FCC Test Report

Product Name	LTE Router
Model No	WLD71-T3
FCC ID.	NKR-WLD71-T3A

Applicant	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

Date of Receipt	Oct. 28, 2016
Issue Date	May 03, 2017
Report No.	1720437R-RFUSP01V00-A
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issue Date: May 03, 2017
Report No.: 1720437R-RFUSP01V00-A

Product Name	LTE Router
Applicant	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.
Manufacturer	WNC
Model No.	WLD71-T3
FCC ID.	NKR-WLD71-T3A
EUT Rated Voltage	DC 12V
EUT Test Voltage	AC 120V/60Hz
Trade Name	WNC
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2015 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v04
Test Result	Complied

Documented By : Jinn Chen

(Senior Adm. Specialist / Jinn Chen)

Tested By : Bill Lin

(Engineer / Bill Lin)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	LTE Router
Trade Name	WNC
Model No.	WLD71-T3
FCC ID.	NKR-WLD71-T3A
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW, 2422-2452MHz for 802.11n-40BW
Number of Channels	802.11b/g/n-20MHz: 11, n-40MHz: 7
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 300Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Dipole Antenna / Inverted-F Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Power Adapter(1)	MFR: APD, M/N: WA-12M12FU Input: AC 100-240V~50-60Hz, 0.5A Max Output: 12V⎓1A Cable Out: Non-shielded, 1.5m
Power Adapter(2)	MFR: I.T.E., M/N: MU12AR120100-A1 Input: AC 100-240V~50/60Hz, 0.3A Output: 12V⎓1A Cable Out: Non-shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain	Directional Gain
1	WNC	95XKAB15.G21 (WLAN Main)	Dipole Antenna	2.0 dBi for 2.4 GHz	5.06dBi
		WLD71(WLAN Aux)	Inverted-F Antenna	2.1 dBi for 2.4 GHz	

Note:

1. Directional Gain = 10 log $[(10^{G1/20}+10^{G2/20}+\ldots\ldots+10^{Gn/20})^{2}/NANT]$ dBi

2. The antenna of EUT conforms to FCC 15.203.

3. Only the higher gain antenna was tested and recorded in this report

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		

Duty Cycle

802.11b	802.11g	802.11n20	802.11n-40
1	1	1	1

Note:

1. The EUT is a LTE Router with a built-in WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps、802.11g is 6Mbps、802.11n(20M-BW) is 7.2Mbps and 802.11n(40M-BW) is 15Mbps)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n 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 MCS0 7.2Mbps 20M-BW)
	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

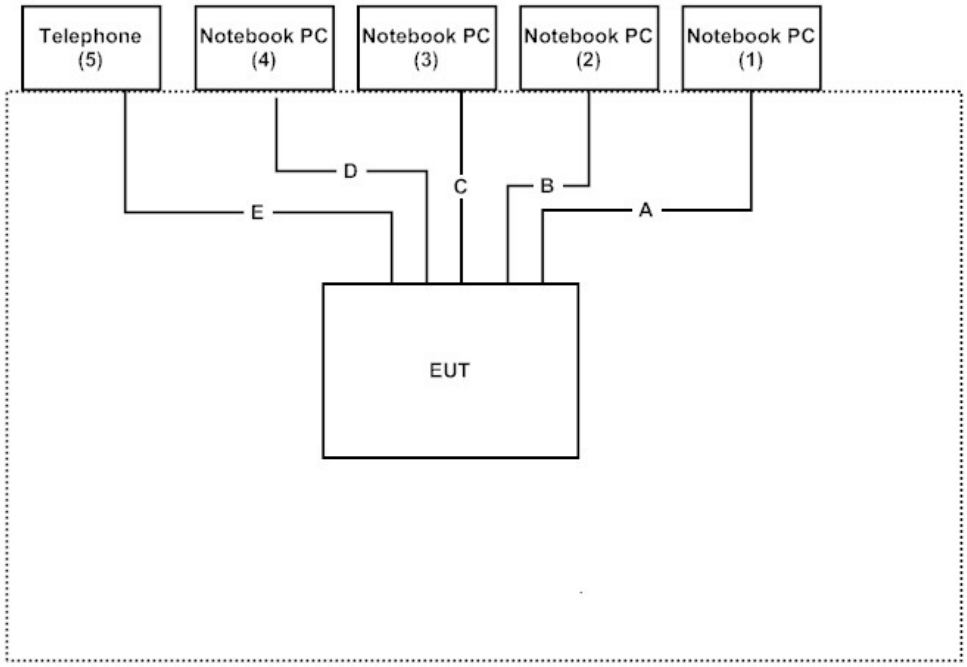
1.3. Tested System Details

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	Notebook PC	DELL	P62G	416FJC2	Non-shielded, 0.8m
2	Notebook PC	DELL	P62G	CY9FJC2	N/A
3	Notebook PC	DELL	P62G	229FJC2	N/A
4	Notebook PC	DELL	P62G	9TSGJC2	N/A
5	Telephone	TENTEL	K-302	50721005000334	N/A

Signal Cable Type		Signal cable Description
A	LAN Cable	Non-shielded, 1.5m
B	LAN Cable	Non-shielded, 1.5m
C	LAN Cable	Non-shielded, 1.5m
D	LAN Cable	Non-shielded, 1.5m
E	Telephone Cable	Non-shielded, 1.5m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “Putty/RTL 819X Releace 0.63/3.3” on the EUT.
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: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: DEKRA Testing and Certification Co., Ltd.
Site Address: No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW1014

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	161601	2016.01.05	2017.01.04
X	Two-Line V-Network	R&S	ENV216	101306	2016.02.15	2017.02.14
X	Two-Line V-Network	R&S	ENV216	101307	2016.03.16	2017.03.15
X	Coaxial Cable	DEKRA	RG400_BNC	RF001	2016.05.25	2017.05.24

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 EMI 2.0 V2.1.113

For Conducted measurements /ASR4

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2016.01.08	2017.01.07
X	Power Meter	Anritsu	ML2496A	1548003	2016.12.15	2017.12.14
X	Power Sensor	Anritsu	MA2411B	1531024	2016.12.15	2017.12.14
X	Power Sensor	Anritsu	MA2411B	1531025	2016.12.15	2017.12.14
	Bluetooth Tester	R&S	CBT	101238	2016.01.02	2017.01.01

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 V8.0.110

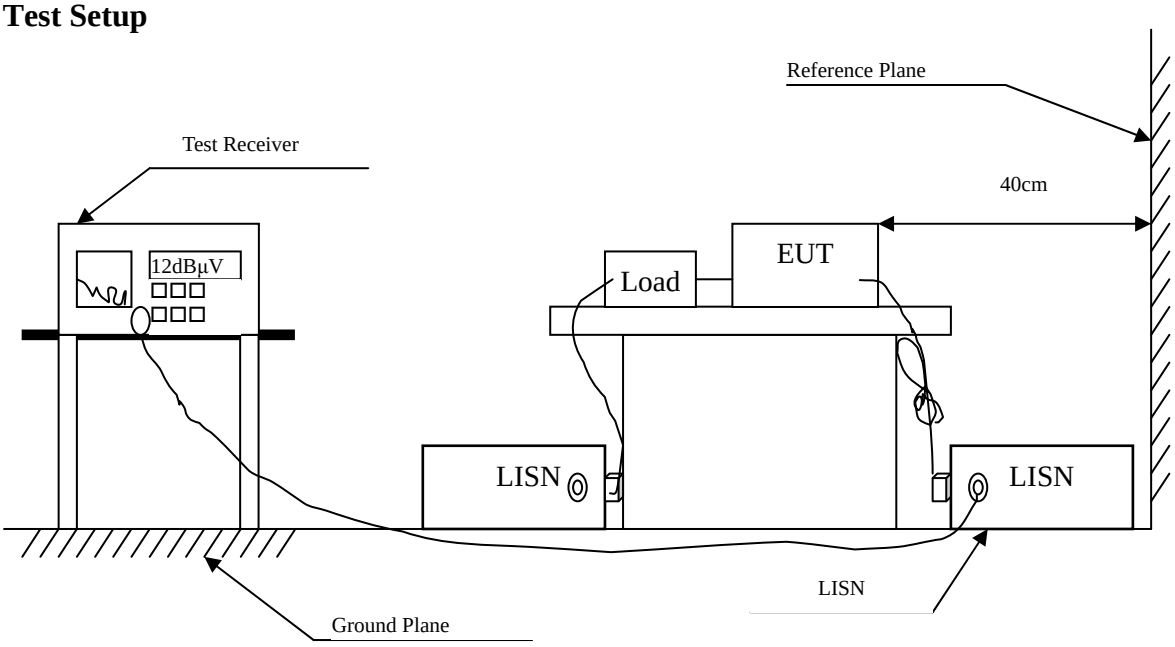
For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	A.H.	SAS-562B	272	2016.07.21	2017.07.20
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2016.02.08	2017.02.07
X	Horn Antenna	ETS-Lindgren	3117	00203800	2016.10.13	2017.10.12
X	Horn Antenna	Com-Power	AH-840	101087	2016.05.03	2017.05.02
X	Pre-Amplifier	EMCI	EMC001330	980316	2016.04.27	2017.04.26
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2016.04.27	2017.04.26
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2016.04.28	2017.04.27
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2016.05.12	2017.05.11
X	Filter	MICRO TRONICS	BRM50702	G251	2016.08.11	2017.08.10
	Filter	MICRO TRONICS	BRM50716	G188	2016.08.11	2017.08.10
X	EMI Test Receiver	R&S	ESR7	101602	2016.12.15	2017.12.14
X	Spectrum Analyzer	R&S	FSV40	101149	2016.12.14	2017.12.13
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2016.05.25	2017.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2016.08.11	2017.08.10

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 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 : LTE Router
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)
(M/N: WA-12M12FU)
Test Date : 2016/12/19

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
Line 1					
Quasi-Peak					
0.160	9.704	37.928	47.633	-18.081	65.714
0.200	9.694	33.145	42.839	-21.732	64.571
0.260	9.696	30.055	39.751	-23.106	62.857
0.470	9.732	24.244	33.976	-22.881	56.857
2.700	9.819	20.115	29.934	-26.066	56.000
6.100	9.922	19.723	29.645	-30.355	60.000
Average					
0.160	9.704	18.934	28.639	-27.075	55.714
0.200	9.694	17.950	27.645	-26.926	54.571
0.260	9.696	13.889	23.585	-29.272	52.857
0.470	9.732	9.376	19.107	-27.750	46.857
2.700	9.819	14.861	24.681	-21.319	46.000
6.100	9.922	13.738	23.660	-26.340	50.000

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 : LTE Router
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)
(M/N: WA-12M12FU)
Test Date : 2016/12/19

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
Line 2					
Quasi-Peak					
0.160	9.696	37.925	47.622	-18.092	65.714
0.240	9.692	29.263	38.955	-24.474	63.429
0.390	9.709	33.044	42.753	-16.390	59.143
2.709	9.819	24.918	34.737	-21.263	56.000
5.000	9.890	22.455	32.345	-23.655	56.000
24.320	10.195	16.053	26.248	-33.752	60.000
Average					
0.160	9.696	19.814	29.511	-26.203	55.714
0.240	9.692	17.185	26.877	-26.552	53.429
0.390	9.709	23.980	33.689	-15.454	49.143
2.709	9.819	17.665	27.484	-18.516	46.000
5.000	9.890	13.857	23.747	-22.253	46.000
24.320	10.195	14.819	25.015	-24.985	50.000

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 : LTE Router
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)
(M/N: MU12AR120100-A1)
Test Date : 2016/12/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
Line 1					
Quasi-Peak					
0.152	9.707	36.435	46.142	-19.801	65.943
0.679	9.741	22.151	31.892	-24.108	56.000
1.450	9.771	28.049	37.821	-18.179	56.000
2.274	9.808	25.579	35.386	-20.614	56.000
2.731	9.819	30.109	39.928	-16.072	56.000
10.097	9.989	11.615	21.604	-38.396	60.000
Average					
0.152	9.707	26.005	35.713	-20.230	55.943
0.679	9.741	16.920	26.661	-19.339	46.000
1.450	9.771	19.981	29.753	-16.247	46.000
2.274	9.808	19.565	29.373	-16.627	46.000
2.731	9.819	24.380	34.199	-11.801	46.000
10.097	9.989	7.493	17.481	-32.519	50.000

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 : LTE Router
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)
(M/N: MU12AR120100-A1)
Test Date : 2016/12/31

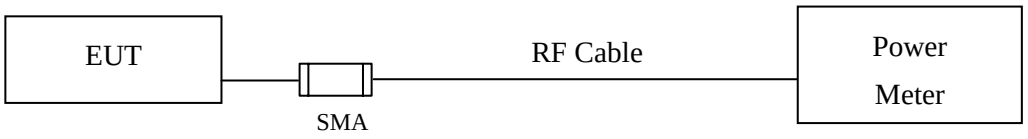
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
Line 2					
Quasi-Peak					
0.157	9.697	37.101	46.798	-19.002	65.800
0.278	9.696	26.432	36.128	-26.215	62.343
0.679	9.740	22.496	32.236	-23.764	56.000
1.448	9.770	28.236	38.006	-17.994	56.000
2.722	9.819	30.378	40.197	-15.803	56.000
10.133	9.998	11.397	21.395	-38.605	60.000
Average					
0.157	9.697	28.372	38.069	-17.731	55.800
0.278	9.696	22.102	31.798	-20.545	52.343
0.679	9.740	16.676	26.416	-19.584	46.000
1.448	9.770	20.535	30.306	-15.694	46.000
2.722	9.819	23.816	33.635	-12.365	46.000
10.133	9.998	7.550	17.548	-32.452	50.000

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 9.1.2 PKPM1 Peak power meter method.

3.4. Uncertainty

±0.86 dB

3.5. Test Result of Peak Power Output

Product : LTE Router
Test Item : Peak Power Output Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)
Test Date : 2016/12/21

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	22.76	--	--	--	24.3	<30dBm	Pass
06	2437	23.75	23.62	23.51	23.43	25.12	<30dBm	Pass
11	2462	21.68	--	--	--	23.3	<30dBm	Pass

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

Product : LTE Router
Test Item : Peak Power Output Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)
Test Date : 2016/12/21

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	18.45	--	--	--	--	--	--	--	25.28	<30dBm	Pass
06	2437	21.61	21.53	21.42	21.33	21.21	21.45	21.33	21.24	25.86	<30dBm	Pass
11	2462	17.61	--	--	--	--	--	--	--	24.96	<30dBm	Pass

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

Product : LTE Router
Test Item : Peak Power Output Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date : 2016/12/21

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2		
		Measurement Level (dBm)										
01	2412	15.76	--	--	--	--	--	--	--	24.02	<30dBm	Pass
06	2437	20.54	20.39	20.27	20.15	20.06	19.87	19.74	19.62	25.48	<30dBm	Pass
11	2462	13.1	--	--	--	--	--	--	--	22.3	<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
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2		
		Measurement Level (dBm)										
01	2412	15.71	--	--	--	--	--	--	--	23.16	<30dBm	Pass
06	2437	20.53	20.45	20.31	20.21	20.11	20.03	19.85	19.72	24.68	<30dBm	Pass
11	2462	14.46	--	--	--	--	--	--	--	22.48	<30dBm	Pass

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

CHAIN A+B

Channel	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	24.02	23.16	26.62	<30dBm	Pass
06	2437	14.4	25.48	24.68	28.11	<30dBm	Pass
11	2462	14.4	22.30	22.48	25.40	<30dBm	Pass

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

Product : LTE Router
Test Item : Peak Power Output Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)
Test Date : 2016/12/21

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		15	30	45	60	90	120	135	150	15		
		Measurement Level (dBm)										
03	2422	15.62	--	--	--	--	--	--	--	23.67	<30dBm	Pass
06	2437	20.14	20.07	19.82	19.71	19.63	19.51	19.42	19.35	25.38	<30dBm	Pass
09	2452	14.44	--	--	--	--	--	--	--	22.94	<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
		15	30	45	60	90	120	135	150	15		
		Measurement Level (dBm)										
03	2422	15.55	--	--	--	--	--	--	--	23.13	<30dBm	Pass
06	2437	20.12	20.01	19.88	19.73	19.61	19.52	19.43	19.33	24.85	<30dBm	Pass
09	2452	15.16	--	--	--	--	--	--	--	23.25	<30dBm	Pass

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

CHAIN A+B

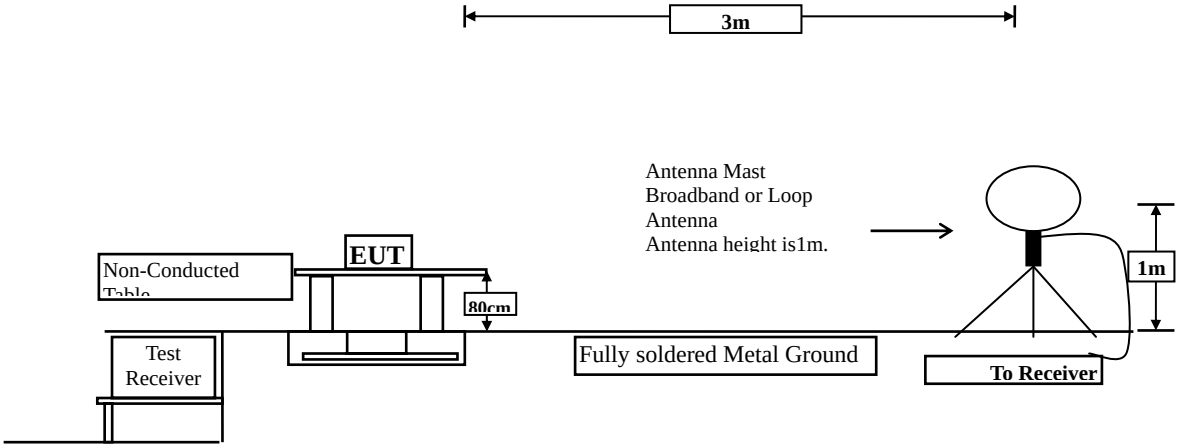
Channel	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
03	2422	30	23.67	23.13	26.42	<30dBm	Pass
06	2437	30	25.38	24.85	28.13	<30dBm	Pass
09	2452	30	22.94	23.25	26.11	<30dBm	Pass

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

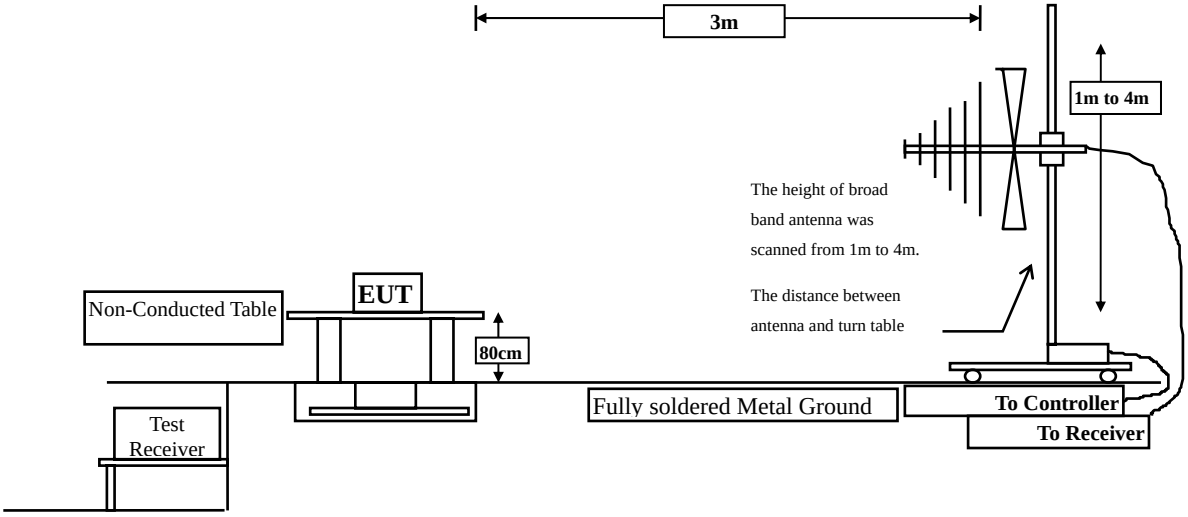
4. Radiated Emission

4.1. Test Setup

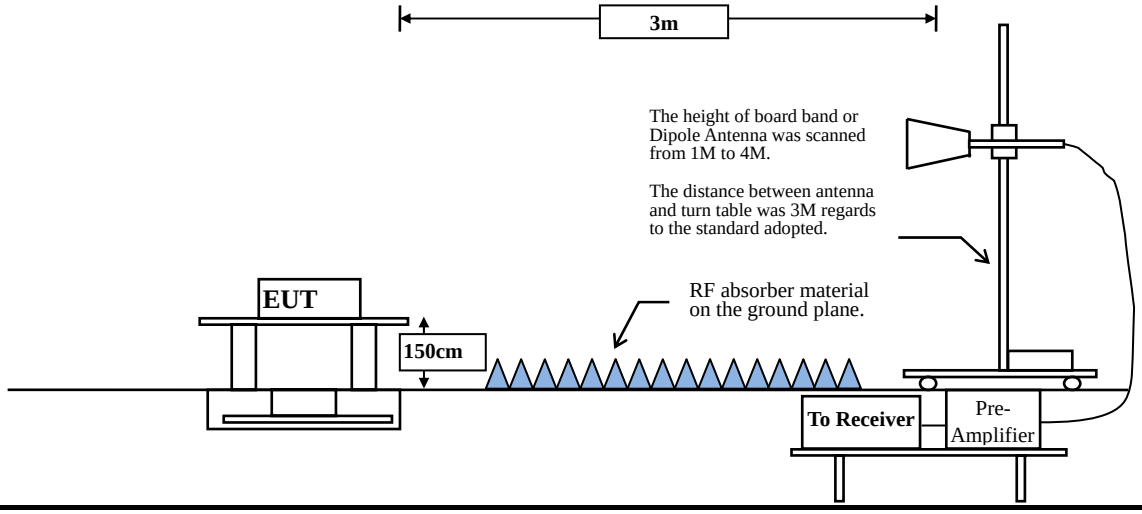
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. Limits

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(a) 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: E field strength (dBμV/m) = 20 log E field strength (uV/m)

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.

4.4. Uncertainty

Horizontal：
30-300MHz: ±4.08dB；300M-1GHz: ±3.86dB；1-18GHz: ±3.77dB；18-40GHz: ±3.98dB。
Vertical：
30-300MHz: ±4.81dB；300M-1GHz: ±3.87dB；1-18GHz: ±3.83dB；18-40GHz: ±3.98dB。

4.5. Test Result of Radiated Emission

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
(M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	-3.785	53.320	49.536	-24.464	74.000
7236.000	-0.753	51.220	50.466	-23.534	74.000
9648.000	1.186	51.660	52.846	-21.154	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4824.000	-3.785	52.720	48.936	-25.064	74.000
7236.000	-0.753	51.090	50.336	-23.664	74.000
9648.000	1.186	51.350	52.536	-21.464	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437 MHz) (M/N:WA-12M12FU)
Test Date	:	2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	-3.770	51.700	47.930	-26.070	74.000
7311.000	-0.719	51.440	50.722	-23.278	74.000
9748.000	1.331	52.380	53.711	-20.289	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-3.770	51.170	47.400	-26.600	74.000
7311.000	-0.719	51.170	50.452	-23.548	74.000
9748.000	1.331	51.100	52.431	-21.569	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz) (M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4924.000	-3.743	51.550	47.807	-26.193	74.000
7386.000	-0.683	50.840	50.157	-23.843	74.000
9848.000	1.571	50.990	52.561	-21.439	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4924.000	-3.743	51.730	47.987	-26.013	74.000
7386.000	-0.683	50.290	49.607	-24.393	74.000
9848.000	1.571	51.450	53.021	-20.979	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz) (M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	-3.785	51.880	48.096	-25.904	74.000
7236.000	-0.753	51.050	50.296	-23.704	74.000
9648.000	1.186	50.910	52.096	-21.904	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4824.000	-3.785	50.780	46.996	-27.004	74.000
7236.000	-0.753	50.000	49.246	-24.754	74.000
9648.000	1.186	50.640	51.826	-22.174	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437 MHz) (M/N:WA-12M12FU)
Test Date	:	2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	-3.770	52.070	48.300	-25.700	74.000
7311.000	-0.719	51.680	50.962	-23.038	74.000
9748.000	1.331	51.380	52.711	-21.289	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-3.770	51.810	48.040	-25.960	74.000
7311.000	-0.719	51.290	50.572	-23.428	74.000
9748.000	1.331	50.420	51.751	-22.249	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz) (M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4924.000	-3.743	52.570	48.827	-25.173	74.000
7386.000	-0.683	50.450	49.767	-24.233	74.000
9648.000	1.186	51.550	52.736	-21.264	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4924.000	-3.743	51.930	48.187	-25.813	74.000
7386.000	-0.683	50.780	50.097	-23.903	74.000
9848.000	1.571	51.550	53.121	-20.879	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz) (M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	-3.785	52.040	48.256	-25.744	74.000
7236.000	-0.753	50.980	50.226	-23.774	74.000
9648.000	1.186	50.180	51.366	-22.634	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4824.000	-3.785	51.790	48.006	-25.994	74.000
7236.000	-0.753	50.120	49.366	-24.634	74.000
9648.000	1.186	50.040	51.226	-22.774	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz) (M/N:WA-12M12FU)
Test Date	:	2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	-3.770	52.150	48.380	-25.620	74.000
7311.000	-0.719	50.800	50.082	-23.918	74.000
9748.000	1.331	50.660	51.991	-22.009	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-3.770	54.530	50.760	-23.240	74.000
7311.000	-0.719	50.780	50.062	-23.938	74.000
9748.000	1.331	51.350	52.681	-21.319	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz) (M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4924.000	-3.743	51.940	48.197	-25.803	74.000
7386.000	-0.683	50.790	50.107	-23.893	74.000
9848.000	1.571	50.840	52.411	-21.589	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4924.000	-3.743	51.030	47.287	-26.713	74.000
7386.000	-0.683	49.840	49.157	-24.843	74.000
9848.000	1.571	51.010	52.581	-21.419	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2422MHz)
(M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4844.000	-3.778	52.390	48.611	-25.389	74.000
7266.000	-0.732	50.210	49.478	-24.522	74.000
9688.000	1.249	50.580	51.830	-22.170	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4844.000	-3.778	50.750	46.971	-27.029	74.000
7266.000	-0.732	50.750	50.018	-23.982	74.000
9688.000	1.249	50.490	51.740	-22.260	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE Router
Test Item	:	Harmonic Radiated Emission Data
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437 MHz) (M/N:WA-12M12FU)
Test Date	:	2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	-3.770	51.750	47.980	-26.020	74.000
7311.000	-0.719	51.360	50.642	-23.358	74.000
9748.000	1.331	51.190	52.521	-21.479	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-3.770	50.880	47.110	-26.890	74.000
7311.000	-0.719	50.540	49.822	-24.178	74.000
9748.000	1.331	51.190	52.521	-21.479	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2452 MHz) (M/N:WA-12M12FU)
Test Date : 2017/04/28

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4904.000	-3.766	51.530	47.764	-26.236	74.000
7356.000	-0.693	50.560	49.867	-24.133	74.000
9808.000	1.467	51.030	52.496	-21.504	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4904.000	-3.766	50.840	47.074	-26.926	74.000
7356.000	-0.693	51.220	50.527	-23.473	74.000
9808.000	1.467	51.160	52.626	-21.374	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)
(M/N :WA-12M12FU)
Test Date : 2016/12/19

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
105.913	-14.989	42.317	27.328	-16.172	43.500
149.493	-10.955	38.161	27.207	-16.293	43.500
202.913	-13.492	38.454	24.962	-18.538	43.500
481.261	-6.135	31.816	25.681	-20.319	46.000
874.884	0.087	31.452	31.538	-14.462	46.000
967.667	1.210	29.294	30.504	-23.496	54.000
Vertical					
118.565	-13.444	46.351	32.907	-10.593	43.500
249.304	-11.924	36.387	24.463	-21.537	46.000
394.101	-7.923	31.452	23.529	-22.471	46.000
619.029	-3.486	31.623	28.137	-17.863	46.000
746.957	-1.499	39.584	38.085	-7.915	46.000
977.507	1.341	29.666	31.008	-22.992	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)
(M/N :WA-12M12FU)
Test Date : 2016/12/19

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
104.507	-15.237	41.403	26.165	-17.335	43.500
183.232	-12.722	36.238	23.516	-19.984	43.500
249.304	-11.924	35.120	23.196	-22.804	46.000
516.406	-5.548	30.112	24.564	-21.436	46.000
730.087	-1.826	36.654	34.828	-11.172	46.000
917.058	0.623	30.213	30.836	-15.164	46.000
Vertical					
107.319	-14.741	47.121	32.381	-11.119	43.500
169.174	-11.000	38.123	27.123	-16.377	43.500
243.681	-11.998	34.266	22.268	-23.732	46.000
583.884	-4.045	29.993	25.948	-20.052	46.000
744.145	-1.554	40.570	39.016	-6.984	46.000
893.159	0.346	30.010	30.356	-15.644	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)
(M/N :WA-12M12FU)
Test Date : 2016/12/19

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
150.899	-10.913	36.460	25.547	-17.953	43.500
183.232	-12.722	36.821	24.099	-19.401	43.500
249.304	-11.924	34.594	22.670	-23.330	46.000
499.536	-5.853	33.229	27.375	-18.625	46.000
780.696	-1.211	29.958	28.748	-17.252	46.000
985.942	1.452	30.572	32.024	-21.976	54.000
Vertical					
112.942	-13.989	43.037	29.049	-14.451	43.500
163.551	-10.807	37.502	26.695	-16.805	43.500
342.087	-9.167	30.084	20.918	-25.082	46.000
604.971	-3.593	29.952	26.358	-19.642	46.000
807.406	-0.941	30.752	29.810	-16.190	46.000
936.739	0.834	30.072	30.907	-15.093	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2437 MHz)
(M/N :WA-12M12FU)
Test Date : 2016/12/19

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
148.087	-11.004	39.322	28.318	-15.182	43.500
191.667	-13.440	36.769	23.330	-20.170	43.500
364.580	-8.630	29.421	20.792	-25.208	46.000
597.942	-3.678	30.108	26.431	-19.569	46.000
773.667	-1.262	31.813	30.550	-15.450	46.000
931.116	0.774	29.791	30.565	-15.435	46.000
Vertical					
111.536	-14.125	45.555	31.431	-12.069	43.500
169.174	-11.000	37.988	26.988	-16.512	43.500
340.681	-9.200	30.355	21.155	-24.845	46.000
592.319	-3.824	29.362	25.537	-20.463	46.000
790.536	-1.137	28.312	27.175	-18.825	46.000
980.319	1.379	28.915	30.294	-23.706	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)
(M/N : MU12AR120100-A1)
Test Date : 2016/12/30

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
139.652	-11.329	41.695	30.366	-13.134	43.500
323.812	-9.607	28.381	18.774	-27.226	46.000
472.826	-6.263	30.440	24.176	-21.824	46.000
680.884	-2.732	31.474	28.742	-17.258	46.000
841.145	-0.402	30.250	29.848	-16.152	46.000
943.768	0.911	29.559	30.470	-15.530	46.000
Vertical					
105.913	-14.989	41.968	26.979	-16.521	43.500
329.435	-9.472	29.897	20.425	-25.575	46.000
531.870	-5.267	30.988	25.721	-20.279	46.000
651.362	-3.204	30.115	26.911	-19.089	46.000
782.101	-1.200	30.754	29.554	-16.446	46.000
914.246	0.591	29.917	30.508	-15.492	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)
(M/N : MU12AR120100-A1)
Test Date : 2016/12/30

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
138.246	-11.458	41.530	30.072	-13.428	43.500
218.377	-13.135	37.542	24.406	-21.594	46.000
436.275	-6.939	30.576	23.637	-22.363	46.000
550.145	-4.929	30.106	25.177	-20.823	46.000
669.638	-2.912	29.647	26.735	-19.265	46.000
828.493	-0.602	29.772	29.170	-16.830	46.000
Vertical					
149.493	-10.955	45.758	34.804	-8.696	43.500
316.783	-9.777	30.576	20.799	-25.201	46.000
493.913	-5.942	29.134	23.193	-22.807	46.000
602.159	-3.615	29.816	26.201	-19.799	46.000
714.623	-2.136	30.611	28.475	-17.525	46.000
867.855	-0.011	29.478	29.467	-16.533	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)
(M/N : MU12AR120100-A1)
Test Date : 2016/12/30

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
107.319	-14.741	40.390	25.650	-17.850	43.500
201.507	-13.524	37.184	23.660	-19.840	43.500
448.928	-6.641	29.368	22.727	-23.273	46.000
640.116	-3.305	29.309	26.004	-19.996	46.000
775.072	-1.252	28.944	27.692	-18.308	46.000
910.029	0.545	28.824	29.370	-16.630	46.000
Vertical					
124.188	-12.862	34.596	21.735	-21.765	43.500
274.609	-10.951	28.679	17.728	-28.272	46.000
451.739	-6.591	29.112	22.521	-23.479	46.000
614.812	-3.518	29.005	25.487	-20.513	46.000
756.797	-1.393	29.023	27.630	-18.370	46.000
905.812	0.501	29.641	30.142	-15.858	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : LTE Router
Test Item : General Radiated Emission Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2437 MHz)
(M/N : MU12AR120100-A1)
Test Date : 2016/12/30

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
141.058	-11.259	39.793	28.534	-14.966	43.500
346.304	-9.064	27.338	18.273	-27.727	46.000
523.435	-5.420	28.951	23.531	-22.469	46.000
651.362	-3.204	27.610	24.406	-21.594	46.000
793.348	-1.117	27.437	26.321	-19.679	46.000
935.333	0.820	29.500	30.320	-15.680	46.000
Vertical					
107.319	-14.741	39.858	25.118	-18.382	43.500
297.101	-10.265	27.997	17.732	-28.268	46.000
425.029	-7.201	28.512	21.312	-24.688	46.000
552.957	-4.856	28.813	23.957	-22.043	46.000
701.971	-2.388	28.539	26.151	-19.849	46.000
914.246	0.591	29.708	30.299	-15.701	46.000

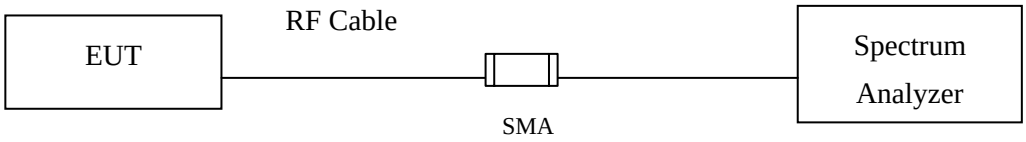
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. 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

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

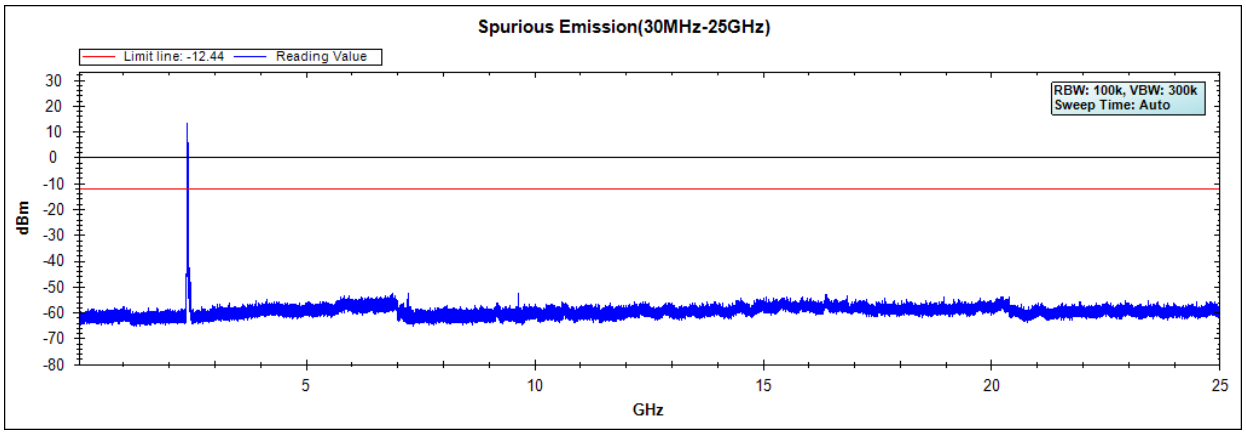
5.4. Uncertainty

±1.23dB

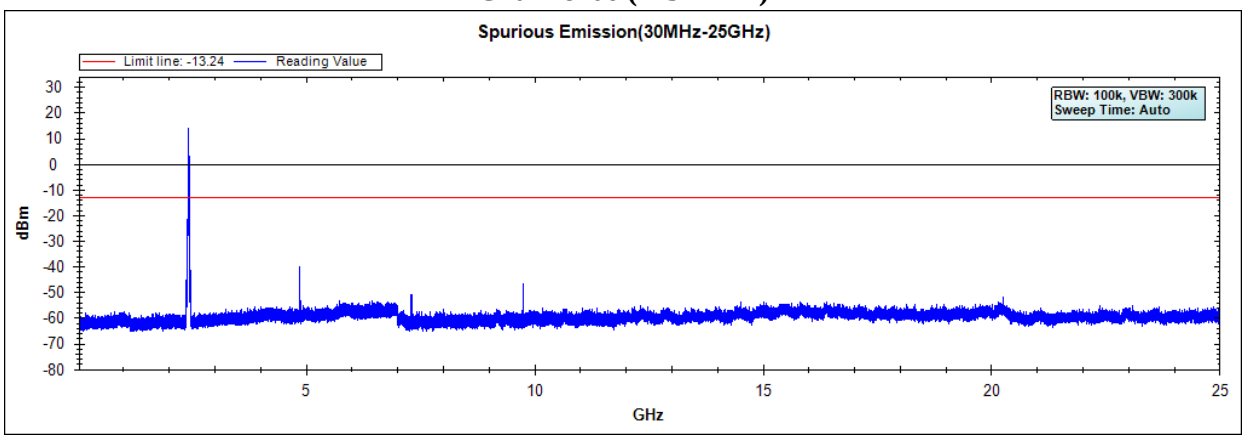
5.5. Test Result of RF antenna conducted test

Product : LTE Router
Test Item : RF antenna conducted test
Test Mode : Mode 1: Transmit (802.11b 1Mbps)
Test Date : 2017/01/05

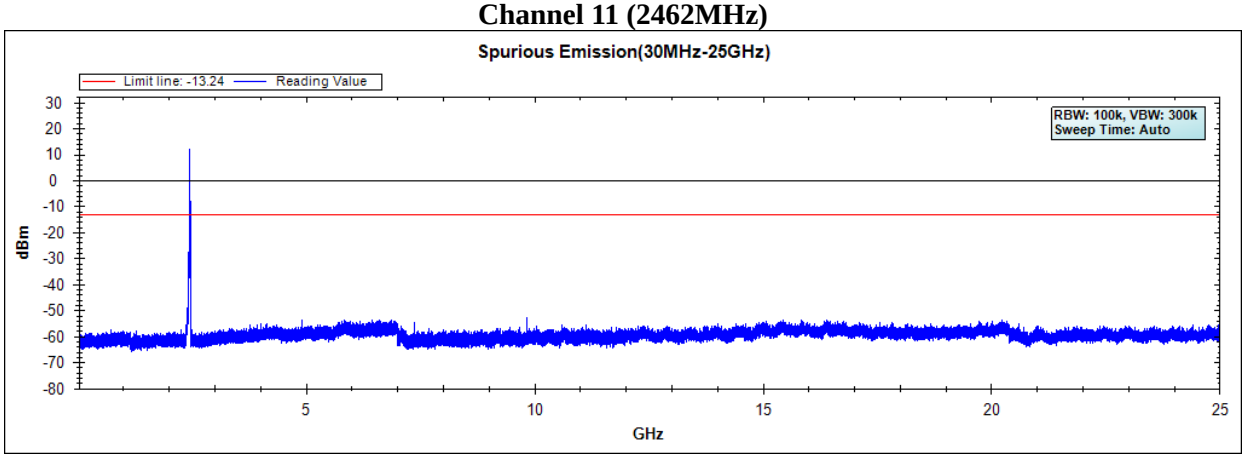
Channel 01 (2412MHz)



Channel 06 (2437MHz)



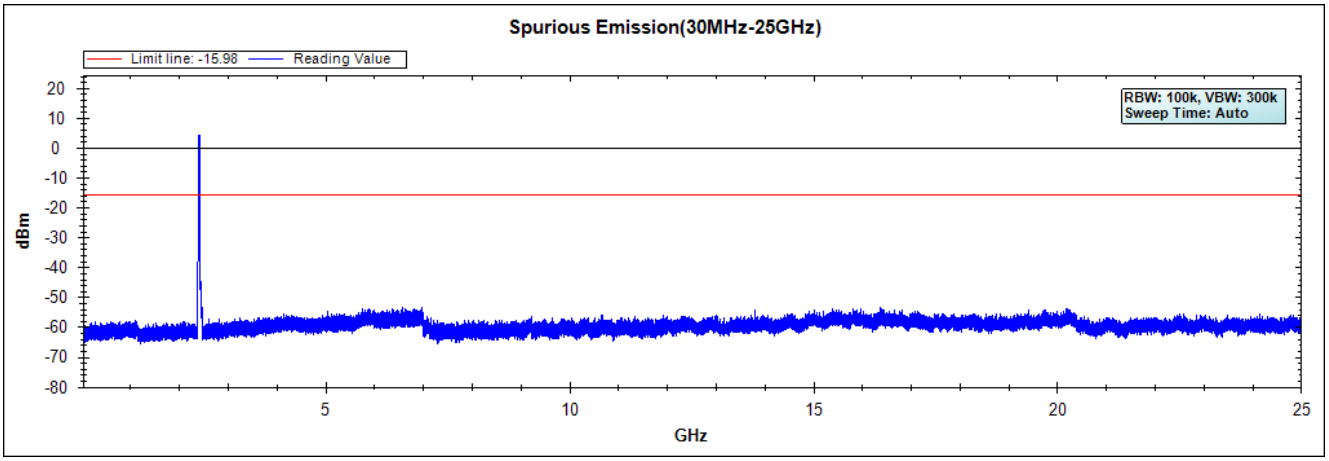
Channel 11 (2462MHz)



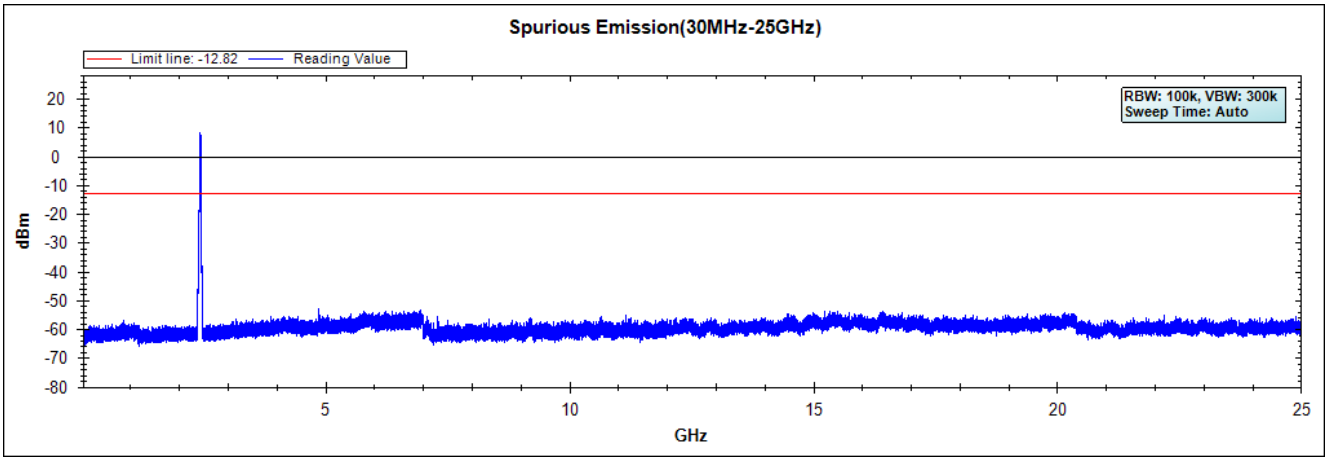
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	LTE Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)
Test Date	:	2017/01/05

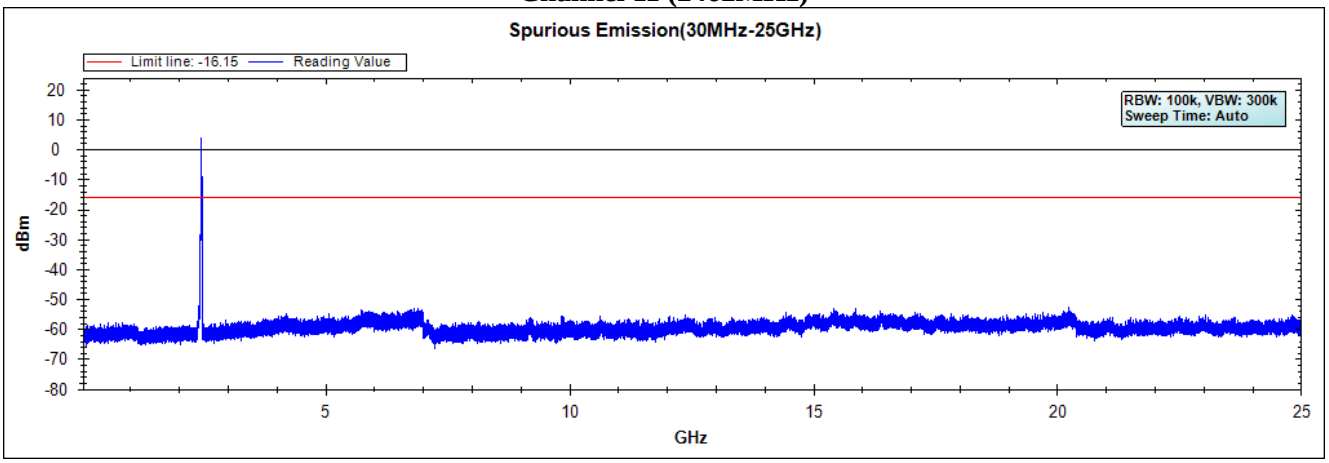
Channel 01 (2412MHz)



Channel 06 (2437MHz)



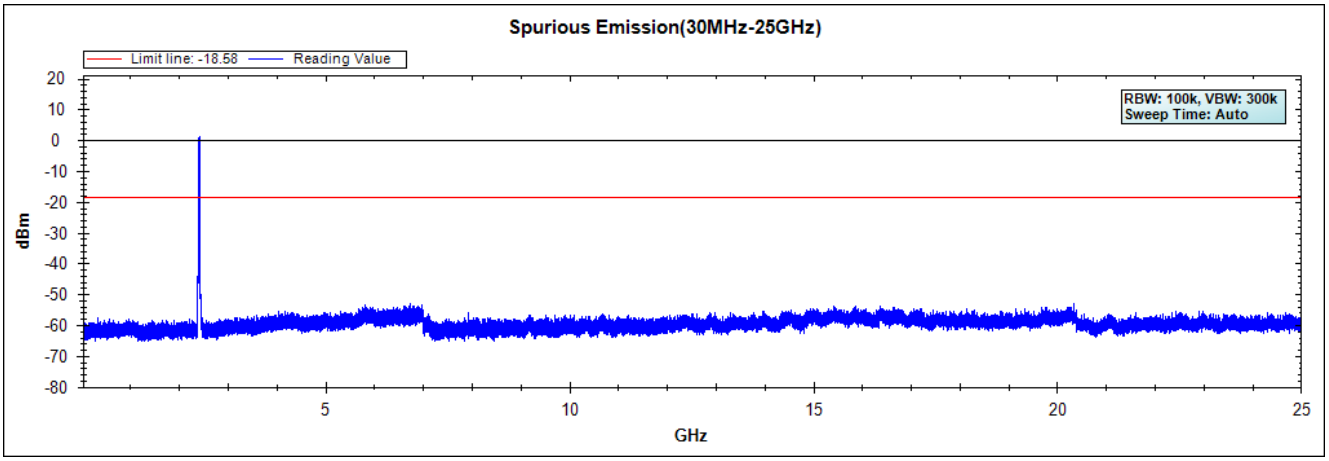
Channel 11 (2462MHz)



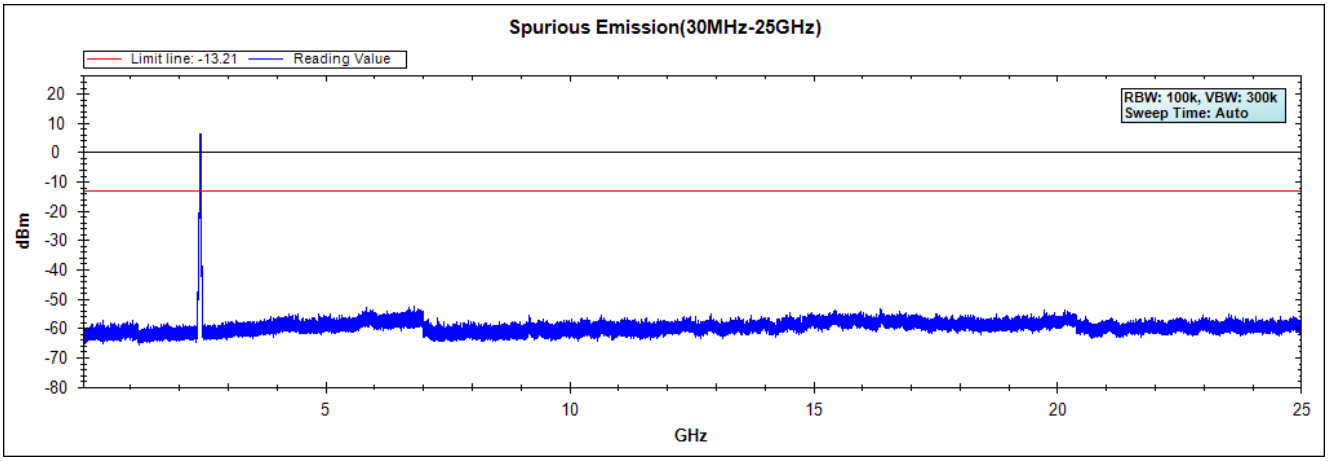
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	LTE Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date	:	2017/01/05

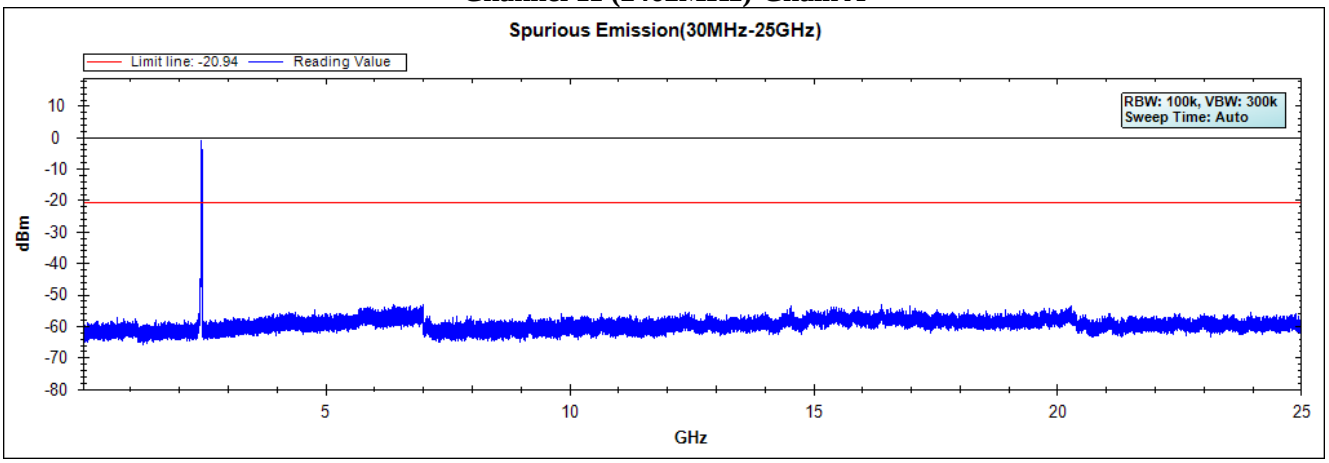
Channel 01 (2412MHz)-Chain A



Channel 06 (2437MHz)-Chain A



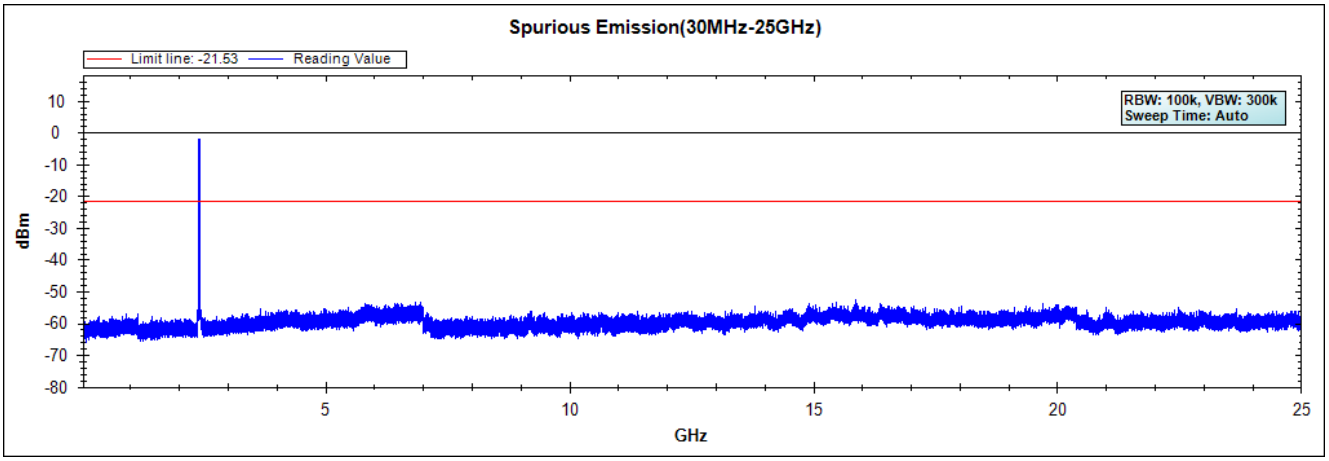
Channel 11 (2462MHz)-Chain A



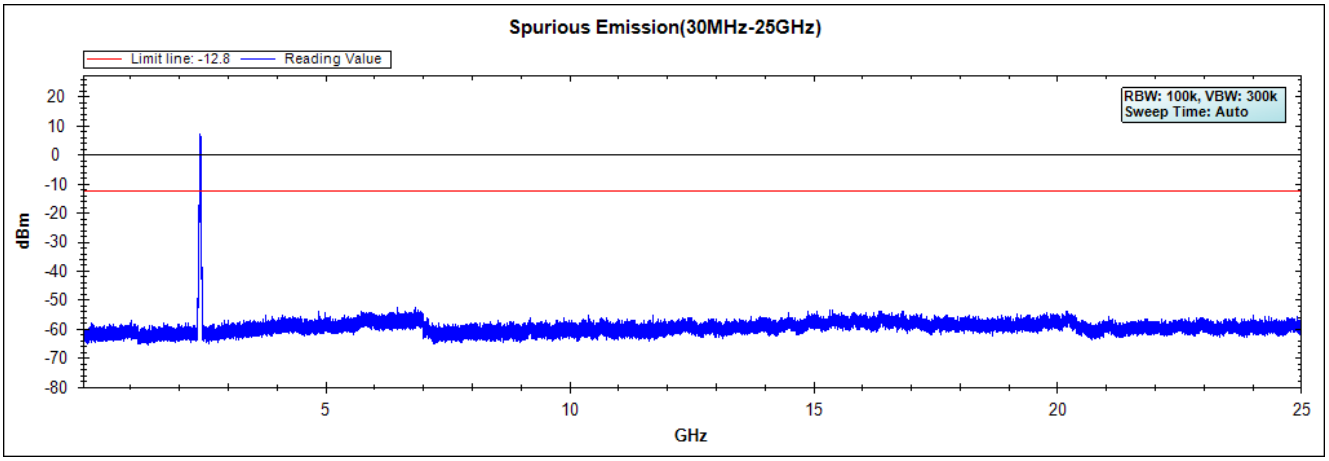
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	LTE Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date	:	2017/01/05

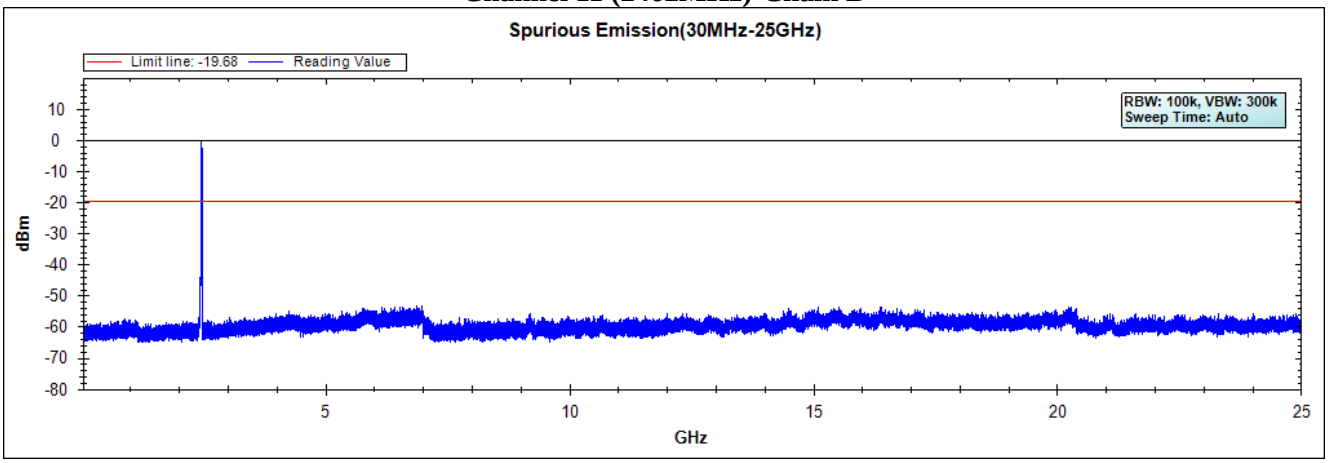
Channel 01 (2412MHz)-Chain B



Channel 06 (2437MHz)-Chain B



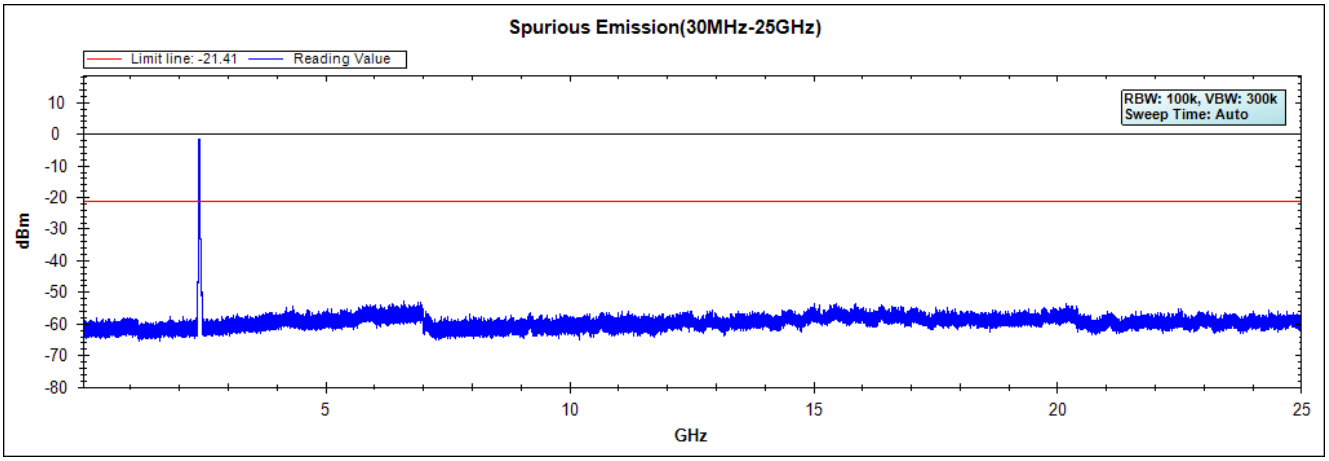
Channel 11 (2462MHz)-Chain B



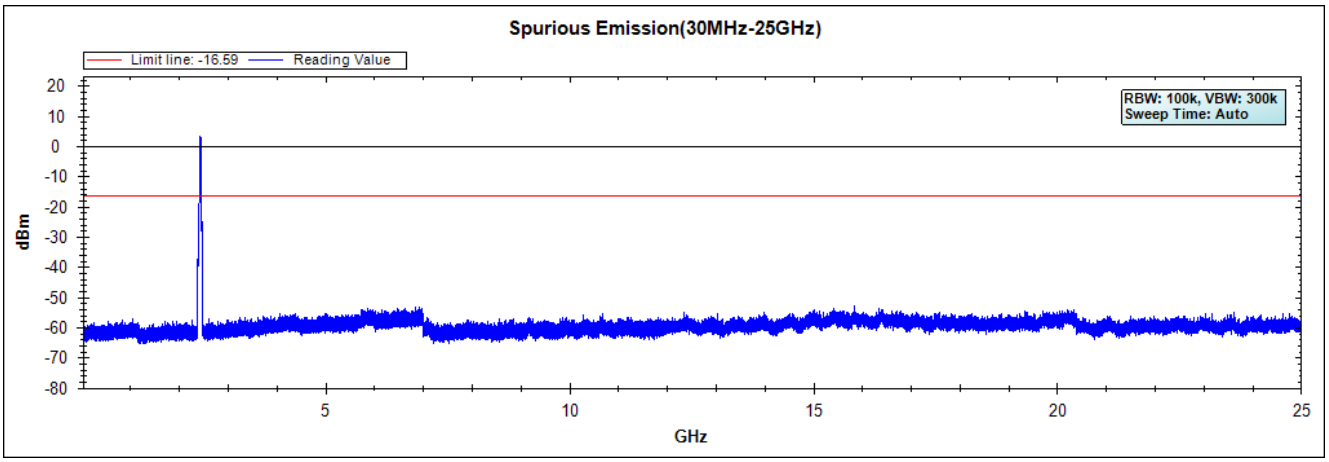
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	LTE Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)
Test Date	:	2017/01/05

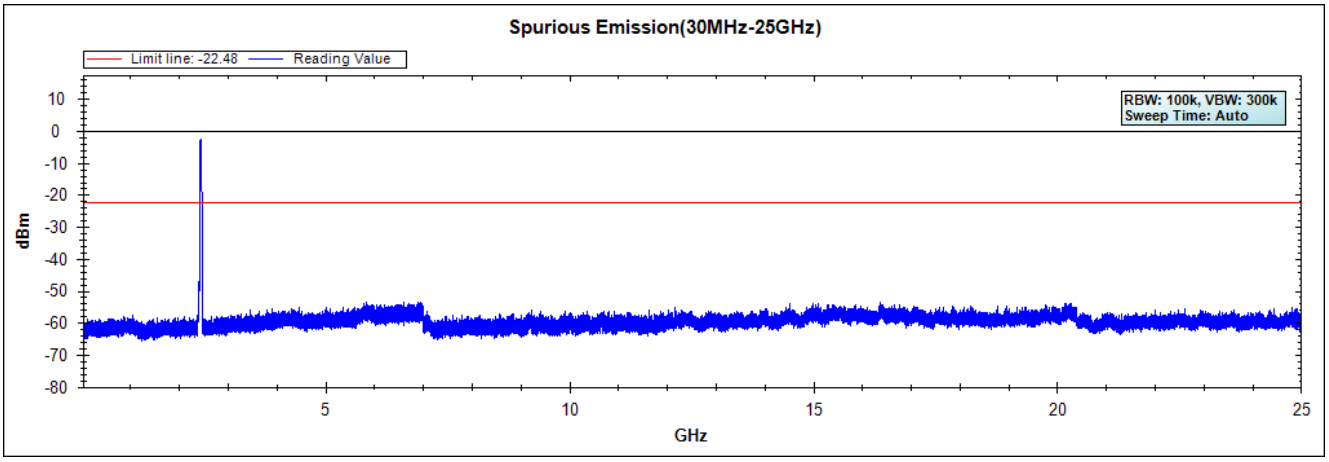
Channel 01 (2422MHz)-Chain A



Channel 04 (2437MHz)-Chain A



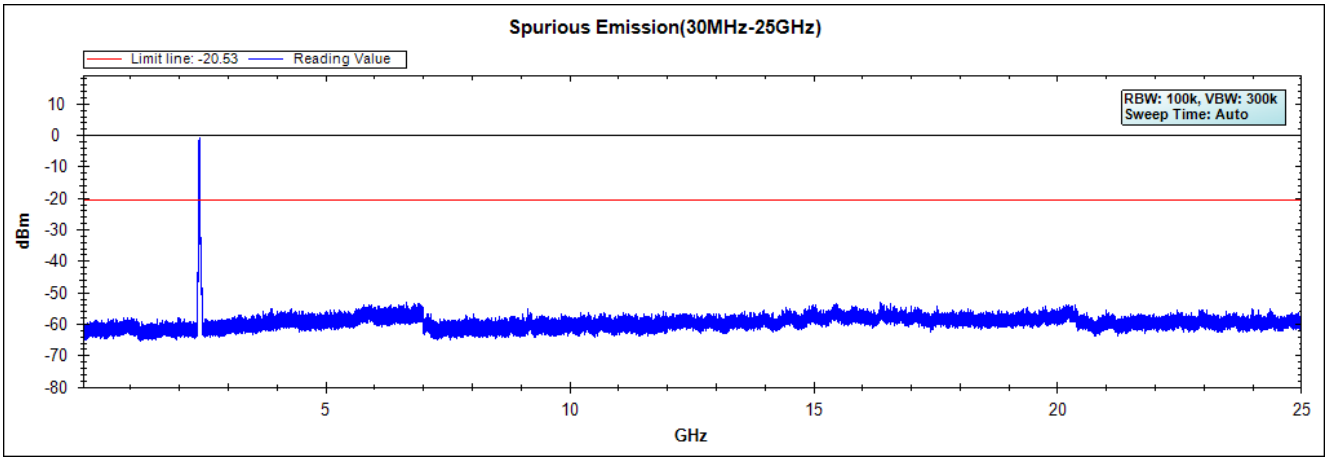
Channel 07 (2452MHz)-Chain A



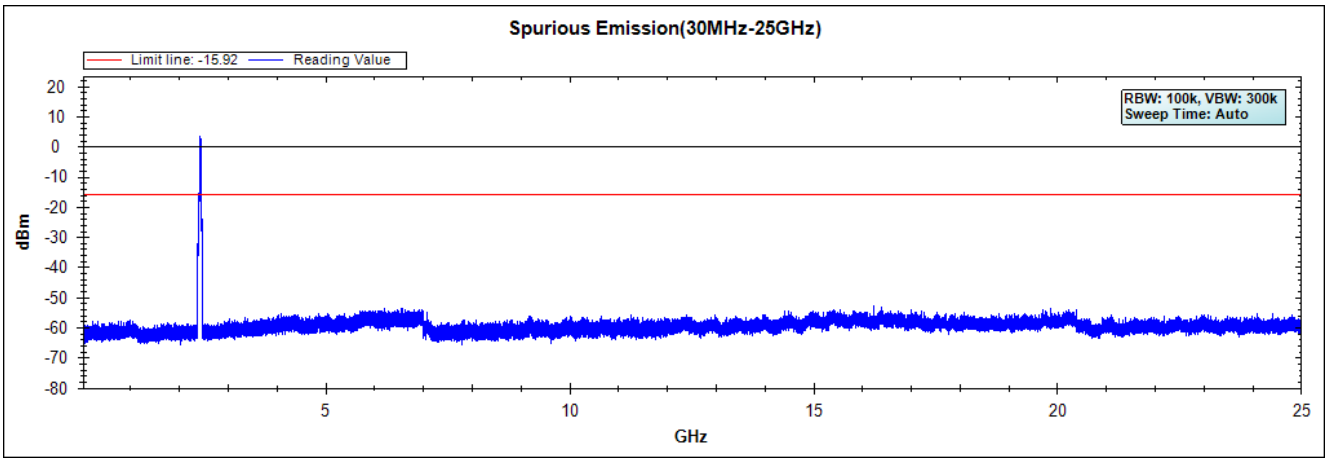
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	LTE Router
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)
Test Date	:	2017/01/05

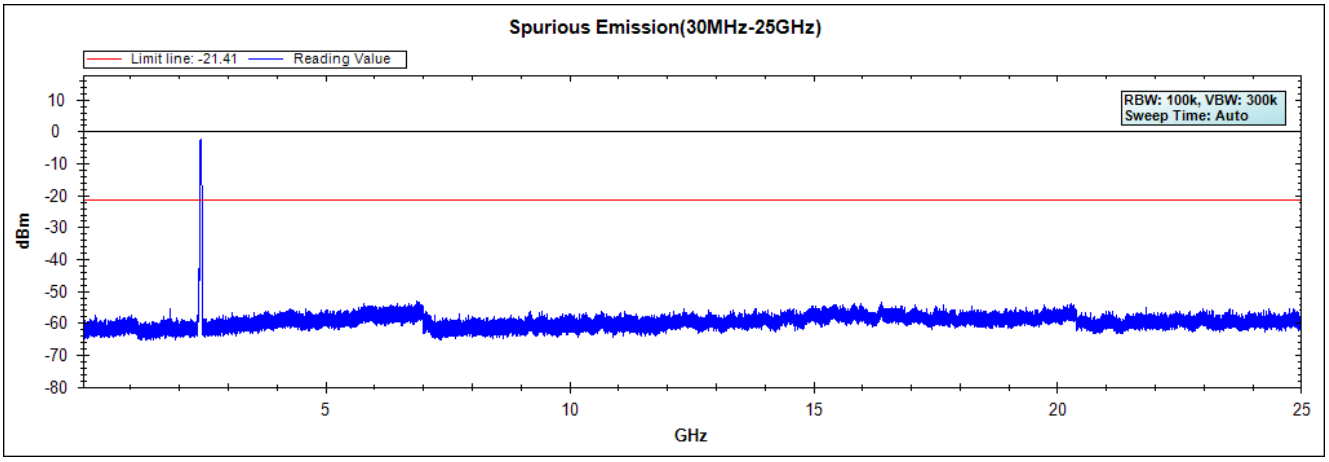
Channel 01 (2422MHz)-Chain B



Channel 04 (2437MHz)-Chain B



Channel 07 (2452MHz)-Chain B

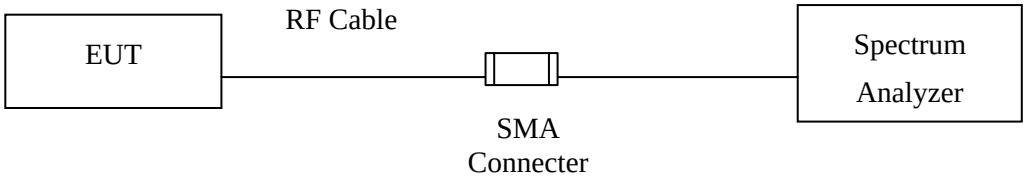


Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

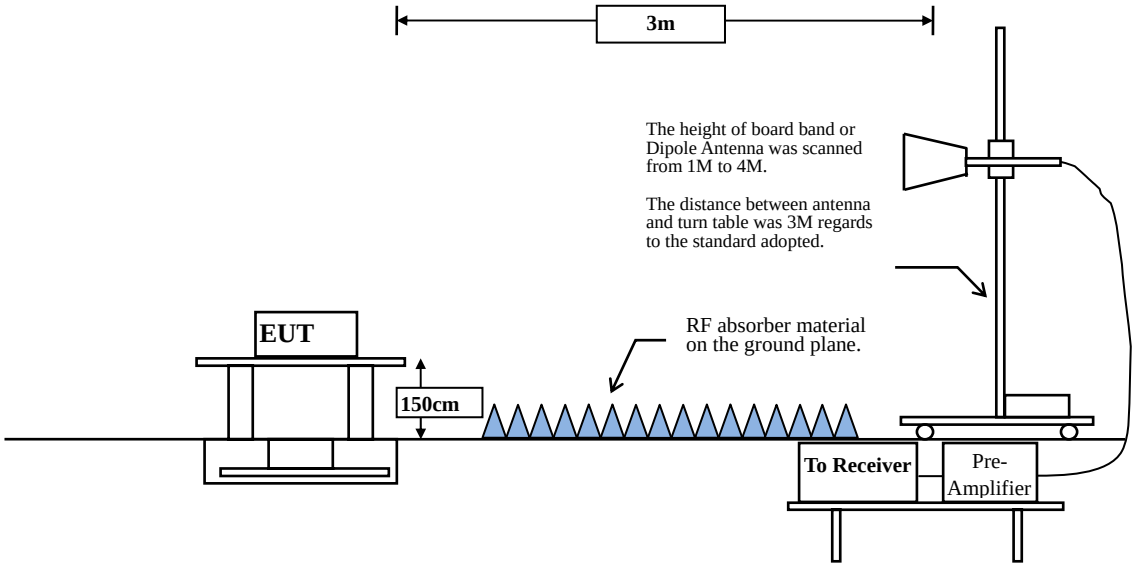
6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1GHz



6.2. Limits

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.

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.

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 : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	11.556	37.554	49.110	74.00	54.00	Pass
01 (Peak)	2398.261	11.575	61.198	72.773	74.00	54.00	Pass
01 (Peak)	2400.000	11.579	59.376	70.955	--	--	--
01 (Peak)	2413.043	11.610	93.276	104.886	--	--	--
01 (Average)	2390.000	11.556	28.232	39.788	74.00	54.00	Pass
01 (Average)	2398.261	11.575	58.105	69.680	74.00	54.00	Pass
01 (Average)	2400.000	11.579	55.946	67.525	--	--	--
01 (Average)	2412.754	11.609	90.196	101.806	--	--	--

Figure Channel 01: Horizontal (Peak)

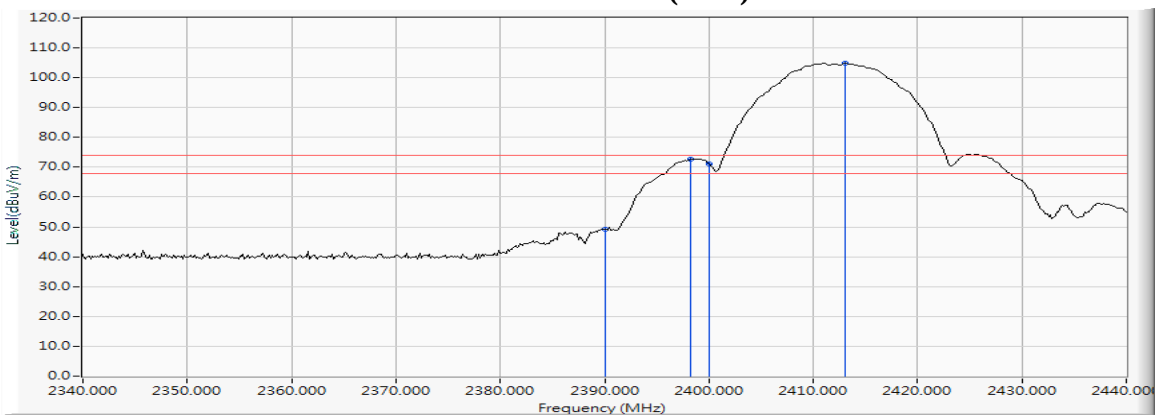
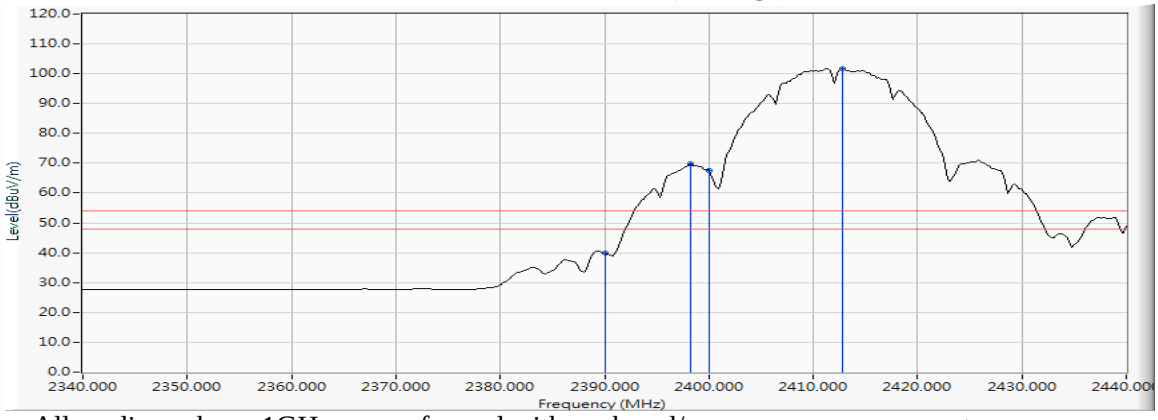


Figure Channel 01: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	11.556	47.289	58.845	74.00	54.00	Pass
01 (Peak)	2398.406	11.575	70.777	82.352	74.00	54.00	Pass
01 (Peak)	2400.000	11.579	68.831	80.410	--	--	--
01 (Peak)	2413.043	11.610	101.564	113.174	--	--	--
01 (Average)	2390.000	11.556	38.489	50.045	74.00	54.00	Pass
01 (Average)	2398.116	11.574	67.521	79.096	74.00	54.00	Pass
01 (Average)	2400.000	11.579	65.284	76.863	--	--	--
01 (Average)	2412.754	11.609	98.511	110.121	--	--	--

Figure Channel 01: VERTICAL (Peak)

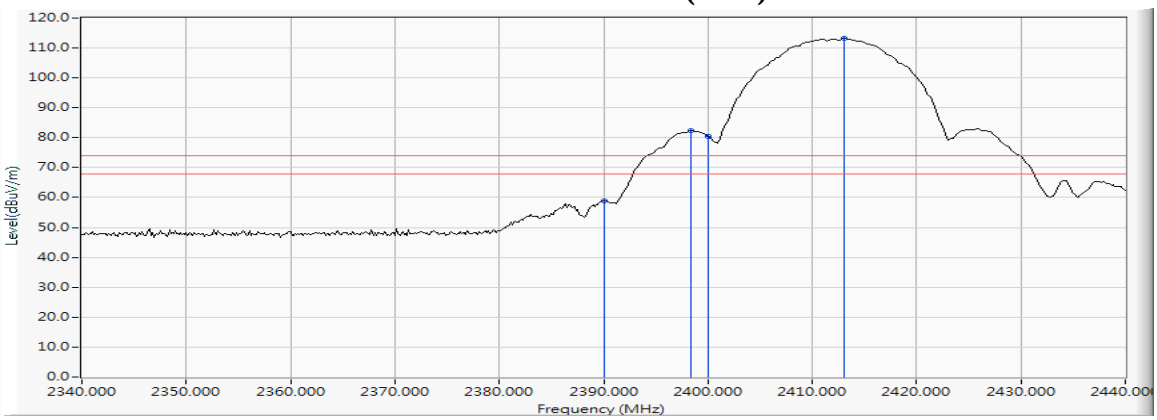
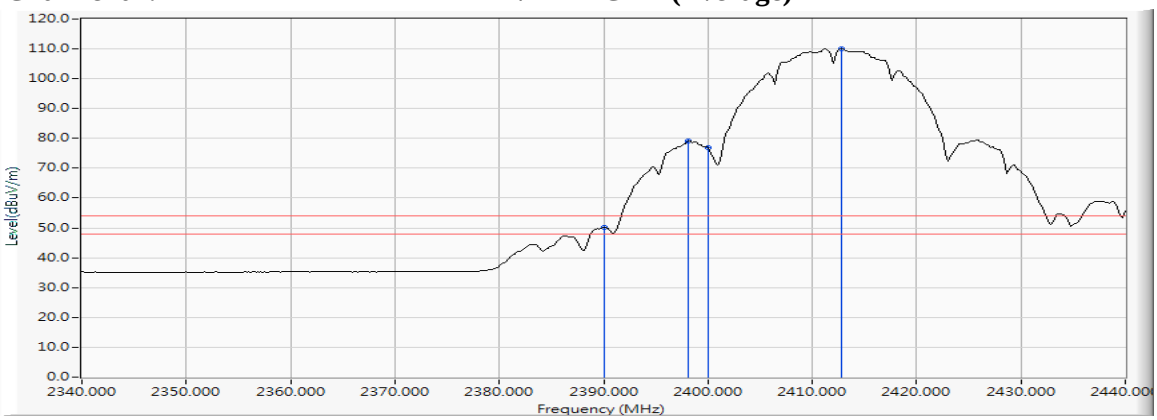


Figure Channel 01: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	LTE Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
		(M /N : WA-12M12FU)
Test Date	:	2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Result
11 (Peak)	2462.051	11.742	91.698	103.441	--	--	--
11 (Peak)	2483.500	11.800	37.261	49.061	74.00	54.00	Pass
11 (Average)	2461.181	11.741	88.704	100.444	--	--	--
11 (Average)	2483.500	11.800	25.356	37.156	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

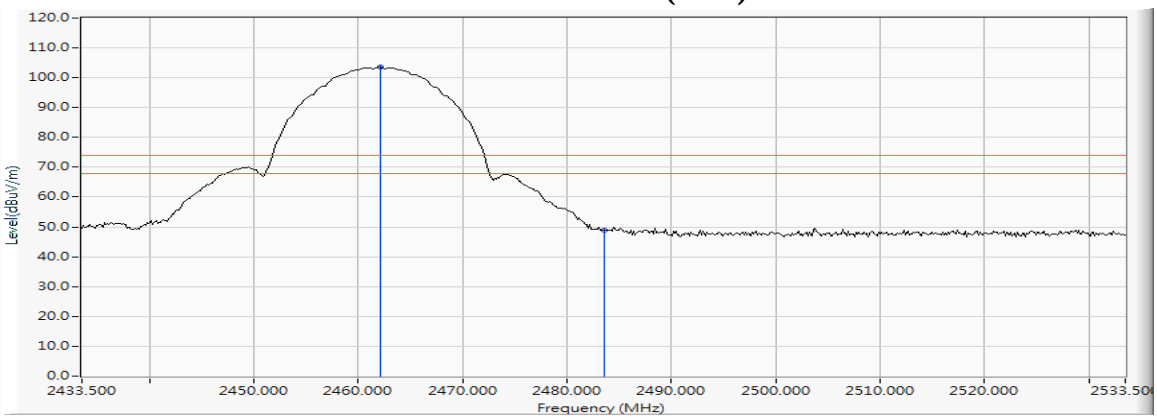
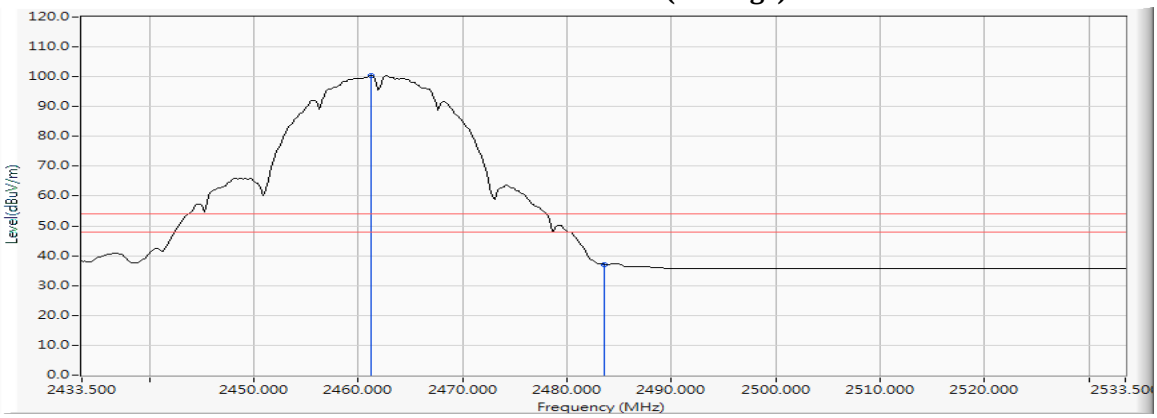


Figure Channel 11: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/28

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2460.891	11.739	100.515	112.255	--	--	--
11 (Peak)	2483.500	11.800	43.467	55.267	74.00	54.00	Pass
11 (Average)	2461.181	11.741	97.546	109.286	--	--	--
11 (Average)	2483.500	11.800	31.596	43.396	74.00	54.00	Pass
11 (Average)	2484.659	11.803	32.651	44.454	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

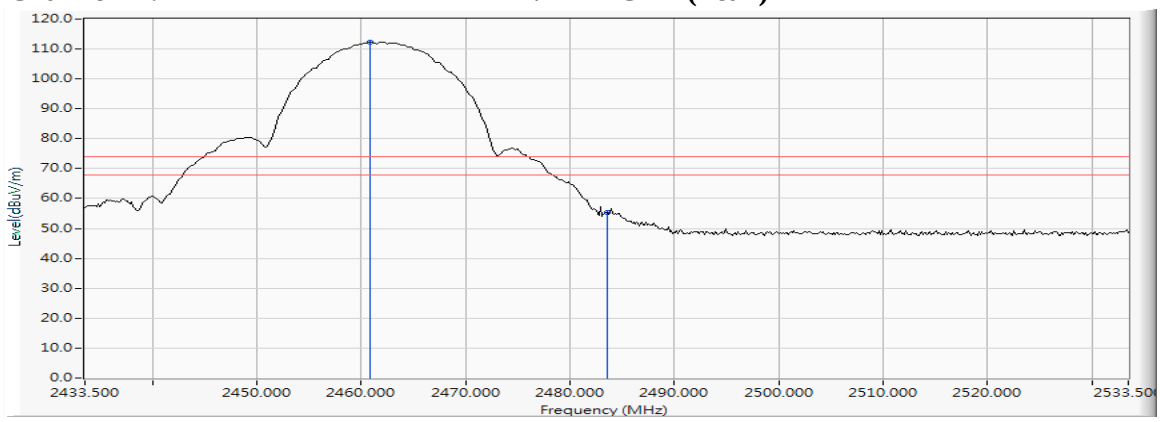
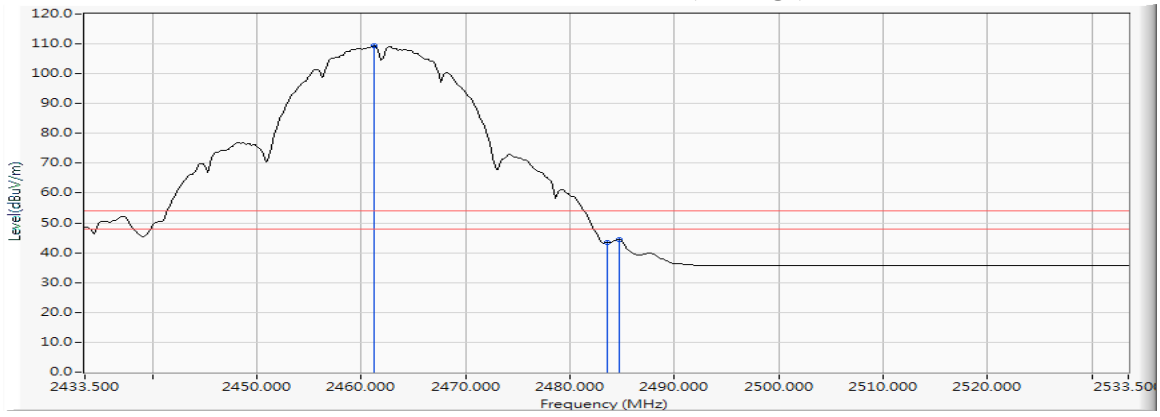


Figure Channel 11: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	11.556	49.510	61.066	74.00	54.00	Pass
01 (Peak)	2400.000	11.579	64.538	76.117	--	--	--
01 (Peak)	2418.261	11.622	90.667	102.290	--	--	--
01 (Average)	2390.000	11.556	31.923	43.479	74.00	54.00	Pass
01 (Average)	2400.000	11.579	44.164	55.743	--	--	--
01 (Average)	2417.391	11.621	81.438	93.059	--	--	--

Figure Channel 01: Horizontal (Peak)

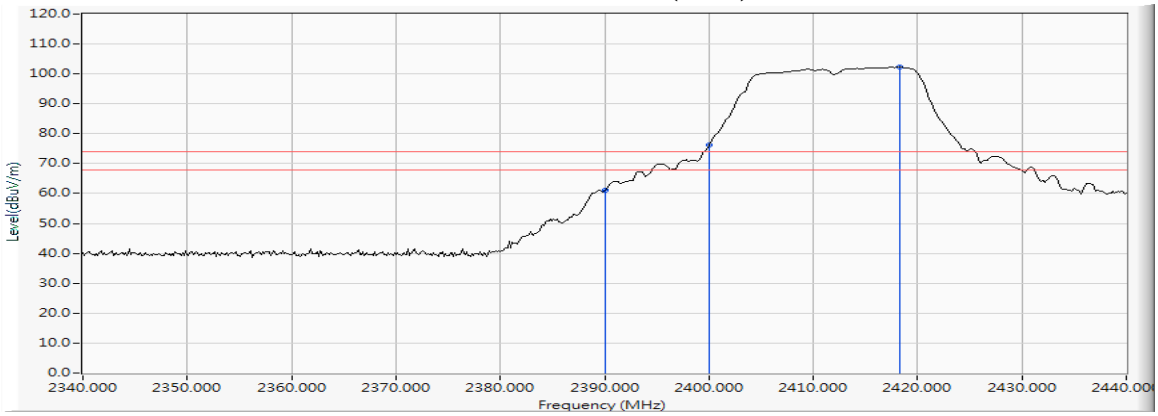
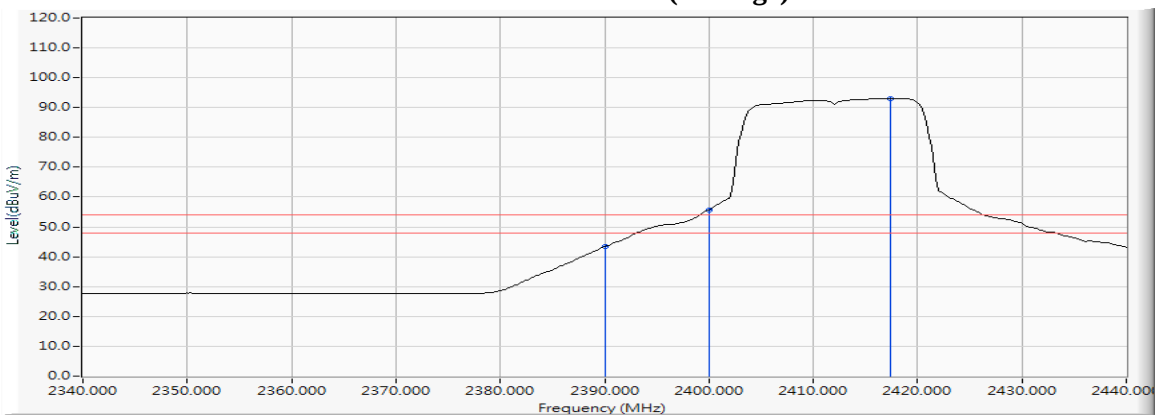


Figure Channel 01: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	11.556	57.368	68.924	74.00	54.00	Pass
01 (Peak)	2400.000	11.579	73.308	84.887	--	--	--
01 (Peak)	2418.551	11.624	98.633	110.256	--	--	--
01 (Average)	2390.000	11.556	40.202	51.758	74.00	54.00	Pass
01 (Average)	2400.000	11.579	52.864	64.443	--	--	--
01 (Average)	2419.130	11.624	89.418	101.043	--	--	--

Figure Channel 01: VERTICAL (Peak)

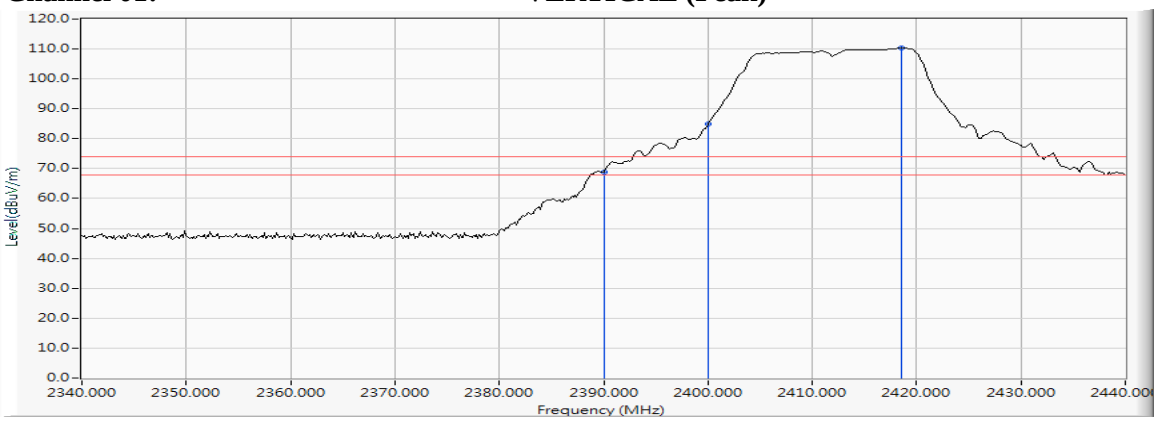
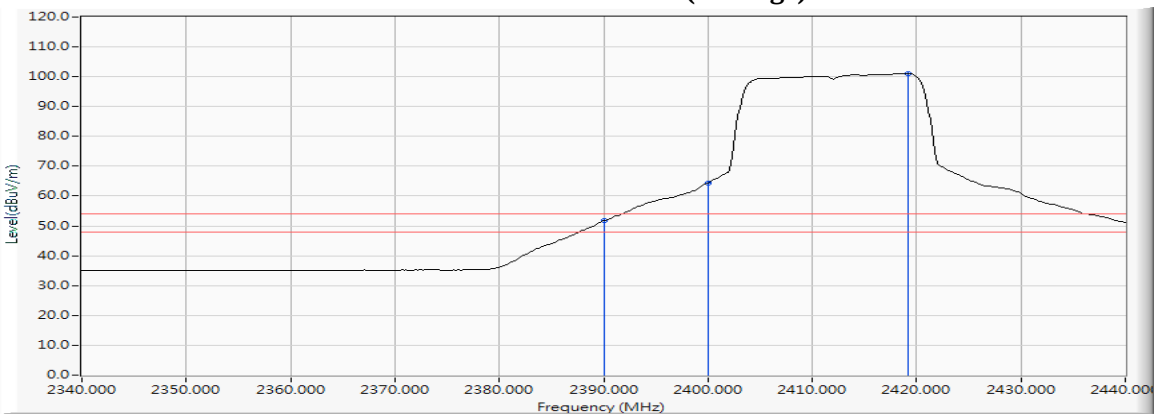


Figure Channel 01: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2467.413	11.759	89.223	100.982	--	--	--
11 (Peak)	2483.500	11.800	47.931	59.731	74.00	54.00	Pass
11 (Average)	2469.007	11.763	80.026	91.790	--	--	--
11 (Average)	2483.500	11.800	31.777	43.577	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

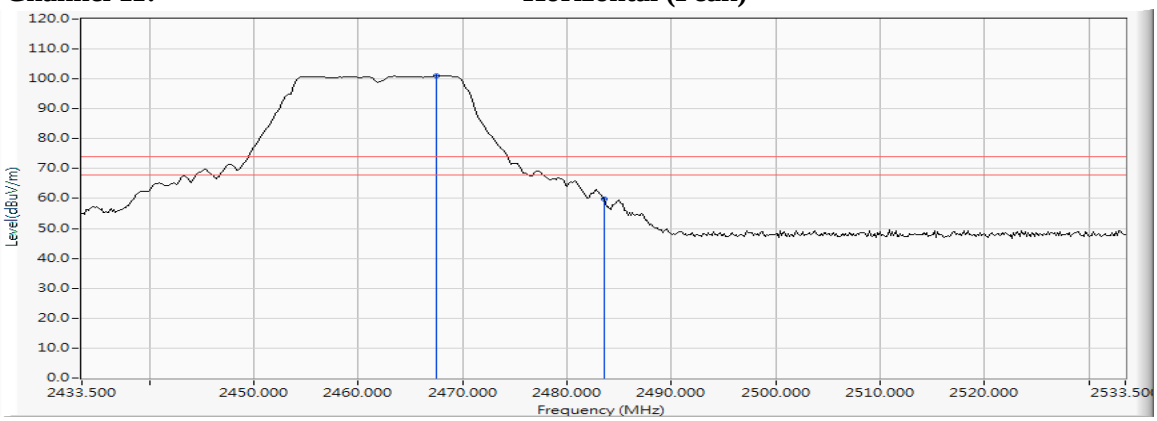
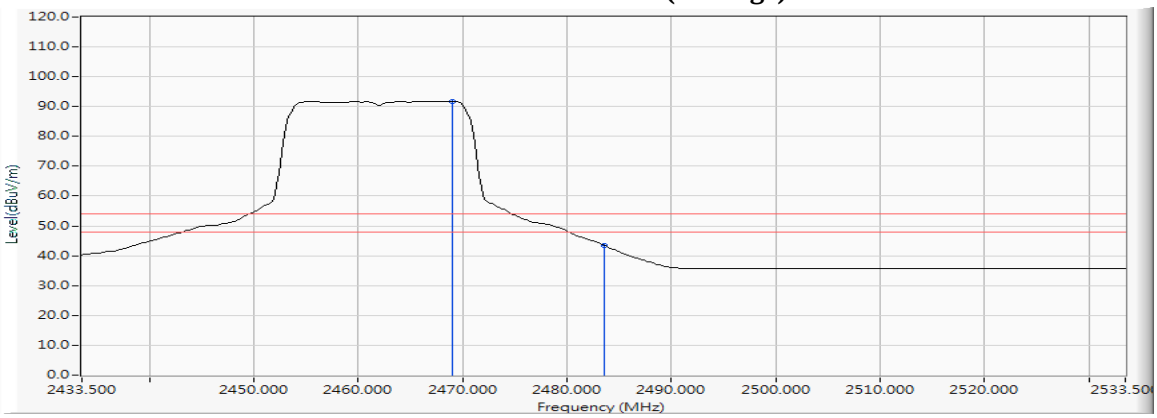


Figure Channel 11: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/28

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2455.094	11.722	98.494	110.216	--	--	--
11 (Peak)	2483.500	11.800	56.260	68.060	74.00	54.00	Pass
11 (Average)	2454.949	11.722	89.219	100.940	--	--	--
11 (Average)	2483.500	11.800	38.898	50.698	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

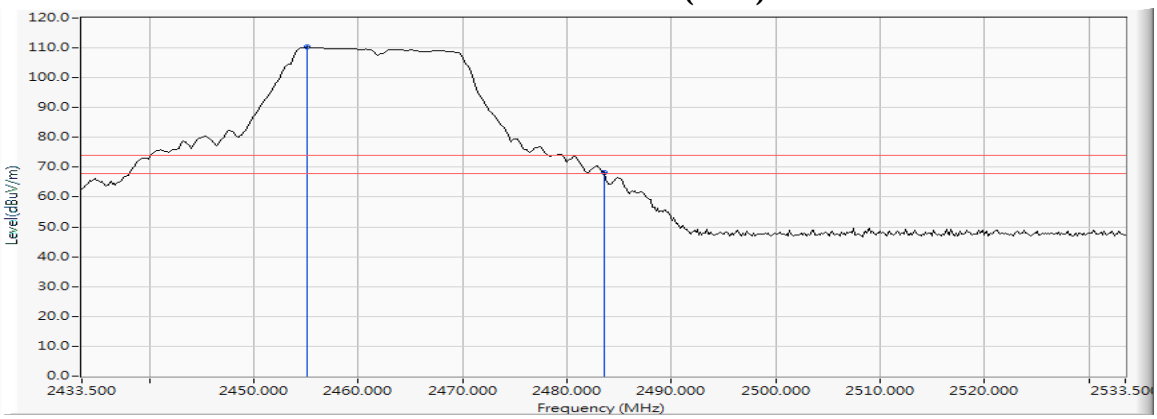
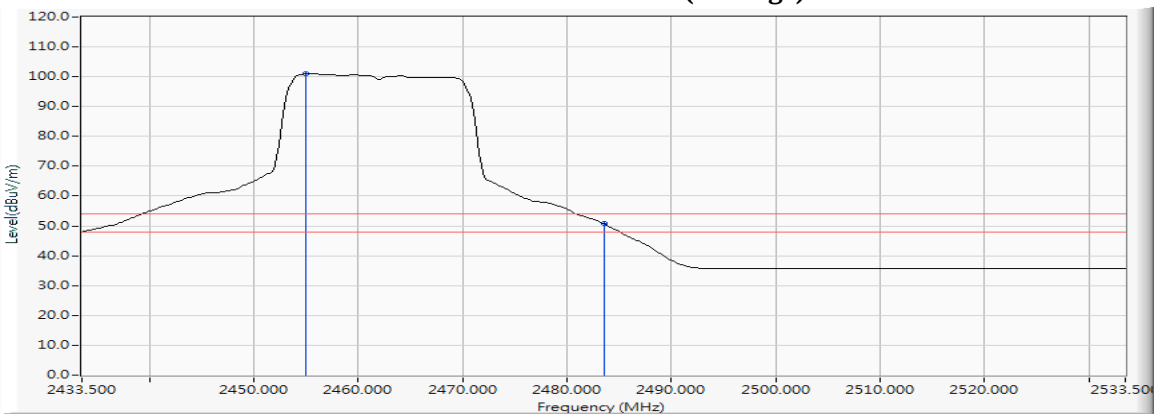


Figure Channel 11: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	11.556	54.444	66.000	74.00	54.00	Pass
01 (Peak)	2400.000	11.579	69.514	81.093	--	--	--
01 (Peak)	2415.362	11.616	95.826	107.442	--	--	--
01 (Average)	2390.000	11.556	35.833	47.389	74.00	54.00	Pass
01 (Average)	2400.000	11.579	49.535	61.114	--	--	--
01 (Average)	2419.420	11.626	85.305	96.930	--	--	--

Figure Channel 01: Horizontal (Peak)

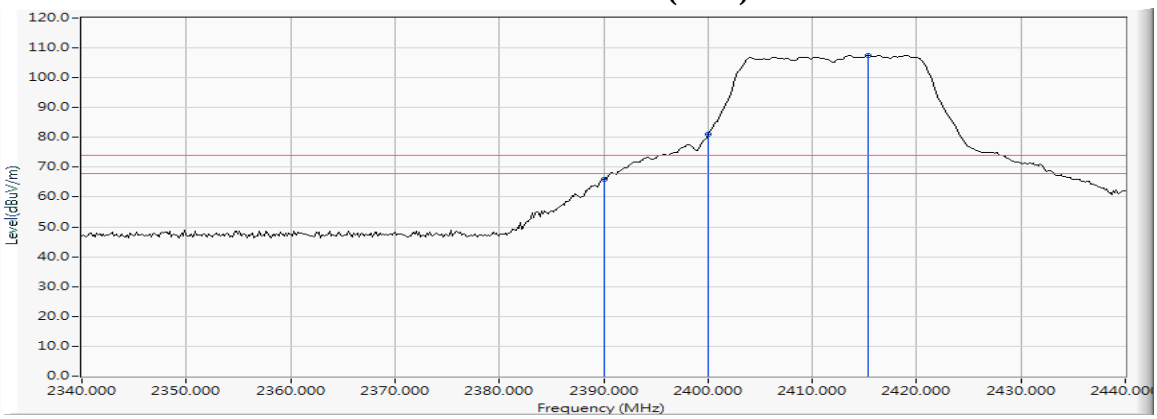
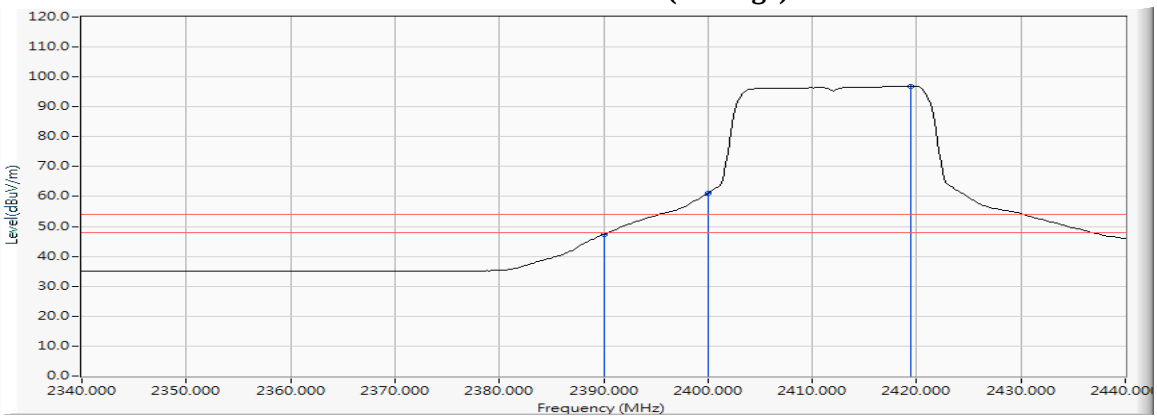


Figure Channel 01: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	11.556	52.397	63.953	74.00	54.00	Pass
01 (Peak)	2400.000	11.579	70.877	82.456	--	--	--
01 (Peak)	2417.826	11.622	98.929	110.551	--	--	--
01 (Average)	2390.000	11.556	37.220	48.776	74.00	54.00	Pass
01 (Average)	2400.000	11.579	50.160	61.739	--	--	--
01 (Average)	2419.565	11.626	87.767	99.393	--	--	--

Figure Channel 01: VERTICAL (Peak)

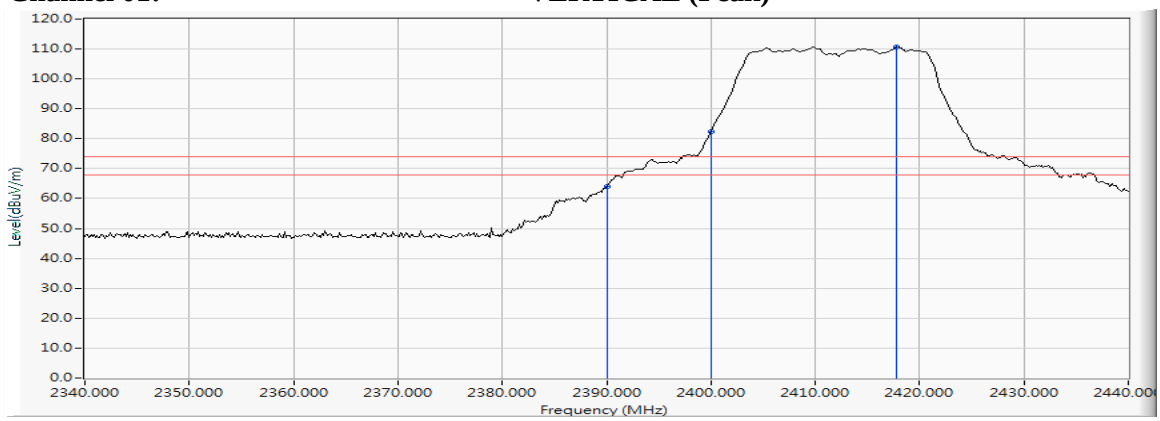
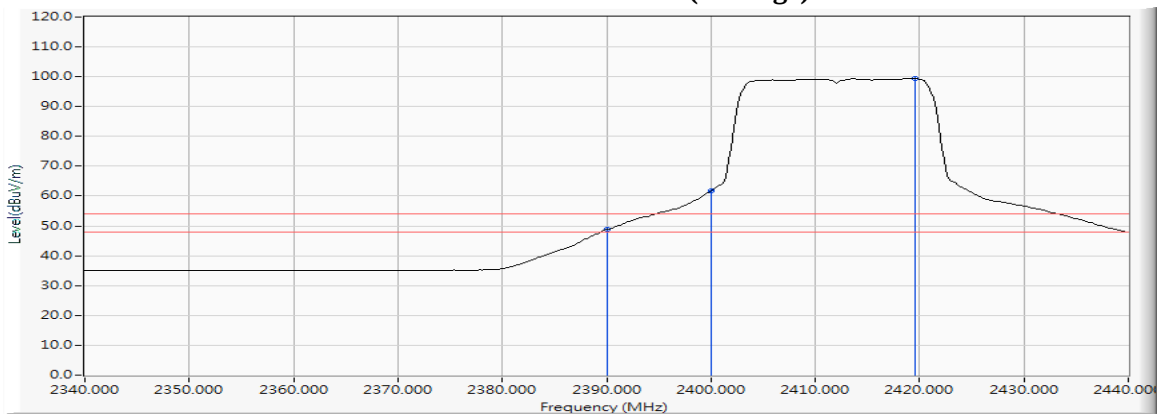


Figure Channel 01: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2465.239	11.753	93.407	105.160	--	--	--
11 (Peak)	2483.500	11.800	51.550	63.350	74.00	54.00	Pass
11 (Peak)	2484.659	11.803	52.071	63.874	74.00	54.00	Pass
11 (Average)	2460.601	11.739	82.739	94.478	--	--	--
11 (Average)	2483.500	11.800	33.013	44.813	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

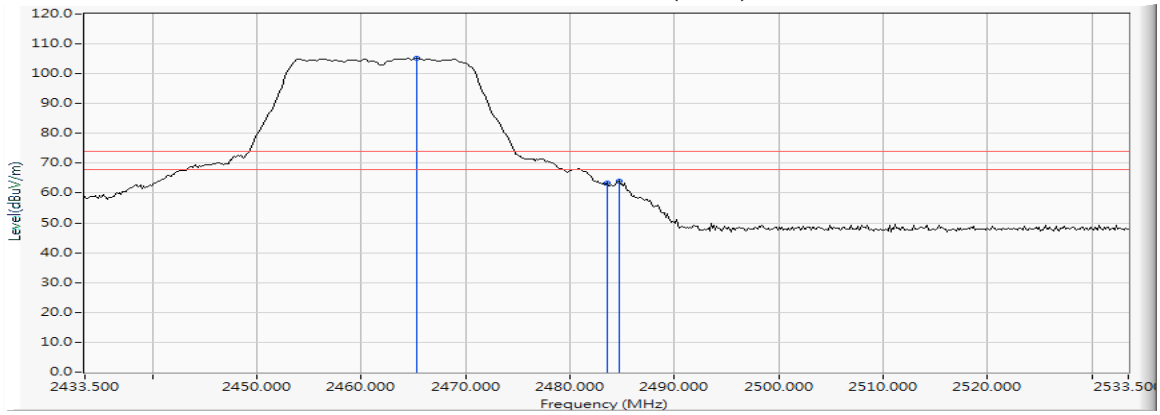
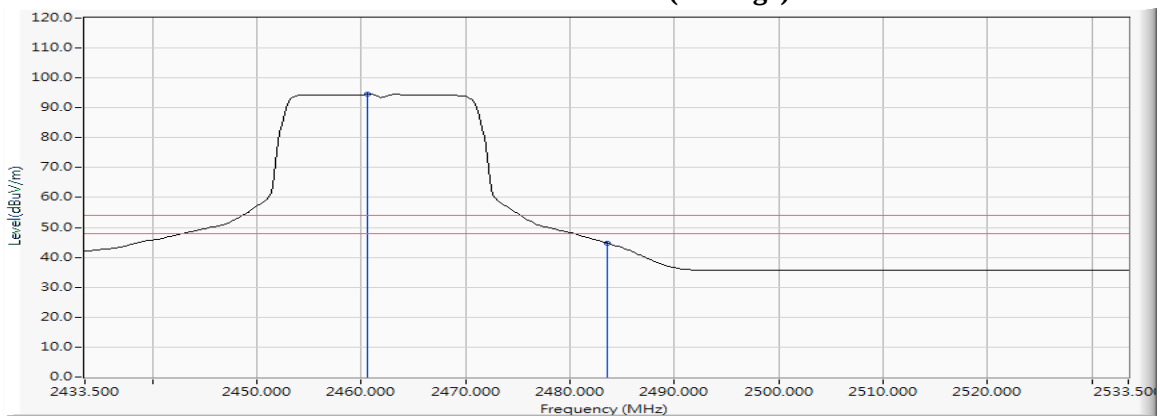


Figure Channel 11: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	LTE Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz) (M /N : WA-12M12FU)
Test Date	:	2017/04/28

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2455.239	11.723	98.397	110.119	--	--	--
11 (Peak)	2483.500	11.800	53.634	65.434	74.00	54.00	Pass
11 (Peak)	2484.804	11.803	54.294	66.097	74.00	54.00	Pass
11 (Average)	2454.659	11.721	86.815	98.536	--	--	--
11 (Average)	2483.500	11.800	36.022	47.822	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

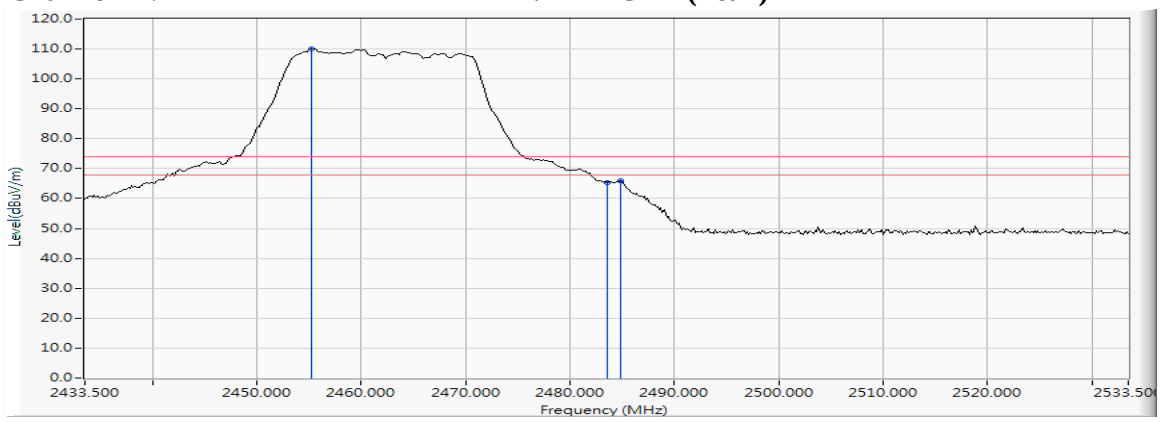
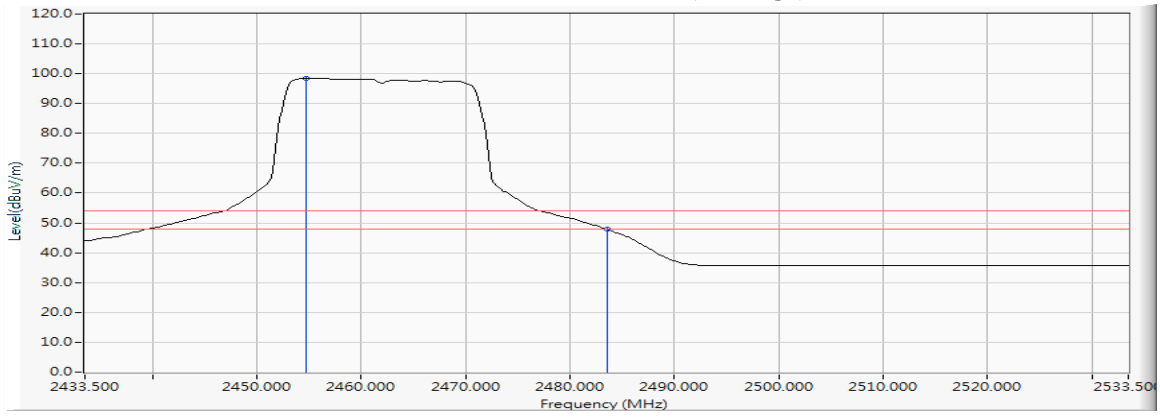


Figure Channel 11: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2422MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Result
03 (Peak)	2390.000	11.556	53.999	65.555	74.00	54.00	Pass
03 (Peak)	2400.000	11.579	63.945	75.524	--	--	--
03 (Peak)	2427.101	11.644	93.452	105.096	--	--	--
03 (Average)	2390.000	11.556	39.067	50.623	74.00	54.00	Pass
03 (Average)	2400.000	11.579	51.989	63.568	--	--	--
03 (Average)	2417.681	11.621	82.573	94.194	--	--	--

Figure Channel 03: Horizontal (Peak)

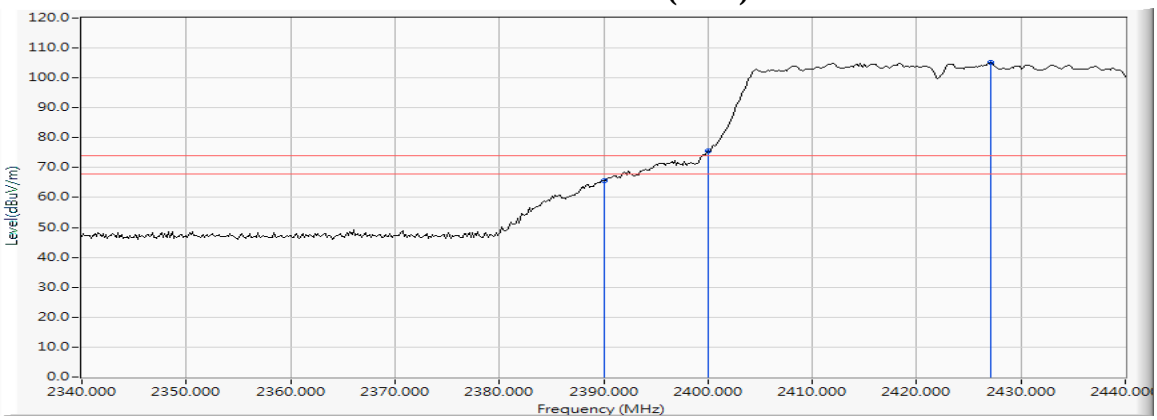
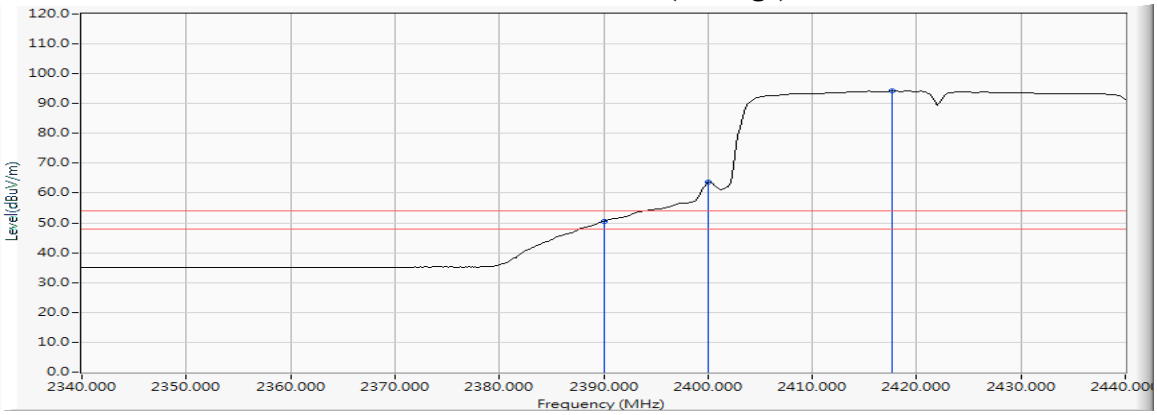


Figure Channel 03: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2422MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Result
03 (Peak)	2390.000	11.556	54.067	65.623	74.00	54.00	Pass
03 (Peak)	2400.000	11.579	63.736	75.315	--	--	--
03 (Peak)	2429.855	11.651	97.346	108.996	--	--	--
03 (Average)	2390.000	11.556	38.873	50.429	74.00	54.00	Pass
03 (Average)	2400.000	11.579	53.267	64.846	--	--	--
03 (Average)	2427.246	11.644	85.383	97.027	--	--	--

Figure Channel 03: VERTICAL (Peak)

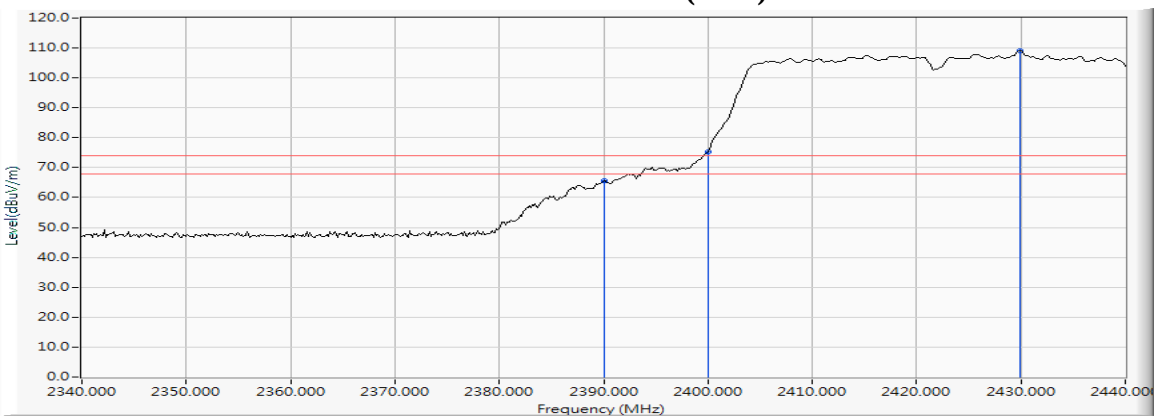
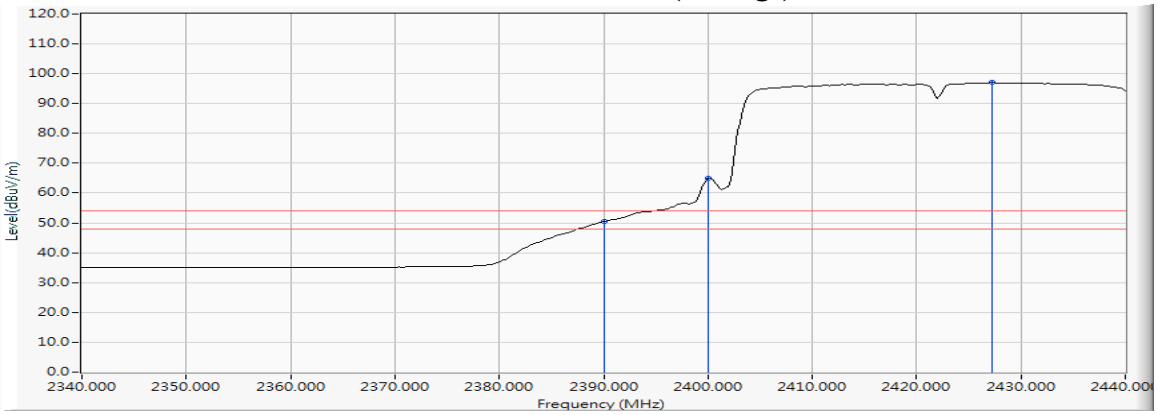


Figure Channel 03: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : LTE Router
Test Item : Band Edge Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2452MHz)
(M /N : WA-12M12FU)
Test Date : 2017/04/27

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
09 (Peak)	2441.906	11.684	92.164	103.847	--	--	--
09 (Peak)	2483.500	11.800	53.588	65.388	74.00	54.00	Pass
09 (Peak)	2484.514	11.801	54.075	65.877	74.00	54.00	Pass
09 (Average)	2438.283	11.673	81.232	92.904	--	--	--
09 (Average)	2483.500	11.800	37.110	48.910	74.00	54.00	Pass

Figure Channel 09: Horizontal (Peak)

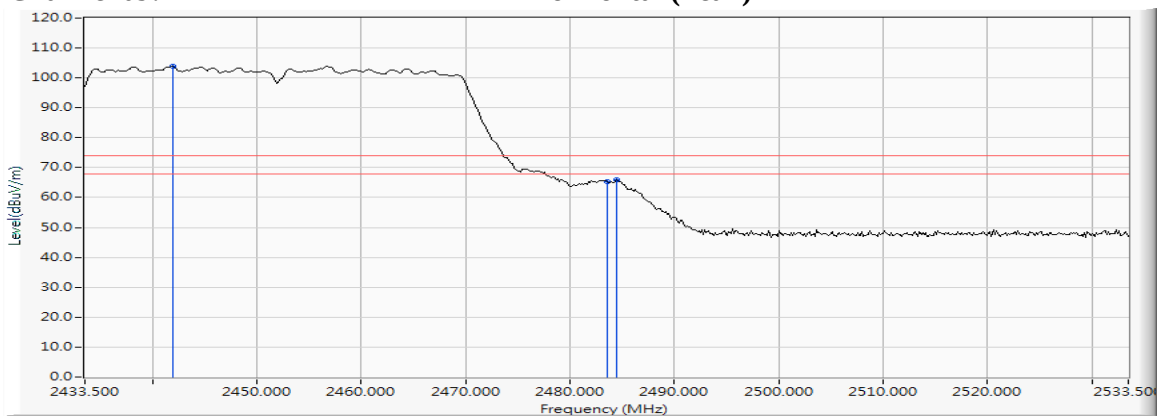
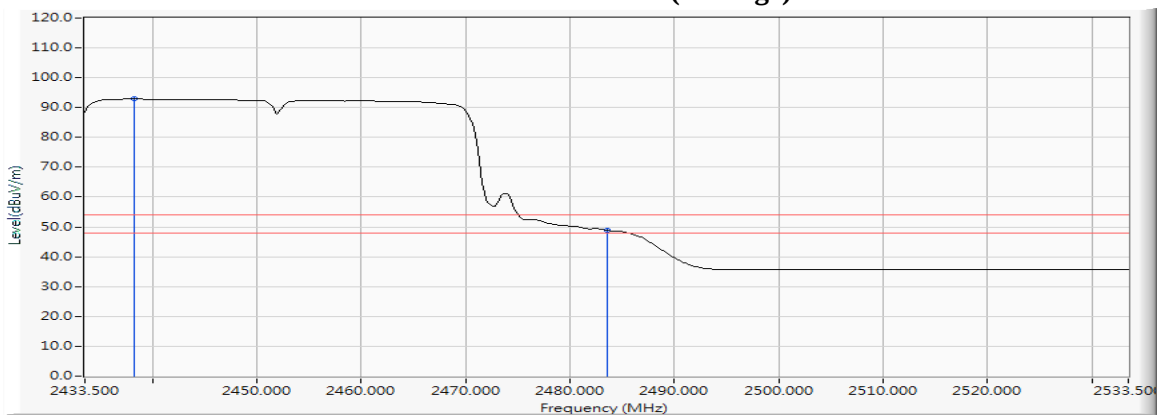


Figure Channel 09: Horizontal (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	LTE Router
Test Item	:	Band Edge Data
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2452MHz) (M /N : WA-12M12FU)
Test Date	:	2017/04/27

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Result
09 (Peak)	2459.877	11.736	96.643	108.379	--	--	--
09 (Peak)	2483.500	11.800	55.429	67.229	74.00	54.00	Pass
09 (Peak)	2484.659	11.803	56.134	67.937	74.00	54.00	Pass
09 (Average)	2445.964	11.695	84.971	96.666	--	--	--
09 (Average)	2483.500	11.800	40.376	52.176	74.00	54.00	Pass

Figure Channel 09: VERTICAL (Peak)

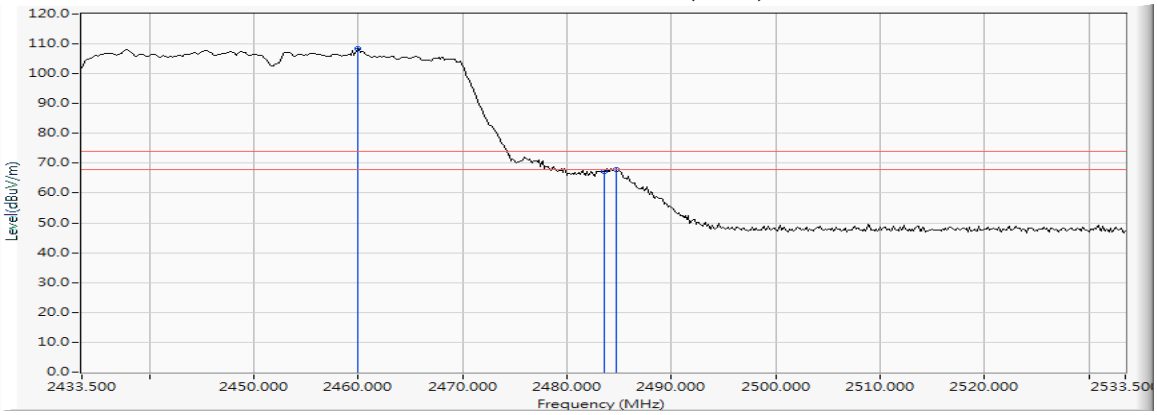
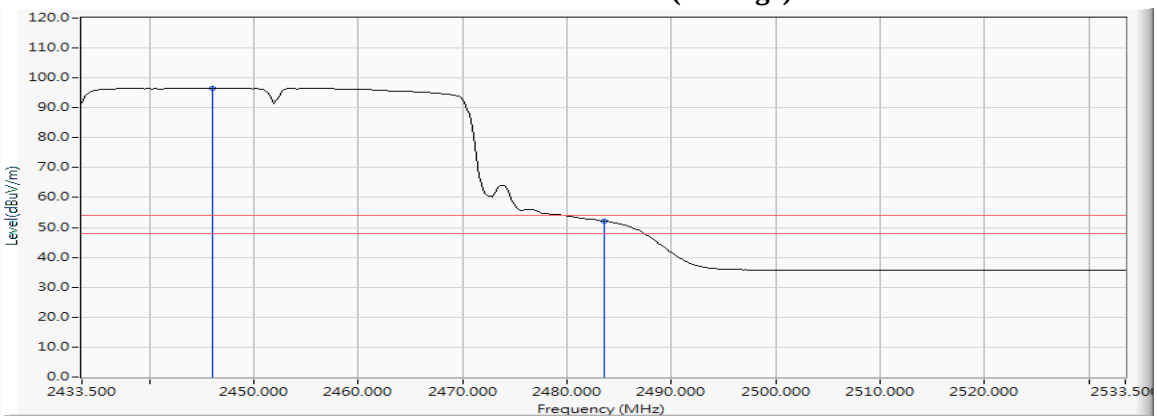


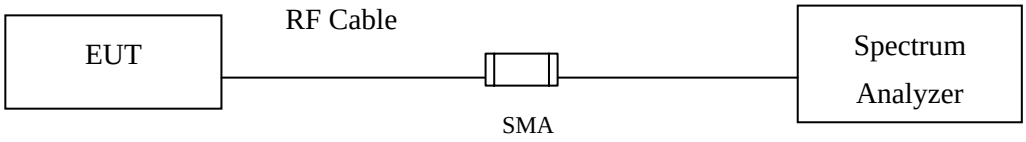
Figure Channel 09: VERTICAL (Average)



Note:1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. 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

The EUT was setup according to ANSI C63.4: 2014; tested according to DTS test procedure of Jan KDB558074 for compliance to FCC 47CFR 15.247 requirements.

7.4. Uncertainty

± 279.2Hz

7.5. Test Result of 6dB Bandwidth

Product : LTE Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)
Test Date : 2017/01/05

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	10200	>500	Pass
06	2437	10200	>500	Pass
11	2462	10200	>500	Pass

Figure Channel 01:

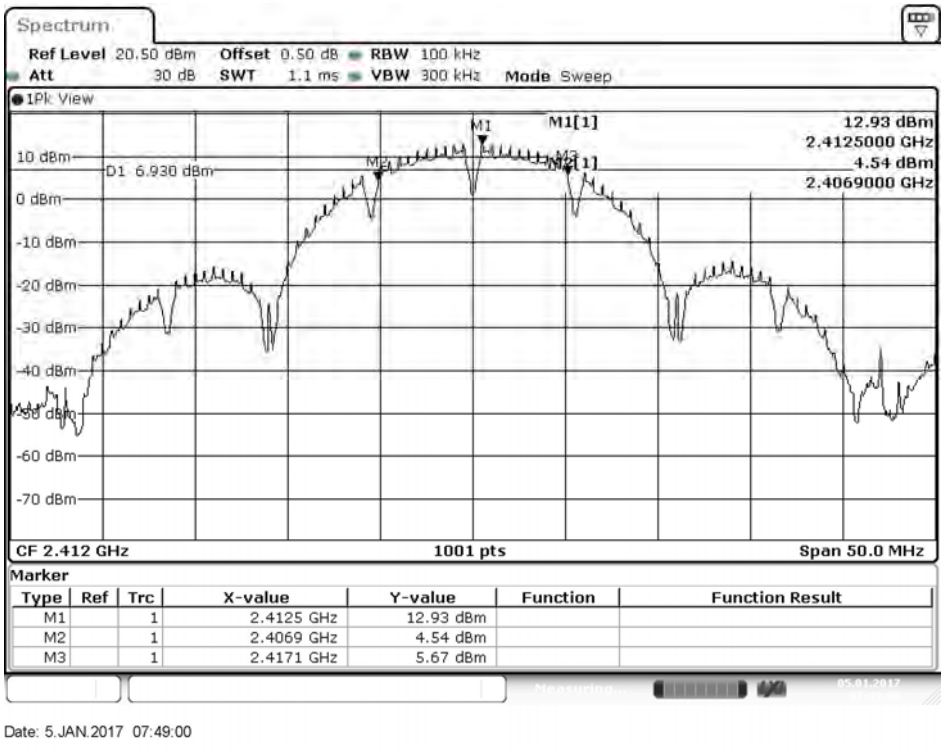
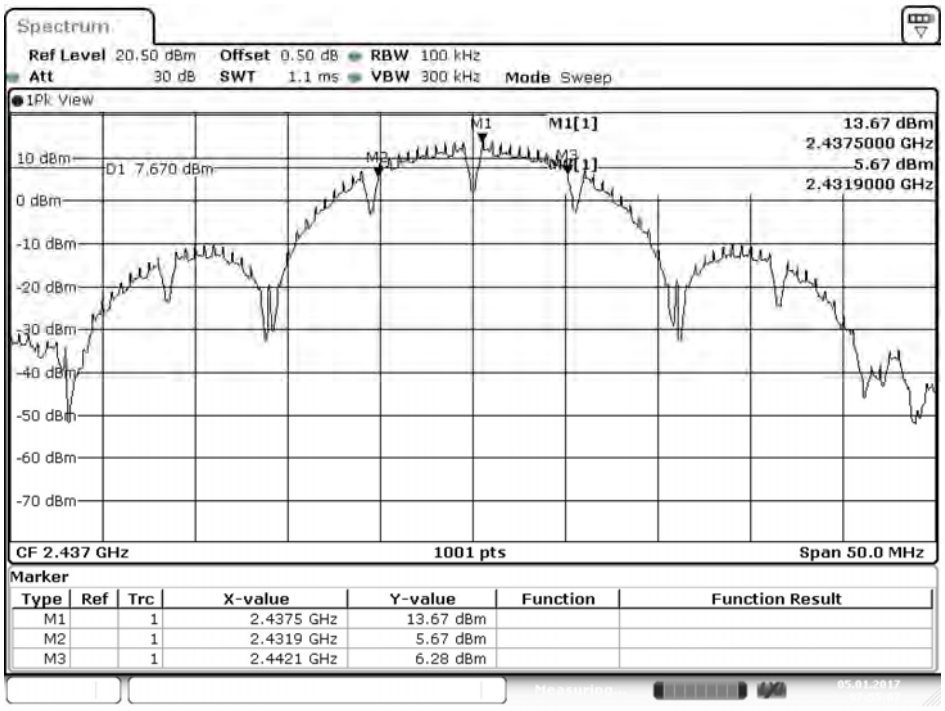
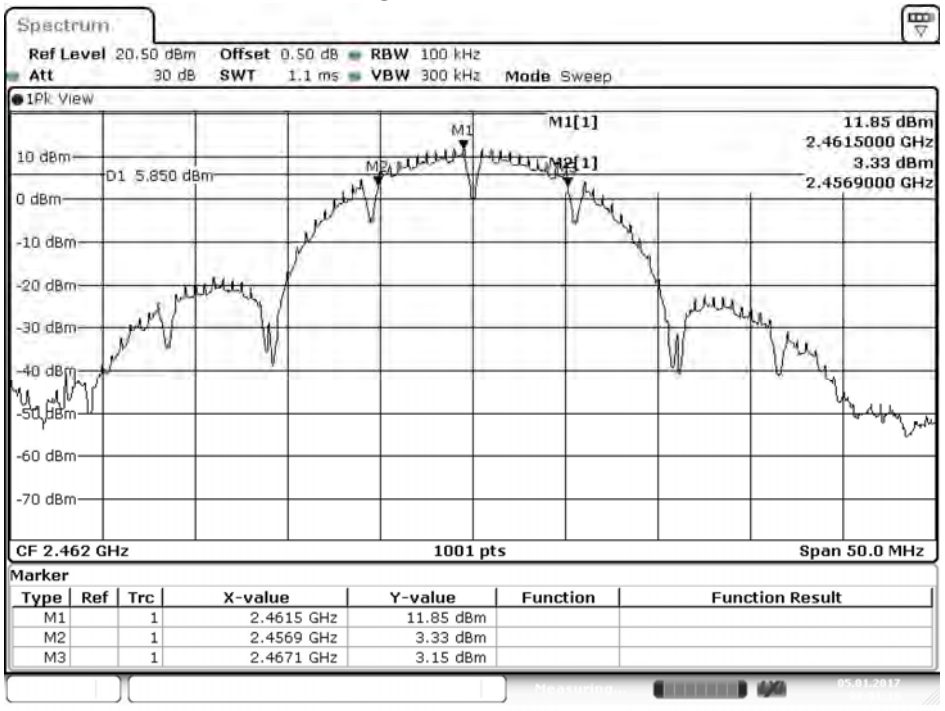


Figure Channel 06:



Date: 5.JAN.2017 07:55:07

Figure Channel 11:



Date: 5.JAN.2017 08:01:19

Product : LTE Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date : 2017/01/05

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	16700	>500	Pass
06	2437	16650	>500	Pass
11	2462	16650	>500	Pass

Figure Channel 01:

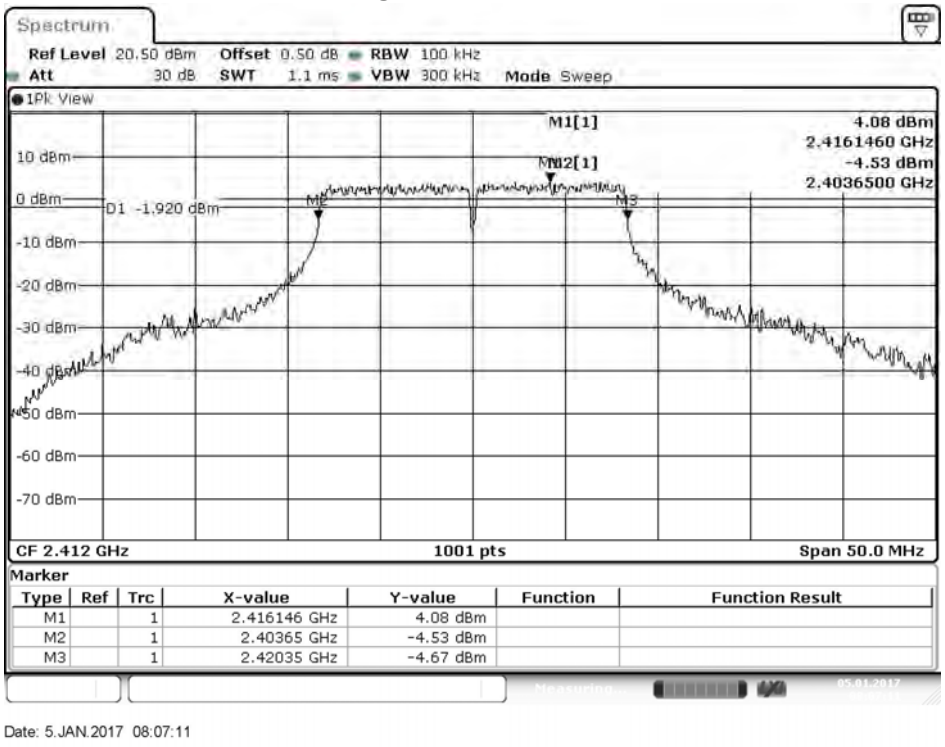
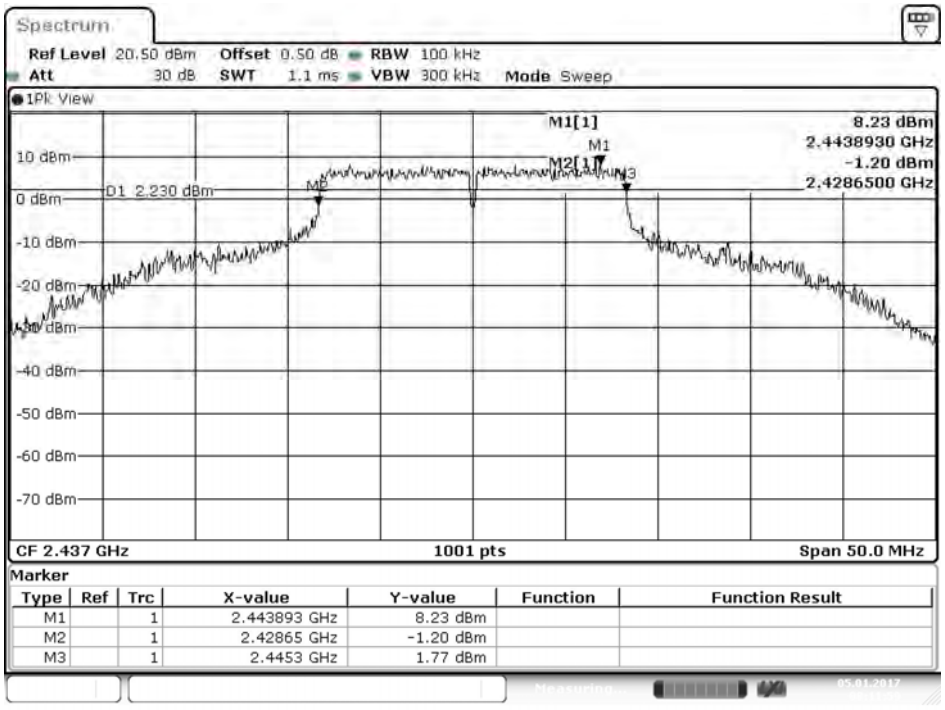
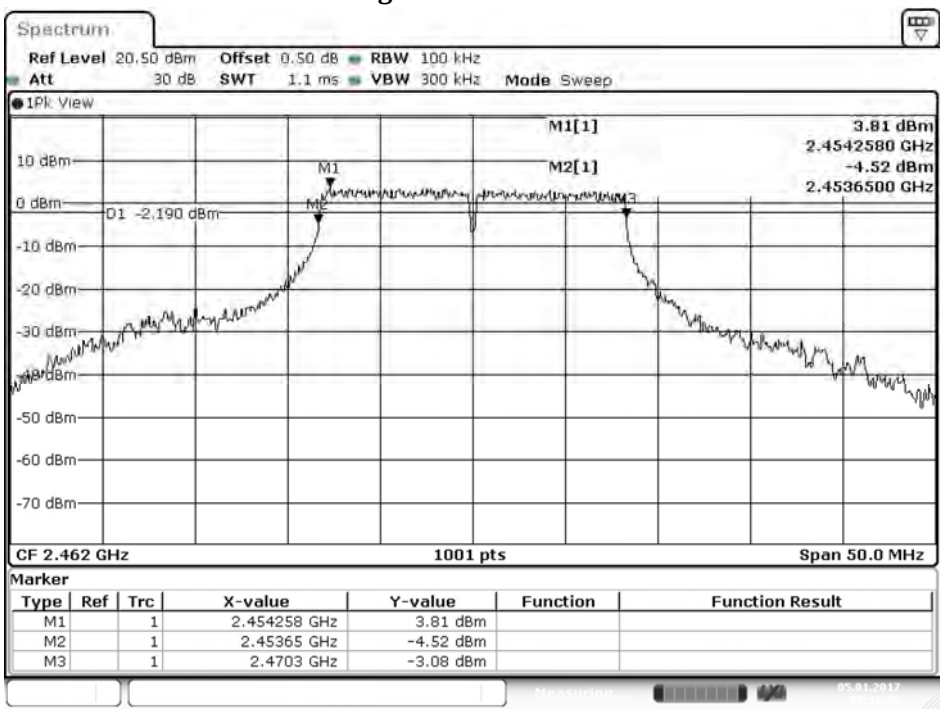


Figure Channel 06:



Date: 5.JAN.2017 08:11:59

Figure Channel 11:



Date: 5.JAN.2017 08:17:27

Product : LTE Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date : 2017/01/05

Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17900	>500	Pass
06	2437	17900	>500	Pass
11	2462	17900	>500	Pass

Figure Channel 01: (Chain A)

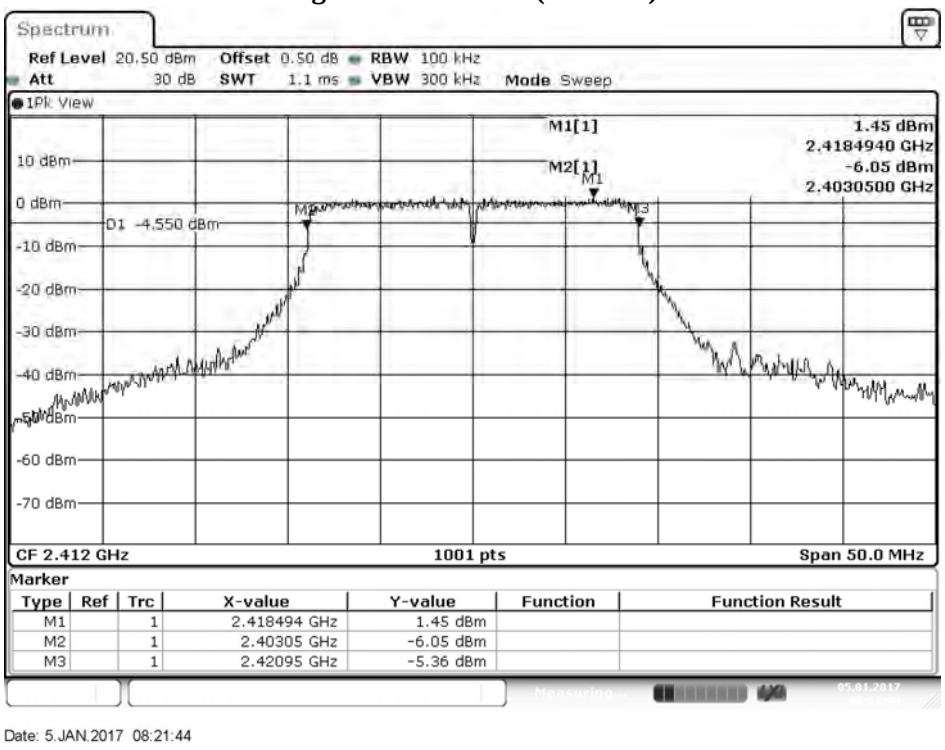
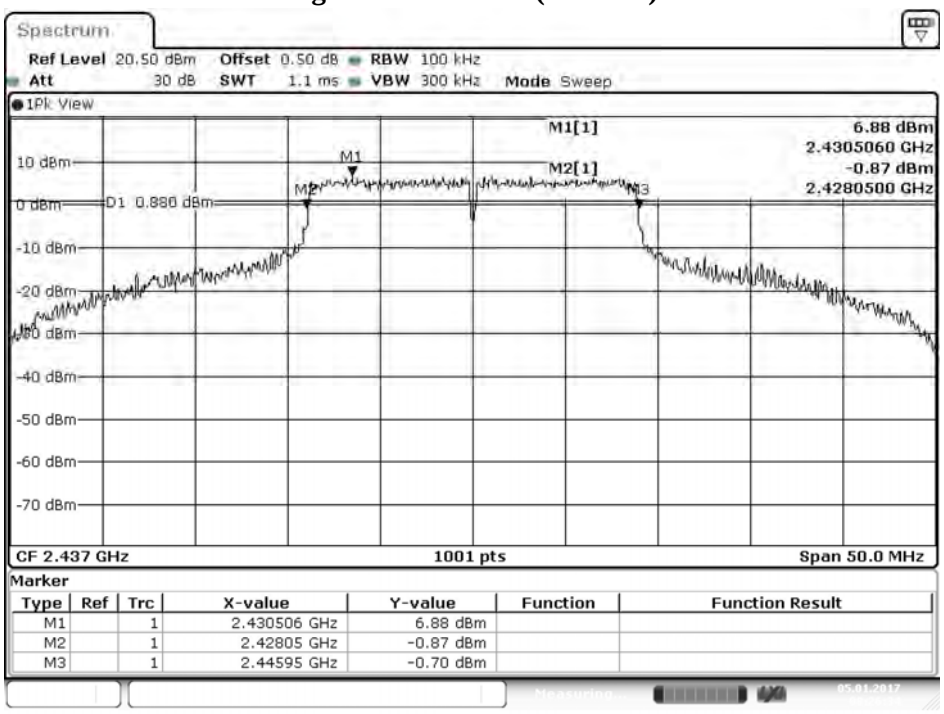
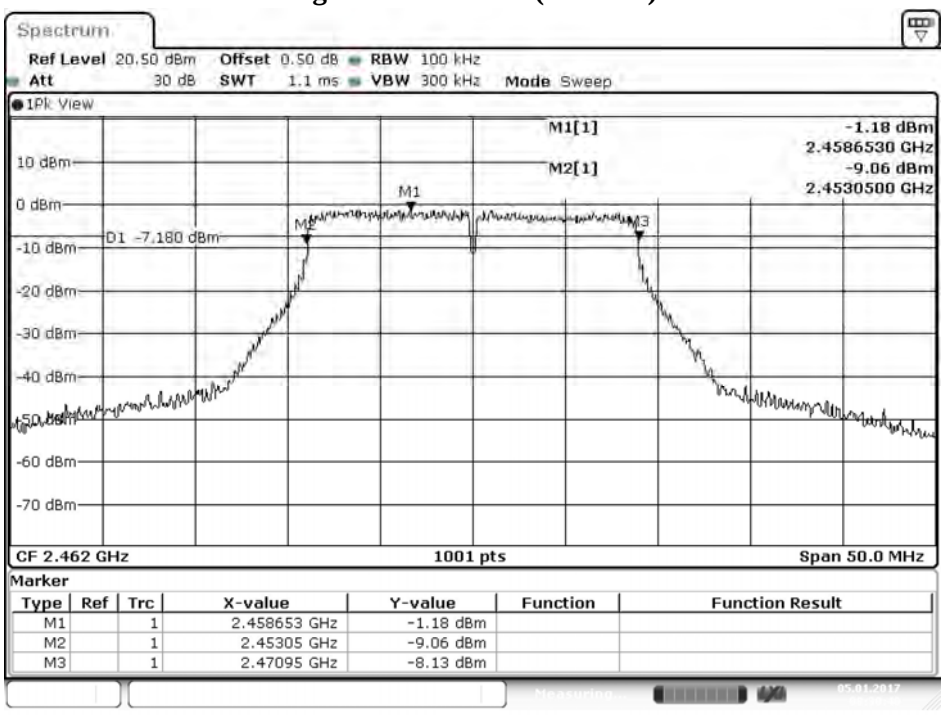


Figure Channel 06: (Chain A)



Date: 5.JAN.2017 08:26:35

Figure Channel 11: (Chain A)



Date: 5.JAN.2017 08:30:41

Product : LTE Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date : 2017/01/05

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17800	>500	Pass
06	2437	17850	>500	Pass
11	2462	17850	>500	Pass

Figure Channel 01: (Chain B)

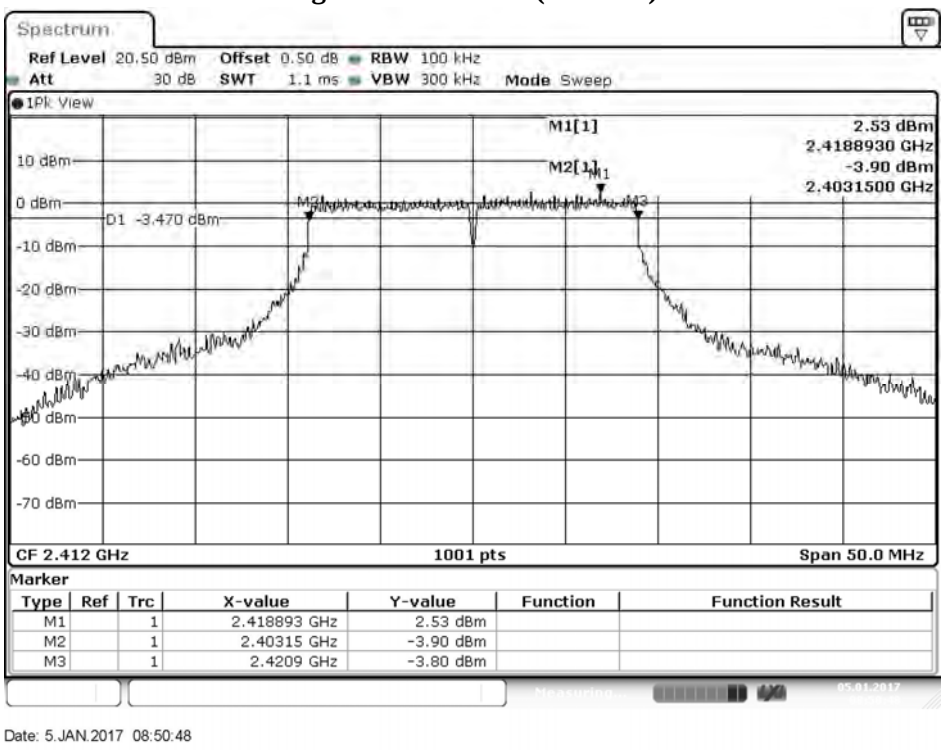
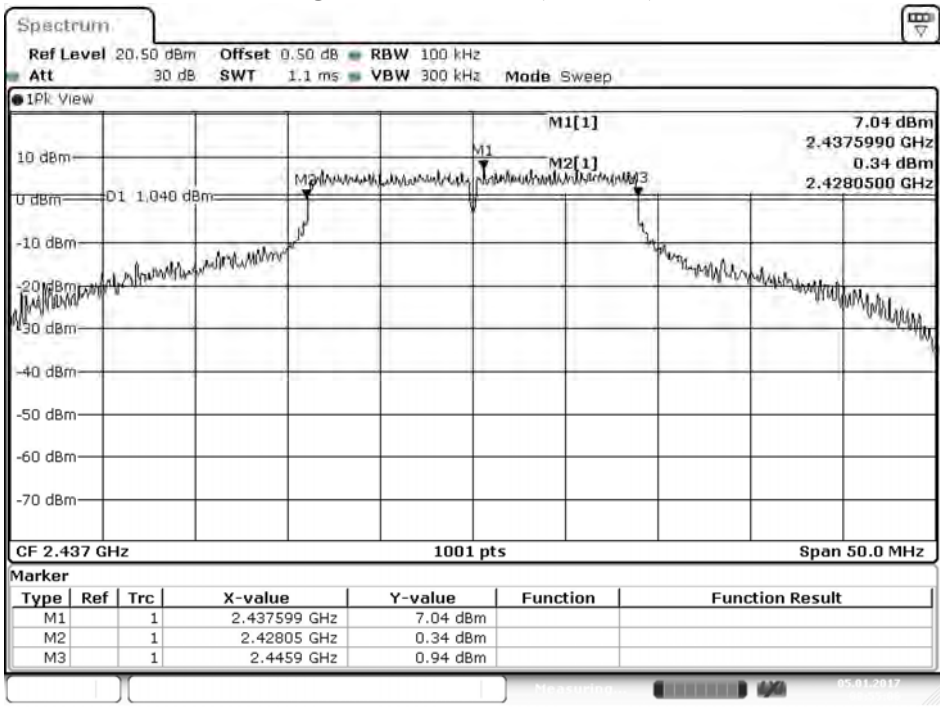
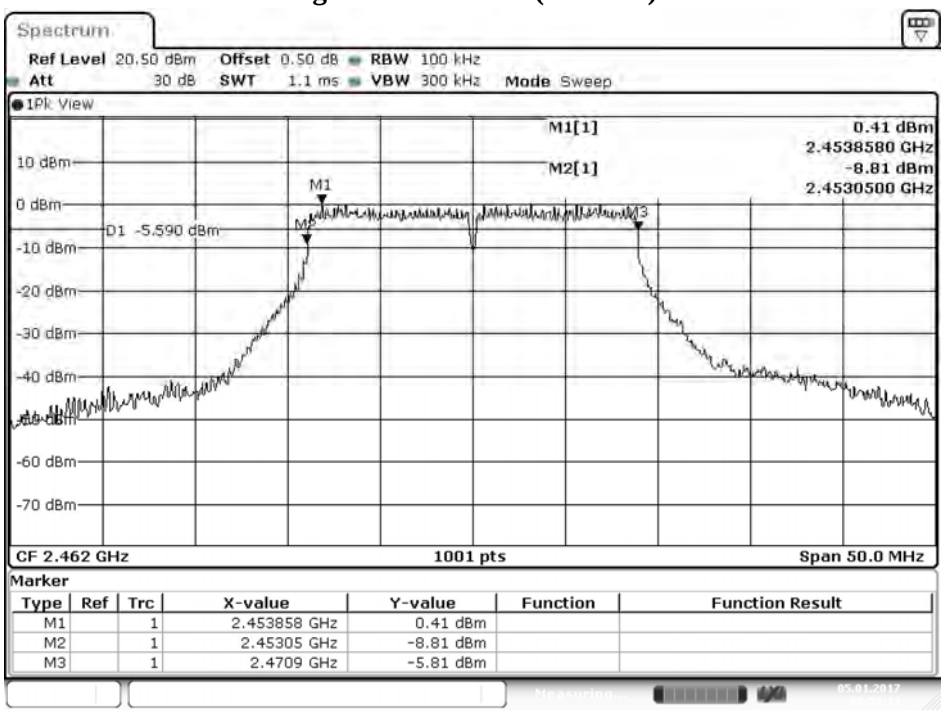


Figure Channel 06: (Chain B)



Date: 5.JAN.2017 08:55:07

Figure Channel 11: (Chain B)



Date: 5.JAN.2017 08:59:13

Product : LTE Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)
Test Date : 2017/01/05

Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	36500	>500	Pass
06	2437	36600	>500	Pass
09	2452	36600	>500	Pass

Figure Channel 03: (Chain A)

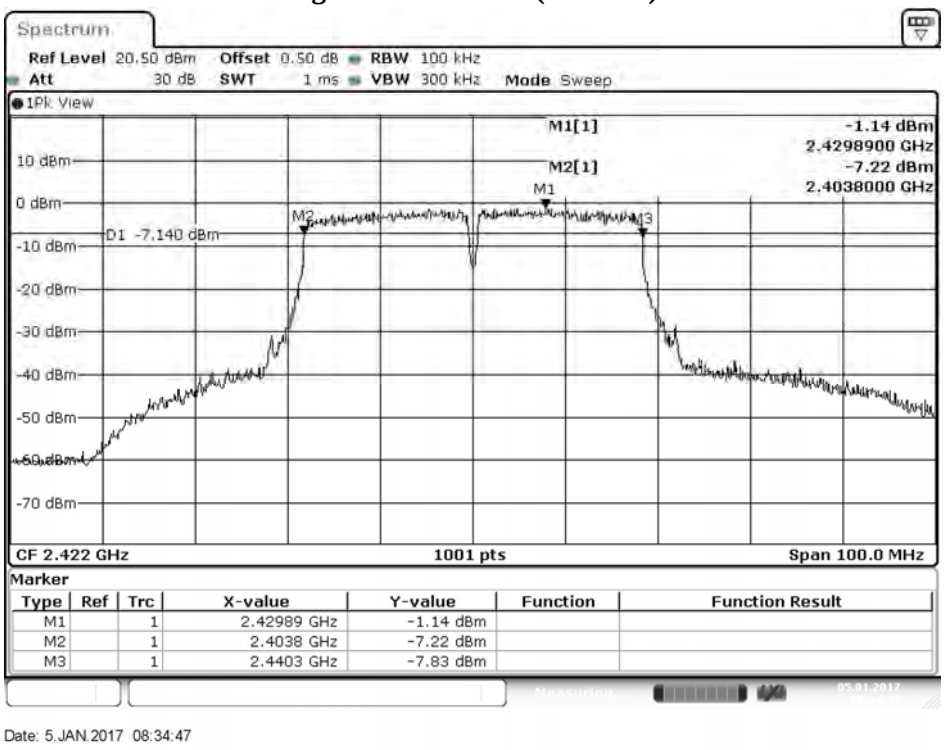
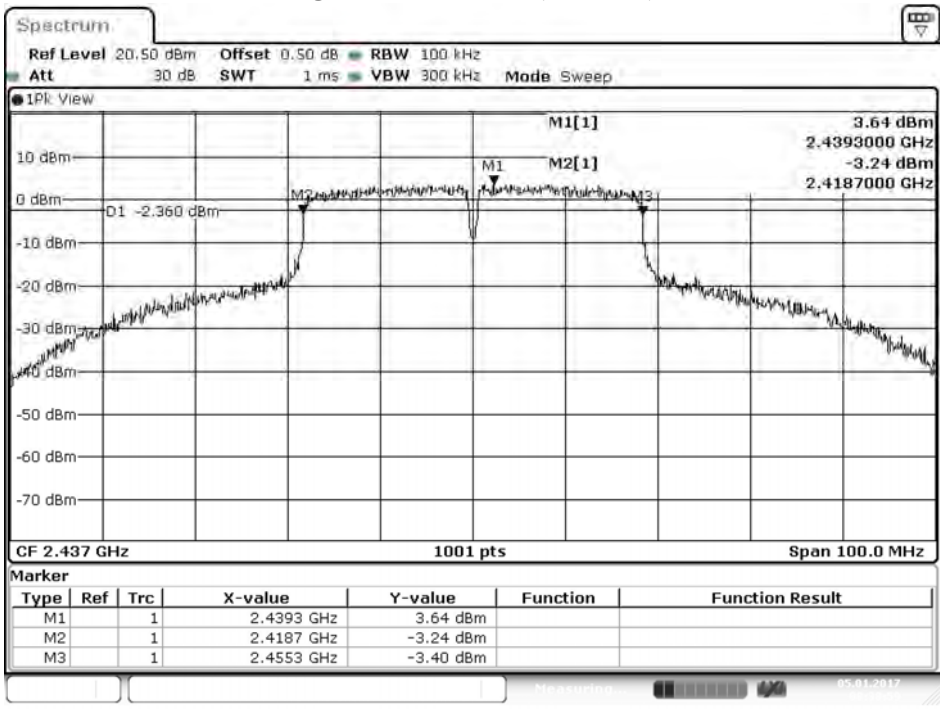
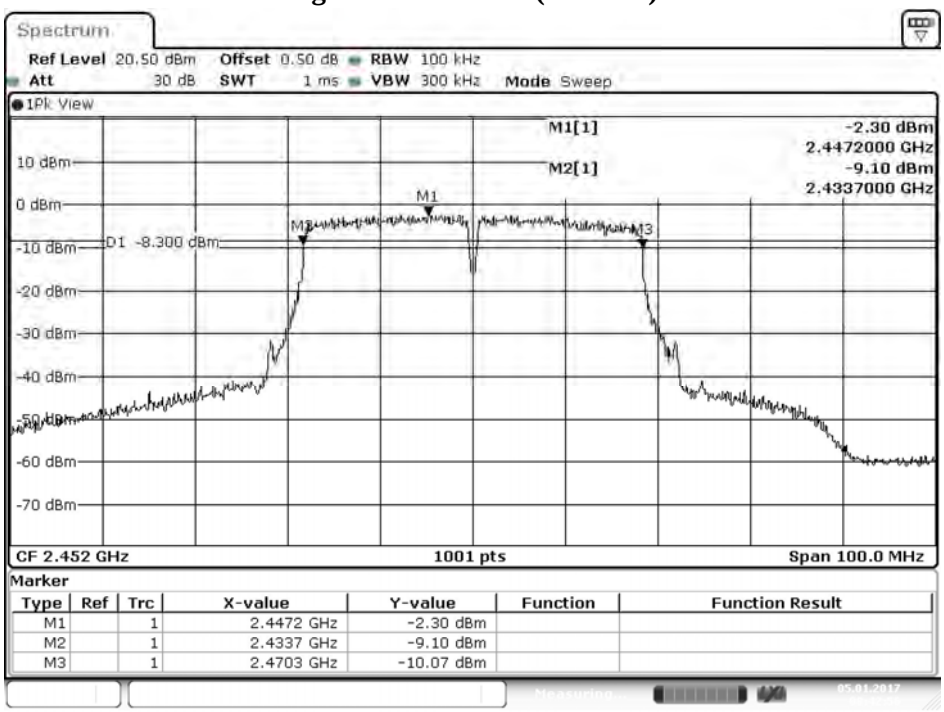


Figure Channel 06: (Chain A)



Date: 5.JAN.2017 08:38:59

Figure Channel 09: (Chain A)



Date: 5.JAN.2017 08:42:57

Product : LTE Router
Test Item : 6dB Bandwidth Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)
Test Date : 2017/01/05

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	36500	>500	Pass
06	2437	36600	>500	Pass
09	2452	36600	>500	Pass

Figure Channel 03: (Chain B)

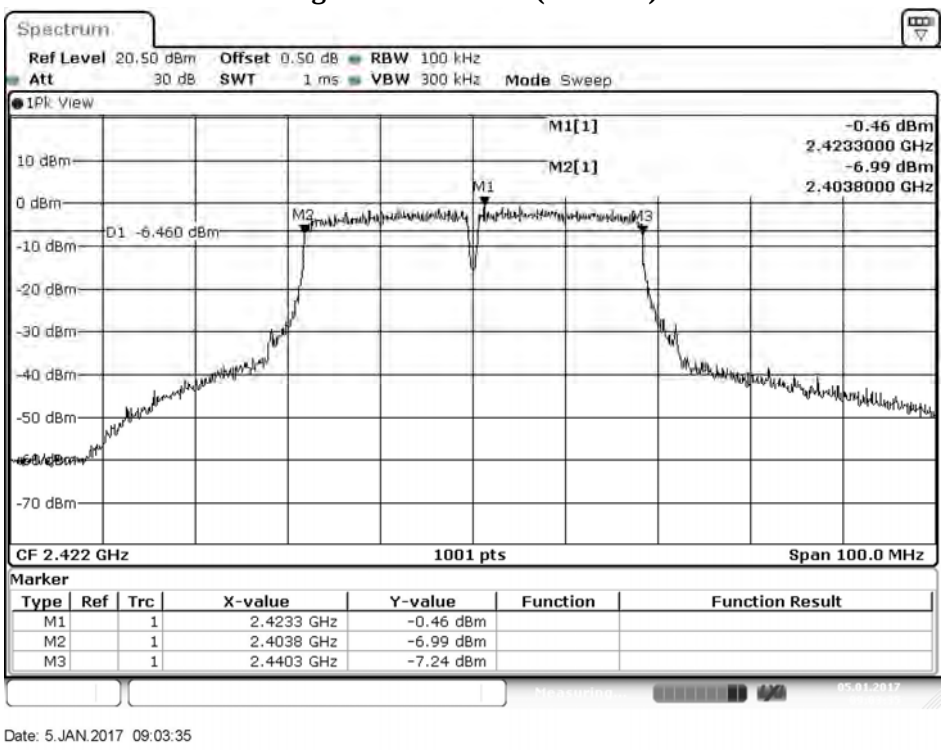
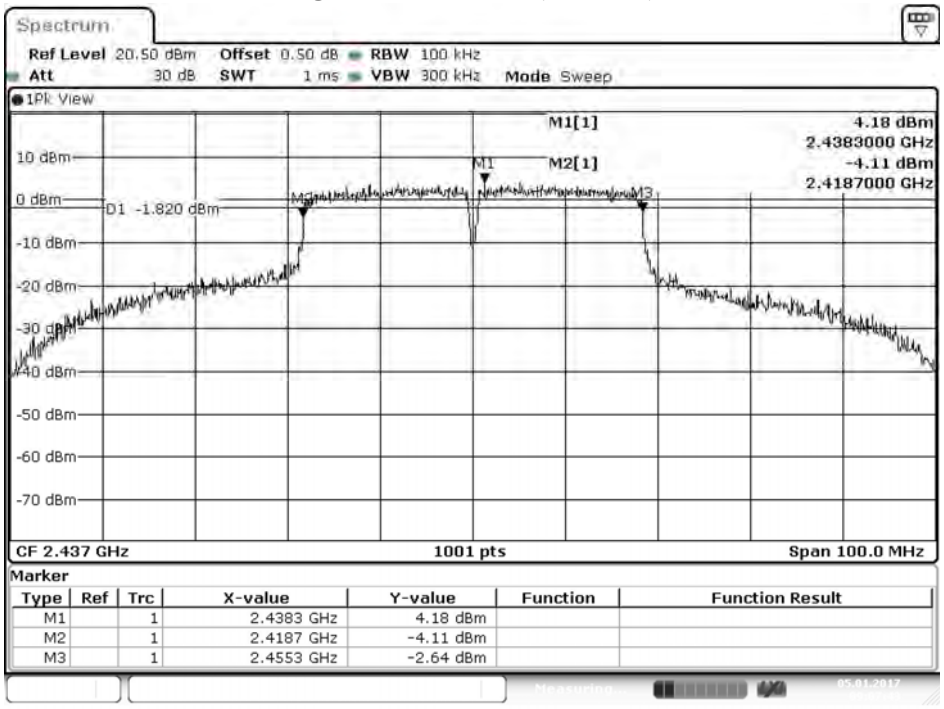
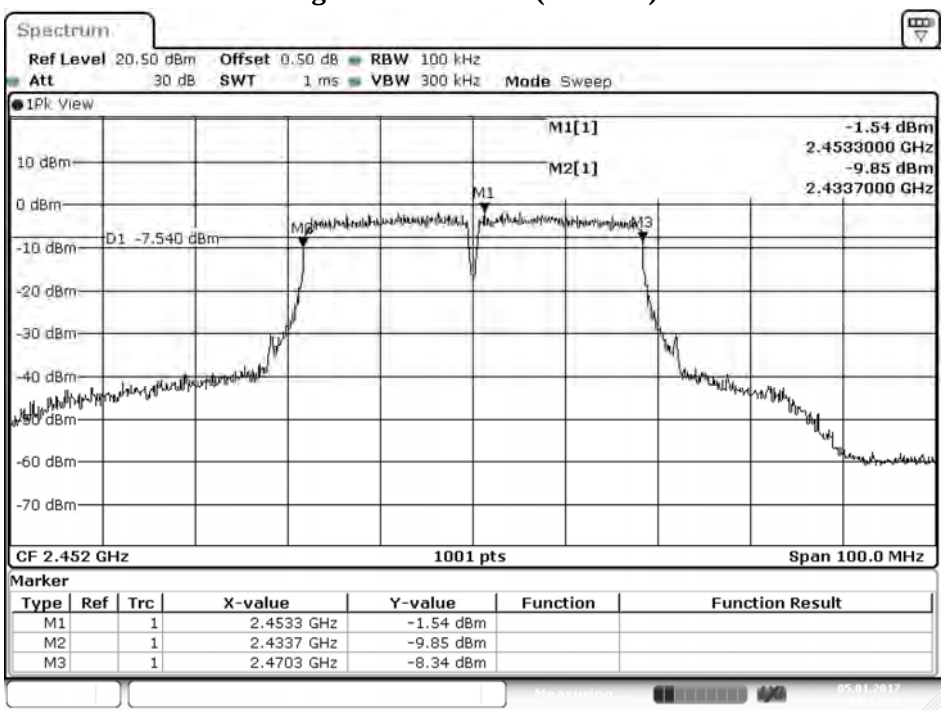


Figure Channel 06: (Chain B)



Date: 5.JAN.2017 09:07:44

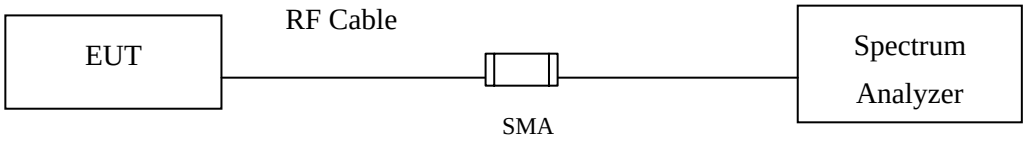
Figure Channel 09: (Chain B)



Date: 5.JAN.2017 09:11:54

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

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.
The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

8.4. Uncertainty

± 1.23 dB

8.5. Test Result of Power Density

Product : LTE Router
Test Item : Power Density Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)
Test Date : 2017/01/05

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	7.560	≦8dBm	Pass
06	2437	6.760	≦8dBm	Pass
11	2462	6.760	≦8dBm	Pass

Figure Channel 01:

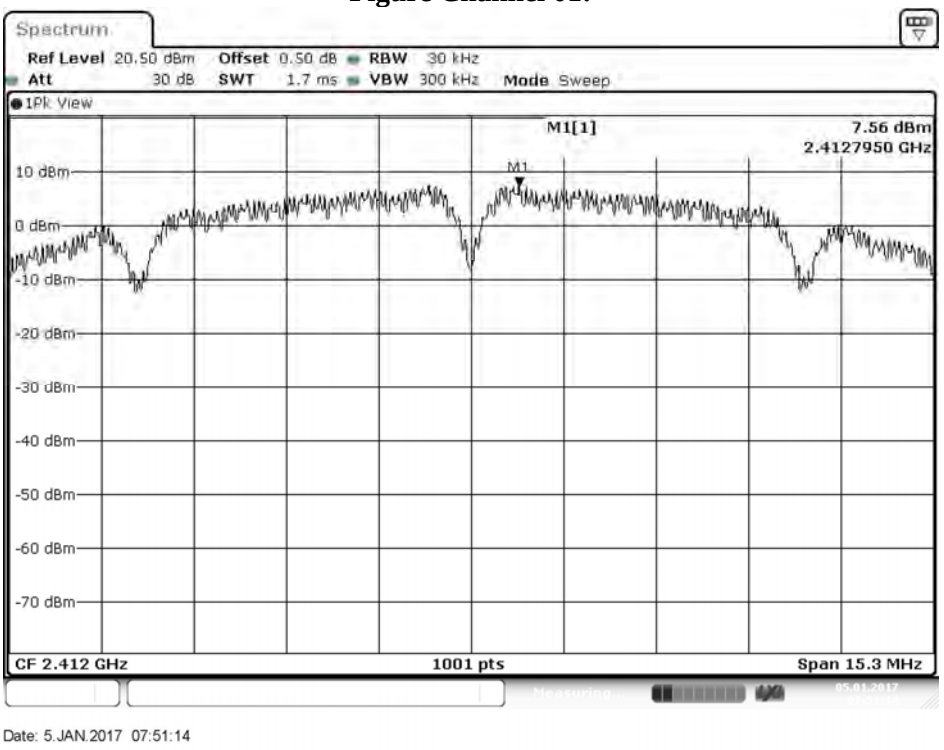
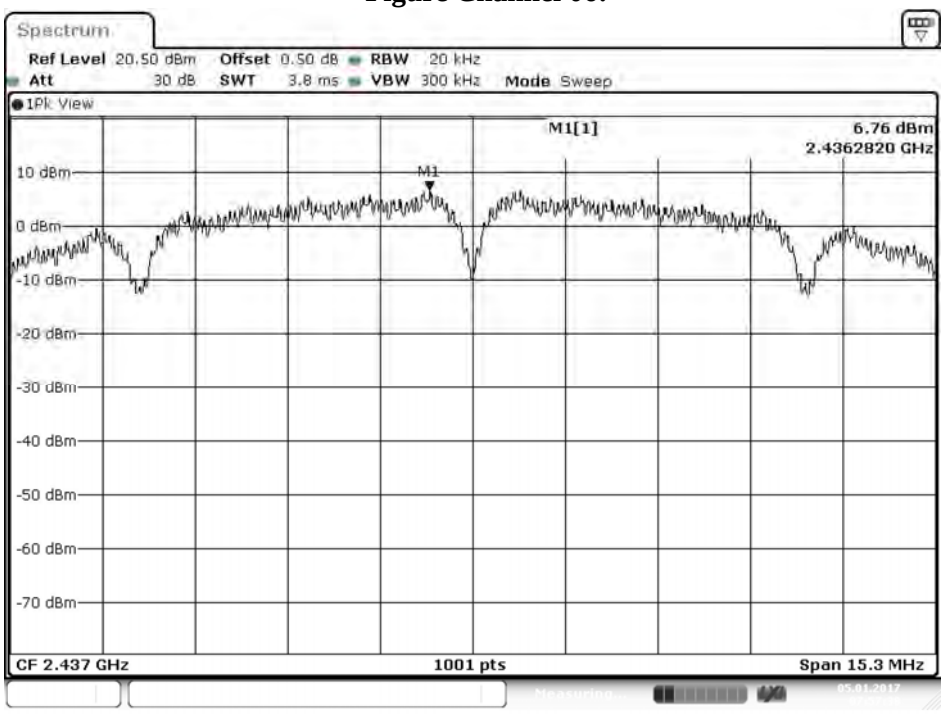
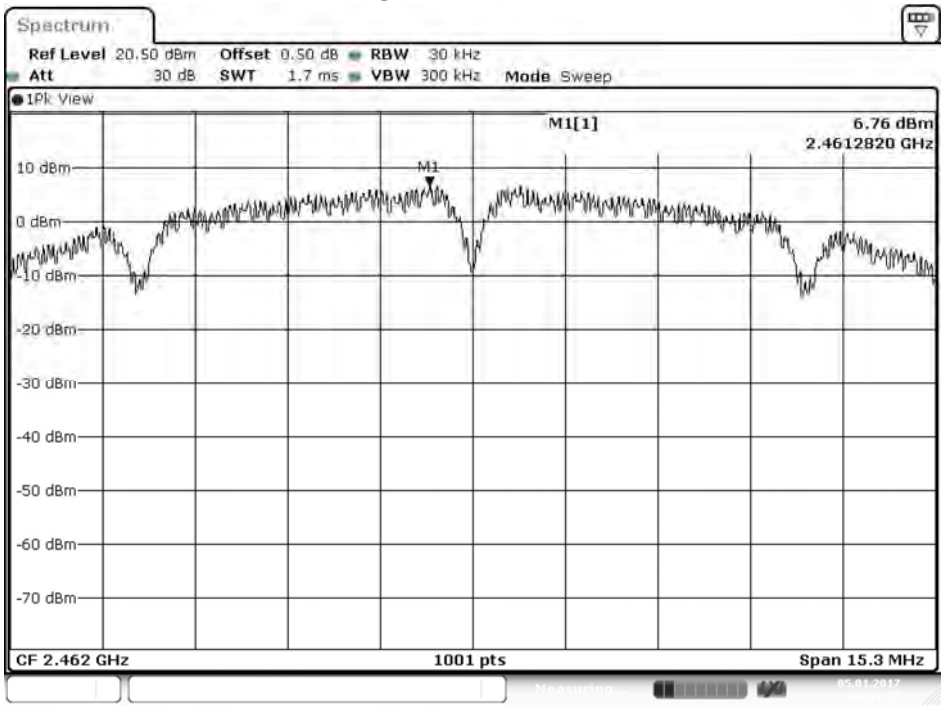


Figure Channel 06:



Date: 5.JAN.2017 07:57:38

Figure Channel 11:



Date: 5.JAN.2017 08:03:33

Product : LTE Router
Test Item : Power Density Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)
Test Date : 2017/01/05

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	4.020	≦8dBm	Pass
06	2437	7.180	≦8dBm	Pass
11	2462	3.850	≦8dBm	Pass

Figure Channel 01:

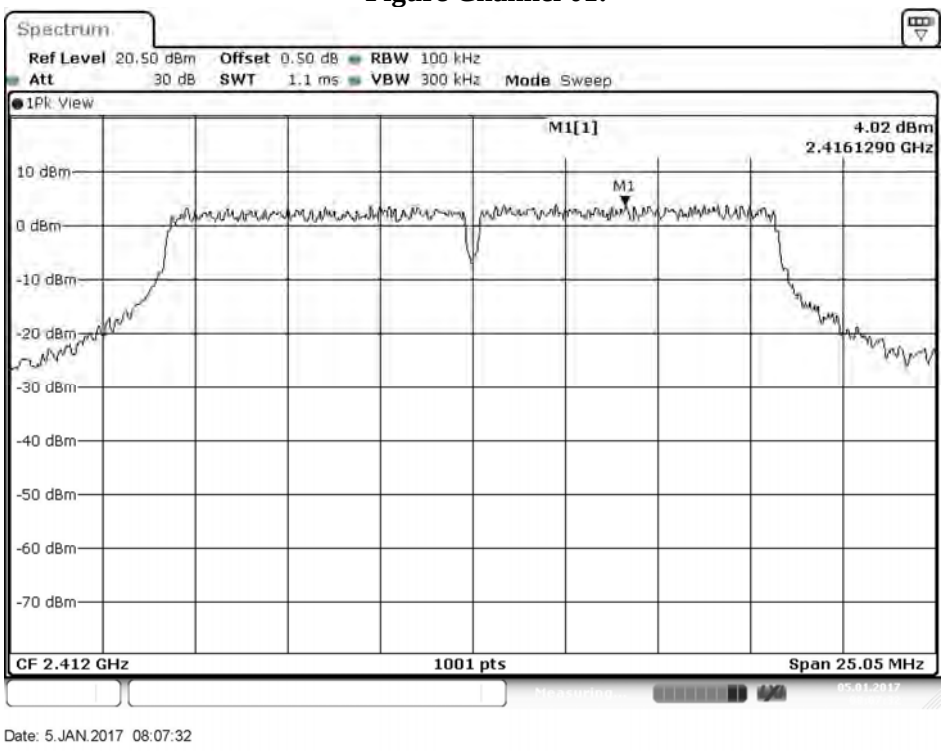
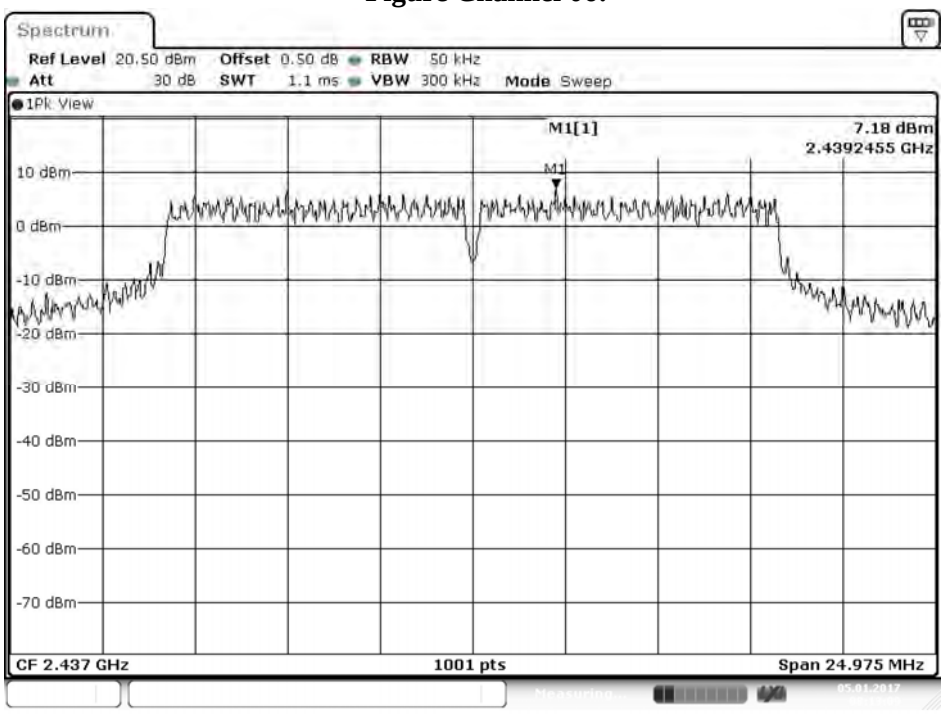
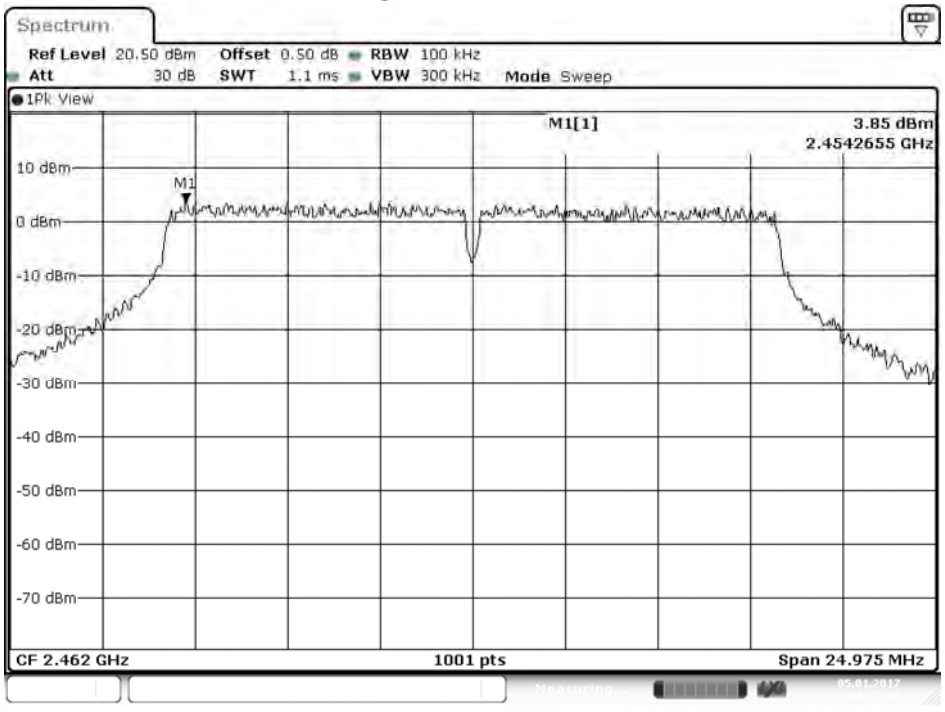


Figure Channel 06:



Date: 5.JAN.2017 08:13:09

Figure Channel 11:



Date: 5.JAN.2017 08:17:49

Product : LTE Router
Test Item : Power Density Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date : 2017/01/05

Channel No.	Frequency (MHz)	Chain	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412.000	A	1.420	4.430	≦8dBm	Pass
		B	-1.530	1.480	≦8dBm	Pass
06	2437.000	A	4.230	7.240	≦8dBm	Pass
		B	4.020	7.030	≦8dBm	Pass
11	2462.000	A	-0.940	2.070	≦8dBm	Pass
		B	0.320	3.330	≦8dBm	Pass

Figure Channel 1: (Chain A)

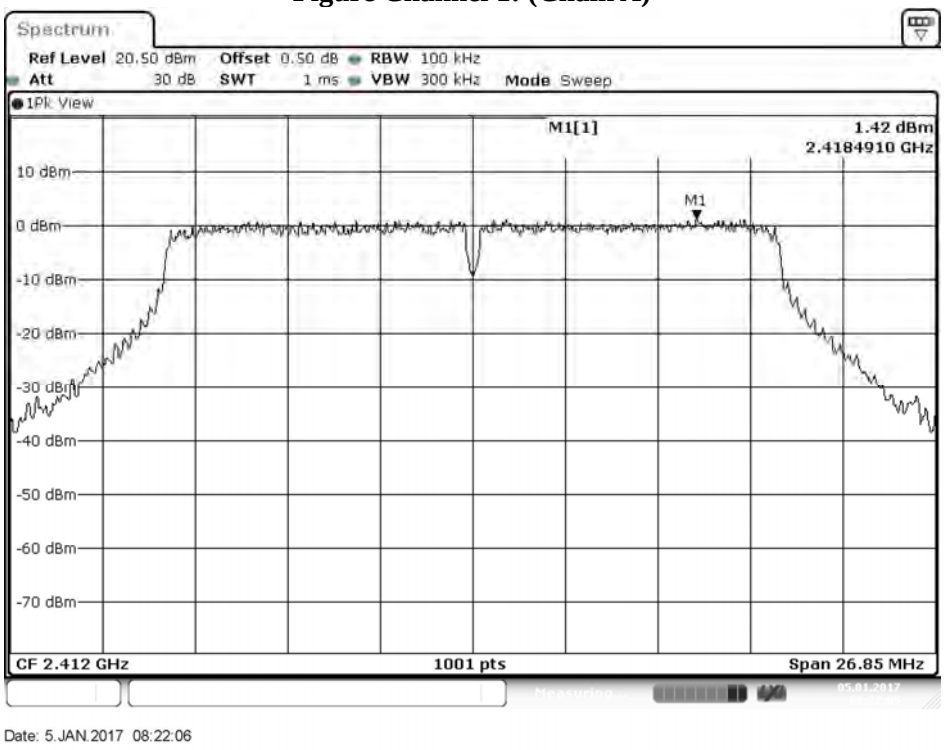


Figure Channel 6: (Chain A)

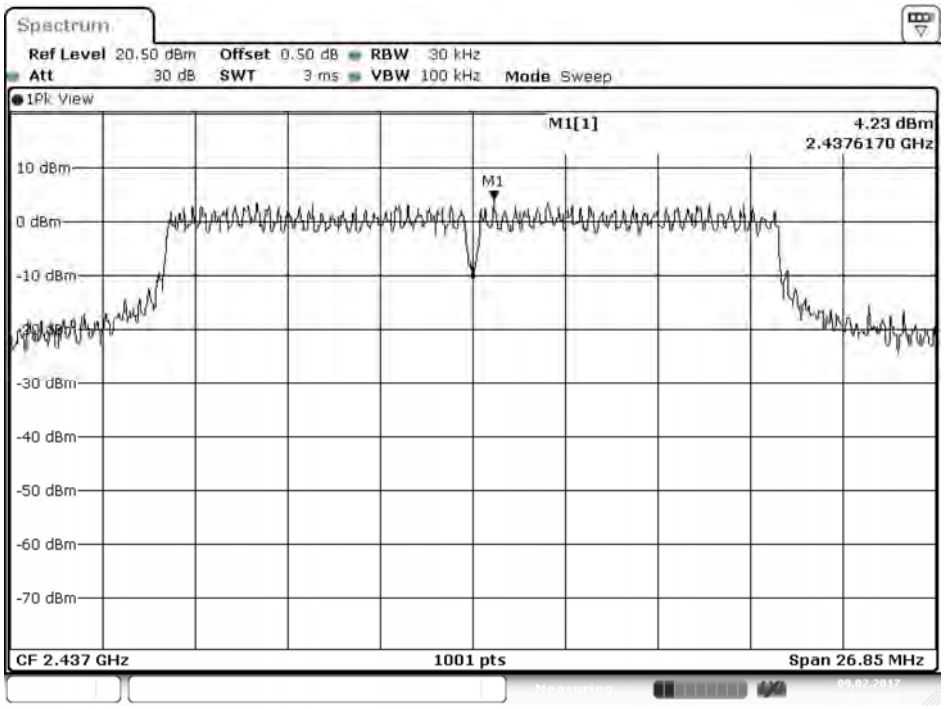


Figure Channel 11: (Chain A)

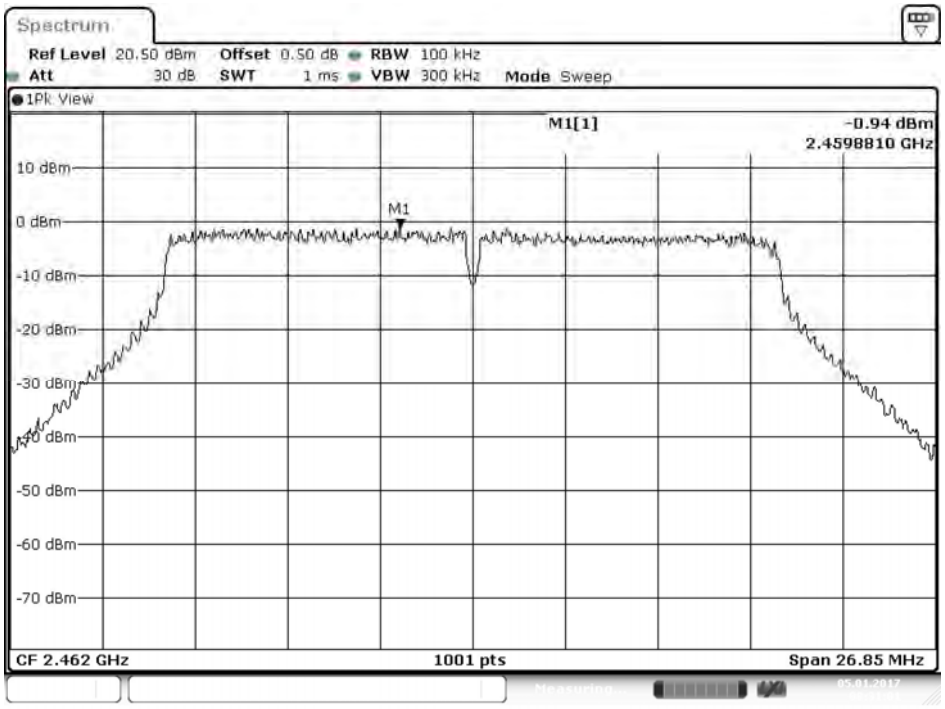
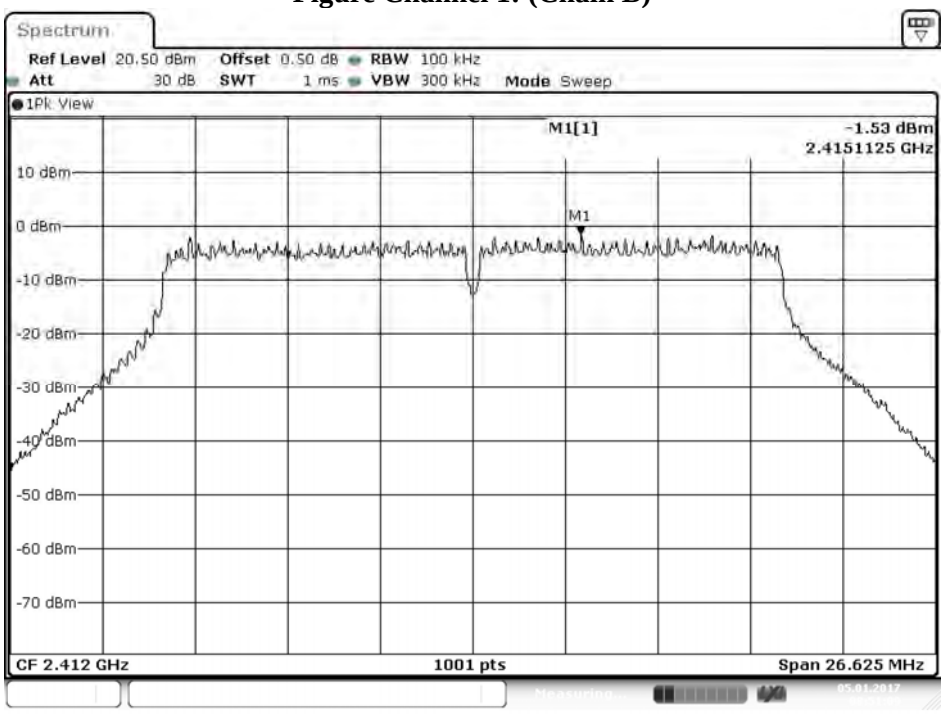
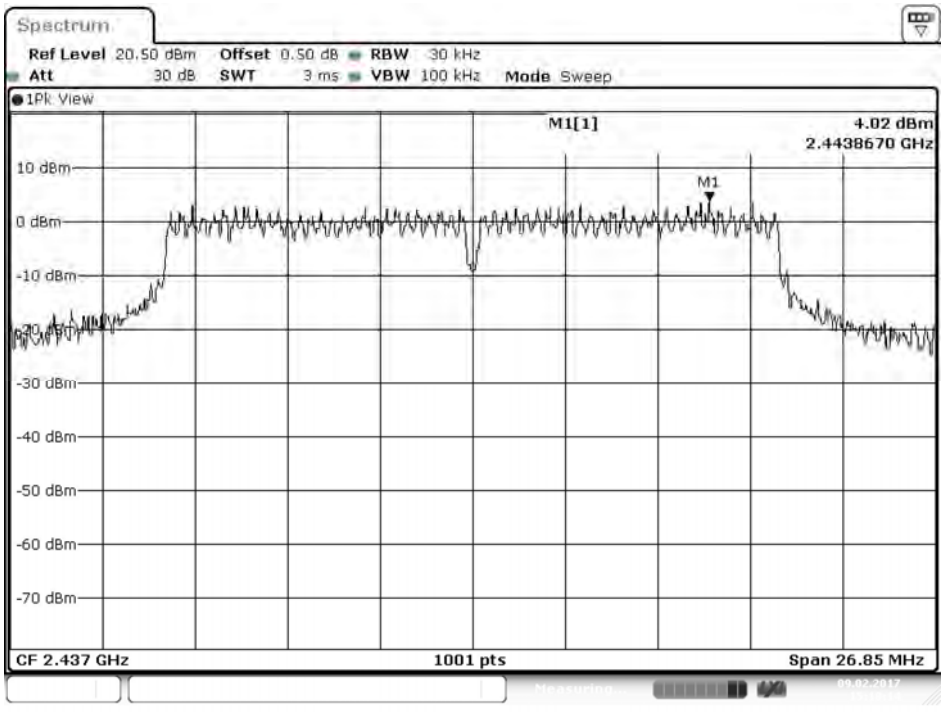


Figure Channel 1: (Chain B)



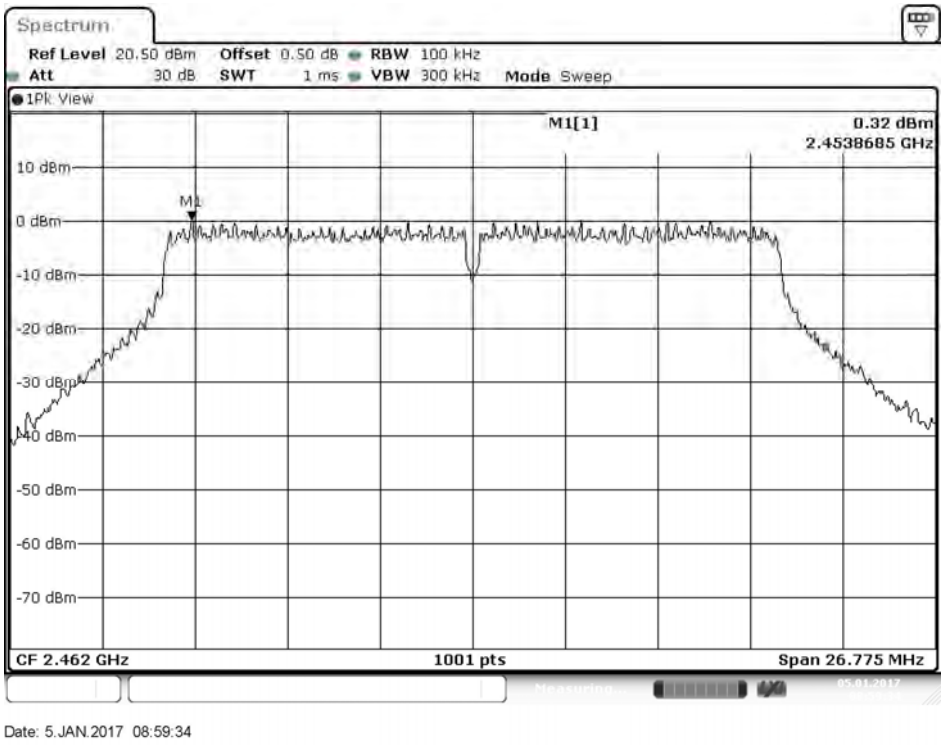
Date: 5.JAN.2017 08:51:10

Figure Channel 6: (Chain B)



Date: 9.FEB.2017 15:18:15

Figure Channel 11: (Chain B)



Product : LTE Router
Test Item : Power Density Data
Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)
Test Date : 2017/01/05

Channel No.	Frequency (MHz)	Chain	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
03	2422.000	A	-1.410	1.600	≦8dBm	Pass
		B	-0.530	2.480	≦8dBm	Pass
06	2437.000	A	3.410	6.420	≦8dBm	Pass
		B	4.080	7.090	≦8dBm	Pass
09	2452.000	A	-2.480	0.530	≦8dBm	Pass
		B	-1.410	1.600	≦8dBm	Pass

Figure Channel 3: (Chain A)

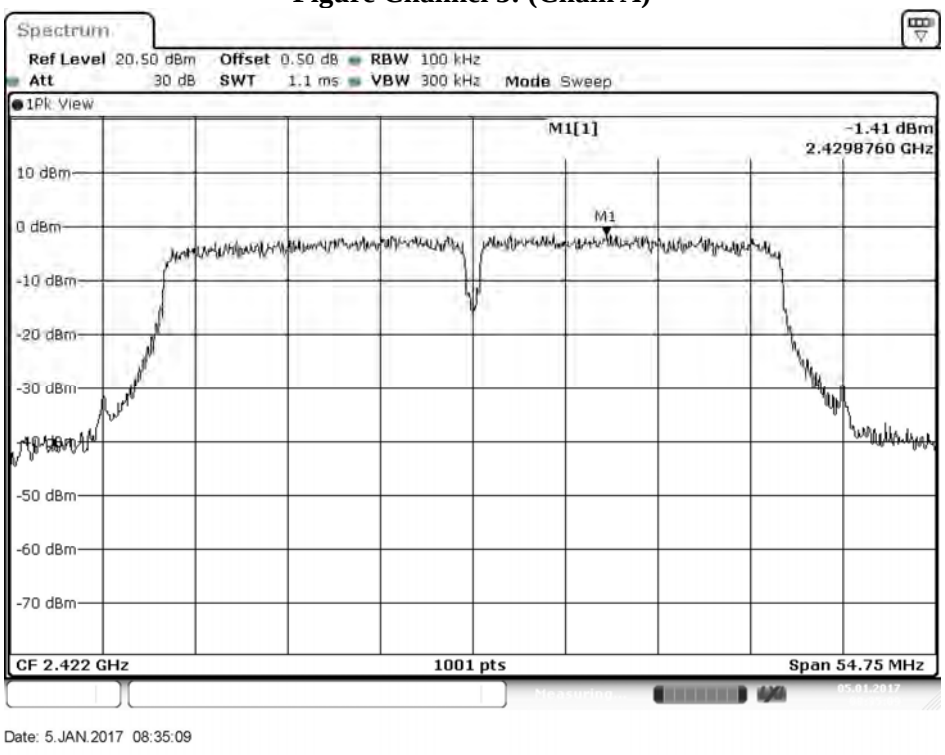
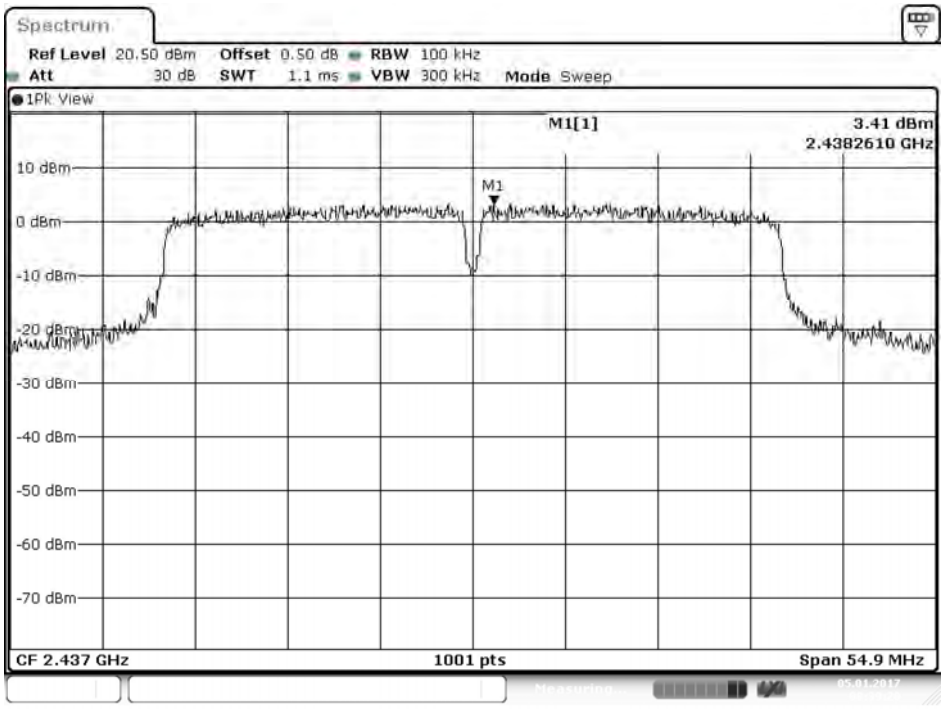
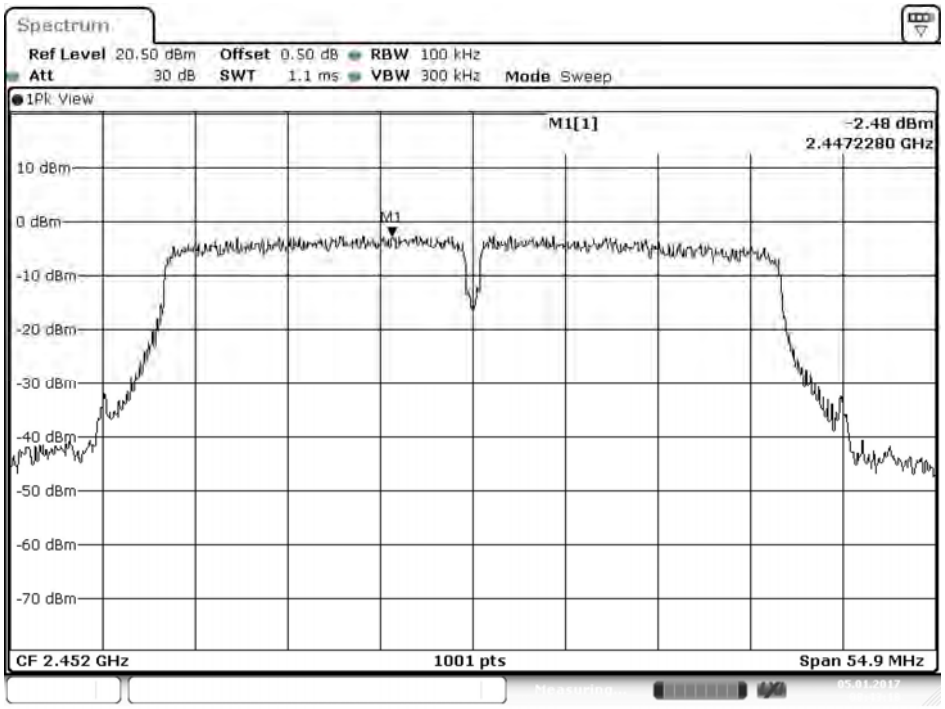


Figure Channel 6: (Chain A)



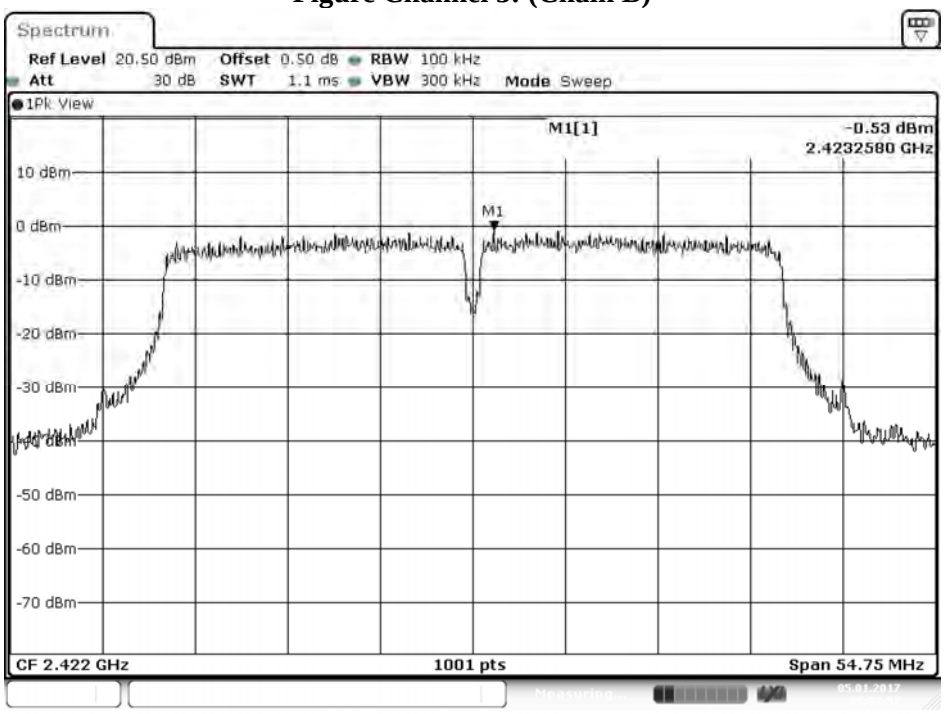
Date: 5.JAN.2017 08:39:21

Figure Channel 9: (Chain A)



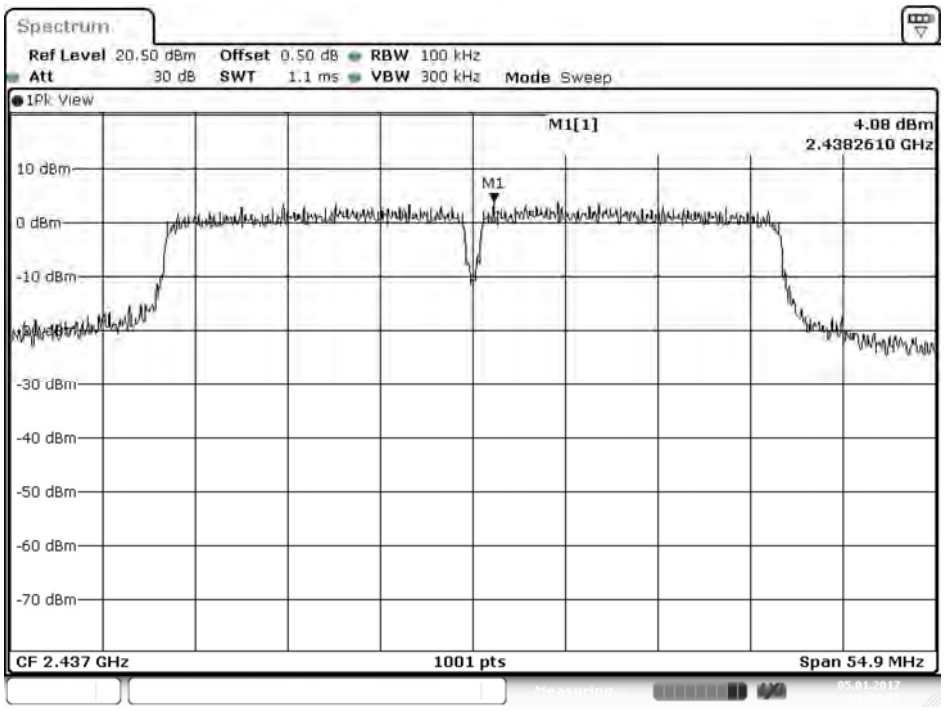
Date: 5.JAN.2017 08:43:18

Figure Channel 3: (Chain B)



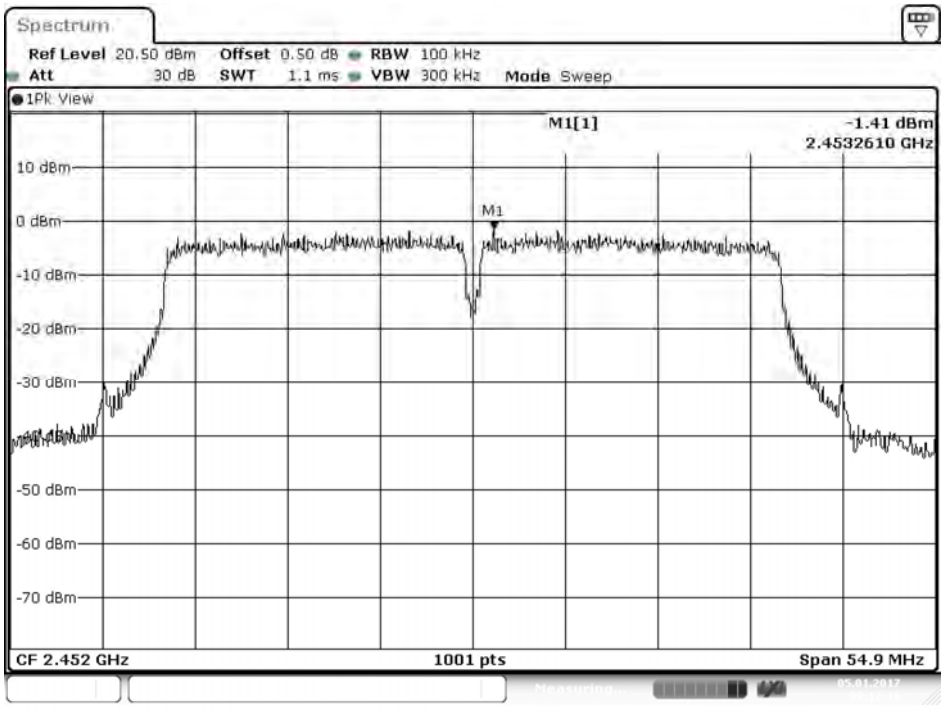
Date: 5.JAN.2017 09:03:57

Figure Channel 6: (Chain B)



Date: 5.JAN.2017 09:08:05

Figure Channel 9: (Chain B)



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.