



FCC TEST REPORT

According to

FCC Rules and Regulations

Part 15 Subpart E

Applicant	: Aruba Networks, Inc.
Address	: 1322 Crossman Ave. Sunnyvale, CA94089 USA
Equipment	: Aruba RAP Multi-port Remote Access Point
Model No.	: RAP-5WN; RAP-5
FCC ID	: Q9DRAP5WN
Trade Name	: Aruba

Laboratory accreditation



- The test result refers exclusively to the test presented test model / sample.,
- The test result does not include DFS test for 5250 ~ 5350 MHz.
- Without written approval of **CerpPASS Technology Corp.**, the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



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CERTIFICATE OF COMPLIANCE

According to

FCC Rules and Regulations

Part 15 Subpart E

Applicant : Aruba Networks, Inc.
Address : 1322 Crossman Ave. Sunnyvale, CA94089 USA
Equipment : Aruba RAP Multi-port Remote Access Point
Model No. : RAP-5WN; RAP-5
FCC ID : Q9DRAP5WN

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4** The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart E (2003)**.

The test was carried out on Jan. 09, 2009 at CerpPASS Technology Corp.

Signature

Anson Chou /

EMC/RF B.U. Vice General Manager



1. Report of Measurements and Examinations

1.1. List of Measurements and Examinations

For Frequency 5.15GHz ~ 5.25GHZ

Applied Standard : FCC Part 15, Subpart E (Section 15.407)		
FCC Rule	Description of Test	Result
15.407(b)(5)	. Conducted Emission	Pass
15.407(b)(1/2/3)(b)(5)	. Radiated Emission	Pass
15.407(a)(1/2/3)	. Peak Transmit Power	Pass
15.407(a)(6)	. Peak Power Excursion	Pass
15.407(a)(1/2/3)	. Peak Power Spectral Density	Pass
15.407(g)	. Frequency Stability	Pass



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Mechanical	
Device Dimensions (HxWxD)	177.8mm x 31.75mm x 241.3mm (7" x 1.25" x 9.5")
Device Weight	1 lb. / 453.6 grams
Shipping Dimensions (HxWxD)	92mm x 300mm x 280mm (3.6" x 11.8" x 11")
Temperature	Operating: 0°C to 40°C (32°F to 104°F) Storage: -10°C to 70°C (14°F to 158°F)
Relative Humidity	5% to 95% non-condensing
Mounting	Stand for a flat level surface (i.e. table top)
Antenna	Integrated, non-detachable articulating tri-band antenna
Visual Status Indicators (LEDs)	• POWER: Power / Status • 0: 10/100/1000Base-T Ethernet Port • 1 - 4: 10/100Base-T Ethernet Port • 5 GHz • 2.4 GHz
Electrical	
Ethernet	• 1 x 100/1000Base-T auto-sensing Ethernet RJ-45 Interface, MDI/MDX • 4x 10/100 Base-T auto-sensing Ethernet RJ-45 Interface, MDI/MDX • IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Wireless LAN	
Network Standards	IEEE 802.11a, IEEE 802.11b, IEEE 802.11g and IEEE 802.11n
Antenna Type	Integral, dual, omni-directional multi-band dipole (supports up to 3x3 MIMO with spatial diversity)
Antenna Gain	3 dBi at 2.4 GHz; 5 dBi at 5 GHz
Radio Technology	• Orthogonal Frequency Division Multiplexing (OFDM) • Direct Sequence Spread Spectrum (DSSS)
Radio Modulation Type	• 802.11a - CCK, BPSK, QPSK, 16-QAM, 64-QAM • 802.11b - CCK, BPSK, QPSK • 802.11g - CCK, BPSK, QPSK, OFDM • 802.11n draft 2.0
Media Access Control	CSMA/CA with ACK
Supported Frequency Bands 2.4 GHz	2.400 ~ 2.4835 GHz (Global), channels country specific
Support Frequency Bands 5 GHz	• 5.150 ~ 5.250 GHz (low band), country-specific • 5.250 ~ 5.350 GHz (mid band), country-specific • 5.470 ~ 5.725 GHz (Worldwide), country-specific • 5.725 ~ 5.825 GHz (high band), country-specific
Supported Countries	Complete country list available at http://www.arubanetworks.com/products/aps/certification
Data Rates	• 802.11b - 1, 2, 5.5, 11 Mbps per channel • 802.11g - 6, 9, 12, 18, 24, 36, 48 and 54 Mbps per channel • 802.11a - 6, 9, 12, 18, 24, 36, 48 and 54 Mbps per channel • 802.11n - Data rate MCS0 – MCS15 (from 6.5 Mbps to 300 Mbps)
Output Transmit Power	• 802.11a: 17 dBm at 6 Mbps; 15 dBm at 54 Mbps • 802.11b: 18 dBm • 802.11g: 17 dBm at 6Mbps; 15 dBm at 54 Mbps • 802.11n: 19 dBm at MCS0; 11 dBm at MCS15



2.2. Description of model numbers

Model	Internal Control Number	Description
RAP-5WN	RAP-5WN	Wireless, 1x 100/1000Base-T & 4x 10/100Base-T
RAP-5	RAP-5	1x 100/1000Base-T & 4x 10/100Base-T
RAP-5WN	RAP-5WN-US	Wireless, 1x 100/1000Base-T & 4x 10/100Base-T (US)
RAP-5	RAP-5-US	1x 100/1000Base-T & 4x 10/100Base-T (US)

2.3. Carrier Frequency of Channels

802.11a, 802.11an HT20 (5150 ~ 5250MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	48	5240
40	5200	---	---
44	5220	---	---

802.11 an HT40 (5150 ~ 5250MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
38	5190	46	5230
42	5210	---	---



2.4. Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included remote workstation, PC, Monitor, Keyboard, Mouse, Modem, Printer, Flash Memory and EUT for EMI test. The remote workstation includes Notebook and ADSL Switch.
- c. An executive program, ping.exe under WIN XP, which transmits and receives data to the remote workstation through RJ11 and Wireless (270M).
- d. The following test modes were performed for test:
 - 802.11a/an, HT20: CH 36: 5180MHz, CH 44: 5220MHz, CH 48: 5240MHz
 - 802.11an, HT40: CH 38: 5190MHz, CH 46: 5230MHz
- e. Test Adapter: MU18-2120150-A1

2.5. Description of Test System

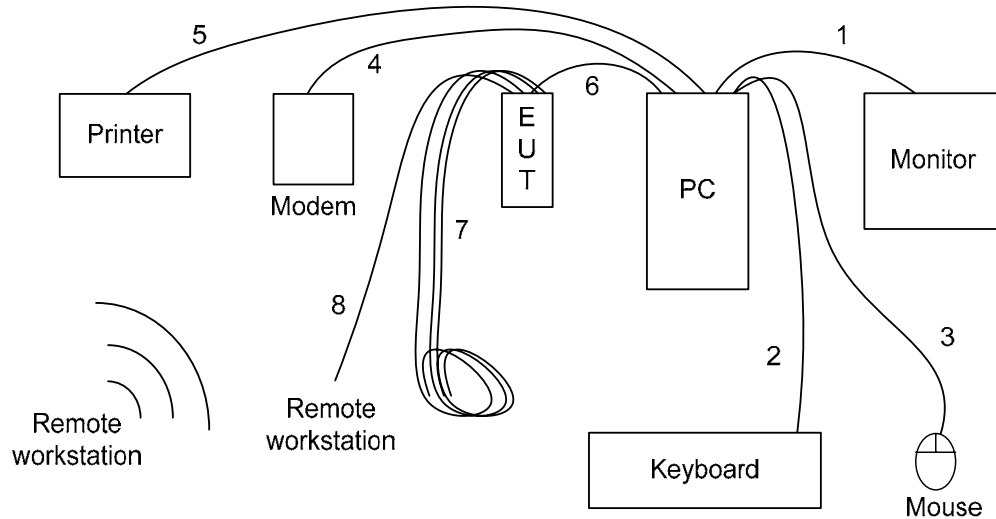
Device	Manufacturer	Model No.	Description
PC	IBM	IGV	Power Cable, Unshielding 1.8 m
Monitor	SlimAGE	510A	Power Cable, Adapter Unshielding 1.8 m Data Cable, VGA Shielding 1.35 m
Keyboard	IBM	KB-0225	Data Cable, PS2 Shielding 1.85 m
Mouse	IBM	MO28VO	Data Cable, USB Shielding 1.85 m
Modem	ACEXX	DM-1414	Power Cable, Adapter Unshielding 1.8 m Data Cable, RS232 Shielding 1.35 m
Printer	HP	Desk Jet 400	Power Cable, Adapter Unshielding 1.8 m Data Cable, Print Shielding 1.6 m
Flash Memory	TranScend	JF 150 1GB	N/A
Remote Workstation			
Notebook	DELL	PP10L	Power Cable, Adapter Unshielding 1.8 m
Notebook	TOSHIBA	PSA50T-05M00C	Power Cable, Adapter Unshielding 1.8 m
Giga HUB	NETGEAR	GS724TP	N/A

Use Cable:

Cable	Quantity	Description
RJ45	1	Unshielding, 1.5m
RJ45	3	Unshielding, 3.0m
RJ45	1	Unshielding, 5.0m



2.6. Connection Diagram of Test System



1. The VGA cable is connected from PC to the Monitor.
 2. The PS2 cable is connected from PC to the PS2 Keyboard.
 3. The USB cable is connected from PC to the USB Mouse.
 4. The RS232 cable is connected from PC to the Modem.
 5. The Print cable is connected from PC to the Printer.
 6. The RJ45 cable is connected from PC to the EUT.
 7. These RJ45 cables (*3) are floating.
 8. The RJ45 cable is connected from EUT to the Remote workstation.
- * The EUT keeps to transmit and receive data to remote workstation by Wireless.

**2.7. General Information of Test**

Test Site:	CerpPASS Technology Corp. 4F-2, No. 28, Lane 78, Xing-Ai Rd. Nei-hu, Taipei City 114 Taiwan R.O.C.
Test Site Location (OATS1-SD):	No.68-1, Shihbachongsi, shihding Township, Taipei City 223, Taiwan, R.O.C.
FCC Registration Number :	632249
IC Registration Number :	4934B-1
VCCI Registration Number :	T-338 for Telecommunication Test C-2188 for Conducted emission test R-1902 for Radiated emission test
Test Voltage:	AC 120V/ 60Hz
Test in Compliance with:	ANSI C63.4-2003 FCC Part 15 Subpart E
Frequency Range Investigated:	AC Power Conducted Emission : from 150kHz to 30 MHz Radiated and conducted Emission: from 30 MHz to 40 GHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.



2.8. History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

[illegible]



3. Antenna Requirements

3.1. Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2. Antenna Construction and Directional Gain

Ant1: Printed antenna, 5 dBi (5GHz Band)

Ant2: Printed antenna, 5 dBi (5GHz Band)

Ant3: Printed antenna, 5 dBi (5GHz Band)

Note:

1. For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density.

For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.



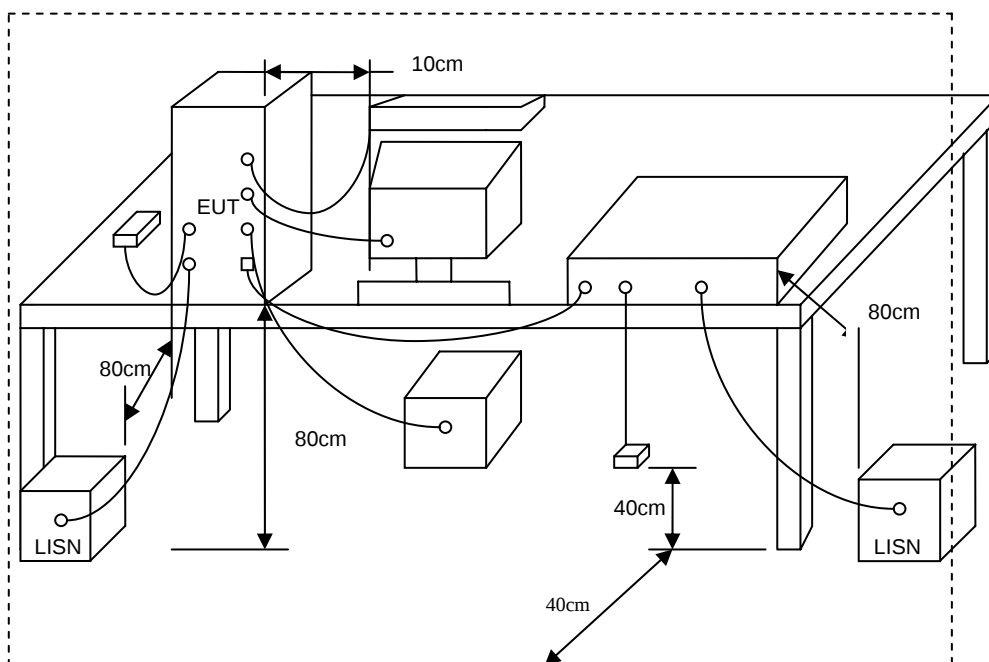
4. Test of Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 1.3.1. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

4.1. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.2. Typical Test Setup Layout of Conducted Emission





4.3. Conducted Emission Requirement

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

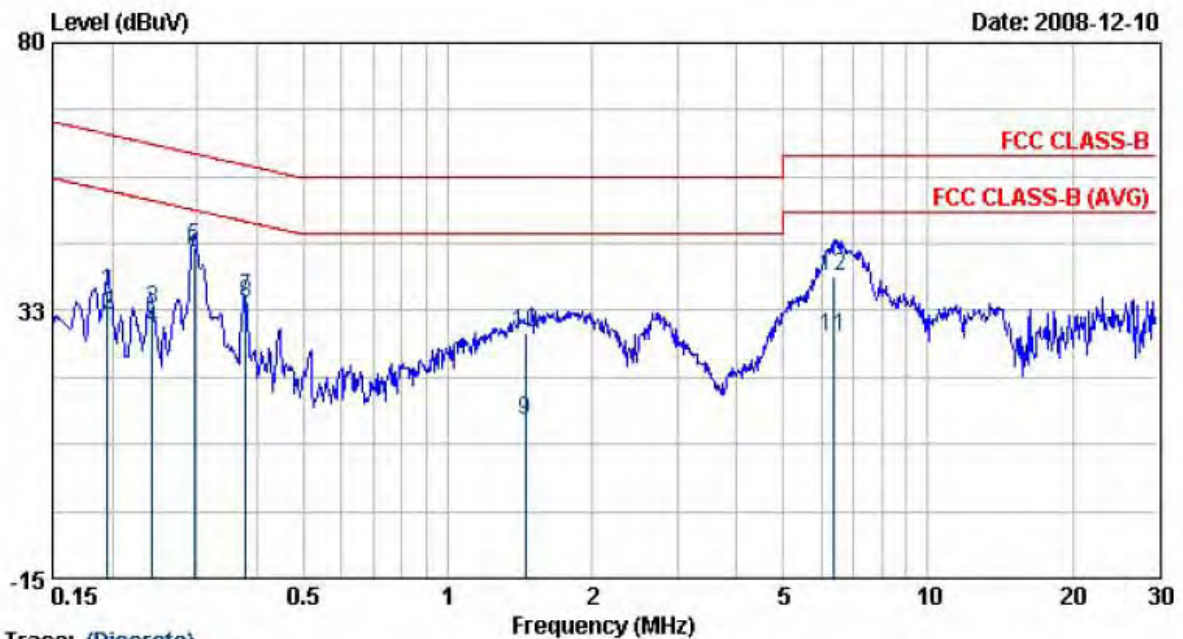
4.4. Measurement Equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date.
EMI Receiver	R&S	ESCI	100443	2008/09/27	2009/09/26
LISN	MESS TEC	NNB-2/16Z	02/10191	2008/05/14	2009/05/13
LISN	ROLF HEINE	NNB-2/16Z	03/10058	2008/04/19	2009/04/18



4.5. Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: 802.11a, CH36	Temperature	: 22 °C
Memo	: MU15-C120125-A1	Humidity	: 52 %



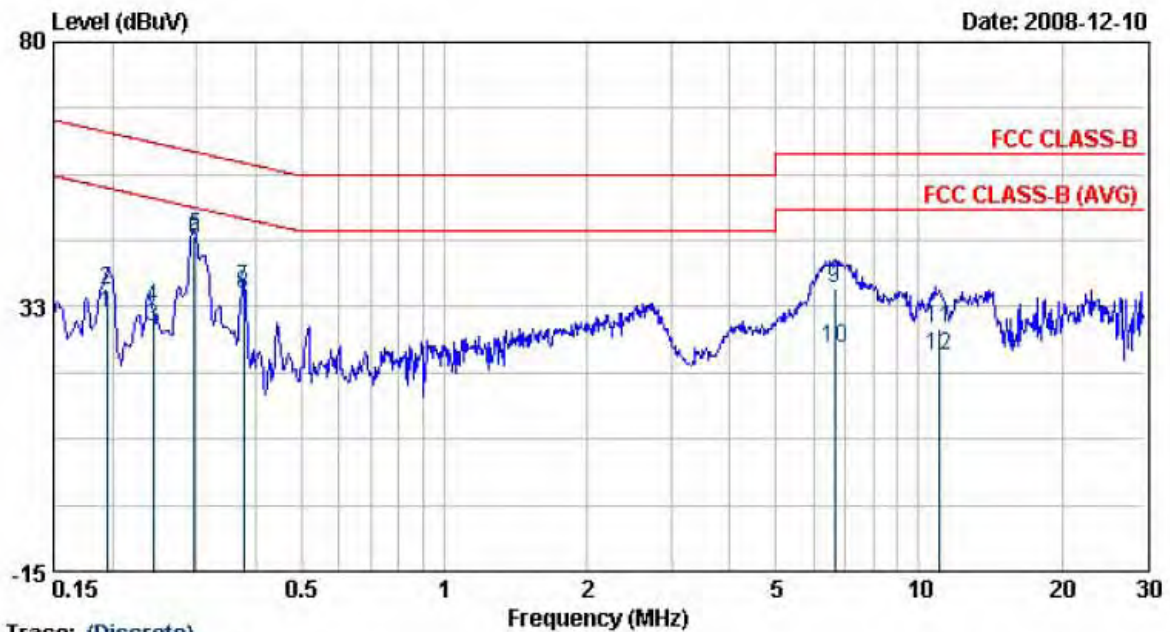
Trace: (Discrete)

Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.20	35.56	0.11	35.67	63.80	-28.13	QP
2	0.20	31.36	0.11	31.47	53.80	-22.33	AVERAGE
3	0.24	32.62	0.12	32.74	62.04	-29.31	QP
4	0.24	29.23	0.12	29.35	52.04	-22.69	AVERAGE
5	0.30	43.64	0.12	43.76	60.35	-16.60	QP
6	0.30	42.46	0.12	42.58	50.35	-7.77	AVERAGE
7	0.38	34.61	0.12	34.74	58.29	-23.55	QP
8	0.38	33.56	0.12	33.68	48.29	-14.61	AVERAGE
9	1.45	12.80	0.20	12.99	46.00	-33.01	AVERAGE
10	1.45	28.46	0.20	28.66	56.00	-27.34	QP
11	6.38	27.43	0.34	27.77	50.00	-22.23	AVERAGE
12	6.38	38.24	0.34	38.58	60.00	-21.42	QP

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss
 3. According to technical experiences, all spurious emission of 802.11a mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
 4. The data is worse case.



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: 802.11a, CH36	Temperature	: 22 °C
Memo	: MU15-C120125-A1	Humidity	: 52 %

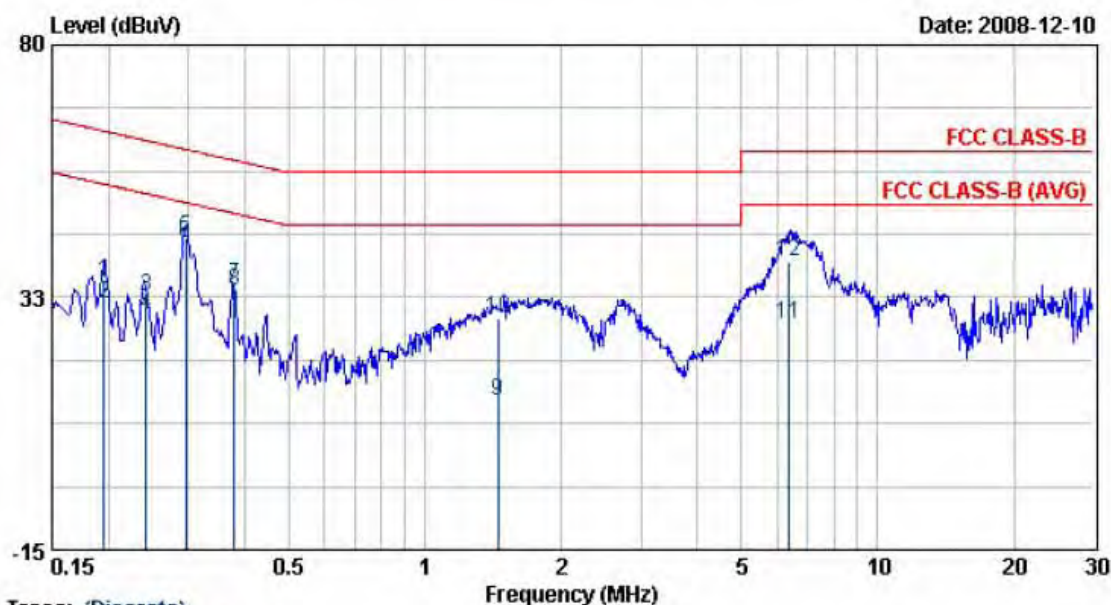


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.19	31.23	0.14	31.37	53.84	-22.47	AVERAGE
2	0.19	35.35	0.14	35.48	63.84	-28.36	QP
3	0.24	28.56	0.14	28.70	51.99	-23.29	AVERAGE
4	0.24	32.33	0.14	32.47	61.99	-29.52	QP
5	0.30	44.95	0.14	45.10	60.32	-15.22	QP
6	0.30	44.13	0.14	44.27	50.32	-6.04	AVERAGE
7	0.38	35.68	0.15	35.83	58.33	-22.49	QP
8	0.38	34.53	0.15	34.67	48.33	-13.65	AVERAGE
9	6.65	35.50	0.36	35.85	60.00	-24.15	QP
10	6.65	24.81	0.36	25.16	50.00	-24.84	AVERAGE
11	11.05	28.16	0.41	28.57	60.00	-31.43	QP
12	11.05	23.24	0.41	23.66	50.00	-26.34	AVERAGE

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss
 3. According to technical experiences, all spurious emission of 802.11a mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
 4. The data is worse case.



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: 802.11an HT20, CH36	Temperature	: 22 °C
Memo	: MU15-C120125-A1	Humidity	: 52 %

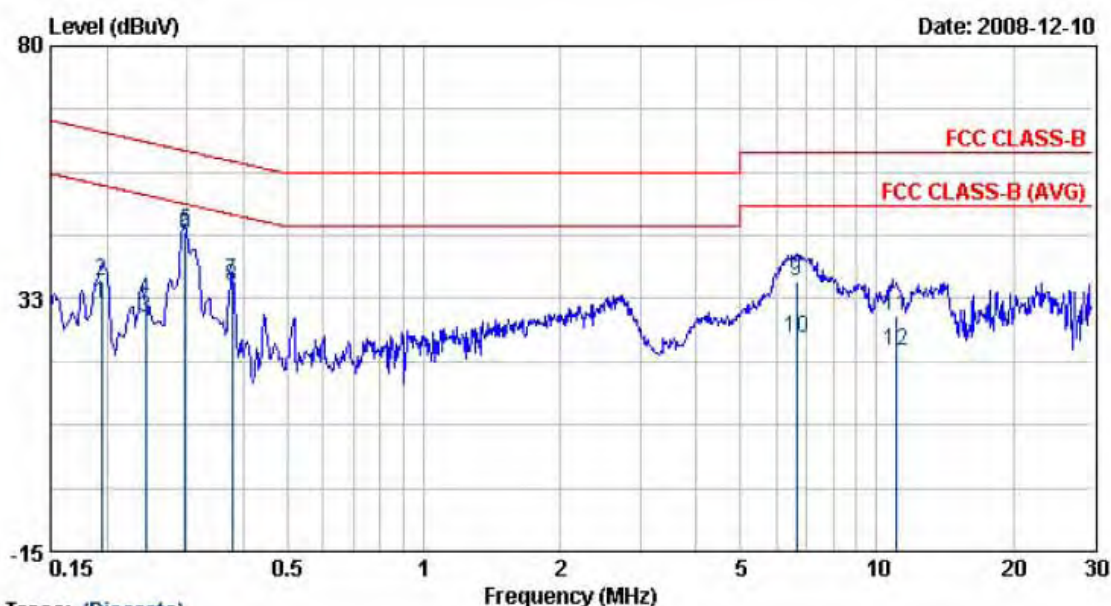


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.20	35.34	0.11	35.45	63.80	-28.35	QP
2	0.20	31.04	0.11	31.15	53.80	-22.66	AVERAGE
3	0.24	32.62	0.12	32.74	62.04	-29.31	QP
4	0.24	29.23	0.12	29.35	52.04	-22.69	AVERAGE
5	0.30	43.64	0.12	43.76	60.35	-16.60	QP
6	0.30	42.46	0.12	42.58	50.35	-7.77	AVERAGE
7	0.38	34.61	0.12	34.74	58.29	-23.55	QP
8	0.38	33.56	0.12	33.68	48.29	-14.61	AVERAGE
9	1.45	12.80	0.20	12.99	46.00	-33.01	AVERAGE
10	1.45	28.46	0.20	28.66	56.00	-27.34	QP
11	6.38	27.06	0.34	27.40	50.00	-22.60	AVERAGE
12	6.38	38.89	0.34	39.23	60.00	-20.77	QP

- Remarks:
1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss
 3. According to technical experiences, all spurious emission of 802.11an HT20 mode at channel 36,44,48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
 4. The data is worse case.



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: 802.11an HT20, CH36	Temperature	: 22 °C
Memo	: MU15-C120125-A1	Humidity	: 52 %

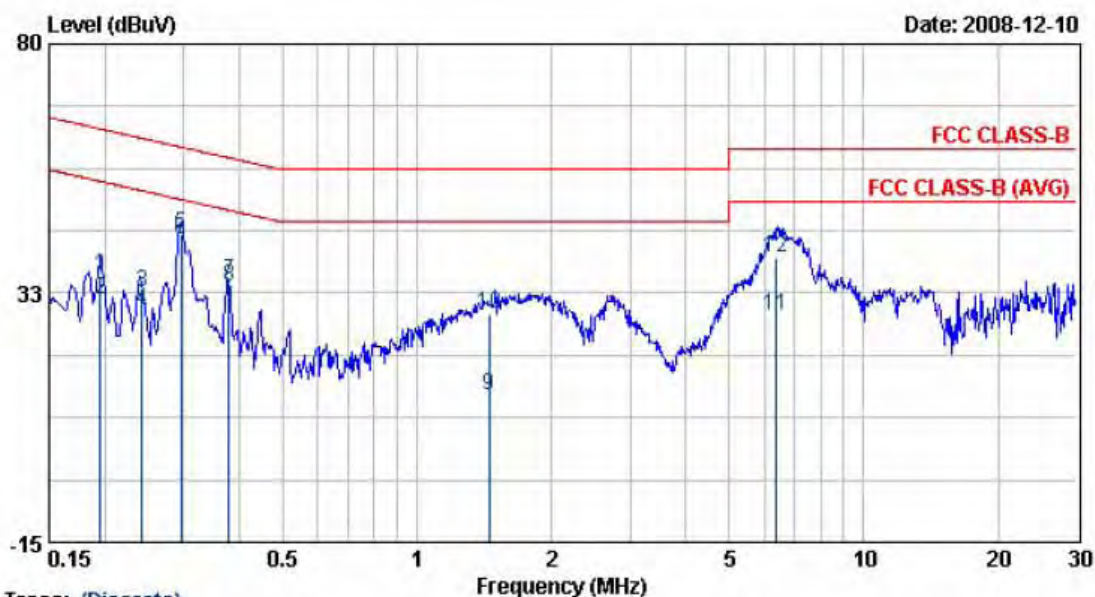


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.19	31.55	0.14	31.68	53.84	-22.16	AVERAGE
2	0.19	35.55	0.14	35.68	63.84	-28.16	QP
3	0.24	28.56	0.14	28.70	51.99	-23.29	AVERAGE
4	0.24	32.33	0.14	32.47	61.99	-29.52	QP
5	0.30	44.95	0.14	45.10	60.32	-15.22	QP
6	0.30	44.13	0.14	44.27	50.32	-6.04	AVERAGE
7	0.38	35.68	0.15	35.83	58.33	-22.49	QP
8	0.38	34.53	0.15	34.67	48.33	-13.65	AVERAGE
9	6.65	35.50	0.36	35.85	60.00	-24.15	QP
10	6.65	24.81	0.36	25.16	50.00	-24.84	AVERAGE
11	11.05	28.64	0.41	29.06	60.00	-30.94	QP
12	11.05	22.33	0.41	22.75	50.00	-27.25	AVERAGE

- Remarks:
1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss
 3. According to technical experiences, all spurious emission of 802.11an HT20 mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
 4. The data is worse case.



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: 802.11an HT40, CH38	Temperature	: 22 °C
Memo	: MU15-C120125-A1	Humidity	: 52 %

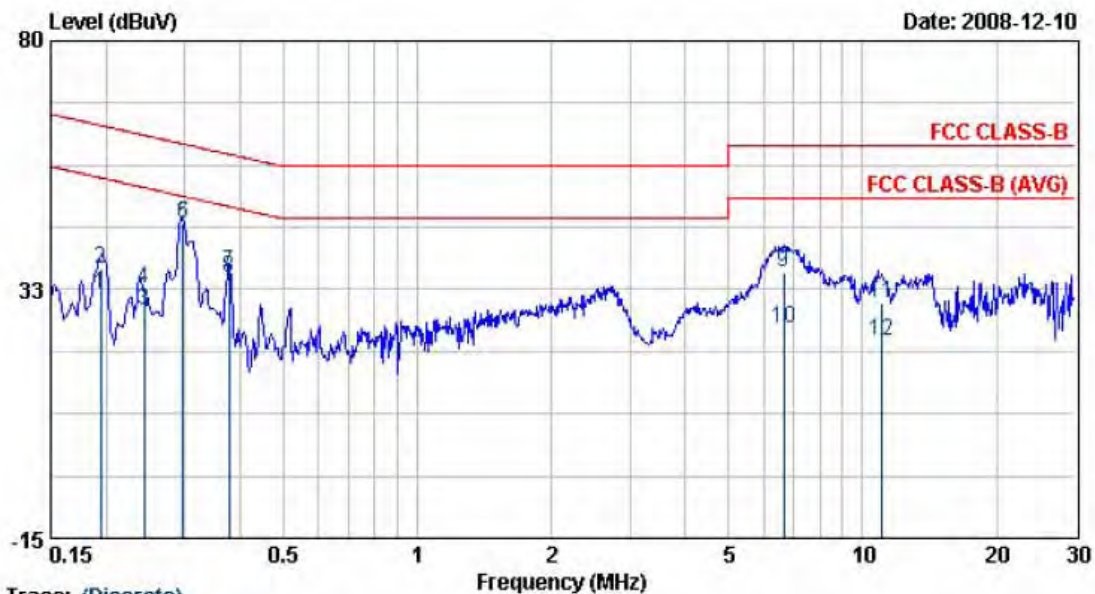


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.20	35.56	0.11	35.67	63.80	-28.13	QP
2	0.20	31.04	0.11	31.15	53.80	-22.66	AVERAGE
3	0.24	32.62	0.12	32.74	62.04	-29.31	QP
4	0.24	29.23	0.12	29.35	52.04	-22.69	AVERAGE
5	0.30	43.64	0.12	43.76	60.35	-16.60	QP
6	0.30	42.46	0.12	42.58	50.35	-7.77	AVERAGE
7	0.38	34.61	0.12	34.74	58.29	-23.55	QP
8	0.38	33.56	0.12	33.68	48.29	-14.61	AVERAGE
9	1.45	12.80	0.20	12.99	46.00	-33.01	AVERAGE
10	1.45	28.46	0.20	28.66	56.00	-27.34	QP
11	6.38	27.86	0.34	28.20	50.00	-21.80	AVERAGE
12	6.38	38.89	0.34	39.23	60.00	-20.77	QP

- Remarks:
1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss
 3. According to technical experiences, all spurious emission of 802.11an HT40 mode at channel 38, 42, 46 are almost the same below 1GHz, so that the channel 38 was chosen as representative in final test.
 4. The data is worse case.



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: 802.11an HT40, CH38	Temperature	: 22 °C
Memo	: MU15-C120125-A1	Humidity	: 52 %



Trace: (Discrete)

Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.19	31.55	0.14	31.69	53.84	-22.15	AVERAGE
2	0.19	36.45	0.14	36.59	63.84	-27.25	QP
3	0.24	28.52	0.14	28.66	51.99	-23.33	AVERAGE
4	0.24	32.37	0.14	32.51	61.99	-29.47	QP
5	0.30	44.94	0.14	45.08	60.32	-15.24	QP
6	0.30	45.13	0.14	45.27	50.32	-5.04	AVERAGE
7	0.38	35.68	0.15	35.83	58.33	-22.49	QP
8	0.38	34.53	0.15	34.67	48.33	-13.65	AVERAGE
9	6.65	35.50	0.36	35.85	60.00	-24.15	QP
10	6.65	24.81	0.36	25.16	50.00	-24.84	AVERAGE
11	11.05	29.56	0.41	29.97	60.00	-30.03	QP
12	11.05	22.24	0.41	22.66	50.00	-27.34	AVERAGE

- Remarks:
1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss
 3. According to technical experiences, all spurious emission of 802.11an HT40 mode at channel 38, 42, 46 are almost the same below 1GHz, so that the channel 38 was chosen as representative in final test.
 4. The data is worse case.

Test engineer:



5. Test of Radiated Emission

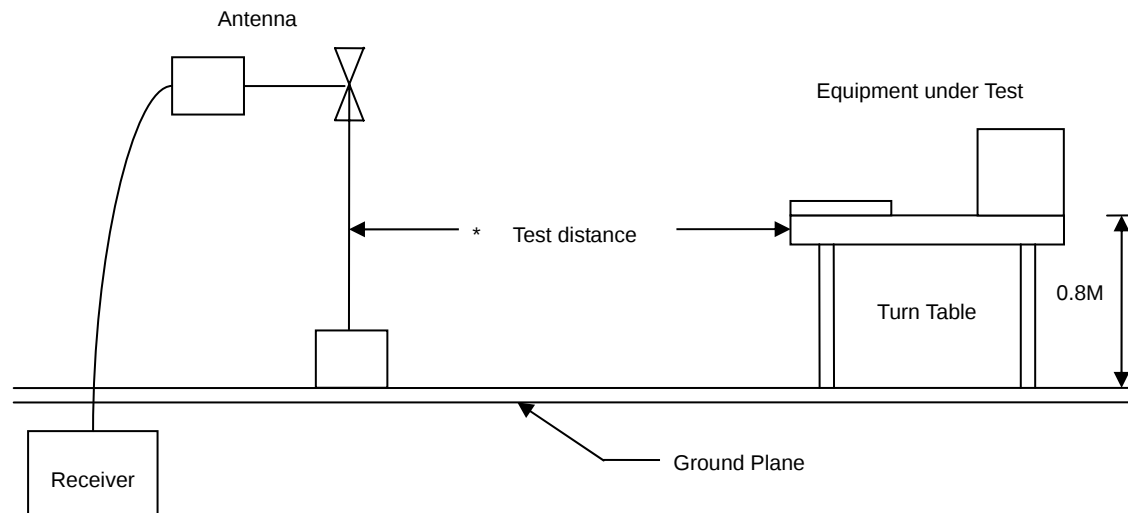
Radiated emissions from 30 MHz to 40 GHz were measured according to the methods defines in ANSI C63.4-2003. The EUT was placed, 0.8 meter above the ground plane, as shown in section 1.4.2. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

5.1. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.



5.2. Typical Test Setup Layout of Radiated Emission



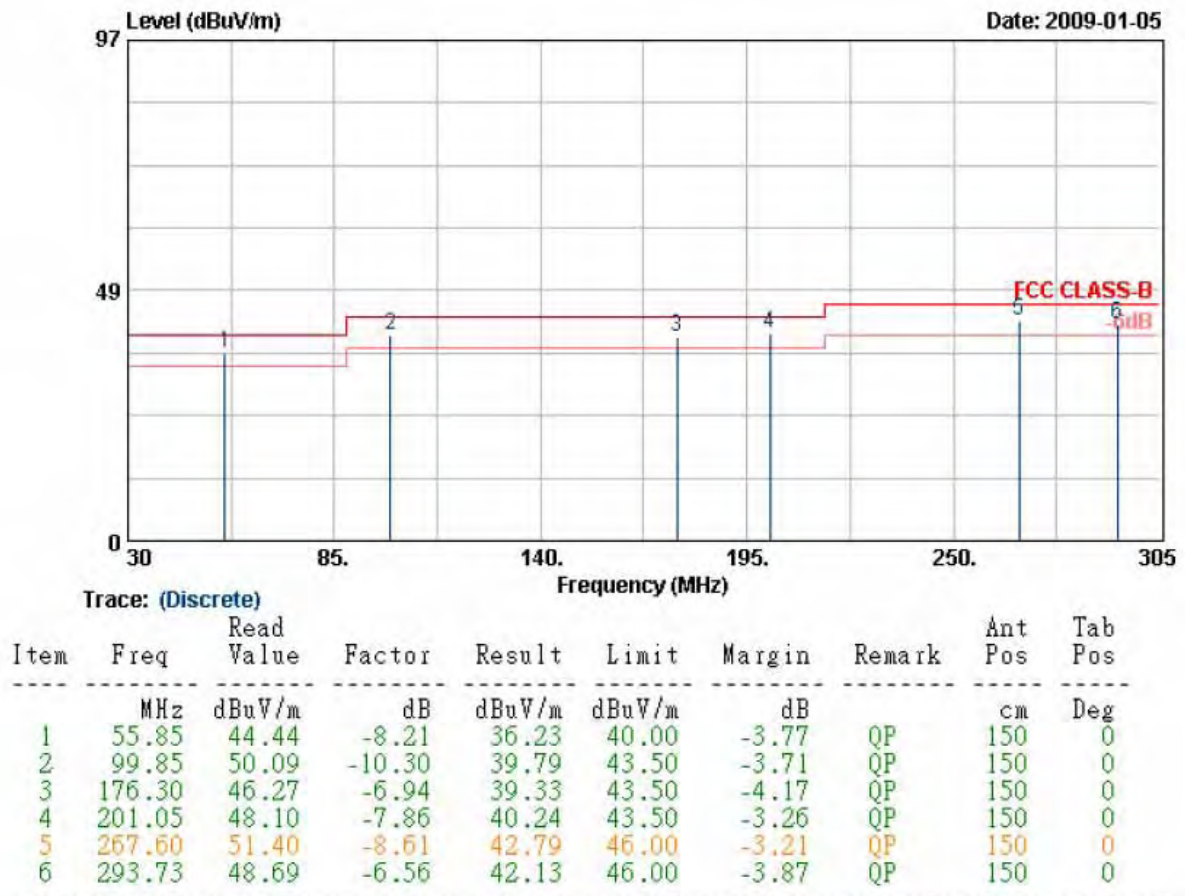
5.3. Measurement Equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Bilog Antenna	CBL6112B	Schaffner	2840	2008/05/15	2009/05/14
Signal Generator	8648B	HP	3629U00612	2008/10/08	2009/10/07
Amplifier	8447D	Agilent	2944A10593	2008/05/26	2009/05/25
EMI Receiver	8546A	HP	3807A00454	2008/08/07	2009/08/06
Spectrum	FSP40	R&S	100047	2008/02/22	2009/02/21
Horn Antenna	3115	EMCO	31589	2008/04/01	2009/03/30
Amplifier	8449B	Agilent	3008A01954	2008/01/24	2009/01/23



5.4. Test Result of Radiated Emission

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11a, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %

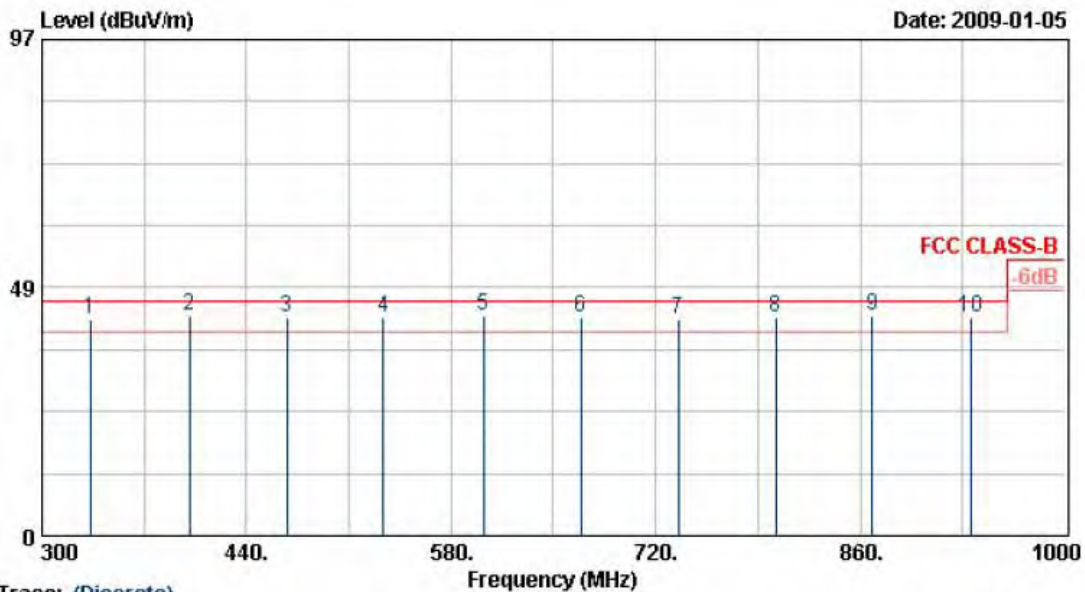


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11a mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11a, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %



Trace: (Discrete)

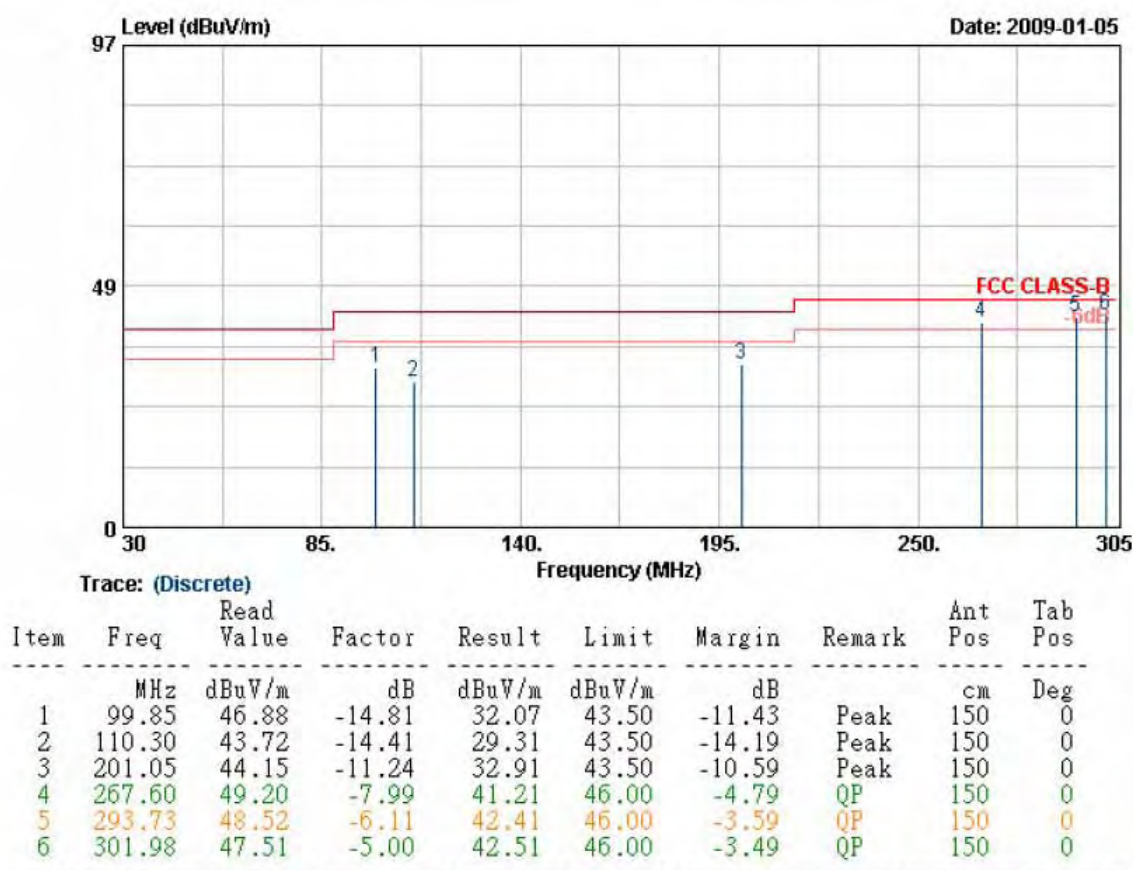
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	332.90	50.51	-8.10	42.41	46.00	-3.59	QP	100	0
2	400.80	47.06	-4.06	43.00	46.00	-3.00	QP	100	0
3	467.30	44.28	-1.68	42.60	46.00	-3.40	QP	100	0
4	533.80	42.93	-0.09	42.84	46.00	-3.16	QP	100	0
5	602.40	42.27	0.71	42.98	46.00	-3.02	QP	100	0
6	668.90	42.60	0.07	42.67	46.00	-3.33	QP	100	0
7	735.40	36.12	6.36	42.48	46.00	-3.52	QP	100	0
8	801.90	39.57	2.96	42.53	46.00	-3.47	QP	100	0
9	868.40	36.78	6.16	42.94	46.00	-3.06	QP	100	0
10	936.30	33.16	9.62	42.78	46.00	-3.22	QP	100	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11a mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %

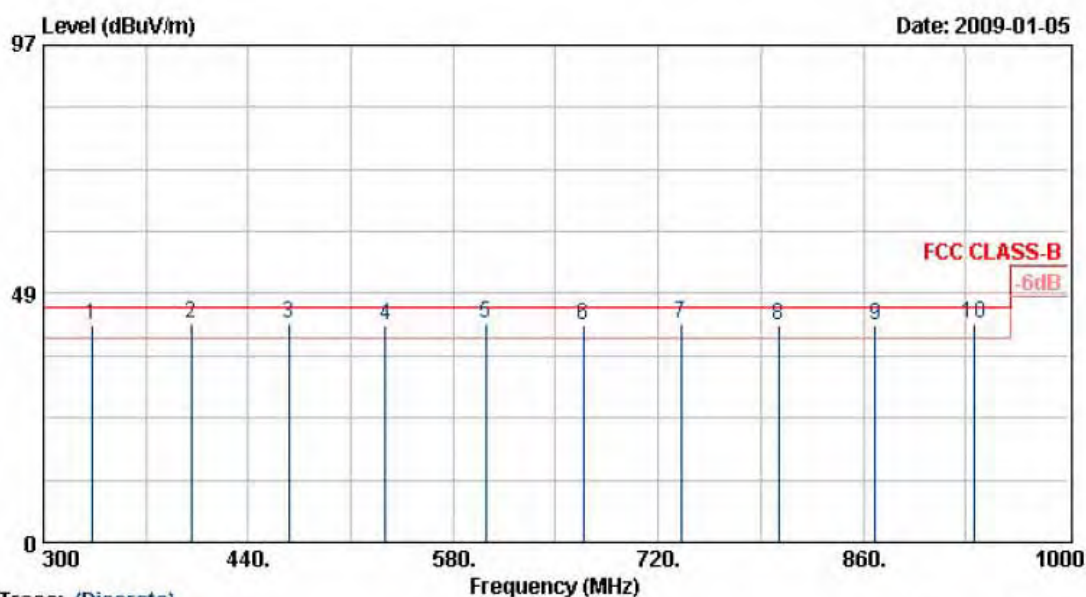


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11a mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %



Trace: (Discrete)

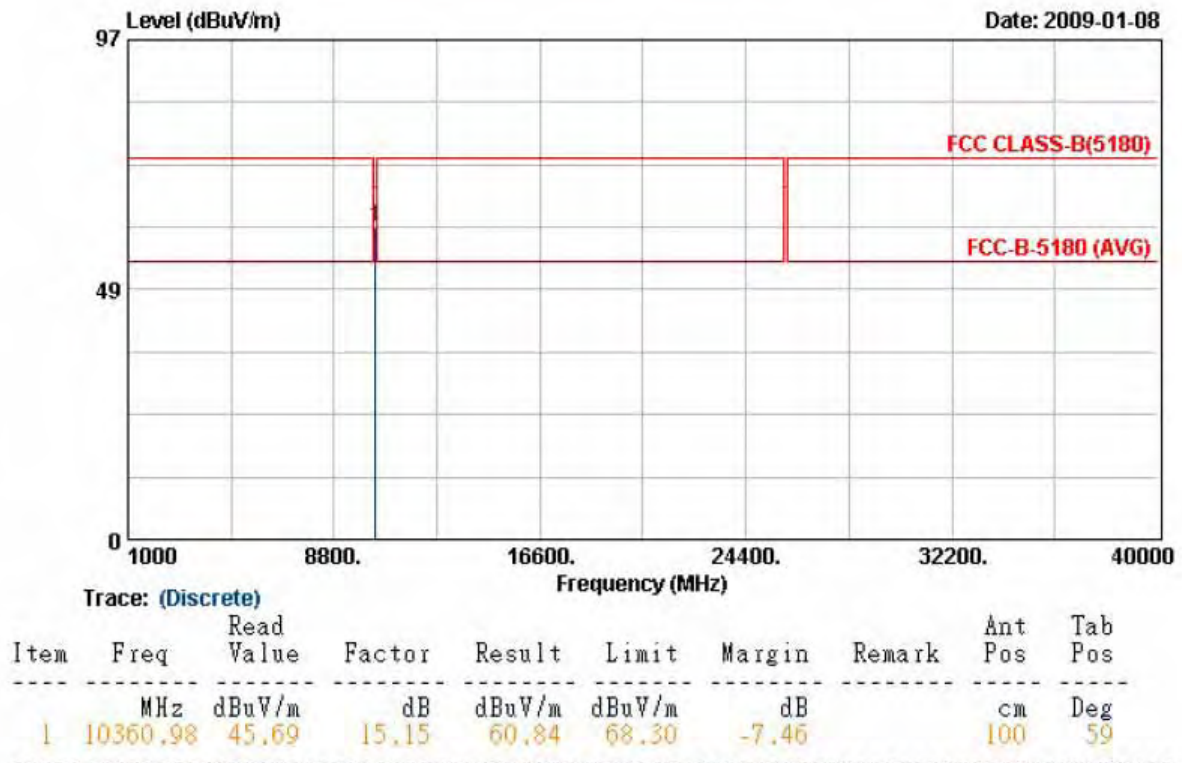
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	332.90	48.17	-5.74	42.43	46.00	-3.57	QP	100	0
2	400.80	44.67	-2.13	42.54	46.00	-3.46	QP	100	0
3	467.30	46.25	-3.74	42.51	46.00	-3.49	QP	100	0
4	533.80	44.54	-2.29	42.25	46.00	-3.75	QP	100	0
5	602.40	40.34	2.25	42.59	46.00	-3.41	QP	100	0
6	668.90	39.48	2.92	42.40	46.00	-3.60	QP	100	0
7	735.40	38.94	3.69	42.63	46.00	-3.37	QP	100	0
8	801.90	37.33	4.85	42.18	46.00	-3.82	QP	100	0
9	868.40	37.03	5.29	42.32	46.00	-3.68	QP	100	0
10	936.30	35.33	7.35	42.68	46.00	-3.32	QP	100	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11a mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11a, CH36	Temperature	: 25 °C
Memo	:	Humidity	: 70 %

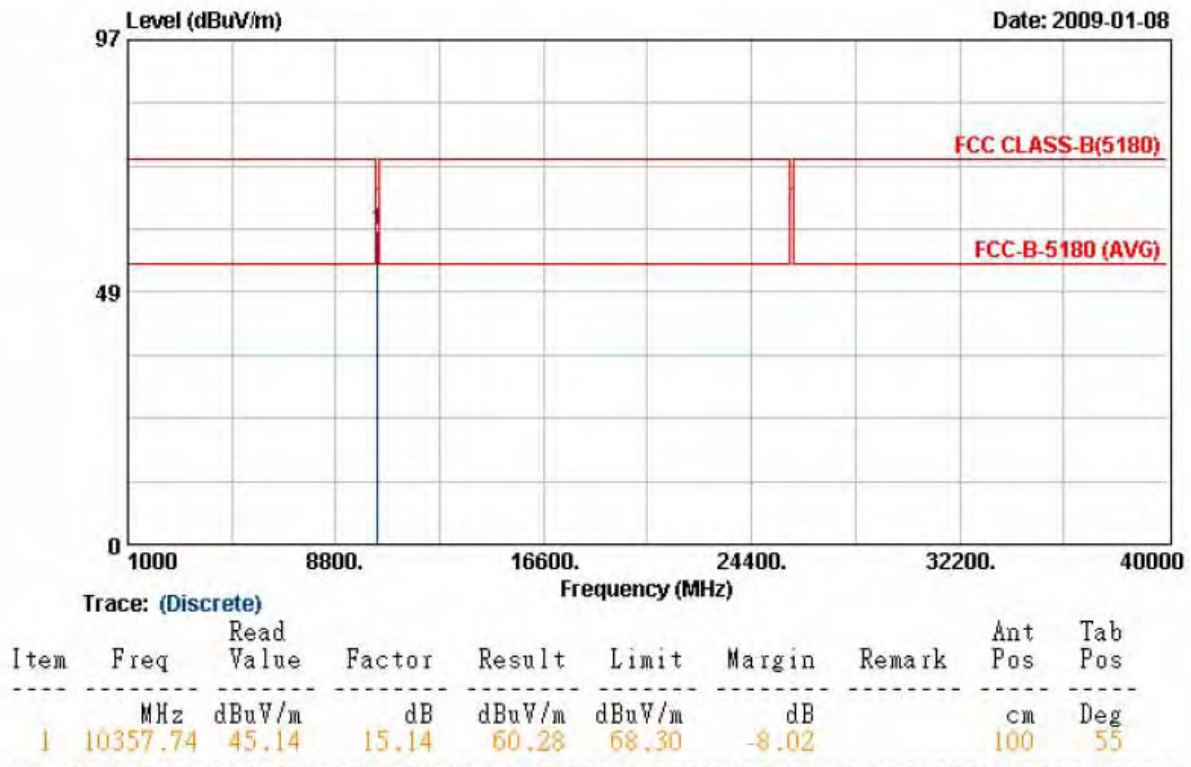


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a, CH36	Temperature	: 25 °C
Memo	:	Humidity	: 70 %

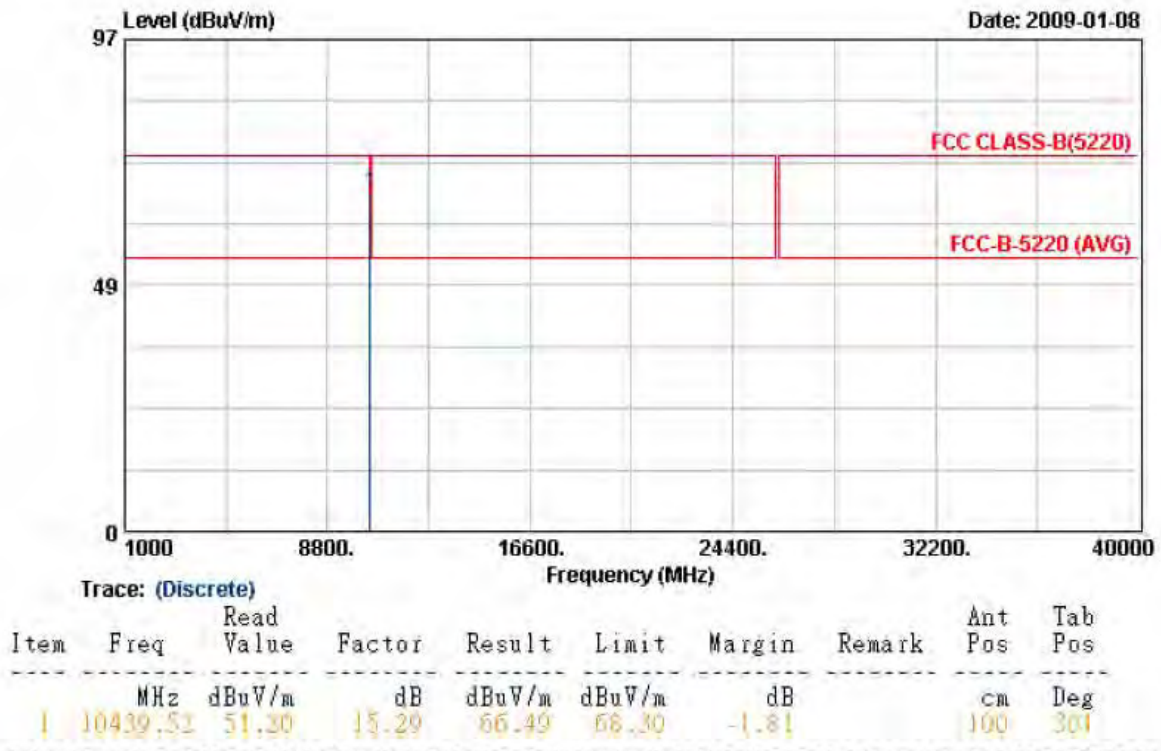


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11a, CH44	Temperature	: 25 °C
Memo	:	Humidity	: 70 %

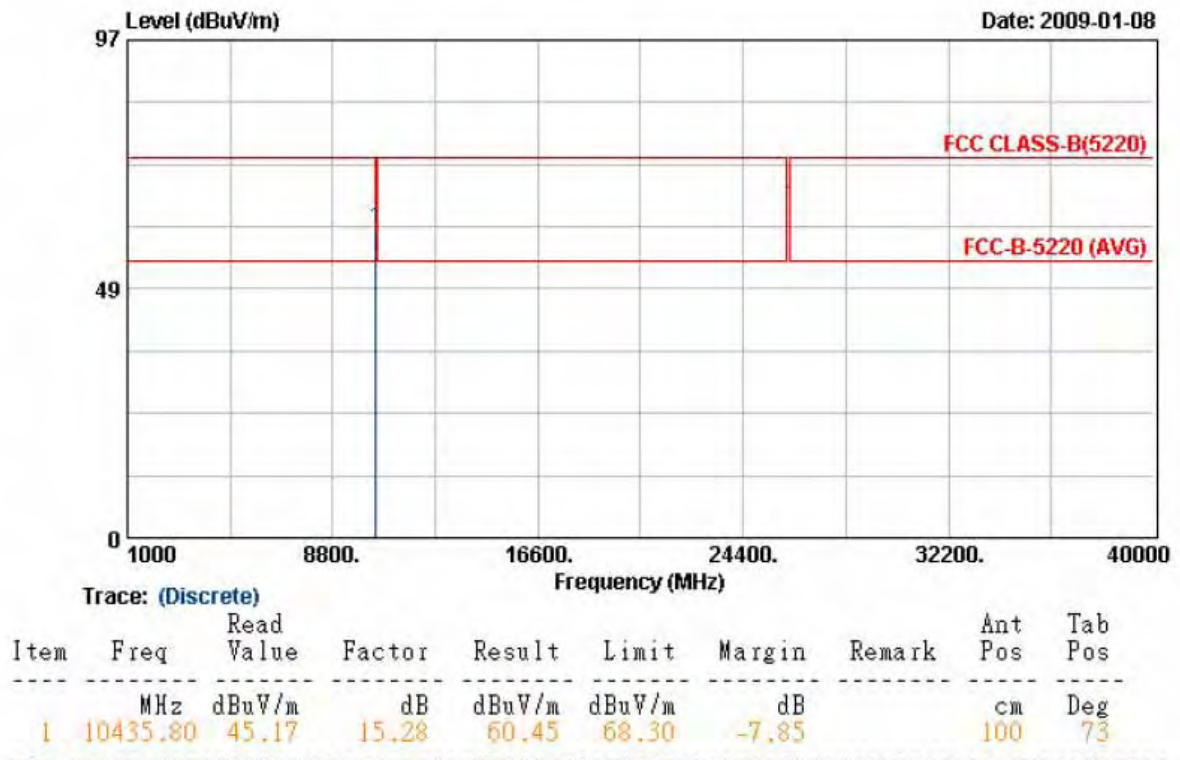


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a, CH44	Temperature	: 25 °C
Memo	:	Humidity	: 70 %

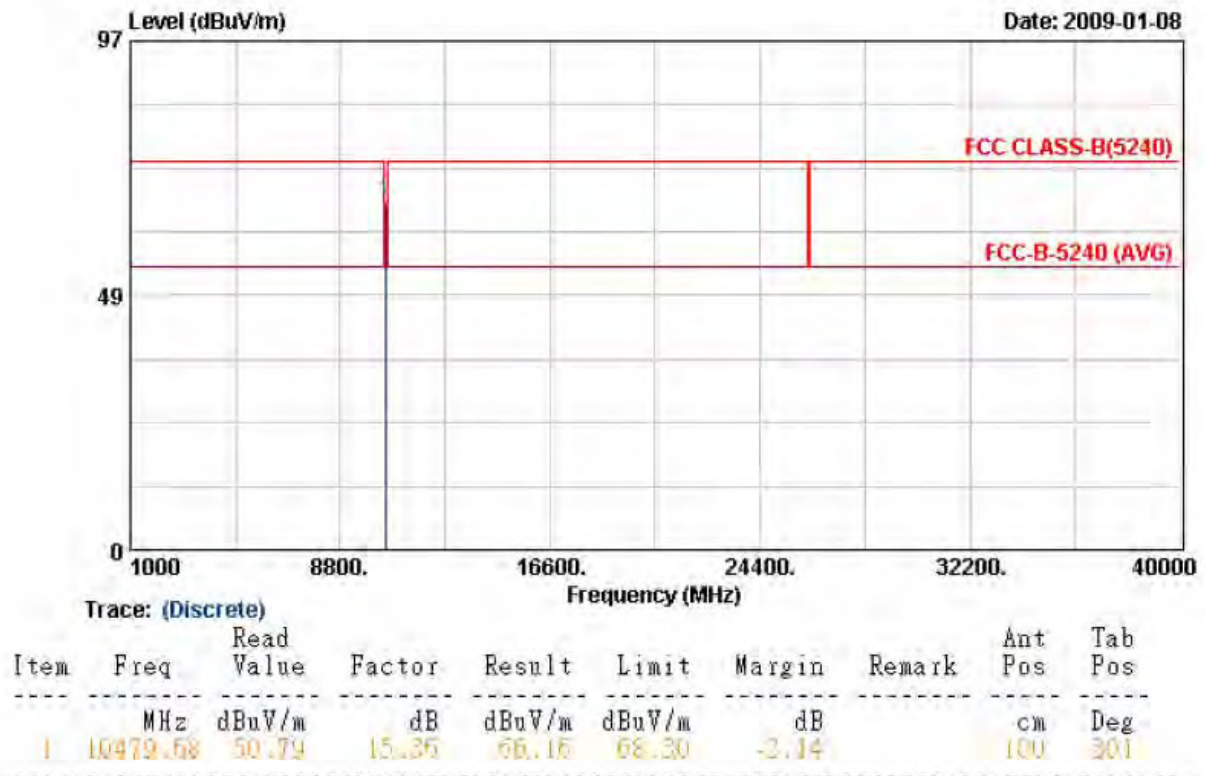


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11a, CH48	Temperature	: 25 °C
Memo	:	Humidity	: 70 %

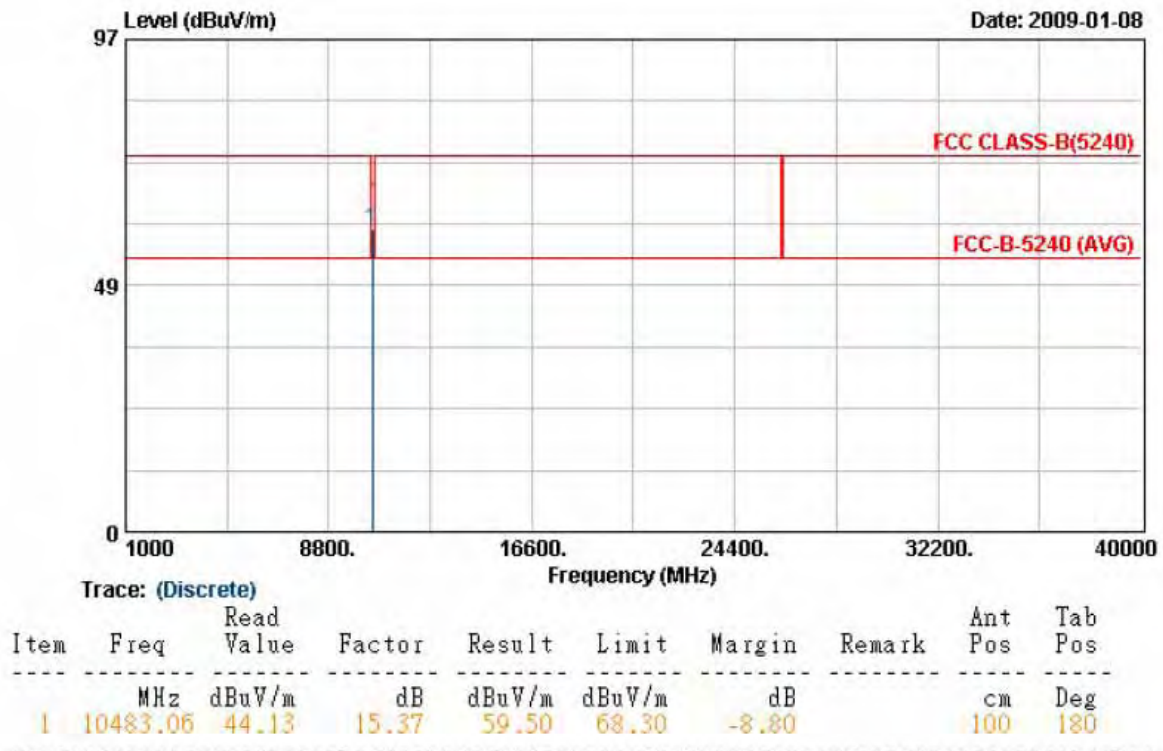


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a, CH48	Temperature	: 25 °C
Memo	:	Humidity	: 70 %

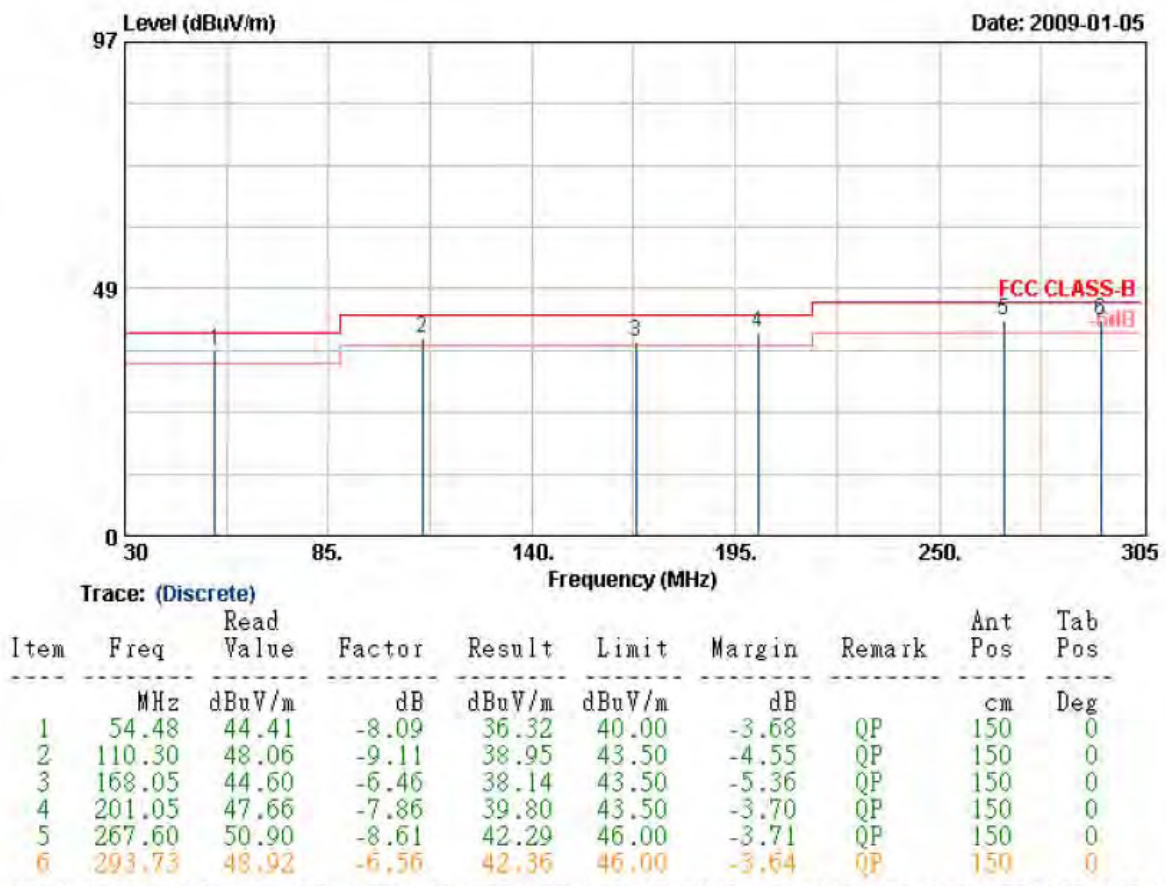


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 2	: 802.11an HT20, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %

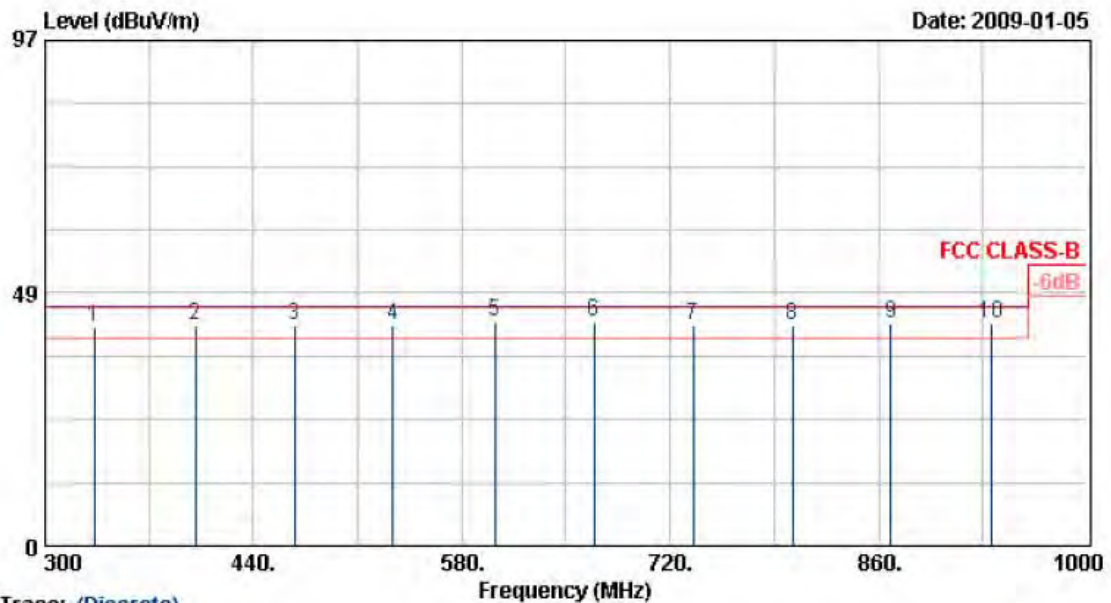


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11an HT20 mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11an HT20, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %



Trace: (Discrete)

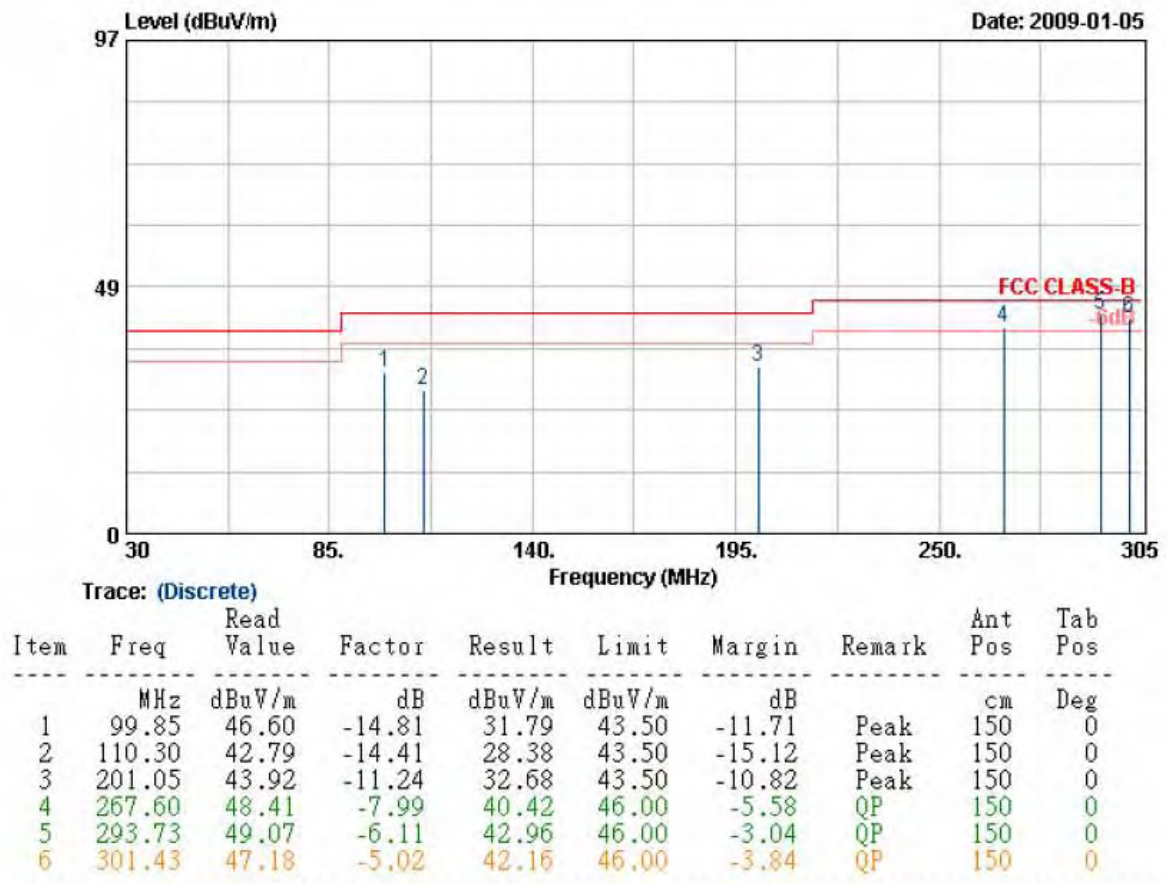
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	332.90	50.19	-8.10	42.09	46.00	-3.91	QP	100	0
2	400.80	46.48	-4.06	42.42	46.00	-3.58	QP	100	0
3	467.30	44.18	-1.68	42.50	46.00	-3.50	QP	100	0
4	533.80	42.46	-0.09	42.37	46.00	-3.63	QP	100	0
5	602.40	42.22	0.71	42.93	46.00	-3.07	QP	100	0
6	668.90	42.89	0.07	42.96	46.00	-3.04	QP	100	0
7	735.40	36.08	6.36	42.44	46.00	-3.56	QP	100	0
8	801.90	39.47	2.96	42.43	46.00	-3.57	QP	100	0
9	868.40	36.40	6.16	42.56	46.00	-3.44	QP	100	0
10	936.30	33.23	9.62	42.85	46.00	-3.15	QP	100	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11an HT20 mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11an HT20, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %



Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11an HT20 mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11an HT20, CH36	Temperature	: 23 °C
Memo	:	Humidity	: 75 %

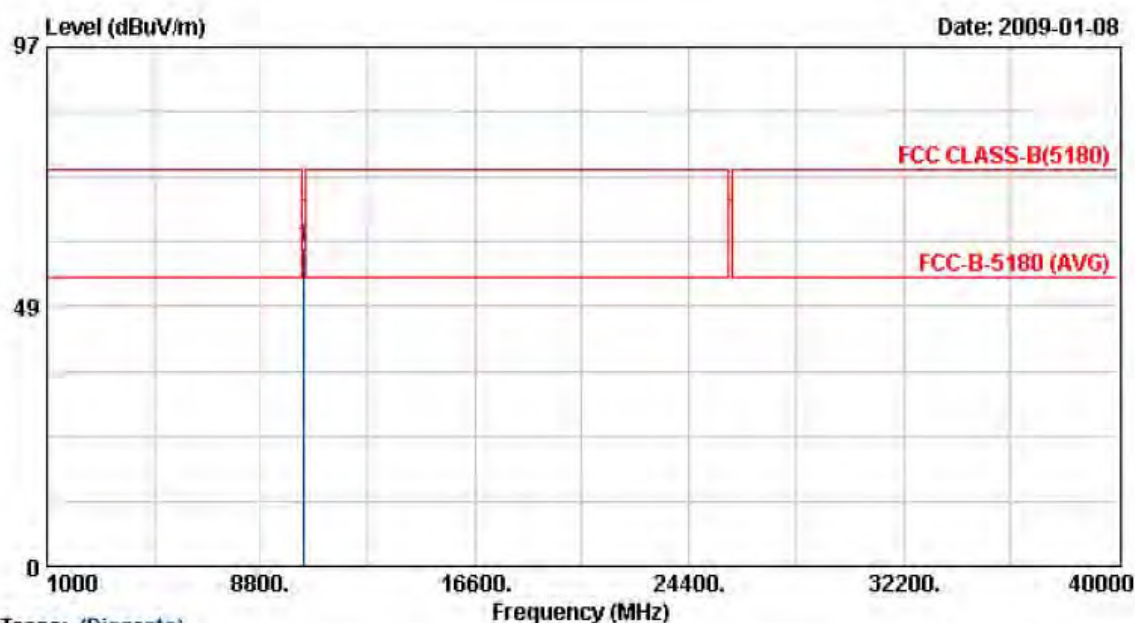


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. According to technical experiences, all spurious emission of 802.11an HT20 mode at channel 36, 44, 48 are almost the same below 1GHz, so that the channel 36 was chosen as representative in final test.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11an HT20, CH36	Temperature	: 25 °C
Memo	:	Humidity	: 70 %



Trace: (Discrete)

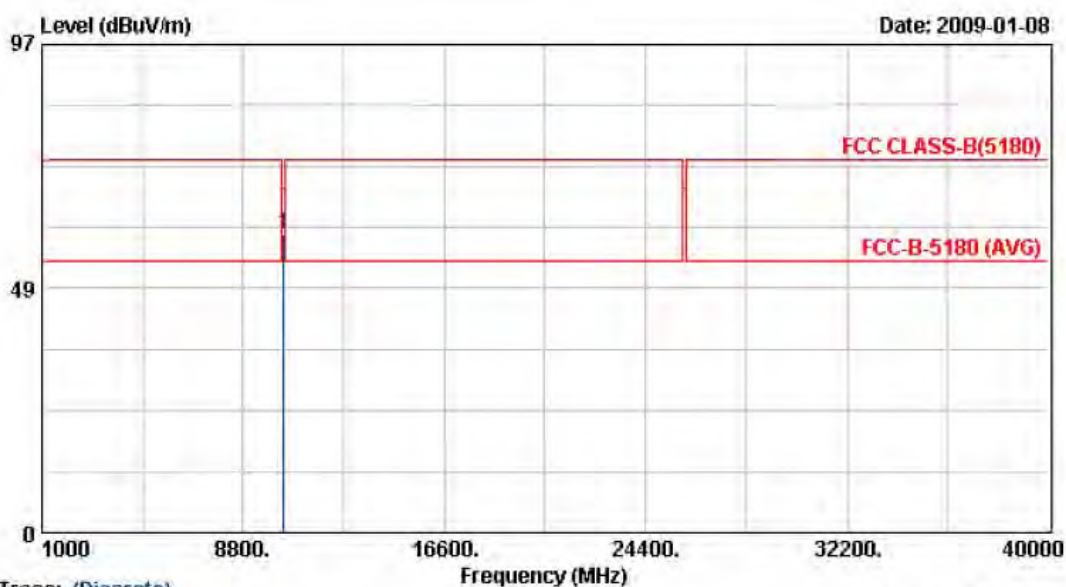
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	10359.30	44.56	15.15	59.71	68.30	-8.59	Peak	100	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11an HT20, CH36	Temperature	: 25 °C
Memo	:	Humidity	: 70 %



Trace: (Discrete)

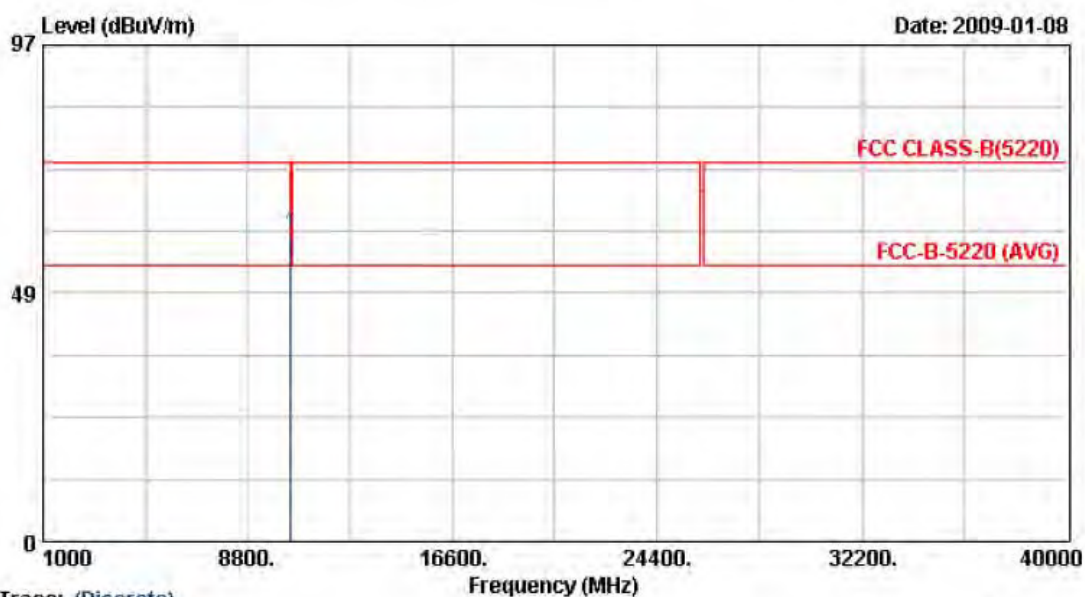
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	10356.52	44.15	15.14	59.30	68.30	-9.00	Peak	150	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: 802.11an HT20, CH44	Temperature	: 25 °C
Memo	:	Humidity	: 70 %



Trace: (Discrete)

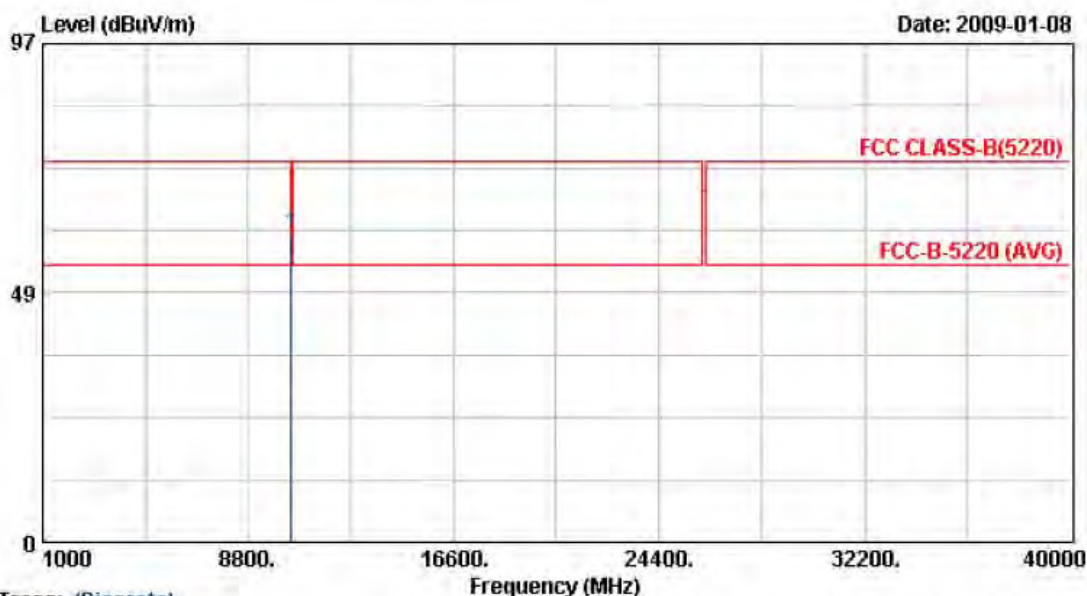
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	10438.16	44.56	15.29	59.85	68.30	-8.45	Peak	100	82

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode 2	: 802.11an HT20, CH44	Temperature	: 25 °C
Memo	:	Humidity	: 70 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	10441.72	44.76	15.30	60.06	68.30	-8.24	Peak	150	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.