

# B-Mobile Limited

## Mobile Phone

Main Model: A5

29th May, 2012

Report No.: 12050037-FCC-R3  
(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

Back Huang Compliance Engineer	Alex Liu Technical Manager	

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Test result presented in this test report is applicable to the representative sample only.

RF Test Report

FCC Part 15.247: 2012

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## Laboratory Introduction

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In addition to testing and certification, SIEMIC provides initial design reviews and compliance management through out a project. Our extensive experience with China, Asia Pacific, North America, European, and international compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC , RF/Wireless , Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
Hong Kong	OFTA , NIST	RF/Wireless , Telecom
Australia	NATA, NIST	EMC, RF, Telecom , Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF , Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom , Safety

### Accreditations for Product Certifications

Country/Region	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	iDA, NIST	EMC , RF , Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC, (RCB 208)	RF , Telecom
Hong Kong	OFTA (US002)	RF , Telecom



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## **1 EXECUTIVE SUMMARY & EUT INFORMATION**

**The purpose of this test programme was to demonstrate compliance of the B-Mobile Limited, Mobile Phone and model: A5 against the current Stipulated Standards. The Mobile Phone has demonstrated compliance with the FCC Part 15.247: 2012 (KDB 558074).**

### **EUT Information**

**EUT**

**Description** : **Mobile Phone**

**Main Model** : **A5**

**UMTS-FDD Band V/GSM850: -2 dBi**

**UMTS-FDD Band II/PCS1900: -1 dBi**

**Antenna Gain** : **Bluetooth: -2 dBi**

**WLAN: -2 dBi**

**GPS: -2 dBi**

**B mobile AC Adapter**

**Input: AC 110-240V 0.2A 50/60Hz**

**Output: DC 5.0V 500mA**

**Input Power** :

**Li-ion Battery**

**Model : A6**

**Charging Voltage:3.7V 1200 mAh**

**Charge Cut-off Voltage: 4.2 V**

**Classification**

**Per Stipulated Test Standard** : **FCC Part 15.247: 2012 (KDB 558074)**



## 2 TECHNICAL DETAILS

<b>Purpose</b>	Compliance testing of Mobile Phone with stipulated standard
<b>Applicant / Client</b>	B-Mobile Limited G/F 144, Un Chau Street Sham Shui Po, Kowloon, Hong Kong
<b>Manufacturer</b>	Golden Knight Industrial Co.,Ltd Room 604, Guoren Mansion, Sic-tech 3rd Road, Sic-tech park, NanShan, SZ
<b>Laboratory performing the tests</b>	SIEMIC Nanjing (China) Laboratories NO.2-1, Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel: +86(25)86730128/86730129 Fax: +86(25)86730127 Email: info@siemic.com
<b>Test report reference number</b>	12050037-FCC-R3
<b>Date EUT received</b>	14th May, 2012
<b>Standard applied</b>	FCC Part 15.247: 2012 (KDB 558074)
<b>Dates of test (from – to)</b>	24th May, 2012 to 26th May, 2012
<b>No of Units :</b>	#1
<b>Equipment Category :</b>	Spread Spectrum System/Device
<b>Trade Name :</b>	B Mobile
<b>RF Operating Frequency (ies)</b>	GSM850 TX : 824.2 ~ 848.8 MHz; RX : 869.2 ~ 893.8 MHz PCS1900 TX : 1850.2 ~ 1909.8 MHz; RX : 1930.2 ~ 1989.8 MHz UMTS-FDD Band V TX : 826.4 ~ 846.6 MHz; RX : 871.4 ~ 891.6 MHz UMTS-FDD Band II TX : 1852.4 ~ 1907.6 MHz; RX : 1932.4 ~ 1987.6 MHz WLAN: 2.4GHz band: 802.11b/g : 2412-2462 MHz Bluetooth : 2402-2480 MHz
<b>Number of Channels</b>	299CH (PCS1900) and 124CH (GSM850) UMTS-FDD Band V : 102CH UMTS-FDD Band II : 277CH Bluetooth: 79CH WiFi: 11CH
<b>Modulation</b>	GSM / GPRS: GMSK UMTS-FDD: QPSK WLAN: DSSS/OFDM Bluetooth: GFSK
<b>GPRS Multi-slot class</b>	8/10/12
<b>FCC ID</b>	ZSW-AX525-AX515



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### **3 MODIFICATION**

**NONE**

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## 4 TEST SUMMARY

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

### Spread Spectrum System/Device

#### Test Results Summary

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Conducted Maximum Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band Edge & Conducted Spurious Emissions	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Restricted Bands	Compliance



## 5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

### 5.1 §15.247 (i) and §2.1093 – RF Exposure

#### Applicable Standard

According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	<u>SAR not required:</u> <u>Unlicensed only</u> o when stand-alone 1-g SAR is not required and antenna is $\geq 5$ cm from other antennas <u>Licensed &amp; Unlicensed</u> o when the sum of the 1-g SAR is $< 1.6$ W/kg for all simultaneous transmitting antennas o when SAR to peak location separation ratio of simultaneous transmitting antenna pair is $< 0.3$ <u>SAR required:</u> <u>Licensed &amp; Unlicensed</u> antenna pairs with SAR to peak location separation ratio $\geq 0.3$ ; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition <u>Note:</u> simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Jaw, Mouth and Nose	<u>Flat phantom SAR required</u> o when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues o position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.



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Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

Three antennas are available for the EUT, (GSM antenna, WLAN/Bluetooth antenna, GPS antenna). The distance between WLAN/BT antenna and WWAN antenna is 7 cm which is More than 5 cm, and the Max output power of WLAN is 11.14 mW <2\*Pref (24 mW), Max output power of BT is 0.47mW <2\*Pref (24 mW). So no stand-alone SAR is required for WLAN and BT antenna. According to KDB 648474, no simultaneous SAR measurement is required too.

Note: The WLAN and BT use the same antenna.

**Result:**

The SAR measurement is exempt.



## **5.2 §15.203 - ANTENNA REQUIREMENT**

### **Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has 3 antennas, one is a PIFA antenna for Bluetooth/WLAN, the gain is -2 dBi; one is a PIFA antenna for GSM/ UMTS-FDD, the gain are -2 dBi for GSM/ UMTS-FDD Band V and -1 dBi for PCS/ UMTS-FDD Band II, other is a PIFA antenna for GPS, the gain is -2 dBi which in accordance to section 15.203, please refer to the internal photos.

**Result:** Compliant.

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## **5.3 §15.247(a) (2) – 6 dB BANDWIDTH TESTING**

### **1. Conducted Measurement**

EUT was set for low, mid, high channel with modulated mode and highest RF output power. The spectrum analyzer was connected to the antenna terminal.

### **2. Environmental Conditions**

Temperature	22°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

### **3. Conducted Emissions Measurement Uncertainty**

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5$ dB.

### **4. Test date : 24th May, 2012**

Tested By : Back Huang

**Requirement(s):** §15.247(a)(2) specifies that the minimum 6 dB bandwidth shall be at least 500 kHz. In addition, the EBW is required information for subsequent band power measurements. The following procedures can be used to determine the EBW:

### **Procedures:**

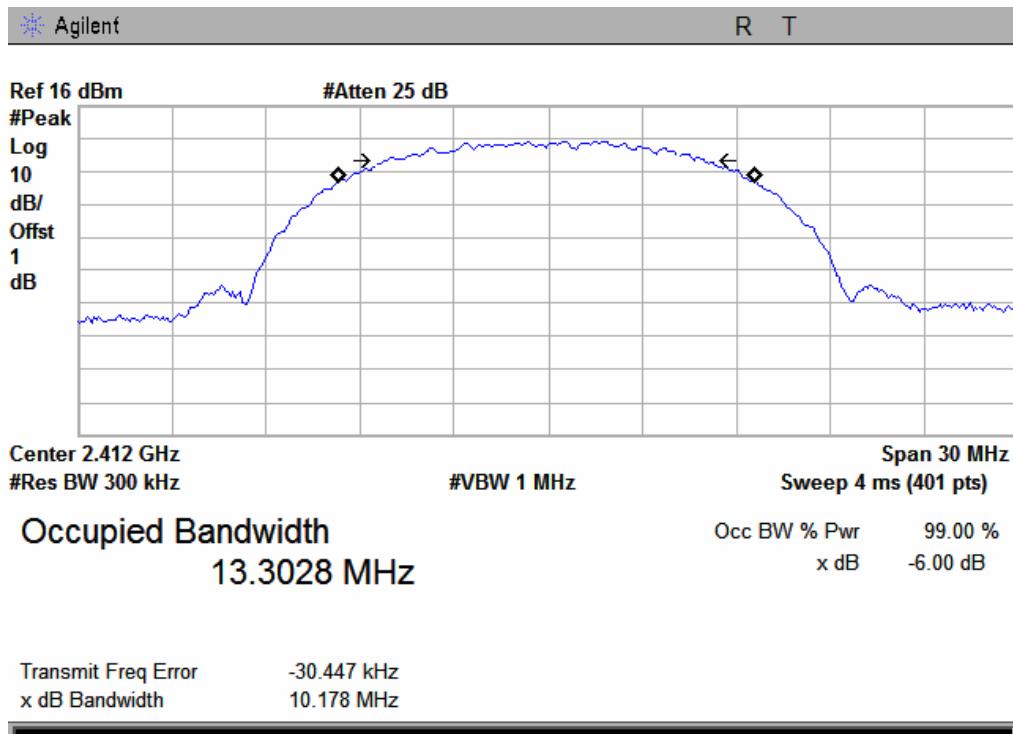
1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

### **Test Result: Pass.**

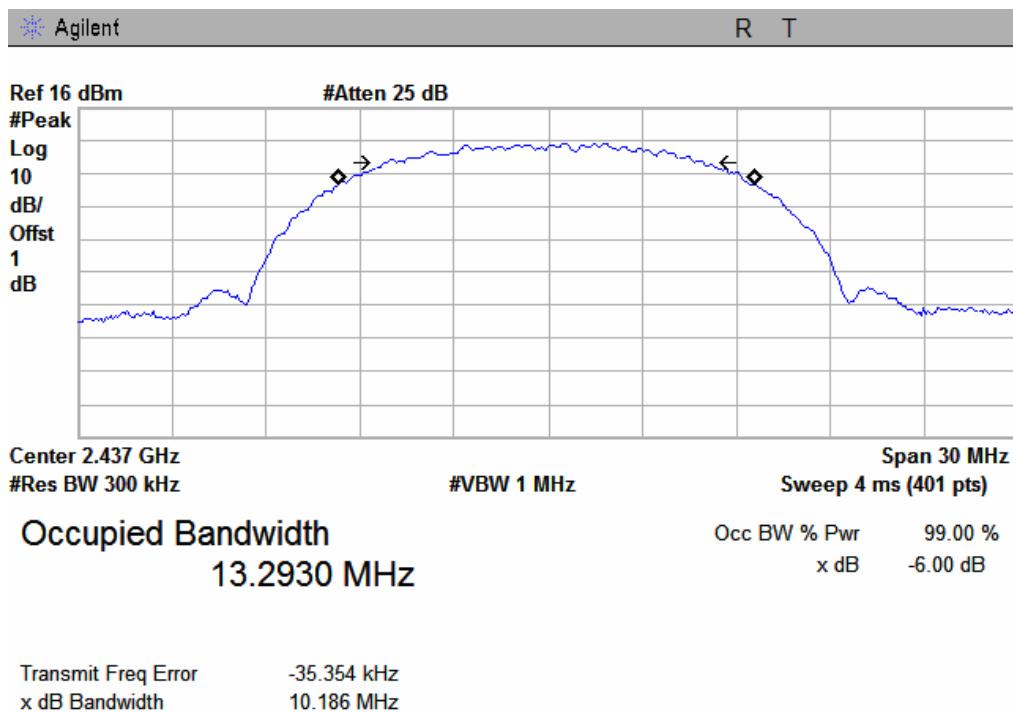
Please refer to the following tables and plots.

Channel	Channel Frequency (MHz)	Measured 6dB Bandwidth (MHz)	FCC Part 15.247 Limit (kHz)
<b>802.11b mode</b>			
Low	2412	10.178	$>500$
Middle	2437	10.186	$>500$
High	2462	10.189	$>500$
<b>802.11g mode</b>			
Low	2412	16.569	$>500$
Middle	2437	16.556	$>500$
High	2462	16.563	$>500$

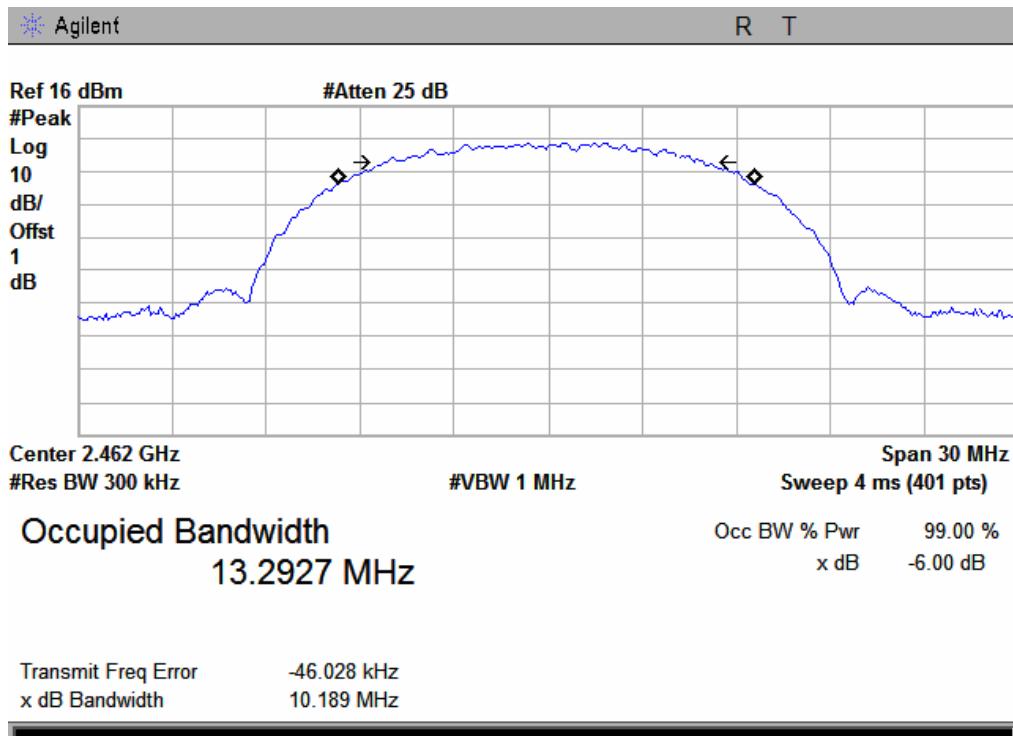
### 802.11b Low Channel



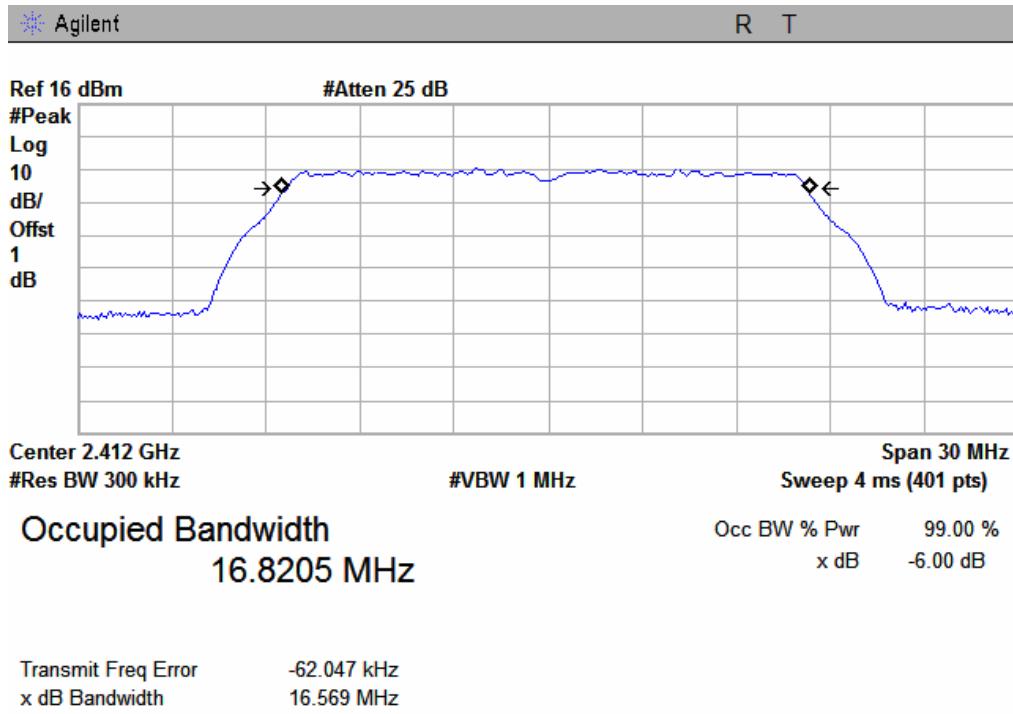
### 802.11b Middle Channel



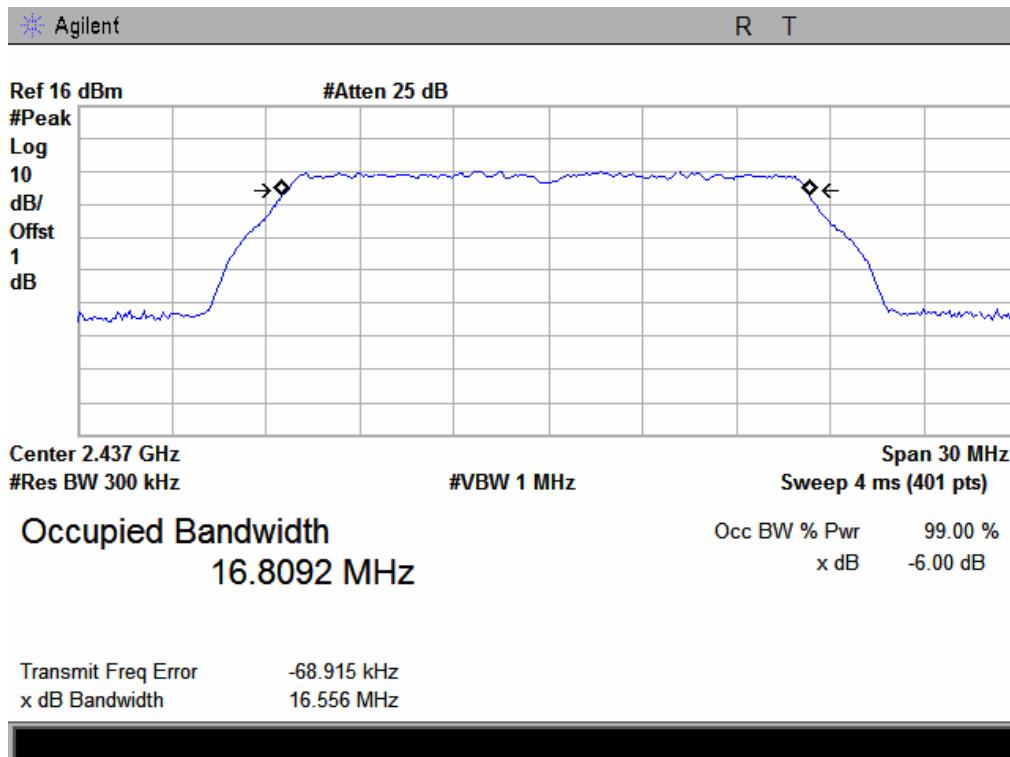
### 802.11b High Channel



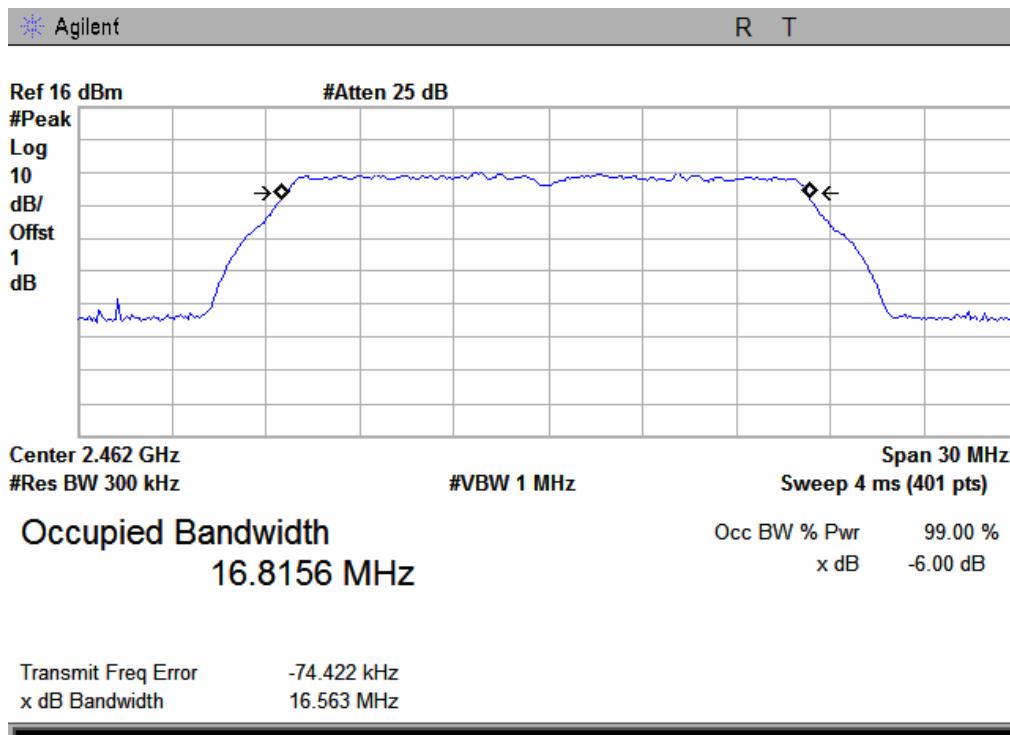
### 802.11g Low Channel

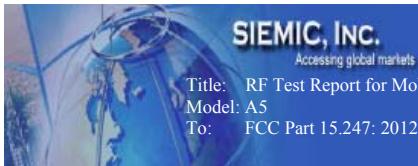


### 802.11g Middle Channel



### 802.11g High Channel





## **5.4 §15.247(b) (3) - Conducted Maximum Output Power**

1. Conducted Measurement  
EUT was set for low, mid, high channel with modulated mode and highest RF output power.  
The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5\text{dB}$ .
3. Environmental Conditions  

Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
4. Test date : 24th May, 2012  
Tested By : Back Huang

### **Standard Requirement:**

#### **Maximum Peak Conducted Output Power Level:**

§15.247(b)(3) specifies that the maximum peak conducted output power for DTS transmitters in any of the three authorized frequency bands is 1 watt (30 dBm). The following procedures can be used to determine the maximum peak conducted output power from a DTS EUT using a spectrum analyzer.

#### **Maximum Conducted (Average) Output Power Level:**

§15.247(b)(3) permits the maximum conducted output power to be measured as an alternative to a peak power measurement to demonstrate compliance to the one watt (30 dBm) output power limit. The maximum conducted output power is the highest total transmit power occurring in any mode when averaged over the EUT EBW. This measurement requires that the EUT be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. Time intervals during which the transmitter is off or transmitting at reduced power levels shall not be included.

### **Procedures:**

#### **Measurement Procedure PK2:**

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.

#### **Measurement Procedure AVG2 (trace averaging over the EBW):**

1. Set the analyzer span to 5-30% greater than the EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW  $\geq$  3 MHz.
4. Ensure that the number of measurement points in the sweep  $\geq 2 \times (\text{span}/\text{RBW})$ .
5. Sweep time = auto couple.
6. Detector = power averaging (RMS) or sample.
7. Employ trace averaging in power averaging (RMS) mode over a minimum of 100 traces.
8. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges to determine the maximum conducted output power of the EUT over the EBW. If the analyzer does not have a band power function, sum the spectral levels (in linear power units) at 1 MHz intervals extending across the entire EBW.

**Test Result: Pass.**

Please refer to the following tables and plots.

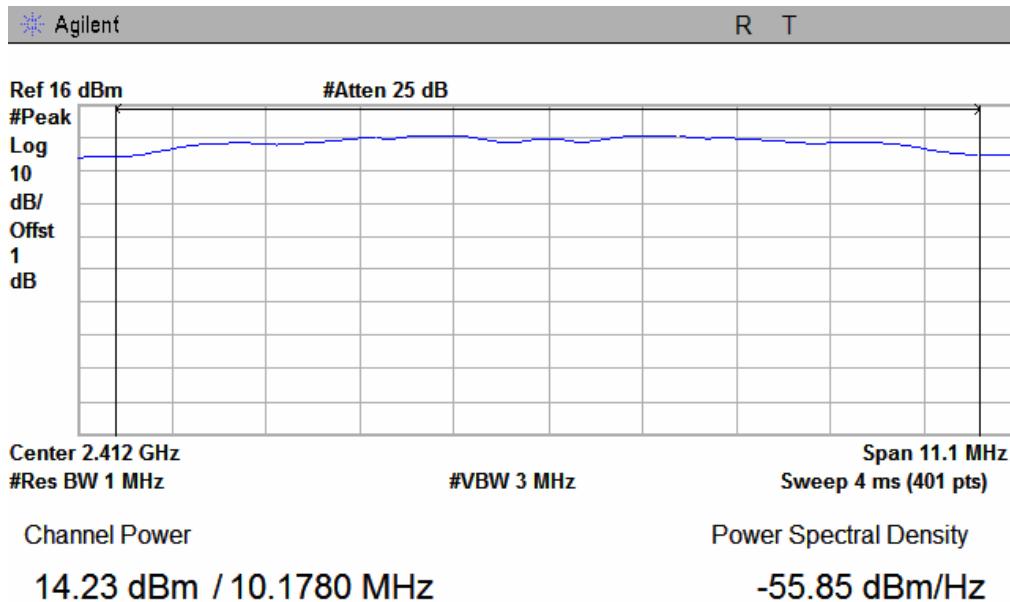
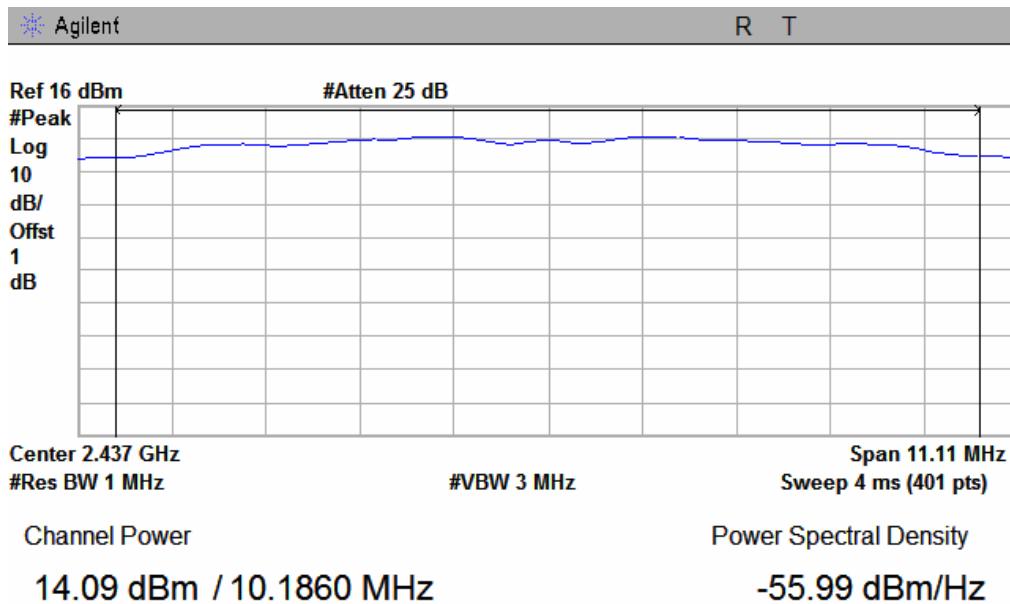
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	PK Output Power (dBm)	AVG Output Power (dBm)	Limit (dBm)
<b>802.11b mode</b>					
Low	2412	1	14.23	10.47	30
Middle	2437	1	14.09	10.19	30
High	2462	1	13.76	9.89	30
<b>802.11g mode</b>					
Low	2412	6	13.15	6.96	30
Middle	2437	6	13.01	6.78	30
High	2462	6	12.66	6.42	30

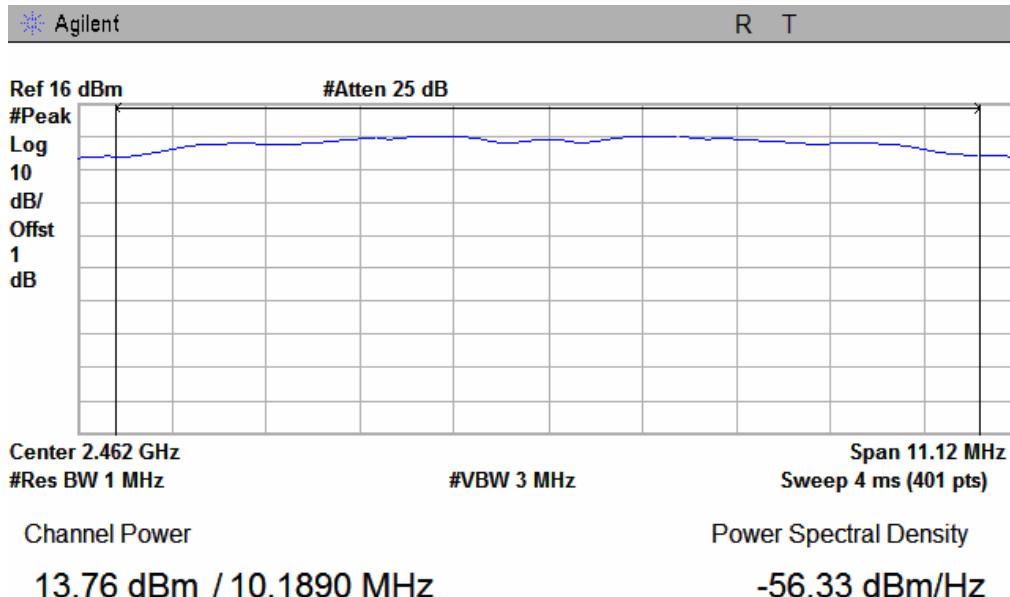
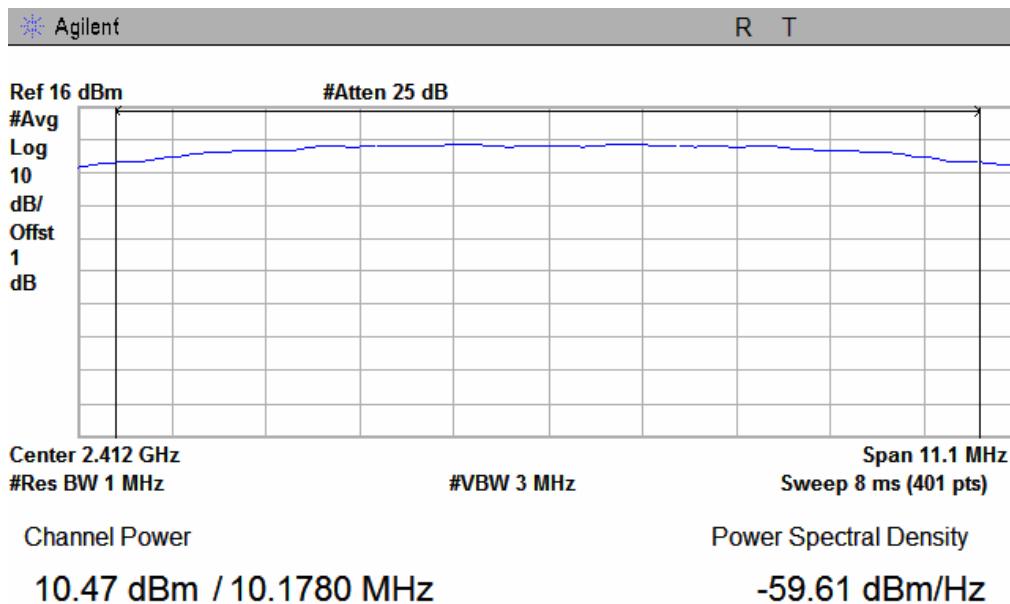
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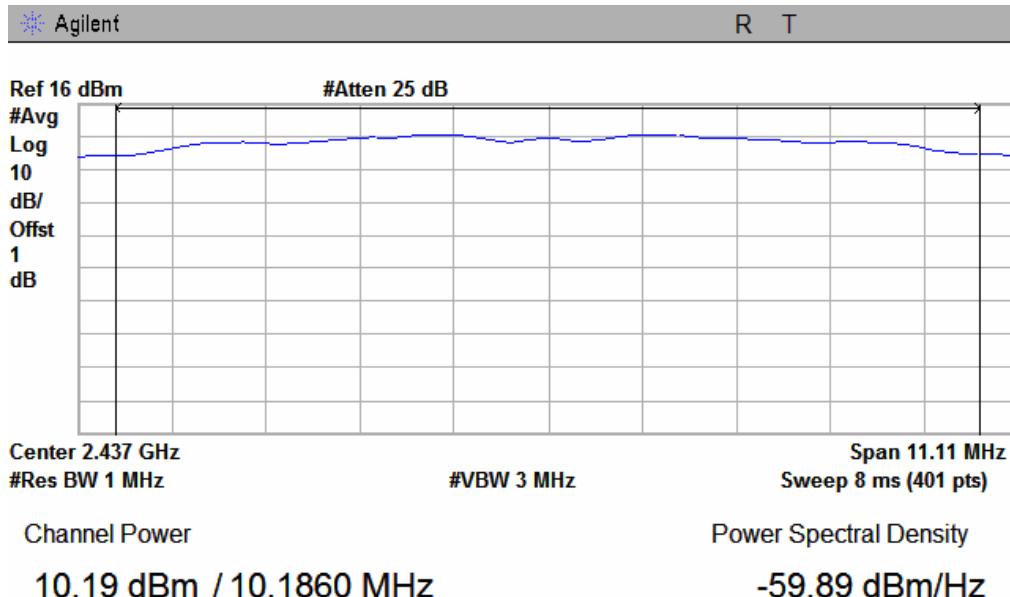
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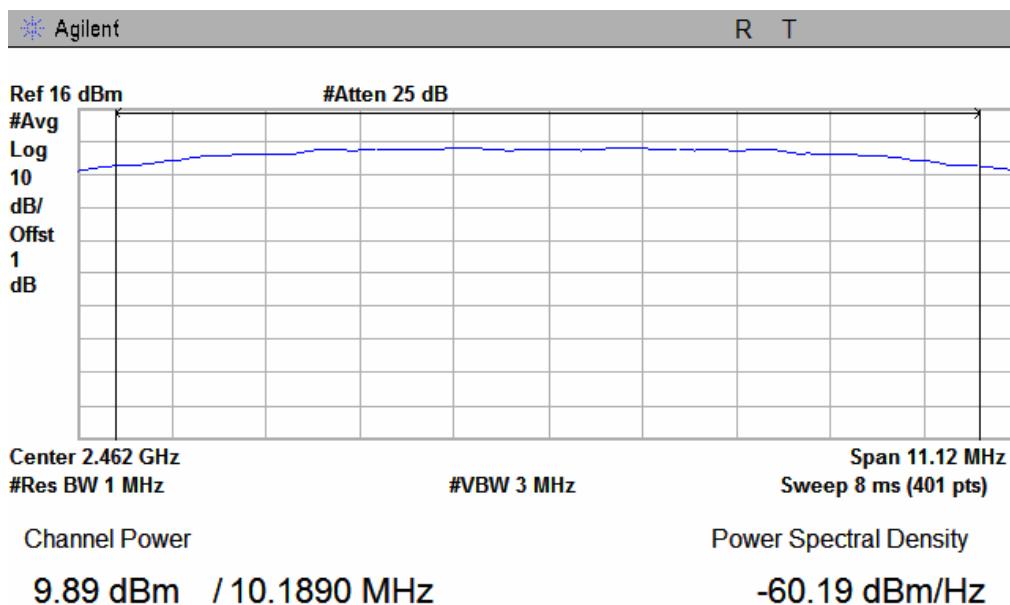
**802.11b Mode:****802.11b PK Output Power, Low Channel****802.11b PK Output Power, Middle Channel**

**802.11b PK Output Power, High Channel****802.11b AVG Output Power, Low Channel**

### 802.11b AVG Output Power, Middle Channel



### 802.11b AVG Output Power, High Channel





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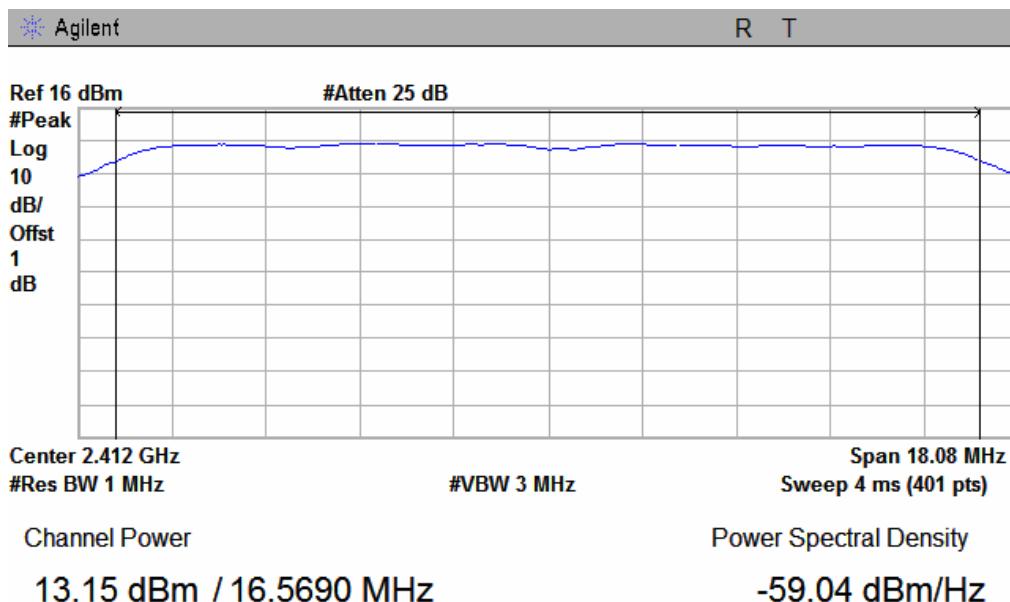
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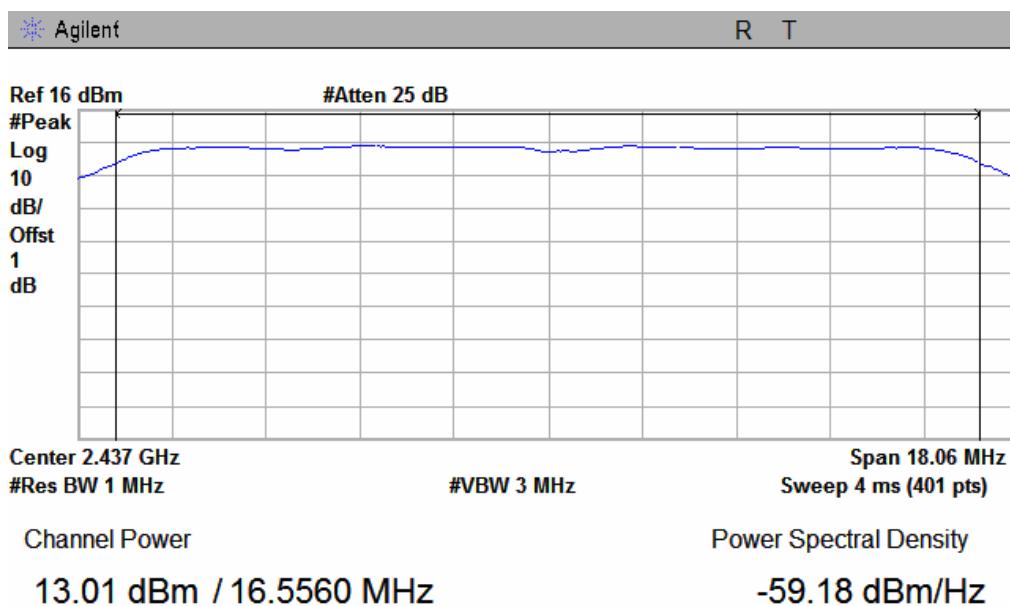
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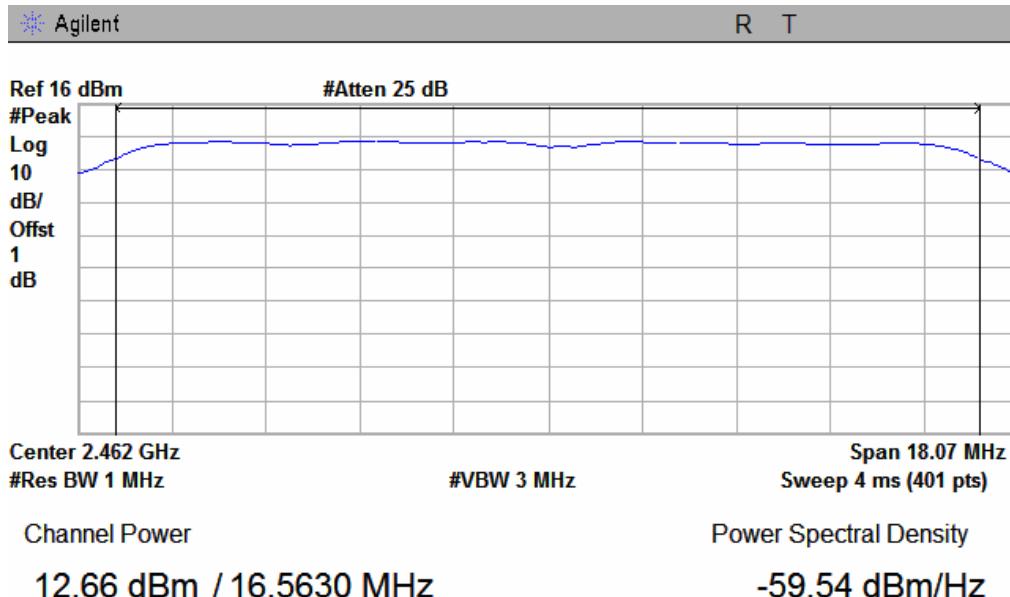
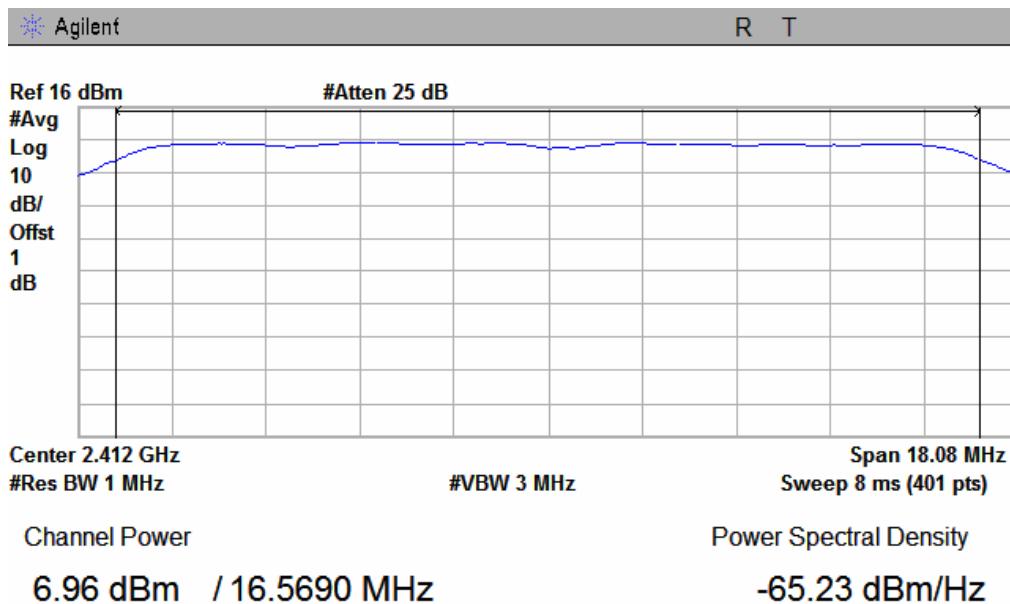
### 802.11g Mode:

#### 802.11g PK Output Power, Low Channel

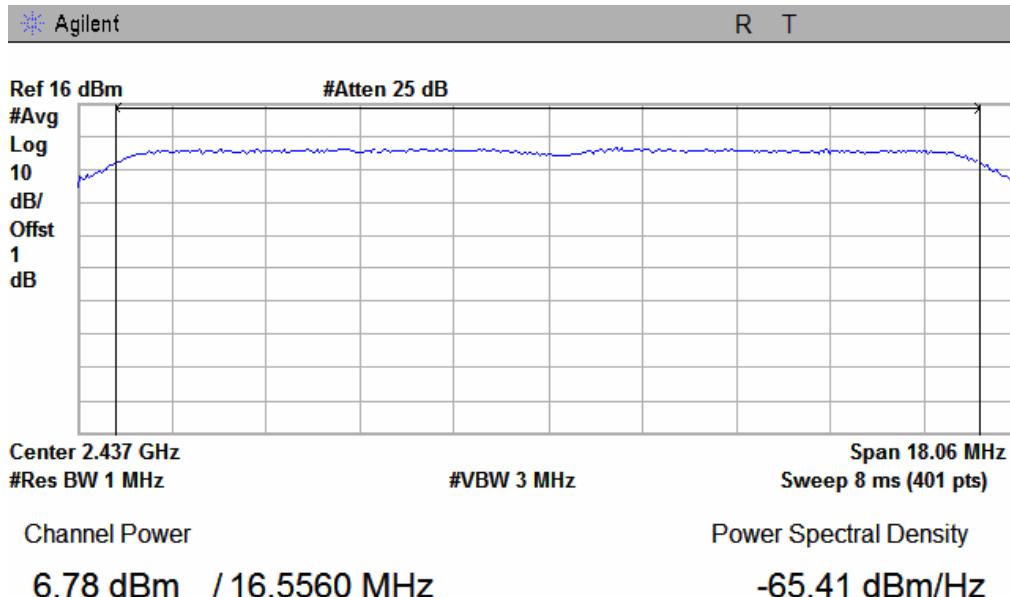


#### 802.11g PK Output Power, Middle Channel

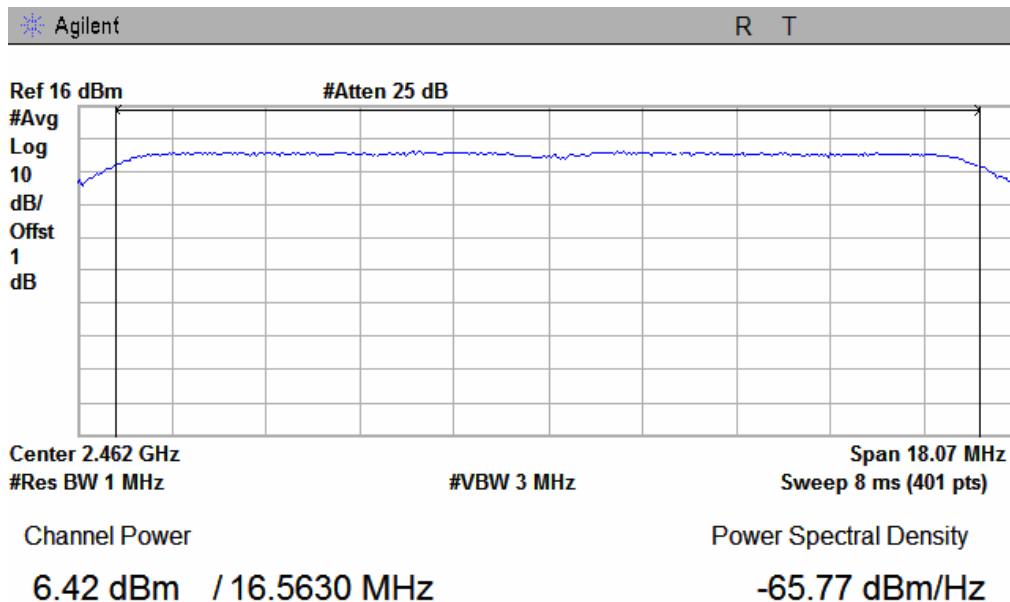


**802.11g PK Output Power, High Channel****802.11g AVG Output Power, Low Channel**

### 802.11g AVG Output Power, Middle Channel



### 802.11g AVG Output Power, High Channel





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## **5.5 §15.247(e) - Power Spectral Density**

### **1. Conducted Measurement**

EUT was set for low, mid, high channel with modulated mode and highest RF output power.

The spectrum analyzer was connected to the antenna terminal.

### **2. Environmental Conditions**

Temperature	22°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

### **3. Conducted Emissions Measurement Uncertainty**

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5$ dB.

### **4. Test date : 24th May, 2012**

Tested By : Back Huang

**Requirement(s):** §15.247(e) specifies a conducted power spectral density (PSD) limit of 8 dBm in any 3 kHz band segment within the fundamental EBW during any time interval of continuous transmission. The same method as used to determine the conducted output power shall be used to determine the power spectral density (i.e., if peak-detected fundamental power was measured then use the peak PSD procedure and if average fundamental power was measured then use the average PSD procedure).

### **Procedures:**

#### **Measurement Procedure PKPSD:**

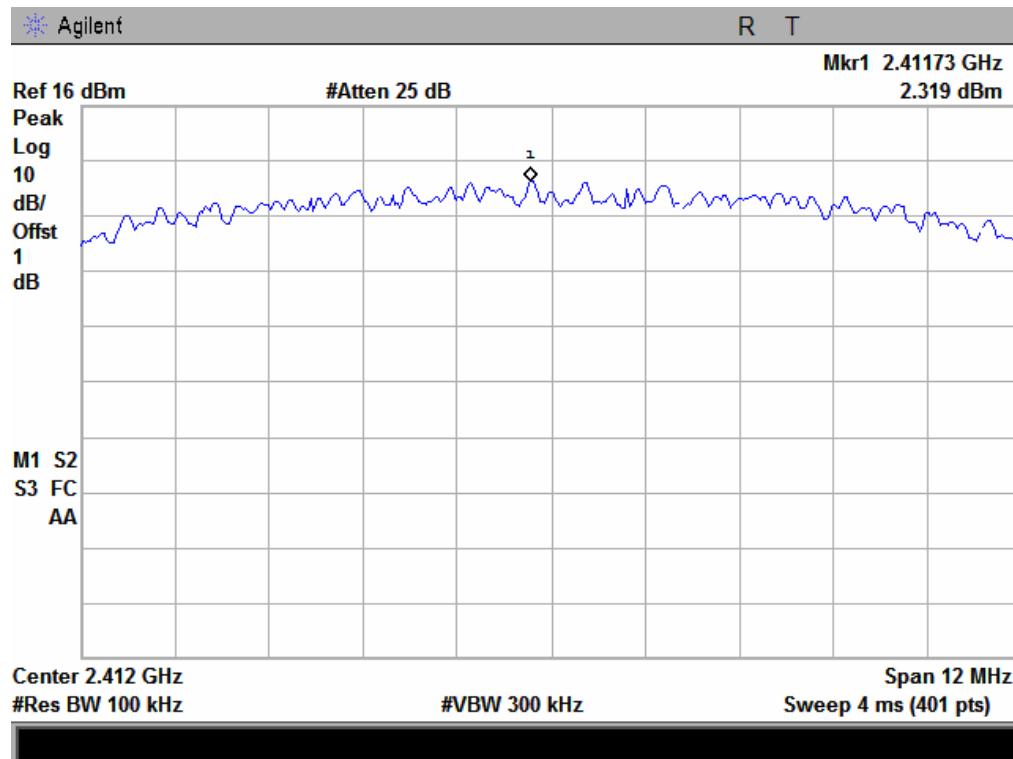
1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW  $\geq 300$  kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF =  $10\log(3\text{ kHz}/100\text{ kHz}) = -15.2$  dB.
11. The resulting peak PSD level must be  $\leq 8$  dBm.

**Test Result: Pass.**

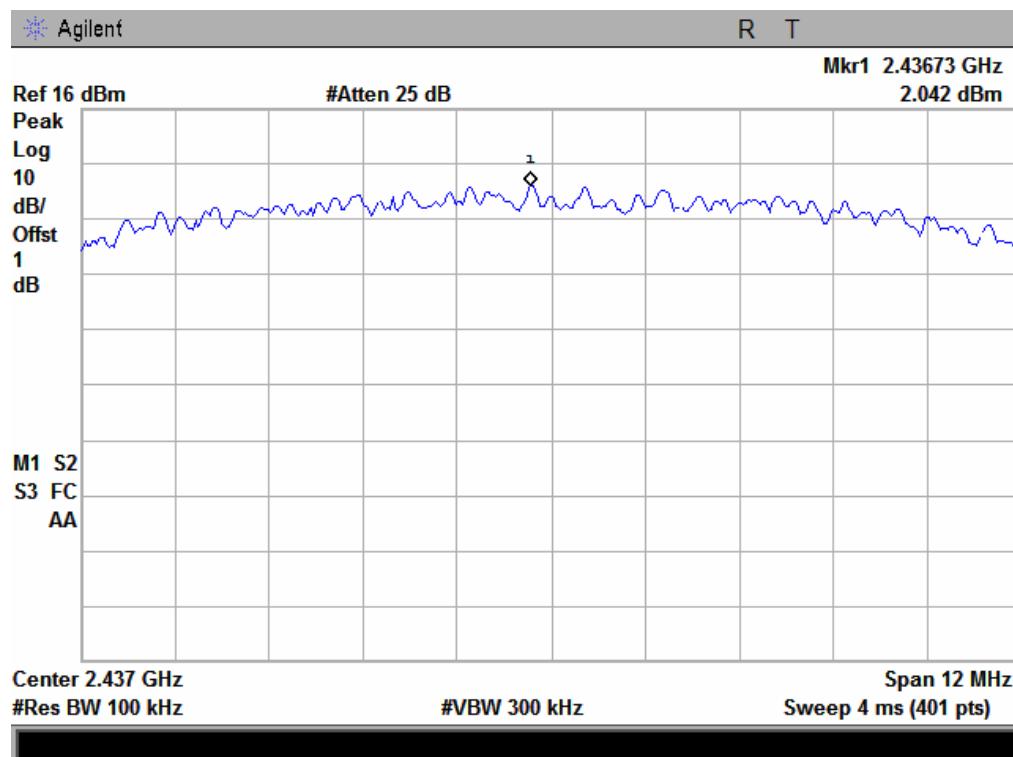
Please refer to the following tables and plots.

Channel	Frequency (MHz)	Data Rate	S.A. Reading (dBm)	BWCF (dB)	PSD (dBm)	Limit (dBm)
802.11b mode						
Low	2412	1	2.319	-15.2	-12.881	8
Middle	2437	1	2.042	-15.2	-13.158	8
High	2462	1	1.672	-15.2	-13.528	8
802.11g mode						
Low	2412	6	-5.831	-15.2	-21.031	8
Middle	2437	6	-6.029	-15.2	-21.229	8
High	2462	6	-6.480	-15.2	-21.680	8

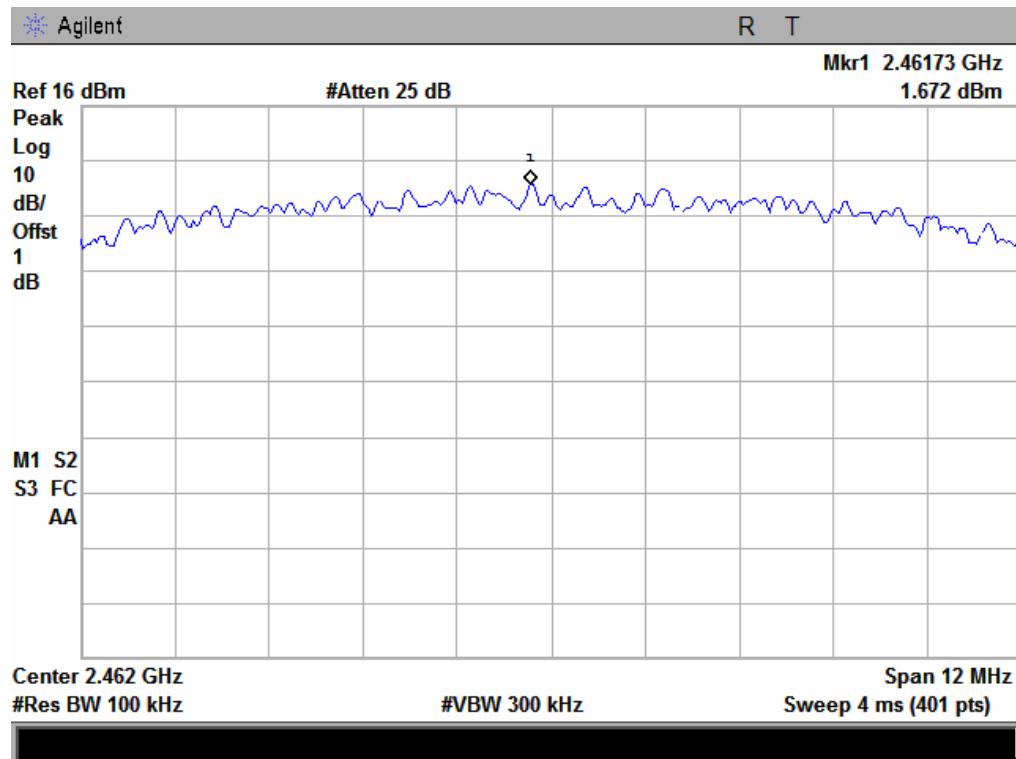
### Power Spectral Density, 802.11b Low Channel



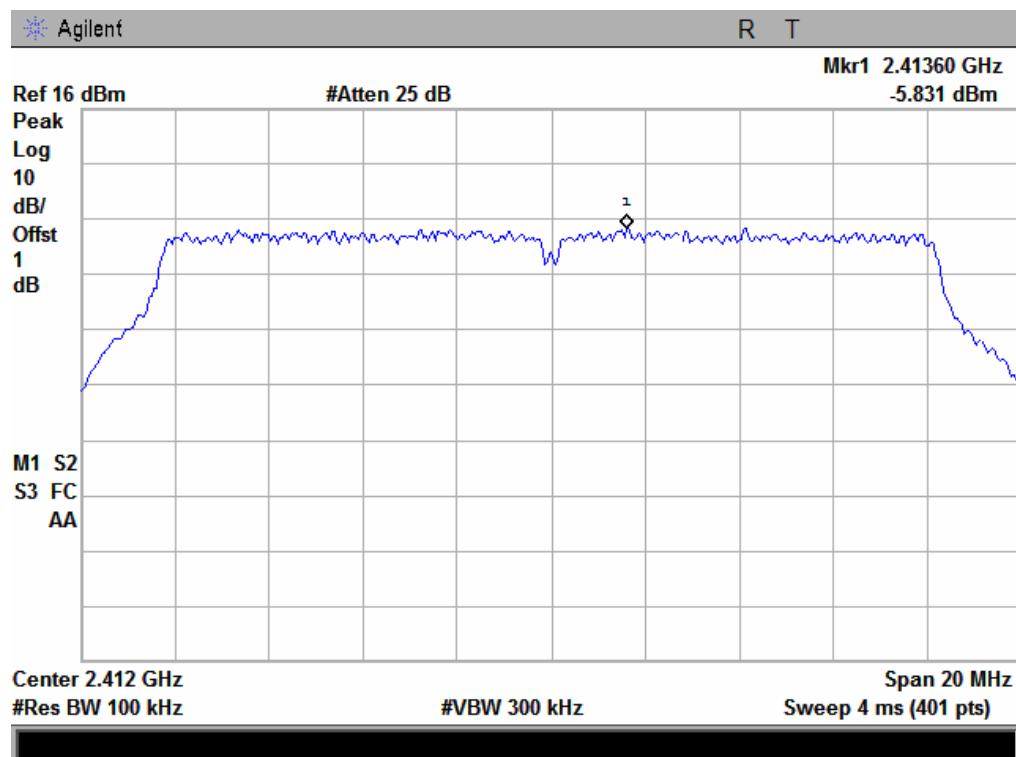
### Power Spectral Density, 802.11b Middle Channel



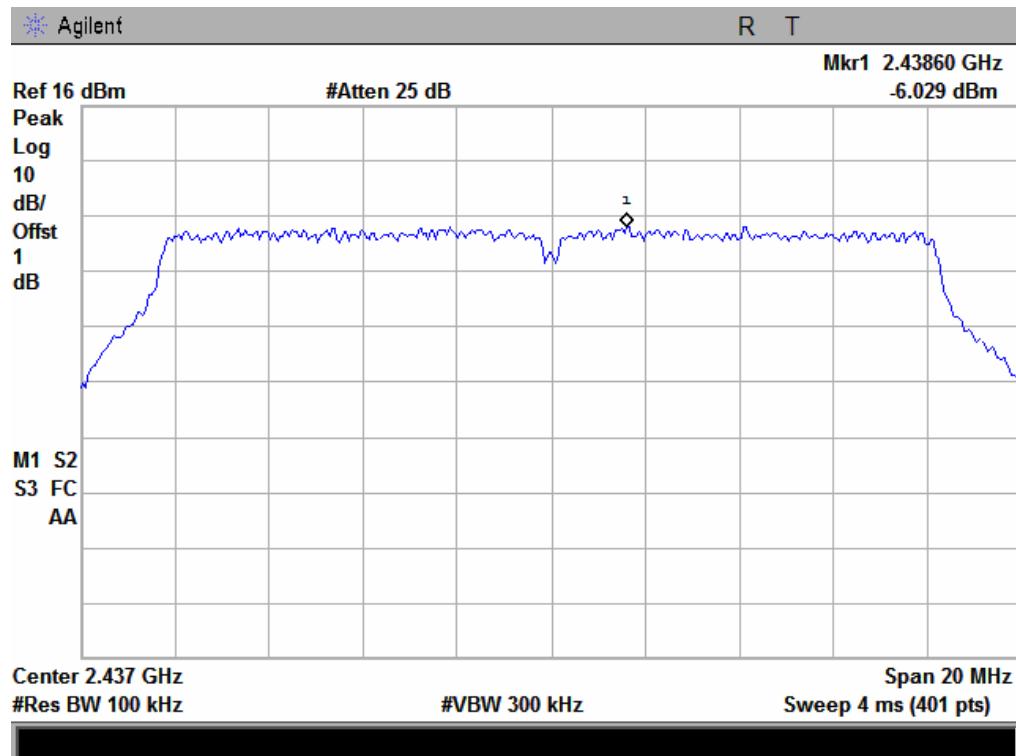
### Power Spectral Density, 802.11b High Channel



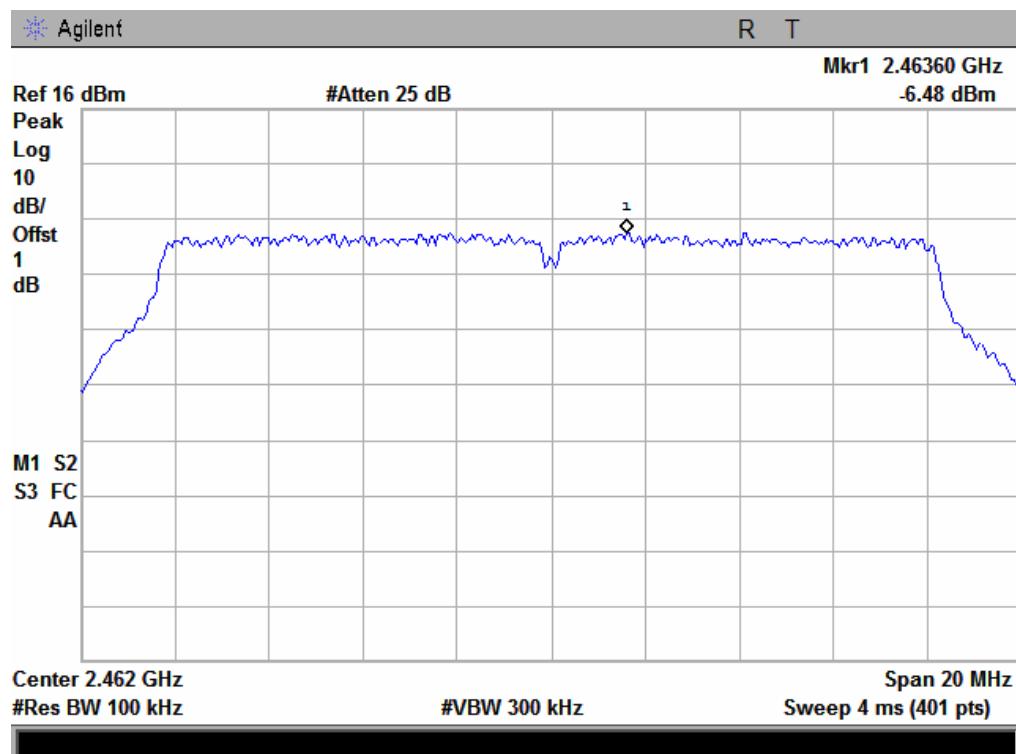
### Power Spectral Density, 802.11g Low Channel



### Power Spectral Density, 802.11g Middle Channel



### Power Spectral Density, 802.11g High Channel





## **5.6 §15.247(d) –Band Edge & Conducted Spurious Emissions**

1. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))
2. Environmental Conditions 

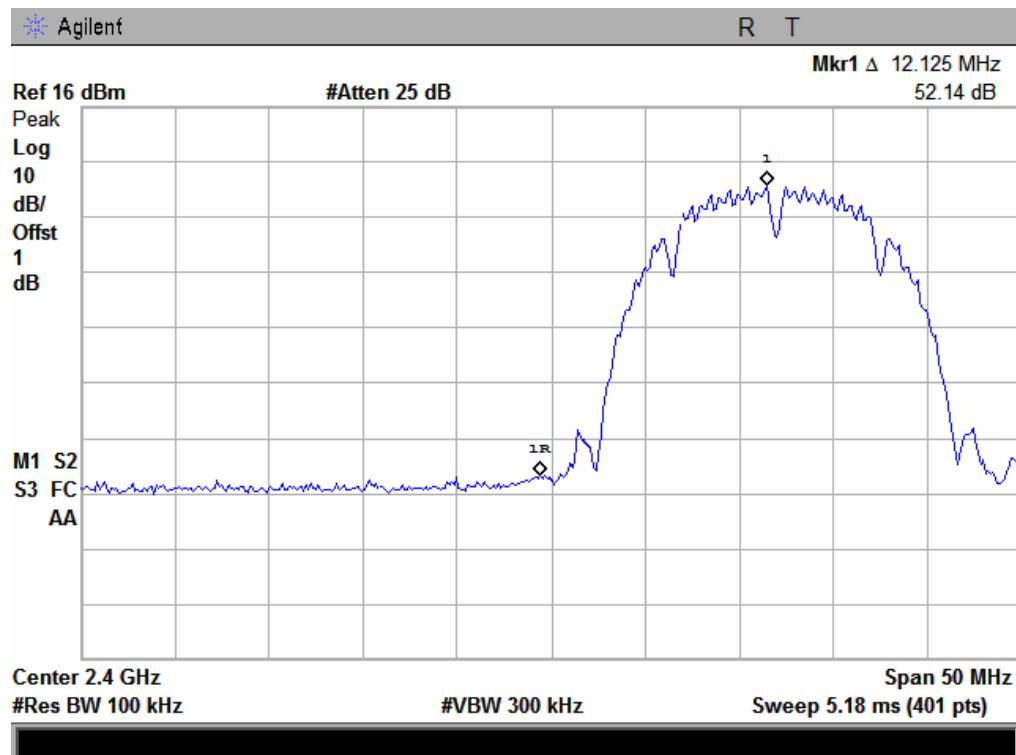
Temperature	16oC
Relative Humidity	50%
Atmospheric Pressure	1019mbar
3. Test date : 24th May, 2012  
Tested By : Back Huang

**Test Result: Pass.**

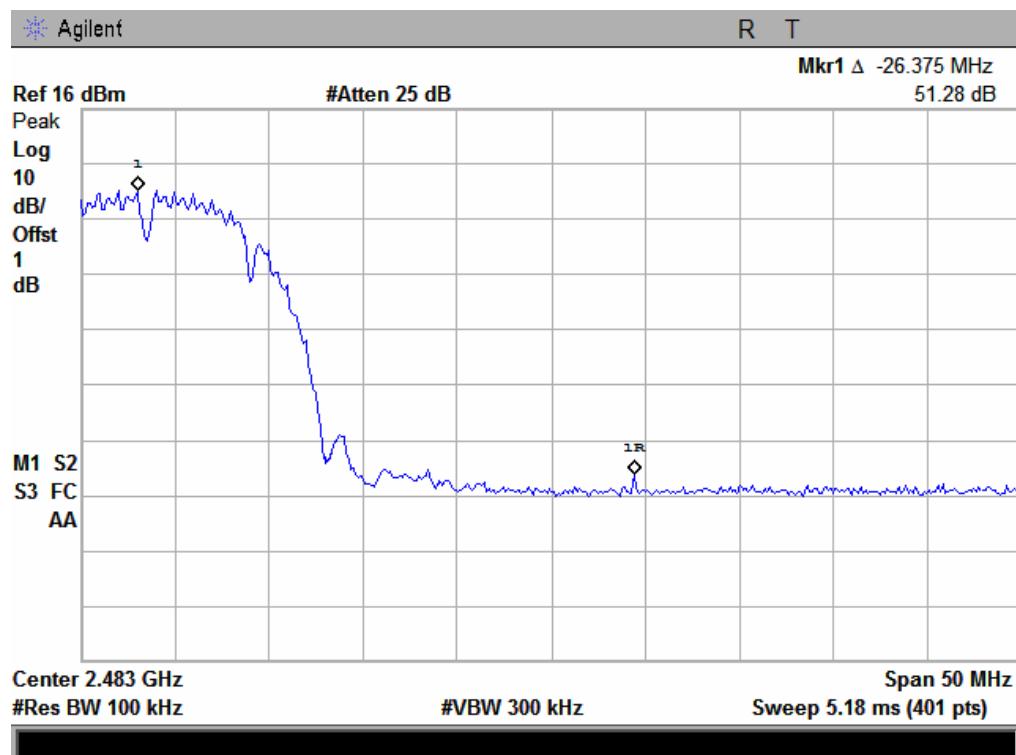
Please refer to the following tables and plots.

<b>Band Edge</b>	<b>Delta Peak to band emission (dB)</b>	<b>Limit (dB)</b>
802.11b mode		
Left Side	52.14	20
Right Side	51.28	20
802.11g mode		
Left Side	40.77	20
Right Side	44.84	20

### 802.11b: Band Edge, Left Side



### 802.11b: Band Edge, Right Side

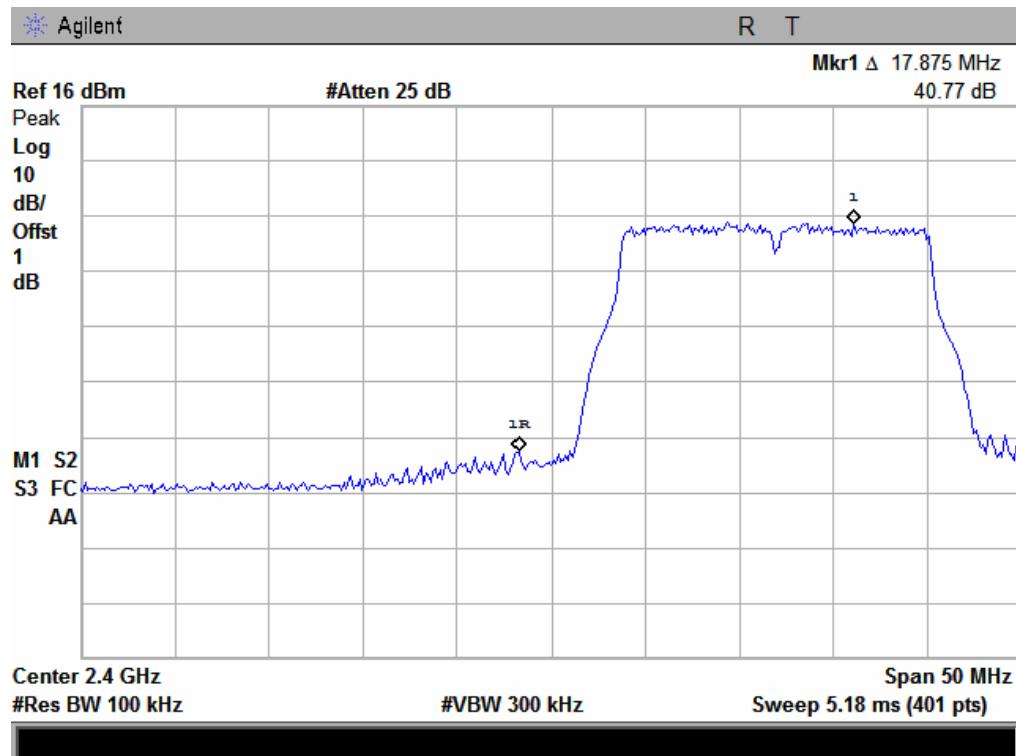
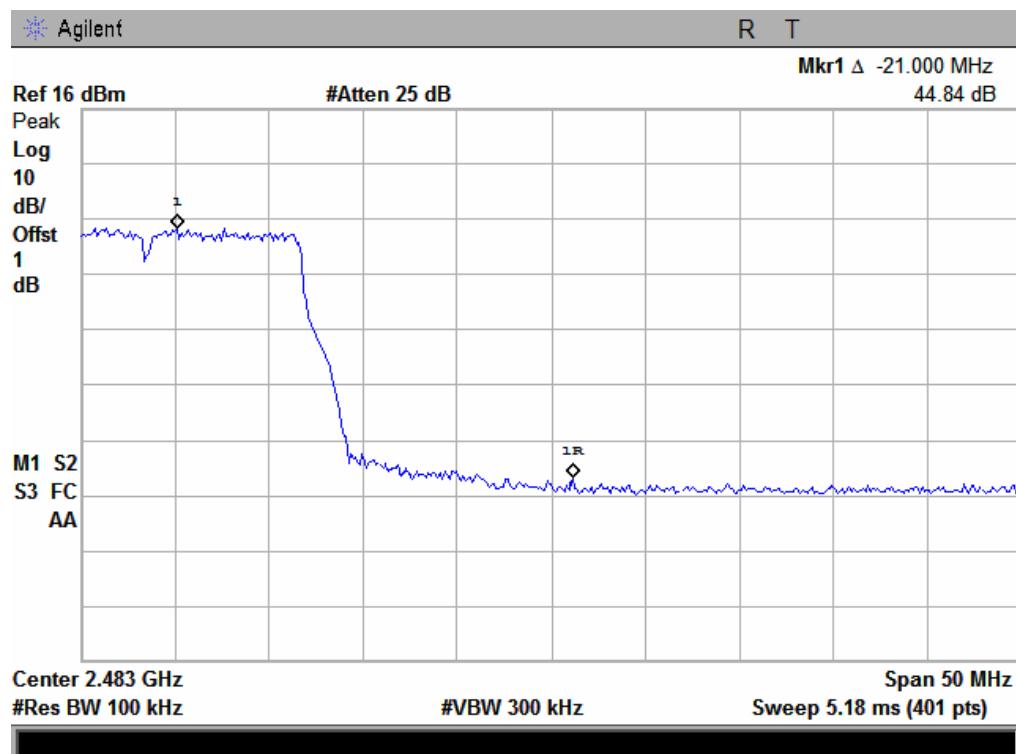


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Model: A5  
To: FCC Part 15.247: 2012 (KDB 558074)

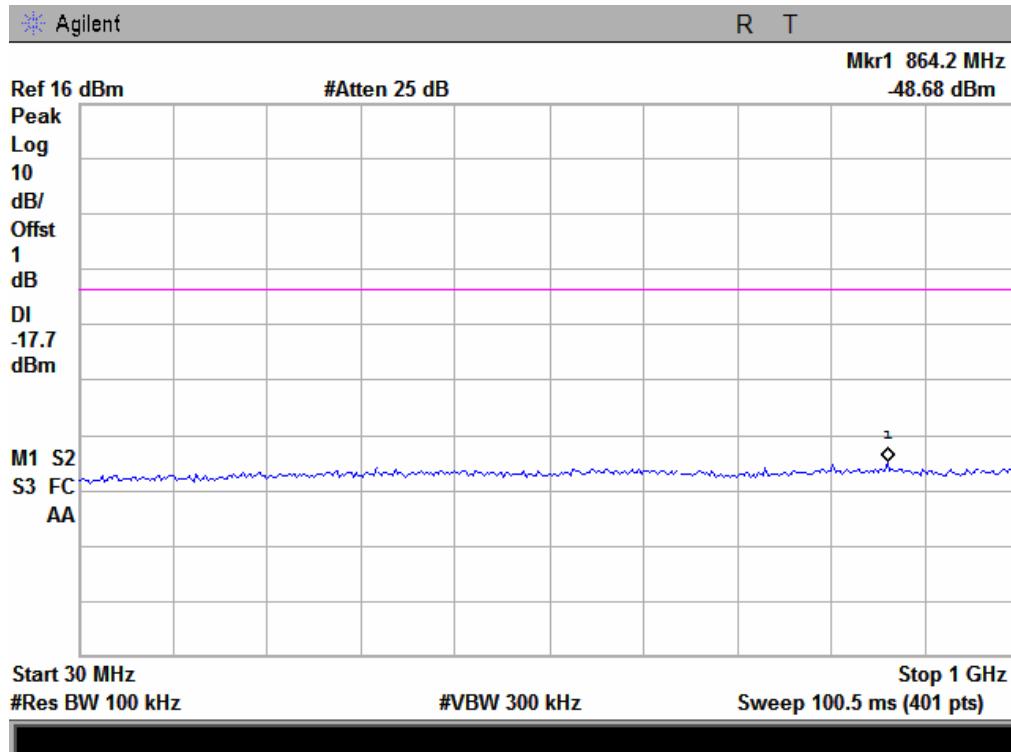
Serial#: 12050037-FCC-R3  
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**802.11g: Band Edge, Left Side****802.11g: Band Edge, Right Side**

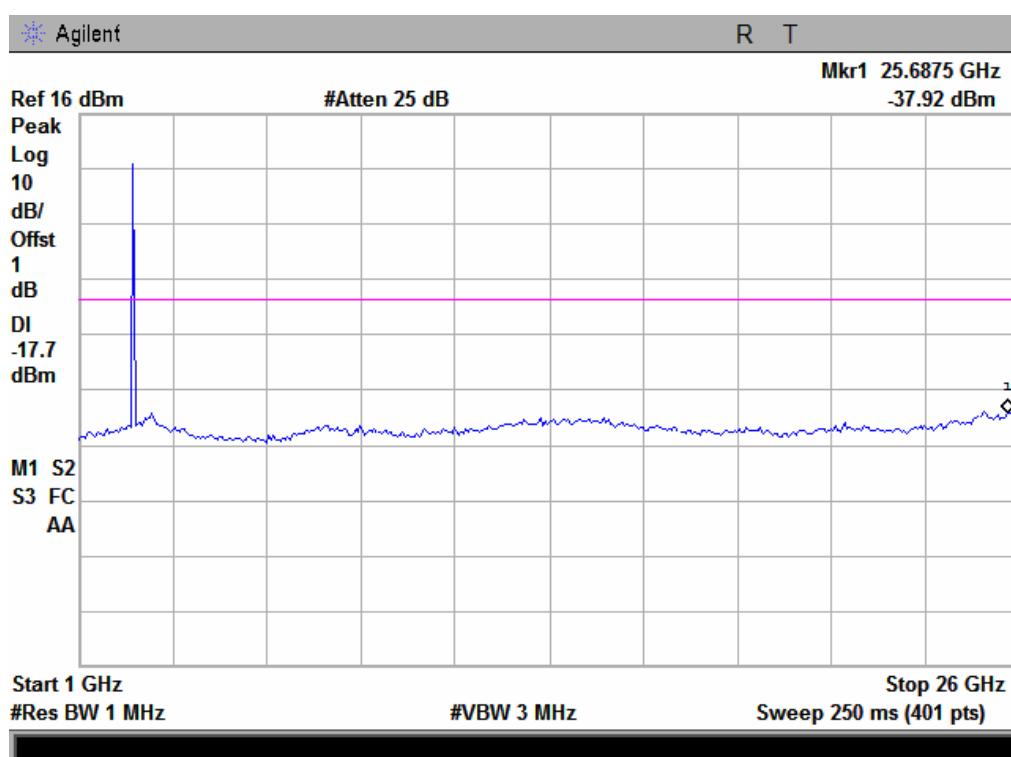
## Antenna Port Conducted Spurious Emissions

Please refer to the following plots.

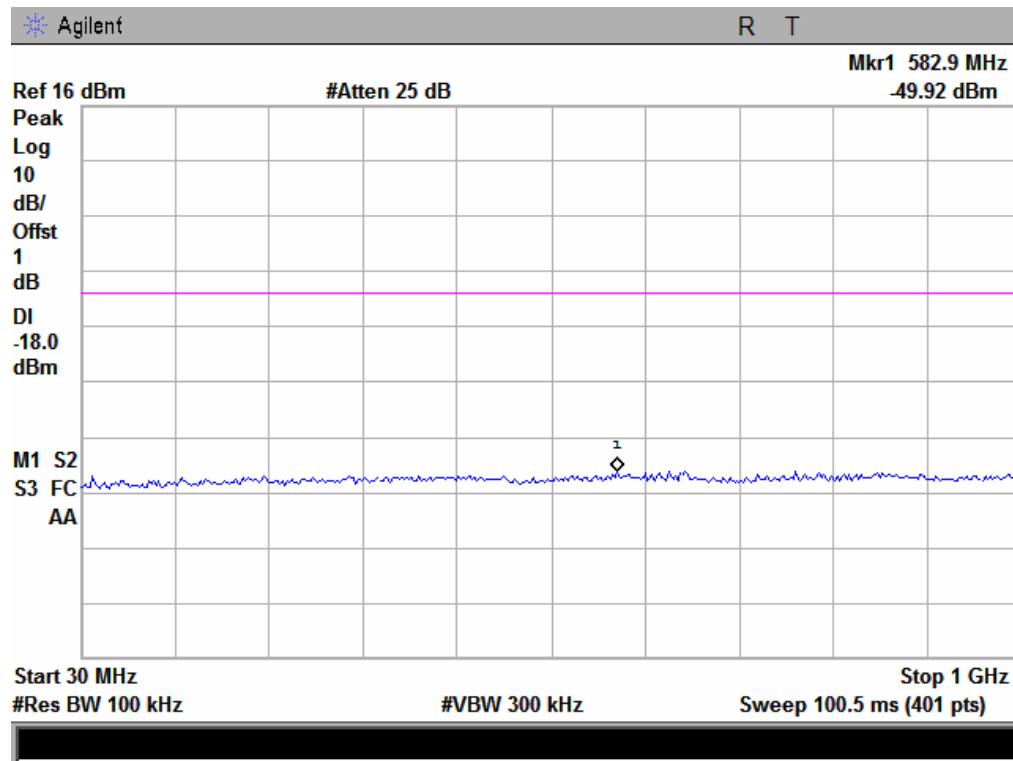
### 802.11b Low Channel Below 1G



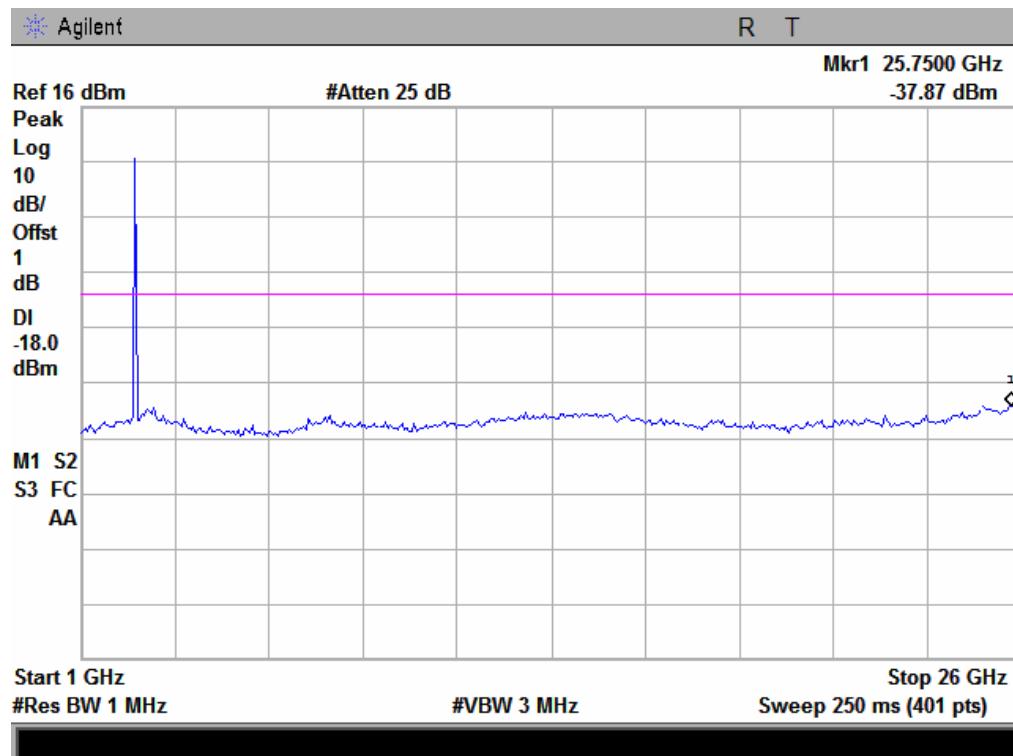
### 802.11b Low Channel Above 1G



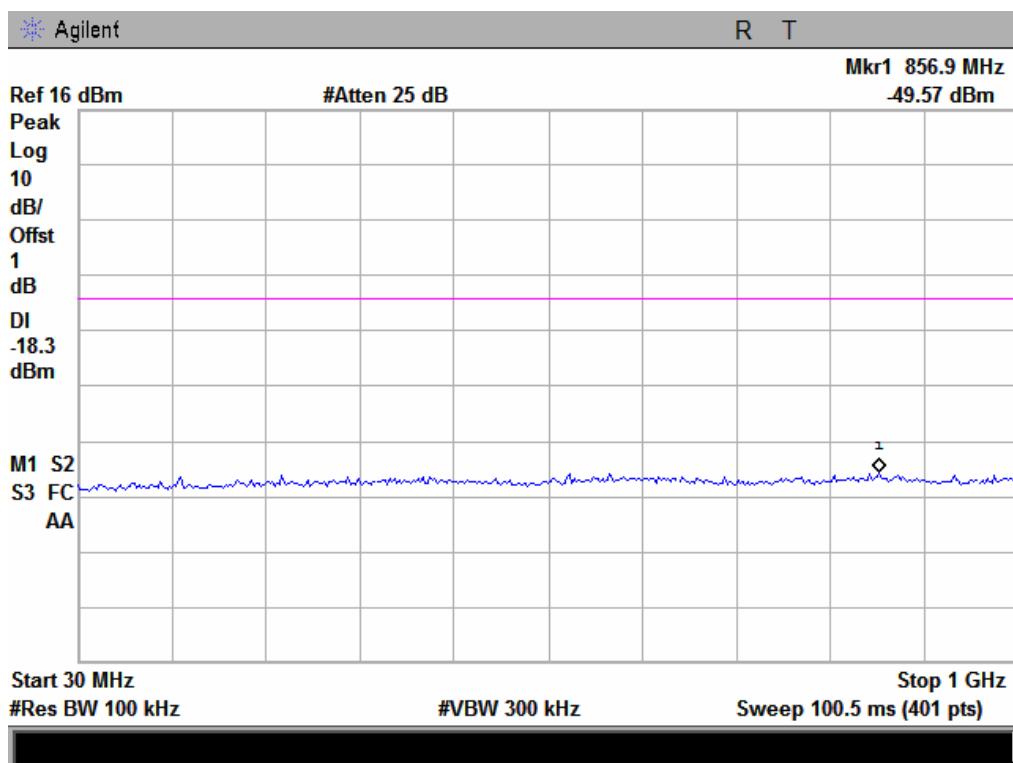
### 802.11b Middle Channel Below 1G



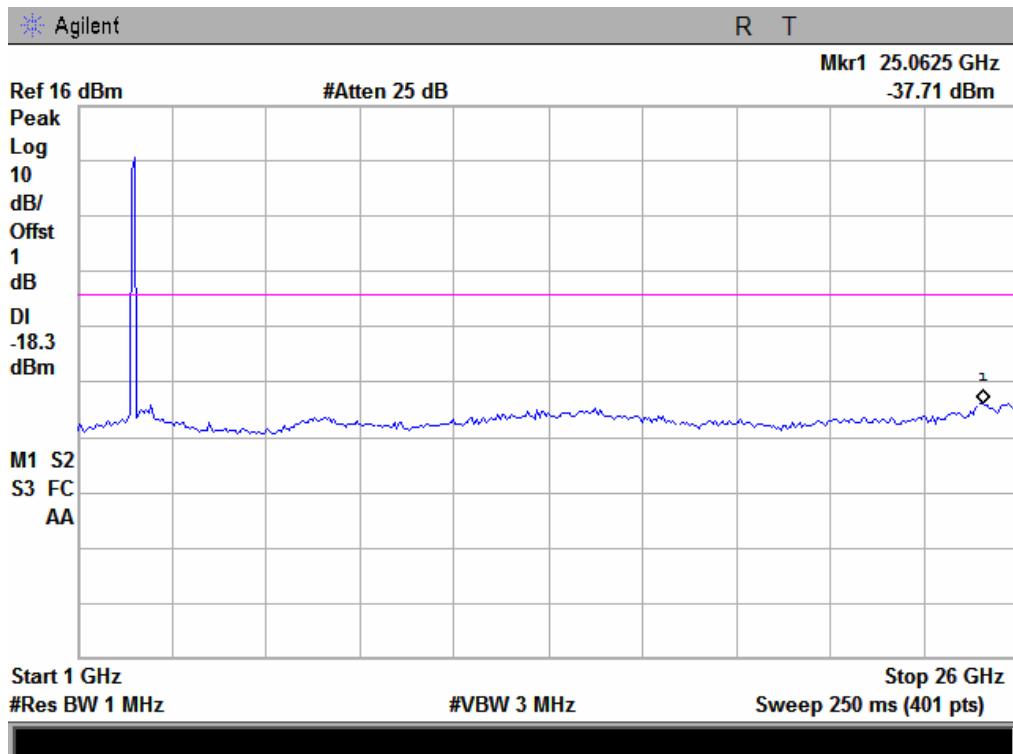
### 802.11b Middle Channel Above 1G



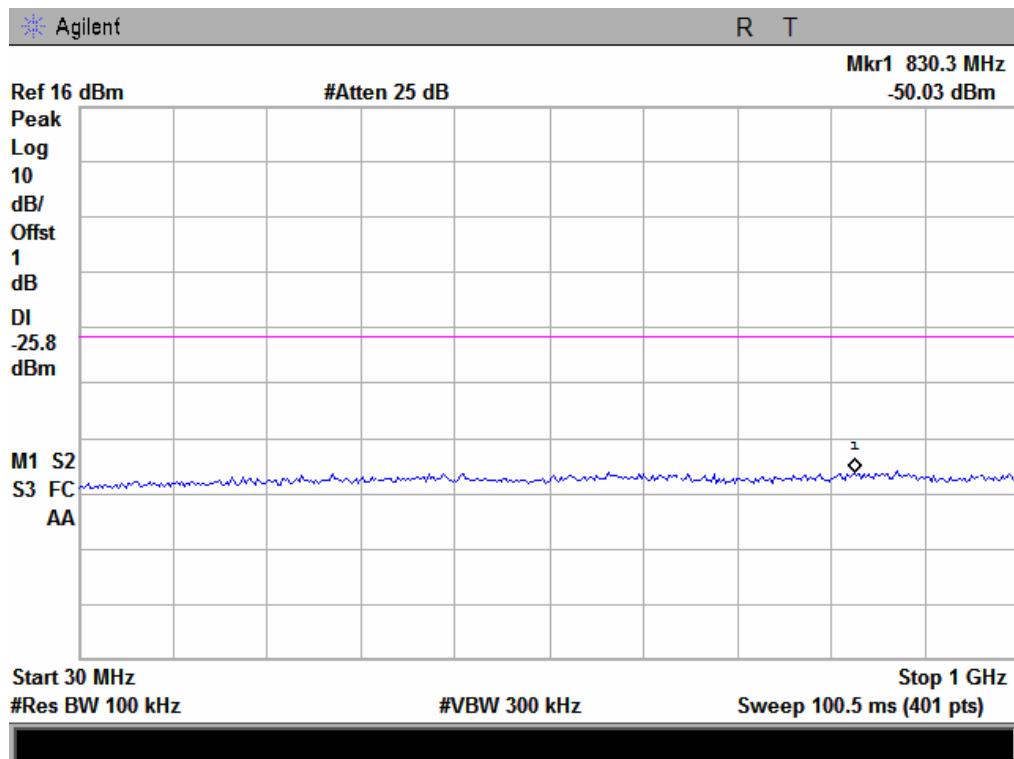
### 802.11b High Channel Below 1G



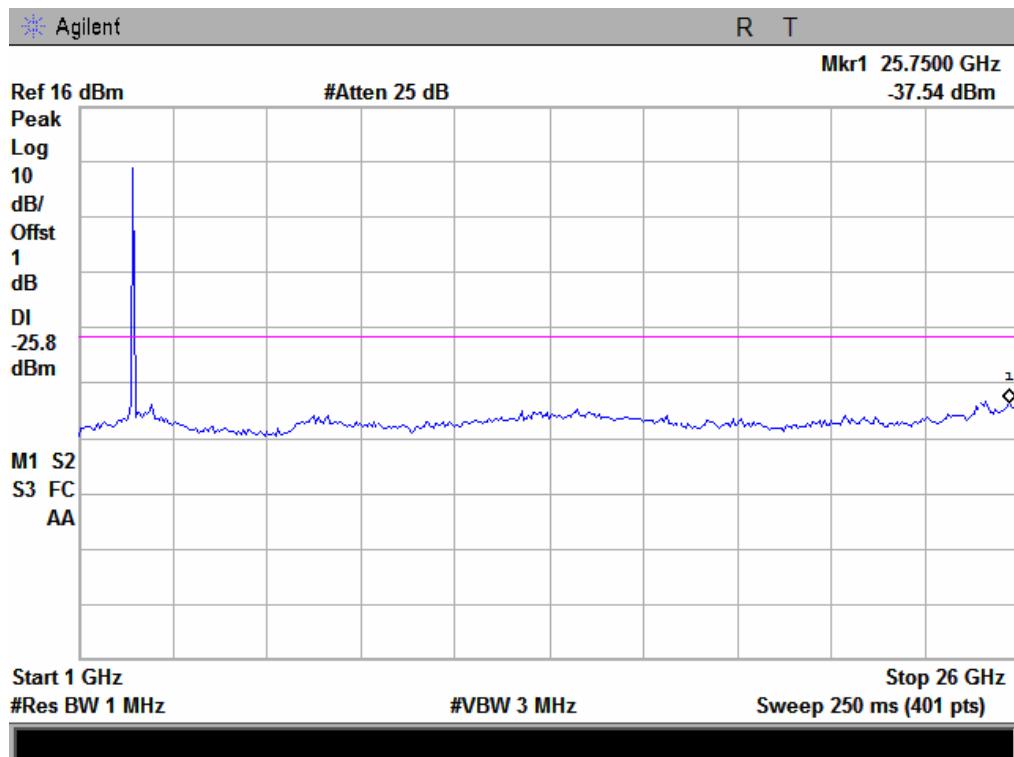
### 802.11b High Channel Above 1G



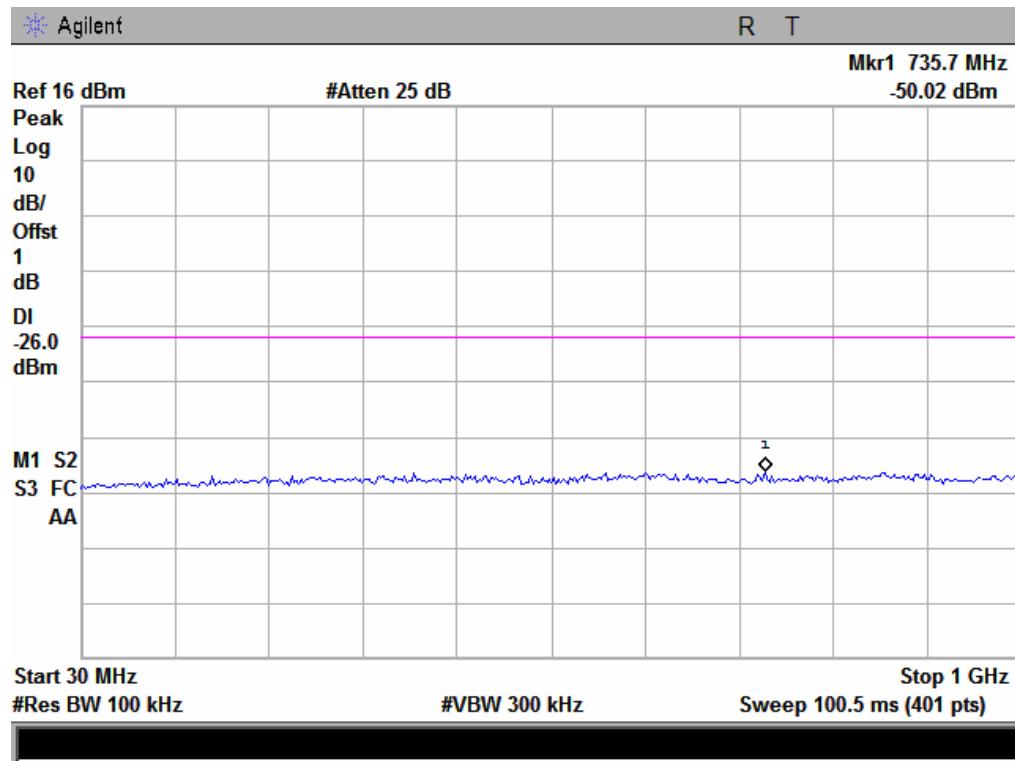
### 802.11g Low Channel Below 1G



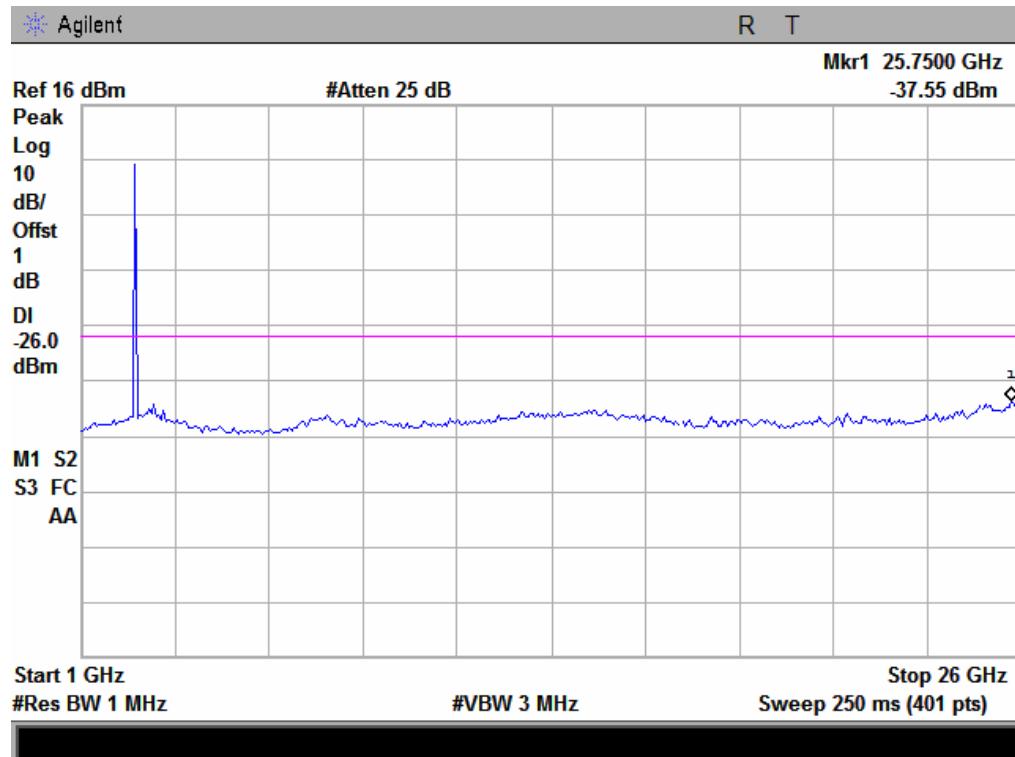
### 802.11g Low Channel Above 1G



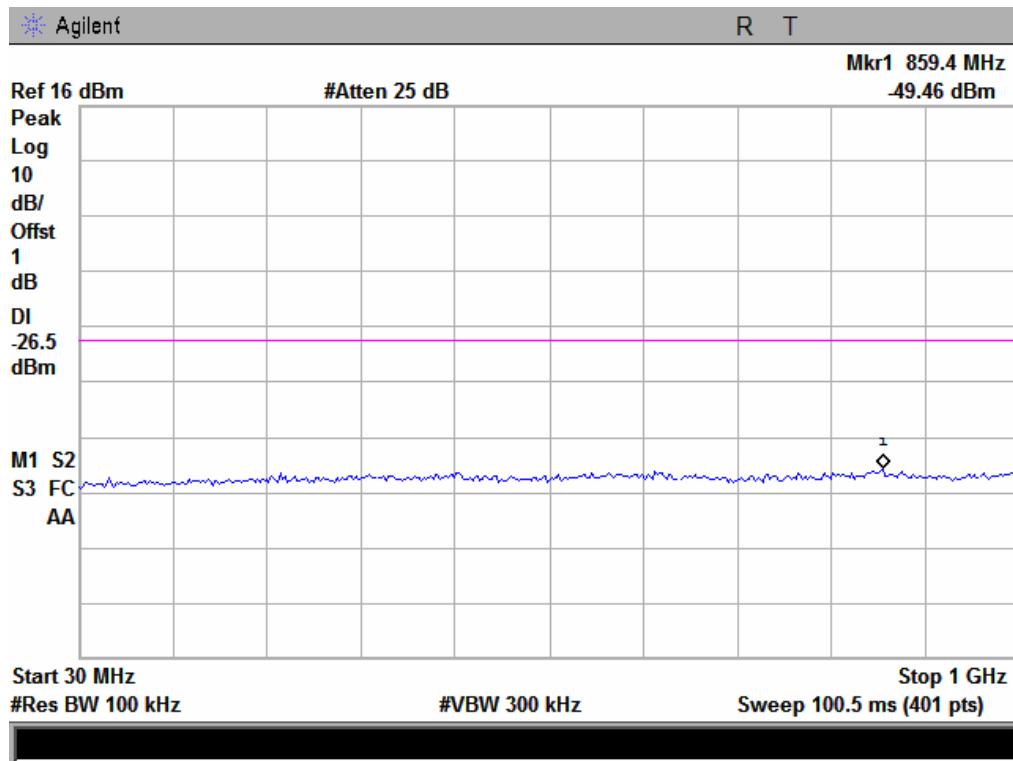
### 802.11g Middle Channel Below 1G



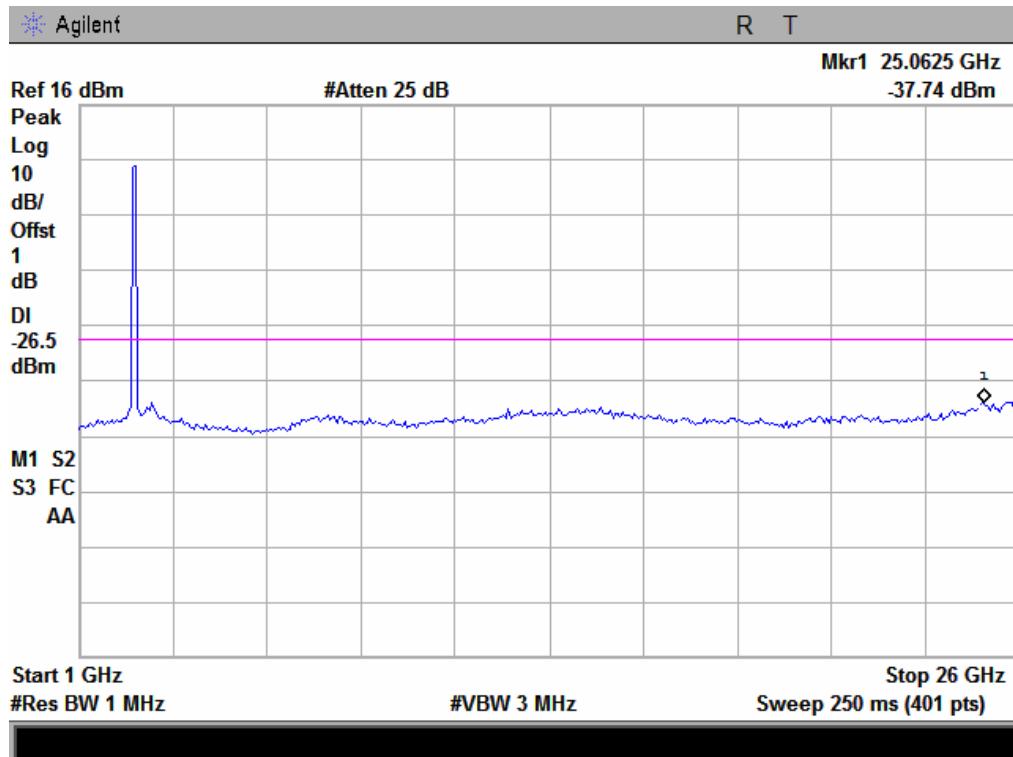
### 802.11g Middle Channel Above 1G



### 802.11g High Channel Below 1G



### 802.11g High Channel Above 1G





## **5.7 §15.207 (a) - AC Power Line Conducted Emissions**

Requirement:

<b>Frequency of emission (MHz)</b>	<b>Conducted limit (dB<math>\mu</math>V)</b>	
	<b>Quasi-peak</b>	<b>Average</b>
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

\*Decreases with the logarithm of the frequency.

### **Procedures:**

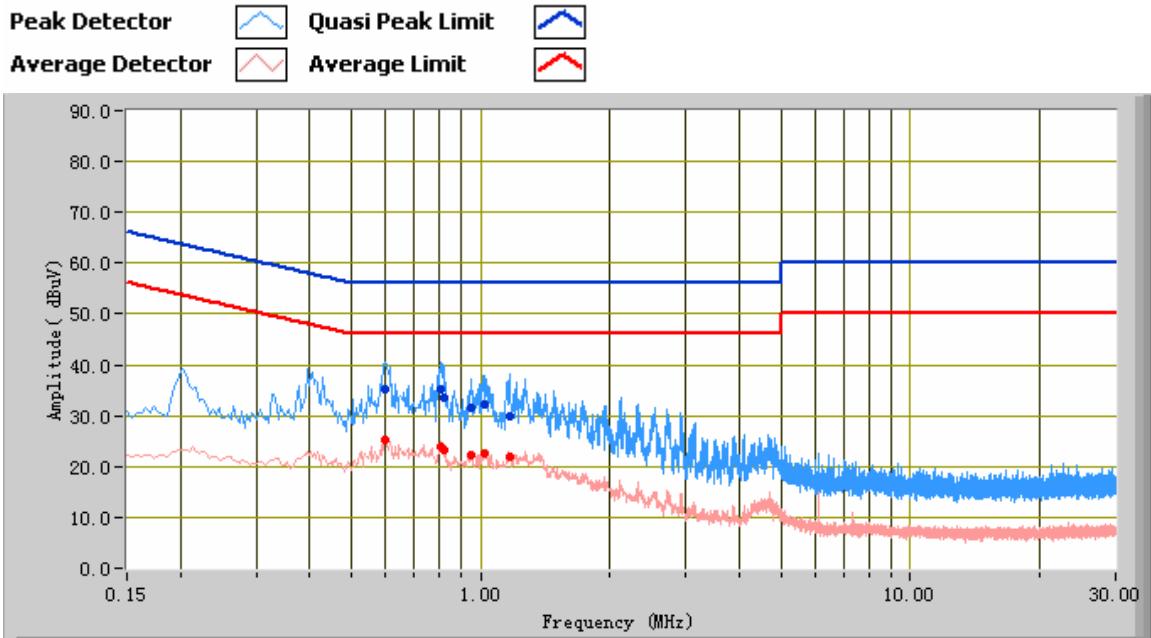
1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is  $\pm 3.5$ dB.
4. Environmental Conditions      Temperature      22°C  
    Relative Humidity      50%  
    Atmospheric Pressure      1019mbar
5. Test date : 25th May, 2012  
Tested By : Back Huang

**SIEMIC, INC.**

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Model: A5  
To: FCC Part 15.247: 2012 (KDB 558074)

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*Test Mode: Transmitting (worst case)***Mode:802.11b****Test Data****Line**

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Factors (dB)
0.81	35.26	56.00	-20.74	23.82	46.00	-22.18	10.16
0.60	35.27	56.00	-20.73	25.21	46.00	-20.79	10.15
0.82	33.56	56.00	-22.44	23.24	46.00	-22.76	10.16
1.17	29.82	56.00	-26.18	21.76	46.00	-24.24	10.17
1.02	32.21	56.00	-23.79	22.53	46.00	-23.47	10.16
0.95	31.41	56.00	-24.59	22.26	46.00	-23.74	10.16

Peak Detector



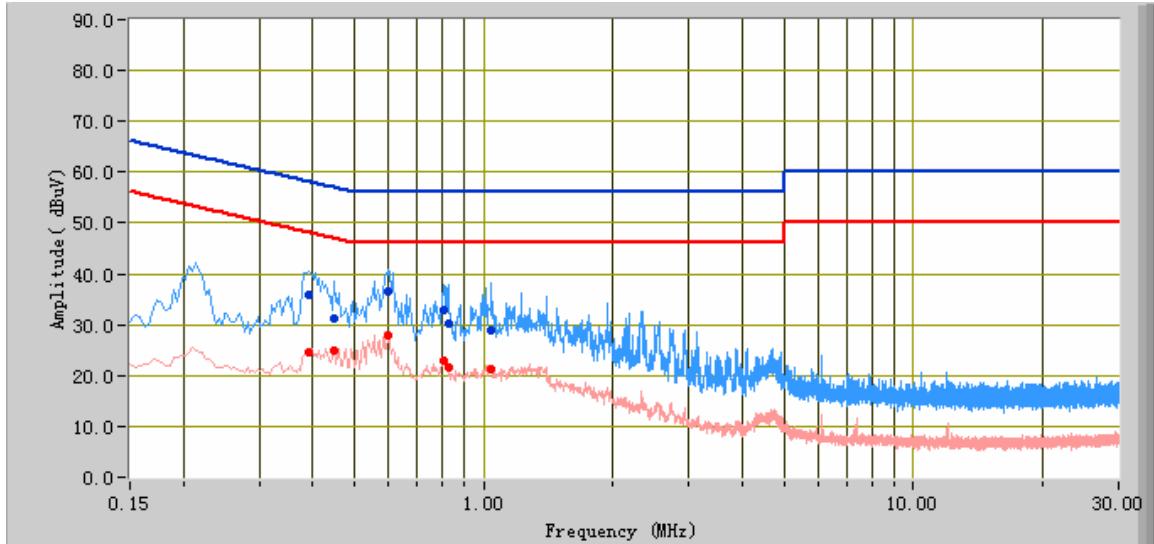
Quasi Peak Limit



Average Detector



Average Limit



### Test Data

#### Neutral

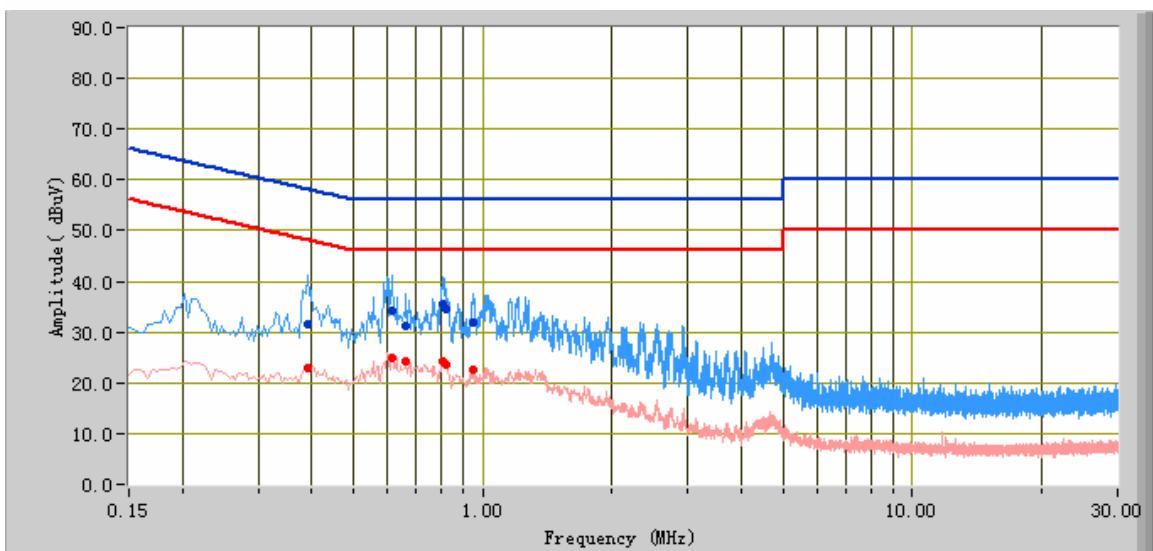
Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Factors (dB)
0.60	36.49	56.00	-19.51	27.74	46.00	-18.26	10.15
0.39	35.74	58.10	-22.36	24.62	48.10	-23.48	10.17
1.04	28.86	56.00	-27.14	21.16	46.00	-24.84	10.16
0.81	32.77	56.00	-23.23	22.97	46.00	-23.03	10.16
0.83	30.30	56.00	-25.70	21.63	46.00	-24.37	10.16
0.45	31.33	56.96	-25.64	24.99	46.96	-21.97	10.17

### Mode:802.11g

Peak Detector

 Quasi Peak Limit

Average Detector

 Average Limit


### Test Data

#### Line

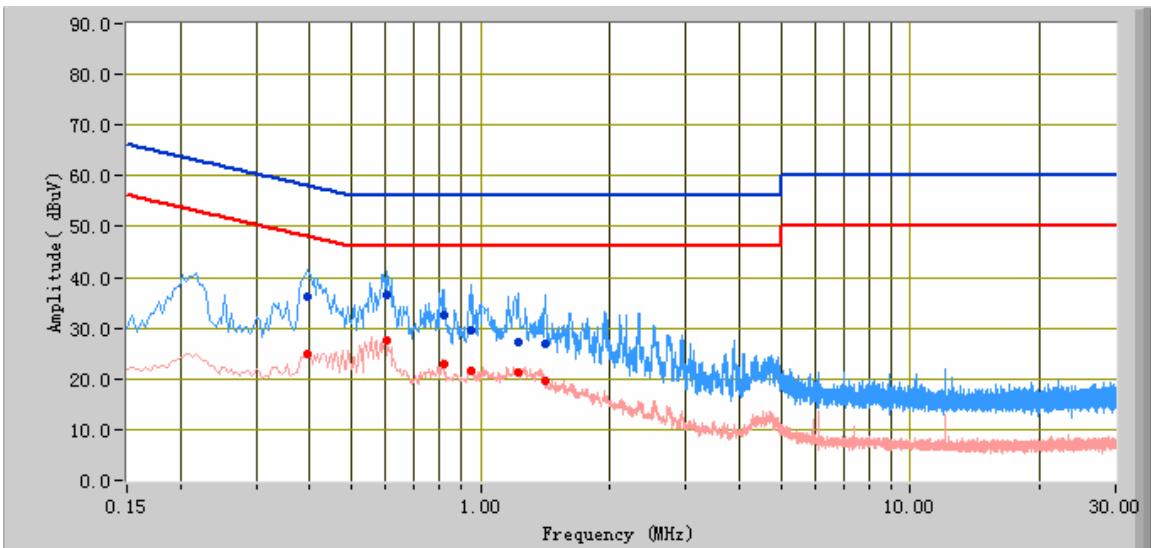
Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Factors (dB)
0.61	34.19	56.00	-21.81	25.04	46.00	-20.96	10.14
0.81	35.42	56.00	-20.58	24.11	46.00	-21.89	10.16
0.39	31.63	58.10	-26.46	23.01	48.10	-25.09	10.17
0.82	34.39	56.00	-21.61	23.60	46.00	-22.40	10.16
0.66	31.19	56.00	-24.81	24.29	46.00	-21.71	10.13
0.95	31.88	56.00	-24.12	22.43	46.00	-23.57	10.16

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**Peak Detector** **Quasi Peak Limit**  
 **Average Limit****Average Detector****Test Data***Neutral*

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Factors (dB)
0.60	36.62	56.00	-19.38	27.45	46.00	-18.55	10.15
0.39	36.06	58.01	-21.96	24.84	48.01	-23.18	10.17
0.95	29.61	56.00	-26.39	21.65	46.00	-24.35	10.16
0.82	32.50	56.00	-23.50	22.93	46.00	-23.07	10.16
1.22	27.10	56.00	-28.90	21.29	46.00	-24.71	10.17
1.41	27.03	56.00	-28.97	19.53	46.00	-26.47	10.18



## **5.8 §15.209, §15.205 & §15.247(d) - Radiated Spurious Emissions & Restricted Bands**

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz & 1GHz above ( 3m & 10m) is +/-6dB.
4. 

Environmental Conditions	Temperature	22°C
	Relative Humidity	50%
	Atmospheric Pressure	1019mbar
5. 

Test date : 26th May, 2012  
Tested By : Back Huang

**Standard Requirement:** The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.

## Test Result: Pass



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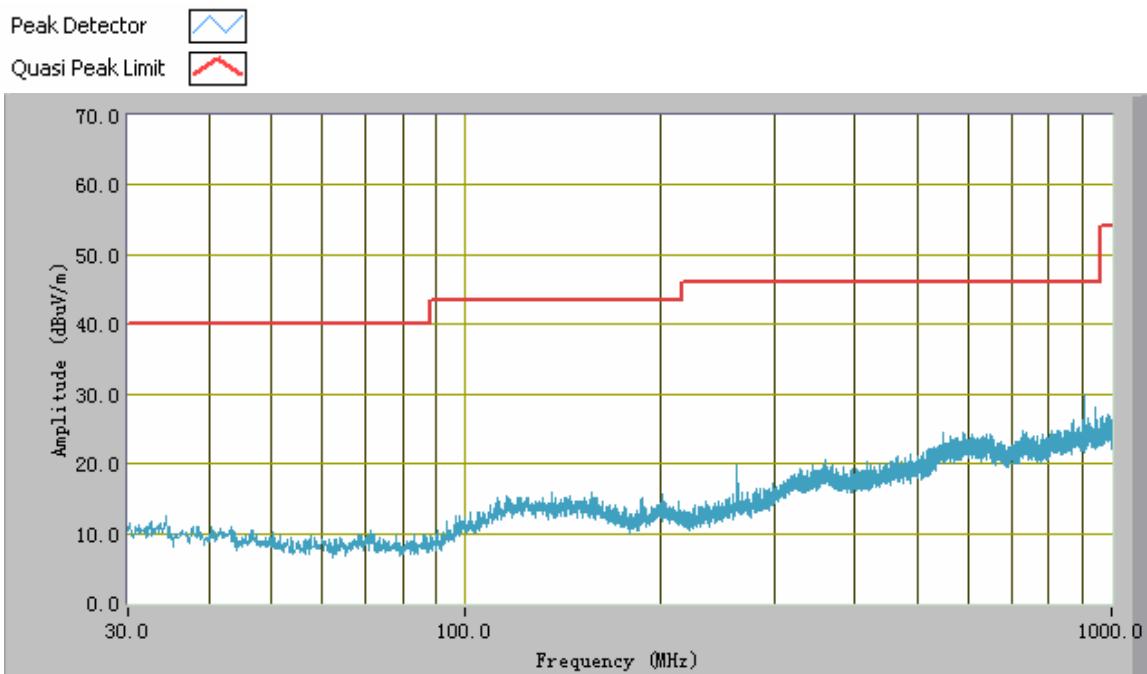
Title: RF Test Report for Mobile Phone  
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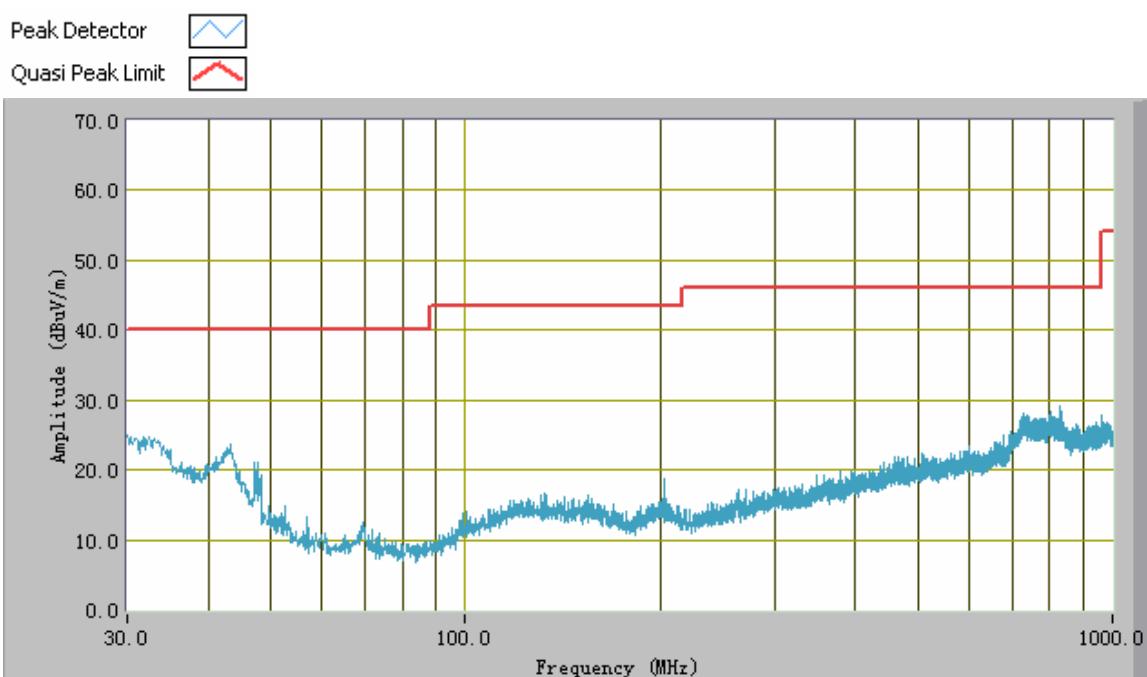
## 30-1000 MHz:

*Test Mode: Transmitting*

**Mode: 802.11b**

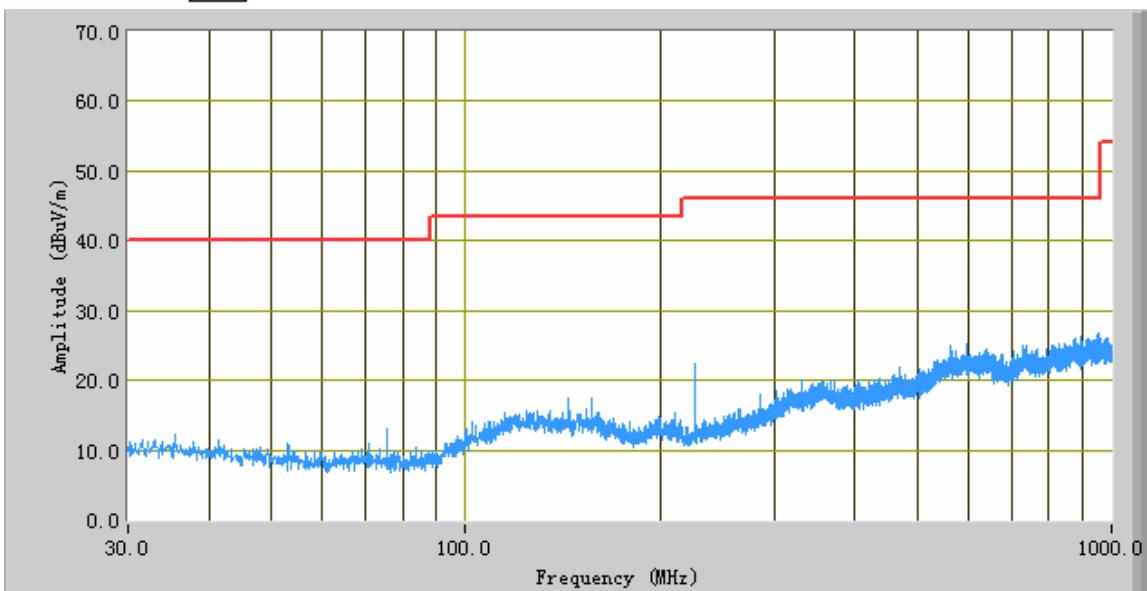
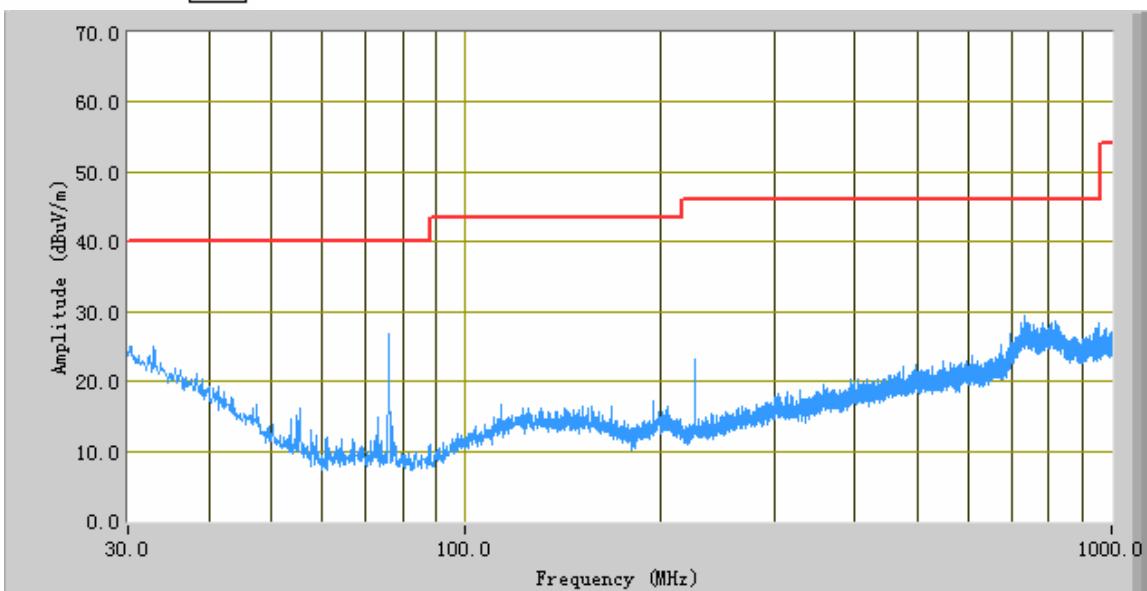


**Polarity Horizontal**



**Polarity Vertical**

*Note: The data of peak detector is much smaller than the limit, so the data was not recorded.*

**Mode: 802.11g**Peak Detector Quasi Peak Limit **Polarity Horizontal**Peak Detector Quasi Peak Limit **Polarity Vertical**

*Note: The data of peak detector is much smaller than the limit, so the data was not recorded.*

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**Above 1 GHz:***Test Mode: Transmitting***Note: Other modes were verified, only the result of worst case basic rate mode was presented.****Mode: 802.11b****Low Channel (2412 MHz)**

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
4824	39.43	AV	154	1.1	V	34.0	2.6	26.79	49.24	54	-4.76
4824	37.65	AV	140	1.2	H	33.8	2.6	26.79	47.26	54	-6.74
4824	52.31	PK	154	1.1	V	34.0	2.6	26.79	62.12	74	-11.88
4824	50.73	PK	140	1.2	H	33.8	2.6	26.79	60.34	74	-13.66
1155.36	33.32	AV	185	1.1	V	25.3	1.2	26.51	33.31	54	-20.69
1155.36	33.13	AV	125	1.1	H	23.8	1.2	26.51	31.62	54	-22.38
1155.36	43.18	PK	185	1.1	V	25.3	1.2	26.51	43.17	74	-30.83
1155.36	42.65	PK	125	1.1	H	23.8	1.2	26.51	41.14	74	-32.86

**Middle Channel (2437 MHz)**

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
4874	37.86	AV	125	1.0	V	33.6	2.6	26.78	47.28	54	-6.72
4874	36.21	AV	256	1.1	H	33.8	2.6	26.78	45.83	54	-8.17
4874	51.25	PK	125	1.0	V	33.6	2.6	26.78	60.67	74	-13.33
4874	48.63	PK	256	1.1	H	33.8	2.6	26.78	58.25	74	-15.75
1226.31	31.54	AV	140	1.0	V	25.3	1.3	26.65	31.49	54	-22.51
1226.31	31.69	AV	178	1.1	H	25.1	1.3	26.65	31.44	54	-22.56
1226.31	39.17	PK	140	1.0	V	25.3	1.3	26.65	39.12	74	-34.88
1226.31	38.97	PK	178	1.1	H	25.1	1.3	26.65	38.72	74	-35.28

**High Channel (2462 MHz)**

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
4924	36.67	AV	158	1.2	V	34.6	2.7	26.75	47.22	54	-6.78
4924	36.03	AV	250	1.1	H	34.7	2.7	26.75	46.68	54	-7.32
4924	51.47	PK	158	1.2	V	34.6	2.7	26.75	62.02	74	-11.98
4924	49.71	PK	250	1.1	H	34.7	2.7	26.75	60.36	74	-13.64
1228.18	32.67	AV	57	1.1	V	25.3	1.3	26.65	32.62	54	-21.38
1228.18	31.94	AV	243	1.0	H	25.1	1.3	26.65	31.69	54	-22.31
1228.18	40.13	PK	57	1.1	V	25.3	1.3	26.65	40.08	74	-33.92
1228.18	39.69	PK	243	1.0	H	25.1	1.3	26.65	39.44	74	-34.56

**SIEMIC, INC.**

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To: FCC Part 15.247: 2012 (KDB 558074)

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**Spurious emission in restricted band:**

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
2367.69	38.45	AV	160	1.2	V	30.2	1.8	26.83	43.62	54	-10.38
2488.54	38.82	AV	125	1.1	V	30.5	1.8	26.83	44.29	54	-9.71
2367.69	33.24	AV	160	1.3	H	30.4	1.8	26.83	38.61	74	-35.39
2488.54	33.19	AV	125	1.2	H	30.6	1.8	26.83	38.76	74	-35.24
2367.69	40.38	PK	160	1.1	V	30.2	1.8	26.83	45.55	54	-8.45
2488.54	41.18	PK	125	1.2	V	30.5	1.8	26.83	46.65	54	-7.35
2367.69	35.72	PK	160	1.3	H	30.4	1.8	26.83	41.09	74	-32.91
2488.54	35.67	PK	125	1.2	H	30.6	1.8	26.83	41.24	74	-32.76

**Mode: 802.11g**

## Low Channel (2412 MHz)

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
4824	33.32	AV	133	1.1	V	34.0	2.6	26.79	43.13	54	-10.87
4824	31.67	AV	320	1.1	H	33.8	2.6	26.79	41.28	54	-12.72
4824	50.25	PK	133	1.1	V	34.0	2.6	26.79	60.06	74	-13.94
4824	48.71	PK	320	1.1	H	33.8	2.6	26.79	58.32	74	-15.68
1184.12	33.46	AV	120	1.2	V	25.3	1.2	26.51	33.45	54	-20.55
1184.12	32.75	AV	133	1.1	H	23.8	1.2	26.51	31.24	54	-22.76
1184.12	41.63	PK	120	1.2	V	23.8	1.2	26.51	40.12	74	-33.88
1184.12	42.96	PK	133	1.1	H	25.3	1.2	26.51	42.95	74	-31.05

## Middle Channel (2437 MHz)

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
4874	36.06	AV	189	1.1	V	33.6	2.6	26.78	45.48	54	-8.52
4874	35.13	AV	156	1.1	H	33.8	2.6	26.78	44.75	54	-9.25
4874	48.15	PK	189	1.1	V	33.6	2.6	26.78	57.57	74	-16.43
4874	46.09	PK	156	1.1	H	33.8	2.6	26.78	55.71	74	-18.29
1307.21	31.39	AV	242	1.1	V	25.4	1.4	26.65	31.54	54	-22.46
1307.21	31.13	AV	134	1	H	25.1	1.4	26.65	30.98	54	-23.02
1307.21	40.47	PK	242	1.1	V	25.4	1.4	26.65	40.62	74	-33.38
1307.21	40.34	PK	134	1	H	25.1	1.4	26.65	40.19	74	-33.81

## High Channel (2462 MHz)

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
4924	35.22	AV	253	1.1	V	34.6	2.7	26.75	45.77	54	-8.23
4924	34.83	AV	135	1.3	H	34.7	2.7	26.75	45.48	54	-8.52
4924	49.44	PK	253	1.1	V	34.6	2.7	26.75	59.99	74	-14.01
4924	47.14	PK	135	1.3	H	34.7	2.7	26.75	57.79	74	-16.21
1243.51	32.06	AV	168	1.1	V	25.3	1.3	26.65	32.01	54	-21.99
1243.51	31.21	AV	287	1.1	H	25.1	1.3	26.65	30.96	54	-23.04
1243.51	39.55	PK	168	1.1	V	25.3	1.3	26.65	39.5	74	-34.5
1243.51	40.32	PK	287	1.1	H	25.1	1.3	26.65	40.07	74	-33.93

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**Spurious emission in restricted band:**

Frequency (MHz)	Substituted level (dBm)	Detector (PK/AV)	Direction (degree)	Height (m)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dBm)	Margin (dB)
2381.74	40.34	AV	110	1.1	V	30.2	1.8	26.83	45.51	54	-8.49
2485.63	41.83	AV	185	1.1	V	30.5	1.8	26.83	47.30	54	-6.70
2381.74	33.87	AV	155	1.1	H	30.4	1.8	26.83	39.24	74	-34.76
2485.63	33.92	AV	180	1.2	H	30.6	1.8	26.83	39.49	74	-34.51
2381.74	43.13	PK	110	1.1	V	30.2	1.8	26.83	48.30	54	-5.70
2485.63	42.94	PK	185	1.1	V	30.5	1.8	26.83	48.41	54	-5.59
2381.74	36.04	PK	155	1.1	H	30.4	1.8	26.83	41.41	74	-32.59
2485.63	36.85	PK	180	1.2	H	30.6	1.8	26.83	42.42	74	-31.58



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## **Annex A. TEST INSTRUMENT & METHOD**

### **Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES**

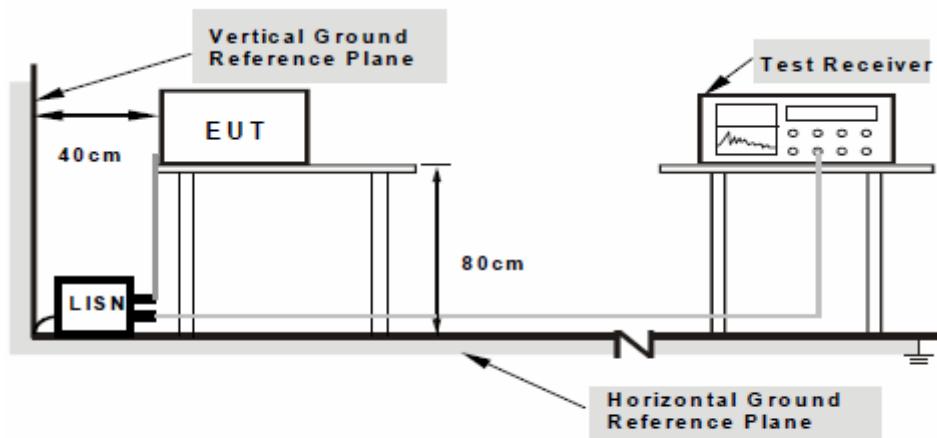
Instrument	Model	Calibration Date	Calibration Due Date
<b>AC Conducted Emissions</b>			
R&S EMI Test Receiver	ESPI3	05/25/2012	05/25/2013
R&S LISN	LI-115	05/25/2012	05/25/2013
<b>Radiated Emissions</b>			
Spectrum Analyzer	8563E	01/10/2012	01/10/2013
EMI Receiver	ESPI3	05/18/2012	05/18/2013
Antenna(1 ~18GHz)	3115	6/2/2011	6/2/2012
Antenna (30MHz~2GHz)	JB1	05/24/2012	05/24/2013
Chamber	3m	4/13/2012	4/13/2013
Pre-Amplifier(1 ~ 18GHz)	AMF-7D-00101800-30-10P	5/24/2012	5/24/2013
Horn Antenna (18~40GHz)	AH-840	7/23/2011	7/23/2012
Microwave Pre-Amp (18~40GHz)	PA-840	Every 2000 Hours	
Universal Radio Communication Tester	CMU200	02/22/2012	02/22/2013
Signal Analyzer	8665B	1/21/2012	1/21/2013
Temperature/Humidity Chamber	1007H	06/08/2011	06/08/2012



## **Annex A.ii. CONDUCTED EMISSIONS TEST DESCRIPTION**

### **Test Set-up**

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.
2. The power supply for the EUT was fed through a  $50\Omega/50\mu\text{H}$  EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipments were powered separately from another main supply.



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration1.

### **Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
3. High peaks, relative to the limit line, were then selected.
4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 KHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made.
5. Steps 2 to 4 were then repeated for the LIVE line (for AC mains) or DC line (for DC power).

### **Description of Conducted Emission Program**

This EMC Measurement software run LabView automation software and offers a common user interface for electromagnetic interference (EMI) measurements. This software is a modern and powerful tool for controlling and monitoring EMI test receivers and EMC test systems. It guarantees reliable collection, evaluation, and documentation of measurement results. Basically, this program will run a pre-scan measurement before it proceeds with the final measurement. The pre-scan routine will run the common scan range from 150 kHz to 30 MHz; the program will first start a peak and average scan on selectable measurement time and step size. After the program complete the pre-scan, this program will perform the Quasi Peak and Average measurement, based on the pre-scan peak data reduction result.



### **Sample Calculation Example**

At 20 MHz

$$\text{limit} = 250 \mu\text{V} = 47.96 \text{ dB}\mu\text{V}$$

Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.20 dB

Q-P reading obtained directly from EMI Receiver = 40.00 dB $\mu$ V  
(Calibrated for system losses)

Therefore, Q-P margin =  $47.96 - 40.00 = 7.96$  i.e. **7.96 dB below limit**



## Annex A. iii RADIATED EMISSIONS TEST DESCRIPTION

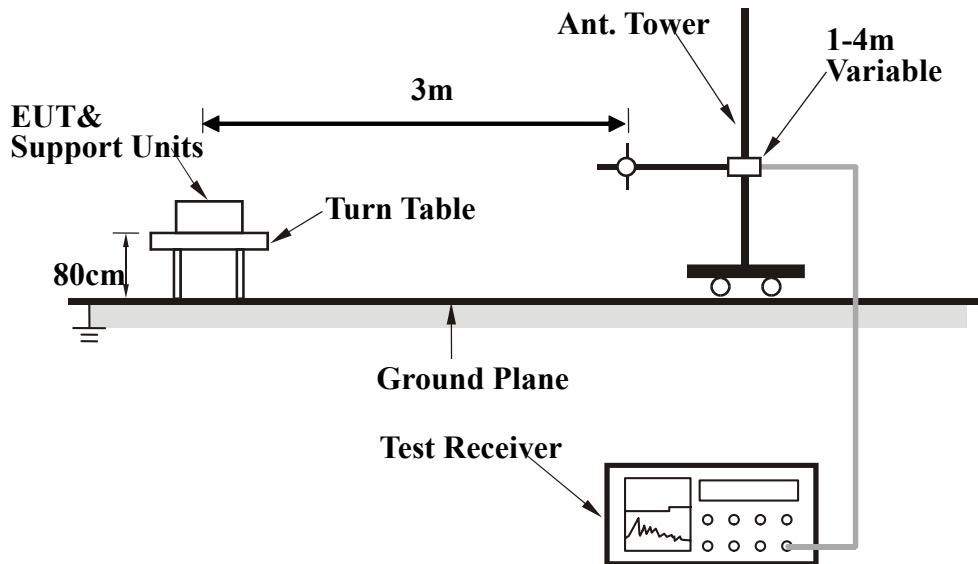
### EUT Characterisation

EUT characterisation, over the frequency range from 30MHz to 10<sup>th</sup> Harmonic, was done in order to minimise radiated emissions testing time while still maintaining high confidence in the test results.

The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer/receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer / receiver. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at the Open Area Test Site (OATS).

### Test Set-up

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.



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## **Test Method**

The following procedure was performed to determine the maximum emission axis of EUT:

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

### **Final Radiated Emission Measurement**

1. Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Peak	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

## **Sample Calculation Example**

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

$$\text{Peak} = \text{Reading} + \text{Corrected Factor}$$

where

$$\text{Corr. Factor} = \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain (if any)}$$

And the average value is

$$\text{Average} = \text{Peak Value} + \text{Duty Factor or}$$
$$\text{Set RBW} = 1\text{MHz}, \text{VBW} = 10\text{Hz}.$$

Note :

If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.



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## **Annex B. EUT AND TEST SETUP PHOTOGRAPHS**

**Please see attachment**

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## **Annex C. TEST SETUP AND SUPPORTING EQUIPMENT**

### **EUT TEST CONDITIONS**

#### **Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION**

The following is a description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Model & Serial Number	Cable Description (List Length, Type & Purpose)
Gateway Laptop	MS2288 & LXWHF02013951C3CA92200	N/A



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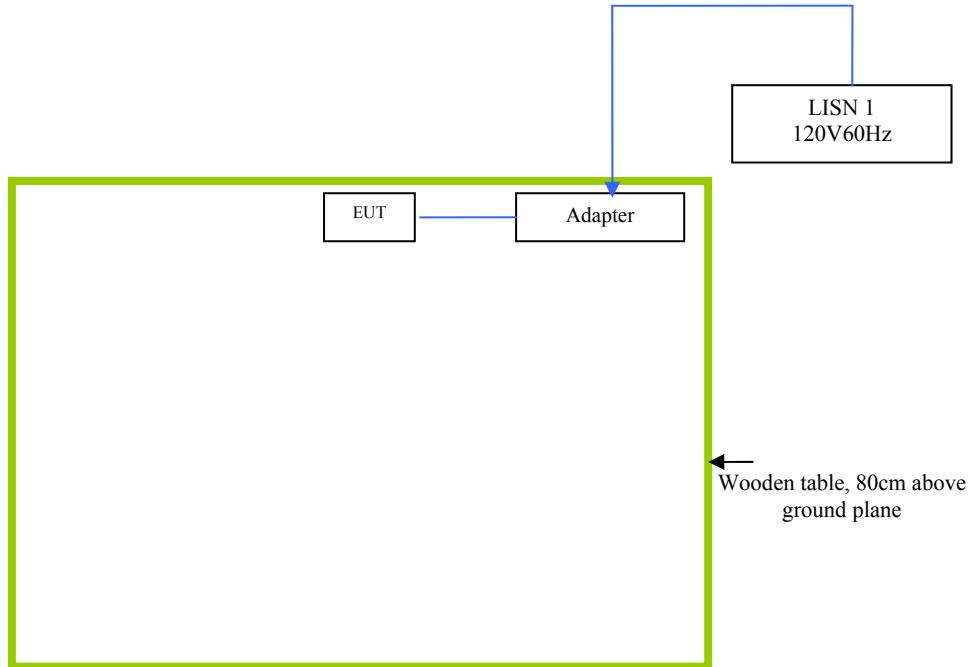
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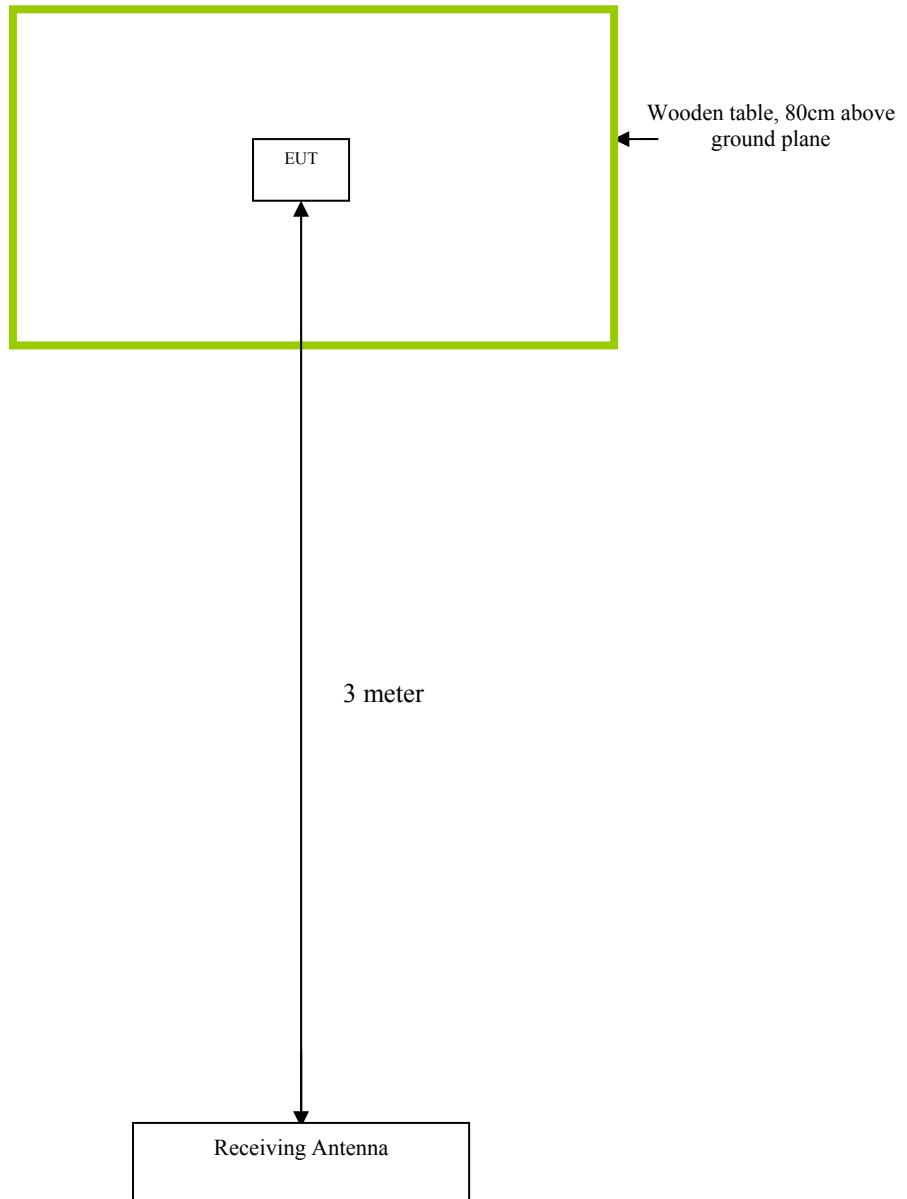
## Block Configuration Diagram for Conducted Emissions

**Note: Before Testing, the EUT must be set up for transmitting by laptop.**



## Block Configuration Diagram for Radiated Emissions

**Note:** Before Testing, the EUT must be set up for transmitting by laptop.





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## **Annex C.ii. EUT OPERATING CONDITIONS**

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation
<b>Emissions Testing</b>	The EUT was continuously transmitting to stimulate the worst case.



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## **Annex D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST**

**Please see attachment**



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## **Annex E. DECLARATION OF SIMILARITY**