FCC Part 15.247(WIFI)
TEST REPORT

for

EDGE Quadband with full QWERTY Keypad Mobile Phone/i720

Model Name: I720
Trade Name: Verykool
Report No.: SH09080017W01
FCC ID: WA6I720

prepared for

Verykool USA Inc.
4350 Executive Dr. #100, San Diego, CA 92121, USA

prepared by

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CTIA Authorized Test Lab
LAB CODE 20081223-00

Table of Contents

1. TEST REPORT CERTIFICATION 4

2. GENERAL INFORMATION 5

2.1. DESCRIPTION OF EUT 5

2.2. Objective 6

2.3. Test Standards and Results 6

2.4. List of Equipments Used 6

2.5. Test Facility 7

2.6. Environmental conditions 7

2.7. Setup of Equipment Under Test 7

2.7.1. DESCRIPTION OF SUPPORT UNITS 7

2.7.2. EUT Operating Condition 7

3. CONDUCTED EMISSION TEST 8

3.1. Limits of Conducted Emission 8

3.2. Test Procedure 8

3.3. Test Setup 9

3.4. EUT Setup and Operating Conditions 9

3.5. Test Results 10

4. RADIATED EMISSION TEST 12

4.1. Limits of Radiated Emission 12

4.2. Test Procedure 12

4.3. Test Setup 13

4.4. EUT Setup and Operating Conditions 13

4.5. Test Results 14

5. 6DB BANDWIDTH MEASUREMENT 15

5.1. Definition 15

5.2. Test Procedure 15

5.3. Test Setup 15

5.4. Setup and Operating Conditions 15

5.5. Test Results 16

6. MAXIMUM PEAK OUTPUT POWER 20

6.1. Requirement of the standard 20
6.2. Test Procedure 20
6.3. Test Setup 20
6.4. EUT Setup and Operating Conditions 20
6.5. Test Results 20
7. BAND EDGE 24
7.1. Requirement of the standard 24
7.2. Test Procedure 24
7.3. Test Setup 24
7.4. EUT Setup and Operating Conditions 24
7.5. Test Results 24
8. CONDUCTED SPURIOUS EMISSION 29
8.1. Requirement of the standard 29
8.2. Test Procedure 29
8.3. Test Setup 29
8.4. EUT Setup and Operating Conditions 29
8.5. Test Results 29
9. POWER SPECTRUM DENSITY MEASUREMENT 33
9.1. Limits of Power Spectrum Density 33
9.2. Test Procedure 33
9.3. Test Setup 33
9.4. EUT Setup and Operating Conditions 33
9.5. Test Results 33

1. Test Report Certification

Equipment under Test:	EDGE Quadband with full QWERTY Keypad Mobile Phone/i720
Brand Name:	Verykool
Model Name:	I720
FCC ID:	WA6I720
Applicant:	Verykool USA Inc. 4350 Executive Dr. #100, San Diego, CA 92121, USA
Manufacturer:	Verykool USA Inc. 4350 Executive Dr. #100, San Diego, CA 92121, USA
Test Standards:	47 CFR Part 15,Subpart C
Test Date(s):	Jan,25 2010 –Feb,4, 2010
Test Result:	PASS

*** We Hereby Certify That:**

The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related European Commission's standards.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: ..... Zhang Wenjie Dated: ..... 2010. 3. 2. .....

Reviewed by: ..... Zhang Jun Dated: ..... 2010. 3. 2. .....

Approved by: ..... Su Feng Dated: ..... 2010.3.2 .....

2. General Information

2.1. DESCRIPTION OF EUT

Product	EDGE Quadband with full QWERTY Keypad Mobile Phone/i720
Brand Name	Verykool
Model Number	I720
WIFI module Model name	I720
WIFI module Brand name	Verykool
Frequency Range	2412 ~ 2472 MHz
Transmit Power	≤20dBm
Modulation Technique	DSSS /OFDM
Number of Channels	11 Channels
Antenna Information	Manufacturer: Sunway Type: PIFA Gain: 0.9dB
Temperature Range	-10 ~ +70°C
Hardware Version	W34ms00b1
Software Version	T081105

NOTE:

1. The EUT is a GSM、GPRS、EDGE、BLUETOOTH、WIFI mobile phone. It provides Wi-Fi (IEEE 802.11b and IEEE 802.11g) wireless interface, operating at 2.4GHz ISM band. The Wi-Fi odulations are Direct Sequence Spread Spectrum (DSSS) for IEEE 802.11b and Orthogonal Frequency Division Multiplexing (OFDM) for IEEE 802.11g. The Channels and transmitter center frequencies are:

- Channel 1: 2412 MHz (lowest channel)
- Channel 2: 2417 MHz
- Channel 3: 2422 MHz
- Channel 4: 2427 MHz
- Channel 5: 2432 MHz
- Channel 6: 2437 MHz (middle channel)
- Channel 7: 2442 MHz
- Channel 8: 2447 MHz
- Channel 9: 2452 MHz
- Channel 10: 2457 MHz
- Channel 11: 2462 MHz (highest channel)

2. Please refer to Appendix I for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.

2.2. Objective

Perform EMC test according to FCC Part 15 Subpart C (Wi-Fi, 2.4GHz ISM band radiator).

2.3. Test Standards and Results

The EUT has been tested according to 47 CFR Part 15, Radio Frequency Devices.
Test items and the results are as bellow:

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№	FCC Rules	Test Type	Result
1	§15.207	Conducted Emission	PASS
2	§15.209 §15.247(c)	Radiated Emission	PASS
3	§15.247(a)	6dB Bandwidth	PASS
4	§15.247(b)	Maximum Peak Output Power	PASS
5	§15.247(c)	Band Edge	PASS
6	§15.247(c)	Conducted Spurious Emission	PASS
7	§15.247(d)	Power Spectrum Density	PASS

2.4. List of Equipments Used

Description	Manufacturer	Model No.	Cal. Date	Serial No.
Test Receiver	Rohde & Schwarz	ESIB26	2009.10	A0304218
Test Receiver	Schwarzbeck	FCKL1528	2009.10	A0304230
Spectrum Analyzer	Rohde & Schwarz	FSP13	2009.10	M-030176
Spectrum Analyzer	Agilent	E4440A	2009.10	MY46187763
LISN	Schwarzbeck	NSLK8127	2009.10	A0304233
Loop Antenna	Rohde & Schwarz	HFH2-Z2	2009.10	A0304220
Ultra Broadband Ant.	Rohde & Schwarz	HL562	2009.10	A0304224
Horn Ant.	Rohde & Schwarz	HF906	2009.10	100150
Shield Room	Nanbo Tech	Site 1	2009.10	A0304188
Anechoic Chamber	Albatross	EMC12.8×6.8×6.4(m)	2009.10	A0304210

2.5. Test Facility

Shenzhen Electronic Product Quality Testing Center Morlab Laboratory is a testing organization accredited by China National Accreditation Board for Laboratories (CNAL) according to ISO/IEC 17025. The accreditation certificate number is L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 CHINA. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

2.6. Environmental conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	20 - 25
Relative Humidity (%):	40 - 60
Atmospheric Pressure (kPa):	96

2.7. Setup of Equipment Under Test

2.7.1. DESCRIPTION OF SUPPORT UNITS

NO	Description	Manufacturer	Model No.
1	Note book PC	DELL	Latitude D610
2	Note book PC	HP	nx6130
3	Wi-Fi wireless router	D-LINK	DI-624+A

2.7.2. EUT Operating Condition

1. Use the two Note book PC to Setup the communication system for test
2. Wireless Router to provide IP to the EUT.
3. Notebook PC (1) ping 192.168.1.212 to EUT.
4. Notebook PC (2) ping 192.168.0.151 to EUT.
6. All of the function are under run.
7. Start test.

3. Conducted Emission Test

3.1. Limits of Conducted Emission

According to FCC §15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

NOTE:

1. The lower limit shall apply at the band edges.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.2. Test Procedure

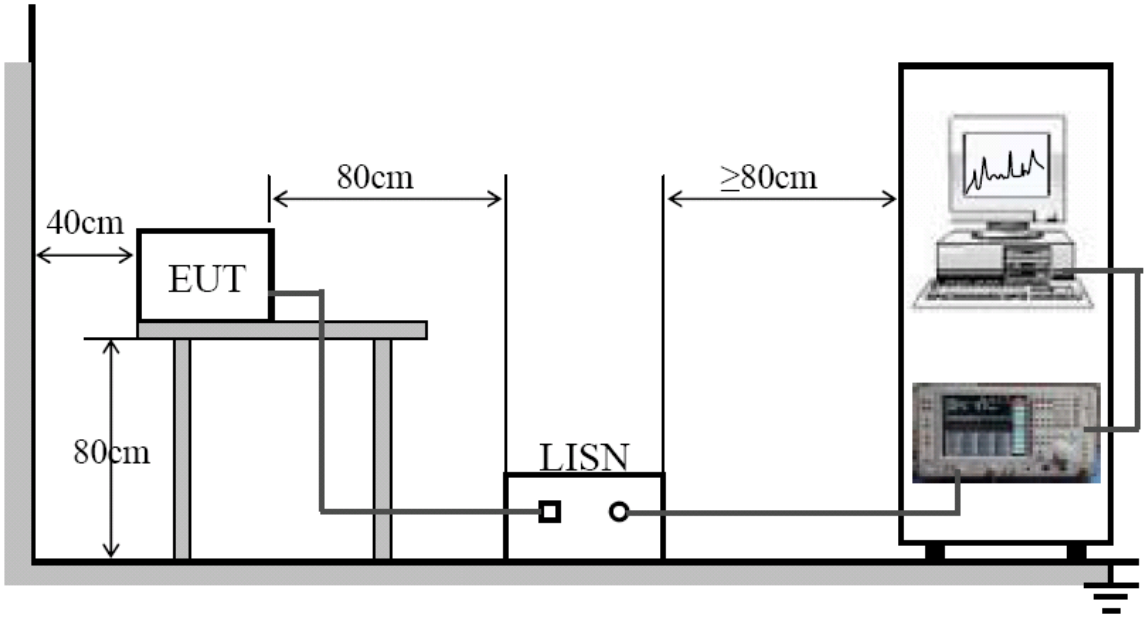
a. The EUT was placed on a 0.8m high insulating table and kept 0.4 meters from the conducting wall of shielded room.

b. The EUT was connected to the power mains through a line impedance stabilization network (LISN). The LISN provide 50Ω/50μH of coupling impedance for the measuring instrument.

c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

d. The frequency range from 150 kHz to 30 MHz was searched using CISPR Quasi-Peak and Average detector.

3.3. Test Setup



For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.

3.4. EUT Setup and Operating Conditions

The EUT configuration of the emission tests was MS + Battery + Charger.

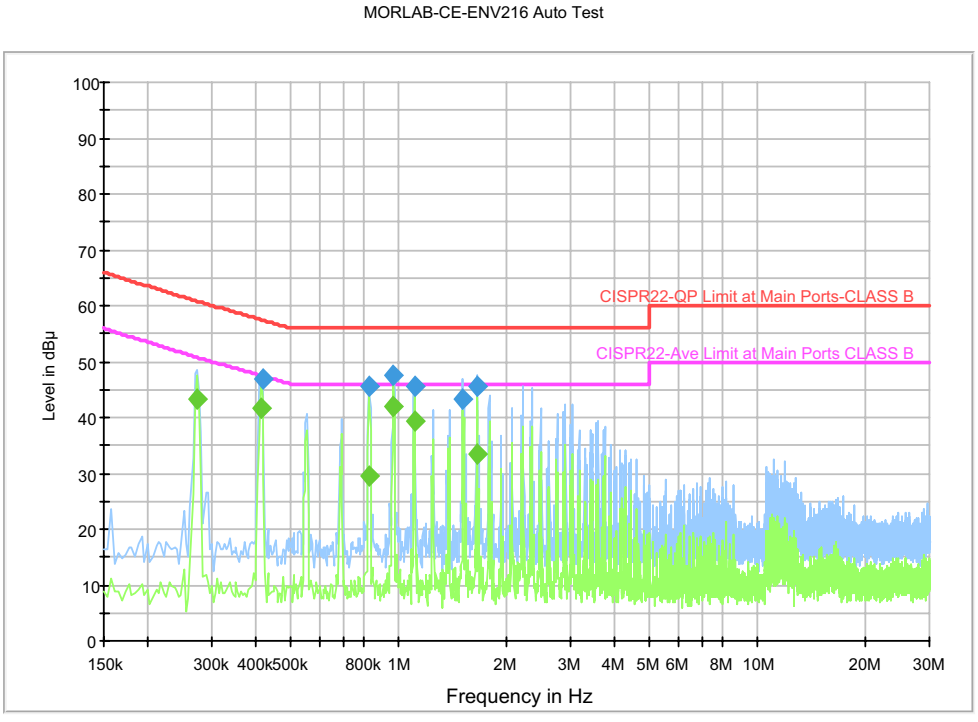
During the measurement, the EUT was charging empty battery. The charger was powered by 120V 60Hz AC mains supply.

The Wi-Fi function of the MS was activated. The EUT accessed to the internet through a Wi-Fi wireless router (D-LINK, DI-624+A), and kept transceiving data with a network termination.

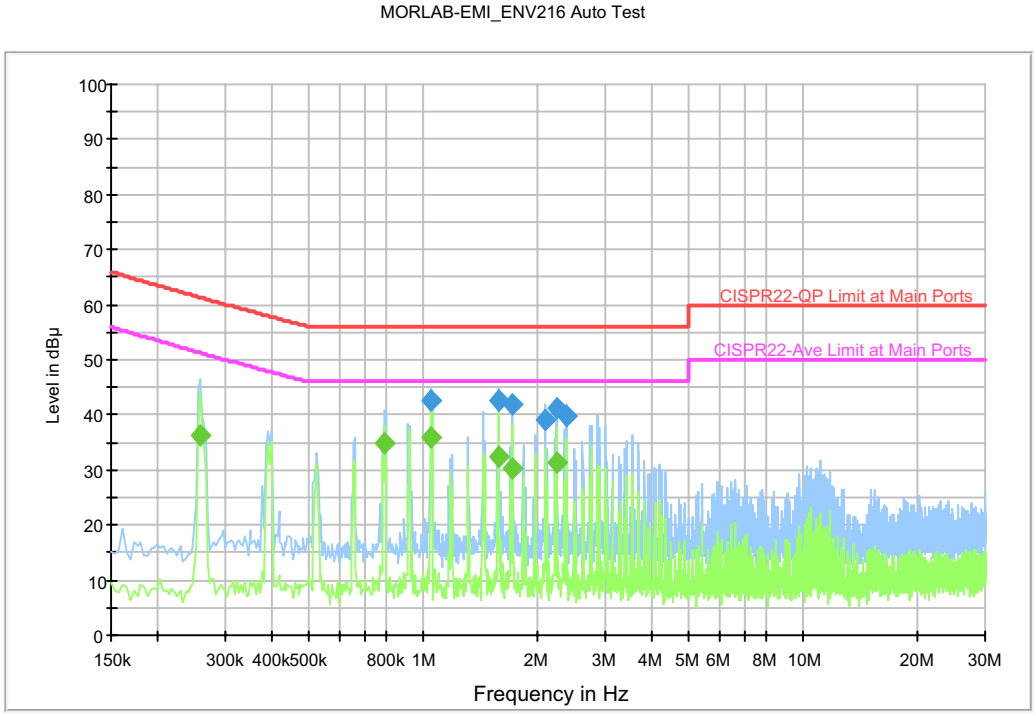
3.5. Test Results

No.	@Frequency (MHz)	Measured Emission Level (dBµV)			Limit (dBµV)		Verdict
		QP	AV	Phase	QP	AV	
1	0.414919	46.9	41.8	L	57.4	56.4	PASS
2	0.821625	45.5	29.5	L	56.0	46.0	PASS
3	0.963412	47.4	42.0	L	56.0	46.0	PASS
4	1.101469	45.5	39.2	L	56.0	46.0	PASS
5	1.504444	43.2	36.8	N	56.0	46.0	PASS
6	1.642500	45.6	33.4	N	56.0	46.0	PASS
7	1.045500	42.6	35.8	N	56.0	46.0	PASS
8	1.567875	42.6	32.3	N	56.0	46.0	PASS
9	1.709662	42.0	30.2	N	56.0	46.0	PASS
10	2.086519	39.2	36.2	N	56.0	46.0	PASS
11	2.224575	41.2	35.0	N	56.0	46.0	PASS
12	2.366362	39.8	31.5	N	56.0	46.0	PASS

Test Plot:



(Plot A: L Phase)



(Plot B: N Phase)

4. Radiated Emission Test

4.1. Limits of Radiated Emission

According to FCC §15.247(c), radiated emission outside the frequency band 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 15.209(a).

According to FCC §15.209 (a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency(MHz)	Field Strength(μ V/m)	Measurement Distance(m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules,

4.2. Test Procedure

a. The EUT was placed on the top of a ratable 0.8 meters above the ground at a semi-anechoic chamber.

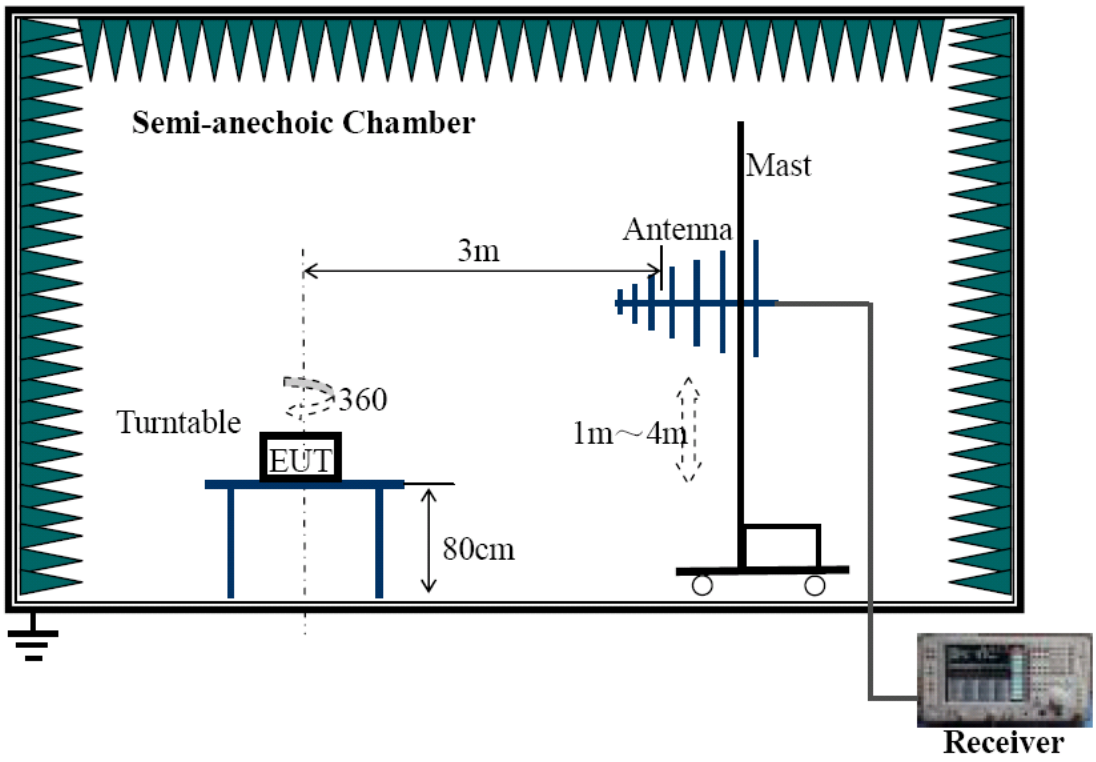
b. In the frequency range of 9 kHz to 30 MHz, magnetic field was measured with loop antenna. The antenna was positioned with its plane vertical at 1 m distance from the EUT. The center of the loop was 1 m above the ground. During the measurement the loop antenna rotated about its vertical axis for maximum response at each azimuth about the EUT.

c. In the frequency range above 30MHz, ultra-broadband bi-log antenna (30 MHz to 1 GHz) and horn antenna (above 1GHz) were used. Antenna was 3 meters away from the EUT. Antenna height was varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode.

e. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10 dB margins would be retested one by one using the quasi-peak method.

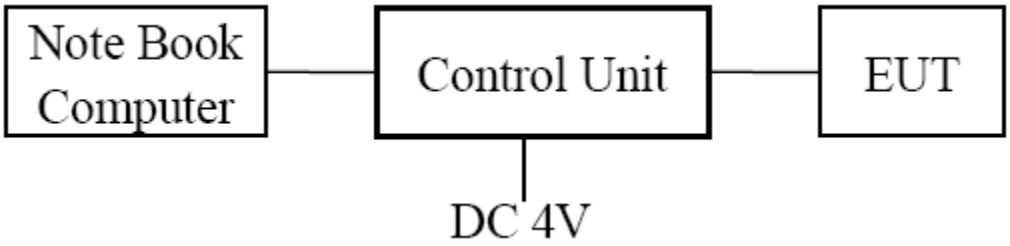
4.3. Test Setup



For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

4.4. EUT Setup and Operating Conditions

The EUT was connected to and controlled by a control unit provided by the applicant.



The EUT was set to continuous Wi-Fi transmitting at maximum power and maximum data rate, e.g., 11 Mbps for IEEE802.11b (DSSS) and 54 Mbps for IEEE802.11g (OFDM).

At each operating mode, lowest, middle and highest channels were measured respectively.

4.5. Test Results

I.FundamentalEmissions

EUT Modulation	EUT Operating Freq. (MHz)	Antenna Polarization	Emission Level (dBμV/m)	
			PK	AV
DSSS	2412.00	Vertical	102.12	93.63
		Horizontal	100.84	92.59
	2437.00	Vertical	101.94	93.25
		Horizontal	100.63	92.13
	2462.00	Vertical	102.31	93.57
		Horizontal	100.99	92.47
OFDM	2412.00	Vertical	100.42	87.37
		Horizontal	98.78	86.33
	2437.00	Vertical	100.45	87.53
		Horizontal	98.96	86.41
	2462.00	Vertical	100.26	87.09
		Horizontal	98.77	86.19

NOTE: Field strength of fundamental emissions were measured and record as a reference for calculation of the band edge emissions according to Marker-Delta Method DA 00-705.

II. Spurious Emissions

EUT Modulation	EUT Operating Freq. (MHz)	Emissions Falling in Restrict Bands (MHz)	Antenna Polarization	Emission Level (dBμV/m)		QP Limits (dBμV/m)	
				PK	AV	PK	AV
DSSS	2412.00	4824.00	Vertical	60.85	48.07	74	54
			Horizontal	58.20	44.91	74	54
	2437.00	4874.00	Vertical	61.04	47.45	74	54
			Horizontal	59.27	45.88	74	54
	2462.00	4924.00	Vertical	61.95	49.50	74	54
			Horizontal	59.68	45.99	74	54
OFDM	2412.00	4824.00	Vertical	62.17	47.93	74	54
			Horizontal	58.71	45.12	74	54
	2437.00	4874.00	Vertical	62.75	48.03	74	54
			Horizontal	59.38	45.91	74	54
	2462.00	4924.00	Vertical	63.35	49.14	74	54
			Horizontal	61.49	47.88	74	54

NOTE: The spurious Emissions from 9 kHz to 10th harmonic of the fundamental frequency were researched. Refer to following test plots.

5. 6dB Bandwidth Measurement

5.1. Definition

According to FCC §15.247 (a) (2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

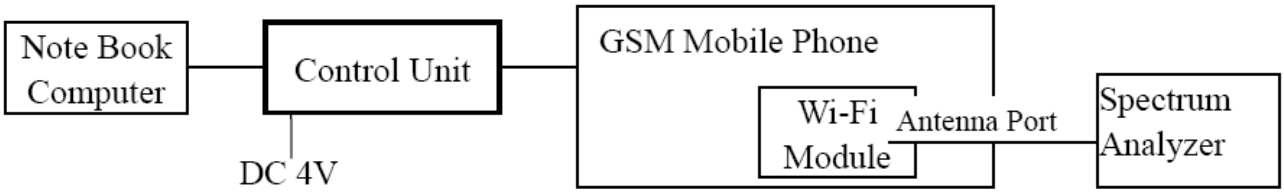
5.2. Test Procedure

a. The EUT temporary antenna port was coupled to the spectrum analyzer. The lost of the cables the test system is calibrated to correct the reading.

b. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode.

c. The resolution bandwidth of the spectrum analyzer was set to at least 1% of the EUT emission bandwidth. RBW=100 kHz, VBW=300 kHz.

5.3. Test Setup



For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

5.4. Setup and Operating Conditions

The EUT was connected to and controlled by a control unit provided by the applicant.

The EUT was set to continuous Wi-Fi transmitting at maximum power and maximum data rate, e.g., 11 Mbps for IEEE802.11b (DSSS) and 54 Mbps for IEEE802.11g (OFDM).

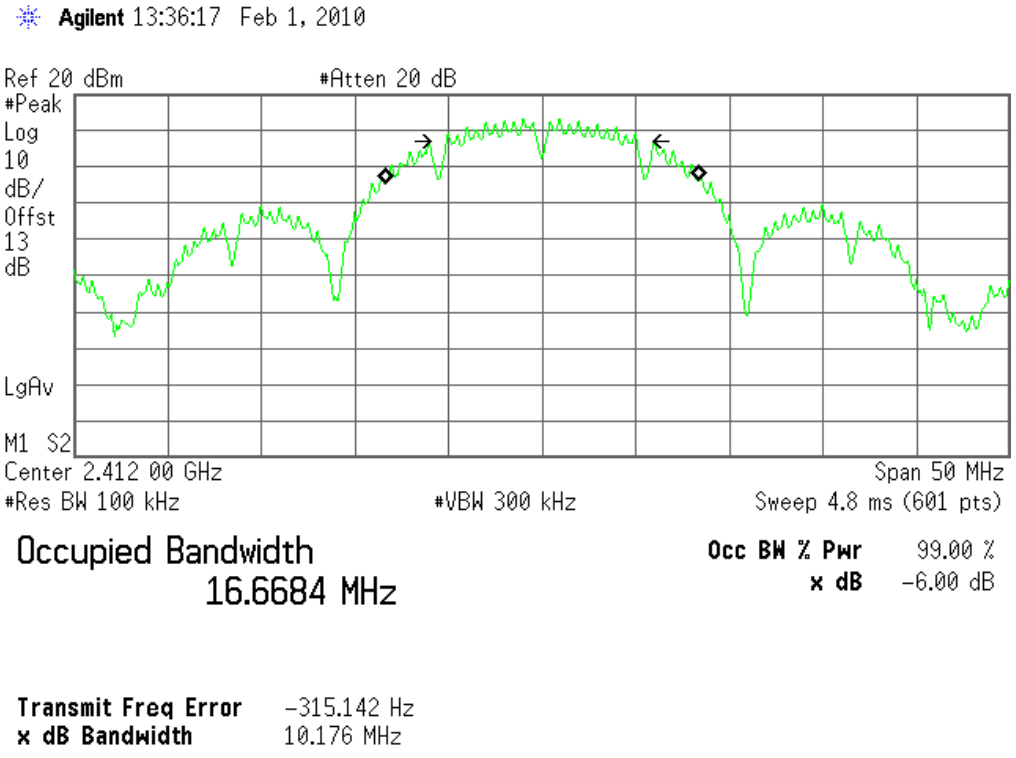
At each operating mode, lowest, middle and highest channels were measured respectively.

5.5. Test Results

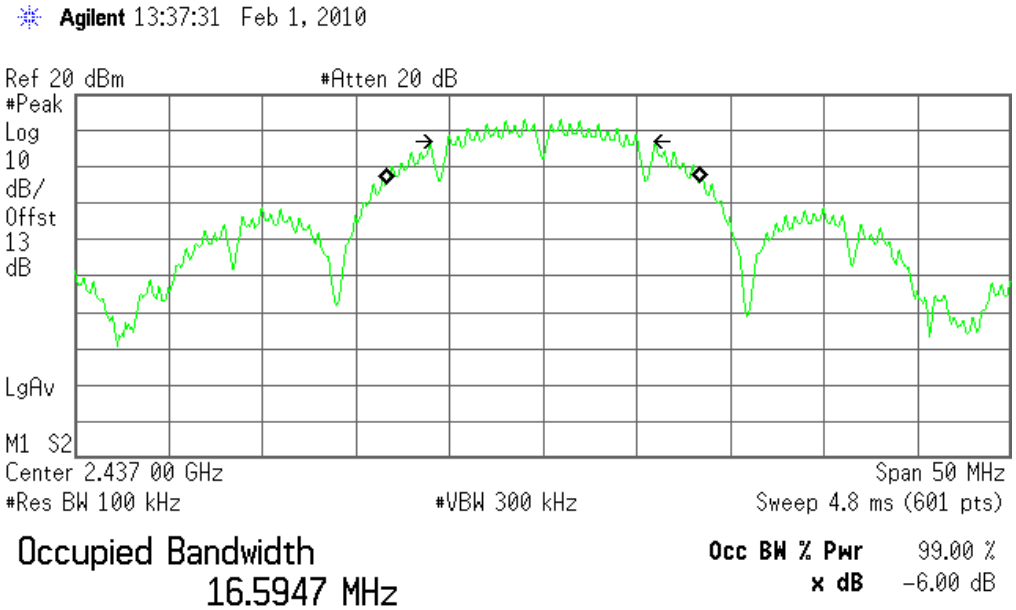
EUT Modulation	EUT Operating Frequency (MHz)	6dB Bandwidth (MHz)	FCC Requirement
DSSS	2412	10.176	>500 kHz
	2437	10.173	
	2462	10.181	
OFDM	2412	15.860	
	2437	15.886	
	2462	15.862	

6dB Bandwidth Test Plots

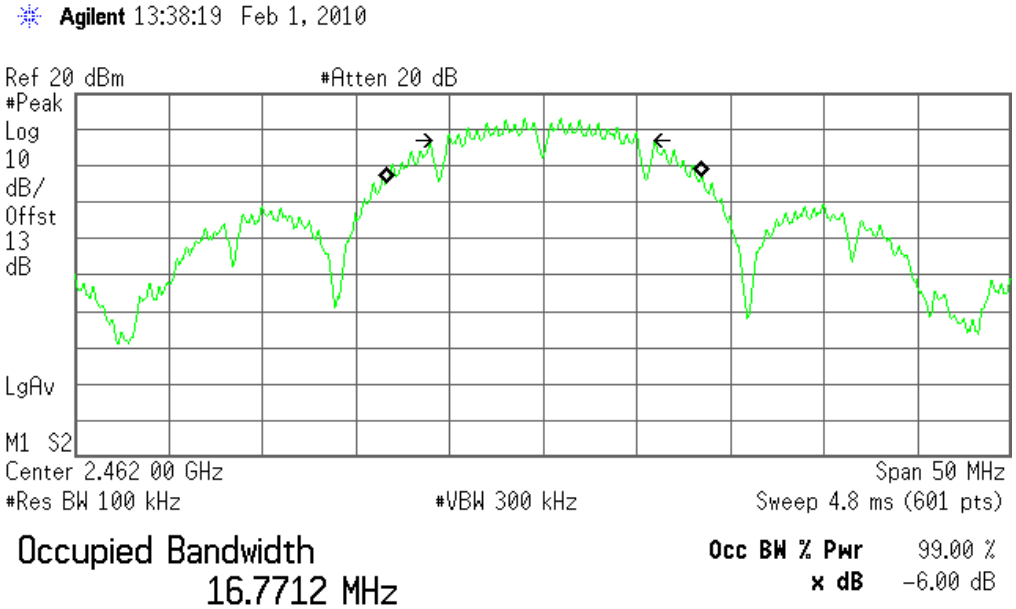
1. DSSS-2412MHz



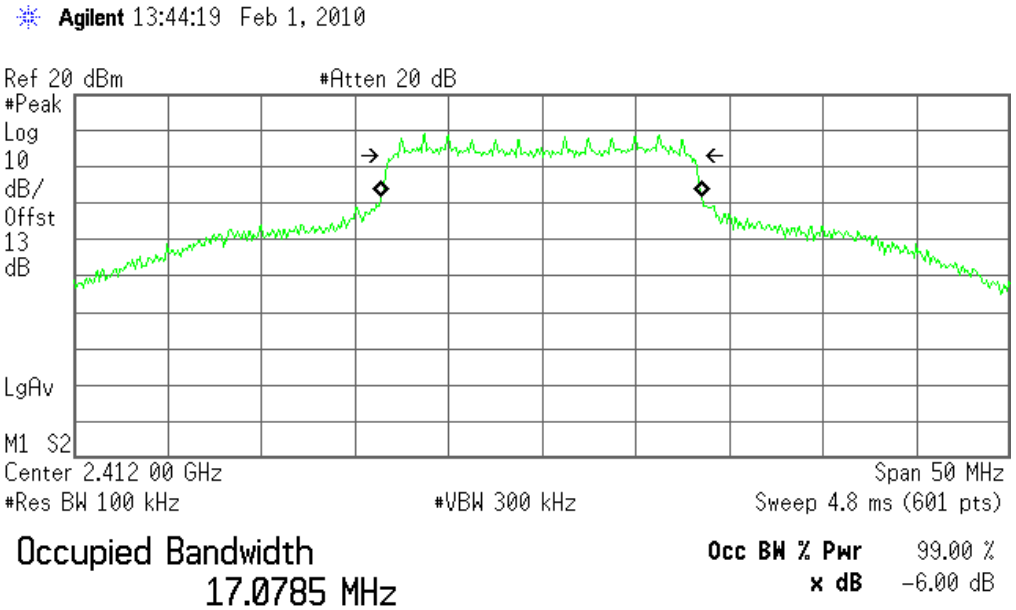
2. DSSS-2437MHz



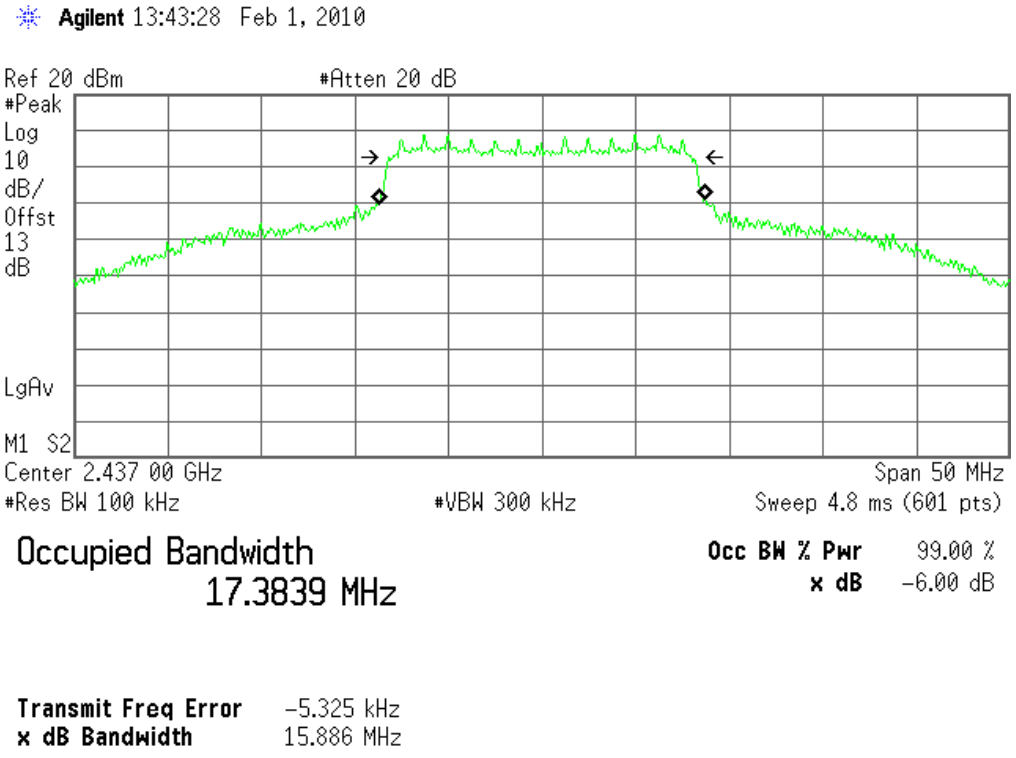
3. DSSS-2462MHz



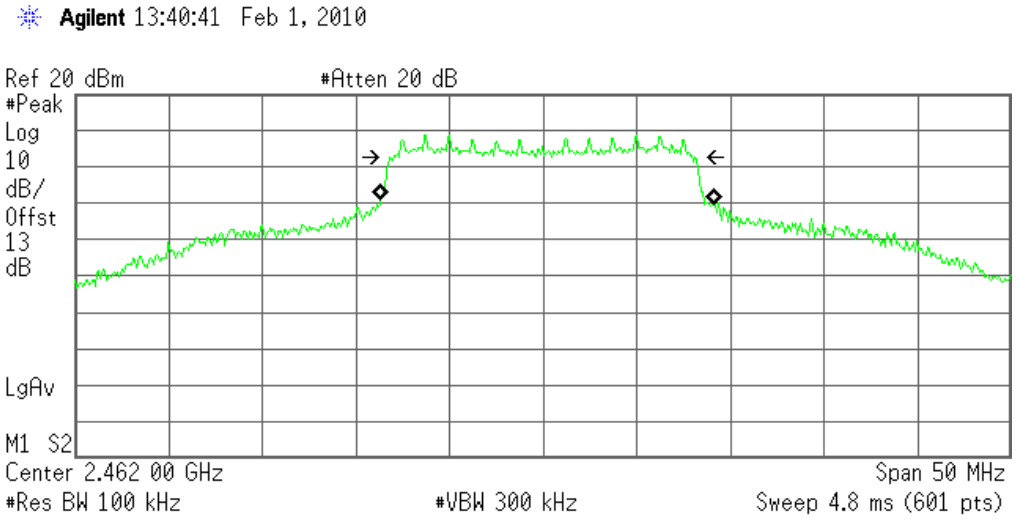
4. OFDM-2412MHz



5. OFDM-2437MHz



6. OFDM-2462MHz



6. Maximum Peak Output Power

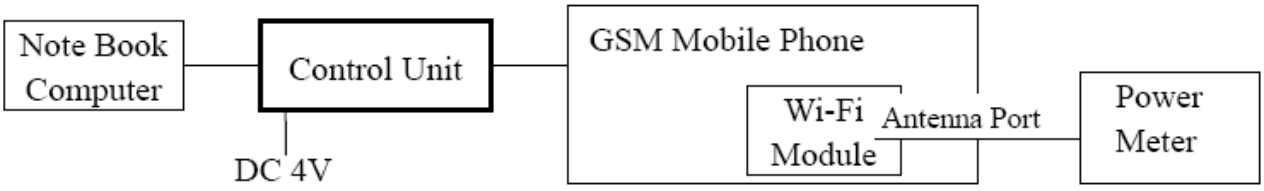
6.1. Requirement of the standard

According to FCC §15.247 (b) (3), the maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands is 1 Watt.

6.2. Test Procedure

The EUT temporary antenna port was coupled to the power meter. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.

6.3. Test Setup



6.4. EUT Setup and Operating Conditions

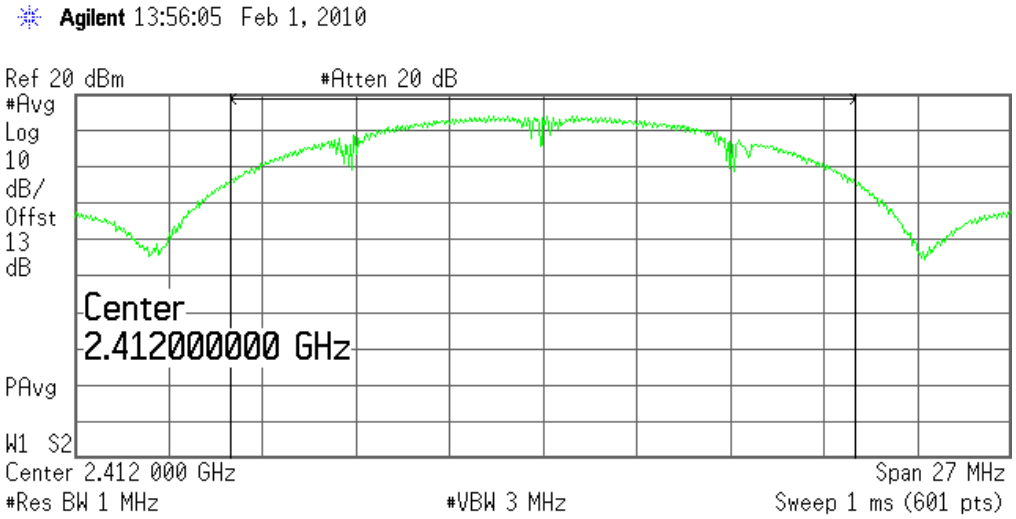
Same as 5.4

6.5. Test Results

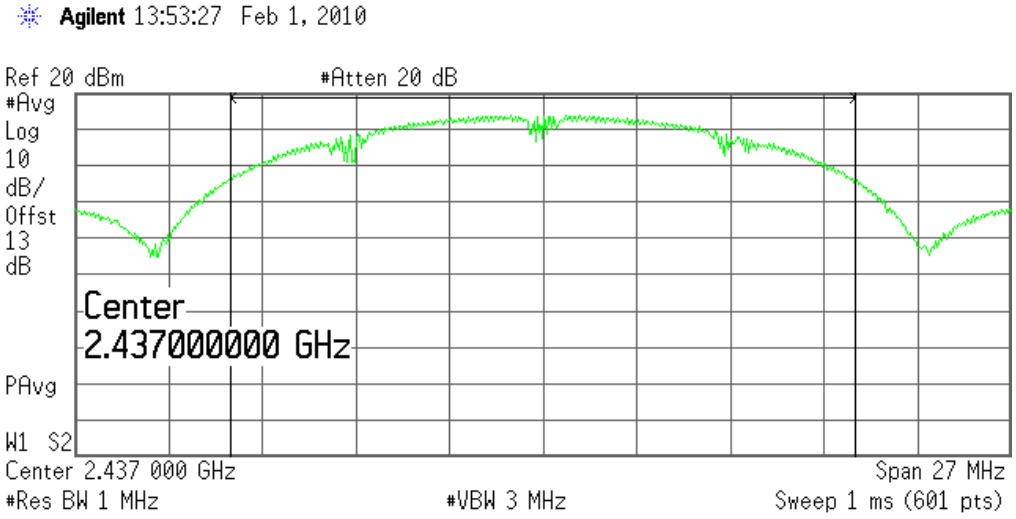
Modulation	Operating Frequency (MHz)	Peak Output Power		Limit (W)
		(dBm)	(W)	
DSSS	2412	22.28	0.169	1
	2437	22.25	0.167	1
	2462	22.23	0.167	1
OFDM	2412	19.40	0.087	1
	2437	19.33	0.085	1
	2462	19.29	0.084	1

Maximum Peak Output Power Test Plots

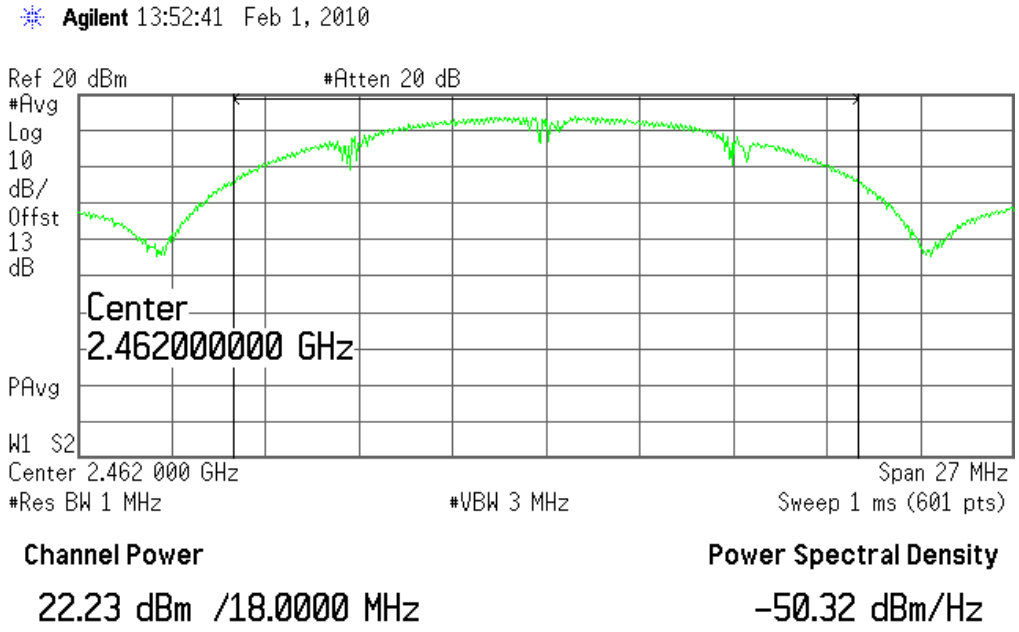
1. DSSS-2412MHz



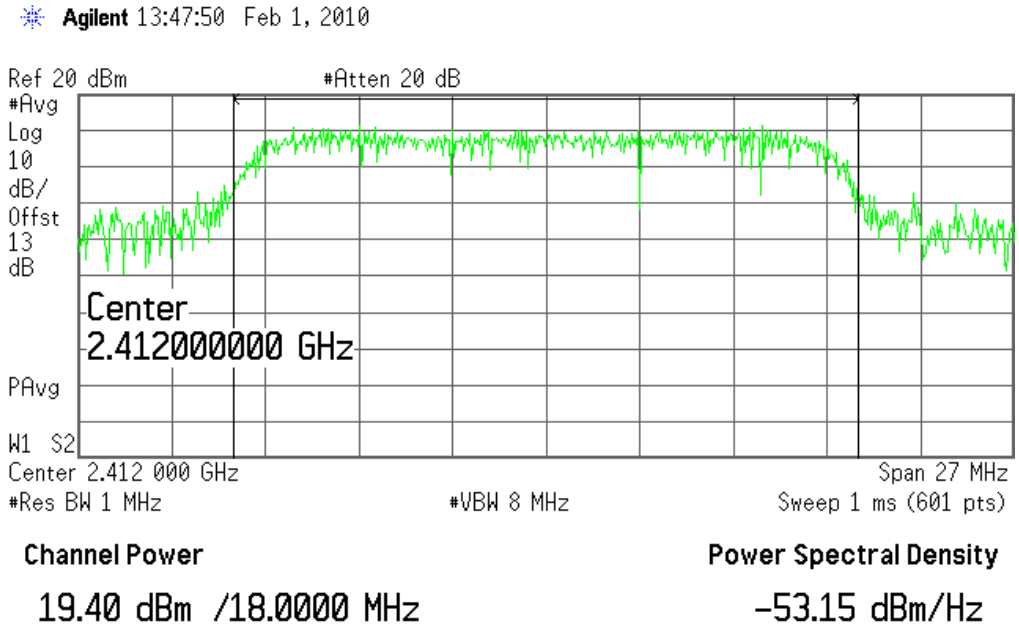
2. DSSS-2437MHz



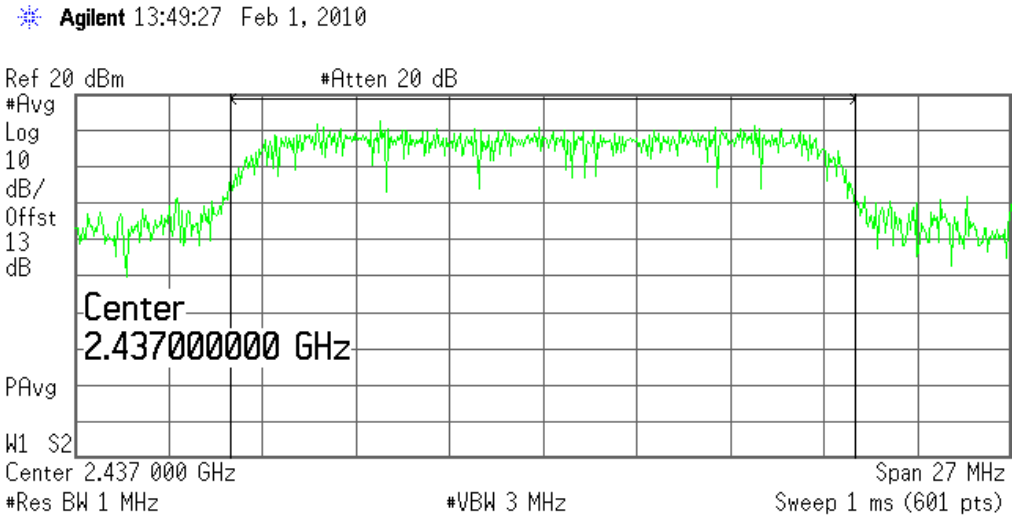
3. DSSS-2462MHz



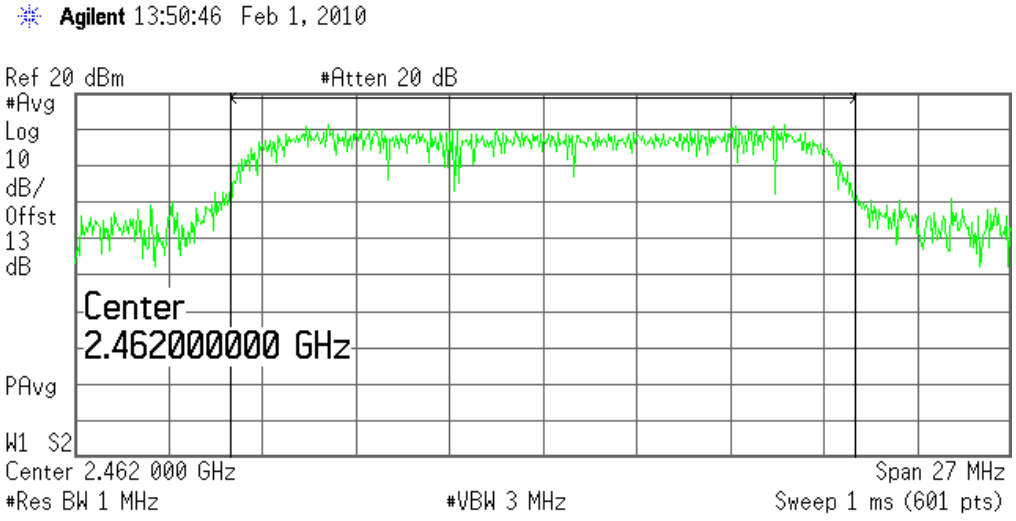
4. OFDM-2412MHz



5. OFDM-2437MHz



6. OFDM-2462MHz



7. Band Edge

7.1. Requirement of the standard

According to FCC §15.247(c), 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.

7.2. Test Procedure

a. The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.

b. The spectrum analyzer was set to Maxpeak Detector function and Average Detector function and Maximum Hold mode.

c. According to the standard requirement, the resolution bandwidth of the spectrum analyzer was set to RBW=100 kHz, VBW=300 kHz.

7.3. Test Setup

Same as 5.3

7.4. EUT Setup and Operating Conditions

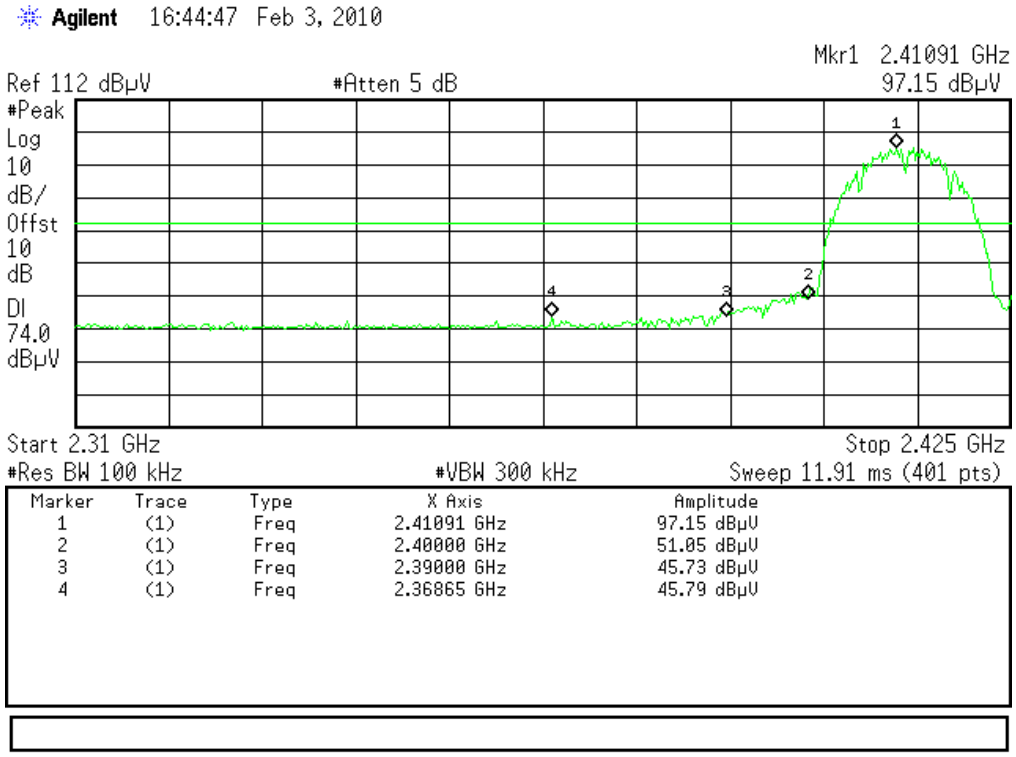
Same as 5.4

7.5. Test Results

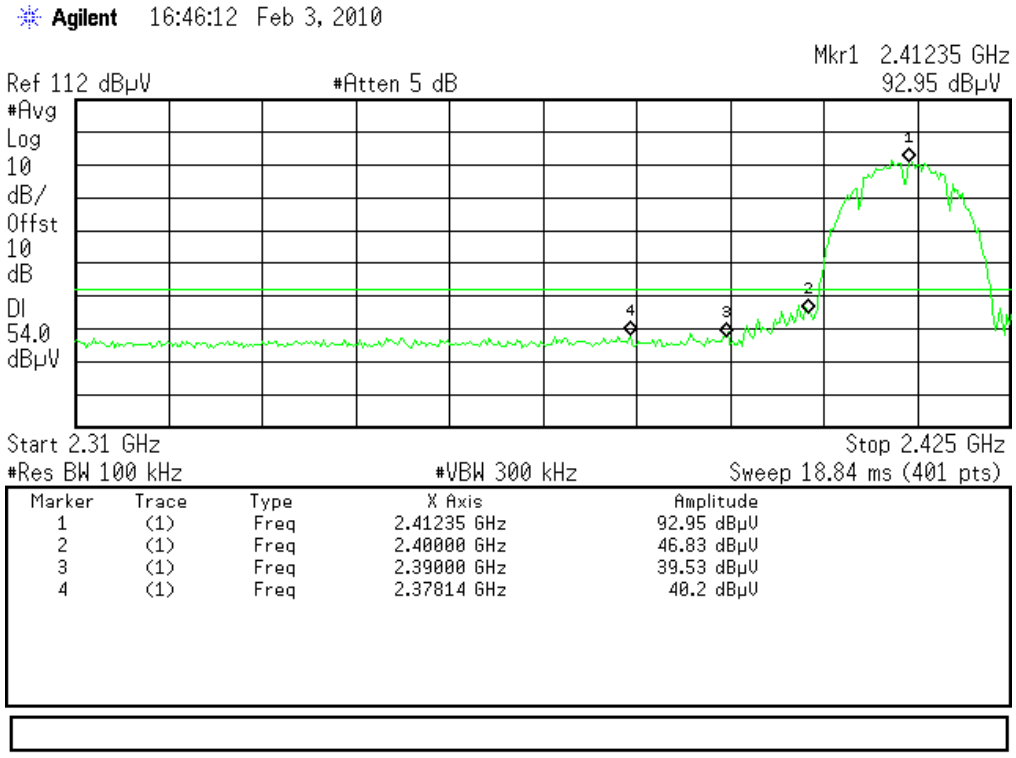
The radio frequency power beyond the band edges was 20dB below the peak output power, measured with 100 kHz resolution bandwidth. Refer to the following test plots.

Band Edge Test Plots

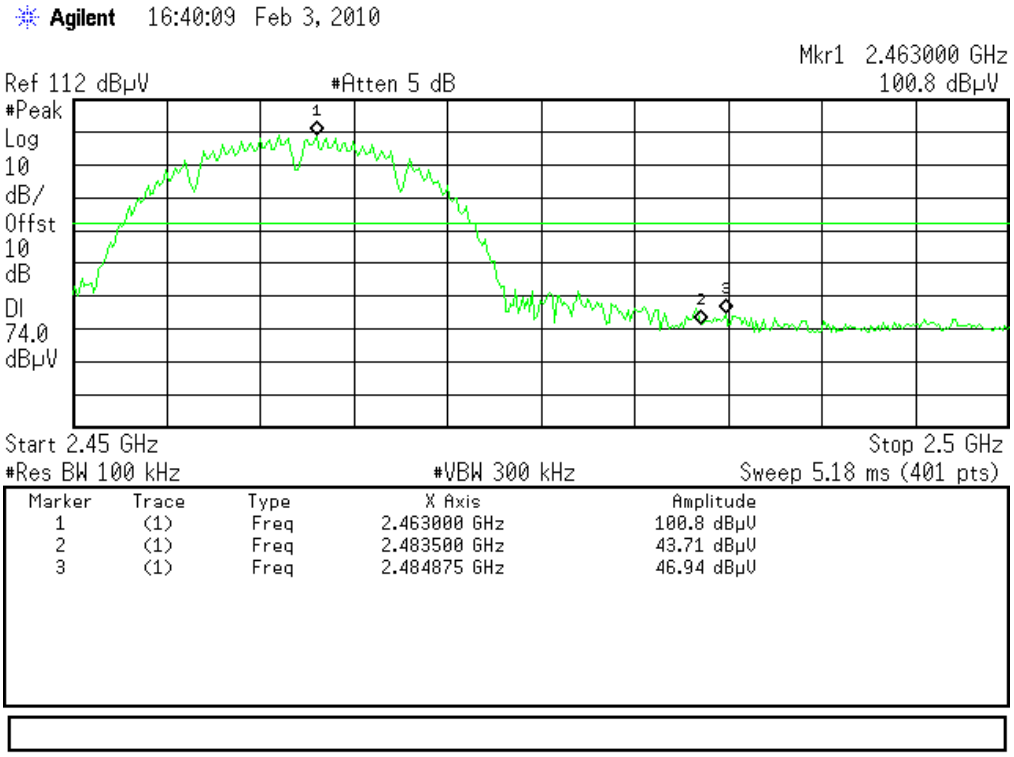
1. DSSS-2412MHz Maxpeak Detector



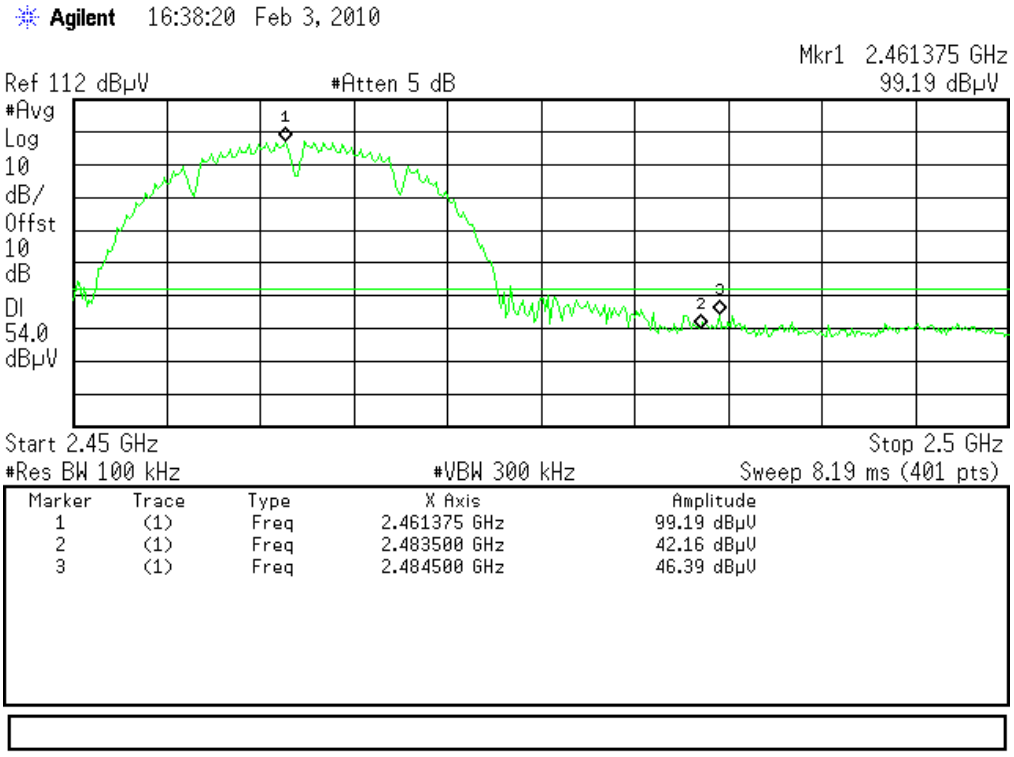
2. DSSS-2412MHz Average Detector



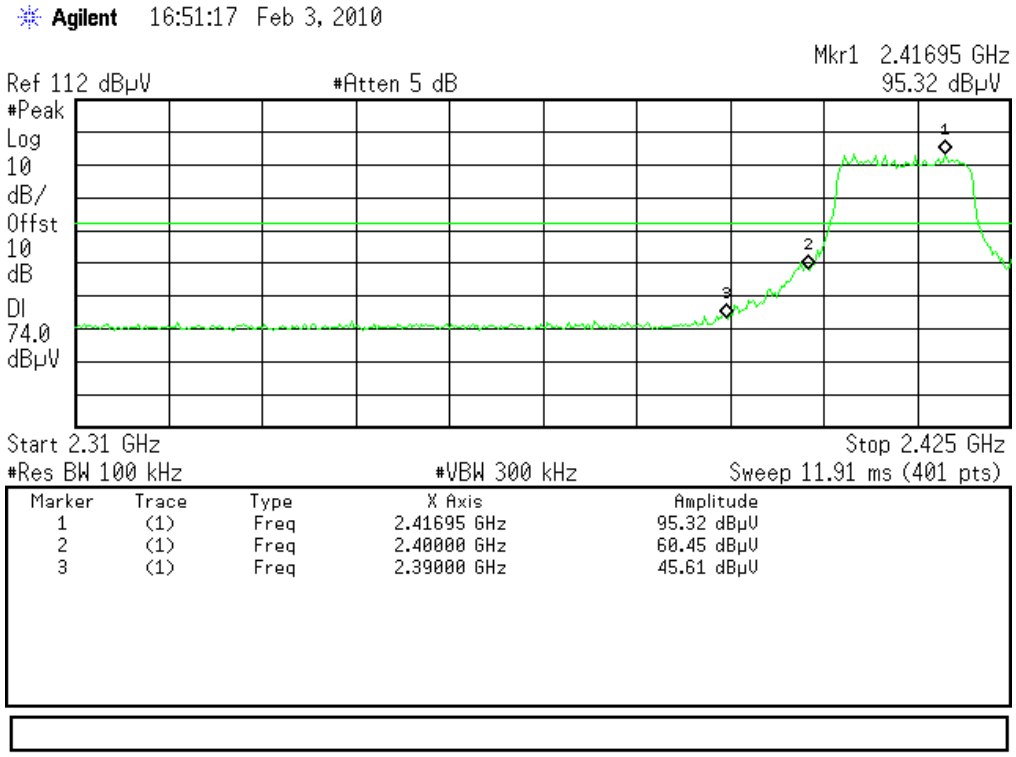
3. DSSS-2462MHz Maxpeak Detector



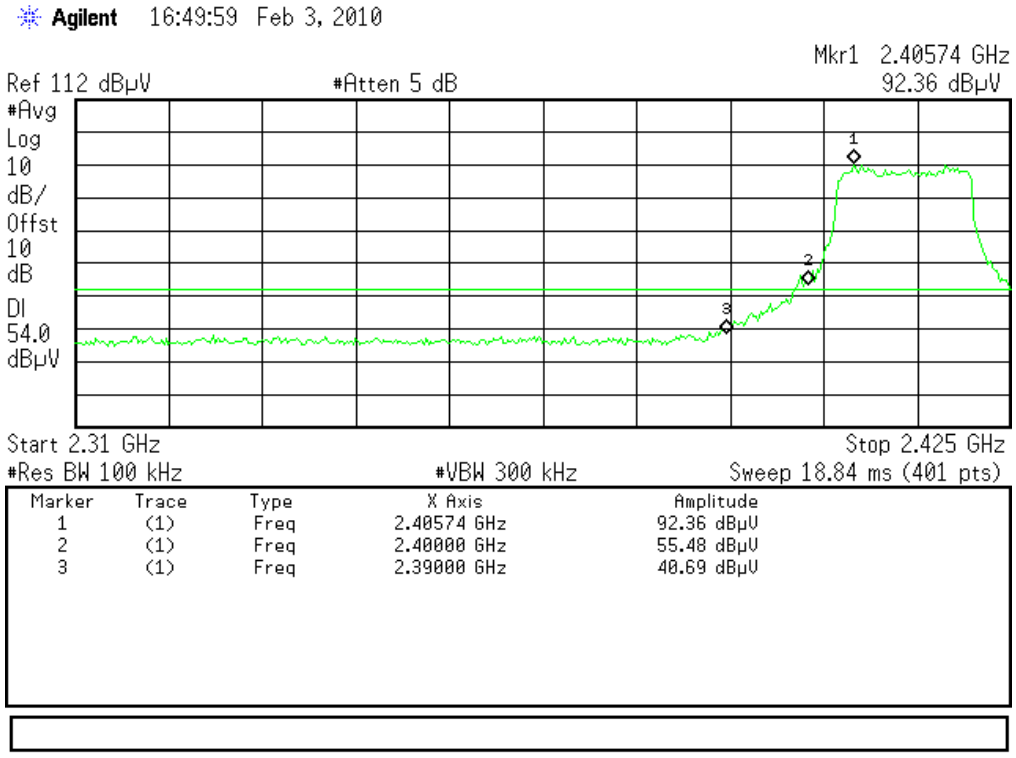
4. DSSS-2462MHz Average Detector



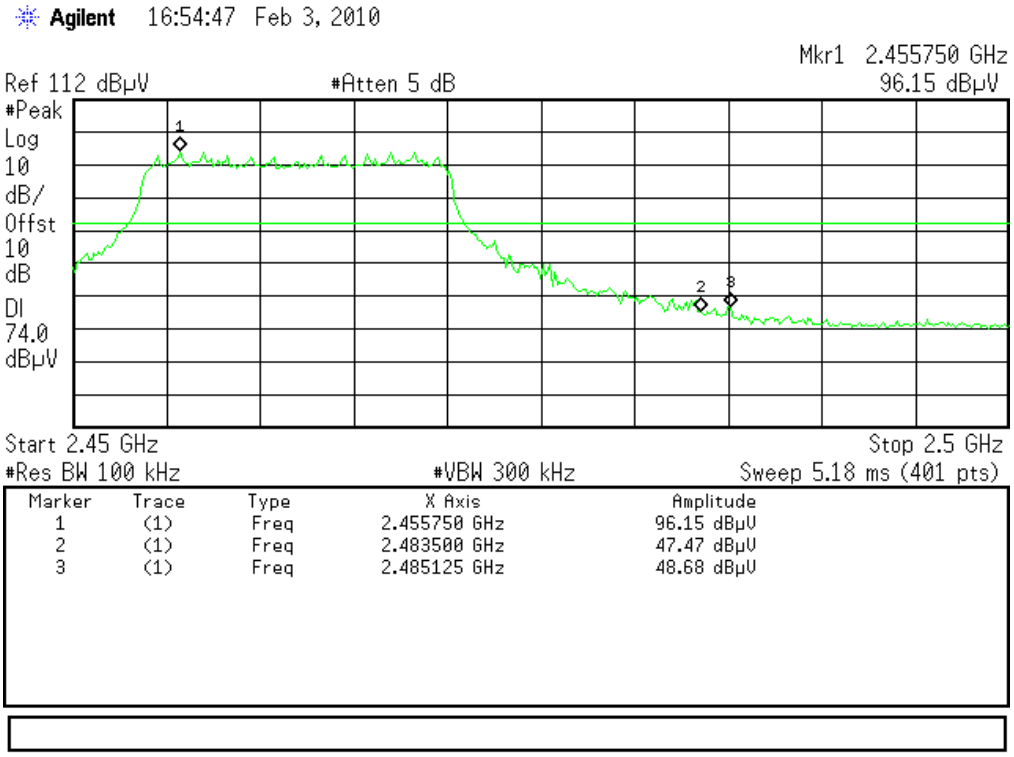
5. OFDM -2412MHz Maxpeak Detector



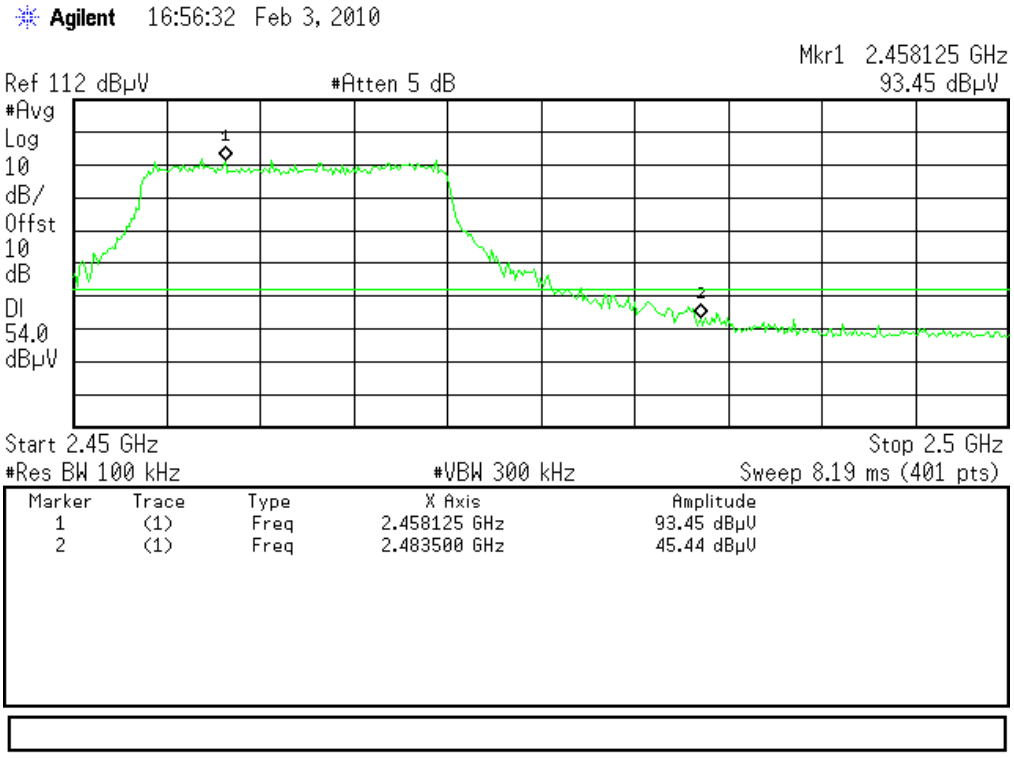
6. OFDM -2412MHz Average Detector



7. OFDM -2462MHz Maxpeak Detector



8. OFDM -2462MHz Average Detector



8. Conducted Spurious Emission

8.1. Requirement of the standard

According to FCC §15.247(c), 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.

8.2. Test Procedure

a. The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.

b. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode.

c. The spurious Emissions from 9 KHz to 10th harmonic of the fundamental frequency were researched.

d. According to the standard requirement, the resolution bandwidth of the spectrum analyzer was set to RBW=100 kHz, VBW=300 kHz.

8.3. Test Setup

Same as 5.3

8.4. EUT Setup and Operating Conditions

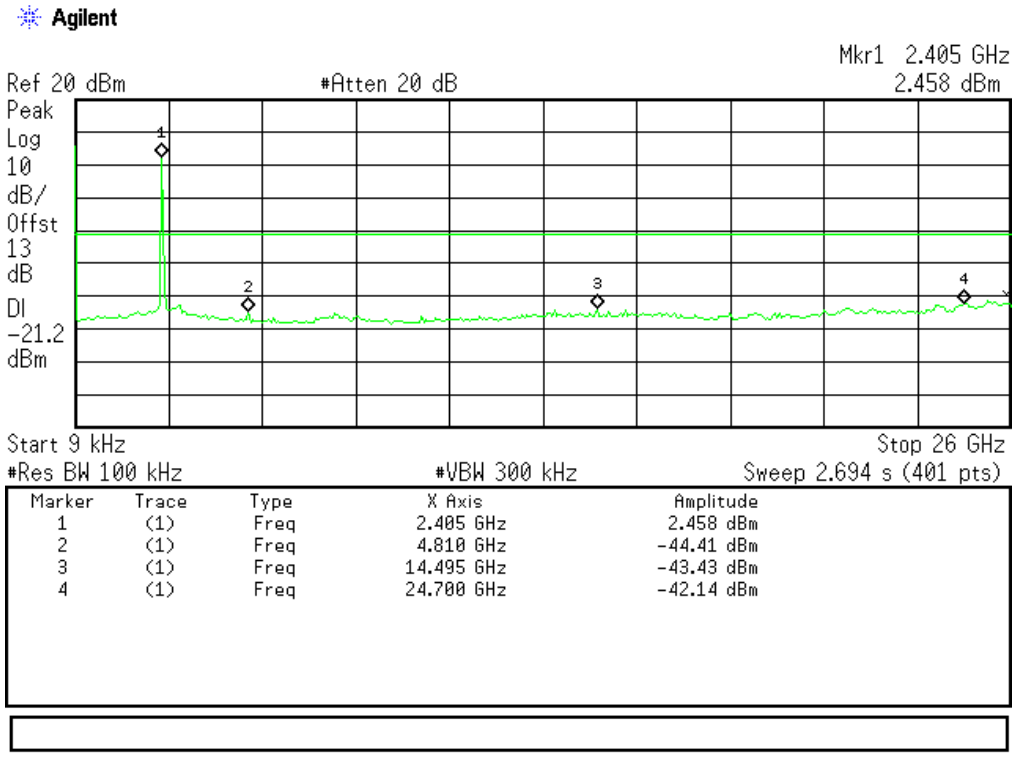
Same as 5.4

8.5. Test Results

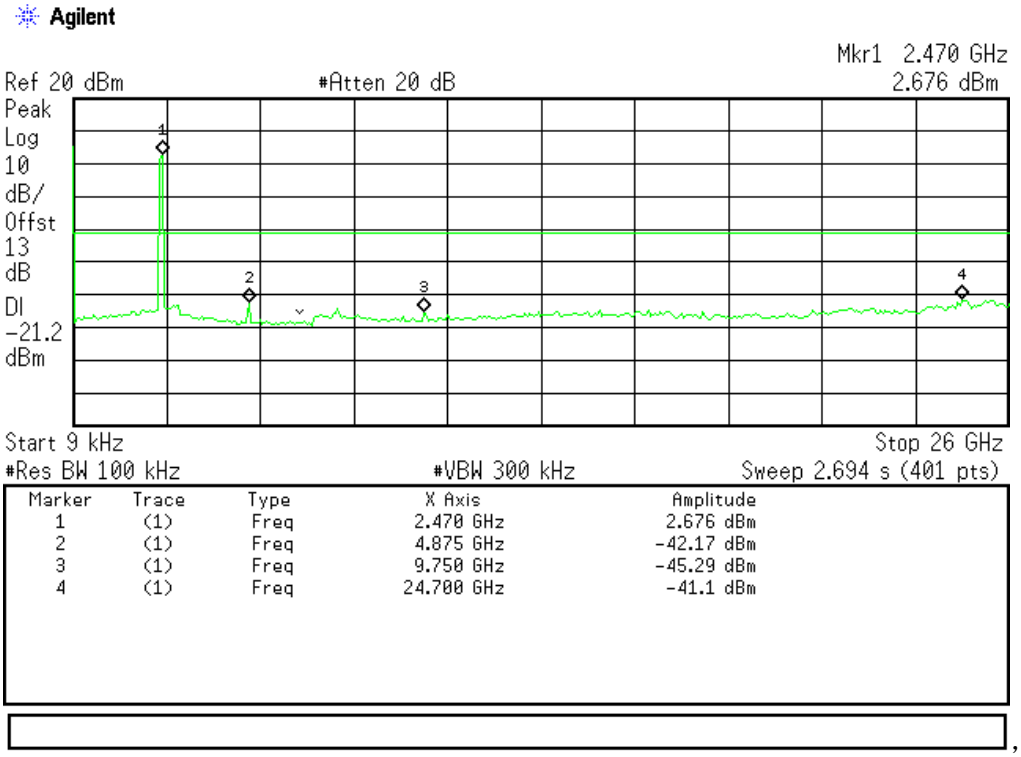
The following test plots shows that spurious emissions in the whole frequency range were bellow the 20dBc limit line.

Conducted Spurious Emission Test Plots

1. DSSS-2412MHz

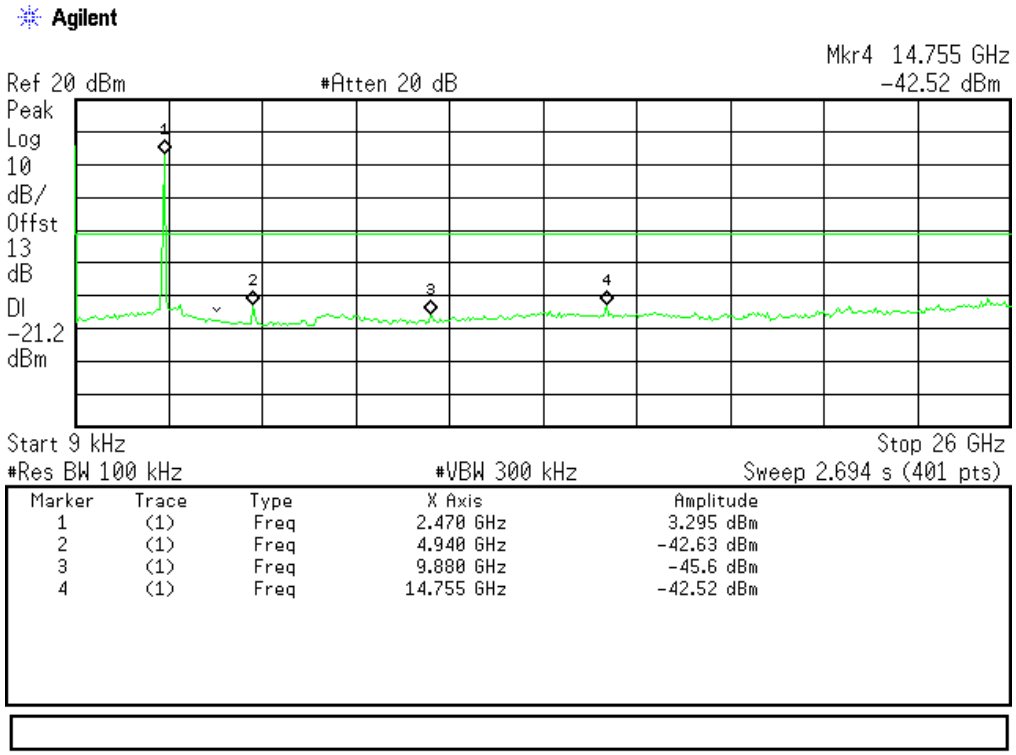


2. DSSS-2437MHz

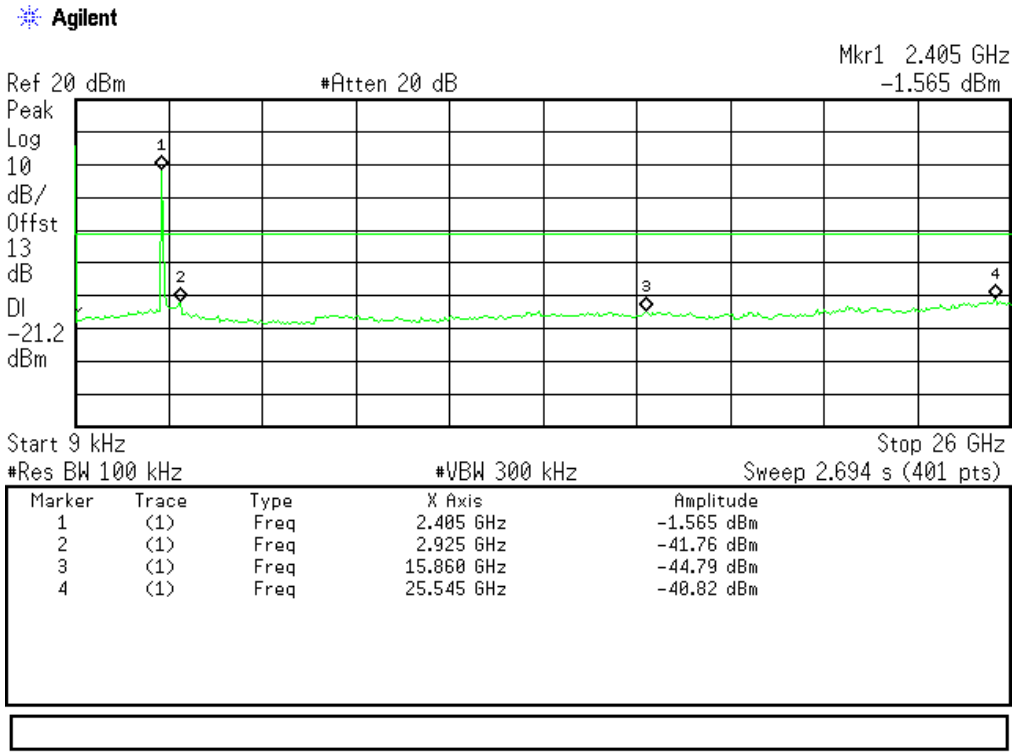


,

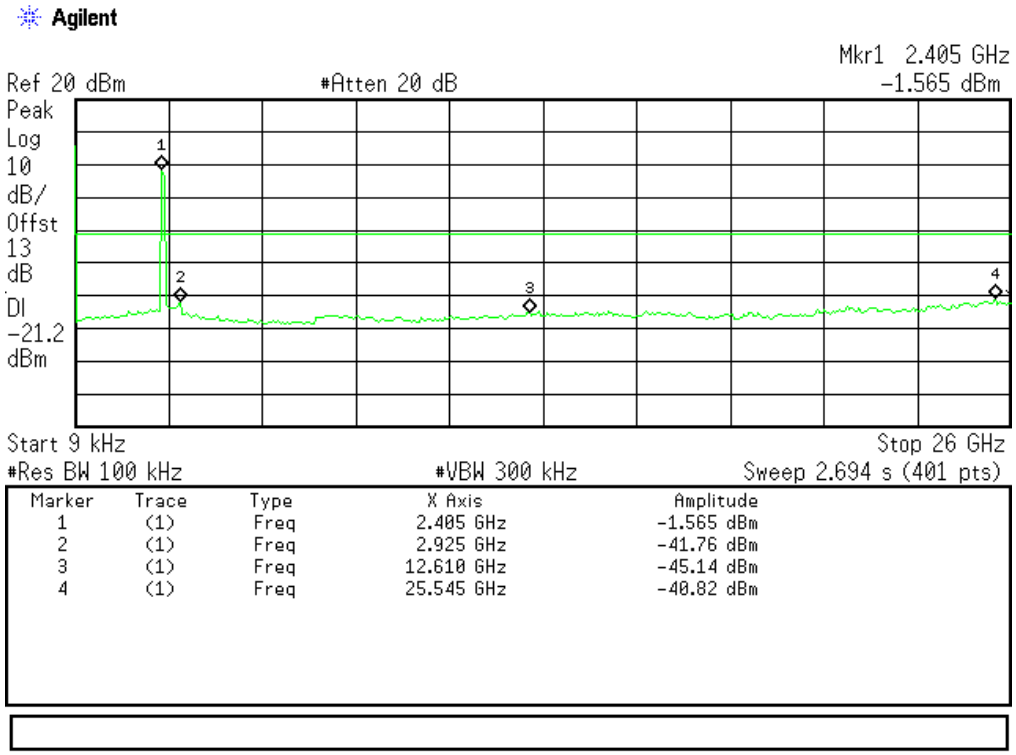
3. DSSS-2462MHz



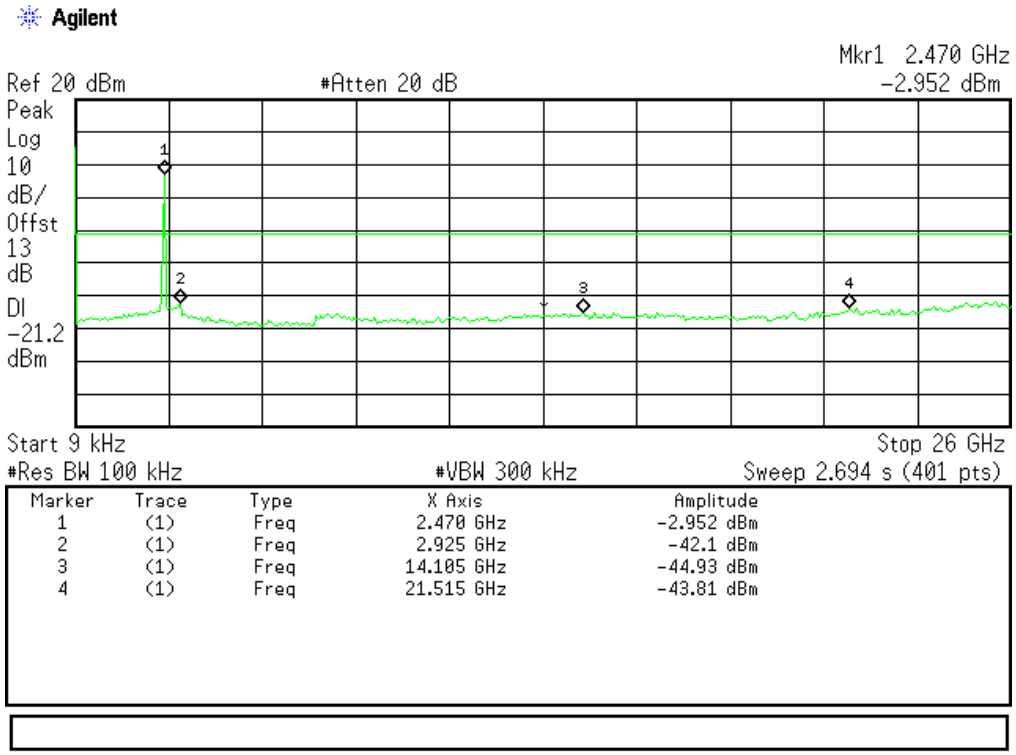
4. OFDM-2412MHz



5. OFDM-2437MHz



6. OFDM-2462MHz



9. Power Spectrum Density Measurement

9.1. Limits of Power Spectrum Density

According to FCC §15.247(d), for digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

9.2. Test Procedure

a. The EUT temporary antenna port was coupled to the spectrum analyzer. The lost of the cables the test system is calibrated to correct the reading.

b. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode.

c. The resolution bandwidth of the spectrum analyzer was set to 3 kHz.

9.3. Test Setup

Same as 5.3

9.4. EUT Setup and Operating Conditions

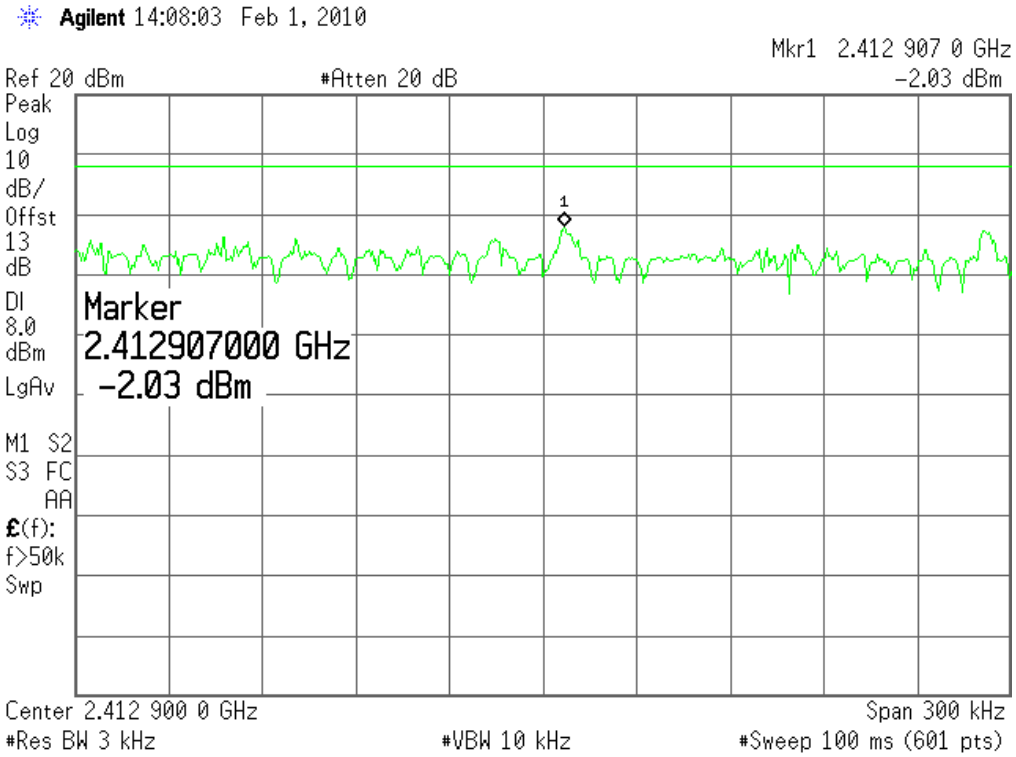
Refer to 5.4.

9.5. Test Results

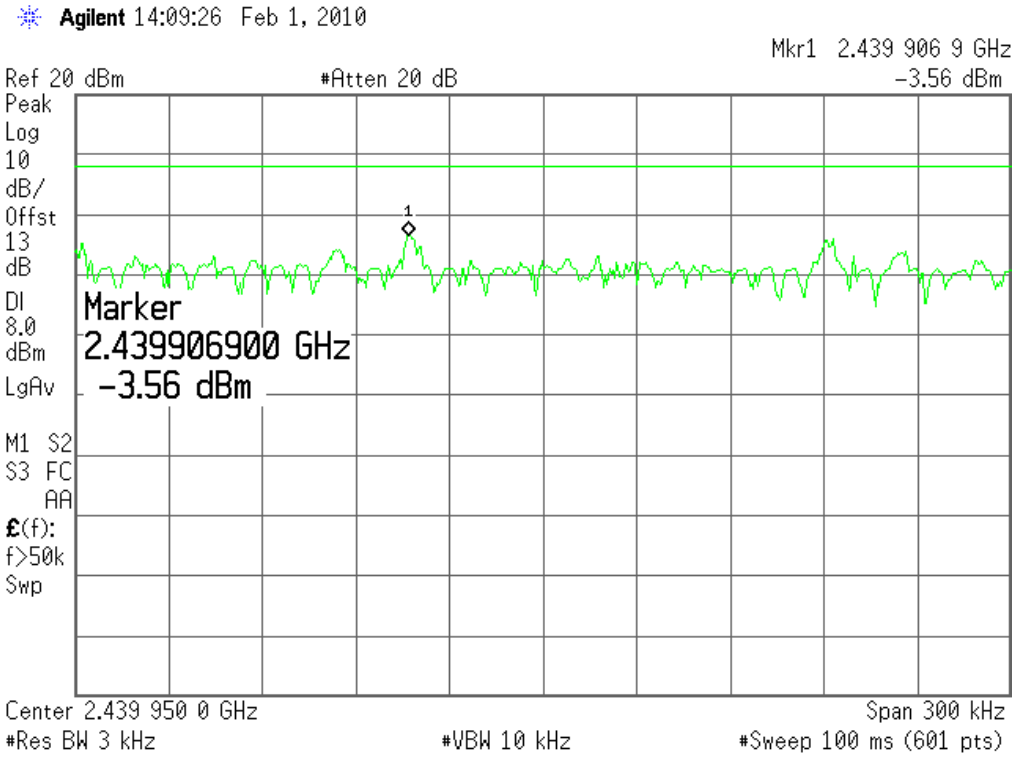
EUT Modulation	Operating Frequency (MHz)	Power spectrum density (dBm/3kHz)	Limit (dBm/3kHz)
DSSS	2412	-2.03	8
	2437	-3.56	
	2462	-2.52	
OFDM	2412	-7.39	
	2437	-6.87	
	2462	-7.77	

Plots of Power Spectrum Density

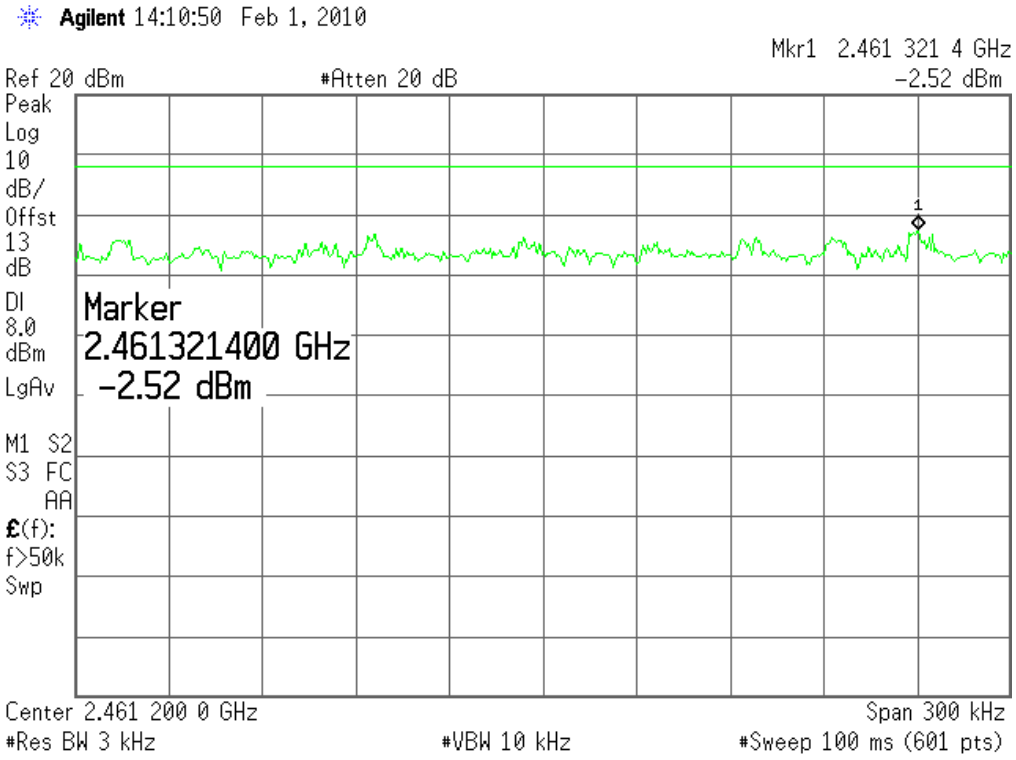
1. DSSS-2412MHz



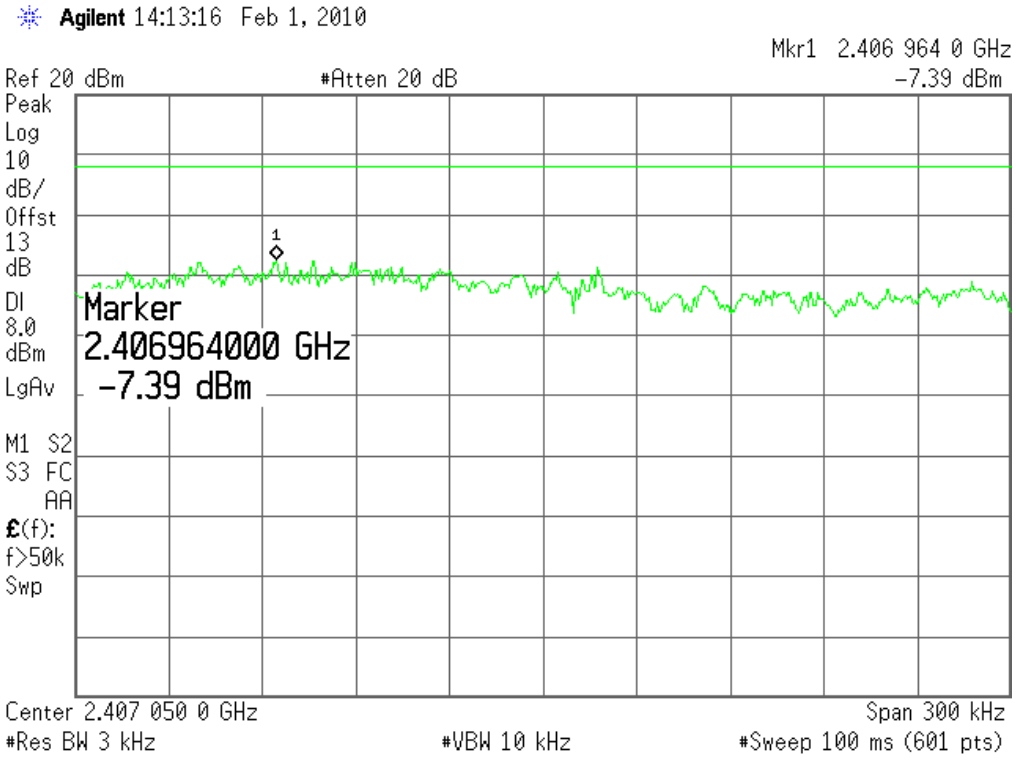
2. DSSS-2437MHz



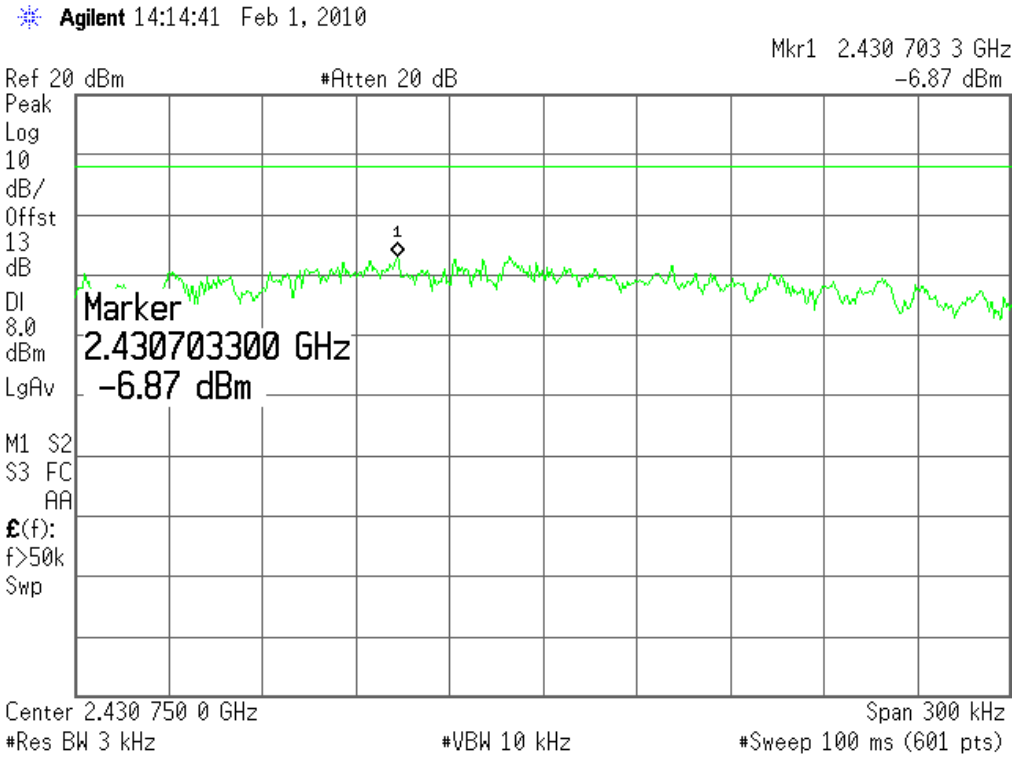
3. DSSS-2462MHz



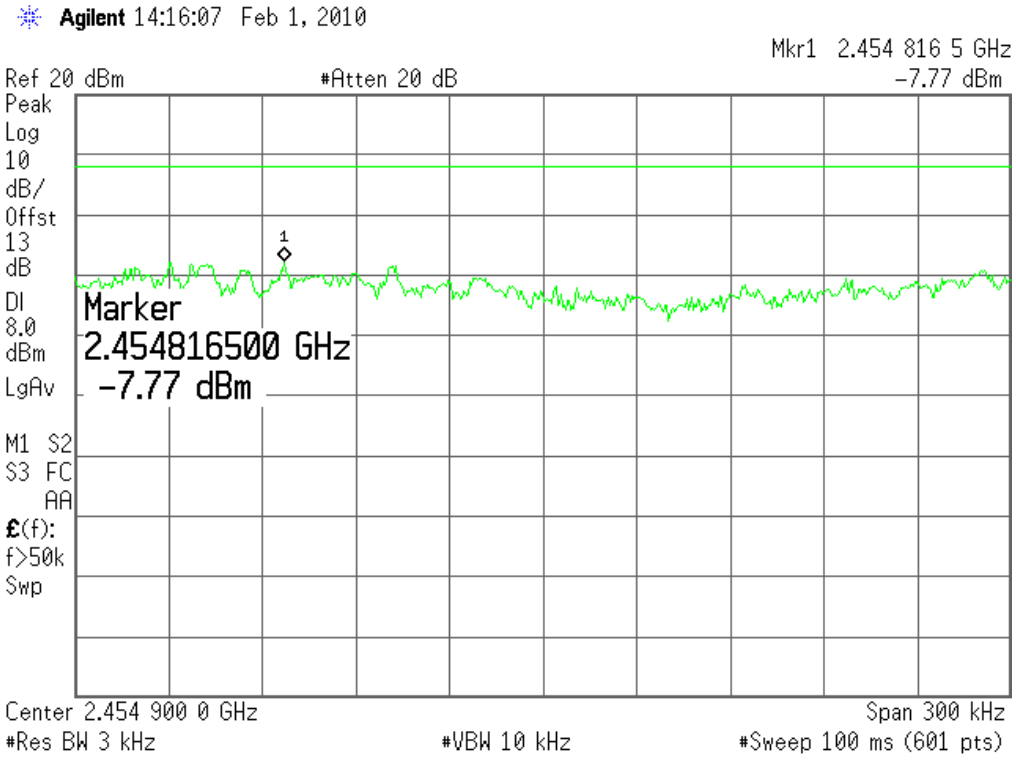
4. OFDM-2412MHz



5. OFDM-2437MHz



6. OFDM-2462MHz



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