

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 1MHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2006

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.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW spectrum analyzer to 1 MHz and set VBW spectrum analyzer to 10 Hz with suitable frequency span including 1 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz ; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

4.6.4 EUT OPERATING CONDITION

Same as Item 4.3.5



4.6.5 TEST RESULTS

802.11b DSSS MODULATION:

The spectrum plots are attached on the following page. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

NOTE (Peak):

The band edge emission plot of DSSS technique on the following first page show 62.82dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 116.3dBuV/m, so the maximum field strength in restrict band is 116.3-62.82=53.48dBuV/m which is under 74 dBuV/m limit.

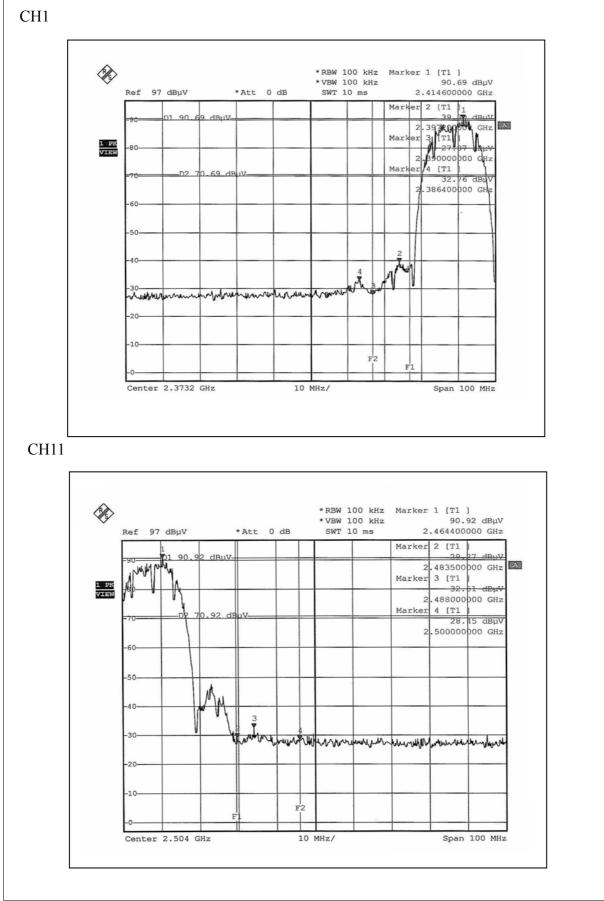
The band edge emission plot of DSSS technique on the following first page shows 61.65dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 116.3dBuV/m, so the maximum field strength in restrict band is 116.3-61.65=54.65dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):

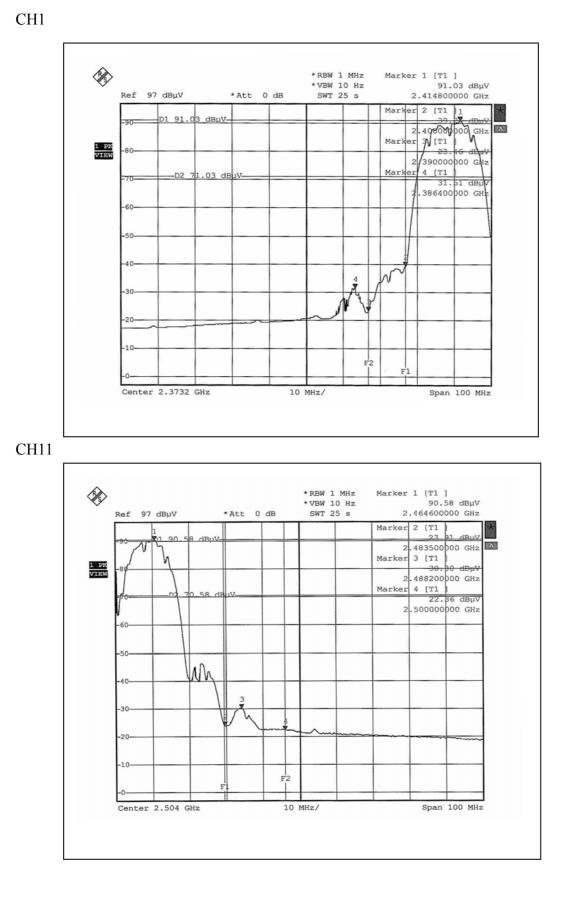
The band edge emission plot of DSSS technique on the following second page shows 67.57dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 112.4dBuV/m, so the maximum field strength in restrict band is 112.4-67.57=44.83dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot of DSSS technique on the following second page shows 66.67dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 112.5dBuV/m, so the maximum field strength in restrict band is 112.5-66.67=45.83dBuV/m which is under 54 dBuV/m limit.

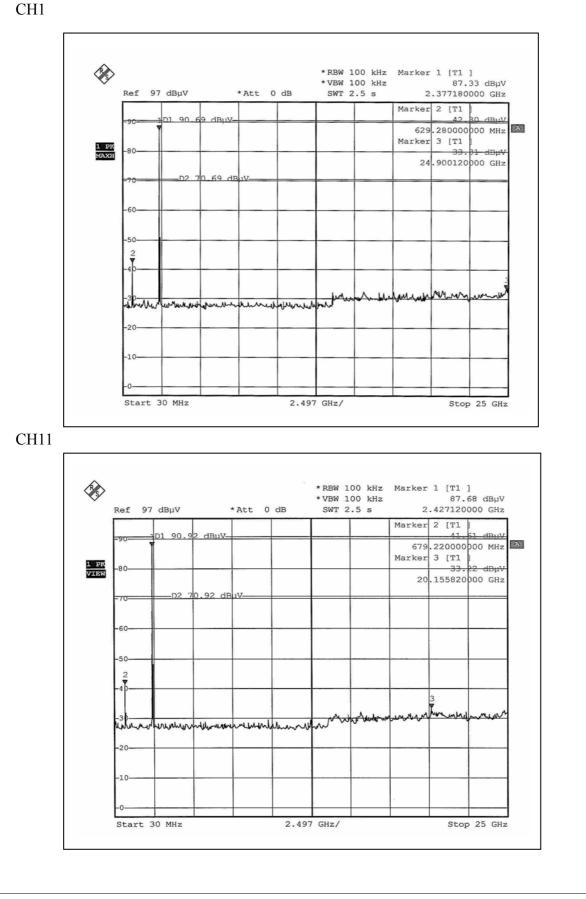














802.11g OFDM MODULATION:

The spectrum plots are attached on the following page. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

NOTE (Peak):

The band edge emission plot of OFDM technique on the following first page show 54.25dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 115.6dBuV/m, so the maximum field strength in restrict band is 115.6-54.25=61.35dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot of OFDM technique on the following first page shows 51.92dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 116.0dBuV/m, so the maximum field strength in restrict band is 116.0-51.92=64.08dBuV/m which is under 74 dBuV/m limit.

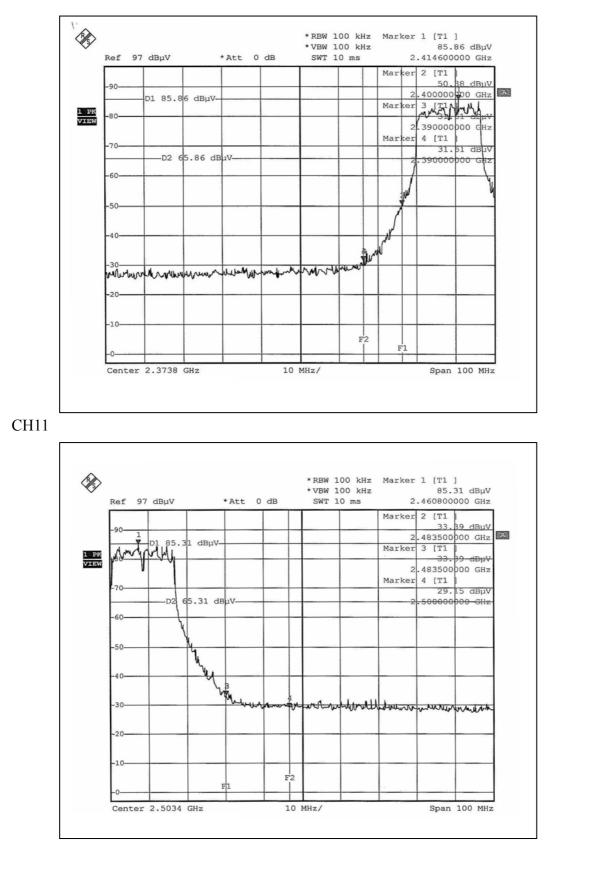
NOTE (Average):

The band edge emission plot of OFDM technique on the following second page shows 55.63dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 105.6dBuV/m, so the maximum field strength in restrict band is 105.6-55.63=49.97dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot of OFDM technique on the following second page shows 54.13dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 105.8dBuV/m, so the maximum field strength in restrict band is 105.8-54.13=51.67dBuV/m which is under 54 dBuV/m limit.



CH1





CH1 × *RBW 1 MHz *VBW 10 Hz SWT 25 s Marker 1 [T1] 85.20 dBµV 2.417800000 GHz *Att 0 dB Ref 97 dBµV Marker 2 [T1] 42.59 dBuV 2.400000000 GHz A D1 85.2 dBµV-Marker 1 PK VIEW 29. .390000000 G 2 4 [T1 Mai 21 29. dE -D2 65.2 dBu 390000b00 C 60 -50 40 30 20-F2 Center 2.3738 GHz 10 MHz/ Span 100 MHz CH11 Ì Marker 1 [T1] 84.81 dBµV 2.460200000 GHz *RBW 1 MHz *VBW 10 Hz SWT 25 s Ref 97 dBµV *Att 0 dB Marker 2 [T1] 30,58 dBuV A .483500000 GHz 84.81 dBµV-VVVV Marker 3 [T1 1 PK VIEW 30.58 dBuV 2.483500000 GHz Marker 4 [T1 70 25.76 dBuV 500000000 GHz -D2 64.81 dBuV-60 -50 -40 -30 -20 -10 F2 10 MHz/ Span 100 MHz



Ì *RBW 100 kHz Marker 1 [T1] *VBW 100 kHz 82.44 dBµV *Att 0 dB Ref 97 dBuV SWT 2.5 s 2.377180000 GHz Marker 2 [T1] 31.82 dBuV A 20 255700000 GHz D1 85.56 dBµV-1 PK VIEW a n 70 -D2 65.86 dBuV--60 -50 40-2 ment unwomen 1 John March when it was propheter was a starter 10 2.497 GHz/ Stop 25 GHz CH11 × *RBW 100 kHz Marker 1 [T1] *VBW 100 kHz 82.22 SWT 2.5 s 2.4271200 82.22 dBµV 2.427120000 GHz 97 dBµV *Att 0 dB Ref Marker 2 [T1] 33.48 dBuV .90 A 24.850180000 GHz D1 85.31 dBµV 1 PK VIEW 70 -D2 65.31 dBuV-60 -50 -40 mynd metel 30menue perminenter man removed that -20 -10 2.497 GHz/ Stop 25 GHz

CH1



DRAFT 802.11n (20MHz) OFDM MODULATION:

The spectrum plots are attached on the following page. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

NOTE (Peak):

The band edge emission plot of OFDM technique on the following first page show 54.86dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 115.2dBuV/m, so the maximum field strength in restrict band is 115.2-54.86=60.34dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot of OFDM technique on the following first page shows 51.96dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 115.2dBuV/m, so the maximum field strength in restrict band is 115.2-51.96=63.24dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):

The band edge emission plot of OFDM technique on the following second page shows 53.06dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 104.8dBuV/m, so the maximum field strength in restrict band is 104.8-53.06=51.74dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot of OFDM technique on the following second page shows 53.72dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 104.9dBuV/m, so the maximum field strength in restrict band is 104.9-53.72=51.18dBuV/m which is under 54 dBuV/m limit.



CH1 Ì * RBW 100 kHz Marker 1 [T1] *VBW 100 kHz SWT 10 ms 85.13 dBµV 2.410800000 GHz Ref 97 dBµV *Att 0 dB Marker 2 [T1 51. 53 dBuV 90 A 2.400000 GHz D1 85.13 dBµV-3 Think white Marker 1 PK VIEW 8 390000000 GH 2 Marker 4 [T1 70 33.28 dBp -D2 65.13 dBuV-38880000-G 60 50 40 mething mention and and the Un the Munder 20 F2 F1 10 MHz/ Span 100 MHz CH11 Ś *RBW 100 kHz Marker 1 [T1] *VBW 100 kHz 85.0 85.03 dBµV 2.465800000 GHz Ref 97 dBµV *Att 0 dB SWT 10 ms Marker 2 [T1 33.07 dBuV A 2.483500000 GHz D1 85.03 dBµV-Marke 3 (T1 1 PK VIEW 22 483500000 GHz 2 4 [T1 Marker 29.56 dBµV 65.03 dB 50000000 CH2 -D2 60 -50 "Why Mummer water man water and the man for some and the second and the 30 20 F2 Span 100 MHz Center 2.502 GHz 10 MHz/



CH1 Ì *RBW 1 MHz *VBW 10 Hz SWT 25 s Marker 1 [T1] 84.39 dBµV Ref 97 dBµV 2.414480000 GHz *Att 0 dB Marker 2 [T1] 45.20 dBuV 2.400000DD0 GHz A D1 84.39 dBµV Mar 1 PK VIEW 31.33 db -80 390000000 GH Mar 4 [T1 -70 31.33 dBµV 39000000 GHz D2 64.39 dBuV-60 -50 -30 10 F2 F1 $^{+}$ 10 MHz/ Center 2.3732 GHz Span 100 MHz CH11 Marker 1 [T1] 85.56 dBµV 2.460600000 GHz × *RBW 1 MHz *VBW 10 Hz SWT 25 s *Att 0 dB Ref 97 dBuV Marker 2 [T1 31.84 dBuV 2.483500000 GHz A 85.56 dBuV-D1 Marker 3 [T1 1 PK VIEW 31. 4 dBut 2.483680000 GHz Marker 4 [T1 25.58 dBµV 500000000 GHz 10 -D2 65.56 dB 60 -50 40 -10 F. Span 100 MHz Center 2.502 GHz 10 MHz/



Ì *RBW 100 kHz Marker 1 [T1] *VBW 100 kHz 84.20 dBµV Ref 97 dBµV *Att 0 dB SWT 2.5 s 2.377180000 GHz Marker 2 [T1 32 58 dBuV .90 A 629.280000000 MHz D1 85.13 dBµV-Marker 3 (T1 1 PK VIEW 80 33 dBut 20 20.305640000 GHz 70 -D2 65.13 dBuV-60 -50 40 3 Al 2 -30monenter the unanumunu 20 -10 2.497 GHz/ Stop 25 GHz CH11 × *RBW 100 kHz Marker 1 [T1] *VBW 100 kHz 82.98 dBµV *Att 0 dB SWT 2.5 s 2.427120000 GHz 97 dBuV Ref 2 [T1 Marker 33. 32 dBuV .90 A 21.404320000 GHz D1 85.03 dBµV-1 PK VIEW 80 -70--D2 65.03 dBuV-60 -50 40 2 Nun March March March March March her -20 -10 2.497 GHz/ Stop 25 GHz

CH1



DRAFT 802.11n (40MHz) OFDM MODULATION:

The spectrum plots are attached on the following page. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

NOTE (Peak):

The band edge emission plot of OFDM technique on the following first page show 46.23dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 111.4dBuV/m, so the maximum field strength in restrict band is 111.4-46.23=65.17dBuV/m which is under 74 dBuV/m limit.

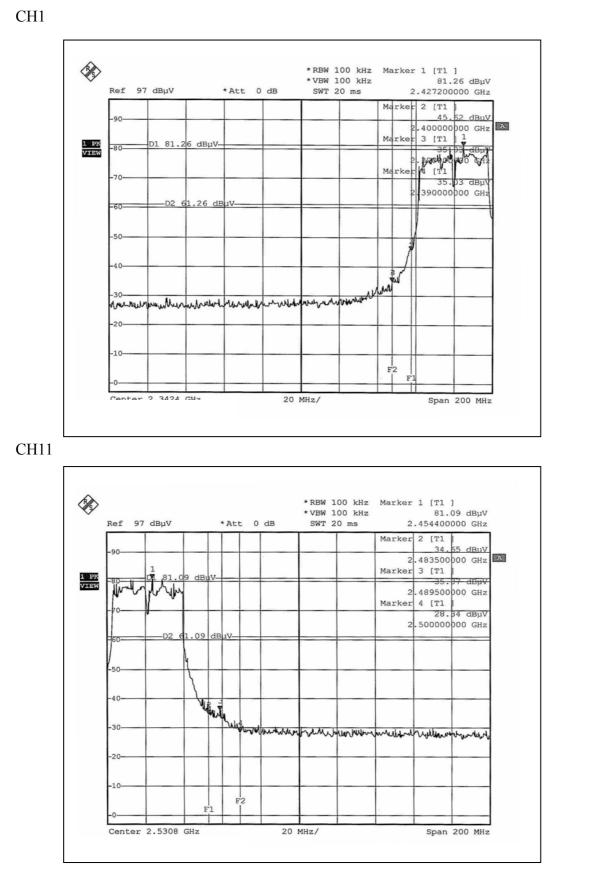
The band edge emission plot of OFDM technique on the following first page shows 46.44dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 110.0dBuV/m, so the maximum field strength in restrict band is 110.0-46.44=63.56dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):

The band edge emission plot of OFDM technique on the following second page shows 47.57dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 99.2dBuV/m, so the maximum field strength in restrict band is 99.2-47.57=51.63dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot of OFDM technique on the following second page shows 46.15dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 98.0dBuV/m, so the maximum field strength in restrict band is 98.0-46.15=51.85dBuV/m which is under 54 dBuV/m limit.





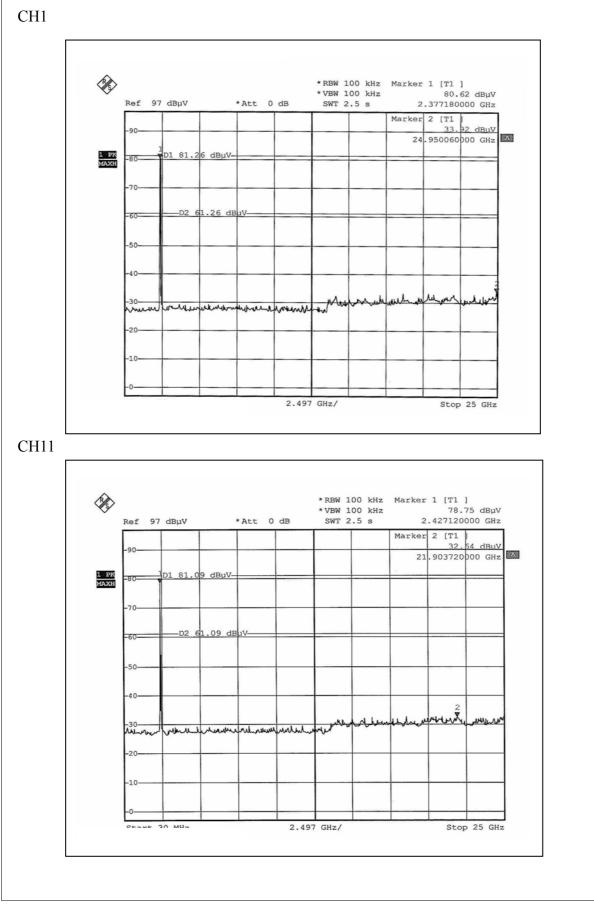
Report No.: RF951024H01

Report Format Version 2.0.5



CH1 Ô *RBW 1 MHz *VBW 10 Hz SWT 50 s Marker 1 [T1] 80.60 dBµV Ref 97 dBµV *Att 0 dB 2.430800000 GHz Marker 2 [T1 38.80 dBuV 400000000 GHz A Marke 3 [T1 1 PK VIEW 80 19000000 GH2 4 [T1 Ma 33. 03 dBµV 390000000 GHz n2 6 dB 40 -30 -10 F2 П Center 2.3424 GHz 20 MHz/ Span 200 MHz CH11 Ì Marker 1 [T1] 79.73 dBµV 2.440800000 GHz *RBW 1 MHz * VBW 10 Hz SWT 50 s Ref 97 dBuV *Att 0 dB Marker 2 [T1 33.58 dBuV A 2.483500000 GHz Marker 3 [T1] 1 PK VIEW 2.483500000 GHz Marker 4 [T1] 27.28 dBµV 2.50000000 GHz -20 F2 F1 6200 2 20 MHz/ Span 200 MHz 00







4.7 ANTENNA REQUIREMENT

4.7.1 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.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

No.	Antenna Type	Gain (dBi)	Cable loss(dB)	Net Gain (dBi)	Antenna Connector
1	Dipole	1.8	0.9	0.9	HRS Connector
2	PCB	1.8	0.8	1.0	HRS Connector
3	Dipole	1.8	0.9	0.9	HRS Connector

The antennas used in this product are as below.



6. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

FCC, UL, A2LA
TUV Rheinland
VCCI
NEMKO
INDUSTRY CANADA , CSA
CNLA, BSMI, NCC
Telefication
PSB , GOST-ASIA(MOU)
CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

<u>www.adt.com.tw/index.5/phtml</u>. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab: Tel: 886-2-26052180 Fax: 886-2-26052943 Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343 Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab: Tel: 886-3-3183232 Fax: 886-3-3185050

Web Site: <u>www.adt.com.tw</u>

The address and road map of all our labs can be found in our web site also.



APPENDIX-A

MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.