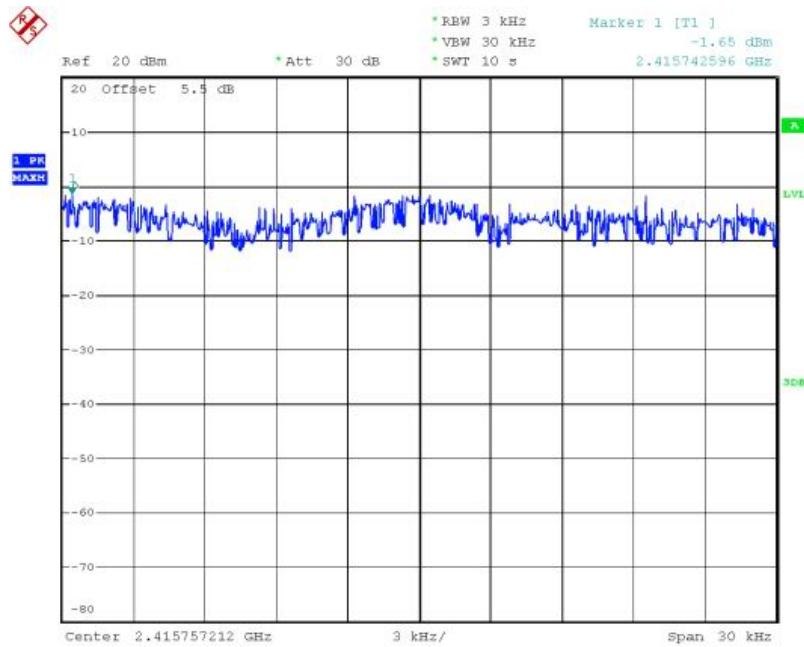
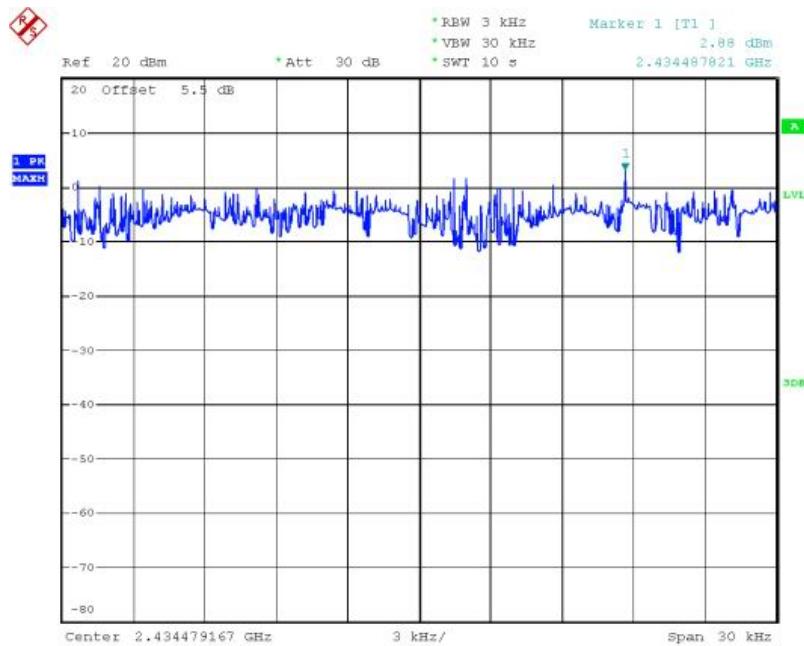


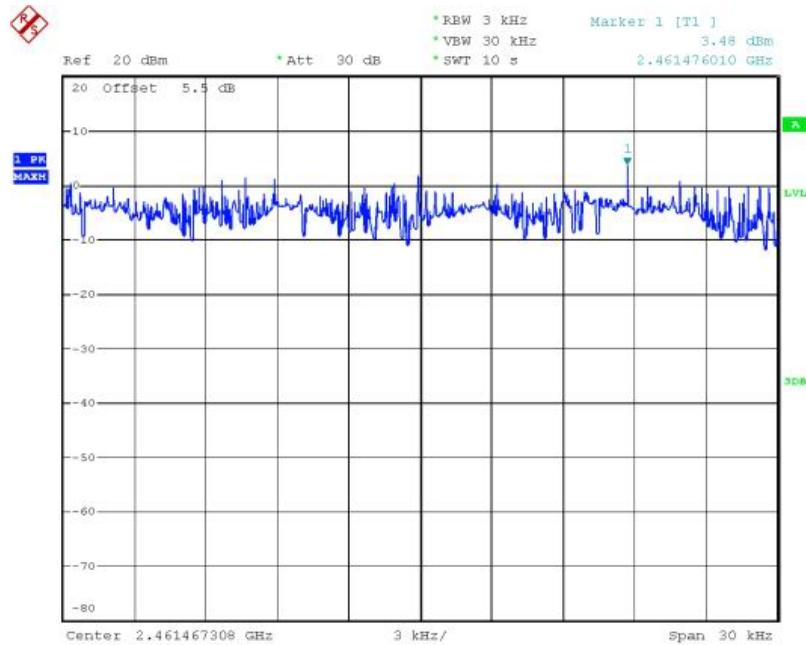
Power Density Plot on Configuration IEEE 802.11b Ant. B1+Ant. B2+Ant. B3/ 2412 MHz


Date: 14.SEP.2008 16:24:12

Power Density Plot on Configuration IEEE 802.11b Ant. B1+Ant. B2+Ant. B3 / 2437 MHz


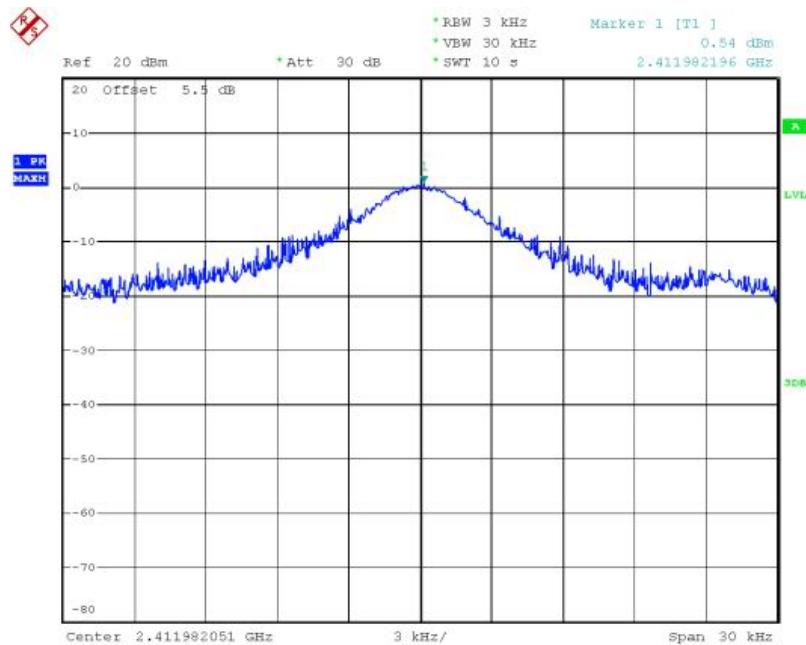
Date: 14.SEP.2008 16:26:44

Power Density Plot on Configuration IEEE 802.11b Ant. B1 +Ant. B2+Ant. B3 / 2462 MHz



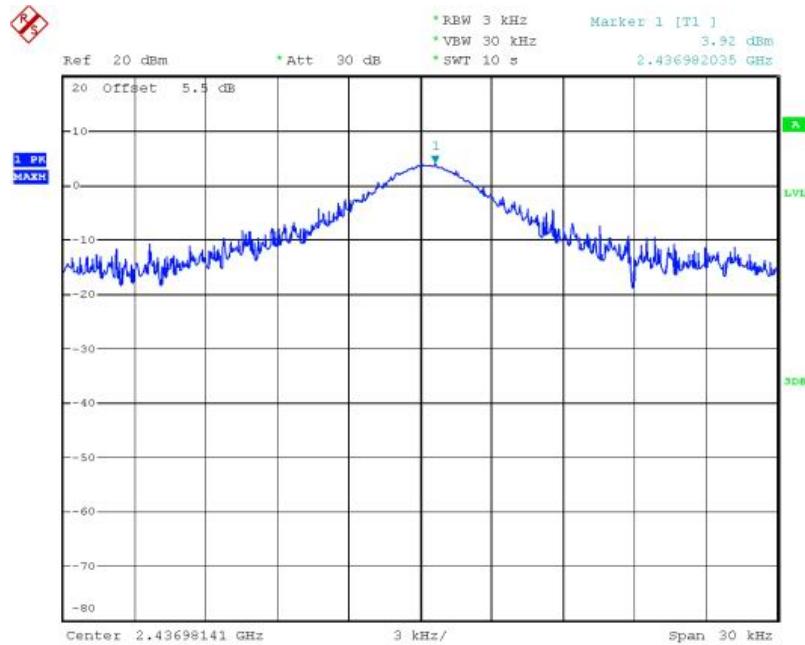
Date: 14.SEP.2008 16:29:09

Power Density Plot on Configuration IEEE 802.11g Ant. B1 +Ant. B2+Ant. B3 / 2412 MHz



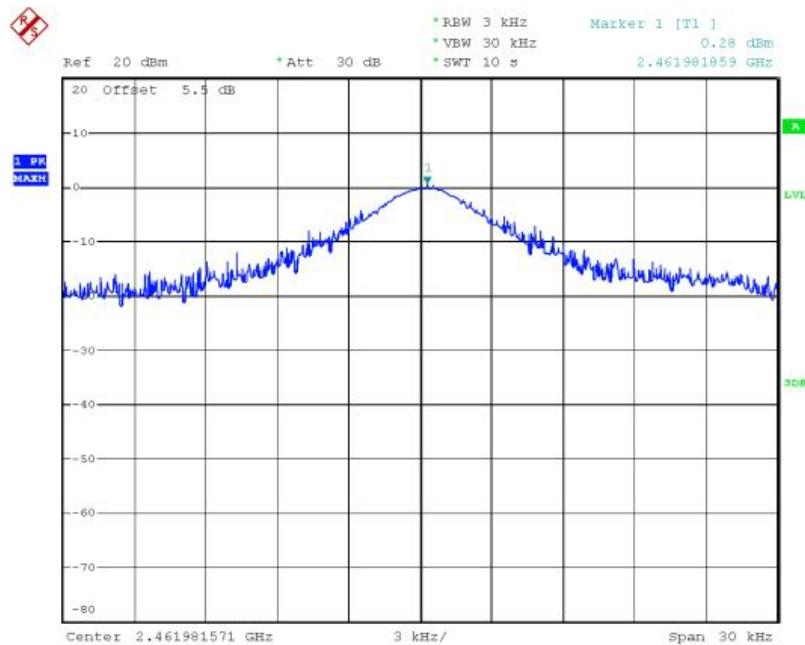
Date: 14.SEP.2008 16:33:54

Power Density Plot on Configuration IEEE 802.11g Ant. B1 +Ant. B2+Ant. B3 / 2437 MHz

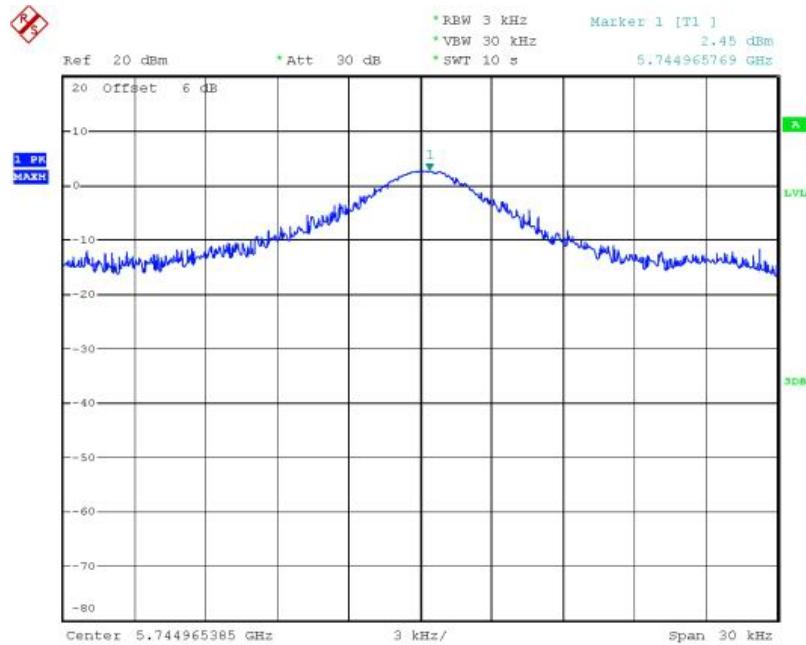


Date: 14.SEP.2008 16:32:30

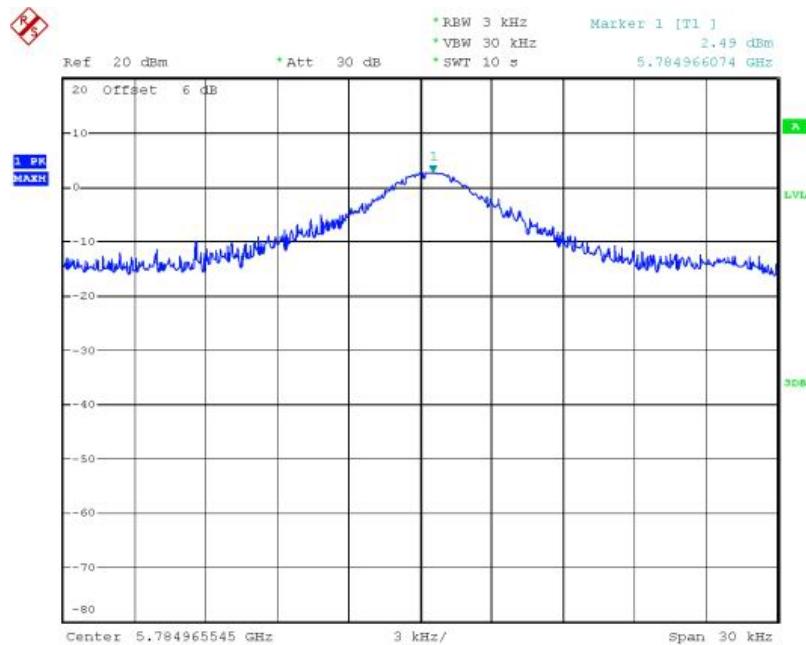
Power Density Plot on Configuration IEEE 802.11g Ant. B1 +Ant. B2+Ant. B3 / 2462 MHz



Date: 14.SEP.2008 16:35:34

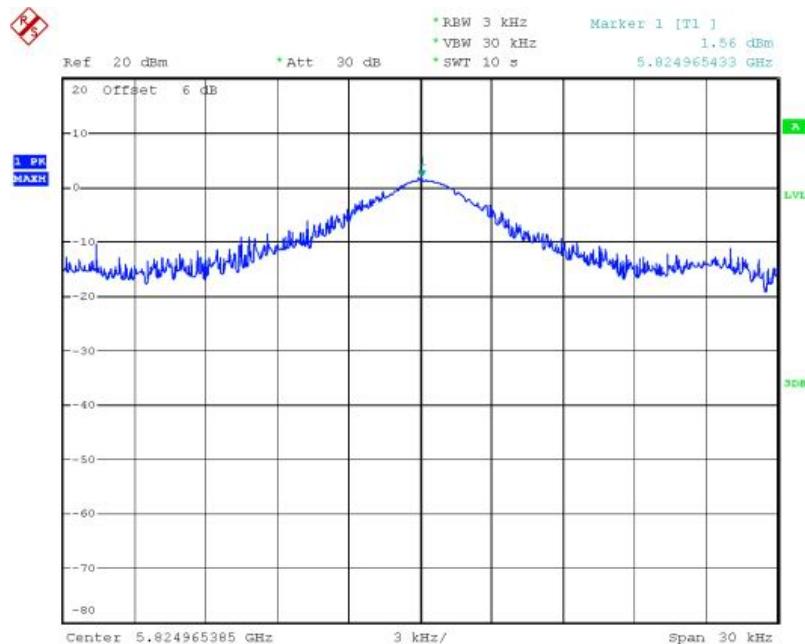
Power Density Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A3 / 5745 MHz


Date: 14.SEP.2008 16:21:44

Power Density Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A3 / 5785 MHz


Date: 14.SEP.2008 16:19:54

Power Density Plot on Configuration IEEE 802.11a Ant. A1 + Ant. A2 + Ant. A3 / 5825 MHz



Date: 14.SEP.2008 16:18:31

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.4.2. Measuring Instruments and Setting

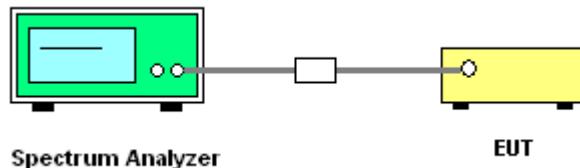
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.
4. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	26°C	Humidity	60%
Test Engineer	Sam Chen	Configurations	802.11a/b/g

Configuration IEEE 802.11b Ant. B1+Ant. B2+Ant. B3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	10.09	15.16	500	Complies
6	2437 MHz	10.64	14.96	500	Complies
11	2462 MHz	9.55	14.74	500	Complies

Configuration IEEE 802.11g Ant. B1+Ant. B2+Ant. B3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.70	16.37	500	Complies
6	2437 MHz	15.92	16.37	500	Complies
11	2462 MHz	16.05	16.37	500	Complies

Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A3

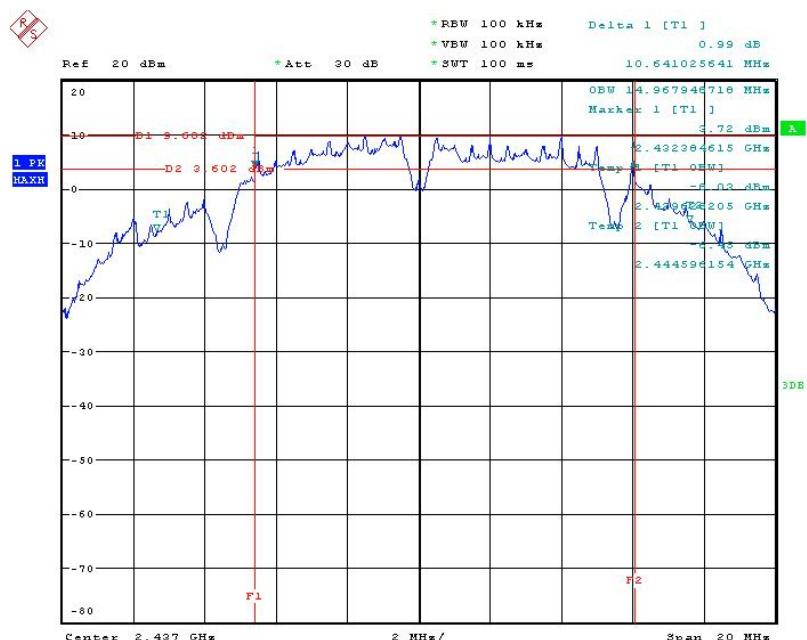
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.31	16.47	500	Complies
157	5785 MHz	16.05	16.37	500	Complies
165	5825 MHz	15.64	16.44	500	Complies

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. B1+Ant. B2+Ant. B3/ 2412 MHz



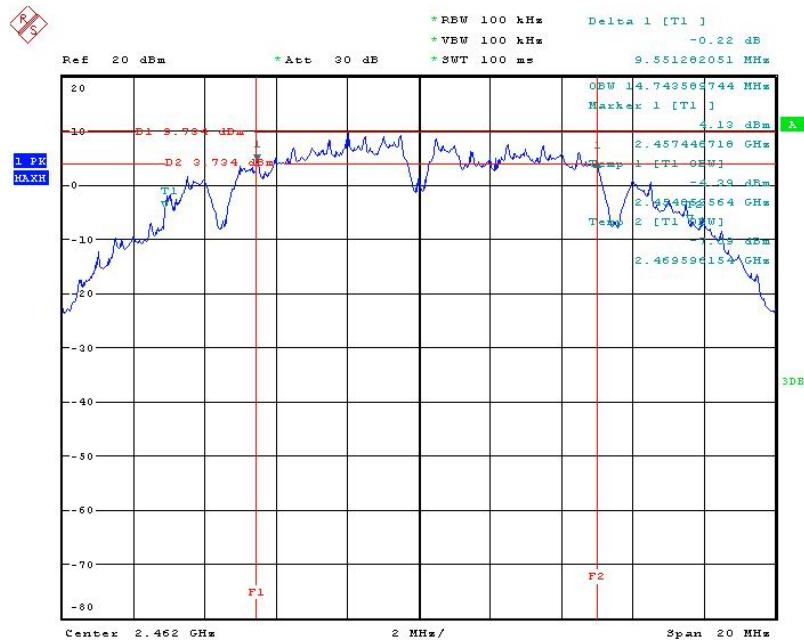
Date: 14.SEP.2008 14:58:05

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. B1+Ant. B2+Ant. B3/ 2437 MHz



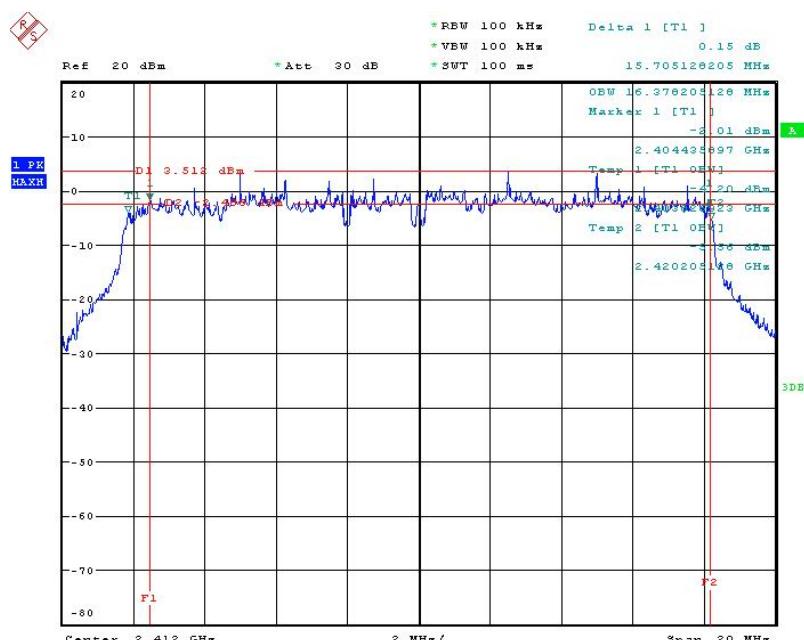
Date: 14.SEP.2008 15:19:00

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. B1+Ant. B2+Ant. B3 / 2462 MHz



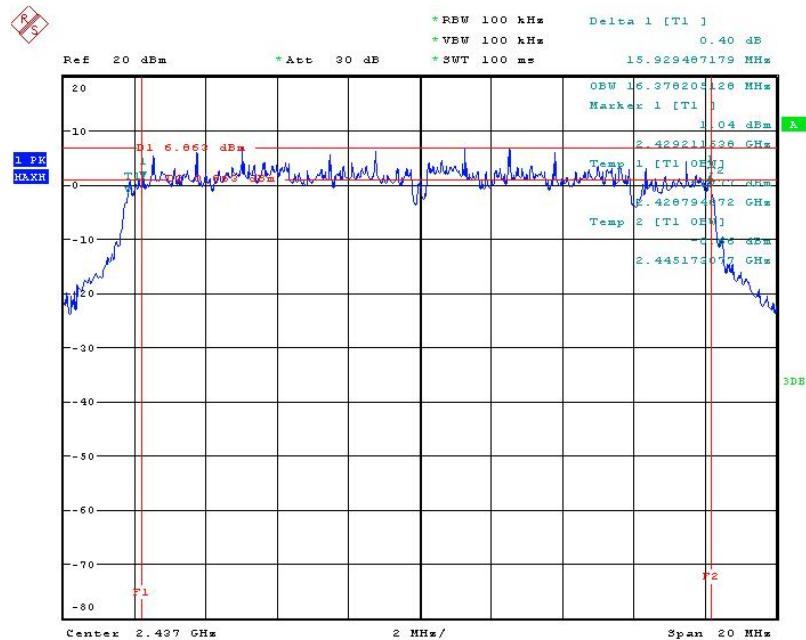
Date: 14.SEP.2008 15:19:52

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. B1+Ant. B2+Ant. B3 / 2412 MHz



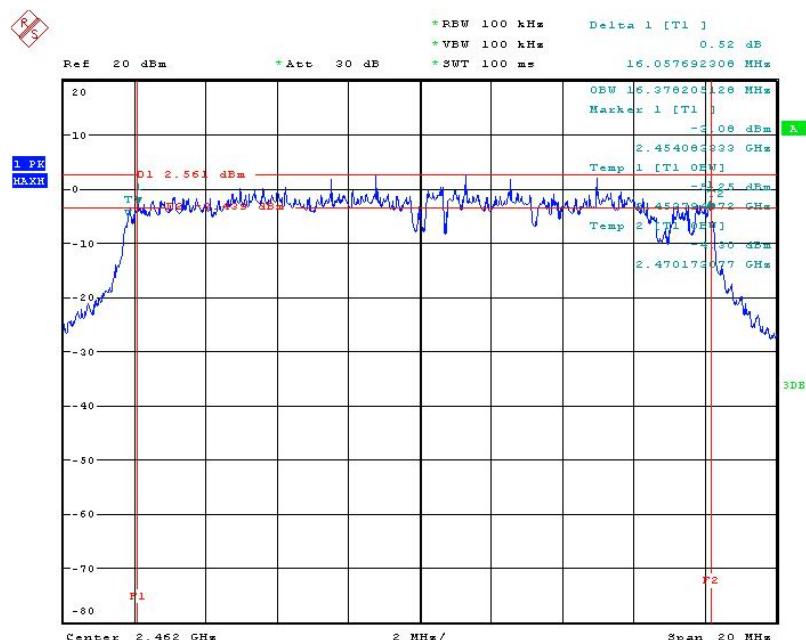
Date: 14.SEP.2008 15:21:08

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. B1+Ant. B2+Ant. B3/ 2437 MHz



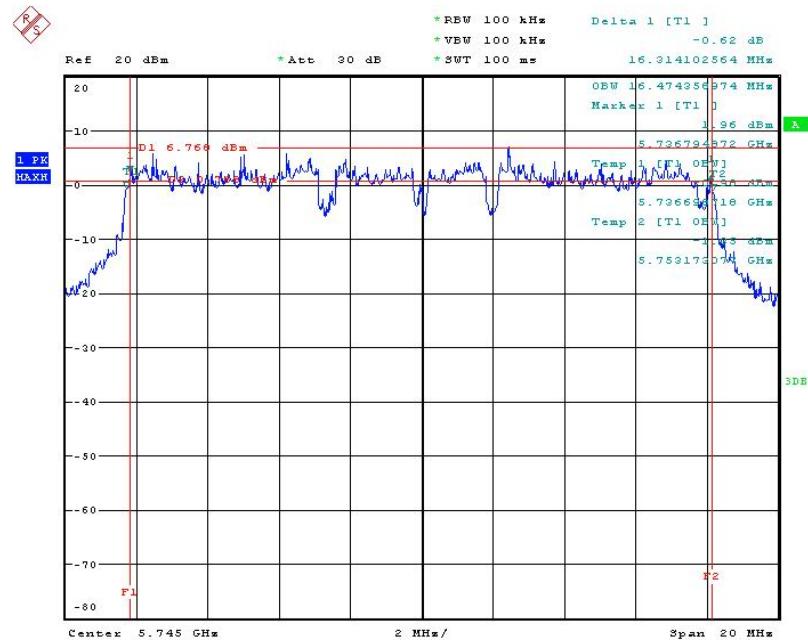
Date: 14.SEP.2008 15:22:16

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. B1+Ant. B2+Ant. B3/ 2462 MHz



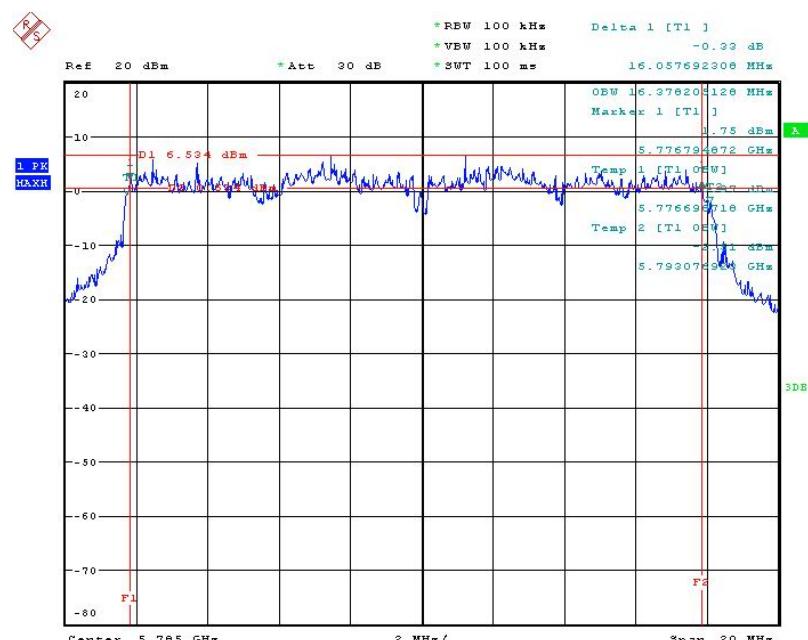
Date: 14.SEP.2008 15:22:47

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A3 / 5745MHz



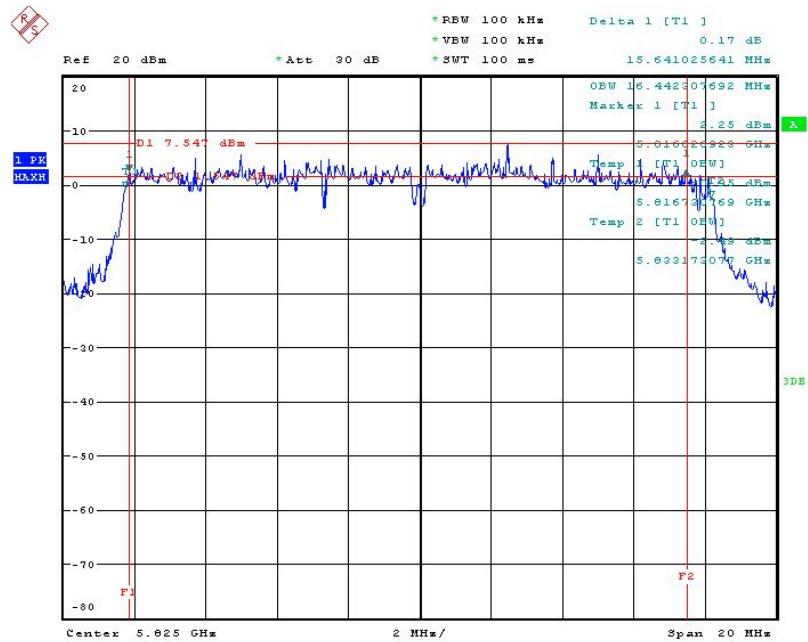
Date: 14.SEP.2008 15:34:40

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A3 / 5785 MHz



Date: 14.SEP.2008 15:35:28

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A3 / 5825MHz



Date: 14.SEP.2008 15:35:56

4.5. Radiated Emissions Measurement

4.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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

4.5.2. Measuring Instruments and Setting

Please refer to section 5 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	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100KHz / 100KHz for peak

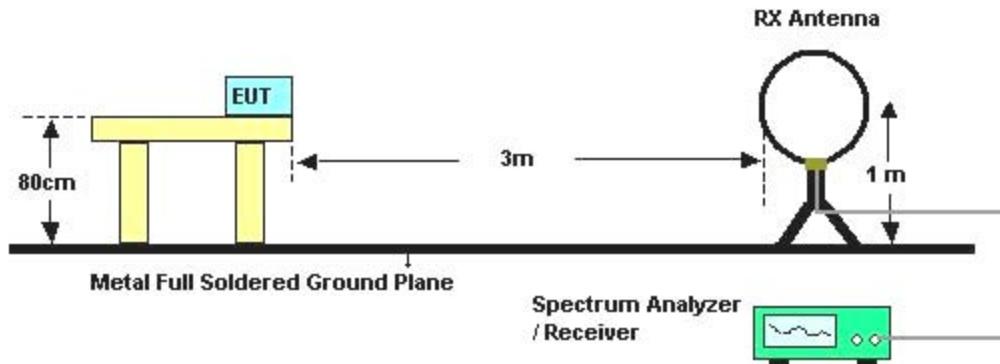
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

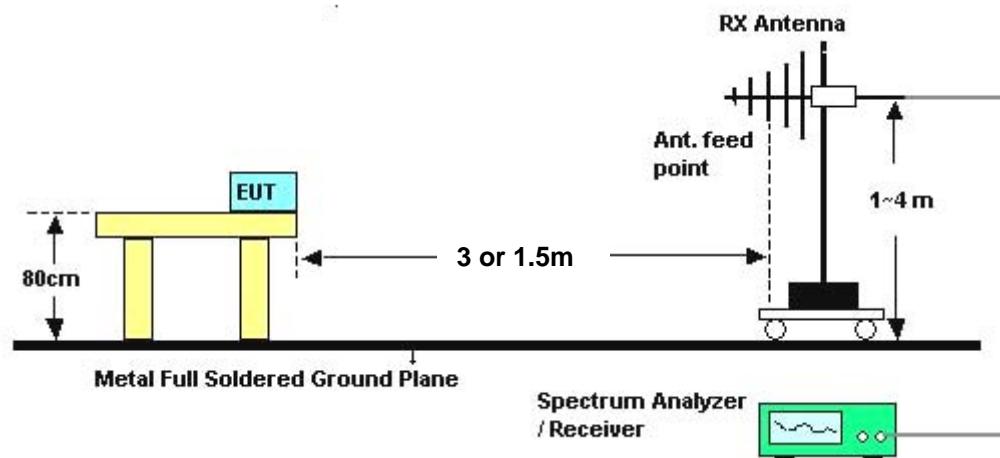
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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.

4.5.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	24°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Normal Link

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 20 dB below the permissible value has no need to be reported.

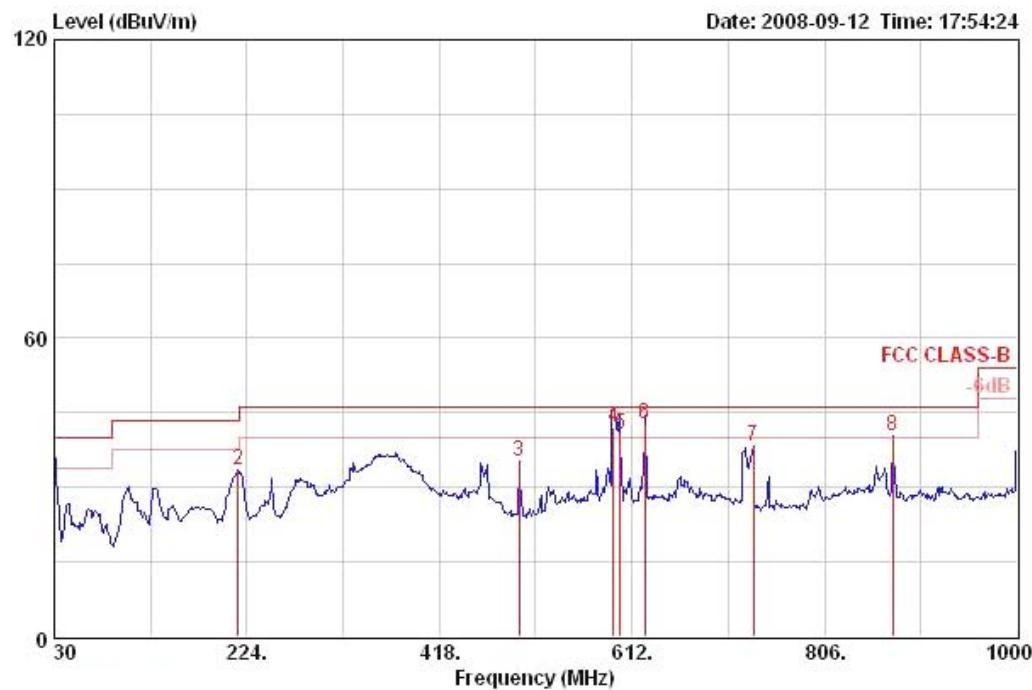
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

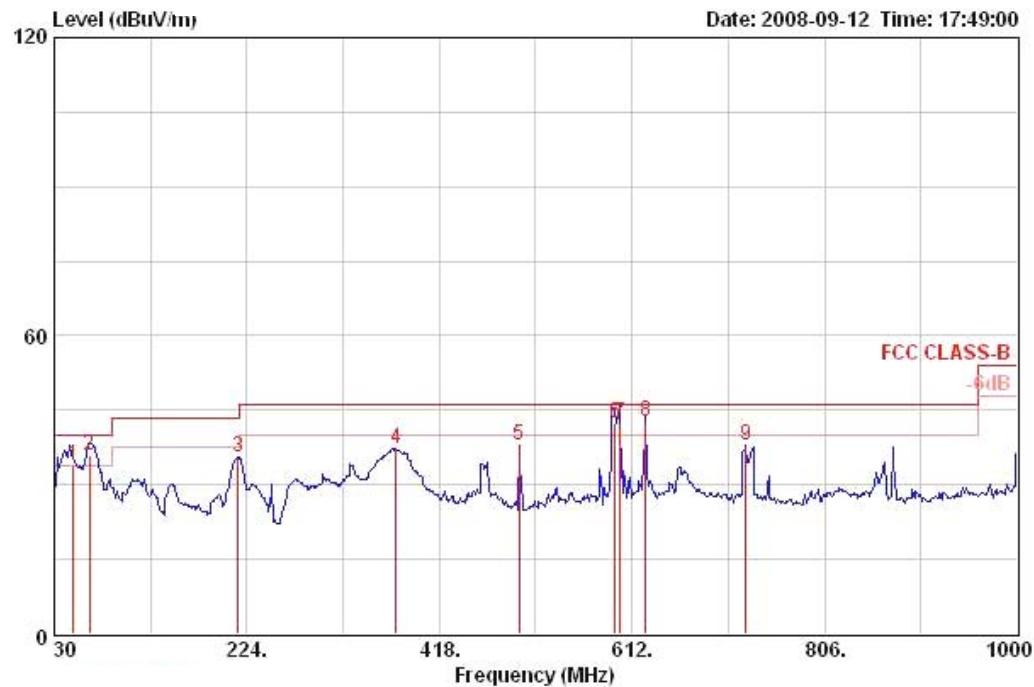
4.5.8. Results of Radiated Emissions (30MHz~1GHz)

Temperature	24°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Mode 2

Horizontal



Freq	Level	Over Limit	Limit Line	Read		Antenna	Preamp	Cable	Remark	Pol/Phase	Table Pos	Ant Pos
				MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm
1	30.000	30.46	-9.54	40.00	39.00	18.76	27.80	0.50	QP	HORIZONTAL	0	100
2	215.270	33.37	-10.13	43.50	48.49	10.19	27.07	1.76	Peak	HORIZONTAL	0	100
3	498.510	35.06	-10.94	46.00	42.86	17.60	28.09	2.70	Peak	HORIZONTAL	0	100
4 !	593.360	42.18	-3.82	46.00	48.70	18.69	28.10	2.89	QP	HORIZONTAL	0	157
5 !	599.880	40.67	-5.33	46.00	47.10	18.77	28.10	2.90	QP	HORIZONTAL	12	165
6 @	624.990	42.82	-3.18	46.00	49.00	18.85	28.07	3.05	QP	HORIZONTAL	163	141
7	734.220	38.12	-7.88	46.00	43.23	19.32	27.86	3.44	Peak	HORIZONTAL	0	100
8 !	874.870	40.48	-5.52	46.00	44.09	20.34	27.45	3.50	Peak	HORIZONTAL	0	100

Vertical


Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Table	Pos	Ant	
		Limit	Line	Level	Factor	Factor	Loss				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB				
1	49.100	33.93	-6.07	40.00	52.20	8.83	27.80	0.70 QP	VERTICAL	346	100
2 !	65.740	35.93	-4.07	40.00	56.10	6.69	27.74	0.88 QP	VERTICAL	11	186
3	215.270	35.70	-7.80	43.50	50.81	10.19	27.07	1.76 Peak	VERTICAL	0	400
4	374.350	37.21	-8.79	46.00	47.00	15.38	27.42	2.25 Peak	VERTICAL	0	400
5	498.510	38.00	-8.00	46.00	45.79	17.60	28.09	2.70 Peak	VERTICAL	0	400
6 !	595.000	42.39	-3.61	46.00	48.90	18.70	28.10	2.89 QP	VERTICAL	56	100
7 !	600.200	42.47	-3.53	46.00	48.90	18.77	28.10	2.90 QP	VERTICAL	0	100
8 !	625.580	42.79	-3.21	46.00	48.96	18.85	28.07	3.05 QP	VERTICAL	0	400
9	726.460	37.92	-8.08	46.00	43.14	19.27	27.89	3.41 Peak	VERTICAL	0	400

Note:

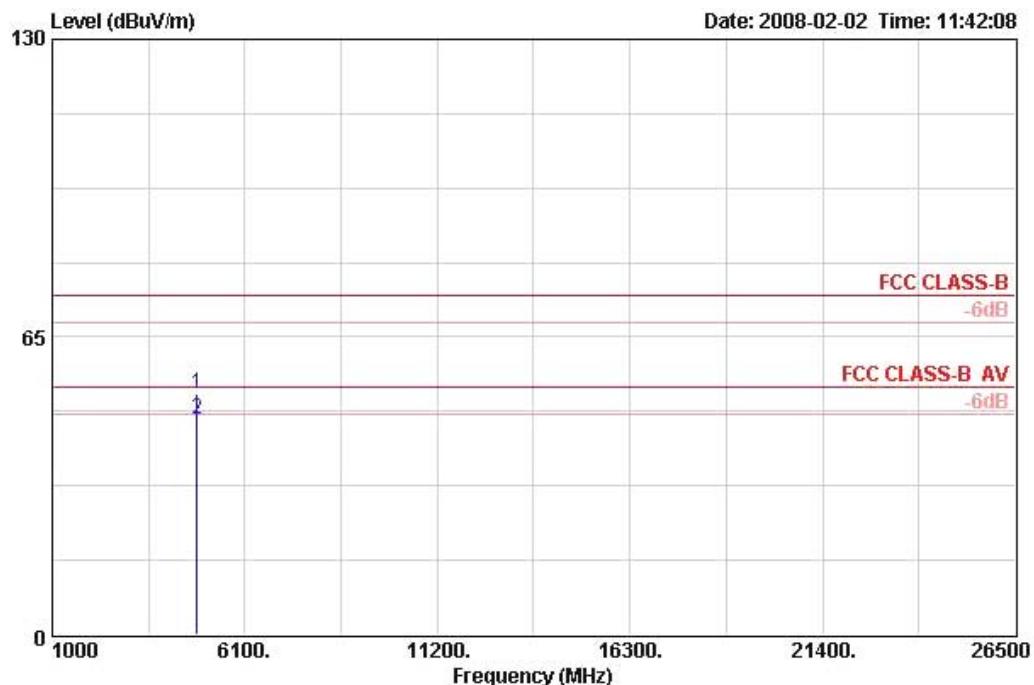
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

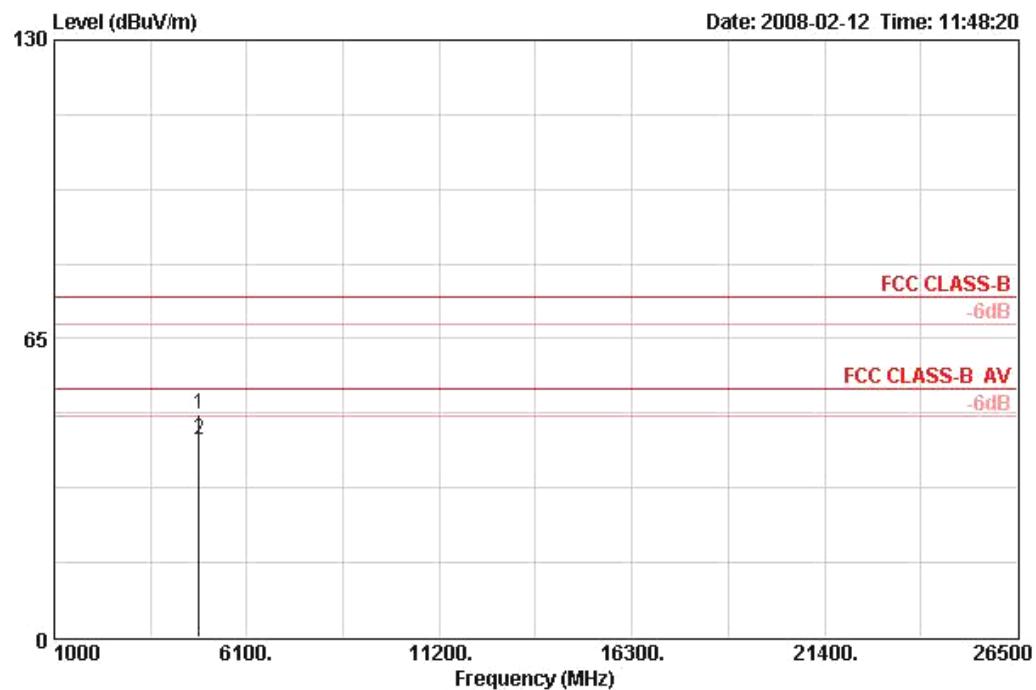
4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11b CH 1 Ant. B1+Ant. B2+Ant. B3

Horizontal

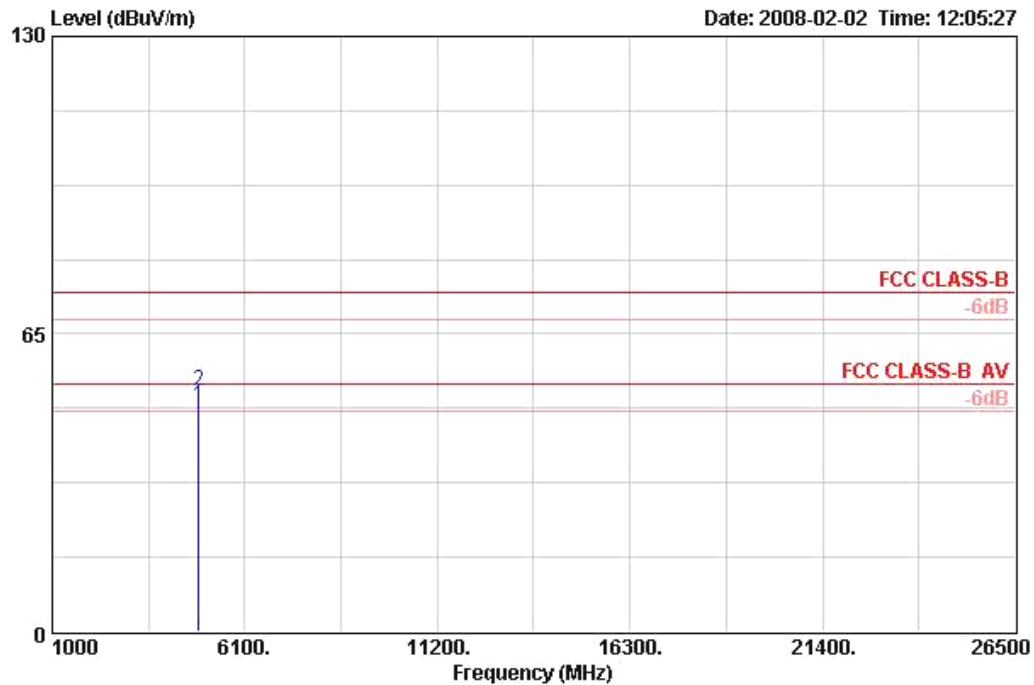


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant Pos	Table Pos	Table Pos	
		Limit	Line	Level	Factor	Loss	Factor				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg		
1	4824.008	52.63	-21.37	74.00	48.34	33.06	6.40	35.16	PEAK	113	313 HORIZONTAL
2	4824.008	47.08	-6.92	54.00	42.79	33.06	6.40	35.16	AVERAGE	113	313 HORIZONTAL

Vertical


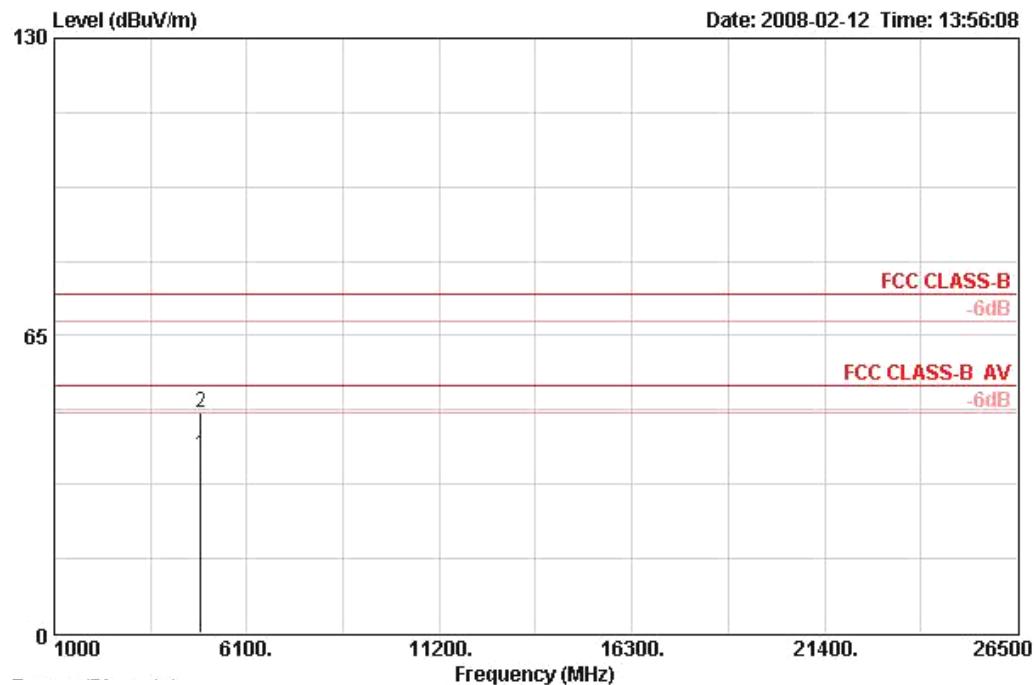
Freq	Level	Over Limit	Limit	Line	Read	Antenna	Cable	Preamp	Table	
									Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	dB	cm	deg
1	4823.720	48.44	-25.56	74.00	44.15	33.06	6.40	35.16	PERK	109
2	4823.970	42.95	-11.05	54.00	38.66	33.06	6.40	35.16	AVERAGE	109
									226	VERTICAL

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11b CH 6 Ant. B1+Ant. B2+Ant. B3

Horizontal


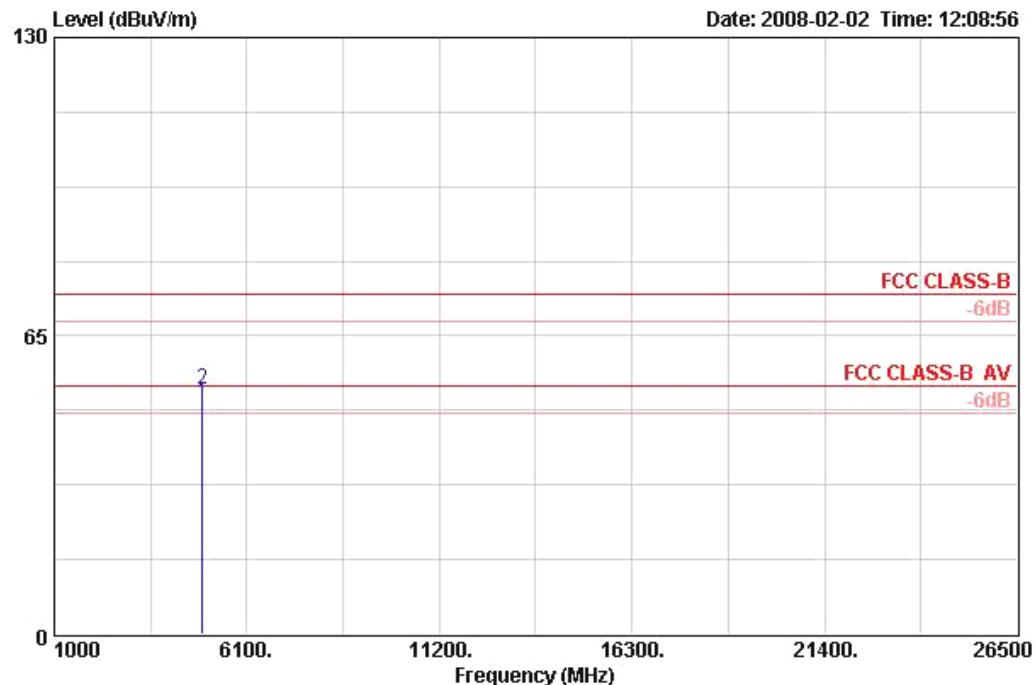
Freq	Level	Over Limit	Limit Line	Read		Ant	Table	Pos	Pos
				Antenna	Cable				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @ 2	4874.010	49.16	-4.84	54.00	44.74	33.16	6.42	35.15	AVERAGE
	4874.010	52.75	-21.25	74.00	48.32	33.16	6.42	35.15	PERK
								112	311 HORIZONTAL
								112	311 HORIZONTAL

Vertical

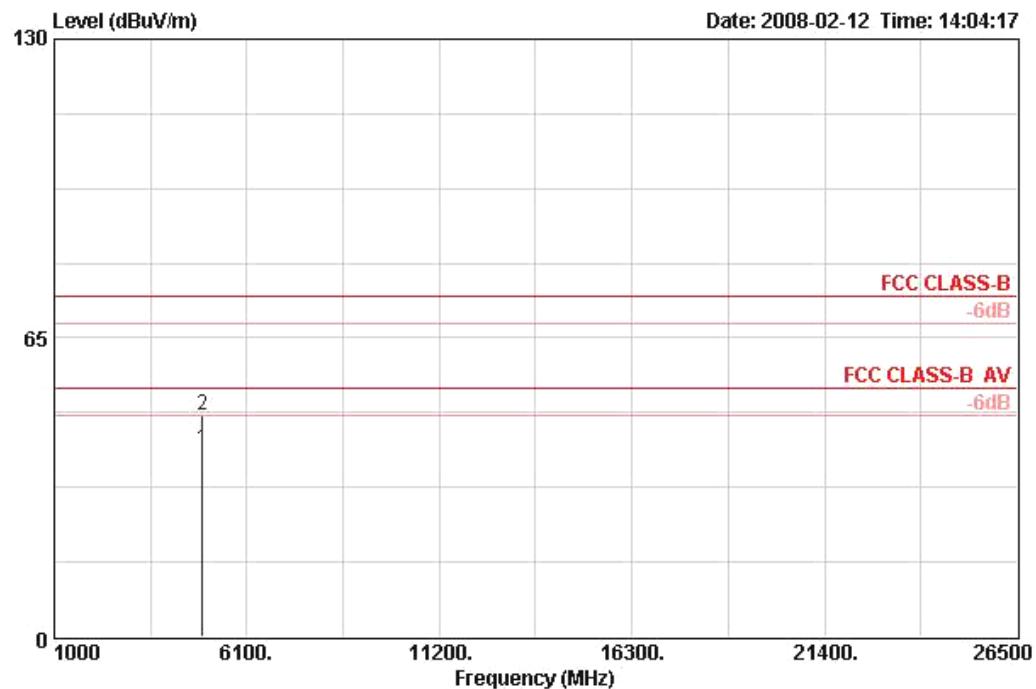


Freq	Level	Over Limit	Limit Line	ReadAntenna		Cable Preamp		Remark	Ant Pos	Table Pos	Table Pol/Phase	
				MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm
1 @	4874.070	38.92	-15.08	54.00	34.50	33.16	6.42	35.15	AVERAGE	108	221	VERTICAL
2	4874.170	47.97	-26.03	74.00	43.55	33.16	6.42	35.15	PERK	108	221	VERTICAL

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11b CH 11 Ant. B1+Ant. B2+Ant. B3

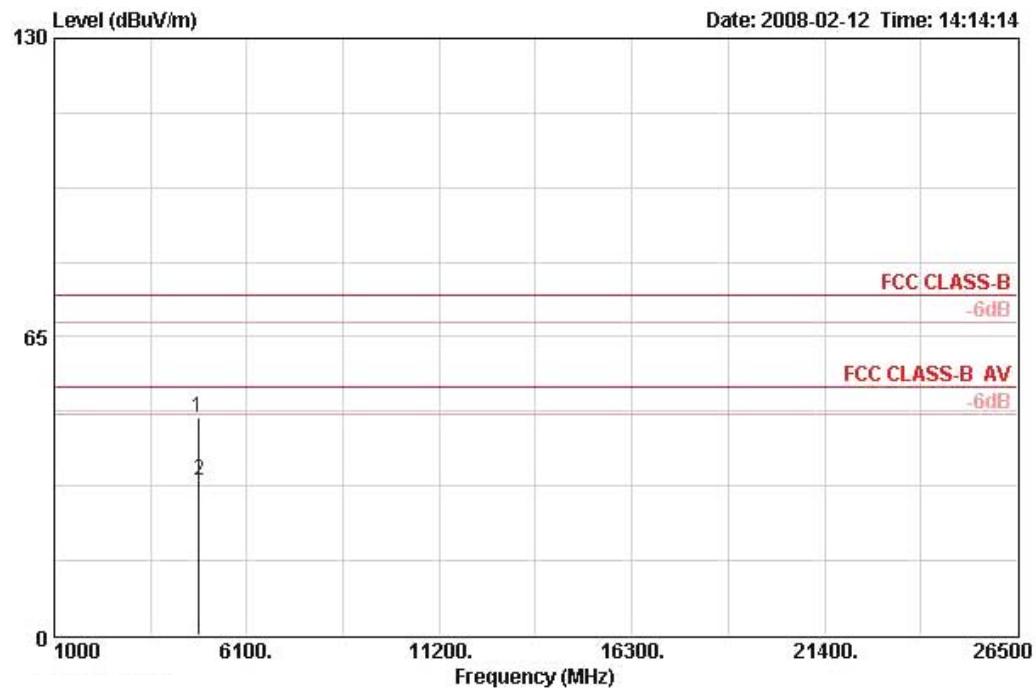
Horizontal


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Level	Factor	Cable	Preamp		Pos	Pos	Pol/Phase
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @ 2	4923.980	50.35	-3.65	54.00	45.79	33.26	6.44	35.14 AVERAGE	112	311	HORIZONTAL
	4923.980	53.46	-20.54	74.00	48.90	33.26	6.44	35.14 PERK	112	311	HORIZONTAL

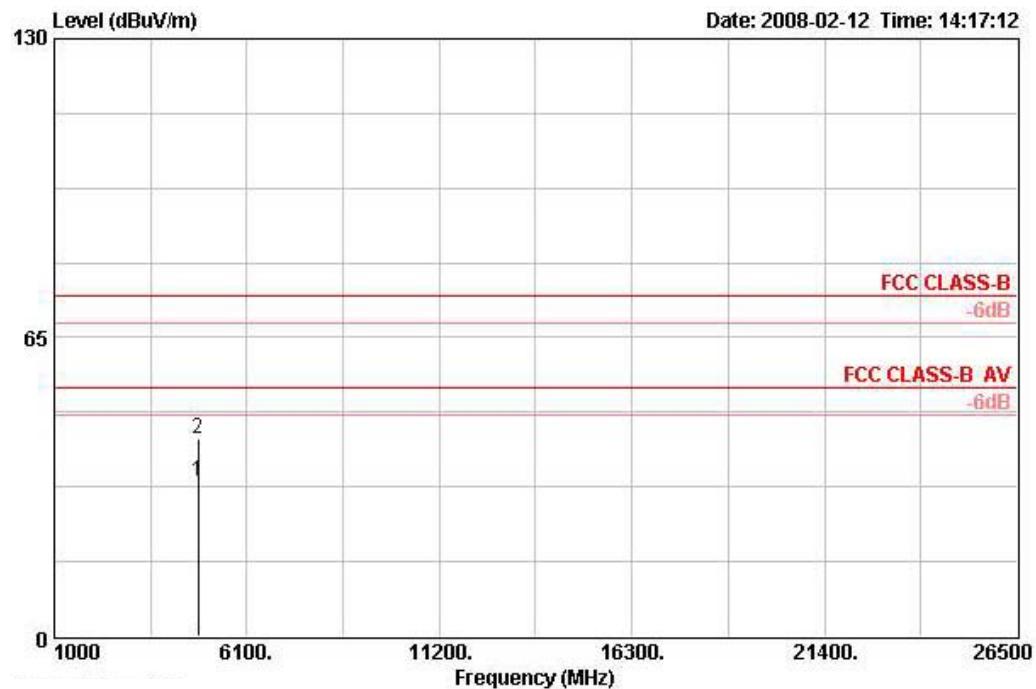
Vertical


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Level	Factor	Loss	Factor		Pos	Pos	Pol/Phase
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @ 2	4924.070	40.66	-13.34	54.00	36.11	33.26	6.44	35.14 AVERAGE	114	285	VERTICAL
	4924.090	48.16	-25.84	74.00	43.60	33.26	6.44	35.14 PEAK	114	285	VERTICAL

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11g CH 1 Ant. B1+Ant. B2+Ant. B3

Horizontal


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Level	Factor	Loss	Factor		Pos	Pos	Pol/Phase
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4822.280	47.29	-26.71	74.00	43.00	33.06	6.40	35.16 PERK	100	361	HORIZONTAL
2	4823.930	33.65	-20.35	54.00	29.37	33.06	6.40	35.16 AVERAGE	100	361	HORIZONTAL

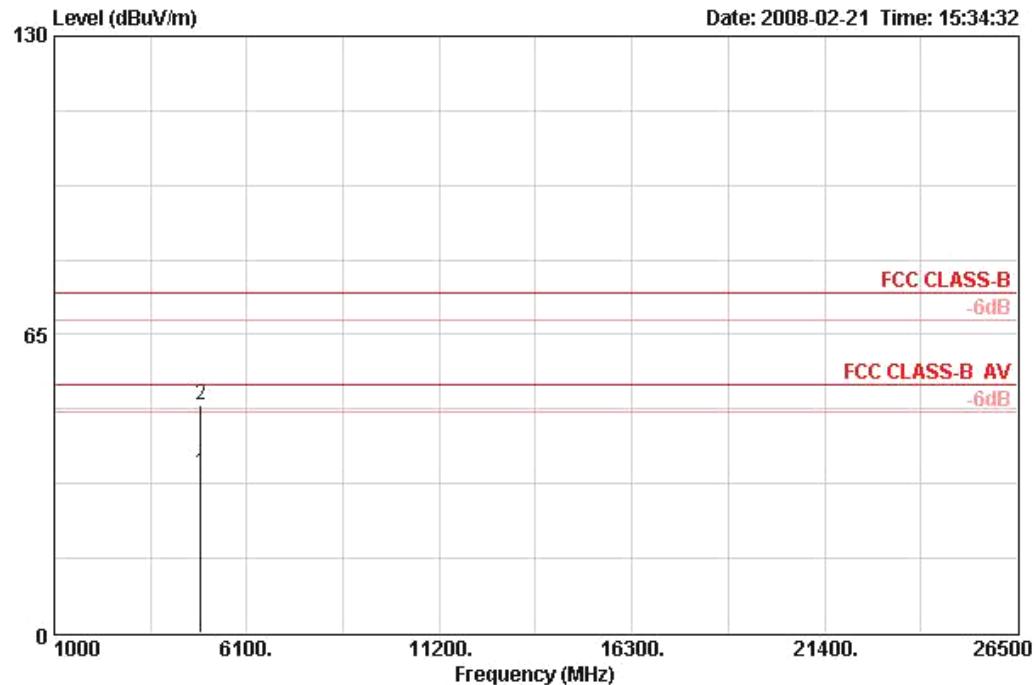
Vertical


Freq	Level	Over Limit	Limit	Read		Ant	Table		
				Antenna	Line			Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4821.820	33.61	-20.39	54.00	29.32	33.06	6.40	35.16	100
2	4822.720	42.99	-31.01	74.00	38.70	33.06	6.40	35.16	100

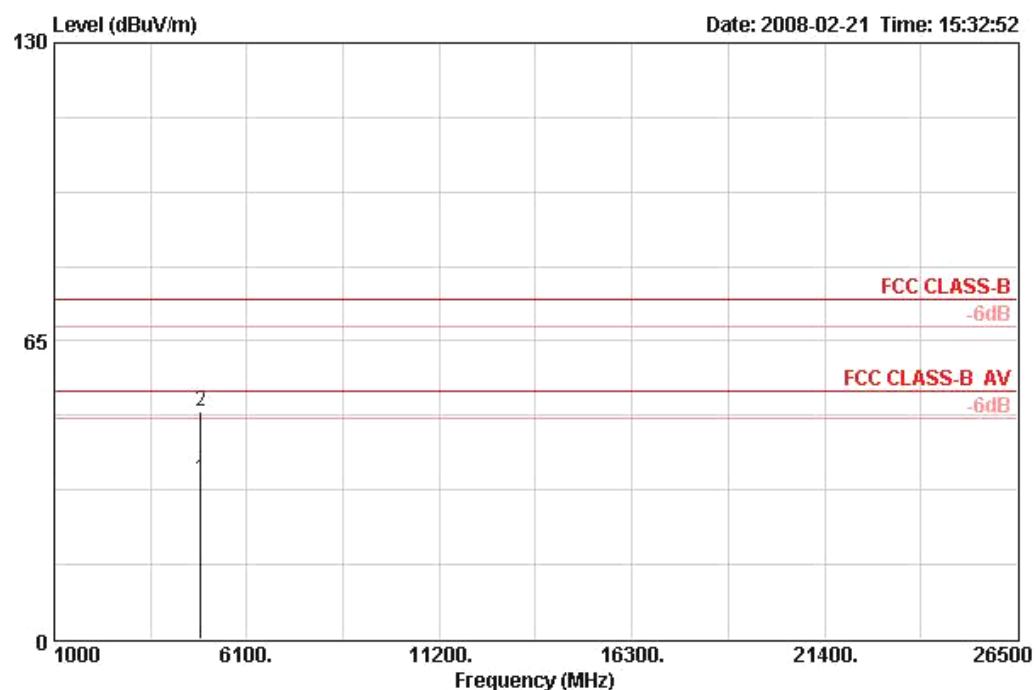
RVERAGE

PERK

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11g CH 6 Ant. B1+Ant. B2+Ant. B3

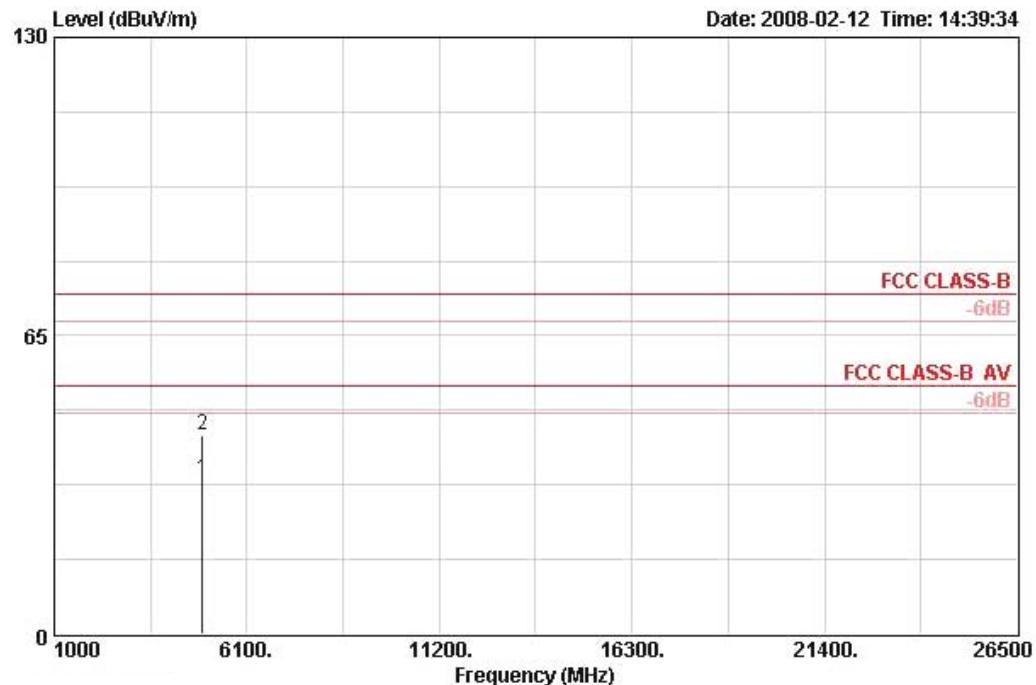
Horizontal


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Line	Limit	Level	Factor	Cable	Preamp				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4874.200	34.69	-19.31	54.00	30.27	33.16	6.42	35.15	AVERAGE	114	268 HORIZONTAL
2	4874.800	49.71	-24.29	74.00	45.29	33.16	6.42	35.15	PEAK	114	268 HORIZONTAL

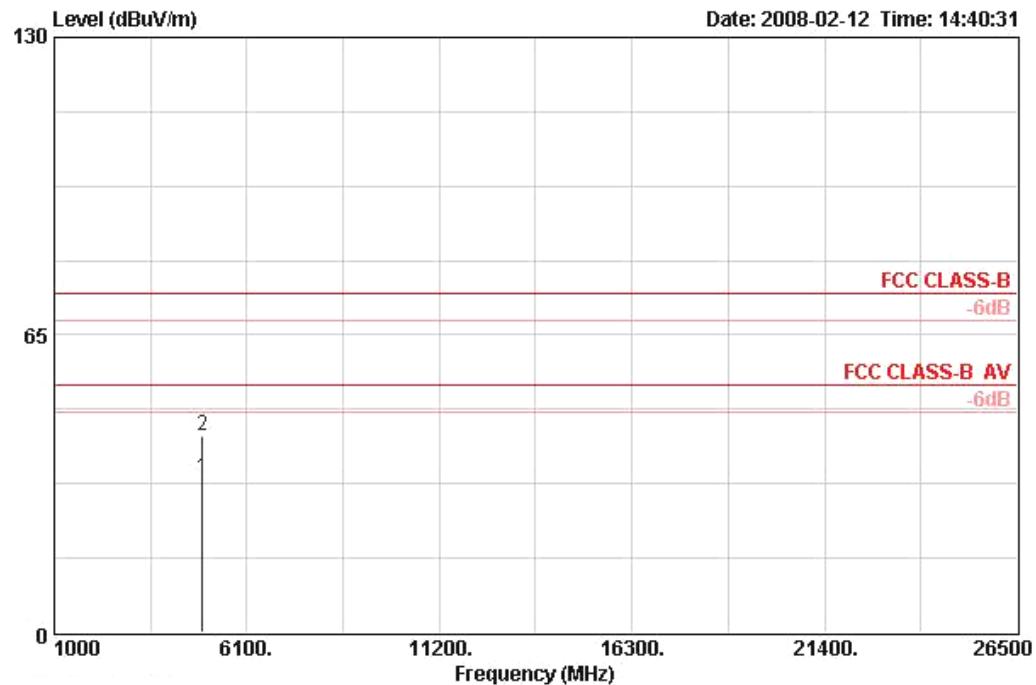
Vertical


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Level	Factor	Cable	Preamp				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4875.040	34.79	-19.21	54.00	30.36	33.16	6.42	35.15	AVERAGE	149	300 VERTICAL
2	4875.380	49.48	-24.52	74.00	45.06	33.16	6.42	35.15	PERK	149	300 VERTICAL

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11g CH 11 Ant. B1+Ant. B2+Ant. B3

Horizontal


Freq	Level	Over Limit	Line	Read	Antenna	Cable	Preamp	Remark	Ant	Table
									Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4923.570	33.79	-20.21	54.00	29.23	33.26	6.44	35.14 AVERAGE	100	361 HORIZONTAL
2	4924.930	43.41	-30.59	74.00	38.85	33.26	6.44	35.14 PEAK	100	361 HORIZONTAL

Vertical


Freq	Level	Over Limit	Limit	Read		Ant	Table		
				Line	Antenna			Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4922.080	33.55	-20.45	54.00	28.99	33.26	6.44	35.14	AVERAGE
2	4922.580	43.12	-30.88	74.00	38.56	33.26	6.44	35.14	PEAK
								100	0 VERTICAL
								100	0 VERTICAL

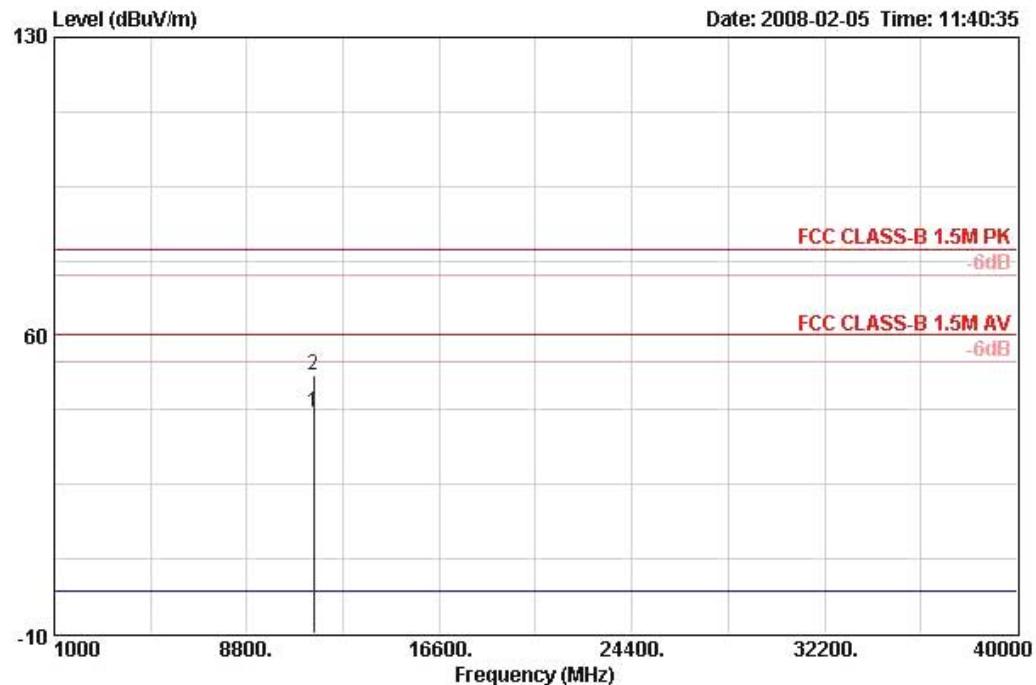
Note:

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

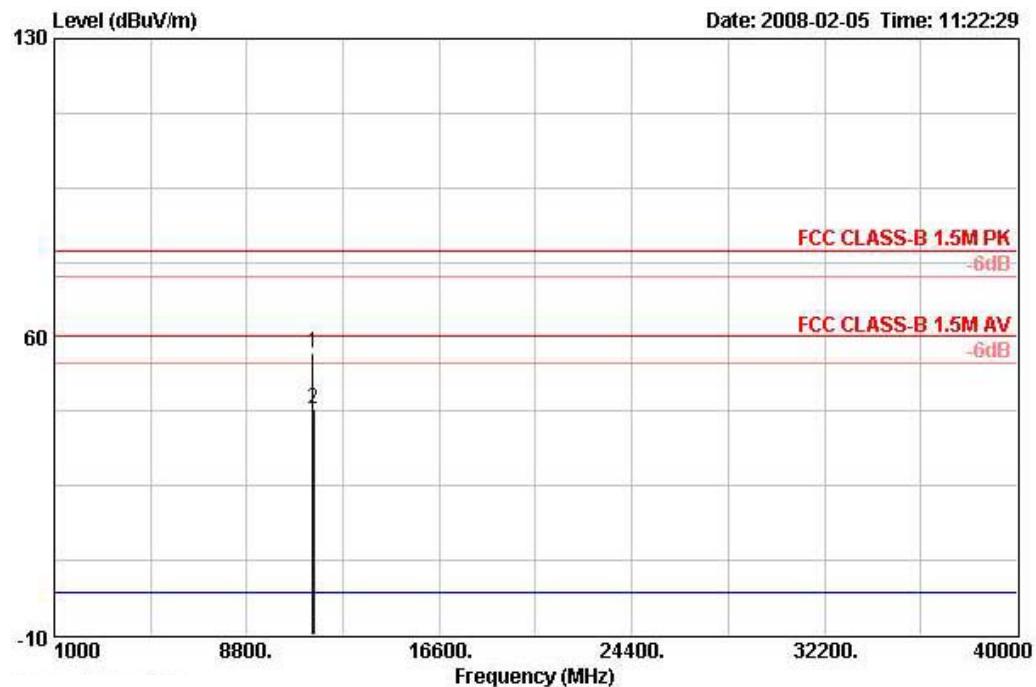
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11a CH 149 Ant. A1+Ant. A2+Ant. A3

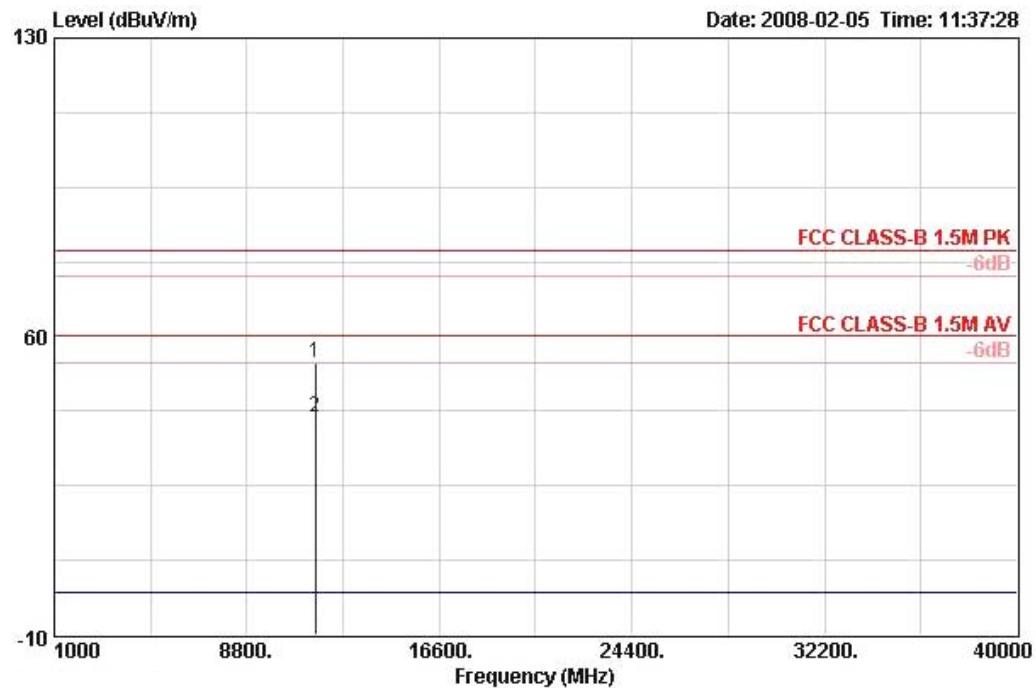
Horizontal


Freq	Level	Over Limit	Limit Line	ReadAntenna			Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Table Pol/Phase
				MHz	dBuV/m	dB	dBuV/m	dB	dB/m	dB	dB	deg
1 @ 2	11491.400 11491.650	41.78 50.62	-18.22 -29.38	60.00 80.00	28.21 37.05	38.78 38.78	9.78 9.78	34.98 34.98	AVERAGE PERK	102 102	353 353	HORIZONTAL HORIZONTAL

Vertical


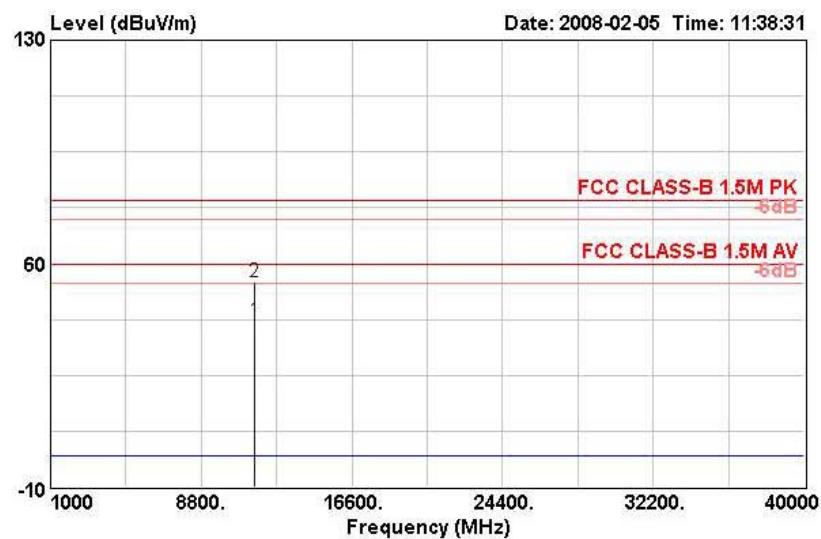
Freq	Level	over Limit	Line	Read		Ant	Table		
				Antenna	Preamp			Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
11489.100	56.29	-23.71	80.00	42.71	38.78	9.78	34.98	PERK	100
11489.830	42.86	-17.14	60.00	29.28	38.78	9.78	34.98	AVERAGE	100
									209 VERTICAL
									209 VERTICAL

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11a CH 157 Ant. A1+Ant. A2+Ant. A3

Horizontal


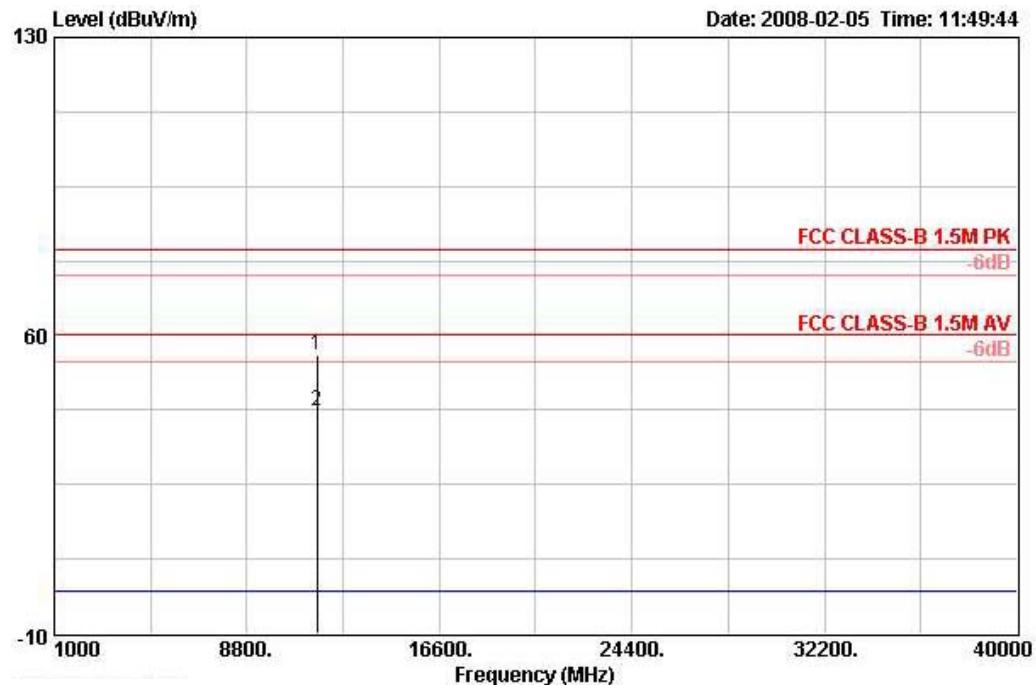
Freq	Level	Over Limit	Limit Line	ReadAntenna		Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Table Pol/Phase
				MHz	dBuV/m	dB	dBuV/m	dB	dB/m	dB	deg
1	11567.720	53.87	-26.13	80.00	40.25	38.83	9.79	35.00	PERK	100	360 HORIZONTAL
2	11570.270	40.98	-19.02	60.00	27.35	38.83	9.80	35.00	AVERAGE	100	360 HORIZONTAL

Vertical



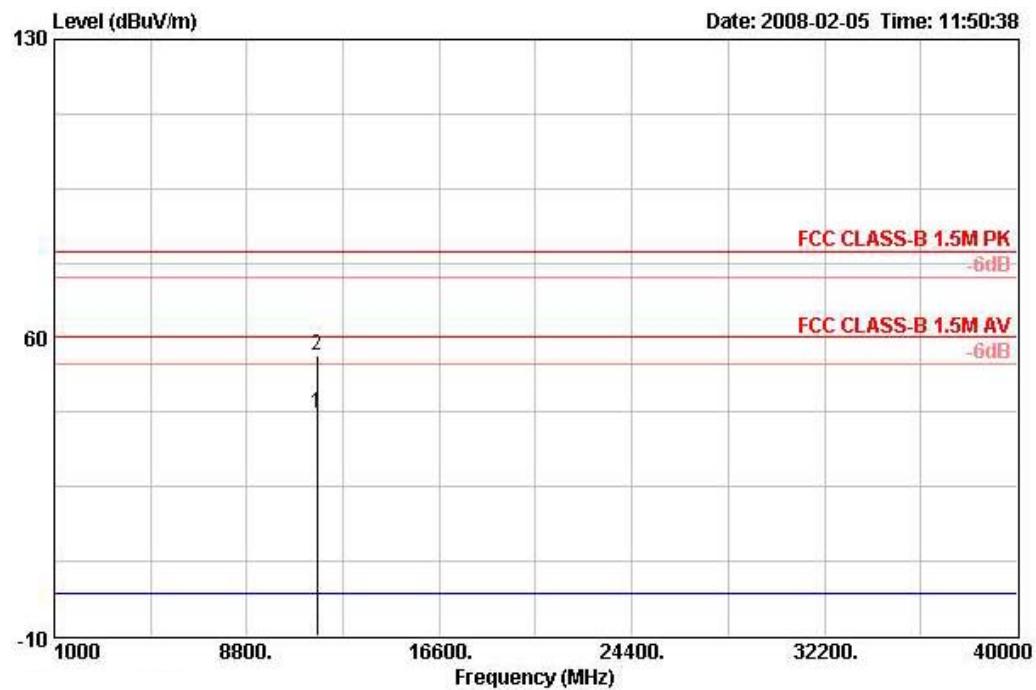
Freq	Level	Over Limit	Limit Line	ReadAntenna		Cable Preamp		Remark	Ant Pos	Table Pos	Table Pol/Phase	
				MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm
1 @ 2	11570.090 11570.270	42.06 54.40	-17.94 -25.60	60.00 80.00	28.44 40.77	38.83 38.83	9.80 9.80	35.00 35.00	AVERAGE PEAK	100 100	290 290	VERTICAL VERTICAL

Temperature	23°C	Humidity	62%
Test Engineer	Jax Chen	Configurations	802.11a CH 165 Ant. A1+Ant. A2+Ant. A3

Horizontal


Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
		Line	Limit	Level	Factor	Loss	Factor			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
11647.800	55.28	-24.72	80.00	41.62	38.86	9.82	35.01	PEAK	103	360 HORIZONTAL
11651.560	42.43	-17.57	60.00	28.76	38.86	9.82	35.01	AVERAGE	103	360 HORIZONTAL

Vertical



Freq	Level	over Limit		Read	Antenna	Cable		Preamp	Remark	Ant	Table
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	11648.880	42.41	-17.59	60.00	28.75	38.86	9.82	35.01	AVERAGE	103	0 VERTICAL
2	11650.460	55.74	-24.26	80.00	42.08	38.86	9.82	35.01	PERK	103	0 VERTICAL

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.

4.6. Radiated Band Edge Emissions Measurement

4.6.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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 (microvolt/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

4.6.2. Measuring Instruments and Setting

Please refer to section 5 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)	100 KHz /100 KHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around bandedges.
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.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Radiated Band Edge and Fundamental Emissions

Temperature	23°C	Humidity	54%
Test Engineer	Sam Chen	Configurations	802.11b CH 1, 6, 11 Ant. B1+Ant. B2+Ant. B3

Channel 1

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
			Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2386.120	67.48	-6.52	74.00	35.18	28.17	4.13	0.00	PEAK	161	28 HORIZONTAL
2 @	2386.360	52.07	-1.93	54.00	19.77	28.17	4.13	0.00	AVERAGE	161	28 HORIZONTAL
3 @	2414.600	117.17			84.81	28.21	4.15	0.00	PEAK	161	28 HORIZONTAL
4	2414.800	113.75			81.38	28.21	4.15	0.00	AVERAGE	161	28 HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
			Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2438.600	118.76			86.29	28.29	4.18	0.00	PEAK	161	28 HORIZONTAL
2 @	2439.800	115.36			82.89	28.29	4.18	0.00	AVERAGE	161	28 HORIZONTAL

Item 1, 2 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
			Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2459.800	112.91			80.39	28.32	4.20	0.00	AVERAGE	162	124 HORIZONTAL
2 @	2461.000	118.64			86.12	28.32	4.20	0.00	PEAK	162	124 HORIZONTAL
3 @	2487.960	51.26	-2.74	54.00	18.63	28.40	4.23	0.00	AVERAGE	162	124 HORIZONTAL
4	2488.060	61.75	-12.25	74.00	29.12	28.40	4.23	0.00	PEAK	162	124 HORIZONTAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	23°C	Humidity	54%
Test Engineer	Sam Chen	Configurations	802.11g CH 1, 6, 11 Ant. B1+Ant. B2+Ant. B3

Channel 1

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Antenna	Level	Loss	Factor				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	2389.460	59.99	-14.01	74.00	27.69	28.17	4.13	0.00 PEAK	148	154	HORIZONTAL
2 @	2390.000	53.28	-0.72	54.00	20.95	28.17	4.15	0.00 AVERAGE	148	154	HORIZONTAL
3	2413.200	107.84			75.48	28.21	4.15	0.00 AVERAGE	148	154	HORIZONTAL
4	2413.400	116.96			84.59	28.21	4.15	0.00 PEAK	148	154	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Antenna	Level	Loss	Factor				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4874.200	34.69			30.27	33.16	6.42	35.15 AVERAGE	114	268	HORIZONTAL
2	4874.800	49.71			45.29	33.16	6.42	35.15 PEAK	114	268	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2437 MHz.

Channel 11

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	
		Limit	Line	Antenna	Level	Loss	Factor				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	2458.400	116.54			84.02	28.32	4.20	0.00 PEAK	148	143	HORIZONTAL
2	2460.000	103.89			71.36	28.32	4.20	0.00 AVERAGE	148	143	HORIZONTAL
3 @	2483.500	52.05	-1.95	54.00	19.46	28.36	4.23	0.00 AVERAGE	148	143	HORIZONTAL
4 @	2483.700	71.20	-2.80	74.00	38.61	28.36	4.23	0.00 PEAK	148	143	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Note:

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

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

The Radiated Band-edge tests were performed at Vertical and Horizontal and the worst-case was found at Horizontal. All the results have been recorded in this report.

Temperature	23°C	Humidity	54%
Test Engineer	Sam Chen	Configurations	802.11a CH 149, 157, 165 Ant. A1+ Ant. A2+Ant. A3

Channel 149

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table
		Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	5741.000	118.38		77.20	34.35	6.84	0.00	PEAK	131
2 @	5744.000	104.80		63.62	34.35	6.84	0.00	AVERAGE	131

Item 1, 2 are the fundamental frequency at 5745 MHz.

Channel 157

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table
		Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	5781.000	120.31		79.11	34.36	6.85	0.00	PEAK	120
2 @	5787.000	106.37		65.15	34.36	6.86	0.00	AVERAGE	120

Item 1, 2 are the fundamental frequency at 5785 MHz.

Channel 165

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table
		Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	5819.400	118.13		76.89	34.36	6.88	0.00	PEAK	133
2 @	5822.400	104.24		63.00	34.37	6.88	0.00	AVERAGE	133

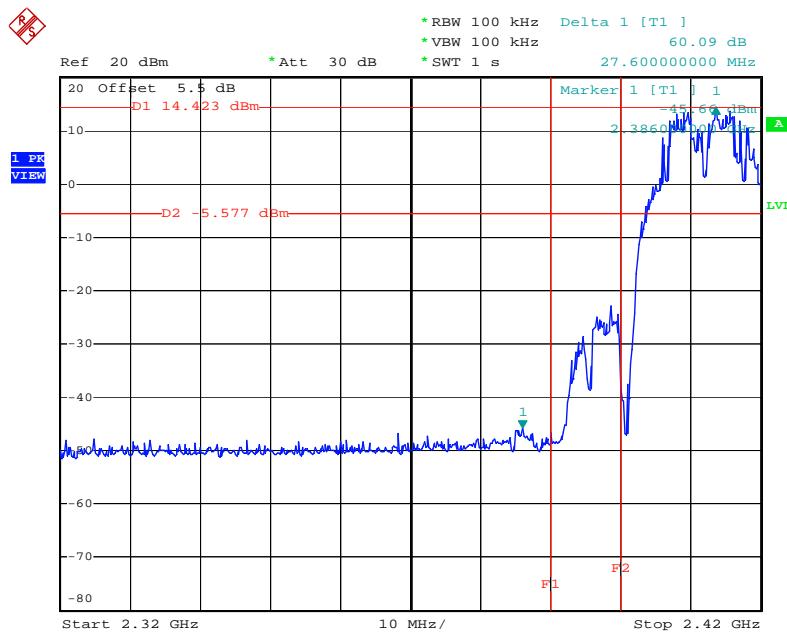
Item 1, 2 are the fundamental frequency at 5825 MHz.

Note:

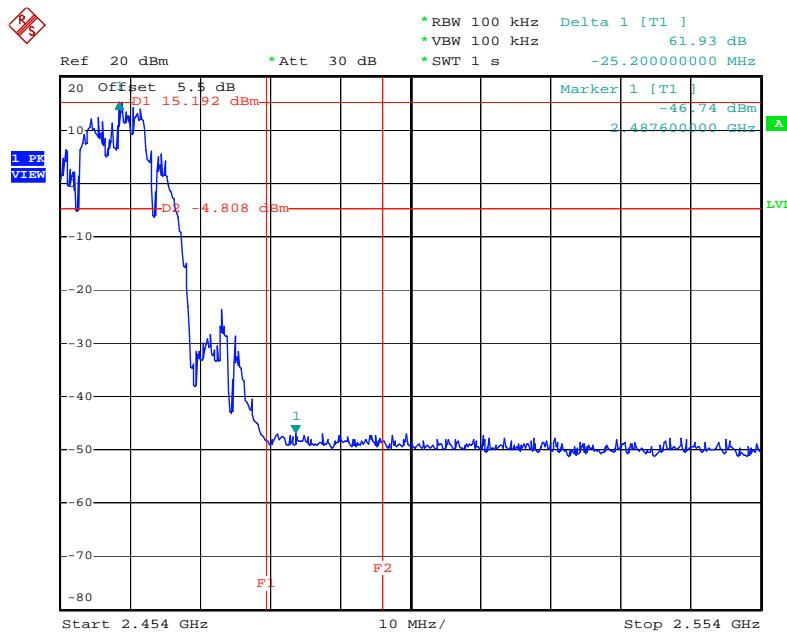
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

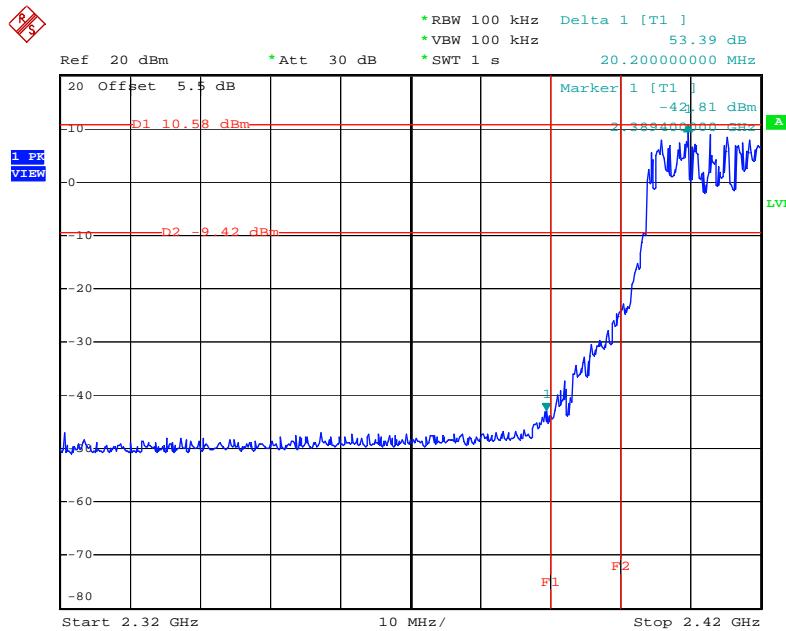
The Radiated Band-edge tests were performed at Vertical and Horizontal and the worst-case was found at Horizontal. All the results have been recorded in this report.

For Emission not in Restricted Band
Low Band Edge Plot on Configuration IEEE 802.11b Ant. B1 + Ant. B2 + Ant. B3/ 2412 MHz


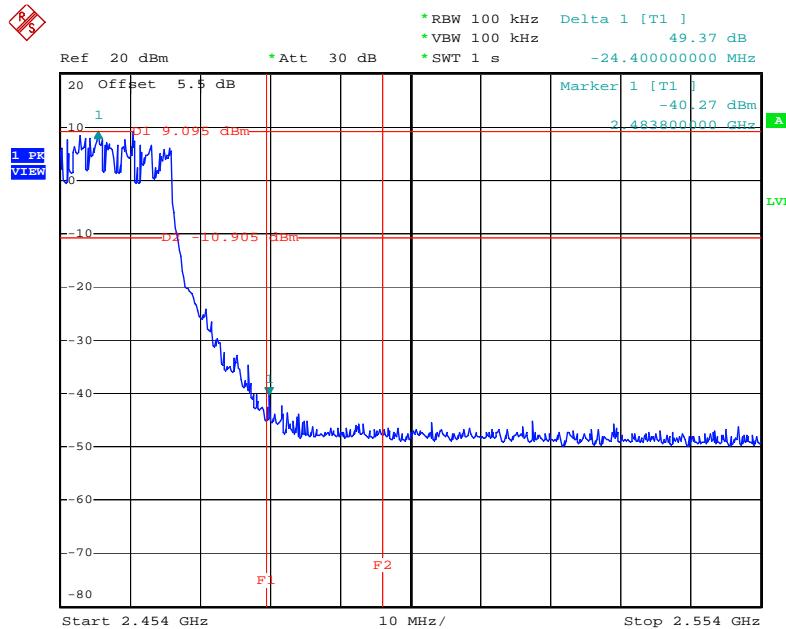
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High Band Edge Plot on Configuration IEEE 802.11b Ant. B1 + Ant. B2 + Ant. B3/ 2462 MHz


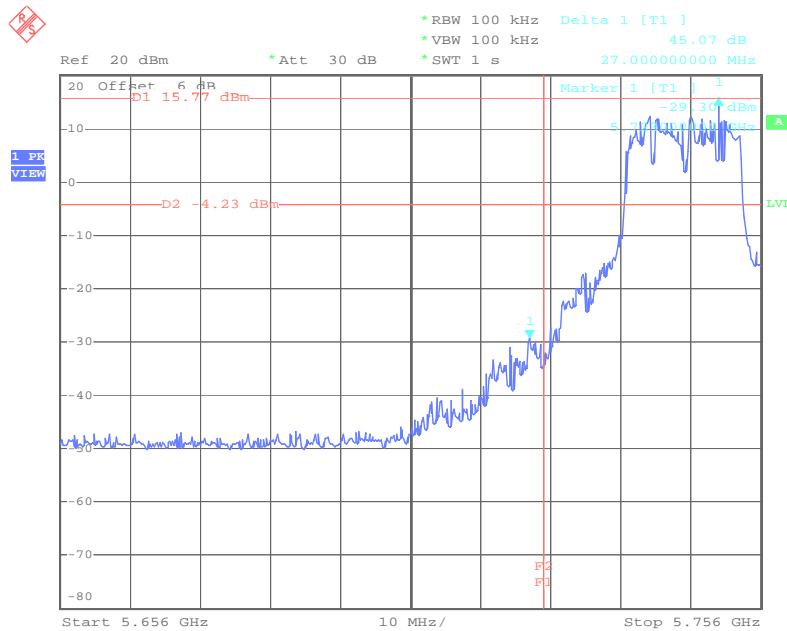
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Low Band Edge Plot on Configuration IEEE 802.11g Ant. B1 + Ant. B2 + Ant. B3/ 2412 MHz / Mode 2


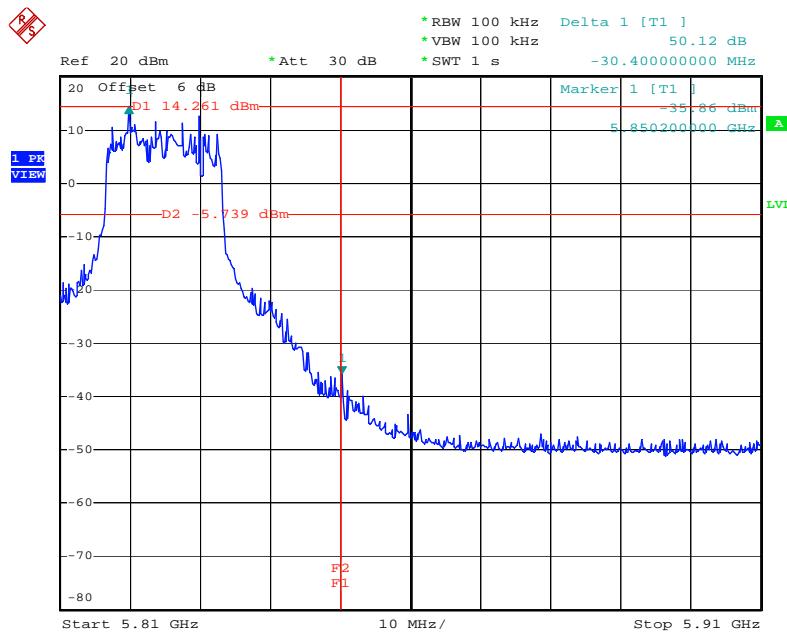
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High Band Edge Plot on Configuration IEEE 802.11g Ant. B1 + Ant. B2 + Ant. B3/ 2462 MHz / Mode 2


Date: 13.FEB.2008 10:39:53

Low Band Edge Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A / 5745 MHz


Date: 13.FEB.2008 11:17:58

High Band Edge Plot on Configuration IEEE 802.11a Ant. A1+Ant. A2+Ant. A / 5825 MHz


Date: 13.FEB.2008 10:09:04

4.7. Antenna Requirements

4.7.1. 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. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz – 2.75GHz	Jul. 14, 2007	Conduction (CO04-HY)
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Mar. 03, 2008	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2007	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2008	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2007	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2008	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2007	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2008	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz – 30MHz	May 09, 2007	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz – 30MHz	Mar. 27, 2008	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 14, 2007	Radiation (03CH03-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 14, 2008	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 14, 2008	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jun. 07, 2007	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jul. 21, 2008	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100305	9 kHz - 40 GHz	Sep. 27, 2007	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2006*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2008*	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 21, 2007	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 12, 2008	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 04, 2007	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 04, 2008	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	NCR	Radiation (03CH03-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Dec. 17, 2007	Conducted (TH01-HY)
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Jan. 10, 2008	Conducted (TH01-HY)
Power Meter	R&S	NRVS	100444	DC ~ 40GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Meter	R&S	NRVS	100444	DC ~ 40GHz	Jul. 11, 2008	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100458	DC ~ 30GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100458	DC ~ 30GHz	Jul. 11, 2008	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 11, 2008	Conducted (TH01-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	May 04, 2007*	Conducted (TH01-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	May 30, 2008*	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 03, 2007	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 13, 2008	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2007	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 01, 2007	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2007	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 07, 2007	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 10, 2008	Conducted (TH01-HY)
oscilloscope	Tektonix	TDS380	B016197	400MHz/ 2GS/s	Jun. 27, 2008	Conducted (TH01-HY)

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

* Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

6. 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 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

7. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-070110

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

Certificate of Accreditation

This is to certify that

Sportun 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, 2007 to January 09, 2010
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



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

PI, total 9 pages

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