FCC TEST REPORT

CATEGORY	:	Mobile
PRODUCT NAME	:	IEEE 802.11a/g Wireless PCI Adapter
FCC ID.	:	KA2DWLAG530A4
FILING TYPE	:	Certification
BRAND NAME	:	D-Link
MODEL NAME	:	DWL-AG510, DWL-AG530, WPC-D16, WPC-D18
APPLICANT	:	**D-Link Corporation** No.8, Li-shing Road VII, Science-based Industrial Park,Hsinchu, Taiwan.
MANUFACTURER	:	Same as applicant
ISSUED BY	:	**SPORTON INTERNATIONAL INC.** 6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien, Taiwan, R.O.C.

Statements:

Only the test result of 802.11a part is shown in this test report. (5150MHz ~ 5250MHz & 5250MHz ~ 5350MHz)

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

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

Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA, NVLAP or any agency of U.S. government.

The test equipment used to perform the test are calibrated and traceable to NML/ROC or NIST/USA.

CNLA

1190

ILAC MRA

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History of this test report

Original Report Issue Date: May 24, 2005

Report No.: FR542514

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

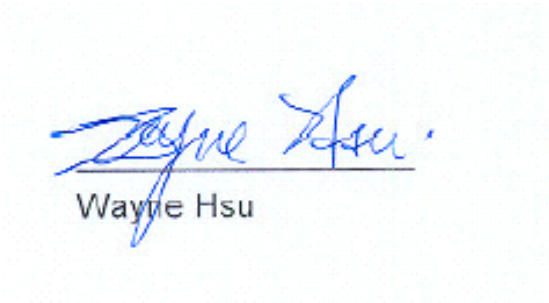
with

47 CFR FCC Part 15 Subpart E (Section 15.407)

PRODUCT NAME	:	IEEE 802.11a/g Wireless PCI Adapter
BRAND NAME	:	D-Link
MODEL NAME	:	DWL-AG510, DWL-AG530, WPC-D16, WPC-D18
APPLICANT	:	**D-Link Corporation** No.8, Li-shing Road VII, Science-based Industrial Park,Hsinchu, Taiwan.
MANUFACTURER	:	Same as applicant

I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4 - 2003 and all test are performed according to 47 CFR FCC Part 15. Testing was carried out on May 24, 2005 at SPORTON International Inc. LAB.



1. General Description of Equipment under Test

1.1. Applicant

D-Link Corporation
No.8, Li-shing Road VII, Science-based Industrial Park,Hsinchu, Taiwan.

1.2. Manufacturer

Same as applicant

1.3. Basic Description of Equipment under Test

This product is a Wireless PCI adapter with 802.11a/b/g wireless solution. The technical data has been listed on section " Features of Equipment under Test ". 2 types of antenna are filed in this project for both 2.4GHz and 5GHz operating frequency band. There are 2 pieces of wireless LAN card for the product: one is DWL-AG 530 (WPC-D16) and the other is DWL-AG510 (WPC-D18). The software are the same in both of the two cards, but only DWL-AG 530 (WPC-D16) card has Turbo function. So only DWL-AG 530 (WPC-D16) card was tested in the project.

1.4. Features of Equipment under Test

Items	Description
Type of Modulation	OFDM (16QAM / 64QAM / DQPSK / DBPSK)
Number of Channels	8
Frequency Band	5150MHz ~ 5250MHz, 5250MHz ~ 5350MHz
Carrier Frequency Range	5180MHz~5240MHz, 5260MHz~5320MHz
Carrier Frequency	See section 1.6 for details
Data Rate	6, 12, 18, 24, 36, 48, 54 Mbps- OFDM 108 Mbps- OFDM- Turbo Mode
Channel Bandwidth	18MHz
Max. Conducted Output Power	See section 1.7 for details
Antenna Type	See section 1.5 for details
Communication Type	Half-Duplex
Testing Duty Cycle	100.00%
Power Rating (DC/AC, Voltage)	5VDC from host
Test Power Source	110.00V AC
Temperature Range (Operating)	-10 ~ 55 °C

1.5. Antenna Description

2 types of antenna were filed in this project.

No.	Antenna Type	Gain (dBi)
1	Dipole Antenna	2.20dBi @5.0GHz
2	Tri- band flying lead and straight Antenna	5.00dBi @5.0GHz

1.6. Table for Carrier Frequencies

Frequency Bands			
5150MHz ~ 5250MHz		**5250MHz ~ 5350MHz**	
Channel	**Frequency**	**Channel**	**Frequency**
36	5180 MHz	52	5260 MHz
40	5200 MHz	56	5280 MHz
44	5220 MHz	60	5300 MHz
48	5240 MHz	64	5320 MHz

1.7. Table for Maximum Conducted Output Power

Normal Mode

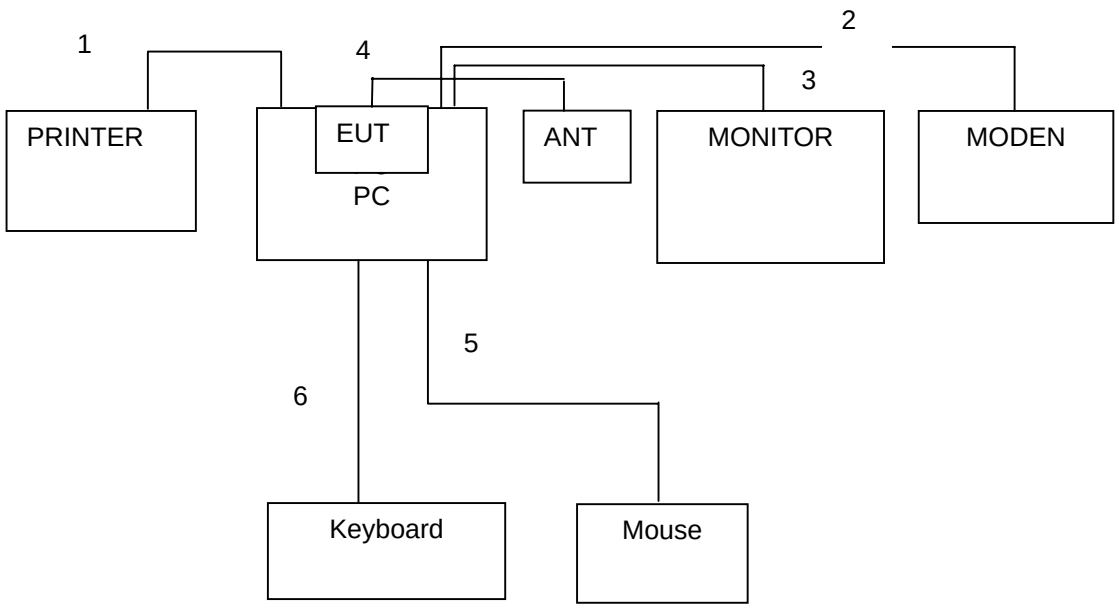
Maximum Conducted Output Power (dBm)	
Frequency Bands 5150MHz ~ 5250MHz	**Frequency Bands 5250MHz ~ 5350MHz**
11.13	17.85

Turbo Mode

Maximum Conducted Output Power (dBm)	
Frequency Bands 5150MHz ~ 5250MHz	**Frequency Bands 5250MHz ~ 5350MHz**
11.82	14.89

2. Test Configuration of the Equipment under Test

2.1. Connection Diagram of Test System



1. LPT cable, 1.35m, Shielding
2. RS232, 1.7m, Shielding
3. VGA Cable, 1.7m Shielding
4. RF Cable, 1.4m Shielding
5. PS2 Cable, 1.8m Shielding
6. PS2 Cable, 1.5m Shielding

2.2. The Test Mode Description

1. For OFDM modulation, BPSK (64QAM) is the worst case on all test items.
2. Spurious emission below 1GHz is independent of channel selection, modulation and antenna type, so only channel 64 was tested.
3. AC conduction emission is independent of channel selection, modulation and antenna type, so only channel 64 was the tested.
4. There are 2 types of antennas were tested.
   Mode 1 : Dipole Antenna
   Mode 2 : Tri- band flying lead and straight Antenna

2.3. Description of Test Supporting Units

Support unit	Brand	Model No.	Serial No.	FCC ID	Data cable (m)
Monitor	ViewSonic	VCDTS21553-3P	-	DoC	1.7
PC	HP COMPAQ	D330ut	-	DoC	-
Keyboard	LOGITECH	Y-SP29	-	DoC	1.5
Mouse	LOGITECH	M-S34	-	DoC	1.8
Printer	EPSON	LQ-680	-	DoC	1.35
MODEM	ACEEX	DM141	-	DoC	1.7

3. General Information of Test

3.1. Test Facility

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.

: TEL 886-3-327-3456

: FAX 886-3-318-0055

Test Site No : 03CH03-HY / TH01-HY / CO04-HY

3.2. Test Conditions

Normal Voltage	: 110.00V (host)
Extreme Voltages	: 126.50V and 93.5V (host)
Normal Temperature	: 20˚C
Extreme Temperature	: -10 ˚C and 55 ˚C

3.3. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.

ANSI C63.4-2003

47 CFR Part 15 Subpart E (Section 15.407)

3.4. Frequency Range Investigated

Radiated emission test: from 30 MHz to 10th carrier harmonic.

3.5. Test Distance

The test distance of radiated emission (30MHz~1GHz) test from antenna to EUT is 3 M.
The test distance of radiated emission (1GHz~10th carrier harmonic) test from antenna to EUT is 3 M.

3.6. Test Software

During testing, Channel & Power Controlling Software: This was provided by the manufacturer and is able to let the test engineer select the operating channel as well as the RF output power. The parameters for channel selection is trying to offer the test engineer the ability to fix the operating channel for testing, both normal data and continuously transmitting modes are allowed, and that for RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameter Table

Normal Mode

Test Software: ART					
Frequency Bands					
5150MHz ~ 5250MHz		5250MHz ~ 5350MHz		5725MHz ~ 5825MHz	
Frequency	Power Setup	Frequency	Power Setup	Frequency	Power Setup
5180 MHz	11	5260 MHz	11	5745 MHz	17
5200 MHz	NA	5280 MHz	NA	5765 MHz	17
5240 MHz	NA	5320 MHz	16	5805 MHz	17

Turbo Mode

Frequency Bands					
5150MHz ~ 5250MHz		5250MHz ~ 5350MHz		5725MHz ~ 5825MHz	
Frequency	Power Setup	Frequency	Power Setup	Frequency	Power Setup
5210 MHz	11.0	5290 MHz	14	5760 MHz	16
5250 MHz	11.5			5800 MHz	16

4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR Part 15 and Part 2

Paragraph	FCC Rule	Description of Test	Result
5.1	15.407	26dB Spectrum Bandwidth	Pass
5.2	15.407	Maximum Conducted Output Power	Pass
5.3	15.407	Peak Power Spectral Density	Pass
5.4	15.407	Ratio of the Peak Excursion	Pass
5.5	15.407	Band Edges Emission	Pass
5.6	15.407	Test of Frequency Stability	Pass
5.7	15.407	AC Power Line Conducted Emission	Pass
5.8	15.209/15.407	Spurious Radiated Emission	Pass
5.9	15.203/15.407	Antenna Requirement	Pass
5.10	2.1091	Maximum Permissible Exposure	Pass

5. Test Result

5.1. Test of 26dB Spectrum Bandwidth

5.1.1. Measuring Instruments

Item 18 of the table on section 6.

5.1.2. Test Procedures

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 300KHz and VBW to 1000KHz.
3. The spectrum width with level higher than 26dB below the peak level.

5.1.3. Test Setup Layout

Spectrum Analyzer **EUT**

5.1.4. Test Result: See spectrum analyzer plots below

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

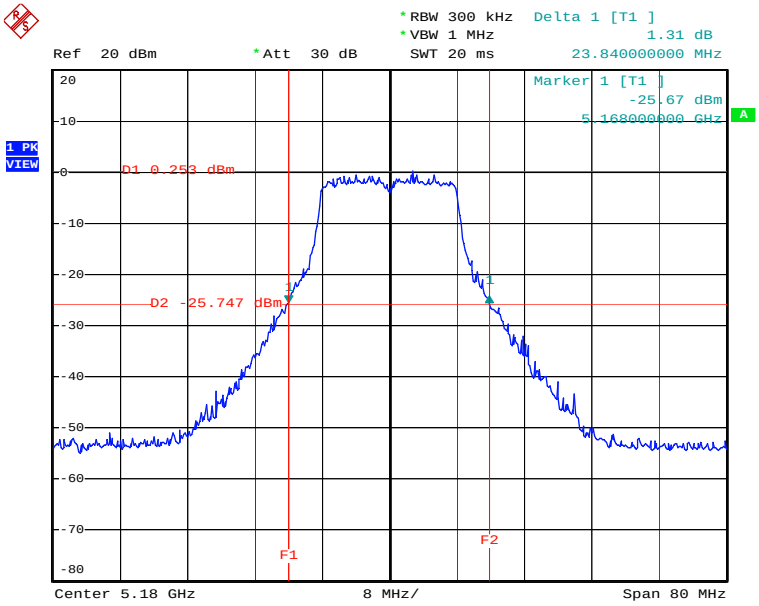
Normal Mode

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Calculated Power Limit (dBm)	Applied Power Limit (dBm)
36	5180 MHz	23.84	18.13	17
52	5260 MHz	25.60	25.15	24
64	5320 MHz	32.48	25.15	24

Turbo Mode

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Calculated Power Limit (dBm)	Applied Power Limit (dBm)
42	5210	43.4	18.13	17
50	5250	45.2	25.15	17
58	5290	45.0	25.15	24

Channel: 36 / 5180 MHz



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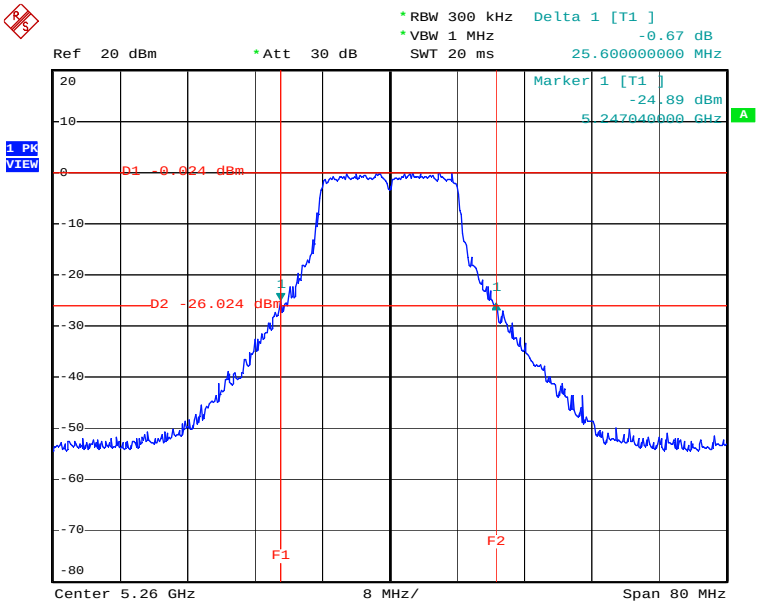
Channel: 52 / 5260 MHz



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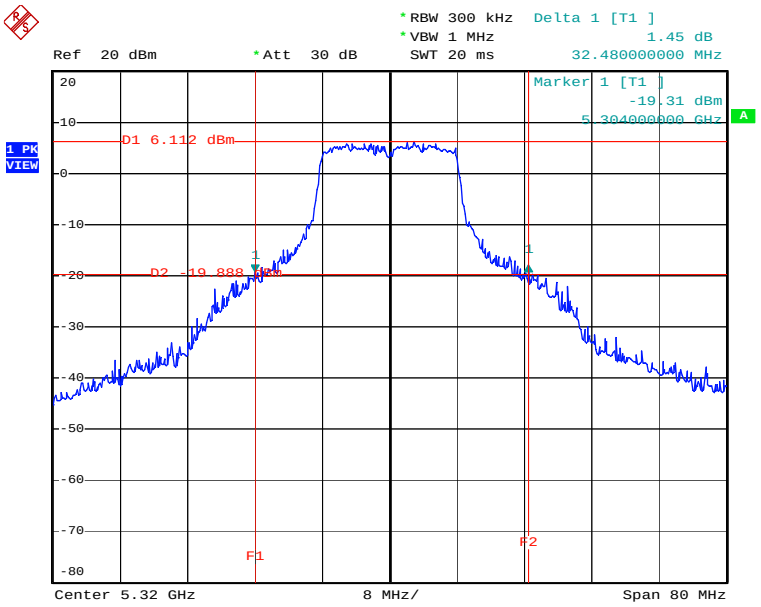
Channel: 64 / 5320 MHz



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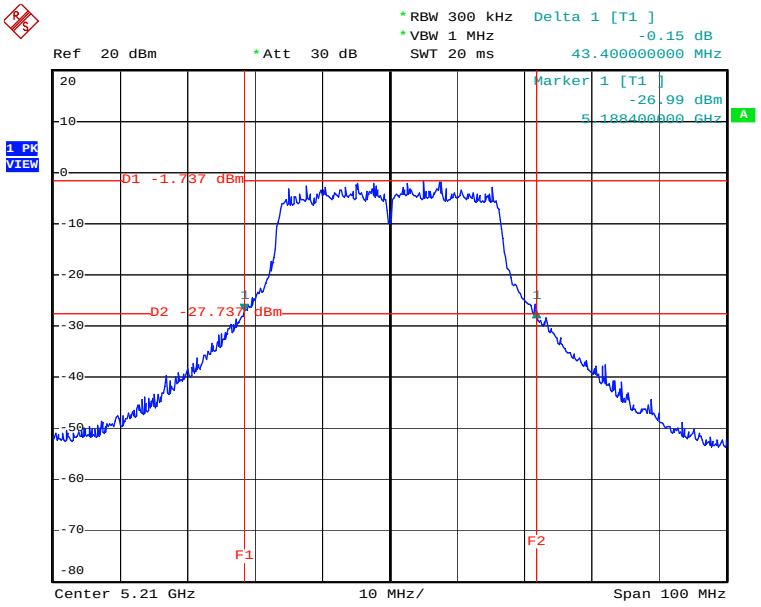
Channel: 42/ 5210 MHz



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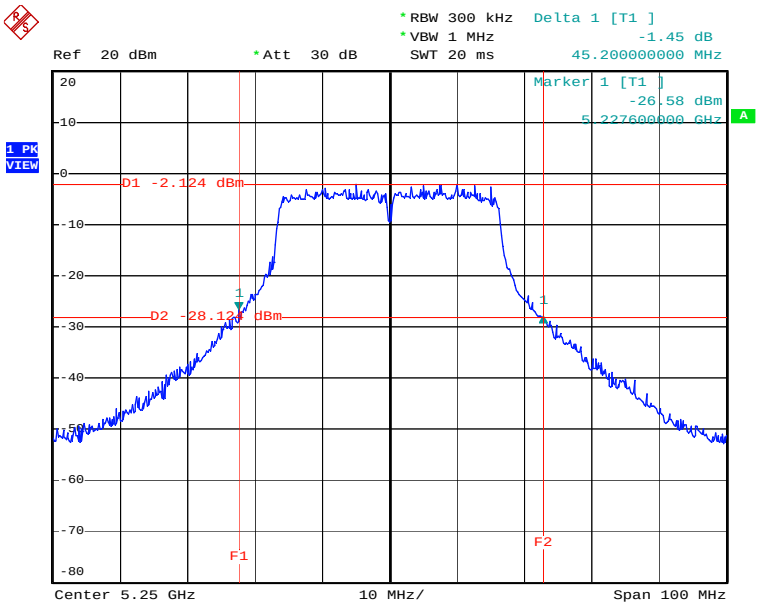
Channel: 50 / 5250MHz



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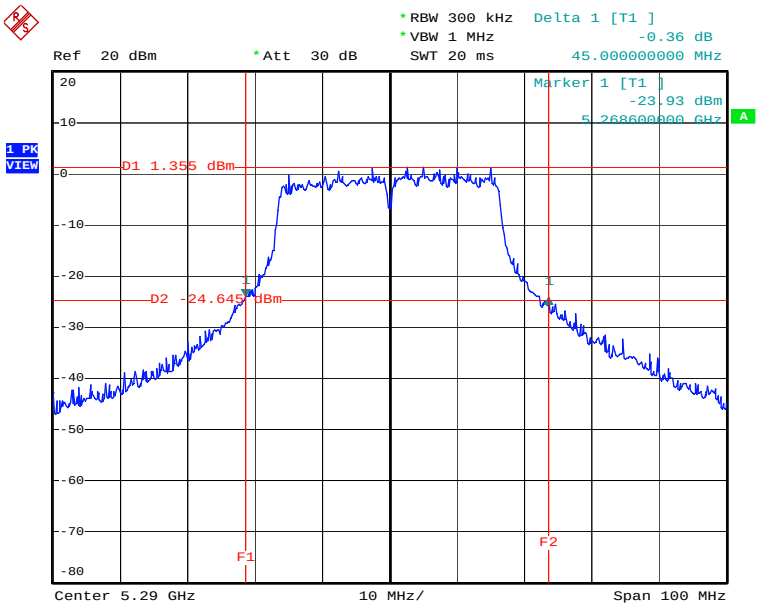
Channel: 58 / 5290MHz



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5.2. Test of Maximum Conducted Output Power

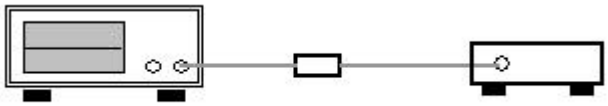
5.2.1. Measuring Instruments

Item 18 of the table on section 6.

5.2.2. Test Procedures

1. According to FCC DA 02-2138 test procedure, EUT connected to spectrum analyzer, then used the channel power function of spectrum analyzer and calculated total average power range is more than 26dB bandwidth.
2. Repeated the 1 for the middle and highest channel of the EUT.

5.2.3. Test Setup Layout



Spectrum Analyzer **EUT**

5.2.4. Test Result of Conducted Power

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

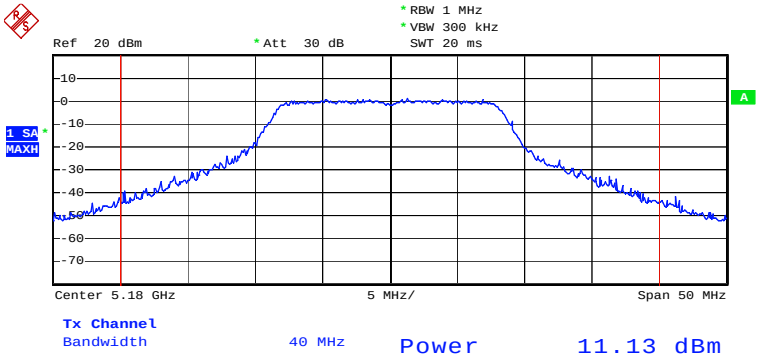
Normal Mode

Channel	Frequency (MHz)	Output Power (dBm)	Limits (dBm)
36	5180 MHz	11.13	17
52	5260 MHz	11.73	24
64	5320 MHz	17.85	24

Turbo Mode

Channel	Frequency (MHz)	Output Power (dBm)	Limits (dBm)
42	5210	11.70	17
50	5250	11.82	17
58	5290	14.89	24

Channel: 36 / 5180 MHz



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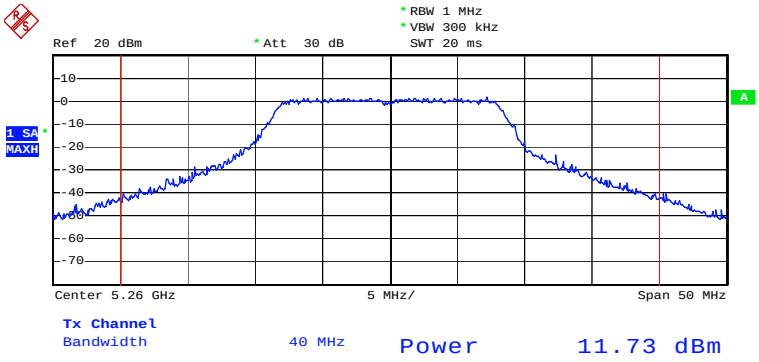
Channel: 52 / 5260 MHz



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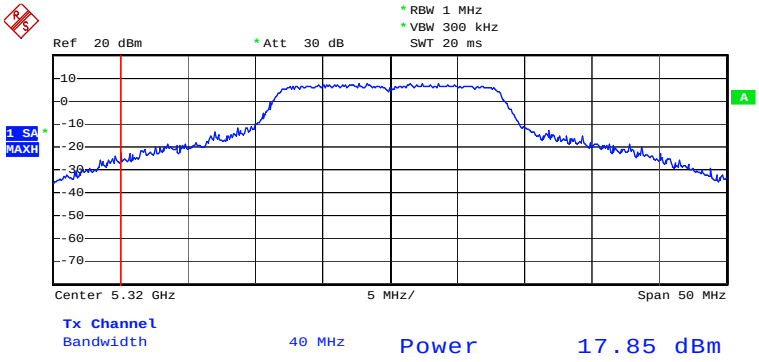
Channel: 64 / 5320 MHz



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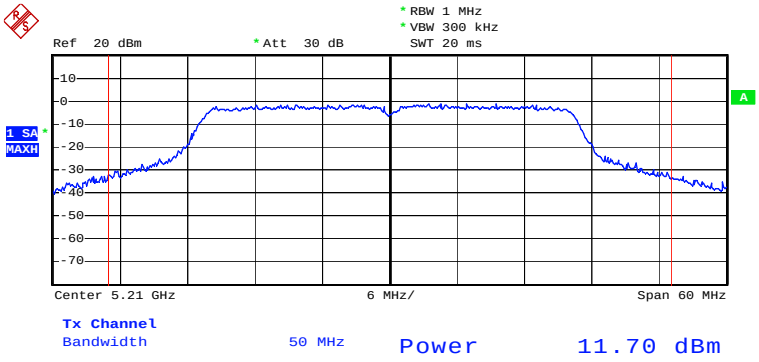
Channel: 42/ 5210 MHz



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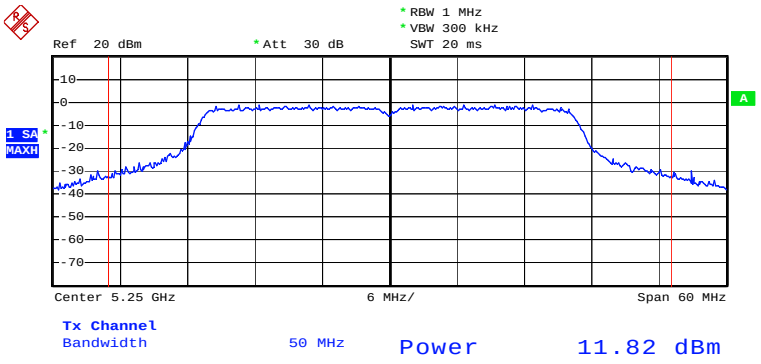
Channel: 50 / 5250MHz



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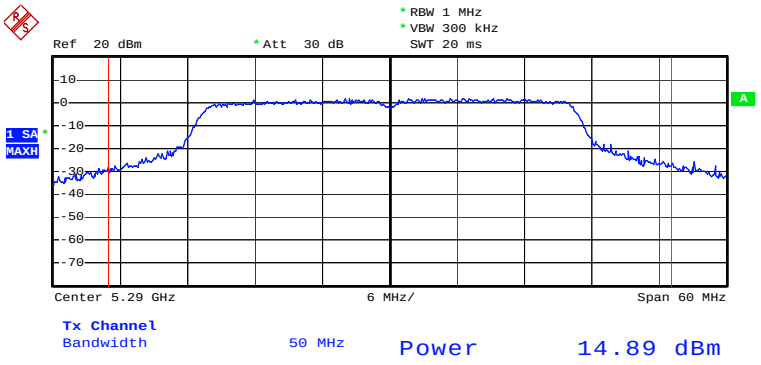
Channel: 58 / 5290MHz



Date: 16.MAY.2005 14:47:58

5.3. Test of Peak Power Spectral Density

5.3.1. Measuring Instruments

Item 18 of the table on section 6.

5.3.2. Test Procedures

1. According to FCC DA 02-2138 test procedure, EUT connected to spectrum analyzer, then used the same setup as power measurement of spectrum analyzer.
2. Repeated the 1 for the middle and highest channel of the EUT.

5.3.3. Test Setup Layout

Spectrum Analyzer **EUT**

5.3.4. Test Result of conducted peak power spectral density

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Normal Mode

Channel	Frequency (MHz)	Power Density (dBm)	Limits (dBm)
36	5180 MHz	-4.37	4
52	5260 MHz	-4.29	11
64	5320 MHz	1.12	11

Turbo Mode

Channel	Frequency (MHz)	Power Density (dBm)	Limits (dBm)
42	5210 MHz	-7.14	4
50	5250 MHz	-7.57	4
58	5290 MHz	-4.10	11

5.4. Ratio of the Peak Excursion

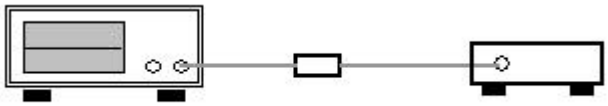
5.4.1. Measuring Instruments

Item 18 of the table on section 6.

5.4.2. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Trace 1:Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz.
3. Use peak detector mode, Max-hold and search the peak of trace 1.
4. Trace 2:Set RBW of spectrum analyzer to 1000kHz and VBW to 300kHz.
5. Use sample detector mode, trace max-hold and search the peak of trace 2
6. The delta limits is 13dB between trace 1 and trace 2 of the peak value.

5.4.3. Test Setup Layout



Spectrum Analyzer **EUT**

5.4.4. Test Result of conducted peak power spectral density

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Normal Mode

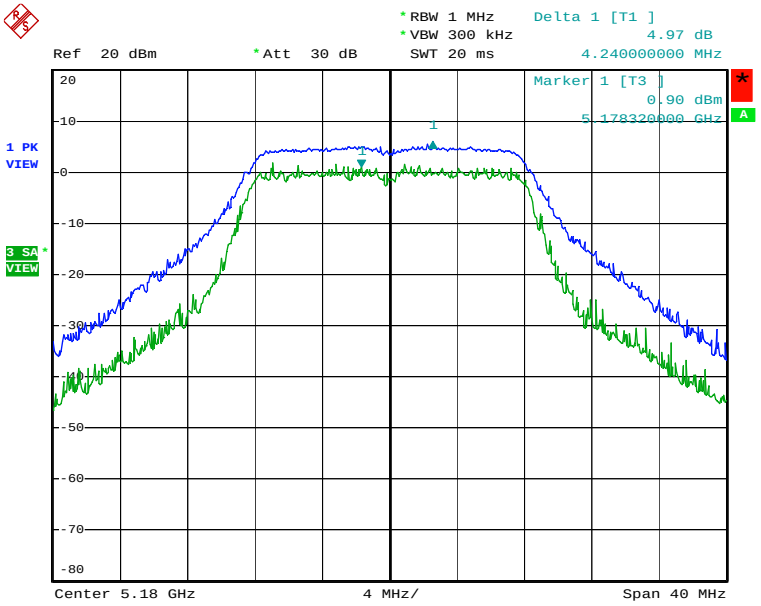
Channel	Frequency (MHz)	Peak Excursion (dB)	Max. Limits (dB)
36	5180 MHz	4.97	13
52	5260 MHz	4.83	13
64	5320 MHz	4.64	13

Turbo Mode

Channel	Frequency (MHz)	Peak Excursion (dB)	Max. Limits (dB)
42	5210 MHz	4.91	13
50	5250 MHz	4.55	13

58	5290 MHz	4.03	13

Channel: 36 / 5180 MHz



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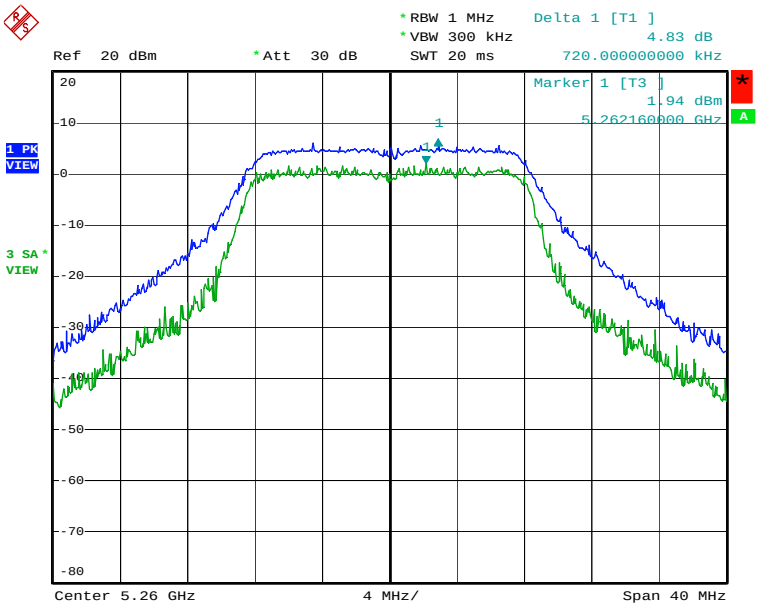
Channel: 52 / 5260 MHz



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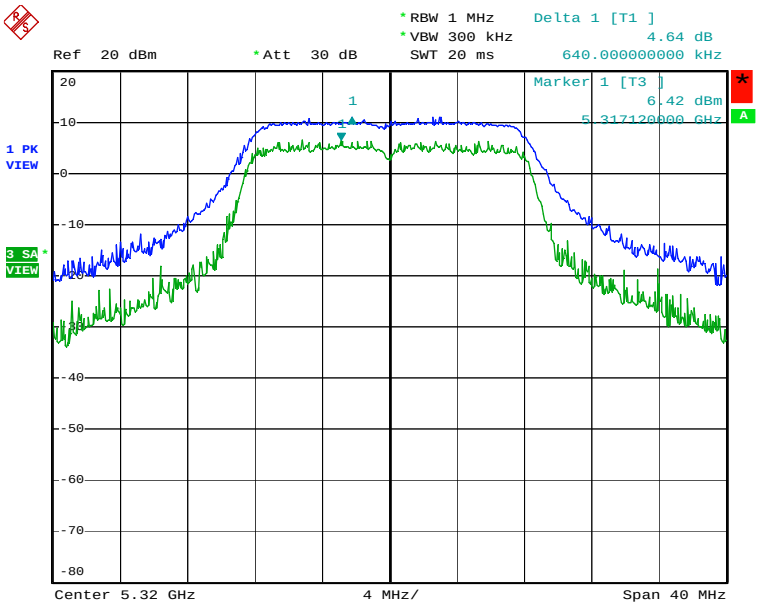
Channel: 64 / 5320 MHz



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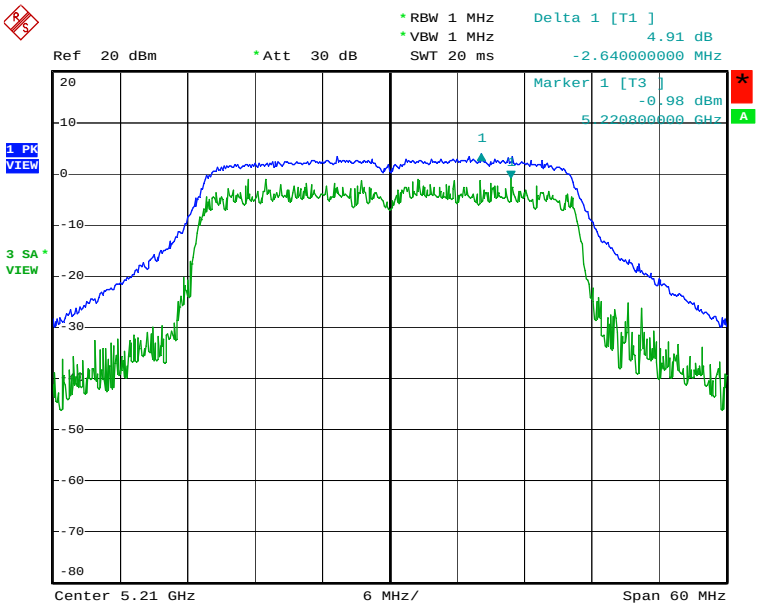
Channel: 42/ 5210 MHz



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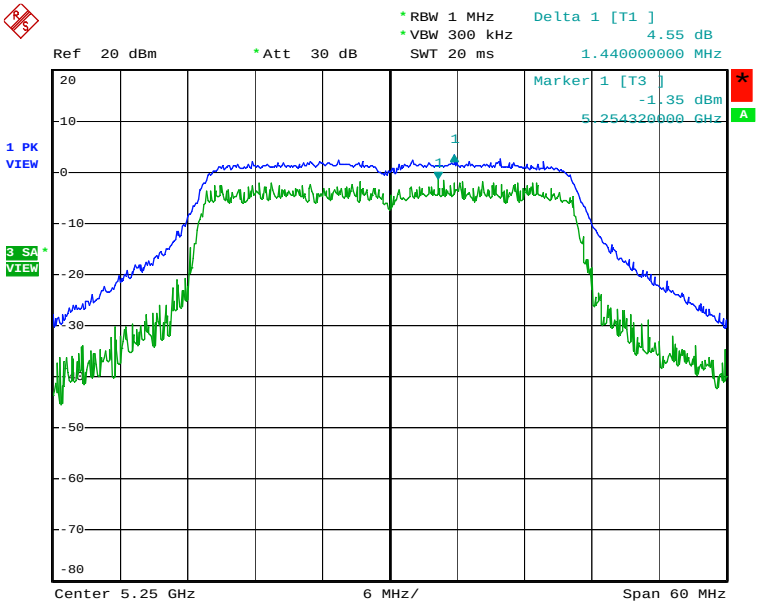
Channel: 50 / 5250MHz



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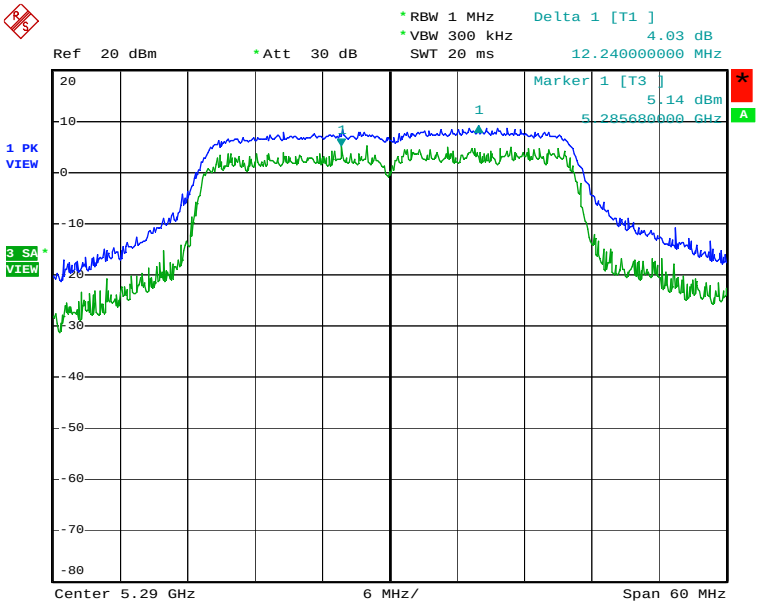
Channel: 58 / 5290MHz



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5.5. Test of Band Edges Emission

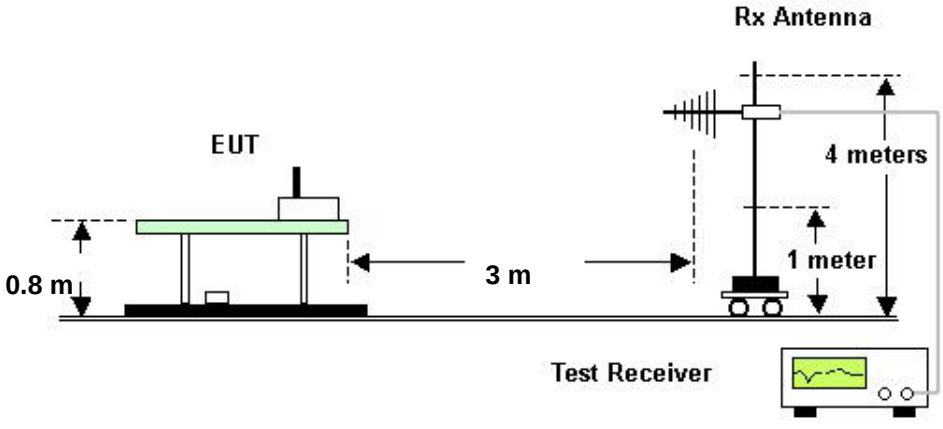
5.5.1. Measuring Instruments

Please reference item 6~17 in chapter 6 for the instruments used for testing.

5.5.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
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. The transmitter is set to the lowest channel of each band.
5. The turntable was rotated 360 degrees to determine the position of the highest radiation.
6. Set both RBW and VBW of spectrum analyzer to 1MHz with convenient frequency span including 1MHz bandwidth from lower band edge.
7. 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. Record the maximum value of band-edge.
8. Remove the transmitter and replace it with a broadband substitution antenna.
9. With the substitution antennas at maximum polarized and with the signal generator tuned to a particular fundamental frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading (item 6). This should be done carefully repeating the adjustment of the test antenna and generator output.
10. Pd(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi). Pd is the dipole equivalent power and Pg is the generator output power into the substitution antenna.
11. The lowest and highest channels of band edges of each band emission was measured and recorded.

5.5.3. Test Setup Layout



5.5.4. Test Result

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Normal Mode

Ant. No.	Gain (dBi)	Freq. Band (MHz)	Freq. (MHz)	Level* (dBm/MHz)	Margin (dB)	Limit (dBm/MHz)
1	2.20	5150~5250	5120.2	-42.68	-15.68	-27
1	2.20	5250~5350	5351.4	-28.70	-1.70	-27
2	5.00	5150~5250	5135.6	-39.07	-12.07	-27
2	5.00	5250~5350	5351.8	-30.06	-3.06	-27

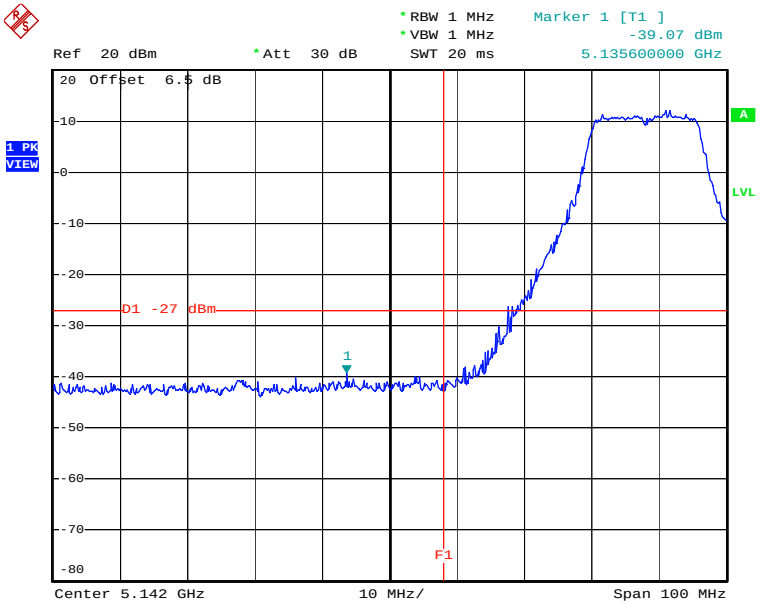
Turbo Mode

Ant. No.	Gain (dBi)	Freq. Band (MHz)	Freq. (MHz)	Level* (dBm/MHz)	Margin (dB)	Limit (dBm/MHz)
1	2.20	5150~5250	5136.8	-43.78	-16.78	-27
1	2.20	5250~5350	5353.0	-28.87	-1.87	-27
2	5.00	5150~5250	5092.8	-40.32	-13.32	-27
2	5.00	5250~5350	5353.4	-29.49	-2.49	-27

Level*: The max EIRP emission in the band-edge.

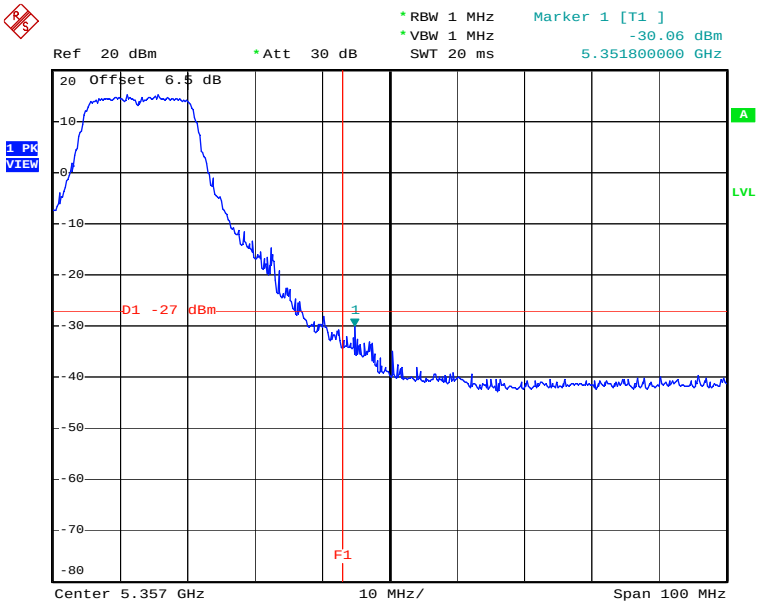
Normal Mode

Channel: 36 / 5180 MHz



Date: 19.MAY.2005 02:02:55

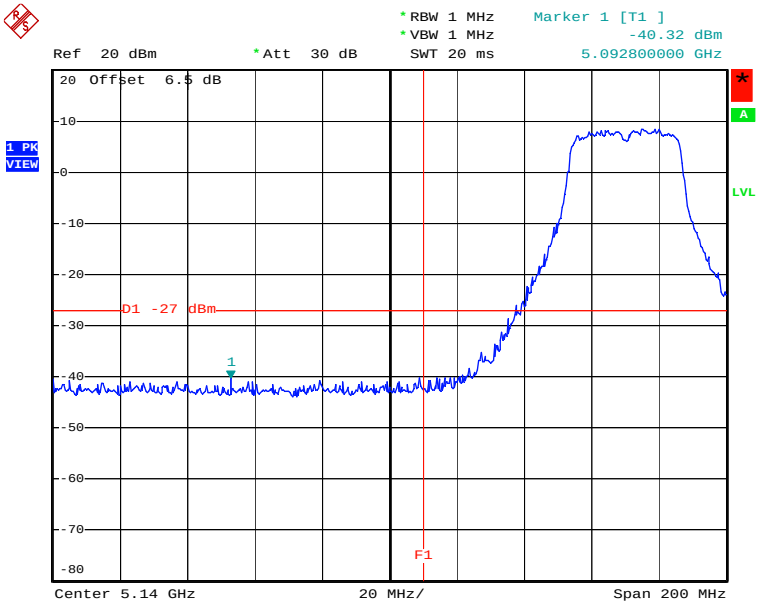
Channel: 64 / 5320MHz



Date: 19.MAY.2005 02:02:13

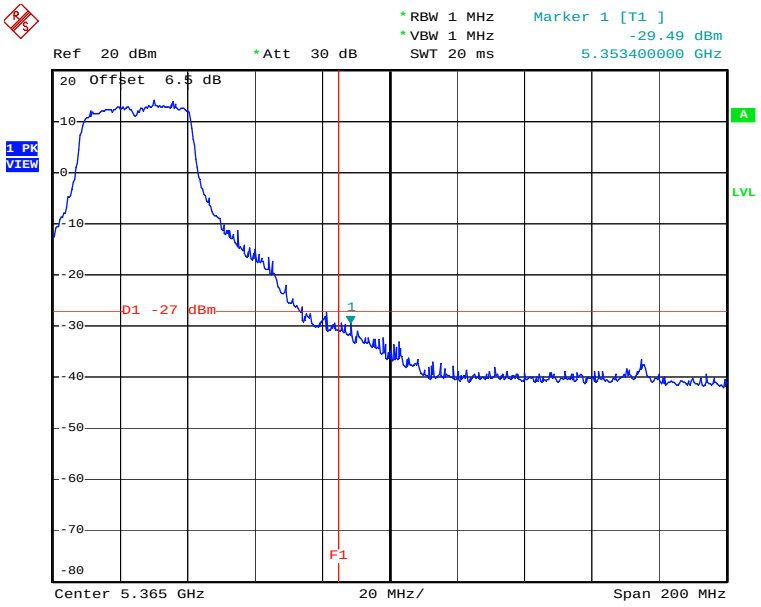
Turbo Mode

Channel: 42 / 5210 MHz



Date: 19.MAY.2005 02:00:00

Channel: 58 / 5290MHz



Date: 19.MAY.2005 02:01:34

5.6. Test of Frequency Stability

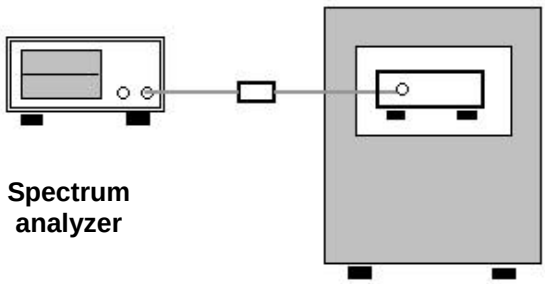
5.6.1. Measuring Instruments

Item 18 of the table on section 6.

5.6.2. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 10kHz and VBW to 10kHz.
3. Use mark counter function to counter the peak un-modulation carrier frequency.
4. The test extreme voltage is, according to 2.1055(d)(1), is to change the primary supply voltage from 85 to 115 percent of the nominal value
5. Extreme temperature rule is, according to 2.1055(a)(1), -30˚C~50˚C.

5.6.3. Test Setup Layout



5.6.4. Test Result

- Modulation Type: Un-Modulated Carrier
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test: 100%

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5260.0000
126.50	5260.0130
110.00	5260.0130
93.50	5260.0025
Max. Deviation (MHz)	0.0130
Max. Deviation (ppm)	2.47

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5260.0000
-30	5260.0130
-20	5260.0130
-10	5260.0025
0	5260.0130
10	5260.0258
20	5260.0025
30	5260.0130
40	5260.0130
50	5260.0025
Max. Deviation (MHz)	0.0258
Max. Deviation (ppm)	4.90

5.7. Test of AC Power Line Conducted Emission

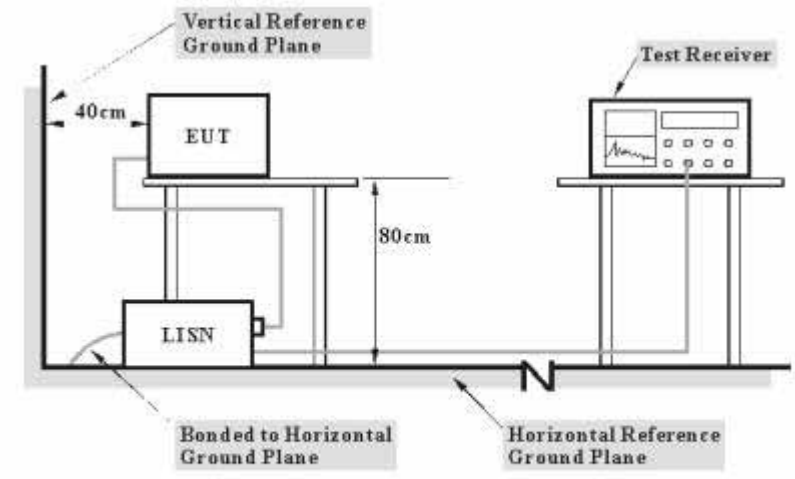
5.7.1. Measuring Instruments

Please reference item 1~5 in chapter 6 for the instruments used for testing.

5.7.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN)
4. All the support units are connected to the other LISNs. The LISN should provides 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Use the Channel & Power Controlling software to make the EUT working on selected channel and expected output power, then use the “H” Patter Generator software to make the supporting equipments stay on working condition.
7. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
8. The measurement has to be done between each power line and ground at the power terminal for each RF channel. Only one RF channel has to be investigated since this test is independent with the RF channel selection.

5.7.3. Test Setup Layout

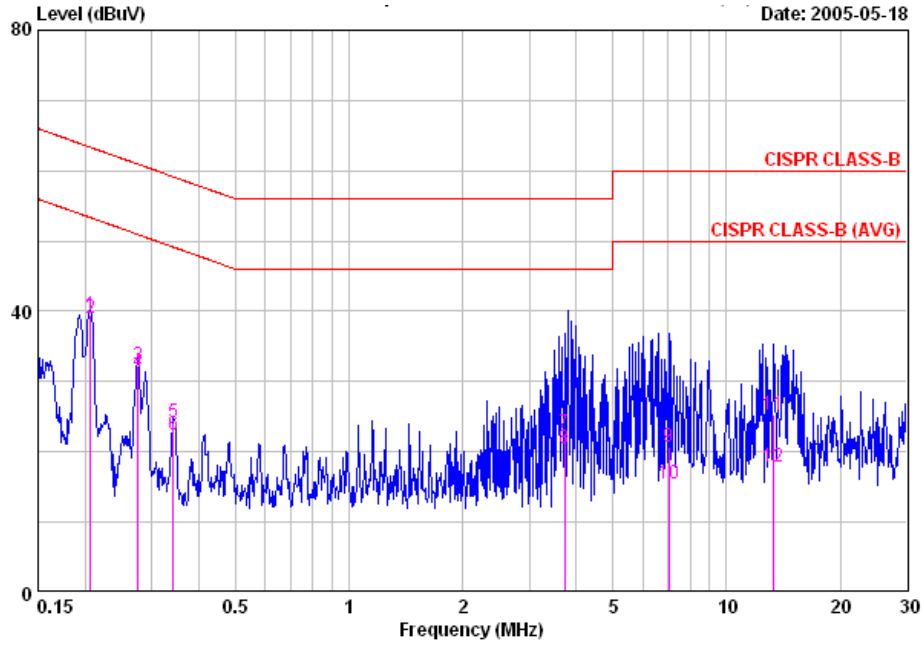


Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

5.7.4. Test Result of Conducted Emission

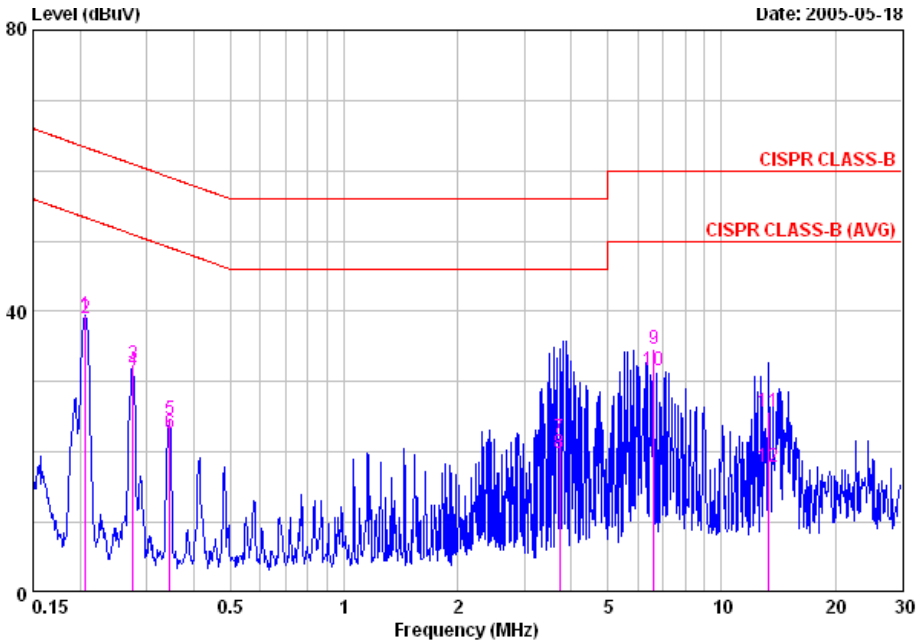
- Mode 1
- Temperature: 15°C
- Relative Humidity: 62%
- Test Engineer: Steven Lu

Line to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20614	39.50	-23.86	63.36	39.40	0.10	0.00	QP
2 @	0.20614	39.06	-14.30	53.36	38.96	0.10	0.00	AVERAGE
3	0.27587	32.36	-28.58	60.94	32.31	0.05	0.00	QP
4	0.27587	31.47	-19.47	50.94	31.42	0.05	0.00	AVERAGE
5	0.34281	24.15	-34.98	59.13	24.13	0.02	0.00	QP
6	0.34281	22.38	-26.75	49.13	22.36	0.02	0.00	AVERAGE
7	3.720	22.65	-33.35	56.00	22.55	0.00	0.10	QP
8	3.720	20.54	-25.46	46.00	20.44	0.00	0.10	AVERAGE
9	7.025	20.66	-39.34	60.00	20.38	0.06	0.22	QP
10	7.025	15.51	-34.49	50.00	15.23	0.06	0.22	AVERAGE
11	13.267	25.33	-34.67	60.00	24.86	0.10	0.37	QP
12	13.267	17.98	-32.02	50.00	17.51	0.10	0.37	AVERAGE

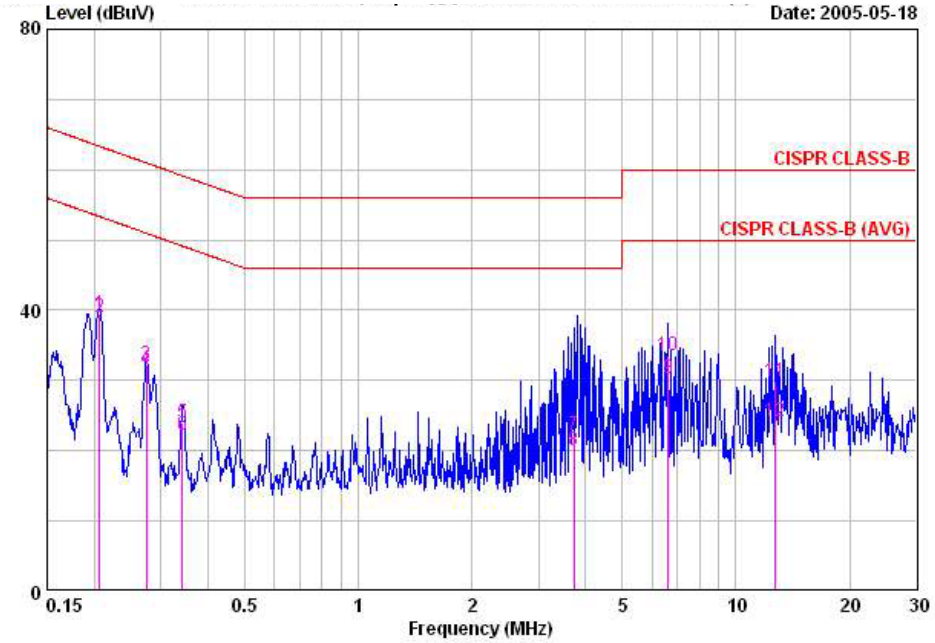
Neutral to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20614	39.54	-23.82	63.36	39.44	0.10	0.00	QP
2 @	0.20614	39.11	-14.25	53.36	39.01	0.10	0.00	AVERAGE
3	0.27587	32.56	-28.38	60.94	32.46	0.10	0.00	QP
4	0.27587	31.70	-19.24	50.94	31.60	0.10	0.00	AVERAGE
5	0.34463	24.57	-34.52	59.09	24.47	0.10	0.00	QP
6	0.34463	22.62	-26.47	49.09	22.52	0.10	0.00	AVERAGE
7	3.720	22.06	-33.94	56.00	21.96	0.00	0.10	QP
8	3.720	19.87	-26.13	46.00	19.77	0.00	0.10	AVERAGE
9	6.627	34.70	-25.30	60.00	34.49	0.00	0.21	QP
10	6.627	31.71	-18.29	50.00	31.50	0.00	0.21	AVERAGE
11	13.267	25.70	-34.30	60.00	25.33	0.00	0.37	QP
12	13.267	17.95	-32.05	50.00	17.58	0.00	0.37	AVERAGE

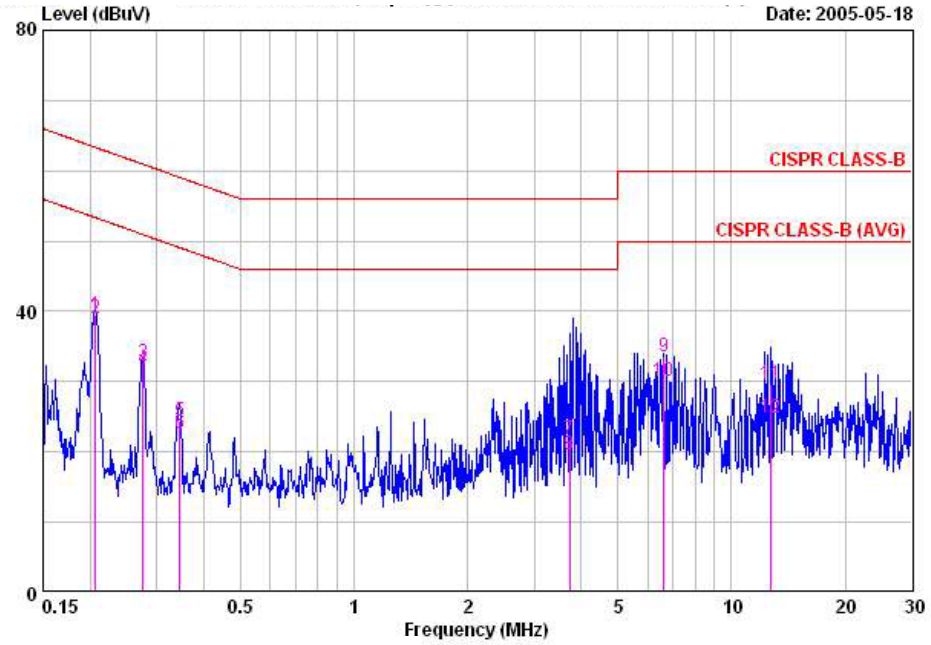
- Mode 2
- Temperature: 15°C
- Relative Humidity: 62%
- Test Engineer: Steven Lu

Line to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20614	39.38	-23.98	63.36	39.28	0.10	0.00	QP
2 @	0.20614	39.01	-14.35	53.36	38.91	0.10	0.00	AVERAGE
3	0.27442	32.32	-28.66	60.98	32.27	0.05	0.00	QP
4	0.27442	31.53	-19.45	50.98	31.48	0.05	0.00	AVERAGE
5	0.34281	23.97	-35.16	59.13	23.95	0.02	0.00	QP
6	0.34281	22.21	-26.92	49.13	22.19	0.02	0.00	AVERAGE
7	3.720	22.24	-33.76	56.00	22.14	0.00	0.10	QP
8	3.720	20.09	-25.91	46.00	19.99	0.00	0.10	AVERAGE
9	6.627	30.24	-19.76	50.00	29.98	0.05	0.21	AVERAGE
10	6.627	33.57	-26.43	60.00	33.31	0.05	0.21	QP
11	12.649	29.87	-30.13	60.00	29.41	0.10	0.36	QP
12	12.649	24.23	-25.77	50.00	23.77	0.10	0.36	AVERAGE

Neutral to Ground



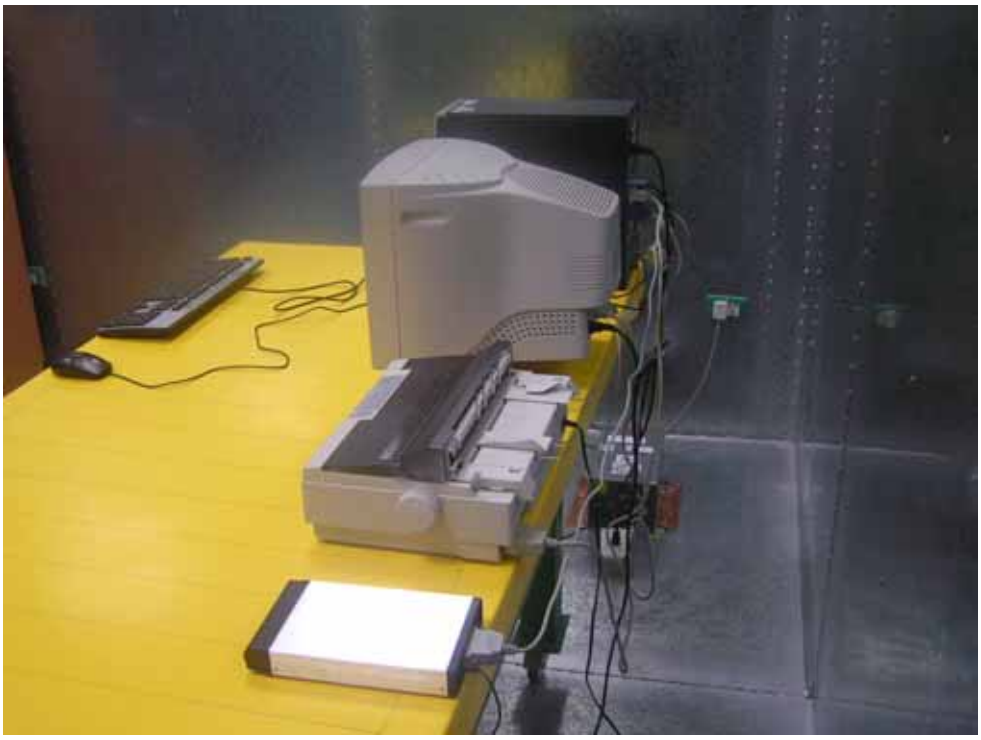
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20614	39.54	-23.82	63.36	39.44	0.10	0.00	QP
2 @	0.20614	39.11	-14.25	53.36	39.01	0.10	0.00	AVERAGE
3	0.27587	32.64	-28.30	60.94	32.54	0.10	0.00	QP
4	0.27587	31.82	-19.12	50.94	31.72	0.10	0.00	AVERAGE
5	0.34463	24.47	-34.62	59.09	24.37	0.10	0.00	QP
6	0.34463	22.71	-26.38	49.09	22.61	0.10	0.00	AVERAGE
7	3.720	21.87	-34.13	56.00	21.77	0.00	0.10	QP
8	3.720	19.70	-26.30	46.00	19.60	0.00	0.10	AVERAGE
9	6.627	33.66	-26.34	60.00	33.45	0.00	0.21	QP
10	6.627	30.04	-19.96	50.00	29.83	0.00	0.21	AVERAGE
11	12.649	29.63	-30.37	60.00	29.27	0.00	0.36	QP
12	12.649	24.90	-25.10	50.00	24.54	0.00	0.36	AVERAGE

5.7.5. Photographs of Conducted Emission Test Configuration

Mode 1

FRONT VIEW

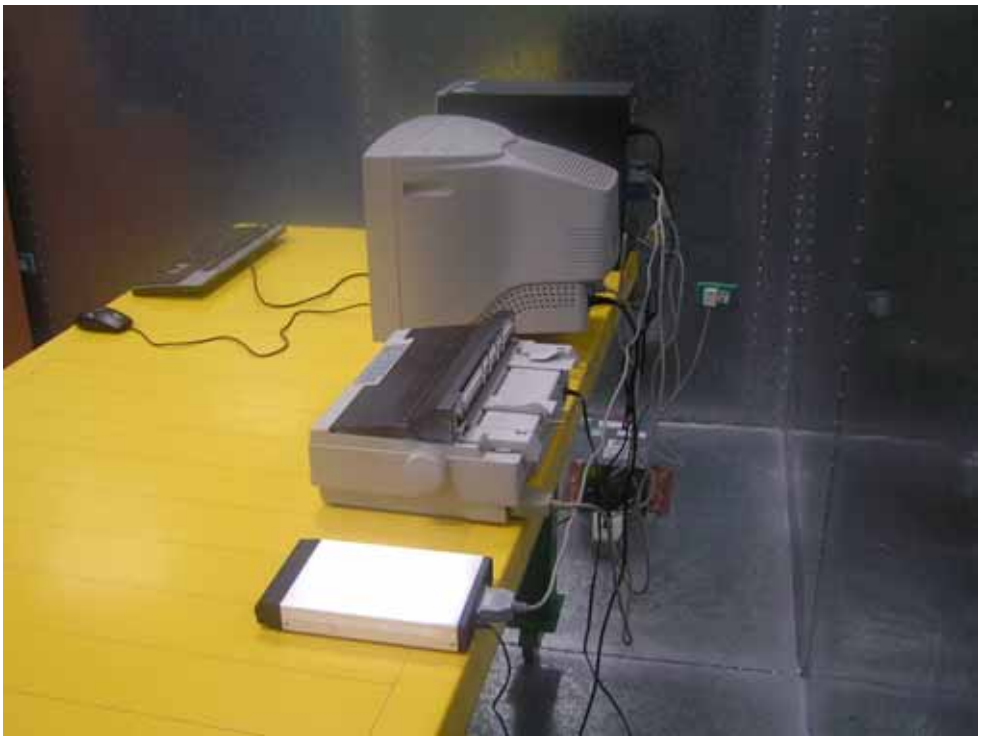
REAR VIEW



Mode 2

FRONT VIEW

REAR VIEW



5.8. Test of Spurious Radiated Emission

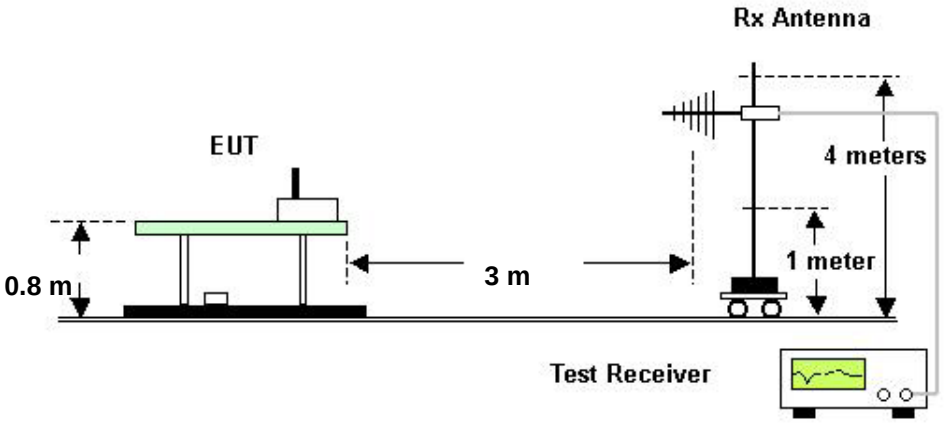
5.8.1. Measuring Instruments

Please reference item 6~17 in chapter 6 for the instruments used for testing.

5.8.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 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 turn table.
4. Power on the EUT and all the supporting units.
5. The turn table 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 scan (from 1 M to 4 M) and then the turn table 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.
9. For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
10. If the emission level of the EUT in peak mode was 3 dB lower than the average 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 for below 1GHz and average method for above the 1GHz. the reported.
11. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB higher 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.

5.8.3. Test Setup Layout



5.8.4. Test Results for CH 64 / 5320MHz (for emission below 1GHz)

- Modulation Type: OFDM
- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	176.470	27.40	-16.10	43.50	8.59	1.05	30.11	47.86	HORIZONTAL	Peak
2 @	299.660	29.25	-16.75	46.00	13.00	1.37	30.16	45.04	HORIZONTAL	Peak
3 @	463.590	30.74	-15.26	46.00	16.73	1.71	30.50	42.81	HORIZONTAL	Peak
4 @	766.230	32.05	-13.95	46.00	19.91	2.19	30.08	40.04	HORIZONTAL	Peak
5 @	831.220	33.68	-12.32	46.00	20.30	2.32	30.02	41.08	HORIZONTAL	Peak
6	960.230	31.67	-22.33	54.00	20.68	2.51	28.98	37.46	HORIZONTAL	Peak

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	40.670	37.61	-2.39	40.00	11.90	0.54	29.81	54.99	VERTICAL	Peak
2 @	66.860	31.43	-8.57	40.00	5.20	0.68	29.90	55.45	VERTICAL	Peak
3 @	498.510	30.41	-15.59	46.00	17.36	1.77	30.53	41.81	VERTICAL	Peak
4 @	765.260	30.65	-15.35	46.00	19.91	2.18	30.08	38.64	VERTICAL	Peak
5 @	831.220	33.27	-12.73	46.00	20.30	2.32	30.02	40.66	VERTICAL	Peak
6	960.230	31.25	-22.75	54.00	20.68	2.51	28.98	37.04	VERTICAL	Peak

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Anter Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	365.620	31.20	-14.80	46.00	14.83	1.51	30.55	45.41	HORIZONTAL	Peak
2 @	466.500	33.28	-12.72	46.00	16.82	1.71	30.52	45.27	HORIZONTAL	Peak
3 @	625.580	34.21	-11.79	46.00	18.75	1.97	30.59	44.08	HORIZONTAL	Peak
4 @	766.230	36.82	-9.18	46.00	19.91	2.19	30.08	44.81	HORIZONTAL	Peak
5 @	797.270	36.03	-9.97	46.00	19.96	2.25	30.13	43.95	HORIZONTAL	Peak
6 @	859.350	36.72	-9.28	46.00	20.21	2.37	29.72	43.86	HORIZONTAL	Peak

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	83.350	28.69	-11.31	40.00	7.40	0.73	29.97	50.52	VERTICAL	Peak
2	365.620	27.24	-18.76	46.00	14.83	1.51	30.55	41.45	VERTICAL	Peak
3 @	715.790	34.38	-11.62	46.00	19.34	2.14	30.31	43.21	VERTICAL	Peak
4 @	765.260	36.02	-9.98	46.00	19.91	2.18	30.08	44.01	VERTICAL	Peak
5 @	800.180	34.60	-11.40	46.00	20.00	2.26	30.13	42.47	VERTICAL	Peak
6 @	859.350	35.85	-10.15	46.00	20.21	2.37	29.72	42.99	VERTICAL	Peak

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.5. Test Results for CH 36 / 5180 MHz (for emission above 1GHz)

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3452.000	44.00	-30.00	74.00	31.19	2.37	36.60	47.04	HORIZONTAL	Peak
2 @	3452.000	38.00	-16.00	54.00	31.19	2.37	36.60	41.04	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3453.000	47.22	-26.78	74.00	31.19	2.37	36.60	50.26	VERTICAL	Peak
2 @	3453.000	38.89	-15.11	54.00	31.19	2.37	36.60	41.93	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3454.000	46.48	-27.52	74.00	31.33	2.37	36.60	49.37	HORIZONTAL	Peak
2 @	3454.000	36.89	-17.11	54.00	31.33	2.37	36.60	39.78	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3453.000	50.21	-23.79	74.00	31.33	2.37	36.60	53.10	VERTICAL	Peak
2 @	3453.000	40.64	-13.36	54.00	31.33	2.37	36.60	43.53	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.6. Test Results for CH 52/ 5260MHz (for emission above 1GHz)

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3506.700	44.90	-29.10	74.00	31.30	2.44	36.60	47.76	HORIZONTAL	Peak
2 @	3506.700	39.00	-15.00	54.00	31.30	2.44	36.60	41.86	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3506.000	47.11	-26.89	74.00	31.30	2.44	36.60	49.97	VERTICAL	Peak
2 @	3506.000	39.70	-14.30	54.00	31.30	2.44	36.60	42.56	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3506.340	45.62	-28.38	74.00	31.20	2.44	36.60	48.58	HORIZONTAL	Peak
2 @	3506.340	36.00	-18.00	54.00	31.20	2.44	36.60	38.96	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3507.000	48.62	-25.38	74.00	31.20	2.44	36.60	51.58	VERTICAL	Peak
2 @	3507.000	40.54	-13.46	54.00	31.20	2.44	36.60	43.50	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.7. Test Results for CH 64 / 5320 MHz (for emission above 1GHz)

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	3546.620	39.18	-14.82	54.00	31.44	2.48	36.63	41.88	HORIZONTAL	AVERAGE
2	3546.620	46.78	-27.22	74.00	31.44	2.48	36.63	49.48	HORIZONTAL	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	3546.670	41.52	-12.48	54.00	31.44	2.48	36.63	44.22	VERTICAL	AVERAGE
2	3546.670	48.49	-25.51	74.00	31.44	2.48	36.63	51.19	VERTICAL	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3545.900	46.00	-28.00	74.00	31.03	2.48	36.63	49.11	HORIZONTAL	Peak
2 @	3545.900	37.00	-17.00	54.00	31.03	2.48	36.63	40.11	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3547.000	50.34	-23.66	74.00	31.03	2.48	36.63	53.45	VERTICAL	Peak
2 @	3547.000	43.20	-10.80	54.00	31.03	2.48	36.63	46.31	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.8. Test Results for CH 42 / 5210MHz (for emission above 1GHz)

- Modulation Type: OFDM- Turbo Mode
- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3473.000	44.10	-29.90	74.00	31.22	2.37	36.60	47.10	HORIZONTAL	Peak
2	3473.000	35.40	-18.60	54.00	31.22	2.37	36.60	38.40	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3474.600	47.50	-26.50	74.00	31.26	2.37	36.60	50.47	VERTICAL	Peak
2 @	3474.600	39.40	-14.60	54.00	31.26	2.37	36.60	42.37	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3473.320	48.10	-25.90	74.00	31.22	2.37	36.60	51.10	HORIZONTAL	PEAK
2 @	3473.360	40.13	-13.87	54.00	31.22	2.37	36.60	43.13	HORIZONTAL	AVERAGE

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	3473.300	36.35	-17.65	54.00	31.22	2.37	36.60	39.36	VERTICAL	AVERAGE
2	3473.300	45.61	-28.39	74.00	31.22	2.37	36.60	48.62	VERTICAL	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.9. Test Results for CH 50 / 5250MHz (for emission above 1GHz)

- Modulation Type: OFDM- Turbo Mode
- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3500.400	46.40	-27.60	74.00	31.30	2.44	36.60	49.26	HORIZONTAL	Peak
2	3500.400	35.30	-18.70	54.00	31.30	2.44	36.60	38.16	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3500.000	47.00	-27.00	74.00	31.30	2.44	36.60	49.86	VERTICAL	Peak
2 @	3500.000	39.00	-15.00	54.00	31.30	2.44	36.60	41.86	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	3500.000	39.90	-14.10	54.00	31.30	2.44	36.60	42.76	HORIZONTAL	AVERAGE
2	3500.000	47.72	-26.28	74.00	31.30	2.44	36.60	50.58	HORIZONTAL	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3499.860	47.23	-26.77	74.00	31.30	2.44	36.60	50.09	VERTICAL	PEAK
2 @	3499.920	36.64	-17.36	54.00	31.30	2.44	36.60	39.50	VERTICAL	AVERAGE

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.10. Test Results for CH 58 / 5290MHz (for emission above 1GHz)

- Modulation Type: OFDM- Turbo Mode
- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

Mode 1

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3527.000	45.00	-29.00	74.00	31.40	2.48	36.61	47.74	HORIZONTAL	Peak
2	3527.000	35.00	-19.00	54.00	31.40	2.48	36.61	37.74	HORIZONTAL	Average

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	3527.000	47.00	-27.00	74.00	31.40	2.48	36.61	49.74	VERTICAL	Peak
2 @	3527.000	37.00	-17.00	54.00	31.40	2.48	36.61	39.74	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	3526.800	37.21	-16.79	54.00	31.40	2.48	36.61	39.94	HORIZONTAL	AVERAGE
2	3526.800	45.59	-28.41	74.00	31.40	2.48	36.61	48.32	HORIZONTAL	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	3526.640	37.40	-16.60	54.00	31.40	2.48	36.61	40.14	VERTICAL	AVERAGE
2	3526.640	47.69	-26.31	74.00	31.40	2.48	36.61	50.42	VERTICAL	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.8.11. Photographs of Radiated Emission Test Configuration

Mode 1

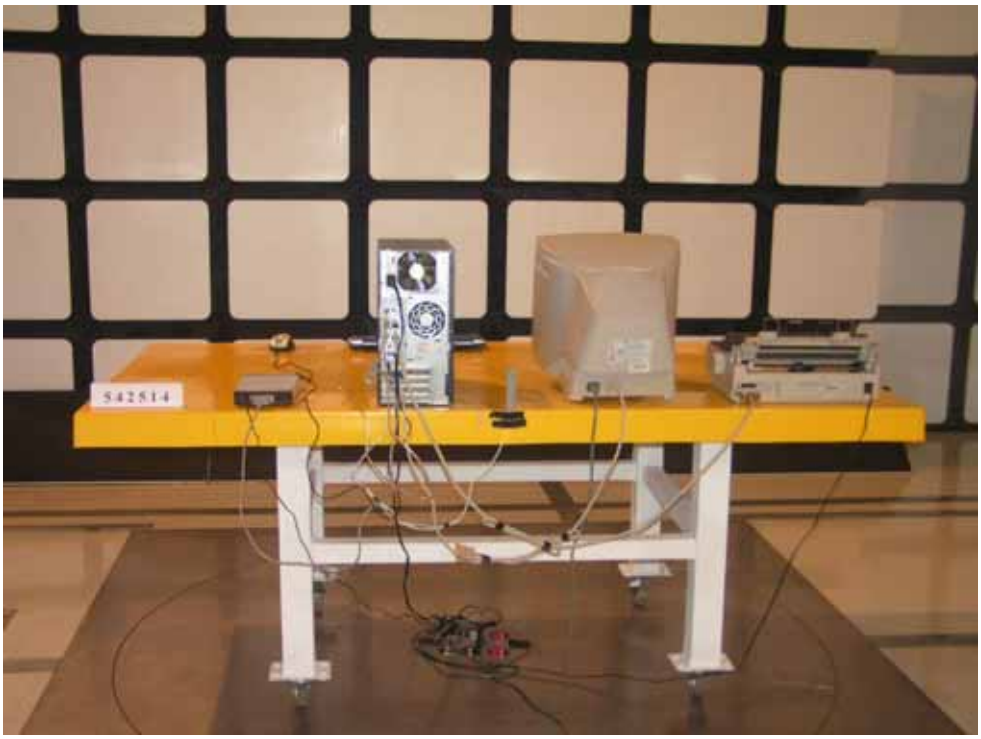
FRONT VIEW

REAR VIEW

Mode 2

FRONT VIEW

REAR VIEW



5.9. Antenna Requirements

5.9.1. Standard Applicable

47 CFR Part15 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.

47 CFR Part15 Section 15.407:

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.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.9.2. Antenna Connected Construction

There are 4 kinds of antenna. External antenna connector uses Reverse SMA. Internal antenna has no connector.

5.10. RF Exposure

5.10.1. Limit For Maximum Permissible Exposure (MPE)

This product can be classified as mobile device, so the 20cm separation distance warning is required. In this section, the power density at 20cm location is calculated to examine if it is lower than the limit.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

F = frequency in MHz

*Plane-wave equivalent power density

5.10.2. MPE Calculation Method

E (V/m) $= \frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (mW/cm²) $= \frac{E^2}{377}$

E = Electric field (V/m)

P = Peak RF output power (mW)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$Pd = \frac{30 \times P \times G}{377 \times d^2}$

From the peak EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the gain of the used antenna, the RF power density can be obtained.

5.10.3. Calculated Result and Limit

- Temperature: 15°C
- Relative Humidity: 62%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Steven Lu

- **Normal Mode**

Mode 1

Frequency	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
5180 MHz	2.20	1.66	11.13	12.97	0.0043	1
5260 MHz	2.20	1.66	11.73	14.89	0.0049	1
5320 MHz	2.20	1.66	17.85	60.95	0.0201	1

Mode 2

Frequency	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
5180 MHz	5.00	3.16	11.13	12.97	0.0082	1
5260 MHz	5.00	3.16	11.73	14.89	0.0094	1
5320 MHz	5.00	3.16	17.85	60.95	0.0383	1

- **Turbo Mode**

Mode 1

Frequency	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
5210 MHz	2.20	1.66	11.70	14.79	0.0049	1
5250 MHz	2.20	1.66	11.82	15.21	0.0050	1
5290 MHz	2.20	1.66	14.89	30.83	0.0102	1

Mode 2

Frequency	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
5210 MHz	5.00	3.16	11.70	14.79	0.0093	1
5250 MHz	5.00	3.16	11.82	15.21	0.0096	1
5290 MHz	5.00	3.16	14.89	30.83	0.0194	1

6. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	EMC Receiver	R&S	ESCS 30	100174	9 KHz – 2.75 GHz	Feb. 15, 2005	Conduction (CO04-HY)
2	LISN	MessTec	NNB-2/16Z	2001/004	9 KHz – 30 MHz	Jun. 09, 2004	Conduction (CO04-HY)
3	LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9 KHz – 30 MHz	Apr. 26, 2005	Conduction (CO04-HY)
4	EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
5	RF Cable-CON	UTIFLEX	3102-26886-4	CB044	9KHz~30MHz	Apr. 20, 2005	Conduction (CO04-HY)
6	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
7	Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 31, 2004	Radiation (03CH03-HY)
8	Amplifier	SCHAFFNER	CPA9231A	18667	9KHz – 2GHz	Jan. 10, 2005	Radiation (03CH03-HY)
9	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 28, 2004	Radiation (03CH03-HY)
10	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 28, 2004	Radiation (03CH03-HY)
11	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Feb. 22, 2005	Radiation (03CH03-HY)
12	Amplifier	MITEQ	AFS44	849984	100MHz~26.5GHz	Mar. 25, 2005	Radiation (03CH03-HY)
13	Horn Antenna	EMCO	3115	6741	1GHz – 18GHz	Apr. 06, 2005	Radiation (03CH03-HY)
14	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
15	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
16	Horn Antenna	Schwarzbeck	BBHA9170	154	18GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
17	RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec.01, 2004	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
18	Spectrum analyzer	R&S	FSP30	100023	9KHZ~30GHZ	Aug. 02, 2004	Conducted (TH01-HY)
19	Power meter	R&S	NRVS	100444	DC~40GHz	Jun. 15, 2004	Conducted (TH01-HY)
20	Power sensor	R&S	NRV-Z55	100049	DC~40GHz	Jun. 15, 2004	Conducted (TH01-HY)
21	Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	Jun. 15, 2004	Conducted (TH01-HY)
22	AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	Jun. 16, 2004	Conducted (TH01-HY)
23	DC power source	G.W.	GPC-6030D	C671845	DC 1V~60V	Nov. 05, 2004	Conducted (TH01-HY)
24	Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2004	Conducted (TH01-HY)
25	RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz~7GHz	Jan. 01, 2005	Conducted (TH01-HY)
26	RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz~1GHz	Jan. 01, 2005	Conducted (TH01-HY)

※ Calibration Interval of instruments listed above is one year.