FCC Test Report
(TR-1204-049-01)

Applicant	:	Friedrich Air Conditioning Co.
Address	:	10001 Reunion Place,Ste.500 San Antonio,TX 78216, USA
Manufacturer	:	Dongguan Dong keng Season Components
Address	:	Jun Da Lu, DongKeng,Dongguan,Guangdong, China
Product Name	:	Kuhl Wireless Adaptor
Trademark	:	FRIEDRICH 1883
Model(s)	:	62600551
Standard(s)	:	FCC Part 15 Subpart C
Test Result	:	Pass
Date of Test	:	May 09, 2012 to Jun 19, 2012
Report issued Dated	:	Jun 20, 2012

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	:	Phenix Zhang	Approved by	:	CHAN king-chui
Date	:	2012.06.20	Technical manager / Date	:	2012.06.20

Table of Contents

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, Dongguang 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	:	Friedrich Air Conditioning Co.
Address	:	10001 Reunion Place,Ste.500 San Antonio,TX 78216, USA
Phone no.	:	None
Fax no.	:	None

2.2 Identification of EUT

Trademark	:	FRIEDRICH 1883
Model(s) No.	:	62600551
Serial No.	:	None

2.3 Spec of EUT

Description of Antenna	:	fixed omnidirectional antenna, 3dBi gain
Power Supply	:	Micro USB (DC 5V)
Operation Frequency	:	2412 MHz ~ 2462 MHz
Number of Channels	:	11
Modulation	:	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g OFDM for IEEE 802.11n20
Data Rate	:	IEEE 802.11b: 11Mbps Max. IEEE 802.11g: 54Mbps Max. IEEE 802.11n20: 65Mbps Max.

2.4 Test Standards List

FCC Part 15 (2011)
RADIO FREQUENCY DEVICES
FCC KDB558074 D01 v01
Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

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 802.11n20: 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

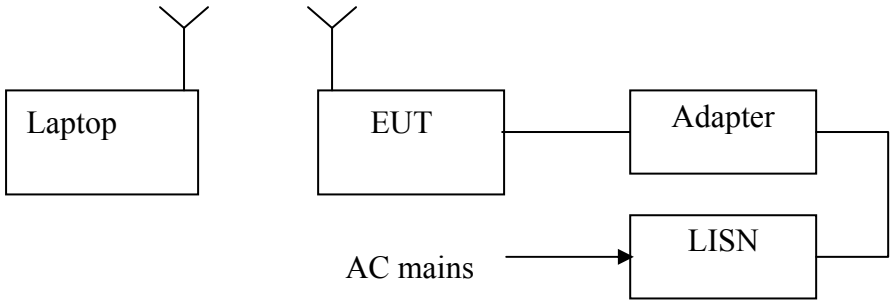
The antenna connector is designed with permanent attachment and no consideration of replacement.
Transmitter antenna of directional gain is 3dBi.

4.2 Conducted Emission (mains)

4.2.1 Test Summary

Test Room	:	Shielded Room
Power Source	:	AC 120V / 60Hz
Standards:	:	FCC Part15 B : 2011
EUT Type	:	Table Top
EUT configuration	:	EUT's highest possible emission level

4.2.2 Block diagram of test setup



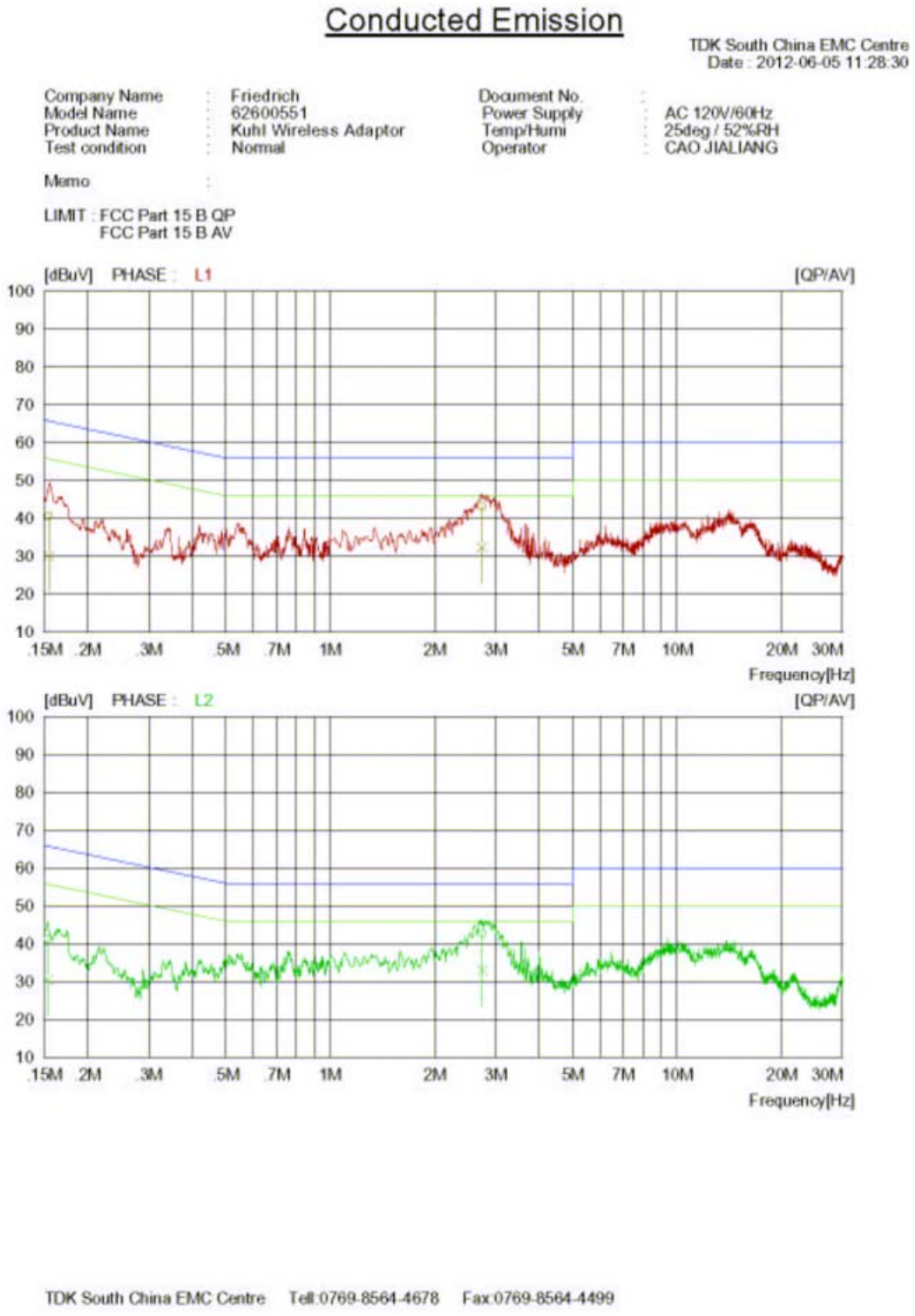
4.2.3 Measurement method

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



Conducted Emission

TDK South China EMC Centre
Date : 2012-06-05 11:28:30

Company Name	:	Friedrich	Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	25deg / 52%RH
Test condition	:	Normal	Operator	:	CAO JIALIANG

Memo :

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

NO	FREQ	READING		C.FACTOR	RESULT		LIMIT		MARGIN		PHASE
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15500	30.6	20.1	10.0	40.6	30.1	65.7	55.7	25.1	25.6	L1
2	2.74000	33.3	22.5	9.9	43.2	32.4	56.0	46.0	12.8	13.6	L1
3	0.15400	31.2	20.5	10.0	41.2	30.5	65.8	55.8	24.6	25.3	L2
4	2.75000	32.8	23.0	9.9	42.7	32.9	56.0	46.0	13.3	13.1	L2

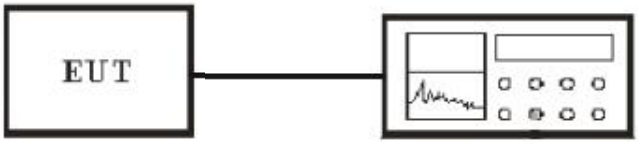
TDK South China EMC Centre Tell:0769-8564-4678 Fax:0769-8564-4499

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



Spectrum

Connection method: The shield cable was connected with EUT and Spectrum which have 50Ω 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. According to KDB558074 requirement, set spectrum analyzer as:
   Measurement mode: Channel Power
   Center Frequency = 2412MHz, 2437MHz or 2462MHz;
   RBW=1MHz, VBW=3MHz,
   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 (℃) : 22~23	EUT: Kuhl Wireless Adaptor
Humidity (%RH): 50~54	M/N: 62600551
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode
Test date: May 24, 2011 to May 25,2010	Test engineer: Phenix

802.11b mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	13.45	30	16.55
MID (CH 6)	2437	13.51	30	16.49
HIG (CH 11)	2462	13.75	30	16.25

802.11g mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	10.26	30	19.74
MID (CH 6)	2437	11.04	30	18.96
HIG (CH 11)	2462	10.94	30	19.06

802.11n20 mode:

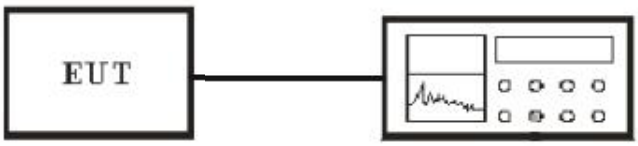
Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	12.34	30	17.66
MID (CH 6)	2437	13.00	30	17.00
HIG (CH 11)	2462	13.01	30	16.99

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



Spectrum

Connection method: The shield cable was connected with EUT and Spectrum which have 50Ω 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 (℃) : 22~23	EUT: Kuhl Wireless Adaptor
Humidity (%RH): 50~54	M/N: 62600551
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode
Test date: Jun 06, 2012	Test engineer: Phenix

802.11b mode:

Frequency (MHz)	Read Delta (dB)	Limits (dB)	Margin (dB)
2400	-45.53	-20	25.53
2483.5	-51.97	-20	31.97

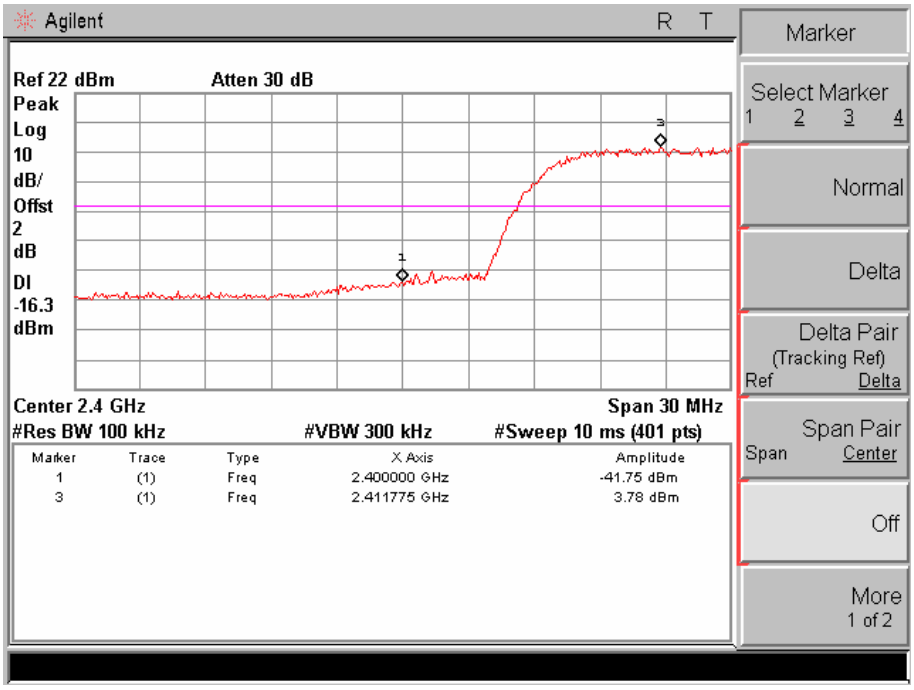
802.11g mode:

Frequency (MHz)	Read Delta (dB)	Limits (dB)	Margin (dB)
2398.5	-30.78	-20	10.78
2400	-31.62	-20	11.62
2483.5	-44.04	-20	24.04

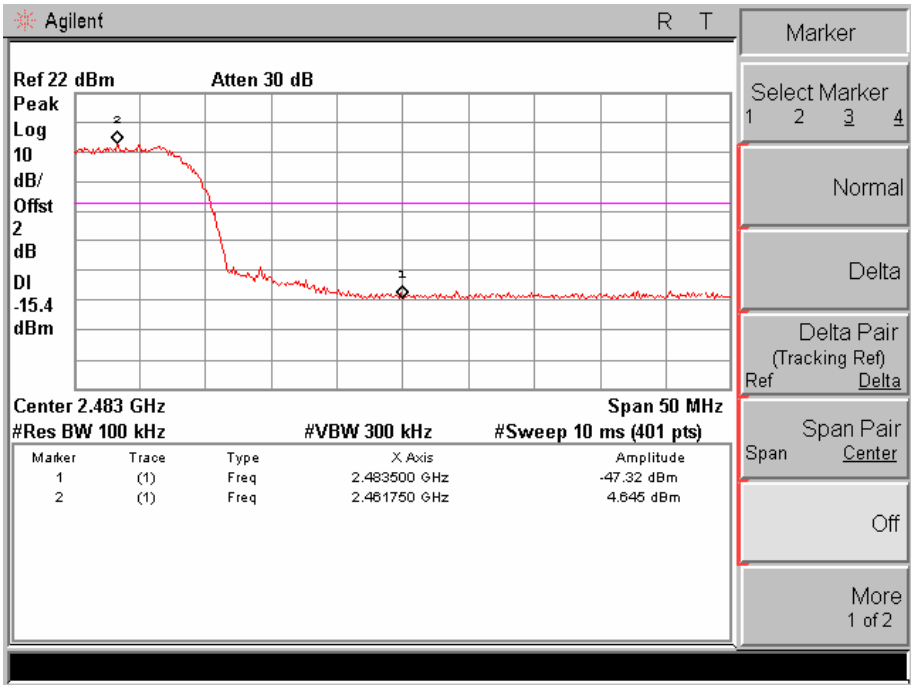
802.11n20 mode:

Frequency (MHz)	Read Delta (dB)	Limits (dB)	Margin (dB)
2399.4	-26.00	-20	6.00
2400	-29.91	-20	9.91
2483.5	-37.96	-20	17.96

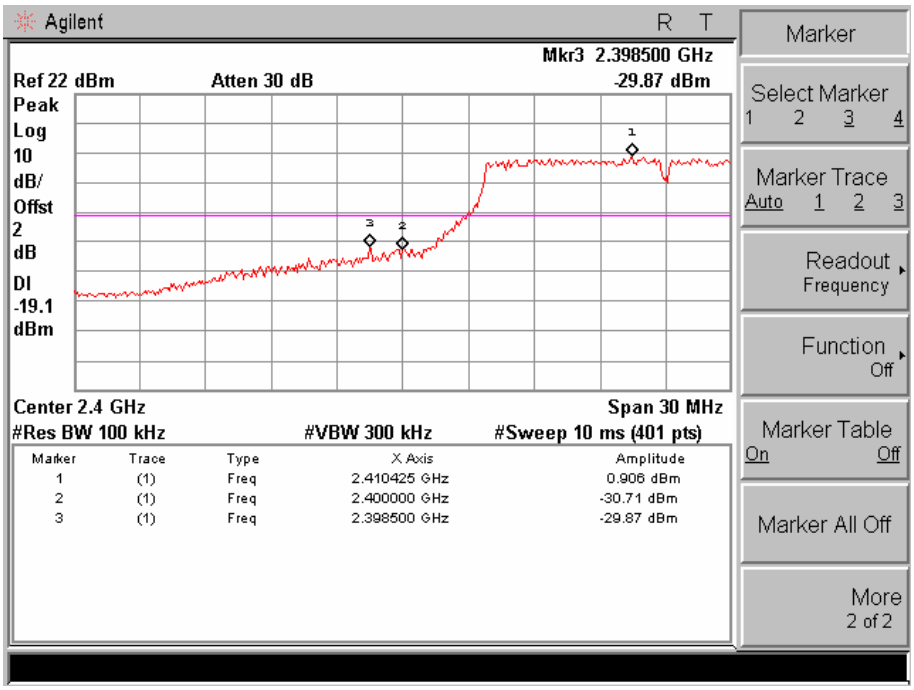
802.11b mode Plot:
Channel LOW：



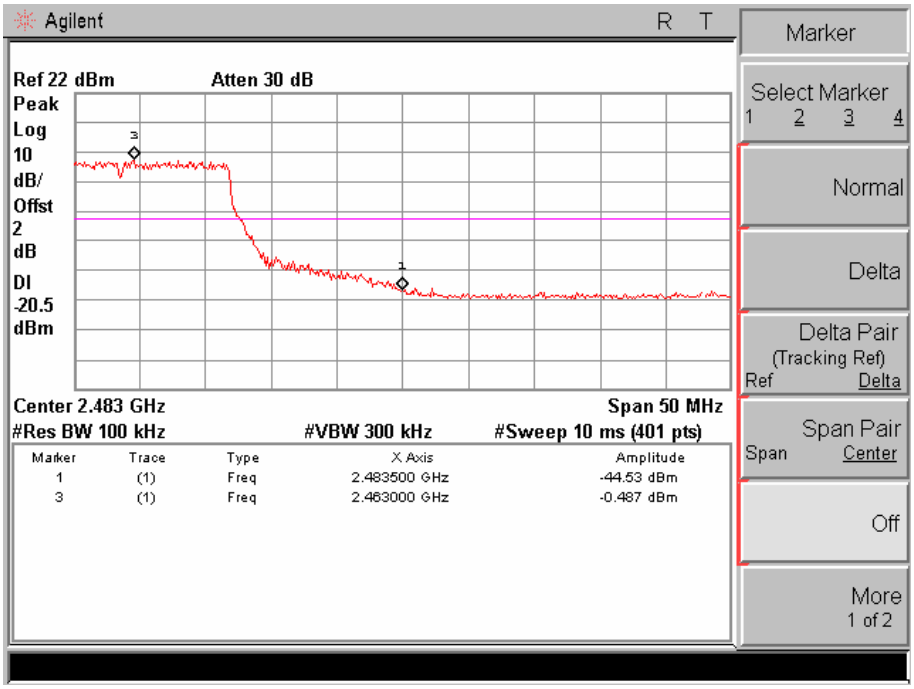
Channel HIG：



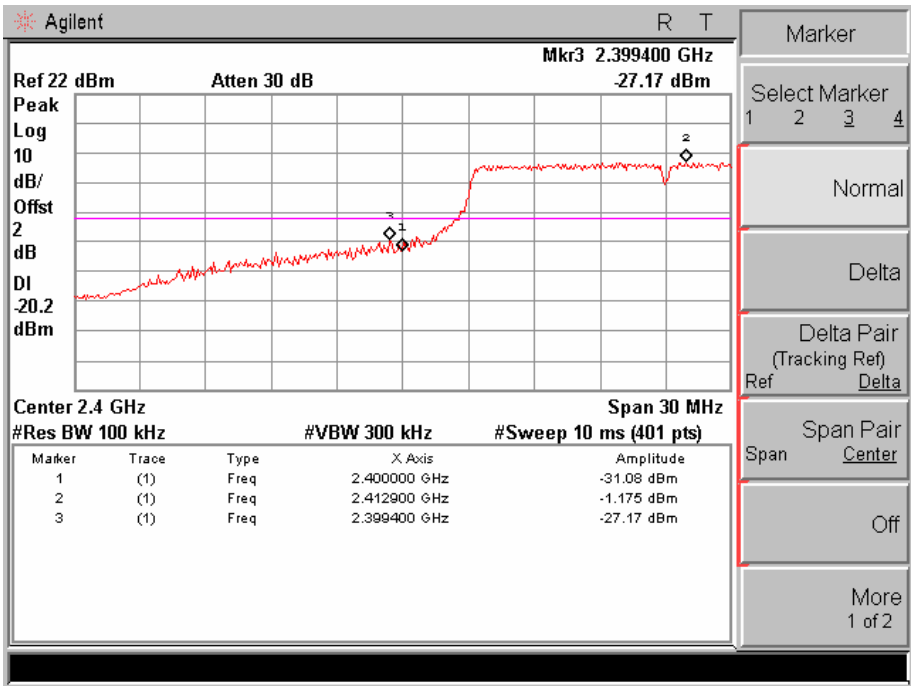
802.11g mode Plot:
Channel LOW：



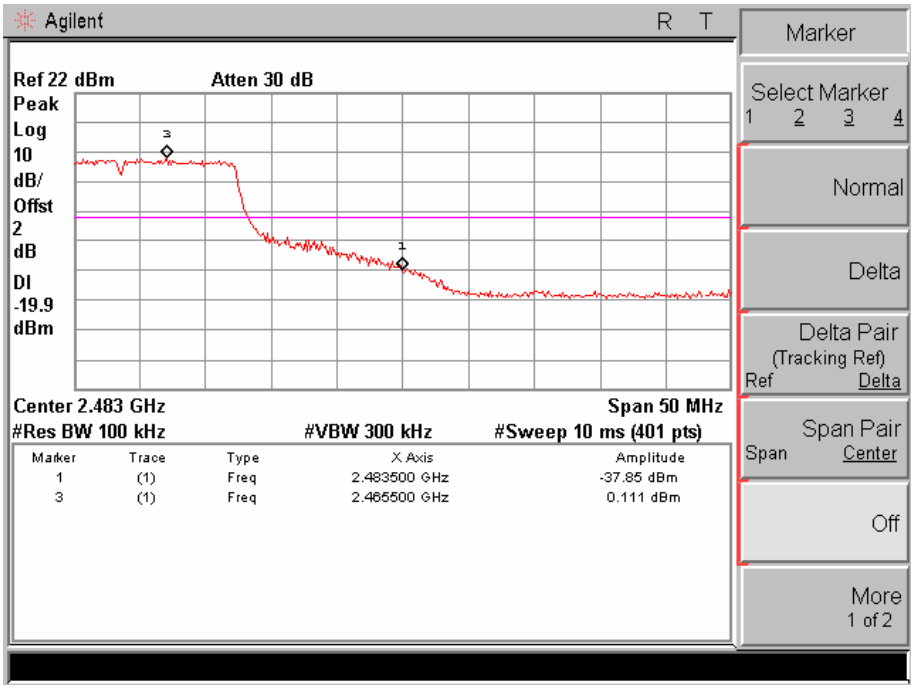
Channel HIG：



802.11n20 mode Plot:
Channel LOW：



Channel HIG：



Radiated:

802.11b mode:

2012/05/30 15:40:45

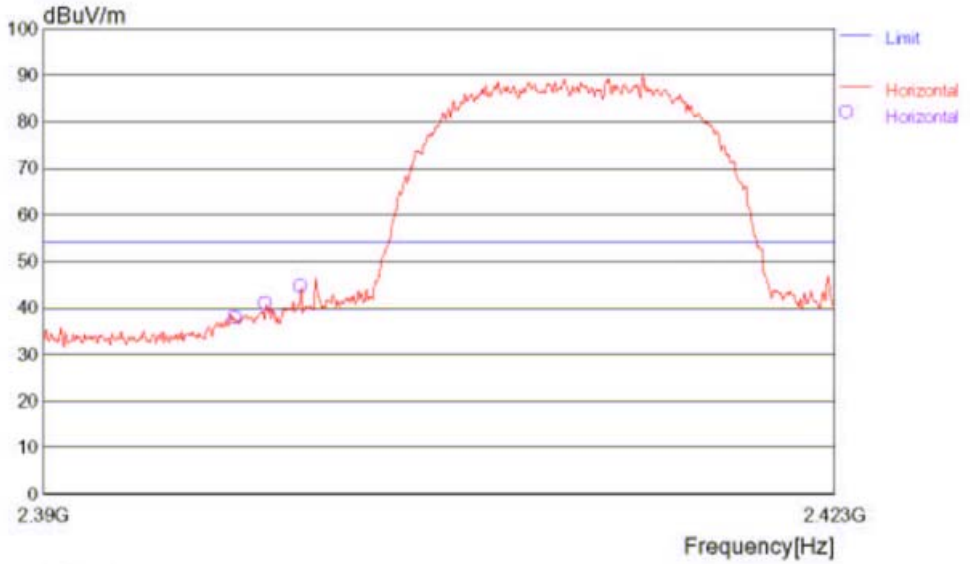
RADIATED EMISSION

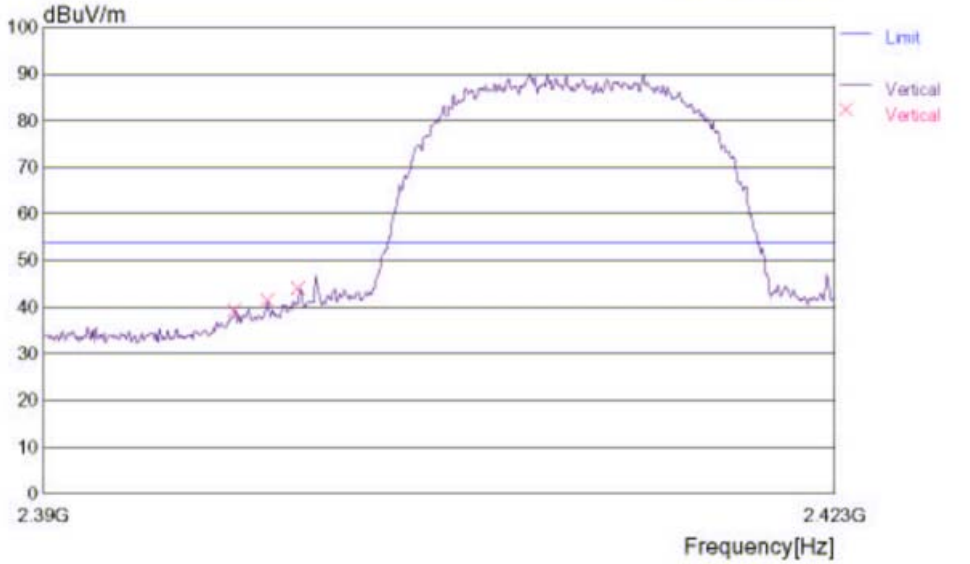
Date : 2012/05/30 15:40:33

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Eliy zhang

Memo : 802.11b CH1

LIMIT : FCC Part15 C transmitter spurious above1G(average)





2012/05/30 15:40:45

RADIATED EMISSION

Date : 2012/05/30 15:40:33

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang
Memo	:	802.11b CH1			

LIMIT : FCC Part15 C transmitter spurious above1G(average)

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
2397.939	40.4	HRN	PK	31.4	-34.0	37.8	285	1.00	Hori.	54.0	16.2
2398.006	41.8	HRN	PK	31.4	-34.0	39.2	4	1.00	Vert.	54.0	14.8
2399.263	43.4	HRN	PK	31.4	-34.0	40.8	166	1.00	Hori.	54.0	13.2
2399.329	43.9	HRN	PK	31.4	-34.0	41.3	26	1.00	Vert.	54.0	12.7
2400.652	46.5	HRN	PK	31.4	-34.0	43.9	46	1.00	Vert.	54.0	10.1
2400.718	46.9	HRN	PK	31.4	-34.0	44.3	285	1.00	Hori.	54.0	9.7

2012/05/30 15:22:29

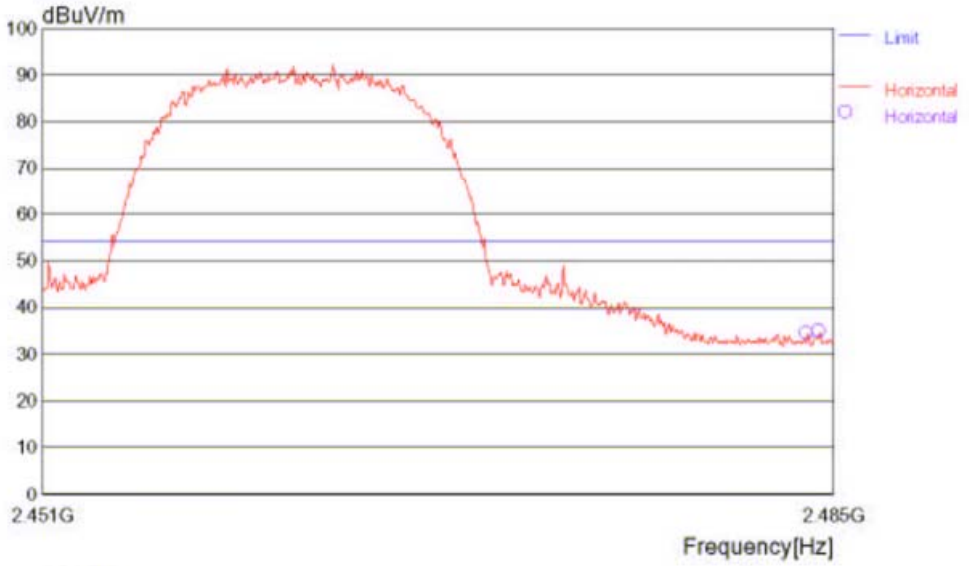
RADIATED EMISSION

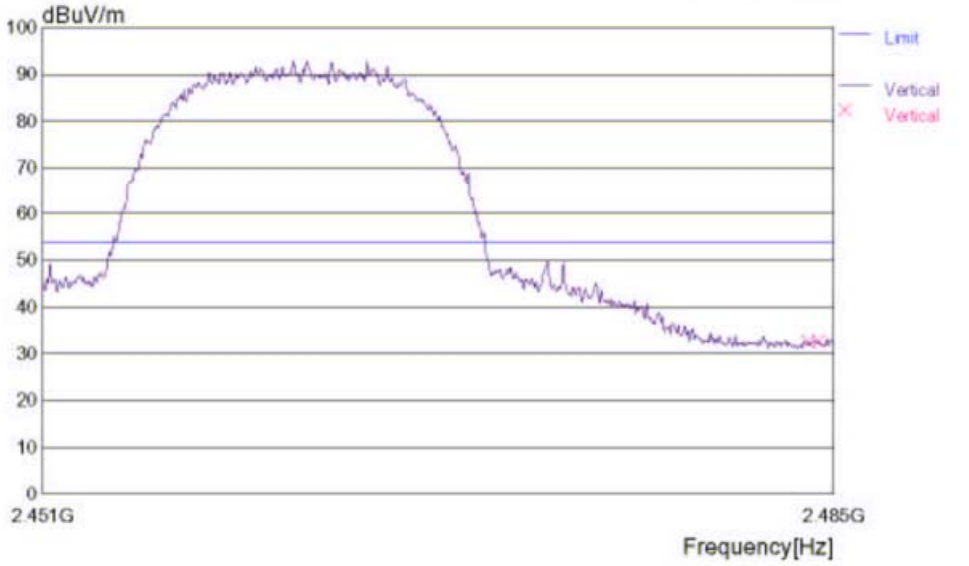
Date : 2012/05/30 15:22:22

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Elly zhang

Memo : 802.11b CH11

LIMIT : FCC Part15 C transmitter spurious above1G(average)





2012/05/30 15:22:29

RADIATED EMISSION

Date : 2012/05/30 15:22:22

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Eliy zhang

Memo : 802.11b CH11

LIMIT : FCC Part15 C transmitter spurious above1G(average)

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
2483.900	37.0	HRN	PK	31.2	-33.8	34.4	96	1.00	Hori.	54.0	19.6
2483.968	35.0	HRN	PK	31.2	-33.8	32.4	30	1.00	Vert.	54.0	21.6
2484.376	34.8	HRN	PK	31.2	-33.8	32.2	38	1.00	Vert.	54.0	21.8
2484.445	37.2	HRN	PK	31.2	-33.8	34.6	67	1.00	Hori.	54.0	19.4

802.11g mode:

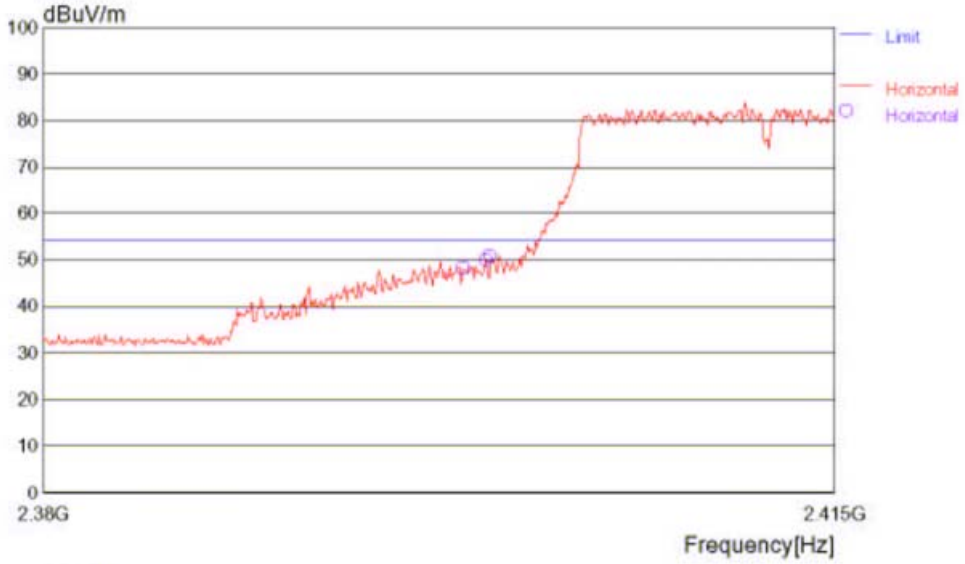
2012/05/09 05:52:17

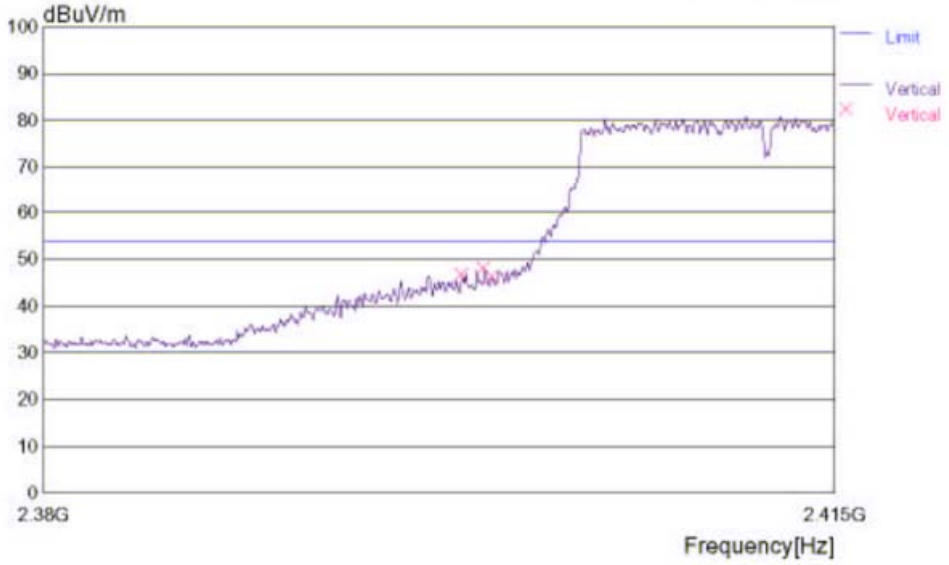
RADIATED EMISSION

Date : 2012/05/09 05:52:11

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:	CH1	Operator	:	Elly zhang
Memo	:	802.11g			

LIMIT : FCC Part15 C transmitter spurious above1G(average)





2012/05/09 05:52:17

RADIATED EMISSION

Date : 2012/05/09 05:52:11

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH1	Operator	: Eliy zhang

Memo : 802.11g

LIMIT : FCC Part15 C transmitter spurious above1G(average)

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
2398.498	49.1	HRN	PK	31.4	-34.0	46.5	160	1.00	Vert.	54.0	7.5
2398.568	50.4	HRN	PK	31.4	-34.0	47.8	162	1.00	Hori.	54.0	6.2
2399.479	50.4	HRN	PK	31.4	-34.0	47.8	164	1.00	Vert.	54.0	6.2
2399.549	52.4	HRN	PK	31.4	-34.0	49.8	162	1.00	Hori.	54.0	4.2
2399.759	53.2	HRN	PK	31.4	-34.0	50.6	158	1.00	Hori.	54.0	3.4
2399.829	48.7	HRN	PK	31.4	-34.0	46.1	164	1.00	Vert.	54.0	7.9

2012/05/09 05:53:16

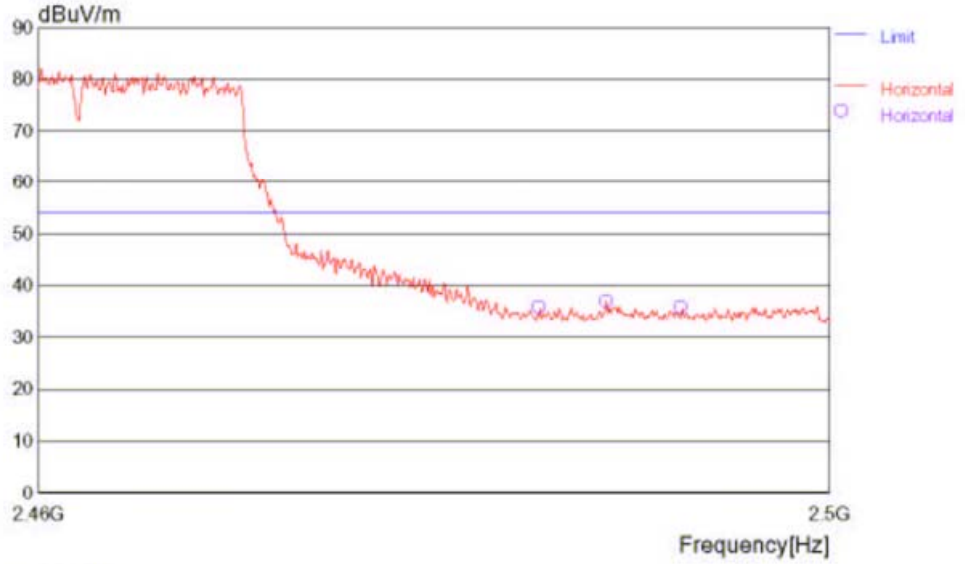
RADIATED EMISSION

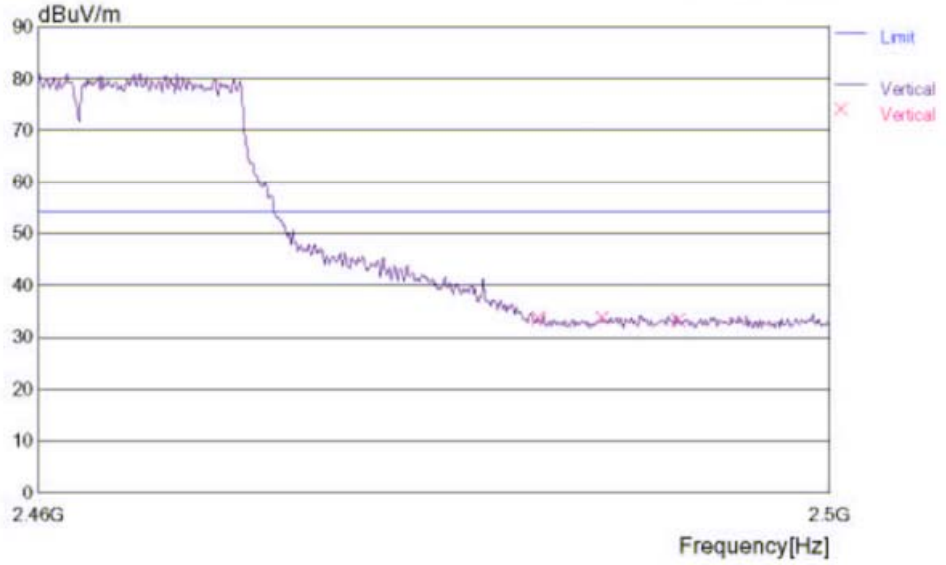
Date : 2012/05/09 05:53:08

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH11	Operator	: Elly zhang

Memo : 802.11g

LIMIT : FCC Part15 C transmitter spurious above1G(average)





2012/05/09 05:53:16

RADIATED EMISSION

Date : 2012/05/09 05:53:08

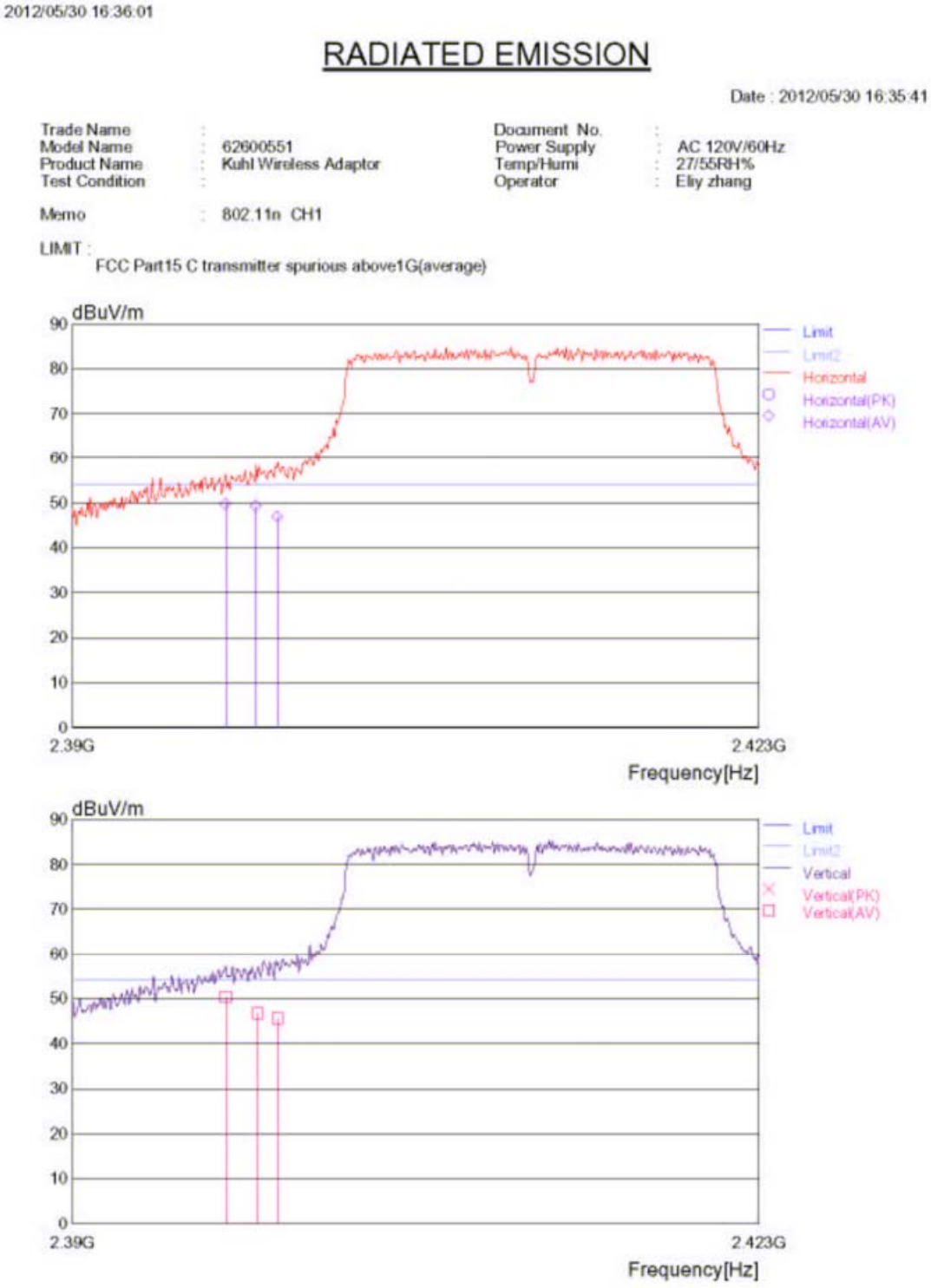
Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH11	Operator	: Eliy zhang

Memo : 802.11g

LIMIT : FCC Part15 C transmitter spurious above1G(average)

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
2485.225	36.0	HRN	PK	31.2	-33.8	33.4	227	1.00	Vert.	54.0	20.6
2485.305	38.2	HRN	PK	31.2	-33.8	35.6	343	2.00	Hori.	54.0	18.4
2488.508	36.1	HRN	PK	31.2	-33.8	33.5	6	1.99	Vert.	54.0	20.5
2488.668	39.6	HRN	PK	31.2	-33.8	37.0	346	2.00	Hori.	54.0	17.0
2492.352	35.8	HRN	PK	31.2	-33.8	33.2	277	3.00	Vert.	54.0	20.8
2492.512	38.1	HRN	PK	31.2	-33.8	35.5	355	2.00	Hori.	54.0	18.5

802.11n20 mode:



2012/05/30 16:36:01

RADIATED EMISSION

Date : 2012/05/30 16:35:41

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang

Memo : 802.11n CH1

LIMIT :
FCC Part15 C transmitter spurious above1G(average)

Frequency [MHz]	Meter Reading (PK) [dBuV]	Meter Reading (AV) [dBuV]	Ant. Type	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Level (AV) [dBuV/m]	Angle [degree]	Height [cm]	Pola.	Limit (PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (PK) [dB]	Margin (AV) [dB]
2397.344	58.9	52.1	HRN	31.4	-34.0	56.3	49.5	85	1.00	Hori	----	54.0	----	4.5
2398.800	60.9	51.6	HRN	31.4	-34.0	58.3	49.0	283	1.00	Hori	----	54.0	----	5.0
2399.858	61.6	49.5	HRN	31.4	-34.0	59.0	46.9	81	1.00	Hori	----	54.0	----	7.1
2397.344	59.7	52.6	HRN	31.4	-34.0	57.1	50.0	4	1.00	Vert	----	54.0	----	4.0
2398.932	59.7	49.2	HRN	31.4	-34.0	57.1	46.6	6	1.00	Vert	----	54.0	----	7.4
2399.858	60.4	48.1	HRN	31.4	-34.0	57.8	45.5	182	1.00	Vert	----	54.0	----	8.5

2012/05/30 15:29:37

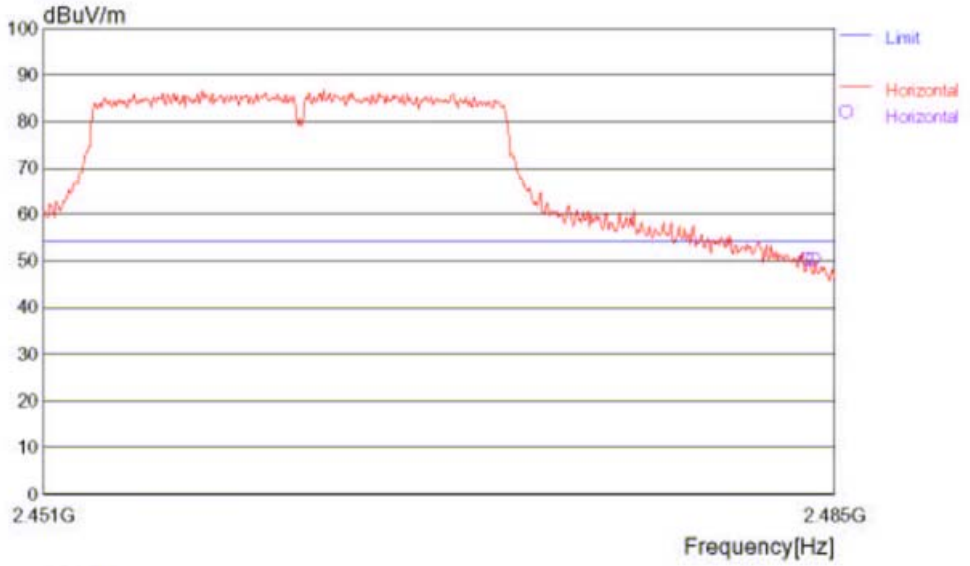
RADIATED EMISSION

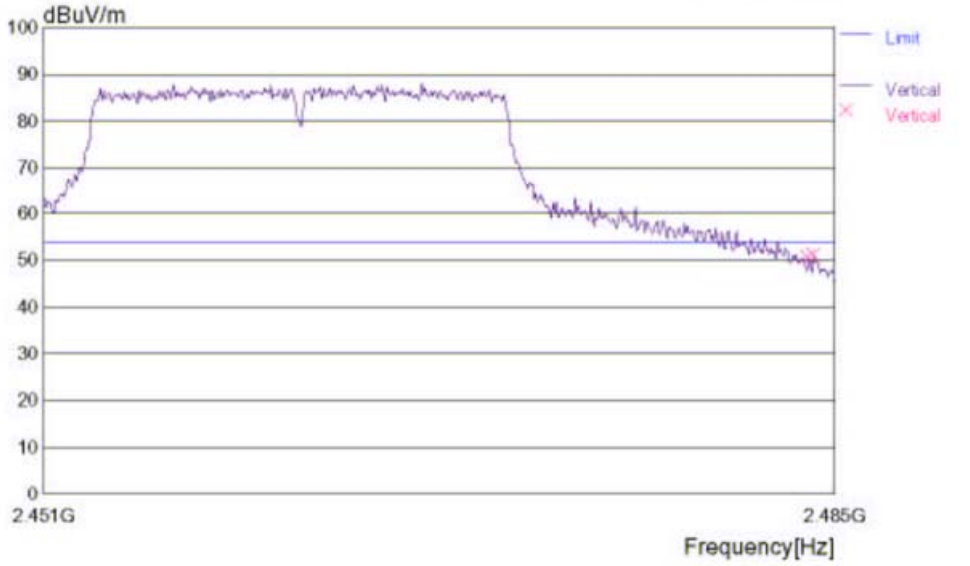
Date : 2012/05/30 15:29:31

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Elly zhang

Memo : 802.11n CH11

LIMIT : FCC Part15 C transmitter spurious above1G(average)





2012/05/30 15:29:37

RADIATED EMISSION

Date : 2012/05/30 15:29:31

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Eliy zhang

Memo : 802.11n CH11

LIMIT : FCC Part15 C transmitter spurious above1G(average)

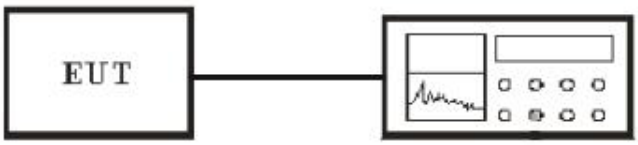
Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
2483.900	52.8	HRN	PK	31.2	-33.8	50.2	294	1.00	Hori.	54.0	3.8
2483.900	52.9	HRN	PK	31.2	-33.8	50.3	38	1.00	Vert.	54.0	3.7
2484.104	53.6	HRN	PK	31.2	-33.8	51.0	195	1.00	Vert.	54.0	3.0
2484.172	52.7	HRN	PK	31.2	-33.8	50.1	298	1.00	Hori.	54.0	3.9

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



Spectrum

Connection method: The shield cable was connected with EUT and Spectrum which have 50Ω 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 (℃) : 22~23	EUT: Kuhl Wireless Adaptor
Humidity (%RH): 50~54	M/N: 62600551
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode
Test date: May 24, 2012 to May 25,2012	Test engineer: Phenix

802.11b mode:

Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
LOW (CH 1)	2412	10.575	＞0.5
MID (CH 6)	2437	10.125	＞0.5
HIG (CH 11)	2462	10.425	＞0.5

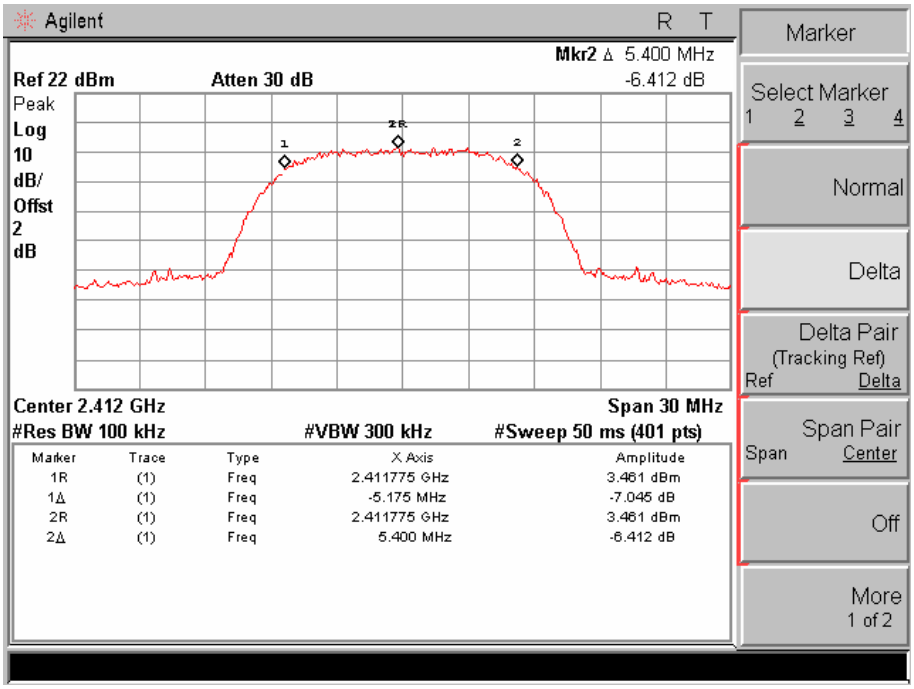
802.11g mode:

Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
LOW (CH 1)	2412	16.650	＞0.5
MID (CH 6)	2437	16.650	＞0.5
HIG (CH 11)	2462	16.650	＞0.5

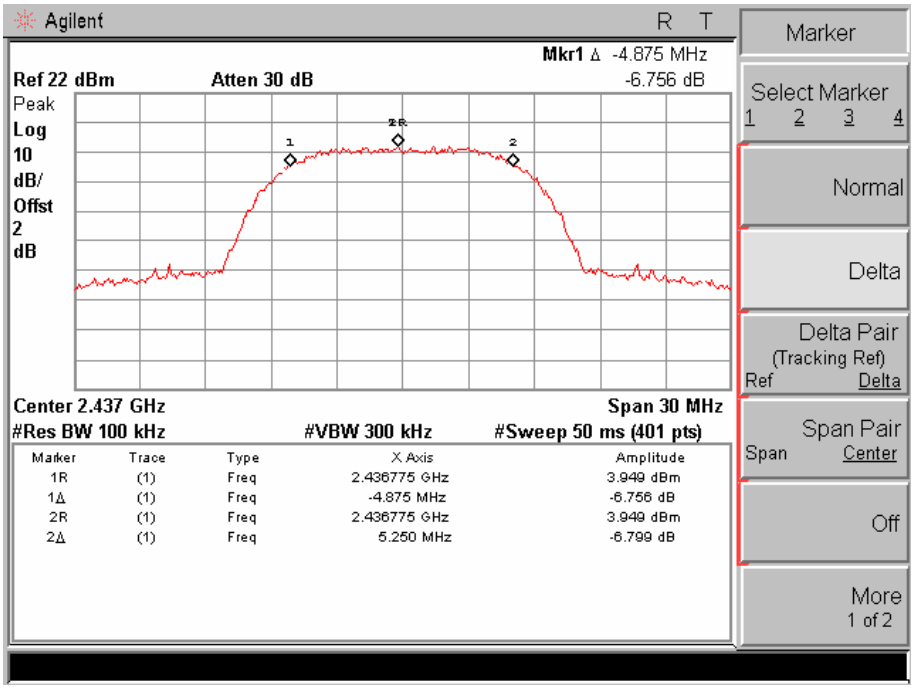
802.11n20 mode:

Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
LOW (CH 1)	2412	17.925	＞0.5
MID (CH 6)	2437	17.775	＞0.5
HIG (CH 11)	2462	17.925	＞0.5

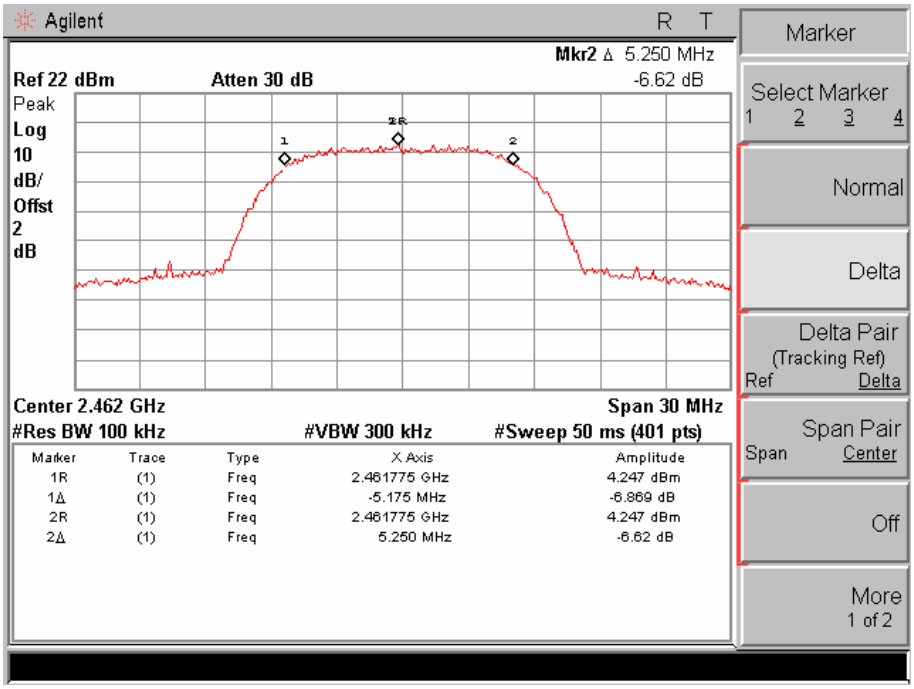
802.11b mode Plot:
Channel LOW：



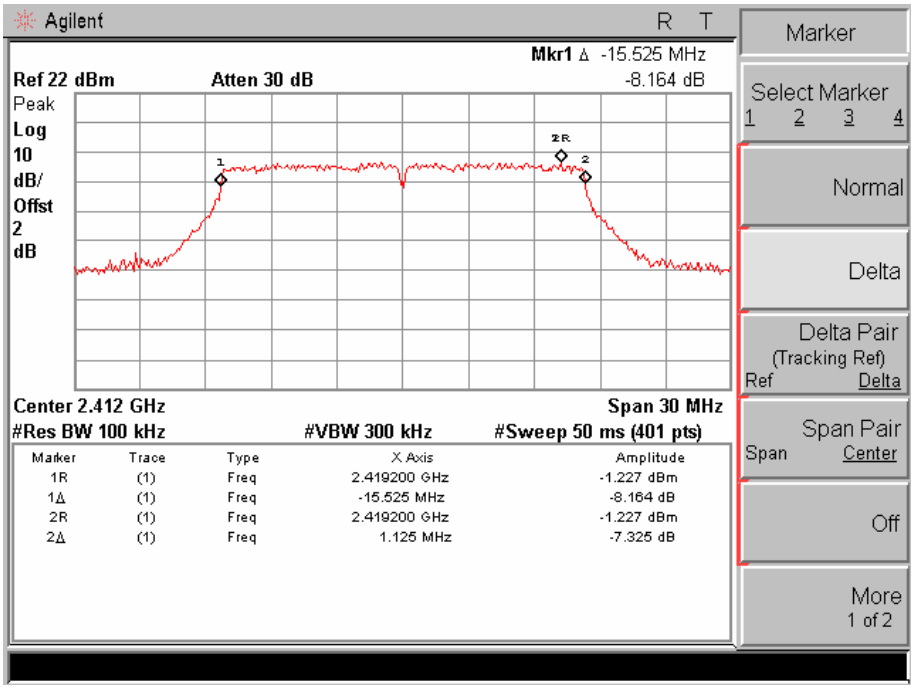
Channel MID：



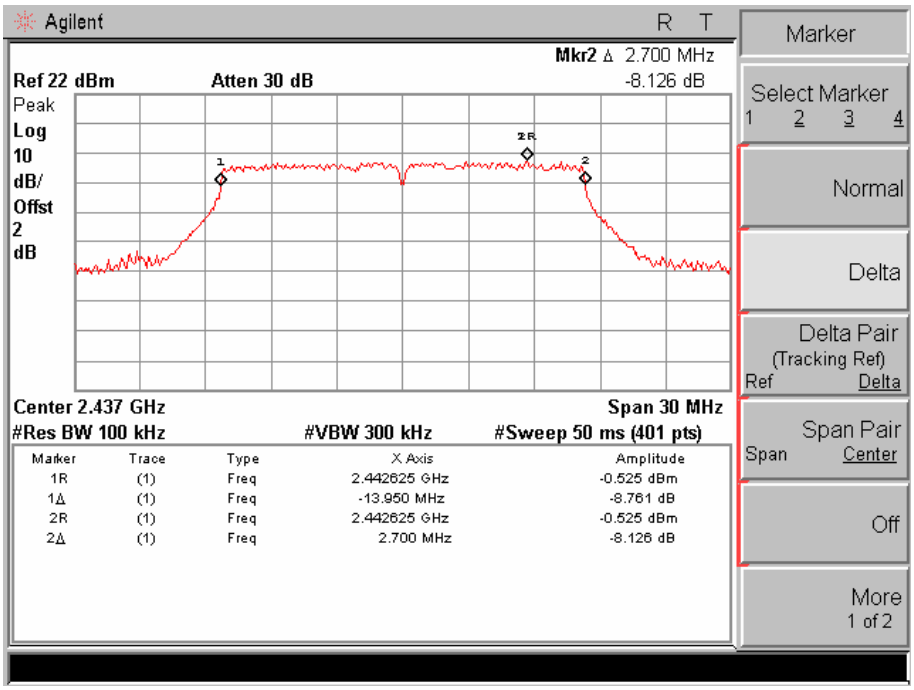
Channel HIG：



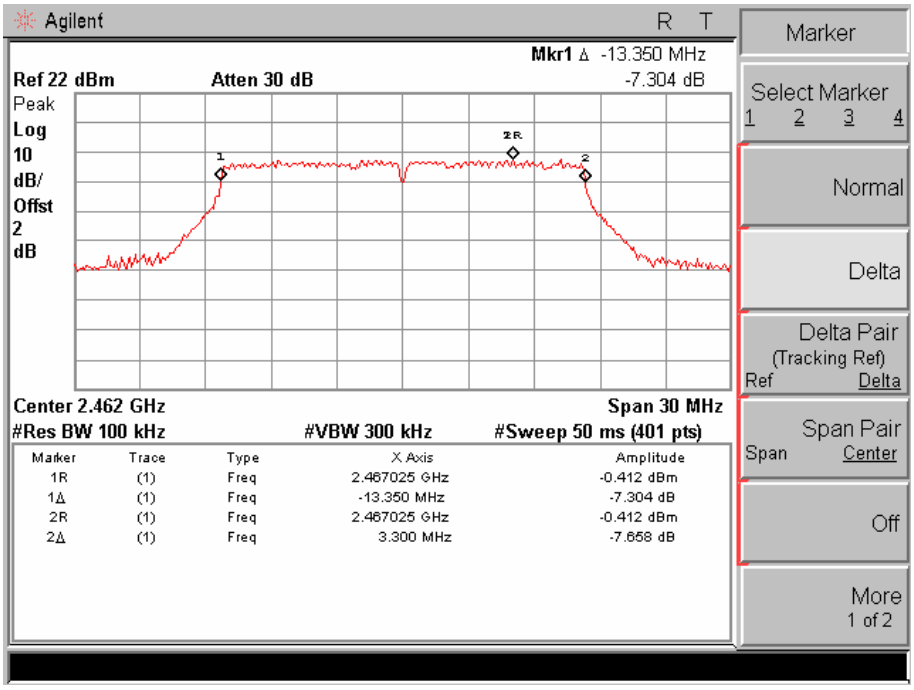
802.11g mode Plot:
Channel LOW：



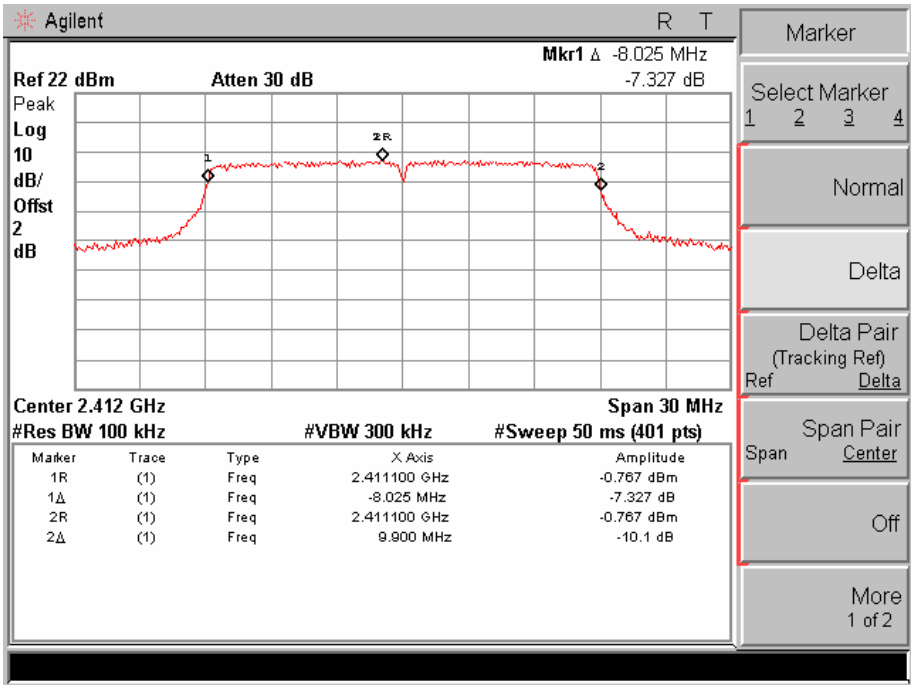
Channel MID：



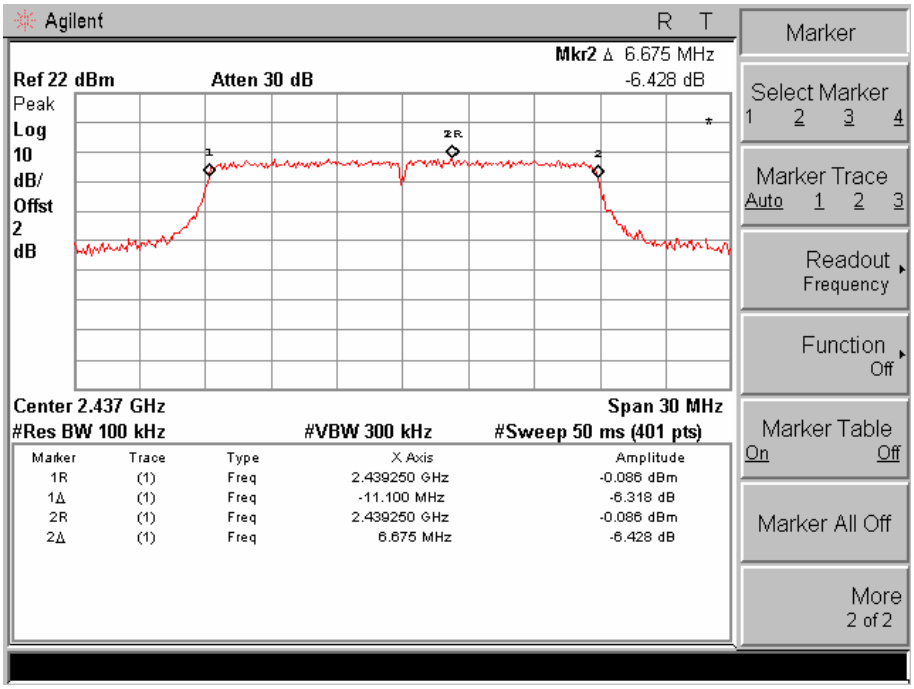
Channel HIG：



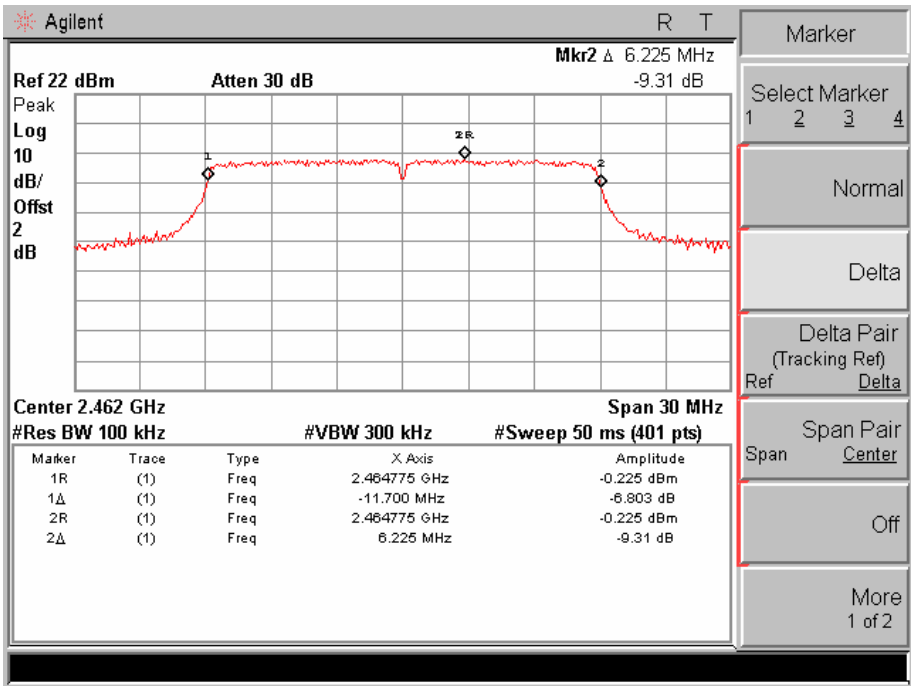
802.11n20 mode Plot:
Channel LOW：



Channel MID：



Channel HIG：

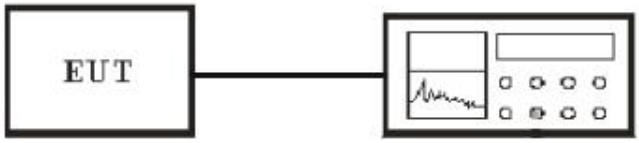

Agilent
R T
Mkr2 Δ 6.225 MHz
Ref 22 dBm
Atten 30 dB
-9.31 dB
Peak
Log
10
dB/
Offst
2
dB
Center 2.462 GHz
Span 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
#Sweep 50 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.464775 GHz -0.225 dBm
1Δ (1) Freq -11.700 MHz -6.803 dB
2R (1) Freq 2.464775 GHz -0.225 dBm
2Δ (1) Freq 6.225 MHz -9.31 dB
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

4.6 Power Spectral Density

4.6.1 Applicable Standard

According to section 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

4.6.2 Block diagram of test setup



Spectrum

Connection method: The shield cable was connected with EUT and Spectrum which have 50Ω 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

According to the KDB 558074, the measurement procedure as below:

1. The transmitter output connected to the spectrum analyzer by a shielded cable.
2. Set the RBW = 100 kHz.
3. Set the VBW = 300 kHz.
4. Set the span to 5-30 % greater than the EBW
5. Detector = peak.
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize
9. Use the peak marker function to determine the maximum power level
10. Scale the observed power level to an equivalent value in 3 kHz.

4.6.4. Result

Temperature (℃) : 22~23	EUT: Kuhl Wireless Adaptor
Humidity (%RH): 50~54	M/N: 62600551
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode
Test date: May 24, 2012 to May 25,2012	Test engineer: Phenix

802.11b mode:

Channel No.	Frequency (MHz)	Power Spectral Density (dBm)	bandwidth correction factor (BWCF)	Result (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	3.461	-15.2	-11.739	8	19.739
MID (CH 6)	2437	3.949	-15.2	-11.251	8	19.251
HIG (CH 11)	2462	4.247	-15.2	-10.953	8	18.953

802.11g mode:

Channel No.	Frequency (MHz)	Power Spectral Density (dBm)	bandwidth correction factor (BWCF)	Result (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	-1.227	-15.2	-16.427	8	24.427
MID (CH 6)	2437	-0.525	-15.2	-15.725	8	23.725
HIG (CH 11)	2462	-0.412	-15.2	-15.612	8	23.612

802.11n20 mode:

Channel No.	Frequency (MHz)	Power Spectral Density (dBm)	bandwidth correction factor (BWCF)	Result (dBm)	Limits (dBm)	Margin (dB)
LOW (CH 1)	2412	-0.767	-15.2	-15.967	8	23.967
MID (CH 6)	2437	-0.086	-15.2	-15.286	8	23.286
HIG (CH 11)	2462	-0.225	-15.2	-15.425	8	23.425

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:

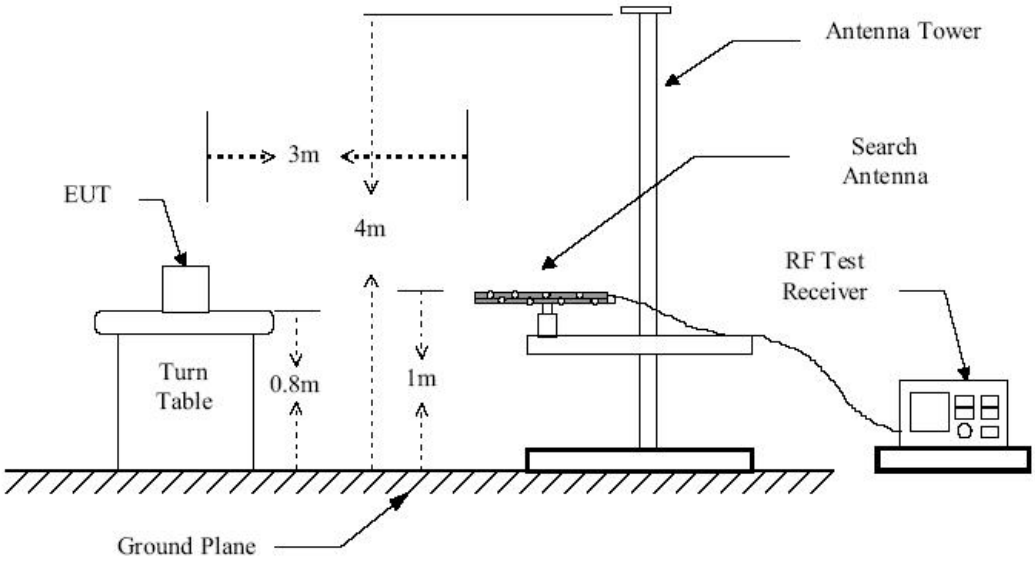


Figure 1 : Frequencies measured below 1 GHz configuration

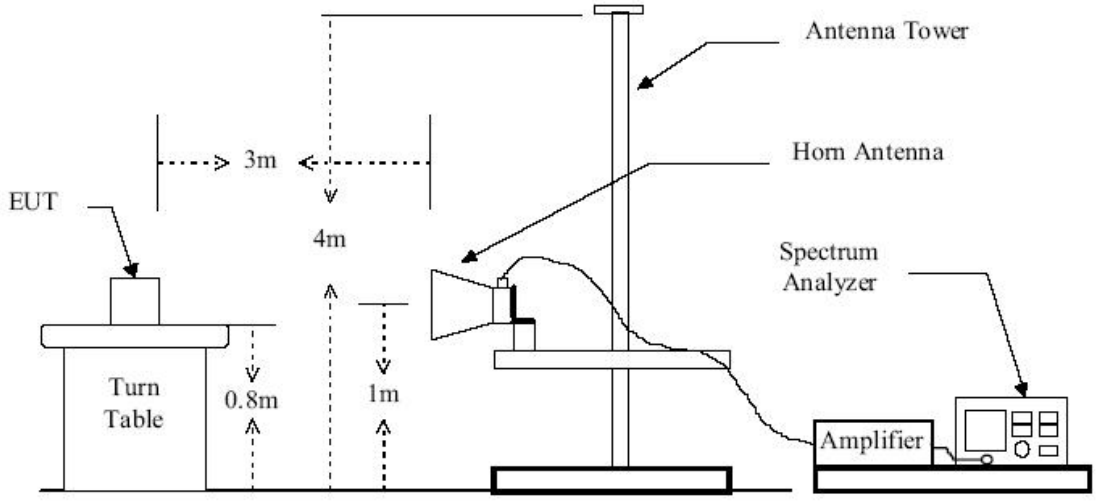
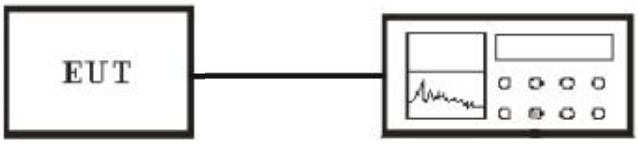


Figure 2 : Frequencies measured above 1 GHz configuration

Conducted Measurement Setup:



Spectrum

Connection method: The shield cable was connected with EUT and Spectrum which have 50Ω 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

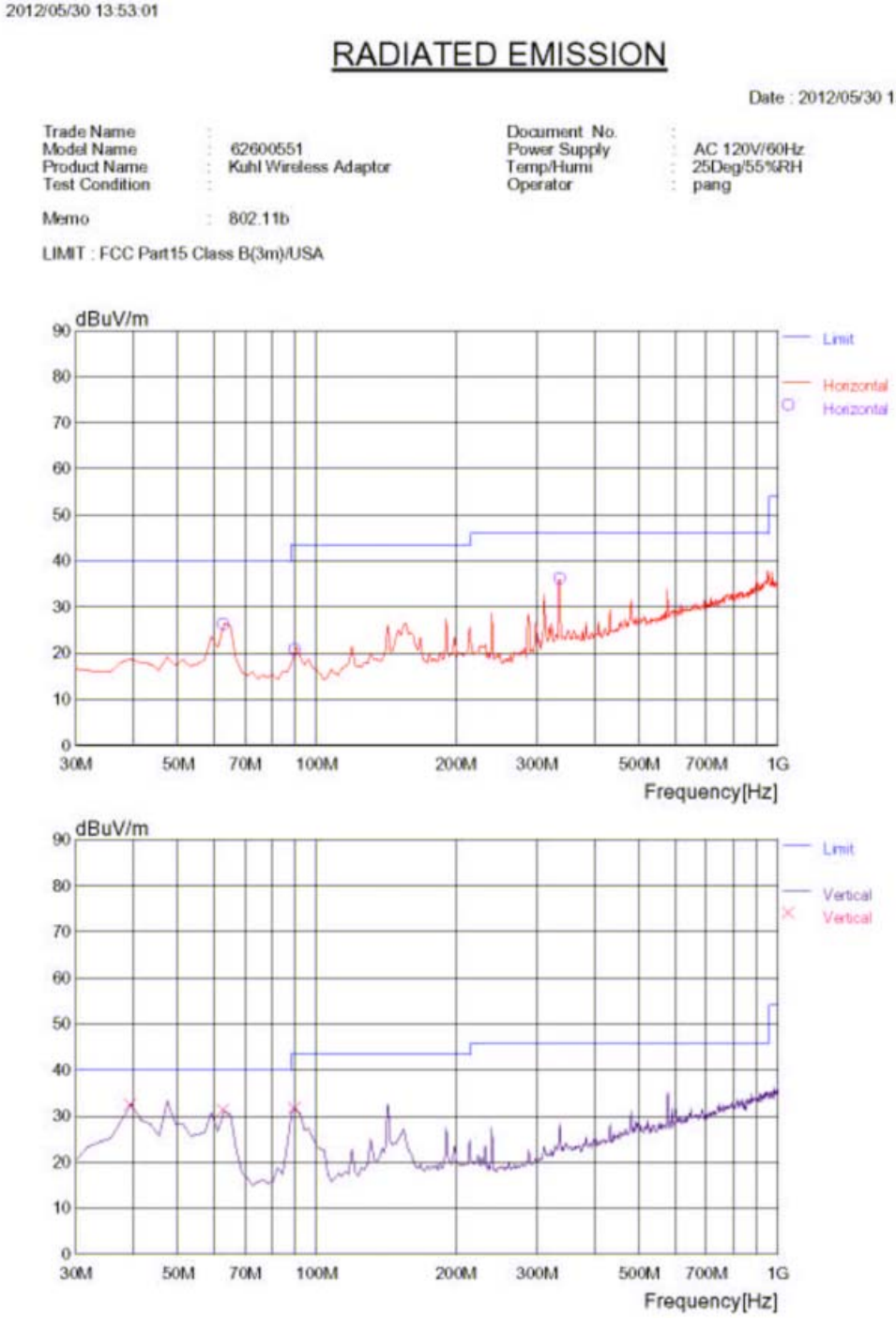
Radiated:

Below 30MHz:

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

30M- 1GHz:

802.11b mode:



2012/05/30 13:53:01

RADIATED EMISSION

Date : 2012/05/30 13:52:18

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	25Deg/55%RH
Test Condition	:		Operator	:	pang

Memo : 802.11b

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]	COMMENT
--- Horizontal ---											
1	63.046	40.4	10.6	6.9	31.6	26.3	40	13.7	200	143	
2	90.261	36.6	8.7	7.0	31.6	20.7	43.5	22.8	200	127	
3	337.134	43.1	15.6	8.8	31.6	35.9	46	10.1	100	90	
--- Vertical ---											
4	39.719	45.9	11.3	6.9	31.6	32.5	40	7.5	100	4	
5	63.046	45.0	10.6	7.0	31.6	31.0	40	9.0	100	66	
6	90.261	47.1	8.7	7.4	31.6	31.6	43.5	11.9	100	236	

802.11g mode:

2012/05/09 04:21:19

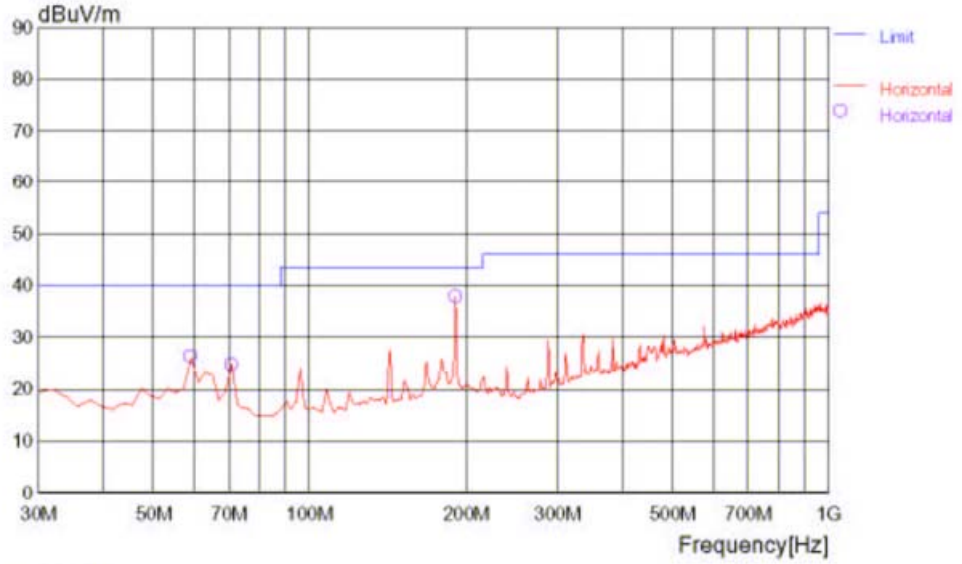
RADIATED EMISSION

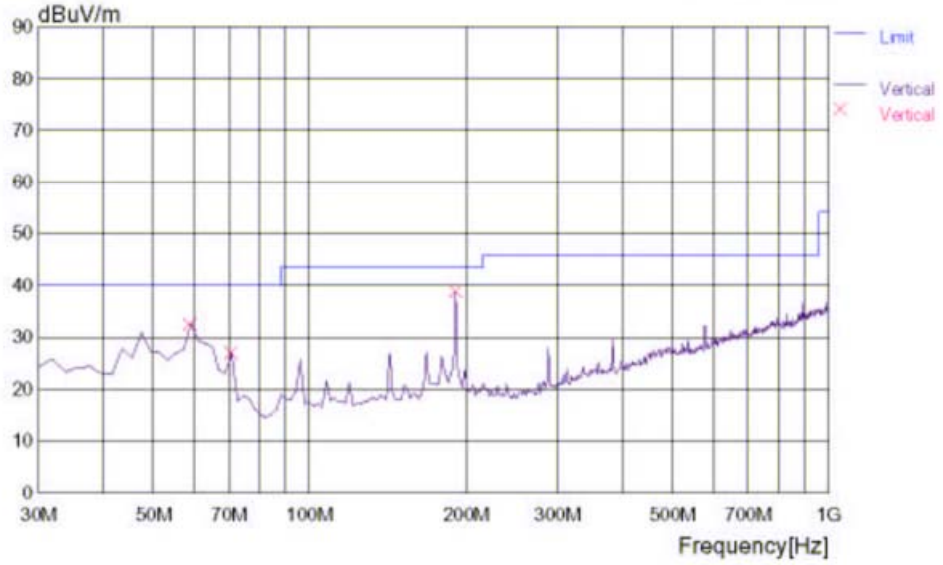
Date : 2012/05/09 04:20:56

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: pang

Memo : 802.11g

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





2012/05/09 04:21:19

RADIATED EMISSION

Date : 2012/05/09 04:20:56

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	pang

Memo : 802.11g

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]	COMMENT
--- Horizontal ---											
1	59.158	39.8	10.8	7.0	31.6	26.0	40	14.0	400	147	
2	70.822	39.0	10.1	7.2	31.6	24.7	40	15.3	300	135	
3	191.343	49.4	13.0	8.0	31.6	37.8	43.5	5.7	200	106	
--- Vertical ---											
4	59.158	46.3	10.8	7.0	31.6	32.5	40	7.5	100	3	
5	70.822	41.1	10.1	7.2	31.6	26.8	40	13.2	100	52	
6	191.343	49.4	13.0	8.0	31.6	38.8	43.5	4.7	100	0	

802.11n20 mode:

2012/05/30 13:56:51

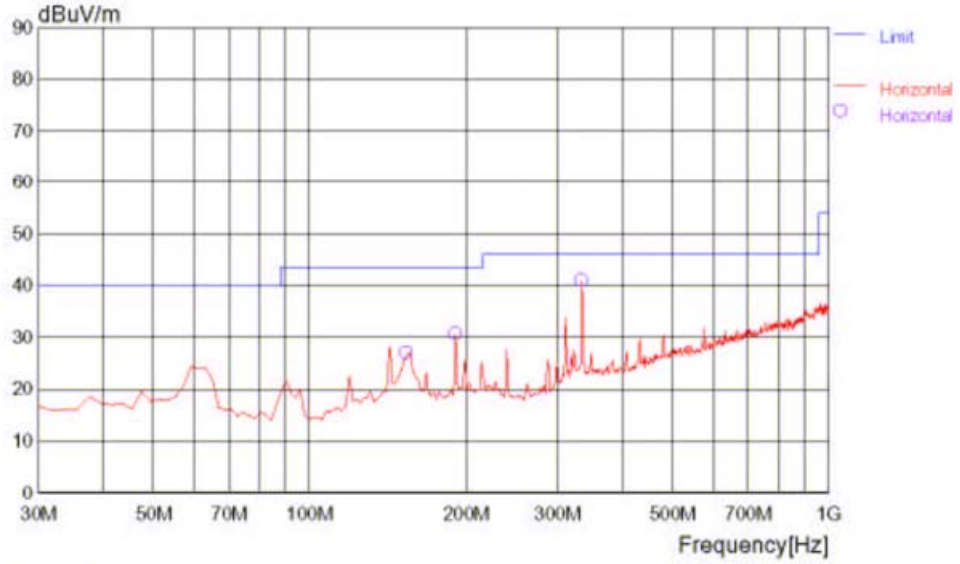
RADIATED EMISSION

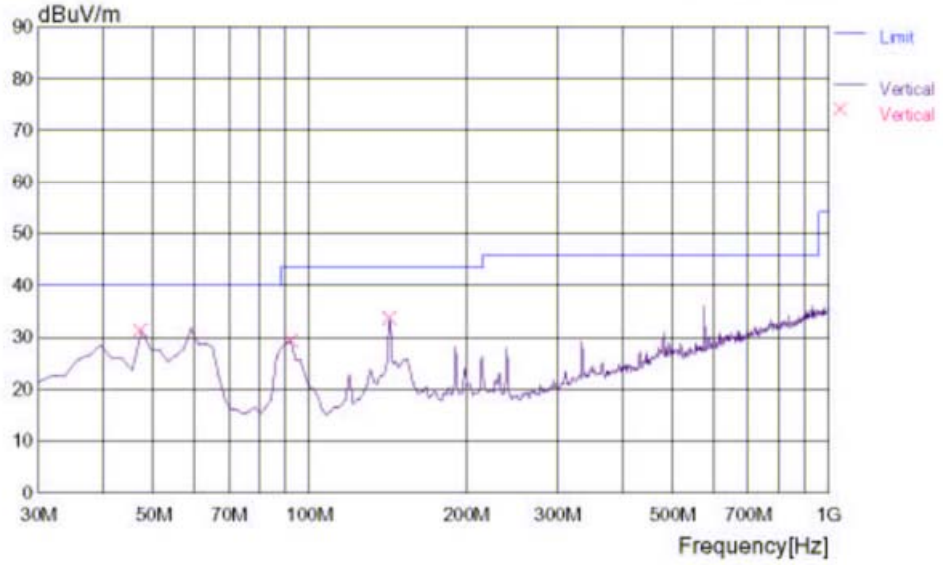
Date : 2012/05/30 13:56:31

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 25Deg/55%RH
Test Condition	:	Operator	: pang

Memo : 802.11n

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





2012/05/30 13:56:51

RADIATED EMISSION

Date : 2012/05/30 13:56:31

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	25Deg/55%RH
Test Condition	:		Operator	:	pang

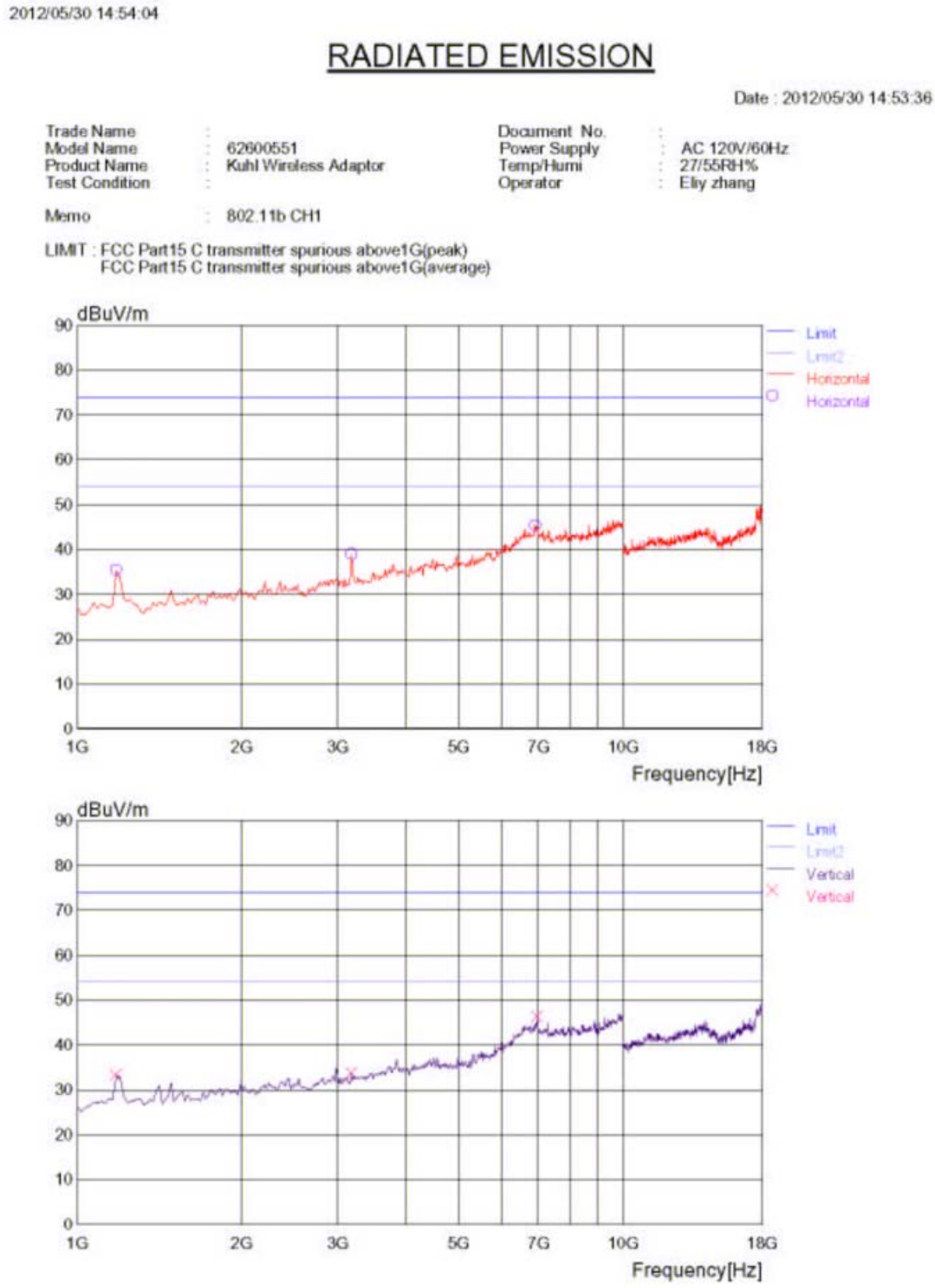
Memo : 802.11n

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]	COMMENT
--- Horizontal ---											
1	154.409	39.0	11.7	7.8	31.6	26.9	43.5	16.6	200	275	
2	191.343	41.0	13.0	8.0	31.6	30.4	43.5	13.1	200	114	
3	335.190	49.1	15.5	8.8	31.6	40.8	46	5.2	100	94	
--- Vertical ---											
4	47.495	44.9	11.0	6.9	31.6	31.2	40	8.8	100	34	
5	92.204	45.0	8.4	7.4	31.6	29.2	43.5	14.3	100	124	
6	142.746	45.8	11.5	7.7	31.6	33.4	43.5	10.1	100	232	

Above 1GHz:

802.11b mode Channel Low:



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

2012/05/30 14:54:04

RADIATED EMISSION

Date : 2012/05/30 14:53:36

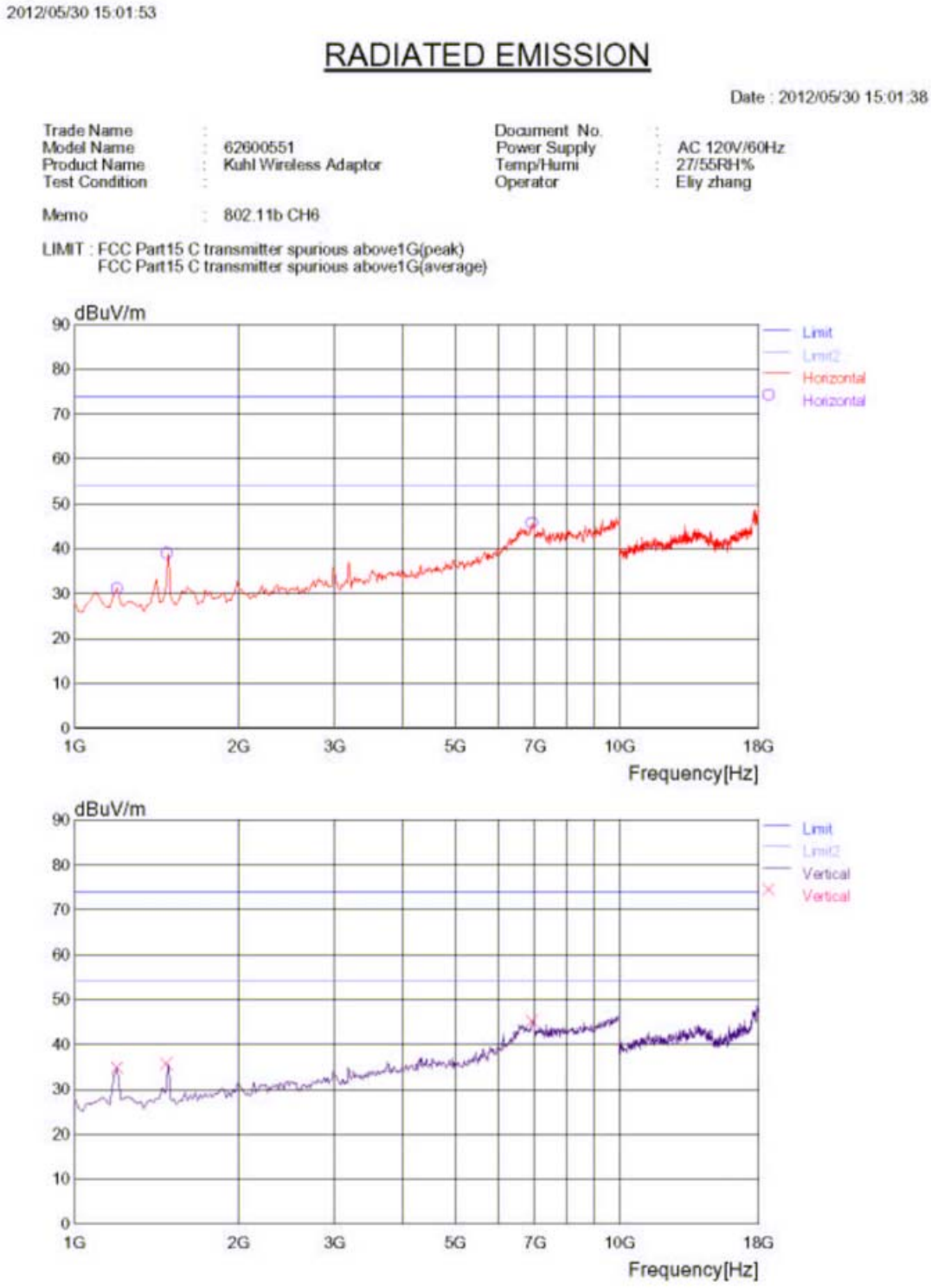
Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang

Memo : 802.11b CH1

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1180.361	43.7	HRN	PK	28.2	-36.7	35.2	105	1.00	Hori.	74.0	38.8
1180.361	41.6	HRN	PK	28.2	-36.7	33.1	308	1.00	Vert.	74.0	40.9
3182.372	38.4	HRN	PK	33.2	-32.8	38.8	169	1.00	Hori.	74.0	35.2
3182.372	33.2	HRN	PK	33.2	-32.8	33.6	119	1.00	Vert.	74.0	40.4
6951.923	33.9	HRN	PK	40.9	-29.7	45.1	77	1.00	Hori.	74.0	28.9
6987.996	34.7	HRN	PK	41.0	-29.6	46.1	226	1.00	Vert.	74.0	27.9

802.11b mode Channel Mid:



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

2012/05/30 15:01:53

RADIATED EMISSION

Date : 2012/05/30 15:01:38

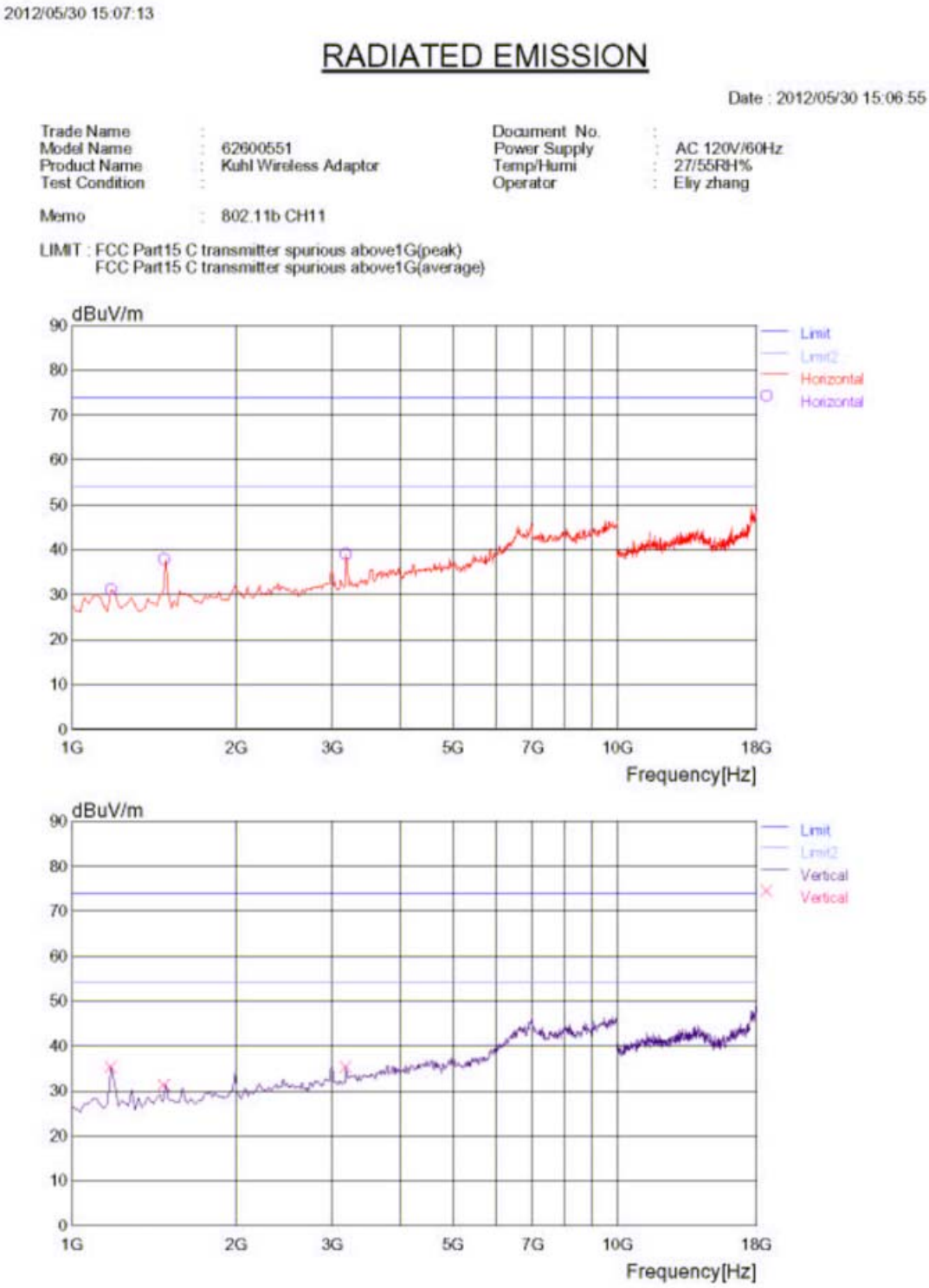
Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang

Memo : 802.11b CH6

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1198.397	39.5	HRN	PK	28.3	-36.7	31.1	334	1.00	Hori.	74.0	42.9
1198.397	43.1	HRN	PK	28.3	-36.7	34.7	113	1.00	Vert.	74.0	39.3
1486.975	45.7	HRN	PK	28.9	-35.9	38.7	14	1.00	Hori.	74.0	35.3
1486.975	42.5	HRN	PK	28.9	-35.9	35.5	216	1.00	Vert.	74.0	38.5
6915.851	34.8	HRN	PK	40.7	-29.8	45.7	220	1.00	Hori.	74.0	28.3
6951.923	33.8	HRN	PK	40.9	-29.7	45.0	80	1.00	Vert.	74.0	29.0

802.11b mode Channel High:



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

2012/05/30 15:07:13

RADIATED EMISSION

Date : 2012/05/30 15:06:55

Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang

Memo : 802.11b CH11

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1180.361	39.5	HRN	PK	28.2	-36.7	31.0	210	1.00	Hori.	74.0	43.0
1180.361	43.6	HRN	PK	28.2	-36.7	35.1	138	1.00	Vert.	74.0	38.9
1486.975	44.6	HRN	PK	28.9	-35.9	37.6	13	1.00	Hori.	74.0	36.4
1486.975	38.3	HRN	PK	28.9	-35.9	31.3	290	1.00	Vert.	74.0	42.7
3182.372	34.6	HRN	PK	33.2	-32.8	35.0	172	1.00	Vert.	74.0	39.0
3182.372	38.3	HRN	PK	33.2	-32.8	38.7	50	1.00	Hori.	74.0	35.3

802.11g mode Channel Low:

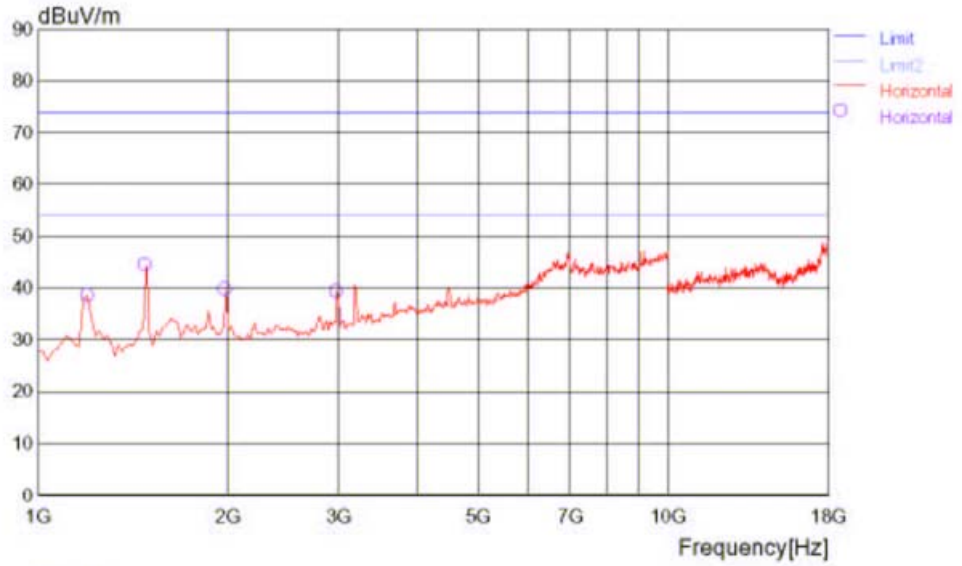
2012/05/09 04:54:06

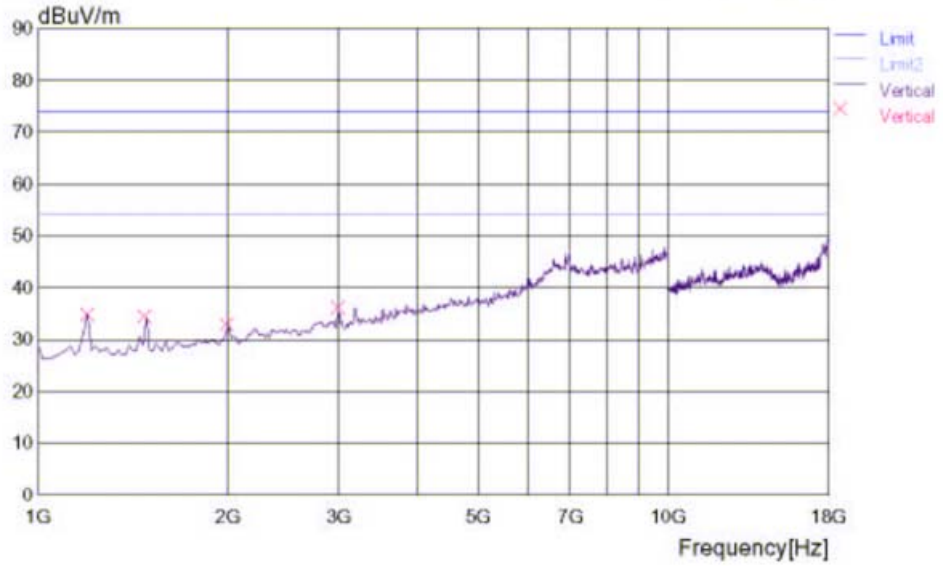
RADIATED EMISSION

Date : 2012/05/09 04:53:59

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH1	Operator	: Elly zhang
Memo	: 802.11g		

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





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

2012/05/09 04:54:06

RADIATED EMISSION

Date : 2012/05/09 04:53:59

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH1	Operator	: Eliy zhang

Memo : 802.11g

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1198.397	46.8	HRN	PK	28.3	-36.7	38.4	79	2.00	Hori.	74.0	35.6
1198.397	43.3	HRN	PK	28.3	-36.7	34.9	133	1.00	Vert.	74.0	39.1
1486.975	51.2	HRN	PK	28.9	-35.9	44.2	348	3.00	Hori.	74.0	29.8
1486.975	41.2	HRN	PK	28.9	-35.9	34.2	203	1.00	Vert.	74.0	39.8
1991.987	44.1	HRN	PK	30.0	-34.6	39.5	2	2.00	Hori.	74.0	34.5
2010.023	37.3	HRN	PK	30.1	-34.6	32.8	3	1.00	Vert.	74.0	41.2
2983.974	40.0	HRN	PK	32.3	-33.0	39.3	310	2.00	Hori.	74.0	34.7
3002.010	36.6	HRN	PK	32.3	-33.0	35.9	91	1.00	Vert.	74.0	38.1

802.11g mode Channel Mid:

2012/05/09 05:09:45

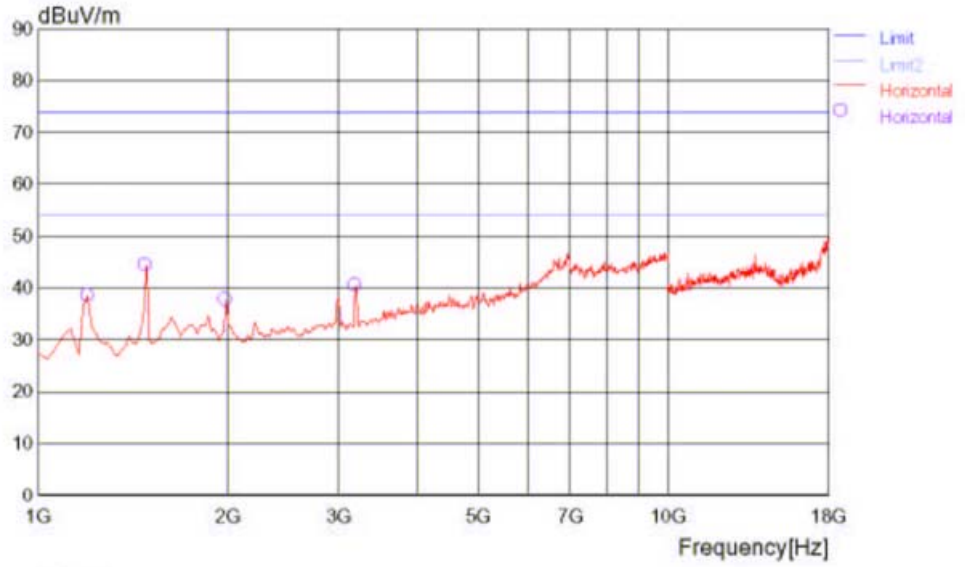
RADIATED EMISSION

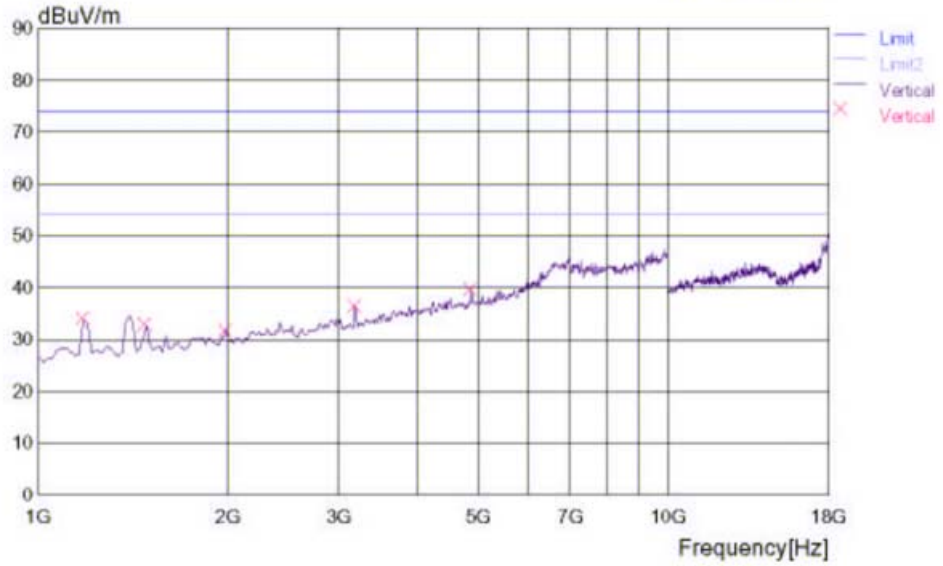
Date : 2012/05/09 05:09:26

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH6	Operator	: Eliy zhang

Memo : 802.11g

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





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

2012/05/09 05:09:45

RADIATED EMISSION

Date : 2012/05/09 05:09:26

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH6	Operator	: Eliy zhang

Memo : 802.11g

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1180.361	42.3	HRN	PK	28.2	-36.7	33.8	135	1.00	Vert.	74.0	40.2
1198.397	46.7	HRN	PK	28.3	-36.7	38.3	30	3.00	Hori.	74.0	35.7
1486.975	51.3	HRN	PK	28.9	-35.9	44.3	18	1.00	Hori.	74.0	29.7
1486.975	39.6	HRN	PK	28.9	-35.9	32.6	205	1.00	Vert.	74.0	41.4
1991.987	42.3	HRN	PK	30.0	-34.6	37.7	0	1.00	Hori.	74.0	36.3
1991.987	36.2	HRN	PK	30.0	-34.6	31.6	201	1.00	Vert.	74.0	42.4
3182.372	36.0	HRN	PK	33.2	-32.8	36.4	36	1.00	Vert.	74.0	37.6
3200.408	39.8	HRN	PK	33.3	-32.7	40.4	59	1.00	Hori.	74.0	33.6
4877.768	34.3	HRN	PK	36.5	-31.2	39.6	185	1.00	Vert.	74.0	34.4

802.11g mode Channel High:

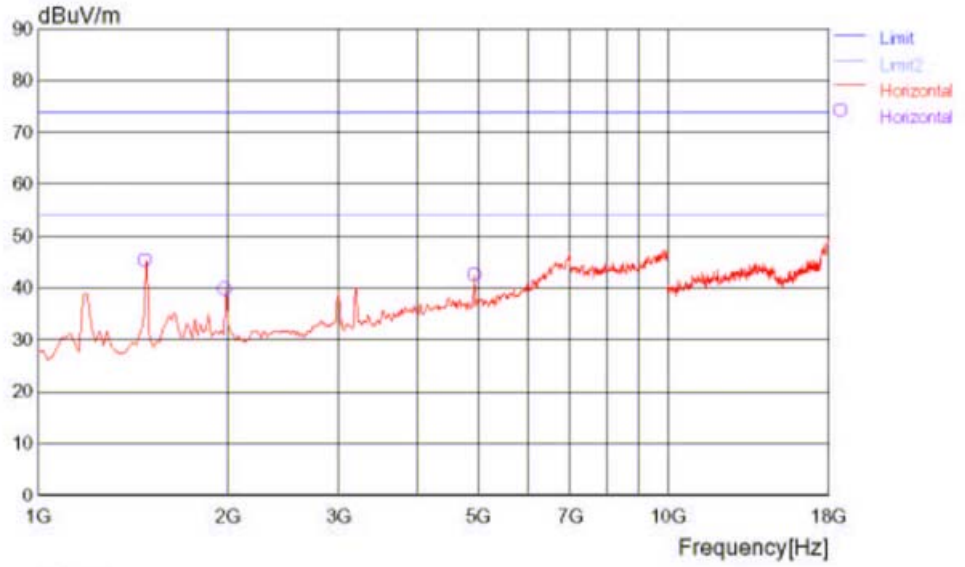
2012/05/09 05:22:10

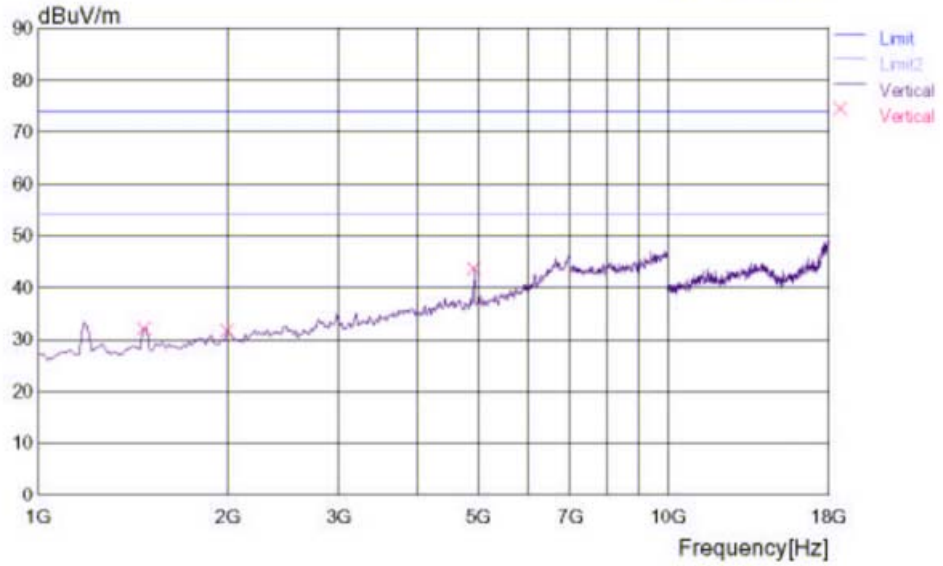
RADIATED EMISSION

Date : 2012/05/09 05:22:03

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH11	Operator	: Elly zhang
Memo	: 802.11g		

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





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

2012/05/09 05:22:10

RADIATED EMISSION

Date : 2012/05/09 05:22:03

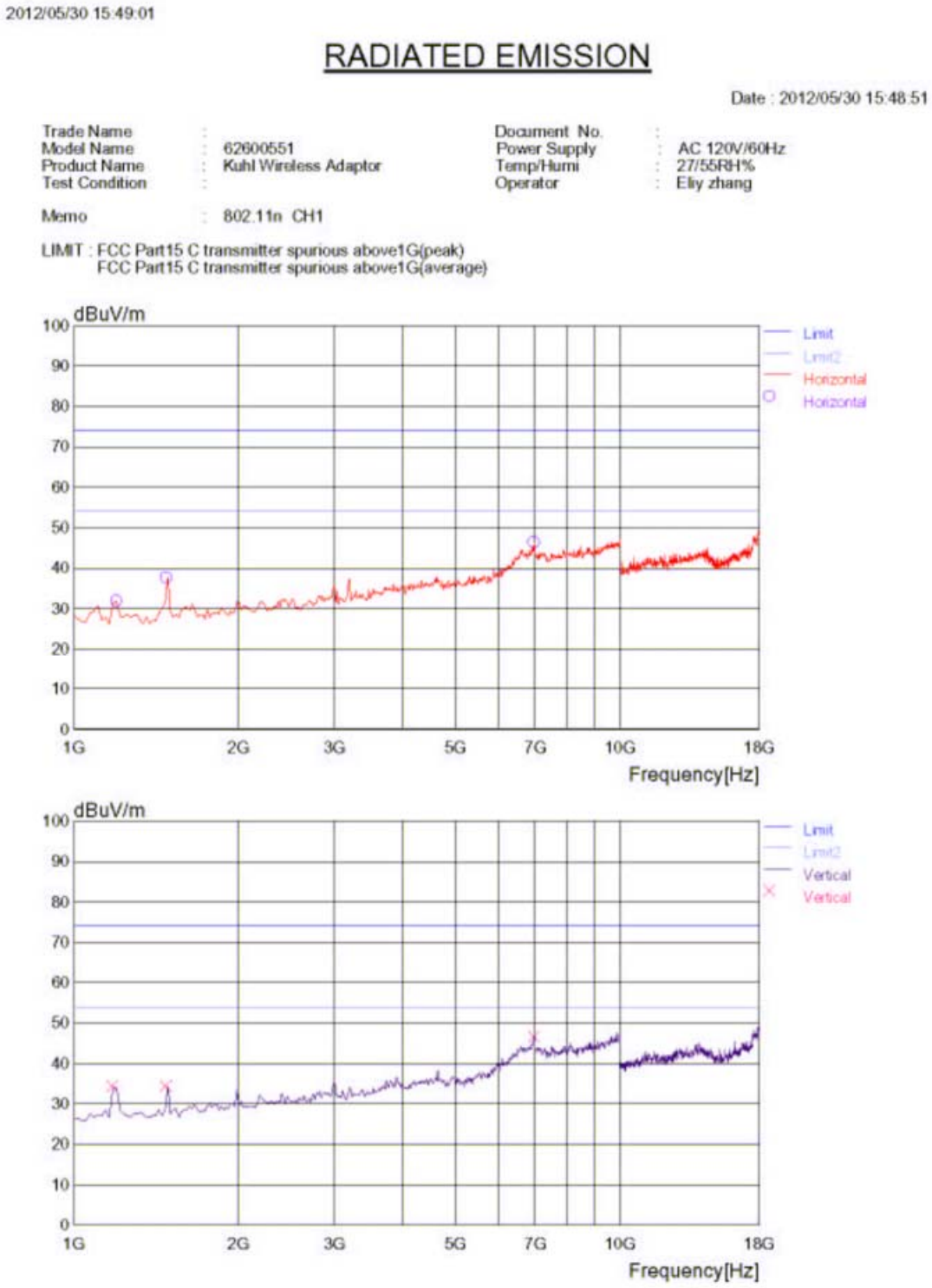
Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	: CH11	Operator	: Eliy zhang

Memo : 802.11g

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1486.975	52.3	HRN	PK	28.9	-35.9	45.3	11	2.00	Hori.	74.0	28.7
1486.975	39.0	HRN	PK	28.9	-35.9	32.0	210	1.00	Vert.	74.0	42.0
1991.987	44.2	HRN	PK	30.0	-34.6	39.6	359	1.00	Hori.	74.0	34.4
2010.023	36.0	HRN	PK	30.1	-34.6	31.5	4	1.00	Vert.	74.0	42.5
4931.876	36.9	HRN	PK	36.6	-31.2	42.3	145	1.00	Hori.	74.0	31.7
4931.876	38.0	HRN	PK	36.6	-31.2	43.4	322	1.99	Vert.	74.0	30.6

802.11n20 mode, Channel Low:



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

2012/05/30 15:49:01

RADIATED EMISSION

Date : 2012/05/30 15:48:51

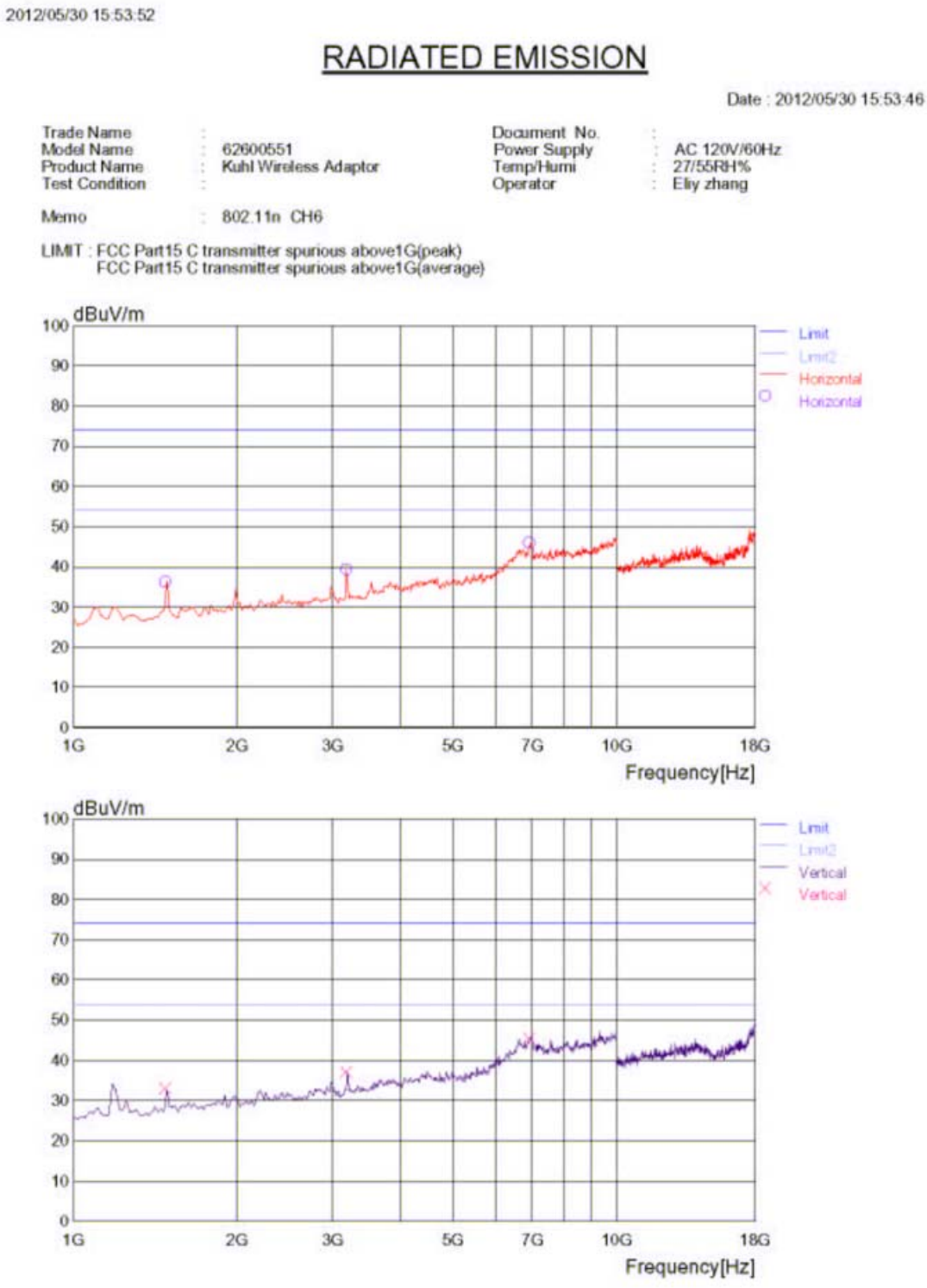
Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang

Memo : 802.11n CH1

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1180.361	42.5	HRN	PK	28.2	-36.7	34.0	314	1.00	Vert.	74.0	40.0
1198.397	40.1	HRN	PK	28.3	-36.7	31.7	6	1.00	Hori.	74.0	42.3
1486.975	44.5	HRN	PK	28.9	-35.9	37.5	22	1.00	Hori.	74.0	36.5
1486.975	41.1	HRN	PK	28.9	-35.9	34.1	186	1.00	Vert.	74.0	39.9
6969.959	35.3	HRN	PK	40.9	-29.7	46.5	344	1.00	Vert.	74.0	27.5
6987.996	34.9	HRN	PK	41.0	-29.6	46.3	341	1.00	Hori.	74.0	27.7

802.11n20 mode, Channel Mid:



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

2012/05/30 15:53:52

RADIATED EMISSION

Date : 2012/05/30 15:53:46

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Eliy zhang

Memo : 802.11n CH6

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

Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1486.975	43.3	HRN	PK	28.9	-35.9	36.3	10	1.00	Hori.	74.0	37.7
1486.975	39.7	HRN	PK	28.9	-35.9	32.7	224	1.00	Vert.	74.0	41.3
3182.372	38.8	HRN	PK	33.2	-32.8	39.2	334	1.00	Hori.	74.0	34.8
3200.408	36.2	HRN	PK	33.3	-32.7	36.8	51	1.00	Vert.	74.0	37.2
6951.923	34.6	HRN	PK	40.9	-29.7	45.8	215	1.00	Hori.	74.0	28.2
6951.923	33.9	HRN	PK	40.9	-29.7	45.1	14	1.00	Vert.	74.0	28.9

802.11n20 mode, Channel High:

2012/05/30 15:59:03

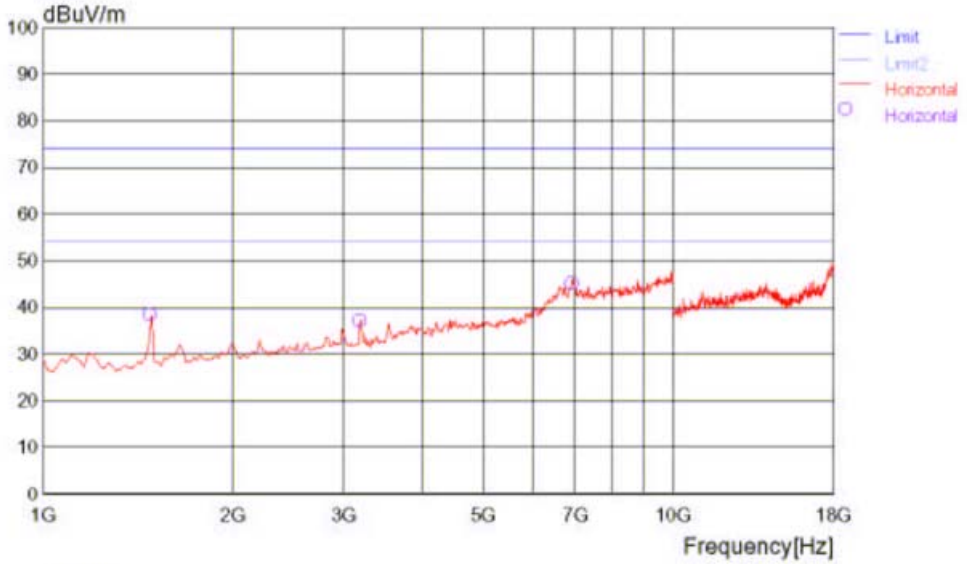
RADIATED EMISSION

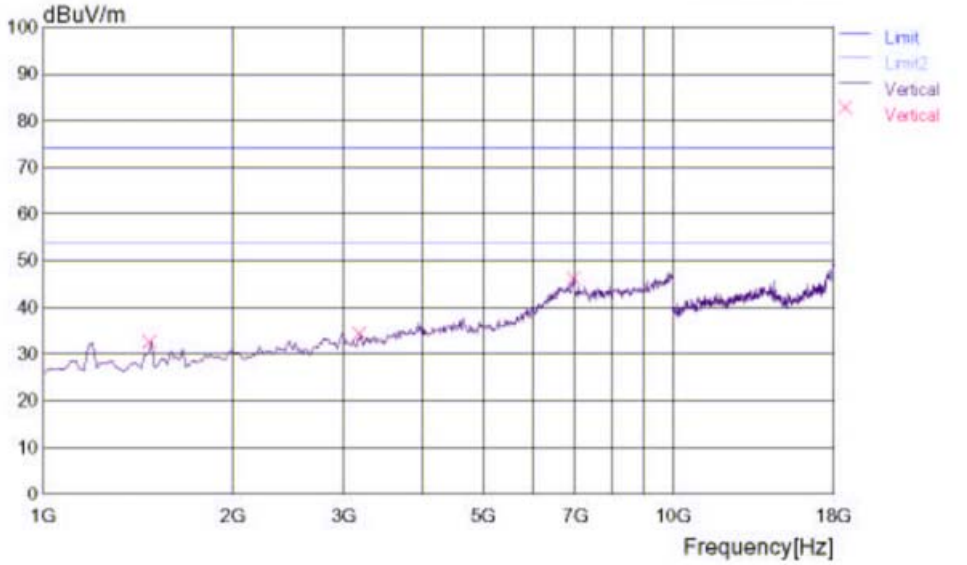
Date : 2012/05/30 15:58:54

Trade Name	:	Document No.	:
Model Name	: 62600551	Power Supply	: AC 120V/60Hz
Product Name	: Kuhl Wireless Adaptor	Temp/Humi	: 27/55RH%
Test Condition	:	Operator	: Elly zhang

Memo : 802.11n CH11

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





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

2012/05/30 15:59:03

RADIATED EMISSION

Date : 2012/05/30 15:58:54

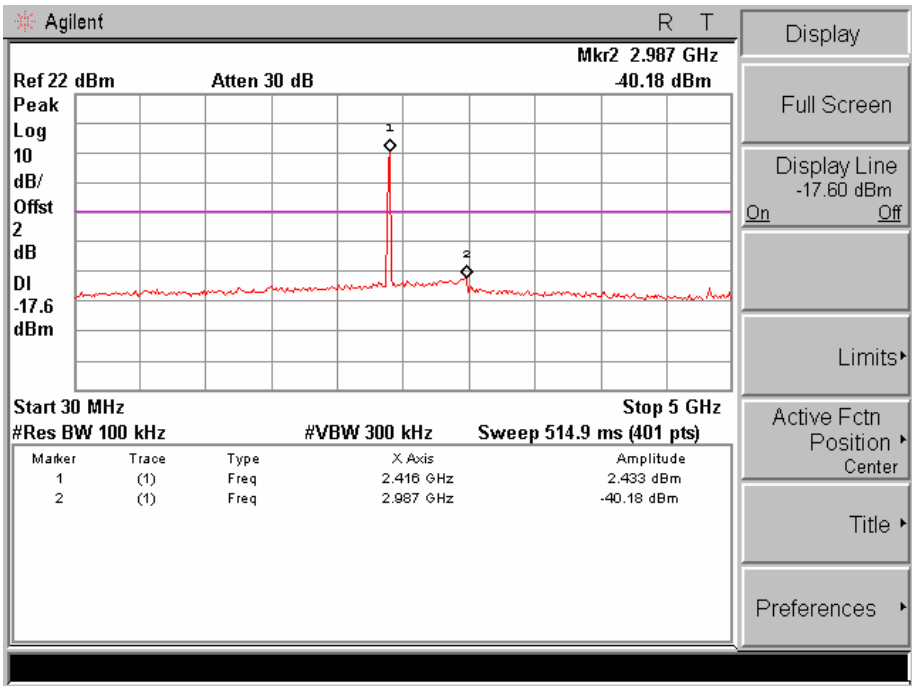
Trade Name	:		Document No.	:	
Model Name	:	62600551	Power Supply	:	AC 120V/60Hz
Product Name	:	Kuhl Wireless Adaptor	Temp/Humi	:	27/55RH%
Test Condition	:		Operator	:	Eliy zhang

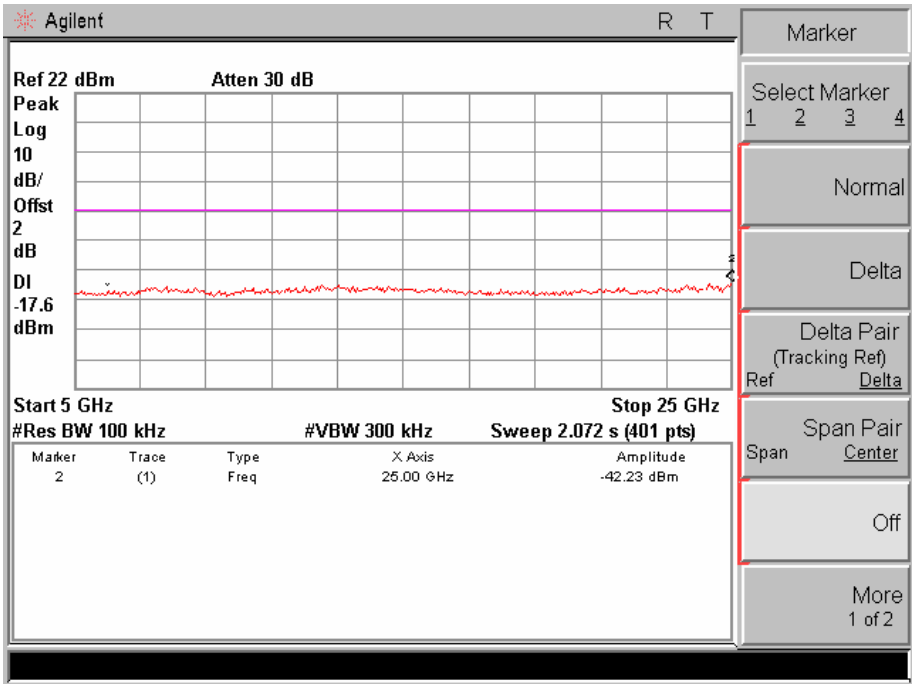
Memo : 802.11n CH11

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

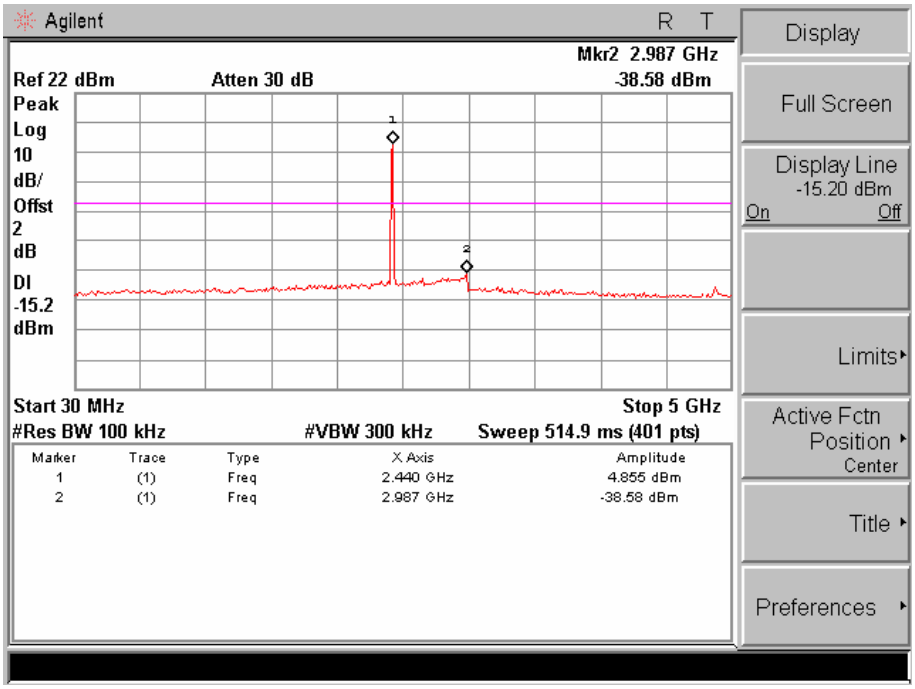
Frequency [MHz]	Meter (PK) [dBuV]	Ant. Type	Detector	Antenna Factor [dB/m]	Total Loss [dB]	Level (PK) [dBuV/m]	Angle [degree]	Height [m]	Pola.	Limit [dBuV/m]	Margin [dB]
1486.975	45.2	HRN	PK	28.9	-35.9	38.2	76	1.00	Hori.	74.0	35.8
1486.975	39.6	HRN	PK	28.9	-35.9	32.6	319	1.00	Vert.	74.0	41.4
3200.408	36.6	HRN	PK	33.3	-32.7	37.2	50	1.00	Hori.	74.0	36.8
3200.408	33.6	HRN	PK	33.3	-32.7	34.2	270	1.00	Vert.	74.0	39.8
6951.923	33.7	HRN	PK	40.9	-29.7	44.9	358	1.00	Hori.	74.0	29.1
6987.996	34.8	HRN	PK	41.0	-29.6	46.2	253	1.00	Vert.	74.0	27.8

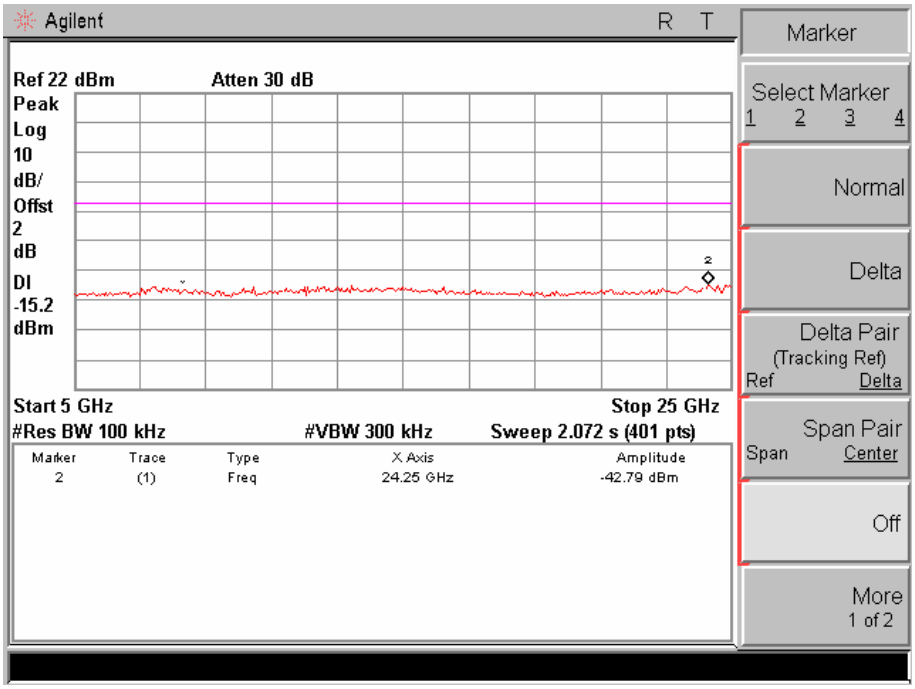
Conducted:
802.11b mode Channel LOW：



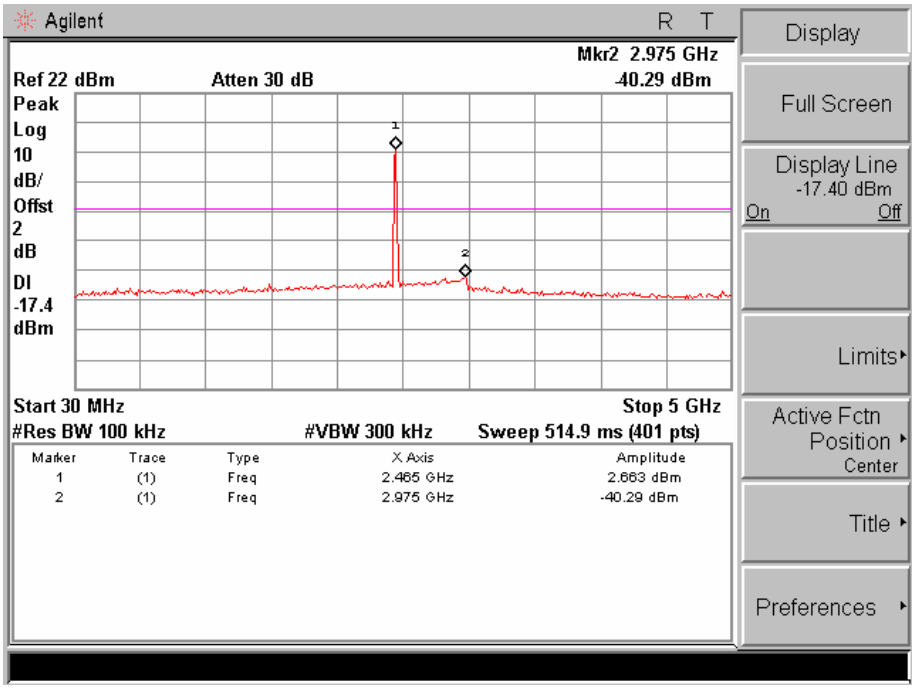


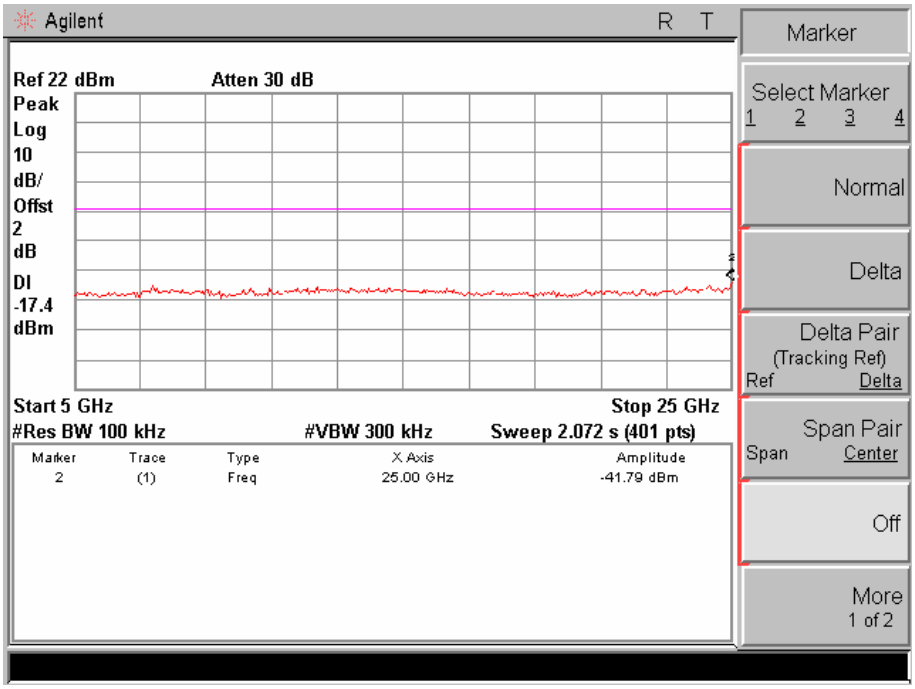
Channel MID：


Agilent
R T
Mkr2 2.987 GHz
Ref 22 dBm
Atten 30 dB
-38.58 dBm
Peak
Log
10
dB/
Offst
2
dB
Dl
-15.2
dBm
Start 30 MHz
Stop 5 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 514.9 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.440 GHz 4.855 dBm
2 (1) Freq 2.987 GHz -38.58 dBm
Display
Full Screen
Display Line
-15.20 dBm
On Off
Limits
Active Fctn
Position
Center
Title
Preferences

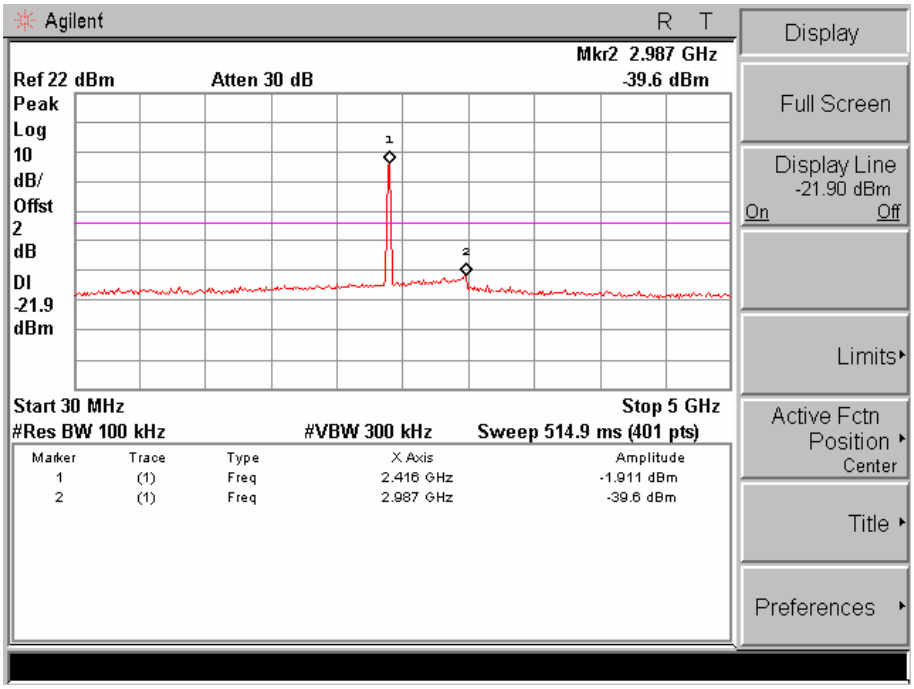

Agilent
R T
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-15.2
dBm
Start 5 GHz
Stop 25 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.072 s (401 pts)
Marker Trace Type X Axis Amplitude
2 (1) Freq 24.25 GHz -42.79 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

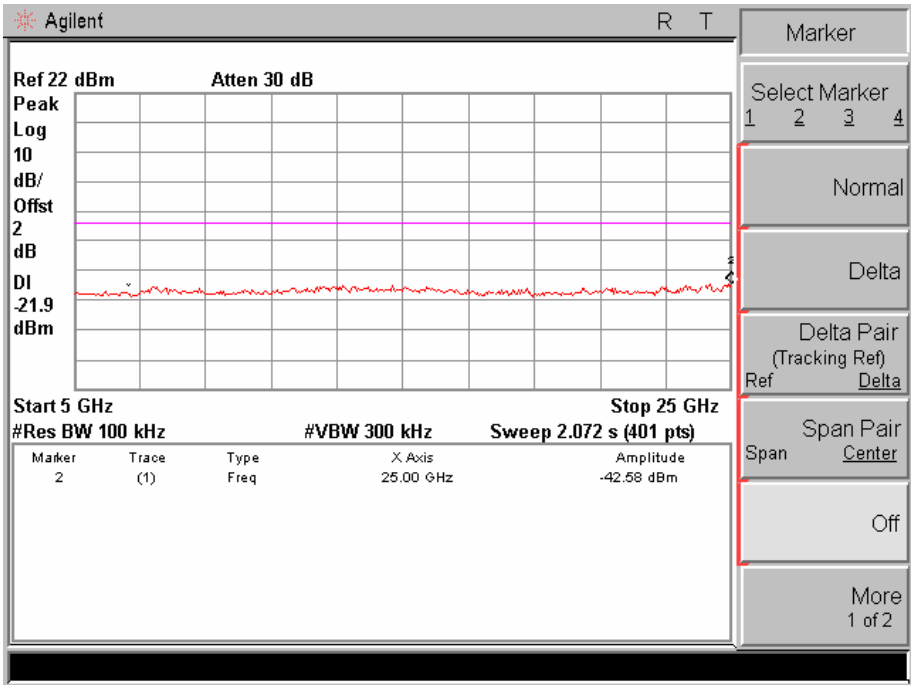
Channel HIG：


Agilent
R T
Mkr2 2.975 GHz
Ref 22 dBm
Atten 30 dB
-40.29 dBm
Peak
Log
10
dB/
Offst
2
dB
Dl
-17.4
dBm
Start 30 MHz
Stop 5 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 514.9 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.465 GHz 2.663 dBm
2 (1) Freq 2.975 GHz -40.29 dBm
Display
Full Screen
Display Line
-17.40 dBm
On Off
Limits
Active Fctn
Position
Center
Title
Preferences

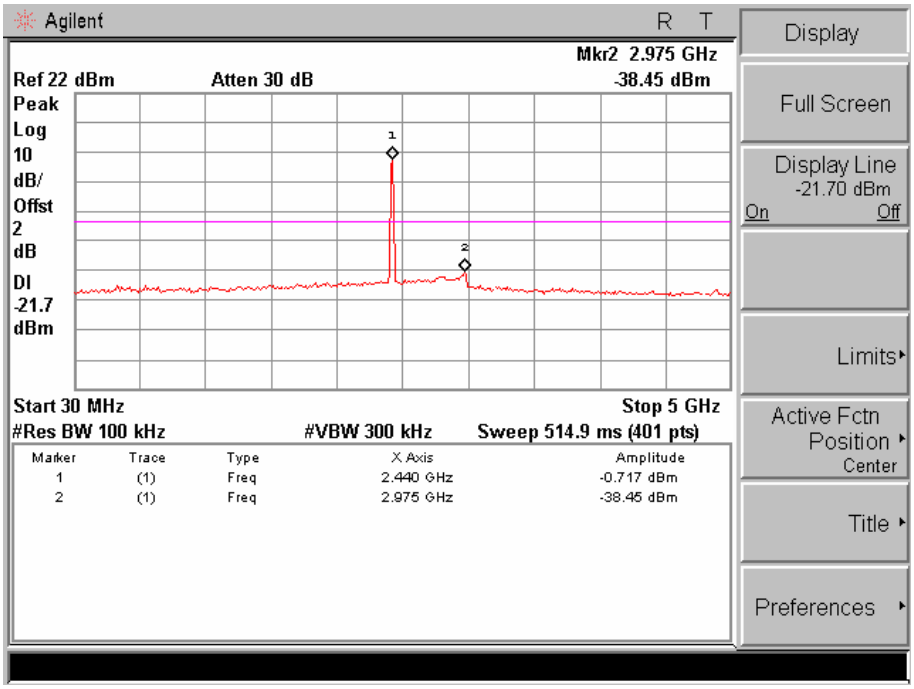

Agilent
R T
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-17.4
dBm
Start 5 GHz
Stop 25 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.072 s (401 pts)
Marker Trace Type X Axis Amplitude
2 (1) Freq 25.00 GHz -41.79 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

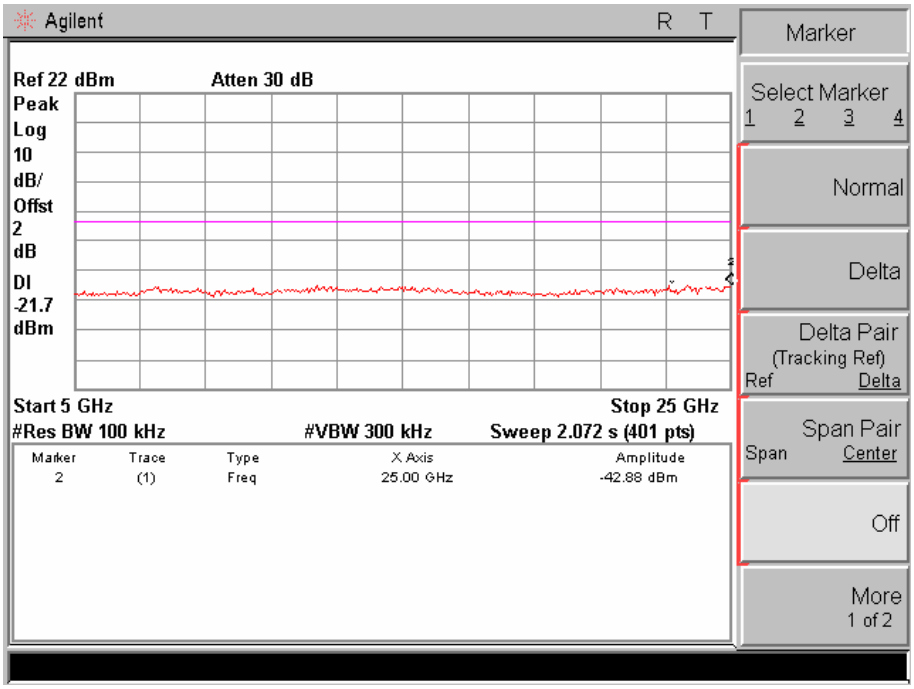
802.11g mode Channel LOW：



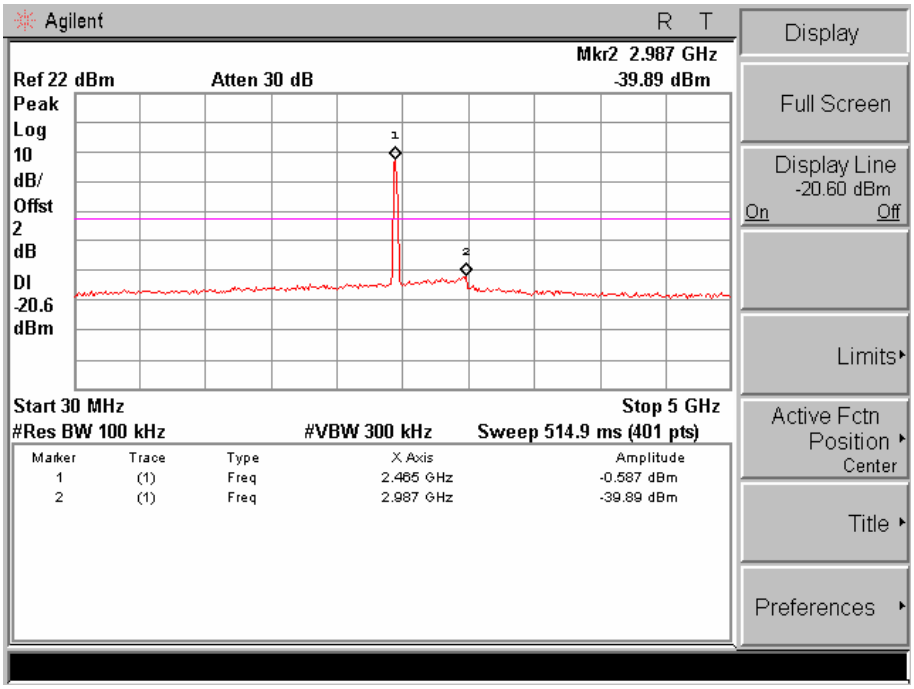


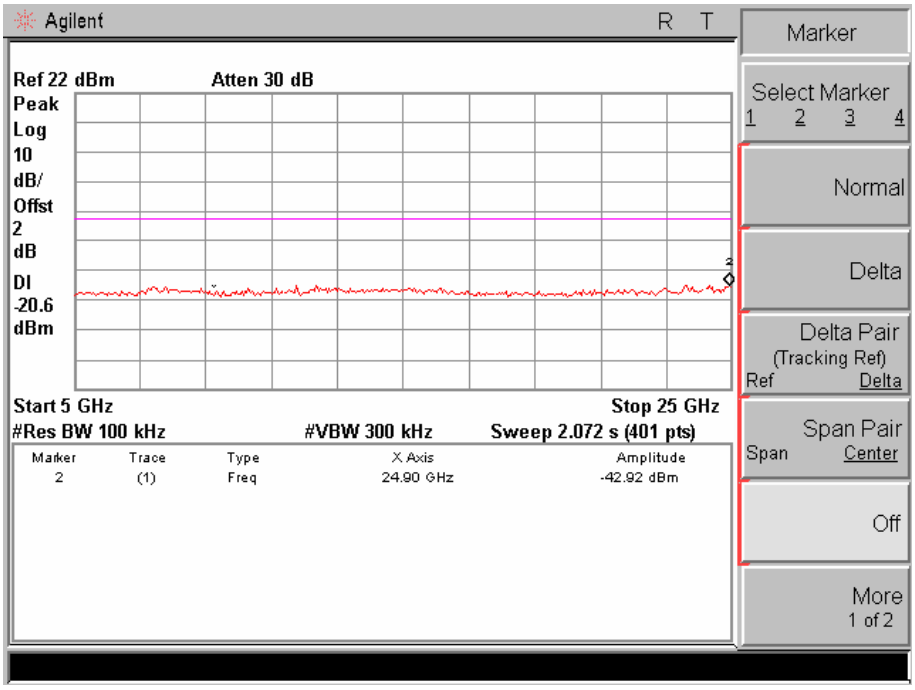
Channel MID：


Agilent
R T
Mkr2 2.975 GHz
Ref 22 dBm
Atten 30 dB
-38.45 dBm
Peak
Log
10
dB/
Offst
2
dB
Dl
-21.7
dBm
Start 30 MHz
Stop 5 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 514.9 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.440 GHz -0.717 dBm
2 (1) Freq 2.975 GHz -38.45 dBm
Display
Full Screen
Display Line
-21.70 dBm
On Off
Limits
Active Fctn
Position
Center
Title
Preferences

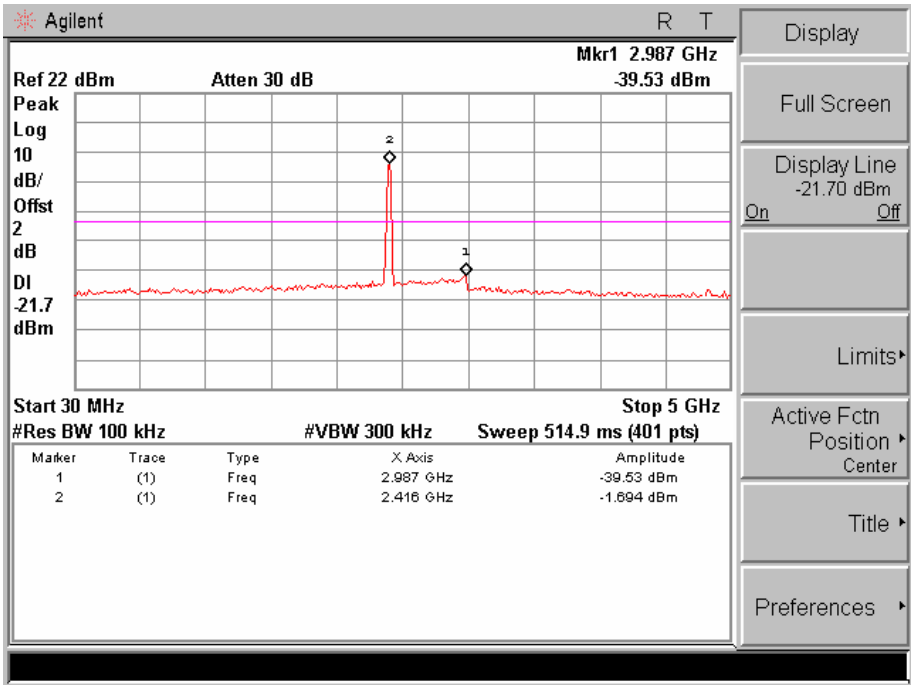

Agilent
R T
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-21.7
dBm
Start 5 GHz
Stop 25 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.072 s (401 pts)
Marker Trace Type X Axis Amplitude
2 (1) Freq 25.00 GHz -42.88 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

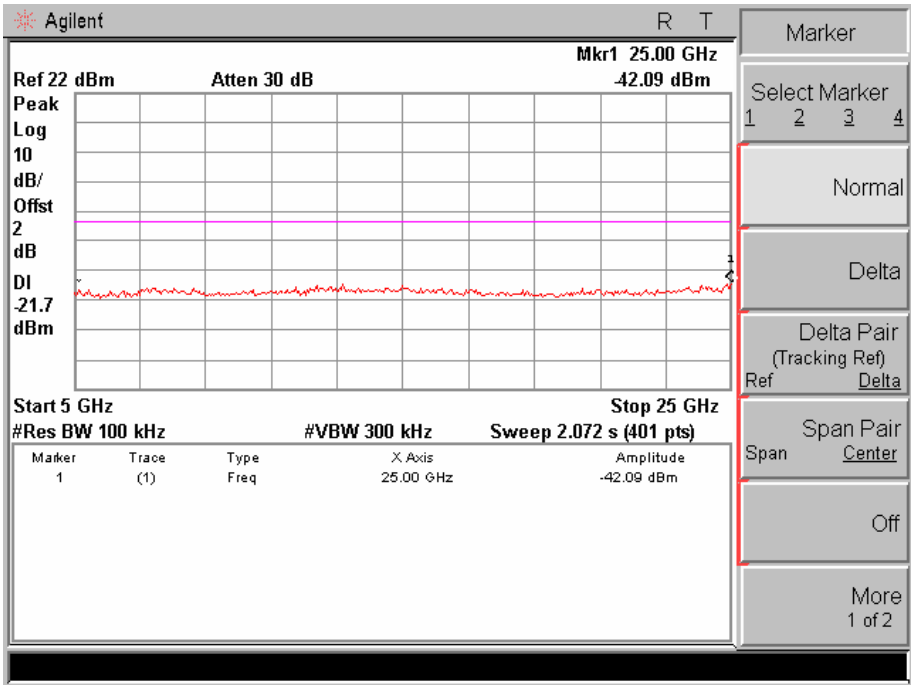
Channel HIG：


Agilent
R T
Mkr2 2.987 GHz
Ref 22 dBm
Atten 30 dB
-39.89 dBm
Peak
Log
10
dB/
Offst
2
dB
Dl
-20.6
dBm
Start 30 MHz
Stop 5 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 514.9 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.465 GHz -0.587 dBm
2 (1) Freq 2.987 GHz -39.89 dBm
Display
Full Screen
Display Line
-20.60 dBm
On Off
Limits
Active Fctn
Position
Center
Title
Preferences

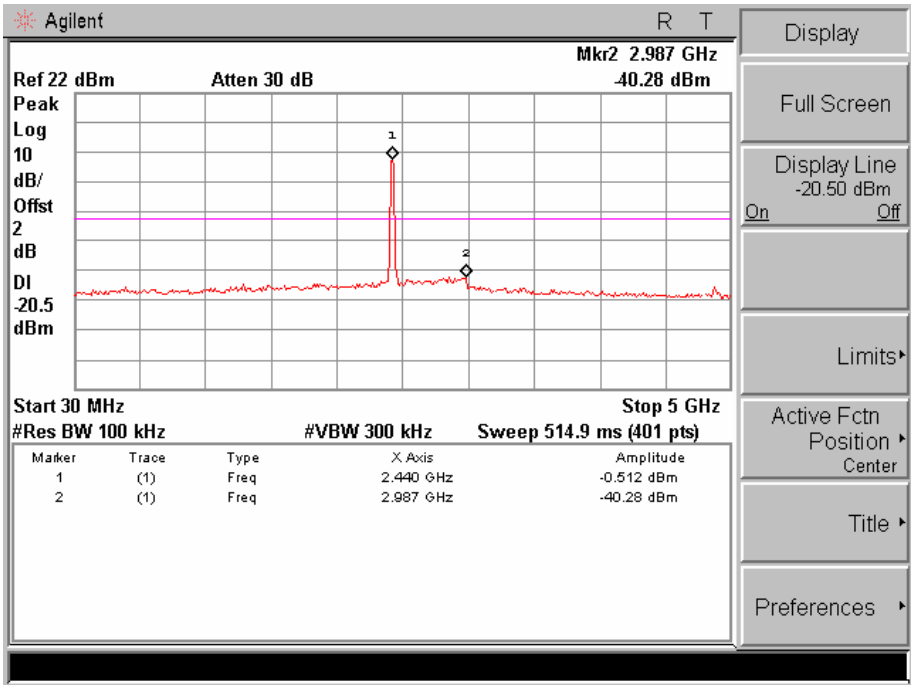

Agilent
R T
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-20.6
dBm
Start 5 GHz
Stop 25 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.072 s (401 pts)
Marker Trace Type X Axis Amplitude
2 (1) Freq 24.90 GHz -42.92 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

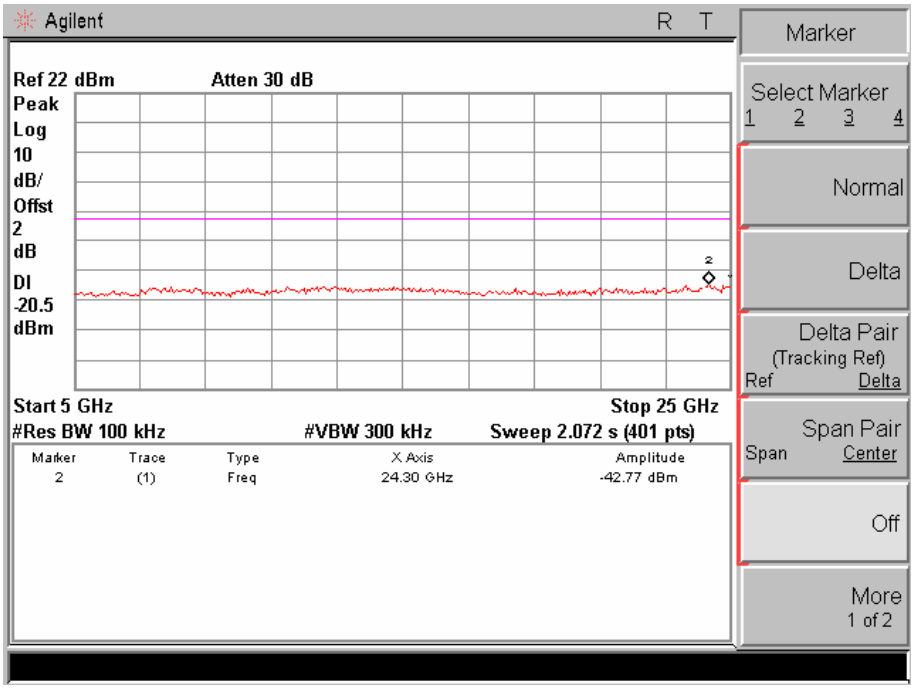
802.11n20 mode, Channel LOW：



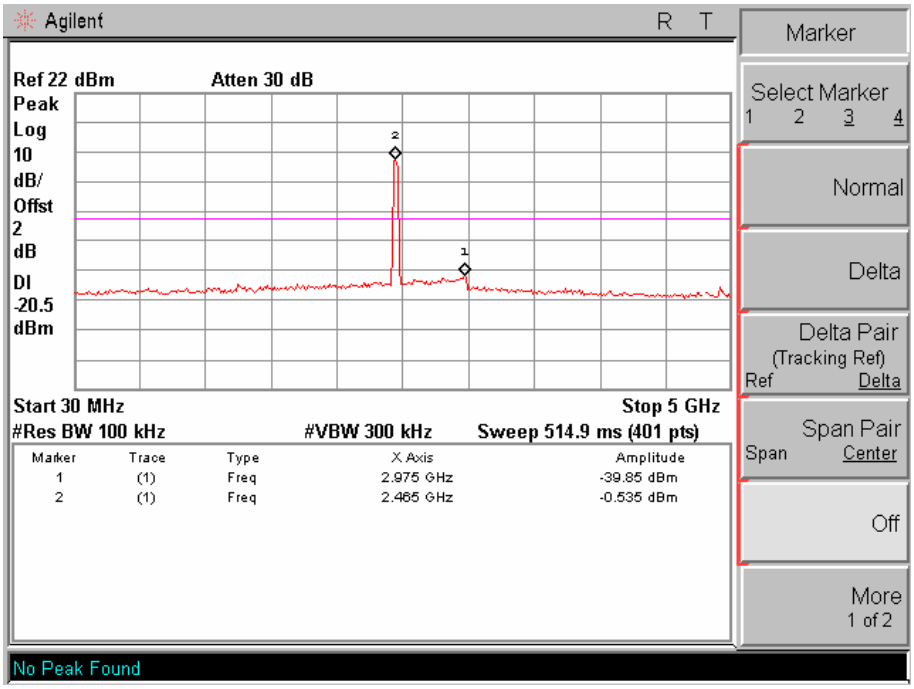


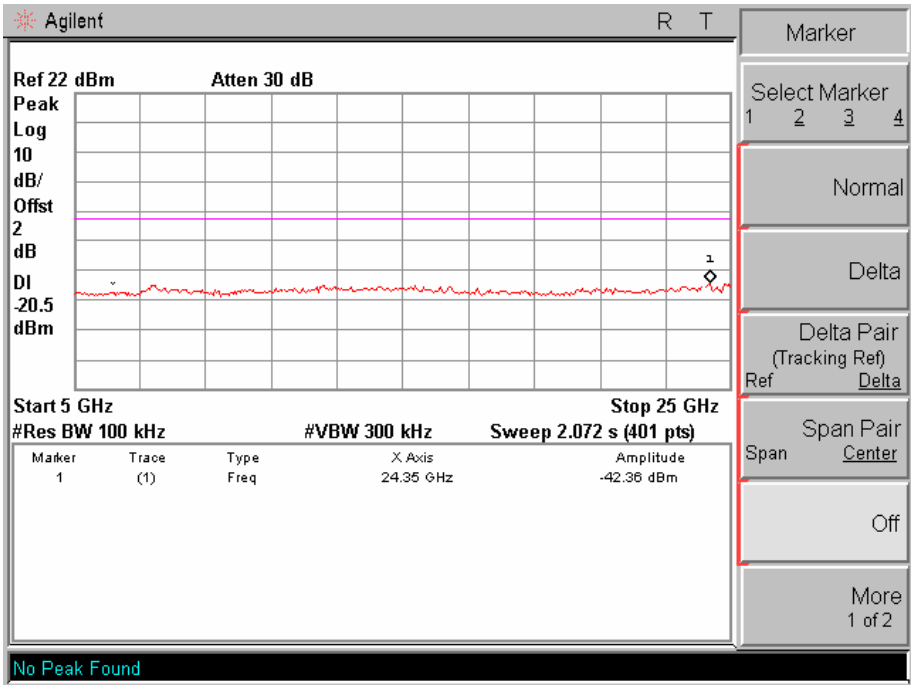
Channel MID：


Agilent
R T
Mkr2 2.987 GHz
Ref 22 dBm
Atten 30 dB
-40.28 dBm
Peak
Log
10
dB/
Offst
2
dB
Dl
-20.5
dBm
Start 30 MHz
Stop 5 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 514.9 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.440 GHz -0.512 dBm
2 (1) Freq 2.987 GHz -40.28 dBm
Display
Full Screen
Display Line
-20.50 dBm
On Off
Limits
Active Fctn
Position
Center
Title
Preferences


Agilent
R T
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-20.5
dBm
Start 5 GHz
Stop 25 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.072 s (401 pts)
Marker Trace Type X Axis Amplitude
2 (1) Freq 24.30 GHz -42.77 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

Channel HIG：

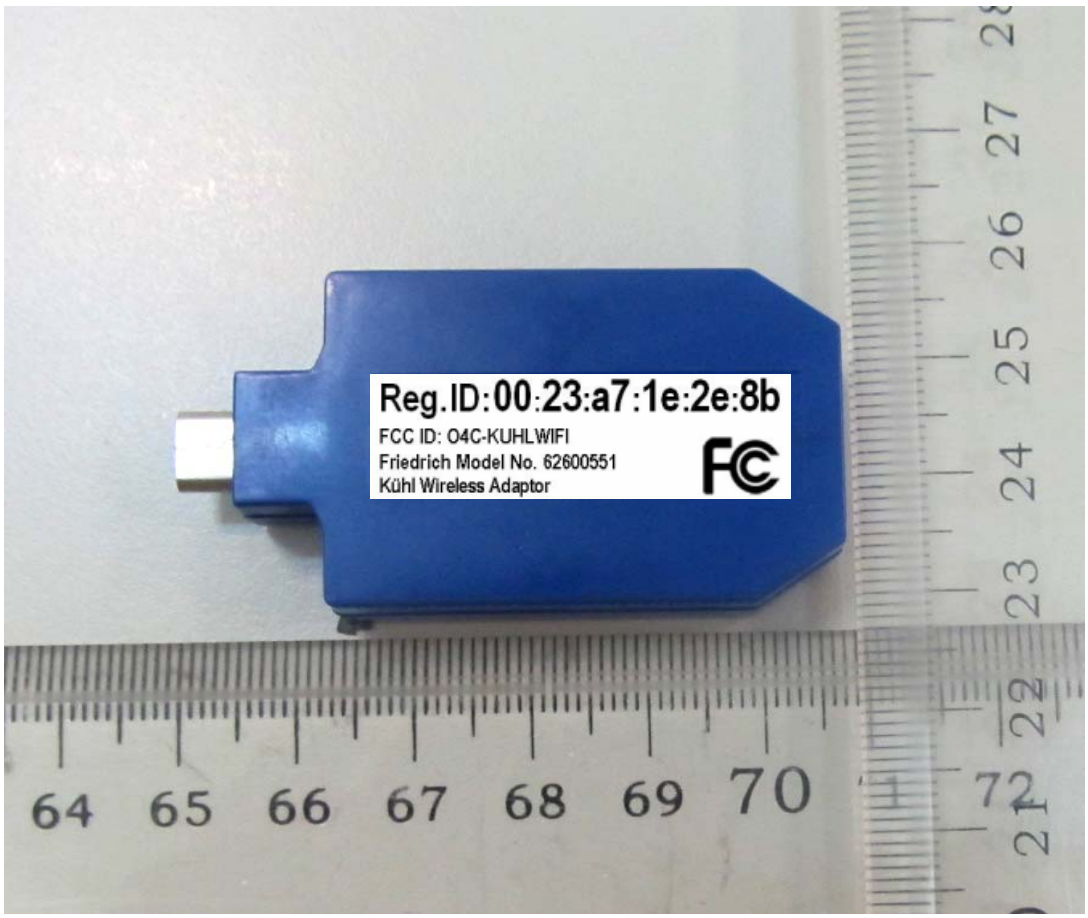

Agilent
R T
Marker
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-20.5
dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
Start 30 MHz
Stop 5 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 514.9 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.975 GHz -39.85 dBm
2 (1) Freq 2.465 GHz -0.535 dBm
No Peak Found


Agilent
R T
Marker
Ref 22 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
2
dB
Dl
-20.5
dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
Start 5 GHz
Stop 25 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.072 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 24.35 GHz -42.36 dBm
No Peak Found

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

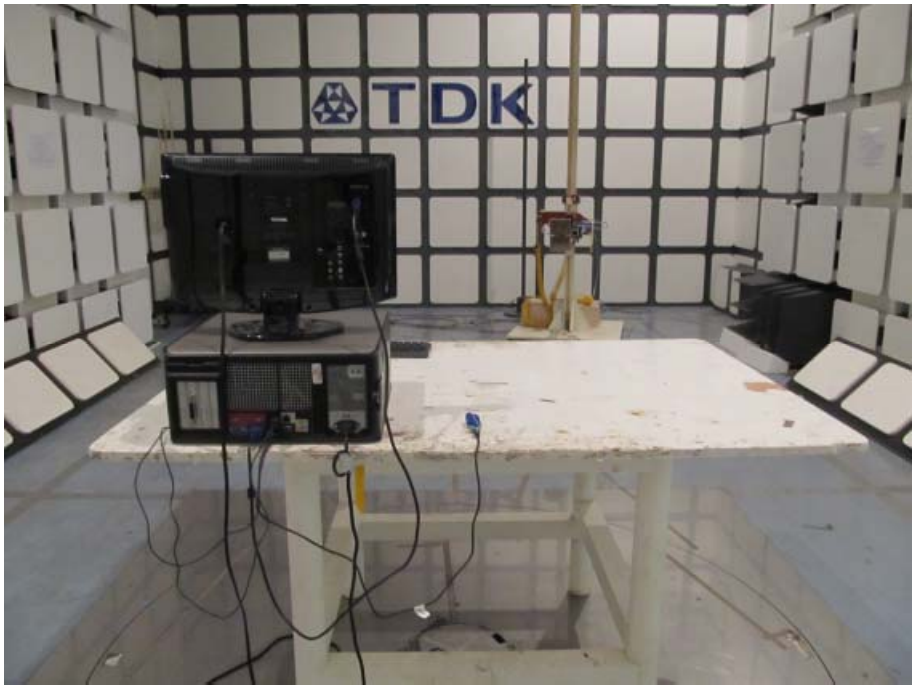
No.	Description	Specification	Quantity
1.	PC	DELL, M/N:OPTIPLEX, S/N: 33494477289	1
2.	Monitor	SHARP/AQUOS, M/N:LCD-19A35-BK, S/N:806915210	1
3.	Keyboard	DELL, M/N:L100, S/N: CN0RH6566589006860007J	1
4.	Mouse	HP, M/N:M-SBF96	1
5.	Laptop	DELL, M/N:Vostro 1400	1

6.2 Photographs of the Test Configuration

6.2.1 Radiated emission

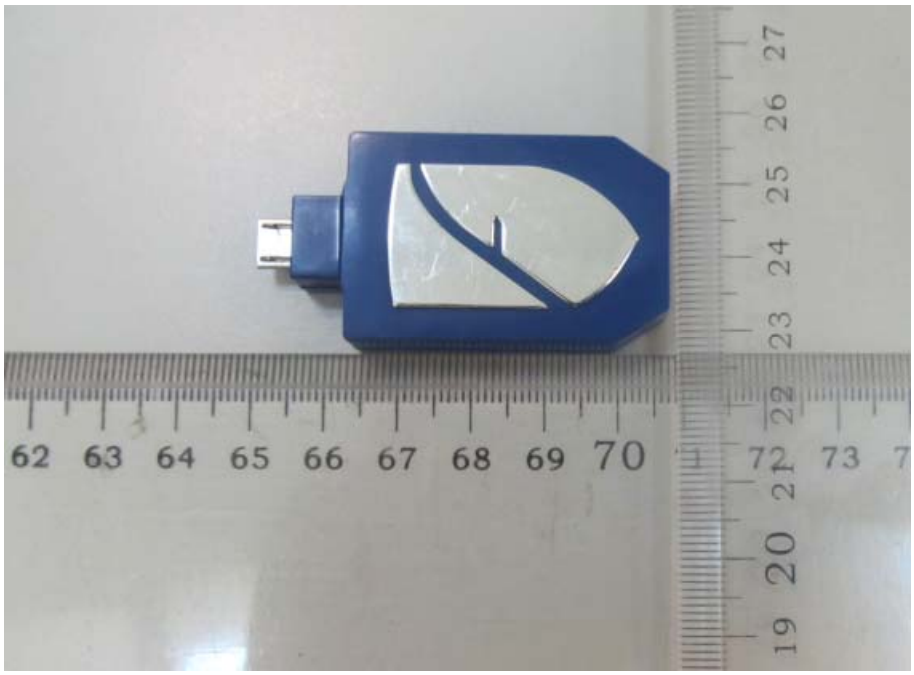
Below 1GHz:

Above 1GHz:

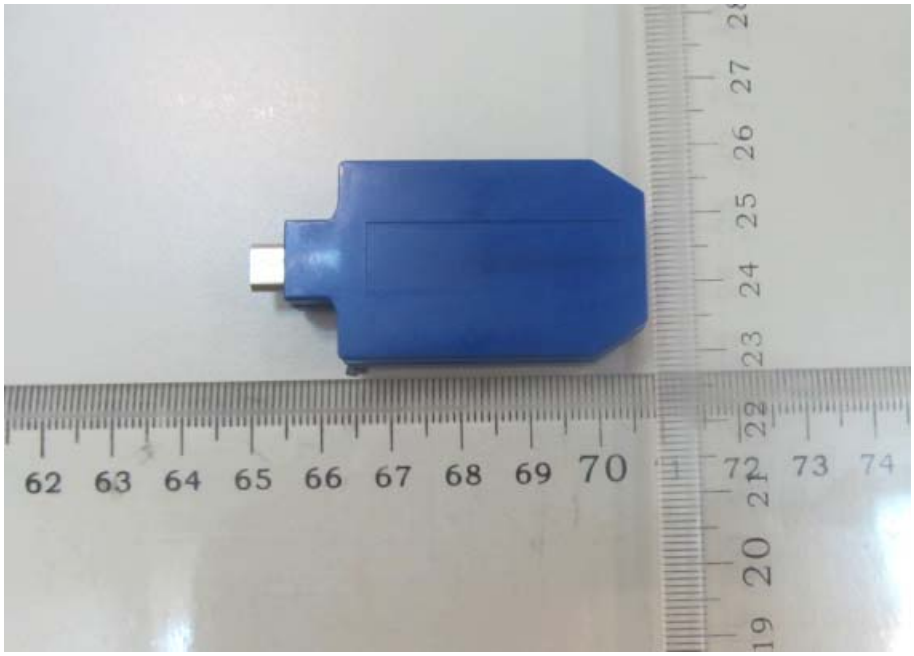


6.2.2 Conducted emission

6.3 Photographs of the EUT



Enclosure of EUT



Enclosure of EUT

7. Equipment List

No.	Equipment	Manufacturer	Model	Serial No.	Calibration Date
1	Precision Biconical Antenna	TDK Co.	PBA-2030	090500	2011-09-18
2	Precision Log Periodic Antenna	TDK Co.	PLP-3003	061001	2011-09-18
3	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130174	2011-09-18
4	Horn antenna	TDK	HRN-0118	130186	2012-04-07
5	Attenuator 6 dB	Agilent	8491B	MY39260147	2011-09-18
6	Preamplifier	TDK Sonoma	310	242803	2012-04-07
7	Preamplifier	ELENA	EAU-3718 GXA	A070701	2012-04-07
8	EMI Receiver	Rohde & Schwarz	ESIB26	100234	2012-04-07
9	EMI Receiver	Rohde & Schwarz	ESCS30	100350	2012-04-07
10	Spectrum Analyzer	Agilent	E4403B	MY44210199	2012-04-07
11	Art. Mains Network	EMCO	3816/2	00044921	2012-04-07
12	Transient Limiter(10 dB)	Agilent	11947A	3107A03736	2012-04-07
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	2012-04-07
16	Shielded Room	TDK Co.	N/A	N/A	N/A
17	Loop Antenna	EMCO	6502	9107-2440	2012-04-07

8. Test Uncertainty

Test	Range	Confidence Level	Calculated Uncertainty
Radiated emission(3m)	30-1000MHz	95%	4.3dB
Radiated emission(3m)	1-25GHz	95%	5.4dB
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 39.719MHz, vertical, Page 42.

	Reading	+	Antenna factor	+	Cable loss	-	Gain	=	Result
Example	45.9	+	11.3	+	6.9	-	31.6	=	32.5

Conducted Emission

For example the point of 0.155MHz, L1 QP, Page 9.

	Reading	+	C. FACTOR	=	Result
Example	30.6	+	10.0	=	40.6