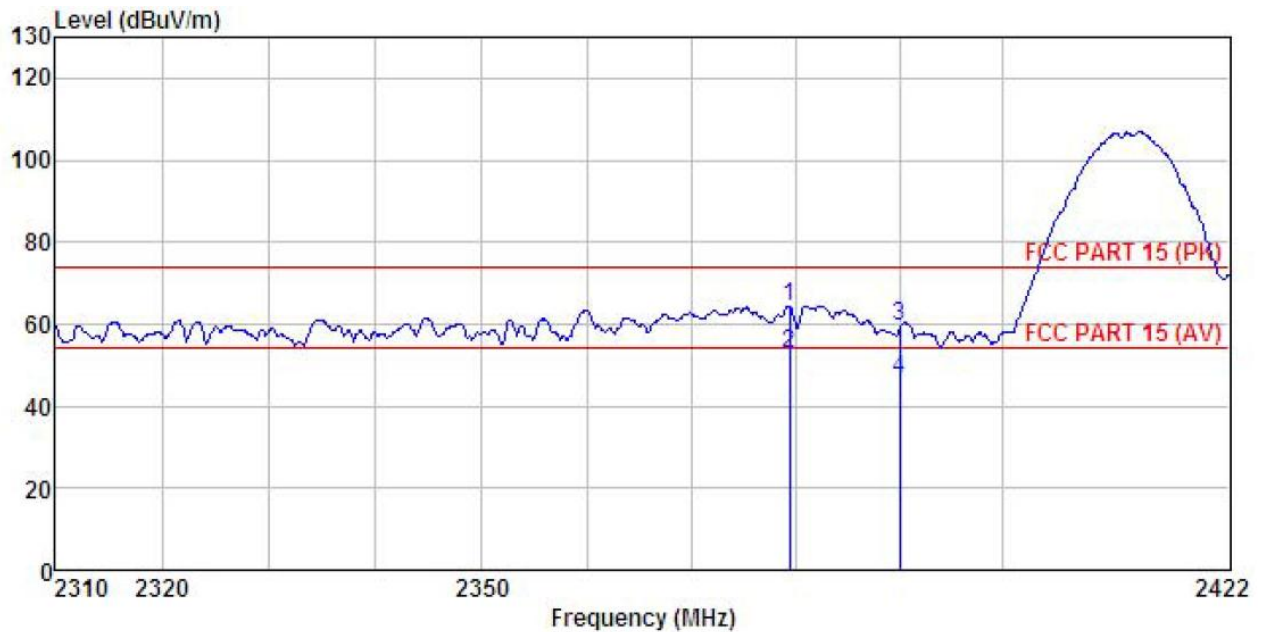
6.6.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013 and KDB 558074				
Test Frequency Range:	2.3GHz to 2.5GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		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 5.8 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

802.11b

Test channel: Lowest channel

Test Polarization: Horizontal



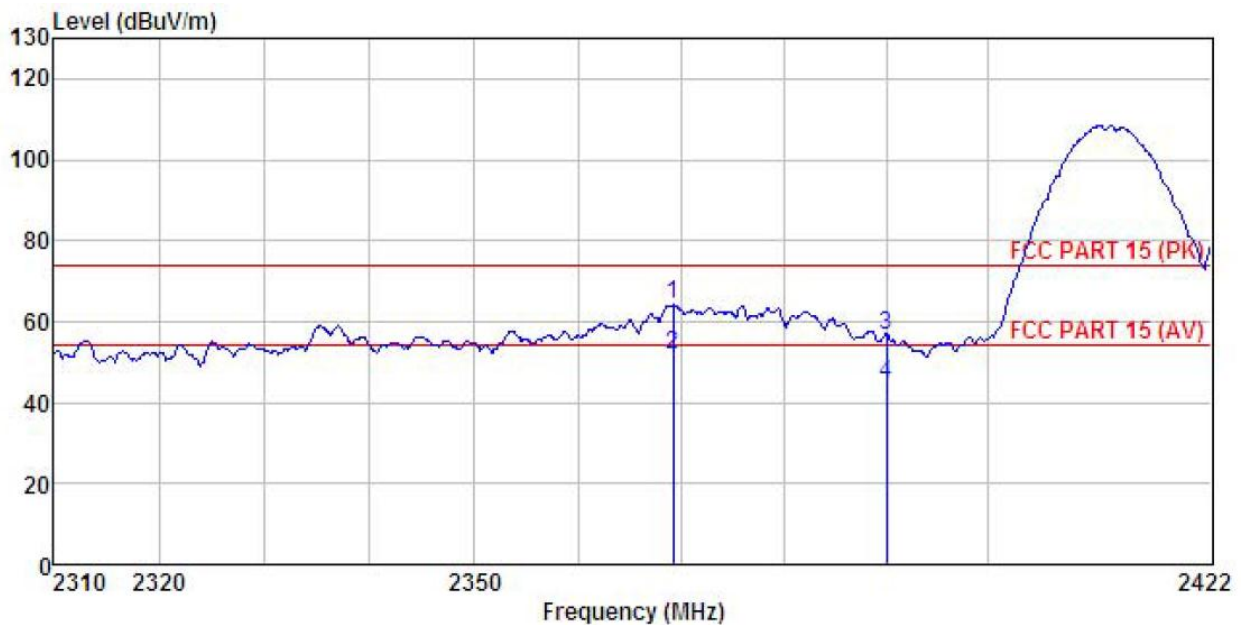
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11b-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

	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	2379.377	34.42	25.41	4.68	0.00	64.51	74.00	-9.49 Peak
2	2379.377	22.44	25.41	4.68	0.00	52.53	54.00	-1.47 Average
3	2390.000	29.57	25.45	4.69	0.00	59.71	74.00	-14.29 Peak
4	2390.000	16.56	25.45	4.69	0.00	46.70	54.00	-7.30 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 Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11b-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

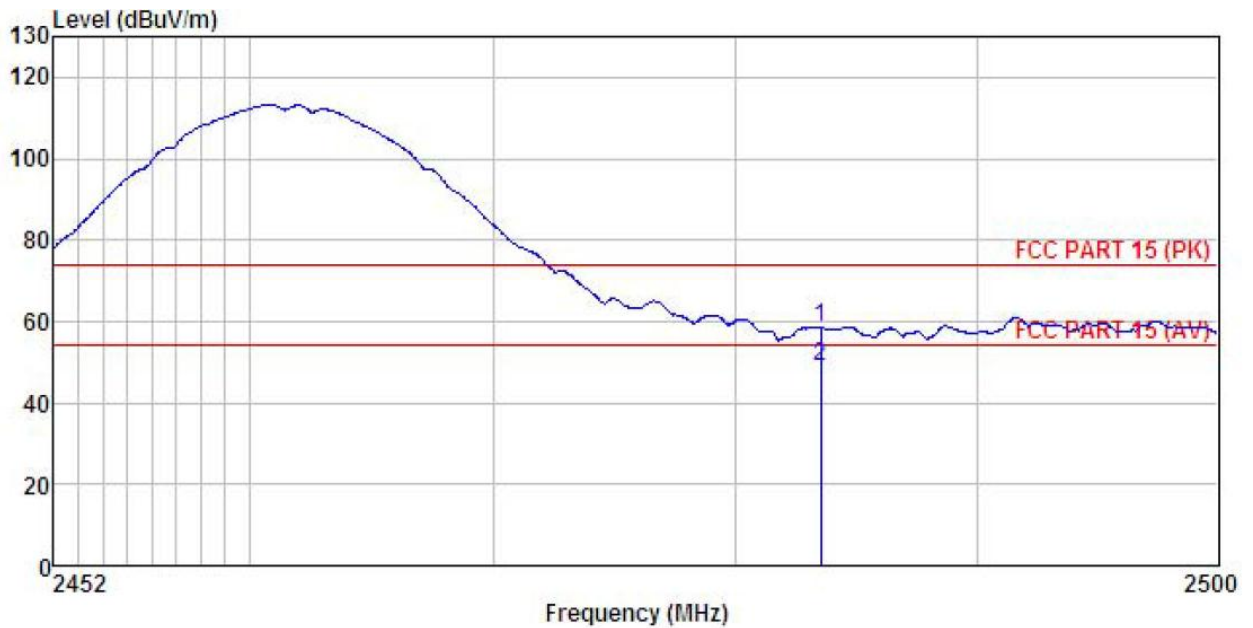
	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dBuV/m	dBuV/m	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2369.260	33.97	25.41	4.67	0.00	64.05	74.00	-9.95	Peak
2	2369.260	21.86	25.41	4.67	0.00	51.94	54.00	-2.06	Average
3	2390.000	26.60	25.45	4.69	0.00	56.74	74.00	-17.26	Peak
4	2390.000	14.34	25.45	4.69	0.00	44.48	54.00	-9.52	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



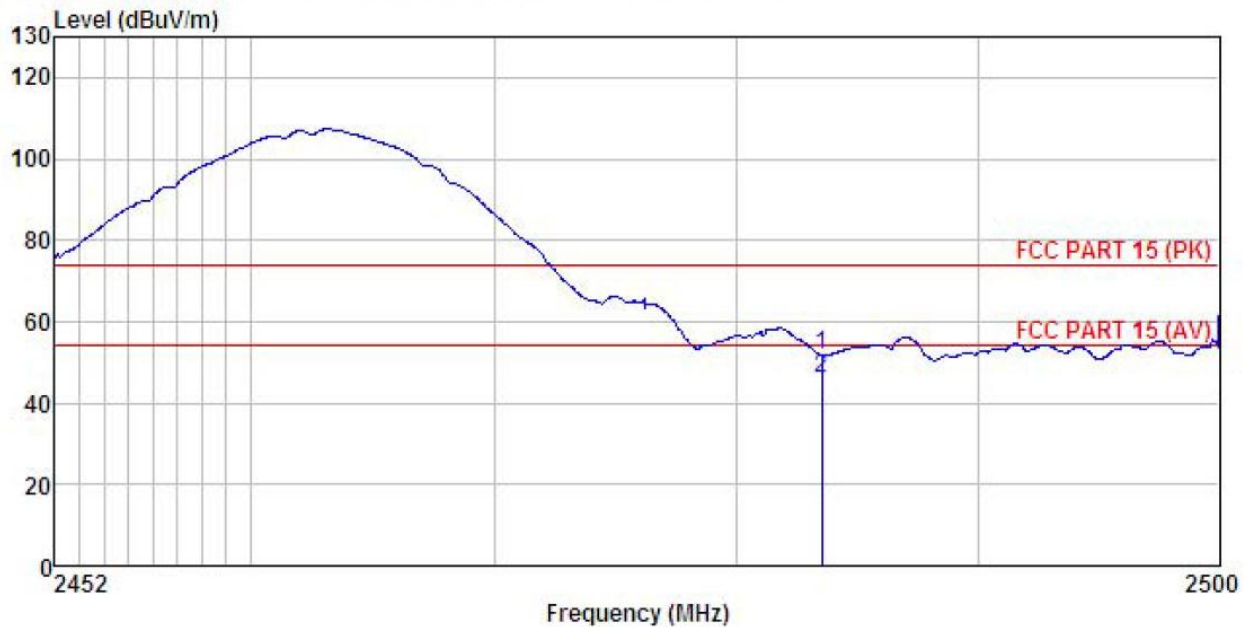
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11b-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	26.08	27.57	4.81	0.00	58.46	74.00	-15.54	Peak
2	2483.500	16.72	27.57	4.81	0.00	49.10	54.00	-4.90	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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11b-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 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	2483.500	19.65	27.57	4.81	0.00	52.03	74.00	-21.97	Peak
2	2483.500	13.64	27.57	4.81	0.00	46.02	54.00	-7.98	Average

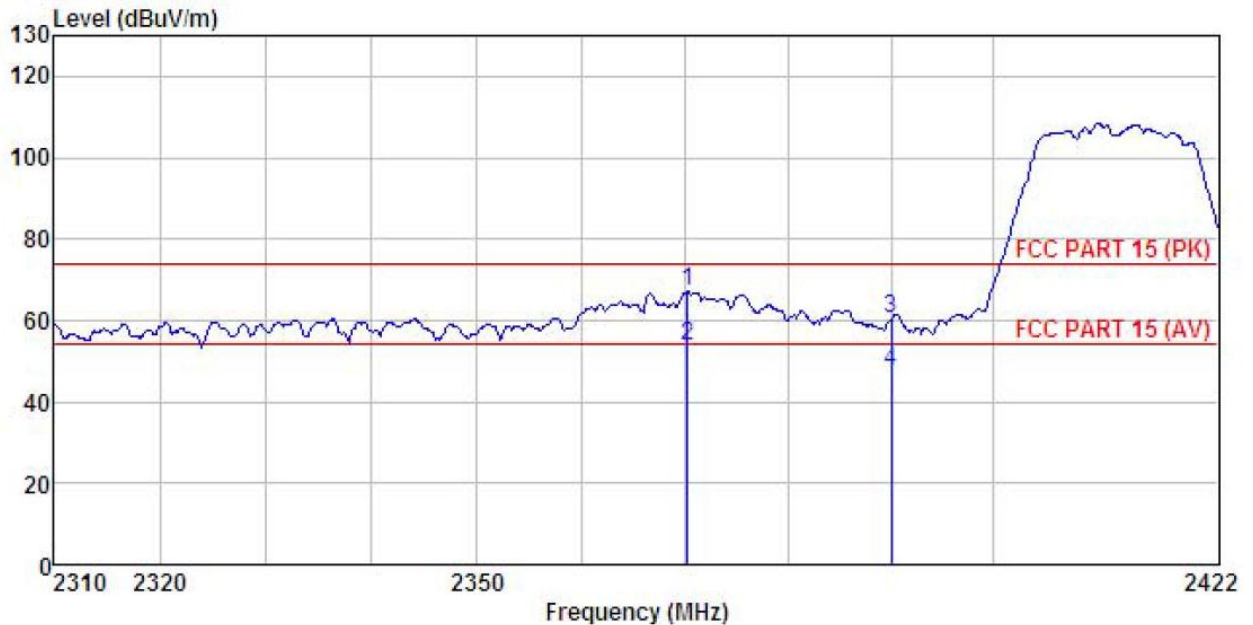
Remark:

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



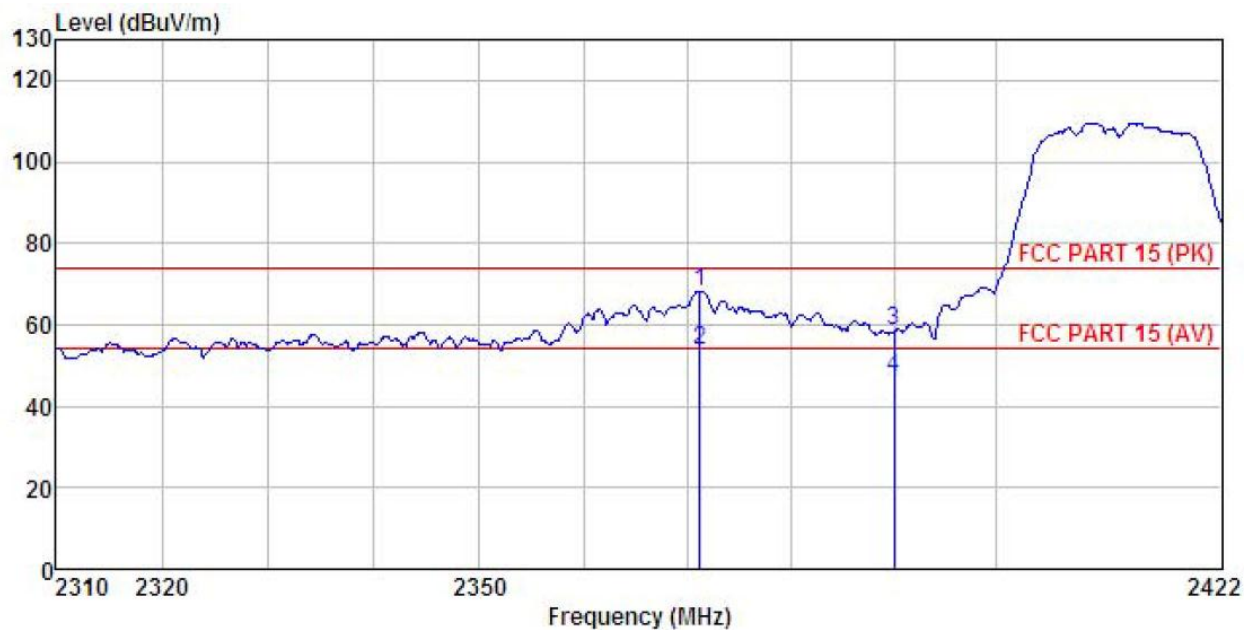
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11g-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

	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	2370.270	36.92	25.41	4.67	0.00	67.00	74.00	-7.00	Peak
2	2370.270	23.49	25.41	4.67	0.00	53.57	54.00	-0.43	Average
3	2390.000	30.30	25.45	4.69	0.00	60.44	74.00	-13.56	Peak
4	2390.000	17.45	25.45	4.69	0.00	47.59	54.00	-6.41	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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11g-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

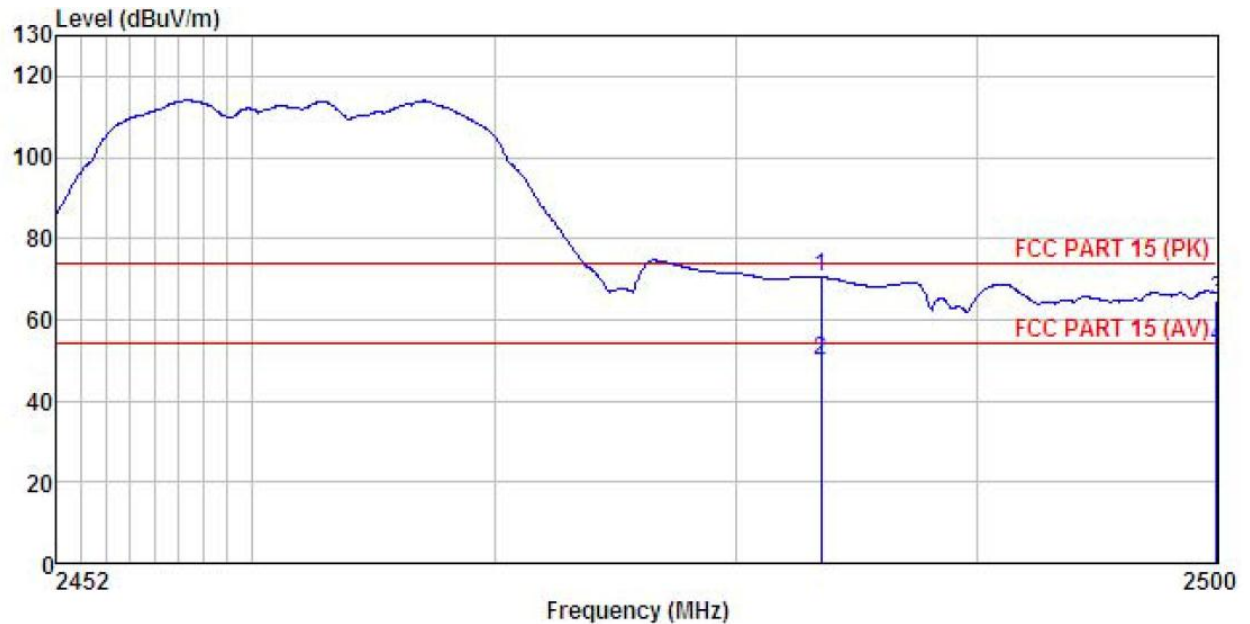
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2371.168	38.20	25.41	4.67	0.00	68.28	74.00	-5.72	Peak
2	2371.168	23.58	25.41	4.67	0.00	53.66	54.00	-0.34	Average
3	2390.000	28.32	25.45	4.69	0.00	58.46	74.00	-15.54	Peak
4	2390.000	16.70	25.45	4.69	0.00	46.84	54.00	-7.16	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



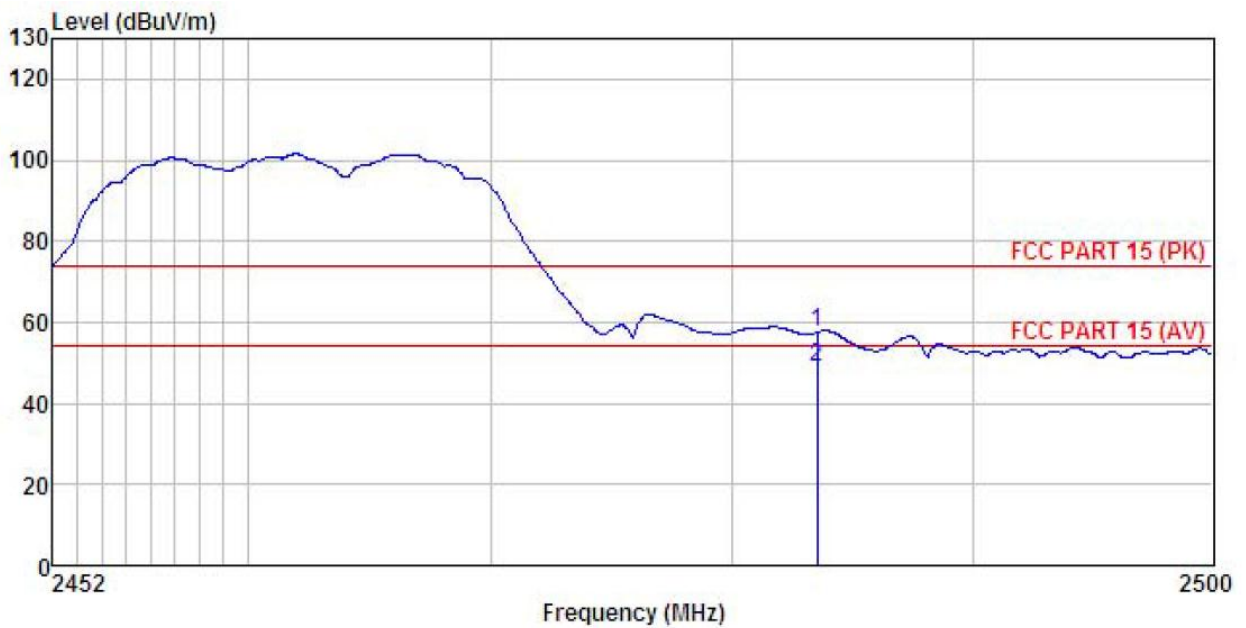
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11G-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=13

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	39.96	25.66	4.81	0.00	70.43	74.00	-3.57	Peak
2	2483.500	19.64	25.66	4.81	0.00	50.11	54.00	-3.89	Average
3	2500.000	34.30	25.70	4.82	0.00	64.82	74.00	-9.18	Peak
4	2500.000	22.94	25.70	4.82	0.00	53.46	54.00	-0.54	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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11G-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=13

	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	2483.500	25.21	27.57	4.81	0.00	57.59	74.00	-16.41	Peak
2	2483.500	16.33	27.57	4.81	0.00	48.71	54.00	-5.29	Average

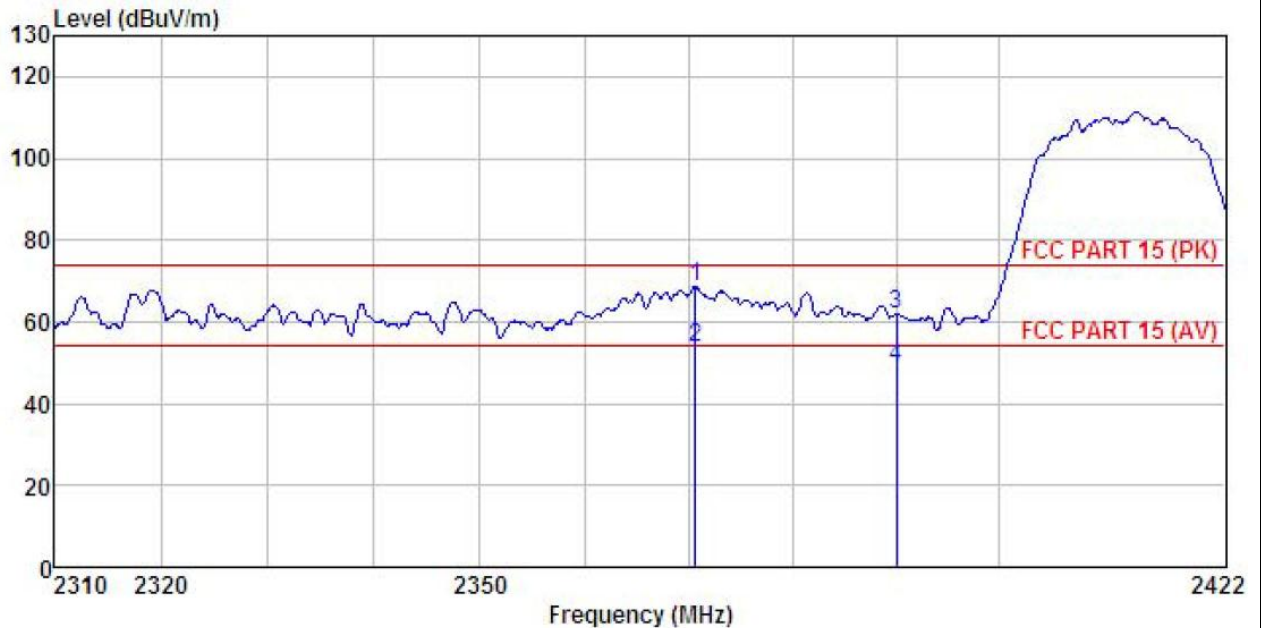
Remark:

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 (H20)

Test channel: Lowest channel

Test Polarization: Horizontal



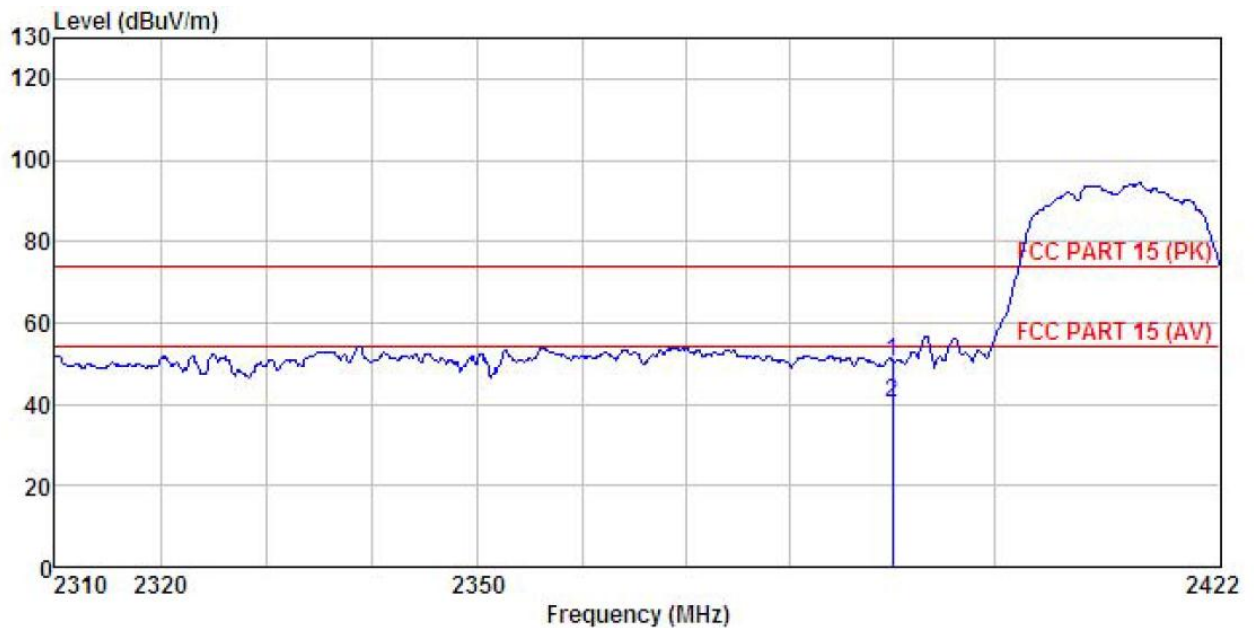
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N20-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=9

	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 2370.606	38.43	25.41	4.67	0.00	68.51	74.00	-5.49	Peak
2 2370.606	23.67	25.41	4.67	0.00	53.75	54.00	-0.25	Average
3 2390.000	31.68	25.45	4.69	0.00	61.82	74.00	-12.18	Peak
4 2390.000	18.59	25.45	4.69	0.00	48.73	54.00	-5.27	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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N20-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

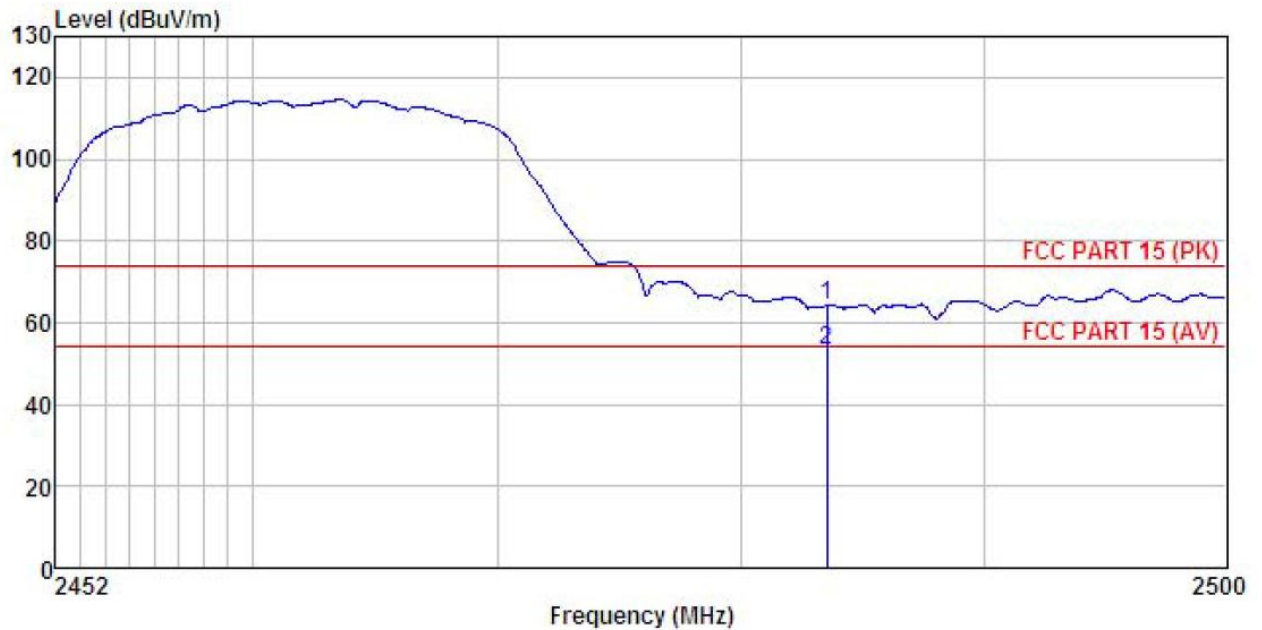
	Freq	Read	Antenna	Cable	Preamp	Limit	Over	
		Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	18.12	27.37	4.69	0.00	50.18	74.00	-23.82 Peak
2	2390.000	8.12	27.37	4.69	0.00	40.18	54.00	-13.82 Average

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



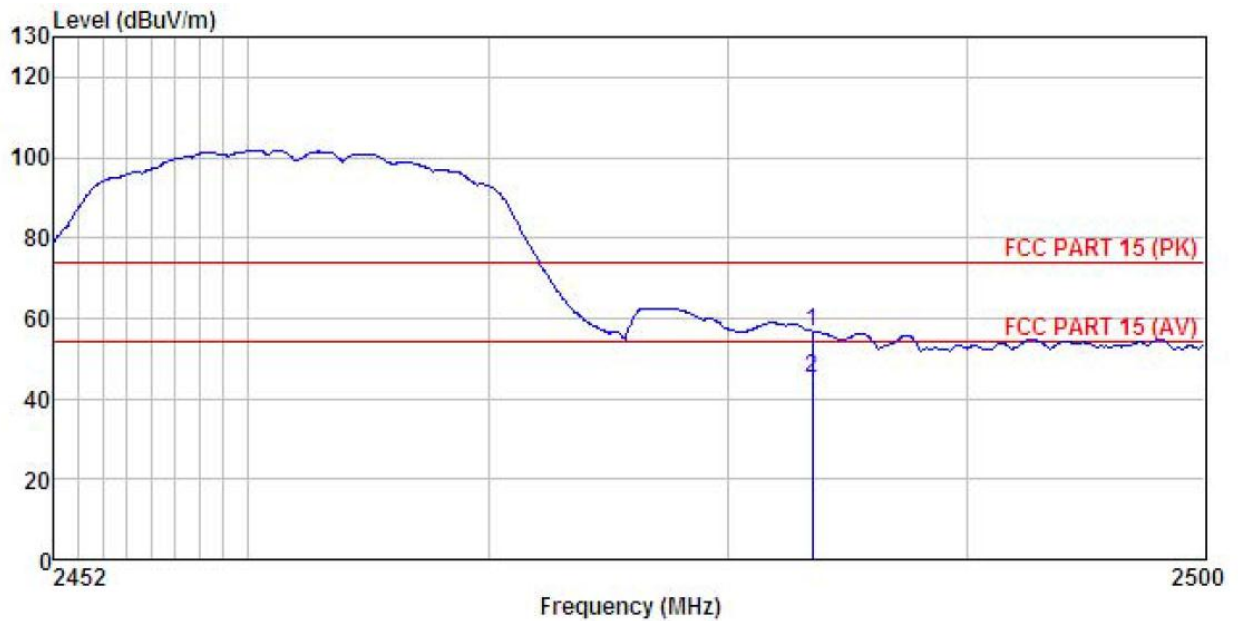
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N20-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=13

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	33.75	25.66	4.81	0.00	64.22	74.00	-9.78	Peak
2	2483.500	22.60	25.66	4.81	0.00	53.07	54.00	-0.93	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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N20-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=13

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	26.34	25.66	4.81	0.00	56.81	74.00	-17.19	Peak
2	2483.500	14.48	25.66	4.81	0.00	44.95	54.00	-9.05	Average

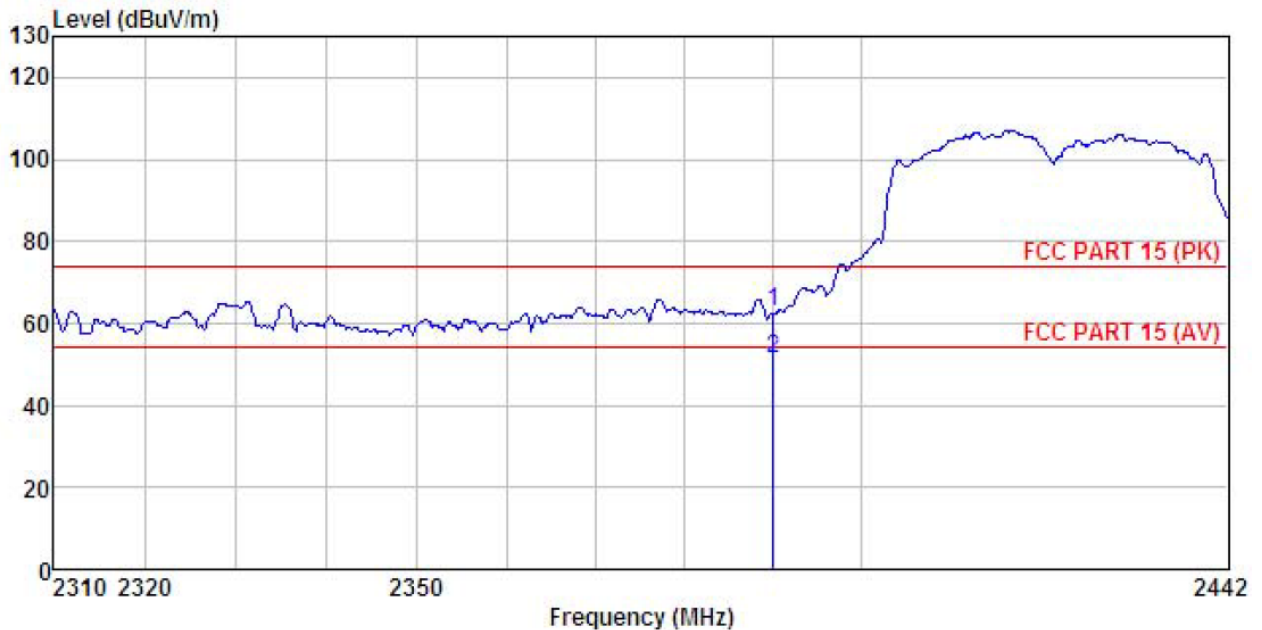
Remark:

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.

802.11n (H40)

Test channel: Lowest channel

Test Polarization: Horizontal



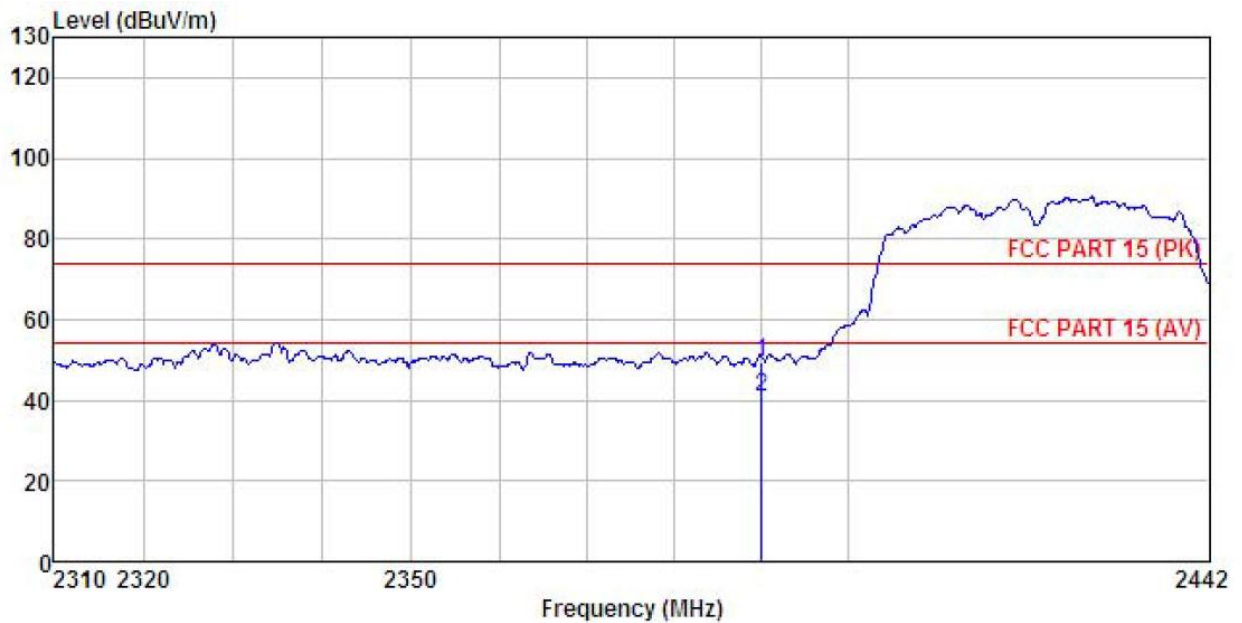
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N40-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

	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	32.73	25.45	4.69	0.00	62.87	74.00	-11.13 Peak
2	2390.000	21.38	25.45	4.69	0.00	51.52	54.00	-2.48 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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N40-L Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=10

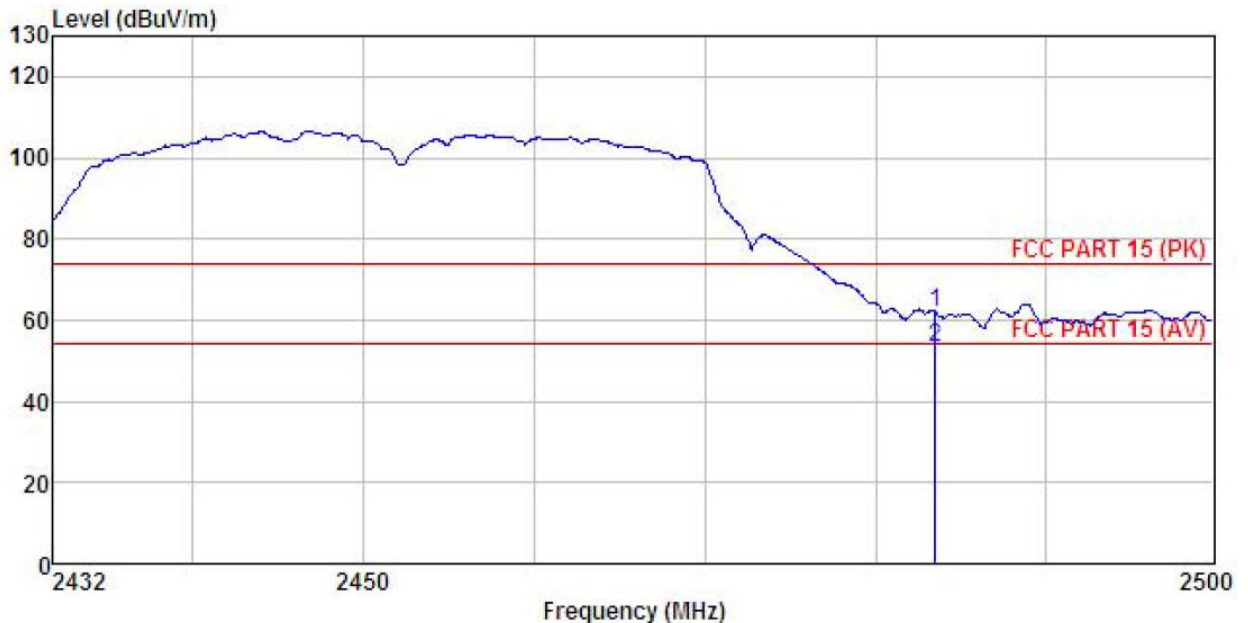
		Read	Antenna	Cable	Preamp		Limit	Over	
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.42	25.45	4.69	0.00	49.56	74.00	-24.44	Peak
2	2390.000	10.42	25.45	4.69	0.00	40.56	54.00	-13.44	Average

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



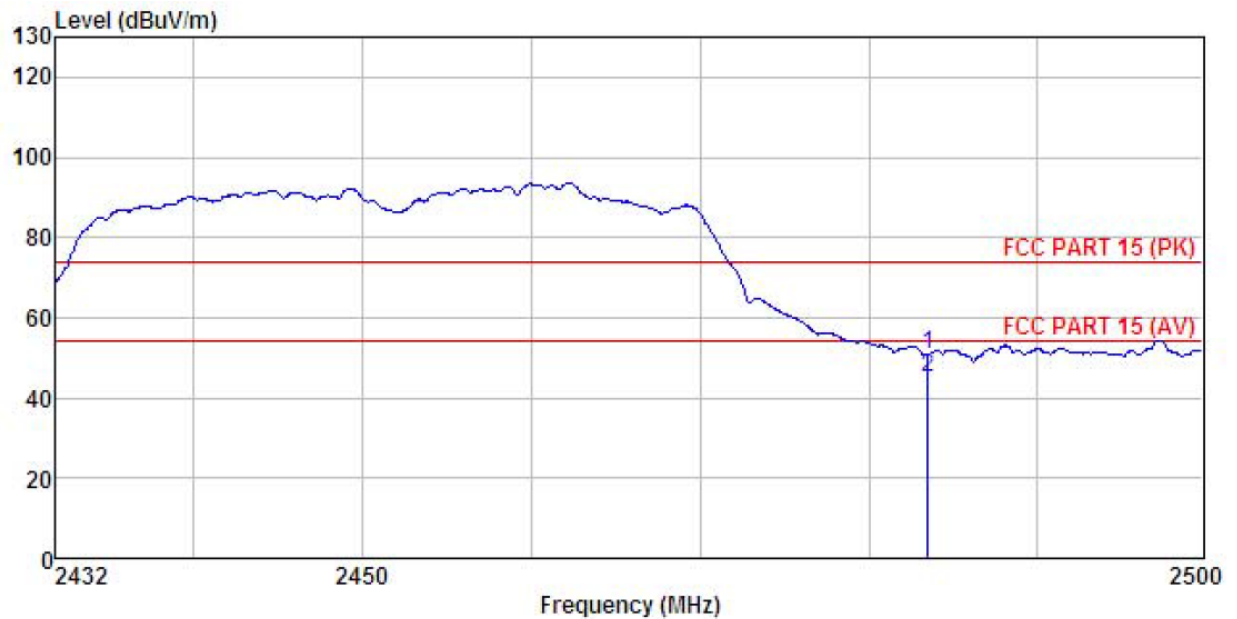
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N40-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=13

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dBuV/m	dBuV/m	Limit	Remark
		dBuV	dB/m	dB	dB			dB	
1	2483.500	31.62	25.66	4.81	0.00	62.09	74.00	-11.91	Peak
2	2483.500	22.92	25.66	4.81	0.00	53.39	54.00	-0.61	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 : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 802.11N40-H Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : P=13

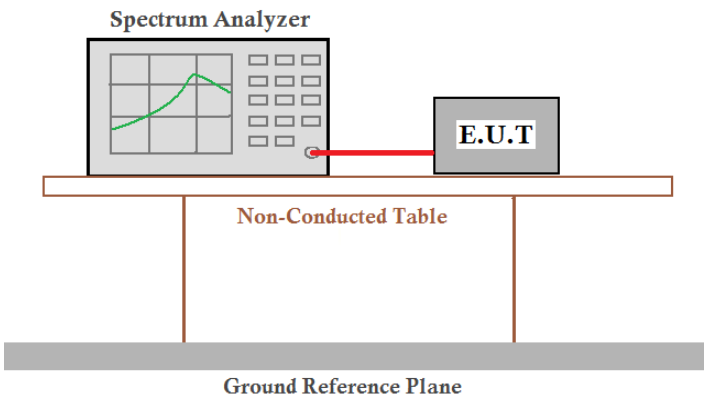
	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dB	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	18.64	27.57	4.81	0.00	51.02	74.00	-22.98	Peak
2	2483.500	12.64	27.57	4.81	0.00	45.02	54.00	-8.98	Average

Remark:

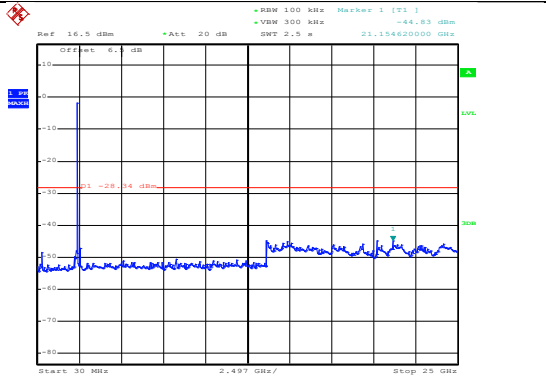
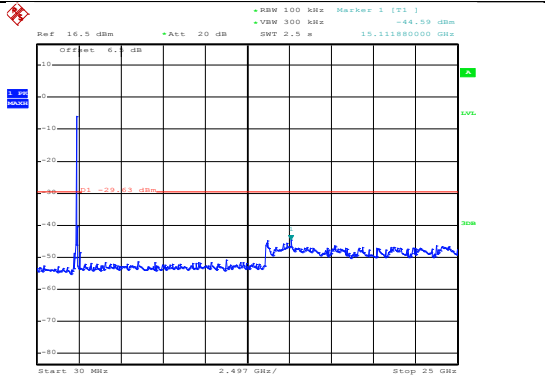
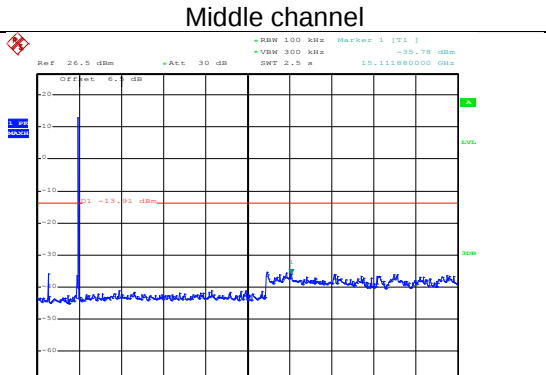
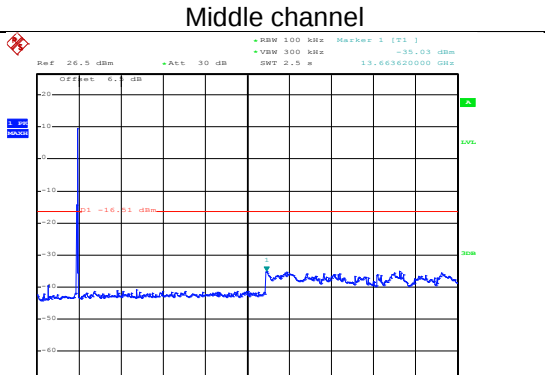
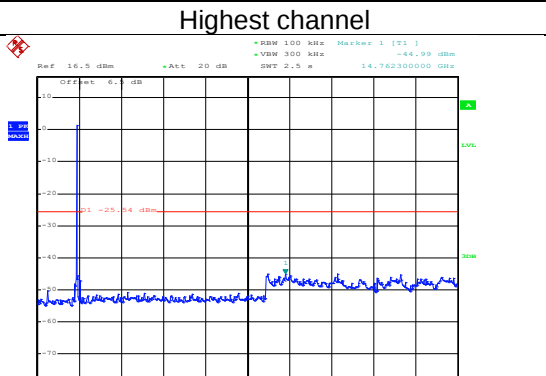
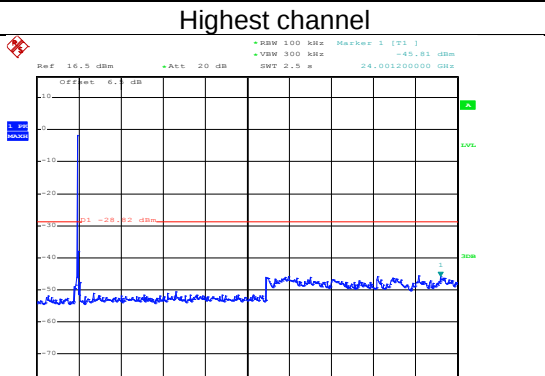
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

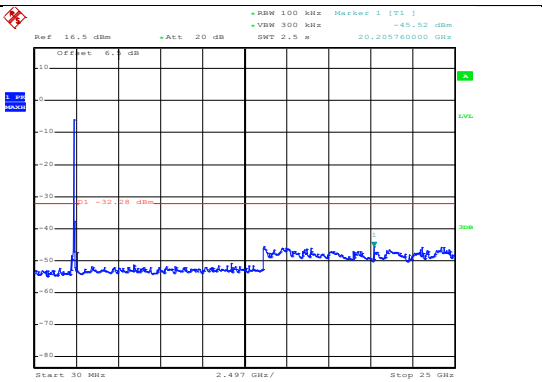
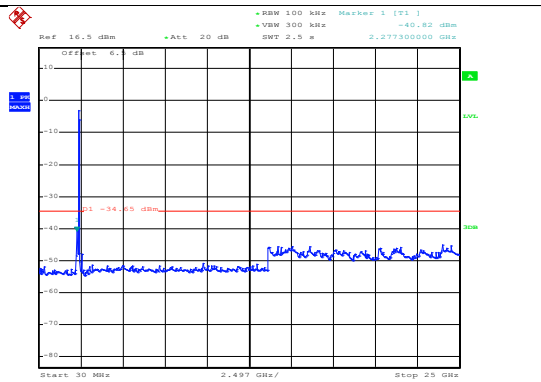
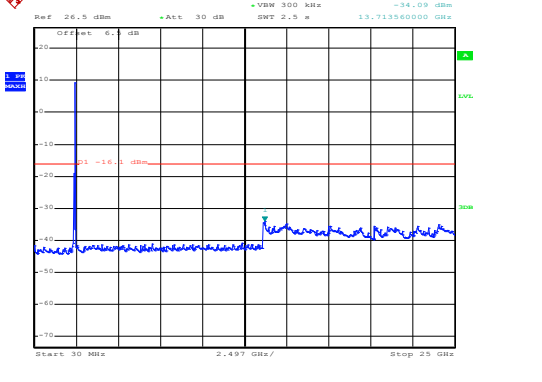
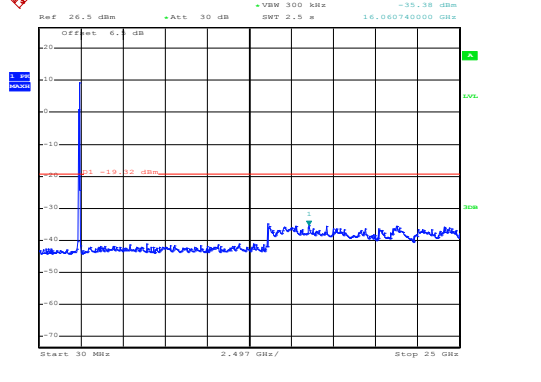
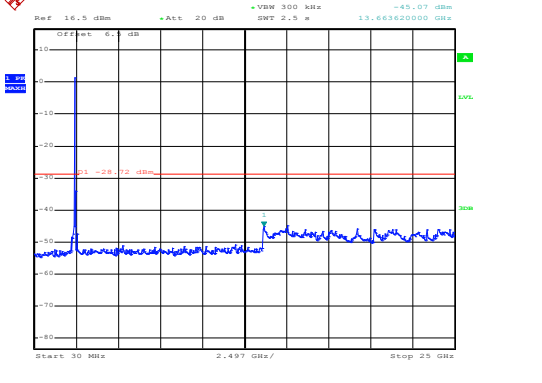
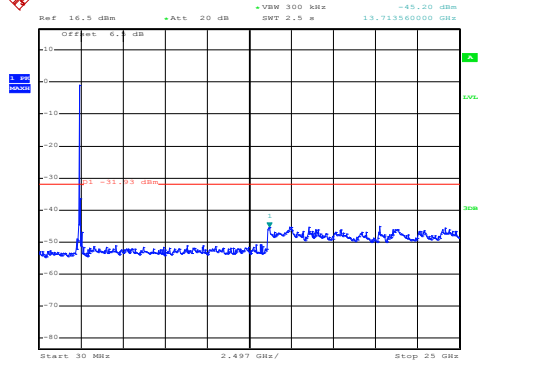
6.7 Spurious Emission

6.7.1 Conducted Emission Method

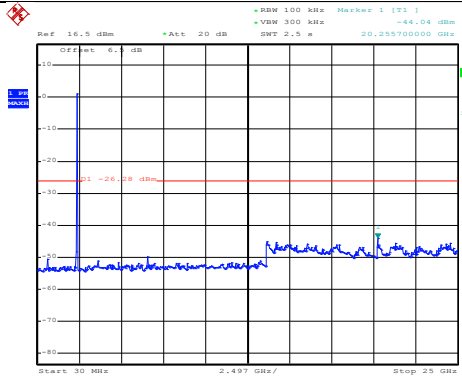
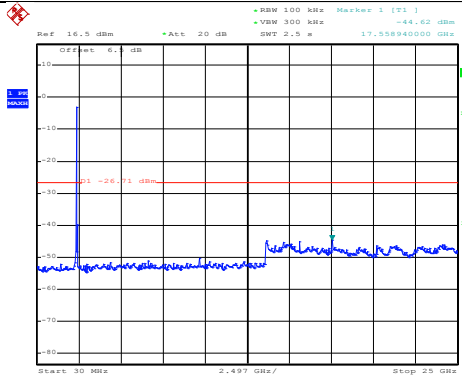
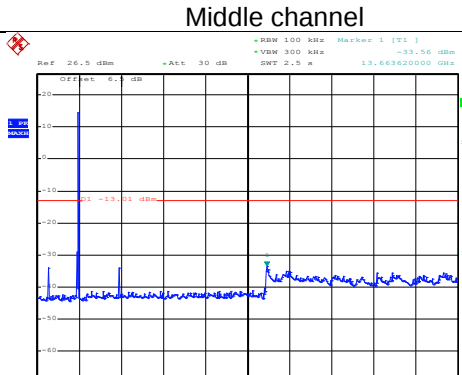
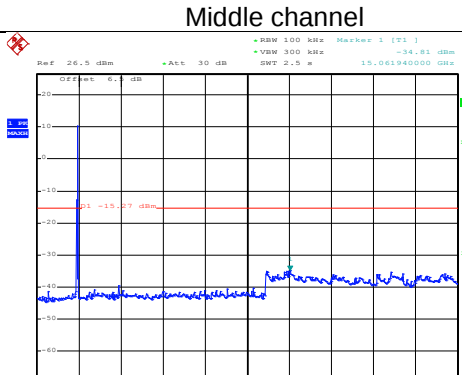
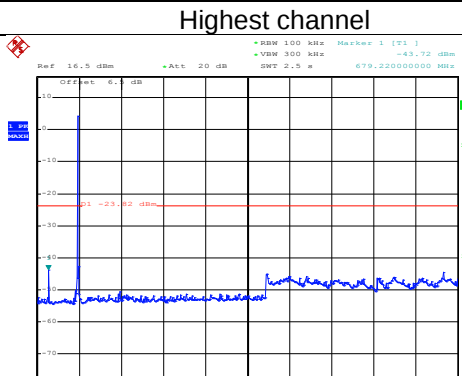
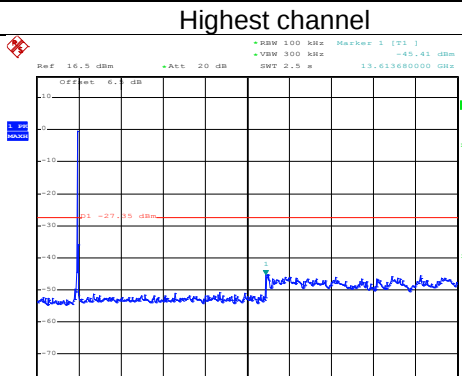
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB 558074
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at 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 for conducted emissions. A Spectrum Analyzer is connected to an Equipment Under Test (E.U.T.) 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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

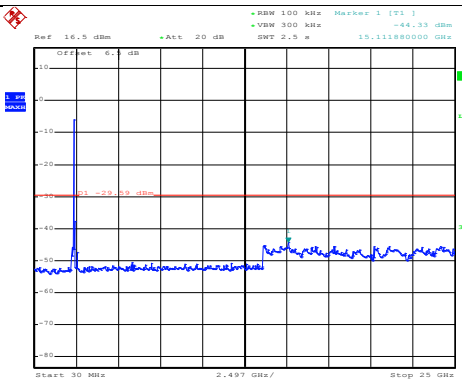
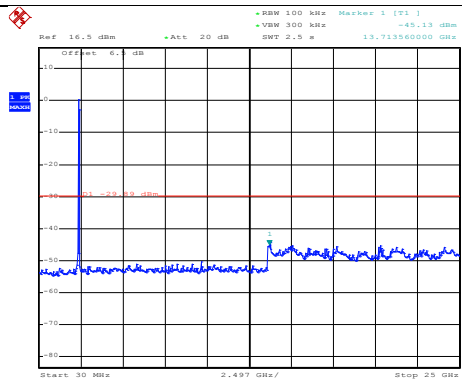
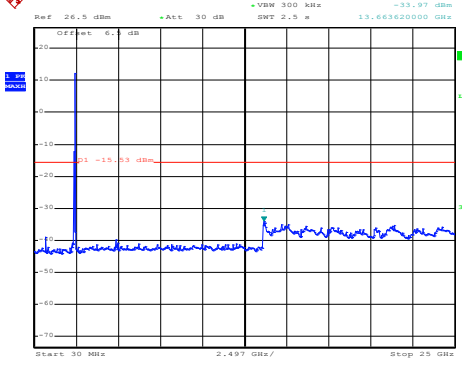
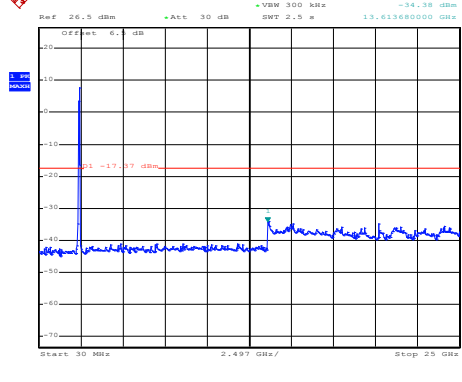
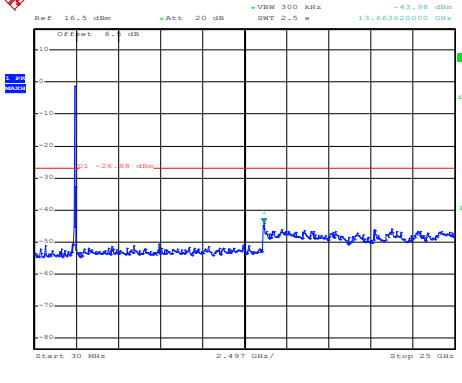
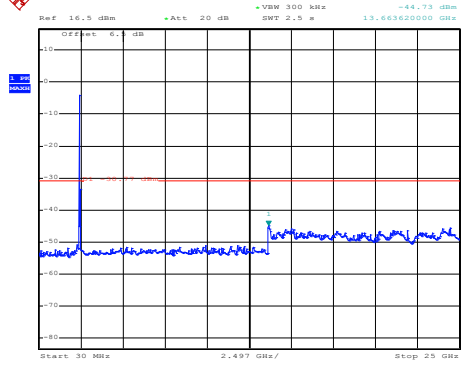
Test plot as follows: TX0

Test mode: 802.11b Lowest channel  Date: 12.JUN.2018 14:59:33	Test mode: 802.11g Lowest channel  Date: 12.JUN.2018 15:04:16
30MHz~25GHz	30MHz~25GHz
Middle channel  Date: 28.MAR.2018 04:19:10	Middle channel  Date: 28.MAR.2018 04:25:32
30MHz~25GHz	30MHz~25GHz
Highest channel  Date: 12.JUN.2018 15:02:18	Highest channel  Date: 12.JUN.2018 15:03:38
30MHz~25GHz	30MHz~25GHz

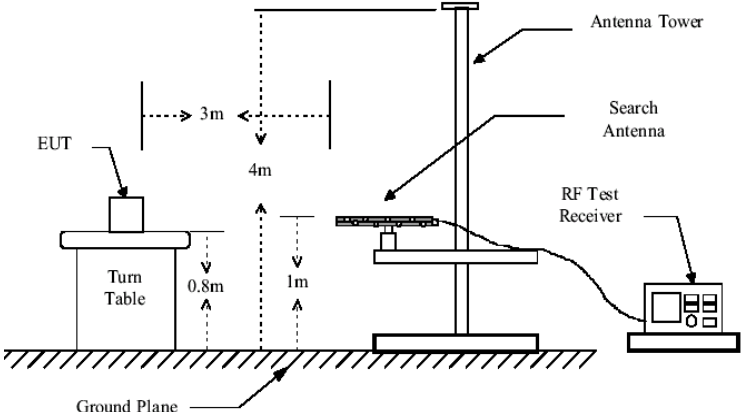
Test mode: 802.11n(HT20) Lowest channel  Date: 12.JUN.2018 15:05:47	Test mode: 802.11n(HT40) Lowest channel  Date: 12.JUN.2018 15:08:51
30MHz~25GHz	30MHz~25GHz
Middle channel  Date: 28.MAR.2018 04:33:11	Middle channel  Date: 28.MAR.2018 04:38:09
30MHz~25GHz	30MHz~25GHz
Highest channel  Date: 12.JUN.2018 15:07:54	Highest channel  Date: 12.JUN.2018 15:10:12
30MHz~25GHz	30MHz~25GHz

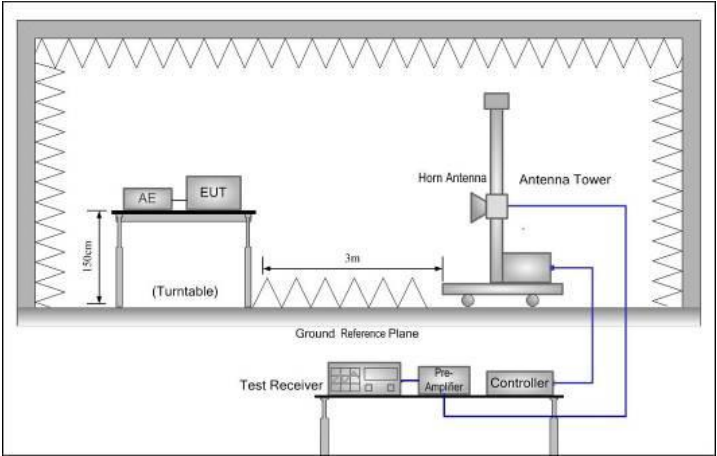
Test plot as follows: TX1

Test mode: 802.11b Lowest channel  Date: 12.JUN.2018 15:00:24	Test mode: 802.11g Lowest channel  Date: 12.JUN.2018 15:05:05
30MHz~25GHz	30MHz~25GHz
Middle channel  Date: 28.MAR.2018 04:18:53	Middle channel  Date: 28.MAR.2018 04:26:11
30MHz~25GHz	30MHz~25GHz
Highest channel  Date: 12.JUN.2018 15:01:14	Highest channel  Date: 12.JUN.2018 15:03:00
30MHz~25GHz	30MHz~25GHz

Test mode: 802.11n(HT20) Lowest channel  Date: 12.JUN.2018 15:06:32	Test mode: 802.11n(HT40) Lowest channel  Date: 12.JUN.2018 15:09:29
30MHz~25GHz	30MHz~25GHz
Middle channel  Date: 28.MAR.2018 04:32:07	Middle channel  Date: 28.MAR.2018 04:38:51
30MHz~25GHz	30MHz~25GHz
Highest channel  Date: 12.JUN.2018 15:07:09	Highest channel  Date: 12.JUN.2018 15:10:48
30MHz~25GHz	30MHz~25GHz

6.7.2 Radiated Emission Method

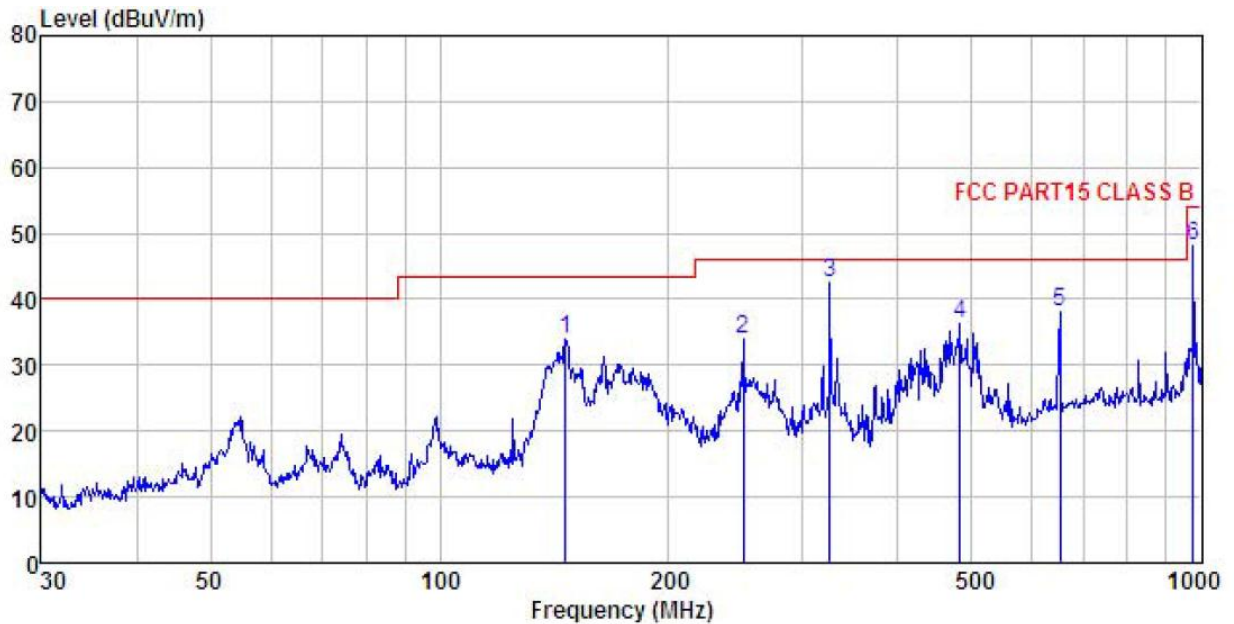
Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		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 5.8 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.

Measurement Data (worst case):

Below 1GHz:

Test Polarization: Horizontal



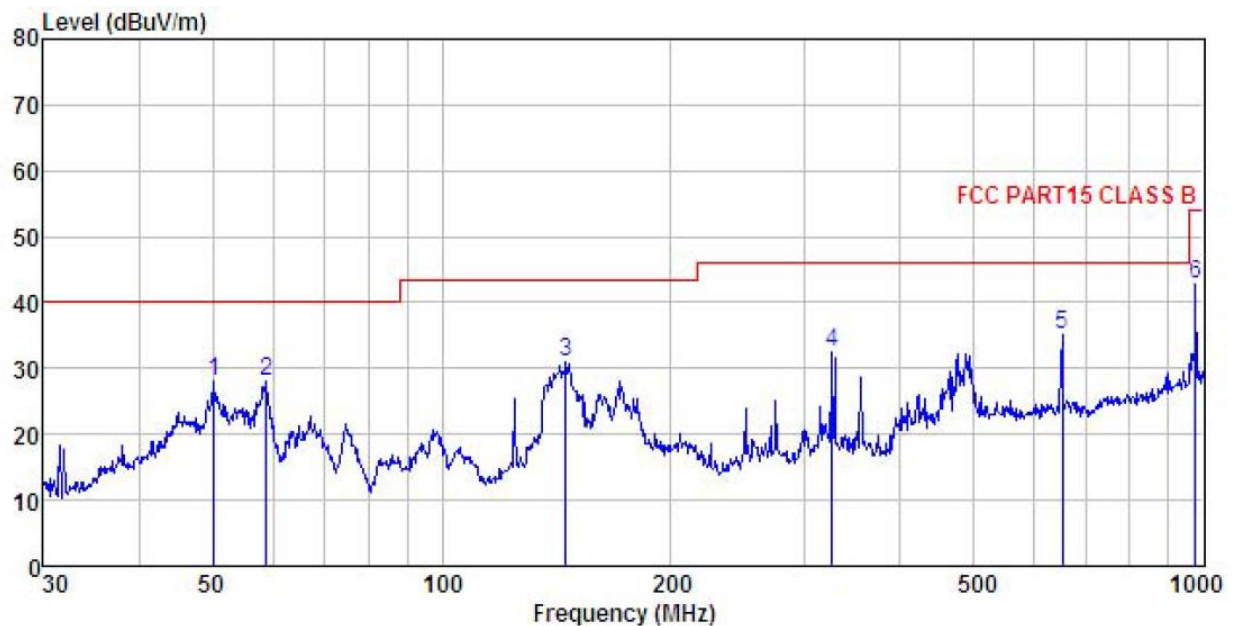
Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 2.4G WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : GRT

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	146.374	52.19	8.42	2.47	29.24	33.84	43.50	-9.66	QP
2	250.301	46.31	13.30	2.81	28.54	33.88	46.00	-12.12	QP
3	325.596	53.89	14.13	3.02	28.51	42.53	46.00	-3.47	QP
4	482.216	44.66	17.02	3.47	28.92	36.23	46.00	-9.77	QP
5	651.942	43.21	19.80	3.87	28.77	38.11	46.00	-7.89	QP
6	975.753	48.84	22.61	4.34	27.57	48.22	54.00	-5.78	QP

Remark:

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

Test Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
 EUT : Broadband Digital Transmission System
 Model : EW-7479GSC
 Test mode : 2.4G WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 Remark : GRT

	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	50.232	42.59	14.06	1.25	29.82	28.08	40.00	-11.92	QP
2	58.819	43.92	12.59	1.38	29.78	28.11	40.00	-11.89	QP
3	145.351	49.42	8.37	2.46	29.24	31.01	43.50	-12.49	QP
4	325.596	43.76	14.13	3.02	28.51	32.40	46.00	-13.60	QP
5	651.942	40.32	19.80	3.87	28.77	35.22	46.00	-10.78	QP
6	975.753	43.37	22.61	4.34	27.57	42.75	54.00	-11.25	QP

Remark:

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

Above 1GHz

802.11b								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4824.00	51.17	30.94	6.81	41.82	47.10	74.00	-26.90	Vertical
4824.00	56.37	30.94	6.81	41.82	52.30	74.00	-21.70	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
4824.00	46.85	30.94	6.81	41.82	42.78	54.00	-11.22	Vertical
4824.00	52.86	30.94	6.81	41.82	48.79	54.00	-5.21	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4874.00	52.34	31.20	6.85	41.84	48.55	74.00	-25.45	Vertical
4874.00	51.64	31.20	6.85	41.84	47.85	74.00	-26.15	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
4874.00	47.85	31.20	6.85	41.84	44.06	54.00	-9.94	Vertical
4874.00	45.64	31.20	6.85	41.84	41.85	54.00	-12.15	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4924.00	50.55	31.46	6.89	41.86	47.04	74.00	-26.96	Vertical
4924.00	50.84	31.46	6.89	41.86	47.33	74.00	-26.67	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
4924.00	45.51	31.46	6.89	41.86	42.00	54.00	-12.00	Vertical
4924.00	45.84	31.46	6.89	41.86	42.33	54.00	-11.67	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.								

802.11g								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4824.00	51.21	30.94	6.81	41.82	47.14	74.00	-26.86	Vertical
4824.00	52.34	30.94	6.81	41.82	48.27	74.00	-25.73	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
4824.00	46.72	30.94	6.81	41.82	42.65	54.00	-11.35	Vertical
4824.00	46.37	30.94	6.81	41.82	42.30	54.00	-11.70	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4874.00	52.38	31.20	6.85	41.84	48.59	74.00	-25.41	Vertical
4874.00	51.23	31.20	6.85	41.84	47.44	74.00	-26.56	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
4874.00	47.64	31.20	6.85	41.84	43.85	54.00	-10.15	Vertical
4874.00	45.52	31.20	6.85	41.84	41.73	54.00	-12.27	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4924.00	50.43	31.46	6.89	41.86	46.92	74.00	-27.08	Vertical
4924.00	50.64	31.46	6.89	41.86	47.13	74.00	-26.87	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
4924.00	45.23	31.46	6.89	41.86	41.72	54.00	-12.28	Vertical
4924.00	45.72	31.46	6.89	41.86	42.21	54.00	-11.79	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.								

802.11n(HT20)								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4824.00	51.26	36.06	6.81	41.82	52.31	74.00	-21.69	Vertical
4824.00	52.23	36.06	6.81	41.82	53.28	74.00	-20.72	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
4824.00	46.67	36.06	6.81	41.82	47.72	54.00	-6.28	Vertical
4824.00	46.21	36.06	6.81	41.82	47.26	54.00	-6.74	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4874.00	52.23	36.32	6.85	41.84	53.56	74.00	-20.44	Vertical
4874.00	51.13	36.32	6.85	41.84	52.46	74.00	-21.54	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
4874.00	47.53	36.32	6.85	41.84	48.86	54.00	-5.14	Vertical
4874.00	45.67	36.32	6.85	41.84	47.00	54.00	-7.00	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4924.00	50.37	36.58	6.89	41.86	51.98	74.00	-22.02	Vertical
4924.00	50.56	36.58	6.89	41.86	52.17	74.00	-21.83	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
4924.00	45.27	36.58	6.89	41.86	46.88	54.00	-7.12	Vertical
4924.00	45.63	36.58	6.89	41.86	47.24	54.00	-6.76	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.								

802.11n(HT40)								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4844.00	51.34	36.06	6.81	41.82	52.39	74.00	-21.61	Vertical
4844.00	52.26	36.06	6.81	41.82	53.31	74.00	-20.69	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
4844.00	46.37	36.06	6.81	41.82	47.42	54.00	-6.58	Vertical
4844.00	46.28	36.06	6.81	41.82	47.33	54.00	-6.67	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4874.00	52.37	36.32	6.85	41.84	53.70	74.00	-20.30	Vertical
4874.00	51.63	36.32	6.85	41.84	52.96	74.00	-21.04	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
4874.00	47.54	36.32	6.85	41.84	48.87	54.00	-5.13	Vertical
4874.00	45.68	36.32	6.85	41.84	47.01	54.00	-6.99	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4904.00	50.42	36.45	6.87	41.85	51.89	74.00	-22.11	Vertical
4904.00	50.61	36.45	6.87	41.85	52.08	74.00	-21.92	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
4904.00	45.37	36.45	6.87	41.85	46.84	54.00	-7.16	Vertical
4904.00	45.36	36.45	6.87	41.85	46.83	54.00	-7.17	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.								