FCC Test Report

Product Name	802.11b/g/n 1T1R Wireless LAN USB Module
Model No	WN4629R
FCC ID.	PPQ-WN4629R

Applicant	Lite-On Technology Corp.	
Address	4F, 90, Chien 1 Road, Chung Ho, New Taipei City 23	
	Taiwan, R.O.C.	

Date of Receipt	July 11, 2013
Issue Date	Aug. 02, 2013
Report No.	137271R-RFUSP42V01
Report Version	V1.0



The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Aug. 02, 2013 Report No.: 137271R-RFUSP42V01



Product Name	802.11b/g/n 1T1R Wireless LAN USB Module		
Applicant	Lite-On Technology Corp.		
Address	4F, 90, Chien 1 Road, Chung Ho, New Taipei City 235, Taiwan, R.O.C.		
Manufacturer	Lite-On Technology (Changzhou) CO., LTD		
Model No.	WN4629R		
FCC ID.	PPQ-WN4629R		
EUT Rated Voltage	DC 3.3V		
EUT Test Voltage	AC 120V/60Hz		
Trade Name	LITE-ON		
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012		
	ANSI C63.4: 2003, ANSI C63.10: 2009		
Test Result	Complied		

The test results relate only to the samples tested.

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Documented By :

Rita Huang

(Senior Adm. Specialist / Rita Huang)

Tested By

Dan Chen

(Engineer / Alan Chen)

Approved By

(Manager / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	802.11b/g/n 1T1R Wireless LAN USB Module		
Trade Name	LITE-ON		
Model No.	WN4629R		
FCC ID.	PPQ-WN4629R		
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 150Mbps		
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK)		
	802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)		
Antenna Type	PIFA Antenna		
Antenna Gain	Refer to the table "Antenna List"		
Channel Control	Auto		

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	INPAQ	WA-M-LA-00-021	PIFA Antenna	1.96 dBi for 2.4GHz

Note:

1. The antenna of EUT is conform to FCC 15.203.

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		
802.11n-40M	Hz Center Fre	equency of Ead	ch 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		

- 1. The EUT is a 802.11b/g/n 1T1R Wireless LAN USB Module with a built-in 2.4GHz WLAN transceiver.
- 2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps \$\$\sigma\$ 802.11g is 6Mbps \$\$802.11n(20M-BW) is 7.2Mbps and \$\$\$802.11n(40M-BW) is 15Mbps)
- 4. 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.
- 5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

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)

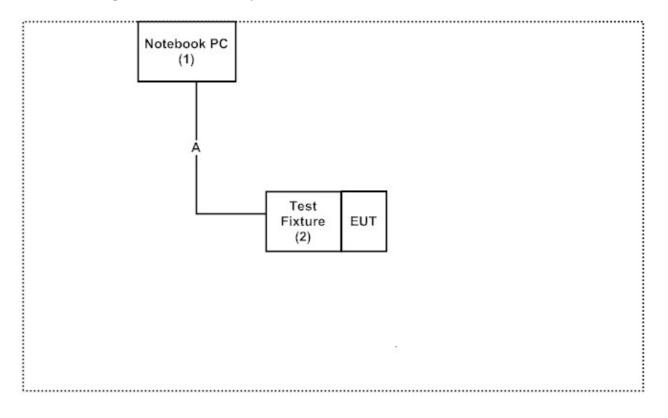
1.3. Tested System Details

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	PPT	N/A	Non-Shielded, 0.8m
2	Test Fixture	LITE-ON	N/A	N/A	N/A

Signa	l Cable Type	Signal cable Description
А	USB Cable	Shielded, 2.0m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute software "QA.exe (v1.0.9.0)" on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

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

The related certificate for our laboratories about the test site and management system can be downloaded from

QuieTek Corporation's Web Site: <u>http://www.quietek.com/tw/ctg/cts/accreditations.htm</u> The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: <u>http://www.quietek.com/</u>

Site Description:	File on
	Federal Communications Commission
	FCC Engineering Laboratory
	7435 Oakland Mills Road
	Columbia, MD 21046
	Registration Number: 92195
Site Name:	Quietek Corporation
Site Address:	No.5-22, Ruishukeng,
	Linkou Dist. New Taipei City 24451,
	Taiwan, R.O.C.
	TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
	E-Mail : <u>service@quietek.com</u>

FCC Accreditation Number: TW1014

2. Conducted Emission

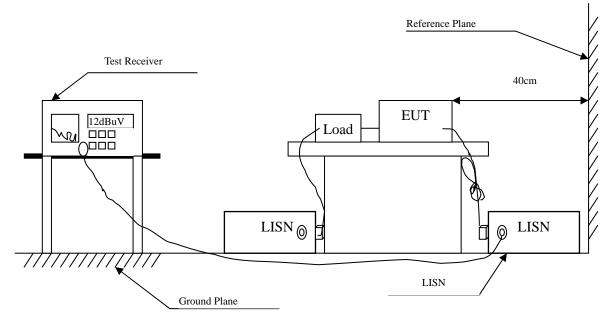
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
Х	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2012	
Х	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2013	Peripherals
Х	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2013	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2013	EUT
Х	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2013	
	No.1 Shielded Room				

Note:

- 1. All equipments are calibrated every one year.
- 2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



2.3. Limits

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

2.4. 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 C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.181	9.724	40.960	50.684	-14.430	65.114
0.240	9.680	35.010	44.690	-18.739	63.429
0.302	9.650	28.510	38.160	-23.497	61.657
0.361	9.650	22.000	31.650	-28.321	59.971
1.880	9.680	19.230	28.910	-27.090	56.000
3.888	9.700	22.940	32.640	-23.360	56.000
Average					
0.181	9.724	31.760	41.484	-13.630	55.114
0.240	9.680	27.740	37.420	-16.009	53.429
0.302	9.650	10.270	19.920	-31.737	51.657
0.361	9.650	15.190	24.840	-25.131	49.971
1.880	9.680	16.240	25.920	-20.080	46.000
3.888	9.700	17.180	26.880	-19.120	46.000

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	: 802.11b/g/n 1T1R Wireless LAN USB Module									
Test Item	: Conducted	l Emission Test								
Power Line	: Line 2									
Test Mode	: Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)									
Frequency	Correct	Reading	Measurement	Margin	Limit					
	Factor	Level	Level							
MHz	dB	dBuV	dBuV	dB	dBuV					
Line 2										
Quasi-Peak										
0.181	9.732	40.920	50.652	-14.462	65.114					
0.244	9.689	35.340	45.029	-18.285	63.314					
0.298	9.660	24.020	33.680	-28.091	61.771					
0.353	9.655	10.950	20.605	-39.595	60.200					
3.822	9.700	26.010	35.710	-20.290	56.000					
15.466	10.000	8.840	18.840	-41.160	60.000					
Average										
0.181	9.732	32.030	41.762	-13.352	55.114					
0.244	9.689	26.810	36.499	-16.815	53.314					
0.298	9.660	19.500	29.160	-22.611	51.771					
0.353	9.655	3.310	12.965	-37.235	50.200					
3.822	9.700	19.630	29.330	-16.670	46.000					
15.466	10.000	3.060	13.060	-36.940	50.000					

-

- 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 Equipment

_	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
Х	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2013
Note:				
1.	All equipments are national or internati		eable calibrations. Each calibra	ation is traceable to the

2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was 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 9.1.3 PKPM1 Peak power meter method.

3.5. Uncertainty

 \pm 1.27 dB

3.6. Test Result of Peak Power Output

Product	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channel Ma	Frequency	For d	Ũ	e Power ata Rate (N	Abps)	Peak Power	Required	Decult
Channel No (MHz)		1	2	5.5	11	1	Limit	Result
			Measur	ement Lev	vel (dBm)			
01	2412	14.68				18.88	<30dBm	Pass
06	2437	16.48	16.42	16.39	16.22	19.78	<30dBm	Pass
11	2462	17.35				21.08	<30dBm	Pass

Product	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

	Fraguanay		Average PowerPeakFor different Data Rate (Mbps)Power									
Channel No	Frequency (MHz)	6	9	12	18	24	36	48	54	6	Required Limit	Result
	Measurement Level (dBm)											
01	2412	16.63								26.07	<30dBm	Pass
06	2437	16.48	16.41	16.38	16.32	16.27	16.22	16.17	16.12	25.88	<30dBm	Pass
11	2462	14.89								25.21	<30dBm	Pass

:	802.11b/g/n 1T1R Wireless LAN USB Module
:	Peak Power Output Data
:	No.3 OATS
:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
	:

	Engeneration		F			e Power ata Rate		5)		Peak Power	Descripted	
Channel No	Frequency (MHz)	7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2	Required Limit	Result
			Measurement Level (dBm)									
01	2412	15.58							-	25.46	<30dBm	Pass
06	2437	15.51	15.48	15.44	15.41	15.37	15.31	15.28	15.14	25.53	<30dBm	Pass
11	2462	13.52								23.89	<30dBm	Pass

Product	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

	Frequency	Average PowerPeakFor different Data Rate (Mbps)Power							Required			
Channel No	(MHz)	15	30	45	60	90	120	135	150	15	Limit	Result
	Measurement Level (dBm)											
03	2422	13.05								24.89	<30dBm	Pass
06	2437	13.23	13.19	12.17	12.14	12.11	12.07	12.98	12.88	24.80	<30dBm	Pass
09	2452	14.23								24.95	<30dBm	Pass

4. Radiated Emission

4.1. Test Equipment

The following test equipment are used during the radiated emission test:

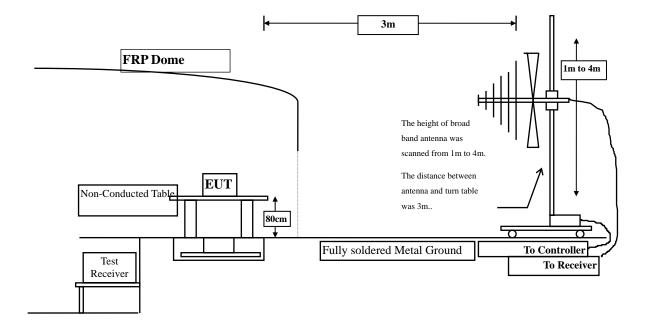
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	Х	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2012
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2012
	Х	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	Х	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2012
	Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	Х	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2012
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

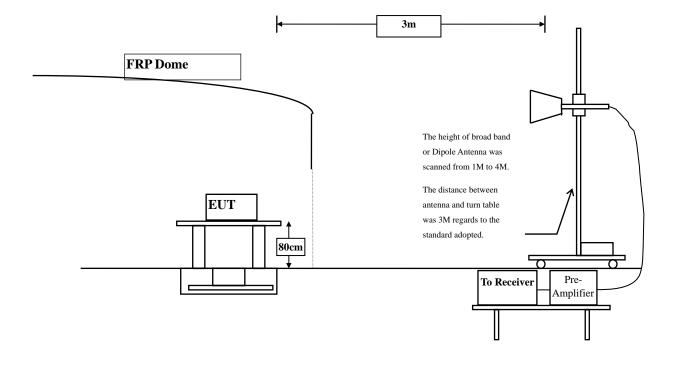
2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. 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	Measurement distance							
	(microvolts/meter)	(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 $(dBuV/m) = 20 \log E$ field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 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 0.8 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: 2009 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 worst radiated emission is measured in the Open Area Test Site on the Final Measurement. The frequency range from 9kHz to 10th harmonics is checked.

4.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	48.000	51.261	-22.739	74.000
7236.000	10.650	37.260	47.910	-26.090	74.000
9648.000	13.337	37.290	50.626	-23.374	74.000
Average Detector: 					
Vertical					
Peak Detector:					
4824.000	6.421	54.760	61.181	-12.819	74.000
7236.000	11.495	38.150	49.645	-24.355	74.000
9648.000	13.807	37.590	51.396	-22.604	74.000
Average Detector:					
4824.000	6.421	47.100	53.521	-0.479	54.000

- 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	: 802.11b/g/n 1T1R Wireless LAN USB Module									
Test Item	: Harmonic Radiated Emission Data									
Test Site	: No.3 OATS									
Test Mode	: Mode 1:	: Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)								
Frequency	Correct	Reading	Measurement	Margin	Limit					
	Factor	Level	Level							
MHz	dB	dBuV	dBuV/m	dB	dBuV/m					
Horizontal										
Peak Detector:										
4874.000	3.038	48.290	51.327	-22.673	74.000					
7311.000	11.795	37.590	49.384	-24.616	74.000					
9748.000	12.635	37.590	50.225	-23.775	74.000					
Arrent Data dari										
Average Detector:										
Vertical										
Peak Detector:										
4874.000	5.812	50.920	56.731	-17.269	74.000					
7311.000	12.630	36.180	48.809	-25.191	74.000					
9748.000	13.126	38.290	51.416	-22.584	74.000					
Average Detector:										
4874.000	5.812	46.670	52.481	-1.519	54.000					

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module Harmonic Radiated Emission Data No.3 OATS Mode 1: Transmit (802.11b 1Mbps) (2462 MHz) 								
Frequency	Correct	Reading	Measurement	Margin	Limit				
	Factor	Level	Level						
MHz	dB	dBuV	dBuV/m	dB	dBuV/m				
Horizontal									
Peak Detector:									
4924.000	2.858	49.030	51.887	-22.113	74.000				
7386.000	13.254	37.590	50.844	-23.156	74.000				
9848.000	13.367	37.530	50.897	-23.103	74.000				
Average Detector:									
Vertical									
Peak Detector:									
4924.000	5.521	49.870	55.390	-18.610	74.000				
7386.000	13.254	37.480	50.734	-23.266	74.000				
9848.000	13.367	37.290	50.657	-23.343	74.000				
Average Detector: 4924.000	5.521	46.750	52.270	-1.730	54.000				

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module Harmonic Radiated Emission Data No.3 OATS Mode 2: Transmit (802.11g 6Mbps) (2412MHz) 								
Frequency	Correct	Reading	Measurement	Margin	Limit				
	Factor	Level	Level						
MHz	dB	dBuV	dBuV/m	dB	dBuV/m				
Horizontal									
Peak Detector:									
4824.000	3.261	49.460	52.721	-21.279	74.000				
7236.000	11.495	38.950	50.445	-23.555	74.000				
9648.000	13.807	37.590	51.396	-22.604	74.000				
Average Detector:									
Vertical									
Peak Detector:									
4824.000	6.421	52.060	58.481	-15.519	74.000				
7236.000	11.495	38.590	50.085	-23.915	74.000				
9648.000	13.807	37.260	51.066	-22.934	74.000				
Average Detector: 4824.000	6.421	36.690	43.111	-10.889	54.000				

- 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	: 802.11b/g/n 1T1R Wireless LAN USB Module							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector:								
4874.000	3.038	47.250	50.287	-23.713	74.000			
7311.000	11.795	38.450	50.244	-23.756	74.000			
9748.000	12.635	38.150	50.785	-23.215	74.000			
Average Detector:								
Peak Detector:								
4874.000	5.812	49.750	55.561	-18.439	74.000			
7311.000	12.630	37.150	49.779	-24.221	74.000			
9748.000	13.126	38.260	51.386	-22.614	74.000			
Average Detector:								
4874.000	5.812	35.290	41.101	-12.899	54.000			

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module Harmonic Radiated Emission Data No.3 OATS Mode 2: Transmit (802.11g 6Mbps) (2462 MHz) 						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4924.000	2.858	45.070	47.927	-26.073	74.000		
7386.000	13.254	36.590	49.844	-24.156	74.000		
9848.000	13.367	37.180	50.547	-23.453	74.000		
Average Detector:							
Vertical							
Peak Detector:							
4924.000	5.521	47.580	53.100	-20.900	74.000		
7386.000	13.254	37.550	50.804	-23.196	74.000		
9848.000	13.367	38.140	51.507	-22.493	74.000		

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- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module Harmonic Radiated Emission Data No.3 OATS Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz) 						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level	-			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4824.000	3.261	49.390	52.651	-21.349	74.000		
7236.000	10.650	39.480	50.130	-23.870	74.000		
9648.000	13.337	37.180	50.516	-23.484	74.000		
Average Detector:							
Vertical							
Peak Detector:							
4824.000	6.421	52.800	59.221	-14.779	74.000		
7236.000	11.495	37.540	49.035	-24.965	74.000		
9648.000	13.807	37.150	50.956	-23.044	74.000		
Average Detector: 4824.000	6.421	36.720	43.141	-10.859	54.000		
102 1,000	0.121	50.720	12,171	10.007	21.000		

- 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	:	802.11b/g/n 1T1R Wireless LAN USB Module							
Test Item	:	Harmonic Radiated	d Emission Data						
Test Site	:	No.3 OATS							
Test Mode	:	Mode 3: Transmit	(802.11n MCS0 7	7.2Mbps 20M-BW) (2	2437 MHz)				
Frequence	су	Correct	Reading	Measurement	Margin	Limit			
		Factor	Level	Level					
MHz		dB	dBuV	dBuV/m	dB	dBuV/m			
Horizont	tal								
Peak Detec	ctor:								
4874.00	0	3.038	47.330	50.367	-23.633	74.000			
7311.00	0	11.795	37.150	48.944	-25.056	74.000			
9748.00	0	12.635	37.480	50.115	-23.885	74.000			
Average Det	ecto	r:							
Vertica	l								
Peak Detec	ctor:								
4874.00	0	5.812	49.740	55.551	-18.449	74.000			
7311.00	0	12.630	36.940	49.569	-24.431	74.000			
9748.00	0	13.126	38.150	51.276	-22.724	74.000			
Average Det	Average Detector:								
4874.00		5.812	37.020	42.831	-11.169	54.000			

- 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	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	46.150	49.007	-24.993	74.000
7386.000	12.127	36.150	48.278	-25.722	74.000
9848.000	12.852	37.150	50.003	-23.997	74.000
Average Detector:					
Vertical					
Peak Detector:					
4924.000	5.521	47.290	52.810	-21.190	74.000
7386.000	13.254	36.490	49.744	-24.256	74.000
9848.000	13.367	37.590	50.957	-23.043	74.000

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- 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	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2422MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4844.000	3.171	45.180	48.351	-25.649	74.000
7266.000	11.162	37.150	48.312	-25.688	74.000
9688.000	12.964	37.180	50.145	-23.855	74.000
Average Detector:					
Vertical					
Peak Detector:					
4844.000	6.178	47.410	53.588	-20.412	74.000
7266.000	11.982	37.180	49.162	-24.838	74.000
9688.000	13.507	37.040	50.548	-23.452	74.000

- 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	: 802.11b/g/n 1T1R Wireless LAN USB Module							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437 MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector:								
4874.000	3.038	44.590	47.627	-26.373	74.000			
7311.000	11.795	36.150	47.944	-26.056	74.000			
9748.000	12.635	37.150	49.785	-24.215	74.000			
Average Detector:								
 Vertical								
Peak Detector:								
4874.000	5.812	46.590	52.401	-21.599	74.000			
7311.000	12.630	36.480	49.109	-24.891	74.000			
9748.000	13.126	37.580	50.706	-23.294	74.000			

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module Harmonic Radiated Emission Data No.3 OATS Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2452 MHz) 						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4904.000	2.914	45.140	48.055	-25.945	74.000		
7356.000	11.995	36.450	48.444	-25.556	74.000		
9808.000	12.475	37.040	49.515	-24.485	74.000		
Average Detector:							
Vertical							
Peak Detector:							
4904.000	5.530	46.080	51.611	-22.389	74.000		
7356.000	13.005	36.180	49.184	-24.816	74.000		
9808.000	12.901	37.480	50.381	-23.619	74.000		

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module General Radiated Emission Data No.3 OATS Mode 1: Transmit (802.11b 1Mbps)(2437 MHz) 					
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level	-		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
119.240	-7.291	46.607	39.317	-4.183	43.500	
274.440	-6.417	44.843	38.426	-7.574	46.000	
383.080	1.305	38.963	40.268	-5.732	46.000	
493.660	1.474	37.397	38.872	-7.128	46.000	
714.820	3.801	32.791	36.592	-9.408	46.000	
935.980	6.760	30.006	36.766	-9.234	46.000	
Vertical						
163.860	-4.819	44.843	40.024	-3.476	43.500	
383.080	0.195	38.963	39.158	-6.842	46.000	
495.600	-1.237	38.309	37.072	-8.928	46.000	
687.660	2.292	30.571	32.863	-13.137	46.000	
899.120	1.647	31.393	33.040	-12.960	46.000	
970.900	2.967	30.825	33.792	-20.208	54.000	

- 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 Test Item Test Site	 802.11b/g/n 1T1R Wireless LAN USB Module General Radiated Emission Data No.3 OATS 					
	Test Mode			g 6Mbps)(2437 MHz	2)		
	Frequency	Correct	Reading	Measurement	Margin	Limit	
		Factor	Level	Level			
-	MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
	Horizontal						
	55.220	-11.767	42.434	30.667	-9.333	40.000	
	163.860	-9.989	45.643	35.654	-7.846	43.500	
	303.540	-4.068	38.817	34.749	-11.251	46.000	
	495.600	1.463	38.309	39.772	-6.228	46.000	
	608.120	3.925	35.484	39.409	-6.591	46.000	
	825.400	7.346	29.046	36.392	-9.608	46.000	
	961.200	6.810	32.571	39.381	-14.619	54.000	
	Vertical						
	142.520	-5.547	36.326	30.779	-12.721	43.500	
	348.160	-0.890	36.203	35.313	-10.687	46.000	
	509.180	0.804	31.051	31.855	-14.145	46.000	
	615.880	1.473	31.281	32.754	-13.246	46.000	
	765.260	1.921	31.280	33.201	-12.799	46.000	
	899.120	1.647	31.393	33.040	-12.960	46.000	

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module General Radiated Emission Data No.3 OATS Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz) 					
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
99.840	-9.873	44.906	35.033	-8.467	43.500	
270.560	-5.638	42.173	36.535	-9.465	46.000	
480.080	1.870	36.341	38.211	-7.789	46.000	
660.500	1.889	31.005	32.894	-13.106	46.000	
788.540	6.144	26.851	32.995	-13.005	46.000	
935.980	6.760	30.006	36.766	-9.234	46.000	
Vertical						
132.820	-3.932	36.392	32.460	-11.040	43.500	
299.660	-4.061	40.071	36.010	-9.990	46.000	
480.080	-3.390	36.341	32.951	-13.049	46.000	
670.200	-0.898	38.719	37.821	-8.179	46.000	
809.880	3.026	28.155	31.181	-14.819	46.000	
935.980	2.820	30.006	32.826	-13.174	46.000	

- 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 Test Item Test Site Test Mode	 802.11b/g/n 1T1R Wireless LAN USB Module General Radiated Emission Data No.3 OATS Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2437 MHz) 									
Frequency	Correct	Reading	Measurement	Margin	Limit					
	Factor	Level	Level							
MHz	dB	dBuV	dBuV/m	dB	dBuV/m					
Horizontal										
95.960	-10.326	46.400	36.074	-7.426	43.500					
266.680	-5.510	41.684	36.174	-9.826	46.000					
439.340	0.749	34.467	35.216	-10.784	46.000					
608.120	3.925	35.484	39.409	-6.591	46.000					
802.120	6.356	28.150	34.506	-11.494	46.000					
951.500	6.993	27.851	34.844	-11.156	46.000					
Vertical										
165.800	-4.665	38.551	33.886	-9.614	43.500					
303.540	-3.998	38.817	34.819	-11.181	46.000					
493.660	-1.656	37.397	35.742	-10.258	46.000					
687.660	2.292	30.571	32.863	-13.137	46.000					
825.400	3.016	29.046	32.062	-13.938	46.000					
953.440	3.015	30.669	33.684	-12.316	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 Equipment

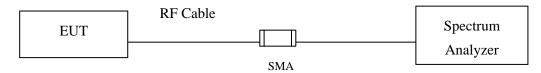
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A/MY48030495	Apr., 2013

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. 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)).

5.4. 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.

5.5. Uncertainty

The measurement uncertainty Conducted is defined as ± 1.27 dB

5.6. Test Result of RF antenna conducted test

Product	:	802.11b/g/n 1T1R Wireless LAN USB Module
Test Item	:	RF antenna conducted test
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

Channel 01 (2412MHz)

RL	RF 50 Ω	AC		SEI	VSE:INT		ALIGN AUTO		PM Jul 29, 2013	-
enter Fre	q 515.000(PNC): Fast 😱 in:Low	Trig: Free #Atten: 30		Avg Typ	e: Log-Pwr	TYP	E 1 2 3 4 5 6 E M WWWWW T P N N N N N	Frequency
0 dB/div I	Ref 20.00 dl	Mkr1 807.9 dBm -56.6					89 MHz 69 dBm	Auto Tur		
og 10.0 0.00 10.0									-16,35 dBm	Center Fre 515.000000 Mi
0.0 0.0 0.0								.1		Start Fr 30.000000 M
0.0 0.0 0.0	Lety menoment into a climit in		Pering Learning and Learning Pering	ang pangang ang pangang pangang pangang pang	t para ang panta kan pila (big tap k	No heart her or he had to be do				Stop Fr 1.000000000 G
art 30.0 N Res BW 10	00 kHz		#VBW	300 kHz				3.3 ms (4	0000 GHz 0001 pts)	CF Sto 97.000000 M
10de trc N <mark>1</mark>	f	× 807.989	MHz	-56.69 di		NCTION FU	NCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Ma
2 3 4 5 6										Freq Offs 0 F
7 8 9 0										
11 1										

Frequency	M Jul 29, 2013		ALIGN AUTO		BE:INT	SEM			RF 50		RL
	E 1 2 3 4 5 6 E M WWWWW T P N N N N N	TYP	e: Log-Pwr	Avg T	Run dB	Trig: Free #Atten: 30	lz NO: Fast 😱 Gain:Low		3.000	er Fre	ent
Auto Tu	Mkr1 2.411 0 GHz dBm 3.51 dBm									div	0 dB/
Center Fr							1				10.0
3.000000000 G								-			0.00
	-16.35 dBm										10.0
Start Fr											20.0
1.000000000 G											30.0 40.0
											50.0
Stop Fr	- ter bil sente ter st	and the state of the state of the			lander lander	Warmer Land	and the second	The second s			60.0
5.00000000 G		a and a state of the second	a contract life of the second	d (manusika _t a	and the first particular states	Contrast (1)		ing a second second second second	Contractor of the State of the	NUMBER OF STREET	70.0
CF St	.000 GHz									1.000	
400.000000 M		<u>.</u>	Sweep 3			300 kHz	#VBW			BW 1	
Auto M	N VALUE	FUNCTIO	UNCTION WIDTH	TION		¥ 3.51 dE	0 GHz	× 2.411		IDE TRC	1 1
Freq Offs								57 M (Barlor 7)			2 3
											4
											6 7
										_	8 9
					_				-		10
											1

RL RF 50	JΩ AC	SENSE:INT	ALIGN AUTO	08:57:46 PM Jul 29, 2013	F		
enter Freq 7.000	PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency		
0 dB/div Ref 20.0		Mkr1 7.940 5 GHz					
					Center Fr 7.000000000 G		
0.0				-16.35 dBm	Start Fr 5.00000000 G		
0.0 0.0 <u>400 (0.000)</u> 0.0	ی این این این این این این این این این ای	n maa ka sa ka			Stop Fr 9.000000000 0		
art 5.000 GHz Res BW 100 kHz		SW 300 kHz		Stop 9.000 GHz 84 ms (40001 pts)	CF St 400.000000 M		
KR MODE TRC SCL 1 N 1 f 2	× 7.940 5 GHz	-56.04 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> N		
3 4 5 6					Freq Off 0		
7							
2							



Frequency	M Jul 29, 2013		ALIGN AUTO		VSE:INT	SEN			RF 50	
.26 Bi	E 1 2 3 4 5 6 E MWWWWW T P N N N N N	TYP	: Log-Pwr	Avg Typ		Trig: Free #Atten: 30	SHZ NO: Fast G Gain:Low	000000 G PI IFC	11.000	er Fre
Auto Tu	Mkr1 9.538 1 GHz dBm -53.37 dBm								ef 20.00	div l
Center Fr					-					
11.00000000 G					1					
	-16.35 dBm									
Start Fr 9.000000000 G										
Stop Fr	a marca a la la la marca da s	and all and and and and and	ا معالم محمد المعالي	not be control of	designed and an and address					221 -
13.00000000 G										
CF St 400.000000 M	.000 GHz 0001 pts)		Sweep 3			300 kHz	#VBV			9.000 BW 10
Auto N	N VALUE	FUNCTIO	NCTION WIDTH	CTION FL		Y -53.37 dE	1 GHz	× 9.538	CL f	ide tro N 1
Freq Offs										
					-					
100 100 tot 100 - Doc 100 100 10					-					
100 100 tot 100 - Doc 100 100 10										
0										

RL RF 50		SENSE:INT	ALIGN AUTO	08:58:56 PM Jul 29, 2013	Frequency
enter Freq 15.000	1000000 GHz PNO: Fast C IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	
dB/div Ref 20.00	dBm	Auto Tui			
9 0.0					Center Fr
00				-16.35 dBm	15.00000000 G
.0				1	Start Fr 13.000000000 G
				an a dia kana amin'ny sola ana amin'ny sola amin'ny sola amin'ny sola amin'ny sola amin'ny sola amin'ny sola a Ny sola amin'ny sola	Stop Fr 17.00000000 G
art 13.000 GHz es BW 100 kHz	#VB	W 300 kHz	Sweep 3	Stop 17.000 GHz 84 ms (40001 pts)	CF St 400.000000 M
N 1 f	× 16.987 2 GHz	-51.01 dBm	INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> N
8 6 6 8					Freq Offs 0
7					
1 1 1					



	rum Analyzer -											
Center F		0 Ω AC 00000000 G	iHz		ISE:INT	Avg Typ	ALIGNAUTO	TRAC	PM Jul 29, 2013 E 1 2 3 4 5 6	Frequency		
	PN0: Fast Trg: Free Run IFGain:Low #Atten: 30 dB Mkr1 20.676 2 GHz											
10 dB/div Log												
10.0 0.00										Center Freq 19.00000000 GHz		
-10.0									-16.35 dBm			
-20.0 -30.0 -40.0									1	Start Freq 17.00000000 GHz		
-50.0 -60.0 -70.0	riel for the Local Society of Party		l - Congratina fictoren en en 1944 - Shari South eye gonten en		nte ^{llen} ted by ones					Stop Freq 21.00000000 GHz		
Start 17.0 #Res BW			#VB۱	W 300 kHz			Sweep 3		.000 GHz 0001 pts)	CF Step 400.000000 MHz		
MKR MODE T	RC SCL	× 20.676 :	2 GHz	-49.57 dB		NCTION	UNCTION WIDTH	FUNCTIO	DN VALUE	<u>Auto</u> Man		
2 3 4 5 6		50. (ANDA 13150)								Freq Offset 0 Hz		
7 8 9 10 11 12												
MSG							STATUS	\$				

RL RF	lyzer - Swept SA 50 Ω AC		SENSE:INT	ALIGN AUTO	09:00:08 PM Jul 29	9, 2013	
enter Freq 2		In East Trig: F	ree Run : 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 TYPE MWW DET P N N		
	Mkr1 23.138 8 GHz Ref 20.00 dBm -47.62 dBm						
0.0						Center Fre	
0.0					-16.	23.000000000 GH	
0.0						Start Fre	
	The second second second		\ 1				
0.0		naman na na sana na ka kin ni na ni na sala na sila na sa				25.00000000 GF	
tart 21.000 GI Res BW 100 k		#VBW 300 k	Hz	Sweep	Stop 25.000 384 ms (40001		
Kr mode tro sci 1 n 1 f	× 23.138 8	3 GHz -47.62	FUN 2 dBm	CTION FUNCTION WIDT	H FUNCTION VALUE		
2 3 4 5						Freq Offs	
5 6 7 8							
9 0 1							
2							



Channel 06 (2437MHz)

		Chamler		,	
Agilent Spectrum Analyzer -					- 1
RL RF 50 Center Freq 515.0		SENSE:IN	T ALIGN Avg Type: Log		
enter Freq 515.0	PNO: Fast C IFGain:Low	➡ Trig: Free Run #Atten: 30 dB	111g 1 ypc. 20g	TYPE MWWWWW DET P N N N N	At a
	IFGalit.Low	in accine of a B		Mkr1 813.396 MH:	Z Auto Tun
0 dB/div Ref 20.0	0 dBm		1	-56.30 dBn	
- og 10.0					Center Fre
0.00					515.000000 MH
10.0				-15.69 dBr	
20.0				-15.69 001	-
30.0		_			Start Fre
40.0		_			30.000000 MH
50.0				1	
		International and a state of the state of th	need projection and the feature of the second state	abdy me to a property of the second stands of the second	Stop Fre
70.0					1.000000000 GH
start 30.0 MHz				Stop 1.0000 GH;	
Res BW 100 kHz	#VB	W 300 kHz	Swee	ep 93.3 ms (40001 pts	CF Ste
MKR MODE TRC SCL	X	Y	FUNCTION FUNCTION	WIDTH FUNCTION VALUE	2 97.000000 MH Auto Ma
1 N 1 f 2	813.396 MHz	-56.30 dBm			
3					Freq Offs
4 5					0+
6 7					-
8					
9 10					
<u>11</u> 12					-
ISG				STATUS	
gilent Spectrum Analyzer - GRL RF 50	Swept SA DΩ AC	SENSE:IN	T ALIGN	AUTO 09:04:03 PM Jul 29, 201	2
Center Freq 3.000			Avg Type: Log	-Pwr TRACE 1 2 3 4 5	6 Frequency
	PNO: Fast C IFGain:Low	Trig: Free Run #Atten: 30 dB		DET P N N N N	N
				Mkr1 2.438 5 GH	
0 dB/div Ref 20.0				4.07 dBm	1
10.0	_ 1				Center Fre
0.00					3.00000000 GH
10.0				-15.69 dBr	
20.0					
-30.0					Start Fre 1.000000000 GH
40.0					
-50.0				10000	
-60.0					Stop Fre
70.0					5.00000000 GH
Start 1.000 GHz #Res BW 100 kHz	#\/B	W 300 kHz	Swo	Stop 5.000 GHz ep 384 ms (40001 pts	
MKR MODE TRC SCL	**D			width Function Value	400.000000 MH Auto Ma
1 N 1 f	2.438 5 GHz	4.07 dBm	INCHORE	TONCTON VALUE	
2 3					F 07
4 5					Freq Offs
6					
7					-
8					

STATUS



		zer - Swept S									
Center	Freq 7.	50 Ω AC				NSE:INT	Avg Type	ALIGNAUTO E: Log-Pwr	TRAC	PM Jul 29, 2013 E 1 2 3 4 5 6	Frequency
				:Fast 🖵 n:Low	Trig: Free #Atten: 30				DE		
								Mk		3 3 GHz	Auto Tune
10 dB/div	Ref	20.00 dBn	n						-55.9	93 dBm	
10.0											Center Freq
0.00							-				7.00000000 GHz
-10.0										-15.69 dBm	
-20.0											Start Freq
-30.0											5.00000000 GHz
-50.0				_ 1_		-					
-60.0	Charles Ind	erte ettre pro	and an a data da	Market Street	and the second second second	والمرجع العرجي	In the state of the state of	a substantial second			Stop Freq
-70.0										The sector is dealed be found in the	9.00000000 GHz
Start 5.0	000 GHz				6				Stop 9	.000 GHz	
#Res B				#VBW	300 kHz			Sweep 3	84 ms (4	0001 pts)	CF Step 400.000000 MHz
MKR MODE			x		Y		ICTION FU	NCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Man
1 N 2	1 f		6.423 3 (GHZ	-55.93 dl	Зm					
3 4											Freq Offset
5 6				_		-					0 Hz
7 8				-		-					
<u>9</u> 10											
11											
MSG								STATUS			

	um Analyzer -									
Center F		0000000 G		1	ISE:INT	Avg Type	ALIGNAUTO E: Log-Pwr	TRAC	PM Jul 29, 2013 E 1 2 3 4 5 6 PE M WWWWW	Frequency
10 dB/div										
10.0 0.00 -10.0									-15.69 dBm	Center Freq 11.000000000 GHz
-20.0 -30.0 -40.0									1	Start Freq 9.000000000 GHz
-50.0 -60.0			olitisze Jakkowskie so odstycze I							Stop Freq 13.00000000 GHz
Start 9.00 #Res BW	100 kHz	×	#VBW	/ 300 kHz			Sweep 3	884 ms (4		CF Step 400.000000 MHz Auto Man
1 N 1 2 3 4 5 6		12.842	1 GHz	-53.28 dE						Freq Offset 0 Hz
7 8 9 10 11 12										
MSG							STATUS			



Center Freq 15.00000000 GHz Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Trig: Free I 2 3 4 5 6 Tree I 2 3 4 5 6 Frequency 0 dB/div Ref 20.00 dBm -51.32 dBm -51.32 dBm Auto Tun 10 dB/div Ref 20.00 dBm -51.32 dBm -51.32 dBm Center Freq 15.00000000 GH 00 dB/div Ref 20.00 dBm -51.32 dBm -51.32 dBm Center Freq 15.00000000 GH 00 dB/div Ref 20.00 dBm -51.32 dBm -51.32 dBm Start Freq 13.00000000 GH 00 dB/div Ref 20.00 dBm -51.32 dBm -51.32 dBm Start Freq 13.00000000 GH 00 dB/div Ref 20.00 dBHz Ref 20.00 dBHz -51.32 dBm Start Freq 13.00000000 GH 30 dB Ref 20.00 dBHz Ref 20.00 dBHz -51.32 dBm -51.32 dBm -51.32 dBm 10 dB/div -51.32 dBm -51.32 dBm -51.32 dBm -51.32 dBm -51.32 dBm 11 dB -51.32 dBm -51.32 dBm -51.32 dBm -51.32 dBm -51.32 dBm 12 dB -51.32 dBm -51.32 dBm -51.32 dBm -51.32 dBm -51.32 dBm 11 dB <th>Agilent Spectrum Analyzer</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Agilent Spectrum Analyzer					
PN0: Fast Trg: Free Run Internet Run Auto Tun IPGainLow #Atten: 30 dB Mkr1 16.954 4 GHz -51.32 dBm Auto Tun 10 dB/div Ref 20.00 dBm -51.32 dBm -51.32 dBm Internet Run -51.32 dBm Internet Run Internet Run -51.32 dBm Internet Run			SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr		Frequency
INKET 10: 394 4 GHZ -09 -51.32 dBm 100 -51.32 dBm 110 -51.32 dBm 110 -51.32 dBm 111 -51.32 dBm </td <td></td> <td>PNO: Fast 😱</td> <td></td> <td></td> <td>DET PNNNN</td> <td>Auto Tupe</td>		PNO: Fast 😱			DET PNNNN	Auto Tupe
10.0 Image: Constraint of the second of	10 dB/div Ref 20.	00 dBm		Mkr		Auto Tune
10.0						Center Fred
20.0 .15.69 dBm 30.0 .15.69 dBm 40.0 .15.69 dBm 50.0 .15.69 dBm 60.0 .15.72 dBm 71.0 .15.72 dBm	0.00					15.00000000 GH:
30.0 30.0	-10.0				-15.69 dBm	
40.0 13.00000000 GHz 60.0 11.00000000 GHz 60.0 11.00000000 GHz 70.0 11.00000000 GHz Start 13.000 GHz Stop 17.000 GHz 40.0 11.00000000 GHz 5 11.00000000 GHz 11.00000000 GHz Stop 17.000 GHz 4 11.00000000 GHz 11.00000000 GHz FUNCTION WIDTH 12.00000000 GHz FUNCTION WIDTH 13.00000000 GHz FUNCTION WIDTH 11.00000000 GHz FUNCTION WIDTH 10.0000000 GHz Freq Offset 10.0000000 GHz Freq Offset 11.00000000 GHz Freq Offset 11.000000000 GHz Freq Offset 11.000000000 GHz Freq Offset 11.0000000000 GHz Freq Offset 11.00000000000000000000000000000000000						Start Free
60.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 17.00000000 GHz 70.0 71.0 71.0 50.0 71.0	-40.0		2 ⁻		ı	13.00000000 GHz
Construction Stop Free 70.0 Image: Stop 17.000 GHz Start 13.000 GHz #VBW 300 kHz Step Free BW 100 kHz #VBW 300 kHz Sweep 384 ms (40001 pts) CF Step 400.00000 MHz 1 1 3 Image: Step Free Step 7.000 GHz 4 Image: Step 7.000 MHz 3 Image: Step 7.000 MHz 4 Image: Step 7.000 MHz 6 Image: Step 7.000 MHz 7 Image: Step 7.000 MHz 9 Image: Step 7.000 MHz 9 Image: Step 7.000 MHz	-50.0	a la subsetta da la subsetta da subsetta	and the second	a		
Start 13.000 GHz #VBW 300 kHz Stop 17.000 GHz CF Step 400.00000 MH #Res BW 100 kHz #VBW 300 kHz Sweep 384 ms (40001 pts) Auto Auto Max 0 N 1 f 16.954 4 GHz -51.32 dBm Function width Function value Auto Max 2 1 1 -	-60.0		The second s	1	the second bet	
#Res BW 100 kHz #VBW 300 kHz Sweep 384 ms (40001 pts) CF Step 400.000000 MHz 1 1 1 1 1 1 1 1 1 1 9 4 <	-70.0					17.00000000 GH:
Model TRG Scl X Y FUNCTION FUNCTION FUNCTION Value 1 N 1 f 16.954.4 GHz 51.32 dBm FUNCTION WIDTH FUNCTION Value 2 1 1 1 1 Add 0.00000 MH. 3 1 1 1 1 Add 0.00000 MH. 4 1 1 1 1 Add 0.00000 MH. 6 1 1 1 1 1 1 9 1 1 1 1 1 1 1 10 1	Start 13.000 GHz #Res BM 100 kHz	#VBM	300 kHz	Sween 3		CF Step
N 1 f 16.954.4 GHz 51.32 dBm 2 - - - - - Freq Offse 3 - - - - - - Freq Offse 4 -					<u> </u>	
3	1 N 1 f					
6 0 0 0 7 0 0 0 11 0 0 0	3					Freq Offse
7 8 9 9 9 9 10 10 10 11 10 10	5					0 H:
9 0 0 10 0 0 11 0 0 12 0 0	7					
	9					
	11					
ISG STATUS	MSG			STATUS		

Agilent Spectr										
Center F	RF	50 Q AC	2H7	SEI	NSE:INT	Ava Tvp	ALIGNAUTO e: Log-Pwr		PM Jul 29, 2013	Frequency
Center I	109 13.0	F	PNO: Fast G Gain:Low	Trig: Free #Atten: 30				TYP		Auto Turo
10 dB/div Log	Ref 20.	.00 dBm					Mkr		3 5 GHz 49 dBm	Auto Tune
10.0										Center Freq
-10.0									-15.69 dBm	19.00000000 GHz
-20.0										Start Freq
-40.0									● 1	17.000000000 GHz
-60.0				de l'engenne begen probe					All and a second s	Stop Freq
-70.0										21.000000000 GHz
Start 17.0 #Res BW			#VBV	V 300 kHz			Sweep 3		.000 GHz 0001 pts)	CF Step 400.000000 MHz
MKR MODE TR		× 20.708	5 GHz	49.49 dE		NCTION FL	INCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Man
3 4										Freq Offset
5 6 7										0 Hz
8 9 10					_					
11 12										
MSG							STATUS			

Agilent Spectrum Analyzer - Si					
RL RF 50 Center Freq 23.000		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	09:06:58 PM Jul 29, 2013 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
	PNO: Fast 🕞 IFGain:Low	#Atten: 30 dB	Mkr	DET P NNNNN 1 23.890 5 GHz	Auto Tune
10 dB/div Ref 20.00	dBm		A CARCERTON A	-47.30 dBm	
0.00					Center Free 23.000000000 GH
20.0				-15.69 dBm	
-30.0			_ 1		Start Fred 21.000000000 GH2
50.0 	ann 1 a thuist an ann ann ann an an an ann an ann an a				Stop Fre
70.0					25.000000000 GH
Start 21.000 GHz Res BW 100 kHz		/ 300 kHz		Stop 25.000 GHz 84 ms (40001 pts)	CF Stej 400.000000 MH
1KB MODE TRC SCL 1 N 1 f 2	× 23.890 5 GHz	-47.30 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
3 4 5 6					Freq Offse 0 H
7 8 9					
10 11 12 12 12 12 12 12 12 12 12 12 12 12					
SG			STATUS		

	M Jul 29, 2013	09:09:43 F	ALIGN AUTO	1	NSE:INT	SE			alyzer - S 50	RF		RL
Frequency	E 1 2 3 4 5 6 E MWWWWW T P N N N N N	TRAC TYP	e: Log-Pwr	Avg Ty	Run		MHz PNO: Fast IFGain:Low	00000	515.00	eq	er Fi	ent
Auto Tun	93 MHz I2 dBm		Mkr					dBm	7 20.00	Rei	div) dB
Center Fre												o.0
515.000000 MH												0.00
	-13.77 dBm											0.0
Start Fre								_		_		0.0
30.000000 MH		▲ 1								-		0.0
Oton Er		*								-		0.0
Stop Fre 1.000000000 Gi				aleysi accordiate	Nilling of part and	and a second definition of				-	tena malian Mana malian	0.0
	000 GHz	Stop 4.0				-6			-	DALL-	30.0	L
CF Ste 97.000000 MH			Sweep 93			W 300 kHz	#VI				BW	
Auto Ma	N VALUE	FUNCTIO	NCTION WIDTH	CTION		¥ -54.12 dl	23.193 MHz	× 82		G SCI	JDE TF	1 1
Freq Offs												2
01				2 (5								4 5 6
												7
										-		9
												1
			STATUS									_

Channel 11 (2462MHz)

		AC		SENS	E:INT		ALIGN AUTO		PM Jul 29, 2013	Frequency
enter F	req 3.0000	00000 GHz PNO: Fas IFGain:Lo	st 🖵 w	Trig: Free F #Atten: 30 (Avg T	ype: Log-Pwr	TYP	2E 1 2 3 4 5 6 PE MWWWWW ET P N N N N N	
) dB/div	Ref 20.00	dBm					Mk		0 0 GHz 72 dBm	Auto Tu
			▲1							Center Fr
.00										3.000000000 G
0.0							_		-13.77 dBm	0.000000000
.0										Start Fr
										1.00000000 G
.0	19		A	a definition and						
	and the second					derestores,	Transmission of the second sec	and the second	and the second sec	Stop Fr 5.000000000 G
										5.000000000
art 1.00								Stop 5	.000 GHz	
	100 kHz	#\	VBW	300 kHz			Sweep 3		0001 pts)	
Res BW	100 kHz	×		Y		TION	Sweep 3	884 ms (4	0001 pts)	400.000000 N
Res BW	100 kHz	27.52				TION		884 ms (4	0001 pts)	CF St 400.000000 M <u>Auto</u> N
Res BW	100 kHz	×		Y		Tion		884 ms (4	0001 pts)	400.000000 M <u>Auto</u> M
Res BW	100 kHz	×		Y		TION		884 ms (4	0001 pts)	400.000000 M <u>Auto</u> M Freq Offs
Res BW 1 N 2 3 4 5 7	100 kHz	×		Y		TION		884 ms (4	0001 pts)	400.000000 N
Res BW G M0009 M 1 N 1 2 1 1 3 1 1 4 1 1 5 1 1 6 1 1 7 1 1 3 1 1	100 kHz	×		Y		TION		884 ms (4	0001 pts)	400.000000 M <u>Auto</u> M Freq Offs
Res BW Image: Second state Image: Second state<	100 kHz	×		Y		TION		884 ms (4	0001 pts)	400.000000 M <u>Auto</u> M Freq Offs



wanent ohect	trum Analyzer - Sw	vept SA								
Center F	RF 50 G	2 AC 00000 GH:	7	SEN	ISE:INT	Avg Typ	ALIGNAUTO e: Log-Pwr	09:10:54 TRAC	PM Jul 29, 2013 E 1 2 3 4 5 6	Frequency
o nicor r	104 1.0000	PN	⊂ 0:Fast ⊂ ain:Low	Trig: Free #Atten: 30				TYF DE	E 1 2 3 4 5 6 E M WWWWW T P N N N N N	
							Mk		3 5 GHz	Auto Tune
10 dB/div Log	Ref 20.00	dBm						-55.9	96 dBm	
10.0		_								Center Free
0.00										7.000000000 GH
-10.0							-		-13.77 dBm	
-20.0										Start Fre
-40.0										5.00000000 GH
-50.0					∮ 1					
-60.0	and the state of the planets of the state of		Contraction of the second		er Les es la cu (thai In Theorem States	laten eta martinet Martineta artikoarten				Stop Fre 9.000000000 GH
-70.0										9.00000000 GH
Start 5.00		-127 - 163	#\/D\	M 200 kUa			Ouroon (.000 GHz	CF Ste
	100 kHz		#VB	N 300 kHz	7 111	TION F	Sweep 3			400.000000 MH
	1 f	7.298 5	GHz	-55.96 dB		CTION FL	JNCTION WIDTH	FUNCTIO		<u>Auto</u> Ma
2 3										Freq Offse
4 5 6	_		-							он
7 8					_					
9			_		_					
11 12			_		_					
MSG										
	trum Analyzer - Sw			0.00			STATUS			
XI RL		2 AC 000000 GH PN	0: Fast G	Trig: Free		Avg Typ	ALIGN AUTO e: Log-Pwr	09:11:29	PM Jul 29, 2013 E 1 2 3 4 5 6 E MWWWW T P N N N N	Frequency
XI RL Center F	RF 50 G Freq 11.000	2 AC 000000 GH PNI IFG2	HZ 0: Fast G ain:Low		Run	Avg Typ	ALIGN AUTO e: Log-Pwr	09:11:29 TRAC TYF DE 1 12.792		
20 dB/div	RF 50 S	2 AC 000000 GH PNI IFG2	0: Fast G	Trig: Free	Run	Avg Typ	ALIGN AUTO e: Log-Pwr	09:11:29 TRAC TYF DE 1 12.792	E 1 2 3 4 5 6 E MWWWWW T P N N N N N	Auto Tun
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