



SPORTON LAB.

Certificate No: ER232843AN

CERTIFICATE



EQUIPMENT : 802.11abgn, USB module

MODEL NO. : WUBR-508N

APPLICANT : SparkLAN Communications, Inc.

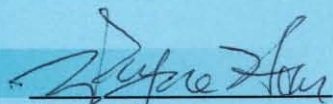
8F., No. 257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan



I HEREBY

CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in **EN 301 893 V1.6.1 (2011-11)**. Testing was carried out on **Apr. 26, 2012** at SPORTON International Inc. LAB.


Wayne Hsu
Assistant Manager



CE RADIO TEST REPORT

According to

EN 301 893 V1.6.1 (2011-11)

Equipment : 802.11abgn, USB module
Brand Name : SparkLAN
Model No. : WUBR-508N
Filing Type : New Application
Applicant : SparkLAN Communications, Inc.
Manufacturer : 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan
Received Date : Mar. 29, 2012
Final Test Date : Apr. 26, 2012

Statement

Test result included in this report is only for dipole antenna (802.11a/n) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in EN 301 893 V1.6.1 (2011-11).

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



Table of Contents

1 SUMMARY OF THE TEST RESULT	2
2 GENERAL INFORMATION.....	3
2.1 Product Details.....	3
2.2 Medium Access Protocol Implemented.....	4
2.3 Table for Filed Antenna.....	5
2.4 Table for Carrier Frequencies	6
2.5 Table for Test Modes	7
2.6 Table for Testing Locations.....	7
2.7 Table for Supporting Units	7
2.8 Table for Parameters of Test Software Setting.....	8
2.9 Test Configurations	8
3 TEST RESULT	9
3.1 Carrier Frequency Stability Measurement	9
3.2 Effective Radiated Power Measurement.....	11
3.3 Power Spectral Density Measurement.....	16
3.4 Transmitter Spurious Emissions Measurement	20
3.5 Spectrum Mask Measurement	52
3.6 Receiver Spurious Emissions Measurement	61
4 LIST OF MEASURING EQUIPMENTS.....	93
5 TEST LOCATION.....	94
6 TAF CERTIFICATE OF ACCREDITATION.....	95
APPENDIX A. TEST PHOTOS	A3
APPENDIX B. PHOTOGRAPHS OF EUT	B14



History of This Test Report

Original Issue Date: May 11, 2012

Report No.: ER232843AN

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



CERTIFICATE OF COMPLIANCE

According to

EN 301 893 V1.6.1 (2011-11)

Equipment : 802.11abgn, USB module

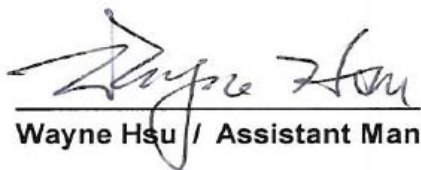
Brand Name : SparkLAN

Model No. : WUBR-508N

Applicant : SparkLAN Communications, Inc.

8F., No. 257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan

Sporton International as requested by the applicant to evaluate the Radio Spectrum essential requirements of the product sample received on Mar. 29, 2012 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested standard(s). The data recorded as well as the test configuration specified is true and accurate for showing the sample's Radio Spectrum nature.



Wayne Hsu / Assistant Manager

SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



1 SUMMARY OF THE TEST RESULT

Applied Standard: EN 301 893 V1.6.1 (2011-11)				
Part	Standard Clause	Description of Test	Result	Under Limit
3.1	5.3.2	Carrier Frequency Stability	Complies	-
3.2	5.3.4	Effective Radiated Power	Complies	1.36 dB
3.3	5.3.4	Power Spectral Density	Complies	3.25 dB
3.4	5.3.5	Transmitter Spurious Emissions	Complies	9.38 dB
3.5	5.3.6	Spectrum Mask	Complies	-
3.6	5.3.7	Receiver Spurious Emissions	Complies	6.82 dB

Test Items	Uncertainty	Remark
Effective Radiated Power (Conducted)	±0.8dB	Confidence levels of 95%
Power Spectral Density (Conducted)	±0.5dB	Confidence levels of 95%
Carrier Frequency Stability	±8.5×10 ⁻⁸	Confidence levels of 95%
Spurious Emissions – 30MHz~1000MHz (Radiated)	±2.6dB	Confidence levels of 95%
Spurious Emissions – 1GHz~18GHz (Radiated)	±2.6dB	Confidence levels of 95%
Spurious Emissions – 18GHz~40GHz (Radiated)	±2.7dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2 GENERAL INFORMATION

2.1 Product Details

There are three types of the EUT. The difference between these three types is connector; we chose the full function type to test. Only the radio detail of IEEE 802.11a/n is shown in this report. For more detailed features description, please refer to the specifications or user's manual.

Items	Description
Power Type	From system
Data Modulation Data Rate (Mbps)	OFDM for IEEE 802.11a (BPSK / QPSK / 16QAM / 64QAM) (6/9/12/18/24/36/48/54) See the below table for IEEE 802.11n
Frequency Range	5150~5350 MHz; 5470~5725 MHz
Channel Number	Band 1~ Band 2 : 8 for 20MHz bandwidth ; 4 for 40MHz bandwidth Band 3 : 9 for 20MHz bandwidth ; 5 for 40MHz bandwidth
EIRP Output Power	802.11a : 21.64 dBm 802.11n : MCS 8 (20MHz) : 21.38 dBm ; MCS 8 (40MHz) : 21.45 dBm

IEEE 802.11n Modulation Scheme

MCS	Spatial	Modulation	Coding Rate	Data rate(Mbps)	
Index	Streams	Type	Type	20 MHz channel 800nsGI	40 MHz channel 800nsGI
0	1	BPSK	1/2	6.5	13.5
1	1	QPSK	1/2	13	27
2	1	QPSK	3/4	19.5	40.5
3	1	16-QAM	1/2	26	54
4	1	16-QAM	3/4	39	81
5	1	64-QAM	2/3	52	108
6	1	64-QAM	3/4	58.5	121.5
7	1	64-QAM	5/6	65	135
8	2	BPSK	1/2	13	27
9	2	QPSK	1/2	26	54
10	2	QPSK	3/4	39	81
11	2	16-QAM	1/2	52	108
12	2	16-QAM	3/4	78	162
13	2	64-QAM	2/3	104	216
14	2	64-QAM	3/4	117	243
15	2	64-QAM	5/6	130	270

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

2.2 Medium Access Protocol Implemented

The 802.11 standard ensures that all stations, both radio-based network interface cards (NICs) and access points, implement access methods for sharing the air medium. When installing wireless LANs (WLAN), most people don't give much thought to these mechanisms. A solid understanding of 802.11's medium access methods, however, will enable you to deal more effectively with issues such as radio frequency interference, denial of services attacks and throughput issues.

Distributed Coordination Function (DCF)

The 802.11 standard makes it mandatory that all stations implement the DCF, a form of carrier sense multiple access with collision avoidance (CSMA/CA). CSMA is a contention-based protocol making certain that all stations first sense the medium before transmitting. The main goal is to avoid having stations transmit at the same time, which results in collisions and corresponding retransmissions.

If a station wanting to send a frame senses energy above a specific threshold on the medium (which could mean the transmission of another station), the station wanting access will wait until the medium is idle before transmitting the frame. The collision avoidance aspect of the protocol pertains to the use of acknowledgements that a receiving station send to the sending station to verify error-free reception. Think of this process of accessing the medium as a meeting where everyone is polite and each person only speaks when no one else is talking. In addition, everyone who understands what the person is saying nods their head in agreement.

The DCF protocol is somewhat more complex than this, though. For example, an 802.11 station utilizes information it gains from other frames that stations are sending over the wireless network. In the control field of each frame, there is a duration field that a sending station places a value in, to indicate how long the station will require the medium. As part of making a decision on whether to transmit a frame, a station must see that the time associated with the duration value of the last frame sent has expired, as well as sense that no physical transmission is taking place. The duration field enables stations to reserve the medium for subsequent frames of some specific 802.11-defined frame exchanges (e.g., RTS/CTS).

Because of its nature, DCF supports the transmission of asynchronous signals. A distinguishing factor of asynchronous signaling is that there are no timing requirements between data carrying frames. For example, the DCF protocol doesn't make any attempt to deliver a series of data frames within any timeframe or at any instant in time. As a result, there is a random amount of delay between each data frame transmission. This form of synchronization is effective for network applications, such as e-mail, Web browsing and VPN access to corporate applications.

DCF Protocol Issues

The DCF protocol is the heart of many WLAN troubles. RF interference is probably the biggest problem. If a source of RF interference (e.g., cordless phone or other WLAN) is present, the DCF can block stations from transmitting for as long as the interfering signal is present. The stations sense enough energy on the medium and wait patiently, in most cases for just a few seconds or minutes. Of course this causes the throughput of the network to drop significantly. That's why you should perform an RF site survey in the facility before installing a WLAN.

Similar to the impact of typical RF interference, someone could implement a denial of service attack, which is a deliberate action to instill RF interference at a level high enough to block a majority of the stations from transmitting. Again, all of the stations will not transmit because they respectfully follow the DCF protocol.

2.3 Table for Filed Antenna

Antenna Category (Ant. Cat.)	
☒	External antenna (dedicated antennas)
☒	Single Power Level (PL) with corresponding antenna(s). Power Level (PL): 1
☒	Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)

Transmitter Outputs & Receiver Inputs Information			
Modulation	Transmitter Outputs	Receiver Inputs	Transmitter Output Signals
802.11a	1	1	-
802.11n HT20 / HT40	2	2	-

Antenna General Information									
Antenna Port (Total 2 Port)					1(TX/RX), 2(TX/RX)				
Maximum RF Output Power Level (PL)					1				
Transmit Chains Power Distribution					☒ symmetrical distribution ☐ asymmetrical distribution				
Ant. No.	PL	Ant. Port [Ant No. X connect to Ant. Port Y]	Ant. Cat.	Ant. Type	Brand	Model	G _{ANT} (dBi)	DG (dBi) [correlated] N _{TX} = 1	DG (dBi) [uncorrelated] N _{TX} = 2
1	1	1	External	Dipole	Lct	FDE_ACBSMA-BGP	5.97	N/A	6.0
	1	2	External	Dipole	Lct	FDE_ACBSMA-BGP	5.97		
☒	EUT is consist of multiple antenna models assembly (multiple antenna models are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. Then Ant. No. <u>1</u> shall be performed the radiated test.								
☒	The equipment is normally installed and point-to-point or point-to-multipoint systems: Ant. No. <u>1</u>								
Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows: Any transmit signals are correlated, Directional Gain (DG) = G _{ANT} + 10 log(N) dBi All transmit signals are completely uncorrelated, Directional Gain (DG)= G _{ANT}									
Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows: Any transmit signals are correlated, Directional Gain (DG) = 10 log[(10 ^{G_{1/20}} + 10 ^{G_{2/20}} + ... + 10 ^{G_{N/20}}) ² /N] dBi All transmit signals are completely uncorrelated, Directional Gain (DG) = 10 log[(10 ^{G_{1/10}} + 10 ^{G_{2/10}} + ... + 10 ^{G_{N/10}})/N] dBi									

**The EUT was pre-tested antenna port 1 and antenna port 2 for single chain, the worst case was antenna port 2. therefore only the test data recorded in this report.



2.4 Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency (20MHz)	Channel No.	Frequency (40MHz)
5150~5250 MHz Band 1	36	5180 MHz	38	5190 MHz
	40	5200 MHz	46	5230 MHz
	44	5220 MHz	-	-
	48	5240 MHz	-	-

Frequency Band	Channel No.	Frequency (20MHz)	Channel No.	Frequency (40MHz)
5250~5350 MHz Band 2	52	5260 MHz	54	5270 MHz
	56	5280 MHz	62	5310 MHz
	60	5300 MHz	-	-
	64	5320 MHz	-	-

Frequency Band	Channel No.	Frequency (20MHz)	Channel No.	Frequency (20MHz)
5470~5725 MHz Band 3	100	5500 MHz	120	5600 MHz
	104	5520 MHz	132	5660 MHz
	108	5540 MHz	136	5680 MHz
	112	5560 MHz	140	5700MHz
	116	5580 MHz	-	-
	Channel No.	Frequency (40MHz)	Channel No.	Frequency (40MHz)
	102	5510 MHz	126	5630 MHz
	110	5550 MHz	134	5670 MHz
	118	5590 MHz	-	-



2.5 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Carrier Frequency Stability	11a Band 1 ~3/BPSK	6Mbps	36/64/100/140
	11n Band 1 ~3/BPSK MCS 8 (20MHz)	13Mbps	36/64/100/140
	11n Band 1 ~3/BPSK MCS 8 (40MHz)	27Mbps	38/62/102/134
Effective Radiated Power Power Spectral Density Spectrum Mask	11a Band 1 ~3/BPSK	6Mbps	36/64/100/140
	11n Band 1 ~3/BPSK MCS 8 (20MHz)	13Mbps	36/64/100/140
	11n Band 1 ~3/BPSK MCS 8 (40MHz)	27Mbps	38/62/102/134
Effective Radiated Power (TPC)	11a Band 1 ~3/BPSK	6Mbps	64/100/140
	11n Band 1 ~3/BPSK MCS 8 (20MHz)	13Mbps	64/100/140
	11n Band 1 ~3/BPSK MCS 8 (40MHz)	27Mbps	62/102/134
Transmitter/ Receiver Spurious Emissions (Below 1GHz)	11a Band 3/BPSK	6Mbps	140
	11n Band 3/BPSK MCS 8 (20MHz)	13Mbps	140
	11n Band 3/BPSK MCS 8 (40MHz)	27Mbps	134
Transmitter/ Receiver Spurious Emissions (Above 1GHz)	11a Band 1 ~3/BPSK	6Mbps	36/64/100/140
	11n Band 1 ~3/BPSK MCS 8 (20MHz)	13Mbps	36/64/100/140
	11n Band 1 ~3/BPSK MCS 8 (40MHz)	27Mbps	38/62/102/134

2.6 Table for Testing Locations

Test Site No.	Site Category	Location	Test Site No.	Site Category	Location
05CH01-HY	FAC	Hwa Ya	TH01-HY	OVEN Room	Hwa Ya

Fully Anechoic Chamber (FAC).

2.7 Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E5520	DoC

2.8 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

For Single Chain:

Power Parameters of IEEE 802.11a Port 2

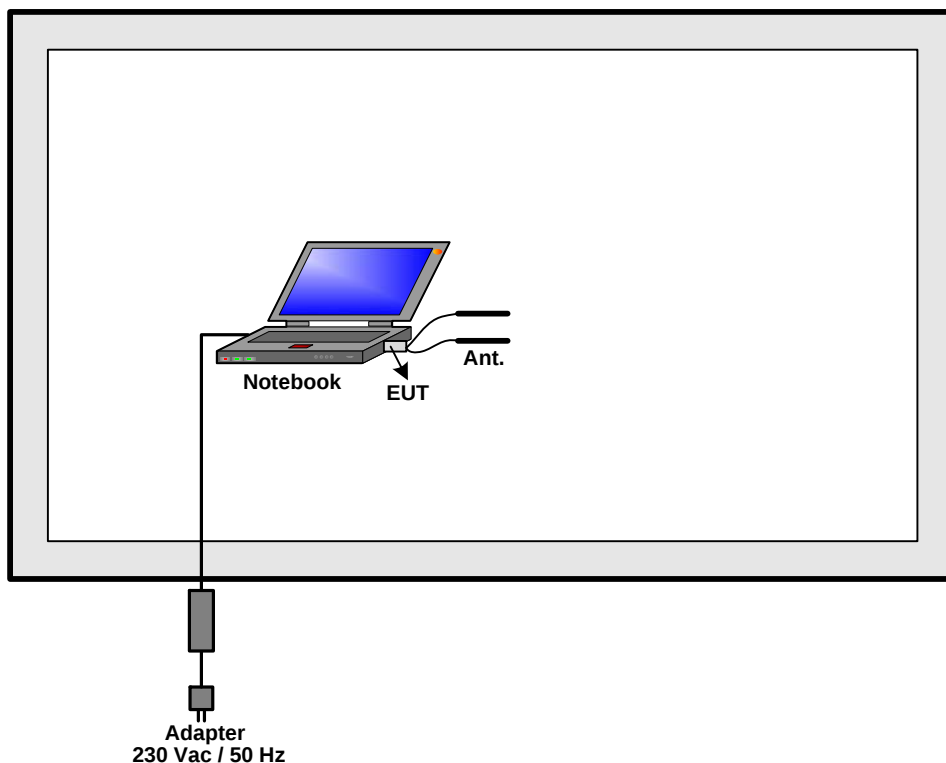
Test Software Version	RT 5x7x QA			
Frequency	5180 MHz	5320 MHz	5500 MHz	5700 MHz
IEEE 802.11a	17	1C	1A	1C

For Two Chains:

Power Parameters of IEEE 802.11n Port 1 + Port 2

Test Software Version	RT 5x7x QA			
Frequency	5180 MHz	5320 MHz	5500 MHz	5700 MHz
IEEE 802.11n (20MHz)	17/14	1A/18	16/16	18/18
Frequency	5190 MHz	5310 MHz	5510 MHz	5670 MHz
IEEE 802.11n (40MHz)	17/14	1A/18	17/18	1E/1F

2.9 Test Configurations



3 TEST RESULT

3.1 Carrier Frequency Stability Measurement

3.1.1 Limit

The frequency tolerance of the carrier signal shall be maintained within 20ppm of the operating frequency. These measurements shall also be performed at normal and extreme test conditions.

3.1.2 Measuring Instruments and Setting

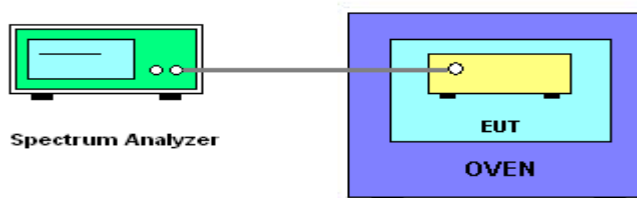
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RB	1 kHz
VB	1 kHz
Sweep Time	Auto

3.1.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 1 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm.
6. These measurements shall also be performed at normal and extreme test conditions.

3.1.4 Test Setup Layout



3.1.5 Test Deviation

There is no deviation with the original standard.

3.1.6 EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.



3.1.7 Test Result

Final Test Date	Apr. 26, 2012	Test Site No.	TH01-HY
Temperature	25.9°C	Humidity	30%
Test Engineer	Ian	Configurations	802.11a/n

For Single Chain:

Configuration IEEE 802.11a Port 2

Configuration 1222-002122-1 OK 2

Test Conditions				Measurement Frequency (MHz)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	5179.995800	5319.995200	5499.994000	5699.994600
T min (°C)	0	V max (V)	253	5180.014400	5320.018600	5500.019800	5700.020400
		V min (V)	207	5180.014400	5320.018600	5500.019800	5700.020400
T max (°C)	55	V max (V)	253	5179.998800	5319.998200	5499.998200	5699.997600
		V min (V)	207	5179.998800	5319.998200	5499.998200	5699.997600
Max. Deviation Frequency				0.014400	0.018600	0.019800	0.020400
Max. Frequency Error (ppm)				2.78	3.50	3.60	3.58
Limits				20 ppm			
Result				Complies			

For Two Chains:

Configuration IEEE802.11n (20MHz) Port 1 + Port 2

Test Conditions				Measurement Frequency (MHz)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	5179.984400	5319.982600	5499.982000	5699.981400
T min (°C)	0	V max (V)	253	5180.000600	5320.001200	5499.998800	5699.999400
		V min (V)	207	5180.000600	5320.001200	5499.998800	5699.999400
T max (°C)	55	V max (V)	253	5180.064200	5320.070200	5500.075600	5700.070800
		V min (V)	207	5180.064200	5320.070200	5500.075600	5700.070800
Max. Deviation Frequency				0.064200	0.070200	0.075600	0.070800
Max. Frequency Error (ppm)				12.39	13.20	13.75	12.42
Limits				20 ppm			
Result				Complies			

Configuration IEEE802.11n (40MHz) Port 1 + Port 2

Test Conditions				Measurement Frequency (MHz)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	5189.982600	5309.982000	5509.981400	5669.980800
T min (°C)	0	V max (V)	253	5190.000600	5309.999400	5509.998800	5669.999400
		V min (V)	207	5190.000600	5309.999400	5509.998800	5669.999400
T max (°C)	55	V max (V)	253	5190.068400	5310.069600	5510.081600	5670.076200
		V min (V)	207	5190.068400	5310.069600	5510.081600	5670.076200
Max. Deviation Frequency				0.068400	0.069600	0.081600	0.076200
Max. Frequency Error (ppm)				13.18	13.11	14.81	13.44
Limits				20 ppm			
Result				Complies			

3.2 Effective Radiated Power Measurement

3.2.1 Limit

The RF output power is the mean equivalent isotropic ally radiated power during a transmission burst. The following table is the highest EIRP mean power limit.

Frequency Range (MHz)	Highest EIRP mean power limit (dBm)
5150~5350	23
5470~5725	23

For Slave devices without a Radar Interference Detection function the mean EIRP shall be less than 23 dBm. For devices using TPC, the RF output power during a transmission burst when configured to operate at the lowest stated power level of the TPC range shall not exceed the levels given in the following table.

Frequency Range (MHz)	Lowest EIRP mean power limit (dBm)
5250~5350	17
5470~5725	17

For Slave devices without a Radar Interference Detection function the mean EIRP shall be less than 17 dBm.

3.2.2 Measuring Instruments and Setting

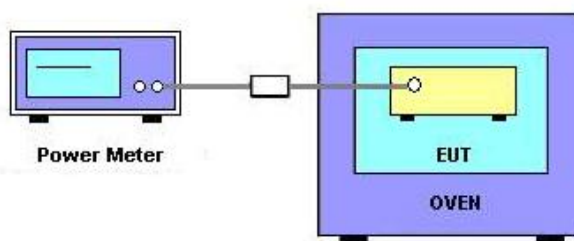
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Average Sensor	MA2411B

3.2.3 Test Procedures

1. Since a temporary antenna connector can be attached on the RF output port, so conducted measurement method was used in this case.
2. A wide band power meter with a matched thermocouple detector was used to directly measure the output power from the RF output port of the EUT in continuously transmitting mode.
3. The $EIRP = A + G + 10 \cdot \log(1/x)$, where A is the power measured in (1), G is the gain of the antenna of the EUT in dBi and x is the duty cycle of the EUT in continuously transmitting mode.
4. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range(s). These measurements shall also be performed at normal and extreme test conditions.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



3.2.7 Test Result for RF output power at the highest power level

Final Test Date	Apr. 26, 2012	Test Site No.	TH01-HY
Temperature	25.9°C	Humidity	30%
Test Engineer	Ian	Configurations	802.11a/n

For Single Chain:

Configuration of IEEE 802.11a Port 2

Test Conditions				Average EIRP power (dBm)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	18.10	18.62	18.71	18.95
T min (°C)	0	V max (V)	253	21.13	21.50	21.39	21.64
		V min (V)	207	21.13	21.50	21.39	21.64
T max (°C)	55	V max (V)	253	14.74	15.15	15.33	15.98
		V min (V)	207	14.74	15.15	15.33	15.98
Max mean Power				21.50		21.64	
Limits				23		23	
Result				Complies			



For Two Chains:

Configuration of IEEE 802.11n (20MHz) Port 1

Test Conditions				Average EIRP power (dBm)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	14.06	14.39	15.18	14.20
T min (°C)	0	V max (V)	253	18.33	18.20	18.51	18.27
		V min (V)	207	18.33	18.20	18.51	18.27
T max (°C)	55	V max (V)	253	10.66	10.75	10.98	10.49
		V min (V)	207	10.66	10.75	10.98	10.49
Max mean Power				18.33		18.51	
Limits				23		23	
Result				Complies			

Configuration of IEEE 802.11n (20MHz) Port 2

Test Conditions				Average EIRP power (dBm)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	14.98	14.33	15.40	15.64
T min (°C)	0	V max (V)	253	18.20	18.26	18.22	18.33
		V min (V)	207	18.20	18.26	18.22	18.33
T max (°C)	55	V max (V)	253	12.42	11.40	11.02	11.55
		V min (V)	207	12.42	11.40	11.02	11.55
Max mean Power				18.26		18.33	
Limits				23		23	
Result				Complies			

Configuration of IEEE 802.11n (20MHz) Port 1+ Port 2

Test Conditions				Average EIRP power (dBm)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	17.55	17.37	18.30	17.99
T min (°C)	0	V max (V)	253	21.28	21.24	21.38	21.31
		V min (V)	207	21.28	21.24	21.38	21.31
T max (°C)	55	V max (V)	253	14.64	14.10	14.01	14.06
		V min (V)	207	14.64	14.10	14.01	14.06
Max mean Power				21.28		21.38	
Limits				23		23	
Result				Complies			



Configuration of IEEE 802.11n (40MHz) Port 1

Test Conditions				Average EIRP power (dBm)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	14.39	14.28	14.94	14.96
T min (°C)	0	V max (V)	253	18.26	18.32	18.27	18.56
		V min (V)	207	18.26	18.32	18.27	18.56
T max (°C)	55	V max (V)	253	10.54	10.65	11.52	11.64
		V min (V)	207	10.54	10.65	11.52	11.64
Max mean Power				18.32		18.56	
Limits				23		23	
Result				Complies			

Configuration of IEEE 802.11n (40MHz) Port 2

Test Conditions				Average EIRP power (dBm)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	14.59	14.54	15.00	14.09
T min (°C)	0	V max (V)	253	18.29	18.51	18.60	18.16
		V min (V)	207	18.29	18.51	18.60	18.16
T max (°C)	55	V max (V)	253	10.68	10.62	11.28	10.33
		V min (V)	207	10.68	10.62	11.28	10.33
Max mean Power				18.51		18.60	
Limits				23		23	
Result				Complies			

Configuration of IEEE 802.11n (40MHz) Port 1+ Port 2

Test Conditions				Average EIRP power (dBm)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	17.50	17.42	17.98	17.56
T min (°C)	0	V max (V)	253	21.29	21.43	21.45	21.37
		V min (V)	207	21.29	21.43	21.45	21.37
T max (°C)	55	V max (V)	253	13.62	13.65	14.41	14.04
		V min (V)	207	13.62	13.65	14.41	14.04
Max mean Power				21.43		21.45	
Limits				23		23	
Result				Complies			



3.2.8 Test Result for RF output power at the lowest power level (TPC)

Final Test Date	Apr. 26, 2012	Test Site No.	TH01-HY
Temperature	25.9°C	Humidity	30%
Test Engineer	Ian	Configurations	802.11a/n

For Single Chain:

Configuration of IEEE 802.11a Port 2

Test Conditions				Average EIRP power (dBm)		
				Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	12.62	12.71	12.95
T min (°C)	0	V max (V)	253	15.50	15.39	15.64
		V min (V)	207	15.50	15.39	15.64
T max (°C)	55	V max (V)	253	9.15	9.33	9.98
		V min (V)	207	9.15	9.33	9.98
Max mean Power				15.50	15.64	
Limits				17	17	
Result				Complies		

For Two Chains:

Configuration of IEEE 802.11n (20MHz) Port 1+ Port 2

Test Conditions				Average EIRP power (dBm)		
				Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	11.37	12.30	11.99
T min (°C)	0	V max (V)	253	15.24	15.38	15.31
		V min (V)	207	15.24	15.38	15.31
T max (°C)	55	V max (V)	253	8.10	8.01	8.06
		V min (V)	207	8.10	8.01	8.06
Max mean Power				15.24	15.38	
Limits				17	17	
Result				Complies		

Configuration of IEEE 802.11n (40MHz) Port 1+ Port 2

Test Conditions				Average EIRP power (dBm)		
				Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	11.42	11.98	11.56
T min (°C)	0	V max (V)	253	15.43	15.45	15.37
		V min (V)	207	15.43	15.45	15.37
T max (°C)	55	V max (V)	253	7.65	8.41	8.04
		V min (V)	207	7.65	8.41	8.04
Max mean Power				15.43	15.45	
Limits				17	17	
Result				Complies		

3.3 Power Spectral Density Measurement

3.3.1 Limit

The maximum spectral power density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is the power density limit.

Mean EIRP limits for power density at the highest power level

Frequency Range (MHz)	Mean EIRP limit	ECC/DEC/(04)08 Mean EIRP limit
5150~5250	10 (dBm/MHz)	0.25 (mW/25kHz)
5250~5350	10 (dBm/MHz)	10 (mW/MHz)
5470~5725	17 (dBm/MHz)	50 (mW/MHz)

For Slave devices without a Radar Interference Detection function the mean EIRP density shall be less than 10 dBm/MHz.

3.3.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer and power meter.

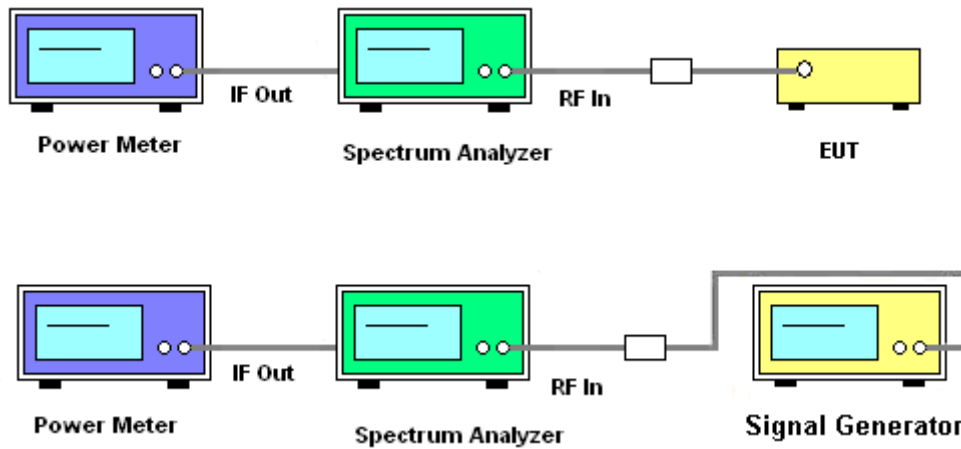
Spectrum Analyzer	Setting
Attenuation	20~30dB
Span Frequency	0 MHz
RB	1 MHz
VB	1 MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Average Sensor	MA2411B

3.3.3 Test Procedures

1. Pre-calibration for the spectrum analyzer has to be done first through a CW signal of the measured carrier frequency with 10dBm power strength.
2. A power meter is connected on the IF output port of the spectrum analyzer.
3. Adjust the spectrum analyzer to have the center frequency the same with the measured carrier. RBW=VBW=1MHz, detector mode is positive peak. Turn off the averaging function and use zero span.
4. The calibrating signal power shall be reduced to 0 dBm and it shall be verified that the power meter reading also reduces by 10 dB.
5. Connect the equipment to be measured. Using the following settings of the spectrum analyzer in combination with "max hold" function, find the frequency of highest power output in the power envelope: center frequency equal to operating frequency; RBW & VBW: 1 MHz; detector mode: positive peak; averaging: off; span: 3 times the spectrum width; amplitude: adjust for middle of the instrument's range. The frequency found shall be recorded.
6. Set the center frequency of the spectrum analyzer to the found frequency and switch to zero span. The power meter indicates the measured power "E". The maximum spectral power density e.i.r.p. is calculated from the above measured power density (D), the observed duty cycle factor(x), and the applicable antenna assembly gain "G" in dBi, according to the formula: $PD = D + G + 10 \log (1/x)$.
7. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range(s).

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



3.3.7 Test Result

Final Test Date	Apr. 26, 2012	Test Site No.	TH01-HY
Temperature	25.9°C	Humidity	30%
Test Engineer	Ian	Configurations	802.11a/n

For Single Chain:

Configuration of IEEE 802.11a Port 2

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	6.07	6.40	5.73	6.75
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			

For Two Chains:

Configuration of IEEE 802.11n (20MHz) Port 1

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	1.29	1.19	1.46	1.16
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			

Configuration of IEEE 802.11n (20MHz) Port 2

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	1.91	1.56	1.14	2.35
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			

Configuration of IEEE 802.11n (20MHz) Port 1+ Port 2

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 36	Ch. 64	Ch. 100	Ch. 140
T nom (°C)	20	V nom (V)	230	4.62	4.39	4.31	4.81
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			



Configuration of IEEE 802.11n (40MHz) Port 1

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	-1.84	-2.26	-1.80	-1.17
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			

Configuration of IEEE 802.11n (40MHz) Port 2

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	-1.87	-1.90	-0.94	-1.22
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			

Configuration of IEEE 802.11n (40MHz) Port 1+ Port 2

Test Conditions				Maximum EIRP Spectral Power Density (dBm/MHz)			
				Ch. 38	Ch. 62	Ch. 102	Ch. 134
T nom (°C)	20	V nom (V)	230	1.16	0.93	1.66	1.82
EN 301 893 V1.6.1 Limits				10dBm / MHz			
Result				Complies			

3.4 Transmitter Spurious Emissions Measurement

3.4.1 Limit

Transmitter spurious emissions are emissions outside the frequency range(s) of the equipment as defined in 5.15~5.25GHz when the equipment is in Transmit mode. The spurious emissions of the transmitter shall not exceed the values in tables 1 in the indicated bands.

Table 1 Transmitter limits for Spurious emissions

Frequency Range (MHz)	Transmit Mode (dBm)
47MHz to 74MHz 87,5MHz to 118Mhz 174MHz to 230MHz 470MHz to 862MHz	-54
Other frequencies Below 1GHz	-36
1GHz~26.5GHz (Outside frequency ranges)	-30

3.4.2 Measuring Instruments and Setting

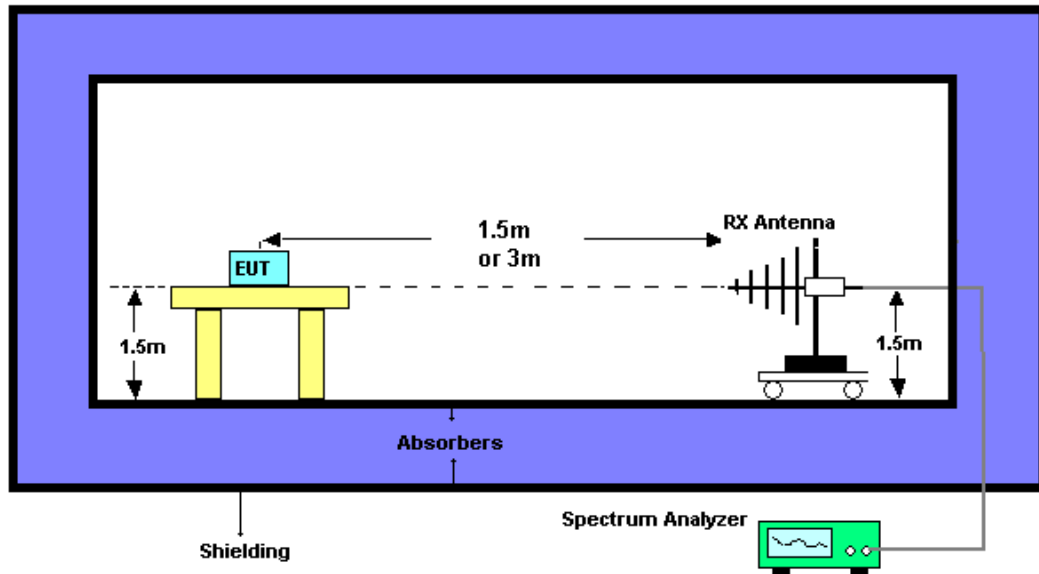
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
Detector	Positive RMS
Span	100 MHz
Sweep Time	Auto
RB / VB	(Below 1GHz) 100 kHz / 100 kHz ; (Above 1GHz) 1 MHz / 1 MHz

3.4.3 Test Procedures

1. The EUT was placed on the top of the turntable in fully anechoic chamber.
2. The test shall be made in the transmitting mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. This measurement shall be repeated with the transmitter in standby mode where applicable.
4. For 30~1000MHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable. For 1~26.5GHz measurement, the receiving Horn antenna was placed 1.5 meters far away from the turntable.
5. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
6. Replace the EUT by standard antenna and feed the RF port by signal generator.
7. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
8. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
9. The level of the spurious emission is the power level of (8) plus the gain of the standard antenna in dBd and minus the loss of the cable used between the signal generator and the standard antenna.
10. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range(s).

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 Results of Standby Mode Spurious Emissions

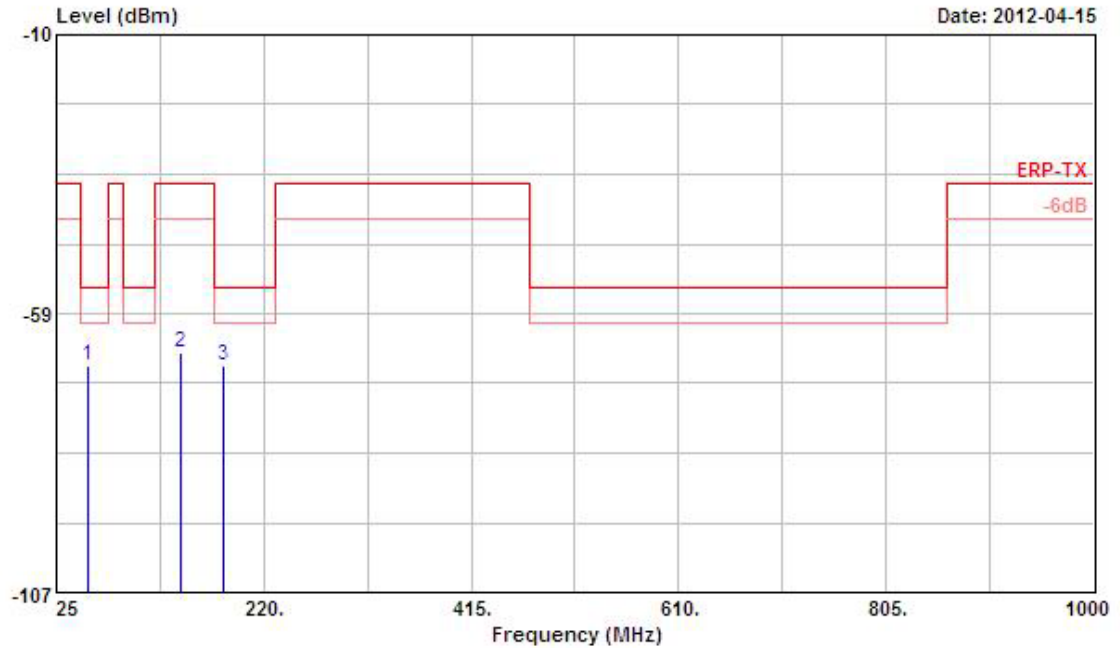
In the initial investigation on standby mode and receiving mode, no significant differences in spurious emissions were observed between these 2 modes. Therefore, test data for standby mode was omitted in this section.



3.4.8 Results of Transmitter Spurious Emissions Below 1GHz

Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 140

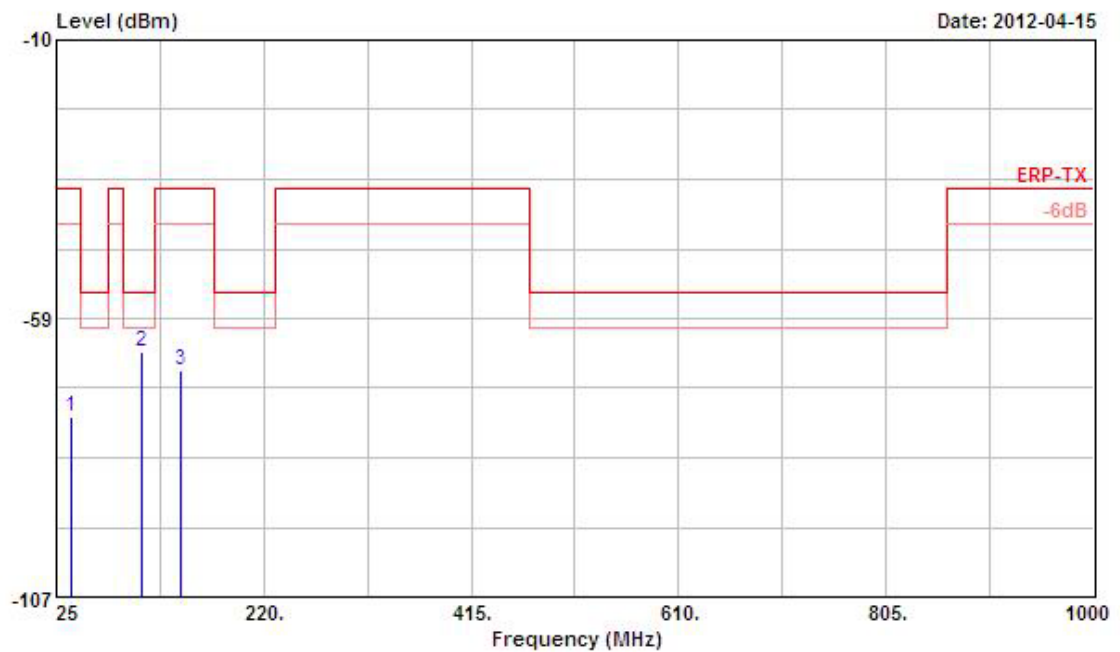
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 @	54.250	-67.48	-13.48	-54.00	-63.40	-4.08
2	141.030	-65.34	-29.34	-36.00	-62.03	-3.31
3 @	181.980	-67.65	-13.65	-54.00	-61.43	-6.22



Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	39.630	-75.73	-39.73	-36.00	-74.98	-0.75
2	105.930	-64.16	-10.16	-54.00	-59.24	-4.92
3	141.030	-67.64	-31.64	-36.00	-63.92	-3.72

Note:

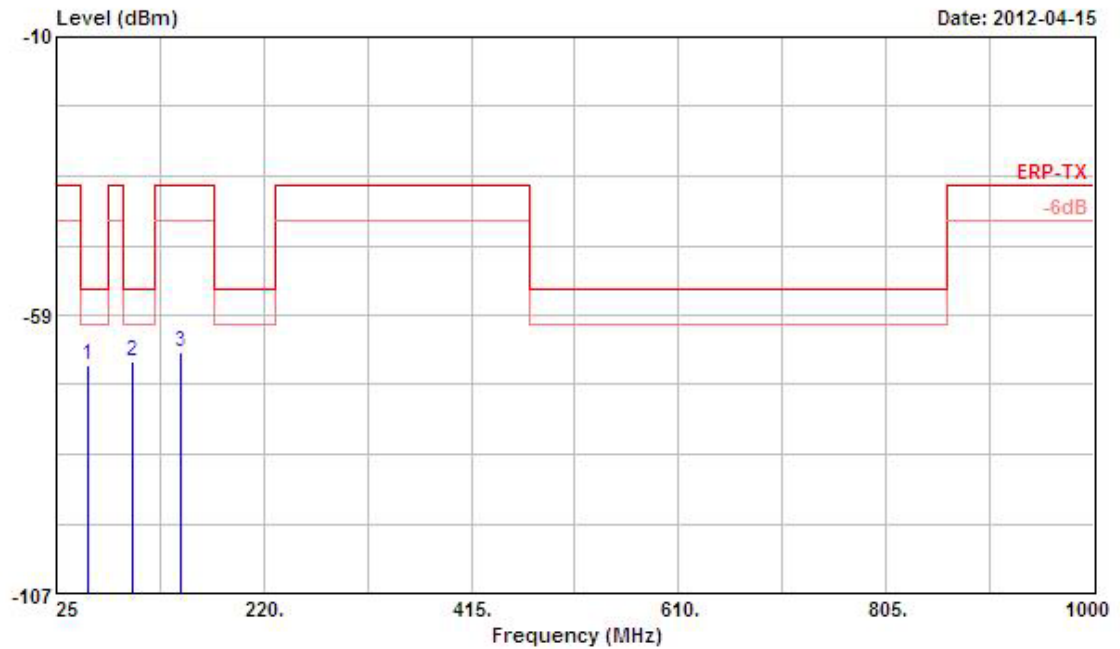
The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



For Two Chains:

Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 140 (20MHz)

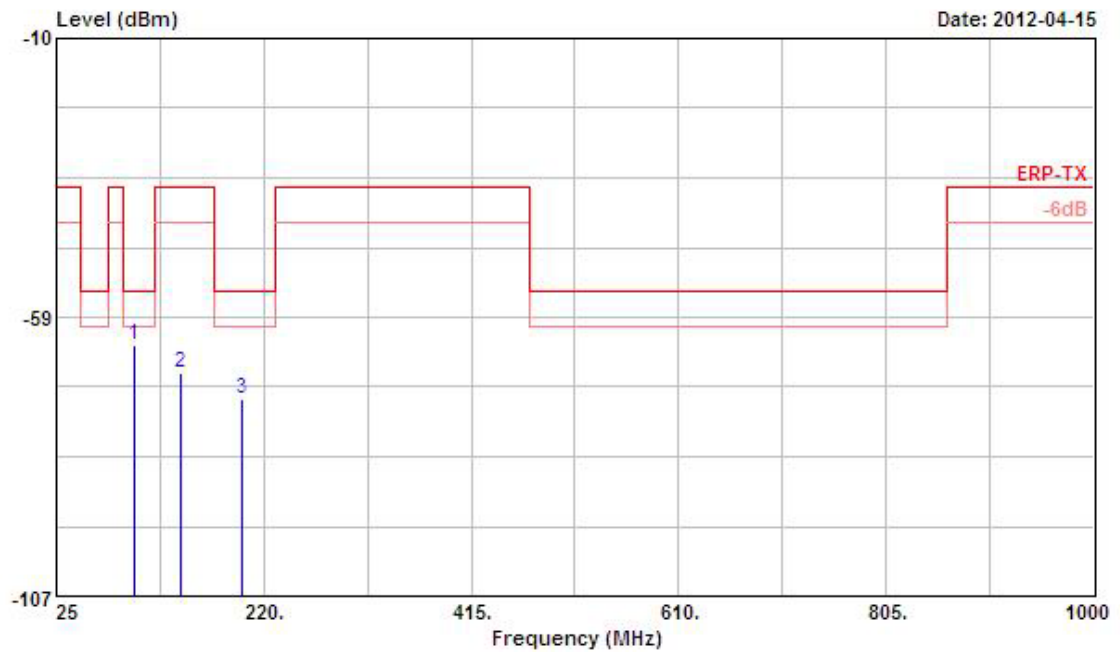
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	55.230	-67.09	-13.09	-54.00	-64.02	-3.07
2	97.150	-66.66	-12.66	-54.00	-60.65	-6.01
3	141.030	-64.97	-28.97	-36.00	-61.66	-3.31



Vertical



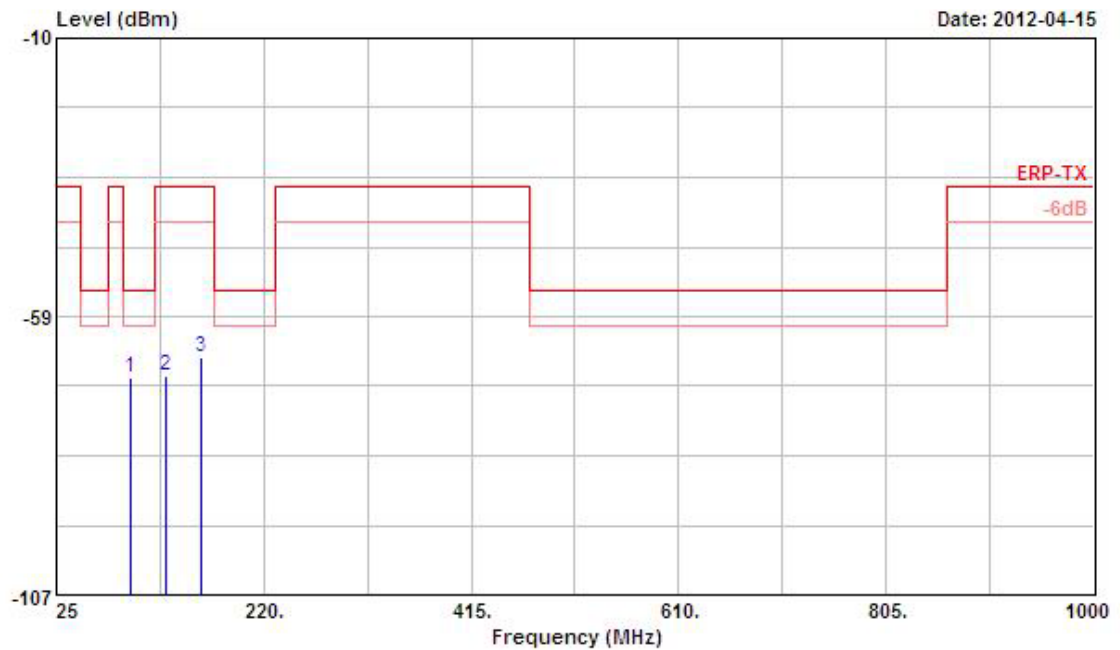
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	98.130	-63.38	-9.38	-54.00	-58.29	-5.09
2	141.030	-68.18	-32.18	-36.00	-64.46	-3.72
3	198.550	-72.61	-18.61	-54.00	-66.03	-6.58

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



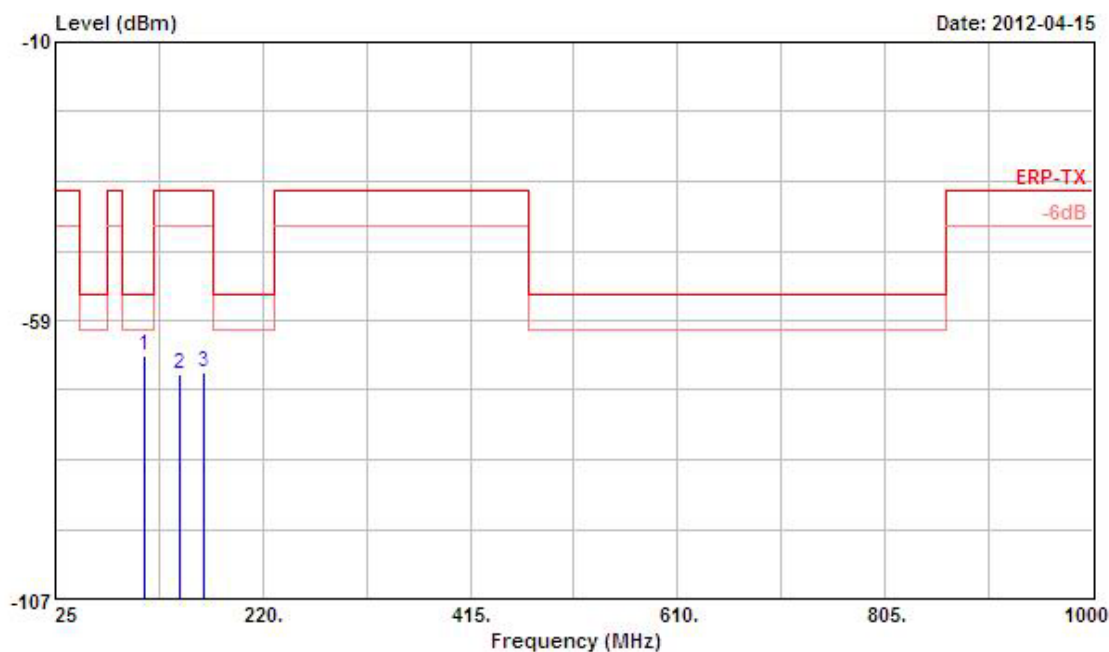
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 134 (40MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	94.230	-69.14	-15.14	-54.00	-62.74	-6.40
2	128.350	-68.85	-32.85	-36.00	-64.83	-4.02
3	160.530	-65.67	-29.67	-36.00	-60.88	-4.79



Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	108.850	-64.60	-10.60	-54.00	-59.82	-4.78
2	141.030	-67.83	-31.83	-36.00	-64.11	-3.72
3	164.430	-67.63	-31.63	-36.00	-62.22	-5.41

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.

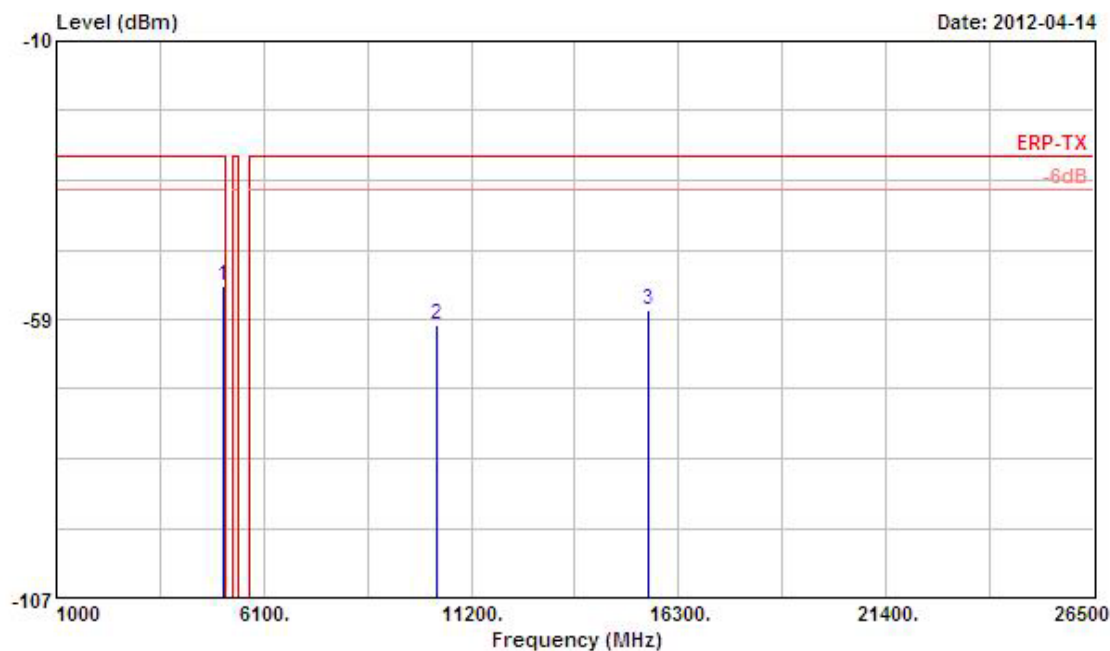


3.4.9 Results of Transmitter Spurious Emissions Above 1GHz

For Single Chain:

Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 36

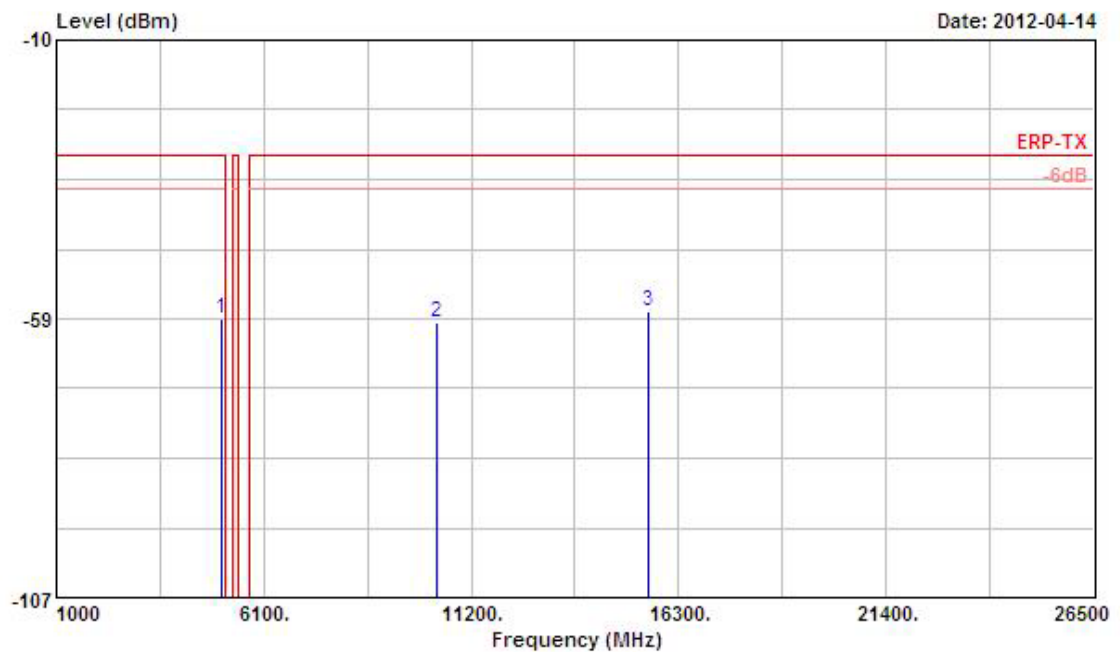
Horizontal



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5122.050	-52.59	-22.59	-30.00	-61.43	8.84
2	10360.000	-59.60	-29.60	-30.00	-73.88	14.28
3	15540.000	-56.90	-26.90	-30.00	-78.76	21.86



Vertical



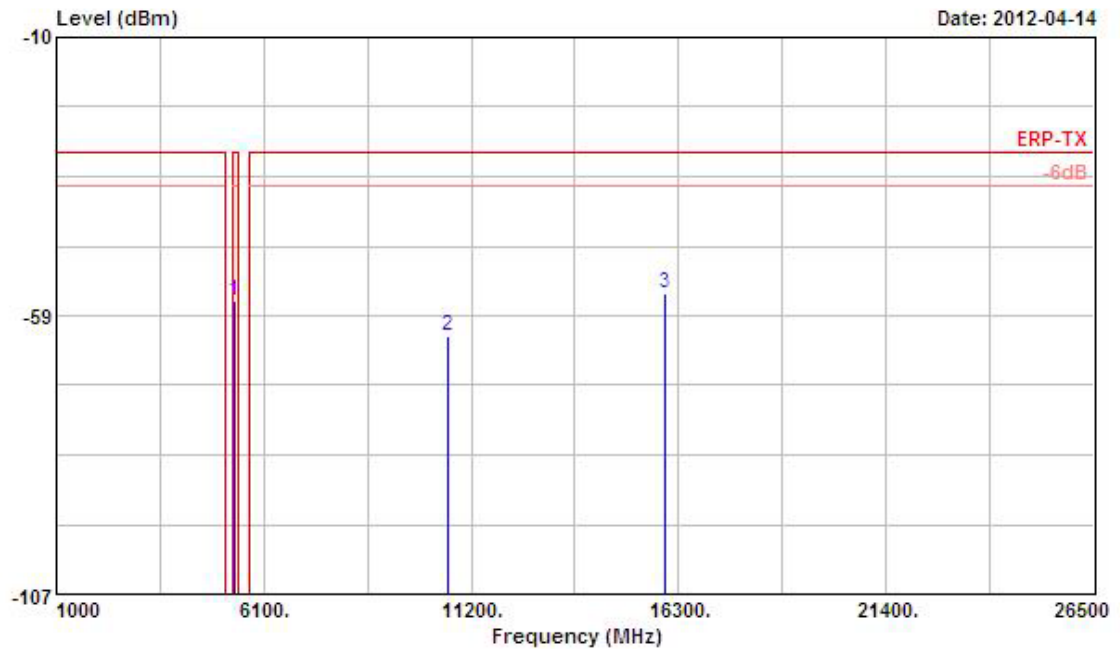
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5061.850	-58.42	-28.42	-30.00	-68.17	9.75
2	10360.000	-59.24	-29.24	-30.00	-74.19	14.95
3	15540.000	-57.14	-27.14	-30.00	-78.59	21.45

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.

Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 64

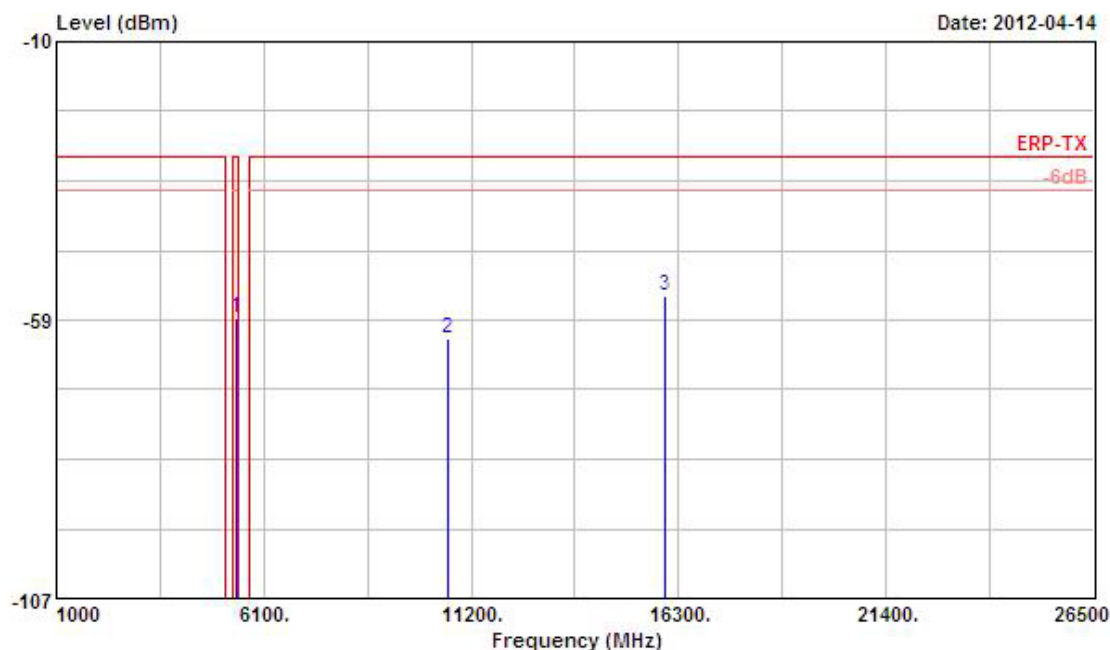
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5372.320	-55.99	-25.99	-30.00	-64.89	8.90
2	10640.000	-62.20	-32.20	-30.00	-76.87	14.67
3	15960.000	-54.68	-24.68	-30.00	-77.25	22.57



Vertical



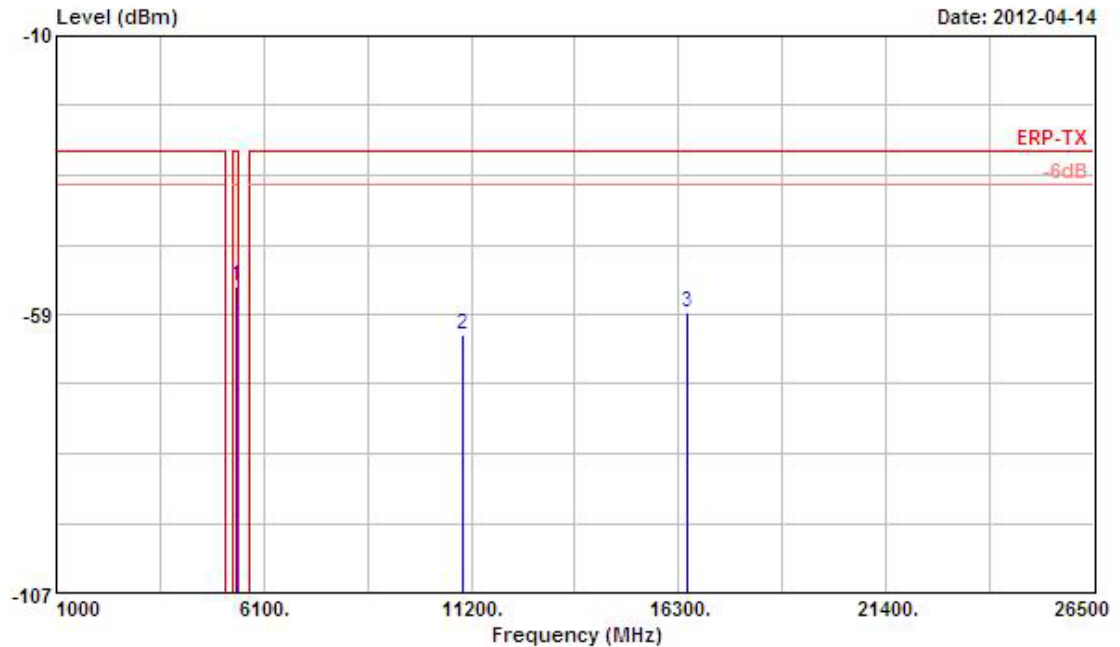
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5443.840	-58.23	-28.23	-30.00	-68.28	10.05
2	10640.000	-61.88	-31.88	-30.00	-77.17	15.29
3	15960.000	-54.22	-24.22	-30.00	-77.46	23.24

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



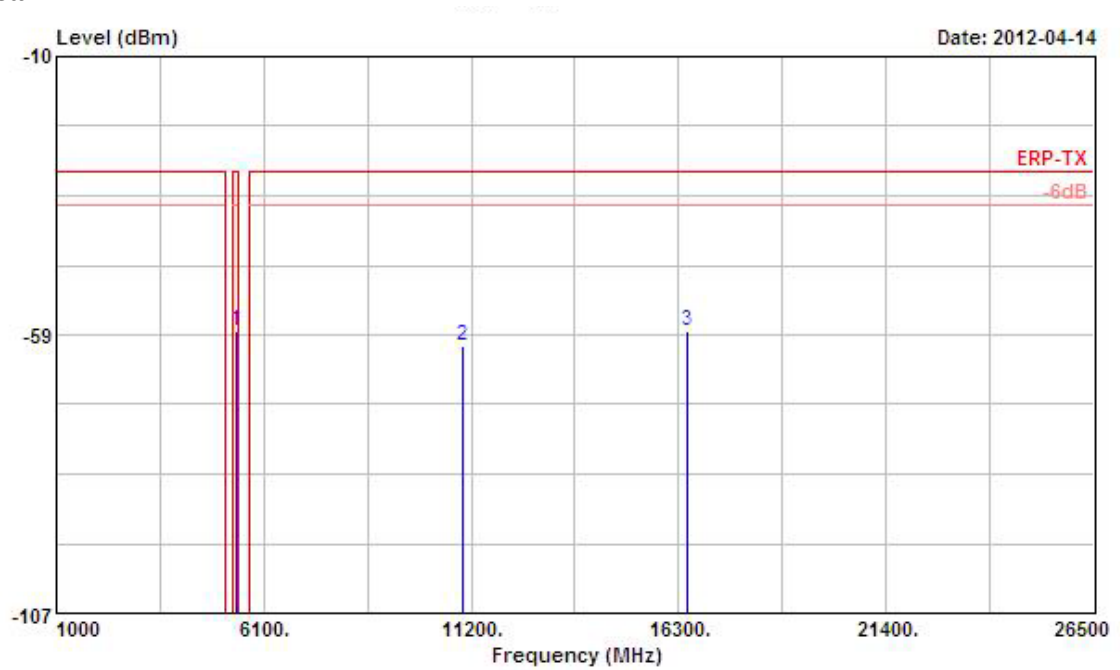
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 100

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5447.320	-53.72	-23.72	-30.00	-62.64	8.92
2	11000.000	-62.03	-32.03	-30.00	-76.83	14.80
3	16500.000	-58.22	-28.22	-30.00	-79.24	21.02



Vertical



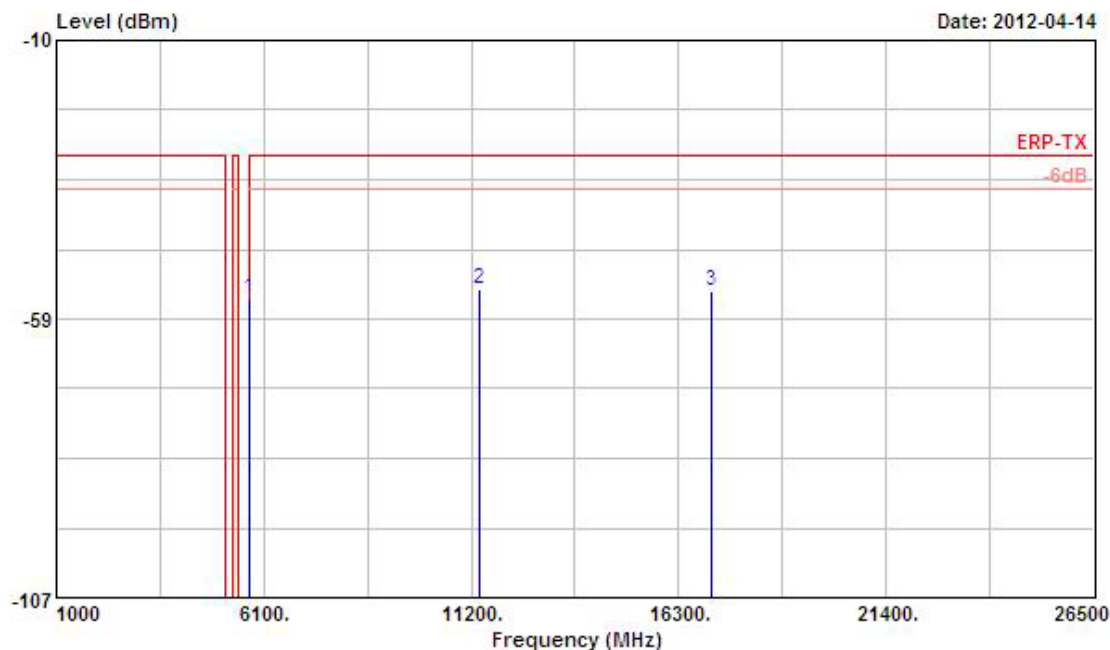
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5447.320	-57.88	-27.88	-30.00	-67.93	10.05
2	11000.000	-60.29	-30.29	-30.00	-76.13	15.84
3	16500.000	-57.78	-27.78	-30.00	-79.65	21.87

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



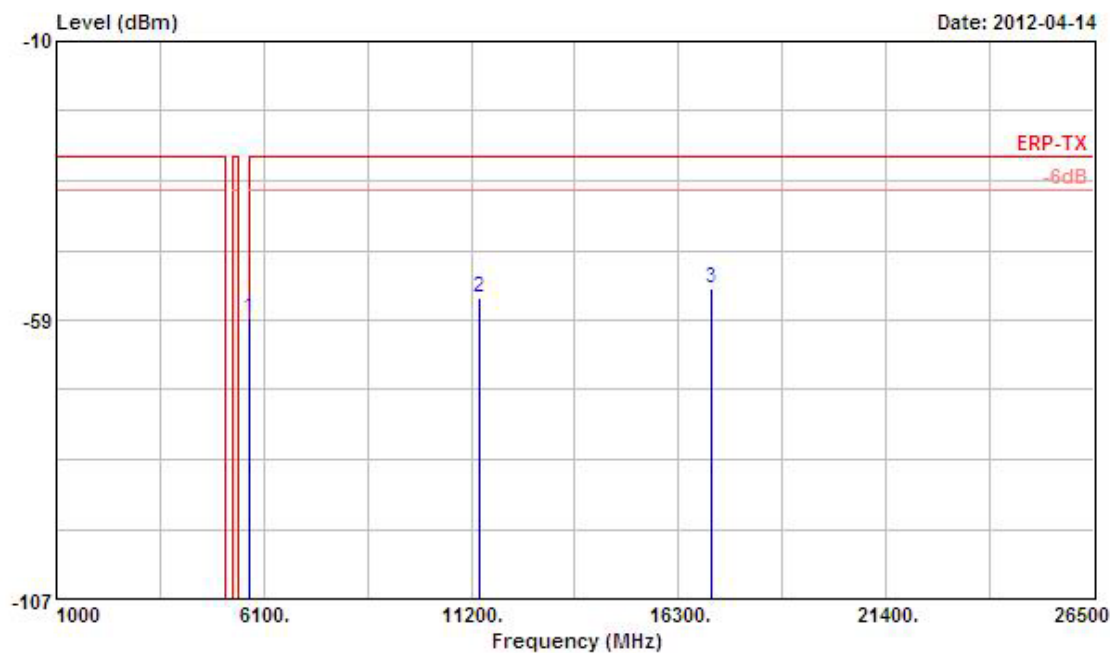
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 140

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5749.230	-55.07	-25.07	-30.00	-64.19	9.12
2	11400.000	-53.25	-23.25	-30.00	-69.35	16.10
3	17100.000	-53.50	-23.50	-30.00	-78.72	25.22



Vertical



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5753.050	-58.12	-28.12	-30.00	-68.40	10.28
2	11400.000	-54.77	-24.77	-30.00	-72.49	17.72
3	17100.000	-52.88	-22.88	-30.00	-79.01	26.13

Note:

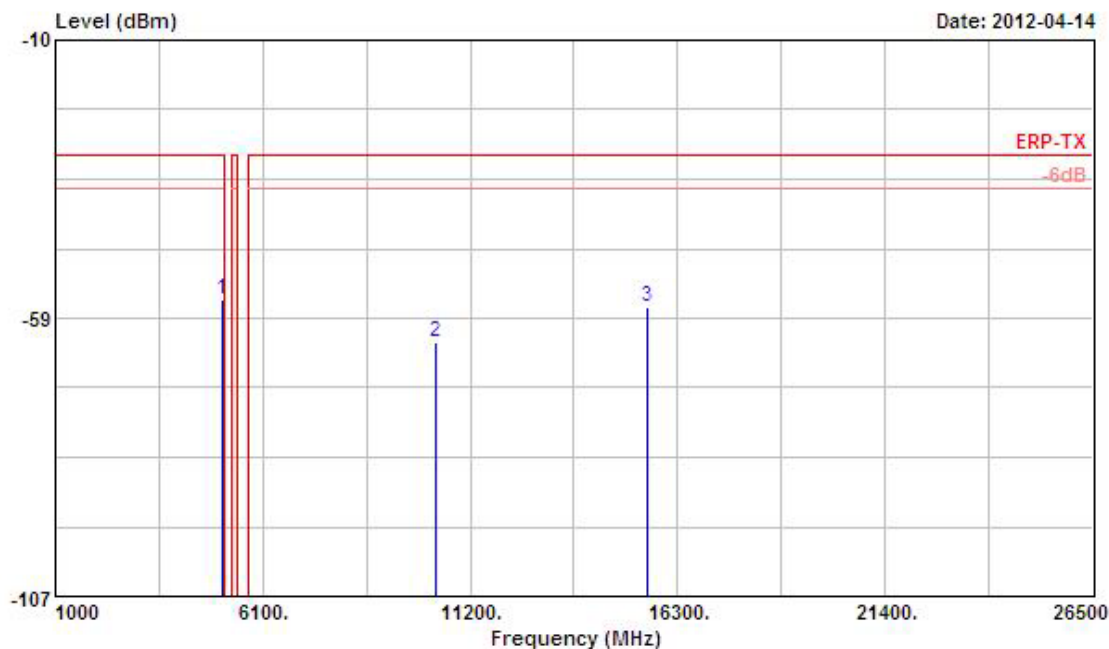
The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



For Two Chains:

Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 36 (20MHz)

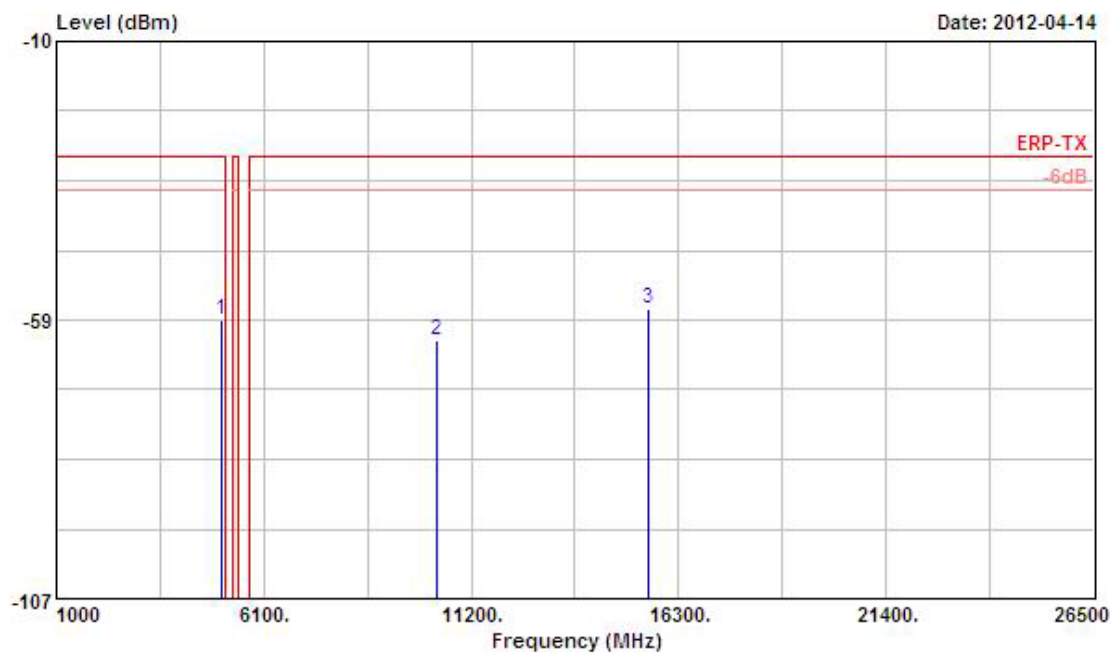
Horizontal



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5122.050	-55.21	-25.21	-30.00	-64.05	8.84
2	10360.000	-62.67	-32.67	-30.00	-76.95	14.28
3	15540.000	-56.65	-26.65	-30.00	-78.51	21.86



Vertical



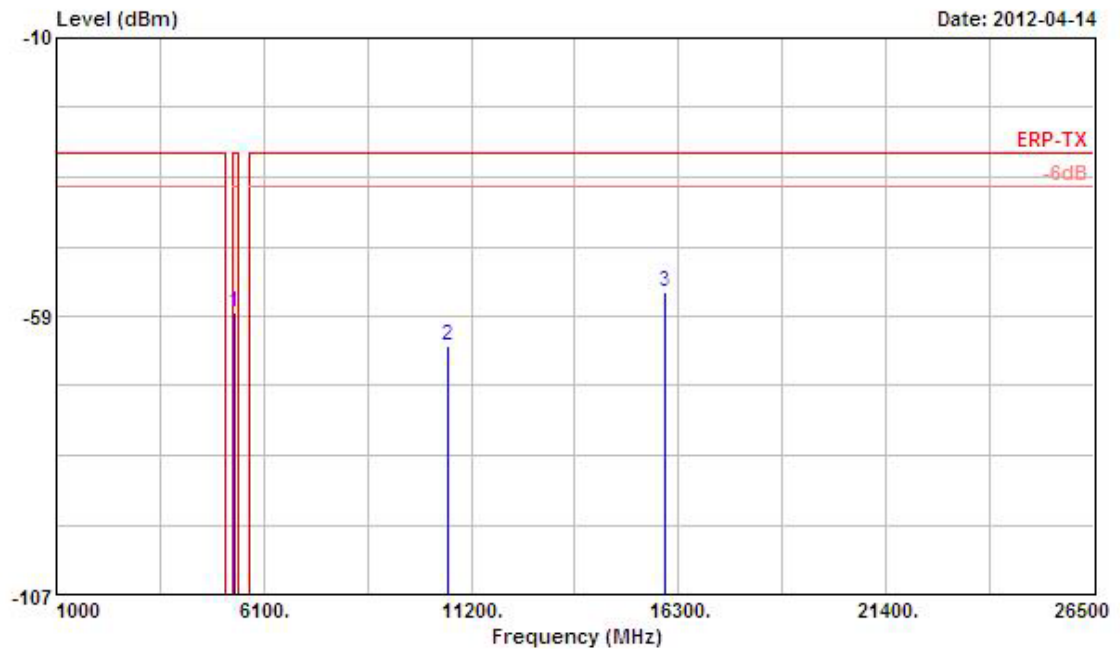
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5051.100	-58.42	-28.42	-30.00	-68.17	9.75
2	10360.000	-61.92	-31.92	-30.00	-76.87	14.95
3	15540.000	-56.54	-26.54	-30.00	-77.99	21.45

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



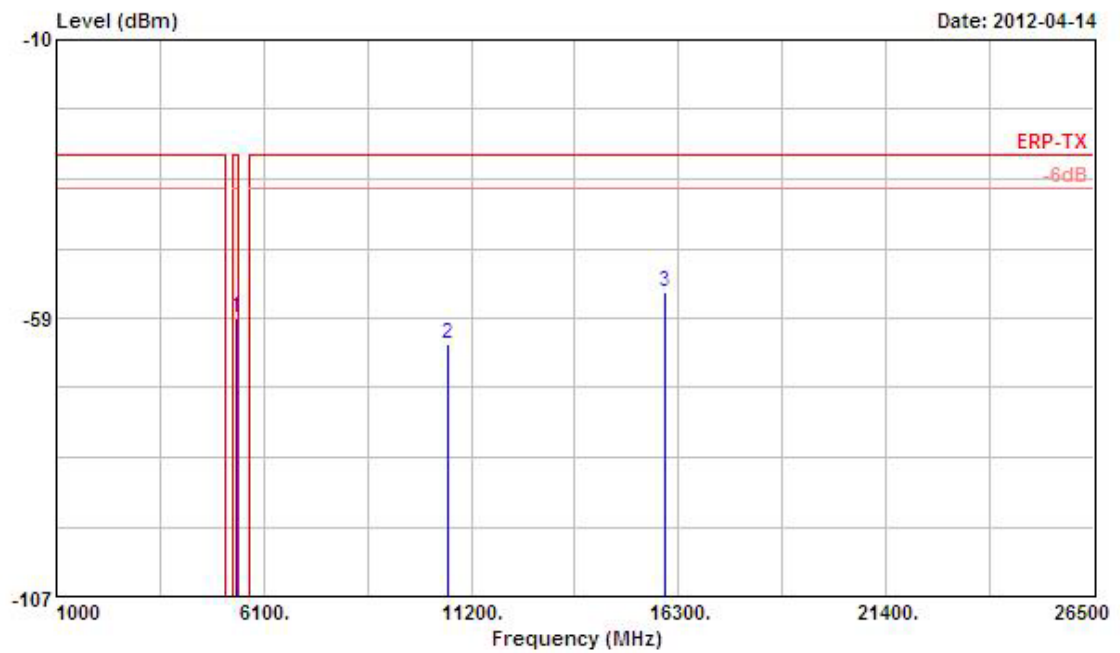
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 64 (20MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5371.840	-57.97	-27.97	-30.00	-66.87	8.90
2	10640.000	-63.62	-33.62	-30.00	-78.29	14.67
3	15960.000	-54.33	-24.33	-30.00	-76.90	22.57



Vertical



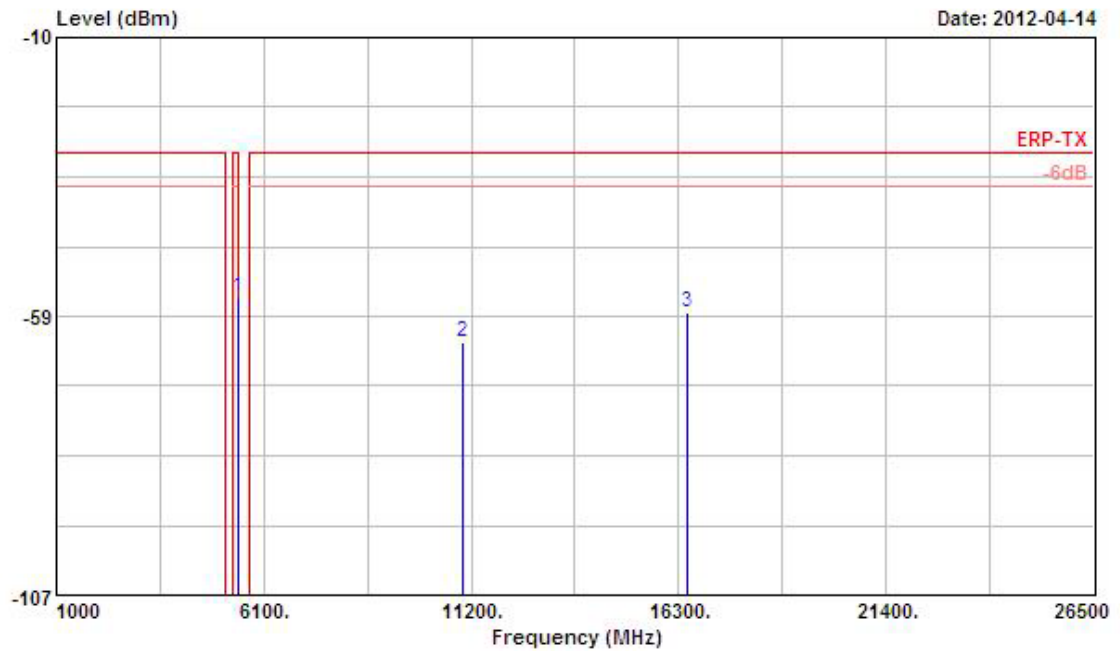
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5445.880	-58.35	-28.35	-30.00	-68.40	10.05
2	10640.000	-63.15	-33.15	-30.00	-78.44	15.29
3	15960.000	-53.90	-23.90	-30.00	-77.14	23.24

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



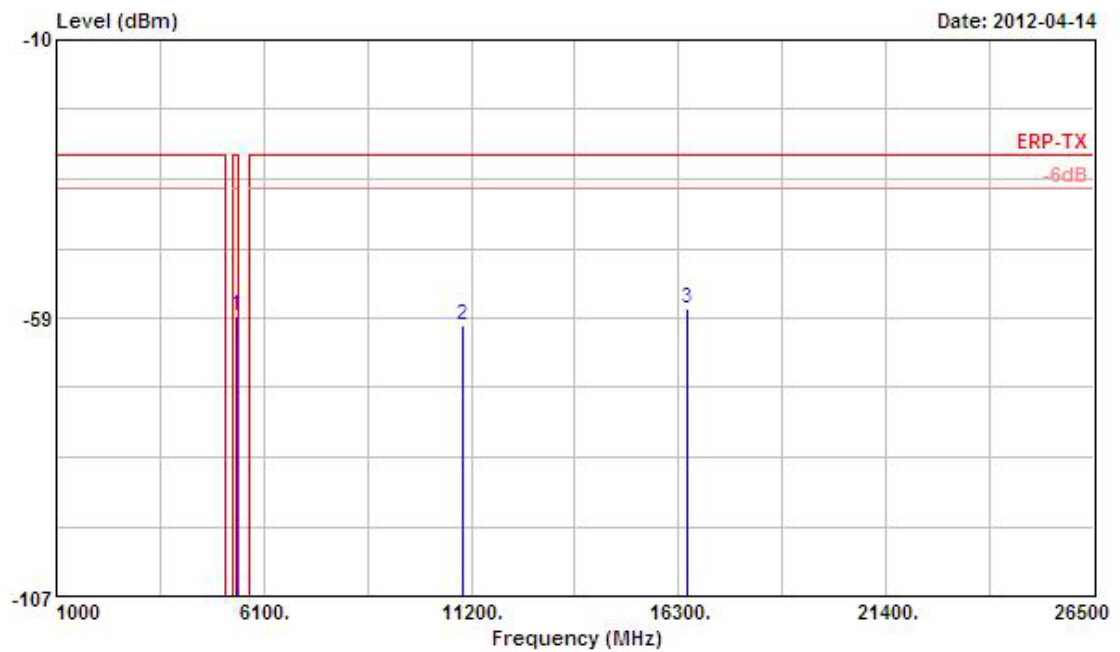
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 100 (20MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5447.800	-55.13	-25.13	-30.00	-64.05	8.92
2	11000.000	-62.95	-32.95	-30.00	-77.75	14.80
3	16500.000	-57.96	-27.96	-30.00	-78.98	21.02



Vertical



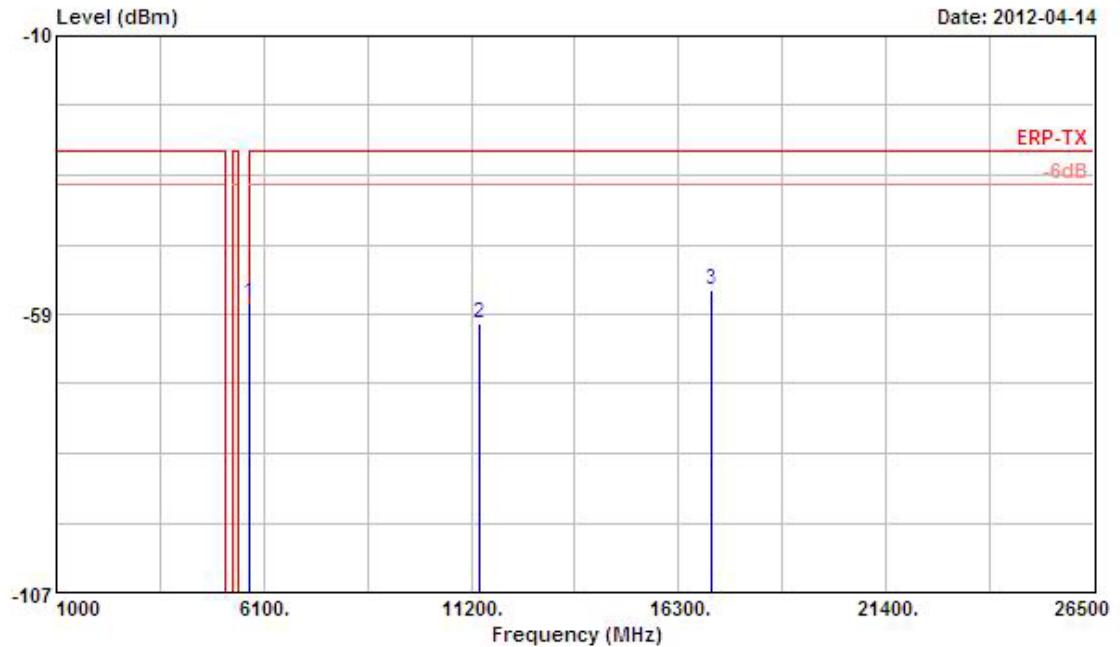
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5445.880	-58.23	-28.23	-30.00	-68.28	10.05
2	11000.000	-59.93	-29.93	-30.00	-75.77	15.84
3	16500.000	-56.73	-26.73	-30.00	-78.60	21.87

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



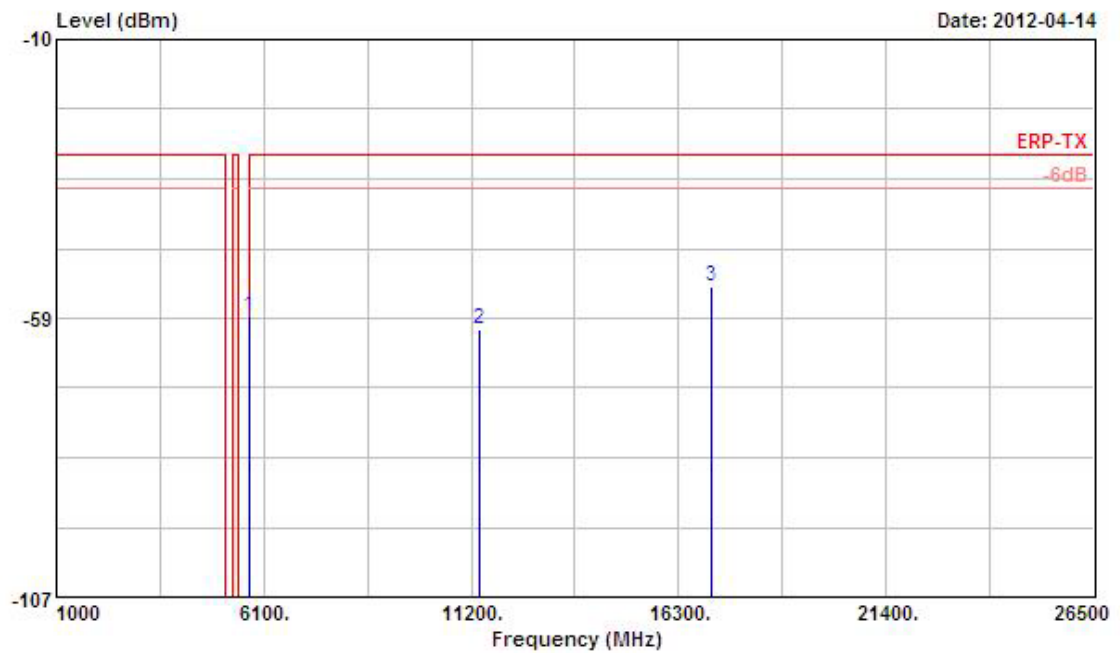
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 140 (20MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5749.230	-56.52	-26.52	-30.00	-65.64	9.12
2	11400.000	-60.08	-30.08	-30.00	-76.18	16.10
3	17100.000	-54.29	-24.29	-30.00	-79.51	25.22



Vertical



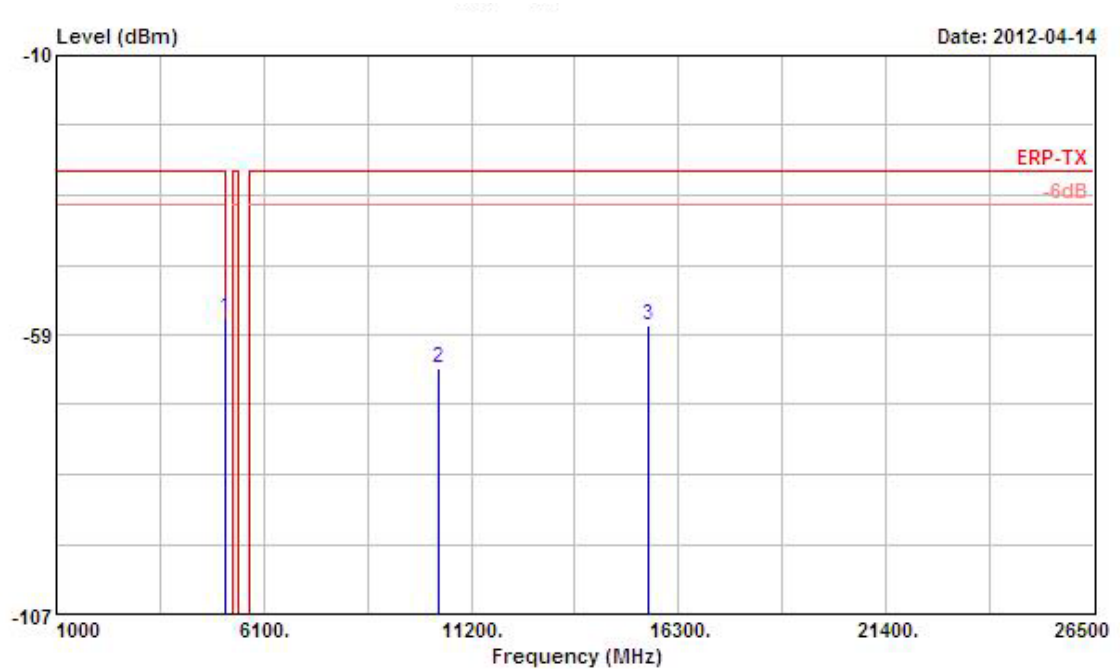
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5749.230	-58.24	-28.24	-30.00	-68.52	10.28
2	11400.000	-60.31	-30.31	-30.00	-78.03	17.72
3	17100.000	-52.85	-22.85	-30.00	-78.98	26.13

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



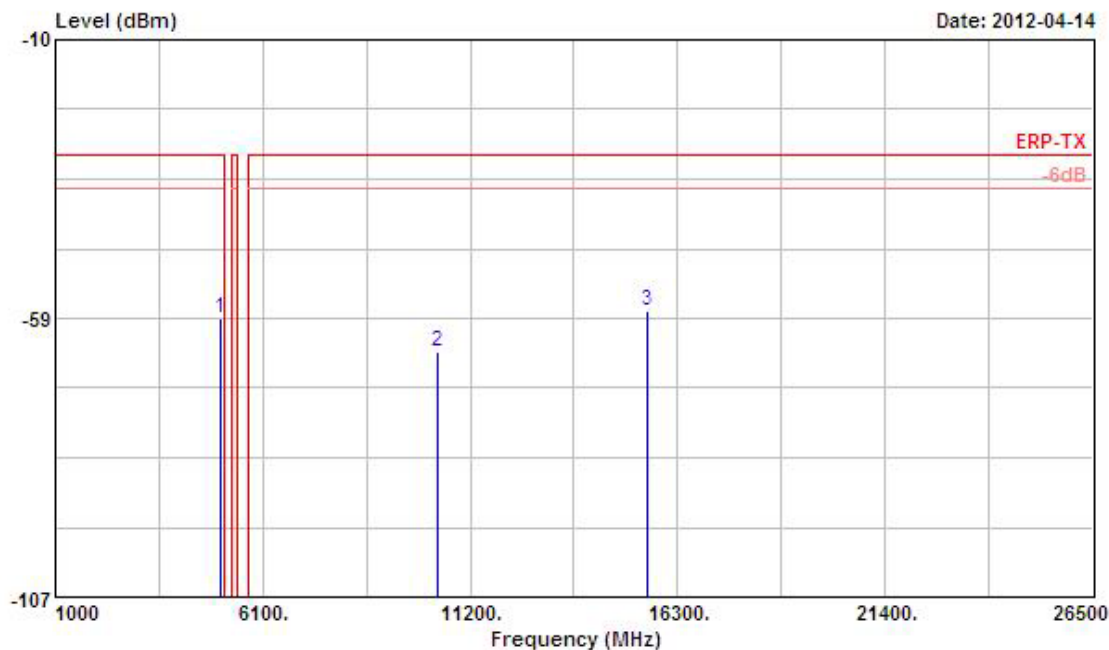
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 38 (40MHz)

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5145.700	-55.73	-25.73	-30.00	-64.58	8.85
2	10380.000	-64.18	-34.18	-30.00	-78.52	14.34
3	15570.000	-56.94	-26.94	-30.00	-78.84	21.90



Vertical



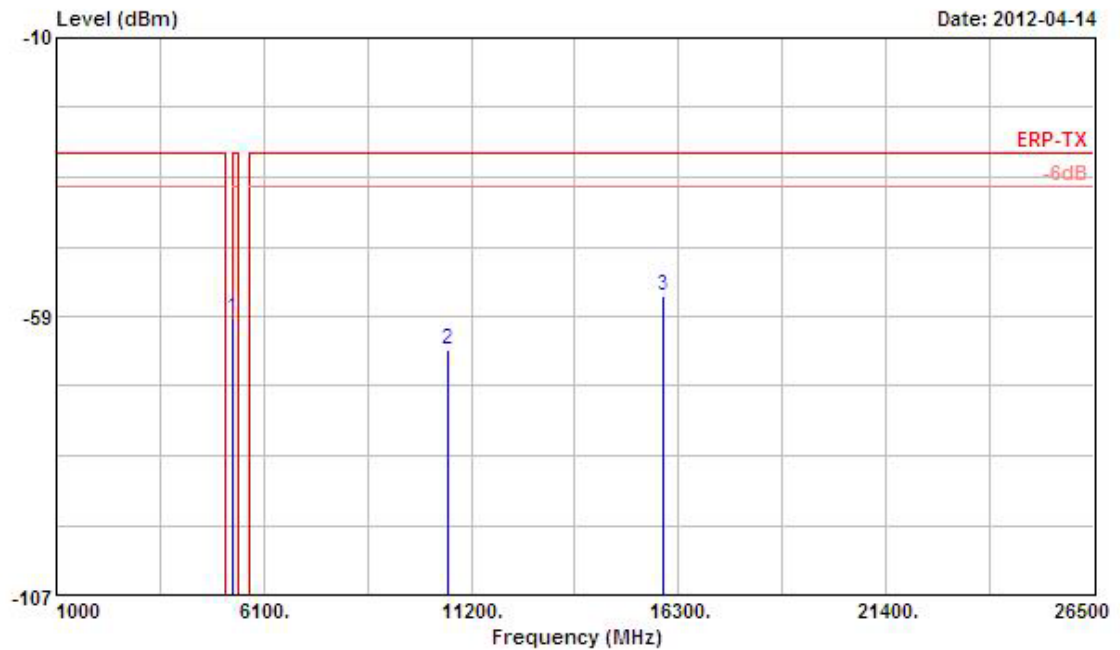
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5068.300	-58.41	-28.41	-30.00	-68.18	9.77
2	10380.000	-64.20	-34.20	-30.00	-79.17	14.97
3	15570.000	-57.18	-27.18	-30.00	-78.74	21.56

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



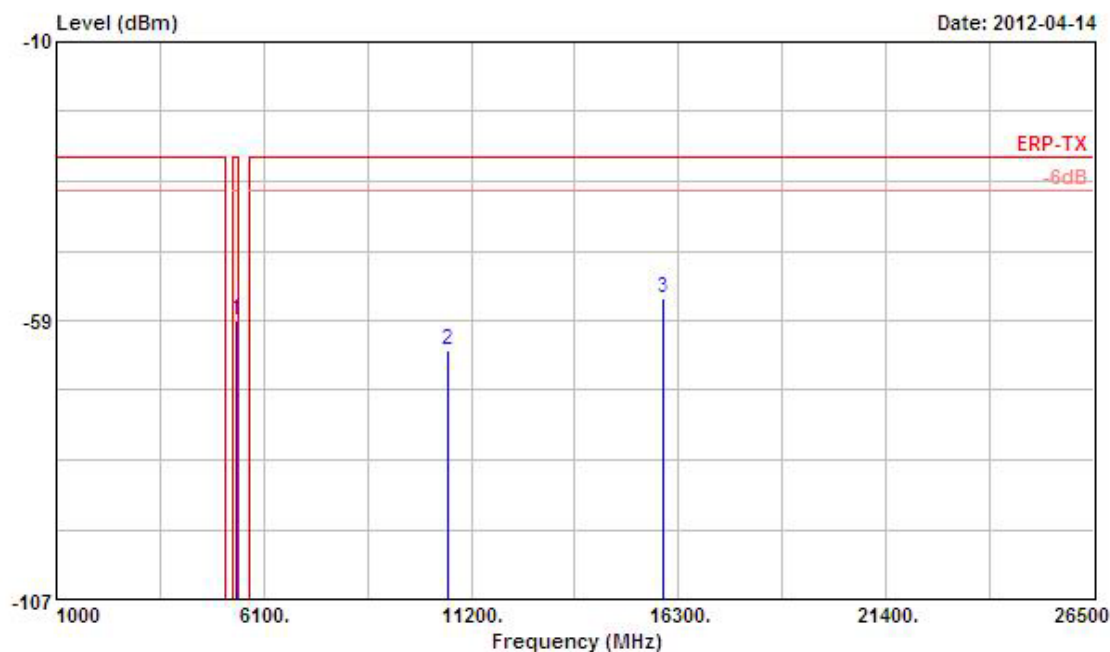
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 62 (40MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5353.720	-58.82	-28.82	-30.00	-67.72	8.90
2	10620.000	-64.37	-34.37	-30.00	-79.04	14.67
3	15930.000	-54.94	-24.94	-30.00	-77.43	22.49



Vertical



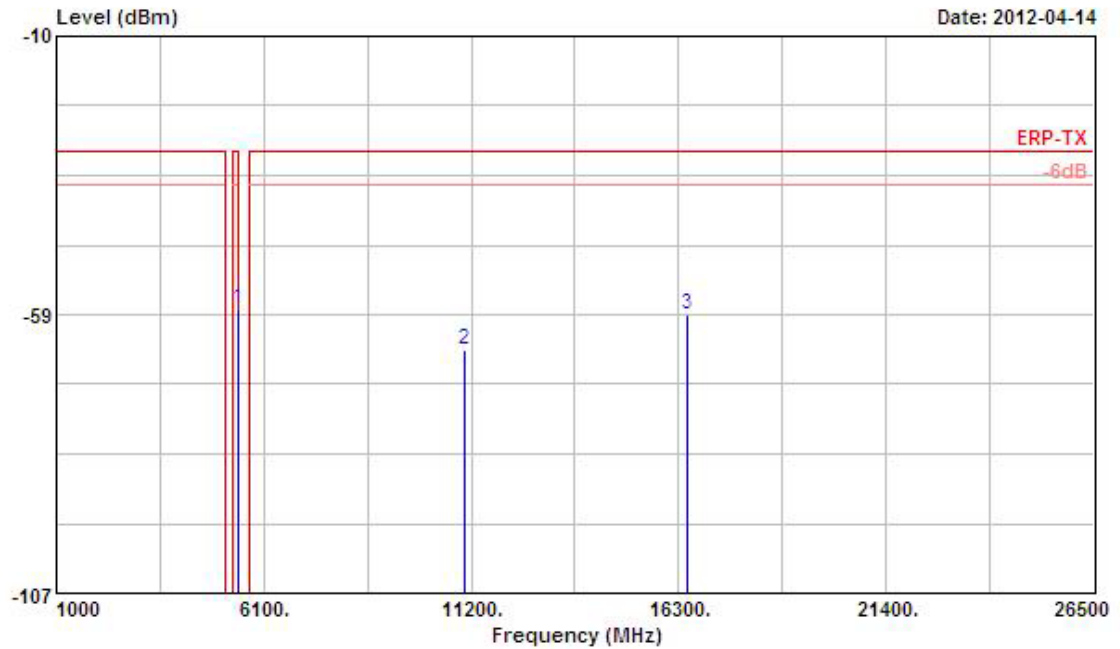
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5446.840	-58.35	-28.35	-30.00	-68.40	10.05
2	10620.000	-63.77	-33.77	-30.00	-79.02	15.25
3	15930.000	-54.75	-24.75	-30.00	-77.78	23.03

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



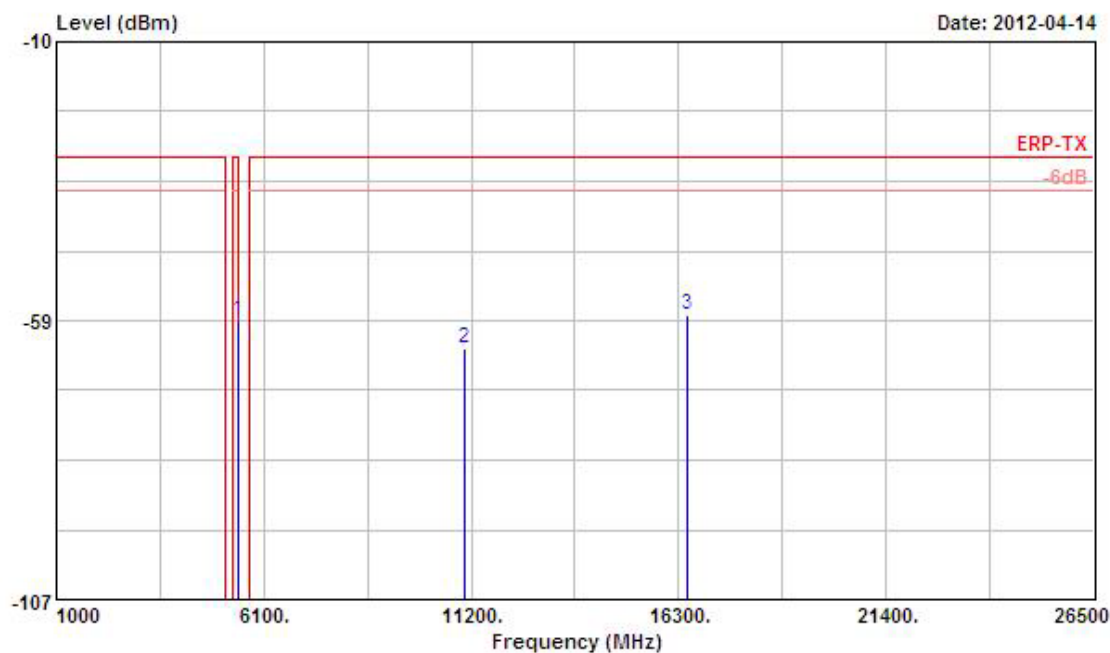
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 102 (40MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5466.400	-57.65	-27.65	-30.00	-66.57	8.92
2	11020.000	-64.53	-34.53	-30.00	-79.41	14.88
3	16530.000	-58.35	-28.35	-30.00	-79.58	21.23



Vertical



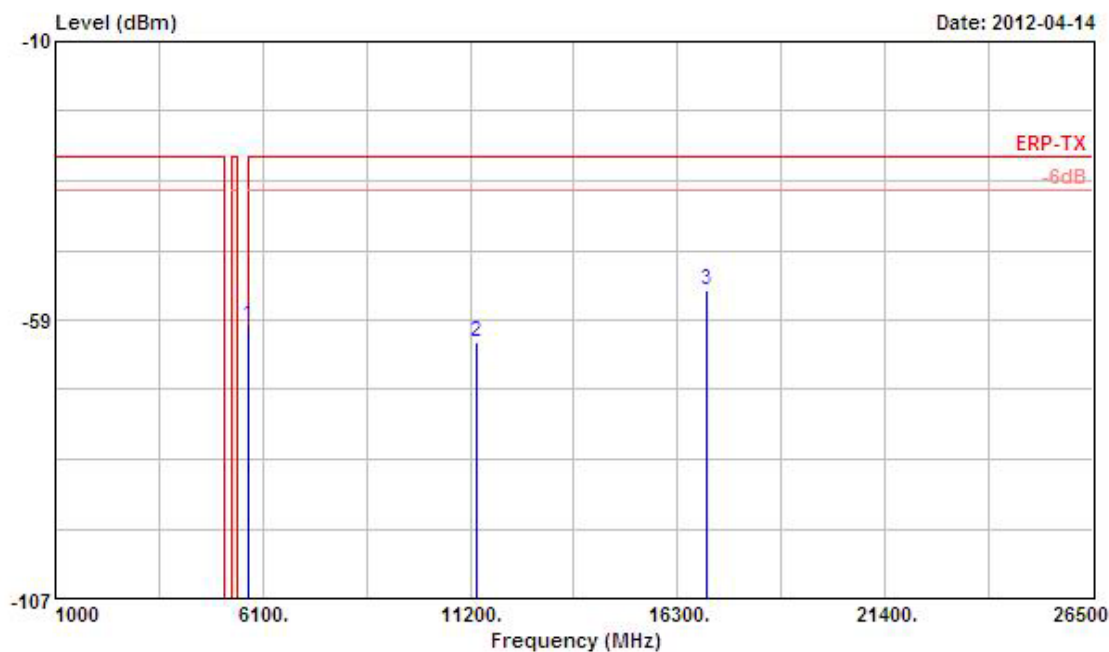
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5461.240	-58.47	-28.47	-30.00	-68.54	10.07
2	11020.000	-63.30	-33.30	-30.00	-79.26	15.96
3	16530.000	-57.39	-27.39	-30.00	-79.48	22.09

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



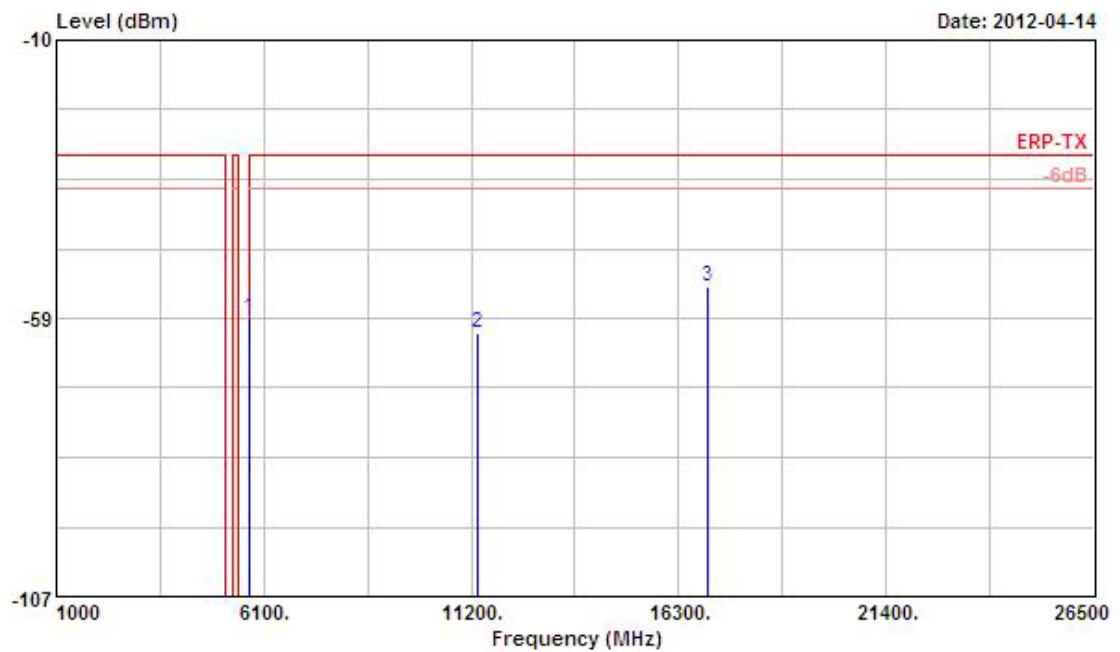
Final Test Date	Apr. 14, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 134 (40MHz)

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	5742.850	-59.41	-29.41	-30.00	-68.53	9.12
2	11340.000	-62.48	-32.48	-30.00	-78.34	15.86
3	17010.000	-53.43	-23.43	-30.00	-78.44	25.01



Vertical



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	5749.230	-58.36	-28.36	-30.00	-68.64	10.28
2	11340.000	-61.22	-31.22	-30.00	-78.59	17.37
3	17010.000	-53.11	-23.11	-30.00	-79.12	26.01

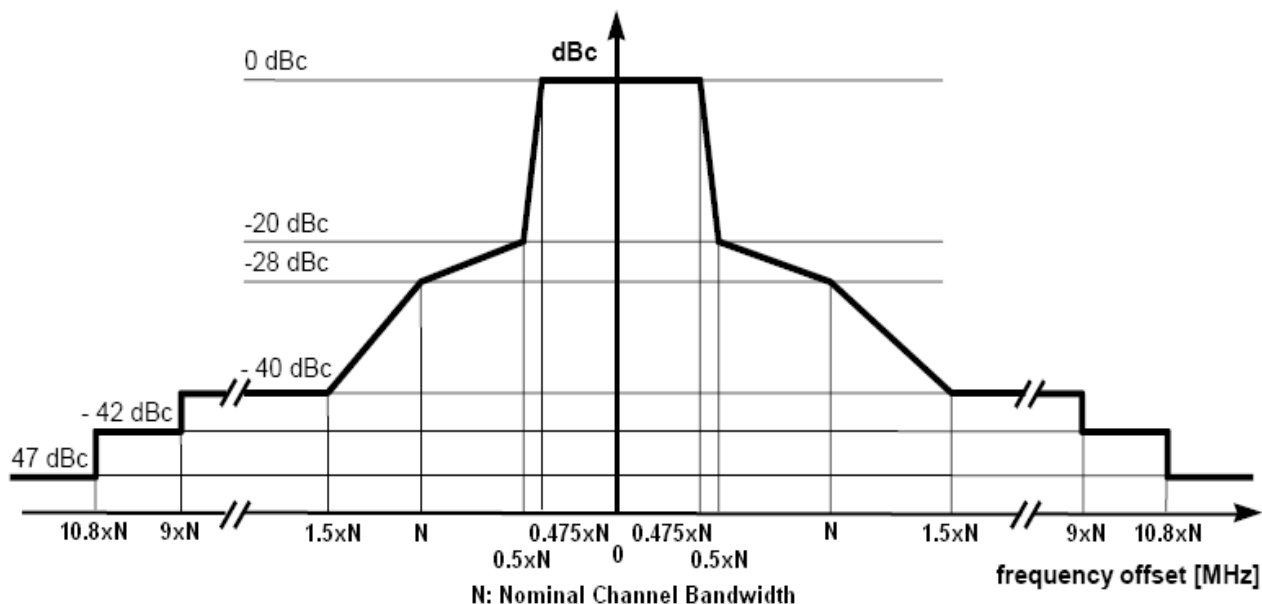
Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.

3.5 Spectrum Mask Measurement

3.5.1 Limit

The average level of the transmitted spectrum within the 5 GHz RLAN bands shall not exceed the following spectrum mask.



NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

3.5.2 Measuring Instruments and Setting

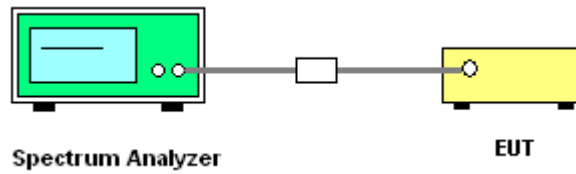
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	1 MHz
VB	30 kHz
Sweep Time	Auto

3.5.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW = 1 MHz, VBW = 30 kHz with average detector and trace was maxhold settings.
3. The spectrum analyzer shall be tuned to measurement frequencies at every 1 MHz interval within $f_c - 0.475 \times N$ MHz to $f_c + 0.475 \times N$ MHz, with zero frequency scans. The maximum average power within $f_c - 0.475 \times N$ MHz to $f_c + 0.475 \times N$ MHz (except f_c) is the reference level for relative power measurements on the channel centred at f_c .
4. The power spectrum of modulation carrier shall be under the spectrum mask.

3.5.4 Test Setup Layout



3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



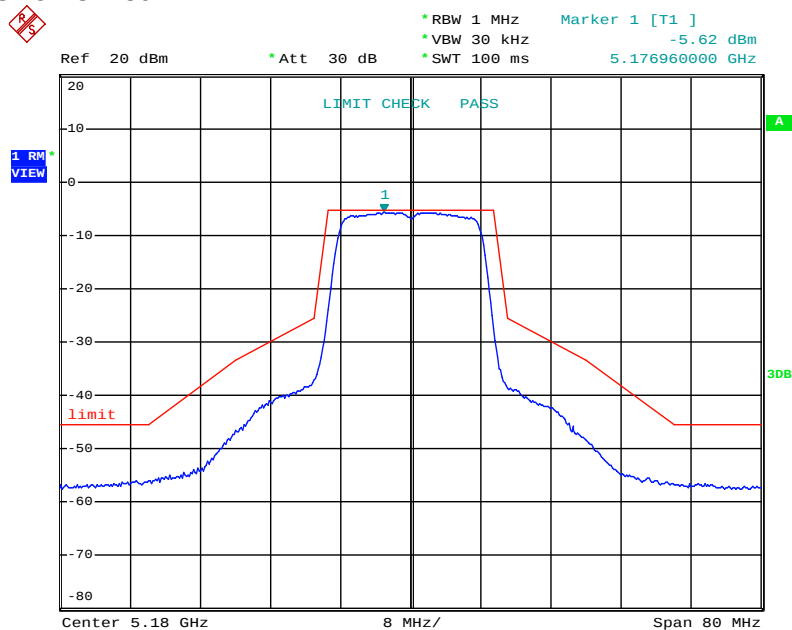
3.5.7 Test Result

Final Test Date	Apr. 24, 2012	Test Site No.	TH01-HY
Temperature	25.9°C	Humidity	30%
Test Engineer	Ian	Configurations	802.11a/n

For single Chains:

Configuration IEEE 802.11a Port 2

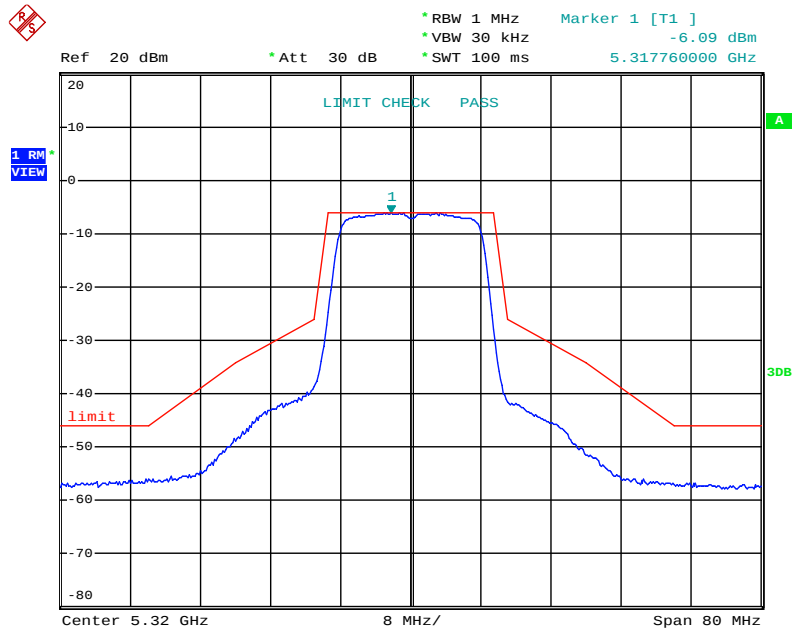
Spectrum Mask on Ch. 36



Date: 24.APR.2012 19:01:22

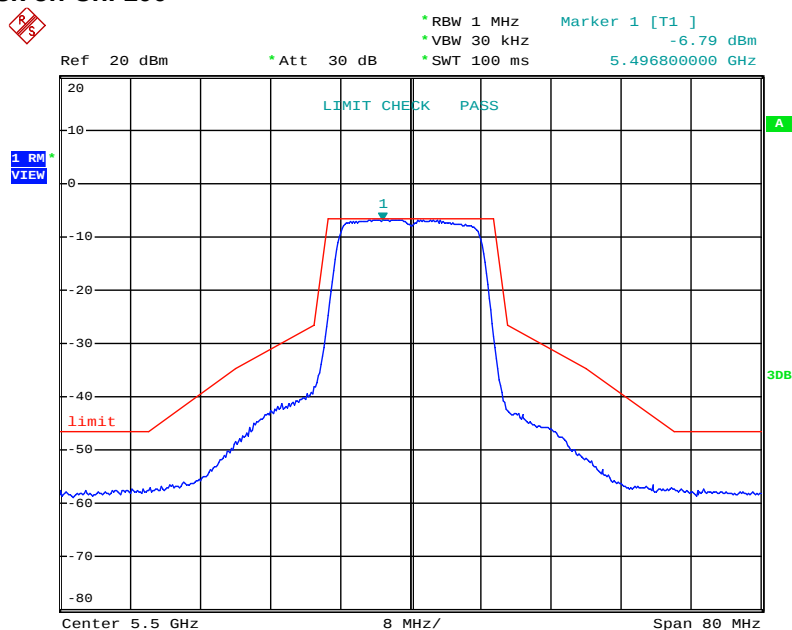


Spectrum Mask on Ch. 64



Date: 24.APR.2012 19:04:20

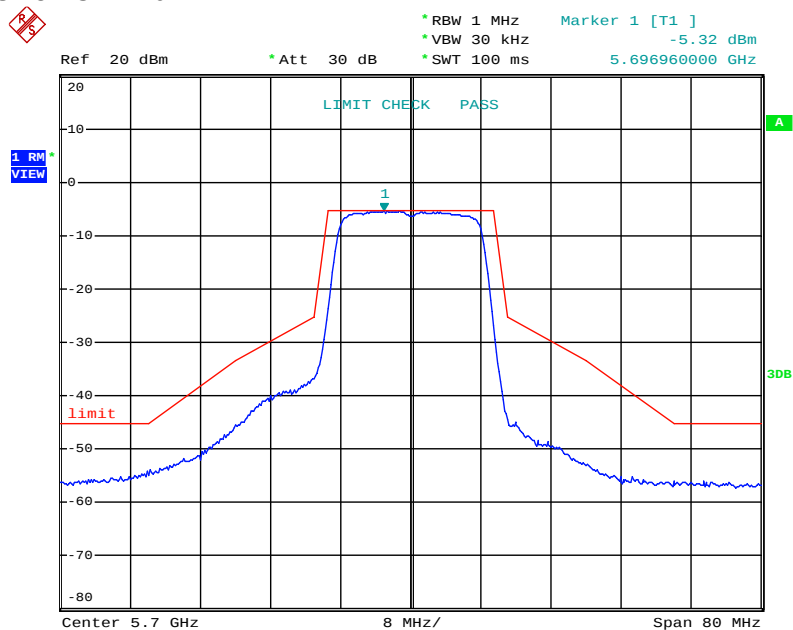
Spectrum Mask on Ch. 100



Date: 24.APR.2012 19:05:00



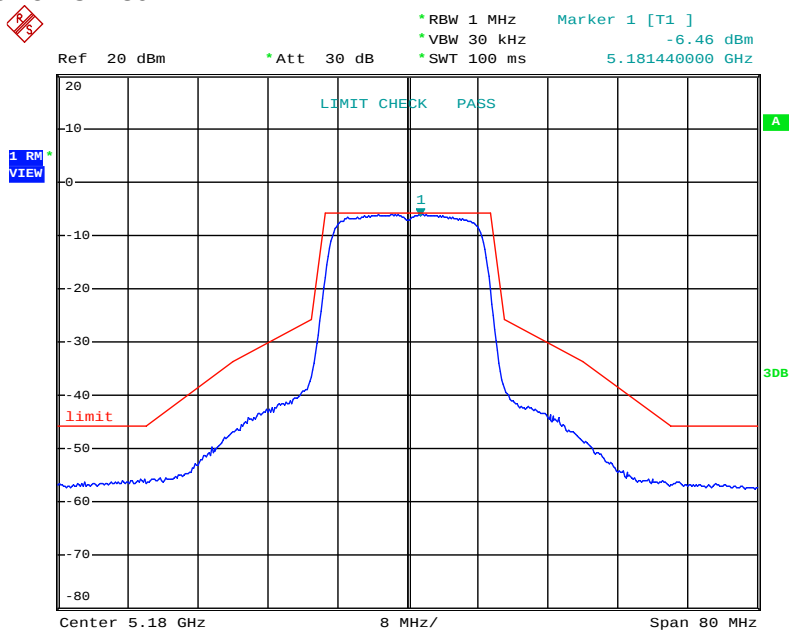
Spectrum Mask on Ch. 140



Date: 24.APR.2012 19:05:26

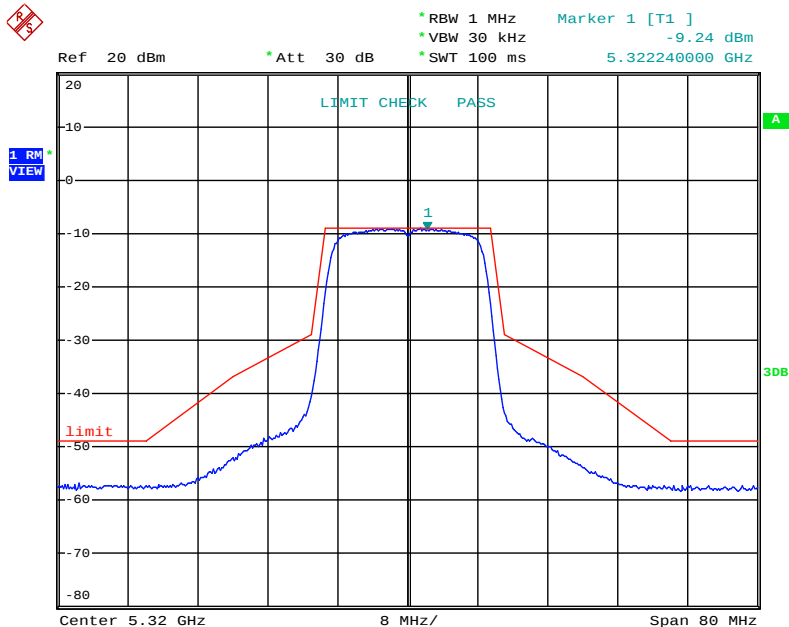


For Two Chains:
Configuration IEEE802.11n (20MHz) Port 1 + Port 2
Spectrum Mask on Ch. 36



Date: 24.APR.2012 19:12:05

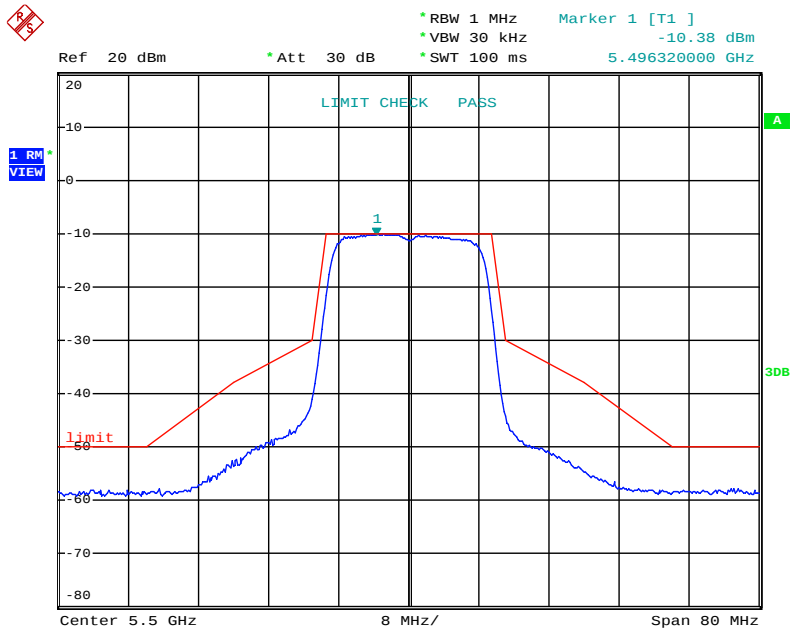
Spectrum Mask on Ch. 64



Date: 24.APR.2012 19:12:34

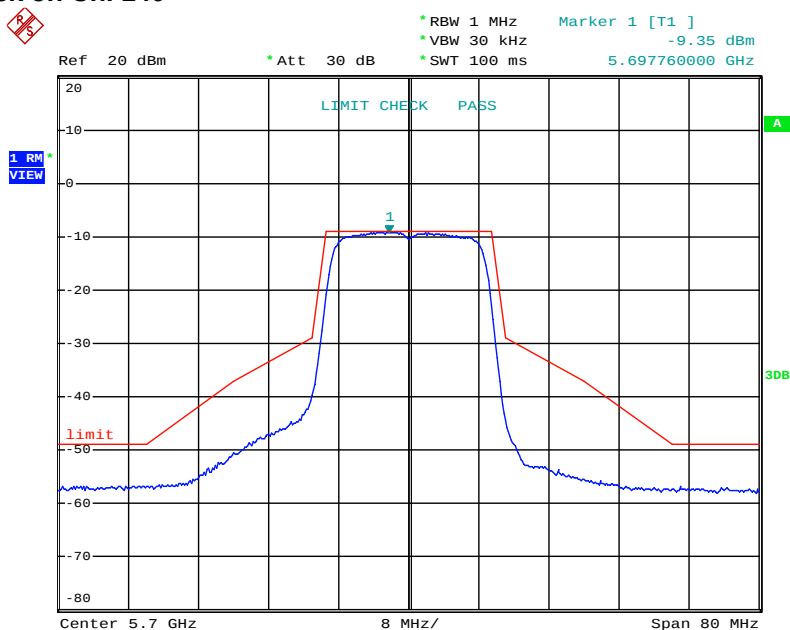


Spectrum Mask on Ch. 100

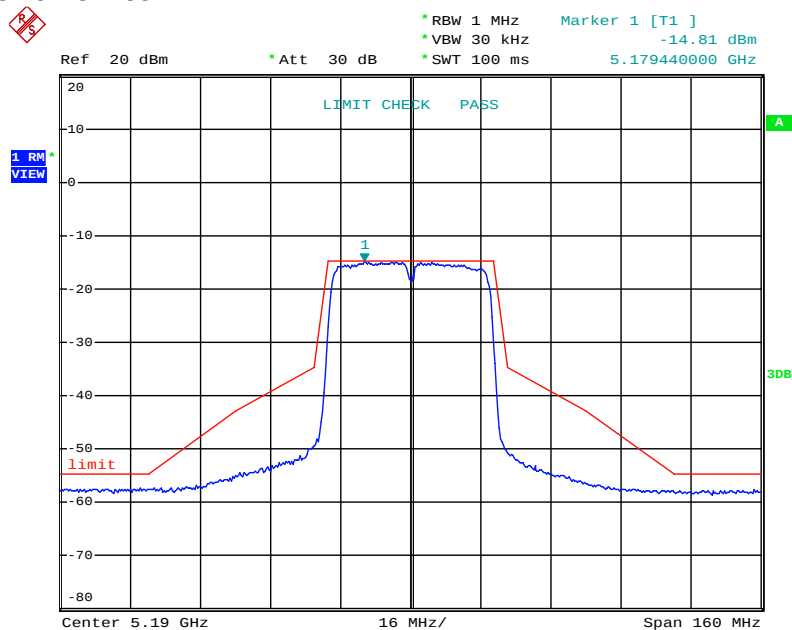


Date: 24.APR.2012 19:13:03

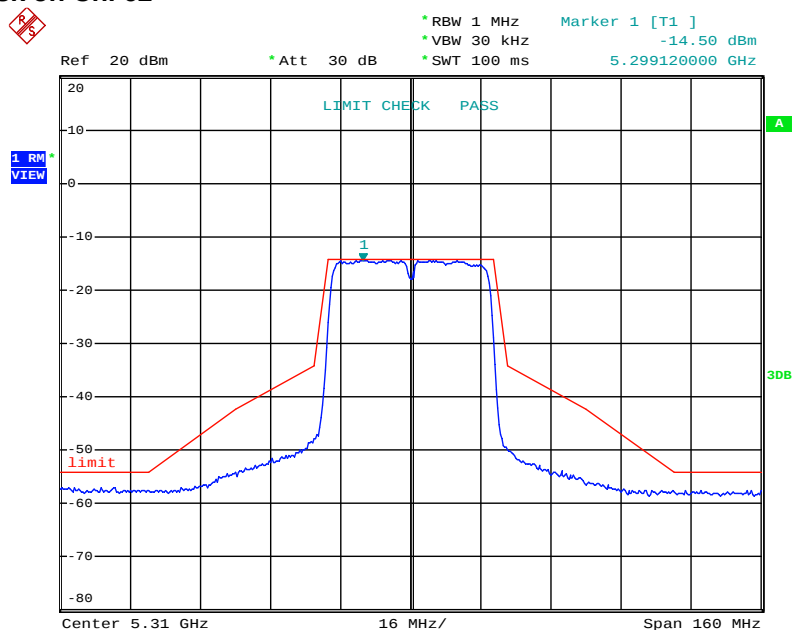
Spectrum Mask on Ch. 140



Date: 24.APR.2012 19:13:32

**Configuration IEEE802.11n (40MHz) Port 1 + Port 2**
Spectrum Mask on Ch. 38

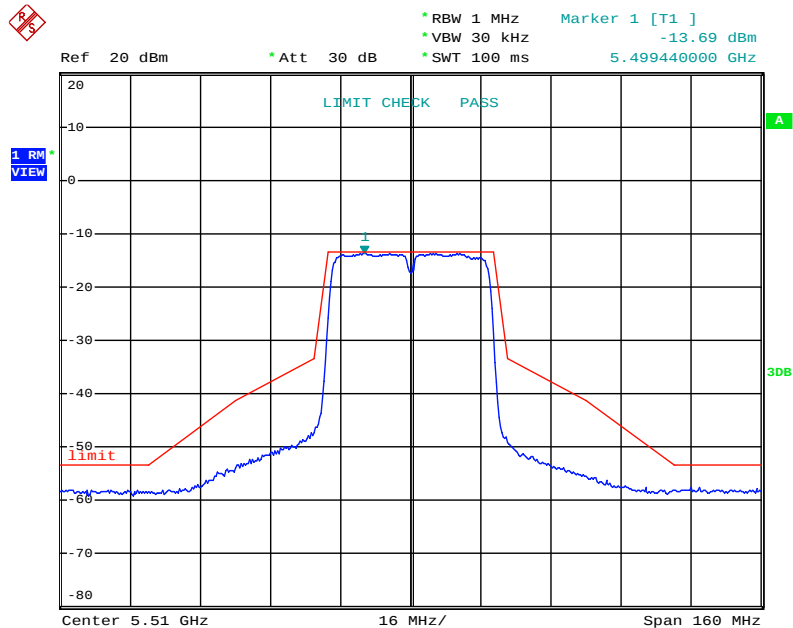
Date: 24.APR.2012 19:15:06

Spectrum Mask on Ch. 62

Date: 24.APR.2012 19:15:39

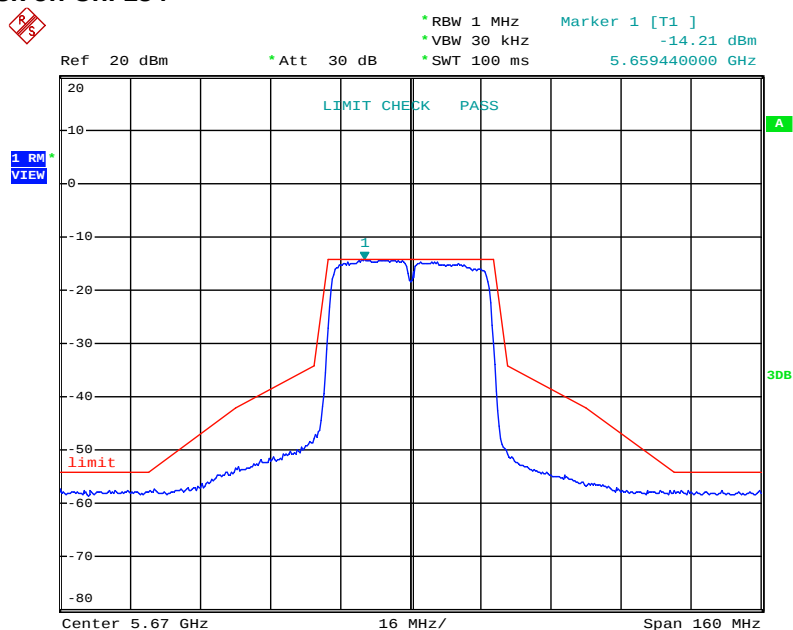


Spectrum Mask on Ch. 102



Date: 24.APR.2012 19:16:11

Spectrum Mask on Ch. 134



Date: 24.APR.2012 19:16:38

3.6 Receiver Spurious Emissions Measurement

3.6.1 Limit

Receiver spurious emissions are emissions at any frequency when the equipment is in receiving mode. The spurious emissions of the receiver shall not exceed the values in following table.

Frequency Range (MHz)	Limit (dBm)
30~1000	-57
1000~26500	-47

3.6.2 Measuring Instruments and Setting

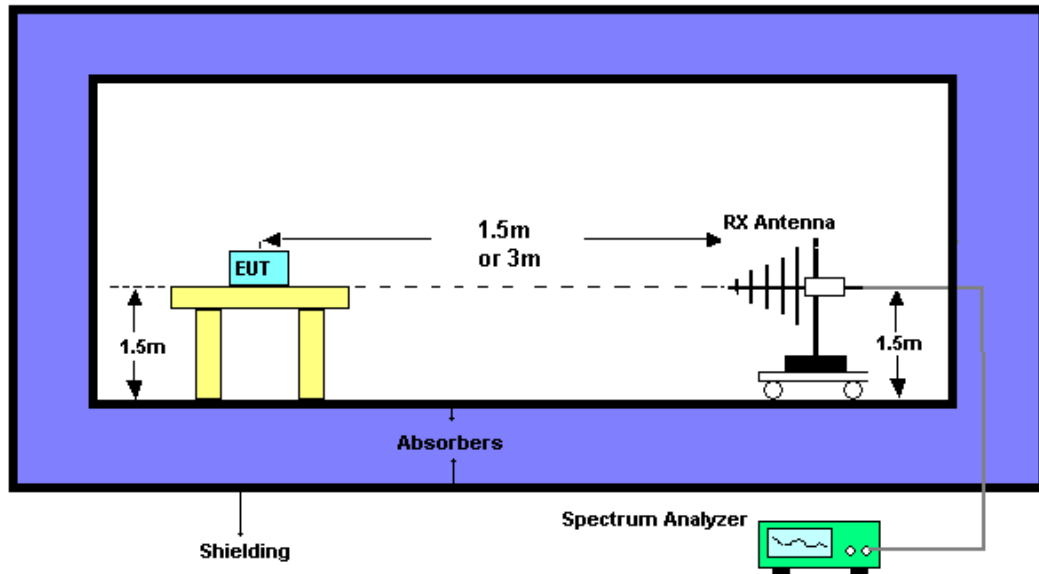
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
Detector	Positive RMS
Span	100 MHz
Sweep Time	Auto
RB / VB	(Below 1GHz) 100 kHz / 100 kHz ; (Above 1GHz) 1 MHz / 1 MHz

3.6.3 Test Procedures

1. The EUT was placed on the top of the turntable in fully anechoic chamber.
2. The test shall be made in the transmitting mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. For 30~1000MHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable. For 1~26.5GHz measurement, the receiving Horn antenna was placed 1.5 meters far away from the turntable.
4. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
5. Replace the EUT by standard antenna and feed the RF port by signal generator.
6. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
7. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
8. The level of the spurious emission is the power level of (7) plus the gain of the standard antenna in dBd and minus the loss of the cable used between the signal generator and the standard antenna.
9. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range.

3.6.4 Test Setup Layout



3.6.5 Test Deviation

There is no deviation with the original standard.

3.6.6 EUT Operation during Test

The EUT was programmed to be in continuously receiving mode.

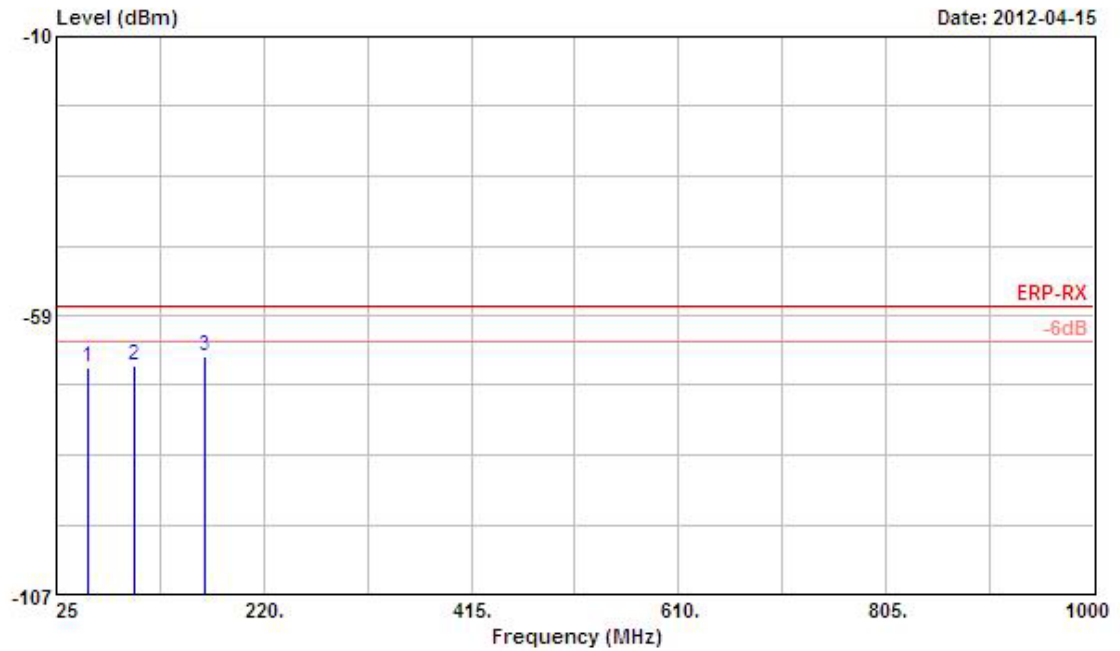


3.6.7 Results of Receiver Spurious Emissions Below 1GHz

For Single Chain:

Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 140

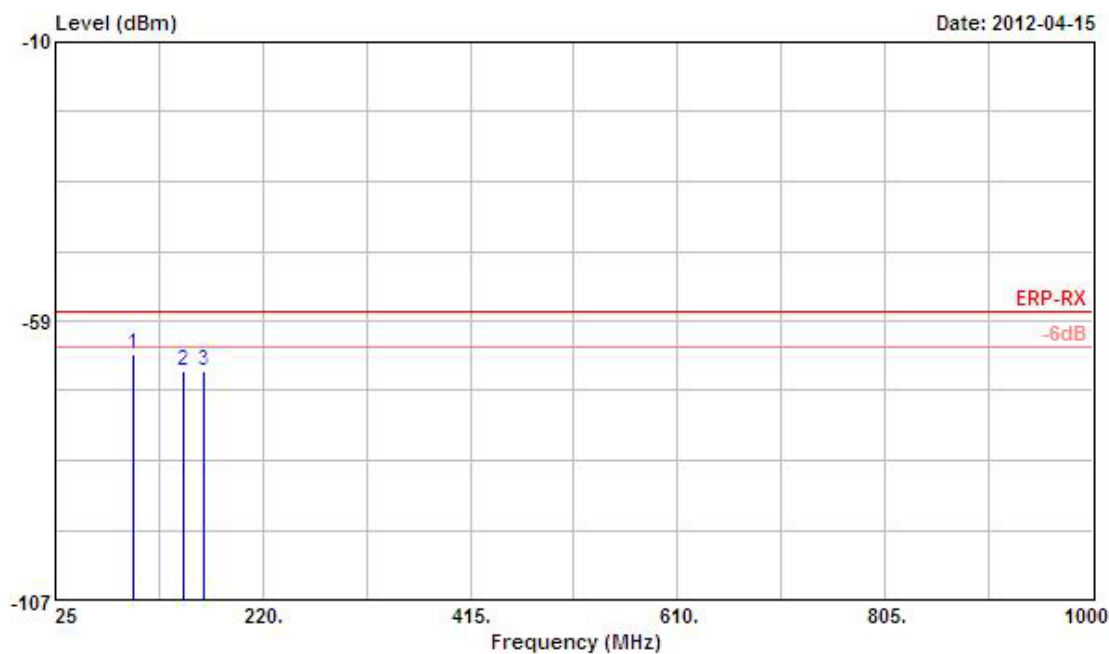
Horizontal



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1 @	54.250	-67.67	-10.67	-57.00	-63.59	-4.08
2 @	98.130	-67.29	-10.29	-57.00	-61.28	-6.01
3 @	164.430	-65.55	-8.55	-57.00	-60.58	-4.97



Vertical



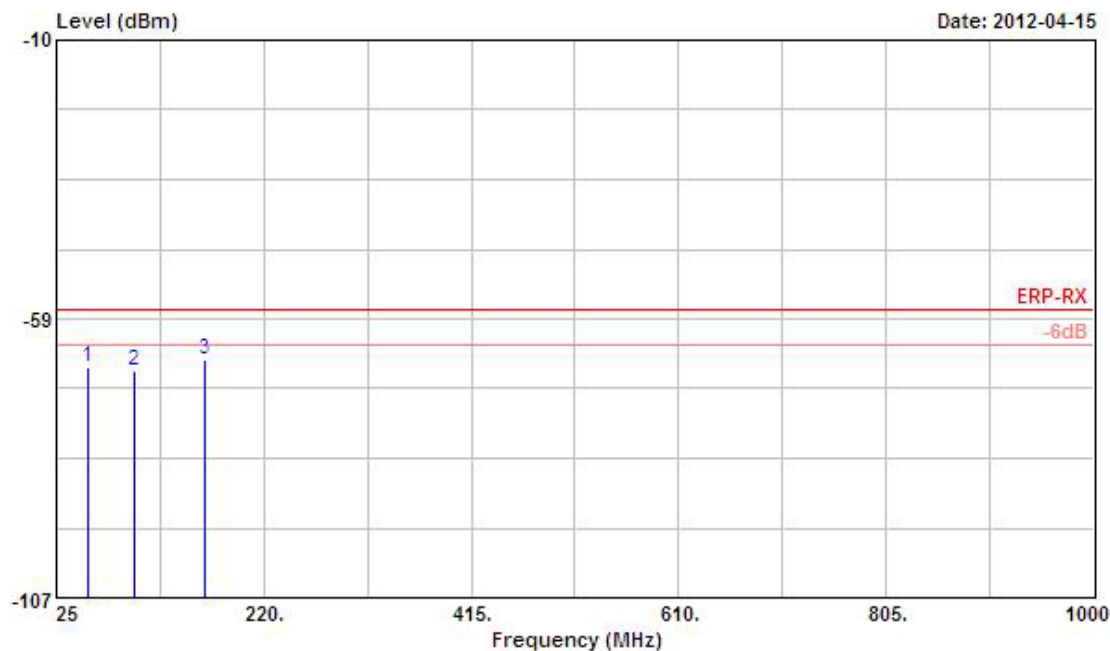
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	98.130	-64.16	-7.16	-57.00	-59.07	-5.09
2	144.930	-67.08	-10.08	-57.00	-62.92	-4.16
3	164.430	-67.07	-10.07	-57.00	-61.66	-5.41

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



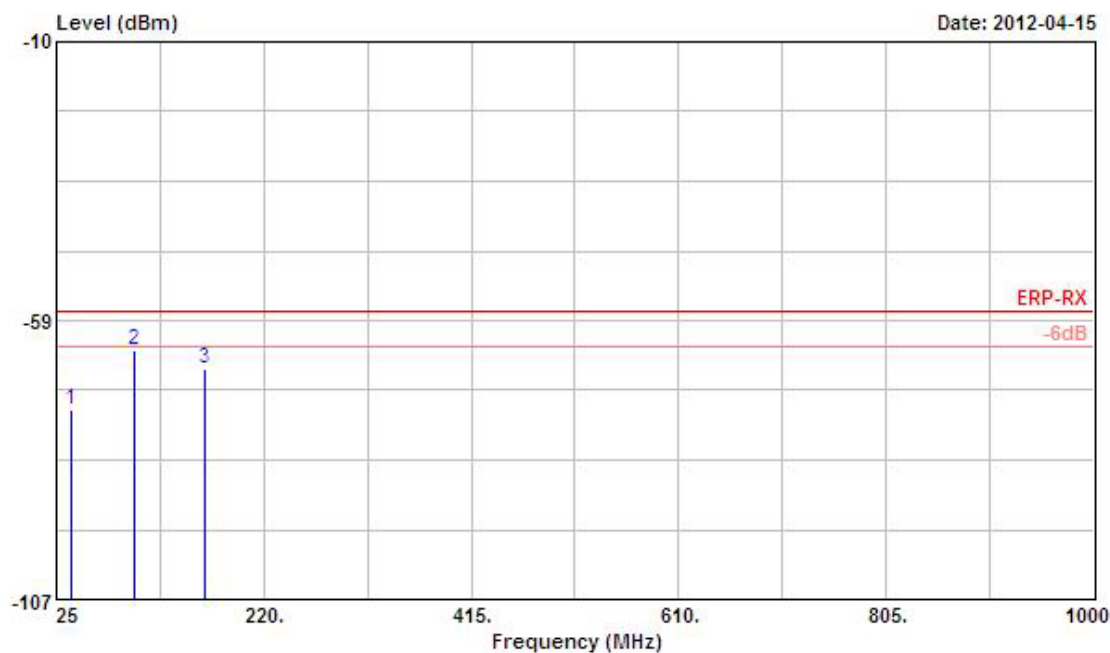
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 140 (20MHz)

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	55.230	-66.90	-9.90	-57.00	-63.83	-3.07
2	98.130	-67.56	-10.56	-57.00	-61.55	-6.01
3	164.430	-65.51	-8.51	-57.00	-60.54	-4.97



Vertical



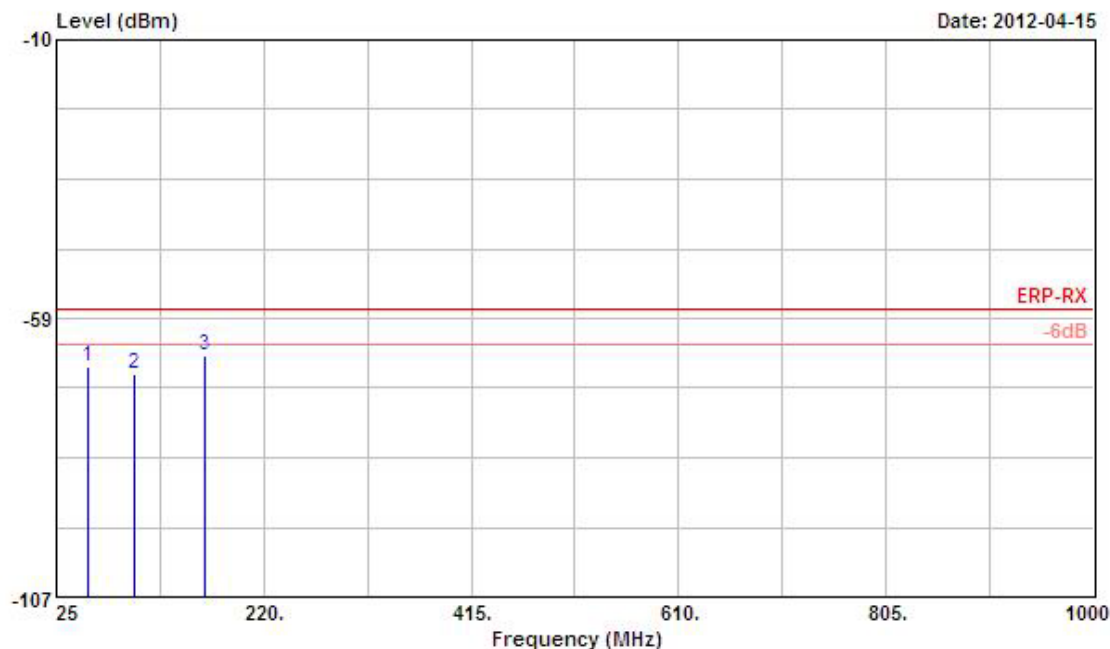
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	39.630	-74.10	-17.10	-57.00	-73.35	-0.75
2	98.130	-63.82	-6.82	-57.00	-58.73	-5.09
3	164.430	-66.96	-9.96	-57.00	-61.55	-5.41

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



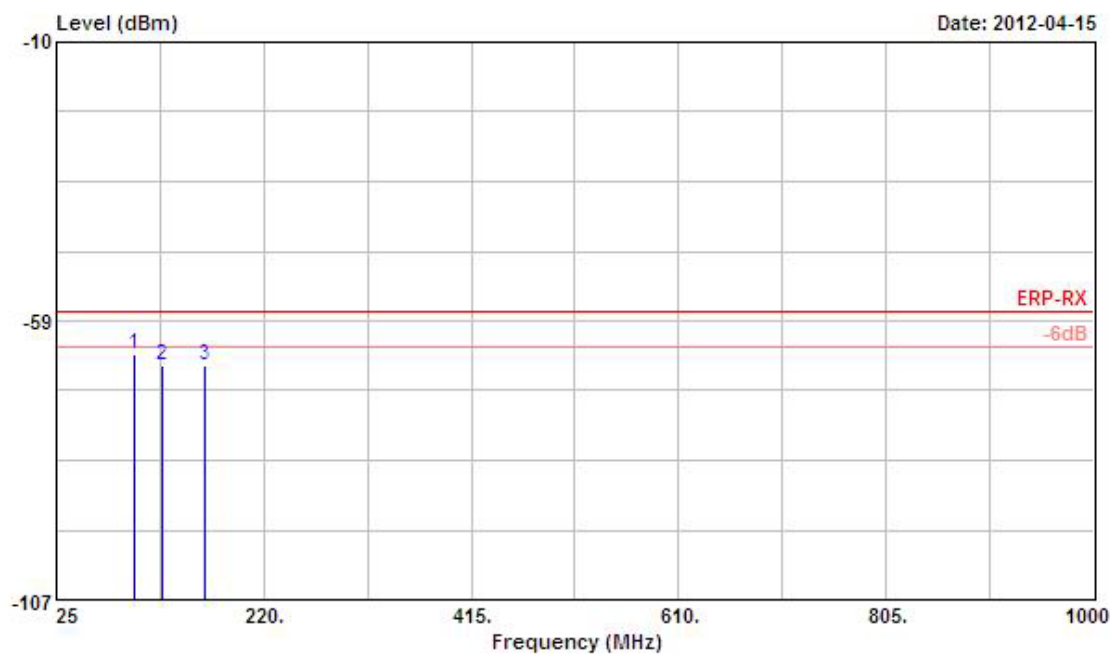
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 134 (40MHz)

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 @	55.230	-66.95	-9.95	-57.00	-63.88	-3.07
2 @	98.130	-68.28	-11.28	-57.00	-62.27	-6.01
3 @	164.430	-64.83	-7.83	-57.00	-59.86	-4.97



Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	98.130	-64.26	-7.26	-57.00	-59.17	-5.09
2	124.450	-66.26	-9.26	-57.00	-62.05	-4.21
3	164.430	-66.34	-9.34	-57.00	-60.93	-5.41

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.

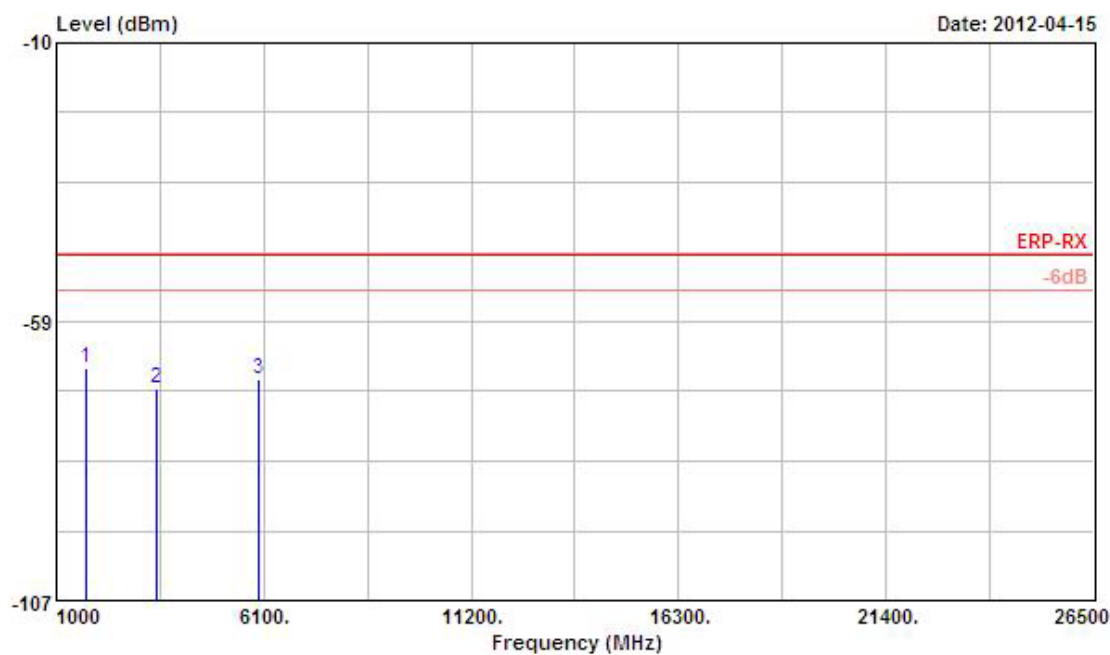


3.6.8 Results of Receiver Spurious Emissions Above 1GHz

For Single Chain:

Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 36

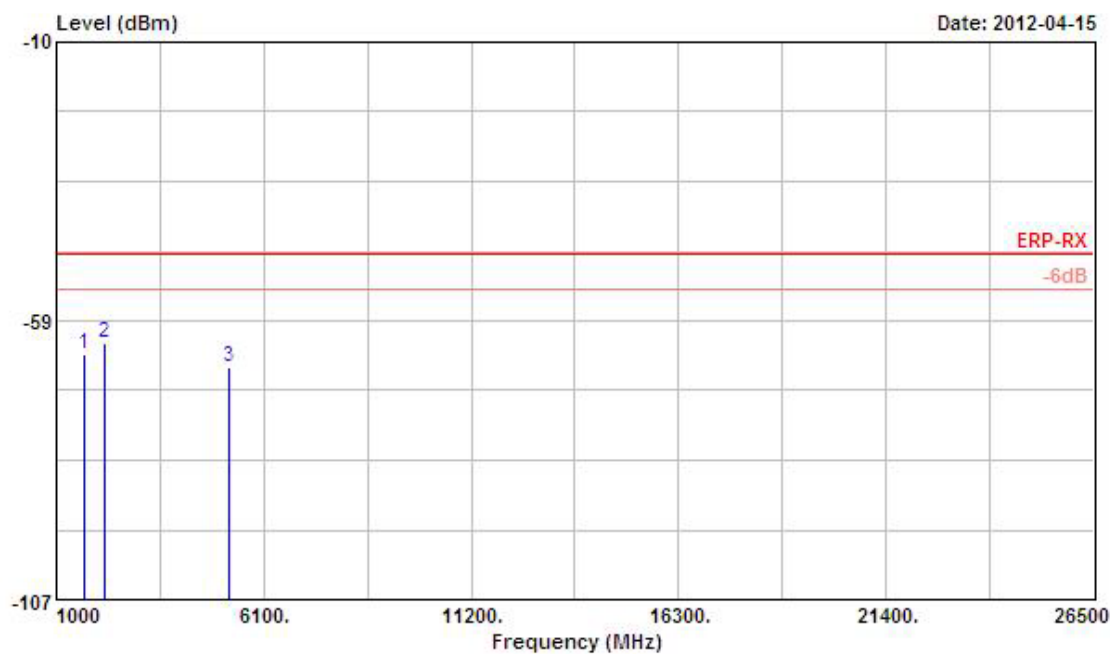
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1715.000	-66.55	-19.55	-47.00	-66.19	-0.36
2	3450.000	-70.08	-23.08	-47.00	-73.15	3.07
3	5990.000	-68.64	-21.64	-47.00	-77.95	9.31



Vertical



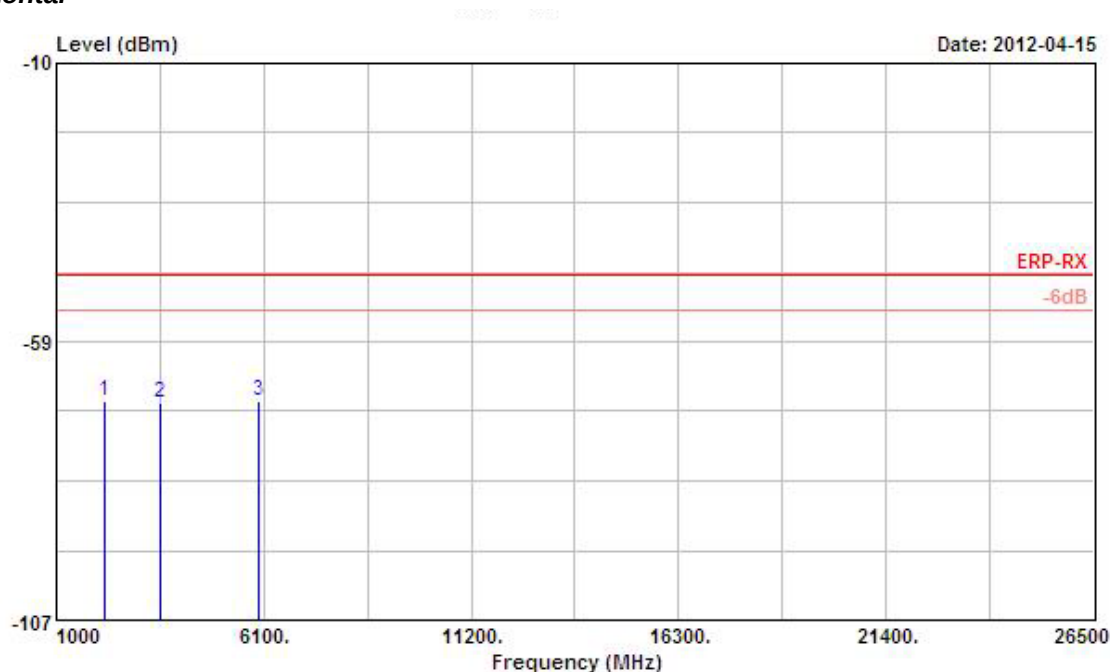
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	@ 1695.000	-64.19	-17.19	-47.00	-63.39	-0.80
2	@ 2170.000	-62.30	-15.30	-47.00	-64.58	2.28
3	@ 5235.000	-66.68	-19.68	-47.00	-76.57	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



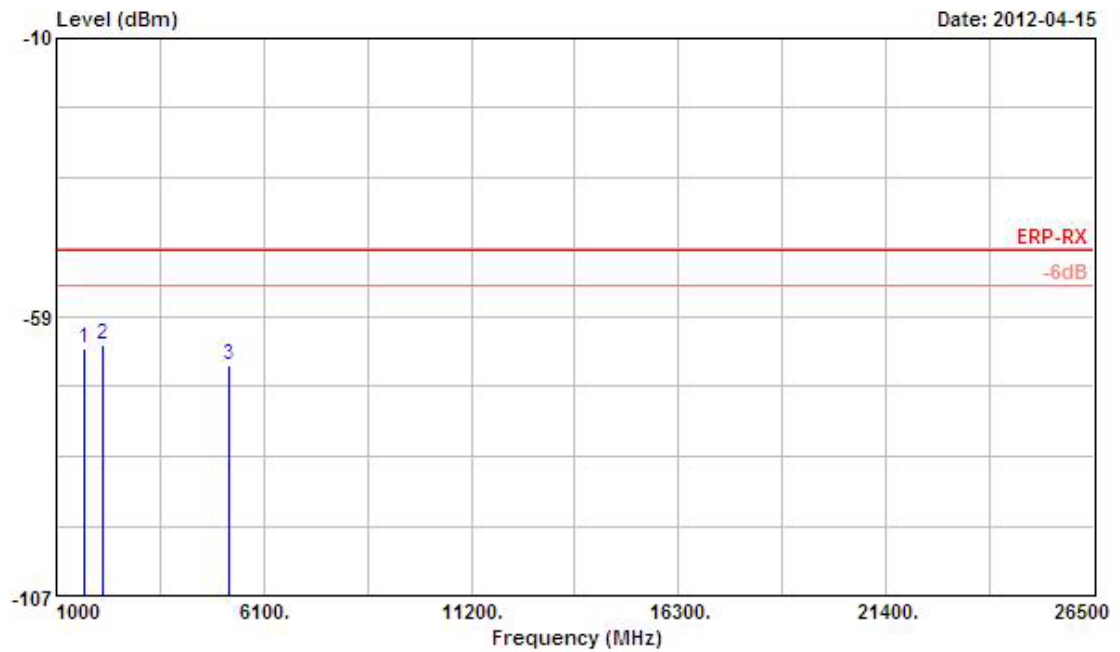
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 64

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	2195.000	-68.79	-21.79	-47.00	-71.27	2.48
2	3535.000	-69.17	-22.17	-47.00	-72.33	3.16
3	5970.000	-68.77	-21.77	-47.00	-78.06	9.29



Vertical



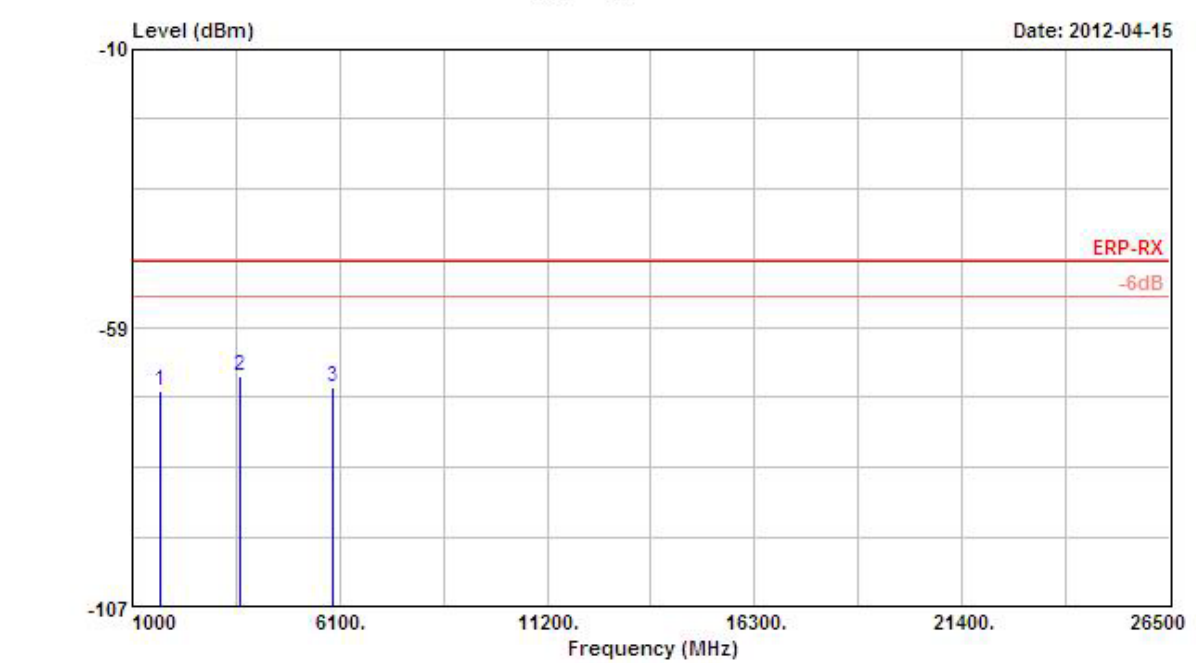
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1690.000	-63.84	-16.84	-47.00	-63.04	-0.80
2	2135.000	-63.29	-16.29	-47.00	-65.57	2.28
3	5235.000	-66.78	-19.78	-47.00	-76.67	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



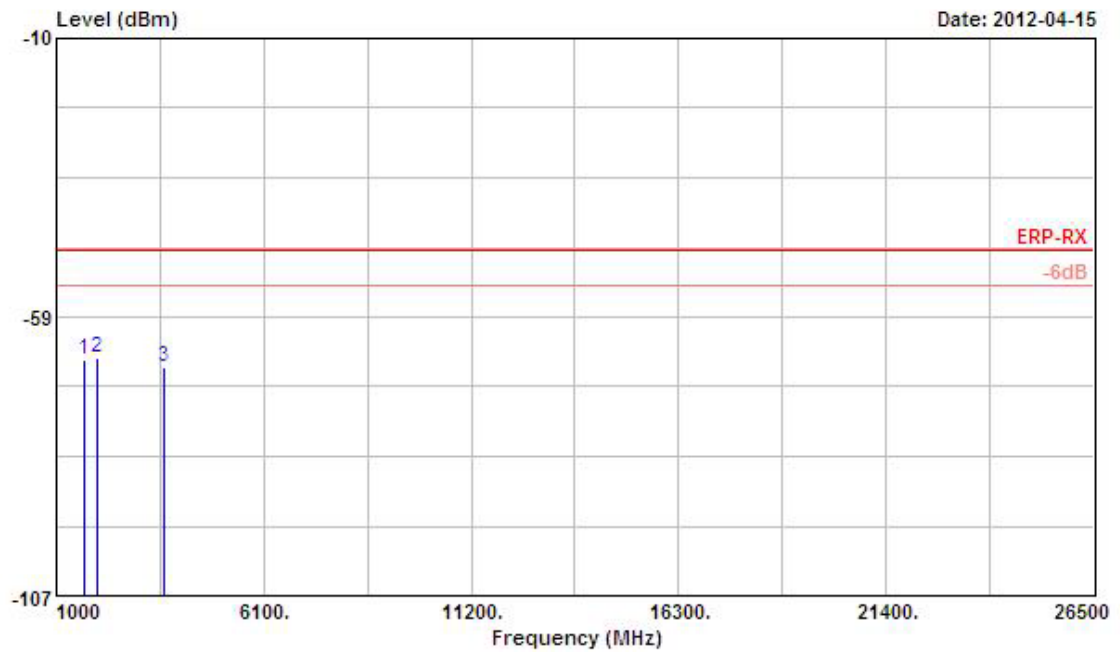
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 100

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1695.000	-69.34	-22.34	-47.00	-68.71	-0.63
2	3655.000	-67.03	-20.03	-47.00	-70.60	3.57
3	5915.000	-68.69	-21.69	-47.00	-77.94	9.25



Vertical



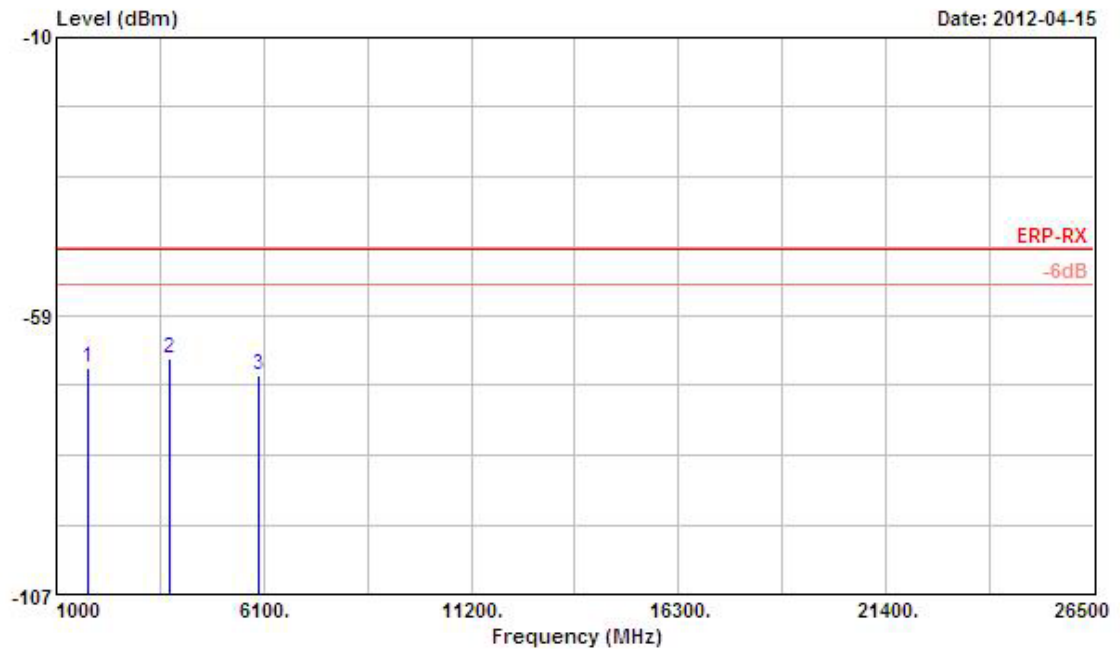
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1675.000	-66.07	-19.07	-47.00	-65.01	-1.06
2	1990.000	-65.55	-18.55	-47.00	-67.82	2.27
3	3655.000	-67.39	-20.39	-47.00	-71.23	3.84

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



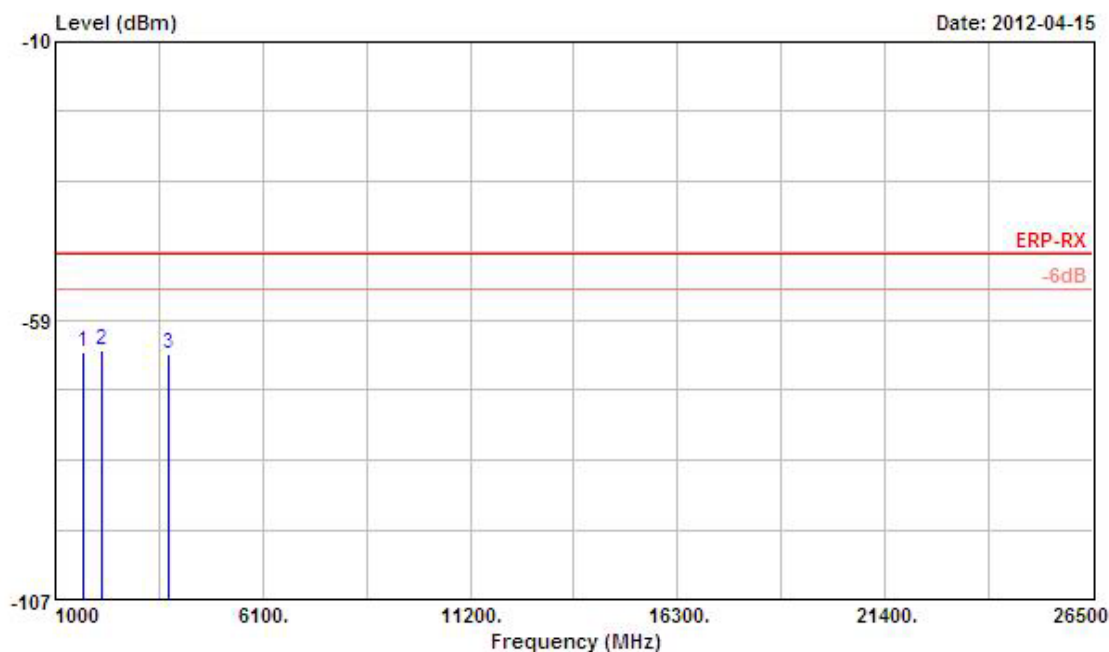
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11a / Ch. 140

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1790.000	-67.40	-20.40	-47.00	-67.82	0.42
2	3795.000	-65.93	-18.93	-47.00	-69.99	4.06
3	5990.000	-68.87	-21.87	-47.00	-78.18	9.31



Vertical



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1690.000	-63.94	-16.94	-47.00	-63.14	-0.80
2	2150.000	-63.57	-16.57	-47.00	-65.85	2.28
3	3795.000	-64.16	-17.16	-47.00	-68.44	4.28

Note:

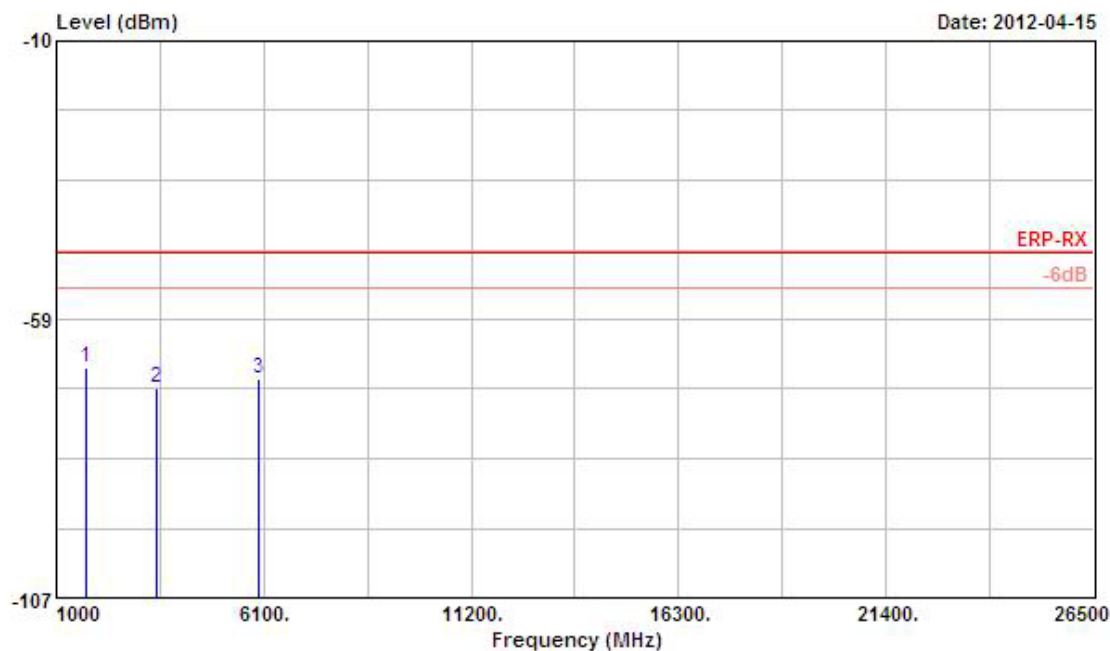
The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



For Two Chains:

Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 36 (20MHz)

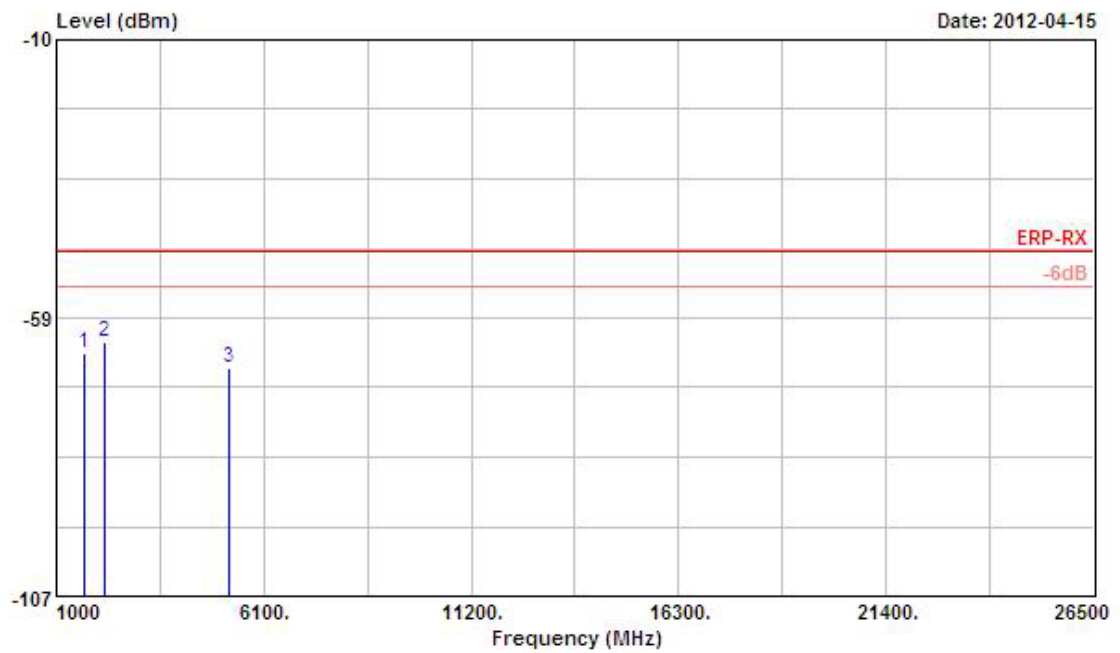
Horizontal



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1715.000	-67.01	-20.01	-47.00	-66.65	-0.36
2	3450.000	-70.42	-23.42	-47.00	-73.49	3.07
3	5990.000	-68.87	-21.87	-47.00	-78.18	9.31



Vertical



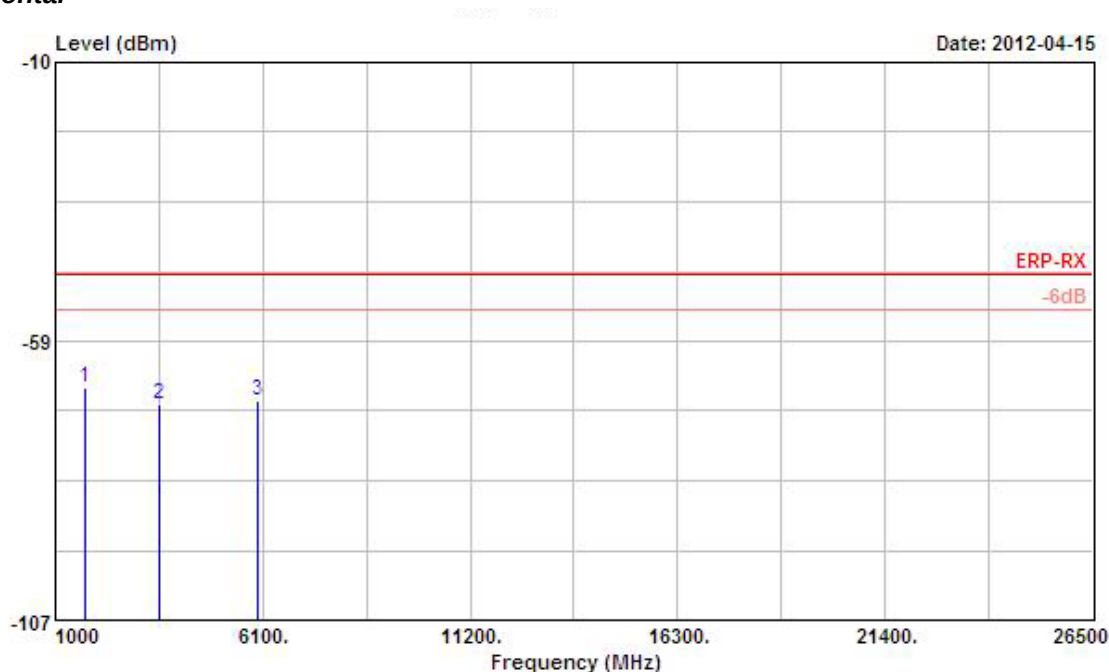
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1670.000	-64.78	-17.78	-47.00	-63.72	-1.06
2	2170.000	-62.65	-15.65	-47.00	-64.93	2.28
3	5235.000	-67.18	-20.18	-47.00	-77.07	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



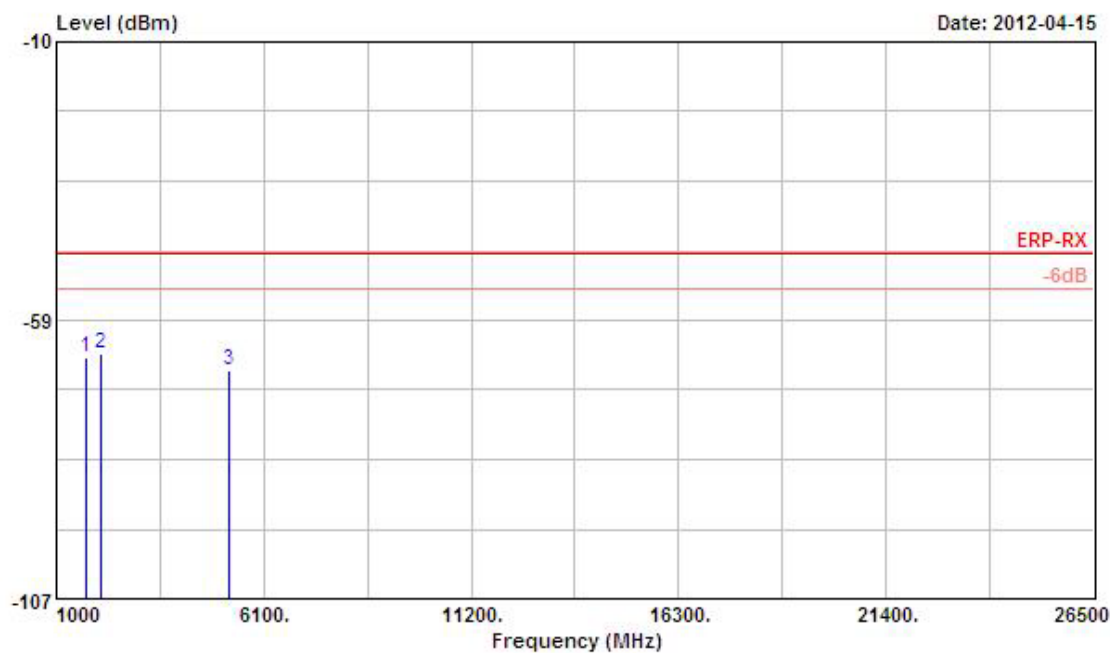
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 64 (20MHz)

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1715.000	-66.58	-19.58	-47.00	-66.22	-0.36
2	3535.000	-69.42	-22.42	-47.00	-72.58	3.16
3	5990.000	-68.87	-21.87	-47.00	-78.18	9.31



Vertical



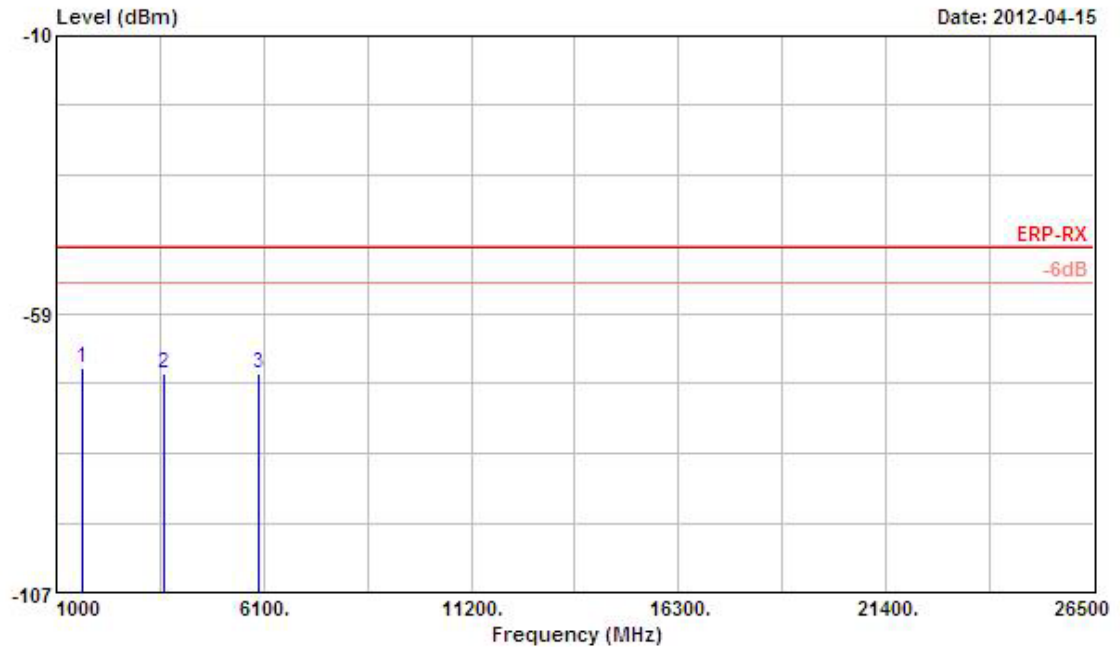
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1735.000	-64.82	-17.82	-47.00	-64.53	-0.29
2	2115.000	-64.41	-17.41	-47.00	-66.69	2.28
3	5235.000	-67.08	-20.08	-47.00	-76.97	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



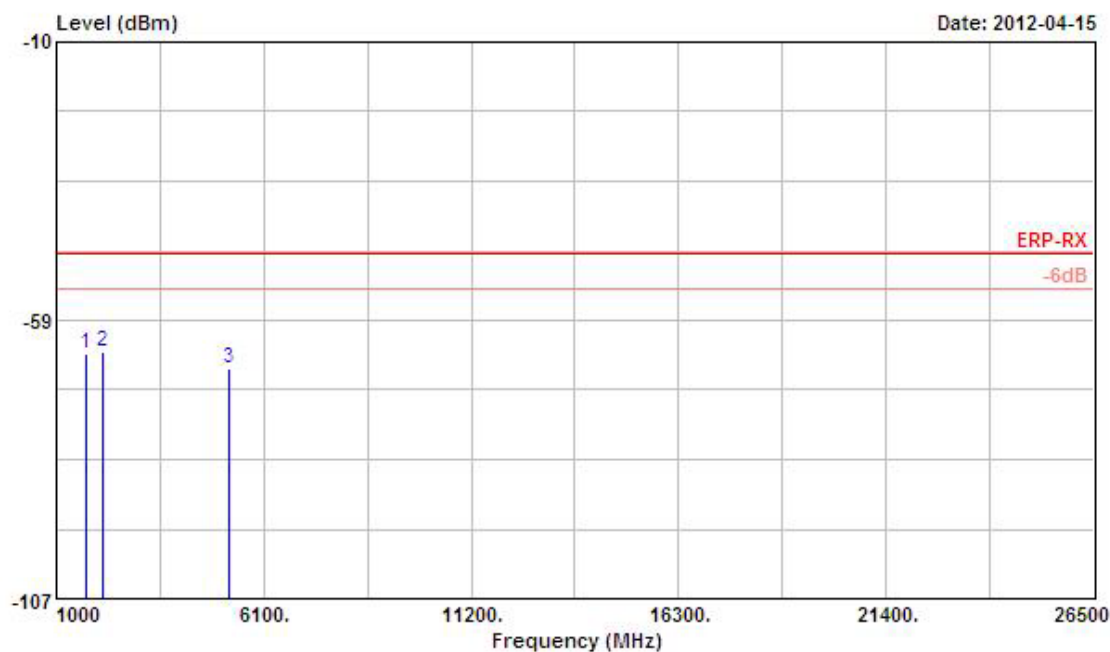
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 100 (20MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1630.000	-68.01	-21.01	-47.00	-66.86	-1.15
2	3655.000	-68.72	-21.72	-47.00	-72.29	3.57
3	5990.000	-68.87	-21.87	-47.00	-78.18	9.31



Vertical



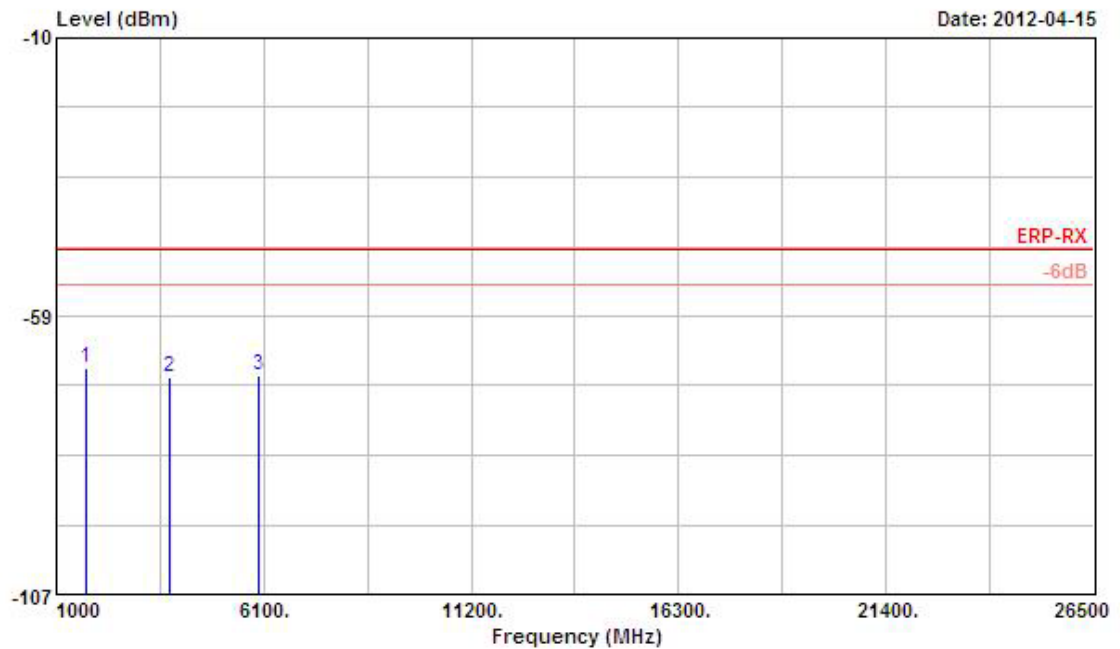
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1715.000	-64.48	-17.48	-47.00	-63.94	-0.54
2	2150.000	-63.92	-16.92	-47.00	-66.20	2.28
3	5235.000	-66.78	-19.78	-47.00	-76.67	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



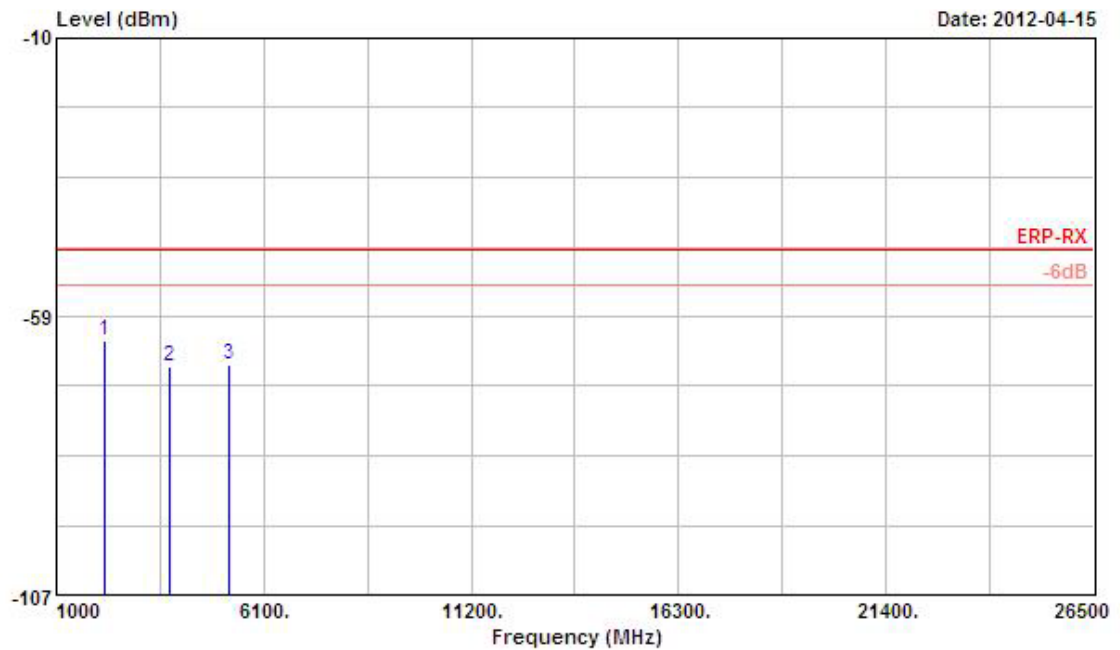
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 140 (20MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1710.000	-67.64	-20.64	-47.00	-67.28	-0.36
2	3795.000	-69.22	-22.22	-47.00	-73.28	4.06
3	5990.000	-68.87	-21.87	-47.00	-78.18	9.31



Vertical



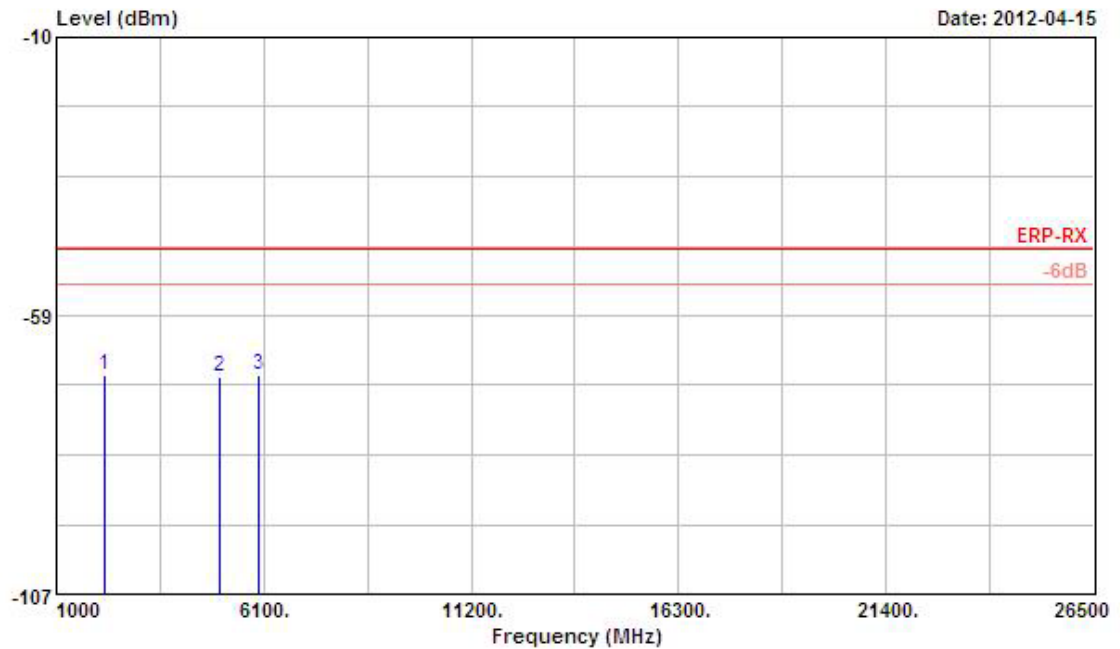
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	2170.000	-62.58	-15.58	-47.00	-64.86	2.28
2	3795.000	-67.14	-20.14	-47.00	-71.42	4.28
3	5235.000	-66.98	-19.98	-47.00	-76.87	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



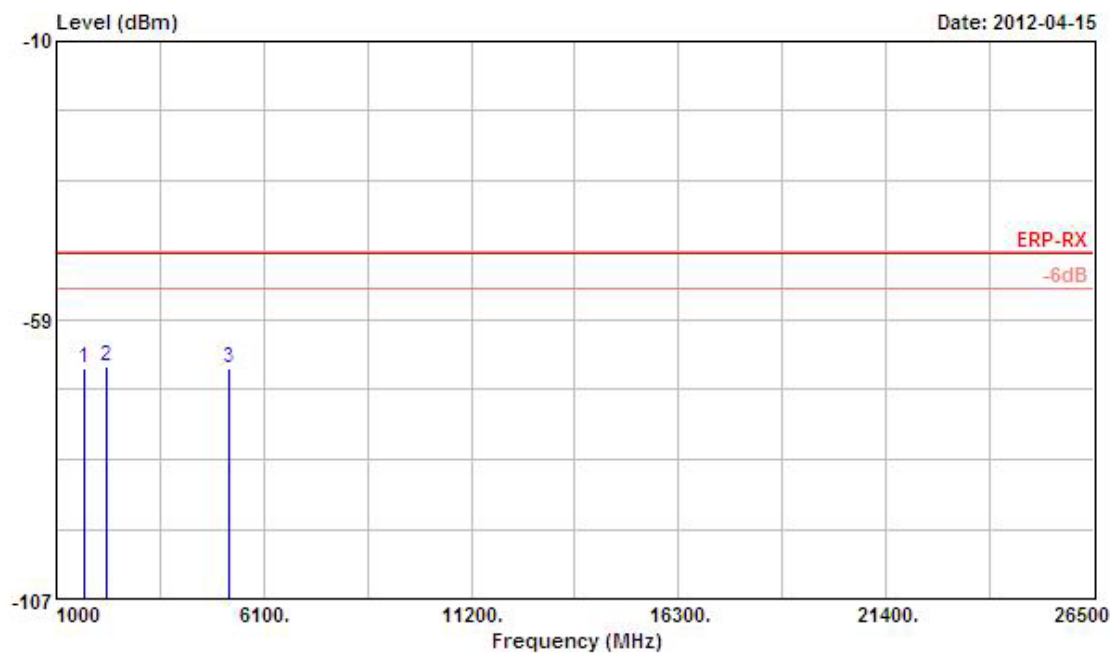
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 38 (40MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	2195.000	-68.74	-21.74	-47.00	-71.22	2.48
2	4995.000	-69.25	-22.25	-47.00	-78.06	8.81
3	5990.000	-68.99	-21.99	-47.00	-78.30	9.31



Vertical



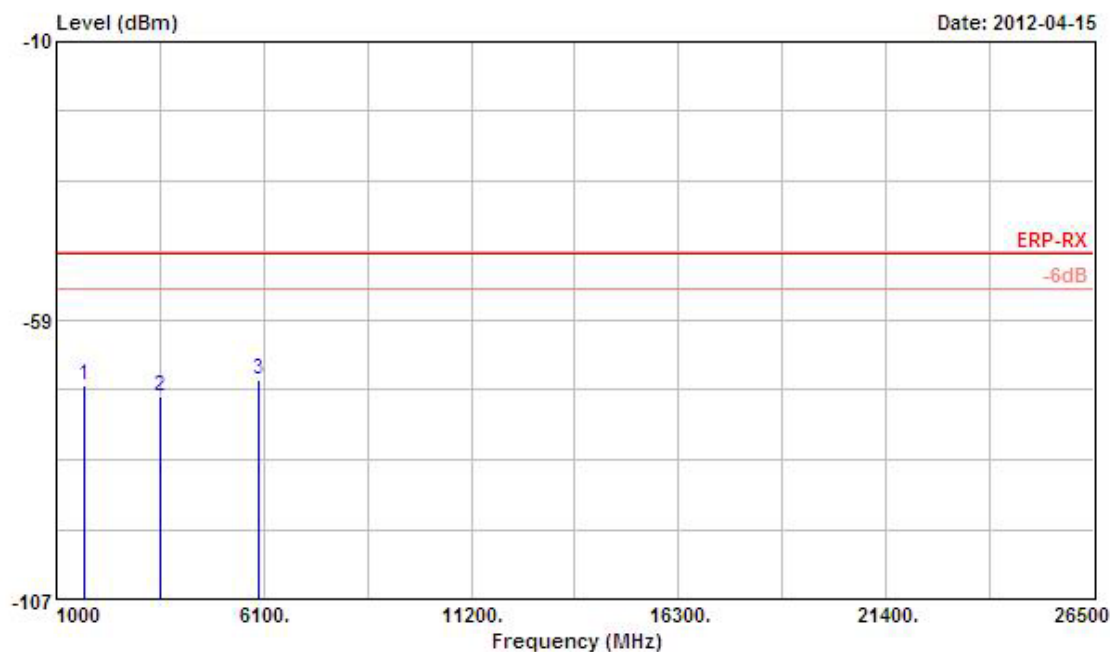
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1670.000	-67.04	-20.04	-47.00	-65.98	-1.06
2	2215.000	-66.59	-19.59	-47.00	-68.87	2.28
3	5235.000	-66.98	-19.98	-47.00	-76.87	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



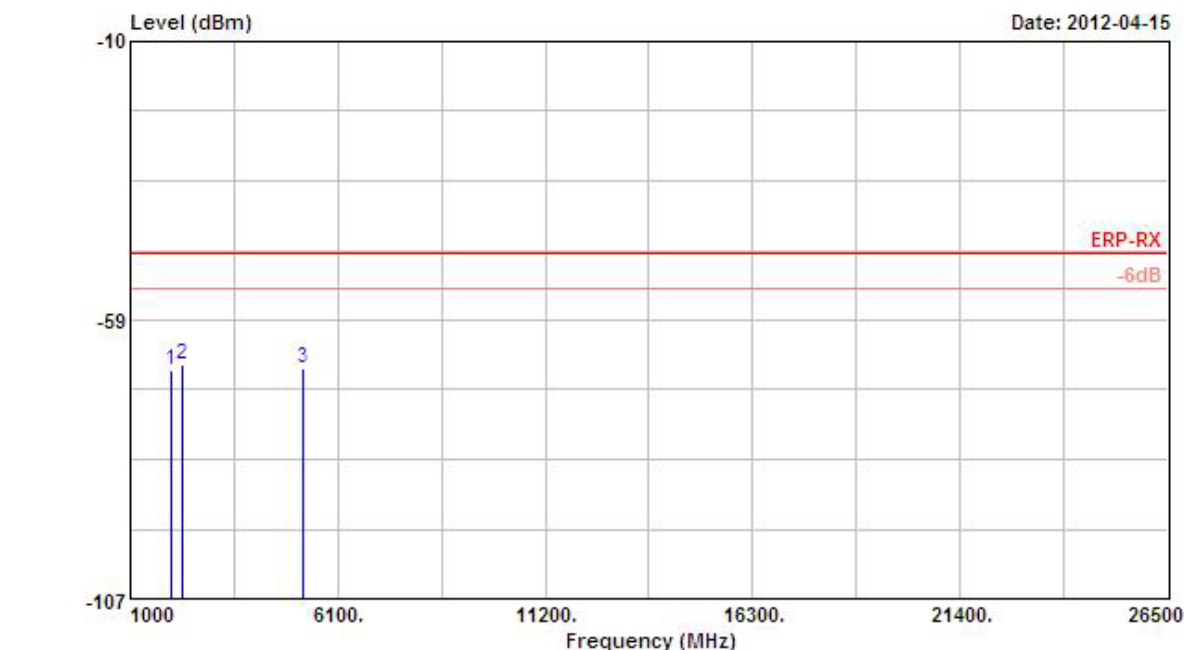
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 62 (40MHz)

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	
	MHz	dBm	dB	dBm	dBm	Factor
1	1695.000	-69.88	-22.88	-47.00	-69.25	-0.63
2	3535.000	-71.75	-24.75	-47.00	-74.91	3.16
3	5990.000	-68.99	-21.99	-47.00	-78.30	9.31



Vertical



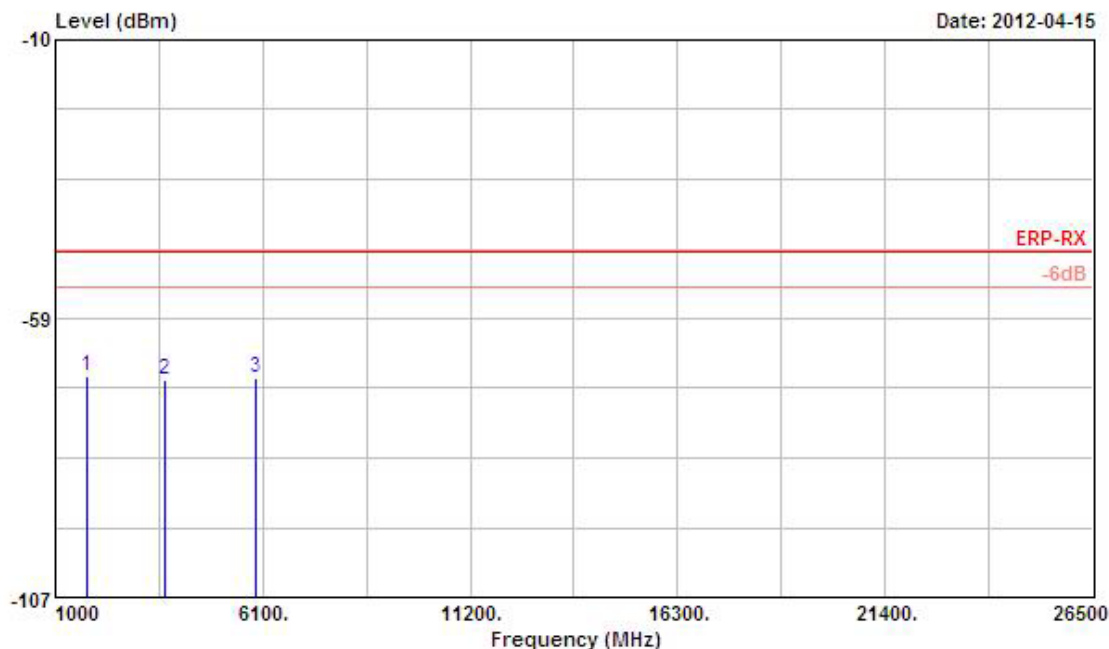
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1990.000	-67.36	-20.36	-47.00	-69.63	2.27
2	2290.000	-66.16	-19.16	-47.00	-68.45	2.29
3	5235.000	-66.98	-19.98	-47.00	-76.87	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



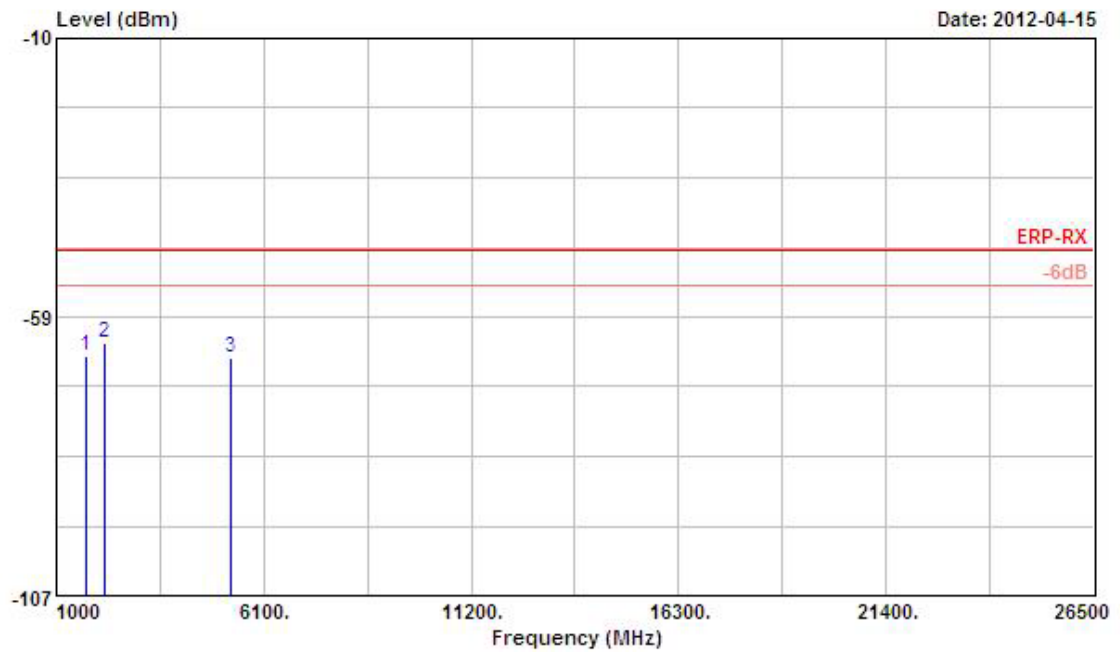
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 102 (40MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1790.000	-68.39	-21.39	-47.00	-68.81	0.42
2	3670.000	-69.23	-22.23	-47.00	-72.88	3.65
3	5915.000	-68.92	-21.92	-47.00	-78.17	9.25



Vertical



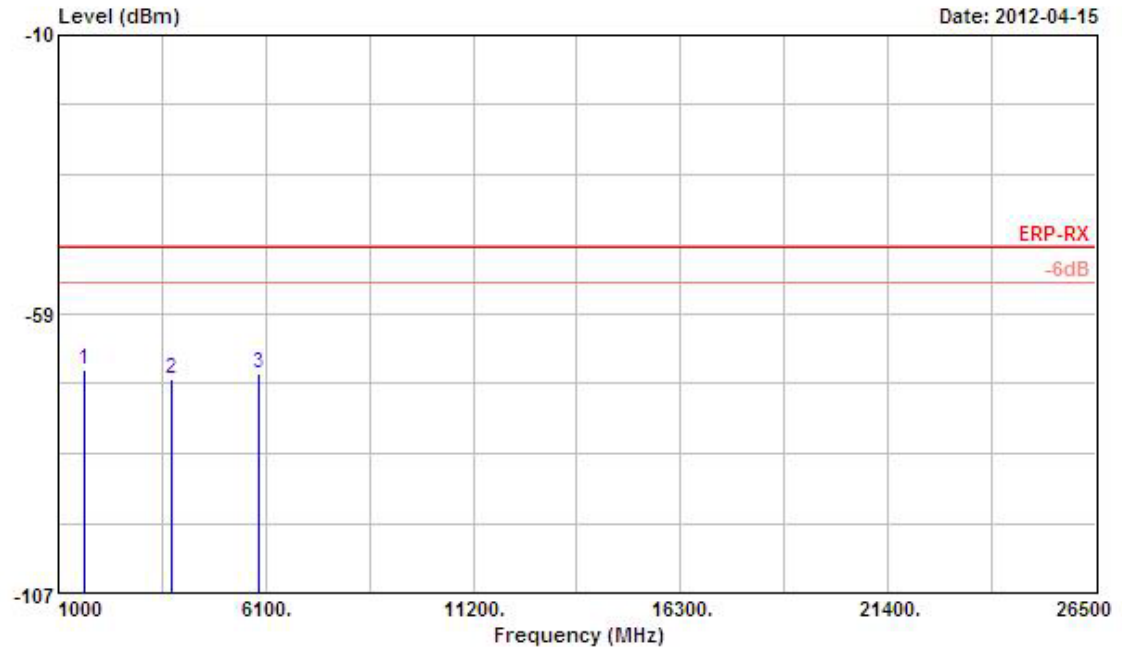
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1735.000	-65.41	-18.41	-47.00	-65.12	-0.29
2	2170.000	-62.89	-15.89	-47.00	-65.17	2.28
3	5270.000	-65.55	-18.55	-47.00	-75.46	9.91

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.



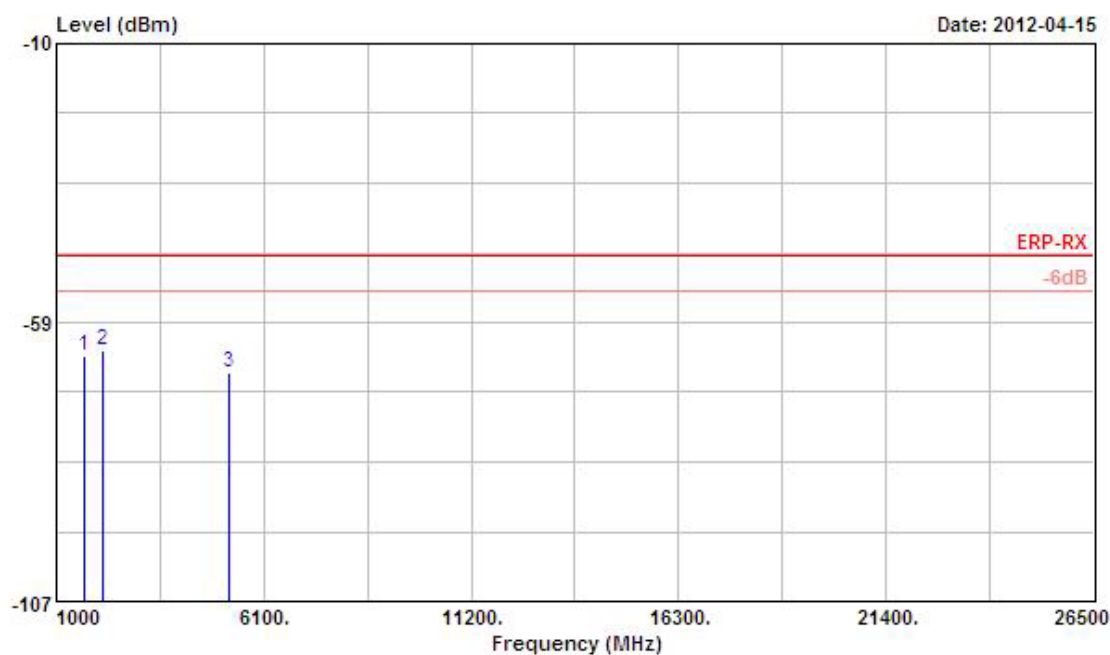
Final Test Date	Apr. 15, 2012	Test Site No.	05CH01-HY
Temperature	26°C	Humidity	56%
Test Engineer	Eric	Configuration	802.11n / Ch. 134 (40MHz)

Horizontal

	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1630.000	-68.17	-21.17	-47.00	-67.02	-1.15
2	3775.000	-69.84	-22.84	-47.00	-73.82	3.98
3	5915.000	-68.92	-21.92	-47.00	-78.17	9.25



Vertical



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	1695.000	-64.17	-17.17	-47.00	-63.37	-0.80
2	2155.000	-63.43	-16.43	-47.00	-65.71	2.28
3	5235.000	-67.29	-20.29	-47.00	-77.18	9.89

Note:

The amplitude of spurious emissions that is lower by more than 6dB below the permissible value need not to be reported.

4 LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9KHz ~ 40GHz	Feb. 21, 2012	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 03, 2011	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Dec. 07, 2011	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 07, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Jun. 16, 2011	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Jun. 20, 2011	Conducted (TH01-HY)
RF Cable-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 03, 2011	Conducted (TH01-HY)
RF Cable-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 03, 2011	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jun. 09, 2011*	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is two year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSEK30	100189	9kHz ~ 40GHz	Dec. 02, 2011	Radiation (05CH01-HY)
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	Jun. 22, 2011	Radiation (05CH01-HY)
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	Mar. 20, 2012	Radiation (05CH01-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2737	25MHz ~ 2GHz	Oct. 22, 2011	Radiation (05CH01-HY)
Horn Antenna	COM-POWER	AH-118	10091	1GHz ~ 18GHz	Feb. 15, 2012	Radiation (05CH01-HY)
RF Cable-R03m	Jye Bao	RG142	CB031	30MHz ~ 1GHz	Feb. 08, 2012	Radiation (05CH01-HY)
RF Cable-high	SUHNER	SUCOFLEX 106	05CH01-HY	1GHz ~ 26.5GHz	Feb. 08, 2012	Radiation (05CH01-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170221	15GHz ~ 40GHz	Dec. 22, 2011	Radiation (05CH01-HY)
Turn Table	HD	DS 420	420/655/12	0 ~ 360 degree	N/A	Radiation (05CH01-HY)
Antenna Mast	HD	MA 240	240/569/12	1 ~ 4 m	N/A	Radiation (05CH01-HY)

Note: Calibration Interval of instruments listed above is one year.



5 TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei 221, Taiwan, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
LINKOU	ADD : No. 30-2, Dingfu Vil., Linkou Dist., New Taipei City 244, Taiwan, R.O.C. TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei 114, Taiwan, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei 235, Taiwan, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

6 TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-111208

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.**EMC & Wireless Communications Laboratory**

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria : ISO/IEC 17025:2005
Accreditation Number : 1190
Originally Accredited : December 15, 2003
Effective Period : January 10, 2010 to January 09, 2013
Accredited Scope : Testing Field, see described in the Appendix
Specific Accreditation Program : Accreditation Program for Designated Testing Laboratory
for Commodities Inspection
Accreditation Program for Telecommunication Equipment
Testing Laboratory
Accreditation Program for BSMI Mutual Recognition
Arrangement with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : December 08, 2011

P1, total 24 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix



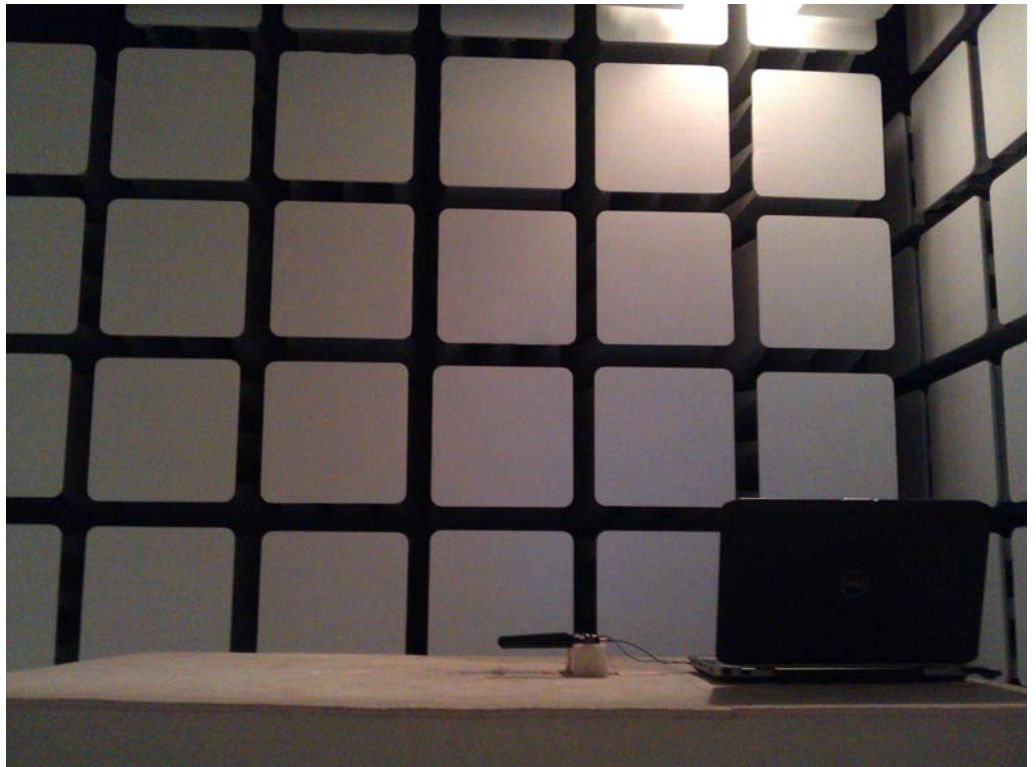
Appendix A. Test Photos

1 Photographs of Radiated Emissions Test Configuration

FRONT VIEW



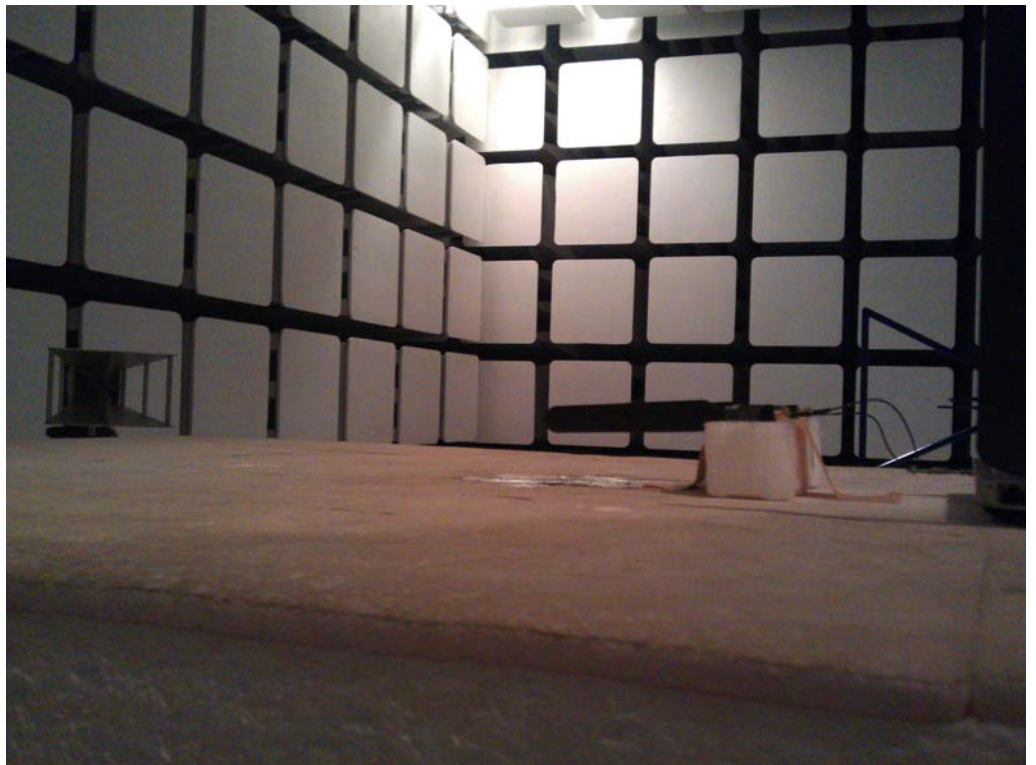
REAR VIEW



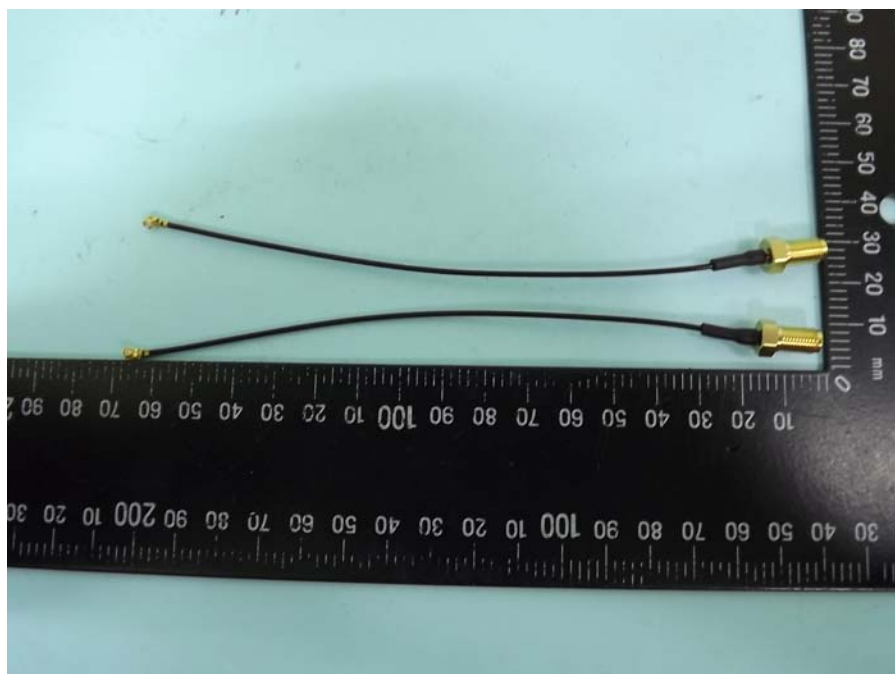
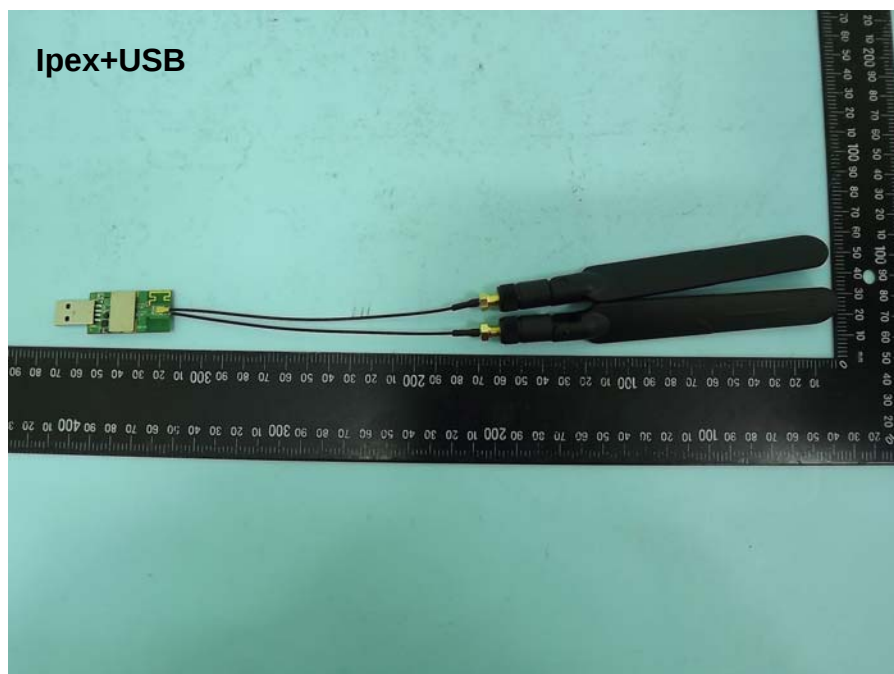
BILOG ANTENNA

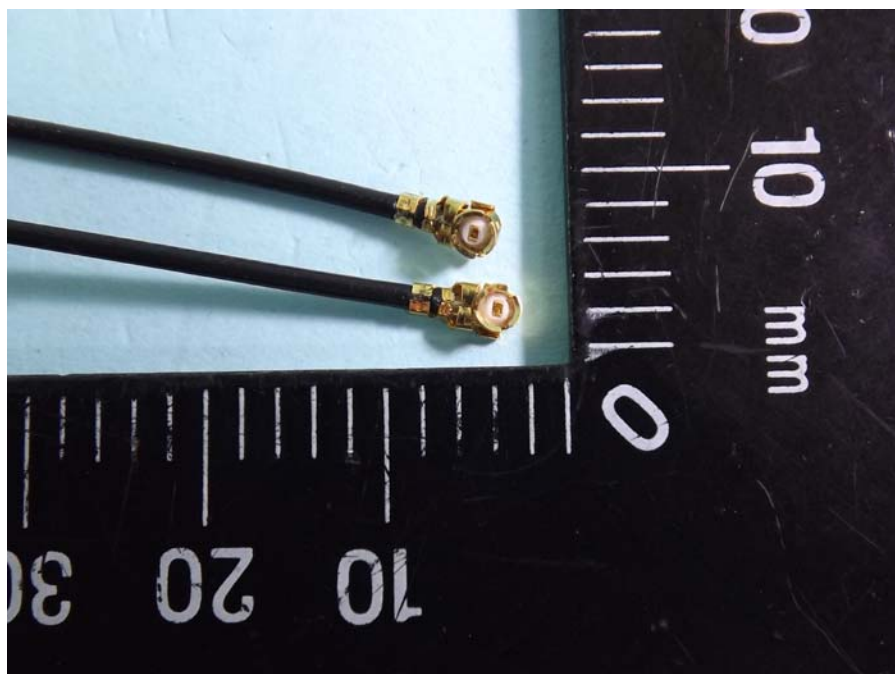


HORN ANTENNA

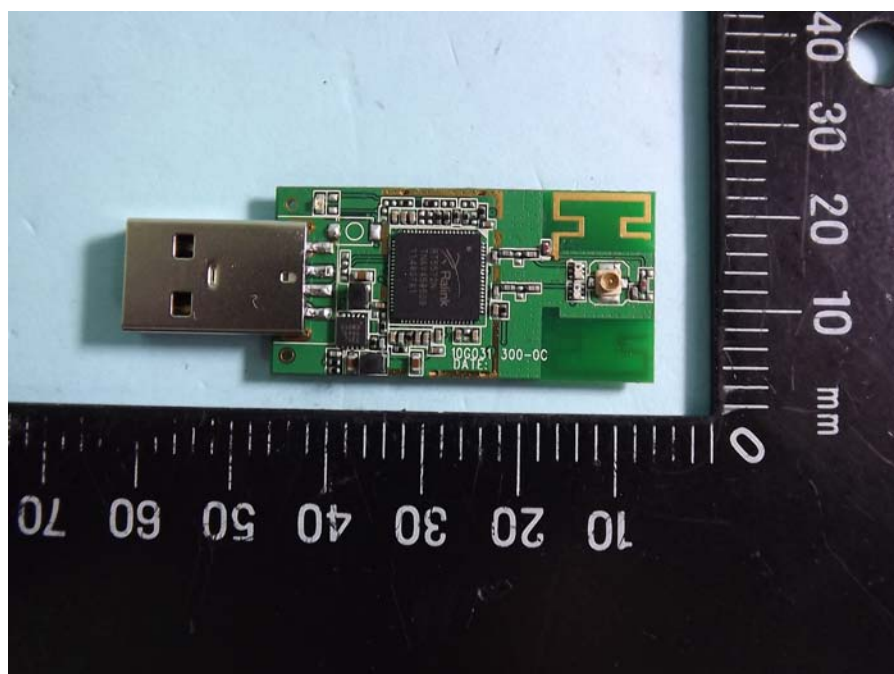
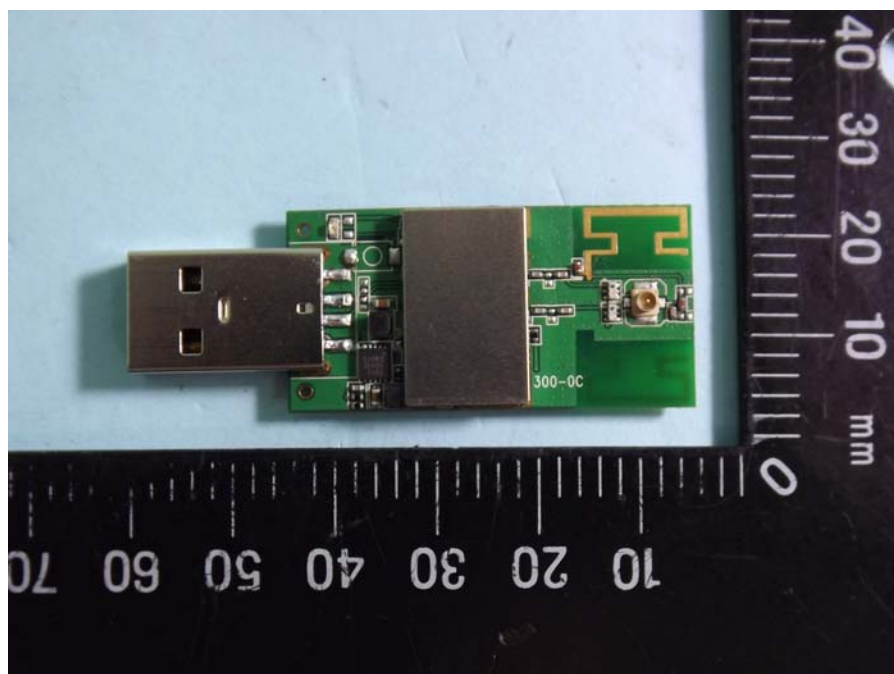


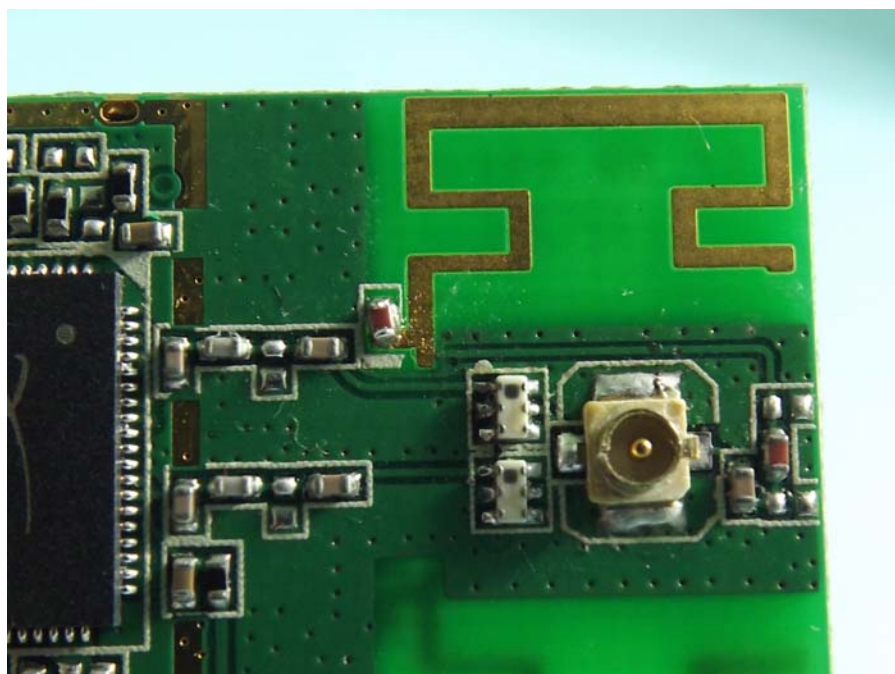
APPENDIX B. Photographs of EUT

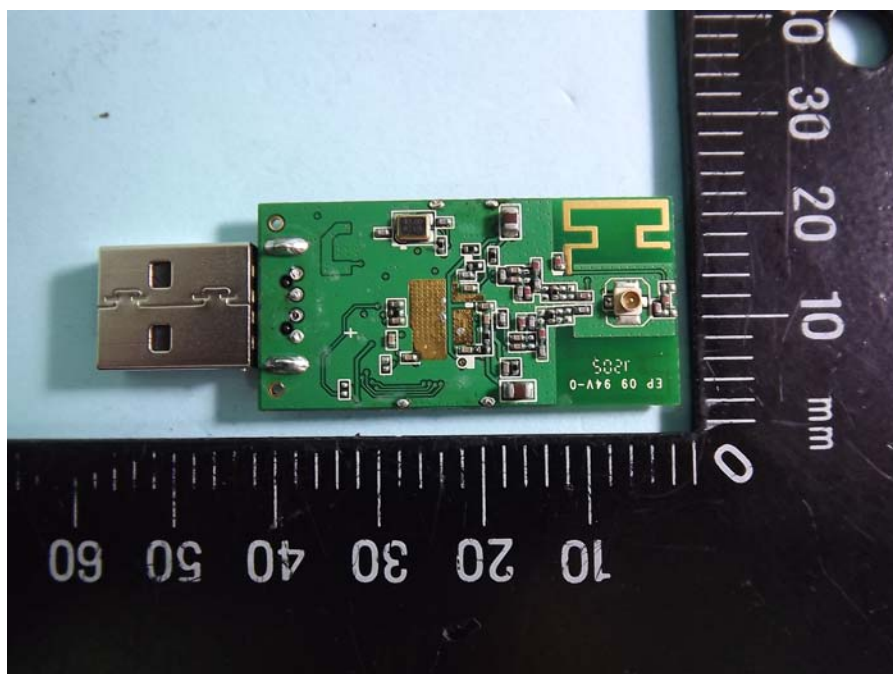


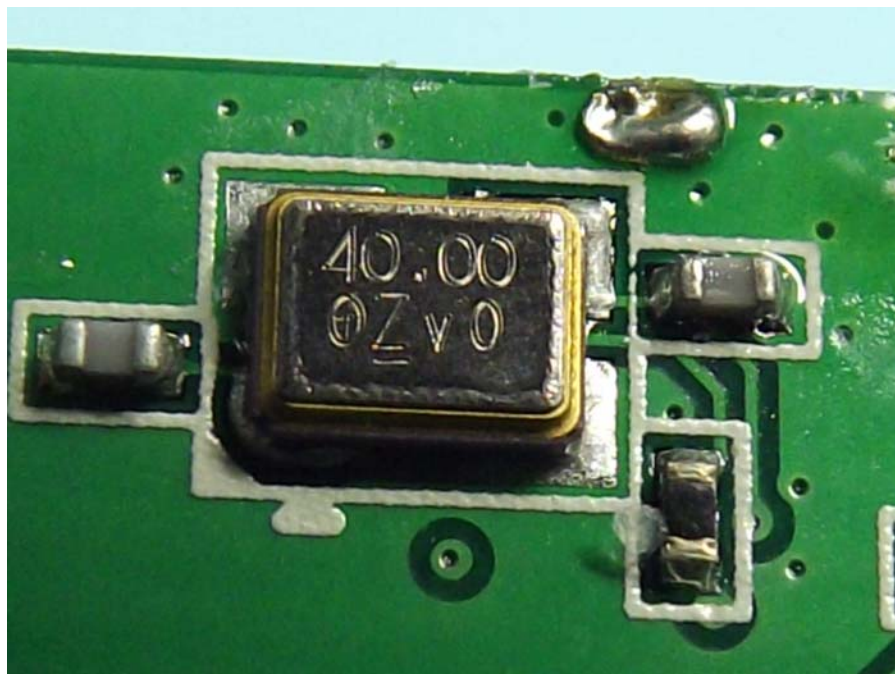












lpex+4pin pin-header

