## 6. Band Edge

## 6.1. Test Equipment

### **RF** Conducted Measurement

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

Note:

- 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
- 2. The test instruments marked with "X" are used to measure the final test results.

#### **RF Radiated Measurement:**

The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
$\Box$ Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2010
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2010
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	Х	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2010
	Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2011
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2010
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2011
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

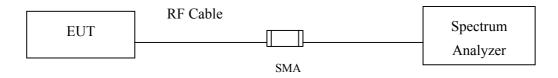
Note:

1. All instruments are calibrated every one year.

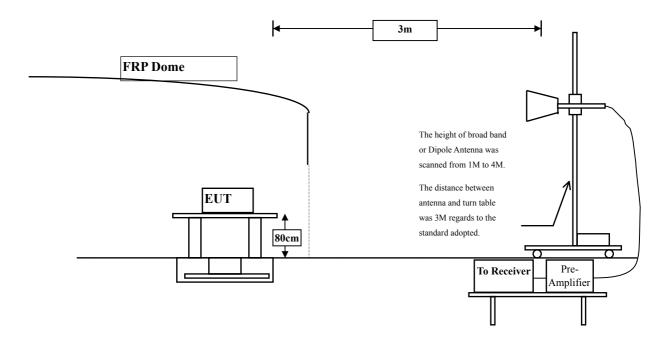
2. The test instruments marked by "X" are used to measure the final test results.

# 6.2. Test Setup

### **RF** Conducted Measurement



### **RF Radiated Measurement:**



### 6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

## 6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

## 6.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

# 6.6. Test Result of Band Edge

Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

## Fundamental Filed Strength

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2412	31.639	73.12	104.758	Peak
Horizontal	2412	31.639	69.61	101.248	Average
Vertical	2412	30.95	73.35	104.299	Peak
Vertical	2412	30.95	69.94	100.889	Average

Note: 1:Spectrum Analyzer setting:

```
Peak detector: RBW=1MHz, VBW=1MHz
```

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2386.4	104.758	49.21	55.548	74.000	Peak
Horizontal	2386.8	101.248	58.982	42.266	54.000	Average
Vertical	2386.4	104.299	49.21	55.089	74.000	Peak
Vertical	2386.8	100.889	58.982	41.907	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)

Agilent Spectrum Analyzer - Sw				50 2 0100	
Center Freq 2.3900	AC 00000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	12:33:56 PM Aug 05, 2011 TRACE 1 2 3 4 5 6	Frequency
	IFGain:Low	☐ Trig: Free Run Atten: 30 dB	Avg Hold: 90/100	TYPE MWWWWW DET P N N N N N r1 2.413 0 GHz	Auto Tune
10 dB/div Ref 20.00 (	dBm			7.766 dBm	
10.0					Center Fred
-10.0					2.390000000 GH:
-20.0					Start Free
-30.0	Marine interest of the second		Ŷ		2.340000000 GH
-50.0					Stop Fre
-70.0					2.440000000 GH
Center 2.39000 GHz #Res BW 1.0 MHz	#\/B\A	1.0 MHz	#Sween	Span 100.0 MHz 500 ms (1001 pts)	CF Ste
MKR MODE TRC SCL	×	Y FU		FUNCTION VALUE	10.000000 MH <u>Auto</u> Ma
1 N 1 f 2 N 1 f 3 N 1 f	2.413 0 GHz 2.390 0 GHz 2.386 4 GHz	7.766 dBm -43.191 dBm -41.444 dBm			
3 N 1 f 4 5	2.380 4 GHZ	-41.444 UDIII			Freq Offse
6 7					
8 9 10					
11 12					
ISG			STATUS		

Agilent Spectrum Analyze	r - Swept SA 50 Ω AC	SENSE: INT	ALIGNAUTO	12:35:25 PM Aug 05, 2011	1
Center Freq 2.3			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWW	Frequency
0 dB/div Ref 20	IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 6/100	(r1 2.413 0 GHz 4.990 dBm	A. 4. T
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			1 M		Center Fre 2.390000000 GF
20.0			$\bigvee$		Start Fro 2.340000000 G
0.0					<b>Stop Fr</b> 2.440000000 G
enter 2.39000 G Res BW 1.0 MHz		BW 10 Hz	Sweep	Span 100.0 MHz 5 7.80 s (1001 pts)	
KR MODE TRC SCL	× 2.413 0 GHz	4.990 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> M
2 N 1 f 3 N 1 f 4 5 6 7	2.390 0 GHz 2.386 8 GHz	-54.486 dBm -53.992 dBm			Freq Offs 0
8 9 00 11 2					
SG			STATU	3	

# QuieTer

Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

### Fundamental Filed Strength

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2462	32.019	72.8	104.819	Peak
Horizontal	2462	32.019	68.97	100.989	Average
Vertical	2462	31.29	72.26	103.55	Peak
Vertical	2462	31.29	68.07	99.36	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	104.819	51.056	53.763	74.000	Peak
Horizontal	2483.5	100.989	60.038	40.951	54.000	Average
Vertical	2483.5	103.55	51.056	52.494	74.000	Peak
Vertical	2483.5	99.36	60.038	39.322	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)

Agilent Spectrum Analyzer - Swept SA		ettu Danu Eu	8	
20 RF 50 Ω AC Center Freq 2.483500000 GHz IFGain:Low	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 31/100	12:32:51 PM Aug 09, 2011 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N N	Frequency
10 dB/div Ref 20.00 dBm	PAttern of the	Mk	r1 2.461 0 GHz 8.019 dBm	Auto Tune
				Center Fred 2.483500000 GH:
-20.0	2	agendantes of hypothemicana	Naulourman constant advator	Start Free 2.433500000 GH
-50.0				<b>Stop Fre</b> 2.533500000 GH
Center 2.48350 GHz #Res BW 1.0 MHz #VE #KR MODE TRE SCL ×	SW 1.0 MHz	#Sweep	Span 100.0 MHz 500 ms (1001 pts) concition value	CF Ste 10.000000 MH Auto Ma
N     I     F     2.461 0 GHz       2     N     1     f     2.483 5 GHz       3     -     -     -     -       3     -     -     -     -       4     -     -     -     -       5     -     -     -     -       6     -     -     -     -       7     -     -     -     -       8     -     -     -     -       9     -     -     -     -       10     -     -     -     -       12     -     -     -     -	8.019 dBm -43.037 dBm			Freq Offse 0 H
SG		STATUS		

Jernier Free	RF 50 Ω q 2.483500	AC DOOO GHz IEGain:Low	Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 1/100	12:33:28 PM Aug 09, 2011 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
10 dB/div F	Ref 20.00 dB		#Atten: 50 dB	Mk	r1 2.461 2 GHz 5.095 dBm	Auto Tun
- <b>og</b> 10.0 0.00 -10.0						Center Fre 2.483500000 GH
-20.0	$\sim$		2			Start Fre 2.433500000 GH
50.0 60.0 70.0						<b>Stop Fre</b> 2.533500000 GH
enter 2.48 Res BW 1.	0 MHz		W 10 Hz		Span 100.0 MHz 7.80 s (1001 pts)	CF Ste 10.000000 M
	f	× 2.461 2 GHz	5.095 dBm -54.943 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto M
	f	2.483 5 GHz				Freq Offs 01



Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

Antenna	Frequency	Correction Factor Reading Level		<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2412	31.639	71.4	103.038	Peak
Horizontal	2412	31.639	59.35	90.988	Average
Vertical	2412	32.019	70.19	102.209	Peak
Vertical	2412	32.019	57.96	89.979	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2390	103.038	32.159	70.879	74.000	Peak
Horizontal	2390	90.988	41.277	49.711	54.000	Average
Vertical	2390	102.209	32.159	70.05	74.000	Peak
Vertical	2390	89.979	41.277	48.702	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)



Agilent Spectrum Analyzer - Sw	rept SA		Icted Dand Ed		
RF 50 Ω Center Freq 2.3900	AC 000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 58/100	12:37:33 PM Aug 05, 2011 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
10 dB/div Ref 20.00 (	IFGain:Low <sup>™</sup> dBm	Atten: 30 dB	Mk	r1 2.414 7 GHz 10.897 dBm	Auto Tune
-og 10.0 0.00 10.0					Center Fre 2.390000000 GH
20.0 30.0 40.0	Annan and an and a start of the	Alter And		Market Market	Start Fre 2.340000000 GH
50.0					Stop Fre 2.440000000 G⊢
enter 2.39000 GHz Res BW 1.0 MHz		/ 1.0 MHz	#Sweep	Span 100.0 MHz 500 ms (1001 pts) conction value	CF Ste 10.000000 MH Auto Ma
1 N 1 f 2 N 1 f 3 4	× 2.414 7 GHz 2.390 0 GHz	10.897 dBm -21.262 dBm			Freq Offs
5 6 7 8					0 H
9 10 11 12					
sg			STATUS		

Agilent Spectrum Analyzer -					
Center Freq 2.390		SENSE:INT	ALIGNAU Avg Type: Log-Pi		5.6 Frequency
10 dB/div Ref 20.0	IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 1/100	Wkr1 2.417 3 GI 0.135 dB	Auto Tun
10.0 .00 .10.0					Center Fre 2.390000000 G⊦
20.0		2			Start Fre 2.340000000 GH
50.0 60.0 70.0					Stop Fre 2.440000000 GH
Center 2.39000 GHz Res BW 1.0 MHz		W 10 Hz		Span 100.0 M eep 7.80 s (1001 p	ts) CF Ste 10.000000 Mi
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 4	× 2.417 3 GHz 2.390 0 GHz	41.142 dBm	UNCTION FUNCTION W	DTH FUNCTION VALUE	Freq Offs
5 6 7 8					01
9 10 11 12					
SG			ST/	ATUS	

# QuieTer

Product :	IEEE 802.11b/g/n WIFI/ BT Combo slim module
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Test Item : Band	Edge Data
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Test Mode : Mode 2: Transmit (802.11g 6Mbps)

## Fundamental Filed Strength

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2462	30.95	73.08	104.029	Peak
Horizontal	2462	30.95	61.3	92.249	Average
Vertical	2462	31.29	73.71	105	Peak
Vertical	2462	31.29	61.71	93	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	104.029	32.182	71.847	74.000	Peak
Horizontal	2483.5	92.249	41.149	51.1	54.000	Average
Vertical	2483.5	105	32.182	72.818	74.000	Peak
Vertical	2483.5	93	41.149	51.851	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)

	11:08:56 AM Aug 12, 2011	ALIGN AUTO	1	NSE:INT	CE		Swept SA		RF	ic spec
Peak Search	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	: Log-Pwr	Avg Ty Avg Hol	e Run	7		0000000			ker '
NextPea	r1 2.457 4 GHz 10.565 dBm									
Next Pk Rig				2						
Next Pk Lo	a, a water a state of the second	crated made and a	-	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	hunderen		-	erekterer	1	NIN <sup>-Newl</sup>
Marker De										
Mkr→0	Span 100.0 MHz 500 ms (1001 pts) FUNCTION VALUE	#Sweep {			/ 1.0 MHz Y	#VB\	2 X		.4835   1.0     10	s BW
Mkr→RefL					10.565 d -21.617 d	7 4 GHz 3 5 GHz			1 f 1 f	N
<b>M</b> o 1 o										
		STATUS		4						

Agilent Spectrum Analyzer - Sw					
RF 50 Ω Center Freq 2.4835	G	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 3/100	11:11:28 AM Aug 12, 2011 TRACE 1 2 3 4 5 6 TYPE MWWWWAWW DET P N N N N N	Frequency
10 dB/div Ref 20.00	IFGain:Low	Atten: 30 dB	Mk	r1 2.456 6 GHz -0.077 dBm	Auto Tun
-og 10.0 0.00 10.0	<b>●</b> <sup>1</sup>				Center Fre 2.483500000 GH
20.0		2			Start Fre 2.433500000 Gi
50.0 60.0 70.0					<b>Stop Fre</b> 2.533500000 GH
enter 2.48350 GHz Res BW 1.0 MHz		N 10 Hz	-	Span 100.0 MHz 7.80 s (1001 pts)	CF Ste 10.000000 M
KR MODE TRO SCL 1 N 1 f 2 N 1 f	× 2.456 6 GHz 2.483 5 GHz	-0.077 dBm -41.226 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> M
3 4 5 6 7					Freq Offs 0
7 8 9 00 11					
SG			STATUS		

# QuieTer

Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Fundamental Filed Strength

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2412	31.639	71.41	103.048	Peak
Horizontal	2412	31.639	59.66	91.298	Average
Vertical	2412	30.95	70.55	101.499	Peak
Vertical	2412	30.95	58.66	89.609	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2390	103.048	30.626	72.422	74.000	Peak
Horizontal	2390	91.298	39.405	51.893	54.000	Average
Vertical	2390	101.499	30.626	70.873	74.000	Peak
Vertical	2390	89.609	39.405	50.204	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)



gilent Spectrum Analyze					
enter Freg 2.3	50 Ω AC 90000000 GHz IFGain:Low	Trig: Free Run Atten: 30 dB	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 67/100	12:39:15 PM Aug 05, 2011 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
0 dB/div Ref 20.	.00 dBm	Atten: ov dB	Mk	r1 2.415 6 GHz 10.474 dBm	Auto Tur
og 10.0 0.00		2			Center Fre 2.390000000 GH
10.0 10.0	shower more regard to and West	manner		the second secon	Start Fre 2.34000000 GH
0.0					<b>Stop Fr</b> 2.440000000 G
enter 2.39000 G Res BW 1.0 MHz R MODE TRO SCL		№ 1.0 MHz	#Sweep	Span 100.0 MHz 500 ms (1001 pts) cunction value	CF Ste 10.000000 MI Auto M
1     1     f       2     N     1     f       3     -     -     -       4     -     -     -       5     -     -     -       6     -     -     -       7     -     -     -       8     -     -     -	2.415 6 GHz 2.390 0 GHz	10.474 dBm -20.152 dBm			Freq Offs 01
9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			STATUS		

Agilent Spectrum Analyzer	- Swept SA 50 Ω AC	SENSE:INT		ALIGNAUTO	12:39:53 PM	4 Aug 05, 2011	
Center Freq 2.39		Trig: Free Run	Avg Type: Avg Hold:2	Log-Pwr	TRAC	E 1 2 3 4 5 6 E MWWWWW	Frequency
	IFGain:Low	Atten: 30 dB	Avgirioid. 2		DE	5 GHz	Auto Tun
0 dB/div Ref 20.0	00 dBm					74 dBm	
10.0			1				Center Fre
0.00				~~~~~~	)		2.390000000 G
0.0							
.0.0		2			Low	~	Start Fr 2.340000000 G
0.0						N.	
0.0							Stop Fr
0.0						s	2.440000000 G
enter 2.39000 GH Res BW 1.0 MHz	z ^ #VBW <sup>/</sup>	10 Hz	- 73 / 73	Sween		00.0 MHz 1001 pts)	CF St
KR MODE TRC SCL	×	Y FU	NCTION FUN	CTION WIDTH	FUNCTIO		10.000000 M <u>Auto</u> M
1 N 1 f 2 N 1 f	2.407 5 GHz 2.390 0 GHz	-0.674 dBm -40.079 dBm					
3 4 5							Freq Offs 0
6 7							
8							
0			0				
12				STATUS			
9				STATUS			

Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	÷	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2462	32.019	70.44	102.459	Peak
Horizontal	2462	32.019	58.82	90.839	Average
Vertical	2462	31.29	70.94	102.23	Peak
Vertical	2462	31.29	59.17	90.46	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	102.459	30.547	71.912	74.000	Peak
Horizontal	2483.5	90.839	38.003	52.836	54.000	Average
Vertical	2483.5	102.23	30.547	71.683	74.000	Peak
Vertical	2483.5	90.46	38.003	52.457	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)



Agilent Spectrum Analyzer - Swe	pt SA	an as		8	
™ RF 50 Ω Center Freq 2.48350		SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 50/100	12:27:18 PM Aug 09, 2011 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
10 dB/div <b>Ref 20.00 d</b>	IFGain:Low <sup>™</sup> Bm	#Atten: 30 dB		r1 2.465 4 GHz 10.353 dBm	Auto Tune
- 09 10.0 0.00 - 10.0 - 20.0	1	2			Center Fre 2.483500000 GH
40.0		Lawrence Lawrence	Markleybergergergergergergergergergergergergerge	Antenterlargen Solars, Austral	Start Fre 2.433500000 G⊦
50.0 60.0 70.0					Stop Fre 2.533500000 GH
enter 2.48350 GHz Res BW 1.0 MHz	#VBV	/ 1.0 MHz	#Sweep	Span 100.0 MHz 500 ms (1001 pts) FUNCTION VALUE	CF Ste 10.000000 MH Auto Ma
N     1     f       2     N     1     f       3     -     -     -       4     -     -     -       5     -     -     6	2.465 4 GHz 2.483 5 GHz	10.353 dBm -20.194 dBm			Freq Offs
7 8 9 10 11 12					
sg			STATUS		

gilent Spectrum Analyzer - S RF 50	Swept SA Ω AC	SENSE:INT	ALIGNAUTO	12:29:21 PM Aug 09, 2011	
enter Freq 2.483	500000 GHz	Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 2/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
0 dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB		r1 2.456 6 GHz -0.667 dBm	Auto Tu
og 10.0 5.00	<b>↓</b> <sup>1</sup>	\			Center Fr 2.483500000 G
	<u>}</u>	2			Start Fr 2.433500000 G
50.0 50.0 70.0				· · · · · · · · · · · · · · · · · · ·	<b>Stop Fr</b> 2.533500000 G
enter 2.48350 GHz Res BW 1.0 MHz	#VE	3W 10 Hz		Span 100.0 MHz 7.80 s (1001 pts)	CF St 10.000000 M
KR MODE TRC SCL 1 N 1 f 2 N 1 f 3 4	× 2.456 6 GHz 2.483 5 GHz	-0.667 dBm -38.670 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto M Freq Offs
5 6 7 8 9					0
0					

Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	Emission Level	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2422	30.715	71.37	103.085	Peak
Horizontal	2422	30.715	59.26	90.975	Average
Vertical	2422	30.017	71.89	102.907	Peak
Vertical	2422	30.017	60.1	91.117	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2388.8	103.085	30.218	72.867	74.000	Peak
Horizontal	2390	90.975	37.708	53.267	54.000	Average
Vertical	2388.8	102.907	30.218	72.689	74.000	Peak
Vertical	2390	91.117	37.708	53.409	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$ 

F = Fundamental field Strength (Peak or Average)



Agilent Spectrum Analyzer - Sv			leteu Danu Eu	0	
RF 50 3 Center Freq 2.3900	2 AC	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 82/100	02:40:57 PM Aug 09, 2011 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N	Frequency
10 dB/div Ref 20.00		#Atten: 50 dB	Mk	r1 2.417 7 GHz 6.600 dBm	Auto Tune
-og 10.0 .0.00 10.0			1	market market and	Center Fre 2.390000000 GH
10.0 20.0 40.0 <b>44.03hm/http://www.flates/flates/</b>	49444041444411814444118179449148004884	132 manual with a sum with			Start Fre 2.340000000 GH
50.0 50.0 70.0					Stop Fre 2.440000000 GH
enter 2.39000 GHz Res BW 1.0 MHz	#VBW	/ 1.0 MHz	#Sweep	Span 100.0 MHz 500 ms (1001 pts)	CF Ste 10.000000 MH Auto Ma
N     1     f       2     N     1     f       3     N     1     f       4     -     -     -       5     -     -     -       6     -     -     -       7     -     -     -       8     -     -     -	2.417 7 GHz 2.390 0 GHz 2.388 8 GHz	6.600 dBm -25.796 dBm -23.618 dBm			Freq Offse
8 9 10 11 12 13 13 13 13 13 13 13 13 13 13 13 13 13			STATUS		

gilent Spectrum Analyzer	- Swept SA 50 Ω AC	SENSE:INT	ALIGNAUTO	02:48:05 PM Aug 09, 2011	
enter Freq 2.39	00000000 GHz		Avg Type: Log-Pwr Avg Hold: 20/100	TRACE 1 2 3 4 5 6	Frequency
0 dB/div Ref 20.	IFGain:Low	#Atten: 30 dB	87 <b>.</b> 04	r1 2.416 9 GHz -5.741 dBm	Auto Tur
			<b>↓</b> 1		Center Fro 2.390000000 GI
80.0		2			<b>Start Fr</b> 2.340000000 G
0.0					<b>Stop Fr</b> 2.440000000 G
enter 2.39000 GH Res BW 1.0 MHz		W 10 Hz		Span 100.0 MHz 5 7.80 s (1001 pts)	CF St 10.000000 M
KR MODE TRC SCL 1 N 1 f 2 N 1 f 3	× 2.416 9 GHz 2.390 0 GHz	-5.741 dBm -43.449 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> M
4 5 6 7					Freq Offs 0
8 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
G			STATU	s	1

Product	:	IEEE 802.11b/g/n WIFI/ BT Combo slim module
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

Antenna	Frequency	<b>Correction Factor</b>	<b>Reading Level</b>	<b>Emission Level</b>	Detector
Pole	[MHz]	[dB/m]	[dBuV]	[dBuV/m]	
Horizontal	2452	30.944	68.94	100.884	Peak
Horizontal	2452	30.944	56.76	88.704	Average
Vertical	2452	30.222	71.25	102.472	Peak
Vertical	2452	30.222	58.34	89.562	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2484.7	100.884	31.146	69.738	74.000	Peak
Horizontal	2483.5	88.704	37.052	51.652	54.000	Average
Vertical	2484.7	102.472	31.146	71.326	74.000	Peak
Vertical	2483.5	89.562	37.052	52.51	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$ 

F = Fundamental field Strength (Peak or Average)

Agilent Spectrum Analyzer - Swe				8	
RF 50 Ω Center Freq 2.48350		SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	12:18:50 PM Aug 09, 2011 TRACE 1 2 3 4 5 6	Frequency
	IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold:>100/100	DET P N N N N	Auto Tune
10 dB/div Ref 20.00 d	IBm		Mk	r1 2.447 6 GHz 6.486 dBm	Auto Tune
10.0 1	anter manage				Center Free
10.00					2.483500000 GH
20.0		23			Start Fre
-30.0				₩ <b>₽₽₽₽</b> ₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	2.433500000 GH
50.0					Stop Fre
70.0					2.533500000 GH
Center 2.48350 GHz #Res BW 1.0 MHz	#VBW	1.0 MHz	#Sweep	Span 100.0 MHz 500 ms (1001 pts)	CF Ste 10.000000 MH
MKR MODE TRO SCL	× 2.447 6 GHz	Y 6.486 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 f 3 N 1 f	2.483 5 GHz 2.484 7 GHz	-24.945 dBm -24.660 dBm			Freq Offse
4 5 6					0F
7 8					
9 10 11					
12					
SG			STATUS		

	RF 50 Ω AC		SENSE:INT	ALIGNAUT		
enter Freq	2.4835000	00 GHz	Trig: Free Run	Avg Type: Log-Pw Avg Hold: 2/100	TYPE M WWWWWW	
		IFGain:Low			DET P N N N N N	
				M	lkr1 2.446 6 GHz	
0 dB/div R	ef 20.00 dBm	1			-5.468 dBm	
10.0						Center Fre
0.00	<b>1</b>					2.483500000 G
10.0						2.483300000 G
20.0						
30.0						Start Fr
40.0						2.433500000 G
50.0						
50.0						Stop Fr
70.0						2.533500000 G
	50 GHz				Span 100.0 MHz	
		200 6				
		#VI	3W 10 Hz	Swe	ep 7.80 s (1001 pts)	
Res BW 1.0	MHz	×	Y	Swee	<u> </u>	10.000000 M
Res BW 1.0 KR MODE TRO SO 1 N 1 f 2 N 1 f	MHz		3W 10 Hz -5.468 dBm -42.520 dBm		• • • • •	10.000000 M
Res BW 1.0 KR MODE TRC SI 1 N 1 f 2 N 1 f 3 1	MHz	× 2.446 6 GHz	-5.468 dBm		• • • • •	10.000000 M <u>Auto</u> M
Res BW 1.0       Image: BW 1.0 <td>MHz</td> <td>× 2.446 6 GHz</td> <td>-5.468 dBm</td> <td></td> <td>• • • • •</td> <td>10.000000 M <u>Auto</u> M Freq Offs</td>	MHz	× 2.446 6 GHz	-5.468 dBm		• • • • •	10.000000 M <u>Auto</u> M Freq Offs
Res BW 1.0       1     N     1     f       2     N     1     f       3     -     -     -       4     -     -     -       5     -     -     -       6     -     -     -       7     -     -     -	MHz	× 2.446 6 GHz	-5.468 dBm		• • • • •	10.000000 M <u>Auto</u> M Freq Offs
Res BW 1.0       1     N     1     f       2     N     1     f       3     -     -     -       4     -     -     -       5     -     -     -       6     -     -     -       7     -     8     -	MHz	× 2.446 6 GHz	-5.468 dBm		• • • • •	10.000000 M <u>Auto</u> M Freq Offs
2 N 1 f 3 4 5 6 7 7 8 9 9	MHz	× 2.446 6 GHz	-5.468 dBm		• • • • •	10.000000 M <u>Auto</u> M Freq Offs
Res BW 1.0       IXE MODE     TRE SI       1     N     1       2     N     1     f       3     -     -     -       4     -     -     -       5     -     -     -       6     -     -     -       7     -     -     -       8     -     -     -       9     -     -     -	MHz	× 2.446 6 GHz	-5.468 dBm		• • • • •	10.000000 MI