FCC Test Report

Product Name	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Model No	BEC 6500X, BEC 6500VAL, BEC 6500AT, BEC 6500AEL, BiPAC 4500VAOZ, BiPAC 4500VAPZ, BiPAC 4500AZ, BiPAC 4500AZL
FCC ID.	QI3BIL-6500X

Applicant	Billion Electric Co., Ltd.
Address	8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)

Date of Receipt	Jan. 21, 2019
Issue Date	Apr. 01, 2019
Report No.	1910238R-RFUSP26V00
Report Version	V1.0

Testing Laboratory
3023

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the government.
The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Test Report

Issue Date: Apr. 01, 2019
Report No.: 1910238R-RFUSP26V00

Product Name	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Applicant	Billion Electric Co., Ltd.
Address	8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
Manufacturer	Billion Electric Co., Ltd.
Model No.	BEC 6500X, BEC 6500VAL, BEC 6500AT, BEC 6500AEL, BiPAC 4500VAOZ, BiPAC 4500VAPZ, BiPAC 4500AZ, BiPAC 4500AZL
FCC ID.	QI3BIL-6500X
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	BEC, Billion
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 15.247 Meas Guidance v05
Test Result	Complied

Documented By : Joanne Lin

(Senior Adm. Specialist / Joanne Lin)

Tested By : Ivan Chuang

(Senior Engineer / Ivan Chuang)

Approved By :

(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Trade Name	BEC, Billion
Model No.	BEC 6500X, BEC 6500VAL, BEC 6500AT, BEC 6500AEL, BiPAC 4500VAOZ, BiPAC 4500VAPZ, BiPAC 4500AZ, BiPAC 4500AZL
FCC ID.	QI3BIL-6500X
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW, 2422-2452MHz for 802.11n-40BW
Number of Channels	802.11b/g/n-20BW: 11, 802.11n-40BW: 7
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 300Mbps
Channel separation	802.11b/g/n: 5MHz
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Dipole Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Power Adapter	MFR: BILLION, M/N: BA024-150160AXU Input: AC 100-240V, 50/60Hz, 0.7A Output: DC 15V, 1.6A Cable Out: Non-shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	GRAND-TEK	1032G00000060 1032G00000070	Dipole	4.8dBi for 2.4 GHz

Note: The antenna of EUT is conforming to FCC 15.203.

802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

802.11n-40MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 03:	2422 MHz	Channel 04:	2427 MHz	Channel 05:	2432 MHz	Channel 06:	2437 MHz
Channel 07:	2442 MHz	Channel 08:	2447 MHz	Channel 09:	2452 MHz		

Note:

1. The EUT is an 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router with a built-in WLAN transceiver, the test report is for 2.4GHz WLAN.
2. The different of each model is shown as below:

The different description of Model						
Model No.	**Product Name**	**Trade Name**	**SIM slot** (2FF)	**Wireless**	**VoIP**	**VPN** (*software)
BEC 6500X	4G/LTE Multi-Service 11ac Broadband Router	BEC, Billion	1	802.11a/b/g/n/ac	O	O
BEC 6500VAL			1		O	X
BEC 6500AT			1		X	O
BEC 6500AEL			1		X	X
BiPAC 4500VAOZ	4G/LTE Wireless-AC VoIP Broadband Router		1		O	O
BiPAC 4500VAPZ			1		O	X
BiPAC 4500AZ	4G/LTE Wireless-AC Broadband Router		1		X	O
BiPAC 4500AZL			1		X	X
Remarks: "O" means function available , "X" means not support.						

3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps-Chain A(ANT 0)、802.11g is 6Mbps-Chain A(ANT 0)、802.11n-20BW is 14.4Mbps-Chain A+B(ANT 0+1) and 802.11n-40BW is 30Mbps-Chain A+B(ANT 0+1)).
5. These tests are conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)
	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)

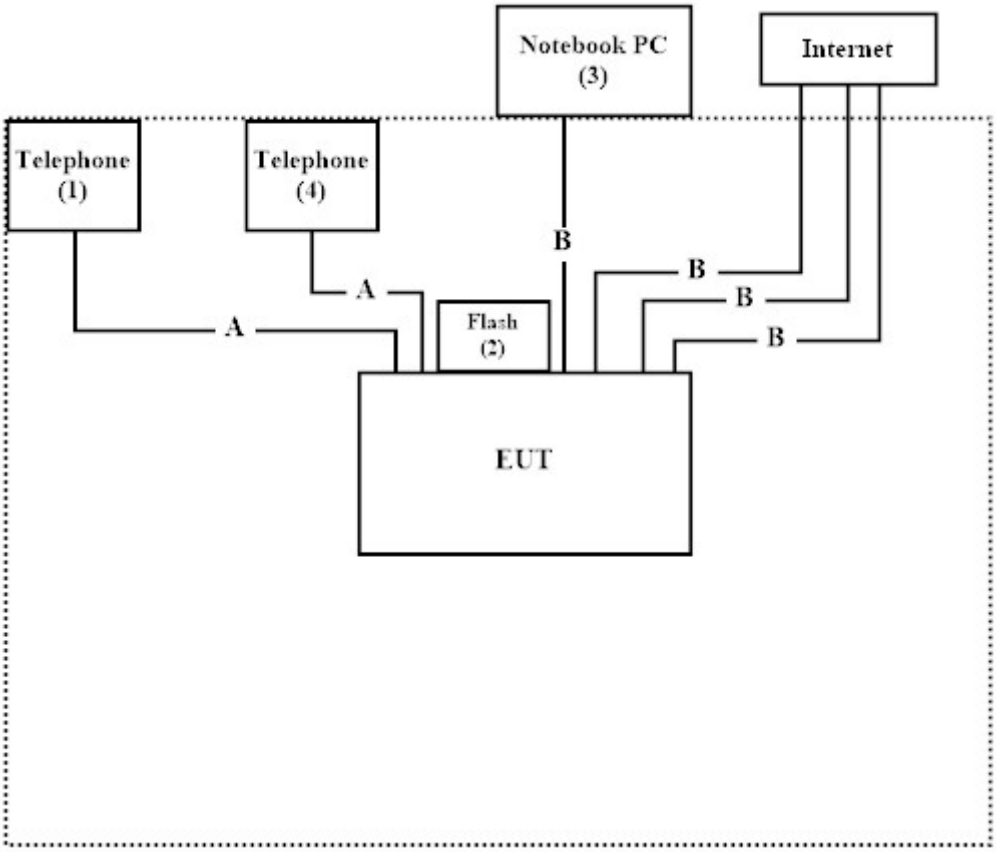
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Telephone	TOSHIBA	DP-5018	N/A	N/A
2	Flash	Transcend	16GB	N/A	N/A
3	Notebook PC	DELL	Inspiron 15 3000	4V5JPJ2	N/A
4	Telephone	TOSHIBA	DP-5018	N/A	N/A

Signal Cable Type		Signal cable Description
A	Telephone Cable	Non-shielded, 2.1m, two PCS.
B	LAN Cable	Non-shielded, 3m, four PCS.

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “MT7603 QA V0.0.0.60” on the Notebook PC.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd.
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New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW0023

1.7. List of Test Item and Equipment

For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101602	2018.12.17	2019.12.16
X	Two-Line V-Network	R&S	ENV216	101306	2019.03.11	2020.03.10
X	Two-Line V-Network	R&S	ENV216	101307	2018.03.20	2019.03.19
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2018.05.24	2019.05.23

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2019.01.25	2020.01.24
X	Power Meter	Anritsu	ML2496A	1548003	2018.12.19	2019.12.18
X	Power Sensor	Anritsu	MA2411B	1531024	2018.12.19	2019.12.18
X	Power Sensor	Anritsu	MA2411B	1531025	2018.12.19	2019.12.18

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test System V9.0.1

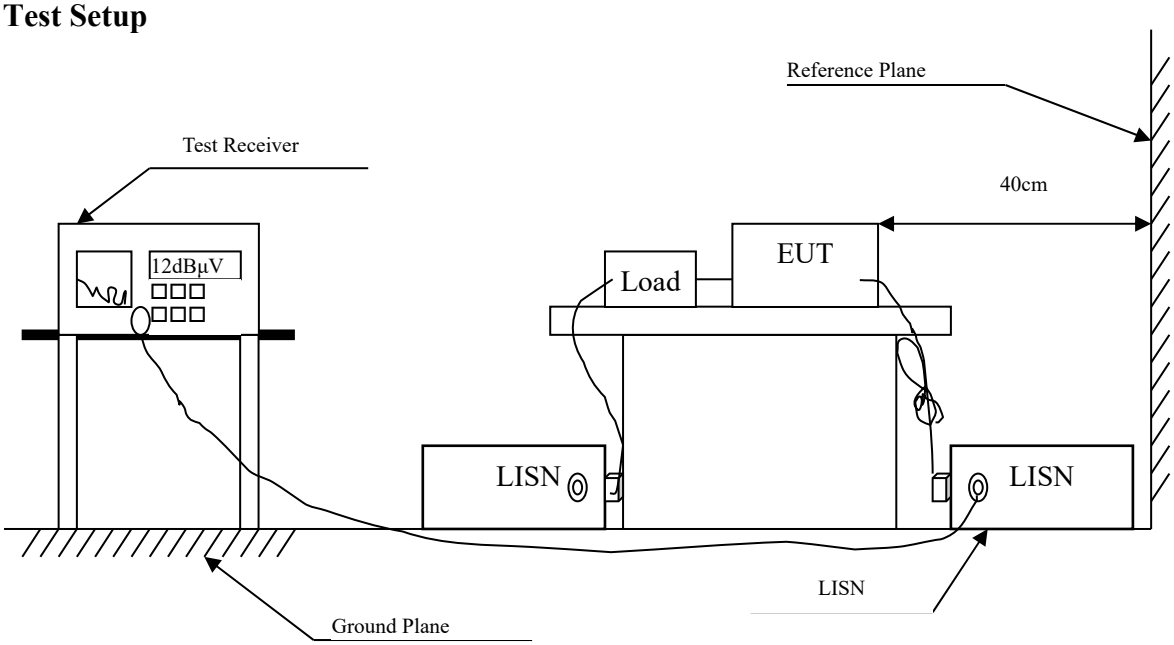
For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2019.02.22	2020.02.21
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2018.04.02	2019.04.01
X	Horn Antenna	ETS-Lindgren	3117	00203800	2018.12.11	2019.12.10
X	Horn Antenna	Com-Power	AH-840	101087	2018.06.01	2019.05.31
X	Pre-Amplifier	EMCI	EMC001330	980316	2018.06.01	2019.05.31
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2018.06.04	2019.06.03
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2018.06.04	2019.06.03
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2018.05.16	2019.05.15
X	Filter	MICRO TRONICS	BRM50702	G251	2018.09.04	2019.09.03
	Filter	MICRO TRONICS	BRM50716	G188	2018.09.04	2019.09.03
X	EMI Test Receiver	R&S	ESR7	101602	2018.12.17	2019.12.16
X	Spectrum Analyzer	R&S	FSV40	101148	2019.02.20	2020.02.19
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2018.05.25	2019.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2018.05.16	2019.05.15

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

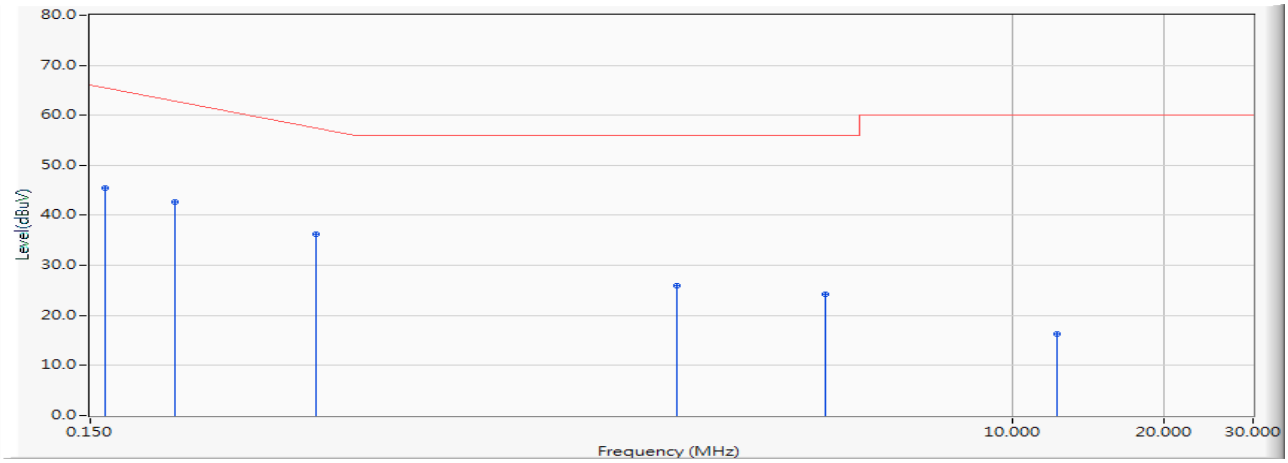
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Uncertainty

± 2.35 dB

2.5. Test Result of Conducted Emission

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2437MHz)
Test Date	:	2019/01/25

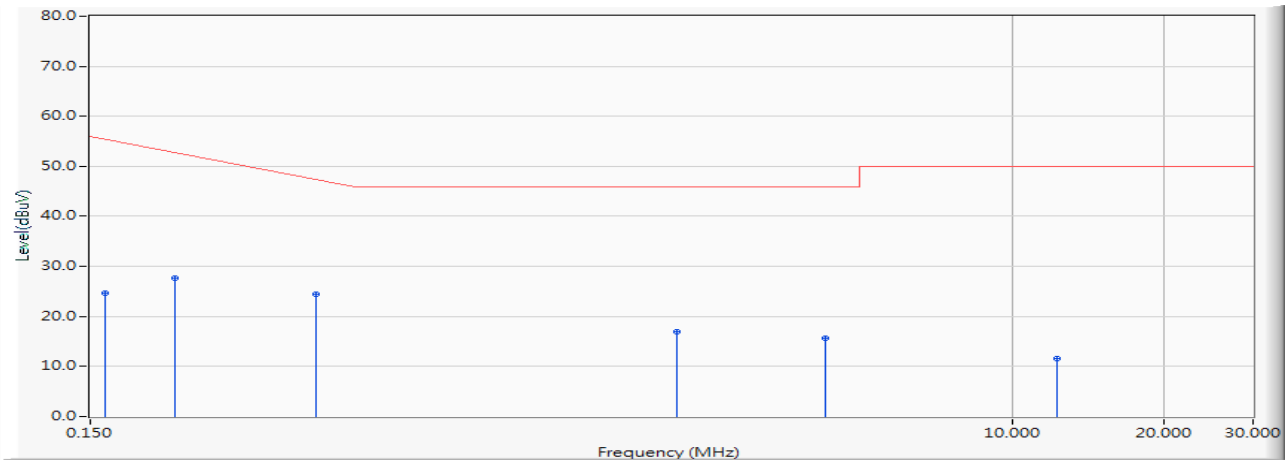


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV)	Margin (dB)	Limit (dBµV)	Detector Type
1	*	0.160	9.610	35.879	45.489	-20.225	65.714	QUASIPEAK
2		0.220	9.611	33.055	42.666	-21.334	64.000	QUASIPEAK
3		0.420	9.624	26.715	36.340	-21.946	58.286	QUASIPEAK
4		2.165	9.662	16.329	25.991	-30.009	56.000	QUASIPEAK
5		4.287	9.723	14.423	24.146	-31.854	56.000	QUASIPEAK
6		12.250	9.872	6.383	16.255	-43.745	60.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "*" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2437MHz)
Test Date	:	2019/01/25

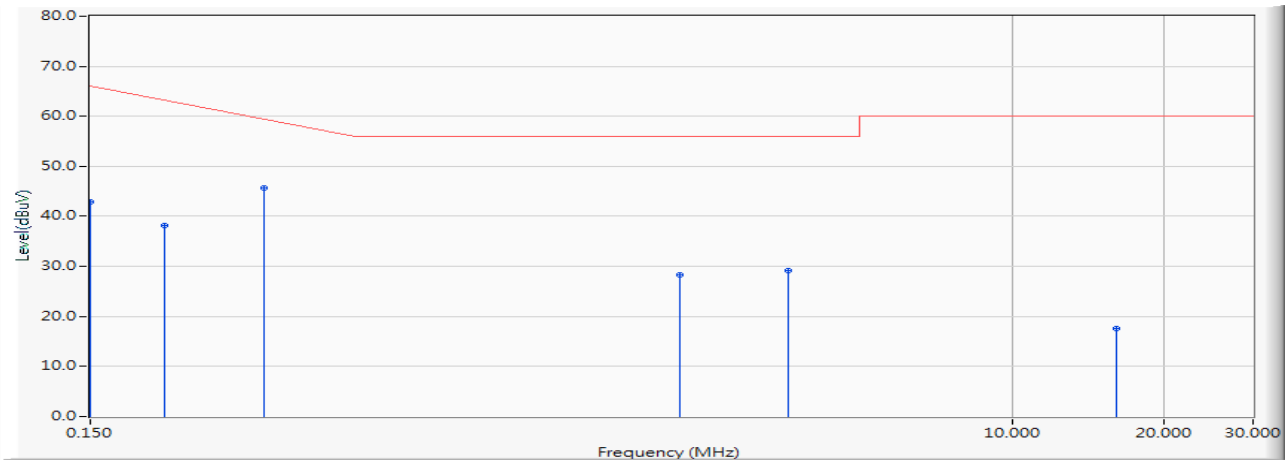


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV)	Margin (dB)	Limit (dBµV)	Detector Type
1		0.160	9.610	15.124	24.734	-30.980	55.714	AVERAGE
2		0.220	9.611	17.965	27.576	-26.424	54.000	AVERAGE
3	*	0.420	9.624	14.730	24.354	-23.932	48.286	AVERAGE
4		2.165	9.662	7.254	16.916	-29.084	46.000	AVERAGE
5		4.287	9.723	5.900	15.623	-30.377	46.000	AVERAGE
6		12.250	9.872	1.750	11.622	-38.378	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "*" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Conducted Emission Test
Power Line	:	Line 2
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2437MHz)
Test Date	:	2019/01/25

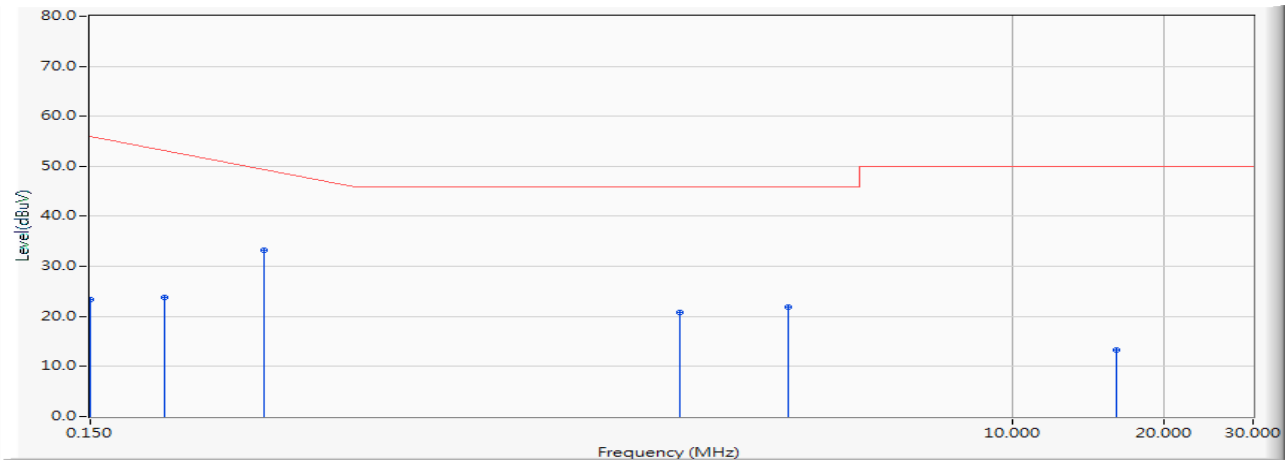


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV)	Margin (dB)	Limit (dBµV)	Detector Type
1		0.150	9.601	33.221	42.822	-23.178	66.000	QUASIPEAK
2		0.210	9.610	28.522	38.132	-26.154	64.286	QUASIPEAK
3	*	0.330	9.615	36.016	45.630	-15.227	60.857	QUASIPEAK
4		2.200	9.662	18.714	28.376	-27.624	56.000	QUASIPEAK
5		3.600	9.706	19.362	29.068	-26.932	56.000	QUASIPEAK
6		16.080	9.946	7.577	17.523	-42.477	60.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "*" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Conducted Emission Test
Power Line	:	Line 2
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2437MHz)
Test Date	:	2019/01/25



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV)	Margin (dB)	Limit (dBµV)	Detector Type
1		0.150	9.601	13.712	23.313	-32.687	56.000	AVERAGE
2		0.210	9.610	14.098	23.708	-30.578	54.286	AVERAGE
3	*	0.330	9.615	23.667	33.281	-17.576	50.857	AVERAGE
4		2.200	9.662	11.145	20.807	-25.193	46.000	AVERAGE
5		3.600	9.706	12.116	21.822	-24.178	46.000	AVERAGE
6		16.080	9.946	3.255	13.201	-36.799	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "*" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Setup

3.2. Limits

The maximum peak power shall be less 1 Watt.

3.3. Test Procedure

Tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 8.3.1.3 PKPM1 Peak power meter method. The maximum average conducted output power using KDB 558074 section 8.3.2.3 Method (Measurement using a gated RF average-reading power meter)

3.4. Uncertainty

±0.86 dB

3.5. Test Result of Peak Power Output

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Peak Power Output Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)
Test Date : 2019/03/05

Chain A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	20.42	--	--	--	22.38	<30dBm	Pass
06	2437	19.97	19.95	19.91	19.88	21.92	<30dBm	Pass
11	2462	19.93	--	--	--	21.84	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Peak Power Output Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)
Test Date : 2019/04/01

Chain A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	19.73	--	--	--	--	--	--	--	27.95	<30dBm	Pass
06	2437	18.91	18.89	18.85	18.82	18.79	18.77	18.75	18.67	27.72	<30dBm	Pass
10	2457	17.93	--	--	--	--	--	--	--	26.88	<30dBm	Pass
11	2462	16.83	--	--	--	--	--	--	--	25.97	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Peak Power Output Data
Test Mode : Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)
Test Date : 2019/03/05

Chain A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		14.4	28.9	43.3	57.8	86.7	115.6	130	144.4	14.4		
		Measurement Level (dBm)										
01	2412	15.34	--	--	--	--	--	--	--	24.01	<30dBm	Pass
06	2437	14.76	14.73	14.71	14.68	14.65	14.62	14.59	14.55	23.43	<30dBm	Pass
11	2462	15.42	--	--	--	--	--	--	--	24.14	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Chain B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		14.4	28.9	43.3	57.8	86.7	115.6	130	144.4	14.4		
		Measurement Level (dBm)										
01	2412	15.62	--	--	--	--	--	--	--	24.15	<30dBm	Pass
06	2437	15.47	15.42	15.41	15.38	15.36	15.32	15.28	15.24	24.12	<30dBm	Pass
11	2462	15.96	--	--	--	--	--	--	--	25.06	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Chain A+B

Channel No	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	14.4	24.01	24.15	27.09	<30dBm	Pass
06	2437	14.4	23.43	24.12	26.80	<30dBm	Pass
11	2462	14.4	24.14	25.06	27.63	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Peak Power Output Data
Test Mode : Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)
Test Date : 2019/04/01

Chain A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		30	60	90	120	180	240	270	300	30		
		Measurement Level (dBm)										
03	2422	17.38	--	--	--	--	--	--	--	26.16	<30dBm	Pass
06	2437	16.51	16.49	16.45	16.42	16.38	16.35	16.31	16.28	25.72	<30dBm	Pass
08	2447	16.31	--	--	--	--	--	--	--	25.61	<30dBm	Pass
09	2452	14.74	--	--	--	--	--	--	--	23.59	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Chain B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		30	60	90	120	180	240	270	300	30		
		Measurement Level (dBm)										
03	2422	17.54	--	--	--	--	--	--	--	26.76	<30dBm	Pass
06	2437	17.39	17.36	17.33	17.28	17.25	17.22	17.18	17.15	26.48	<30dBm	Pass
08	2447	16.47	--	--	--	--	--	--	--	25.52	<30dBm	Pass
09	2452	15.61	--	--	--	--	--	--	--	24.21	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Chain A+B

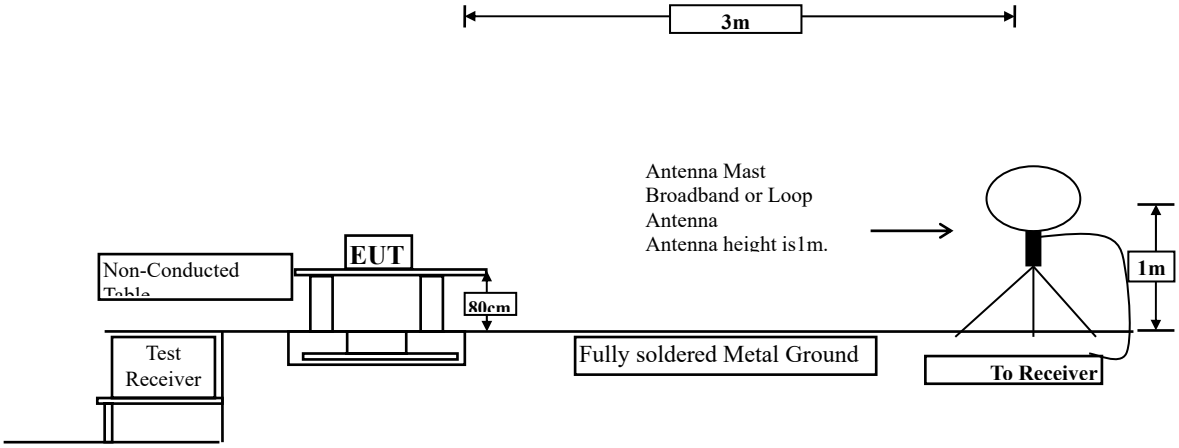
Channel No	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
03	2422	30	26.16	26.76	29.48	<30dBm	Pass
06	2437	30	25.72	26.48	29.13	<30dBm	Pass
08	2447	30	25.61	25.52	28.58	<30dBm	Pass
09	2452	30	23.59	24.21	26.92	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

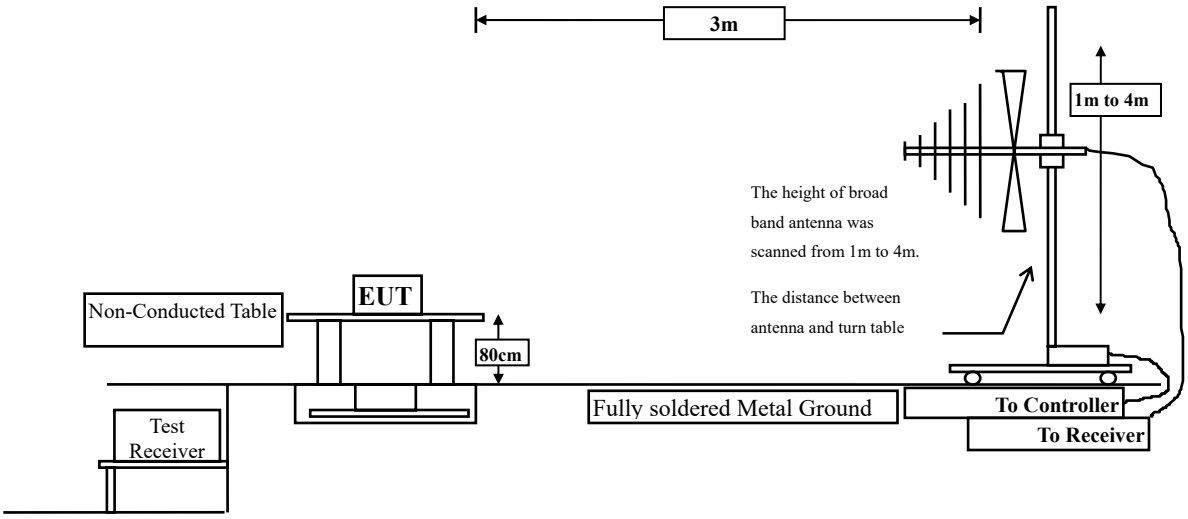
4. Radiated Emission

4.1. Test Setup

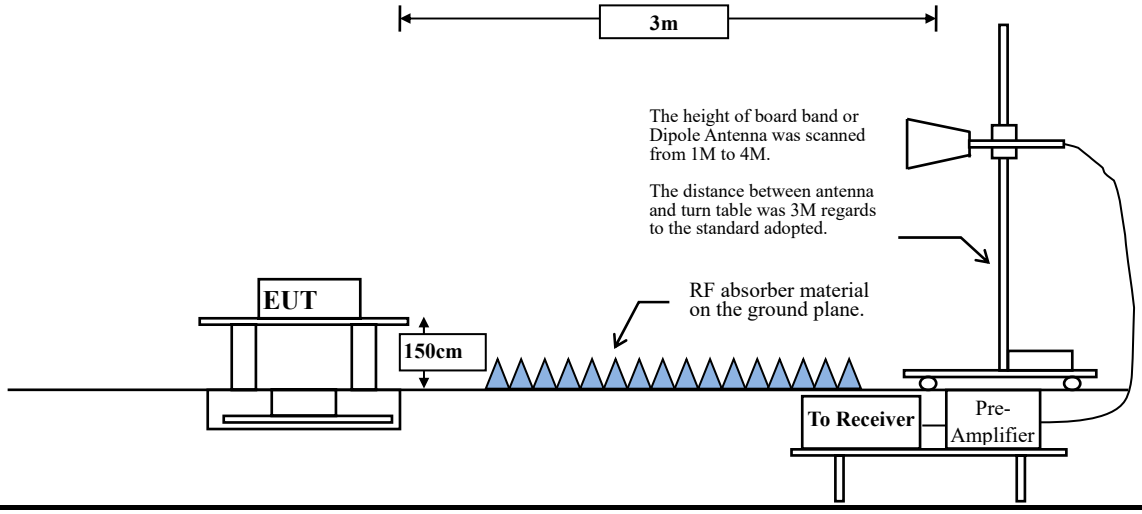
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks:
1. RF Voltage (dBμV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to KDB 558074 Peak power measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to KDB 558074 Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	99.66	--	--	10
802.11g	98.98	--	--	10
802.11n20	88.38	0.6840	1462	2k
802.11n40	73.66	0.3565	2805	3k

Note: Duty Cycle Refer to Section 9

4.4. Uncertainty

Horizontal polarization：

30-300MHz: ±4.08dB；300M-1GHz: ±3.86dB；1-18GHz: ±3.77dB；18-40GHz: ±3.98dB

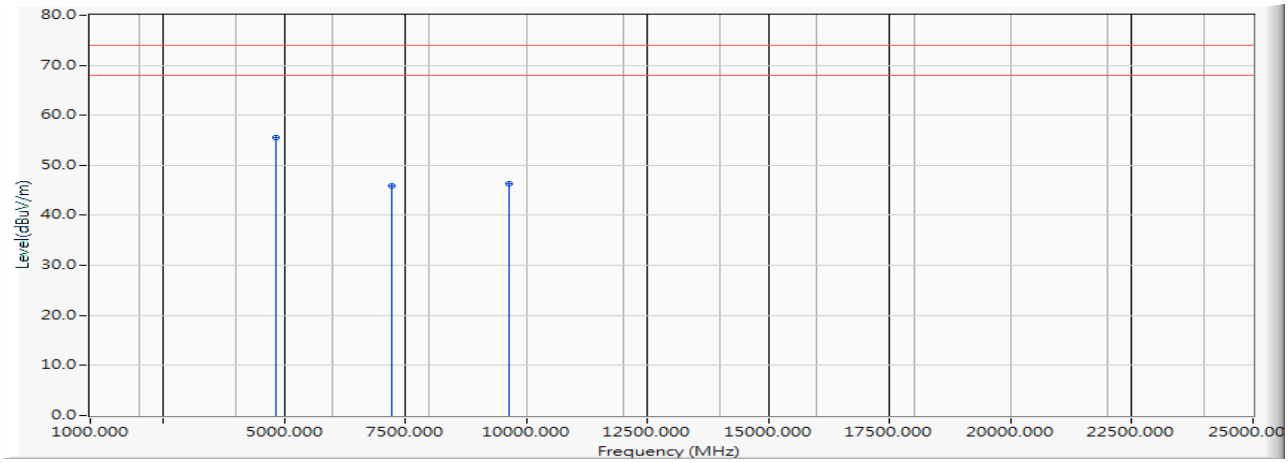
Vertical polarization：

30-300MHz: ±4.81dB；300M-1GHz: ±3.87dB；1-18GHz：±3.83dB；18-40GHz: ±3.98dB

4.5. Test Result of Radiated Emission

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



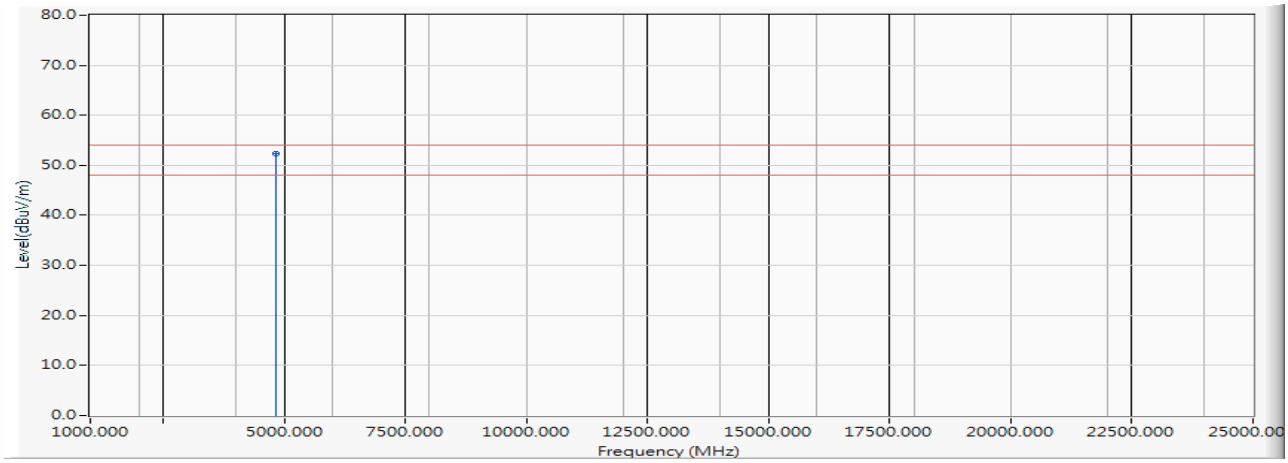
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	61.600	55.515	-18.485	74.000	PEAK
2		7236.000	-3.033	48.940	45.907	-28.093	74.000	PEAK
3		9648.000	-0.680	46.960	46.280	-27.720	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



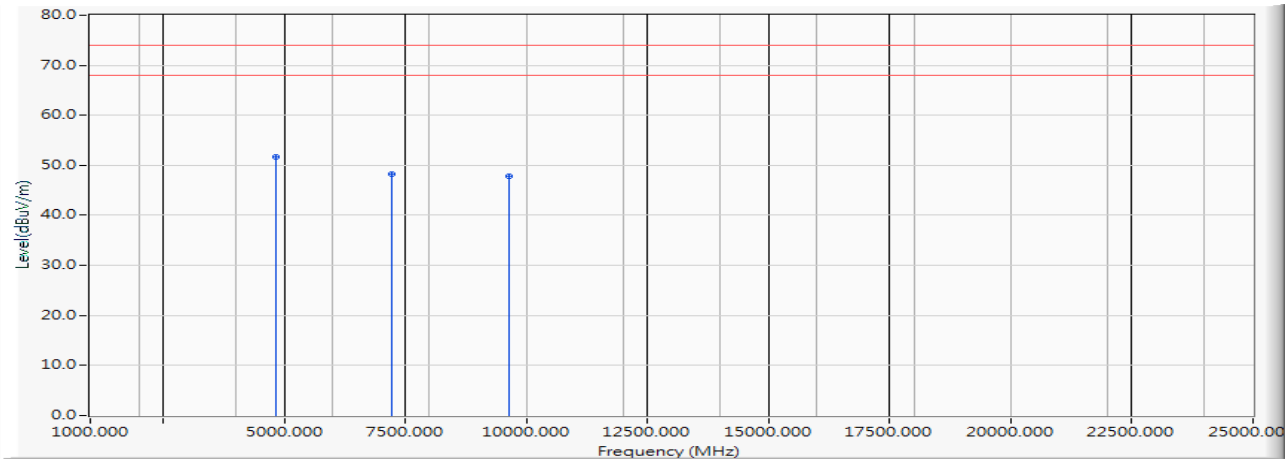
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	58.370	52.285	-1.715	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Vertical



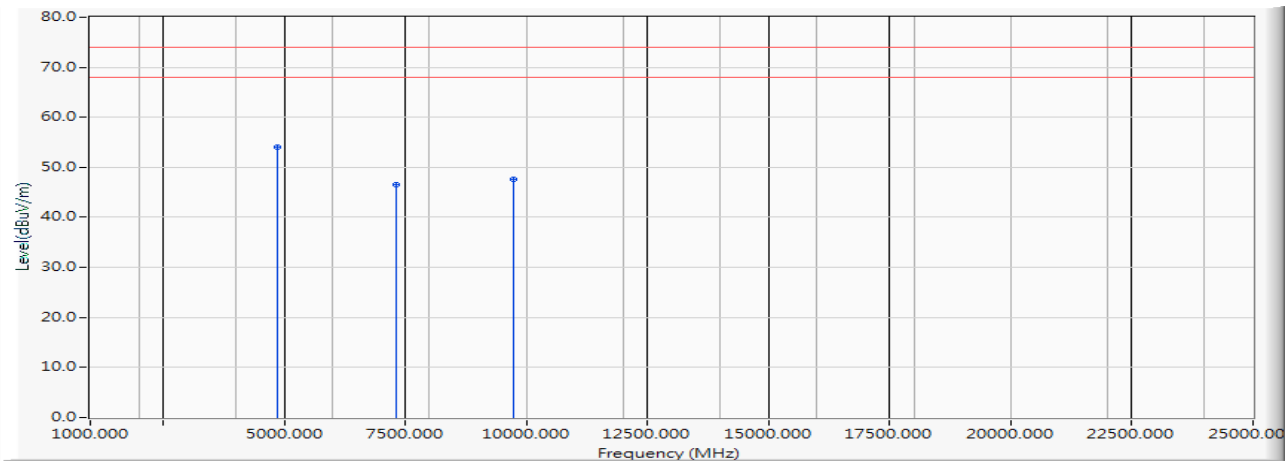
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	57.770	51.685	-22.315	74.000	PEAK
2		7236.000	-3.033	51.260	48.227	-25.773	74.000	PEAK
3		9648.000	-0.680	48.420	47.740	-26.260	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)
Test Date	:	2019/02/25

Horizontal



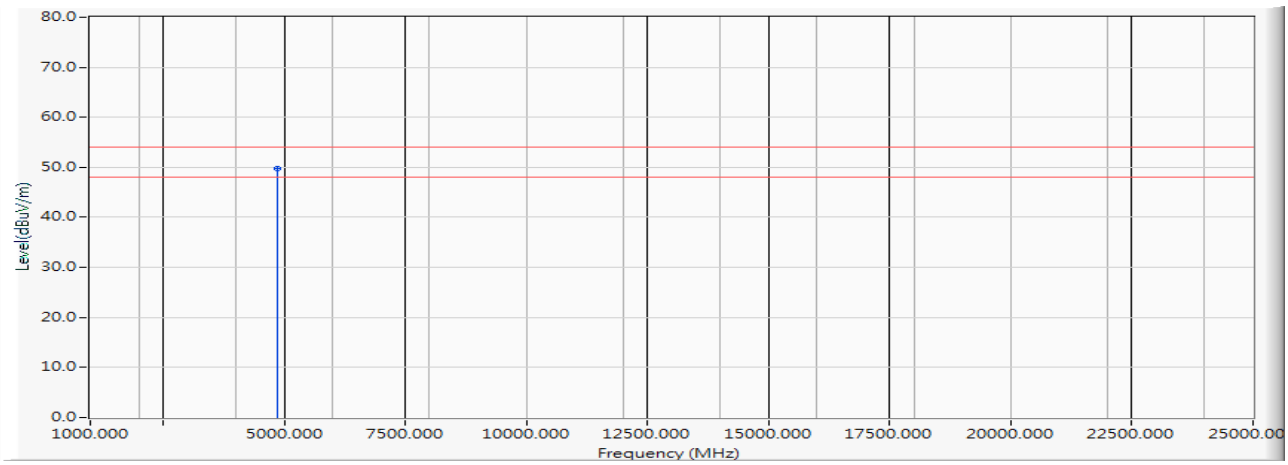
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	60.210	54.155	-19.845	74.000	PEAK
2		7311.000	-2.976	49.420	46.445	-27.555	74.000	PEAK
3		9748.000	-0.502	48.070	47.568	-26.432	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)
Test Date	:	2019/02/25

Horizontal



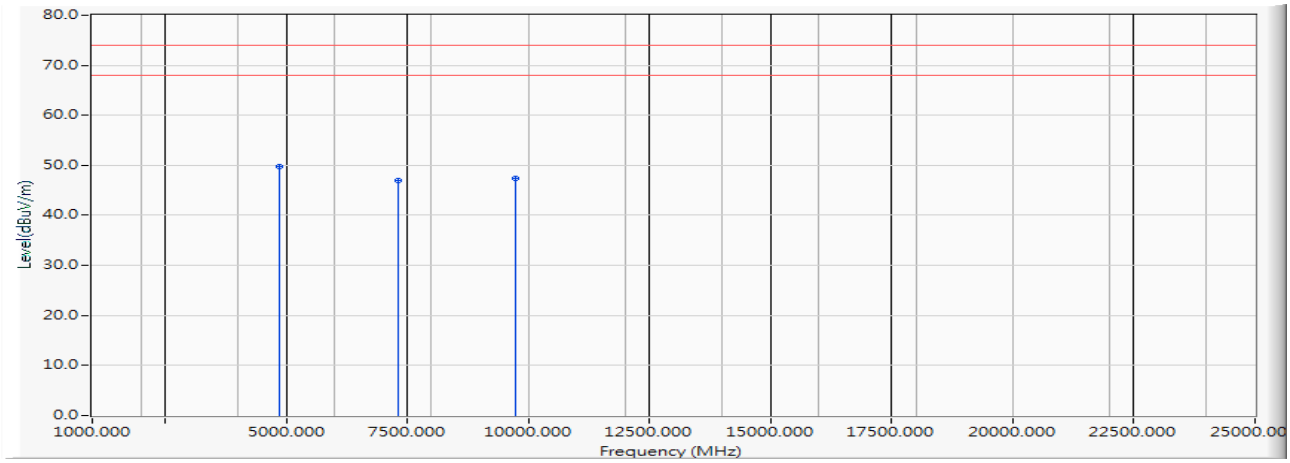
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	55.870	49.815	-4.185	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)
Test Date	:	2019/02/25

Vertical



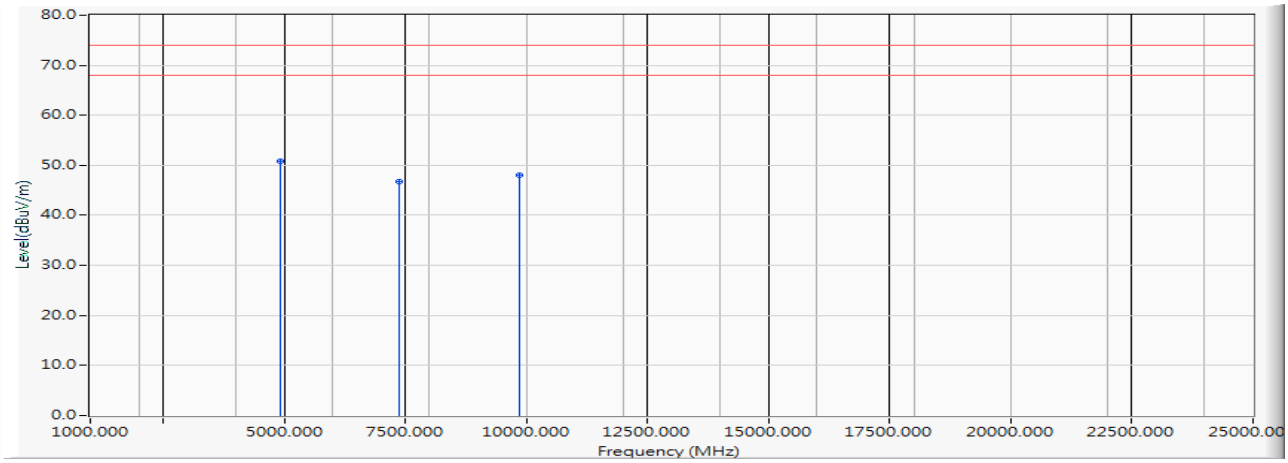
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	55.770	49.715	-24.285	74.000	PEAK
2		7311.000	-2.976	50.050	47.075	-26.925	74.000	PEAK
3		9748.000	-0.502	47.950	47.448	-26.552	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)
Test Date	:	2019/02/25

Horizontal



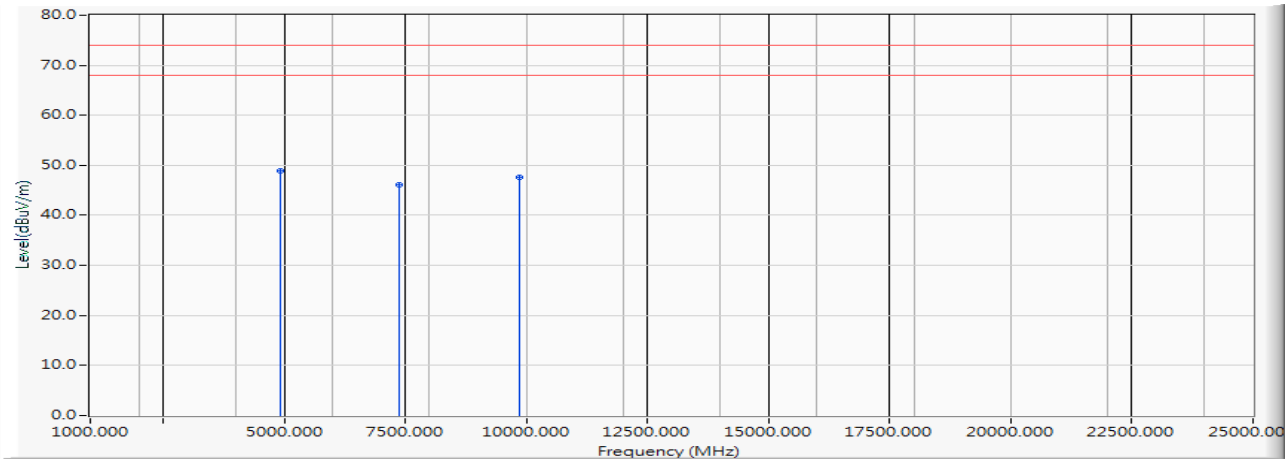
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4924.000	-6.041	56.780	50.740	-23.260	74.000	PEAK
2		7386.000	-2.861	49.550	46.688	-27.312	74.000	PEAK
3		9848.000	-0.399	48.430	48.031	-25.969	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)
Test Date	:	2019/02/25

Vertical



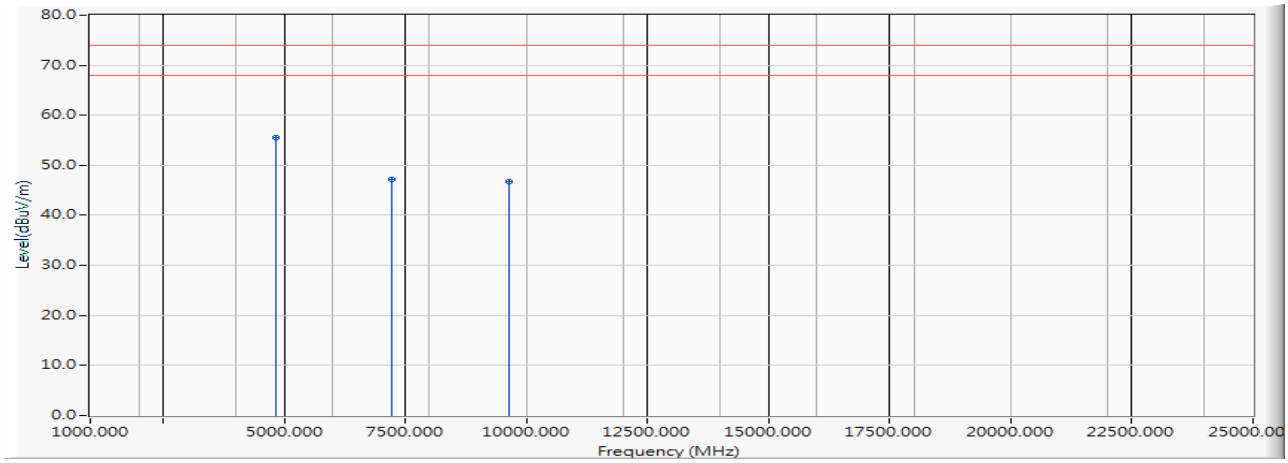
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4924.000	-6.041	54.990	48.950	-25.050	74.000	PEAK
2		7386.000	-2.861	49.060	46.198	-27.802	74.000	PEAK
3		9848.000	-0.399	47.960	47.561	-26.439	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



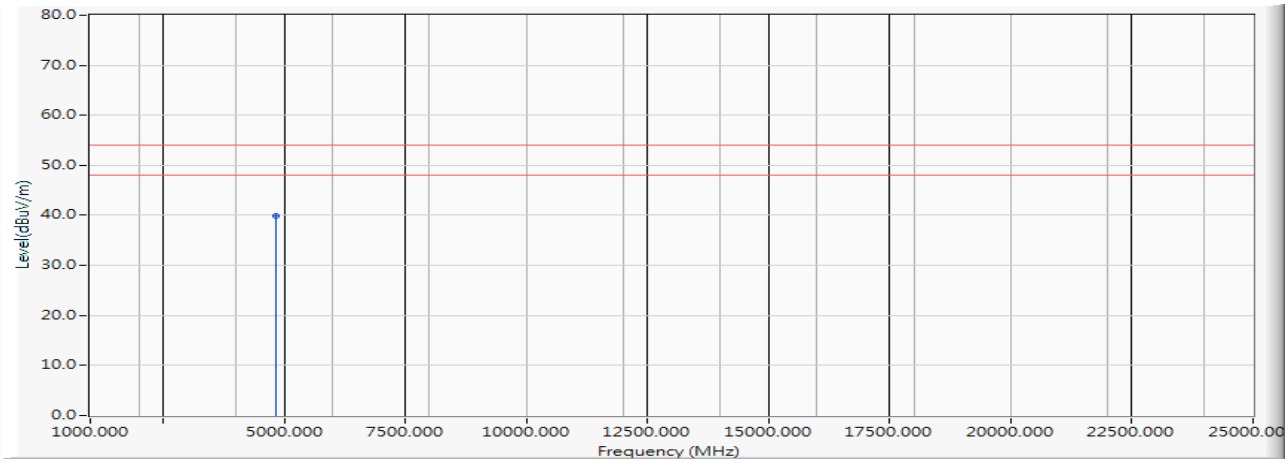
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	61.590	55.505	-18.495	74.000	PEAK
2		7236.000	-3.033	50.320	47.287	-26.713	74.000	PEAK
3		9648.000	-0.680	47.350	46.670	-27.330	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



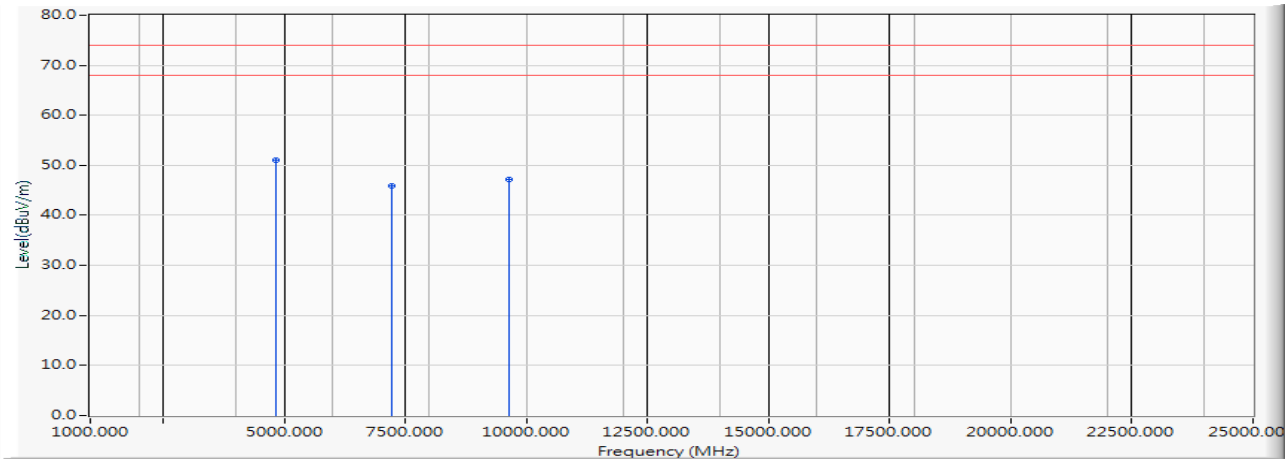
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	46.050	39.965	-14.035	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Vertical



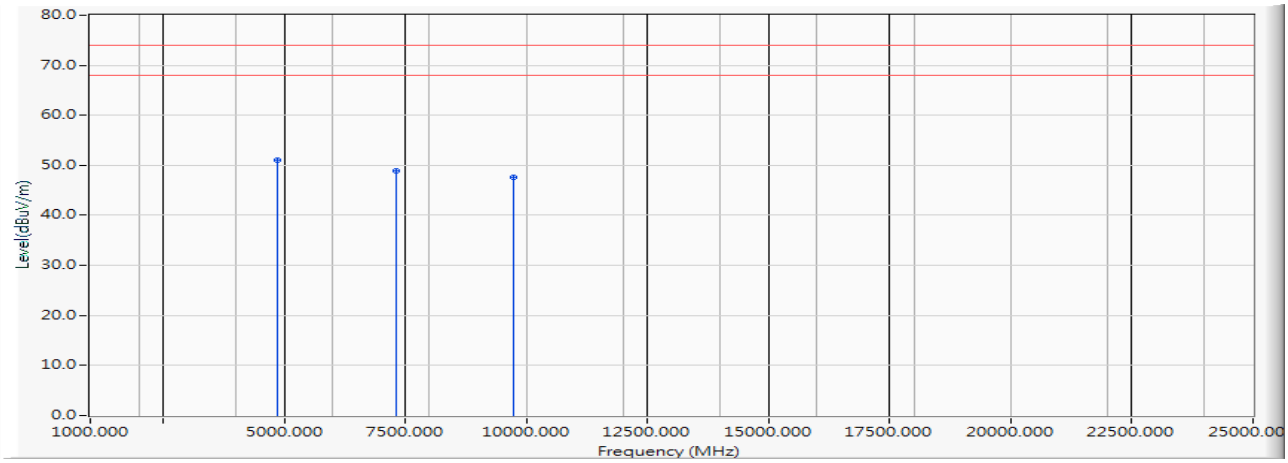
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	57.140	51.055	-22.945	74.000	PEAK
2		7236.000	-3.033	48.980	45.947	-28.053	74.000	PEAK
3		9648.000	-0.680	47.780	47.100	-26.900	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)
Test Date	:	2019/02/25

Horizontal



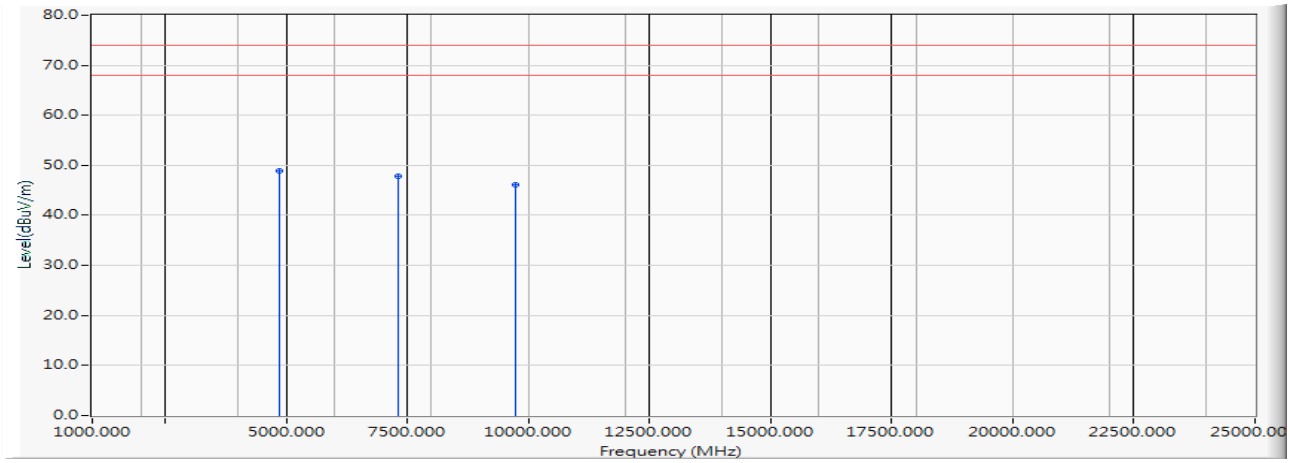
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	57.120	51.065	-22.935	74.000	PEAK
2		7311.000	-2.976	51.980	49.005	-24.995	74.000	PEAK
3		9748.000	-0.502	48.170	47.668	-26.332	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)
Test Date	:	2019/02/25

Vertical



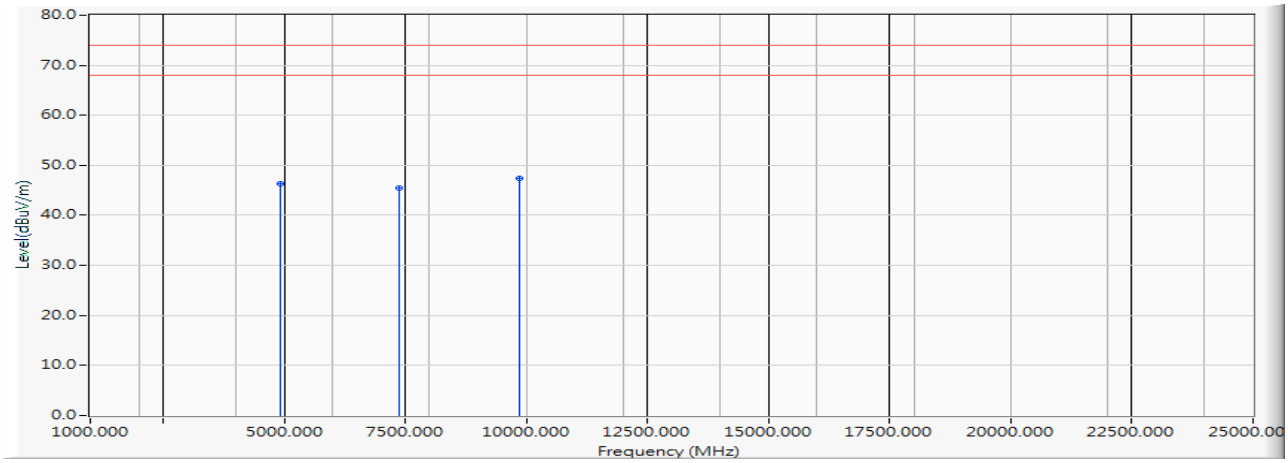
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	54.850	48.795	-25.205	74.000	PEAK
2		7311.000	-2.976	50.760	47.785	-26.215	74.000	PEAK
3		9748.000	-0.502	46.550	46.048	-27.952	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)
Test Date	:	2019/02/25

Horizontal



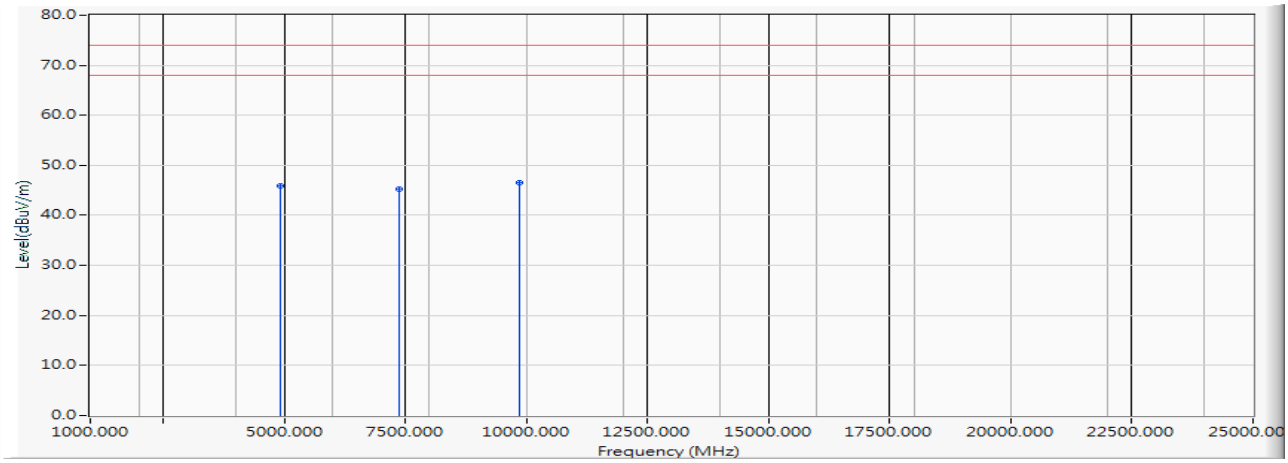
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		4924.000	-6.041	52.450	46.410	-27.590	74.000	PEAK
2		7386.000	-2.861	48.320	45.458	-28.542	74.000	PEAK
3	*	9848.000	-0.399	47.810	47.411	-26.589	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)
Test Date	:	2019/02/25

Vertical



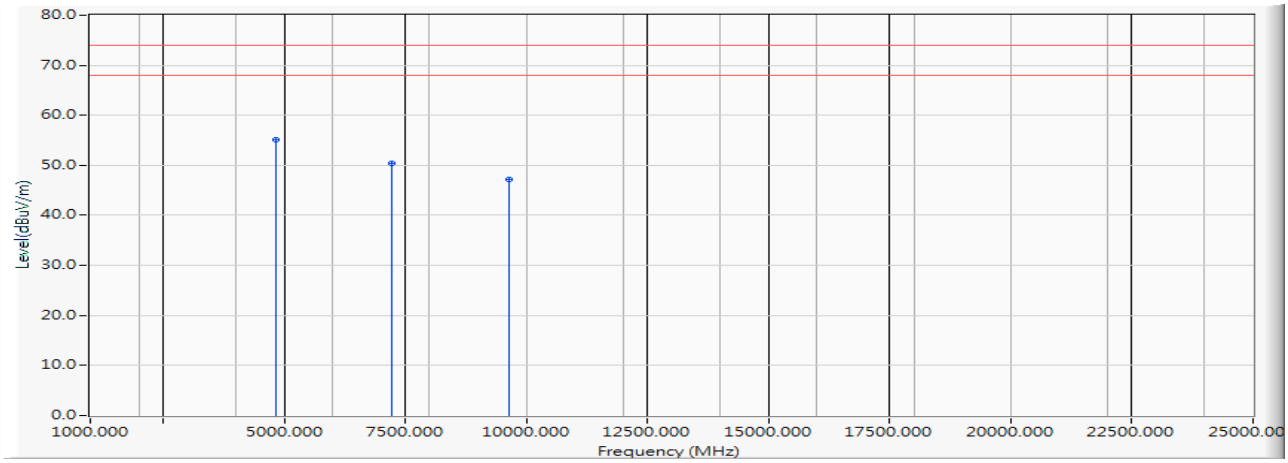
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4924.000	-6.041	51.870	45.830	-28.170	74.000	PEAK
2		7386.000	-2.861	48.170	45.308	-28.692	74.000	PEAK
3		9848.000	-0.399	46.980	46.581	-27.419	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)(2412MHz)
Test Date	:	2019/02/25

Horizontal



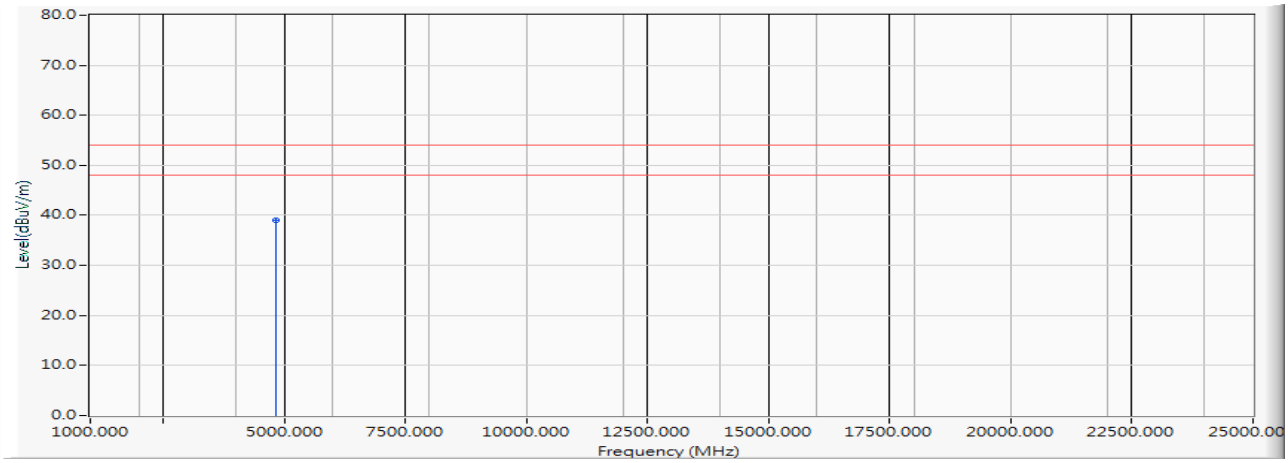
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	61.250	55.165	-18.835	74.000	PEAK
2		7236.000	-3.033	53.520	50.487	-23.513	74.000	PEAK
3		9648.000	-0.680	47.850	47.170	-26.830	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)(2412MHz)
Test Date	:	2019/02/25

Horizontal



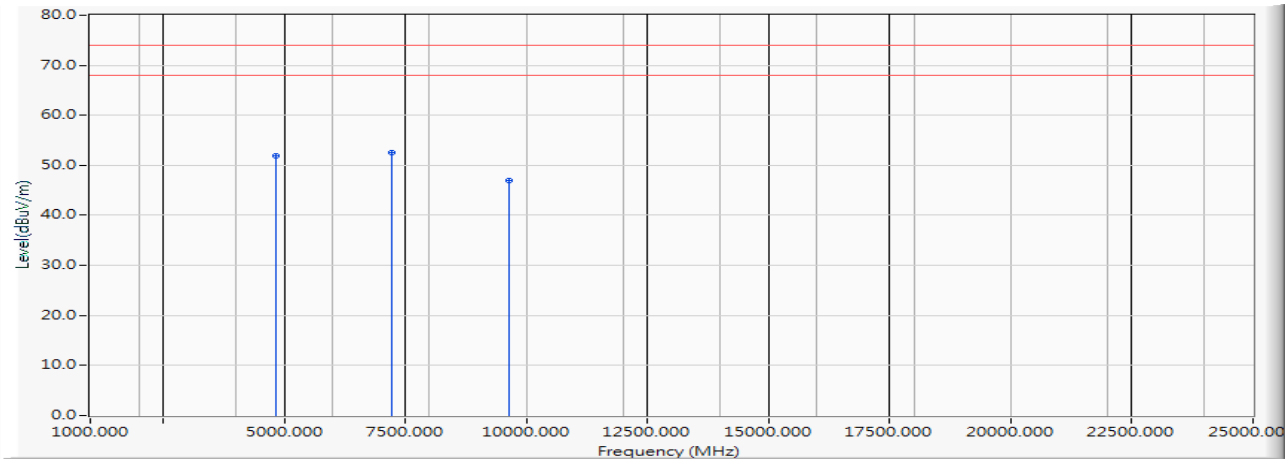
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4824.000	-6.086	45.040	38.955	-15.045	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)(2412MHz)
Test Date	:	2019/02/25

Vertical



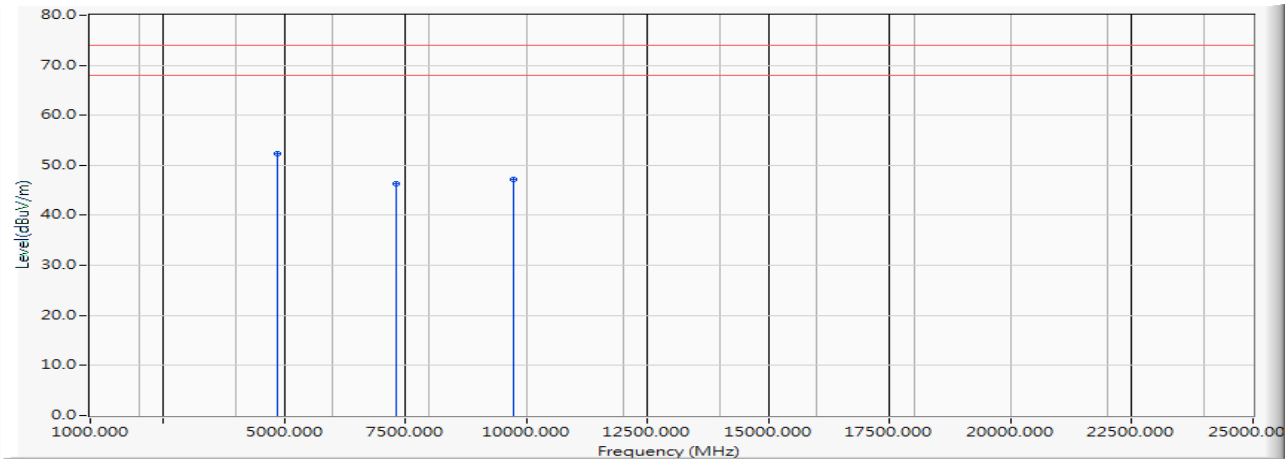
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		4824.000	-6.086	57.910	51.825	-22.175	74.000	PEAK
2	*	7236.000	-3.033	55.480	52.447	-21.553	74.000	PEAK
3		9648.000	-0.680	47.640	46.960	-27.040	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2437 MHz)
Test Date	:	2019/02/25

Horizontal



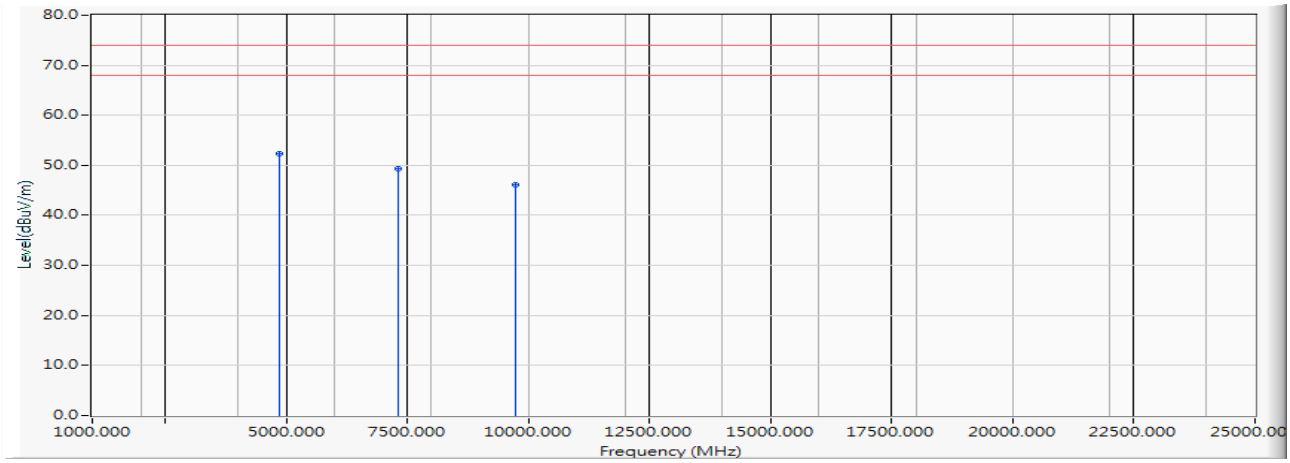
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	58.410	52.355	-21.645	74.000	PEAK
2		7311.000	-2.976	49.320	46.345	-27.655	74.000	PEAK
3		9748.000	-0.502	47.710	47.208	-26.792	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2437 MHz)
Test Date	:	2019/02/25

Vertical



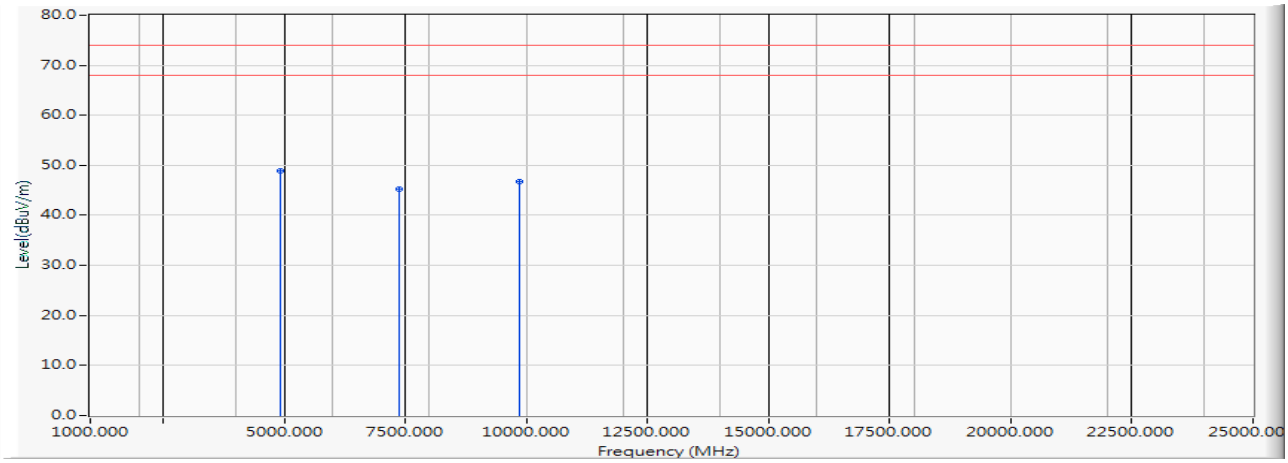
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	58.330	52.275	-21.725	74.000	PEAK
2		7311.000	-2.976	52.220	49.245	-24.755	74.000	PEAK
3		9748.000	-0.502	46.520	46.018	-27.982	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2462 MHz)
Test Date : 2019/02/25

Horizontal



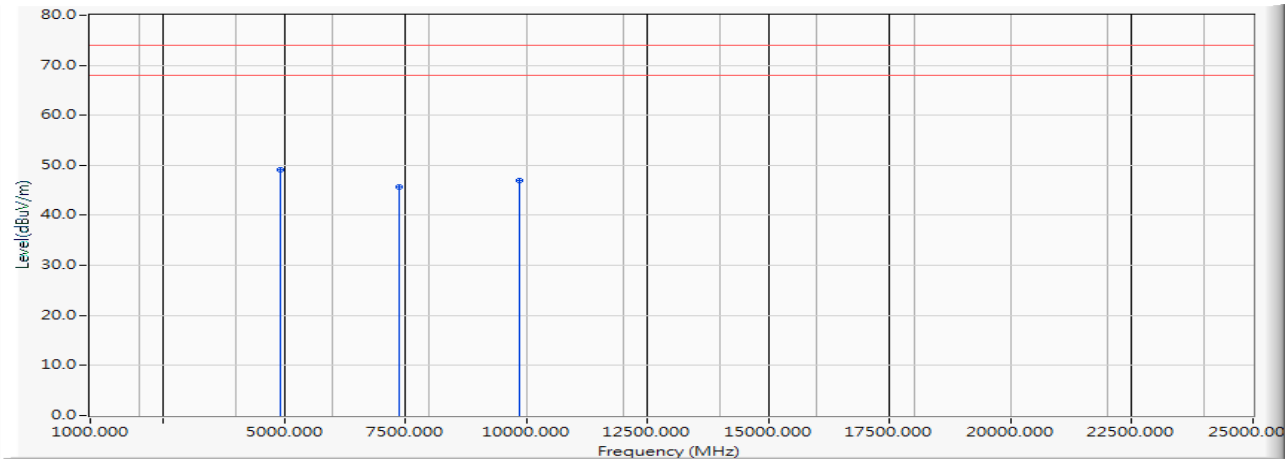
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4924.000	-6.041	54.840	48.800	-25.200	74.000	PEAK
2		7386.000	-2.861	48.050	45.188	-28.812	74.000	PEAK
3		9848.000	-0.399	47.190	46.791	-27.209	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2462 MHz)
Test Date : 2019/02/25

Vertical



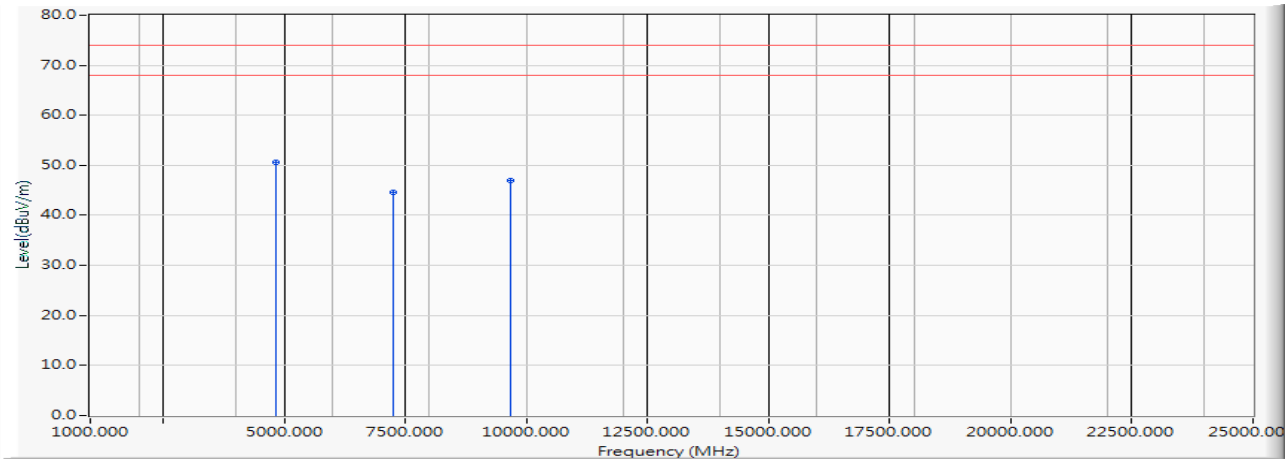
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4924.000	-6.041	55.100	49.060	-24.940	74.000	PEAK
2		7386.000	-2.861	48.610	45.748	-28.252	74.000	PEAK
3		9848.000	-0.399	47.340	46.941	-27.059	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)(2422MHz)
Test Date	:	2019/02/25

Horizontal



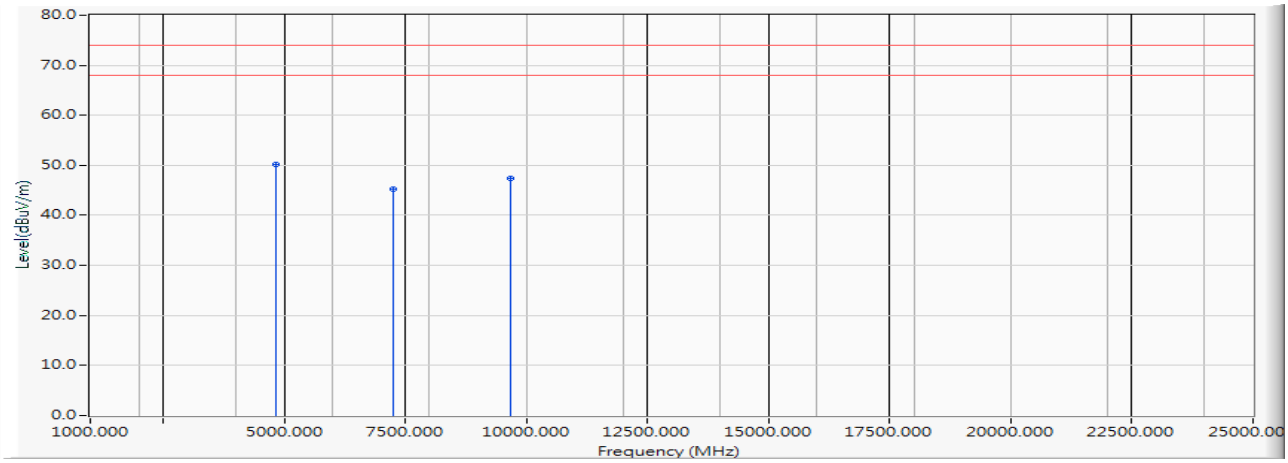
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4844.000	-6.075	56.630	50.554	-23.446	74.000	PEAK
2		7266.000	-3.025	47.630	44.604	-29.396	74.000	PEAK
3		9688.000	-0.618	47.550	46.933	-27.067	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)(2422MHz)
Test Date	:	2019/02/25

Vertical



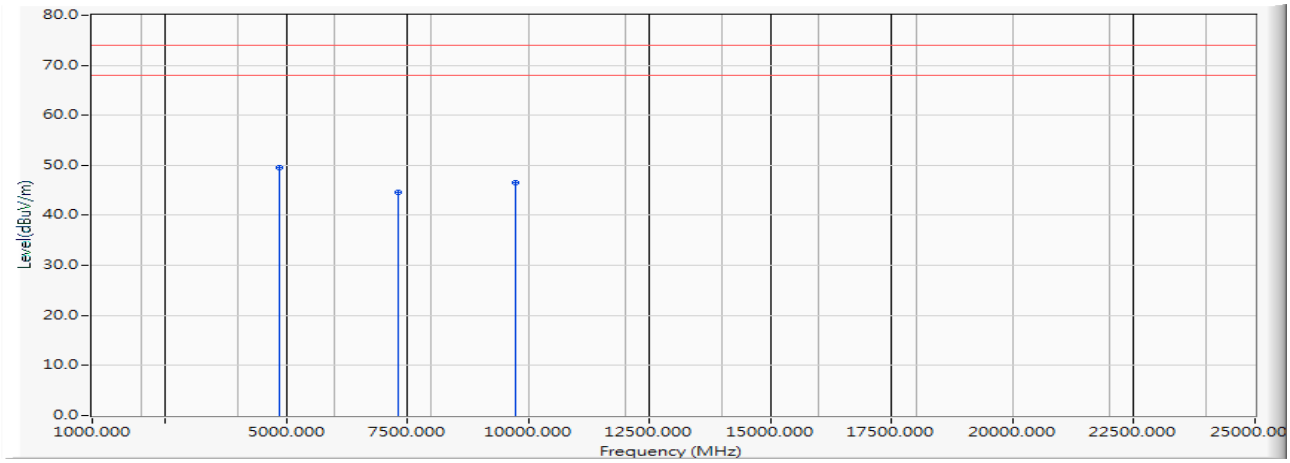
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4844.000	-6.075	56.200	50.124	-23.876	74.000	PEAK
2		7266.000	-3.025	48.180	45.154	-28.846	74.000	PEAK
3		9688.000	-0.618	48.110	47.493	-26.507	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2437 MHz)
Test Date	:	2019/02/25

Horizontal



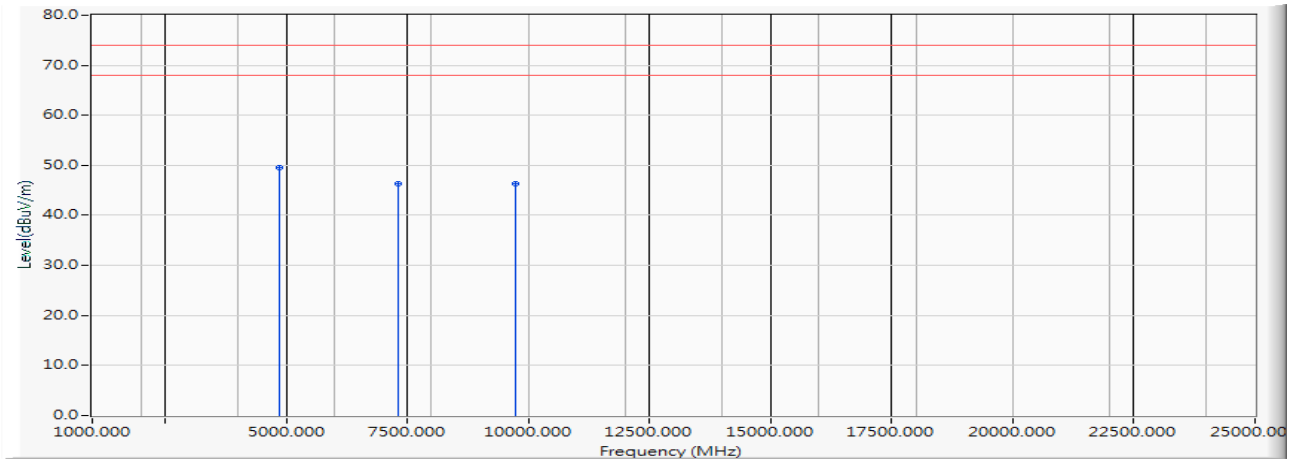
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	55.650	49.595	-24.405	74.000	PEAK
2		7311.000	-2.976	47.510	44.535	-29.465	74.000	PEAK
3		9748.000	-0.502	47.050	46.548	-27.452	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2437 MHz)
Test Date	:	2019/02/25

Vertical



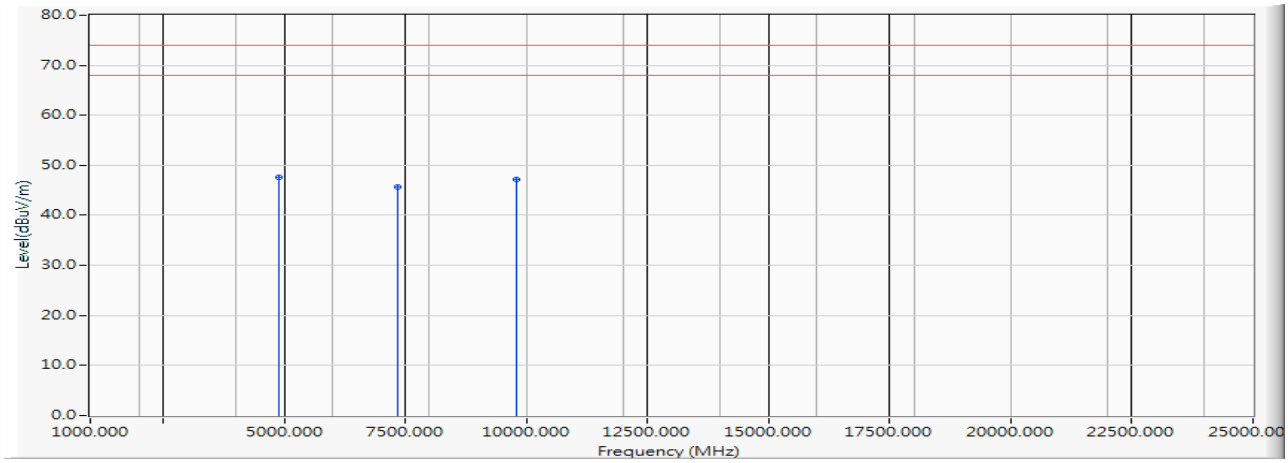
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4874.000	-6.055	55.690	49.635	-24.365	74.000	PEAK
2		7311.000	-2.976	49.200	46.225	-27.775	74.000	PEAK
3		9748.000	-0.502	46.780	46.278	-27.722	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2452 MHz)
Test Date : 2019/02/25

Horizontal



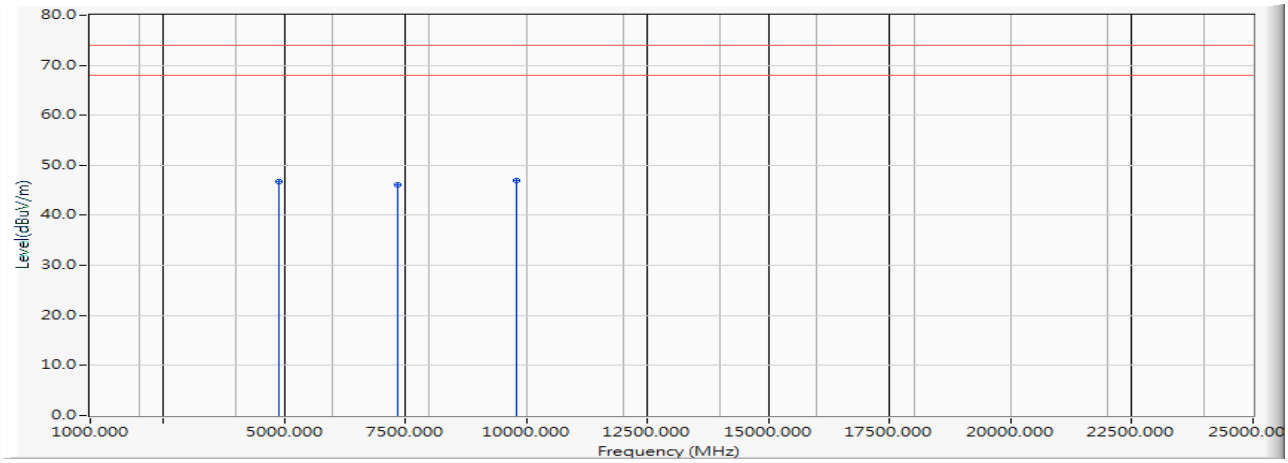
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	4904.000	-6.069	53.670	47.601	-26.399	74.000	PEAK
2		7356.000	-2.911	48.510	45.600	-28.400	74.000	PEAK
3		9808.000	-0.445	47.580	47.135	-26.865	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2452 MHz)
Test Date : 2019/02/25

Vertical



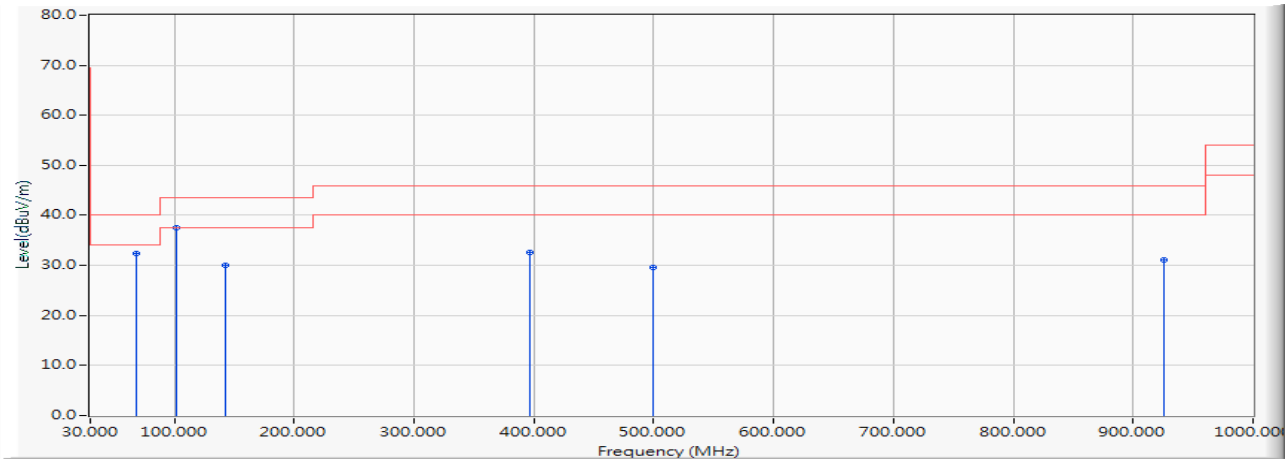
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		4904.000	-6.069	52.930	46.861	-27.139	74.000	PEAK
2		7356.000	-2.911	49.050	46.140	-27.860	74.000	PEAK
3	*	9808.000	-0.445	47.310	46.865	-27.135	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)
Test Date	:	2019/01/25

Horizontal



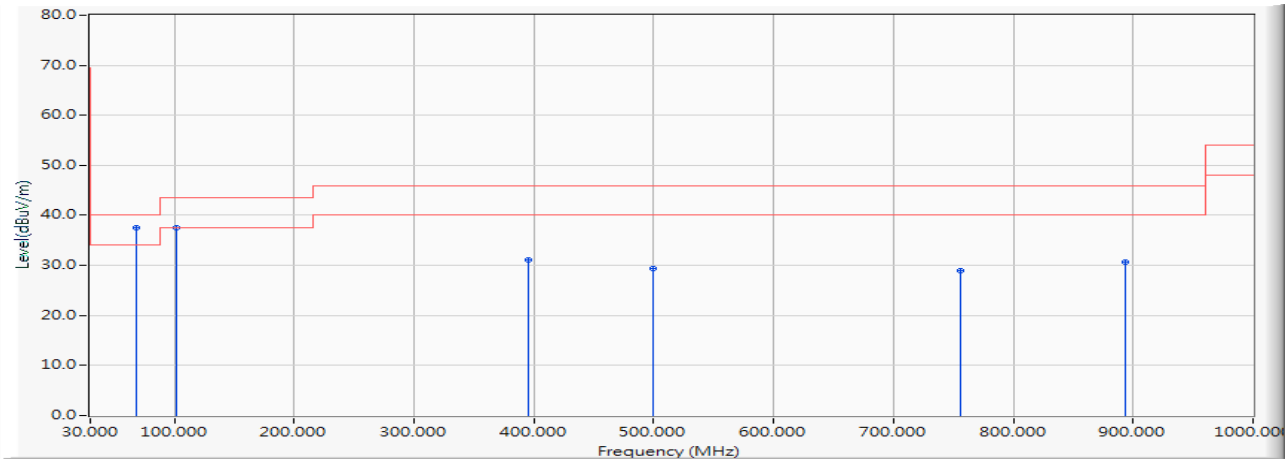
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		67.957	-13.304	45.614	32.310	-7.690	40.000	QUASIPEAK
2	*	101.696	-15.852	53.391	37.539	-5.961	43.500	QUASIPEAK
3		142.464	-11.344	41.462	30.118	-13.382	43.500	QUASIPEAK
4		396.913	-8.106	40.754	32.648	-13.352	46.000	QUASIPEAK
5		499.536	-5.960	35.621	29.661	-16.339	46.000	QUASIPEAK
6		925.493	0.082	31.026	31.108	-14.892	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)
Test Date	:	2019/01/25

Vertical



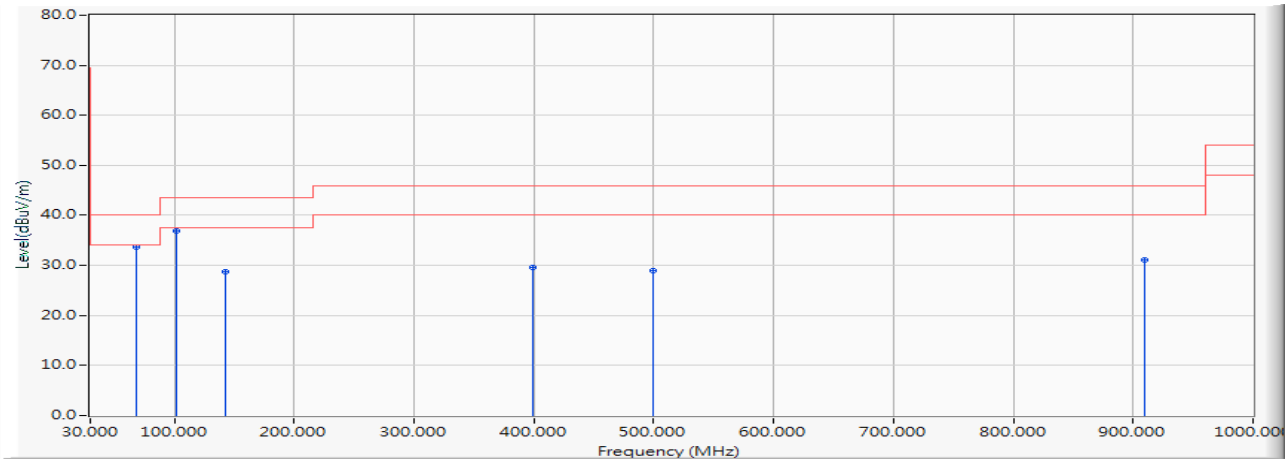
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	67.957	-13.304	50.766	37.462	-2.538	40.000	QUASIPEAK
2		101.696	-15.852	53.366	37.514	-5.986	43.500	QUASIPEAK
3		395.507	-8.139	39.135	30.997	-15.003	46.000	QUASIPEAK
4		499.536	-5.960	35.389	29.429	-16.571	46.000	QUASIPEAK
5		755.391	-1.985	30.890	28.905	-17.095	46.000	QUASIPEAK
6		893.159	-0.293	30.866	30.574	-15.426	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)
Test Date	:	2019/01/25

Horizontal



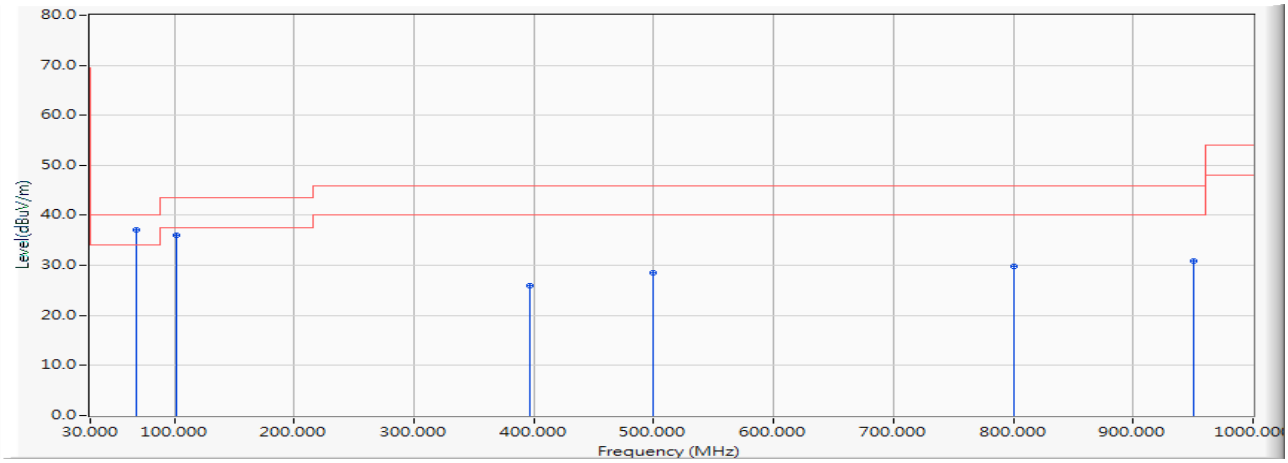
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	67.957	-13.304	46.992	33.688	-6.312	40.000	QUASIPEAK
2		101.696	-15.852	52.677	36.825	-6.675	43.500	QUASIPEAK
3		142.464	-11.344	40.125	28.781	-14.719	43.500	QUASIPEAK
4		399.725	-8.042	37.563	29.521	-16.479	46.000	QUASIPEAK
5		499.536	-5.960	34.931	28.971	-17.029	46.000	QUASIPEAK
6		910.029	-0.091	31.091	31.001	-14.999	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)
Test Date	:	2019/01/25

Vertical



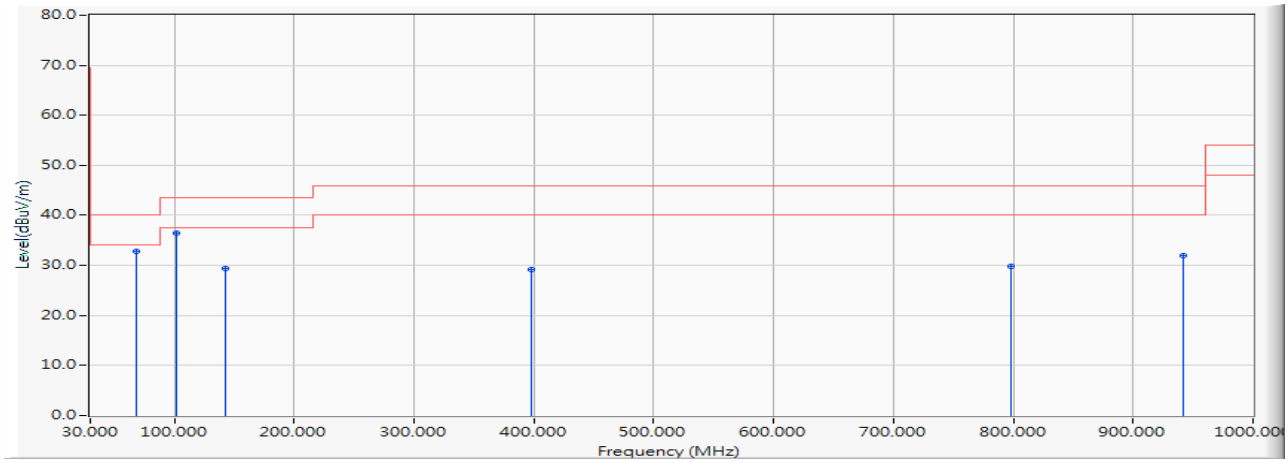
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	67.957	-13.304	50.316	37.012	-2.988	40.000	QUASIPEAK
2		101.696	-15.852	51.942	36.090	-7.410	43.500	QUASIPEAK
3		396.913	-8.106	34.161	26.055	-19.945	46.000	QUASIPEAK
4		499.536	-5.960	34.399	28.439	-17.561	46.000	QUASIPEAK
5		800.377	-1.651	31.508	29.857	-16.143	46.000	QUASIPEAK
6		950.797	0.359	30.492	30.852	-15.148	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)(2437 MHz)
Test Date	:	2019/01/25

Horizontal



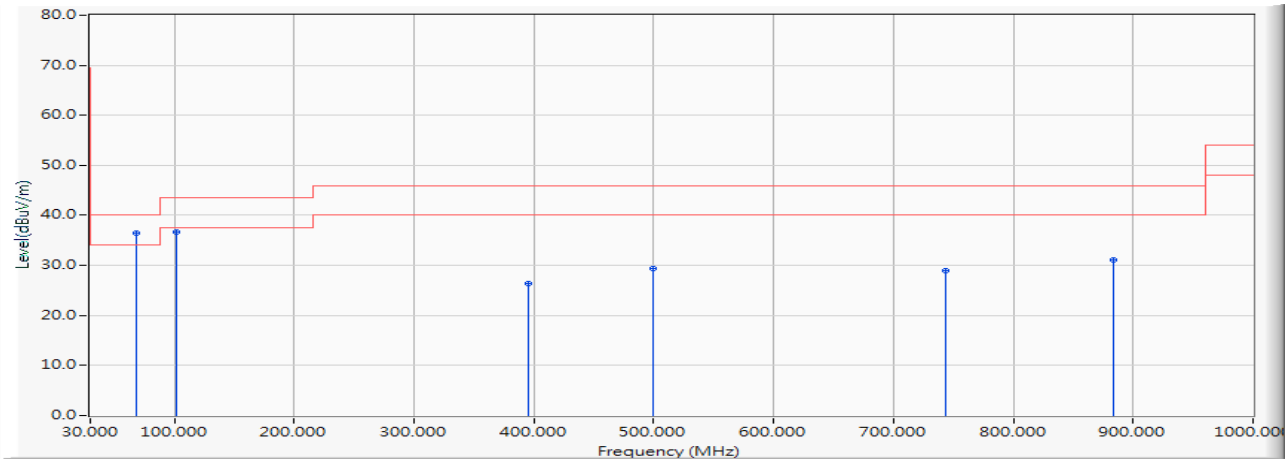
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		67.957	-13.304	46.202	32.898	-7.102	40.000	QUASIPEAK
2	*	101.696	-15.852	52.386	36.534	-6.966	43.500	QUASIPEAK
3		142.464	-11.344	40.778	29.434	-14.066	43.500	QUASIPEAK
4		398.319	-8.074	37.311	29.237	-16.763	46.000	QUASIPEAK
5		797.565	-1.676	31.559	29.883	-16.117	46.000	QUASIPEAK
6		942.362	0.265	31.688	31.953	-14.047	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)(2437 MHz)
Test Date	:	2019/01/25

Vertical



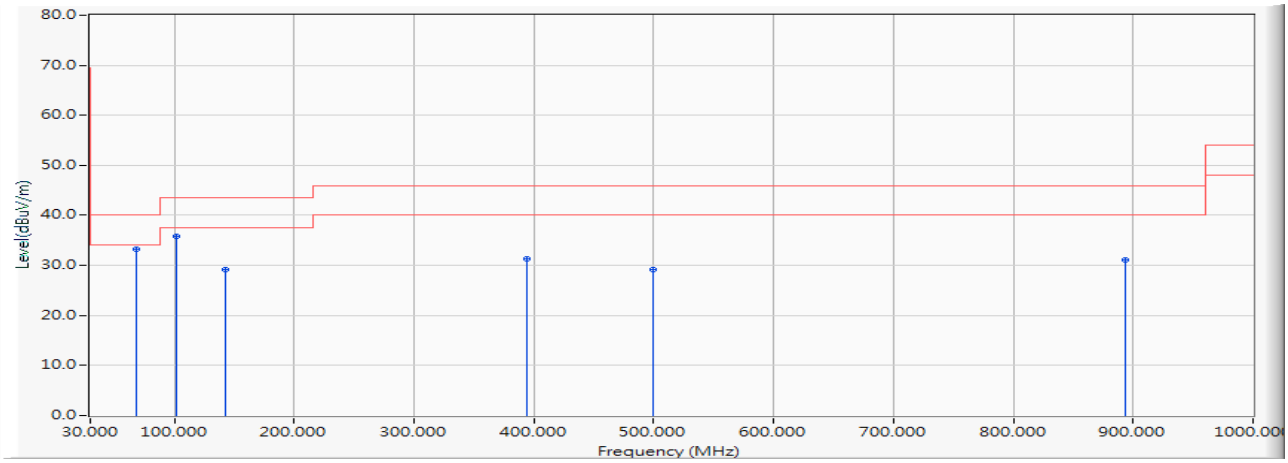
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	67.957	-13.304	49.759	36.455	-3.545	40.000	QUASIPEAK
2		101.696	-15.852	52.551	36.699	-6.801	43.500	QUASIPEAK
3		395.507	-8.139	34.622	26.484	-19.516	46.000	QUASIPEAK
4		499.536	-5.960	35.359	29.399	-16.601	46.000	QUASIPEAK
5		744.145	-2.136	31.131	28.995	-17.005	46.000	QUASIPEAK
6		883.319	-0.426	31.541	31.115	-14.885	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)(2437 MHz)
Test Date	:	2019/01/25

Horizontal



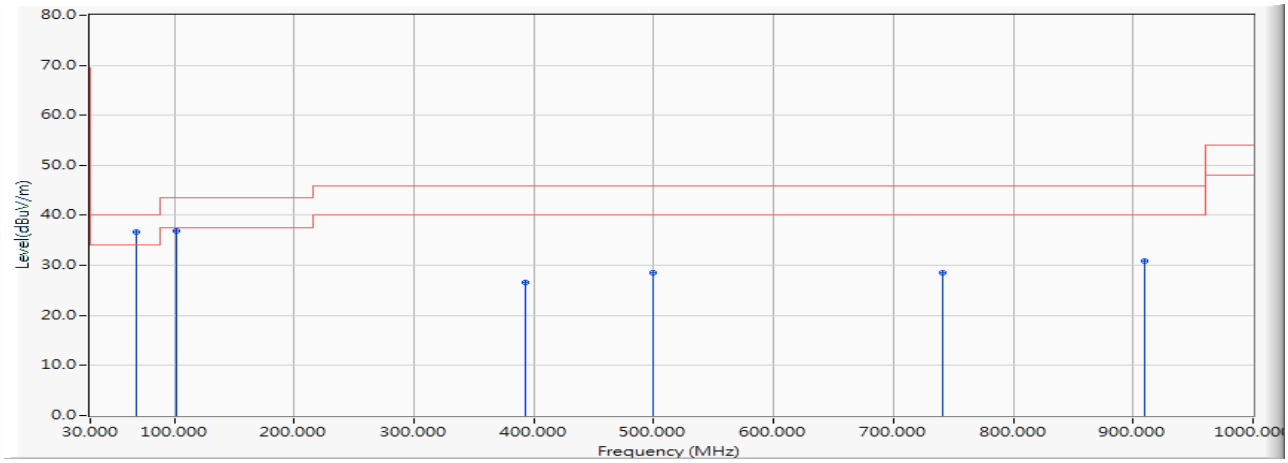
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	67.957	-13.304	46.456	33.152	-6.848	40.000	QUASIPEAK
2		101.696	-15.852	51.766	35.914	-7.586	43.500	QUASIPEAK
3		142.464	-11.344	40.606	29.262	-14.238	43.500	QUASIPEAK
4		394.101	-8.170	39.510	31.340	-14.660	46.000	QUASIPEAK
5		499.536	-5.960	35.047	29.087	-16.913	46.000	QUASIPEAK
6		893.159	-0.293	31.404	31.112	-14.888	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	General Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)(2437 MHz)
Test Date	:	2019/01/25

Vertical



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	67.957	-13.304	49.927	36.623	-3.377	40.000	QUASIPEAK
2		101.696	-15.852	52.794	36.942	-6.558	43.500	QUASIPEAK
3		392.696	-8.202	34.710	26.508	-19.492	46.000	QUASIPEAK
4		499.536	-5.960	34.506	28.546	-17.454	46.000	QUASIPEAK
5		741.333	-2.191	30.720	28.529	-17.471	46.000	QUASIPEAK
6		910.029	-0.091	30.949	30.859	-15.141	46.000	QUASIPEAK

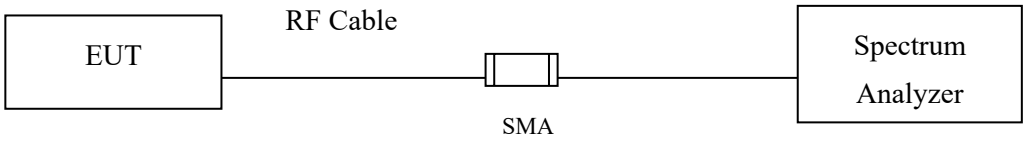
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

5. RF antenna conducted test

5.1. Test Setup

RF antenna Conducted Measurement:



5.2. Limits

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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.3. Test Procedure

Tested according to DTS test procedure of KDB558074 section 8.5 DTS emissions in non-restricted frequency bands for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

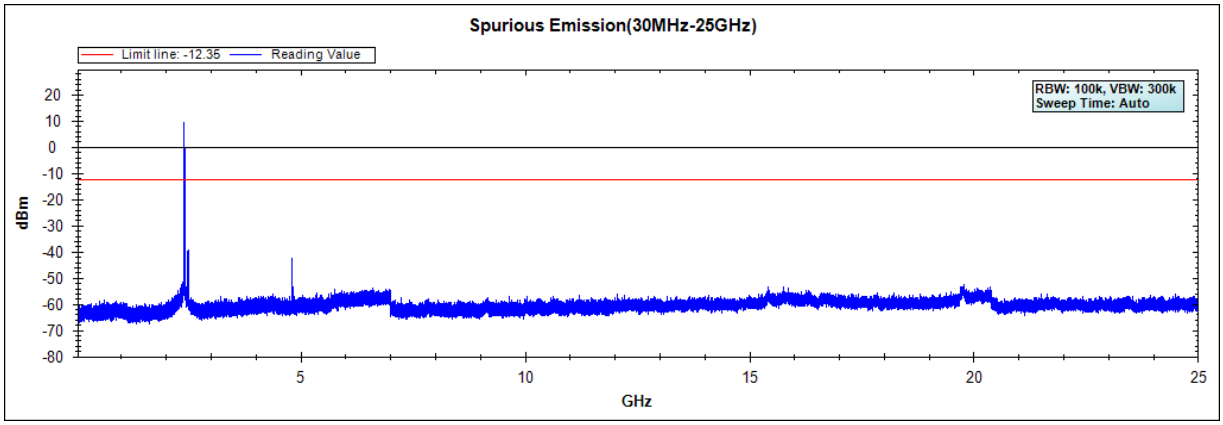
5.4. Uncertainty

±1.23dB

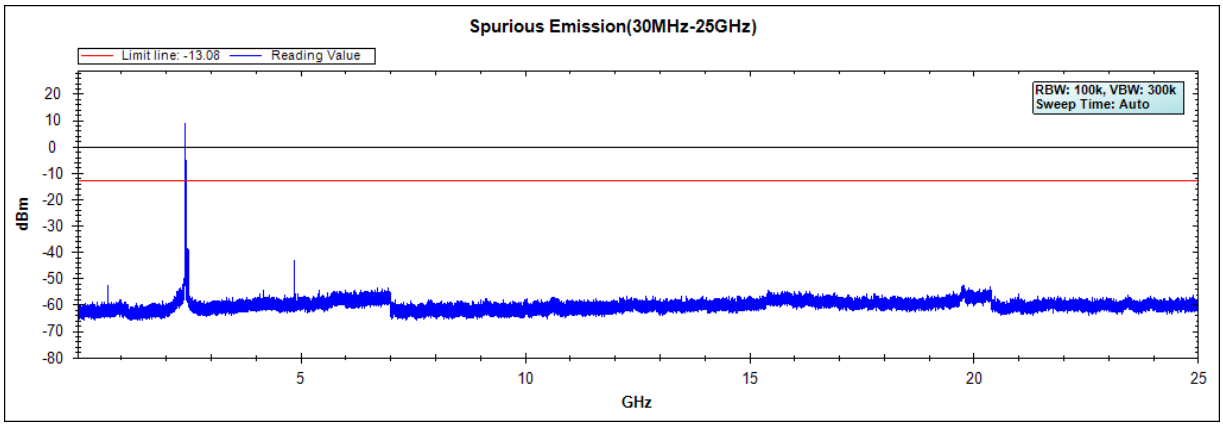
5.5. Test Result of RF antenna conducted test

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	RF antenna conducted test
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)
Test Date	:	2019/03/05

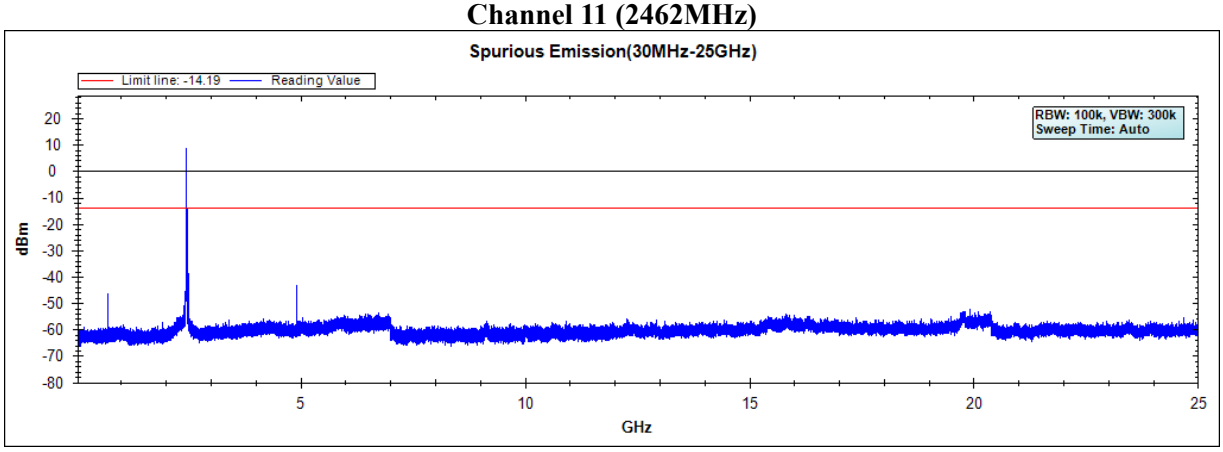
Channel 01 (2412MHz)



Channel 06 (2437MHz)



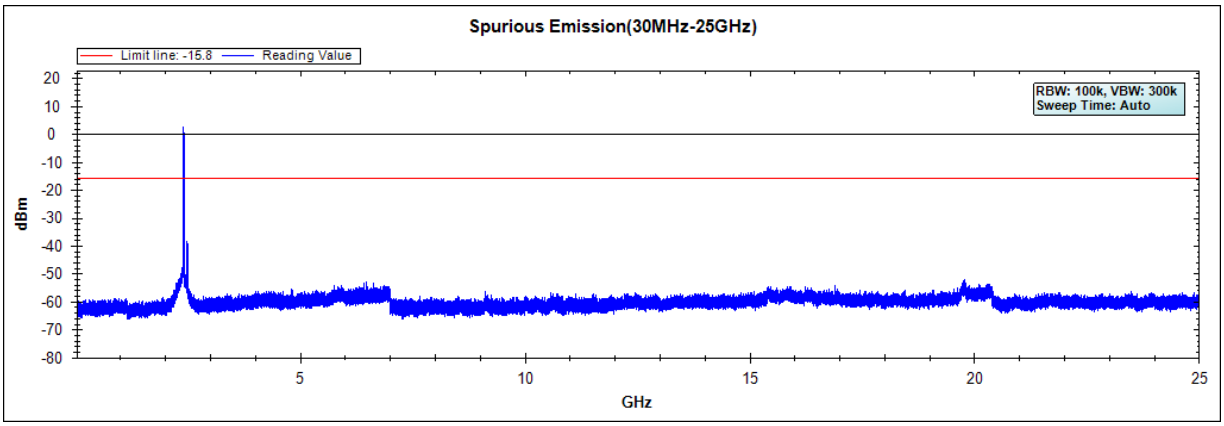
Channel 11 (2462MHz)



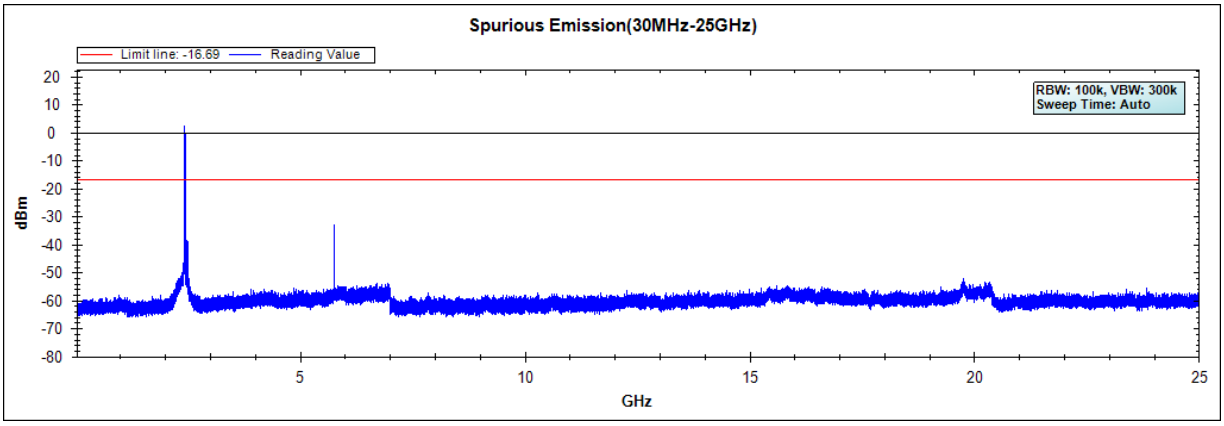
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)
Test Date	:	2019/03/05

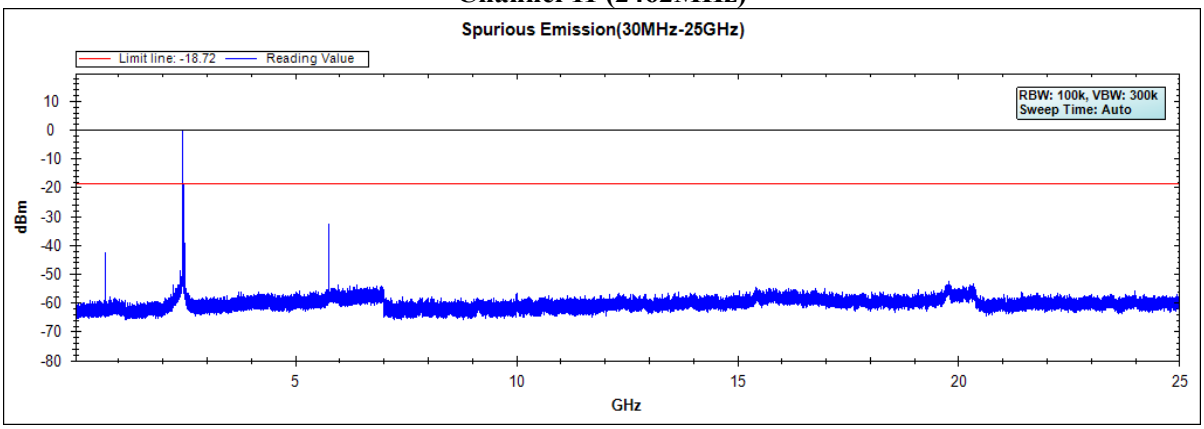
Channel 01 (2412MHz)



Channel 06 (2437MHz)



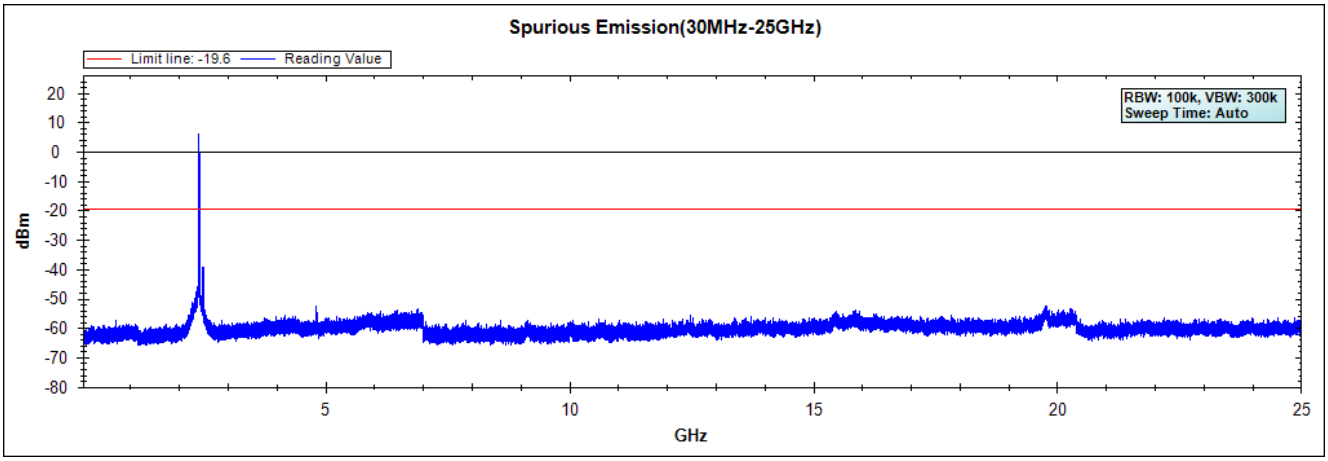
Channel 11 (2462MHz)



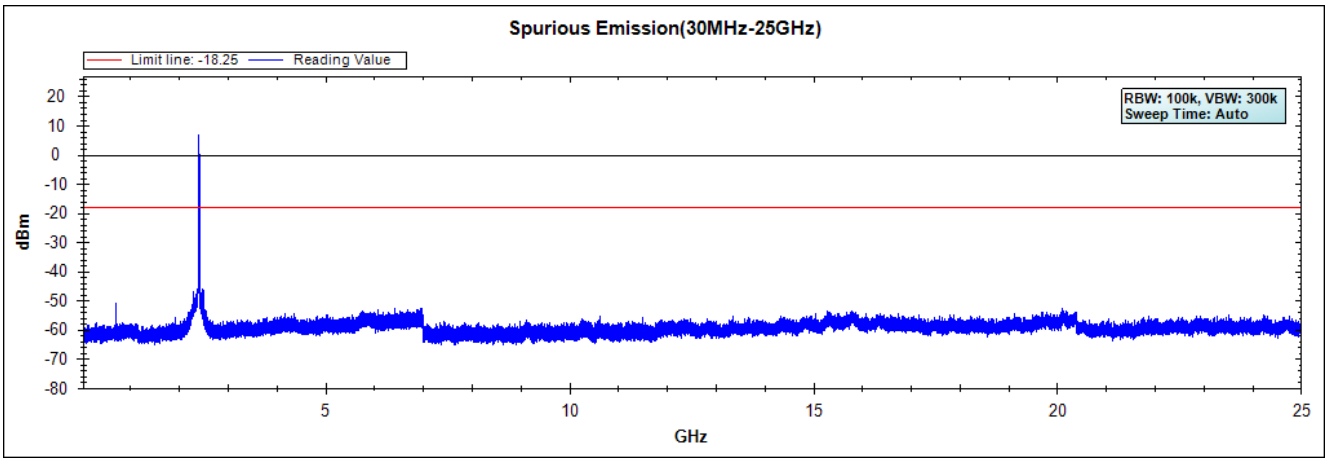
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)
Test Date	:	2019/03/05

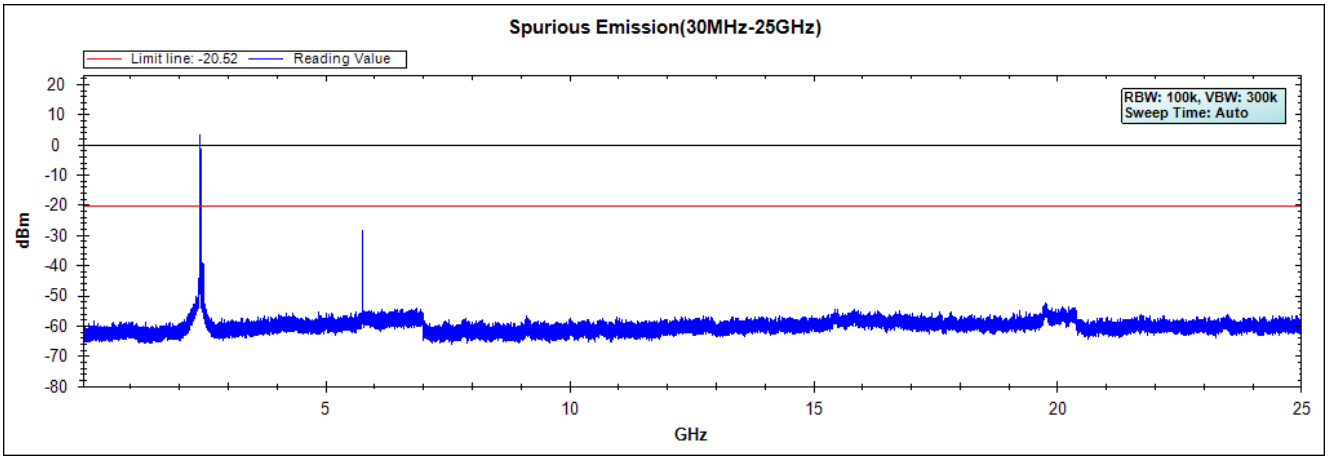
Channel 01 (2412MHz)-Chain A



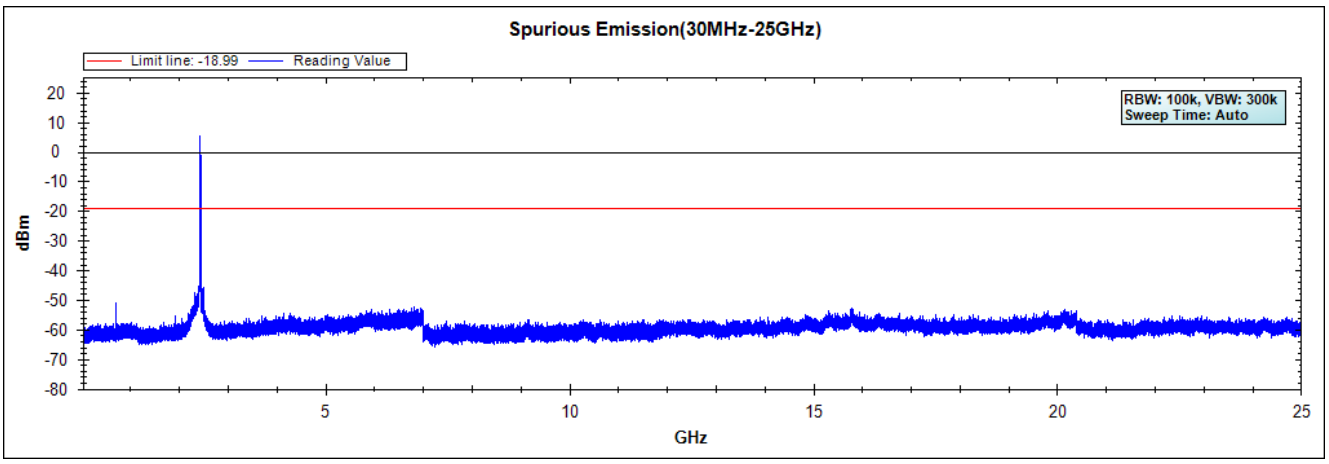
Channel 01 (2412MHz)-Chain B



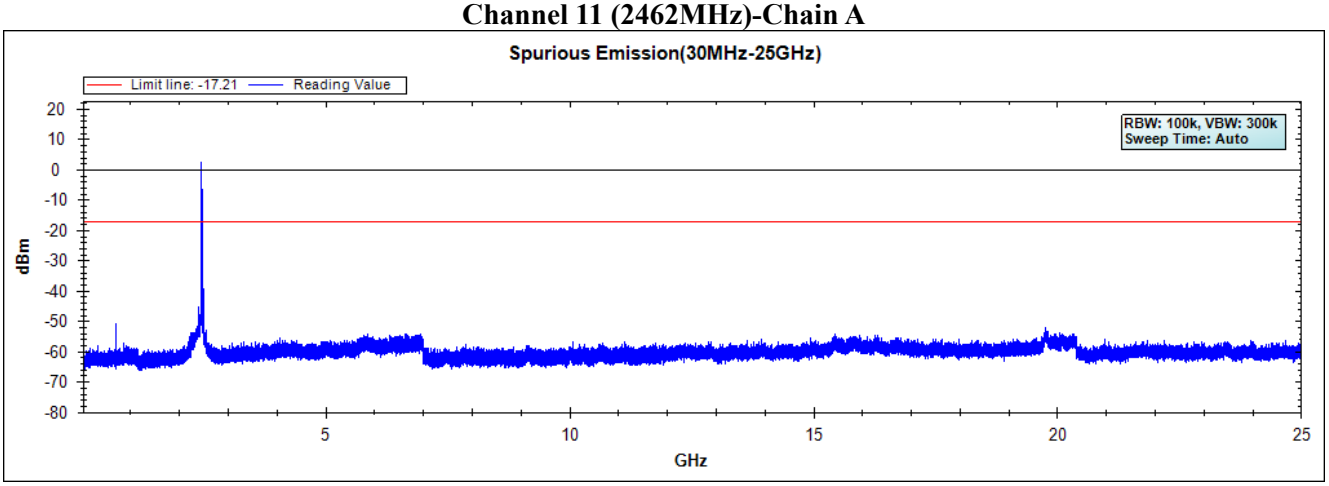
Channel 06 (2437MHz)-Chain A



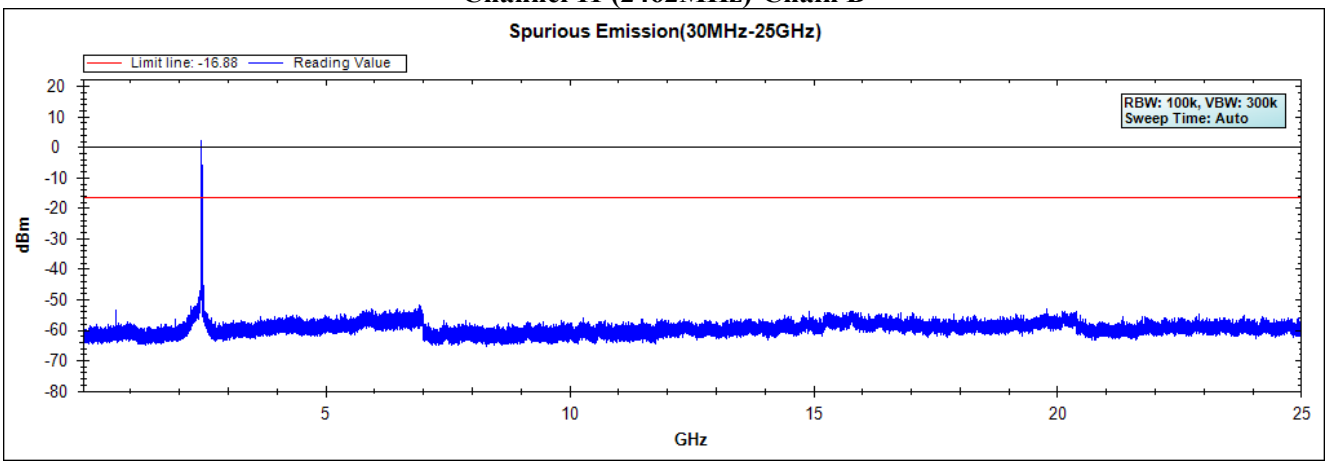
Channel 06 (2437MHz)-Chain B



Channel 11 (2462MHz)-Chain A



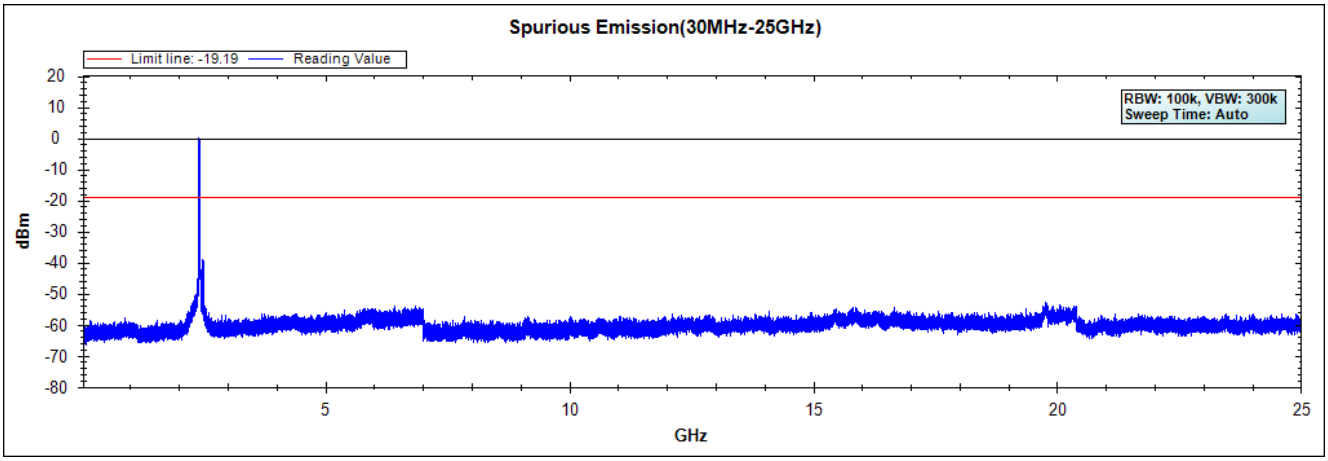
Channel 11 (2462MHz)-Chain B



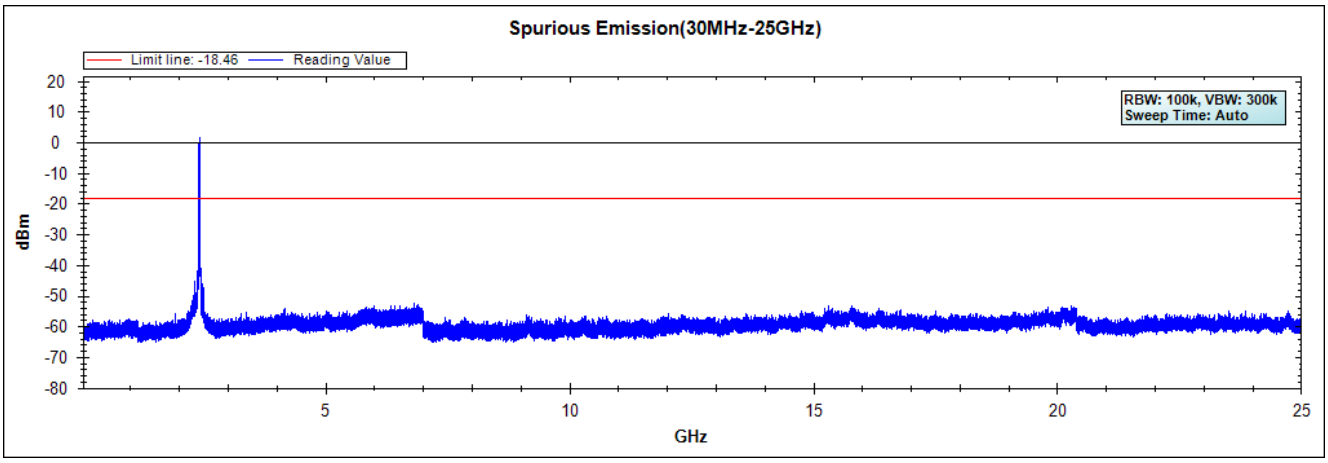
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)
Test Date	:	2019/03/05

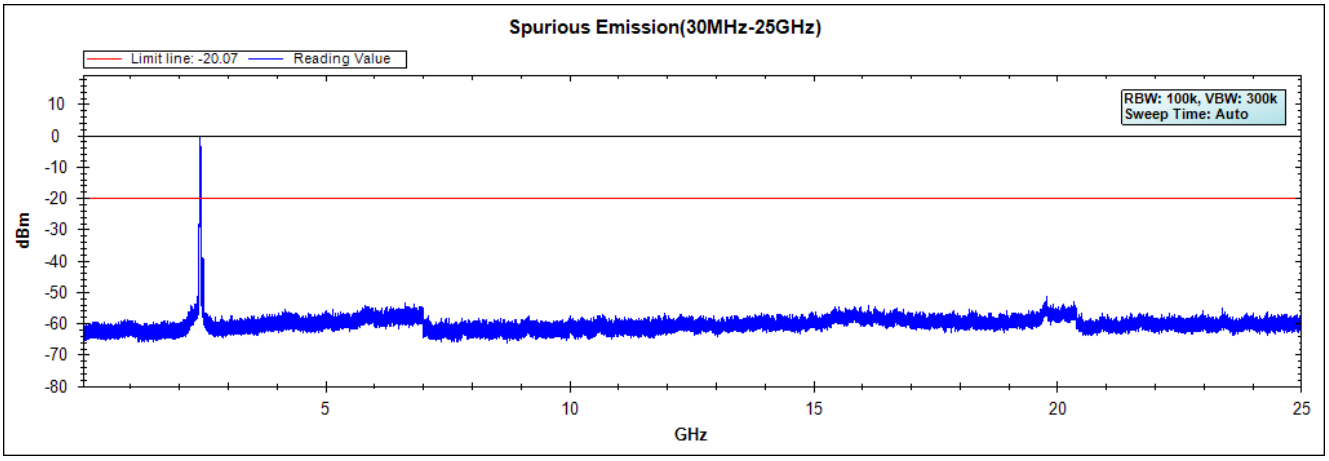
Channel 03 (2422MHz)-Chain A



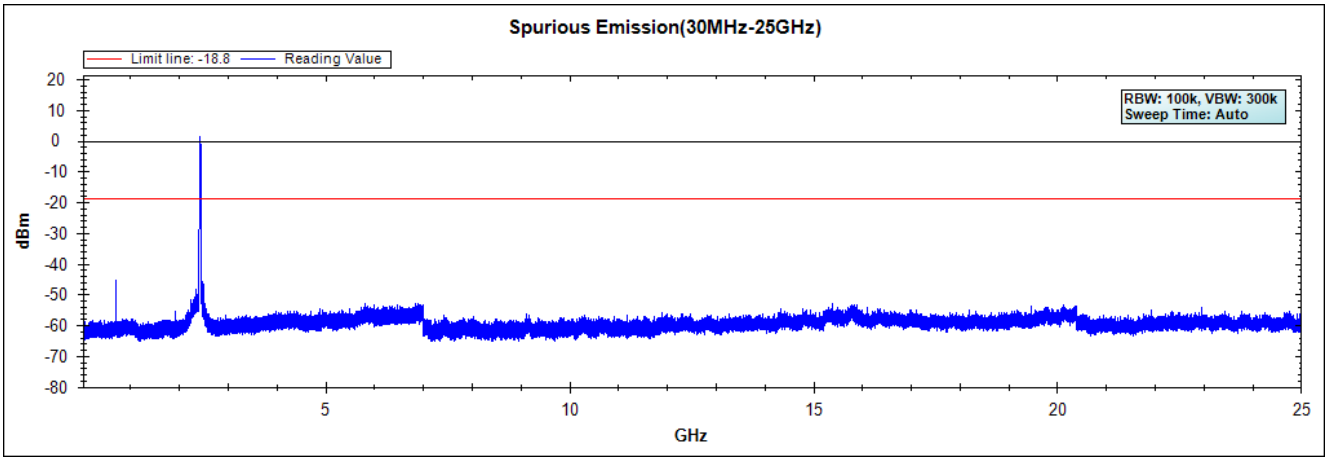
Channel 03 (2422MHz)-Chain B



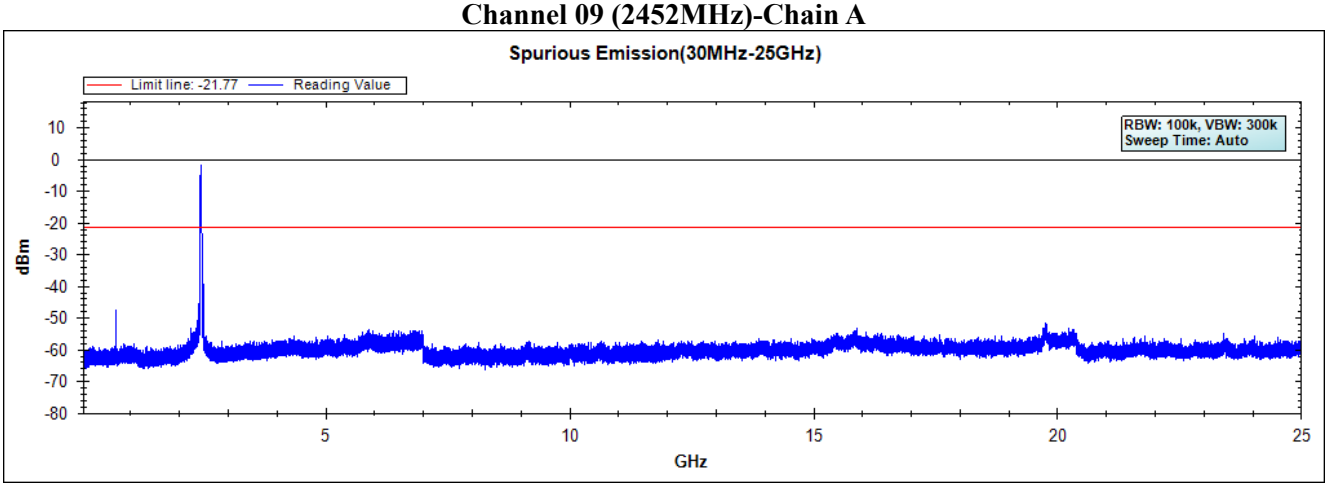
Channel 06 (2437MHz)-Chain A



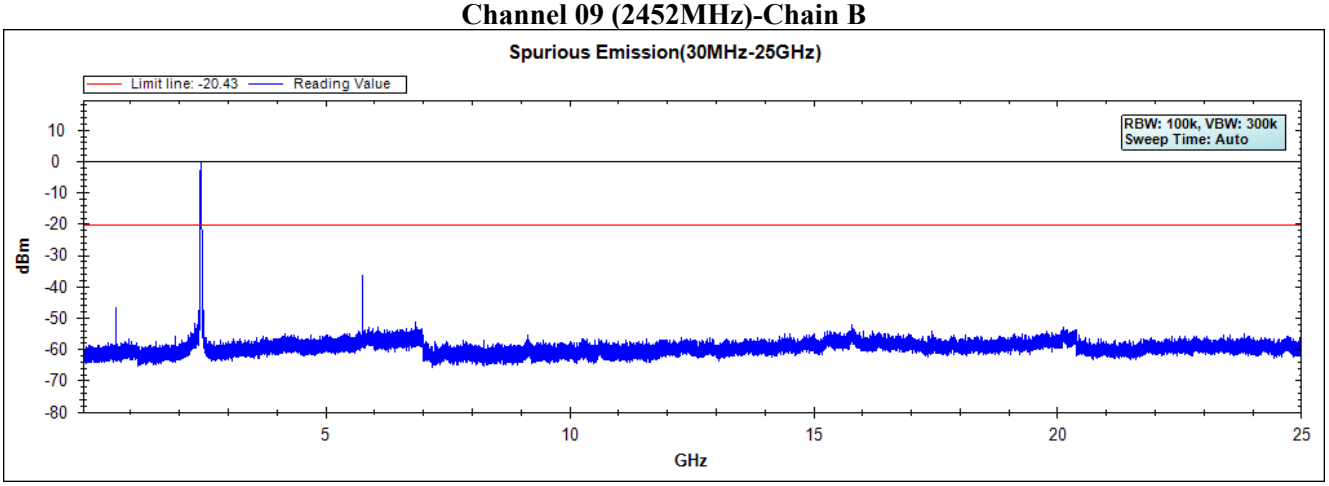
Channel 06 (2437MHz)-Chain B



Channel 09 (2452MHz)-Chain A



Channel 09 (2452MHz)-Chain B

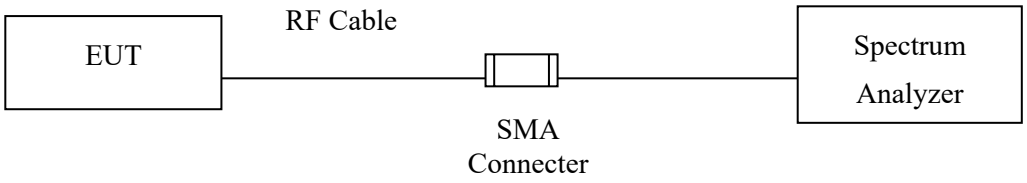


Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

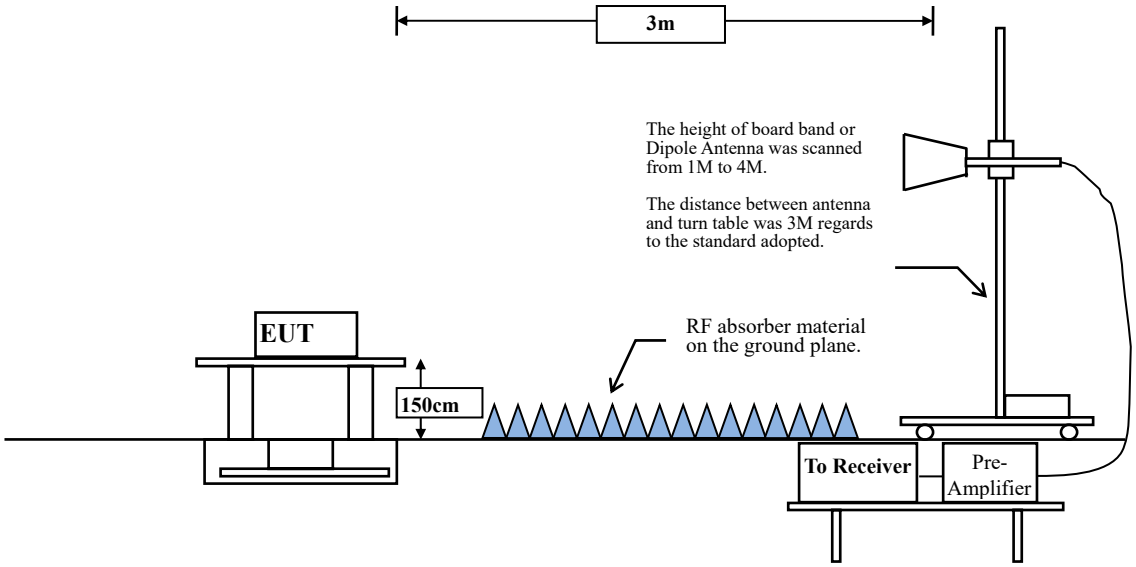
6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1GHz



6.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

RBW and VBW Parameter setting:

According to KDB 558074 Peak power measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to KDB 558074 Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	99.66	--	--	10
802.11g	98.98	--	--	10
802.11n20	88.38	0.6840	1462	2k
802.11n40	73.66	0.3565	2805	3k

Note: Duty Cycle Refer to Section 9

6.4. Uncertainty

Conducted: ±1.23dB

Radiated:

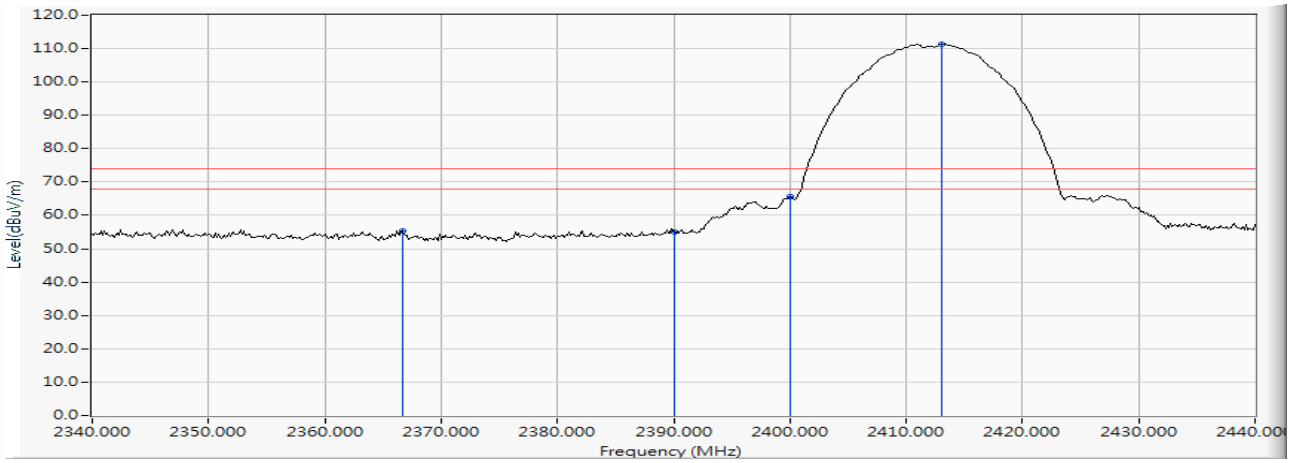
Horizontal polarization：1-18GHz: ±3.77dB

Vertical polarization：1-18GHz : ±3.83dB

6.5. Test Result of Band Edge

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



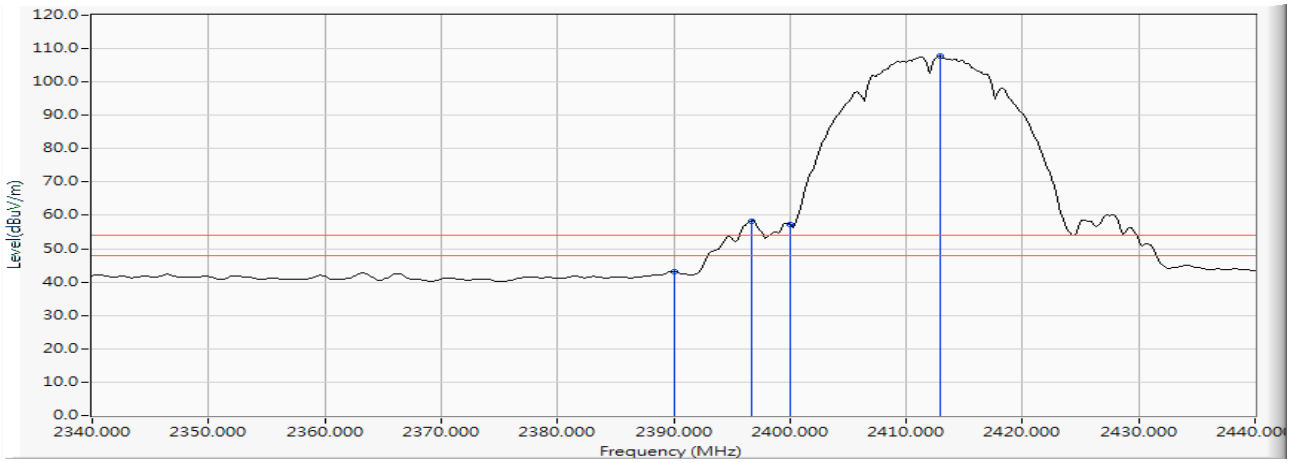
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2366.667	10.169	45.292	55.461	-18.539	74.000	PEAK
2		2390.000	10.262	44.795	55.057	-18.943	74.000	PEAK
3		2400.000	10.304	55.189	65.492	--	--	PEAK
4	*	2413.043	10.357	101.058	111.414	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



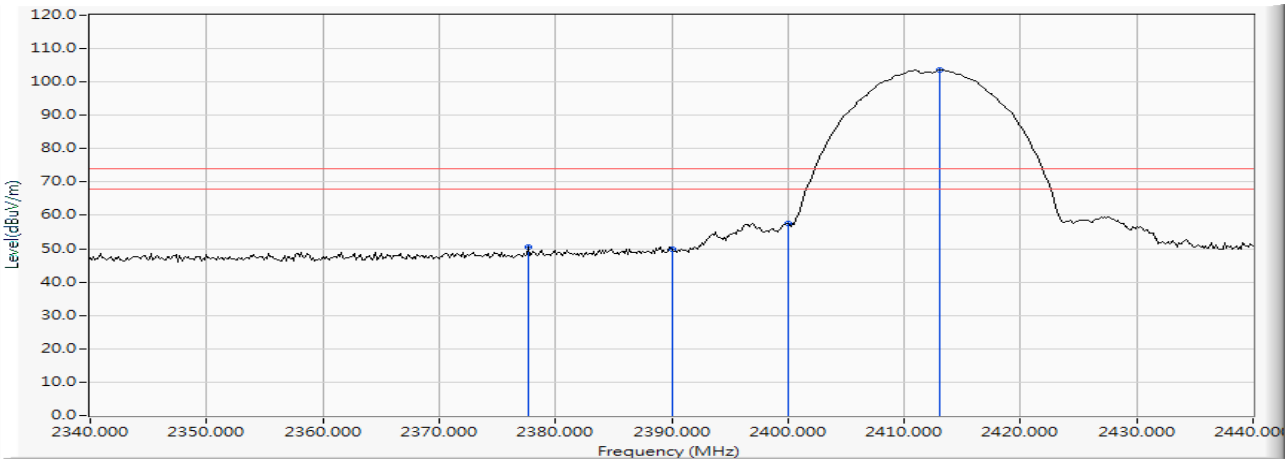
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	32.911	43.173	-10.827	54.000	AVERAGE
2		2396.667	10.289	48.075	58.365	--	--	AVERAGE
3		2400.000	10.304	46.936	57.239	--	--	AVERAGE
4	*	2412.899	10.355	97.426	107.782	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Vertical



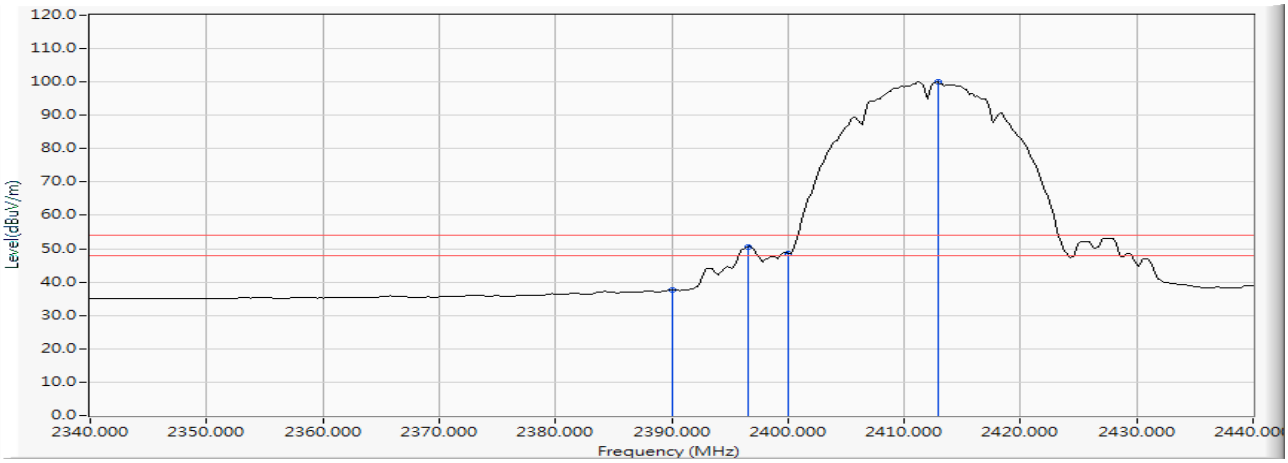
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2377.681	10.212	40.302	50.514	-23.486	74.000	PEAK
2		2390.000	10.262	39.755	50.017	-23.983	74.000	PEAK
3		2400.000	10.304	47.407	57.710	--	--	PEAK
4	*	2413.043	10.357	93.275	103.631	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date	:	2019/02/25

Vertical



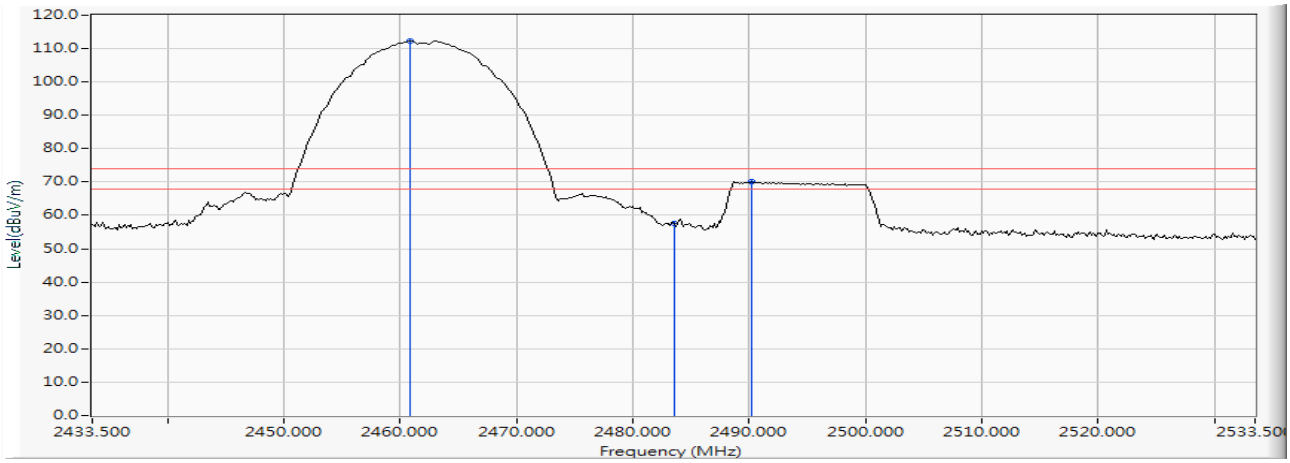
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	27.344	37.606	-16.394	54.000	AVERAGE
2		2396.522	10.289	40.256	50.545	--	--	AVERAGE
3		2400.000	10.304	38.341	48.644	--	--	AVERAGE
4	*	2412.899	10.355	89.696	100.052	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
Test Date	:	2019/02/25

Horizontal



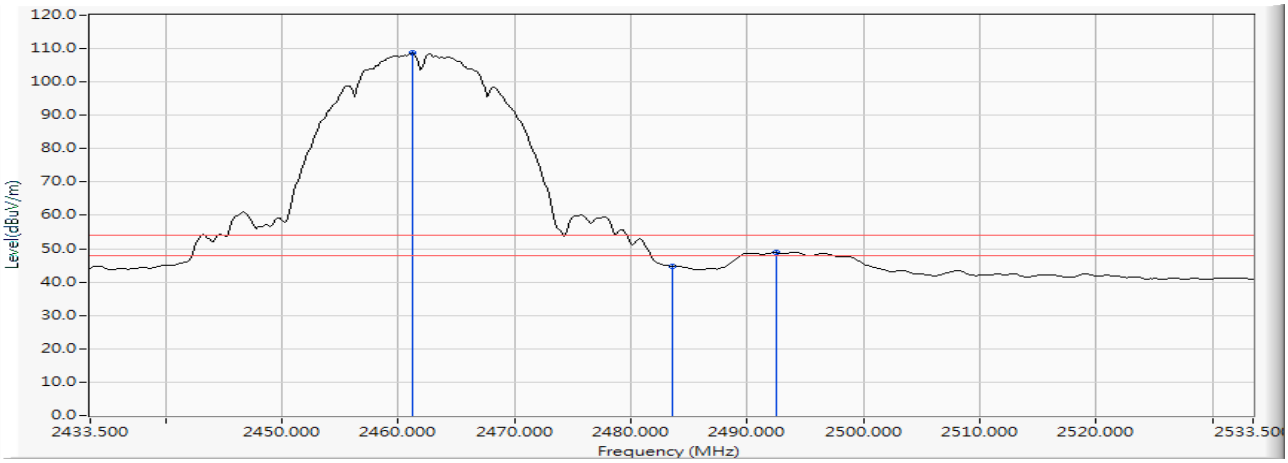
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2460.891	10.544	101.766	112.311	--	--	PEAK
2		2483.500	10.640	46.990	57.631	-16.369	74.000	PEAK
3		2490.167	10.667	59.610	70.277	-3.723	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
Test Date	:	2019/02/25

Horizontal



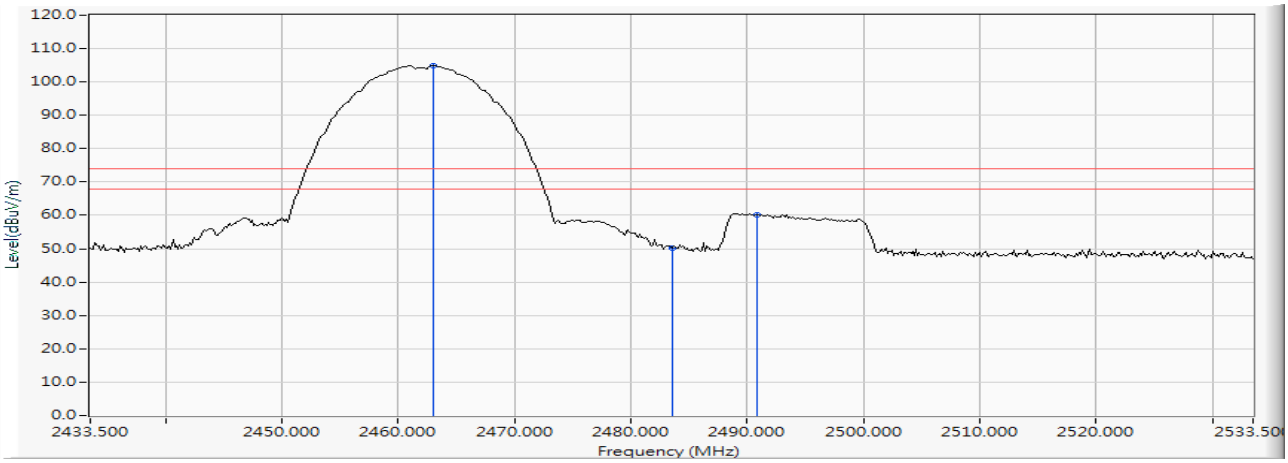
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2461.181	10.545	98.108	108.654	--	--	AVERAGE
2		2483.500	10.640	34.202	44.843	-9.157	54.000	AVERAGE
3		2492.486	10.676	38.159	48.835	-5.165	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
Test Date	:	2019/02/25

Vertical



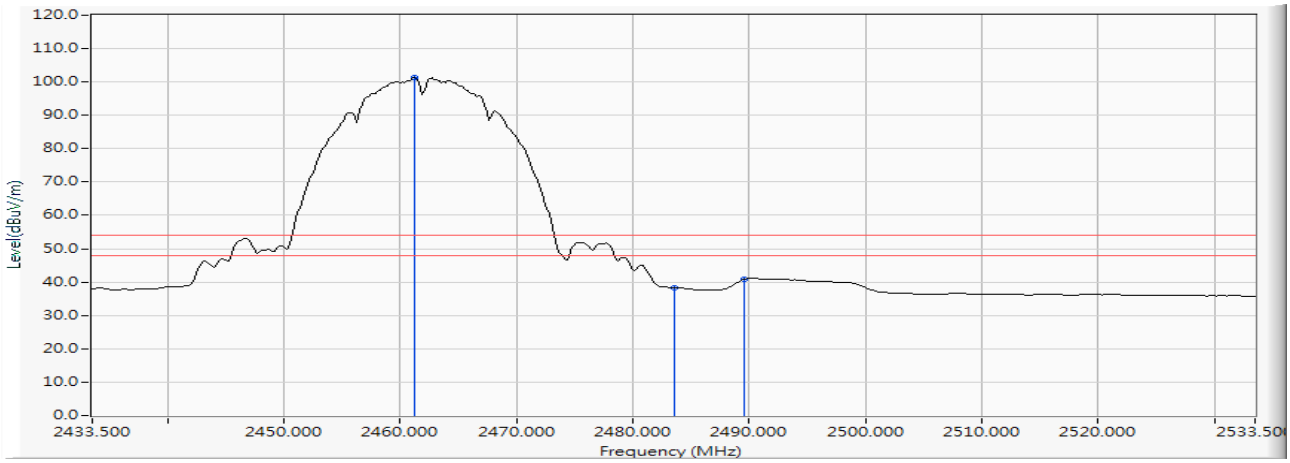
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2463.065	10.554	94.295	104.849	--	--	PEAK
2		2483.500	10.640	39.457	50.098	-23.902	74.000	PEAK
3		2490.891	10.670	49.599	60.269	-13.731	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
Test Date	:	2019/02/25

Vertical



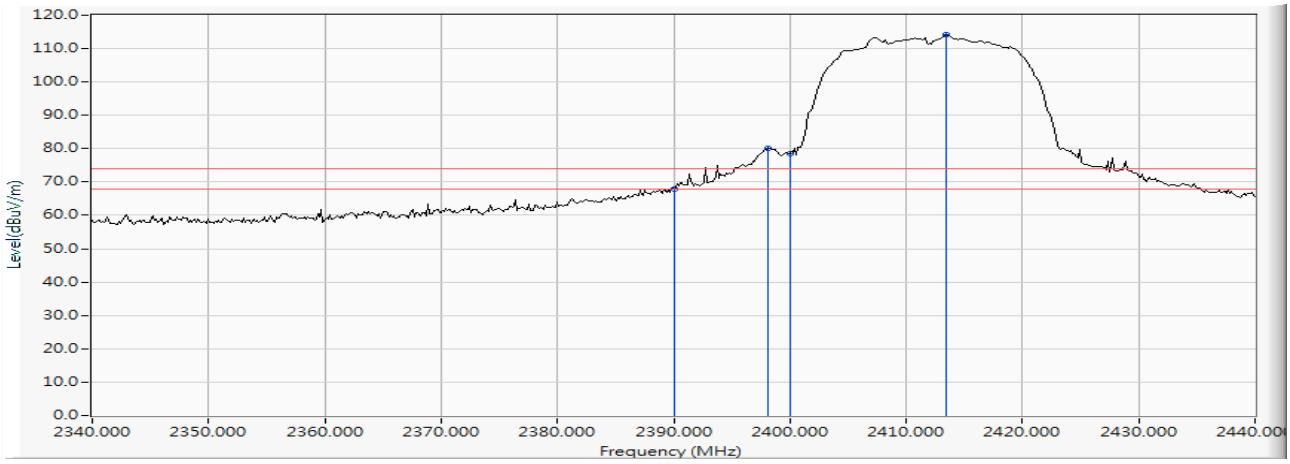
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2461.181	10.545	90.804	101.350	--	--	AVERAGE
2		2483.500	10.640	27.701	38.342	-15.658	54.000	AVERAGE
3		2489.587	10.666	30.186	40.851	-13.149	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



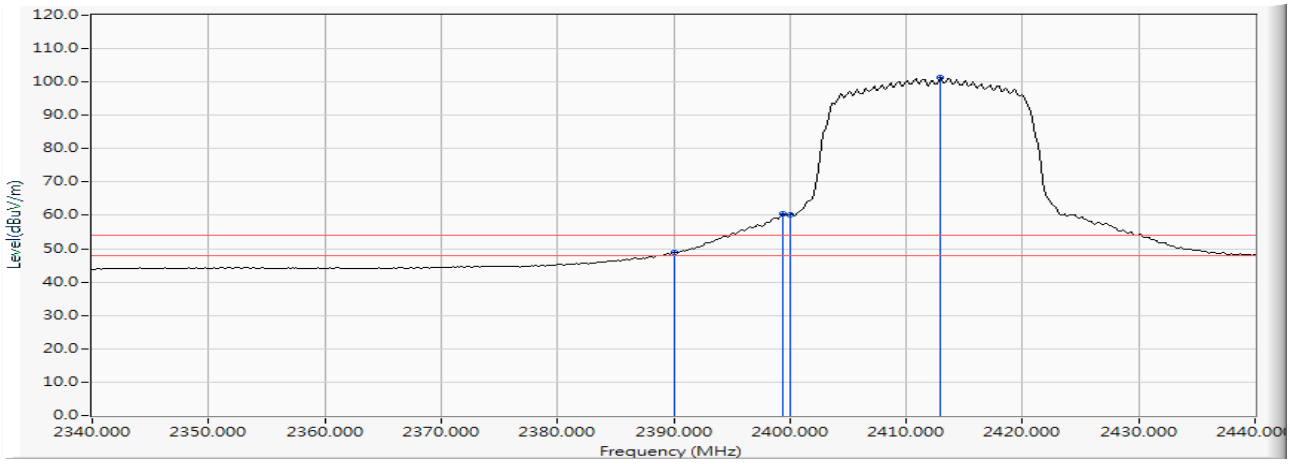
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	57.572	67.834	-6.166	74.000	PEAK
2		2398.116	10.295	69.779	80.074	--	--	PEAK
3		2400.000	10.304	68.342	78.645	--	--	PEAK
4	*	2413.478	10.358	103.691	114.049	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Horizontal



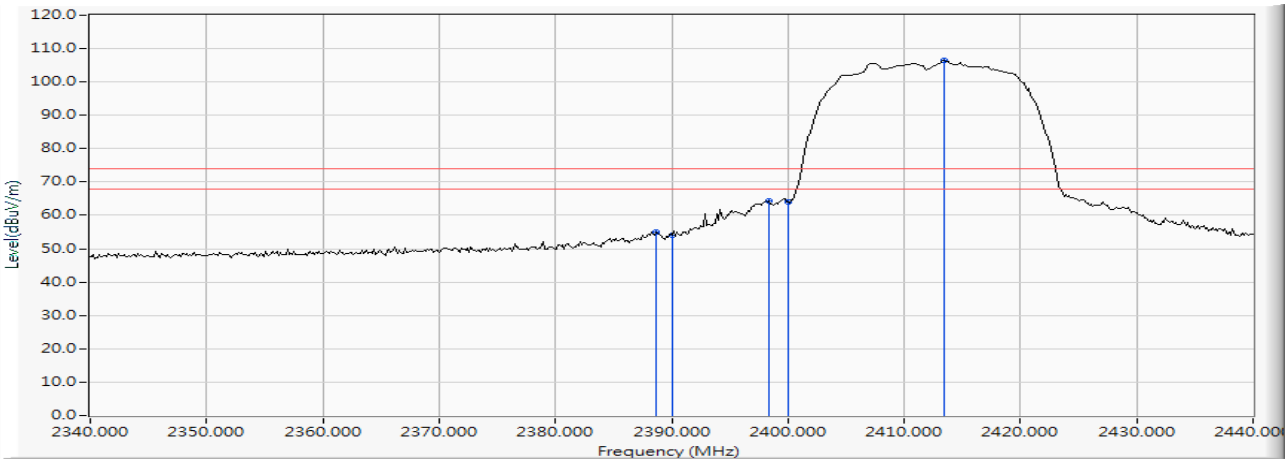
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	38.484	48.746	-5.254	54.000	AVERAGE
2		2399.420	10.301	50.058	60.359	--	--	AVERAGE
3		2400.000	10.304	50.017	60.320	--	--	AVERAGE
4	*	2412.899	10.355	90.832	101.188	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Vertical



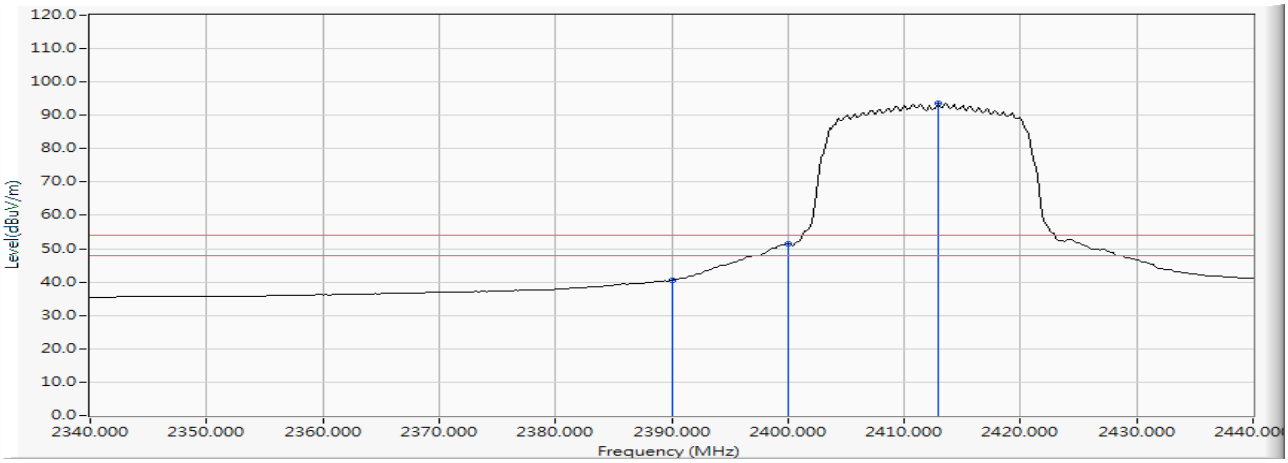
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2388.696	10.257	44.752	55.009	-18.991	74.000	PEAK
2		2390.000	10.262	43.925	54.187	-19.813	74.000	PEAK
3		2398.406	10.296	54.098	64.395	--	--	PEAK
4		2400.000	10.304	53.673	63.976	--	--	PEAK
5	*	2413.478	10.358	96.075	106.433	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date	:	2019/02/25

Vertical



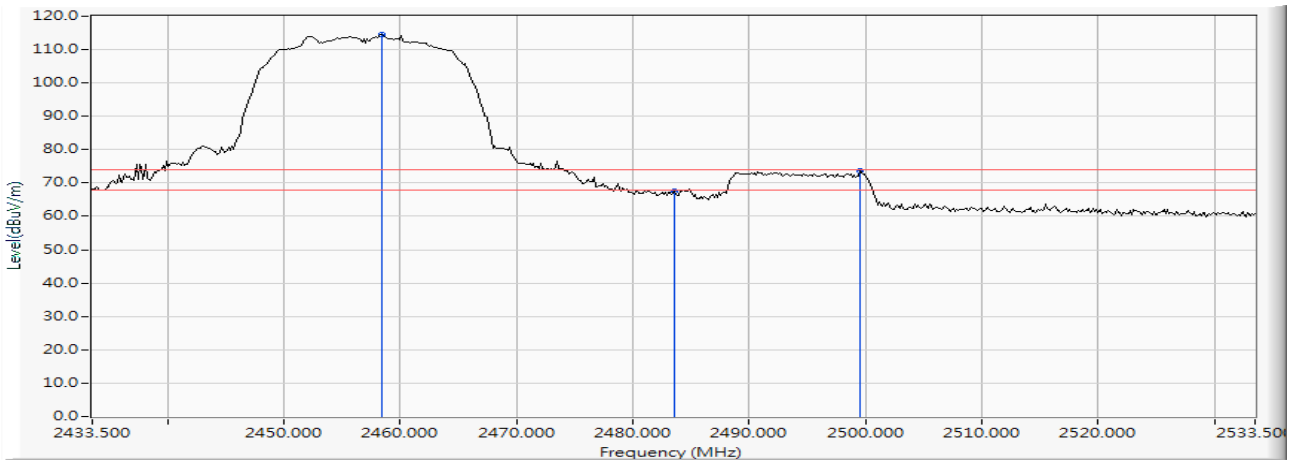
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	30.397	40.659	-13.341	54.000	AVERAGE
2		2400.000	10.304	41.224	51.527	--	--	AVERAGE
3	*	2412.899	10.355	83.287	93.643	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2457MHz)
Test Date	:	2019/04/01

Horizontal



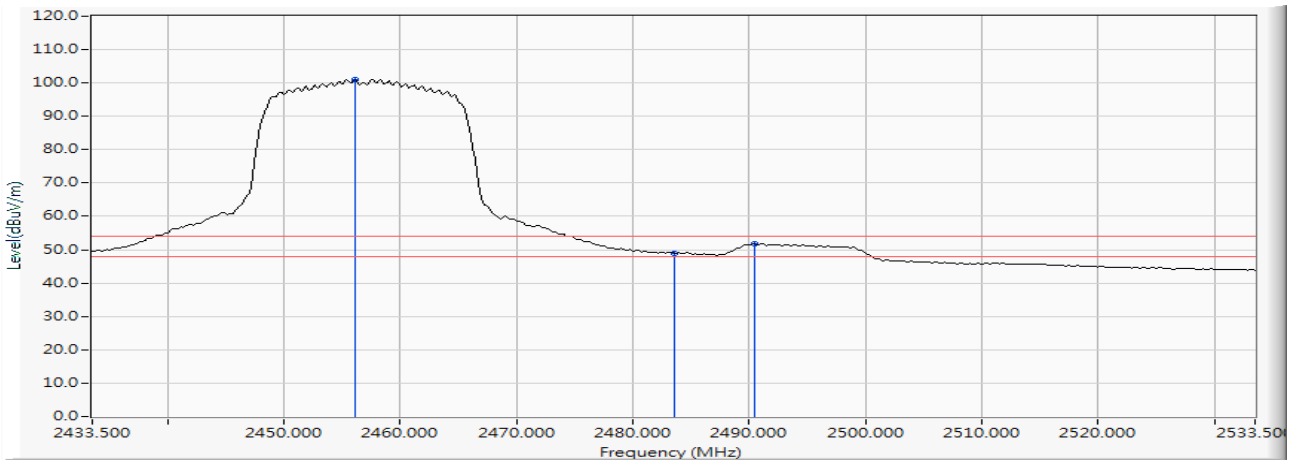
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2458.428	10.534	103.870	114.404	--	--	PEAK
2		2483.500	10.640	56.873	67.514	-6.486	74.000	PEAK
3		2499.587	10.697	62.944	73.640	-0.360	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2457MHz)
Test Date	:	2019/04/01

Horizontal



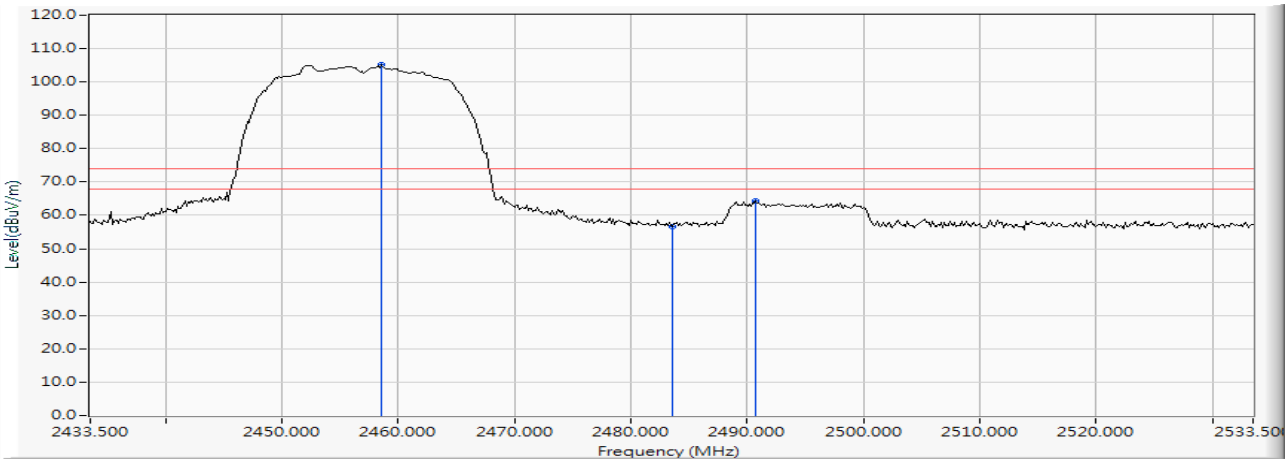
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2456.109	10.524	90.596	101.120	--	--	AVERAGE
2		2483.500	10.640	38.326	48.967	-5.033	54.000	AVERAGE
3		2490.457	10.668	41.132	51.800	-2.200	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2457MHz)
Test Date	:	2019/04/01

Vertical



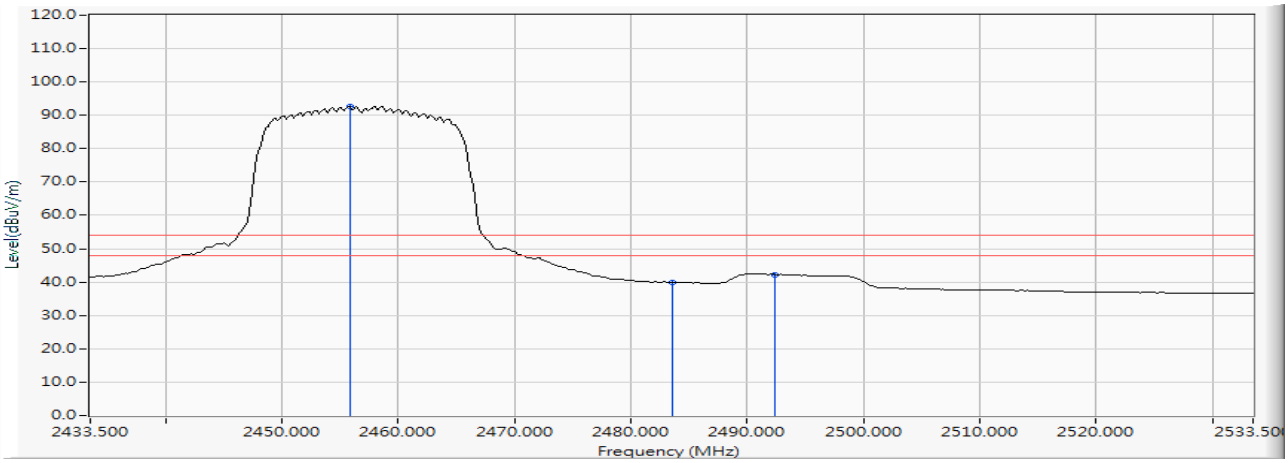
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2458.572	10.534	94.577	105.112	--	--	PEAK
2		2483.500	10.640	45.832	56.473	-17.527	74.000	PEAK
3		2490.746	10.669	53.668	64.337	-9.663	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2457MHz)
Test Date	:	2019/04/01

Vertical



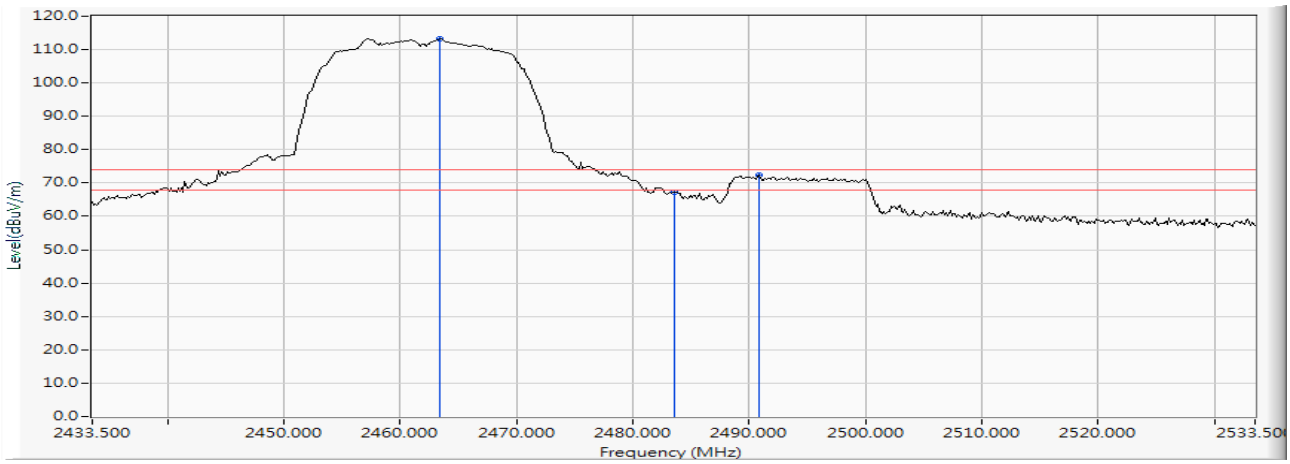
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2455.819	10.523	82.257	92.779	--	--	AVERAGE
2		2483.500	10.640	29.306	39.947	-14.053	54.000	AVERAGE
3		2492.341	10.675	31.578	42.254	-11.746	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
Test Date	:	2019/02/25

Horizontal



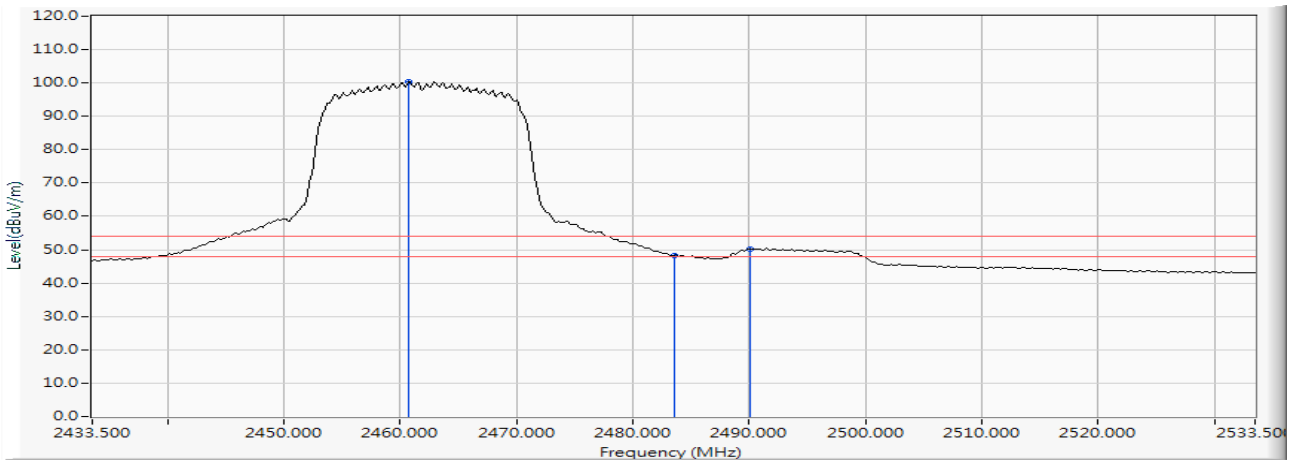
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2463.355	10.555	102.691	113.247	--	--	PEAK
2		2483.500	10.640	56.501	67.142	-6.858	74.000	PEAK
3		2490.891	10.670	61.622	72.292	-1.708	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
Test Date	:	2019/02/25

Horizontal



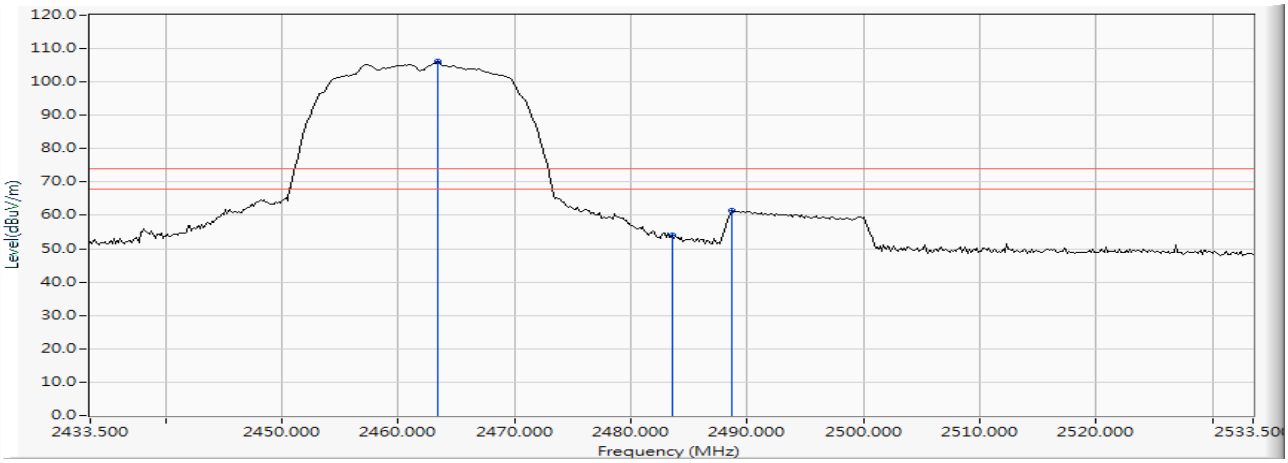
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2460.746	10.544	89.895	100.439	--	--	AVERAGE
2		2483.500	10.640	37.706	48.347	-5.653	54.000	AVERAGE
3		2490.022	10.667	39.643	50.309	-3.691	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
Test Date	:	2019/02/25

Vertical



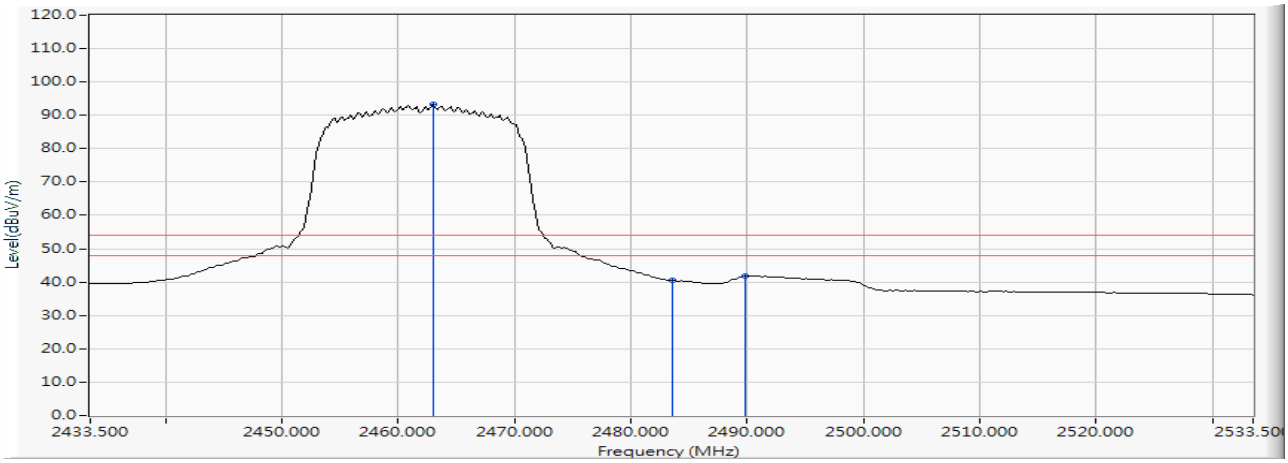
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2463.355	10.555	95.560	106.116	--	--	PEAK
2		2483.500	10.640	43.547	54.188	-19.812	74.000	PEAK
3		2488.717	10.661	50.687	61.348	-12.652	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
Test Date	:	2019/02/25

Vertical



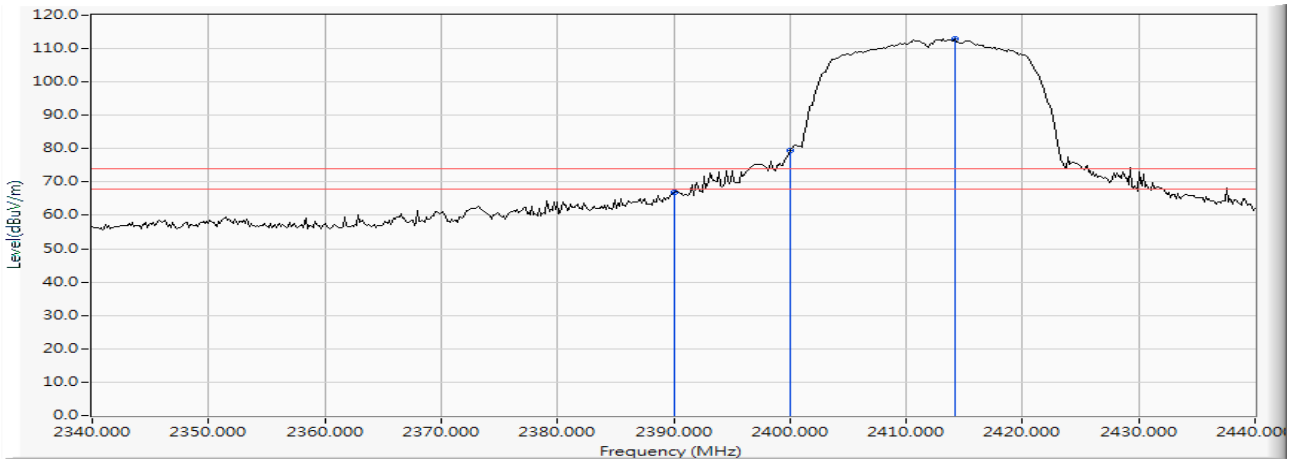
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2463.065	10.554	82.651	93.205	--	--	AVERAGE
2		2483.500	10.640	29.847	40.488	-13.512	54.000	AVERAGE
3		2489.877	10.667	31.143	41.809	-12.191	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2412MHz)
Test Date	:	2019/02/25

Horizontal



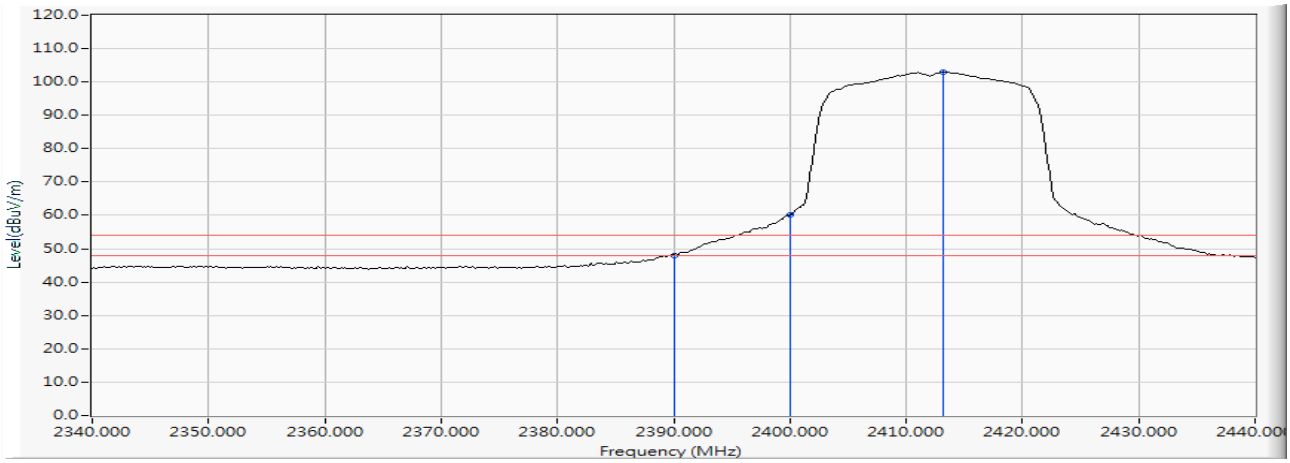
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	56.745	67.007	-6.993	74.000	PEAK
2		2400.000	10.304	69.179	79.482	--	--	PEAK
3	*	2414.203	10.360	102.468	112.829	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2412MHz)
Test Date	:	2019/02/25

Horizontal



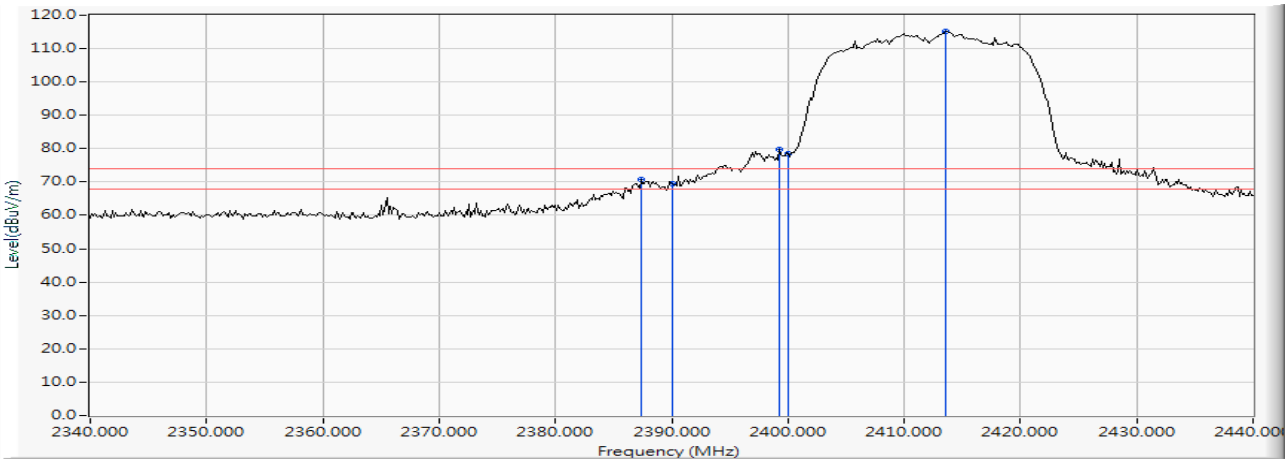
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	37.833	48.095	-5.905	54.000	AVERAGE
2		2400.000	10.304	49.928	60.231	--	--	AVERAGE
3	*	2413.188	10.357	92.663	103.020	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2412MHz)
Test Date	:	2019/02/25

Vertical



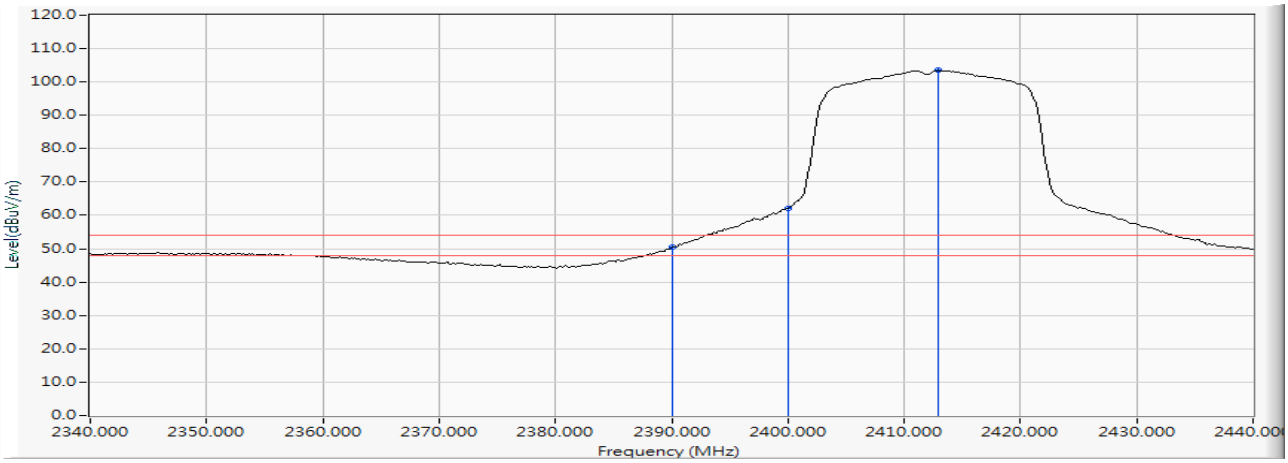
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2387.391	10.251	60.374	70.625	-3.375	74.000	PEAK
2		2390.000	10.262	59.202	69.464	-4.536	74.000	PEAK
3		2399.275	10.300	69.553	79.853	--	--	PEAK
4		2400.000	10.304	68.355	78.658	--	--	PEAK
5	*	2413.623	10.358	104.679	115.037	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2412MHz)
Test Date	:	2019/02/25

Vertical



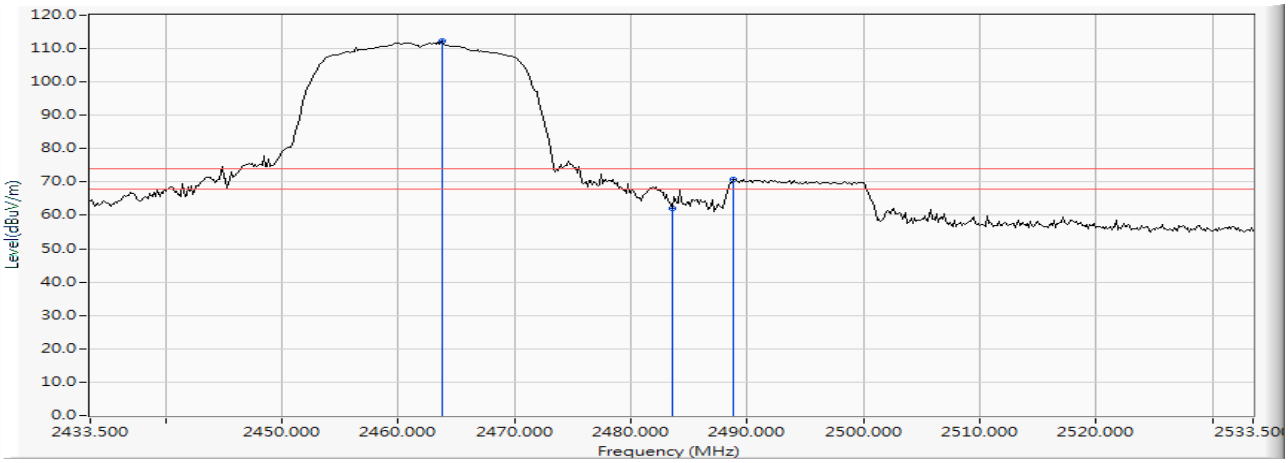
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	40.149	50.411	-3.589	54.000	AVERAGE
2		2400.000	10.304	51.808	62.111	--	--	AVERAGE
3	*	2412.899	10.355	93.084	103.440	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2462MHz)
Test Date	:	2019/02/25

Horizontal



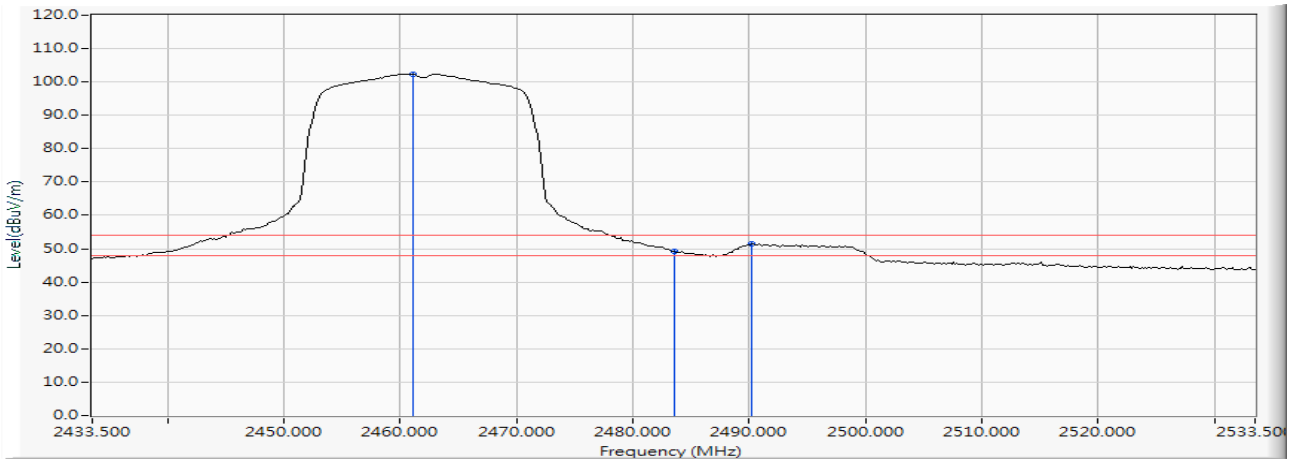
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2463.790	10.558	101.576	112.133	--	--	PEAK
2		2483.500	10.640	51.597	62.238	-11.762	74.000	PEAK
3		2488.862	10.661	60.166	70.828	-3.172	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2462MHz)
Test Date	:	2019/02/25

Horizontal



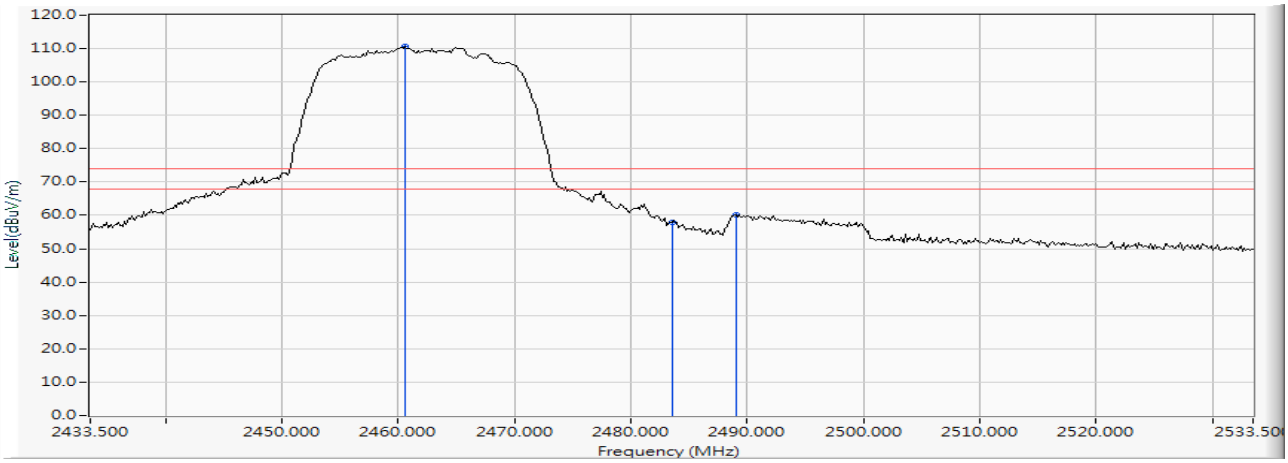
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2461.036	10.545	91.852	102.397	--	--	AVERAGE
2		2483.500	10.640	38.592	49.233	-4.767	54.000	AVERAGE
3		2490.167	10.667	40.754	51.421	-2.579	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2462MHz)
Test Date	:	2019/02/25

Vertical



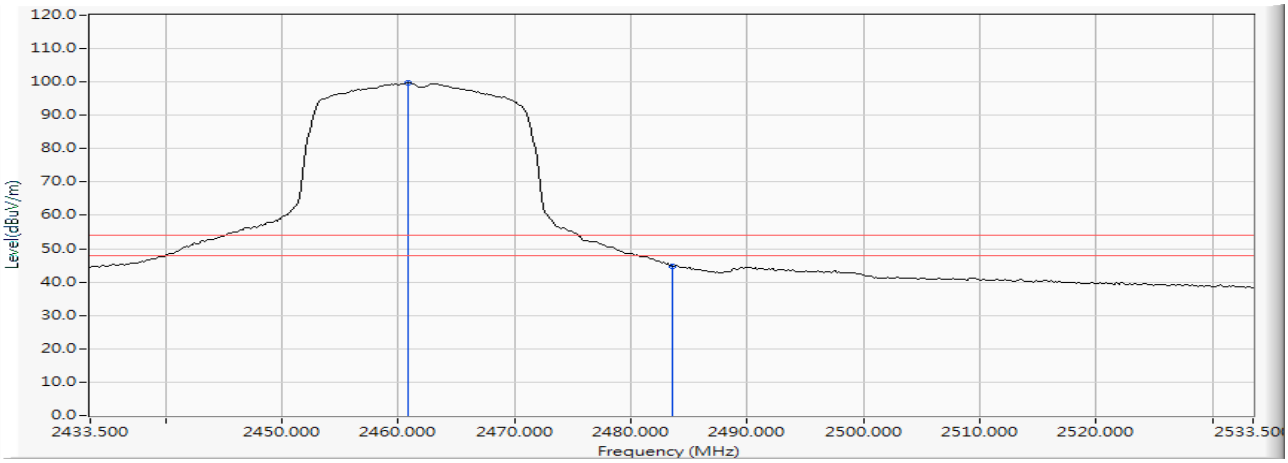
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2460.601	10.543	100.124	110.667	--	--	PEAK
2		2483.500	10.640	47.364	58.005	-15.995	74.000	PEAK
3		2489.007	10.662	49.595	60.257	-13.743	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW) (2462MHz)
Test Date	:	2019/02/25

Vertical



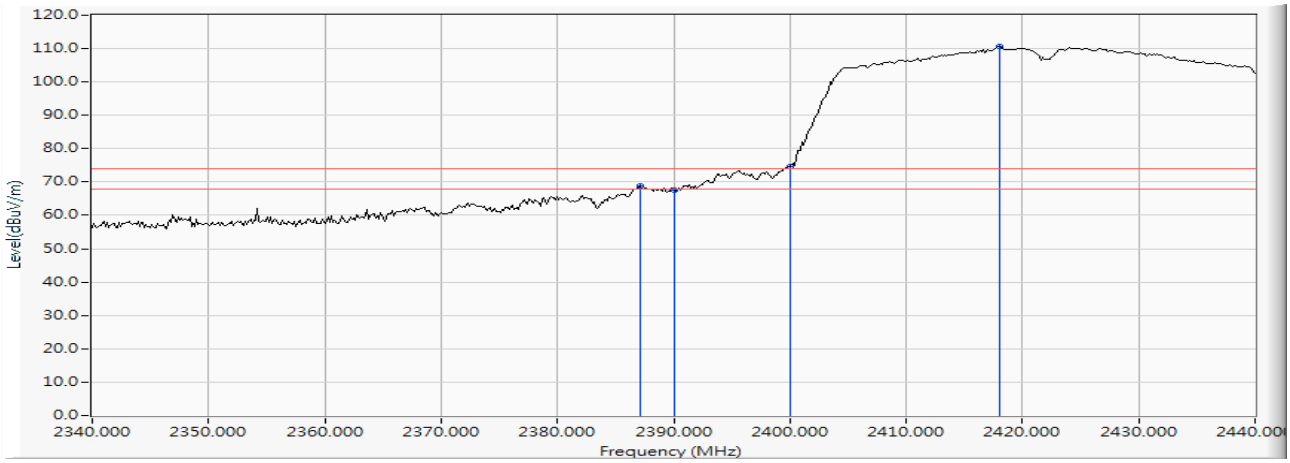
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2460.891	10.544	89.146	99.691	--	--	AVERAGE
2		2483.500	10.640	34.021	44.662	-9.338	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2422MHz)
Test Date	:	2019/02/25

Horizontal



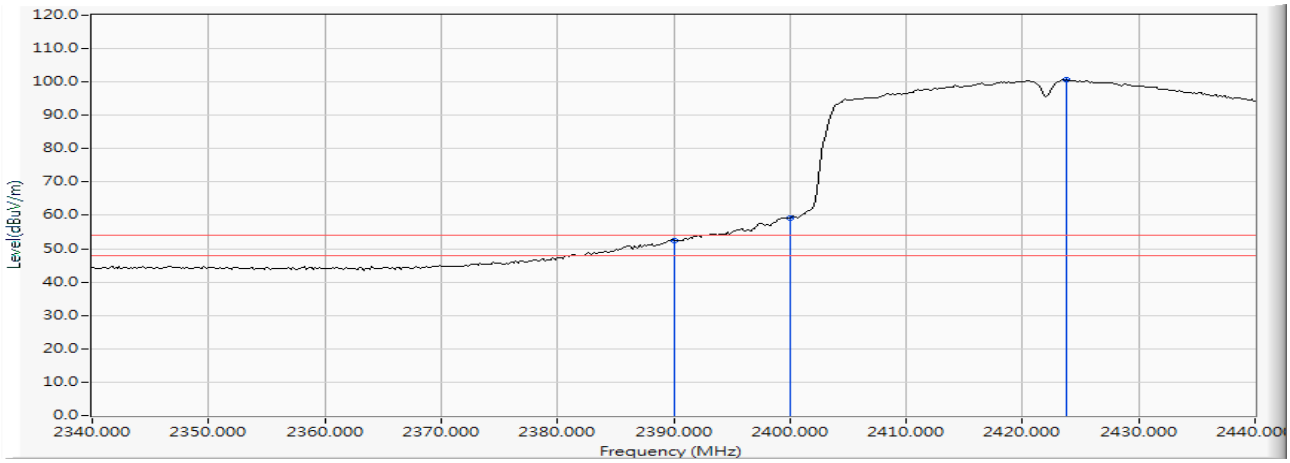
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2387.101	10.250	58.548	68.798	-5.202	74.000	PEAK
2		2390.000	10.262	57.382	67.644	-6.356	74.000	PEAK
3		2400.000	10.304	64.184	74.487	--	--	PEAK
4	*	2417.971	10.376	100.300	110.676	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2422MHz)
Test Date	:	2019/02/25

Horizontal



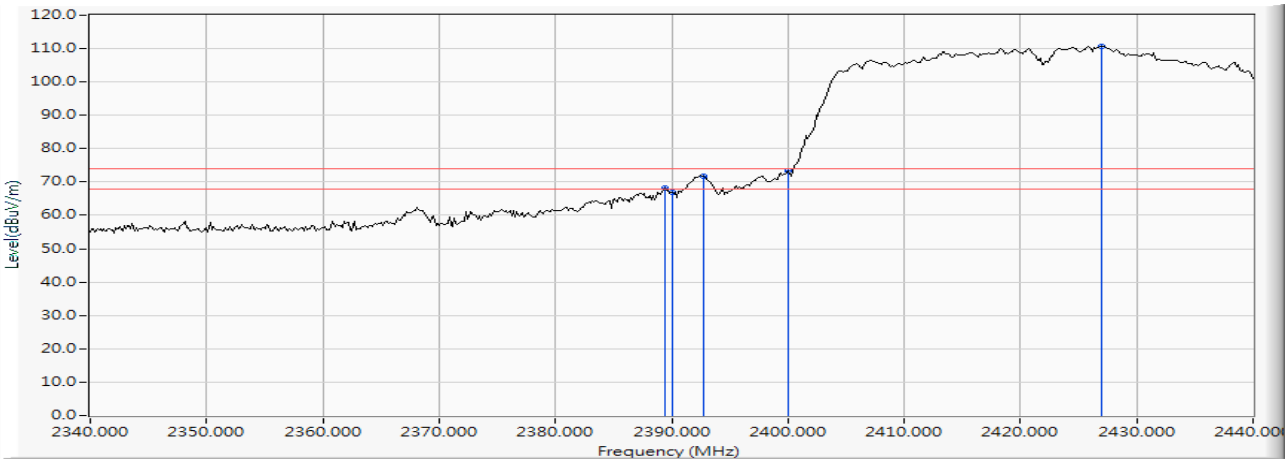
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	42.235	52.497	-1.503	54.000	AVERAGE
2		2400.000	10.304	48.840	59.143	--	--	AVERAGE
3	*	2423.768	10.400	90.250	100.650	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2422MHz)
Test Date	:	2019/02/25

Vertical



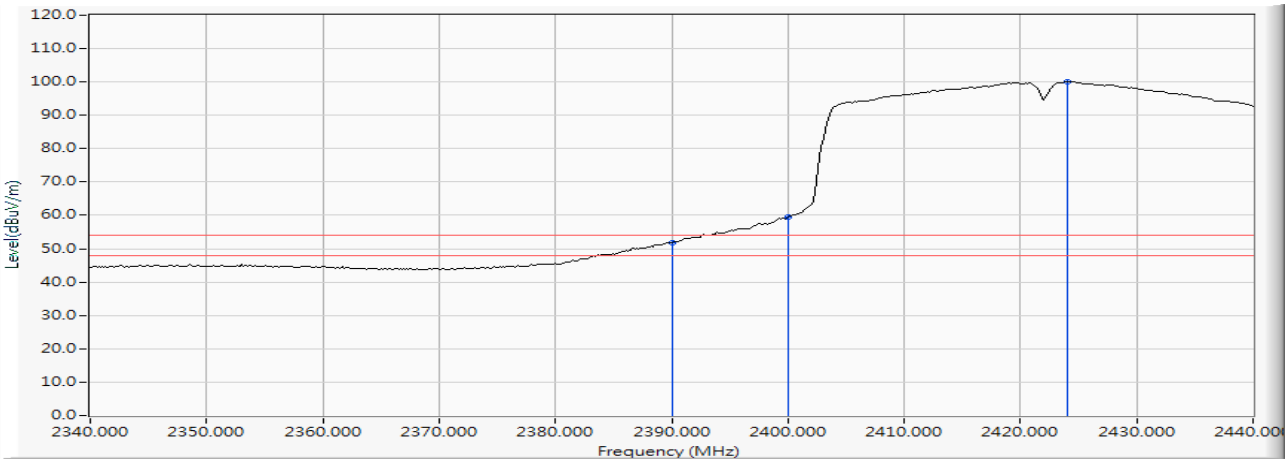
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2389.420	10.260	57.995	68.255	-5.745	74.000	PEAK
2		2390.000	10.262	56.679	66.941	-7.059	74.000	PEAK
3		2392.754	10.273	61.522	71.796	--	--	PEAK
4		2400.000	10.304	63.174	73.477	--	--	PEAK
5	*	2426.957	10.414	100.400	110.814	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2422MHz)
Test Date	:	2019/02/25

Vertical



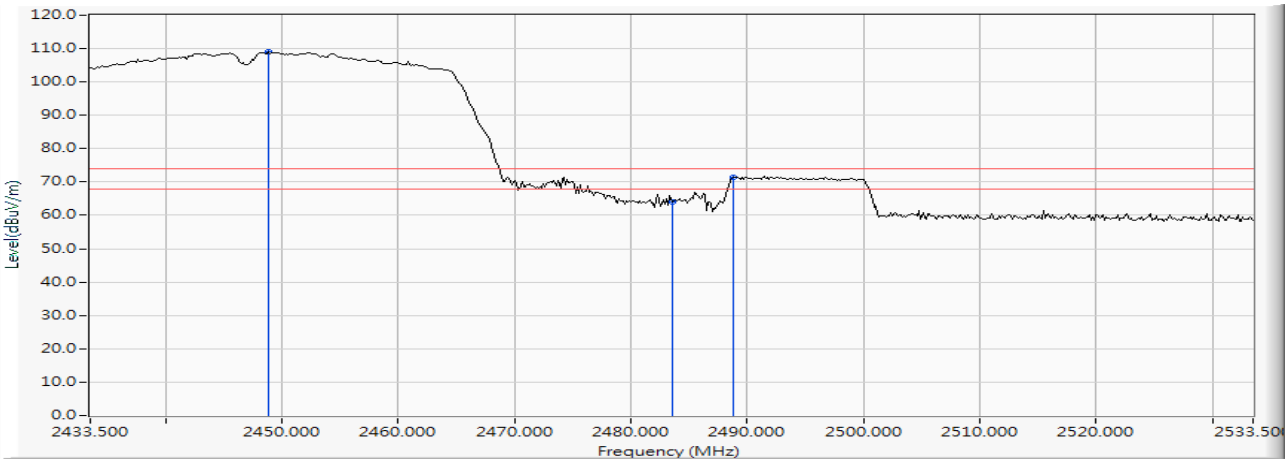
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1		2390.000	10.262	41.503	51.765	-2.235	54.000	AVERAGE
2		2400.000	10.304	49.096	59.399	--	--	AVERAGE
3	*	2424.058	10.401	89.776	100.177	--	--	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2447MHz)
Test Date	:	2019/04/01

Horizontal



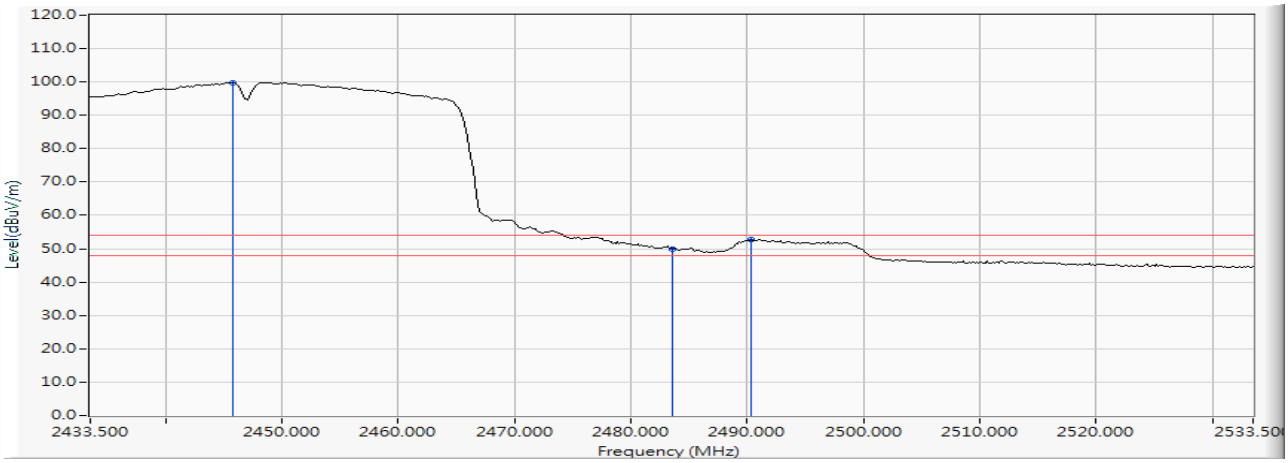
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2448.862	10.498	98.503	109.001	--	--	PEAK
2		2483.500	10.640	53.497	64.138	-9.862	74.000	PEAK
3		2488.862	10.661	60.705	71.367	-2.633	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2447MHz)
Test Date	:	2019/04/01

Horizontal



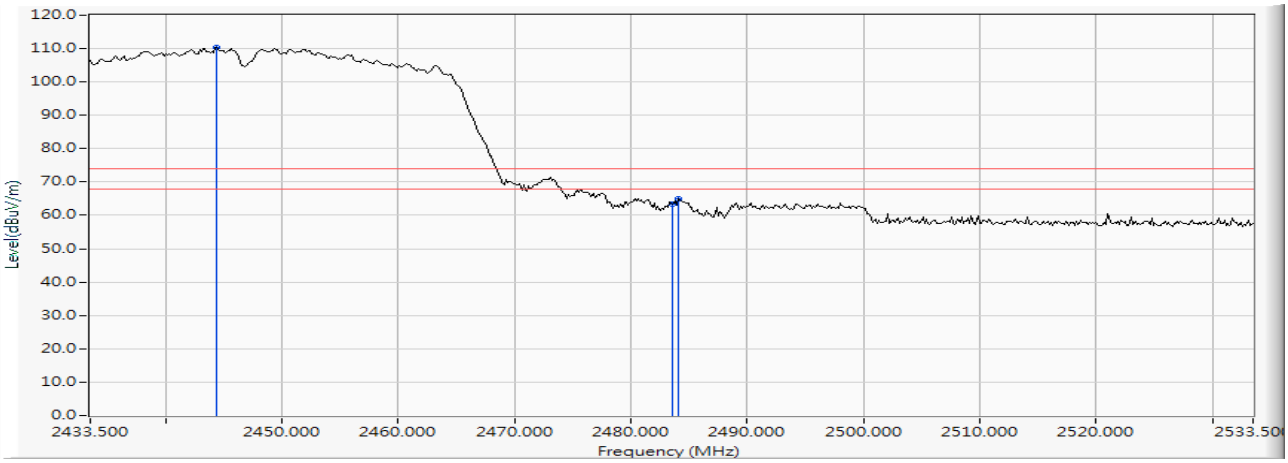
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2445.819	10.488	89.311	99.798	--	--	AVERAGE
2		2483.500	10.640	39.265	49.906	-4.094	54.000	AVERAGE
3		2490.312	10.668	41.982	52.650	-1.350	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2447MHz)
Test Date	:	2019/04/01

Vertical



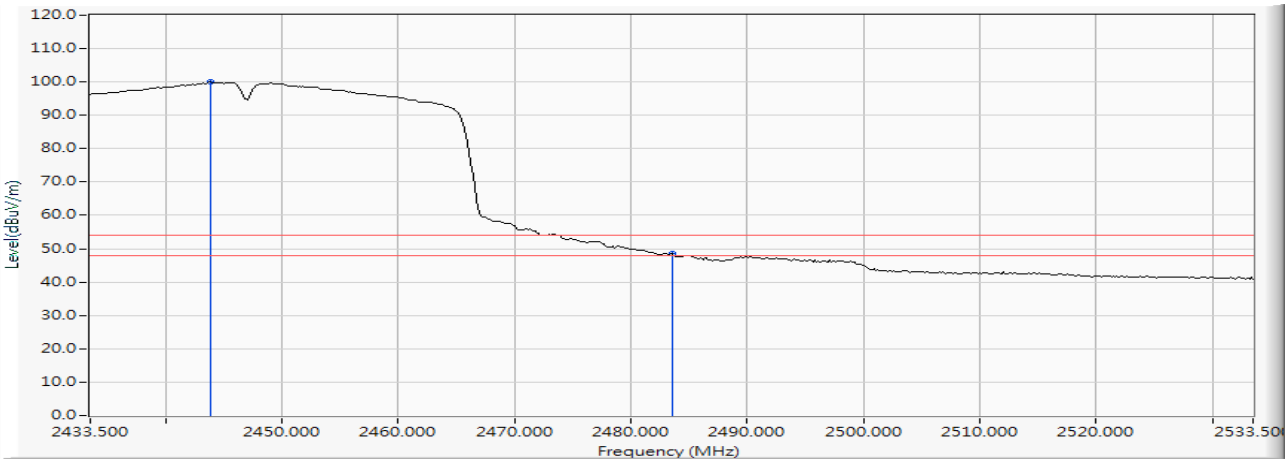
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2444.370	10.482	99.987	110.469	--	--	PEAK
2		2483.500	10.640	52.652	63.293	-10.707	74.000	PEAK
3		2484.080	10.644	54.316	64.959	-9.041	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2447MHz)
Test Date	:	2019/04/01

Vertical



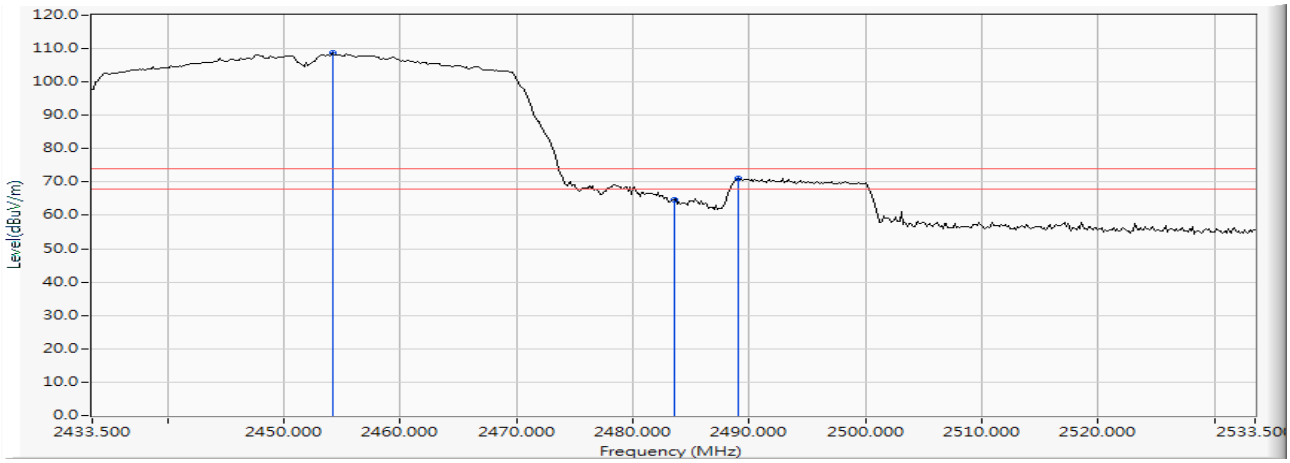
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2443.790	10.480	89.491	99.971	--	--	AVERAGE
2		2483.500	10.640	37.786	48.427	-5.573	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2452MHz)
Test Date	:	2019/02/25

Horizontal



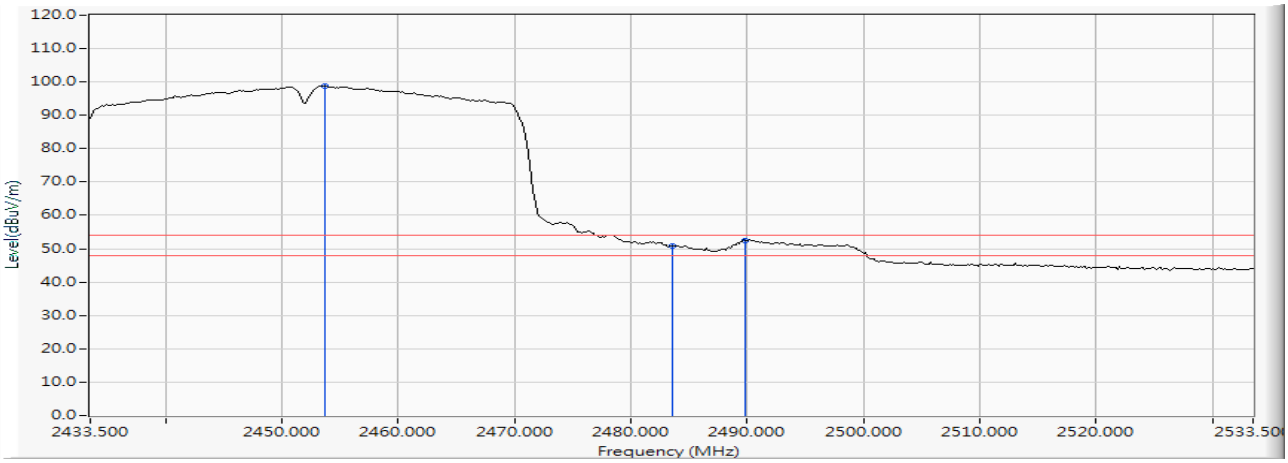
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2454.225	10.516	98.147	108.664	--	--	PEAK
2		2483.500	10.640	54.027	64.668	-9.332	74.000	PEAK
3		2489.007	10.662	60.298	70.960	-3.040	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2452MHz)
Test Date	:	2019/02/25

Horizontal



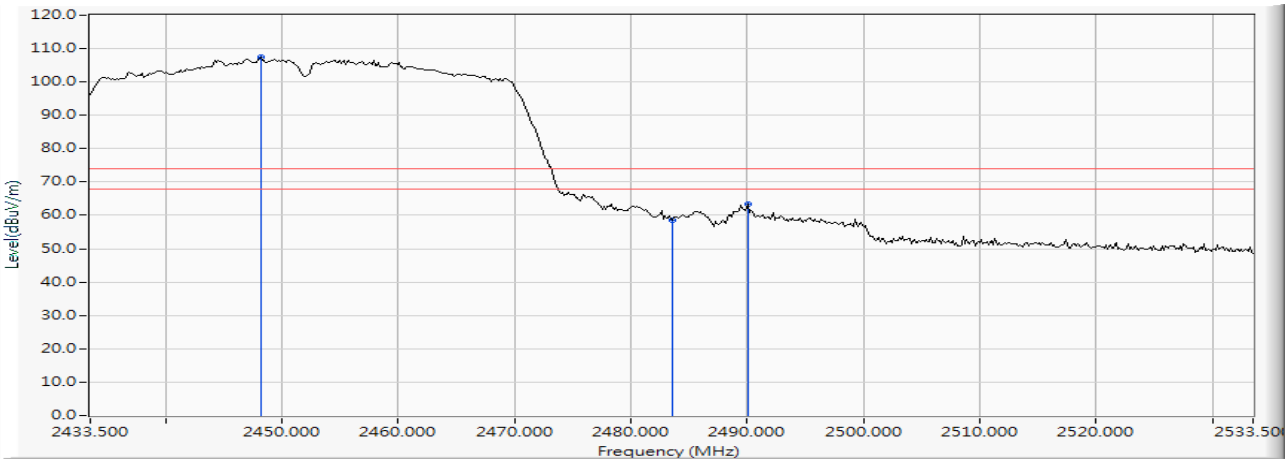
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2453.645	10.514	88.148	98.663	--	--	AVERAGE
2		2483.500	10.640	40.076	50.717	-3.283	54.000	AVERAGE
3		2489.877	10.667	41.898	52.564	-1.436	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2452MHz)
Test Date	:	2019/02/25

Vertical



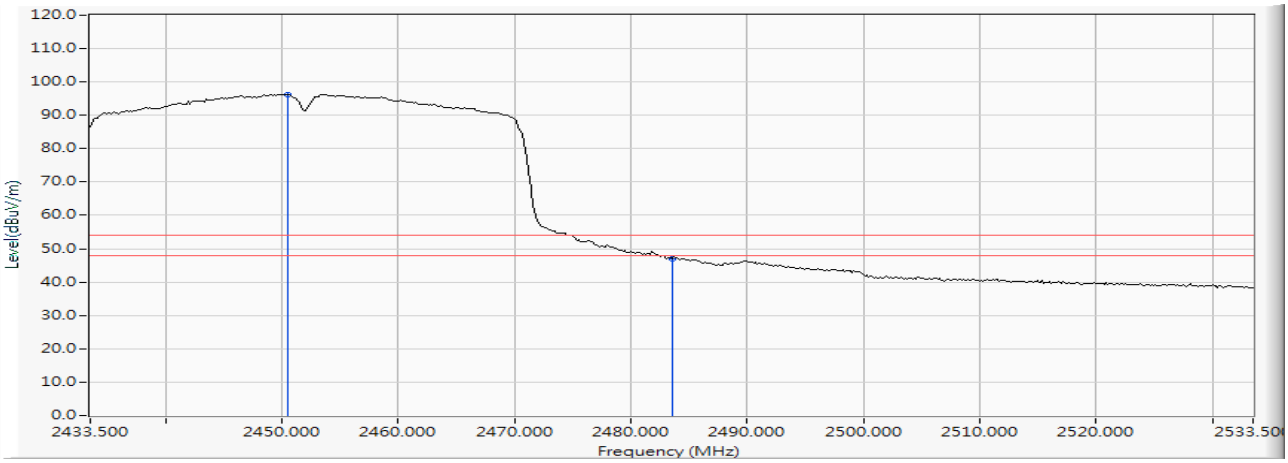
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2448.138	10.496	96.917	107.412	--	--	PEAK
2		2483.500	10.640	47.951	58.592	-15.408	74.000	PEAK
3		2490.022	10.667	52.743	63.409	-10.591	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW) (2452MHz)
Test Date	:	2019/02/25

Vertical



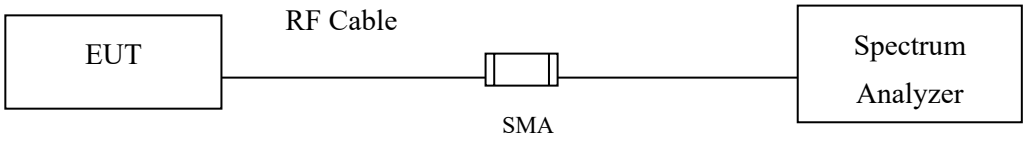
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	2450.457	10.503	85.716	96.220	--	--	AVERAGE
2		2483.500	10.640	36.421	47.062	-6.938	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

Tested according to DTS test procedure of KDB558074 section 8.2 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 1-5% of the emission bandwidth, VBW≥3*RBW

7.4. Uncertainty

± 279.2Hz

7.5. Test Result of 6dB Bandwidth

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router

Test Item : 6dB Bandwidth Data

Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	9650	>500	Pass
06	2437	9650	>500	Pass
11	2462	9650	>500	Pass

Figure Channel 01:

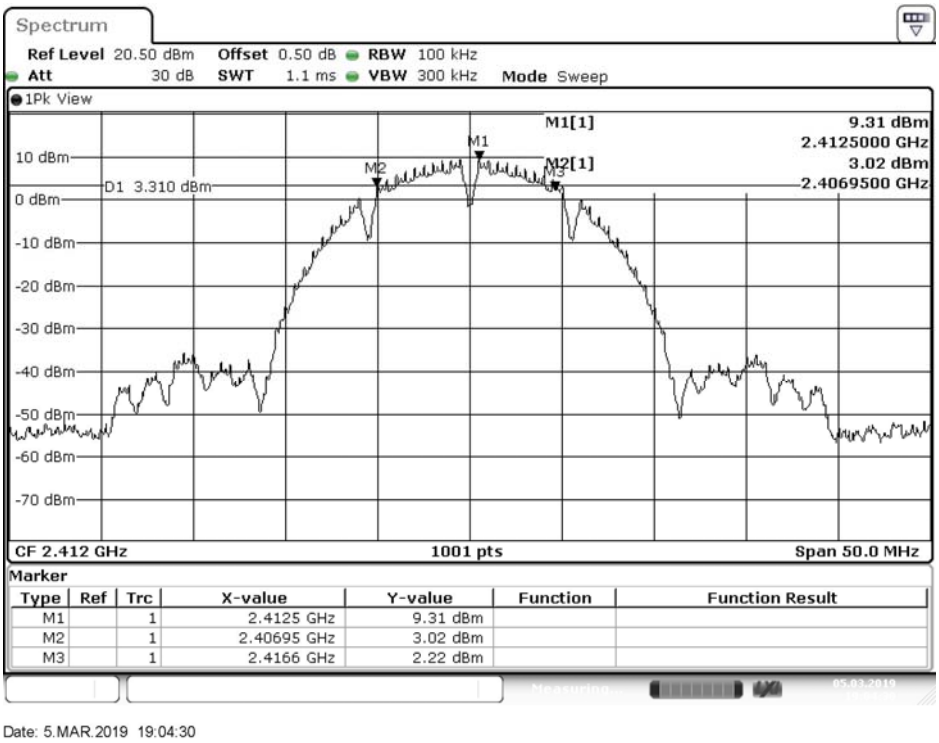
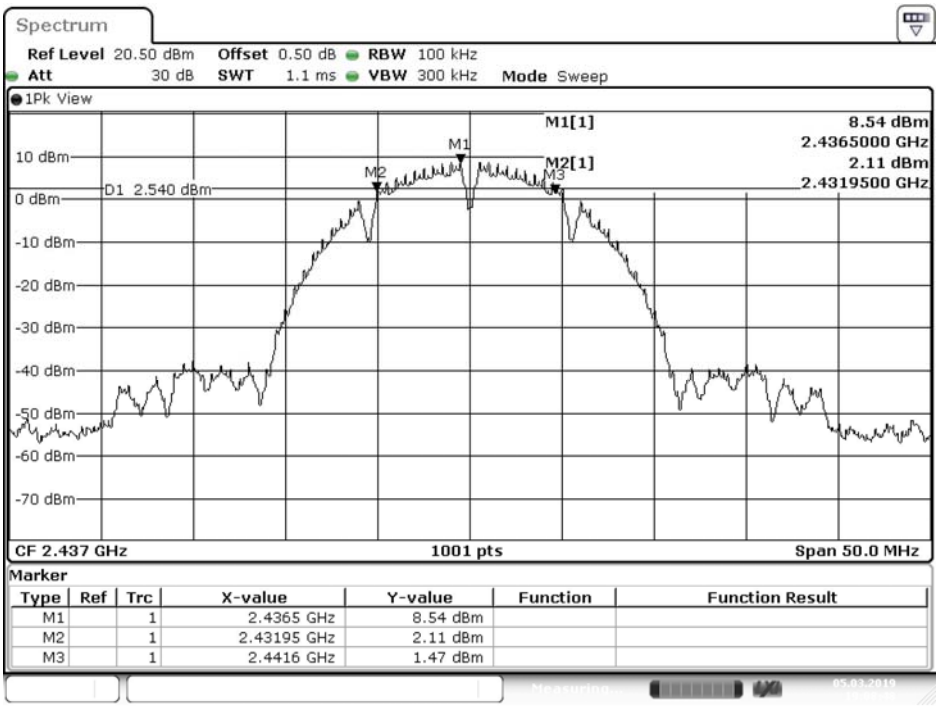
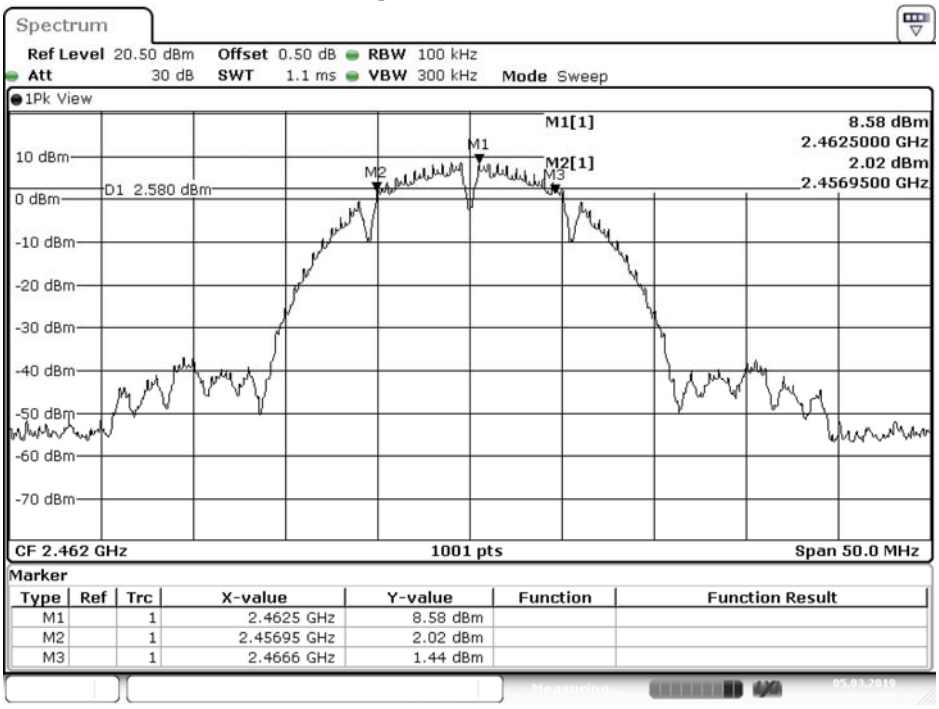


Figure Channel 06:



Date: 5.MAR.2019 19:08:48

Figure Channel 11:

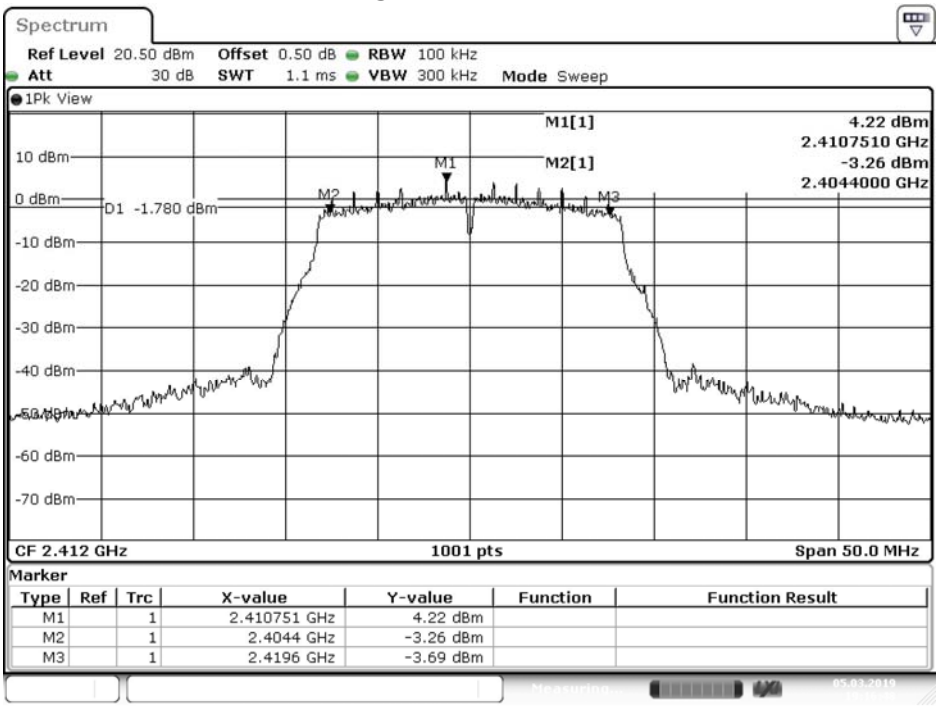


Date: 5.MAR.2019 19:12:50

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

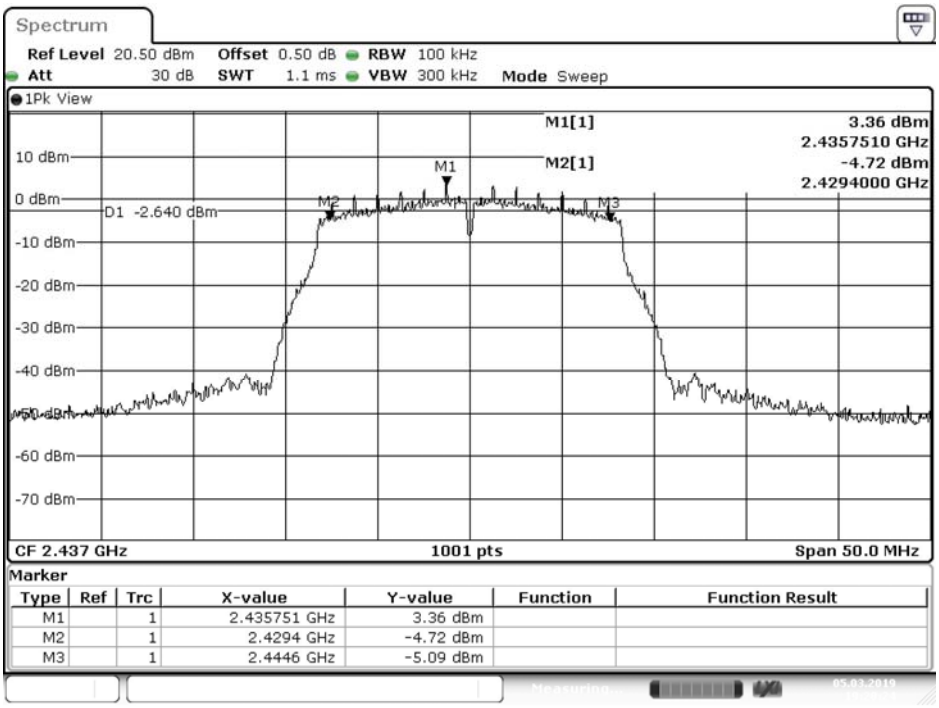
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	15200	>500	Pass
06	2437	15200	>500	Pass
11	2462	15150	>500	Pass

Figure Channel 01:



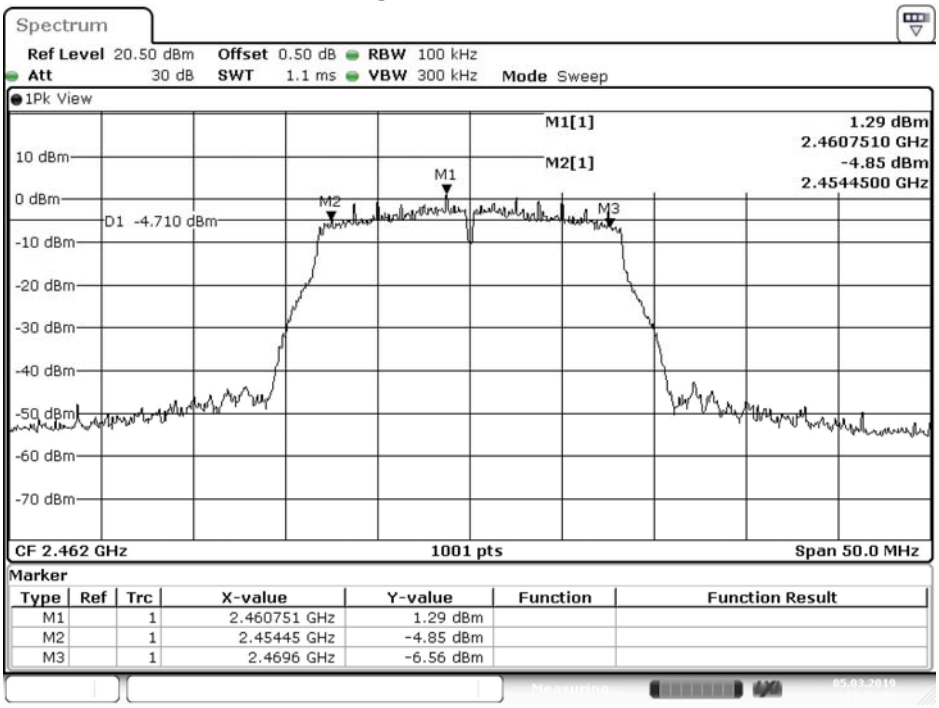
Date: 5.MAR.2019 19:16:49

Figure Channel 06:



Date: 5.MAR.2019 19:20:24

Figure Channel 11:

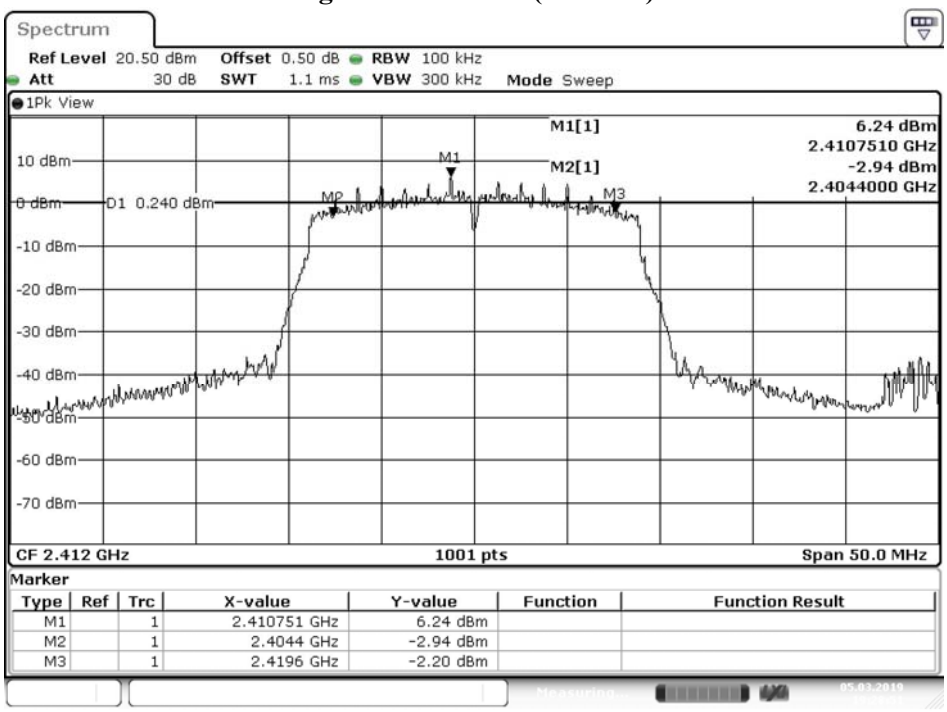


Date: 5.MAR.2019 19:23:59

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)

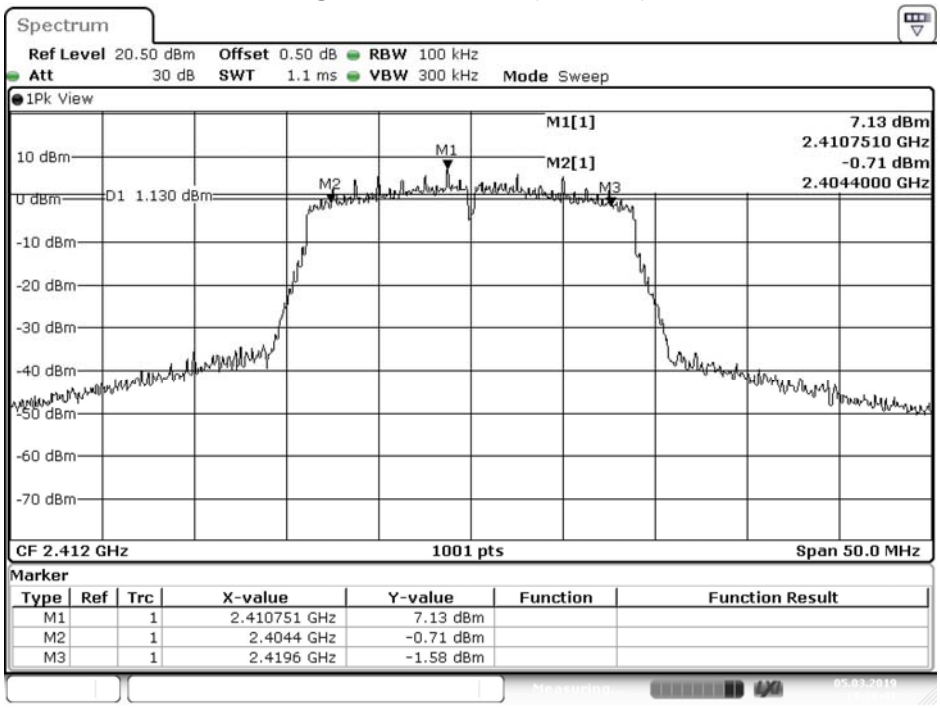
Channel No.	Frequency (MHz)	Chain	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	A	15200	>500	Pass
06	2437	A	15200	>500	Pass
11	2462	A	15200	>500	Pass
01	2412	B	15200	>500	Pass
06	2437	B	15200	>500	Pass
11	2462	B	15150	>500	Pass

Figure Channel 01 (Chain A)



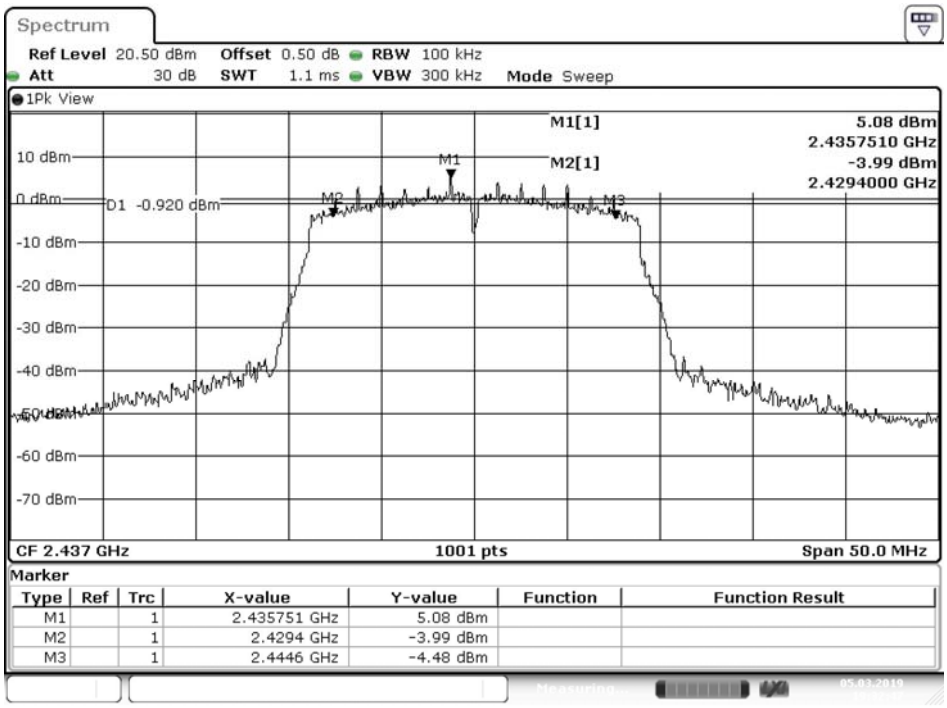
Date: 5.MAR.2019 19:28:52

Figure Channel 01 (Chain B)



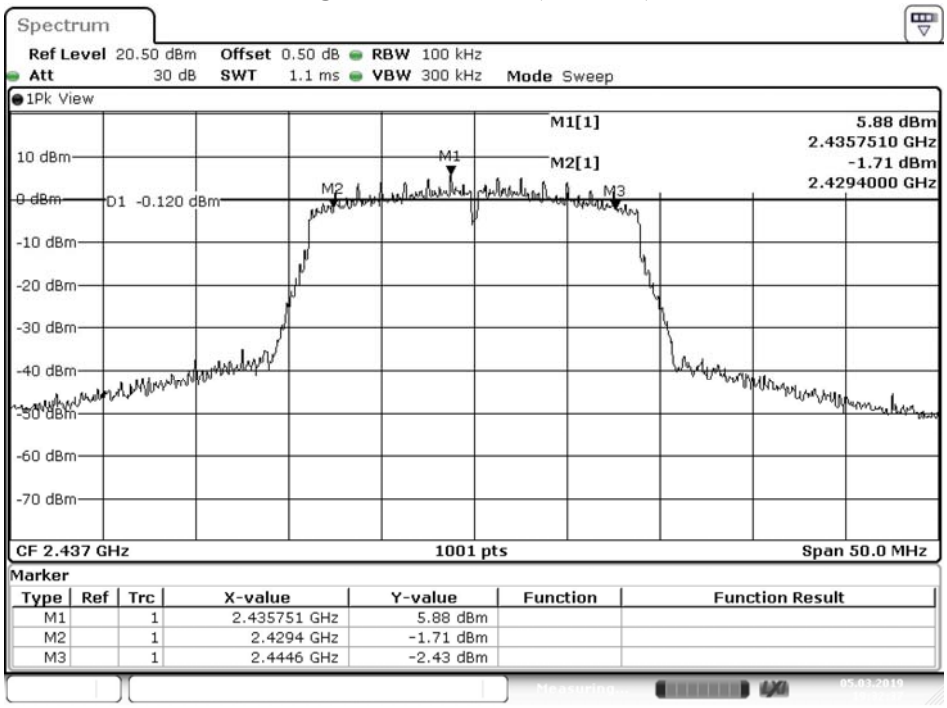
Date: 5.MAR.2019 19:28:42

Figure Channel 06 (Chain A)



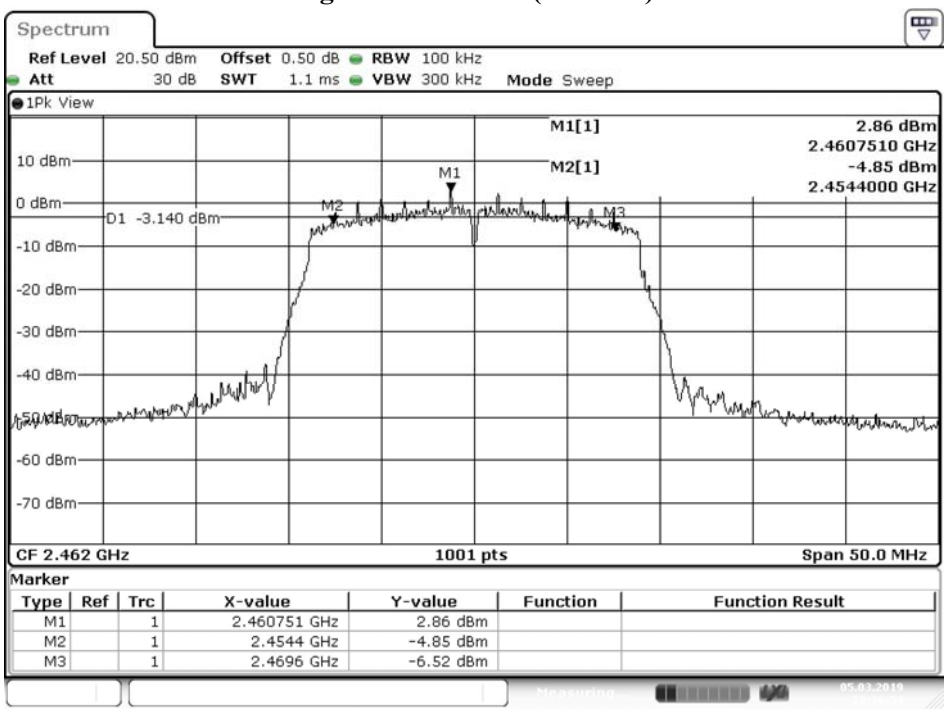
Date: 5.MAR.2019 19:32:47

Figure Channel 06 (Chain B)



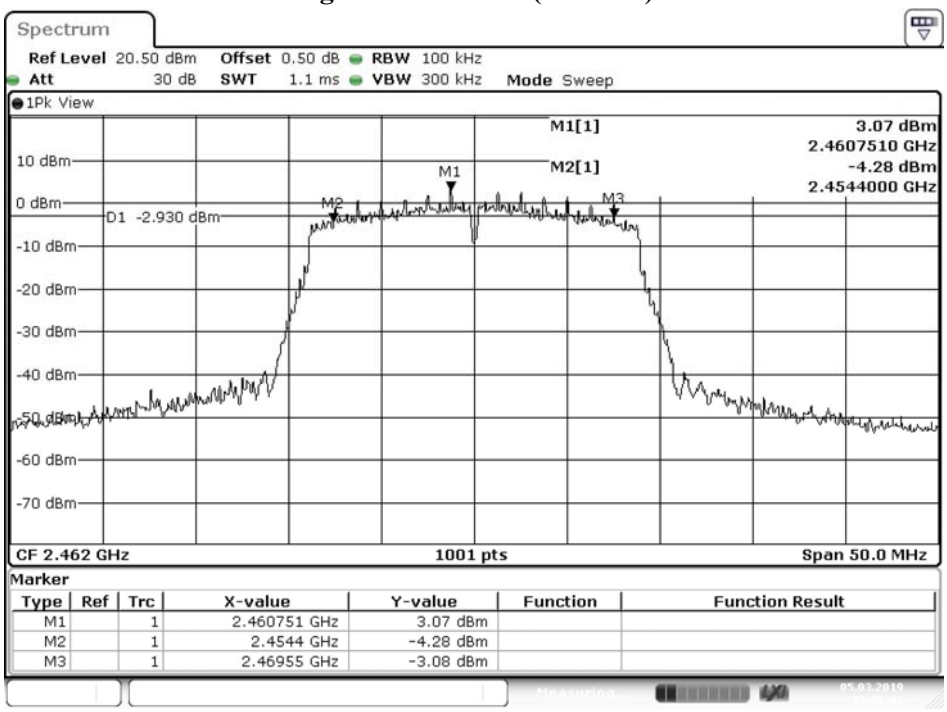
Date: 5.MAR.2019 19:32:37

Figure Channel 11 (Chain A)



Date: 5.MAR.2019 19:36:53

Figure Channel 11 (Chain B)

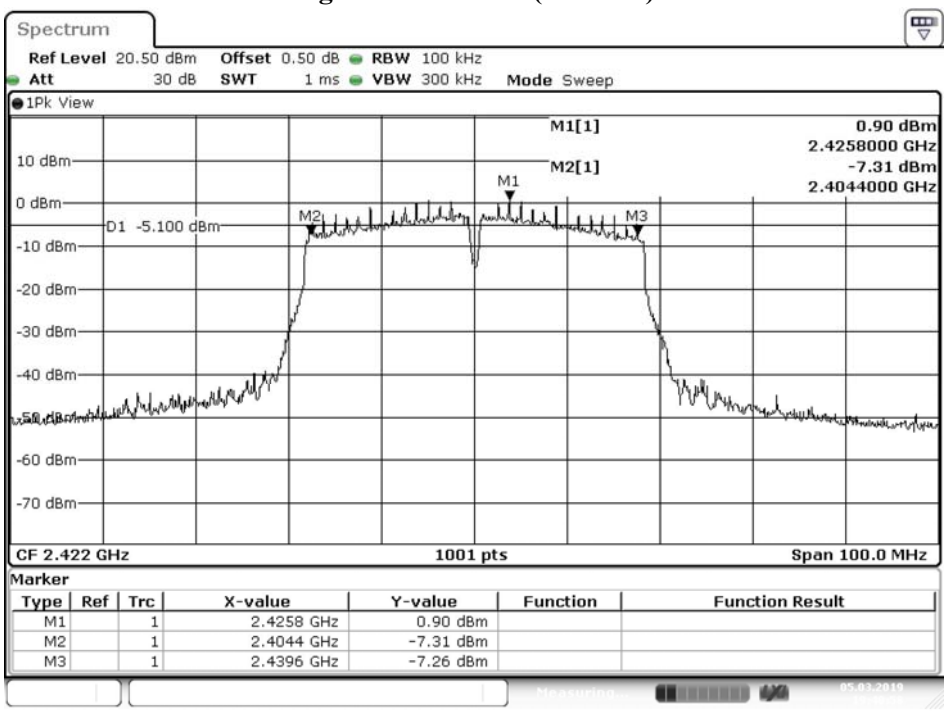


Date: 5.MAR.2019 19:36:43

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)

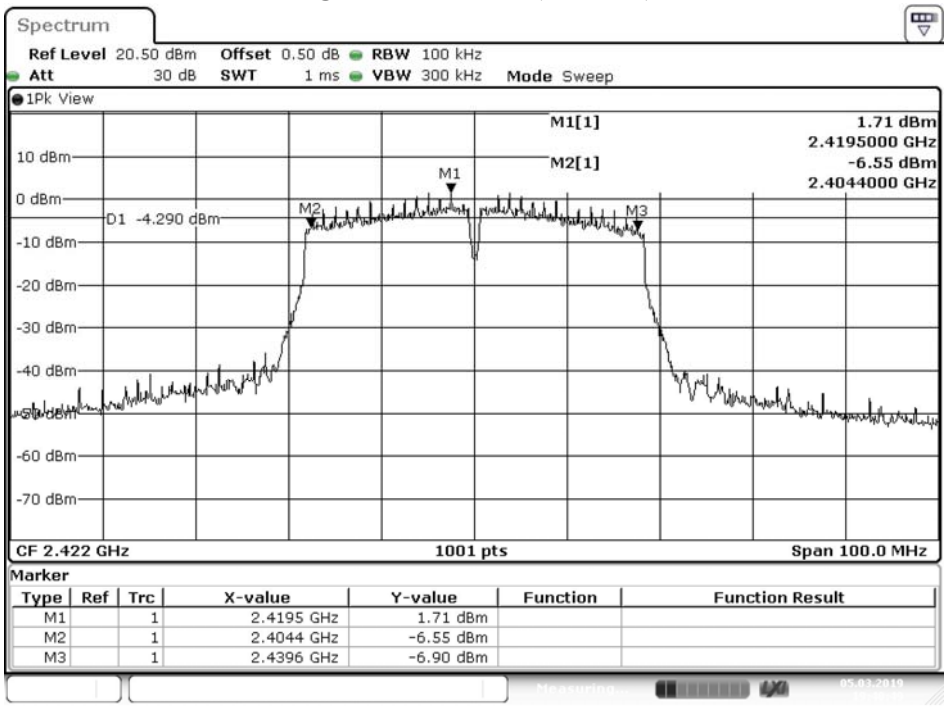
Channel No.	Frequency (MHz)	Chain	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	A	35200	>500	Pass
06	2437	A	35200	>500	Pass
09	2452	A	35200	>500	Pass
03	2422	B	35200	>500	Pass
06	2437	B	35300	>500	Pass
09	2452	B	35200	>500	Pass

Figure Channel 03 (Chain A)



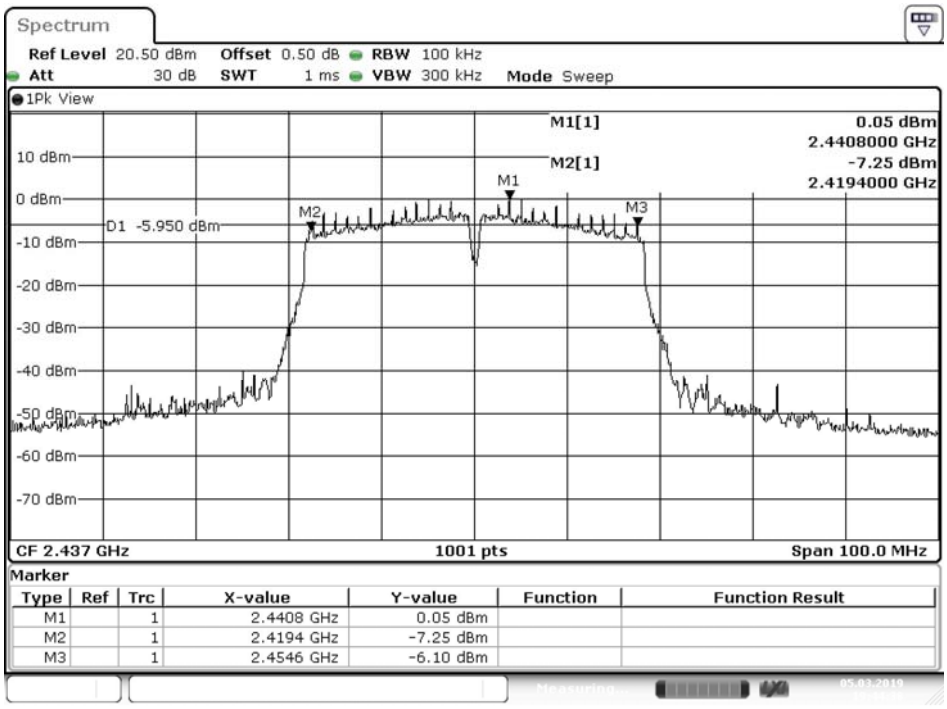
Date: 5.MAR.2019 19:40:59

Figure Channel 03 (Chain B)



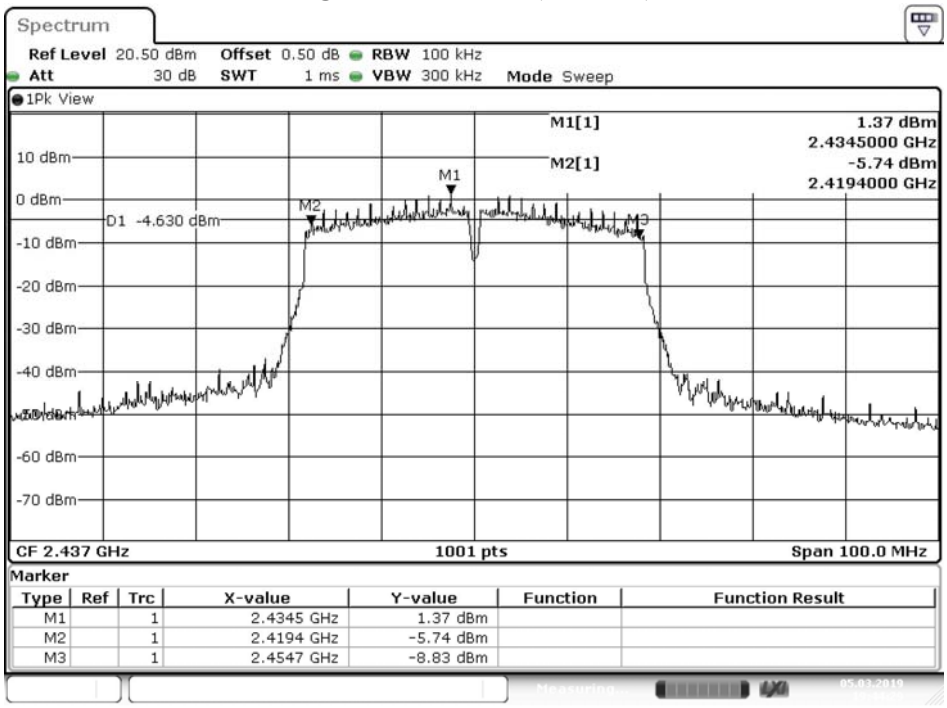
Date: 5.MAR.2019 19:40:49

Figure Channel 06 (Chain A)



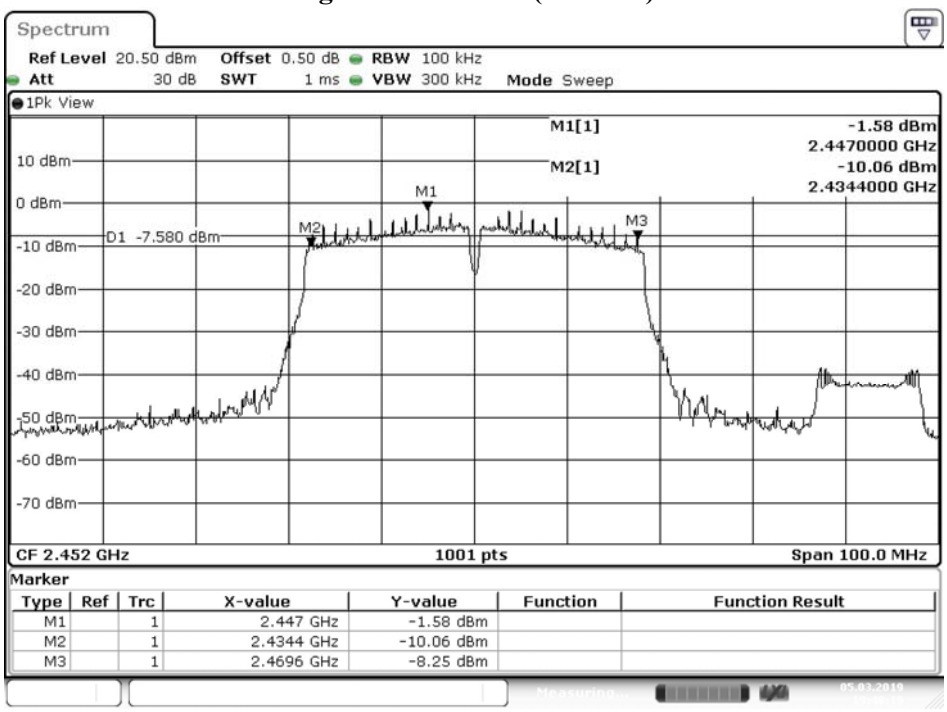
Date: 5.MAR.2019 19:44:39

Figure Channel 06 (Chain B)



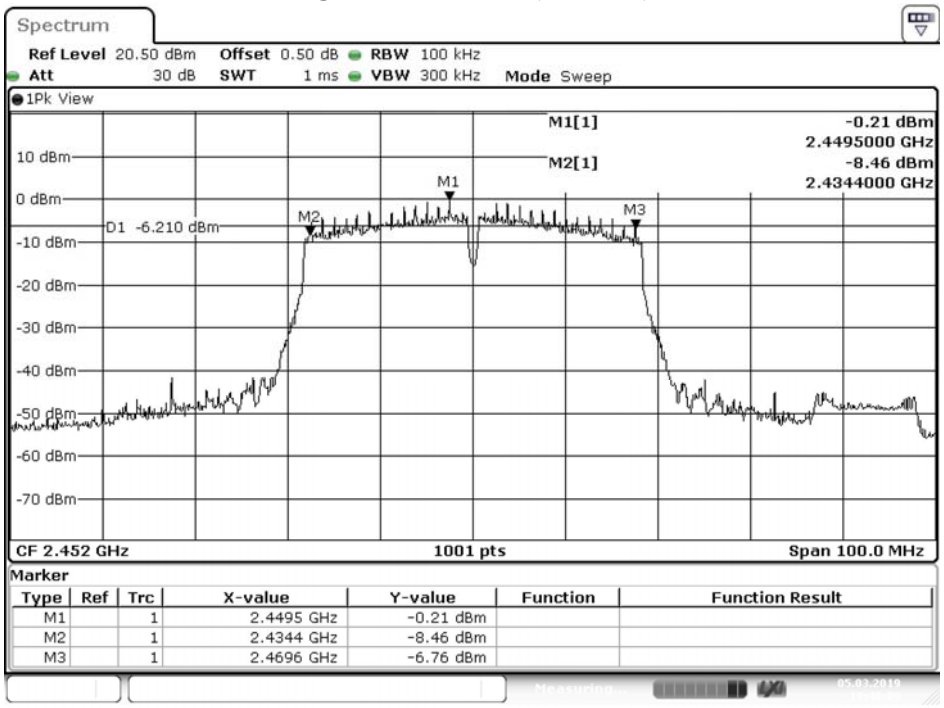
Date: 5.MAR.2019 19:44:29

Figure Channel 09 (Chain A)



Date: 5.MAR.2019 19:48:20

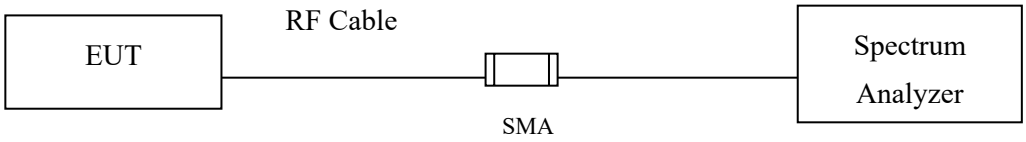
Figure Channel 09 (Chain B)



Date: 5.MAR.2019 19:48:10

8. Power Density

8.1. Test Setup



8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.3. Test Procedure

Tested according to DTS test procedure of KDB558074 section 8.4 for compliance to FCC 47CFR 15.247 requirements.

8.4. Uncertainty

± 1.23 dB

8.5. Test Result of Power Density

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Power Density Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Limit (dBm)	Result
01	2412.000	7.65	≦8dBm	Pass
06	2437.000	6.92	≦8dBm	Pass
11	2462.000	5.81	≦8dBm	Pass

Figure Channel 01:

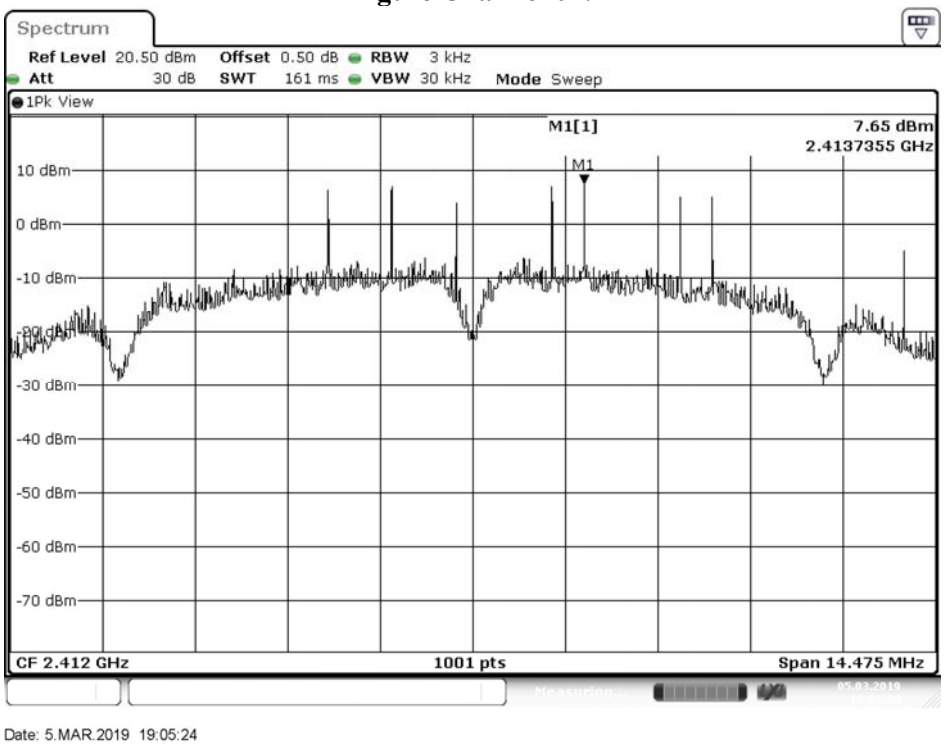
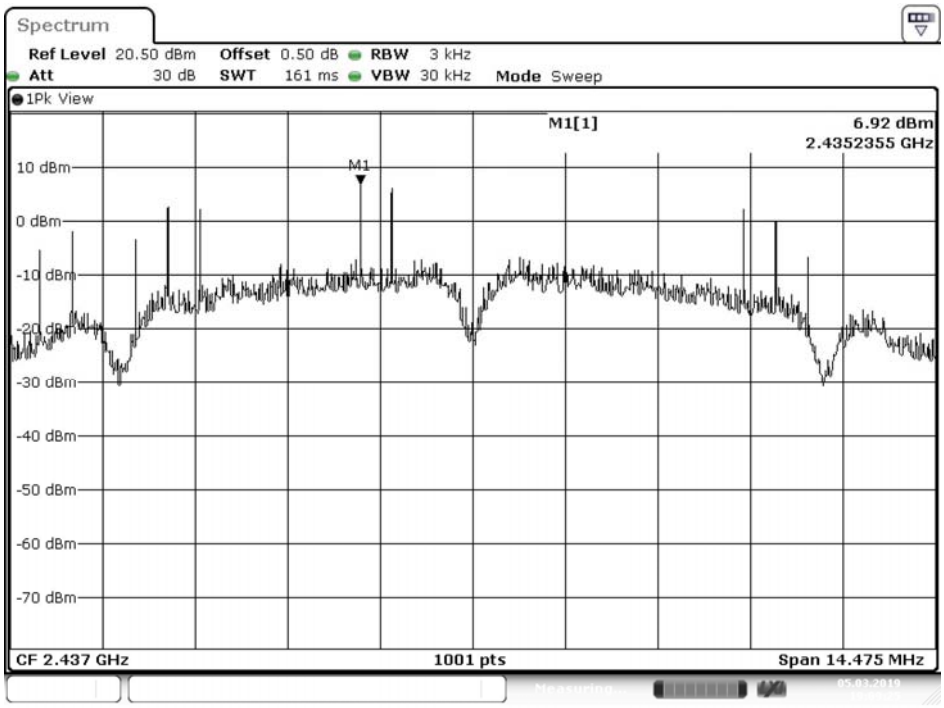
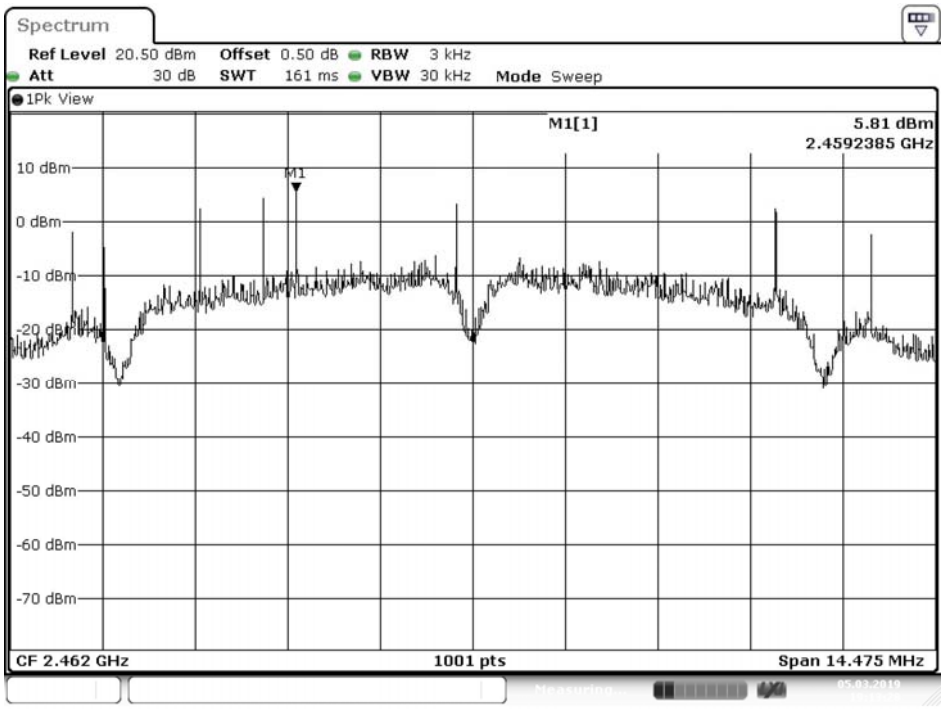


Figure Channel 06:



Date: 5.MAR.2019 19:09:26

Figure Channel 11:



Date: 5.MAR.2019 19:13:28

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Power Density Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Limit (dBm)	Result
01	2412.000	4.20	≦8dBm	Pass
06	2437.000	3.31	≦8dBm	Pass
11	2462.000	1.28	≦8dBm	Pass

Figure Channel 01:

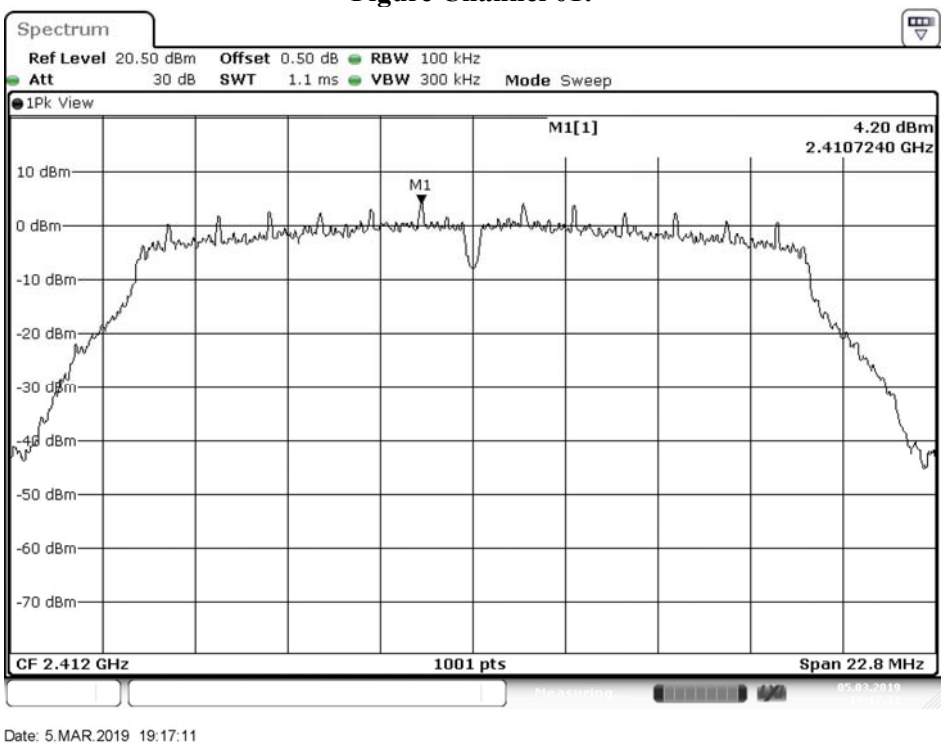
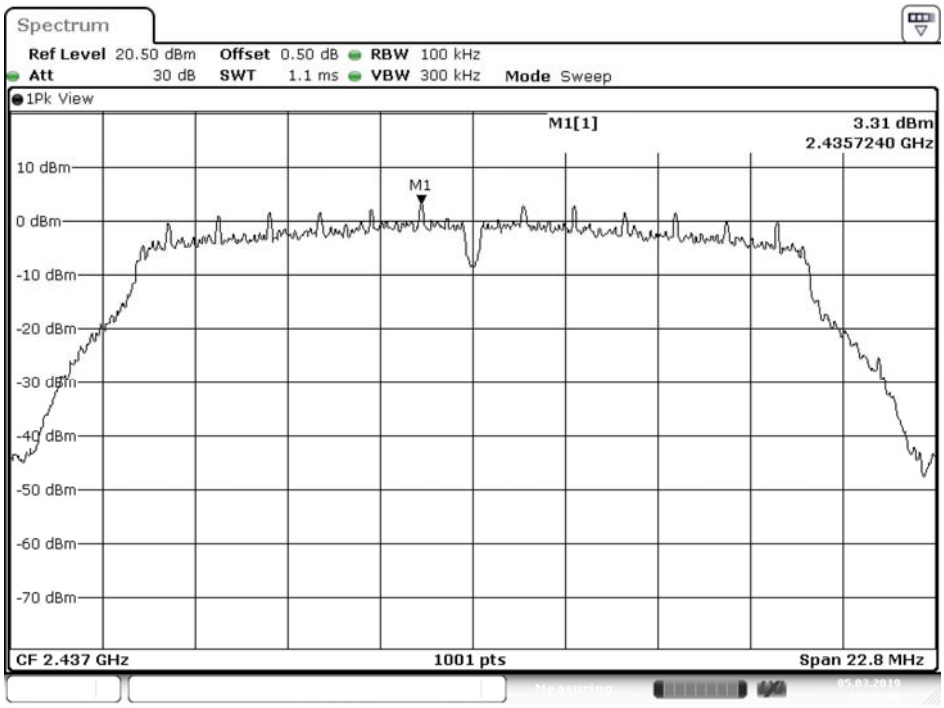
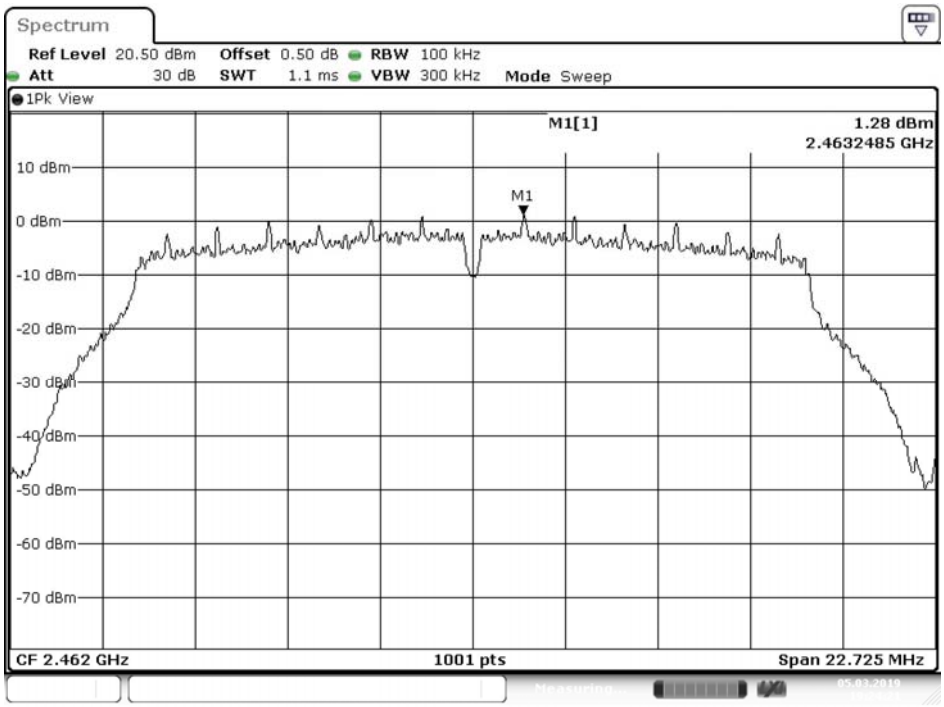


Figure Channel 06:



Date: 5.MAR.2019 19:20:46

Figure Channel 11:



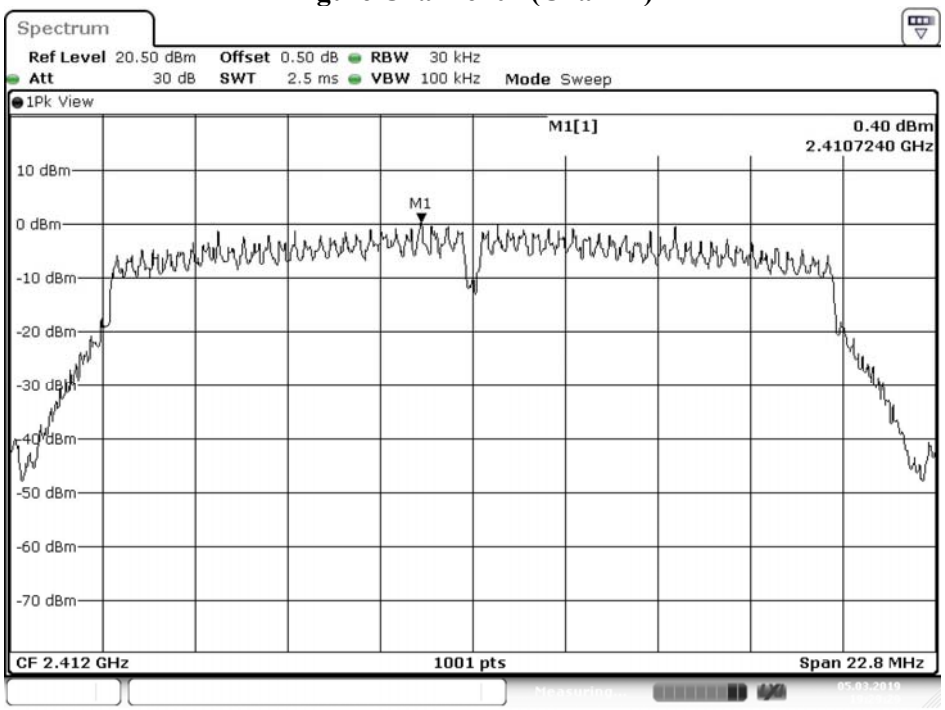
Date: 5.MAR.2019 19:24:21

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Power Density Data
Test Mode : Mode 3: Transmit (802.11n MCS8 14.4Mbps 20M-BW)

Channel No.	Frequency (MHz)	Chain	Measurement Level (dBm)	Total PPSD Level (dBm)	Limit (dBm)	Result
01	2412.000	A	0.40	3.41	≦8dBm	Pass
		B	1.75	4.76	≦8dBm	Pass
06	2437.000	A	-0.52	2.49	≦8dBm	Pass
		B	1.01	4.02	≦8dBm	Pass
11	2462.000	A	2.79	5.80	≦8dBm	Pass
		B	3.12	6.13	≦8dBm	Pass

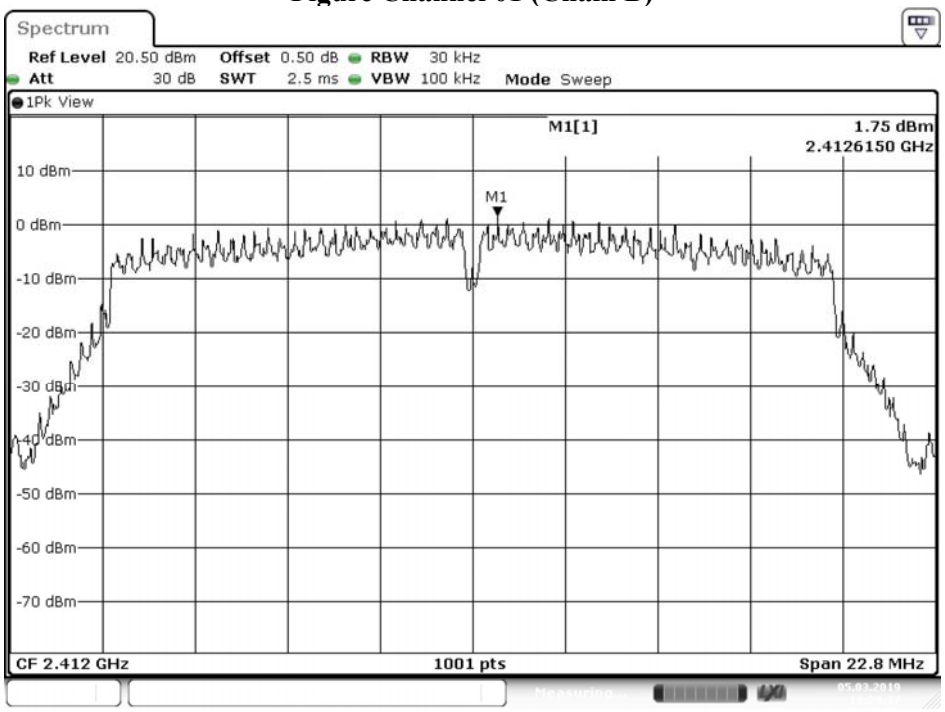
Note : The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 01 (Chain A)



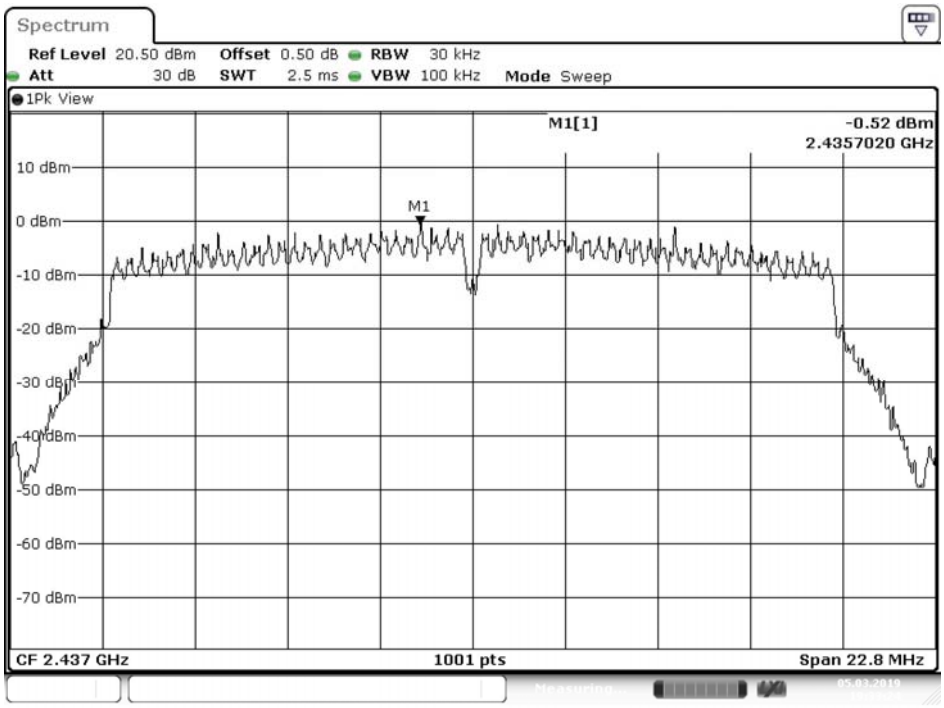
Date: 5.MAR.2019 19:29:29

Figure Channel 01 (Chain B)



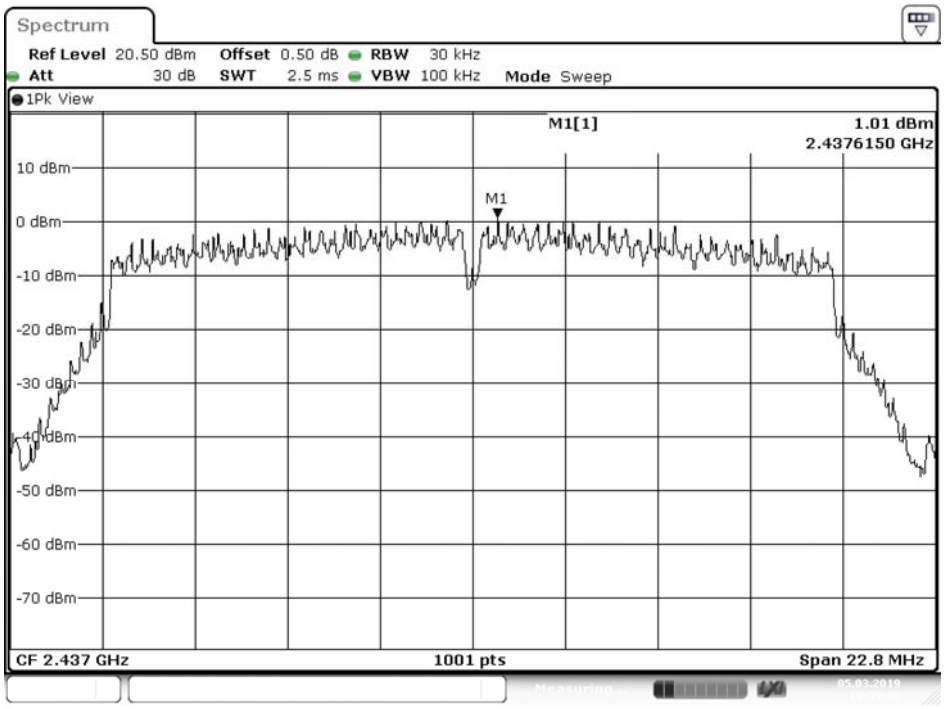
Date: 5.MAR.2019 19:29:37

Figure Channel 06 (Chain A)



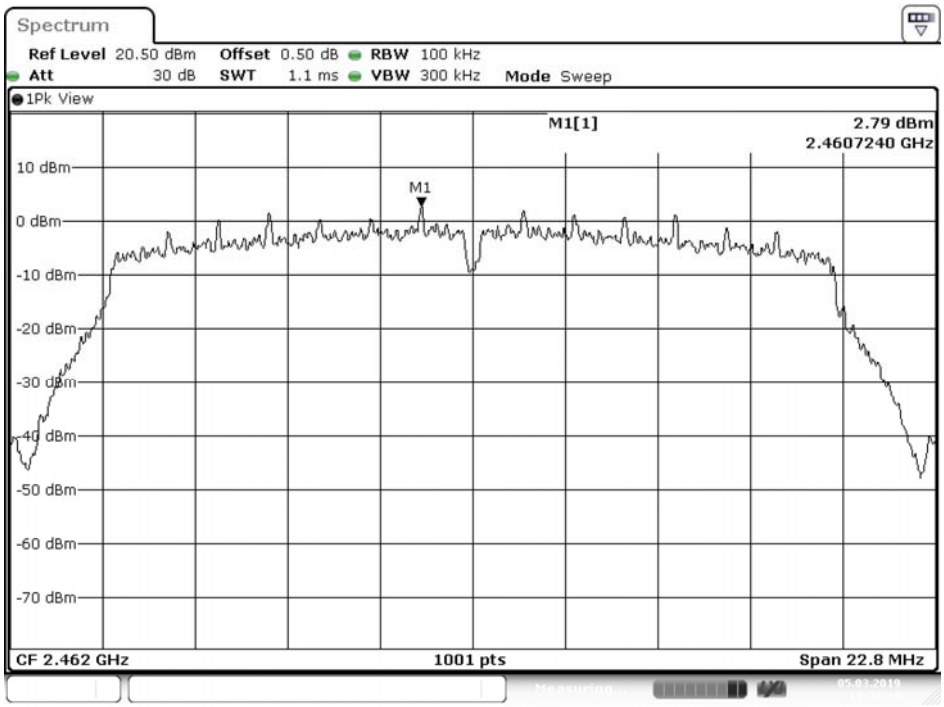
Date: 5.MAR.2019 19:33:25

Figure Channel 06 (Chain B)



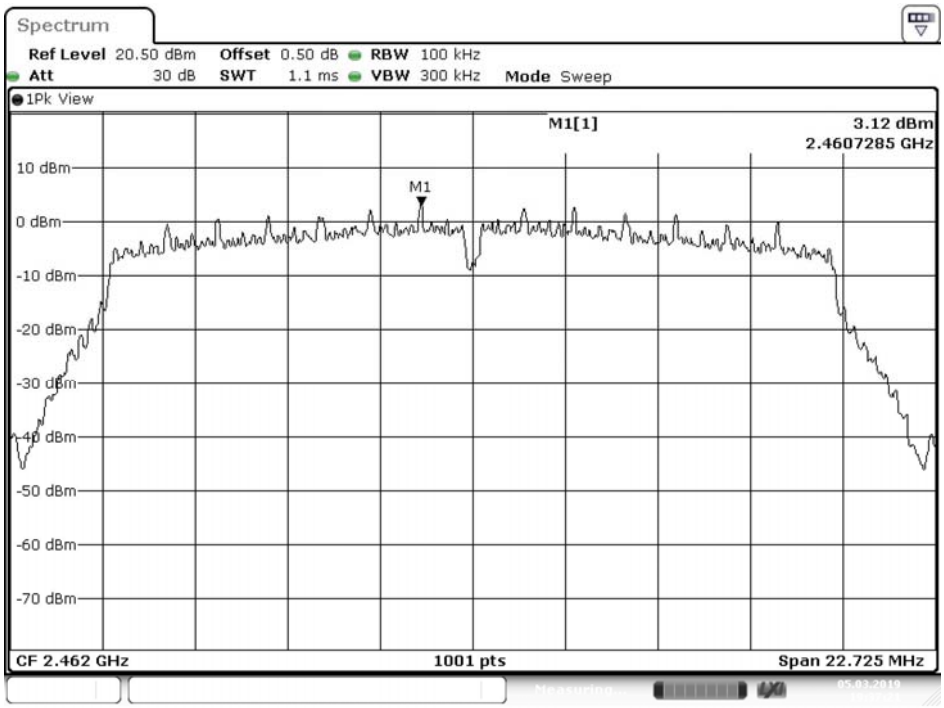
Date: 5.MAR.2019 19:33:32

Figure Channel 11 (Chain A)



Date: 5.MAR.2019 19:37:15

Figure Channel 11 (Chain B)



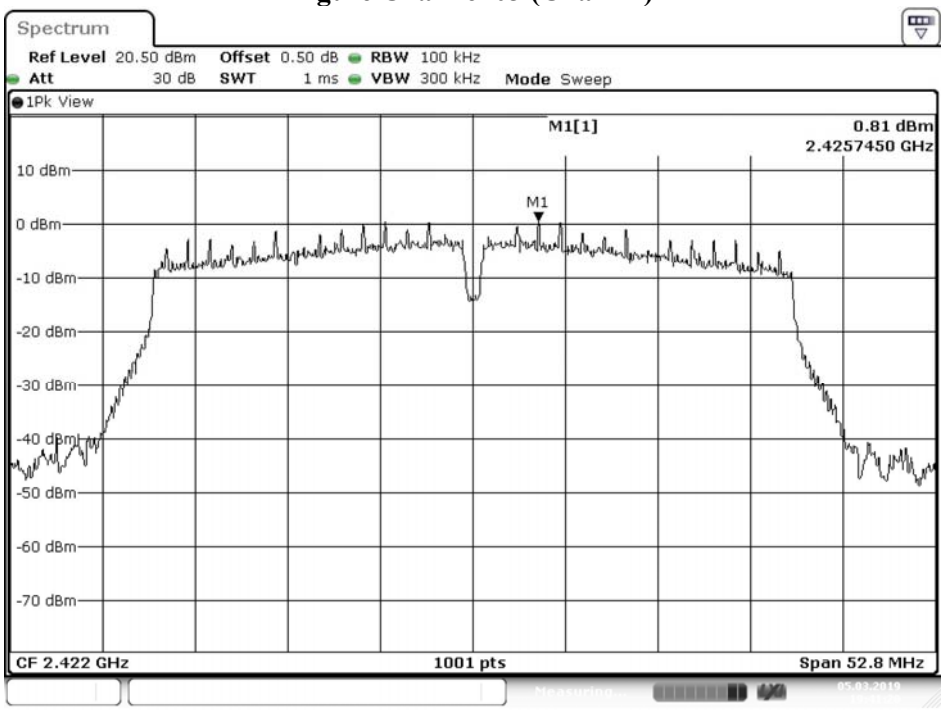
Date: 5.MAR.2019 19:37:22

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Power Density Data
Test Mode : Mode 4: Transmit (802.11n MCS8 30Mbps 40M-BW)

Channel No.	Frequency (MHz)	Chain	Measurement Level (dBm)	Total PPSD Level (dBm)	Limit (dBm)	Result
03	2422.000	A	0.81	3.82	≦8dBm	Pass
		B	1.54	4.55	≦8dBm	Pass
06	2437.000	A	-0.07	2.94	≦8dBm	Pass
		B	1.20	4.21	≦8dBm	Pass
09	2452.000	A	-1.77	1.24	≦8dBm	Pass
		B	-0.43	2.58	≦8dBm	Pass

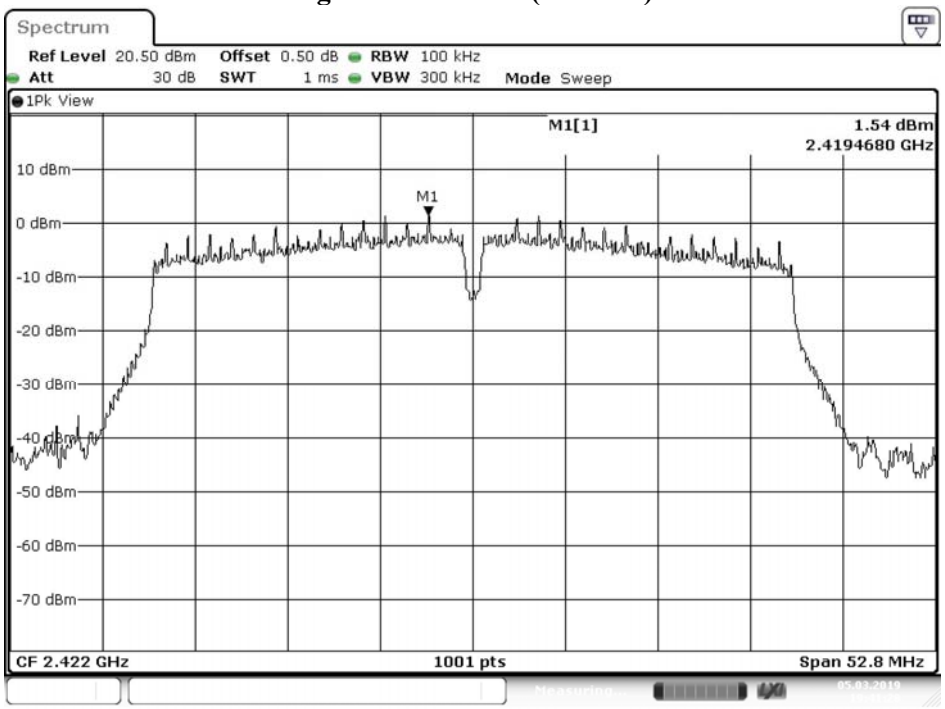
Note : The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 03 (Chain A)



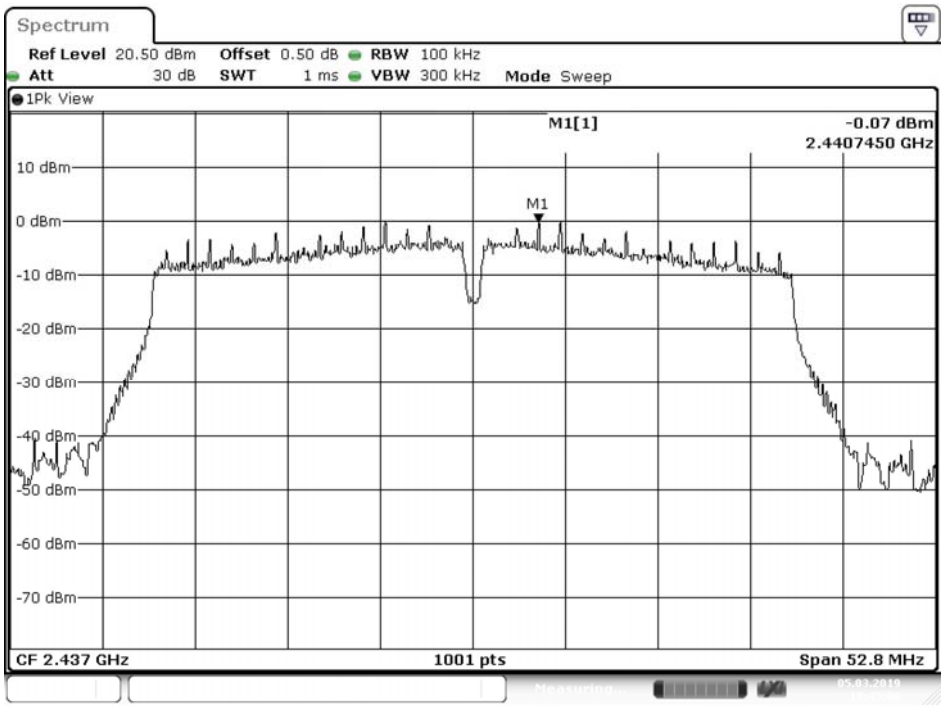
Date: 5.MAR.2019 19:41:20

Figure Channel 03 (Chain B)



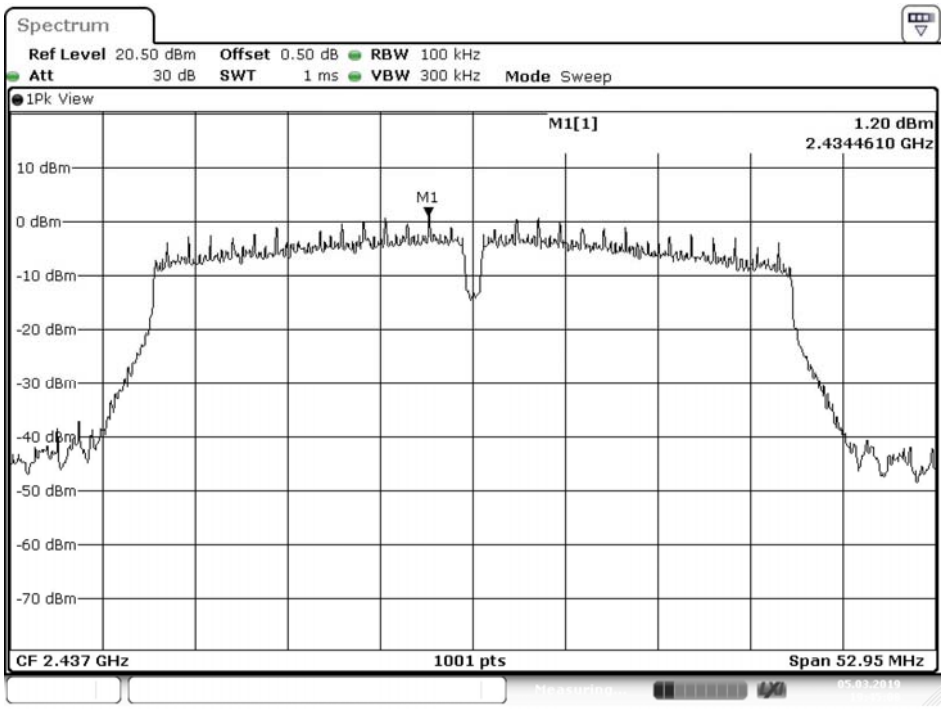
Date: 5.MAR.2019 19:41:28

Figure Channel 06 (Chain A)



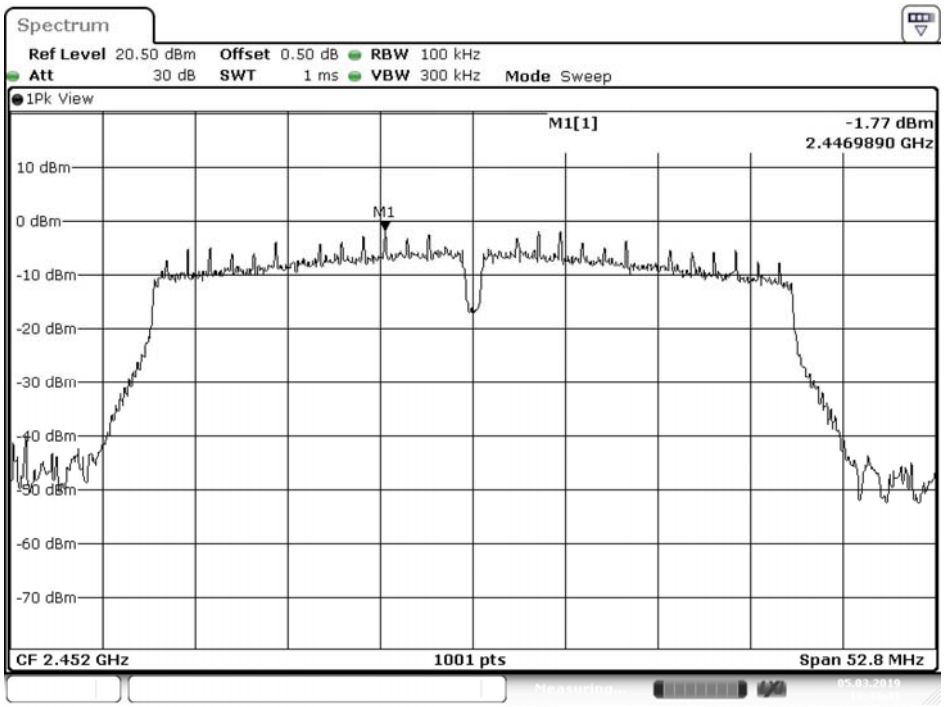
Date: 5.MAR.2019 19:45:00

Figure Channel 06 (Chain B)



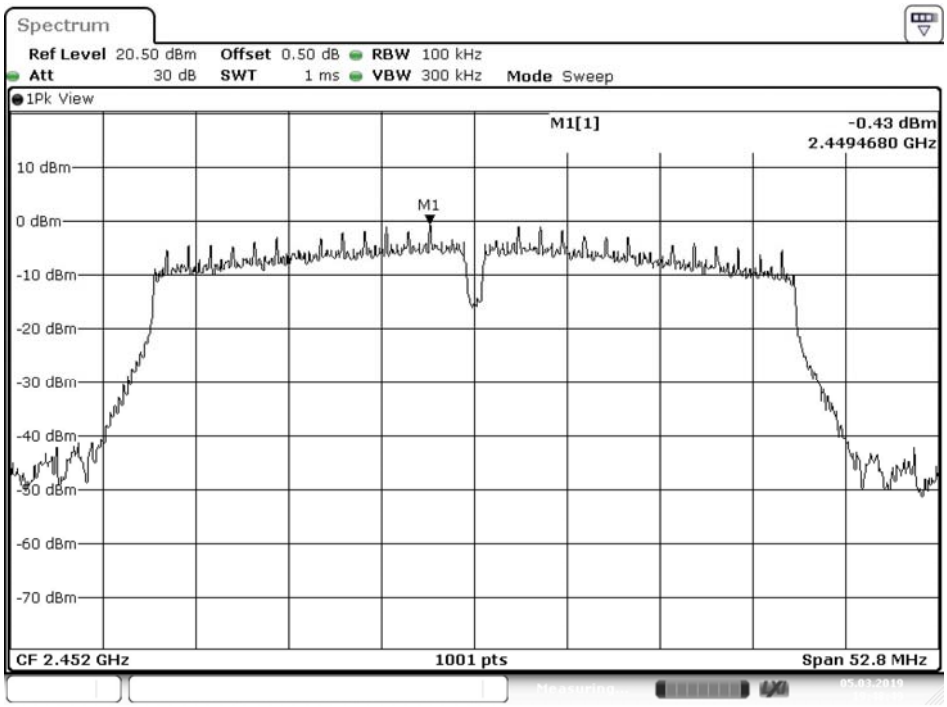
Date: 5.MAR.2019 19:45:08

Figure Channel 09 (Chain A)



Date: 5.MAR.2019 19:48:41

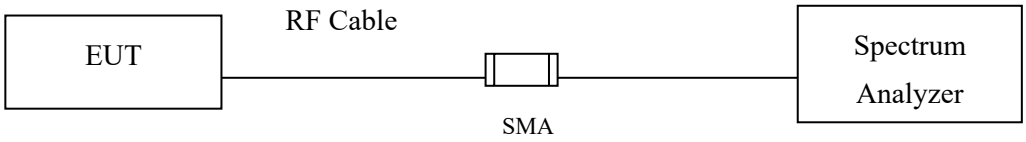
Figure Channel 09 (Chain B)



Date: 5.MAR.2019 19:48:49

9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

9.3. Uncertainty

± 2.31msec

9.4. Test Result of Duty Cycle

Product : 4G/LTE Multi-Service 11ac Broadband Router, 4G/LTE Wireless-AC VoIP Broadband Router, 4G/LTE Wireless-AC Broadband Router
Test Item : Duty Cycle
Test Mode : Transmit

Duty Cycle Formula:

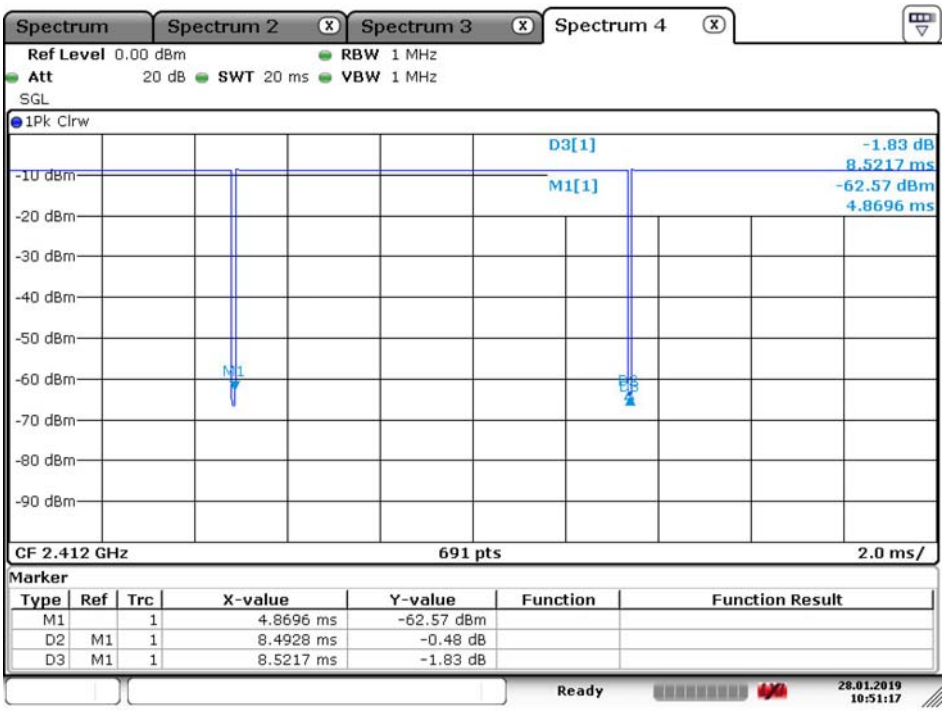
Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

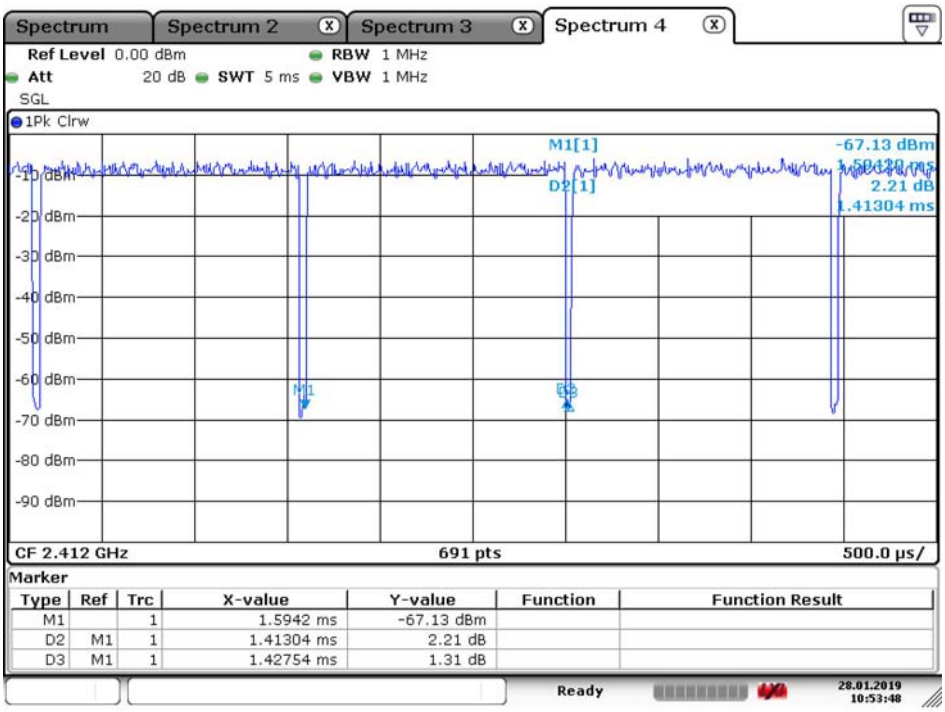
2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11b	8.4928	8.5217	99.66	0.01
802.11g	1.4130	1.4275	98.98	0.04
802.11n20	0.6840	0.7739	88.38	0.54
802.11n40	0.3565	0.4840	73.66	1.33

802.11b



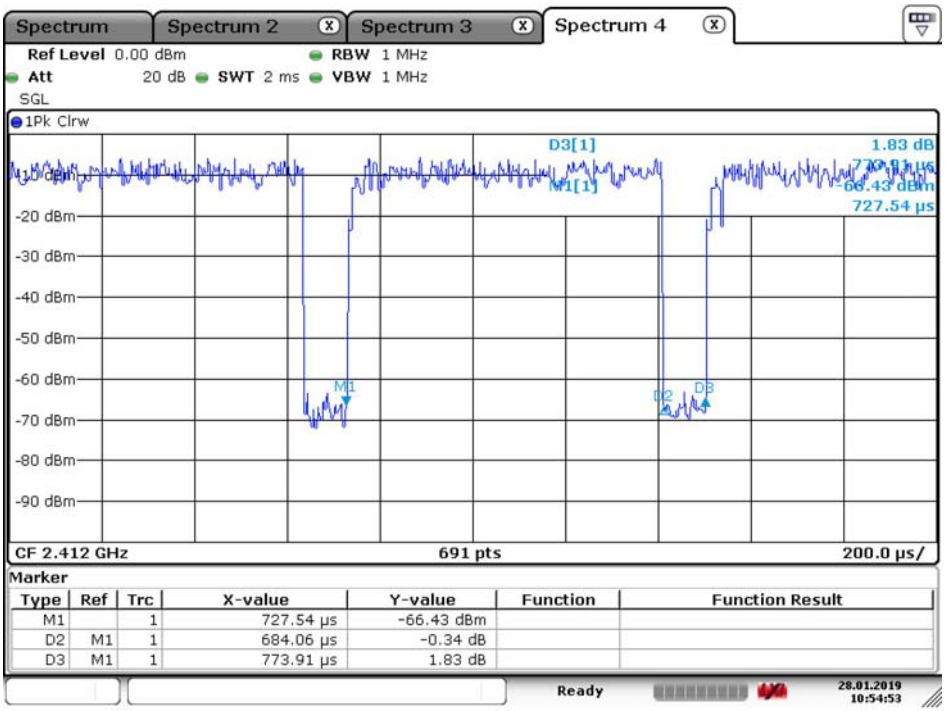
Date: 28.JAN.2019 10:51:17

802.11g



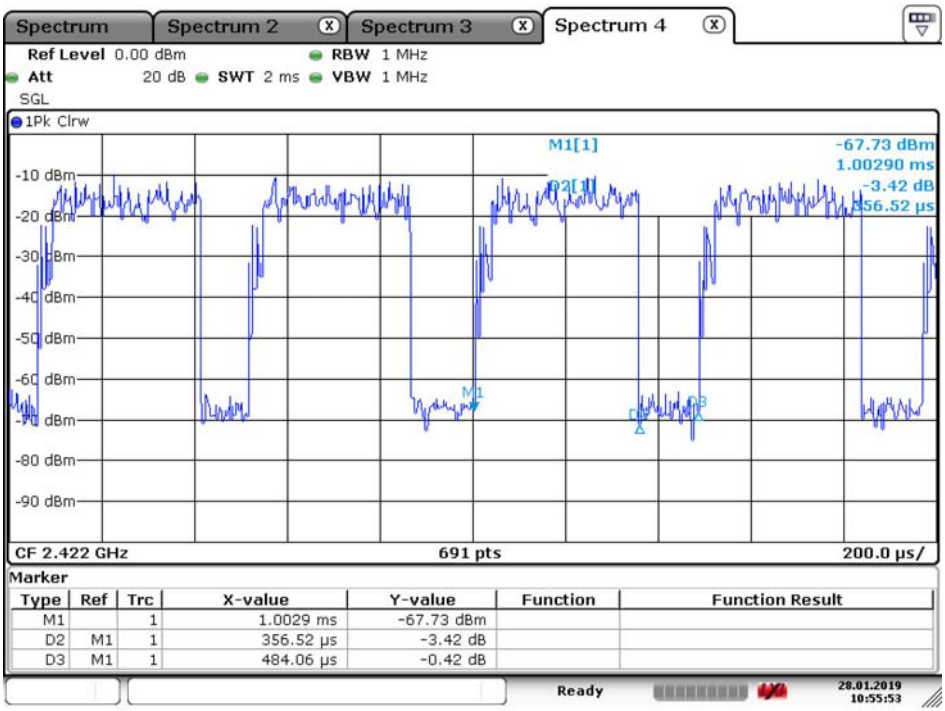
Date: 28.JAN.2019 10:53:48

802.11n20



Date: 28.JAN.2019 10:54:54

802.11n40



Date: 28.JAN.2019 10:55:53

10. EMI Reduction Method During Compliance Testing

No modification was made during testing.