

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : Digital Video Camera
Brand Name : Toshiba
Model No. : PA3906*****
("A-Z", "0-9", "-", "_", "~" or blank)
Product Name : Camileo AIR10
Filing Type : New Application
Applicant : Toshiba Corporation
Digital Products & Services Company, 2-9,
Suehiro-cho Tokyo 198-8710 Japan
FCC ID : CJ6UPA3906WL
Manufacturer : Chicony Electronics Co., Ltd
No.25, Wugong 6th Rd., Wugu Dist.,
New Taipei City 248, Taiwan (R.O.C.)
Received Date : Feb. 23, 2011
Final Test Date : Mar. 02, 2011

Statement

Test result included is only for the 802.11a (5150~5350MHz; 5470~5725MHz) of the product.

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart E**.

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



SPORTON International Inc.

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

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History of This Test Report

Original Issue Date: Feb. 21, 2012

Report No.: FR121105-05AA

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

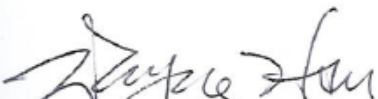
CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : Digital Video Camera
Brand Name : Toshiba
Model No. : PA3906*****
("*"="A-Z", "0-9", "-", "_", "~" or blank)
Product Name : Camileo AIR10
Applicant : Toshiba Corporation
Digital Products & Services Company, 2-9,
Suehiro-cho Tokyo 198-8710 Japan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Feb. 23, 2011 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.


Wayne Hsu / Assistant Manager

SPORTON International Inc.

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

1 SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	Rule Section	Description of Test	Result	Under Limit
3.1	15.207	AC Power Line Conducted Emissions	Complies	7.24 dB
3.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
3.3	15.407(a)	Maximum Conducted Output Power	Complies	4.07 dB
3.4	15.407(a)	Power Spectral Density	Complies	2.30 dB
3.5	15.407(a)	Peak Excursion	Complies	7.36 dB
3.6	15.407(b)	Radiated Emissions	Complies	1.77 dB
3.7	15.407(b)	Band Edge Emissions	Complies	0.02 dB
3.8	15.407(g)	Frequency Stability	Complies	-
3.9	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2 GENERAL INFORMATION

2.1 Product Details

Only the radio detail of IEEE 802.11a is shown in this report. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	5V from adapter or 3.7V Li-ion battery
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Frequency Range	5150~5350MHz; 5470~5725MHz
Channel Band Width (99%)	Band 1: 18.19 MHz ; Band 2: 17.87 MHz ; Band 3: 17.23 MHz
Conducted Output Power	Band 1: 12.93 dBm ; Band 2: 12.47 dBm ; Band 3: 11.26 dBm

2.2 Accessories

Power	Brand	Model	Rating
Switching Adapter	SUNNY	SYS1381-1005-W2	INPUT : 100-240V ~ 0.5A MAX,50-60Hz 0.2A OUTPUT : 5V 2.0A
Li-ion Battery	-	-	3.7V 4.25Wh

Other accessories please refer to the user's manual.

2.3 Table for Filed Antenna

Antenna Type	Connector	Gain (dBi)
		5G
FPCB Antenna	Fixed on Board	3.29

2.4 Table for Carrier Frequencies

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

Frequency Band	Channel No.	Frequency (20MHz)
5250~5350 MHz Band 2	52	5260 MHz
	56	5280 MHz
	60	5300 MHz
	64	5320 MHz

Frequency Band	Channel No.	Frequency (20MHz)
5470~5725 MHz Band 3	100	5500 MHz
	104	5520 MHz
	108	5540 MHz
	112	5560 MHz
	116	5580 MHz
	132	5660 MHz
	136	5680 MHz
	140	5700 MHz

2.5 Table for Test Modes

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

Test Items	Mode	Data Rate	Channel
AC Power Conducted Emission Radiated Emission Below 1GHz	Normal Mode	Auto	-
Max. Conducted Output Power 26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion Radiated Emission Above 1GHz Band Edge Emission	11a Band 1~3/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140

Note: The X axis is the worst case of the EUT in Radiated Emissions and Band Edge Emissions test.

2.6 Table for Testing Locations

Test Site No.	Site Category	Location
CO01-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH02-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC).

2.7 Table for Supporting Units

The EUT was tested alone.

2.8 Table for Parameters of Test Software Setting

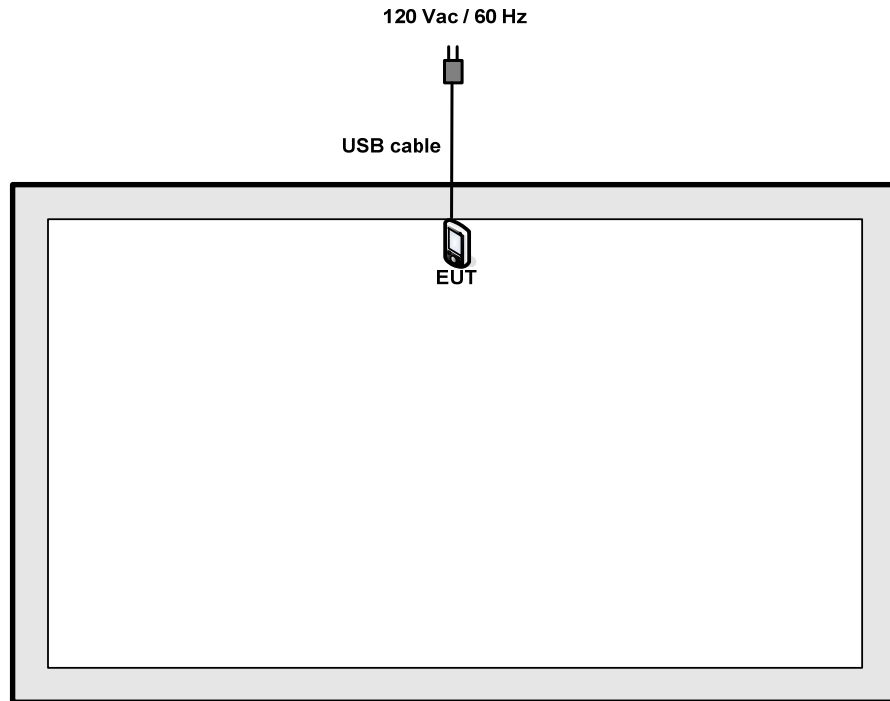
During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Power Parameters of IEEE 802.11a

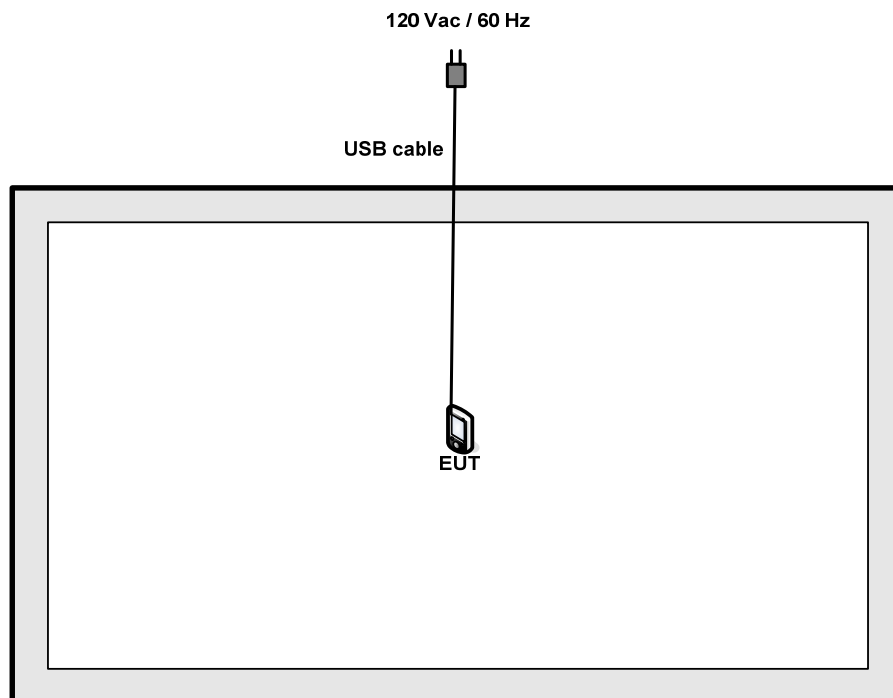
Test Software Version	NA		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	18	18	18
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11a	18	18	18
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11a	18	18	18

2.9 Test Configuration

Radiation Emissions Test Configuration For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Class B

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

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

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

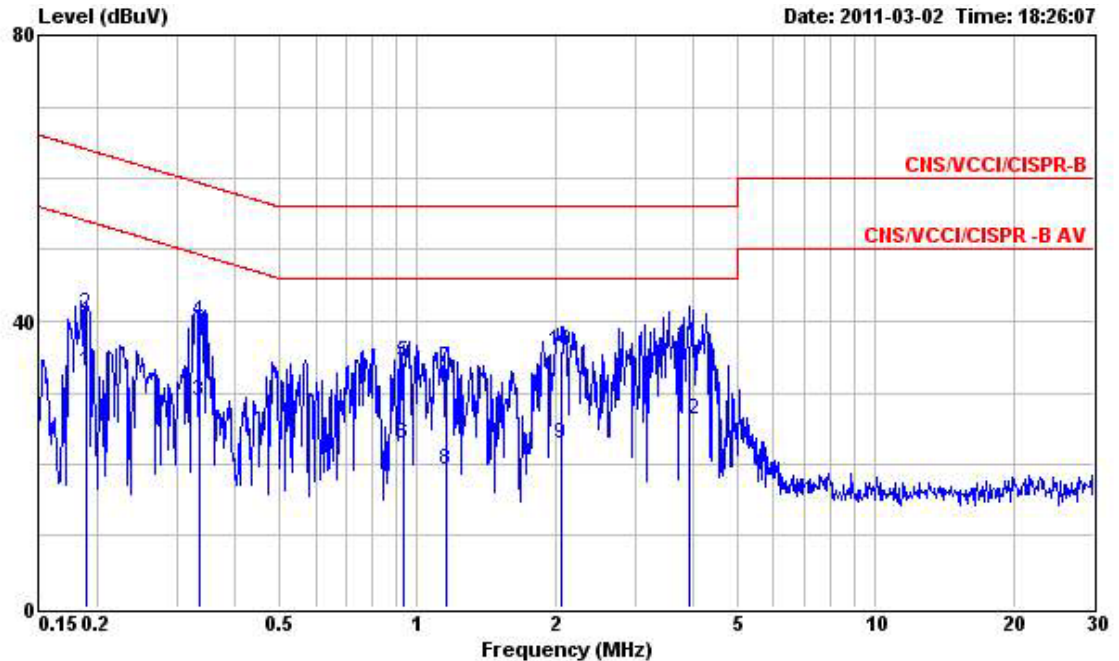
3.1.3 Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of 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 or host of 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 provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

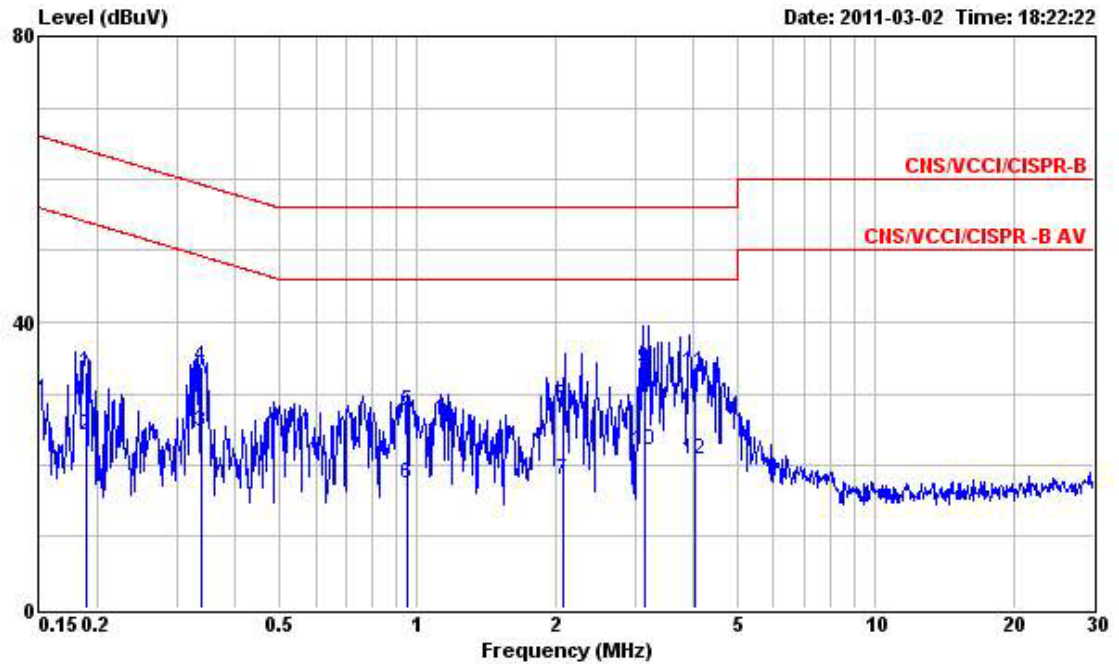
Final Test Date	Mar. 02, 2011	Test Site No.	CO01-HY
Temperature	18.8℃	Humidity	51.5%
Test Engineer	David	Configuration	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.189	32.88	-21.20	54.08	32.21	0.08	0.59	Average
2	0.189	41.08	-23.00	64.08	40.41	0.08	0.59	QP
3	0.334	28.74	-20.61	49.35	28.05	0.09	0.60	Average
4	0.334	40.08	-19.27	59.35	39.39	0.09	0.60	QP
5	0.937	34.36	-21.64	56.00	33.65	0.11	0.60	QP
6	0.937	22.83	-23.17	46.00	22.12	0.11	0.60	Average
7	1.156	33.40	-22.60	56.00	32.69	0.11	0.60	QP
8	1.156	19.28	-26.72	46.00	18.57	0.11	0.60	Average
9	2.054	22.96	-23.04	46.00	22.23	0.13	0.60	Average
10	2.054	35.81	-20.19	56.00	35.08	0.13	0.60	QP
11	3.940	36.51	-19.49	56.00	35.74	0.17	0.60	QP
12	3.940	26.25	-19.75	46.00	25.48	0.17	0.60	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.189	33.05	-31.03	64.08	32.40	0.06	0.59	QP
2	0.189	24.25	-29.83	54.08	23.60	0.06	0.59	Average
3	0.337	24.66	-24.62	49.28	23.99	0.07	0.60	Average
4	0.337	33.77	-25.51	59.28	33.10	0.07	0.60	QP
5	0.953	27.49	-28.51	56.00	26.80	0.09	0.60	QP
6	0.953	17.31	-28.69	46.00	16.62	0.09	0.60	Average
7	2.090	17.88	-28.12	46.00	17.17	0.11	0.60	Average
8	2.090	28.29	-27.71	56.00	27.58	0.11	0.60	QP
9	3.130	33.58	-22.42	56.00	32.85	0.13	0.60	QP
10	3.130	22.00	-24.00	46.00	21.27	0.13	0.60	Average
11	4.040	33.02	-22.98	56.00	32.29	0.14	0.59	QP
12	4.040	20.80	-25.20	46.00	20.07	0.14	0.59	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2 99% Occupied Bandwidth Measurement

3.2.1 Limit

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

3.2.2 Measuring Instruments and Setting

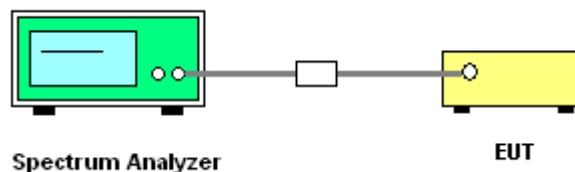
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	300 kHz
VB	1000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

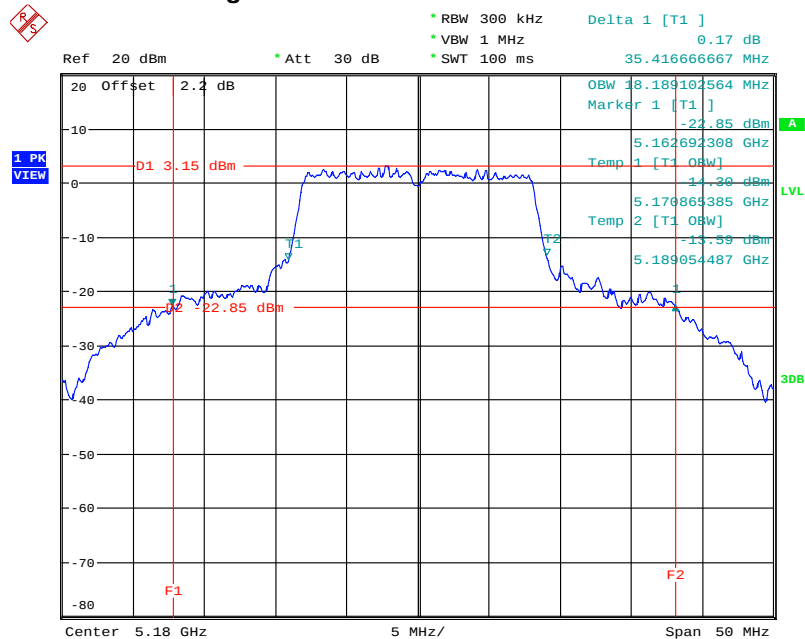
3.2.7 Test Result of 99% Occupied Bandwidth

Final Test Date	Feb. 25, 2011	Test Site No.	TH01-HY
Temperature	25°C	Humidity	62%
Test Engineer	Ian	Configurations	802.11a

Configuration of IEEE 802.11a

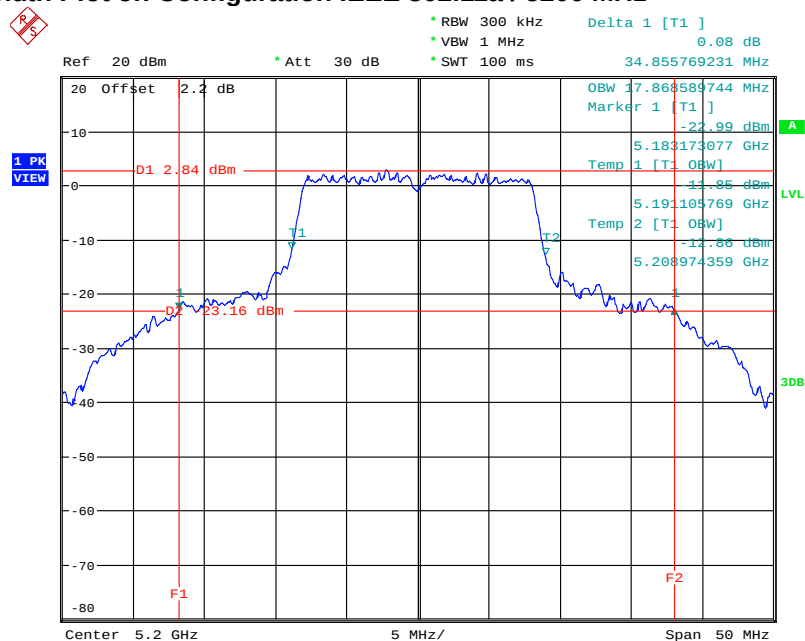
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	35.42	18.19
40	5200 MHz	34.86	17.87
48	5240 MHz	35.10	18.03
52	5260 MHz	34.70	17.55
56	5280 MHz	35.02	17.87
64	5320 MHz	34.54	17.47
100	5500 MHz	32.85	17.23
116	5580 MHz	25.80	17.23
140	5700 MHz	25.16	17.15

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5180 MHz



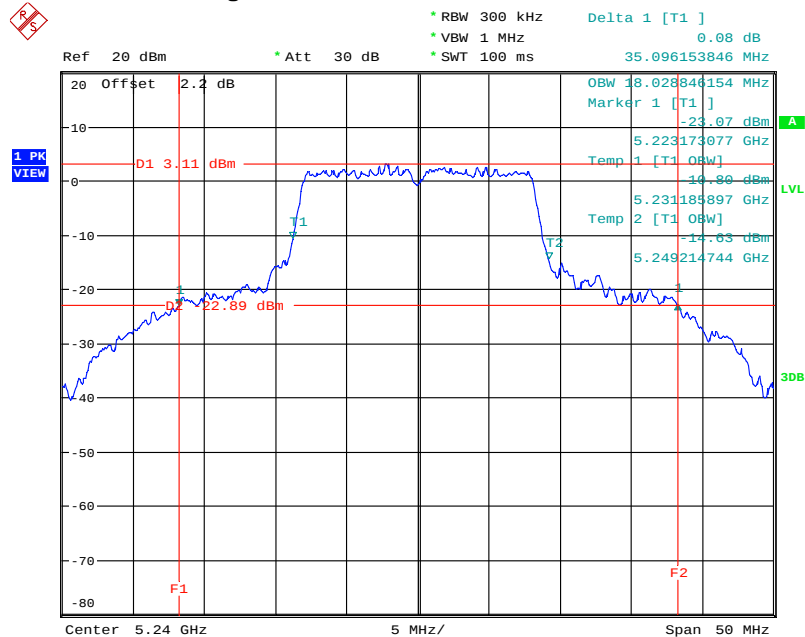
Date: 25.FEB.2011 16:34:39

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5200 MHz



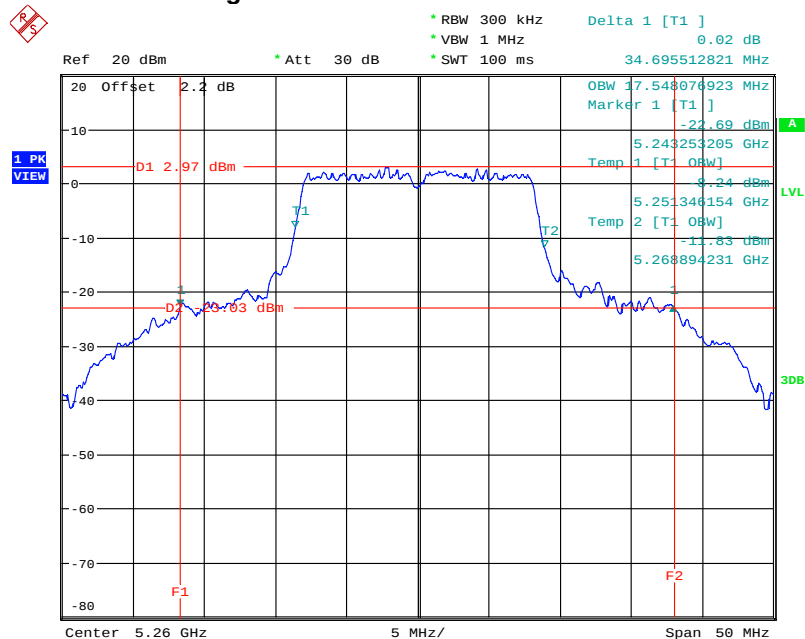
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26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5240 MHz



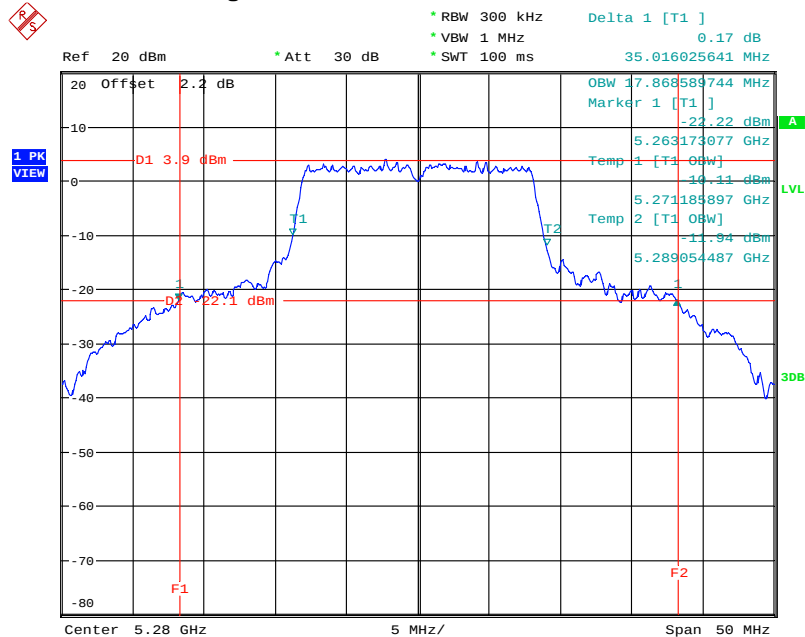
Date: 25.FEB.2011 17:02:19

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5260 MHz



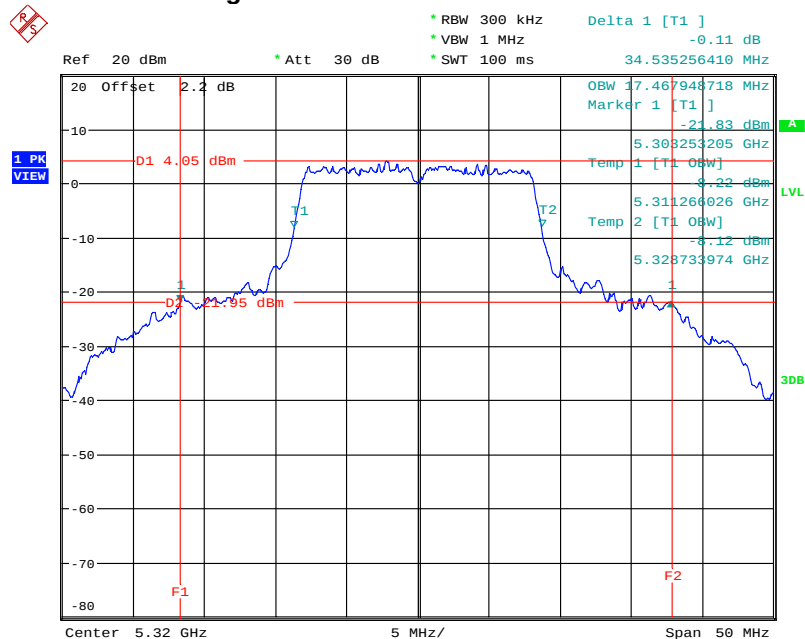
Date: 25.FEB.2011 17:13:30

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5280 MHz



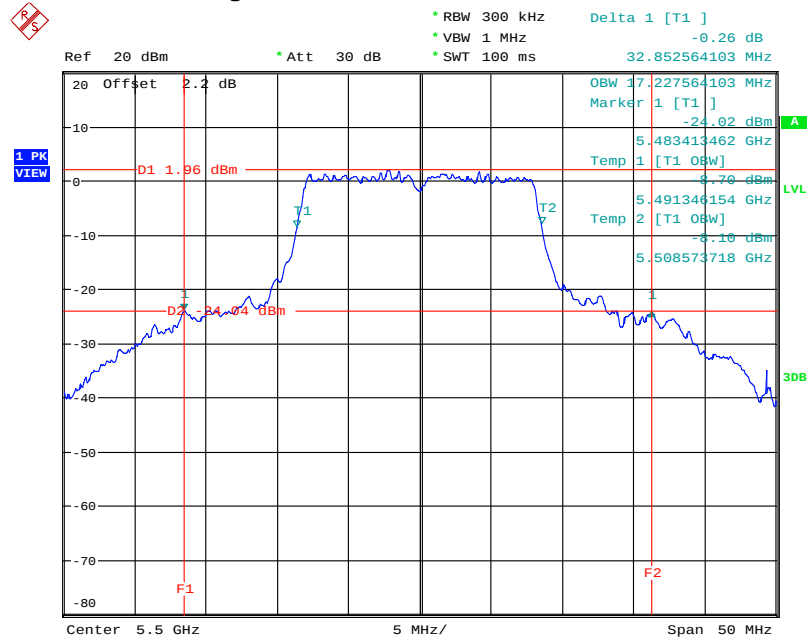
Date: 25.FEB.2011 17:27:15

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5320 MHz



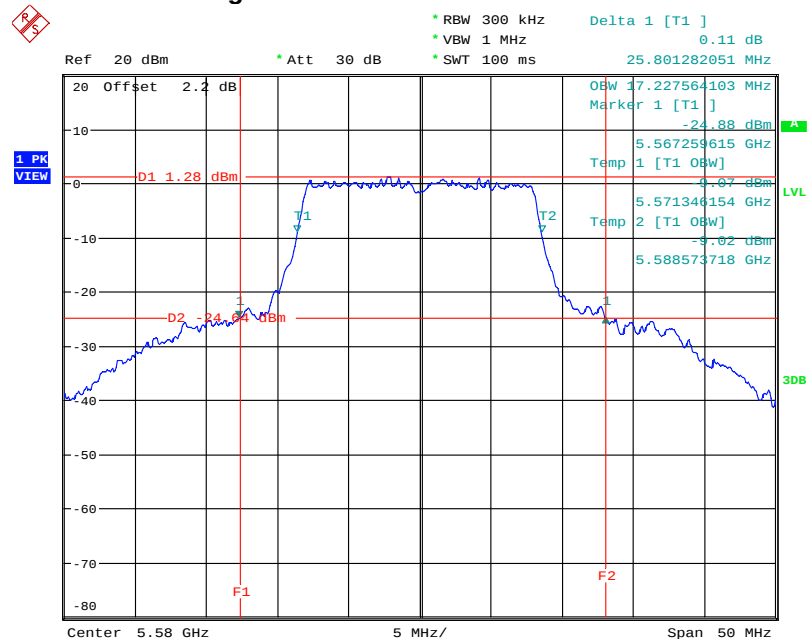
Date: 25.FEB.2011 17:50:33

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5500 MHz



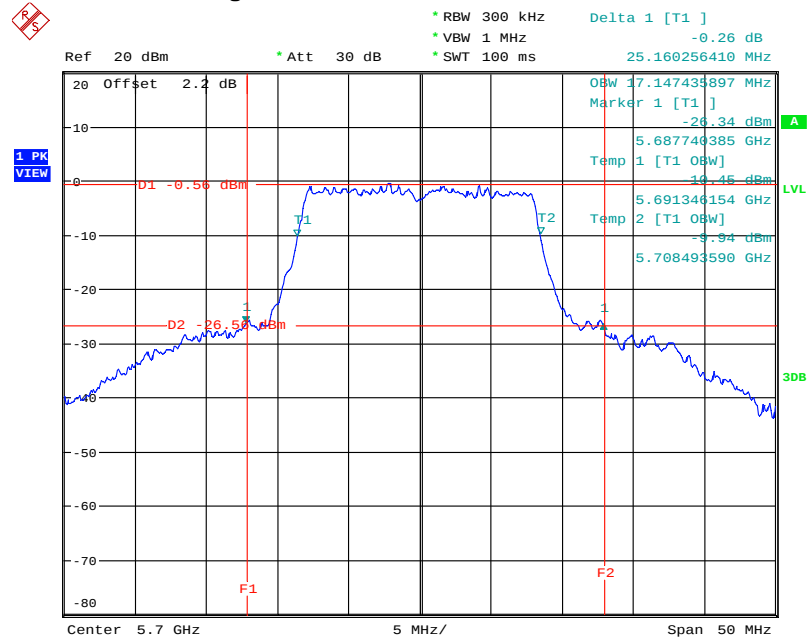
Date: 25.FEB.2011 17:59:55

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5580 MHz



Date: 25.FEB.2011 18:15:16

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5700 MHz



Date: 25.FEB.2011 18:23:25

3.3 Maximum Conducted Output Power Measurement

3.3.1 Limit

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 (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Maximum Conducted Output Power mean that the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.

3.3.2 Measuring Instruments and Setting

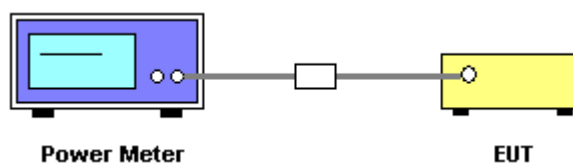
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

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

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the wideband power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of Maximum Conducted Output Power

Final Test Date	Feb. 25, 2011	Test Site No.	TH01-HY
Temperature	25°C	Humidity	62%
Test Engineer	Ian	Configurations	802.11a

Configuration of IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.93	17.00	Complies
40	5200 MHz	12.68	17.00	Complies
48	5240 MHz	12.52	17.00	Complies
52	5260 MHz	12.41	24.00	Complies
56	5280 MHz	12.47	24.00	Complies
64	5320 MHz	11.85	24.00	Complies
100	5500 MHz	11.26	24.00	Complies
116	5580 MHz	9.87	24.00	Complies
140	5700 MHz	9.51	24.00	Complies

3.4 Power Spectral Density Measurement

3.4.1 Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 3.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4
5.25-5.35 GHz / 5.47-5.725GHz	11
5.725-5.825 GHz	17

3.4.2 Measuring Instruments and Setting

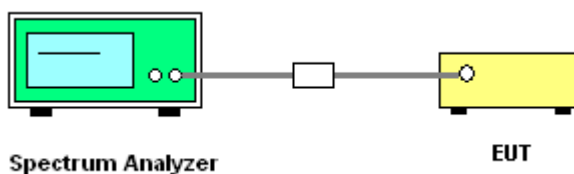
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz. Set Detector to Peak, Trace to Max Hold. Mark the frequency with maximum peak power as the center of the display of the spectrum.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

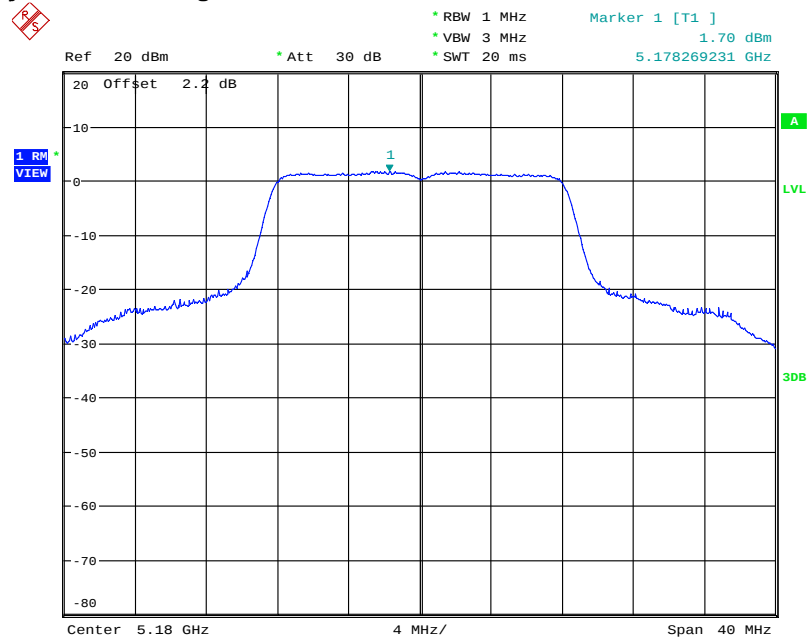
3.4.7 Test Result of Power Spectral Density

Final Test Date	Feb. 25, 2011	Test Site No.	TH01-HY
Temperature	25°C	Humidity	62%
Test Engineer	Ian	Configurations	802.11a

Configuration of IEEE 802.11a

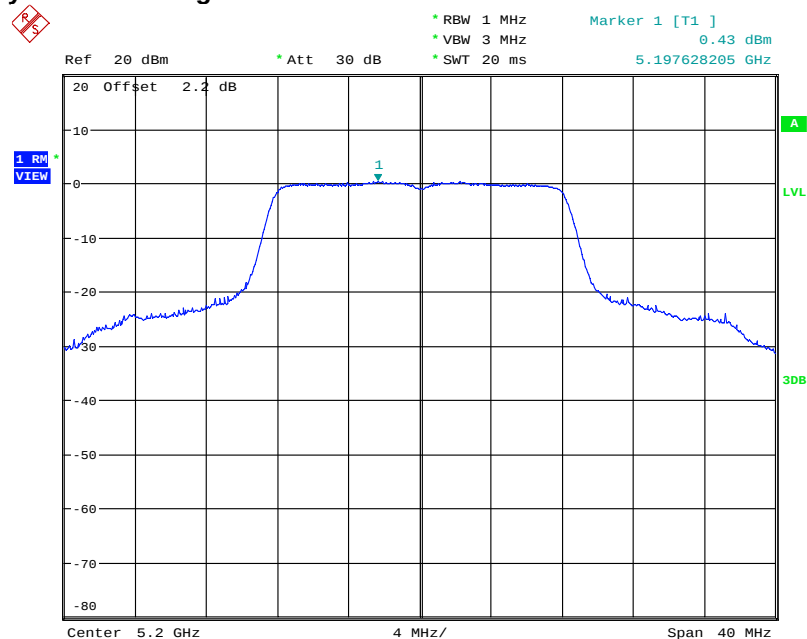
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	1.70	4.00	Complies
5200 MHz	0.43	4.00	Complies
5240 MHz	0.46	4.00	Complies
5260 MHz	0.70	11.00	Complies
5280 MHz	1.40	11.00	Complies
5320 MHz	1.72	11.00	Complies
5500 MHz	-0.32	11.00	Complies
5580 MHz	-1.29	11.00	Complies
5700 MHz	-2.66	11.00	Complies

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



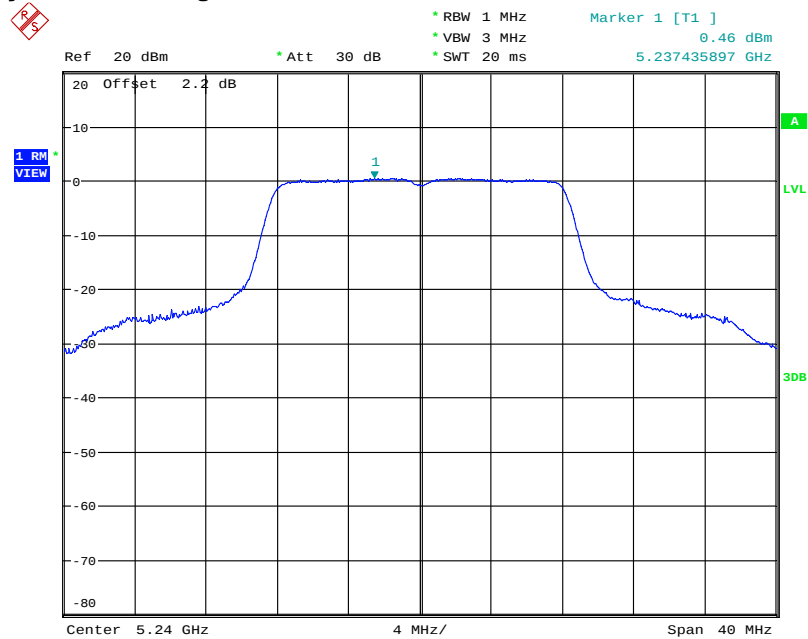
Date: 25.FEB.2011 16:30:33

Power Density Plot on Configuration IEEE 802.11a / 5200 MHz



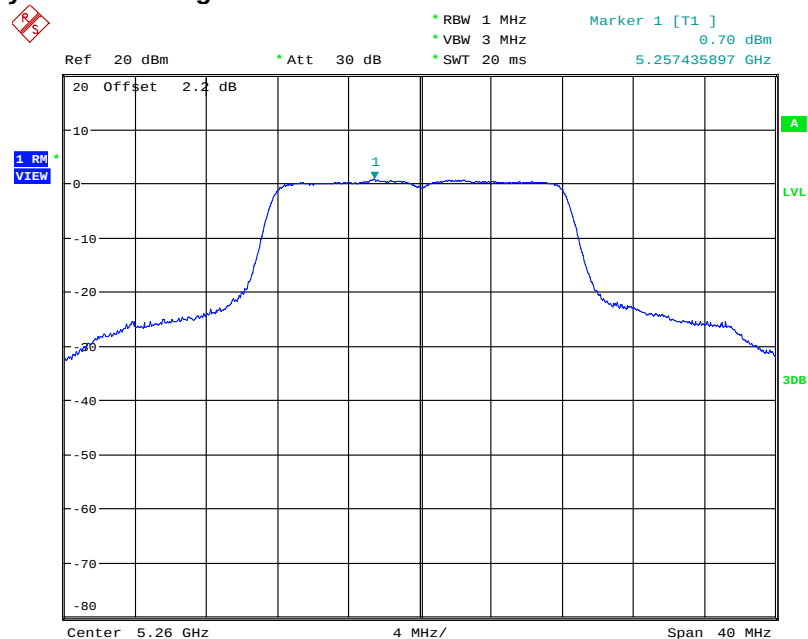
Date: 25.FEB.2011 16:46:30

Power Density Plot on Configuration IEEE 802.11a / 5240 MHz



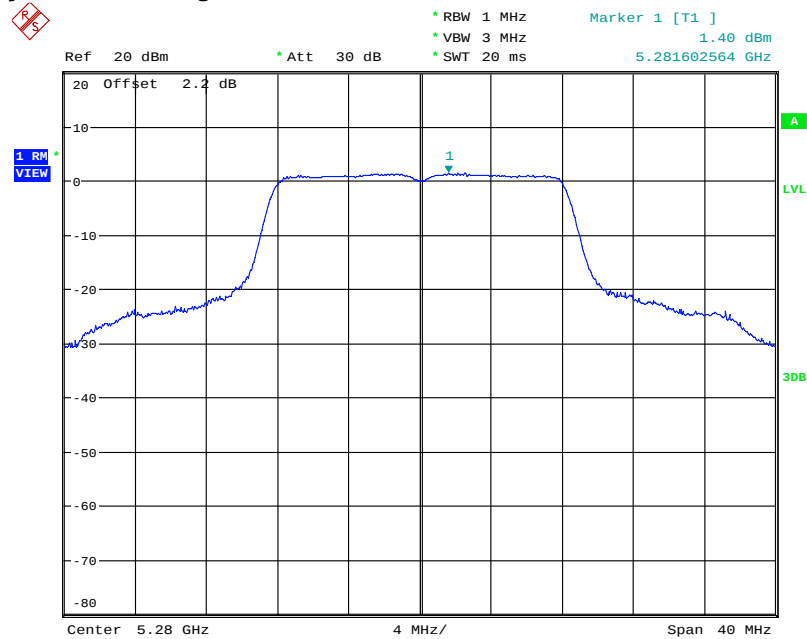
Date: 25.FEB.2011 16:59:14

Power Density Plot on Configuration IEEE 802.11a / 5260 MHz



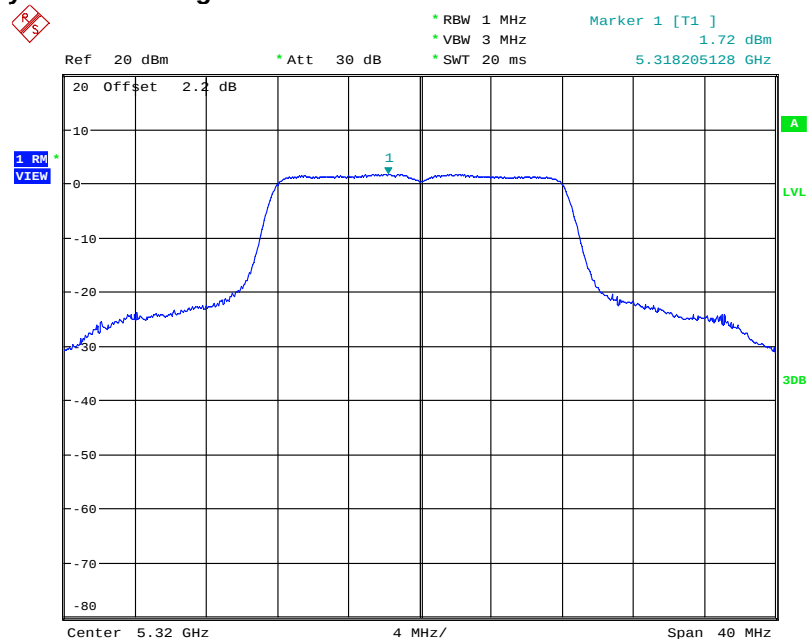
Date: 25.FEB.2011 17:04:40

Power Density Plot on Configuration IEEE 802.11a / 5280 MHz



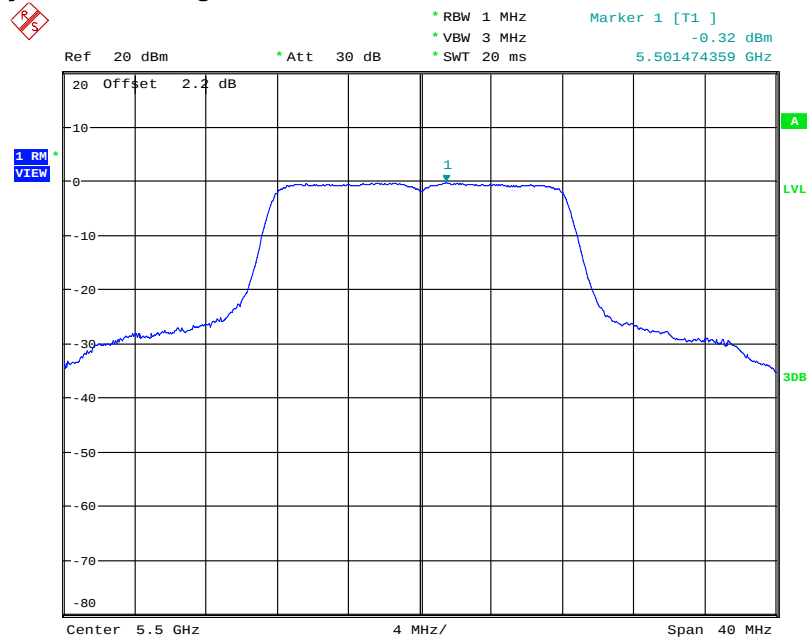
Date: 25.FEB.2011 17:24:24

Power Density Plot on Configuration IEEE 802.11a / 5320 MHz



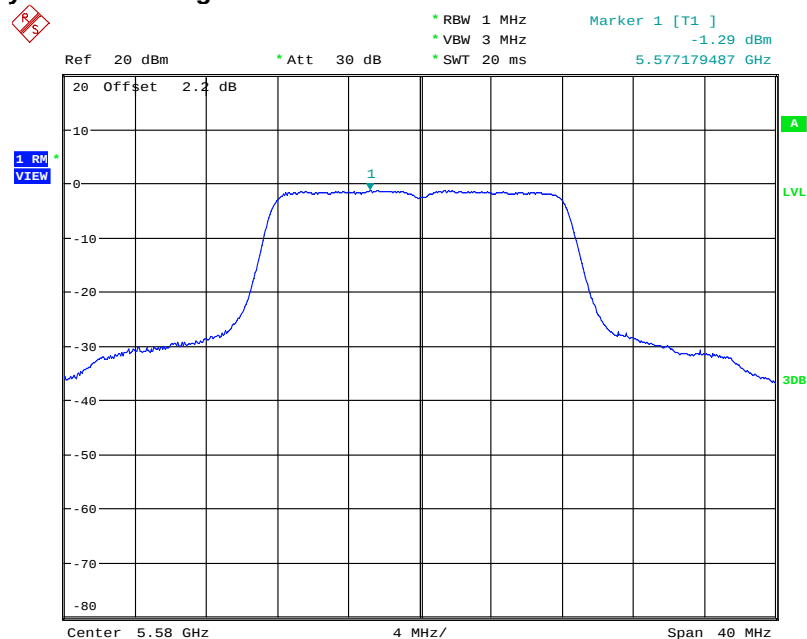
Date: 25.FEB.2011 17:47:33

Power Density Plot on Configuration IEEE 802.11a / 5500 MHz



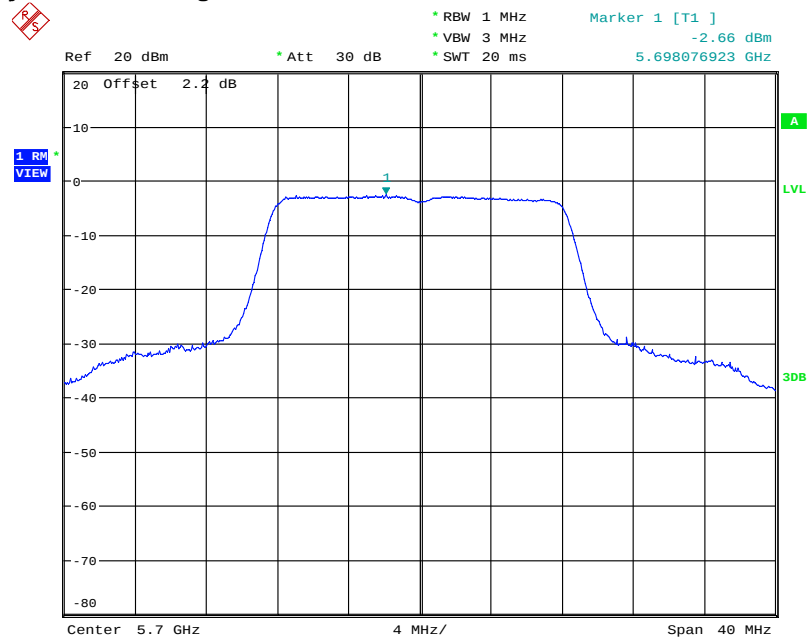
Date: 25.FEB.2011 17:52:06

Power Density Plot on Configuration IEEE 802.11a / 5580 MHz



Date: 25.FEB.2011 18:01:48

Power Density Plot on Configuration IEEE 802.11a / 5700 MHz



Date: 25.FEB.2011 18:19:23

3.5 Peak Excursion Measurement

3.5.1 Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

3.5.2 Measuring Instruments and Setting

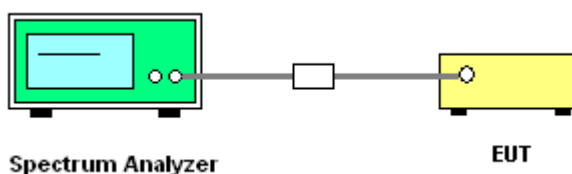
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz (Peak Trace) / 1000 kHz (Average Trace)
VB	3000 kHz (Peak Trace) / 300 kHz (Average Trace)
Detector	Peak (Peak Trace) / Sample (Average Trace)
Trace	Max Hold
Sweep Time	60s

3.5.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emissions bandwidth. The largest difference between the following two traces (Peak Trace and Average Trace) must be ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold—and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to “free run”. Set RBW = 1 MHz. Set VBW $\geq 1/T$ (IEEE 802.11a VBW = 300kHz $\geq 1/4\mu\text{s}$). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.

3.5.4 Test Setup Layout



3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

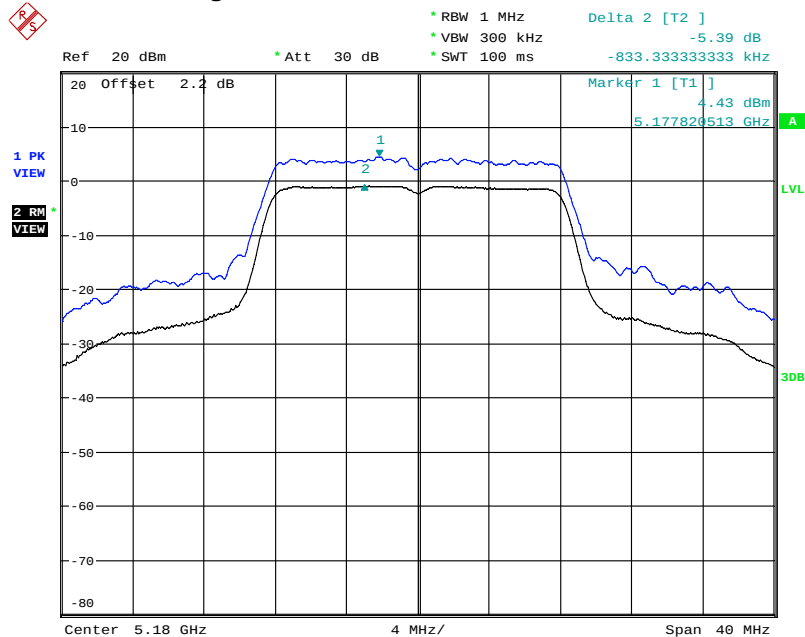
3.5.7 Test Result of Peak Excursion

Final Test Date	Feb. 25, 2011	Test Site No.	TH01-HY
Temperature	25°C	Humidity	62%
Test Engineer	Ian	Configurations	802.11a

Configuration of IEEE 802.11a

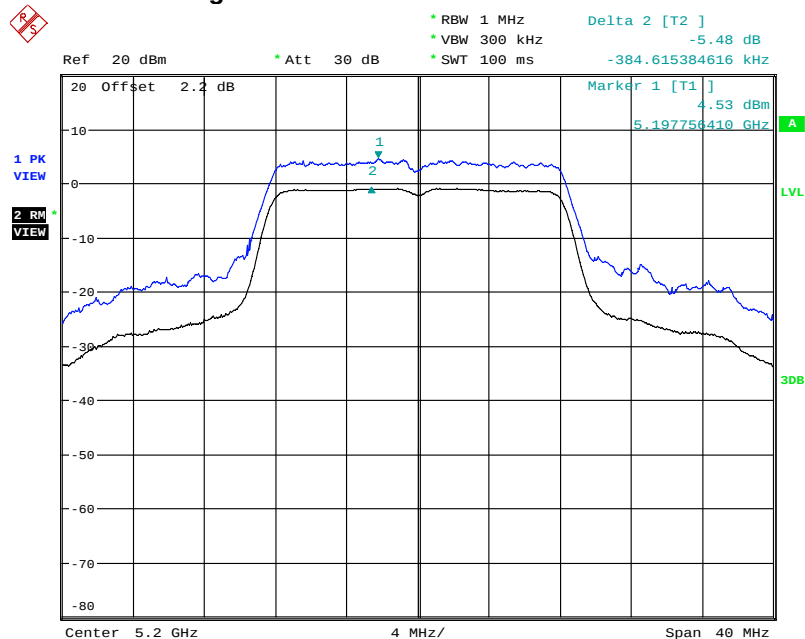
Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	5.39	13	Complies
5200 MHz	5.48	13	Complies
5240 MHz	5.33	13	Complies
5260 MHz	5.49	13	Complies
5280 MHz	5.29	13	Complies
5320 MHz	4.99	13	Complies
5500 MHz	5.27	13	Complies
5580 MHz	5.17	13	Complies
5700 MHz	5.64	13	Complies

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



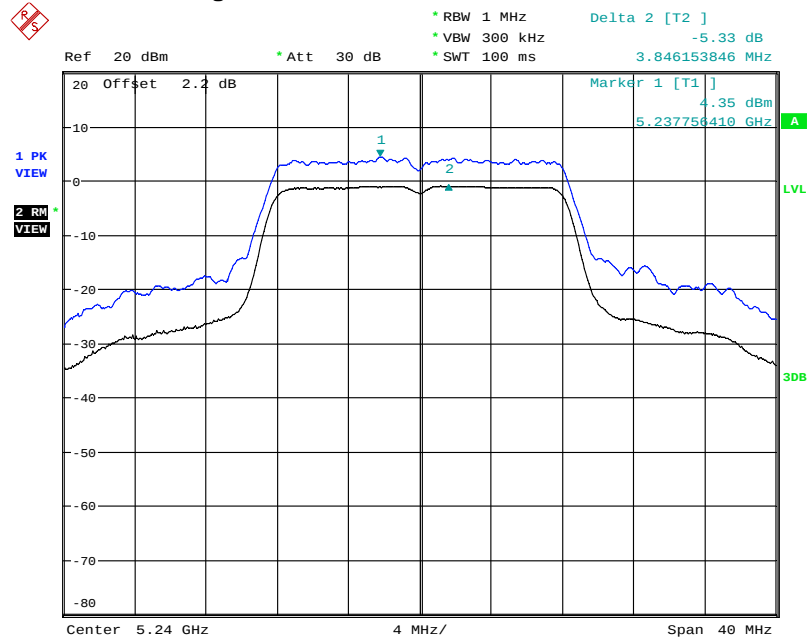
Date: 25.FEB.2011 16:32:34

Peak Excursion Plot on Configuration IEEE 802.11a / 5200 MHz



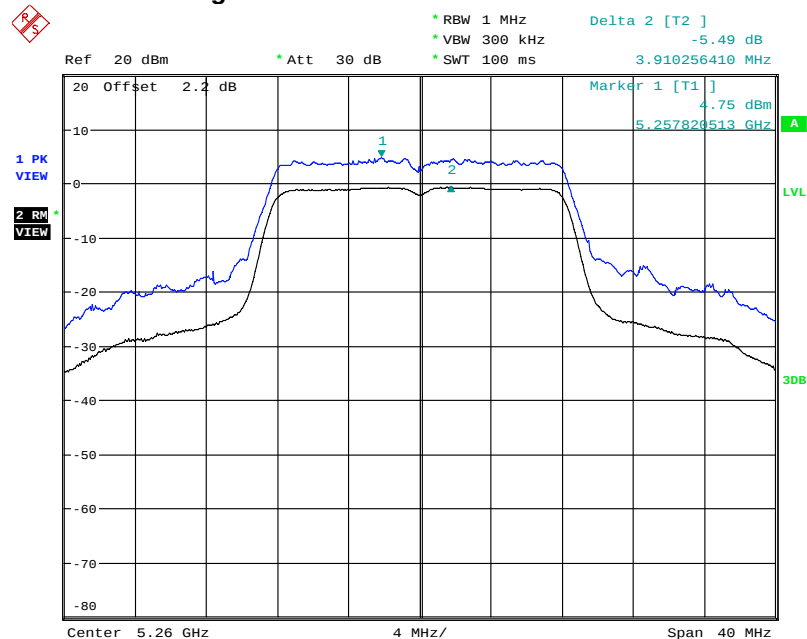
Date: 25.FEB.2011 16:48:04

Peak Excursion Plot on Configuration IEEE 802.11a / 5240 MHz



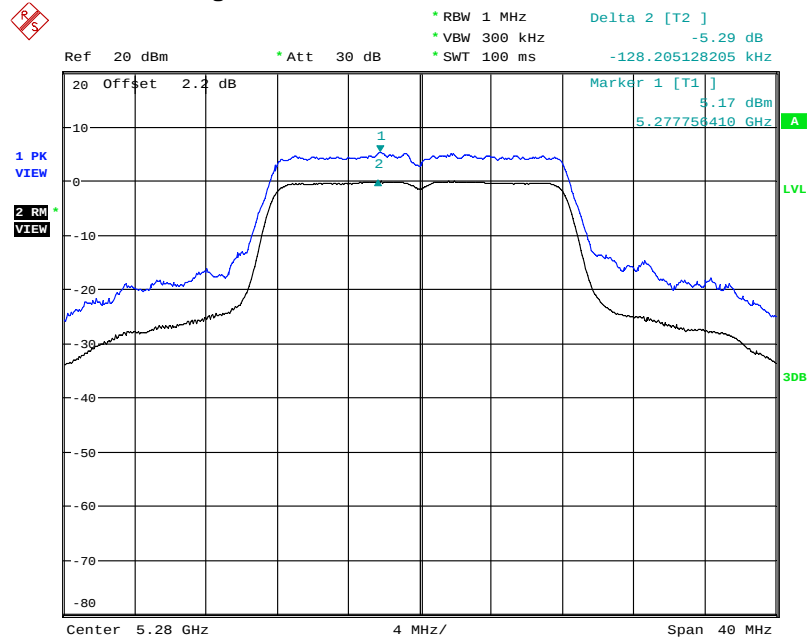
Date: 25.FEB.2011 17:00:52

Peak Excursion Plot on Configuration IEEE 802.11a / 5260 MHz



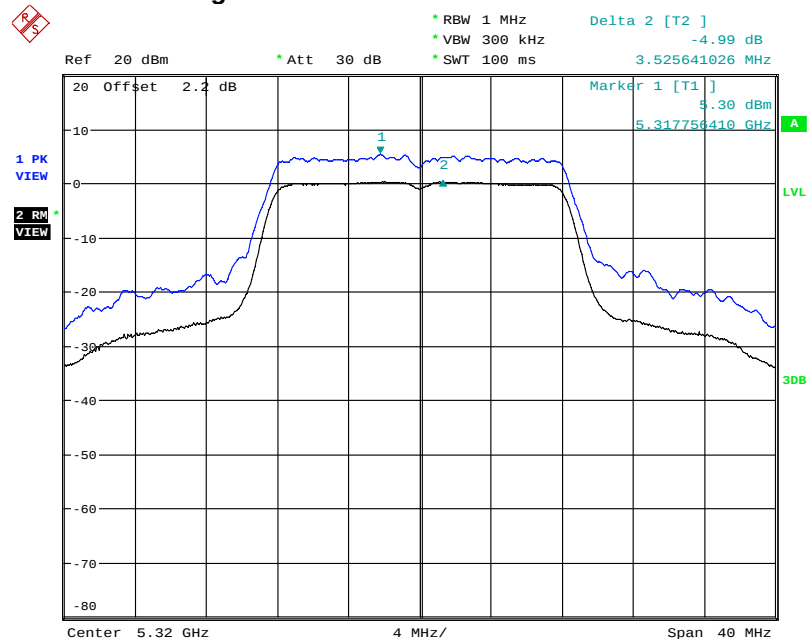
Date: 25.FEB.2011 17:06:23

Peak Excursion Plot on Configuration IEEE 802.11a / 5280 MHz



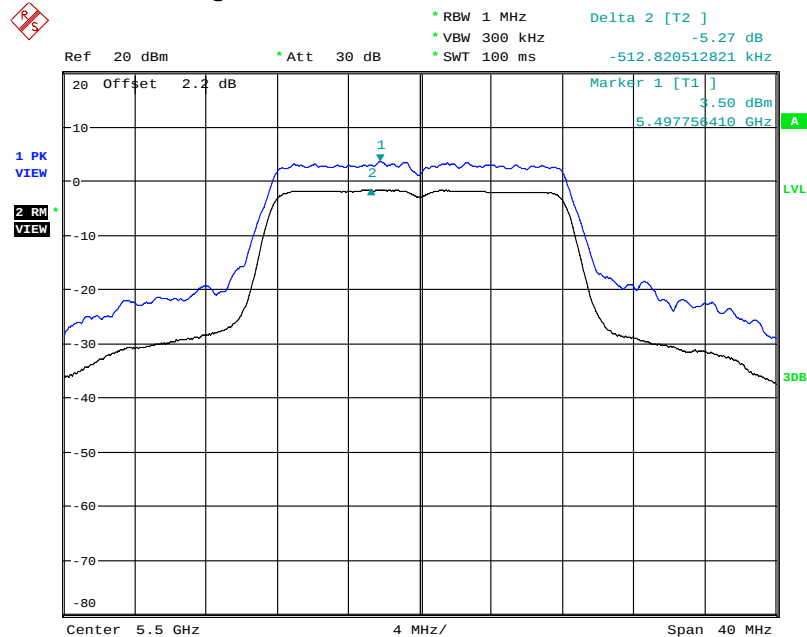
Date: 25.FEB.2011 17:25:54

Peak Excursion Plot on Configuration IEEE 802.11a / 5320 MHz



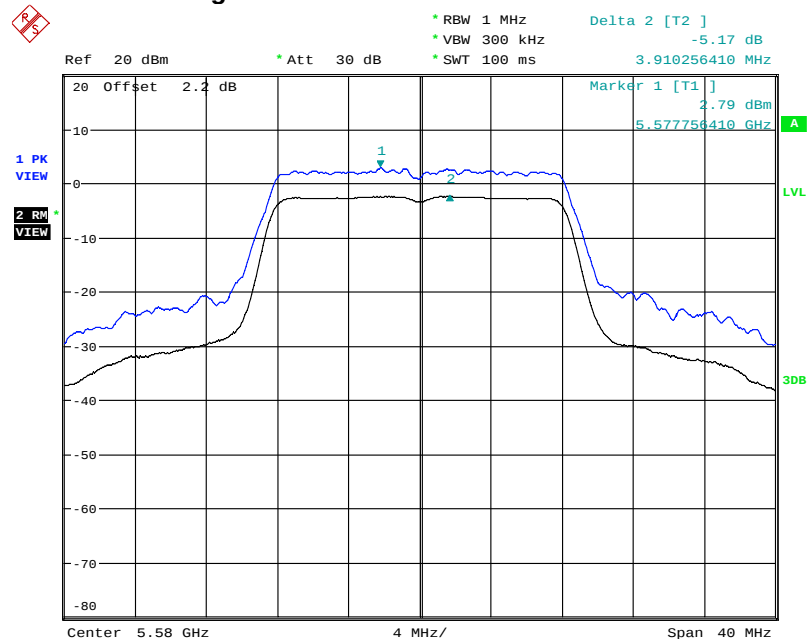
Date: 25.FEB.2011 17:48:54

Peak Excursion Plot on Configuration IEEE 802.11a / 5500 MHz



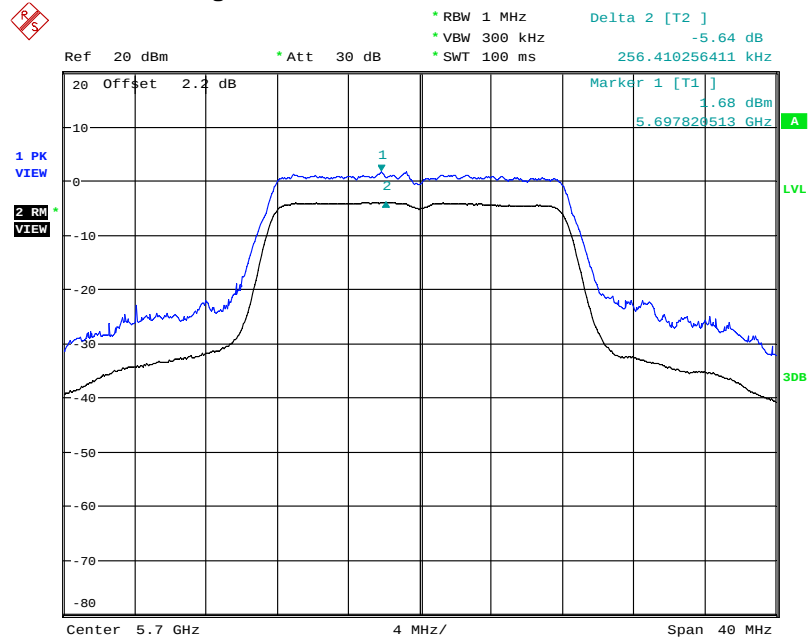
Date: 25.FEB.2011 17:57:07

Peak Excursion Plot on Configuration IEEE 802.11a / 5580 MHz



Date: 25.FEB.2011 18:05:13

Peak Excursion Plot on Configuration IEEE 802.11a / 5700 MHz



Date: 25.FEB.2011 18:21:40

3.6 Radiated Emissions Measurement

3.6.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.6.2 Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz z for peak

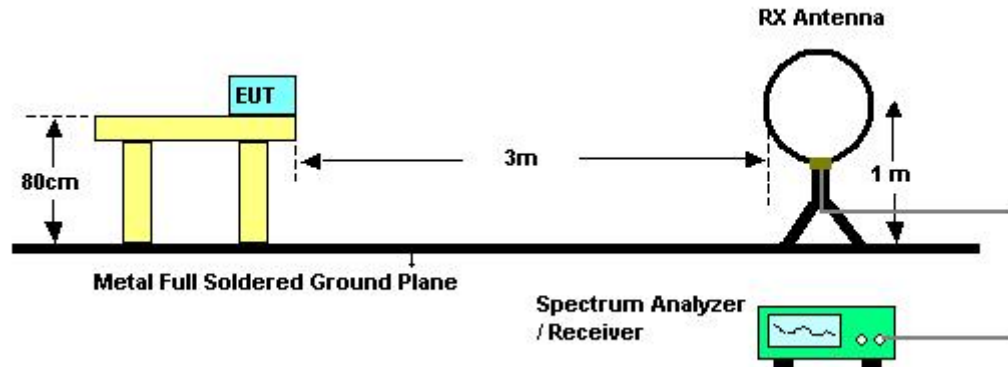
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.6.3 Test Procedures

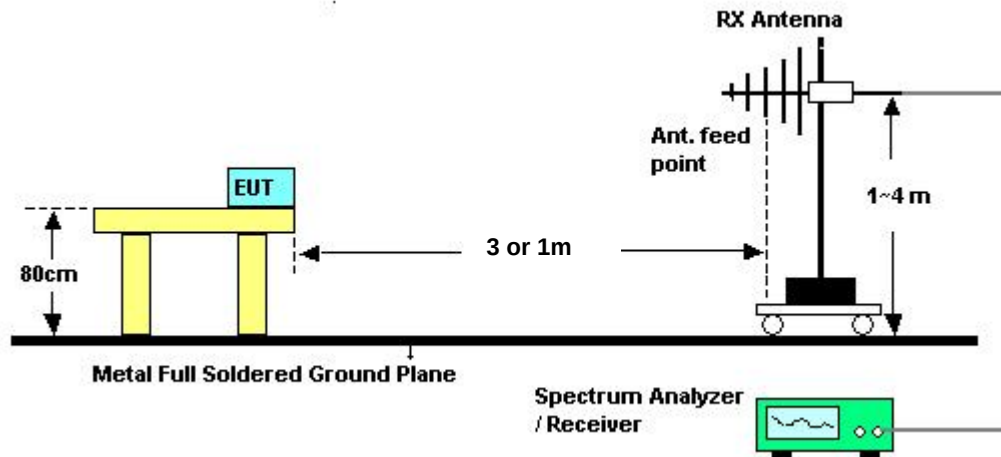
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions 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.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions 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.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.6.4 Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.6.5 Test Deviation

There is no deviation with the original standard.

3.6.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.6.7 Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5℃	Humidity	52%
Test Engineer	Daniel		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

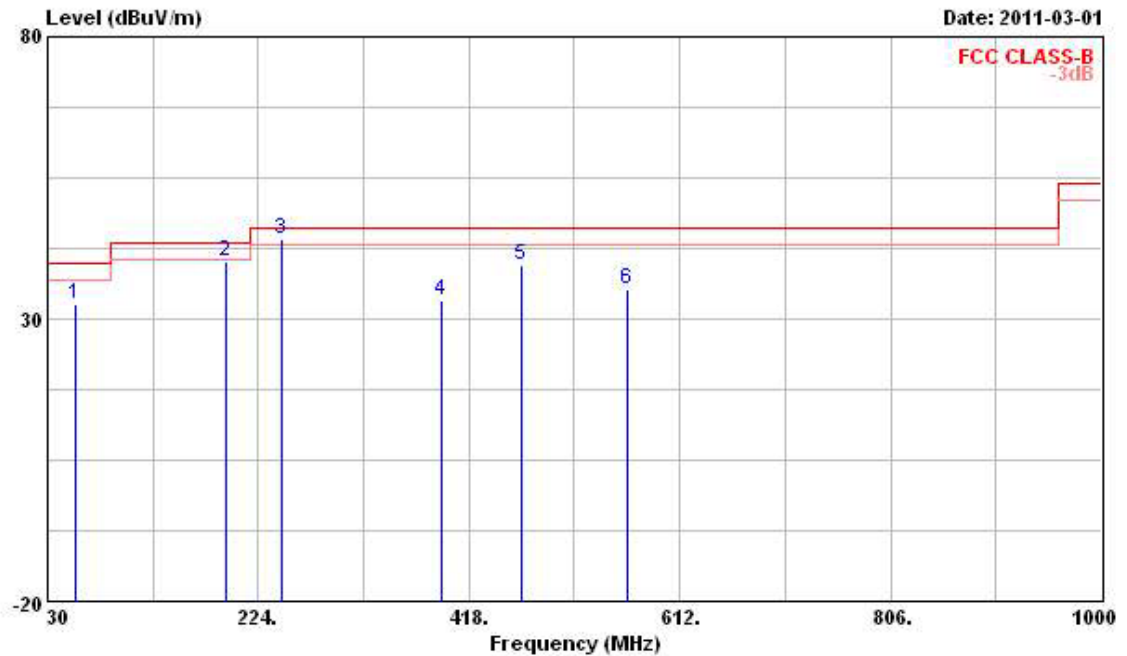
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

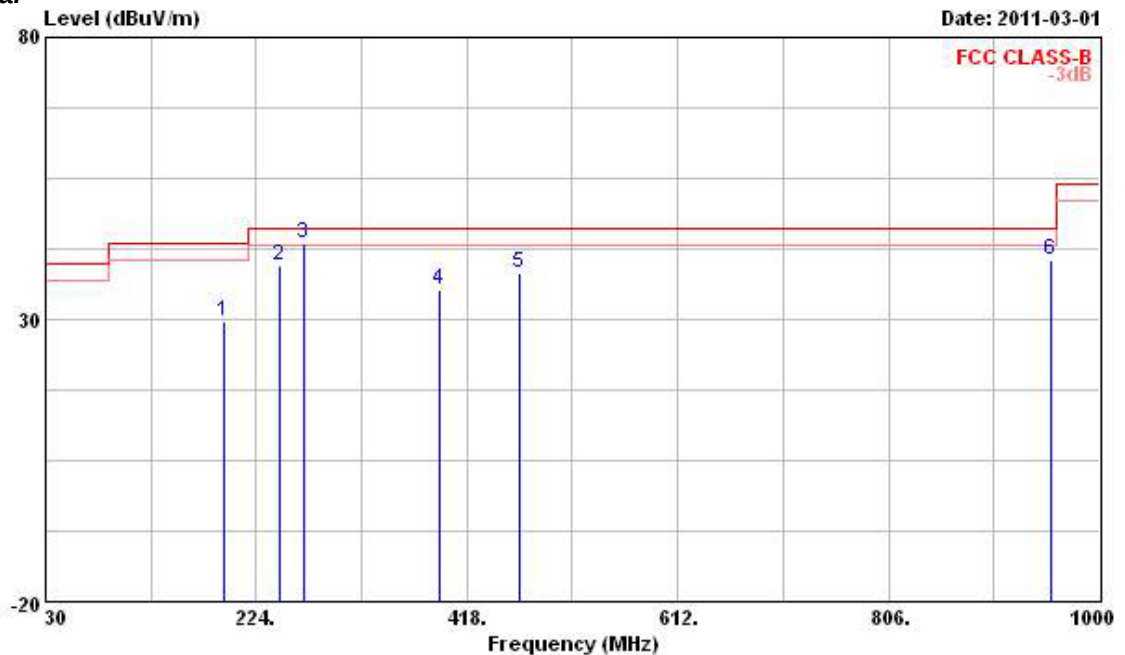
3.6.8 Results of Radiated Emissions (30MHz~1GHz)

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5℃	Humidity	52%
Test Engineer	Daniel	Configuration	Normal Mode

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	56.190	32.49	-7.51	40.00	51.00	8.05	1.19	27.75 Peak
2	194.900	40.24	-3.26	43.50	54.07	10.99	2.29	27.11 Peak
3	245.340	44.23	-1.77	46.00	55.57	12.84	2.65	26.83 QP
4	392.780	33.15	-12.85	46.00	42.30	15.15	3.29	27.59 Peak
5	466.500	39.49	-6.51	46.00	47.30	16.61	3.59	28.01 Peak
6	564.470	35.26	-10.74	46.00	40.43	19.14	3.85	28.16 Peak

Vertical



Emission

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	194.900	29.57	-13.93	43.50	43.40	10.99	2.29	27.11	Peak
2	245.340	39.65	-6.35	46.00	50.99	12.84	2.65	26.83	Peak
3	268.620	43.60	-2.40	46.00	54.37	13.26	2.77	26.80	QP
4	392.780	35.34	-10.66	46.00	44.49	15.15	3.29	27.59	Peak
5	466.500	38.25	-7.75	46.00	46.06	16.61	3.59	28.01	Peak
6	956.350	40.68	-5.32	46.00	41.17	21.42	5.27	27.18	Peak

Note:

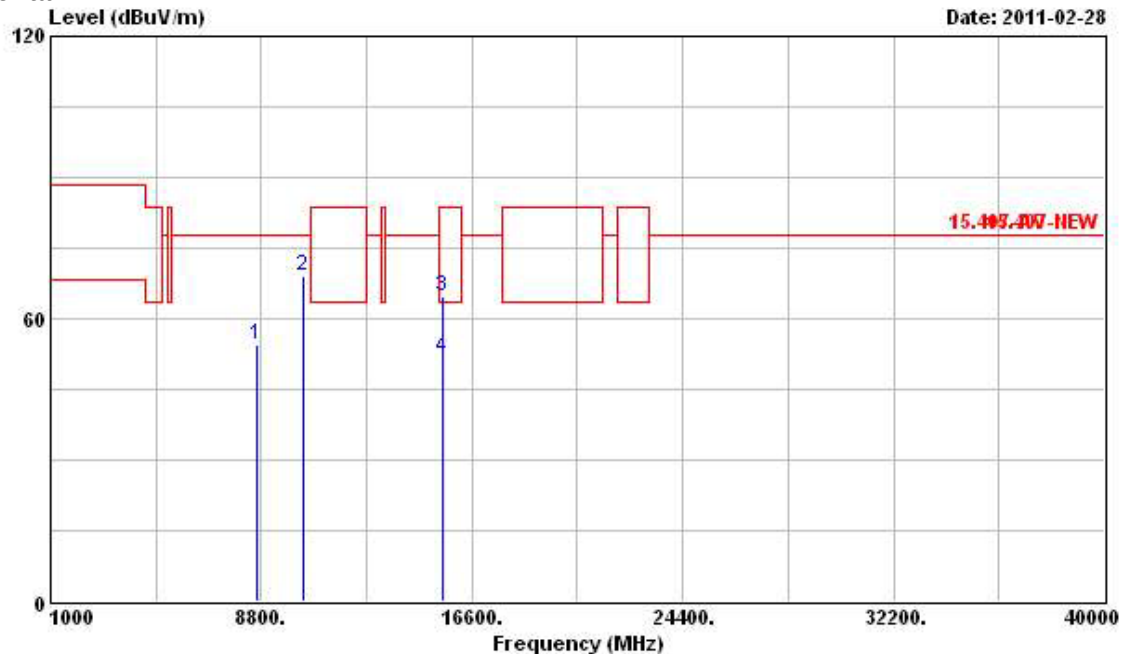
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

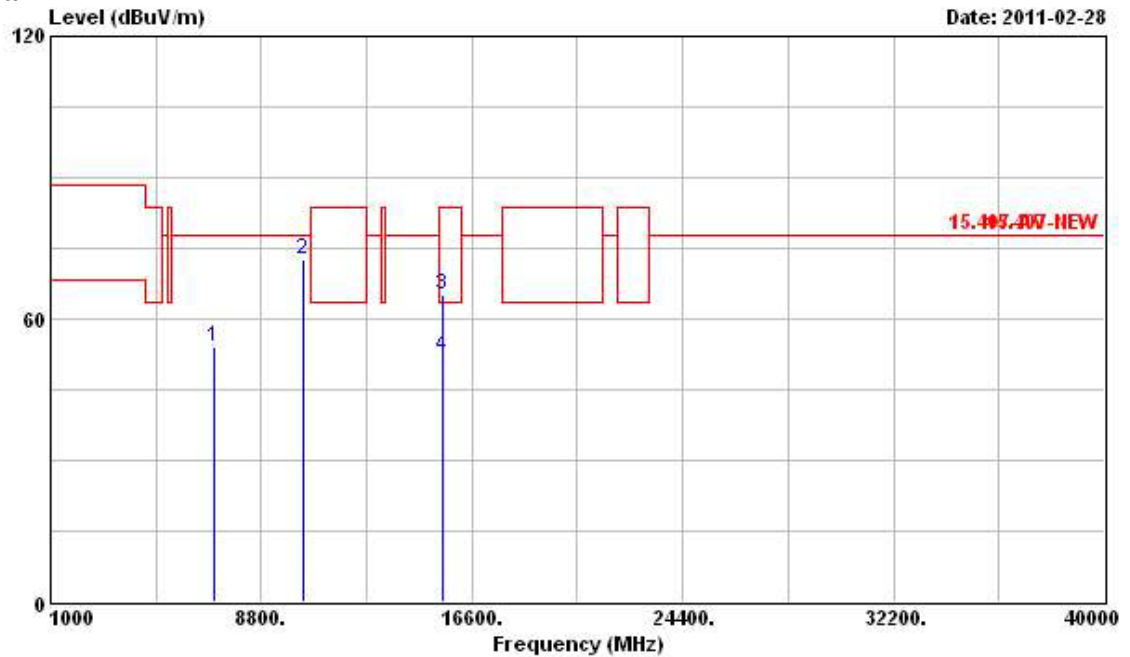
3.6.9 Results for Radiated Emissions (1GHz~40GHz)

Final Test Date	Feb. 28, 2011	Test Site No.	03CH02-HY
Temperature	24.5℃	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 36

Horizontal

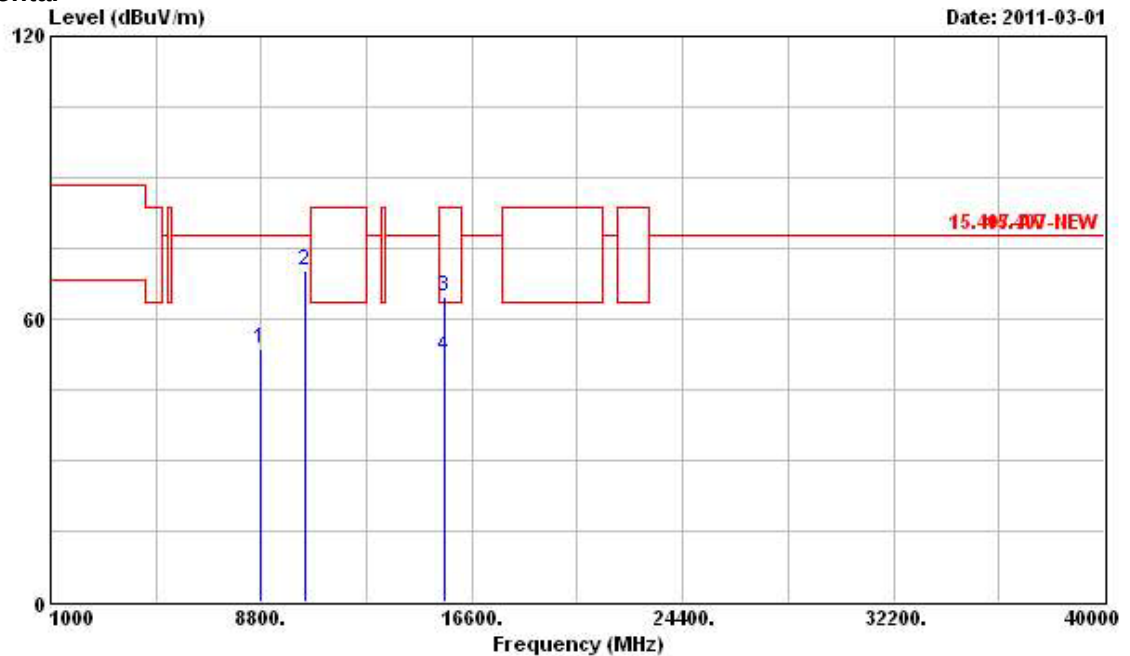
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8648.000	54.49	-23.35	77.84	44.46	38.38	6.01	34.36	Peak	---	---
2	10360.000	69.25	-8.59	77.84	56.66	40.02	6.71	34.14	Peak	---	---
3	15540.000	64.69	-18.85	83.54	46.27	42.81	8.45	32.84	Peak	---	---
4	15540.000	51.61	-11.93	63.54	33.19	42.81	8.45	32.84	Average	---	---

Vertical



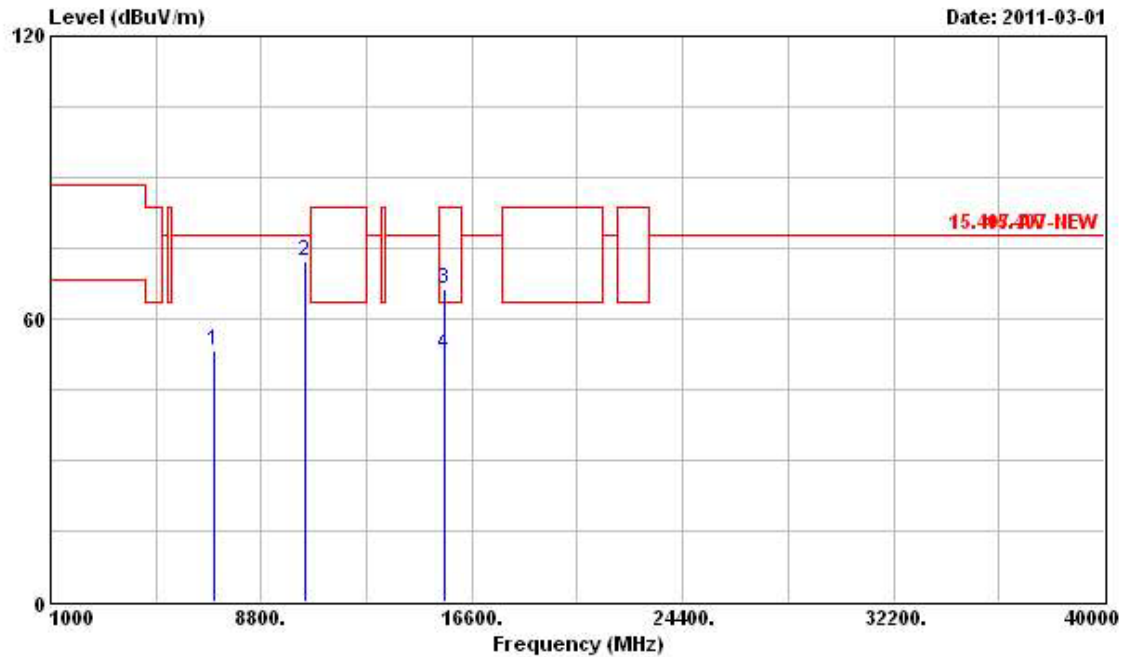
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7086.000	53.95	-23.89	77.84	44.80	37.82	5.61	34.28	Peak	---	---
2	10360.000	72.61	-5.23	77.84	60.02	40.02	6.71	34.14	Peak	---	---
3	15540.000	65.22	-18.32	83.54	46.80	42.81	8.45	32.84	Peak	---	---
4	15540.000	51.96	-11.58	63.54	33.54	42.81	8.45	32.84	Average	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 40

Horizontal

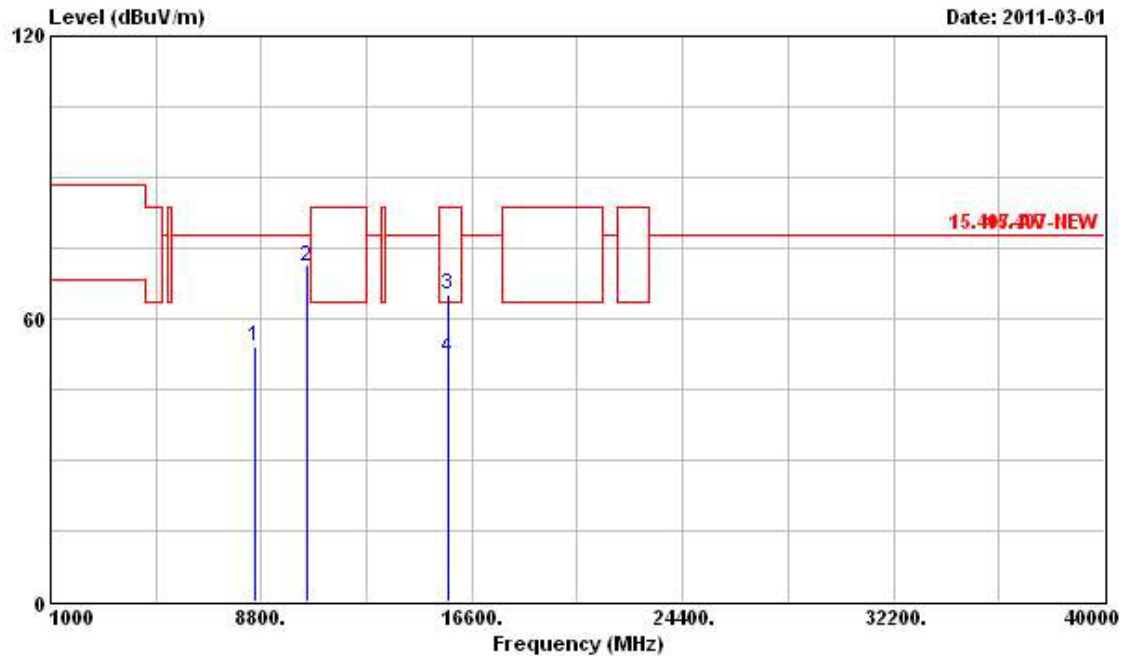
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8742.000	53.68	-24.16	77.84	43.78	38.31	6.06	34.47	Peak	---	---
2	10400.000	70.44	-7.40	77.84	57.75	40.04	6.75	34.10	Peak	---	---
3	15600.000	64.89	-18.65	83.54	46.54	42.82	8.45	32.92	Peak	---	---
4	15600.000	52.27	-11.27	63.54	33.92	42.82	8.45	32.92	Average	---	---

Vertical



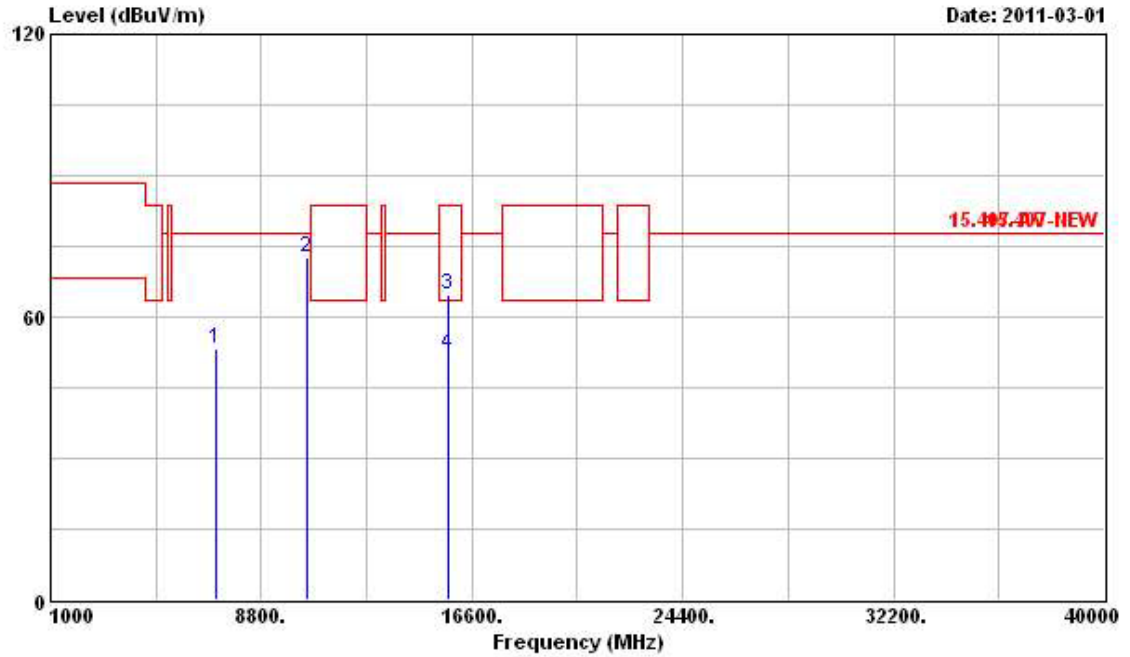
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	7072.000	53.16	-24.68	77.84	44.02	37.81	5.61	34.28 Peak	---	---
2	10400.000	72.40	-5.44	77.84	59.71	40.04	6.75	34.10 Peak	---	---
3	15600.000	66.25	-17.29	83.54	47.90	42.82	8.45	32.92 Peak	---	---
4	15600.000	52.41	-11.13	63.54	34.06	42.82	8.45	32.92 Average	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 48

Horizontal

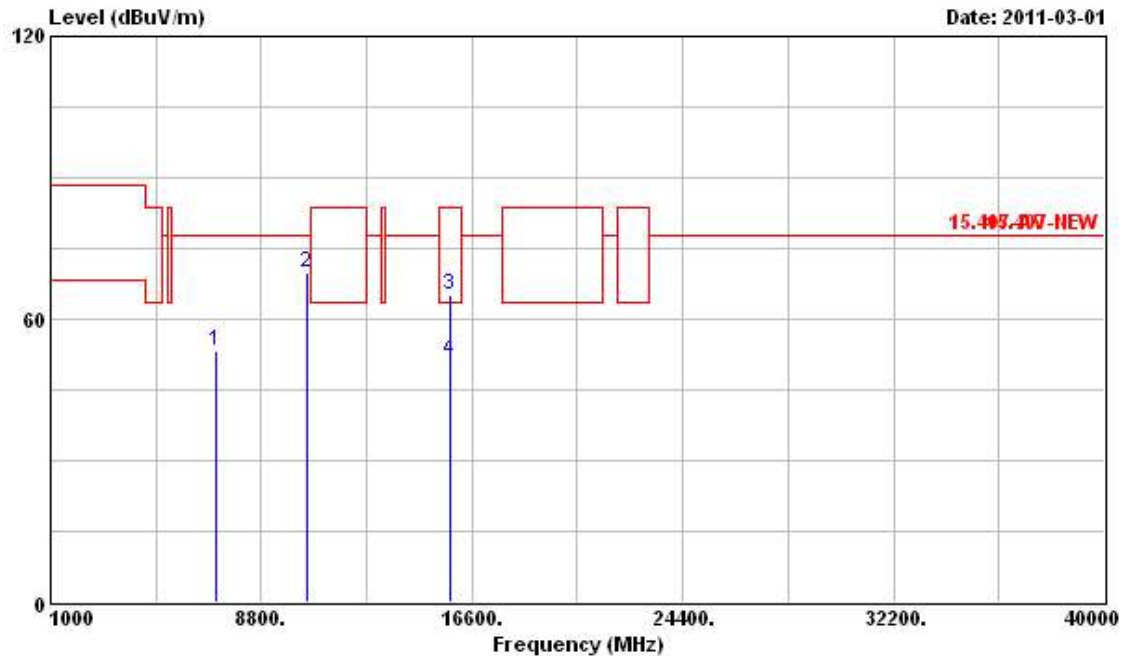
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8598.000	54.26	-23.58	77.84	44.16	38.42	5.99	34.31	Peak	---	---
2	10480.000	71.25	-6.59	77.84	58.37	40.09	6.82	34.03	Peak	---	---
3	15720.000	64.96	-18.58	83.54	46.69	42.84	8.46	33.03	Peak	---	---
4	15720.000	51.83	-11.71	63.54	33.56	42.84	8.46	33.03	Average	---	---

Vertical



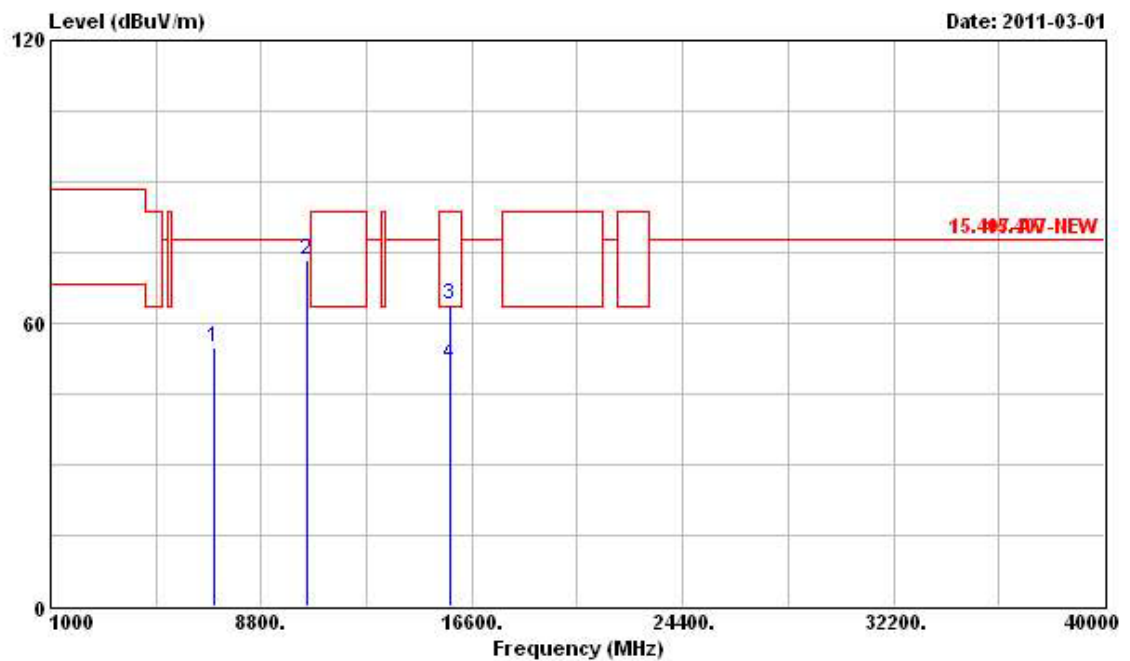
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7126.000	53.19	-24.65	77.84	44.04	37.82	5.61	34.28	Peak	---	---
2	10480.000	72.45	-5.39	77.84	59.57	40.09	6.82	34.03	Peak	---	---
3	15720.000	64.91	-18.63	83.54	46.64	42.84	8.46	33.03	Peak	---	---
4	15720.000	52.05	-11.49	63.54	33.78	42.84	8.46	33.03	Average	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 52

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7126.000	53.43	-24.41	77.84	44.28	37.82	5.61	34.28	Peak	---	---
2	10520.000	69.81	-8.03	77.84	56.85	40.11	6.85	34.00	Peak	---	---
3	15780.000	65.18	-18.36	83.54	46.97	42.86	8.46	33.11	Peak	---	---
4	15780.000	51.22	-12.32	63.54	33.01	42.86	8.46	33.11	Average	---	---

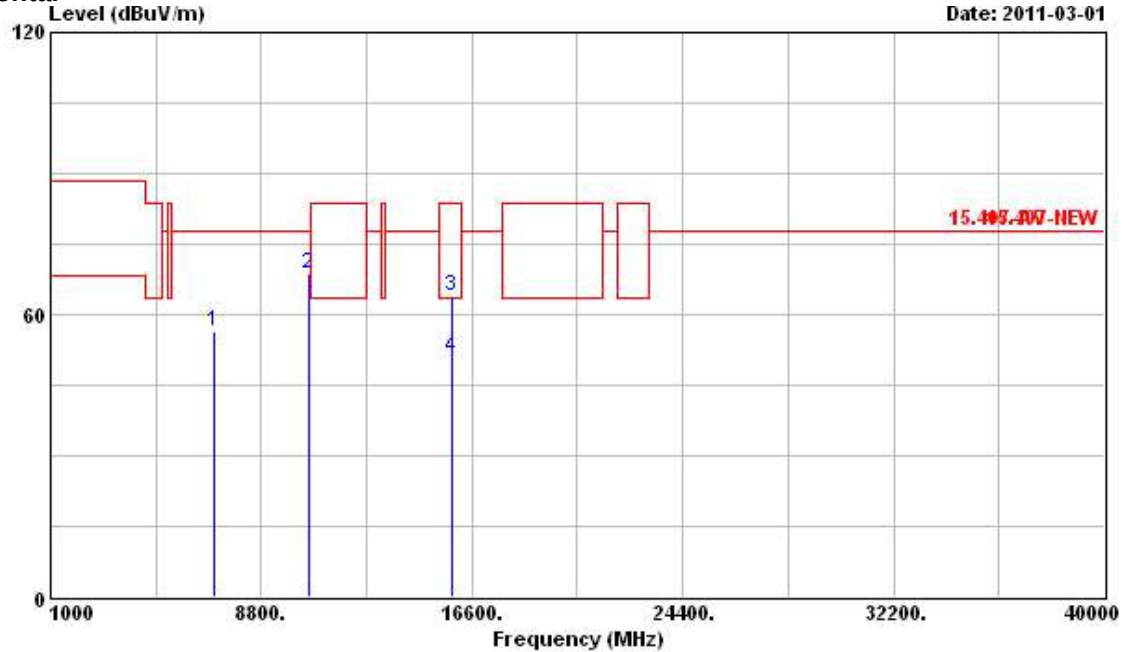
Vertical



62.900000 50

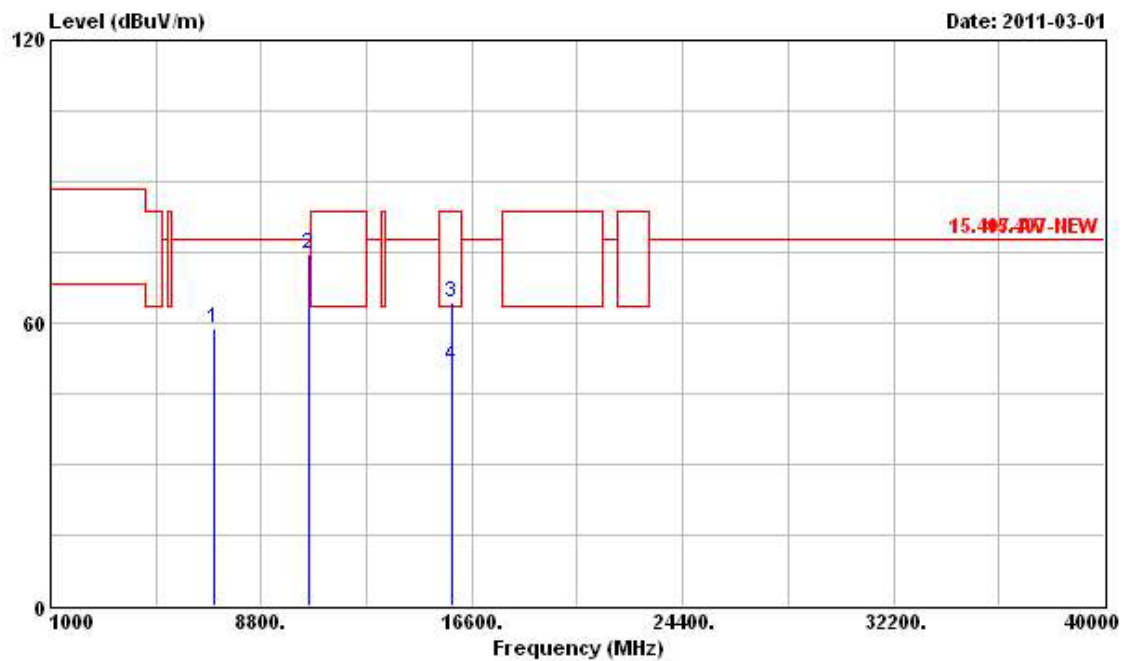
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7056.000	54.69	-23.15	77.84	45.56	37.81	5.60	34.28	Peak	---	---
2	10520.000	73.56	-4.28	77.84	60.60	40.11	6.85	34.00	Peak	---	---
3	15780.000	64.12	-19.42	83.54	45.91	42.86	8.46	33.11	Peak	---	---
4	15780.000	51.49	-12.05	63.54	33.28	42.86	8.46	33.11	Average	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 56

Horizontal

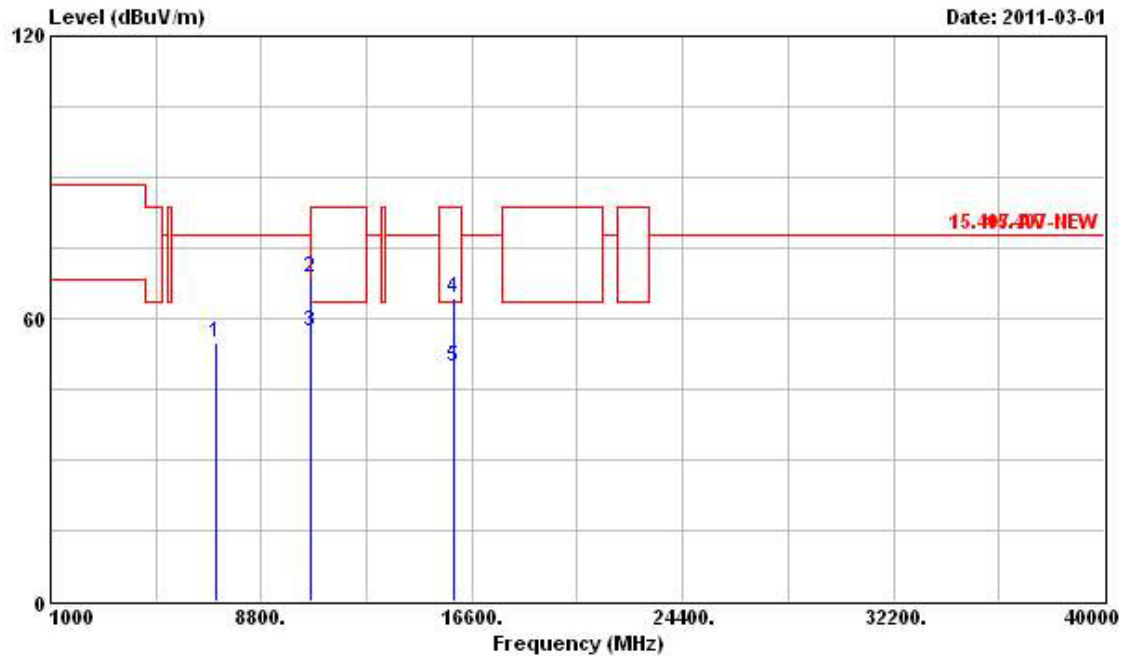
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7028.000	56.26	-21.58	77.84	47.13	37.81	5.60	34.28	Peak	---	---
2	10560.000	68.59	-9.25	77.84	55.52	40.13	6.88	33.94	Peak	---	---
3	15840.000	63.96	-19.58	83.54	45.79	42.87	8.46	33.16	Peak	---	---
4	15840.000	50.83	-12.71	63.54	32.66	42.87	8.46	33.16	Average	---	---

Vertical



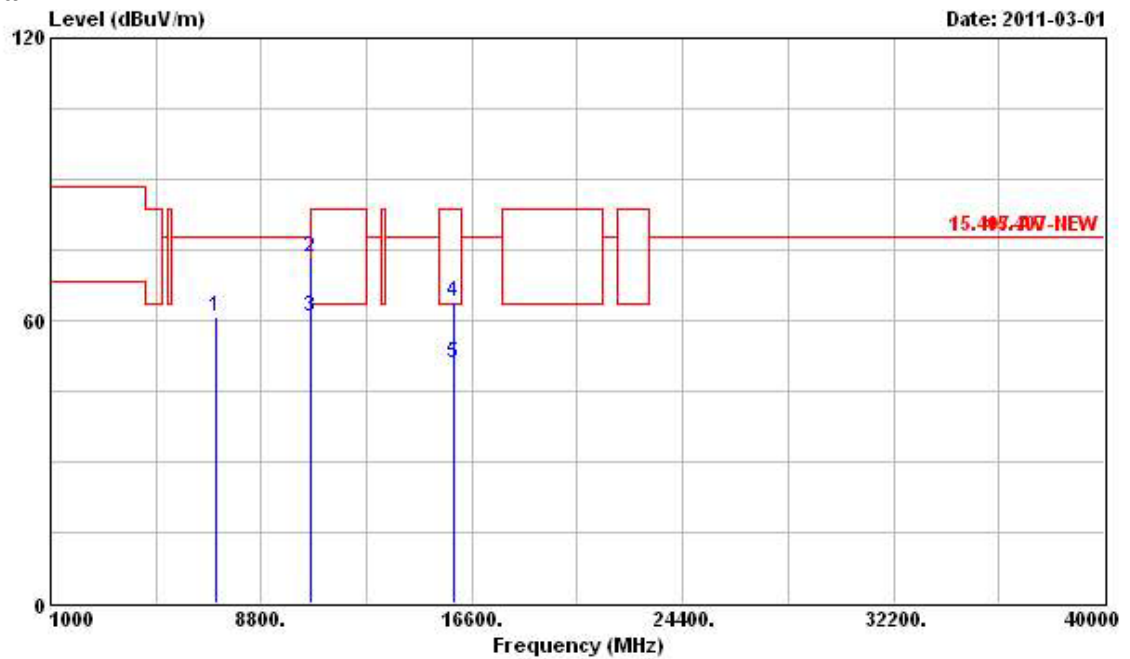
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7036.000	58.97	-18.87	77.84	49.84	37.81	5.60	34.28	Peak	---	---
2	10560.000	74.50	-3.34	77.84	61.43	40.13	6.88	33.94	Peak	---	---
3	15840.000	64.28	-19.26	83.54	46.11	42.87	8.46	33.16	Peak	---	---
4	15840.000	50.91	-12.63	63.54	32.74	42.87	8.46	33.16	Average	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 64

Horizontal

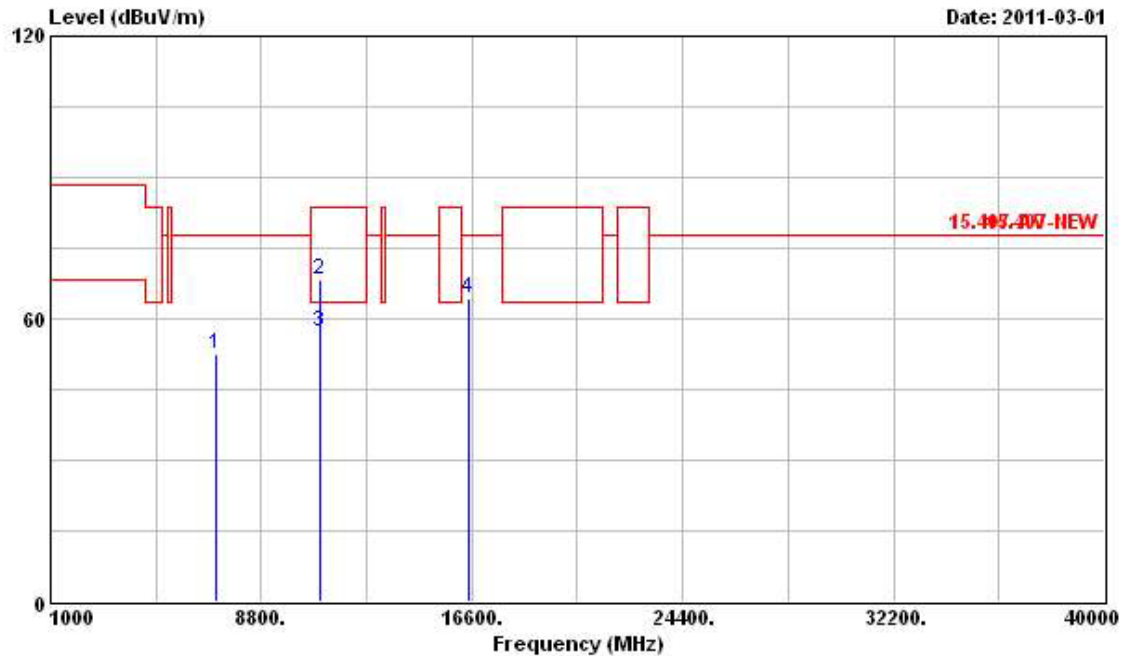
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7092.000	55.00	-22.84	77.84	45.85	37.82	5.61	34.28	Peak	---	---
2	10640.000	68.65	-14.89	83.54	55.38	40.18	6.93	33.84	Peak	---	---
3	10640.000	57.35	-6.19	63.54	44.08	40.18	6.93	33.84	Average	---	---
4	15960.000	64.17	-19.37	83.54	46.10	42.89	8.47	33.29	Peak	---	---
5	15960.000	49.63	-13.91	63.54	31.56	42.89	8.47	33.29	Average	---	---

Vertical



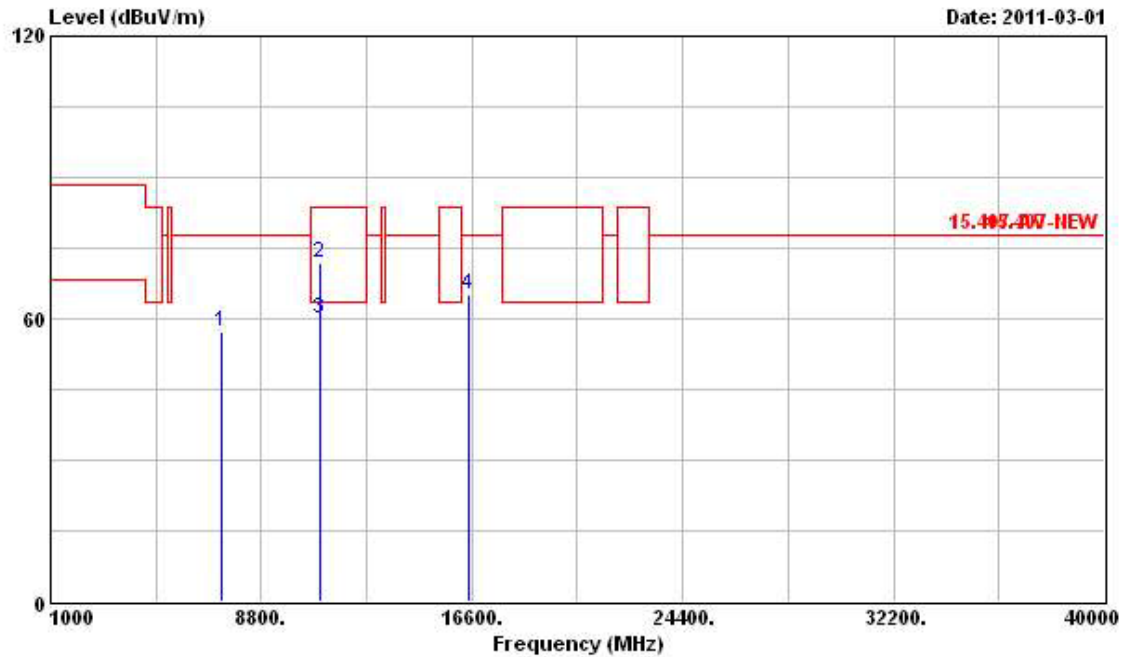
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7090.000	60.72	-17.12	77.84	51.57	37.82	5.61	34.28	Peak	---	---
2	10640.000	73.54	-10.00	83.54	60.27	40.18	6.93	33.84	Peak	---	---
3	10640.000	60.79	-2.75	63.54	47.52	40.18	6.93	33.84	Average	---	---
4	15960.000	63.89	-19.65	83.54	45.82	42.89	8.47	33.29	Peak	---	---
5	15960.000	51.04	-12.50	63.54	32.97	42.89	8.47	33.29	Average	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 100

Horizontal

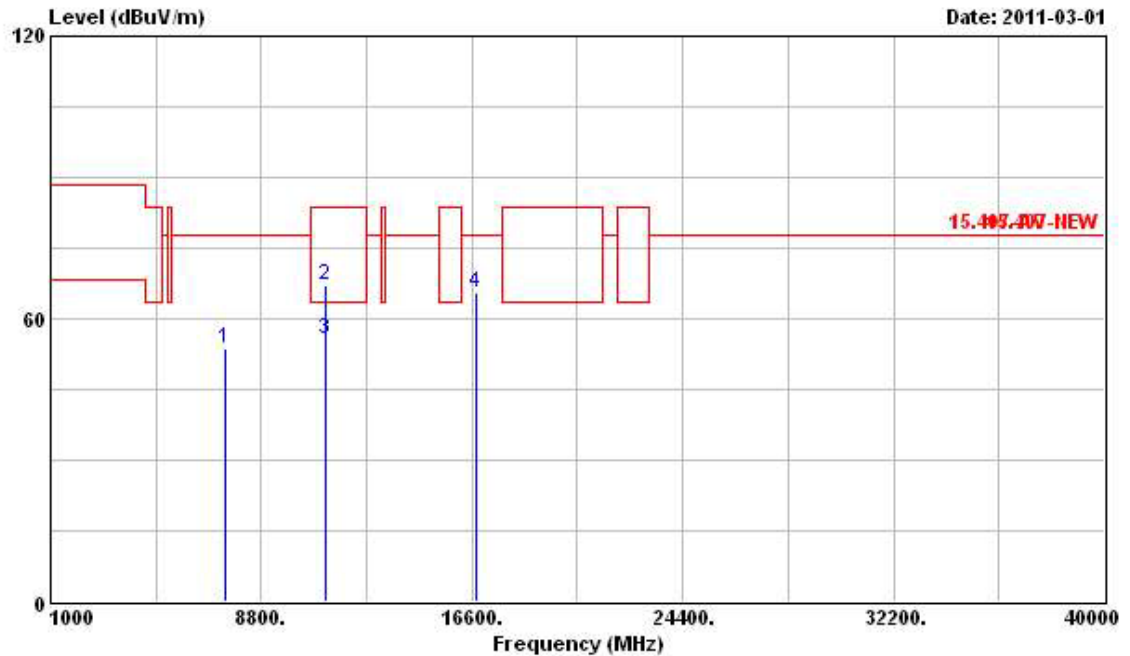
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7120.000	52.37	-25.47	77.84	43.22	37.82	5.61	34.28	Peak	---	---
2	11000.000	68.44	-15.10	83.54	54.26	40.40	7.17	33.39	Peak	---	---
3	11000.000	57.13	-6.41	63.54	42.95	40.40	7.17	33.39	Average	---	---
4	16500.000	64.17	-13.67	77.84	45.21	43.50	8.24	32.78	Peak	---	---

Vertical



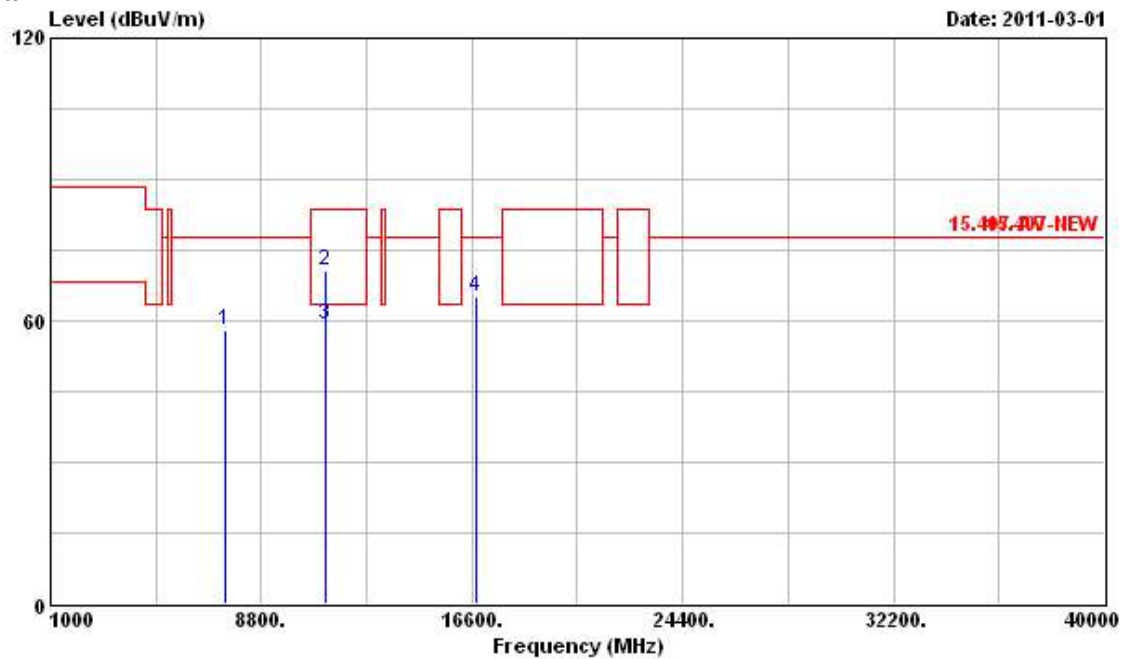
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7320.000	57.12	-20.72	77.84	47.90	37.87	5.64	34.29	PK	---	---
2	11000.000	72.03	-11.51	83.54	57.85	40.40	7.17	33.39	Peak	---	---
3	11000.000	60.04	-3.50	63.54	45.86	40.40	7.17	33.39	Average	---	---
4	16500.000	65.04	-12.80	77.84	46.08	43.50	8.24	32.78	Peak	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 116

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7440.000	53.52	-24.32	77.84	44.27	37.89	5.65	34.29	PK	---	---
2	11160.000	67.18	-16.36	83.54	53.22	40.47	6.96	33.47	Peak	---	---
3	11160.000	55.70	-7.84	63.54	41.74	40.47	6.96	33.47	Average	---	---
4	16740.000	65.61	-12.23	77.84	46.10	43.60	8.47	32.56	Peak	---	---

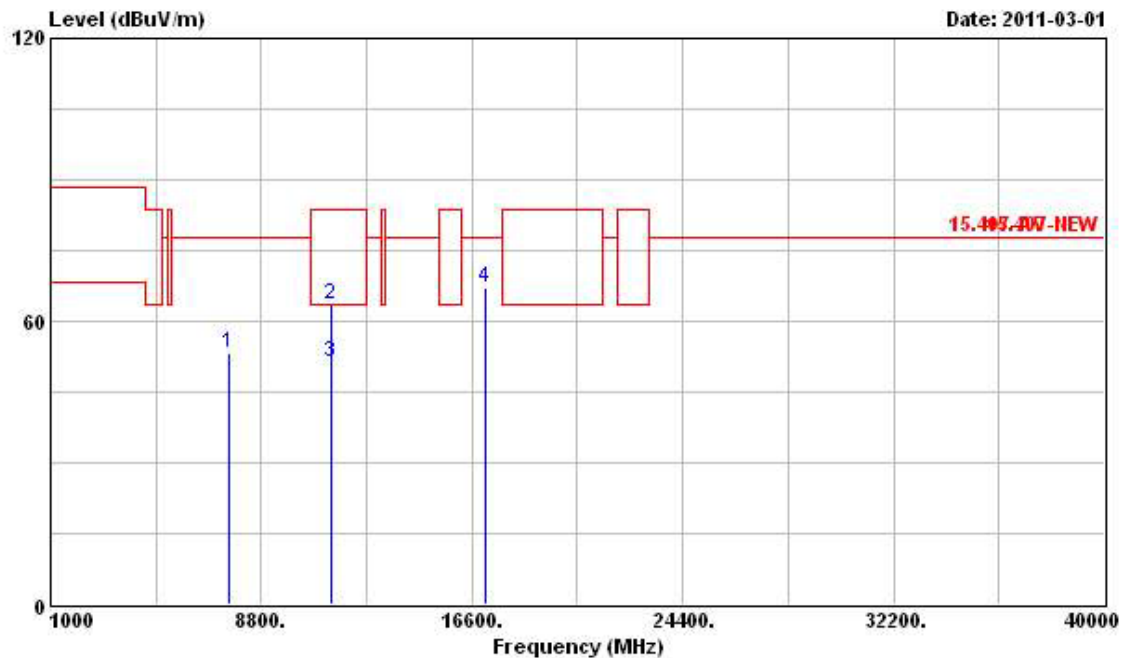
Vertical



0.000000
 0.000000

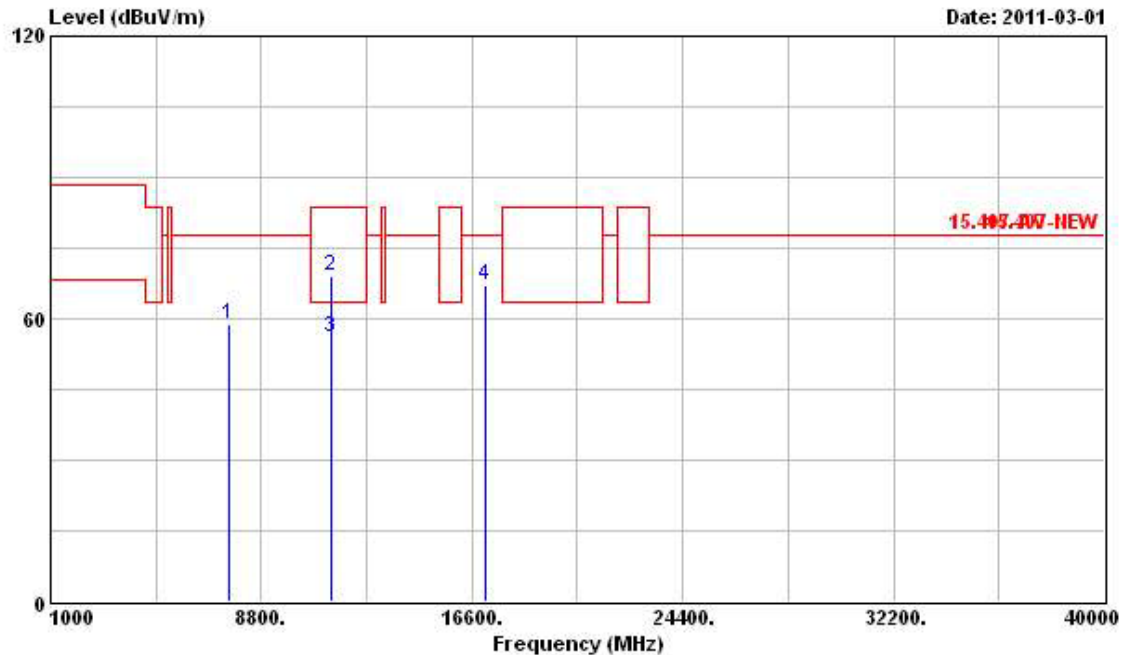
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7440.000	58.03	-19.81	77.84	48.78	37.89	5.65	34.29	PK	---	---
2	11160.000	70.53	-13.01	83.54	56.57	40.47	6.96	33.47	Peak	---	---
3	11160.000	59.37	-4.17	63.54	45.41	40.47	6.96	33.47	Average	---	---
4	16740.000	65.02	-12.82	77.84	45.51	43.60	8.47	32.56	Peak	---	---

Final Test Date	Mar. 01, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 140

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7594.000	53.38	-24.46	77.84	44.05	37.96	5.68	34.31	PK	---	---
2	11400.000	63.53	-20.01	83.54	49.86	40.56	6.71	33.60	Peak	---	---
3	11400.000	51.48	-12.06	63.54	37.81	40.56	6.71	33.60	Average	---	---
4	17100.000	66.97	-10.87	77.84	47.00	43.64	8.61	32.28	Peak	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7596.000	58.65	-19.19	77.84	49.32	37.96	5.68	34.31	PK	---	---
2	11400.000	69.24	-14.30	83.54	55.57	40.56	6.71	33.60	Peak	---	---
3	11400.000	56.01	-7.53	63.54	42.34	40.56	6.71	33.60	Average	---	---
4	17100.000	67.25	-10.59	77.84	47.28	43.64	8.61	32.28	Peak	---	---

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.7 Band Edge and Fundamental Emissions Measurement

3.7.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.7.2 Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1 MHz /1 MHz for Peak

3.7.3 Test Procedures

1. The test procedure is the same as section 3.6.3; only the frequency range investigated is limited to 100MHz around band edges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

3.7.4 Test Setup Layout

This test setup layout is the same as that shown in section 3.6.4.

3.7.5 Test Deviation

There is no deviation with the original standard.

3.7.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.7.7 Test Result of Band Edge and Fundamental Emissions

Final Test Date	Feb. 24, 2011	Test Site No.	03CH02-HY
Temperature	24.5℃	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 36, 40, 48

Channel 36

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5149.400	73.23	-10.31	83.54	32.24	36.21	4.78	0.00	Peak	---	---
2 @	5181.500	116.63			75.57	36.26	4.80	0.00	Peak	---	---
1	5150.000	59.07	-4.47	63.54	18.08	36.21	4.78	0.00	Average	---	---
2 @	5178.300	106.21			65.15	36.26	4.80	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Channel 40

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5117.400	71.49	-12.05	83.54	30.55	36.16	4.78	0.00	Peak	---	---
2 @	5193.300	116.09			75.00	36.28	4.81	0.00	Peak	---	---
3	5381.400	71.87	-11.67	83.54	30.46	36.54	4.87	0.00	Peak	---	---
1	5117.700	58.70	-4.84	63.54	17.76	36.16	4.78	0.00	Average	---	---
2 @	5193.000	105.98			64.89	36.28	4.81	0.00	Average	---	---
3	5393.700	59.16	-4.38	63.54	17.74	36.54	4.88	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Channel 48

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5121.300	71.24	-12.30	83.54	30.30	36.16	4.78	0.00	Peak	---	---
2 @	5241.300	117.51			76.36	36.33	4.82	0.00	Peak	---	---
3	5392.200	71.83	-11.71	83.54	30.41	36.54	4.88	0.00	Peak	---	---
1	5116.200	58.70	-4.84	63.54	17.76	36.16	4.78	0.00	Average	---	---
2 @	5238.600	107.26			66.11	36.33	4.82	0.00	Average	---	---
3	5395.800	59.17	-4.37	63.54	17.73	36.56	4.88	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Final Test Date	Feb. 24, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 52, 56, 64

Channel 52

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5104.200	71.51	-12.03	83.54	30.60	36.14	4.77	0.00	Peak	---	---
2 @	5261.700	116.88			75.69	36.37	4.82	0.00	Peak	---	---
3	5373.000	71.48	-12.06	83.54	30.10	36.51	4.87	0.00	Peak	---	---
1	5109.000	58.68	-4.86	63.54	17.75	36.16	4.77	0.00	Average	---	---
2 @	5261.700	106.67			65.48	36.37	4.82	0.00	Average	---	---
3	5394.600	59.22	-4.32	63.54	17.78	36.56	4.88	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Channel 56

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5131.800	71.65	-11.89	83.54	30.68	36.19	4.78	0.00	Peak	---	---
2 @	5286.600	116.08			74.84	36.40	4.84	0.00	Peak	---	---
3	5396.100	71.47	-12.07	83.54	30.03	36.56	4.88	0.00	Peak	---	---
1	5113.800	58.68	-4.86	63.54	17.75	36.16	4.77	0.00	Average	---	---
2 @	5286.900	105.97			64.73	36.40	4.84	0.00	Average	---	---
3	5362.500	59.17	-4.37	63.54	17.79	36.51	4.87	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Channel 64

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	5321.620	116.40			75.11	36.44	4.85	0.00	Peak	---	---
2	5352.210	74.03	-9.51	83.54	32.67	36.49	4.87	0.00	Peak	---	---
1 @	5321.900	105.76			64.47	36.44	4.85	0.00	Average	---	---
2	5350.250	59.53	-4.01	63.54	18.17	36.49	4.87	0.00	Average	---	---

The item 1 is the fundamental signals which can be ignored.

Final Test Date	Feb. 24, 2011	Test Site No.	03CH02-HY
Temperature	24.5°C	Humidity	52%
Test Engineer	Daniel	Configuration	802.11a Ch. 100, 116, 140

Channel 100

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5458.320	72.82	-10.72	83.54	31.29	36.63	4.90	0.00	Peak	---	---
2 @	5501.840	117.78			76.17	36.70	4.91	0.00	Peak	---	---
1	5456.400	59.17	-4.37	63.54	17.64	36.63	4.90	0.00	Average	---	---
2 @	5506.080	107.34			65.71	36.70	4.93	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Channel 116

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	5433.520	71.76	-11.78	83.54	30.25	36.61	4.90	0.00	Peak	---	---
2 @	5576.880	116.61			74.88	36.78	4.95	0.00	Peak	---	---
3	5725.040	72.60	-5.24	77.84	30.59	36.97	5.04	0.00	Peak	---	---
1	5448.560	59.42	-4.12	63.54	17.89	36.63	4.90	0.00	Average	---	---
2 @	5576.880	106.51			64.78	36.78	4.95	0.00	Average	---	---
3	5740.400	60.06	-17.78	77.84	18.00	36.99	5.07	0.00	Average	---	---

The item 2 is the fundamental signals which can be ignored.

Channel 140

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	5701.640	116.08			74.09	36.95	5.04	0.00	Peak	---	---
2 @	5725.160	77.82	-0.02	77.84	35.81	36.97	5.04	0.00	Peak	---	---
1 @	5700.980	105.54			63.55	36.95	5.04	0.00	Average	---	---
2	5725.000	61.85	-15.99	77.84	19.84	36.97	5.04	0.00	Average	---	---

The item 1 is the fundamental signals which can be ignored.

3.8 Frequency Stability Measurement

3.8.1 Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or $\pm 20\text{ppm}$ (IEEE 802.11a specification).

3.8.2 Measuring Instruments and Setting

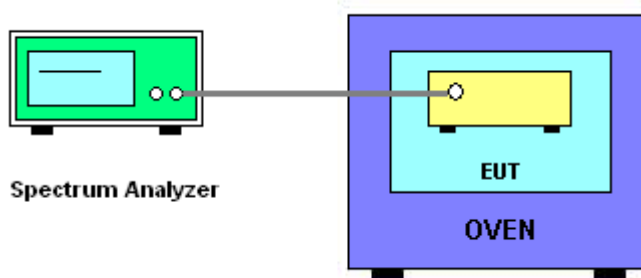
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RB	10 kHz
VB	10 kHz
Sweep Time	Auto

3.8.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than $\pm 20\text{ppm}$ (IEEE 802.11a specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is $-30^\circ\text{C} \sim 50^\circ\text{C}$.
8. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

3.8.4 Test Setup Layout



3.8.5 Test Deviation

There is no deviation with the original standard.

3.8.6 EUT Operation during Test

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

3.8.7 Test Result of Frequency Stability

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5320 MHz
4.255	5319.993309
3.7	5319.985894
3.145	5319.975961
Max. Deviation (MHz)	0.024039
Max. Deviation (ppm)	4.52

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5320 MHz
-30	5319.993252
-20	5319.948077
-10	5319.960260
0	5319.992457
10	5319.978205
20	5319.983974
30	5319.973391
40	5319.967948
50	5319.983974
Max. Deviation (MHz)	0.051923
Max. Deviation (ppm)	9.76

3.9 Antenna Requirements

3.9.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.9.2 Antenna Connector Construction

Please refer to section 2.3 in this test report; antenna connector complied with the requirements.

4 LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz – 2.75GHz	Sep. 14, 2010	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Jan. 31, 2011	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Mar. 01, 2011	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz – 30MHz	Mar 02, 2011	Conduction (CO01-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	Conduction (CO01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Jan. 06, 2011	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Apr. 16, 2010	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Oct. 22, 2010	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2010	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2010	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 30, 2010	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	Jan. 06, 2011	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	Jan. 06, 2011	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 26, 2010*	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100004	9 kHz - 40 GHz	Nov. 17, 2010	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 01, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz – 1.3 GHz	Jul. 23, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz – 26.5 GHz	Jul. 23, 2010	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz~18GHz	Nov. 11, 2010	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 26, 2011	Radiation (03CH02-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX106	03CH02-HY	1GHz~40GHz	Feb. 26, 2011	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz - 2 GHz	Oct. 16, 2010	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 29, 2010*	Radiation (03CH02-HY)

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

5 TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

6 TAF CERTIFICATE OF ACCREDITATION


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

Certificate No. : L1190-111208

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

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


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

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