

FCC Test Report (TR-1012-036-01)

Applicant : Starbridge Networks L.L.C.

Address : 3265 Meridian Parkway, STE # 134 Weston, FL 33331, USA

Manufacturer : Kasda Digital Technology Co., Ltd.

Address : B-31 Building, Tanglang Industry Zone, XiLi, Nanshan, Shenzhen, China

Product Name : ADSL2+ 802.11b/g/n 4 Port Managed Switch Router

Trademark : Starbridge

Model(s) : Starbridge 1531

Standard(s) : FCC Part 15 Subpart C

Test Result : Pass

Date of Test : Dec 22, 2010 to Jan 07, 2011

Report issued Dated : Jan 10, 2011

The report shall not be reproduced except in full, without the written approval of the TDK EMC Center.

The results in this report apply only to the sample(s) tested. The production units are required to conform to the initial sample as received when the units are placed in the market.



Responsible Engineer	:		Approved by	:	
		Phenix Zhang	Technical manager		CHAN king-chui
Date	:	2011.01.10	Date	:	2011.01.10

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1. Description of the Test Site

1.1 Test Site Location:

Laboratory	:	TDK South China EMC Center SAE Technologies Development (Dongguan) Co., Ltd. Changan Branch
Address	:	Zhenan Hi-tech Industrial Park, Dongguan City, Guangdong Province, China
Phone no.	:	(86)-769-8564-4678
Fax no.	:	(86)-769-8564-4499
Email	:	emc@cn.tdk.com

1.2 Site Registration

VCCI (September, 2008)	:	Reg. No. R-2205, C-2392
FCC site registration (July, 2008)	:	Reg. No. 732901
IC registration	:	Reg. No. 7993
EMCC (September, 2008)	:	Reg. No. NAR/tl-060330
CNAS(August, 2010)	:	Reg. No. L4677

1.3 Test Scope

EMC and RF testing according to national / international standards

2. Description of the Tested Samples

2.1 Customer Information

Customer : Starbridge Networks L.L.C.
Address : 3265 Meridian Parkway, STE # 134 Weston, FL 33331, USA
Phone no. : 954-334-1390
Fax no. : 954 334-1395

2.2 Identification of EUT

Trademark : Starbridge
Model(s) No. : Starbridge 1531
Serial No. : None

2.3 Spec of EUT

Description of Antenna : fixed omnidirectional antenna, 3dBi gain
Power Supply : 12V DC, 1A
Description of adaptor : 1#: Trademark: HONOR
Model: ADS-12G-12 12012GPCU
Input: AC 100-240V, 50/60Hz, 0.3A
Output: DC 12V 1A

2#: Trademark: UE
Model: UE12L-120100SPAU
Input: AC 100-240V, 50/60Hz, 0.3A
Output: DC 12V 1A
Operation Frequency : 2412 MHz ~ 2462 MHz
Number of Channels : 11
Type of Modulation : DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g
MIMO-OFDM for IEEE 802.11n
Data Rate : IEEE 802.11b: 11/5.5/2/1Mbps
IEEE 802.11g: 54/48/36/24/18/12/9/6Mbps
IEEE 802.11n: Up to 75Mbps(dynamic)

2.4 Test Standards List

FCC Part 15 (2009)

American national standard for methods of measurement of radio noise emissions from low-voltage electrical and electronic equipment in the range of 9KHz to 40GHz.

3. Test Specifications

3.1 Standard(s) Used

FCC Rules	Description Of Test	Result
15.203/15.247(b)	Antenna Requirement	Pass
15.207	Conducted Emission	Pass
15.247(b)(3)	Maximum Peak Output Power	Pass
15.247(d)	Band Edges Emission	Pass
15.247(a)(2)	6 dB Bandwidth	Pass
15.247(e)	Power Spectral Density	Pass
15.247(d)	Spurious Radiated Emission	Pass

3.2 Test Mode

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE 802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 11Mbps data rate (worst case) are chosen for the final testing.

IEEE 802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 54Mbps data rate (worst case) are chosen for the final testing.

IEEE 802.11n: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 65Mbps data rate (worst case) are chosen for the final testing.

3.3 Deviations from the Test Specification

N/A

4. Test Result

4.1 Antenna Requirement

4.1.1 Standard Applicable

Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna James or electrical connector is prohibited.

Section 15.247(b):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.1.2 Antenna Connected Construction

The antenna connector is designed with permanent attachment and no consideration of replacement.

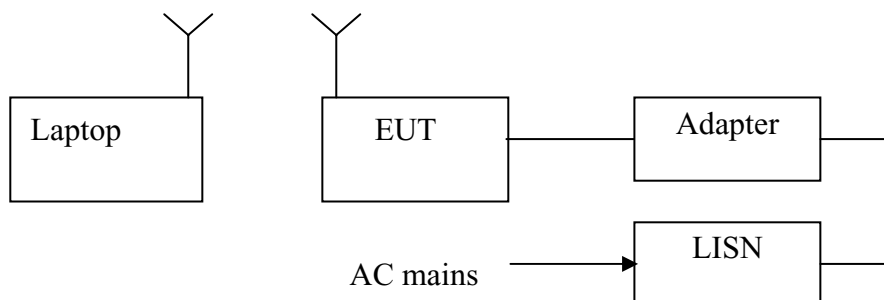
Transmitter antenna of directional gain is 3dBi.

4.2 Conducted Emission (mains)

4.2.1 Test Summary

Test Room	: Shielded Room
Power Source	: AC 120V / 60Hz
Standards:	: FCC Part15 B : 2009
EUT Type	: Table Top
EUT configuration	: EUT's highest possible emission level

4.2.2 Block diagram of test setup



4.2.3 Measurement method

The EUT along with its peripherals were placed on a 1.0m (W) x 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4m space from a vertical reference plane. The EUT was connected to power mains through a Artificial Mains Network(AMN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.

The excess power cable between the EUT and the AMN was bundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

4.2.4. Result

PASS

1# Adaptor:

2010-12-22 15:01:33

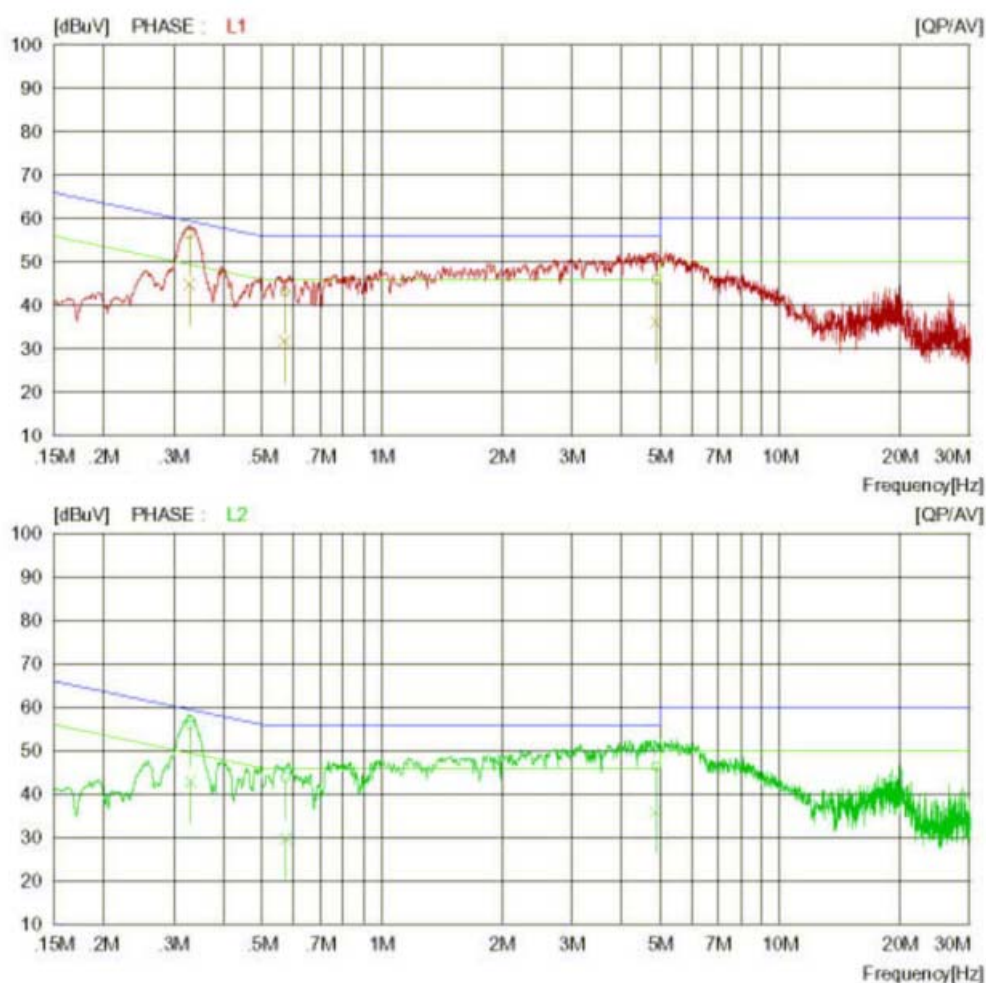
Conducted Emission

TDK South China EMC Centre
Date : 2010-12-22 15:01:30

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: ADSL ROUTER	Temp/Humi	: 25deg / 52%RH
Test condition	: NORMAL	Operator	: YongSheng Pang

Memo : ADAPTER(ADS-12G-12 12012GPCU)

LIMIT : FCC Part 15 B QP
FCC Part 15 B AV



TDK South China EMC Centre Tell:0769-8564-4678 Fax:0769-8564-4499

2010-12-22 15:01:34

Conducted Emission

TDK South China EMC Centre
Date : 2010-12-22 15:01:30

Trade Name	:	Starbridge	Document No.	:	
Model Name	:	Starbridge 1531	Power Supply	:	AC 120V/60Hz
Product Name	:	ADSL ROUTER	Temp/Humi	:	25deg / 52%RH
Test condition	:	NORMAL	Operator	:	YongSheng Pang

Memo : ADAPTER(ADS-12G-12 12012GPCU)

LIMIT : FCC Part 15 B QP
FCC Part 15 B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.32900	46.5	35.0	10.0	56.5	45.0	59.5	49.5	3.0	4.5	L1
2	0.57000	33.2	21.9	10.0	43.2	31.9	56.0	46.0	12.8	14.1	L1
3	4.89100	36.0	26.0	10.1	46.1	36.1	56.0	46.0	9.9	9.9	L1
4	0.33100	45.8	32.9	10.0	55.8	42.9	59.4	49.4	3.6	6.5	L2
5	0.57500	33.8	19.8	10.0	43.8	29.8	56.0	46.0	12.3	16.2	L2
6	4.88700	36.2	25.7	10.1	46.3	35.8	56.0	46.0	9.7	10.2	L2

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2# Adaptor:

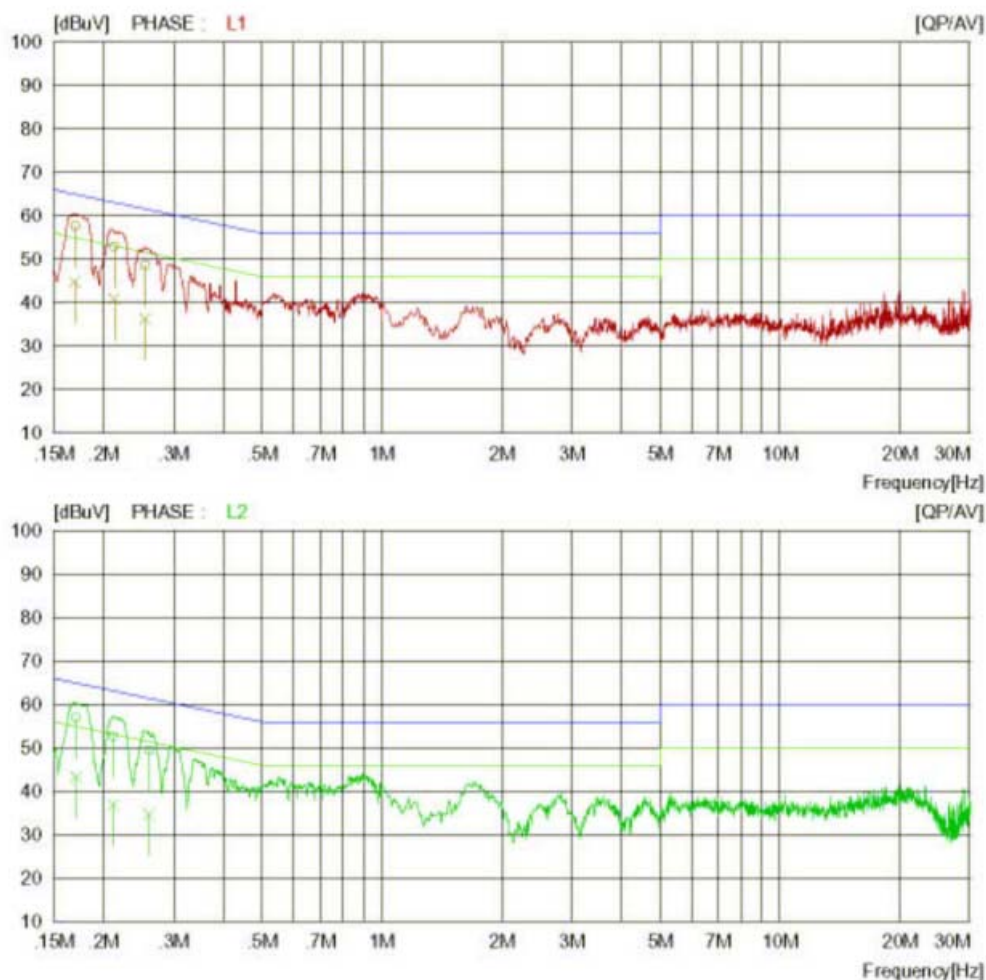
2010-12-22 15:17:05

Conducted Emission

TDK South China EMC Centre
Date : 2010-12-22 15:17:01

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: ADSL ROUTER	Temp/Humi	: 25deg / 52%RH
Test condition	: NORMAL	Operator	: YongSheng Pang

Memo : ADAPTER(UE12L-120100SPAU)

LIMIT : FCC Part 15 B QP
FCC Part 15 B AV


TDK South China EMC Centre Tell:0769-8564-4678 Fax:0769-8564-4499

2010-12-22 15:17:05

Conducted Emission

TDK South China EMC Centre
Date : 2010-12-22 15:17:01

Trade Name	:	Starbridge	Document No.	:	
Model Name	:	Starbridge 1531	Power Supply	:	AC 120V/60Hz
Product Name	:	ADSL ROUTER	Temp/Humi	:	25deg / 52%RH
Test condition	:	NORMAL	Operator	:	YongSheng Pang

Memo : ADAPTER(UE12L-120100SPAU)

LIMIT : FCC Part 15 B QP
FCC Part 15 B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.17000	47.5	34.7	10.1	57.6	44.8	65.0	55.0	7.4	10.2	L1
2	0.21300	42.9	30.7	10.1	53.0	40.8	63.1	53.1	10.1	12.3	L1
3	0.25500	38.6	26.2	10.1	48.7	36.3	61.6	51.6	13.0	15.3	L1
4	0.17100	46.8	33.1	10.1	56.9	43.2	64.9	54.9	8.0	11.7	L2
5	0.21200	42.6	26.8	10.1	52.7	36.9	63.1	53.1	10.4	16.2	L2
6	0.26100	39.4	24.6	10.1	49.5	34.7	61.4	51.4	11.9	16.7	L2

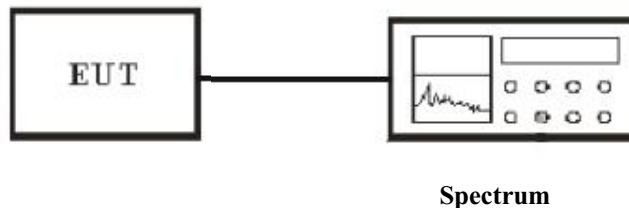
TDK South China EMC Centre Tell:0769-8564-4678 Fax:0769-8564-4499

4.3 Maximum Peak Output Power

4.3.1 Applicable Standard

According to Section 15.247(b)(3), for systems using digital modulation in 2400-2483.5MHz: 1 Watt.

4.3.2 Block diagram of test setup



Connection method: The shield cable was connected with EUT and Spectrum which have $50\Omega Z_C$. There have a combiner inserted between the spectrum and EUT. The connector of EUT side is original by manufacturer. The connector of Spectrum side is N type.

4.3.3 Measurement method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in above figure without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Use the following spectrum analyzer settings:
Measurement mode: Channel Power
Center Frequency = 2412MHz, 2437MHz or 2462MHz;
Channel Power Span = 48MHz
Integ. Bandwidth = 30MHz ,
Sweep = auto
Detector function = peak
4. Hold on 30s, find out the max value on the screen of Spectrum.
5. Repeat above procedures until all frequencies measured were complete.

4.3.4. Result

Temperature (°C) : 22~23	EUT: ADSL2+ 802.11b/g/n 4 Port Managed Switch Router
Humidity (%RH) : 50~54	M/N: Starbridge 1531
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode
Test date: Jan 05, 2011 to Jan 07,2010	Test engineer: Phenix

802.11b mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	13.58	30	16.42
MID (CH 6)	2437	13.40	30	16.60
HIG (CH 11)	2462	12.01	30	17.99

802.11g mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	12.83	30	17.17
MID (CH 6)	2437	13.27	30	16.73
HIG (CH 11)	2462	13.51	30	16.49

802.11n mode:

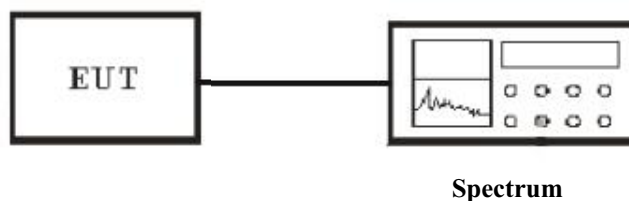
Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	13.81	30	16.19
MID (CH 6)	2437	13.61	30	16.39
HIG (CH 11)	2462	10.99	30	19.01

4.4 Band Edges Emission

4.4.1 Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

4.4.2 Block diagram of test setup



Connection method: The shield cable was connected with EUT and Spectrum which have $50\Omega Z_C$. There have a combiner inserted between the spectrum and EUT. The connector of EUT side is original by manufacturer. The connector of Spectrum side is N type.

4.4.3 Measurement method

1. The transmitter is set to the lowest channel.
2. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.
3. Set both RBW and VBW of spectrum analyzer to 100KHz with convenient frequency span including 20MHz bandwidth from lower band edge. Then detector set to peak and max hold this trace.
4. The lowest band edges emission was measured and recorded.
5. The transmitter set to the highest channel and repeated 2~4.

4.4.4. Result

Conducted:

Temperature (°C) : 22~23	EUT: ADSL2+ 802.11b/g/n 4 Port Managed Switch Router
Humidity (%RH) : 50~54	M/N: Starbridge 1531
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode
Test date: Jan 05, 2011 to Jan 07,2010	Test engineer: Phenix

802.11b mode:

Frequency (MHz)	Read Delta (dB)	Limits (dB)	Margin (dB)
2400	-42.7	-20	22.7
2483.5	-48.3	-20	28.3
2500.1	-39.9	-20	19.9

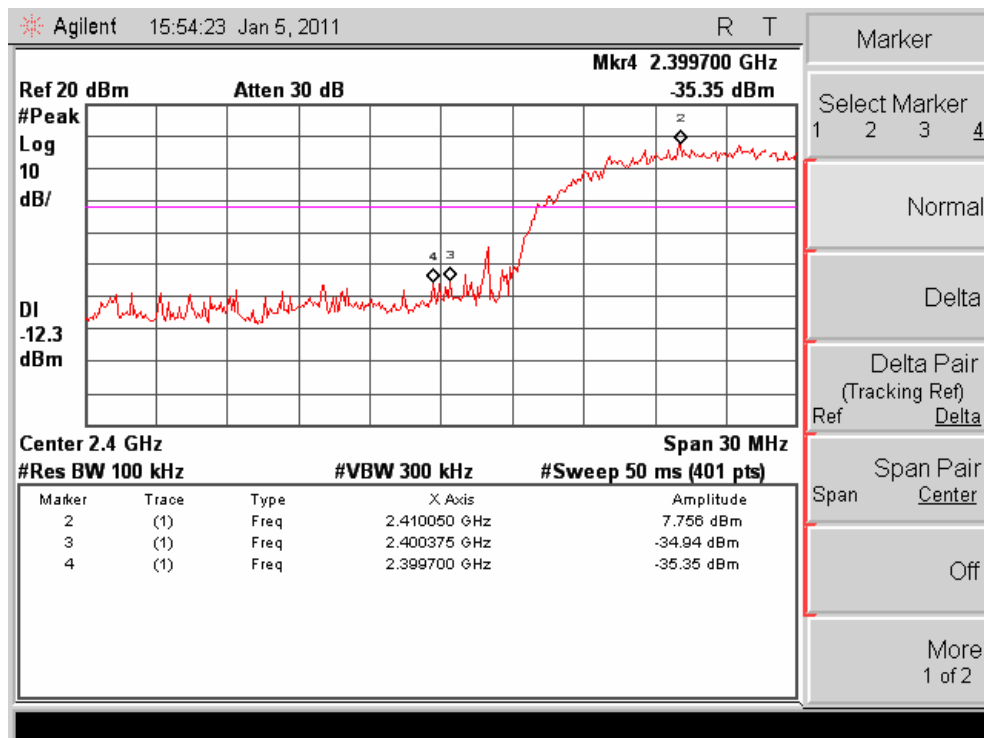
802.11g mode:

Frequency (MHz)	Read Delta (dB)	Limits (dB)	Margin (dB)
2396.85	-32.3	-20	12.3
2400	-49.2	-20	29.2
2483.5	-45.8	-20	25.8
2516.5	-27.9	-20	7.9

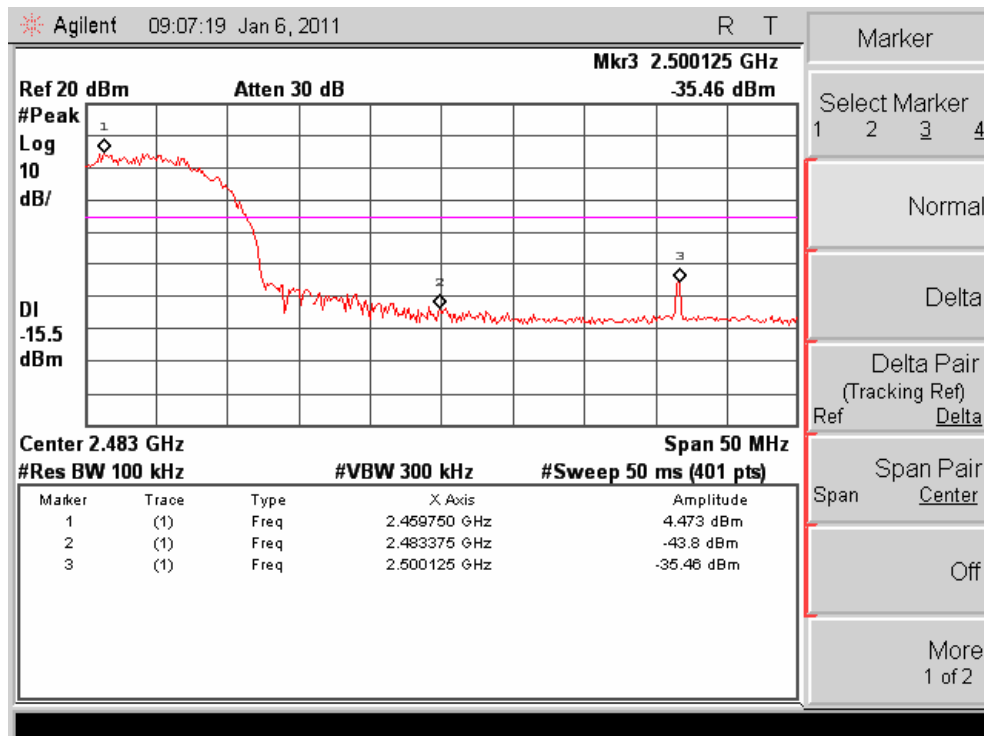
802.11n mode:

Frequency (MHz)	Read Delta (dB)	Limits (dB)	Margin (dB)
2397.1	-27.8	-20	7.8
2400	-31.1	-20	11.1
2483.5	-45.4	-20	25.4
2517.7	-27.3	-20	7.3

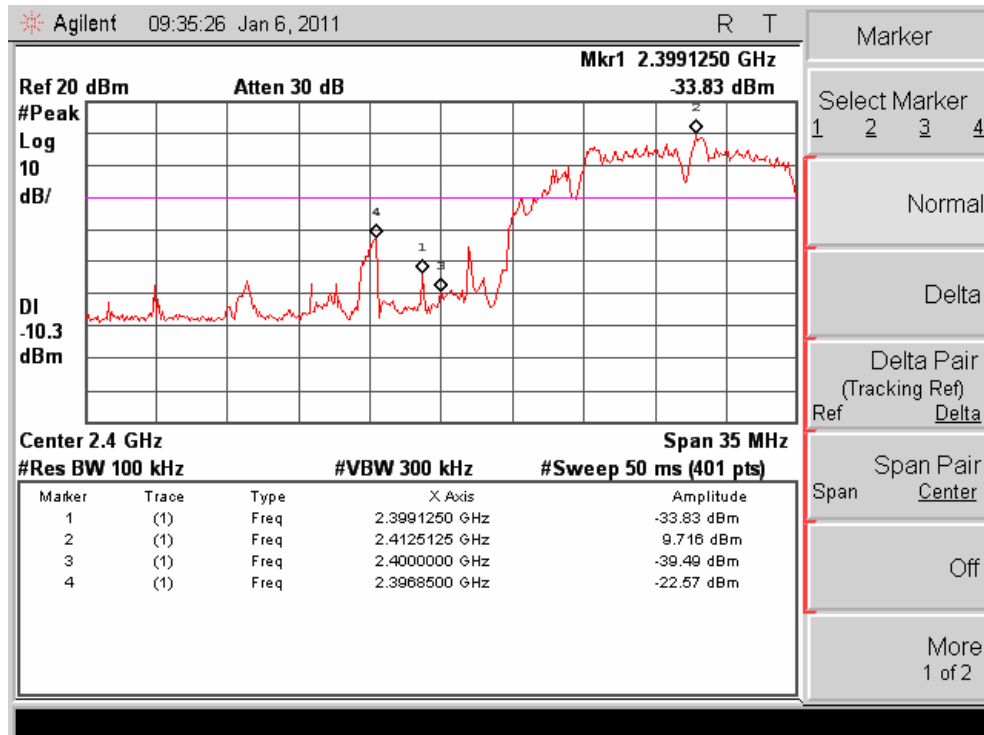
802.11b mode Plot: Channel LOW



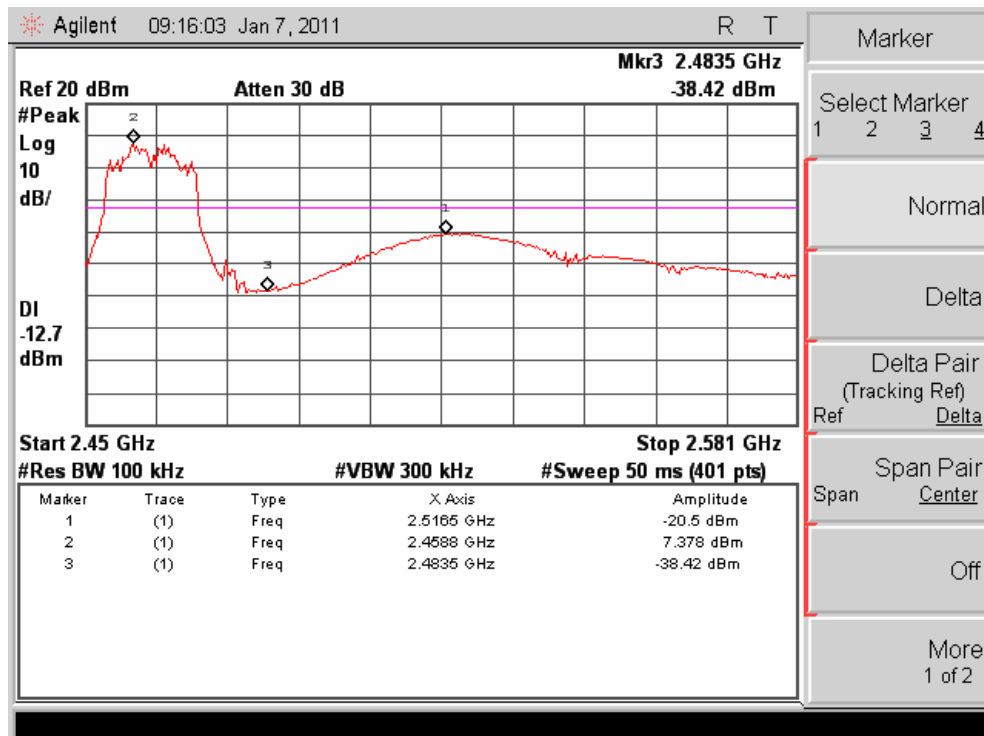
Channel HIG



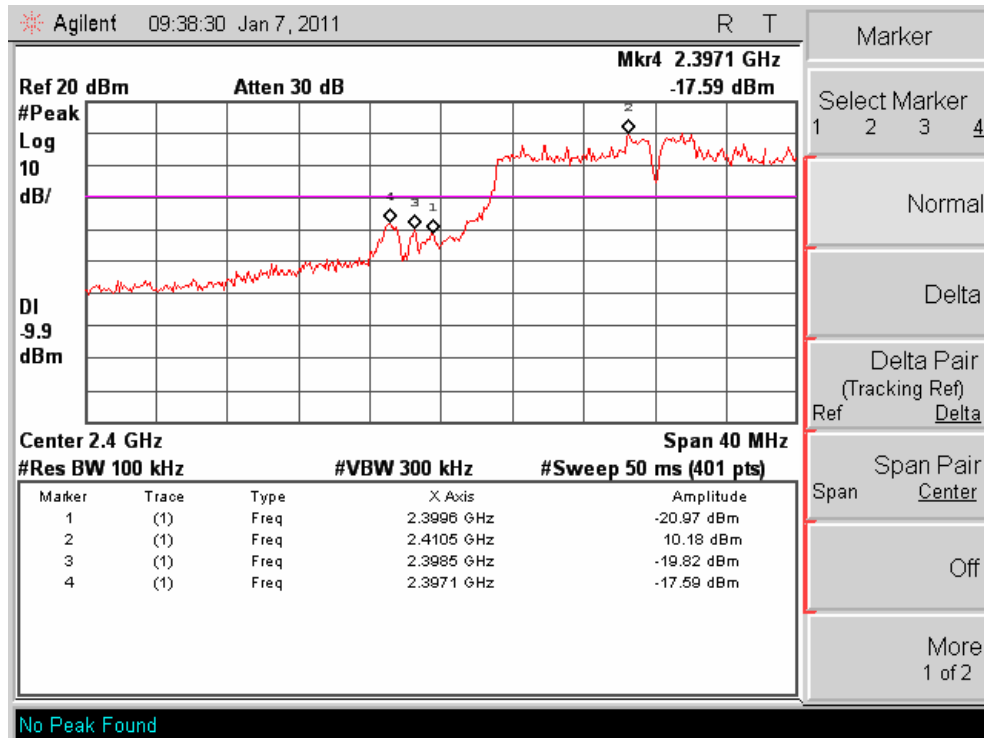
802.11g mode Plot: Channel LOW



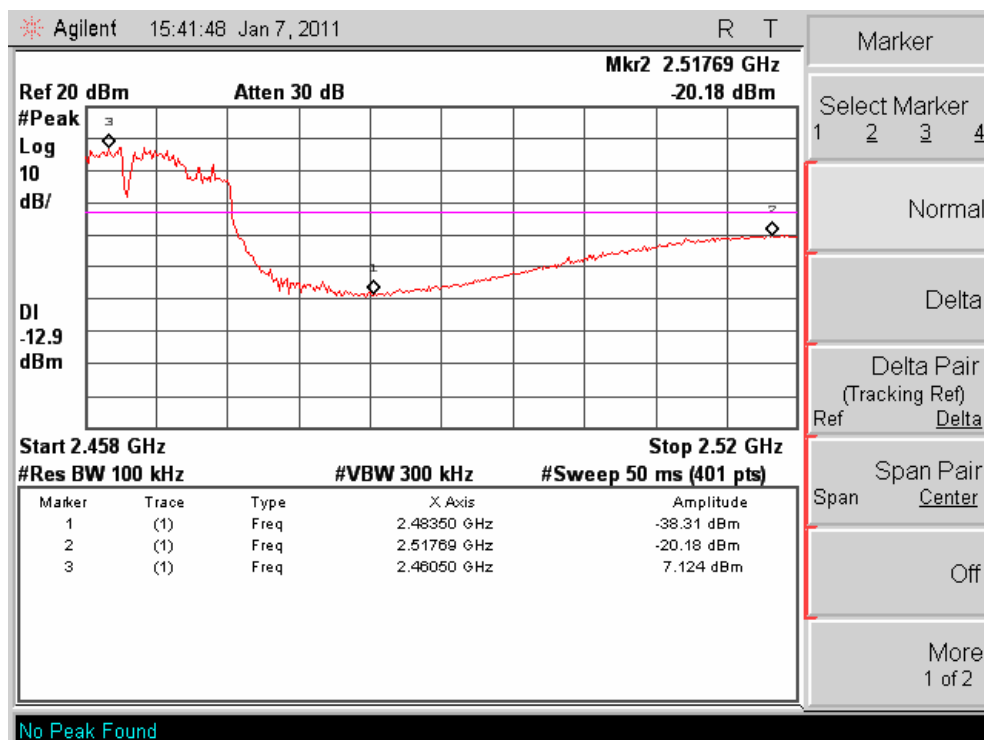
Channel HIG



802.11n mode Plot: Channel LOW



Channel HIG



Radiated:
802.11b mode:

2010-12-30 14:44:45

RADIATED EMISSION

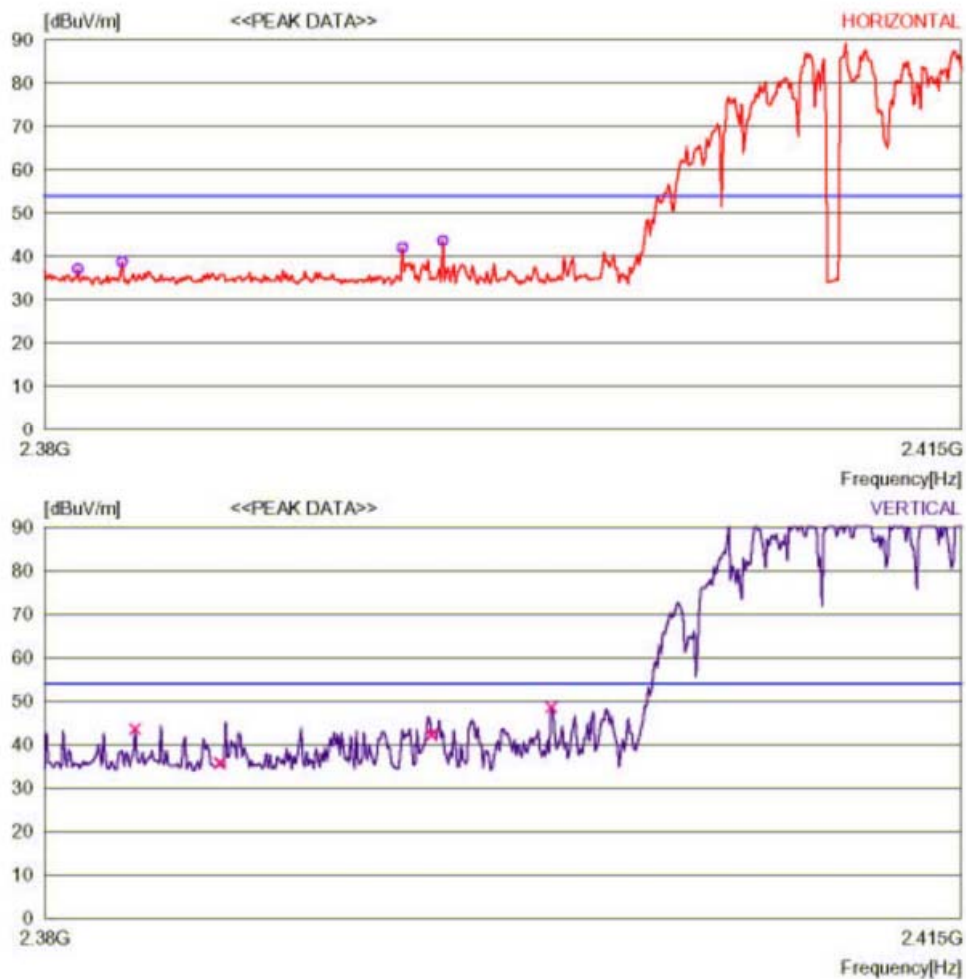
Date : 2010-12-30 14:44:36

Trade Name : Starbridge
Model Name : Starbridge 1531
Product : Switch Router
Test Condition : TX mode, 802.11b, CH 1

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 27/55RH%
Operator : Phenox zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)



2010-12-30 14:44:45

RADIATED EMISSION

Date : 2010-12-30 14:44:36

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11b, CH 1	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	2381.261	29.7	31.5	15.5	39.5	37.2	54	16.8	200	180
2	2382.943	31.3	31.5	15.5	39.5	38.8	54	15.2	100	322
3	2393.593	34.7	31.4	15.5	39.5	42.1	54	11.9	100	326
4	2395.135	36.3	31.4	15.5	39.5	43.7	54	10.3	100	326
---- Vertical ----										
5	2383.433	36.1	31.4	15.5	39.5	43.5	54	10.5	100	171
6	2386.656	28.3	31.4	15.5	39.5	35.7	54	18.3	200	76
7	2394.714	34.8	31.4	15.5	39.5	42.2	54	11.8	200	118
8	2399.269	41.1	31.4	15.5	39.5	48.5	54	5.5	200	143

2010-12-30 14:25:34

RADIATED EMISSION

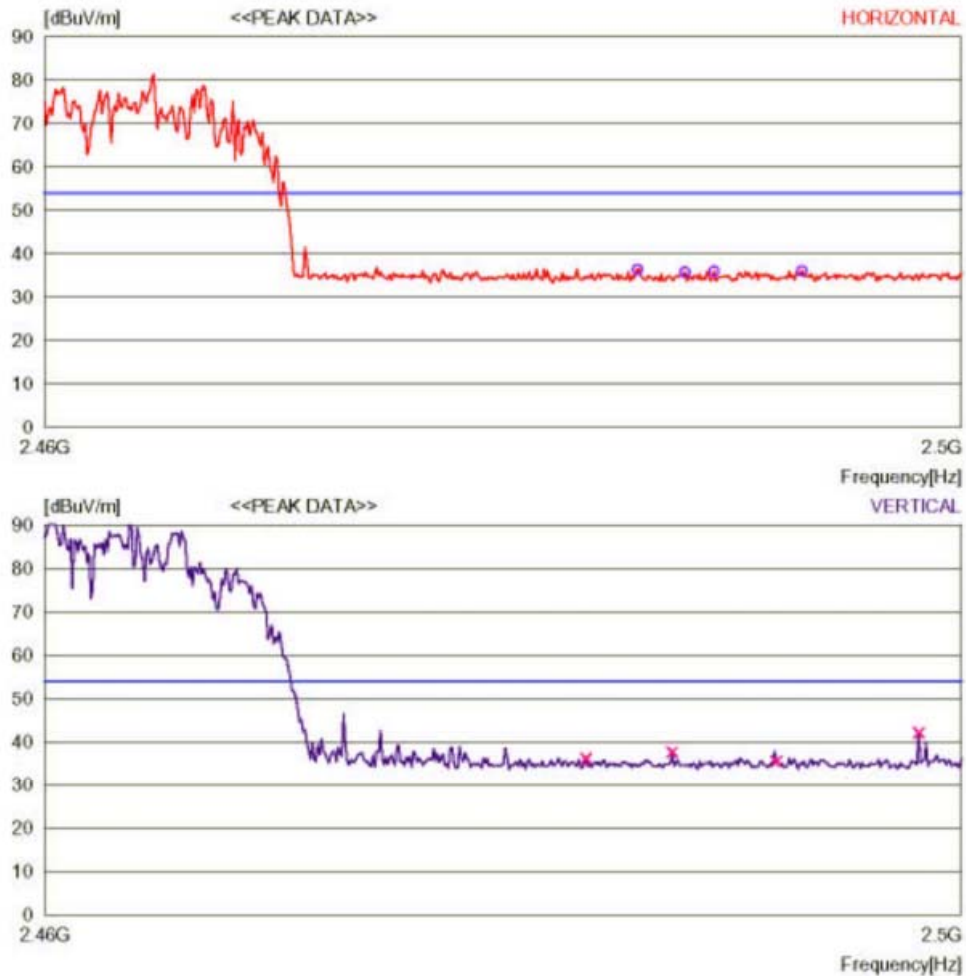
Date : 2010-12-30 14:25:28

Trade Name : Starbridge
Model Name : Starbridge 1531
Product : Switch Router
Test Condition : TX mode, 802.11b, CH 11

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 27/55RH%
Operator : Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)



2010-12-30 14:25:34

RADIATED EMISSION

Date : 2010-12-30 14:25:28

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11b, CH 11	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	2485.785	29.0	31.2	15.6	39.4	36.4	54	17.6	100	72
2	2487.867	28.4	31.2	15.6	39.4	35.8	54	18.2	200	188
3	2489.148	28.6	31.2	15.6	39.4	36.0	54	18.0	100	204
4	2492.992	28.7	31.2	15.6	39.4	36.1	54	17.9	100	192
---- Vertical ----										
5	2483.543	28.7	31.2	15.6	39.4	36.1	54	17.9	200	258
6	2487.307	30.2	31.2	15.6	39.4	37.6	54	16.4	100	92
7	2491.871	28.1	31.2	15.6	39.4	35.5	54	18.5	200	287
8	2498.117	34.7	31.2	15.6	39.4	42.1	54	11.9	200	188

802.11g mode:

2010-12-30 15:05:32

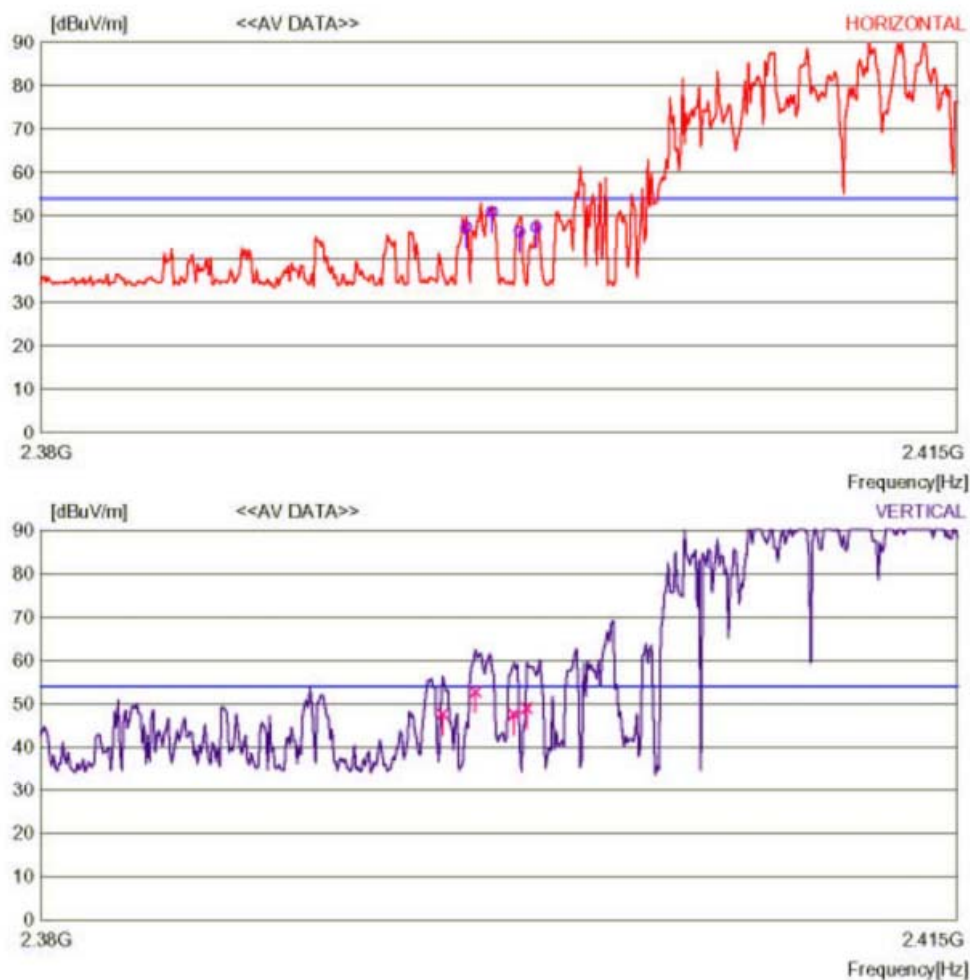
RADIATED EMISSION

Date : 2010-12-30 15:05:25

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 1	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)



2010-12-30 15:05:32

RADIATED EMISSION

Date : 2010-12-30 15:05:25

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product : Switch Router	Temp/Humi : 27/55RH%
Test Condition : TX mode, 802.11g, CH 1	Operator : Phenix zhang
Memo :	

LIMIT : FCC Part15 C transmitter spurious above1G(average)

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN AV [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [deg]
---- Horizontal ----										
1	2396.186	40.0	31.4	15.5	39.5	47.4	54.0	6.6	100	72
2	2397.167	43.6	31.4	15.5	39.5	51.0	54.0	3.0	200	60
3	2398.218	39.0	31.4	15.5	39.5	46.4	54.0	7.6	200	130
4	2398.848	40.0	31.4	15.5	39.5	47.4	54.0	6.6	100	109
---- Vertical ----										
5	2395.275	40.2	31.4	15.5	39.5	47.6	54.0	6.4	200	333
6	2396.536	45.3	31.4	15.5	39.5	52.7	54.0	1.3	100	307
7	2398.008	40.1	31.4	15.5	39.5	47.5	54.0	6.5	100	68
8	2398.498	41.5	31.4	15.5	39.5	48.9	54.0	5.1	200	254

2010-12-30 15:11:57

RADIATED EMISSION

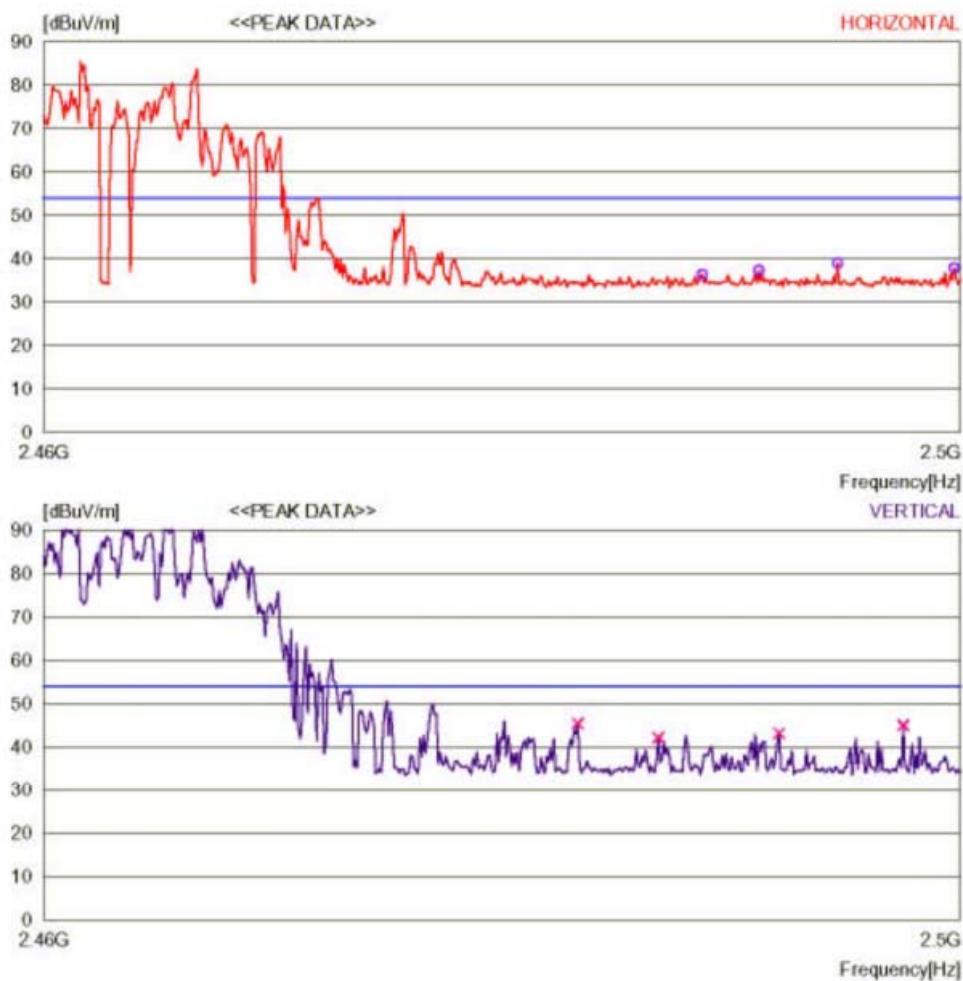
Date : 2010-12-30 15:11:49

Trade Name : Starbridge
Model Name : Starbridge 1531
Product : Switch Router
Test Condition : TX mode, 802.11g, CH 11

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 27/55RH%
Operator : Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)



2010-12-30 15:11:58

RADIATED EMISSION

Date : 2010-12-30 15:11:49

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 11	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	2488.668	29.0	31.2	15.6	39.4	36.4	54	17.6	200	64
2	2491.150	30.0	31.2	15.6	39.4	37.4	54	16.6	100	349
3	2494.594	31.6	31.2	15.6	39.4	39.0	54	15.0	100	342
4	2499.719	30.5	31.2	15.6	39.4	37.9	54	16.1	100	342
---- Vertical ----										
5	2483.223	38.0	31.2	15.6	39.4	45.4	54	8.6	200	109
6	2486.746	34.7	31.2	15.6	39.4	42.1	54	11.9	200	279
7	2492.031	35.7	31.2	15.6	39.4	43.1	54	10.9	100	72
8	2497.477	37.6	31.2	15.6	39.4	45.0	54	9.0	100	4

802.11n mode:

2010-12-30 13:33:21

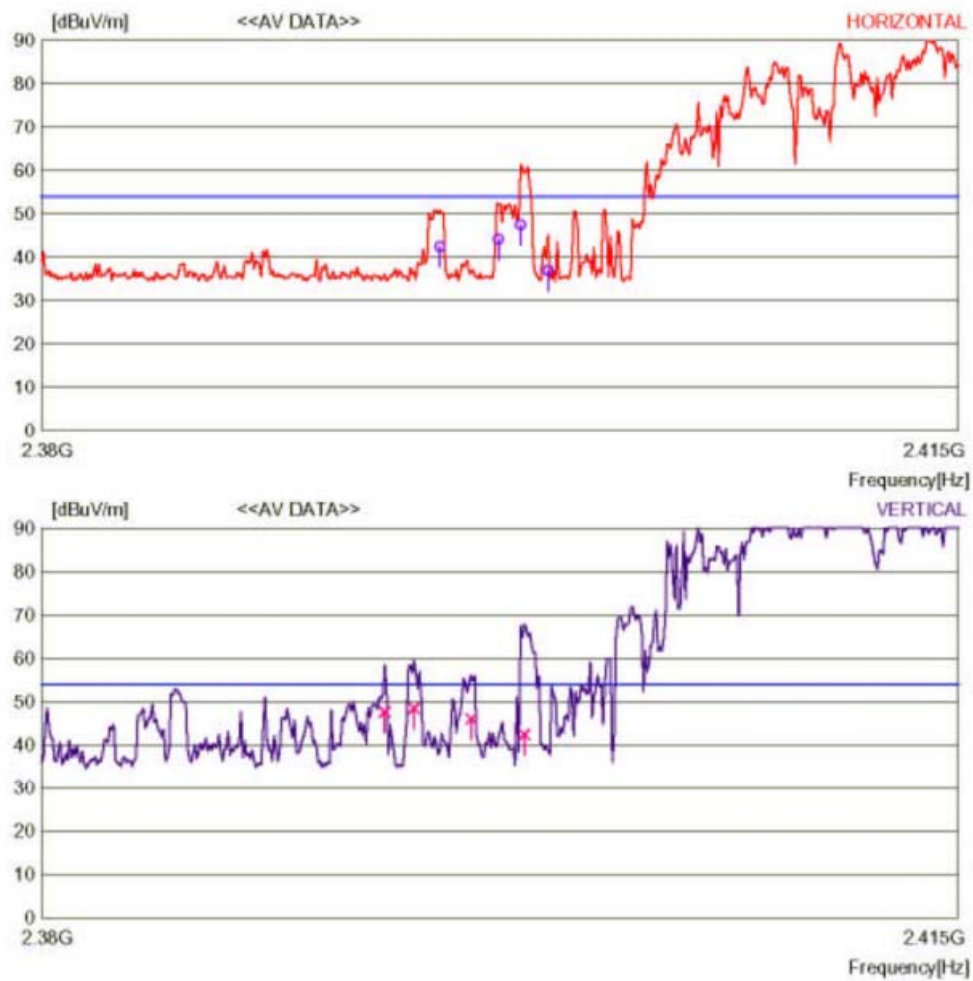
RADIATED EMISSION

Date : 2010-12-30 13:33:05

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11n, CH 1	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)



2010-12-30 13:33:21

RADIATED EMISSION

Date : 2010-12-30 13:33:05

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product : Switch Router	Temp/Humi : 27/55RH%
Test Condition : TX mode, 802.11n, CH 1	Operator : Phenix zhang
Memo :	

LIMIT : FCC Part15 C transmitter spurious above1G(average)

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN AV [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [deg]
---- Horizontal ----										
1	2395.135	35.1	31.4	15.5	39.5	42.5	54.0	11.5	200	22
2	2397.377	36.8	31.4	15.5	39.5	44.2	54.0	9.8	200	124
3	2398.218	40.1	31.4	15.5	39.5	47.5	54.0	6.5	200	170
4	2399.269	29.6	31.4	15.5	39.5	37.0	54.0	17.0	200	120
---- Vertical ----										
5	2398.358	35.0	31.4	15.5	39.5	42.4	54.0	11.6	100	167
6	2393.033	40.2	31.4	15.5	39.5	47.6	54.0	6.4	200	1
7	2394.154	41.0	31.4	15.5	39.5	48.4	54.0	5.6	200	155
8	2396.326	38.6	31.4	15.5	39.5	46.0	54.0	8.0	200	134

2010-12-30 14:12:16

RADIATED EMISSION

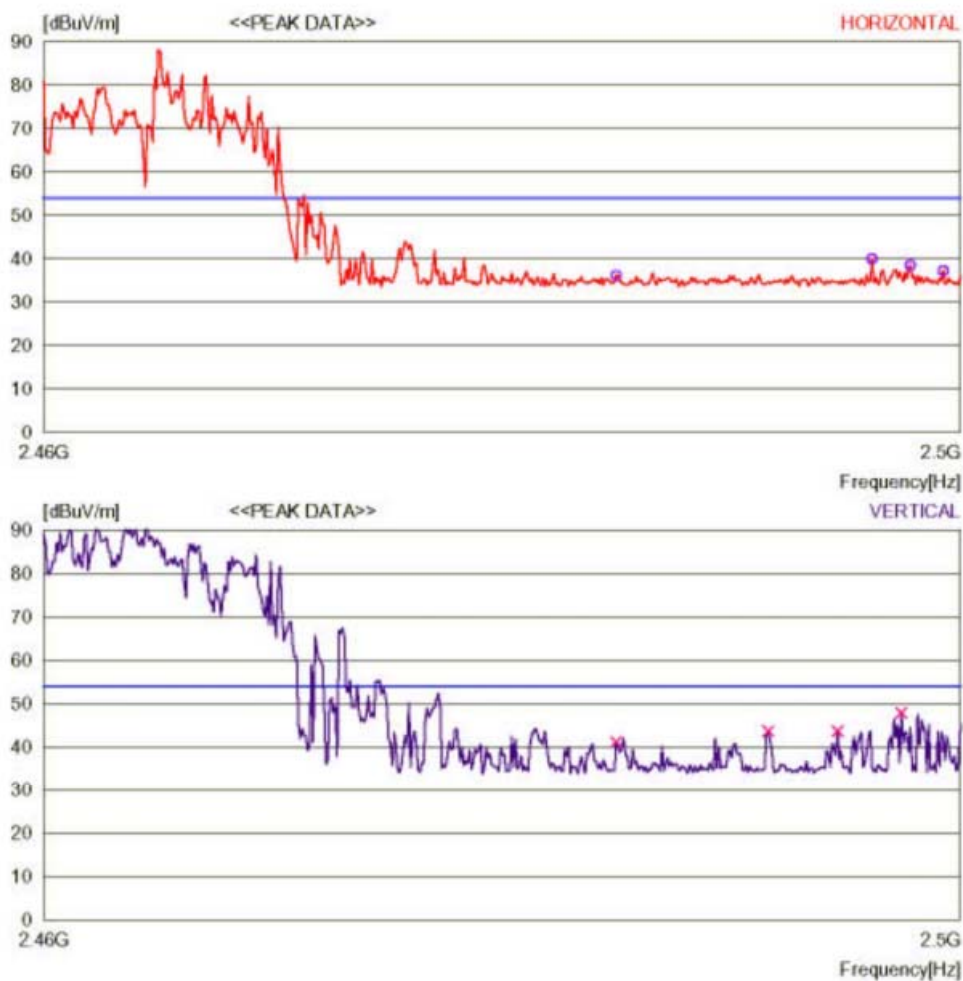
Date : 2010-12-30 14:12:06

Trade Name : Starbridge
Model Name : Starbridge 1531
Product : Switch Router
Test Condition : TX mode, 802.11n, CH 11

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 27/55RH%
Operator : Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)



2010-12-30 14:12:16

RADIATED EMISSION

Date : 2010-12-30 14:12:06

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11n, CH 11	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)

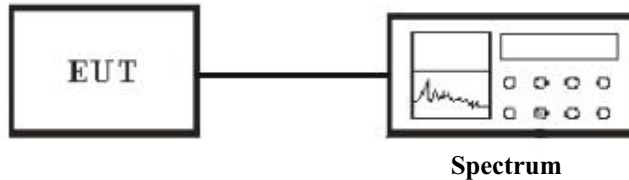
No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	2484.904	28.8	31.2	15.6	39.4	36.2	54	17.8	200	108
2	2496.115	32.6	31.2	15.6	39.4	40.0	54	14.0	200	207
3	2497.797	31.1	31.2	15.6	39.4	38.5	54	15.5	200	178
4	2499.238	29.9	31.2	15.6	39.4	37.3	54	16.7	200	162
---- Vertical ----										
5	2484.904	33.7	31.2	15.6	39.4	41.1	54	12.9	100	216
6	2491.551	36.2	31.2	15.6	39.4	43.6	54	10.4	201	114
7	2494.594	36.2	31.2	15.6	39.4	43.6	54	10.4	201	114
8	2497.396	40.4	31.2	15.6	39.4	47.8	54	6.2	201	304

4.5 6dB BANDWIDTH

4.5.1 Applicable Standard

According to section 15.247(a)(2), for digital modulation technique, the minimum 6dB bandwidth shall be at least 500kHz.

4.5.2 Block diagram of test setup



Connection method: The shield cable was connected with EUT and Spectrum which have $50\Omega Z_C$. There have a combiner inserted between the spectrum and EUT. The connector of EUT side is original by manufacturer. The connector of Spectrum side is N type.

4.5.3 Measurement method

1. The transmitter output was connected to the spectrum analyzer through a shielded cable.
2. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Span=40MHz, Sweep=auto.
3. Set Detector to Peak, Trace to Max Hold and Sweep Time is auto.
4. Mark the peak frequency and -6dB(upper and lower) frequency.
5. Repeat above 1-4 points for the middle and highest channel of the EUT.

4.5.4. Result

Temperature (°C) : 22~23	EUT: ADSL2+ 802.11b/g/n 4 Port Managed Switch Router
Humidity (%RH) : 50~54	M/N: Starbridge 1531
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode
Test date: Jan 05, 2011 to Jan 07,2010	Test engineer: Phenix

802.11b mode:

Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
LOW (CH 1)	2412	12.0	>0.5
MID (CH 6)	2437	10.1	>0.5
HIG (CH 11)	2462	10.8	>0.5

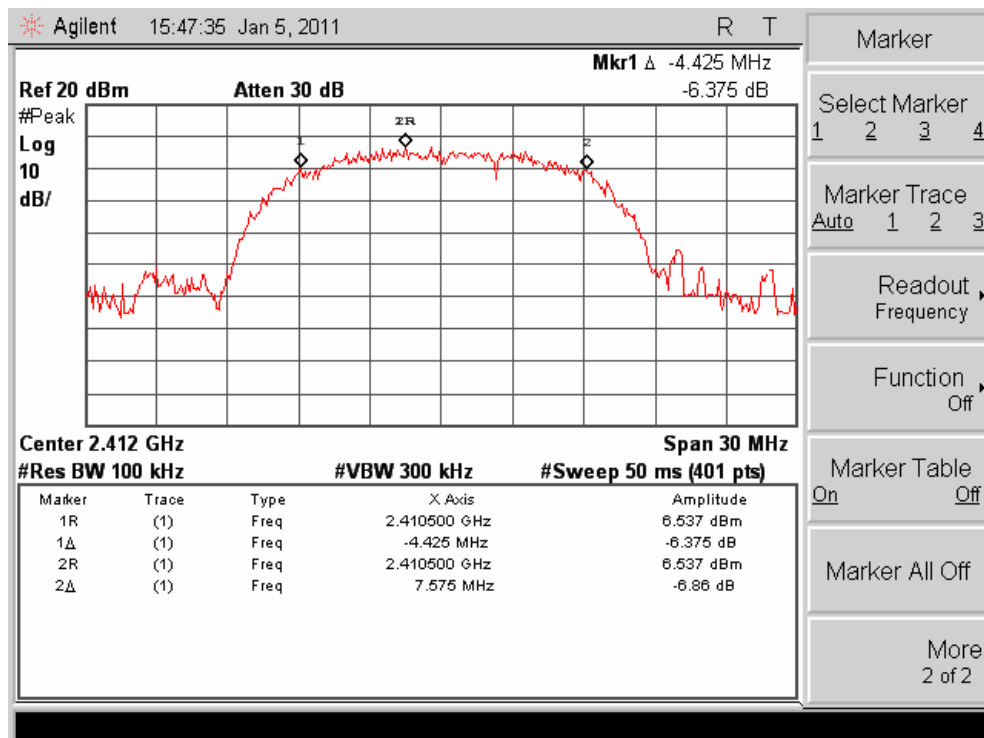
802.11g mode:

Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
LOW (CH 1)	2412	16.5	>0.5
MID (CH 6)	2437	16.5	>0.5
HIG (CH 11)	2462	16.5	>0.5

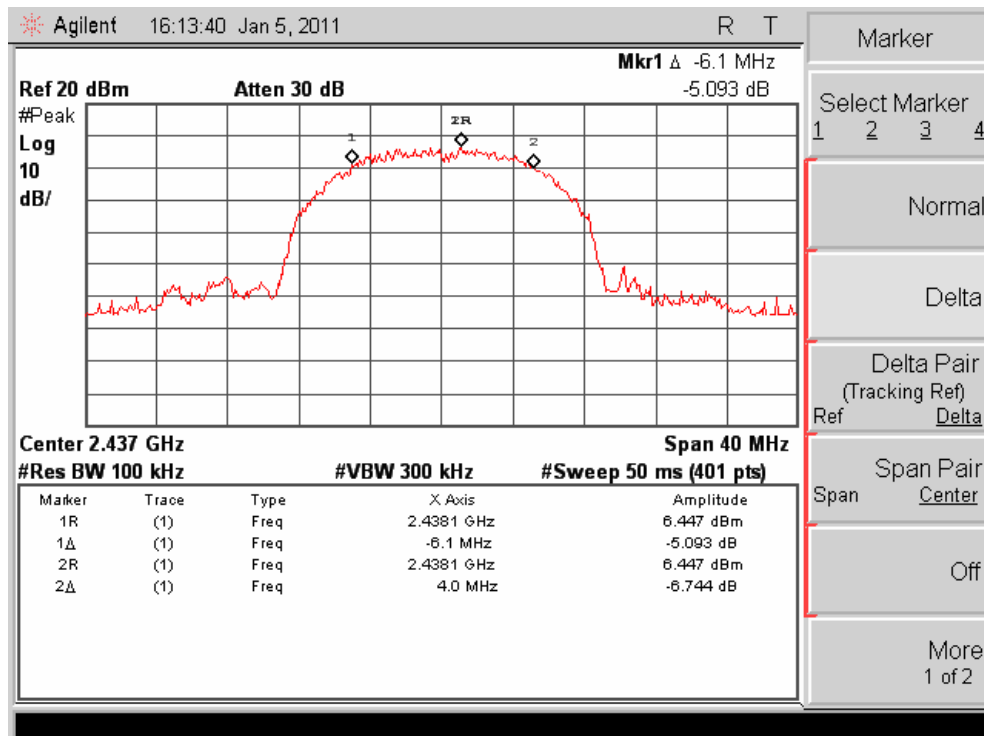
802.11n mode:

Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
LOW (CH 1)	2412	17.6	>0.5
MID (CH 6)	2437	17.5	>0.5
HIG (CH 11)	2462	17.5	>0.5

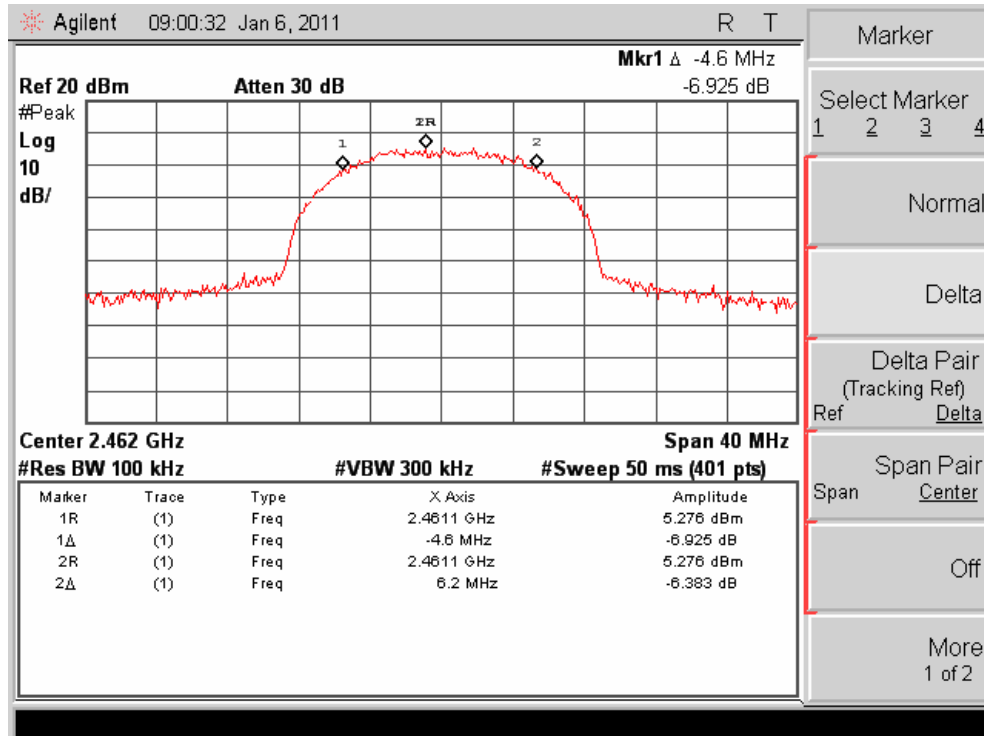
802.11b mode Plot: Channel LOW



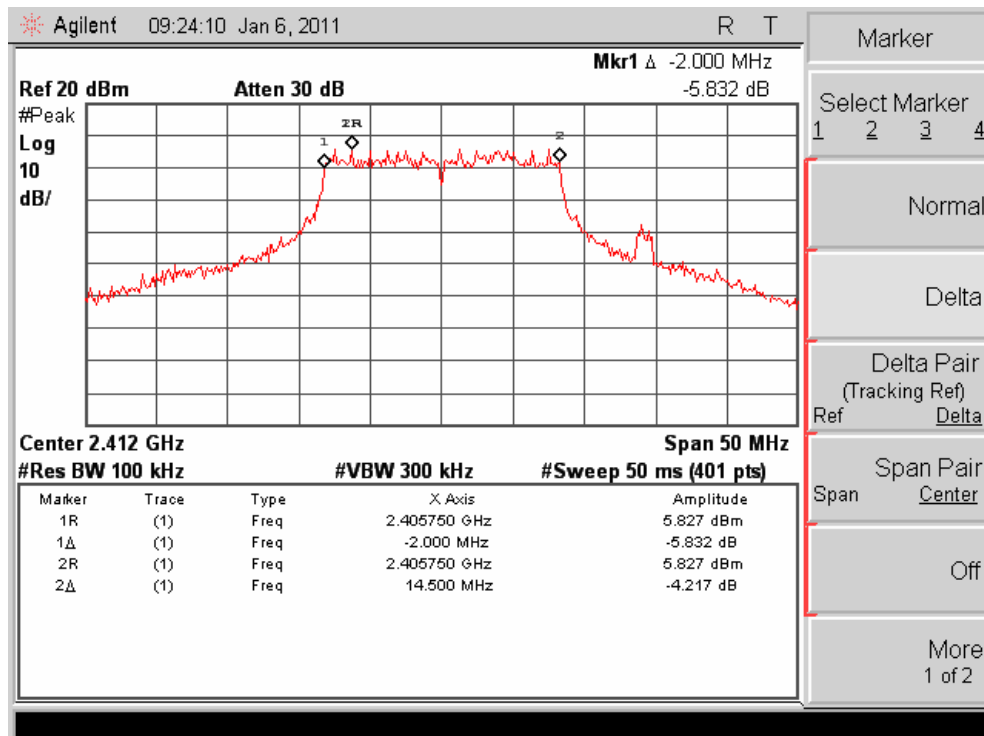
Channel MID



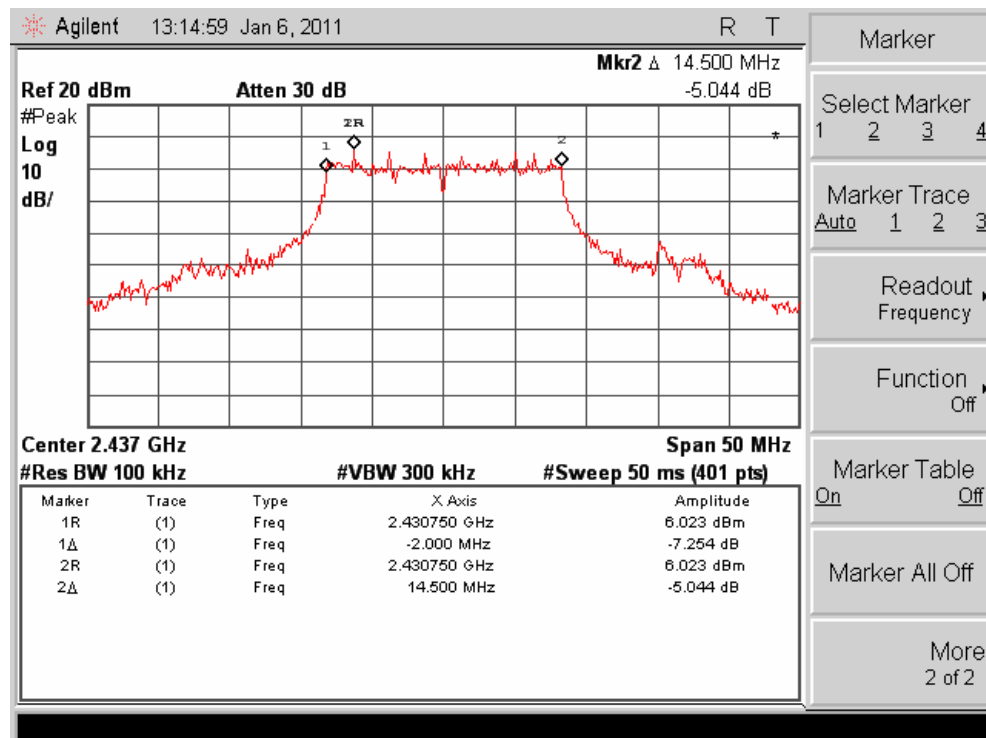
Channel HIG



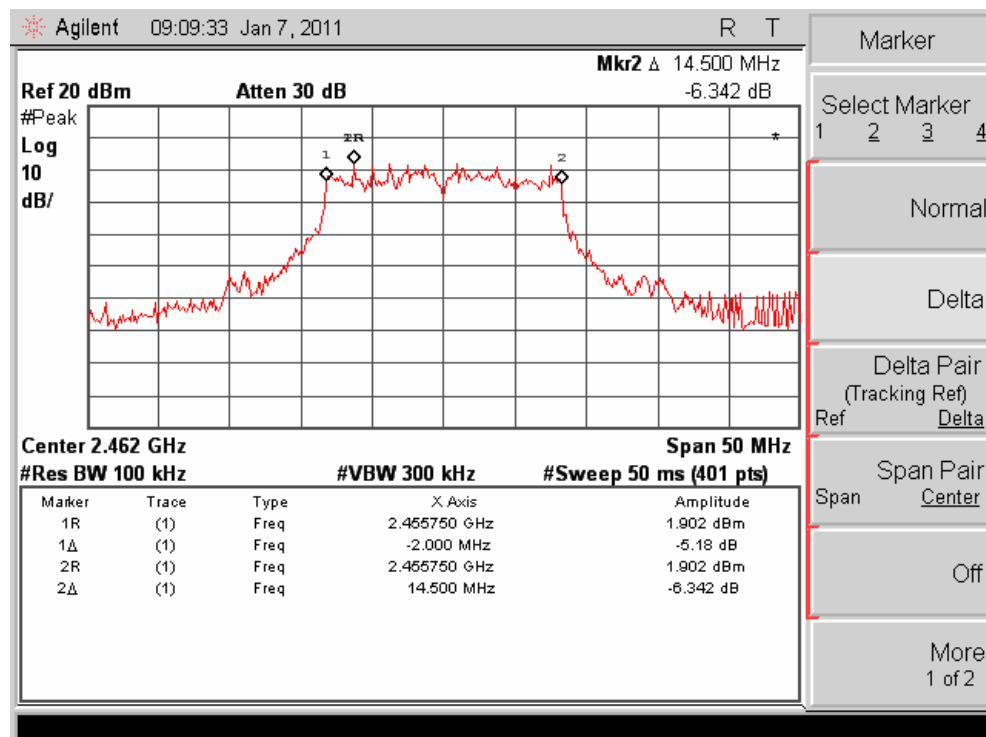
802.11g mode Plot: Channel LOW



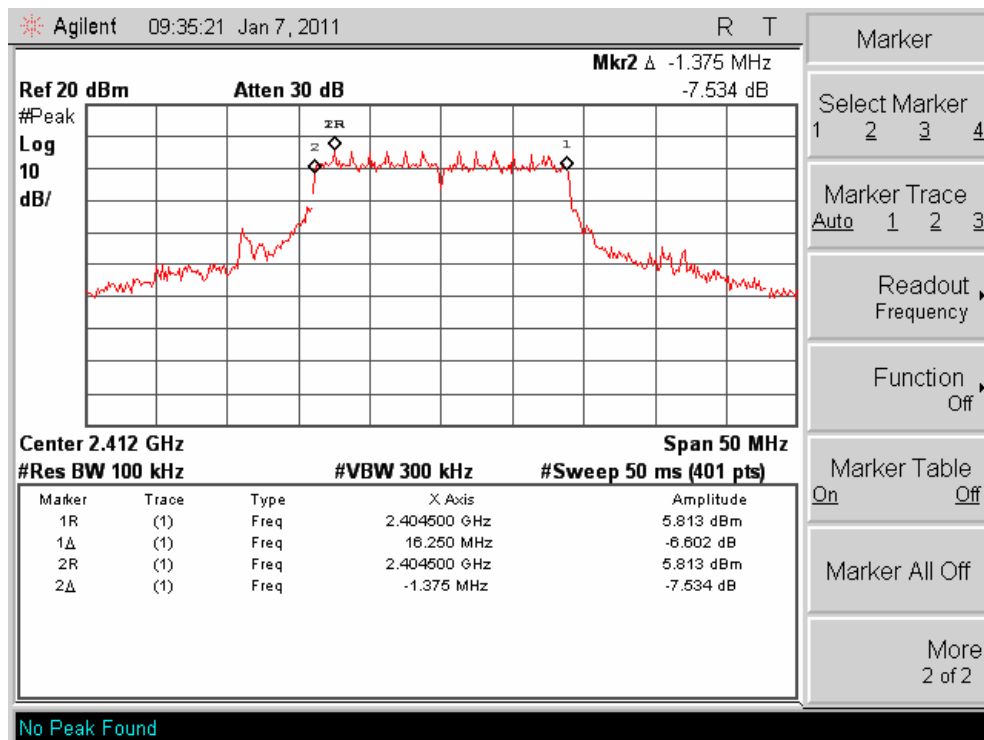
Channel MID



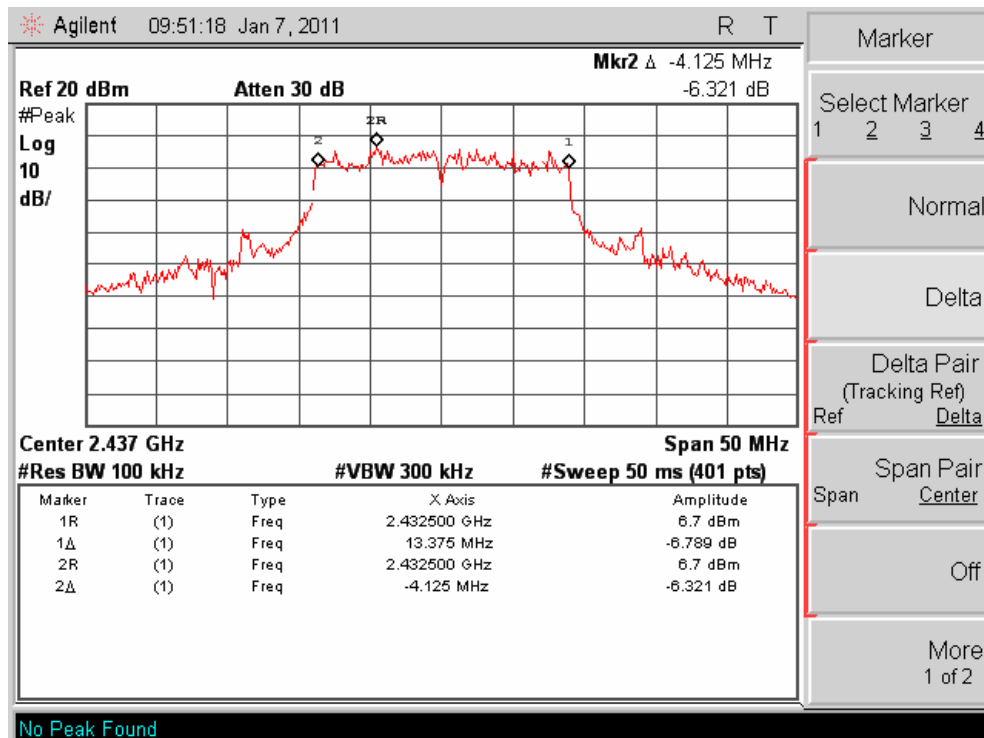
Channel HIG



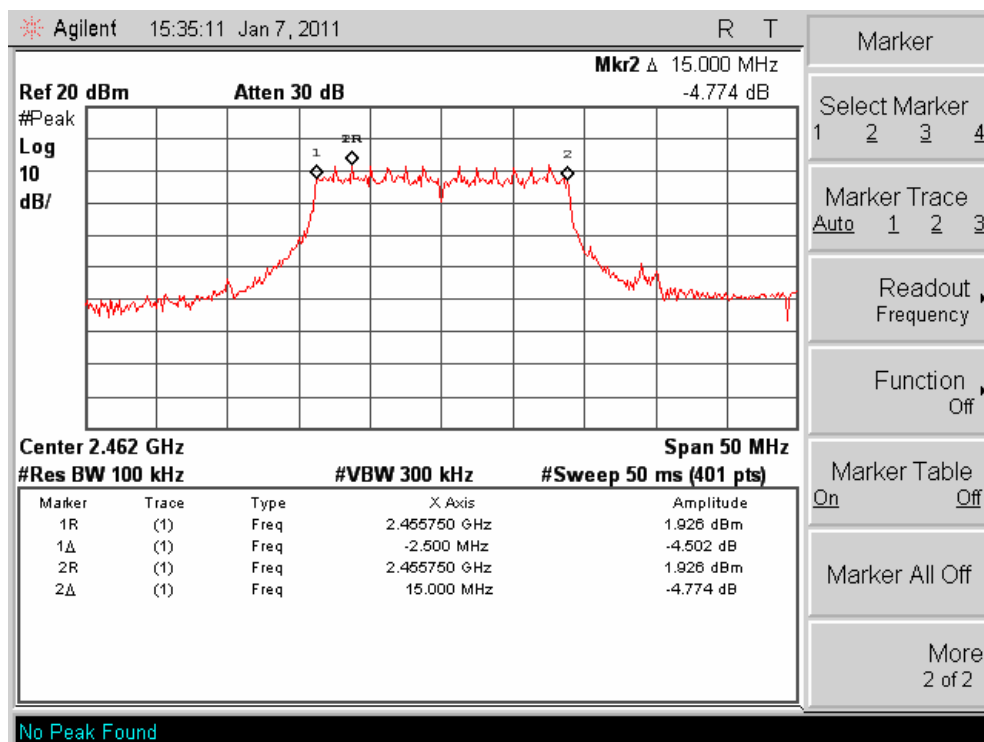
802.11n mode Plot: Channel LOW



Channel MID



Channel HIG

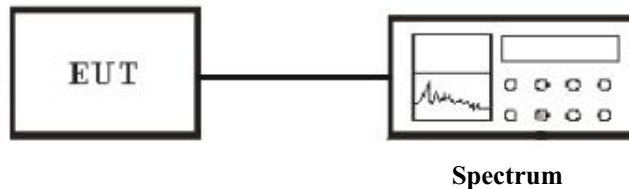


4.6 Power Spectral Density

4.6.1 Applicable Standard

According to section 15.247(d), for digital modulation technique, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

4.6.2 Block diagram of test setup



Connection method: The shield cable was connected with EUT and Spectrum which have $50\Omega Z_C$. There have a combiner inserted between the spectrum and EUT. The connector of EUT side is original by manufacturer. The connector of Spectrum side is N type.

4.6.3 Measurement method

1. The transmitter output was connected to the spectrum analyzer through a shielded cable.
2. Set the spectrum analyzer as RBW=3 kHz, VBW=10 kHz, Span=300 kHz, Sweep=100s.
3. Set Detector to Peak, Trace to Max Hold.
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The plot of result is show on the screen of spectrum analyzer.
5. Repeat above 1-4 points for the middle and highest channel of the EUT.

4.6.4. Result

Temperature (°C) : 22~23	EUT: ADSL2+ 802.11b/g/n 4 Port Managed Switch Router
Humidity (%RH) : 50~54	M/N: Starbridge 1531
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode
Test date: Jan 05, 2011 to Jan 07,2010	Test engineer: Phenix

802.11b mode:

Channel No.	Frequency (MHz)	Power Spectral Density (MHz)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	-6.74	8	13.26
MID (CH 6)	2437	-9.24	8	10.76
HIG (CH 11)	2462	-9.39	8	10.61

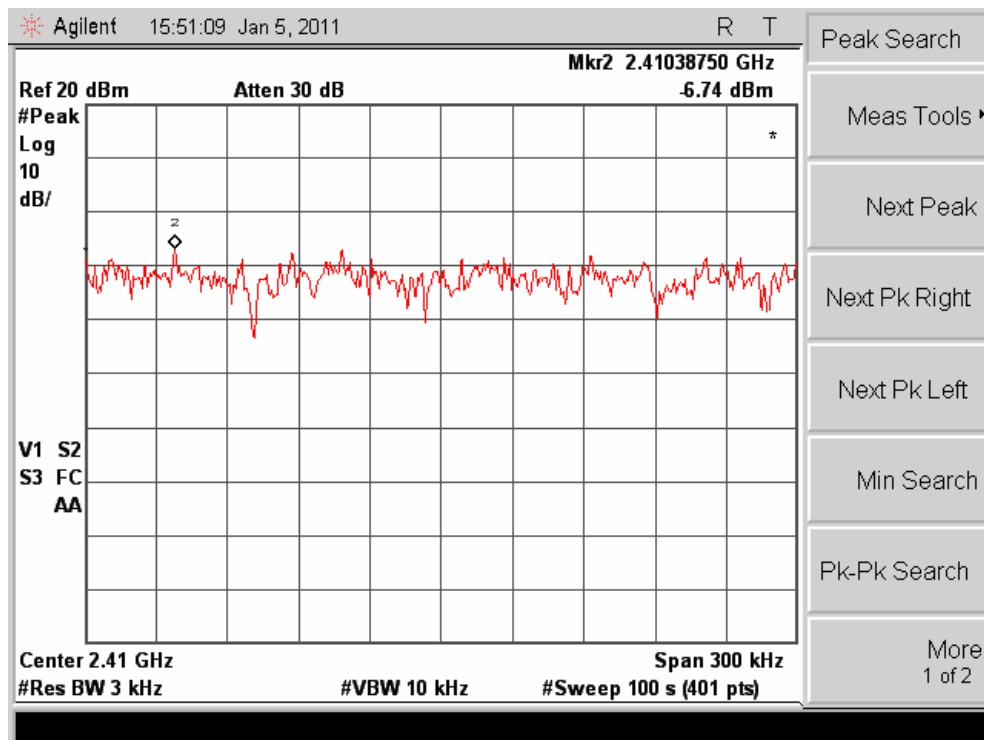
802.11g mode:

Channel No.	Frequency (MHz)	Power Spectral Density (MHz)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	-5.13	8	14.87
MID (CH 6)	2437	-4.62	8	15.38
HIG (CH 11)	2462	-6.19	8	13.81

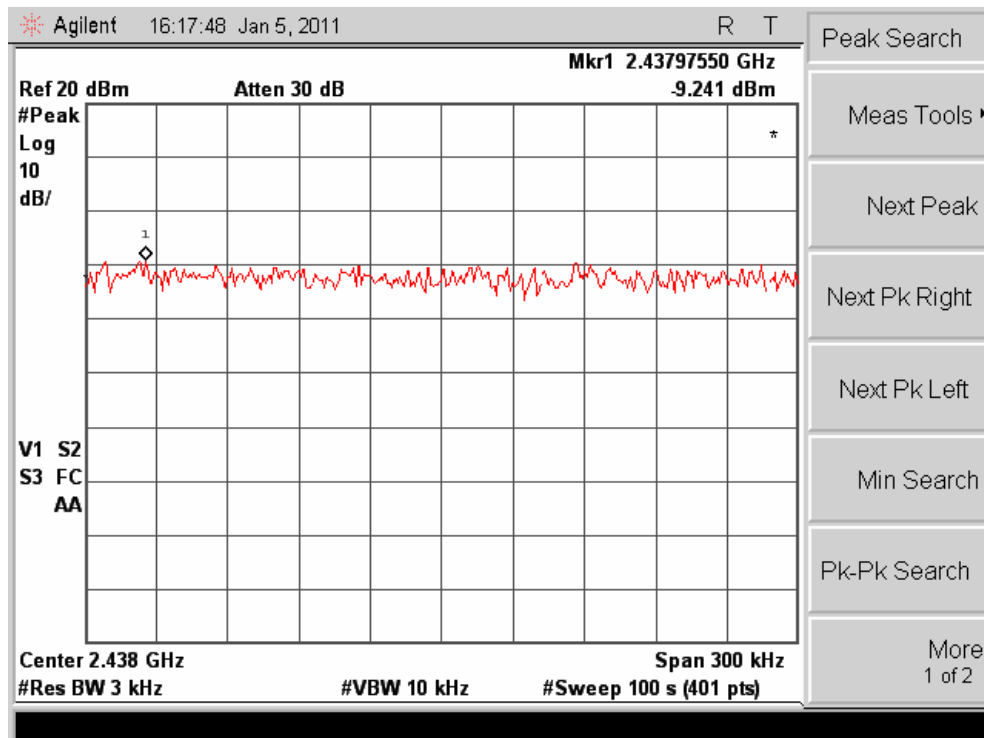
802.11n mode:

Channel No.	Frequency (MHz)	Power Spectral Density (MHz)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	-1.16	8	18.84
MID (CH 6)	2437	-3.09	8	16.91
HIG (CH 11)	2462	-4.95	8	15.05

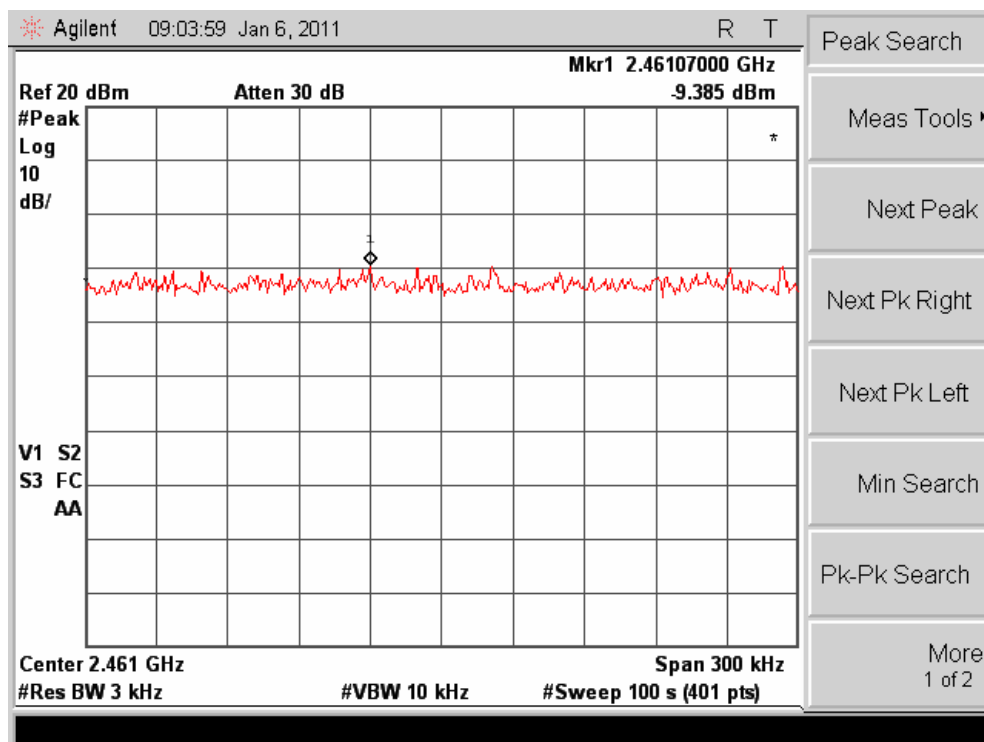
802.11b mode Plot: Channel LOW



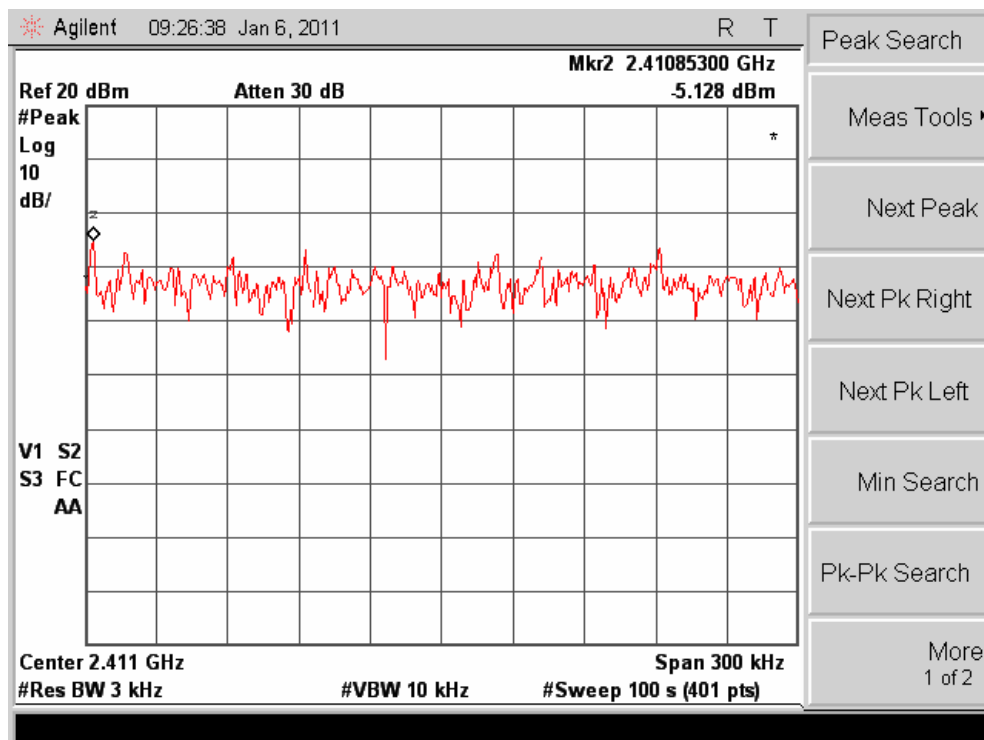
Channel MID



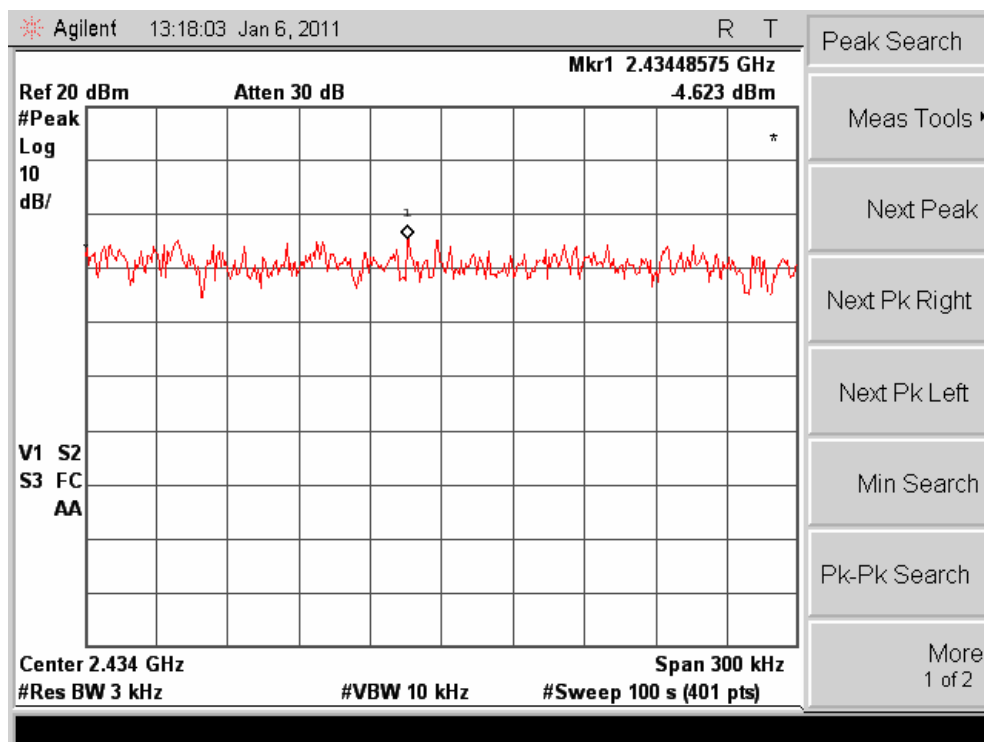
Channel HIG



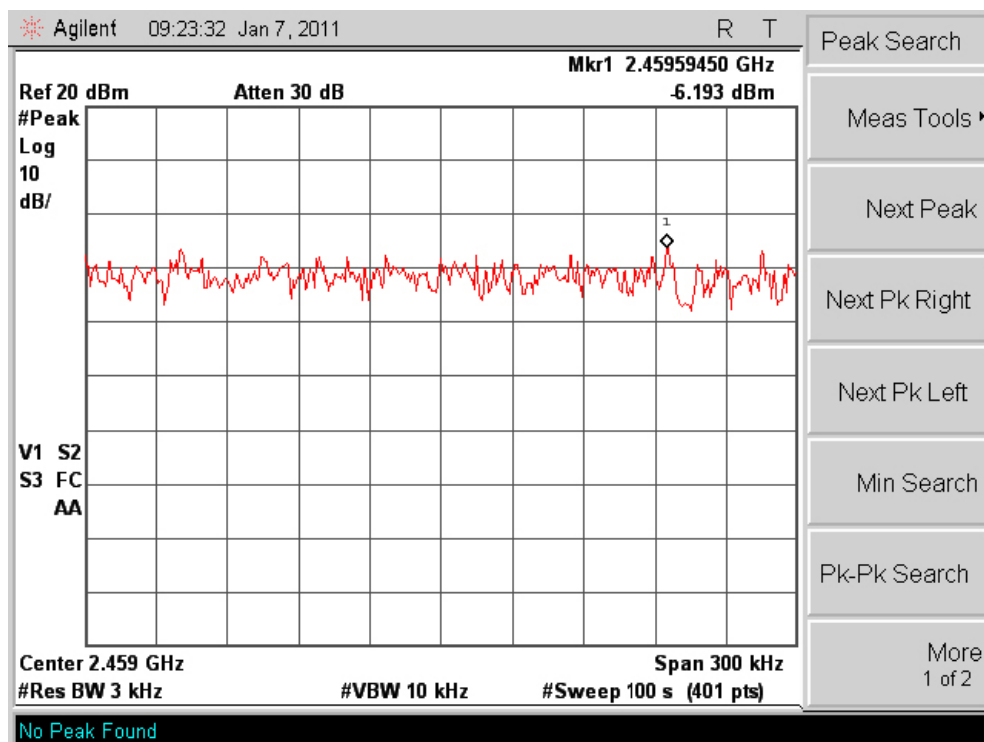
802.11g mode Plot: Channel LOW



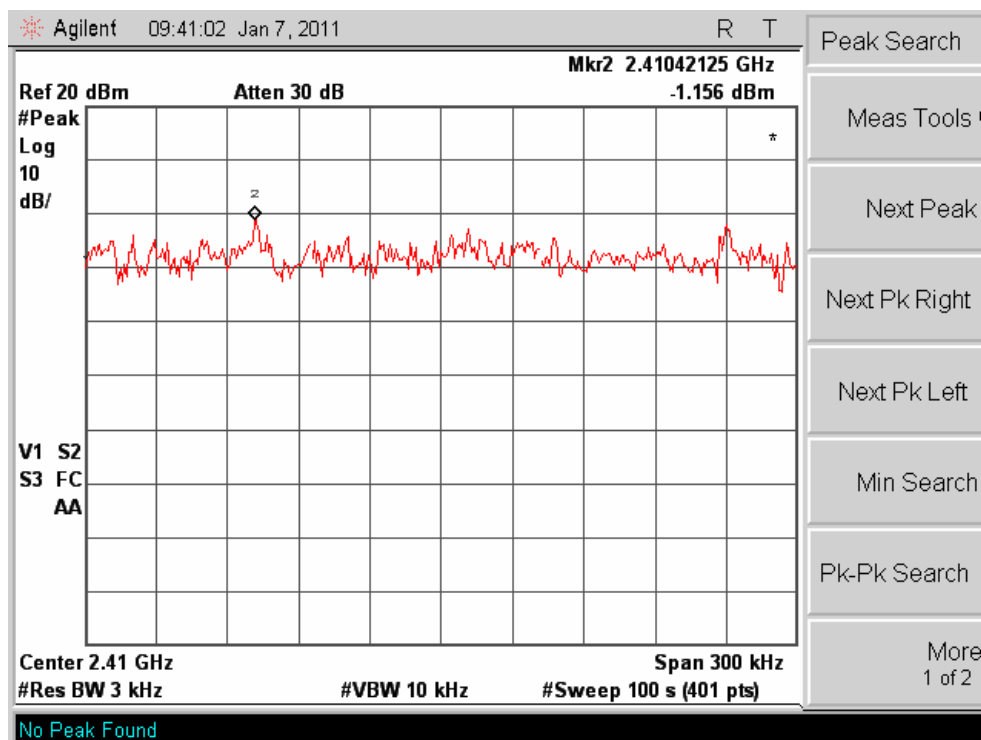
Channel MID



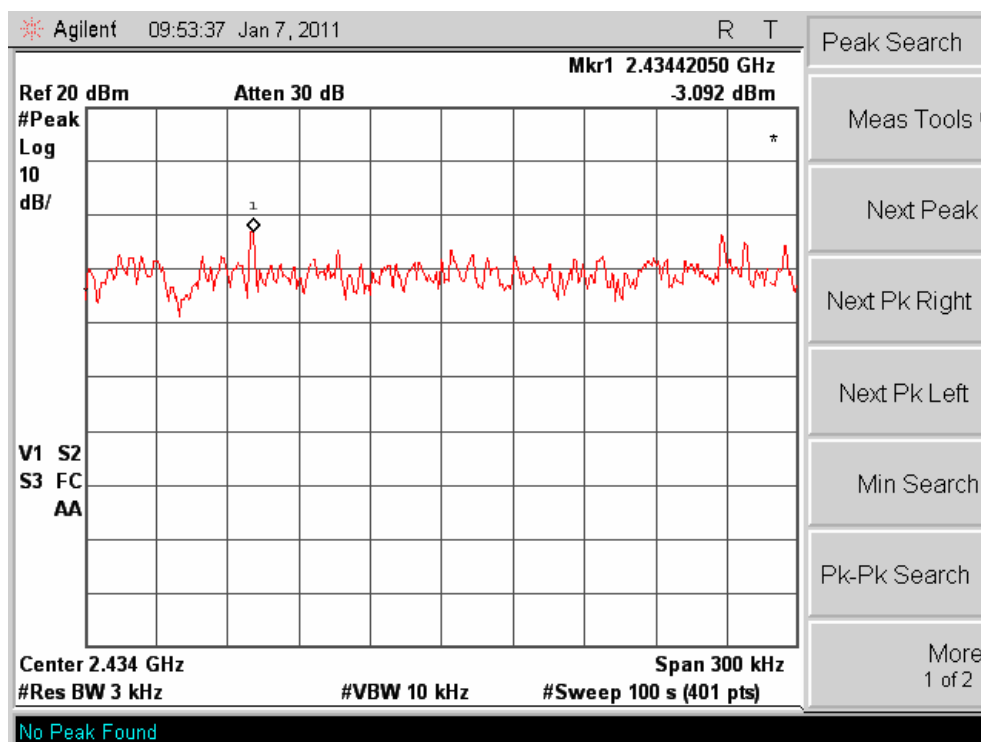
Channel HIG



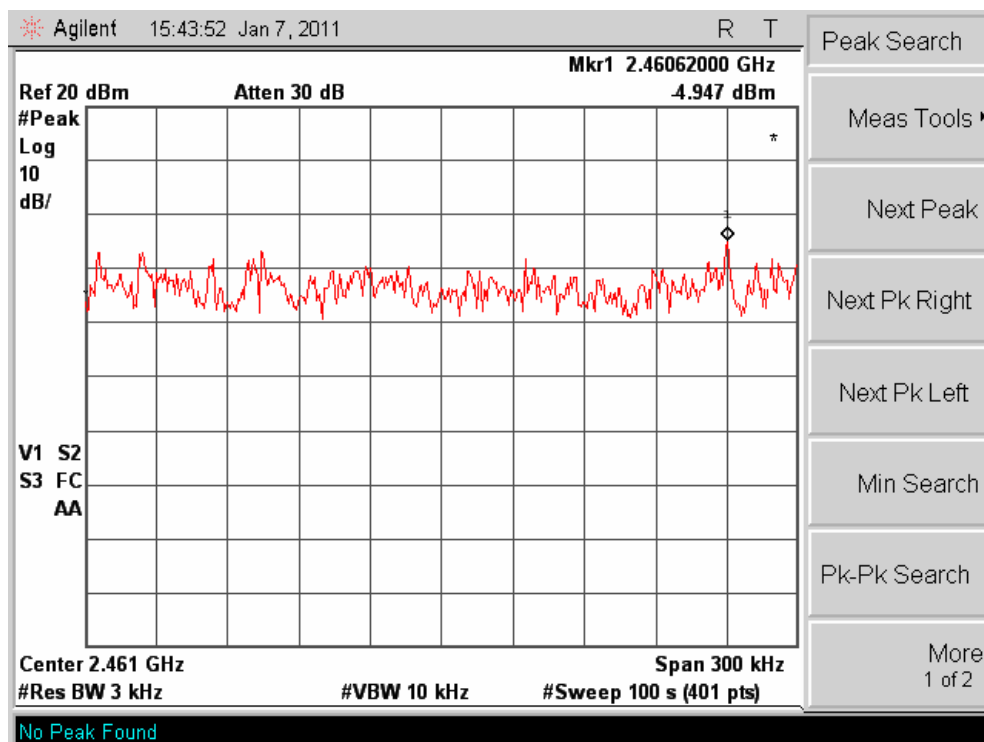
802.11n mode Plot: Channel LOW



Channel MID



Channel HIG



4.7 Spurious Radiated Emission

4.7.1 Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

4.7.2 Block diagram of test setup

Radiated Measurement Setup:

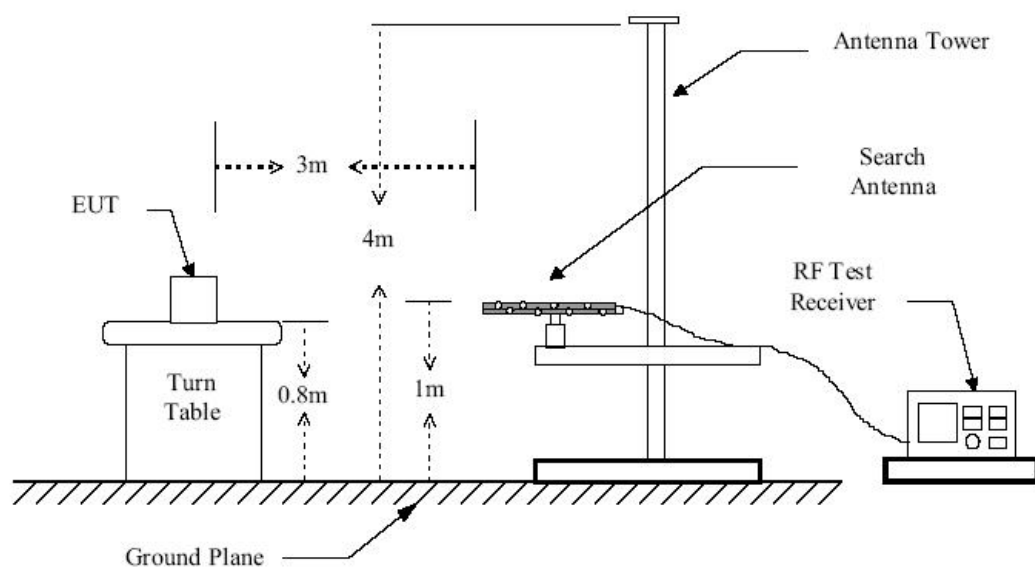


Figure 1 : Frequencies measured below 1 GHz configuration

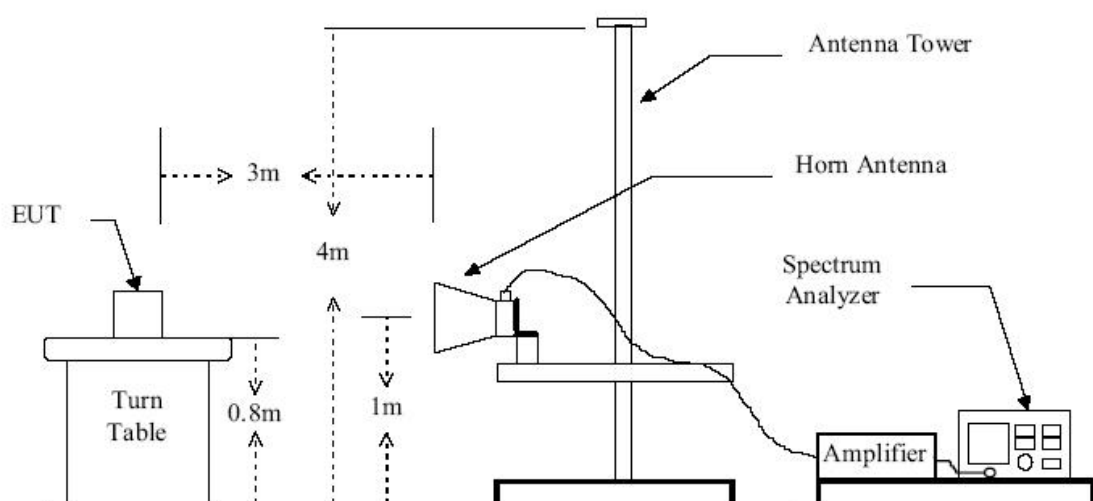
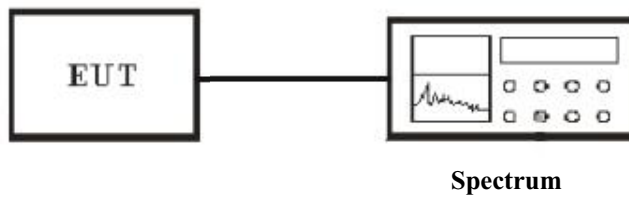


Figure 2 : Frequencies measured above 1 GHz configuration

Conducted Measurement Setup:



Connection method: The shield cable was connected with EUT and Spectrum which have $50\Omega Z_C$. There have a combiner inserted between the spectrum and EUT. The connector of EUT side is original by manufacturer. The connector of Spectrum side is N type.

4.7.3 Measurement method

Radiated Measurement

1. Configure the EUT according to ANSI C63.4 (2003).
2. The EUT was placed on the top of the turntable 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
4. Power on the EUT and all the supporting units.
5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

Conducted Measurement

1. For emission above 1GHz, conducted measurement method is used.
2. The transmitter is set to the lowest channel.
3. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.
4. Set RBW to 100 KHz and VBW to 300 KHz, Then detector set to peak and max hold this trace.
5. The lowest band edges emission was measured and recorded.
6. The transmitter set to the highest channel and repeated 2~4.

4.7.4. Result

PASS

Radiated:

Below 30MHz:

No further spurious emissions found between lowest internal used or generated frequency and 30 MHz.

30M- 1GHz:

802.11b mode:

1# Adaptor:

2010-12-28 15:41:37

RADIATED EMISSION

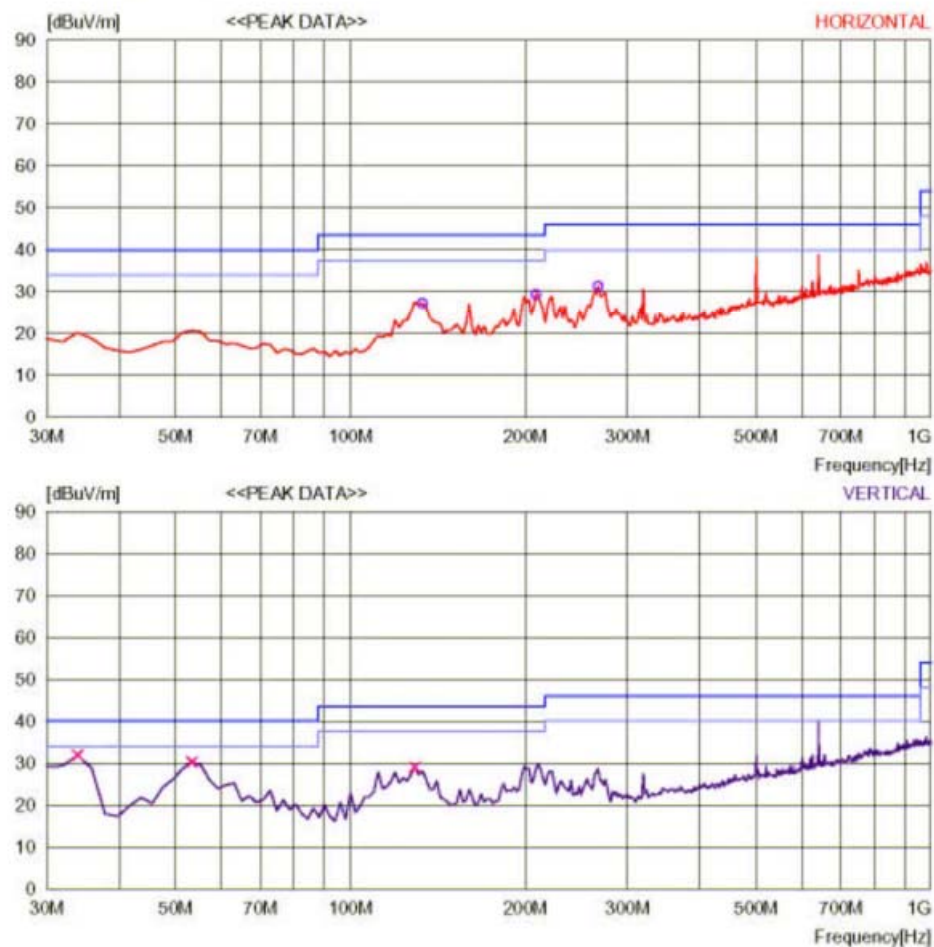
Date : 2010-12-28 15:39:55

Trade Name : Starbridge
Model Name : Starbridge 1531
Product Name : Switch Router
Test Condition :

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 25 Deg/55% RH
Operator : YongSheng Pang

Memo : 802.11b mode adapter(ADS-12G-12 12012GPCU)

LIMIT : FCC Part15 Class B(3m)/USA
MARGIN: 6 dB



2010-12-28 15:41:37

RADIATED EMISSION

Date : 2010-12-28 15:39:55

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: Switch Router	Temp/Humi	: 25 Deg/55% RH
Test Condition	:	Operator	: YongSheng Pang

Memo : 802.11b mode adapter(ADS-12G-12 12012GPCU)

LIMIT : FCC Part15 Class B(3m)/USA
MARGIN: 6 dB

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	133.026	39.9	11.3	7.6	31.6	27.2	43.5	16.3	200	246
2	208.838	39.9	13.2	7.9	31.6	29.4	43.5	14.1	100	274
3	267.155	42.2	12.4	8.3	31.6	31.3	46	14.7	100	130
----- Vertical -----										
4	33.888	45.3	11.6	6.6	31.6	31.9	40	8.1	100	31
5	53.327	44.3	10.8	6.8	31.6	30.3	40	9.7	100	20
6	129.138	41.7	11.3	7.6	31.6	29.0	43.5	14.5	100	64

2# Adaptor:

2011-01-06 10:11:51

RADIATED EMISSION

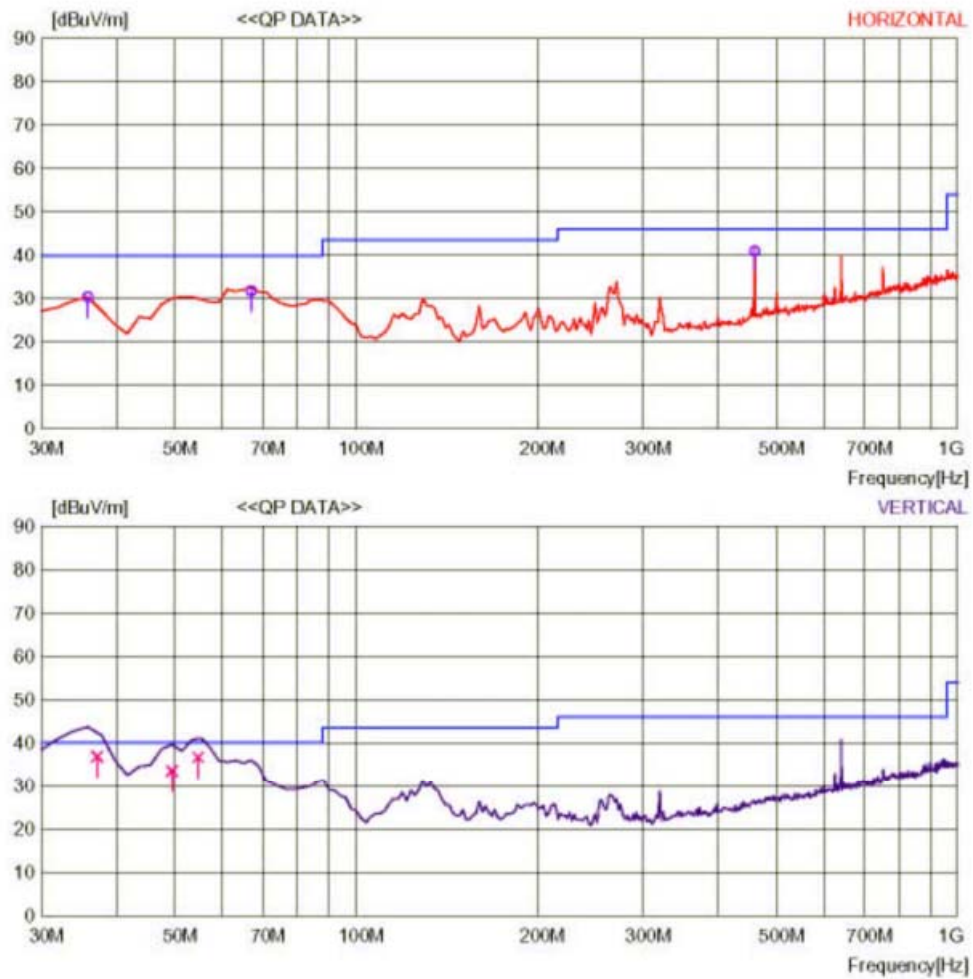
Date : 2011-01-06 10:11:20

Trade Name : Starbridge
Model Name : Starbridge 1531
Product Name : Switch Router
Test Condition : 802.11b Mode

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 25 Deg/55% RH
Operator : Phenix Zhang

Memo : adapter(UE12L-120100SPAU)

LIMIT : FCC Part15 Class B(3m)/USA



2011-01-06 10:11:51

RADIATED EMISSION

Date : 2011-01-06 10:11:20

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: Switch Router	Temp/Humi	: 25 Deg/55% RH
Test Condition	: 802.11b Mode	Operator	: Phenix Zhang

Memo : adapter(UE12L-120100SPAU)

LIMIT : FCC Part15 Class B(3m)/USA

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	QP	[dBuV/m]	[dB]	[cm]	[deg]
		[dBuV]	[dB]							
----- Horizontal -----										
1	35.832	44.0	11.3	6.7	31.6	30.4	40.0	9.6	400	134
2	66.934	46.0	10.4	7.0	31.6	31.8	40.0	8.2	400	316
3	459.599	45.0	18.0	9.4	31.4	41.0	46.0	5.0	300	130
----- Vertical -----										
4	37.112	50.4	11.3	6.7	31.6	36.8	40.0	3.2	230	143
5	54.602	50.6	10.8	6.8	31.6	36.6	40.0	3.4	107	105
6	49.439	47.5	10.9	6.7	31.6	33.5	40.0	6.5	100	101

802.11g mode:

1# Adaptor:

2011-01-04 14:38:59

RADIATED EMISSION

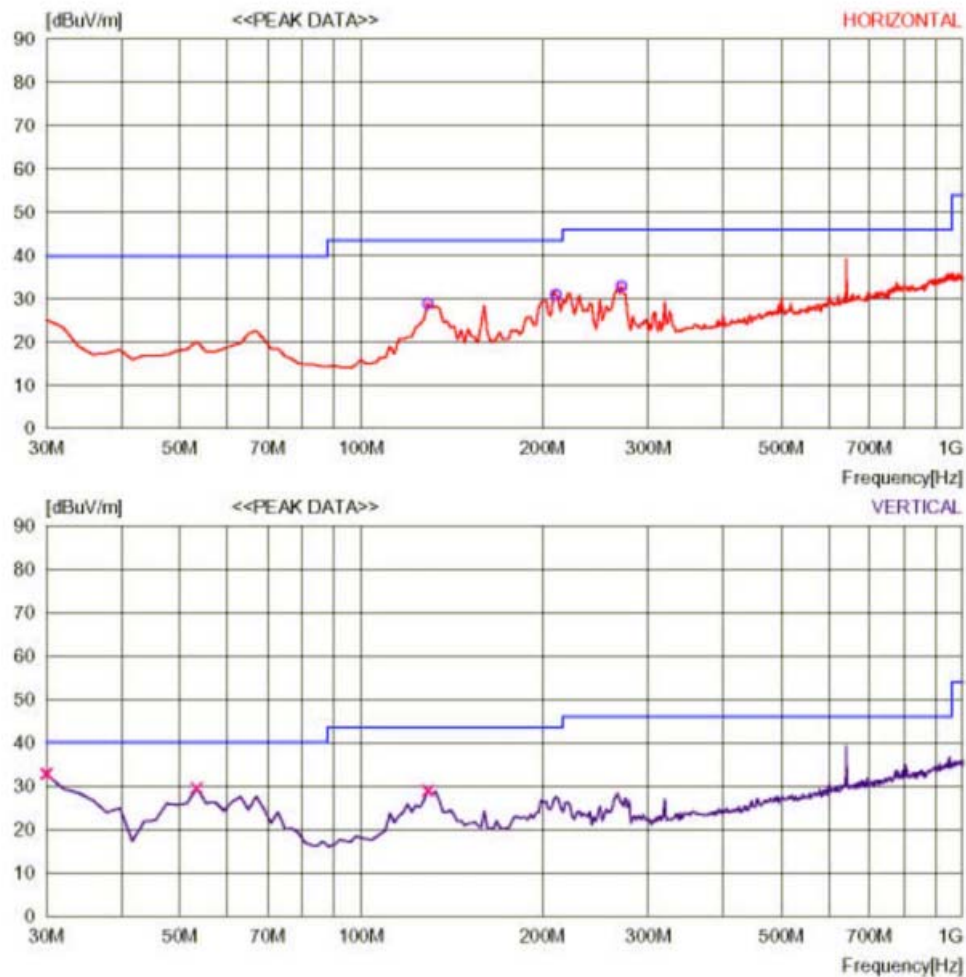
Date : 2011-01-04 14:38:41

Trade Name : Starbridge
Model Name : Starbridge 1531
Product Name : Switch Router
Test Condition : 802.11g Mode

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 25 Deg/55% RH
Operator : Phenix Zhang

Memo : adapter(ADS-12G-12 12012GPCU)

LIMIT : FCC Part15 Class B(3m)/USA



2011-01-04 14:39:00

RADIATED EMISSION

Date : 2011-01-04 14:38:41

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: Switch Router	Temp/Humi	: 25 Deg/55% RH
Test Condition	: 802.11g Mode	Operator	: Phenix Zhang

Memo : adapter(ADS-12G-12 12012GPCU)

LIMIT : FCC Part15 Class B(3m)/USA

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	129.138	41.7	11.3	7.6	31.6	29.0	43.5	14.5	200	258
2	210.782	41.6	13.1	7.9	31.6	31.0	43.5	12.5	200	258
3	271.042	43.8	12.5	8.3	31.6	33.0	46	13.0	100	192
----- Vertical -----										
4	30.000	45.4	12.5	6.5	31.6	32.8	40	7.2	100	275
5	53.327	43.5	10.8	6.8	31.6	29.5	40	10.5	100	72
6	129.138	41.6	11.3	7.6	31.6	28.9	43.5	14.6	100	92

2# Adaptor:

2011-01-06 10:32:09

RADIATED EMISSION

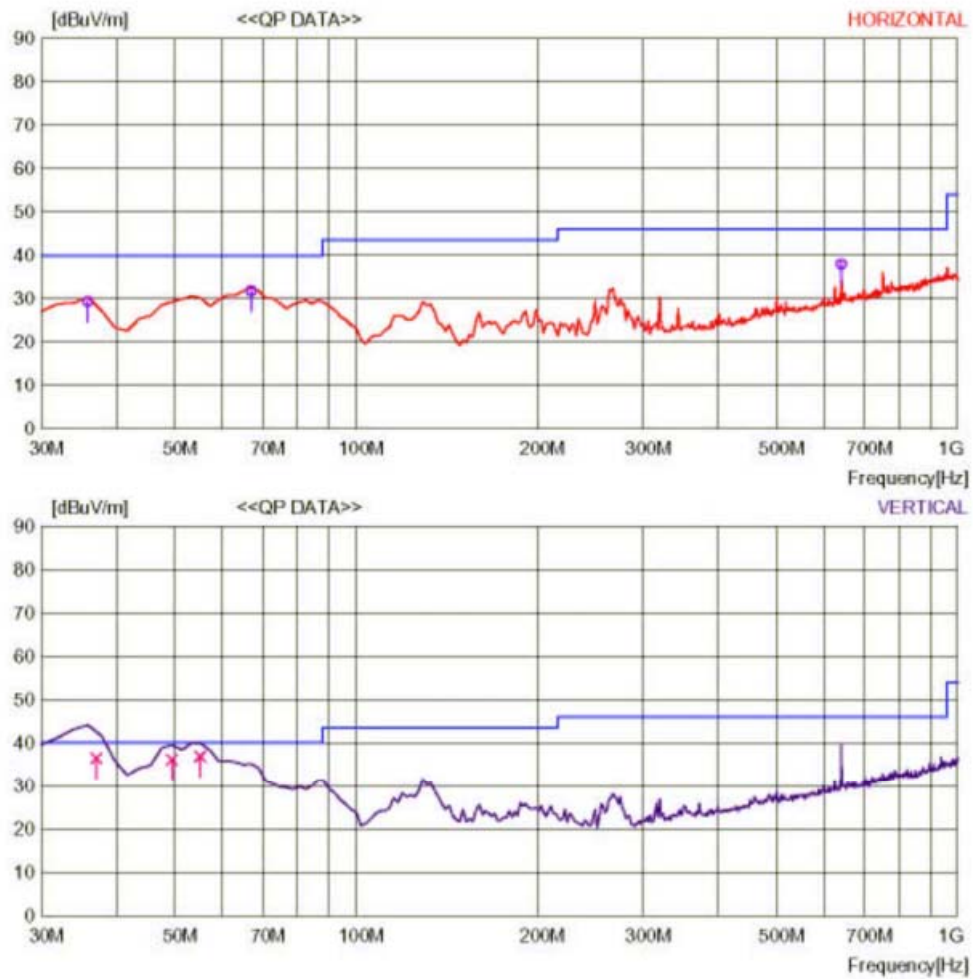
Date : 2011-01-06 10:31:27

Trade Name : Starbridge
Model Name : Starbridge 1531
Product Name : Switch Router
Test Condition : 802.11g Mode

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 25 Deg/55% RH
Operator : Phenix Zhang

Memo : adapter(UE12L-120100SPAU)

LIMIT : FCC Part15 Class B(3m)/USA



2011-01-06 10:32:09

RADIATED EMISSION

Date : 2011-01-06 10:31:27

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product Name : Switch Router	Temp/Humi : 25 Deg/55% RH
Test Condition : 802.11g Mode	Operator : Phenix Zhang

Memo : adapter(UE12L-120100SPAUI)

LIMIT : FCC Part15 Class B(3m)/USA

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QF [dBuV]	FACTOR [dB]	[dB]	[dB]	QF [dBuV/m]	[dBuV/m]	[dB]	[cm]	[deg]
---- Horizontal ----										
1	35.832	43.0	11.3	6.7	31.6	29.4	40.0	10.6	400	159
2	66.934	46.0	10.4	7.0	31.6	31.8	40.0	8.2	400	324
3	640.381	39.0	20.5	9.8	31.3	38.0	46.0	8.0	200	209
---- Vertical ----										
4	37.000	50.1	11.3	6.7	31.6	36.5	40.0	3.5	201	0
5	55.050	50.8	10.8	6.8	31.6	36.8	40.0	3.2	118	60
6	49.439	50.1	10.9	6.7	31.6	36.1	40.0	3.9	100	23

802.11n mode:

1# Adaptor:

2011-01-06 11:04:41

RADIATED EMISSION

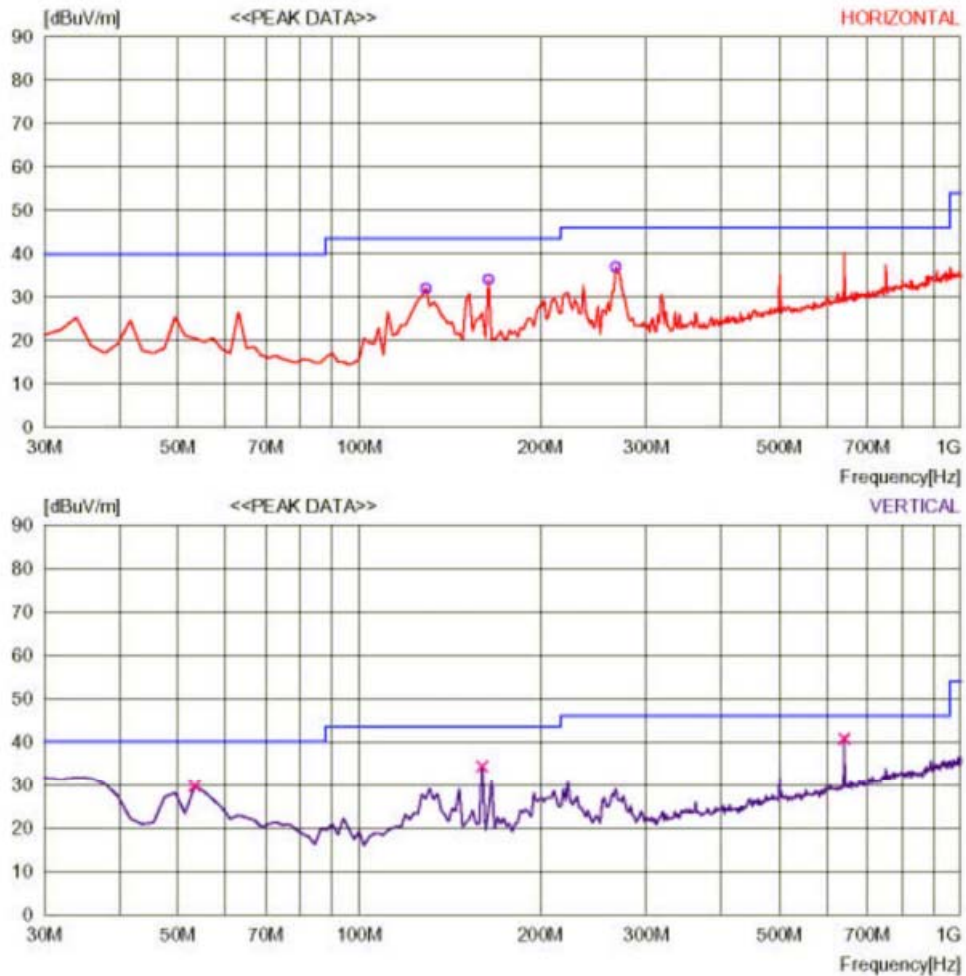
Date : 2011-01-06 11:04:21

Trade Name : Starbridge
Model Name : Starbridge 1531
Product Name : Switch Router
Test Condition :

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 25 Deg/55% RH
Operator : Phenix Zhang

Memo : 802.11n Mode adapter(ADS-12G-12 12012GPCU)

LIMIT : FCC Part15 Class B(3m)/USA



2011-01-06 11:04:41

RADIATED EMISSION

Date : 2011-01-06 11:04:21

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: Switch Router	Temp/Humi	: 25 Deg/55% RH
Test Condition	:	Operator	: Phenix Zhang

Memo : 802.11n Mode adapter(ADS-12G-12 12012GPCU)

LIMIT : FCC Part15 Class B(3m)/USA

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	129.138	44.7	11.3	7.6	31.6	32.0	43.5	11.5	200	246
2	164.128	45.9	12.0	7.8	31.6	34.1	43.5	9.4	100	336
3	267.155	47.9	12.4	8.3	31.6	37.0	46	9.0	100	4
----- Vertical -----										
4	53.327	43.7	10.8	6.8	31.6	29.7	40	10.3	100	357
5	160.241	46.3	11.9	7.7	31.6	34.3	43.5	9.2	300	342
6	640.381	41.7	20.5	9.8	31.3	40.7	46	5.3	100	162

2# Adaptor:

2011-01-06 10:49:23

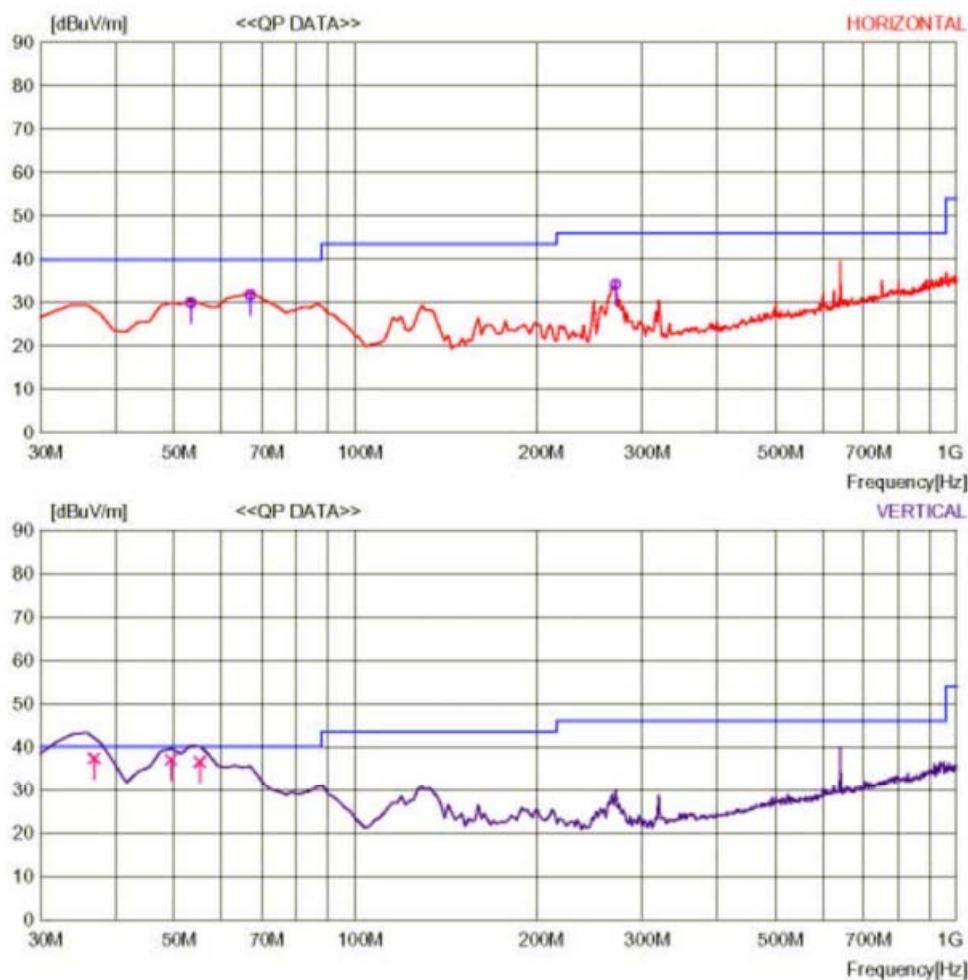
RADIATED EMISSION

Date : 2011-01-06 10:49:01

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product Name	: Switch Router	Temp/Humi	: 25 Deg/55% RH
Test Condition	: 802.11n Mode	Operator	: Phenix Zhang

Memo : adapter(UE12L-120100SPAU)

LIMIT : FCC Part15 Class B(3m)/USA



2011-01-06 10:49:23

RADIATED EMISSION

Date : 2011-01-06 10:49:01

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product Name : Switch Router	Temp/Humi : 25 Deg/55% RH
Test Condition : 802.11n Mode	Operator : Phenix Zhang

Memo : adapter(UE12L-120100SPAUI)

LIMIT : FCC Part15 Class B(3m)/USA

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QF [dBuV]	FACTOR [dB]	[dB]	[dB]	QF [dBuV/m]	[dBuV/m]	[dB]	[cm]	[deg]
---- Horizontal ----										
1	53.327	44.0	10.8	6.8	31.6	30.0	40.0	10.0	400	312
2	66.934	46.0	10.4	7.0	31.6	31.8	40.0	8.2	400	320
3	271.042	45.0	12.5	8.3	31.6	34.2	46.0	11.8	200	151
---- Vertical ----										
4	36.823	50.9	11.3	6.7	31.6	37.3	40.0	2.7	102	22
5	55.186	50.5	10.8	6.8	31.6	36.5	40.0	3.5	117	86
6	49.439	51.0	10.9	6.7	31.6	37.0	40.0	3.0	100	27

Above 1GHz:

802.11b mode Channel Low:

2010-12-30 09:38:23

RADIATED EMISSION

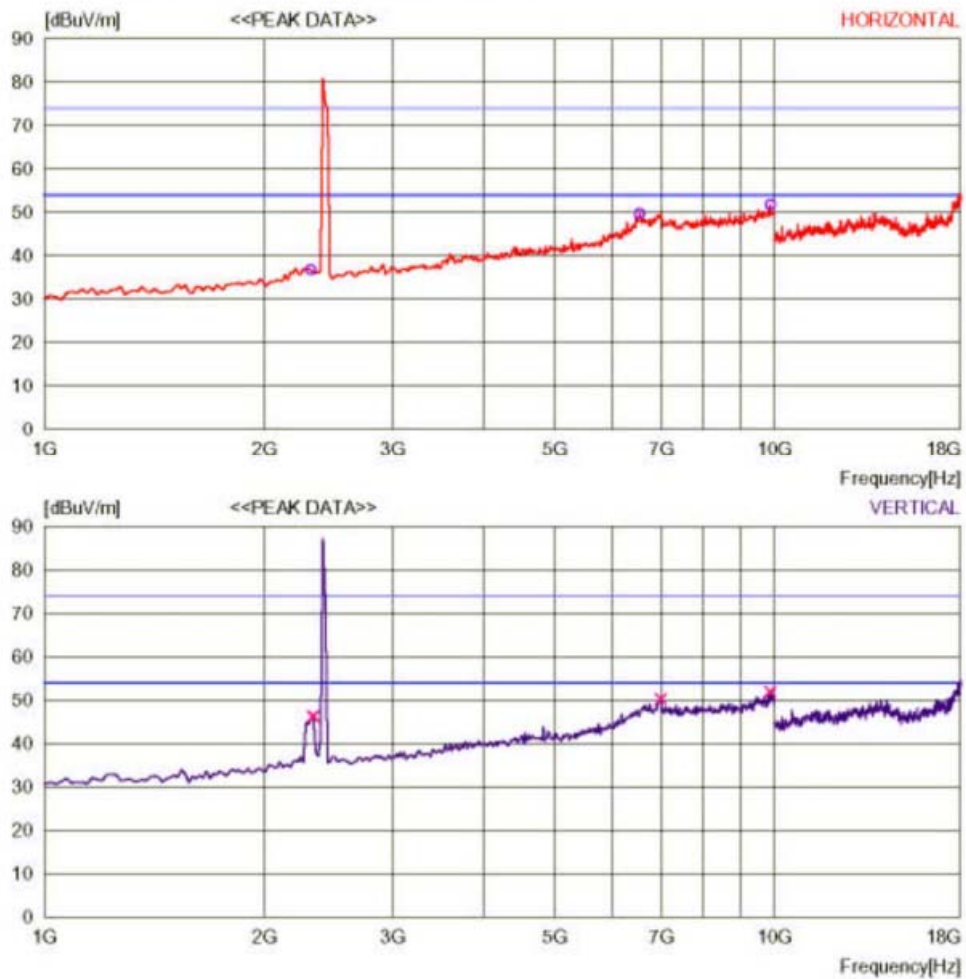
Date : 2010-12-30 09:37:57

Trade Name : Starbridge
Model Name : Starbridge 1531
Product : Switch Router
Test Condition : TX mode, 802.11b, CH 1

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 27/55RH%
Operator : Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 09:38:23

RADIATED EMISSION

Date : 2010-12-30 09:37:57

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11b, CH 1	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	2316.637	29.2	31.7	15.4	39.5	36.8	54	17.2	100	158
2	6537.092	29.9	40.2	19.2	39.6	49.7	54	4.3	100	357
3	9873.776	27.2	42.4	21.7	39.5	51.8	54	2.2	100	357
----- Vertical -----										
4	2334.674	38.7	31.6	15.4	39.5	46.2	54	7.8	100	237
5	6987.996	28.8	41.0	19.6	39.2	50.2	54	3.8	100	30
6	9873.776	27.3	42.4	21.7	39.5	51.9	54	2.1	300	354

802.11b mode Channel Mid:

2010-12-30 09:48:54

RADIATED EMISSION

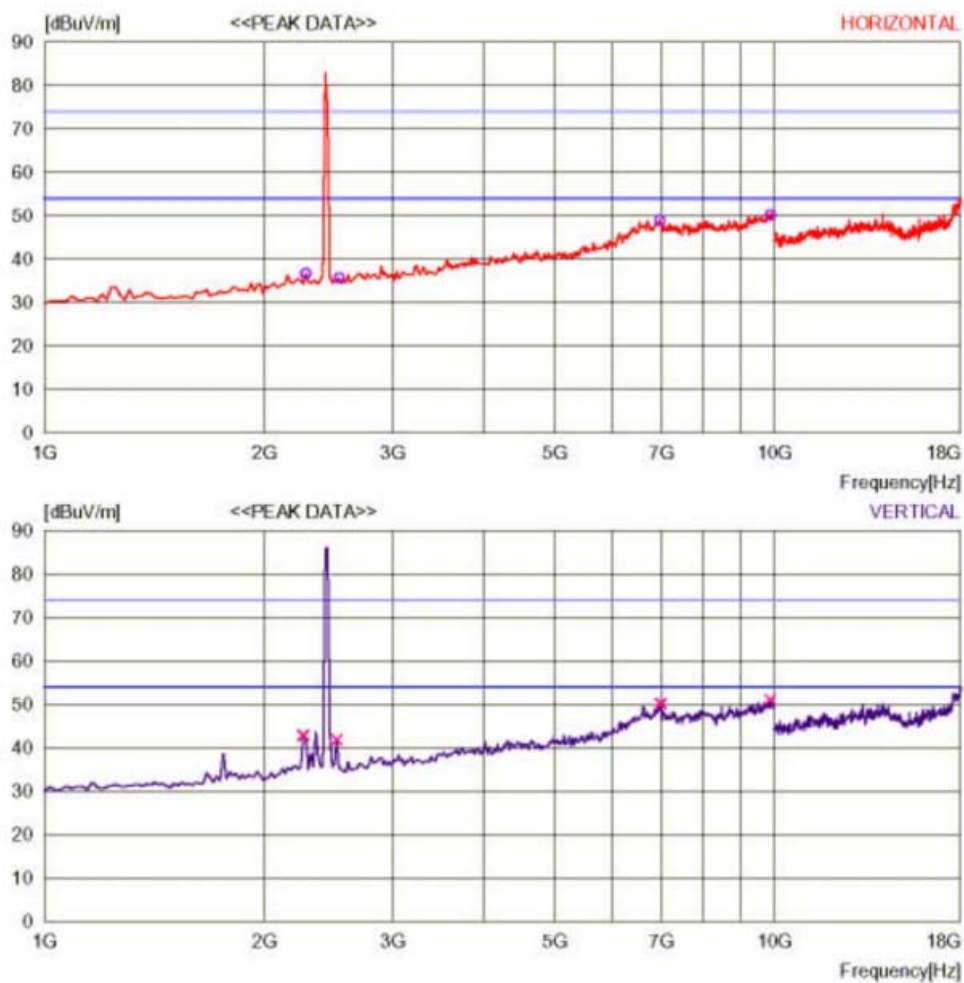
Date : 2010-12-30 09:48:47

Trade Name : Starbridge
Model Name : Starbridge 1531
Product : Switch Router
Test Condition : TX mode, 802.11b, CH 6

Document No. :
Power Supply : AC 120V/60Hz
Temp/Humi : 27/55RH%
Operator : Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 09:48:55

RADIATED EMISSION

Date : 2010-12-30 09:48:47

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product : Switch Router	Temp/Humi : 27/55RH%
Test Condition : TX mode, 802.11b, CH 6	Operator : Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	2280.565	29.0	31.8	15.4	39.5	36.7	54	17.3	200	81
2	2533.071	28.3	31.1	15.7	39.4	35.7	54	18.3	100	105
3	6969.959	27.8	40.9	19.6	39.3	49.0	54	5.0	100	311
4	9873.776	25.6	42.4	21.7	39.5	50.2	54	3.8	200	287
---- Vertical ----										
5	2262.529	35.2	31.8	15.3	39.5	42.8	54	11.2	100	238
6	2515.035	34.3	31.2	15.7	39.4	41.8	54	12.2	200	175
7	6987.996	28.7	41.0	19.6	39.2	50.1	54	3.9	100	134
8	9855.740	26.4	42.4	21.7	39.5	51.0	54	3.0	200	22

802.11b mode Channel High:

2010-12-30 10:01:32

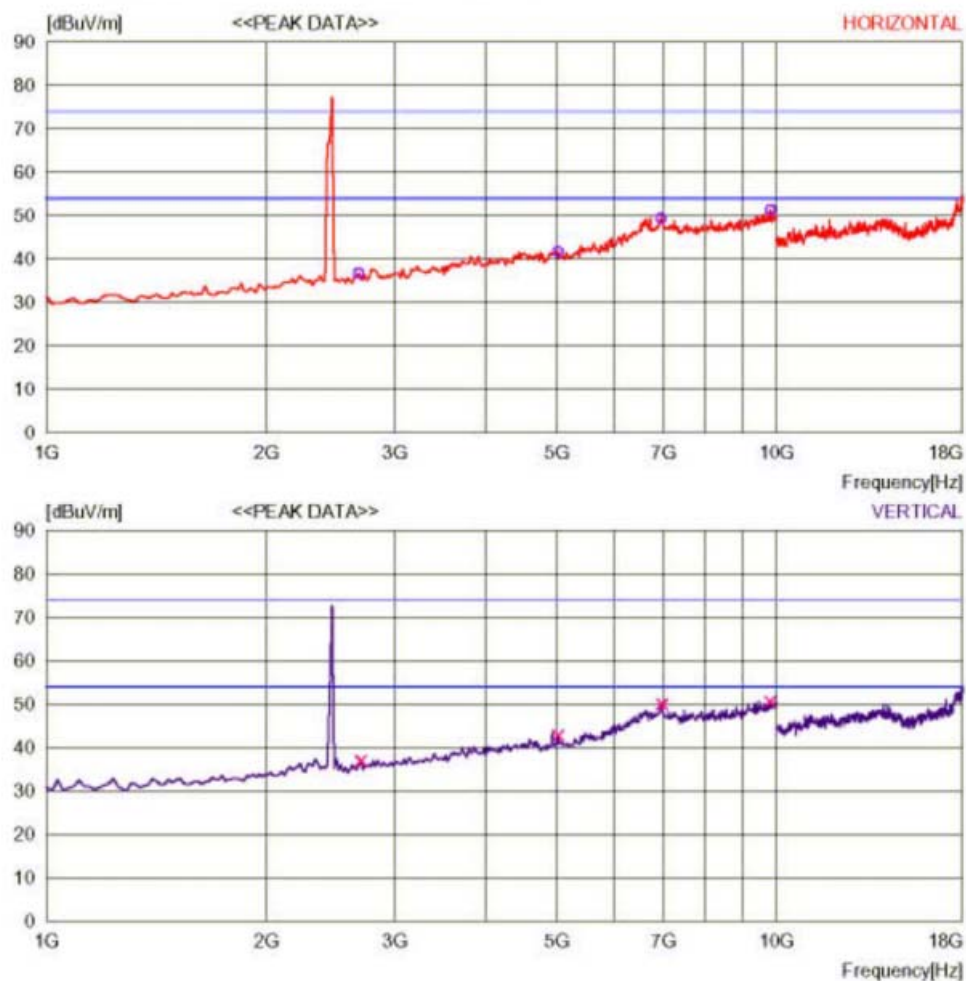
RADIATED EMISSION

Date : 2010-12-30 10:01:25

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11b, CH 11	Operator	: Phenix zhang

Memo

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 10:01:33

RADIATED EMISSION

Date : 2010-12-30 10:01:25

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11b, CH 11	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	2677.360	28.8	31.4	15.9	39.3	36.8	54	17.2	100	294
2	5022.057	26.1	36.7	18.0	39.1	41.7	54	12.3	200	93
3	6951.923	28.2	40.9	19.6	39.3	49.4	54	4.6	100	101
4	9819.668	26.9	42.5	21.6	39.6	51.4	54	2.6	200	2
---- Vertical ----										
5	2695.396	28.6	31.5	16.0	39.3	36.8	54	17.2	100	355
6	5022.057	27.1	36.7	18.0	39.1	42.7	54	11.3	200	80
7	6969.959	28.7	40.9	19.6	39.3	49.9	54	4.1	200	97
8	9801.632	26.1	42.5	21.6	39.6	50.6	54	3.4	200	55

802.11g mode Channel Low:

2010-12-30 10:14:39

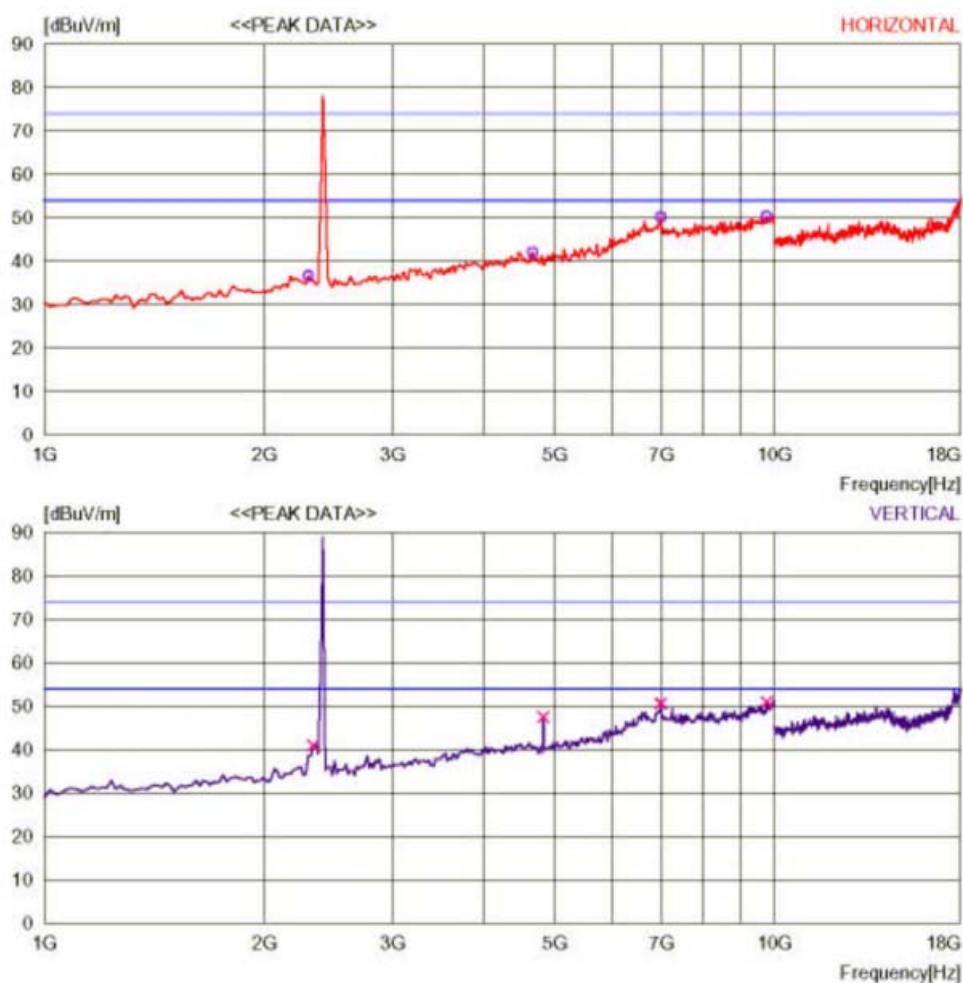
RADIATED EMISSION

Date : 2010-12-30 10:14:05

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 1	Operator	: Phenix zhang

Memo

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 10:14:39

RADIATED EMISSION

Date : 2010-12-30 10:14:05

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 1	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	2298.601	29.1	31.7	15.4	39.5	36.7	54	17.3	200	172
2	4661.334	26.9	36.5	17.7	39.0	42.1	54	11.9	200	64
3	6987.996	28.8	41.0	19.6	39.2	50.2	54	3.8	200	250
4	9747.523	26.0	42.4	21.6	39.6	50.4	54	3.6	200	2
---- Vertical ----										
5	2334.674	33.4	31.6	15.4	39.5	40.9	54	13.1	100	234
6	4823.660	32.4	36.4	17.8	39.1	47.5	54	6.5	200	319
7	6987.996	29.2	41.0	19.6	39.2	50.6	54	3.4	100	193
8	9765.560	26.5	42.4	21.6	39.6	50.9	54	3.1	100	242

802.11g mode Channel Mid:

2010-12-30 10:25:39

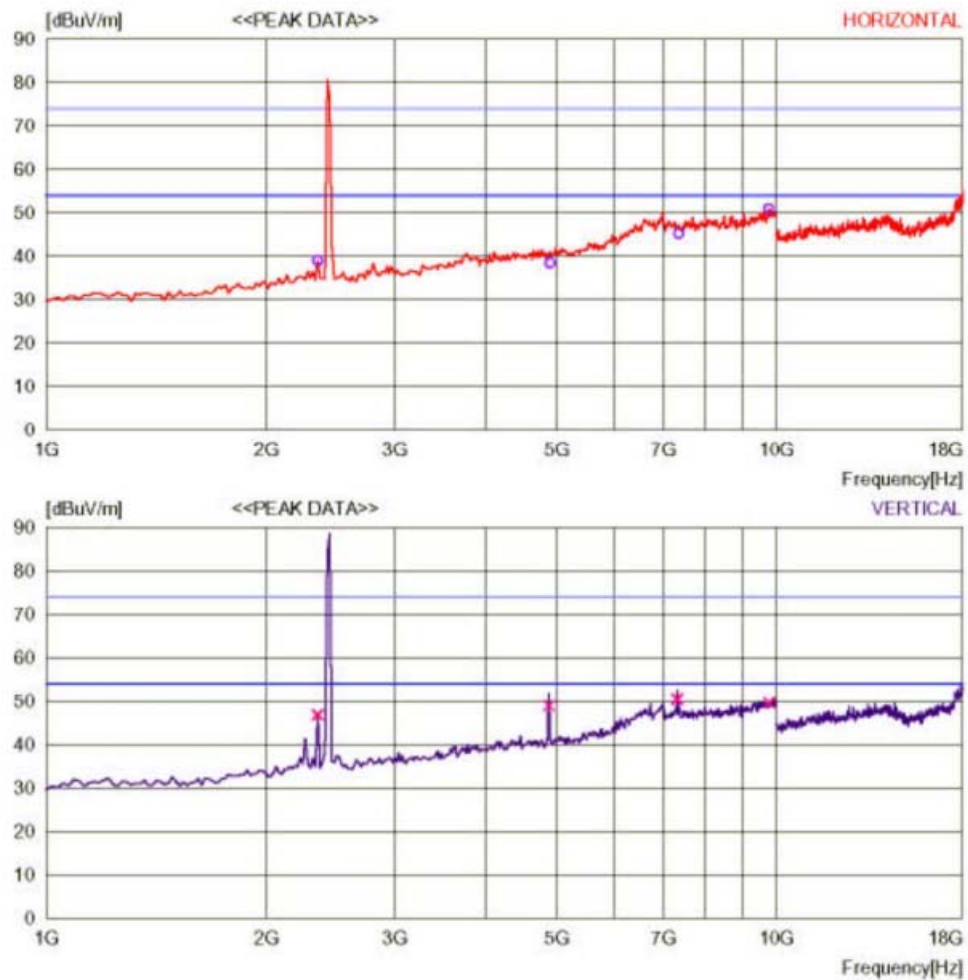
RADIATED EMISSION

Date : 2010-12-30 10:25:23

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 6	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 10:25:39

RADIATED EMISSION

Date : 2010-12-30 10:25:23

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 6	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	2352.710	31.5	31.5	15.5	39.5	39.0	54	15.0	100	335
2	4895.804	25.8	36.5	15.6	39.4	38.5	54	15.5	200	345
3	7348.718	25.5	41.0	17.9	39.1	45.3	54	8.7	100	84
4	9765.560	26.6	42.4	21.6	39.6	51.0	54	3.0	100	319
---- Vertical ----										
5	2352.710	39.3	31.5	15.5	39.5	46.8	54	7.2	200	158
6	4877.768	36.3	36.5	15.5	39.4	48.9	54	5.1	200	302
7	7312.646	30.5	41.1	17.9	39.1	50.4	54	3.6	200	14
8	9783.596	25.1	42.5	21.6	39.6	49.6	54	4.4	200	298

802.11g mode Channel High:

2010-12-30 10:38:23

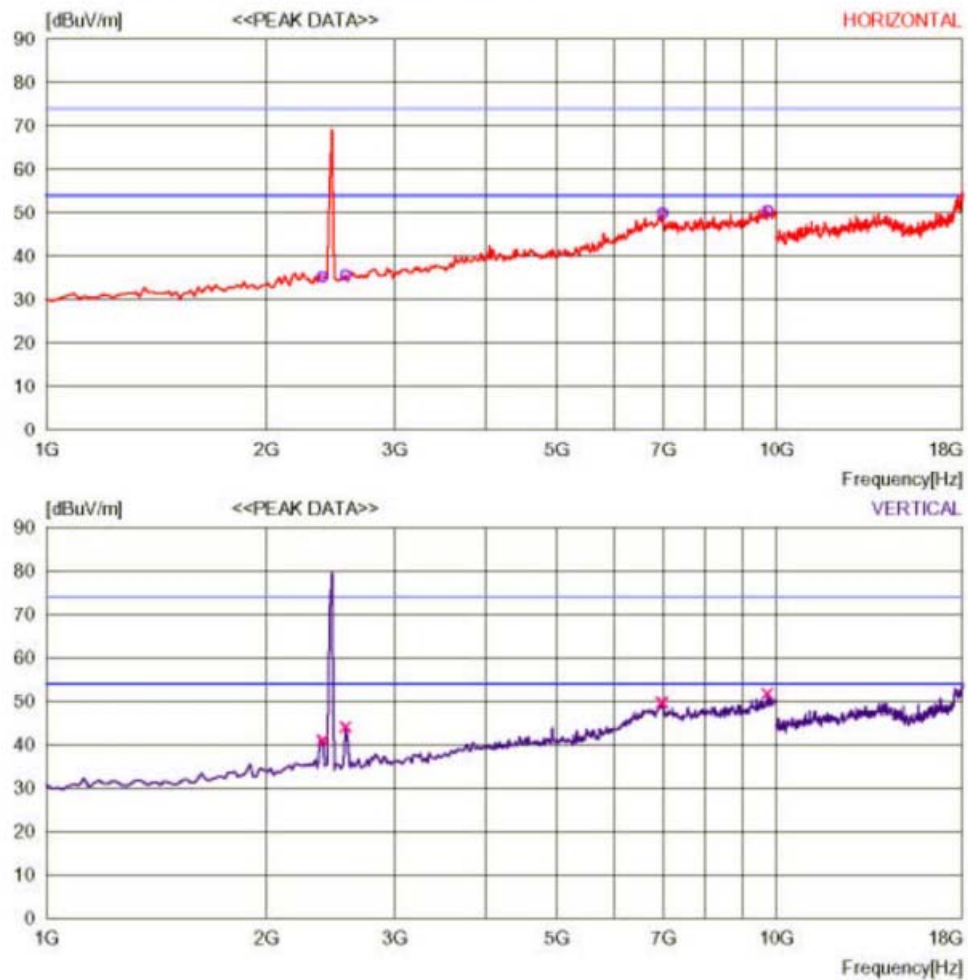
RADIATED EMISSION

Date : 2010-12-30 10:38:11

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 11	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 10:38:23

RADIATED EMISSION

Date : 2010-12-30 10:38:11

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11g, CH 11	Operator	: Phenix zhang

Memo :

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	2388.782	27.9	31.4	15.5	39.5	35.3	54	18.7	200	30
2	2569.143	28.2	31.1	15.8	39.4	35.7	54	18.3	100	278
3	6987.996	28.5	41.0	19.6	39.2	49.9	54	4.1	200	158
4	9729.487	26.1	42.4	21.6	39.6	50.5	54	3.5	100	278
---- Vertical ----										
5	2388.782	33.5	31.4	15.5	39.5	40.9	54	13.1	200	30
6	2569.143	36.5	31.1	15.8	39.4	44.0	54	10.0	100	28
7	6969.959	28.4	40.9	19.6	39.3	49.6	54	4.4	200	183
8	9711.451	27.4	42.4	21.5	39.6	51.7	54	2.3	200	195

802.11n mode, Channel Low:

2010-12-30 11:02:58

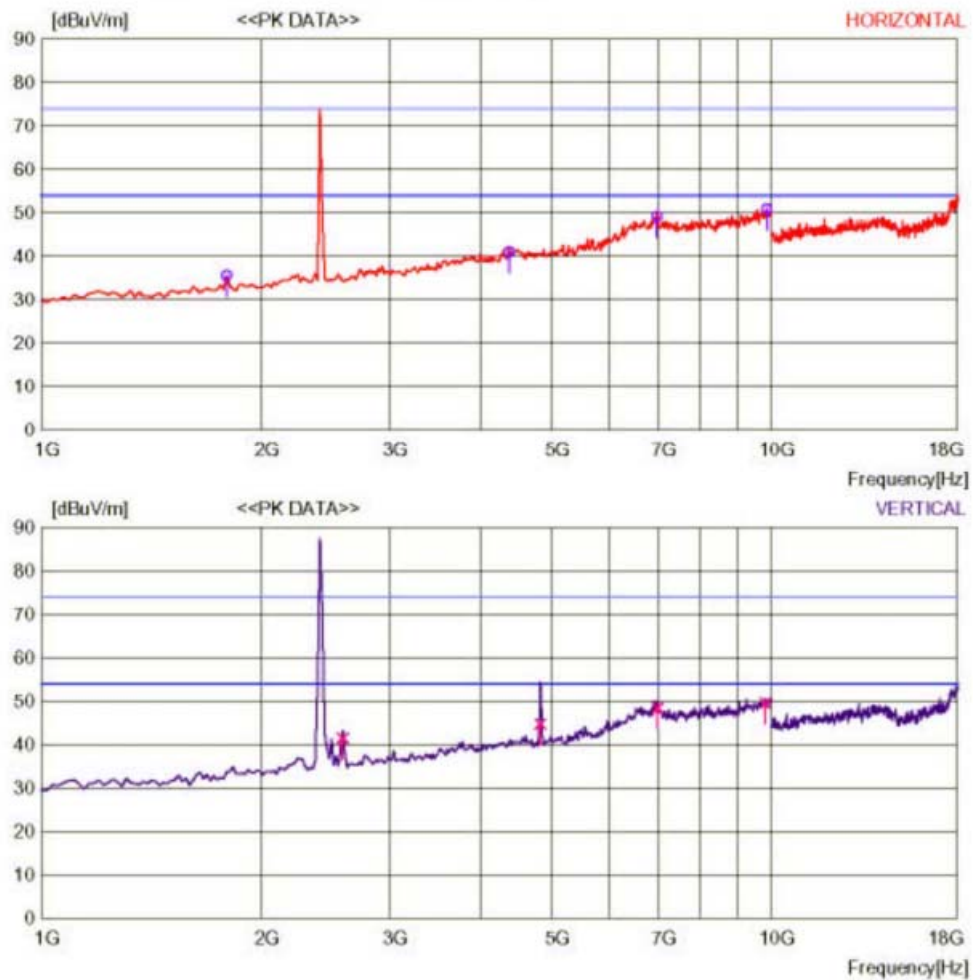
RADIATED EMISSION

Date : 2010-12-30 11:02:50

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Humi	: 27/55RH%
Test Condition	: TX mode, 802.11n, CH 1	Operator	: Phenix zhang

Memo

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 11:02:58

RADIATED EMISSION

Date : 2010-12-30 11:02:50

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product : Switch Router	Temp/Humi : 27/55RH%
Test Condition : TX mode, 802.11n, CH 1	Operator : Phenix zhang
Memo :	

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ READING		ANT LOSS		GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE	DETECTOR
	[MHz]	[dBuV]	FACTOR	[dB]							
			[dB]	[dB]	[dB]	[dBuV/m][dBuV/m]		[dB]	[cm]	[deg]	
----- Horizontal -----											
1	1793.590	30.8	29.8	14.8	39.8	35.6	74.0	38.4	100	266	PK
2	4372.756	26.0	36.5	17.5	39.0	41.0	74.0	33.0	200	154	PK
3	6969.959	28.0	40.9	19.6	39.3	49.2	74.0	24.8	100	68	PK
4	9855.740	26.3	42.4	21.7	39.5	50.9	74.0	23.1	100	187	PK
----- Vertical -----											
5	4823.660	29.6	36.4	17.8	39.1	44.7	54.0	9.3	100	203	AV
6	2587.179	34.0	31.0	15.8	39.4	41.4	54.0	12.6	200	191	AV
7	6987.996	27.0	41.0	19.6	39.2	48.4	54.0	5.6	100	191	AV
8	9819.668	25.0	42.5	21.6	39.6	49.5	74.0	4.5	100	154	PK

802.11n mode, Channel Mid:

2010-12-30 11:17:47

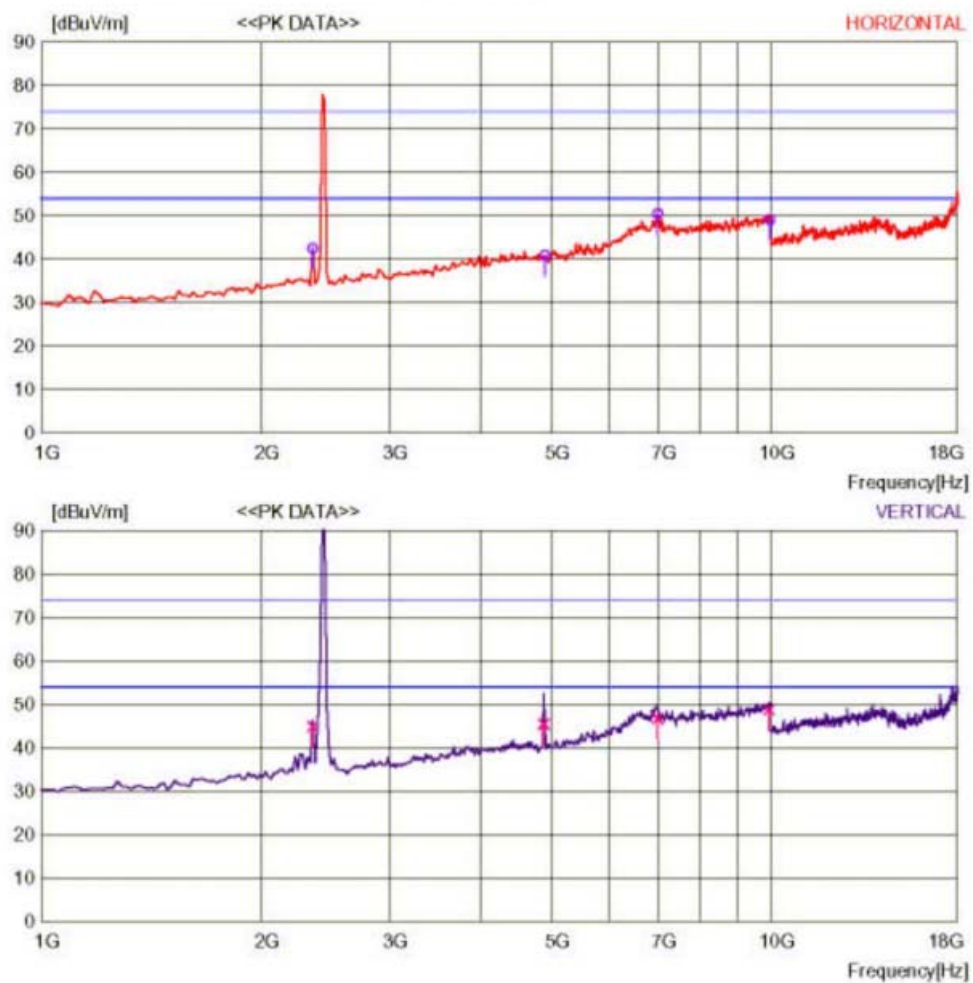
RADIATED EMISSION

Date : 2010-12-30 11:17:39

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Huma	: 27/55RH%
Test Condition	: TX mode, 802.11n, CH 6	Operator	: Phenix zhang

Memo

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 11:17:47

RADIATED EMISSION

Date : 2010-12-30 11:17:39

Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product : Switch Router	Temp/Humi : 27/55RH%
Test Condition : TX mode, 802.11n, CH 6	Operator : Phenix zhang
Memo :	

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE	DETECTOR
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dB]	[dBuV/m][dBuV/m]	[dB]	[cm]	[deg]	
---- Horizontal ----											
1	2352.710	35.0	31.5	15.5	39.5	42.5	74.0	31.5	100	327	PK
2	4895.804	25.6	36.5	17.9	39.1	40.9	74.0	33.1	200	183	PK
3	6987.996	29.1	41.0	19.6	39.2	50.5	74.0	23.5	200	220	PK
4	9945.921	24.5	42.2	21.9	39.5	49.1	74.0	24.9	200	257	PK
---- Vertical ----											
5	2352.710	37.4	31.5	15.5	39.5	44.9	54.0	9.1	200	145	AV
6	4877.768	30.1	36.5	17.9	39.1	45.4	54.0	8.6	200	306	AV
7	6987.996	25.3	41.0	19.6	39.2	46.7	54.0	7.3	200	108	AV
8	9927.885	24.1	42.2	21.9	39.5	48.7	54.0	5.3	100	100	AV

802.11n mode, Channel High:

2010-12-30 11:35:20

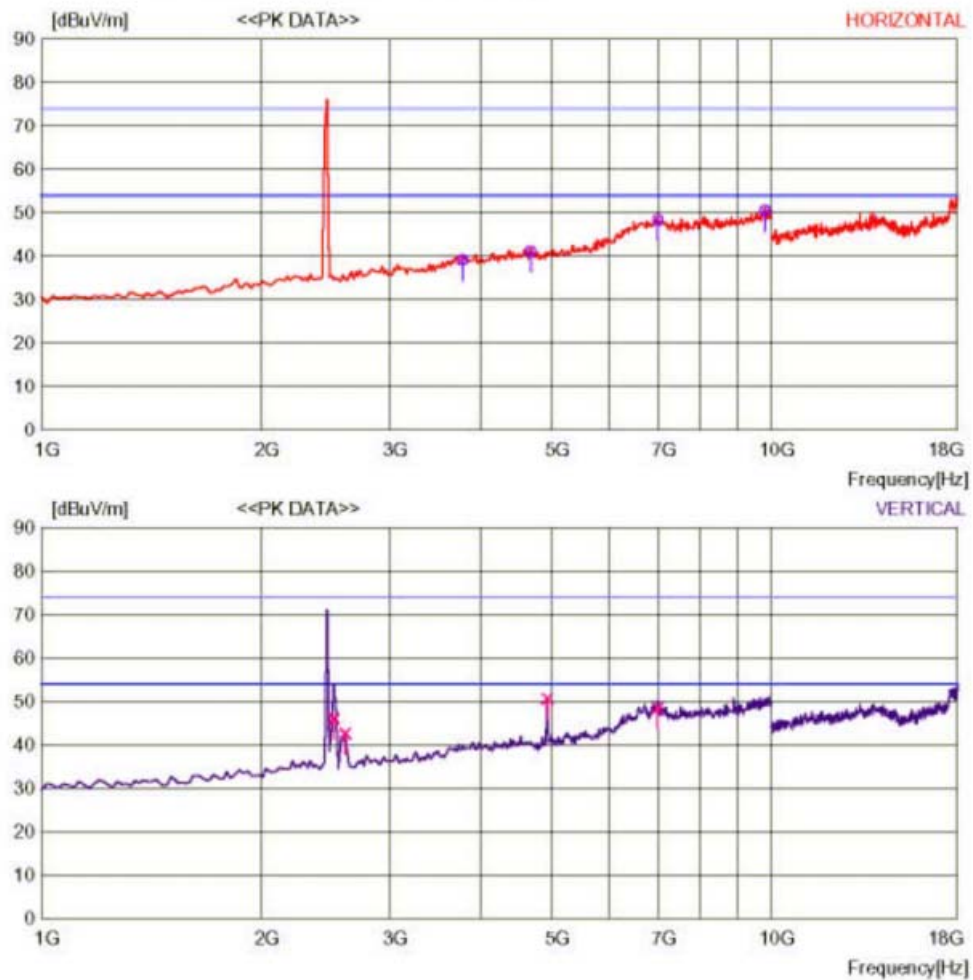
RADIATED EMISSION

Date : 2010-12-30 11:32:33

Trade Name	: Starbridge	Document No.	:
Model Name	: Starbridge 1531	Power Supply	: AC 120V/60Hz
Product	: Switch Router	Temp/Huma	: 27/55RH%
Test Condition	: TX mode, 802.11n, CH 11	Operator	: Phenix zhang

Memo

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)



No further spurious emissions found between 18GHz and 25GHz.

2010-12-30 11:35:20

RADIATED EMISSION

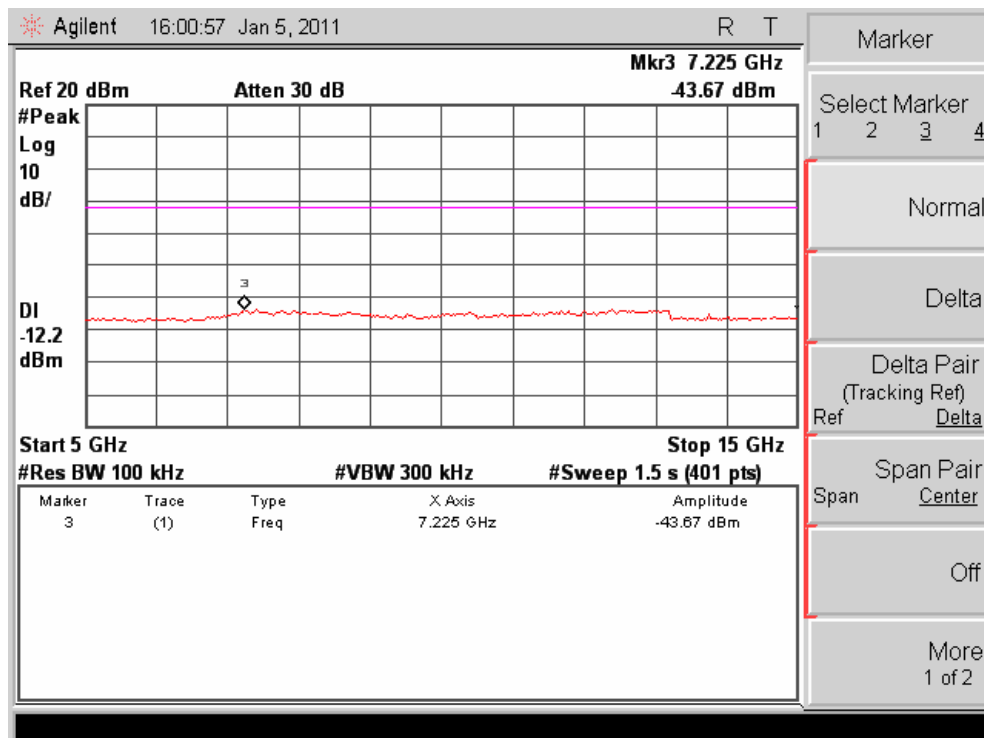
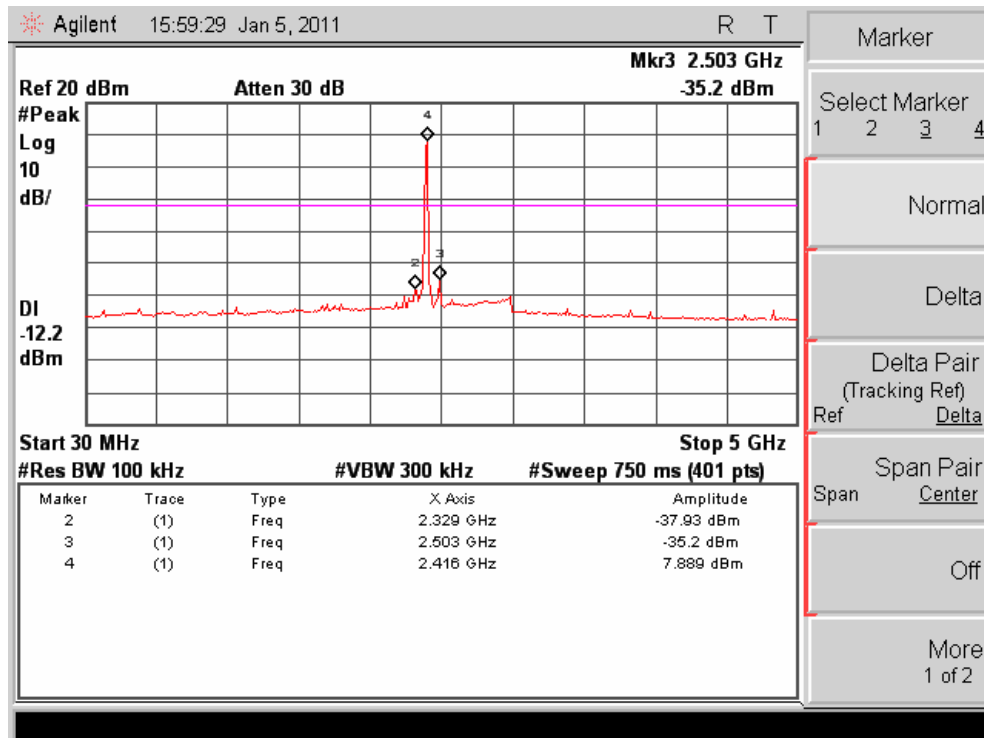
Date : 2010-12-30 11:32:33

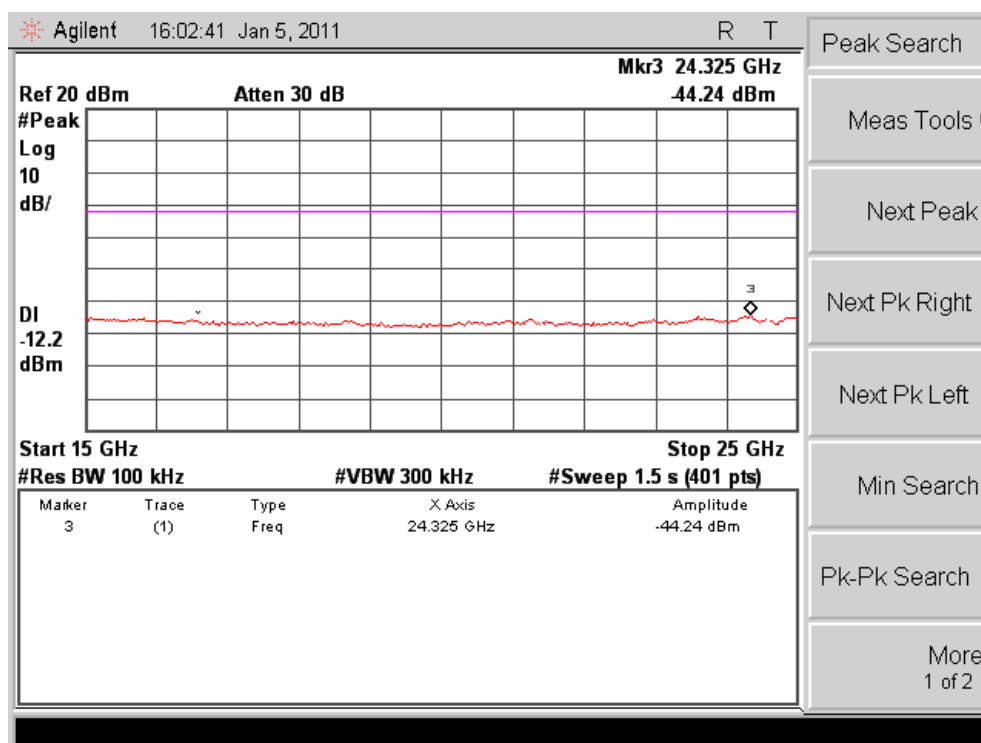
Trade Name : Starbridge	Document No. :
Model Name : Starbridge 1531	Power Supply : AC 120V/60Hz
Product : Switch Router	Temp/Humi : 27/55RH%
Test Condition : TX mode, 802.11n, CH 11	Operator : Phenix zhang
Memo :	

LIMIT : FCC Part15 C transmitter spurious above1G(average)
FCC Part15 C transmitter spurious above1G(peak)

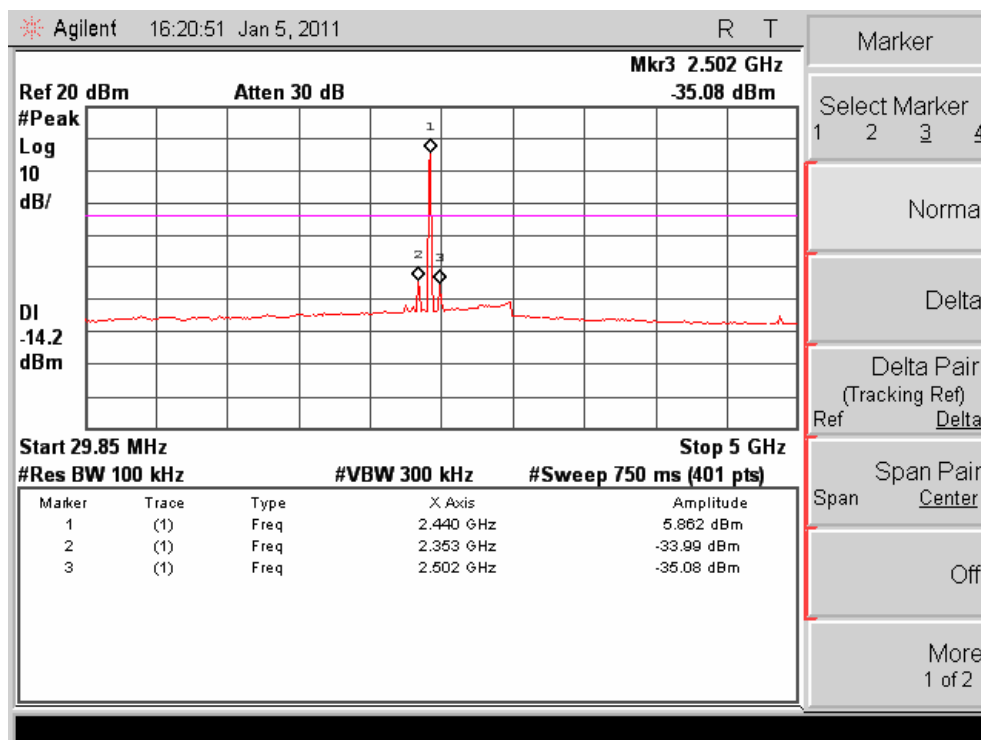
No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE	DETECTOR
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dB]	[dBuV/m][dBuV/m]	[dB]	[cm]	[deg]	
---- Horizontal ----											
1	3777.564	26.2	35.1	16.9	39.0	39.2	74.0	34.8	100	162	PK
2	4679.371	26.0	36.5	17.7	39.0	41.2	74.0	32.8	200	4	PK
3	6987.996	27.0	41.0	19.6	39.2	48.4	74.0	25.6	100	158	PK
4	9801.632	26.1	42.5	21.6	39.6	50.6	74.0	23.4	200	160	PK
---- Vertical ----											
5	2515.035	38.5	31.2	15.7	39.4	46.0	54.0	8.0	200	199	AV
6	2605.216	35.0	31.0	15.9	39.4	42.5	74.0	31.5	200	294	PK
7	4931.876	35.2	36.6	17.9	39.1	50.6	74.0	23.4	100	205	PK
8	6987.996	27.0	41.0	19.6	39.2	48.4	74.0	25.6	100	238	PK

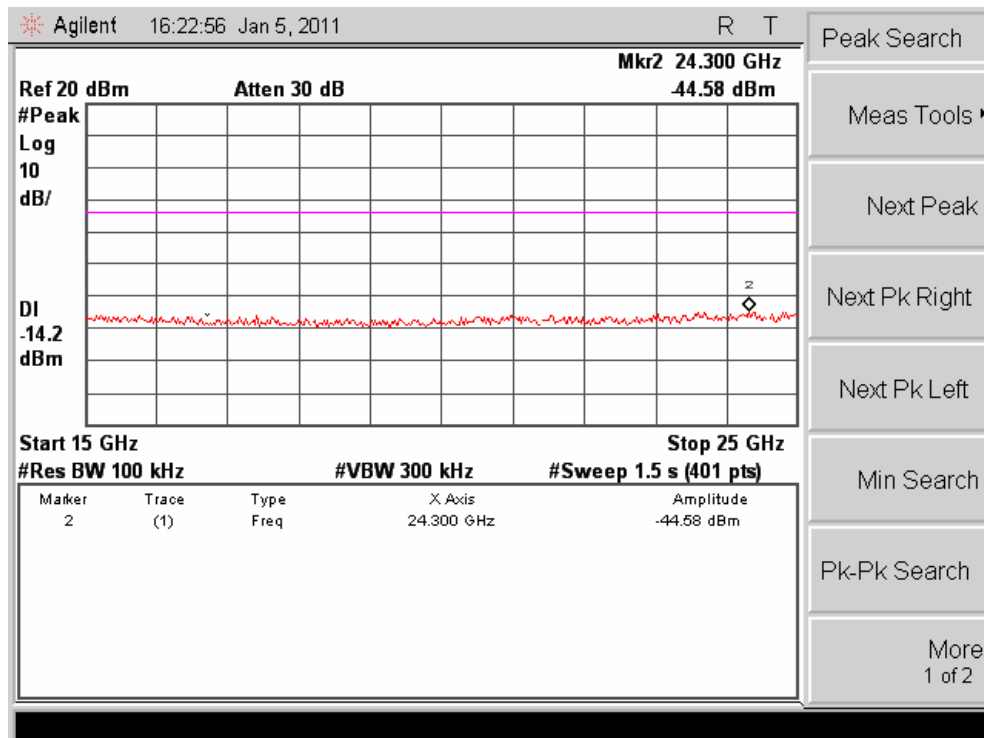
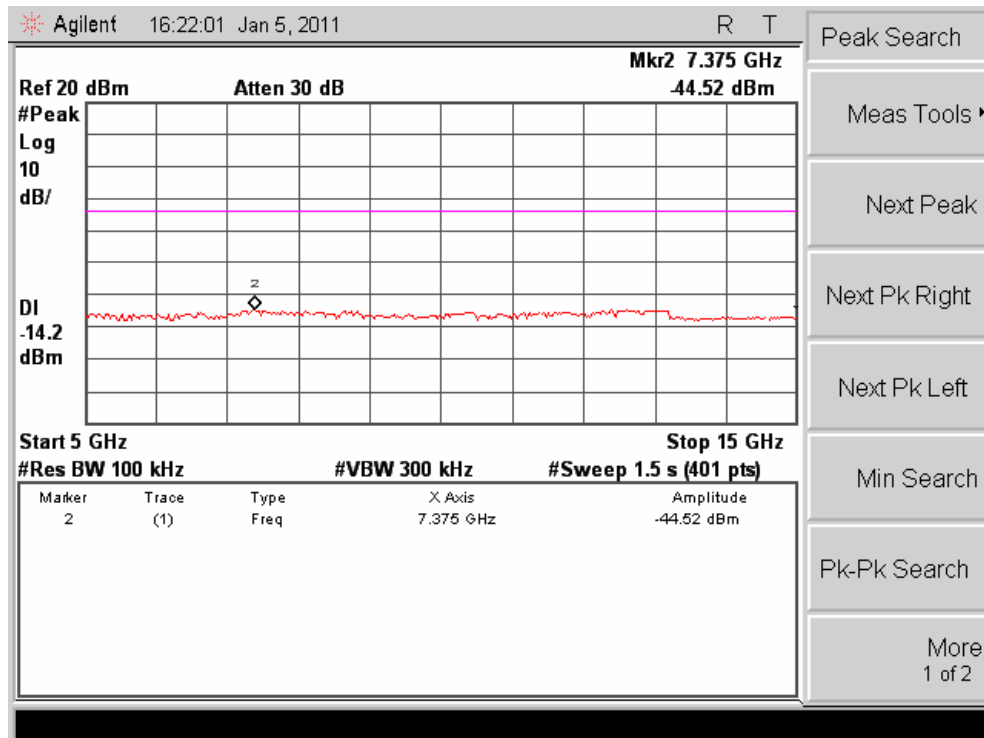
Conducted:
802.11b mode Channel LOW



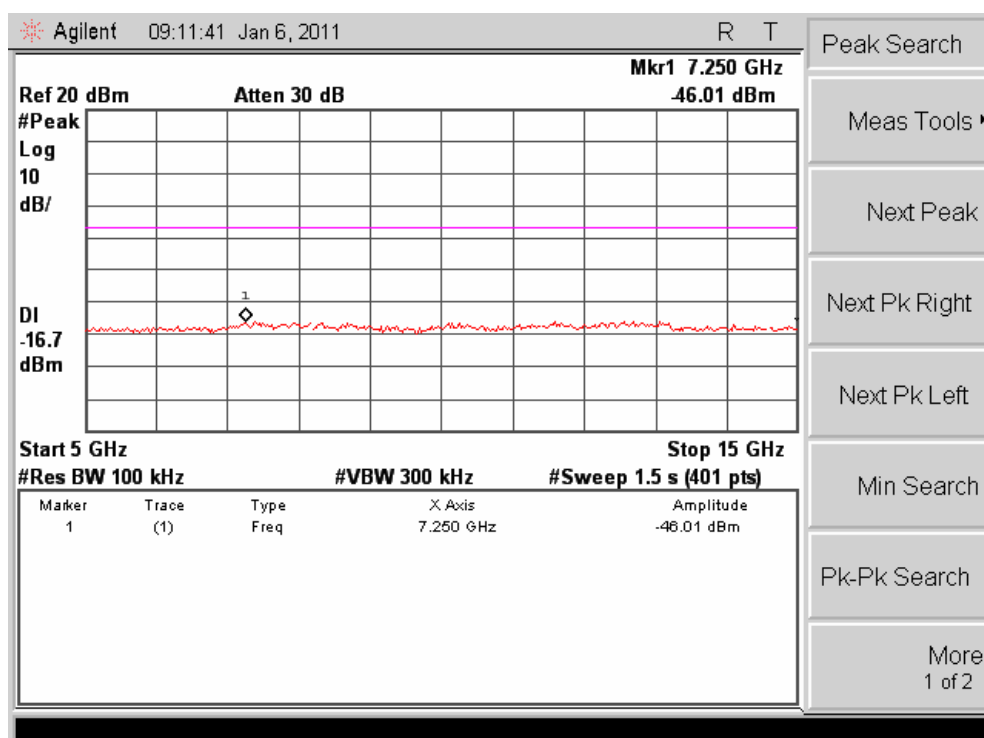
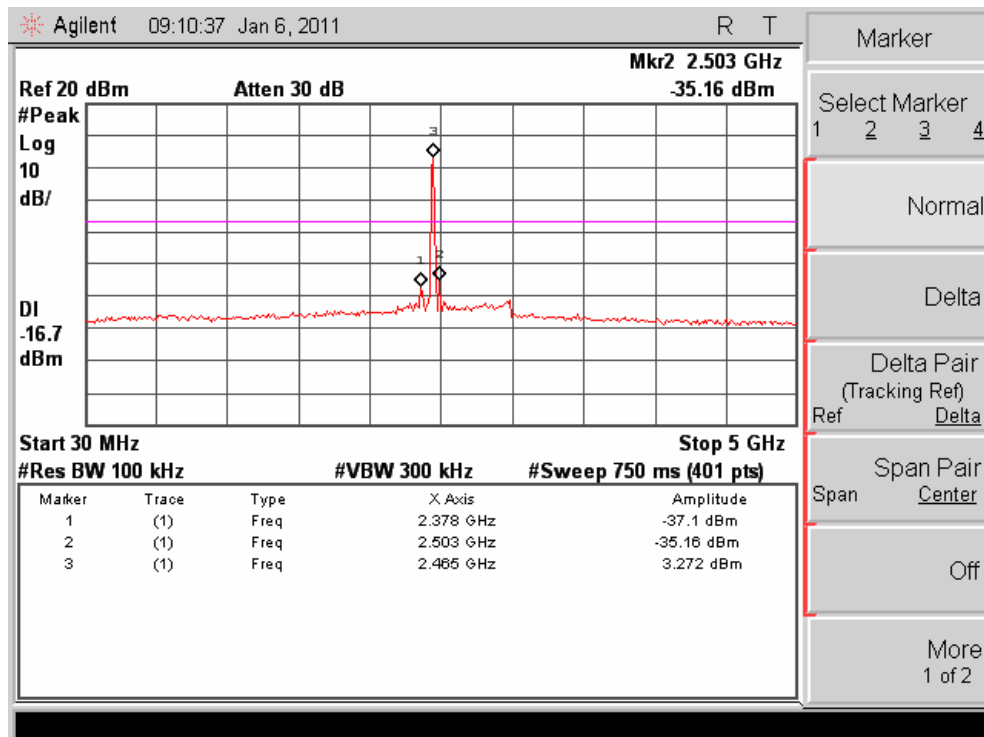


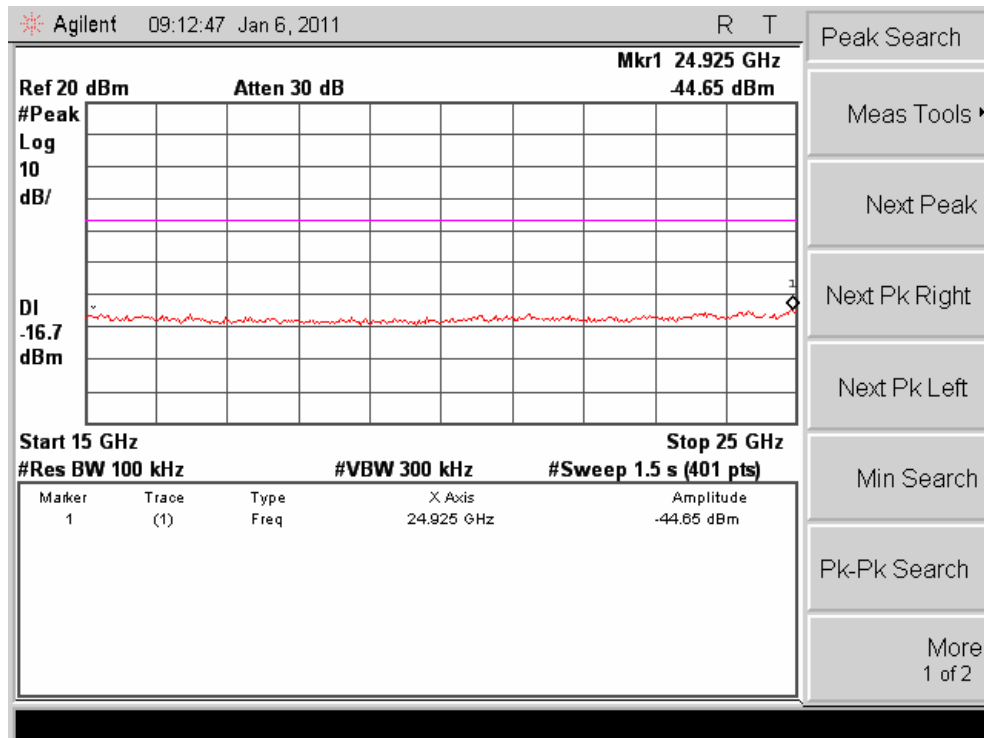
Channel MID



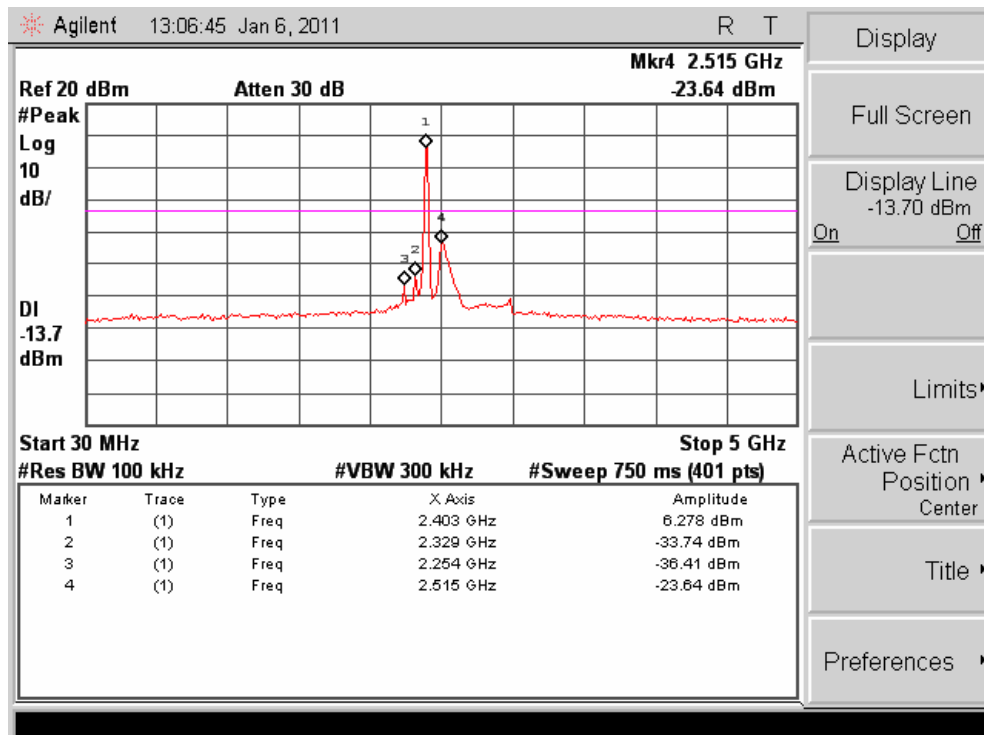


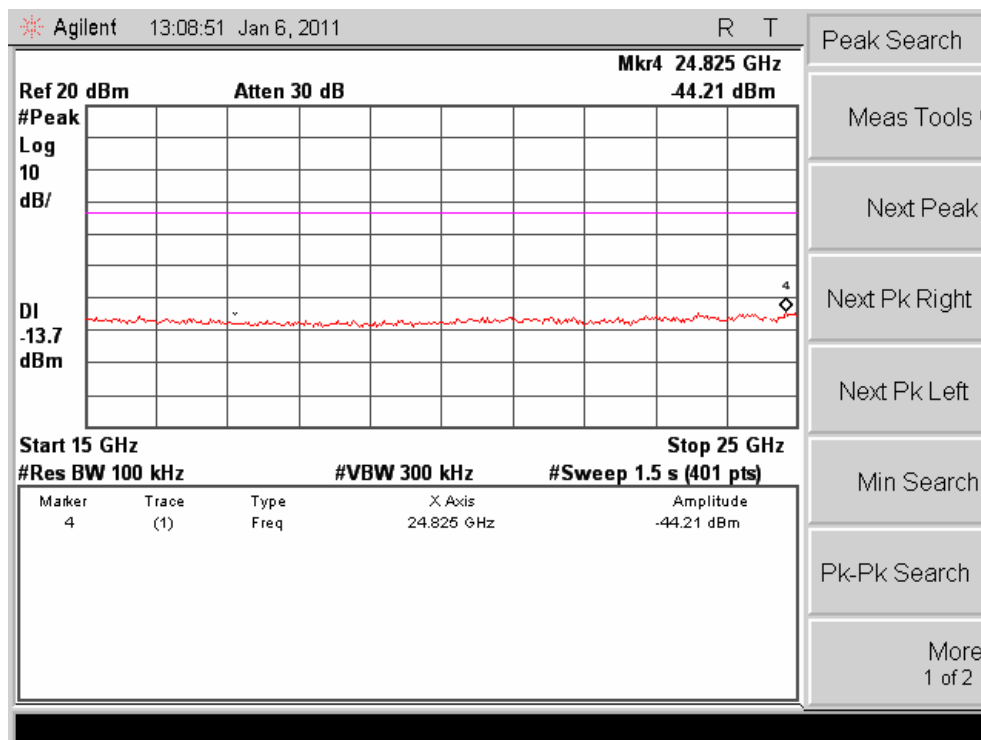
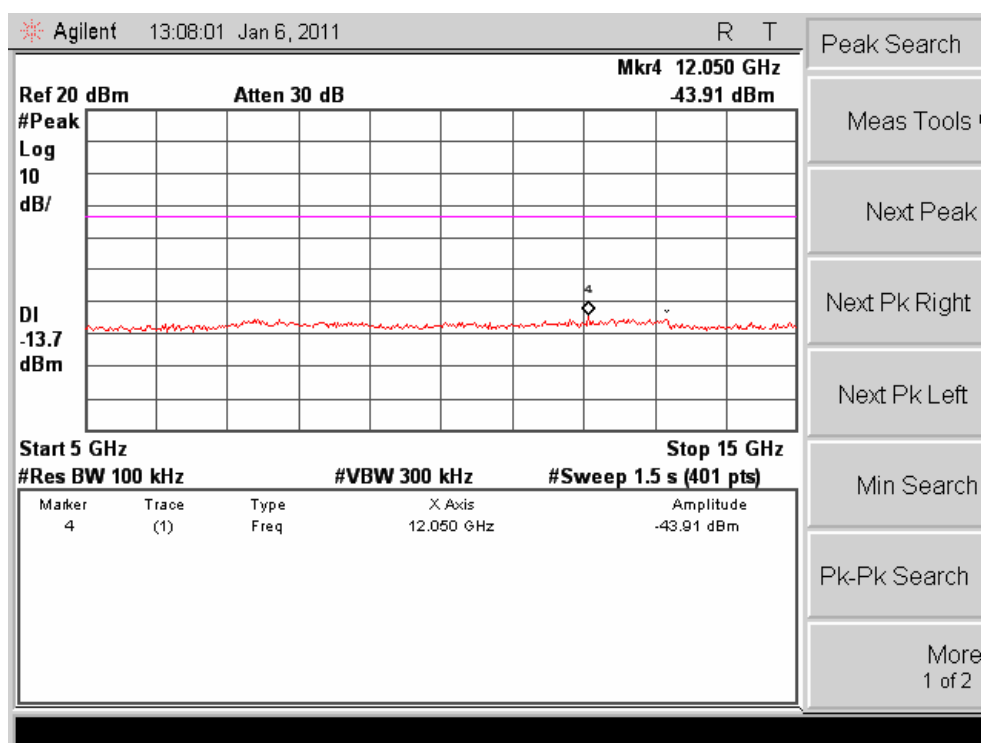
Channel HIG



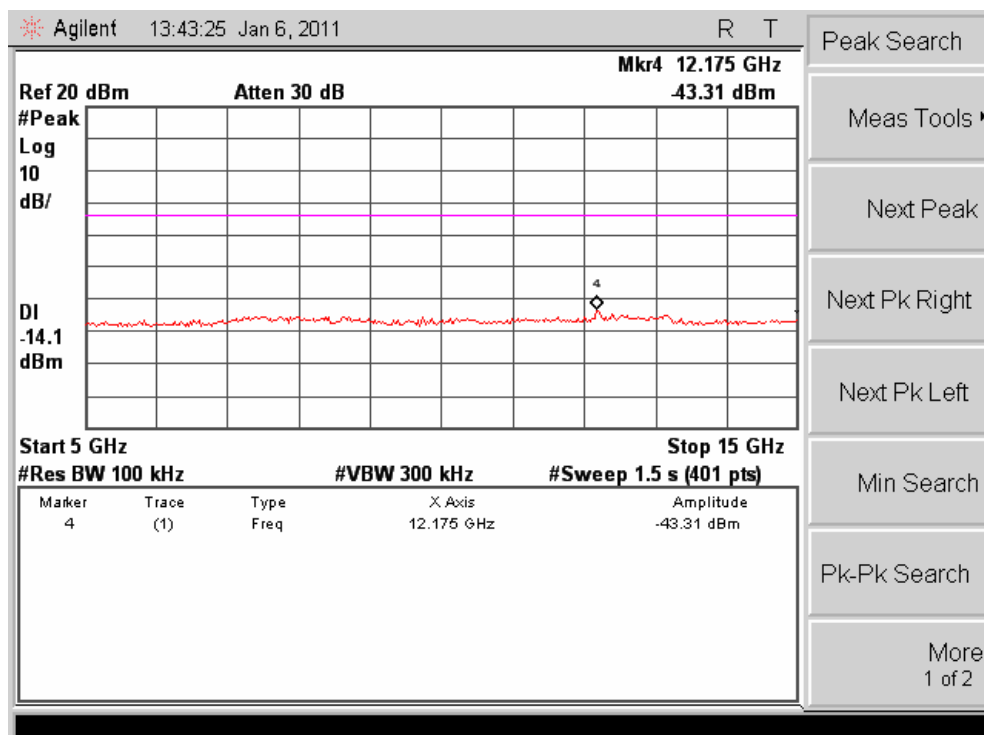
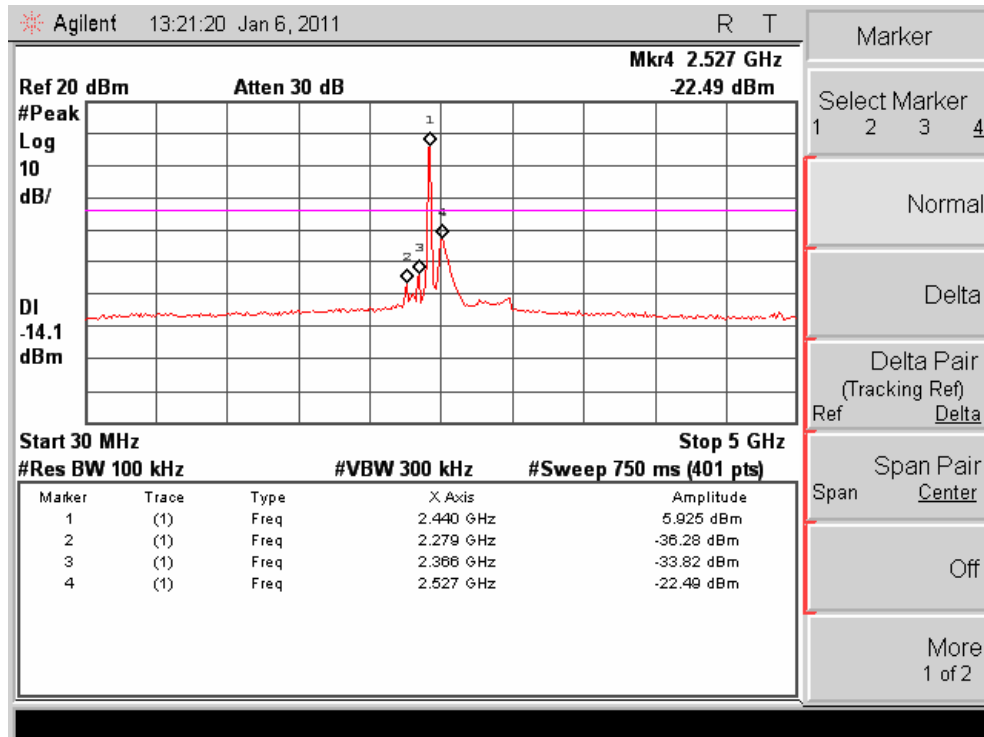


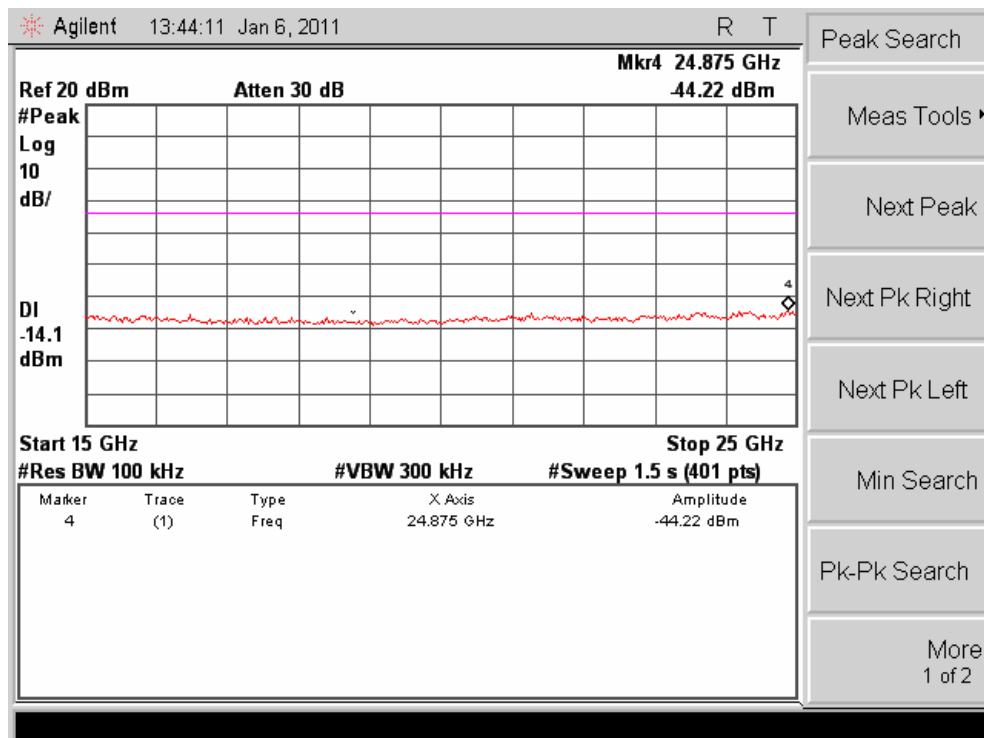
802.11g mode Channel LOW



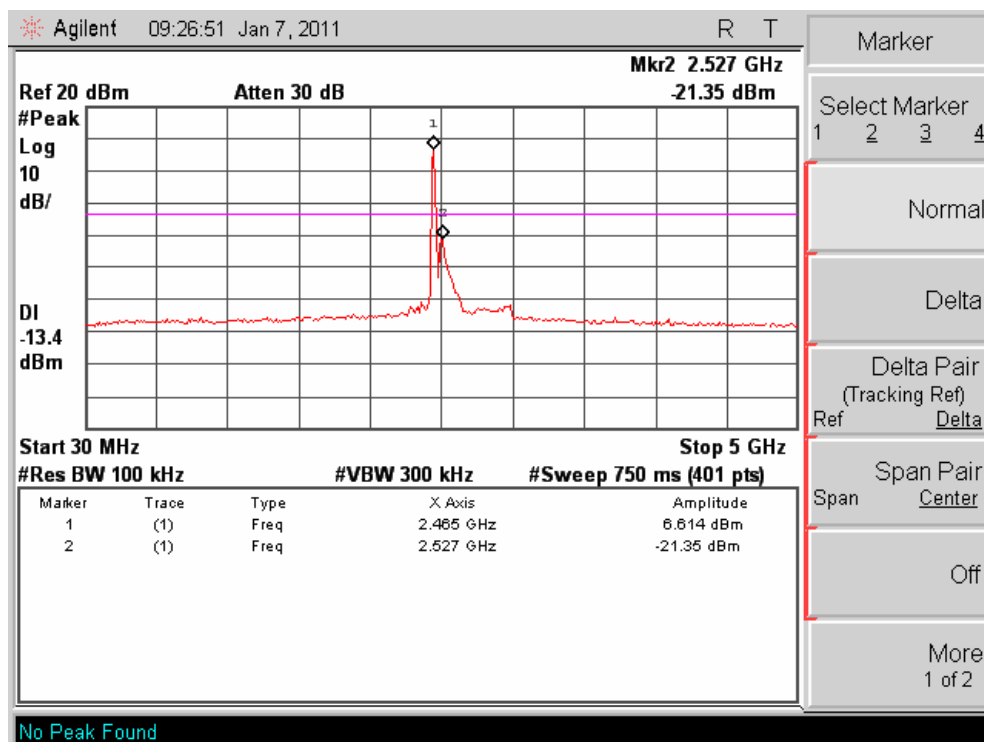


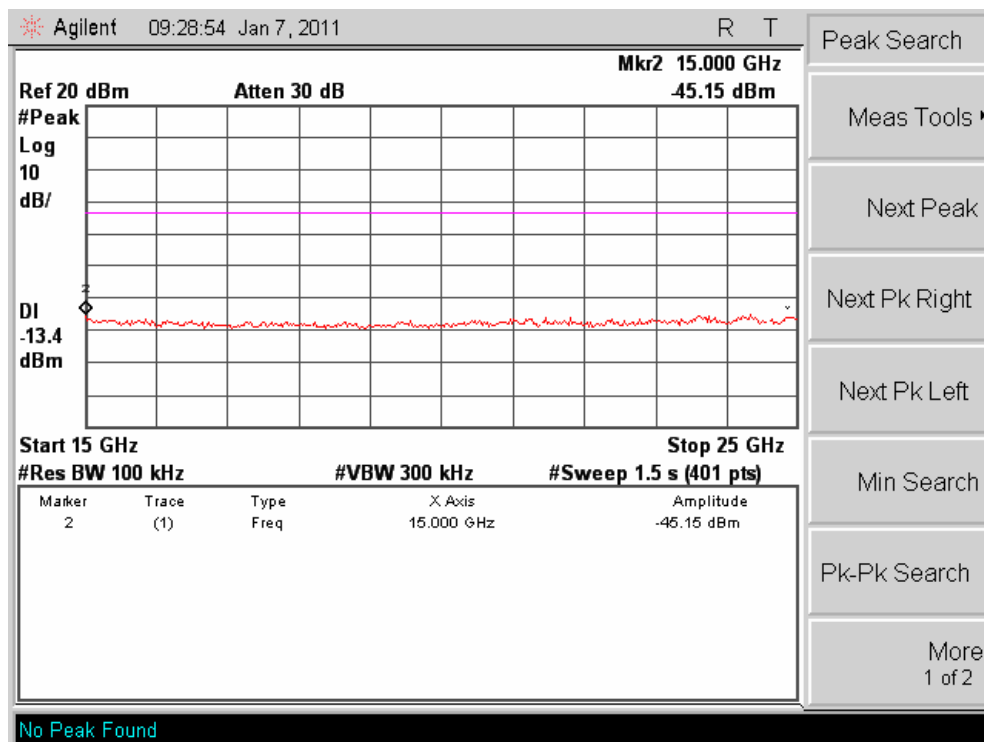
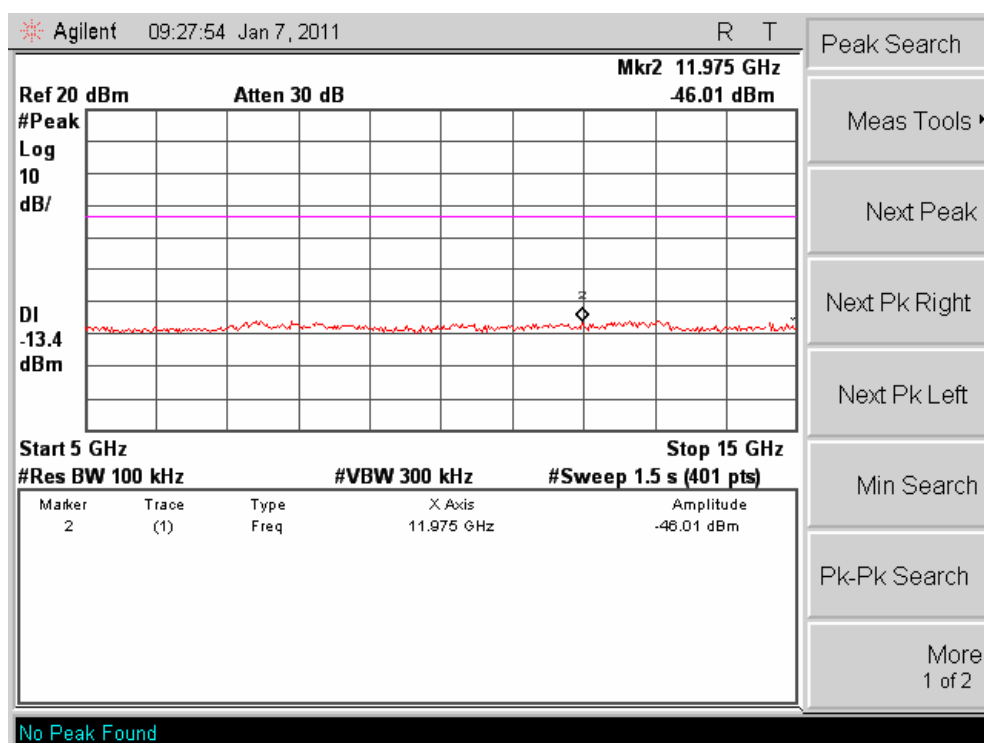
Channel MID



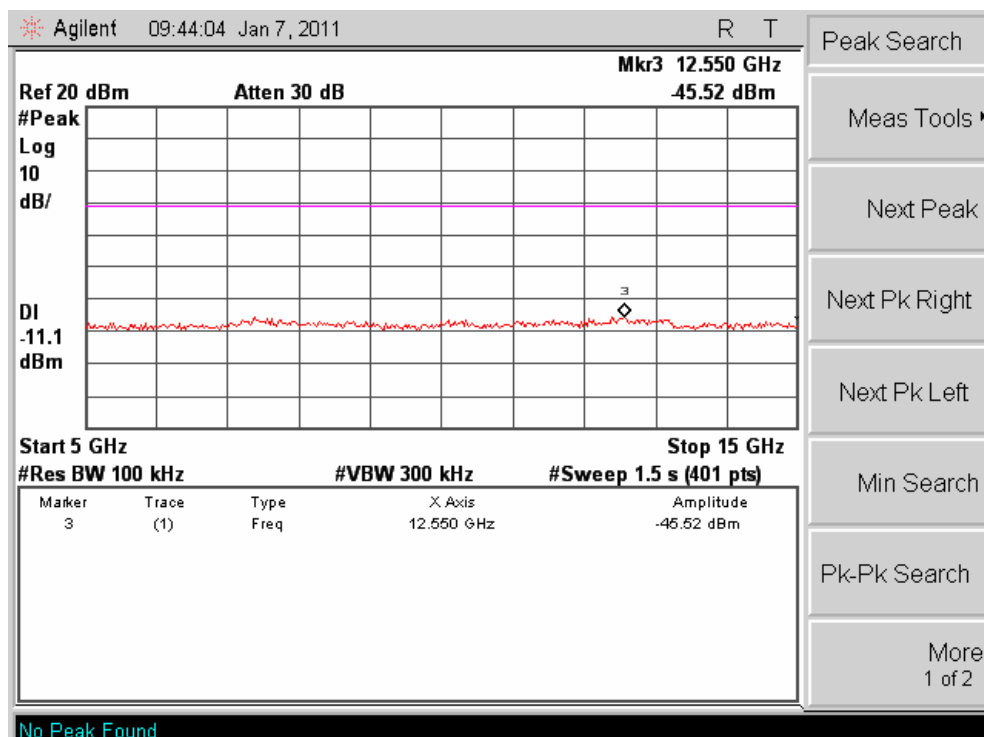
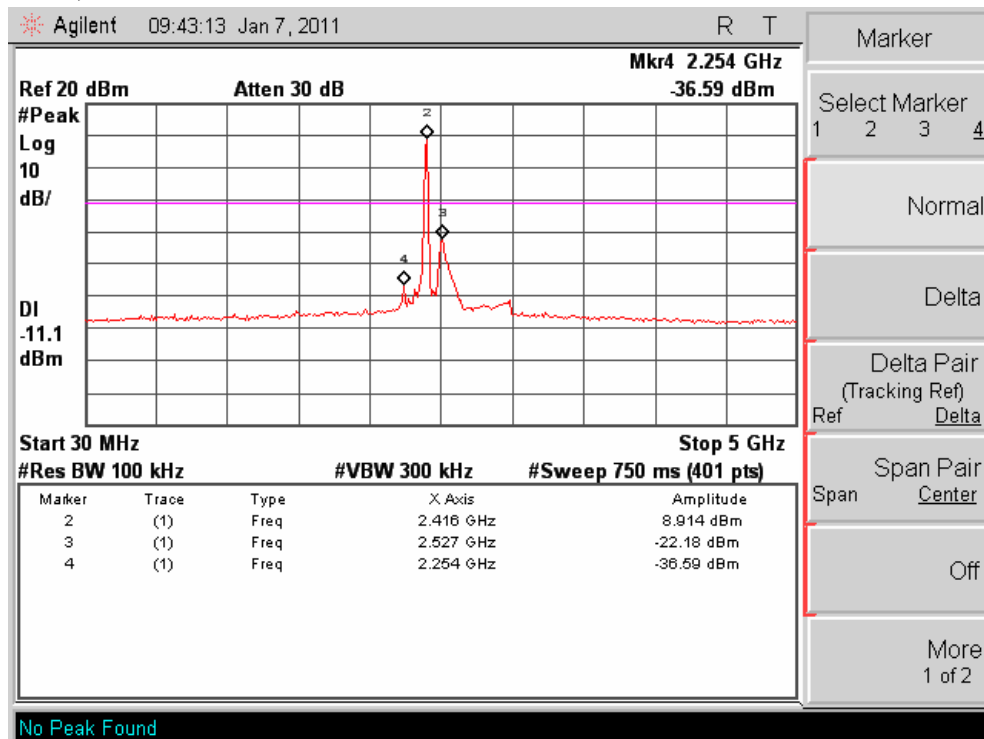


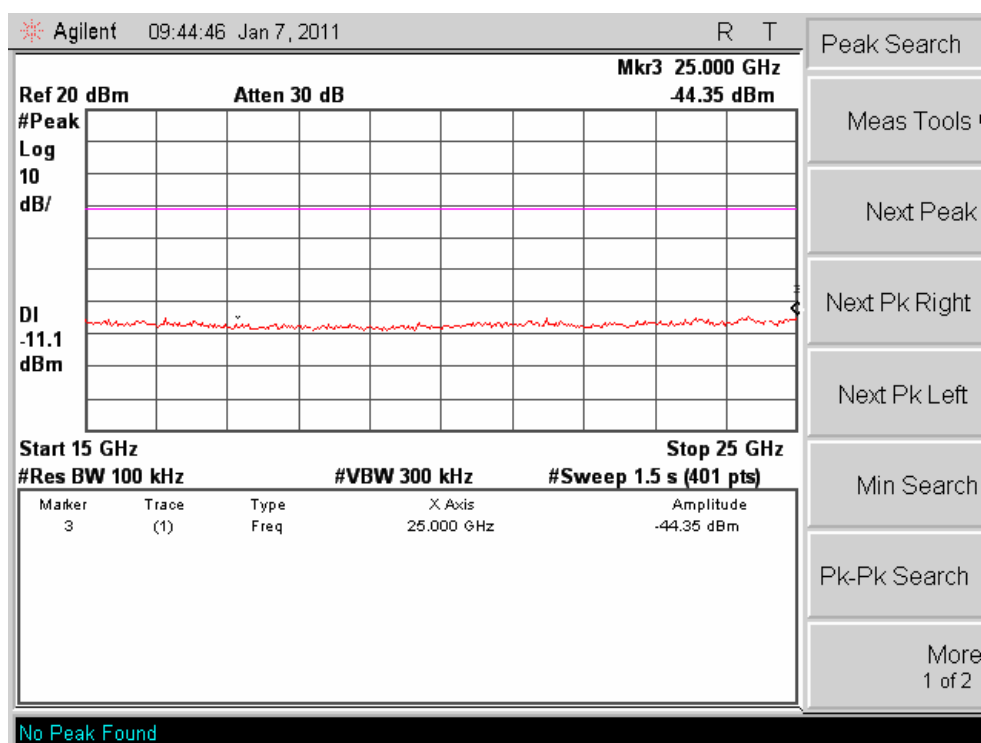
Channel HIG



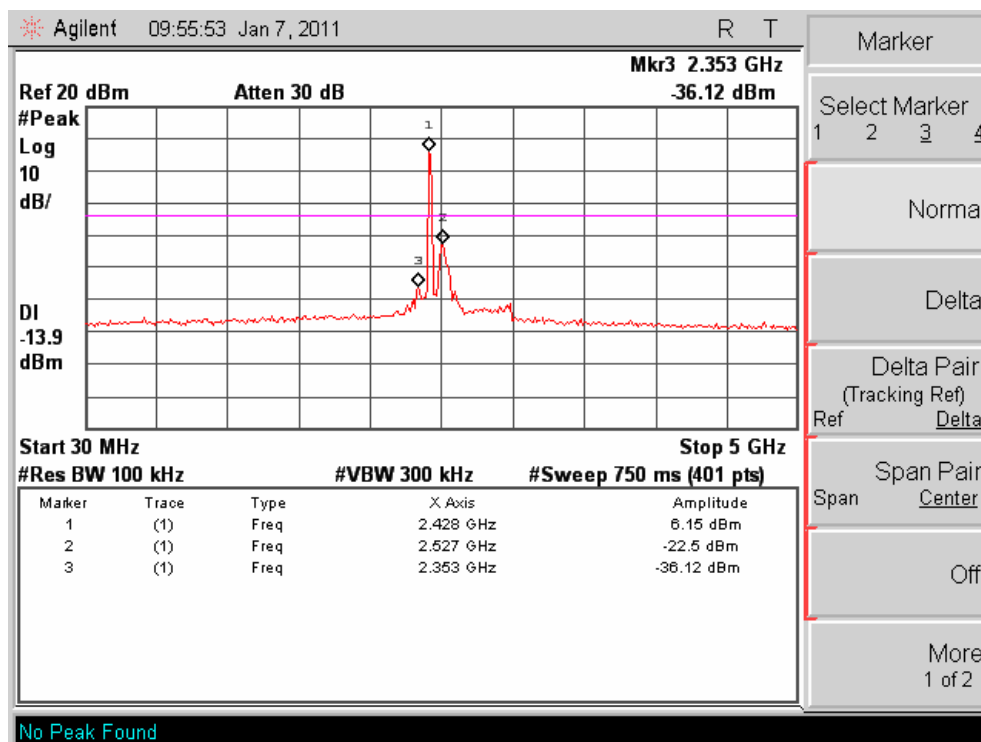


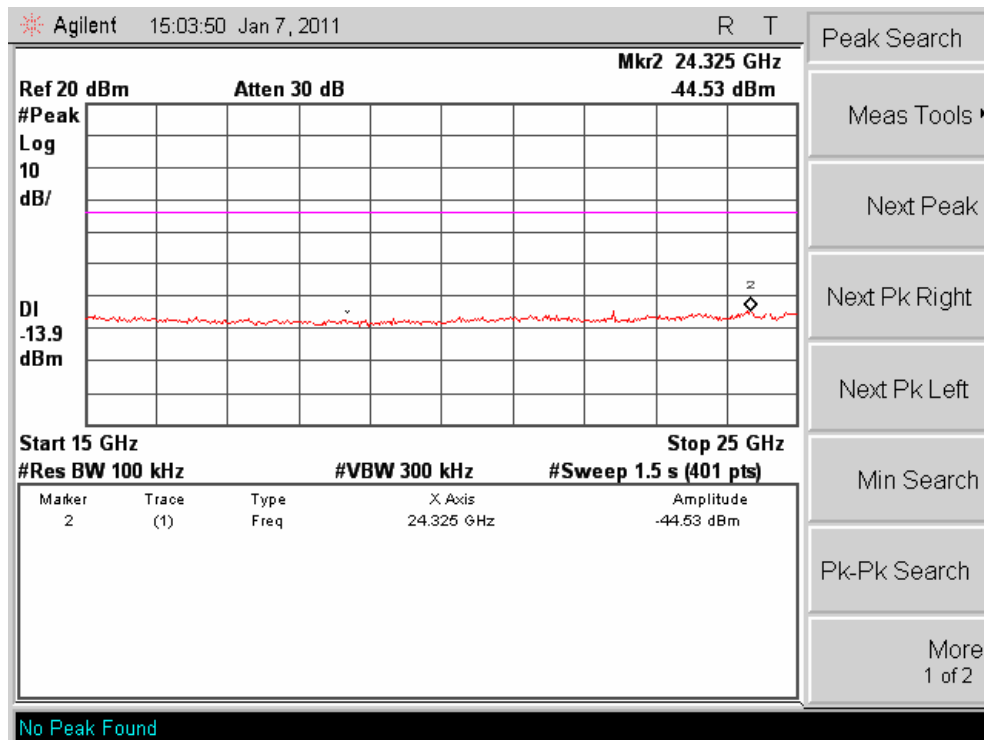
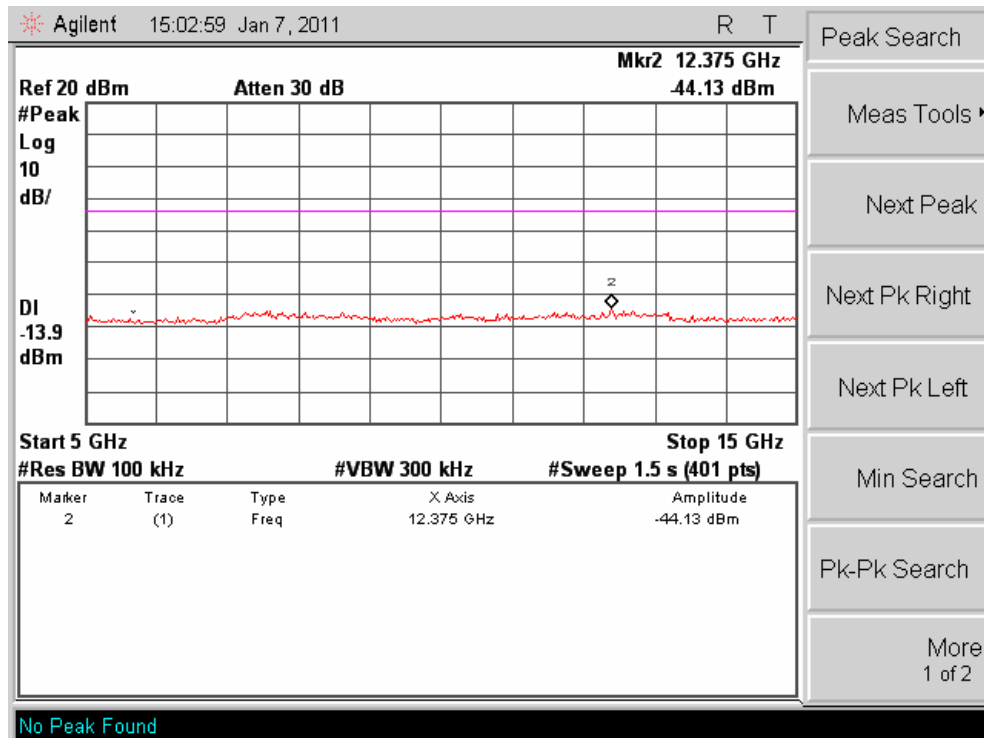
802.11n mode, Channel LOW



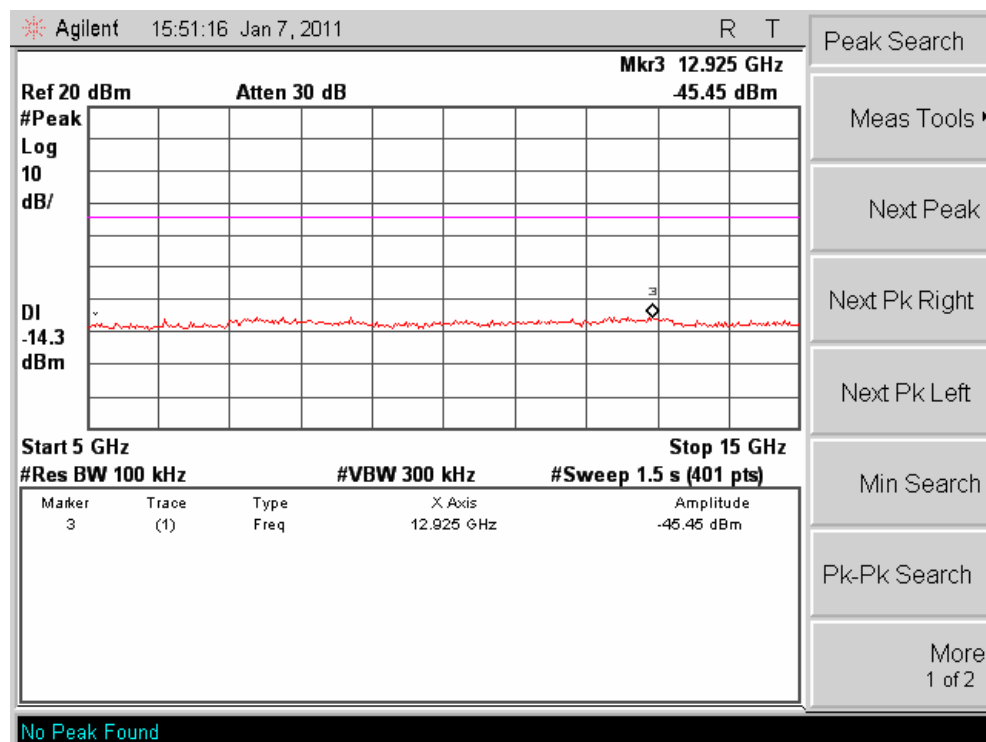
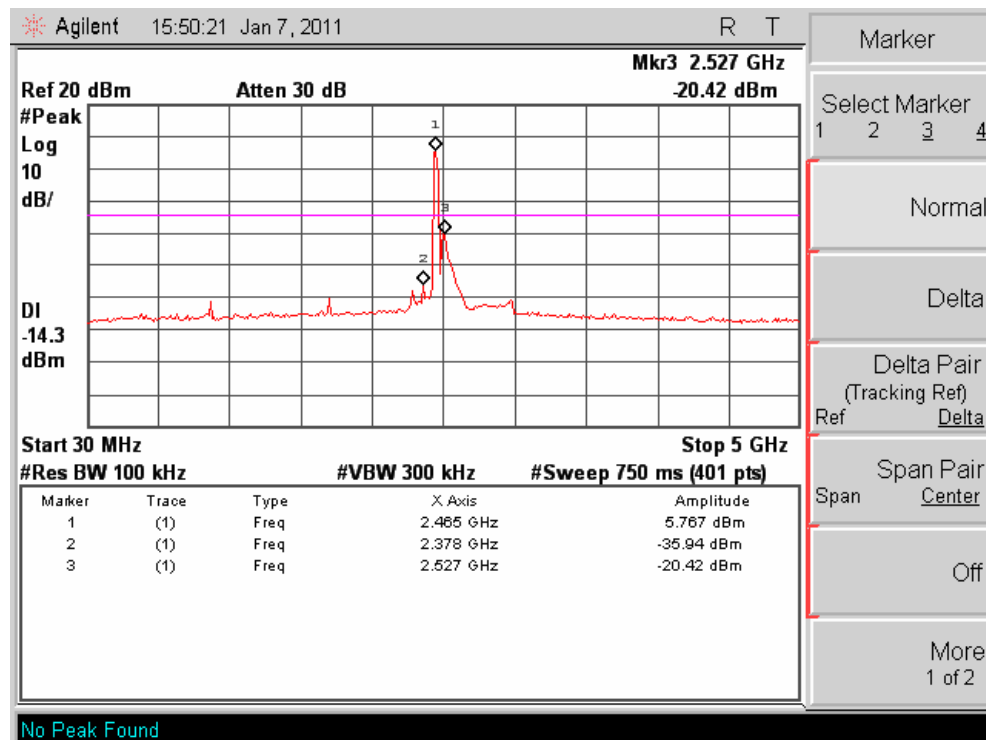


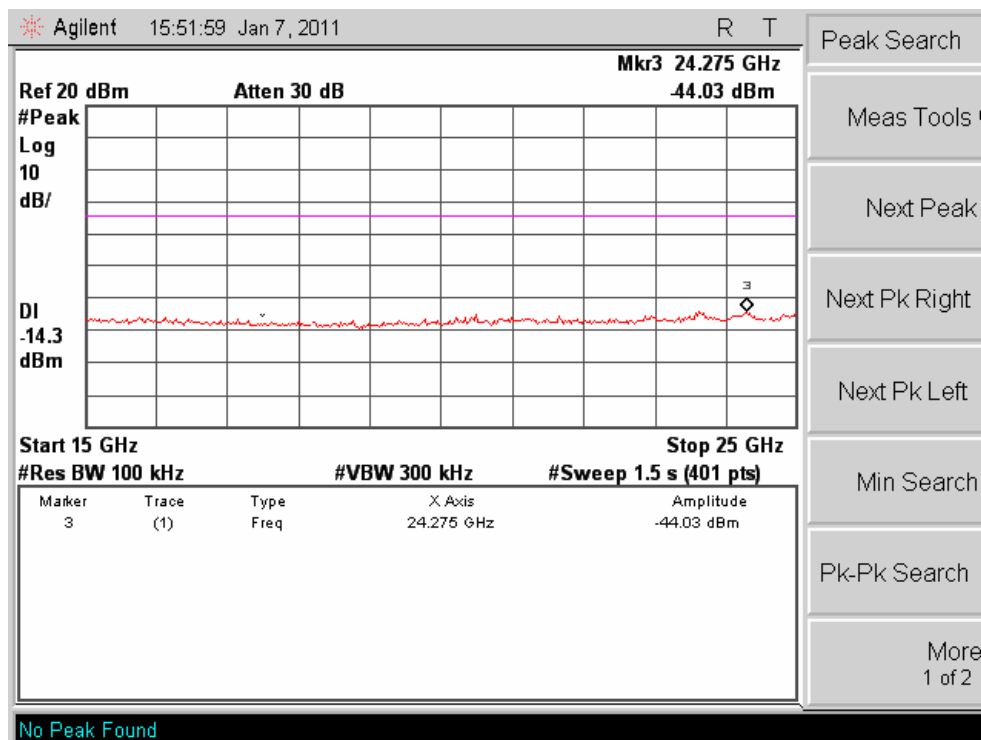
Channel MID





Channel HIG

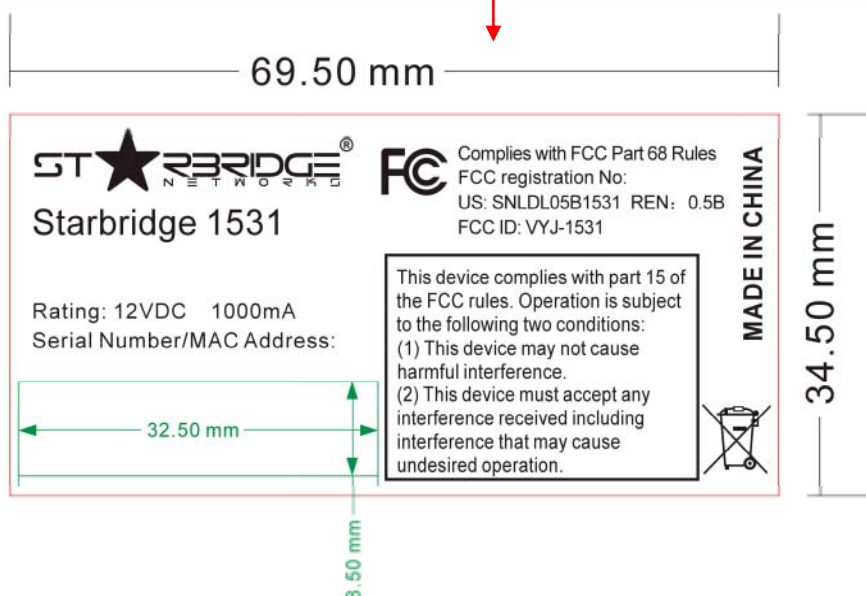




5. FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Mark Location:



6. Test Setup

6.1 Ancillary and Accessory Equipment Used

No.	Description	Specification	Quantity
1.	PC	DELL, M/N:OPTIPLEX, S/N: 33494477289	1
2.	Monitor	SHARP/AQUOS, M/N:LCD-19A35-BK, S/N:806915210	1
3.	Keyboard	DELL, M/N:L100, S/N: CN0RH6566589006860007J	1
4.	Mouse	HP, M/N:M-SBF96	1
5.	Laptop	DELL, M/N:Vostro 1400	1

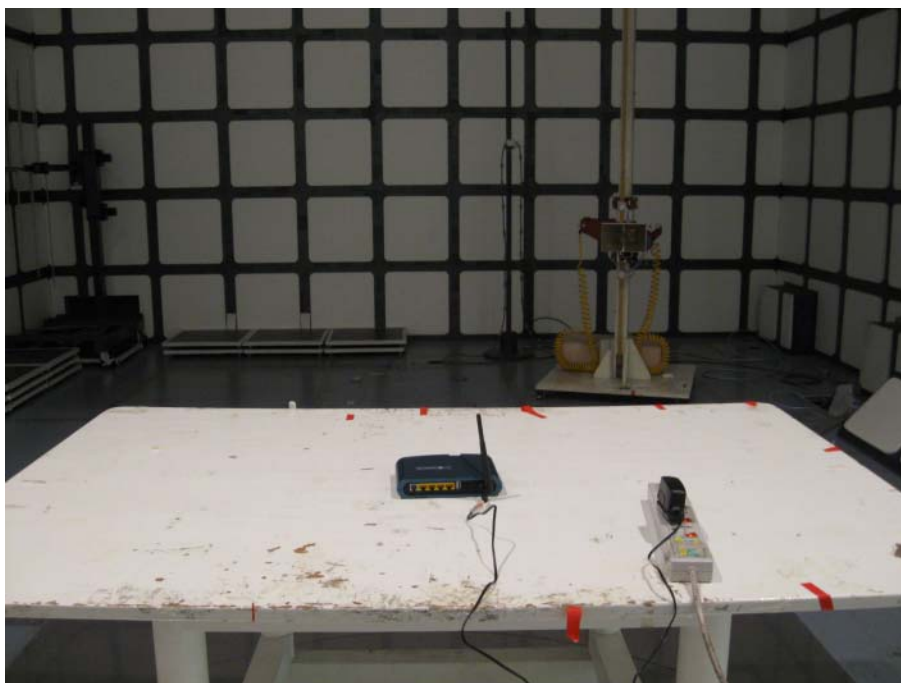
6.2 Photographs of the Test Configuration

6.2.1 Radiated emission

Below 1GHz:



Above 1GHz:



6.2.2 Conducted emission



6.3 Photographs of the EUT



Enclosure of EUT



Enclosure of EUT



Internal Photo



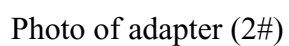
Photo of adapter (1#)



Photo of adapter (1#)



Photo of adapter (2#)



7. Equipment List

No.	Equipment	Manufacturer	Model	Serial No.	Calibration Date
1	Precision Biconical Antenna	TDK Co.	PBA-2030	090500	2010-09-18
2	Precision Log Periodic Antenna	TDK Co.	PLP-3003	061001	2010-09-18
3	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130174	2010-09-18
4	Horn antenna	TDK	HRN-0118	130186	2010-04-07
5	Attenuator 6 dB	Agilent	8491B	MY39260147	2010-09-18
6	Preamplifier	TDK Sonoma	310	242803	2010-04-07
7	Preamplifier	ELENA	EAU-3718 GXA	A070701	2010-04-07
8	EMI Receiver	Rohde & Schwarz	ESIB26	100234	2010-04-07
9	EMI Receiver	Rohde & Schwarz	ESCS30	100350	2010-04-07
10	Spectrum Analyzer	Agilent	E4403B	MY44210199	2010-04-07
11	Art. Mains Network	EMCO	3816/2	00044921	2010-04-07
12	Transient Limiter(10 dB)	Agilent	11947A	3107A03736	2010-04-07
13	Personal Computer	HP	DX2000MT	MXD4250FZM	N/A
14	Personal Computer	HP	DX2000MT	MXD4130B2N	N/A
15	Semi-Anechoic Chamber	TDK Co.	N/A	N/A	2010-04-07
16	Shielded Room	TDK Co.	N/A	N/A	N/A
17	Loop Antenna	EMCO	6502	9107-2440	2010-04-07
18	Combiner	Mini-Circuits	ZFRSC-183 -S+	F492100907	2010-04-02

8. Test Uncertainty

Test	Range	Confidence Level	Calculated Uncertainty
Radiated emission(3m)	30-1000MHz	95%	4.3dB
Conducted emission	0.15-30MHz	95%	3.3dB

9. Appendix

9.1 Confirmation of Compliance within the Limits

9.1.1 Method of calculating measurement result

Radiated Emission

For example the point of 33.888MHz, vertical, Page 59.

$$\text{Reading} + \text{Antenna factor} + \text{Cable loss} - \text{Gain} = \text{Result}$$

$$\text{Example } 45.3 + 11.6 + 6.6 - 31.6 = 31.9$$

Conducted Emission

For example the point of 0.329MHz, L1 QP, Page 9.

$$\text{Reading} + \text{C. FACTOR} = \text{Result}$$

$$\text{Example } 46.5 + 10.0 = 56.5$$