



## 6. POWER SPECTRAL DENSITY MEASUREMENT

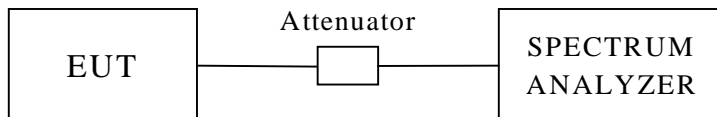
### 6.1 TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	DATE OF CALIBRATION
ROHDE & SCHWARZ TEST RECEIVER	ESMI	842088/005 841978/008	SEPT. 3, 2002
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7750A	725A 852141	N/A

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 6.2 TEST SETUP



### 6.3 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum Power Spectral Density Measurement is 8dBm.



## 6.4 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3KHz RBW and 30KHz VBW, set sweep time=span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

## 6.5 UNCERTAINTY OF CONDUCTED EMISSION

The uncertainty of conducted emission is  $\pm 1.82\text{dB}$ .

## 6.6 TEST RESULTS

<b>EUT</b>	Wireless CABLE Router	<b>MODEL</b>	CME063W
<b>INPUT POWER (SYSTEM)</b>	120VAC, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27°C, 70%RH,
<b>TESTED BY : M. C. Huang</b>			

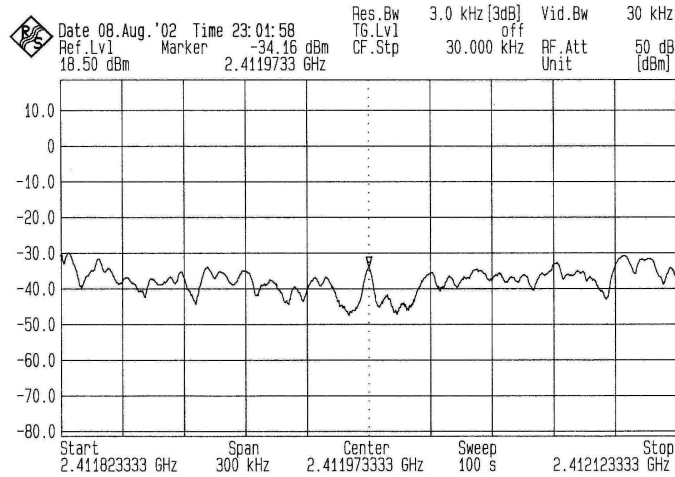
<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>RF POWER LEVEL IN 3KHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS / FAIL</b>
1	2412	-28.16	8	PASS
6	2437	-28.19	8	PASS
11	2462	-28.75	8	PASS

Note:

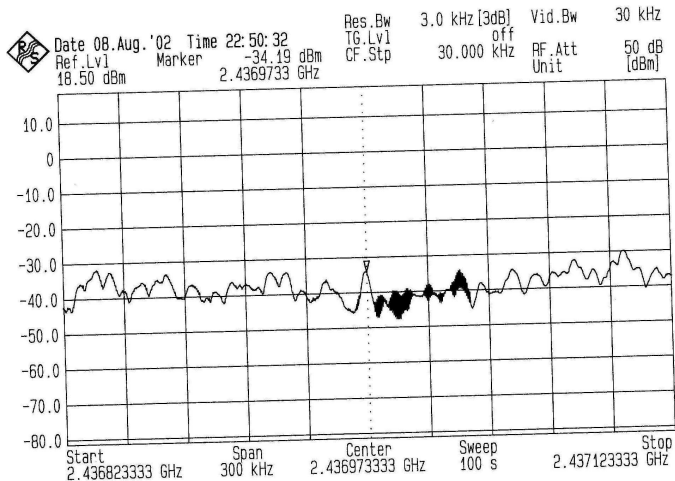
- 1.The measurement value of RF Power Level + 6dB attenuator=Final RF Power Level



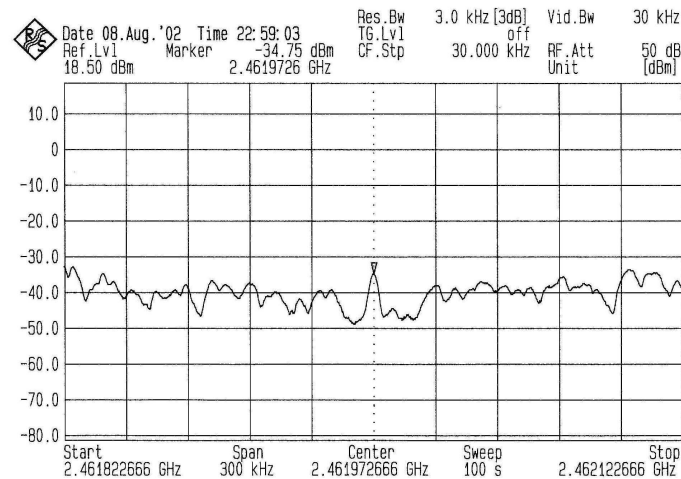
## 6.7 PHOTO OF POWER SPECTRAL DENSITY MEASUREMENT



Channel 1



Channel 6



Channel 11



## 7. OUT OF BAND MEASUREMENT

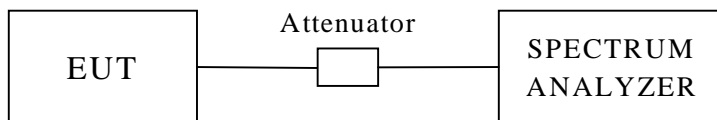
### 7.1 TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	DATE OF CALIBRATION
ROHDE & SCHWARZ TEST RECEIVER	ESMI	842088/005 841978/008	SEPT. 3, 2002
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7750A	725A 852141	N/A

NOTE :

3. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
4. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 7.2 TEST SETUP



### 7.3 LIMITS OF OUT OF BAND EMISSIONS MEASUREMENT

1. Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.



## 7.4 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100KHz with suitable frequency span including 100KHz bandwidth from band edge. The band edges was measured and recorded.
2. Radiated emission test: Applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement. For measurements above 1 GHz, set RBW= 1MHz, VBW= 10Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation, use the setting shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

## 7.5 UNCERTAINTY OF CONDUCTED EMISSION

The uncertainty of conducted emission is  $\pm 1.82\text{dB}$ .

## 7.6 TEST RESULTS

### A. Conducted

Refer to 7.7 photo of out band Emission measurement

### B. Radiated

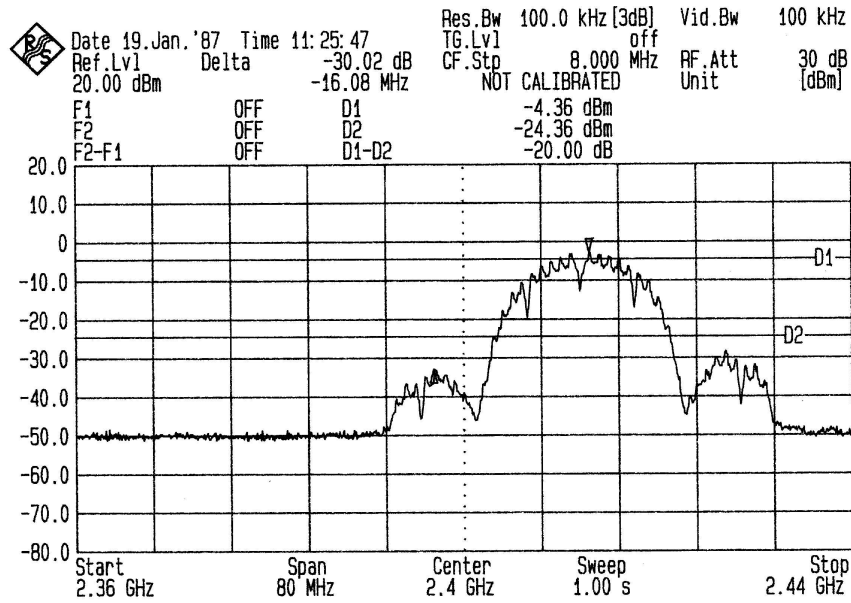
Refer to the section of Radiation Emission ; Test requirement 15.205 from P19 to P24 of the measurement data.

<b>EUT</b>	Wireless CABLE Router	<b>MODEL</b>	CME063W
<b>INPUT POWER (SYSTEM)</b>	120VAC, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27°C, 70%RH,
<b>TESTED BY : M. C. Huang</b>			

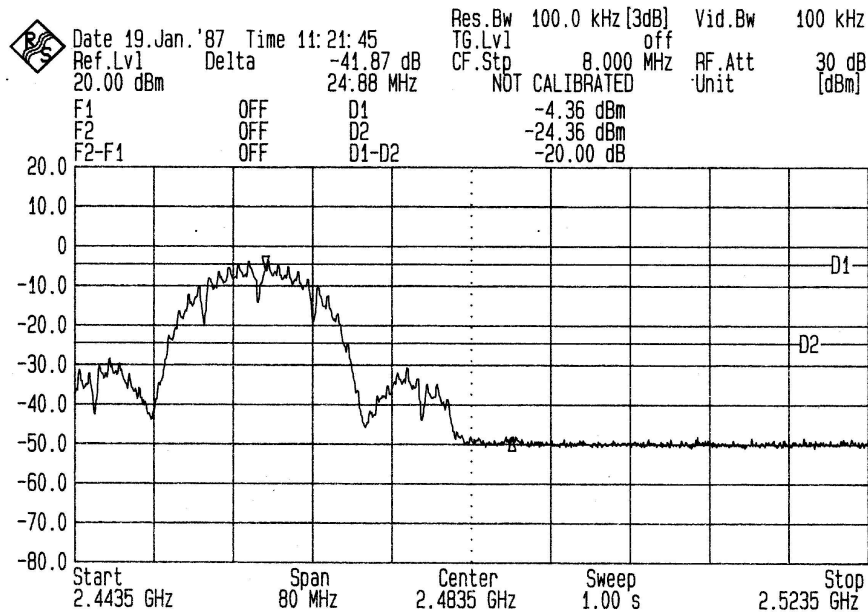
<b>CHANNEL FREQUENCY (MHz)</b>	<b>Required Limit (dBc)</b>	<b>PASS / FAIL</b>
<2400	>20	PASS
>2483.5	>20	PASS
<2400	>20	PASS
>2483.5	>20	PASS



### 7.7 PHOTO OF OUT OF BAND MEASUREMENT



FRONT



BACK



## **8. ANTENNA REQUIREMENT**

### **8.1 STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if 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 6dBi.

### **8.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is PCB antenna. The antenna connector is MMSX. And the maximum Gain of this antenna is only 2dBi.



## 9. RF EXPOSURE EVALUATION

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)  
 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

### 9.1 FRIIS FORMULA

Friis transmission formula :  $Pd = (Pout * G) / (4 * \pi * r^2)$

Where

Pd = power density in mW/cm<sup>2</sup>

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

### 9.2 EUT OPERATING CONDITION

A software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.





## 9.3 TEST RESULT OF RF EXPOSURE EVALUATION

Product : Wireless CABLE Router  
Test Item : RF Exposure Evaluation Data  
Test Mode : Normal Operation

### 9.3.1 ANTENNA GAIN

Antenna Gain : The maximum Gain measured in fully anechoic chamber is 2dBi linear scale.

### 9.3.2 OUTPUT POWER INTO ANTENNA & RF EXPOSURE EVALUATION DISTANCE

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum Allowable Distance ® From Skin(cm)
CH1	2412.00	16.5	2.373532
CH6	2437.00	16.4	2.346362
CH11	2462.00	16.5	2.401016

The distance r (4<sup>th</sup> column) calculated from the Friis transmission formula is far shorter than 20cm separation requirement. So, RF exposure limit warning or SAR test are not required.