FCC TEST REPORT
for
SHENZHEN APEXIS ELECTRONIC CO., LTD.

IP Camera
Model No.: APM-J803-WS, APM-J802-WS, APM-J803-Z-WS, APM-H803-WS, APM-H804-WS, APM-H401-WS, APM-H701-WS, APM-J901-Z-WS, APM-H901-Z-WS, APM-H501-MPC-WS

Prepared for	:	SHENZHEN APEXIS ELECTRONIC CO., LTD.
Address	:	502 East Keji Building, Shenzhen High-Tech Ind-Park, Nanshan District, Shenzhen, China

Prepared By	:	Anbotek Compliance Laboratory Limited
Address	:	1/F, 1 /Building, SEC Industrial Park, No.4 Qianhai Road, Nanshan District, Shenzhen, 518054, China Tel: (86) 755-26014771 Fax: (86) 755-26014772

Report Number	:	201111735F
Date of Test	:	Nov. 11~21, 2011
Date of Report	:	Nov. 21, 2011

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Test Report

TEST REPORT

Applicant	:	SHENZHEN APEXIS ELECTRONIC CO., LTD.
Manufacturer	:	SHENZHEN APEXIS ELECTRONIC CO., LTD.
EUT	:	IP Camera
Model No.	:	APM-J803-WS, APM-J802-WS, APM-J803-Z-WS, APM-H803-WS, APM-H804-WS, APM-H401-WS, APM-H701-WS, APM-J901-Z-WS, APM-H901-Z-WS, APM-H501-MPC-WS
Serial No.	:	N/A
Rating	:	5V⎓, 2.0A
Trade Mark	:	apexis

Measurement Procedure Used:
FCC Part15 Subpart C, Paragraph 15.247: 2010

The device described above is tested by Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek Compliance Laboratory Limited

Date of Test : Nov. 11~21, 2011

Prepared by :

Andy chen

(Engineer / Andy Chen)

Reviewer :

Coco. Xiang

(Project Manager / Coco Xiang)

Approved & Authorized Signer :

Henry. Yang

(Manager / Henry Yang)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	IP Camera
Model Number	:	APM-J803-WS, APM-J802-WS, APM-J803-Z-WS, APM-H803-WS, APM-H804-WS, APM-H401-WS, APM-H701-WS, APM-J901-Z-WS, APM-H901-Z-WS, APM-H501-MPC-WS (Note: All samples are the same except the model number & shape of appliances, so we prepare "APM-J803-WS" for EMC test only.)
Test Power Supply	:	120V~, 60Hz for Adapter
Adapter	:	Power Supply Model: SAW-0502000 Input: 100-240V~, 50-60Hz, 0.5A Output: 5V⎓, 2000mA
RF Transmission Frequency	:	2412-2462MHz(802.11b/g)
Channels	:	11
Antenna Type	:	RPSMA-J Port (It is a unique coupling to the interntional radiator, which considered sufficient to comply with the provisions of 15.203)
Antenna Gain	:	2dBi
Applicant	:	SHENZHEN APEXIS ELECTRONIC CO., LTD.
Address	:	502 East Keji Building, Shenzhen High-Tech Ind-Park, Nanshan District, Shenzhen, China
Manufacturer	:	SHENZHEN APEXIS ELECTRONIC CO., LTD.
Address	:	fifth floor, NO.53, NO.2 Langshan Road, Daliang, Wanfeng, Shajing, Bao'an District, Shenzhen, China
Date of receiver	:	Nov. 10, 2011
Date of Test	:	Nov. 11~21, 2011

1.2. Auxiliary Equipment Used during Test

PC	:	Manufacturer: DELL M/N: OPTIPLEX 380 S/N: 1J63X2X CE , FCC: DOC
MONITOR	:	Manufacturer: DELL M/N: E170Sc S/N: CN-00V539-64180-055-0UPS CE , FCC: DOC
KEYBOARD	:	Manufacturer: DELL M/N: SK-8115 S/N: CN-0DJ313-71616-06C-02XN CE , FCC: DOC Cable: 1m, unshielded
MOUSE	:	Manufacturer: DELL M/N: M-UARDEL7 S/N: N/A CE , FCC: DOC Cable: 1m, unshielded
Printer	:	Manufacturer:Brother M/N: MFC-3360C S/N: N/A CE, FCC:DOC
Power Line	:	Non-Shielded, 1.5m
VGA Cable	:	Non-Shielded, 1.5m
Network Cable	:	Non-Shielded, 1.5m

1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503
Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021
Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, August 20, 2010.

IC-Registration No.: 8058A-1
Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, August 30, 2010.

Test Location
All Emissions tests were performed at
Anbotek Compliance Laboratory Limited. at 1/F, 1 /Building, SEC Industrial Park, No.4 Qianhai Road, Nanshan District, Shenzhen, 518054, China

1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

2. MEASURING DEVICE AND TEST EQUIPMENT

The following test equipments were used during test:

Equipment	Manufacturer	Model #	Serial #	Data of Cal.	Due Data
EMI Test Receiver	Rohde & Schwarz	ESCI	100119	Mar.03, 2011	Mar.02, 2012
EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	Sep.22, 2011	Sep.21, 2012
EMI Test Software	SHURPLE	ESK1	N/A	N/A	N/A
Spectrum Analyzer	Agilent	E7405A	MY45114970	Jun.21, 2011	Jun.20, 2012
Signal Generator	Rohde & Schwarz	SMR27	100124	Jul.06, 2010	Jul.05, 2012
Signal Generator	Rohde & Schwarz	SML03	102319	Aug.01, 2010	Aug.01, 2012
AC Power Source	Sepcial power system	YF650	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS21	100218	Apr.30, 2010	Apr.29, 2012
Power Meter	Rohde & Schwarz	NRVD	101287	Jul.19, 2011	Jul.18, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Universal radio Communication tester	Rohde & Schwarz	CMU200	101724	Sep.08, 2011	Sep.07, 2012
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
BiConilog Antenna	ETS-LINDGREN	3142C	00042670	Mar.03, 2011	Mar.02, 2012
BiConilog Antenna	ETS-LINDGREN	3142C	00042673	Mar.03, 2011	Mar.02, 2012
Loop Antenna	ETS-LINGREN	6502	00071730	Mar.03, 2011	Mar.02, 2012
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00035926	Dec.30, 2009	Dec.29, 2011
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00041545	Dec.30, 2009	Dec.29, 2011
Pre-amplifier	CD	PAM0203	804203	Jun.21, 2011	Jun.20, 2012
RF Switch	CD	RSU-M3	706543	Jun.21, 2011	Jun.20, 2012
Thermo-/Hygrometer	N/A	TH01	N/A	May.03, 2011	May.02, 2012
Shielding Room	Zhong Yu Electronic	N/A	N/A	N/A	N/A
3m Anechoic Chamber	Zhong Yu Electronic	N/A	N/A	Apr.28, 2010	Apr.27, 2012

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC Part 15, Paragraph 15.247

3.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

* The digital circuit porting of the EUT has been tested and verified to comply with FCC Part 15, Subpart B., Class B Digital Devices and the associated Radio Receiver has also been tested and found to comply with FCC Part 15, Subpart B – Radio Receivers.

3.2. Description of Test Modes

The EUT has been tested under operating condition.
Software used to control the EUT for staying in continuous transmitting and receiving mode isprogrammed.
IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 11Mbps highest data rate (worst case) are chosen for the final testing.
IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 54Mbps data rate (the worst case) are chosen for the final testing.

3.3. List of channels:

√ - available

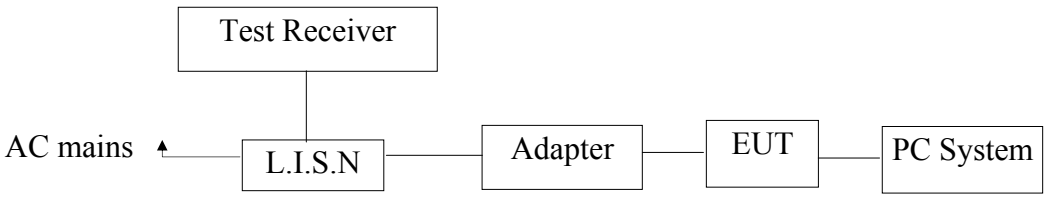
X - tested

Number	Frequency(MHz)	802.11 b/g	
1	2412	√	X
2	2417	√	
3	2422	√	
4	2427	√	
5	2432	√	
6	2437	√	X
7	2442	√	
8	2447	√	
9	2452	√	
10	2457	√	
11	2462	√	X

4. Conducted Emission Test

4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: IP Camera)

4.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

EUT : IP Camera
Model Number : APM-J803-WS
Applicant : SHENZHEN APEXIS ELECTRONIC CO., LTD.

4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work in test mode (ON) and measure it.

4.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2009 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 4.6.

4.6. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150KHz to 30 MHz is investigated.

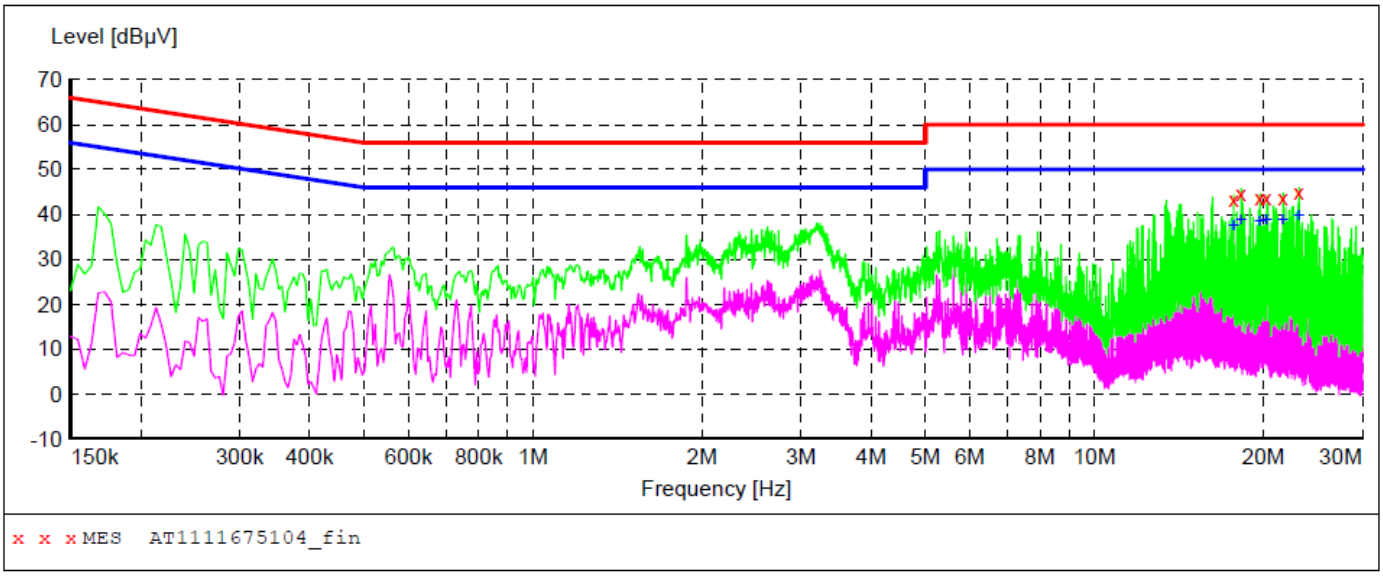
Please refer the following pages.

CONDUCTED EMISSION TEST DATA

EUT:	IP Camera M/N: APM-J803-WS
Operating Condition:	On
Test Site:	1# Shielded Room
Operator:	Andy Chen
Test Specification:	AC 120V/60Hz for Adapter
Comment:	Live Line
	Tem:25℃ Hum:50%

SCAN TABLE: "Voltage(150K~30M)FIN"

Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "AT1111675104_fin"

11/11/2011 9:23AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
17.695000	43.00	10.8	60	17.0	QP	L1	GND
18.244000	44.50	10.8	60	15.5	QP	L1	GND
19.711000	43.30	10.8	60	16.7	QP	L1	GND
20.260000	43.50	10.8	60	16.5	QP	L1	GND
21.664000	43.50	10.8	60	16.5	QP	L1	GND
23.131000	45.00	10.8	60	15.0	QP	L1	GND

MEASUREMENT RESULT: "AT1111675104_fin2"

11/11/2011 9:23AM

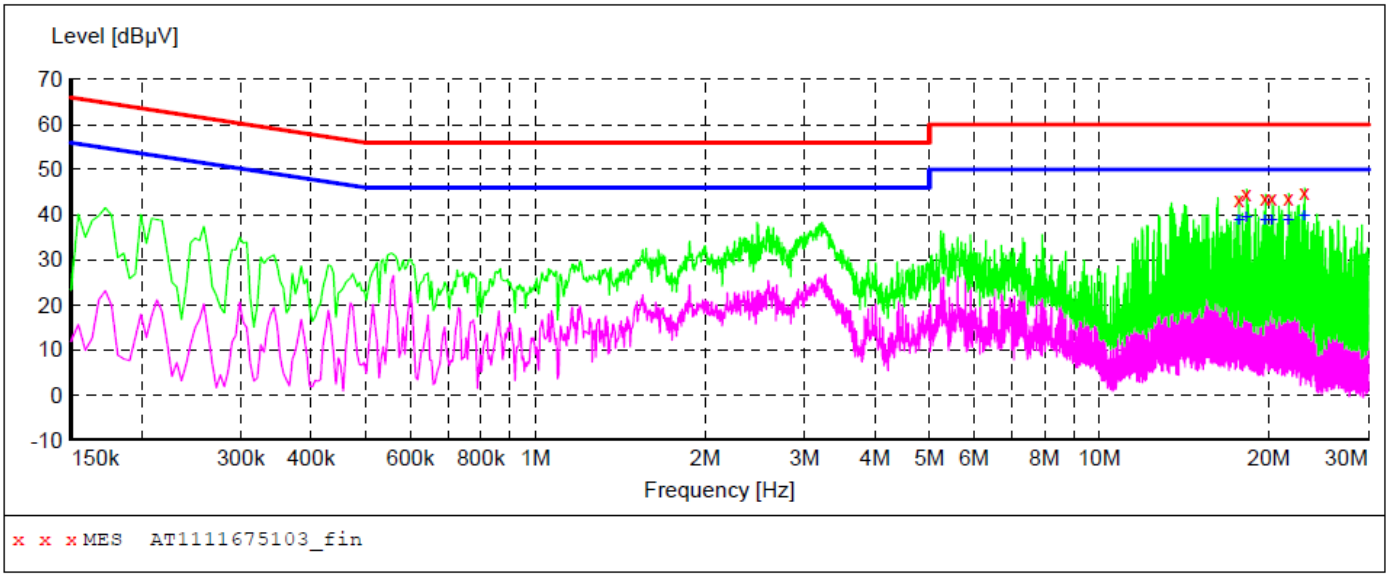
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
17.695000	36.40	10.8	50	13.4	AV	L1	GND
18.244000	38.50	10.8	50	11.5	AV	L1	GND
19.711000	38.60	10.8	50	11.4	AV	L1	GND
20.260000	38.70	10.8	50	11.3	AV	L1	GND
21.664000	38.00	10.8	50	12.0	AV	L1	GND
23.131000	40.00	10.8	50	10.0	AV	L1	GND

CONDUCTED EMISSION TEST DATA

EUT:	IP Camera M/N: APM-J803-WS
Operating Condition:	On
Test Site:	1# Shielded Room
Operator:	Andy Chen
Test Specification:	AC 120V/60Hz for Adapter
Comment:	Neutral Line
	Tem:25℃ Hum:50%

SCAN TABLE: "Voltage(150K~30M)FIN"

Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "AT1111675103_fin"

11/11/2011 9:19AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
17.695000	43.40	10.8	60	16.6	QP	N	GND
18.244000	44.70	10.8	60	15.3	QP	N	GND
19.711000	43.20	10.8	60	16.8	QP	N	GND
20.260000	43.50	10.8	60	16.5	QP	N	GND
21.664000	43.00	10.8	60	17.0	QP	N	GND
23.131000	45.00	10.8	60	15.0	QP	N	GND

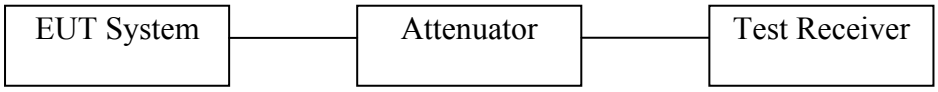
MEASUREMENT RESULT: "AT1111675103_fin2"

11/11/2011 9:19AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
17.695000	38.70	10.8	50	11.3	AV	N	GND
18.244000	39.20	10.8	50	10.8	AV	N	GND
19.711000	38.80	10.8	50	11.2	AV	N	GND
20.260000	38.80	10.8	50	11.2	AV	N	GND
21.664000	38.50	10.8	50	11.5	AV	N	GND
23.131000	40.30	10.8	50	9.7	AV	N	GND

5. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

5.1 Test Setup



5.2 6dB Bandwidth

a. Limt

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

b. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Span = 50MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

c. Test Setup

See 5.1

d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	7.6		Pass
Mid	2437	8.1	>500	Pass
High	2462	7.7		Pass

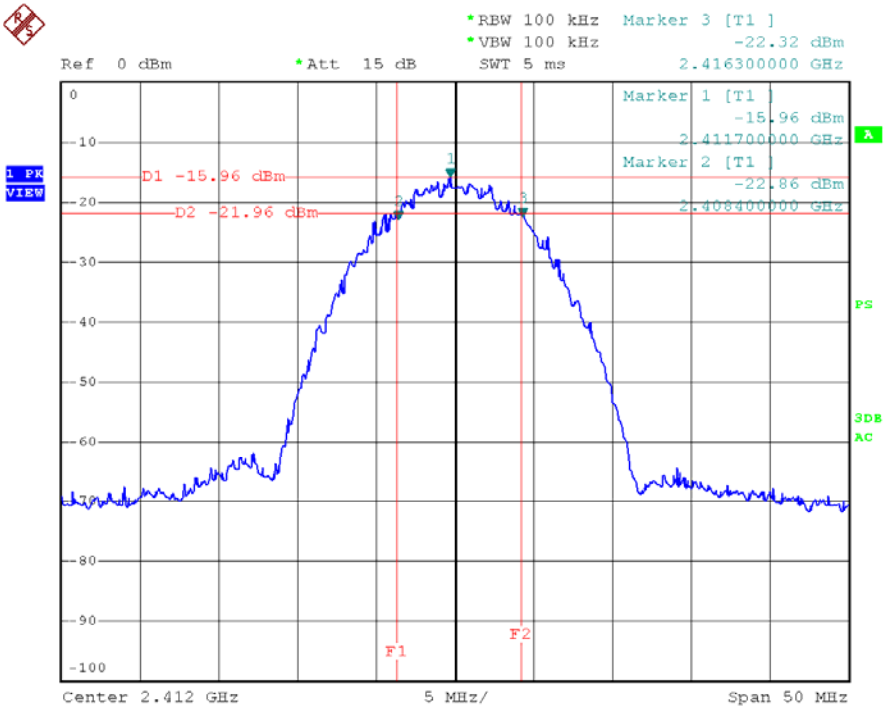
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	17.3		Pass
Mid	2437	16.5	>500	Pass
High	2462	16.5		Pass

f. Test Plots

See the following page.

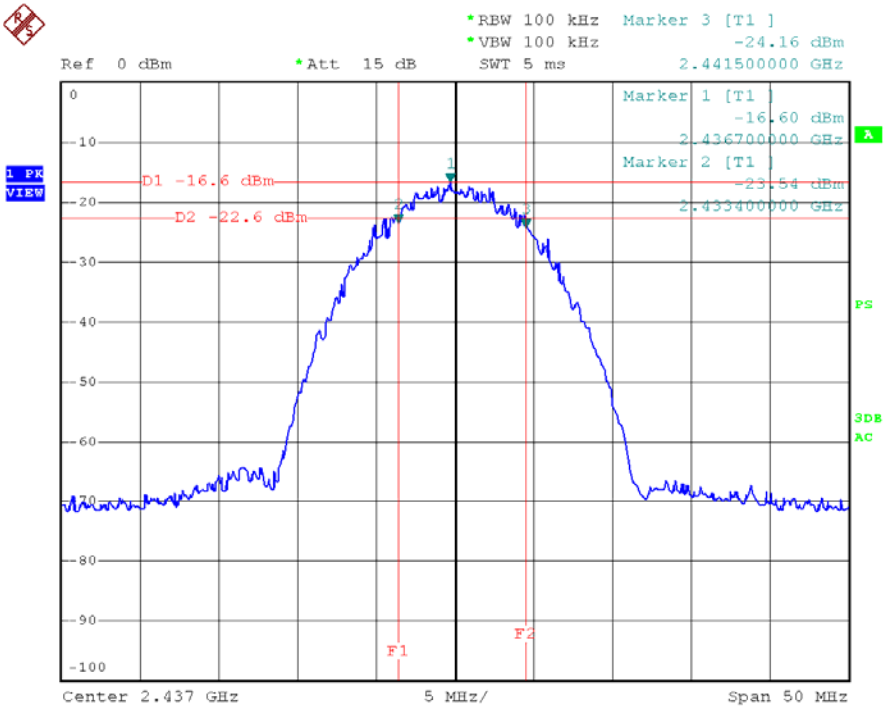
Test Mode: 802.11b---Low



6dB-2412M in 11M

Date: 21.NOV.2011 14:48:04

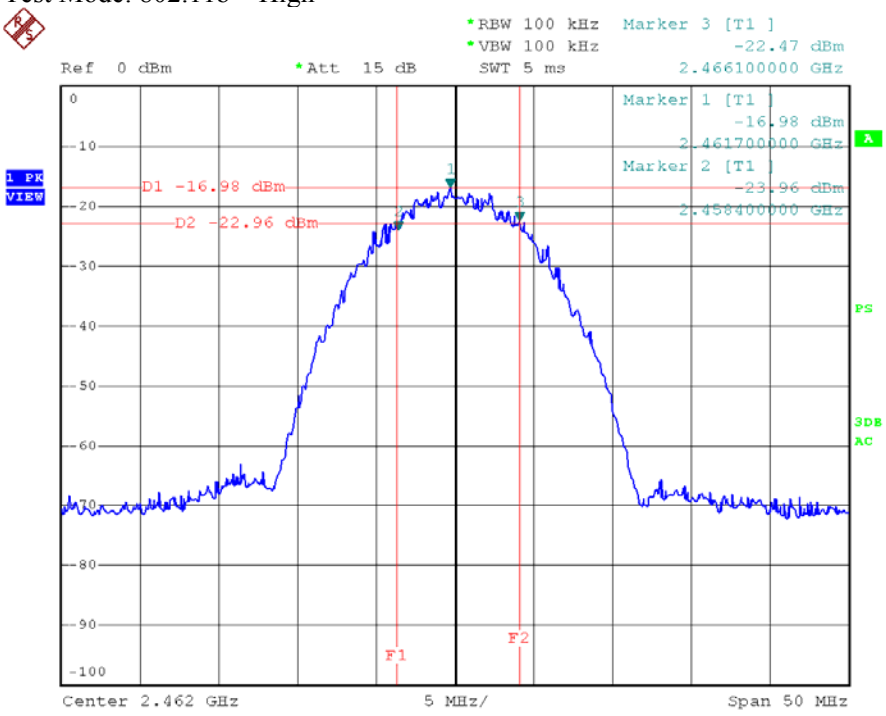
Test Mode: 802.11b---Mid



6dB-2437M in 11M

Date: 21.NOV.2011 14:49:33

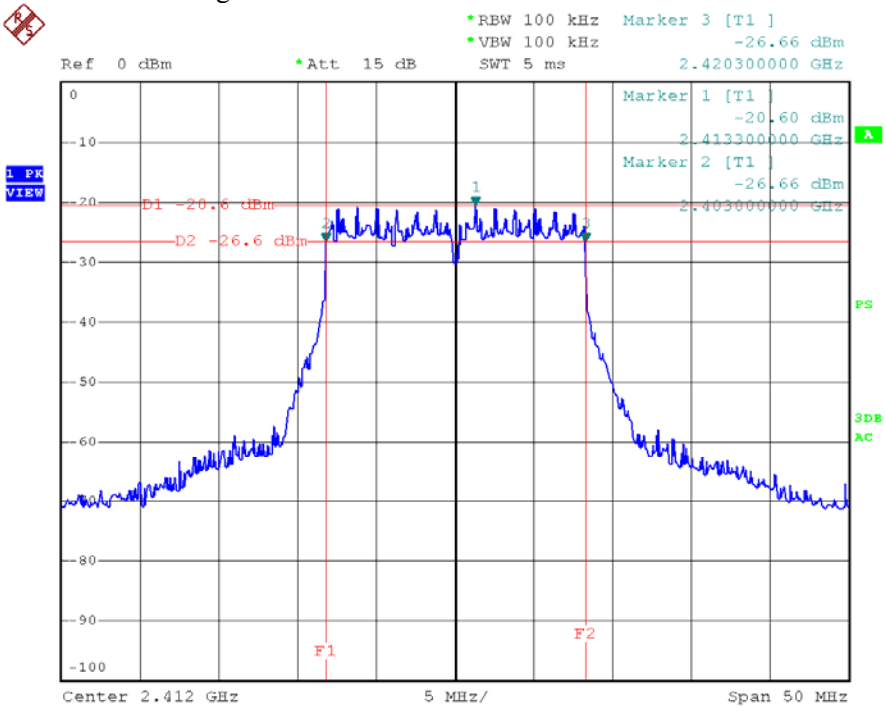
Test Mode: 802.11b---High



6dB-2462M in 11M

Date: 21.NOV.2011 14:50:51

Test Mode: 802.11g---Low

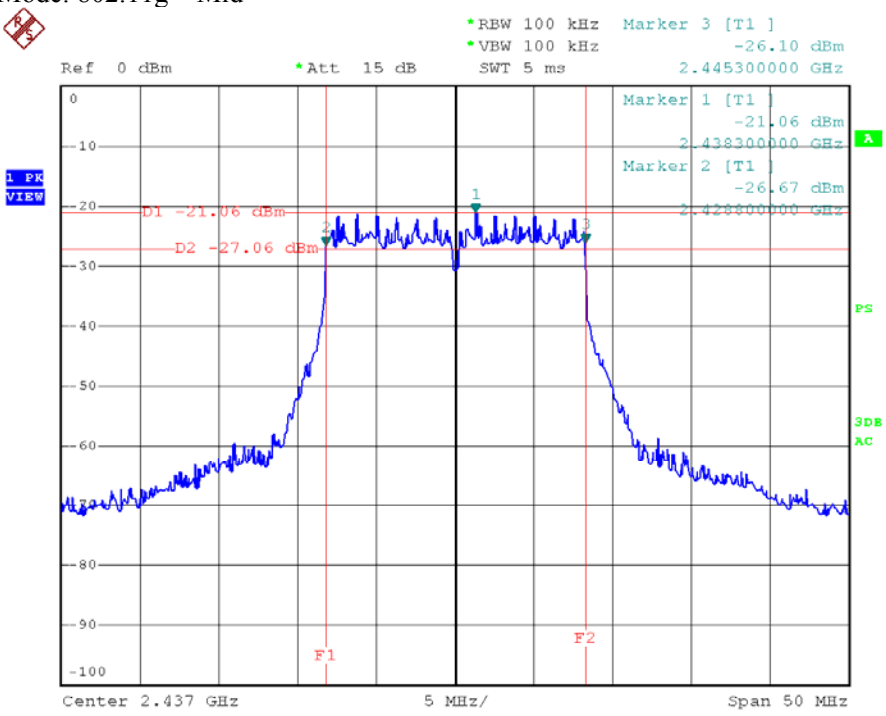


6dB-2412M in 54M

Date: 21.NOV.2011 14:54:47

FCC ID: Y2E-APMJ803WS

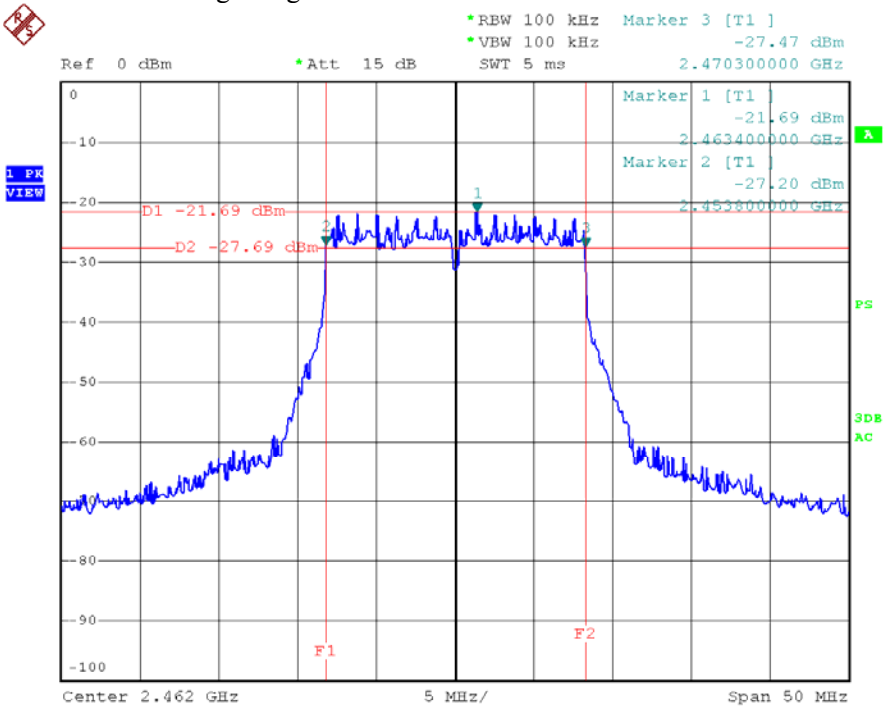
Test Mode: 802.11g---Mid



6dB-2437M in 54M

Date: 21.NOV.2011 14:53:31

Test Mode: 802.11g---High



6dB-2462M in 54M

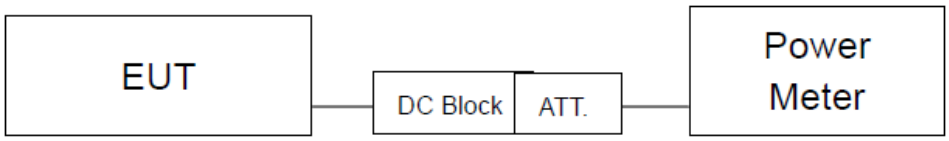
Date: 21.NOV.2011 14:52:07

5.3 Maximum Peak output power test

a. Limt

The maximum peak output power of the intentional radiator shall not exceed the following:
1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. Configuration of Measurement



c. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to DTS test procedure of Oct 2007 KDB558074 for compliance to FCC 47CFR 15.247 requirements. For FCC §15.247(b) the power output was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Peak output power was read directly from power meter. The test was performed at 3 channels (lowest, middle and highest).

d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power		Limit		Result
		(dBm)	(watts)	(dBm)	(watts)	
Low	2412	-7.73	0.000169	30	1	Pass
Mid	2437	-8.39	0.000145			Pass
High	2462	-8.88	0.000129			Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power		Limit		Result
		(dBm)	(watts)	(dBm)	(watts)	
Low	2412	-11.00	0.000079	30	1	Pass
Mid	2437	-11.59	0.000069			Pass
High	2462	-12.05	0.000062			Pass

5.4 Band Edges Measurement

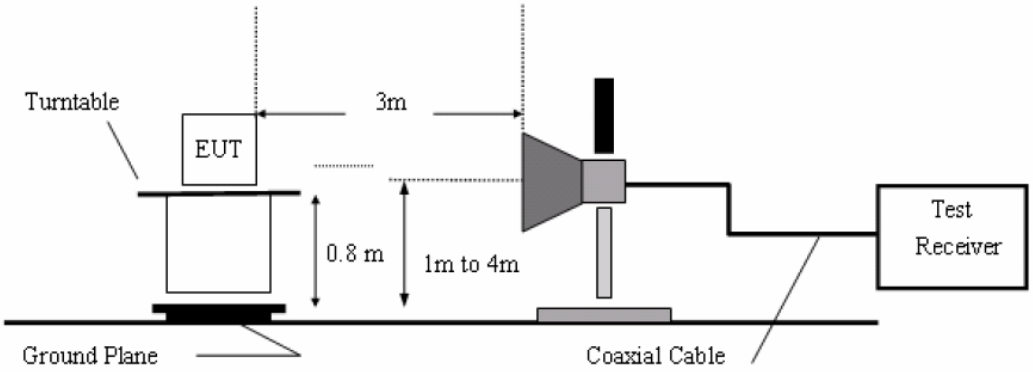
a. Limt

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, 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 in15.209(a).

b. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Peak detector: RBW=100KHz, VBW=100KHz, SWT=AUTO
   Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO
   The EUT is tested in 9*6*6 Chamber.
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

c. Test Setup



d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Restrict Freq. Band (MHz)	Detector Mode	Maximum level (dBμV/m)	Limit (dBm)	Margin (dB)
Low	2310~2390	PK	38.07	74	-35.93
		AV	34.13	54	-19.87
High	2483.5~2500	PK	34.93	74	-39.07
		AV	29.48	54	-24.52

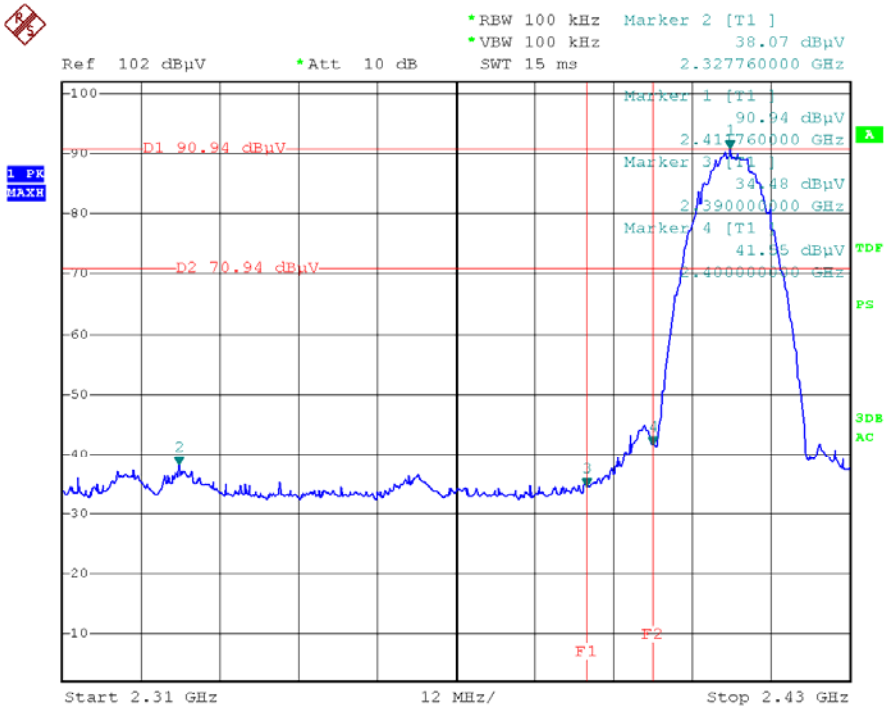
Test mode: IEEE 802.11g

Channel	Restrict Freq. Band (MHz)	Detector Mode	Maximum level (dBμV/m)	Limit (dBm)	Margin (dB)
Low	2310~2390	PK	37.18	74	-36.82
		AV	32.48	54	-21.52
High	2483.5~2500	PK	37.65	74	-36.35
		AV	30.43	54	-23.57

f. Test Plots

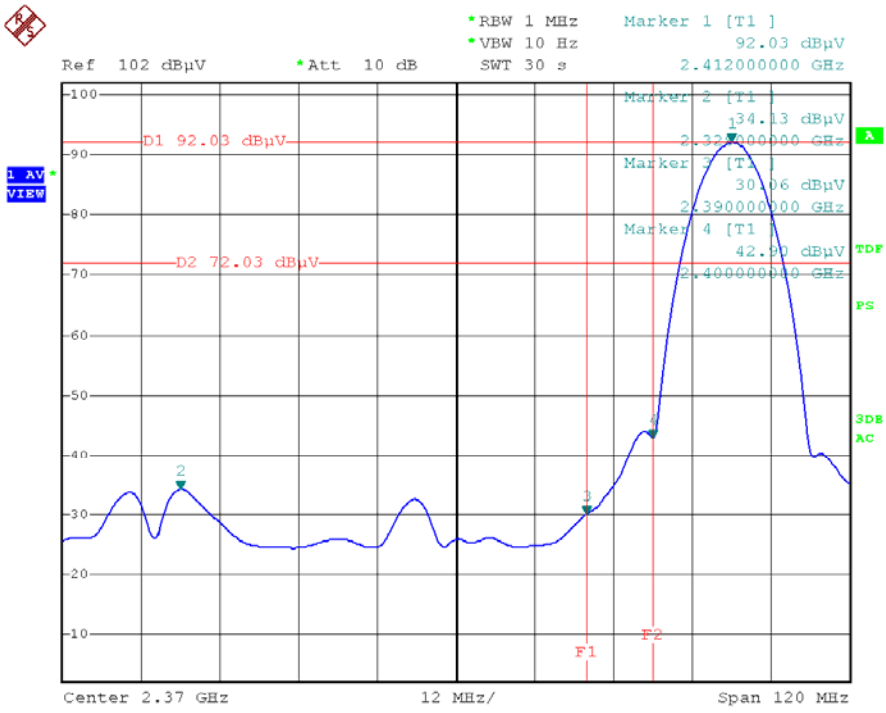
See the following page.

Test Mode: 802.11b ---Low



Band-2412M in 11M

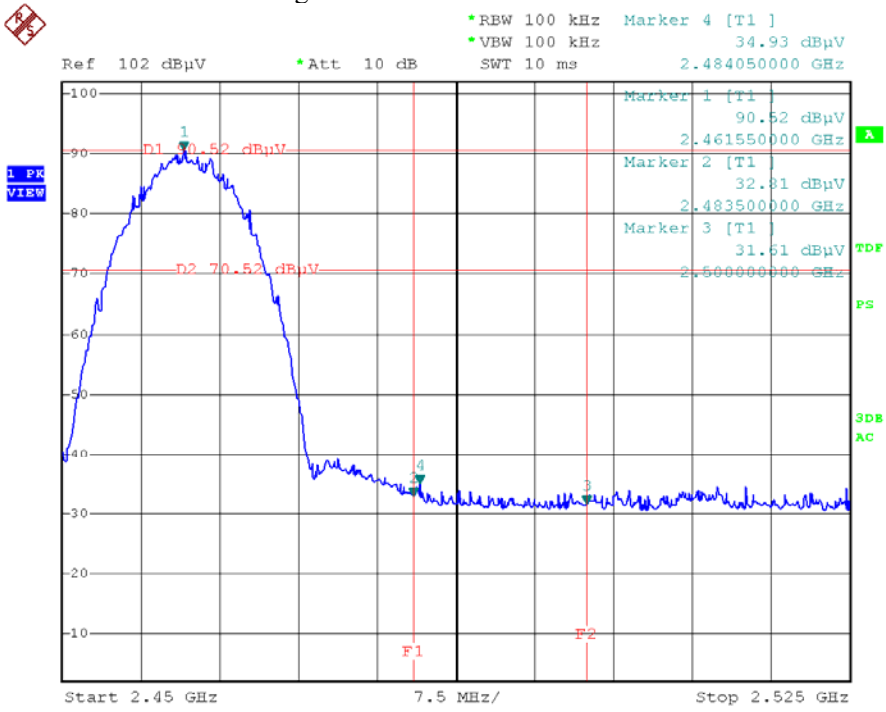
Date: 21.NOV.2011 14:19:08



Band-AV-2412M in 11M

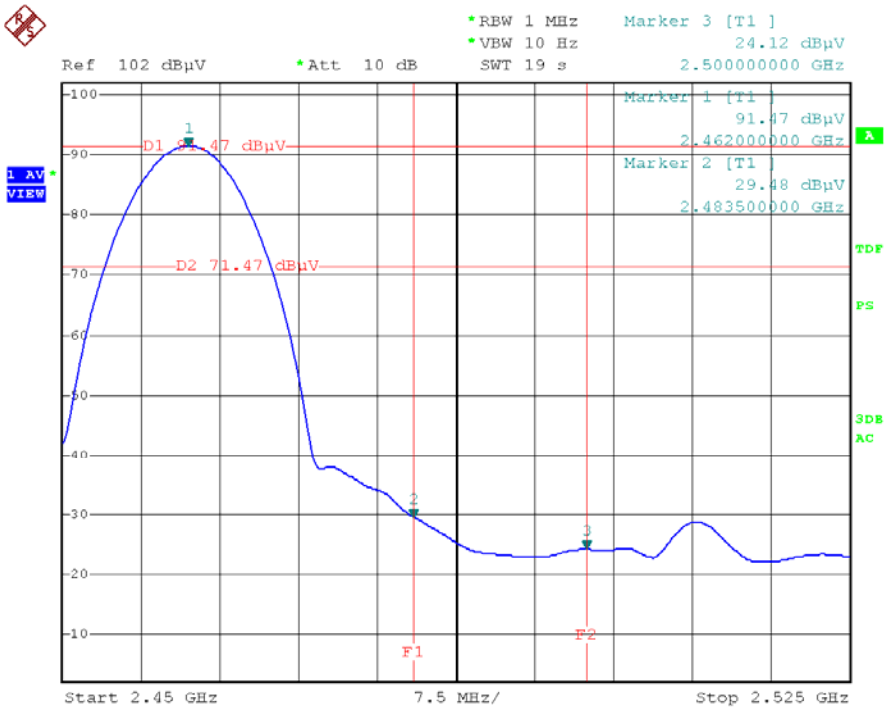
Date: 21.NOV.2011 14:25:15

Test Mode: 802.11b ---High



Band-2462M in 11M

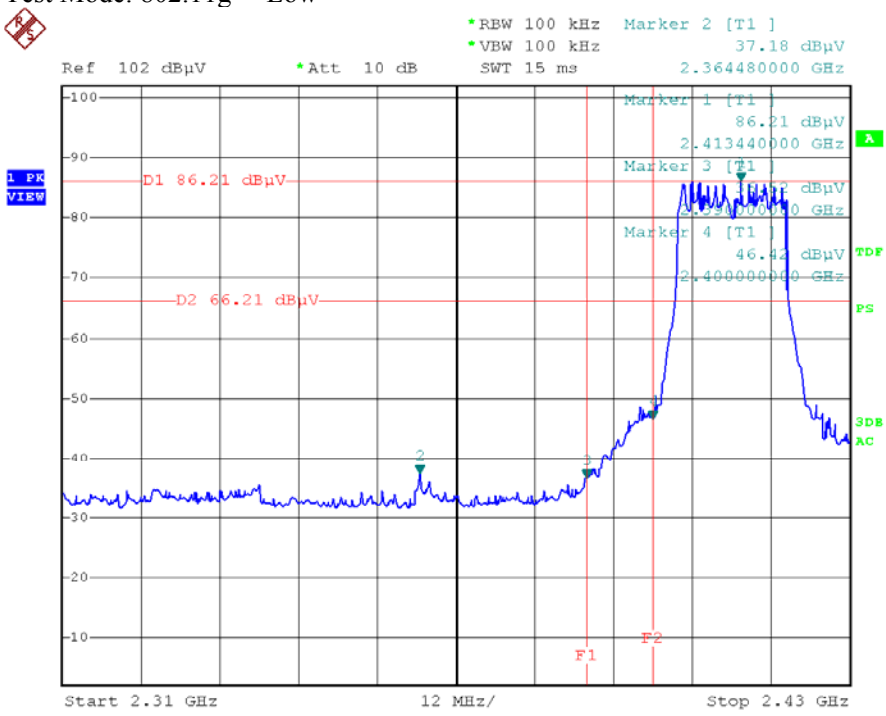
Date: 21.NOV.2011 14:16:03



Band-AV-2462M in 11M

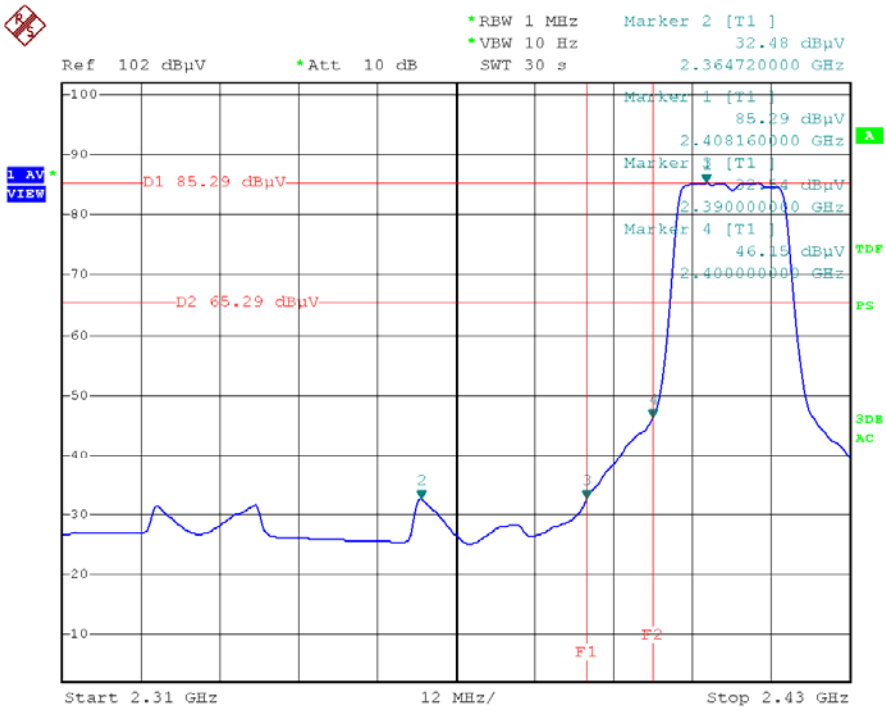
Date: 21.NOV.2011 14:28:56

Test Mode: 802.11g ---Low



Band-2412M in 54M

Date: 21.NOV.2011 14:20:32

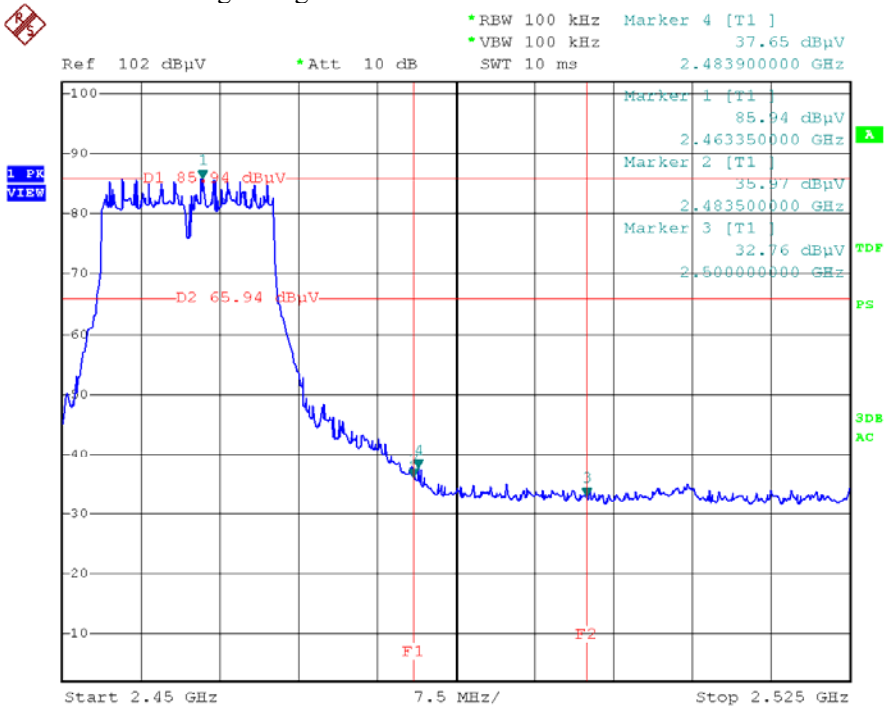


Band-AV-2412M in 54M

Date: 21.NOV.2011 14:22:53

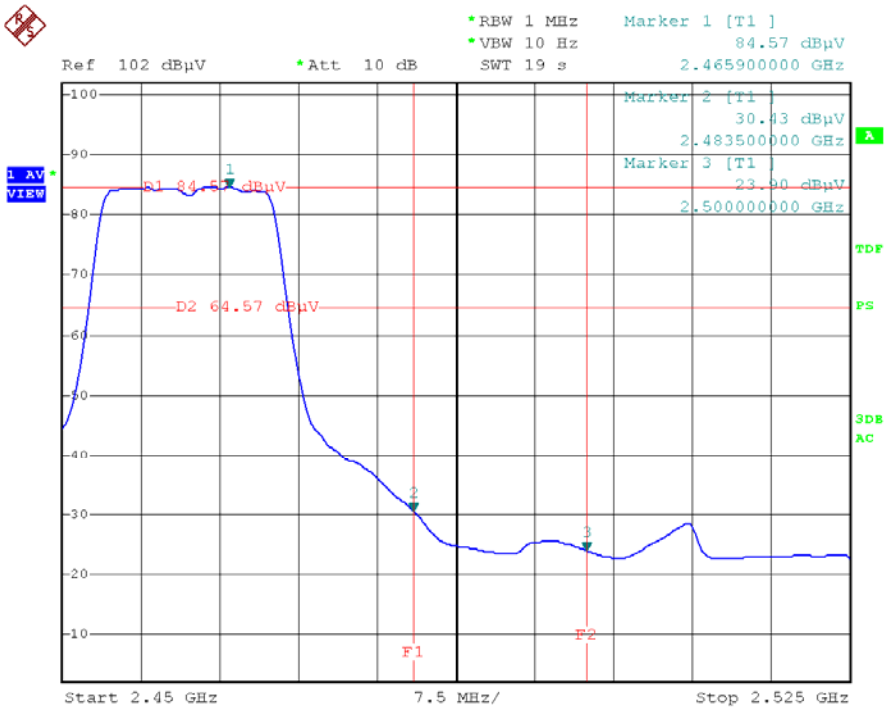
FCC ID: Y2E-APMJ803WS

Test Mode: 802.11g ---High



Band-2462M in 54M

Date: 21.NOV.2011 14:13:04



Band-AV-2462M in 54M

Date: 21.NOV.2011 14:30:06

5.5 Peak Power Spectral Density

a. Limt

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

b. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5MHz, Sweep=500s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

c. Test Setup

See 5.1

d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD(average) (dBm)	∑PPSD (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2412	-28.62	-		-36.62	Pass
Mid	2437	-29.27	-	8.00	-37.27	Pass
High	2462	-29.72	-		-37.72	Pass

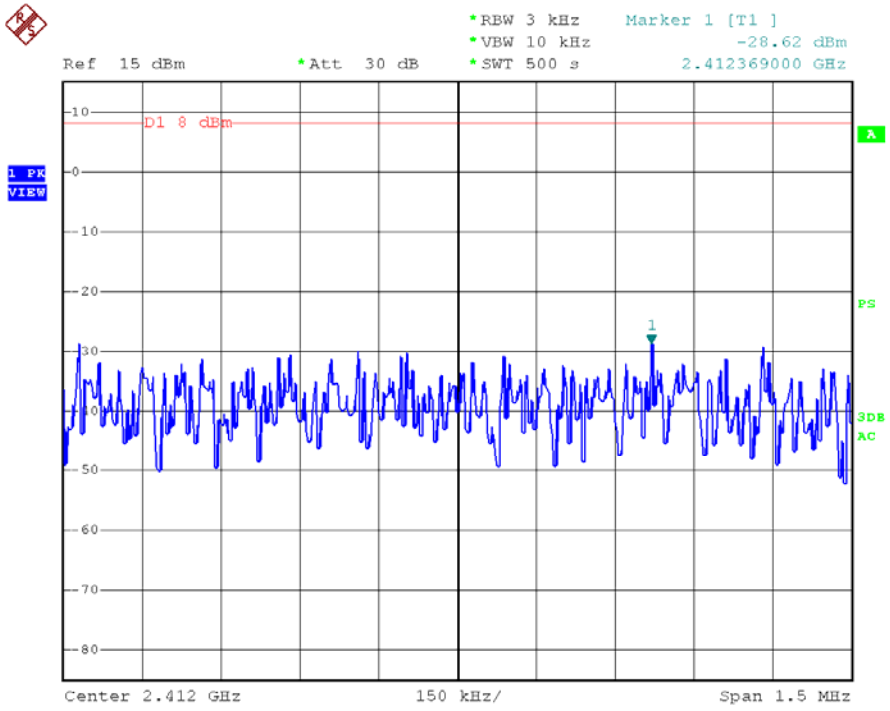
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD(average) (dBm)	∑PPSD (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2412	-36.05	-		-44.05	Pass
Mid	2437	-36.66	-	8.00	-44.66	Pass
High	2462	-37.18	-		-45.18	Pass

f. Test Plot

See the following pages

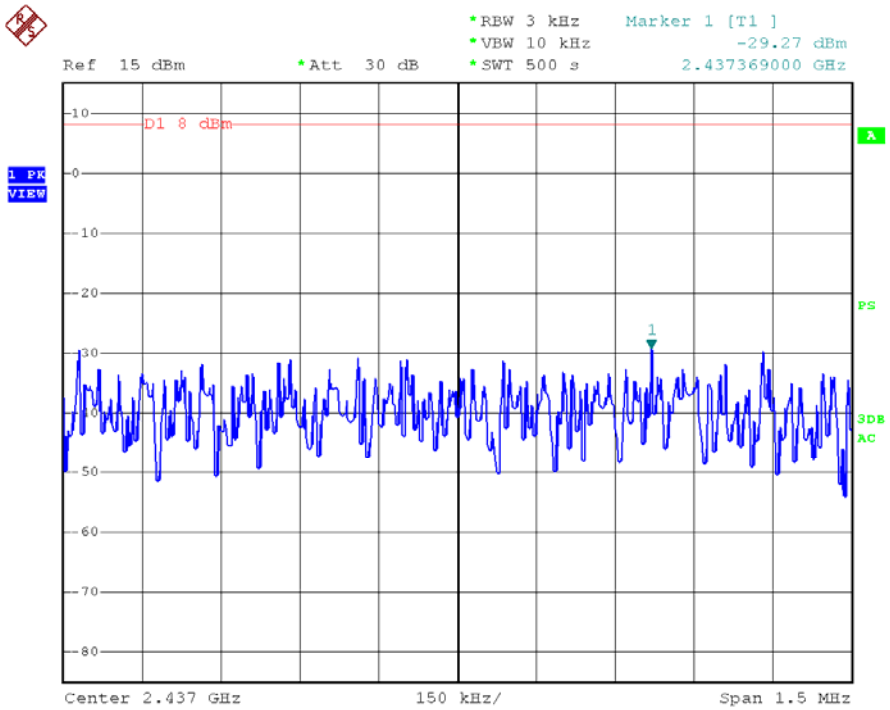
802.11 b CH--Low



Power density-2412M in 11M

Date: 19.NOV.2011 13:48:44

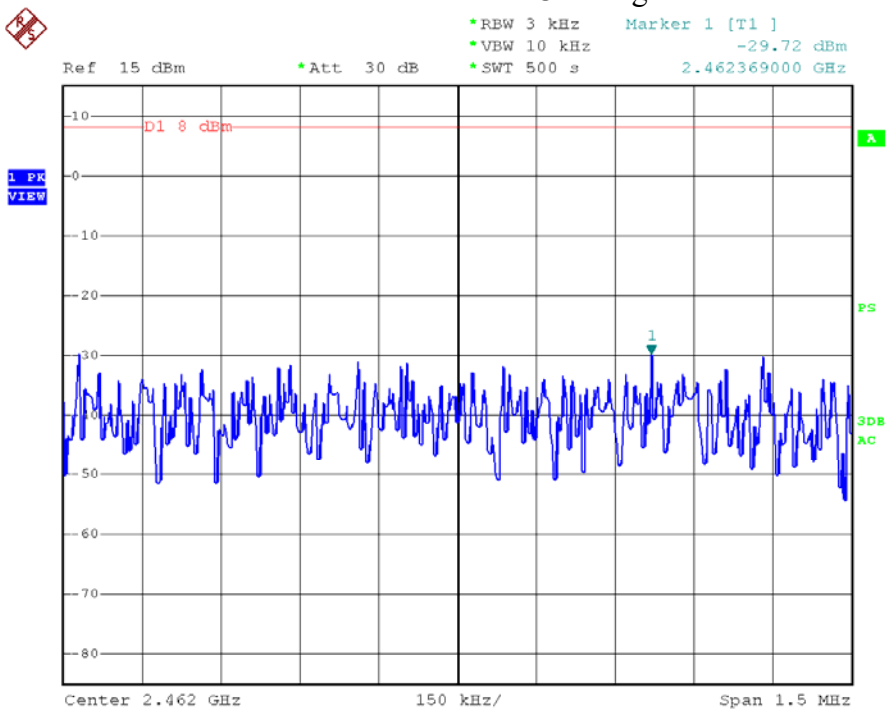
CH--Mid



Power density-2437M in 11M

Date: 19.NOV.2011 13:50:16

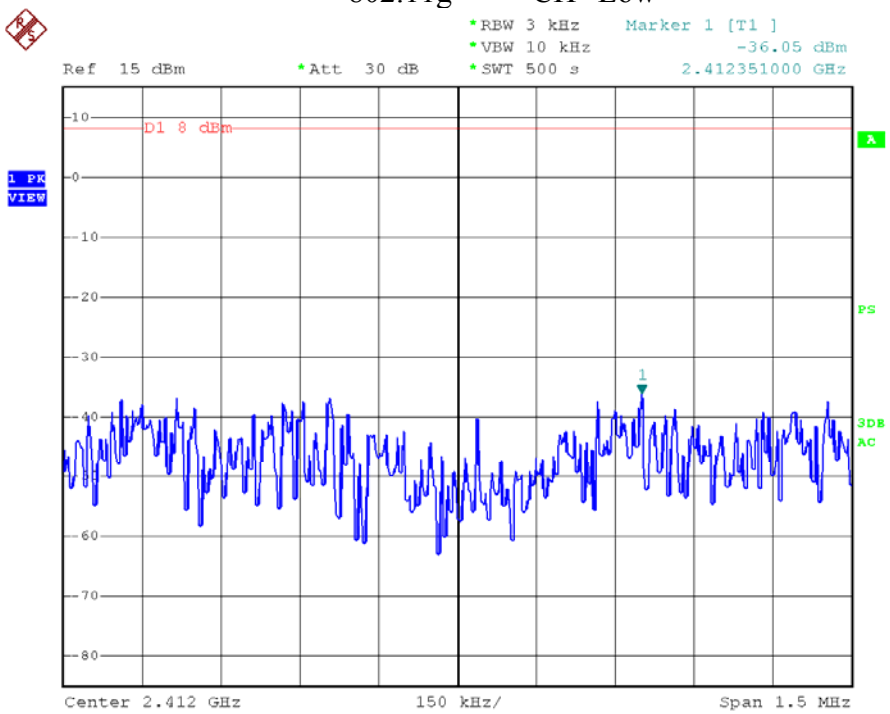
CH--High



Power density-2462M in 11M

Date: 19.NOV.2011 13:51:41

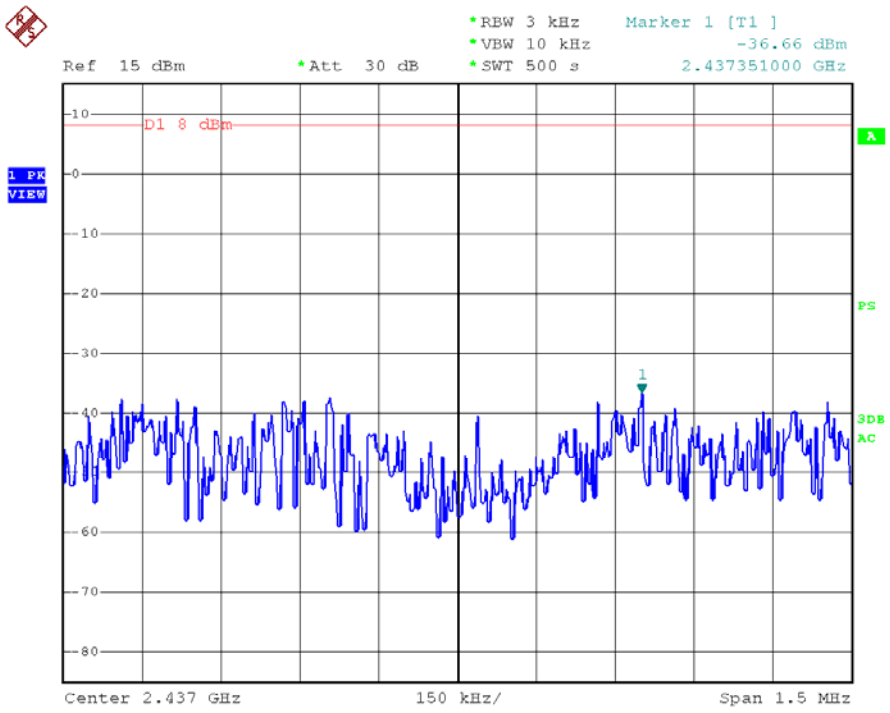
802.11g CH--Low



Power density-2412M in 54M

Date: 19.NOV.2011 14:07:43

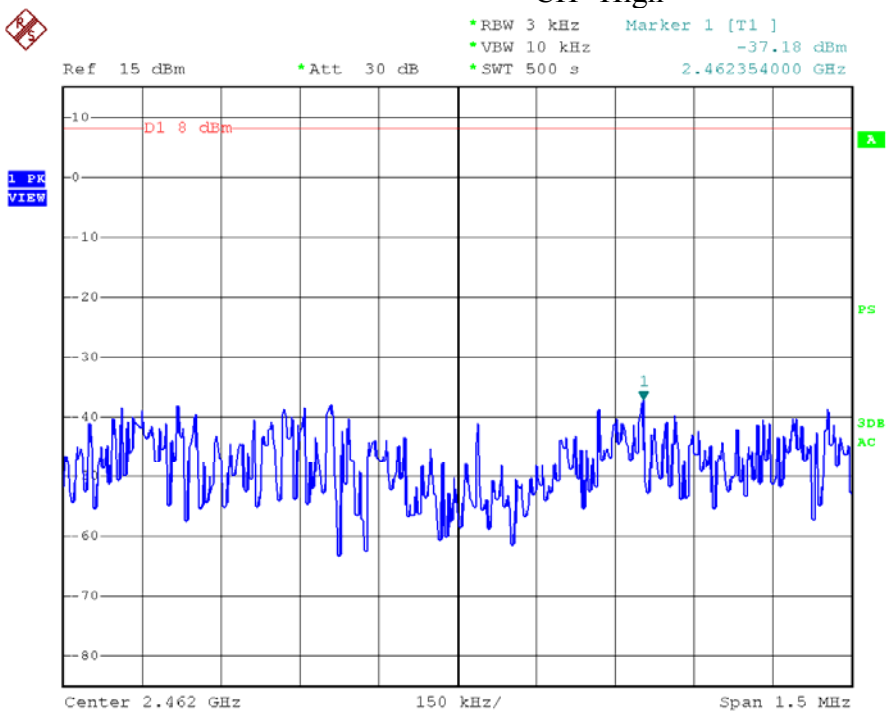
CH--Mid



Power density-2437M in 54M

Date: 19.NOV.2011 14:06:27

CH--High



Power density-2462M in 54M

Date: 19.NOV.2011 14:05:22

5.6 Radiated Emissions

5.6.1. Requirements (15.209 & 15.205):

5.6.1.1. Test Limits (< 30 MHZ)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30

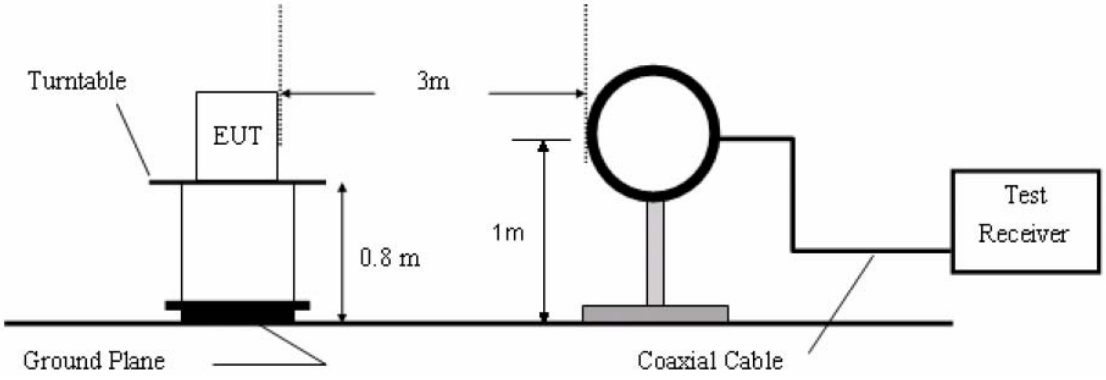
5.6.1.2. Test Limits (≥ 30 MHZ)

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics	S15.209	
902-928 MHZ		30 - 88 MHz	40 dBuV/m @3M
2.4-2.4835 GHz		88 - 216 MHz	43.5
94 dBμV/m @3m	54 dBμV/m @3m	216 - 960 MHz	46
		ABOVE 960 MHz	54dBuV/m

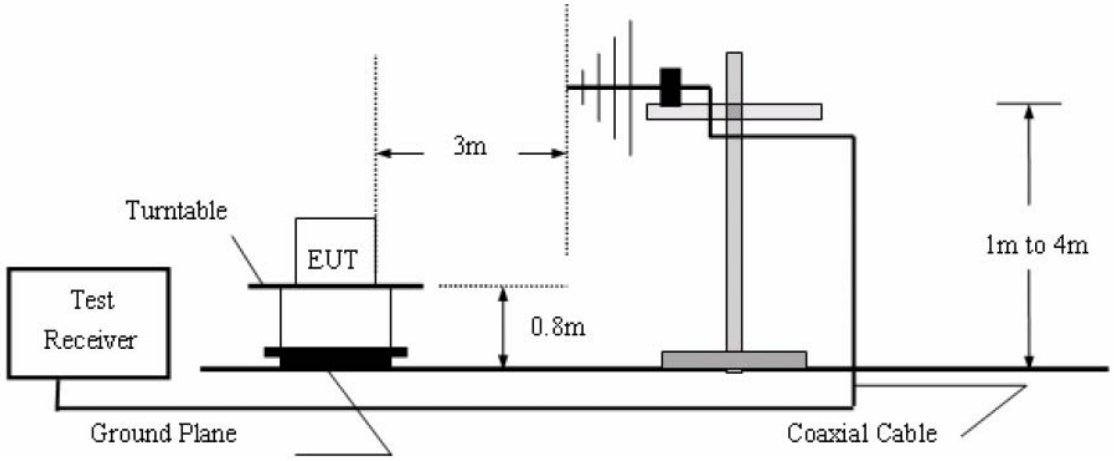
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.205(c)).

5.6.2. Test Configuration:

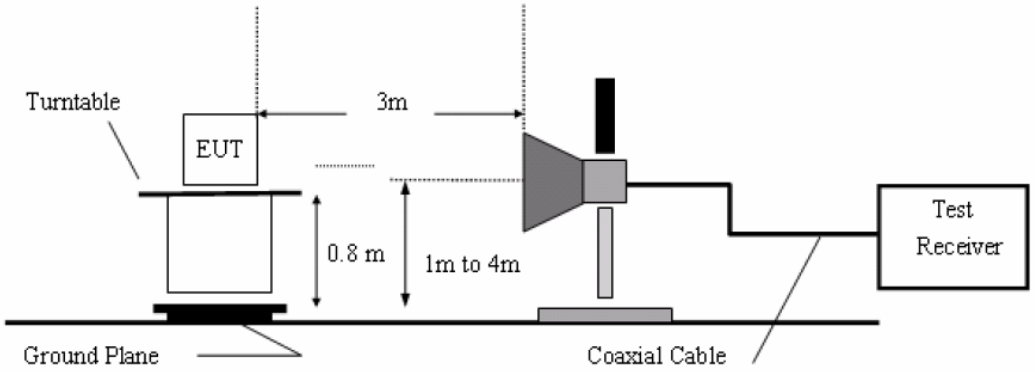
5.6.2.1. 9k to 30MHz emissions:



5.6.2.2. 30M to 1G emissions:



5.6.2.3. 1G to 40G emissions:



5.6.3. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz.
All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz.
The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 5.6.4.

5.6.4.Test Results

Below 30MHz

There is no emissions were detected below 30MHz

From 30MHz to 1 GHz

Operation Mode: Normal link — Test Date: Nov. 11, 2011
Temperature: 25°C — Tested by: Andy Chen
Humidity: 70 % RH — Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Detector Mode (PK/QP)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
166.650	V	Peak	53.40	-15.40	38.00	43.50	-5.50
333.686	V	Peak	53.93	-13.17	40.76	46.00	-5.24
399.166	V	Peak	49.39	-8.58	40.81	46.00	-5.19
421.020	V	Peak	49.40	-8.13	41.47	46.00	-4.73
490.000	V	Peak	47.46	-7.56	40.90	46.00	-6.10
638.180	V	Peak	44.33	-4.84	40.49	46.00	-6.51
142.050	H	Peak	54.52	-16.59	37.93	43.50	-5.57
161.460	H	Peak	55.42	-15.01	40.41	43.50	-3.09
178.950	H	Peak	54.44	-14.78	39.66	43.50	-3.84
324.500	H	Peak	51.42	-10.15	41.27	46.00	-4.73
330.666	H	Peak	50.46	-9.87	41.59	46.00	-5.41
598.716	H	Peak	45.62	-5.68	39.94	46.00	-6.06

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz and the IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low — Test Date: Nov. 11, 2011
Temperature: 25°C — Tested by: Andy Chen
Humidity: 70 % RH — Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4824	H	47.86	35.76	4.58	34.94	53.26	---	74.00	54.00	-20.74	Peak
2.	4824	H	40.05	35.76	4.58	34.94	---	45.46	74.00	54.00	-8.54	AVG
3.	7240	H	43.87	37.85	5.63	35.25	52.09	---	74.00	---	---	Peak
4.	9648	H	43.61	39.39	6.34	35.70	53.64	---	74.00	---	---	Peak
5.	12060	H	---	---	---	---	---	---	---	---	---	---
6.	14472	H	---	---	---	---	---	---	---	---	---	---
7.	16884	H	---	---	---	---	---	---	---	---	---	---
8.	19296	H	---	---	---	---	---	---	---	---	---	---
9.	21708	H	---	---	---	---	---	---	---	---	---	---
10.	24120	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4824	V	48.08	35.13	4.58	34.94	---	52.85	74.00	54.00	-1.15	AVG
2.	4824	V	52.06	35.13	4.58	34.94	56.83	---	74.00	54.00	-17.17	Peak
3.	7240	V	44.07	36.90	5.63	35.25	51.34	---	74.00	---	---	Peak
4.	9648	V	45.05	38.57	6.34	35.70	54.26	---	74.00	---	---	Peak
5.	12060	V	---	---	---	---	---	---	---	---	---	---
6.	14472	V	---	---	---	---	---	---	---	---	---	---
7.	16884	V	---	---	---	---	---	---	---	---	---	---
8.	19296	V	---	---	---	---	---	---	---	---	---	---
9.	21708	V	---	---	---	---	---	---	---	---	---	---
10.	24120	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11b / CH Mid
Temperature: 25°C
Humidity: 70 % RH

Test Date: Nov. 11, 2011
Tested by: Andy Chen
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4874	H	41.19	35.83	4.61	34.93	---	46.70	74.00	54.00	-7.30	AVG
2.	4874	H	48.76	35.83	4.61	34.93	54.28	---	74.00	54.00	-19.72	Peak
3.	7311	H	42.70	37.86	5.64	35.26	50.94	---	74.00	54.00	-3.06	Peak
4.	9748	H	43.24	39.51	6.36	35.70	53.40	---	74.00	---	---	Peak
5.	12185	H	---	---	---	---	---	---	---	---	---	---
6.	14622	H	---	---	---	---	---	---	---	---	---	---
7.	17059	H	---	---	---	---	---	---	---	---	---	---
8.	19496	H	---	---	---	---	---	---	---	---	---	---
9.	21933	H	---	---	---	---	---	---	---	---	---	---
10.	24370	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4874	V	48.00	35.18	4.61	34.93	---	52.87	74.00	54.00	-1.13	AVG
2.	4874	V	52.14	35.18	4.61	34.93	57.01	---	74.00	54.00	-16.99	Peak
3.	7311	V	43.32	36.92	5.64	35.26	50.62	---	74.00	54.00	-3.38	Peak
4.	9748	V	43.69	38.71	6.36	35.70	53.05	---	74.00	---	---	Peak
5.	12185	V	---	---	---	---	---	---	---	---	---	---
6.	14622	V	---	---	---	---	---	---	---	---	---	---
7.	17059	V	---	---	---	---	---	---	---	---	---	---
8.	19496	V	---	---	---	---	---	---	---	---	---	---
9.	21933	V	---	---	---	---	---	---	---	---	---	---
10.	24370	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11b / CH High
Temperature: 25°C
Humidity: 70 % RH

Test Date: Nov. 11, 2011
Tested by: Andy Chen
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4924	H	40.50	35.90	4.68	34.92	---	46.16	74.00	54.00	-7.84	AVG
2.	4924	H	48.77	35.90	4.68	34.92	54.43	---	74.00	54.00	-19.57	Peak
3.	7386	H	42.66	37.88	5.65	35.28	50.91	---	74.00	54.00	-3.09	Peak
4.	9848	H	43.86	39.61	6.38	35.70	54.15	---	74.00	---	---	Peak
5.	12310	H	---	---	---	---	---	---	---	---	---	---
6.	14772	H	---	---	---	---	---	---	---	---	---	---
7.	17234	H	---	---	---	---	---	---	---	---	---	---
8.	19696	H	---	---	---	---	---	---	---	---	---	---
9.	22158	H	---	---	---	---	---	---	---	---	---	---
10.	24620	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4924	V	51.81	35.23	4.68	34.92	56.80	---	74.00	54.00	-17.20	Peak
2.	4924	V	47.64	35.23	4.68	34.92	---	52.63	74.00	54.00	-1.37	AVG
3.	7386	V	43.40	36.96	5.65	35.28	50.73	---	74.00	54.00	-3.27	Peak
4.	9848	V	43.65	38.81	6.38	35.70	53.14	---	74.00	---	---	Peak
5.	12310	V	---	---	---	---	---	---	---	---	---	---
6.	14772	V	---	---	---	---	---	---	---	---	---	---
7.	17234	V	---	---	---	---	---	---	---	---	---	---
8.	19696	V	---	---	---	---	---	---	---	---	---	---
9.	22158	V	---	---	---	---	---	---	---	---	---	---
10.	24620	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11g / CH Low
Temperature: 25°C
Humidity: 70 % RH

Test Date: Nov. 11, 2011
Tested by: Andy Chen
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4824	H	46.12	35.76	4.58	34.94	51.52	---	74.00	---	-22.48	Peak
2.	4824	H	31.17	35.76	4.58	34.94	---	36.57	---	54.00	-17.43	AVG
3.	7240	H	43.17	37.85	5.63	35.25	51.40	---	---	---	---	Peak
4.	9648	H	43.41	39.39	6.34	35.70	53.44	---	---	---	---	Peak
5.	12060	H	---	---	---	---	---	---	---	---	---	---
6.	14472	H	---	---	---	---	---	---	---	---	---	---
7.	16884	H	---	---	---	---	---	---	---	---	---	---
8.	19296	H	---	---	---	---	---	---	---	---	---	---
9.	21708	H	---	---	---	---	---	---	---	---	---	---
10.	24120	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4824	V	34.70	35.13	4.58	34.94	---	39.48	74.00	54.00	-14.52	AVG
2.	4824	V	46.81	35.13	4.58	34.94	51.58	---	74.00	54.00	-22.42	Peak
3.	7240	V	43.70	36.90	5.63	35.25	50.97	---	---	---	---	Peak
4.	9648	V	43.27	38.59	6.34	35.70	52.50	---	---	---	---	Peak
5.	12060	V	---	---	---	---	---	---	---	---	---	---
6.	14472	V	---	---	---	---	---	---	---	---	---	---
7.	16884	V	---	---	---	---	---	---	---	---	---	---
8.	19296	V	---	---	---	---	---	---	---	---	---	---
9.	21708	V	---	---	---	---	---	---	---	---	---	---
10.	24120	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11g / CH Mid
Temperature: 25°C
Humidity: 70 % RH

Test Date: Nov. 11, 2011
Tested by: Andy Chen
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4874	H	44.32	35.83	4.61	34.93	49.84	---	---	54.00	-4.16	Peak
2.	7311	H	42.24	37.86	5.64	35.26	50.48	---	---	54.00	-3.52	Peak
3.	9748	H	43.05	39.51	6.36	35.70	53.21	---	---	---	---	Peak
4.	12185	H	---	---	---	---	---	---	---	---	---	---
5.	14622	H	---	---	---	---	---	---	---	---	---	---
6.	17059	H	---	---	---	---	---	---	---	---	---	---
7.	19496	H	---	---	---	---	---	---	---	---	---	---
8.	21933	H	---	---	---	---	---	---	---	---	---	---
9.	24370	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4874	V	45.07	35.18	4.61	34.93	49.94	---	---	54.00	-4.06	Peak
2.	7311	V	43.68	36.92	5.64	35.26	50.98	---	---	54.00	-3.02	Peak
3.	9748	V	43.31	38.71	6.36	35.70	52.68	---	---	---	---	Peak
4.	12185	V	---	---	---	---	---	---	---	---	---	---
5.	14622	V	---	---	---	---	---	---	---	---	---	---
6.	17059	V	---	---	---	---	---	---	---	---	---	---
7.	19496	V	---	---	---	---	---	---	---	---	---	---
8.	21933	V	---	---	---	---	---	---	---	---	---	---
9.	24370	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11g / CH High
Temperature: 25°C
Humidity: 70 % RH

Test Date: Nov. 11, 2011
Tested by: Andy Chen
Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4924	H	42.74	35.90	4.68	34.92	48.40	---	---	54.00	-5.60	Peak
2.	7386	H	42.05	37.88	5.65	35.28	50.30	---	---	54.00	-3.70	Peak
3.	9848	H	43.75	39.61	6.38	35.70	54.04	---	---	---	---	Peak
4.	12310	H	---	---	---	---	---	---	---	---	---	---
5.	14772	H	---	---	---	---	---	---	---	---	---	---
6.	17234	H	---	---	---	---	---	---	---	---	---	---
7.	19696	H	---	---	---	---	---	---	---	---	---	---
8.	22158	H	---	---	---	---	---	---	---	---	---	---
9.	24620	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4924	V	44.05	35.23	4.68	34.92	49.04	---	---	54.00	-4.96	Peak
2.	7386	V	43.23	36.96	5.65	35.28	50.56	---	---	54.00	-3.44	Peak
3.	9848	V	43.18	38.81	6.38	35.70	52.67	---	---	---	---	Peak
4.	12310	V	---	---	---	---	---	---	---	---	---	---
5.	14772	V	---	---	---	---	---	---	---	---	---	---
6.	17234	V	---	---	---	---	---	---	---	---	---	---
7.	19696	V	---	---	---	---	---	---	---	---	---	---
8.	22158	V	---	---	---	---	---	---	---	---	---	---
9.	24620	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shownin Actual FS column.
4. Spectrum setting:
a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.