FCC REPORT
(WIFI)

Applicant:	Shenzhen Tuoshi network communicationc co., limited
Address of Applicant:	3 Floor A5 Building, Yinlong Industrial park, 292 Shenshan Road, longgang shenzhen China

Equipment Under Test (EUT)

Product Name:	4G wireless router
Model No.:	LT15F, LT15D, LT15H, LT15, LT10
Trade mark:	tuoshi Dionlink
FCC ID:	2ATBFLT15
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	05 May., 2019
Date of Test:	06 May., to 21 May., 2019
Date of report issued:	23 May., 2019
Test Result:	PASS*

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

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

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2 Version

Version No.	Date	Description
00	*23 May., 2019*	*Original*

Tested by:	Carey Chen ***Test Engineer***	***Date:***	*23 May., 2019*
Reviewed by:	Winner Zhang ***Project Engineer***	***Date:***	*23 May., 2019*

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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
Pass: The EUT complies with the essential requirements in the standard. *N/A: N/A: Not Applicable.*		

5 General Information

5.1 Client Information

Applicant:	Shenzhen Tuoshi network communicationc co., limited
Address:	3 Floor A5 Building, Yinlong Industrial park, 292 Shenshan Road, longgang shenzhen China
Manufacturer/Factory:	Shenzhen Tuoshi network communicationc co., limited
Address:	3 Floor A5 Building, Yinlong Industrial park, 292 Shenshan Road, longgang shenzhen China

5.2 General Description of E.U.T.

Product Name:	4G wireless router
Model No.:	LT15F, LT15D, LT15H, LT15, LT10
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:	External Antenna
Antenna gain:	3dBi
Power supply:	AC 120V / 60Hz
AC adapter:	Model: RD120101000-C55-91MG Input: AC100-240V 50/60Hz 0.6A MAX Output: DC 12.0V, 1000mA
Test Sample Condition:	The test samples were provided in good working order with no visible defects.
Remarks:	item No.: LT15F, LT15D, LT15H, LT15, LT10 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.

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(H20)	6.5Mbps
802.11n(H40)	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)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.54 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.84 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.36 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	03-18-2019	03-17-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		

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	03-18-2019	03-17-2020
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2019	03-17-2020
LISN	CHASE	MN2050D	1447	03-18-2019	03-17-2020
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2018	07-20-2019
Cable	HP	10503A	N/A	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		

6 Test results and Measurement Data

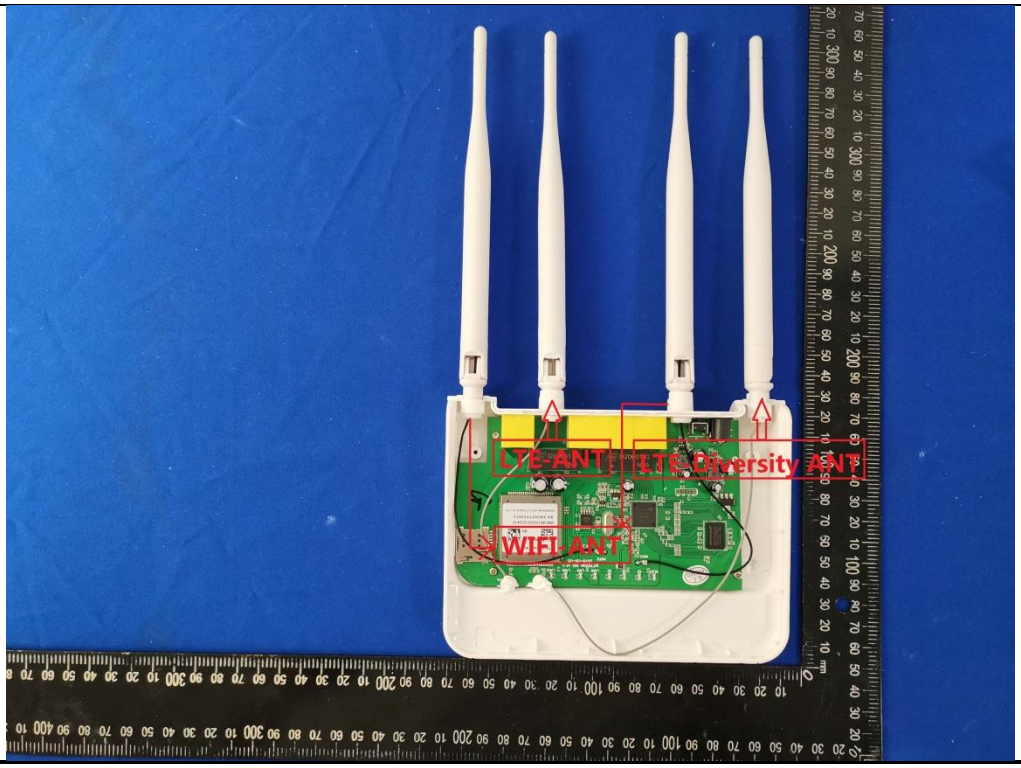
6.1 Antenna requirement

Standard requirement:	FCC Part 15 C Section 15.203 /247(b)

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(b) (4) requirement:
(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

E.U.T Antenna:	

The Wi-Fi antenna is an External Antenna which cannot replace by end-user, the best case gain of the antenna is 3 dBi.



6.2 Conducted Emission

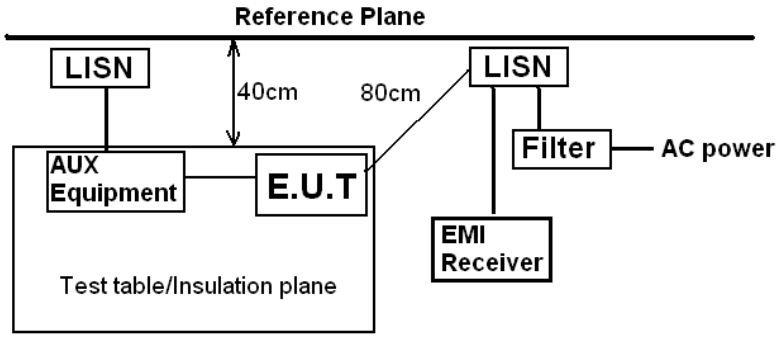
Test Requirement:	FCC Part 15 C Section 15.207
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150 kHz to 30 MHz
Class / Severity:	Class B
Receiver setup:	RBW=9 kHz, VBW=30 kHz
Limit:	

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

1. 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.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Test setup:

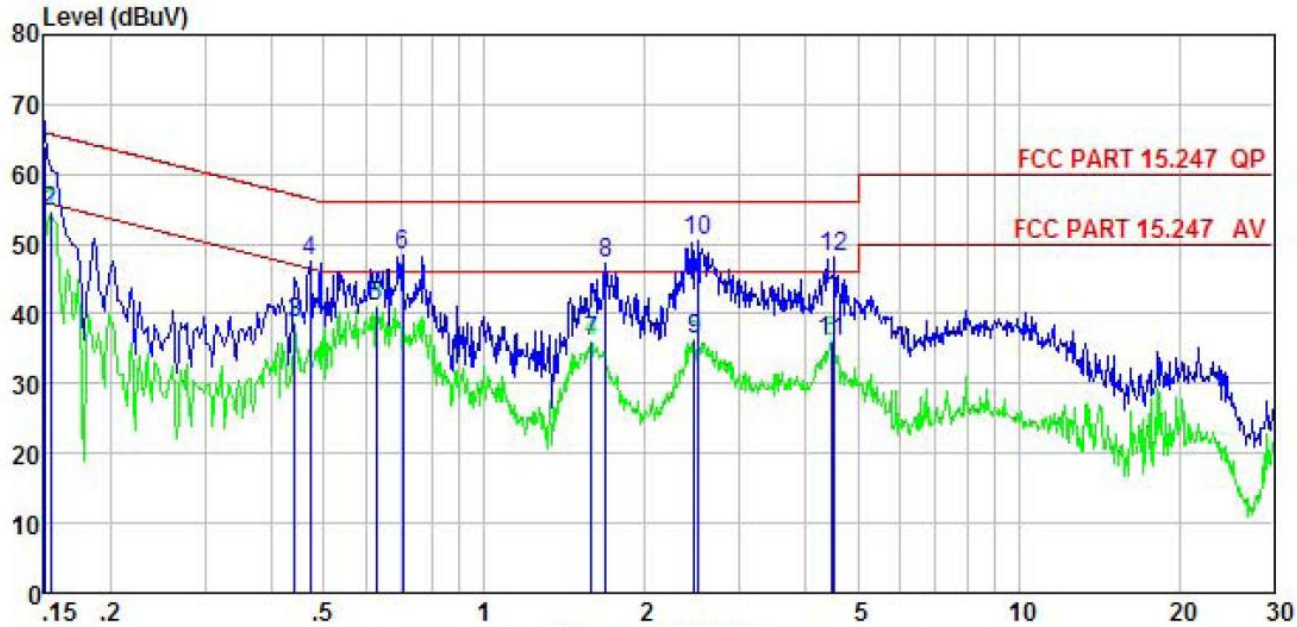


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Product name:	4G wireless router	**Product model:**	LT15F
Test by:	Carey	**Test mode:**	Wi-Fi Tx mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

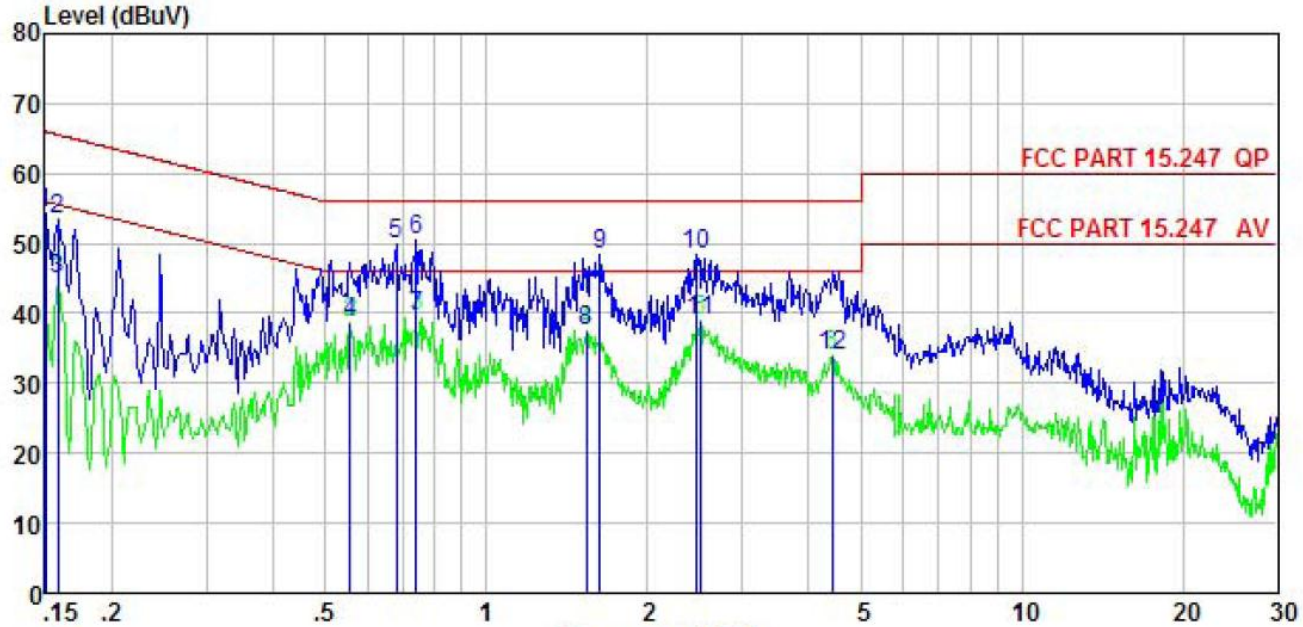


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	53.86	-0.45	10.78	64.19	66.00	-1.81	QP
2	0.154	44.16	-0.45	10.78	54.49	55.78	-1.29	Average
3	0.442	28.39	-0.38	10.74	38.75	47.02	-8.27	Average
4	0.471	37.14	-0.38	10.75	47.51	56.49	-8.98	QP
5	0.627	30.74	-0.38	10.77	41.13	46.00	-4.87	Average
6	0.705	37.91	-0.38	10.77	48.30	56.00	-7.70	QP
7	1.585	25.54	-0.40	10.93	36.07	46.00	-9.93	Average
8	1.689	36.66	-0.40	10.94	47.20	56.00	-8.80	QP
9	2.474	25.68	-0.43	10.94	36.19	46.00	-9.81	Average
10	2.513	39.95	-0.43	10.94	50.46	56.00	-5.54	QP
11	4.454	25.61	-0.47	10.87	36.01	46.00	-9.99	Average
12	4.525	37.64	-0.47	10.87	48.04	56.00	-7.96	QP

Notes:

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

Product name:	4G wireless router	**Product model:**	LT15F
Test by:	Carey	**Test mode:**	Wi-Fi Tx mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Neutral
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

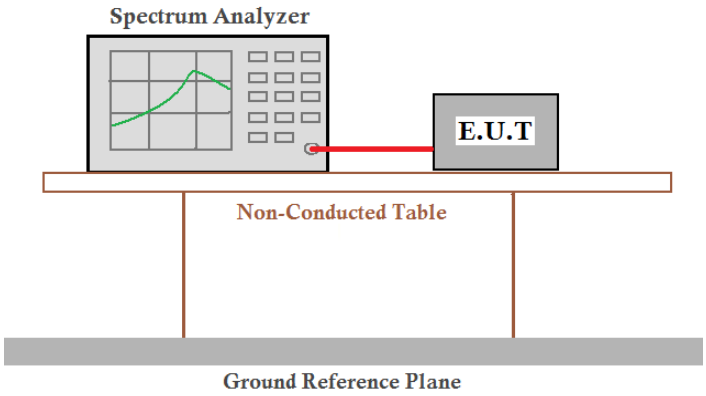


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	44.21	-0.68	10.78	54.31	66.00	-11.69	QP
2	0.158	43.28	-0.68	10.77	53.37	65.56	-12.19	QP
3	0.158	34.82	-0.68	10.77	44.91	55.56	-10.65	Average
4	0.555	28.64	-0.65	10.76	38.75	46.00	-7.25	Average
5	0.679	39.78	-0.64	10.77	49.91	56.00	-6.09	QP
6	0.739	40.20	-0.64	10.79	50.35	56.00	-5.65	QP
7	0.739	29.36	-0.64	10.79	39.51	46.00	-6.49	Average
8	1.535	27.28	-0.65	10.93	37.56	46.00	-8.44	Average
9	1.628	38.18	-0.66	10.93	48.45	56.00	-7.55	QP
10	2.461	38.12	-0.67	10.94	48.39	56.00	-7.61	QP
11	2.500	28.84	-0.67	10.94	39.11	46.00	-6.89	Average
12	4.430	23.71	-0.71	10.87	33.87	46.00	-12.13	Average

Notes:

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

6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB 558074
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

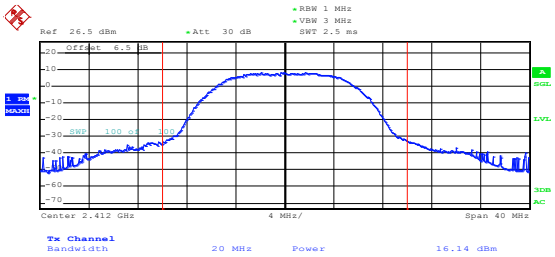
Measurement Data:

Mode	Maximum Conducted Output Power (dBm)							Limit (dBm)	Result
	ANT Port	Measuring power (dBm)			Total power (dBm)				
		Lowest	Middle	Highest	Lowest	Middle	Highest		
802.11b	ANT 0	16.14	16.53	16.91	/	/	/	30.00	Pass
	ANT 1	15.94	15.97	16.01					
802.11g	ANT 0	15.47	15.74	15.85	/	/	/		
	ANT 1	15.43	15.35	15.37					
802.11n(H20)	ANT 0	14.16	14.48	14.51	17.20	17.34	17.35		
	ANT 1	14.22	14.17	14.17					
802.11n(H40)	ANT 0	13.78	13.95	14.06	16.74	16.83	16.86		
	ANT 1	13.67	13.68	13.63					

Test plot as follows:

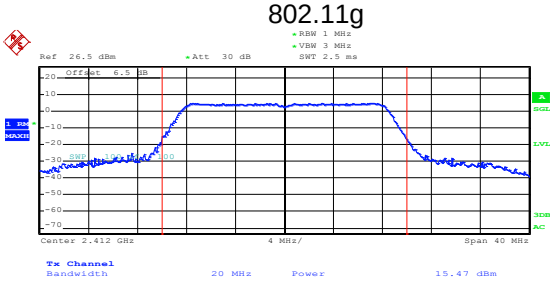
ANT 0:

802.11b



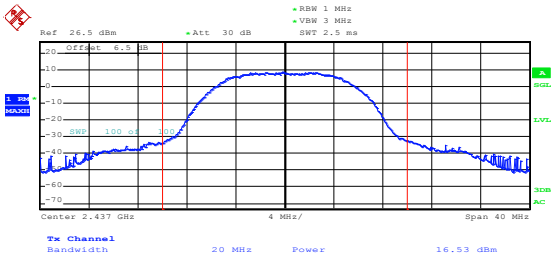
Date: 15.MAY.2019 20:34:52

802.11g



Date: 15.MAY.2019 20:37:16

Lowest channel



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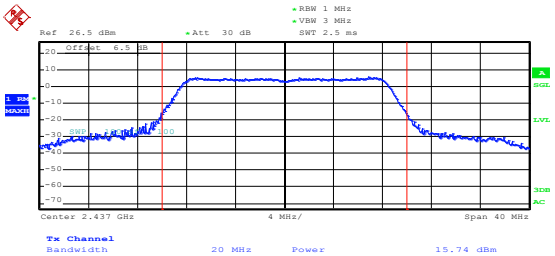
Lowest channel



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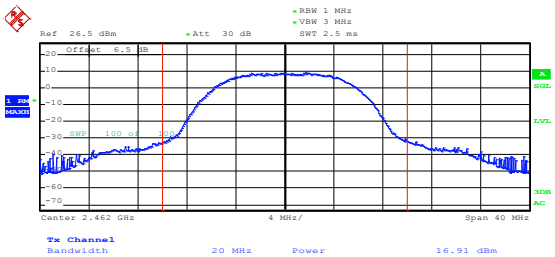
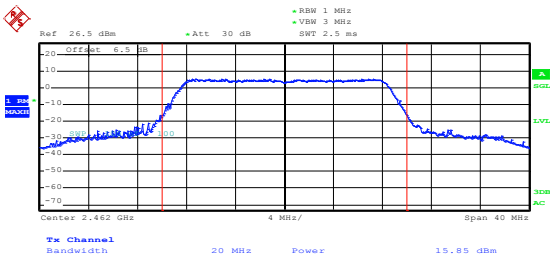
Middle channel



Date: 15.MAY.2019 20:32:29

Middle channel

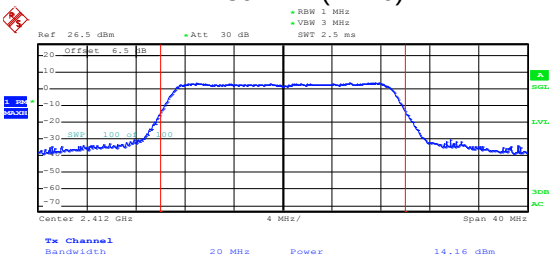


Date: 15.MAY.2019 20:40:07

Highest channel

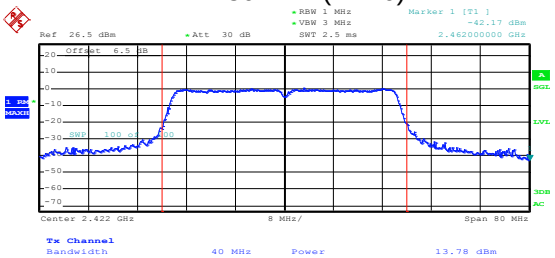
Highest channel

802.11n(HT20)



Date: 15.MAY.2019 20:43:23

802.11n(HT40)



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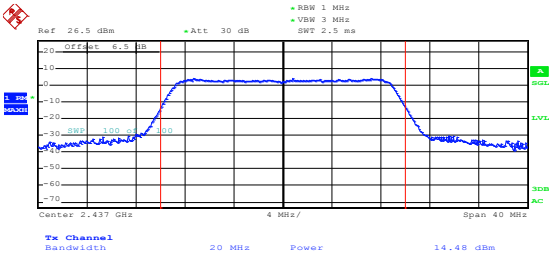
Lowest channel



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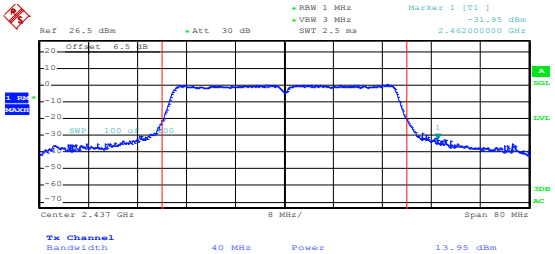
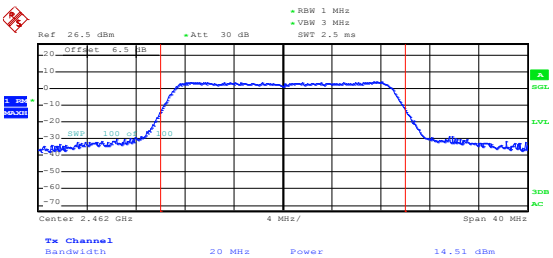
Lowest channel



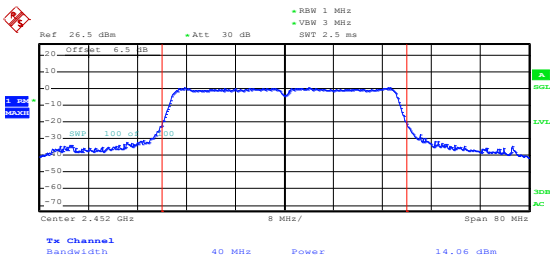
Date: 15.MAY.2019 20:51:08

Middle channel



Date: 15.MAY.2019 20:47:12

Middle channel

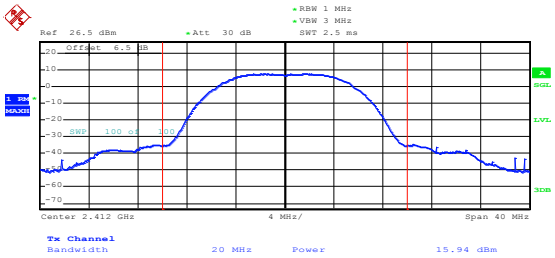


Date: 15.MAY.2019 20:51:59

Highest channel

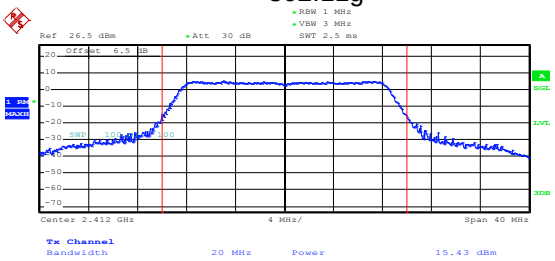
ANT 1:

802.11b



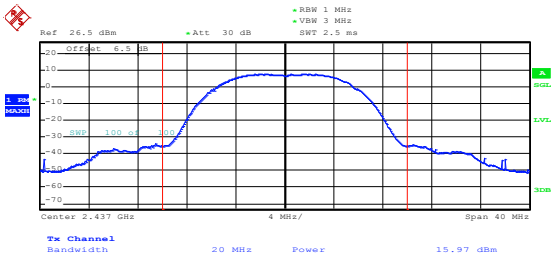
Date: 16.MAY.2019 09:31:36

802.11g



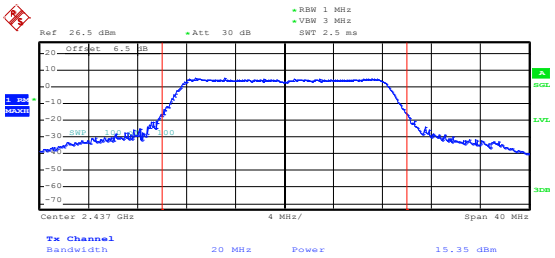
Date: 16.MAY.2019 09:46:39

Lowest channel



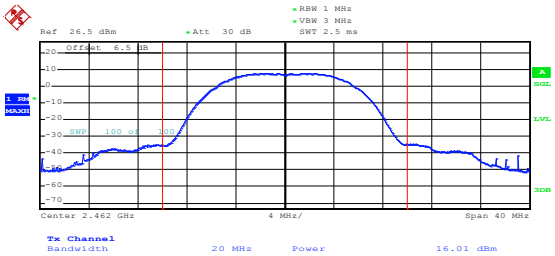
Date: 16.MAY.2019 09:32:32

Lowest channel



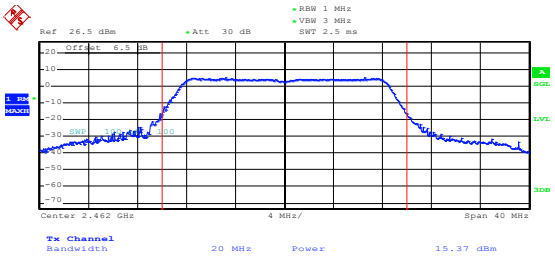
Date: 16.MAY.2019 09:45:36

Middle channel



Date: 16.MAY.2019 09:33:34

Middle channel

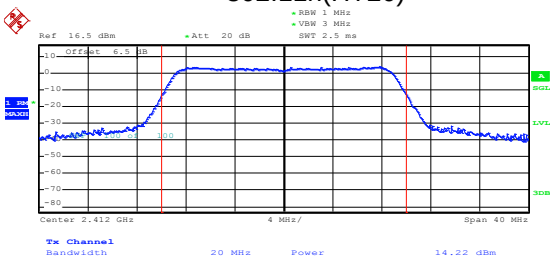


Date: 16.MAY.2019 09:47:22

Highest channel

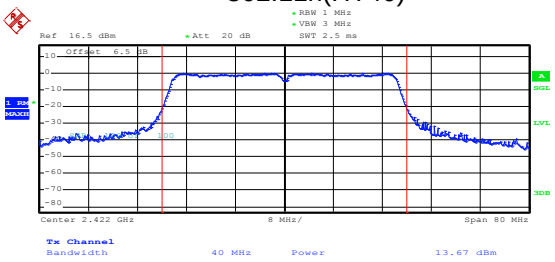
Highest channel

802.11n(HT20)



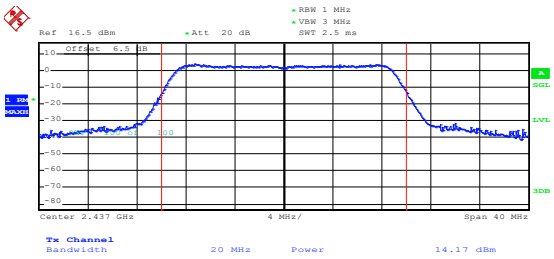
Date: 16.MAY.2019 14:15:26

802.11n(HT40)



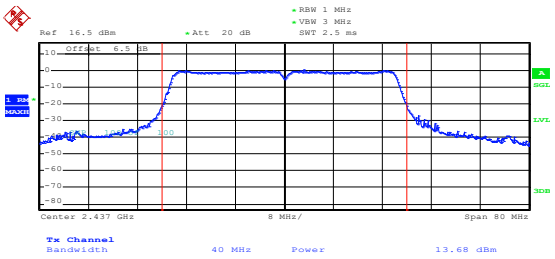
Date: 16.MAY.2019 14:18:16

Lowest channel



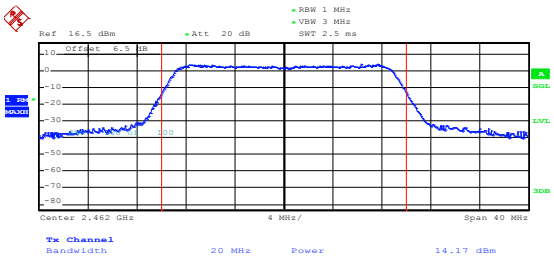
Date: 16.MAY.2019 14:16:18

Lowest channel



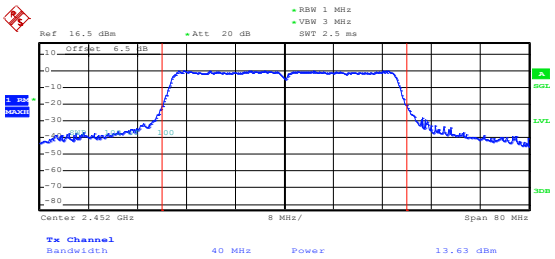
Date: 16.MAY.2019 14:19:15

Middle channel



Date: 16.MAY.2019 14:16:57

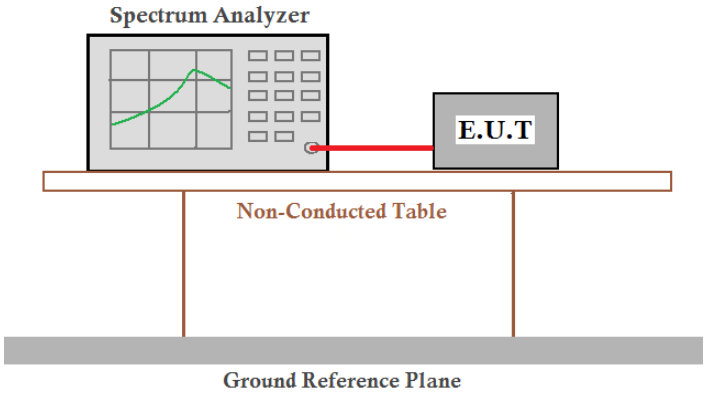
Middle channel



Date: 16.MAY.2019 14:20:03

Highest channel

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

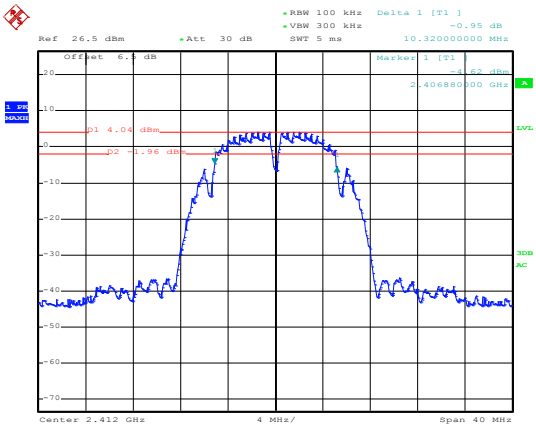
Measurement Data:

Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	10.32	16.56	17.52	36.64	>500	Pass
Middle	10.32	16.56	17.76	36.64		
Highest	10.32	16.56	17.68	36.64		
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	12.40	16.48	17.60	36.32	N/A	N/A
Middle	12.40	16.48	17.60	36.32		
Highest	12.40	16.48	17.60	36.32		

Test plot as follows:

802.11b

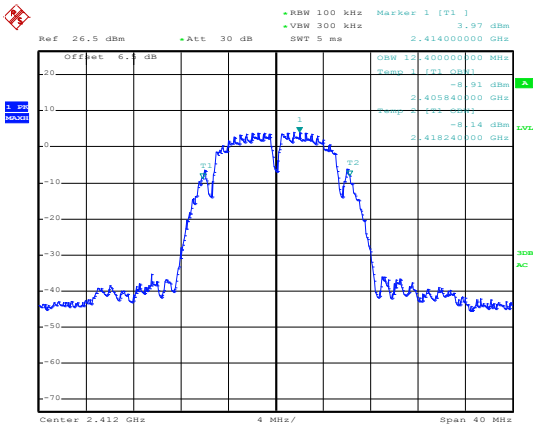
6dB EBW



Date: 15.MAY.2019 21:13:27

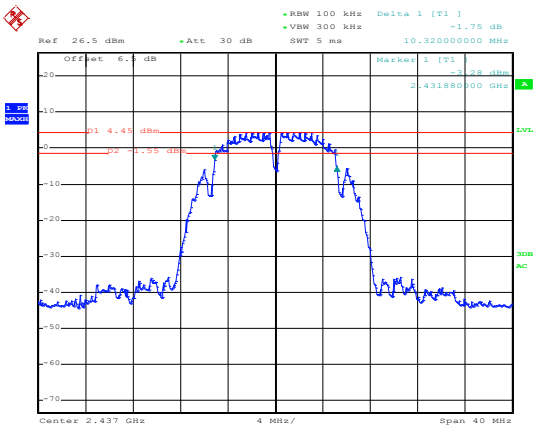
Lowest channel

99% OBW



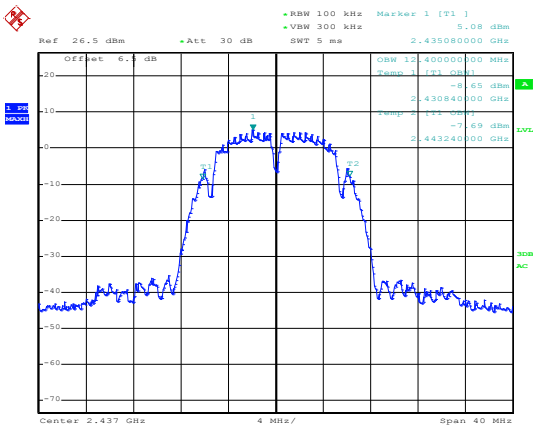
Date: 15.MAY.2019 21:20:29

Lowest channel



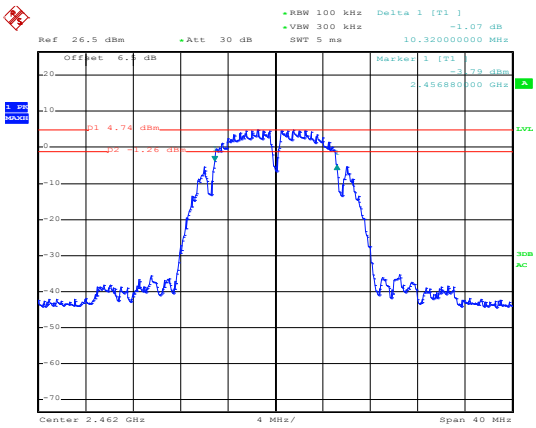
Date: 15.MAY.2019 21:15:12

Middle channel



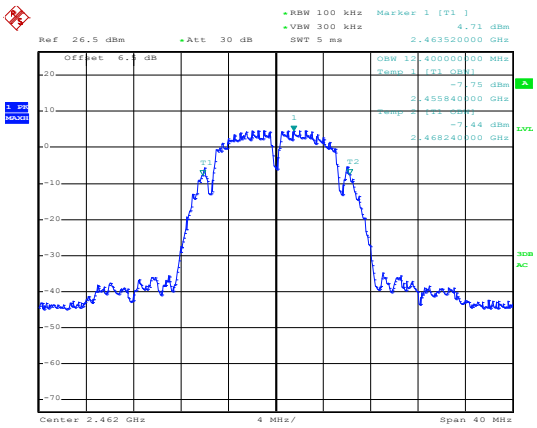
Date: 15.MAY.2019 21:18:49

Middle channel



Date: 15.MAY.2019 21:16:53

Highest channel

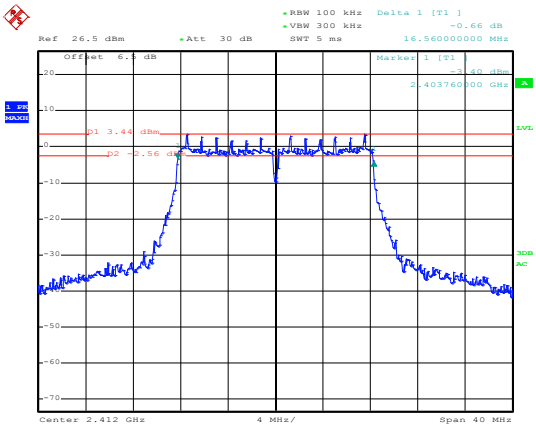


Date: 15.MAY.2019 21:19:44

Highest channel

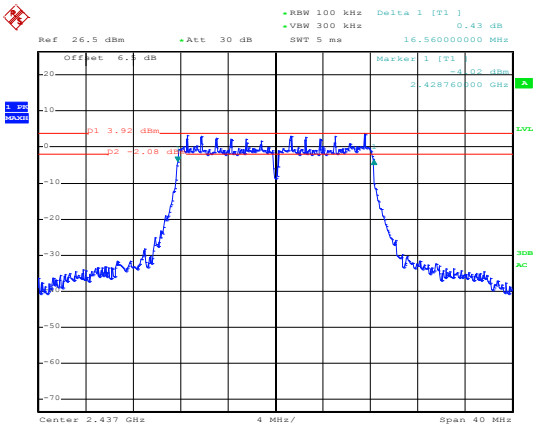
802.11g

6dB EBW



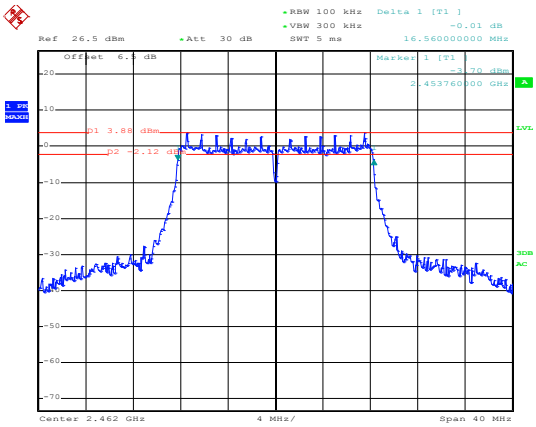
Date: 15.MAY.2019 21:11:44

Lowest channel



Date: 15.MAY.2019 21:10:18

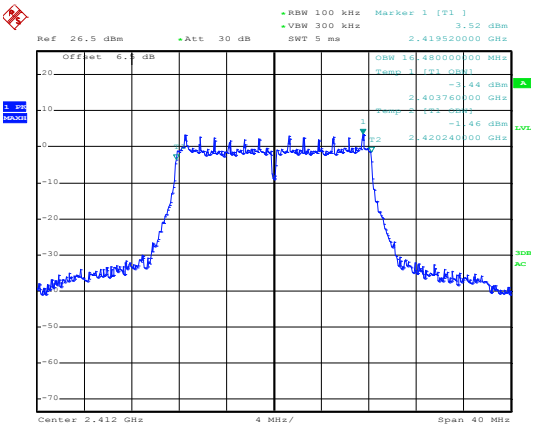
Middle channel



Date: 15.MAY.2019 21:08:43

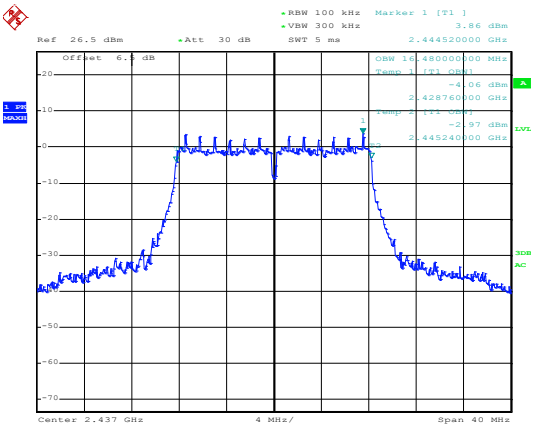
Highest channel

99% OBW



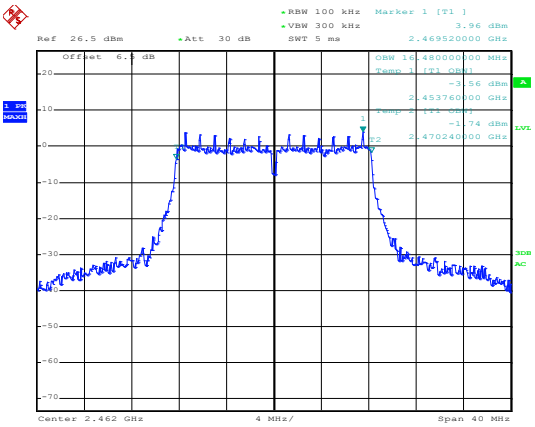
Date: 15.MAY.2019 21:21:14

Lowest channel



Date: 15.MAY.2019 21:21:57

Middle channel

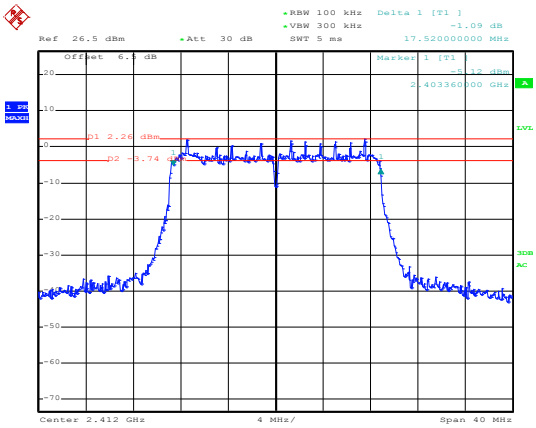


Date: 15.MAY.2019 21:22:50

Highest channel

802.11n(H20)

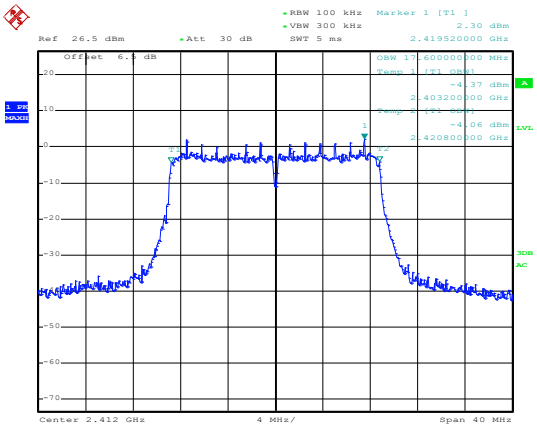
6dB EBW



Date: 15.MAY.2019 21:03:07

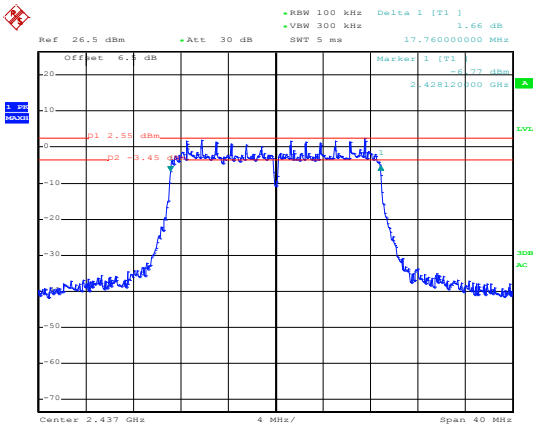
Lowest channel

99% OBW



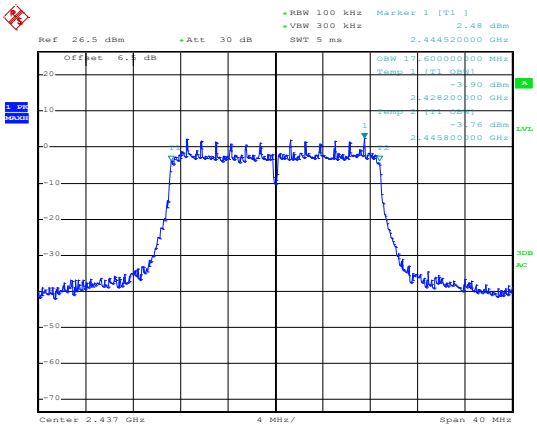
Date: 15.MAY.2019 21:26:30

Lowest channel



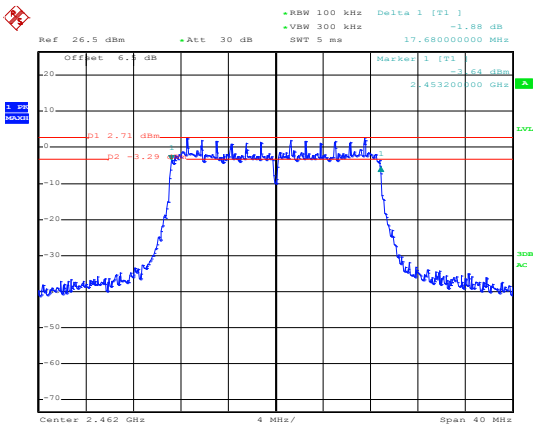
Date: 15.MAY.2019 21:05:01

Middle channel



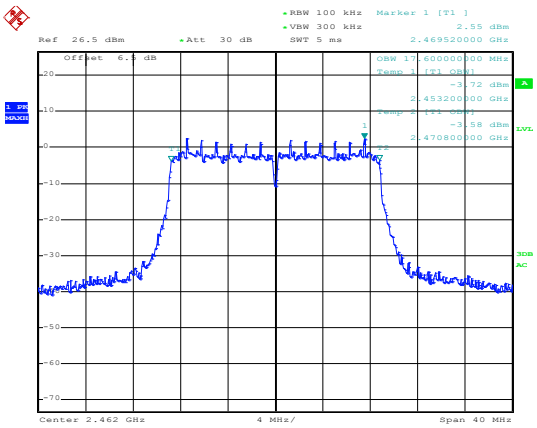
Date: 15.MAY.2019 21:25:51

Middle channel



Date: 15.MAY.2019 21:06:55

Highest channel

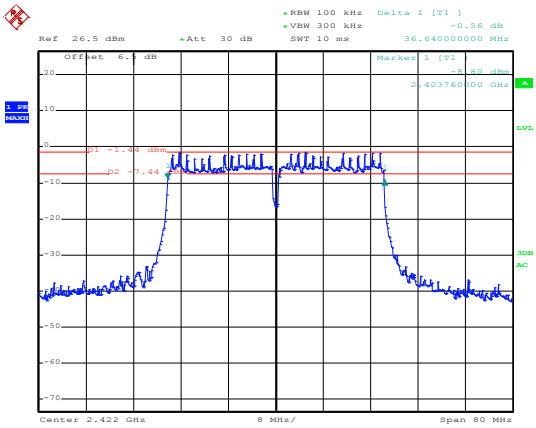


Date: 15.MAY.2019 21:25:06

Highest channel

802.11n(H40)

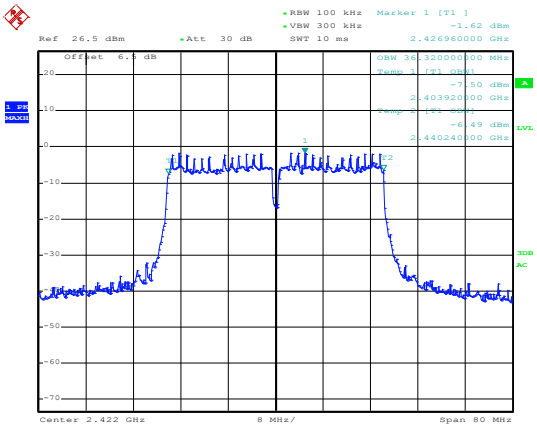
6dB EBW



Date: 15.MAY.2019 21:00:47

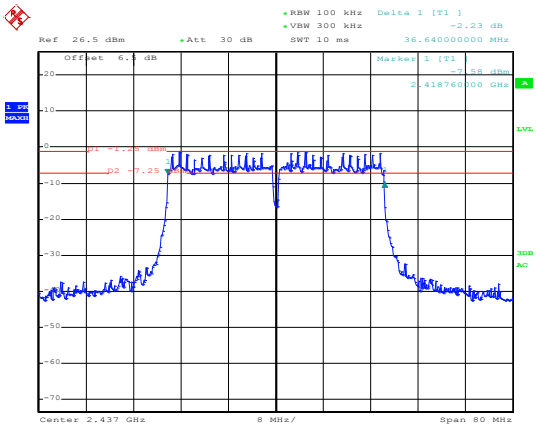
Lowest channel

99% OBW



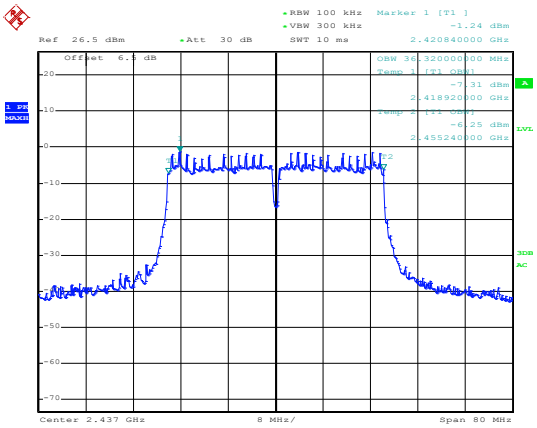
Date: 15.MAY.2019 21:27:48

Lowest channel



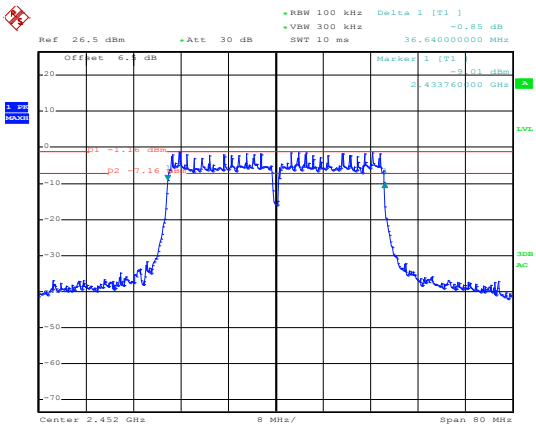
Date: 15.MAY.2019 20:59:12

Middle channel



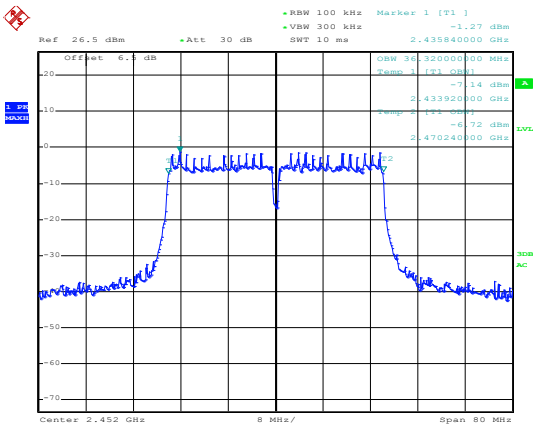
Date: 15.MAY.2019 21:28:27

Middle channel



Date: 15.MAY.2019 20:57:35

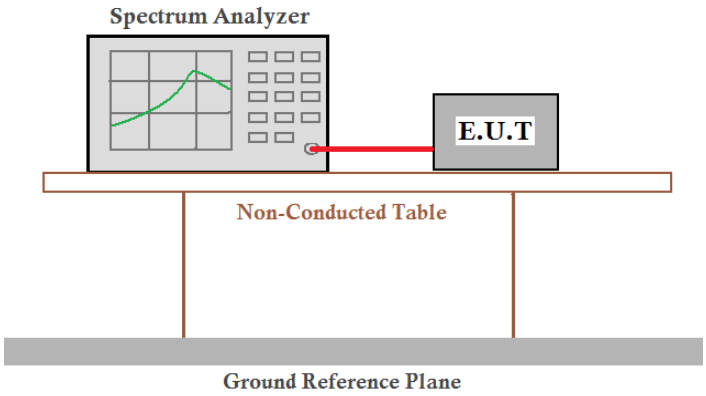
Highest channel



Date: 15.MAY.2019 21:29:11

Highest channel

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
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

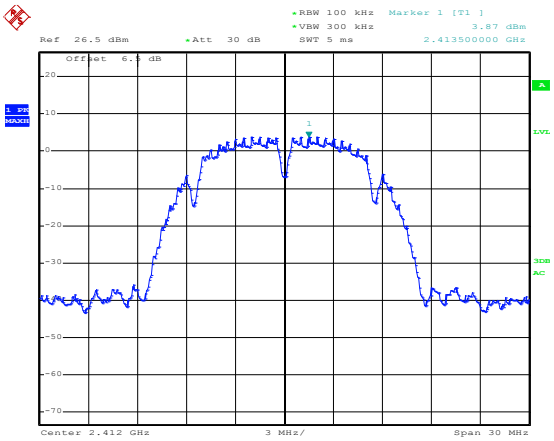
Measurement Data:

Mode	Power Spectral Density (dBm)							Limit(dBm)	Result
	ANT Port	Measuring (dBm)			Total (dBm)				
		Lowest	Middle	Highest	Lowest	Middle	Highest		
802.11b	ANT 0	3.87	4.37	4.73	/	/	/	8.00	Pass
	ANT 1	4.89	5.08	4.94					
802.11g	ANT 0	3.55	3.95	4.1	/	/	/		
	ANT 1	3.15	3.11	3.06					
802.11n(H20)	ANT 0	1.73	1.72	1.57	4.81	4.70	4.61		
	ANT 1	1.87	1.65	1.63					
802.11n(H40)	ANT 0	-1.87	-2.03	-2.23	1.16	1.07	0.94		
	ANT 1	-1.84	-1.86	-1.91					

Test plot as follows:

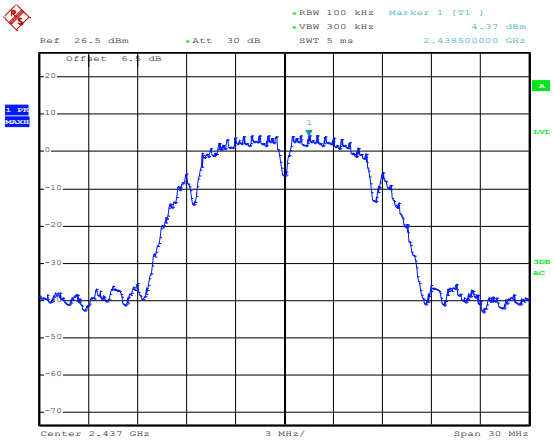
ANT 0:

Test mode: 802.11b



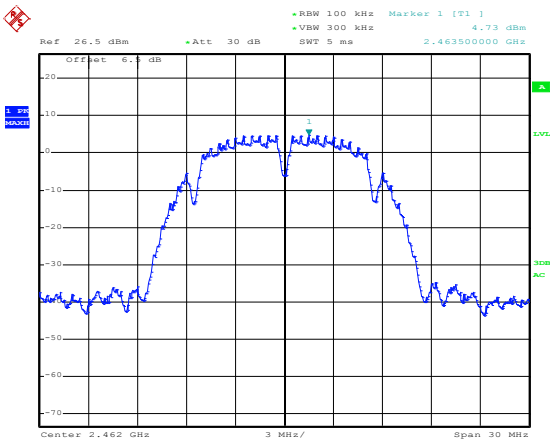
Date: 15.MAY.2019 21:55:23

Lowest channel



Date: 15.MAY.2019 21:56:28

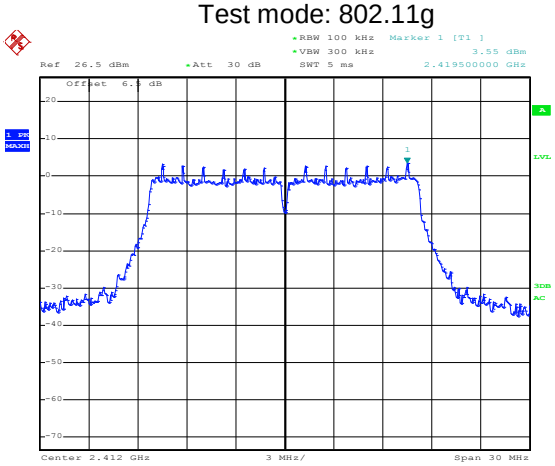
Middle channel



Date: 15.MAY.2019 21:57:21

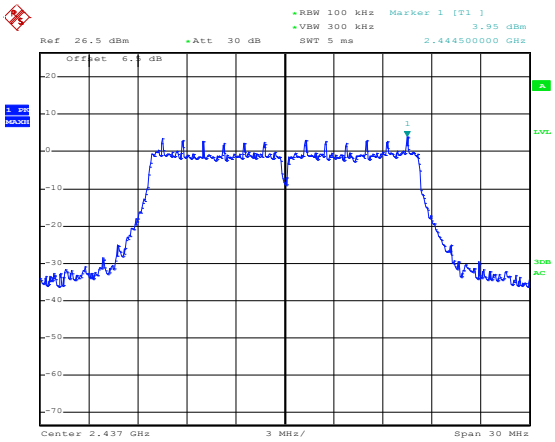
Highest channel

Test mode: 802.11g



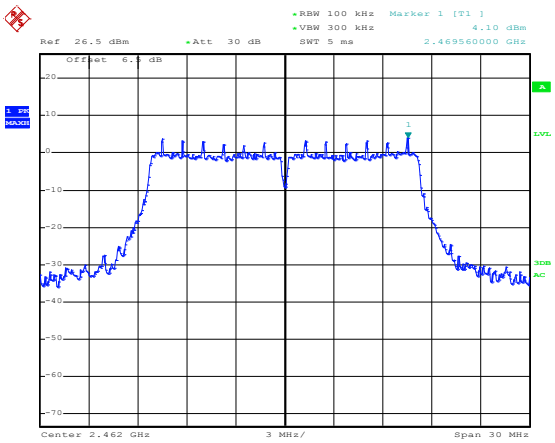
Date: 15.MAY.2019 21:53:26

Lowest channel



Date: 15.MAY.2019 21:51:42

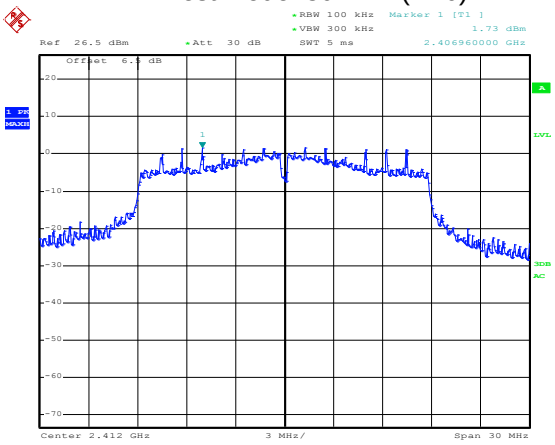
Middle channel



Date: 15.MAY.2019 21:50:41

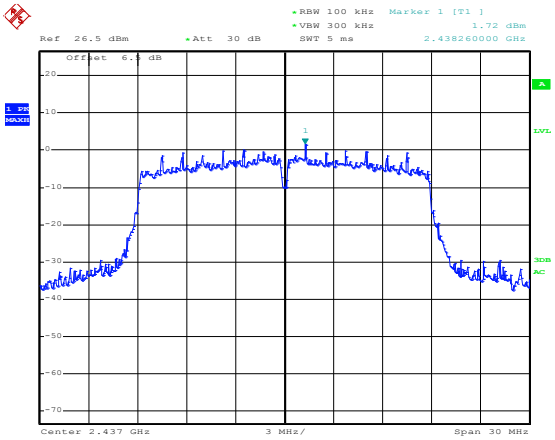
Highest channel

Test mode: 802.11n(H20)



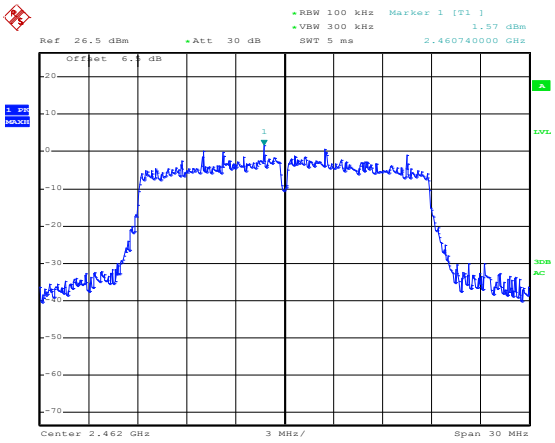
Date: 15.MAY.2019 10:19:37

Lowest channel



Date: 15.MAY.2019 09:47:13

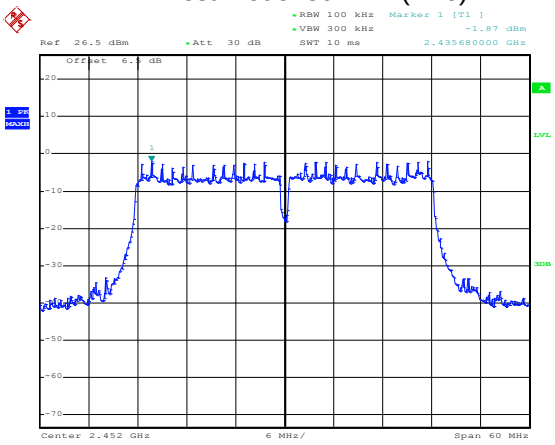
Middle channel



Date: 15.MAY.2019 09:47:42

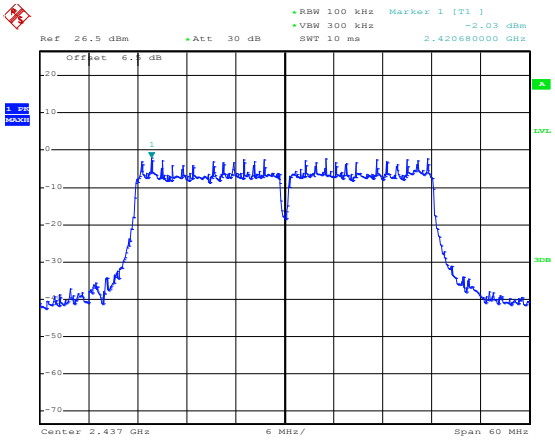
Highest channel

Test mode: 802.11n(H40)



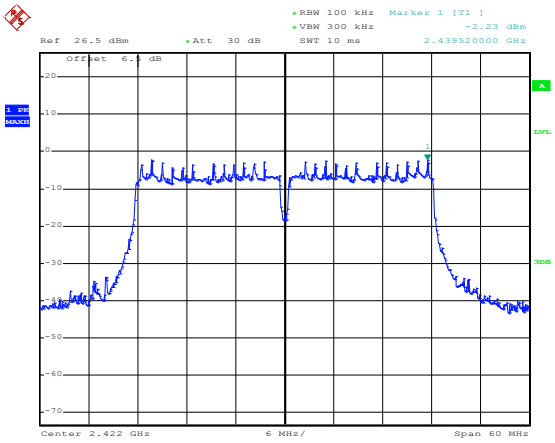
Date: 16.MAY.2019 12:00:23

Lowest channel



Date: 16.MAY.2019 11:59:09

Middle channel

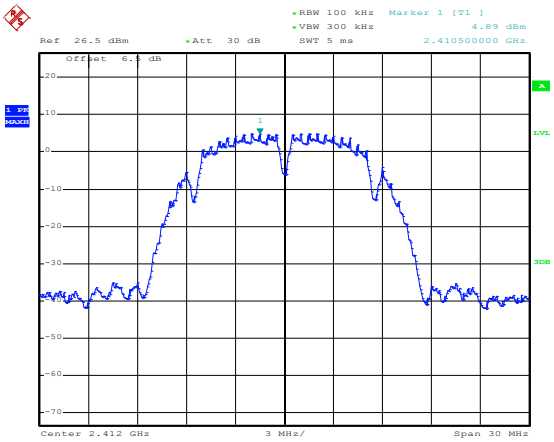


Date: 16.MAY.2019 12:01:22

Highest channel

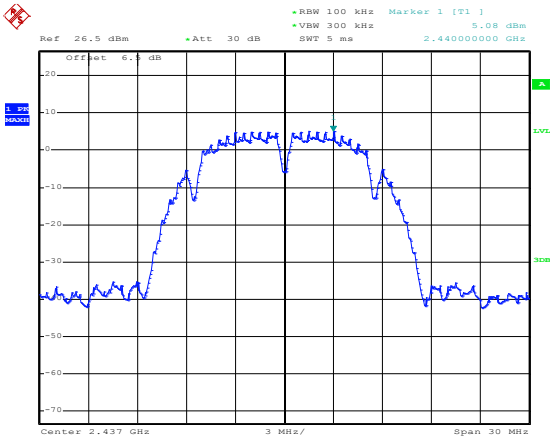
ANT 1:

Test mode: 802.11b



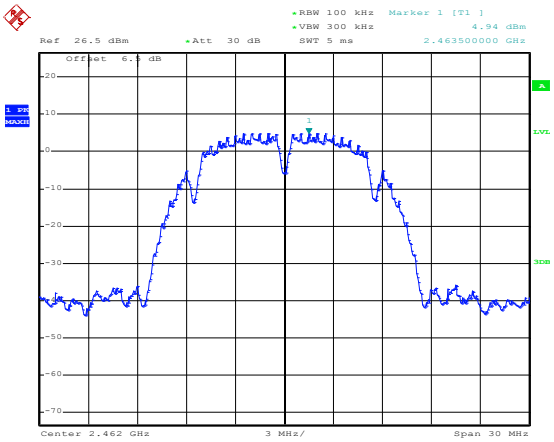
Date: 16.MAY.2019 10:28:12

Lowest channel



Date: 16.MAY.2019 10:24:35

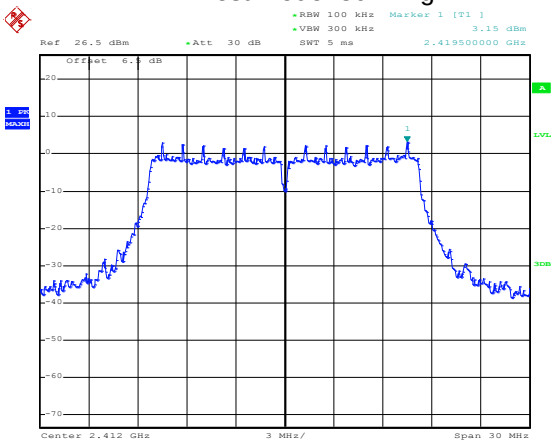
Middle channel



Date: 16.MAY.2019 10:22:34

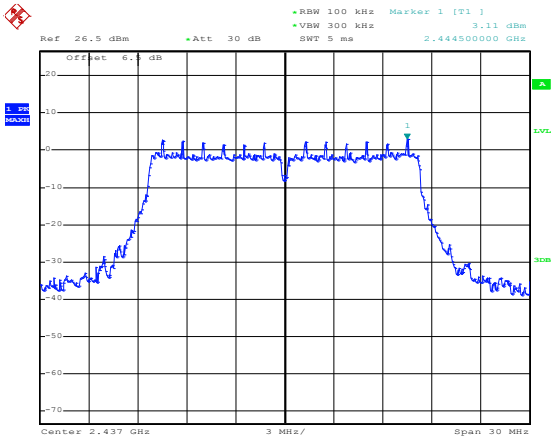
Highest channel

Test mode: 802.11g



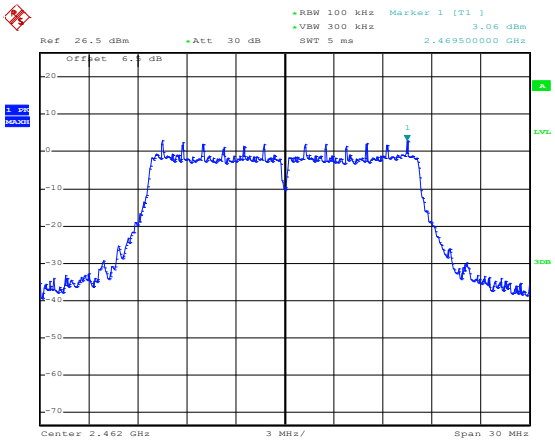
Date: 16.MAY.2019 10:19:51

Lowest channel



Date: 16.MAY.2019 10:20:40

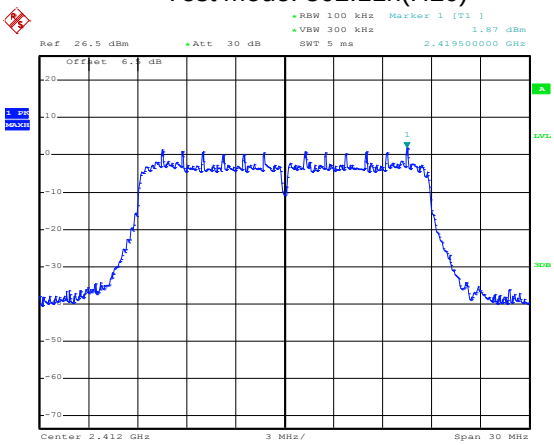
Middle channel



Date: 16.MAY.2019 10:21:24

Highest channel

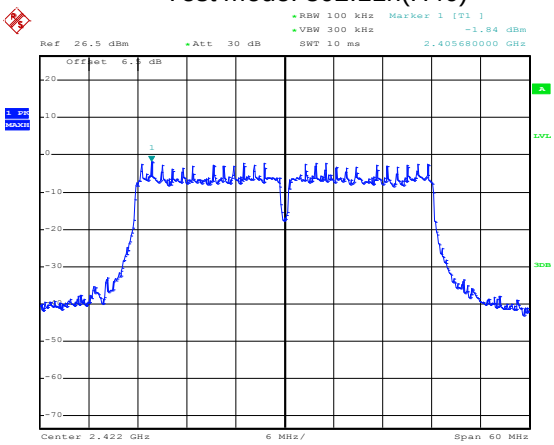
Test mode: 802.11n(H20)



Date: 16.MAY.2019 14:41:45

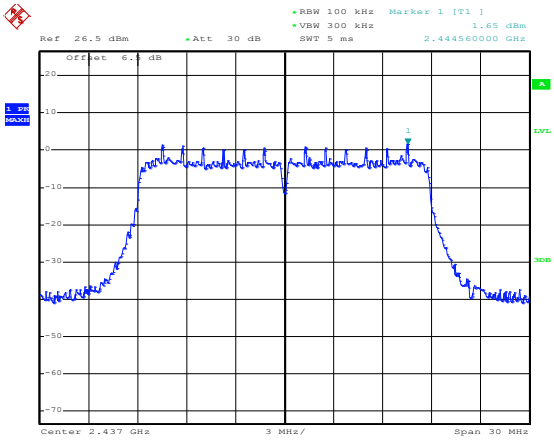
Lowest channel

Test mode: 802.11n(H40)



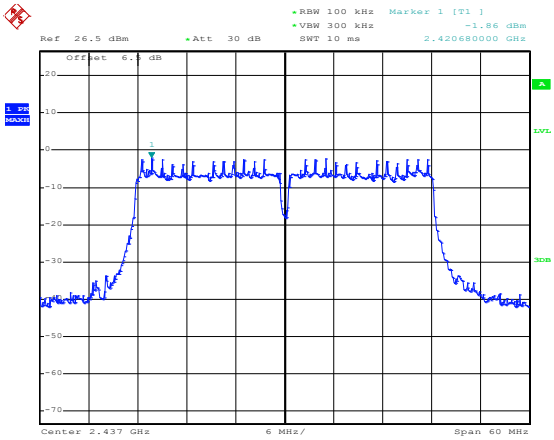
Date: 16.MAY.2019 14:39:33

Lowest channel



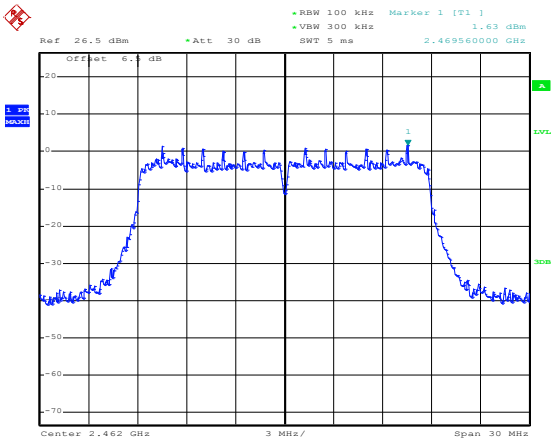
Date: 16.MAY.2019 14:43:27

Middle channel



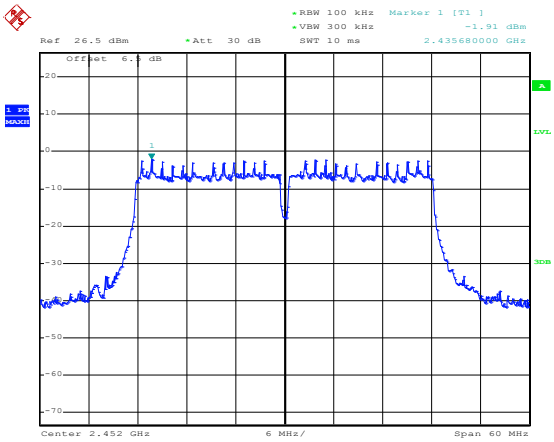
Date: 16.MAY.2019 14:38:37

Middle channel



Date: 16.MAY.2019 14:44:58

Highest channel

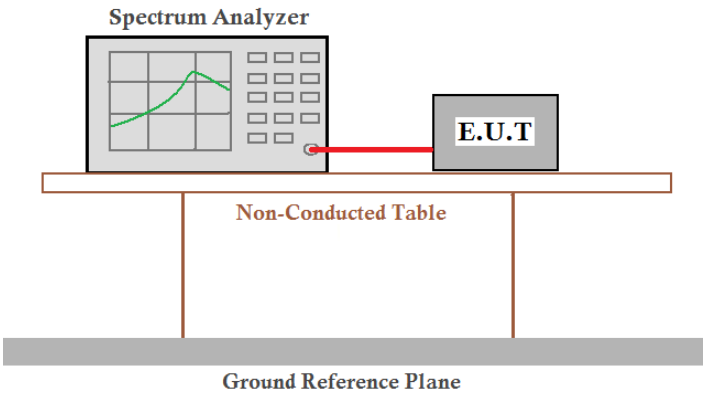


Date: 16.MAY.2019 14:37:44

Highest channel

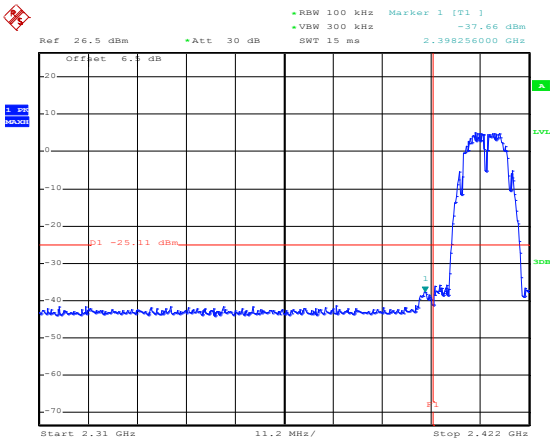
6.6 Band Edge

6.6.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and 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:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

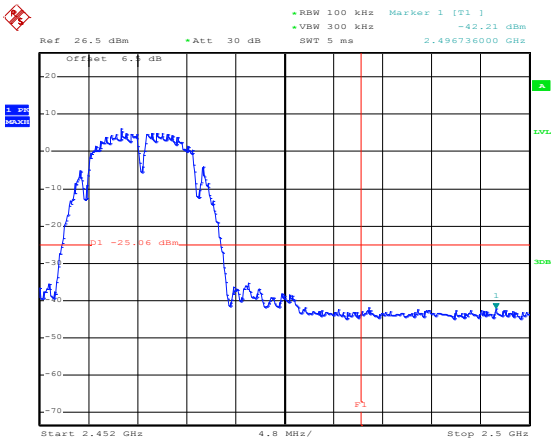
Test plot as follows:

802.11b



Date: 16.MAY.2019 10:31:06

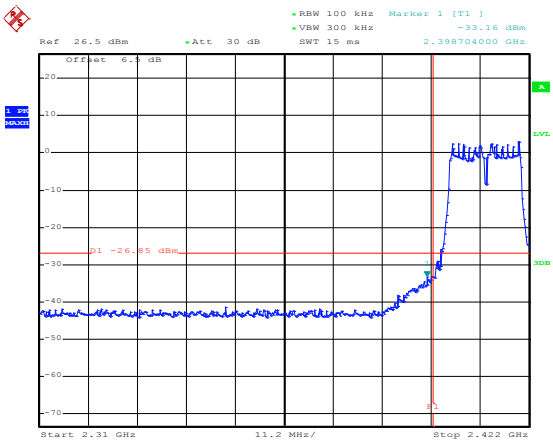
Lowest channel



Date: 16.MAY.2019 10:37:06

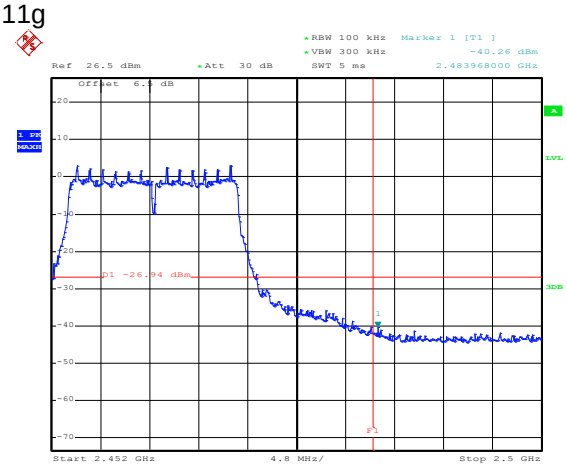
Highest channel

802.11g



Date: 16.MAY.2019 10:32:45

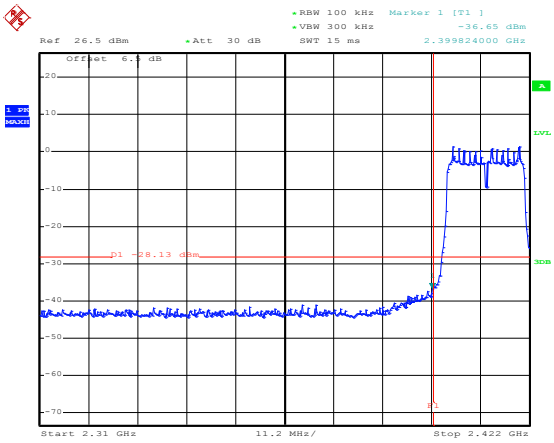
Lowest channel



Date: 16.MAY.2019 10:35:54

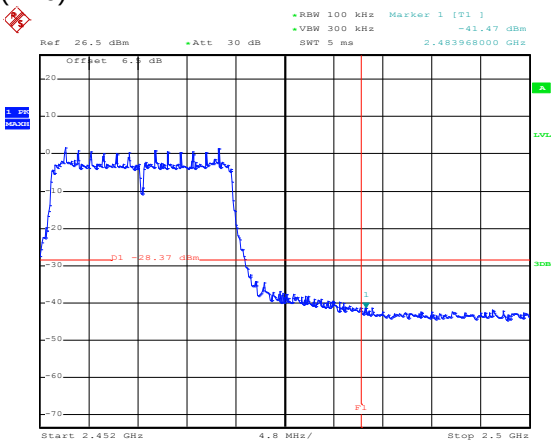
Highest channel

802.11n(H20)



Date: 16.MAY.2019 14:51:31

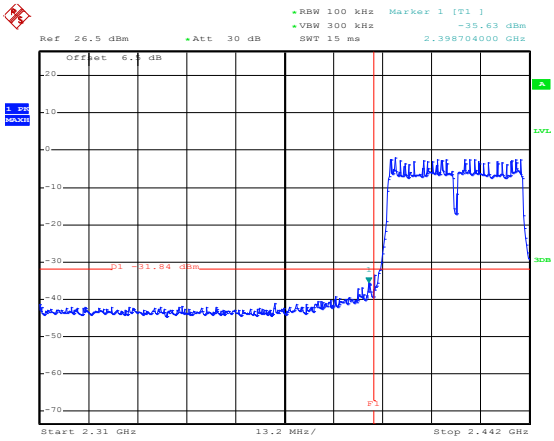
Lowest channel



Date: 16.MAY.2019 14:46:26

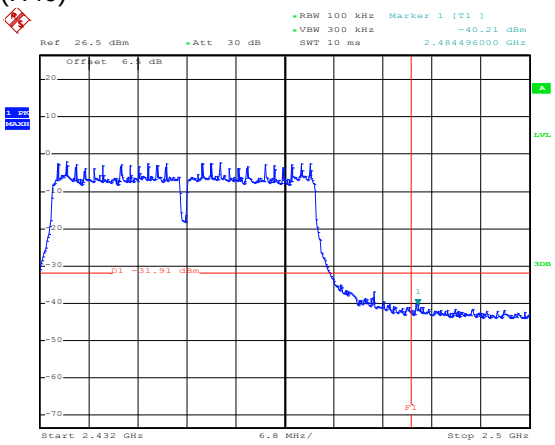
Highest channel

802.11n(H40)



Date: 16.MAY.2019 14:49:32

Lowest channel



Date: 16.MAY.2019 14:47:54

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

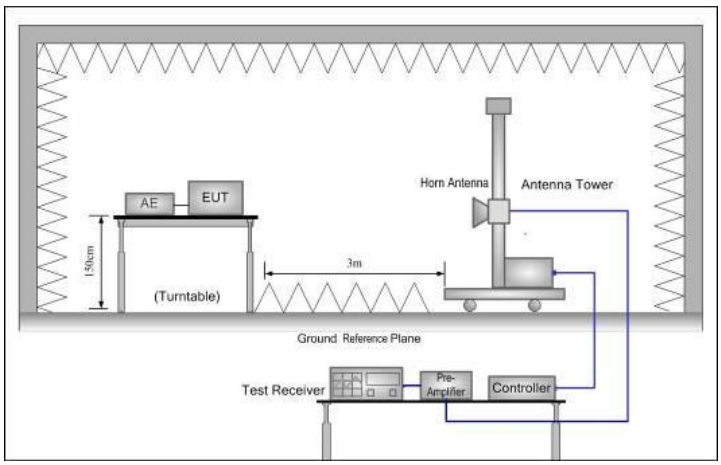
Limit:

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:

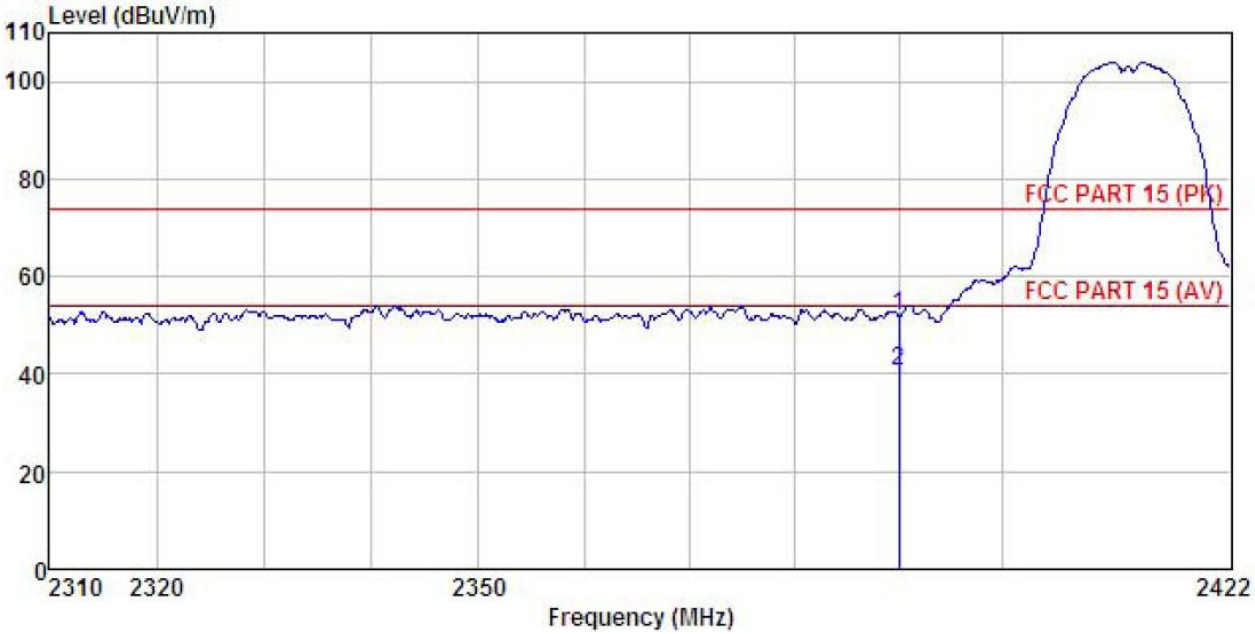


Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

SISO-ANT 0:

802.11b mode:

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

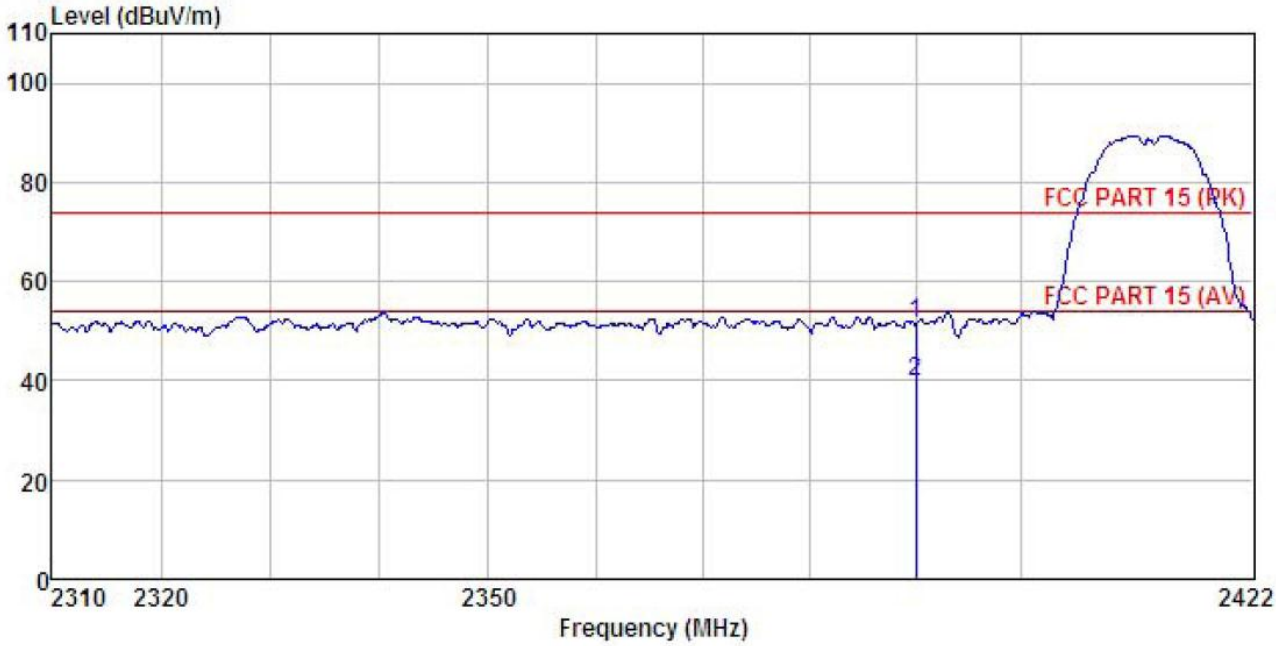


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.32	27.07	4.69	0.00	52.08	74.00	-21.92	Peak
2	2390.000	8.73	27.07	4.69	0.00	40.49	54.00	-13.51	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Lowest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

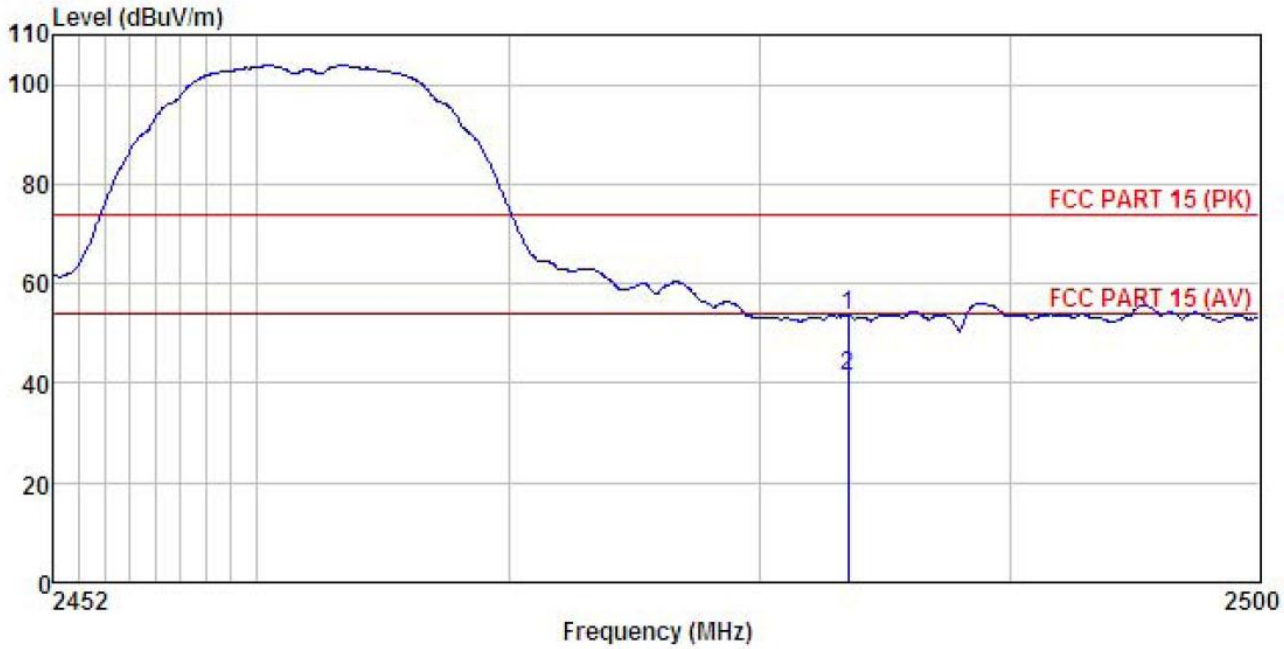


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.98	27.08	4.69	0.00	51.75	74.00	-22.25	Peak
2	2390.000	8.10	27.08	4.69	0.00	39.87	54.00	-14.13	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

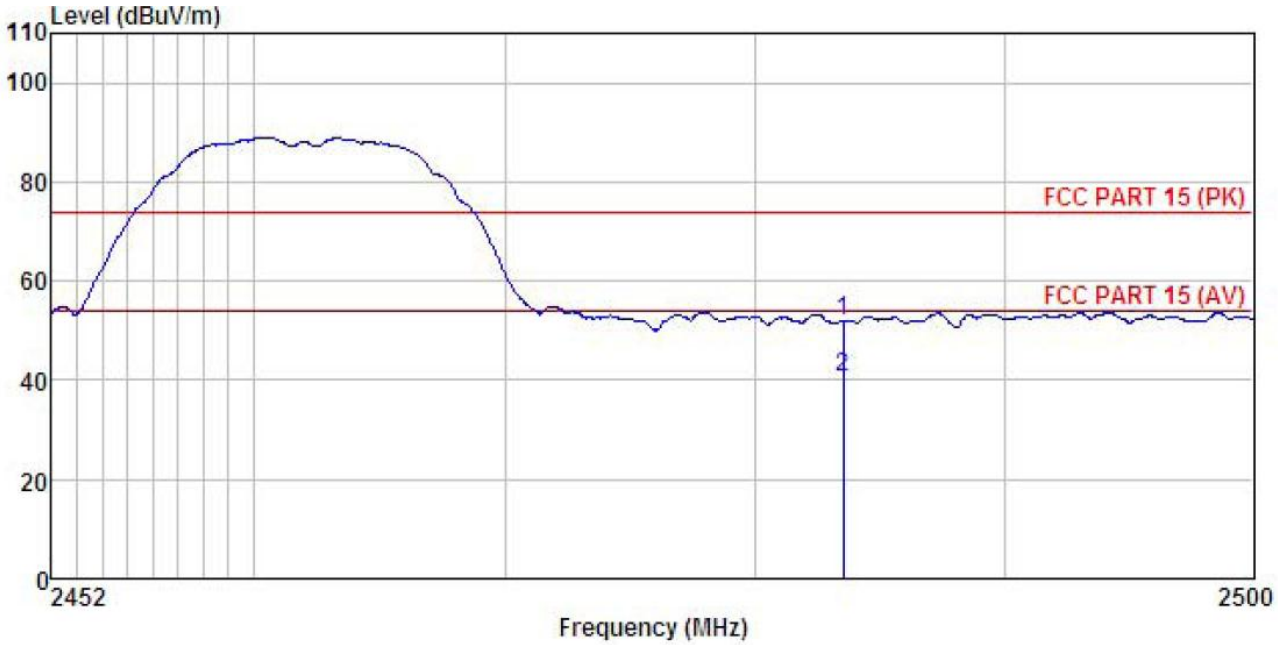


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	21.56	27.36	4.81	0.00	53.73	74.00	-20.27	Peak
2	2483.500	9.11	27.36	4.81	0.00	41.28	54.00	-12.72	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Highest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	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	19.63	27.35	4.81	0.00	51.79	74.00	-22.21	Peak
2	2483.500	8.53	27.35	4.81	0.00	40.69	54.00	-13.31	Average

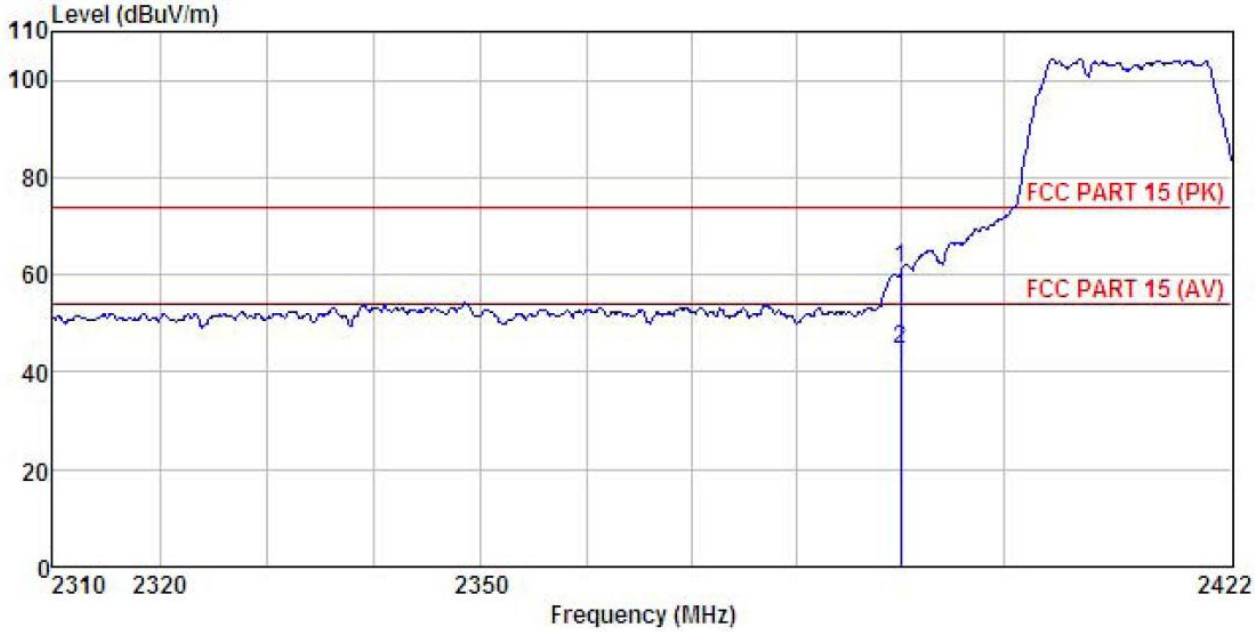
Remark:

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.*

SISO-ANT 0:

802.11g mode:

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

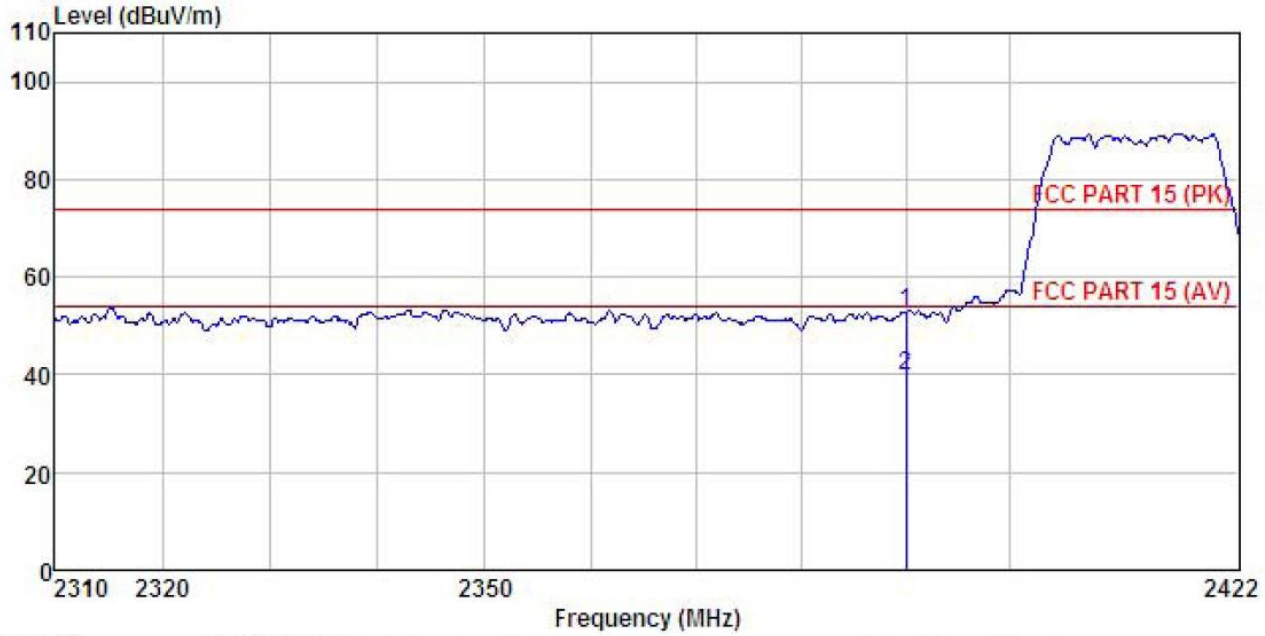


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	29.38	27.07	4.69	0.00	61.14	74.00	-12.86	Peak
2	2390.000	12.70	27.07	4.69	0.00	44.46	54.00	-9.54	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Lowest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

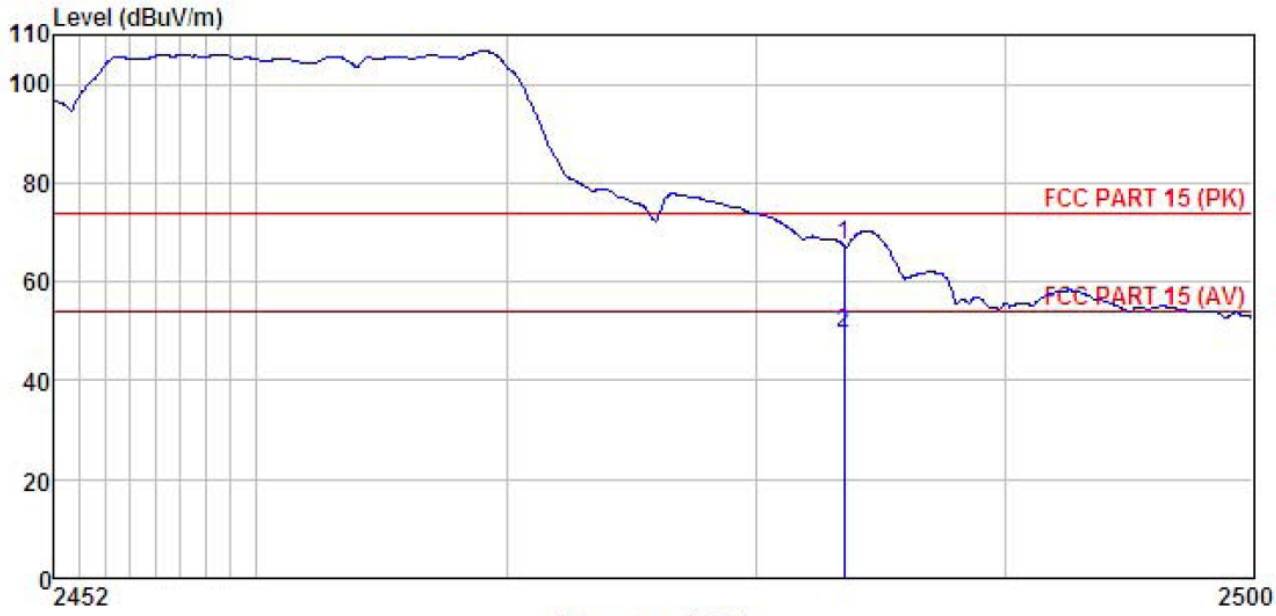


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.93	27.08	4.69	0.00	52.70	74.00	-21.30	Peak
2	2390.000	8.14	27.08	4.69	0.00	39.91	54.00	-14.09	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

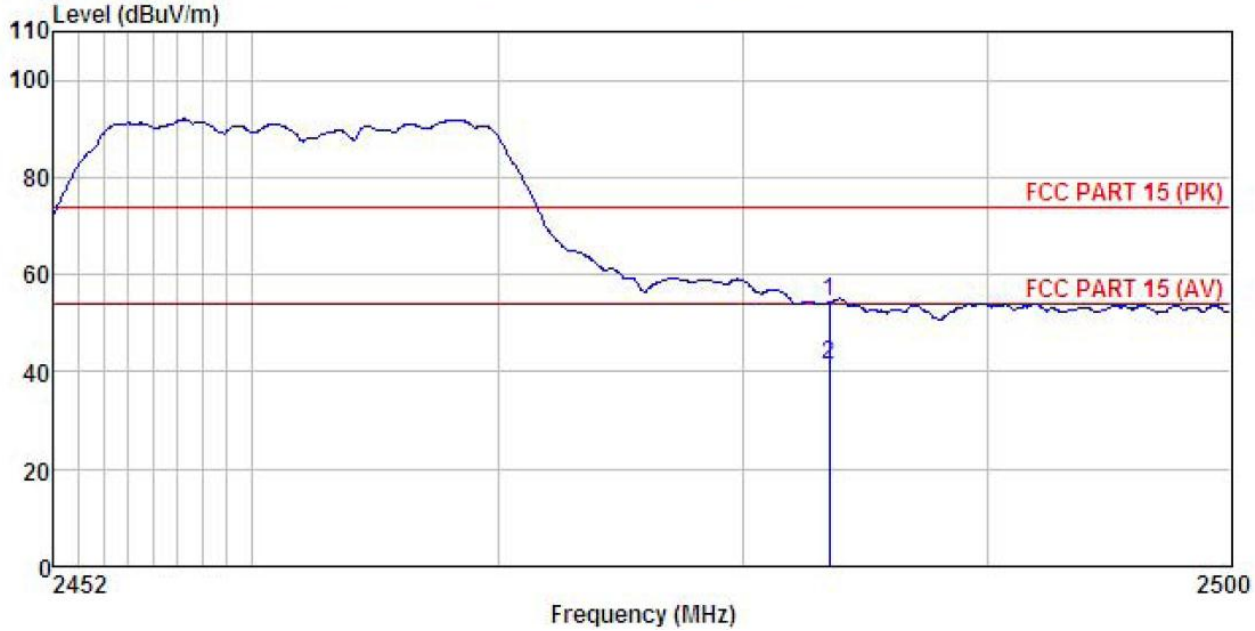


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	35.16	27.36	4.81	0.00	67.33	74.00	-6.67	Peak
2	2483.500	17.26	27.36	4.81	0.00	49.43	54.00	-4.57	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Highest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	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	22.15	27.35	4.81	0.00	54.31	74.00	-19.69	Peak
2	2483.500	9.12	27.35	4.81	0.00	41.28	54.00	-12.72	Average

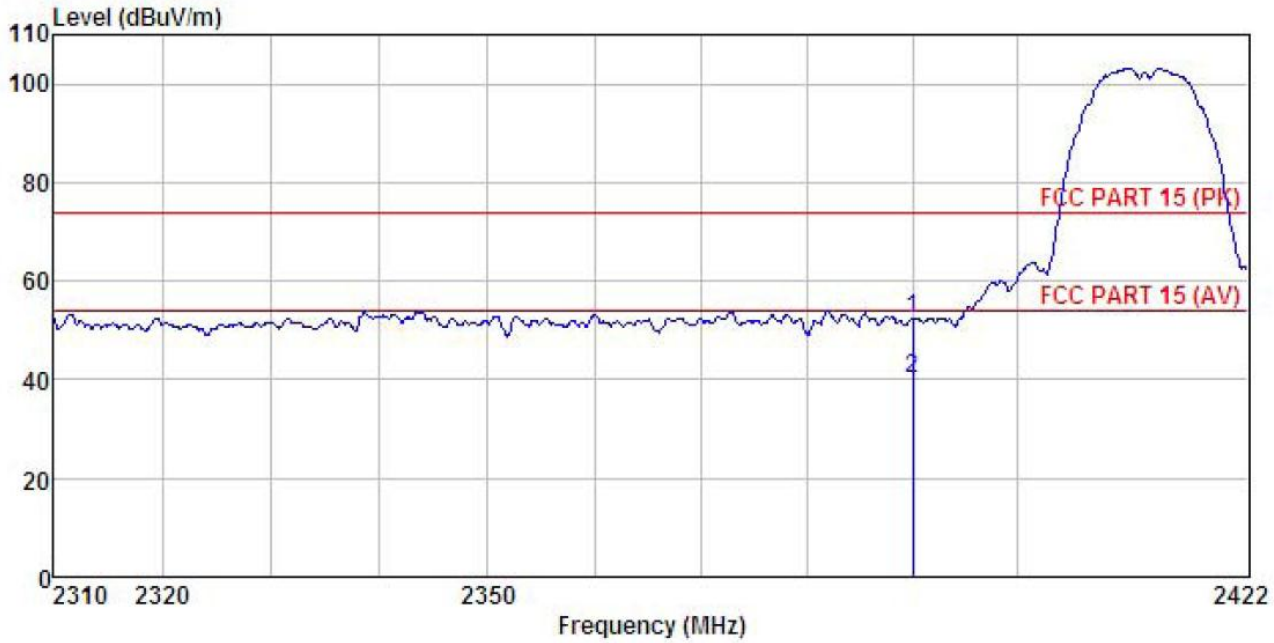
Remark:

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.*

SISO-ANT 1:

802.11b mode:

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

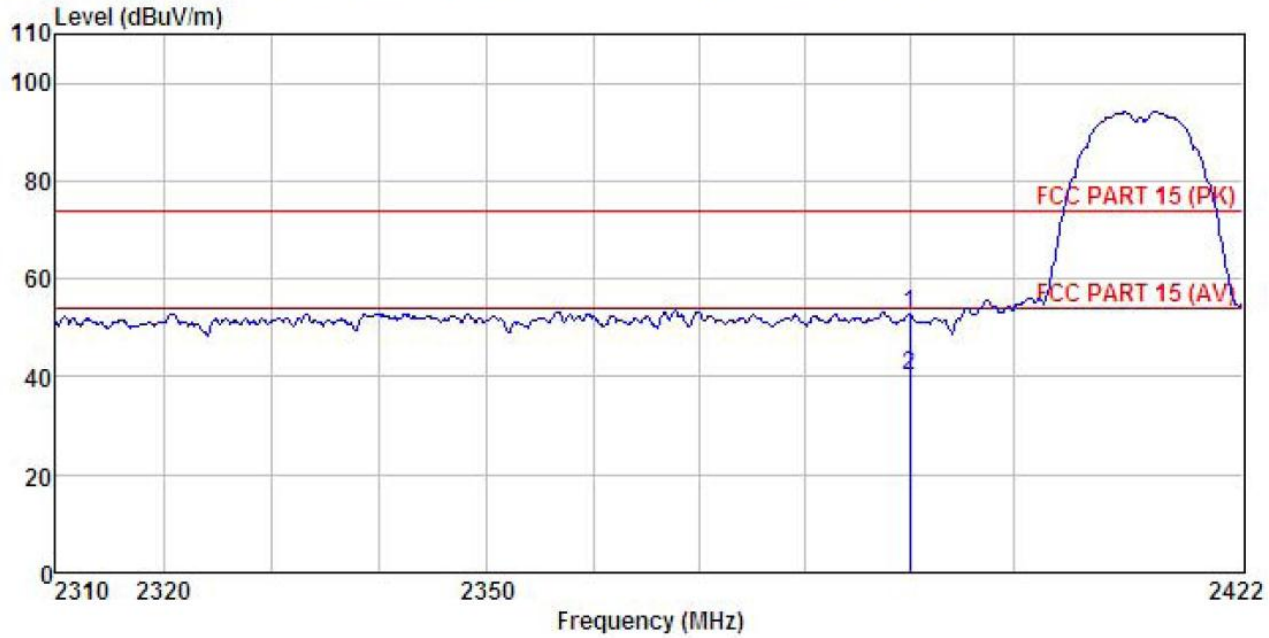


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.71	27.07	4.69	0.00	52.47	74.00	-21.53	Peak
2	2390.000	8.35	27.07	4.69	0.00	40.11	54.00	-13.89	Average

Remark:

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

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Lowest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

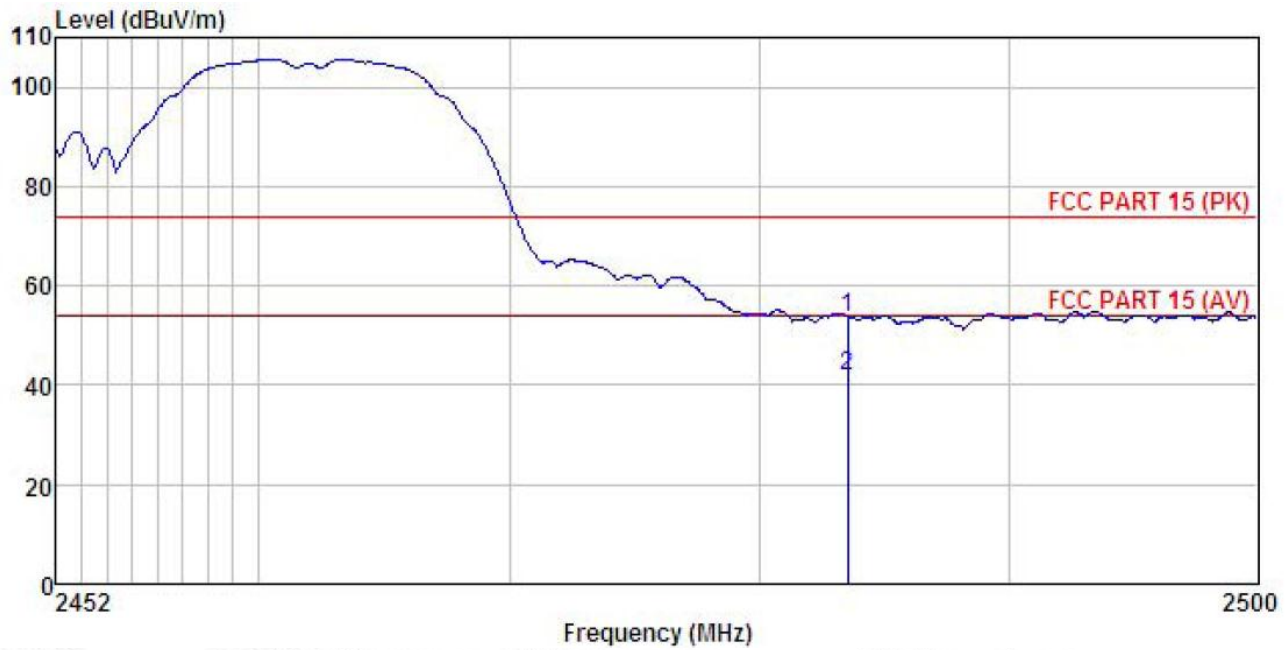


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.85	27.08	4.69	0.00	52.62	74.00	-21.38	Peak
2	2390.000	8.25	27.08	4.69	0.00	40.02	54.00	-13.98	Average

Remark:

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

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



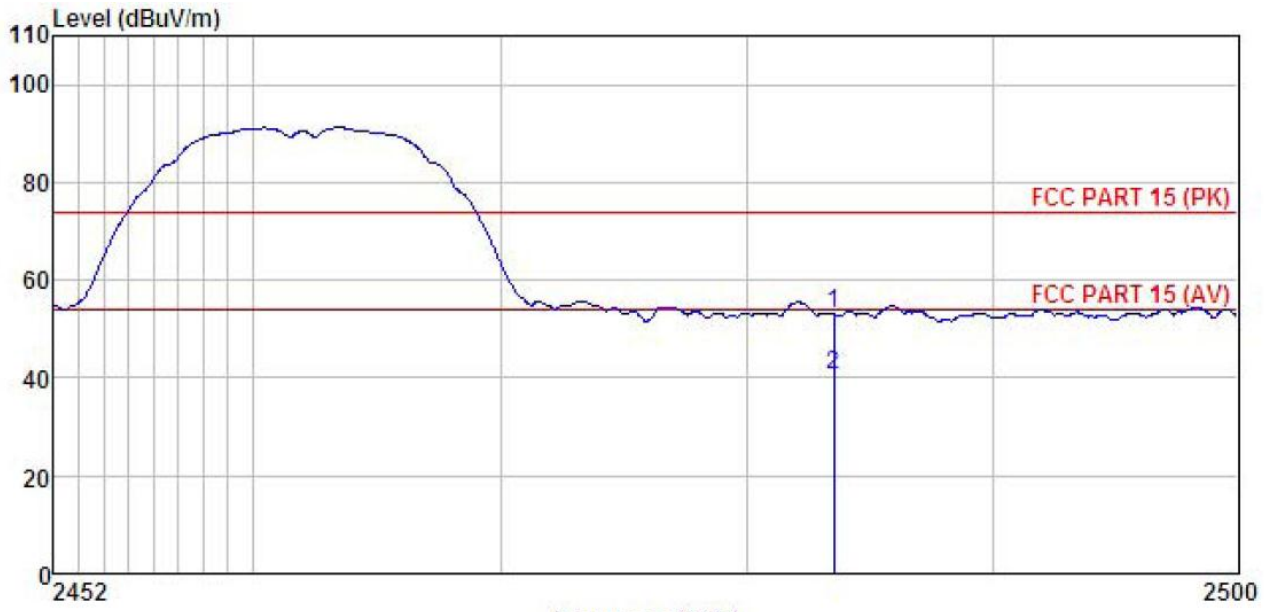
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	21.52	27.36	4.81	0.00	53.69	74.00	-20.31	Peak
2	2483.500	9.62	27.36	4.81	0.00	41.79	54.00	-12.21	Average

Remark:

3. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

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

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11b Tx mode
Test Channel:	Highest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	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	20.92	27.35	4.81	0.00	53.08	74.00	-20.92	Peak
2	2483.500	8.56	27.35	4.81	0.00	40.72	54.00	-13.28	Average

Remark:

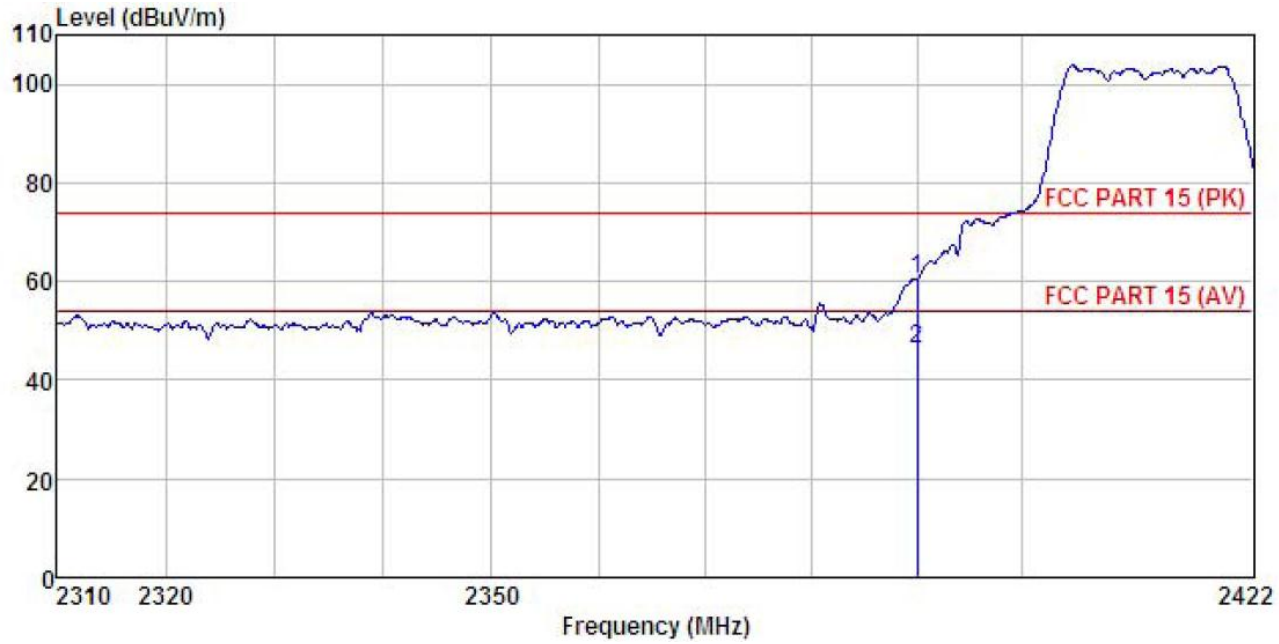
3. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

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

SISO-ANT 1:

802.11g mode:

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

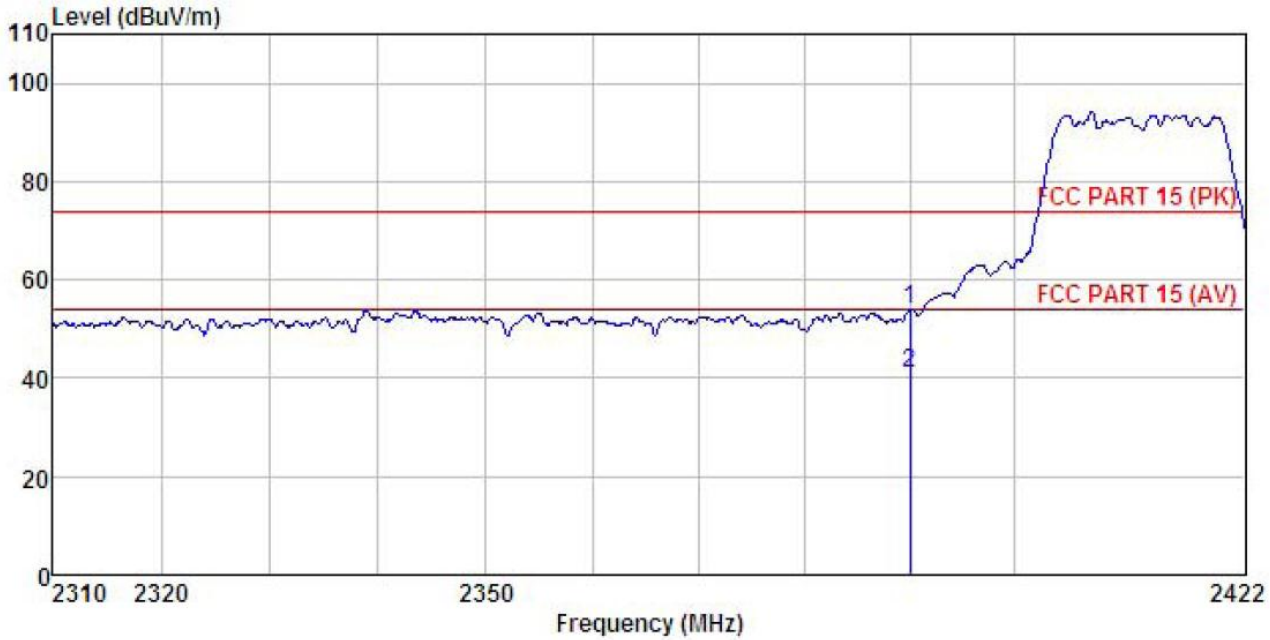


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	28.91	27.07	4.69	0.00	60.67	74.00	-13.33	Peak
2	2390.000	14.38	27.07	4.69	0.00	46.14	54.00	-7.86	Average

Remark:

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

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Lowest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

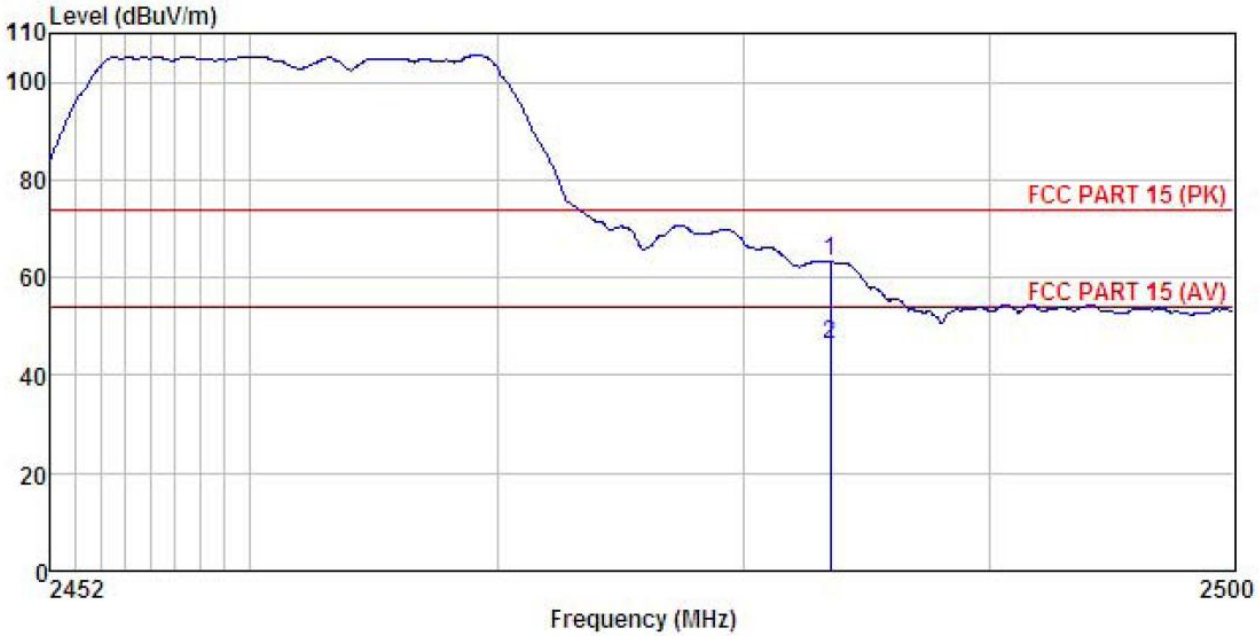


	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	22.26	27.08	4.69	0.00	54.03	74.00	-19.97	Peak
2	2390.000	9.41	27.08	4.69	0.00	41.18	54.00	-12.82	Average

Remark:

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

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

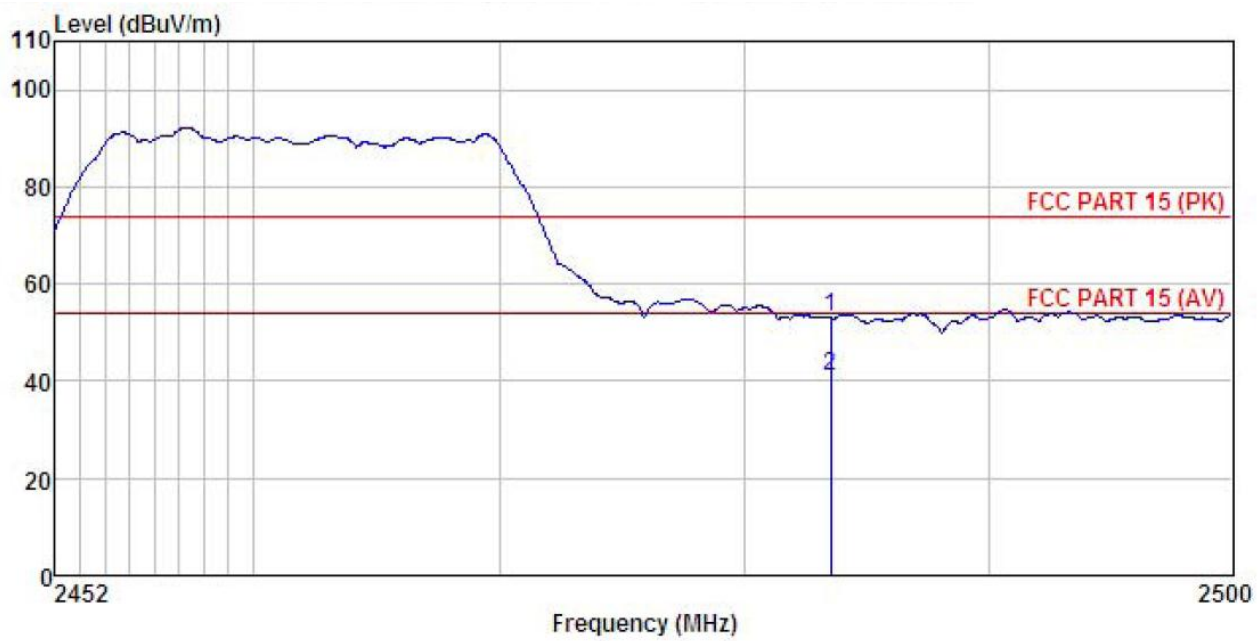


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	31.10	27.36	4.81	0.00	63.27	74.00	-10.73	Peak
2	2483.500	14.21	27.36	4.81	0.00	46.38	54.00	-7.62	Average

Remark:

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

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11g Tx mode
Test Channel:	Highest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	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	20.89	27.35	4.81	0.00	53.05	74.00	-20.95	Peak
2	2483.500	8.66	27.35	4.81	0.00	40.82	54.00	-13.18	Average

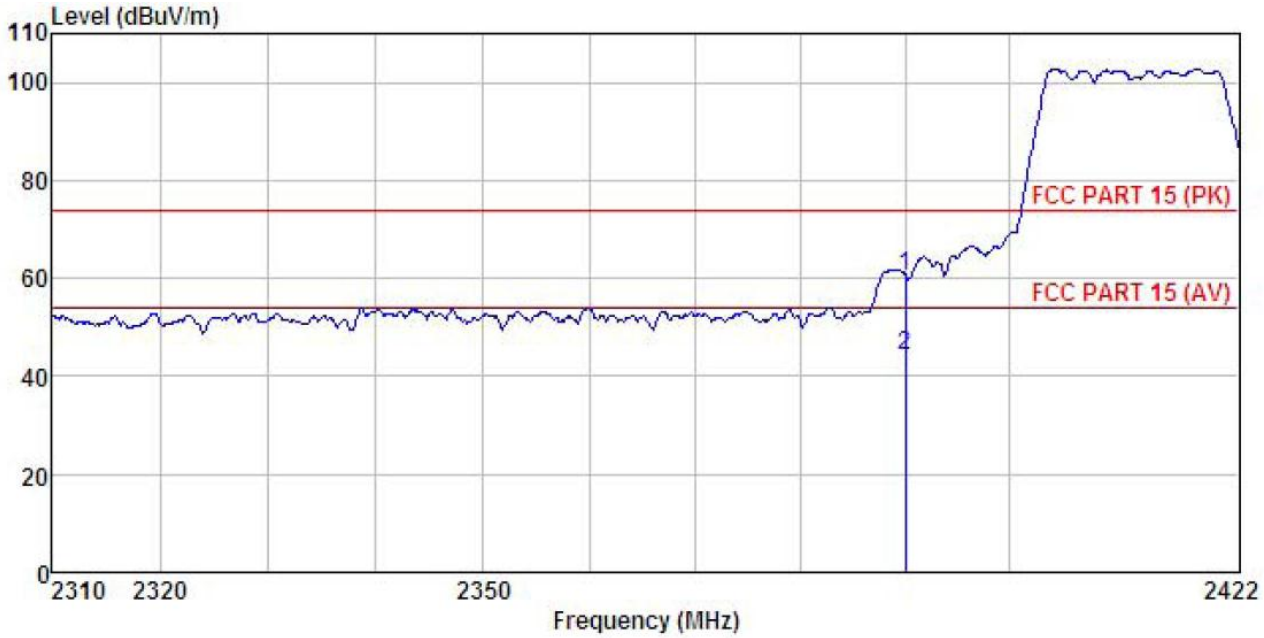
Remark:

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

MIMO:

802.11n (HT20):

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT20) Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

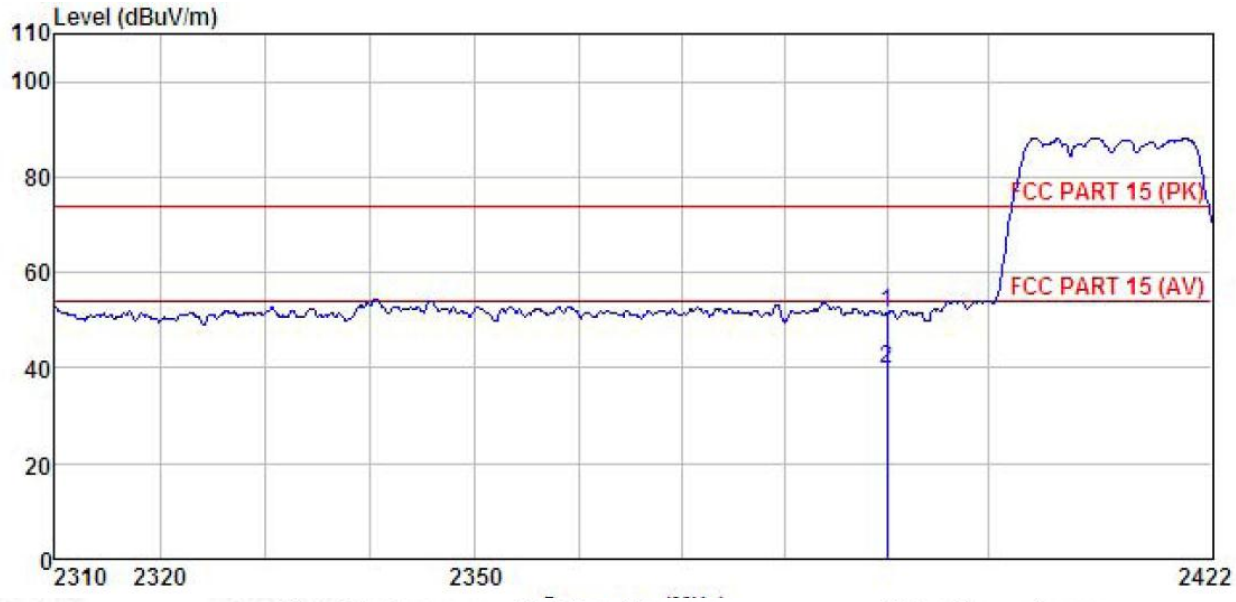


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	28.76	27.07	4.69	0.00	60.52	74.00	-13.48	Peak
2	2390.000	12.34	27.07	4.69	0.00	44.10	54.00	-9.90	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT20) Tx mode
Test Channel:	Lowest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

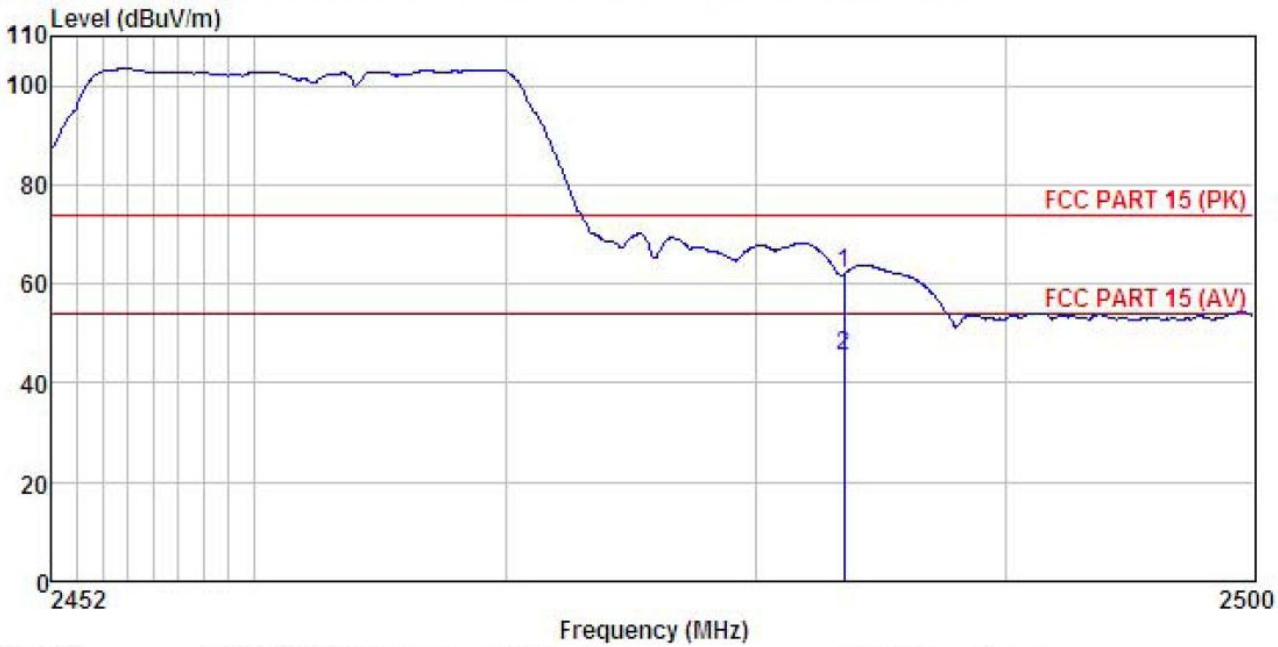


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.62	27.08	4.69	0.00	51.39	74.00	-22.61	Peak
2	2390.000	8.13	27.08	4.69	0.00	39.90	54.00	-14.10	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT20) Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

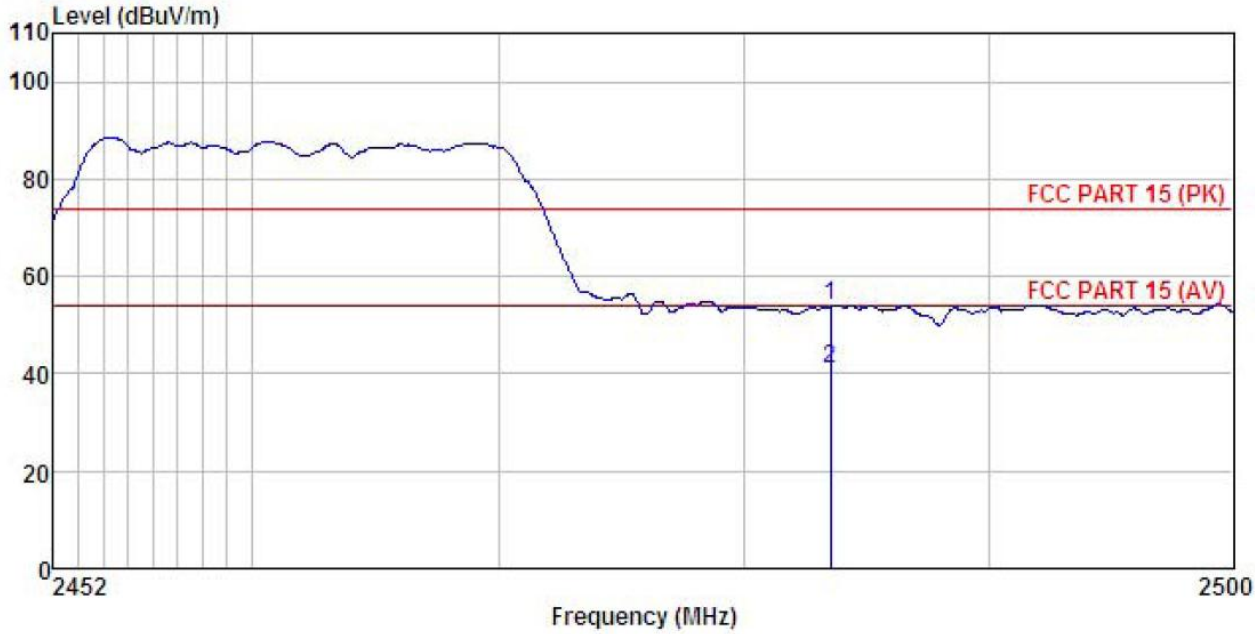


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	29.81	27.36	4.81	0.00	61.98	74.00	-12.02	Peak
2	2483.500	13.36	27.36	4.81	0.00	45.53	54.00	-8.47	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT20) Tx mode
Test Channel:	Highest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	Freq	ReadAntenna Level	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	21.75	27.35	4.81	0.00	53.91	74.00	-20.09	Peak
2	2483.500	8.74	27.35	4.81	0.00	40.90	54.00	-13.10	Average

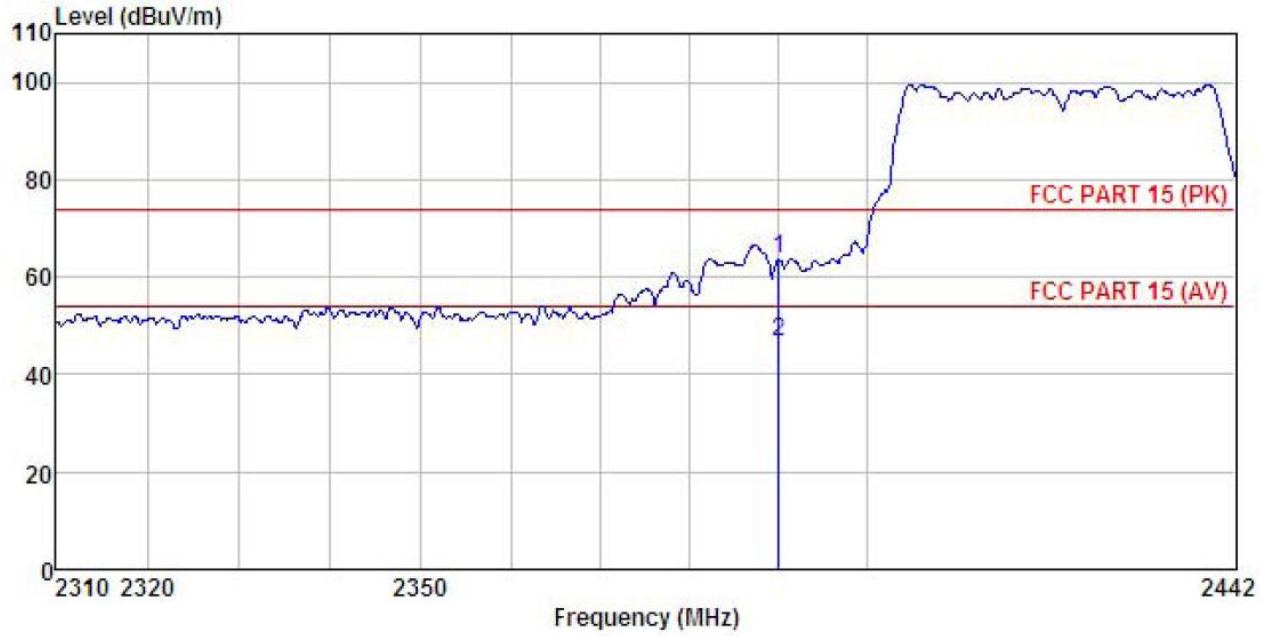
Remark:

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.*

MIMO:

802.11n (HT40):

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT40) Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

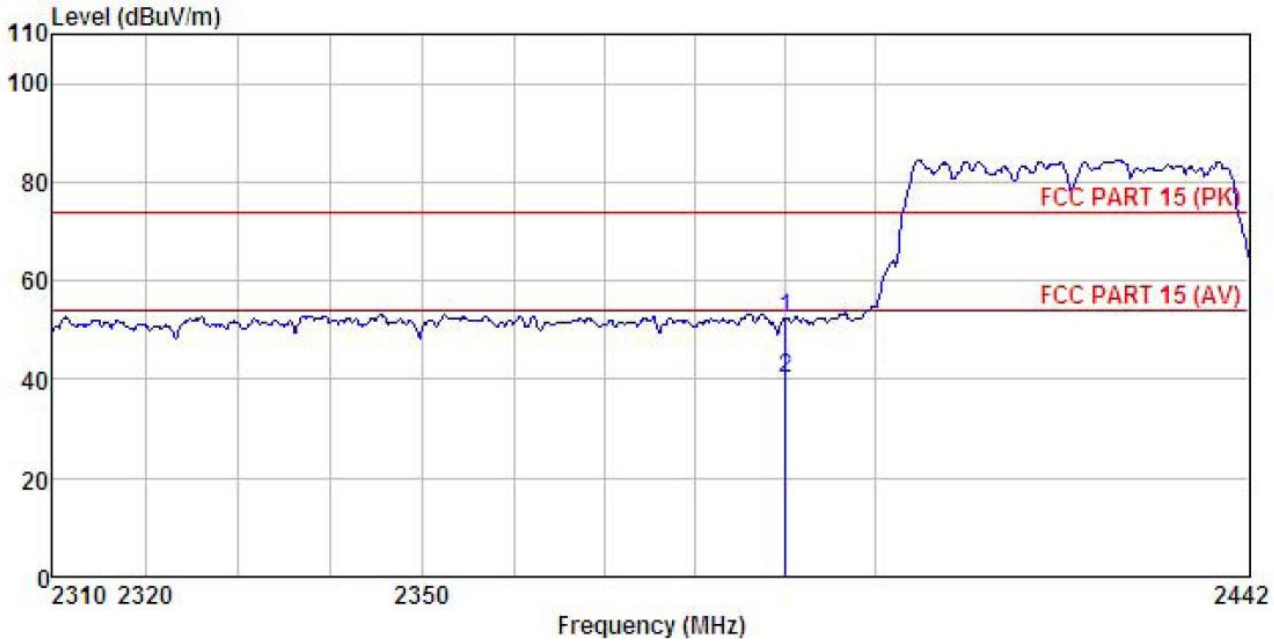


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	31.87	27.07	4.69	0.00	63.63	74.00	-10.37	Peak
2	2390.000	14.88	27.07	4.69	0.00	46.64	54.00	-7.36	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT40) Tx mode
Test Channel:	Lowest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

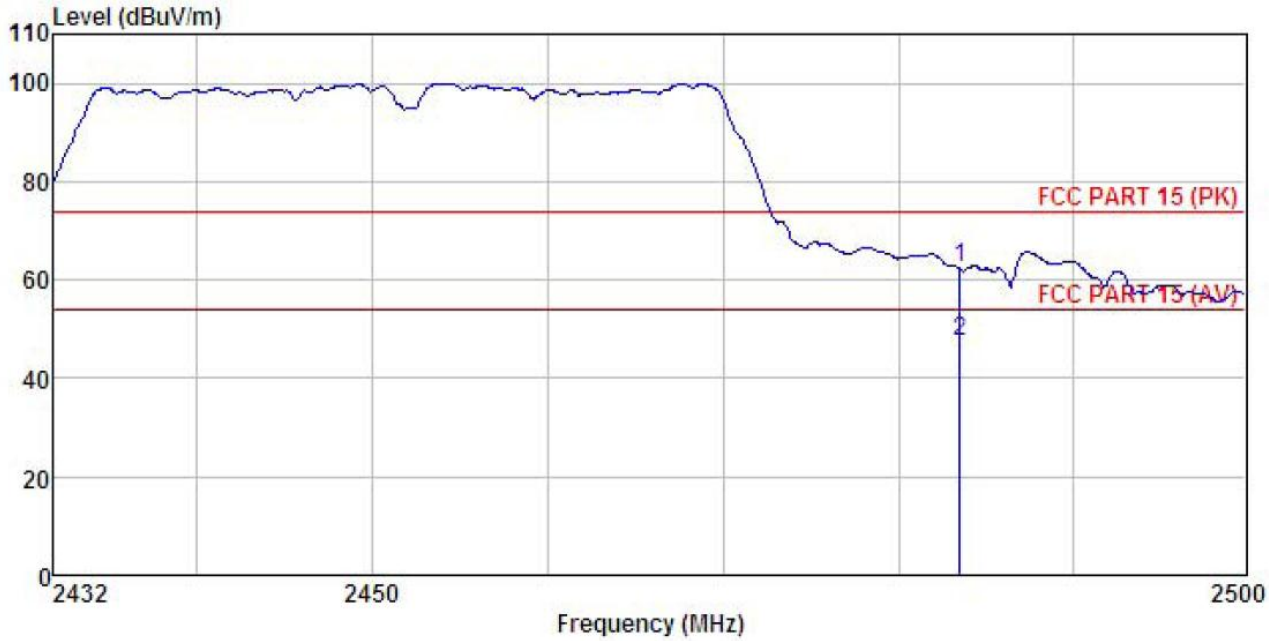


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.55	27.08	4.69	0.00	52.32	74.00	-21.68	Peak
2	2390.000	8.46	27.08	4.69	0.00	40.23	54.00	-13.77	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT40) Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

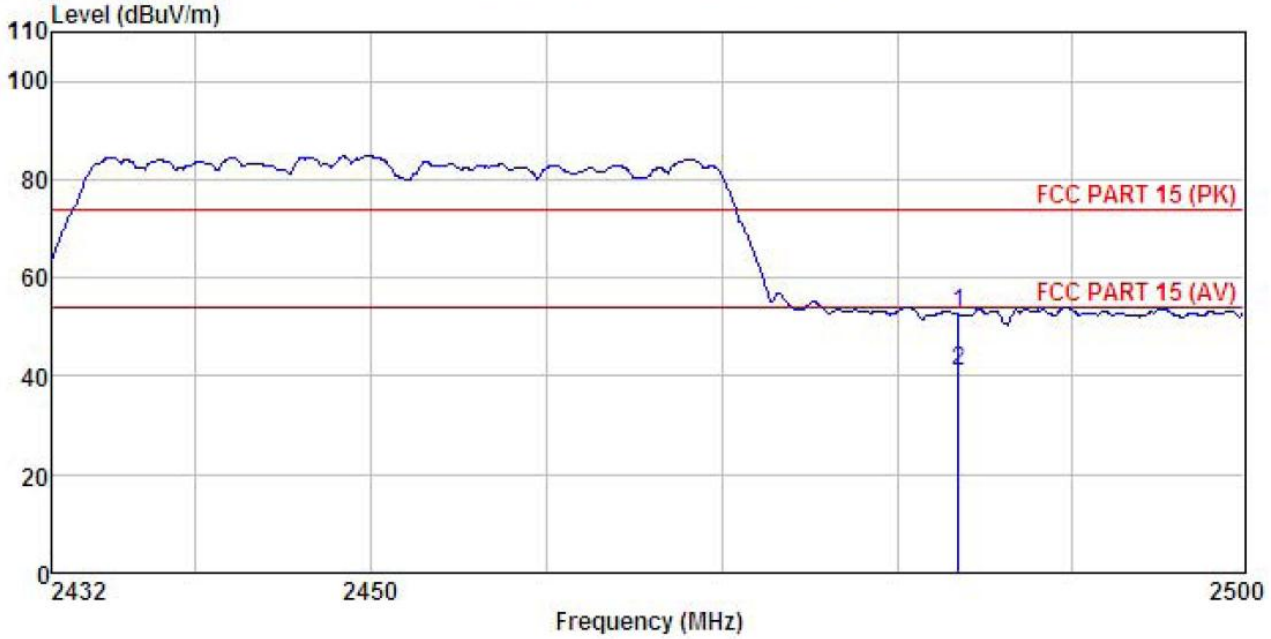


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	30.20	27.36	4.81	0.00	62.37	74.00	-11.63	Peak
2	2483.500	15.26	27.36	4.81	0.00	47.43	54.00	-6.57	Average

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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	802.11n(HT40) Tx mode
Test Channel:	Highest channel	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



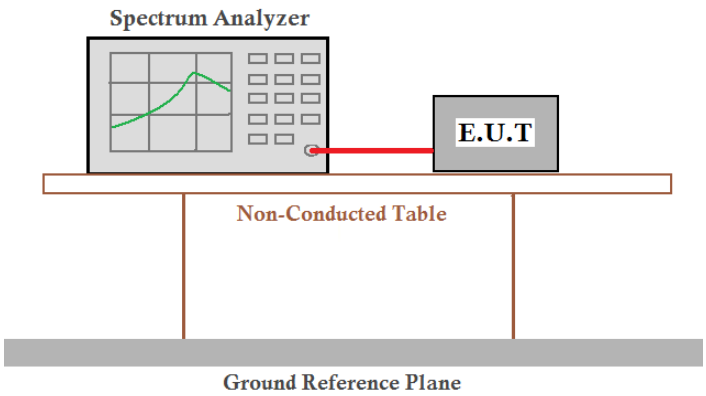
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	20.50	27.35	4.81	0.00	52.66	74.00	-21.34	Peak
2	2483.500	8.96	27.35	4.81	0.00	41.12	54.00	-12.88	Average

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

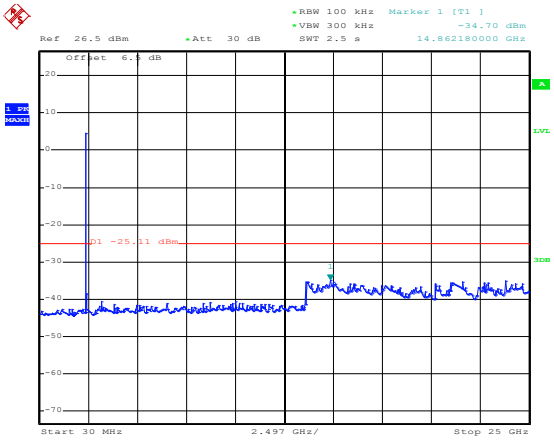
6.7.1 Conducted Emission Method

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:	
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:

Test mode: 802.11b

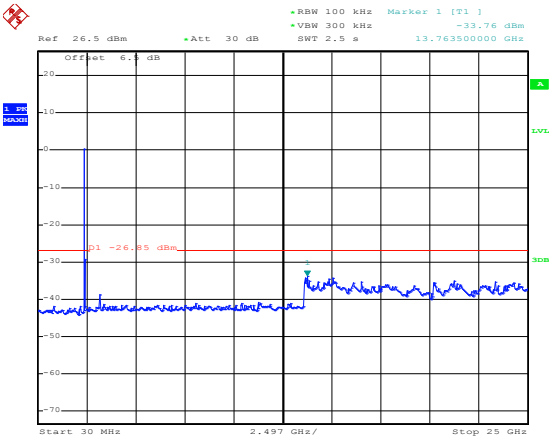
Lowest channel



Date: 16.MAY.2019 10:40:17

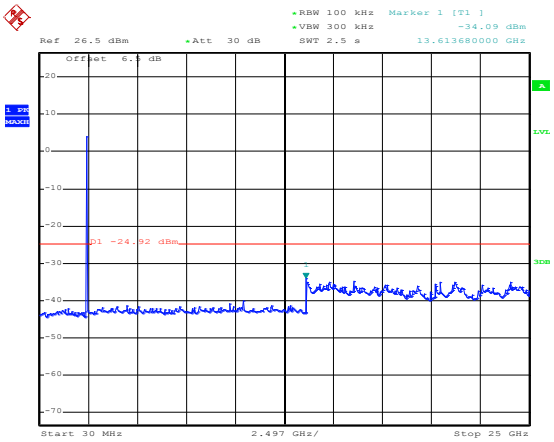
Test mode: 802.11g

Lowest channel



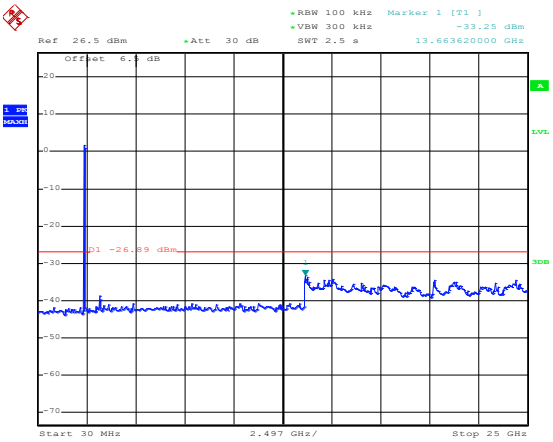
Date: 16.MAY.2019 10:41:50

Middle channel



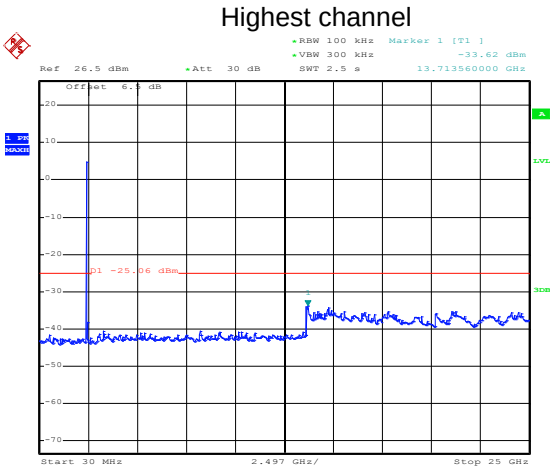
Date: 16.MAY.2019 10:39:12

Middle channel



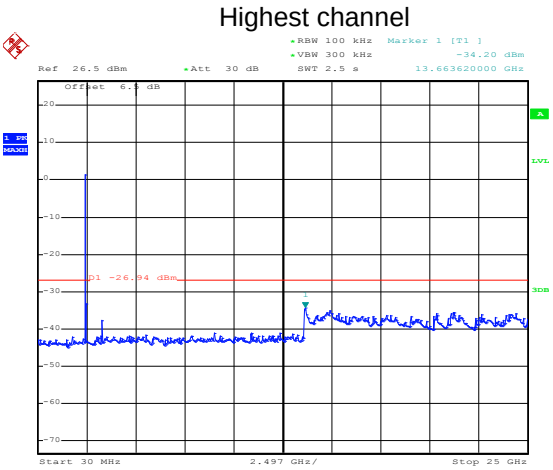
Date: 16.MAY.2019 10:42:45

Highest channel



Date: 16.MAY.2019 10:38:22

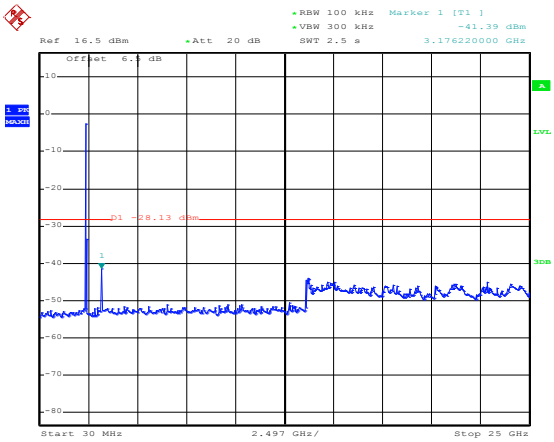
Highest channel



Date: 16.MAY.2019 10:43:50

Test mode: 802.11n(H20)

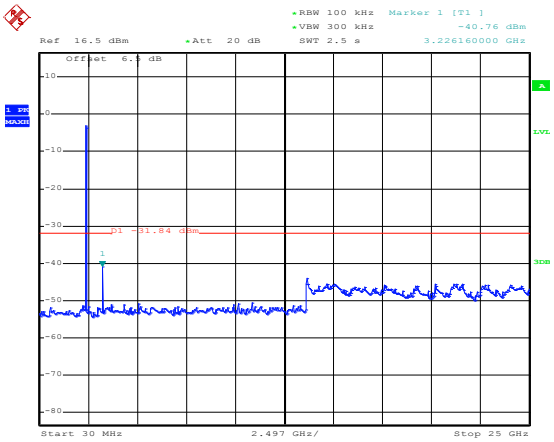
Lowest channel



Date: 16.MAY.2019 14:52:22

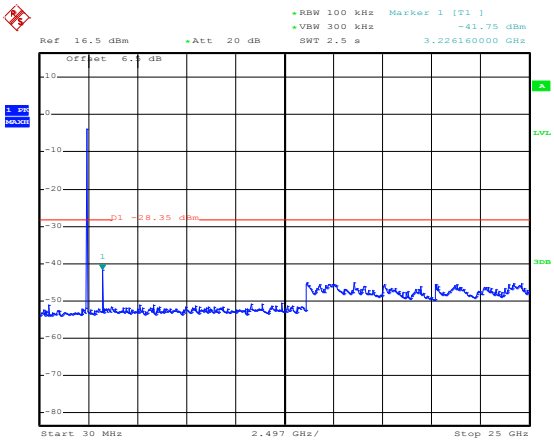
Test mode: 802.11n(H40)

Lowest channel



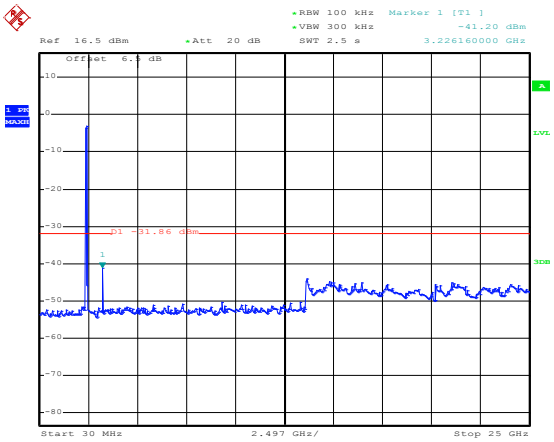
Date: 16.MAY.2019 14:55:28

Middle channel



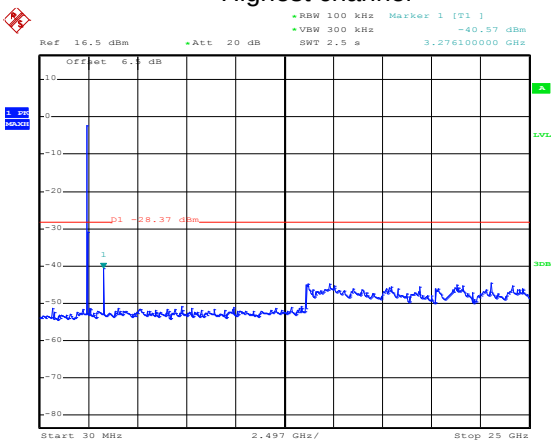
Date: 16.MAY.2019 14:53:19

Middle channel



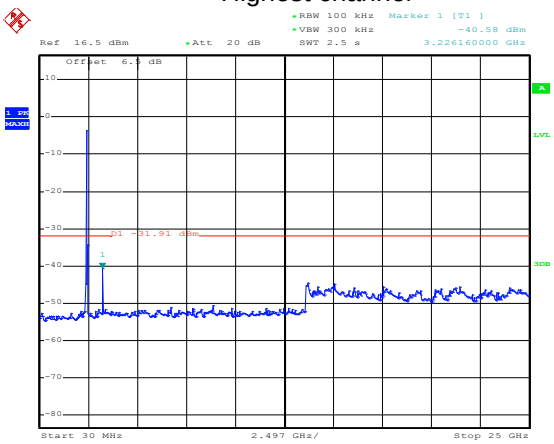
Date: 16.MAY.2019 14:56:25

Highest channel



Date: 16.MAY.2019 14:54:22

Highest channel



Date: 16.MAY.2019 14:57:20

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:

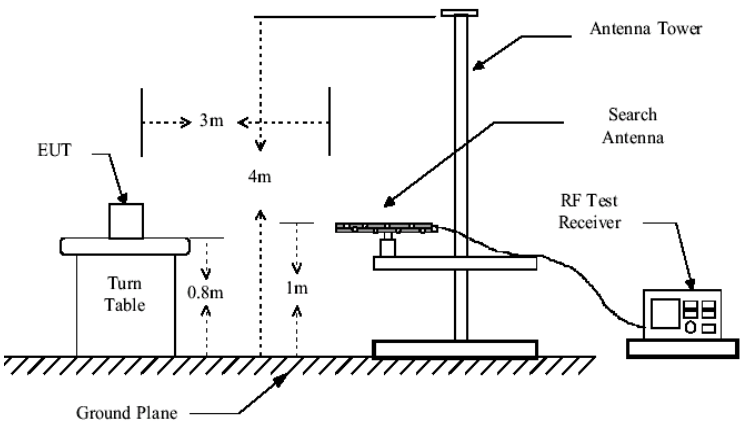
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Procedure:

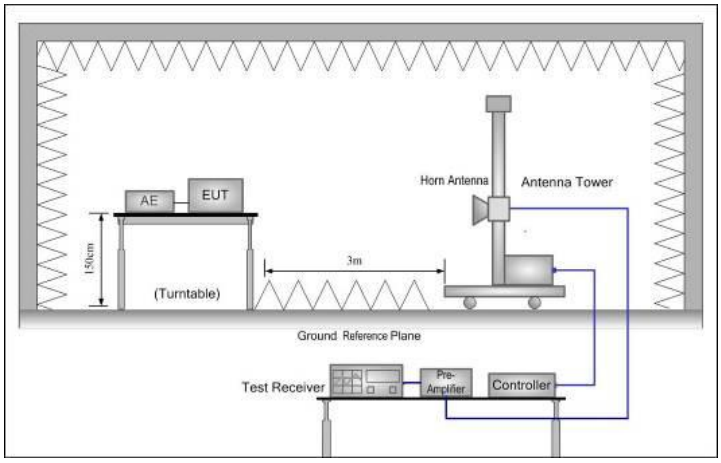
1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted 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



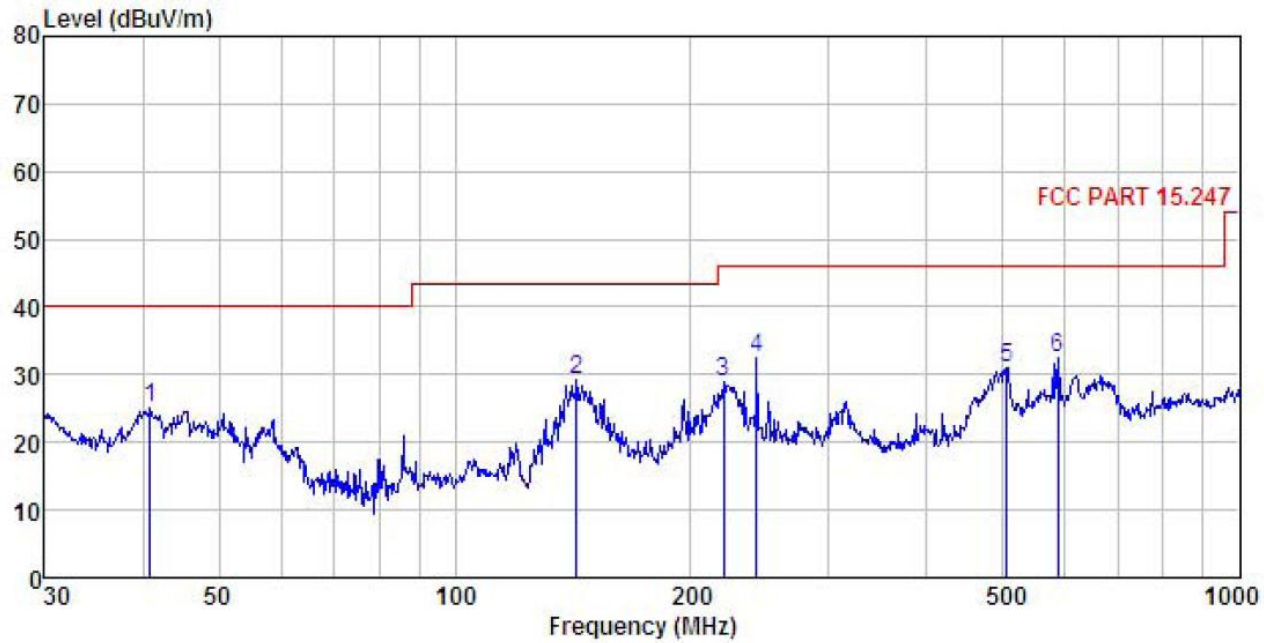
Above 1GHz

	
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:

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	Wi-Fi Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

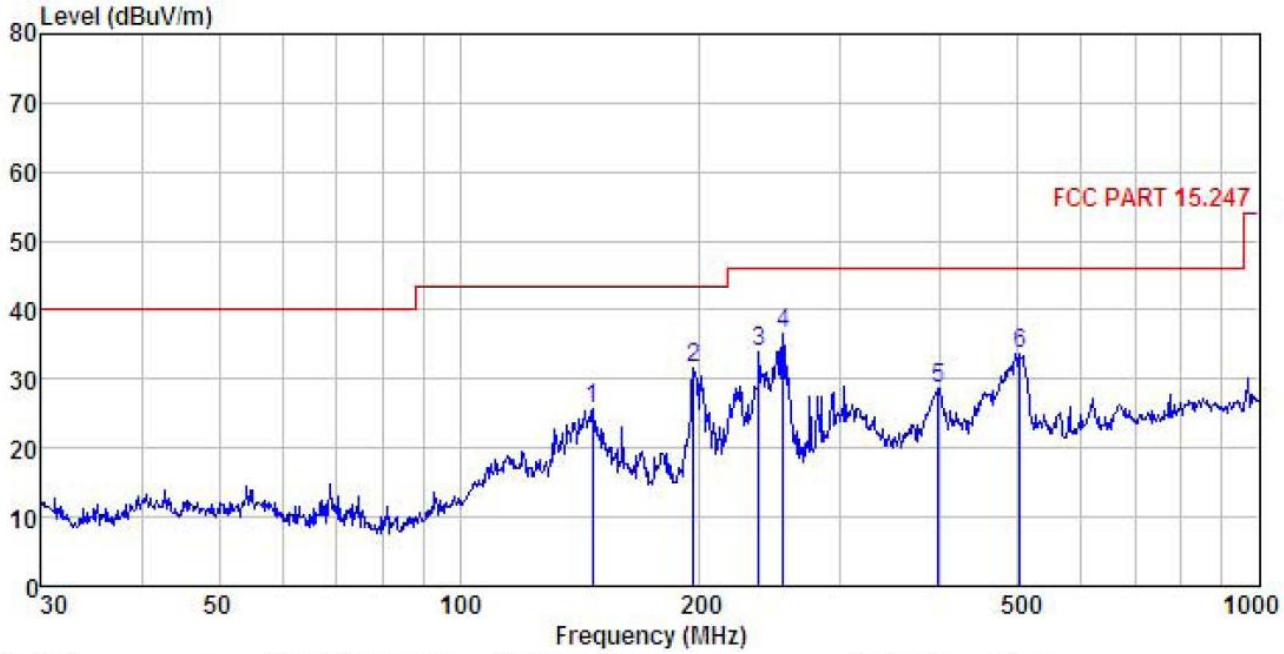


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	40.845	41.24	12.39	1.22	29.89	24.96	40.00	-15.04	QP
2	142.824	46.64	9.31	2.43	29.26	29.12	43.50	-14.38	QP
3	219.845	43.27	11.47	2.85	28.71	28.88	46.00	-17.12	QP
4	242.525	45.76	12.42	2.82	28.58	32.42	46.00	-13.58	QP
5	504.706	38.22	18.22	3.65	28.97	31.12	46.00	-14.88	QP
6	586.844	38.38	19.23	3.93	28.98	32.56	46.00	-13.44	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.*

Product Name:	4G wireless router	**Product model:**	LT15F
Test By:	Carey	**Test mode:**	Wi-Fi Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	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	146.888	43.44	9.09	2.47	29.24	25.76	43.50	-17.74	QP
2	196.510	46.98	10.50	2.84	28.85	31.47	43.50	-12.03	QP
3	236.645	47.52	12.18	2.83	28.61	33.92	46.00	-12.08	QP
4	253.837	49.62	12.76	2.82	28.53	36.67	46.00	-9.33	QP
5	397.633	39.00	15.26	3.08	28.77	28.57	46.00	-17.43	QP
6	502.940	40.71	18.21	3.64	28.96	33.60	46.00	-12.40	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

SISO-ANT 0								
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	46.91	36.06	6.81	41.82	47.96	74.00	-26.04	Vertical
4824.00	46.88	36.06	6.81	41.82	47.93	74.00	-26.07	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	38.05	36.06	6.81	41.82	39.10	54.00	-14.90	Vertical
4824.00	37.14	36.06	6.81	41.82	38.19	54.00	-15.81	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	50.39	36.32	6.85	41.84	51.72	74.00	-22.28	Vertical
4874.00	49.81	36.32	6.85	41.84	51.14	74.00	-22.86	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	41.13	36.32	6.85	41.84	42.46	54.00	-11.54	Vertical
4874.00	40.28	36.32	6.85	41.84	41.61	54.00	-12.39	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	47.28	36.58	6.89	41.86	48.89	74.00	-25.11	Vertical
4924.00	46.84	36.58	6.89	41.86	48.45	74.00	-25.55	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	42.21	36.58	6.89	41.86	43.82	54.00	-10.18	Vertical
4924.00	37.85	36.58	6.89	41.86	39.46	54.00	-14.54	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.*

SISO-ANT 0								
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	46.85	36.06	6.81	41.82	47.90	74.00	-26.10	Vertical
4824.00	46.34	36.06	6.81	41.82	47.39	74.00	-26.62	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	38.01	36.06	6.81	41.82	39.06	54.00	-14.94	Vertical
4824.00	37.12	36.06	6.81	41.82	38.17	54.00	-15.83	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	49.58	36.32	6.85	41.84	50.91	74.00	-23.09	Vertical
4874.00	49.37	36.32	6.85	41.84	50.70	74.00	-23.30	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	38.14	36.32	6.85	41.84	39.47	54.00	-14.53	Vertical
4874.00	39.48	36.32	6.85	41.84	40.81	54.00	-13.19	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	47.13	36.58	6.89	41.86	48.74	74.00	-25.26	Vertical
4924.00	46.52	36.58	6.89	41.86	48.13	74.00	-25.87	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	37.14	36.58	6.89	41.86	38.75	54.00	-15.25	Vertical
4924.00	37.53	36.58	6.89	41.86	39.14	54.00	-14.86	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.*

SISO-ANT 1								
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	46.91	36.06	6.81	41.82	47.96	74.00	-26.04	Vertical
4824.00	46.88	36.06	6.81	41.82	47.93	74.00	-26.07	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	38.05	36.06	6.81	41.82	39.10	54.00	-14.90	Vertical
4824.00	37.14	36.06	6.81	41.82	38.19	54.00	-15.81	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	50.39	36.32	6.85	41.84	51.72	74.00	-22.28	Vertical
4874.00	49.81	36.32	6.85	41.84	51.14	74.00	-22.86	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	41.13	36.32	6.85	41.84	42.46	54.00	-11.54	Vertical
4874.00	40.28	36.32	6.85	41.84	41.61	54.00	-12.39	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	47.28	36.58	6.89	41.86	48.89	74.00	-25.11	Vertical
4924.00	46.84	36.58	6.89	41.86	48.45	74.00	-25.55	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	42.21	36.58	6.89	41.86	43.82	54.00	-10.18	Vertical
4924.00	37.85	36.58	6.89	41.86	39.46	54.00	-14.54	Horizontal

Remark:

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

SISO-ANT 1								
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	46.85	36.06	6.81	41.82	47.90	74.00	-26.10	Vertical
4824.00	46.34	36.06	6.81	41.82	47.39	74.00	-26.62	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	38.01	36.06	6.81	41.82	39.06	54.00	-14.94	Vertical
4824.00	37.12	36.06	6.81	41.82	38.17	54.00	-15.83	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	49.58	36.32	6.85	41.84	50.91	74.00	-23.09	Vertical
4874.00	49.37	36.32	6.85	41.84	50.70	74.00	-23.30	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	38.14	36.32	6.85	41.84	39.47	54.00	-14.53	Vertical
4874.00	39.48	36.32	6.85	41.84	40.81	54.00	-13.19	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	47.13	36.58	6.89	41.86	48.74	74.00	-25.26	Vertical
4924.00	46.52	36.58	6.89	41.86	48.13	74.00	-25.87	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	37.14	36.58	6.89	41.86	38.75	54.00	-15.25	Vertical
4924.00	37.53	36.58	6.89	41.86	39.14	54.00	-14.86	Horizontal

Remark:

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

MIMO								
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	45.25	36.06	6.81	41.82	46.30	74.00	-27.70	Vertical
4824.00	46.01	36.06	6.81	41.82	47.06	74.00	-26.94	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4824.00	36.63	36.06	6.81	41.82	37.68	54.00	-16.32	Vertical
4824.00	37.12	36.06	6.81	41.82	38.17	54.00	-15.83	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	49.42	36.32	6.85	41.84	50.75	74.00	-23.25	Vertical
4874.00	49.27	36.32	6.85	41.84	50.60	74.00	-23.40	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	38.01	36.32	6.85	41.84	39.34	54.00	-14.66	Vertical
4874.00	39.22	36.32	6.85	41.84	40.55	54.00	-13.45	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	47.02	36.58	6.89	41.86	48.63	74.00	-25.37	Vertical
4924.00	46.31	36.58	6.89	41.86	47.92	74.00	-26.08	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	37.07	36.58	6.89	41.86	38.68	54.00	-15.32	Vertical
4924.00	37.52	36.58	6.89	41.86	39.13	54.00	-14.87	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.*

MIMO								
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	45.11	36.06	6.81	41.82	46.16	74.00	-27.84	Vertical
4844.00	45.50	36.06	6.81	41.82	46.55	74.00	-27.45	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	36.23	36.06	6.81	41.82	37.28	54.00	-16.72	Vertical
4844.00	36.69	36.06	6.81	41.82	37.74	54.00	-16.26	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	49.37	36.32	6.85	41.84	50.70	74.00	-23.30	Vertical
4874.00	49.01	36.32	6.85	41.84	50.34	74.00	-23.66	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	39.15	36.32	6.85	41.84	40.48	54.00	-13.52	Vertical
4874.00	40.01	36.32	6.85	41.84	41.34	54.00	-12.66	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	46.69	36.45	6.87	41.85	48.16	74.00	-25.84	Vertical
4904.00	47.01	36.45	6.87	41.85	48.48	74.00	-25.52	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	37.45	36.45	6.87	41.85	38.92	54.00	-15.08	Vertical
4904.00	37.21	36.45	6.87	41.85	38.68	54.00	-15.32	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.*